




xPD-1K12 High-Voltage Pack Service Tool

User Manual



⚠ DANGER

Hazardous voltage.
Do not remove protective covers.
Failure to follow this instruction may result in electric shock, personal injury, or death.
Circuit boards, test points, and output voltages also may be floating above or below chassis ground.

NOTICE

This xPD-1K12 is designed for indoor use only.
Do not operate the xPD-1K12 outdoors.
Operation of the xPD-1K12 in an outdoor environment can result in equipment damage.




⚠ WARNING

Risk of explosion.
This device contains internal arcing and sparking parts which should not be exposed to flammable vapors. This device should be located at least 18 inches (457mm) above grade. Failure to follow this instruction may result in personal injury or death.

⚠ DANGER

Risk of explosive gases.
Batteries may generate explosive gases. To reduce risk, follow these safety instructions and those published by the battery manufacturer and OEM. Failure to follow these instructions may result in personal injury or death.



⚠ DANGER

Charging a non-rechargeable battery may cause the battery to burst.
Only charge batteries for which xPD-1K12 has been designed and is intended for use. Failure to follow these instructions may result in personal injury or death

NOTICE

The xPD-1K12 has not been designed for exposure to rain or snow. Operate the xPD-1K12 only indoors in a clean environment. Failure to follow these instructions may result in equipment damage.

⚠ WARNING

Only qualified technicians may use this equipment.
The required qualifications vary by region. Always observe local laws and legislative directives.
Failure to follow this instruction may result in serious personal injury or death.



⚠ DANGER

Hazardous voltage.
An improper connection can result in electric shock
To avoid electrical shock or burn, never alter the xPD-1K12's original AC cord and plug. Disconnect plug from outlet when xPD-1K12 is idle. Failure to follow these instructions may result in personal injury or death.




⚠ 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 gases, even when the battery is not in operation. Always work in a well-ventilated area. Failure to follow these instructions may result in personal injury or death.

⚠ CAUTION

Wash hands after handling.
REQUIRED BY CALIFORNIA PROP. 65: Battery posts, terminals, and related accessories may contain lead and lead compounds, chemicals known to the state of California to cause cancer and birth defects or other reproductive harm.



⚠ DANGER

Hazardous voltage.
An improper connection can result in electric shock
To avoid electrical shock or burn, never alter the xPD-1K12's original AC cord and plug. Disconnect plug from outlet when the xPD-1K12 is idle.

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General Safety Guidelines



IMPORTANT SAFETY INSTRUCTIONS - SAVE THESE INSTRUCTIONS

IT IS OF UTMOST IMPORTANCE THAT BEFORE USING YOUR xPD-1K12, YOU READ THIS MANUAL AND FOLLOW THE SAFETY AND OPERATING INSTRUCTIONS EXACTLY.

DANGER






Hazardous voltage.
Do not remove protective covers.
Failure to follow this instruction may result in electric shock, personal injury, or death.
Circuit boards, test points, and output voltages also may be floating above or below chassis ground.

NOTICE

This xPD-1K12 is designed for indoor use only.
Do not operate the xPD-1K12 outdoors.
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Manual 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.
Bold Letters	The text for screen options are in Bold letters.

1. Maintenance

- **SAVE THESE INSTRUCTIONS** - This manual contains important instructions that shall be followed during installation, operation and maintenance of the unit.

WARNING



Risk of explosion.

This device contains internal arcing and sparking parts which should not be exposed to flammable vapors. This device should be located at least 18 inches (457mm) above grade. Failure to follow this instruction may result in personal injury or death.

- Periodic inspection and care are highly recommended, especially if the xPD-1K12 is operating in a harsh environment.
- Inspect for signs of overheating, rust, paint deterioration and general condition of the unit. If corrective measures should be taken, contact Midtronics. [Contact information on back cover.](#) Removal of dust, dirt and debris from the external enclosure surfaces is encouraged and may be performed while the unit is in operation.



IMPORTANT: No user-serviceable parts are inside the xPD-1K12. No unauthorized personnel should ever remove the cover.

- Ensure that the AC power line ground is connected properly to the xPD-1K12 input connector or chassis. Similarly, other power ground lines including those to application and maintenance equipment must be grounded properly for both personnel and equipment safety.
- In normal operation, the operator does not have access to hazardous voltages within the chassis. However, depending on the user's application configuration, HIGH VOLTAGES HAZARDOUS TO HUMAN SAFETY may be normally generated on the output terminals. The customer/user must ensure that the output power lines are labeled properly as to the safety hazards and that any inadvertent contact with hazardous voltages is eliminated.
- This xPD-1K12 is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the xPD-1K12 by a person responsible for their safety.

1.1 To reduce risk of battery explosion, follow these safety instructions and those published by the battery manufacturer and the manufacturer of any equipment you intend to use in the vicinity of a battery. Review cautionary marking on these products and on the engine, and on the vehicle or equipment containing the battery.

If you are uncertain as to the type of battery you are attempting to charge, or the correct procedure for checking the battery's state of charge, contact the seller or battery manufacturer.

- 1.2 Use of an attachment not recommended or sold by the xPD-1K12 manufacturer may result in a risk of fire, electric shock, or injury to persons.
- 1.3 To reduce risk of damage to the electric plug and cord, pull by the plug rather than by the cord when disconnecting the xPD-1K12.
- 1.4 Do not operate the xPD-1K12 if it has received a sharp blow, been dropped or otherwise damaged in any way; contact Midtronics (see contact information on back cover).
- 1.5 Do not disassemble the xPD-1K12; when repair is required contact nearest Midtronics regional office ([see back cover of this manual for locations and contact information](#)). Incorrect reassembly may result in a risk of electric shock or fire.
- 1.6 To reduce risk of electric shock, unplug the xPD-1K12 from the AC outlet before attempting any maintenance or cleaning. Turning off the controls will not reduce this risk.
- 1.7 Connect and disconnect the battery leads only when directed to do so by the xPD-1K12.
- 1.8 Do not overcharge the battery (See Section 3).
- 1.9 Charge the battery in a dry, well-ventilated area.
- 1.10 Never place articles on or around the xPD-1K12, or locate the xPD-1K12 in a way that will restrict the flow of cooling air through the cabinet.
- 1.11 An extension cord should not be used with xPD-1K12.
- 1.12 Have a damaged cord or plug replaced immediately.

NOTICE

The xPD-1K12 has not been designed for exposure to rain or snow. Operate the xPD-1K12 only indoors in a clean environment. Failure to follow these instructions may result in equipment damage.

2. Personal Precautions**⚠ WARNING**

Only qualified technicians may use this equipment. The required qualifications vary by region. Always observe local laws and legislative directives. Failure to follow this instruction may result in serious personal injury or death.

- 2.1 Have plenty of fresh water and soap nearby in case battery electrolyte contacts skin, clothing or eyes.
- 2.2 Always wear all personal protective equipment (PPE) defined by OEM when working with batteries serviced by xPD-1K12.
- 2.3 If battery electrolyte contacts skin or clothing, wash immediately with soap and water. If electrolyte enters the eye, immediately flush with cold running water for at least 10 minutes, and seek medical attention.
- 2.4 NEVER smoke or allow a spark or flame in vicinity of a battery or engine.
- 2.5 Before working with a battery, remove personal metal items such as rings, bracelets, necklaces, watches, etc. A battery can produce a short circuit current high enough to weld such items causing a severe burns.
- 2.6 The xPD-1K12 is not intended to supply power to a low-voltage electrical system other than applications using rechargeable batteries.
- 2.7 **NEVER** charge a battery outside of recommended operating temperature range as defined by OEM. Allow battery to come within operating temperature range xPD-1K12 (Pg.8) and battery operating range prior to charging.

3. Grounding & Power Cord Connections

- 3.1 The xPD-1K12 must be grounded to reduce risk of electric shock. The xPD-1K12 is equipped with an electric cord having an equipment grounding conductor and a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

⚠ DANGER

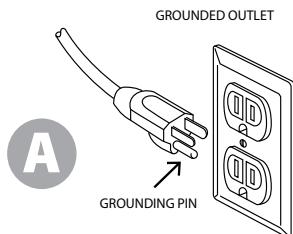
Hazardous voltage.

An improper connection can result in electric shock

To avoid electrical shock or burn, never alter the xPD-1K12's original AC cord and plug. Disconnect plug from outlet when xPD-1K12 is idle. Failure to follow these instructions may result in personal injury or death.

**IF THE PLUG DOES NOT FIT THE OUTLET, HAVE A PROPER OUTLET
INSTALLED BY A QUALIFIED ELECTRICIAN.**

- 3.1 This xPD-1K12 is for use on a nominal 120 volts or 240 volts circuit. The 120V grounding plug looks like the plug illustrated in *Figure A*.



- 3.3 Use of an extension cord could result in a risk of fire and electric shock.
- 3.4 The plugs and receptacles have dedicated grounding terminals and must be mated with plugs and receptacles having matching grounding terminals.

4. xPD-1K12 Location



IMPORTANT: The xPD-1K12 is designed for indoor use only!

It is the responsibility of the operator to provide a controlled environment for the equipment. Work tents are a common method of protecting equipment in adverse conditions.

The xPD-1K12 depends upon the surrounding air for cooling. The free flow of air is important as is the air temperature. The xPD-1K12 must be mounted so that air can freely circulate all around it.

