

INTEGRATED BALANCER **SWALLOW DC ED CHARGER**



Operating Instructions

Please keep for future reference

Dear Customer

Thank you for purchasing this Swallow DC EQ charger. We are sure you will be pleased with its performance and features. In order to ensure that you obtain the maximum from its operation, please read the following instructions carefully.

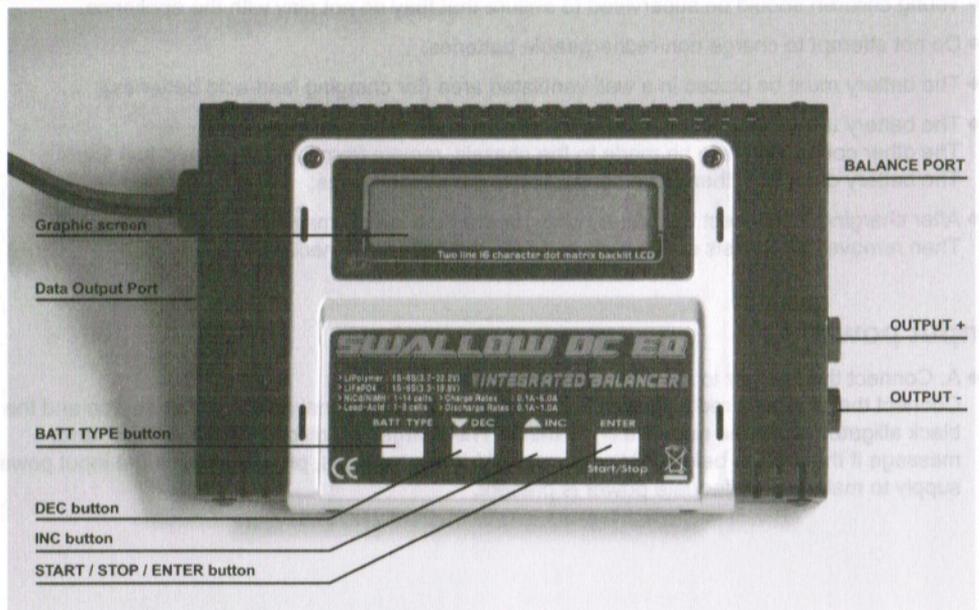
Special Features

- ◆ Input voltage is 11~15V DC
- ◆ Capable of charging and discharging 1 - 14 NiCd or NiMH cells, 1 - 6 Lithium-Ion, Lithium-Polymer or LiFePO4 cells or 2 ~ 12V lead-acid batteries
- ◆ Adjustable charge current (0.1A - 6.0A)
- ◆ Adjustable discharge current (0.1A - 1.0A).
- ◆ "Zero Delta V" peak detection for NiCd and NiMH batteries
- ◆ "Constant Current / Constant Voltage" charge method for Lithium-Ion/Po, LiFe batteries and Pb batteries.
- ◆ Pack Cycling(Charge to Discharge / Discharge to Charge)
- ◆ 2 -line, 16 character, blue backlit, LCD makes the screen extremely clear and legible.
- ◆ Built-in an intelligent balancing circuit is designed to individually balance each cell on the connected lithium battery pack within the tolerance of 5mV during charge or discharge.
- ◆ Voltage monitoring feature is to show each actual cell voltage on the screen during balancing.
- ◆ Various warning messages for improper input voltage, wrong connections, unsuitable battery condition and reverse polarity on output.
- ◆ Packaged in a rugged, extruded aluminum case

Specification

Input Voltage	11.0–15.0V DC
Battery Type & Cells	1–14 Nickel–Cadmium cells / 1–14 Nickel–Metal Hydride cells 1–6 Lithium–Ion or Lithium–Polymer or LiFePO4 cells(type : 3.6V or 3.7V or 3.3V) 1 – 6 Lead–Acid cells (2V per cell)
Battery capacity	100mAh ~ 6000mAh adjustable ONLY for Lithium–Ion, Lithium–Polymer and LiFePO4
Charge Current	0.1A ~ 6A in 100mA steps
Discharge Current	0.1A ~ 1A in 10mA steps (auto limited to 5W maximum)
Trickle Charge Current	0 ~ 200mA
Balancing current	Max. 280mA
Charge Termination	" zero delta V" peak detection for NiCd/NiMH " constant current / constant voltage " for Li–Ion/Po/Fe and Pb
Delta Peak Sensitivity	5mV ~ 25mV for NiCd & 3mV ~ 25mV for NiMH batteries per cell
Cycling	Charge to Discharge / Discharge to Charge
Display Type	2–line, 16 blue backlit character LCD
Dimensions	152 x 93 x 31(mm)
Weight	310 g

