

SIGMA^{EQ}

ECO II

80W

LiPo/LiFe/LiIon:	1 - 6S
NiMH/NiCd:	1 - 16S
Pb:	2 - 20V
Charge Power:	80W
Charge Rate:	0.1A - 10A
Discharge Rate:	0.1A - 2A



Ripmax

Operating Manual



PLEASE READ THIS OPERATING MANUAL COMPLETELY AND CAREFULLY AS IT CONTAINS A WIDE VARIETY OF SPECIFIC PROGRAMMING AND SAFETY INFORMATION. THE SELECTION OF THE CORRECT OPERATING PARAMETERS IS THE RESPONSIBILITY OF THE USER. KEEP THIS MANUAL IN A SAFE PLACE, AND BE SURE TO PASS IT ON TO THE NEW OWNER IF YOU EVER SELL YOUR SIGMA EQ ECO II.

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WHAT'S NEW IN SIGMA EQ ECO II

- Max charge current now reaches to 10A instead of 6A, that means it can speed up your charge by increasing the charge current. (80W Limited)
- Max balance current increase to 460mA from 300mA. That means it can speed up the balance charge of your lithium batteries.
- 15 extra functions providing more convenience for your hobby time.
 - 1>**LANGUAGES**: There are two languages which you can select (English and German).
 - 2>**CELL METER**: You can test the voltage of each battery cell.
 - 3>**CAPACITY**: Check the capacity of the battery.
 - 4>**IR**: You can measure the per-cell internal resistance of the battery pack.
 - 5>**BALANCER**: You can balance the voltage of each cell to preserve the performance of your batteries.
 - 6>**DIGITAL POWER**: Using the charger's output as a DC power supply.
 - 7>**BRUSH MOTOR**: You can easily break-in new brushed electric motors using a variable voltage and running time.
 - 8>**FOAM HOT CUTTER**: The charger acts as a convenient power supply for a hot wire foam cutter.
 - 9>**MOTOR/ESC/SERVO**: The charger can output a PPM signal instead of your TX for your MOTOR/ESC/SERVO. You can now see it's working status.
 - 10>**USB PORT**: Output 5V 3A can easily charge your mobile phone and tablet.
 - 11>**SERVO TEST**: You can test a servo.
 - 12>**THRUST CALCULATOR**: You can easily calculate the thrust of a propeller.
 - 13>**TEMP**: The charger can measure an external temperature by using a temperature sensor, (Optional).
 - 14>**VOLTAGE METER**: You can measure the DC voltage of an object.
 - 15>**PPM TEST**: You can test the PPM signal from an RX, checking for any issues between your TX and RX.

FOREWORD

Thank you purchasing the Sigma EQ Eco II balance charger. This product is a rapid charger with a high performance microprocessor and specialised operating software. Please read this entire operating manual before using this product. It covers a wide range of information on operating and safety.

SPECIFICATIONS

Operating voltage range:	DC 11.0~18.0 Volt or AC 240 Volt
Circuit power:	Max.charge power 80W [DC Input] 80W [AC Input] Max.discharge power 10W
Charge current range:	0.1~10.0A
Discharge current range:	0.1~2.0A
Current drain for balancing Li-po:	460mA/cell
NiCd/NiMH battery cell count:	1~16 cell
Li-ion/Li-Fe/Li-Po cell count:	1~6 series
Pb battery voltage:	2V~20V
Weight:	590g (Net Weight)
Dimensions:	180 x 145 x 57mm

SPECIAL FEATURES

Optimised operating software

Sigma EQ Eco II features an AUTO function that automatically sets the current level while charging or discharging. For Lithium batteries, it can help prevent overcharging which may lead to an explosion due to user error, and can disconnect the circuit automatically and alarm when detecting any malfunction.

Many settings can be configured by the user.

Internal independent lithium battery balancer

Sigma EQ Eco II employs an individual-cell-voltage balancer. It isn't necessary to connect an external balancer for balance charging.

Balancing individual cells and battery discharging

During the process of discharging, Sigma EQ Eco II can monitor and balance each cell of the battery individually. An error message will indicate and the process will be terminated automatically if the voltage of any single cell is abnormal.

Adaptable to various type of lithium batteries

Sigma EQ Eco II is adaptable to various types of Lithium batteries, such as Li-ion, Li-Po, Li-HV and the new Li-Fe.

Fast and storage modes of lithium batteries

The purpose to charge a Lithium battery varies, "fast" charge reduces the duration of charging, whereas "store" state can control the final voltage of your battery, enabling the storage and protection of your battery over long period of time.

Maximum safety

Delta-peak sensitivity: The automatic charge termination program is based on the principle of Delta-peak voltage detection. When the battery's voltage exceeds the limit, the process will be terminated automatically.

Automatic charging current limits

You can set the upper limit for the charging current when charging your NiCd or NiMH batteries; It is useful for NiMH batteries of low impedance and capacity in the "AUTO" charging mode.

Capacity limit

The charging capacity is always calculated as the charging current multiplied by the time. If the charging capacity exceeds the limit, the process will be terminated automatically. You can set the maximum value.

Temperature threshold*

The batteries internal chemical reaction can cause the temperature of the battery to rise. If the temperature limit is reached, the process will be terminated. *This function is available by connecting an optional temperature probe, which is not included.

Processing time limit

You can limit the maximum total process time to avoid any possible unwanted damage to the battery if detecting errors are unusual.