- 4.1 Do not place combustible materials on or near the xPD-1K12 or mount the xPD-1K12 closer than 3 inches from any adjacent wall. The xPD-1K12 must never be mounted next to or above heat generating equipment.
- 4.2 Locate the xPD-1K12 as far away from the battery as the cables permit.
- 4.3 Never place the xPD-1K12 directly above the battery being charged; gases from the battery could corrode and damage the xPD-1K12.
- 4.4 Only operate the xPD-1K12 in a well-ventilated area that is free of dangerous vapors.
- 4.5 Store the xPD-1K12 in safe, dry location.
- 4.6 Do not operate the xPD-1K12 in high relative humidity conditions (85% non-condensing maximum).
- 4.7 When using the xPD-1K12, follow all regulations for the locality in which the equipment is used.

Storage

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

Product Specifications

Power

- AC Input: 100 – 240 ~, 50/60 Hz;
6A Max.
Voltage Tolerance: +/-10%
- DC Battery Input: 1000 VDC max.,
40A Max.
12.5kW Max.

Power Cord

Accepts C19 locking connector for region-specific power cables:

- United States: NEMA 5-15 termination, rated at 15A/125V UL CSA
- EU: CEE 7/7 Plug, rated at 16A/250V VDE
- UK: BS 1363 Plug, rated at 13A/250V UL ASTA

DC Cables

- 3m (9.84 Ft.)

Applications

Battery Discharge

Battery Chemistries

- Lithium ion
- Lithium Ion Phosphate
- Nickel Metal

Operating Parameters

- Operating temperature range: 0°C to +50°C (32°F to 140°F)
- Storage temperature range: -10°C to + 85°C (14°F to 185°F)
- Humidity: 15% to 85% R.H., non-condensing at 22°C (71.7°F)
- Max. Altitude: 2000m
- Pollution Degree: 2

Dimensions

- 58.0 cm L x 60.0 cm W x 37.0 cm H (22.83 in. L x 23.62 in W x 14.56 in H)
- Weight: 234 kG (75.00 LBS)

Protection Features

- Reverse polarity protection

Certifications

- | | |
|-----------------|------------------|
| • CE | • FCC |
| • ROHS | • UL 61010 |
| • CSA 61010 | • IEC 61010 |
| • IEC 61000-4-2 | • IEC 61000-4-3 |
| • IEC 61000-4-4 | • IEC 61000-4-5 |
| • IEC 61000-4-6 | • IEC 61000-4-11 |
| • IEC 61000-6-4 | |

Connectivity

- USB 2.0 connection
- CAN bus interface
- Bluetooth 2.0
- WiFi

User Interface

- Advanced navigation and charge applications
- 10.1" Touch Screen

1 – Introduction & Overview

General Safety Precautions

For safe, efficient, and accurate operation, review the safety and operating instructions in this manual and the xPD-1K12 Safety Manual before using the xPD-1K12. Always use the necessary safety precautions when working with batteries to prevent severe injury or death. Follow all OEM instructions and SAE or regional safety recommendations, as well as the following general high-voltage precautions:

Connecting To AC Power

Plug the xPD-1K12 into a dedicated, grounded nominal 15-amp or higher AC outlet.

Initial Set-Up

Front View



① Touch Screen Display

③ Work Tray

② Barcode Scanner

④ Emergency Stop



Side View



① Power Switch	④ Diagnostic Port
② Power Cable Port	⑤ High Voltage Cable Port
③ Low Voltage Cable Port	⑥ Hot Air Exhaust

Making Connections

All of the cable connections on the xPD-1K12 are unique so it isn't possible to mis-connect them, however care should be taken that cables are inserted correctly and completely. Keep the area around the xPD-1K12 and the attached cables clear to avoid tripping or accidental disconnection.

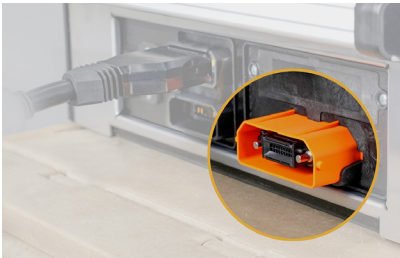
1. First, locate the Power Cable and the matching port (② in the Side View above), and insert the cable into the port. To remove the Power Cable, press the red tab on the plug and pull the cord from the receptacle.



- Next, locate the Low Voltage Cable and the matching port (⑤ in the Side View), and insert the cable into the port. To remove the Power Cable, press the red tab on the plug and pull the cord from the receptacle.



- The High Voltage Port (⑥ in the Side View) is the only port colored Safety Orange, as is the High Voltage Cable. Insert the High Voltage Cable into the High Voltage port, aligning the round tab on the port with the notch in the black security clamp of the cable. Once the cable is inserted fully, pull the lever of the safety clamp down, flush with the cable connector. This will both pull the cable fully home, and secure it to the High Voltage port.

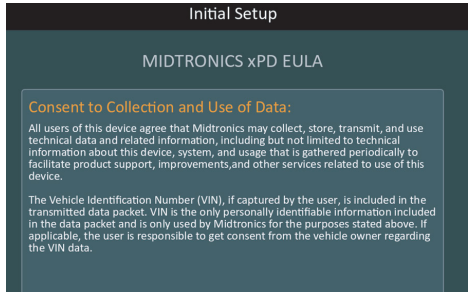


- Once all connections are made, power on the xPD-1K12 (① in the Side View).



Initial Set-up

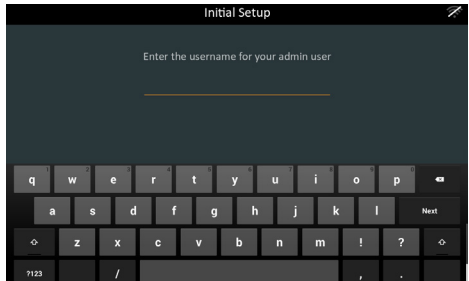
1. Upon initial power-up, the Welcome Screen is displayed. Tap **Next** to continue.



2. The System Language selection screen will display, Select a language and tap **Next**.

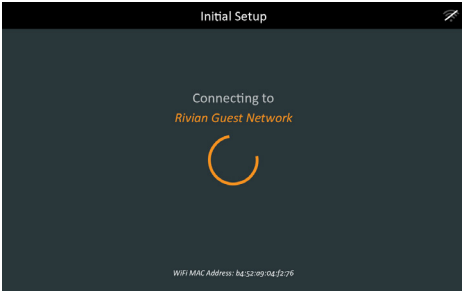


3. The settings for the **Admin User** will display. Enter the user name of the person to be identified as the tool Administrator.



Additional users can be set up in the **Settings** menu on the tool. See **Chapter 7: Settings** for additional information. Tap **Next** to continue.

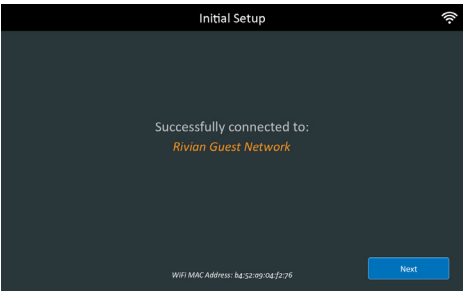
- 4. The tool will automatically scan and connect to the WiFi network **Rivian Guest Network**. Tap **Next** to proceed.



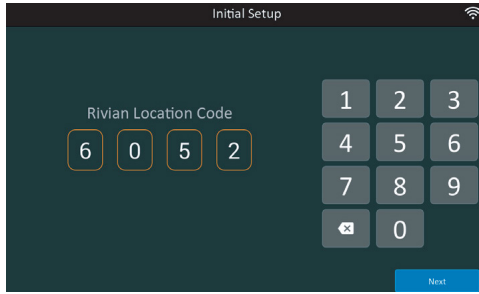
- 5. If unable to connect, a screen will appear directing user to add an available network to connect to the tool.



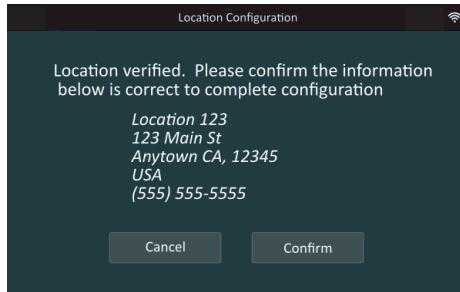
- 6. Once a network connection is established, select **Next** to continue.



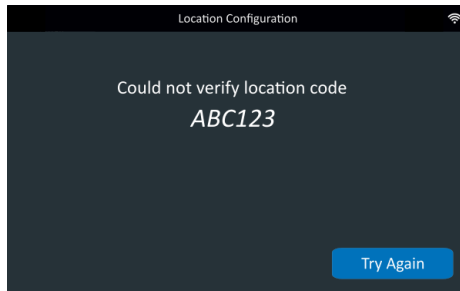
7. Enter your **Rivian Location Code** to setup the location information.



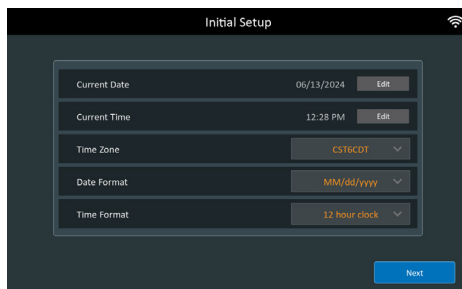
8. The code entered will automatically pull up the information associated with that code. Confirm the location information is correct and tap **Confirm**.