CONTROLS



Special Features

- ◆ 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, Lithium-Polymer, and Lead-Acid batteries.
- ◆ Make sure to place the charger on a firm level surface for charging.
- ◆ Do not attempt to charge batteries at excessive fast charge currents.
Check with your battery manufacturer for the maximum charge rate applicable to your battery.
- ◆ Do not use automotive type battery chargers to power the charger.
- ◆ 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.
- ◆ Do not allow water, moisture or foreign objects into the charger.
- ◆ Do not place the battery or charger on or near a flammable object while in use.
Keep away from carpets, cluttered workbenches, etc.
- ◆ Do not cover the air intake holes on the charger as this could cause the charger to overheat.
- ◆ Connect the input leads to a 12V power supply first, then connect the battery.
- ◆ Do not disassemble the charger.
- ◆ This appliance is not intended for use by young children or infirm persons unless they have been adequately supervised by a responsible person to ensure that they can use the appliance safely.
- ◆ Young children should be supervised to ensure that they do not play with the appliance.
- ◆ Do not attempt to charge non-rechargeable batteries.
- ◆ The battery must be placed in a well ventilated area (for charging lead-acid batteries)
- ◆ The battery terminal not connected to the chassis has to be connected first.
The other connection is to be made to the chassis, remote from the battery and fuel line.
The battery charger is then to be connected to the supply mains;
- ◆ After charging disconnect the battery charger from the supply mains.
Then remove the chassis connection and then the battery connection.

Input power

- ◆ A. Connect the charger to the 12V DC power supply.
Connect the charger's red alligator clip to the positive (+) terminal on the power source and the black alligator 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 adequate power is present.

Output battery connections

◆ Two 4mm banana sockets are located on the right side of the charger. Connect the battery charge lead to these sockets with the positive (+) lead connected to the red socket and the negative (-) lead to the black socket. The "No battery" error message will be displayed if trying to start to charge without connecting a battery. The "Open circuit" error message will be displayed if a battery becomes disconnected from the charger while a function is in progress. A "Reverse polarity" error message will be displayed if a battery is connected to the charger in reverse.

◆ **Note.**

In order to balance lithium batteries during charge or discharge, pls ensure that both battery charge leads and balancing connector on the battery pack should be connected to both two 4mm output banana sockets and balancing port together on the charger.

If the battery charge leads are ONLY connected to the output banana sockets without connecting the balancing connector on the lithium battery pack to the balancing port on the charger, the charger should charge or discharge the connected lithium pack without balancing the pack.

Operation

When the charger is connected to the power supply the charger will show the battery mode that has been last used.

If the battery TYPE button is briefly pressed, the present battery type (NiCd, NiMH, Lithium, or Pb) will blink.

While the existing battery type is blinking, every time the battery TYPE button is pressed, the following modes are shown in order. NiCd → NiMH → Lithium → Pb → NiCd

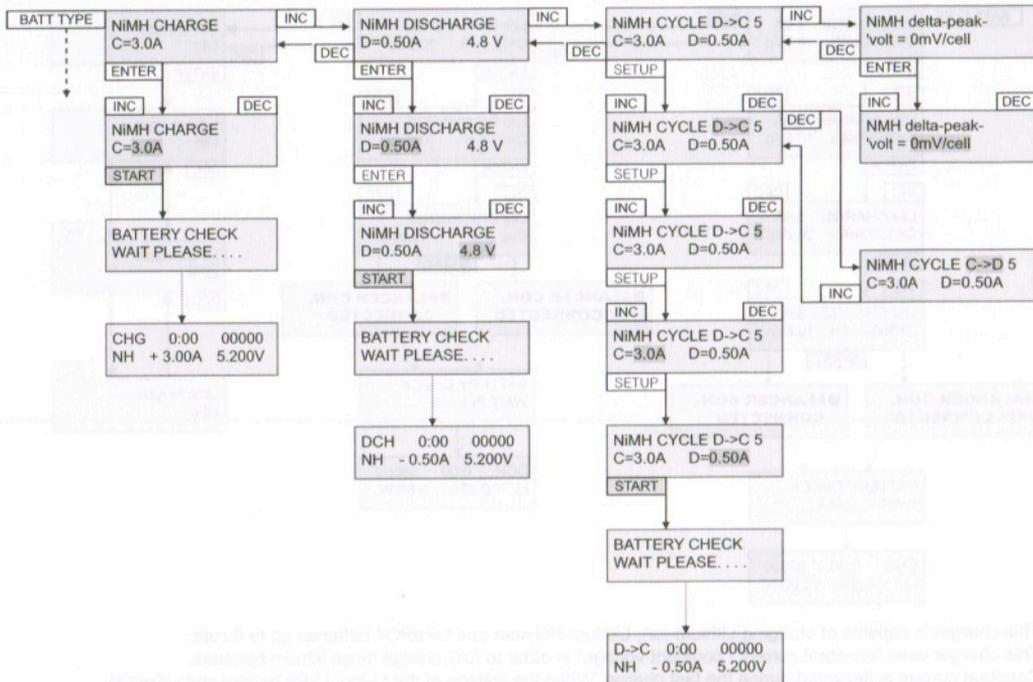
If the other buttons are pressed, or nothing is pressed, the present battery type stops blinking.

