

GRX-3000

Battery Diagnostic Station



INSTRUCTION MANUAL



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Safety Guidelines

1 General Safety Precautions

1. **IMPORTANT SAFETY INSTRUCTIONS. IT IS OF UTMOST IMPORTANCE THAT BEFORE USING YOUR CHARGER, YOU READ THIS MANUAL AND FOLLOW THE SAFETY AND OPERATING INSTRUCTIONS EXACTLY. SAVE THESE INSTRUCTIONS.**

⚠ CAUTION

Risk of explosive gases

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

- 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.

⚠ CAUTION

Charging a non-rechargeable battery may cause the battery to burst.

To reduce the risk of injury, only charge rechargeable lead-acid type batteries including maintenance-free, low-maintenance, or deep-cycle batteries.

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

- 1.2 Use of an attachment not recommended or sold by the battery charger 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 charger.
- 1.4 Position the AC and DC leads to avoid tripping over them and to prevent damage by hood, doors, or moving engine parts; protect from heat, oil, and sharp edges.
- 1.5 Do not operate the charger if it has received a sharp blow, been dropped or otherwise damaged in any way; take it to a qualified service center.
- 1.6 Do not disassemble charger; take it to a qualified service center when repair is required. Incorrect reassembly may result in a risk of electric shock or fire.

- 1.7 To reduce risk of electric shock, unplug the charger from the AC outlet before attempting any maintenance or cleaning. Turning off the controls will not reduce this risk.

⚠ CAUTION

Remove marine "boat" batteries and charge them on shore.

Charging marine batteries on-board requires specially designed equipment for marine use.

- 1.8 Connect and disconnect the battery leads only when the AC supply cord is disconnected.
- 1.9 Do not overcharge the battery. (See sections 3 and 10 in the safety instructions)
- 1.10 Charge the battery in a dry, well-ventilated area.
- 1.11 Never place articles on or around the charger, or locate the charger in a way that will restrict the flow of cooling air through the cabinet.
- 1.12 An extension cord should not be used unless absolutely necessary. (See paragraph 4.3.)
- 1.13 Have a damaged cord or plug replaced immediately.
- 1.14 Do not expose the charger to rain or snow.

2 Personal Precautions

- 2.1 Always have someone within range of your voice, or close enough to come to your aid, when working around lead acid batteries.
- 2.2 Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
- 2.3 Wear complete eye protection, clothing protection, and wear rubber soled shoes. Place damp cloth over battery to protect against acid spray. When ground is very wet or covered with snow, wear rubber boots. Avoid touching eyes while working near battery.
- 2.4 If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters the eye, immediately flush with cold running water for at least 10 minutes, and seek medical attention.
- 2.5 NEVER smoke or allow a spark or flame in vicinity of a battery or engine.
- 2.6 Be extra cautious to reduce risk of dropping a metal tool onto the battery. It might spark or short circuit the battery or other electrical part that may cause an explosion.

- 2.7 Before working with a lead-acid battery, remove personal metal items such as rings, bracelets, necklaces, watches, etc. A lead-acid battery can produce a short circuit current high enough to weld such items causing a severe burn.

⚠ CAUTION

Non-rechargeable batteries may burst when charging causing personal injury and damage.

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

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

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

3 Preparing To Charge The Battery

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


4. Grounding & Power Cord Connections

- 4.1 The charger must be grounded to reduce risk of electric shock. The charger 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 charger's original AC cord and plug. Disconnect plug from outlet when charger is idle.




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

- 4.2 This battery charger is for use on a nominal 120-volt circuit and has a grounding plug that looks like the plug illustrated in *Figure A*. A temporary adapter, which looks like the adapter illustrated in *Figures B* and *C*, may be used to connect this plug to a two-pole receptacle as shown in *Figure B*, if a properly grounded outlet is not available. The temporary adapter should be used only until a properly grounded outlet can be installed by a qualified electrician.

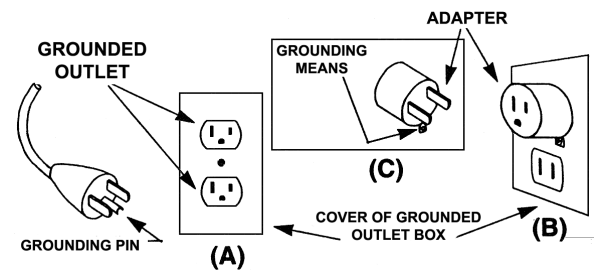
⚠ DANGER

Hazardous voltage. An improper connection can result in electric shock

Before using an adapter be certain the center screw of the outlet plate is grounded. The rigid ear or lug extending from the adapter must be connected to a properly grounded outlet. Make certain it is grounded. If necessary, replace the original screw that secures the adapter ear or lug to the cover plate and make the ground connection to the grounded outlet.



USE OF AN ADAPTER IS NOT ALLOWED IN CANADA. IF A GROUNDING-TYPE RECEPTACLE IS NOT AVAILABLE, DO NOT USE THIS APPLIANCE UNTIL THE PROPER OUTLET IS INSTALLED BY A QUALIFIED ELECTRICIAN.



- 4.3 An extension cord should not be used unless absolutely necessary. Use of an improper extension cord could result in a risk of fire and electric shock. If an extension cord must be used, make sure:
 - a. that the pins on plugs of the extension cord are the same number, size, and shape as those of the plug on the charger;
 - b. that the extension cord is properly wired and in good electrical condition;
 - c. that the wire size is large enough for the AC ampere rating of charger as specified in the following table.

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

*American Wire Gauge

5. Charger Location

- 5.1 Locate the charger as far away from the battery as the charger cables permit.
- 5.2 Never place the charger directly above the battery being charged unless using the charger with a cart or enclosure designed for this purpose. Gases from the battery will corrode and damage the charger.
- 5.3 Never allow battery acid to drip on the charger when taking gravity readings or filling a battery.
- 5.4 Operate the charger only in a well-ventilated area that is free of dangerous vapors.
- 5.5 Store the charger in safe, dry location and maintain it in perfect condition.
- 5.6 Do not set the battery on top of the charger or where its acid might drip onto the charger.

6. DC Connection Precautions

- 6.1 All switches should be set in the OFF position and AC cord should be DISCONNECTED from electrical outlet before you connect and disconnect the charger clamps. Never allow the clamps to touch each other.
- 6.2 When attaching the charger clamps, be certain to make the best possible mechanical as well as electrical connection. This will tend to prevent the clamps from slipping off the connections, avoid dangerous sparking, and assure safer and more efficient charging. The clamps should be kept clean.


