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## Expandable Electrical Diagnostic Platform

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*For testing 6- and 12-volt automotive batteries  
and 12-volt charging systems*



# ***INSTRUCTION MANUAL***

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## Chapter 1: Before You Begin

### Starting the tester for the first time


When the tester is first used the operator is asked to enter a couple of items such as language, date and time. Changes can be made afterwards by going in to the Utility Menu and selecting CONFIG TESTER.

### Safety

Because of the possibility of personal injury, always use extreme caution when working with batteries. Follow all manufacturers' instructions and BCI (Battery Council International) safety recommendations.

### General Precautions

- ⇒ Battery acid is highly corrosive. If acid enters your eyes, immediately flush them thoroughly with running cold water for at least 15 minutes and seek medical attention. If battery acid gets on your skin or clothing, wash immediately with water and baking soda.
- ⇒ Always wear proper safety glasses or face shield when working with or around batteries.
- ⇒ Keep hair, hands, and clothing as well as the analyzer cords and cables away from moving engine parts.
- ⇒ Remove any jewelry or watches before you start servicing the battery.
- ⇒ Use caution when working with metallic tools to prevent sparks or short circuits.
- ⇒ Never lean over a battery when testing, charging or jump starting it.

<b>⚠ DANGER</b>	
	<p><b>Risk of explosive gases. Never smoke or allow a spark or flame in the vicinity of a battery.</b></p> <p>Batteries can produce a highly explosive mix of hydrogen gas and oxygen, even when the battery is not in operation. Always work in a well-ventilated area.</p>

<b>⚠ WARNING</b>	
<p><b>Wash hands after handling.</b></p> <p>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.</p>	

The tester is manufactured in line with the latest state of the art and according to recognised safety standards. If used incorrectly or misused, however, it can cause



- injury or death to the user or a third party,
- damage to the tester and other material assets belonging to the operator,
- inefficient operation of the tester.

All persons involved in commissioning, operating, maintaining and servicing the tester must

- be suitably qualified,
- have knowledge of and experience in dealing with testers and batteries and
- read and follow these operating instructions carefully.

### Conventions Used in This Manual

To help you learn how to use your analyzer, the manual uses these symbols and typographical conventions:

Convention	Description
	The safety symbol followed by the word <b>WARNING</b> or <b>CAUTION</b> indicates instructions for avoiding hazardous conditions and personal injury.
<b>CAUTION</b>	The word <b>CAUTION</b> indicates instructions for avoiding equipment damage.
	The wrench symbol indicates procedural notes and helpful information.
<b>UP ARROW</b>	The text for keypad buttons and soft-key functions are in bold capital letters.
CAPITAL LETTERS	The text for screen options are in regular capital letters.

## Chapter 2: Overview

### Connections and Data Ports



- 1 Data transmitter: sends test results to a PC using an optional hardware and software kit.
- 2 Infrared temperature sensor with a range of -28 °C to +93 °C
- 3 6-pin connector for the battery test cable.
- 4 Input for accessories (optional).
- 5 Spring-loaded data card slot for test data storage and software upgrades.
- 6 DB-9 connector for future expandability.

### Removing and Inserting the Data Card

The analyzer ships with a storage card slot to protect it from dust and debris. To remove the data card, push briefly on its edge to release it and pull it from the slot. When inserting a card, push it into the slot until it locks. The card is correctly inserted when it is not protruding from the slot. To protect the card slot and enable the analyzer to read and write to the card, leave the card in the slot.

### Connecting the Battery Test Cable

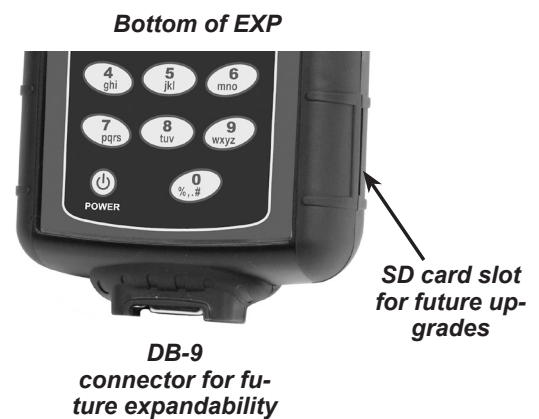
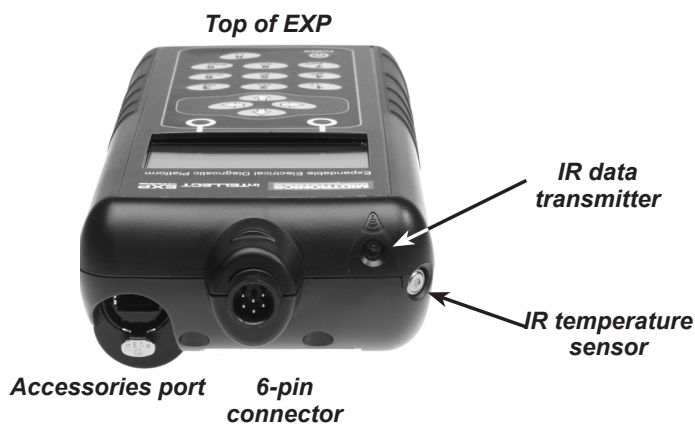


**CAUTION:** To prevent damage to the analyzer's circuitry, do not connect the analyzer to a voltage source greater than 30 Vdc.

## Test Leads, Connectors, and Data Ports

For the cable test leads (lower picture), there are two connectors on the top of the tester (top left).

- For the battery test cable, there is a 6-pin connector with a locking ring.
- For the amp clamp and the multimeter test cables, the Tester has an accessories port, which is a RJ45 connector with a release lever.



There are two IR data ports on the top of the Tester (top left).

- An IR data transmitter, which transmits test results to the optional IR printer.
- An IR temperature measurement sensor.

The tester also has a DB-9 connector for future expandability and an SD card slot for future software upgrades or data logging (top right).

### Display and Keypad

The keypad and display work together to help you quickly find and use the right tools at the right time. The display also keeps you on track with on-screen navigation aids, directions and messages. Below you can see how the elements on the screen relate to the keypad.

The **Internal Batteries Status Indicator**, which appears in the screen's top left corner, lets you know the status and charge level of the analyzer's 6 1.5 V batteries. The X shown in the figure shows that the tester is powered by the battery you're testing to conserve the internal batteries.

Press the two **Soft Keys** linked to the bottom of the screen to perform the functions displayed above them. The functions change depending on the menu or test process. So it may be helpful to think of the words appearing above them as part of the keys. Some of the more common soft-key functions are SELECT, BACK, and END.

When you connect the tester to a battery it functions as a voltmeter. The voltage reading appears above the left soft key until you move to other menus or functions.

In some cases, you can use the **Alphanumeric Keypad** to enter numerical test parameters instead of scrolling to them with the **ARROW** keys.

You'll also use the Alphanumeric Keys to create and edit customer coupons. The keypad includes characters for punctuation. To add a space, press the **RIGHT** and **LEFT ARROW** keys simultaneously.

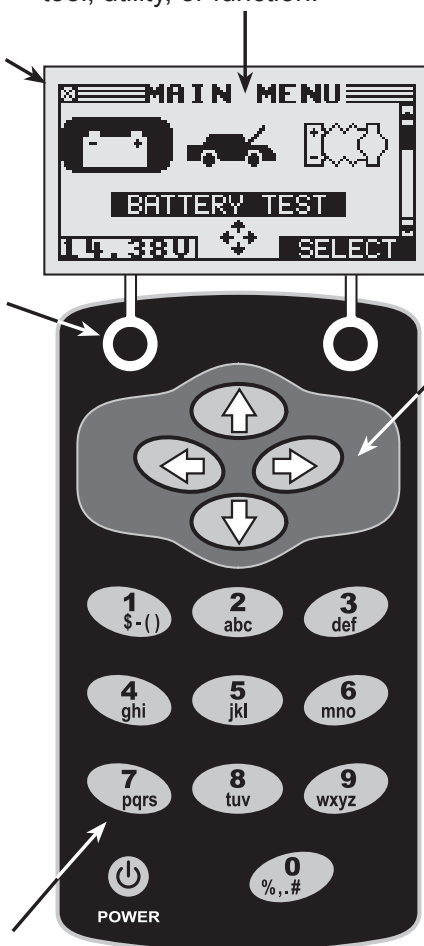
The **Title Bar** shows you the name of the current menu, test tool, utility, or function.

The **Selection Area** below the **Title Bar** contains items you select or into which you enter information. The area also displays instructions and warnings.

