Intelligent 80W Balance Charger, Discharger & Cycler

ETRONIX
MODEL ELECTRONICS

Instruction Manual

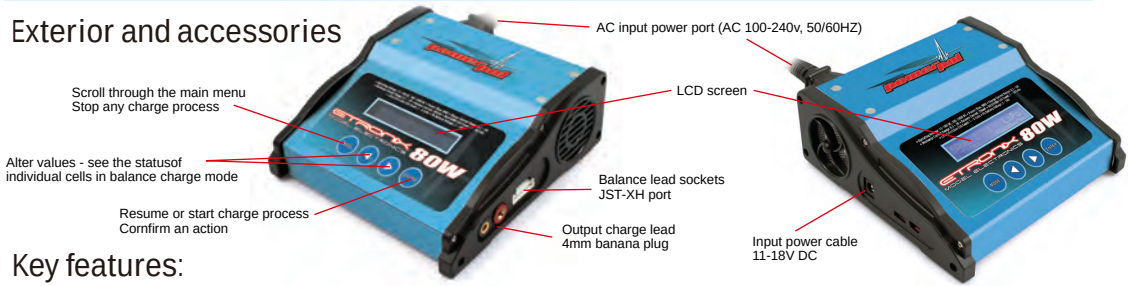
PowerPal AC Intelligent digital balance Charger
Operating Manual

CONTENTS

Performance parameter

Input voltage range	DC:11~18V AC:100~240V
Charge current range	0.1~6.0A
Discharge current range	0.1~2.0A
Charge power limited	max.80W
Discharge power limited	max.10W
Balance current	max.300mA
Balance tolerance	±0.01V
Nicd/NiMH battery cell count	1~18cells
Lithium battery types	Li-po,Li-ion,Li-Fe
Lithium battery cell count	1~6series
Pb battery voltage	2- 24V
Weight:	640g
Dimensions:	145x145x56mm

Exterior and accessories



Key features:

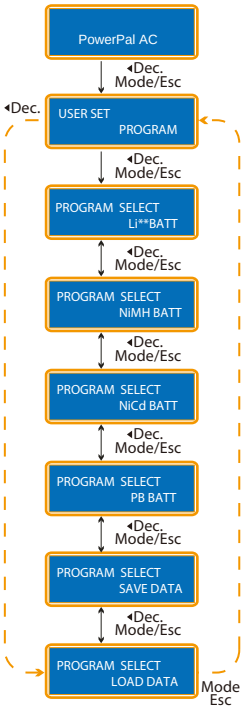
Mode Esc : mode selection/stop/back button. Press this key to select in the main menu or back to the main menu and to stop during the process.

Dec./Inc. :reduce and increase button, you can browse other concerning information by this button during the charge/discharge process. When you are setting parameters, press Dec. key for reduce, and Inc. key for increase.

Enter start : select/enter button, to start work by press it more than 2 seconds.

Operating instructions:

- Main menu



This shows you the type of charger for 2s, press Enter start into the main menu after self -check OK.

User set program, press Mode Esc key down and Dec. key upward for circulatory choose. Press Enter start key into submenu.

Lithium battery program

NiMH battery program

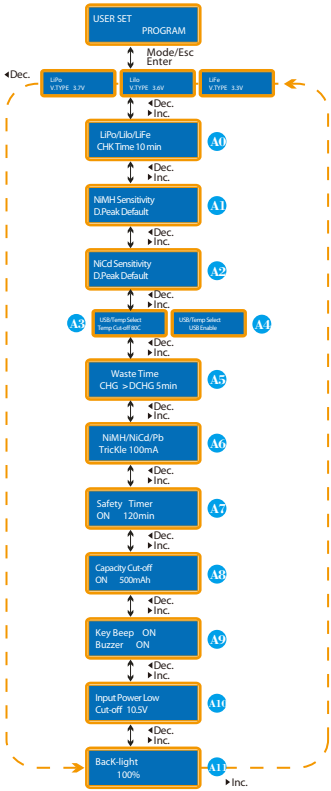
NiCd battery program

Pb battery program

Save data program

Load data program

▶ *Initial parameter set up*



Tip: please set up correctly in the “user set” menu before into the job for the first time you use it.

Press Enter Start key to the first screen on the left, then press Mode Esc key to enter the into parameter setting menu.

You can switch at the same level menu by Dec./Inc. key.Please refer the detailed flow chart on the left.