7. Installing The Battery

⚠ CAUTION

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

- 7.1 Before working on the vehicle, firmly apply the emergency brake and place the gear shift to NEUTRAL—shift an automatic transmission to PARK.
- 7.2 Locate the charger as far away from the battery as the charger cords permit and position the AC and DC cords to avoid stepping on or tripping over them and to prevent damage by hood, doors, or moving engine parts.
- 7.3 Stay clear of fan blades, belts, pulleys, and any other parts that can cause physical injury.
- 7.4 Turn **OFF** all vehicle loads, including door lights, and correct any defects in the vehicle’s electrical system that may have caused low battery.
- 7.5 Check the polarity of the battery posts. The **POSITIVE (POS., P, +)** post usually has a larger diameter than the **NEGATIVE (NEG., N,-)** post.
- 7.6 Determine which post of the battery is grounded (connected) to the chassis. If the negative post is grounded (as in most vehicles), see paragraph 7.7. If the positive post is grounded, see paragraph 7.8.
- 7.7 For a negative-grounded vehicle, first connect the **POSITIVE (RED)** clamp from the charger to the **POSITIVE (POS., P, +)** ungrounded post of the battery. Then connect the **NEGATIVE (BLACK)** clamp to the **NEGATIVE (NEG., N,-)** post of the battery. Do not connect the clamp to the carburetor, fuel lines, or sheet-metal body parts. When disconnecting the charger, turn all switches to **OFF**, disconnect the AC cord, remove the clamp from the **NEGATIVE** battery terminal, and then remove the clamp from the **POSITIVE** battery terminal.

⚠ DANGER



Hazardous voltage.
Can cause death or serious personal injury.

Setting the switches to “OFF” does not always disconnect the charger electrical circuit from the AC power cord or the DC charger clamps.

7.8 For positive-grounded vehicle, connect the **NEGATIVE (BLACK)** clamp from the charger to the **NEGATIVE (NEG., N, -)** ungrounded post of battery. Then connect the **POSITIVE (RED)** clamp to the **POSITIVE (POS., P, +)** post of the battery. Do not connect clamp to carburetor, fuel lines, or sheet-metal body parts.

When disconnecting the charger, turn the switches to **OFF**, disconnect the AC cord, remove the clamp from the **POSITIVE** battery terminal, and then remove the clamp from the **NEGATIVE** battery terminal.

CAUTION: WHEN POSITIVE (+) POST OF VEHICLE BATTERY IS GROUNDED, DOUBLE CHECK POLARITY.

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

8.1 Check the polarity of battery posts. **POSITIVE (POS., P, +)** post usually has larger diameter than **NEGATIVE (NEG., N, -)** post.

8.2 When disconnecting the charger, always do so in the reverse sequence of the connecting procedure; break the first connection while staying as far away from the battery as practical.

8.3 **MARINE "BOAT" BATTERIES MUST BE REMOVED AND CHARGED ON SHORE. TO SAFELY CHARGE THEM ON BOARD REQUIRES EQUIPMENT ESPECIALLY DESIGNED FOR MARINE USE.**

⚠ CAUTION

Risk of explosive gases.

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

⚠ CAUTION

Risk of explosive gases.

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


Chapter 1: Before You Begin


Safety Reminder

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

Safety Precautions


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


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..


CAUTION

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.

- ⇒ Battery acid is highly corrosive. If acid enters your eyes, immediately flush them thoroughly with cold running water for at least 10 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 cords and cables away from moving engine parts.
- ⇒ Remove any jewelry or watches before you start servicing the battery.
- ⇒ Use caution when working with metallic tools to prevent sparks or short circuits.
- ⇒ Never lean over a battery when testing, charging, or jump starting.
- ⇒ Never charge a frozen battery. Gases may form, cracking the case, and spray out battery acid.

Conventions Used in This Manual

To help you learn how to use your GRX, the manual uses these symbols and typographical conventions:

Symbols And Typographical Conventions

Convention	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.
CAUTION	The word CAUTION indicates instructions for avoiding equipment damage.
	The wrench symbol indicates procedural notes and helpful information.
UP ARROW	The text for keypad buttons are in Bold capital letters.
CAPITAL LETTERS	The text for screen options are in regular capital letters.
BACK ARROW	The text for soft keys are in Bold capital letters.

Chapter 2: Overview

Battery Diagnostic Station: Front View

The controls to the Battery Diagnostic Station are accessible on the front panel of the GRX.



① Integrated Thermal Printer (optional)

For printing and sharing test results.

② Status Indicator Lights

Indicates charging, faults, communication, and power status.

③ Expandable Plug-in Module Bay

For future expansion

④ Display Screen

Backlit graphical display and keypad for data entry.

⑤ Soft Keys

Press these keys to perform the functions displayed at the bottom of the display screen.

⑥ Arrow Keys

The arrow keys let you scroll numerical values and move between menus and icons.

⑦ Alphanumeric Keypad

Using the keypad you can enter alphanumeric and numerical test parameters.

⑧ STOP Button

Use the STOP button to stop a battery charging session that is in progress.

Battery Diagnostic Station: Side View

USB and data card ports are located on the right side of the GRX charger housing.



1 USB Port

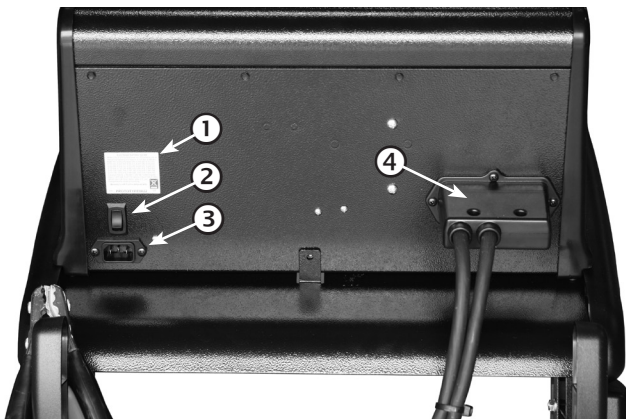
For future communication needs.

2 Data Card Slot

Designed to accept an SD-type data card for data storage and upgrading the internal software.

Battery Diagnostic Station: Rear View

Connectors for the charger cables and power cord are on the back of the GRX Diagnostic Charger. The serial number you will need to register your GRX is on the back of the charger housing.



