



NOVAK
Racing Electronics
www.teamnovak.com

The Ionic takes Millennium Pro charger technology and puts it into an affordable, easy-to-use charger with a simple user-interface, highly visible LED display, and auto-battery conditioning. The Ionic is equipped with **Ni-Cd Linear Mode** for all Ni-Cd cells, and the new **NOVAK Ni-MH2 Mode** for the ultimate charge of all sizes of Ni-MH cells without overheating.

SPECIFICATIONS	
Case Size	5.10" x 4.20" x 2.80" (12.95 x 10.67 x 7.11 cm)
Weight (AC/DC model)	22.56 ounces (640 grams)
Weight (DC only model)	13.80 ounces (391 grams)
AC Input Voltage (AC/DC model)	100-240 volts AC (built-in supply UL & CE approved)
DC Input Voltage (AC/DC model/built-in supply output)	12 volts DC
DC Input Voltage (External/Aux. supply)	12-15 volts DC
Charging Modes	Ni-Cd Linear • Novak Ni-MH2
Charging Capability (AC/DC model w/built-in supply)	4-7 cells (1.2 VDC/cell)
Charging Capability (with 14.5V External/Aux. supply)	4-8 cells (1.2 VDC/cell)
Charge Rates	0.5, 1.0, & 4.0 amps
Circuit Protection	Input & Output RVP/Short-Circuits, Shorted Batteries, Thermal Overload

DC OPERATION & CONNECTION

INPUT POWER SOURCE VOLTAGE should be 1.5V above the voltage the battery pack peaks.

Example 1: (6 cell Ni-Cd pack peak-voltage=10.5 volts) + (1.5 volts) = 12 volts DC

Example 2: (8 cell transmitter pack peak-voltage=13.0 volts) + (1.5 volts) = 14.5 volts DC***

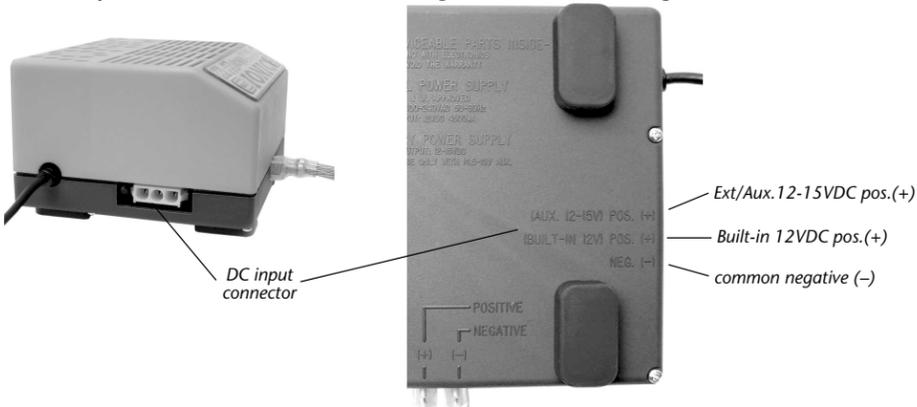
Remember that older battery packs peak at higher voltages.

NOTE: 8 CELL CHARGING REQUIRES 14.5VDC POWER SUPPLY—If adequate voltage is not available, the charger will not allow the selection of 8 cells during set-up.

***If power supply's voltage is not high enough to peak battery, charge 8 cell packs as two, 4 cell packs.

DC INPUT POWER CONNECTOR is on the left side of the Ionic's case. The supplied Input Power Harness has a matching connector on it that plugs directly into the Ionic's connector.

The input power connector in the charger has 3 pins (see case bottom for pin polarity). When looking at the bottom of the charger, the two pins toward the back of the charger are the positive (+) connections. The center pin is for the built-in power supply that comes in the AC/DC model only. The top pin is for an External/Aux. power supply that outputs 12-15 volts DC. The pin closest to the front of the charger is the common negative (-).