The **Directional Arrows** on the display show you which **Arrow Keys** to press to move to other icons or screens. The Up and Down Directional Arrows, for example, let you know to press the **UP** and **DOWN ARROW** keys to display the screens that are above and below the current screen.

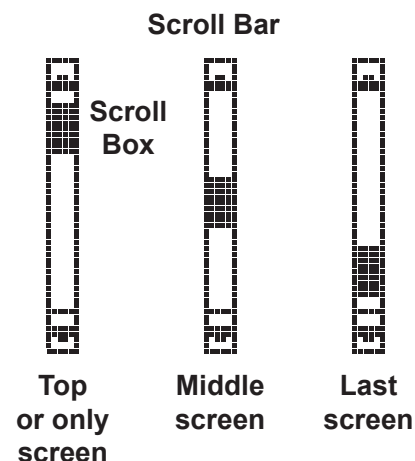
The Left and Right Directional Arrows let you know to use the **LEFT** or **RIGHT ARROW** keys to highlight an icon for selection.

Another navigational aid is the **Scroll Bar** along the right side of the screen. The position of its scroll box tells you which menu screen you're viewing.



Press the **POWER** button to turn the Tester on and off. The Tester also turns on automatically when you connect its test leads to a battery.

Whichever way you turn on the Tester, it always highlights the icon and setting you last used for your convenience.



Main Menu and Keypad



## Data Entry Methods

To perform a particular test or function, the tester will ask for different types of information. This means that the methods you use to enter information will change depending on the type of information requested. The four types of entry methods are described below.


### Menu icons

A menu icon is a graphical representation of a function you can select, such as the Diode Icon in the DMM Menu. To select an icon, use the **LEFT** or **RIGHT ARROW** key to highlight it. Highlighting changes the icon to a white picture on a black background. To confirm your selection, press the appropriate soft key.

### Option Buttons

Some lists have option buttons before each item. To select an item, use the **UP/DOWN ARROW** keys to move the dot into the button next to the item you want. You can also use the alphanumeric keypad to enter the number preceding the option button. To confirm your selection, press the appropriate soft key.

### Scrolling Lists

Scrolling lists contain items that extend above and below the screen or the selection box that contains them. To indicate that there are more items, the symbols  appear to the right of the first visible or highlighted item on the list.

To select from this type of list, use the **UP/DOWN ARROW** keys to scroll to the item, or use the keypad to enter your choice, and press the appropriate soft key.

### Alphanumeric Entry

Some selections require you to use the alphanumeric keypad. These “user-defined” selections have a blinking horizontal line (cursor) to the right of the last character.

Use the **UP/DOWN ARROW** keys to highlight a line for editing. Display the character, symbol, or number you want by rapidly pressing its key as many times as needed. If you pause, the cursor moves to the right. To backspace, press the **LEFT ARROW** key. Use the **RIGHT ARROW** key to add a space. Use the **UP/DOWN ARROW** keys to highlight a line for editing. When finished, press the appropriate soft key to save your settings.











## Menu Structure

This section will help you get to your destination while letting you know what test leads you may need when you arrive. The test leads are represented by symbols for their connectors.

### Main Menu


















The Main Menu is the starting point for all tools and utilities, which are depicted as icons. Some icons lead directly to the function they represent, while others are menu icons that lead to two or more functions. Menu icons are marked here with an asterisk (\*) and are mapped on the following pages.

Icon	Description
	The <b>BATTERY TEST</b> tests a battery using the battery information you select in a series of screens.
 1	With <b>SYSTEM TEST</b> you can test the battery, and the starting and charging systems.
 1	<b>CABLE DROP TEST</b> tests both sides of a circuit simultaneously for voltage. Three preset tests and 1 user-defined.
 1 *	Digital multimeter ( <b>DMM</b> ) has 8 test meters, a temperature sensor, and options for clamps and probes.
	<b>QC TEST</b> is used for testing stock or compound batteries.
 *	<b>INFO</b> contains a test counter, data transfer utility, and the tester software version and serial number.
 *	<b>PRINT/VIEW</b> for all statistical info and software version info.
 *	<b>UTILITY</b> includes functionality to setup the tester.




1: EST version only

### DMM Menu (EST version only)

The DMM Menu has icons for a temperature sensor and 8 test meters, some of which require different test leads.




Icon	Description
 	<b>DC VOLTS METER</b> measures voltage within a range of 0 to 60 Vdc.
 	<b>AC VOLTS METER</b> measures voltage within a range of 0 to 24 Vac.
 	<b>SCOPE</b> traces voltage with time and frequency measurements.
 	<b>DC AMP METER</b> tests the strength of the direct current flow through a circuit.
 	<b>AC AMP METER</b> tests the strength of the alternating current flow through a circuit.
	<b>TEMPERATURE METER</b> displays temperature in degrees F or C (units you can select in the Utilities Menu.)
 	<b>OHM METER</b> tests a circuit for continuity and resistance measured in ohms ( $\Omega$ ).
 	<b>DIODE</b> tests a diode for forward voltage drop.
 	<b>VOLTS AMP METER</b> measures two signals simultaneously: DC voltage and amperage.

### Info Menu

Icon	Description
	<b>TOTALS</b> displays the total battery tests performed since the tester was first used, the totals by decision, or allows you to clear the counters.
	<b>TRANSFER DATA</b> is an optional IR software and hardware package, which enables you to transfer test data to a PC.
	<b>VERSION INFO</b> displays the software version and serial number.












## Print/View Menu

The tester stores the last test results in its memory until you perform another test. To review or print results before you retest, select a test type in the Print/View Menu.

Icon	Description
	<b>VIEW TEST</b> displays the last test result.
	<b>VIEW CABLE TEST</b> displays the last cable drop test result.
	<b>VIEW QC TEST</b> displays the last QC test result.

## Utility Menu

The Utility Menu lets you customize your analyzer for your needs.

Icon	Description
	<b>CONFIG TESTER</b> allows you to set the following parameters: MODE, TIME, FORMAT, DATE, USER, and REGION.
	The <b>DISPLAY</b> allows you to set the contrast of the LCD.
	<b>CONFIG PRINTER</b> enables you to configure the printer to IrDA.
	<b>TEMPERATURE</b> enables you to select degrees C or F for temperature measurements.
	Create your own address details for printouts with the <b>SHOP INFO</b> icon.
	If you have created a coupon in the <b>COUPON</b> utility, use coupon to enable or disable.
	<b>EDIT COUPON</b> allows you to create and store up to three separate coupons to be printed on test results.
	With the <b>LANGUAGE</b> menu you can select one of the 24 available languages.
	With <b>FORMAT CARD</b> you erase all information on the data card
	With <b>UPDATE</b> you can install new software on the tester
	<b>QC MODE</b> allows you to add and delete batteries, and import and export battery lists.

## Chapter 3: Test Preparation

### **Inspecting the Battery**

Before starting the test visually inspect the battery for:

- Cracked, buckled, or leaking case. If you see any of these defects, replace the battery.
- Corroded, loose, or damaged cables and connections. Repair or replace them as needed.
- Corrosion on the battery terminals, and dirt or acid on the case top. Clean the case and terminals using a wire brush and a mixture of water and baking soda.
- Low electrolyte level. If the electrolyte level is too low, add distilled water to fill up to 1/2 above the top of the plates and fully charge the battery. Do not overfill.
- Corroded or loose battery tray and hold-down fixture. Tighten or replace as needed.

### **Testing Out-of-Vehicle**

The preferred battery test location is in the vehicle. However, if you plan to test out of the vehicle:

- Always disconnect the negative cable from the battery first and reconnect it last.
- Always use a carry tool or strap to lift and transport the battery.

### **Testing In-Vehicle**

The preferred test position is at the battery posts. If you must test at a remote-post location, it should have both a positive and negative post.

At the start of the test, make sure all vehicle accessory loads are off, the key is not in the ignition, and the doors are closed.

### **Connecting the Battery Test Cable**

**CAUTION:** Do not connect the tester to a voltage source greater than 30 Vdc.

Connect the battery test cable to the tester by first aligning the cable connector's 6 pins with the holes on top of the tester. Firmly insert the connector and tighten the locking ring.

Connect the clamps to the battery: the red clamp to the positive (+) terminal and the black clamp to the negative (-) terminal.

If you connect the clamps in the wrong polarity (positive to negative or negative to positive), the tester displays CLAMPS REVERSED! Reconnect the clamps correctly.

To make sure both sides of the clamps are gripping the terminals, rock the each clamp back and forth. A poor connection will prevent testing, and the tester will display the message CHECK CONNECTION. If the message reappears after you have correctly reconnected the clamps, clean the terminals and reconnect.

