

Astro Flight #109 Lithium Digital Charger/Discharger

Congratulations! You have just purchased one of the finest Lithium Polymer Digital **Charger/Dischargers** available. With proper care it should give you many years of service. **Before using this unit, please read these instructions carefully.** The Astro #109 Lithium is specially designed to charge and discharge Lithium Polymer battery packs. This charger can handle any pack containing from one cell up to nine cells (4.2 volts to 37.2 volts). Cell sizes can range from 140 mahr to 8000 mahr. **All cells in a single battery pack must be of the same capacity and in the same state of charge.**

The Model #109 Lithium charger uses a proprietary 8 bit microprocessor to perform all of the necessary mathematical computations required to insure foolproof charging and discharging Lithium Polymer battery packs. A two line digital display indicates the status of the charging sequence and shows you the charge current, the number of cells in the battery pack, the battery voltage, the duration of the charge, and the actual number of milliamp hours of charge put into the battery pack. A built in voltage converter boosts the input from 12 volts to 40 volts so that battery packs containing one to nine cells can be charged. This charger is designed to be powered from a 12 volt regulated power supply, like our Astro Model #120, or from a 12 volt automobile battery. **Never use an automobile battery charger as a power source, for it could damage your new Model #109 Lithium Charger.**

There are two power cords on the **charger/discharger**. The four foot long cord with the alligator clips is the **input cord** and should be connected to the 12 volt power source. The short cord is the **output cord** and is fitted with an Astro Zero Loss Connector #526. Connect the **output cord** to the Lithium Polymer battery being charged or discharged. Astro Flight Zero Loss Connectors (p/n #525, 526 and 527) may be purchased from Astro Flight or from your local hobby dealer. We strongly urge you to consider using our Astro connectors. They are both polarized for positive and negative and input and output. They will prevent you from making costly mistakes. The charger has a current adjust knob on the front panel. Charging current can then be adjusted between fifty milliamps and eight amps. Discharging current is electronically limited to 1.25 amps.

Six messages are displayed during the charging sequence.

1. The amount of charging current flowing into the Li-Polymer battery pack.
2. The number of cells the charger “thinks” the battery contains.
3. The charging mode.
4. The voltage of the battery being charged.
5. The duration of charge in hours, minutes and seconds.
6. The number of milliamp-hours of charge put into the battery pack.

When the charger software detects fully charged condition, charging will stop. The display will indicate the maximum voltage reached, the duration of charging and the milliamp hours of charge delivered to the battery. The buzzer will then beep three times.

Three messages will be displayed during the discharging sequence.

1. The voltage of the battery packs being discharged.
2. The duration of the discharge in hours, minutes and seconds.
3. The total number of milliamp hours delivered to the load.

When the Lithium Polymer battery has been discharged to a voltage of approximately 3 volts per cell, the discharging will automatically stop.

Charging your Lithium Polymer Battery

Connect the alligator cords to a 12 volt regulated power supply, like our Astro Model 120, or a 12 volt automobile battery. The display should come on and say Astro Flight Lithium, “**waiting for battery**”.

Wait for the display to say “**waiting for battery**” then connect the short output cord to the Lithium Polymer battery you wish to charge. Charging will automatically begin. If your battery is not connected, has a loose connection, is connected backwards, or is drained to less than 3 volts, the microprocessor will not detect the battery and “**waiting for battery**” will still be displayed. If your battery is properly connected, the display will begin indicating the charge current, the battery voltage, the duration of the charge and the milliamp hours delivered to the battery. **Always start charging with the current adjust at zero amps and slowly increase the charging rate until the rate equals the capacity of the battery pack.** We recommend charging Lithium Polymer batteries at a 1C rate (a rate equal to the mahr. rating of the cells). For example, we recommend charging a 1200 mahr pack at 1.2 amps. During the first minute of charging, the charging current may decrease slightly as the battery voltage rises. After one or two minutes you may want to re-adjust the rate.

During the first minute of charging the display will show the charging mode and the number of cells that the micro processor “thinks” are in the battery pack. The display will read 1C1 on a single cell and 2C1 on two cells etc. **If the display reads more cells than the battery contains STOP AT ONCE. Something is wrong with your battery.**

After the first minute the charger automatically switches to mode 2 the display will now read 1C2, 2C2, 3C2. After about one hour when the battery is almost fully charged, the Lithium charger will switch to Mode 3.

In Mode 3 the charging current is turned on and off periodically as the micro processor slowly brings the cell voltage up to 4.2 volts per cell. When battery voltage reaches 4.2 volts per cell, the battery is charged and charging stops.

After charging is complete, the digital display will indicate that the battery charging is complete. The display will show the highest voltage reached and the number of milliamp hours of charge put into the battery.

Discharging your Lithium Polymer Battery

To Discharge your battery, first connect the battery then connect the alligator clips to your 12 volt power source. Discharging will automatically begin.