Input power monitoring

To protect a car battery used as DC input power from being damaged, its voltage is constantly monitored. If it drops below the lower limit, the process will end automatically.

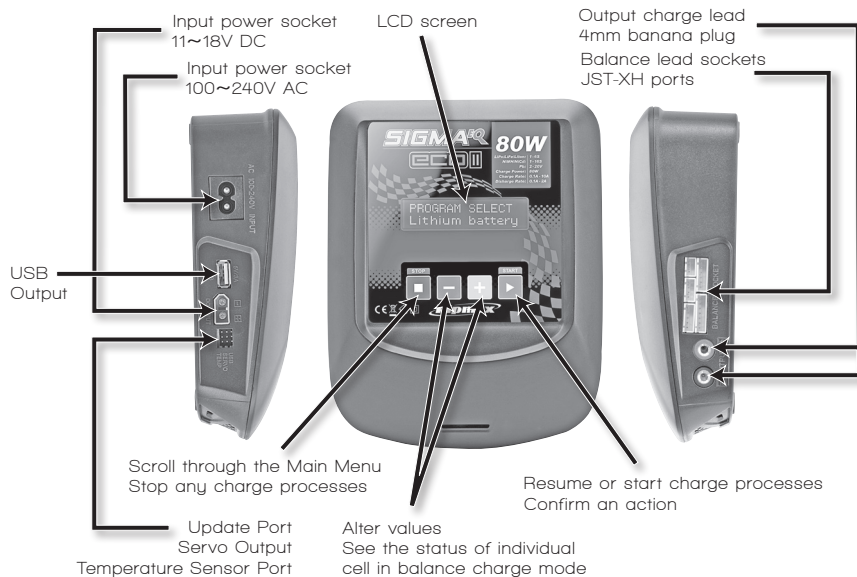
Data store / load

A maximum of five batteries data can be stored for the users convenience. You can keep the data pertaining to each program setting of the battery for continuous charging or discharging. Users can use these stored data settings at any time without any special program setting.

Cyclic Charging/Discharging

1 to 5 cyclic and continuous process of charge>discharge or discharge>charge is operable for battery refreshing and balancing (NiCd & NiMH only).

CHARGER LAYOUT



LITHIUM POLYMER BALANCE CHARGE PROGRAM CONNECTION DIAGRAM

This diagram shows the correct way to connect your battery to the Sigma EQ Eco II charger whilst charging in the balance charge program mode only.



WARNING:

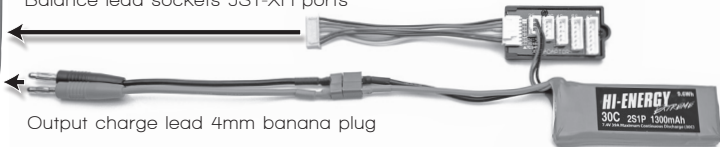
Failure to connect as shown in this diagram will damage this charger.



Balance lead sockets JST-XH ports

Output charge lead 4mm banana plug







If necessary,
use an adaptor.
(Optional)



The main battery leads must be connected along with the balance lead connector as shown before charging your battery. **If using crocodile clips make sure they are unable to touch together!**

WARNING AND SAFETY NOTES

These warnings and safety notes are particularly important. Please follow the instructions for maximum safety or the charger and the battery can, at best, be damaged, or worst cause a fire.

-  Never leave the charger unattended when it is connected to its power supply. If any malfunction is found, TERMINATE THE PROCESS AT ONCE and refer to this manual.
-  Keep the charger well away from dust, damp, rain, heat, direct sunshine and vibration. Never drop it!
-  The allowable input voltage is 11-18V DC or 100-240V AC but not both at the same time.
-  This charger and the battery should be put on a heat-resistant, non-flammable and non-conductive surface. Never place on a car seat, carpet or similar. Keep all flammable and volatile materials away from the operating area.
-  Make sure that you know the specifications of the battery to be charged or discharged to ensure that it meets the requirements of this charger. If the program is set up incorrectly, the battery and charger may be damaged. It can also cause a fire or explosion due to over charging.
-  Always charge in well ventilated areas!

NiCd/NiMH Voltage level: 1.2V/cell - Allowable fast charge current: 1C-2C (depends on the performance of the cells) Discharge voltage cut off level: 0.85V/cell (NiCd), 1.0V/cell (NiMH)

Li-ion Voltage level: 3.6V/cell Max.charge voltage: 4.1V/cell - Fast charge current: 1C or less
Min.discharge voltage cut off level: 2.5V/cell or higher

Li-Po Voltage level: 3.7V/cell Max. charge voltage: 4.2V/cell - Allowable fast charge current: 1C or less recommended. Consult the battery manufacturer for higher
Discharge voltage cut off level: 3.0V/cell or higher

Li-Fe Voltage level: 3.3V/cell Max. charge voltage: 3.6V/cell - Fast charge current: 1C or less. Consult the battery manufacturer for higher
Discharge voltage cut off level: 2.0V/cell or higher

Li-HV Voltage level: 3.8V/cell Max. charge voltage: 4.35V/cell - Allowable fast charge current: 1C or less
Consult the battery manufacturer for higher
Discharge voltage cut off level: 3.0V/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 a short circuit between the charge leads, always connect the charge cable to the charger first, then connect the power source. Reverse the sequence when disconnecting.

