EO Genius & EO Hub Installation Guide.

Contents

1.0 Introduction

Your EO Hub & EO Genius must be installed by an EO Approved and onboarded installer.

The installation should be in accordance with the IET Code of Practice for Electric Vehicle Charging Equipment Installation and local regulations.

This document includes:

+ Installation instructions for EO Genius hardware.
+ EO Hub installation & Wiring connections.
+ How to power the EO Genius hardware for the first time.
+ Support.

1.0

Introduction

This document is designed to complement the EO Academy training and does not replace any onboarding or online academy certifications.

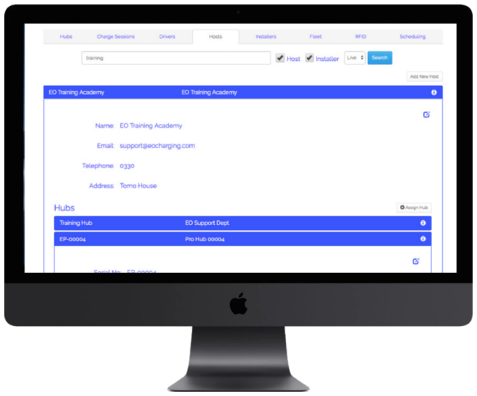
It is still mandatory for installers to have made contact with our onboarding team as not do so can affect product warranty and help via the support desk.

The details of all EO Academy training can be obtained by emailing:

onboarding@eocharging.com

Experience has shown that often the most difficult part of the installation is enabling the communications between the EO Hub and the EO Cloud back office portal. Therefore it is recommended that the IT settings (section **3.13**, pg. 22) are discussed with the customer soon as possible.

1.0



Actions to take prior to hardware install.

It is the Installers responsibility to create the Host, and allocate the appropriate Hub and chargers accordingly on the EO Cloud.

We recommend you do not proceed until you have carried out tasks described on the EO Cloud user guide.

Please see the EO Cloud User Guide for assistance.

1.02

Log in and access the EO Portal.

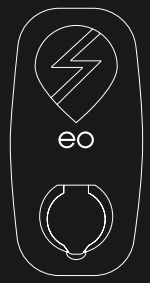
1.03

Create the host (customer).

1.04

Allocate the EO Hub & charge points.

2.0 Installation instructions for the EO Genius.



Your EO Genius **MUST** be installed by an EO Approved Installer. The Installation should be in accordance with the IET Code of Practice for Electric Vehicle Charging Equipment Installation and current local regulations. Completing the online EO Academy training is also mandatory prior to installation.

2.0

2.01

Remove the EO charger and base plate from the packaging.

2.02

Unscrew the locking plate (bar) from the base plate using the tool provided.

2.03

Level the base plate against the wall (or EO post). Fix the base plate to the wall or post using the 4mm holes.

2.04

Unscrew the cover on the back plate connector.

2.05

Using a hole cutter, cut a hole into the rear plate connector for the gland.

2.06

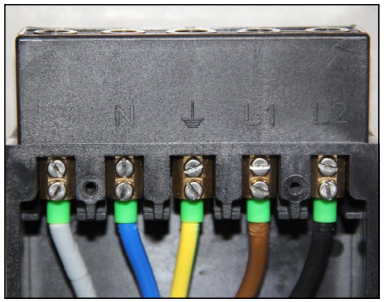
Fit the correct sized gland for your power cable.

2.07

Unscrew the 6 screws (10 screws if installing a 3-phase unit), feed the cable through the gland and secure. Prepare the ends and if stranded or multi-stranded cable is utilised make sure to fit ferrules.

2.08

Connect the power cables to the pins as shown – Single Phase or Three Phase.



2.09

Replace the cover.

2.10

An additional screw is provided should you need another earth.

2.11

Replace the locking plate and screws to secure the unit.

Power up the unit and test.

2.0

2.12

Important Installation Information	
Characteristics of power supply input	Permanently connected to 230/400V 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 II equipment
Charging mode (MODE 3)	DO NOT USE: Adaptors, converters and cord extensions with this device
Ventilation during supply of energy	Does not support ventilation during charging

The installer should select the RCD and earthing configuration in accordance with the IET Code of Practice and local regulations.

Note: Where the EO Genius includes DC leakage protection (DCL) a Type A RCD can be fitted at the supply. Otherwise a Type B RCBO or equivalent should be used. EO recommend a dedicated 40A supply rated circuit for each charging station.

3.0 EO Hub installation and wiring connections.

3.0

Installation instructions: EO Hub.

Install the EO Hub in a suitable indoor location close to the output of the electricity meter.

Physically mount it to the wall using the mounting holes and four appropriate screws (not included).

