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TOYOTA

LEXUS

GR8

Battery Diagnostic Station

00002-MCGR8

INSTRUCTION MANUAL

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Safety Guidelines

1 General Safety Precautions

⚠ 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.

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.

2.8 **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 & 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 220-volt circuit.

⚠ 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.

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:

1. The pins on plugs of the extension cord are the same number, size, and shape as those of the plug on the charger;
2. The extension cord is properly wired and in good electrical condition;
3. The wire size is large enough for the AC ampere rating of charger.

Recommended minimum AWG* size for extension cords for battery chargers

AC input rating amperes		**AWG* size of cord**			
		Length of cord, feet (m)			
Equal or greater than:	**But less than:**	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

⚠ 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.

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 Removing the Battery

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

⚠ 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..

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

8.3 Attach at least a 60 cm (24-inch), 6-gauge insulated battery cable to the negative (–) battery terminal.

8.4 Connect the **POSITIVE (RED)** charger clamp to the **POSITIVE (POS., P, +)** post of battery.

8.5 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.

8.6 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.

Safety Reminder

For safe, efficient, and accurate charging and testing, review the safety and operating instructions in this manual before using the charger. 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.

- ✓ 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 charger 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.

Chapter 1: Introduction & Overview

Conventions In This Manual

To help you learn how to use your charger the manual uses these 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.

Assembling The GR8

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

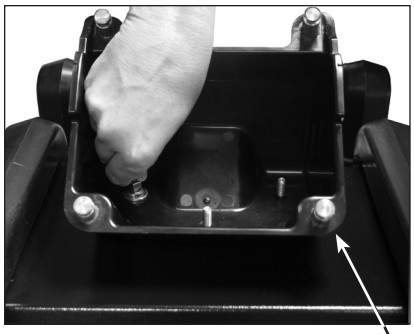
Control Module

1. The hardware to attach the control module's mounting bracket to the charger 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 pre-installed bolts for the control module mounting bracket.

2. 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.



Pre-installed bolts on Control Module mounting bracket.

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



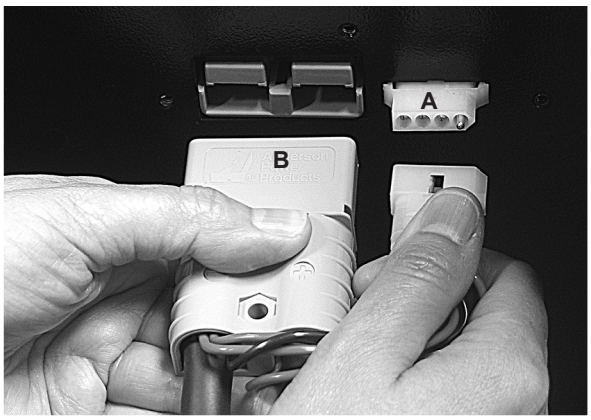
4. Connect the serial cable between the charger and tighten the screws on each connector.



Charger Cables

The two connectors for the charger cables are located on the back of the unit. Three screws are included to secure the cables.

Plug the small connector into the small socket (**A**) on the back of the unit.



1. Plug the large connector (**B**) into the large socket while placing the protective cover (**C**) against the back of the unit.



2. 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.
3. Insert the screws through the holes in the cover and securely tighten the screws.



The installation is now complete.

Connecting AC Power

Plug in the power cord on the back of the unit. Plug the charger into a dedicated, grounded nominal 16-amp or higher AC outlet. Press the power switch to the **ON** position.

Front of GR8



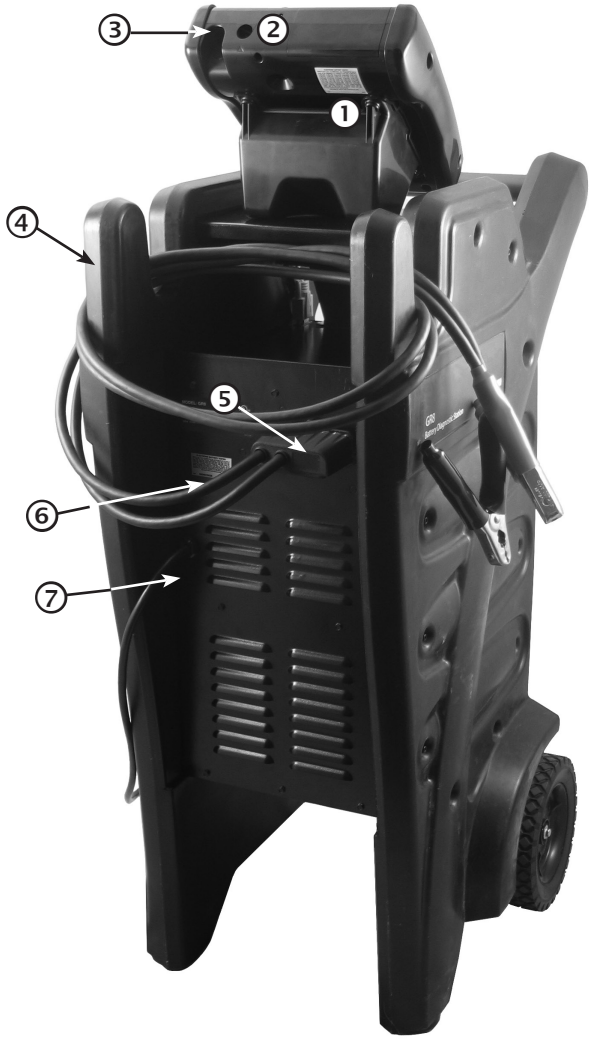
① **Control Module**
Backlit graphical display and keypad for data entry.

② **STATUS light**
Lights in conjunction with beeping alarm to indicate transitions and warnings.

③ **Data Card slot**
For data storage and future software updates.

④ **ON/OFF Switch**
Turns power on and off to the charger.

Back of GR8



① **Control Module Label**

② **Test Cable Connector**

③ **Amp Clamp Connector**

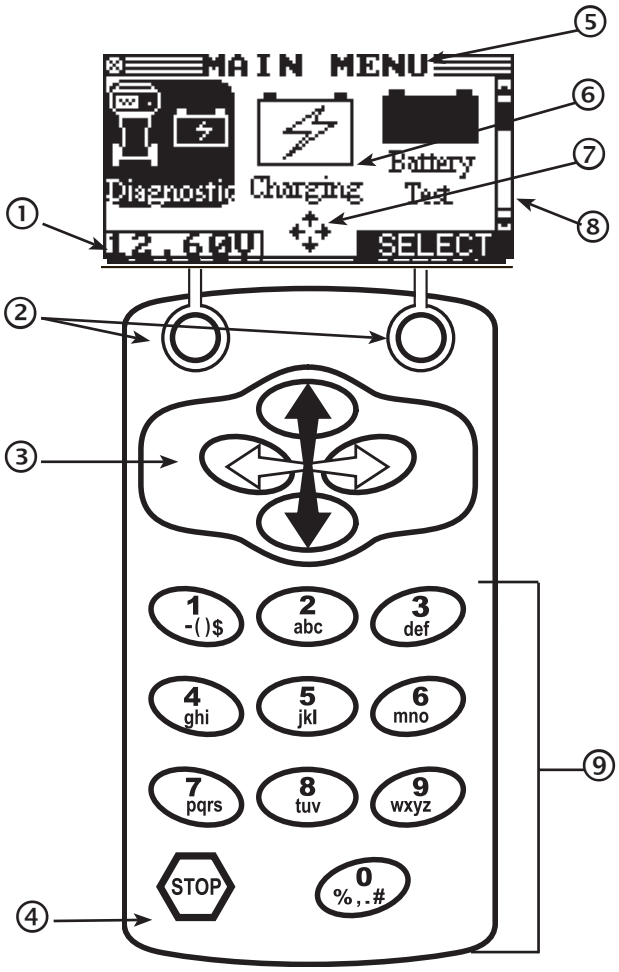
④ **Cable Wrap**
For storing test cables when not in use.

