DSS-5000P

Battery Diagnostic Service System

For testing 6- and 12-volt automotive / 12-volt and 24-volt charging systems.

Users Guide

Contents

Chapter 1: Introduction

Personal Precautions

⚠ DANGER

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

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.

⚠ WARNING

Wash hands after handling.

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.

Inspect the battery for damage 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:

⇨ 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.

Symbols Conventions

Symbol	Description
⚠	The safety symbol indicates instructions for avoiding hazardous conditions and personal injury.
⚠	The safety symbol with the words **CAUTION**, **WARNING,** or **DANGER** indicates instructions for avoiding hazardous conditions and personal injury.
🔧	The wrench symbol indicates procedural notes and helpful information.

Description

The analyzer uses function-specific applications accessed through a series of menus and icons to guide users through the battery testing process for consistent testing implementation and accuracy. These are accessed using the Controller's touch screen display. Test results can be displayed on the full-color screen, printed, or wirelessly emailed.

Accessories

A033 Lead Post Adapters

Tester Components

Controller

① **Carrying Handle**: For carrying the Controller and Tester Pod (when attached).

② **Controller Release Lever**: Press to release the Controller from the Tester Pod.

③ **Power Button**: Hold for 2 seconds to turn the Controller on and off independent of the Tester Pod. Flashes when the Controller is being charged.

④ **Touch Screen**: Primary user interface.
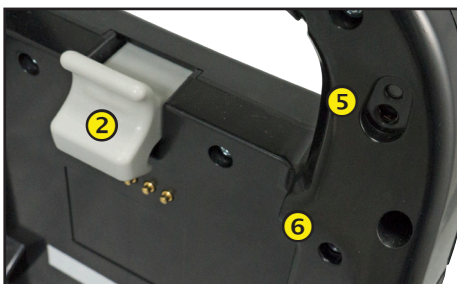
⑤ **Camera & Flashlight:** For VIN scanning and identification.

⑥ **Temperature Sensor:** For measuring battery temperature.
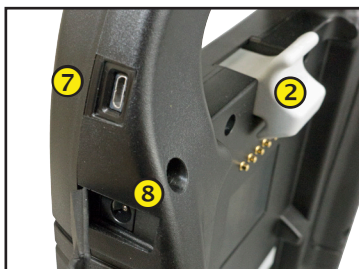
⑦ **Micro-USB Port**: For updating and servicing the Controller when a WiFi network is not available.

⑧ **Power Supply Connection**

Tester Pod

① **Controller Charging Contacts:** For charging and communicating with the Controller when mounted to the Tester Pod.

② **Status Indicator LEDs:**

    ⏻ - Power is on.

    ✳ - Tester Pod is communicating with the Controller.

    ⊖ - Clamps reversed

③ **Integrated Printer:** For printing and sharing test results.

④ **Clamp Storage Mounts:** Use to keep the test clamps protected when the tester is not in use.

⑤ **Tester Pod Internal Batteries**

Charging Dock

① **Tester Pod Charging Contacts:** For charging the Tester Pod

② **Power Supply Connection**

⚠ **IMPORTANT:** The DSS-5000 automatically checks and installs any software updates every night. Always leave the Controller/Tester Pod in the Dock plugged into a 110v outlet and connected to a WiFi network every night.

Test Preparation

Inspecting the Battery

Before starting the test visually inspect the battery for:

- Cracked, buckled, or leaking case. If you see any of these defects, replace the battery.

- Corroded, loose, or damaged cables and connections. Repair or replace them as needed.

- Corrosion on the battery terminals, and dirt or acid on the case top. Clean the case and terminals using a wire brush and a mixture of water and baking soda.

- Low electrolyte level. If the electrolyte level is too low, add distilled water to fill up to 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.

> ### ⚠ WARNING
>
> **Failure to properly install lead terminal adapters, or using adapters that are dirty or worn, may cause false test results.**
>
> When testing side-post or Group 31 batteries, always use lead terminal adapters provided with the tester—do not test at the battery's steel bolts. To avoid damage, never use a wrench to tighten the adapters more than ¼ turn.

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. Otherwise, you must remove the battery and perform an out-of-vehicle test.

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 A Battery

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

Connect the clamps to the tester: 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.

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

Setting User Preferences

Before starting your test you may want to customize the use of your analyzer by setting preferences in the Settings (⚙) Menu. The Settings Menu is described in Chapter 9.

Initial Power Up

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

System Language	Select the Controller default language displayed on the screen.
Test Result Language	Select the Controller default language for all displayed tests and test 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.

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 the new user name and password.

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 9: Settings to change these defaults.

5. Select the correct manufacturer logo and tap **Next** to continue.

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

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

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

Battery Rating	Default: CCA (Cold Cranking Amps
Temperature Units	Select Fahrenheit or Celsius
Decimal Separator	Select decimal point or comma

8. A list of devices connected to the tester is displayed.

   To add a device, tap the plus (+) sign and follow the on-screen instructions. To unlink from a device, tap the displayed serial number to select it. Tap the trash can icon (🗑) to delete it.

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

9. 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.

10. The BMIS (**B**attery **M**anagement **I**nformation **S**ystem) Account screen is displayed. Tap **Yes** to enter the username and the password or **No** to skip this step.

Country	Username	Password
U.S. Nissan	nissan@dss5000.com	nissan1
U.S. Infiniti	infiniti@dss5000.com	infiniti1
Nissan Canada	nissancanada@dss5000.com	nissan1
Infiniti Canada	infiniticanada@dss5000.com	infiniti1

11. A searchable list of dealerships is displayed. Enter the Dealer ID or dealership name to search for the correct dealership and tap ➔.

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

13. 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.
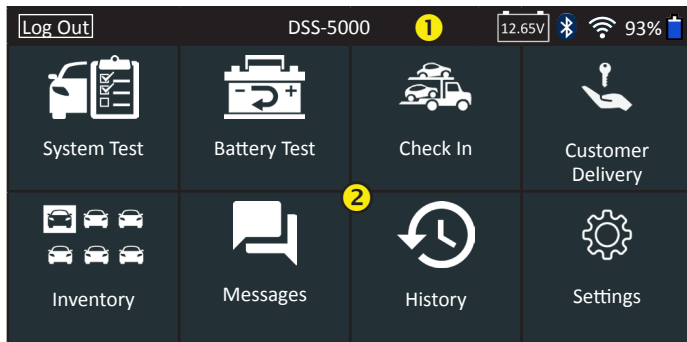
Store Name	Midtronics
Street Address	7000 Monroe
Street Address 2	
City	Willowbrook
State	IL
Zipcode	60527
Phone #	1-630-323-2800

14. The login screen is displayed.

Tap a user name to access the Main Menu.

Main Menu

Log Out	DSS-5000 ①	12.65V 🔵 📶 93% 🔋
System Test	Battery Test	Check In	Customer Delivery
② Inventory	Messages	History	Settings

① Menu Bar

| Log Out	Log out current user	93%	Controller internal battery level
🔵	Bluetooth connectivity status	🔋	Controller internal battery status
📶	WiFi signal strength	12.65V	Connected battery voltage

② Main Menu Selection Area

Viewing 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.

| ●●● Screen 1	● Screen 1
●●● Screen 2	●
●●● Screen 3	● Screen 2
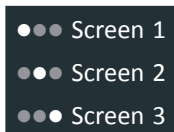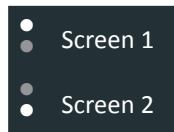
Swipe Horizontally | *Swipe Vertically*

Main Menu Icons

Icon	Description
System Test	Tests the battery, starting and charging systems of a vehicle. The battery must be in the vehicle to perform this test.
Battery Test	Tests an in-vehicle battery using conductance and Conductance Profiling™ to diagnose the cranking capability and reserve capacity.
Check In	For testing batteries in incoming vehicles.
Customer Delivery	For testing batteries in vehicles prior to final customer delivery.
Inventory	For testing vehicle batteries in dealer inventory awaiting sale. Use as part of a comprehensive lot management program.
Messages	Displays alerts and notifications for upcoming tests and activities including scheduled tests, tool software updates and maintenance opportunities.
History	Access archived test histories or search test history by VIN or by technician.
Settings	Setup/adjust: WiFi, printer setup, email settings, user information, default language, display and sound settings, BMIS information, shop information, and connected devices. Also access to tester software version information.
Support	Access the analyzer Self-Test and a digitized version of the Instruction Manual.

