



Battery Management Innovation

MODEL GR1 240

BATTERY MANAGEMENT CENTER



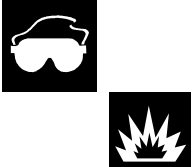


INSTRUCTION MANUAL

TABLE OF CONTENTS

PRECAUTIONS	4
SAFETY INSTRUCTIONS	5
SPECIFICATIONS	9
General	9
Output ratings	9
Input ratings	9
OPERATION	10
Front panel	10
Back panel	10
GR-1 Operating Steps	11
Important Notes	11
1. Connect GR-1 to battery	11
2. Connect to AC power	11
3. Select GR-1 modes	11
4. Select type	11
5. Select charge current	12
6. Select Standard	12
7. Set rating	12
8. Enter Charging Time (Manual charge only)	12
GR-1 Functions	13
1. Diagnostic Fast Charge (12 V)	13
Diagnostic Charging	13
Fast Charging a battery	13
Top-Off mode	14
Diagnostic Acceptance charge	14
2. Manual charge (12 and 24 V)	14
Timed charging (between 5 and 120 minutes)	14
Continuous charging	15
3. Jump Start Vehicle	15
OPTIONS	16
1. View BMC Code	16
2. View last test data	16
3. Print last test data	16
4. Language	16
TROUBLE-SHOOTING	17
Messages	17
Operation	17
GR-1 ASSEMBLY	18
Handle installation	18
NOTES	18
PATENTS	BACKCOVER

***** PRECAUTIONS *****

Always use the following precautions when working with batteries:

DANGER / POISON	
	SHIELD EYES EXPLOSIVE GASES CAN CAUSE BLINDNESS OR INJURY
	NO SPARKS NO FLAMES
	SULFURIC ACID CAN CAUSE BLINDNESS OR SEVERE BURNS

SAFETY INSTRUCTIONS

IMPORTANT: READ AND SAVE THIS SAFETY AND INSTRUCTION MANUAL. KEEP IT WITH OR NEAR GR-1 AT ALL TIMES.

IMPORTANT SAFETY INSTRUCTION

- WORKING IN THE VICINITY OF A BATTERY CAN BE DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION, AND WHEN DISCHARGED OR CHARGED. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT EACH TIME BEFORE USING YOUR GR-1, YOU RE-READ THIS MANUAL AND MAKE CERTAIN YOU FULLY UNDERSTAND IT AND FOLLOW THE SAFETY AND OPERATING INSTRUCTIONS EXACTLY.**
- 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 engine, and on vehicle or equipment containing the battery.
- CAUTION:** To reduce the risk of injury, charge only rechargeable LEAD-ACID TYPE batteries, which may include **MAINTENANCE-FREE, LOW-MAINTENANCE, AGM/SPIRAL, GEL or DEEP CYCLE** batteries. Other types of batteries may burst causing personal injury and damage. **NEVER RECHARGE NON- RECHARGEABLE 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.
- 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.
- To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting GR-1.
- Position 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.
- Do not operate GR-1 if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified service center.
- Do not disassemble GR-1; take it to a qualified service center when repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
- If the GR-1 is in need of service, call Midtronics at **+31 (30) 6868 150**
- To reduce risk of electric shock, unplug GR-1 from the AC outlet before attempting any maintenance or cleaning. Turning off the controls only will not reduce this risk.
- BOAT BATTERIES MUST BE REMOVED AND CHARGED ON SHORE. TO SAFELY CHARGE THEM ON BOARD REQUIRES EQUIPMENT ESPECIALLY DESIGNED AND UL/CE LISTED FOR MARINE USE.**
- Do not overcharge battery. See Safety Instructions (3)**
- Connect and disconnect battery leads only when AC supply cord is disconnected.
- When charging a battery, locate in a dry, well-ventilated area.
- Never place articles on or around GR-1, or locate GR-1 in a way that will restrict the flow of cooling air through cabinet.
- An extension cord should not be used unless absolutely necessary.
- Have damaged cord or plug replaced immediately only by a qualified service center to prevent risk of electric shock or fire.
- Do not expose GR-1 to wet weather conditions.