An RJ45 connector cable is provided to start your serial line and should be connected to the serial comms port of the EO Hub.

3.01

EO Hub Connections

The EO Hub has the following connections as shown in the diagram below:

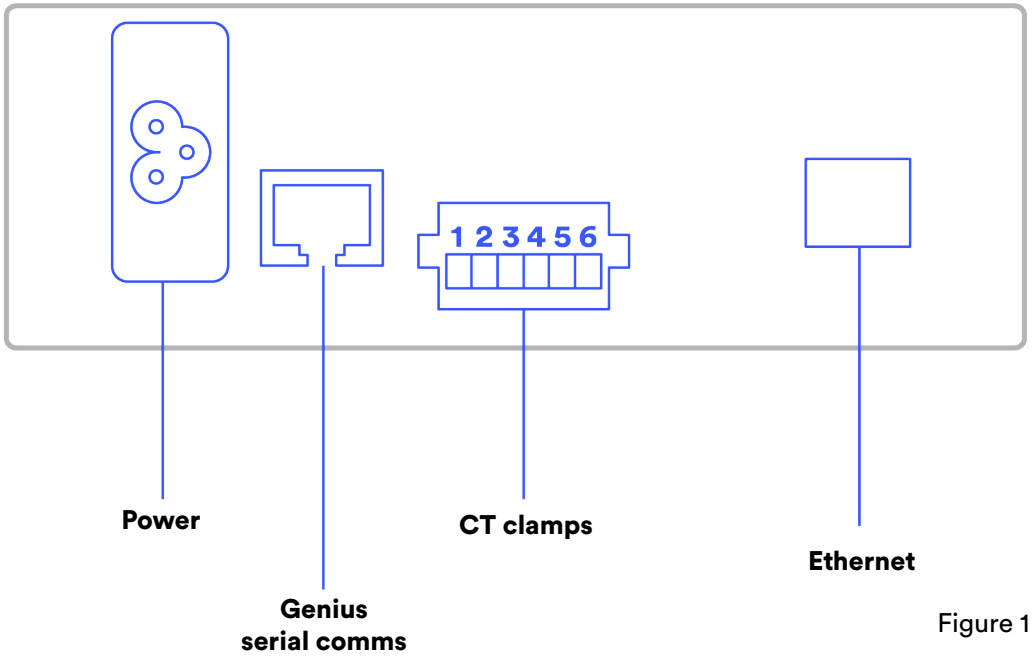


Figure 1

3.0

Connecting the Serial cable to the RJ45 connector on the hub.

Use the short link, provided, to make the initial connection from the EO Hub to serial line RS485.

If not using the link provided we recommend the use of a Wago style connector for this purpose.

We recommend you us ethe Belden 9841 as the serial line.

DO NOT use CAT 5 or 6 cable as serial line type or you will find issues with data transfer.

DO fit ferrules to ends of serial wires if when using Wago connectors.

3.02

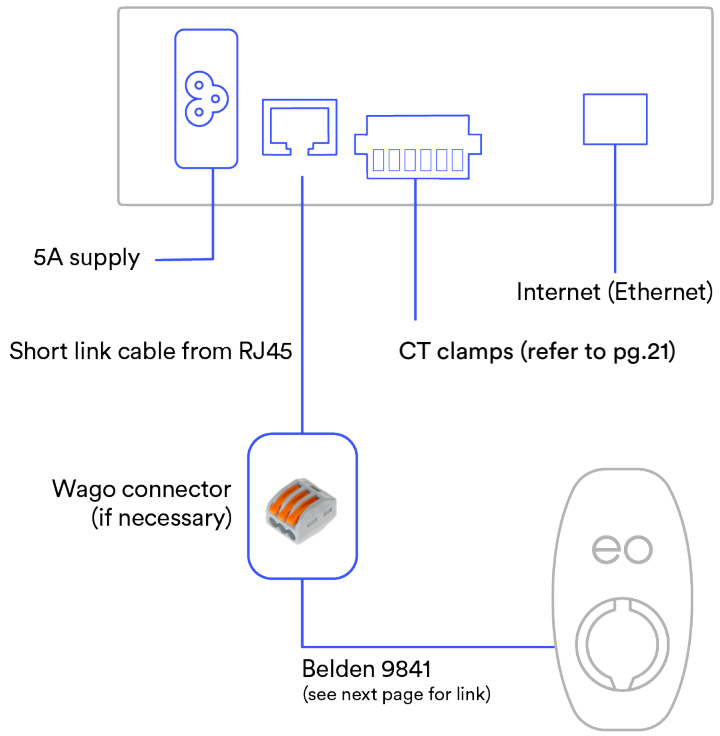


Figure 2

The wiring of the EO Hub RJ45 connector for serial comms is as follows:

