IMPORTANT: All battery tests must be completed directly at the battery posts. Only the Cayenne may be tested using the remote jump posts.
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Chapter 1: Introduction & Overview

General Safety Precautions

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.

**Risk of explosive gases**

Batteries generate explosive gases during normal operation, and when discharged or charged.

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. Never smoke or allow a spark or flame in the vicinity of a battery.

**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 a face shield and protective clothing 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.**

Test Leads, Connectors, and Data Ports

For the cable test leads, there are two connectors and two IR data ports on the top of the tester.

- For the battery test cable, there is a 6-pin connector with a locking ring.
- An IR data transmitter, which transmits test results to the optional IR printer.
- An IR temperature measurement sensor.

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.

The tester also has a DB-9 style connector on the bottom of the unit for future expansion. There is also a data card slot for future software upgrades or data logging.

Conventions Used in This Manual

To help you learn how to use your EXP-1145 analyzer, the manual uses these symbols and typographical conventions:

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>This symbol indicates additional important information.</td>
</tr>
<tr>
<td>!</td>
<td>The safety symbol with the words CAUTION, WARNING, or DANGER indicates instructions for avoiding hazardous conditions and personal injury.</td>
</tr>
</tbody>
</table>
**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. The following figure shows how the elements on the screen relate to the keypad.

![Main Menu and Keypad](image)

1. **Internal Batteries Status Indicator**
   This indicator appears in the screen's top left corner, lets you know the status and charge level of the analyzer's six 1.5-volt batteries. The X in the top left corner of the screen shows that the analyzer is powered by the battery you're testing to conserve the analyzer's internal batteries.

2. **Voltmeter**
   When you first connect the analyzer 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.

3. **Soft Keys**
   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**.

4. **Arrow ( ) Keys**
   Press the **ARROW** keys to scroll to numerical values and move to menus and icons.

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

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

7. **Selection Area**
   The selection area below the Title Bar contains selectable items or dialog boxes that display information or require a response.

8. **Menu Screen Arrows**
   When displayed in menu screens, the menu screen arrows show you which **ARROW** key on the keypad to press to display other icons or screens. The Up and Down Menu Screen Arrows, for example, indicate when to press the up or down keys to display the screens above and below the current screen.

   The Left and Right Menu Screen Arrows tell you when to use the left or right keys to select an icon.

   When displayed under a list of options, the menu screen arrows show you which keypad arrow to press to highlight a character or item in a list.

9. **Scroll Bar**
   Another navigational aid is the scroll bar on the right side of the screen. The position of its scroll box shows you whether the screen is the top (or only screen), middle, or last in a series.

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

    You can also use the alphanumeric keys to create and edit customer coupons and your shop contact information on printed test results, and manage User IDs.

    Refer to the table below for the characters associated with each alphanumeric key.
Alphanumeric Keys and Associated Characters

<table>
<thead>
<tr>
<th>Key</th>
<th>Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$ - ( ) 1</td>
</tr>
<tr>
<td>2</td>
<td>a b c 2</td>
</tr>
<tr>
<td>3</td>
<td>d e f 3</td>
</tr>
<tr>
<td>4</td>
<td>g h i 4</td>
</tr>
<tr>
<td>5</td>
<td>j k l 5</td>
</tr>
<tr>
<td>6</td>
<td>m n o 6</td>
</tr>
<tr>
<td>7</td>
<td>p q r s 7</td>
</tr>
<tr>
<td>8</td>
<td>t u v 8</td>
</tr>
<tr>
<td>9</td>
<td>w x y z 9</td>
</tr>
<tr>
<td>0</td>
<td>% , . # 0</td>
</tr>
</tbody>
</table>

Data Entry Methods

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 or 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 or to move the dot to the button next to the item. To confirm your selection, press the appropriate soft key.

Scroll Boxes

Scroll boxes contain variables that are displayed by scrolling using arrow keys.

To select, use or to scroll to the value, and press the appropriate soft key. In the illustration the left directional arrow indicates that you can press to clear all or part of the entry.

Scrolling Lists

Scrolling lists contain items that extend above and below the screen. The first number above the right soft key indicates the position in the list of the highlighted item. The second number above the right soft key indicates the number of items in the list.

To select an item, press or to highlight the item, and press the appropriate soft key. To move the highlight bar up five lines at a time, press . To move the highlight bar down five lines at a time, press.

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 or 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 . Use to add a space. Use or to highlight a line for editing. When finished, press the appropriate soft key to save your settings.

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 options.

Menu icons marked with an asterisk (*) are mapped on the following pages.

<table>
<thead>
<tr>
<th>Menu Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>©</td>
<td>Tests a battery using the battery information you select in a series of screens.</td>
</tr>
<tr>
<td>©</td>
<td>Optional function to test a vehicle’s battery, starter, and charging systems.</td>
</tr>
<tr>
<td>©</td>
<td>Test consecutive batteries using the same battery ratings and settings.</td>
</tr>
<tr>
<td>©</td>
<td>Allows you to view and print the results of the battery test before they are overwritten when you start a new test.</td>
</tr>
<tr>
<td>©</td>
<td>Includes a test counter, data transfer utility, the software version and serial number.</td>
</tr>
<tr>
<td>©</td>
<td>Utilities to customize your user interface.</td>
</tr>
</tbody>
</table>

* Optional Add-on Function
Chapter 1: Introduction & Overview

Utility Menu

The Utility Menu lets you customize your analyzer to suit your needs.