PERSONAL PRECAUTIONS

1. Always have someone within range of your voice, or close enough to come to your aid, when working around batteries.
2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
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.
4. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flush with running cold water for at least 10 minutes and get doctor's attention.
5. **NEVER** smoke or allow a spark or flame in vicinity of battery or engine.
6. Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short circuit the battery or other electrical part that may cause an explosion.
7. Before working with a battery, remove personal metal items such as rings, bracelets, necklaces, watches, etc. A battery can produce a short circuit current high enough to weld such items causing a severe burn.
8. Use charger for charging LEAD ACID batteries only. The GR-1 is not intended to supply power to a low-voltage electrical system other than applications using rechargeable type batteries. Do not use battery charger for charging dry-cell batteries commonly used with home appliances. These batteries may burst and cause personal injury and property damage.
9. NEVER charge a frozen battery, thaw it out first. Charging will then be safer and more efficient.

PREPARING THE BATTERY

1. If necessary to remove battery from vehicle to charge, always remove grounded terminal from battery first. Make sure all accessories in the vehicle are off so as not to cause an arc.
2. Use stud adapters on side-post and/or Truck batteries that are not in the vehicle.
3. Be sure area around battery is well ventilated while battery is being charged. Using a piece of cardboard or other nonmetallic material as a fan can forcefully blow gas away.
4. Clean battery terminals. Be careful to keep corrosion from coming into contact with your eyes.
5. Add distilled water in each cell until battery acid reaches level specified by manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without caps, carefully follow the manufacturer's recharging instructions.
6. Study all battery manufacturers' specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.
7. Determine the voltage of the battery and make sure that the output voltage menu selection is set at the correct voltage.

GR-1 LOCATION

1. Locate GR-1 as far away from battery as GR-1 cables permit.
2. Never place GR-1 directly above battery being charged; gases from battery will corrode and damage GR-1.
3. Never allow electrolyte to drip on GR-1 when taking gravity readings or filling a battery.
4. Operate GR-1 only in well-ventilated area, free of dangerous vapors.
5. Store GR-1 in safe, dry location and maintain in perfect condition.
6. Do not set battery on top of GR-1 or where its acid might drip onto GR-1.
7. Locate charger so that the plug is accessible at all times.

DC CONNECTION PRECAUTIONS

1. Set the GR-1 switch in the O position and AC cord should be **DISCONNECTED** from electrical outlet before you connect and disconnect GR-1 clamps. Never allow clamps to touch each other.
2. When attaching GR-1 clamps, be certain to make the best possible mechanical as well as electrical connection. Clamps should be kept clean.

AC POWER CORD CONNECTION INSTRUCTIONS

1. GR-1 should be grounded to reduce risk of electric shock. GR-1 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. This battery charger is for use on a 230 AC V circuit.
2. **DANGER: NEVER ALTER AC CORD OR PLUG PROVIDED-IF IT WILL NOT FIT OUTLET, HAVE PROPER OUTLET INSTALLED BY A QUALIFIED ELECTRICIAN. IMPROPER CONNECTION CAN RESULT IN THE RISK OF AN ELECTRIC SHOCK.**
3. An extension cord should not be used unless absolutely necessary. Use of improper extension cord could result in a risk of fire and electric shock. If extension cord must be used, make sure that:
 - a) Pins on extension cord are the same number, size, and shape as those of plug on GR-1;
 - b) Extension cord is properly wired and in good electrical condition; and
 - c) Wire size is large enough for AC ampere rating of GR-1 as specified in the following table:

RECOMMENDED MINIMUM AWG SIZE FOR EXTENSION CORDS WHEN USED WITH BATTERY CHARGERS					
AC Input Rating, Amperes		Length of Cord, Feet			
Equal to or greater than...	But less	25	50	100	150
	than...	AWG Size of Cord			
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