Pin 1 – Unused

Pin 2 – Unused but connected to GND

Pin 3 – Unused but connected to GND

Pin 4 – Comms A – Blue

Pin 5 – Comms B – White with blue stripe

Pin 6 – Unused but connected to GND

Pin 7 – Unused but connected to GND

Pin 8 – Unused but connected to GND

RJ45 plug and wiring –

Pins 4 & 5 to be selected only
(snip off other wires)

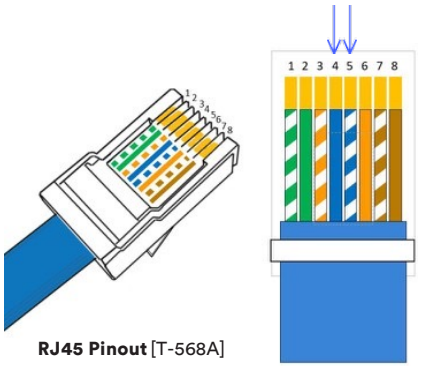


Figure 3

3.0

Wiring connections for EO Genius and the serial bus.

Each Genius charge point has a short length of cable protruding from it. This needs to be connected to the other stations in a ‘Daisy Chain’ format to eventually terminate at the EO Hub.

3.03

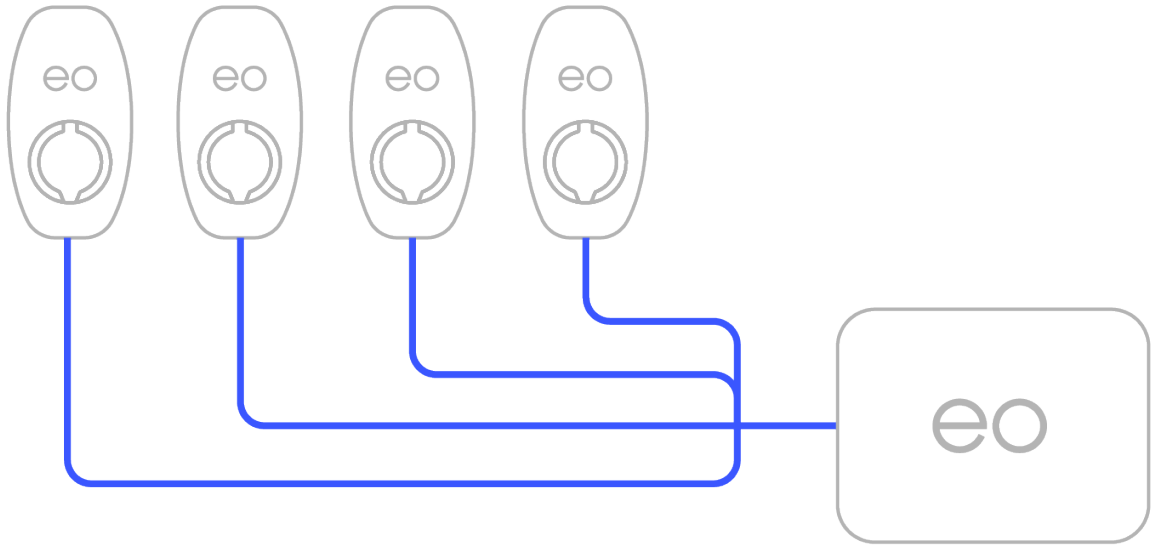


Figure 4

3.0

Wiring connections for EO Genius and the serial bus.

The diagram to the right shows the Genius charge points and pre-fitted short length of serial cable. Four core is supplied on earlier chargers with two core on later models. Select the appropriate colours according to your charger version:

Version 1 - charger cable colours:

1. Black (comms B)
2. Red (comms A)

Version 2 - charger cable colours:

