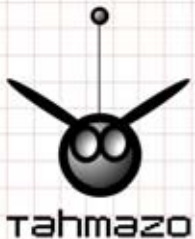
T15 POWER UP

DIGITAL CHARGER & DISCHARGER

INSTRUCTION MANUAL


Tahmazo

T15 Manual Contents

Thank you for purchasing this digital T15 DC charger and you will be pleased with its performance. T15 is an innovative multi-function charger designed to maximise charge efficiency using it own unique algorithm. Please read the following instructions carefully.

T15 Power Up Instructions

Features

01 Compact and portable packed in a rugged aluminum case

02 Uses either 12v Lead Acid battery or 11-15v DC power supply input (not supplied)

03 Capable of charging and discharging
1 - 14 NiCd or NiMH cells/
1 - 5 Lithium-Ion or Lithium-Polymer cells/ 2 ~ 12V Lead-Acid batteries

04 Adjustable charge current (0.1A - 5.0A)

05 Adjustable discharge current (0.1A - 1.0A)

06 Microprocessor controlled charging and discharging system:
- " zero delta V " peak detection for NiCd and NiMH batteries
- "constant current / constant voltage " charge method for Lithium-Ion/Po batteries and Pb batteries.

09 Programmeable cycle mode (Charge to Discharge / Discharge to Charge) up to 5 cycle

10 2 -line, 16 character LCD with backlight to make the screen clear and legible.

11 To protect both the charger and batteries, the maximum charge and discharge current are automatically limited

12 Zero Current Voltage Check prevents incorrect delta peak auto cut-off caused by high connection resistance or high resistance/old/faulty battery packs

13 Low and over voltage input battery warning function-input voltage outside the range 9.5-15.5v causes a warning message "Input Power" to be shown on the display, together with an audible warning.

14 In the event of the battery being charged becoming disconnected from the charger, the display shows a warning message "Open Circuit" along with an audible warning.

15 Reverse polarity protection. The display will show "Output Battery Reverse Polarity" if the battery being charged is connected in reverse along with an audible warning. If the charger is connected in reverse polarity to the input battery, the charger will not power up.

T15 Safety Precautions

01 Do NOT attempt to charge incompatible types of rechargeable batteries. This charger is designed to only charge and discharge nickel-cadmium, nickel-metal hydride, lithium-ion, and lithium-polymer batteries.

02 Make sure the charger is placed on a firm level surface for charging.

03 Do not attempt to charge batteries at excessive charge currents.

04 Do not use automotive type battery chargers to power the charger.

05 Do not leave the charger unattended while charging. Disconnect the battery and remove input power from charger immediately if the charger becomes hot. Allow the charger or battery to cool down before reconnecting.

06 Do not allow water, moisture or foreign objects into the charger.

07 Do not place the battery or charger on or near a flammable object while in use. Keep away from carpets, cluttered workbenches, etc.

08 Do not cover the air intake holes on the charger as this could cause the charger to overheat.

09 Connect the input leads to a 12V power supply first, then connect the battery.

10 Do not disassemble the charger.

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T15 Specifications

	Type	Description
Input Voltage		11 ~ 15v DC
Charge Mode	NiCd/NiMh	Charge/Discharge/Cycle (C to D/D to C)
	Pb/Li-Ion/Li-Po	Charge/Discharge
Battery Cell (Pack)	NiCd/NiMh	1 ~ 14 cells
	Li-Ion/Li-Po	1 ~ 5 cells
	Pb	2 ~ 12v
Charge Current	All batteries	0.1A ~ 5.0A per 100mA step
Discharge Current	All batteries	0.1A ~ 1.0A per 10mA step
Discharge Cutoff Voltage	NiCd/NiMh	0.1 ~ 16.8v
	Pb/Li-Ion/Li-Po	Battery pack voltage step
Trickle Charge Current	NiCd/NiMh	0 ~ 200mA
Display	LCD	16 x 2 character dot matrix

T15 Quick Start

Input power

T15 can be operated from either a 12V lead acid battery or 11-15V DC power supply. Connect the charger's red clip to the positive (+) terminal on the power source, and the black clip to the negative (-) terminal. The charger will display "Input voltage" error message if the input is below 11V, or above 15V.
If this happens, please recheck the input power supply to make sure there is adequate power.

Output battery connections

Two sockets RED and BLACK are located on the right side of the charger. Connect the battery charging leads to these sockets with the positive (+) lead connected to the red socket and the negative (-) lead to the black socket. "No battery" error message with an audible warning will be displayed if you are trying to start charge without connecting a battery. "Open circuit" error message with an audible warning will be displayed if a battery becomes disconnected from the charger while charging/discharging is in progress. "Reverse polarity" error message with an audible warning will be displayed if a battery is connected to the charger in reverse polarity.

