Charger specifications

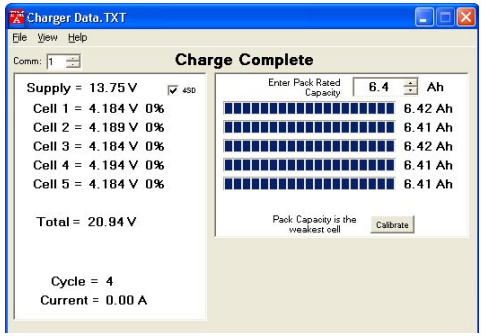
For battery type	2s to 6s FMA BalancePro HD Lithium Polymer packs only
Input voltage	11 to 15VDC
Nominal output voltage	4.2 volts per cell
Output current	Up to 10A

Charger Viewer Software

Use the Charger Viewer Software to monitor pack voltage, cell voltages, charge current and error codes on your PC.

1. Download "Charger 6s Viewer" from **Support** page at www.fmadirect.com. Double-click downloaded file and follow installation instructions.
2. Connect Charger to BalancePro HD 6s Pack and to power supply.
3. Connect Charger to PC using an RS232C cable and FMA P/N FSIM1. If PC doesn't have an RS232C port, use an RS232C-to-USB adapter to connect cable to USB port.
4. Launch Charger Viewer. Change **Comm** setting until data appears in window.

- *To see voltage versus time:* **View > Graphs**. In **Graphs** window, **View > Charge Voltage** or **View > Discharge Voltage**.
- *To add notes:* **View > Battery Notes**.
- *To see charger error codes:* **View > Error Code History**.



FMA limited warranty

FMA, Inc. warrants this product to be free of manufacturing defects for the term of 90 days from the date of purchase. Should any defects covered by this warranty occur, the product shall be repaired or replaced with a unit of equal performance by FMA or an authorized FMA service station.

Limits and exclusions

This warranty may be enforced only by the original purchaser, who uses this product in its original condition as purchased, in strict accordance with the product's instructions. Units returned for warranty service to an FMA service center will be accepted for service when shipped postpaid, with a copy of the original sales receipt or warranty registration form, to the service station designated by FMA.

This warranty does not apply to:

- Consequential or incidental losses resulting from the use of this product.
- Damage resulting from accident, misuse, abuse, neglect, electrical surges, reversed polarity on connectors, lightning or other acts of God.
- Damage from failure to follow instructions supplied with the product.
- Damage occurring during shipment of the product either to the customer or from the customer for service (claims must be presented to the carrier).
- Damage resulting from repair, adjustment, or any alteration of the product by anyone other than an authorized FMA technician.
- Installation or removal charges, or damage caused by improper installation or removal.

Call (301) 668-7614 for more information about service and warranty repairs.

051123

BalancePro HD 6s Charger

Model LIPOCH6S10 cell balancing battery charger for FMA BalancePro HD Lithium Polymer packs

BalancePro HD

Features

- Operates from any 11 to 15VDC power source, such as a power supply or 12V lead acid battery.
- Charge balancing design assures optimum charging for each cell in pack.
- Charger and pack system maximizes pack operation.
- Data output port for displaying charge curves on your PC.

Precautions

- Follow all instructions in this manual to assure safe operation.
- Always watch LiPo packs while they are charging. Never leave LiPo packs unsupervised during charging.
- Allow packs to cool down before charging them.
- Wiring on BalancePro HD packs limits continuous output to 60 Amps, even though the cell configurations may be rated higher.
- See additional warning sheets provided with this charger and FMA LiPo packs.
- Follow all guidelines for charging, discharging, handling and storing LiPo cells.

WARNING! The FMA Direct BalancePro HD 6s Charger is designed to charge only FMA Direct BalancePro HD lithium polymer battery packs and FMA Direct CellPro lithium polymer battery packs. Charging CellPro battery packs will require the use of a BalancePro HD-to-CellPro adapter. **Using this charger to charge any other manufacturer's battery may result in fire, property damage or bodily injury.**

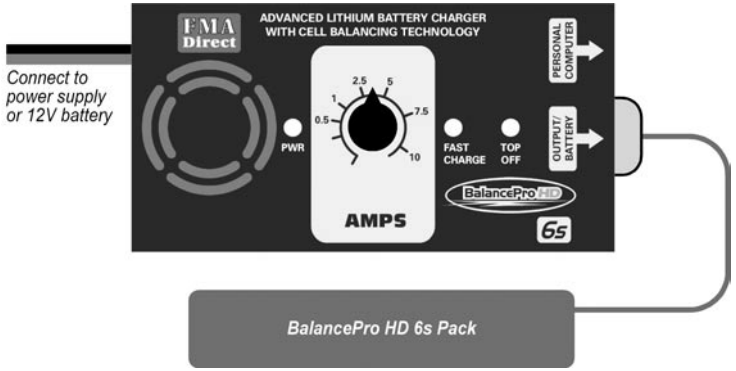
FMA, Inc. ● 5716A Industry Lane ● Frederick, MD 21704

Sales: (800) 343-2934 ● Technical: (301) 668-7614 ● www.fmadirect.com

FMA Direct

Connecting the pack

Connect your BalancePro HD Pack's connector to the Charger's output connector.



