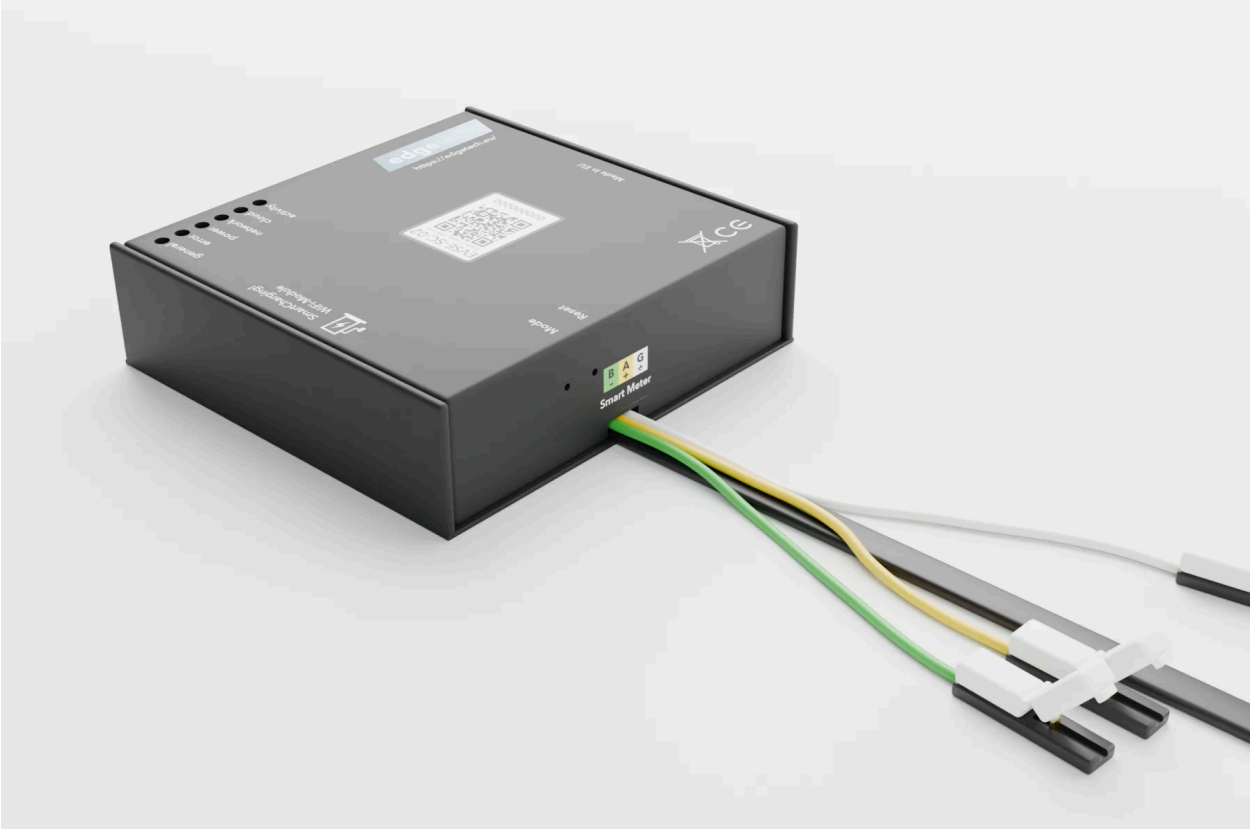
INSTALLATION MANUAL

Charger with load balancing on the smart meter (EVSE-SC-02)

How to install the charge controller EVSE-C-3x32A with its RDC-DD and the site controller EVSE-SC-02 on the P1 port of a DSMR 5 smart meter, and how to set them up with the MyCharger app. For qualified electricians and experienced installers.



CONTENTS

1. The system at a glance
2. Safety
3. Before you start
4. Install the charger
5. Install the site controller EVSE-SC-02
6. More than one charger
7. Switch on and check
8. Set up with the MyCharger app
9. Subscription and support
10. Disposal
11. Technical data

1. The system at a glance

An EdgeTech charger with load balancing has two parts, connected by one Modbus cable:

PART	WHERE	WHAT IT DOES
Charger with the charge controller **EVSE-C-3x32A** and the **RDC-DD EVSE-X-DCD**	At the parking space	Talks to the car, switches the power to the car on and off, and stops charging on overheating, a missing earth or a DC residual current above 6 mA
Site controller EVSE-SC-02	Next to the smart meter, on its P1 port	Reads what the house uses and returns from the smart meter and tells each charger, every second, how much current it may take, so the main fuse never trips. Connects to the MyCharger app over WiFi

Two cables run between the metering cabinet and the charger: the **power cable** and the **Modbus cable**.