<table>
<thead>
<tr>
<th>Menu Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONFIG TESTER</td>
<td>Configure the tester by selecting several specific functions.</td>
</tr>
<tr>
<td>DISPLAY</td>
<td>Settings to adjust the screen contrast and backlight time.</td>
</tr>
<tr>
<td>CONFIG PRINTER</td>
<td>Enables you to configure the printer to IrDA.</td>
</tr>
<tr>
<td>SHOP INFO</td>
<td>Enables you to add a custom header to printed test results.</td>
</tr>
<tr>
<td>COUPON</td>
<td>If you’ve created a coupon in the Edit Coupon utility, use Coupon to turn it on and off.</td>
</tr>
<tr>
<td>EDIT COUPON</td>
<td>Enables you to create a coupon at the bottom of printed test results.</td>
</tr>
<tr>
<td>LANGUAGE</td>
<td>Sets the language of the display and printouts.</td>
</tr>
<tr>
<td>FORMAT CARD</td>
<td>Formats the data card to receive data. Also erases all data on the card.</td>
</tr>
<tr>
<td>UPDATE</td>
<td>Updates the software using files on an data card.</td>
</tr>
<tr>
<td>BATTERY MENU</td>
<td>Change, add or delete batteries for Compound/Stock mode.</td>
</tr>
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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.

<table>
<thead>
<tr>
<th>Menu Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIEW TEST</td>
<td>Displays the last Battery and System Test results. Sends the results to an optional IR printer.</td>
</tr>
<tr>
<td>VIEW QC TEST</td>
<td>Displays the last QC Test result. Sends the result to an optional IR printer.</td>
</tr>
</tbody>
</table>

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.

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

Test Preparation

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 ½ 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 To The Battery

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

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.

For a **CHECK CONNECTION** message make sure both sides of the clamps are gripping the terminals, by rocking each clamp back and forth. If the message reappears after you have correctly reconnected the clamps, clean the terminals and reconnect.

The message **WIGGLE CLAMPS** can indicate that there is no good connection between the clamps and the battery posts. This could be because of corrosion on the posts. Wiggle the clamps and retest.

If there is a problem with the cable resistance the same message can appear. Contact Midtronics for further action.

**NOTE**: When the battery voltage is below 0.5 Volt the message **CHECK CONNECTION** can appear. Fully charge the battery and retest.

Initial Power Up
Following the first time power up of the tester, set and adjust the tester language, date, time, and dealer ID code. Further adjustments. Access these same settings at any time using the functions in the Utility Menu.

1. Use ▲ or ▼ to select the tester default LANGUAGE and press NEXT to continue, or press the corresponding number key. There are 24 languages available.
   1. ○ ENGLISH
   2. ○ ESPAÑOL
   3. ○ FRANÇAIS
   4. ○ DEUTSCH

2. Using ▲ or ▼ to select the tester date display format and press NEXT to continue, or press the corresponding number keys.
   1. ○ MM/DD/YYYY
   2. ○ DD/MM/YYYY

3. Adjust the tester date by using ◀ or ▶ to select the month, day, and year. Use ▲ or ▼ to advance each number up or down. Press NEXT to continue.

4. Use ▲ or ▼ to select the tester clock display mode and press NEXT to continue, or press the corresponding number keys.
   1. ○ 24 HOUR
   2. ○ AM / PM

5. Adjust the tester clock by using ◀ or ▶ to select the hours and minutes. Use ▲ or ▼ to advance each number up or down. Press NEXT to continue.

6. Use the keypad to enter your four digit alphanumeric DEALER ID code and press SAVE to save your preferences and continue to the Main Menu.
Chapter 2: Battery Test

The tester will guide you through the steps of selecting your battery test parameters and interpreting the results. Before you start the test, review the instructions in previous chapter.

1. Use the ARROW keys to select the BATTERY TEST icon and press SELECT to continue. The BACK key returns you to the Main Menu at the start of the test and to the previous screen as you progress.

2. Use ▲ or ▼ to select the battery LOCATION and press NEXT to continue, or press the corresponding number keys.

   1. ○ IN VEHICLE
   2. ○ OUT OF VEHICLE

In Vehicle Testing

1. Use the keypad or an attached barcode scanner to enter the vehicle's VIN code and press NEXT to continue.

2. Use ▲ or ▼ to select the MODEL of the vehicle being tested and press NEXT to continue, or press the corresponding number key.

   NOTE: If you select a specific MODEL, select the correct battery from the list displayed. If you select OTHER, skip to step 3.

   For CAYENNE or CARRERA GT select the battery POST TYPE and press NEXT to continue, or press the corresponding number key.

   1. ○ BATTERY POST
   2. ○ JUMP START POST

   If you are testing a Cayenne, use ▲ or ▼ to select the ENGINE TYPE of the vehicle being tested and press NEXT to continue, or press the corresponding number key.

   1. ○ GASOLINE ENGINE
   2. ○ DIESEL ENGINE

   Use ▲ or ▼ to select the battery option for the specific model type selected and press NEXT to continue.

3. Use ▲ or ▼ to select the BATTERY TYPE and press NEXT to continue, or press the corresponding number key.

   1. ○ REGULAR
   2. ○ AGM
   3. ○ SPIRAL
   4. ○ GEL

4. Use ▲ or ▼, or press the corresponding number key to select the RATING UNITS and press NEXT to continue.

   1. ○ SAE
   2. ○ EN
   3. ○ JIS
   4. ○ DIN

Ratings

<table>
<thead>
<tr>
<th>Ratings</th>
<th>Description</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAE (CCA)</td>
<td>Society of Automobile Engineers. The amount of current a battery can provide at 0 °F (−17.8 °C).</td>
<td>100 to 3000</td>
</tr>
<tr>
<td>EN</td>
<td>Europa-Norm</td>
<td>100 to 1700</td>
</tr>
<tr>
<td>JIS</td>
<td>Japanese Industrial Standard: (shown on a battery as a combination of numbers and letters.)</td>
<td>72 numbers from 26A17 to 245H52</td>
</tr>
<tr>
<td>DIN</td>
<td>Deutsche Industrie-Norm</td>
<td>100 to 1000</td>
</tr>
<tr>
<td>IEC</td>
<td>International Electrotechnical Commission</td>
<td>100 to 1000</td>
</tr>
</tbody>
</table>

IMPORTANT: Battery rating types (ex. SAE, EN, etc.) are not equivalent and cannot be interchanged. Using an incorrect battery rating will result in an inaccurate test results.