Chapter 2: System Test
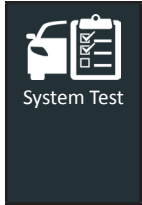
Use System Test to perform Battery Tests on in-vehicle batteries using test parameters determined by vehicle VIN or year, make, and model of the vehicle being tested. Following the Battery Test, the vehicle starting and charging systems are also tested.

NOTE: An In Vehicle Test test will always associate the in-vehicle battery with the VIN of the vehicle in which it is installed.
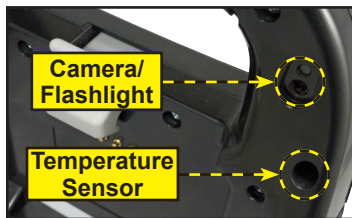
At any time during the test tap ◀ to return to the previous screen or 🏠 to return to the Main Menu.

Battery Test

1. Connect the Tester Pod test clamps to the battery (**Black** to negative [–], **Red** to [+]).

2. Press the Controller Release Lever and disconnect the Controller from the Tester Pod.

3. On the Controller at the Main Menu tap **System Test**.

4. Tap **Next** at the Connect Clamps screen. The Acquire VIN screen is displayed.

5. Use the camera built into the back of the Controller handle to scan the VIN bar code. For best results, use the barcode located on the driver's side door frame. The VIN is also displayed behind the windshield on the driver's side dashboard.

NOTE: Refer to Appendix B for recommended scanning procedures and VIN scanning help.
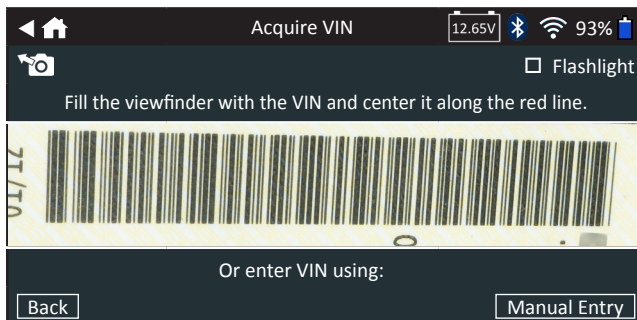
Camera/Flashlight

Temperature Sensor

Controller

Drivers Door Frame

1N4AL2AP1CC

Windshield

Acquire VIN   12.65V ⚡ 🛜 93% 🔋
☐ Flashlight

Fill the viewfinder with the VIN and center it along the red line.

Or enter VIN using:

Back   Manual Entry

Manual Entry: Use the on-screen keypad to manually type the 17-digit VIN and tap **Next**.

1	2	3	4	5	6	7	8	9	0
W	E	R	T	Y	U	P			
A	S	D	F	G	H	J	K	L	
Z	X	C	V	B	N	M		⌫	

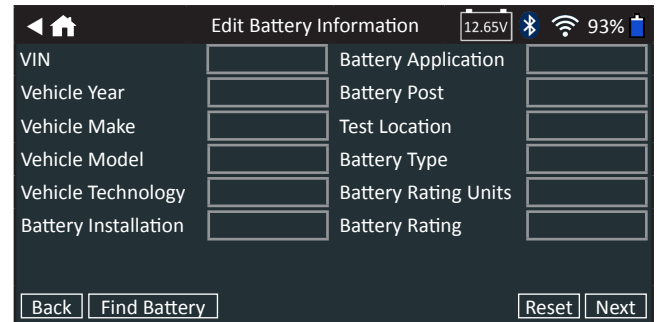Back   Next

The displayed digit counter will count up the alphanumeric characters as they are being entered on the keypad.

6. If this is the first time the vehicle is being tested tap **Yes** if the installed battery is original equipment or **No** if a replacement battery has been installed.

   If **No** is selected, enter the battery rating. Tap Reset to re-enter the battery rating

7. The Edit Battery Information screen displays vehicle and battery information based on the VIN.

   If the displayed information is correct, tap **Next** to begin the Battery Test. Tap on the corresponding box to edit the parameter information.

◀🏠   Edit Battery Information   12.65V ⚡ 🛜 93% 🔋

VIN		Battery Application	
Vehicle Year		Battery Post	
Vehicle Make		Test Location	
Vehicle Model		Battery Type	
Vehicle Technology		Battery Rating Units	
Battery Installation		Battery Rating	

Back   Find Battery   Reset   Next

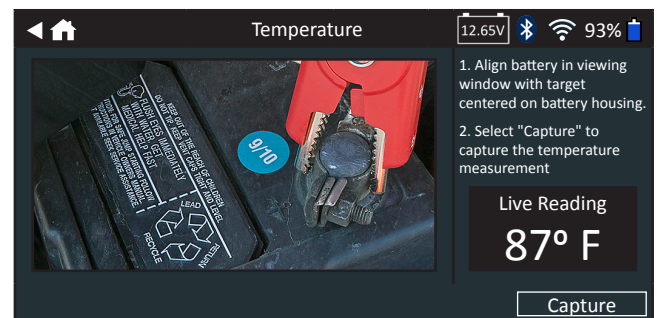See Appendix A at the back of this manual for parameter descriptions.

NOTE: Tap **Find Battery** to search for the battery location based on the vehicle year, make, and model based on the VIN or vehicle year, make, and model selected.

NOTE: Tap **Reset** to re-enter the battery rating if a replacement battery has been selected.

8. Align the temperature sensor on the Controller over the battery and tap **Capture**. The Battery Test begins when the temperature is successfully captured.

◀🏠   Temperature   12.65V ⚡ 🛜 93% 🔋

1. Align battery in viewing window with target centered on battery housing.

2. Select "Capture" to capture the temperature measurement

Live Reading

87° F

Capture

System Test

1. When prompted, start the engine and let it idle.

2. Tap **Next**. The analyzer tests the alternator output.

3. When prompted, rev the engine to between 2000 to 3000 rpm and tap **Next**.

4. Hold the engine revs while the analyzer tests the alternator output again.

5. When prompted, idle the engine.

6. When prompted, turn on the vehicle's high beam headlights and the interior blower fan.

7. When prompted, rev the engine to between 2000 to 3000 rpm and tap **Next**.

8. Hold the engine revs while the analyzer tests the alternator output again.

9. When prompted Idle the engine and then turn it off.

10. Tap **Next** to display the test results.

Test Results-Summary
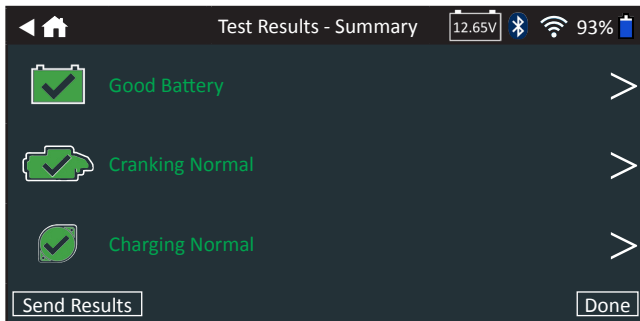
Test Results - Summary