### **Connecting an Accessory Cable**

If you are using an accessory cable, plug it as you would a phone jack into the accessories port on top of the tester. It locks automatically into the port. To remove it after testing, press the lever and pull the connector out.

### **Setting User Preferences**

Before starting your test you may want to customize the use of your analyzer by setting preferences in the Utility Menu. The menu has settings for the display's date and time, the contrast and backlight time, a utility to customize printouts for the optional IR printer, among others.

To conserve the analyzer's internal batteries, the tester will turn off after 30 seconds of inactivity.

## Chapter 4: Battery Test

The tester guides you through the steps of selecting your battery test parameters and interpreting the results. Before you start the test, review the instructions in *Chapter 3: Test Preparation*.

- In the Main Menu select the BATTERY TEST icon.



Press the **SELECT** soft key to continue.

- Select the BATTERY LOCATION.

- UNDER HOOD
- UNDER SEAT
- TRUNK
- FOOT WELL
- OUT OF VEHICLE

Press the **NEXT** soft key to continue.

### Under hood

- Select the VEHICLE TYPE.

- REGULAR
- START-STOP

Press the **NEXT** soft key to continue.

- Select the TEST LOCATION.

- JUMP START POST
- BATTERY POST

Press the **NEXT** soft key to continue.

### Regular - Battery Post

- Select the BATTERY TYPE.

- REGULAR
- AGM
- GEL
- START-STOP

Press the **NEXT** soft key to continue.

*In case of START-STOP please see the sub-chapter 'START-STOP - BATTERY POST'.*

- Select the battery's capacity rating standard. The standard, and the rating units required are printed on the battery label. If the information is unreadable, contact the battery manufacturer.

- EN
- EN2
- DIN
- IEC
- SAE
- JIS
- CCA

### Battery Standards

Rating System	Description	Range
EN (A)	European Norm	100 to 3000
EN2 (A)	European Norm II	100 to 3000
DIN (A)	Deutsche Industrie-Norm	100 to 1000
IEC (A)	International Electrotechnical Commission	100 to 1000
SAE (A)	European labeling of CCA	100 to 3000
JIS	Japanese Industrial Standard: (shown on a battery as a combination of numbers and letters.	74 numbers from 26A17 to 245H52
CCA	Cold Cranking Amps (specified by SAE): The amount of current a battery can provide at 0 °F (-17.8 °C).	100 to 3000

If you select JIS, the analyzer asks for the JIS part number. Scroll to the part number. To increase your scrolling speed, hold the **UP (▲)** or **DOWN (▼) ARROW** key, or use the **LEFT (◀)** or **RIGHT (▶) ARROW** key to move up or down four part numbers at a time.

Press the **NEXT** soft key to continue.

- Press an **UP (▲)** or **DOWN (▼) ARROW** key to select the BATTERY RATING.



Press **ENTER** and begin the battery test.

- Select the **TEMPERATURE** (only asked when relevant for the battery decision).

Aim the tester 5 cm from the sides or top of the battery case. As soon as the temperature reading is stable the operator can press **NEXT**.

The tester will now start testing the battery.

**Regular - Jump Start Post**

5. Select the PLATFORM.
- 1  PLATFORM 1
  - 2  PLATFORM 2
  - 3  PLATFORM 3
- Press the **NEXT** soft key to continue.
6. Select the CAR MODEL. Depending on the chosen platform you will see different models, e.g.:
- 208 (A9)/ 2008 (A94)  
C4 Cactus (E3)  
OTHER
- Press the **NEXT** soft key to continue.
7. Select the BATTERY RATING. Again, the options you get here all depend on what you have chosen before.
- 480 A(EN)  
640 A(EN)  
720 A(EN)  
800 A(EN)
- Press **NEXT** to begin the battery test.

**Start-stop - Battery Post**

5. Select the BATTERY RATING.
- 1  760A EN AGM
  - 2  Q-85
  - 3  T-105
  - 4  OTHER
- When OTHER is chosen you will have to put in the parameters manually.*
- Press the **NEXT** soft key to continue.
6. Select the **TEMPERATURE** (only asked when relevant for the battery decision).
- Aim the tester 5 cm from the sides or top of the battery case. As soon as the temperature reading is stable the operator can press **NEXT**.
- The tester will now start testing the battery.

**Start-stop - Jump Start Post**

5. Select the PLATFORM.
- 1  PLATFORM 1
  - 2  PLATFORM 2
- Press the **NEXT** soft key to continue.
6. Select the CAR MODEL. Depending on the chosen platform you will see different models, e.g.:
- 208 (A9)/ 2008 (A94)  
C4 Cactus (E3)  
OTHER
- Press the **NEXT** soft key to continue.
7. Select the START-STOP SYSTEM.
- SST ALTERNATOR  
SST STARTER
- Press the **NEXT** soft key to continue.
8. Select the BATTERY RATING. Again, the options you get here all depend on what you have chosen before.
- 760 A(EN)
- Press **NEXT** to begin the battery test.

**Under seat, trunk, or foot well**

3. Select the TEST LOCATION.
  - 1  JUMP START POST
  - 2  BATTERY POST

Press the **NEXT** soft key to continue.

**Battery Post**

4. Select the BATTERY TYPE.
  - 1  REGULAR
  - 2  AGM
  - 3  GEL
  - 4  START-STOP

Press the **NEXT** soft key to continue.

*In case of START-STOP please see the sub-chapter 'START-STOP - BATTERY POST'.*

5. Select the battery's capacity rating standard. The standard, and the rating units required are printed on the battery label. If the information is unreadable, contact the battery manufacturer.
  - 1  EN
  - 2  EN2
  - 3  DIN
  - 4  IEC
  - 5  SAE
  - 6  JIS
  - 7  CCA

**Battery Standards**

Rating System	Description	Range
EN (A)	European Norm	100 to 3000
EN2 (A)	European Norm II	100 to 3000
DIN (A)	Deutsche Industrie-Norm	100 to 1000
IEC (A)	International Electrotechnical Commission	100 to 1000
SAE (A)	European labeling of CCA	100 to 3000
JIS	Japanese Industrial Standard: (shown on a battery as a combination of numbers and letters.	74 numbers from 26A17 to 245H52
CCA	Cold Cranking Amps (specified by SAE): The amount of current a battery can provide at 0 °F (-17.8 °C).	100 to 3000

If you select JIS, the analyzer asks for the JIS part number. Scroll to the part number. To increase your scrolling speed, hold the **UP (▲)** or **DOWN (▼) ARROW** key, or use the **LEFT (◀)** or **RIGHT (▶) ARROW** key to move up or down four part numbers at a time.

Press the **NEXT** soft key to continue.

6. Press an **UP (▲)** or **DOWN (▼) ARROW** key to select the BATTERY RATING.



Press **ENTER** and begin the battery test.

7. Select the **TEMPERATURE** (only asked when relevant for the battery decision).

Aim the tester 5 cm from the sides or top of the battery case. As soon as the temperature reading is stable the operator can press **NEXT**.

The tester will now start testing the battery.

**Jump start post**

4. Select the BATTERY RATING. The battery rating that you can choose from depends on the battery location. For example:

- 1  480 A(EN)
- 2  640 A(EN)

Press the **NEXT** soft key to continue.

*In case of TRUNK the next step is included:*

5. Select the CAR MODEL. The models that you can choose from depend on the chosen BATTERY RATING.

407

C5

Press the **NEXT** soft key to continue.

6. Enter the VIN (TRUNK - 950 A(EN) only).

Press **NEXT** to begin the battery test.

**Start-Stop - Battery post**

4. Select the BATTERY RATING.

- 1  760A EN AGM
- 2  Q-85
- 3  T-105
- 4  OTHER

*When OTHER is chosen you will have to put in the parameters manually.*

Press the **NEXT** soft key to continue.

5. Select the **TEMPERATURE** (only asked when relevant for the battery decision).

Aim the tester 5 cm from the sides or top of the battery case. As soon as the temperature reading is stable the operator can press **NEXT**.

The tester will now start testing the battery.

**Out of vehicle**

3. Select the BATTERY TYPE.

- 1  REGULAR
- 2  AGM
- 3  GEL
- 4  START-STOP

Press the **NEXT** soft key to continue.

*In case of START-STOP please see the sub-chapter 'START-STOP - BATTERY POST':*

4. Select the battery's capacity rating standard. The standard, and the rating units required are printed on the battery label. If the information is unreadable, contact the battery manufacturer.

