

Operating Instructions

e-STATION BC8DX

Two identical and independent outputs with integrated balancer
 Charge current up to 9A, discharge current up to 5A, 1 to 8 series of Lilo/LiPo/LiFe, 1 to 22 cells of NiCd/NiMH, 2 to 28V of Lead-acid (Pb) at each output



● Special features

- Operating software

The operating program in this charger is executed with mutual links and communications with every components to prevent any possible error, so it introduces the maximum safety. Especially, the charging algorithm is so multifarious that you can select the best program to suit your requirement. And BC8DX has a large LCD for showing various informations including charge/discharge graphs during the process.

- High-power dual output circuit

BC8DX employs the circuit that features two totally independent but identical high-power outputs which are powered as much as 160watts each. As a result, it can charge or discharge up to 44 cells of NiCd/NiMH or 16 series of Lithium batteries simultaneously. Furthermore, the twin-fan cooling system is so efficient that can hold such a power without any trouble of running the circuit.

- Dual Individual voltage balancer for Lithium batteries

BC8DX has individual cell voltage balancers at both outputs. So it does not need any balancer separately when charging Lithium batteries (Lilo/LiPo/LiFe) for voltage balancing.

- Balance individual cells on discharge

BC8DX also can monitor and balance individual cells of the Lithium battery pack during the discharge process as well as 'FAST' and 'STORAGE' mode. If the voltage of any one cell varies abnormally, the process will be stopped with the error message.

- Accept various types of Lithium battery

BC8DX can accept three types of Lithium batteries - Lilo, LiPo and LiFe. They have different characteristics by their chemistry. You can select any one of them that you are going to process before the job. For their specifications, refer 'Warnings and safety notes' section.

- Maximum safety

Delta-peak sensitivity : The automatic charge termination program works on the principle of the Delta-peak voltage detection. (NiCd/NiMH)

Auto-charge current limit : When charging NiCd or NiMH at 'AUTO' current mode, you can set the upper limit of charge current to avoid from feeding high current to the battery. This is very useful when charging the low impedance and small capacity NiMH battery in 'AUTO' mode.

Capacity limit : The charging capacity always calculated by multiple of the charging current and time. If the charging capacity exceeds the limit the process will be terminated automatically when you set the maximum value.

Temperature limit : The temperature of the battery on charging or discharging will be raised by its internal chemical reaction. If you set the limit of temperature the process will be expired forcibly when the limit has been reached.

Processing time limit : You can also restrain the maximum processing time to prevent any possible defect.

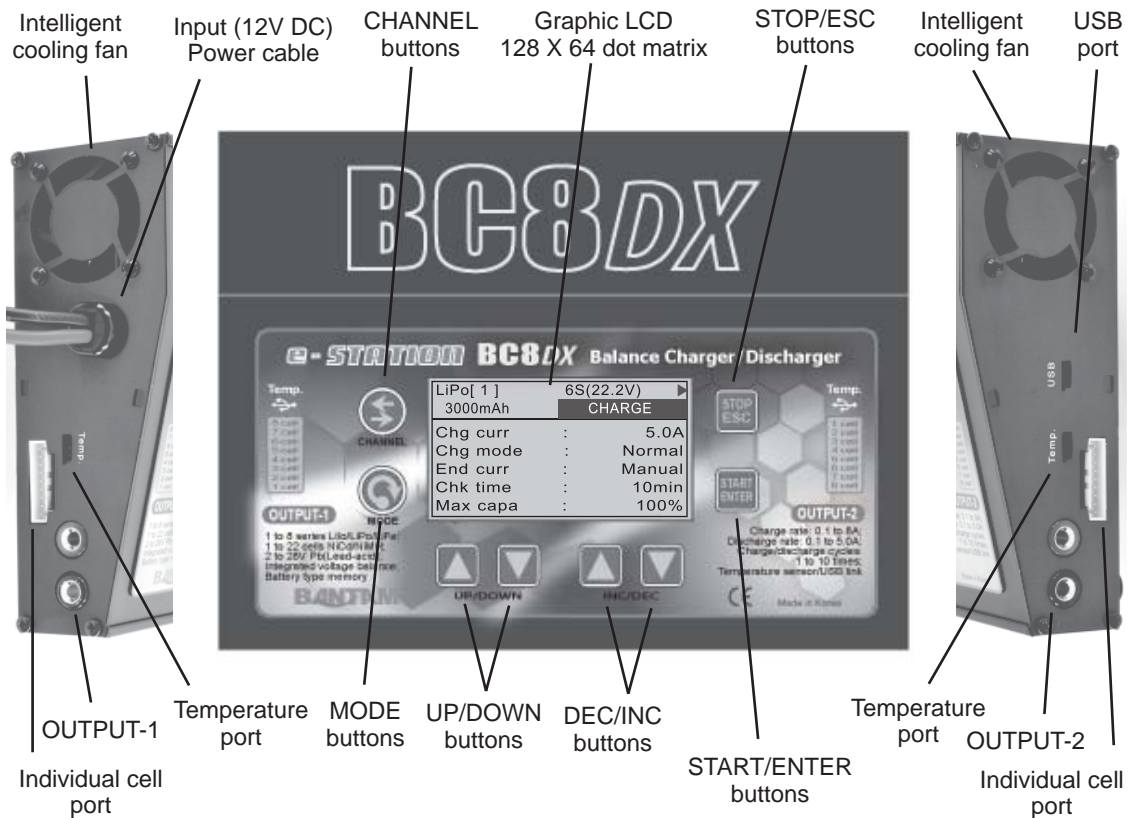
- Cyclic charging/discharging

Perform 1 to 10 cycles of charge>discharge or discharge>charge continually for battery refreshing and balancing at both outputs.

- PC based analysis using USB communication

For technical expert, BC8DX offers PC based program can analysis the characteristic of the battery via USB port. It shows a graph of voltage, current, capacity and temperature curves. It also shows the individual voltage of each cell in the Lithium battery pack. This program can run on both outputs with single USB link to PC.

● Exterior of the charger



- 'CHANNEL' button

Switches the screen display between output-1 and output-2. The user can see the values for each output separately when the process is running by pressing this button.

- 'MODE' button

Select the sub-programs in the program set-up screen.

- 'UP' and 'DOWN' buttons

Navigate the cursor through the main menus vertically, and scroll the program set-up screen.

- 'DEC' and 'INC' buttons

Decrease or increase the parameter value or enter the program mode. And also, they navigate the cursor through the main menu horizontally. Switch the process data screen between graph, informations and individual cell voltages during charging or discharging.

- 'START/ENTER' button

Commence the program by pressing this button at the program set-up screen.
Confirms the message.

- 'STOP/ESC' button

Suspend the program by pressing this button during the program is running.
Deletes the error message.
Returns to the previous screen.

● Warnings and safety notes

- Never leave the charge unsupervised when it is connected to its power supply. If any malfunction is observed, terminate the process immediately and refer to the operating instructions.
- Keep away the unit from dust, damp, rain, heat direct sunshine and vibration. Do not drop it.
- The circuit of the unit is designed to be powered by a 12V DC like car battery or similar DC power supply.
- The charger and the battery to charge or discharge should be set up on a head-resistant, non-inflammable and non-conductive surface. Never place them on a car seat, carpet or similar. Keep all the inflammable volatile materials well away from operating area.
- Be sure to understand the information of the battery to be charged or discharged accurately. If the program is set up incorrectly the battery can severely be damaged. Especially Lithium battery can cause a fire or an explosion by over-charging.