If the Battery type button is pressed and briefly held, the recent & previous data will be shown for 3 seconds.

If the Enter button is briefly pressed, a parameter which can be adjusted starts to blink and if the Enter button is pressed again, the next parameter starts to blink. If nothing is pressed for 3 seconds, the parameter stops blinking.

Once the Enter button is pressed and briefly held, the charger starts to charge or discharge according to the selected parameters.

NiMH MODE



NiMH CHARGE
C=3.0A

Setting charge current

Adjust and find the desired charge current which ranges from 0.1A to 6.0A with the INC & DEC buttons. Press the ENTER button to confirm the setting.

NiMH DISCHARGE
D=0.50A 4.8 V

Setting discharge current

Adjust and find the desired discharge current which ranges from 0.1A to 1A with the INC & DEC buttons. Press the ENTER button to confirm the setting.

NiMH DISCHARGE
D=0.50A 4.8 V

Setting discharge cutoff voltage

This is the voltage that the charger should stop discharging the battery. Adjust and find total discharge cutoff voltages to be discharged from 0.1V to 16.8V with the INC & DEC buttons. Press the ENTER button to confirm the setting.

NiMH CYCLE C->D 5
D=0.50A

Setting cycle

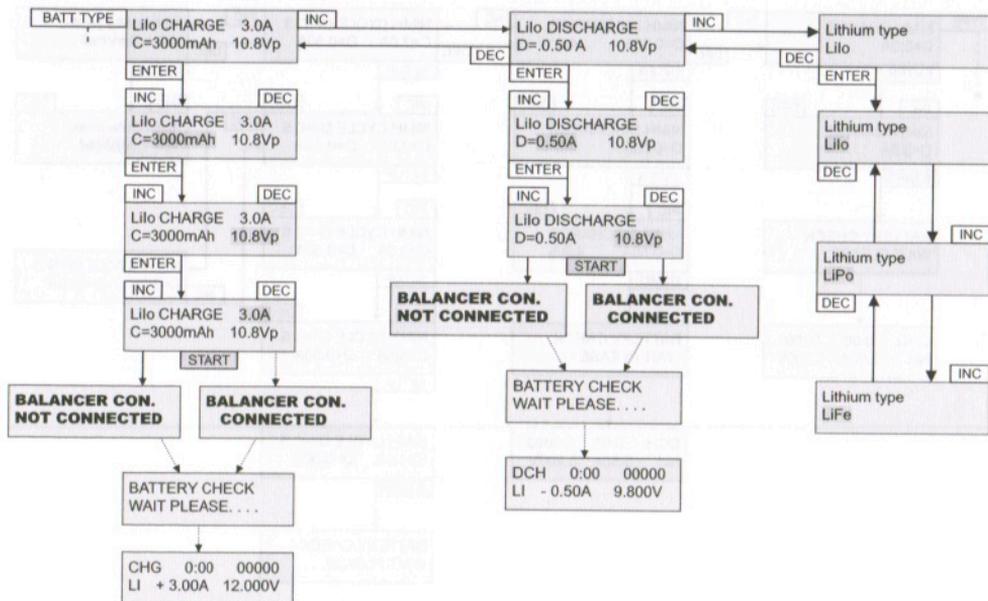
This is to set cycling with two options (Charge to Discharge / Discharge to Charge). Set cycling with the INC & DEC buttons, and press the ENTER button to confirm the setting.