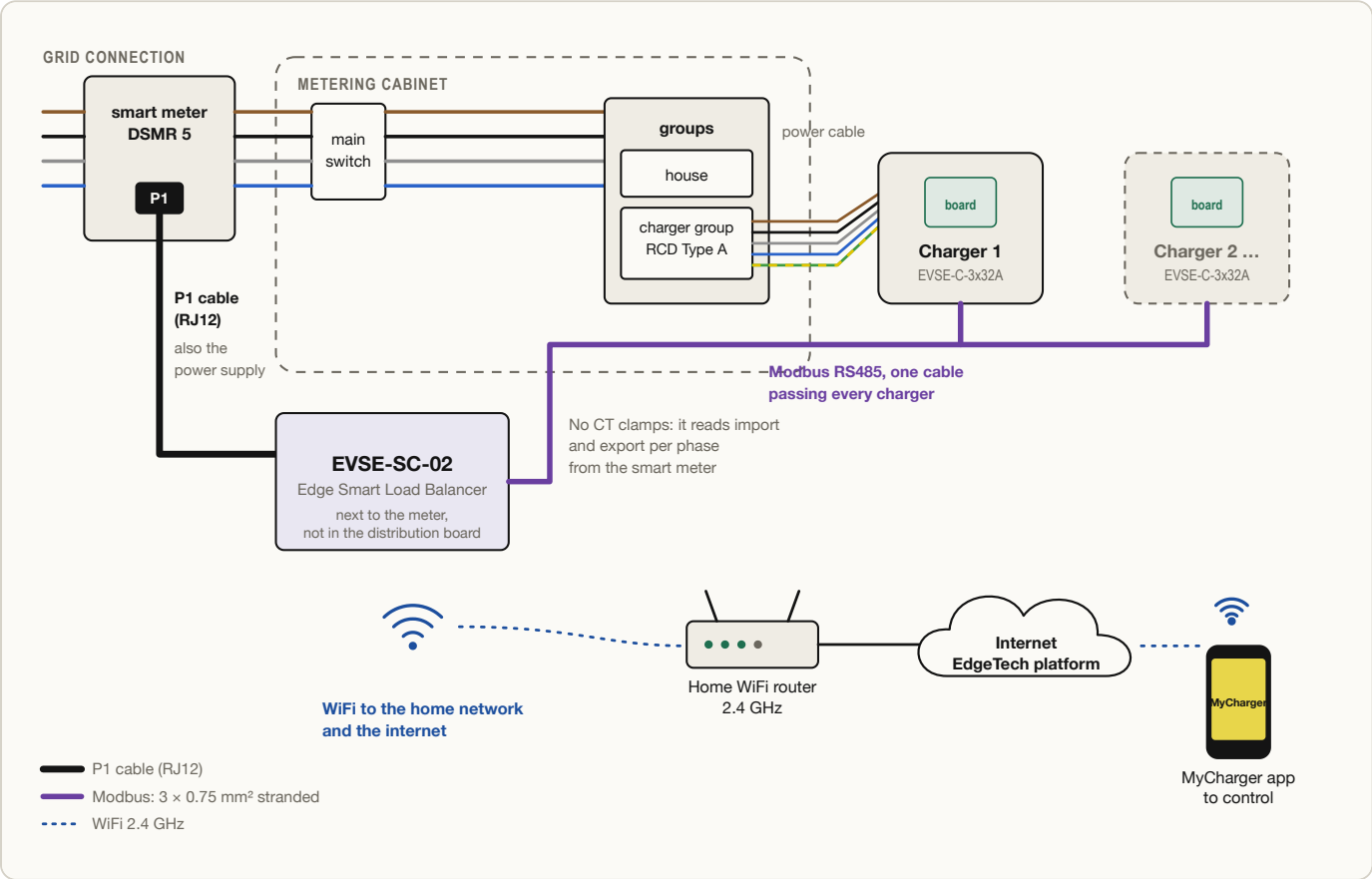


Figure 1. The system with the site controller EVSE-SC-02.

