
CPX-900 WiFi

Battery & System Analyzer



***For testing 6 and 12-volt automotive batteries and
12- and 24-volt charging systems***

User Manual

Contents

1 – Introduction

- Personal Precautions
- Symbols Conventions
- Description
- Consent to Collection and Use of Data:
- Controls & Connections
- Main Menu
 - Additional Screens
 - Main Menu Icons
- Initial Power Up
 - WiFi Settings
 - BMIS Settings
 - Shop Settings
 - Data Collection Consent
- Test Preparation
 - Inspecting the Battery
 - Testing Out-of-Vehicle
 - Testing In-Vehicle
 - Connecting To A Battery
 - Setting User Preferences

2 – In Vehicle Test

- Battery Test
 - Battery Test Results
- System Test
 - System Test Results

3 – Out Of Vehicle Test

- Battery Test
 - Battery Test Results

4 – History

5 – Messages

- Accessing Messages

6 – Settings

- Tool
 - Display
 - Date & Time
 - Print Format
 - Work Order
 - Auto Test
 - VIN Entry
 - Version
- Shop Settings
 - Admin
 - Shop Info
- Network
 - WiFi
- BMIS Settings

7 – Maintenance & Troubleshooting

Tester Cables

 Cleaning Clamps

 Handling Test Cables

 Storing Test Cables

Printer Paper

 Replacing The Paper Roll

Replacing The Internal Batteries

Appendix A: Recommended Scanning Procedure

 Scanning Tips


Appendix B: Test Results Decision Tables

 Battery Test Results

 Alternator Test Results

1 – Introduction

Personal Precautions




⚠ DANGER	
	<p>Risk of explosive gases. Never smoke or allow a spark or flame in the vicinity of a battery.</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>

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

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 tester’s touch screen display. Test results can be displayed on the full-color screen, printed, or wirelessly emailed.

Consent to Collection and Use of Data:

You agree that Midtronics, Inc. may collect, store, transmit, and use technical data and related information, including but not limited to technical information about this device, system and application software, and accessories, that is gathered periodically to facilitate the provision of product support, product improvements, product development, and other services related to use of this device. If electing to collect personal data (such as e-mail addresses) the user is solely responsible for obtaining any necessary permissions, and agrees to indemnify and hold harmless Midtronics, Inc. its subsidiaries, officers, employees and agents from any liability associated with collecting, storing, and transmitting such personal data.

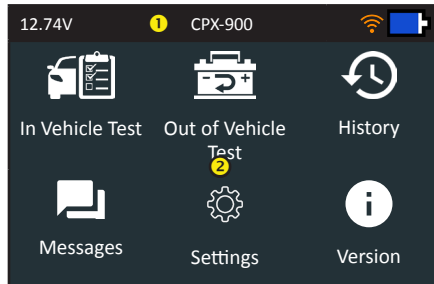
Controls & Connections



- ① Display Screen
- ② Cooling Vent
- ③ Arrow Keys & Power Button
- ④ Mini-USB Port
- ⑤ Thermal Printer (optional)
- ⑥ Temperature Sensor
- ⑦ VIN Barcode Scanner (optional)
- ⑧ Clamp Tabs



Main Menu



① **Menu Bar**

12.74V	Battery Voltage (if connected)		Controller internal battery status
	WiFi signal strength		

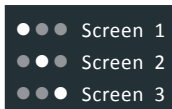
② **Main Menu Selection Area**



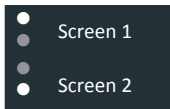
When displayed, the Screen Arrows show which **ARROW** key on the keypad to press to display other icons or screens. When displayed under a list of options, the Screen Arrows show which keypad arrow to press to highlight a character or item in a list.

