MOTOBATT Hybrid GO BEYOND LIMITS OF BOTH LEAD ACID & LITHIUM BATTERIES

# Trouble shooting Chart Lifepo4 Battery-P and (HP Series and Hybrid)

- Always charge your Motobatt Lifepo4 battery properly before use

- Motobatt Lithium HP series and Hybrid batteries are programmed to 0v when in protection mode.

- Motobatt uses both a balance board and a PCB Safety board in its HP series and Hybrid batteries to control the dynamic balancing and the safety parameters of the battery. Importantly it “protects the battery cells” by entering shutdown mode see conditions below in Fig 2

- Most aftermarket chargers will NOT ACTIVATE under 2v, so you must use a Motobatt Lithium charger model (which activates from 0v) or a direct source of power such as a car battery or constant voltage card charger to apply charge to reset the board. Once activated you can measure and see that you have voltage at the terminal, if the voltage is lower than specified use any 12v charger to recharge so long as it does not have a desulphation mode.

- If the battery is at the required voltage it may be that the amperage draw of your vehicle in certain conditions at startup is too high for the battery pack performance or safety board settings and there is a mismatch. In this case you need to return the battery and select one of the same size with a higher Amp Hour capacity. It is not only the Cranking amps that matter, you must be able to draw down on the battery the amount of discharge amps required to start the machine under different conditions. Extreme conditions like snow cold temperatures, hot temperatures and repeatedly holding down the start button can all be causes of shutdown activation or over discharging the pack in the case of P series. Riders in Fred Flintstone mode hill climbing on the starter button will wreck a good battery! Do not repeatedly hold the start button allow the battery to “rest for 30 seconds” between difficult starts.

- Motobatt P series has no shutdown protection since the physical size of that battery will not allow for the fitment of a PCB. If this battery is drawn under ***8V it will likely irreversibly damage the cell pack.*** You must always ensure a fully charged battery before attempting starting or you risk ruining the battery. ***This is not a warranty event, its maintenance!*** We often find our P series batteries will start machines that our HP series will not. This is due to the programmed voltage settings on the PCB. They may be just outside the range needed for a successful start. To ensure the battery is not ruined and you have enough reserve, we have to have the setting in the safe voltage shutdown range. In this case you will need to opt for a battery of higher overall capacity if you want reliability. There can be large differences in amp draw in between brands with the same engine size and CCA requirements.

- Generally there is no diagnostic equipment available to check why a lithium starting battery of this type has failed. So you will need to use a Multimeter or voltmeter to check terminal voltage.

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# MOTOBATT Hybrid GO BEYOND LIMITS OF BOTH LEAD ACID & LITHIUM BATTERIES

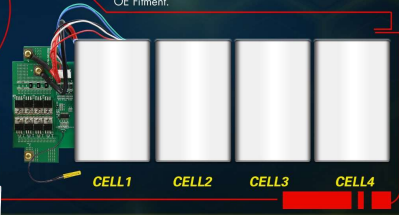
# Overview Lifepo4 Battery HP Series and Hybrid

## MOTOBATT Pro Lithium (HP-SERIES)

## HIGH PERFORMANCE

### BALANCER AND PROTECTION CIRCUIT BOARD

- SAFE - Most Stable Chemistry Available.
- POWERFUL - Dynamic Cell Balancer (CBC) to Maximize High Cranking Power.
- DURABLE - 5 Times Longer Life,No Sulfation & No need Off Season Maintenance.
- Fit & Go - Ready to go anytime,Super Light & Exact OE Fitment.




**BALANCER FUNCTION:** IS TO OPTIMIZE EACH CELL VOLTAGE TO THE MAXIMUM OUTPUT

**CELL PROTECTION:** BALANCE PROTECTION (PER CELL) ACTIVATE AT 3.59V

**VOLTAGE PROTECTION:**
Charging protection cut off at 15.4 V  Discharging protection cut off at 8.0V

**TEMPERATURE PROTECTION:**
Charging protection cut off at 55° C  Discharging protecton cut off at 75° C

| | |
|---|---|
| Battery Type: | **MPLX7U-H.P** |
| Voltage: 12V CCA: 165 | |
| Weight: 0.53kg | |
| Dimensions (in / mm) | |
| L: 4.49(114) W: 2.76(70) H:3.43(87) HL: 5.00(127) | |
| Assembly Figure Terminal Locations: 2 | |
| Terminals: 2, M5x2.5 (Part#MPT1) | |
| Screws: 4, M5X7 (Part#2xMPS1) | |
| Allen Wrench: 1, 3x3 (Part#MPAK1) | |
| Terminal Caps: 2, 11x5.5 (Part#MPC1) | |
| EVA: 3,Bottom | (2 Pcs EVA #MPLX7U-EVA 110*67*20) (1 Pcs EVA #MPLX7U-EVA 110*67*3) |
| EVA 1=20mm,2=20mm,3=3mm, total=43mm | |

