

ONYX²⁶⁰

AC/DC Dual Touch Charger Instruction Manual



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



WARNING!! Charging lithium-based rechargeable batteries poses a risk of FIRE! NEVER treat lithium-based batteries in the same manner as other battery types. NEVER LEAVE LITHIUM BATTERIES UNATTENDED WHILE BEING CHARGED! ALWAYS charge lithium-based batteries in a fireproof location! Failure to follow all care and handling instructions contained in this manual could result in quick, severe, permanent damage to the batteries and all surroundings!! Follow all safety precautions when using such batteries, as listed on page 6 of this manual!

INDEX

Important Precautions	2	Balance.	10
Glossary of Terms.	3	Battery	10
Specifications.	3	Data	11
Controls and Connections	4	Graph	11
Input Power	4	Charge	12
Cooling Fan	5	User	12
Determining Battery Type & Specifications	5	Memory	13
Care and Handling of Lithium Batteries	6	Error Messages & Troubleshooting Guide	14
Care and Handling of NiMH Batteries	7	Limited Warranty	15
Battery Connection	8	Disclaimer.	15
Main Menu	9		

IMPORTANT PRECAUTIONS



- **Do not leave the charger unattended while in use.**
- **Remain in sight of the charger while it's in use.**
- **Always use a LiPo safety bag when charging lithium cells.**
- **Disconnect the battery and remove input power from the charger immediately if the charger or battery 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 fan or 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 overcharge batteries as permanent damage could result. Do not use a charge current rate which exceeds the safe level of the battery.
- Do not place the charger or battery on flammable surfaces or near combustible materials while in use, such as carpet, cluttered workbench, paper, plastic, vinyl, leather and wood, inside an R/C model or full sized automobile!
- Do not connect the charger to AC and DC inputs at the same time.
- Allow the charger and battery to cool down between charges.
- Always disconnect the charger from the power source when not in use.
- Remain in sight of the charger while it's in use.
- Always use a LiPo safety bag when charging lithium cells.

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 1000). Or, 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 (650mA 1hr = 650mAh). A 3200mAh battery can deliver 3200mA (3.2A) of current for one hour (3200mA 1hr = 3200 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 600mA) 1800mA or 1.8A. The 1C current value for a 3200mAh battery would be 3200mA (3.2A), etc.

SPECIFICATIONS

GENERAL SPECIFICATIONS

AC input: 110V AC 60Hz

DC input: 12-17V DC

Safety/protection devices: Solid-state reverse polarity and current overload circuitry; 0-300 minute safety timer; fan

Case size: 6.0 x 2.75 x 7.25 in (152 x 70 x 184 mm)

Weight (w/o cords): 18.5oz (524g)

SPECIFICATIONS FOR EACH OUTPUT

Output power: 60W

Battery types: 1-15 NiCd/NiMH (1.2 – 18.0V); 1-6S Lithium (3.7 – 22.2V)

Battery capacity range: 100-60,000mAh

Programmable model memories: 10

Fast charge current: 6.0A

Fast charge termination: Peak detection (NiCd/NiMH); cc/cv (Lithium)

Ni peak sensitivity: 10-20mV, adjustable

Ni auto-trickle current: 1/20 fast charge setting or 10 – 250 mA (manual)

Lithium balancing accuracy: 5mV per cell

Lithium node current (max): 300 mA

Display type: 3.2-inch color touch screen

Data displayed: Input, output and individual cell voltages; peak voltage; charge current, capacity and time; battery percentage; battery chemistry; errors and alerts

Input connections: Detachable DC lead with alligator clips; detachable AC lead with standard plug

Output connections: Banana jacks for 4mm plugs (main); radio jack w/ universal connector

Included output adapters: Banana to Star Plug; banana to standard; JST XH balancing board w/ cable adapter for each output

For small electric vehicle batteries, find a charge lead that best matches the type of battery you are charging. Look for these and other charge adapters at your local retailer:

Item Number Charge Lead Description

DTXC2220	Charge Lead – banana plugs to standard
DTXC2223	Charge Lead – banana plugs to mini plug
DTXC2224	Charge Lead – banana plugs to XT90
DTXC2225	Charge/Balance Lead – 4mm Bullet

Always connect the charge lead to the charger first. Then connect the battery to the charge lead. Always match polarities on the battery wires, charge leads and banana jacks – black connection to black (-) and red connections to red (+).

B. BALANCE PORT

To connect an adapter for balancing of lithium batteries. See page 9.

