



GR8 1100
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.**

WARNING

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.

WARNING

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.

WARNING

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.

⚠ WARNING
Non-rechargeable batteries may burst when charging causing personal injury and damage.
Only charge rechargeable lead-acid maintenance-free, low-maintenance or deep-cycle batteries.

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 make sure that the output voltage selector switch is set at the correct voltage. If the charger has an adjustable charge rate, charge the battery initially at lowest rate. If the charger has only one voltage, verify that the battery voltage matches the voltage of charger.

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

4. Grounding And AC Power Cord Connection Instructions

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.

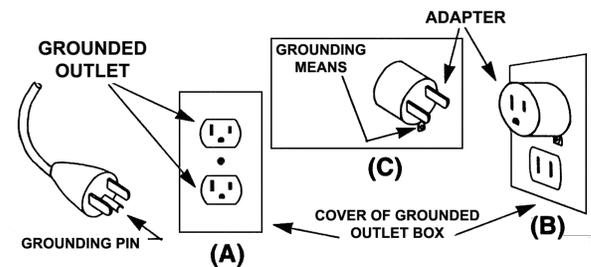
⚠ DANGER	
	Hazardous voltage. An improper connection can result in electric shock
	To avoid electrical shock or burn, never alter the charger's original AC cord and plug. Disconnect plug from outlet when charger is idle.

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; 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.

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. Installing The Battery

WARNING

Risk of explosive gases

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

- 7.1 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.

- 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 Attach at least a 60 cm (24-inch), 6-gauge insulated battery cable to the negative (-) battery terminal.
- 8.3 Connect the **POSITIVE (RED)** charger clamp to the **POSITIVE (POS., P, +)** post of battery.
- 8.4 Position yourself and the free end of cable as far away from the battery as possible—do not face the battery when making the final connection—then connect the **NEGATIVE (BLACK)** charger clamp to the free end of the cable.
- 8.5 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.
- 8.6 **MARINE “BOAT” BATTERIES MUST BE REMOVED AND CHARGED ON SHORE. TO SAFELY CHARGE THEM ON BOARD REQUIRES EQUIPMENT ESPECIALLY DESIGNED FOR MARINE USE.**

⚠ WARNING**Risk of explosive gases**

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

WARNING: 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 analyzer. In addition, follow all manufacturers' instructions and BCI (Battery Council International) safety recommendations.

We also recommend that you register the GR8 to activate your warranty. See "Registering Your GR8" on the next page.



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:** 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. Never smoke or allow a spark or flame in the vicinity of a battery.
- WARNING—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. Wash hands after handling.
- Battery acid is highly corrosive. If acid enters your eyes, immediately flush them thoroughly with cold running water for at least 15 minutes and seek medical attention. If battery acid gets on your skin or clothing, wash immediately with a mixture of water and baking soda.
- Always wear proper safety glasses or face shield when working with or around batteries.
- Keep hair, hands, and clothing as well as the analyzer cords and cables away from moving engine parts.
- Remove any jewelry or watches before you start servicing the battery.
- Use caution when working with metallic tools to prevent sparks or short circuits.
- Never lean over a battery when testing, charging, or jump starting.
- Never charge a frozen battery. Gases may form, cracking the case, and spray out battery acid.

Conventions Used in This Manual

To help you learn how to use your GR8, the manual uses these symbols and typographical conventions:

Convention	Description
	The safety symbol 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	The text for soft keys are in Arial Black capital letters.

Registering Your GR8

Before using the GR8, we recommend that you register it online to activate your warranty. Registration will also make it faster and easier for you to obtain technical support and service. The GR8 has two serial numbers: one for the control module and another for the charger engine. For their locations, see the illustration on page 14.

To register, log on at www.midtronics.com/warranty.html and have your serial numbers ready. If your charger needs repair, call Midtronics Customer Service 1.800.776.1995. Servicing the charger yourself may void your warranty. Refer to the appendix on what is covered by the warranty.

Assembling the GR8

The GR8 is shipped with the control module, mounting bracket, and charger cables packed separately. For easy assembly, follow these steps:

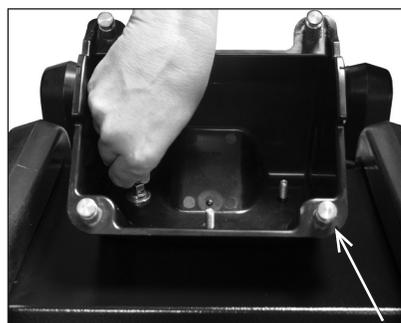
- Center the three holes in mounting bracket over the bolts, and lower the bracket onto the charger. Reinstall the hardware in this order: the flat washer first, the lock washer next, and the hex nut last. Tighten the nuts securely.

Attaching the Control Module

- The hardware to attach the control module's mounting bracket to the GR8 is installed on the top of the charger. There are three bolts with one flat washer, one lock washer, and one hex nut per bolt. Remove the washers and hex nuts, and set them aside.



One of three preinstalled bolts for the control module mounting bracket.

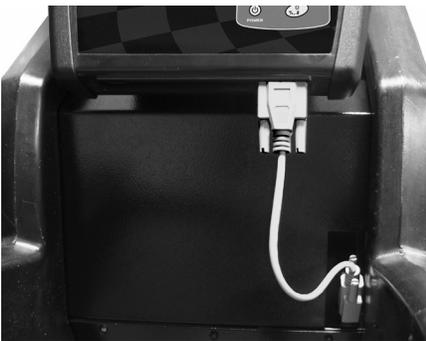


One of four preinstalled bolts on the bracket for mounting the control module.

- Center the holes on the bottom of the control module with the bolts, and lower the module onto the top of the barcket. Firmly pull the module down at an angle until the bolts are inserted securely into the slots extending from the module's holes.



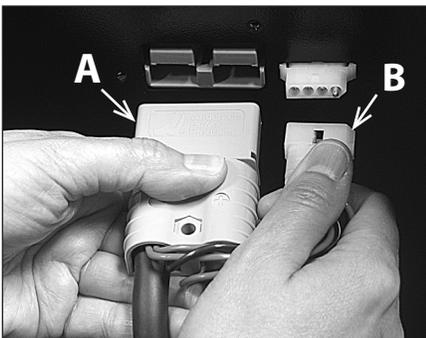
- Connect the serial cable between the charger and tighten the screws on each connector.



Attaching the Charger Cables

The two connectors for the charger cables are located on the back of the GR8. Three screws are included to secure the cables. To attach the cables:

- Plug in the large connector (A), then plug in the small connector (B).



- Slide the cover (C) down the cables until it seats against the sheetmetal.



- Insert the screws through the holes in the cover and sheetmetal. Tighten the screws securely with a small screwdriver. (To remove the cables, use the attachment instructions in reverse.)



Chapter 2: Overview

Front of GR8

The controls to the GR8 are accessible on the front of the charger: the control module (user interface) and the ON/OFF switch.



1 Control module

Backlit graphical display and keypad for data entry.

2 ON/OFF switch

Turns power on and off to the GR8.

3 SD card slot

For future upgrades via an SD card. The slot contains a plastic filler card for protection.

