MAGNUM ENERGY

ME-RC

Remote Control

Owner's Manual

(for revision 1.6 or higher)

Disclaimer of Liability

Since the use of this manual and the conditions or methods of installation, operation, use and maintenance of the ME-RC are beyond the control of Magnum Energy Inc., this company does not assume responsibility and expressly disclaims liability for loss, damage or expense, whether direct, indirect, consequential or incidental, arising out of or anyway connected with such installation, operation, use, or maintenance.

Due to continuous improvements and product updates, the images shown in this manual may not exactly match the unit purchased.

Restrictions on Use

The ME-RC remote shall not be used in connection with life support systems, life saving or other medical equipment or devices. Using the ME-RC with this particular equipment is at your own risk.

Important Product Safety Instructions

This manual contains important safety instructions that must be followed during the installation and operation of this product. Read all instructions and safety information contained in this manual before installing or using this product.

- All electrical work must be performed in accordance with local, state and federal electrical codes.
- This product is designed for indoor / compartment installation. It must not be exposed to rain, snow, moisture or liquids of any type.
- Use insulated tools to reduce the chance of electrical shock or accidental short circuits.
- Remove all jewelry such as rings, watches, bracelets, etc., when installing or performing maintenance on the inverter.
- Always disconnect the batteries or energy source prior to installing or performing maintenance on the inverter. Live power may be present at more than one point since an inverter utilizes both batteries and AC. Turning off the inverter may not reduce this risk. As long as AC power is connected, it will pass thru the inverter regardless of the power switch on the inverter or the ON/OFF INVERTER pushbutton on the remote.

Safety Symbols

To reduce the risk of electrical shock, fire, or other safety hazard, the following safety symbols have been placed throughout this manual to indicate dangerous and important safety instructions.

Warning: This symbol indicates that failure to take a specified action could result in physical harm to the user.

Caution: This symbol indicates that failure to take a specified action could result in damage to the equipment.

Info: This symbol indicates information that emphasizes or supplements important points of the main text.

Remedy: This symbol provides possible solutions for related issues.

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1.0 Overview

The ME-RC remote control allows you to monitor and customize the operating parameters to your Magnum inverter/charger. It is the same remote used on all Magnum inverter/charger models in the ME, MM, MS, and the RD Series lines so there is no cross-platform confusion.

The ME-RC50 comes standard with a 50 foot, 4-conductor (twisted-pair) telephone cable and includes non-volatile memory; which preserves adjustable settings, even if power to the remote or inverter is removed. The Magnum remote control has all of the programming and operation functions included in an easy-to-use package.

This manual is for the ME-RC with revision 1.6 or higher; see the *TECH: 02 Revisions* display on page 16 for information on how to determine your revision level.

Figure 1-1, Front Panel Features

The ME-RC is equipped with the following features:

- **LED Indicators -** The at-a-glance LEDs provide the inverter/charger status in a straightforward way.
- **LCD Display -** The LCD display is a 16 x 2 line (32 characters total), alphanumeric display, used for setting up the inverter/charger operation as well as viewing current status or fault messages.
- **ON/OFF Pushbuttons (x2) -** Allows the inverter or charger to be independently and quickly enabled or disabled.
- **Menu Pushbuttons (x5) -** The menu pushbuttons allow the inverter or charger to be configured to your specific system preferences. These menus also allow simple access to menu items that can help with monitoring and troubleshooting your inverter/charger system.
- **Rotary Knob -** The rotary encoder knob is similar to a dash radio knob and used to quickly scroll through and select various menu items and settings. Push the rotary knob to "SELECT" a menu item or to "save" a setting once it is displayed on the LCD screen.

2.0 Installation

Before installing the remote, read the entire installation section to determine how you are going to install your ME-RC. The more thorough you plan in the beginning, the better your inverter needs will be met.

Info: Installations should be performed by qualified personnel, such as a licensed or certified electrician. It is the installer's responsibility to determine which safety codes apply and to ensure that all applicable installation requirements are followed. Applicable installation codes vary depending on the specific location and application.

Info: Review the "Important Product Safety Information" on the front inside cover page before any installation.

2.1 Installation Guidelines

• Before connecting any wires, determine the remote cable route throughout the home or vehicle/boat both to and from the inverter.

• Always check for existing electrical, plumbing or other areas of potential damage BEFORE drilling or cutting into walls to mount the remote.

• Make sure all wires have a smooth bend radius and do not become kinked.

• If installing this remote in an boat, RV or truck; ensure the conductors passing through walls, bulkheads or other structural members are protected to minimize insulation damage such as chafing, which can be caused by vibration or constant rubbing.

2.2 Tools Required

Installing the remote control is a simple process and requires the following tools:

- Phillips screwdriver
- Cut-out tool (knife/saw)
- Level
- Pencil
- Drill
- Drill Bit (7/64")

2.3 Installation Procedure

1. Select an appropriate location to install the remote control. Allow ample room to access the remote's adjustment dial and to view the LEDs. Ensure the viewing angle of the display is appropriate.

2. Refer to figure 2-1 for hole and cutout dimensions.

3. Run the remote cable between the remote and the inverter/charger. This cable is a 4-wire, twisted-pair, telephony standard with RJ11 connectors on each end. A standard telephone cable may be substituted if the provided remote cable is not able to be used.

4. Connect the remote cable into the RJ11 "Remote" port (has dark blue label) on the inverter/charger (see figure 2-2).

5. Have the inverter connected to batteries, but ensure the inverter is off and that no AC power is connected to the inverter.

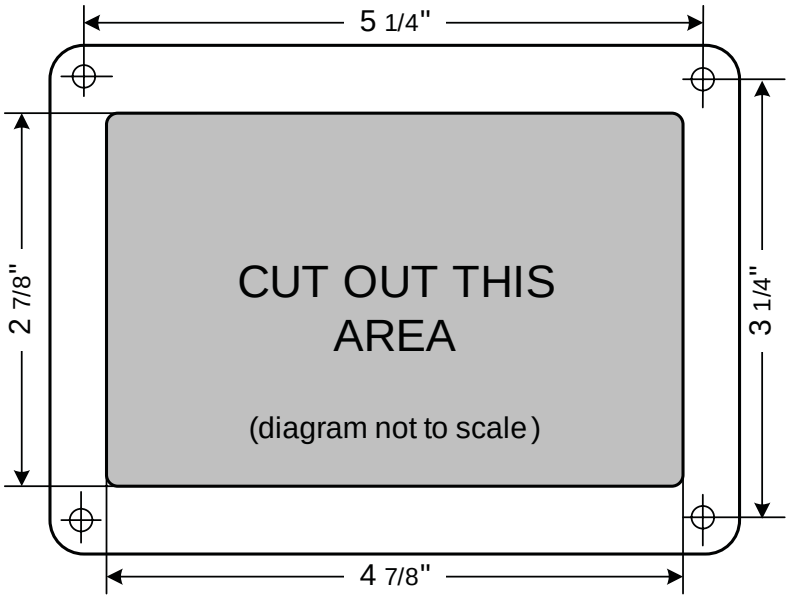


Figure 2-1, Remote Cut-Out Dimensions

Info: All power to operate the remote control is provided by the inverter/charger through the remote cable.

6. While monitoring the front of the remote, connect the other end of the cable into the RJ11 jack on the back-side of the remote (see figure 2-2).

7. Immediately upon connecting the remote cable, all the LED's will come on as the unit goes through a self-test. After the initial self-test completes, text should appear with a system status message indicating the current state of the inverter/charger. If not, please refer to the troubleshooting section.

8. Secure the remote to the wall using the four 6 x 3/4" screws provided.

9. The remote is ready for set-up.

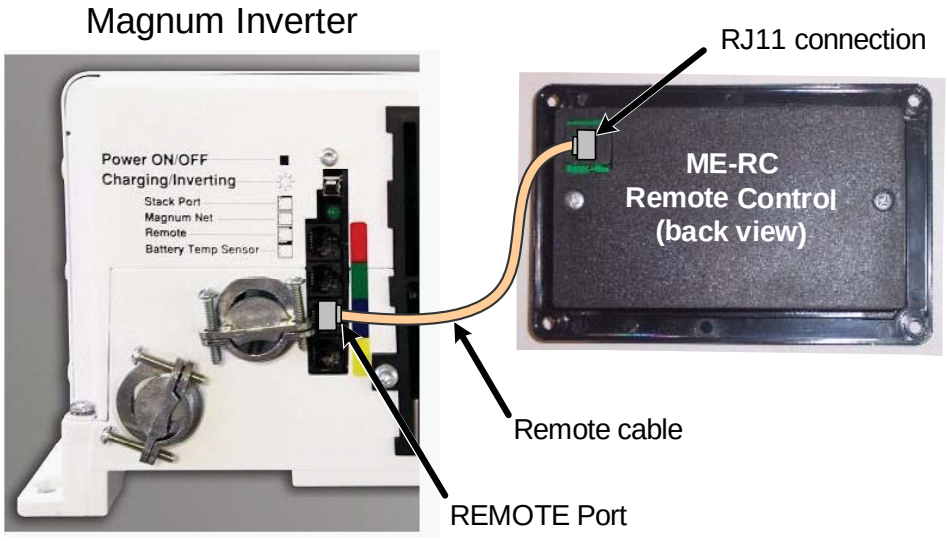


Figure 2-2, Remote Control Connections

3.0 Setup

When the remote is connected to a Magnum inverter/charger, the settings in the remote control determine the inverter/charger operating parameters. The default settings in the remote control (see Table 3-4, Inverter/Charger Default Settings) are adequate for most installations, however you have the option to change some of the operating parameters if required. This section will show you how to navigate the remote, give you an understanding of the function of each adjustable setting and help you decide what setting should be used.

3.1 Navigating the Remote's Menu

The ME-RC has an internal structure that provides menu items and adjustable settings that provide the ability to configure your inverter/charger to your specific parameters.

Info: See figure *4-1, Inverter/Charger Menu Map* for a complete map of the inverter/charger menu items and adjustable settings.

Familiarize yourself with the items on the front panel which are used to find, adjust and save the desired setting. They are:

- **LCD Display -** The bottom line of the LCD display shows the menu items, adjustable settings or the meters display information.

Info: The bottom line of the LCD display returns to the Home Screen to show DC voltage and current (see *Figure 3-1*) after 2 minutes - if no buttons have been pressed.

- **Menu Pushbuttons (x5) -** These five menus allow simple access to the menu items that can help with configuring, monitoring and troubleshooting your inverter/charger system.
- **Rotary SELECT Knob -** This knob allows you to quickly scroll through and select various menu items and settings after pressing a menu pushbutton. This knob also is used to "save" a setting once it is displayed on the LCD screen.

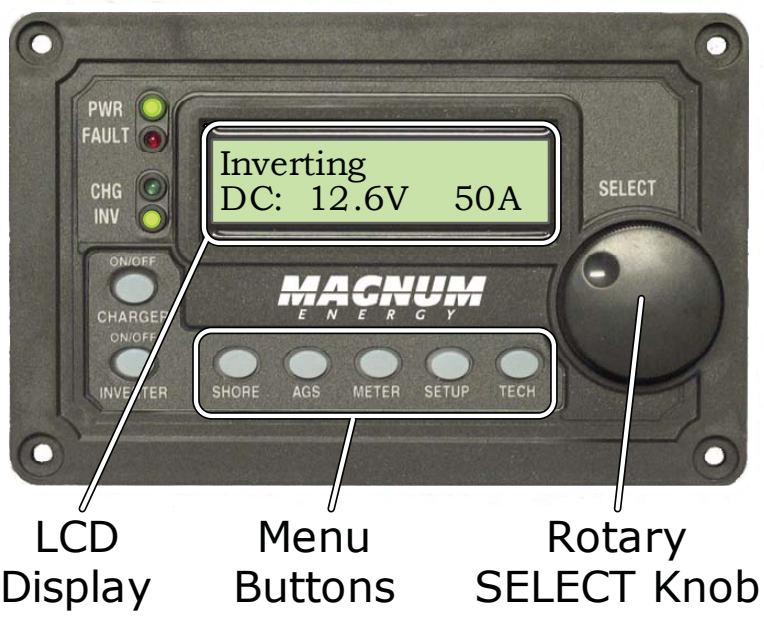
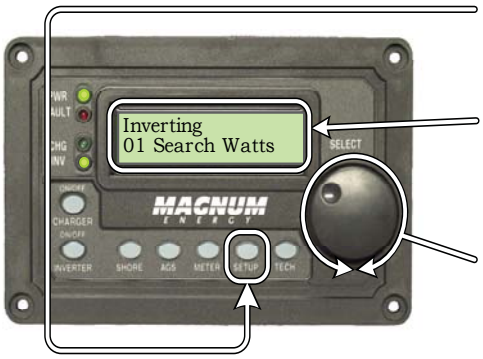


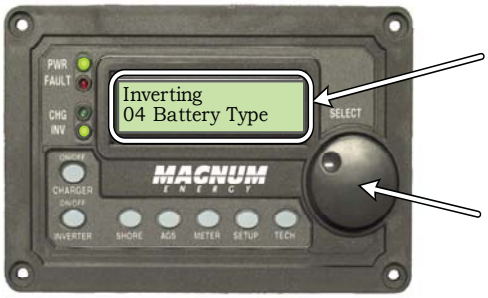
Figure 3-1, Front Panel Set-up Features



1. Press the SETUP Menu button.

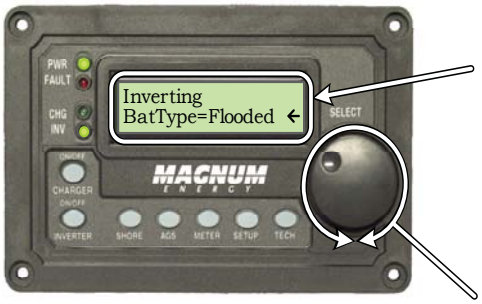
Bottom line shows a menu item.