GR-1 CONNECTION - BATTERY IN VEHICLE

1. Before working on vehicle, firmly apply emergency brake and place gearshift to **NEUTRAL** – shift an automatic transmission to **P**.
2. Locate GR-1 as far away from battery as GR-1 cords permit and position AC and DC cords to avoid stepping on or tripping over them and to prevent damage by hood, doors, or moving engine parts.
3. Stay clear of fan blades, belts, pulleys, and any other parts that can cause physical injury.
4. Turn **OFF** all vehicle loads, including door lights, and correct any defects in car's electrical system that may have caused low battery.
5. Check polarity of battery posts. The **POSITIVE (+)** post usually has larger diameter than **NEGATIVE (-)** post.
6. Determine which post of battery is grounded (connected) to chassis. If negative post is grounded see step 7. If positive post is grounded see step 8.
7. For negative-grounded vehicle, first connect **POSITIVE (red)** clamp from GR-1 to **POSITIVE (+)** ungrounded post of battery. Then connect **NEGATIVE (BLACK)** clamp to **NEGATIVE (-)** post of battery. Do not connect clamp to carburetor, fuel lines, or sheet metal body parts. Connect to a heavy gauge metal part of frame or engine block. When disconnecting charger, turn switches OFF, disconnect AC cord, remove clamp from vehicle chassis, and then remove clamp from battery terminal.
8. **For positive-grounded vehicle, connect NEGATIVE (BLACK) clamp from charger to NEGATIVE ungrounded post of battery. Then connect POSITIVE (RED) clamp to vehicle chassis or engine block away from battery.** Do not connect clamp to carburetor, fuel lines, or sheet metal body parts. Connect to a heavy gauge metal part of frame or engine block. When disconnecting charger, turn switches OFF, disconnect AC cord, remove clamp from vehicle chassis, and then remove clamp from battery terminal.

GR-1 CONNECTION—BATTERY NOT IN VEHICLE

If necessary to remove battery from vehicle or equipment, always remove grounded terminal from battery first.

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

FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE. A SPARK NEAR BATTERY MAY CAUSE AN EXPLOSION. TO REDUCE RISK:

1. Check polarity of battery posts. **POSITIVE (+)** post usually has larger diameter than **NEGATIVE (-)** post.
2. Connect **POSITIVE (RED)** GR-1 clamp to **POSITIVE (+)** post of battery.
Connect **NEGATIVE (BLACK)** GR-1 clamp to **NEGATIVE (-)** post of battery.

SPECIFICATIONS

GENERAL

Lead-acid batteries: GEL, AGM/SPIRAL, Flooded

Number of cells: 6

Rated capacity: 5 to 250 Ampere-hours

Note: A 24 V operation consists of two 12 V (6cell) batteries connected in series.

OUTPUT RATINGS

DC Voltage	Amps	Type of charge	Charge time
12 V	10 A	Slow charge	Continuous
12 V	30 A	Medium charge	Continuous
12 V	60 A	Fast charge	Continuous
12 V	80 A	Boost charge	1 minute max on 3 minutes max off
12 V	250 A	Engine start	5 seconds max on 3 minutes min off
24 V	30 A	Medium charge	Continuous

INPUT RATINGS

230 V AC (6A / 9A / 23A) 50Hz

OPERATION

Visually inspect the battery before charging. If there are any signs of a leaking or cracked case, discard the battery.

Do not attempt to charge a battery that is in this condition.

FRONT PANEL

Under the display, there are 5 push buttons and an ON/OFF switch.



The **UP/DOWN** buttons are used for scrolling through selections on the display and to increase/decrease displayed values.



The **ENTER** button is used to accept the displayed selection and to continue to the next step.



The **INFO** button is used to enter the options menu, which accesses the Languages, BMC Code, Last Test Data and Print feature.



The **STOP** button is used to abort any charging cycle. During menu selections, it can be used to go back to the previous step.

BACK PANEL

The back panel contains the positive and negative charging cables, the AC power cord, and a 9-pin connector.

The 9-pin connector is used to connect the serial printer to.

Note: The 9-pin connector is also used for Service related items but only by authorized factory and service technicians. Improper use of this connector will result in damage to the GR-1.

The handle, which attaches to the back panel, includes a clamp-holder bar. When used consistently, this feature adds safety, convenience and longer operating life to the clamps, cables, and GR-1.

GR-1 OPERATING STEPS

IMPORTANT NOTES:

- Clean the battery terminals. If stud adapters are required, fasten them with the proper tool. Do not use the battery clamps to tighten adapters.
- Use stud adapters on Side-Post and/or Truck batteries that are not in the vehicle.
- Never remove the clamps from a battery to abort an active charging session. Always use the STOP button before removing the clamps.
- Do not leave clamps lying in battery acid.
- Attach clamps to clamp-holder bar when the GR-1 is not in use.
- Clean up any acid spills immediately (e.g., with baking soda and water).
- Clamps must be cleaned after every use.