NiCd/NiMH voltage level: 1.2V/cell

allowable fast charge current: 1C ~ 2C depends on the performance of cell

discharge voltage cut off level: 0.85V/cell(NiCd), 1.0V/cell(NiMH)

Lilo voltage level: 3.6V/cell

max. charge voltage: 4.1V/cell

allowable fast charge current: 1C or less

min. discharge voltage cut off level: 2.5V/cell or higher

LiPo voltage level: 3.7V/cell

max. charge voltage: 4.2V/cell

allowable fast charge current: 1C or less

discharge voltage cut off level: 3.0V/cell or higher

LiFe voltage level: 3.3V/cell

max. charge voltage: 3.6V/cell

allowable fast charge current: 4C or less (e.g. A123M1)

discharge voltage cut off level: 2.0V/cell or higher

Pb voltage level: 2.0V/cell

(Lead-acid) max. charge voltage: 2.46V/cell

allowable fast charge current: 0.4C or less

discharge voltage cut off level: 1.75V/cell or higher

- To avoid short-circuits between the charge lead, always connect the charge cable to the unit first and only then to the battery to be charged or discharged. Reverse the sequence when disconnecting.
- Do not attempt to charge or discharge the following types of battery.
 - Battery pack, which consists of different types of cell (including different manufacturers).
 - Battery, which is already fully charged or just slightly discharged.
 - Non-rechargeable batteries (Explosion hazard).
 - Batteries that require a different charge technique from NiCd, NiMH, Lilo, LiPo, LiFe or Pb.
 - Faulty or damaged battery.
 - Battery fitted with an integral charge circuit or a protection circuit.
 - Batteries installed in a device, or which are electrically linked to other components.
 - Batteries that are not expressly stated by the manufacturer to be suitable for the currents the charger delivers during the charge process.

- Please bear in mind of checking the following point before charge operation.
 - Did you select the appropriate program, which are suitable for the type of battery?
 - Did you set up adequate current for charging or discharging?
 - Lithium battery pack can be composed with parallel and series circuits mixed. You have to check the composition of the battery pack carefully before charging.
 - Are all connections firm and safe, or is there an intermittent contact at any point in the circuit?

- **Charging**

A specific quantity of electrical energy is fed into the battery during charge process. The charge quantity is calculated by multiplying charge current by charge time. The maximum permissible charge current varies according to the battery type or its performance, and can be found in the information provided by the battery manufacturer. It is only allowed to charge batteries at rates higher than the standard charge current if they are expressly stated to be capable of quick-charge.

- Connect the battery to charge to output terminal of the charger using suitable charge lead. They are red, positive(+) and black, negative(-). Since the charger may not detect the difference between the internal resistance of the battery pack, cable resistance and connectors transfer resistance, the first requirement, if the charger to work properly is that the charge lead should be of adequate conductor cross-section. And also high-quality connectors (normally gold-contact type) must be fitted to both ends.

- Refer to the information provided by the battery manufacturer regarding charging methods, and verify the recommended charge current and charge time. Especially for Lithium batteries, you have to follow the charge instruction provided by the manufacturer strictly.

- Do not attempt to disassemble the battery pack arbitrarily.

- You have to pay attention to verify the capacity and the voltage of the Lithium battery pack. It may be composed of parallel and series connection mixed. In parallel link the capacity of the battery pack is multiplied by the number of cells but the voltage remains same. That kind of voltage imbalance causes a fire or explosion during charge process. We recommend you compose the Lithium battery pack in series only.

- **Discharging**

The typical purpose of discharge is to determine the residual capacity of the battery, or to lower the voltage of battery to a defined level. When you discharge the battery you also have to pay attention on the process same as charging. To avoid the battery becoming deep-discharged, set the final discharge voltage correctly. Lithium batteries should not be deep-discharged to lower than the minimum voltage, as this leads to a rapid loss of capacity or a total failure. Generally, you do not need to discharge Lithium battery voluntarily.

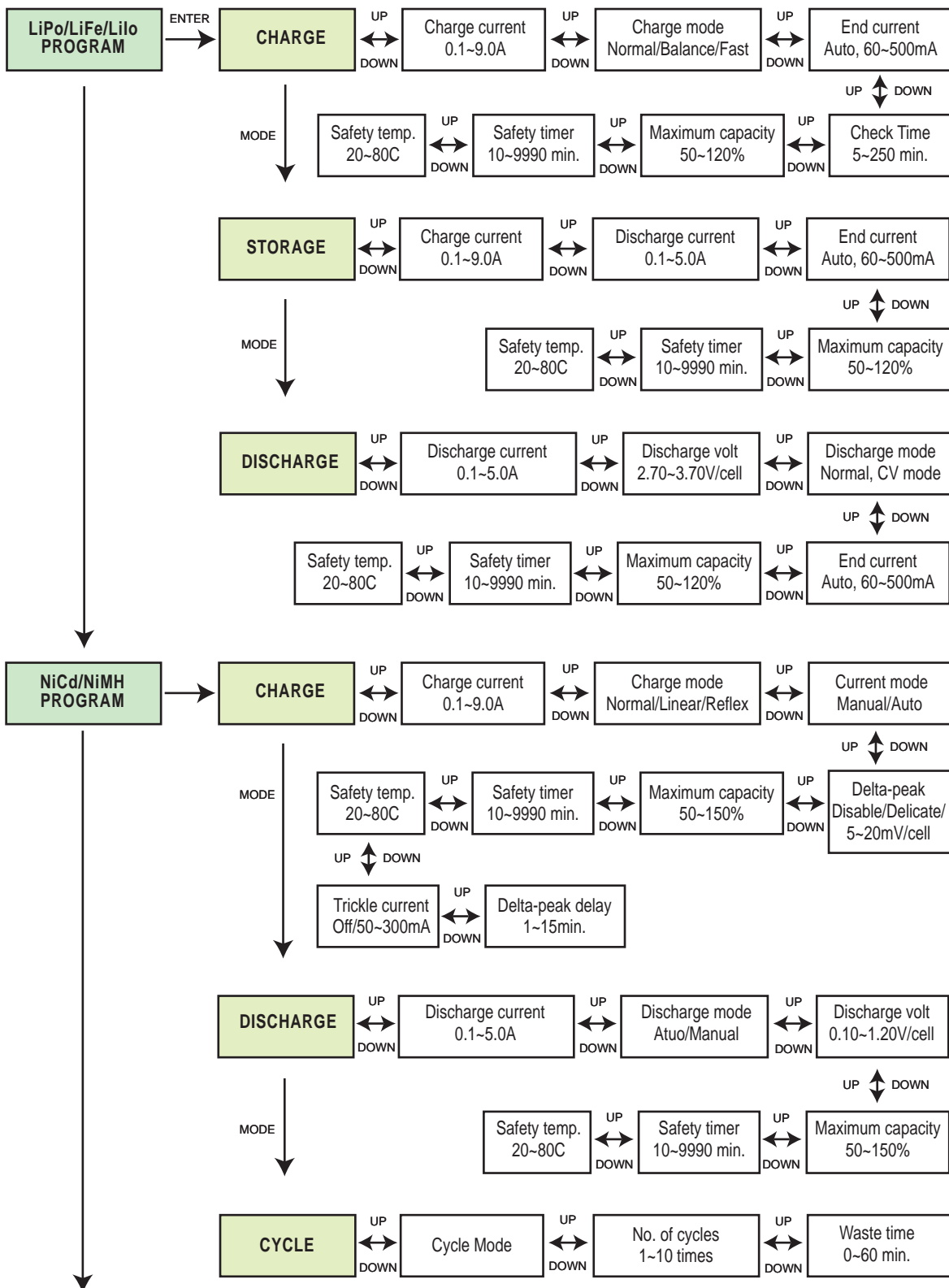
- Some rechargeable batteries are said to have a memory effect. If they are partly used and recharged before the whole charge is drawn out, they 'remember' this and next time will only use that part of their capacity. This is a 'memory effect'. NiCd and NiMH batteries are said to suffer from memory effect. They prefer complete cycles; fully charge then use until empty, do not recharge before storage - allow them to self-discharge during storage. NiMH batteries have less memory effect than NiCd.