2. Turn the SELECT knob to the desired menu item.



When the bottom line shows the desired menu item -

3. Press the SELECT knob.



Bottom line shows current setting* (indicated by a ←).

*[if this setting is correct, press the SELECT knob to continue to the next menu item].

4. Turn the SELECT knob to the desired setting.

When the bottom line shows the desired setting -

5. Press the SELECT knob to "save" this desired setting.

Figure 3-2, SETUP Menu Navigation

3.2 Menu Pushbuttons and Menu Items

The five menu pushbuttons (**SHORE**, **AGS**, **METER**, **SETUP** or **TECH**) allow the inverter/charger system to be configured to your specific preferences. These menus also allow you to access menu items that can help with monitoring and troubleshooting your system.

Read this section to help understand the function of each Menu pushbutton and the configurable settings - to determine if they should be changed to optimize the operation of the inverter/charger.

3.2.1 SHORE Menu

This menu pushbutton gives a quick means of changing your Shore Max setting to coordinate with the circuit breaker rating from the incoming AC source.

- **SHORE: Shore Max** - This selection ensures the inverter AC loads receive the maximum current available from the utility or generator power. Whenever the utility or generator is connected to the inverter (thru AC HOT 1), the current used to power the AC loads and to charge the batteries is monitored. When the total current used to power the AC loads and charge the batteries begins to approach the *Shore Max* setting, the current that was used for charging the batteries will automatically be reduced. This ensures the AC loads have all the available current when needed.

Default setting: Shore Max = 30A

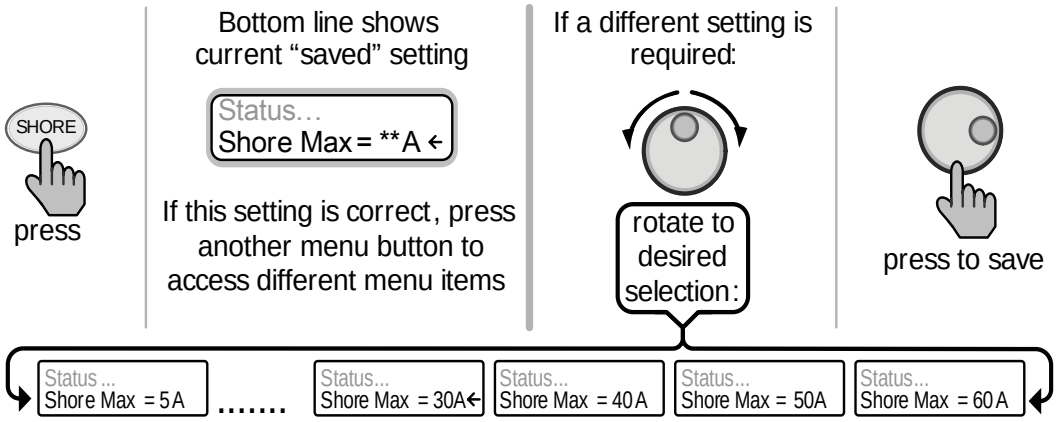


Figure 3-3, SHORE: Shore Max Selections

Where to set: Set the *Shore Max* setting to match the current rating of the utility power or generator's circuit breaker. If using multiple AC sources (utility and generator) through an AC transfer switch, adjust this setting to the smaller AC breaker size. This setting is very dependent on the stability of the AC source. If using a generator, factors such as altitude and output voltage regulation may require a lower setting than the generator's breaker size. For best performance, lower this setting to 1/3 its rated capacity and gradually increase while ensuring the voltage level stays above the *SETUP:* 06 V*AC Dropout* setting.

Caution: The Shore Max setting does not limit the current to the inverter loads. If the current from the loads on the output of the inverter are greater than the circuit breaker rating on the incoming AC source, you may experience nuisance tripping on this breaker.

3.2.2 AGS Menu

The AGS menu pushbutton allows the optional Auto Generator Start (AGS) controller (if installed and networked) to be configured to your specific system preferences and check status of the AGS.

Refer to the ***ME-AGS Owner's Manual*** (part number: 64-0005) for detailed information on the Magnum Energy Auto Generator Start (ME-AGS) and this menu.

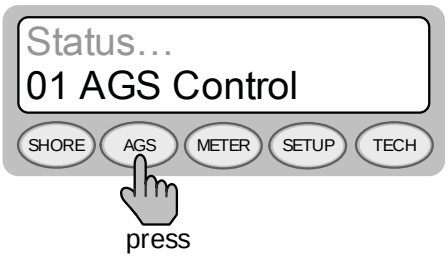


Figure 3-4, AGS Menu Display

3.2.3 METER Menu

Pressing the METER menu pushbutton gives you access to different meters, which helps determine the status of the inverter/charger and battery system.

- **METER: 01 INV/CHG Meter** - This menu provides the DC voltage and current while either inverting or charging.

The DC: V (Volts) display provides the voltage from the batteries connected to the inverter. The DC: V accuracy is ±1.5% with a 0.1 VDC resolution.

While inverting, the DC: A (Amps) display shows the battery current used by the inverter. If you are charging, the DC A (amps) display shows the amount of current delivered to the batteries. The accuracy of this display below 1 amp AC (~10 amps DC @ 12VDC) is not detected. When the current into or out of the batteries is greater than 1 amp AC, the display accuracy is ±20%.

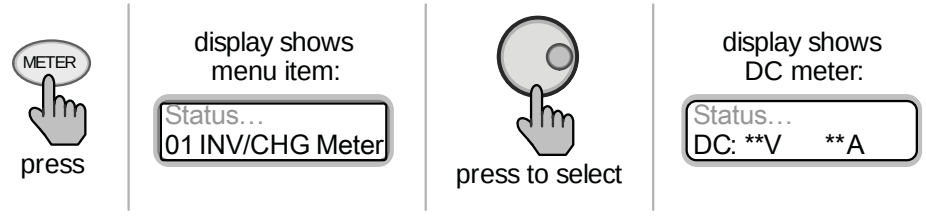


Figure 3-5, METER: 01 INV/CHG Meter Display

- **METER: 02 Battery Meter** - This menu allows the optional Battery Monitor (if installed) to be configured to your specific system preferences and display the status of the battery system; refer to the ***ME-BMK Owner's Manual*** (part number 64-0013) for detailed information on the Magnum Energy Battery Monitor Kit (ME-BMK) and this menu.

3.2.4 SETUP Menu

Pressing the SETUP menu pushbutton provides access to the menu items and settings that allow the inverter/charger to be configured. Read each menu item to determine if any setting requires adjustment to meet your requirements.

- **SETUP: 01 Search Watts** - Allows you to turn off the Search Watts feature or adjust the power level to determine when the search watts feature becomes active. The power level range selection is 5W to 50W. If this feature is not needed, select *Search=Off*. When search is turned off, the inverter continuously provides full AC voltage to the loads.

Default setting: *Search= 5W.*

Info: When the Search Watts feature is active, "Searching" appears on the top line of the LCD display and the green 'INV' LED will slowly flash.

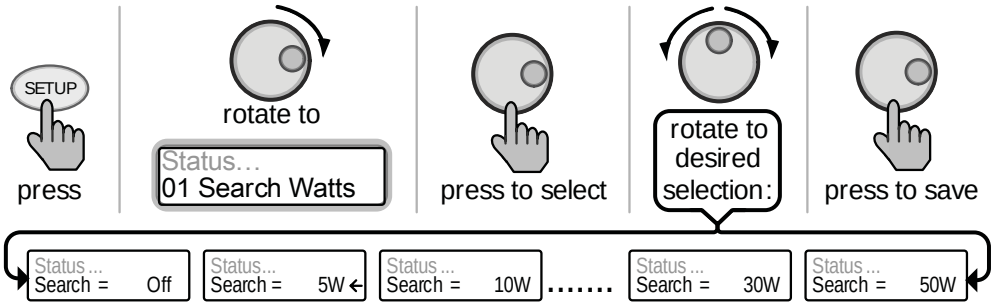


Figure 3-6, SETUP: 01 Search Watts Selections

What is the "Search Watts" feature? This feature is used to help save battery power by reducing the inverter's output to search pulses when there is no detectable load. If someone turns on a load greater than the wattage level setting while the inverter is "searching", the inverter will start "inverting" to provide full voltage on its output.

Should I use the "Search Watts" feature? If the inverter can spend a great deal of time "searching" (to reduce the power drain on your batteries) and you can tolerate small loads (less than 5 watts) from being on, then the search mode feature should be used. However, if you require some small load (digital clocks, satellite receivers, answering machines, etc.) to always be on, then this feature should be turned off (*Search = Off*).

I want to use the Search Watts feature, how do I determine where to set it? The search watts setting should be adjusted to the same power level (or the next lower setting) of the smallest load that you want to run. If you don't know the wattage of the smallest load you want to run, turn the load on and decrease the *Search Watts* setting until the load comes on and stays on.

Example: You have reviewed all the loads you want to run and determined that the smallest load is a 30 watt light, then set the *Search = 30W.* Whenever you turn on any load (because all the loads are greater than 30 watts), the inverter will stop "searching" and start "inverting" to deliver power to the load.

Note: Even though the search feature is on, some connected equipment may draw enough current even while in the "off" position to keep the inverter in the "inverting mode".

• **SETUP: 02 LowBattCutOut -** The Low Battery Cut-Out (LBCO) setting is used to set the DC voltage level that turns off the inverter to help protect the batteries from over-discharge damage. Selections are from 9.0 VDC to 12.2 VDC (12-volt inverter models), 18.0 VDC to 24.4 VDC (24-volt inverter models), or 36.0 to 48.8 (48-volt inverter models). If the battery voltage drops below the LBCO selected set-point continuously for more than 1 minute, the fault LED will come on, the inverter will turn off, and the display will show a 'Low Battery' status. If the battery voltage falls below 8.5 volts (12-volt models), 17.0 volts (24-volt models), or 34.0 (48-volt models); the fault LED and 'Low Battery' status will be immediate.

Default settings: LBCO = 10.0 VDC (12-volt models), 20.0 VDC (24-volt models) or 40.0 VDC (48-volt models).

Info: The inverter will automatically begin to start inverting when the DC voltage increases to ≥ 12.5 VDC (12-volt models), ≥ 25.0 VDC (24-volt models) or ≥ 50.0 VDC (48-volt models). If AC power is available and connected to the inverter's input, the inverter will automatically clear the 'Low Battery' fault, pass the input AC power to the output and begin charging the batteries.

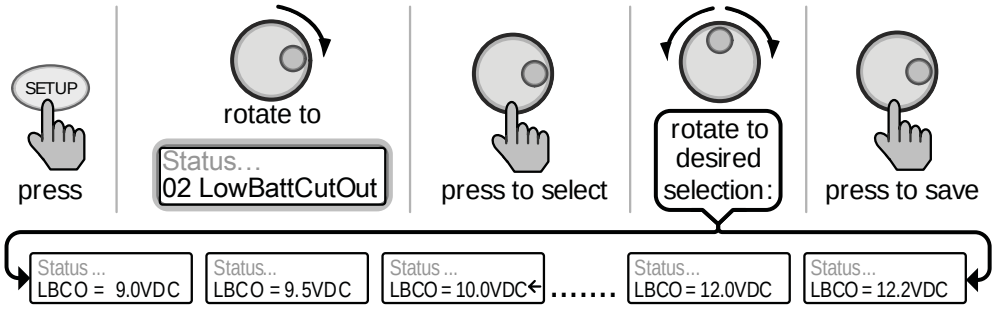


Figure 3-7, SETUP: 02 LowBattCutOut Selections (12-volt shown)

Where do I set the LBCO setting? If you want to cycle the batteries slightly - but don't want to discharge them more than 20%*, then the LBCO setting should be set from 11.5 to 12.2 VDC (12-volt models), 23.0 to 24.4 VDC (24-volt models) or 46.0 to 48.8 (48-volt models). In some applications, such as installed in an off-grid home or doing a lot of dry-camping in your RV, you may want to cycle down to 50%* by setting the LBCO from 10.0 to 11.4 VDC (12-volt models), 20.0 to 22.8 VDC (24-volt models) or 40.0 to 45.6 VDC (48-volt models). In extreme circumstances, you have the ability to discharge the batteries to 80%* by setting the LBCO to 9.0 or 9.5 VDC (12-volt models), 18.0 or 19.0 VDC (24-volt models), or 36.0 or 38.0 VDC (48-volt models) before recharging.

* These discharge percentage are rough estimates; for accurate battery monitoring, a battery monitor such as Magnum's ME-BMK is required.