When you are willing to alter the parameter value in the program, press Enter Start key to make it blink, then change the value with Dec./Inc. key. The value will be stored by press Enter Start key once.

This charger can accept three types of Lithium batteries: LiPo/Lilo/LiFe; you have to check the battery carefully and set it up correctly, or it will cause an explosion! (Please refer the table A)

This charge can recognize the cell count of Lithium battery automatically at the beginning of charge or discharge process to avoid from erroneous setting by user. But deeply discharged battery can be perceived incorrectly. To prevent the error, you can set the time term to verify the cell count by the processor. (See the screen A0)

Normally, 10minutes are enough to perceive it correctly. For the battery of larger capacity, you may reduce the term or use with the default value.

A1 A2 shows the trigger voltage for automatic charge termination of NiMH and NiCd battery(ΔV), the effective value ranges from 2 to 20mV per cell. If ΔV is set higher, there is a danger of overcharging the battery; if it is set lower, there is a possibility of premature of termination. Please refer technical specification of the battery. (NiCd: 12mV, NiMH: 7mV)

Tips: if the voltage of charging battery is lower than 2.5V, ΔV may can not be perceived, this will cause a danger of discharge. You can connect a temperature sensor or use the charger current above 1C to avoid it.

There is a 3-pin port on the left side of the unit. It can be used as a temperature sensor port or USB port, if the port is assigned as a temp.port, you can use an optional temperature probe to contact the surface of battery (see the screen A2) and you can set the maximum temperature at which the danger should allow battery to reach during charge, once a battery reaches this value the process will be terminated to protect the battery. When it is selected as an USB port, you can connect the charger to your PC with an optional USB cable. This can utilize the optional software that can show you the charge process at PC. (See the screen A4)

When NiMH or Nicd battery is on the cyclic process of charge/discharge, it can often become warm. The program insert a time delay to occur after each charge and discharge process to allow the battery adequate time to cool down before being subjected to the next process. (See the screen A5) the value ranges from 1 to 60 minutes. If you are not sure, you can set it over 10minutes.

The charger will automatically supply the trickle function to achieve the full charge with out overheating the battery fast charge has been terminated. You can alter the trickle value when the charger shows you the screen A6

When you start a charger process, the integral safety timer automatically starts running at the same time. This is programmed to prevent overcharge the battery. If it proves to be faulty ,or if the temination circuit cannot detect the battery full. A7 shows you this program can be on or off, and you can set the maximum safety time, the value ranges from 10 to 720min.As the same principle, there is maximum-capacity-limited function. See A8 , the value ranges from 10 to 20000mAh.

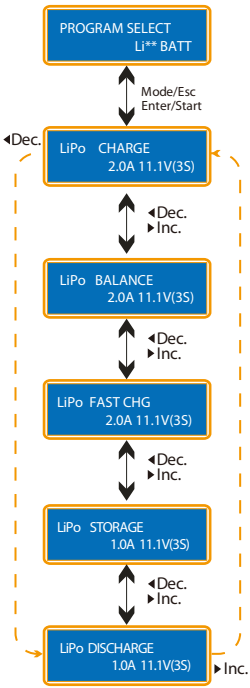
At the screen A9 you can set the audible sounds to be on or off by this program.

When you use the car battery to supply power for charger, screen A10 shows you this program monitors the voltage of input DC battery. If the voltage drops below the value you set the operation forcibly terminated to protect the input attery. You can adjust the brightness of LCD screen at the charger (see A11)

Please refer the information below (chart A), and select the correct parameter for each battery, or it will cause a serious result!

item \ types	Li-Po	Li-10	Li-Fe	NiMH	NiCD	Pb
Standard voltage (V/cell)	3.70	3.60	3.30	1.20	1.20	2.00
Max. Charge voltage cut off level (V/cell)	4.20	4.10	3.60	1.60	1.60	2.45
Allowable fast current	⩽1C	⩽1C	⩽4C	⩽2C	⩽2C	⩽0.4C
Min. Discharge voltage cut off level (V/cell)	⩾3.00	⩾3.00	⩾2.00	⩾1.00	⩾0.85	⩾1.75

▶ *Lithium batteries (Lilo/LiPo/LiFe) program*



Press Mode Esc key to the screen on the left, then press Enter Start key to enter into the parameter setting menu. You can switch at the same level menu by Dec./Inc. key. Please refer the detailed flow chart on the left. When you are willing to alter the parameter value in the program, press Enter Start key to make it blink, then change the value with Dec./Inc. Key. The value will be stored by pressing Enter Start key once, and then press Enter Start key for more than 2 seconds to start the process.