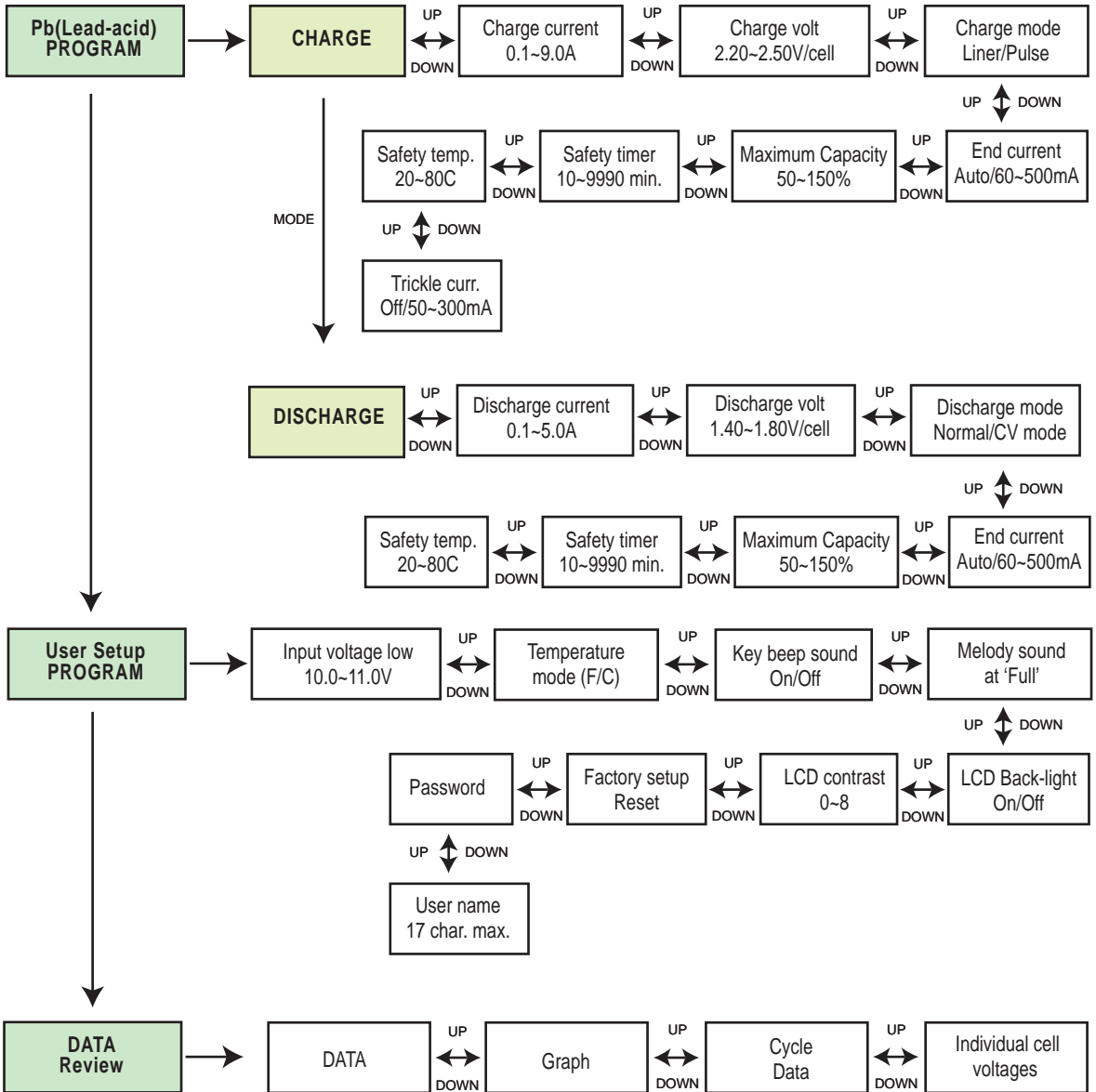
- The Lithium battery prefers a partial rather than a full discharge. Frequent full discharges should be avoided if possible. Instead, charge the battery more often or use a larger battery.

- The brand-new NiCd battery pack is partially useful with its capacity until it has been subjected to 10 or more charge cycles in any case. The cyclic process of charge and discharge will lead to optimize the capacity of battery pack.

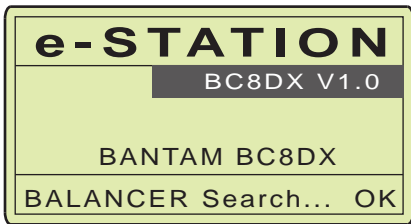
⚠ Those warnings and safety notes are particularly important. Please follow the instructions for a maximum safety; otherwise the charger and the battery can be damaged violently. And also it can cause a fire to injure a human body or to lose the property.

● Program flow chart





● The first display



When you connect the crocodile clips which attached to the charger as an input power cable to a suitable 12V power source, the start-up display appears. The charger will carry out self-test on balancer circuit instantly, and will show 'OK' on success at right bottom corner. Thus the power-on process has been completed. If it fails to test the balancer circuit, balance function for Lixx batteries can not work, but other programs are fine to work. Even the case, the charger needs

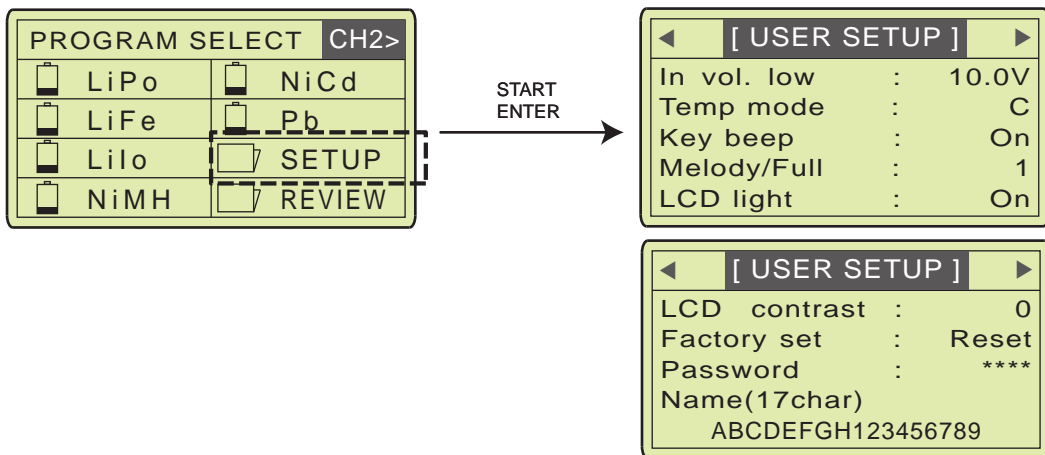
to be repaired. The display shows the brand name, device name and firmware version as well as the user's name. The default display for user's name is 'BANTAM BC8DX', but you can revise it by your name at 'SETUP' program.

Press 'START/ENTER' button to go for the main menu display.

● Initial parameter set up

BC8DX will be operated with the default values of the initial settings which were done at the factory, when it is connected to a 12V DC battery or any similar input power source for the first time. The user can set these values at his/her own requirements. These setup data will be commonly applied to both output channels.

Select  SETUP using 'UP/DOWN' or 'INC/DEC' buttons, and press 'START/ENTER'.



To manipulate the cursor, you can use 'UP/DOWN' or 'INC/DEC' buttons at 'PROGRAM SELECT' screen. And you can use 'UP/DOWN' button to move the cursor in vertical direction and use 'INC/DEC' buttons in horizontal direction. By pressing 'STOP/ESC' button, the screen goes to previous menu at any time.

- **In Vol. Low** : This program monitors the voltage of input battery. If the voltage drops below the value you set the operation forcibly terminated to protect the input battery. (10.0 ~ 11.0V)

- **Temp. Mode** : Choice of temperature mode. (C, Celcius or F, Fahrenheit)

- **Key Beep** : The beep sounds at every time pressing the buttons to confirm your action.

- **Melody/Full** : Select the melody sound at the time when the process is finished. These audible sounds can be on or off.

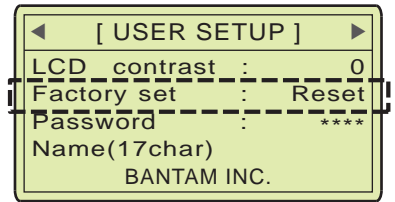
- **LCD Light** : LCD back-light can be on and off.

- **LCD Contrast** : You can adjust the brightness of LCD screen, when 'Light' is on.

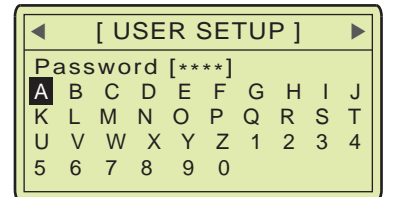
- **Factory setup** : Restore all values to the default which was done at our factory. To do this, you need to enter the password. The way of entering the password is described on 'Password' mode at next step. When you perform this program successfully, all the data will return to their default values including the password('0000'). It will take several seconds to initialize the data.