C. RADIO BATTERY

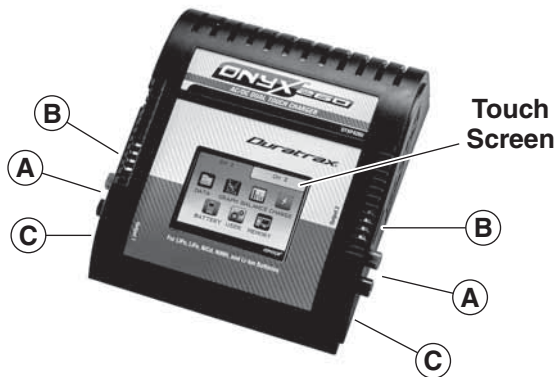
To directly connect a receiver or transmitter battery for charging.

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. Located on the left side of the charger is a jack for the connection of the DC power cord. Once

CONTROLS and CONNECTIONS



A. OUTPUT BANANA JACKS

For connection to a wide variety of charge adapters. Adapters with a standard plug and Star Plug are included.

connected to the charger, connect the DC power cord to the 12V 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 9 amps while maintaining 12 volts DC.



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 60 watts. Depending on certain conditions (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.

COOLING FAN

A built-in cooling fan helps keep the charger cool during operation. This will help extend the service life of the charger, and allow it to function more accurately and efficiently. The fan only functions while a battery is being charged.

CAUTION: Place the charger on a flat surface. Do not block the vent holes for the cooling fan on the bottom of the charger. Failure to do so could cause the charger to overheat and possibly cause permanent damage.

DETERMINING BATTERY TYPE & SPECIFICATIONS

IMPORTANT: What is your battery’s CHEMISTRY TYPE, RATED CAPACITY, AND RATED VOLTAGE? To avoid causing permanent damage to your battery, carefully read your battery’s label and/or instruction sheet or consult your battery supplier and determine:

1. **TYPE:** Is the battery a nickel-metal hydride (NiMH), nickel-cadmium (NiCd), lithium-polymer (LiPo), lithium-ion (Lilon), or lithium-ferrite-phosphate (LiFe, such as LiFeSource brand)?
2. **RATED CAPACITY:** The amount of charge energy the battery can store should be listed on the battery’s label 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 follows (refer to the charts at right):
 - a. NiMH and NiCd: number of cells \times 1.20.
 - b. LiPo batteries: number of cells \times 3.70.
 - c. Lilon batteries: number of cells \times 3.60.
 - d. LiFe batteries (LiFeSource): number of cells \times 3.30.

NiCd and NiMH Battery Pack Voltages

Number of Cells	Nominal Voltage
4 cells	4.8 V
5 cells	6.0 V
6 cells	7.2 V
7 cells	8.4 V
8 cells	9.6 V
9 cells	10.8 V
10 cells	12.0 V
11 cells	13.2V
12 cells	14.4V
13 cells	15.6V
14 cells	16.8V
15 cells	18.0V

LiPo, Lilon and LiFe Pack Voltages

Number of Cells	Nominal Voltage		
	LiFe	Lilon	LiPo
1 cell	3.3 V	3.6 V	3.7 V
2 cells	6.6 V	7.2 V	7.4 V
3 cells	9.9 V	10.8 V	11.1 V
4 cells	13.2 V	14.4 V	14.8 V
5 cells	16.5V	18.0V	18.5V
6 cells	19.8V	21.6V	22.2V

Care & Handling of LiPo, Lilon, & LiFe Batteries



WARNING!! DO NOT try to charge lithium-polymer (LiPo) or lithium-ion (Lilon) or lithium-ferrite-phosphate (LiFe) cells in the same way as other battery types! Always read the instructions that are included with your lithium batteries carefully before use. Failure to follow these care and handling instructions can quickly result in severe, permanent damage to the batteries and their surroundings and even start a FIRE!

- **ALWAYS** charge lithium batteries in a fireproof location, which could be a container made of metal or ceramic tile. Monitor the area with a smoke or fire alarm, and have a lithium approved fire extinguisher available at all times.
- **NEVER** attempt to use the charger's NiCd and NiMH functions for LiPo, Lilon or LiFe batteries.
- **NEVER** attempt to extinguish a lithium fire with water or a non-lithium approved fire extinguisher!
- **ALWAYS** provide adequate ventilation around LiPo/Lilon/LiFe batteries during charge, while in use, and during storage.
- **NEVER** allow LiPo, Lilon or LiFe cells to overheat at any time, as they can and usually will become physically damaged and could possibly **EXPLODE** or catch **FIRE!!** If a battery becomes overheated (over 140°F, 60°C), disconnect it from the charger **IMMEDIATELY!**
- **NEVER** continue to charge LiPo, Lilon or LiFe batteries if the charger fails to recognize full charge. LiPo and

LiFe cells which swell or emit smoke may be in an overcharge condition and should be disconnected from the charger immediately.