Without a site controller the charger also works on its own: it charges every car that is plugged in, up to the maximum set with its jumper (16 A or 32 A per phase).

This manual is for the EVSE-SC-02 on the P1 port. For a house without a DSMR 5 smart meter, use the EVSE-SC-01 with CT clamps and its manual.

2. Safety

- Installation and maintenance are for **qualified electricians** who have read this manual and work to IEC 60364 and NEN 1010 (in the Netherlands also NEN 3140).
- Work only on an installation that is **switched off and verified dead**.
- Do not work in the rain or at a relative humidity above 95 %.
- Size every cable for its current and length, per NEN 1010.
- Protect every charger with its own circuit breaker and an RCD type A (30 mA). The RDC-DD in the charger detects DC residual currents, so a type B RCD is not needed.
- Make sure that all chargers together cannot draw more than the main connection allows. The site controller takes care of this during charging; in larger installations, put all chargers behind one common fuse as well.
- The site controller EVSE-SC-02 belongs indoors, next to the smart meter. Do not open the smart meter: the P1 port is on the outside.

3. Before you start

3.1 The grid connection

Find out the size of the main connection: 1-phase or 3-phase, and the main fuse (for example 3×25 A). It is on the energy bill or available from the network operator. You enter it in the app later (section 8).

3.2 What you need

- An RCD type A and a circuit breaker for the charger circuit, 1-phase or 3-phase to match the charger.
- A smart meter **DSMR 5** (or ESMR 5) with a **P1 port**. Older meters do not supply enough data.
- A free P1 port, or a powered P1 splitter if the port is already in use.
- Room for the EVSE-SC-02 next to the meter; its P1 cable must reach the port without being extended.
- WiFi (2.4 GHz) at the meter. If coverage in the metering cabinet is poor, add a repeater or an access point nearby.
- Up to 10 chargers.

3.3 Cables

CABLE	REQUIREMENT
Power cable	L1, L2, L3, N, PE (or L1, N, PE for 1-phase), sized for the current and the length per NEN 1010
Modbus cable	3 cores of at least 0.75 mm², **stranded (multi-core)**. Up to 150 m. No Ethernet cable (Cat5/Cat6) in the terminals: its thin solid cores break
Underground	Use armoured underground cable, or lay both cables in a conduit large enough for the two

