TROUBLESHOOTING GUIDE

MagnaSine Hybrid
MSH3012RV

MAGNUM
E N E R G Y

Sensata
Technologies

Precision Circuits Remote Display

Keystone RV Company™

KEYSTONE RV   KEYSTONERV.COM

FSi   Future Sales

FUTURE SALES   FUTURESALESRV.COM

1.1 Troubleshooting Chart

The MSH3012RV inverter/charger is a fairly simple device to troubleshoot. The following chart is designed to help you quickly pinpoint the most common inverter/charger failures.

Table, 1-1, MSH3012RV Inverter/Charger Troubleshooting

Symptom	Possible Cause	Recommended Solution
No output power. Inverter LED is OFF.	Inverter is switched OFF.	Switch the inverter ON.
	Battery voltage is too low. The battery voltage level has dropped below the Low Battery Cutout (LBCO) set-point for more than one minute.	Check fuses/circuit-breakers and cable connections. Check battery voltage at the inverter's terminals. Your batteries may need to be charged, this fault condition will automatically clear when the battery voltage exceeds the LBCI voltage.
	The battery voltage is too high. The inverter automatically resets and resumes operation when the battery voltage drops to the HBCI voltage or lower.	This condition usually only occurs when an additional charging source (alternator, solar panels, or other external charging sources) is used to charge the battery bank. Reduce or turn off any other charger to the inverter batteries to allow the voltage level to drop.
	Over-temperature condition: the internal temperature of the inverter has risen above acceptable limits; caused by loads too great for the inverter to operate continuously, or by lack of ventilation to the inverter. When the unit has cooled, it will automatically reset and resume operation.	Reduce the number of electrical loads that you are operating, this will avoid a repeat over-temp shutdown if the cause was too many loads for the ambient conditions. Check ventilation around the inverter, ensure cool air is available to pass through the inverter.
	AC overload condition: the inverter has turned off because the connected loads are larger than the inverter's output capacity, or the output wires are shorted.	Reduce the AC loads connected to the inverter, or remove all AC output wiring and restart the inverter.
	Internal fault: this fault occurs when an internal fault is detected.	To clear, this fault, an inverter reset is required, **see Section 1.2** to perform an inverter reset.
No output power. Status LED is flashing ON once every second.	Unit is in Search mode, which means load is too small for Search mode circuit detection.	Turn on a load greater than 5 Watts to bring inverter to full output power.
No output power. Status LED is flashing very quickly—fluttering.	Unit is in continuous reset.	Check that the inverter Power ON/OFF switch is not stuck in the ON position (ensure you can feel a click when pushing). If not, the inverter requires repair/service.

Table, 1-1, MSH3012RV Inverter/Charger Troubleshooting (Continued)

Symptom	Possible Cause	Recommended Solution
Low output or surge power. Green LED is flashing.	Loose or corroded battery cables.	Clean and tighten all cables.
	Low batteries.	Recharge or replace batteries.
	Loose AC output connections.	Tighten AC output connections.
	Battery cables are the wrong length or gauge.	Verify recommended cable lengths and gauges from the manual. Replace cables as necessary.
Low charging rate when connected to AC power.	Charge rate backing off due to high temperature inside inverter.	Provide better inverter ventilation/cooling, or additional battery chargers may be needed if battery bank is very large.
	Low AC input voltage (<90 VAC).	Check AC input wiring.
	While charging, the unit may go into charger back-off protection, which automatically reduces the current to the batteries. This is caused by: 1) The internal temperature is too hot—the charger automatically <u>reduces</u> the charge rate to maintain temperature; or 2) The AC input voltage falls below 90 VAC—the charger <u>will stop charging</u> to help stabilize the incoming AC voltage.	
Low charging rate when using a generator.	Generator output is too low to power both load and charger.	Reduce the load or obtain a larger generator.
Charger does not charge.	Loose or corroded battery cables.	Clean and tighten battery cables.
	Defective batteries or blown fuse in-line from inverter to batteries.	Load test batteries and/or check fuse.
	Wrong or no AC input to the AC HOT 1 IN terminal.	Verify proper AC input voltage (105-104 VAC) and frequency (50-70 Hz).
	Check AC input breaker (CB1) on inverter.	Push on breaker to ensure it has not opened.
The inverter will not connect to the incoming AC source on the AC 2 IN terminal.	The AC source connected to the AC HOT 2 IN terminal will not be accepted if it is in-phase with the AC source on the AC HOT 1 IN terminal. A neutral and two legs from an AC source is connected to the NEUT IN, AC HOT 1 IN and AC HOT 2 IN terminals; and must be from a split-phase source (120/240 VAC) or from a three-phase source (120/208 VAC WYE).	

1.2 Resetting the Inverter

Under some fault conditions (e.g., an internal fault), the inverter will need to be reset. Ensure all AC power (utility, generator, shorepower) is removed from the inverter's input before resetting.

⚠️ **CAUTION:** If AC is connected while performing an inverter reset, damage may occur.

1.2.1 Performing an Inverter Reset

To perform an inverter reset (also known as a "soft reset"):

1) Press and hold the Power ON/OFF pushbutton (*see Figure 1-A*) for approximately ten (10) seconds until the Charging/Inverting Status LED comes on and blinks rapidly.