- **NEVER** set the charger's LiPo/Lilon/LiFe battery voltage settings to a voltage that is HIGHER than the nominal rating of the battery itself, as such cells cannot handle overcharging in any way.
- **NEVER** charge LiPo, Lilon or LiFe batteries at currents greater than the "1C" rating of the battery, or the maximum rated current as specified by the battery's manufacturer.
- **NEVER** allow LiPo, Lilon or LiFe cells to come in contact with moisture or water at any time.
- **NEVER** allow the internal electrolyte from LiPo, Lilon or LiFe batteries to get in the eyes or on skin – wash affected areas immediately if they come in contact with the electrolyte and contact your physician!
- **ALWAYS** keep LiPo, Lilon or LiFe batteries away from children.



Always use a LiPo charge bag, such as the ElectriFLY SafeCharge™ LiPo battery charge bag, when charging LiPo batteries. This bag is intended to reduce the effects that might occur if a LiPo battery experiences a failure while being charged. If a LiPo battery suffers damage while being charged inside the



SafeCharge LiPo charge bag, the high-temperature material and coating will add a layer of safety to suppress flames from exiting the bag. Please follow all instructions and safety information included with the LiPo battery and SafeCharge LiPo charging bag. **NOTE: The ElectriFLY SafeCharge bag is only rated for up to 11.1V 3200 mAh LiPo battery.**



Open all snaps, open the bag and place the battery inside as far down into the bag as possible.



Route wires cleanly out of the side and close all snaps.

CARE & HANDLING of NiMH BATTERIES

- Do not to allow NiMH batteries to overheat! Disconnect overheated batteries from the charger immediately and allow to cool.
- Do not attempt to use the charger's lithium functions with NiMH batteries.
- Store NiMH packs with some voltage remaining on the cells (refer to battery supplier).

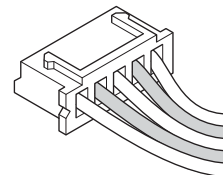
- It is important to recharge NiMH batteries immediately prior to use, as they have a high self discharge rate.
- The charger will automatically apply a trickle charge to the battery when peak charge ends.
- “AAA”, “AA” and “A” size radio batteries can safely be peak charged at currents up to 1.5C to 2C (battery capacity × 1.5 or 2.0). High charge currents can over-heat batteries and thus reduce service life, especially for smaller size cells.



WARNING! DO NOT charge a LiPo battery which is not wired for balancing, or which does not have a built-in protection circuit! Such types of LiPo batteries have NO means to protect the equipment or the user from damage that could result from an overcharge condition of any single cell in the pack.

Packs wired for **BALANCING** have a unique connector which has more than two wires going to the pack itself (like shown at right.) Each wire is connected to an individual cell inside the pack, by which the charger monitors the condition of the individual cell and controls whether it should be charged. Such packs **MUST** be charged with a LiPo charger that is capable of balancing, such as the Onyx 255.

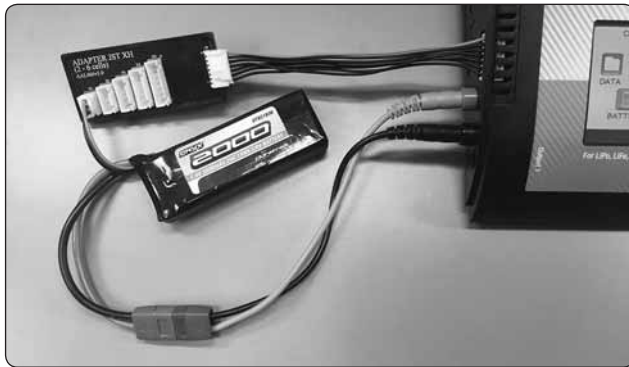
Balancing Connector



NON-BALANCED packs are wired so the charger can only detect the voltage of the entire pack (not individual cells), so there is only one charge lead. It's highly recommended to **ONLY** use such types of LiPo packs if they have a built-in charge safety circuit which prevents any single cell in the pack from being overcharged. Follow the battery's charge instructions for proper charging procedure.