1. White + Blue tracer (comms B)
2. Blue (comms A)

3.03

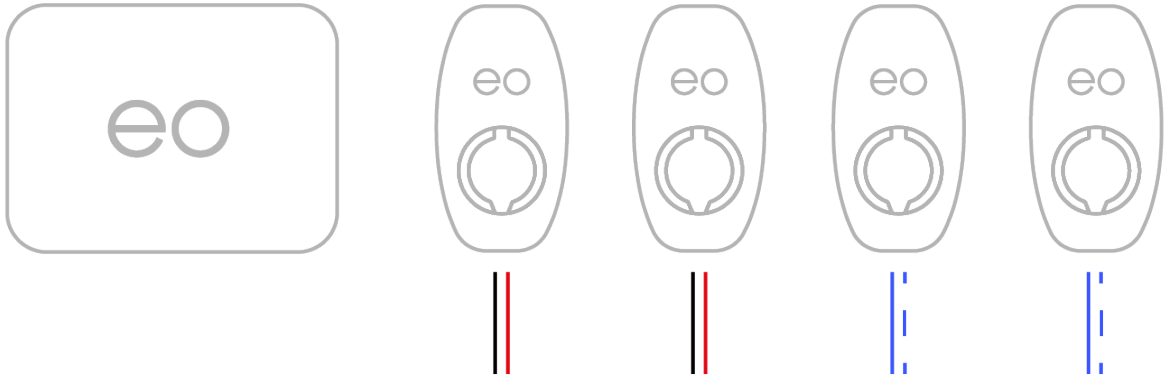


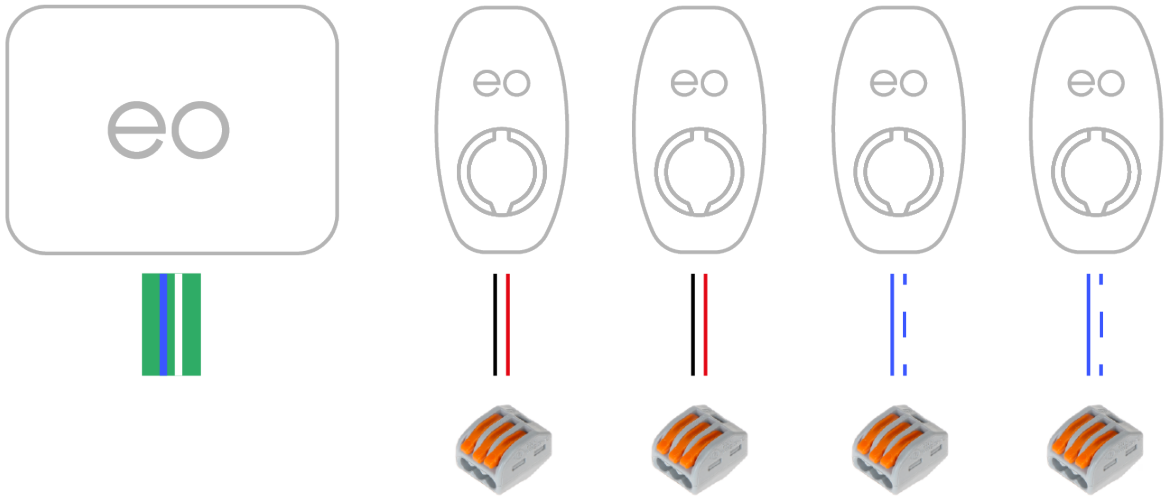
Figure 5

3.0

Wiring connections for EO Genius and the serial bus.

To facilitate serial line connections we recommend the use of Wago style connectors as seen here and also recommend using similar enclosures as seen on the right hand side.

3.03



Wago Connectors

Figure 6

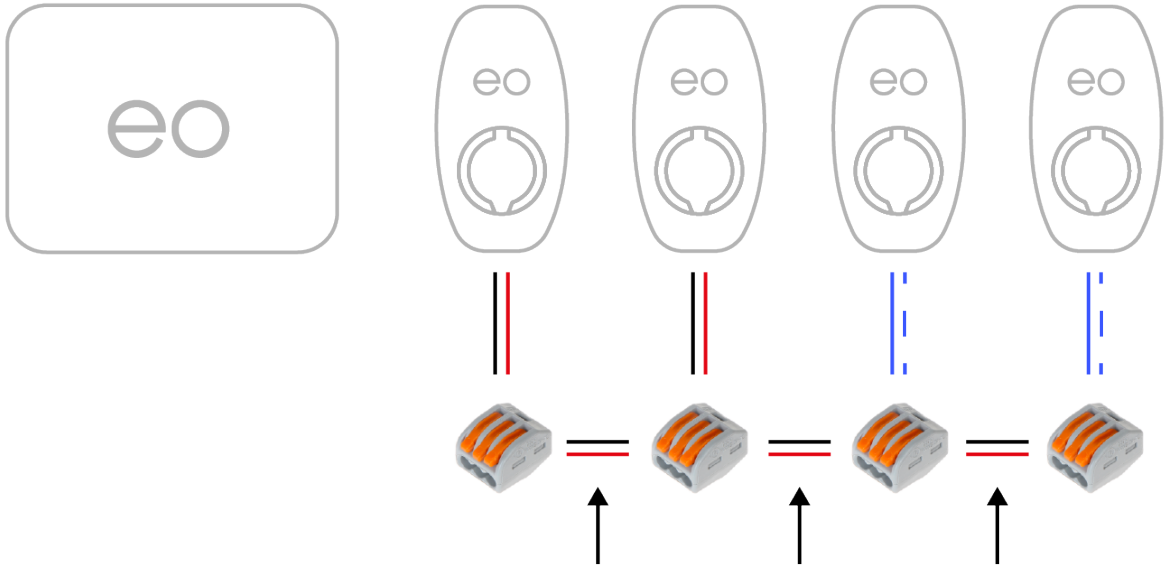
3.0

Wiring connections for EO Genius and the serial bus.