Info: The higher the LBCO setting, the less the inverter will discharge the batteries; which should allow the batteries to have a longer life. The downside to a higher LBCO setting is that you need to charge more often to prevent the inverter from shutting down.

Info: If there is an ME-AGS installed, the *AGS: 04 Start Volts* setting should be ≥1.0 volts higher than the LBCO setting – this is to prevent the inverter from shutting down before the generator comes on.

• **SETUP: 03 Batt AmpHrs** - Used to select the approximate capacity of the battery bank connected to the inverter. This setting determines the time the battery charger is in the Absorb Charging stage (i.e. Absorption Time). See Table 3-1 to correlate the battery capacity to the Absorption Time; selections are in 200 AmpHrs increments from 200 - 1600 AmpHrs.

Default setting: Batt AmpHrs= 400

Table 3-1, Battery AmpHrs to Absorb Charging Time

Battery AmpHrs	Absorb Charging Time
Batt AmpHrs = 200	60 minutes
Batt AmpHrs = 400	90 minutes
Batt AmpHrs = 600	120 minutes
Batt AmpHrs = 800	150 minutes
Batt AmpHrs = 1000	180 minutes
Batt AmpHrs = 1200*	210 minutes
Batt AmpHrs = 1400*	240 minutes
Batt AmpHrs = 1600*	270 minutes

* these settings are active only on newer inverter revisions.

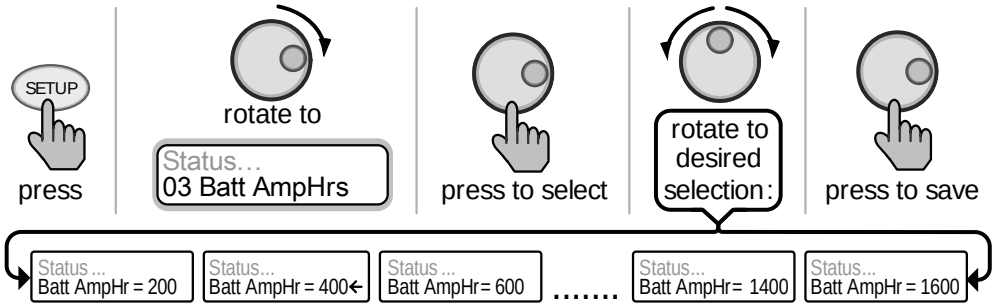


Figure 3-8, SETUP: 03 Batt Amphrs Selections

Where do I set the Battery Amp-Hour setting? Select the same setting or the next highest setting based on the 20-hour Amp-Hour (AH) capacity of your battery bank.

How do I determine my Battery Amp-Hour capacity? The inverter requires deep cycle batteries, which are specifically made for continuous use. Deep cycle batteries are rated either by a) amp-hours or b) reserve capacity in minutes.

a) Amp-hour (AH) capacity is a measurement of how many amps a battery can deliver for a specified length of time (usually 20 hours) until the voltage achieves 1.75 VDC / cell at 80°F (typically 10.5 vdc for a 12-volt battery).

b) Reserve Capacity (RC) is a measure of how many minutes a battery can deliver a certain amount of current (usually 25 amps) and maintain a voltage above 1.75 VDC/cell at 80°F. If using the 25 amps rate, the 20-hour Amp-Hour (AH) capacity can be estimated by multiplying "minutes reserve capacity" by 50%.

Table 3-2 below provides an estimated 20-hour Amp-Hour capacity based on the group/code size, physical size and voltage of the battery. If you are not sure of your battery's 20-hour AH rating, consult your battery manufacturer/ dealer or use the table below to obtain an estimate.

Table 3-2, Battery Size to Battery Amp-Hours (estimated)

Group / Code Size	Physical Size (L" x W" X H")	Battery Voltage	Battery AHrs (20-hour rate)
GC-2 (Golf Cart)	10 3/8 x 7 13/16 x 10 5/8	6V	220 AmpHrs
L16	11 11/16 x 7 x 16 11/16	6V	375 AmpHrs
Group 22	9 1/2 x 6 7/8 x 8 5/16	12V	55 AmpHrs
Group 24	10 1/4 x 6 13/16 x 8 7/8	12V	70 AmpHrs
Group 27	12 1/16 x 6 13/16 x 8 7/8	12V	95 AmpHrs
Group 31	13 x 6 13/18 x 9 7/16	12V	110 AmpHrs
4D	20 3/4 x 8 3/4 x 9 7/8	12V	200 AmpHrs
8D	20 3/4 x 11 1/8 x 9 7/8	12V	250 AmpHrs

Once you've determined the Amp-hour capacity of each battery, review how your batteries are connected (parallel or series) to determine the total amp-hour capacity of the battery bank:

Parallel connection – batteries connected in parallel (positive to positive, negative to negative) increase the amp-hour capacity of the battery bank, but the voltage remains the same.

For example: You have a 12-volt battery bank with three 12-volt batteries that are rated at 125 Amp-Hours (AH) each. Each of the positive terminals are connected together and each of the negative terminals are connected together, which means they are connected in parallel. The amp-hours of each battery connected in parallel are added together (125 AH + 125 AH + 125 AH = 375 AH), but the voltage of the battery bank stays the same (12 VDC).

Series connection - batteries connected in series (positive to negative) increase the voltage of the battery bank, but the amp-hour rate remains the same.

For example: You have a 12-volt battery bank with two 6-volt batteries that are rated at 220 amp-hours. The positive terminal of the first battery is connected to the negative terminal of the second battery, which means these batteries are connected in series. Since the two 6-volt batteries are connected in series, the voltage of the batteries are added together to produce 12-volts (6 VDC + 6 VDC = 12 VDC), but the amp-hour capacity of the battery bank does not change (220 AH).

In battery banks where you have batteries connected in series and in parallel –the rules are the same. The batteries connected in series are referred to as a "series string" and the amp-hour capacity doesn't change. Each "series string" is connected together in parallel to increase the amp-hour capacity. Add the amp-hour capacity of each "series string" connected in parallel to determine the total amp-hour capacity of the battery bank.

• **SETUP: 04 Battery Type** - Used to select the battery type, which determines the battery charge profile and ensures the batteries are receiving the proper charge voltage. Selections are GEL (for Gel batteries), Flooded (for liquid lead acid batteries), AGM 1 (for Lifeline AGM batteries) and AGM 2 (for East Penn/Deka/Discover/Trojan AGM batteries). The charging voltages vary depending on the battery type selected; see Table 3-3.

Default setting: BattType = Flooded

The voltage settings shown in Table 3-3 are based on the Battery Temperature Sensor (BTS) being disconnected or at a temperature of 77° F (25° C). If the BTS is connected, the actual charge voltages will increase if the temperature around the BTS is below 77° F (25° C) and decrease if higher than 77° F (25° C). This ensures the batteries receive correct charging even if they become cold or hot.

Table 3-3, Battery Type to Charge Voltages

Battery Type	Inverter Voltage	Absorption Voltage	Float Voltage	Equalization Voltage
GEL	12 VDC	14.1 VDC	13.6 VDC	14.1 VDC***
	24 VDC	28.2 VDC	27.2 VDC	28.2 VDC***
	48 VDC	56.4 VDC	54.4 VDC	56.4 VDC***
Flooded	12 VDC	14.6 VDC	13.4 VDC	15.5 VDC
	24 VDC	29.2 VDC	26.8 VDC	31.0 VDC
	48 VDC	58.4 VDC	53.6 VDC	62.0 VDC
AGM 1*	12 VDC	14.3 VDC	13.1 VDC	15.0 VDC
	24 VDC	28.6 VDC	26.2 VDC	30.0 VDC
	48 VDC	57.2 VDC	52.4 VDC	60.0 VDC
AGM 2**	12 VDC	14.5 VDC	13.5 VDC	14.5 VDC***
	24 VDC	29.0 VDC	27.0 VDC	29.0 VDC***
	48 VDC	58.0 VDC	54.0 VDC	58.0 VDC***

* specifications for Concord (Lifeline Series).
** specifications for East Penn / Deka / Discover/ Trojan.
*** voltage same as absorption voltage - to prevent equalization.

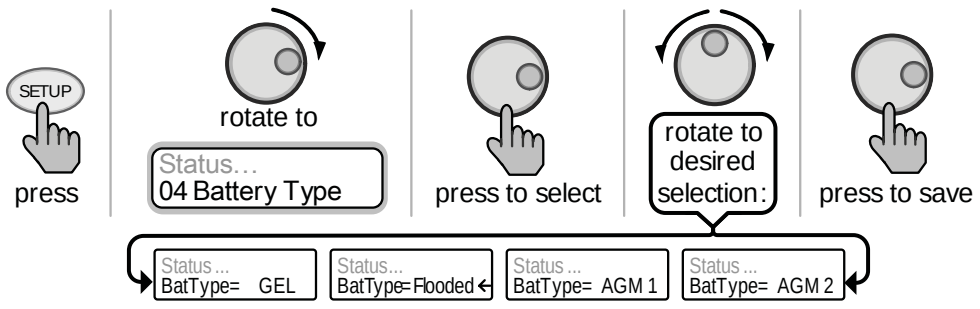


Figure 3-9, SETUP: 04 Battery Type Selections

• **SETUP: 05 Charge Rate -** Used to set the maximum charge rate allowed to charge the batteries during bulk, absorption, float and equalize charging. Selections are 'Max Charge = 0%' up to 'Max Charge = 100%. The *Max Charge = 0%* setting is available to help minimize charging while continuing to allow pass-thru power. The rest of the selections are provided to limit the charge rate on the battery bank - to help prevent battery overheating caused by charging at too high a charge rate.

The *Max Charge* selections are provided as a percentage of the inverter/charger's maximum charging capability. Refer to label on the side of the inverter or the operator's manual for the inverter/charger to determine its maximum charge rate. Once you find this maximum charge rate, determine the percentage needed to limit the charge rate to your battery-bank.

For example, if the maximum charge rate of your inverter/charger is 100 amps and you need to limit the charge rate to 50 amps, choose the *Max Charge = 50%* selection (50 amps = 50% of 100 amps).

Default setting: Max Charge = 80%

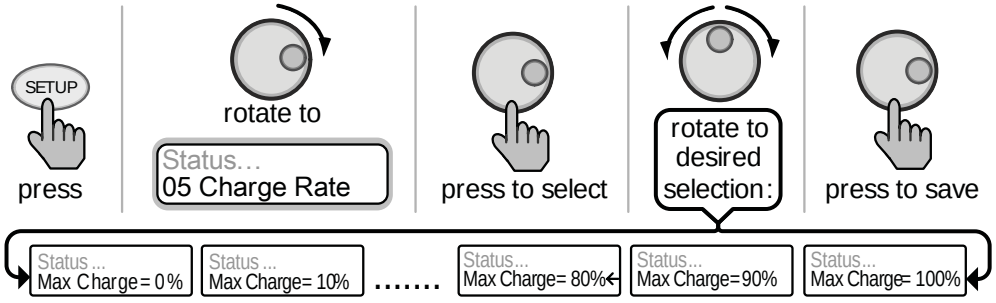


Figure 3-10, SETUP: 05 Charge Rate Selections

Info: If the Max Charge rate is set to 0%, the topology of the Magnum Inverter - when connected to an AC source - will over-ride the 0% setting and start charging if the battery voltage is <7 VDC (12 VDC models), <14 VDC (24-volt models) or <28 VDC (48-volt models).

How do I determine where to set my maximum charge rate? The maximum charge rate is generally set to a C/5* rate (C = the total amp-hour capacity of the battery bank). The C/5 rate is usually used when the objective is to charge the batteries as quickly as possible (i.e. 400 Amp-Hours ÷ 5 = 80 amp maximum charge rate). A lower rate such as C/20* or C/10* is recommended in installations where batteries are charged for long periods of time (i.e. plugged into shorepower for long periods or in a back-up power application).

Some GEL and AGM batteries can be charged at a higher charge rate - check with the battery manufacturer.

Info: If multiple inverter/charger's are used on a single battery bank, you must ensure that the total charge rate from all inverter/chargers is limited to the maximum charge rate needed for your battery bank. The Max Charge rate only limits the charging on each inverter/charger individually, not on all inverter/chargers.

* C/5, C/10, or C/20 rate - Charge rates are commonly expressed as a ratio of the total amp-hour (AH) capacity of the battery bank. For example, with a 400 AH battery bank (C = 400), the C/5 charge rate is 80 A (400/5 = 80 A).

• **SETUP: 06 VAC Dropout** - Used to select the minimum AC voltage that must be present on the input before the inverter/charger switches from inverter to charger mode. For example: If this setting is set to *Dropout = 60 VAC*, then the AC input voltage must be above 60 Volts before the inverter will allow switch from inverter mode to charge mode.