BATTERY CONNECTION

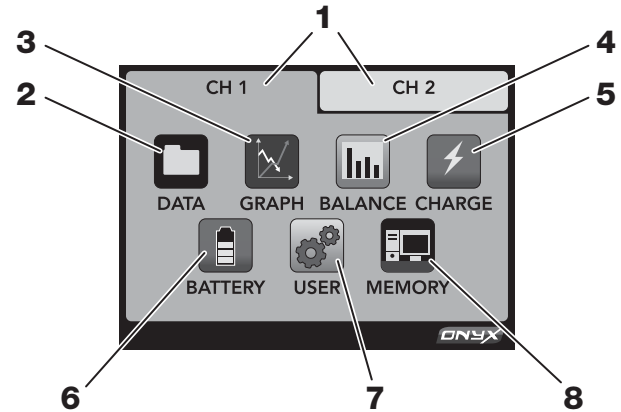
1. After determining which battery type is to be charged, what connector is being used and all appropriate programming is completed, the correct adapter will need to be installed prior to charging. If an adapter other than what is included is needed, please refer to the 'CONTROLS AND CONNECTIONS' section on page 4 for a list of adapters that are sold separately.
2. For **NiCd/NiMH**: Plug the adapter into the charger **FIRST**. Then connect the battery to the adapter **ONLY** after it has been connected to the charger. Proceed to the 'Starting Charge' section.
3. For **LiPo, Lilon OR LiFe**: Lithium batteries for R/C are commonly available in two different assembly/wiring configurations: wired for balancing, and non-balanced. It's important to know which configuration you have before proceeding. **Consult your battery supplier if you are unsure if your battery is wired for balancing, if it's not wired for balancing but has a built-in safety circuit, or neither.**



4. Connect the balance board adapter to the charger's balancing jack (above). The red wire will always be on the left. Next, connect the charge lead adapter that matches your battery connector type to the charger's banana jacks. Then connect the battery's balance lead

to the balancing board. Lastly, connect the battery's main power lead to the adapter connected to the charger's banana jacks (note proper polarity, shown above right). The Onyx 260 will not charge **ANY** lithium pack if the balance **AND** main lead are not connected.

MAIN MENU



1. Selects charger output.
2. **DATA:** Displays real time charging information.
3. **GRAPH:** Displays charging data in graphical format.
4. **BALANCE:** Balances lithium packs without charging.
5. **CHARGE:** Begins charge process.
6. **BATTERY:** Set up battery parameters for charging.
7. **USER:** Set sounds, colors and backlight.
8. **MEMORY:** Select 1 of 10 memory slots per output.

BATTERY

Set up battery specifications for charging.

To set up battery settings for charging, touch the area next to the parameter. Then touch the ▲ or ▼ to make the adjustment.

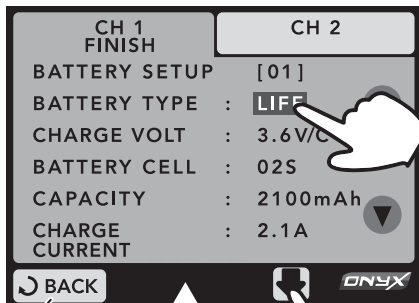


Charge settings should ALWAYS match battery specifications.



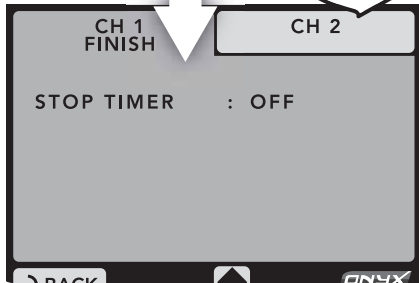
WARNING!

NEVER set the BATTERY TYPE to a type that does not match your battery! For example, accidentally charging a LiPo battery in the NiCd or NiMH setting could result in an overcharge condition, which could result in an intense FIRE!



Back to Main Menu

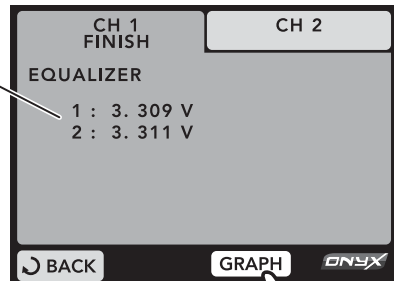
Page Down



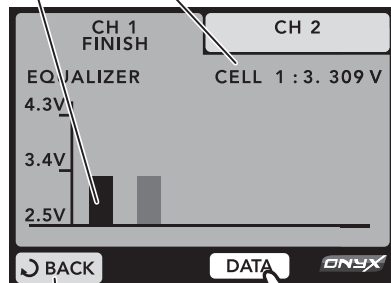
BALANCE

Displays individual lithium cell voltages as text or bar graph form in real time during the charge process. Also balances lithium packs without charging. To balance a pack without charging, connect the battery's balance and main battery lead to charger. The equalizer will balance the individual cells by discharging the high cell to equalize with the low cells.