With the data bus connection at charge points it's time to create your RS485 connections 'daisy chain' back to the EO Hub. We recommend Belden 9841 600v as it carries the best properties for this application. **DO NOT** use Cat6 type cable for this application.

Remember to fit ferrules where serial wire has been stripped for connections.

3.04



Main Serial Line (Belden 9841)

Figure 7

3.0

RJ45 Wiring connections for Genius serial bus RE485.

The serial connector on the hub is an RJ45 socket i.e. a standard Ethernet socket. The thickness of the recommended Belden type cable is too thick to be connected into the RJ45 connector therefore a short 30cm Ethernet cable can be used as the EO Hub's primary connection.

3.04

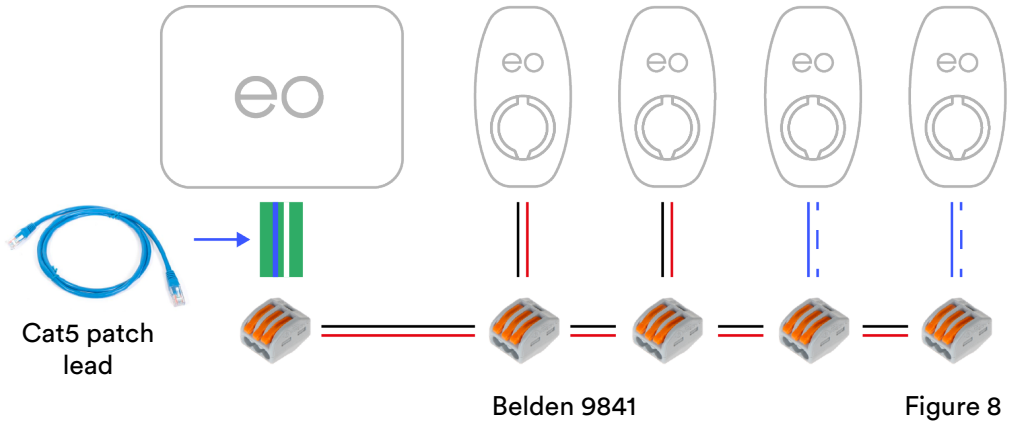


Figure 8

Connecting the Serial cable to the RJ45 connector on the EO Hub:

1. Use the enclosed **RJ45 to serial line adaptor.**

2. Take a standard CAT 5 Ethernet cable.
3. Cut a short length with the RJ45/ Ethernet plug on one end.
4. Strip and expose the bare wires for pins 4&5 for Comms A&B and pin 1 for earth.
5. Connect the serial cable to the bare wires using a 3 way level connector.

3.0

Resistors for the Serial Bus RS485.

Resistors are used, in this case, to increase efficiency of data transmission and reduce any possibility of noise and interference.

Considerations should be observed when creating your serial line topology.

Both examples opposite are correct due to the placement of both termination resistors.

In both examples, resistors are placed at both ends of the serial line.

Resistors should bridge both comms A & B wires.

3.07

To ensure a reliable communication on the RS485 serial cable, a 120 ohm 0.25W terminating resistor must be fitted at each end of the serial line, effectively bridging both serial wires.