! Do not connect more than one battery pack to this charger at any one time.

! Never attempt to charge or discharge the following types of batteries.

A battery pack which consists of different types of cells (including different manufacturers).

Non-rechargeable batteries (Explosion hazard).

Batteries that require a different charge technique from NiCd, NiMh, Li-ion, Li-Fe, Li-HV, LiPo or Gel cell (Pb, Lead acid).

A faulty or damaged battery.

A battery fitted with an integral charge circuit or a protection circuit.

Batteries installed in a device or 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 keep in mind the following points before commencing charging:

Did you select the appropriate program suitable for the type of battery you are charging?

Did you set up appropriate current for charging or discharging?

Have you checked the battery voltage? Lithium battery packs can be wired in parallel and in series, i.e. a 2 cell pack can be 3.7V (in parallel) or 7.4V (in series).

Have you checked that all connections are firm and secure? Make sure there are no intermittent contacts at any point in the circuit.

! **Charging.**

During the charge process, a specific quantity of electrical energy is fed into the battery. The charge quantity is calculated by multiplying the charge current by the charge time. The maximum permissible charge current varies depending on the battery type or its performance and can be found in the information from the battery manufacturer. Only batteries that are expressly stated to be capable of a quick-charge should be charged at rates higher than the standard charge current.

Connecting the battery to the output socket of the charger: Red is positive and Black is negative. Due to the difference between the resistance of different cables and connectors, the charger may be unable to detect the correct resistance of the battery pack. The essential requirement for the charger to work properly is that the charge lead should be of an adequate conductor cross-section, and high quality connectors (which are normally gold-plated) should be fitted to both ends.

Always refer to the manual from the battery manufacturer pertaining to charging methods, recommended charging current and charging time. Lithium batteries should be charged according the charging instructions provided by the manufacturer only.

Attention should be paid to the connection of Lithium batteries in particular.

Do not attempt to disassemble a battery pack.

Please note that Lithium battery packs can be wired in parallel and in series. In a parallel connection, the battery capacity is calculated by doubling a single cell's capacity. They stay the same as a series wired pack. It is recommended to only charge series, wired packs.

Discharging.

The main purpose of discharging is to check the capacity of a battery or to reduce the battery's voltage to a defined level. The same attention should be paid to the discharging process as charging. The final discharge voltage should be set up correctly to avoid deep-discharging.

Lithium batteries cannot be discharged to lower than the minimum voltage, or it will cause a rapid loss of capacity or a total failure.

Generally, Lithium batteries do not need to be discharged.

Please pay attention to the minimum voltage of lithium batteries to protect the battery.

Some rechargeable batteries have a memory effect. If they are partly used and recharged before the whole charge is accomplished, they remember this and will only use that part of their capacity next time.

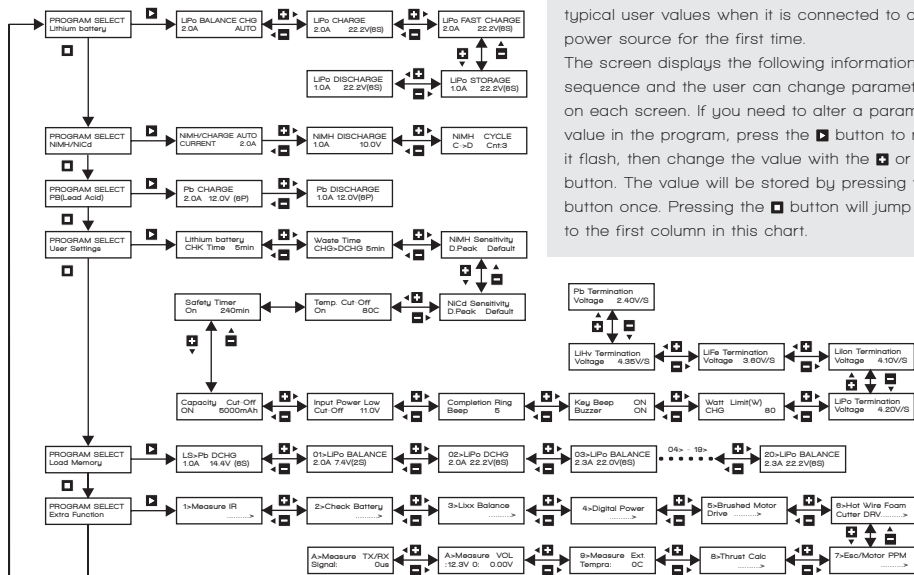
This is a "memory effect" it is said that NiCd and NiMH batteries suffer from memory effect.

NiCds have more memory effect than NiMH batteries.

Lithium batteries are recommended to be discharged partially rather than fully discharged.

Frequent full discharging should be avoided if possible. Instead, charge the battery more often or use a battery of larger capacity. Full capacity cannot be used until it has been subjected to 10 or more charge cycles. The cyclic process or charge and discharge will optimise the capacity of battery.

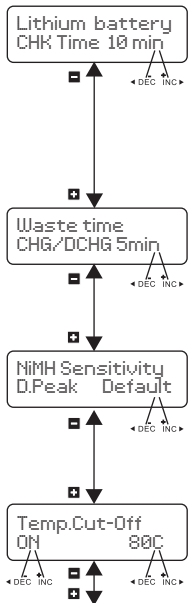
Program flow chart.