This setting also determines the minimum AC voltage threshold where the inverter/charger transfers from the AC input (utility/shore or generator) and begin inverting. This protects AC loads from utility outages. For example: If this setting is set to *Dropout = 60 VAC*, when the AC input voltage drops to 60 volts, the inverter will switch from charge mode to inverter mode. Selections are *Dropout = 60 VAC* to *Dropout = 100 VAC.*

Default setting: Dropout = 80 VAC

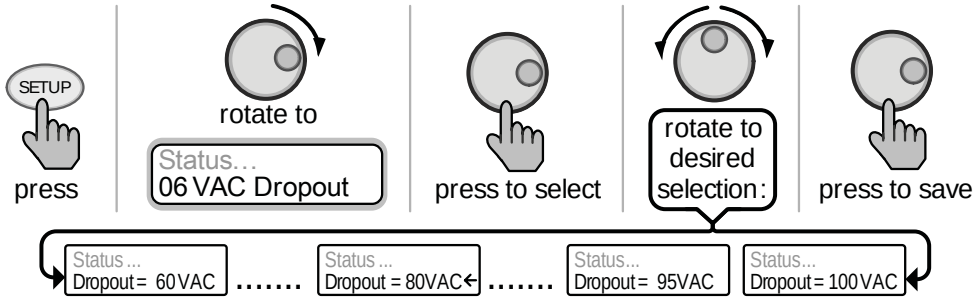


Figure 3-11, SETUP: 06 VAC Dropout Selections

Where do I set my VAC Dropout? It depends on the application and what you are using as the AC source. The settings not only look at the incoming voltage to determine when to transfer, but also determines the response sensitivity to incoming voltage fluctuations.

Use a VAC Dropout setting above 80 VAC (>80 VAC) when the AC source is well regulated and operating devices that are sensitive to voltage fluctuations. These settings are intolerant of voltage fluctuations and provide a quicker transfer. The transfer time from charge mode to inverter mode is about 16 milliseconds when using these settings (*Dropout = 85 VAC* to *Dropout = 100 VAC*).

Use the 80 VAC or lower setting (≤80 VAC) when the AC source may have significant fluctuations in RMS voltage. These settings are highly recommended if using a generator for charging. The transfer time from charge mode to inverter mode is about 22 milliseconds when using these settings (*Dropout = 60 VAC* to *Dropout = 80 VAC*).

• **SETUP: 07 Power Saver** - This setting allows you to turn off the Power Saver™ feature or select the time (from 1 minute to 60 minutes) that determines how often the display goes into Power Saver mode.

Default setting: PwrSave = 15min

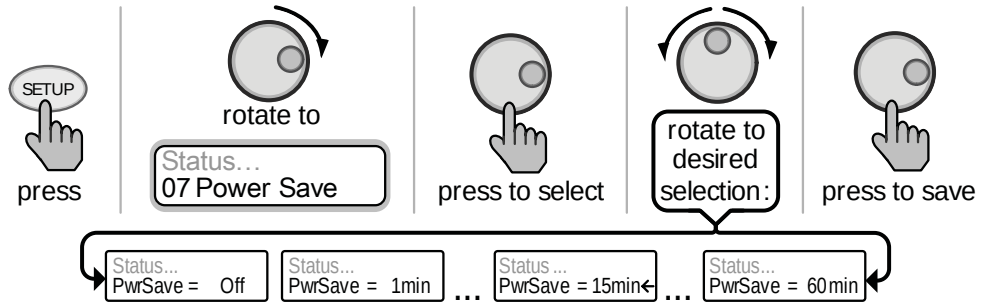


Figure 3-12, SETUP: 07 Power Saver Selections

What is the power saver feature? The Power Saver feature causes the LCD back-light and LED's on the remote display to turn off to conserve energy. The remote goes into Power Saver mode if there hasn't been a pushbutton press or fault message for a period of time (this time is determined by the *SETUP: 07 Power Save* setting). Whenever the remote goes into the Power Saver mode, the LCD backlight and LED's can be reactivated by pressing any menu pushbutton*. If you have a fault during the Power Saver mode, the LCD backlight and Fault LED will come on and stay on as long as the fault is detected.

If you want the LCD backlight and LED's to always be on, you will need to turn the Power Saver feature off by selecting *PwrSave = Off*.

* Even though you can press any menu pushbutton, do not press the ON/OFF INVERTER or ON/OFF CHARGER pushbutton to reactivate the remote's backlight and LED's - this will cause the charger or inverter to change the operating status. Instead, press the METER pushbutton; it does not change the inverter or charger status.

• **SETUP: 08 Scrn Contrast** - Used to adjust the contrast of the LCD screen for the best looking display based on the current lighting conditions and viewing angle.

Default setting: Contrast = 32

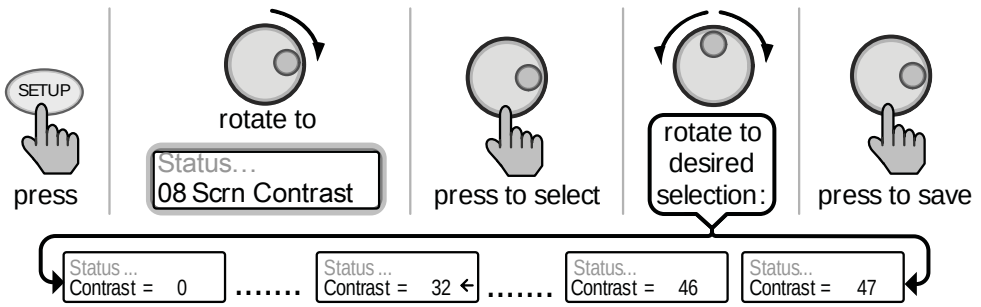


Figure 3-13, SETUP: 08 Scrn Contrast Selections

3.2.5 TECH Menu

The TECH menu pushbutton provides access to selections that are used to assist service technicians in troubleshooting. It provides access to system information along with a selection that allows all system settings to be returned to the original factory default values.

TECH: 01 Temperatures – This "read only" menu displays temperature readings of the battery temperature sensor (if connected), the transformer, the FET's (Field Effect Transistors) and a networked AGS (if installed).

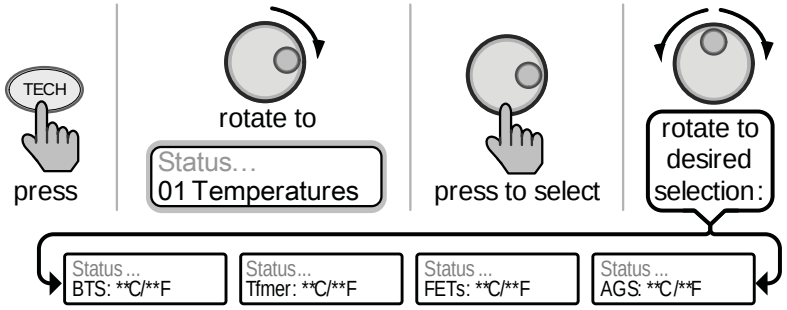


Figure 3-14, TECH: 01 Temperatures Display

TECH: 02 Revisions – This "read only" menu displays the firmware revision level of the inverter, remote and any optional accessory (i.e. AGS) that is installed and networked.

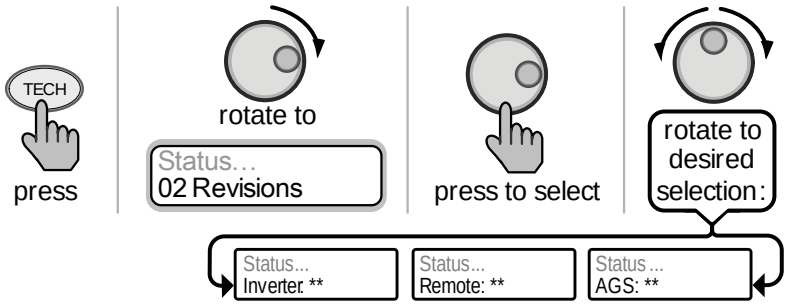


Figure 3-15, TECH: 02 Revisions Display

TECH: 03 Inv Model – This "read only" menu displays the model number of the connected inverter.

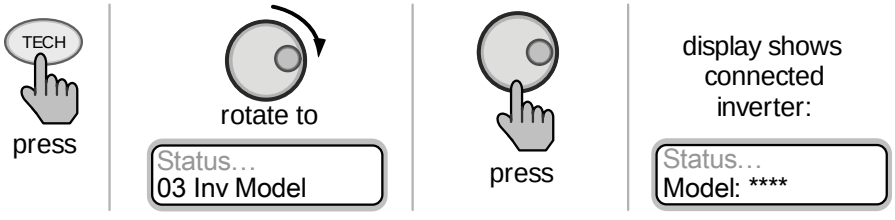


Figure 3-16, TECH: 03 Inv Model Display

Info: If "Model: UNKNOWN" is displayed, then the remote is connected to a newer released inverter; all menu selections and features in the remote control will function normally.

• **TECH: 04 Load Defaults** - This menu restores all settings on the inverter/charger and any settings on accessories that are networked and controlled by the inverter (i.e. ME-AGS) to the factory default settings. To restore, press and hold the Rotary SELECT knob for 5 seconds. After the default settings have been restored, the display will show DEFAULTS LOADED. The inverter/charger factory defaults are listed in Table 3-4.

Info: For detailed information on the factory default settings for any networked accessory; refer to the owner's manual for that accessory.

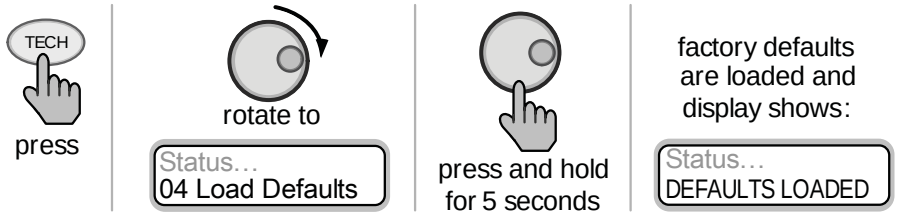


Figure 3-17, TECH: 04 Load Defaults Selection

Table 3-4, Inverter/Charger Default Settings

Menu Items		Default Settings
SHORE Pushbutton		Shore Max = 30A*
SETUP Pushbutton	01 Search Watts	Search = 5W
	02 LowBattCutOut	LBCO = 10.0 VDC (12-volt models), 20.0 VDC (24-volt models) or 40.0 VDC (48-volt models)
	03 Batt AmpHrs	Batt Amphrs = 400 AmpHrs (Absorb Time = 90 minutes)
	04 Battery Type	BatType = Flooded
	05 Charge Rate	Max Charge = 80%
	06 VAC Dropout	Dropout = 80VAC
	07 Power Save	PwrSave = 15min
	08 Scrn Contrast	Contrast = 32*

***** All adjustable inverter/charger settings in the ME-RC (except for *Shore Max* or *Contrast*, which revert back to the default setting) are saved in non-volatile memory and will be preserved until changed even if all power to the remote or inverter is lost.

Caution: An accessory that is networked to the inverter may have settings that revert back to default if all power to the inverter is lost. Refer to the owners manual for the accessory in question to determine if any setting in the accessory is affected.

4.0 Menu Map: ME-RC Remote Control

The following figure is a complete overview of the inverter/charger settings and info displays available in the ME-RC; this should help with menu navigation.