"AUTO charging" this is for individual Lithium battery or some special battery pack without balance port or cell count. The left side of the first line shows the type of battery you selected at the user setting. The right side of the first line shows you the mode of charge. The value on the left side of second line sets a charge current and the value on the right side of second line sets the cells count of the battery. The definition of the following screen is all the same.

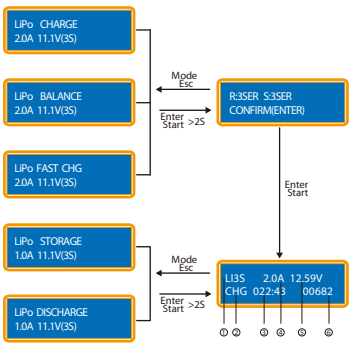
"Balance charging" this is for 2-6cells of Lithium battery with balance port, the battery pack being charged should have the individual cell connect, and connect it to the individual port at the right side of charger with a suitable connection cable that fits with your battery pack. (See picture B) In this mode, the charging process will be different from ordinary charging mode. The internal processor of the charger will monitor and control the voltage of each cell of the battery pack. This can improve the discharging performance of the battery! EV charger use the optimized calculation to control the tolerance in the range of +—0.01V!

"Fast charging" select this mode to finish charging process earlier. Principle: When the current down to 1/5 of the current you set during the CV term, it will stop the process and eliminate the forcible requirement of the balance precision. (Whether it is been connected to the balance port), the charging capacity may be a bit smaller than normal charging but the process time will be reduced.

"Storage mode" this is for charging or discharging Lithium battery not to be used for the time being. In order to reduce the wastage, you can select this mode to remain the power to 40% to store. The final voltage are different from the type of the battery, Lilo:3.75V、 liPo:3.85V、 LiFe:3.3V.This is an intellective program, if the voltage of battery at its initial stage is over the voltage level to storage, the program will start to discharge, and if it is lower, the program will start to charge automatically. In order to ensure each battery pack meets the demand, the individual plug of the battery pack should be connected to the individual port of charger.

"Discharge mode" theoretically, Lithium battery do not need to discharge, especially deep-discharge. This feature is to ensure the power wastage of the Lithium battery over 90%, to avoid the overcharge of the individual battery, you should connect the balance plug of the battery to the charger, and the current may not exceed 1C.

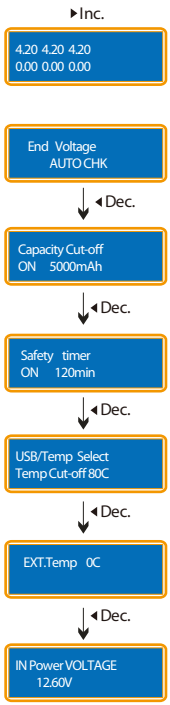
▶ ***Start to charge/discharge: after set up the mode menu correctly***, press Enter Start Key for more than 2 seconds to start the process.



This screen shows the number of cells you set up and the processor detects. "R" shows the number of cells selected by you at the previous menu. If both numbers are identical you can start charging by press Enter Start button. If not, press Mode Esc button to go back to previous menu, and then carefully check the number of cells of the battery pack to charge again. If you selected the AUTO mode or discharge mode, you can pass over this screen directly.

This screen shows the present situation during charge process.To stop charging press Mode Esc key once; As you can see in the sketch on left,①:for the cells count,②:for the operating mode, CHG=charging at auto mode、BAL=balance charging mode FAS=fast charging STO=storage mode Dsc=discharge mode;③:elapsed time, ④:charge/discharge current,⑤:charge/discharge voltage of battery,⑥:capacity of charge/discharge.

- According to press Dec./Inc. key you can inquire the indivi***dual voltage of each batteries and final voltage etc. continually as follow (this need to connect the balance plu***g):



You can check the individual voltages of each cell in the battery pack while using the individual connection cable to the battery.

The final voltage will be reached at the end of process.

You can inquire the safety capacity.