1. CONNECT GR-1 TO BATTERY

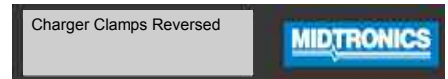
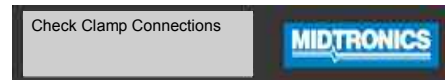
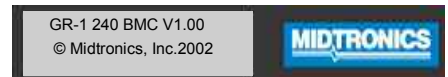
Connect the GR-1 charging clamps to the battery in accordance with all precautions and safety instructions.

2. CONNECT TO AC POWER

Plug the GR-1 into a dedicated, grounded 16 Amp AC outlet. Do not use an AC line cord adapter or extension cord. Toggle the power switch to the I (ON) position.

The user will be informed if any side of the GR-1 clamp is not making good contact.

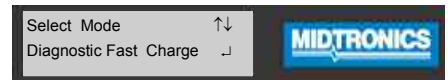
If you accidentally reverse the clamp connections, the GR-1 will indicate this with a message and an audible alarm. Toggle the power switch to the O position and return to [GR-1 Operating Steps \(1\)](#)



3. SELECT GR-1 MODES

Use the UP/DOWN buttons to select the mode: Diagnostic Fast Charge, Manual Charge or Jump Start Vehicle.

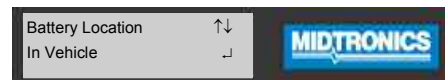
Press the ENTER button to continue.



DIAGNOSTIC FAST CHARGE (12 V)

If Diagnostic Fast Charge is selected use the UP/DOWN buttons to select the location of the battery: In Vehicle or Out of Vehicle.

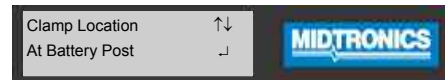
Press the ENTER button to continue.



If the selected location for the battery was Out of Vehicle, go to [GR-1 Operating Steps \(4\)](#)

If the selected Battery Location was In Vehicle, use the UP/DOWN buttons to select the location for connecting the clamp: At Battery Post, At Jumper Post, or At Side Post.

Press the ENTER button to continue. Go to [GR-1 Operating Steps \(4\)](#)



MANUAL CHARGE (12 and 24 V)

If the selected Mode was Manual Charge, go to [GR-1 Operating Steps \(4\)](#)

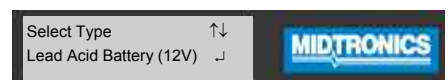
JUMP START VEHICLE

If the selected Mode was Jump Start Vehicle, see [GR-1 Functions \(3\)](#)


4. SELECT TYPE

Use the UP/DOWN buttons to select the battery type: Lead Acid Battery(12V or 24V), AGM/Spiral Battery(12V), GEL Battery(12V) or Truck (12V).

Press the ENTER button to continue.

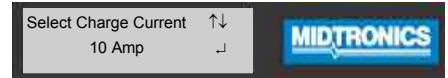


5. **SELECT CHARGE CURRENT** (Manual Charge Only!)


If the selected Mode was Manual Charge, use the UP/DOWN  buttons to select the desired output current: 10 Amp, 30 Amp or 60 Amp.

Press the ENTER  button to continue.

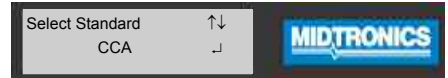
Note: when in doubt, start with the lowest charging rate.



6. **SELECT STANDARD**

Use the UP/DOWN  buttons to select the battery standard: CCA, CA, MCA, JIS#, DIN (A), SAE (A), IEC (A) or EN (A).

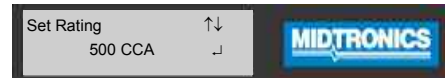
Press the ENTER  button to continue.



7. **SET RATING**


Use the UP/DOWN  buttons to enter the battery rating.


Press the ENTER  button to continue.






If the selected Mode was Diagnostic Fast Charge, the charging cycle will begin. If the selected Mode was Manual Charge, go to [GR-1 Operating Steps \(8\)](#) See also [GR-1 Functions \(1\)](#)

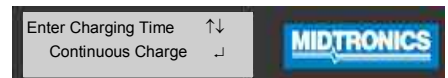
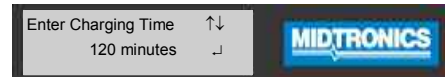
8. **ENTER CHARGING TIME** (Manual Charge Only)

If the selected Mode was Manual Charge, use the UP/DOWN  buttons to select the desired charging time: from 5 minutes up to Continuous Charge.

Press the ENTER  button to begin the timed charge.