- **Password** : You can set your own 4-digit password. It has been set on '0000'-all zeros, at the factory. Or, you can change the password to new one. When you press 'INC' or 'DEC' button at this step, there will be shown all the available letters. The password can be any combination of 4-digits within those alphanumeric. Locate the black mark to the desired character using 'INC' or 'DEC' buttons, and press 'ENTER' to input. To move the cursor backward or forward, use 'UP' or 'DOWN' button. First, input old password, then type new password.

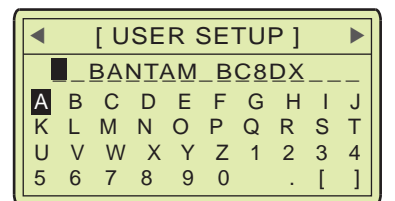
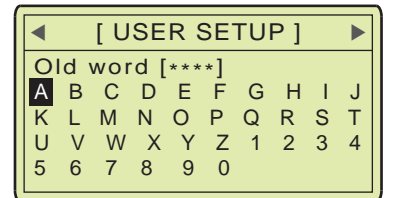
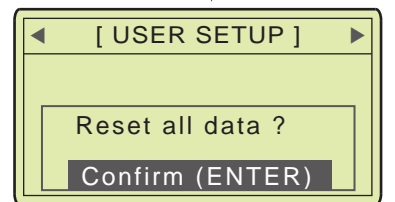
- **Name** : The charger shows the user name at the first screen at power-on. You can set your name of maximum 17 alpha-numeric characters. When you enter the mode by pressing 'INC' or 'DEC' button, the charger will ask the password, and you need to input the password to change the name. The user name can be entered using exactly the same procedure as described on 'Password' mode.



START
ENTER

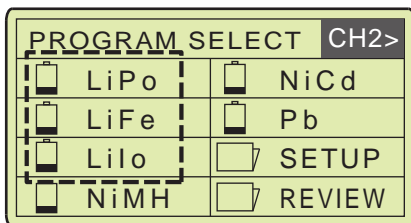


START
ENTER



! If you forgot the password, you can not reset the charger to factory default, and also you can not amend the user name again. The charger should be returned to our factory to revive the password.

● Lithium battery (Lilo/LiPo/LiFe) program

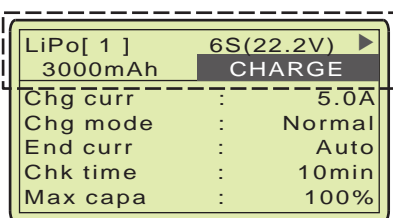


These programs are only suitable for charging and discharging Lithium batteries with a nominal voltage of 3.3V, 3.6V or 3.7V per cell. These batteries need to adopt different charge technique is termed constant voltage(CV) and constant current (CC) method. The charge current varies according to the battery capacity and performance. The final voltage of charge process is also very important, it should be precisely matched with the charged voltage of the battery. They are 4.2V for LiPo, 4.1V for Lilo and

3.6V for LiFe. The charge current and nominal voltage as for cell-count set on the charge program must always be matched with the battery being charged.

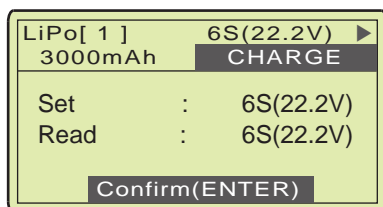
Select the output channel that the program will be performed by pressing 'CHANNEL' button. Then, select one of the program which suits the type of battery being processed using 'UP/DOWN' button and press 'START/ENTER' button to enter the program.

Charging Lithium battery (Lilo/LiPo/LiFe)

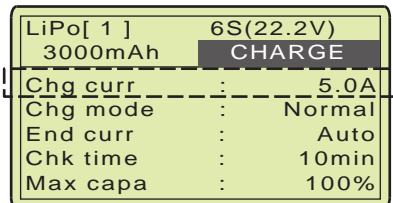


You can choose a sub-program to be performed by pressing 'MODE' button, there are 'CHARGE', 'DISCHARGE' and 'STORAGE' programs. And then select the data number which will newly set up, or load the data number already set up for re-use using 'INC' or 'DEC' buttons. If you have the set-up data which had been performed successfully before, you can just start the process after loading the data number. All setup data will be stored at charger's memory automatically after setting them all. Input the cell-count and capacity of the battery will be charged. The cell-count and capacity need to be matched with the battery. Use 'UP/DOWN' buttons to scroll up and down the menu, and change the value using 'INC/DEC' buttons when the pertinent field is blinking.

To start the process, press and hold 'START/ENTER' button for more than 3 seconds regardless of cursor position.



This shows the number of cells you set up and the charger detects. 'Read' shows the cell-count found by the charger and 'Set' is the number of cells selected by you at the previous screen. If both numbers are identical you can start charging by press 'START/ENTER' button. If not, press 'STOP/ESC' button to go back to previous screen. Then carefully check the number of cells of the battery pack again.



- **Charge current** : Set the charge current. (0.1 ~ 9.0A)

LiPo[1]	6S(22.2V)
3000mAh	CHARGE
Chg curr	: 5.0A
Chg mode	: Normal
End curr	: Auto
Chk time	: 10min
Max capa	: 100%

- **Chg. mode (Charge mode)** : You can select a method of charging, they are Normal, Balance, FAST.

Balance mode; This is for equalizing the individual voltages of battery pack. The battery pack should have the individual cell connector. Connect it to the individual port at the charger with a suitable connection cable or adaptor that fits with the type of connector of your battery pack. And also, you should to connect the battery output plug to the output of charger. The internal processor of the charger will monitor the voltages of each cell and controls the charging current to equalize the voltage.

FAST mode; To charge the battery earlier, this program eliminates certain term of CV range. Actually, the charging current will go to 1/5 of initial value gradually at the end of process, while the normal charging goes to 1/10 at the end of CV term. The charging capacity may be bit smaller than normal charging but the charging time can be reduced.

LiPo[1]	6S(22.2V)
3000mAh	CHARGE
Chg curr	: 5.0A
Chg mode	: Normal
End curr	: Auto
Chk time	: 10min
Max capa	: 100%

- **End curr. (End current)** : Set the final charging current at termination. **The end current should be less than the initial charge current.**

Auto; The process will be terminated when the charging current go to 1/10 of its initial value. Otherwise, the charge current will be decreased until the designated value has been reached. (Auto, 60~500mA)

LiPo[1]	6S(22.2V)
3000mAh	CHARGE
Chg curr	: 5.0A
Chg mode	: Normal
End curr	: Auto
Chk time	: 10min
Max capa	: 100%

- **Chk. time (Check time)** : BC8DX recognizes the cell-count of Lithium battery automatically and shows the counts at the beginning of charge or discharge process to avoid from erroneous input by user. But the battery which has been discharged deeply can be perceived the cell-count incorrectly. The charger will work on the cell-count anyway during the check time. But if the charger finds the wrong cell-count at the end of check time, the process will be terminated with an error message. To prevent the error, you can set the time term to verify the cell-count by the charger. Normally, 10 minutes are enough to perceive the cell-count correctly. For the battery of larger capacity, you may extend the time term. (5 ~ 250 min.)

! It is very important to know the exact type of battery to be charged, nominal voltage and capacity. Not to know these facts is the reason why batteries are damaged and improperly cared for. Read the battery's label and instruction sheet carefully, or consult the battery supplier to get those facts.

! For balance mode charge, BANTAM supplies some balance adaptors for various brands of Lixx batteries in the market. The balance adaptor should be acceptable at this charger.
 The suitable adaptors for single battery pack are;
 Part no. EAC133: PolyQuest type, EAC134: Align type, EAC138: Kokam/Graupner type and EAC139: FlightPower/ThunderPower type.
 The suitable adaptors for balancing multiple battery packs are;
 Part no. EAC153: PolyQuest type, EAC154: Align type, EAC158: Kokam/Graupner type and EAC159: FlightPower/ThunderPower type.