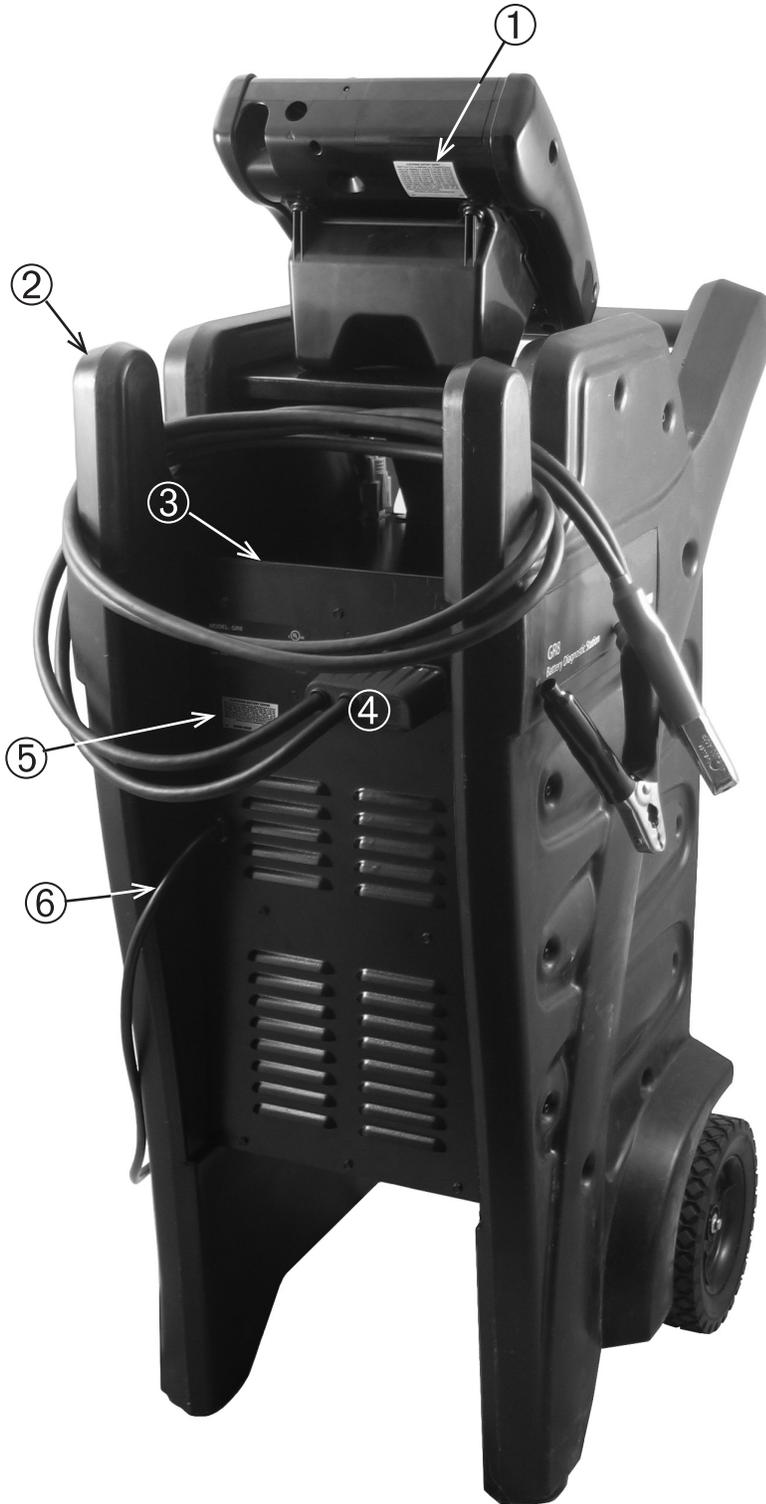
4 STATUS light

Lights in conjunction with beeping alarm to indicate transitions and warnings.



Back of GR8

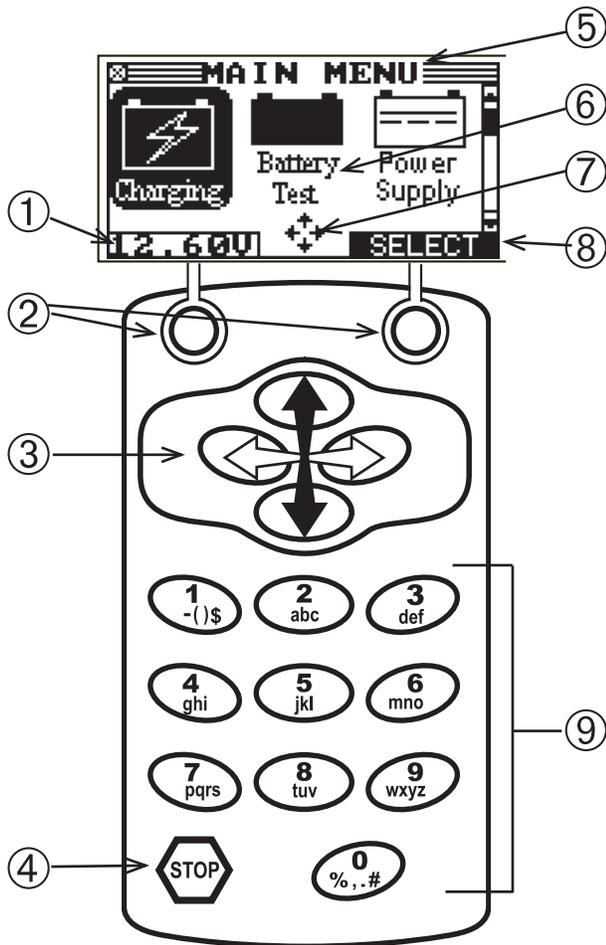
In addition to containing the outlets for the charger cables and power cord, the back of the GR8 is the location for the serial numbers for the charger engine and the control module. Both numbers are necessary for warranty registration.



- 1 Serial number label**
(for control module)
- 2 Cable wrap**
For storing cables when not in use.
- 3 Storage shelf**
- 4 Charger cable connectors**
- 5 Serial number label**
(for charger engine)
- 6 AC power cord**
Connection to grounded nominal 120 V outlet.

Display and Keypad

The GR8 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 GR8 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

Press the **STOP** to stop (abort) a charging session.

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 **UP** (▲) and **DOWN** (▼) **ARROW** keys to display the screens above and below the current screen.

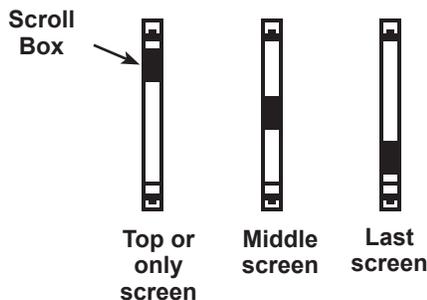
The Left and Right Menu Screen Arrows tell you when to use the **LEFT** (◀) or **RIGHT** (▶) **ARROW** keys to select an icon.

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 **RIGHT ARROW** key. To erase a space and insert a character, press the **LEFT ARROW** key.

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

Alphanumeric Keys and Associated Characters

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
0	% , . # 0

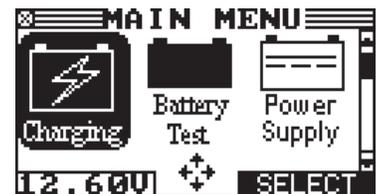
Data Entry Methods

To perform a particular test or function, the GR8 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 Diode Icon in the DMM Menu. To select an icon, use the **LEFT** or **RIGHT ARROW** 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 **UP** (▲) or **DOWN** (▼) **ARROW** 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 **UP** (▲) or **DOWN** (▼) **ARROW** key to highlight the item, and press the appropriate soft key.

To move the highlight bar up five lines at a time, press the **LEFT** (◀) **ARROW**. To move the highlight bar down five lines at a time, press the **RIGHT** (▶) **ARROW** 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 the **UP (▲)** or **DOWN (▼) ARROW** keys 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 the **LEFT (◀) ARROW** key. Use the **RIGHT ARROW** key to add a space. Use the **UP/DOWN ARROW** keys to highlight a line for editing. When finished, press the appropriate soft key to save your settings.

Value Boxes

Value boxes contain items that extend above and below the selection box that contain them. To indicate that there are more values, the symbols ▲▼ appear to the right of the box.



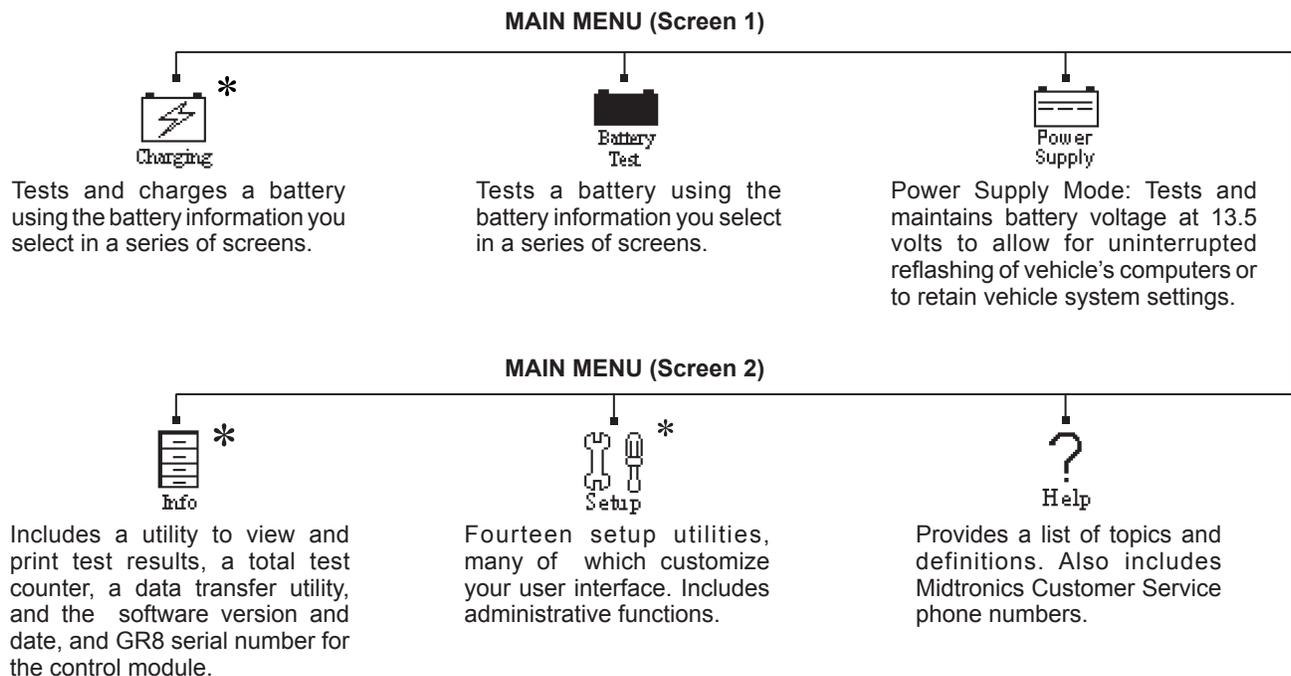
To select, use the **UP (▲)** or **DOWN (▼) ARROW** key to scroll to the value, or use the keypad to enter the value directly, and press the appropriate soft key. In the illustration the left directional arrow indicates that you can press the **LEFT (◀) ARROW** key to clear all or part of the entry.