NiMH delta-peak-
'volt = 0mV/cell

Setting Delta Peak Sensitivity.

This is to set the Delta Peak Sensitivity from 3mV to 25mV per cell with INC & DEC buttons and press the ENTER button to confirm the setting.

Lithium MODE (Li-Ion / LiPo / LiFe)



This charger is capable of charging Lithium-Ion, Lithium-Polymer and LiFePO4 batteries up to 6 cells. This charger uses "constant current / constant voltage" in order to fully charge those lithium batteries. Constant current is delivered during the fast charge. When the voltage of the Li-Ion, Li-Po battery and LiFePO4 reaches approx 4.1V, 4.2V, and 3.7V per cell, the charger starts to change its charge method from "constant current" to "constant voltage". The "constant voltage" allows the battery to dictate how much current the charger should deliver for safe, full charges. When the current drops below approx 1/10 currents of user selected battery capacity, the charger will stop charging as the battery is fully charged.

Lilo CHARGE 6.0A
C=3000mAh 10.8Vp

Setting battery capacity

Adjust and set the desired battery capacity from 100mAh to 6000mAh (50mAh per step) with the INC & DEC buttons. Press the ENTER button to confirm the setting.

Lilo CHARGE 6.0A
C=3000mAh 10.8Vp

Setting battery voltages for Li-Ion battery pack

Select the proper total battery voltages to be charged or discharged with the INC & DEC buttons – 3.6V, 7.2V, 10.8V, 14.4V, 18.0V and 21.6V [Vpack]

LPo CHARGE 6.0A
C=3000mAh 11.1Vp

Setting battery voltages for Li-Po battery pack

Select the correct total battery voltages to be charged or discharged with the INC & DEC buttons – 3.7V, 7.4V, 11.1V, 14.8V, 18.5V and 22.2V [Vpack]

LiFe CHARGE 6.0A
C=3000mAh 11.1Vp

Setting battery voltages for Li-Fe battery pack

Select the correct total battery voltages to be charged or discharged with the INC & DEC buttons – 3.3V, 6.6V, 9.9V, 13.2V, 16.5V and 19.8V [Vpack]

Lilo CHARGE 6.0A
C=3000mAh 10.8Vp

Setting charge current

Adjust and find the desired charge current which ranges from 0.1A to 6.0A with the INC & DEC buttons. Press the ENTER button to confirm the setting.

Lilo DISCHARGE
D=0.50A 10.8Vp

Setting discharge current

Adjust and find the desired discharge current from 0.10A to 1.00A (0.01A per step) with the INC & DEC buttons. Press the ENTER button to confirm the setting.

Lithium type
LiPo

Setting battery type

Choose the desired battery type (Li-Ion, Li-Po or Li-Fe) with the INC & DEC buttons. Press the ENTER button to confirm the setting.

For safety purposes, this charger is designed to automatically deliver a 1C charge rate to batteries of Li-Ion, Li-Po or Li-Fe, based on the user selected battery capacity.
 Example: Li-Po cell of 1500mAh capacity : 1C = 1500mAh (= 1.5A) charge current.

Note : The maximum voltage for Li-Ion is 4.1V per cell, 4.2V per cell for Li-Po batteries, and 3.7V per cell for Li-Fe batteries. Therefore, it is extremely important to choose the proper battery type to be charged, as each Lithium battery has the different voltage level. Otherwise, it may cause very serious damage to the batteries and increase the risk of a fire !

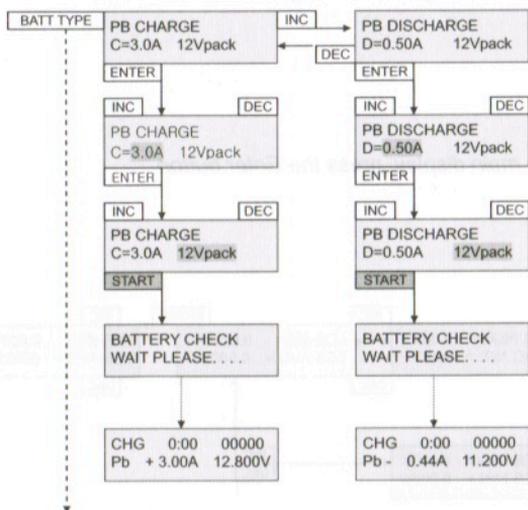
**BALANCER CON.
NOT CONNECTED**

The left screen should be shown if lithium charge or discharge starts without connecting the balancing cable to the balancing port of the charger.

