



The DuraTrax® Onyx™ 210 charger is great for a wide variety of applications! Charge current options of 800mA, 1.5A, 3A, and 5 amps, plus 4 to 8 cell NiCd or NiMH compatibility makes this charger great for batteries for 1/18th to 1/8th scale electrics, nitro receiver packs, and transmitter batteries. A tiny built-in switching AC power supply plus DC input capability is perfect for use at home or the track. A custom LCD with blue backlight is great for viewing various types of charge data in any lighting condition. A unique jack is built-in which is handy for charging 4 to 5 cell nitro Rx batteries or transmitter packs.



It is strongly recommended to completely read this manual before use! Damage resulting from misuse or modification will void your warranty.

INDEX

SPECIFICATIONS	1	RESETTING THE CHARGER	6
SPECIAL FEATURES.....	2	CARE & HANDLING OF NIMH BATTERIES	6
IMPORTANT PRECAUTIONS	2	ERROR INDICATORS & TROUBLESHOOTING GUIDE.....	6
GLOSSARY OF TERMS.....	2	5-YEAR LIMITED WARRANTY – U.S.A. & CANADA ONLY.....	7
INPUT POWER	3		
CONTROLS & CONNECTIONS.....	3		
DETERMING BATTERY TYPE & SPECIFICATIONS.....	4		
GETTING STARTED	4		
STARTING CHARGE.....	5		
CHARGE COMPLETE – TRICKLE CHARGE	5		
VIEW DATA SCREENS	6		

SPECIFICATIONS

AC input:	110V AC 60Hz
DC input:	11 to 15V DC, built-in lead with alligator clips
Battery types:	4 to 8 NiCd or NiMH (4.8 to 9.6V)
Battery capacity range:	750 to 7500mAh
Fast charge current:	0.8A, 1.5A, 3A, 5A linear (40W)
Fast charge termination:	peak detection
Fast charge safety timer:	90 minutes
Peak sensitivity:	8mV for NiCd, 4mV for NiMH
Auto-trickle current:	1/20 fast charge setting
Controls:	3 push buttons
Display type:	7-segment custom LCD with blue backlight
Audible tones:	indicate start, stop, errors
* Output connections:	built-in lead with standard connector, built-in jack for charging 4 or 5 cell Rx packs or Tx packs
Protective devices:	solid-state reverse polarity and current overload
Case size:	5.75" x 5.25" x 1.81" [146 x 133 x 46mm]
Weight:	19.2 oz. [543g]
* Adapter - Standard to Deans® Ultra® male available separately (GPMM3131)	
* Adapter - Standard to Vendetta, MiniQuake, RS4 Battery available separately (DTXC2210)	

SPECIAL FEATURES

- A tiny, lightweight built-in switching AC power supply is great for portability and cramped pit areas, yet can still deliver up to 5 amps charge current!
- Selectable charge currents of 800mA, 1.5A, 3A, and 5 amps.
- A custom peak detection system for NiCd and NiMH batteries, with auto-trickle.
- Pushbutton controls, audible tones, and a custom LCD with backlight aid in setup and use.
- LCD shows battery voltage, charge current, time, and capacity, battery type, and more.
- A built-in jack is included for charging 4 or 5 cell NiCd or NiMH receiver batteries for nitro models – even transmitter packs!
- A DC power lead with alligator clips easily connects to many 12V DC power sources.
- Solid-state reverse polarity and current overload protection ensure trouble-free operation.

IMPORTANT PRECAUTIONS



Disconnect the battery and remove input power from the charger immediately if the charger becomes hot!!

- Do not attempt to charge incompatible types of rechargeable batteries as permanent damage to the battery and charger could result.
- Do not use automotive type battery chargers to power the charger.
- Do not allow water, moisture or foreign objects into the charger.
- Do not block the air intake holes, which could cause the charger to overheat.
- Do not attempt to use batteries with more cells or total voltage than listed in the specifications.
- Do not leave the charger unattended while in use.
- Do not place the charger or battery on flammable surfaces or near combustible material while in use such as a carpet, cluttered workbench, paper, plastic, vinyl, leather, and wood, inside an R/C model or full sized automobile!
- Do not overcharge batteries as permanent damage could result. Do not use a charge current that exceeds the safe level of the battery.
- Do NOT connect the charger's AC and DC input connectors to any power source at the same time.
- Allow the charger or battery to cool down before reconnecting.
- Always disconnect from power source when not in use.

GLOSSARY OF TERMS

Amps (A): The unit of measure for charge current.