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

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

Battery Test Results

The test results are displayed on the Controller screen.
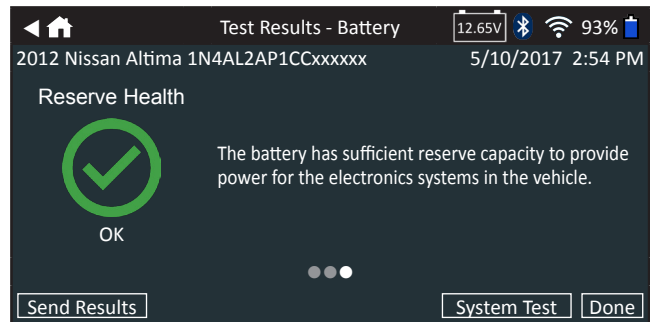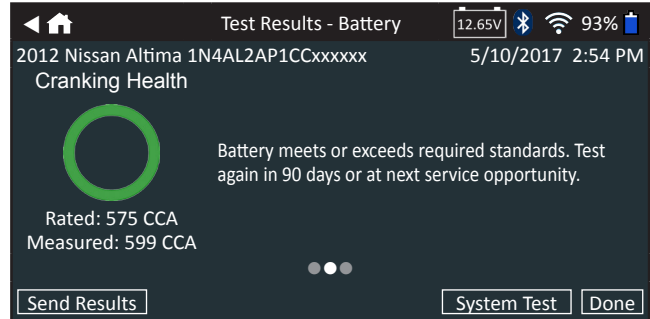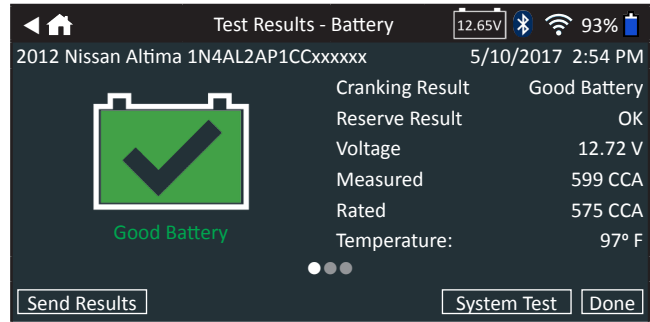
Test Results - Battery Test

1. To send the test results to a configured printer or email address, tap **Send Results**.

2. Tap **Email** to send the results via email or Print to print the results using a configured printer.
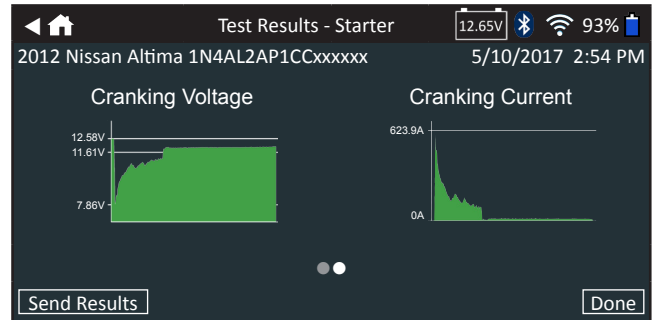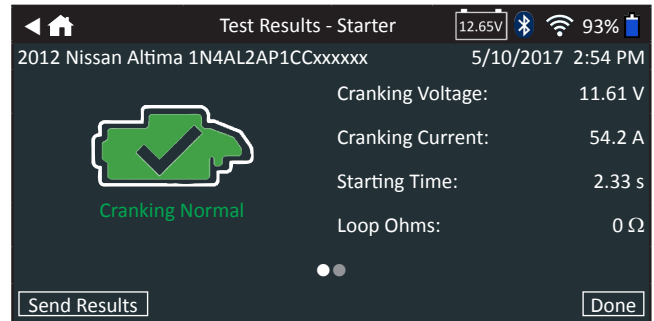
3. Tap **Done** or 🏠 to return to the Main Menu.

Test Results - Battery Test

Decision	Cranking Health	Reserve Capacity	Description
Good Battery	Good Battery	Good Battery	Battery meets or exceeds required standards.
	Good Battery	Unknown Reserve	Battery meets or exceeds required standards.
	Good Recharge	Good Battery	Battery is good, but low on charge. Fully charge the battery for optimal performance and life. Check for causes of low charge.
Good Recharge	Charge & Retest	Good Battery	
	Good Recharge	Unknown Reserve	
Charge & Retest	Charge & Retest	Unknown Reserve	Battery requires charge to determine condition.
Replace Battery	Badcell Replace Short	Replace Battery	Battery fails to meet industry accepted standards.
	Charge & Retest	Replace Battery	Battery is low in charge and shows low reserve capacity. Low reserve capacity will compromise the battery's ability to provide system current and hold a charge.
	Good Battery	Replace Battery	Battery is good for cranking purpose but shows low reserve capacity. Low reserve capacity will compromise the battery's ability to provide system current and hold a charge.
	Good Recharge	Replace Battery	
	Replace Battery	Good Battery	Battery fails to meet industry accepted standards
	Replace Battery	Replace Battery	
	Replace Battery	Unknown Reserve	
Badcell Short Replace	Badcell Replace Short	Good Battery	
	Badcell Replace Short	Unknown Reserve	

Test Results - Reserve Capacity

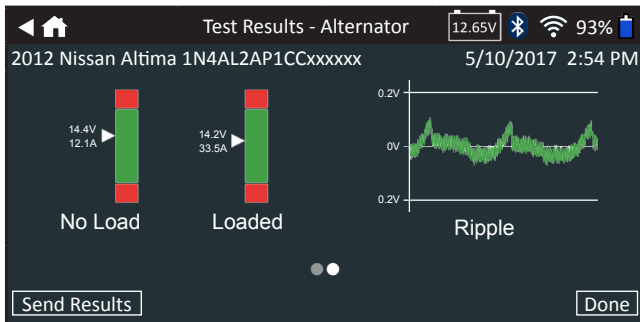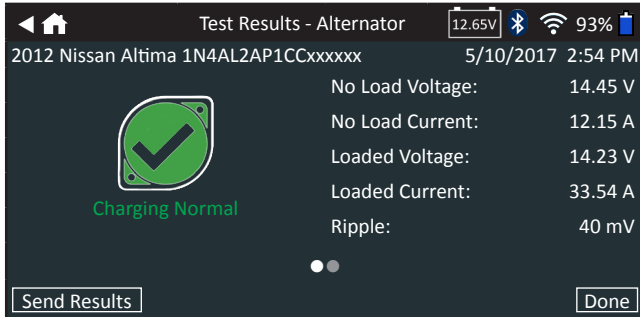| Decision	Action
OK	The battery has sufficient reserve capacity to provide power for the electronics systems in the vehicle.
Warning	The battery reserve capacity is low, which can impact power for vehicle electronics including console screen, entertainment systems, power seats, etc… Recommend replacing the battery.
No Test	System conditions have prevented a testing battery reserve capacity. Ensure all vehicle accessory loads are off, the key is not in the ignition, and the doors are close. Then test again.

Starter Test Results

Test Results - Starter
2012 Nissan Altima 1N4AL2AP1CCxxxxxx   5/10/2017 2:54 PM
12.65V 93%
Cranking Normal
Cranking Voltage: 11.61 V
Cranking Current: 54.2 A
Starting Time: 2.33 s
Loop Ohms: 0 Ω
Send Results   Done

Test Results - Starter
2012 Nissan Altima 1N4AL2AP1CCxxxxxx   5/10/2017 2:54 PM
12.65V 93%
Cranking Voltage   Cranking Current
12.58V
11.61V
7.86V
623.9A
0A
Send Results   Done

Test Results - Starter Test

Test Results - Starter

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 (REPLACE or BAD CELL.) 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

Test Results - Alternator Test

Test Results - Alternator

Decision	Action
Charging Normal	The output from the alternator is normal.
No Output	No output detected. Check belts to ensure alternator is rotating when engine is running. √ Check all alternator connections including to the battery. Clean or replace if necessary and retest. √ If the belts and connections are in good working condition, replace alternator or external voltage regulator.
Low Output	Alternator not providing enough current to power electrical loads and charge the battery. √ Check belts to ensure the alternator is rotating with the engine running. √ Check alternator connections to and from the battery. If loose or heavily corroded, clean or replace the cable and retest.
High Output	Alternator voltage to the battery exceeds normal limits of a functioning regulator. √ Check for loose and normal ground connections. If no connection problems are found, replace the regulator. 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.

Test Results - Diode

Decision	Action
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	

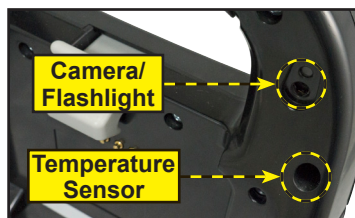# Chapter 3: Battery Test

Battery Test

Use Battery Test to perform tests on vehicles brought in for service using test parameters determined by VIN of the vehicle being tested.

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

1. Connect the Tester Pod test clamps to the battery (**Black** to negative [–], **Red** to [+]).

2. Press the Controller Release Lever and disconnect the Controller from the Tester Pod.

3. On the Controller at the Main Menu tap the **Battery Test** icon.

4. Tap **Next** at the Connect Clamps screen. The Acquire VIN screen is displayed.

5. Use the camera built into the back of the Controller handle to scan the VIN bar code. For best results, use the barcode located on the driver's side door frame. The VIN is also displayed behind the windshield on the driver's side dashboard.