Additional Screens

The dots at the bottom or side of a menu or results screen indicate additional screens are available,









Press ◀ or ▶



Press ▲ or ▼

Main Menu Icons

Icon	Description
 In Vehicle Test	For testing batteries that are connected to and installed in a vehicle. An In Vehicle Test includes a Battery Test and a System (Starter and Charging) Test.
 Out of Vehicle Test	For testing batteries not connected to or removed from a vehicle.
 History	Access archived test histories or search test history by VIN or by technician.
 Messages	Displays alerts and notifications for upcoming tool software updates.
 Settings	Setup/adjust: WiFi, printer setup, email settings, user information, default language, display and sound settings, BMIS information, and shop information.
 Version	Access to tester software version information.

Initial Power Up

The tester will take a few moments when powered up for the first time.

BMIS Setup-does not display if Wifi not successfully setup (See "BMIS" in Chapter 6: Setup)

WiFi Settings

Set up the tool's WiFi connection. Select **Skip** to configure WiFi at a later time. See "Network" in Chapter 6: Setup

<u>Automatic</u>	The tester searches for any detectable WiFi networks. Select a displayed network is then displayed on the tester screen.
<u>Manual</u>	Manually enter Security, SSID, Password, Encryption, and WEP Keys.

BMIS Settings

At the User Credentials screen, enter the Midtronics-provided username, password, Client ID, and Location ID to access BMIS data management.

Use ▲▼◀▶ to highlight the numbers on the displayed keyboard and press ■ to select. Press **Skip** to move to the next step.



NOTE: If WiFi was not configured in the previous step, the BMIS setup screen is not displayed.

<u><i>Username</i></u>	Provided by Midtronics
<u><i>Password</i></u>	Provided by Midtronics
<u><i>Client ID</i></u>	Provided by Midtronics
<u><i>Location ID</i></u>	Provided by Midtronics

Shop Settings

Use to enter information about the shop in which the tester will be used.

Shop Name	Country
Shop Address	Phone Number
Shop Address 2	Email Address
City	Website
State	(Blank)
Zipcode	(Blank)
Country	

With the displayed alphanumeric keypad, use ▲▼◀▶ to highlight the desired alphanumeric character. Select ↑ to access the lower case and symbol character maps.

Once all of the alphanumeric characters have been entered, select **Save** or **Esc** to exit without saving.

Data Collection Consent

Select **Accept** to acknowledge test data is being collected via BMIS.

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-Vehicle. However, for testing Out-Of-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.

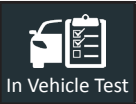
Connect the clamps to the tester: the red clamp to the positive (+) terminal and the black clamp to the negative (-) terminal. If the clamps are reversed when connected, the tester displays CLAMPS REVERSED! Reconnect the clamps.

Make sure both sides of the clamps are gripping the terminals by rocking each clamp back and forth. A poor connection will prevent testing, and the tester will display a CHECK CONNECTION message. If the message reappears after reconnecting, clean the terminals and reconnect.

Setting User Preferences

Customize the analyzer by setting preferences in the Settings () Menu, described in Chapter 6.

2 – In Vehicle Test



Use In Vehicle Test to perform Battery Tests on in-vehicle batteries using test parameters determined by vehicle VIN or through manual entry of battery parameters. A System Test for Starter and Charging testing is also available.



NOTE: When VIN Entry is enabled (See Chapter 6 - Settings), an In Vehicle Test test will always associate the in-vehicle battery to the VIN of the vehicle being tested.



IMPORTANT: To expedite the testing procedure, make sure Auto Test is enabled. (Chapter 6 - Settings) The testing process begins as soon as the clamps are connected.

The CPX-900 provides a battery decision along with additional detailed information on battery cranking and reserve capacity. Press ▲◀▶▼ to return to the previous screen, select options and when necessary, ■ to enter or continue to the next step.

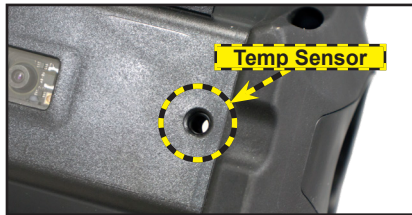
Battery Test

1. Connect the tester clamps to the battery terminals.
2. Auto Test - If enabled, the tool immediately begins testing the battery. (See Chapter 6 - Settings)



NOTE: The testing process uses Conductance Profiling™ technology to determine battery cranking capability and Reserve Capacity. This additional analysis can take up to 60 seconds to complete.