Show individual cell voltages for up to six lithium cells.



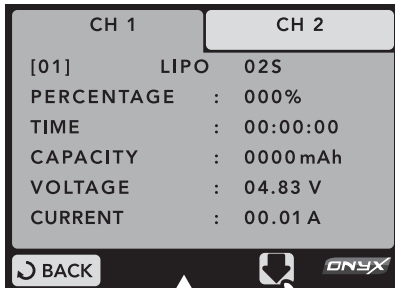
Touching each cell's bar graph will display that voltage in text here. Example shows Cell 1 voltage.



Back to Main Menu

DATA

Displays real time charging information.



PERCENTAGE: Amount of capacity delivered to battery divided by battery capacity rating. NOTE: Percentage will only read 100% or higher if battery was completely discharged prior to charging.

TIME: Current charge time.

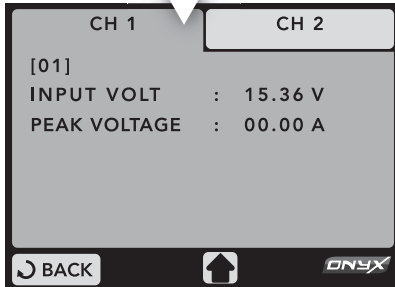
CAPACITY: Capacity delivered to battery during charge.

VOLTAGE: Displays battery voltage.

CURRENT: Amount of current being delivered to battery.

INPUT VOLT: Input voltage to charger.

PEAK VOLTAGE: Highest battery voltage measured during charge process.

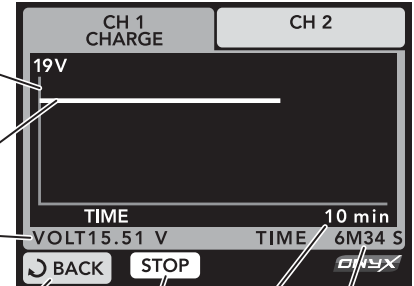


GRAPH

Displays live charging information in graph form.

Graph Voltage Scale. Scale changes depending on connected battery voltage.

Voltage on battery is displayed in graph and text format.



Back to Main Menu

Stop Charge

Charge time

Graph Time Scale. Will update automatically during charge process.

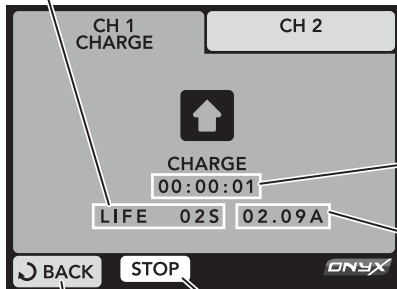
CHARGE

Each time the power is cycled and prior to the first charge process, this warning screen will appear when the charge icon is pressed. These warnings must be read, understood and accepted before the charge process begins.



Press RETURN to return to MAIN MENU.

Press OK to begin charge process.



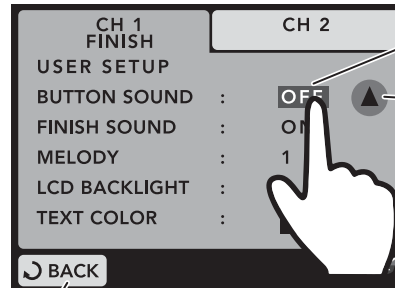
Back to Main Menu

Stop Charge

Once returned to Main Menu, the charge process will continue. Additional charging information can be viewed by pressing DATA, GRAPH or BALANCE.

USER

Sets system wide parameters including sounds, colors and backlight. Adjustment in SETUP for CH1 carries over to CH2.



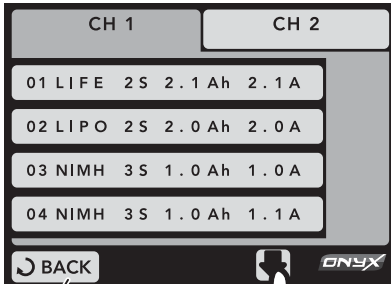
Back to Main Menu

Touch area next to parameter to select.