5. Use ▲ or ▼, or press the corresponding number keys to select the battery rating for the battery being tested. For JIS, select from the displayed part number list. To increase your scrolling speed, hold down ▲ or ▼.

   550 ▼ A(SAE)

Press NEXT to proceed to the next step.

6. If necessary, select the battery TEMPERATURE. Hold the top of the tester two inches above the battery case so that the IR temperature sensor can approximate the battery temperature.

   Battery Case (Top) 50 mm From Battery

Press NEXT to lock in the battery temperature and continue to the next step. For the next few seconds the tester will display the word TESTING and a stopwatch while it evaluates the battery.
Chapter 2: Battery Test

Out Of Vehicle Testing

1. Use ▲ or ▼, or press the corresponding number key to select the BATTERY TYPE and press NEXT to continue.
   1: REGULAR
   2: AGM
   3: SPIRAL
   4: GEL

2. Use ▲ or ▼, or press the corresponding number key to select the RATING UNITS and press NEXT to continue.
   1: SAE
   2: EN
   3: JIS
   4: DIN

<table>
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<tr>
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<th>Range</th>
</tr>
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<tr>
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<td>Society of Automobile Engineers. The amount of current a battery can provide at 0 °F (–17.8 °C).</td>
<td>100 to 3000</td>
</tr>
<tr>
<td>EN</td>
<td>Europa-Norm</td>
<td>100 to 1700</td>
</tr>
<tr>
<td>JIS</td>
<td>Japanese Industrial Standard: (shown on a battery as a combination of numbers and letters.)</td>
<td>72 numbers from 26A17 to 245H52</td>
</tr>
<tr>
<td>DIN</td>
<td>Deutsche Industrie-Norm</td>
<td>100 to 1000</td>
</tr>
<tr>
<td>IEC</td>
<td>International Electrotechnical Commission</td>
<td>100 to 1000</td>
</tr>
</tbody>
</table>

IMPORTANT: Battery rating types (ex. SAE, EN, etc.) are not equivalent and cannot be interchanged. Using an incorrect battery rating will result in an inaccurate test results.

3. Use ▲ or ▼ to select the battery rating for the battery being tested, or press the corresponding number keys. For JIS, select from the displayed part number list. To increase your scrolling speed, hold down ▲ or ▼.

   Press NEXT to proceed to the next step.

4. If necessary, select the battery TEMPERATURE. Hold the top of the tester two inches above the battery case so that the IR temperature sensor can approximate the battery temperature.

   Press NEXT to lock in the battery temperature and continue to the next step.

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

Surface Charge

The battery will 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 begins testing.

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

Deep Scan Test

For deeply discharged batteries, the tester may perform a Deep Scan Test to further analyze the battery to determine if it should be replaced or can be recovered.

After the Deep Scan Test the tester will display the results.
Battery Test Results

After the test the tester will display one of five battery decisions with the complete results in a series of screens. Use ▲ or ▼ to scroll through each result.

To send the results to an IR printer, align the analyzer’s IR transmitter with the printer’s receiver and press PRINT. To return to the Main Menu, press END.

Battery Decisions and Recommendations

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<td>GOOD BATTERY</td>
<td>Return the battery to service.</td>
</tr>
<tr>
<td>GOOD–RECHARGE</td>
<td>Fully charge the battery and return it to service.</td>
</tr>
<tr>
<td>CHARGE&amp;RETEST</td>
<td>Fully charge the battery and retest. Failure to fully charge the battery before retesting may cause false readings. If CHARGE &amp; RETEST appears again after you fully charge the battery, replace the battery.</td>
</tr>
<tr>
<td>REPLACE BATTERY</td>
<td>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.</td>
</tr>
<tr>
<td>BAD CELL–REPLACE</td>
<td>Replace the battery.</td>
</tr>
<tr>
<td>FROZEN BATTERY</td>
<td>Let battery warm before testing or charging.</td>
</tr>
</tbody>
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All test results are stored on the data card. This data can be copied from the card and used to verify / compare results.
Chapter 4: System Test

System Test is an optional add-on function that tests a vehicle's battery, starter, and charging systems. All test results are stored on the data card. This data can be copied from the card and used to verify / compare results.

NOTE: When you start a new test, the last test results in memory are overwritten.

If you use the ARROW keys to select option buttons, press NEXT to continue to the next step.

1. In the Main Menu select the SYSTEM TEST icon and press NEXT to continue.
2. Use the keypad or the barcode scanner to enter the vehicle VIN code and press NEXT to continue.
3. Use ▲ or ▼ to select the MODEL of the vehicle being tested and press NEXT to continue, or press the corresponding number key.

NOTE: If you select OTHER, skip to step 3.

For CAYENNE or CARRERA GT select the battery POST TYPE and press NEXT to continue, or press the corresponding number key.

1  □ BATTERY POST
2  □ JUMP START POST

If you are testing a Cayenne, use ▲ or ▼ to select the ENGINE TYPE of the vehicle being tested and press NEXT to continue, or press the corresponding number key.

