VERSION: A1.1

Manual

Mounting & installation

Zeliox ECO

ENGLISH

zeliox®

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1 Unpacking and check Zeliox ECO

The first steps for unpacking and installing the Zeliox ECO:

Step 1. Unpack Zeliox ECO and check that everything is included.

Step 2. Switch on the Zeliox ECO using the on/off button on the display at the front and test if 230V and 12V out is operational.

a. **230V AC**: Turn on the RCD on the front and measure the voltage.

b. **12V DC**: Measure voltage on the grey Anderson connector at the back.

c. Check if the battery of the Zeliox ECO is 100% full.

Step 3. If an extra battery is packed, unpack it and check if everything is included.

a. Charge extra battery 100% with external battery charger, set to lithium.

b. If the additional battery is not connected to the Zeliox ECO and you are going to charge it 100% full first then a through connection must be made on the green connector, Battery Switch. And set the switch on the battery to ON. If you do not make the through connection then the battery will not be charged.

Figure 1-1 extra batteries

Warning: *When connecting two batteries together, both batteries must be of the same capacity. Also, both batteries must be of equal voltage and charge (100% full). This is to avoid imbalance and large equalisation currents, thus preventing damage.*

2 Prepare the power cables according to manual

Connection port silkscreen	Connector name	Pictures	Recommended cable specifications			
			Polarity	Wire diameter	Length	Color
12V Input	SA50（Red）		Positive	6~10 mm² (6~9 AWG)	≤3m	Red
			Negative	6~10 mm² (6~9 AWG)	≤3m	Black
12V Output	SA50（Grey）		Positive	6~10 mm² (6~9 AWG)	≤3m	Red
			Negative	6~10 mm² (6~9 AWG)	≤3m	Black
MPPT Charger	SA50（Blue）		Positive	6~10 mm² (6~9 AWG)	≤3m	Red
			Negative	6~10 mm² (6~9 AWG)	≤3m	Black
*M12-100/P	SA120（Grey）		Positive	25~35 mm² (2~3 AWG)	≤1m	Red
*M12-200/H	SA175（Grey）		Negative	35~50 mm² (0~2 AWG)	≤1m	Black

2.1 12V DC Input

The 12V DC Input, red connector, must be connected to the vehicle's starter battery with plus and minus cables. It is recommended to fuse the plus cable extra on the starter battery side. Minus cable directly to the minus pole of the battery or to a connection point provided for this purpose.

Fuse Zeliox ECO I and II, 60A

Fuse ECO II+ and III, 100A

Attention: There is often a sensor on the negative pole of the battery. The connection of the minus cable to the Zeliox ECO must be fitted AFTER the sensor. Steps: Starter battery terminal → sensor → connection minus cable to Zeliox ECO.

Note: to an Anderson connector SA50 you can squeeze a 16mm2 cable

Warning: *Make sure the supply cable is of sufficient thickness to avoid unnecessary voltage loss. See table below.*

Recommended battery cables table:

The table below shows the maximum current for a number of standard cables where the voltage drop is 0.259 Volt. This table uses the total cable length, this is the length of the positive cable plus the length of the negative cable. Not that the losses over the contacts are not included.

Cable diameter (mm)	Cable cross-section (mm^2)	Maximum current (A) for a total cable length up to 5 meters	Maximum current (A) for a total cable length up to 10 meters	Maximum current (A) for a total cable length up to 15 meters	Maximum current (A) for a total cable length up to 20 meters
0.98	0.75	2.3	1.1	0.8	0.6
1.38	1.5	4.5	2.3	1.5	1.1
1.78	2.5	7.5	3.8	2.5	1.9
2.26	4	12	6	4	3
2.76	6	18	9	6	5
3.57	10	30	15	10	8
4.51	16	48	24	16	12
5.64	25	75	38	25	19
6.68	35	105	53	35	26
7.98	50	150	75	50	38
9.44	70	210	105	70	53
11.00	95	285	143	95	71
12.36	120	360	180	120	90

Calculating cable thickness

Cable thickness depends on the current that has to flow through the cable, with the length of this cable playing an even greater role. The rule of thumb below can be applied when selecting the right cable:

Wire cross-section (mm2) = total length of plus and minus cable (metres) x the maximum current (A) x 0.0175 / voltage drop (V)

In a mobile DC installation, a voltage drop of 5% is acceptable.

