EO Mini Installation & User Guide V2.2

Table of Contents

1 Introduction

This document details the installation instructions for the EO Mini. It includes:

- How to mount and wire up the EO Mini
- How to set the current rating using the rotary switch
- What the LED colours mean
- Limit and Suspend Options

Note – there are several evolutions of the EO Mini. This document details the settings for the latest version (Issue 6) but the document will highlight differences where appropriate with earlier versions (Issue 4).

2 Installation Instructions the EO Mini

2.1 Physical Installation Instructions

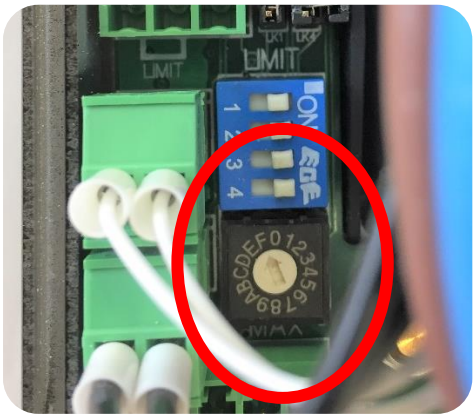
1) Remove the EO Mini from the packaging. Undo the 4 screws in the corners, then remove the front faceplate of the EO Mini and keep in a safe place (along with the plastic bungs for the front plate screws).

2) Offer the back plate of the EO Mini up to the installation location; make sure the surface is flat and level. Level the EO Mini base and mark the position of the 4 holes. Take the EO Mini base away and drill the four holes. Do NOT drill through the EO Mini base or base screw holes. We suggest using a 6mm masonry drill bit if affixing to brickwork. Do not screw the base to the wall at this point as this will be done later.

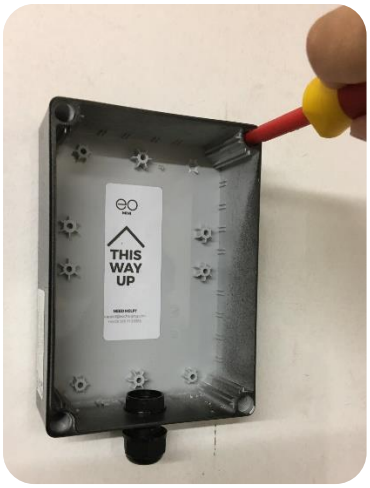
3) Drill the correct size hole in the bottom of the EO Mini base to take the cable gland. Note that cable entry must be from below to ensure weathertightness of the enclosure. Use

either a cone drill or a hole saw to cut the hole to the right diameter.

4) Fit the cable gland and clean out the EO Mini for dust.
5) Use the rotary switch on the EO Mini to select the correct current rating as per the enclosed instructions and section 4.



6) Attach the EO Mini base to the wall using four screws. Ensure that the base is the correct way up and that it is flush against the wall.



7) Strip and prepare the power cable – EO recommends crimping ferrules onto the ends of the prepared power cable wire.

8) Connect the power cable to the front plate of the EO Mini.

9) Position all cables so that you can close the EO Mini front plate to the EO Mini back plate, making sure that no cables are trapped. Secure the EO Mini front plate to the EO Mini back plate. Do NOT over tighten the screws.
Ensure that the 4 plastic bungs are inserted into the screw holes.

Congratulations. Another EO Mini has been successfully installed!

2.2 Important Installation Information

Characteristics of Power Supply Input	Permanently connected to 230V AC supply
Characteristics of Power Supply Output	Supplies 230V AC to the vehicle
Normal Environmental Conditions	Can be installed indoors or outdoors
Access Requirements	Can be installed with no access restrictions
Mounting Method	Stationary equipment intended for surface or post mounting
Protection Against Electric Shock	Class I equipment
Charging Mode	Mode 3 charging equipment
Ventilation During Supply of Energy	Does not support ventilation during charging
Ingress Protection	IP54
Mechanical Strength	IK08
Operating Temperature	-10°C to +50°C
Height of Installation	The charging equipment should be mounted with the bottom face of the enclosure at least 0.9m above ground level.
Usage of Adaptors / Cord Extension Sets	Adaptors and conversion adaptors sets are not permitted to be used with the equipment. Cord extension sets are not permitted to be used.

The installer must select the RCD and earthing configuration in accordance with local regulation & best practice.

Where the EO Mini includes DC leakage protection a **Type A RCD** can be fitted at the supply. Otherwise a **Type B RCD** or equivalent should be used. EO recommend a 20A supply rated supply circuit for a 16A charging station and 40A supply for on 32A charging station.