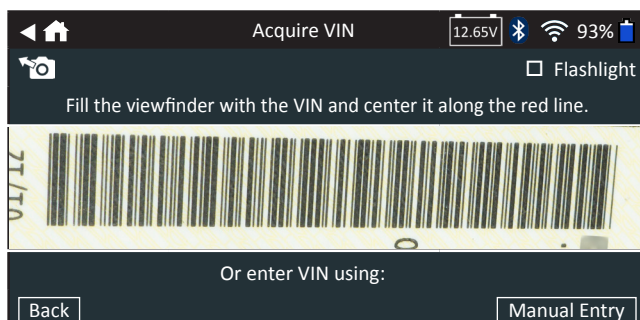> **NOTE:** Refer to Appendix B for recommended scanning procedures and VIN scanning help.

Controller

Drivers Door Frame

Windshield

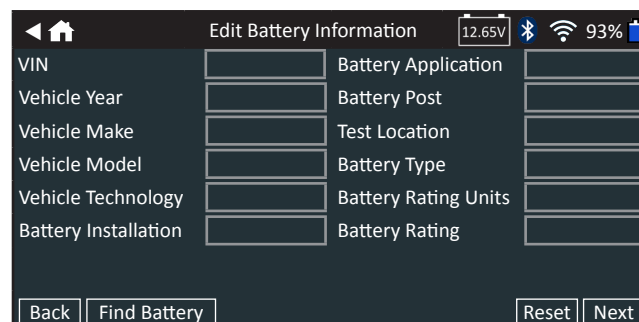*Manual Entry*: Use the on-screen keypad to manually type the 17-digit VIN and tap **Next**.

The displayed digit counter will count up the alphanumeric characters as they are being entered on the keypad.

6. If this is the first time the vehicle is being tested tap **Yes** if the installed battery is original equipment or **No** a replacement battery has been installed.

    If **No** is selected, enter the battery rating. Tap Reset to re-enter the battery rating

7. The Edit Battery Information screen displays vehicle and battery information based on the VIN.

    If the displayed information is correct, tap **Next** to begin the Battery Test. Tap on the corresponding box to edit the parameter information.

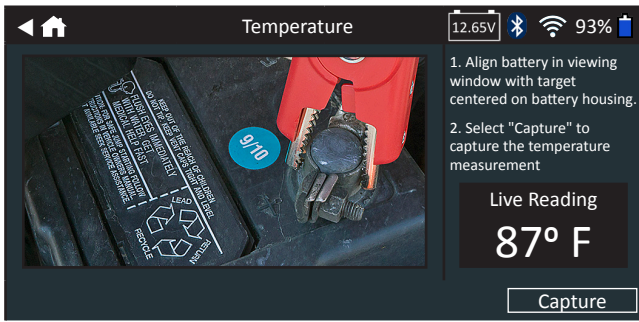See Appendix A at the back of this manual for parameter descriptions.

> **NOTE**: Tap **Find Battery** to display a battery location diagram for the vehicle being tested (based on the captured VIN).
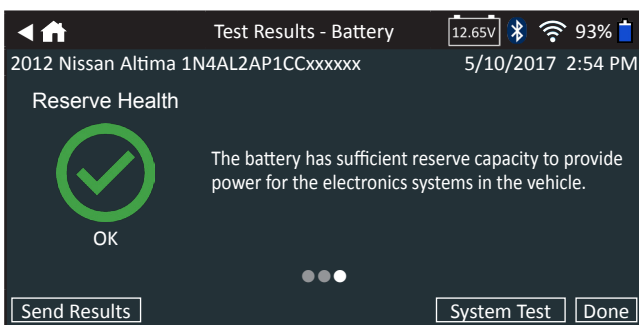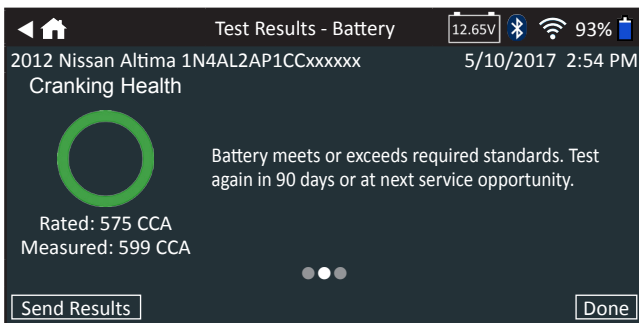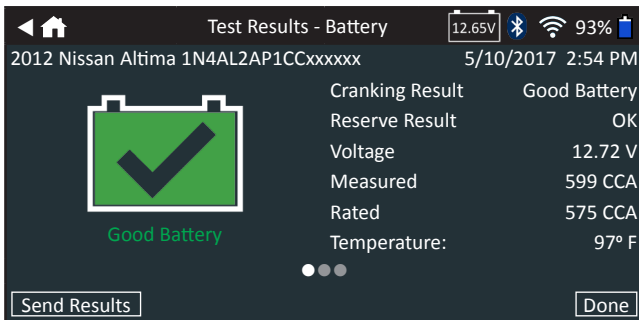
> **NOTE**: Tap **Reset** to re-enter the battery rating if a replacement battery has been selected.

8. Align the temperature sensor on the Controller over the battery and tap **Capture**. The test begins when the temperature is successfully captured.

The test results are displayed on the Controller screen.

Test Results - Battery Test

9. To send the test results to a configured printer or email address, tap **Send Results**.

10. Tap **Email** to send the results via email or Print to print the results using a configured printer.

11. Tap **Done** or 🏠 to return to the Main Menu.

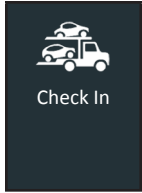
🔧   **NOTE**: See System Test Results in Chapter 2: System Test for a full explanation of all possible test outcomes.
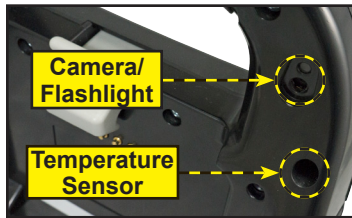
Chapter 4: Check In

Use Check In for preliminary battery testing of newly arrived vehicles to ensure it will not sit in a low state of charge for an extended period of time potentially damaging the battery. Renders "Good Battery" or "Charge and Retest" decisions based on measured 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 Tester Pod test clamps to the battery (**Black** to negative [–], **Red** to [+]).

2. Press the Controller Release Lever and disconnect the Controller from the Tester Pod.

3. On the Controller at the Main Menu tap the **Check In** icon.

4. Tap **Next** at the Connect Clamps screen. The Acquire VIN screen is displayed.

5. Use the camera built into the back of the Controller handle to scan the VIN bar code. For best results, use the barcode located on the driver's side door frame. The VIN is also displayed behind the windshield on the driver's side dashboard.

> **NOTE:** Refer to Appendix B for recommended scanning procedures and VIN scanning help.
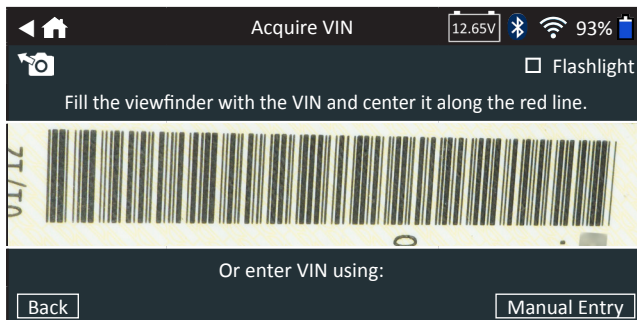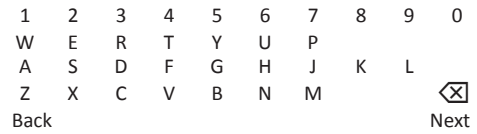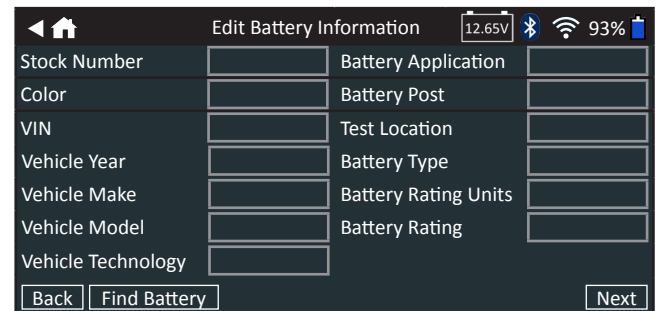

Controller

Drivers Door Frame

Windshield

Manual Entry: Use the on-screen keypad to manually type the 17-digit VIN and tap **Next**.