Menu Structure

This section contains a graphical representation of the menu structure with brief descriptions of the utilities in each menu.

Main Menu

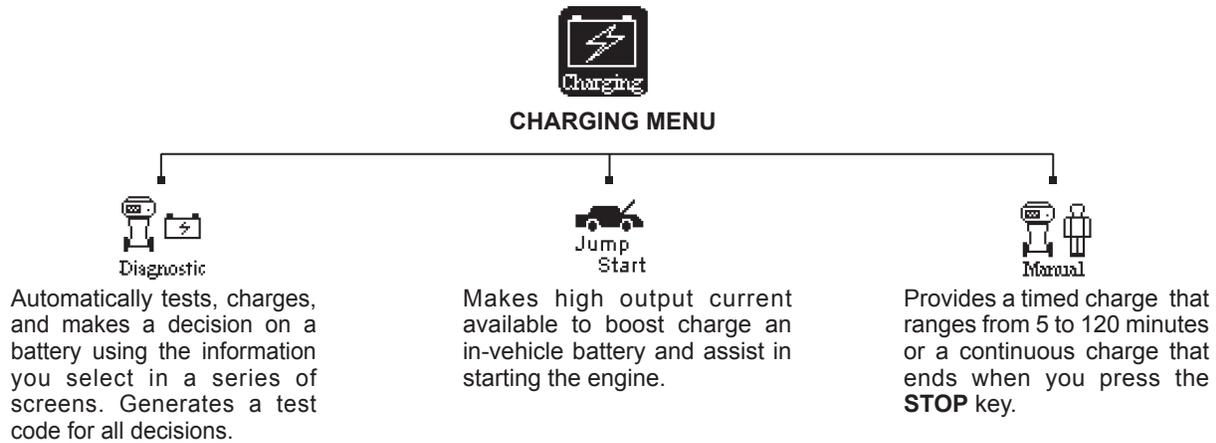
The Main Menu is the starting point for all tools and utilities, which are depicted as icons. Some icons lead directly to the function they represent, while others are menu icons that lead to two or more options. Menu icons marked with an asterisk (*) are mapped on the following pages.



Charging Menu



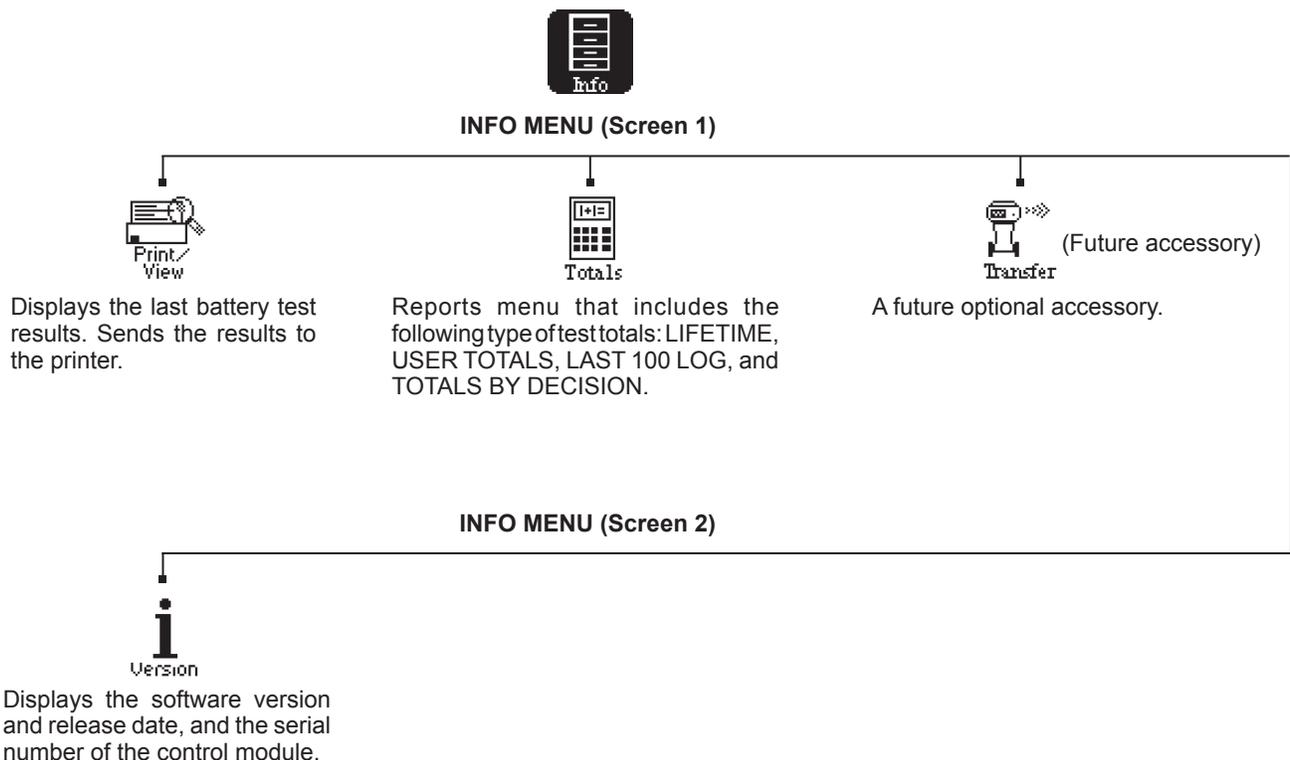
The Charging Menu provides three charging options: Diagnostic Charging, Jump Start, and Manual Charging..



Info Menu



The Info Menu has utilities to help you manage your test data, view and print test results, track the usage and history of your GR8.



Setup Menu

(Admin PIN required to access the Setup Menu)



The Setup Menu lets you customize options in the GR8 to suit your needs. Before using the GR8 for the first time, check the default values to see what options you may want to change, add, or delete.



SETUP (Screen 1)



Clock
Settings to adjust date and time.



Users
Add, edit, or delete User IDs.



Shop
Allows you to add a custom header to printed test results.

SETUP (Screen 2)



Display
Settings to adjust the screen contrast and backlight time.



Coupon
If you created a coupon in the EDIT COUPON utility, use COUPON to enable or disable.



Edit Coupon
Allows you to create and store up to three separate coupons to be printed on test results.

SETUP (Screen 3)



Temp
Allows you to select degrees in C or F for temperature measurements.



Language
Sets the language of the display and printouts.



Format
Formats the SD card to receive data. Also erases all data on the card.

SETUP (Screen 4)



Update
Updates the GR8 software via files on an SD card.



Admin
Allows you to enable or disable PIN settings and User IDs, clear test totals, and restore defaults.



Buzzer
Turns buzzers alert on or off.

Chapter 3: Getting Started

The GR8 is initially set to require a default USER ID and PIN to access the Main Menu. In addition, it requires a default ADMIN PIN to access the Setup Menu. The instructions in this section will help you quickly put your GR8 to work.

Logging In for the First Time

Bootup

When you turn on the GR8, it takes approximately eight seconds to boot up while testing the integrity of its software.



The first selection screen to appear enables you to set the language for the display and printed test results.

1. Use the UP or DOWN ARROW key to move the dot to the option button of your choice(1, 2, or 3).
 - 1 ENGLISH
 - 2 ESPAÑOL
 - 3 FRANÇAIS

Press the NEXT soft key to continue.