3. At the Main Menu select In Vehicle Test.
4. Enter Work Order - If enabled, use the displayed keyboard template to Enter Work Order information. (See Chapter 6 - Settings)
5. Temperature - when prompted, hold the tester temperature sensor 6 to 12 inches over the top of the battery being tested.



Select **Capture** to lock in the live temperature reading.

6. VIN Capture - (scanner optional) scan the VIN bar code, usually located in the right corner of the vehicle's front windshield or on the driver's side door frame.

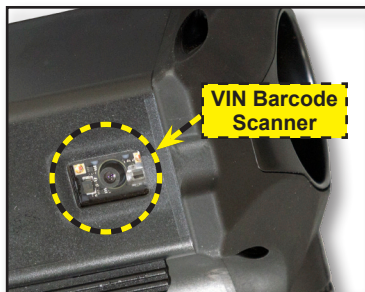
Refer to Appendix A for additional scanning tips.



NOTE: VIN scanning is skipped when the CPX-900 is not equipped with an optional scanner.



NOTE: Barcode types supported by the CPX-900 include A: 1D: Code 39, Code 128, UPC, Codabar, GS1-Limited; 2D: PDF417, QR Code: Model 2, and Data Matrix type barcodes. Refer to Appendix A for recommended VIN scanning procedures.



Drivers Door Frame



Windshield

Manual Entry - Use the on-screen keypad to manually type the 17-digit VIN and select **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			
ESC									Save

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

- Battery Test Setup** - Edit the displayed battery information. Select **Start** to begin the testing process.

Application	Automotive 4D/8D	Group 31
Battery Post	Top Post	Side Post
Battery Type	Flooded AGM Spiral EFB	AGM Gel
Battery Units	CCA DIN IEC MCA	CA SAE EN EN2
Battery Rating	Hold down ▲ or ▼ to increase scrolling speed.	

Rating	Description	Range
CCA	Cold Cranking Amps (specified by SAE): The amount of current a battery can provide at 0 °F (-17.8 °C).	100 to 3000
CA	Cranking Amps : The amount of current a battery can provide at 32°F (0 °C).	100 to 3000
DIN	Deutsche Industrie-Norm	100 to 1000
SAE	Society of Automotive Engineers - European labeling of CCA	100 to 3000
IEC	International Electrotechnical Commission	100 to 1000
EN	Europa-Norm	100 to 1700
MCA	Marine Cranking Amps : The amount of current a battery can provide at 32°F (0 °C).	100 to 3000
EN2	Europa-Norm	100 to 1700

Battery Test Results

Icons are color-coded to indicate status.



Battery Test



Starter Test



Alternator Test

Green:

All test parameters were completed and have passed.

Red:

The battery has failed the test.

Yellow:


Some test parameters may require further testing.

Gray:

Insufficient data to perform the test.

Test Results - Battery

VIN: 1HGEM225X5Lxxxxx




Good Battery

Rated	575 CCA
Voltage	12.72 V
Measured	599 CCA
Temperature:	97° F

Send Results System Test Done

Test Results - Battery

Cranking Health




Battery meets or exceeds required standards. Test again in 90 days.

Rated: 575 CCA
Measured: 599 CCA

Test Results - Battery

Reserve Health



OK

The battery has sufficient reserve capacity to provide power for the electronics systems in the vehicle.

Test Results - Battery Test



NOTE: See Appendix B for complete parameter descriptions.

Select **Send Results** displayed at the bottom of the tester screen to send the test results to the optional built-in printer or via email. Select **Done** to return to the Main Menu.



