

# Ford DCA-8000

## Diagnostic Battery Analyzer



User Guide



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# General Safety Precautions

**IMPORTANT SAFETY INSTRUCTIONS.** WORKING IN THE VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF THE UTMOST IMPORTANCE THAT THESE INSTRUCTIONS ARE FOLLOWED EACH TIME THE ANALYZER IS USED.

For safe, efficient, and accurate charging and testing, review the safety and operating instructions in this manual before using the analyzer. In addition, follow all manufacturers' instructions and BCI (Battery Council International) safety recommendations.

## 1 General Safety Precautions

<b>⚠ CAUTION</b>		<b>⚠ WARNING</b>	<b>⚠ DANGER</b>
	<b>Charging a non-rechargeable battery may cause the battery to burst.</b>	<b>Risk of explosive gases.</b>	<b>Risk of Fire</b>
To reduce the risk of injury, only charge rechargeable lead-acid type batteries including maintenance-free, low-maintenance, or deep-cycle batteries.		Batteries generate explosive gases during normal operation, and when discharged or charged.	Use only lithium-ion battery packs that include the battery management system and all necessary protection for the battery pack integral to the pack.

- 1.1 To reduce risk of battery explosion, follow these safety instructions and those published by the battery manufacturer and the manufacturer of any equipment you intend to use in the vicinity of a battery. Review cautionary marking on these products and on the engine, and on the vehicle or equipment containing the battery.  
  
If you are uncertain as to the type of battery you are attempting to charge, or the correct procedure for checking the battery's state of charge, contact the seller or battery manufacturer.
- 1.2 Use of an attachment not recommended or sold by the battery analyzer manufacturer may result in a risk of fire, electric shock, or injury to persons.
- 1.3 To reduce risk of damage to the electric plug and cord, pull by the plug rather than by the cord when disconnecting the analyzer.
- 1.4 Position the AC and DC leads to avoid tripping over them and to prevent damage from moving engine parts; protect from heat, oil, and sharp edges.
- 1.5 Do not operate the analyzer if it has received a sharp blow, been dropped or otherwise damaged in any way; take it to a qualified service center.
- 1.6 Do not disassemble analyzer; take it to a qualified service center when repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
- 1.7 To reduce risk of electric shock, unplug the analyzer from the AC outlet before attempting any maintenance or cleaning. Turning off the controls will not reduce this risk.
- 1.8 Connect and disconnect the battery leads only when the AC supply cord is disconnected.
- 1.9 Do not overcharge the battery.
- 1.10 Charge the battery in a dry, well-ventilated area.
- 1.11 Never place articles on or around the analyzer, or locate the analyzer in a way that will restrict the flow of cooling air through the cabinet.
- 1.12 An extension cord should not be used unless absolutely necessary. (See paragraph 4.2)
- 1.13 Have a damaged cord or plug replaced immediately.
- 1.14 Do not expose the analyzer to rain or snow.

## 2 Personal Precautions

- 2.1 This analyzer is not to be used by people with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- 2.2 Children should be supervised to ensure they do not play with the appliance.
- 2.3 Always have someone within range of your voice, or close enough to come to your aid, when working around lead acid batteries.
- 2.4 Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
- 2.5 Wear complete eye protection, clothing protection, and wear rubber soled shoes. Place damp cloth over battery to protect against acid spray. When ground is very wet or covered with snow, wear rubber boots. Avoid touching eyes while working near battery.
- 2.6 If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters the eye, immediately flush with cold running water for at least 10 minutes, and seek medical attention.
- 2.7 NEVER smoke or allow a spark or flame in vicinity of a battery or engine.
- 2.8 Be extra cautious to reduce risk of dropping a metal tool onto the battery. It might spark or short circuit the battery or other electrical part that may cause an explosion.
- 2.9 Before working with a lead-acid battery, remove personal metal items such as rings, bracelets, necklaces, watches, etc. A lead-acid battery can produce a short circuit current high enough to weld such items causing a severe burn.

### CAUTION

To avoid electrical shock or burn, never alter the analyzer's original AC cord and plug. Disconnect plug from outlet when analyzer is idle.

The analyzer is not intended to supply power to a low-voltage electrical system other than applications using rechargeable, lead-acid type batteries. Do not use the battery analyzer for charging dry-cell batteries commonly used with home appliances. These batteries may burst and cause personal injury and property damage.

- 2.10 NEVER charge a frozen battery; thaw it out first.

## 3 Preparing To Charge The Battery


- 3.1 If it is necessary to remove the battery from vehicle to charge it, always remove the grounded terminal from the battery first. Make sure all accessories in the vehicle are off, so as not to cause an arc.
- 3.2 Be sure the area around the battery is well ventilated while the battery is being charged. Gas can be forcefully blown away by using a piece of cardboard or other non-metallic material as a fan.
- 3.3 Clean the battery terminals. Be careful to keep corrosion from coming into contact with your eyes.
- 3.4 Add distilled water in each cell until the battery acid reaches the level specified by the manufacturer. This helps purge excessive gas from the cells. Do not overfill. For a battery without caps, carefully follow the manufacturer's recharging instructions
- 3.5 Study all battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.
- 3.6 Determine the voltage of the battery by referring to the car owner's manual and make sure that the output voltage selector switch is set at the correct voltage. If the analyzer has an adjustable charge rate, charge the battery initially at lowest rate. If the analyzer has only one voltage, verify that the battery voltage matches the voltage of analyzer.

For a analyzer not having an output voltage selector switch, determine the voltage of the battery by referring to car owner’s manual and make sure it matches the output rating of the battery analyzer.

#### 4 Grounding & Power Cord Connections


4.1 The analyzer must be grounded to reduce risk of electric shock. The analyzer is equipped with an electric cord having an equipment grounding conductor and a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

**⚠ DANGER**



**Hazardous voltage.**  
**An improper connection can result in electric shock.**

To avoid electrical shock or burn, never alter the analyzer’s original AC cord and plug. Disconnect plug from outlet when analyzer is idle.



**IMPORTANT:** If the plug does not fit the outlet, have a proper outlet installed by a qualified electrician.

4.2 An extension cord should not be used unless absolutely necessary. Use of an improper extension cord could result in a risk of fire and electric shock. If an extension cord must be used, make sure:

- a. that the pins on plugs of the extension cord are the same number, size, and shape as those of the plug on the analyzer;
- b. that the extension cord is properly wired and in good electrical condition;
- c. that the wire size is large enough for the AC ampere rating of analyzer as specified in the following table.

Recommended minimum AWG* size for extension cords for battery analyzers					
AC input rating Amps		AWG* size of cord			
Equal or greater than:	But less than:	Length of cord, feet (m)			
		25 (7.6)	50 (15.2)	100 (30.5)	150 (45.6)
8	10	18	14	12	10
10	12	16	14	10	8
12	14	16	12	10	8
14	16	16	12	10	8
16	18	14	12	8	8

\*American Wire Gauge

## 5 Analyzer Location

Not for permanent installation: Modifying this analyzer for permanent installation in a vehicle or installing this analyzer in a vehicle for permanent use is not recommended.

### WARNING

**In the event of fail device may generate and emit sparks.**

Only charge rechargeable flooded maintenance-free, low-maintenance or deep-cycle batteries.

This analyzer is not designed to be used outside without taking the necessary precautions and cannot be used in wet locations. The analyzer must always be protected from direct contact with water.