Charging the pack

CAUTION: Follow all LiPo charging precautions, including charging packs in a fireproof container and monitoring the entire charging operation.

1. **Allow the pack to cool.**
2. Set the Charger's current control:
   - Whenever possible, charge at 1C, which will charge packs to 90% capacity in about 1 hour. (Charging to 100% capacity requires an additional 1 to 3 hours, depending on battery capacity; this is a characteristic of Lithium Polymer chemistry.)
   - Fast charging (3C) will charge the packs to 90% capacity in about 20 minutes. (Charging to 100% capacity requires an additional 1 to 3 hours, depending on battery capacity; this is a characteristic of Lithium Polymer chemistry.)

   CAUTION: *NEVER* exceed 3C charge rate for a BalancePro HD pack. Serious damage to the battery pack may occur including venting with flames in some instances!
3. Connect the charger to a 11 to 15VDC power source, such as a power supply or 12V lead acid or gel cell battery. The red Power LED will turn on.
4. Monitor charging with the LEDs:

Charge step	Fast Charge LED (yellow)	Top Off LED (green)
Begin	On	Off
80% fast charge*	On	Flashing slow
90% top off†	Off	Flashing fast
100% complete	Off	On

*Takes about 1 hour at 1C to reach 90% of capacity.
†Takes an additional 1 to 3 hours at 1C to reach 100% capacity.

5. When charging is complete:
   - Disconnect the charger from the power source and
   - Disconnect the pack from the charger (in any order).

Tip: Store BalancePro HD Packs (and all LiPo batteries) at about ½ charge. LiPo chemistry has a very low self-discharge rate, and LiPo batteries do not need periodic recharging as NiCd and NiMH batteries do.

Troubleshooting

If the yellow and green LEDs flash simultaneously, there is an error. The LEDs flash an error code. Count the number of flashes before the pause, then look up the code in the table below. Correct the error. If errors continue, contact FMA Customer Service.

Tip: The charger stores error information. If you return the charger for service, FMA can diagnose the problem.

Code	Cause	Resolution
1	Low-cell-voltage timeout on startup	Cycle charger power. Try charging again no more than 2 times.
2	Input voltage below 10 volts	Lower charge amps, get a bigger power supply.
3	Input voltage above 16 volts	Power supply voltage is too high. Lower voltage.
4	Input voltage unstable	Power supply is too small. Lower charge amps.
5	Cell voltage above 4.30 volts	Discharge pack.
6	Cell removed too many times	Cycle charger power. If error continues, pack or charger may have a problem.
7	Bad mode number	Factory error. Send charger for repair.
8	Checksum error	Factory error. Send charger for repair.
9	Current greater than 13 amps	If input voltage didn't change, send charger for repair.
10	Shorted drive FET	Factory error. Send charger for repair.
11	Voltage reference is reading low	Factory error. Send charger for repair.
12	Voltage reference is reading high	Factory error. Send charger for repair.
13	Crowbar blown	Factory error. Send charger for repair.
14	Bad EEPROM write	Factory error. Send charger for repair.
15	System soft start	Cycle charger power. Check for bad power connection.
16	Firmware corruption	Factory error. Send charger for repair.
17	Cell voltages don't total correctly	Cycle charger power. Pack may have a bad cell.
18	Cell balancing stopped after 4 hours	Raise charge current. Pack may be too big or bad.
19	Cell top-off stopped after 4 hours	Raise charge current. Pack may be too big or bad.
20	Fast charge stopped after 4 hours	Raise charge current. Pack may be too big or bad.
21	Bad cell count	Cycle charger power. If error continues, pack may be bad.
22	Current below 100mA	If pack is not full, try raising current above 1A.
23	Pack detect ran 16 times without finishing a single charge	Cycle power. Pack may have bad cell.
24	Cell dropped below 3 volts during charge	Pack may have bad cell.
28	Pack detect failed	Cycle power. Check node connections with voltmeter.