**BALANCER CON
CONNECTED**

The left screen should be shown if lithium charge or discharge starts with connecting the balancing cable to the balancing port of the charger.

Pb MODE



to NiCd charge

PB CHARGE
C=3.0A 12Vpack

Setting charge current

Adjust and find the desired charge current which ranges from 0.1A to 6.0A with the INC & DEC buttons. Press the ENTER button to confirm the setting

PB CHARGE
C=3.0A 12Vpack

Setting battery voltages for Li-Ion battery pack

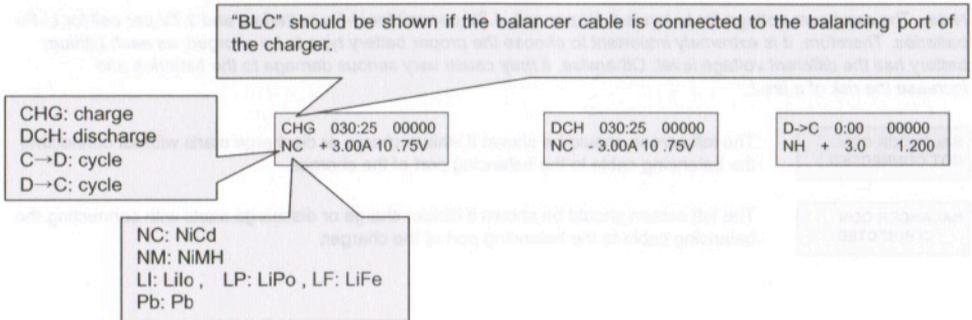
Select the proper total battery voltages to be charged or discharged with the INC & DEC buttons – 2V, 4V, 6V, 8V, 10V, and 12V [Vpack]

PB DISCHARGE
D=0.50A 12Vpack

Setting discharge current

Adjust and find the desired discharge current from 0.10A to 1.00A (0.01A per step) with the INC & DEC buttons. Press the ENTER button to confirm the setting.

Displays during charge, discharge, and cycle



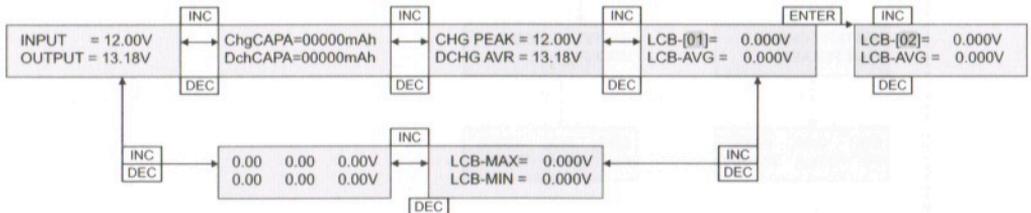
If the Enter button is pressed, the charge or discharge can be terminated.

Completion display

END 030:00 00000
NC 100mA 10.75V

In order to move to the main display, press the Enter button.

Data display



If the Battery type button is pressed for over 3 seconds, the Data view will be displayed as above. Data displays can be scrolled left and right by INC & DEC buttons.

If the Battery type button is again pressed, those data view screen should be disappeared.

LCB-[01]= 0.000V
LCB-AVG = 0.000V

This screen is only shown if a balancing connector is connected. Press the ENTER button then the "01" should flash, each cell voltage is shown by INC & DEC buttons.

LCB-MAX= 0.000V
LCB-MIN = 0.000V

This screen is also only shown if a balancing connector is connected. Its shows each maximum and minimum voltages on the screen.

Error messages

INPUT BATTERY
VOLTAGE ERROR

When input voltage is below 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 circuit of the charger 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 Pb batteries.

CHECK THE BATT.
LOW VOLTAGE

If wrong voltages are set, or batteries are over discharged, while charging Lithium or Pb batteries.

BALANCER VOLTAGE
IS TOO HIGH

If voltage per cell is too high during balancing, this message should appear.

BALANCER VOLTAGE
IS TOO LOW

If battery cells are short-circuited during balancing, this message should appear.

DON'T CHARGE LiXX
WITH THIS MODE

If the charger starts charging, discharging, or cycle for NiCd/MH, or Pb batteries with connecting the balancing cable to the balancing port of the charger.

Error messages

W001
W002

When your voltage is below 11.5V or more

W003

W004

W005

W006

W007

W008

W009

W010

W011