- 5.1 The analyzer must be located in an area with sufficient air space to allow unrestricted airflow in and around the analyzer.
- 5.2 Locate the analyzer as far from the battery as the analyzer cables permit.
- 5.3 Never place the analyzer directly above the battery being charged; gases from the battery will corrode and damage the analyzer.
- 5.4 Never allow battery acid to drip on the analyzer when taking gravity readings or filling a flooded cell battery.
- 5.5 Operate the analyzer only in a well-ventilated area that is free of dangerous vapors.
- 5.6 Store the analyzer in safe, dry location and maintain it in perfect condition.
- 5.7 Do not set the battery on top of the analyzer or where its acid might drip onto the analyzer.

## 6 DC Connection Precautions

- 6.1 Connect and disconnect the analyzer clamps only after the analyzer has been turned off and the AC supply cord is disconnected from the electric outlet.
- 6.2 Never allow the analyzer clamps to touch each other.
- 6.3 When attaching the analyzer clamps, be certain to make the best possible mechanical as well as electrical connection. This will tend to prevent the clamps from slipping off the connections, avoid dangerous sparking, and assure safer and more efficient charging. The clamps should be kept clean.

### DANGER



**Hazardous voltage.  
Can cause death or serious  
personal injury.**

Setting the switches to "OFF" does not always disconnect the analyzer electrical circuit from the AC power cord or the DC analyzer clamps.

## 7 Installing The Battery

### **WARNING**

#### **Risk of explosive gases.**

A spark near the battery may cause a battery explosion. Follow these steps when the battery is installed in the vehicle to reduce the risk of explosion.

- 7.1 Locate the analyzer as far away from the battery as the analyzer cords permit and position the AC and DC cords to avoid stepping on or tripping over them and to prevent damage by moving engine parts.
- 7.2 Turn **OFF** all vehicle loads, including door lights, and correct any defects in the vehicle's electrical system that may have caused low battery.
- 7.3 First connect the **POSITIVE (RED)** clamp from the analyzer to the **POSITIVE (POS., P, +)** ungrounded post of the battery. Then connect the **NEGATIVE (BLACK)** clamp to the **NEGATIVE (NEG., N,-)** post of the battery. Do not connect the clamp to the carburetor, fuel lines, or sheet-metal body parts.

## 8 Removing the Battery

- 8.1 If it is necessary to remove the battery from the vehicle or equipment, always remove the grounded terminal from the battery first.

### **WARNING**

#### **Risk of explosive gases.**

A spark near the battery may cause a battery explosion. Follow these steps when the battery is installed in the vehicle to reduce the risk of explosion.

### **WARNING**

#### **Risk of explosive gases.**

Make sure all vehicle loads are **OFF** to prevent a possible arc.

- 8.2 Check the polarity of battery posts.
- 8.3 Connect the **POSITIVE (RED)** analyzer clamp to the **POSITIVE (POS., P, +)** post of battery.
- 8.4 Position yourself and the free end of cable as far away from the battery as possible—do not face the battery when making the final connection—then connect the **NEGATIVE (BLACK)** analyzer clamp to the free end of the cable.
- 8.5 When disconnecting the analyzer, always do so in the reverse sequence of the connecting procedure; break the first connection while staying as far away from the battery as practical.

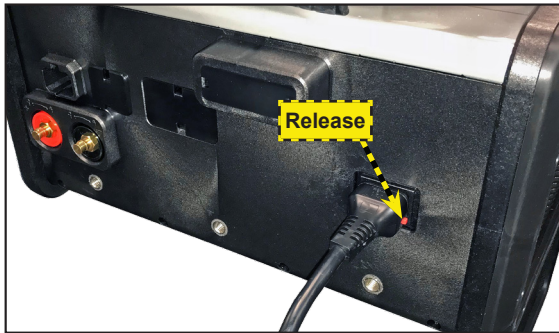
## 9 Maintenance & Storage

Follow these guidelines to protect the analyzer and test cables from damage and premature wear:

- 9.1 The grease, dirt, and sulfation that build up on battery terminals are highly corrosive and can damage the clamps over time. Before connecting the clamps, ensure accurate test readings and protect the clamps by cleaning the battery case and terminals using a wire brush and a mixture of water and baking soda.
- 9.2 Periodically clean the clamps using a mixture of baking soda and water, or a mild hand-soap, and a small bristle brush.
- 9.3 Clean the battery terminals. If stud adapters are required, fasten them with the proper tool. Do not use the battery clamps to tighten adapters.
- 9.4 Never remove the clamps from a battery to abort an active charging session. Always press the red **STOP** button before removing the clamps.
- 9.5 Do not leave the clamps laying in battery acid.

### Locking Power Cord

Always pull back on the red tab on the side of the power cord connector to release/remove it from the analyzer's power socket.



### Storage

Always store the analyzer in safe, dry location and maintain it in perfect condition.

## 10 Wireless Safety



The operation of this equipment is subject to the following two conditions.

1. This equipment or device may not cause harmful interference.
2. This equipment or device must accept any interference. Including interference that may cause undesired operation.

**SAVE THESE INSTRUCTIONS**

# Product Specifications

## Power

Input: 100 – 240 , 50/60 Hz; 12A max.  
Output: 12V , 70A

## Charge Cables

- 3m
- 5m

## Power Cord

Accepts C19 locking connector for region-specific power cables:

- EU: EMA 5-15 termination, rated at 16A/250V UL CSA
- UK: EMA 5-15 termination, rated at 13A/250V UL CSA
- United States: EMA 5-15 termination, rated at 15A/125V UL CSA

## Applications

- |                   |                    |
|-------------------|--------------------|
| • Automotive      | • Marine           |
| • Power Sports    | • Group 31         |
| • Lawn and Garden | • Commercial 4D/8D |



## Battery Chemistries

- |             |              |
|-------------|--------------|
| • Lead acid | • AGM Spiral |
| • AGM       | • EFB        |

## Rating System

- |       |       |       |
|-------|-------|-------|
| • CCA | • JIS | • IEC |
| • CA  | • DIN | • EN  |
| • MCA | • SAE |       |

## Operating Parameters

- Input Voltage: 100 – 240 , 50/60 Hz; 12A max.
- Output: 14VDC , 70A maximum

## Humidity

- 15% to 85% R.H., non-condensing

## Dimensions

(without handle or base)

- Weight: 15.45 kg (34 lbs)

## Temperature

- Operating temperature range: 0°C to +60°C (32°F to +140°F)
- Storage temperature range: -10°C to + 85°C (14°F to 185°F)

## Certifications

- |       |        |
|-------|--------|
| • CUL | • RoHS |
| • ETL | • VL   |
| • FCC | • UKFA |

## Connectivity

### Wi-Fi

- 802.11 b/g/n 2.4GHz
- Security – WEP, WP, WPA-2 Enterprise

### Bluetooth

- 2.0
- USB 2.0 connection CAN bus interface
- CAN bus interface

## Protection Features

- |                              |                                     |
|------------------------------|-------------------------------------|
| • Reverse polarity           | • Battery voltage too low (< 5.5 V) |
| • Non-12V battery connection | • Clamp high temperature detection  |
| • Clamp connection           |                                     |

## BMIS-Enabled

- Remote “over the air” software updates
- Enterprise asset management
- Reporting and analytic tools
- Communication with next generation Midtronics platforms and tools

## User Interface

- Advanced navigation and charge applications
- Remote notifications (Wi-Fi- or Bluetooth-enabled)
- Intuitive charge cycle feedback
- 5” Touch Screen




# 1 – Introduction & Overview

## Safety Reminder

For safe, efficient, and accurate charging and testing, review the safety and operating instructions in this manual before using the analyzer. In addition, follow all manufacturer instructions and BCI (Battery Council International) safety recommendations.

