More tips

- The Kokam LIPO-402 charger can also charge Lithium Ion cells and packs.
- Kokam/USA's Versatile Adapter, part number 501MC, is a great companion for the charger. It provides Futaba, JR, Airtronics, Deans and Molex connectors, plus 2.1mm and 2.5mm power connectors, enabling you to easily connect your cells and packs to the charger. Be sure to get the 201BCB cable at the same time—it directly connects the Versatile Adapter to the charger.

- To determine the LiPoly pack configuration that will work best in your application, use the LiPo Calc design tool on the Kokam/USA Web site, www.kokamusa.com (or www.fmadirect.com).

LIPO-402 Lithium Polymer Battery Charger specifications

For battery types	Lithium Polymer (LiPoly) and Lithium Ion (LiIon) only
Nominal output voltage	User-settable to: 3.7VDC for single cells (4.21VDC at end of charge cycle) 7.4VDC for two cells in series (8.42VDC at end of charge cycle) 11.1VDC for three cells in series (12.63VDC at end of charge cycle) 14.8VDC for four cells in series (16.84VDC at end of charge cycle)
Output current	User-settable to 0.1A, 0.25A, 0.5A, 0.75A, 1.0A or 1.5A
Maximum output power	25W
Input voltage	10 to 15VDC
Dimensions	4-3/16in (106mm) wide, 1.6in (40mm) high, 0.5in (12mm) deep, 4-11/16in (119mm) wide including connectors and jumpers

Kokam/USA limited warranty for chargers

Kokam/USA warrants this product to be free of manufacturing defects for the term of one year from the date of purchase. Should any defects covered by this warranty occur, the charger shall be repaired or replaced with a unit of equal performance by Kokam/USA or an authorized Kokam/USA service station.

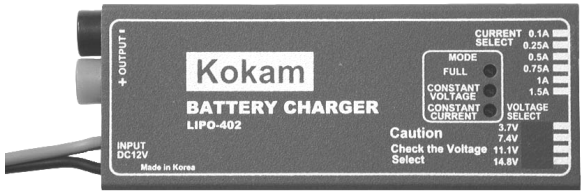
Limits and exclusions

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 a Kokam/USA 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 Kokam/USA.

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 Kokam/USA 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.



LIPO-402 Charger

for

Kokam/USA Lithium Polymer cells and packs

About the charger

The Kokam LIPO-402 charger is designed to charge Kokam/USA Lithium Polymer (LiPoly) cells and battery packs. It charges up to four LiPoly cells connected in series. Six current settings handle a wide range of cell and pack capacities. The charger can be powered by a 12V lead acid or gel cell battery, a DC power supply or any source that can provide 10 to 15VDC. Built-in circuitry prevents damage to the charger if cells, packs or power source are incorrectly connected to the input or output terminals.

LiPoly cells are best charged using a special sequence: constant current at the beginning of the charge cycle, followed by constant voltage at the end of the charge cycle. The LIPO-402 charger automatically follows this sequence. Two LEDs on the charger's panel show which charging condition is currently active, and a third LED lights when charging is complete.

Kokam/USA Lithium Polymer cells are the next-generation replacement for NiCd, NiMH and Lithium Ion cells. This unique power technology offers high energy density, low weight, long life, safe operation and environmentally-friendly chemistry. Order Kokam/USA cells and packs through the Kokam/USA Web site, www.kokamusa.com (or www.fmadirect.com). LiPoly technical and application information is available in the Support section of the Web site.

Precautions

- The LIPO-402 charger is designed specifically for charging Lithium Polymer (LiPoly) and Lithium Ion cells and packs. **Do not** use the LIPO-402 charger to charge NiCd, NiMH or any other type of battery.
- Never charge LiPoly batteries with a charger designed for NiCd, NiMH or any other type of battery chemistry. LiPoly cells require a special charging sequence (described above) not provided by chargers made for other battery technologies.
- For best results, use a 1C charge rate* (where C = cell/pack capacity). Charging at a 1C rate takes approximately 1 hour (for a fully discharged cell/pack). Charge rates greater than 1C may reduce cell capacity.* Extreme charge rates **will** damage cells.
- Follow all guidelines for charging, discharging, handling and storing LiPoly cells.*

*For details, see the *Kokam/USA Lithium Polymer Cell application manual*, AN000001, available in the Support section of the Web site.

Parts list

- Charger
- 2 jumpers (plus 2 spares)
- 2 banana plugs for output cable
- EMI choke (on input cable; reduces radio frequency interference to other devices)

Kokam USA a division of FMA Inc.

