



# Magnum Lithium Charging

July 13, 2020

# Agenda

- What is Changing
- LFP Charger Operation
- Affected Products
- Literature Updates
- How to Select LFP on ME-RC
- How to Select LFP on ME-MR
- New Part Numbers
- Inverter Labeling
- Accessory Labeling
- Complete List of Affected Part Numbers

# What Is Changing

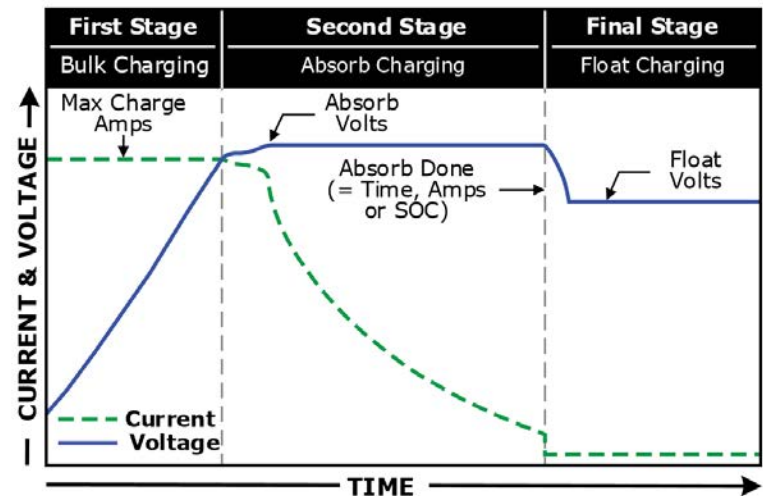
- Lithium iron phosphate (LFP) will be a standard battery type selection
  - This is in addition to the four that are already available: Gel, Flooded, AGM1, AGM2
  - Software change only
  
- LFP Settings
  - See table for voltages
  - Equalize charging is not available
  - Temperature Compensation is not used, remove the temp sensor from the inverter
  - Re-bulk voltage threshold is lower
  - Raised available low battery cut-out range (LBCO)

Battery Type	Inverter Voltage	Absorption Voltage	Float Voltage	Equalization Voltage
GEL	12 VDC	14.1 VDC	13.6 VDC	14.1 VDC <sup>1</sup>
	24 VDC	28.2 VDC	27.2 VDC	28.2 VDC <sup>1</sup>
	48 VDC	56.4 VDC	54.4 VDC	56.4 VDC <sup>1</sup>
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 <sup>2</sup>	12 VDC	14.3 VDC	13.3 VDC <sup>4</sup>	15.5 VDC
	24 VDC	28.6 VDC	26.6 VDC <sup>4</sup>	31.0 VDC
	48 VDC	57.2 VDC	53.2 VDC <sup>4</sup>	62.0 VDC
AGM 2 <sup>3</sup>	12 VDC	14.5 VDC	13.5 VDC	14.5 VDC <sup>1</sup>
	24 VDC	29.0 VDC	27.0 VDC	29.0 VDC <sup>1</sup>
	48 VDC	58.0 VDC	54.0 VDC	58.0 VDC <sup>1</sup>
LFP	12 VDC	14.4 VDC	13.6 VDC	14.4 VDC <sup>1</sup>
	24 VDC	28.8 VDC	27.2 VDC	28.8 VDC <sup>1</sup>
	48 VDC	57.6 VDC	54.4 VDC	57.6 VDC <sup>1</sup>



# Charger Operation for LFP

- Bulk Charging
  - Begins Bulk charging whenever AC power is connected
    - Will not bypass Bulk if battery voltage is high
  - Remains in Bulk until the absorption voltage is achieved
- Absorb Charging
  - Remains at Absorb voltage until absorption time is reached (determined by absorb time setting) then switches to Float
- Float Charging
  - Remain in Float as long as the AC source is available
  - Will not enter Full Charge Stage, or Battery Saver mode (note: lead acid will switch to Full Charge mode after 4 hours in Float)
- Will re-enter Bulk charging when:
  - AC power is reconnected (regardless of battery voltage) (unless it is within 2 minutes)
  - If voltage drops below the LFP re-bulk level ( $\leq 12.8V$ ) for 10 seconds ( $12.1VDC$  for lead acid)



## Affected Products

- All Magnum sine inverters for mobile applications (Including variants such as -F and -U)
  - MMS Series
    - MMS1012
    - MMSA1012
  - MS Series
    - MS2000
    - MS2012
    - MS2812
    - MS2024
    - MS4024
    - MS4048
  - MSH Series
    - MSH3012M
    - MSH3012RV
    - MSH4024M