## Safety Precautions





Inspect the battery for damages and check the electrolyte level. If the electrolyte level is too low, replenish it and fully charge the battery. Always use the necessary safety precautions when working with batteries to prevent severe injury or death. Follow all manufacturers' instructions and BCI (Battery Council International) safety recommendations, which include the following precautions:

 <b>DANGER</b>	 <b>CAUTION</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>	<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>

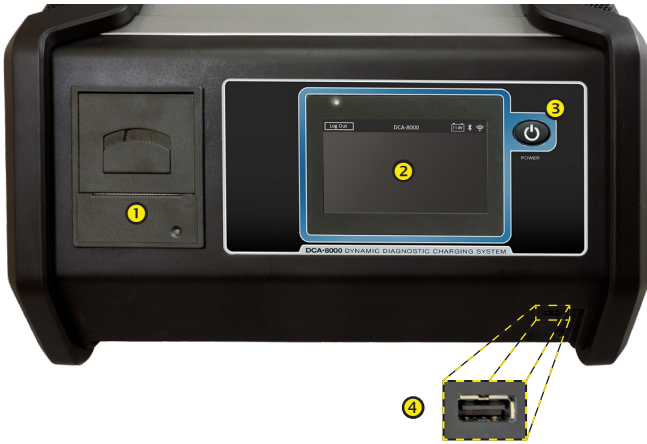
- ✓ Battery acid is highly corrosive. If acid enters your eyes, immediately flush them thoroughly with cold running water for at least 15 minutes and seek medical attention. If battery acid gets on your skin or clothing, wash immediately with a mixture of water and baking soda.
- ✓ Always wear proper 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.
- ✓ Never charge a frozen battery. Gases may form, cracking the case, and spray out battery acid.

## Manual Conventions

This manual uses these symbols and typographical conventions:

Symbol	Description
	The safety symbol indicates instructions for avoiding hazardous conditions and personal injury.
	The safety symbol with the words <b>CAUTION</b> , <b>WARNING</b> , or <b>DANGER</b> indicates instructions for avoiding hazardous conditions and personal injury.
	The wrench symbol indicates procedural notes and helpful information.
	These symbols indicate which arrow keys on the keypad to press for a given function.
<b>Bold Letters</b>	The text for screen options are in <b>Bold</b> letters.

### Front View



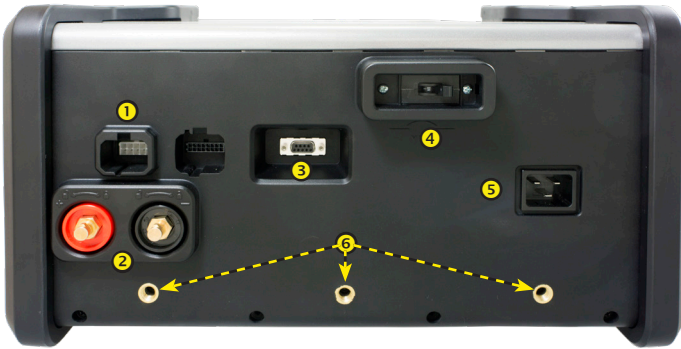
1 Thermal Printer

3 Analyzer Power Button

2 Touch Screen Display

4 USB Port

### Rear View



1 Communication Cable Connection

4 Circuit Breaker Reset

2 Charge Cable Connections

5 Power Cord Socket

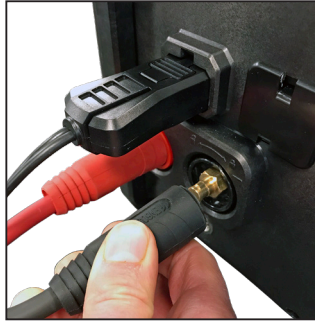
3 VIN Scanner Connection (DB-9)

6 For Analyzer Cart Mounting Bolts

## Connections

### Charge Cables

1. Insert the communication cable.
2. Insert and rotate the charge cable quick connectors clockwise 180° to lock them onto the Quick Connector Locking Post on the analyzer.



3. The connection process is complete when all three cables are connected to the analyzer.

### Locking Power Cord

Pull back on the red tab on the side of the connector to release/remove the power cord from the analyzer's power socket.



### Scanner Cable (Optional Accessory)

Use the screws on the connector to secure the cable to the analyzer.



## Charging Out-of-Vehicle (Battery Test)

The preferred battery charging location is in the vehicle. However, if you plan to charge 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.

### ⚠ CAUTION

#### Do not test at the battery's steel bolts.

Failure to properly install lead terminal adapters, or using adapters that are dirty or worn, may cause false test results. Always use lead terminal adapters provided with the analyzer when testing side-post or Group 31 batteries.



**IMPORTANT:** To avoid damage, never use a wrench to tighten the adapters.

## Connecting To The Battery

Connect the analyzer clamps to the battery in accordance with all precautions and safety instructions. **Do not connect either clamp to the vehicle's chassis.**

Connect the **Red** clamp to the positive (+) terminal and the **Black** clamp to the negative (-) terminal. An alert is displayed if the clamps are reversed on the battery terminals.

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

## Initial Setup

1. Upon initial power-up, the **Language Settings** screen is displayed. Tap **Next** to continue.

<b>System Language</b>	Select the Controller default language displayed on the screen.
<b>Test Result Language</b>	Select the Controller default language for all displayed tests and test results.
<b>Email Language</b>	Select the default standard language for the analyzer to use for all tests and results sent via email.
<b>Print Language</b>	Select the default standard language for the analyzer to use for all tests and results printed using a networked printer.

2. A Consent to collect data screen is displayed. Tap the Consent check box and then tap **Next** to continue.
3. Using the displayed keypad template, enter username and password for the administrator account
4. Tap **Next** to continue.



**IMPORTANT:** By default, the first user created is assigned Administrator rights. Tap **Add User** to add additional users. See Chapter 10 - Settings to change these defaults.

5. The **Date/Time Settings** are displayed. Tap **Next** to continue after making any adjustments.

<i>Select Time Format:</i>	12-hour or 24-hour format
<i>Select Date Format:</i>	DD/MM/YYYY, MM/DD/YYYY, or YYYY/MM/DD
<i>Select Time Zone:</i>	Time zone offset from Greenwich Mean Time
<i>Set Date:</i>	Set the current date

6. The **Test Settings** are displayed. Tap **Next** to continue after making any adjustments.

<i>Temperature Units</i>	Select <b>Fahrenheit</b> or <b>Celsius</b>
<i>Decimal Separator</i>	Select decimal point or comma



**NOTE:** A passkey number is automatically generated once the Bluetooth pairing has been established.

7. A listing of detected Configured WiFi networks is displayed.


**To select a network:** For initial setup, no networks will be displayed here yet.

**To add a network:** Tap the plus (+) sign, then select from one of the displayed detected networks.

To manually add a network, tap the plus (+) sign again. Follow the on-screen instructions to select the Network SSID, Security, and IP Settings. Tap **Next** when finished.


Use the onscreen keypad to manually enter the Network SSID, security type, and IP settings. If necessary, enter the WiFi network password. Tap **Next** when finished.


A confirmation screen is displayed when the analyzer has successfully connected to the WiFi network.

**To delete a network:** Tap a displayed network to select it. Tap trash can icon () to delete it.

8. The **Email Address Book** screen (Admin Only) is displayed.

*To add an email address:* Tap the plus (+) sign, then use the displayed keyboard to add the address.

*To edit an email address:* Tap the pencil  icon, then use the displayed keyboard to edit the address.

*To delete an email address:* Tap a displayed email address to select it. Tap trash can icon  to delete it.

*To use the default email server settings:* Tap the gear  icon to use the default.