'STORAGE' program for Lithium battery

This is for Lithium battery not to be used for long time. The program will determine to charge or discharge the battery to a certain voltage depending on the voltage of the battery at its initial stage. The final voltage are different from type of batteries, 3.75V for Lilo, 3.85V for LiPo and 3.3V for LiFe per cell. If the voltage of battery at its initial stage is over the voltage level to storage, the program will start to discharge.

LiPo[1]	6S(22.2V)	▶
3000mAh	STORAGE	
Chg curr	:	5.0A
Dchg curr	:	3.0A
End curr	:	Auto
Max capa	:	100%
Safety time	:	720min

LiPo[1]	6S(22.2V)	▶
3000mAh	STORAGE	
Dchg curr	:	3.0A
End curr	:	Auto
Max capa	:	100%
Safety time	:	720min
Safety temp	:	50C

- **Chg. curr. (Charge current)** : Set the charge current. (0.1 ~ 9.0A)
- **Dchg. curr. (Discharge current)** : Set the discharge current for the case of discharging. (0.1 ~ 5.0A)
- **End curr. (End current)** : Set the final charging current at termination. (Auto, 60~500mA)

Discharging Lithium battery

LiPo[1]	6S(22.2V)	▶
3000mAh	DISCHARGE	
Dchg curr	:	5.0A
Dchg volt	:	2.70V/C
Dchg mode	:	Normal
End curr	:	Not use
Max capa	:	100%

LiPo[1]	6S(22.2V)	▶
3000mAh	DISCHARGE	
Dchg mode	:	Normal
End curr	:	Not use
Max capa	:	100%
Safety time	:	720min
Safety temp	:	50C

- **Dchg. curr. (Discharge current)** : Set the discharge current. The value may not exceed 1C for a maximum safety. and (0.1 ~ 5.0A)
- **Dchg. volt (Discharge volt)** : Set the final voltage per cell. The final voltage should not be under the voltage level that is recommended by the battery manufacturer to avoid deep discharging. The default is 2.70V/cell. (2.70~3.70V/cell)
- **Dchg. mode (Discharge mode)** : Set the discharge mode.
 - Normal; The charger will keep on discharging with the discharge current continuously until the discharge voltage has been reached.
 - CV mode; The discharging current will start to be decreased gradually until the end current which will be set up at next has been reached, when the voltage has been dropped to the final discharge voltage. For maximum discharge, use this mode.
- **End curr. (End current)** : Set the final discharging current at termination. **The end current should be less than the initial discharge current.**
 - Auto; The process will be terminated when the discharge current go to 1/10 of its initial value. Otherwise, the discharge current will be decreased until the designated value has been reached. (Auto, 60~500mA)

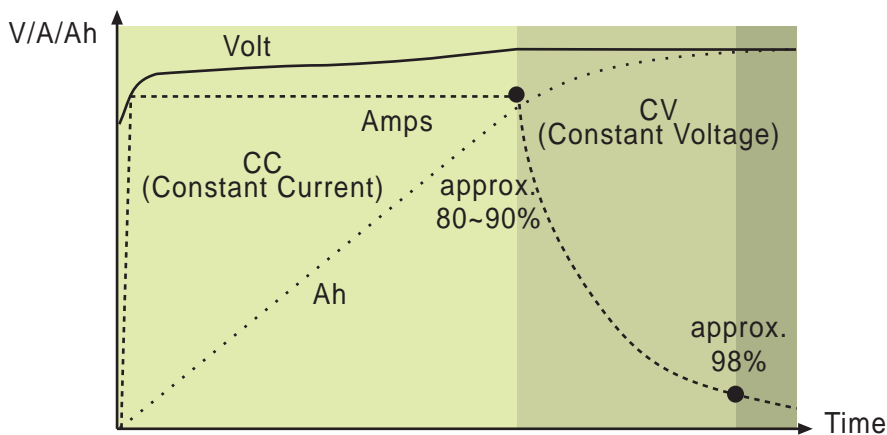
Safety programs for all types of battery

- **Max. capa. (Maximum capacity)** : You can define the maximum capacity which can be charged or discharged by the form of a percentage of battery capacity set in the top of display. If full-charge has not been detected for any reason, the charger limits the quantity of feeding energy by the value and terminates the process as on the value is reached. If the battery manufacturer recommends to apply a partial charge to battery before long-term storage, you can use this function also. This is a safety feature programmed to protect the battery from over-charging or deep-discharging condition. (50 ~ 120%)

- **Safety timer** : When you start a charge process, the integral safety timer automatically starts running. This is programmed to prevent over-charging or deep-discharging the battery, if the charger or battery is proved to be fault. Or, if the termination circuit cannot detect the full-charging. The value for the safety timer should be generous enough to allow the full-charging. (10 ~ 1380 min.)

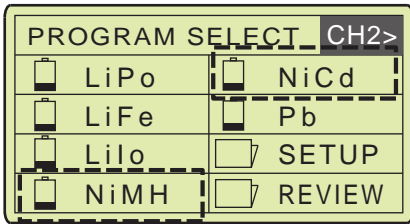
- **Safety temp. (Safety temperature)** : This is a feature using temperature probe contacting the surface of battery. The charger can monitor the temperature of battery being charged or discharged. Monitoring the battery temperature can result in the most accurate full charges in addition to its voltage. The recommended maximum values are 45~55C(113~130F) for NiCd, 43~52C(110~125F) for NiMH and 32~35C(90~95F) for Lixx. Once the battery reaches this temperature during the process, the program will be terminated to protect the battery. If the battery reaches the temperature during discharge, the discharge process will temporarily pause to allow the battery to cool down to a safe temperature. The discharge process will automatically resume when the battery's temperature drops about 4°C below the maximum temperature setting. Set the maximum temperature at which the charger should allow the battery to reach during charge or discharge process. (20 ~ 80C)

CC/CV charging process for Lixx and Pb(Lead-acid)



These batteries need to adopt different charge technique which is termed constant current(CC) and constant voltage(CV) method. As the process starts, the CC phase will be committed first, in which the charging current is maintained at a constant level until the battery reaches their final charge voltage. And then, the CV phase will be initiated, in which the voltage is maintained at a constant level. At this point the battery already has been charged about 80~90% full. The charging current will start to decrease until it reached its 1/10 of starting amount. When the charging current reaches 1/10 of initial amount, the charger will stop the charging process. The battery is virtually fully charged at this point.

● NiMH/NiCd battery program

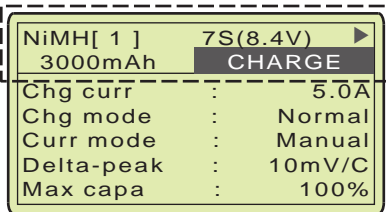


These programs are for charging or discharging NiMH (Nickel-Metal-Hydride) or NiCd (Nickel-Cadmium) battery commonly used for R/C model applications. The charge current varies according to the battery capacity and performance. The type of battery which is either NiMH or NiCd must be correct for the battery being charged.

Select the output channel that the program will be performed by pressing 'CHANNEL' button, and select 'NiCd' or 'NiMH'

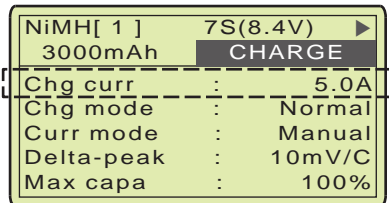
which suits the type of battery being processed using UP/DOWN' button. Press 'START/ENTER' button to enter the program.

Charging NiCd/NiMH battery



You can choose a sub-program to be performed by pressing 'MODE' button, there are 'CHARGE', 'DISCHARGE' and 'CYCLE' programs. And then select the data number which will newly set up, or load the data number already set up for re-use using 'INC' or 'DEC' buttons. If you have the set-up data which had been performed successfully before, you can just start the process. All setup data will be stored at charger's memory automatically. Input the cell-count and capacity of the battery will be charged. The cell-count and capacity need to be matched with the battery. Use 'UP/DOWN' buttons to scroll up and down the menu, and change the value using 'INC/DEC' buttons when the pertinent field is blinking.

To start the process, press and hold 'START/ENTER' button for more than 3 seconds.