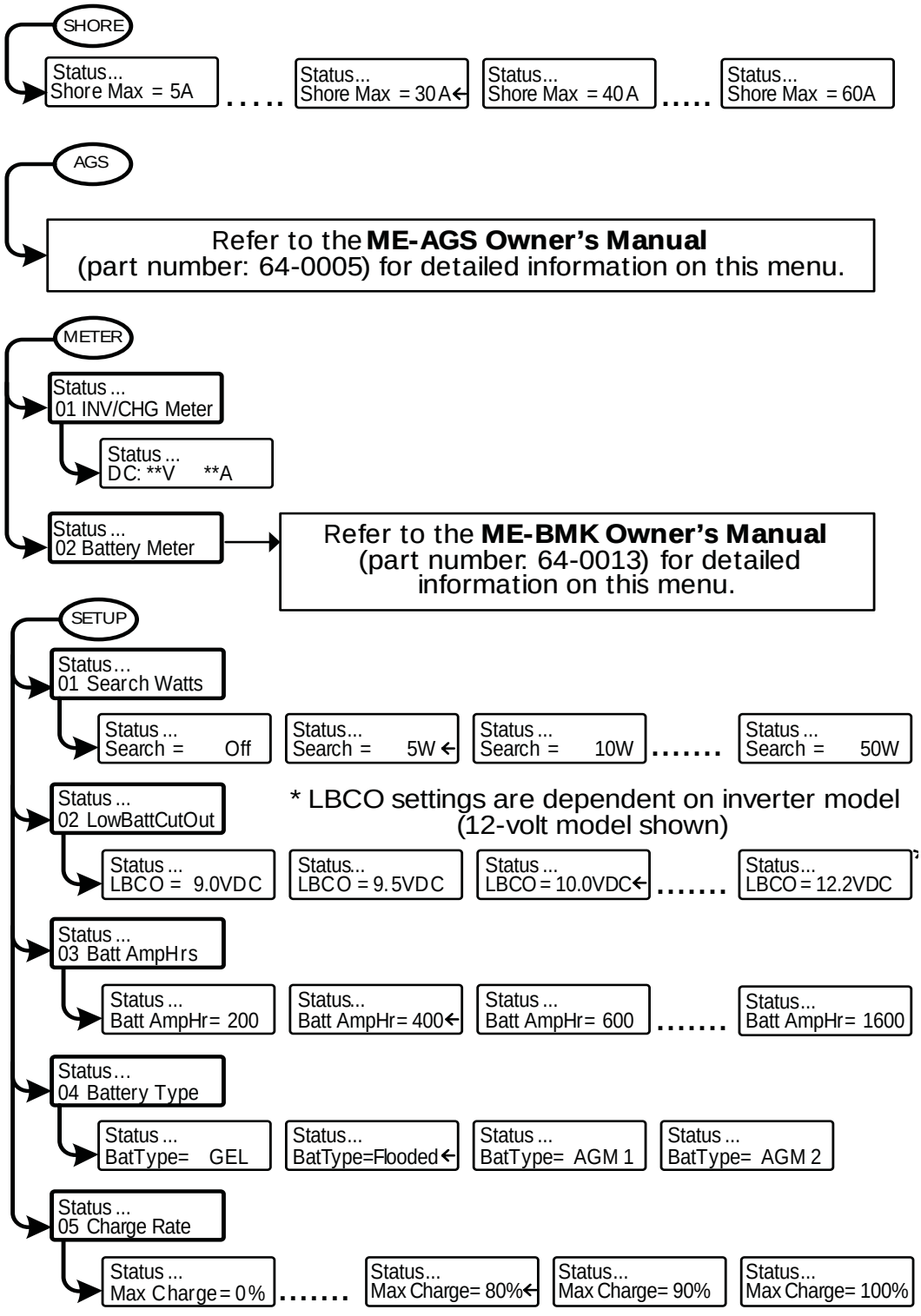


Figure 4-1, Inverter/Charger Menu Map

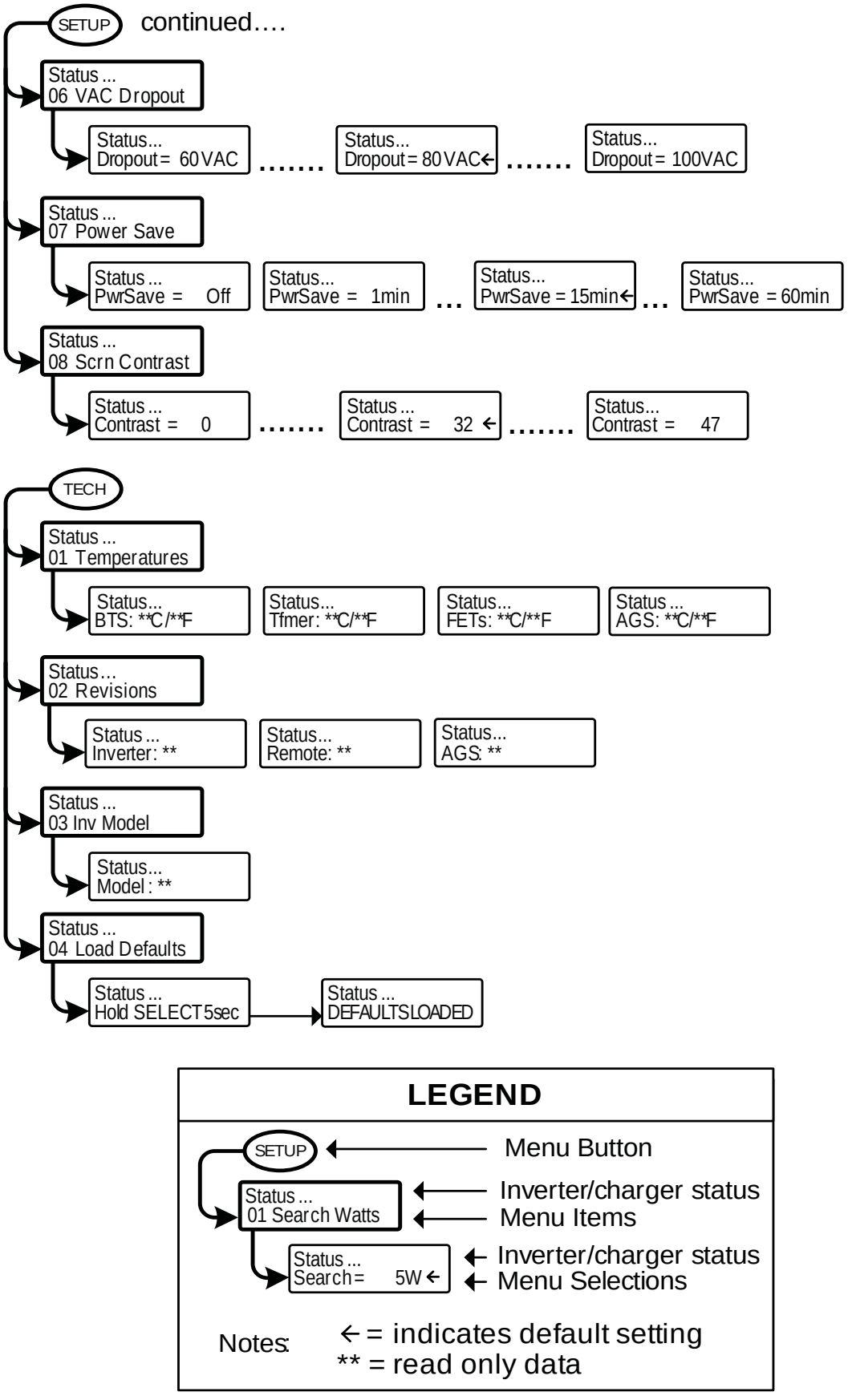


Figure 4-1, Inverter/Charger Menu Map (continued)

5.0 Operation

This section explains how to operate the inverter/charger. It also helps to explain the operational status determined by the LED indicators and LCD display.

5.1 Front Panel

The ME-RC front panel contains LEDs and a LCD display for viewing system status; pushbuttons to control system operation; and a Rotary Knob that allows an easy way to select and find system information.

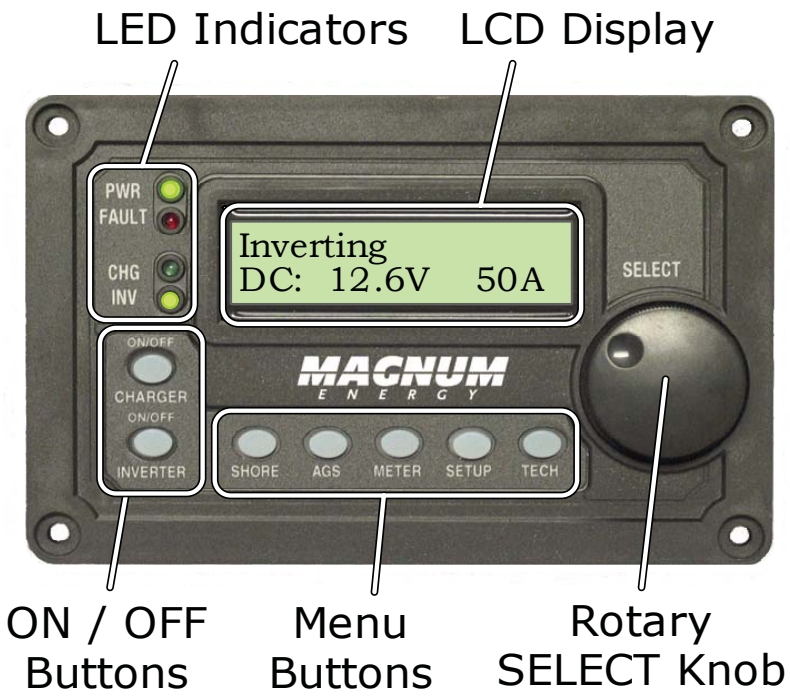


Figure 5-1, ME-RC Front Panel Controls and Indicators

5.1.1 LED Indicators

There are four LED's indicators on the front panel that light solid or blink to indicate the inverter/charger's status. When the remote is first powered-up, all the LED's come on as it goes through a self-test. Once the self-test is complete, the LED's along with the LCD provide the operating status of the inverter/charger. See section 5.3.4 for the LED Indicator Guide.

5.1.2 LCD Display

The LCD display is used for setting up the system operation as well as viewing the current operating status or any fault condition. This display has two lines of alphanumeric characters and features a back-light that can be set to turn off to conserve power. The top line provides the inverter/charger status, which is detailed in this section. The bottom line displays battery information while using the METER menu, system troubleshooting information while in the TECH menu and menu items that can be configured for your specific system operation while in the SETUP menu. This display automatically powers up with the current system status on the top line and the Home Screen (detailing the inverter's DC voltage and current as shown in figure 5-1) on the bottom line.

5.1.3 ON/OFF Pushbuttons

- ON/OFF INVERTER: This pushbutton toggles the inverter function on and off. The green "INV" LED turns on and off with the pushbutton.

- ON/OFF CHARGER: This pushbutton toggles the charger function on and off whenever the charger is actively charging. The green "CHG" LED turns on and off with this pushbutton. This pushbutton is also used to initiate an equalize charge; for more information on using this equalize charge feature, see section 5.2.2 and the Equalizing Mode information page 26.

5.1.4 Menu Pushbuttons

These five menu pushbuttons provide quick access to menu items that can help with configuring, monitoring and troubleshooting your inverter /charger system.

- SHORE: This pushbutton allows you to set the appropriate breaker size for the incoming utility/shore power and is used to control the amount of AC amps the battery charger uses from the HOT 1 IN input; see section 3.2.1 for more detailed information.

- AGS: This pushbutton allows the networked Auto Generator Start (AGS) controller (if connected) to be configured to specific system preferences and check status of the AGS. Refer to the ***ME-AGS Owner's Manual*** (part number: 64-0005) for detailed information on this menu.

- METER: This pushbutton provides meter information on the inverter/charger system; see section 3.2.3 for more detailed information.

- SETUP: This pushbutton allows the inverter/charger to be configured to your specific system preferences; see section 3.2.4 for more detailed information.

- TECH: This pushbutton allows you to access menu selections that can help service personnel with troubleshooting and also allows the factory default setting to be restored; see section 3.2.5 for more detailed information.

5.1.5 Rotary SELECT Knob

The Rotary 'SELECT' knob is similar to a dash radio knob and used to easily view and select various menu items and settings displayed in the LCD screen. Turn the rotary knob clockwise and counterclockwise to view the different menu items and available charger and inverter settings. Push or "SELECT" the rotary knob to enter a menu item or to "save" a setting once they are displayed on the LCD screen.

Info: All adjustable inverter/charger settings in the ME-RC (except for *Shore Max* and *Contrast* - which revert back to default) are saved in non-volatile memory and will be preserved until changed - even if all power to the remote or inverter is lost.

Caution: An accessory that is networked to the inverter may have settings that revert back to default if all power to the inverter is lost. Refer to the operation manual for the particular accessory to determine if any setting for the accessory is affected.

5.2 Operating the Inverter/Charger

5.2.1 Inverter Mode

Turning the inverter on: Press the ON/OFF INVERTER pushbutton to activate the inverter function. The inverter will either be actively "inverting" by using power from the batteries to power the AC loads (see figure 5-4); or will be "searching" for a load by using very little power from the batteries - if in search mode (see figure 5-3). The green 'INV' LED will be on when the inverter is actively inverting and the green 'INV' LED will flash while searching.

Turning the inverter off: While the inverter is actively "inverting" or "searching", the ON/OFF INVERTER pushbutton can be pressed to switch the inverter function off and this will turn the green 'INV' LED off (see figure 5-2).

Inverter Standby: The inverter is in standby when the inverter is active (green 'INV' LED is on) and an external AC power (utility/shore or generator) is passing through the inverter to power the AC loads. During normal operation, the AC loads will be powered by the external AC power, however, if a blackout or brownout condition occurs, the inverter senses these conditions, transfers to inverter mode and powers the AC loads connected to the inverter.

Caution: If you have critical loads and in Inverter Standby, do not press the ON/OFF INVERTER pushbutton to turn the inverter function off. If the green 'INV' LED is off, inverter power will NOT be available to run your critical loads if the external AC power is interrupted.

5.2.2 Charger mode

Turning the charger on: The charger will automatically be activated and begin to charge your batteries when acceptable AC power (utility/shore or generator) is connected to the input (HOT IN 1) of the inverter. When the charger is ON, it produces DC voltage and current to charge your batteries. The CHG LED will be on when the charger is ON and actively charging. While charging the display will show Bulk, Absorption, Float or Full Charge (see figures 5-5 thru 5-9).

Charger Standby: While the charger is actively charging, the ON/OFF CHARGER pushbutton can be pressed to switch the charger to "Charger Standby". While the charger is in Charger Standby, the incoming AC is still available on the inverter's output, but the charger is not allowed to charge. The display will show 'Charger Standby' and the CHG LED will flash when the charger is in standby mode, (see figure 5-10).

Info: To resume charging, momentarily press the ON/OFF CHARGER button; or disconnect/reconnect AC power to the inverter's input.

Equalize charging: Equalizing is a "controlled overcharge" performed after the batteries have been fully charged. It helps to mix the battery electrolyte (to reverse the buildup of stratification) and also helps to remove sulfates that may have built up on the plates. These conditions, if left unchecked will reduce the overall capacity of the battery.

Warning: Do not perform an equalization charge without reading and following all safety precautions pertaining to charging/equalization as noted in this manual and any equalization information in the inverter's manual.

To enable the equalization charge; see figure 5-11 and follow all related information on page 26.