9. The **Shop Information** screen (Admin Only) is displayed.

Use the onscreen keypad to enter the store name, address, and phone number. Tap **Next** to continue.

Store Name	<input type="text" value="Midtronics"/>
Street Address	<input type="text" value="7000 Monroe"/>
Street Address 2	<input type="text"/>
City	<input type="text" value="Willowbrook"/>
State	<input type="text" value="IL"/>
Zipcode	<input type="text" value="60527"/>
Phone #	<input type="text" value="1-630-323-2800"/>

10. The login screen is displayed.



11. Tap a user name to access the Main Menu.

### Main Menu



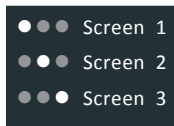
**1 Menu Bar**

Log Out	Log out current user	Bluetooth connectivity status
12.65V	Measured battery voltage	
WiFi icon	WiFi signal strength	

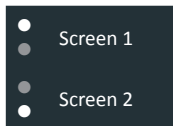
**2 Main Menu Selection Area**

### Additional Screens

The dots at the bottom or side of a menu or results screen indicate additional screens are available. Use your finger to swipe horizontally left, right, up or down across the Controller screen to view all of the results.













**Swipe Horizontally**



**Swipe Vertically**

## Main Menu Icons

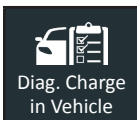
Icon	Description	Icon	Description
 Diag. Charge in Vehicle	Automates battery testing for quickly testing vehicles using the fewest steps. A warranty code is provided after the test.	 Manual Charge	Provides a timed charge that ranges from 5 to 120 minutes or a continuous charge that ends when <b>STOP</b> is pressed.
 Diag. Charge out of Vehicle	For testing out-of-vehicle customer batteries for possible return. A warranty code is provided after the test.	 Settings	Setup/adjust: WiFi, printer setup, email settings, user information, default language, display/sound settings, BMIS, shop info, connected devices, tool software version information.
 PDI to Dealer	Makes sure the battery is tested and charged before delivery.	 Power Supply	Maintains battery voltage at 13.5 volts to provide uninterrupted reprogramming and retention of a vehicle's system settings.
 History	Access archived test histories or search test history by VIN or by technician.	 Battery Test Only	Use the <b>Battery Diagnostics</b> function to perform a deep analysis of a battery without charging it. A warranty code is provided after the test.
 Messages	Displays alerts, notifications, and tool software updates.	 Help	Access the analyzer Self-Test and a digitized version of the Instruction Manual that was shipped with the analyzer.

**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 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.

## 2 – Diagnostic Charge in Vehicle



Use **Diag. Charge in Vehicle** to test a battery installed and connected in a vehicle using the battery list to choose the battery fitted in the vehicle being tested.

At any time during the test tap ◀ to return to the previous screen or 🏠 to return to the Main Menu.

### Battery Test

1. Connect the analyzer clamps to the appropriate battery posts.
2. At the Main Menu tap **Diag. Charge in Vehicle**. The **Acquire Battery Information** screen is displayed.
3. Use a connected bar code scanner (optional accessory) to scan the **Battery barcode**. If the battery is known in the battery list, the test parameters will be populated accordingly. If you don't have a barcode or the battery is not found in the list, you can choose **Manual selection** to find it.

From the Manual selection screen, you can also choose **Manual entry** to manually enter battery test parameters as shown below:



**NOTE:** Refer to Appendix A for recommended scanning procedures.

Battery information	
Batt. Location	Under hood
Test Location	Battery post
Battery Type	SLI
Rated Ah	Optional
Battery rating units	SAE/EN
Battery rating	Enter rating
Battery producer	Select producer
VID	12345
Back	Continue

4. In the **Battery Information** screen, you can choose the battery location. Please note that if you test the battery connecting to the **Jump Posts**, you need to select the specific vehicle you are testing to ensure an accurate measurement.



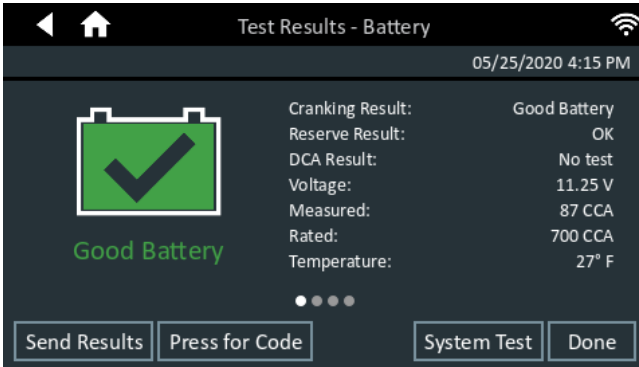
**NOTE:** See Appendix B for complete parameter descriptions.

The analyzer performs a series of tests to determine the overall condition of the battery before applying a charge. Those steps include measuring the ambient battery temperature, Cranking Health, Reserve Capacity, Charge Acceptance, and applying a Load Test to the battery.

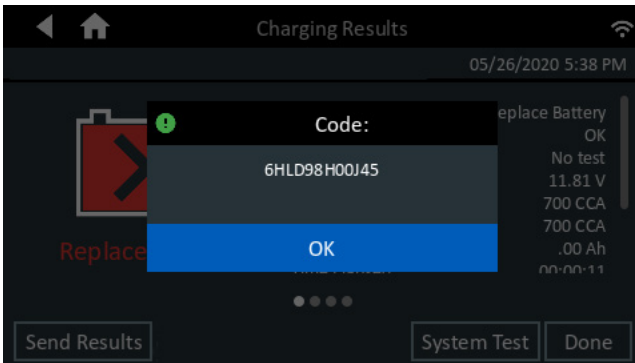
The test results are then displayed on the analyzer screen.

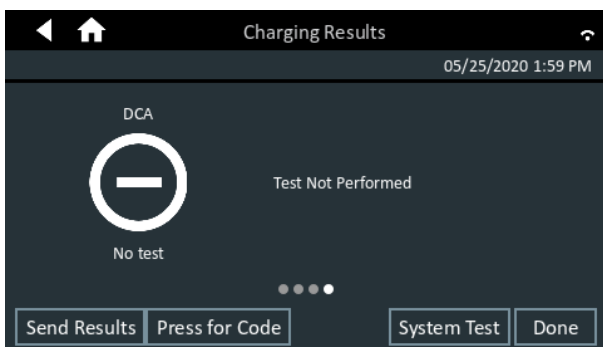
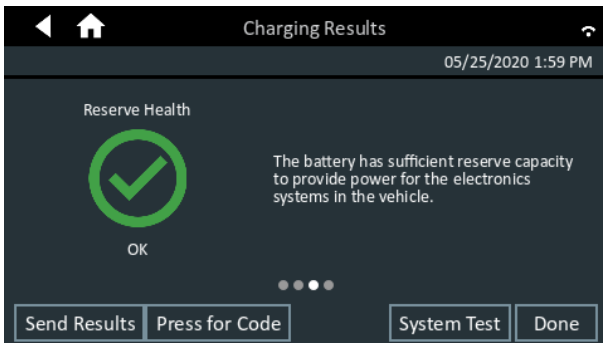
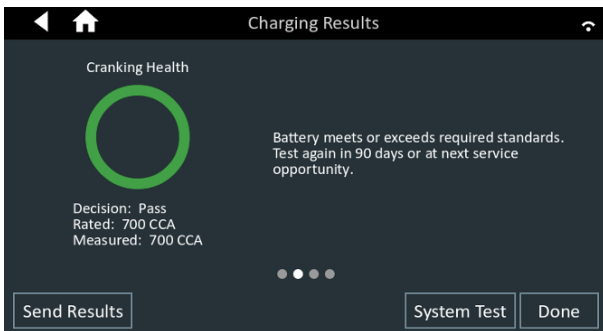
5. If the displayed information is correct, tap **Next** to begin the Battery Test.