1 Serial Number

On bottom of label; required for product registration.

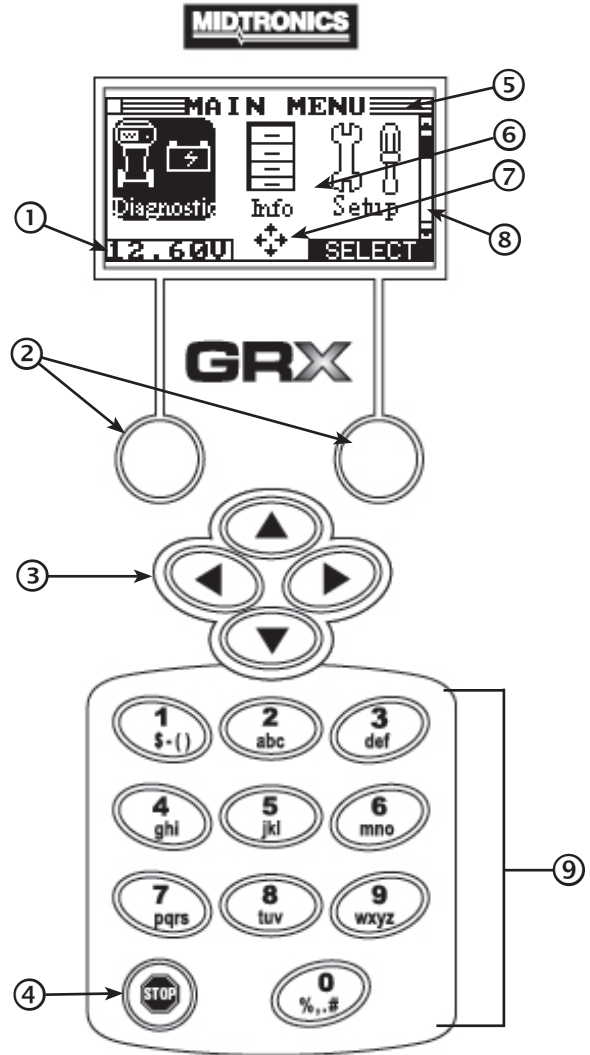
2 Power Switch

3 AC power cord

4 Charging Cable Connection

Display and Keypad

The GRX display and keypad work together to help you quickly find and use the right tools at the right time. The display also keeps you on track with onscreen navigation aids, directions and messages. The illustration shows how the elements on the screen relate to the keypad.



1 Voltmeter

When you first connect the GRX to a battery it functions as a voltmeter. The voltage reading appears above the left soft key until you move to other menus or functions.

2 Soft Keys

Press the two soft keys linked to the bottom of the screen to perform the functions displayed above them. The functions change depending on the menu or test process. So it may be helpful to think of the words appearing above them as part of the keys.

3 Arrow (▲▼◀▶) keys

Press the arrow keys to scroll to numerical values and move to menus and icons.

④ **STOP Key**

Use the **STOP** button to stop a battery charging session that is in progress.

⑤ **Title Bar**

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

⑥ **Selection Area**

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

⑦ **Menu Screen Arrows**

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

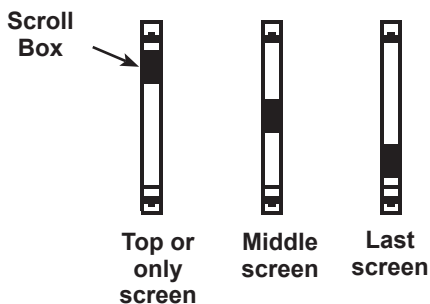
The left and right menu screen arrows tell you when to use the ◀ or ▶ keys to select an icon.

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

⑧ **Scroll Bar**

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

Some screens also indicate the page order with a notation such as P1/3 (page 1 of 3).



⑨ **Alphanumeric Keypad**

In some cases, you can use the alphanumeric keypad to enter numerical test parameters instead of scrolling to them with the arrow keys.

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

To add a space, press the ▶ key. To erase a space and insert a character, press the ◀ key.

Refer to the table below for the characters associated with each alphanumeric key.

Key	Character
①	\$ - () 1
②	a b c 2
③	d e f 3
④	g h i 4
⑤	j k l 5
⑥	m n o 6
⑦	p q r s 7
⑧	t u v 8
⑨	w x y z 9
⑩	% , . # 0

Alphanumeric Keys and Associated Characters

Data Entry Methods

To perform a particular test or function, the GRX requires different types of information. This means that the methods you use to enter information will change depending on the type of information requested. The six types of entry methods are described below.

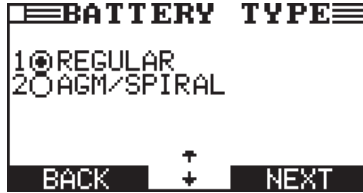
Typically, the soft key below the right half of the screen confirms your choice, although the command above it may vary. (Examples: **SELECT**, **NEXT**, and **SAVE**.) In a similar fashion, the soft key below the left half of the screen cancels your choice or returns you to the previous screen, although the word above it may also vary. (Examples: **BACK** and **CLEAR**.)

Menu Icons

A menu icon is a graphical representation of a function you can select, such as the Diagnostic icon in the Main Menu. To select an icon, use the ◀ or ▶ key to highlight it. Highlighting changes the icon to a white picture on a black background. To confirm your selection, press the appropriate soft key.

Option Buttons

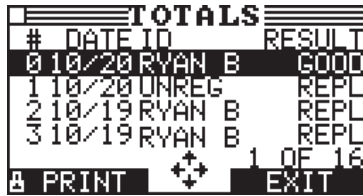
Some lists have option buttons before each item. To select an item, use the ▲ or ▼ keys to move the dot to the button next to the item. To confirm your selection, press the appropriate soft key.



You can also use the alphanumeric keypad to enter the number preceding the option button of your choice. No additional keypress is needed to proceed.

Scrolling Lists

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



To select an item, the ▲ or ▼ key to highlight the item, and press the appropriate soft key.

To move the highlight bar up five lines at a time, press the ◀ key. To move the highlight bar down five lines at a time, press the ▶ key.

Alphanumeric Entry

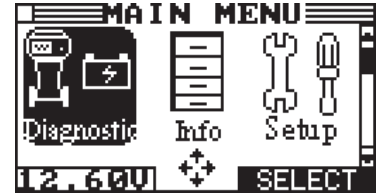
Some selections require you to use the alphanumeric keypad. These “user-defined” selections have a blinking horizontal line (cursor) to the right of the last character.