- 1  EN
- 2  EN2
- 3  DIN
- 4  IEC
- 5  SAE
- 6  JIS
- 7  CCA

**Battery Standards**

Rating System	Description	Range
EN (A)	European Norm	100 to 3000
EN2 (A)	European Norm II	100 to 3000
DIN (A)	Deutsche Industrie-Norm	100 to 1000
IEC (A)	International Electrotechnical Commission	100 to 1000
SAE (A)	European labeling of CCA	100 to 3000
JIS	Japanese Industrial Standard: (shown on a battery as a combination of numbers and letters.	74 numbers from 26A17 to 245H52
CCA	Cold Cranking Amps (specified by SAE): The amount of current a battery can provide at 0 °F (-17.8 °C).	100 to 3000

If you select JIS, the analyzer asks for the JIS part number. Scroll to the part number. To increase your scrolling speed, hold the **UP (▲)** or **DOWN (▼) ARROW** key, or use the **LEFT (◀)** or **RIGHT (▶) ARROW** key to move up or down four part numbers at a time. Press the **NEXT** soft key to continue.

5. Press an **UP (▲)** or **DOWN (▼) ARROW** key to select the BATTERY RATING.



Press **ENTER** and begin the battery test.

6. Select the **TEMPERATURE** (only asked when relevant for the battery decision).

Aim the tester 5 cm from the sides or top of the battery case. As soon as the temperature reading is stable the operator can press **NEXT**.

The tester will now start testing the battery.

**Start-Stop - Battery post**

4. Select the BATTERY RATING.

- 1  760A EN AGM
- 2  Q-85
- 3  T-105
- 4  OTHER

*When OTHER is chosen you will have to put in the parameters manually.*

Press the **NEXT** soft key to continue.

5. Select the **TEMPERATURE** (only asked when relevant for the battery decision).

Aim the tester 5 cm from the sides or top of the battery case. As soon as the temperature reading is stable the operator can press **NEXT**.

The tester will now start testing the battery.



## Additional Test Requirements

For a more decisive result the tester may ask for additional information or probe deeper into the battery's condition. The following messages and instructions may appear before the analyzer displays the results of your test.

### System Noise

To perform a correct measurement the tester requires the vehicle to be in rest. After the car has been driven some vehicle specific systems might still be active in the background. The tester will detect this and displays the message **SYSTEM NOISE**. When this message appears switch off all consumers (radio, airconditioning) and remove the key from the ignition. As soon as there is no more activity in the vehicle the tester will continue testing and display the test result.

### Unstable Battery Detected

A battery that is weak or that has just been charged may retain enough electrical activity to be detected by the analyzer and will 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. If the battery is fully charged, check the clamp connections.

### Surface Charge

The battery can hold a surface charge if the engine has been running or after the battery has been charged. The tester may prompt you to remove the surface charge before it displays a test result.

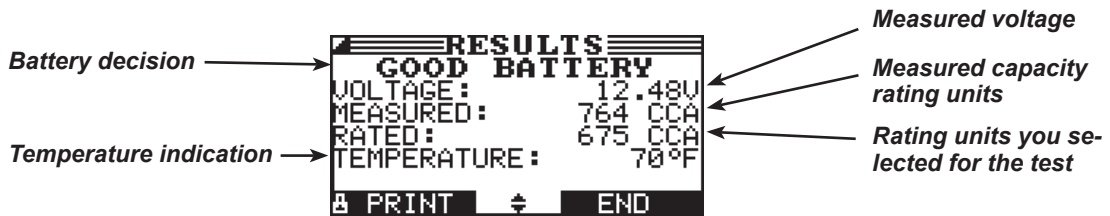
1. Follow the instructions indicating when to turn the headlights on and off (IN-VEHICLE)
2. The tester will resume testing after it detects that the surface charge is removed.

### Deep Scan Test

In some cases the tester may need to further analyze the battery to determine whether the battery should be replaced or it has a significant chance to be recovered. It will then conduct a Deep Scan Test of the battery for a few seconds. This test will typically be performed on batteries that are in a low state of charge.

### Battery Test Results

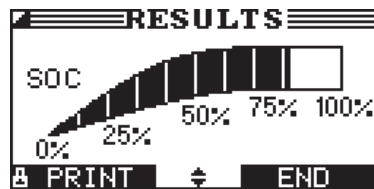
After the test the tester will display the complete results in a series of screens, see below. Use the **UP/DOWN ARROW** keys to scroll through each result. To send the results to the IR receiver, point the tester towards the IR Receiver, press the **TRANSFER** soft key and wait until the hourglass has disappeared from the screen.



General health of the battery and its ability to deliver its specified performance compared with a new battery



Battery's state of charge



Good Battery Result

#### Battery Decisions and Recommendations

Decision	Recommended Action
GOOD BATTERY	Return the battery to service.
CHARGE BATTERY	Fully charge the battery and return it to service.
CHARGE & RETEST	Fully charge the battery and retest. <b>Failure to fully charge the battery before retesting may cause false readings.</b> If CHARGE & RETEST appears again after you fully charge the battery, replace the battery.
REPLACE BATTERY	Replace the battery and retest. A REPLACE BATTERY result may also mean a poor connection between the battery cables and the battery. After disconnecting the battery cables, retest the battery using the out-of-vehicle test before replacing it.
BAD CELL-REPLACE	Replace the battery and retest.
FROZEN BATTERY	Thaw the battery and retest.

## Chapter 5: System Test

(EST version only)

Before starting the test, inspect the alternator drive belt. A belt that is glazed or worn, or lacks the proper tension, will prevent the engine from achieving the rpm levels needed for the test.

The System Test includes 3 tests that provide a complete diagnosis of the vehicle's electrical system:

- BATTERY TEST
- STARTER TEST
- ALTERNATOR TEST

### Battery Test

The System Test includes a test of the battery to eliminate it as the cause of starting or charging problems. See Chapter 4 for the Battery Test procedure.

### Starter Test

1. Have your amp clamp ready and select the AMP CLAMP availability.

- 1  INTEGRATED
- 2  OTHER
- 3  NONE

Press the **NEXT** soft key to continue.

2. Attached the Amp clamp to the tester, do not connect it around any wire.

Press the **NEXT** soft key to continue.

3. Tester will zero out the Amp clamp.

4. Place Amp clamp around negative cable.

Press the **NEXT** soft key to continue.

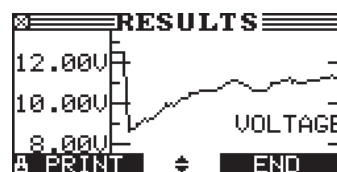
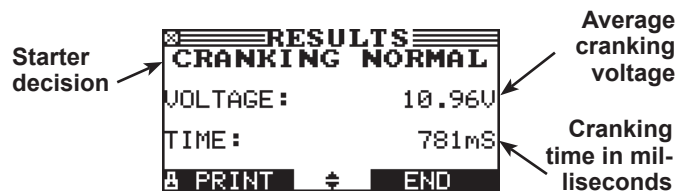
5. Start the vehicle's engine when prompted. If after the vehicle started and the results do not appear after approximately 25 seconds, press the **NO START** soft key.

6. The analyzer displays one of the decisions and the results in a series of screens.

**NOTE:** In some cases, the tester may not detect the vehicle's starting profile. It will display the soft key options **STARTED** and **NO START**. If you select **STARTED**, the analyzer skips to the Alternator Test. If you select **NO START**, the test process ends.

### Starter System Test Results

The results include the battery analysis. Use the **UP (▲)** or **DOWN (▼) ARROW** key to scroll to each screen. See the Starter System Decision table for an explanation of the starter system decisions. To continue testing, press the **NEXT** soft key.



X axis = time

### Starter System Test Decisions

Decision	Action
CRANKING NORMAL	The starter voltage is normal and the battery is fully charged.
LOW VOLTAGE	The starter voltage is low and the battery is fully charged.
CHARGE BATTERY	The starter voltage is low and the battery is discharged. Fully charge the battery and retest the starter system.
REPLACE ADVISED	Replace the battery and retest before testing the alternator test..
NO START	The engine did not start and the test was aborted.
CRANKING SKIPPED	The tester did not detect the vehicle's starting profile and skipped the Starter Test.

## Alternator Test

- The tester starts checking for alternator output.



**NOTE:** If necessary the analyzer will ask if you are testing a diesel engine. It will resume testing after you make your selection.

- Depending on whether you are working with an integrated Amp clamp, you will be either prompted to TURN OFF LOADS AND ENGINE or asked to CHECK IF CLAMP POINTS AWAY FROM THE NEGATIVE BATTERY POST.

In case of the former, turn off vehicle loads (blowers, interior light, radio, etc.) and the engine. Press the **NEXT** soft key to continue.

- ANALYZING CHARGING SYSTEM DATA
- TURN OFF LOADS AND ENGINE: Turn off vehicle loads (blowers, interior light, radio, etc.) and idle the engine. Press the **NEXT** soft key to continue.