During Discharge the digital display will indicate battery voltage, duration of discharge in hours, minutes and seconds, and the milliamp hours delivered from the Lithium Polymer battery to the electronic load in the charger.

When Discharge is complete the discharging will automatically stop. As long as the pack remains connected, the display will be frozen with the values of final discharge voltage and the number of milliamp hours taken from the pack.

To go back to charging, remove the battery pack, wait for the display to say “waiting for battery” and then connect the next battery.

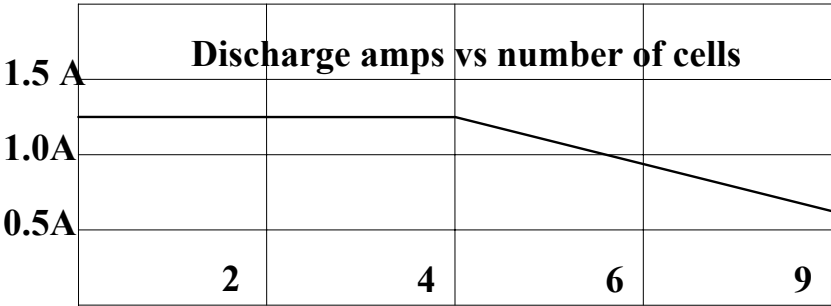
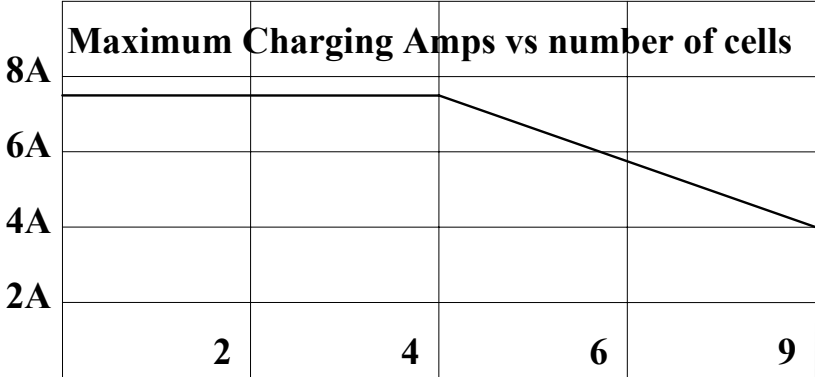
Messages

Over voltage error This message is displayed if a battery pack of more than nine cells is connected to the charger or if while charging the battery is disconnected. If you see “**Overvoltage error**”, remove the battery pack and disconnect the alligator clips from the 12 volt power source. Set the Charge current to minimum. Then reconnect the battery. If you have modified your charger to a different connector, please check to make sure that the polarity of your connector is correct and that you have done a good solder job.

Waiting for Battery this message occurs when the computer does not detect a positive voltage of 3 volts or more at the output cord. Make sure there are no loose connections and that the polarity of the pack is correct. Connect your battery pack then adjust the charger for desired charging rate.

Shorted Output This message can occur if the battery is removed while still charging. Remove the 12 Volt source and then re-connect the 12 Volt source to reset microprocessor in the charger. Then reconnect the battery to continue charging.

I hope that you will enjoy my latest charger design, and I would like to thank Doug Ingraham for designing the computer software.
Bob Boucher



Other Astro Products you may wish to Purchase

Stock No	Item Description	Price
100	Micro Meter up 10 A and 15 V	\$59.95
101	Whattmeter up to 75 A and 80 V	\$59.95
102	6/7 Cell Discharger	\$19.95
103	10/12 Cell Discharger	\$19.95
104	4/8 Cell Discharger for Rec. and Trans.	\$19.95
105	Servo Tester	\$19.95
110	Model 110 Deluxe Charger/Discharger	\$129.95
120	Model 112 Deluxe Charger/Discharger	\$149.95
120	Model 120 Power Supply 12.5 Amps, 13 Volts	\$79.95
523	Silicone Wire 16 Gage, 3 ft Red and 3 ft Black	\$4.95
524	Silicone Wire 16 Gage, 10 ft Red and 10 ft Blk	\$9.95
525	Astro Zero Loss Connectors, 1 pair	\$6.95
526	Astro Zero Loss Connectors, 2 motor side	\$5.95
527	Astro Zero Loss Connectors, 2 nicad side	\$7.95
528	Silicone Wire 13 Gage 3ft Red and 3 ft black	\$4.95
529	Silicone Wire 13 Gage, 10 ft Red and 10 ft Blk	\$11.95
544	Charger patch cord Astro to Tamiya	\$7.50
545	Charger patch cord Astro to Deans Ultra	\$7.50
546	Charger patch cord Astro to Deans Micro	\$7.50
547	Charger patch cord Astro to Receiver Nicad	\$7.50
548	Charger patch cord Astro to Transmitter	\$7.50

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