Installation Guide: eoHub and eoGenius

Table of Contents

1   Introduction

This document details the physical installation instructions for the Hub, how to connect it to the Genius charging stations and the Ethernet communication requirements.

This document is designed to complement the EO Academy training days and it is still mandatory for Installers to attend a training day before installing a genius and hub.

The details of all EO Academy training events can be found here: www.eocharging.eventbrite.co.uk

Experience has shown that often the most difficult part of the installation is enabling the communications between the eoHub and the eoCloud back office portal. Therefore it is recommended that the IT settings (section 3.4) are discussed with the client as soon as possible.

2 Wiring Connections for the Genius Charging stations and the serial bus

Each Genius charging station has a short two wire serial cable protruding from it. This needs to be connected to the other stations and the hub in a daisy chain fashion (with the hub at one end).
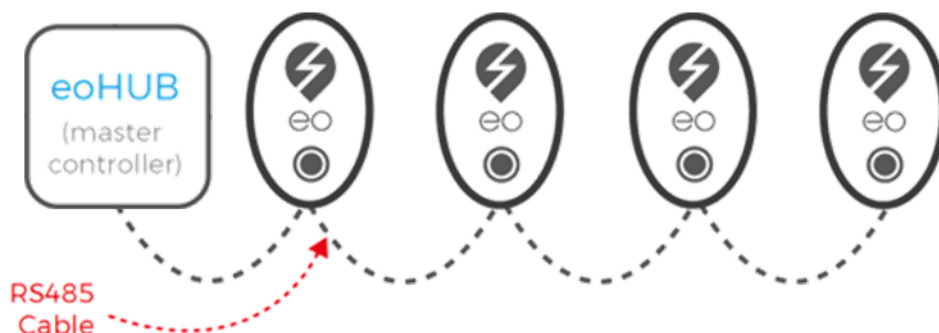

Figure 1 - eoHub and eoGenius serial communication bus

Different cables have been used in the manufacture of Genius charging stations and therefore the Comms A and Comms B could be either of the following

- Comms A – Red or Blue&White stripe
- Comms B – Black or White&Blue stripe

Serial cable needs to be run from the hub to the genius charging station in order to connect the two together. Without full communication in place the eoGenius the charging station will perform identically in operation to an eoBasic and will not offer any advanced functionality.

When the charging stations are daisy chained, please note the following recommendations and best practices:

- Terminate the RS485 cable from the charging station into a breakout box
- Use Wago connectors to join the two cables together to create the serial bus.
- When post mounting, the breakout box can be placed within the post
- When wall mounting, the breakout box can be placed within the trunking

This best practice is shown in Figure 2 below.

Figure 2 - Wago connectors linking up the serial bus

Although very short cable runs can be achieved using CAT5E cable, for reliable operation the following RS485 products are recommende. Note that by using a 600V rated serial cable this allows the installer to run serial bus cable together in the same containment as the conductors

- Belbin 9841 – LSZH 600V – Link
- Belbin 9841 – SWA LSZH – Link

2.1   Fitting termination resistors to the RS485 Serial Bus

To ensure reliable communication on RS485 serial cable runs of greater than 25m, a 120 ohm 0.25W terminating resistor should be applied at each end of the bus. The following link provides guidance on selection of a termination resistor:

https://maximintegratedsupport.force.com/support/s/article/RS-485-Termination-Resistor-Power-Rating

2.2   Earthing of the Serial Bus

With to the current mounting mechanism of the serial cable in the genius station, this is the recommended best practice for the earthing of the serial bus:

- Connect the shield of the serial cable to Pin 1 on the RJ45 connector at the hub (refer to section 3.2)
- Connect all of the shields of the serial cables together at each breakout box
- DO NOT connect the shield of the cable to the earth of the charging station

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

The serial connector on the hub is an RJ45 socket i.e. a standard Ethernet socket. The thickness of the recommended serial cable is too thick to be connected into an RJ45 connector. To overcome this, use the following steps:

- Take a standard Ethernet cable
- Cut a short length with the RJ45/Ethernet plug on one end.

- Strip and expose the bare wires for pins 4&5 for Comms A&B and pin 1 for earth
- Connect the serial cable to the bare wires using a 3 way level connector

A typical finished connection is shown below in Figure 3

Figure 3 - Connecting the serial cable to the RJ45 socket on the hub

3   Wiring Connections for the Hub

There are four connections to the hub

- Power
- Serial Comms to the charging stations
- CT Clamps
- Ethernet connection for internet access

Figure 4 - Connections to the Genius Hub

3.1   Power

This is supplied via a standard IEC plug. It is recommended that this cable is terminated directly into a 5A fused connection unit (ie not using the 3-pin plug). This avoids the risk of it being unplugged in error.

Regulations state charging equipment must have a dedicated final radial circuit, so eoHub must not be powered on the same radial as the charging stations. Where a dedicated EV distribution board is fitted, we recommend a single phase supply is taken from this this same board.

3.2   eoGenius RS485 serial Comms

The eoGenius charging station needs to connect to the eoHub via an serial bus. Charging stations are daisy chained together with the final connection to the eoHub. The serial bus connects to the hub via an RJ45 connection. The wiring of theeo Hub RJ45 connector for serial comms is as follows:

- Pin 1 – Earth
- Pin 2 – Unused but connected to GND
- Pin 3 – Unused but connected to GND
- Pin 4 – Comms A
- Pin 5 – Comms B
- Pin 6 – Unused but connected to GND
- Pin 7 – Unused but connected to GND
- Pin 8 – Unused but connected to GND

3.3   CT Clamps

If automatic load management is going to be used at the installation then CT clamps need to be installed and connected to the eoHub. Connections to the eoHub is as follows

- Pin 1 – L1 – White
- Pin 2 – L1 – Black
- Pin 3 – L2 – White
- Pin 4 – L2 – Black
- Pin 5 – L3 – White
- Pin 6 – L3 – Black

    Pin 1 is the left hand pin of the connector shown in Figure 4.

3.4   Ethernet connection & Network Security Settings

For the eoHub to communicate to the eoCloud back office Portal, an internet enabled ethernet connection needs to be provided using an RJ45 connector.

As standard, the eoHub IP address and DNS server address are assigned via DHCP. Once assigned, it is best if the IP address is reserved in the DHCP table. For sites where a fixed IP address is required please contact EO Support for advice.

For most non-domestic installations, the following firewall settings must be applied to allow the eoHub to connect to EO servers.

<u>Please share these details with site IT manager to ensure setting are correctly applied ready for completion of your installation!!!</u>

- TCP ports 4455-4456 must to be open allow the outgoing connection
- TCP and UDP port 53 must be open for EO remote diagnostics access

For sophisticated firewall systems, the following addresses must all be reachable

- hubsvr1.eocharging.uk   Secondary eoCloud server
- hubsvr2.eocharging.uk   Primary eoCloud server

- hubsvr4.eocharging.uk   Test eoCloud server
- postie.ccsys.uk   Email exchange server
- 8.8.8.8   Primary DNS
- 8.8.4.4   Secondary DNS

Once the settings have been configured, it's possible to test the whether the ports are open by navigating to:

http://porttest.eocharging.com:4455
http://porttest.eocharging.com:4456

All EO Charging technical documentation

3.5   Boot Up

On power up, the eoHub performs a boot up sequence which can take around 90sec to complete. It is finished when all of the status LEDs (refer to Figure 4) are flashing green. These LEDs can also provide diagnostic information for the support team.

4 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