Using the UP  button past 120 minutes will select the Continuous Charge mode.

Press the ENTER  button to begin the continuous charge. (The STOP  button is used to turn off continuous charging.) See also [GR-1 Functions \(2\)](#)



GR-1 FUNCTIONS

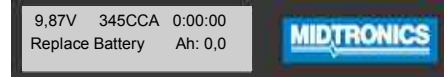
1. DIAGNOSTIC FAST CHARGE (12 V)

The GR-1 will control and monitor the entire charging session including: initial diagnostic testing, initial diagnostic charging, data analysis, charging duration, charging level, charging rate, top-off charging (when appropriate) and final diagnostic testing.

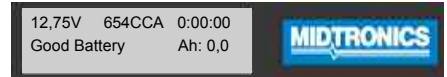
The GR-1 will perform a number of tests prior to the actual charging. While performing these diagnostic tests, the display may show a moving status bar.



If the GR-1 detects a defective battery it will stop and display one of the following results: Replace Battery or Bad Cell Battery.

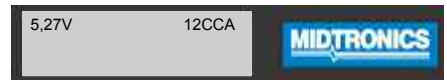


If the GR-1 detects that the battery has reached sufficient state-of-charge and cold cranking amps it will stop and displays the result: Good Battery

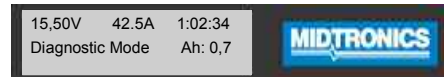


DIAGNOSTIC CHARGING

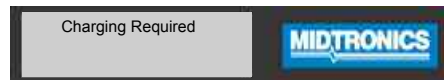
If the analysis finds a battery with insufficient state-of-charge, the GR-1 briefly displays the measured voltage and available starting current, and then begins the diagnostic charging mode. This mode greatly enhances the GR-1's ability to judge hard to diagnose batteries.



The length of time required for diagnostic charging varies, depending on the type of battery being charged. During this first diagnostic mode (which does not exceed 4 minutes), the GR-1 keeps the user informed by displaying the following information: Charging voltage, Charging current, remaining time to charge, charging mode, and the amount of charge put back into the battery (shown in Ah).



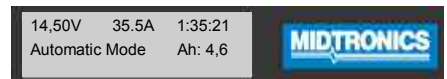
This first diagnostic charging mode will detect whether the battery is capable of accepting charge or not. Having detected this it will proceed to the main Diagnostic Fast Charge mode. The GR-1 alerts the user of this transition with a message and an audible tone.




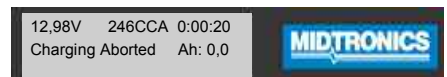
FAST CHARGING A BATTERY

The GR-1 controls the charging voltage and charging current based on its analysis of the diagnostic testing data, diagnostic charging data and the battery information that was selected by the user. It continuously monitors the battery and analyzes the charging progress during the entire timed automatic charging session. In some cases, the GR-1 may find a battery to be defective before the end of the estimated time to charge. In other cases, the GR-1 may detect that the battery accepted the charge more quickly than estimated. With either case, the GR-1 will alert the user with an audible alarm and an appropriate message.

During charging, the GR-1 keeps the user informed by displaying the following information: Charging voltage, Charging current, Remaining time to charge, Charging mode and the amount of charge put back into the battery (shown in Ah).



Note: If at any time the GR-1 needs to be stopped, press the STOP  button and the charging session will be aborted.

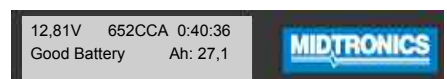


CHARGE COMPLETION

The Diagnostic Fast Charge session is complete when the proper amount of charge is put back into the battery or the remaining time to charge goes to zero. The GR-1 will then perform its final diagnostic tests on the battery.



When the analysis is complete, the GR-1 will alert the user with an audible alarm and will display the following information: battery voltage, available current in CCA, total charging time, battery condition, and the final amount of charge put back into the battery (Ah). Details can be found on the print-out.



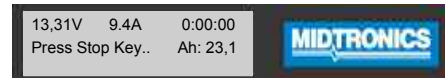
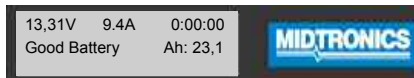
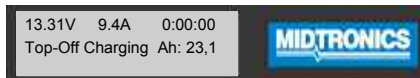
TOP-OFF MODE

When the GR-1 has finished its charging cycle and the result was Battery Good it will go in to Top-Off Mode. In this charging mode the battery is charged with a low current. The operator has the possibility to end the Top-Off Mode by pressing the Stop key or the GR-1 will stop itself when the Charging current drops below 2 A. GR-1 alerts the user of this transition with a message and an audible tone.