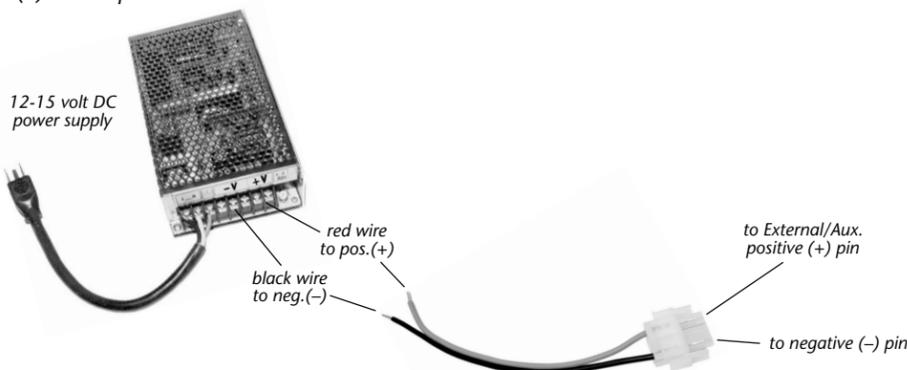
ACCEPTABLE INPUT POWER SOURCES: DC power supply* (built-in or Aux) or lead-acid battery**

*Output current of power source should meet/exceed desired charge rate.

**Connect input power harness to lead-acid battery before connecting harness to Ionic.

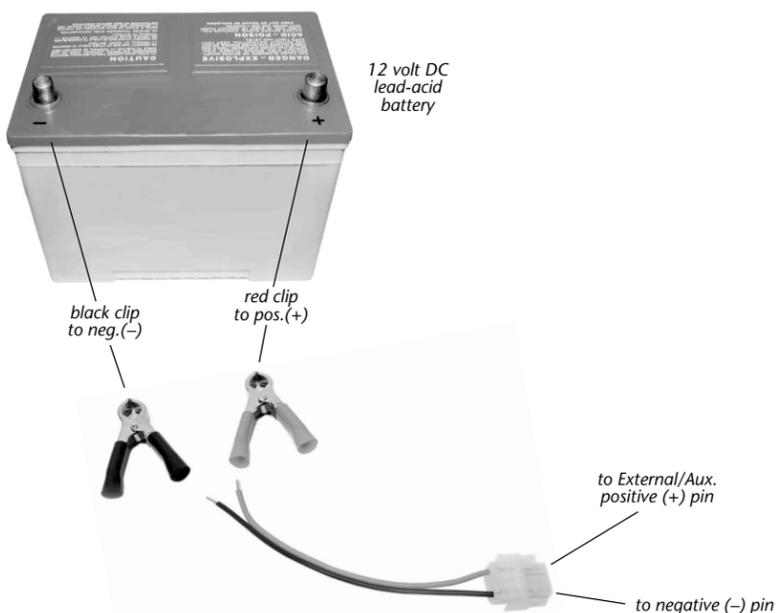
If using Ionic with an External/Aux. power supply, cut and strip the wires of included input power harness to the desired length and secure them to the output terminal screws of the 12-15 volt DC power supply.

- Connect the wire that goes to the Ionic's External/Aux. positive (+) pin to the power supply's positive (+) DC output terminal.
- Connect the wire that goes to the Ionic's negative (-) pin to the power supply's negative (-) DC output terminal.



If using Ionic with a lead-acid battery or power supply with post-style output terminals, solder the included alligator clips to the included input power harness

- Solder the wire that goes to the Ionic's External/Aux. positive (+) pin to the RED alligator clip.
- Solder the wire that goes to the Ionic's negative (-) pin to the BLACK alligator clip.



IMPORTANT PRECAUTIONS

The following precautions will help to prevent possible damage to the Ionic charger, the battery pack, or the input power source.