1  □ PETROL
2  □ DIESEL

Use ▲ or ▼ to select the battery option for the specific model type selected and press NEXT to continue.

3. Use ▲ or ▼ to select the BATTERY TYPE and press NEXT to continue, or press the corresponding number key.

1  □ REGULAR
2  □ AGM
3  □ SPIRAL
4  □ GEL

4. Use ▲ or ▼, or press the corresponding number key to select the RATING UNITS and press NEXT to continue.

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<tr>
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<th>Range</th>
</tr>
</thead>
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<td>JIS</td>
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</tr>
<tr>
<td>IEC</td>
<td>International Electrotechnical Commission</td>
<td>100 to 1000</td>
</tr>
</tbody>
</table>

IMPORTANT: Battery rating types (ex. SAE, EN, etc.) are not equivalent and cannot be interchanged. Using an incorrect battery rating will result in an inaccurate test results.

5. Use ▲ or ▼, or press the corresponding number keys to select the battery rating or in the case of JIS, the part number. To increase your scrolling speed, hold down ▲ or ▼. Press NEXT to proceed to the next step.

6. Press ▲ or ▼ to select the BATTERY RATING or use the numeric keys and press NEXT to continue.

If CCA, scroll to the rating and press SELECT. The entry range is 100 to 3000, except for DIN and IEC, which have a range of 100 to 1000.

7. If necessary, select the battery TEMPERATURE. Hold the top of the tester two inches above the battery case so that the IR temperature sensor can approximate the battery temperature.
Press NEXT to lock in the battery temperature and continue to the next step.

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

**Battery Test Results**

After the test the tester will display the battery test decisions across a series of screens. Use ▲ or ▼ to scroll through each result.

To send the results to an IR printer, align the analyzer's IR transmitter with the printer's receiver and press PRINT. To return to the Main Menu, press END.

### Battery Decisions and Recommendations

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<th>Decision</th>
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<tr>
<td>FROZEN BATTERY</td>
<td>Let battery warm before testing or charging.</td>
</tr>
</tbody>
</table>

### Starting System Test

1. Use the keypad to enter the BATTERY AH.

   ![Image of keypad with '?' and 'AH']

2. When prompted, start the vehicle's engine.

   **NOTE:** In some cases, the tester may not detect the vehicle's starting profile and will display the options STARTED and NO START. Select STARTED, to continue with an alternator test. Select NO START to end the test process.

### Starting System Results

To send the results to an IR printer, align the analyzer’s IR transmitter with the printer’s receiver and press PRINT. To return to the Main Menu, press END.

![Image of starting system results chart]
## Starter System Decision

<table>
<thead>
<tr>
<th>Decision</th>
<th>Action Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRANKING NORMAL</td>
<td>The starter voltage is normal and the battery is fully charged.</td>
</tr>
<tr>
<td>LOW VOLTAGE</td>
<td>The starter voltage is low and the battery is fully charged.</td>
</tr>
<tr>
<td>CHARGE BATTERY</td>
<td>The starter voltage is low and the battery is discharged. Fully charge the battery and repeat the starter system test.</td>
</tr>
<tr>
<td>REPLACE BATTERY</td>
<td>(If the battery test result was REPLACE or BAD CELL.) The battery must be replaced before testing the starter.</td>
</tr>
<tr>
<td>NO START</td>
<td>The engine didn’t start and the test was aborted.</td>
</tr>
<tr>
<td>CRANKING SKIPPED</td>
<td>The tester didn’t detect the vehicle’s starting profile and skipped the Starter Test.</td>
</tr>
<tr>
<td>SIDE POST TEST</td>
<td>Test data was inconclusive using the side post. Retest using side post adapters.</td>
</tr>
<tr>
<td>JUMP START POST</td>
<td>Data was inconclusive using the jump start post. Retest at the battery terminals.</td>
</tr>
</tbody>
</table>

## Charging System Test

1. **CHECKING FOR ALTERNATOR OUTPUT:** The analyzer is testing for alternator voltage.
2. **TURN ALL VEHICLE LOADS OFF, IDLE ENGINE:** Turn off vehicle loads (blowers, interior light, radio, etc.) and idle the engine. Press NEXT to continue.
3. **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 moves to the right.

   **NOTE:** Some 8-cylinder and older vehicles idle at a high level after starting, allowing the analyzer to detect the rev automatically.

4. **ACQUIRING DATA...HOLD ENGINE RPM:** Continue to hold the rpm while the analyzer takes system measurements.
5. **ENGINE REV DETECTED, IDLE ENGINE:** The analyzer has detected the rev. Press NEXT to continue.
6. **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.

## Charging System Results

To send the results to an IR printer, align the analyzer’s IR transmitter with the printer’s receiver and press PRINT. To return to the Main Menu, press END.

### Decision

- **LOADS-OFF DC VOLTAGE AT REV**
- **LOADS-OFF CURRENT AT REV** (if amp clamp is used)
- **LOADS-ON DC VOLTAGE AT REV**
- **LOADS-ON CURRENT AT REV** (if amp clamp is used)

### Normal DC Voltage Range

- **MAX**
- **MIN**

### Peak-to-Peak AC Voltage

- **ripples**
- **Graph of diode waveform**

7. **TURN HIGH BEAMS AND BLOWER MOTOR ON, IDLE ENGINE:** After a few seconds, the analyzer 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 and the blower to high. Do not use cyclical loads such as air conditioning or windshield wipers.

8. **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.

9. **REV ENGINE WITH LOADS ON FOR 5 SECONDS:** The analyzer 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 moves to the right.