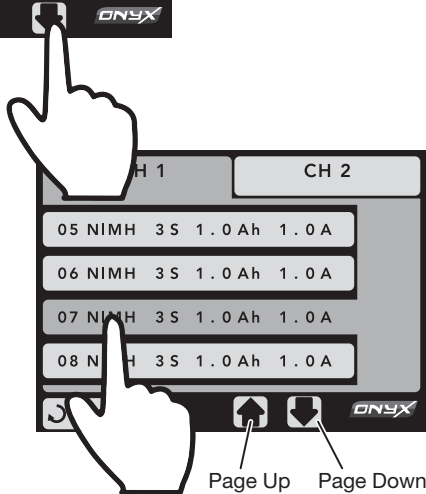
Then use ▲ or ▼ to make the adjustment.

MEMORY

Ten battery memories are available for each output. To select a battery memory, use the **↑** and **↓** to locate desired memory. Then touch to select. Example below is selecting Memory 07 for use.

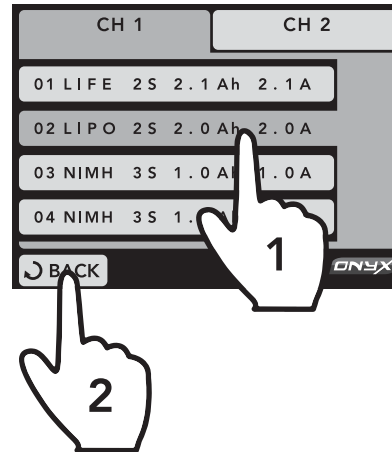


Back to Main Menu



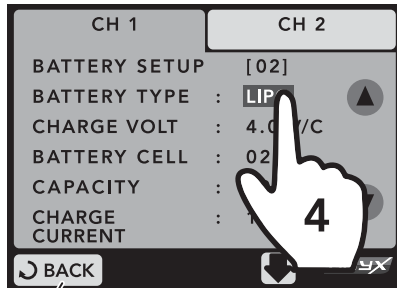
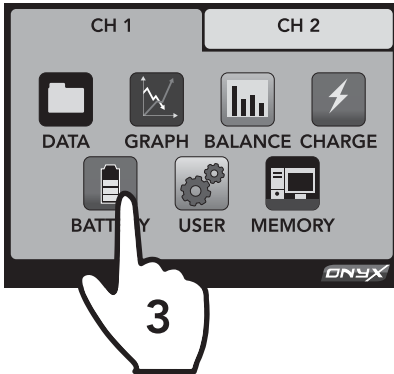
To program battery memory, start by touching the MEMORY icon on the MAIN MENU. **1** Select MEMORY position to program. **2** Then touch BACK to return to MAIN MENU. **3** Next, touch the BATTERY ICON and **4** program battery settings as shown on page 10 of this manual. The battery settings are stored automatically in selected memory. Repeat process for programming additional memory positions.

WARNING! NEVER set the BATTERY TYPE screen with settings that do not match your battery! For example, accidentally charging a LiPo battery in the NiCd setting could result in an overcharge condition on the battery, which could result in an intense FIRE!



ERROR MESSAGES & TROUBLESHOOTING GUIDE

1. **INPUT LOW:** DC Input Voltage is below 12V. Readjust DC power supply to 12V or higher. 13V is recommended.
2. **INPUT OVER 17V:** DC input voltage is above 17V. Readjust DC power supply to below 17V. 13V is recommended.
3. **CELLS/TYPE ERROR:** Lithium pack balance lead is not connected. Connect lithium pack balance lead and retry charge process. Check charge settings and be sure they match battery specifications.
4. **OPEN CIRCUIT:** Main battery charge lead is not connected. Connect battery to charge.
5. **WRONG +/- OR OPEN:** Battery is connected backwards to the charger's output. Reverse the connection and retry charge process.
6. **OUTPUT NO BAT:** NiCd/NiMH battery became disconnected during charge process. Reconnect battery and retry charge.



Back to Main Menu

5-YEAR LIMITED WARRANTY - *U.S.A. and 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 (217) 398-0007

3002 N. Apollo Drive Suite 1
Champaign, IL 61822

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.



DISCLAIMER

Hobbico will not be held responsible for any and all incidental damages and bodily harm that may result from improper use and/or handling of this battery charger. In purchasing this product the buyer/user agrees to bear all responsibilities of these risks and not hold Hobbico, its distributors (owners and employees) and/or retailers responsible for any accidents, injury to persons, or property damage. If you do not agree with these conditions, please return this product to the place of purchase.