Email

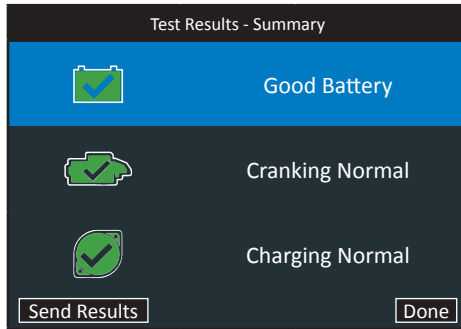


Printer

System Test

1. Select **System Test** displayed at the bottom of the screen to continue to the System Test.
2. Start the vehicle's engine and let it idle.
3. Ensure all accessories (High Beam headlights/ventilation blower etc.) are off and select **Next**.
The alternator output is tested.
4. When prompted, rev and hold the engine to between 2000 to 3000 rpm.
The alternator output is tested.
5. When prompted Idle the engine and and select **Next**.
6. Turn on the high beam headlights and ventilation blower and select **Next**.
The alternator output is tested.
7. When prompted, rev and hold the engine to between 2000 to 3000 rpm.
The alternator output is tested.
8. When prompted, turn off all loads and Idle the engine. Select **Next**.

System Test Results



Test Results - Summary

The Test Results - Summary screen is displayed following a System Test. Select the Battery, Cranking, or Charging Test to view detailed test results for each part of the test.



NOTE: See Appendix B for complete parameter descriptions.

Select **Send Results** displayed at the bottom of the tester screen to send the test results to the optional built-in printer or via email. Select **Done** to return to the Main Menu.



Email



Printer

3 – Out Of Vehicle Test



Use Out Of Vehicle Test to test and verify the condition of a batteries that is not connected to a vehicle..

IMPORTANT: To expedite the testing procedure, makes sure Auto Test is enabled. (Chapter 6 - Settings) The testing process begins as soon as the clamps are connected.

The CPX-900 provides a battery decision along with additional detailed information on battery cranking and reserve capacity. Press ▲◀▶▼ to return to the previous screen, select options and when necessary, ■ to enter or continue to the next step.

Battery Test

1. Connect the tester clamps to the battery terminals.
2. Auto Test - If enabled, the tool immediately begins testing the battery. (See Chapter 6 - Settings)



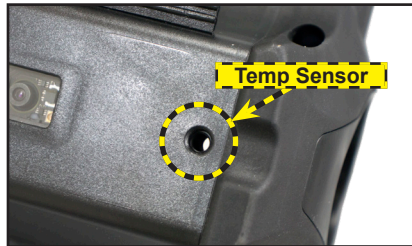
NOTE: The testing process uses Conductance Profiling™ technology to determine battery cranking capability and Reserve Capacity. This additional analysis can take up to 60 seconds to complete.

3. At the Main Menu select Out Of Vehicle Test. The Battery Test begins immediately.
4. Enter Work Order - (if enabled) Use displayed template to Enter Work Order information.
5. Battery Test Setup - Edit the displayed battery information. Select **Start** to begin the testing process.

Application	Automotive 4D/8D	Group 31
Battery Post	Top Post	Side Post
Battery Type	Flooded AGM Spiral EFB	AGM Gel
Battery Units	CCA DIN IEC MCA	CA SAE EN EN2
Battery Rating	Hold down ▲ or ▼ to increase scrolling speed.	

Rating	Description	Range
CCA	Cold Cranking Amps (specified by SAE): The amount of current a battery can provide at 0 °F (-17.8 °C).	100 to 3000
CA	Cranking Amps : The amount of current a battery can provide at 32°F (0 °C).	100 to 3000
DIN	Deutsche Industrie-Norm	100 to 1000
SAE	Society of Automotive Engineers - European labeling of CCA	100 to 3000
IEC	International Electrotechnical Commission	100 to 1000
EN	Europa-Norm	100 to 1700
MCA	Marine Cranking Amps : The amount of current a battery can provide at 32°F (0 °C).	100 to 3000
EN2	Europa-Norm	100 to 1700

6. **Temperature** - when prompted, hold the tester temperature sensor 6 to 12 inches over the top of the battery being tested.



Select **Capture** to lock in the live temperature reading.