The table below shows the maximum length for the 12V DC supply cable of the ECO I & II and the ECO II+ & III, respectively, for the standard cable thicknesses.

12V DC power cable ECO I & ECO II		
mm2	maximum current amp	total length plus + min kabel
2,5	30	1,2
4	30	2,0
6	30	3,0
10	30	4,9
16	30	7,9
25	30	12,3
35	30	17,3
50	30	24,7
70	30	34,5
90	30	44,4

12V DC power cable ECO II+ & ECO III		
mm2	maximum current amp	total length plus + min kabel
2,5	60	0,6
4	60	1,0
6	60	1,5
10	60	2,5
16	60	3,9
25	60	6,2
35	60	8,6
50	60	12,3
70	60	17,3
90	60	22,2

The table takes into account a voltage drop of 0.269V. The is about 2% of the nominal battery voltage of 12.6V. If you calculate with max 5%, the specified lengths may be longer. A voltage drop of between 2 and 5% is considered normal.

2.2 12V DC Output

The 12V DC output, small grey connector, can be split with multiple 12V fuses. The maximum allowable current is 30A.

2.3 MPPT charger

The Zeliox ECO is prepared for connecting solar panels. A solar inverter (MPPT) with solar panels can be connected to the blue Anderson connector at the rear. The maximum allowable latent current is 40A. Zeliox ECO offers two solar inverters

- Solar Mate SP100-20 (max 300Wp)
- Solar Mate SP100-40 (max 600Wp)

When using these solar inverters, it is possible to monitor the charging current in the Zeliox App. Both inverters have to be connected to the Zeliox ECO with a communication cable (RJ45) for this purpose.

For connecting and setting the solar module, please refer to the MPPT user manual.

It is necessary to program the MPPT in Force mode. See page 21 of the manual for this.