- Remotes

- ME-MR



- ME-RC



- ME-RVC



- Items not being updated at this time
  - Mod-sine inverters (ME, MM Series)
  - Stationary inverters (RD, MSH-RE Series)
  - Export inverters (MM-E, RD-E, MS-E Series)
  - ME-BMK (Battery Monitoring Kit)
  - ME-ARC (Advanced Remote Control)

### Notes:

- Must have updated remotes and inverters to be able to make the LFP selection
- Settings are stored in the non-volatile memory of the remote

# Literature Updates

- Spec Sheets

## Features

- Pure Sine Wave – Power your sensitive electronics without worry. The MS Series provides reliable, utility-grade power.
- Power Factor Corrected (PFC) Charger – Our PFC charger is built into all of our inverter/chargers. It uses less energy from a generator than a standard charger – 25-30% less AC current than standard chargers.
- Battery Profile Presets – Using the ME-RC or ME-MR Remote Controls, easily choose from and set standard battery profiles, including **Lithium Iron Phosphate (LFP)**, Gel, Flooded, AGM1, and AGM2.
- Convenient Wiring Access – An extra large AC access cover with terminal screw block and 360° DC connection terminals with

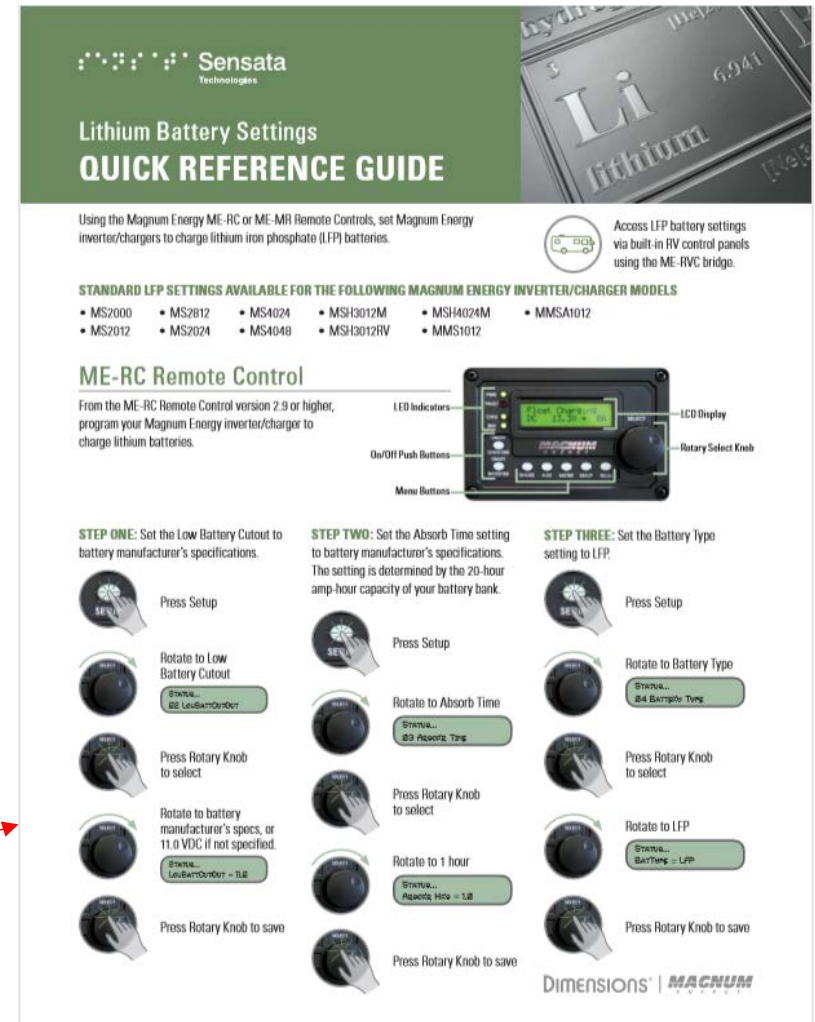
- Manuals

- ME-MR
- ME-RC

- Magnum Compatibility Matrix

<https://www.magnum-dimensions.com/references/magnum-remote-compatibility>

- Quick Reference Guide



**Lithium Battery Settings QUICK REFERENCE GUIDE**

Using the Magnum Energy ME-RC or ME-MR Remote Controls, set Magnum Energy inverter/chargers to charge lithium iron phosphate (LFP) batteries.

Access LFP battery settings via built-in RV control panels using the ME-RVC bridge.