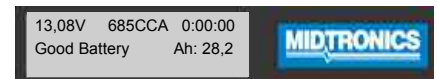
During Top-Off Mode, the GR-1 sounds an audible alarm every minute, and keeps the user informed by displaying the following information: Charging voltage, Charging current, Top-Off Mode message and the amount of charge put back into the battery (shown in Ah).

Cycled messages inform the user that the battery is ready to be put back into service: Top-Off Mode / Good Battery / Press Stop Key.



CHARGE COMPLETION

When Top-Off Mode is complete, the GR-1 will alert the user with an audible alarm and will display the following information: Battery voltage, available starting current in CCA, battery condition, and the final amount of charge put back into the battery (in Ah). Details can be found on the print-out.



The audible alarm will sound every 30 seconds, until the user presses the STOP  button.

DIAGNOSTIC ACCEPTANCE CHARGE

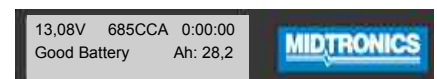
During the Diagnostic Fast Charge mode the GR-1 can detect that the battery does not accept current as expected. This means that the GR-1 switches over to the Diagnostic Acceptance Mode. In this mode the battery will be monitored to see if it accepts a lower charging current than what normally is used.

The Diagnostic Acceptance Charge mode will switch the charging current at fixed time intervals in an effort to fully charge the battery.

When the GR-1 detects that the battery picks-up charging current it can switch over to the Diagnostic Fast Charge mode again.

CHARGE COMPLETION

When Diagnostic Acceptance Charge is complete, the GR-1 will alert the user with an audible alarm and will display the following information: Battery voltage, available starting current in CCA, battery condition and the final amount of charge put back into the battery (in Ah). Details can be found on the print-out.



The audible alarm will sound every 30 seconds, until the user presses the STOP  button.

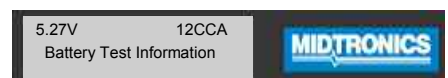
2. MANUAL CHARGE (12 and 24 V)

The GR-1 prompts the user to select the battery type, standard and rating. In addition to that the charging current and charging time needs to be entered as described in the Operating Steps (4 - 8).

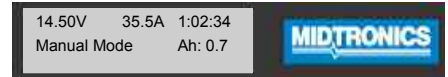
The GR-1 charges the battery based on the voltage, current, and time that the user selects. It does not continuously monitor the battery nor analyze the charging progress in an effort to optimize charging levels or reduce charging time.

TIMED CHARGING (Between 5 and 120 minutes)

If a charging time is selected the GR-1 will analyze the battery briefly display the measured voltage and available starting current in CCA and then begin charging at the selected levels.



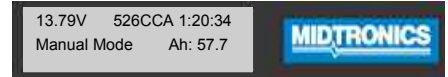
During charging, the GR-1 keeps the user informed by displaying the following information: charging voltage, charging current, remaining time to charge, charging mode (Manual Mode), and the amount of charge put back into the battery (shown in Ah).



CHARGE COMPLETION

The manual charge session is complete when the selected, remaining time to charge goes to zero. The GR-1 will measure and record the final parameters of the battery. Details can be found on the print-out.

When the measurement is complete, the GR-1 will alert the user with an audible alarm and will display the following information: battery voltage, available starting current in CCA, total charging time, charging mode, and the final amount of charge put back into the battery (shown in Ah). Details can be found on the print-out.



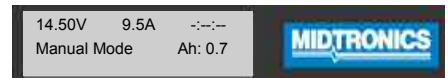
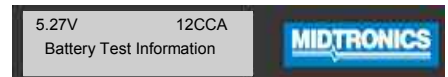
The audible alarm will sound every 30 seconds, until the user presses the STOP button.

CONTINUOUS CHARGING

If Continuous Charge is selected, the GR-1 will analyze the battery briefly, display the measured voltage and available starting current in CCA and then begin charging at the selected levels.

The user must press the STOP button to stop the charging session.