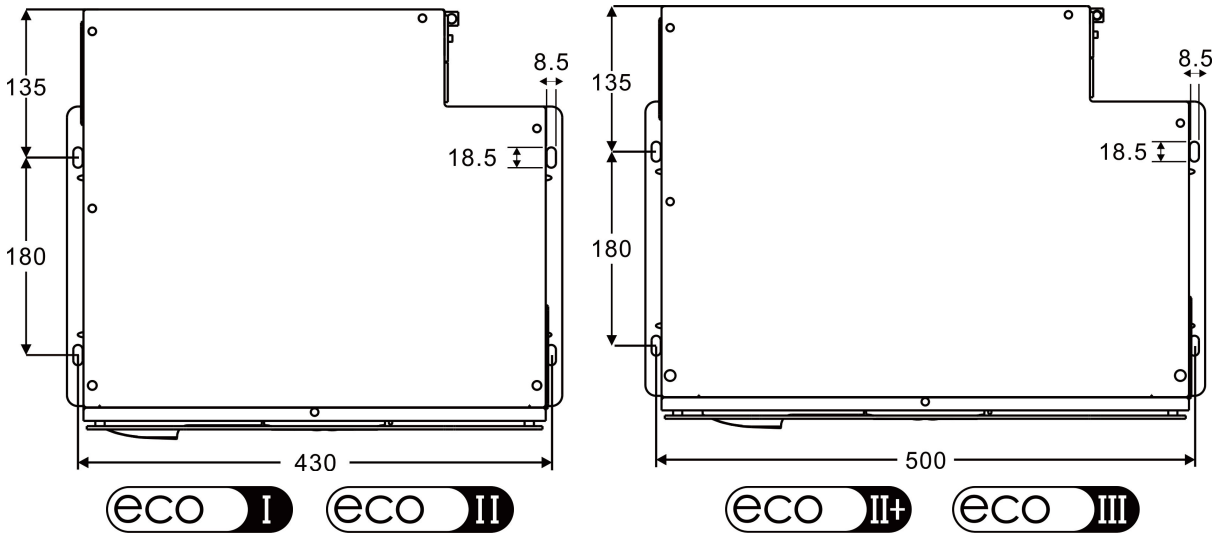
	Display	Setting range	Description
>Para_Mode	OutCtrl_CHG	0- Disable 1- Enable Default setting: 0-Disable	Enable state of charging external control mode, read only.
	RlyCtrl_Config	0-Default 1- Alarm Switch 2-REGO System Default setting: 0- Default	Output dry contact configuration.Select 0, if the connection is detected in the DC Coupling system, take one puff every 5 minutes to wake up Kinergier Pro(Connected to the input dry contacts of the Kinergier Pro). Select1,short connection at fault alarm. Select2,used for our REGO System.
	Silent_Mode_EN	0- Disable 1- Enable Default setting: 0-Disable	Silent mode setting
	Force_Charger	0- Disable 1- Enable Default setting: 0-Disable	Forced charge mode setting
	EPO_DRY_IN_EN	0- Disable 1- Enable Default setting: 0-Disable	Remote Switch enable setting
	Sys_Default_On	0- Disable 1- Enable Default setting: 1- Enable	Enable startup state of system mode. In the DC Coupling system, set to enter the startup state after power-on.
	Under the Setting menu, there are three parameter Setting options, among which EQ Setting needs to select the corresponding battery type to open. >Basic Set Advanced Set >EQ Setting In Basic Set, there are the following Setting options.		
	Display	Setting range	Description

Note: after programming the Force charger, it takes some time before you can detect that the MPPT is charging, at least 5 to 30 minutes.

3 Mounting

3.1 Positioning and perforation requirements

Please select a plane and drill holes according to the installation positioning requirements in figure 3-1. Before use, the product must be effectively fixed and cannot be fixed upside down. The fixing bolt is M8, and the fixing torque is 22Nm.



3.2 Optional: Mounting brackets

With the mounting brackets, the Zeliox ECO can be mounted in a different way. Normally, you mount the Zeliox ECO as described in section 3.1 positioning and perforation requirements. But with this set, the Zeliox ECO can be mounted at the back and front.

Note: Screws and threaded inserts are not included.

3.3 Optional: Reposition display

The original display can be dismantled and replaced with the replacement set display. With a UTP cable, the original display can be mounted in another place.

4 Installation

4.1 Switch External control

It is possible to turn the Zeliox ECO on/off with an external switch. The switch must be connected to the green connector on pins 1 and 2 on the back of the Zeliox ECO. By switching in an LED you can see whether the Zeliox ECO is on or off. The additional switch is optionally available. Below is the wiring diagram of a combined switch with LED function. To connect the switch with LED, a 4-core cable must be fitted. The 12V+ for the LED can be connected to pin 11 of the green connector on the back of the Zeliox ECO.