⑤ **Charge Cable Connection**

⑥ **Charge Engine Label**

⑦ **AC Power Cord Connection**

Control Module Keypad



① **Voltmeter**
The voltage reading for a connected battery appears above the left soft key until other menus or functions are selected.

② **Soft Keys**
Press the two soft keys to perform the functions displayed above them. These functions will change depending on the menu or test process.

③ **ARROW Keys**
Press the **ARROW** keys to scroll to numerical values and move to menus and icons.

④ **POWER Key**
Press the **POWER** key to turn the control module ON and OFF.

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 (▲▼◀▶)**

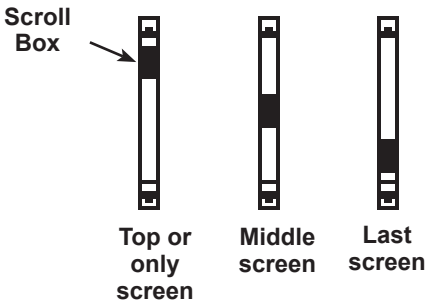
When displayed, the arrows show you which **ARROW** key on the keypad to press to display other icons or screens.

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

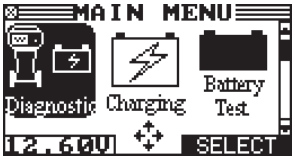
Refer to the following table for the characters associated with each alphanumeric key.

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
⓪	%	,	.	#	0

Data Entry Methods

Typically, the soft key below the right half of the screen confirms your choice. The soft key below the left half of the screen cancels your choice or returns you to the previous screen.

Menu Icons



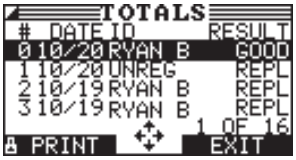
A menu icon is a graphical representation of a function you can select, such as the DC Amp Meter Test Icon in the DMM Menu. To select an icon, use ◀ or ▶ to highlight it. Highlighting changes the icon to a white picture on a black background. To confirm your selection, press the appropriate soft key.

Option Buttons



Some lists have option buttons before each item. To select an item, use ▲ or ▼ 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, use ▲ or ▼ to highlight the item, and press the appropriate soft key. To move the highlight bar up five lines at a time, press ◀. To move the highlight bar down five lines at a time, press ▶.

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 ▶ to add a space. Use ▲ or ▼ 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 ▲ or ▼ 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 ◀ to clear all or part of the entry.

Check Boxes



To indicate that you can choose more than one option, the Logos Utility has check boxes. Select (check) and deselect (uncheck) logos by pressing the numerical key that corresponds to the logo number (1, 2, 3). In the illustration all three logos are selected.

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.

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 warranty code.
Charging *	Tests and charges a battery using the battery information you select in a series of screens.
Battery Test	Tests a battery using the battery information you select in a series of screens.
Info *	Includes a utility to view and print test results, a total test counter, a data transfer utility, and the software version and date, and charger serial number for the control module.
Setup *	Twelve setup utilities, many of which customize your user interface. Includes administrative functions.
Help	Provides a list of topics and definitions. Also includes Midtronics Customer Service phone numbers.

Setup Menu

Setup

Use the Setup Menu to customize the charger's user options. (Admin PIN required to access the Setup Menu. The default is 12345.)

Icon	Description
Clock	Settings to adjust the time.
Users	Add, edit, or delete User IDs.
Shop	Allows you to add a custom header to printed test results.
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	Allows you to create and store up to three separate coupons to be printed on test results coupon at the bottom of printed test results.
Temp	Enables you to select degrees C or F for temperature measurements.
Language	Sets the language of the display and printouts.
Format	Formats the data card to receive data. Also erases all data on the card.
Update	Updates the charger software using files on an data card.
Admin	Allows you to enable or disable PIN settings and User IDs, clear test totals, and restore defaults.
Logos	Select one or more logos to appear on printed results.
Printer	Select between an internal printer or an optional IR external printer.

Charging Menu



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

Icon	Description
	Power Supply Mode: Tests and maintains battery voltage at 13.5 volts to allow for uninterrupted reflashing of vehicle's computers or to retain vehicle system settings.
	Makes high output current available to boost charge an in-vehicle battery and assist in starting the engine.
	Provides a timed charge that ranges from 5 to 120 minutes or a continuous charge that ends when you press the **STOP** key.

Info Menu



Use the Info Menu to manage test data, view and print test results, track the usage and history of the charger.

Icon	Description
	Displays the last battery test results. Sends the results to the IR printer.
	Reports menu that includes the following type of test totals: LIFETIME, USER TOTALS, LAST 100 LOG, and TOTALS BY DECISION.
	A future optional accessory consists of an IR software and hardware package that will enable you to transfer test data to a PC.
	Displays the software version and release date, and the serial number of the control module.

Initial Startup

The charger 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 charger to work.

It takes approximately 5 to 10 seconds for the charger to power up while testing the internal software integrity.



When using the **ARROW** keys to select option buttons, press **NEXT** to continue to the next step. **BACK** returns you to the Main Menu at the start of the test and to the previous screen as you progress. When using the keypad, no additional keypress is needed.

Initial Administrator Login

1. Following power up, select the region where the charger will be used.

   1 ⦿ USA

   2 ○ CANADA

2. Select **NEXT** to confirm the selection.
3. Select the Printer type.

   1 ⦿ IR PRINTER

   2 ○ INTEGRATED PRINTER

4. Select a administrator USER ID.
5. Enter a four-digit User ID Personal Identification Number (PIN). The default is "0000".

   ENTER PIN

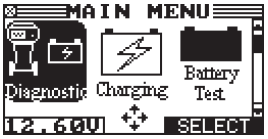
   ****

   A greeting screen is displayed showing the User ID, the total number of tests performed, and the starting date.

USER ID	TOTAL
UNREG	0

   SINCE : 8/14/2017

6. Press **NEXT** to continue to the Main Menu.



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 charger 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 charger 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. See Chapter 6: Setup for more information.

Help Menu and Soft Keys

In addition to the **HELP** soft keys, the charger contains 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 2: Diagnostic



The Diagnostic charging function has four modes to determine the State-of-Health of the battery while bringing it to a full State-of-Charge.

① ***Initial Analysis:*** The charger first analyzes the battery and makes a decision: REPLACE BATTERY (or REPLACE-BAD CELL) or GOOD BATTERY. A warranty code is generated when testing by CCA or JIS.

② ***Diagnostic Mode:*** Once the charger determines that the battery is good, needs charging, and is safe to charge, it proceeds to Diagnostic Charge Mode. During the charging session, the charger 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 charger 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 charger automatically switches to Recovery Mode in an attempt to recover a hard-to-charge battery.

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

When using the **ARROW** keys to select option buttons, press **NEXT** to continue to the next step. When using the keypad, no additional keypress is needed. Use **BACK** to return to the Main Menu at the start of the test and or the previous screen during the test.

IMPORTANT: When starting a new charge session, the last battery test results in memory will be over-written. Remember to record or print the results retain them.

1. At the Main Menu select the DIAGNOSTIC icon.
2. Select the battery location.

   1 ⦿ OUT OF VEHICLE

   2 ○ IN VEHICLE

   A battery not connected to a vehicle is considered OUT OF VEHICLE.