- Charge only nickel-cadmium or nickel-metal hydride rechargeable battery packs—Damage will occur from charging other battery types (lead-acid, lithium-ion, gel cells, etc.).
- Never allow water, moisture, or other foreign materials to enter Ionic charger.
- Do not use automobile battery chargers to power the Ionic—False peaks can occur, and excessive voltage spikes can damage the Ionic.
- Do not obstruct air intake on top of Ionic—Overheating/thermal shut down will occur.
- Do not charge batteries with fewer than 4, or more than 8 cells—connected in series.
- Do not charge battery packs connected in parallel—Batteries will be damaged.
- Enhanced-voltage ("zapped") batteries charge erratically—Consult the battery matching company for charging recommendations.
- Excessive charge current can damage batteries—Follow battery maker recommendations.
- Never exceed 15 volts DC input power source to power the Ionic.
- Never connect AC voltage to the DC input power connector of the Ionic.
- Gases from a lead-acid battery may ignite if sparks occur when connecting or disconnecting the Ionic's alligator clips—Using a lead-acid battery as a power source may generate hydrogen gas and should only be used in a well ventilated area. Avoid open flames and sparks which may ignite battery gases.

NEVER START THE ENGINE WHEN CHARGER IS CONNECTED TO A CAR'S BATTERY!

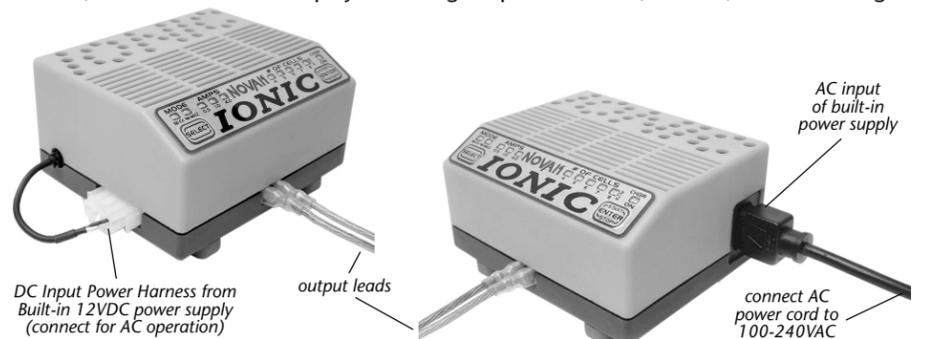
PLEASE FOLLOW ALL INSTRUCTIONS CAREFULLY

CHARGER SET-UP & OPERATION

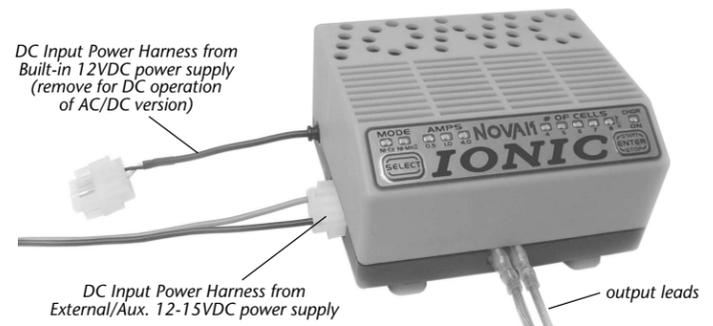
Follow these easy steps to set-up your Ionic charger and charge your batteries:

- 1. AC Operation (AC/DC version only):** Connect the built-in power supply's output to the DC input connector. Connect the included AC power cord to the AC input of the built-in power supply and to an AC outlet.

Ionic will go through a quick self-check sequence during which the keypad LEDs will flash, then the LEDs will display the charger's present mode, current, & cell# settings.

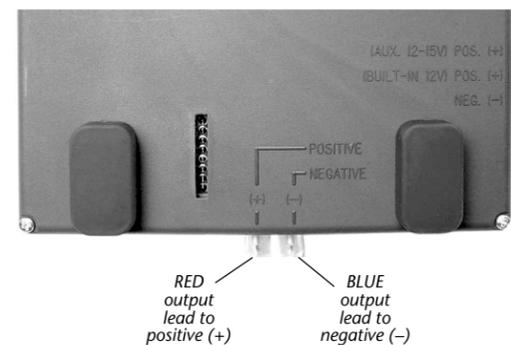


- DC Operation (either version Ionic):** Connect an External/Aux. power supply to the DC input power connector (AC/DC version: disconnect the built-in supply's DC input connector).