Battery Test Results



NOTE: See Battery Test Results in Chapter 2 - In Vehicle Test for test result screens and descriptions.

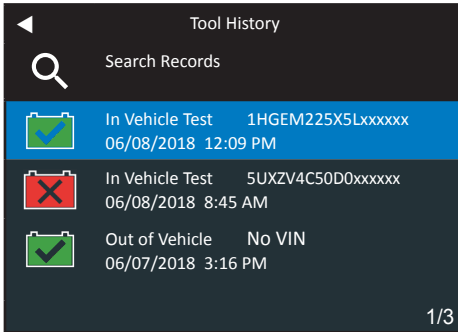
4 – History



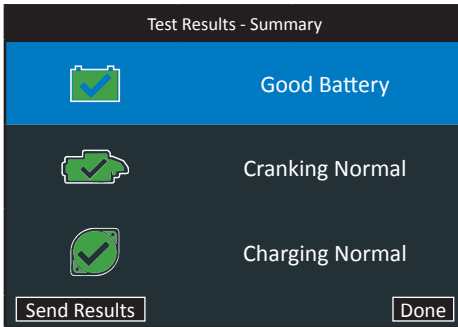
Use History to access the tool usage history, a vehicle history based on VIN, and user histories. The search function can also be used find test records for specific vehicles and technicians.

Press ▲◀▶▼ to return to the previous screen, select options and when necessary, ■ to enter or continue to the next step.

1. At the Main Menu, select **History**. The Tool History screen is displayed.




2. Select a vehicle record to view the results or select Search Options to search for records by manually entering a VIN, scanning a VIN, or by test result decision.
3. For In Vehicle tests, the Summary screen is displayed.



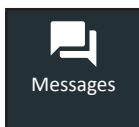
Test Results - Summary

4. Select the Battery, Cranking, or Alternator Test to view detailed test results for each part of the test.

 **NOTE:** See Battery Test Results in Chapter 2 - In Vehicle Test for test result screens and descriptions.

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

5 – Messages



The Messages function displays alerts and notifications for upcoming tool software updates.

Select ◀ to return to the previous screen or 🏠 to return to the Main Menu.

Accessing Messages

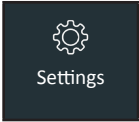


A number is displayed next to the Messages icon when the analyzer has received any critical messages.

② Unread Critical Messages

② Read Critical Messages

6 – Settings



Use Setup to setup and adjust the tester display and time, shop and administrative settings, network connectivity, and BMIS settings.

Press ▲◀▶▼ to return to the previous screen, select options and when necessary, ■ to enter or continue to the next step.

Tool

Display

Use ◀ to return to the Display menu.

<u>Language</u>	Select the analyzer default standard language.
<u>Temperature Units</u>	Select the default temperature units (Fahrenheit/Celsius) used when measuring battery temperature.
<u>Number Separator</u>	Select the default number display using commas or periods separators.

Date & Time

Use ◀ to return to the Display menu.

<u>Date Format</u>	Select Month/Day/Year (MM/DD/YYYY), or Day/Month/Year DD/MM/YYYY.
<u>Date</u>	<p>Use ▲ or ▼ to advance the month, day, and year. Use ◀ or ▶ to advance left or right and move to Cancel or Next. Select Next to save the date or Cancel to exit without saving.</p> <div style="text-align: center;"> </div>
<u>Time Format</u>	Select 12 or 24 Hour Format.
<u>Time</u>	<p>Use ▲ or ▼ to advance the hours, minutes, and AM/PM setting. Use ◀ or ▶ to advance left or right and move to Cancel or Next. Select Next to save the time or Cancel to exit without saving.</p> <div style="text-align: center;"> </div>

Print Format

Set the default to include Shop Info and State Of Health (SoH) information on test result printouts. Use **◀** to return to the Display menu.

<u>Include Shop Info</u>	Press ■ to check and uncheck the box. A checked box indicates the shop information will be included on printed test results.
<u>Include SoH Graph</u>	Press ■ to check and uncheck the box. A checked box indicates the State Of Health screen will be included on printed test results.