FMA Direct

Kokam/USA • 5716A Industry Lane • Frederick, MD 21704
Sales: (800) 343-2934 • Technical: (301) 668-7614 • www.kokamusa.com • www.fmadirect.com

Prepare the output cable

If you aren't using the 201BCB cable and 501MC Versatile Adapter (available separately), then make a cable to connect your cell/pack to the charger:

1. Solder the supplied banana plugs to one end of the cable.
2. Solder a connector to match your cell/pack to the other end of the cable (observe polarity!)

Charging a cell or pack

You'll need a 10–15VDC power source: 12V lead-acid battery/gel cell, or 12VDC power supply.

1. Determine cell/pack voltage and capacity. Use the information and examples below as a guide. "C" is the capacity of a single cell in milliamp-hours (mAh).

Single cell	**Example:** for a single 560mAh cell...
Voltage: 3.7mAh Capacity: C mAh	Cell voltage is 3.7V Cell capacity is 560mAh
Series-connected pack	**Example:** for three 800mAh cells in series...
Voltage: S x 3.7V *where S = no. cells in series* Capacity: C mAh	Pack voltage is 3 x 3.7V = 11.1V Pack capacity is 800mAh
Parallel-connected pack	**Example:** for four 145mAh cells in parallel...
Voltage: 3.7V Capacity: P x C mAh *where P = no. cells in parallel*	Pack voltage is 3.7V Pack capacity is 4 x 145mAh = 580mAh
Series/parallel-connected pack	**Example:** for two parallel-connected sets of three 560mAh cells connected in series...
Voltage: S x 3.7V *where S = no. cells in series* Capacity: P x C mAh *where P = no. cells in parallel*	Pack voltage is 3 x 3.7V = 11.1V Pack capacity is 2 x 560mAh = 1120mAh

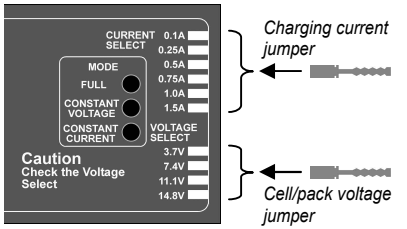
2. Determine desired charge rate. ("C" is cell/pack capacity in mAh.)

Charge rate	**Example**	
	Desired charge rate	*In step 3, you would set charger current to*
Slow: 1/5 C mAh	Slow charge rate for 1020mAh capacity cell would be 204mA	0.25A (250mA)
Moderate: 1/2 C mAh	Moderate charge rate for 1020mAh capacity cell would be 510mA	0.5A (500mA)
Maximum: 1 C mAh	Maximum charge rate for 1020mAh capacity cell would be 1020mAh	1.0A (1000mA); to prevent charging too rapidly, round the 1C rate *down* to the closest charger current

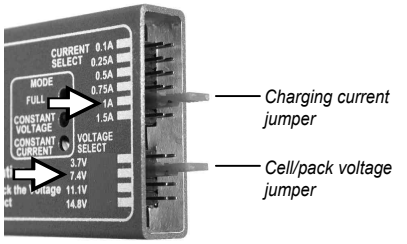
3. Set charger's output current and voltage.

a. Carefully place one jumper on the two pins corresponding to the desired output current.

b. Carefully place the other jumper on the two pins corresponding to the cell/pack voltage.

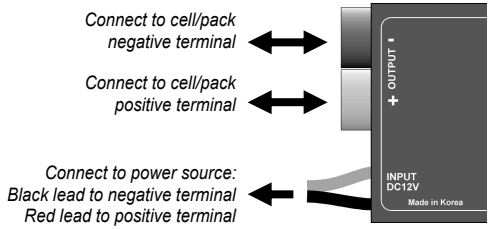


Example: *Jumpers in this example are set for 1A output current and 7.4V cell/pack voltage.*

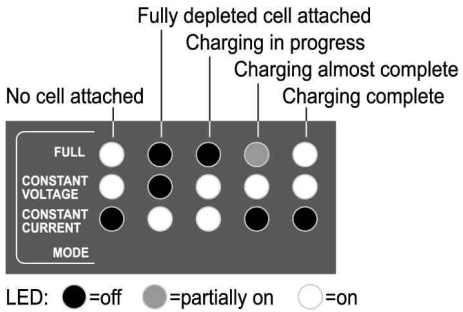


4. Connect charger to LiPoly cell/pack and power source as shown at right.

You can connect up to 12 cells/packs of the same capacity in parallel.



5. Monitor charger. The LEDs show charger status.



Charging is complete when the "Full" and "Constant voltage" LEDs are at the same intensity.

Tip: Continue charging for a while after reaching the "Charging complete" state. This assures the cell/pack is 100% charged.

6. When charging is complete:

a. Disconnect charger from power source.
b. Disconnect cell/pack from charger.

Tip: Cell/pack may be left connected indefinitely without harm. When the cell/pack is fully charged, charger output drops to almost 0mA.