3. Select the battery rating.

   1 ⦿ CCA

   2 ○ JIS

CCA	Cold Cranking Amps. The most common rating for starting batteries rated at 0 ºF.
JIS	Japanese Industrial Standard. Shown on a battery as a combination of numbers and letters, for example: **26A17**

4. Select the BATTERY TYPE.

   1 ⦿ FLOODED

   2 ○ AGM/SPIRAL

   3 ○ AGM/FLAT PLATE

   4 ○ EFB

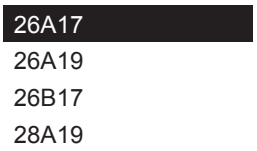
5. Enter the BATTERY RATING. Scroll to the rating and press **SELECT** to begin the test.

   Entry range is between 100 to 3000, except for DIN and IEC, which have a range of 100 to 1000. Hold ▲ or ▼ to increase your scrolling speed.

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

For JIS, scroll to the correct JIS number.



Initial Analysis

The progress of the analysis is shown by the left to right movement of a progress bar.

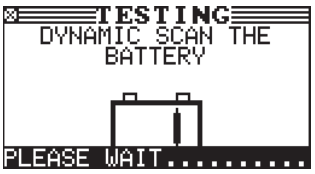


If additional testing is required, progress is shown by the clockwise fill of a pie chart.



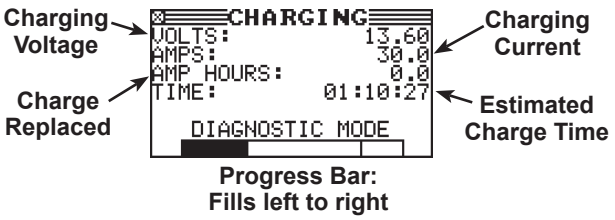
Dynamic Scan Test

For a deeply discharged battery, the charger may conduct a Dynamic Scan Test to determine if the battery can be recovered.



Diagnostic Charging

If the charger determines that the battery has an insufficient State-of-Charge, it automatically enters the Diagnostic mode. Charging voltage, current and duration are based on continual analysis of testing and charging data, as well as the selected battery parameters.



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.

Step 1: The charger applies a 150-amp load and tests the battery's response (approximately 30-35 seconds).



Step 2: The charger measures the battery's CCA (approximately 5-10 seconds).



Recovery Mode

Recovery Mode optimizes the charger for a hard-to-charge battery. To continue the session, select **YES** .

If you select **NO**, the charge session aborts (stops) and you will not be able to obtain a warranty code if the charging session would have resulted in a REPLACE decision.

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

NOTE: 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.

Completing a Charge Session

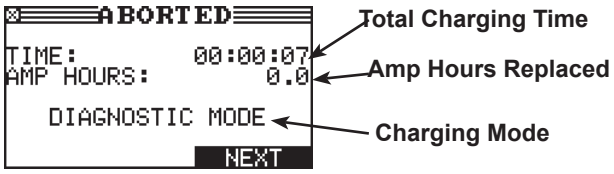
The charge session is complete when the proper amount of charge is put back into the battery or the remaining estimated time to charge counts down to near zero.

If the charger determines the battery is bad before the end of the estimated time to charge, a REPLACE BATTERY or REPLACE-BAD CELL decision is displayed. Both decisions include a warranty code and a Midtronics test code.

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

Aborting a Charge Session

To abort a charging session, press **STOP**. A warranty code will not be generated for an aborted charging session. After aborting, select **NEXT** to return to the Main Menu.



Top-Off Mode

Top-off charging fills a good battery to capacity after a completed charge session. Select **YES** to enter Top-Off or **NO** to display the charging session results.

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

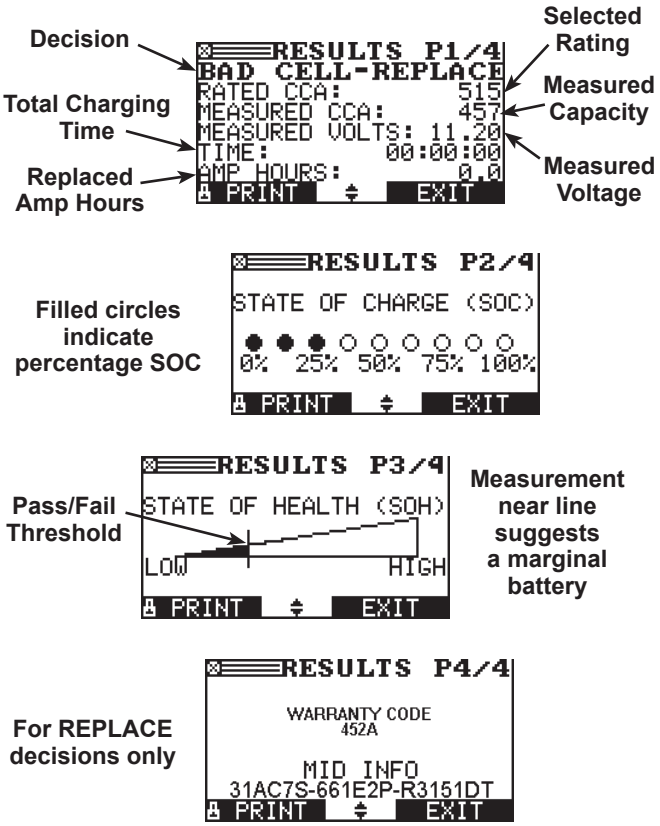
To exit Top-Off Mode press **STOP** or allowing the charger to complete the charging. When Top-Off Mode is complete, an alarm sounds every 30 seconds until **STOP** is pressed.

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

Diagnostic Charge Results

The charger displays one of three battery decisions and an analysis, which includes the battery State-of-Charge (SOC) and State-of-Health (SOH).

Use ▲ or ▼ to scroll to each screen. Press **EXIT,** to return to the Main Menu. Press **PRINT** to print the test results.



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** **Risk of explosive gases** Charging a battery with a bad cell my cause the battery to explode.

State-of-Charge (SOC)

The State-of-Charge (SOC) is one of several important factors that affect the battery's ability to crank an engine. It is a measure of the available capacity remaining of a battery expressed as a percentage of its original rated capacity. During testing, the charger accurately detects a battery's State-of-Charge and indicates this as part of the test results.

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 charger 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. The charger predicts a battery's State-of-Health based on the characterization of Toyota and Lexus OEM batteries and OEM replacement batteries.

Chapter 3: Charging Menu



Use the Charging menu to access the Power Supply, Jump Start, and Manual functions of the charger.

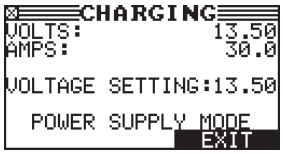
Power Supply Mode



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

1. At the Charging menu select the Power Supply mode icon.
2. Select the BATTERY TYPE.
   - 1 ◉ FLOODED
   - 2 ○ AGM/SPIRAL
   - 3 ○ AGM/FLAT PLATE
   - 4 ○ EFB

   The charger tests the battery to determine if it is safe to charge.
3. If the battery is safe to charge, the charger begins maintaining the battery voltage at 13.5 volts.



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



NOTE: 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.

4. Press **EXIT** to return to the Main Menu.

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

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.

1. At the Charging menu select the Jump Start mode icon.
2. Select the BATTERY TYPE.
   - 1 ◉ FLOODED
   - 2 ○ AGM/SPIRAL
   - 3 ○ AGM/FLAT PLATE
   - 4 ○ EFB

   The charger tests the battery to determine if it is safe to charge for jump starting.



NOTE: 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.

3. If the battery is safe to charge, press **NEXT** to begin the boost charge.

   The charger begins boost-charging. Do not crank the engine at this time.
4. Crank the engine for up to five seconds when the charger displays "CRANK ENGINE NOW," beeps and the status light flashes.
5. When the charger displays "JUMP START COMPLETE," press **STOP**. The alarm sounds every second until the **STOP** button is pressed.

Manual Charging



The Manual charging function charges a battery based on user specified current or voltage limits, and charge duration.

The charger makes no battery test decisions in this mode and a warranty code is not generated.