| | |
|---|---|
| Battery Type: | **MPL14B4-HP** |
| voltage: 12V CCA: 280 | |
| Weight: 0.83kg | |
| Dimensions (in / mm) | |
| L: 5.90(150) W: 2.76(70) H:4.09(104) HL: 5.66(144) | |
| Assembly Figure Terminal Locations: 2 | |
| Terminals: 2, M6x2.5(Part#MPT2) | |
| Screws: 4, M6X7 (Part#2xMPS2) | |
| Allen Wrench: 1, 4x4 (Part#MPAK2) | |
| Terminal Caps: 2, 12x5.5 (Part#MPC2) | |
| EVA: 3,Bottom | (2 Pcs EVA #MPL14B4-EVA 147*67*15) (1 Pcs EVA #MPL14B4-EVA 147*67*10) |
| EVA 1=15mm,2=10mm,3=15mm, total=40mm | |

| | |
|---|---|
| Battery Type: | **MPLTZ14S-HP** |
| Voltage: 12V CCA: 280 | |
| Weight: 0.89kg | |
| Dimensions (in / mm) | |
| L: 5.94(151) W: 3.43(87) H:3.74(95) HL: 4.13(110) | |
| Assembly Figure Terminal Locations: 4 | |
| Terminals: 2, M6x2.5 (Part#MPT2) | |
| Screws: 4,M6X7 (Part#2xMPS2) | |
| Allen Wrench: 1, 4x4 (Part#MPAK2) | |
| Terminal Caps: 4, 12x5.5 (Part#2xMPC2) | |
| EVA: 2,Bottom | (1 Pcs EVA #MPLTZ14S-EVA 147*84*10) (1 Pcs EVA #MPL16U-EVA 147*84*5) |
| EVA 1=10mm,2=5mm, total=15mm | |

| | |
|---|---|
| Battery Type: | **MPLX16U-HP** |
| Voltage: 12V CCA: 370 | |
| Weight: 1.07kg | |
| Dimensions (in / mm) | |
| L: 5.94(151) W: 3.43(87) H:5.11(130) HL: 6.29(160) | |
| Assembly Figure Terminal Locations: 4 | |
| Terminals: 2, M6x2.5 (Part#MPT2) | |
| Screws: 4, M6X7 (Part#2xMPS2) | |
| Allen Wrench: 1, 4x4 (Part#MPAK2) | |
| Terminal Caps: 4, 12x5.5 (Part#2xMPC2) | |
| EVA: 2,Bottom | (1 Pcs EVA #MPLX16U-EVA 147*84*15) (1 Pcs EVA #MPL16U-EVA 147*84*5) |
| EVA 1=15mm,2=15mm, total=30mm | |

| | |
|---|---|
| Battery Type: | **MPLX14AU-HP** |
| Voltage: 12V CCA: 300 | |
| Weight: 1.00kg | |
| Dimensions (in / mm) | |
| L: 5.31(135) W: 3.54(90) H: 5.74(146) HL: 6.92(176) | |
| Assembly Figure Terminal Locations: 4 | |
| Terminals: 2, M6x2.5 (Part#MPT2) | |
| Screws: 4, M6x7 (Part#2xMPS2) | |
| Allen Wrench: 1, 4x4 (Part#MPAK2) | |
| Terminal Caps: 4, 12x5.5 (Part#2xMPC2) | |
| EVA: 3,Bottom | (3 Pcs EVA #MPLX14AU-EVA 132*87*10) |
| EVA 1=10mm,2=10mm,3=10mm, total=30mm | |