1	2	3	4	5	6	7	8	9	0
W	E	R	T	Y	U	P			
A	S	D	F	G	H	J	K	L	
Z	X	C	V	B	N	M			⌫

Back   Next

The displayed digit counter will count up the alphanumeric characters as they are being entered on the keypad.

6. The Edit Battery Information screen displays vehicle and battery information based on the VIN.

If the displayed information is correct, tap **Next** to begin the Battery Test. Tap on the corresponding box to edit the parameter information.

See Appendix A at the back of this manual for parameter descriptions.
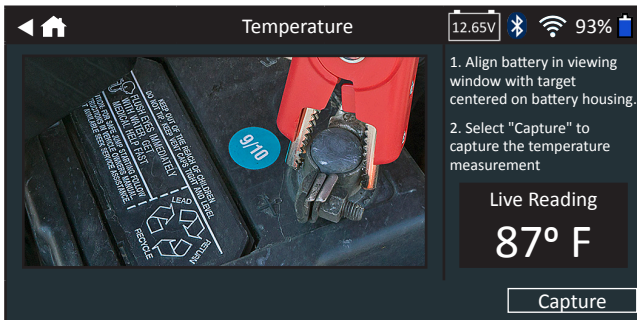
> **NOTE**: Tap **Find Battery** to display a battery location diagram for the vehicle being tested (based on the captured VIN).
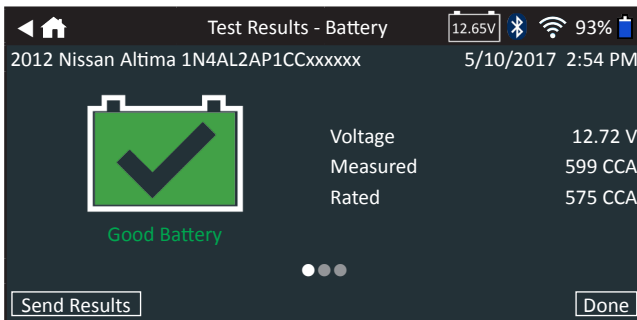
> **NOTE**: Tap **Reset** to re-enter the battery rating if a replacement battery has been selected.

7. Align the temperature sensor on the Controller over the battery and tap **Capture**. The test begins when the temperature is successfully captured.

The test results are displayed on the Controller screen.

Test Results - Battery Test

NOTE: See System Test Results in Chapter 2: System Test for a full explanation of all possible test outcomes.

---

8. To send the test results to a configured printer or email address, tap **Send Results**.

9. Tap **Email** to send the results via email or Print to print the results using a configured printer.

10. Tap **Done** or 🏠 to return to the Main Menu.

Chapter 5: Customer Delivery
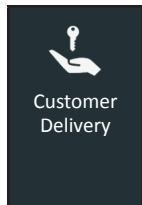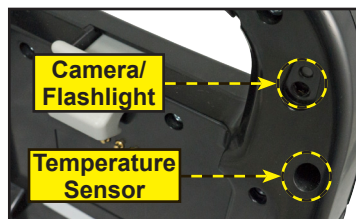
Customer Delivery

Use Customer Delivery to perform a battery test right before a vehicle is delivered to a customer to ensure a bad battery is not delivered to the customer potentially resulting in a return visit. Renders "Good Battery" or "Charge and Retest" decisions based on measured battery voltage.

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

1. Connect the Tester Pod test clamps to the battery (**Black** to negative [–], **Red** to [+]).

2. Press the Controller Release Lever and disconnect the Controller from the Tester Pod.

3. On the Controller at the Main Menu tap the **Customer Delivery** icon.

4. Tap **Next** at the Connect Clamps screen. The Acquire VIN screen is displayed.

5. Use the camera built into the back of the Controller handle to scan the VIN bar code. For best results, use the barcode located on the driver's side door frame. The VIN is also displayed behind the windshield on the driver's side dashboard.

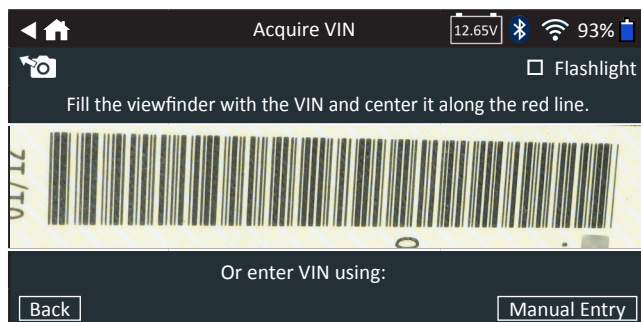> **NOTE:** Refer to Appendix B for recommended scanning procedures and VIN scanning help.

Camera/Flashlight

Temperature Sensor

Controller

Drivers Door Frame

1N4AL2AP1CC

Windshield

Acquire VIN   12.65V 🔵 📶 93% 🔋

📷   ☐ Flashlight

Fill the viewfinder with the VIN and center it along the red line.

Or enter VIN using:

Back   Manual Entry

Manual Entry: Use the on-screen keypad to manually type the 17-digit VIN and tap **Next**.

1	2	3	4	5	6	7	8	9	0
W	E	R	T	Y	U	P			
A	S	D	F	G	H	J	K	L	
Z	X	C	V	B	N	M			⌫

Back   Next

The displayed digit counter will count up the alphanumeric characters as they are being entered on the keypad.

6. The Edit Battery Information screen displays vehicle and battery information based on the VIN.

If the displayed information is correct, tap **Next** to begin the Battery Test. Tap on the corresponding box to edit the parameter information.

◄ 🏠	Edit Battery Information	12.65V 🔵 📶 93% 🔋
Stock Number		Battery Application
Color		Battery Post
VIN		Test Location
Vehicle Year		Battery Type
Vehicle Make		Battery Rating Units
Vehicle Model		Battery Rating
Vehicle Technology		
Back	Find Battery	Next

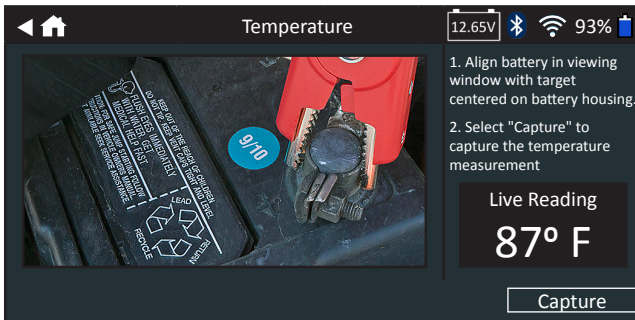See Appendix A at the back of this manual for parameter descriptions.

> **NOTE:** Tap **Find Battery** to display a battery location diagram for the vehicle being tested (based on the captured VIN).
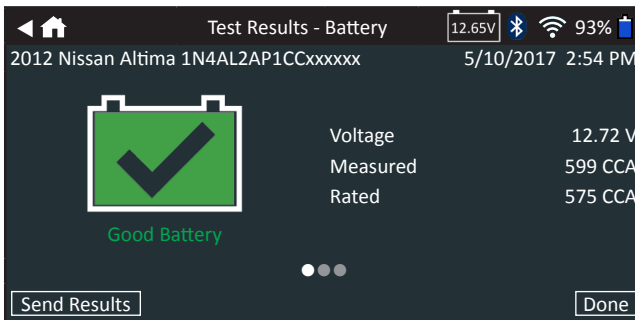
> **NOTE:** Tap **Reset** to re-enter the battery rating if a replacement battery has been selected.

7. Align the temperature sensor on the Controller over the battery and tap **Capture**. The test begins when the temperature is successfully captured.

The test results are displayed on the Controller screen.