3 Wiring Connections

It is possible to configure the EO Mini to connect to TN Networks or IT Networks. This is done by different mechanisms:

1) EO Mini Issue 6 – Using a Jumper – refer to Section 3.1 & 3.2
2) EO Mini Issue 4 – using the rotary current selection switch – refer to section 4

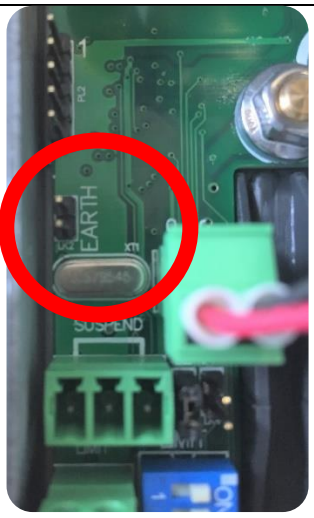
3.1 One Phase TN Networks

By default the Earth Jumper is attached which enables the EO Mini to check that earth is present before allowing charging sessions.

Wiring System	Markings on the Mini			Earth Jumper	
	Live	Earth	Neutral		
TN (220V)	L1	PE (Protective Earth)	N	ON	
TN (110V)	L1	PE (Protective Earth)	L2		

3.2 One Phase IT networks (e.g. Norway)

For markets that with to connect to the IT network, then the Earth Test Jumper must be removed. Removing this jumper will allow the Mini to be connected without an appropriate earth connection

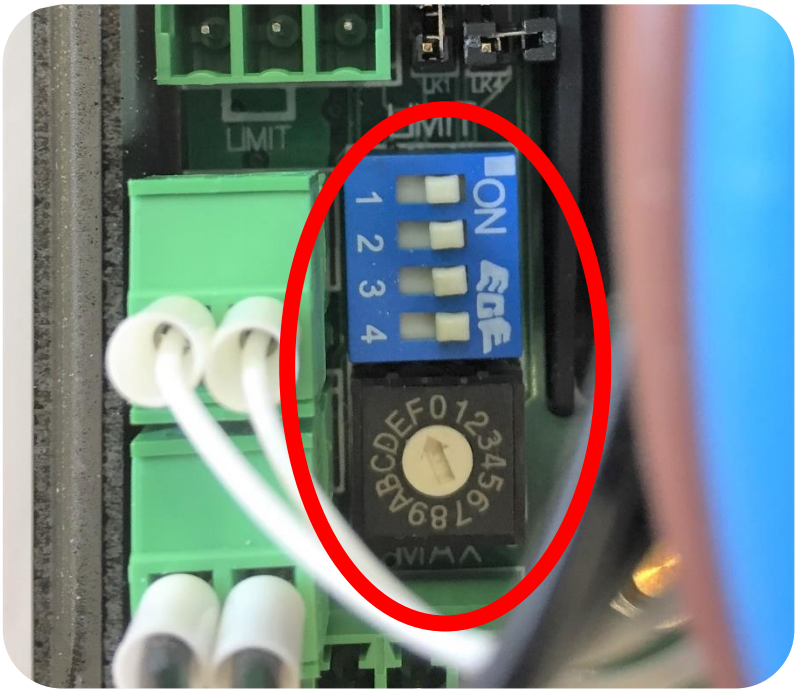
Wiring System	Markings on the Mini			Earth Jumper	
	Live	Earth	Neutral		
IT (220V)	L1	Not Connected	N	OFF	
IT (110V)	L1	Not Connected	L2		

4 Setting the Maximum Current

It is possible to change the maximum current rating of the EO Mini by using the rotary switch. There are two sets of hardware with different rotary switch values. It is important to set the rotary switch according to the correct hardware

4.1 EO Mini Issue 6+Hardware

This version of the EO Mini is identified by the presence of the dip switches shown below



The Values of the rotary switch are as follows

Rotary Switch Position	Maximum Current of the EO Mini (Amps)
0	0A – Off – Default Position
1	6
2	8
3	10
4	13
5	15
6	16
7	18
8	20
9	22
A	24
B	25
C	26
D	28
E	30
F	32

4.2 EO Mini Issue 4 hardware – 16 way switch – FW version 11

This version of the EO Mini does not have the BLUE dip switches

4.2.1 EO Mini Issue 4 - TN-C-S or PME Earth

The following switch positions determine the maximum current rating for countries that use a TN-C-S or PME earthing system.

Switch Position	Mains Test (Loss of earth)	Current Rating (Amp)
0	YES	0A (default state)
1		6A
2		8A
3		10A
4		12A
5		16A
6		20A
7		25A
8		30A
9		32A

4.2.2 EO Mini Issue 4 - IT Earth

The following switch positions determine the maximum current rating for countries that use an IT earthing system. This option disables the loss of mains tests in the firmware

Switch Position	Mains Test (Loss of earth)	Current Rating (Amp)
A	NO	6A
B		10A
C		16A
D		20A
E		25A
F		32A

These switch setting values were chosen to align with commonly used MCB ratings.