| | |
|---|---|
| Battery Type: | **MPL51814-HP** |
| Voltage: 12V CCA: 370 | |
| Weight: 1.15kg | |
| Dimensions (in / mm) | |
| L: 7.32(186) W: 3.22(82) H: 6.73(171) | |
| Assembly Figure Terminal Locations: 4 | |
| Terminals: 2, M6x2.5 (Part#MPT2) | |
| Screws: 4, M6x7 (Part#2xMPS2) | |
| Allen Wrench: 1, 4x4 (Part#MPAK2) | |
| Terminal Caps: 4, 12x5.5 (Part#2xMPC2) | |
| EVA: None | |

| | |
|---|---|
| Battery Type: | **MPLX30UHD-HP** |
| Voltage: 12V CCA: 550 | |
| Weight: 1.78kg | |
| Dimensions (in / mm) | |
| L: 6.53(166) W: 4.96(126) H: 6.88(175) HL: 7.55(192) | |
| Assembly Figure Terminal Locations: 4 | |
| Terminals: 2, M6x2.5 (Part#MPT3) | |
| Screws: 4, M6x7 (Part#2xMPS2) | |
| Allen Wrench: 1, 4x4 (Part#MPAK2) | |
| Terminal Caps: 4, 12x5.5 (Part#2xMPC2) | |
| Spacers: 17mm Bottom (Part#MPC2), 2 Square Top Corners (Part#MPSC) | |

| | |
|---|---|
| Battery Type: | **MPLX20UHD-HP** |
| Voltage: 12V CCA: 450 | |
| Weight: 1.39kg | |
| Dimensions (in / mm) | |
| L: 6.88(175) W: 3.42(87) H: 6.10(155) HL: 6.88(175) | |
| Assembly Figure Terminal Locations: 4 | |
| Terminals: 4, M6x2.5 (Part#MPT2 and #MPT3) | |
| Screws: 4, M6x7 (Part#2xMPS2) | |
| Allen Wrench: 1, 4x4 (Part#MPAK2) | |
| Terminal Caps: 4, 12x5.5 (Part#2xMPC2) | |
| Spacers: 2, 20mm Bottom (Part# MPB57), 13mm Back (Part# MPS5) | |

## PROTECTION CIRCUIT BOARD (PCB)

### HP SERIES FEATURES:

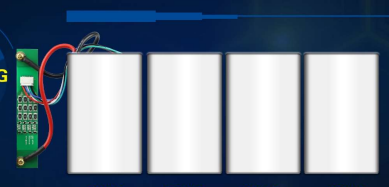
- Over charge protection-Prevents the machine,charger or consumer applying damaging voltages to the battery.
- Over discharge protection-Prevents machine or consumer draining battery to failure point by parasitic rain or battery application incompatibility.At 8V battery will shut down the protect the cells from being discharged to failure. Simply recharge to full voltage and use again!
- Prevents damages by non-lithium chargers using de-sulphating mode or boost mode.
- Thermal Protection-Built in temperature sensor activates shutdown process before the battery an overheat.
- Note competitor batteries or standard P series Lithium batteries may not recover from being drawn below 8V. This is a main cause of nuisance warranty.

# MOTOBATT Hybrid GO BEYOND LIMITS OF BOTH LEAD ACID & LITHIUM BATTERIES

## Overview Lifepo4 Battery-P

MOTOBATT Pro Lithium (P–SERIES)

PERFORMANCE CELL BALANCER CIRCUIT




- **BALANCER FUNCTION:** IS TO OPTIMIZE EACH CELL VOLTAGE TO THE MAXIMUM OUTPUT
- **CELL PROTECTION:** BALANCE PROTECTION (PER CELL) ACTIVATE AT 3.59V

- SAFE - Most Stable Chemistry Available.
- POWERFUL - Dynamic Cell Balancer (CBC) to Maximize High Cranking Power.
- DURABLE - 5 Times Longer Life,No Sulfation & No need Off Season Maintenance.
- Fit & Go - Ready to go anytime,Super Light & Exact OE Fitment.