As a default setting, this charger will be set to typical user values when it is connected to a power source for the first time.

The screen displays the following information in sequence and the user can change parameters on each screen. If you need to alter a parameter value in the program, press the **▶** button to make it flash, then change the value with the **+** or the **-** button. The value will be stored by pressing the **▶** button once. Pressing the **◀** button will jump back to the first column in this chart.

! Program select user settings

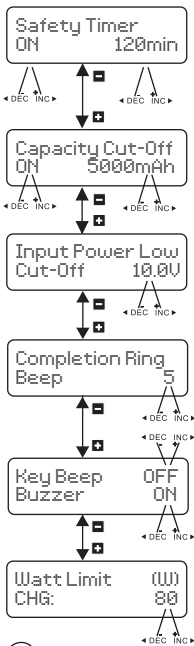


To avoid an erroneous setting by the user, the charger will automatically detect the cell count of a Lithium battery at the beginning of the charge or discharge process. To prevent an over discharged battery from being detected incorrectly, resulting in an error, you can set a time limit for the processor to verify the cell count. The default setting is 10 minutes which is typically enough time to properly detect the cell count. For batteries of a larger capacity, you may extend the time, and for the batteries of a smaller capacity, you may reduce the time or use with the default value.

The battery becomes warm after cycles of a charge/discharge process. The program will insert a time delay after each charge/discharge process to allow the battery enough time to cool down before beginning next cycle of charge/discharge process. The valid value ranges from 1 to 60 minutes.

This setting is for NiMH/NiCd batteries only. This screen allows you to set the delta peak detect settings between 5mV and 25mV per cell. The default is set at 10mV, suiting most applications.

The screen shows the cut-off temperature of a battery. To set this you can press the **■** or **+** button to turn this setting ON or OFF. Then use the same buttons to set the cut-off temperature between 0~90°C. The maximum temperature of the battery can be set during the charge process. The process will be terminated automatically to protect battery once the temperature of battery reaches this value. This feature is accomplished through temperature probe (optional).



When the charge process starts, the integrated safety timer starts to run simultaneously. If an error is detected or the termination circuit cannot detect whether the battery is fully charged or not. This unit is programmed to prevent overcharging. Please refer to the statement (shown right) to calculate the timer you should set.

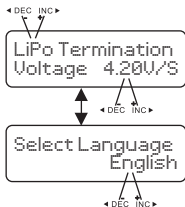
The program provides maximum capacity protection. If the Delta peak voltage cannot be detected or the safety timer times out, the charge process will stop automatically when the battery reaches the user-set maximum charge capacity.

This function monitors the voltage of the input battery used to power this charger. If the voltage is lower than the user-set value, the program will end forcibly to protect the input battery.

This setting sets the amount of beeps the charger speaker plays when the selected charge/discharge function completes.

The beep confirms the users' operation sounds every time a button is pressed. The beep or melody sounds at various times during operation to confirm different mode change. These functions can be switched on or off.

You can set a Watt limit for the charge rate between 60W and 80W.



This screen sets the termination voltage of battery types (LiPo 4.1-4.3V/S, Lilo 4.0-4.2V/S, LiFe 3.5-3.7V/S, LiHv 4.25-4.45V/S, Pb 2.3-2.45V/P). Use the default in the middle of each range but the ability is there for experienced modellers to vary if needed.

This program, provides you with two languages (English and German). Press the **▶** button again, and a beep will be sound, you can see the "English" is flashing, at this moment, press the **▶** button, or press the **⊕** button, to select the language.

Safe timer Calculation

When charging NiCd or NiMH batteries, divide the capacity by the current, then divide the result by 11.9. Set this number of minutes as the value for the safety timer setting. If the charger stopped at this time limit, about 140% of the capacity will have been fed into the battery. For example:

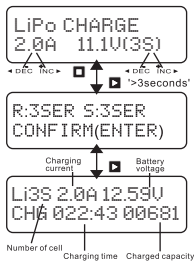
Capacity	Current	Safety Time
2000mAh	2.0A	$(2000/2.0=1000)/11.9=84$ minutes
3300mAh	3.0A	$(3300/3.0=1100)/11.9=92$ minutes
1000mAh	1.2A	$(1000/1.2=833)/11.9=70$ minutes

Program select Lithium battery

The program is only suitable for charging Lithium batteries with a nominal voltage of 3.3/ 3.6/3.7V / 3.85V/cells. Different batteries have different charging techniques. There are two linked processes termed as constant voltage and constant current. The charge current varies according to battery capacity and specification.

The final voltage individual cell is very important. It should precisely match the voltage of the battery type: LiPo is 4.2V, Lilo is 4.1V, LiFe is 3.6V, LiHV is 4.35V. The charge current and total voltage of the battery should be correctly set. The final voltage is not adjustable and is set at safe value already.

When you want to change the values of parameters, please press the **▶** button to make it flash and then use the **⊕** or **⊖** button to change the value. Then press the **▶** button again to store the value.

