## Guidelines for installing a Node Connector

WARNING: Working with LiPo cells can be DANGEROUS. Read the warnings throughout this manual before continuing.

Since every installation will be different, only general instructions can be provided.

- Apply tape to each wire extending from the Node Connector, and write each wire's node number on the tape. Assure correct labeling by checking continuity between connector pins and wire ends.

- Use a voltmeter to verify existing pack wiring. **Never assume you know how the pack is wired.** Measure voltage and determine polarity of every wire exiting the pack. Apply tape to each wire, and write each wire's node number on the tape.

- Before attaching Node Connector wires to the pack, make certain the node numbers on each side of the joint are the same.
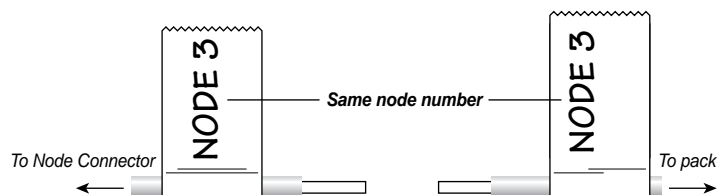
- **If the battery pack already has node connector** for another brand of charger, the safest approach is to cut the existing node wires and splice on the FMA Node Connector. **To prevent shorts, work with only one node wire at a time.**

  a. Cut and strip one node wire extending from the pack.

  b. Place heat-shrink tubing on the wire.

  c. Solder the appropriate FMA Node Connector wire to the prepared pack node wire.

  d. Slide the tubing over the connection, then shrink the tubing.

  e. Repeat steps a-d for each node wire.

  f. If there are unused node wires extending from the FMA Node Connector:
     - Cut unused wires where they exit the connector, or
     - Cut bare wire from the free ends of the node wires, then tape the free ends securely inside the pack.

- **If the pack does not already have a node connector,** you must solder the FMA Node Connector directly to cell tabs or interconnections—*but only where solder is already present*. Half the tabs in a LiPo pack are aluminum and cannot be soldered using conventional solder and methods.

WARNING: Excessive heat on cell tabs will damage the cell's seal. **FMA Direct strongly advises against soldering node wires to tabs of any cells that do not already have solder on them.**

- If needed: as the last step, cover the pack to prevent shorts. One method is to wrap the pack in tape. Large diameter heat shrink tubing for covering packs is available from FMA Direct (*www.fmadirect.com*).

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LiPo Pack Node Connector

for connecting LiPo packs to FMA cell-balancing chargers and accessories

Model CPBP7 for use with the Cellpro 4s Charger and Cellpro accessories

Model SVBP7 for use with the BalancePro HD 6s Charger and BalancePro HD accessories

Important

Read and understand the contents of this instruction manual before you attempt to install the Node Connector. Failure to heed all warnings and follow all instructions provided in this manual may result in fire and serious injury.

Background

Node connectors enable FMA Direct cell-balancing chargers to prevent overcharging by monitoring individual cells within a Lithium Polymer pack as it charges. This feature also enables FMA chargers to perform cell balancing, which brings cell voltages to within a few millivolts of each other by the end of the charge cycle.

Functionally, a node connector has a wire attached to each cell within a pack, and the connector end plugs into the FMA charger. FMA's BalancePro HD and Cellpro LiPo packs, for example, are equipped with node connectors. These packs form plug-and-play cell-balancing systems when used with the corresponding BalancePro HD 6s and Cellpro 4s LiPo chargers. They can also be used with FMA's Discharge Protection Modules (which prevent overdischarging) and Charge Protection Modules (which prevent overcharging when packs are charged by a non-cell-balancing charger).

If a LiPo pack doesn't have a node connector, adding an FMA LiPo Pack Node Connector can make it compatible with the BalancePro HD or Cellpro charger and accessories. This enables you to take advantage of the safe, reliable cell-balancing plug-and-play capabilities of FMA's chargers, and use them with BalancePro HD and Cellpro accessories.