Use ▲ or ▼ to highlight a line for editing. Display the character, symbol, or number you want by rapidly pressing its key as many times as needed. If you pause, the cursor moves to the right. To backspace, press ◀. Use the ▶ to add a space. Use ▲ or ▼ to highlight a line for editing. When finished, press the appropriate soft key to save your settings.


Main Menu




The Main Menu is the starting point for all tools and utilities, which are depicted as icons. Some icons lead directly to the function they represent, while others are menu icons that lead to two or more options.




Menu Icon	Description
 Diagnostic	Automatically tests, charges, and makes a decision on a battery using the information you select in a series of screens. Generates a test code for Replace and Bad Cell decisions.
 Info	Includes a utility to view and print a test counter, a data transfer utility, the software version and date and the GRX serial number.
 Setup	The Setup Menu lets you customize options in the GRX to suit your needs.
 Help	Provides a list of topics and definitions. Also includes Midtronics Customer Service phone numbers.














Info Menu

 The Info menu allows you to select Totals, Transfer results and view Software Version information.

Menu Icon	Description
 View Test	Displays the last Diagnostic charge results. Sends the results to the optional printer.
 Totals	Reports menu that includes the following type of test totals: LIFETIME, USER TOTALS, LAST 100 LOG, and TOTALS BY DECISION.
 Version	Lists the software version, version date, and serial number.

Setup Menu

 The Setup Menu lets you customize your analyzer to suit your needs. Before testing, check default values to see what options you may want to change.

Menu Icon	Description
 Clock	Settings to adjust the time.
 Shop	Enables you to add a custom header to printed test results.
 Users	Add, edit, or delete GRX User IDs.
 Display	Settings to adjust the screen contrast and backlight time.
 Coupon	If you've created a coupon in the Edit Coupon utility, use Coupon to turn it on and off.
 Edit Coupon	Enables you to create a coupon at the bottom of printed test results.
 Temp	Allows you to select degrees in C or F for temperature measurements.
 Language	Sets the language of the display and printouts.
 Admin	Offers additional administration options such as showing the User ID and headers for printouts.
 STORE ID#	Allows you to enter your Store Identification information.
 Update	Updates the diagnostic charger's internal software using files on an data card.
 Buzzer	Allows you to turn the buzzer OFF. Default is ON.
 Format	Formats the data card to receive data. Also erases all data on the card.

Chapter 3: Preparing to Charge

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 as needed.
- Corrosion on the battery terminals, 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 the level indicated by the battery manufacturer, and fully charge the battery. Do not overfill.

Connecting the Clamps

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

Connecting to AC Power

Plug the charger into a dedicated, grounded nominal 15-amp or higher AC outlet. Press the power switch to the **ON** position.

Place the battery in the Charging Compartment of the Diagnostic Station and feed the test cables through the back of the cart. Connect the clamps to the battery posts: negative (-) black clamp to the negative (-) post; positive (+) red clamp to the positive (+) post.

If the clamps are not making good contact with the battery posts, the screen displays CHECK CLAMP CONNECTIONS. Make sure that both jaws of each charging clamp come in good contact with the battery posts. If you accidentally reverse the clamp connections, the charger sounds an alarm and display "Charger Clamps Reversed."

Initial Startup

The Battery Diagnostic Station is initially set to require a default USER ID to access the Main Menu. The instructions in this section will help you quickly put your Battery Diagnostic Station to work.

When you first turn on the GRX, it takes approximately eight seconds to boot up while testing the integrity of its software.

Bootup

After the logo appears, the first selection screen to appear enables you to set the language for the display and printed test results.

1. Use the ▲ or ▼, or press the corresponding numerical key to move the dot to the option button of your choice.
 - 1 ENGLISH
 - 2 ESPAÑOL
 - 3 FRANÇAIS
2. Press **NEXT** to continue.

Entering Your Store ID Number and Zip Code

The next screen asks you to enter your store ID number.

1. Insert a character by pressing the alphanumeric key associated with the character as many times as needed.

ENTER STORE ID#

2. Press **NEXT** to continue.
3. Use the alphanumeric keypad to enter your store's zip code.

ENTER ZIP CODE

4. Press **NEXT** to continue.

The next time you log in, you will not be asked for your store ID and zip code. The Battery Diagnostic Station saves stores them in memory until you change them using the STORE ID# option in the Setup Menu. An administrator password is required to access the menu.

Logging in as an Unregistered User

The default setting requires a user name and password to display the Main Menu. You can log in as an unregistered user or you can create a new user ID.

1. To log in as an unregistered user, press **NEXT** to select the highlighted UNREG.

```

0 UNREG
1 ADD USER
    
```

2. The "Hello" screen appears with the total tests performed under the User ID since the total was last reset to zero. Press **NEXT** to navigate to the Main Menu.

```

USER ID      TOTAL
UNREG              0
SINCE : 10/24/2005
    
```

Adding a User

1. Use ▼ to scroll to ADD USER. Press **NEXT** to continue.

```

0 UNREG
1 ADD USER
    
```

2. Use ▲ or ▼ to scroll to the ID placeholder you want to use. Scrolling past the first line displays the previous screen. Scrolling past the fourth line displays the next screen. To display more placeholders, continue scrolling or use ◀ or ▶ to jump up or down through the list five lines at a time. Press **NEXT** to continue.

```

1 USER01
2 USER02
3 USER03
4 USER04
    
```

3. To clear the default characters, press ◀. To add a space, move the cursor forward by pressing ▶.

```

ENTER USER ID
USER01
    
```

4. Insert a character by pressing the alphanumeric key associated with the character as many times as needed. Press **SAVE**.

```

ENTER USER ID
DAN L
    
```

Setting User Preferences

Before starting your test you may want to customize the use of your Battery Diagnostic Station by setting preferences in the Setup Menu and creating a User ID. The menu has settings for the date and time, the contrast, and a utility to customize printouts for the optional printer, among others. The setup utilities are described in Chapter 3 Overview.

Help Menu and Soft Keys

In addition to the **HELP** soft keys, the Battery Diagnostic Station provides a Help Menu. The menu also provides troubleshooting information and phone numbers for Midtronics Customer Service, in case you encounter a problem and/or need technical assistance.

Chapter 4: Diagnostic Charging

Diagnostic Charging Modes



The DIAGNOSTIC charging function uses different modes to determine the State-of-Health of a battery while bringing it to a full State-of-Charge.