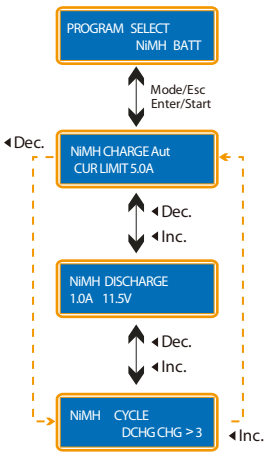
You can inquire the safety time.

You can use the 3-pin port as an USB port or inquire the safety temperature value.

It show you the external temperature when the temperature sensor is connected you can inquire

This shows the present voltage of input power

NiMH/NiCd battery program



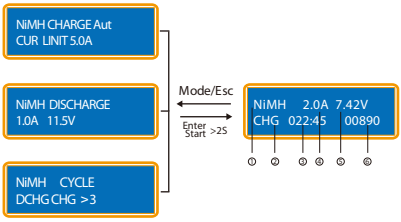
Press Mode Esc key to the screen on the left, and then press Enter start key to Enter start into the submenu. You can switch at the same level menu to select the mode by Dec./Inc. Key. Please refer the detailed flow chart on the left. When you are willing to alter the parameter value in the program, press Enter start key to make it blink, then change the value with Dec./Inc. key. The value will be stored by pressing Enter start key once. Then press Enter start key for more than 2 seconds to start the process. Since the menu of NiMH is the same as NiCd, there is an example of NiMH only.

"CHARGE" mode the default mode is "AUT". In "AUT" mode,you need to set the upper limit of charger current to avoid from higher feeding current that may damage the battery. Because some batteries of low impedance and small capacity can lead to the higher charge current by the processor at automatic charge mode. But in "Man" mode, it will charge the battery with the charge current you set at the display. Each mode can be switched by pressing start/enter key, when the current field is blinking, press Dec./Inc. key for more than 1 second.

"DISCHARGE" mode the discharge current ranges from 0,1A to 5.0A and the final voltage ranges from 0.1 to 5.0A and the final voltage ranges from 0.1 to 25.0V, the operating method similar as Lithium battery. The final voltage of NiMH battery is 1.0V/Cell, and the NiCd is 0.85V/cell, please refer the recommend by the battery of manufacturer.

"CYCLE" mode this charger can perform 1-5 cycles of DCHG>CHG or CHG>DCHG continually. You can select it for the new NI** battery or the long-term placement NI** battery. Please set up carefully or it will damage the battery! To set the parameter please follow the previous charge/discharge menu.

▸ ***After check all the mode, to start the process press*** Enter Start ***key*** for more than 2 seconds.



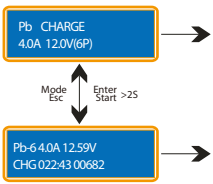
The screen displays the present state of process. To stop It press Mode Esc key;
Description: ①:the type of battery, ②:operating mode: CHG=charge、DSC=discharge DCHG>CHG or CHG>DCHG=the cycle mode; ③:elapsed time, ④:charge/discharge current of the battery, ⑤:voltage of the battery pack, ⑥:capacity of charge/discharge

You can inquire the temperature and ΔV continually by press Dec./Inc. Key

▸ ***Pb battery program***

This is programmed for charging Pb battery with nominal voltage from 2 to 24v, Pb battery can not be charged rapidly. They can only deliver relatively lower current compare to their capacity. The optimal charge current will be 1/10 of the capacity. Please always follow the instruction supplied by the manufacturer of battery.

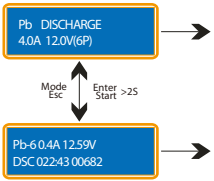
▸ ***charging Pb battery***



As you can see on left, you can set up the charge current on the left. The nominal of the second line and voltage of the battery on the right of the second line. The charge current ranges from 0.1-10.0A and the voltage should be matched with the battery being charged. Start the charge process by pressing Enter Start key for more than 2 seconds.

The screen displays the state of charging process. To stop charging forcibly, press Mode Esc key once.

discharging Pb battery



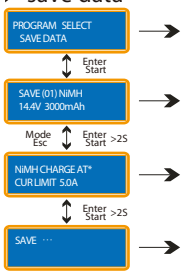
Set discharge current on the left and final voltage on the right, the discharge current ranges from 0.1-5.0A and the voltage should be matched with battery being discharged. Start the discharge process by pressing Enter Start key for more than 2 seconds.

The screen displays the current state of discharge.

save data and load data program

This charger can store /load up to 5 data of batteries, you can out the data for the process without setting up the program again.

save data



Press Mode Esc key to the screen on the left, then press Enter Start key to enter into the submenu.