Work Order

<u>Work Order</u>	Press ■ to check/uncheck the box to enable/disable the function.
<u>Customize Enable</u>	Press ■ to check/uncheck the box to enable/disable the ability to customize Work Order Text.
<u>Work Order Text</u>	Use ▲▼◀▶ to highlight characters on the displayed keyboard and press ■ to select. Limit=13 characters. Select Esc to return to the Work Order Settings screen.

Auto Test

Press **■** to check and uncheck the box. A checked box indicates the tester will immediately begin testing a battery as soon as it is connected. Use **◀** to return to the Tool menu.



NOTE: To expedite the testing procedure, enable the Auto Test function.

VIN Entry

Press **■** to check and uncheck the box. A checked box indicates the VIN Entry option will be included as part of an In Vehicle Test. Use **◀** to return to the Tool menu.

Version

Use to confirm technical information for internal tester software and hardware.

Config:	Build Number:
Firmware:	Serial Number:
Flash:	MAC ID:
EEPROM:	FCC ID:
Build Date:	

Shop Settings

Admin

<u>Admin Enable</u>	Press ■ to check and uncheck the box. A checked box indicates the Admin function is enabled.
<u>Admin Pin</u>	Use ▲▼◀▶ to select a four (4) digit Admin PIN. Select OK to save the PIN or Cancel to exit without saving. Use ◀ to return to the Shop Settings menu.

Shop Info

Use to enter information about the shop in which the tester will be used.

Shop Name	Country
Shop Address	Phone Number
Shop Address 2	Email Address
City	Website
State	(Blank)
Zipcode	(Blank)
Country	(Blank)

With the displayed alphanumeric keypad, use ▲▼◀▶ to highlight the desired alphanumeric character.

Select ↑ to access the lower case and symbol character maps.

Once all of the alphanumeric characters have been entered, select **Save** or **Esc** to exit without saving.

Network

WiFi

Automatic

The tester searches for any detectable WiFi networks. A list of detected WiFi networks is then displayed on the tester screen. Highlight a displayed network and press ■ to connect. Press ◀ to return to the WiFi Settings screen.

Manual

Manually enter Security, SSID, Password, Encryption, and WEP Keys. Select **Connect**.

BMIS Settings

Username

Provided by Midtronics

Password

Provided by Midtronics

Client ID

Provided by Midtronics

Location ID

Provided by Midtronics

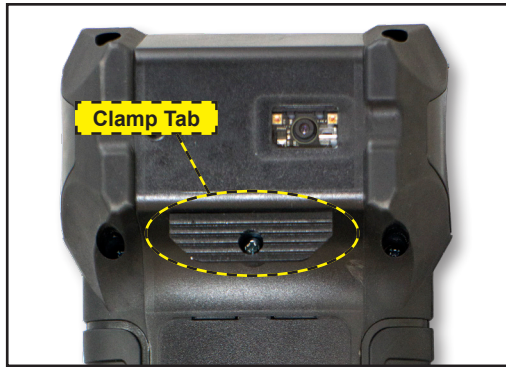
7 – Maintenance & Troubleshooting

Tester Cables

The test cables that come with your analyzer are consumable items. Cables are like tires in that the more you use them and the harder you drive them, the shorter their useful life. Here are a few things you can do to protect your test cables from damage and premature wear:

Cleaning Clamps

- 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.
- Periodically clean the clamps using a mixture of baking soda and water, or a mild hand-soap, and a small bristle brush.
- To protect the clamps from oil and dirt, clip them to the Clamp Tab on the back of the analyzer.



Handling Test Cables

- Always connect and disconnect the clamps to the battery by opening and closing the clamps. Never pull on the test cables to remove the battery clamps. Pulling can damage the Y-junction, the cables, and the clamps to the extent that the analyzer may produce lower-than-expected conductance readings or fail completely.
- Never carry the analyzer by the cables. Carrying the analyzer or swinging it by the cables puts unnecessary strain on the cables and can result in premature failure. Handle the analyzer with care to get the maximum use from the product.