2) Once the rapid flashing has begun, release the Power ON/OFF pushbutton. The Status LED will go off after the pushbutton is released.

3) After the inverter reset is completed, press the ON/OFF pushbutton to turn the inverter on.

If the inverter reset is completed, press the ON/OFF pushbutton to turn the inverter on. If the inverter reset fails, you will need to perform a power reset using the procedure below. In either case, if an internal fault does not clear, the inverter will require repair at an Authorized Service Center (ASC).

ℹ️ **INFO:** The Power ON/OFF pushbutton is a small momentary type switch which operates by lightly pressing and releasing. Be careful not to apply too much force when pushing or the switch might break.
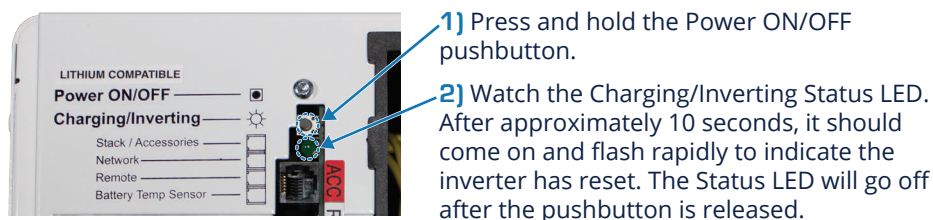

1) Press and hold the Power ON/OFF pushbutton.

2) Watch the Charging/Inverting Status LED. After approximately 10 seconds, it should come on and flash rapidly to indicate the inverter has reset. The Status LED will go off after the pushbutton is released.

Figure 1-A, Performing an Inverter Reset

1.2.2 Performing a Power Reset

To perform a power reset (also known as a "hard reset"):

1) Open the inverter's positive DC disconnect (or disconnect the positive battery cable to the inverter).

⚠️ **CAUTION:** If removing all battery power (positive and negative) to the inverter, do NOT remove the DC negative connections to the inverter or any accessory until after all positive battery connections have been disconnected. This will prevent damage to the inverter or to any network connected accessory.

2) Ensure the inverter(s) and the remote are disconnected from all AC and DC power (the remove display will be blank).

3) After the inverter(s) has been disconnected from all power for 30 seconds, reconnect the inverter DC disconnects (or reconnect the positive battery cable) and resume operation.

ℹ️ **INFO:** If DC disconnects are not used, 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.

1) Press the SETUP menu button.

Bottom line shows a menu heading.

2) Turn the SELECT know to the desired menu item.

When the bottom line shows the desired menu heading:

3) Press the SELECT knob.

Bottom line shows current setting.*

*(If this setting is correct, rotate the SELECT knob to continue to the next menu item.)

4) Press the SELECT knob to change the desired setting.
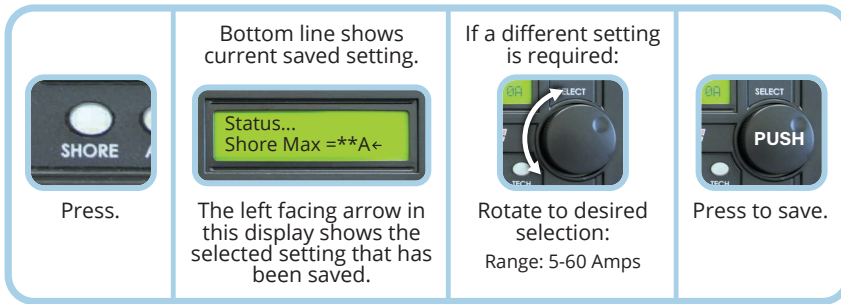
Rotate the SELECT knob to the desired setting.

When the bottom line shows the desired setting:

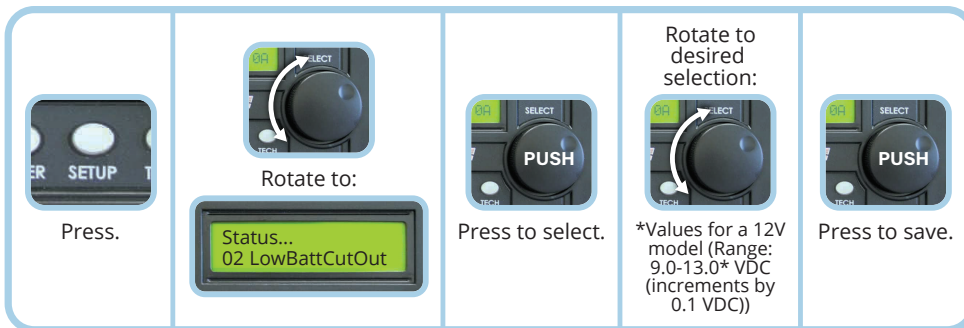**5)** Press the SELECT knob to save this setting.

Figure 3-A, SHORE: Shore Max Selection

Press.

Bottom line shows current saved setting.

Status...
Shore Max =**A←

The left facing arrow in this display shows the selected setting that has been saved.