10. **ACQUIRING DATA...HOLD ENGINE RPM:** Continue to hold the rpm while the analyzer takes system measurements.

11. **ENGINE REV DETECTED, IDLE ENGINE:** The analyzer has detected the rev. Press NEXT to continue.

12. **ANALYZING CHARGING SYSTEM DATA:** The analyzer is completing its final analysis of the charging system data.

13. **TURN OFF LOADS AND ENGINE:** Press NEXT to display the results.
### Charging System Decision

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>NO PROBLEMS</td>
<td>The system is showing normal output from the alternator. No problem detected.</td>
</tr>
<tr>
<td>NO VOLTAGE</td>
<td>✓ Ensure alternator is rotating when engine is running.</td>
</tr>
<tr>
<td>LOW VOLTAGE</td>
<td>✓ Check alternator connections especially to the battery. If loose or heavily corroded, clean or replace and retest.</td>
</tr>
<tr>
<td>HIGH VOLTAGE</td>
<td>✓ If the belts and connections are in good working condition, replace the alternator.</td>
</tr>
<tr>
<td></td>
<td>✓ For REPLACE decision with a HIGH OUTPUT decision, check battery for fluid spewing through the vent caps causing low electrolyte levels and will harm the battery.</td>
</tr>
</tbody>
</table>

### Diode Decision

<table>
<thead>
<tr>
<th>Decision</th>
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</tr>
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<tbody>
<tr>
<td>EXCESSIVE RIPPLE</td>
<td>One or more alternator diodes are not functioning or stator is damaged, shown by excessive AC ripple current to the battery.</td>
</tr>
<tr>
<td></td>
<td>✓ Confirm alternator mounting is sturdy and belts are functioning properly. If okay, replace the alternator.</td>
</tr>
<tr>
<td>OPEN PHASE</td>
<td>Replace the alternator.</td>
</tr>
<tr>
<td>OPEN DIODE</td>
<td>Replace the alternator.</td>
</tr>
<tr>
<td>SHORTED DIODE</td>
<td>Replace the alternator.</td>
</tr>
</tbody>
</table>
Chapter 5: QC Test

The tester has the ability to test consecutive batteries without having to input each battery’s rating / settings.

**Stock Control**

Use the Stock Control function when testing batteries that have been standing in a warehouse or on a pallet and have not been installed in a vehicle.

1. Use the ARROW keys to select the QC MODE icon and press SELECT to continue. The BACK key returns you to the Main Menu at the start of the test and to the previous screen as you progress.

2. Use ▲ or ▼ to select STOCK CONTROL and press NEXT to continue or press the corresponding number keys.
   - 1 ○ STOCK CONTROL
   - 2 ○ COMPOUND TEST

3. The total number of QC tests completed is displayed on the screen. To reset the counter, press ▼ and ▲ at the same time.

   Press NEXT to continue.

4. Use ▲ or ▼, or press the corresponding number key to select the BATTERY TYPE and press NEXT to continue.
   - 1 ○ REGULAR
   - 2 ○ AGM
   - 3 ○ SPIRAL
   - 4 ○ GEL

5. Use ▲ or ▼, or press the corresponding number key to select the RATING UNITS and press NEXT to continue.
   - 1 ○ SAE  5 ○ IEC
   - 2 ○ EN
   - 3 ○ JIS
   - 4 ○ DIN

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**IMPORTANT:** Battery rating types (ex. SAE, EN, etc.) are not equivalent and cannot be interchanged. Using an incorrect battery rating will result in an inaccurate test results.

6. Use ▲ or ▼ to select the BATTERY RATING for the battery being tested, , or press the corresponding number keys. For JIS, select from the displayed part number list. To increase your scrolling speed, hold down ▲ or ▼.

   Press NEXT to continue.

7. Use ▲ or ▼ to select the VOLTAGE and press NEXT to continue or press the corresponding number keys.

   Press NEXT to continue.

8. Set the battery TEMPERATURE. Aim the tester 5 cm from the sides or top of the battery case.

   As soon as the temperature reading is stable press NEXT to lock in the battery temperature.

   The tester will now test the battery.
Stock Control Results
STOCK CONTROL test results are saved automatically to the inserted SD-type data card.

1. To send the results to an IR printer, align the analyzer’s IR transmitter with the printer’s receiver and press PRINT.
2. Press END to return to the Battery Menu.

To view saved QC Test results, at the Main Menu select the Print/View icon and choose the View QC Test icon. See Chapter 5: Print View for more information.

Compound Test
Use the Compound Test when testing a battery that has been installed in a new vehicle.

1. Use the ARROW keys to select the QC MODE icon and press SELECT to continue. The BACK key returns you to the Main Menu at the start of the test and to the previous screen as you progress.
2. Use ▲ or ▼ to select COMPOUND TEST and press NEXT to continue or press the corresponding number keys.
   1. STOCK CONTROL
   2. COMPOUND TEST
3. The total number of QC tests completed is displayed on the screen. To reset the counter, press ◀ and ► at the same time.

Press NEXT to continue.

4. For a COMPOUND TEST, use ▲ or ▼ to select the type of battery SELECTION, or press the corresponding number key.
   1. MANUAL ENTRY
   2. PRE SELECTION

Manual Entry
Use the MANUAL ENTRY option when entering the battery parameter information found on the battery.

1. Use ▲ or ▼, or press the corresponding number key to select the BATTERY TYPE and press NEXT to continue.
   1. REGULAR
   2. AGM
   3. SPIRAL
   4. GEL
2. Use ▲ or ▼, or press the corresponding number key to select the RATING UNITS and press NEXT to continue.
   1. SAE
   2. EN
   3. JIS
   4. DIN

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**IMPORTANT:** Battery rating types (ex. SAE, EN, etc.) are not equivalent and cannot be interchanged. Using an incorrect battery rating will result in an inaccurate test results.