**NOTE:** If necessary the analyzer will ask if you are testing a diesel engine. It will resume testing after you make your selection.

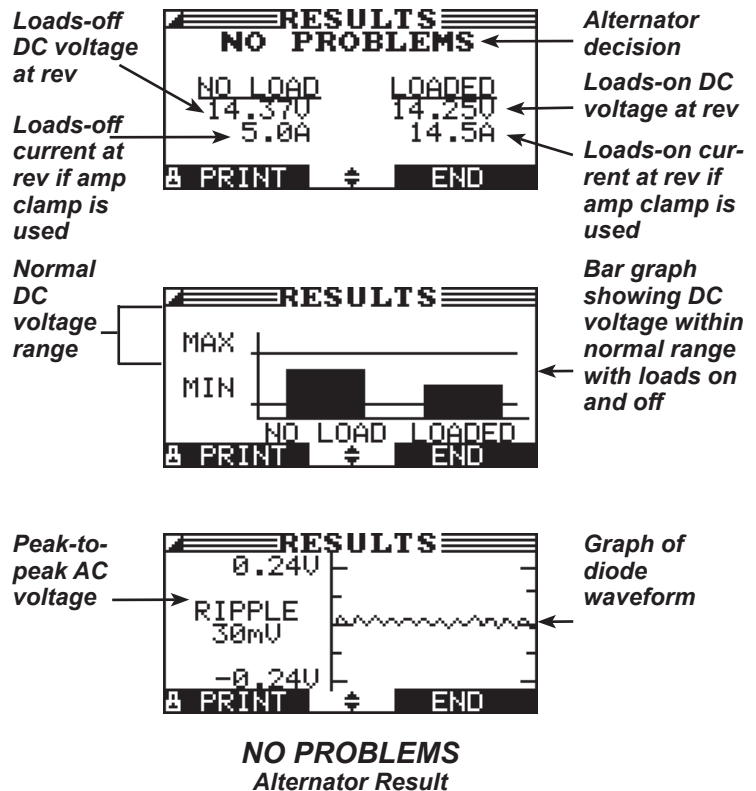
- REV ENGINE WITH LOADS OFF FOR 5 SECONDS: Rev the engine with the loads off. Gradually increase the rpm until the analyzer tells you to HOLD the rev level as the bar on the display crosses the rpm target line.
- ACQUIRING DATA....HOLD ENGINE RPM: Continue to hold the rpm while the Tester takes system measurements.
- ENGINE REV DETECTED, IDLE ENGINE: The Tester has detected the rev. Press the **NEXT** soft key to continue.
- TESTING ALTERNATOR AT IDLE, LOADS OFF: The analyzer will next test the engine at idle for comparison to other readings, and then test the diode ripple. Excessive ripple usually means one or more diodes have failed in the alternator or there is stator damage.
- TURN HIGH BEAMS AND BLOWER MOTOR ON, IDLE ENGINE: After a few seconds, the Tester will ask you to turn on the accessory loads. It will determine if the charging system is able to provide enough current for the demands of the electrical system.

**IMPORTANT:** Turn on the high-beam headlights, the blower to high and the rear defogger. Don't use cyclical loads such as air conditioning or windshield wipers.

- TESTING ALTERNATOR AT IDLE, LOADS ON: The analyzer will determine if the charging system is able to provide sufficient current for the demands of the vehicle's electrical system.
- REV ENGINE WITH LOADS ON FOR 5 SECONDS: The Tester will test the charging system with the loads on and prompt you to rev the engine. Gradually increase the rev until the analyzer tells you to HOLD the rev level as the bar on the display crosses the rpm target line.
- ACQUIRING DATA....HOLD ENGINE RPM: Continue to hold the rpm while the Tester takes system measurements.

- ENGINE REV DETECTED, IDLE ENGINE: The Tester has detected the rev. Press the **NEXT** soft key to continue.
- ANALYZING CHARGING SYSTEM DATA: The Tester is completing its final analysis of the charging system data.
- TURN OFF LOADS AND ENGINE: Press the **NEXT** soft key to display the results.

### Alternator Test Results



**Alternator Decisions and Recommendations**

Decision	Action
NO PROBLEMS	The system is showing normal output from the alternator. No problem detected.
NO OUTPUT	<p>The alternator is not providing charging current to the battery.</p> <ul style="list-style-type: none"> <li>• Check the belts to ensure the alternator is rotating with the engine running. Replace broken or slipping belts and retest.</li> <li>• Check all connections to and from the alternator, especially the connection to the battery. If the connection is loose or heavily corroded, clean or replace the cable and retest.</li> <li>• If the belts and connections are in good working condition, replace the alternator. (Older vehicles use external voltage regulators, which may require only replacement of the voltage regulator.)</li> </ul>
LOW OUTPUT	<p>The alternator is not providing enough current to power the system's electrical loads and charge the battery.</p> <ul style="list-style-type: none"> <li>• Check the belts to ensure the alternator is rotating with the engine running. Replace broken or slipping belts and retest.</li> <li>• Check the connections from the alternator to the battery. If the connection is loose or heavily corroded, clean or replace the cable and retest.</li> </ul>
HIGH OUTPUT	<p>The voltage output from the alternator to the battery exceeds the normal limits of a functioning regulator.</p> <ul style="list-style-type: none"> <li>• Check to ensure there are no loose connections and that the ground connection is normal. If there are no connection problems, replace the regulator. (Most alternators have a built-in regulator requiring you to replace the alternator. In older vehicles that use external voltage regulators, you may need to replace only the voltage regulator.)</li> </ul>

**Diode Decisions and Recommendations**

Decision	Action
EXCESSIVE RIPPLE	<p>One or more diodes in the alternator aren't functioning or there's stator damage, which is shown by an excessive amount of AC ripple current supplied to the battery.</p> <ul style="list-style-type: none"> <li>• Make sure the alternator mounting is sturdy and that the belts are in good shape and functioning properly. If the mounting and belts are good, replace the alternator.</li> </ul>
OPEN PHASE	The Tester has detected an open phase within the alternator. Replace the alternator.
OPEN DIODE	The Tester has detected a open diode within the alternator. Replace the alternator.
SHORTED DIODE	The Tester has detected an shorted diode within the alternator. Replace the alternator.

## Chapter 6: Cable Drop Test

(EST version only)

If the test results for the starter or charging systems indicate that there may be a problem, you may want to perform the Cable Drop Test to determine if it is due to worn cables or bad connections between the battery and the alternator or starter. Worn cables or bad connections create higher resistance, which causes a drop across the circuit. The voltage drop reduces current carrying capability that displays the same symptoms as a weak alternator or starter and causes premature battery failure.

There's no need to run the engine. The Cable Drop Test uses Midtronics' conductance technology to send a signal through the circuit at the component under test. The tester then simultaneously calculates voltage drop on the positive (+) and negative (-) sides of any circuit as well as the total voltage drop. The amperage range for each of the four tests is 0 to 1000 A. When you change the setting from the factory defaults, the tester will store your setting in memory for your next test.

There are three preset tests:

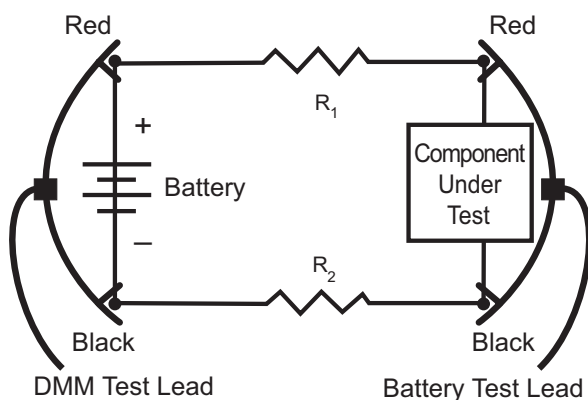
- BATTERY GROUND
- STARTER CIRCUIT
- ALTERNATOR CIRCUIT

A fourth test, OTHER CIRCUIT, tests other grounds and circuits against your specified amperage capacity.

The test requires two test lead connections:

- Battery test leads at the component's output lead (the B+ or output screw on the alternator) and the component's housing as ground
- DMM test leads at the battery terminals

**NOTE:** The test requires a complete circuit. If you're testing a system with a remote solenoid, you can test from the battery to the solenoid, but not from the battery to the starter.



**Connections for the Cable Drop Test**

To begin, select the Cable Drop Test icon in the Main Menu and follow the instructions on the display.

**IMPORTANT:** For accurate results the battery should be good and fully charged before you perform a test.

### Battery Ground Test

The Battery Ground Test measures the voltage drop for the ground strap.