4. Install the charger

4.1 The connections of the charge controller

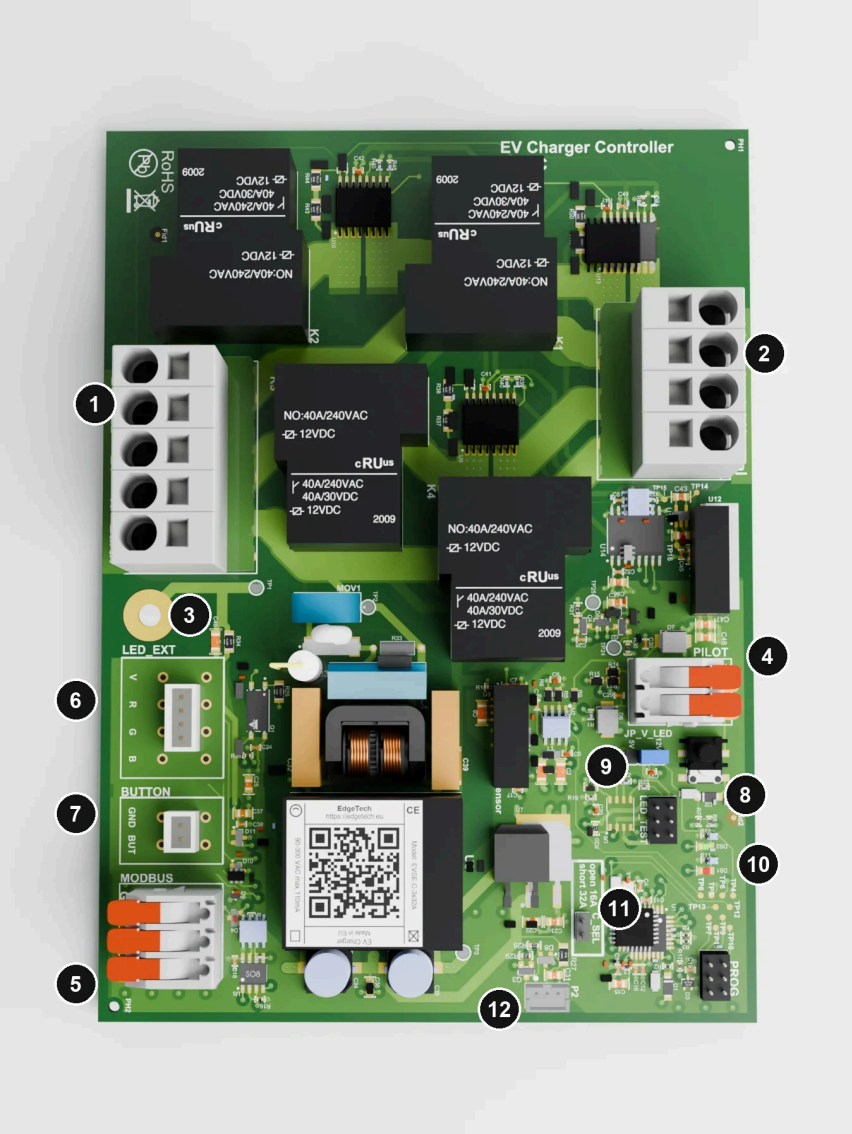


Figure 2. Charge controller EVSE-C-3x32A.

#	CONNECTION	USE
1	Mains in, 5-pole	L1, L2, L3, N, PE of the power cable
2	To the car, 4-pole	L1, L2, L3, N to the charging cable or socket, through the RDC-DD ring
3	Earth	Earth point of the board
4	Control pilot, terminal with levers	**CP**: the thin signal wire of the charging cable. **PP**: only with a Type 2 socket; with a fixed cable leave PP empty
5	Modbus, terminal with levers	G, A, B of the Modbus cable
6	External LED	Common-cathode RGB LED or three separate LEDs
7	External button	Optional push button (GND, BUT)
8	Test button	Gives the board a state change
9	JP_V_LED	Voltage for the external LED: 5 V or 12 V
10	Indicator LEDs	Green: status. Red: error code (section 7)

#	CONNECTION	USE
11	C_SEL	Maximum current: open = 16 A, jumper fitted = 32 A per phase
12	RDC-DD and cable lock	Two white connectors side by side: 4-pin for the RDC-DD lead, 3-pin for the cable lock module EVSE-X-CL (Type 2 socket only)