Initial User Login

1. USER ID: The default User ID **0 UNREG** appears. Press the **NEXT** soft key to select it.

0 UNREG

3. HELLO: The "Hello" screen appears. Press the **NEXT** soft key to navigate to the Main Menu.

<u>USER ID</u>	<u>TOTAL</u>
UNREG	0
SINCE : 10/24/2005	

Chapter 4: Setup Menu



The Setup Menu has several functions to customize the use of your GR8—from the language of the user interface to the contrast of the display. The most important, however, is the ADMIN (administrative) function which controls user access. Access to the Setup Menu initially requires an ADMIN PIN (default: 12345).

Any factory of the default settings in the table below can be customized to your specific shop.

Setup Function	Default Settings
CLOCK TIME MODE DATE FORMAT	Current Central Standard Time AM Current DD/MM/YYYY (day/month/year)
USERS	USER01 through USER99 are placeholder IDs used to create user names and PINs.
SHOP	Generic header for printouts with 12 lines of text and a maximum of 17 characters per line
DISPLAY LCD CONTRAST	Range: 0 (lightest) to 10 (darkest). The default is set at 9.
COUPON	Coupon printing disabled. Storage for three coupons; COUPON 1 is the default.
EDIT COUPON	COUPON (number) LINE 1 through COUPON (number) LINE 2 with a maximum of 17 characters per line.
TEMPERATURE	DEGREES F (Fahrenheit)
LANGUAGE	English (French and Spanish available)
ADMIN OPTIONS 1-USER ID 2-PIN 3-UNREG. USER 4-ADMIN 5-PRINT HEADER	User login screen enabled (ON) User PIN screen disabled (OFF) Unregistered user accessibility enabled (ON) Administrative PIN disabled (ADMIN RIGHTS: OFF) Print Header enabled (ON)
BUZZER	Enable/disable audible buzzer tone and LED on control module (ON)

Clock



The CLOCK ADJUST utility has four settings. Use the **UP (▲)** or **DOWN (▼) ARROW** key 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 Day-light Saving Time.

TIME :	9:07 AM
MODE :	AM/PM
DATE :	9/07/2005
FORMAT :	MM/DD/YYYY

Time

- Use the **LEFT (◀)** or **RIGHT (▶) ARROW** keys to highlight the hour, minutes, or AM or PM. To rapidly scroll, hold down an **UP (▲)** or **DOWN (▼) ARROW** key.

9 : 19 PM

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

Mode

Use the **UP (▲)** or **DOWN (▼) ARROW** key, or press the corresponding numerical key (1 or 2) to move the dot to the option button of your choice.

- Select the AM/PM or 24-hour mode
 - AM/PM
 - 24 HOUR
- If you used the **ARROW** keys, press the **SAVE** soft key to save your setting or the **BACK** soft key to return to the CLOCK ADJUST screen 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.

Date

- Use the **LEFT (◀)** or **RIGHT (▶) ARROW** key to highlight the month, day, or year. To rapidly scroll, hold down an **UP (▲)** or **DOWN (▼) ARROW** key.

6 / 17 / 2005

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

Format

Use the **UP (▲)** or **DOWN (▼) ARROW** or press the corresponding numerical key (1 or 2) to move the dot to 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 the **SAVE** soft key to save your setting or the **BACK** soft key to return to the CLOCK ADJUST screen 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.

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

- To create a USER ID, select:
 - ENTER NEW
 - DELETE
 - EDIT

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

- Use the **UP (▲)** or **DOWN (▼) ARROW** keys to scroll to the ID placeholder you want to use. Scrolling past the first line displays the previous page. Scrolling past the fourth line displays the next page. To display more placeholders, continue scrolling or use the **LEFT (◀)** or **RIGHT (▶) ARROW** key to jump up or down through the list five lines at a time.

1 USER01

2 USER02

3 USER03

4 USER04

Press the **NEXT** soft key to continue.

- To clear the default characters, press the **LEFT** (◀) **ARROW** key. To add a space, move the cursor forward by pressing the **RIGHT** (▶) **ARROW** key.

ENTER USER ID

USER01

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

ENTER USER ID

RYAN B

- Enter a four-digit PIN and press **NEXT**.

ENTER PIN

- The GR8 asks you to re-enter the PIN correctly before it can be saved. Re-enter your PIN and press the **SAVE** soft key.

RE-ENTER PIN

Deleting a User ID

- To delete a USER ID, select:

- ENTER NEW
- DELETE
- EDIT

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

- Use the **ARROW** keys to select a USER ID as described in step 2 in *Entering a New User ID*.

1 RYAN B

2 JIM F

3 USER03

4 USER04

Press the **DELETE** soft key to continue.



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

- The GR8 displays:

USER ID, PIN AND
USER TEST TOTAL WILL
BE DELETED.
DO YOU WANT
TO CONTINUE?

Press the **YES** soft key to delete the USER ID, or press the **NO** soft key to return to the ID list.

Edit (Editing a User ID)

This function can also be used to change a USER PIN.

- To edit a USER ID, select:

- ENTER NEW
- DELETE
- EDIT

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

- Use the **ARROW** keys to select a USER ID as described in step 2 in "Entering a New User ID" on page 24.

1 RYAN B

2 JIM F

3 USER03

4 USER04

Press the **NEXT** soft key to continue.

- To clear the characters, press the **LEFT** (◀) **ARROW** key. To add a space, move the cursor forward by pressing the **RIGHT** (▶) **ARROW** key. To change the PIN it is not necessary to edit the USER ID.

ENTER USER ID

RYAN G

Press the **SAVE** soft key.

- Enter the current or a new four-digit PIN and press **NEXT**.

ENTER PIN

- The GR8 asks you to re-enter the PIN correctly before it can be saved. Re-enter your PIN and press the **SAVE** soft key.

RE-ENTER PIN

Shop



The SHOP INFO utility allows you to create a header for your printed test results showing your business location information. Its three information screens contain 8 lines of text with a maximum of 17 characters per line.

Screen 1
1-YOUR SHOP NAME —
2-1000 ANY STREET
3-YOUR TOWN, STATE
4-YOUR POSTAL CODE

Screen 2
5-YOUR COUNTRY —
6-YOUR PHONE NUMBER
7-WWW.WEBSITE.COM
8-

To help you edit and center your header, use a pencil to write the information in the template below before entering it into the GR8.

Header Template

Line 1																	
Line 2																	
Line 3																	
Line 4																	
Line 5																	
Line 6																	
Line 7																	
Line 8																	

To create or overwrite a header:

1. Press the **UP (▲)** or **DOWN (▼) ARROW** to highlight the line you want to change. The cursor will be blinking to the right of the last character in the line. (The cursor won't be visible if all character spaces are filled.)
2. To erase a character, press the **LEFT (◀) ARROW** key.
3. 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 the **RIGHT**

(▶) ARROW key. If you pause momentarily, the cursor will automatically move to the right.



NOTE: Be sure to erase any default characters on unused lines by pressing the **LEFT (◀) ARROW** key.

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

Display



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

Contrast Level

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

1. Press the **EDIT** soft key to display the option's numerical scroll box.



2. Press the **UP (▲)** or **DOWN (▼) ARROW** key or the corresponding numerical keys to select your preference. To erase a character, press the **LEFT (◀) ARROW** key.
3. Press the **SAVE** soft key to save your setting or the **BACK** soft key to return to the CONTRAST LEVEL screen without saving the changes.

Coupon



The COUPON SELECT utility allows you to print one of the three custom coupons or messages created in the EDIT COUPON utility. You also have the option of having no coupon print.

1. Use the **UP** (▲) or **DOWN** (▼) **ARROW** key, or press the corresponding numerical key (1, 2, 3, or 4) to move the dot to the option button of your choice.
 - 1 COUPON 1
 - 2 COUPON 2
 - 3 COUPON 3
 - 4 NO USER COUPON PRINTED
2. If you used the **ARROW** keys, press the **SAVE** soft key to save your setting or the **BACK** soft key to return to the COUPON SELECT screen 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



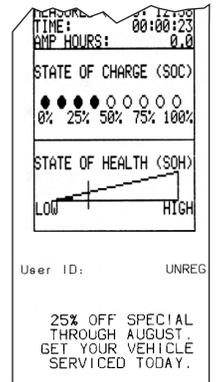
The EDIT COUPON utility allows you to create and store up to three promotional coupons or messages for your customers.

Its two information screens contain eight lines of text with a maximum of 17 characters per line. (The COUPON utility allows you to select which coupon to print at the bottom of your test results.)