### Battery Test Results



In the results screen, choose **Press for Code**, to view the DTC code to be used to claim warranty. An example is shown here below. This code will also be included on the printed and emailed results.






Icons are color-coded to indicate status.

<b>Green:</b>	All test parameters were completed and have passed.	<b>Red:</b>	The battery has failed the test.
<b>Yellow:</b>	Some test parameters may require further testing.	<b>White:</b>	Insufficient data to perform the test.

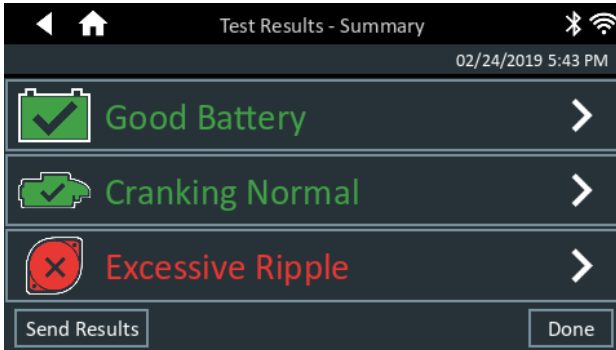
To print using the integrated printer or send the test results to a configured printer or via email tap **Send Results** and select an option. To return to the Home Screen, tap **Done** or **System Test** to continue with the System Test.

 **NOTE:** Refer to Appendix C: Test Result Decision Tables for a complete explanation of possible test results.

### System Test

1. When testing in vehicle, there is an optional system test available that includes testing the starter motor and alternator. Start it by pressing the **System Test** button on the battery results screen.
2. Start the engine and let it idle.
3. Turn off all electrical accessories such as headlights and the interior ventilation blower fan and tap **Next**.
4. The analyzer tests the alternator output at idle.
5. When prompted, rev and hold the engine to between 2000 to 3000 RPM and tap **Next**.
6. The analyzer tests the alternator output again.
7. When prompted Idle the engine.
8. Turn on the high beam headlights and interior ventilation blower motor and tap **Next**.
9. The analyzer tests the alternator output at idle.
10. When prompted, rev and hold the engine to between 2000 to 3000 RPM and tap **Next**.
11. The analyzer tests the alternator output again.
12. When prompted turn off all loads and Idle the engine.
13. Tap **Next** to display the test results.

### System Test Results-Summary



*Test Results - Summary*

A **Test Results - Summary** screen is displayed following a System Test. Tap ► to view detailed test results for each part of the test.



**NOTE:** Refer to Appendix C: Test Result Decision Tables for a complete explanation of possible test results.

To send the test results to a configured printer or via email tap **Send Results** and select an option. To return to the Home Screen, tap **Done** or 🏠 to return to the Main Menu.

## 3 – Diagnostic Charge Out of Vehicle



Use the **Diag. Charge out of Vehicle** function to test a battery not installed and connected in a vehicle.

At any time during the test tap ◀ to return to the previous screen or 🏠 to return to the Main Menu.

### Battery Test

1. Connect the analyzer clamps to the appropriate battery posts.

At the Main Menu tap **Diag. Charge out of Vehicle**. Use the optional barcode scanner to scan the battery barcode to acquire the battery information.

If the battery is known in the battery list, the test parameters will be populated accordingly. If you don't have a barcode scanner, can't scan the barcode, or the battery is not found in the list, you can choose **Manual selection** to find it.

From the Manual selection screen, you can also choose **Manual entry** to manually enter battery test parameters as shown below:

Battery information	
Battery Type	SLI
Rated Ah	43 Ah
Battery rating units	SAE/EN
Battery rating	390
Battery producer	JCI
VID	12345

Buttons: Back, Continue

2. Tap the box across from each displayed parameter and select the correct information from the displayed list, or enter the value using the on-board keyboard.
3. VID means vehicle identification, here you should fill in the last 5 digits of the chassis number.
4. Tap **Next** to begin the Battery Test or press **Back** to return to the battery list.

The analyzer performs a series of tests to determine the overall condition of the battery before applying a charge. Those steps include measuring the ambient battery temperature, Cranking Health, Reserve Capacity, Charge Acceptance, and applying a Load Test to the battery.

The test results are then displayed on the analyzer screen.

### Battery Test Results

See Chapter 2 - Diagnostic Charge in Vehicle for screen images.



**NOTE:** Refer to Appendix C: Test Result Decision Tables for a complete explanation of possible test results.

To print the results using the integrated printer, or send the test results to a configured printer or via email tap **Send Results** and select an option. To return to the Home Screen, tap **Done** or 🏠 to return to the Main Menu.

## 4 – PDI to Dealer



Use **PDI to Dealer** function, to make sure the battery is in good condition before the vehicle is being shipped to the dealer.

At any time during the test tap ◀ to return to the previous screen or 🏠 to return to the Main Menu.

### Battery Test

1. Connect the analyzer clamps to the appropriate battery posts.
2. At the Main Menu tap **PDI to Dealer**. The **Acquire Battery Information** screen is displayed.
3. Use a connected bar code scanner (optional accessory) to scan the Battery part number. If the battery is known in the battery list, the test parameters will be populated accordingly. If you don't have a barcode or the battery is not found in the list, you can choose **Manual Selection** to find it.



**NOTE:** Refer to Appendix A for recommended scanning procedures.

Field	Value
Battery Type	SLI
Rated Ah	43 Ah
Battery rating units	SAE/EN
Battery rating	390
Battery producer	JCI
VID	12345

4. In the **Battery Information** screen, you can choose the battery location. Please note that if you test the battery connecting to the **Jump Posts**, you need to select the specific vehicle you are testing to ensure an accurate measurement.
5. If the displayed information is correct, tap **Continue** to begin the Battery Test.

### Battery Test Results

See Chapter 2 - Diagnostic Charge in Vehicle for screen images.



**NOTE:** Refer to Appendix C: Test Result Decision Tables for a complete explanation of possible test results.

To print the results using the integrated printer, or send the test results to a configured printer or via email tap **Send Results** and select an option.

To return to the Home Screen, tap **Done** or 🏠 to return to the Main Menu.

## 5 – Battery Test Only



Use the **Battery Test Only** function to perform a deep analysis of a battery without charging it.

At any time during the test tap ◀ to return to the previous screen or 🏠 to return to the Main Menu.

### Battery Test

1. Connect the analyzer clamps to the appropriate battery posts.
2. At the Main Menu tap **Battery Test Only**. The **Acquire Battery Information** screen is displayed.
3. Use a connected bar code scanner (optional accessory) to scan the Battery part number. If the battery is known in the battery list, the test parameters will be populated accordingly. If you don't have a barcode or the battery is not found in the list, you can choose **Manual Selection** to find it.



**NOTE:** Refer to Appendix A for recommended scanning procedures.



4. In the **Battery Information** screen, you can choose the battery location. Please note that if you test the battery connecting to the **Jump Posts**, you need to select the specific vehicle you are testing to ensure an accurate measurement.
5. If the displayed information is correct, tap **Continue** to begin the Battery Test.

### Battery Test Results

See Chapter 2 - Diagnostic Charge in Vehicle for screen images.



**NOTE:** Refer to Appendix C: Test Result Decision Tables for a complete explanation of possible test results.

To print the results using the integrated printer, or send the test results to a configured printer or via email tap **Send Results** and select an option.

To return to the Home Screen, tap **Done** or 🏠 to return to the Main Menu.