The blinking (01) shows you the data No, you can press Dec./Inc. key to change it. Press Dec./Inc. key can select the type of battery, voltage, capacity, and you can set them by pressing Enter Start key, then press Enter Start key for more than 2 seconds to select the charge mode.

Setting up charge/discharge current and final voltage.

To save the data, press Enter Start key for more than 2 seconds.

load data

Press Mode Esc key to the screen on the left, and then press Enter Start key to enter the submenu.

You can press Dec./Inc. key to select the data number when the (01) field is blinking.

Press Enter Start key for more than 2 seconds, it will show you the left screen, loading the data.

Warning and error messages

REVERSE POLARITV →	The output is connected to a battery with incorrect polarity.
CONNECTION BREAK →	This will be displayed in case of detecting an interruption of the connection between battery and output or voluntarily disconnecting the charge lead during the operation of charge or discharge on output.
SHORT ERR →	There was a short-circuit at output. Please check the charging leads.
INPUT VOL ERR →	The voltage of input power drops below the limit.
VOL SELECT ERR →	The voltage of Lithium battery pack was selected incorrectly. Verify the voltage of battery pack carefully.
BREAK DOWN →	There happens the malfunction at the charger circuit by any reason.
BATTERY CHECK LOW VOLTAGE →	The processor detects the voltage is lower than you set at Lithium program. Please check the cell count of the battery pack.
BATTERY CHECK HIGH VOLTAGE →	The processor detects the voltage is higher than you set at Lithium program. Please check the cell count of the battery pack.

BATTERY VOLTAGE CELL LOW VOL →	The voltage of one of the cell in the Lithium battery pack is too low. Please check the voltage of the cell one by one.
BATTERY VOLTAGE CELL HIGH VOL →	The voltage of one of the cell in the Lithium battery pack is too high. Please check the voltage of the cell one by one.
BATTERY VOL ERR CELL CONNECT →	There is bad connection at the individual connector. Please check the connector and cables carefully.
TEMP OVER ERR →	The internal temperature of the unit goes too high. Cool down the unit.
CONTROL FAILURE →	The processor can not continue to control the feeding current by any reason. The unit needs to be repaired.

Safety message

Although the charger is designed to work in a stable environment to play a role, but in use, you still need careful maintenance, as long as these important tips to follow, that is easy and effective use of your charger.

- When you start the process, especially the discharge process, the unit will become warm, please keep clear of the heat area and do not cover it by anything when using.
- Do not keep it in a environment below 5℃ or above 50 ℃
- Use it carefully, do not use it in a wet or corrosive environment.
- Ensure that you charge away from flammable materials.
- The unit will be damaged if dropped, hit or has a heavy object placed on it.

- Do not charge above the required voltage recommended by battery brands.
- Ensure that you always select the correct type of battery type and capacity.
- The standard accessories can only support one battery pack. When you are willing to use multi-packs, please separately purchase the special accessories, never do a disassembly or alteration to the charger.
- Do not attempt to charge/discharge the non-recharged battery or damaged battery.
- Keep the charger away from children and pet at all time! Never leave the charger unsupervised when it is connected to its power supply. Always place cells in a Lipo sack when charging.

Waranty and Service

We guarantee this product to be free of manufacturing and assembly defects for a period of one year from the time of purchase. The warranty only applies to material or operational defects, which are present at t he time of purchase. During that period, we will repair or replace free of service charge for products deemed defective due to those causes.

You will be required to produce proof of purchase (invoice or receipt). This warranty is not valid for any damage or subsequent damage arising as a result of misuse, modification or as a result of failure to observe the procedures outlined in this manual.

This symbol means that you must dispose of electrical from the General household waste when it reaches the end of its useful life.

Take your charger to your local waste collection point or recycling centre.

This applies to all countries of the European Union, and to other European countries with a separate waste collection system.

Warning:

• Do not use input voltage AC 100-240V and DC 14V/16A simultaneously when charging or discharging

• Do not charge 2 or more groups of batteries simultaneously.

Both of these incorrect operating actions will short circuit the charger.

Etronix is an exclusive brand of CML Distribution, Saxon House,
Saxon Business Park, Hanbury Road, Bromsgrove, B60 4AD.
Web: www.etronix-rc.com e-mail: info@etronix-rc.com