Test Results - Battery Test

 NOTE: See System Test Results in Chapter 2: System Test for a full explanation of all possible test outcomes.

---

8. To send the test results to a configured printer or email address, tap **Send Results**.

9. Tap **Email** to send the results via email or Print to print the results using a configured printer.

10. Tap **Done** or 🏠 to return to the Main Menu.

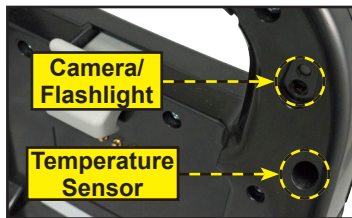# Chapter 6: Inventory
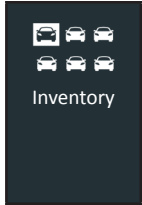
Inventory

Use Inventory to perform a battery test on a vehicle that has been sitting on a lot, port, or any other extended time waiting to be delivered or sold. This will identify batteries needing charging, keep inventory batteries healthy and reduce bad customer service experiences..

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

1. Connect the Tester Pod test clamps to the battery (**Black** to negative [–], **Red** to [+]).

2. Press the Controller Release Lever and disconnect the Controller from the Tester Pod.

3. On the Controller at the Main Menu tap the **Inventory** icon.

4. Tap **Next** at the Connect Clamps screen. The Acquire VIN screen is displayed.

5. Use the camera built into the back of the Controller handle to scan the VIN bar code. For best results, use the barcode located on the driver's side door frame. The VIN is also displayed behind the windshield on the driver's side dashboard.

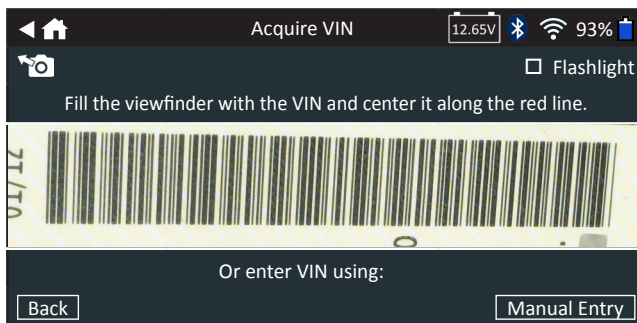**NOTE:** Refer to Appendix B for recommended scanning procedures and VIN scanning help.

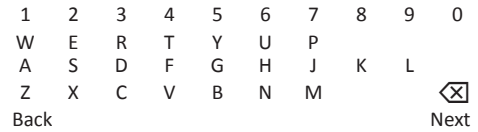**Camera/ Flashlight**

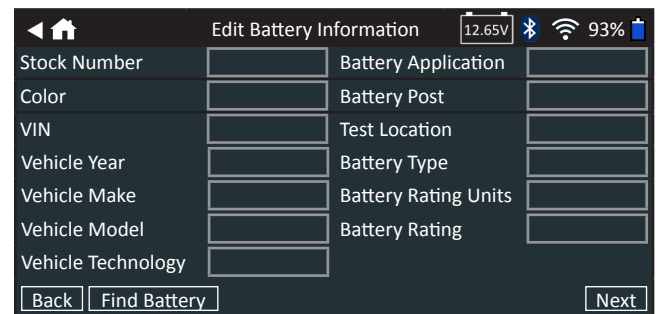**Temperature Sensor**

Controller

Drivers Door Frame

1N4AL2AP1CC

Windshield

Acquire VIN   12.65V 🗦 📶 93% 🔋

☐ Flashlight

Fill the viewfinder with the VIN and center it along the red line.

Or enter VIN using:

| Back | Manual Entry |

Manual Entry: Use the on-screen keypad to manually type the 17-digit VIN and tap **Next**.

1	2	3	4	5	6	7	8	9	0
W	E	R	T	Y	U	P			
A	S	D	F	G	H	J	K	L	
Z	X	C	V	B	N	M			⌫

Back   Next

The displayed digit counter will count up the alphanumeric characters as they are being entered on the keypad.

6. The Edit Battery Information screen displays vehicle and battery information based on the VIN.

If the displayed information is correct, tap **Next** to begin the Battery Test. Tap on the corresponding box to edit the parameter information.

◄ 🏠   Edit Battery Information   12.65V 🗦 📶 93% 🔋

Stock Number		Battery Application	
Color		Battery Post	
VIN		Test Location	
Vehicle Year		Battery Type	
Vehicle Make		Battery Rating Units	
Vehicle Model		Battery Rating	
Vehicle Technology			

| Back | Find Battery | | Next |

See Appendix A at the back of this manual for parameter descriptions.
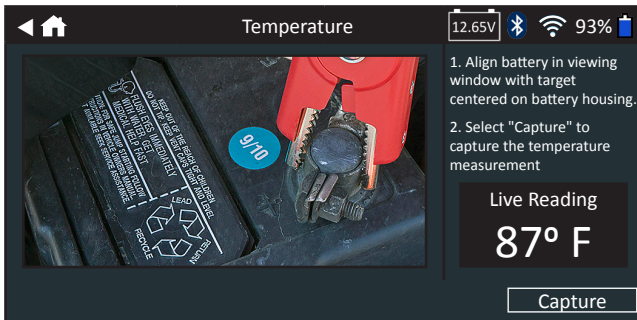
NOTE: Tap **Find Battery** to display a battery location diagram for the vehicle being tested (based on the captured VIN).

**NOTE**: Tap **Reset** to re-enter the battery rating if a replacement battery has been selected.

7. Align the temperature sensor on the Controller over the battery and tap **Capture**. The test begins when the temperature is successfully captured.

The test results are displayed on the Controller screen.

> **NOTE:** A warning screen is displayed if the battery requires charging or replacing.
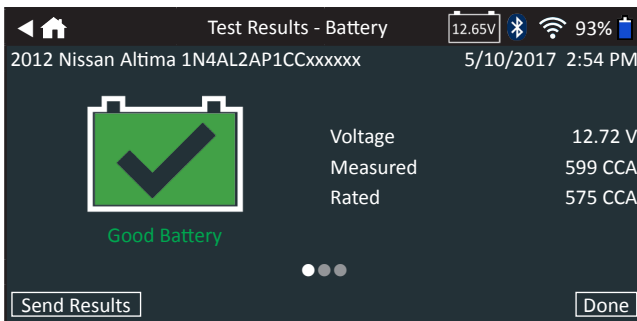
Test Results - Battery Test

> **NOTE**: See System Test Results in Chapter 2: System Test for a full explanation of all possible test outcomes.

8. To send the test results to a configured printer or email address, tap **Send Results**.

9. Tap **Email** to send the results via email or Print to print the results using a configured printer.

10. Tap **Done** or 🏠 to return to the Main Menu.

Chapter 7: Messages
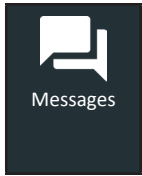
Messages

The Messages function displays alerts and notifications for upcoming tests and activities. This includes scheduled testing as well as tool software updates and maintenance opportunities.

	Mark Read Or Unread		Delete Notification
	Perform Message Action		

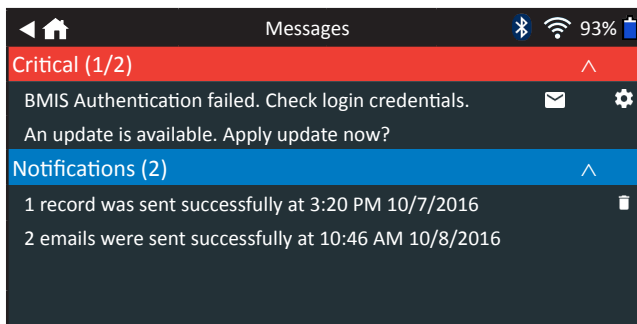Tap ◄ to return to the previous screen or 🏠 to return to the Main Menu.

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.

② (red)   Unread Critical Messages

② (blue)   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.

Chapter 8: History
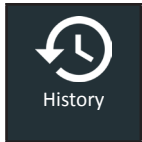
Use History to access the tool usage history, a vehicle history based on VIN, and user histories. The search function can also be used find test records for specific vehicles and technicians.