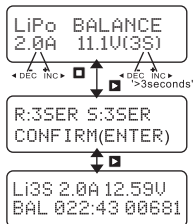


Charging of Lithium batteries without balancing cells

The left side of the first line shows the type of battery you choose. The value on the left of the second line of the charger is the current set and the right the series cell count. After setting the current and voltage, press the **[ENTER]** button for more than 3 seconds to start the process. The screen then displays the number of cells you charging as a safety check. "R" shows the number of cells detected by the charger and "S" is the number of cells set by you on the previous screen. If both numbers are identical you can start the charging by press the **[ENTER]** button. If not, press the **[ENTER]** button to go back to previous screen to carefully check the number of cells in the battery pack before going ahead. This screen then shows the real-time status during the charge process. Press the **[ENTER]** button once to stop the charge process.

Charging Lithium batteries in the cell balance mode

This function is for balancing the voltage of Lithium-polymer battery cells while charging. In the balance mode, the battery needs to have a balance lead connected to the appropriate individual port on the right side of the charger. You need to connect the batteries output plugs to the 4mm output sockets of charger also. Charging in this mode is different from the normal modes, because the built-in processor monitors voltage of individual cells and controls input current fed into each cell to 'balance' the voltages.



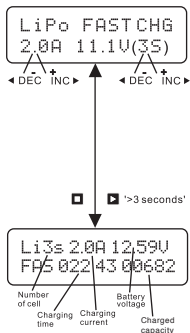
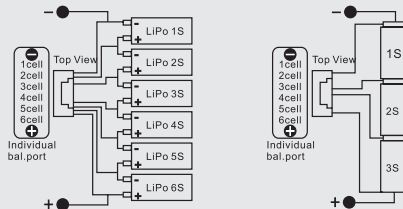
The value on the left side of the second line sets the charge current. The value on the right side of the second line sets the battery pack's voltage. After setting current and voltage, press the **[ENTER]** button for more than 3 seconds to start the process.

This displays the number of cells you set up and the processor detects. "R" shows the number of cells detected by the charger and "S" is the number of cells set by you at the previous screen. If both numbers are identical you can start charging by pressing the **[ENTER]** button. If not, press the **[ENTER]** button to go back to the previous screen and carefully check the number of cells in the battery pack before going ahead.

This screen shows the real-time status during the charge process. Press the **[ENTER]** button once to stop the charge process.

Individual cell connection diagram

Pin-assignment of 8-pin



Fast charging a Lithium battery

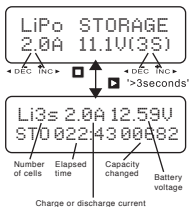
When charging lithium batteries in the fast mode the charging current will become lower towards the end of charging cycle. When the current is down to 1/5 of the current you set during the CV term, it will stop the process and eliminate the forcible requirement of the balance precision (Whether it is been connected to the balance port or not). In the fast mode the charging capacity is slightly lower than in normal charge mode, but the charging time is reduced.

You can set up the charging current and voltage of the battery pack. Press the button to display voltage confirmation. Then press the button again to confirm and begin charging.

This screen shows the real-time status of "fast charging". Press the button once to stop the charge process.

Storage control of Lithium battery

This function is for charging/discharging batteries which are not used at once. This program is designed for charging or discharging batteries of a specific original state. They are classified by types: 3.70V Lilo, 3.80V LiPo, 3.85V LiHV and 3.30V LiFe. The program will begin to discharge if the original state of the battery exceeds the voltage level of storage.

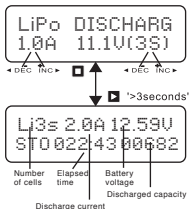


At this screen, you can set up the current and voltage of the battery pack. Charging and discharging will make the batteries come to the voltage level of the "storage" state.

This screen shows the real-time status charging. Press the button once to stop the charge process.

Discharging Lithium battery

The value of the discharge current on the left can not exceed 1C, and the value on the right can not be under the voltage recommended by the manufacturer to avoid deep discharging. Press the button for more than 3 seconds to start charging.



This shows the real-time status of discharging, you can press the button to stop discharging.

Voltage balancing and monitoring in the charge/discharge process

This monitors the voltage of each cell when the battery packs are in the charge/discharge process. If the voltage of any cell is abnormal, the screen will show an error message and terminate the program. If there is some battery damage or a disconnection you will be shown an error message, press the button see which cell is damaged.

```
BATTERY VOL ERR
CELL LOW VOL
```



```
4.14 4.16 4.09
2.18 0.00 0.00
```

The processor detects that the voltage of one cell is too low.

The 4th cell was damaged. Note: The value of a voltage may be zero if disconnection occurs.

```
NiMH CHARGE AUTO
CURRENT 1.0A
```



```
NiMH 1.0A 7.79V
CHG 001:15 00019
```

Battery type Elapsed time Battery voltage Charged capacity
Charge current

Program select NiCd/NiMH battery

This program is for charging and discharging NiCd/NiMH batteries associated with R/C model applications. You can press the button to make the parameter flash and then the or the button to change the parameter value. Press the button to store the value and move onto the next parameter. Only the battery type and current can be adjusted

This program charges the battery using the current you set up. In the "auto" state you should set up the upper limit of the charge current to avoid damage by excessive feeding current. Some batteries of low resistance and capacity can lead to higher current in the "auto" charging mode. But in the manual mode, it will charge with the current you set. You can make it blink in the current field and press or the button at the same time to switch mode. The screen shows the real-time status. Press the button to end the program. A sound will be emitted to indicate the end of the program.

```
NiMH DISCHARGE
1.0A 11.5V
```



```
NiMH 2.0A 7.42V
DSC 022:45 00690
```

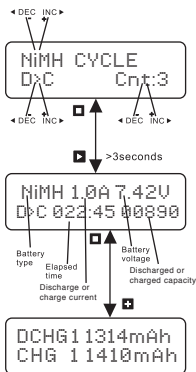
Battery type Elapsed time Battery voltage Discharged capacity
Discharge current

Discharging of NiCd/NiMH battery



Set the discharge current on the left and the final voltage on the right. The range of the discharge current is 0.1-2.0A and the final voltage range is 0.1-25.0V. Press the button for more than 3 seconds to start the program.