1. **SELECT CIRCUIT:** Use the **UP/DOWN ARROWS** or the numerical keypad to select the Battery Ground Test.
  - 1  BATTERY GROUND
  - 2  STARTER CIRCUIT
  - 3  ALTERNATOR CIRCUIT
  - 4  OTHER CIRCUIT

Press the **NEXT** soft key to continue.

2. **SET AMPS:** Use the **UP/DOWN ARROWS** or the keypad to select the rated amperage of the circuit you are testing. The default is 80 A.



Press the **NEXT** soft key to continue.

3. Connect the positive (+) clamp of the battery test leads to the starter's battery terminal stud. Connect the negative (-) clamp to the starter's housing.
4. Connect the positive (+) DMM clamp to the battery's positive (+) post. Connect the negative clamp (-) to the battery's (-) negative post.



For the next few seconds the Tester will display the word **TESTING** and a stopwatch while it evaluates the battery ground.

### Battery Ground Test Results

The image shows the tester's LCD display with the following text:
   
BATTERY GROUND
   
CIRCUIT DROP: 0.08V
   
PASS
   
+ DROP: 0.00V
   
- DROP: 0.08V
   
PRINT
   
END
   
Annotations with arrows point to specific parts:
   
- 'Total circuit voltage drop' points to 'CIRCUIT DROP: 0.08V'
   
- 'Decision' points to 'PASS'
   
- 'Voltage drop across positive side of circuit' points to '+ DROP: 0.00V'
   
- 'Voltage drop across negative side of circuit' points to '- DROP: 0.08V'

If there is a problem, the decision is **CLEAN AND RETEST OR REPLACE**. To print the results, align the Tester's IR transmitter with the printer's receiver, and select the **PRINT** soft key. To return to the Main Menu, press the **END** key.

### Starter Circuit

The Starter Circuit Test measures the voltage drop of the starter circuit.

1. SELECT CIRCUIT: Use the **UP/DOWN ARROWS** or the numerical keypad to select the Battery Ground Test.
  - 1  BATTERY GROUND
  - 2  STARTER CIRCUIT
  - 3  ALTERNATOR CIRCUIT
  - 4  OTHER CIRCUIT

Press the **NEXT** soft key to continue.

2. SET AMPS: Use the **UP/DOWN ARROWS** or the keypad to select the rated amperage of the starter circuit. The default is 150 A.



Press the **NEXT** soft key to continue.

3. Connect the positive (+) clamp of the battery test leads to the starter's battery terminal stud. Connect the negative (-) clamp to the starter's housing.
4. Connect the positive (+) DMM clamp to the battery's positive (+) post. Connect the negative clamp (-) to the battery's (-) negative post.



For the next few seconds the Tester will display the word TESTING and a stopwatch while it evaluates the battery ground.

### Alternator Circuit

The Alternator Circuit Test measures the voltage drop of the alternator circuit.

1. SELECT CIRCUIT: Use the **UP/DOWN ARROWS** or the numerical keypad to select the Battery Ground Test.
  - 1  BATTERY GROUND
  - 2  STARTER CIRCUIT
  - 3  ALTERNATOR CIRCUIT
  - 4  OTHER CIRCUIT

Press the **NEXT** soft key to continue.

2. SET AMPS: Use the **UP/DOWN ARROWS** or the keypad to select the rated amperage of the alternator circuit. The default is 80 A.



Press the **NEXT** soft key to continue.

3. Connect the positive (+) clamp of the battery test leads to the starter's battery terminal stud. Connect the negative (-) clamp to the starter's housing.
4. Connect the positive (+) DMM clamp to the battery's positive (+) post. Connect the negative clamp (-) to the battery's (-) negative post.



For the next few seconds the Tester will display the word TESTING and a stopwatch while it evaluates the battery ground.

### Starter Circuit Test Results

**Starter Circuit PASS Result**

The screenshot shows the following data:

- Total circuit voltage drop: 0.30V
- Decision: PASS
- + DROP: 0.15V
- DROP: 0.15V
- Buttons: PRINT and END

Annotations:

- Total circuit voltage drop (points to 0.30V)
- Decision (points to PASS)
- Voltage drop across positive side of circuit (points to + DROP: 0.15V)
- Voltage drop across negative side of circuit (points to - DROP: 0.15V)

If there is a problem, the decision is CLEAN AND RETEST OR REPLACE. To print the results, align the Tester's IR transmitter with the printer's receiver, and select the **PRINT** soft key. To return to the Main Menu, press the **END** key.

### Alternator Circuit Test Results

**Alternator Circuit PASS Result**

The screenshot shows the following data:

- Total circuit voltage drop: 0.30V
- Decision: PASS
- + DROP: 0.15V
- DROP: 0.15V
- Buttons: PRINT and END

Annotations:

- Total circuit voltage drop (points to 0.30V)
- Decision (points to PASS)
- Voltage drop across positive side of circuit (points to + DROP: 0.15V)
- Voltage drop across negative side of circuit (points to - DROP: 0.15V)

If there is a problem, the decision is CLEAN AND RETEST OR REPLACE. To print the results, align the Tester's IR transmitter with the printer's receiver, and select the **PRINT** soft key. To return to the Main Menu, press the **END** key.



## Other Circuit

This test enables you to measure voltage drop across other components.

1. **SELECT CIRCUIT:** Use the **UP/DOWN ARROWS** or the numerical keypad to select the Battery Ground Test.
  - 1  BATTERY GROUND
  - 2  STARTER CIRCUIT
  - 3  ALTERNATOR CIRCUIT
  - 4  OTHER CIRCUIT

Press the **NEXT** soft key to continue.

2. **SET AMPS:** Use the **UP/DOWN ARROWS** or the keypad to select the rated amperage of the alternator circuit. The default is 10 A.

10 A

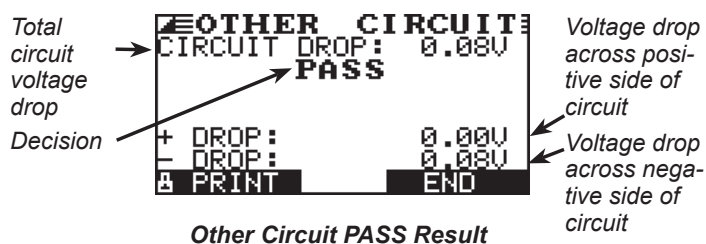
Press the **NEXT** soft key to continue.

3. Connect the positive (+) clamp of the battery test leads to the starter's battery terminal stud. Connect the negative (-) clamp to the starter's housing.
4. Connect the positive (+) DMM clamp to the battery's positive (+) post. Connect the negative clamp (-) to the battery's (-) negative post.



For the next few seconds the Tester will display the word **TESTING** and a stopwatch while it evaluates the battery ground.

## Other Circuit Test Results



If there is a problem, the decision is **CLEAN AND RETEST** OR **REPLACE**. To print the results, align the Tester's IR transmitter with the printer's receiver, and select the **PRINT** soft key. To return to the Main Menu, press the **END** key.

## Chapter 7: QC test

The tester has the ability to test multiple batteries one after the other without having to input the battery rating / settings. There are two types of QC tests: the **STOCK CONTROL** or **COMPOUND TEST**.

**STOCK CONTROL** is meant for batteries standing in a warehouse or on a pallet where as **COMPOUND TESTING** is done when the battery is in the vehicle.

Use the Utility Menu to change the QC MODE.

### Stock control

1. The first screen shows you the amount of tests performed. Once you press both the arrow keys you reset the test counter. Press **NEXT** if you want to continue without clearing the tests.



2. Select the **BATTERY TYPE**

- 1  REGULAR
- 2  AGM
- 3  GEL

Press the **NEXT** soft key to continue.

3. Select the **RATING UNITS**

- 1  EN
- 2  EN2
- 3  DIN
- 4  IEC
- 5  SAE
- 6  JIS
- 7  CCA

Press the **NEXT** soft key to continue.

4. Select the **BATTERY RATING**

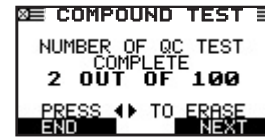
Press the **UP** (▲) and **DOWN** (▼) **ARROW** keys to select the rating. In case of a JIS battery type the part number.

5. Enter the **MINIMUM VOLTAGE**.

Press **NEXT** to begin the battery test.

### Compound test

1. The first screen shows you the amount of tests performed. Once you press both the arrow keys you reset the test counter. Press **NEXT** if you want to continue without clearing the tests.