Storing Test Cables

- Never wrap the cables around the analyzer; this puts unnecessary strain on the test cables.

Because the test cables are the “tires” of the analyzer, they have a certain life expectancy and will wear out eventually. However, the abuse examples cited above are not covered under warranty. To ensure the best performance and longest life of the test cables, attach and remove them with care, and carry the analyzer and cables together.

Printer Paper

The internal printer is shipped with a roll of 2¼" wide by 17/8" in diameter thermal printing paper installed. Replacement rolls are available through Midtronics or online office supply websites.



NOTE: Due to production variances some paper roll diameters may be too large. Please remove paper from roll to recommended 17/8" diameter. DO NOT force cover to close if roll is too large.



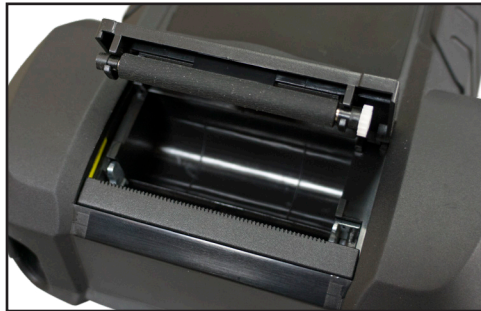
NOTE: The analyzer uses only thermal printing paper.

Replacing The Paper Roll

1. Unlock the printer door by gently lifting up on the release.



2. Lift the printer door and remove the spent roll.



3. Place a new roll of paper in the compartment. The paper feeds from the bottom of the roll.
4. Pull the paper forward so that it extends past the serrated edge of the paper slot.
5. Close the door and make sure the lever locks securely. For a clean tear, pull the paper along the serrated edge. **Do not pull the paper straight out of the printer.**

Replacing The Internal Batteries

1. Turn the analyzer face down.
2. Use a Phillips screwdriver to remove the screw securing the door to the battery compartment.



3. Lift the door at the tab and place it aside.



4. Remove the discharged batteries.
5. Insert new batteries as shown. Make sure the positive and negative terminals are positioned correctly.
6. Reposition the door on the battery compartment.
7. Reinsert and tighten the screw.

Appendix A: Recommended Scanning Procedure

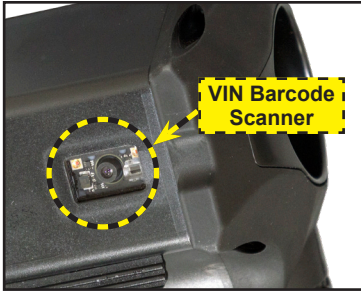
The CPX-900 uses an optional 1D/2D barcode scanner built into the back of the tester to scan the VIN of the vehicle being tested. This number is then cross referenced with the original equipment manufacturer's battery specifications stored in the tester's database and displayed on the tester screen.



NOTE: Barcode types supported by the CPX-900 include A: 1D: Code 39, Code 128, UPC, Codabar, GS1-Limited; 2D: PDF417, QR Code: Model 2, and Data Matrix type barcodes.

Scanning Tips

- **Barcode Scanner:** Located in the upper left portion on the back of the tester.



Drivers Door Frame








Windshield





- **Hold Steady:** Hold the tester steady when scanning the VIN barcode. This allows the user to clearly see the barcode and allows the scanner to focus on it.
- **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:** If sunlight is shining directly onto the VIN barcode, try pivoting the scanner up or down slightly to reduce any glare.

Appendix B: Test Results Decision Tables

Battery Test Results

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 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.
		Unknown Reserve	
 Charge & Retest	Charge & Retest	Unknown Reserve	Battery requires charge to determine condition.
		Charge & Retest	
 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 Replace Short	Good Battery		
 Badcell Short Replace	Badcell Replace Short	Unknown Reserve	
	Badcell Replace Short	Unknown Reserve	

Alternator Test Results

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.