- **Chg. curr. (Charge current)** : Set the charge current. (0.1 ~ 9.0A)

- **Chg. mode (Charge mode)** : Set the charge mode which the charger will work with.

Normal; The charger will work with the parameters which were set at the screen. The feeding current will be zero at every 90 seconds to have 6 seconds of waste-time for higher charging efficiency.

Linear; The charging current will be fed continuously without hesitating. The battery is charged with pure 'Direct-Current'.

Reflex; The battery will be charged using the pulsed current which is very brief and high-rate discharge pulses. This will help to prevent from undesired side effect like 'memory effect'. When you select this mode, you need to set the partial capacity percent which will be charged with pulsed current. After set the percent using 'INC' or 'DEC' buttons, press 'ESC' to exit. The charger will work with 'Reflex' mode only until the capacity has been charged to the percent. After that, the charger will work at 'Normal mode'

NiMH[1]	7S(8.4V)	▶
3000mAh	CHARGE	
Chg curr	:	5.0A
Chg mode	:	Normal
Curr mode	:	Manual
Delta-peak	:	10mV/C
Max capa	:	100%

- **Curr. mode (Current mode)** : Set the charge current mode.

Manual: The charger will feed the charge current set at 'Chg. curr.' for whole process.

Auto: The optimum charge current will be set by the charger automatically. The charge current set at 'Chg. curr.' will be upper limit of charge current.

NiMH[1]	7S(8.4V)	▶
3000mAh	CHARGE	
Chg curr	:	5.0A
Chg mode	:	Normal
Curr mode	:	Manual
Delta-peak	:	10mV/C
Max capa	:	100%

- **Delta-peak (Delta-peak voltage sensitivity)** : Set the Delta-peak voltage sensitivity at termination. (Disable, Delicate, Default, 5~20mV/cell)

Disable: The charger would not detect Delta-peak voltage for termination. To terminate charging process, the charger will check the parameters set up at other safety parameters like max. capacity, safety timer or safety temperature. If any one has been reached at its limit, the charging process will be terminated. (for NiMH only)

Delicate: The charger will detect a very small variation at delta-peak voltage. Some NiMH batteries which shows small voltage-drop at peak need to be use this option.

Default: If you do not know much about this function, or for ordinary batteries, select this mode. 15mV/cell for NiCd or 10mV/cell for NiMH will be used.

NiMH[1]	7S(8.4V)	▶
3000mAh	CHARGE	
Delta-peak	:	10mV/C
Max capa	:	100%
Safety timer	:	720min
Safety temp	:	50C
Trickle curr	:	100mA

- **Trickle curr. (Trickle charge current)** : Activate or deactivate the trickle charge after the termination of process. (Off, 50 ~ 300mA)

NiMH[1]	7S(8.4V)	▶
3000mAh	CHARGE	
Max capa	:	100%
Safety timer	:	720min
Safety temp	:	50C
Trickle curr	:	100mA
Peak delay	:	5min.

- **Peak delay** : This restrains the delta-peak voltage detection until the time is reached after starting the process. This prevents a premature cut-off from the battery of high internal resistance. The default value is one minute. (1 ~ 15 minutes)

Discharging NiCd/NiMH battery

NiMH[1]	7S(8.4V)	▶
3000mAh	DISCHARGE	
Dchg curr	:	5.0A
Dchg mode	:	Normal
Dchg volt	:	Default
Max capa	:	100%
Safety timer	:	720min

NiMH[1]	7S(8.4V)	▶
3000mAh	DISCHARGE	
Dchg mode	:	Normal
Dchg volt	:	Default
Max capa	:	100%
Safety timer	:	720min
Safety temp	:	50C

- **Dchg. curr. (Discharge current)** : Set the discharge current. (0.1 ~ 5.0A)
- Dchg. mode (Discharge mode) : Set the discharge mode which the charger will work with.
Manual: The charger will stop discharging at the time when the voltage drops to the final voltage set at next parameter-'Dchg volt'.
Auto: The process will be finished, when the voltage drops to 0.90V per cell.
- **Dchg. volt (Discharge volt)** : Set the final voltage which the battery will reach at the end of discharge. The default value is 0.90V/cell. (0.1 ~ 1.2V/cell)

Charge-to-discharge & discharge-to-charge cycles NiMH/NiCd battery

You can use this function for balancing, refreshing and break-in the battery. All of charging and discharging parameters will be adopted from the values of 'CHARGE' and 'DISCHARGE' programs.

NiMH[1]	7S(8.4V)	▶
3000mAh	CYCLE	
Cycle mode	:	CHG>DCHG
No. cycles	:	2T
Waste time	:	10min

- **Cycle mode** : Set the sequence of performing program.
 CHG>DCHG; The charger starts with charging process, after the battery will be discharged again.
 DCHG>CHG; It starts with discharging process, after which the battery will be charged again.
- **No. cycles** : The number of cycles in the process. (1~10 times)

- **Waste time** : To avoid the battery from rising temperature caused by the internal chemical reactions, there should be a brief cool-off time between cycles. (0~60 minutes)

⚠ Cautions for NiMH batteries

- Do not allow NiMH batteries to over-heat. Using the battery cooler will prevent over-heating at charge and discharge.
- Small size batteries like 'AAA', 'AA' and 'A' can safely be full charged at currents up to 1.0C. Higher charge current can easily over-heat batteries and thus damage batteries.
- NiMH batteries have higher self-discharge rate compare to NiCd, so it is necessary to recharge the battery immediately prior to use.
- Store NiMH batteries with some voltages remaining.

● Pb (lead-sulphuric acid) battery program

PROGRAM SELECT CH2>	
LiPo	NiCd
LiFe	Pb
LiIo	SETUP
NiMH	REVIEW

This is programmed for charging Pb (lead-acid) battery with nominal voltage from 2 to 28V. Pb batteries are totally different from NiCd or NiMH batteries, but very similar with Lithium batteries. They can only deliver relatively lower current compare to their capacity, and similar restrictions definitely apply to charge. So the optimal charge current will be 1/10 of the capacity. Pb batteries must not be charged rapidly.

Always follow the instruction which was supplied by the battery manufacturer.

Select the output channel that the program will be performed by pressing 'CHANNEL' button and select 'Pb' program using UP/DOWN' button. Press 'START/ENTER' button to enter the program.

Charging Pb battery

Pb[1]	6S(12.0V)
12000mAh	CHARGE
Chg curr	: 5.0A
Chg volt	: Default
Chg mode	: Linear
End curr	: Auto
Max capa	: 100%

You can choose a sub-program to be performed by pressing 'MODE' button, there are 'CHARGE' and 'DISCHARGE' programs. And then select the data number will newly set up or load the data already set up for re-use using 'INC' or 'DEC' buttons. If you have the set-up data which had been performed successfully before, you can just start the process. Set the cell-count and capacity of the battery will be charged. The cell-count (or, voltage) and capacity need to be identical with the battery. Use 'UP/DOWN' buttons to scroll up and down the menu, and change the value using 'INC/DEC' buttons when the pertinent field is blinking.

To start the process, press and hold 'START/ENTER' button for more than 3 seconds.

Pb[1]	6S(12.0V)
12000mAh	CHARGE
Chg curr	: 5.0A
Chg volt	: Default
Chg mode	: Linear
End curr	: Auto
Max capa	: 100%

- **Chg. curr. (Charge current)** : Set the charge current. (0.1 ~ 9.0A)

Pb[1]	6S(12.0V)
12000mAh	CHARGE
Chg curr	: 5.0A
Chg volt	: Default
Chg mode	: Linear
End curr	: Auto
Max capa	: 100%

- **Chg. volt (Charge volt)** : Set the final charge voltage per cell. The charger will charge the battery until the voltage has been reached. The default values is 2.45V/cell. (2.20~2.50V/cell)

Pb[1]	6S(12.0V)
12000mAh	CHARGE
Chg curr	: 5.0A
Chg volt	: Default
Chg mode	: Linear
End curr	: Auto
Max capa	: 100%

- **Chg. mode (Charge mode)** : Set the charge mode which the charger will work with.

Linear; The charging current will be fed continuously without hesitating. The battery is charged with pure 'Direct-Current'.