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

📄	Tool History
🚗	Vehicle History
👥	User History
Σ	Totals
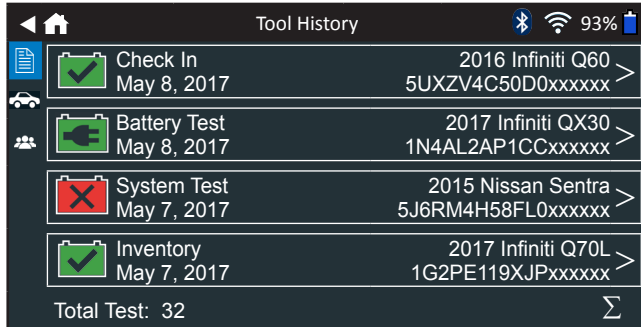
Tool History

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 Σ 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

The totals are displayed by possible results for all battery chemistries and potential test results.

Good Battery	BC Open Or Load Fail Replace
Good Recharge	Broken Weld Replace
Charge & Retest	Temp Sensor Failed
Replace Battery	Aborted
Badcell Short Replace	Invalid Test
Remote Post	Aborted / 24V
Side Post	Out Of Balance

Totals By Test Type

Displays test totals by test type.

System Test	Customer Delivery
Battery Test	Inventory
Check In	

Totals By Date And Location

Displays test totals by time interval. Also displays the number of tests performed in and out of vehicle.

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

Vehicle History

Vehicle History displays test totals conducted on specific vehicles based on the VIN. It is also possible to enter a VIN to search for test records for a specific vehicle by tapping the displayed buttons.
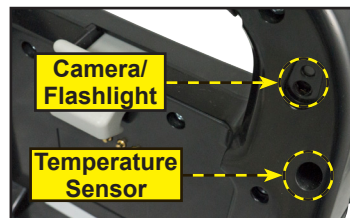
Tap on the records displayed on the right side of the screen to view the individual test results.

Vehicle Select Option

Tap 🔍 to select vehicle search option.

Manual Lookup: Use the on-screen keypad to manually type the 17-digit VIN and tap **Next**.

VIN Scan: Use the camera built into the back of the Controller handle to scan the VIN bar code. For best results, use the barcode located on the driver's side door frame. The VIN is also displayed behind the windshield on the driver's side dashboard.

Search: Search records by Vehicle Year, Make, and Model.

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.

Chapter 9: Settings

Use the Settings 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, user management, connected accessories, and device information.

Settings

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.

➕	Add Network	🗑	Delete Selected Network
📶	Connect Highlighted Network	🔄	Refresh Network List

WiFi Setup Procedure

1. At the Main Menu, tap Settings.

2. Tap on the WiFi icon 📶 to display a list of configured WiFi networks.

   NOTE: If initial setup is being performed, the network add list is displayed by default as there are no configured networks. See Adding A Network.

   If a network has been previously configured, the DSS-5000 will automatically connect. An (X) will appear over the network signal strength indicator if the network is not within range or available.

3. If more than one network has been configured, the active network is displayed first in the list. To select a different network, tap the network name then tap 📶.

   When connected, the network name moves to the top of the list with ● displayed next to it. An error message is displayed if the DSS-5000 was not able to connect to the selected network.

4. Tap **X** to exit and return to the network list.

5. Tap 🏠 to return to the Main Menu.

Adding A Network

1. Tap ➕ to add a WiFi network.

   A list of detected WiFi networks is displayed.

2. To add a network manually tap ➕ again. Network SSID, Security and IP Settings are required fields.

3. Tap the network name from the list of detected WiFi networks to access the Security and IP Settings. A password may also be required (may require IT assistance).

Security	None
	WEP
	WPA/WPA2 PSK
IP Address	DHCP
	Static

NOTE: Passwords can be case-sensitive. Make note of passwords and the on-screen keypad to avoid connection failures due to incorrect password entry.

4. Tap → to configure the selected network.

NOTE: If the selected network requires a User Authentication page, the message "Sign in to WiFi network" is displayed. Tap Continue to be redirected to the page. User credentials (ex. User Name and Password) may require IT assistance.

5. Once the network has been successfully configured, tap → to return to the list of available configured networks. The selected network is displayed at the top of the list with a ● next to it.

6. Tap 🏠 to return to the Main Menu.

Deleting A Network

1. Tap a displayed network.

2. Tap 🗑 to delete the network and tap Yes to confirm.

Printer Settings

The Printer Setup 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.

✎	Edit Printer Settings	⚙	Printer Setup
🗑	Delete Selected Network		Configured Printers
	Print Test Page		
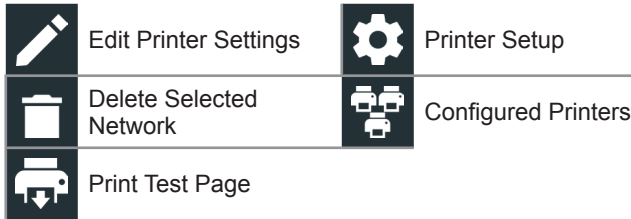
Adding A WiFi Printer (Admin Only)

1. Tap ⚙ to access the Printer Setup 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	⚙	Server Settings
✎	Edit Address		Address Book
🗑	Delete Selected Address	➔	Send Test Email
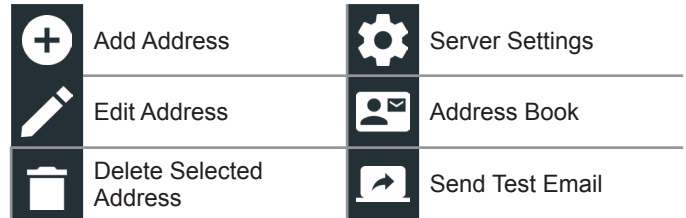
Add Address (Admin Only)

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.

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.

1. Tap ⚙ to display the current logged in Admin user.

2. Select a displayed user by tapping it.

3. Tap ✎ to edit the Username, Password, and User Type (Standard or Admin).

4. Tap **X** when complete to return to the User Management screen.

5. 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 default standard language for the analyzer to use on the Controller.

Test Result Language

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

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 Controller 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 taping on the check box.

Sleep Time

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

Dim Time

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

BMIS Login (Admin Only)

Enter and edit BMIS Login and Password information. Log into a BMIS account.

Login   Zone3@yourshop.com

Password   • • • • • •

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 tester date and time settings.

🏠 Settings Home	🕐 Date/Time Settings
⚙ Test Settings	💾 Create MDCA Log File

Shop Information

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

Store Name	Midtronics
Street Address	7000 Monroe
Street Address 2	
City	Willowbrook
State	IL
Zipcode	60527
Phone #	1-630-323-2800

Test Settings

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

Battery Rating	CCA
Temperature Units	° F
Decimal Separator	00.00
Create MDCA Log File	💾

Battery Rating
Default battery rating units used when testing batteries.

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 to assist in troubleshooting. Only generate this file when directed to do so 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	12 Hour
Select Date Format	10/18/2016
Select Time Zone	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.

▲	▲	▲
Apr	17	2017
May	**18**	**2017**
Jun	19	2017
▼	▼	▼
CANCEL		SET

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

▲	▲	▲
9	50	AM
10	**51**	**PM**
11	52	
▼	▼	▼
CANCEL		SET

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

Settings and version information instructions

Device List

 Displays connected and linked accessory devices. Additional devices and CVG-2 modules can also be detected and linked to the analyzer.

Add	Refresh
Delete Paired Device	Enabled

Add Tester Pod

1. Tap ⊕ to add a device.

2. Move the device to be linked within 30 feet of the Controller, turn on the device, then tap →.

3. A list of detected devices is displayed. Tap > next to the desired device to select it. If the desired device is not displayed, tap ↻ to refresh the list.

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

A confirmation message is displayed when the device has been successfully linked.

4. Tap → to return to the Device List screen.

Deleting A Diagnostic Base

1. Tap 🗑 next to the base to be deleted.

2. Tap Yes to delete.

Add CVG Device

1. Tap ⊕ to add a CVG.

2. Plug the CVG into the OBDII port of any vehicle.

3. Turn the vehicle ignition on, but do not start the vehicle.

4. A list of detected CVGs is displayed. Tap > next to the desired CVG to select it. If the desired CVG is not displayed, tap ↻ to refresh the list.

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

A confirmation message is displayed when the CVG has been successfully linked.