## 6 – Manual Charge



### Manual Charge

Provides a timed charge that ranges from 5 to 120 minutes or a continuous charge that ends when STOP is pressed.

At any time during the test tap ◀ to return to the previous screen or 🏠 to return to the Main Menu.

1. Connect the Diagnostic Device test clamps to the battery.
2. At the Main Menu tap **Manual Charge**. The **Edit Battery Information** screen is displayed.
3. Enter the battery information and charging parameters.



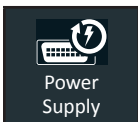
**NOTE:** See Appendix B for complete parameter descriptions.

If the displayed information is correct, tap **Continue** to begin the Manual Charge. Tap on the corresponding box to edit the parameter information.

The test results are displayed on the analyzer screen.

To send the test results to a configured printer or via email tap **Send Results** and select an option. To return to the Home Screen, tap **Done** or 🏠 to return to the Main Menu.

## 7 – Power Supply



Use Power Supply to maintain battery voltage in a vehicle to allow for uninterrupted reprogramming of vehicle's computer, retain vehicle system settings, or simply to maintain battery voltage.

At any time during the test tap ◀ to return to the previous screen or 🏠 to return to the Main Menu.

1. Connect the Diagnostic Device test clamps to the battery.
2. At the Main Menu tap **Power Supply**. The **Power Supply** screen is displayed.

Power Supply

Battery Type: Fllooded

Rated Ah: Optional

Power Supply Voltage: 14.8

Battery Units: CCA

Battery Rating: Enter Rating

Start Power Supply



**NOTE:** See Appendix B for complete parameter descriptions.

3. Enter the battery information and reflashing parameters.

If the displayed information is correct, tap **Start Power Supply** to begin.

Power Supply Results

Final Voltage: 9.14 V

Measured: 27 CCA

Rated: 300 CCA

Ah Replaced: .00 Ah

Time Elapsed: 00:00:55

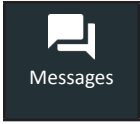
Temperature: 80 F

Send Results Done

The test results are displayed on the analyzer screen.

To send the test results to a configured printer or via email tap **Send Results** and select an option. To return to the Home Screen, tap **Done** or 🏠 to return to the Main Menu.

## 8 – Messages



The **Messages** function displays alerts, notifications and tool software updates.



Mark Read Or Unread

Perform Message Action



Delete Notification

Tap to return to the previous screen or to return to the Main Menu.

### Accessing Messages



A number is displayed next to the **Messages** icon when the analyzer has received any critical messages. The number does not include non-critical Notifications.

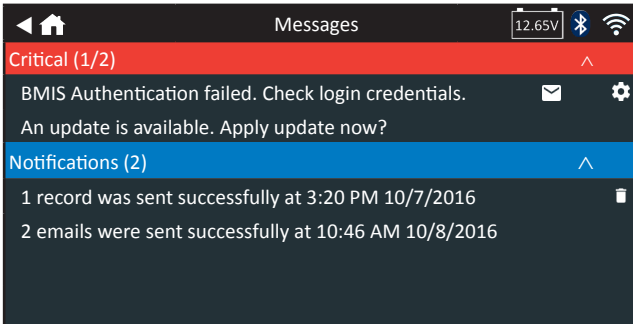


Unread Critical Messages



Read Critical Messages

1. Tap **Messages** on the Main Menu screen.



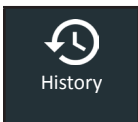
2. Tap to read a message.  
Tap to perform the message action item.  
Tap to delete a message.
3. Tap to collapse a list of messages or to expand the list.

### Message Types

**Critical:** An important action cannot be performed and may require user action.

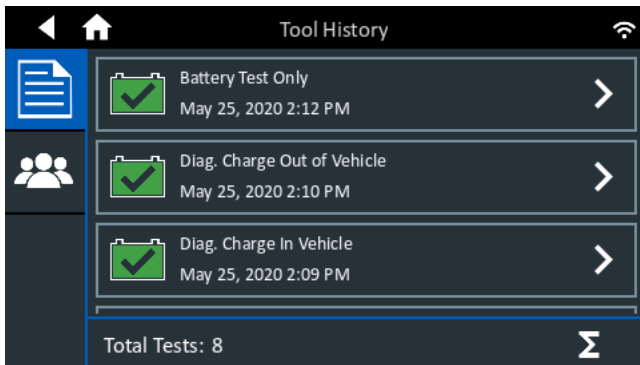
**Notifications:** Indicates an action has been performed or data has been sent.

## 9 – History



Use **History** to access the tool usage history and user histories. The search function can also be used find test records for specific vehicles and technicians.

At the Main Menu, tap **History**. By default the **Tool History** screen is displayed.



### Tool History



Use **Tool History** to view test total history as well as in vehicle and out of vehicle test totals. Individual test results are also displayed.

Tap ► to view individual test details.

Tap ∑ to view **Total By Test Decision**, **Total By Test Type**, and **Total By Date And Location**.

Tap **Done** to return to the **Tool History** screen.

#### Totals By Test Decision

Good Battery	Charge & Retest
Good Recharge	Replace Battery
Aborted	Badcell Short Replace

#### Totals By Charge Decision

Good Battery	Replace Battery
Good Recharge	Badcell Short Replace
Aborted	NO DECISION

**Totals By Test Type**

Diag. Charge out of Vehicle	Battery Replacement
Diag. Charge in Vehicle	Manual Charge
PDI to Dealer	

**Totals By Date And Location**

Last 7 Days	In Vehicle
Last 30 Days	Out Vehicle
Last 90 Days	



**NOTE:** Refer to Appendix C: Test Result Decision Tables for a complete explanation of possible test results.

**User History**

**User History** displays test totals for the user that is currently logged in to the analyzer.

Tap ► to view individual test details.

Tap Σ to view **Total By Test Decision**, **Total By Test Type**, and **Total By Date And Location**.

**Totals By Test Decision**

Good Battery	Charge & Retest
Good Recharge	Replace Battery
Aborted	Badcell Short Replace

**Totals By Charge Decision**

Good Battery	Replace Battery
Good Recharge	Badcell Short Replace
Aborted	NO DECISION

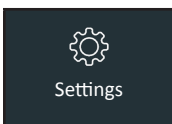
**Totals By Test Type**

Out Of Vehicle Charge	Battery Replacement
In Vehicle Charge	Manual Charge
Jump Start	

**Totals By Date And Location**

Last 7 Days	In Vehicle
Last 30 Days	Out Vehicle
Last 90 Days	

## 10 – Settings



Use the Setup options to setup and adjust WiFi, printer setup and selection, email settings, user information, default language, display settings, sound settings, BMIS login information, shop information, connected accessories, and tool software version information.

Tap to return to the previous screen or to return to the Main Menu.

### WiFi



Use **WiFi** to view, add, and delete wireless networks.

Tap on the WiFi icon to display a list of detected and configured WiFi networks.



### Adding A Network

1. Tap to add a WiFi network.  
A list of detected wireless networks is displayed with next to the selected network.
2. Tap to access the network Security and IP Settings.

Security	None
	WEP
	WPA/WPA2 PSK
IP Address	DHCP
	Static

3. Tap to configure the selected network.
4. Once the network has been successfully configured, tap to return to the list of available configured networks. A indicates the selected network.

### Deleting A Network

1. Tap a displayed network.
2. Tap to delete the network and tap **Yes** to confirm.

## Printer Settings

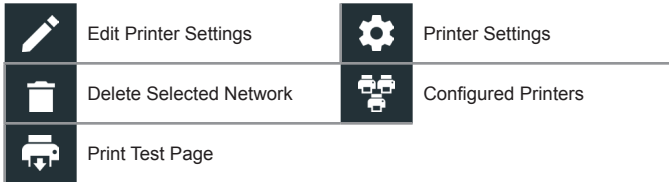


The **Printer Settings** function detects and displays a list of connected and available WiFi and Bluetooth printers.