Select the type of battery

When the charger is connected to the power supply, the charger will show a battery mode that was last used. If the Battery Type button is briefly pressed, the present battery type (NiCd, NiMH, Lithium, or Pb) blinks. Each time the Battery type button is pressed, the following battery types are shown in the following cycle:

NiCd → NiMH → LiPo → Pb → NiCd (return)

Choosing lithium polymer or lithium ion

01 When the "LiPo" battery type is blinking, pressing the INC button will cycle the screen to the following:
LiPo CHARGE → LiPo DISCHARGE → Lithium type

02 Then press the ENTER button and the 'LiPo' battery type will blink. For selection of the type of lithium battery:
- Lithium Polymer ('LiPo') - Press INC
- Lithium Ion ('LiIo') - Press DEC

03 Once you have selected the type of lithium battery, press the BATTERY TYPE button once and then DEC button to cycle through the functions.

Set the charging /discharging current

If the Enter button is depressed, a parameter will blink indicating that the parameter can be adjusted. Then press the INC or DEC button to change the setting of the parameter to the desired value. To select or cycle to the next parameter, press the Enter button again. The blinking will stop if no buttons are depressed for 5 seconds. ('C' denotes Current measured in milliampere hour or mAh)

Starting charging or discharging

Hold the Enter button for 5 seconds to start charging or discharging. To stop the charging or discharging process, please the Enter button at any time.

View data

When the charging or discharging operation stops, you can view the charging or discharging data by depressing the Battery type button for 5 seconds. The data will be shown in their respective screen displays as follow:

- INPUT and OUTPUT voltage
- CHARGING and DISCHARGING capacity
- CHARGING PEAK and AVERAGE DISCHARGING voltage

The screen display will return to the previous function page after 5 seconds.

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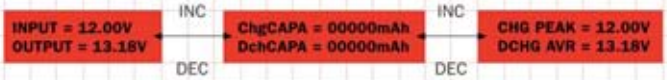
Example of the data display



Displays during charge, discharge, and cycle

Example of displays

- CHG : charge
- DCH : discharge
- C->D : cycle
- D->C : cycle

T15 Charging and Discharging Operation

Connect the charger's red clip to the positive (+) terminal on the power source, and the black clip to the negative (-) terminal. The last used setting will be displayed.

Selecting the battery type

Press the Battery Type button until the desired battery type is indicated on the display. Each time the Battery Type button is depressed, the charger will beep. The following battery type modes are shown in the following cycle:

NiCd → NiMH → LiPo → Pb → NiCd (return)

For the selection of the type of lithium battery, refer to QUICK START - Choosing lithium polymer or lithium ion.

Selecting the mode of operation

Press the INC or DEC button until the CHARGE (to charge the battery) or DISCHARGE (to discharge the battery) display appears. The following shows the screen displays for the different type of batteries. (For cycling of battery, please see CYCLING OPERATION on page 8)

	CHARGE	DISCHARGE
NICD battery	NiCd CHARGE C = 3.0A	NiCd DISCHARGE D = 0.50A 4.8V
NIMH battery	NiMH CHARGE C = 3.0A	NiMH DISCHARGE D = 0.50A 4.8V
LIPO battery	Lilo CHARGE C = 3000mAh 10.8Vp	Lilo DISCHARGE D = .0.50A 10.8Vp
PB battery	PB CHARGE C = 3.0A 10.8Vp	PB DISCHARGE D = 0.50A 12Vp

Selecting the charging or discharging current

Press the Enter button once to select the 'C=' parameter ('C' denotes Charging Current measured in milliampere hour or mAh). Then adjust the value of the parameter by pressing the INC or DEC buttons. To cycle or select the next parameter, press the Enter button.

Selecting the voltage for lithium and lead acid battery

(This is applicable only for lithium battery and lead-acid battery. The charger will auto-detect the voltage of the battery if they are either NiCd or NiMh) Press the Enter button until the parameter indicating the voltage is blinking. Then set the appropriate value of the parameter by pressing the INC or DEC buttons.

Note: Care must be taken to set the appropriate voltage for the Lithium batteries.

Voltage for lithium battery

Pack	Lithium Ion(v)	Lithium Polymer(v)
1-cell	3.6	3.7
2-cells	7.2	7.4
3-cells	10.8	11.1
4-cells	14.4	14.8
5-cells	18.0	18.5

Once all the parameters have been set, press and hold the Enter button for 5 seconds to start. The operation can be aborted anytime by pressing the Enter button.

T15 Cycling Operation

Cycling operation will charge and discharge(C-D) or discharge and charge(D-C) the battery pack, over the desired number of times or cycle. Cycling operation is not performed on lithium or lead-acid battery.

First, connect the charger's red clip to the positive (+) terminal on the power source, and the black clip to the negative (-) terminal. The last used setting will be displayed.

Selecting the battery type

Press the Battery Type button until the desired battery type is indicated on the display. Each time the Battery Type button is depressed, the charger will beep. The following battery type modes are shown in the following cycle:

NiCd → NiMH → LiPo → Pb → NiCd (return)

Selecting the mode of operation

Press the INC or DEC button until the 'CYCLE' displays with the following

- 'C-D' - to charge and then discharge the battery or
- 'D-C' - to discharge and then charge the battery.

Press the Enter button to confirm. Then press the INC or DEC button to select the type of cycling operation you will like to perform.

The following shows the different screen displays for the Nicd and NiMh.