| | |
|---|---|
| Battery Type: **MPLX7U–P** | |
| Voltage: 12V CCA: 165 | |
| Weight: 0.49kg | |
| Dimensions (in / mm) L: 4.49(114) W: 2.76(70) H:3.43(87) HL: 5.00(127) | |
| Assembly Figure Terminal Locations: 2 | |
| Terminals: 2, M5x2.5 (Part#MPT1) | |
| Screws: 4, M5X7 (Part#2xMPS1) | |
| Allen Wrench: 1, 3x3 (Part#MPAK1) | |
| Terminal Caps: 2, 11x5.5 (Part#MPC1) | |
| EVA: 3,Bottom | (2 Pcs EVA #MPLX7U-EVA 110*67*20) (1 Pcs EVA #MPLX7U-EVA 110*67*3) |
| EVA 1=20mm,2=20mm,3=3mm, total=43mm | |

| | |
|---|---|
| Battery Type: **MPL14B4–P** | |
| Voltage: 12V CCA: 280 | |
| Weight: 0.77kg | |
| Dimensions (in / mm) L: 5.90(150) W: 2.76(70) H:4.09(104) HL: 5.66(144) | |
| Assembly Figure Terminal Locations: 2 | |
| Terminals: 2, M6x2.5(Part#MPT2) | |
| Screws: 4, M6X7 (Part#2xMPS2) | |
| Allen Wrench: 1, 4x4 (Part#MPAK2) | |
| Terminal Caps: 2, 12x5.5 (Part#MPC2) | |
| EVA: 3,Bottom | (2 Pcs EVA #MPL14B4-EVA 147*67*15) (1 Pcs EVA #MPL14B4-EVA 147*67*10) |
| EVA 1=15mm,2=10mm,3=15mm, total=40mm | |

| | |
|---|---|
| Battery Type: **MPLTZ14S–P** | |
| Voltage: 12V CCA: 280 | |
| Weight: 0.82kg | |
| Dimensions (in / mm) L: 5.94(151) W: 3.43(87) H:3.74(95) HL: 4.13(110) | |
| Assembly Figure Terminal Locations: 4 | |
| Terminals: 2, M6x2.5 (Part#MPT2) | |
| Screws: 4,M6X7 (Part#2xMPS2) | |
| Allen Wrench: 1, 4x4 (Part#MPAK2) | |
| Terminal Caps: 4, 12x5.5 (Part#2xMPC2) | |
| EVA: 2,Bottom | (1 Pcs EVA #MPLTZ14S-EVA 147*84*10) (1 Pcs EVA #MPL16U-EVA 147*84*5) |
| EVA 1=10mm,2=5mm, total=15mm | |

| | |
|---|---|
| Battery Type: **MPLX16U–P** | |
| Voltage: 12V CCA: 370 | |
| Weight: 0.99kg | |
| Dimensions (in / mm) L: 5.94(151) W: 3.43(87) H:5.11(130) HL: 6.29(160) | |
| Assembly Figure Terminal Locations: 4 | |
| Terminals: 2, M6x2.5 (Part#MPT2) | |
| Screws: 4, M6X7 (Part#2xMPS2) | |
| Allen Wrench: 1, 4x4 (Part#MPAK2) | |
| Terminal Caps: 4, 12x5.5 (Part#2xMPC2) | |
| EVA: 2,Bottom | (1 Pcs EVA #MPLX16U-EVA 147*84*15) (1 Pcs EVA #MPL16U-EVA 147*84*5) |
| EVA 1=15mm,2=15mm, total=30mm | |

| | |
|---|---|
| Battery Type: **MPLX14AU–P** | |
| Voltage: 12V CCA: 300 | |
| Weight: 0.92kg | |
| Dimensions (in / mm) L: 5.31(135) W: 3.54(90) H: 5.74(146) HL: 6.92(176) | |
| Assembly Figure Terminal Locations: 4 | |
| Terminals: 2, M6x2.5 (Part#MPT2) | |
| Screws: 4, M6x7 (Part#2xMPS2) | |
| Allen Wrench: 1, 4x4 (Part#MPAK2) | |
| Terminal Caps: 4, 12x5.5 (Part#2xMPC2) | |
| EVA: 3,Bottom | (3 Pcs EVA #MPLX14AU-EVA 132*87*10) |
| EVA 1=10mm,2=10mm,3=10mm, total=30mm | |

| | |
|---|---|
| Battery Type: **MPL51814–P** | |
| Voltage: 12V CCA: 370 | |
| Weight: 1.07kg | |
| Dimensions (in / mm) L: 7.32(186) W: 3.22(82) H: 6.73(171) | |
| Assembly Figure Terminal Locations: 4 | |
| Terminals: 2, M6x2.5 (Part#MPT2) | |
| Screws: 4, M6x7 (Part#2xMPS2) | |
| Allen Wrench: 1, 4x4 (Part#MPAK2) | |
| Terminal Caps: 4, 12x5.5 (Part#2xMPC2) | |
| EVA: None | |