4.3 EO Mini Issue 4 hardware – 16 way switch – FW version 8

Firmware version 8 is identified by if the EO Mini has a 16 way switch and the serial number is less than EO-05418.

4.3.1 TN-C-S or PME Earth

The following switch positions determine the maximum current rating for countries that use a TN-C-S or PME earthing system.

Switch Position	Mains Test (Loss of earth)	Current Rating (Amp)
0	YES	11
1		12
2		14
3		16
4		19
5		22
6		24
7		28
8		30
9		32

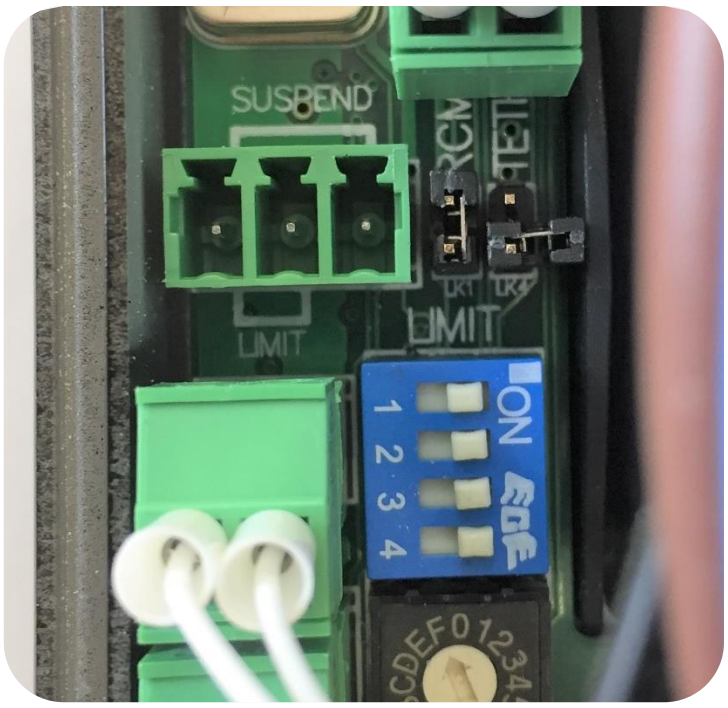
4.3.2 IT Earth

The following switch positions determine the maximum current rating for countries that use an IT earthing system. This option disables the loss of mains tests in the firmware

Switch Position	Mains Test (Loss of earth)	Current Rating (Amp)
A	NO	11
B		12
C		16
D		22
E		28
F		32

5 Limit and Suspend

There are two new features on the EO Mini Issue 6+ which allow further control of the Mini by remote control systems. These are access by the three-way terminal block and the blue dip switches



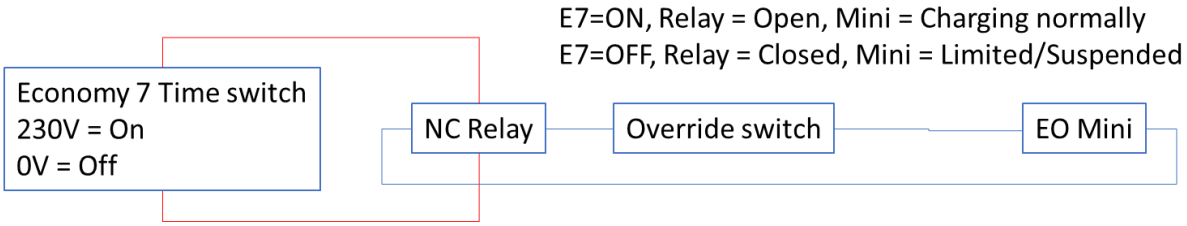
- Suspend – If Pins 1&3 are shorted together then the maximum charging rate shall be set to 0A i.e. turned off
- Limit – If Pins 1 & 2 are shorted together then the maximum charging rate is set to the following

Dip Switch 1	Dip Switch 2	Dip Switch 3	Dip Switch 4	Max Current (A)
OFF	OFF	OFF	OFF	0A – Off – Default Position
ON	OFF	OFF	OFF	6
OFF	ON	OFF	OFF	8
ON	ON	OFF	OFF	10
OFF	OFF	ON	OFF	13
ON	OFF	ON	OFF	15
OFF	ON	ON	OFF	16
ON	ON	ON	OFF	18
OFF	OFF	OFF	ON	20
ON	OFF	OFF	ON	22
OFF	ON	OFF	ON	24
ON	ON	OFF	ON	25
OFF	OFF	ON	ON	26
ON	OFF	ON	ON	28
OFF	ON	ON	ON	30
ON	ON	ON	ON	32 (Default)

5.1 Example usage – Economy 7 in the UK

The limit and suspend features are considered for use in conjunction with an external control system. The economy 7 time switch in the UK would be a good example. An economy 7 time switch might have the following profile

A suggested connection is detailed below



If the economy 7 time switch is disabled (e.g. during day time) then the relay closes which shorts the connections between Pins 1&2 (Limit) or Pins 1&3 (Suspend) and limits or suspends charging. This means that charging would only be enabled when the economy 7 time is enabled.