Pulse; The charger will work with the parameters which were set at the screen. The feeding current will be zero at every 30 seconds to have 3 seconds of waste-time for higher charging efficiency.

Pb[1]	6S(12.0V)	▶
12000mAh	CHARGE	
Chg curr	:	5.0A
Chg volt	:	Default
Chg mode	:	Linear
End curr	:	Auto
Max capa	:	100%

- **End curr. (End current)** : Set the final charging current at termination.

Auto; The process will be terminated when the charging current go to 1/10 of its initial value. Otherwise, the charge current will be decreased until the input value has been reached. (Auto, 60~500mA)

Pb[1]	6S(12.0V)	▶
12000mAh	CHARGE	
End curr	:	Auto
Max capa	:	100%
Safety timer	:	720min
Safety temp	:	50C
Trickle curr	:	100mA

- **Tickle curr. (Trickle charge current)** : Activate or deactivate the trickle charge after the termination of process. (Off, 50 ~ 300mA)

Discharging Pb battery

Pb[1]	6S(12.0V)	▶
12000mAh	DISCHARGE	
Dchg curr	:	5.0A
Dchg volt	:	Default
Dchg mode	:	Normal
End curr	:	Not use
Max capa	:	100%

Pb[1]	6S(12.0V)	▶
12000mAh	DISCHARGE	
Dchg mode	:	Normal
End curr	:	Auto
Max capa	:	100%
Safety timer	:	720min
Safety temp	:	50C

- **Dchg. curr. (Discharge ent)** : Set the discharge current. (0.1 ~ 5.0A)

- **Dchg. Volt (Discharge volt)** : Set the final voltage per cell. The final voltage should not be under the voltage level that is recommended by the battery manufacturer to avoid deep discharging. (Default, 1.40~1.80V/cell)

- **Dchg. mode (Discharge mode)** : Set the discharge mode.

Normal; The charger will keep on discharging with the discharge current continuously until the discharge voltage has been reached.

CV mode; The discharging current will start to be decreased gradually until the end current which will be set up at next has been reached, when the voltage has been dropped to the final discharge voltage.

- **End curr. (End current)** : Set the final discharging current at termination. **The end current should be less than the initial discharge current.**

Auto; The process will be terminated when the discharge current go to 1/10 of its initial value. Otherwise, the discharge current will be decreased until the designated value has been reached. (Auto, 60~500mA)

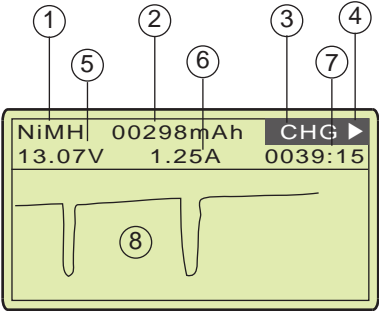
Using both OUTPUT-1 and OUTPUT-2

To activate opposite output channel during the process is running on an output, just press 'CHANNEL' button. The main menu screen or the program set-up screen will be shown for new output. Even the screen switch to new display, the process keeps on running at the other output. Connect the battery to new output channel, and select or set up suitable program by following the instruction. After finishing the setup, press 'START/ENTER' button for more than 3 seconds to start the process at the output channel. Now, both output channels are running their own process.

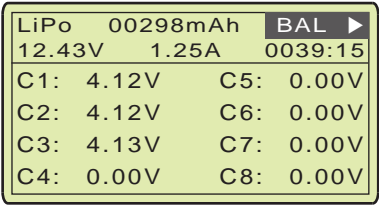
Remember both output channels have the circuit which is independent, but identical.

● Screen displays during process

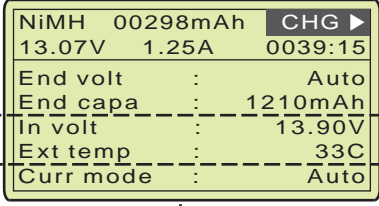
As the program starts by pressing 'START/ENTER' button, the LCD will be changed to show the charge or discharge graph, and also some other data. Those displays can be altered by pressing 'INC' or 'DEC' button. The display will go back to the graph screen automatically, after showing the data screen in three minutes.



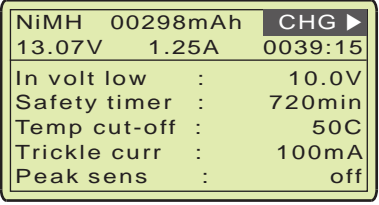
INC/DEC



INC/DEC



INC/DEC



- (1) Type of battery being processed.
- (2) Actual charged or discharged capacity. The value is calculated by multiple of process time and current.
- (3) The process is going on at the output.
- (4) The output channel which the process is going on. You can alter the display to show the data at opposite output channel by pressing 'CHANNEL' button.
- (5) The voltage of battery is being processed, which will be updated as the process goes on in real time.
- (6) The feeding current at real time.
- (7) Elapsed time after the process started.
- (8) The graph shows the voltage curves in Y-axis along with the time in X-axis. The graph will automatically be scaled to fit in the screen.

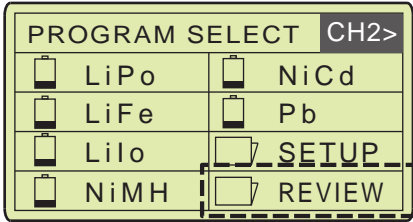
Individual cell voltages : The display shows the voltage of individual cells during charging Lixx battery. To show the voltages, the balance adaptor should be linked to the balance port of charger with connecting the balance tab of battery pack.

In volt : The voltage of battery or DC power source, which is being used as an input power supply for the charger.

Ext. temp. : The temperature of battery is being process in real time. The temperature sensor should contact the surface of battery firmly to read out the data accurately.

The other values show the data you already done at the program set-up to verify what you have done.

● Review the data after finishing the process

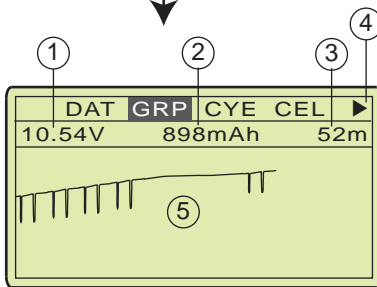


After finishing the program, you can review the data which had been pertained to the input and output of the charger by selecting REVIEW menu at the main screen.

These data can not be shown while the program is being on process.

DAT	GRP	CYE	CEL	▶
Input vol	:		12.35V	
Output vol	:		10.54V	
Ext. temp	:		42C	
Chg time	:		52min	
Dchg time	:		0min	
Capacity	:		898mAh	

UP/DOWN



UP/DOWN

DAT	GRP	CYE	CEL	▶
No	Capacity	Voltage		
1	C	00000mAh	0.00V	
	D	00000mAh	0.00V	
2	C	00000mAh	0.00V	
	D	00000mAh	0.00V	

UP/DOWN

DAT	GRP	CYE	CEL	▶
No	Vol	No	Vol	
C1:	4.20V	C5:	0.00V	
C2:	4.19V	C6:	0.00V	
C3:	4.20V	C7:	0.00V	
C4:	0.00V	C8:	0.00V	

Input vol : DC voltage at the charger's input lead.

Output vol : DC voltage of battery at the end of process.

Ext. temp. : The temperature of battery as measured with temperature sensor connected to temp. port of charger at the end of process.

CHG time : The total amount of time needed to complete charge process.

DCHG time : The total amount of time needed to complete discharge process.

Capacity : The total amount of charged or discharged capacity for whole process.

(1) Output voltage : Shows the DC voltage at the output on end of process.

(2) Charged or discharged capacity

(3) Time : Records the amount of time in minutes, which needed to complete the process, not counting the time in trickle charge.

(4) Output channel mark : The output channel which the process had been performed.

(5) The graph shows the voltage curves in Y-axis along with the time in X-axis, after the process has finished.

This display shows the battery's capacity and peak voltage readings for each charge and discharge period for up to 10 cycles. The cycle number is show on the left side of the display. Pressing 'INC' or 'DEC' button will scroll the display up and down. Charge data is marked by 'C' and discharge data is marked by 'D'.

The display shows the final voltage of individual cells, when the balance tab was connected to the individual port of charger during the process of Lixx battery. ith balance mode.