- ① **Initial Analysis** The diagnostic station analyzes a battery and renders a decision: REPLACE BATTERY (or REPLACE-BAD CELL) or GOOD BATTERY. A test code only appears for REPLACE decisions.
- ② **Diagnostic Mode** If the diagnostic station determines that a battery needs charging and is safe to charge, it proceeds to Diagnostic mode. During the charging session, the charger updates the remaining charge time. The charger continues to test the battery throughout Diagnostic mode and may determine at some point that the battery needs to be replaced.

Selecting the Charging Parameters

Make sure all vehicle accessory loads are off, the key is not in the ignition, and the doors are closed.



IMPORTANT: When you start a new charge session, the last battery test results in memory will be overwritten..

- 1. In the Main Menu use ▲ or ▼ highlight the DIAGNOSTIC icon and press **SELECT**.
- 2. If available, use the keypad to enter the battery date code printed on the battery label and press **ENTER** to continue.

IF AVAILABLE, ENTER THE BATTERY DATE CODE

MM/YY

- 3. Use ▲ or ▼ or use the keypad to select the POST TYPE and press **NEXT** to continue.
 - 1 TOP POST
 - 2 SIDE POST
- 4. Use ▲ or ▼ or use the keypad to select the battery APPLICATION and press **NEXT** to continue.
 - 1 AUTOMOTIVE
 - 2 MARINE BATTERY
 - 3 MOTORCYCLE
 - 4 LAWN AND GARDEN
 - 5 GROUP 31



NOTE: If MOTORCYCLE is selected, you will be prompted to enter the battery part number printed on the side of the battery.

Scroll to the desired part number by using the arrow keys or use the keypad to enter the part number. When using the keypad, the list of available part numbers will be narrowed as characters are entered. Once you selected the correct number, press **ENTER** to begin the Initial Analysis.

- 5. Use ▲ or ▼ or use the keypad to select the BATTERY TYPE and press **NEXT** to continue.
 - 1 REGULAR/FLOODED
 - 2 AGM
 - 3 AGM SPIRAL
 - 4 GEL
- 6. Use ▲ or ▼ or use the keypad to select the battery's rating units.
 - 1 CCA
 - 2 CA
 - 3 MCA

The rating units and information are printed on the battery label. If the information is unreadable, contact the battery manufacturer. The rating may also be found on the manufacturer's label usually located on the drivers door frame and the vehicle owners manual.

Rating System	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
MCA	Marine Cranking Amps: The amount of current a battery can provide at 32°F (0°C).	100 to 3000

Press **NEXT** to continue.

- 7. Use ▲ or ▼ or use the keypad to select the numerical BATTERY RATING.

500 CCA

Press **ENTER** to begin the diagnostic charge.

Initial Analysis

When you select the last charge parameter the Battery Diagnostic Station begins the initial battery analysis. The progress of the analysis is shown by the left to right movement of a progress bar.



Step 1: The Battery Diagnostic Station applies a 150-amp load and tests the battery's response (approximately 36 seconds)



Step 2: The Battery Diagnostic Station measures the battery's CCA (approximately 8 seconds)



Dynamic Scan Test

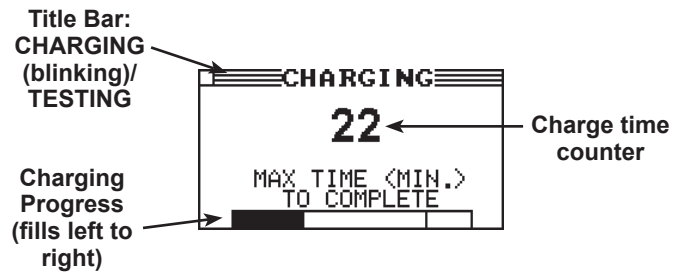
In some cases the Battery Diagnostic Station may need to further analyze a deeply discharged battery to determine whether the battery should be replaced or if it can be recovered. It then conducts a Deep Scan Test of the battery for a few seconds. If any messages appear during the test, refer to Chapter 8: Maintenance / Troubleshooting.



If the battery does not need charging, the Battery Diagnostic Station displays the results and its analysis. For screen illustrations and an explanation of the results, Chapter 8: Maintenance / Troubleshooting.

Diagnostic Charging

If the Diagnostic Station determines that the battery needs charging, it will automatically begin to do so. In this mode the Battery Diagnostic Station controls the charging voltage, current and duration based on its continual analysis of testing and charging data, and the selected battery parameters. The following illustration shows an example of the information displayed during charging.

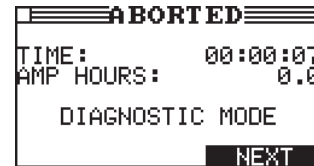


NOTE: The actual time needed to charge the battery may be less than the estimated time depending on the battery's charge acceptance.

When the battery requires testing, the display alternates between the CHARGING and TESTING screens.

Aborting a Charge Session

If you need to abort the charging session, press the **STOP** key. You will not be able to obtain a test code for a possible **REPLACE** decision for an uncompleted charge. After aborting, select **NEXT** to return to the Main Menu.



Completing a Charge Session

The charge session is complete when the proper amount of charge is put back into the battery or the remaining estimated time to charge counts down to near zero.

If the Battery Diagnostic Station finds that the battery is bad before the end of the estimated time to charge, it displays the decision **REPLACE BATTERY** or **REPLACE-BAD CELL** and the results. Both decisions include a test code.

Diagnostic Charge Results

The Battery Diagnostic Station displays one of four battery decisions (**GOOD BATTERY**, **REPLACE BATTERY**, **BAD CELL-REPLACE**, and **OK, REPLACE SOON**) and an analysis, which includes the battery State-of-Health (SOH) for batteries more than 36 months old. Refer to the screen illustrations and the Diagnostic Charge Battery Decision table on page 20.

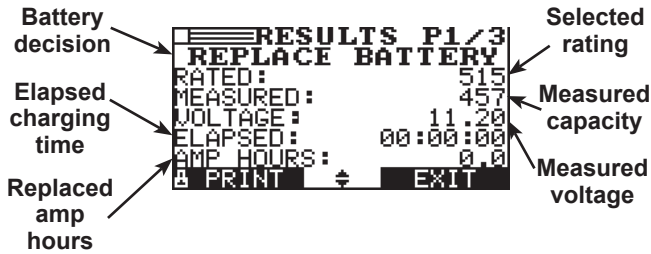
Use **▲** or **▼** to scroll to each screen. To return to the Main Menu, press **EXIT**. To print, press **PRINT**.