**NOTE:** WiFi network communication must be successfully established before a printer or printers can be detected and setup.

Tap on the Printer icon to display a list of available printers on the configured WiFi and Bluetooth networks.



### Adding A WiFi Printer (Admin Only)

1. Tap to access the **Printer Settings** functions.
2. Tap to add a WiFi printer.  
Make sure the printer is on and connected to the same wireless network as the analyzer.
3. Tap to add the printer to the list of eligible printers.
4. Tap to connect to the selected printer. A message is displayed when the configuration is successful.
5. Tap to return to the printer list.

### Adding A Bluetooth Printer (Admin Only)

1. Tap the sign to add a Bluetooth printer.
2. Make sure the printer(s) is on.
3. Tap to add the printer to the list of eligible printers.
4. Tap to connect to the selected printer.
5. When prompted, enter the device PIN and tap . A message is displayed when the pairing is successful.
6. Tap to return to the printer list.

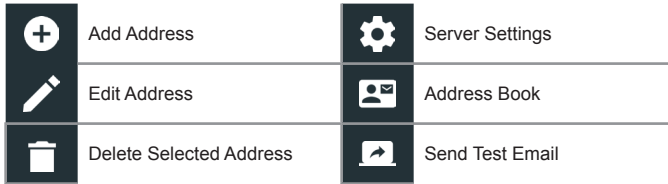
### Deleting A Printer (Admin Only)

1. Tap to access the **Printer Setup** functions.
2. Tap a displayed printer.
3. Tap to delete the printer and tap **Yes** to confirm.

## Email



Displays all entered email addresses. Addresses can be added, edited, and deleted (Admin Only). Entered email accounts are added to the email address book. Frequently used email addresses can be selected from the displayed address list rather than being re-typed each time.



### Add Address (Admin Only)

1. Tap **+** to add an email address.
2. Use the displayed keypad to enter the contact name and email address.
3. Tap **Add** to add the address to the email list or **Cancel** to exit and return to the email list.

### Edit Address (Admin Only)

1. Select a displayed email address by tapping it.
2. Tap **✎** to edit the address.
3. Use the displayed keypad to edit the contact name and email address.
4. Tap **Add** to add the address to the email list or **Cancel** to exit and return to the email list.

### Deleting An Address (Admin Only)

1. Select the email address by tapping it.
2. Tap **🗑** to delete the address and tap **Yes** to confirm or **Cancel** to exit and return to the email list.

### Email Server Settings

Enter and edit the email settings for sending outgoing email.

1. Tap **⚙** to access the email sever settings.
2. Tap **✎** to enter or modify existing server settings including **Host, Port, Login, Password, SMTP Authorization, Enable TLS** and **From Email Address** information.
3. Tap **🗑** to clear all server settings.
4. Tap **📧** to return to the **Email Address Book**.

## User Settings (Admin Only)



Modify Usernames and Passwords..



Edit Users



User Settings







Delete Users



User Management

## User Management (Admin Only)

1. Tap  to access **User Management** functions.
2. Tap  to display the current logged in Admin user.
3. Select a displayed user by tapping it.
4. Tap  to edit the **Username**, **Password**, and **User Type (Standard or Admin)**.
5. Tap **X** when complete to return to the **User Management** screen.
6. Tap  to delete the selected user and **Yes** to confirm.

## Language Settings



Use the Language & Input function to select the default system language used by the tool. User defaults also include **Test Results**, **Email**, and **Print languages**.

### System Language

Select the analyzer default standard language.

### Test Result Language

Select the default language for the analyzer to use for all displayed tests and results.

### Email Language

Select the default standard language for the analyzer to use for all tests and results sent via email.

### Print Language

Select the default standard language for the analyzer to use for all tests and results printed using a networked printer.

## Display Settings



Adjust the analyzer display including the **Brightness**, **Sleep Time**, and **Dim Time**. **Auto Brightness** can also be turned on and off.

### Brightness

Adjust the display brightness by tapping and holding the slider, then moving it right or left to make the screen brighter or darker.

### Auto Brightness

Enable and disable **Auto Brightness** by tapping on the check box.

### Sleep Time

Adjust the amount of elapsed time before the analyzer goes into a power saving (Sleep) mode. Default = 2 minutes.

### Dim Time

Adjust the amount of elapsed time before the analyzer goes into a power saving (Dim) mode. Default = 1 minute.

## BMIS (Admin Only)








View the BMIS login information the tool uses to connect with Midtronics BMIS as well as the connection status. This information is not editable.

## Shop Information (Admin Only)



Access default Shop Information including store name, address, and phone number. Also access battery test defaults including rating, temperature units, and decimal separator. Use also to adjust the analyzer date and time settings.


	Settings Home		User Settings
	Test Settings		User Management
	Date/Time Settings		Create MDCA Log File


### Shop Information

Use the onscreen keypad to enter the store name, address, and phone number.

Store Name	<input type="text" value="Midtronics"/>
Street Address	<input type="text" value="7000 Monroe"/>
Street Address 2	<input type="text" value="0 F"/>
City	<input type="text" value="Willowbrook"/>
State	<input type="text" value="IL"/>
Zipcode	<input type="text" value="60527"/>
Phone #	<input type="text" value="1-630-323-2800"/>

## Test Settings

1. Tap  to access the test setting defaults. Tap the boxes or icons to change the values.

Temperature Units	<input type="text" value="0 F"/>
Decimal Separator	<input type="text" value="00.00"/>
Create MDCA Log File	

### Temperature Units

Default temperature units used when measuring battery temperature.

### Decimal Separator

Default number display using commas or periods separators.



### Create MDCA Log File

The MDCA function is used by Midtronics technical support.

2. Tap  to return to the **Shop Information** screen.

## Date/Time Settings

1. Tap  to access the Date/Time setting defaults.

Select Time Format	<input type="text" value="12 Hour"/>
Select Date Format	<input type="text" value="10/18/2016"/>
Select Time Zone	<input type="text" value="EST"/>
Set Date	
Set Time	

### Select Time Format

12 or 24 Hour Format



### Select Date Format

Month/Day/Year, Day/Month/Year, or Year/Day/Month

### Select Time Zone

Time zone in which the analyzer will be operated.

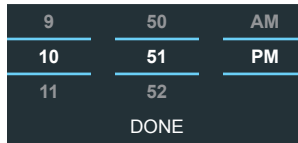
### Set Date


Tap  or  to enter the month, day, and year. Tap **Set** to save the date or **Cancel** to exit without saving.

May	10	2017
<b>Jun</b>	<b>11</b>	<b>2018</b>
Jul	12	2019
DONE		

### Set Time

Tap ▲ or ▼ to enter the hours, minutes, and AM/PM. Tap **Set** to save the date or **Cancel** to exit without saving.



2. Tap  to return to the **Shop Information** screen.

### Version Information



Use **Version Information** to display software version information.



Factory Reset



Check For Updates



Legal Information

Serial Number	0987654321
WiFi MAC Address	e0:e5:cf:b3:9b:25
Configuration Version	192-411340-A00-0039
Data Version	192-481341-A01-005
Controller Version	192-001339-A00-0039
Diagnostic Device Version	192-211379A-25
CVG-2 Device Version	No Device Configured
OS Version	dca8000-eng 4.4.2 DEV10_06

### Factory Reset

Use this function to return the tool to the original as built configuration including all history and test settings.