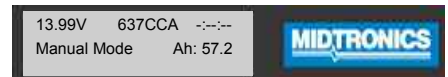
During charging, the GR-1 keeps the user informed by displaying the following information: charging voltage, charging current, charging mode (Manual Mode), and the amount of charge put back into the battery (in Ah).



CHARGE COMPLETION

The Continuous Charge session is complete when the STOP button is pressed. The GR-1 will measure and record the final parameters of the battery. Details can be found on the print-out.

When the measurement is complete, the GR-1 will sound an audible alarm and display the following information: battery voltage, available starting current in CCA, charging mode, and the final amount of charge put back into the battery (shown in Ah).



The audible alarm will sound every 30 seconds until the user presses the STOP button again, or disconnects the charger clamps from the battery.

Note: If the 60 Amp mode is selected for manual or continuous charging, see GR-1 Operating Steps (5), the GR-1 will automatically switch the output to the 30 Amp mode after one hour.

3. JUMP START VEHICLE

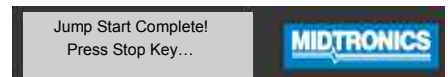
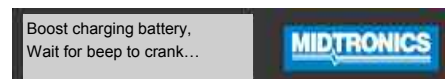
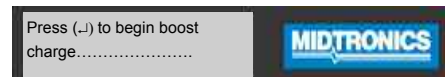
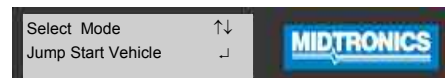
This mode makes high output current available to boost charge an in-vehicle battery as well as assist in starting the engine.

The GR-1 will prompt the user to begin “boost charging” the battery. This will greatly improve the ability to start the engine when it’s time to crank the engine.




The GR-1 informs the user that the battery is being “boost charged”. This process will take less than a minute.

When the GR-1 determines the optimal time to crank the engine, it will inform the user. The user can crank the engine for up to 5 seconds.

The GR-1 will inform the user when the jump start function is complete.



OPTIONS

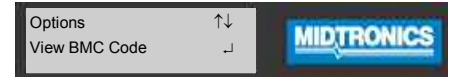
The following options can be selected by pressing the INFO  button as the first selection after the GR-1 is turned on. Pressing the ENTER  button after a charge session has been completed (or aborted) will display the BMC Code. To exit the BMC Code display and to access the other options, press the INFO  button again.


1. VIEW BMC CODE

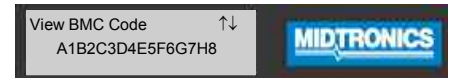
A BMC code can be viewed at the end of the charging session and anytime before the next charging session. A new BMC code automatically overwrites the previous BMC code.


Press the INFO  button.

Use the UP/DOWN  buttons to select View BMC Code.



Press the ENTER  button to display the BMC Code for the most recently completed charge session.




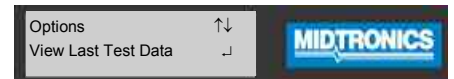
Press the INFO  button to return to the Options menu.


The BMC code may be required for proper warranty processing. The BMC code may be used to enforce warranty policy and to insure testing procedures are followed.

2. VIEW LAST TEST DATA


Press the INFO  button.

Use the UP/DOWN  buttons to select View Last Test Data.



Press the ENTER  button to display the results for the most recently completed charge session.

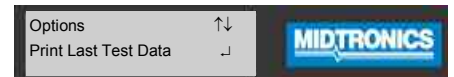
The GR-1 saves the following, final test data: battery voltage, available starting current in CCA, total charging time, battery condition, and the final amount of charge put back into the battery shown in Ah.

Press the INFO  button to return to the Options menu.

3. PRINT LAST TEST DATA


Press the INFO  button.

Use the UP/DOWN  buttons to select Print Last Test Data.



Press the ENTER  button to start printing.

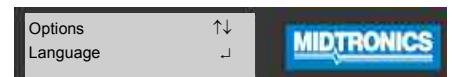
The GR-1 saves the following, final test data: battery voltage, available starting current in CCA, total charging time, battery condition, and the final amount of charge put back into the battery shown in Ah.

Press the INFO  button to return to the Options menu.


4. LANGUAGE

Press the INFO  button.


Use the UP/DOWN  buttons to select Language.



Press the ENTER  button to continue.

Use the UP/DOWN  buttons to select a language from the list.