9. If the location code is incorrect, tap **Try Again** and enter the correct location information.

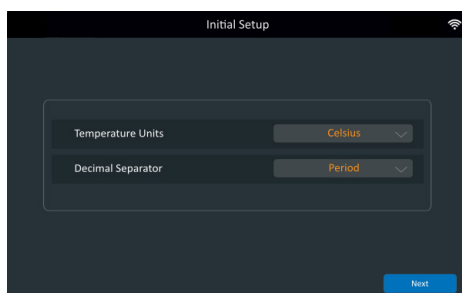


10. If this step is skipped, a warning will appear on screen and the tool will not associate data from discharges with the correct location.
11. Once the location information is entered correctly and verified, the **Date and Time** screen will display.

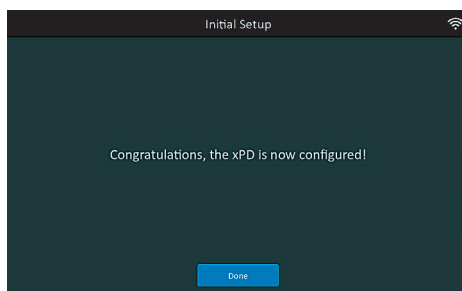


Set the current date and time, select your time zone, and set your date/time formats, then **Next** to continue.

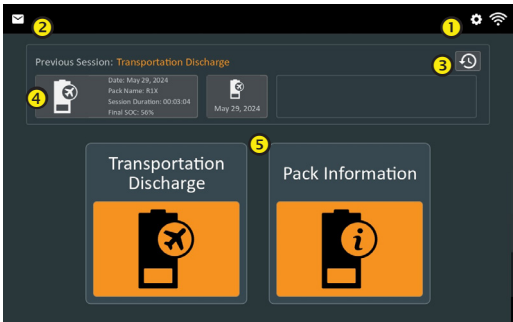
12. The screen for setting your shops Temperature and Decimal preferences is displayed. Make your selections and tap Next .



13. Your xPD-1K12 is now configured. Select **Done** to go to the main menu.



Main Menu

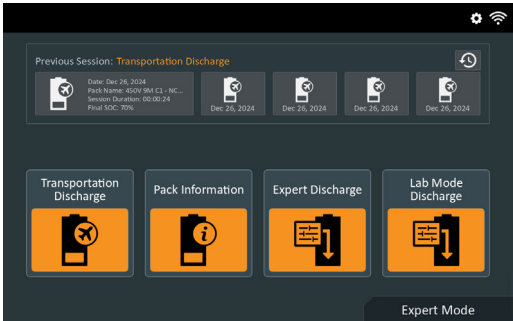


- ① Settings ② Messages ③ History ④ Specific History Record ⑤ Applications

Main Menu Icons

Icon	Description	Icon	Description
 Transportation Discharge	Transportation Discharge function discharges the pack to a predefined State of Charge.	 Messages	Access messages, alerts and notifications on tool
 Pack Information	Pack Information provides information about the pack without performing any other function.	 Settings	Setup/adjust: user information, default language, WiFi, email settings, user information, shop info, tool software version information.
 Expert Discharge	Approved, experienced users can access additional levels of pack service.	 History	Access archived test histories or search test history by VIN or by technician.
 Lab Mode Discharge	Approved, experienced users can access this application to perform pack discharge with low voltage communication with the pack.		

Expert Mode Home Screen

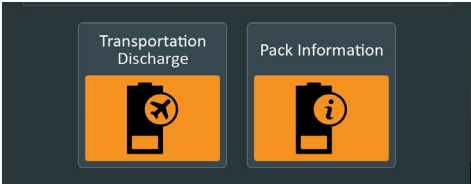


2 – Discharge

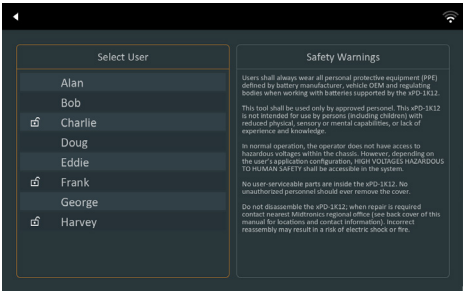


Use this function to discharge the pack to a pre-defined **State of Charge (SOC)**.

1. The Transportation Discharge application allows the Users to discharge the chosen pack to a pre-defined SOC target. The pre-defined SOC target may vary depending on the pack.

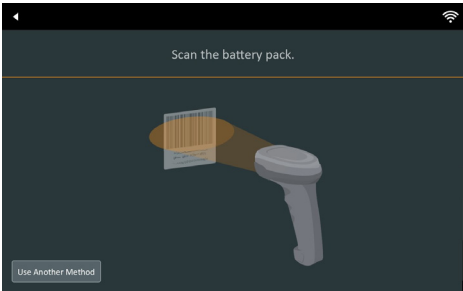


2. Select your Username from the list. Users with the unlock icon will be able to access expert mode (Details in Chapter 6: Expert User Functionality).

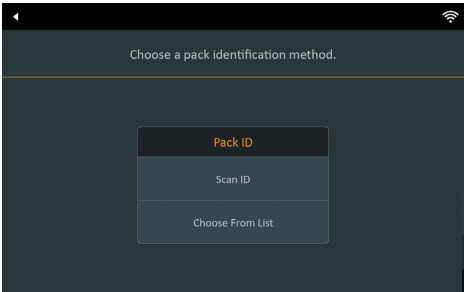


Pack Selection

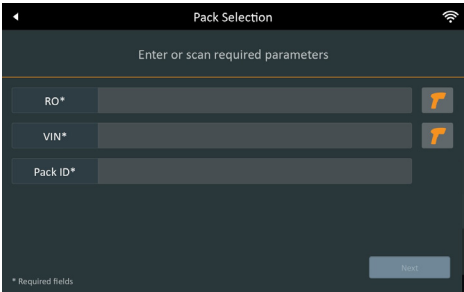
1. Use your barcode scanner to scan the barcode on the battery pack. This will determine the pack type and if it is a supported pack. If you do not have a barcode scanner, tap **Use Another Method** and you can select the pack using a manual method.



2. Select your method to determine battery pack. **Manual Entry, Scanning or Choose From List.**



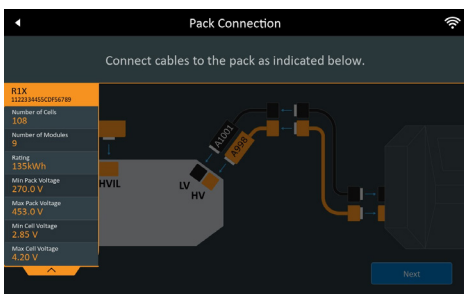
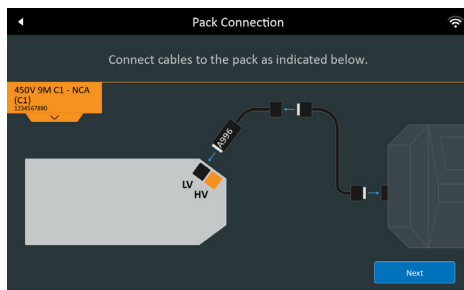
3. Input the session parameters. These can be scanned or input manually.



Tap **Next**.

Pack Connection

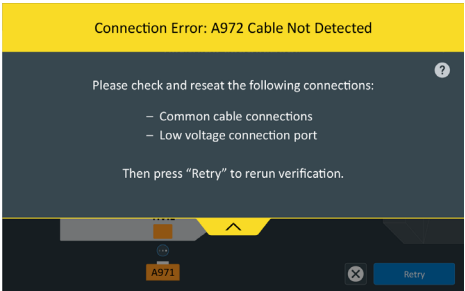
- Based on your pack selection, the xPD-1K12 will display a diagram of the pack and the cables needed for it. Follow the diagram to insert all connectors needed. The drop-down at the left side of the screen can be tapped to give more detailed information on the connections. Tap **Next**.



Connection Verification / Errors

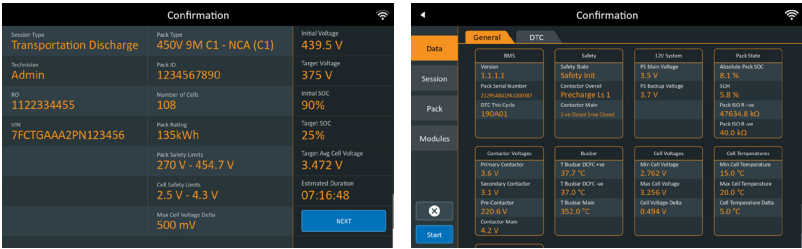
1. xPD-1K12 will verify all connections are made. If connection errors are detected, the xPD-1K12 will direct the user to the error to make that connection. Tapping on the ⓘ will abort the session.

Specific cable connection errors can be viewed by opening the drop-down menu.



Correct the connection errors and Tap **Retry**.

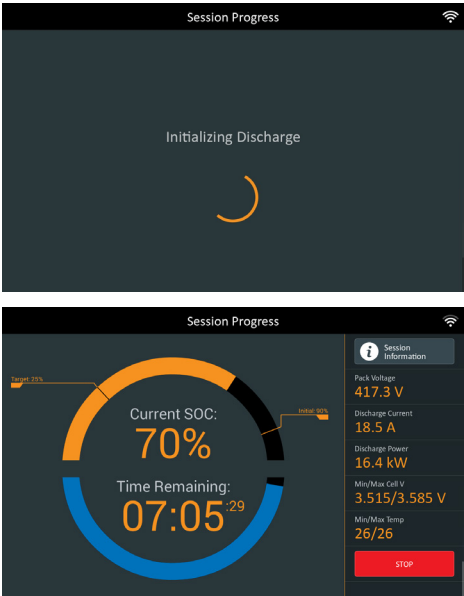
2. After cables are connected, a confirmation screen will appear.