⚠ CAUTION

Charging after the battery is fully charged can result in excessive battery temperature

Overcharging will "gas" the battery and boil off electrolytes, shortening battery life. Monitor the battery's State-of-Charge and temperature to avoid overcharging.

1. At the Charging menu select the Manual icon.

2. Select the BATTERY TYPE.

   1 ⦿ FLOODED

   2 ○ AGM/SPIRAL

   3 ○ AGM/FLAT PLATE

   4 ○ EFB

3. Select current or voltage limiting.

   1 ⦿ LIMIT CURRENT

   2 ○ LIMIT VOLTAGE

   For CURRENT, select the maximum amperage (1 to 60 amps) and press **NEXT**. When in doubt, start with a low charging current.

   For VOLTAGE, select the maximum voltage and press **NEXT**. The range for Regular-type batteries is 12.7 to 15.3 V; AGM is 12.7 to 14.4 V. Press **NEXT**.

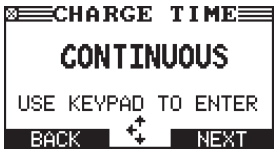
   

4. Select a charge duration from 5 to 120 minutes. To select a timed charge when "CONTINUOUS" is displayed, use the keypad to enter a duration 5 and 120 minutes. For durations longer than 120 minutes, select Continuous charging. Continuous charging stops when you press the **STOP** key.

   Timed Charge

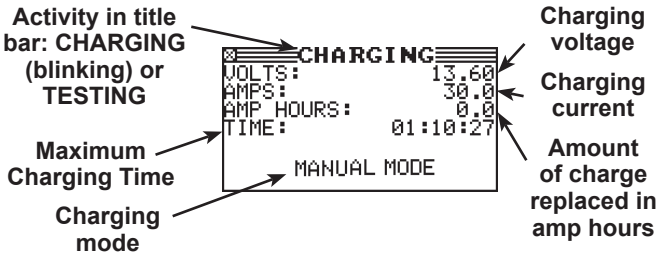
   

   Continuous Charge

   NOTE: The charger tests the battery to determine if it is safe to charge. If the battery is defective, warning tone will sound and the status light will flash. Press **EXIT** to return to the Main Menu.

5. If the battery is safe to charge, the charger will begin charging at the selected levels.

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

6. When Manual Mode ends, the total charging time for continuous and timed charging, the replaced amp hours, and the charging mode is displayed.

   When finished, an alarm will sound three tones every 30 seconds.

Chapter 4: Battery Test

Use the Battery Test function to test individual batteries either in a vehicle (connected) or out of vehicle. Batteries can also be tested by rating and type.

1. Select the battery LOCATION.

   1 ⦿ OUT OF VEHICLE

   2 ○ IN VEHICLE

   A battery not connected to a vehicle is considered OUT OF VEHICLE.

2. Select the battery rating.

   1 ⦿ CCA

   2 ○ JIS

CCA	Cold Cranking Amps. The most common rating for starting batteries rated at 0 ºF.
JIS	Japanese Industrial Standard. Shown on a battery as a combination of numbers and letters, for example: **26A17**

3. Select the BATTERY TYPE.

   1 ⦿ FLOODED

   2 ○ AGM/SPIRAL

   3 ○ AGM/FLAT PLATE

   4 ○ EFB

4. Enter the BATTERY RATING. Scroll to the rating and press **SELECT** to begin the test.

   580 ▲▼ CCA

   Entry range is between 100 to 3000, except for DIN and IEC, which have a range of 100 to 1000. Hold ▲ or ▼ to increase your scrolling speed.

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

For JIS, scroll to the correct JIS number.

26A17
26A19
26B17
28A19

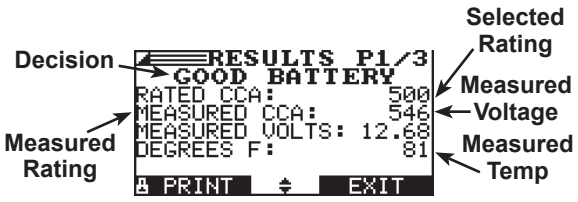
Dynamic Scan Test

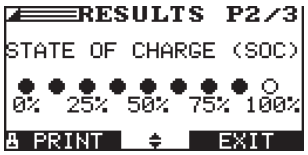
In some cases the charger may need to further analyze a deeply discharged battery. It will then conduct a Deep Scan Test.

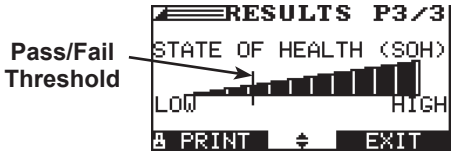
Test Results

Battery Test information is displayed across multiple screens. Use ▲ or ▼ to scroll to view each. Press **EXIT** to return to the Main Menu or **PRINT** to print out the results.

IMPORTANT: A new test will overwrite the last battery test result details. Record or print the results to retain them.







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. Use ▲ or ▼ to view Time To Charge estimates and the tested battery State Of Charge.
REPLACE BATTERY	May also mean a poor connection between the battery cables and the battery. Disconnect the battery cables and retest out-of-vehicle test before replacing.
BAD CELL–REPLACE	Replace the battery and retest.

State-of-Charge (SOC)

The State-of-Charge is one of several important factors that affect the battery's ability to crank an engine. It is a measure of the available capacity remaining of a battery expressed as a percentage of its original rated capacity.

State-of-Health (SOH)

State-of-Health is a measure of a battery's condition relative to a fresh battery. It is based on cranking rating, open-circuit voltage, conductance (ability to deliver current) and battery temperature. The tester predicts a battery's State-of-Health based on the characterization of Toyota and Lexus OEM batteries and OEM replacement batteries.

Although a State-of-Health problem can be the result of defects in construction, most often it is a result of normal wear-out mechanisms, which are dependant on the 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, 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.

Chapter 5: Info Menu



The Info Menu has six utilities to print and view your test data and track tester usage and history.

When using the **ARROW** keys to select option buttons, press **NEXT** to continue to the next step. When using the keypad, no additional keypress is needed. Use **BACK** to return to the Main Menu at the start of the test and or the previous screen during the test.

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

If you have trouble printing, select **HELP**, which becomes visible when the printing progress bar appears on the display.

Print/View



Use PRINT/VIEW to view and print the results of a battery test before they are overwritten by a new test.

The printed results share the same format as the onscreen results. In addition, information related to the test option used will appear on the printed results.

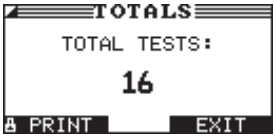
Totals



Totals tracks the number of battery tests in four categories: the Lifetime, User Totals, Last 100 Log, and Totals By Decision.

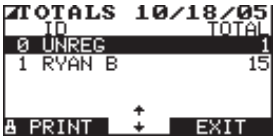
1. ⊙ LIFETIME

   Total tests since the charger was first used.



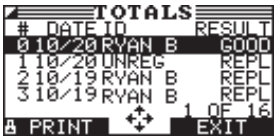
2. ⊙ USER TOTALS

   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.



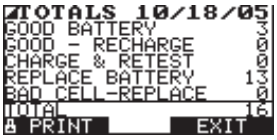
3. ⊙ LAST 100 LOG

   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.



Version



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

Chapter 6: Setup Menu



Use the Setup Menu to customize the charger's user interface. It is also used to access the administrative (ADMIN) functions which control user access.

Access to the Setup Menu initially requires an ADMIN PIN (default: 12345).

Clock



Use the CLOCK ADJUST utility to adjust the clock time, display mode, date, and display format.

TIME :	**9:07 AM**
MODE :	**AM/PM**
DATE :	**8/14/2017**
FORMAT :	**MM/DD/YYYY**

Time

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

9 : 19 / PM

2. Press **SAVE** to save the selection.

   The CLOCK/DATE ADJ menu is displayed.