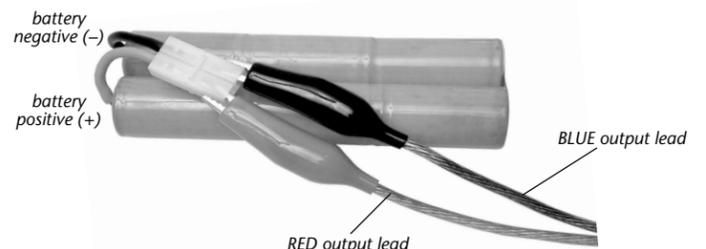
- 2. Check that output leads are properly connected to charger—**The polarity of the output leads is marked on the front edge of the bottom of the Ionic's case.

- Connect the RED output lead to the blade connector marked POSITIVE (+).
- Connect the BLUE output lead to the NEGATIVE (-) blade connector.



- 3. Connect the charger output leads to battery pack.**

- Connect the RED output lead to battery POSITIVE (+).
- Connect the BLUE output lead to battery NEGATIVE (-).



- 4. Select charger settings for battery pack to be charged:** (refer to RECOMMENDED SETTINGS section)

- **ENTER SET-UP MODE**—Press SELECT button to enter the set-up mode.
- **SELECT CHARGE MODE**—Press SELECT button to choose either Ni-Cd or Ni-MH2 charge mode—Then press ENTER button to select the mode whose LED is illuminated.
- **SELECT CHARGE CURRENT**—Press SELECT button to choose 0.5, 1.0, or 4.0 Amps—Then press ENTER button to select the charge current whose LED is illuminated.
- **SELECT # OF CELLS IN BATTERY PACK**—Press SELECT button to choose 4, 5, 6, 7, or 8 cells (8 cells only available with Aux. 14.5VDC supply)—Then press ENTER button to select the number of cells whose LED is illuminated and exit the set-up mode.

- 5. Press START/ENTER button to begin charging**—CHGR ON LED lights and the battery pack is analyzed. After few seconds the CHGR ON LED flashes 3 times and charging begins (If CHGR ON LED does not flash, pack is being conditioned and charge will begin when finished).

- 6. Ionic indicates battery is completely charged**—CHGR ON LED flashes then all the LEDs scroll on across the keypad. This sequence indicates the battery pack has peaked and is completely charged. Press ENTER button to acknowledge or remove battery pack.

RECOMMENDED SETTINGS

For the best charge performance and battery life, use the following settings for your Ionic charger depending on the given battery type and size. Note that in order to charge 8 cells you must use an external power supply that is at least 14.5 volts DC. If the external power supply does not have enough voltage, the charger will not let you select 8 cells.

BATTERY TYPE	CELL SIZE	MODE	AMPS	# OF CELLS
Nickel-Cadmium	A & larger (A, sub-C , D, & F)	Ni-Cd	4.0	4-8
Nickel-Cadmium	AA & smaller (above 600mAh cells)	Ni-Cd	1.0	4-8
Nickel-Cadmium	AA & smaller (below 600mAh cells)	Ni-Cd	0.5	4-8
Nickel-Metal Hydride	A & larger (A, sub-C , D, & F)	Ni-MH2	4.0	4-8
Nickel-Metal Hydride	AA & smaller (above 600mAh cells)	Ni-MH2	1.0	4-8
Nickel-Metal Hydride	AA & smaller (below 600mAh cells)	Ni-MH2	0.5	4-8

In the **Ni-Cd mode** the Ionic uses a constant current linear charge and looks for a delta-peak (voltage threshold) of 12mV/cell to determine when the battery is completely charged.

The Ionic's **Ni-MH2 mode** is an exclusive charge algorithm (developed by Novak Electronics for the Millennium Pro charger) that uses an innovative method to determine the end of charge so precisely, that overheated battery packs are a thing of the past.