4.2 Wiring

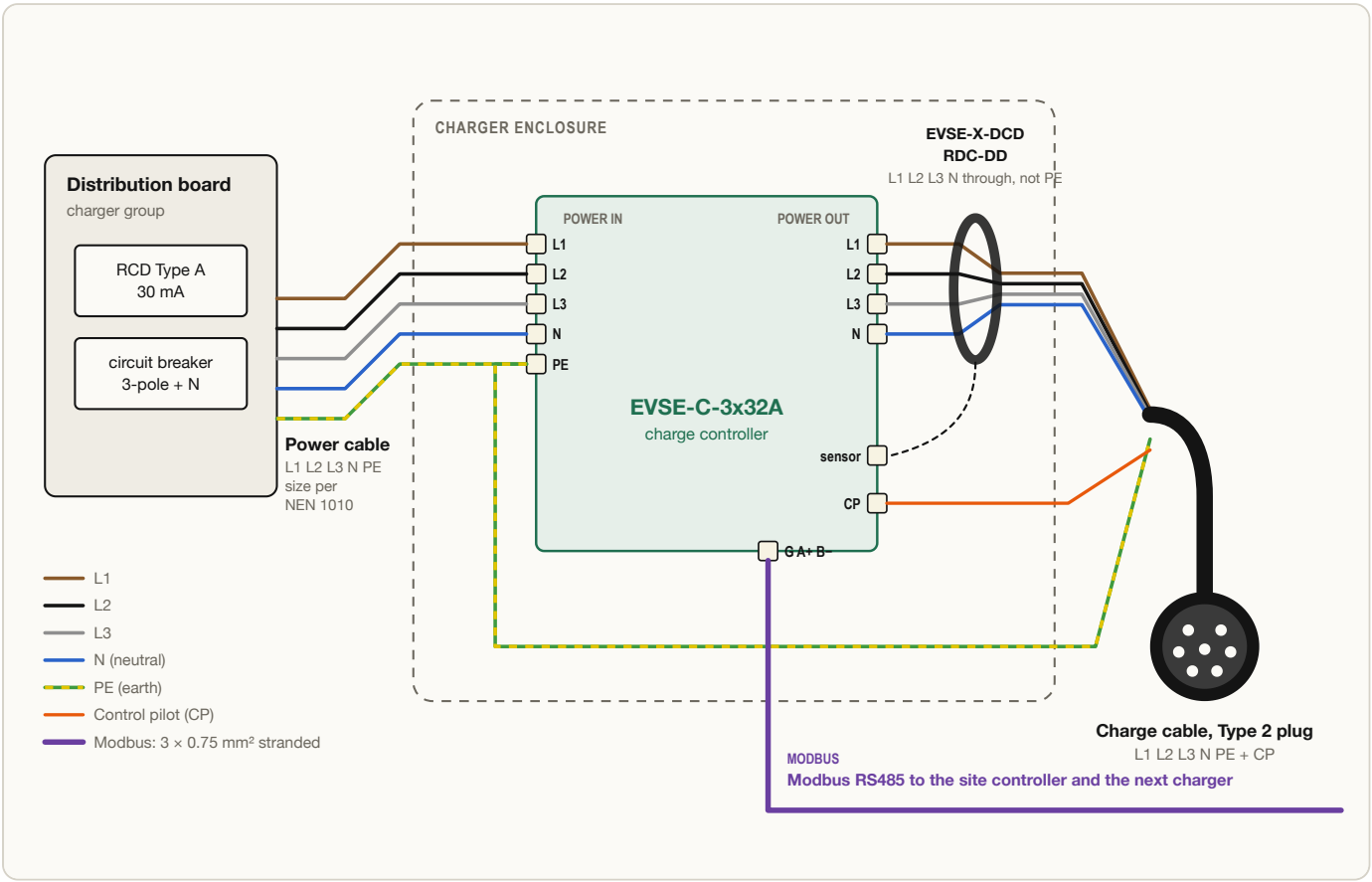


Figure 3. Wiring of the charger. Wire colours: L1 brown, L2 black, L3 grey, N blue, PE green-yellow.

4.3 Step by step

1. **Choose the place.** Outdoors on a post or a wall, or indoors. A garage or cellar keeps the charger out of the sun; the fixed cable can then hang outside. Check that the charging cable reaches the car.
2. **Prepare the enclosure.** Drill the holes for the cable glands of the power cable and the charging cable with a step drill, and the holes in the back wall for mounting. Seal the screw holes.
3. **Mount the charge controller** in the enclosure, directly or with the brackets.
4. **Connect the RDC-DD** to the 4-pin connector at 12 with the supplied lead.
5. **Earth.** All earth wires meet in the supplied push-in connector: PE from terminal 1, PE of the power cable and PE of the charging cable.
6. **Charging cable.** Feed it through its gland. Put L1, L2, L3 and N **through the RDC-DD ring** and into terminal 2; PE goes to the earth connector, **not** through the ring. Put the CP wire into the CP input of terminal 4. Lift the lever fully, push the wire in deep, close the lever and pull gently to check.
7. **Power cable.** Mount the enclosure, feed the power cable through its gland and connect L1, L2, L3, N to terminal 1 and PE to the earth connector. Watch the colours: L1 on L1, L2 on L2, L3 on L3.
8. **Modbus cable.** G, A and B to terminal 5: G to G, A to A, B to B at the site controller.
9. **Check** that no strands stick out of any terminal. A loose strand can touch the next terminal and cause a short circuit.
10. **Maximum current.** Set C_SEL (11) to 16 A or 32 A to match the circuit breaker and the cable.

4.4 Chargers with a Type 2 socket

- **PP.** The socket tells the charger the rating of the cable that is plugged in through the proximity pilot (PP). Connect PP of the socket to the PP input of terminal 4, and check the connection with an ohmmeter from the socket's PP contact to the PP input.
- **Cable lock.** The socket's lock is driven by the cable lock module EVSE-X-CL on the 3-pin connector at 12. Each type of socket lock is tested before supply.