Mode

1. Select the correct clock mode.
   - 1 ⦿ 24 HOUR
   - 2 ○ AM/PM
2. Press **SAVE** to save the selection.

   The CLOCK/DATE ADJ menu is displayed.

Date

1. Use ▲ or ▼ to adjust the month, day, and year.
2. Use ▲ or ▼ to select month, day, or year to adjust.
3. Press **SAVE** to save the selection.

   The CLOCK/DATE ADJ menu is displayed.

Format

1. Select the date display format.
   - 1 ⦿ DD/MM/YYYY (day/month/year)
   - 2 ○ MM/DD/YYYY (month/day/year)
2. Press **SAVE** to save the selection.

   The CLOCK/DATE ADJ menu is displayed.

Users



Use the USERS utility to create and edit a USER ID with 1 to 7 alphanumeric characters and link it to a test counter. USER IDs and their associated test totals can also be deleted.

Enter New

1. At the User ID select ENTER NEW.
   - 1 ⦿ ENTER NEW
   - 2 ○ DELETE
   - 3 ○ EDIT
2. Scroll to an ID placeholder. Scroll past the first line to go to the previous page or past the last line to go to the next page. To display more placeholders, use ▲ or ▼. Use ◀ or ▶ to jump up or down five lines at a time.

1 USER01
2 USER02
3 USER03
4 USER04

   Press **NEXT** to continue.
3. Use ◀ to clear the default characters. Use ▶ to add a space.

ENTER USER ID

4. Use the keypad to enter the user PIN.

ENTER PIN

5. Use the keypad to re-enter the USER ID and press **SAVE**.

   The USER ID screen is displayed.

Deleting



NOTE: Placeholder USER IDs (i.e., USER03) cannot be deleted.

1. At the User ID select DELETE.
   - 1 ○ ENTER NEW
   - 2 ⦿ DELETE
   - 3 ○ EDIT
2. Use ▲ or ▼ to select the USER ID and press **DELETE**.
3. Press **YES** to confirm the User ID deletion or **NO** to go back one screen without deleting.

Edit

1. At the User ID select EDIT.

   1 ○ ENTER NEW

   2 ○ DELETE

   3 ◉ EDIT

2. Scroll to an ID placeholder. Scroll past the first line to go to the previous page or past the last line to go to the next page. To display more placeholders, use ▲ or ▼. Use ◀ or ▶ to jump up or down five lines at a time.

   1 USER01
   2 USER02
   3 USER03
   4 USER04

   Press **NEXT** to continue.

3. Use ◀ to clear the default characters. Use ▶ to add a space.

   ENTER USER ID

4. Use the keypad to enter the user PIN.

   ENTER PIN

5. Use the keypad to re-enter the USER ID and press **SAVE**.

   The EDIT USER ID screen is displayed and can be edited.

Shop



Use to create a header for printed test results with the business location information. Three information screens contain eight (8) lines of text with a maximum of 17 characters per line.

Screen 1	Screen 2	Screen 3
1–WORKSHOP NAME __	5–COUNTRY __	9–
2–STREET NAME	6–PHONE NUMBER	10–
3–CITY	7–FAX NUMBER	11–
4–ZIP CODE	8– WEBSITE.COM	12–

1. Press ▲ or ▼ to highlight the line to change. The cursor will be to the right of the last character in the line. (Or not visible if all character spaces are filled.)
2. To erase a character, press ◀.
3. To Insert a character press the alphanumeric key associated with the character as many times as needed. Use ▶ to insert blank spaces. Pause momentarily to automatically move the cursor to the right.
4. Press **SAVE**.

Display



Use the DISPLAY option to adjust the contrast of the text on the display and the backlight time.

Contrast Level

1. Press **ADJUST** key to display the numerical scroll box.

   9 ▲▼ **(1-10)**

2. Press ▲ or ▼ to change the value up or down, or press the corresponding number key. The contrast level is 0 (lightest) to 10 (darkest).
3. Press **SAVE**.

Coupon



Use COUPON to turn on or off the option to include a user coupon with the printed test results following a battery test or diagnostic charge. This function can also be used to create a custom user coupon.

1. Select the correct Coupon option.

   1 ◉ COUPON 1

   2 ○ COUPON 2

   3 ○ COUPON 3

   4 ○ NO USER COUPON PRINTED

2. Press **SAVE**.

Edit Coupon



Use this utility allows to create promotional coupons or messages for your customers that will print at the bottom of every test result. Two information screens contain eight lines of text with a maximum of 17 characters per line.

To create and edit a coupon, use same procedure described in the *Shop* section of this chapter. Use the template in the Appendix of this manual to plan and center text.

Temp



Use the TEMP utility to set the units of measure to either Celsius or Fahrenheit.

1. Select the correct Temp option.

   1 ◉ DEGREES C

   2 ○ DEGREES F

2. Press **SAVE**.

Language



Use LANGUAGE to select the default language used for the display and printouts.

1. Select the correct Language option.
   - 1 ⦿ ENGLISH
   - 2 ○ ESPAÑOL
   - 3 ○ FRANÇAIS
2. Press **SAVE**.

Format



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

Update



Use this utility to update the charger software using an inserted data card.

Admin



Use ADMIN to adjust user-specific functions within the tester. It can also be used to clear test totals and restore settings to factory defaults.

Select the ADMIN icon to access of administrative functions:

- 1 ⦿ OPTIONS
- 2 ○ CHANGE ADMIN PIN
- 3 ○ CLEAR TEST TOTALS
- 4 ○ RESET DEFAULTS

Options

This function contains four functions that control user access to the charger and the Admin menu itself. Each option can be turned ON or OFF. After each selection press **SAVE** or **BACK** to return to the Admin menu without saving.

1 – USER ID
Enable (ON) or disable (OFF) USER ID login screen.

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

2 – PIN
Enable (ON) or disable (OFF) USER PIN login screen.

3 – UNREG. USER
Enable (ON) or disable (OFF) unregistered login access to the charger 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
Enable (ON) or disable (OFF) ADMIN PIN login screen for access to the Setup Menu.

Change Admin PIN

Use this function to change the five-digit Administrator PIN. Re-enter it a second time and then press **SAVE**. The default PIN is **12345**. Call Midtronics at 1.800.776.1995 for a forgotten or missing Administrator PIN.

Clear Test Totals

Use this function to clear the test totals by User ID and battery test decision. The charger will prompt the user to verify the counter should be reset to zero (0) before it continues.

NOTE: This will not clear the Lifetime Total and the Last 100 Log.

Reset Defaults

Use this function to reset Administrative options to the original factory settings. It will clear all registered users and restrict access to the charger. Use the default UNREG USER ID/PIN and the default Administrator PIN. It will clear all registered users and restrict access to the charger.

Option	Default
1 – USER ID	ON
2 – PIN	ON
3 – UNREG. USER	ON
4 – ADMIN	ON

Logos



Use the Logos utility to select one or more logos to appear at the top of your printed test results. The print default is all three logos.

- 1 ✓ TOYOTA
- 2 ✓ LEXUS

1. To deselect, remove the check marks by pressing the associated number key that corresponds to the number (1, 2, or 3) preceding the logo.
2. Repeat step 1 to select a logo.
3. Press **SAVE**.

Printer



Use the Printer function to select between an optional external IR or integrated printer (part no. A141) inserted into the Control Module.

NOTE: Test results can also be accessed and printed via the Midtronics BMIS website if tool's BMIS functionality is enabled and the tool is connected to the Midtronics server via a WiFi network and the Internet.

1. Select the PRINTER icon.
2. Select the correct printer type.
   - 1 ⦿ IR PRINTER
   - 2 ○ INTEGRATED PRINTER
3. Press **SAVE**.