2. Select the **BATTERY LOCATION**.

- 1  UNDER HOOD
- 2  UNDER SEAT
- 3  TRUNK
- 4  FOOT WELL
- 5  PRE-SELECTION
- 6  MANUAL ENTRY

Press the **NEXT** soft key to continue.

**MANUAL** input is selecting the different battery parameters that can be found on the battery. The **PRE-SELECTION** is what is entered in the tester memory. This is initially empty but can be filled in from the **UTILITY** menu.

3. Select the **POST TYPE**.

- 1  JUMP START POST
- 2  BATTERY POST

Press the **NEXT** soft key to continue.

**Jump Start Post***UNDER HOOD*

4. Select the PLATFORM.
- 1  PLATFORM 1
  - 2  PLATFORM 2
  - 3  PLATFORM 3

Press the **NEXT** soft key to continue.

5. Select the CAR MODEL. Depending on the chosen platform you will see different models, e.g.:

208 (A9)/ 2008 (A94)

OTHER

Press the **NEXT** soft key to continue.

6. Select the BATTERY RATING. Again, the options you get here all depend on what you have chosen before.

640 A(EN)

Press **NEXT** to begin the battery test.

*UNDER SEAT*

4. Select the BATTERY RATING. The battery rating that you can choose from depends on the battery location. For example:

1  480 A(EN)

2  640 A(EN)

Press the **NEXT** soft key to continue.

5. Enter the **MINIMUM VOLTAGE**.

Press **NEXT** to begin the battery test.

*TRUNK*

4. Select the BATTERY RATING.

1  800 A(EN)

2  950 A(EN)

Press the **NEXT** soft key to continue.

5. Select the CAR MODEL. The models that you can choose depend on the chosen BATTERY RATING.

407

C5

Press the **NEXT** soft key to continue.

6. Enter the VIN (950 A(EN) only).

Press **NEXT** to begin the battery test.

7. Enter the **MINIMUM VOLTAGE**.

Press **NEXT** to begin the battery test.

**Battery Post**

4. Select the **BATTERY TYPE**

1  REGULAR

2  AGM

3  GEL

Press the **NEXT** soft key to continue.

5. Select the **RATING UNITS**

1  EN

2  EN2

3  DIN

4  IEC

5  SAE

6  JIS

7  CCA

Press the **NEXT** soft key to continue.

6. Select the **BATTERY RATING**

Press the **UP (▲)** and **DOWN (▼) ARROW** keys to select the rating. In case of a JIS battery type the part number.

7. Enter the **MINIMUM VOLTAGE**.

Press **NEXT** to begin the battery test.

## Chapter 8: Info Menu

The Info Menu has 3 utilities to help you manage your test data and track the usage and history of your analyzer.

### ***Totals***

The TOTALS report displays the total number of battery tests performed since the Tester was first used. Press the **LEFT** and **RIGHT ARROW** keys simultaneously to clear the total and reset the starting date.

### ***Transfer Data***

The TRANSFER DATA utility lets you transfer test data to a PC using an IR receiver.

### ***Version Info***

Version info displays the software version, the date the software was released, and the serial number of the analyzer. The utility keeps a permanent count of the number of battery tests performed since the analyzer was first used.

## Chapter 9: Print/View

The Print/View Menu enables you to view and print the results of the Battery, System, and Cable Drop Tests before you perform another test and overwrite the results in memory.

### ***View Test***

VIEW TEST gives you the option of viewing and printing the results of the Battery and System Tests. To print the results, align the analyzer's IR transmitter with the printer's receiver, and select the **PRINT** soft key. To return to the Main Menu, press the **END** key.

### ***View Cable Test***

VIEW CABLE TEST gives you the option of viewing and printing the results of the Cable Drop Tests. To print the results, align the analyzer's IR transmitter with the printer's receiver, and select the **PRINT** soft key. To return to the Main Menu, press the **END** key.

### ***View QC Test***

VIEW QC TEST gives you the option of viewing and printing all results of the Quality Control Test. To print the results, align the analyzer's IR transmitter with the printer's receiver, and select the **PRINT** soft key. To return to the Main Menu, press the **END** key.

## Chapter 10: Utilities

The Utility Menu allows you to easily set up your analyzer:

### Config Tester

CONFIG TESTER has six settings. Use the **UP/DOWN ARROW** keys to highlight the setting you want to change.

<b>MODE :</b>	<b>AM/PM</b>
<b>TIME :</b>	<b>9:07 PM</b>
<b>FORMAT :</b>	<b>MM/DD/YYYY</b>
<b>DATE :</b>	<b>03/14/2014</b>
<b>USER :</b>	<b>COMPOUND</b>
<b>REGION :</b>	<b>OTHER</b>

### Mode

Use the **UP/DOWN ARROWS** to move the dot to the option button of your choice.

- Select the 24-hour or AM/PM mode
  - 24 HOUR
  - AM/PM
- Press the **SAVE** soft key to save your setting or the **BACK** soft key to return to the CONFIG TESTER screen without saving the changes.

### Time

- Use the **LEFT/RIGHT ARROWS** to highlight the hour, minutes, or AM or PM. To rapidly scroll, hold down an **ARROW** key.

**9** : 19 PM

- Press the **SAVE** soft key to save your setting or **BACK** to return to the CONFIG TESTER screen saving the changes.

### Format

Use the **UP/DOWN ARROWS** or press the corresponding numerical key to move the dot to the option button of your choice or enter its number.

- Select the FORMAT
  - MM/DD/YYYY (month/day/year)
  - DD/MM/YYYY (day/month/year)
- Press the **SAVE** soft key to save your setting or the **BACK** soft key to return to the CONFIG TESTER screen without saving the changes.

### Date

- Use the **LEFT/RIGHT ARROWS** to highlight the hour, minutes, or AM or PM. To rapidly scroll, hold down an **ARROW** key.

**03** / 14 / 2014

- Press the **SAVE** soft key to save your setting or the **BACK** soft key to return to the CONFIG TESTER screen without saving the changes.

### User

COMPOUND MODE can only be used by authorized compound users.

- Select the USER type
  - DEALER
  - COMPOUND
- Press the **SAVE** soft key to save your setting or the **BACK** soft key to return to the CONFIG TESTER screen without saving the changes.

### Region

Use the **UP/DOWN ARROWS** to move the dot to the option button of your choice.

- Select the REGION
  - OTHER
  - LATAM
- Press the **SAVE** soft key to save your setting or the **BACK** soft key to return to the CONFIG TESTER screen without saving the changes.

### Display

The LCD OPTIONS utility enables you to adjust the contrast of the text on the display and the backlight time.

### Contrast Level

- The contrast level is 0 (lightest) to 10 (darkest). To change it:
- Press the **UP** or **DOWN ARROW** to highlight the option.

<b>CONTRAST LEVEL</b>	<b>10</b>
<b>BACKLIGHT TIME</b>	<b>60</b>

- Press the **ADJUST** soft key to display the option's numerical scroll box.

**10**  **(1-10)**

- Press the **UP/DOWN ARROW** keys or the corresponding numerical key to select your preference.
- Press the **SAVE** soft key to save your setting or the **BACK** soft key to return to the CONTRAST LEVEL screen without saving the changes.

## Backlight Time

Backlight time is from 0 to 60 seconds. To change it:

1. Press the **UP** or **DOWN ARROW** to highlight the option.

CONTRAST LEVEL	10
<b>BACKLIGHT TIME</b>	<b>60</b>

2. Press the **ADJUST** soft key to display the option's numerical scroll box.

<b>60</b>		<b>SEC</b>
-----------	---	------------

3. Press the **UP/DOWN ARROW** keys or the corresponding numerical key to select your preference.
4. Press the **SAVE** soft key to save your setting or the **BACK** soft key to return to the BACKLIGHT screen without saving the changes.

## Config Printer

When using this option it allows you to switch our printer from HP protocol to IrDA protocol.

## Temperature Units

The TEMPERATURE UNITS utility enables you to set the units of measure to either Celsius or Fahrenheit.

To set your preference:

1. Use the **UP/DOWN ARROWS** or press the corresponding numerical key to move the dot to the option button of your choice.
  - 1  DEGREES F
  - 2  DEGREES C
2. Press the **SAVE** soft key to save your setting.

## Shop Info

The SHOP INFO utility enables you to create a header for your printed test results showing your business location information. Its two information screens contain eight lines of text with up to 16 characters on each line.