**STANDARD LFP SETTINGS AVAILABLE FOR THE FOLLOWING MAGNUM ENERGY INVERTER/CHARGER MODELS**

- MS2000 • MS2812 • MS4024 • MSH3012M • MSH4024M • MMSA1012
- MS2012 • MS2024 • MS4048 • MSH3012RV • MMS1012

**ME-RC Remote Control**

From the ME-RC Remote Control version 2.9 or higher, program your Magnum Energy inverter/charger to charge lithium batteries.

LED Indicators, LCD Display, Rotary Select Knob, On/Off Push Buttons, Menu Buttons

**STEP ONE: Set the Low Battery Cutoff to battery manufacturer's specifications.**

Press Setup  
 Rotate to Low Battery Cutoff  
 Press Rotary Knob to select  
 Rotate to battery manufacturer's specs, or 11.0 VDC if not specified.  
 Press Rotary Knob to save

**STEP TWO: Set the Absorb Time setting to battery manufacturer's specifications. The setting is determined by the 20-hour amp-hour capacity of your battery bank.**

Press Setup  
 Rotate to Absorb Time  
 Press Rotary Knob to select  
 Rotate to 1 hour  
 Press Rotary Knob to save

**STEP THREE: Set the Battery Type setting to LFP.**

Press Setup  
 Rotate to Battery Type  
 Press Rotary Knob to select  
 Rotate to LFP  
 Press Rotary Knob to save

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# How To Select LFP on ME-RC



**STEP ONE:** Set the Low Battery Cutout to battery manufacturer's specifications.



Press Setup



Rotate to Low Battery Cutout

STATUS...  
B2 LowBattCutOut



Press Rotary Knob to select



Rotate to battery manufacturer's specs, or 11.0 VDC if not specified.

STATUS...  
LowBattCutOut = 11.0



Press Rotary Knob to save

**STEP TWO:** Set the Absorb Time setting to battery manufacturer's specifications. The setting is determined by the 20-hour amp-hour capacity of your battery bank.



Press Setup



Rotate to Absorb Time

STATUS...  
B3 ABSORB TIME



Press Rotary Knob to select



Rotate to 1 hour

STATUS...  
Absorb Hrs = 1.0



Press Rotary Knob to save

**STEP THREE:** Set the Battery Type setting to LFP.



Press Setup



Rotate to Battery Type

STATUS...  
B4 BATTERY TYPE



Press Rotary Knob to select



Rotate to LFP

STATUS...  
BATTYPE = LFP



Press Rotary Knob to save

# How To Select LFP on ME-MR



**STEP ONE:** Set the Battery Amp Hours to 200 AH = 1 hour.



Press Menu/Home button until the display shows BAT AHRS



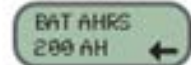
The current "saved" setting is indicated by an arrow in the bottom right-hand corner of the display



Press On/Off/Change button until 200 AH is shown



Press Save/Hold button to save the 200 AH setting



**STEP TWO:** Set the Battery Type setting to LFP.



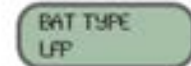
Press Menu/Home button until the display shows BAT TYPE



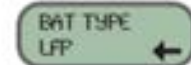
The current "saved" setting is indicated by an arrow in the bottom right-hand corner of the display



Press On/Off/Change button until LFP is shown



Press Save/Hold button to save the LFP setting



**STEP THREE:** Set the Low Battery Cutout to battery manufacturer's specifications.



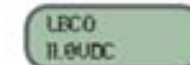
Press Menu/Home button until the display shows LBCO



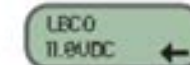
The current "saved" setting is indicated by an arrow in the bottom right-hand corner of the display



Press On/Off/Change button until correct Low Battery VDC setting is shown for your battery specs, or 11.0VDC if not specified.



Press Save/Hold button to save the LBCO setting





# New Part Numbers

- New part numbers for LFP compatibility
  - “L” will be added to the end of the model and before the packaging, for example:

Current P/N	New P/N
MS2000-F	MS2000-L-F
MSH3012M	MSH3012M-L
ME-MR-F	ME-MR-L-F
ME-RC50	ME-RC50-L

- New part number will be printed on the label on the box – See pictures
- Current P/N’s will no longer be manufactured after launch date
- Need to consume inventory before fully transitioning to new part number