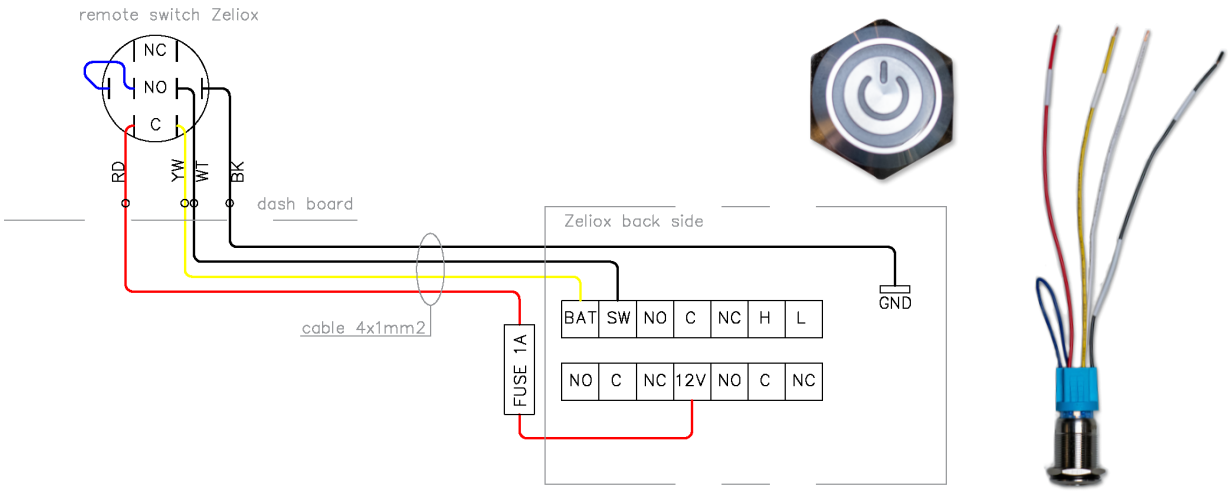


Figure 4-1 Zeliox ECO I, II, II+ and III new switch

Note: if you want to use the external switch, the switch on the Zeliox ECO must be in the OFF position. You control the Zeliox ECO with the switch on the Zeliox ECO OR with the external switch.

4.2 Connecting mains voltage (230V AC IN)

When the Zeliox ECO is connected to the shore power (mains voltage), it is possible that the shore ground fault protection will trip. This is a consequence of too high a starting current of the Zeliox ECO. If this happens, it is recommended to first switch on the Zeliox ECO using the on/off button on the front and only then connect the Zeliox ECO to the mains voltage.

4.3 External battery

The external battery should be connected to the large grey Anderson connector at the rear of the Zeliox ECO.

Connect the battery using the cable sizes and fuse specified in the Manual.

Note: Connect the RJ45 communication cable at the back of the Zeliox ECO in the "M12-200 COM" port and in the battery in the "Link In" port. The bridge in the green connector must be removed.

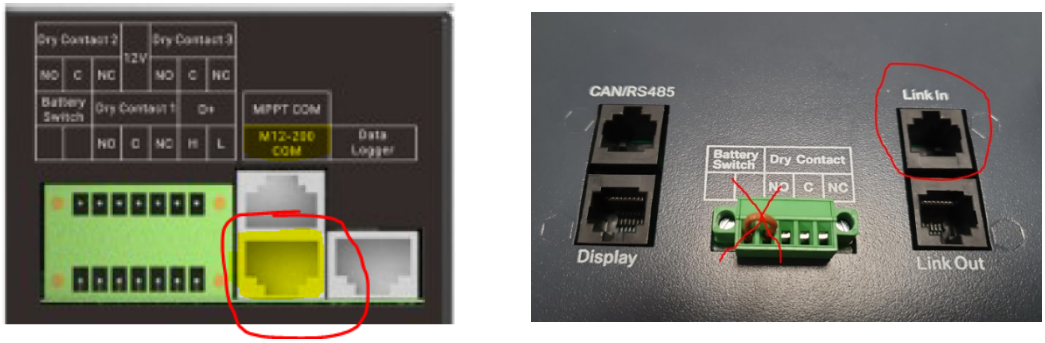


Figure 4-2 Connections external battery

Warning: When coupling, all batteries connected in parallel to the Zeliox ECO must be of equal capacity and voltage.

4.4 Configuration of solar panels

Solar panels can be mounted on a vehicle in various ways. It starts with selecting the type of solar panel, fixed frame or flex. For a neat finish, consider semi flexible solar panels. You can mount these panels with the curvature of the roof giving you lower air resistance. You can seal these panels directly onto the roof. Degrease well beforehand and use a primer.