5.3 System Status Messages

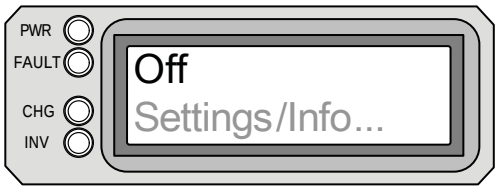
The remote control uses the top line of the LCD display to show the inverter/ chargers current operation by displaying a status message. This section will show the inverter/ charger's operating modes and the available status messages under each mode. Use these status messages along with the Status LED's to determine the inverter/charger's current operating status and to help troubleshoot the system if a fault occurs.

There are three operating modes of the inverter/charger:

- Inverter Mode
- Charger Mode
- Fault Mode

5.3.1 Inverter Mode Messages

The inverter/charger will be in the Inverter Mode when AC power (shorepower/utility or generator) is not available or unacceptable to the inverter/charger's input. The Inverter Mode messages are Off, Searching and Inverting.



Off appears on the LCD; all LED's are off.

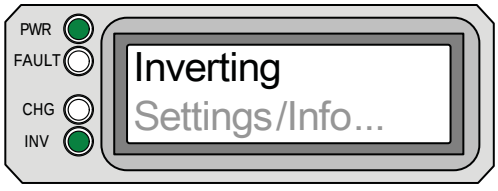
Figure 5-2, Off Mode

- **Off** – This message tells you that there is no AC available on the inverter's AC output. The inverter function is off and there is no utility/shore or generator power AC sensed on its input.

Searching appears on the LCD. The PWR (green) LED is on solid and the INV (green) LED slowly flashes. The FAULT (red) and CHG (green) LED's are off.

Figure 5-3, Searching Mode

- **Searching** – The inverter is in the Search mode, which means the AC loads on the inverter output are less than the *SETUP: 01 Search Watts* setting. The search mode function is used to reduce the inverter draw from the battery and may be turned off at any time if you want full inverter output voltage available at all times (see the SETUP: 01 section).



Inverting appears on the LCD. The PWR (green) and INV (green) LED's are on solid. The FAULT (red) and CHG LED's are off.

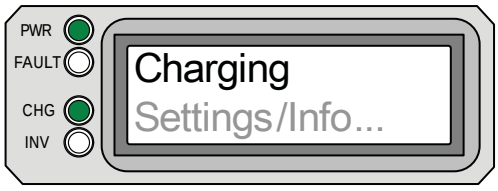
Figure 5-4, Inverting Mode

- **Inverting** - The inverter is providing AC voltage on its output by inverting power from the batteries.

5.3.2 Charger Mode Messages

When AC power (utility or generator) is connected to the inverter/charger, it begins to monitor the AC input for acceptable voltage. Once the AC input is accepted, the AC transfer relay (inside the inverter) closes and charger mode begins. There are several charger mode messages; view the top line of the LCD display and the corresponding message in this section to determine and understand the particular charger mode.

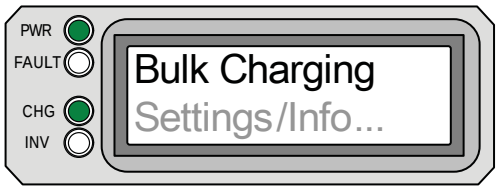
Info: The AC input becomes acceptable after a minimum 10 second delay and when the voltage is greater than the *SETUP: 06 VAC Dropout* setting.



Charging appears on LCD; PWR (green) and CHG (green) LED's are on solid; FAULT (red) LED is off and INV (green) LED could be on or off.

Figure 5-5, Charging Mode

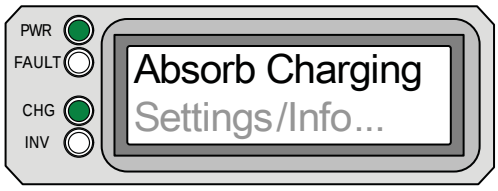
- **Charging** – Once the charger mode has been enabled, the unit will wait and display "Charging". During this wait time the DC voltage is being sampled to determine the charge routine. If the DC voltage is ≤12.9 VDC (12-volt models), ≤25.8 VDC (24-volt models) or ≤51.6 VDC (48-volt models); the charger will initiate "Bulk Charging". If the DC voltage is greater than 12.9 VDC (12-volt models), 25.8 VDC (24-volt models) or 51.6 VDC (48-volt models) the charger will go to "Float Charging".



Bulk Charging appears on LCD; PWR (green) is on solid and CHG (green) LED is typically on solid, but may blink slowly; FAULT (red) LED is off; INV (green) LED could be on or off.

Figure 5-6, Bulk Charging Mode

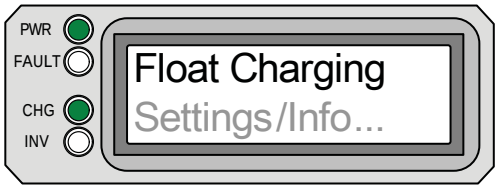
- **Bulk Charging** – The battery charger is delivering maximum current (determined by the *SETUP: 05 Charge Rate* setting) to the batteries. The charger will remain in bulk charge until the absorb voltage (determined by the *SETUP: 04 Battery Type* setting) is achieved.



Absorb Charging appears on LCD; PWR (green) is on solid and CHG (green) LED is typically on solid, but may blink slowly; FAULT (red) LED is off and INV (green) LED could be on or off.

Figure 5-7, Absorb Charging Mode

- **Absorb Charging** - The absorb charge state is the constant voltage stage and begins when the absorb voltage is reached (determined by the *SETUP: 04 Battery Type* setting) while bulk charging. During this stage, the DC charging current decreases in order to maintain the absorb voltage setting. This charge stage continues until the Absorb Charging time (determined by the *SETUP: 03 Battery AmpHrs* setting) is finished.

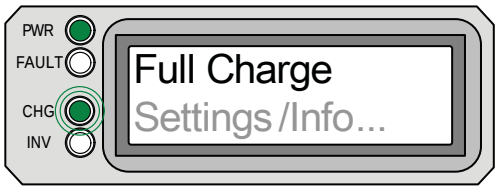


Float Charging appears on LCD; PWR (green) LED is on solid and CHG (green) LED is typically on solid, but may blink slowly; FAULT (red) LED is off and INV (green) LED could be on or off.

Figure 5-8, Float Charging Mode

- **Float Charging** – At the end of the Absorb Charging time, the charger reduces the charge voltage and tries to maintain the batteries at the float charge voltage setting; which is determined by the *SETUP: 04 Battery Type* setting as shown in Table 3-3, Battery Type to Battery Charge Voltages.

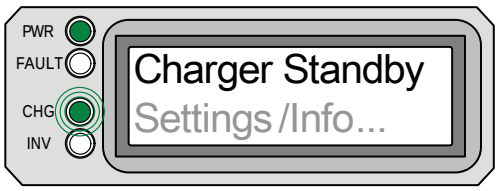
Info: If the battery voltage falls ≤12.1 VDC (12-volt models), ≤24.2 VDC (24-volt models) or ≤48.4 VDC (48-volt models); the unit will begin bulk charging.



Full Charge appears on LCD; PWR (green) LED is on solid and CHG (green) LED blinks slowly; FAULT (red) LED is off and INV (green) LED could be on or off.

Figure 5-9, Full Charge Mode

- **Full Charge** – This status indicates that you have entered the Battery Saver™ mode. This mode maintains the batteries without overcharging, thus preventing excessive loss of water in flooded batteries or drying out of GEL/AGM batteries. After 4 hours "Float Charging", the charger will turn off and "Full Charge" is displayed (charger is now in Battery Saver™ mode). If the battery voltage drops to ≤12.6 (12-volt models), ≤25.2 (24-volt models) or ≤50.4 (48-volt models); the charger will automatically initiate another 4 hours "Float Charging". This cycle helps to ensure the batteries are monitored and maintained; and continues as long as AC power is continuously connected to the AC input.

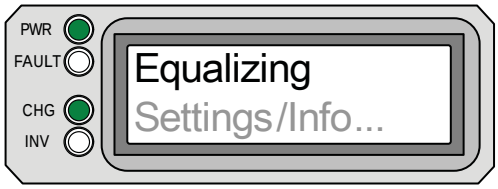


Charger Standby appears on LCD; PWR (green) LED is on solid and CHG (green) LED slowly blinks; FAULT (red) LED is off and INV (green) LED could be on or off.

Figure 5-10, Charger Standby Mode

- **Charger Standby** - This means the charger has been disabled to prevent any charging, but the AC power (from shore/utility or generator) to the AC input is still available on the AC output. This display is shown when the ON/OFF CHARGER pushbutton is pressed while the AC power is passing thru the inverter/charger.

Info: To enable charging again, press the ON/OFF CHARGER pushbutton. When the charger is again enabled, the charger will continue in the charge mode it left and the CHG (green) LED will come on solid.



Equalizing appears on LCD; PWR (green) and CHG (green) LED's are on solid; FAULT (red) LED is off and INV (green) LED could be on or off.

Figure 5-11, Equalizing Mode

Equalizing - The battery charger is delivering the equalize voltage to the batteries; see Table 3-3, *Battery Type to Battery Charge Voltages* to determine the equalize voltage for your battery type.

Equalize charging can be enabled by the ON/OFF CHARGER pushbutton - if the *SETUP: 04 Battery Type* selection allows. Equalization charging can only be enabled while the charger is in float charge or in Battery Saver mode. To turn on equalize charging, ensure the LCD display reads "Float Charging" or "Full Charge", then press and hold the ON/OFF CHARGER pushbutton down (about 5 seconds) until the LCD screen displays "Equalizing".

The equalize charge will continue for 4 hours and then automatically stop and return to "Float Charging". The equalize charge can be manually stopped by pressing and holding the ON/OFF CHARGER pushbutton down (about 5 seconds) until the LCD screen displays "Float Charging".

During equalize charge stage the batteries will begin gassing and bubbling vigorously which consumes water; ensure each cell has adequate distilled water levels prior to equalizing and add water as needed after equalizing.

How often should I equalize? Some experts recommend that heavily used batteries should be equalized periodically, ranging anywhere from once a month to once or twice per year. Other experts only recommend equalizing when the cells have a low specific gravity or when the difference between any individual cell has a specific gravity reading greater than .015 after being fully charged.

How long should I equalize? While the batteries are gassing, monitor the specific gravity readings every hour; when the specific gravity readings no longer increase, the equalization charge is complete and should be stopped.

Warning: Equalizing produces hydrogen and oxygen gas. Ensure the battery compartment has adequate ventilation in order to dissipate this gas to avoid explosions.

Caution: Ensure you batteries can be equalized - only equalize your batteries if permitted by your battery manufacturer or dealer. Performing an equalize charge on batteries other than liquid lead acid or certain AGM types could permanently damage them. Refer to your battery manufacturer/dealer for instructions on how to properly equalize your batteries.

Caution: Ensure the DC loads will not be damaged by the higher voltage applied to the batteries during the equalize charge. If in doubt, disconnect the DC loads to prevent damage.

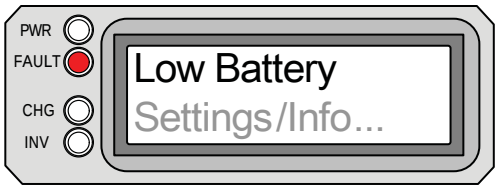
Info: Equalization charging is not available if GEL or AGM 2 is selected under the *SETUP: 04 Battery Type* menu.

5.3.3 Fault Mode Messages

The fault LED comes on and a fault status is displayed when an abnormal condition is detected. View the LCD display and the information in this section to determine and correct the issue.

Info: Many of the faults will automatically restart when the fault is cleared. Some faults will require a manual restart; this requires the ON/OFF INVERTER pushbutton on the remote to be pressed and released. Finally, if the fault is unable to clear, an inverter reset may be required - see section 6.2 to perform an inverter reset.

5.3.3.1 System Fault messages - These fault messages are usually caused by some external issue that directly affects the inverter/charger system.

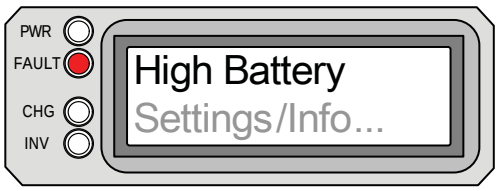


Low Battery appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-12, Low Battery Fault

- **Low Battery** – The inverter turned off to help prevent the batteries from being over-discharged. This message is displayed and the FAULT (red) LED illuminates when the battery voltage drops below the *SETUP: 02 LowBattCutOut* (LBCO) setting for more than 1 minute. The inverter will automatically restart and resume operation when the battery voltage rises to ≥12.5 VDC (12-volt models), ≥25.0 VDC (24-volt models), or ≥50.0 VDC (48-volt models).

Remedy: This fault will also automatically restart if AC power (such as utility/shore power or a generator) is connected to the inverter/charger's input and battery charging begins.



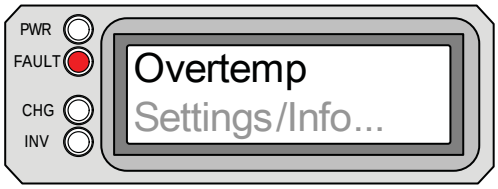
High Battery appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-13, High Battery Fault

- **High Battery** – The inverter has turned off because the battery voltage is at a very high level. This fault message is displayed and the FAULT (red) LED will be on when the battery voltage is above the High Battery Cut-Out (HBCO) value. This fault will automatically restart and resume operation when the battery voltage drops 0.3 VDC (12-volt models), 0.6 VDC (24-volt models), or 1.2 VDC (48-volt models) below the HBCO value.