IMPORTANT: When you start a new test, the last battery test in memory will be overwritten. Remember to record or print the results if you need to retain them.

REPLACE BATTERY Results: Diagnostic Charge Mode

Screen 1 of 3



Screen 2 of 3



Screen 3 of 3

Displays only if battery is older than 36 months

The area on the left of the dial indicates a **REPLACE** decision. The area on the right indicates a **GOOD** battery.



State-of-Health (SOH)

A factor that affects a battery's ability to crank an engine is its actual condition or State-of-Health (SOH). It is a measure of the battery's condition relative to a fresh battery. Based on cranking rating, open-circuit voltage, conductance (ability to deliver current) and battery temperature, the Battery Diagnostic Station will not only qualify a battery as "good" or "bad" (should be replaced), but can also identify a "marginal" battery.

Although a State-of-Health problem can be the result of defects in construction, it is most often the result of normal wear-out mechanisms, which are dependant on vehicle needs, climate, and operating conditions. This results in irreversible physical and chemical changes until eventually the battery can no longer hold a charge and supply the power necessary to start the car and provide auxiliary power to the electrical system.


As the battery approaches end of life, its deterioration accelerates, until it finally fails to start the vehicle. Before failing, the battery may start the vehicle under normal conditions but may not be able to operate in more extreme conditions. Extreme heat or cold could expose a weak battery and cause it to fail.

Printing Test Results

To print a hard copy of the test results:

1. Press the **PRINT** soft key.
2. Select the language for the printed results. Use ▲ or ▼ or use the keypad to select the language of your choice.
 - 1 ENGLISH
 - 2 ESPAÑOL
 - 3 FRANÇAIS
3. Press **NEXT** to the test results.

Diagnostic Charge Battery Decisions

Battery Decision	Recommended Action
GOOD BATTERY	Return the battery to service.
CHARGE REQUIRED	The battery requires charging before a decision can be made.
REPLACE BATTERY	<p>A REPLACE BATTERY decision indicates that a battery no longer meets BCI specifications for its type and rating. Replacement is recommended.</p> <p> NOTE: A REPLACE BATTERY decision can be the result of entering incorrect ratings, use of incorrect side post adapters/improper connection or corroded battery posts.</p>
BAD CELL-REPLACE	<p>Replace the battery. This decision indicates a bad cell within the battery.</p> <p>DO NOT CHARGE A BATTERY WITH A BAD CELL!</p>
OK, REPLACE SOON	The battery may fail under extreme climate conditions. Consider replacing as a preventative measure.

Chapter 5: Info Menu



The Info Menu has six utilities to help you print and view your test data and track the usage and history of your Battery Diagnostic Station.

View Test



VIEW TEST allows you to view and print the battery results before they are overwritten when you start a new diagnostic charge session. The printed results share the same format as the screen results.

Totals



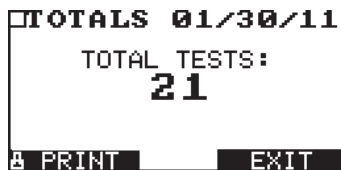
TOTALS counts the number of battery tests in four categories:

- 1 LIFETIME
- 2 USER TOTALS
- 3 LAST 100 LOG
- 4 TOTALS BY DECISION

Select the total you want to see and press the **NEXT** soft key to continue.

Lifetime

The LIFETIME total shows the total number of battery tests completed since the Battery Diagnostic Station was first used. The total cannot be reset to 0.



User Totals

USER TOTALS show the total number of tests completed by User ID (and by UNREG user) since the first time a registered user logged in and the last time the totals were reset to 0 by the Administrator.



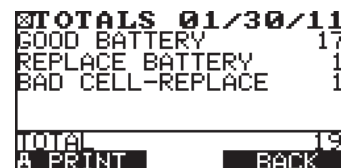
Last 100 Log

The LAST 100 LOG shows the last 100 tests performed by User ID (and by UNREG user); includes the date and the battery decision (GOOD, REPLACE, etc.).



Totals By Decision

The TOTALS BY DECISION shows the total number of completed tests by battery decision since the last time the totals were reset to 0.



Version



The VERSION utility displays the Battery Diagnostic Station's software version, the software release date, and the serial number.

Chapter 6: Setup Menu



The Setup Menu has different utilities that let you customize the user interface. These utilities have default settings that you can change, depending on your requirements.

Setup Default Settings

Setup Function	Default Settings
CLOCK	
MODE	AM/PM
TIME	The current Central Standard Time
DATE	Current
FORMAT	MM/DD/YYYY (month/day/year)
SHOP	Generic header for printouts with 12 lines of text and a maximum of 17 characters per line.
USERS	USER01 through USER48 are placeholder IDs used to create user names.
DISPLAY	
CONTRAST LEVEL	Range: 0 (lightest) to 10 (darkest). The default is set at 9.
COUPON	Disabled (NO COUPON PRINTED)
EDIT COUPON	Eight lines of text with 17 characters per line. Default: USER COUPON LINE 1 through USER COUPON LINE 8
TEMPERATURE	DEGREES F (Fahrenheit)
LANGUAGE	English (French-Canadian and Spanish are available). The language can be selected at startup and changed when ready to print.
SETUP OPTIONS	
1-USER ID	User login screen enabled (ON)
2-UNREG. USER	Unregistered user accessibility enabled (ON)
3-PRINT HEADER	Enables and disables printing the SHOP header on your test results (Default: ON)
BUZZER	ON

Clock



The CLOCK ADJUST utility has four settings. Use ▲ or ▼ to highlight the setting you want to change.

Although the date and time have been set at the factory, you may want to make adjustments based your time zone or Daylight Saving Time.

MODE :	AM/PM
TIME :	9:07 AM
FORMAT :	MM/DD/YYYY
DATE :	11/29/2006

Mode

Use ▲ or ▼ or use the keypad to select the option button of your choice.

- Select the 24-hour or 12-hour (AM/PM) clock.
 - 24 HOUR
 - AM/PM
- If you used the arrow keys, press **SAVE** to save your setting or **BACK** to return to the CLOCK ADJUST screen without saving the changes.

Time

- Use ◀ or ▶ to highlight the hour, minutes, or AM or PM. To rapidly scroll, hold down ▲ or ▼.

9 : 19 PM

- Press **SAVE** to save your setting, or press **BACK** to return to the CLOCK ADJUST screen.