1. Use the **UP** (▲) or **DOWN** (▼) **ARROW** key, or press the corresponding numerical key (1, 2, 3, or 4) to move the dot to the option button of your choice.
 - 1 COUPON 1
 - 2 COUPON 2
 - 3 COUPON 3
2. If you used the **ARROW** keys, press the **SAVE** soft key to save your setting or the **BACK** soft key to return to the COUPON SELECT screen 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.

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



To help you edit and center your coupon, use a pencil to write the information in the template below before entering it into the GR8.

Coupon Template

Line 1																			
Line 2																			
Line 3																			
Line 4																			
Line 5																			
Line 6																			
Line 7																			
Line 8																			

Temp



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

To set your preference:

1. Use the **UP** (▲) or **DOWN** (▼) **ARROW** key, or press the corresponding numerical key (1 or 2) to move the dot to the option button of your choice.

- 1 DEGREES F
- 2 DEGREES C

2. If you used the **ARROW** (▲▼) keys, press the **SAVE** soft key to save your setting or the **BACK** soft key 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



Language

The LANGUAGE utility allows you to select a language for the display and printouts. To set your preference:

- Use the **UP (▲)** or **DOWN (▼) ARROW** key or press the corresponding numerical key (1, 2, or 3) to move the dot to the option button of your choice.
 - ENGLISH
 - ESPAÑOL
 - FRANÇAIS
- If you used the **ARROW** keys, press the **SAVE** soft key to save your setting or the **BACK** soft key 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



Format

Select this utility to format an SD card to receive data or erase all data on the card. The GR8 will warn you before formatting the disk and ask if you want to continue.

Update



Update

This utility allows you to update the GR8 software using an SD card.

Admin



Admin

This section explains how to administer password access to the GR8. It also describes functions that clear test totals and restore settings to factory defaults.

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

- OPTIONS
- CHANGE ADMIN PIN
- CLEAR TEST TOTALS
- RESET DEFAULTS

Options

In the OPTIONS section there are four 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 the **SAVE** soft key. To return to the administrative functions list without saving, press the **BACK** soft key.

1 USER ID

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



NOTE: When you turn off the USER ID, the USER PIN option is automatically turned off.

2 PIN

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

3 UNREG. USER

Select this setting to enable (ON) or disable (OFF) unregistered login access to the GR8 when option **1 – USER ID** is ON. When the option **2 – PIN** is ON, the PIN for USER ID **UNREG** is **0000** (4 zeros).

4 ADMIN

Select this setting to enable (ON) or disable (OFF) the ADMIN PIN login screen that allows access to the Setup Menu.

5 PRINT HEADER

Select this setting to enable (ON) or disable (OFF) printing your shop information on the printout.

Change Admin PIN

This function allows you to change your five-digit Administrator PIN. The GR8 will ask you to re-enter it correctly before it will save. The default PIN is **12345**. If you forgot your Administrator PIN, call Midtronics at 1.800.776.1995 for assistance.

Clear Test Totals

This function allows you to clear the test totals by User ID and battery test decision. The GR8 will verify that you want the counter reset to 0 before it continues.



NOTE: This will not clear the LIFETIME total and the LAST 100 LOG.

Reset Defaults

This function allows you to reset Administrative options to their original settings. It will clear all registered users and restrict access to the GR8.

Option	Default Settings
1 – USER ID	ON
2 – PIN	OFF
3 – UNREG. USER	ON
4 – ADMIN	OFF
5 – PRINT HEADER	ON

Buzzer



The BUZZER utility allows you to enable or disable the beep that alerts you that your attention is needed, i.e., end of charge session.

- Use the **UP** or **DOWN ARROW** key or press the corresponding numerical key (1 or 2) to move the dot to the option button of your choice.
 - 1 OFF
 - 2 ON
- If you used the **ARROW** keys, press the **SAVE** soft key to save your setting or the **BACK** soft key to return to the Admin/Utility 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.

Chapter 5: 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.
- Corroded or loose battery terminals, tray and hold-down fixture. Tighten or replace as needed.

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.

If the clamps are not making good contact with the battery posts, the GR8 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 will sound an alarm and display "Charger Clamps Reversed."

Setting User Preferences

Before starting your test you may want to customize the use of your GR8 by setting preferences in the Setup Menu and creating a User ID. The menu has settings for the date and time, the contrast and backlight time, a utility to customize printouts for the optional IR printer, among others. The setup utilities are described in Chapter 4 on page 23.

Help Menu and Soft Keys

In addition to the **HELP** soft keys, the GR8 provides a Help Menu with a glossary of test-related definitions that you may want to review prior to testing. 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 6: Charging Menu

Diagnostic Charging Modes



Charging

Diagnostic Charging has four modes that the GR8 may use to determine the State-of-Health of the battery while bringing it to a full State-of-Charge.

- ① **Initial Analysis:** The GR8 first analyzes the battery and makes a decision: REPLACE BATTERY (or REPLACE-BAD CELL) or GOOD BATTERY. A test code appears for all decisions.
- ② **Diagnostic Mode:** Once the GR8 determines that the battery is good, needs charging, and is safe to charge, it proceeds to Diagnostic Charge Mode. During the charging session, the GR8 provides updates of the charging voltage, charging current, remaining time to charge, charging mode, and the amount of charge replenished into the battery in amp-hours. The GR8 continues to test the battery throughout Diagnostic Mode and may determine at some point that the battery needs to be replaced.
- ③ **Top-Off Mode:** This mode occurs automatically at the end of the charge cycle to allow the charger to fill a good battery to capacity. Top-Off Mode ends when the battery's acceptance of the charge current goes below 2 amps, or when you press the **STOP** button.
- ④ **Recovery Mode:** In some cases, the GR8 automatically switches to Recovery Mode in an attempt to recover a hard-to-charge battery.

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. Remember to record or print the results if you need to retain them.

1. In the Main Menu the CHARGING icon is highlighted. Press the **SELECT** key.



2. In the Charging Menu use the **LEFT (◀)** or **RIGHT (▶) ARROW** key to highlight the DIAGNOSTIC icon. Press the **SELECT** soft key.



3. Use the **UP (▲)** or **DOWN (▼) ARROW** key to select the battery LOCATION, or press the corresponding numerical key (1 or 2) to move the dot to the option button of your choice.
 - 1 OUT OF VEHICLE
 - 2 IN VEHICLE

The **BACK** soft key returns you to the Main Menu at the start of the test and to the previous screen as you progress.



NOTE: If you use the **ARROW** keys to select option buttons, press the **NEXT** soft key to continue to the next step. If you use the alpha-numeric keypad to enter the number preceding the option button, no additional keypress is needed.

4. Use the **UP (▲)** or **DOWN (▼) ARROW** key to select whether the vehicle odometer reading is above or below 250 miles.
 - 1 BELOW 250 MILES
 - 2 ABOVE 250 MILES

5. Use the **UP (▲)** or **DOWN (▼) ARROW** key to select the battery type.
 - 1 REGULAR FLOODED
 - 2 AGM
 - 3 AGM SPIRAL
6. Use the **UP (▲)** or **DOWN (▼) ARROW** key to select a testing/charging option, or press the corresponding numerical key to move the dot to the option button of your choice.

TEST USING:

- | | |
|--|-----------------------------|
| 1 <input checked="" type="radio"/> CCA | 4 <input type="radio"/> SAE |
| 2 <input type="radio"/> JIS | 5 <input type="radio"/> IEC |
| 3 <input type="radio"/> DIN | 6 <input type="radio"/> EN |



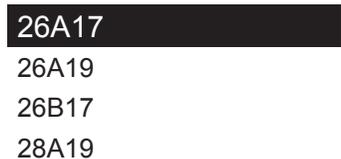
IMPORTANT: It is important to input the correct charge parameters. If you use the wrong parameters, an inaccurate result will occur.

7. If CCA, use the keypad to enter the value, or scroll to the value with the **UP/DOWN ARROW** keys. Press **SELECT**.



OR

If JIS, select the JIS number.



Initial Analysis

When you select the last charge parameter the GR8 begins the initial battery analysis. The progress of the analysis is shown by the left to right movement of a progress bar.



If additional testing is required, progress is shown by the clockwise fill of a pie chart.



Deep Scan Test

In some cases the GR8 may need to further analyze a deeply discharged battery to determine whether the battery should be replaced, or if it can possibly be recovered. It will then conduct a Deep Scan Test of the battery for a few seconds while displaying a battery undergoing a scan. If any messages appear during the test, refer to Chapter 10: Test Messages on page 45.



If the battery does not need charging, the GR8 displays the results and its analysis, which includes the State-of-Health (SOH). For screen illustrations and an explanation of the results, see the next section.