BATTERY MAINTENANCE

Getting the most run time and the longest life from your batteries requires more than just selecting the proper charge current. It is important that you take care of your battery packs. The following are some simple maintenance tips to get the most out of your cells.

RE-PEAKING

In R/C racing, it is sometimes common practice to re-peak the battery just before a race to get the most capacity out of the pack. There are some things that are important to know if you are considering doing this, our recommendations are as follows:

Ni-Cd Batteries

Ni-Cd cells *can be re-peaked* if desired. Wait a short amount of time (10-20 minutes) after the completion of the initial charge to allow the cells that peaked before others in the pack to discharge down to the same level as the remaining cells. Once the individual cells have equalized, re-start the charger to bring all the cells up together until they peak.

Ni-MH Batteries

We DO NOT recommend re-peaking Ni-MH cells. Use these batteries immediately after the initial charge is complete for the best performance. If batteries are not used right away, do not re-charge until battery pack has cooled to room temperature.

DISCHARGING

Another common maintenance procedure for batteries is discharging the cells between each charge cycle. With the new technology in batteries, it is important to treat each type of cell correctly to avoid damage. These are our recommendations for discharging:

Ni-Cd Batteries

Ni-Cd cells should be discharged between every charge. Storing and then recharging a partially charged Ni-Cd battery will result in decreased capacity and performance, and will reduce the number of effective charge cycles you will get from your packs (*shorter battery life*).

The easiest method to discharge your Ni-Cd batteries is to put a 30 ohm/10 watt resistor across the battery terminals as shown here.

30Ω/10W resistor



Leave the resistor attached to the pack until the resistor cools to room temperature. This may take several hours. Remove the resistor from the battery at this time. **Battery damage can also occur if the resistor remains attached to the pack for longer than 24 hours.**

Ni-MH Batteries

We DO NOT recommend deep discharging Ni-MH cells. If you are going to store these batteries for extended periods (2 weeks or more), it is good to partially charge them before storage (2-4 minutes), then charge them completely (*normal charge*) before usage.

Ni-MH batteries that have been stored for extended periods (two weeks or more) have an increased chance of false-peaking. These type of cells perform much better when used on a regular basis. If your Ni-MH packs have not used for a while (or are new), watch them closely during their initial charges. Be sure that they are warm when the charger has stopped.

COOLING FAN

The Ionic charger has a built-in cooling fan that runs whenever it is charging. When the Ionic is in the conditioning mode, the fan will not run unless the charger is very hot. The cooling fan may also run when the charger is not charging, because the Ionic's circuitry monitors the ambient temperature and runs the fan when it requires cooling.

It is very important that you do not block the ventilation grills in the top of the charger. Doing so may cause the charger to overheat and thermally shut down.

DO NOT BLOCK VENTILATION GRILLS



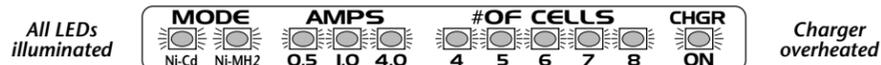
TROUBLE-SHOOTING GUIDE

The Ionic charger has built-in fault detection circuitry that can detect any problems with the charger, the battery, or the connections. Any problems detected are then displayed in the form of fault codes by illuminating certain combinations of the LEDs in the keypad.

The LED fault codes are described here:

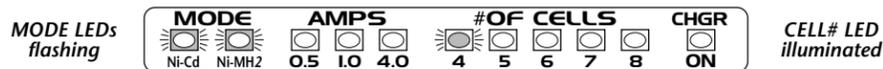
ALL KEYPAD LEDs ARE ILLUMINATED

• If all of the LEDs are illuminated on the charger's keypad, the charger has entered a cool-down mode because an overheat condition has occurred. You MUST acknowledge/clear the fault by pressing the ENTER button. After acknowledgment, the CHGR ON LED will turn off. The rest of the LEDs will remain illuminated until the charger has cooled down.