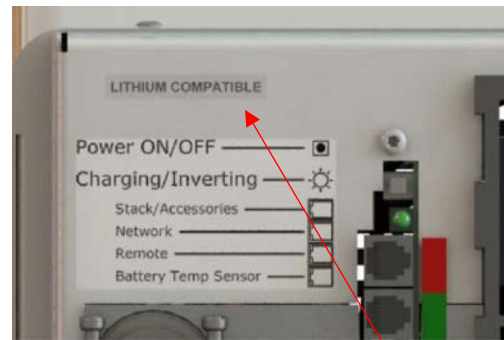


# Inverter Labeling

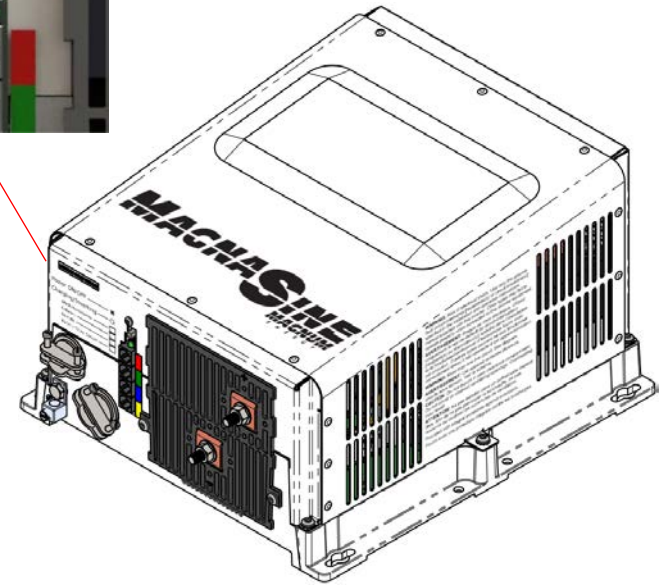
- “Lithium Compatible” label will be added to the products



MMS-1012



MS/MSH



# Accessory Labeling



ME-MR



ME-RC



ME-RVC



# Complete List of Affected Part Numbers

Current P/N	New P/N	Description	Current P/N	New P/N	Description
MMS1012-F	MMS1012-L-F	Inverter MMS1012 Freight Box	MS2812-F	MS2812-L-F	Inverter MS2812 Freight Box
MMS1012-U	MMS1012-L-U	Inverter MMS1012 Ups Box	MS2812-U	MS2812-L-U	Inverter MS2812 Ups Box
MMS1012-G	MMS1012-GL	Inverter MMS1012 w/gfci	MS2812-G	MS2812-GL	Inverter MS2812 Ups Box GCFI with R
MMSA1012-G	MMSA1012-GL	Inverter MMSA1012-G	MS2024	MS2024-L	Inverter 24Vdc 2000W MS Series
MS2000-F	MS2000-L-F	Inverter MS2000 Freight Box	MS4024-U	MS4024-L-U	Inverter 24Vdc 4000W MS Series
MS2000-U	MS2000-L-U	Inverter MS2000 Ups Box	MS4024-G	MS4024-GL	Inverter MS4024-G with GCFI & Remot
MS2000-G	MS2000-GL	Inverter MS2000-G Ups Box with Remo	MS4048	MS4048-L	Inverter MS4048
MS2000-20B-F	MS2000-20BL-F	Inverter MS2000-20B Freight Bo	MS4048-20B	MS4048-20BL	Inverter MS4048 w/20A Breakers
MS2000-20B-U	MS2000-20BL-U	Inverter MS2000-20B Ups Box	MSH3012M	MSH3012M-L	Inverter MSH3012M
MS2000-15B-F	MS2000-15BL-F	Inverter MS2000-15B Freight Bo	MSH3012RV	MSH3012RV-L	Inverter 12Vdc 3000W MSH-RV Series
MS2000-15B-U	MS2000-15BL-U	Inverter MS2000-15B Ups Box	MSH4024M	MSH4024M-L	Inverter MSH4024M
MS2012-F	MS2012-L-F	Inverter MS2012 Freight Box	ME-MR	ME-MR-L	Remote ME-MR
MS2012-U	MS2012-L-U	Inverter MS2012 Ups Box	ME-MR-F	ME-MR-L-F	Remote ME-MR (BAGGED)
MS2012-G	MS2012-GL	Inverter MS2012-G with GFCI & Remot	ME-MR25	ME-MR25-L	Remote ME-MR w/25ft Cable
MS2012-20B-F	MS2012-20BL-F	Inverter MS2012-20B Freight Bo	ME-MR25-B25	ME-MR25-L-B25	Remote ME-MR w/25ft Cable 25PC
MS2012-20B-U	MS2012-20BL-U	Inverter MS2012-20B Ups Box	ME-RC	ME-RC-L	ME Series Remote Control
MS2012-15B-F	MS2012-15BL-F	Inverter MS2012-15B FreightBox	ME-RC-F	ME-RC-L-F	ME Series Remote Control (BAGGED)
MS2012-15B-U	MS2012-15BL-U	Inverter MS2012-15B UPS Box	ME-RC50	ME-RC50-L	ME Series Remote Control 50'
			ME-RVC	ME-RVC-L	ME-RVC Bridge