Milli-amps (mA): A unit of measure for current, being amps (A) multiplied by 1000 and listed as "mA". So 2.5A is the same as 2500mA (2.5 x 1000). To convert mA to amps, divide the mA number by 1000. So 25mA is the same as 0.025A (25 divided by 1000).

Capacity and milli-amp hours (mAh): The amount of energy a battery can store is called its **capacity**, which is defined as how much current a battery can supply constantly over one hour of time. Most hobby batteries are rated for capacity in "**mAh**" or **milli-amp hours**. A 650mAh battery can deliver 650mA of current for one hour ($650\text{mA} \times 1\text{hr} = 650\text{mAh}$). A 3200mAh battery can deliver 3200mA (3.2A) of current for one hour ($3200\text{mA} \times 1\text{hr} = 3200\text{mAh}$), etc.

"C" rating: Capacity is also referred to as the "C" rating. Some battery suppliers recommend charge currents based on the battery's "C" rating. A battery's "1C" current is the same number as the battery's rated capacity number, but noted in mA or amps. A 600mAh battery has a 1C current value of 600mA, and a 3C current value of (3 x 600mA) 1800mA or 1.8A. The 1C current value for a 3200mAh battery would be 3200mA (3.2A), etc.

INPUT POWER

AC Input: For indoor use, this charger includes a built-in switching AC power supply that delivers power by connecting the AC power cord to a common 110V AC outlet.

DC Input: This charger can be powered by a portable 12V DC power source for use at the track. On the left side of the charger, connect the DC power cord's alligator clips directly to the output terminals on the 12V DC power source. Always match polarities (red lead to red "+" terminal, black lead to black "-" terminal). To utilize the charger's **absolute maximum** power capabilities the DC power source must be capable of delivering at least 4 amps while maintaining 12 volts DC.

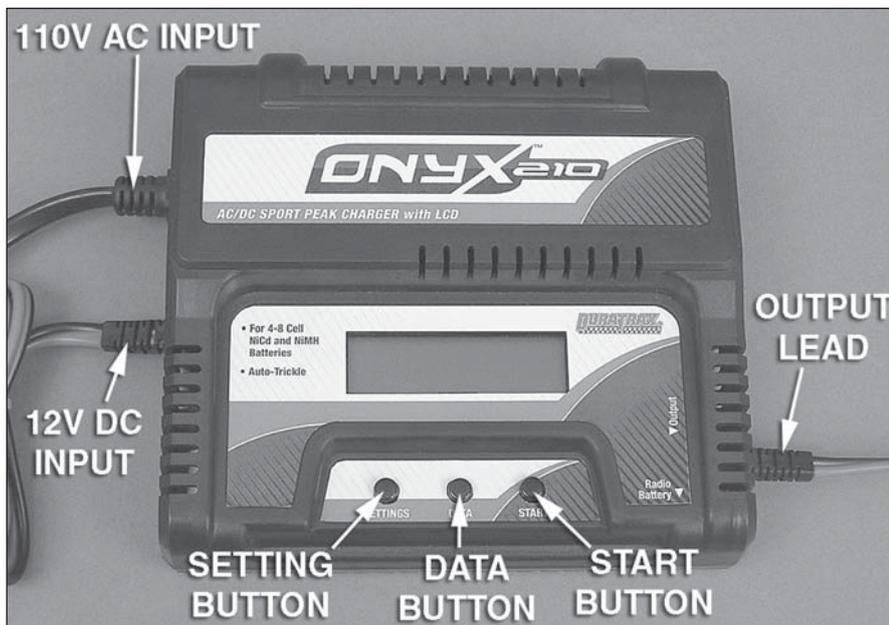


WARNING! Never accidentally short together the positive (+) and negative (-) input connections when connected to 12V DC power. Failure to do so could result in permanent damage to the power source and the charger.

This charger is rated for a maximum output power of 40 watts. Depending on certain conditions (e.g. if charge current is set to maximum, the maximum number of cells are connected to the output, and input voltage is low), the actual current delivered to the battery might be slightly less than the setting. This is normal.

The charger will be on at all times when connected to input power. Disconnect the charger from input power when not in use.

CONTROL & CONNECTIONS

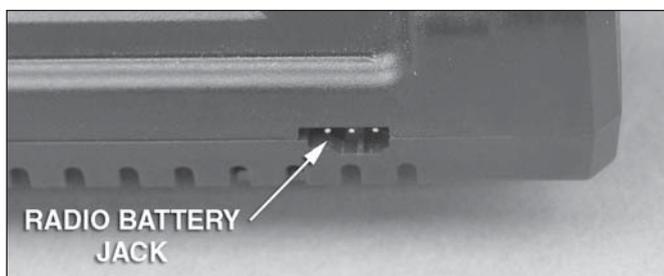


OUTPUT LEAD: The standard connector is compatible with most R/C car batteries. See the SPECIFICATIONS chart on page 1 for a list of additional adapters for charging battery types with different connectors.