Info: The HBCO value is dependent on your inverter revision and model. Normally, the HBCO value for the ME/MM/RD Series inverters is 16 VDC (12-volt models) or 32 VDC (24-volt models); and the HBCO value for the MS/MMS Series inverters is 17 VDC (12-volt models), 34 VDC (24-volt models), or 68 VDC (48-volt models).

Remedy: This fault usually only occurs when an external DC charging source is charging the inverter's battery bank. Turn off any other additional charging source to allow the DC voltage level to drop.

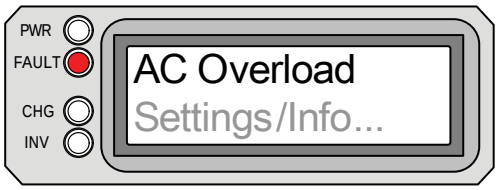


Overtemp appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-14, Overtemp Fault

- **Overtemp** – This fault message indicates the inverter/charger has shut down because the internal power components (FET's and/or Transformer) have exceeded their safe temperature operating range. When the unit has cooled down, it will automatically restart and continue operation.

Remedy: If the fault occurs while inverting, reduce the load on the inverter; if it occurs while charging, turn down the charge rate. If this fault happens often, ensure the inverter is not in a hot area, has proper ventilation and the cooling fans inside the inverter are working.

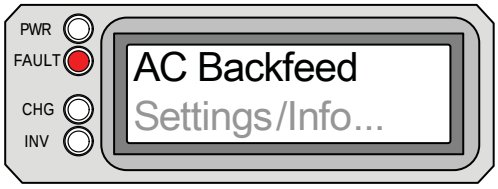


AC Overload appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-15, AC Overload Fault

- **AC Overload** - This fault message displays when the AC load on the inverter/charger's output has exceeded the inverters AC current protection limits. If the overload condition lasts for less than 10 seconds, the unit will automatically restart and resume operation. However, if the overload occurs more than 10 seconds, the unit will shut down and will require a manual restart.

Remedy: This fault usually occurs because the connected AC loads are larger than inverter's output capacity, there is a wiring short on the output or the output wires are incorrectly wired. Once the AC loads are reduced or the output wiring is corrected; the inverter can be restarted after a manual restart has been accomplished.

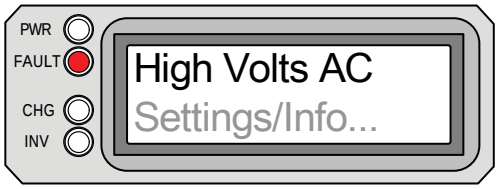


AC Backfeed appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-16, AC Backfeed Fault

- **AC Backfeed -** This fault message causes the inverter to shutdown because AC voltage from an external AC source has been detected on the inverters AC output. When the unit shutdowns because of this fault condition, an inverter reset will be required to resume operation (see section 6.2 to reset the inverter).

Remedy: This fault usually occurs because the AC output wiring is connected to (or able to be connected to) the incoming AC source. When this fault happens, all system wiring should be re-checked to ensure the incoming hot and/or neutral wires are not able to be connected to the AC output.

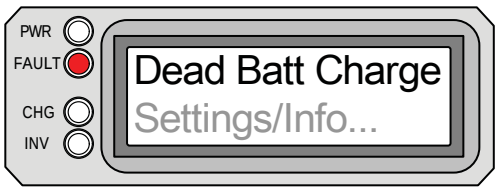


High Volts AC appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-17, High Volts AC Fault

- **High Volts AC** - This fault causes the charger to be disabled because a very high AC voltage (>150 VAC) has been detected on the AC input.

Remedy: Remove all AC power from the inverter's AC input to automatically restart this fault; ensure only 120VAC power is connected to the inverter's AC input.

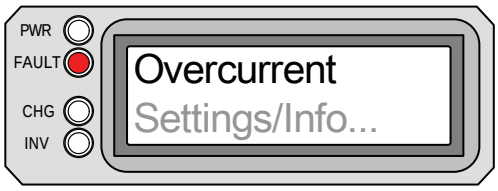


Dead Battery Charge appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-18, Dead Battery Charge Fault

- **Dead Battery Charge** – This fault has detected a very discharged battery bank or a battery bank that is disconnected from the inverter. The unit is attempting to enter the charge mode, but has detected less than 7 volts (12-volt models), 14 volts (for 24-volt models) or 28 volts (for 48-volt models) on the battery bank. This fault will continue until current is able to flow into the battery from the battery charger. Once this happens, the fault will automatically restart.

Remedy: Check the DC voltage on the inverter's DC terminals and compare it with the DC voltage on the battery bank, these two voltages should be very close (<0.5 VDC difference). If not, check to ensure all connections are tight and the fuse/circuit breaker between the inverter and battery bank is good.

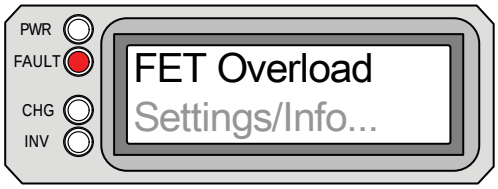


Overcurrent appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-19, Overcurrent Fault

- **Overcurrent** - This fault causes the inverter to shutdown to protect internal power components and may be caused by an excessive AC load. If the overload condition lasts for less than 3 seconds, the unit will automatically restart and resume operation. However, if the overcurrent condition occurs more than 10 seconds, the unit will shut down and will require a manual restart.

Remedy: This fault usually occurs because the connected AC loads are larger than the inverter's output capacity, there is a wiring short on the AC output or the wires are incorrectly wired. Once the AC loads are reduced or the output wiring is corrected; manually restart the inverter to resume operation. If this fault condition continues after all these recommendation, perform a inverter reset (see section 6.2).

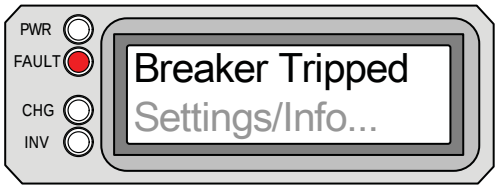


FET Overload appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-20, FET Overload Fault

- **FET Overload -** This fault message indicates the inverter/charger has shut down because the internal FET's (Field Effect Transistor's) have quickly exceeded a safe operating temperature. When the FET's have cooled, the unit will require a manual restart to resume operation.

Remedy: If the fault continues to occur, disconnect all the inverter's AC output wires and reset the inverter (see section 6.2). If this fault does not clear after doing a reset, the inverter may require service.



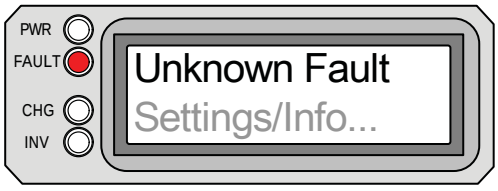
Breaker Tripped appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-21, Breaker Tripped Fault

- **Breaker Tripped** - The inverter has detected that the AC input breaker on the inverter/charger has opened due to excess current flow thru the inverter to the AC loads.

Remedy: After reducing the AC loads, push in the inverter's AC input circuit breaker to reset and resume operation.

Info: While in charger mode, the inverter's AC input breaker could nuisance trip if the loads on the inverter's AC HOT OUT 1 exceed the current rating of this circuit breaker.

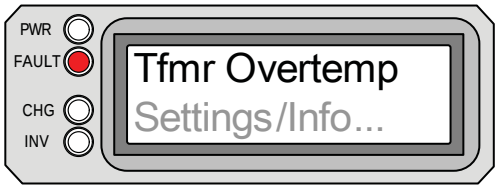


Unknown Fault appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-22, Unknown Fault

- **Unknown Fault** - This fault message displays when the inverter/charger has sent a fault code that cannot be determined by the remote.

Remedy: Call the Technical Support department at Magnum Energy for assistance to help determine and understand the actual fault status.



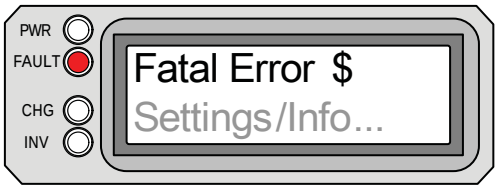
Tfmr Overtemp appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-23, Tfmr Overtemp Fault

• **Tfmr Overtemp** - This fault message is displayed when the TCO (Temperature Cut-Out) opens and causes the inverter to shutdown to protect the internal power transformer from damage. When the TCO has cooled down, the inverter will automatically restart and resume operation.

Remedy: If the fault occurs while inverting, reduce the load on the inverter; if it occurs while charging, turn down the charge rate. If this fault occurs often, ensure the inverter is in a cool location, has adequate ventilation and the internal cooling fans are operational.

5.3.3.2 Remote Fault Message – The remote control may not be functioning correctly and can also display a fault condition. Refer to the following fault message to help troubleshoot the remote.



Fatal Error $ appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are normally off.

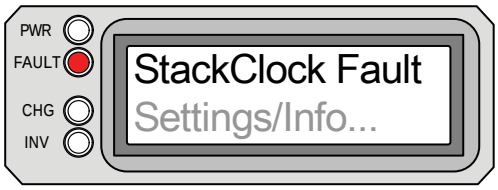
Figure 5-24, Fatal Error $ Fault

• **Fatal Error $** - This fault message indicates that the remote's internal data addressing was unrecognizable; similar to a computer lock-up.

Remedy: Reset the remote by disconnecting the remote communications cable from the inverter for 5 seconds and then reconnect (see figure 2-2). If the fault continues after resetting the remote, the remote requires service at an authorized service facility.

Info: The bottom line may not display correct information while the Fatal Error $ fault condition is displayed; ignore any remote display information during a Fatal Error $ fault.

5.3.3.3 Stacking Fault Messages – A fault condition may occur when two inverters are stacked together - using the stacking interface to provide 120/240VAC output - that is not possible on a single inverter installation. Refer to the following fault messages to help troubleshoot the inverters.



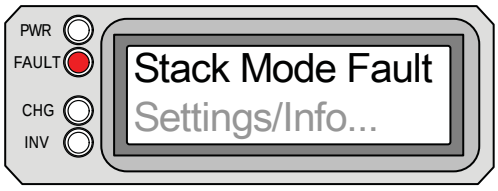
StackClock Fault appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-25, StackClock Fault

- **StackClock Fault** - There is a stacker cable problem; or 2. One inverter is losing synchronization with the other inverter.

Remedy: 1. Ensure you are using a Magnum Stacking Cable (this is not a telephone/data cable, this is a custom made cable). 2. Inspect the stacker cable and reconnect at both ends (listen and make sure you hear an audible "click" from the connectors at both inverters).

This fault has been known to occur when a Magnum Energy accessory is plugged into the Stack Port, but the installation is not using multiple inverters in a stacked configuration. If this occurs, perform an inverter reset (see section 6.2).

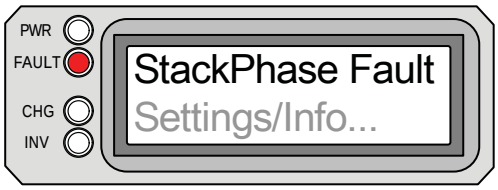


Stack Mode Fault appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-26, Stack Mode Fault

- **Stack Mode Fault -** This unit has detected a problem with the "other" stacked inverter, check that unit for a fault condition.

Remedy: This fault will automatically clear when the fault with the other inverter is corrected.



StackPhase Fault appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

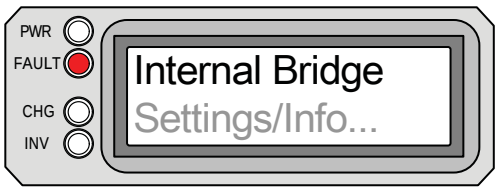
Figure 5-27, StackPhase Fault

- **StackPhase Fault -** 1. The AC input wiring is incorrect; or 2. One phase was lost from the AC input source; or 3. One of the inverter's internal transfer relay is bad; or 4. The inverter's AC input circuit breaker may be open.

Remedy: If this fault doesn't clear after checking these four recommendations; perform an inverter reset (see section 6.2).

5.3.3.4 Internal Fault Messages - The inverter continually monitors several internal components. If an condition inside the inverter occurs that does not allow proper operation, the inverter will shutdown to help protect itself. To clear these "internal" type of faults, the inverter will require an inverter reset.

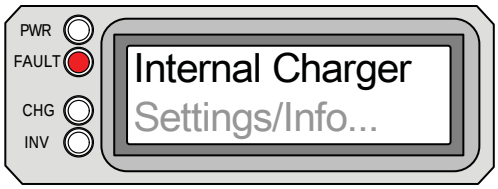
Remedy: Perform an inverter reset; see section 6-2. After the re-setting the inverter, press the ON/OFF INVERTER pushbutton to turn the inverter on and verify the fault has cleared. If the "internal" fault remains, the inverter will require repair at a service facility.