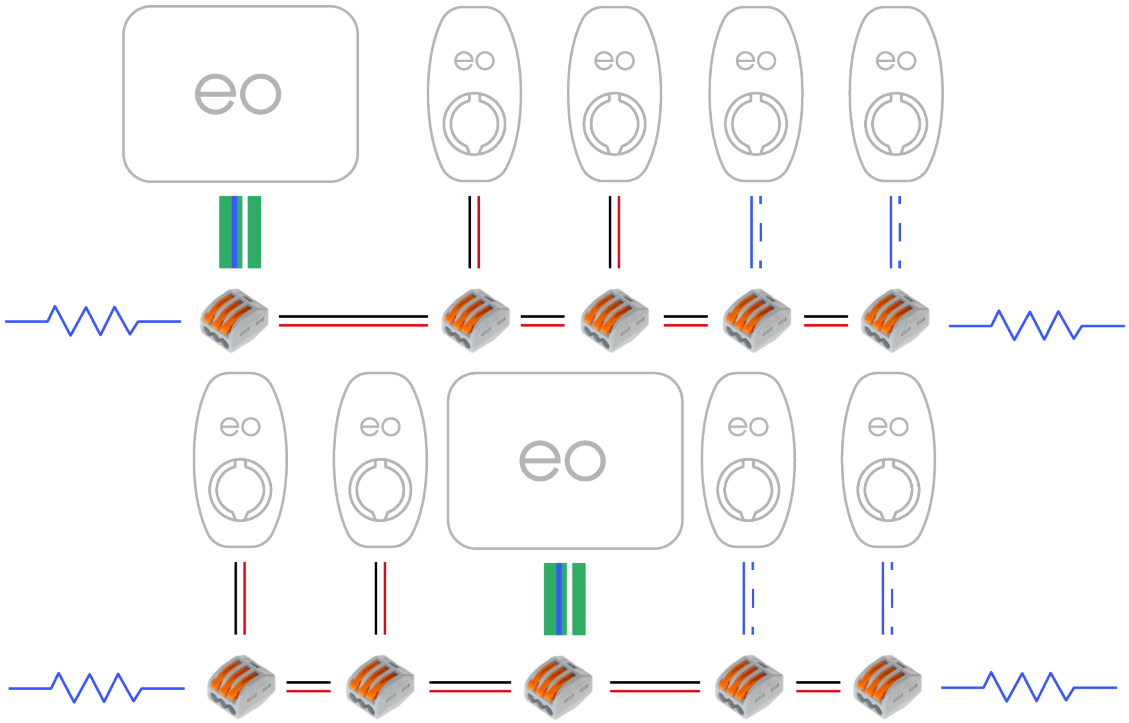


Figure 9

3.0

Resistors for the Serial Bus RS485.

3.08

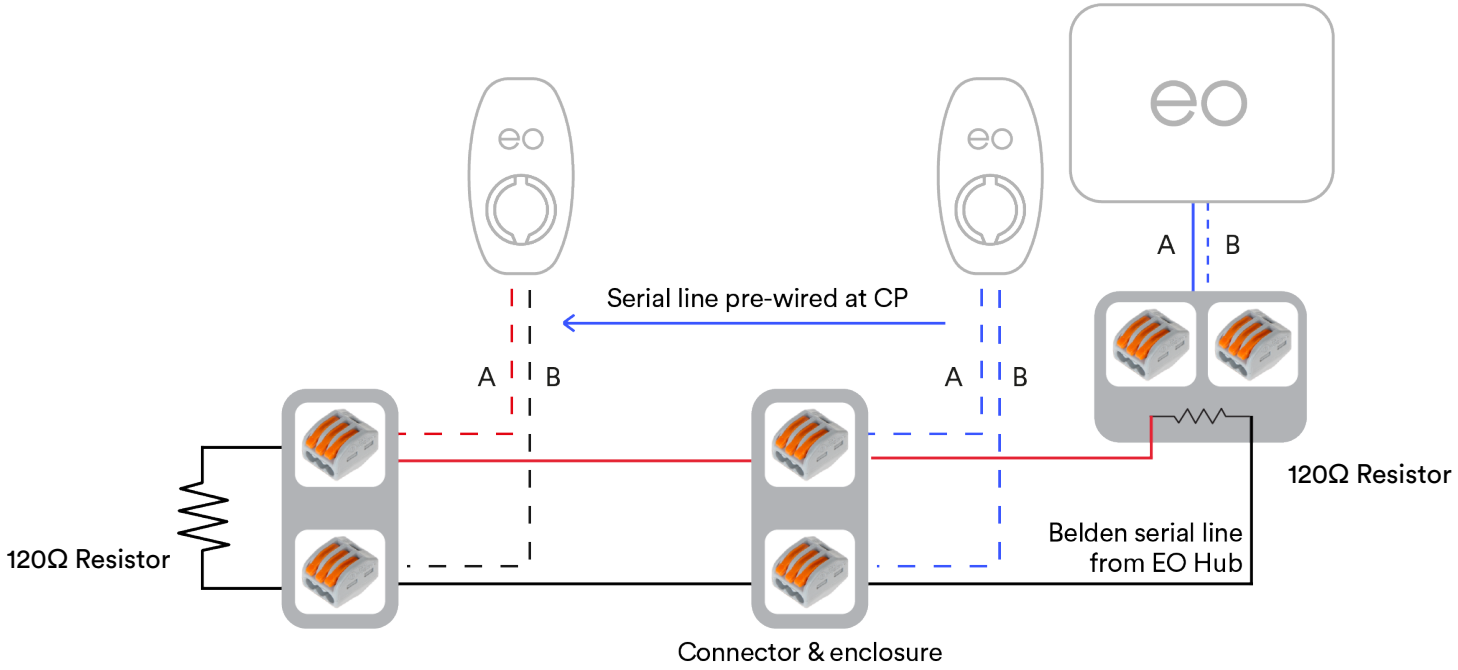


Figure 10

3.0

Serial bus connector. Best practice.