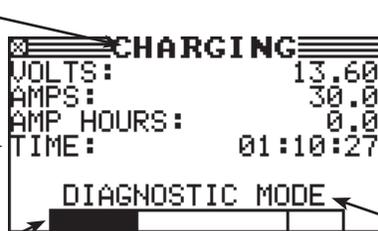
Diagnostic Charging

If the GR8 determines that the battery has an insufficient State-of-Charge, it automatically begins Diagnostic Charge Mode. During the charge session the GR8 controls the charging voltage, current and duration based on its continual analysis of testing and charging data, and the selected battery parameters. The illustration shows an example of the information displayed during charging.

Activity in title bar: CHARGING (blinking) or TESTING

Countdown of the estimated time needed to charge the battery in hours, minutes, and seconds**

Fills left to right as charging progresses



Charging voltage

Charging current

Amount of charge replaced in amp hours

Charging mode



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. The TESTING screens represent a two-step process:

Step 1: The GR8 applies an electrical load and tests the battery's response.

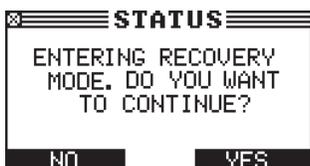


Step 2: The GR8 measures the battery's CCA.



Recovery Mode

In some cases the GR8 may give you the option of selecting Recovery Mode before displaying the final results. Recovery Mode optimizes the charge for a hard-to-charge battery. To continue the charge session, press the **YES** soft key in response to:



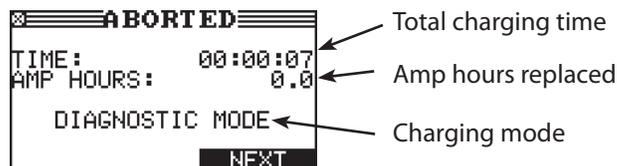
The maximum charge time in Recovery Mode is three hours, although most batteries will finish charging sooner. During Recovery Mode the charger continuously analyzes the battery to make a decision as quickly as possible.

If you select **NO**, the charge session aborts (stops) and you will not be able to obtain a test code.

If you make no selection within two minutes, the GR8 automatically proceeds to Recovery Mode.

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 an uncompleted charge. After aborting, select **NEXT** to return to the Main Menu.



Completing a Charge Session

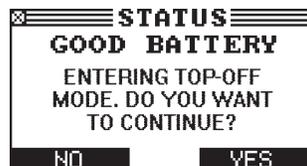
The charge session is complete when the proper amount of charge is put back into the battery or the remaining estimated time to charge counts down to zero.

If the GR8 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.

When the decision is **GOOD BATTERY**, the GR8 gives you the option of topping off the battery's charge level before it displays the results.

Top-Off Mode

Top-off charging fills a good battery to capacity after a completed charge session. The GR8 gives you the option of selecting **YES** to proceed to Top-Off at any time or **NO** to display the results.



If you make no selection within two minutes, the charger automatically begins Top-Off Mode.

You have the option of stopping Top-Off Mode at any time by pressing the **STOP** key or allowing the GR8 to complete the charging. When Top-Off Mode is complete, the alarm sounds every 30 seconds until you press **STOP**.



Press the **NEXT** soft key to display the final results.

Diagnostic Charge Results

The GR8 displays one of three battery decisions (GOOD BATTERY, REPLACE BATTERY, REPLACE-BAD CELL) and an analysis, which includes the battery State-of-Health (SOH). Refer to the screen illustrations on this page.

Use the **UP (▲)** or **DOWN (▼) ARROW** keys to scroll to each screen. To return to the Main Menu, press the **EXIT** soft key. To print, press the **PRINT** soft key.



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.

State-of-Health (SOH)

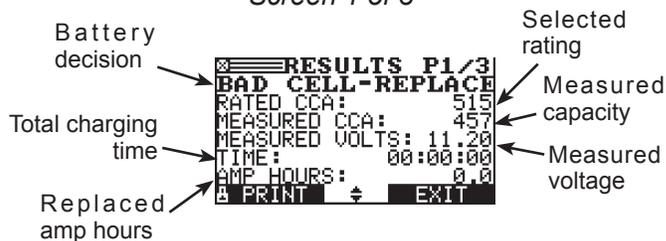
Another factor affecting a battery’s ability to crank an engine is its actual condition or State-of-Health (SOH). It is a measure of the battery’s condition relative to a fresh battery. Based on cranking rating, open-circuit voltage, conductance (ability to deliver current) and battery temperature, the GR8 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.

BAD CELL-REPLACE Results: Diagnostic Charge Mode

Screen 1 of 3

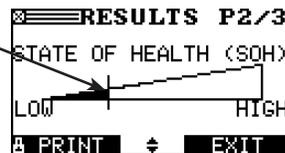


Screen 2 of 3

The line on the graph marks the Pass/Fail threshold for the battery.

A measurement to the left of the line indicates a REPLACE decision.

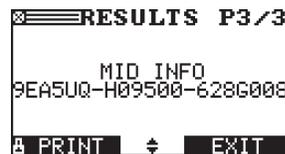
A measurement to the right of the line indicates a GOOD battery.



A measurement near the line on the right suggests a marginal battery.

Screen 3 of 3

The results include a Midtronics information code for ALL decisions.



Battery Decisions: Diagnostic Charge

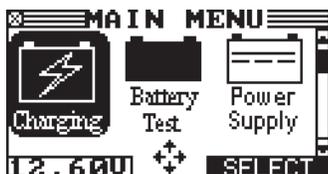
Battery Decision	Recommended Action
GOOD BATTERY	Return the battery to service.
REPLACE BATTERY	A REPLACE BATTERY result may also mean a poor connection between the battery cables and the battery. After disconnecting the battery cables, retest the battery using the out-of-vehicle test before replacing it.
BAD CELL–REPLACE	Replace the battery. This decision indicates a bad cell within the battery.  WARNING: Charging a battery with a bad cell is dangerous!

Manual Charging

The GR8 charges the battery based on the current limit or voltage limit, and charge duration that you select. Because the charger makes no battery test decisions in this mode, it does **not** produce a test code.

CAUTION: You must monitor the battery’s State-of-Charge (SOC) and temperature to avoid overcharging. Any charging after the battery is fully charged can result in excessive battery temperature, which will “gas” the battery and boil off electrolyte, shortening battery life.

1. In the Main Menu, the BATTERY CHARGE icon is highlighted. Press the **SELECT** key.



2. In the Charging Menu use the **LEFT** (◀) or **RIGHT** (▶) **ARROW** key to highlight the MANUAL icon. Press the **SELECT** soft key.



3. Use the **UP** (▲) or **DOWN** (▼) **ARROW** key to select the BATTERY TYPE, or press the corresponding numerical key to move the dot to the option button of your choice.

- 1 REGULAR FLOODED
- 2 AGM
- 3 AGM SPIRAL

Press the **NEXT** soft key. The **BACK** soft key returns you to the Main Menu at the start of the test and to the previous screen as you progress.

4. Use the **UP** (▲) or **DOWN** (▼) **ARROW** key to select the LIMIT TYPE, or press the corresponding numerical key (1 or 2) to move the dot to the option button of your choice.
 - 1 LIMIT CURRENT
 - 2 LIMIT VOLTAGE

Press the NEXT soft key. The BACK soft key returns you to the Main Menu at the start of the test and to the previous screen as you progress.

 **NOTE:** If you use the **ARROW** keys to select option buttons, press the **NEXT** soft key to continue to the next step. If you use the alpha-numeric keypad to enter the number preceding the option button, no additional keypress is needed.

5. You can set limits using VOLTAGE or CURRENT. If your limit type is CURRENT, select the maximum amperage (1 to 60 amps). When in doubt, start with a low charging current. Press the **NEXT** soft key.



If your limit-type is VOLTAGE, select the maximum voltage. The range for Lead-Acid is 12.7 to 15.3 V; AGM is 12.7 to 14.4 V. Press the **NEXT** soft key.



- Select a charge duration from 5 to 120 minutes, or select a duration greater than 120 minutes for Continuous charging. To select a timed charge when "CONTINUOUS" is displayed, use the key pad to enter a duration 5 and 120 minutes.

Continuous charging stops when you press the STOP key.

Timed Charge Selection Screen



Continuous Charge Selection Screen



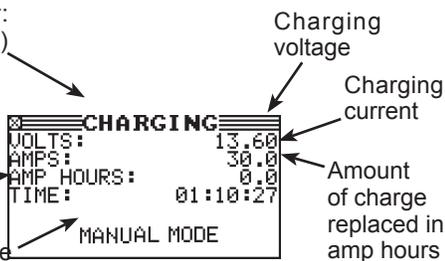
NOTE: The GR8 tests the battery to determine if it is safe to charge. If it detects that the battery is defective, it displays a warning that the battery is unsafe to charge. Press the **EXIT** soft key to return to the Main Menu.