The screen indicates the discharging state. You can press the button to alter the discharge current. Press the button again to store the value. Press the button to stop discharging. The emitted sound alerts the end of discharging.

Charge/discharge cycle NiCd/NiMH battery







You can set battery type in the top left corner followed by the order (Charge>Discharge or Discharge>Charge) on the left and the number of cycles on the right. You can balance, refresh or bed-in a new battery with this function. You can set a temporary cool-off procedure in the user setting.

Press the  button to stop the program, you can press the  button to alter the charge current. The sound indicates the end of program.

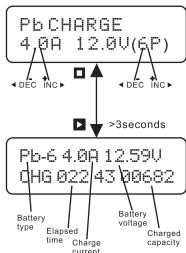
When it approaches the end, you can see the capacity of the battery being charged or discharged. You can press  or the  button, to display the result of each cycle.

Program select Pb (lead acid)

This program is only suitable for charging a Pb (lead-acid) battery with nominal voltage from 2 to 20V. Pb (lead-acid) batteries are completely different to a NiCd / NiMH batteries. These batteries can only deliver a lower current in comparison to their capacity. The same restriction applies to the charging process.

Consequently, the optimum charge current can only be 1/10 of the capacity. A Pb battery cannot be fast-charged. Please follow the instructions provided by the battery manufacturer. You can press the  button to make it flash and alter the value of the parameter using  or the  button. Press the  button to store the value.

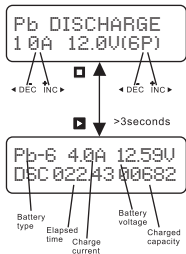
Charging a Pb battery



Set up the charge current on the left and the nominal voltage on the right. The range of current is 0.1- 10.0A. The voltage should match the battery being charged. Press the **▣** button for more than 3 seconds to start charging.

The screen displays the real-time charging status. Press the **▣** button to alter the discharge current. Press the **▣** button again to store the parameter value you set. Press the **▣** button to end the program.

Discharging a Pb battery

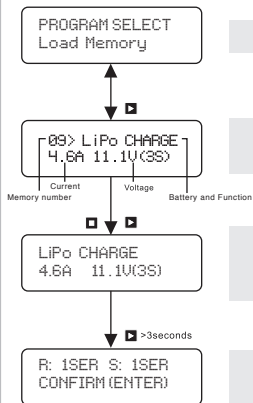


Set up the discharge current on the left and nominal voltage on the right. The range of discharge current is 0.1 - 2.0A, the voltage should match the battery being charged. Press the **▣** button for more than 3 seconds to start discharging.

The screen displays the real-time discharging status. Press the **▣** button to alter the discharge current. Press the **▣** button again to store the parameter value you set. Press the **▣** button to end the program.

Program select load memory

For your convenience Sigma EQ Eco II has a data memory function. It automatically stores the last 20 operations data, so you can call back the data when charging or discharging without setting up the program again.



Select "Load Memory" from the main menu, then press the **▶** button.

Press the **◀** or the **▶** button to cycle through the saved profiles. There are memory slots from 1 through to 20, plus "LS", which automatically saves the last charging profile used.

Press the **▶** button to customise the saved profile. Here you can use the **◀** button to rotate between different settings. Press the **⏏** button to change them, then press the **▶** button again to save.

Once the setup is complete, you can press and hold the **▶** button to run the profile. The confirm screen will then appear and charging can start, or you can simply press the **▶** button to save the profile and exit to the main screen.

Various information in the programs

Li3s 1.2A12.59V
BAL02243 00682



4.14 4.16 4.09
0.00 0.00 0.00

You can check for various types of information on the LCD screen during the charging process. Press the button and the charger will display the user's setting. You can press the button to monitor the voltage of each cell while the battery is connected to the balance port.

Voltage of each cell in the battery pack when the battery is connected via a balance lead.

Li3s 1.2A12.59V
BAL02243 00682



EndVoltage
12.6v(3S)

It comes to the displayed final voltage when the program ends.



Capacity Cut-off
On 5000mAh

Capacity cut off for setting the value of capacity.



Safety Timer
ON 120min

Safety timer ON and duration time in minutes.



Temp Cut-off
80C

Cut off temperature.



Ext.Temp 26C

The external temperature is displayed when the temperature probe is used. (Optional)



IN Power Voltage
12.56V

Input voltage.

Program select extra function

In this program, you can select other functions.

1>Measure internal resistance program

In this program, the charger can measure the per-cell internal resistance (only available for lithium batteries)

```
1 > measure IR
----->
```



The battery pack starts to measure internal resistance.

```
C1: 115 16 14mΩ
C4: 161 15 18mΩ
```

Row C1 shows the internal resistance for cells 1-3 and C4 shows cells 4-6. This function is only available for Lithium batteries.