3. Use ▲ or ▼ to select the BATTERY RATING for the battery being tested, , or press the corresponding number keys. For JIS, select from the displayed part number list. To increase your scrolling speed, hold down ▲ or ▼.

   550 A(SAE)

Press NEXT to continue.
4. Use ▲ or ▼ to select the VOLTAGE and press NEXT to continue or press the corresponding number keys.

![Battery Case (Top)](image)

As soon as the temperature reading is stable press NEXT to lock in the battery temperature.

The tester will now test the battery.

**Pre-Selection**

The PRE-SELECTION function is a quick way to access battery information previously entered in the tester memory. The list of PRE-SELECTION options can be filled through the Battery Menu option in the Utility Menu.

1. Use ▲ or ▼ to select the TEST LOCATION and press NEXT to continue or press the corresponding number keys.
   1.  BATTERY POST
   2.  JUMP START POST

   For JUMP START POST, select the MODEL and BATTERY from the displayed list and press NEXT to continue.

2. Use ▲ or ▼ to select the BATTERY RATING from the stored list created through the Battery Menu function in the Utility Menu and press NEXT to continue.

3. Use ▲ or ▼ to select the VOLTAGE and press NEXT to continue or press the corresponding number keys.

   ![12.40 V](image)

   Press NEXT to continue.

4. Set the battery TEMPERATURE. Aim the tester 5 cm from the sides or top of the battery case.

   ![Battery Case (Top)](image)

   As soon as the temperature reading is stable press NEXT to lock in the battery temperature.

   **NOTE:** When testing at the Jump Start posts, use ▲ or ▼ to select the TEMPERATURE and press NEXT to continue or press the corresponding number keys.

   The tester will now test the battery.

**Compound Test Results**

COMPOUND TEST results are not automatically saved and do not count toward the 100 maximum results that the tester can store unless you save it manually.

1. To save the results, press SAVE.

2. Using the keypad, enter any IDENTIFICATION information you wish to include with the test result. This information will be displayed when the results are printed out.

   Press NEXT to continue.

3. Press NEW to test another battery using the COMPOUND TEST.

4. To send the results to an IR printer, align the analyzer’s IR transmitter with the printer’s receiver and press PRINT.

5. To return to the Battery Warranty menu without saving, press END.

To view saved QC Test results, at the Main Menu select the Print/View icon and choose the View QC Test icon. See Chapter 5: Print View for more information.
Chapter 6: Print / View

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

1. Use the ARROW keys to select the PRINT/VIEW icon and press SELECT to continue.

2. Press the BACK key to return to the Main Menu at the start of the test and to the previous screen as you progress.

View Test

VIEW TEST gives you the option of viewing and printing the results of the last Battery or System Test performed.

To print the results, align the analyzer’s IR transmitter with the printer’s receiver and select PRINT. To return to the Print View menu, press END.

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 PRINT. To return to the Print View menu, press END.
Chapter 7: Info Menu

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

1. Use the ARROW keys to select the INFO icon and press SELECT to continue. The Reports Menu is displayed.
2. Press the BACK key to return to the Main Menu at the start of the test and to the previous screen as you progress.

Totals

The TOTALS menu shows you the total number of tests in various categories since the values were last cleared and reset to zero.

Counter Totals

1. Use ▲ or ▼, or press the corresponding number key to select the TOTALS and press NEXT to continue.

   1  TOTAL
   2  TOTALS BY DECISION
   3  CLEAR COUNTERS

The TOTALS screen appears. The BACK key returns you to the Reports Menu or to the previous screen as you progress.

2. To send the results to an IR printer, align the analyzer’s IR transmitter with the printer’s receiver and press PRINT.
3. Press END to return to the COUNTER screen.

Totals By Decision

TOTALS BY DECISION displays the total number of tests by battery decision.

1. Use ▲ or ▼, or press the corresponding number key to select the TOTALS and press NEXT to continue. The TOTALS screen appears.

The BACK key returns you to the Reports Menu or to the previous screen as you progress.
Chapter 8: Utilities

The Utility Menu has several utilities that customize the tester—from the language of the user interface to the contrast of the text on the display. The utilities have default settings that you can change, depending on your requirements.

1. Use the ARROW keys to select the UTILITY icon and press SELECT to continue.
2. Press BACK to return to the Main Menu and to the previous screen as you progress.

Config Tester

1. Use the ARROW keys to select the CONFIG TESTER icon and press SELECT to continue.
2. Press the BACK key to return to the Utility Menu at the start of the test and to the previous screen as you progress.

Time

<table>
<thead>
<tr>
<th>TIME</th>
<th>9:59 AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODE</td>
<td>AM/PM</td>
</tr>
<tr>
<td>DATE</td>
<td>DD/MM/YYYY</td>
</tr>
<tr>
<td>FORMAT</td>
<td>27/03/2012</td>
</tr>
<tr>
<td>TEMP. UNITS</td>
<td>C</td>
</tr>
<tr>
<td>WRITE FAIL</td>
<td>ASK</td>
</tr>
<tr>
<td>DEALER ID</td>
<td>12345678</td>
</tr>
</tbody>
</table>

Format

1. Use ▲ or ▼ to select FORMAT.
2. Press ◀ or ▶ to toggle between MM/DD/YYYY and DD/MM/YYYY display.
3. Press OK to return to the Utility Menu.