● Warning and error messages

BC8DX incorporates a various functions of protective and monitoring the system to verify functions and the state of its electronics. In any case of occurring error, the screen displays the cause of error that is self-explanatory with audible sound.

Check connection ...
Reversed polarity
STOP/ESC

The output is connected to a battery with incorrect polarity.

Check charger ...
Over-temperature
STOP/ESC

The internal temperature of the unit goes too high. Cool down the unit.

Check connection ...
Connection break
STOP/ESC

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.

Check cell-count ...
Incorrect cell-count
STOP/ESC

The cell-count of Lithium battery pack was selected incorrectly. Verify the cell-count carefully.

Check charger ...
Break-down
STOP/ESC

There happens the malfunction at the charger circuit by any reason. The charger should be repaired at the factory.

Check connection ...
Short-circuit
STOP/ESC

There is a short-circuit at output. Please check the charging leads or output cable of battery pack.

Check battery ...
Low voltage
STOP/ESC

The charger detects the voltage is lower than you set at Lithium program. Please check the cell-count of the battery pack.

Check battery ...
High voltage
STOP/ESC

The charger detects the voltage is higher than you set at Lithium program. Please check the cell-count of the battery pack.

Check balancer ...
Comm. error
STOP/ESC

The balancing circuit had been damaged. The balance function can not be used, and the charger needs to be repaired at our factory.

Balance error ...
Low cell vol.
STOP/ESC

The voltage of one of the cell in the Lithium battery pack is too low. Please check the voltage of cells one by one.

Balance error ...
High cell vol.
STOP/ESC

The voltage of one of the cell in the Lithium battery pack is too high. Please check the voltage of cells one by one.

Balance error ...
Bad connection
STOP/ESC

There are bad connection at the individual connector. Please check the connector and cables carefully.

Balance error ...
Ref. data fail
STOP/ESC

The charger can not read out the individual voltages correctly because of malfunction of main processor. The charger needs to be repaired.

Check power ...
Low input volt
STOP/ESC

The voltage of input power drops below the limit.

● Glossary of terms

Amps(A): The unit of measure for charge or discharge electric current. The program of the charger will show most of the current in amps(A) at its LCD screen.

Milliampere(mA): The electric current, being amps(A) multiplied by 1000 and noted as 'mA'. So 2.0A is the same as 2000mA (2.0x1000). Or, to convert mA to amps, divide the mA number by 1000. So 200mA is the same as 0.2A. If a current value is below 1.0A, the LCD screen of the charger will still show the current in amps, not milliampere. For example, a current of 600mA will be displayed as 0.6A, and a current of 100mA will actually be shown as 0.1A.

Capacity, milliampere hours (mAh), and amp-hours (Ah): Charge energy stored by a battery is called 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 milliampere hours. A 650mAh battery can deliver 650mA of current for one hour (650mA x 1hr = 650mAh). The batteries of very large capacity, such as lead-acid(Pb) batteries, are usually rated in 'Ah' or amp-hours. A '12V 60Ah' car battery can deliver 60 amps of current for one hour (60A x 1hr = 60Ah).

Nominal voltage(V): The nominal voltage of the battery pack can be determined as follows;

-NiCd or NiMH: multiply the total number of cells in the pack by 1.2. A 8-cell pack will have a nominal voltage of 9.6 volts (8x1.2).

-LiPo: multiply the total number of cells in the pack by 3.7. A 3-cell LiPo wired in series will have a nominal voltage of 11.1 volts (3x3.7).

-Lilo: multiply the total number of cells in the pack by 3.6. A 2-cell Lilo wired in series will have a nominal voltage of 7.2 volts (2x3.6).

-LiFe: multiply the total number of cells in the pack by 3.3. A 4-cell Lilo wired in series will have a nominal voltage of 13.2 volts (4x3.3).

If the nominal voltage of the battery is not printed on the battery's label, consult your battery manufacturer or supplier. Do not guess the rated voltage of battery.

'C'-rating: Capacity is also referred to as the 'C' rating. Some battery suppliers recommend charge and discharge currents based on the battery '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).

● Maximum circuit power chart

For the voltage of battery is more than 16V, the actual amount of charge current feeds to the battery might automatically be limited, so not to exceed the charger's maximum rated charging power of 160 watts at an output channel. And also, for the battery having more than 5V, the discharge current delivered to the battery might be limited by the maximum rated discharge power of 25 watts per output.

Maximum charge/discharge current at 12V DC input				
	No. of cells	Rated voltage(V)	Charge current(A)	Discharge current(A)
NiCd/NiMH	1	1.2	9.0	5.0
	2	2.4	9.0	5.0
	3	3.6	9.0	5.0
	4	4.8	9.0	5.0
	5	6.0	9.0	4.2
	6	7.2	9.0	3.5
	7	8.4	9.0	3.0
	8	9.6	9.0	2.6
	9	10.8	9.0	2.3
	10	12.0	9.0	2.1
	11	13.2	9.0	1.9
	12	14.4	9.0	1.7
	13	15.6	9.0	1.6
	14	16.8	9.0	1.5
	15	18.0	8.9	1.4
	16	19.2	8.3	1.3
	17	20.4	7.8	1.2
	18	21.6	7.4	1.2
	19	22.8	7.0	1.1
	20	24.0	6.7	1.0
	21	25.2	6.3	1.0
	22	26.4	6.1	0.9
LiPo	1S	3.7	9.0	5.0
	2S	7.4	9.0	3.4
	3S	11.1	9.0	2.3
	4S	14.8	9.0	1.7
	5S	18.5	8.6	1.4
	6S	22.2	7.2	1.1
	7S	25.9	6.2	1.0
	8S	29.6	5.4	0.8
LiFe	1S	3.3	9.0	5.0
	2S	6.6	9.0	3.8
	3S	9.9	9.0	2.5
	4S	13.2	9.0	1.9
	5S	16.5	9.0	1.5
	6S	19.8	8.1	1.3
	7S	23.1	6.9	1.1
	8S	26.4	6.1	0.9
Pb		6.0	9.0	4.2
		8.0	9.0	3.1
		10.0	9.0	2.5
		12.0	9.0	2.1
		14.0	9.0	1.8
		16.0	9.0	1.6
		18.0	8.9	1.4
		20.0	8.0	1.3
		22.0	7.3	1.1
		24.0	6.7	1.0
		26.0	6.2	1.0
		28.0	5.7	0.9

● Specifications

Operating voltage range :	10.0 ~ 18.0V DC 12V Lead-acid battery or equivalent high power PSU
Circuit power :	Charge max. 160W per output Discharge max. 25W per output
Charge current :	0.1 ~ 9.0A
Discharge current :	0.1 ~ 5.0A
NiCd/NiMH battery cell count :	1 ~ 22 cells at an output
Lithium battery cell count :	1 ~ 8 series at an output
Pb battery voltage :	2 ~ 28V at an output
Battery data memory :	5 memories per program
Battery capacity range :	100 ~ 65000mAh
Delta-peak sensitivity :	Disable/Delicate/5 ~ 20mV adjustable
Temperature cut-off range :	20 ~ 80C/68 ~ 176F
Trickle charge current :	Off, 50 ~ 300mA adjustable (N/A for Lixx)
Cycle count :	1 ~ 10 times (N/A for Lixx)
Cycle cool-off waste time :	0 ~ 60 minutes adjustable
Current drain for balancing Lixx :	200mAh/cell
Weight :	1100 g
Dimensions :	200 X 150 X 55 mm

● Warranty and service

We warrant this product for a period of one year (12 months) from the date of purchase. The guarantee applies only to such material or operational defects, which are present at the time of purchasing the product. During that period, we will repair or replace without service charge any product deemed defective due to those causes. Any repairs carried out under warranty do not extend the original warranty period. You will be required to present proof of purchase (invoice or receipt). The defective unit has to be sent to us by pre-paid delivery; we will pay for return shipping cost. This warranty does not cover the damage due to wear, overloading, incompetent handling or using of incorrect accessories.

BANTAM Inc.

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Electrical equipment marked with the cancelled waste bin symbol must not be discarded in the standard household waste; instead it should be taken to a suitable specialist disposal system.

Date of purchase/delivery :

Dealer :