It's advisable to install an over-ride switch so that the user can plug in and choose to charge outside of the economy 7 charging window simply by opening or closing the switch.

6 How to use the EO Mini

6.1 Charging a vehicle

In order to charge a vehicle, the following steps should be followed

- Turn on EO Mini
- Plug cable into vehicle
- Plug cable into EO Mini (not applicable if a tethered unit is installed)
- The Vehicle should start to charge

In order to stop a charging session, the following steps should be followed:

- Stop the charging session from the vehicle e.g. unlock the vehicle
- Remove the cable from the vehicle
- Remove the cable from the EO Mini (not applicable if a tethered unit is installed)

6.2 Storage of tethered cable

When not in use, the tethered cable should be wound up and stored on a locally provided hook. The plug should be latched into the plug holder on the front of the EO Mini.

6.3 Cleaning

It is recommended to periodically clean the terminals of the socket with a suitable solvent based cleaner to ensure that the socket is free from dirt and other contaminates.

7 Lights

The colour of the LED should be interpreted as follows:

7.1 Power Up

When the unit is powered up the following sequence should be observed

State	LED Colour	Notes
Power OFF	Not illuminated	No power is available
Power On	LED solid RED	Initialising
	LED pulses BLUE	Unit has started up successfully and is ready to charge

7.2 Normal Operation

State	LED Colour	Notes
No cable is inserted	LED pulses BLUE	Ready to charge
Cable is inserted	LED pulses GREEN	Charging station is communicating with the vehicle and trying to start a charging session
	LED solid GREEN	A charging session has started successfully
Cable is removed	LED pulses BLUE	Ready to charge
PAUSED	LED solid YELLOW	The unit has been put on pause by an external system e.g. EO Hub, EO ALM or an external system

7.3 Fault Conditions

The charging stations can detect certain fault conditions and when a fault condition is detected then the LED flashes RED a certain number of times to indicate the nature of the fault. The fault codes are:

LED error codes	Notes
Solid Red	An internal fault has occurred
Two short red flashes	There is no earth connection
Three short red flashes	More than 6ma of DC current has leaked to earth
Four short red flashes	Live and Neutral are connected back to front
Five short red flashes	The mains supply has dropped below 170V
Seven short red flashes	Diode test failed - Vehicle issue
Eight short red flashes	Thermistor Fault - no Thermistor present
One red flash and two purple flashes	An over current event has occurred i.e. the vehicle has tried to draw more than 130% of the cable capacity (only applicable on EO Mini Issue 6+)

The LED is latching. This means that as soon as a fault is detected, then the fault code is displayed on LED until the end of the charging session. If the fault disappears during the charging session, then the LED will continue to display the fault code so that the end user is aware that a fault has occurred. The LED will only return to normal operation when the cable has been removed at the end of the charging session. This is designed to indicate to the end user, whether a fault has occurred and indicates a potential problem with the installation or might explain why the charging session was interrupted.

Without this functionality, a fault might occur on the installation and disappear before the end user can be notified.

7.3.1 What should I do if a fault occurs?

Remove the charging cable and verify the LED returns to normal operation (pulsing blue). If this doesn't clear the fault, then power cycle the charging station by turning off and on the main circuit

breaker (RCD) to the station. If the fault persists then contact the installer as there is potentially and installation issue that needs to be addressed.

8 Further Technical Support

All EO Charging technical documentation is published in the EO Resource Centre, this is found at:
https://www.eocharging.com/service-support/

The EO Support team can be reached at:

- Email: support@eocharging.com
- Phone: +44 (0) 333 77 20383

8.1 Revision History

Revision	Date	Changes
1.1	11th Dec 2019	Addition of section 6 and specified minimum height of installation in section 2.2
1.2	24th Dec 2020	Added section 6.3 on cleaning the contacts
1.3	14th Feb 2020	Updated section 2.2 with product details
1.4	18th Feb 2020	Confirmed as IK08 in section 2.2
2.0	19th May 2020	Added the EO Mini Issue 4 settings into this guide as well – primarily section 4
2.1	24th July 2020	Corrected the fault colour code for the over current
2.2	5th Oct 2020	Updated for Issue 8 error codes (7 & 8 flashes - section 7.3)