Temp. Units

1. Use ▲ or ▼ to select TEMP UNITS.
2. Press ◀ or ▶ to toggle between Celsius or Fahrenheit.
3. Press OK to return to the Utility Menu.

Write Fail

After each measurement the test results are stored on an SD-type data card inside of the tester. In case the data cannot be stored on to the card you can select the way this is notified to the operator.

1. Use ▲ or ▼ to select WRITE FAIL.
2. Press ◀ or ▶ to toggle between ASK, FORCE, and IGNORE.
3. Press OK to return to the Utility Menu.

Dealer ID

1. Use ▲ or ▼ to select WRITE FAIL.
2. Press ◀ or ▶ to toggle between ASK, FORCE, and IGNORE.
3. Use the tester keypad to enter your four digit alphanumeric dealer ID.
4. Press SAVE to save your changes and return to the Config Tester menu or press BACK to return to the menu without saving your changes.

Display

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

1. Use the ARROW keys to select the DISPLAY icon and press SELECT to continue.
2. Press BACK to return to the Utility Menu at the start of the test and to the previous screen as you progress.
Contrast Level
The contrast level is 0 (lightest) to 10 (darkest). To change it:
1. Press ▲ or ▼ to highlight the option.

   CONTRAST LEVEL  9
   BACKLIGHT TIME  15

2. Press ◀ or ▶ to access the LCD CONTRAST screen.
3. Press ▲ or ▼ to increase the display contrast level, or press the corresponding number on the keypad.

   10 (1-10)

4. Press SAVE to save your setting or BACK 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 ▲ or ▼ to highlight the option.

   CONTRAST LEVEL  9
   BACKLIGHT TIME  15

2. Press ◀ or ▶ to access the BACKLIGHT TIME screen.
3. Press ▲ or ▼ to increase the display backlight time, or press the corresponding number on the keypad.

   15 SEC

4. Press ▲ or ▼, or the corresponding number keys to select your preference.
5. Press SAVE to save your setting or BACK to return to the CONTRAST LEVEL screen without saving the changes.

Config Printer

Use CONFIG PRINTER option to configure your IrDA printer into the correct protocol.
1. Use the ARROW keys to select the CONFIG PRINTER icon and press SELECT to continue.
2. Turn on the printer you want to configure.
3. Point the tester at the printer and press NEXT. Wait until the hourglass displayed on the screen disappears and the Utility Menu is displayed before moving the printer or the tester.

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.

To help you edit and center your shop information, use the template in the Appendix of this manual to lay everything out before entering it into your tester.
1. Use the ARROW keys to select the SHOP INFO icon and press SELECT to continue. Press BACK to return to the Utility Menu at the start of the test and to the previous screen as you progress.

   The first of two SHOP INFO screens is displayed on the screen. Use ▲ or ▼ to scroll between screens.

   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

2. Press ▲ or ▼ to highlight the line you want to change. The cursor will be blinking to the right of the last character in the line.
3. To move the cursor backward to erase a character, press ◀; to move the cursor forward, press ▶.
4. Insert a character by pressing the key associated with the character as many times as needed.
5. Press SAVE to save your setting or BACK 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 ARROW keys to select the COUPON icon and press SELECT to continue. Press BACK to return to the Utility Menu at the start of the test and to the previous screen as you progress.

2. Press ▲ or ▼ to select your coupon option, or the corresponding number key.

   1 ○ NO USER COUPON PRINTED
   2 ○ USER COUPON

3. Press SAVE to save your setting or BACK 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 procedure uses the same procedure as a SHOP INFO header. See the Shop Info instructions for more information.

To help you edit and center your coupon information, use the template in the Appendix of this manual to lay everything out before entering it into your tester.

**Language**

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

1. Use the ARROW keys to select the COUPON icon and press SELECT to continue. Press BACK to return to the Utility Menu at the start of the test and to the previous screen as you progress.

   The Language options are displayed. There are a total of 24 language options.

   1. ENGLISH
   2. ESPAÑOL
   3. FRANCAIS
   4. DEUTSCH

2. Press NEXT to save your changes and return to the Utility Menu.

**Format Disk**

Select this utility to format an data card to receive data or erase all data on the card. The tester will warn you before formatting the disk 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 data card.

1. Use the ARROW keys to select the UPDATE icon and press SELECT to continue. Press BACK to return to the Utility Menu at the start of the test and to the previous screen as you progress.

   2. Press ▲ or ▼, or the corresponding number key to select your UPDATE option.

      1. FIRMWARE
      2. SAVE CONFIG
      3. LOAD CONFIG

   FIRMWARE Updates the tester software using a file on the data card.

   SAVE CONFIG Saves the tester configuration file to the data card.

   LOAD CONFIG Loads the configuration file into the tester from the data card. This will overwrite any current configuration file already loaded on the tester.

**Firmware**

When FIRMWARE is select, the tester checks the data card in the data card slot for an updated version of software. If one is found, the tester software is updated after a confirmation screen is displayed.

An error message is displayed if no firmware update is found.

**Save Config**

This option is a quick way to export the tester configuration file to a data card. The file can then be moved to other testers via the data card.

**Load Config**

Selecting this option will cause the tester to check the inserted data card for a saved configuration file. If one is found, it is loaded onto the tester.

**Battery Menu**

The BATTERY MENU option lets you build a custom battery list, import a list from the data card, or save the battery list to the data card. This function lets you add and delete specific battery types from the battery list you can access when using the QC Test option (See Chapter 5: QC Test).

1. Use the ARROW keys to select the BATTERY MENU icon and press SELECT to continue. Press BACK to return to the Utility Menu at the start of the test and to the previous screen as you progress.
2. Press ▲ or ▼ to select the item you want to modify and press NEXT, or the corresponding number key.