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5. Install the site controller EVSE-SC-02

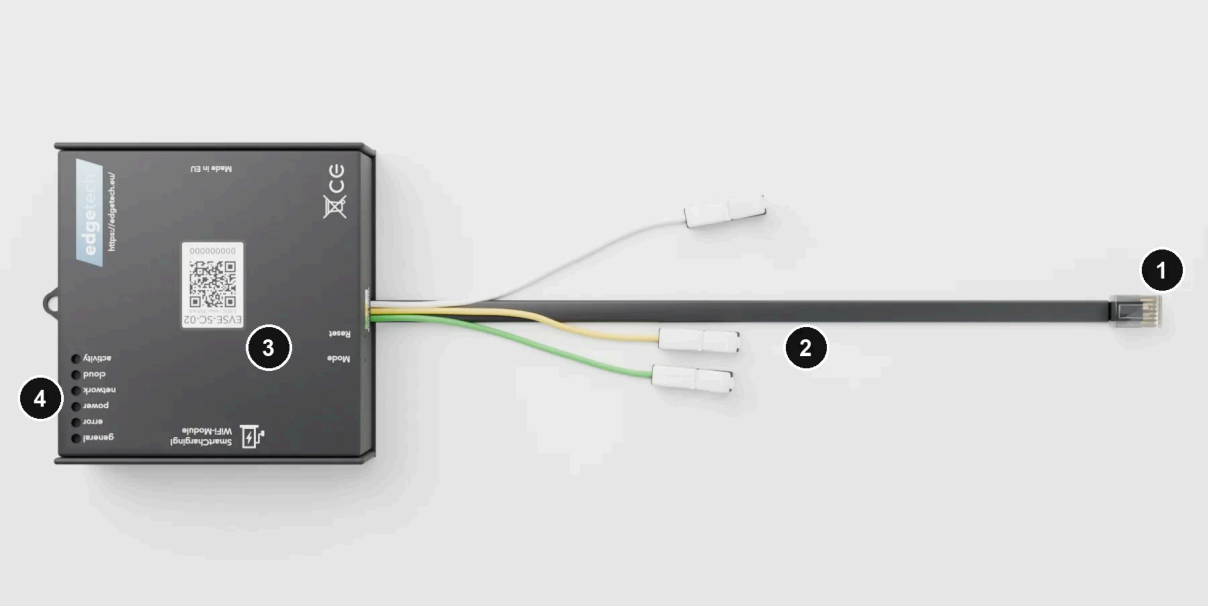

Figure 4. EVSE-SC-02: 1 P1 plug (RJ12); 2 Modbus wires G (white), A+ (yellow), B– (green) with splice connectors; 3 Reset and Mode pinholes; 4 status LEDs.

1. Place the EVSE-SC-02 **next to the smart meter**, not in the distribution board.
2. **P1 (1):** plug the fixed cable into the P1 port of the smart meter. Do not extend this cable. If the P1 port is already in use, use a powered P1 splitter.
3. **Supply:** the EVSE-SC-02 is powered by the P1 port. If the meter supplies less than 250 mA, power it with 5 V on its micro-USB port.
4. **Modbus (2):** connect the Modbus cable to the three wires with the splice connectors. Do not strip the wires; the connectors cut through the insulation. G to G, A+ to A, B– to B.
5. There are no CT clamps: the EVSE-SC-02 reads import and export per phase from the smart meter, so solar charging works.

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6. More than one charger

- All chargers share **one Modbus cable** that runs from the site controller past every charger. Keep the branch from the cable to each board short.
- Up to **10 chargers** on the EVSE-SC-02.
- Every charger leaves the factory at Modbus address 1. **The site controller gives each new charger its own address**; you do not have to set anything.

7. Switch on and check

7.1 The charger

Switch on the RCD and the circuit breaker. Plug in a car or a test box: the charger switches on and the car starts charging. The indicator LEDs (10) on the charge controller show what it is doing:

GREEN LED	MEANING
Steady on	Started, ready to charge
Short on, short off	Charging cable connected
Short on, long off	Charging on 1 phase
2× short on, long off	Charging on 3 phases

With an external RGB LED (6), **blue** steady means the charger is charging.

If the **red LED** is on, there is an error; its blink pattern gives the error code. Check the earth first, both at the charger and at the house.

ERROR	RED LED
Start-up error	Very long off, very short on
High temperature	Short on, short off, short on, long off
Temperature too high, charging stopped	Short on, short off, 2× short on, long off
No earth connected	Short on, short off, 3× short on, briefly off
Relay stays switched on	Short on, short off, 4× short on, short off
DC residual current (RDC-DD)	Short on, short off, short on, short off, 2× short on, short off
No error	Off

7.2 The site controller EVSE-SC-02

The site controller has six LEDs (4): four green ones (power, network, cloud, activity), a red error LED and a colour LED (general). In normal operation power, network and cloud are steady green, activity gives a short green flash about once a second, and the general LED is steady cyan.