Review the information on screen to ensure accuracy. Tap **Start**.

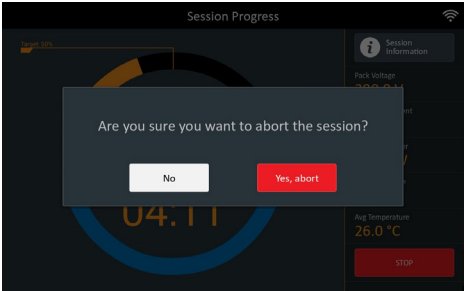
Discharge Progress


- 1. A session has started. The critical information is displayed on the main screen.



Stop Button

The **Stop** button can be pressed at any point during the discharge and is the primary method to stop. A pop up box will ask the user to if they want to abort the session.



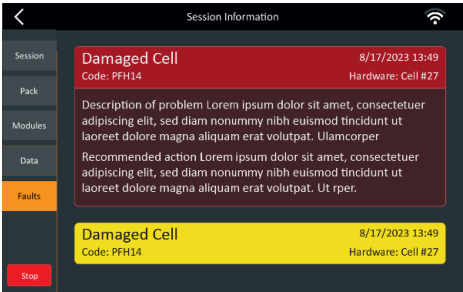


IMPORTANT: The Emergency Stop located on top of the xPD-1K12 can be pressed at any point during the discharge. The Emergency Stop should only be used in cases of emergency.

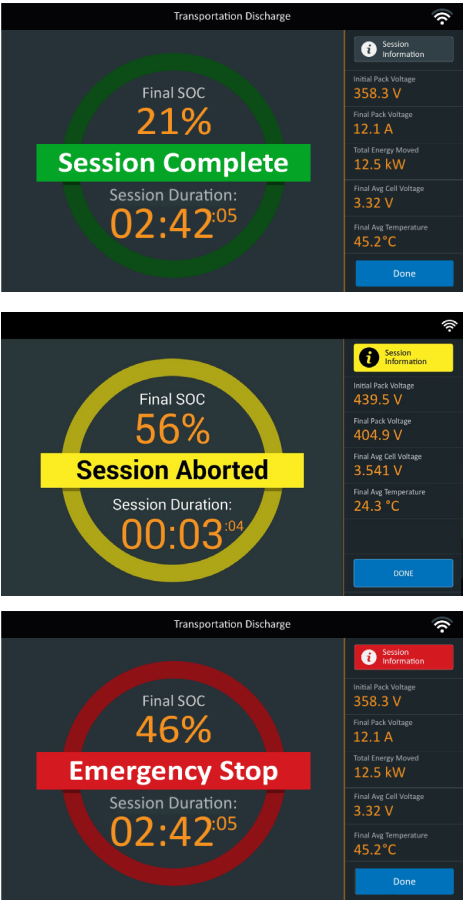
2. User can tap the **Session Information** button in the top right to see more detail on the pack during the discharge.



3. If there are any faults, this will show up in the faults tab under session information for the user to take action.



4. The screen will show green if the discharge stopped by reaching its target voltage, will show yellow if the user aborted the discharge, and it will show red if the discharge was stopped by the emergency stop button or a fault.
- The user can check pack information by tapping the Session Information button.
- When complete, tap **Done**.
- The record will be stored and is available in the History Application.



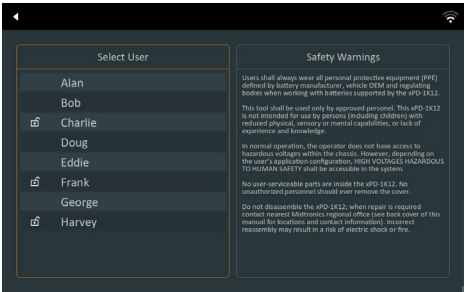
3 – Pack Information



Use this function to read details about the pack data for information prior to running a discharge.

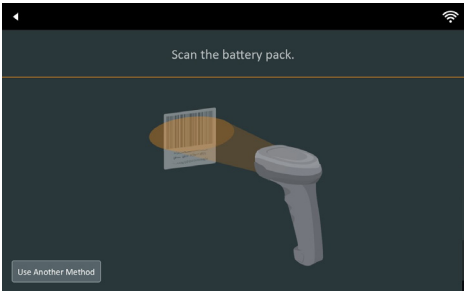
User Name

Select your Username from the list. Users with the unlock icon will be able to access expert mode (Details in Chapter 6: Expert User Functionality)



Pack Selection

1. Use your barcode scanner to scan the barcode on the battery pack. This will determine the pack type and if it is a supported pack.
If you do not have a barcode scanner, tap **Use Another Method** and you can select the pack using a manual method.

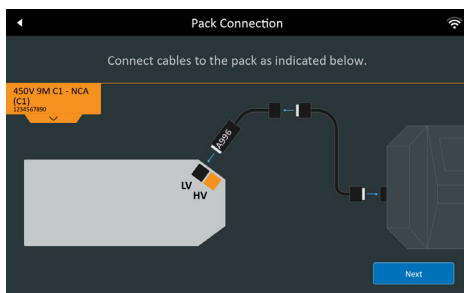


2. Select your method to determine battery pack. **Manual Entry**, **Scanning** or **Choose From List**. Input the session parameters. These can be scanned or input manually.

Tap **Next**.

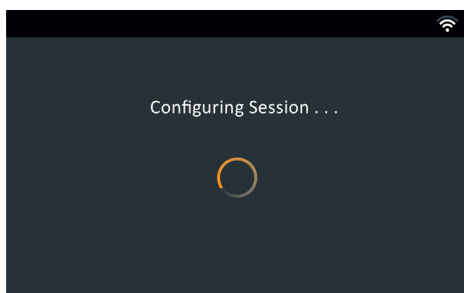
Pack Connection

1. Based on your pack selection, the xPD-1K12 will display a diagram of the pack and the cables needed for it. Follow the diagram to insert all connectors needed.



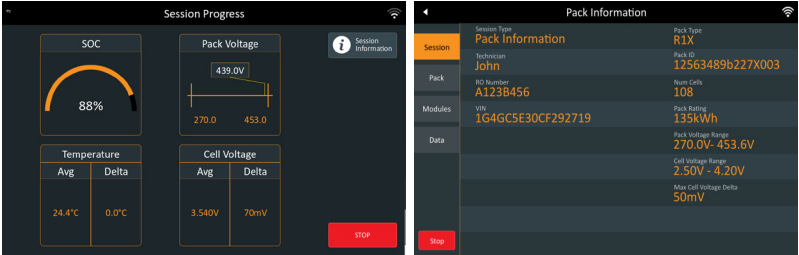
Connection Verification / Errors

2. xPD-1K12 will verify all connections are made. If no errors are found, tap **Next**. If connection errors are detected, the xPD-1K12 will direct the user to the error to make that connection. Follow those instructions, then tap **Retry**.



Pack Information

1. Battery pack information is displayed on screen. More detailed information can be pulled using the tabs on the left side of the screen for pack, modules and BMS data such as DTCs or faults.



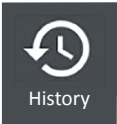
2. DTC's will displayed on the Data tab. (Image for reference only).

Session Progress				
Data	General		DTC	
	Category	DTC#	Name	Value
Session Limits	D1: Safety - Safety	P1320F4	Cell Over Voltage - Severe Limit	1
	D1: Safety - Safety Limits	P1303A3	Cell Over Voltage - Safety Limit	1
Pack	ADBM52959	P18101C	ESS BPI (in volent) over	0
	ADBM52972	P131102	Current Shunt Sensor with LEM Rationality Fail	0
Modules	ADBM52973	P13110A	Either Current Shunt Sensor with LEM Rationality Fail	0
	B1B	P130872	Battery Isolation Bus Struck Open	0
	B1B	P130A73	Battery Isolation Bus Struck Closed	0
	B1B	U001187	Lost Communication with Battery Isolation Box	0
	BMS HW Diagnostics	P134996	TLF35584 Fault Component Internal Failure	0
	BMS HW Diagnostics	P13B886	BMS Hardware Fault	0
	BMS HW Diagnostics	P13B896	BMS Hardware fault (odd diff)	0
	BMS HW Diagnostics	P13B796	BMS HW Revision Mismatch	0
	BMS HW Diagnostics	P13B796	BMS Battery Pack Aux ID Mismatch	0
	BMS HW Diagnostics	P13A245	BMS Watchdog Violation	0

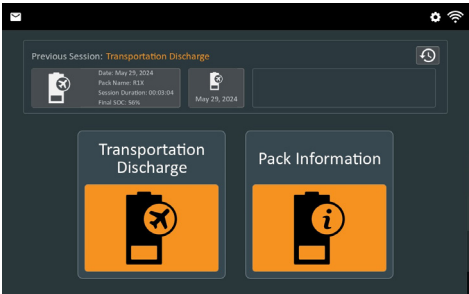
⚠ CAUTION

Some DTCs indicate damage or issues that can be a safety concern. The user should only do this after verifying the DTC and determining it is not a safety concern.