Format

Use ▲ or ▼ or use the keypad to select the option button of your choice.

- Select the format of the date.
 - MM/DD/YYYY (month/day/year)
 - DD/MM/YYYY (day/month/year)
- If you used the arrow keys, press **SAVE** to save your setting or **BACK** to return to the CLOCK ADJUST screen without saving the changes.

Date

1. Use ◀ or ▶ to highlight the month, day, or year. To rapidly scroll, hold down ▲ or ▼.



2. Press **SAVE** to save your setting or **BACK** to return to the CLOCK ADJUST screen without saving the changes.

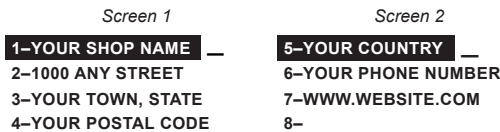
Shop



The SHOP INFO utility allows you to create a header for your printed test results with your business location information when the Admin option 3-PRINT HEADER is selected. Three screens of information contain 12 lines of text with a maximum of 17 characters per line.

To help you edit and center your header, use a pencil to write the information using the template in the Appendix at the back of this manual.

1. Use ▲ or ▼ or use the keypad to select the SHOP icon and press **NEXT**.
2. Press ▲ or ▼ to highlight the line you want to change.



The cursor blinks to the right of the last character in the line. (The cursor is not visible if all character spaces are filled.)

3. To erase a character, press ◀.
4. Insert a character by pressing the alphanumeric key associated with the character as many times as needed. You can center text by inserting blank spaces with ▶. If you pause momentarily, the cursor will automatically move to the right.

IMPORTANT: Be sure to erase any default characters on unused lines by pressing ◀.

5. Press **SAVE** to save your setting or **BACK** to return to the SHOP INFO screen without saving the changes.

Users



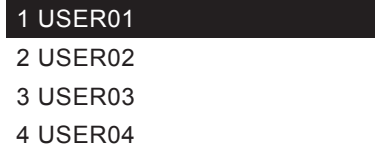
The USERS utility allows you to create and edit a USER ID with 1 to 7 alphanumeric characters and link it to a test counter. It also allows you to delete a USER ID and its associated test total.

Entering a New User ID

1. To create a USER ID, select:
 - 1 ENTER NEW
 - 2 DELETE
 - 3 EDIT

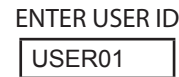
Press **NEXT** to display the list of available IDs.

2. Use ▲ or ▼ to scroll to the ID placeholder you want to use. To display more placeholders, continue scrolling or use ◀ or ▶ to jump up or down through the list five lines at a time.



Press **NEXT** to continue.

3. To clear the default characters, press ◀. To add a space, move the cursor forward by pressing ▶.



4. Insert a character by pressing the alphanumeric key associated with the character as many times as needed.



Press **SAVE**.

Deleting a User ID



NOTE: You cannot delete placeholder USER IDs (i.e., USER03).

1. Use ▲ or ▼ or use the keypad to select the USER ID you want to delete.
 - 1 ENTER NEW
 - 2 DELETE
 - 3 EDIT

Press **NEXT** to display the list of IDs.

2. Use the arrow keys to select a USER ID as described in step 2 in "Entering a New User ID" on the previous page.



Press **DELETE** to continue.

Display



The LCD OPTIONS utility allows you to adjust the contrast of the text on the display.

Contrast Level

The contrast level is 0 (lightest) to 10 (darkest). To change it:

1. Press **ADJUST** to display the option's numerical scroll box.



3. Use **▲** or **▼** or use the keypad to select your preference. To erase a character, press **◀**.
4. Press **SAVE** to save your setting or **BACK** to return to the LCD OPTIONS screen without saving the changes.

Coupon



The COUPON utility allows you to enable and disable the custom coupons or message created in the EDIT COUPON utility. You also have the option of having no coupon print.

1. Use **▲** or **▼** or use the keypad to select the option button of your choice.
 - 1 NO USER COUPON PRINTED
 - 2 USER COUPON
2. If you used the arrow keys, press **SAVE** to save your setting or **BACK** to return to the Setup Menu without saving the changes.

If you use the alphanumeric keypad to enter the number preceding the option button, no additional keypress is needed to save your selection.

Edit Coupon



The EDIT COUPON utility allows you to create and store a promotional coupon or message on the printed test results you give to your customers.

The utility's two information screens contain eight lines of text with a maximum of 17 characters per line. To enable and disable the inclusion of the text on your test results, use the COUPON utility.

To create and edit a coupon, see the procedure under "Shop" in this chapter for using the keypad to enter and backspace over characters.

Temp



The TEMP. UNITS utility allows you to set the units of measurement to either Fahrenheit or Celsius. To set your preference:

1. Use **▲** or **▼** or use the keypad to select the option button of your choice.
 - 1 DEGREES F
 - 2 DEGREES C
2. If you used the arrow keys, press **SAVE** to save your setting or **BACK** to return to the Setup Menu without saving the changes.

If you use the alphanumeric keypad to enter the number preceding the option button, no additional keypress is needed to save your selection.

Language



The LANGUAGE utility allows you to select a language for the display and printouts. You can override the selection when the Battery Diagnostic Station displays the language option after you turn it on or print results.

1. Use **▲** or **▼** or use the keypad to select the option button of your choice.
 - 1 ENGLISH
 - 2 ESPAÑOL
 - 3 FRANÇAIS
2. If you used the arrow keys, press **SAVE** to save your setting or **BACK** to return to the Setup Menu without saving the changes.

If you use the alphanumeric keypad to enter the number preceding the option button, no additional keypress is needed to save your selection.

Admin



Select the ADMIN icon to display a list of administrative functions:

- 1 OPTIONS
- 2 CLEAR TEST TOTALS
- 3 RESET DEFAULTS

Use **▲** or **▼** or use the keypad to select the option button of your choice.

Options

In the OPTIONS section are three functions that allow you to control user access to the Main Menu and Setup Menu. Each option is easily enabled or disabled by turning it ON or OFF. To save your settings after each selection, press **SAVE**. To return to the administrative functions list without saving, press **BACK**.

1 – USER ID

Select this setting to enable (ON) or disable (OFF) the USER ID login screen.

2 – UNREG. USER

Select this setting to enable (ON) or disable (OFF) unregistered login access to the Battery Diagnostic Station.

3 – PRINT HEADER

Select this setting to enables or disable printing of the header you created using the Shop Utility.