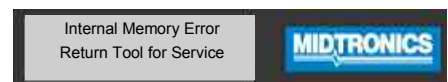
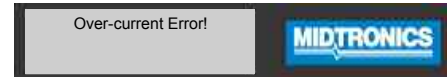
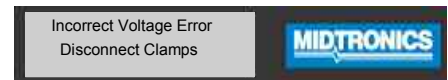
Press the ENTER  button to save the new language selection and to return to the Options menu.

Press the INFO  button again to return to the Functions menu.

TROUBLE-SHOOTING

MESSAGES

1. The “Incorrect Voltage Error” message means that the user has made an incorrect menu selection (e.g. selected 12V but connected to 24V) or it means that the GR-1 was connected across a battery voltage that the GR-1 is not rated for.
2. The “Overcurrent Error!” message means that a battery or vehicle electrical system has tried to draw too much current from the GR-1. Observe all ratings, limits, precautions and warnings. Check all connections and GR-1 menu selections.
3. The “Part Number Corrupt!” message means that the information for a particular JIS battery number is corrupt. Except for testing with this JIS number, the GR-1 is fully functional. Obtain the actual CCA rating for the battery and input this CCA value for “Battery Rating” instead of using the JIS number.
4. The “Internal Memory Error” message means that an internal error has occurred in the GR-1 and it should be sent back for service.



OPERATION

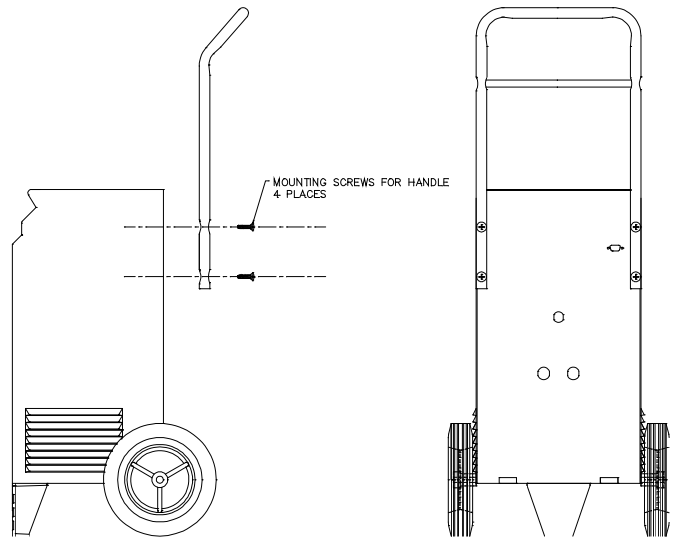
1. The ON/OFF switch is toggled to the on position but the GR-1 does not power-up.
 - a. Make sure the AC power cord is completely inserted into the AC outlet.
 - b. Make sure the AC outlet is live (check fuse or circuit breaker).
 - c. Check the AC power cord for damage.
2. The GR-1 is on, the clamps are connected per Instruction Manual, but the display still shows “Check Clamp Connections”.
 - a. Make sure that both jaws of the charging clamp come in good contact with the connection point. “Check Clamp Connections” will remain on the display, as long as half of one clamp is not making good contact.
3. The GR-1 is displaying messages in the wrong language.
 - a. See OPTIONS (4): Language.

GR-1 ASSEMBLY

HANDLE INSTALLATION

CAUTION: THE GR-1 MUST BE FULLY ASSEMBLED BEFORE OPERATING.

1. Locate the handle and hardware provided.
2. Position the handle, so that the angle faces away from the back of the GR-1 and so that all mounting holes line up. Refer to the drawing.
3. Use all 4 screws to attach the handle to the back of the GR-1.



NOTES

Patents

This charger is made in the U.S.A. by MIDTRONICS, INC. and is protected by one or more of the following U.S. Patents: 6,172,505; 6,172,483; 6,163,156; 6,137,269; 6,104,167; 6,091,245; 6,081,098; 6,051,976; 6,037,777; 6,002,238; 5,945,829; 5,914,605; 5,831,435; 5,821,756; 5,757,192; 5,598,098; 5,592,093; 5,585,728; 5,574,355; 5,572,136; 5,343,380; 5,140,269; 4,912,416; 4,881,038; 4,825,170; 4,816,768; Canadian patents: 2,091,262; 1,295,680; 1,280,164; United Kingdom patents: 0,672,248; 0,417,173; German patents: P693 25 388.6; P689 23 281.0-08; European patent: 0,548,266; Japanese patent: 3006800; 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.



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