FMA LiPo Pack Node Connectors are available in two versions:

- Model CPBP7 for attachment to 2s to 4s packs so they can be used with the Cellpro 4s Charger, Discharge Protection Module and Charge Protection Module.

- Model SVBP7 for attachment to 2s to 6s packs so they can be used with the BalancePro HD 6s Charger, Discharge Protection Module and Charge Protection Module.

WARNING! Use the Node Connector only with the charger or accessory accepting the product's connector: 1) the FMA Direct Cellpro 4s Charger, Discharge Protection Module, or Charge Protection Module, or 2) the FMA Direct BalancePro HD 6s Charger, Discharge Protection Module or Charge Protection Module. FMA, Inc. will not be liable for damages that result from improper installation or use of this product. Maximum charge rate is 1C, or as specified for battery being charged. **Lithium polymer batteries may ignite under certain conditions. Read all safety precautions, warnings and instructions completely before installing and using this product!**

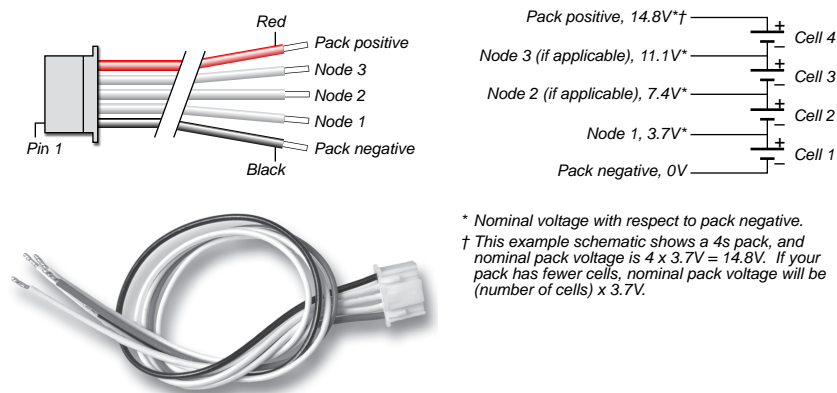**FMA, Inc.** ● 5716A Industry Lane ● Frederick, MD 21704

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

FMA Direct

Warnings

- Building or modifying a LiPo pack is a DANGEROUS ACTIVITY involving HIGH CURRENTS.

- LiPo cells and packs, if mishandled, can cause FIRE and PERSONAL INJURY.

- Before building or modifying a LiPo pack:
  - YOU MUST understand basic wiring and battery electronics.
  - YOU MUST be experienced in soldering and have good soldering skills.
  - YOU MUST know how to handle LiPo cells and packs to prevent shorts and other dangerous situations.

- You must take all precautions needed to prevent catastrophic events, including (but not limited to):
  - Remove all rings, bracelets, necklaces and any other personal items which could short the pack or individual cells. Clear the work area of wires, tools and any other items which could cause a short.
  - You must work near a fire box, bucket filled with water or bucket filled with sand. If the pack is shorted, you must immediately drop the pack—without touching it with your bare hands—into the fire box or bucket.

- If you decide to attach an FMA LiPo Pack Node Connector to a LiPo pack, you accept all responsibility for any damages that may result.

- If, after reviewing these requirements and warnings, you decide *not* to use the LiPo Node Connector, you may return it to FMA Direct for a full refund. (If you cut or solder LiPo Node Connector wires, the unit is not returnable.)

- To avoid the hazards described above:
  - Use FMA's Cellpro or BalancePro HD packs. With node connectors already attached, these packs (available in a wide range of configurations) plug directly into the corresponding charger or accessory—no soldering is required.

    or
  - Use FMA's LiPo Charger Adapters to connect TP and PQ packs to the Cellpro 4s Charger and accessories, or the BalancePro HD 6s Charger and accessories. These adapters plug directly into the respective charger or accessory, and provide connectors for plugging in TP and PQ packs—no soldering is required.