Zeliox ECO has done tests with flexible solar panels from Sunpower with a PV power of 110W. The panels have a Voc of 21.9V and an Isc of 6.32A.

On an MPPT 100-20 you can put 4 panels in series, the Voc is then 86.8V. is smaller than the allowable voltage of the MPPT, which is 100V. True, the total PV power is then 400Wp, but the MPPT itself regulates the allowable power.

On an MPPT 100-40, you could connect a maximum of 8 panels. 4 in series and then another 4 panels in series parallel. However, the advice is not to connect more than 10% above the maximum PV power. The maximum PV power of the MPPT 100-40 is 600Wp. Six solar panels of 110Wp is therefore sufficient.

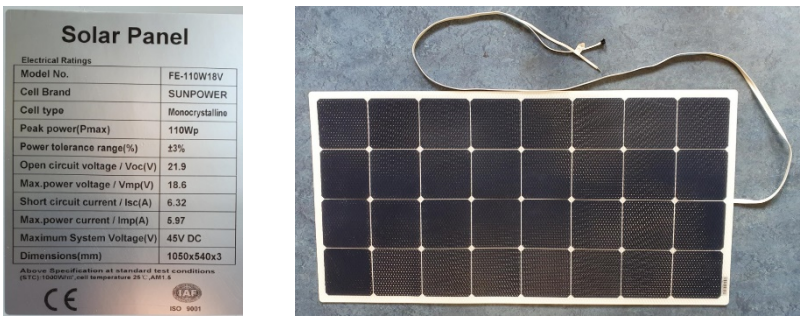


Figure 4-3 Example Flexible solar panel with flush mount (connection at the bottom)