2>Checking the capacity of the battery

```
2>CheckBattery
Capacity ----->
```



Start to check the capacity of a Lithium battery.

```
Select battery
LiPo
```

Press the button again, and then press the or the button, you can select battery type (LiPo/LiFe/LiIo).

```
>3seconds ↓ ←DEC INC
```

```
LiPo-6S 19.878V
95% C-----
```

Press the button (>3 seconds), the screen will display the status of the lithium battery connected. It indicates the cell count, voltage and charge percentage.

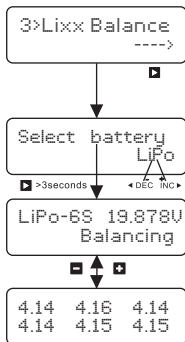


```
4.14 4.16 4.14
4.14 4.15 4.15
```

Press the or the button to see the voltage or each individual cell to see the voltages.

3>Lixx balance of battery

In this program, you can simply balance your 2-6S Lixx batteries using the integrated balancer. It indicates the voltage for each cell in your battery pack.



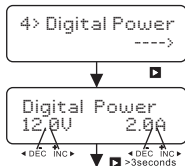
Press the **▶** button.

Press the **▶** button again, then Press the **+** or the **-** button to select your battery type (LiPo/LiFe/LiIo).

Press the **▶** button (>3 seconds) to start the balance procedure.

Press the **+** or the **-** button to see the voltage of each individual cell to see the voltages.

4>Set up voltage and current for the digital power



Press the **▶** button (>3 seconds) to start Digital Power.

Using the charger's output as a DC power supply. Press the **▶** button again, a beep will be sound. Then you Press the **+** or the **-** button to set up the voltage and current for the digital power. (Voltage range:5.0-25.0V, current range:0.1-10.0A)

```
DGPW 0.0A 19.87V
001:54 0.0W
```

Press the **▶** button for more than 3 seconds, and this screen displays the current, voltage and test time for digital power. (Max. power: 80W) DGPW is short for digital power.

5>Brushed Motor Drive

You can easily break-in a new brushed electric motor using a variable voltage and running time.

With this function you also can check the motor performance to optimise your power-train.

The break-in process is essential for maximizing the power of a new brushed motors.

New motors have square brushes which press up against the curved commutator.

The goal for the break-in process is to gently shape the brushes so that they develop a curved surface that fits snugly against the commutator giving greater conducting surface area and hence lower losses and higher efficiency.

WARNING: Do not operate the motor with anything attached and keep the rotating parts clear of hazards.

```
5>Brushed Motor
Drive ---->
```

Connect your brushed motor to the output socket of Sigma EQ Eco II, always connect the polarities correctly, red is positive and black is negative.

```
MOTOR DRV 30min
2.0A 12.00V
<DEC INC> <DEC INC> <DEC INC>
  ▲ ▲ ▲
  ▼ ▼ ▼
  ▶ >3seconds
```

The value in the right side of the first line sets the test duration in minutes. The second line shows the upper limit of current on the left and drive voltage on the right. After setting the current and voltage, Press the **▶** button for more than 3 seconds to start the process. A beep tone will sound. (Test time: 1-240min, Current: 0.1-10A, Test voltage:1-28V)

```
MOTOR 0.0A 19.87V
DRV 000:43 0.0W
```

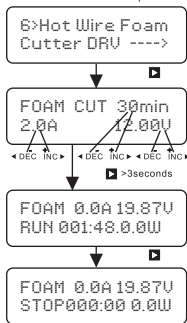
Status display. The top line shows the drive current and voltage. The second line shows the time elapsed and the watts being drawn.

```
MOTOR 0.0A 19.87V
STOP000:00 0.0W
```

You can stop the test at any time by pressing press the **▶** button

6>Hot wire foam cutter drive

In this mode, the charger acts as a convenient power supply for a DIY hot wire foam cutter. The current will need to be varied depending on the length of wire and foam type. For experienced users only as hot wire can be dangerous.

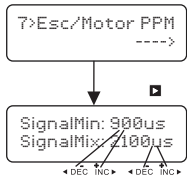


The value on the right side of the first line sets the cutting duration in minutes. The second line shows the upper limit of the current on the left side and drive voltage on the right. After setting the current and voltage press the **▶** button for more than 3 seconds to start the next process. A beep tone will be sound. (Running time: 1-240min, Current: 0.1-10A, Voltage: 1-28V)

Status display. The top line shows the foam cut current and voltage. The second line shows the status and in the lower right corner alternately displays the output power or total run time.

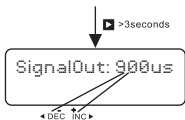
You can stop the test at any time by pressing the **▶** button.

1>Check ESC/Motor PPM



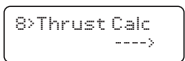
The Sigma EQ Eco II is an advanced charger that incorporates a feature which allows you to check an electric motor/ESC combination. **WARNING: Do not operate the motor with anything attached and keep the rotating parts clear of hazards.**

Connect the Rx connector from ESC to the Servo port in the left corner of the charger. Press the **▶** button, then press the **+** or the **-** button. After setting the max. signal and min signal, press the **▶** button for more than 3 seconds to start the next process. The minimum pulse width range is 700~1500us and the max pulse width range is 1500~2300us.



This screen shows the output signal. This can be changed $\left[\right]$ using or $\left[\right]$ buttons.