If a different setting is required:

Rotate to desired selection:

Range: 5-60 Amps

Press to save.

Standard should be 30A. If you are plugged into a smaller output source like a 15A household outlet, you should turn your shore setting down accordingly.

Figure 3-B, SETUP: 02 LowBattCutOut Selections (12V)

Press.

Rotate to:

Status...
02 LowBattCutOut

PUSH

Press to select.

Rotate to desired selection:

Values for a 12V model (Range: 9.0-13.0 VDC (increments by 0.1 VDC))

PUSH

Press to save.

LBCO can be as low as 11.6 with the DragonFly batteries. Your system was set at 12.0 at the factory. Heavy loads like air conditioners will "sag" the voltage lower and may cause the LBCO to fault. If this happens, turn off the heavy load and charge the batteries. The inverter will not come back on until the voltage is 1.0 VDC above the LBCO.

Figure 3-C, SETUP: 03 Absorb Time Selections

Press.

Rotate to:

Status...
03 Absorb Time

PUSH

Press to select.

Rotate to desired selection:

Range: 0.1-25.5 hrs (increments by 0.1 hrs)

PUSH

Press to save.

Absorb Time is set to 2.5 hrs from factory. 0.5 hrs per 100Ahr of battery.

Figure 3-D, SETUP: 04 Battery Type Selections

Press.

Rotate to:

Status...
04 Battery Type

PUSH

Press to select.

Rotate to desired selection:

Selections: GEL, Flooded, AGM1, AGM2, CC/CV, Custom, LFP

PUSH

Press to save.

Battery type is set to custom from the factory. Your values should be:

14.4 Absorb
13.6 Float
14.4 Equalize
Final Charge = Silent
Rebulk = 13.2

Battery Type (Custom)-

This selection allows you to individually adjust the float, absorb, and equalization charge voltage settings and to set an equalization time for your batteries. The following Custom battery settings display only if *Custom* has been selected from the *04 Battery Type* menu. Use these settings to determine the battery's absorption, float, and equalization voltages, and the maximum amount of time spent equalizing.

Absorb-

Sets the level at which the charging voltage is held constant during a Float cycle.

Factory Setting- *14.4V (12V inverter)*   **Range-** *12.0-16.0V (12V)*

Float-

Sets the level at which the charging voltage is held constant during a Float cycle.

Factory Setting- *13.6V (12V inverter)*   **Range-** *12.0-16.0V (12V)*

Equalize-

Sets the level at which the charging voltage is held constant during an Equalization cycle.

NOTE: *Equalize volts cannot be set lower than the Absorb setting or more than 2 volts (for 12V systems).*

Factory Setting- *14.4V (12V inverter)*   **Range-** *12.0-16.0V (12V)*

Set Final Charge Stage = Silent-

Silent mode stops charging once it transitions from Absorb mode to *'Silent'*. Once the charger enters Silent mode the battery voltage is continuously monitored. If the batteries fall to the *Rebulk* value, the charger restarts the Bulk Charge mode and then transitions to Absorb Charge mode. After the Absorb Charge mode, the charger again transitions to Silent mode. This silent to rebulk to absorb and back to silent cycle will continue as long as it is required.

ReBulk-

When *Silent* is selected, you must also set the DC voltage set-point where the charger restarts the Bulk Charge mode. This setting should be at the lowest DC volts you want the batteries to fall before starting a new bulk charge. Typically, the lowest DC volts the batteries are allowed to fall is 12.8-13.2 VDC (for Lithium 12V systems).

Factory Setting- *Rebulk = 13.3V (12V inverter)*   **Range-** *12.0-16.0 VDC (12V)*

Why would I use Silent Stage?

Silent mode is typically used when an alternate charge source is available and able to fully charge or finish the charge cycle after the Absorb stage. A major difference between Multi mode and Silent mode is that the Silent mode returns to Bulk mode instead of Float mode. In Silent mode, you can adjust the Rebulk set-point in order to allow the alternate charge source to provide more of the battery charging.

Table, 3.3, ME-RC's Inverter/Charger Default Settings

Menu Items		Default Settings	SuperSolar Settings
SHORE Pushbutton		Shore Max = 30A	Shore Max = 30A
SETUP Pushbutton	01 Search Watts	Search = 5W	Search = OFF
	02 LowBattCutOut	LBCO = 10.0 VDC (12V inverter)	LBCO = 11.6 VDC
	03 Absorb Time	Absorb Hrs = 1.5	Absorb Hrs = 2.5
	04 Battery Type	BatType = Flooded	BatType = Custom
	05 Charge Rate	Max Charge = 80%	Max Charge = 80%
	06 VAC Dropout	Dropout = 80 VAC* (150 VAC for export models)	Dropout = 80 VAC
	07 Power Save	PwrSave = 15 minutes	PwrSave = 15 minutes
	08 Screen Setup	Contrast = 100% Brightness = 50%	Contrast = 100% Brightness = 50%
	09 Final Charge	Final = Multi	Final = Silent
	10 Power Up Always	Pwr Up = NO	Pwr Up = NO
	11 Bulk Always	Bulk Always = OFF	Bulk Always = OFF