**IMPORTANT:** All previous modifications to the original settings will be overwritten.

### Legal Information

Displays software attribution information via the Midtronics website. The analyzer must be connected to the Internet.

### Check for Updates

Use this function to check via the internet connection for any updates to the analyzer software.



# Appendix A: Recommended Scanning Procedure

## Scanning

For scanning battery part numbers, the DCA-8000 Diagnostic Analyzer uses a handheld scanner (optional accessory) connected to the back of analyzer using a DB-9 style connector. Once successfully scanned, the battery number is cross referenced with the Ford battery list stored in the analyzer's database and displayed on the screen.

## Scanning Tips







- **Hold Steady:** Hold the device steady when scanning the barcode. This allows the user to clearly see the barcode and allows the camera to focus on it.
- **Scan Entire Barcode:** Position the scanner in and out until it covers the entire barcode.
- **Lighting/Glare:** The built-in flashlight will automatically turn on in low light situations. If the flashlight, or sunlight, is shining directly onto the barcode, try pivoting the camera up or down slightly to reduce any glare.

## Appendix B: Battery Information Definitions

<b>Battery Location</b>	Under Hood, Under Seat, Trunk		
<b>Battery Post</b>	Battery Post, Jump Post		
<b>Battery Rating</b>	Enter the Battery Rating Units value		
<b>Battery Type</b>	SLI, EFB, EFB+, EBF+C, AGM		
<b>Battery Rating Units</b>	CCA	Cold Cranking Amps: Battery current at 0 °F (-17.8 °C).	100 to 3000
	JIS	Japanese Industrial Standard: Usually printed on battery label.	26A17 to 245H52
	DIN(A)	Deutsche Industrie-Norm	100 to 1000
	SAE(A)	European labeling of CCA	100 to 3000
	IEC(A)	International Electrotechnical Commission	100 to 1000
	EN(A)	Europa-Norm	100 to 1700
	EN2(A)	Europa-Norm	100 to 1700
<b>Charge Limit</b>	Limit charge by Voltage or Amperage		
<b>Charge Value</b>	Maximum amount of applied charge (Voltage or Amperage)		
<b>Rated Ah</b>	Rating of battery being charged in Amp-hours (optional)		
<b>Temperature (Max)</b>	Maximum temperature of battery during a manual charge		
<b>Test Location</b>	Battery Post, Jump Start Post, Jump Post (BMS)		
<b>Time Type</b>	Timed (10 to 120 minutes) or Continuous		
<b>Time Value (Timed Charge Only)</b>	Length (In Minutes) of Manual Timed Charge		
<b>Vehicle Identification (VID)</b>	Mandatory to enter at least 5 digits, reflecting the last digits of the vehicle chassis number.		

# Appendix C: Test Results Decision Tables







## Battery Test Results

Overall Decision	Cranking Health	Reserve Health	Charge Acceptance
 Good Battery	Pass	Pass	Pass
 Good Recharge	Pass		
No result displayed.	Charge and Retest (only in "Battery test only" app)		
 Replace Battery	Fail	Fail	Fail
	Pass		
		Pass	Fail
	Fail		No Test
 Bad Cell Replace Battery		Fail	No Test





**Battery Test Results (cont'd.)**

SOH Message	RC Message	CA Message
Battery meets or exceeds required standards. Test again in 90 days or at next service opportunity.	The battery has sufficient reserve capacity to provide power for the electronics systems in the vehicle.	The battery has sufficient charge acceptance to recover for a proper system functionality.
Battery is good, but low on charge. Fully charge the battery for optimal performance and lifespan.		
No result displayed. DCA to use Advanced Diagnostics for decision.		
Battery fails to meet industry accepted standards.		
Battery is good for cranking but shows low reserve capacity. Low reserve capacity will compromise the battery's ability to provide system current or hold a charge.	The reserve capacity of the battery is low. Low reserve capacity could impact the ability of the battery to provide power for the electronics systems in the vehicle.	
The battery meets or exceeds required standards. Test again in 90 days or at next service opportunity.	The battery has sufficient reserve capacity to provide power for the electronics systems in the vehicle.	Battery has poor charge acceptance and may not be able to recover from a proper system operation.
Battery is good for cranking but shows low reserve capacity. Low reserve capacity will compromise the battery's ability to provide system current or hold a charge.	The reserve capacity of the battery is low. Low reserve capacity could impact the ability of the battery to provide power for the electronics systems in the vehicle.	The battery has sufficient charge acceptance to recover for a proper system functionality.
Battery fails to meet industry accepted standards.	Test not performed	Test not performed






## Starter Test Results

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 repeat the starter system test.
 Replace Battery	If the battery test result was <b>REPLACE</b> , the battery must be replaced before testing the starter.
 Low Current	The starter voltage is high but the cranking amps are low.
 No Start	The engine didn't start and the test was aborted or the vehicle's starting profile was not detected and the Starter Test was skipped.

## Alternator Test Results

Decision	Action
 CHARGING NORMAL	The output from the alternator is normal.
 NO OUTPUT	<p>No output detected. Check belts to ensure alternator is rotating when engine is running.</p> <ul style="list-style-type: none"> <li>√ Check all alternator connections including to the battery. Clean or replace if necessary and retest.</li> <li>√ If the belts and connections are in good working condition, replace alternator or external voltage regulator.</li> </ul>
 LOW OUTPUT	<p>Alternator not providing enough current to power electrical loads and charge the battery.</p> <ul style="list-style-type: none"> <li>√ Check belts to ensure the alternator is rotating with the engine running.</li> <li>√ Check alternator connections to and from the battery. If loose or heavily corroded, clean or replace the cable and retest.</li> </ul>
 HIGH OUTPUT	<p>Alternator voltage to the battery exceeds normal limits of a functioning regulator.</p> <ul style="list-style-type: none"> <li>√ Check for loose and normal ground connections. If no connection problems are found, replace the regulator.</li> </ul> <p>The normal high limit of a typical automotive regulator is 14.5 volts +/-0.5. Refer to the manufacturer specifications for the correct limit, which may vary by vehicle type.</p>

**Diode Test Results**

Decision	Action
 NORMAL RIPPLE	The output from the alternator is normal.
 EXCESSIVE RIPPLE	One or more diodes in the alternator are not functioning or there is stator damage, which is shown by an excessive amount of AC ripple current supplied to the battery. √ 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.
 OPEN PHASE	Replace the alternator.
 OPEN DIODE	
 SHORTED DIODE	

# Patents / Warranty / Service

## PATENTS

This product 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

Midtronics products are warranted to be free of defects in materials and workmanship for a period for a period of two (2) years for the unit and one (1) year for the cables from date of purchase. Midtronics will, at our option, repair or replace the unit with a re-manufactured unit. This limited warranty applies only to Midtronics products, 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 the Midtronics office in your region (see address block below). Have your model number and serial numbers at hand. This first step is critical as Midtronics will troubleshoot the problem(s) over the phone, and many problem(s) are resolved during this step. If the problem cannot be resolved, the Customer Service Agent will issue a Return Material Authorization (RMA) number and provide instructions on where to ship your equipment. The RMA number becomes your tracking number when communicating with Midtronics. The final step is to pack the equipment to avoid damage in transit and return the equipment freight prepaid (you pay), to the attention of the RMA number and the address provided by the Customer Service Agent.

Midtronics or it's designee will repair and return the unit using the same shipping service level as received. If it is determined 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 the shipping & handling charges added to the invoice. Midtronics' products beyond the warranty period are subject to the repair charges in place at that time. Out-of-warranty repairs carry a 6-month warranty.



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