SETTING BUTTON: For selecting NiCd or NiMH battery type, and the charge current rate.

DATA BUTTON: For selecting different data to be viewed on the LCD.

START BUTTON: For starting charge. Can also be used to stop charge.



RADIO BATTERY JACK: A unique jack is located on the front edge of the charger, for charging of NiCd or NiMH 4 or 5 cell receiver batteries for nitro vehicles, or even 8 cell transmitter batteries! This jack is universal – compatible with Futaba-J, Airtronics-Z, Hitec, JR, and Spektrum receiver battery connectors, and BEC type connectors.

For some transmitters, opening the battery compartment and disconnecting the battery's lead will reveal if the battery's own plug can be connected directly to this jack on the charger. Or, if you wish to connect the charger to a transmitter's built-in charge jack, check with your local retailer for the appropriate charge adapter listed below:

Part number	Description
GPMM3100	BEC to Futaba® Tx Charge Jack Adapter
GPMM3101	BEC to Hitec® / Airtronics® Tx Charge Jack Adapter
GPMM3102	BEC to JR® / Spektrum® Tx Charge Jack Adapter



WARNING! Do NOT attempt to charge one battery through the main output lead, and another through the jack on the front edge of the charger at the same time!! Failure to do so might permanently damage the charger.

DETERMINING BATTERY TYPE & SPECIFICATIONS

Always read your battery's label and/or instruction sheet before use, and determine:

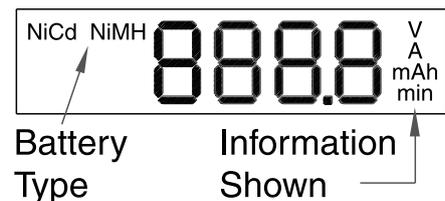
1. **TYPE:** Is the battery a nickel-metal hydride (NiMH) or nickel-cadmium (NiCd)?
2. **RATED CAPACITY:** What is the battery's rated capacity, in "mAh" ("milli-amp hours")?
3. **RATED VOLTAGE:** If not printed on the battery's label, consult your battery supplier or determine the proper pack voltage as shown in the chart at right.

Battery Voltage Chart	
Number of cells	Rated Nominal Voltage
4 cells	4.8V
5 cells	6.0V
6 cells	7.2V
7 cells	8.4V
8 cells	9.6V

GETTING STARTED

1. Connect the charger to input power.
2. Every time the charger is connected to input power, the default setting is to charge a **NiMH battery at 5 amps**. If this setting matches your battery and needs, skip to STARTING CHARGE below. Otherwise, to adjust the battery type and charge current settings, proceed as follows...

3. **Battery type:** Press the SETTINGS button briefly to choose between "NiCd" or "NiMH" battery types. This will set the peak sensitivity value to 8mV for NiCd batteries, or 4mV for NiMH batteries, to achieve the most accurate peak charges for your battery.



4. **Charge current:**
 - a. Press and hold the SETTINGS button for 3 seconds. The charge current setting will show on the LCD.
 - b. Briefly press the SETTINGS button again to scroll through all charge current options - 0.8A, 1.5A, 3.0A, and 5.0A. Refer to the chart at right for a list of recommended charge currents for different size batteries.
 - c. Once the desired current is found, press and HOLD the SETTINGS button again for 3 seconds. The LCD will return to the opening screen.

Charge Current Recommendations	
Battery's rated capacity	Charge Current Setting
750-1000mAh	0.8A
1000-1400mAh	1.5A
1500-2400mAh	3.0A
2500-5000mAh	5.0A