Chapter 7: Software Update (MUW)

The MUW (Midtronics Update Wizard) is a TIS-based system that allows you to update the software in your GR8 Battery Diagnostic Station when new software revisions are released. The process requires the software update cable (00002-A1280) and will take approximately 15 to 20 minutes to complete. You can press the **"Cancel"** button to stop the process at any time **EXCEPT** when the charger is actually updating with the new software.

Using The Update Wizard

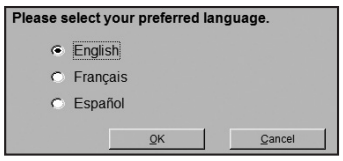
1. To launch the MUW from the TIS client navigate to:

   TIS>Diagnostics>Tools & Equipment>Battery Diagnostics>Available Software Updates

   on the TIS homepage. Click on the link to the most current Production Revision. The screen shown below will appear.



2. Click the "**Set Language**" button to run the update in English, French, or Spanish and click "**OK"** to continue.



3. Plug the charger into a dedicated, grounded nominal 15-amp or higher AC outlet and turn it on.



4. Click **"Next"** to continue.

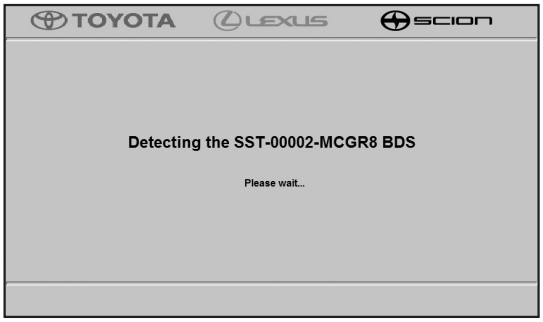
5. If a data card is installed, remove it until the software update is complete and click **"Next"** to continue.

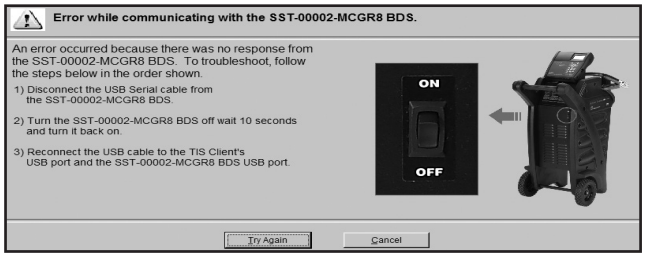


6. Connect the USB cable to the charger Control Module and the TIS client and click **"Next"** to continue.

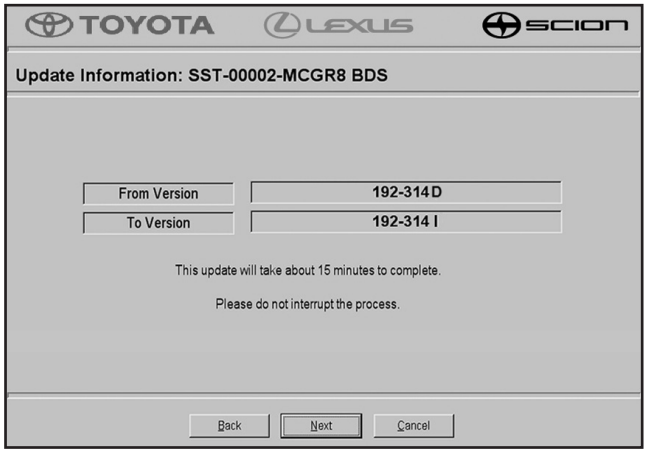


The software will attempt to detect the charger. If there is a communication problem, the MUW will display an error message with troubleshooting tips



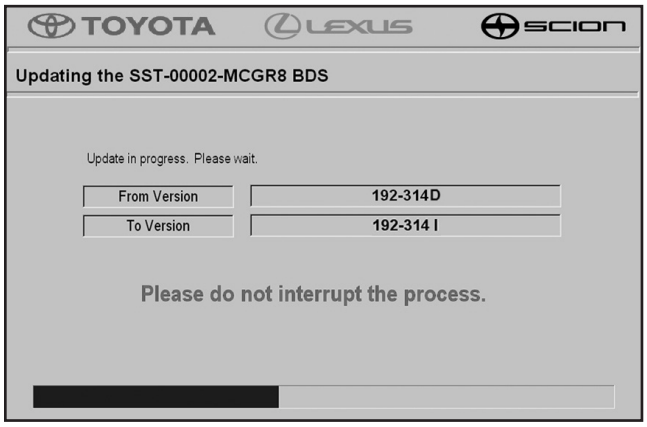


7. After troubleshooting, click "**Try Again"** to continue. Once a connection has been established, the Midtronics MUP file and version information will be displayed.

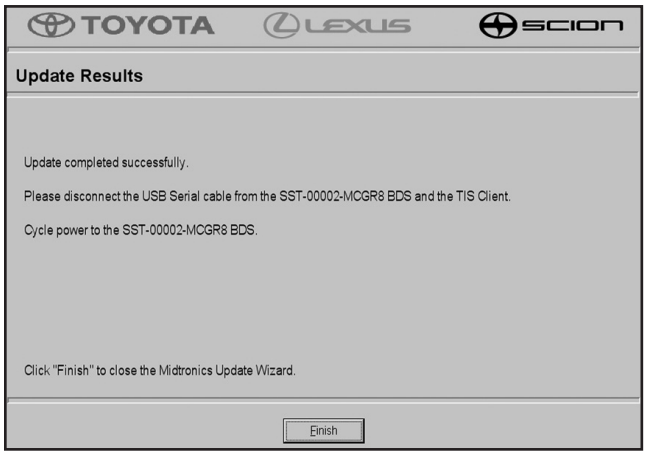


8. Click the **"Next"** button to begin the update process. The update to the charger will begin. The updating process can take 15 to 20 minutes to complete.

IMPORTANT: Do not interrupt the updating process. Stopping the updating process before it is completed will make the charger inoperable.



When the update has been completed successfully, the following screen is displayed.



10. Click **"Exit",** disconnect the USB cable from the charger Control Module, and cycle the power to the unit.

The software updating process is now complete.

Chapter 8: Maintenance & Troubleshooting

Test Messages

If troubleshooting does not solve the problem, call Midtronics Customer Service at 1.800.776.1995.

Message	Explanation
Battery Too Cold	The charger 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.
Surface Charge Detected	The battery will hold a surface charge if the engine has been running or after the battery has been charged. The charger may prompt you to remove the surface charge before it begins testing. 1. Follow the screen instructions indicating when to turn the headlights on and off. 2. The charger will resume testing after it detects that the surface charge is removed.
System Noise Detected	The charger 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 charger will automatically retest when it no longer detects system noise. If the message reappears: • 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	A battery that is weak, or that has just been charged, may retain enough electrical activity to be detected by the charger and will adversely affect the test results. A fully charged battery should stabilize quickly, after which the charger will automatically retest. Weak batteries should be charged and retested. If the battery is fully charged, check the clamp connections.

Test Cable Maintenance

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

Cleaning Clamps

- The grease, dirt, and sulfation that build up on battery terminals are highly corrosive and can damage the clamps over time. Before connecting the clamps, ensure accurate test readings and protect the clamps by cleaning the battery case and terminals using a wire brush and a mixture of water and baking soda.
- Periodically clean the clamps using a mixture of baking soda and water, or a mild hand-soap, and a small bristle brush.

Handling Test Cables

- Always connect and disconnect the clamps to the battery by opening and closing the clamps. Never pull on the test cables to remove the battery clamps. Pulling can damage the Y-junction, the cables, and the clamps to the extent that the charger may produce lower-than-expected conductance readings or fail completely.
- The charger cables are engineered to enable you to perform a full system test while sitting in the driver's seat. When not using the full length of the cables, keep them coiled with about an 8-to-10-inch diameter.