### Screen 1

**1-YOUR SHOP NAME** —  
**2-1000 ANY STREET**  
**3-YOUR TOWN, STATE**  
**4-YOUR POSTAL CODE**

### Screen 2

**5-YOUR COUNTRY** —  
**6-YOUR PHONE NUMBER**  
**7-WWW.WEBSITE.COM**  
**8-YOUR SHOP ID NUMBER**

To create or overwrite a header:

1. Press the **UP** or **DOWN ARROW** to highlight the line you want to change. The cursor will be blinking to the right of the last character in the line.
2. To move the cursor backward to erase a character, press the **LEFT ARROW** key; to move the cursor forward, press the **RIGHT ARROW** key.
3. Insert a character by pressing the key associated with the character as many times as needed.
4. You can center text by selecting blank spaces before and after lines of text or insert spaces between words.
5. Press the **SAVE** soft key to save your setting or the **BACK** soft key to return to the SHOP INFO screen without saving the changes.

## Coupon

The COUPON SELECT utility enables and disables the printing of the custom coupon you've created in the EDIT COUPON utility.

1. Use the **UP/DOWN ARROWS** or press the corresponding numerical key to move the dot to the option button of your choice.
  - 1  NO USER COUPON PRINTED
  - 2  USER COUPON
2. Press the **SAVE** soft key to save your setting or the **BACK** soft key to return to the COUPON SELECT screen without saving the changes.

## Edit Coupon

The EDIT COUPON utility enables you to create a promotional coupon for your customers that prints at the bottom of every test result. Its two information screens contain eight lines of text with up to 16 characters each.

The editing process is the same as when you create a header for your test results printouts. See the SHOP utility for more information.

## Language

The LANGUAGE utility enables you to select a language for the display and printouts. To set your preference:

1. Use the **UP/DOWN ARROWS** or press the corresponding numerical key to move the dot to the option button of your choice.
2. Press the **SAVE** soft key to save your setting.

## Format Card

Select this utility to format an SD card to receive data or erase all data on the card. The Tester will warn you before formatting the card and ask you if you want to continue.



**Update**

As software updates become available you'll be able to use this utility to update the Tester software using files on an SD card.

**QC Mode**

Use this option to configure your way of quality control measurements. Select either the Compound mode or Stock control mode.

## Chapter 11: Troubleshooting

If you have problems with the display or the Midtronics printer, try these troubleshooting suggestions:

### **The Display Does Not Turn On**

- Check the connection to the vehicle battery.
- Press the **POWER** button.
- The vehicle's battery may be too low to power the analyzer (below 1 volt). Fully charge the battery and retest.
- The analyzer's 6 AA batteries may need to be replaced.

### **The STATUS LED Flashes**

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

**Printer STATUS LED**

Sequence	Condition	Solution
* * *	No paper	Insert new paper
** ** **	Thermal head too hot	Allow head to cool
*** *** ***	Batteries weak	Recharge printer batteries for 16 hours

### **Data Will Not Print**

- 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 printer below the **MODE** button should be pointed directly at each other. The maximum distance for reliable transmission between the ports is 17 in (45 cm).

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

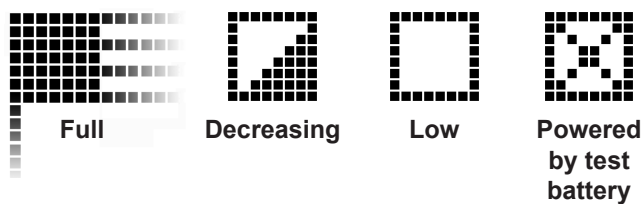
- Make sure the printer is on. The printer shuts off after 2 minutes of inactivity to conserve the batteries. To turn the printer on, briefly press the **MODE** button. The green **STATUS** light should turn on. Make sure you are using the Midtronics printer. Other printers may not be compatible.
- Direct sunlight interferes with infrared data transmission and receiving. If the printer is not receiving data, remove the printer and EXP from direct sunlight. If the printed 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 batteries are good, and the IR transmitter and receiver are aligned, check the printer manual for further instructions or call Midtronics at 800-776-1995 for assistance. (See "Patents, Limited Warranty, Service" for more information.)

## Chapter 12: Tester Internal Batteries

The Tester uses 6 AA, 1.5-volt batteries (alkaline recommended) to allow testing of batteries down to 1 volt and supply power while the menu is active. The analyzer can test batteries down to 5.5 volts when the internal batteries are not functioning.

### **Battery Power Indicator**

The square in the upper left corner of the display indicates the charge level of the battery pack. The square is black when the battery pack is fully charged. It gradually changes to white as the charge level declines. The Tester will display a warning message when the batteries need replacing.



*Power Level Indicator for AA Batteries*

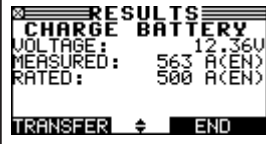

### **Replacing the Tester Batteries**

1. Turn the Tester face down.
2. Press gently on the ridges above the arrow on the battery compartment cover.
3. Slide the cover in the direction of the arrow and remove the cover.
4. Remove the discharged batteries.
5. Insert new batteries. Make sure the positive and negative terminals are positioned correctly.
6. Insert the door's tabs into the slots on the analyzer and slide the door closed, making sure the latch locks.




## Chapter 13: Data export to PC

Data export requires a Midtronics IR receiver and special data viewer software.

### Data export after battery test

	<p>After a battery test, the test results appear. Press "Transfer" to enter the transfer menu.</p>
	<p>Make sure the data program is running. Point the tester to the IR receiver and press "Transfer" to start the actual transmission of the data.</p>



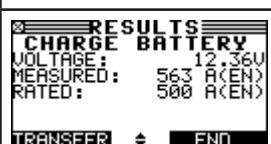

### Data export from menu

	<p>Select "Info" in the main menu of the battery tester</p>
	<p>Select "Transfer data" in the "Info" menu</p>
	<p>Make sure the data program is running. Point the tester to the IR receiver and press "Transfer" to start the actual transmission of the data.</p>

## Chapter 14: Print Data to IR printer

Printing test results requires a Midtronics IR printer.

### Printing test results

 <p>MAIN MENU PRINT/VIEW 12.34V SELECT</p>	<p>Select "Print/View" in the main menu of the battery tester</p>
 <p>REPORTS VIEW TEST BACK ++ SELECT</p>	<p>Select "View test" in the "Reports" menu</p>
 <p>RESULTS CHARGE BATTERY VOLTAGE: 12.36V MEASURED: 563 A&lt;EN&gt; RATED: 500 A&lt;EN&gt; TRANSFER END</p>	<p>The latest test is displayed on the screen. Press "Print" to enter the print menu</p>
 <p>PRINTING TURN PRINTER ON. POINT TESTER AT PRINTER AND AIM TESTER AT PRINTER UNTIL HOURGLASS IS GONE PRINT END</p>	<p>Make sure the printer is turned on. Point the tester to the printer and press "Print" to start printing the test results</p>



## DECLARATION OF CONFORMITY

According to CEN/CENELEC EN 45014 and ISO/IEC Guide 22



Manufacturer's Address: 7000 Monroe Street  
Willowbrook, IL 60527  
USA

Declares, that the product

Product Name: Battery Analyzer  
Model Number: EXP-1000, NVS-1000  
Product Options: *This declaration covers all options of the above product(s).*

**Conforms to the following European Directives:**

*The product herewith complies with the requirements of the IEC Publication 61326-1:1997 and carries the CE Marking accordingly*

**Conforms to the following product standards\*:**

Emissions Tests Results				
Environmental Phenomena	Frequency Range	Basic Standard	Test Level	Test Result
RF Radiated Emissions	30-1000 MHz	EN 55022	Class A	Pass

Immunity Tests Results					
Port Tested	Environmental Phenomena	Frequency Range	Basic Standard	Test Level	Test Result
Enclosure	ESD	8 kV Air 4 kV Contact	EN 61000-4-2	B	Pass
Enclosure	RF EM Field	3 V/m; 80-2000 MHz	EN 61000-4-3	A	Pass

CE Product-Family Test Specifications and Results			
Document	Date	Title	Test Results
CENELEC EN 61326	2002	Electrical equipment for measurement, control and laboratory use – EMC requirements	Complied with all applicable tests

\*Radiometrics Midwest Corporation, Romeoville, Illinois, USA (NVLAP Lab Code 121191, Certification Number 1495.01) performed all tests on the product in a typical configuration required by the test specifications. A full list of Radiometrics capabilities can be accessed at [www.radiomet.com](http://www.radiomet.com).

16 June 2006

Date

Jacob C. Blevins  
Quality Manager

## PATENTS

The EXP series is made by Midtronics, Inc., and is protected by one or more U.S. and foreign patents. For specific patent information, contact Midtronics, Inc. at +1 630 323-2800.

## LIMITED WARRANTY

This analyzer is warranted to be free of defects in materials and workmanship for a period of two years 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 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.



[www.midtronics.com](http://www.midtronics.com)

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