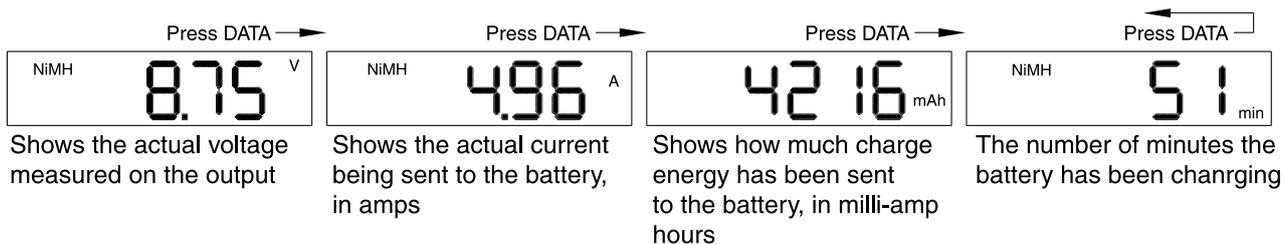
STARTING CHARGE

Linear current will be supplied to NiCd and NiMH batteries during charge. The peak detection method will be used to find the highest battery voltage during charge. Once peak voltage is detected, the charger will automatically stop fast charge and start trickle charge.

1. **For 6 or 7 cell batteries**, connect the battery to the charger's output lead. Make sure the polarities of the battery and charger's leads match (red charger wire to red battery wire, black charger wire to black battery wire). Skip to step 3.
2. **For 4 or 5 cell receiver batteries or 8 cell transmitter packs**, insert the battery's plug in the RADIO BATTERY jack on the front edge of the charger, or use the proper adapter to do so (see page 3). Make sure the battery's black or brown wire is on the right side when inserting into the jack.

Caution: Make sure the charge current setting is safe for your battery to prevent overheating of the cells. "AAA", "AA", "A", and "2/3A" size batteries generate heat more quickly than large sub-C batteries. It's NOT recommended to charge batteries having a rated capacity less than 750mAh with this charger. Most radio batteries should NOT be charged at currents greater than 1.5A. Failure to follow this recommendation could permanently damage your battery!

3. To **START CHARGE**, press and hold the START button for 3 seconds.
4. During charge, the LCD will alternate between the battery voltage and charge current screens so you can quickly determine if charge is progressing correctly.
5. Pressing the DATA button during charge will manually scroll the LCD through all data screens like shown below.



Note that when the LCD shows the battery's voltage during charge, the reading will seem slightly higher than normal. This is due to the loading effect of the charger, and is normal. A higher load will skew the reading more than a smaller load. When fast charge is finished, battery voltage readings will be more accurate.

If you wish to manually stop a charge process, either disconnect the battery from the charger, or press START. Tones will sound, and the LCD will return to the opening screen.

CHARGE COMPLETED – TRICKLE CHARGE

When the charger has detected peak it will automatically stop charge and show "End" on the LCD. Audible tones will also sound for about 10 seconds (pressing START while the tones are sounding will turn them off). The charger will automatically change to trickle charge mode at this time.

The trickle charge current value is set automatically by the charger as shown in the chart at right, and shown in amps "A". The charger will remain in trickle charge mode until the battery is disconnected from the charger, or the START button is pressed again.

Fast Charge Current Setting	Approx. Trickle Current
0.8A	0.05A (50mA)
1.5A	0.10A (100mA)
3.0A	0.15A (150mA)
5.0A	0.25A (250mA)

A backup safety timer is built into this charger to automatically stop fast charge if peak is not detected in 90 minutes. If the "min" display shows "Stop", this safety timer stopped charge (and not the peak detection circuit). You might want to attempt to re-peak the battery by starting another charge. Refer to the TroubleShooting Guide for more details.

VIEW DATA SCREENS

After peak charge has been detected, you can review the four different data screens to see the final results of the peak charge. While “End” is showing, repeatedly press DATA to scroll through the screens like shown on the previous page to view the final results of the charge process. The screen will automatically revert back to “End” three seconds after a button is pressed last.

RESETTING THE CHARGER

When a peak charge has finished, press START to reset the charger. The LCD will return to the opening screen, and the charger will stop delivering trickle current to the battery. Pressing the DATA button will scroll through the different data screens on the LCD.

CARE & HANDLING OF NiMH BATTERIES

- Do not to allow NiMH batteries to overheat! Disconnect overheated batteries from the charger immediately and allow to cool.
- Store NiMH packs with some voltage remaining on the cells (refer to battery supplier).
- It is important to recharge NiMH batteries immediately prior to use, as they have a high self-discharge rate.
- “AAA”, “AA” and “A” size radio batteries can safely be peak charged at currents up to 1.5C to 2C (battery capacity x 1.5 or 2.0). High charge currents can overheat batteries and thus reduce service life, especially for smaller size cells.