5. Tap → to return to the Device List screen.

Version Information

 Use Version Information to display WiFi connection data the DSS Controller, Diagnostic Device, and CVG-2 Device software version information.

Factory Reset	Check For Updates
Legal Information	

DSS Serial Number	
WiFi MAC Address	
Configuration Version	
Data Version	
DSS Controller Version	
Diagnostic Device Version	
CVG-2 Device Version	No Device Configured
OS Version	

Factory Preset

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 tester software.

Chapter 10: Support
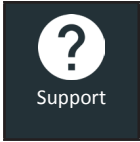
Use the Support function to access built-in Self-Testing functions or to view a digitized version of the Instruction Manual.

User Manual

Tap the icon to view the analyzer's Instruction Manual.

Self-Diagnostics

Use to test WiFi network and printer connections, CVG pairing, Tester Pod diagnostics, Controller display testing, and Controller touch panel testing.

Self-Diagnostics	
WiFi Self-Diagnostics	
WiFi Printer Self-Diagnostics	
CVG Self-Diagnostics	
Tester Pod Self-Diagnostics	
Display Self-Diagnostics	
Touchscreen Self-Diagnostics	
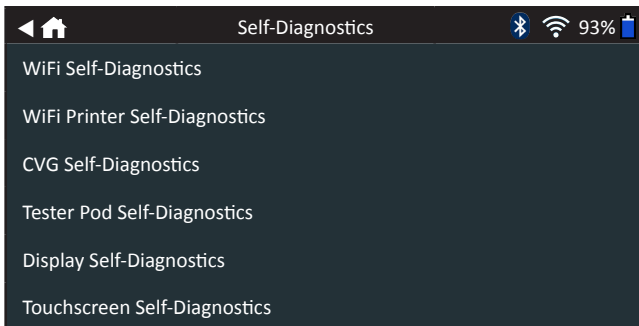
WiFi Self-Diagnostics	Tests connectivity to the BMIS server via the selected WiFi network
WiFi Printer Self-Diagnostics	Use to configure a WiFi printer
CVG Self-Diagnostics	Check connectivity to a configured CVG device
Tester Pod Self-Diagnostics	Check connectivity between the Controller and the Tester Pod
Display Self-Diagnostics	Tests Controller pixel display
Touchscreen Self-Diagnostics	Tests Controller touchscreen responsiveness

Appendix A: Battery Information Screen Descriptions

◀ 🏠	Edit Battery Information	12.65V ✳ 🛜 93% 🔋
VIN	Battery Application	
Vehicle Year	Battery Post	
Vehicle Make	Test Location	
Vehicle Model	Battery Type	
Vehicle Technology	Battery Units	
Battery Installation	Battery Rating	
Back Find Battery		Reset Next

Stock Number	Dealer-assigned inventory tracking number.
Color	Color of vehicle in inventory being tested.
VIN	A unique code, including a serial number, used by the automotive industry to identify individual motor vehicles, motorcycles, scooters and mopeds, as defined in ISO 3833.
Vehicle Year	Model year that a vehicle was manufactured.
Vehicle Make	Vehicle manufacturer
Vehicle Model	Vehicle name or number
Vehicle Technology	Hybrid, Gasoline, Electric, Start-Stop, Hybrid Start-Stop, Diesel
Battery Installation	Single Battery or Dual Batteries
Battery Application	Automotive, Marine, Powersport, Group 31, Commercial 4D/8D, Lawn and Garden
Battery Post	Top Post, Side Post, Dual Post
Test Location	Top Post, Side Post, Remote Post
Battery Type	Flooded, AGM (Absorbed Gas Mat), AGM Spiral, Gel, Enhanced Flooded

Battery Units	CCA	Cold Cranking Amps: Battery current at 0 ºF (–17.8 ºC).	100 to 3000
	CA	Cranking Amps: Battery current at 32 °F (0 ºC).	100 to 3000
	JIS	Japanese Industrial Standard: Usually printed on battery label.	26A17 to 245H52
	DIN(A)	**D**eutsche **I**ndustrie-**N**orm	100 to 1000
	SAE(A)	European labeling of CCA	100 to 3000
	IEC(A)	**I**nternational **E**lectrotechnical **C**ommission	100 to 1000
	EN(A)	**E**uropa-**N**orm	100 to 1700
	EN2(A)	**E**uropa-**N**orm	100 to 1700

Battery Rating	Enter the Battery Rating Units value.

Appendix B: Recommended Test Procedure

The DSS-5000 testing process uses Conductance Profiling™ technology which determines battery cranking capability and also adds Reserve Capacity testing. With this additional process, initial battery analysis can take up to 60 seconds to complete.

⚠️ **IMPORTANT:** Always begin each test by connecting the Tester Pod clamps to the battery being tested. The testing process begins as soon as the clamps are connected.

The DSS-5000 provides a battery decision along with additional detailed information on battery cranking and reserve capacity. Swipe the screen horizontally to the right or left to view the additional results screens. (See Page 3)

VIN Scanning

The DSS-5000 uses a camera built into the Controller handle to scan the VIN of the vehicle being tested. This number is then cross referenced with the original equipment manufacturer's battery specifications stored in the tester's database and displayed on the Controller screen.

Scanning Tips

- **Camera:** Located in the upper left portion on the back of the Controller handle.
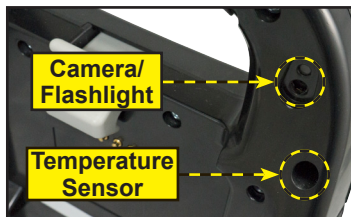
Controller

Drivers Door Frame

Windshield

- **Hold Steady:** Hold Controller steady when scanning the VIN barcode. This allows the user to clearly see the barcode and allows the camera to focus on it.
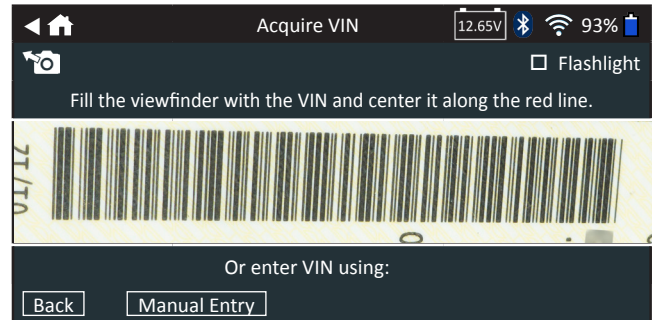
- **Fill Viewfinder**: Make sure the entire barcode is visible. Keeping the entire VIN barcode visible while slowly moving the camera closer or further away will help capture.

- **Clean Barcode/Windshield**: Surface dirt can interfere with the scanning process. If necessary wipe the VIN barcode with a cloth or your finger remove any surface dirt.

- **Lighting/Glare:** The built-in flashlight will automatically turn on In low light situations. If the flashlight, or sunlight, is shining directly onto the VIN barcode, try pivoting the camera up or down slightly to reduce any glare.

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

The DSS-5000P NI and DSS-5000P INF products are warranted to be free of defects in materials and workmanship for a period of two (2) years on the analyzer and one (1) year on the test 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 Midtronics at 866-592-8052. Have your model and serial numbers ready. This first step is critical as we will trouble-shoot the problem(s) over the phone, and many problems are resolved during this step. If the problem cannot be resolved, then the Customer Service Agent will issue you a Return Material Authorization (RMA). This number becomes your tracking number. The final step is to return the unit to Midtronics freight prepaid (you pay), to the attention of the RMA number obtained.

In USA:
Midtronics, Inc.
Attn: RMA # xxxxx (this is the RMA number that you must obtain from Midtronics)
7000 Monroe St.
Willowbrook, IL 60527

In Canada:
Midtronics c/o FTN (FTN is Fed-ex Trade Networks –this is NOT a Midtronics facility)
Attn: RMA # xxxxx (this is the RMA number that you must obtain from Midtronics)
7075 Ordan Drive
Mississauga, ON L5T1K6

Midtronics will service and return the unit using the same type of 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 shipping & handling charges added to the invoice. Midtronics products beyond the warranty period are subject to the repair charges in place at that time. Optional re-manufacturing service is available to return our products to like-new condition. Out-of-warranty repairs carry a 3-month warranty. Re-manufactured units purchased from Midtronics are covered by a 6-month warranty.

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