	NiCd	NiMh
Charge, then Discharge	NiCd CYCLE C->D 5 C = 3.0A D = 0.50A	NiMH CYCLE C->D 5 C = 3.0A D = 0.50A
Discharge, then Charge	NiCd CYCLE D->C 5 C = 3.0A D = 0.50A	NiMH CYCLE D->C 5 C = 3.0A D = 0.50A

Selecting the number of cycles

When you have selected the mode of operation, press the Enter button to confirm. The number of cycles will blink and you can set the number of cycles to perform by the INC or DEC button, up to a maximum of 5 cycles.

Selecting the charging and discharging current

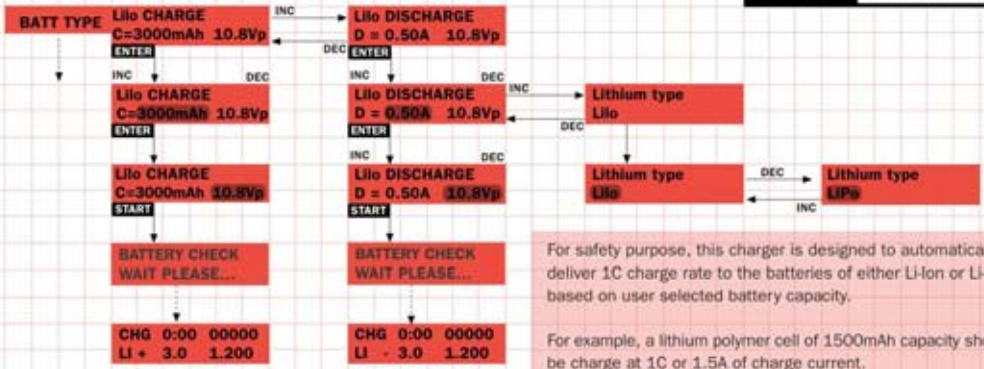
Press the Enter button once to select the 'C=' parameter ('C' denotes Charging Current measured in milliampere hour or mAh). Then adjust the value of the parameter by pressing the INC or DEC buttons. To cycle or select the next parameter, press the Enter button.
Repeat this process for setting the discharge current 'D=' parameter ('D' denotes Discharge Current measured in milliampere hour or mAh).

Once all the parameters have been set, press and hold the Enter button for 5 seconds to start. The operation can be aborted anytime by pressing the Enter button.

T15 NiCd Mode Quick Reference

T15 NiMH Mode

T15 Li-Ion / Li-Po Mode

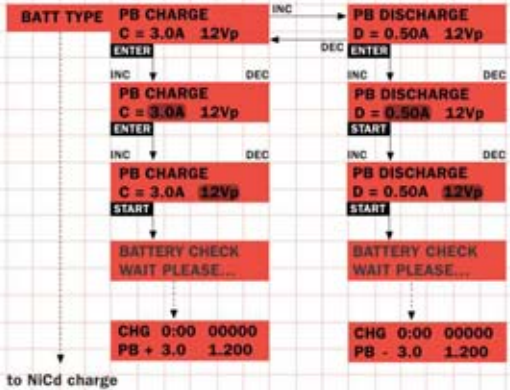


For safety purpose, this charger is designed to automatically deliver 1C charge rate to the batteries of either Li-Ion or Li-Po based on user selected battery capacity.

For example, a lithium polymer cell of 1500mAh capacity should be charge at 1C or 1.5A of charge current.

Note: The maximum voltage for Li-Ion batteries is 4.1V per cell, and 4.2V per cell for Li-Po batteries. Therefore, it is extremely important to choose the proper lithium battery type to be charged. Unless otherwise, it may cause very serious damage to the batteries and the surrounding area!

T15 Pb Mode


BATT TYPE
PB CHARGE
C = 3.0A 12Vp
INC
DEC
PB DISCHARGE
D = 0.50A 12Vp
ENTER
INC
DEC
PB CHARGE
C = 3.0A 12Vp
ENTER
INC
DEC
PB DISCHARGE
D = 0.50A 12Vp
START
INC
DEC
PB CHARGE
C = 3.0A 12Vp
START
INC
DEC
PB DISCHARGE
D = 0.50A 12Vp
START
BATTERY CHECK
WAIT PLEASE...
BATTERY CHECK
WAIT PLEASE...
CHG 0:00 00000
PB + 3.0 1.200
CHG 0:00 00000
PB - 3.0 1.200
to NiCd charge

T15 Error Messages

INPUT BATTERY VOLTAGE ERROR	When input voltage is under 11.0V or exceeds 15V.
NO BATTERY	When a battery is not connected to the charger's output.
OUTPUT BATTERY REVERSE POLARITY	When a battery is connected to the output in reverse.
OUTPUT CIRCUIT PROBLEM	When the charger's circuit has a problem...
CHECK THE BATT OPEN CIRCUIT	When a battery becomes disconnected during an operation.
CHECK THE BATT OVER VOLTAGE	If wrong voltages are set while charging Lithium or Lead-Acid batteries.
CHECK THE BATT LOW VOLTAGE	If wrong voltages are set or batteries are over discharged while charging Lithium or Lead-Acid batteries.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