4 – History

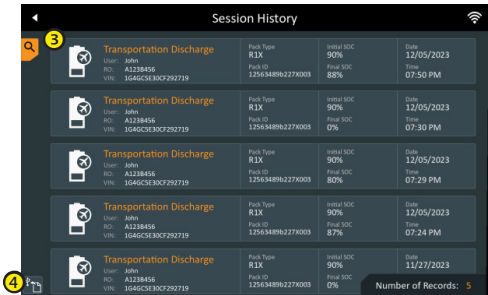


Use this function to retrieve records of previous sessions performed with this xPD-1K12.

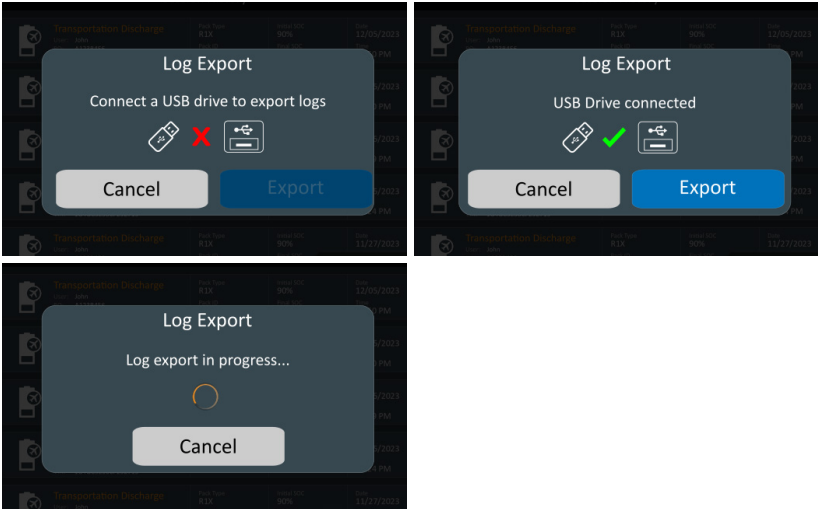


1. A shortcut for the 5 most recent sessions is displayed on the main menu screen. Tap each record (1) directly to pull these up.
2. Tap on the **Clock** icon (2) at the upper right of the screen to access a full list of sessions run on this tool.
3. Scroll through the list of records to find a specific session. Tapping directly on the session will pull up the results screens for that session.
4. Tapping the **Magnifying Glass** icon (3) at the upper left will allow the user to search all records based on the following parameters:

- Session Type
- VIN
- Status
- Date Range
- Pack Type
- User
- ROP
- Pack ID



- 5. Tap the Export to USB icon in the lower left (4) to download all records to an external drive. User will be asked to connect a USB drive to the xPD-1K12. Tap **Export**.



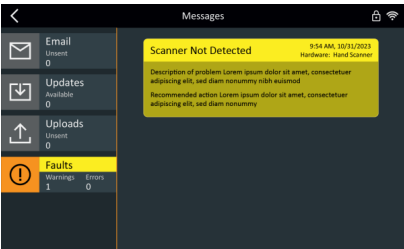
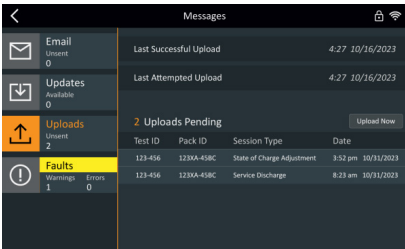
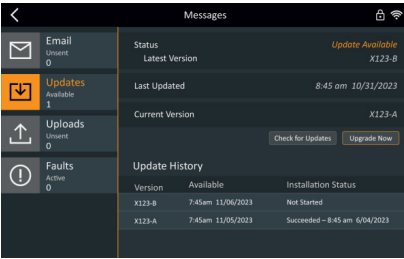
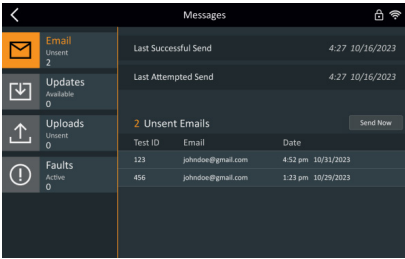
5 – Messages



Use this function to view messages on the tool for the user.
This includes:

- 1 Email attempts that were unsent
- 2 OTA updates that are available
- 2 Unsuccessful uploads
- 4 Faults detected in the xPD-1K12

1. Select the Envelope Icon in the upper left of the Main menu. The user will see multiple taps and can click through for any of the files listed above which require user action.



6 – Expert User Functionality

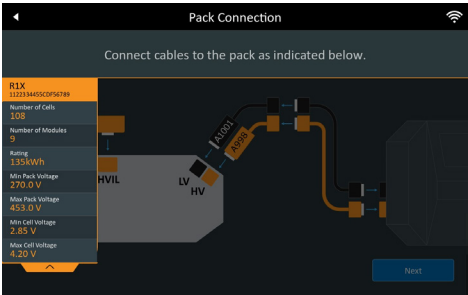


xPD-1K12 can setup users with additional functionality through a password protected “Expert Mode”. Additionally applications are then made available to the expert. Access to this mode is controlled by your organization and the admin user of your xPD-1K12.

⚠ CAUTION

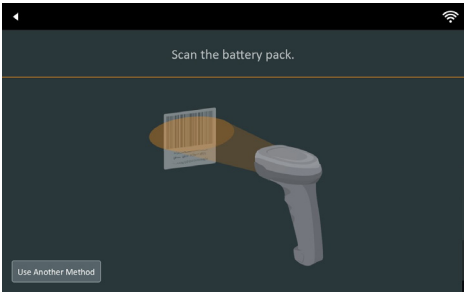
Expert Mode removes constraints put in place to ensure the pack is within safe and normal operating limits. Expert mode should only be used by battery experts with full knowledge of the pack and potential outcomes of connecting and discharging the pack in its current state

- 1. An expert user will have access to additional applications: **Expert Discharge** and **Lab ModeDischarge**.

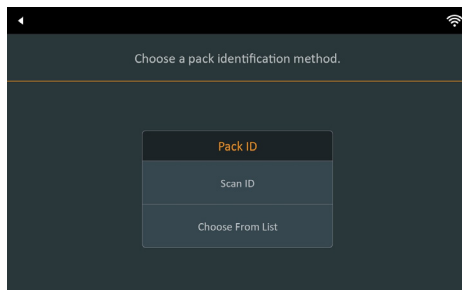


Pack Selection

- 1. Use your barcode scanner to scan the barcode on the battery pack. This will determine the pack type and if it is a supported pack. If you do not have a barcode scanner, tap **Use Another Method** and you can select the pack using a manual method.



2. Select your method to determine battery pack. **Manual Entry, Scanning or Choose From List.**



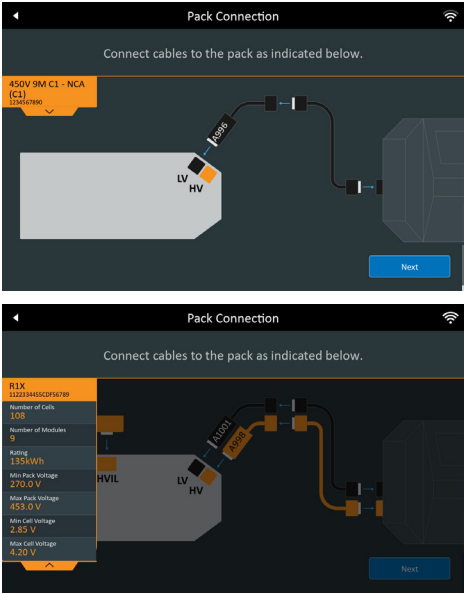
3. Input the session parameters. These can be be scanned or input manually.

A screenshot of a mobile application interface titled 'Pack Selection'. The header bar is dark with a back arrow and a Wi-Fi icon. Below the header, the text 'Enter or scan required parameters' is centered. There are three input fields, each with a label and an asterisk: 'RO*', 'VIN*', and 'Pack ID*'. To the right of each input field is a small orange icon of a scanner. At the bottom right, there is a 'Next' button. In the bottom left corner, there is a small text label: '* Required fields'.

Tap **Next**.

Pack Connection

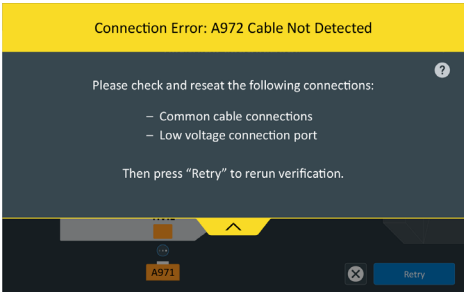
- Based on your pack selection, the xPD-1K12 will display a diagram of the pack and the cables needed for it. Follow the diagram to insert all connectors needed. The drop-down at the left side of the screen can be tapped to give more detailed information on the connections. Tap **Next**.



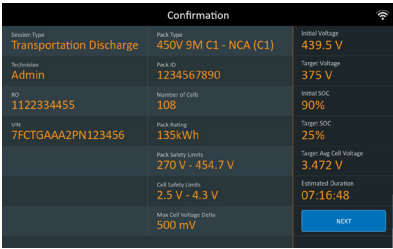
Connection Verification / Errors

- 1. xPD-1K12 will verify all connections are made. If connection errors are detected, the xPD-1K12 will direct the user to the error to make that connection. Tapping on the ⓘ will abort the session.

Specific cable connection errors can be viewed by opening the drop-down menu.



- Correct the connection errors and Tap **Retry**.
- 2. After cables are connected, a confirmation screen will appear.