MODE LEDs FLASHING & CELL# LED IS ILLUMINATED

• If both of the MODE LEDs are flashing and any CELL# LED is illuminated, the charger has detected a problem with either the connections or the battery. The CELL# LED that is illuminated indicates one of the fault codes listed below. If this occurs, check the connections and the battery to resolve the problem, then press the ENTER button to clear the fault. If you are unable to solve the problem, check with our Customer Service Department.



CELL# LED ILLUMINATED	FAULT CODE
4	Battery pack not connected
5	Output leads shorted while charging
6	Power supply not connected
7	Damaged battery pack, or charge attempted with output leads shorted
8	Insufficient voltage to charge 8 cell pack

MODE LEDs FLASHING & AMP LED IS ILLUMINATED

• If both of the MODE LEDs are flashing and any AMP LED is illuminated, the charger has detected an internal problem with itself. If this occurs, the charger must be returned for service. Refer to the CUSTOMER SERVICE & REPAIRS section for service procedures.



AMP LED ILLUMINATED	FAULT CODE
0.5, 1.0, or 4.0	Internal damage (Return for service)

NI-MH BATTERY PACK FALSE-PEAKS

Ni-MH batteries that have been stored for extended periods (or brand new, sitting on the shelf) have an increased chance of false-peaking. These cells perform much better when used regularly. Watch stored Ni-MH packs during their initial charges—Charged packs will be warm.

If any other problems occur, or if the charger will not power up and you have checked all connections and power sources, contact our customer service department as listed below.

CUSTOMER SERVICE & REPAIRS

NOVAK ELECTRONICS, INC.
18910 Teller Avenue
Irvine, CA 92612

(949) 833-8873
FAX (949) 833-1631
www.teamnovak.com

Monday-Thursday: 8:00am-5:00pm (PST) • Friday: 8:00am-4:00pm (closed every other Friday)

Before sending your Ionic charger in for service, thoroughly review the Trouble-Shooting Guide and the instructions. After reviewing the instructions, if you feel your Ionic charger requires service, please obtain the most current product service options and pricing by one of the following methods:

WEBSITE: We have an abundance of information available on our website for all of the Novak products. Print a copy of the **PRODUCT SERVICE FORM** from the **SERVICE** section of the website. Fill out the required information on this form and return it with the Novak product that requires servicing.

PHONE/FAX/E-MAIL: Contact our customer service department by phone, fax, or e-mail as listed above, and we will supply you with the most current service options.

WARRANTY SERVICE: For warranty service work, you **MUST CLAIM WARRANTY** on the **PRODUCT SERVICE FORM** and include a valid cash register receipt or purchase invoice with the purchase date printed on it, or a previous service invoice from Novak. If warranty provisions have been voided there will be service charges.

- Hobby dealers/distributors are not authorized to replace products thought to be defective.
- If a hobby dealer returns your product for service, submit a completed **PRODUCT SERVICE FORM** to the dealer and make sure it is enclosed with the product.
- Novak Electronics, Inc. does not make any electronic components (transistor, resistors, capacitors, etc.) available for sale.

PRODUCT WARRANTY



Novak electronics, Inc. guarantees the Ionic charger to be free from defects in materials and workmanship for a period of 120 days from original date of purchase (verified by dated, itemized sales receipt). Warranty does not cover incorrect installation, components worn by use or excessive force, exceeding the recommended input voltage, damage resulting from charging fewer or more than the recommended number of cells, or from improper connection or charging of receiver battery packs or enhanced-voltage batteries, any splices to the output wires or built-in power supplies input/output wires, damage from disassembling the case, tampering with the internal electronics, or allowing water, moisture, or any foreign materials to enter charger or get onto the PC board, or any damage caused by flooding or other act of God.

In no case shall our liability exceed the product's original cost or cover the cost of batteries damaged while charging. We reserve the right to modify the provisions stated in this warranty without notice.

Because Novak Electronics, Inc. has no control over connection and use of this product, no liability may be assumed nor will be accepted for damage resulting from the use of this product. Every Ionic charger is thoroughly tested before leaving our facility, and is therefore considered operational. By the act of connecting/operating this product, the user accepts all resulting liability.

IM-4475-1 12-2001



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