- If the battery is safe to charge, the GR8 will begin charging at the selected levels. The illustration shows an example of the information displayed during timed charging

Activity in title bar: CHARGING (blinking) or TESTING

Charge time countdown in hours, minutes, and seconds.

Charging mode



Charging voltage

Charging current

Amount of charge replaced in amp hours



NOTE: If Continuous charge is selected, charging time is not displayed.

- When Manual Mode ends, the GR8 displays the total charging time for Continuous and Timed Charging, the amp hours replaced, and the charging mode.

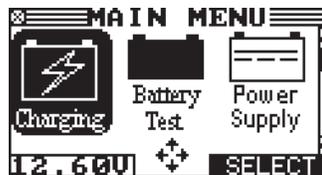
The alarm sounds every 30 seconds until you disconnect the clamps, or press the **NEXT** soft key.



Jump Start

This charging mode makes high output current available to boost charge an in-vehicle battery as well as assist in starting the engine. If you need to abort at any time, press the **STOP** key

- In the Main Menu, the BATTERY CHARGE icon is highlighted. Press the **SELECT** key.



- In the Charging Menu use the **LEFT** (◀) or **RIGHT** (▶) **ARROW** key to highlight the JUMP START icon. Press the **SELECT** soft key.



NOTE: The GR8 tests the battery to determine if it is safe to charge. If it detects that the battery is defective, it displays a warning that the battery is unsafe to charge. Press the **EXIT** soft key to return to the Main Menu.

- Use the **UP** (▲) or **DOWN** (▼) **ARROW** key to select the BATTERY TYPE, or press the corresponding numerical key (1, 2, or 3) to move the dot to the option button of your choice.

- 1 REGULAR FLOODED
- 2 AGM
- 3 AGM SPIRAL

Press the **NEXT** soft key. The **BACK** soft key returns you to the Main Menu at the start of the test and to the previous screen as you progress.



NOTE: If you use the **ARROW** keys to select option buttons, press the **NEXT** soft key to continue to the next step. If you use the alphanumeric keypad to enter the number preceding the option button, no additional keypress is needed.

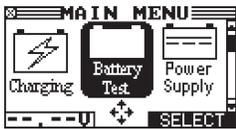
- If the battery is safe to charge, the GR8 will prompt you to press the **NEXT** soft key to begin the boost charge
- The GR8 begins boost-charging. Do not crank the engine at this time.
- When the GR8 displays "CRANK ENGINE NOW," beeps and flashes the status light, you can crank the engine for up to five seconds.
- When the GR8 displays "JUMP START COMPLETE," press the **STOP** key. (The alarm sounds every second until you press **STOP**.)

Chapter 7: Battery Test



This test evaluates a battery using the parameters you select (Model, Stock #, CCA, JIS, etc.) and with option of performing a Diagnostic Charge on a good battery.

- In the Main Menu use the **LEFT (◀)** or **RIGHT (▶) ARROW** key to highlight the BATTERY TEST icon. Press the **SELECT** soft key.



- Use the **UP (▲)** or **DOWN (▼) ARROW** key to select the BATTERY LOCATION, or press the corresponding numerical key (1, 2, or 3) to move the dot to the option button of your choice.

- OUT OF VEHICLE
- IN VEHICLE

The **BACK** soft key returns you to the Main Menu at the start of the test and to the previous screen as you progress.



NOTE: If you use the **ARROW** keys to select option buttons, press the **NEXT** soft key to continue to the next step. If you use the alphanumeric keypad, no additional keypress is needed to save your selection.

- Use the **UP (▲)** or **DOWN (▼) ARROW** key to select the odometer setting or press the corresponding numer key to move to the option of your choice.

- BELOW 250 MILES
- ABOVE 250 MILES

- Select the BATTERY TYPE:

- REGULAR FLOODED
- AGM
- AGM SPIRAL

- Select a test option and press the **NEXT** soft key.

TEST BY:

- | | |
|--|-----------------------------|
| 1 <input checked="" type="radio"/> CCA | 4 <input type="radio"/> SAE |
| 2 <input type="radio"/> JIS | 5 <input type="radio"/> IEC |
| 3 <input type="radio"/> DIN | 6 <input type="radio"/> EN |

Test Option	Description
CCA	Cold Cranking Amps. The most common rating for starting batteries rated at 0 °F.
JIS	Japanese Industrial Standard. Shown on a battery as a combination of numbers and letters, for example: 26A17 .
DIN	Deutsche Industrie Norm - The German standard for batteries
SAE	Society of Automotive Engineers - Identical to CCA
IEC	International Electrotechnical Commission
EN	Europa - Normal Standards



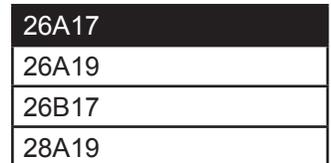
IMPORTANT: It is important to input the correct test parameters. If you use the wrong parameters, an inaccurate test result will occur.

TEST BY CCA or JIS

- If CCA, use the keypad to enter the value, or scroll to the value with the **UP/DOWN ARROW** keys. Press **SELECT**.



Or select the JIS number



Deep Scan Test

In some cases the GR8 may need to further analyze a deeply discharged battery to determine whether the battery should be replaced, or if it can possibly be recovered. It will then conduct a Deep Scan Test of the battery for a few seconds while displaying a battery undergoing a scan. If any messages appear during the test, refer to Chapter 10: Test Messages on page 45.



The GR8 may recommend charging before it displays the test results. Select **YES** to begin Diagnostic Charge Mode or **NO** to return to the results. (See "Diagnostic Charging" on page 33.)

Battery Results

The GR8 displays one of six battery decisions (GOOD BATTERY, GOOD-RECHARGE, CHARGE, RETEST, REPLACE BATTERY, REPLACE BAD-CELL) and an analysis, which includes the battery State-of-Health (SOH). Refer to the screen illustrations and table in the next column.

Use the UP (p) or DOWN (q) ARROW keys to scroll to each screen. To return to the Main Menu, press the EXIT soft key. To print, press the PRINT soft key.



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.

State-of-Health (SOH)

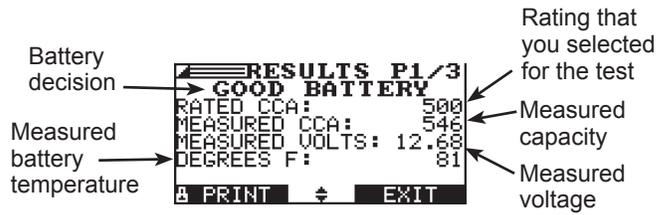
Another factor affecting a battery's ability to crank an engine is its actual condition or State-of-Health. It is a measure of the battery's condition relative to a fresh battery. Based on cranking rating, open-circuit voltage, conductance (ability to deliver current) and battery temperature, the GR8 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.

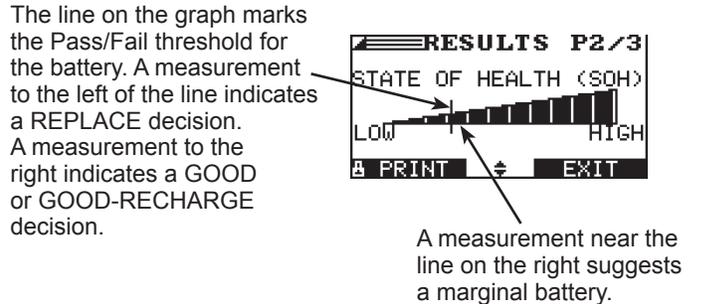
As the battery approaches end of life, its deterioration accelerates, until it finally fails to start the vehicle. Before failing, the battery may start the vehicle under normal conditions but may not be able to operate in more extreme conditions. Extreme heat or cold could expose a weak battery and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

GOOD BATTERY Results: Battery Test

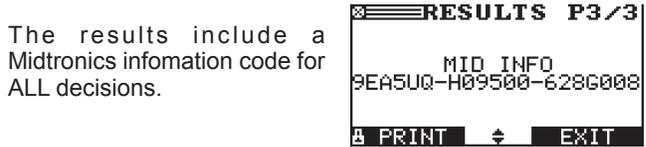
Screen 1 of 3 (P1/3)



Screen 2 of 3 (P2/3)



Screen 3 of 3 (P3/3)



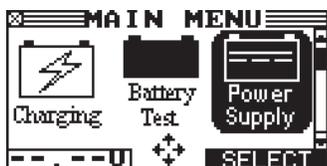
Decision	Recommended Action
GOOD BATTERY	Return the battery to service.
GOOD-RECHARGE	Fully charge the battery and return it to service.
CHARGE & RETEST	Fully charge the battery and retest. Failure to fully charge the battery before retesting may cause false readings. If CHARGE & RETEST appears again after you fully charge the battery, replace the battery.
REPLACE BATTERY	A REPLACE BATTERY result may also mean a poor connection between the battery cables and the battery. After disconnecting the battery cables, retest the battery using the out-of-vehicle test before replacing it.
BAD CELL-REPLACE	Replace the battery. This decision indicates a bad cell within the battery. WARNING: Charging a battery with a bad cell is dangerous!