1  ○  ADD BATTERY
2  ○  DELETE BATTERY
3  ○  IMPORT LIST
4  ○  EXPORT LIST

Adding A Battery
1. To add a battery to the battery list, press ▲ or ▼ to select the BATTERY TYPE and press NEXT to continue, or the corresponding number key.

1  ○  REGULAR
2  ○  AGM
3  ○  SPIRAL
4  ○  GEL

2. Use ▲ or ▼ to select the RATING UNITS and press NEXT to continue, or press the corresponding number key.

1  ○  SAE
2  ○  EN
3  ○  JIS
4  ○  DIN

3. Use ▲ or ▼ to select the battery rating and press NEXT to add the battery to the list, or press the corresponding number keys.

4. Press ▲ or ▼ to enter the battery CAPACITY and press NEXT, or the use the number keypad.

80 AH

For JIS, select the part number from the list displayed on the screen. To increase your scrolling speed, hold down ▲ or ▼.

Deleting A Battery
1. Press ▲ or ▼ to select DELETE BATTERY and press NEXT, or the corresponding number key.

1  ○  ADD BATTERY
2  ○  DELETE BATTERY
3  ○  IMPORT LIST
4  ○  EXPORT LIST

A list of batteries that can be deleted is displayed on the screen.

2. Use ▲ or ▼ to highlight the battery you want to delete from the list and press NEXT.

Once the battery has been successfully deleted from the list, BATTERY LIST is displayed on the screen.

Import List
The IMPORT LIST function will import a battery list that has been saved to the internal data card.

1. Press ▲ or ▼ to select IMPORT LIST and press NEXT to continue, or press the corresponding number key.

1  ○  ADD BATTERY
2  ○  DELETE BATTERY
3  ○  IMPORT LIST
4  ○  EXPORT LIST

2. Press YES at the confirmation screen to complete importing the list.

Export List
The EXPORT LIST function will export a battery list to the internal data card for archiving or for exporting the list to other testers.

1. Press ▲ or ▼ to select EXPORT LIST and press NEXT to continue, or press the corresponding number key.

1  ○  ADD BATTERY
2  ○  DELETE BATTERY
3  ○  IMPORT LIST
4  ○  EXPORT LIST

2. Once the battery list has been successfully exported, the BATTERY MENU is displayed on the screen.
Chapter 9: Maintenance & Troubleshooting

Maintenance

Cables
To ensure proper test readings and the long life of your test cables:

- Periodically clean the clamps using a mixture of baking soda and water or mild hand soap, and a small non-metal brush. An old toothbrush works great.
- DO NOT CARRY THE TESTER BY THE CABLES. Carrying the analyzer or swinging it by the cables puts unnecessary strain on the cable set. Always carry the analyzer and the cables together.
- DO NOT put the analyzer on a bench and let the cables hang over the side of the bench. This can stress the connection between the cables and the analyzer.
- ALWAYS connect and disconnect the clamps to the battery by opening and closing them. NEVER pull on the cable set to remove the terminal clamps. Abuse can cause premature failure and lowered conductance readings.
- DO NOT WRAP THE CABLE SET AROUND THE ANALYZER when it’s not in use. This puts unnecessary strain on the cable set.
- NEVER attempt to repair a cable set or replace the clamps yourself. Any modifications to the cable set or clamps can affect the accuracy of the measurements and will void the warranty.

Housing
Wipe surface dirt from the analyzer’s housing with a soft cloth dampened with a solution of mild soap and water. Do not immerse the analyzer in water or let water flow over the analyzer. Make sure the IR temperature sensor on the front of the analyzer housing is clean from surface dirt. Do not open the housing, other than the battery door. There are no customer serviceable parts inside, and opening the housing will void the warranty.

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. Remove the screw.
3. Press gently on the ridges above the arrow on the battery compartment cover.
4. Slide the cover in the direction of the arrow and remove the cover.
5. Remove the discharged batteries.
6. Insert the new batteries, making sure the positive and negative terminals are positioned correctly.
7. Insert the door’s tabs into the slots on the analyzer and slide the door closed, making sure the latch locks.
Troubleshooting

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

Display Problems
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.
• If troubleshooting does not solve the problem, contact Midtronics at 1-800-776-1995.

The STATUS LED Flashes (Midtronics Printer)
When a printer fault occurs, the STATUS LED flashes. You can identify the fault by the number of sequential flashes:

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Condition</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>No paper</td>
<td>Insert new paper</td>
</tr>
<tr>
<td>**</td>
<td>Thermal head too hot</td>
<td>Allow head to cool</td>
</tr>
<tr>
<td>***</td>
<td>Batteries weak</td>
<td>Recharge printer batteries for 16 hours</td>
</tr>
</tbody>
</table>

Printer STATUS LED

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 tester from direct sunlight. If the printed characters are not clear or are partially missing, recharge the battery and reprint.
# Appendix

## Shop Header Template

To help you edit and center your coupon, use the template below to lay out your shop information below before entering it into the charger.

<table>
<thead>
<tr>
<th>Line 1</th>
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<td>Line 2</td>
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</tbody>
</table>

## Coupon Template

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</tbody>
</table>
PATENTS

The EXP-1000 Expandable Electrical Diagnostic Platform 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.

SERVICE

To obtain service, contact Midtronics for a Return Material Authorization number, and return the unit to Midtronics freight prepaid, Attention: RMA# ________. Midtronics will service the analyzer and, whenever possible, 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. Any analyzer beyond the warranty period is 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. To obtain RMA for service, call 1-800-776-1995 and press option 1.