Review the information on screen to ensure accuracy. Tap **Start**.

Expert Discharge

1. This application functions similarly to the standard discharge applications but allows the user more control over the discharge target and speed. The user can now set the discharge target by Pack SOC, Pack Voltage or Avg Cell Voltage.

The first screenshot shows the 'Session Input' screen with 'Target Type' set to 'SOC'. The 'Target SOC' field is highlighted in orange and shows '-- %'. The second screenshot shows 'Target Type' set to 'Voltage'. The 'Target Voltage' field is highlighted in orange and shows '-- V'. The third screenshot shows 'Target Type' set to 'Avg Cell Voltage'. The 'Target Avg Cell Voltage' field is highlighted in orange and shows '-- V'. All three screens have a numeric keypad on the right and a 'Next' button at the bottom right.

2. Expert Mode can optionally set parameters to discharge the pack at a slower than max rate. In normal use, xPD-1K12 monitors pack parameters during a discharge to automatically stop based on pre-defined limits of the pack. Expert user can select to remove this monitoring so a discharge can proceed in the case of pack damage.

The screenshot shows the 'Session Input' screen with the title 'Enter optional session parameters' and a subtitle 'Only populated parameters will be used'. It has three input fields: 'Max Duration' (showing '--:--:--'), 'Max Power' (showing '-- kW'), and 'Max Current' (showing '-- A'). Below these are 'Cell Limit Checks' with checkboxes for 'Cell Min' (checked), 'Cell Max' (checked), and 'Cell Delta' (unchecked). There are also 'Temperature Limit Checks' with checkboxes for 'Temp Min' (checked), 'Temp Max' (unchecked), and 'Temp Delta' (checked). A numeric keypad is on the right and a 'Next' button is at the bottom right.

⚠ CAUTION

Removing parameter monitoring can lead to the pack discharging with cells and temperatures outside of safe limits. Expert user is responsible for monitoring and ensuring pack safe operation during an expert discharge.

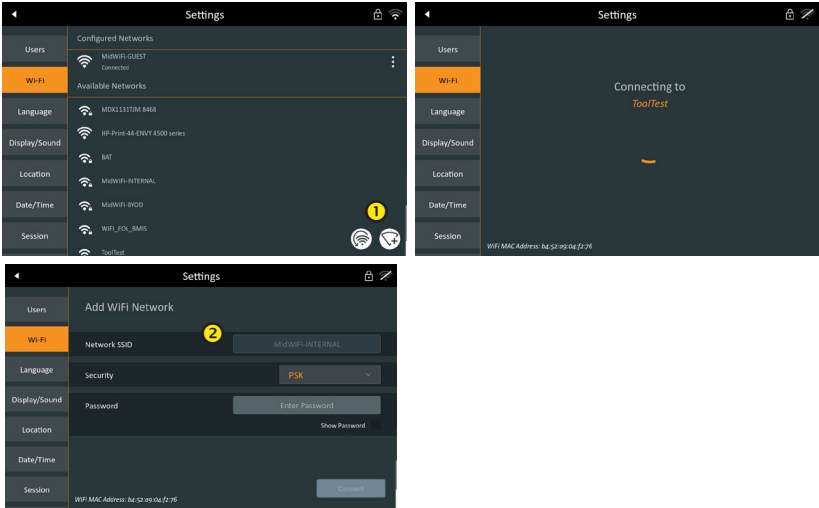
7 – Settings



Use this function to change the settings of the tool which were set in the initial setup as well as adding/changing users and getting system information.

WiFi

1. User can see available networks to select appropriate connection.
Tap the icons in lower right (1) to refresh the network list or manually enter a network.
When setting up a network, user will have fields (2) to enter necessary security information to get connected.
Tap **Next** once complete and xPD-1K12 will connect to the selected WiFi network.



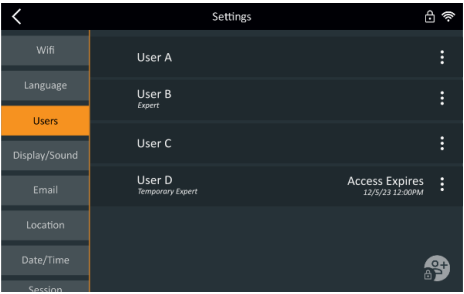
Language

1. User can select their preferred language for the tool OS and displays.

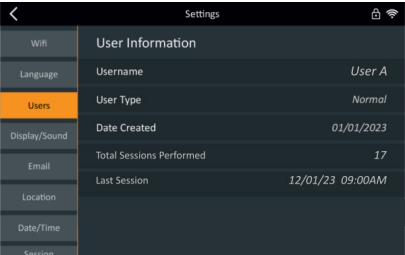
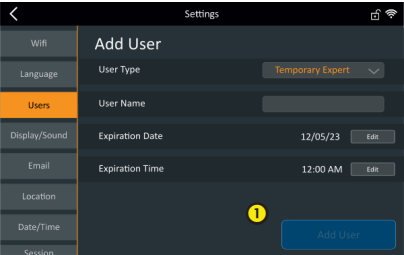


Users

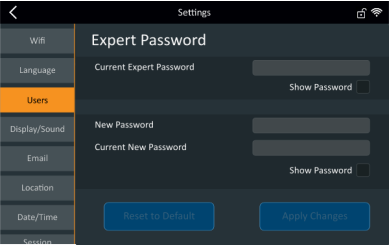
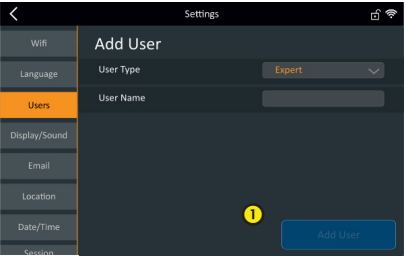
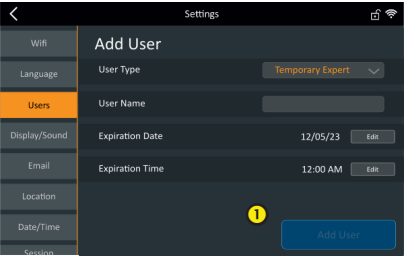
1. Add/Change/Delete Users for the xPD-1K12. Tap the User icon in the bottom right (👤) to add users.



2. For normal users, only a username is needed.



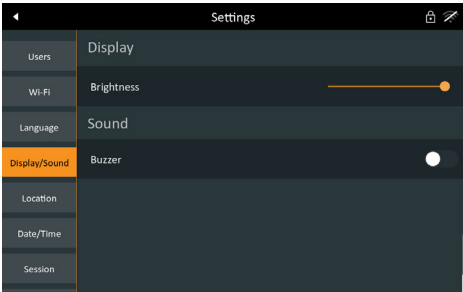
3. Expert users or Temporary Expert Users will need a password for setup.



4. Only the Admin user can delete users and add expert users. Tap the User icon in the bottom right (👤) to add users.

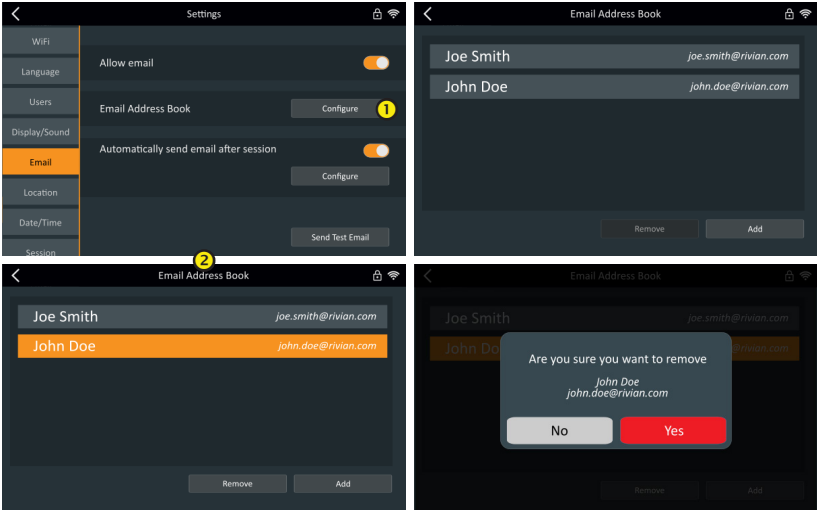
Display and Sound

- 1. Adjust the screen brightness and turn buzzer/sound on/off.

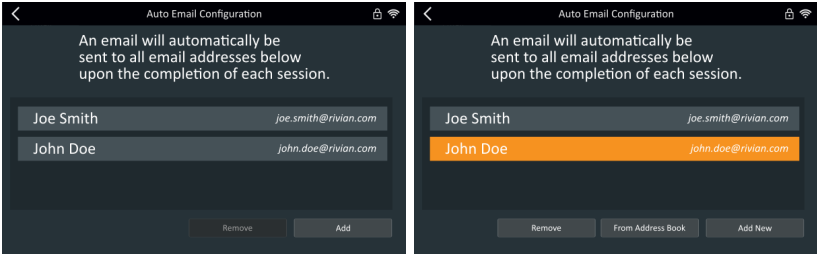


Email

- 1. User can modify and manage the tool's Email Contacts and Address Book.

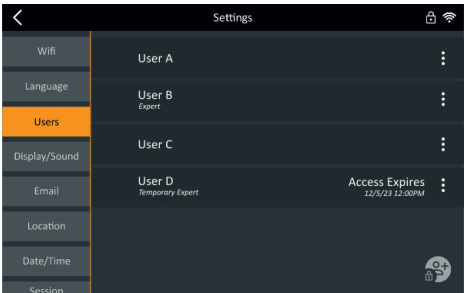


- 2. User can configure Email automation.