3.09

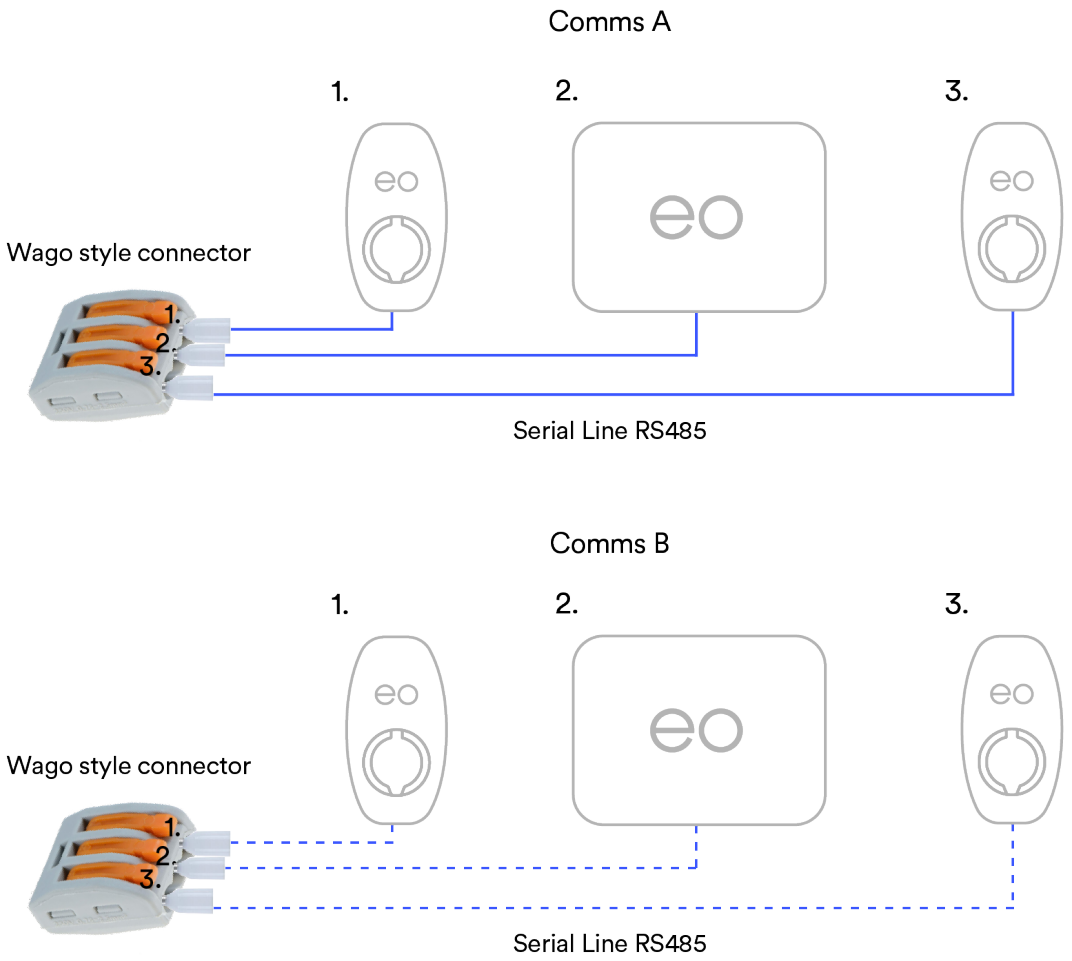


Figure 11

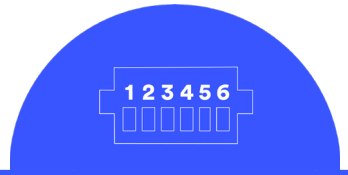
3.0

CT clamps.

CT clamps are only needed if automatic load management (ALM) is used.

Note: The CT clamps need to be fitted in the correct orientation. The Arrow which states "**Source**" needs to be pointing towards the source of the supply. For example, the arrow of the CT clamp for the ALM would be pointing upstream to the utility meter.

3.10



EO HUB PIN	CT CONNECTION	CT FUNCTION
Left hand terminal	L1 - White	Phase 1
CT1 (Left)	L1 - Black	
CT2	L2 - White	Phase 2
CT2	L2 - Black	
CT3	L3 - White	Phase 3
Right hand terminal	L3 - Black	

Please pay close attention to the **EO Hub Pin numbers**.

The CT clamps need to be fitted in the correct orientation – follow this table and orientation on the CT Clamps.