Internal Bridge appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-28, Internal Bridge Fault

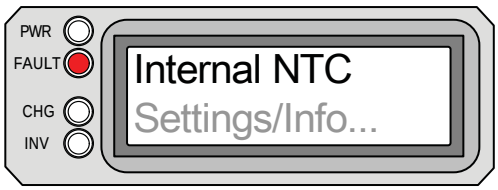
- **Internal Bridge** – This fault message displays and the inverter shuts down because the internal power-bridge protection circuit has been activated.



Internal Charger appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-29, Internal Charger Fault

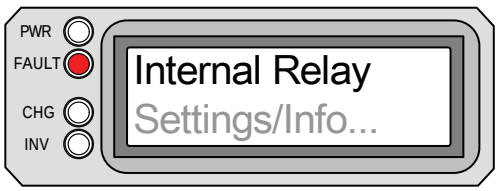
- **Internal Charger** - This fault message displays and the inverter shuts down because the internal charger protection circuit has been activated.



Internal NTC appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-30, Internal NTC Fault

- **Internal NTC** - This fault message displays and the inverter shuts down because the internal NTC (temperature sensor) circuit has been activated.



Internal Relay appears on the LCD and the FAULT (red) LED is on. The PWR (green), CHG (green) and INV (green) LED's are off.

Figure 5-31, Internal Relay Fault

- **Internal Relay** - This fault message displays and the inverter shuts down because the internal AC transfer relay protection circuit has been activated.

5.3.4 LED Indicator Guide

The remote provides the following LED's; use them along with the LCD display to determine the operating status.

Table 5-1, LED Indicator Guide

LED	Status	Meaning
PWR (green)	OFF	1. Remote is in Power Saver mode - press METER pushbutton to activate LED's; or 2. No power to remote (check remote cable or power to inverter); or 3. No AC power from inverter, shore or generator at inverter's AC output terminals.
	ON	AC power is available from inverter, shore or generator at the inverter's AC output terminals.
FAULT (red)	OFF	Normal operation.
	ON	A fault condition has been detected, check the LCD display to find and correct the cause.
CHG (green)	OFF	1. Remote is in Power Saver mode - press the METER pushbutton to activate LED's; or 2. Charger off - no utility or AC generator present.
	ON	Bulk, Absorb, Float or Equalize charge mode (see the LCD display to determine charge status).
	BLINKING (faster than 1/sec)	Utility or AC generator power is detected on the inverter's AC input. The LCD display will not show a charging status.
	BLINKING (slower than 1/sec)	Battery Saver mode - the charger is monitoring and maintaining the batteries. The LCD display will show "Full Charge".
		Charger Standby - the ON/OFF CHARGER pushbutton was pressed to disable the charger. The LCD display will show "Charger Standby".
	BLINKING (faster than 1/sec)	Charger Back-off - the internal temperature is getting hot so the charger is automatically reducing the charge rate to maintain temperature. The LCD display will show a charging status.
	BLINKING (every other sec)	Low AC Input Voltage - the input AC voltage is below 85 VAC. The charger has been automatically disabled to help stabilize incoming AC voltage.
INV (green)	OFF	1. Remote is in Power Saver mode - press the METER pushbutton to activate LED's; or 2. Inverter is disabled.
	ON	Inverter is enabled - 1. Supplying AC power on the output; or 2. In standby (if both INV and CHG LED's are on); the inverter will automatically supply AC power to the loads if shore or generator power is lost.
	BLINKING	Inverter is in search mode (the AC load is below the *SETUP: 01 Search Watts* setting).

6.0 Troubleshooting

The remote may not function correctly, use the following table to help find a solution.

Table 6-1, Remote Control Troubleshooting Guide

Symptom	Possible Cause	Solution
Display shows unrecognizable letters or symbols.	Static electricity may have been discharged into the LCD display	**Reset remote**: disconnect remote communications cable from inverter for 5 seconds and reconnect (see figure 2-2).
Display shows "fatal error" or "illegal address".	The remote's internal data addressing was unrecognizable.	**Reset remote**: disconnect remote communications cable from inverter for 5 seconds and reconnect (see figure 2-2).
LCD text display is locked-up, pushing any pushbutton has no response - may show "revision" or "connecting".	RJ11 connections on communication cable are not making a good connection	**Reset remote**: 1) disconnect remote cable from inverter for 5 seconds and reconnect; 2) check RJ11 cable connection on back of remote (see figure 2-2). Important: ensure the RJ11 connector is pushed into the correct port; you should feel/ hear "click" when the connection is made.
	Remote not getting sufficient power from inverter.	Ensure inverter batteries are connected and inverter is operating correctly; inverter should be able to invert and power AC loads from batteries (ensure no AC power is connected to the inverter AC inputs).
LEDs and backlight are off.	Remote is in Power Saver mode.	Press METER pushbutton to reactivate remote (or defeat Power saver mode).
Remote is non-functional (no lights, no text on LCD display and no response when pressing any pushbutton).	Communication cable bad or not correctly connected to remote port on inverter.	Check communications cable from inverter to remote; ensure: 1) it is connected to the REMOTE port, 2) the correct communications cable is used (a 4-conductor telephone cable may be substituted to determine if cable is good).
	Inverter is not connected to batteries.	Ensure inverter batteries are connected and inverter is operating correctly without any AC power connected (can invert and power AC loads from batteries).

6.0 Troubleshooting

6.1 Troubleshooting Tips -

6.1.1 Inverter problems:

- Inverter turned on, green led on inverter blinking, no output: Inverter is in search mode. Either defeat search mode - if not needed - or turn on loads greater than the Search Watts setting.

6.1.2 Charger problems:

- **Unit won't transfer to charge mode with AC applied:** Is charge (CHG) LED on remote blinking? If not, then the charger does not recognize the incoming AC being within acceptable limits. Measure the input AC voltage, it should be 120VAC +/ 20 VAC; also check that VAC dropout setting on the remote is 80 VAC or less. If the CHG LED is blinking, the transfer relay should be closing within 20 seconds, and begin charging. If the LED is on solid, the relay should be closed, and the charger should begin charging.

- **Transfer relay closes then opens and continues to cycle:** AC voltage is too low, or has transients that drop the AC voltage momentarily. Change the VAC Dropout setting to 80 VAC or 60 VAC and check for improvements. If the cycling continues, back off the *Charge Rate* from 100% to 50%.

This cycling may also be caused if the AC output of the inverter is connected to the inverter's AC input, check for proper input and output AC wiring.

- **Charger not charging even though charge LED is on steady and the unit says "Charging":** Full charge rates are not obtained in "Charging" mode, only after this mode changes to "Bulk Charging", "Absorb Charging" or "Float Charging" modes.

- **Charger not charging even though charge LED is on steady and the unit says "Bulk Charging" (or "Absorb Charging"):** Check the DC amps meter, and DC voltmeter on the ME-RC display, it should be 80% or more of rated charge current if the battery voltage is under 14.0 VDC (28.0 VDC on 24-volt models or 48.0 VDC for 48-volt models). If not, check the *Charge Rate* setting and verify the setting is 80% or greater. Still low charge rate? Check the *Shore Amps* setting to verify setting. If no AC loads are being "passed thru" the inverter, the S*hore Amps* setting must be 15 amps (25 amps for 3kW unit) or greater, to receive full charge rate.

- **Charger says "Float Charging" not "Bulk Charging" when the AC is first plugged in:** Check DC voltmeter on the ME-RC display, if the battery is over 13.0 VDC (26.0 VDC for a 24-volt unit or 52.0 VDC for 48-volt models) then the battery was already charged and the charger automatically goes to "Float Charging" to keep from overcharging the batteries.

- **Charge amps are lower than expected, or is 0 amps DC:** Measure input AC voltage and increase if the input voltage is under 90 VAC. The charge rate is reduced to try and keep the input voltage above 90 VAC; also check the *Shore Max* and *Charger Rate* settings to determine if the current is being limited.

- **Charger output voltage is higher than expected:** Check the Battery Temperature Sensor (BTS) temperature. If the BTS is installed, the charge voltage settings will increase if the temperature around the BTS is below 77° F (25° C) and decrease if the temperature around the BTS is higher than 77° F (25° C).

6.2 Performing an Inverter Reset

If the remote shows an 'internal' fault or the inverter needs to be reset; press and hold the Power ON/OFF pushbutton (see figure 6-1) for at least fifteen (15) seconds until the Charging/Inverting LED comes on and flashes rapidly to indicate the inverter has reset. Once the rapid flashing has begun, release the Power ON/OFF pushbutton. After the inverter reset is completed, check the remote display to verify that the fault has cleared.

Some older inverter models do not allow an inverter reset, if the inverter reset fails, you will need to power-down the inverter using the procedure below. In either case, if an "internal fault" does not clear, the inverter will require repair at an authorized service facility.

Info: The Power ON/OFF pushbutton is a small momentary type switch which operates by lightly pressing and releasing.

Info: All adjustable inverter/charger settings in the ME-RC (except for the *SHORE: Shore Max* and *SETUP: 08 Scrn Contrast* settings - which revert back to default) are saved in non-volatile memory and are preserved until changed - even if an inverter reset is performed or if all power to the remote or inverter is removed.

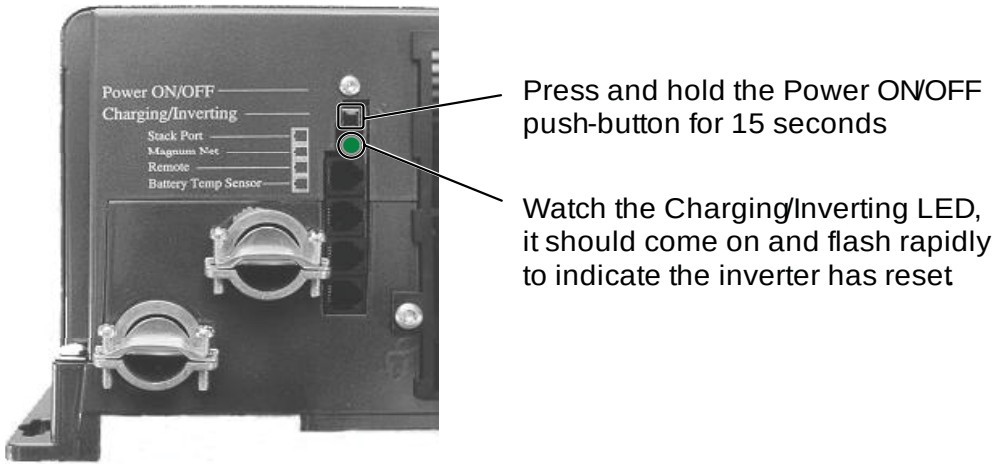


Figure 6-1, Performing an Inverter Reset

6.3 Powering-down the Inverter

Perform the following steps to power-down the inverter:

1. Remove all AC power (utility or generator power) to the inverter.
2. Disconnect the positive battery cable to the inverter.
3. Ensure the inverter and remote control are disconnected from all AC and DC power (the remote display will be blank).

After the inverter has been disconnected from all power for 30 seconds, re-connect the positive battery cable and resume operation.

Info: There may be a momentary spark when the positive battery cable is connected to the inverter's terminal; this is normal and indicates that the inverter's internal capacitors are being charged.

7.0 Limited Warranty

Magnum Energy, Inc., warrants the ME-RC remote control to be free from defects in material and workmanship that result in product failure during normal usage, according to the following terms and conditions:

1. The limited warranty for this product extends for a maximum of 24 months from the product's original date of purchase; or for the same period as the connected Magnum Energy inverter if the inverter and remote are newly installed at the same time up to a maximum of 36 months.

2. The limited warranty extends to the original purchaser of the product and is not assignable or transferable to any subsequent purchaser.

3. During the limited warranty period, Magnum Energy will repair, or replace at Magnum Energy's option, any defective parts, or any parts that will not properly operate for their intended use with factory new or rebuilt replacement items if such repair or replacement is needed because of product malfunction or failure during normal usage. The limited warranty does not cover defects in appearance, cosmetic, decorative or structural parts or any non-operative parts. Magnum Energy's limit of liability under the limited warranty shall be the actual cash value of the product at the time the original purchaser returns the product for repair, determined by the price paid by the original purchaser. Magnum Energy shall not be liable for any other losses or damages.

4. Upon request from Magnum Energy, the original purchaser must prove the product's original date of purchase by a dated bill of sale, itemized receipt.

5. The original purchaser shall return the product prepaid to Magnum Energy in Everett, WA. After the completion of service under this limited warranty, Magnum Energy will return the product prepaid to the original purchaser via a Magnum-selected non-expedited surface freight within the contiguous United States and Canada; this excludes Alaska and Hawaii.

6. If Magnum repairs or replaces a product, its warranty continues for the remaining portion of the original warranty period or 90 days from the date of the return shipment to the original purchaser, whichever is greater. All replaced products and parts removed from repaired products become the property of Magnum Energy.

7. This limited warranty is voided if:

- the product has been modified without authorization,
- the serial number has been altered or removed,
- the product has been damaged through abuse, neglect, accident, high voltage or corrosion.
- the product was not installed and operated according to the owner's manual.

BEFORE RETURNING ANY UNIT, CONTACT MAGNUM ENERGY FOR A RETURN MATERIAL AUTHORIZATION (RMA) NUMBER.

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