Storing Test Cables

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

If an inspection or a change in test results indicate that the test cables need to be replaced, please call Midtronics Customer Service at 1.800.776.1995.

IR Printer

The printer included with the tester is a portable thermal printer with an infrared interface. Battery voltage and head temperature compensation is used to provide constant print quality. The printer uses ***rechargeable*** batteries, not replaceable batteries, and comes with a **CHARGER** that is **NOT A POWER SUPPLY**. Therefore, if the batteries do become discharged, they must be charged for up to four hours to be fully charged. The printer will not function properly by simply plugging the charger in. For best results, follow these instructions.

The printer must only be used with (00002-A0900) charger. Using an unapproved source may void the warranty.



NOTE: To conserve battery charge, the printer will turn off after two minutes of inactivity. For frequent printer use, leave the charger plugged in at all times.

Power On Procedure

When the **STATUS** indicator is off, the printer is off. A brief press of the **MODE** button turns on the printer and turns on the **STATUS** light (green). A brief press of the **MODE** button turns the printer off. When charging the printer batteries, make sure that the printer is off.

Installing the Batteries

The printer uses four AA, NiMH (Nickel Metal Hydride) **rechargeable** batteries rated at 1.2 volt, 1600 mAH. (One set of batteries is included with the kit.)

NOTE: Be sure to purchase rechargeable batteries as specified. ***Using the printer charger with regular alkaline batteries will damage the batteries and the printer and will void your warranty.***

3. Turn the printer face down.
4. Lift the latch on the battery compartment door and remove the door.
5. Insert new batteries, making sure the positive and negative terminals are positioned correctly.
6. Insert the door's tabs into the slots on the printer and close the door, making sure the latch locks.

Charging The Batteries

Before using the printer for the first time, ***fully charge the batteries overnight for 16 hours.***

1. Make sure the printer is OFF (the green status light is off).
2. Connect the charger to the printer, then plug the charger into a standard AC power outlet.
3. After a few seconds, the printer's green LED will flash about once per second while the batteries are charging. When the batteries are fully charged, the LED will stop flashing.

Power On Self-Test

Once the printer batteries are charged, a printer self-test can be performed. The self test will check most of the printer functions (printer mechanism, control circuitry, firmware version).

With the printer LED off, hold down the **MODE** button for approximately two seconds, then release. The printer will turn on and print a self-test report. The printer is now ready for use.

Printing Data And Screen Images

In addition to the option of printing data whenever the **PRINT** command appears, you can print screen images by simultaneously pressing the **7** and **9** buttons on the tester.

IMPORTANT: When starting a new test, the last battery test in memory is overwritten. Record or print the results to retain them.

Printing Data

1. Aim the Control Module's IR data transmitter directly at the printer's IR receiver (below the **MODE** button). If the Control Module is moved away from the printer or aimed in the wrong direction, partial data or gibberish may print. The maximum distance for reliable transmission between the ports is 17" (45 cm).
2. Press **PRINT**. Keep the Control Module's IR data transmitter aligned with the printer's IR receiver until printing is complete.

Printing Screen Images

1. Align the IR data transmitter and receivers as described in step 1 above.
2. Simultaneously press the **7** and **9** keys. Be sure to keep the Control Module's IR data transmitter aligned with the printer's IR receiver until printing is complete.

Paper Feed and Tear Procedure

When the printer is on, you can manually feed paper by pressing and holding the **MODE** button for more than one second.

When removing the printout from the printer, pull the printout toward the front of the printer and tear from one side to the other across the serrated edge.

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). Replacement rolls can be purchased at most office supply stores.

1. Open the paper cup lid, and when the printer is turned on, remove the remaining paper using the **MODE** button. ***Do not pull the paper through the printer mechanism.***
2. Reel off a few inches from a new roll of paper and check that the end has a clean, straight edge.
3. Slide the leading edge of the paper into the entry point of the mechanism just below the roller, with the leading edge of the paper feeding forward from the bottom of the roll.
4. The printer will detect the paper and will feed it through to the correct position for printing.

If the paper becomes creased or out of alignment, cut the end of the paper roll and feed out the creased paper using the **MODE** button. Reload the paper, ensuring that the paper has a clean straight edge.

Printer Storage

If the printer is frequently used, ***the charger can be plugged in at all times***. If the printer is used infrequently, make sure to charge the batteries at least every two to three weeks. If the batteries are uncharged for long periods of time, they will need charging before use. Eventually, the batteries may no longer accept a charge and will need to be replaced.

The charge life of the battery pack is approximately 6000 lines (59 ft or 18 m) of continuous printing, depending on how often they are used and how well they are maintained. When they fail to hold a charge or last only a short time after charging, replacement AA NiMH rechargeable batteries are generally available anywhere batteries are sold.

NOTE: Be sure to purchase rechargeable batteries as specified. ***Using the printer charger with regular alkaline batteries will damage the batteries and the printer and will void your warranty.***

For more printer troubleshooting information, refer to the following troubleshooting guide.

Printer Troubleshooting

The **STATUS** light indicates the source of most printer problems. If troubleshooting doesn't solve the problem, call Midtronics Customer Service at 1.800.776.1995.

Problem	Solution
Printer will not print. STATUS light is off.	• Turn on the printer by pressing and holding the **MODE** button. The **STATUS** light should be on (green). If the **STATUS** light does not illuminate, follow the instructions in the next box.
STATUS light remains off after pressing the MODE button.	• The batteries must be installed and partially charged to print. • Make sure the batteries are properly installed and that they are the correct batteries (1.2 V, 1600 mAH, NiMH **rechargeable** only). Regular AA batteries will not supply enough power for the printer to function properly and will damage the printer if used with the supplied charger. **Remember: THE CHARGER IS NOT A POWER SUPPLY!** • If the batteries are of the correct type and properly installed, charge the printer overnight.
STATUS light is on, but printer won't print.	• Open the paper cup and ensure that the roll is installed correctly and that there are no foreign objects inside the paper cup. If the paper looks OK, try removing the roll and reinstalling the paper. • If the printer still doesn't print, press the **MODE** button to turn off the printer. Run a self-test on the printer by pressing the **MODE** button for three seconds. Once you release the button, the printer should print a self-test.
STATUS light flashes continuously.	• Replace the paper.
STATUS light flashes three times and pauses (ongoing).	• Make sure batteries are installed correctly, and charge the printer overnight.
Printout has missing information, or other characters.	• Something may be interfering with the IR data transmission. Make sure that the printer and tester are not in direct sunlight or directly below a fluorescent light and try printing again. OR • Charge the printer overnight. Batteries with an insufficient charge may cause inconsistent printouts.
Printout is gibberish.	• If the batteries become weak, printing will become faint, erratic, or not possible at all. Turn off the printer and charge the batteries for at least 15 minutes before attempting further printing. • Check to see what configuration your printer is in. The printer is set up at Midtronics to operate in IrDA mode, which is compatible with the charger's communications protocol. Run a self-test on the printer by pressing the **MODE** button for three seconds. Once you release the button, the printer will print out a self-test. Near the top of the printout, under the heading INFRARED PORT, it should say IRDA PHYSICAL LAYER. If it says 33Khz ENCODED, configure your printer for IrDA mode by following these steps: 1. Make sure the printer is off. 2. Press and hold the **MODE** button. After about five seconds the **STATUS** light will flash five times. 3. Now release the **MODE** button and briefly press it once. Wait until the light flashes once. 4. Next, briefly press the **MODE** button twice, then wait. After a short delay, the **STATUS** light should flash twice and the printer should power on. 5. Turn the printer off again by briefly pressing the **MODE** button. 6. Press and hold the **MODE** button. After about five seconds the **STATUS** light will flash five times. 7. Release the **MODE** button and briefly press it four times. Wait until the light flashes four times. 8. Briefly press the **MODE** button once, and then wait. After a short delay, the **STATUS** light should flash once and the printer should power on in IrDA mode. 9. Line up the IR port of the tester with the IR receiver port on the printer. Make sure the printer is on, and try printing again.