Figure 12

3.0

Ethernet connection & Network security settings.

3.11

Ethernet connection

For the EO Hub to communicate to the EO Cloud back office, an Internet connection is required. This can be achieved by using an Ethernet lead connecting to the client's network.

As standard, the EO Hub IP address and DNS server address are assigned via DHCP. Once assigned, it is best if the IP address is reserved in the Server DHCP table where possible. For sites where a fixed IP address is required please contact EO Support who can advise further.

3.12

Sites having firewalls

There are other options available if a static IP address is strictly requested by your Host. This can be discussed with the EO support team, who can provide further information.

3.13

Firewall Port Settings:

+ TCP ports 4455 must be open allow the outgoing connection.
+ TCP and UDP port 53 must be open for DNS and is critical.

3.0

Ethernet connection & Network security settings.

3.14

GPRS Modems

It is also possible to connect the EO Hub via a GSM 4G modem If unable to reach the client network.

An additional outdoor antenna should be considered for the best connectivity and reliability.

EO can supply both the above, pre-configured with a SIM package if required. If a third party modem is used, then please consider the following points to ensure that a connection can be made:

+ Update APN settings, on the router, for mobile network.
+ Turn off any VPN settings.

3.0

Ethernet connection & Network security settings.

3.15

Boot up

On power up, the EO Hub performs a boot up sequence which can take around 90 seconds to complete. Once the Hub has successfully booted and connected to the EO Servers, all three LED's should be illuminated.

LED1 is on the far left
LED2 is in the middle
LED3 is on the far right

Note: If the EO Hub has been unsuccessful at connecting to the Internet and EO Servers, LED1 (far left) will not be illuminated.

If the above occurs, ports and Internet access should be verified to be working at source.

Figure 13

3.0

EO Hub LED status.

3.16

EO Hub LEDs

There are three status LEDs on the EO Hub as shown in Figure 4. These LEDs are either illuminated green or off. The LEDs indicate different stages of operation with the principle stages being **Start Up** and **Normal Operation.**

STAGE	LED 1	LED 2	LED 3	REPEATS	DESCRIPTION
1	■			6 times	Start up
		■			
			■		
2		■		Solid	Error state - contact EO
3		■		2 flashes	Error state - contact EO
4			■	2 flashes	Start up successful
			■		
5		■		6 times	Normal operation - LED 1 blinking, LED 2 solid
			■	5 times	
6			■		Start up successful
		■			
	■				
3	■		■		Fatal error - Contact EO
		■			

Figure 14: Start up

3.0

EO Hub LEDs.

STAGE	LED 1	LED 2	LED 3	REPEATS	DESCRIPTION
1	■			6 times	Secondary start up.
		■			
			■		
2	■			Solid	Internet connection test.
3	■	■		Solid	Configuring EO Hub (Can take up to 60 seconds).
4	■	■	■	LED 1+2 = S LED 3 = BR	The EO Hub is communicating with the EO Genius charging stations. This is the normal operational state.
5	■	■	■	LED 1+2+3 = S	The EO Hub is connected to the EO Cloud but no charging stations have been allocated to the EO Hub.

* S = Solid, BR = Blinks Rapidly

Figure 15: Normal Operation

3.0

3.17

Powering up the EO Genius

On powering up the charge stations the LED's will firstly flash red. Then will settle to pulsing blue (normal state).

If a red LED is shown after six blue pulses, this would signify a bad serial line connection meaning the charger cannot communicate with the EO Hub.

Check all serial line connections including connectors and re-check.

3.18

Charger LED

The colour of the LED should be interpreted as follows:

Power up

STATE	LED COLOUR	NOTES
Power OFF	Not illuminated	No power is available
Power ON	LED solid RED	Initialising
Power ON	LED pulses BLUE	Unit has started up successfully and is ready to charge

Figure 16

Normal operation

STATE	LED COLOUR	NOTES
No cable inserted	LED pulses BLUE	Ready to charge
Cable 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 removed	LED pulses BLUE	Ready to charge
Paused	LED solid YELLOW	The unit has been paused by the EO Hub

Figure 17

3.0

Normal operation.

3.19

Starting a charging session

1. Unlock the vehicle
2. Plug the cable into the vehicle
3. Plug the other end of the cable into the EO Genius
4. The charging session shall start (subject to any authentication settings applied)

Stopping a charging session

1. Stop the charging session from the vehicle e.g. by unlocking the vehicle
2. Remove the cable from the vehicle
3. Remove the cable from the EO Genius

3.20

Storage of tethered cable

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

3.21

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.

4.0 Technical Support.

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

The EO Support team can be reached at:
support@eocharging.com
+44 (0) 333 77 20383

Happy Charging!