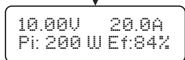
8>Thrust Calculator



In this program, you can easily calculate the thrust of a propeller without connecting it to the charger.

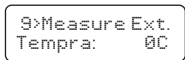


Press the $\left[\right]$ or the $\left[\right]$ button, You can set up the RPM in on the left side of first line and the parameter of the propeller on the right side of the first line. the screen display the thrust calculator and its power. Th is short for thrust and P is short for power. After setting the RPM, please press the $\left[\right]$ button for more than 3 seconds to start the next process.



In this process, you can set up voltage and current for the motor on the first line. The screen displays the estimated power/efficiency. Pi is short for power input and Ef is short for efficiency.

9>Measure External Temperature



In this program, the charger can measure the external temperature by using a temperature sensor, sold separately.

A>Measure Input Voltage and Output Voltage

A>Measure VOL
I:12.1V O:19.87V

In this program you can measure the DC voltage of the input (11-18V) and the output (0.1-28V).

B>Measure TX/RX

B>Measure TX/RX
Signal: 0us

In this program, the charger can measure the signal from an RX. Connect a Rx output (double ended servo lead commonly called a gyro lead, Not Supplied) to the servo port on the left corner of the charger. The charger will display servo output signal .

Warning and error information

Sigma EQ Eco II incorporates a variety of functions for the systems to verify processes and the state of the electronics. In the case of an error the screen will display the cause of error and emit an audible sound.

REVERSE POLARITY

Incorrect polarity connected.

CONNECTION BREAK

Battery connection is interrupted.

SHORT ERR

Short-circuit of the output terminals.

INPUT VOL ERR

The charger is expecting a different voltage, please check the voltage of the input battery.

VOL SELECT ERR

The voltage of the battery pack has been selected incorrectly!

BREAK DOWN

The charger has malfunctioned for some reason. Seek professional advice.

BATTERY CHECK
LOW VOLTAGE

The voltage is lower than the value set. Please check the number of cells in the battery pack.

BATTERY CHECK
HIGH VOLTAGE

The voltage is higher than the value set. Please check the number of cells in the battery pack.

BATTERY VOLTAGE
CELL LOW VOL

Voltage of one cell in the battery pack is too low, please check the voltage of each cell.

BATTERY VOLTAGE
CELL HIGH VOL

Voltage of one cell in the battery pack is too high, please check the voltage of each cell.

BATTERY VOLTAGE
CELL CONNECT

Wrong connection of the connector detected, please check the connector and cable.

TEMP OVER ERR

The internal temperature is too high, please let the charger cool down.

CONTROL FAILURE

The processor cannot control the feeding current, please repair it.

Warranty and service

We warrant this product for a period of one year (12 months) from the date of purchase.

This guarantee applies to materials 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. You will be required to present proof of purchase (invoice or receipt). This warranty does not cover the damage due to wear, overloading, incorrect handling or use of incorrect accessories.

This does not affect your statutory rights.



EU Compliance

This product complies with the essential requirements of all appropriate EU directives. A copy of the declaration of conformity can be obtained from Ripmax Ltd, www.ripmax.com

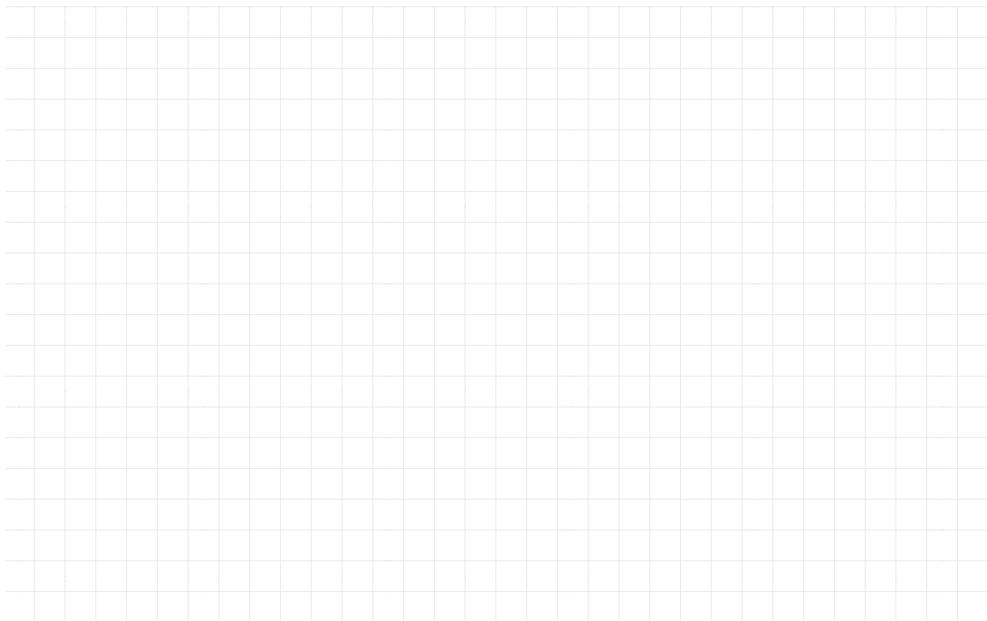


Instruction for disposal of WEEE by users in the European Union

Electrical equipment marked with the crossed wheeled bin symbol must not be discarded in the standard household waste. Instead, it should be taken to a suitable specialist disposal location or your dealer.

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