Clear Test Totals

This function allows you to clear the test totals by User ID and battery test decision. The Battery Diagnostic Station verifies that you want the counter reset to 0 before it continues.



NOTE: This will not clear the lifetime test total available in the VERSION information screen.

Reset Defaults

This function allows you to reset administrative options to their original settings. It will clear all registered users.

Option	Default Settings
1 – USER ID	ON
2 – UNREG. USER	ON
3 – PRINT HEADER	ON

Store ID#



Allows you to enter your store ID number.

1. Insert a character by pressing the alphanumeric key associated with the character as many times as needed.

ENTER STORE ID#

2. Press **NEXT** to continue.
3. Use the alphanumeric keypad to enter your store's zip code and press **SAVE**.

ENTER ZIP CODE

Buzzer



The BUZZER utility allows you to enable or disable the beep that warns you if the clamps are connected improperly and alerts you to other errors.

1. Use **▲** or **▼** or use the keypad to select the option button of your choice.
 - 1 OFF
 - 2 ON
2. If you used the arrow keys, press **SAVE** to save your setting or **BACK** to return to the Setup Menu without saving the changes.

If you use the alphanumeric keypad to enter the number preceding the option button, no additional keypress is needed to save your selection.

Format Disk



Select this utility to format an SD-type data card to receive data or erase all data on the card. The Battery Diagnostic Station will warn you before formatting the disk and ask if you want to continue.

Update



When software updates become available for the Battery Diagnostic Station, this utility walks you through the quick process of updating the Battery Diagnostic Station software using a data card.

Chapter 7: Maintenance / Troubleshooting

Test Messages

The table below will help you troubleshoot test messages.

Message	Explanation
Battery Too Cold	The GRX may display BATTERY TOO COLD. Warm the battery and retest. Never charge a frozen battery. Gases may form, cracking the case, and leak battery acid. Select EXIT to return to the Main Menu or PRINT to print the screen message.
Unstable Battery Detected	A battery that is weak, or that has just been charged, may retain enough electrical activity to be detected by the GRX and will adversely affect the test results. A fully charged battery should stabilize quickly, after which the GRX will automatically retest. Weak batteries should be charged and retested. If the battery is fully charged, check the clamp connections.

Display Problems

The display does not turn on.

- Make sure the power cord is plugged in and the ON/OFF switch is set to **ON**.

The display is dim:

- The contrast may need to be adjusted in the Setup Menu. Highlight the DISPLAY icon and press **ENTER**. Use ▲ or ▼ to scroll the contrast value to the desired level.

Internal Printer

The internal printer is shipped with a roll of thermal printing paper installed in the paper compartment. The roll size is 2¼ inches wide by 1⁷/₈ inch in diameter. Replacement rolls are available at most office supply stores.

The Battery Diagnostic Station uses only thermal printing paper. Below are four major office supply stores that carry the recommended paper:

Store	Part Number
Office Depot	209-653-271
Office Max	20121146
Quill	856607
Staples	531236

Replacing the Paper Roll:

- Unlock the printer door by lifting up on the release handle.



- Lift the printer door and remove the spent roll.
- Place a new roll of paper in the compartment. The paper feeds from the bottom of the roll.
- Pull the paper forward so that it extends past the serrated edge of the paper slot.
- 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.**

Removing the Printer

If the internal printer needs service, contact Midtronics Customer Service for a shipping instructions and a return authorization number.

To remove the printer:

- Use a Phillips screwdriver to remove the two (2) screws securing the printer to the GRX housing.



Store the screws in a safe place.

2. Pull the printer straight up and out of the GRX.



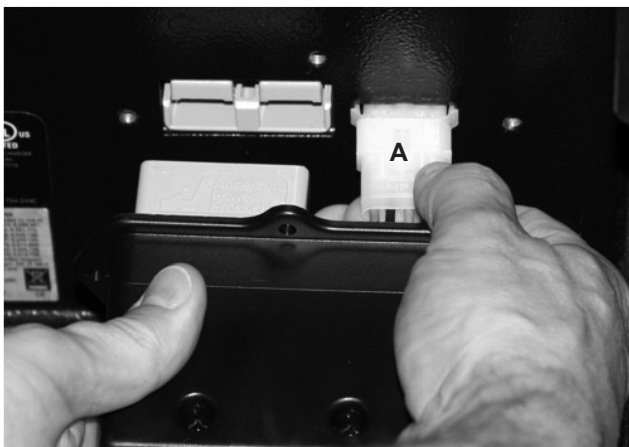
Reinstalling the Printer

1. Insert the printer into its compartment in the housing.
2. Gently guide—**do not force**—the printer into the housing until the printer is seated properly.
3. Insert and tighten the screws.

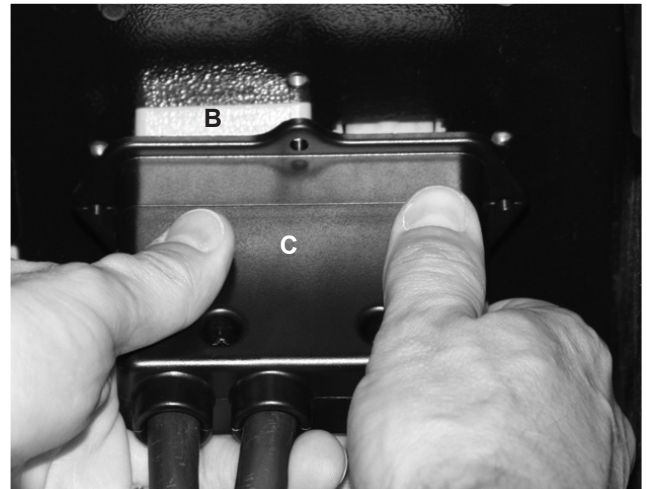
Connecting the Charger Cables

The connector for the charger cables is located on the back of the GRX. Three screws are included to secure the cables. To attach the cables:

1. Plug the small connector into the small socket (A) on the back of the Battery Diagnostic Station.



2. Plug the large connector (B) into the large socket while placing the protective cover (C) against the back of the Diagnostic Station.



3. Insert the screws through the holes in the cover (circled) and securely tighten the screws with a #2 Phillips head screwdriver.



The installation is now complete.

In addition to the troubleshooting suggestions in this chapter, the Help Menu provides tips on troubleshooting problems with the printer, the cables, and loss of power. It also includes Midtronics Customer Service phone numbers.