- FMA recommends using a 1C charging rate for all LiPo packs *except* BalancePro HD packs. Before charging at higher than 1C, consult the manufacturer's recommendations to assure that charging at a higher rate is permitted. Charging a pack at a rate for which it was not designed could severely shorten pack life. Safety features in FMA cell-balancing chargers support charging at rates up to 3C. However, charging at greater than 1C is possible *only when the pack is rated for the higher rate*. FMA, Inc. accepts no liability for damages resulting from charging a Lithium battery at a rate higher than that specified for the battery.
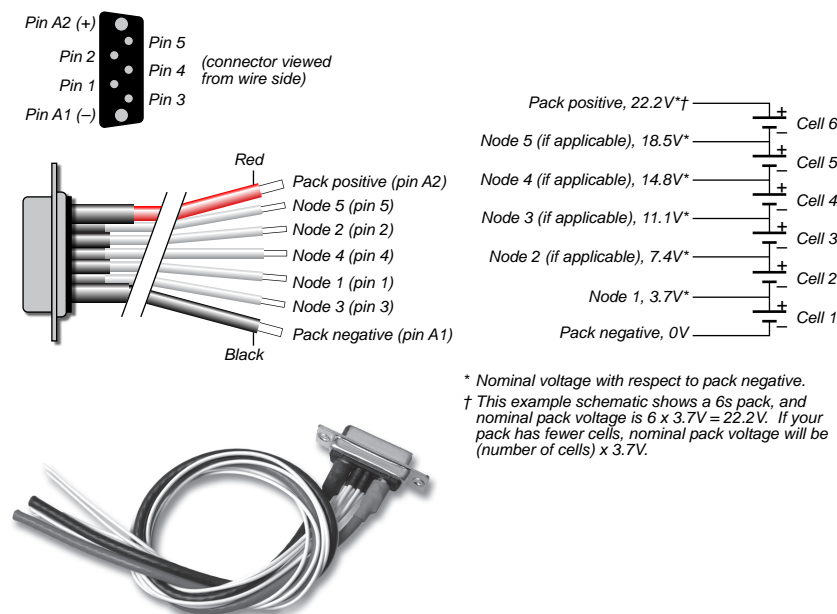
Cellpro Node Connector pinouts and schematic

Red — Pack positive
Node 3
Node 2
Node 1
Pack negative
Pin 1
Black

Pack positive, 14.8V*† — Cell 4
Node 3 (if applicable), 11.1V* — Cell 3
Node 2 (if applicable), 7.4V* — Cell 2
Node 1, 3.7V* — Cell 1
Pack negative, 0V

* Nominal voltage with respect to pack negative.
† This example schematic shows a 4s pack, and nominal pack voltage is 4 x 3.7V = 14.8V. If your pack has fewer cells, nominal pack voltage will be (number of cells) x 3.7V.

BalancePro HD Node Connector pinouts and schematic

Pin A2 (+)   Pin 5
Pin 2   Pin 4   (connector viewed from wire side)
Pin 1   Pin 3
Pin A1 (−)

Red — Pack positive (pin A2)
Node 5 (pin 5)
Node 2 (pin 2)
Node 4 (pin 4)
Node 1 (pin 1)
Node 3 (pin 3)
Pack negative (pin A1)
Black

Pack positive, 22.2V*† — Cell 6
Node 5 (if applicable), 18.5V* — Cell 5
Node 4 (if applicable), 14.8V* — Cell 4
Node 3 (if applicable), 11.1V* — Cell 3
Node 2 (if applicable), 7.4V* — Cell 2
Node 1, 3.7V* — Cell 1
Pack negative, 0V

* Nominal voltage with respect to pack negative.
† This example schematic shows a 6s pack, and nominal pack voltage is 6 x 3.7V = 22.2V. If your pack has fewer cells, nominal pack voltage will be (number of cells) x 3.7V.