LED	OFF	GREEN, BLINKING	GREEN, STEADY
Power	No supply	Waiting for the smart meter (P1 port)	Smart meter found, running
Network	No WiFi	Connecting to WiFi	Connected to WiFi
Cloud	No WiFi, or no active subscription	Connecting to the EdgeTech server	Connected to the EdgeTech server
Activity		A short flash about once a second: all chargers answered in the last control cycle	

ERROR LED (RED)	MEANING
Off	No errors
Blinking together with the power LED, at start-up	Waiting for the smart meter. If no DSMR 5 meter answers, the site controller restarts and tries again
Short flash instead of the green activity flash	At least one charger did not answer in that control cycle. Check the Modbus cable and the address of the chargers

GENERAL LED (COLOUR)	MEANING
Cyan, steady	Connected to the EdgeTech server. Everything is working
Cyan, blinking	Not connected to the EdgeTech server yet. Load balancing keeps working
Yellow, blinking	Searching for chargers on the Modbus cable, or loading new firmware into a charger
Green	No active subscription. Load balancing keeps working
Dark blue, blinking	Setup mode: ready for the app
Magenta, blinking	Firmware update of the site controller. Do not unplug
Red, blinking fast	Factory reset armed: press once more to confirm (section 8)
Red, steady	Factory reset in progress; the site controller then restarts

All LEDs on at once: factory test mode.

8. Set up with the MyCharger app

1. **Install MyCharger** from the App Store or Google Play.
2. **Setup mode.** Hold the Mode pinhole (3) for 3 seconds, until the general LED blinks dark blue.
3. **WiFi.** In the app, scan the QR code on the site controller and enter the name and password of the WiFi network (2.4 GHz). If there are several networks, choose the one with the strongest signal at the site controller.
4. **Grid connection.** Enter the size of the main connection, for example 3×25 A, or 1×40 A for an older house with a 1-phase connection.
5. **Pair the chargers.** The app finds the chargers on the Modbus cable; give each one a name. More chargers can be added later under Settings › Chargers, also chargers of another installation with an access code.

The site controller may load new firmware during setup. If the app showed an error meanwhile, close the app, open it again, and repeat steps 3 and 4. To restart the EVSE-SC-02, unplug the P1 cable for 3 seconds.

Factory reset. This removes the WiFi settings and the list of chargers, then restarts the site controller; set it up again from step 2.

1. Press the Mode pinhole (3) 4 times quickly (short presses, less than a second apart). The general LED blinks red fast.
2. Wait 1 to 5 seconds, then press once more. The general LED turns steady red and the site controller restarts.

If you do not press within 5 seconds, nothing is reset.

9. Subscription and support

Load balancing always keeps working, with or without a subscription. With a subscription the app also gives control from anywhere: start and stop, delayed charging for off-peak hours, consumption overviews and notifications, and firmware updates for the site controller and the chargers. See App and subscription and Subscription.

If the main connection changes, set up the site controller again in the app.

Support: support@edgetech.eu, with a photo of the QR code on the site controller. The latest version of this manual is always at edgetech.eu/manual.

10. Disposal

Under normal conditions the equipment lasts at least 10 years. Hand in old equipment at the supplier or at a collection point for electrical waste; do not put it in household waste.

11. Technical data

	CHARGE CONTROLLER EVSE-C-3X32A	SITE CONTROLLER EVSE-SC-02
Supply	90–300 V AC, 50 Hz, 3 W	From the P1 port (≥ 250 mA) or 5 V micro-USB
Charging	Mode 3 (IEC 61851-1), 1- or 3-phase, 6–32 A, max 3×32 A (22 kW)	
Measurement		P1 port, DSMR 5 / ESMR 5
Chargers		Up to 10
Modbus	RS485, 19200 8N1 (set by the site controller)	RS485 master, 19200 8N1
WiFi		2.4 GHz, 802.11 b/g/n
Size	168 × 122 × 25 mm	88 × 90 × 25 mm
Protection	IP00, class I, for building into an enclosure	Indoors, next to the meter

The RDC-DD EVSE-X-DCD trips at a DC residual current above 6 mA and switches off within about 300 ms through the charge controller. Full specifications: charge controller, RDC-DD, EVSE-SC-02.

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