ERROR MESSAGES & TROUBLESHOOTING GUIDE

Several safety features are included in this charger to protect itself and the battery against certain unwanted conditions, as follows:

LCD	PROBLEM AND SOLUTION
“Err.1”	The DC input voltage is below 11.0V or exceeds 15V DC. Make sure the input voltage is within this range.
“Err.2”	A battery is not connected to the output. Make sure a good connection exists between the battery and charger and re-try.
“Err.3”	The battery is connected backwards to the output. Re-connect the battery to the charger’s output with the proper polarity.
“Err.4”	The battery has become disconnected during charge. Re-establish a good physical connection between the battery and charger, and re-start charge.
“Err.5”	Some type of electronic interruption or malfunction has occurred. If you believe that some external force might have caused the charger to err, and that a true circuit malfunction has not occurred, you might attempt to re-start charge. Otherwise, if you believe the charger is not functioning properly, disconnect the battery from the charger, and the charger from input power, and contact Hobby Services for further details.
“Err.6”	The charger has somehow fallen out of calibration. Contact Hobby Services for further details.
“Stop”	The 90 minute backup safety timer has expired. You can re-start charge, or disconnect the battery from the charger.

Other possible problems:

PROBLEM - LCD does not work when unit is connected to input power: Check power supply for improper power. Check input connections for solid contact. DC input power might be connected backwards...reverse input connection. Contact Hobby Services for further details.

PROBLEM - Battery voltage low after charge (below 1.2V per cell): The capacity setting, charge current setting, and/or backup safety timer settings might be too low. The peak sensitivity setting might be too low or too high...re-adjust setting. Perhaps poor quality charge leads...replace with new.

5-YEAR LIMITED WARRANTY – *U.S.A. & CANADA ONLY

DuraTrax warrants this product to be free from defects in materials and workmanship for a period of five (5) years from the date of purchase. During that period, DuraTrax will, at its option, repair or replace without service charge any product deemed defective due to those causes. You will be required to provide proof of purchase (invoice or receipt). This warranty does not cover damage caused by abuse, misuse, alteration or accident. If there is damage stemming from these causes within the stated warranty period, DuraTrax will, at its option, repair or replace it for a service charge not greater than 50% of its then current retail list price. Be sure to include your daytime telephone number in case we need to contact you about your repair. This warranty gives you specific rights. You may also have other rights, which vary from state to state.

For service on your DuraTrax product, warranty or non-warranty, send it post-paid and insured to:

HOBBY SERVICES
3002 N. Apollo Drive Suite 1
Champaign, IL 61822
(217) 398-0007
www.hobbyservices@hobbico.com

*For warranty and service information if purchased outside the USA or Canada, see the additional warranty information insert (if applicable) or ask your retailer for more information.

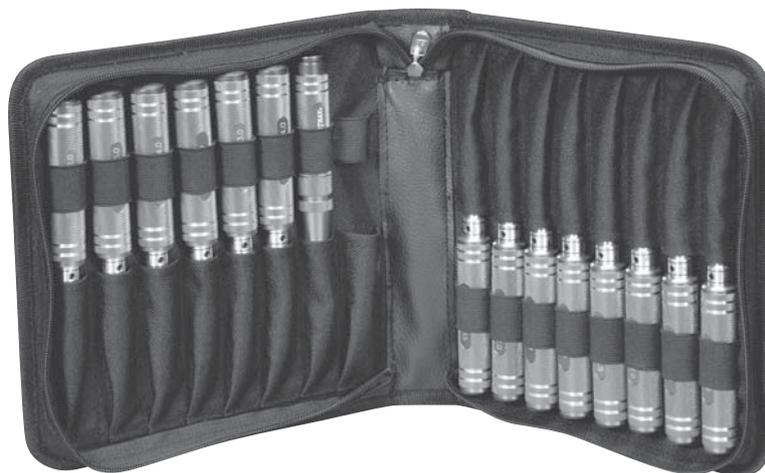


OTHER ITEMS AVAILABLE FROM DURATRAX



DuraTrax Pit Tech™ Deluxe Car Stand

This convenient workstation for R/C cars and trucks features a rotating top plate for easy access from all sides and a dropped center section that provides a stable work platform for models with uneven chassis bottoms. Includes an extra-large parts tray and built-in holes to keep shocks handy when rebuilding. **DTXC2370**



DuraTrax Ultimate Tool Set w/Pouch

DuraTrax Ultimate tools have hardened steel tips plus a blue-anodized aluminum handle that's knurled for a no-slip grip. This set has 'em all – 4 each of metric and SAE hex drivers, 3 each of slotted and Phillips screwdrivers – plus an Ultimate Body Reamer. And to keep them handy and organized, DuraTrax includes a 15-pocket, book-style tool pouch with zipper. **DTXR0400**