Appendix A: Glossary

A

ADMIN: A utility in the Setup Menu, which is accessible only by the charger ADMIN(istrator) when the ADMIN PIN is enabled. ADMIN controls USER ID and USER PIN access to the charger, as well as the utilities that customize the chargers features. The utility also allows the Administrator to clear test totals, reset system defaults, change the ADMIN PIN or enable/disable it.

ADMIN PIN: ADMIN Personal Identification Number. A series of five numbers in the range of 00000 to 99999 that accesses the Setup Menu. The ADMIN PIN can be enabled and disabled by ADMIN.

AGM/Flat Plate: Absorbed Glass Mat. These batteries contain cells of flat lead plates separated by a matrix of glass fibers. The fibers hold electrolyte like a sponge, making the battery non-spillable. The flat plate design makes the battery resemble standard lead acid batteries.

AGM/Spiral: Absorbed Glass Mat. Spiral is the plate configuration. AGM/Spiral Batteries contain cells of rolled lead plates between a matrix of glass fibers. The fibers hold electrolyte like a sponge, making the battery non-spillable. The battery, which resembles a six-pack, is used in automotive and some specialty applications.

Alphanumeric Keys: Control module keys that allow you to enter either numerical or alphabetical information or both, depending on the input requirements.

B

Battery Type: Refers to the battery's chemistry; see **AGM** as an example.

C

CCA: A rating system that indicates a new, fully charged battery's ability to deliver current for 30 seconds at 0 °F (-17.8 °C) before the battery voltage drops below 7.2 volts.

Clock: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that allows setting the time, mode (AM or PM), date, and format (month, day, year).

Conductance: The ability of a battery to conduct current. It is a measurement of the plate surface (unimpaired by sulfation and other defects) available in a battery for chemical reaction, which determines how much power the battery can supply.

Coupon: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that enables and disables the printing of up to three custom coupons created with the **Edit Coupon** utility in the **Setup Menu**.

D

Display: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that allows adjustments to contrast level and backlight time of the charger display.

Dynamic Conductance: Advanced Midtronics test technology that uses multiple inputs, tests, advanced processing, and filtering for better test accuracy.

Dynamic Scan Test: A test that further analyzes a deeply discharged battery to determine whether the battery should be replaced or if it has a chance to be recovered.

E

Edit Coupon: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that allows the creation of a promotional coupon or message for your customers that prints at the bottom of test results. The utility has two information screens with up to eight lines of text and a maximum of 17 characters per line.

EFB/Enhanced **F**looded **B**attery is an enhanced version of standard wet-flooded technology. The primary benefits of EFB technology are improved charge acceptance and greater cyclic durability when operating in a reduced state of charge (typical of Stop Start applications).

Electrolyte: A solution of water and sulfuric acid used in lead acid batteries to conduct current.

F

Flooded: Also called "wet cell." A type of battery that contains cells with grids of lead plates immersed in electrolyte. The flooded lead-acid battery is used in most cars.

Format Disk: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that formats a data card.

I

In-Vehicle Test: A test conducted on a battery connected to the vehicle.

Info Menu: Includes the Print/View and QC Test Utilities, a total test counter, data transfer utility (future option), the charger software, and serial number.

IR Printing: The transmission of a wireless infrared signal from the charger to a receiver on the IR printer to print test results. You can print results by pressing the **PRINT** soft key, when available, or by simultaneously pressing the **7** and **9** keys.

IR Temperature Sensor: An infrared sensor on the top left corner of the charger Control Module that is used to measure the temperature of the battery under test.

J

JIS: Japanese **I**ndustrial **S**tandard. A rating system for Japanese OEM batteries, which is shown on a battery as a combination of numbers and letters (for example: **80D26**).

K

Keypad Arrows: Arrows that allow you to navigate through the control module screens, to select options, and to input data. The keypad arrows to use are indicated by the **Directional Arrows**.

L

Language: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is available, that allows the selection of English, Spanish, or French as the charger user interface.

Logos: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that enables or disables the printing of one or more logos (Toyota, Lexus) at the top of test results.

M

Main Menu: Contains the primary functions of the charger: Battery Test and QC Mode. Also contains the Info, Setup, and Help Menus.

Menu Screen Arrows: Arrows on the bottom of the control module display that tell you which keypad arrows to use to navigate through the screens, make selections, and enter data.

MUW: Midtronics **U**pdate **W**izard. Software available on the TIS system that allows you to update the charger software.

O

Out-of-Vehicle Test: A test conducted on a battery disconnected from the vehicle.

P

Placeholder USER ID: A default USER ID, such as USER02, that occupies a place in the charger memory for the creation of personalized USER IDS.

Print Screen: A function that allows you to print a hardcopy of a screen image by simultaneously pressing the **7** and **9** keys.

Print/View: A utility in the Info Menu that allows you to view and print the results of the battery test before they are overwritten when you start a new test.

R

Remote Post: Jumper post available under the hood when the battery is hidden in the vehicle.

S

Setup Menu: A utility menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that customizes the functionality of the charger. Menu options include setting the date and time, creating custom coupons and messages for printed test results, adjusting the display contrast, and controlling access to the charger.

Shop: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that allows the creation of a header for printed test results showing business location information. The utility has three screens with up to 12 lines of text and a maximum of 17 characters per line.

Side Post: Posts located on the side of the battery case.

Soft Keys: Two keys located below the control module's display that are linked to screen commands

State-of-Charge (SOC): The amount of charge in the battery. SOC is used to determine if the battery needs to be charged.

State-of-Health (SOH): A measure of a battery's condition relative to a fresh battery, i.e., whether it needs to be replaced.

T

Temp: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, that allows the selection of the temperature units of measurement: Fahrenheit or Celsius.

Top Post: A post on the top of the battery case.

Transfer: A future optional utility (with an icon in the Info Menu) that will transfer test data stored in the charger to a computer. The utility will consist of a software and hardware package.

U

Update: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, updates the charger software via a data card.

USER ID: A login name (**Id**entification) containing a maximum of seven alphanumeric characters used to access to the charger. USER IDs can be enabled and disabled by the charger ADMIN(istrator).

USER PIN: Personal **I**dentification **N**umber. A series of four numbers in the range of 0000 to 9999 that is used to authenticate USER IDs and gain access to the charger. USER PINs can be enabled and disabled by the charger ADMIN(istrator) without disabling the USER ID, if required.

Users: A utility in the Setup Menu, which is accessible only by ADMIN when the ADMIN PIN is enabled, the allows the creation, editing, and deletion of USER IDS and USER PINS.

Appendix B: Templates

Header Template

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

Coupon Template

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

PATENTS

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

LIMITED WARRANTY

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

SERVICE

To obtain service, contact Midtronics at 866-592-8052. Have your model and serial numbers ready. This first step is critical as we will trouble-shoot the problem(s) over the phone, and many problems are resolved during this step. If the problem cannot be resolved, then the Customer Service Agent will issue you a Return Material Authorization (RMA). This number becomes your tracking number. The final step is to return the unit to Midtronics freight prepaid (you pay), to the attention of the RMA number obtained.

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

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

Midtronics will service and return the unit using the same type of service as received. If Midtronics determines that the failure was caused by misuse, alteration, accident, or abnormal condition of operation or handling, purchaser will be billed for the repaired product and it will be returned freight prepaid with shipping & handling charges added to the invoice. Midtronics products beyond the warranty period are subject to the repair charges in place at that time. Optional re-manufacturing service is available to return our products to like-new condition. Out-of-warranty repairs carry a 3-month warranty. Re-manufactured units purchased from Midtronics are covered by a 6-month warranty.

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