| | |
|---|---|
| Battery Type: **MPLX30UHD–P** | |
| Voltage: 12V CCA: 550 | |
| Weight: 1.62kg | |
| Dimensions (in / mm) L: 6.93(166) W: 4.96(126) H: 6.88(175) HL: 7.55(192) | |
| Assembly Figure Terminal Locations: 4 | |
| Terminals: 2, M6x2.5 (Part#MPT3) | |
| Screws: 4, M6x7 (Part#2xMPS2) | |
| Allen Wrench: 1, 4x4 (Part#MPAK2) | |
| Terminal Caps: 4, 12x5.5 (Part#2xMPC2) | |
| Spacers: 17mm Bottom (Part#MPC2), 2 Square Top Corners (Part#MPSC) | |

| | |
|---|---|
| Battery Type: **MPLX20UHD–P** | |
| Voltage: 12V CCA: 450 | |
| Weight: 1.29kg | |
| Dimensions (in / mm) L: 6.88(175) W: 3.42(87) H: 6.10(155) HL: 6.88(175) | |
| Assembly Figure Terminal Locations: 4 | |
| Terminals: 4, M6x2.5 (Part#MPT2 and #MPT3) | |
| Screws: 4, M6x7 (Part#2xMPS2) | |
| Allen Wrench: 1, 4x4 (Part#MPAK2) | |
| Terminal Caps: 4, 12x5.5 (Part#2xMPC2) | |
| Spacers: 2, 20mm Bottom (Part# MPB57), 13mm Back (Part# MPS5) | |

| | |
|---|---|
| Battery Type: **MPLXXTM16–P** | |
| Voltage: 12V CCA: 165 | |
| Weight: 0.50kg | |
| Dimensions (in / mm) L: 3.56(90.4) W: 3.62(91.9) H: 2.08(52.8) | |
| Assembly Figure Terminal Locations: 2 | |

### CELL BALANCING CIRCUIT (CBC) P SERIES FEATURES:

- This is a key feature of Motobatt batteries that many competitors do not have.It provides the ultimate in cell control giving superior performance, life span and safety.
- Each Motobatt Lithium battery contains a unique CBC which controls the charge and discharge of the cells at all times, especially when currents can be unreliable when in actual use on the machine.
- Many competitors require you to buy their specific battery charger at a high cost because the CBC is in the charger,not the battery itself.
- This is inferior cell control since the only time the cells are properly controlled is when connected to a wall socket.

Note Motobatt P-Series batteries do not have our unique PCB board. For maximum life choose the HP upgrade

### RECOMMENDED UPGRADE

**Motobatt Pro Lithium HP Series** Featuring Protection Circuit Board (PCB) with automatic overcharging,over discharging and thermal protection.

MOTOBATT Hybrid GO BEYOND LIMITS OF BOTH LEAD ACID & LITHIUM BATTERIES

# Trouble shooting Chart Lifepo4 Battery-HP Series and Hybrid

Motobatt Lithium and Hybrid batteries are programmed to 0v when in protection mode. Most aftermarket chargers will NOT ACTIVATE under 2v, so you must use a Motobatt Lithium charger model or a direct source of power such as a car battery to apply charge to reset the board. Once activated you can use any 12v charger to recharge so long as it does not have a desulphation mode.

| | | | | | |
|---|---|---|---|---|---|
| 1 | Voltage Meter | Measure Battery Voltage | Voltage <12.8v | Charge Battery Motobatt Lithium Charger | Battery >14.6v OK |
| 2 | Starting Fails | Measure Battery Voltage | Voltage -< 0v | Battery in protection mode | Charge Battery Motobatt Lithium Charger |
| 3 | Starting Fails | Measure Battery Voltage | Voltage -< 0v | Check Engine- OK | Engine is outside parameters of the battery |
| 4 | Lights and Ignition on | Engine Start Multiple Attempt Fails | Voltage -< 0v | Battery in protection mode | Change battery for higher capacity model |
| 5 | Starting Fails | Voltage <12.8v | Charge Battery Motobatt Lithium Charger | Voltage <12.8v | Battery Weak- Replace Battery |