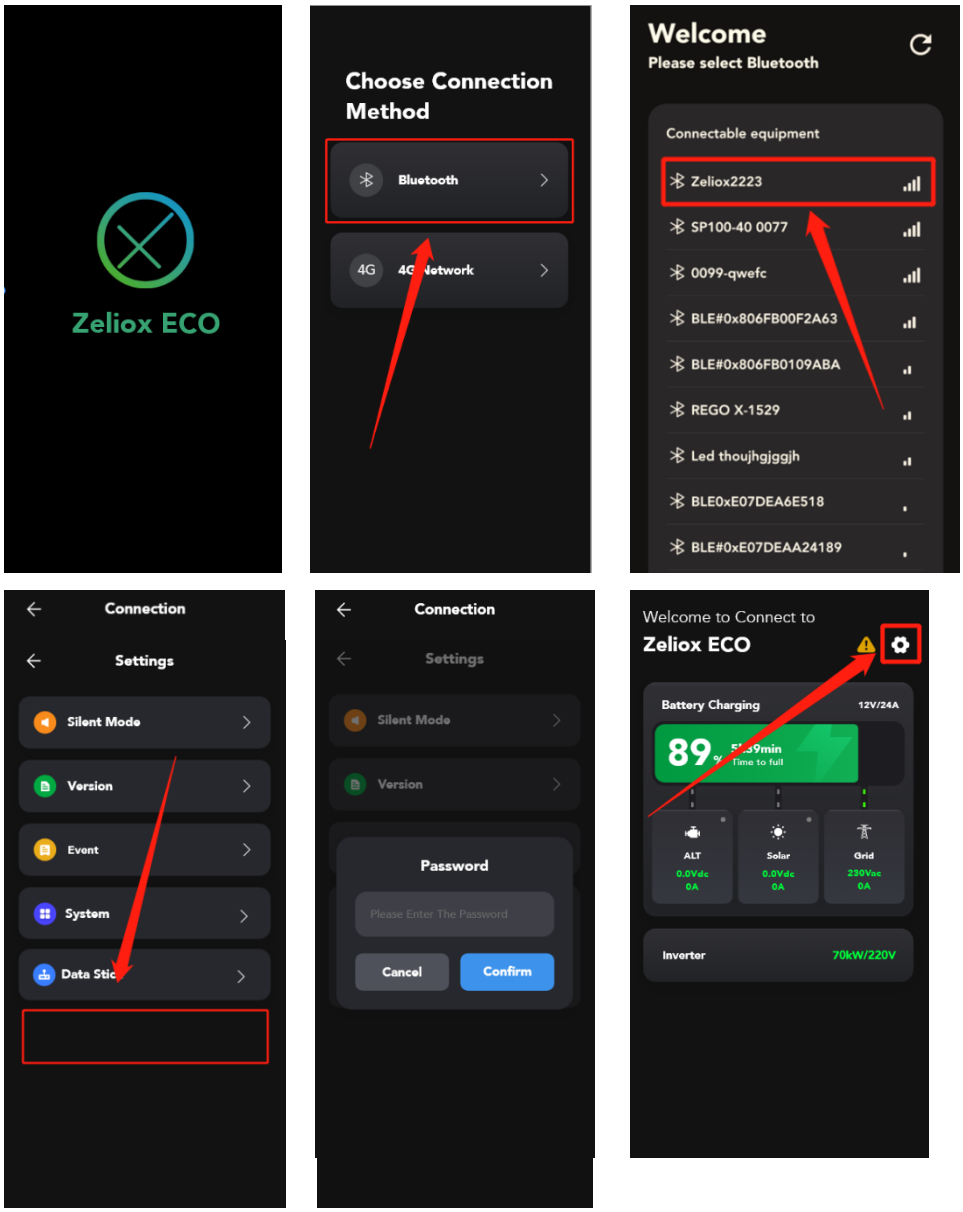
4.5 Configure Zeliox ECO App settings

Download the Zeliox ECO app.

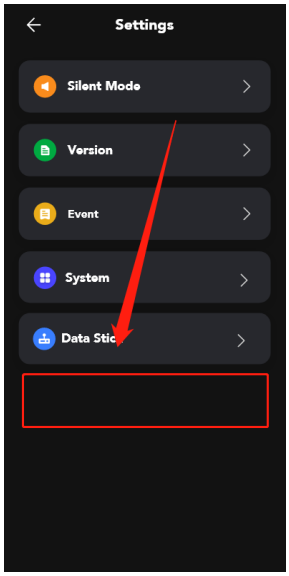
APP Store

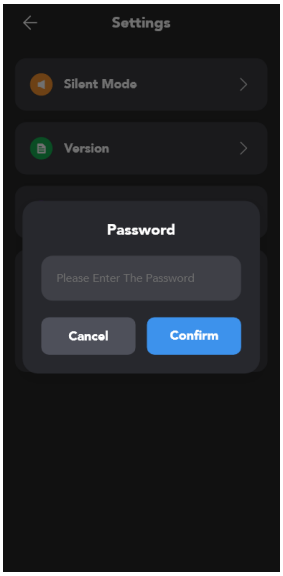
Google Play

Connect the Zeliox ECO with the Zeliox ECO app and click on the settings icon on the home page to go to the setting page.



If you are a professional engineer, click on the area five times in a row and enter the correct password (password: 1000) to enter the engineer setup page. For the correct settings, Zeliox can be contacted for additional support.





5 Heat pack explanation

Each Zeliox ECO and its additional battery are equipped with a heat pack. The heat pack can only become active when an external power source is provided. An external power source can be:

- Vehicle charging (vehicle battery)
- Wall current charging (mains voltage)
- Solar charging (solar panels)

When the battery temperature is ≤2℃, you will be notified and the Zeliox ECO can no longer be charged directly. By switching on the internal charger by connecting an external power source, the Zeliox ECO will automatically switch on the heating function. After the automatic heating of the lithium battery is completed, the alarm will disappear and the Zeliox ECO can be charged normally again.

When the ambient temperature is below -20°C, the Zeliox ECO can no longer discharge and a low-temperature alarm will be reported. Warm-up of the lithium battery is necessary to be able to use the Zeliox ECO again.

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