Chapter 8: Power Supply Mode



Power Supply Mode tests and maintains battery voltage in the vehicle at 13.5 volts to allow for uninterrupted reflashing of vehicle computers, retain vehicle system settings, or simply to maintain battery voltage.

1. In the Main Menu use the **LEFT (◀)** or **RIGHT (▶) ARROW** key to highlight the POWER SUPPLY icon. Press the **SELECT** soft key.



2. Use the **UP (▲)** or **DOWN (▼) ARROW** key to select the BATTERY TYPE, or press the corresponding numerical key to move the dot to the option button of your choice.

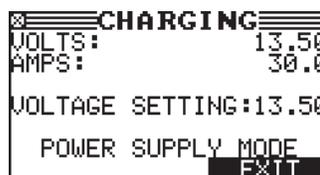
- 1 REGULAR FLOODED
- 2 AGM
- 3 AGM SPIRAL

Press the **NEXT** soft key.



NOTE: The GR8 tests the battery to determine if it is safe to charge. If it detects that the battery is defective, it beeps, flashes the status light, and displays a warning that the battery is unsafe to charge. Press the **EXIT** soft key to return to the Main Menu.

3. If the battery is safe to charge, the GR8 begins maintaining the battery voltage at 13.5 volts.



NOTE: Amperage fluctuates in response to the vehicle's demands.

If the voltage drops below the 12.8, the GR8 displays a warning and raises the voltage to the setpoint.

4. When finished servicing the vehicle, press the **STOP** button or the OFF switch, unplug the power cord and disconnect the clamps.

Chapter 9: 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 GR8.

If the **PRINT** soft key is available, align the GR8 IR transmitter with the printer's receiver, and select the **PRINT** soft key. To return to the Main Menu, press the **EXIT** soft key.

If you have trouble printing, select the **HELP** soft key, which becomes visible when the printing progress bar appears on the display. Also refer to Chapter 11: IR Printer Guide on page 47.

Print/View



PRINT/VIEW allows you to view and print the results of the battery test before they are overwritten when you start a new test. The printed results share the same format as the screen results. In addition, information related to the test option you used appears on the printed results.

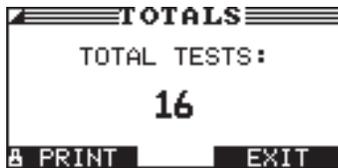
Totals



TOTALS counts the number of battery tests in four categories: the LIFETIME, USER TOTALS, LAST 100 LOG and TOTALS BY DECISION.

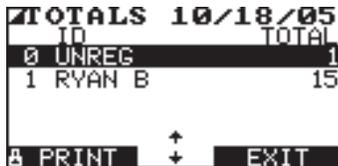
1 LIFETIME

Total tests since the GR8 was first used.



2 USER TOTALS

Total tests by User ID (and by UNREG user) since the first time a registered user logged in and the last time they were cleared by ADMIN.



3 LAST 100 LOG

Last 100 tests performed by User ID (and by UNREG user); includes the date and the battery decision (GOOD, REPLACE, etc.).



4 TOTALS BY DECISION

Totals by battery decision since the last time they were cleared by ADMIN.



Transfer



TRANSFER is future optional accessory that consists of an IR software and hardware package that will enable you to transfer test data to a PC.

Version



VERSION displays the GR8 software version, the date the software was released, and the serial number of the control module. The utility also allows you to print the information.

Chapter 10: Test Messages

The table below will help you troubleshoot test messages. If troubleshooting does not solve the problem, call Midtronics Customer Service at 1.800.776.1995.

MESSAGE	EXPLANATION
System Noise Detected	<p>The GR8 has detected computer, ignition noise, or parasitic drain, and will attempt to retest. Make sure all vehicle loads are off, doors are closed, and the ignition is in the off position. The GR8 will automatically retest when it no longer detects system noise. If the message reappears:</p> <ul style="list-style-type: none"> • You may be testing too close to a noise source, such as a charger or other high-current device. If so, move away and retest. • If you are unable to find the source of the noise, fully charge the battery and retest. If the message appears after recharging, test the battery out of the vehicle. • Disconnect the battery cables and retest.
Unstable Battery Detected	<p>A battery that is weak, or that has just been charged, may retain enough electrical activity to be detected by the GR8 and will adversely affect the test results. A fully charged battery should stabilize quickly, after which the GR8 will automatically retest. Weak batteries should be charged and retested. If the battery is fully charged, check the clamp connections.</p>

Chapter 11: Replacement Printer Paper

Replacing the Paper Roll

The IR printer uses thermal paper in a roll with the dimensions 2.25 in x 85 ft (57 mm x 25.9 m). You can purchase replacement rolls at most office supply stores.

Below are three major office supply stores that carry the recommended paper:

Store	Part Number	Phone
Office Depot	209-653-271	800-463-3768
Office Max	20121146	800-283-7674
Quill	856607	800-789-1331
Staples	531236	800-378-2753

Chapter 12: Test Cable Maintenance

Here are a few things you can do to protect your test cables from damage and premature wear:

- The grease, dirt, and sulfation that build up on battery terminals are highly corrosive and can damage the clamps over time. Before connecting the clamps, ensure accurate test readings and protect the clamps by cleaning the battery case and terminals using a wire brush and a mixture of water and baking soda.
- Periodically clean the clamps using a mixture of baking soda and water, or a mild hand-soap, and a small bristle brush.
- Clean the battery terminals. If stud adapters are required, fasten them with the proper tool. Do not use the battery clamps to tighten adapters.
- Never remove the clamps from a battery to abort an active charging session. Always press the red **STOP** button before removing the clamps.
- Do not leave the clamps laying in battery acid.
- Hang the clamps on the cable wrap on the back of the GR8 when not in use.

PATENTS

The GR8 Battery Diagnostic Station is made in the U.S.A. by Midtronics, Inc. and is protected by one or more of the following U.S. Patents: 4,816,768; 4,825,170; 4,881,038; 4,912,416; 5,572, 136; 5,585,728; 5,592,093; 5,757,192; 5,821,756; 5,831,435; 5,914,605; 6,051,976; 6,091,245; 6,163,156; 6,249,124; 6,304,087; 6,310,481; 6,316,914; 6,323,650; 6,351,102; 6,359,441; 6,363,303; 6,392,414; 6,441,585; 6,445,158; 6,456,045; 6,469,511; 6,534,993; 6,544,078; 6,556,019; 6,566,883; 6,586,941; 6,707,303. Canadian Patents: 1,295,680; 1,280,164. United Kingdom Patent: 0,672,248; 0,417,173. German Patent: 693 25 388.6; 689 23 281.0-08; 93 21 638.6. And other U.S. and Foreign patents issued and pending. This product may utilize technology exclusively licensed to Midtronics, Inc. by Johnson Controls, Inc. and/or Motorola, Inc.

LIMITED WARRANTY

The charger and its cables are warranted to be free of defects in materials and workmanship for a period of one year from date of purchase. The printer is warranted to be free of defects in materials and workmanship for a period of one year from date of purchase. The rechargeable batteries in the printer are warranted to be free of defects in materials and workmanship for a period of 90 days from date of purchase. The alkaline batteries in the GR8 are not covered under warranty. Midtronics will, at our option, repair or replace the equipment with a remanufactured equipment. This limited warranty applies only to the specified equipment, and does not cover any other equipment, static damage, water damage, overvoltage damage, dropping the units, 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 GR8 or printer, or to modify the cable assembly.

SERVICE

To obtain service, contact Midtronics for a Return Authorization number, and return the unit to Midtronics freight prepaid, Attention: RA# _____. Midtronics will service the GR8 and reship the next scheduled business day following receipt, using the same type carrier and service as received. If Midtronics determines that the failure was caused by misuse, alteration, accident, or abnormal condition of operation or handling, purchaser will be billed for the repaired product and it will be returned freight prepaid with freight charges added to the invoice. Any GR8 beyond the warranty period is subject to the repair charges in effect at that time. Optional remanufacturing service is available to return the tester to like-new condition. Out-of-warranty repairs will carry a 3-month warranty. Remanufactured units purchased from Midtronics are covered by a 6-month warranty.

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