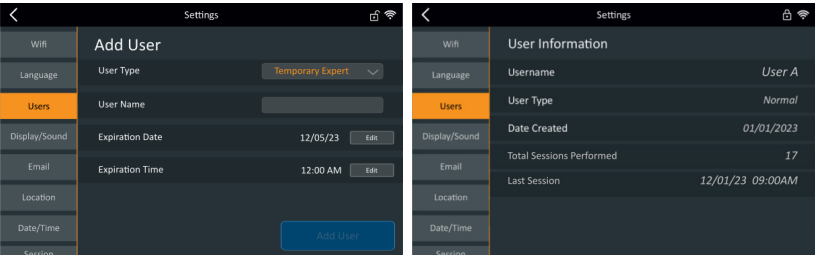


Users

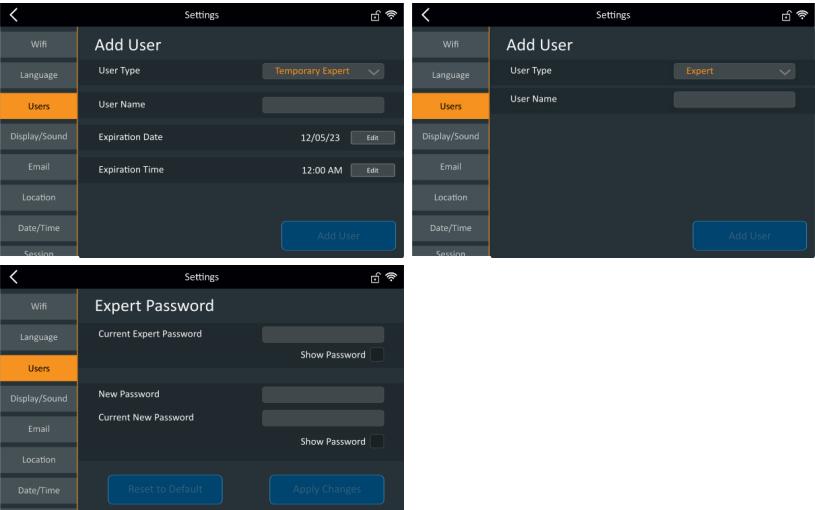
1. Add/Change/Delete Users for the xPD-1K12. Tap the User icon in the bottom right (👤) to add users.



2. For normal users, only a username is needed.



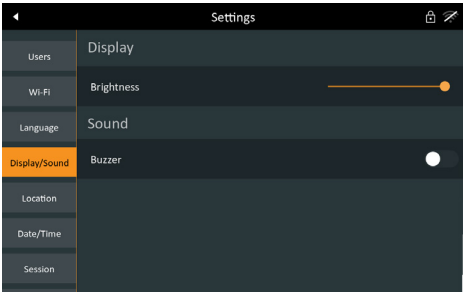
3. Expert users or Temporary Expert Users will need a password for setup.



4. Only the Admin user can delete users and add expert users.
Tap the User icon in the bottom-right (👤) to add users.

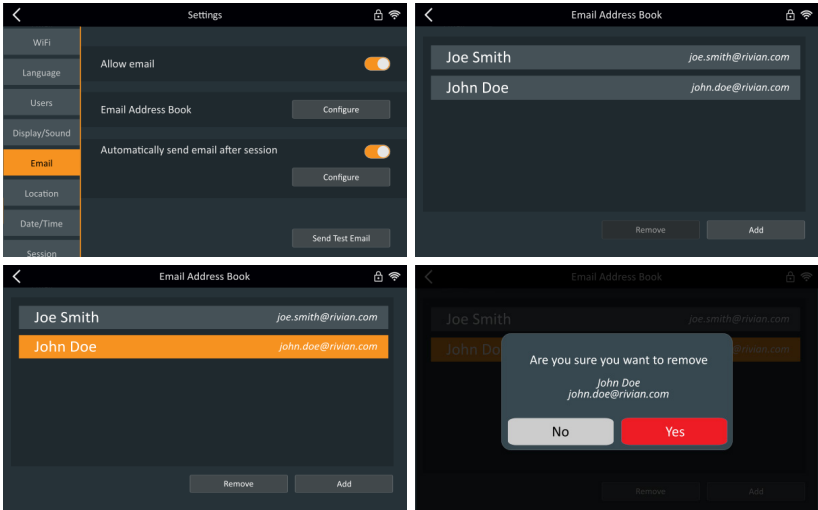
Display and Sound

- 1. Adjust the screen brightness and turn buzzer/sound on/off.

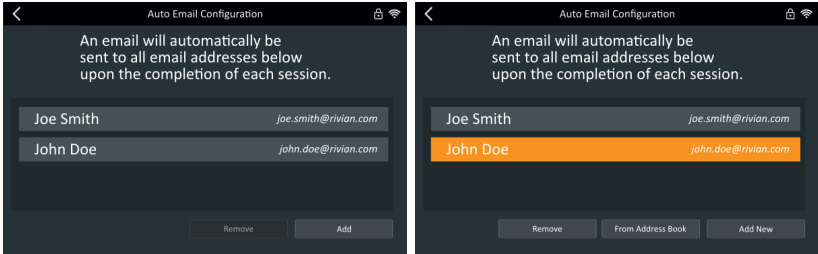


Email

- 1. User can modify and manage the tool's Email Contacts and Address Book.

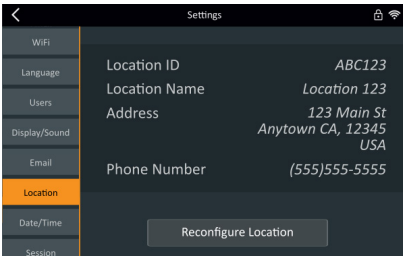


- 2. User can configure Email automation.

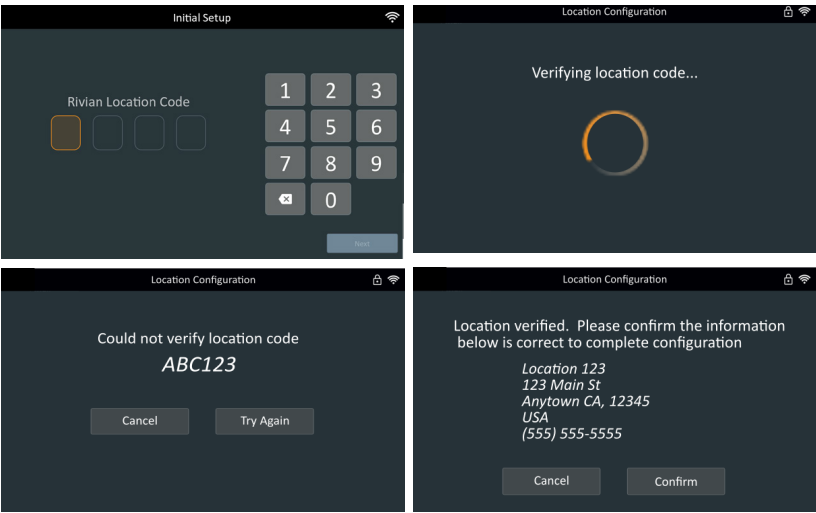


Location

- 1. View the location information automatically set based on the Rivian location code supplied during initial setup.

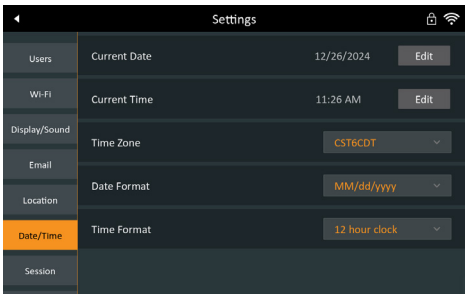


- 2. Only the Admin User can reconfigure the location.
- 3. Location is always set using the Rivian location code.



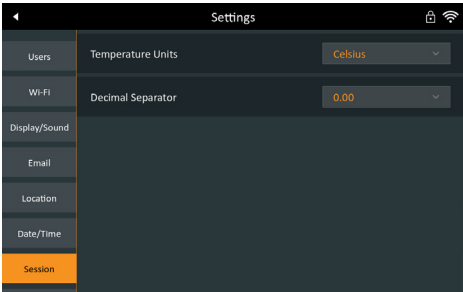
Date/Time

User can view/edit the date and time format selected during initial setup.



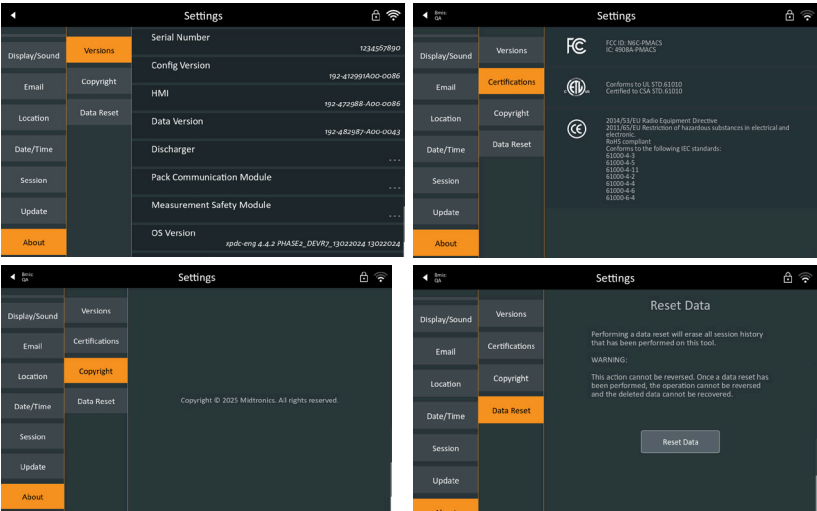
Session Preferences

User can view/edit the number and unit formats.



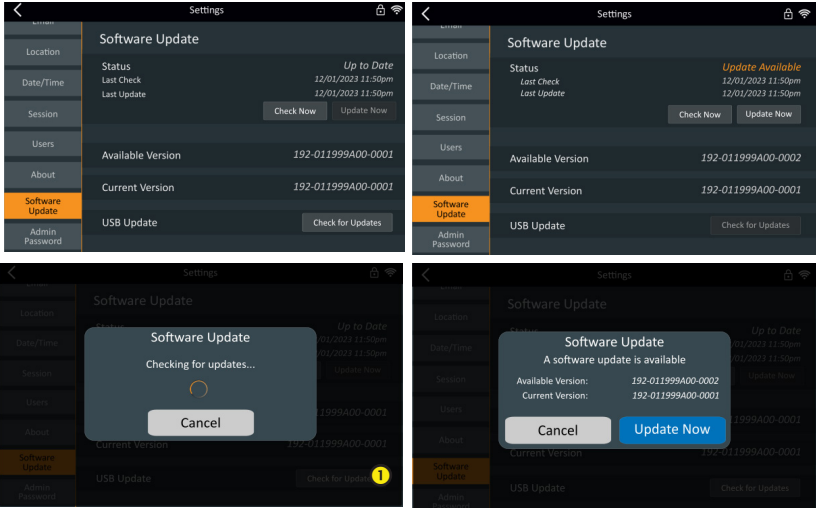
About

User can View xPD-1K12 information including SW version, certifications and copyright.
Tool and Data Reset can be performed from the about screen.

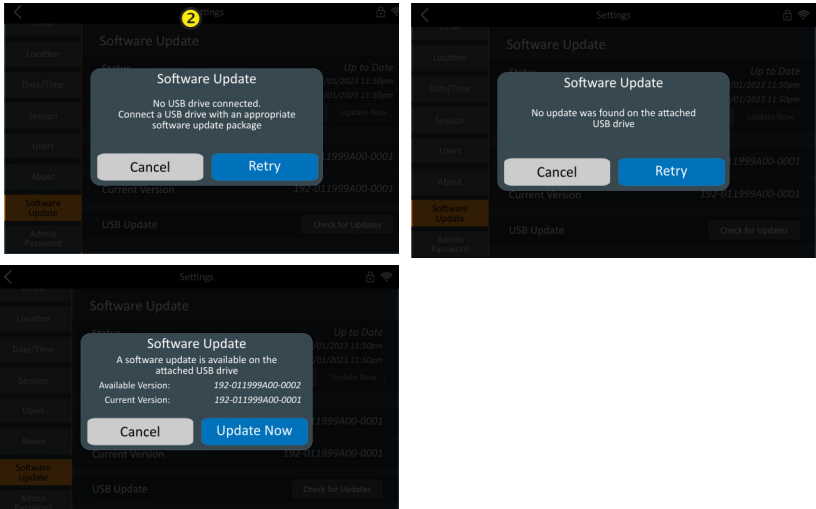


Software Update

- User can check for updates. Primary method for updates is OTA and will downloaded to the tool when connected to a WiFi network.
When a software update is available tap **Update Now** to perform the update.



- As a backup, update is possible through the USB port on the xPD-1K12. Follow the on screen prompts to connect the USB drive to the xPD-1K12 and perform the update if needed.



8 – Troubleshooting

Error Code No.	Diagnosis	Corrective Action
1000-2999	Internal System Fault	Reboot the device and confirm if the problem persists. If it persists, contact Midtronics for troubleshooting and next steps.
3000-3999	Safety Hardware Fault	
4000-4999	Pack Safety Limits Fault	Confirm by running a diagnostic session before attempting to discharge again.
5000-5999	Software Fault	Reboot the device and confirm if the problem persists. If it persists, contact Midtronics for troubleshooting and next steps.

9 – Most Common Error Codes

Error Code	Error Title	Error Description	Resolution
MSM#4001	HV Connection Fault	xPD could not verify HV Iface Voltage	Disconnect and reconnect HV cables, if problem persists contact Midtronics Customer Support
MSM#4002	Reverse Polarity Fault	xPD HV Iface voltage is reversed	Disconnect HV Stub and reverse terminals to the correct position. If problem persists contact Midtronics Customer Support
MSM#4003 MSM#4004 MSM#4005 MSM#4006 MSM#4007	xPD Current Channel Fault	xPD has detected an anomaly between the current sensors and have surpassed its safety threshold	Retry desired action. If problem persists stop using the xPD and contact Midtronics Customer Support
MSM#4008	Pack Voltage Too High Fault	Pack Voltage has exceeded the xPD safety threshold	Confirm that the pack's voltage is above the pack's limits, if problem persists contact Midtronics Customer Support
MSM#4009	Pack Voltage Too low Fault	Pack Voltage is below the xPD safety threshold	Confirm that the pack's voltage is below the pack's limits, if problem persists contact Midtronics Customer Support
PCM#4001	Pack Voltage Too High Fault	Pack Voltage has exceeded the xPD safety threshold	Confirm that the pack's voltage is above the pack's limits, if problem persists contact Midtronics Customer Support
PCM#4002	Pack Voltage Too low Fault	Pack Voltage has fallen below the xPD safety threshold	Confirm that the pack's voltage is below the pack's limits, if problem persists contact Midtronics Customer Support
PCM#4003	Pack SOC Too Low Fault	Pack SoC is below its safety threshold	Confirm that the pack's SoC is below the pack's limits, if problem persists contact Midtronics Customer Support

Error Code	Error Title	Error Description	Resolution
PCM#4004	Pack Cell Delta Too Large	Pack Cells have too large of a voltage delta between each other	Confirm that the pack's cells have a delta of over 500mV, if problem persists contact Midtronics Customer Support
PCM#4005	Pack Cell Min Fault	Lowest Pack Cell voltage is below its safety threshold	Confirm that the pack has a cell below the packs safety limits, if problem persists contact Midtronics Customer Support
PCM#4006	Pack Cell Max Fault	Highest Pack Cell voltage is above its safety threshold	Confirm that the pack has a cell above the packs safety limits, if problem persists contact Midtronics Customer Support
PCM#4007	Pack Type BMS Mismatch	Pack BMS Mismatch	xPD has detected a different pack than selected, please retry pack selection, if problem persists contact Midtronics Customer Support
PCM#4008	Pack Type Invalid BMS	Pack BMS is not valid or recognize	xPD has detected a pack that is not supported, please retry pack selection or use lab mode, if problem persists contact Midtronics Customer Support
DSC#3013	Thermal Switch has tripped	The Thermal Switches are located on the safety string, as long as this is not the only error this is not valid	Thermal Switches will open whenever the safety string is open. As long as this error is not reported alone, the user can ignore this.
DSC#3014			

10 – Patent, Warranty, and Service

PATENTS

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

LIMITED WARRANTY

Midtronics products are warranted to be free of defects in materials and workmanship for a period of one (1) year from date of purchase. Midtronics will, at our option, repair or replace the unit with a re-manufactured unit. This limited warranty applies only to Midtronics products, and does not cover any other equipment, static damage, water damage, overvoltage damage, dropping the unit, or damage resulting from extraneous causes including owner misuse. Midtronics is not liable for any incidental or consequential damages for breach of this warranty. The warranty is void if owner attempts to disassemble the unit or to modify the cable assembly.

SERVICE

To obtain service, contact the Midtronics office in your region (see address block below). Have your model number and serial numbers at hand. This first step is critical as Midtronics will troubleshoot the problem(s) over the phone, and many problem(s) are resolved during this step. If the problem cannot be resolved, the Customer Service Agent will issue a Return Material Authorization (RMA) number and provide instructions on where to ship your equipment. The RMA number becomes your tracking number when communicating with Midtronics. The final step is to pack the equipment to avoid damage in transit and return the equipment freight prepaid (you pay), to the attention of the RMA number and the address provided by the Customer Service Agent.

Midtronics or it's designee will repair and return the unit using the same shipping service level as received. If it is determined that the failure was caused by misuse, alteration, accident or abnormal condition of operation or handling, purchaser will be billed for the repaired product and it will be returned freight prepaid with the shipping & handling charges added to the invoice. Midtronics' products beyond the warranty period are subject to the repair charges in place at that time. Out-of-warranty repairs carry a 6-month warranty.



www.midtronics.com

Corporate Headquarters

Willowbrook, IL USA

Phone: 1.630.323.2800

Canadian Inquiries

Toll Free: +1 1 866 592 8052

Asia/Pacific (excluding China)

Contact Corporate Headquarters

Phone: +1.630.323.2800

Midtronics b.v.

European Headquarters

Houten, The Netherlands

Serving Europe, Africa, the Middle
East, and The Netherlands

Phone: +31 306 868 150

Midtronics China

China Operations

Shenzhen, China

Phone: +86 755 2374 1010

Midtronics India

Navi Mumbai, India

Phone: +91 22 2756 4103/1513