Green Motion Duo EV charger Installation Manual

Powering Business Worldwide

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Content overview

1. Introduction

Thank you for choosing the Eaton Green Motion Duo EV charger.

Before you start

This manual contains important instructions that must be followed during installation, operation and maintenance of the Eaton Green Motion Duo EV charger. All instructions must be read before installing and operating the equipment. This manual should be retained for future reference. Please note that the Green Motion Duo EV charger must only be installed by professional and qualified personnel, i.e. an Eaton technical support representative or a professional installer. There are no user serviceable parts inside the Green Motion Duo EV charger. Failure to observe the above will void the guarantee provided and Eaton cannot be held legally accountable.

Technical disclaimer

All drawings, descriptions and illustrations contained in this document serve to provide a clear overview and/or technical explanation of the present product and its various components and accessories. In line with our goal to continuously improve the products and the customer service we provide, all specifications contained in this document are subject to change without notice.

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1.1 Conventions used in this document

This manual adopts the following type conventions and acronyms to refer to Green Motion Duo EV charger or its parts:

ALL CAPITALS highlight critical points that require careful attention.

All abbreviations used in this document are listed in Table 1.

Table 1. Glossary

Abbreviation	Description
AC	Alternating current
CAN	Controller area network
CSC	Charging station controller
CU	Control unit
DHCP	Dynamic host configuration protocol
EMC	Electromagnetic compatibility
EMI	Electromagnetic interference
EV	Electric vehicle
FW	Firmware
HW	Hardware
IEC	International electrotechnical commission
IP	Internet protocol
LAN	Local area network
LCD	Liquid crystal display
LED	Light emitting diode
MCB	Miniature circuit breaker
N	Neutral
NAT	Network address translation
OCPP	Open charge point protocol
OV	Overvoltage
PAT	Port address translation
PE	Protective earth
PPE	Personal protective equipment
RCCB	Residual current circuit breaker
RCD	Residual current device
RDC-DD	Residual direct current detecting device
SEC	Supply equipment controller
SIM card	Subscriber identity module card
SW	Software
TCP	Transmission control protocol
UI	User interface
WEEE	Waste electrical and electronic equipment

CSC and SEC are hardware components of the Green Motion Duo charger.

1.2 Product and accessory list

Table 2. Product part numbers

Part number	Description	Master / Node	Protection	Payment Terminal
GMM2222BBCG00C03	Master 2xT2S MCB 4G ISO15118	Master	MCB, Shunt trip, RCCB	No
GMM2222BBCH00C03	Master 2xT2S MCB 4G ISO15118 POS	Master	MCB, Shunt trip, RCCB	Yes
GMM2222BACG00C04	Node 2xT2S MCB ISO15118	Node*	MCB, Shunt trip, RCCB	No
GMM2222BBBH00C03	Master 2xT2S 4G ISO15118 POS	Master	RCCB	Yes
GMM2222BBBG00C03	Master 2xT2S 4G ISO15118	Master	RCCB	No
GMM2222BABG00C04	Node 2xT2S ISO15118	Node*	RCCB	No

*Can be installed only on a charger cluster where a Master exists.

Table 3. Accessory part numbers

Part number	Description
GMA03AF000000000	Wall-Mounted Cable Holder for Type 2 AC Charging Cables
GMA03AB000000000	Green Motion Duo Floor-mount Pedestal Single
GMA03AC000000000	Green Motion Duo Floor-mount Pedestal Dual Extension Kit
GMA03AO000000000	5 m Straight Type 2 AC Charging Cable, Black
GMA03AP000000000	7.5 m Straight Type 2 AC Charging Cable, Black
GMA03AQ000000000	5 m Coiled Type 2 AC Charging Cable, Black

1.3 Symbols used in this manual

1.3.1 Related icons

Imminent dangers causing serious injuries. Danger of death.

Hazardous behaviors that could cause serious injuries.

Hazardous behaviors that could cause death.

Behaviors that could cause minor injuries to people or minor damages to things.

An electric shock can be fatal.

Avoid touching internal or external parts normally live while the system is powered on.

Read the instructions. These instructions are intended for professional installers. Professional and qualified personnel must be experts in the field and is therefore responsible for commissioning the system in accordance with the manufacturer's instructions and local legislation.

The notes preceded by this symbol relate to technical issues and ease of operation.

The EU Directive on Waste Electrical and Electronic Equipment (WEEE).

1.4 Field of applications

This installation manual is intended for professional and qualified personnel. It describes how to securely install the Green Motion Duo EV charger.

Table 4. Eaton Green Motion Duo EV charger overview

Power input	
Input voltage	1 x 230 V - 1 phase 3 x 400 V - 3 phase
Input current	Up to 2x 32 A Up to 1x 64 A
Input frequency	50 Hz, 60 Hz
Grid compatibility	TN, TT, 230V-IT
Power output	
Output power[1]	Up to 2x 22 kW
Output type	2x T2S Socket with interlock
Simultaneous charging	2
Environmental	
Operating temperature	-30°C to +50 °C[4]
Storage temperature (charger)	-40°C to +80°C
Storage temperature (payment terminal)	-35°C to +70°C
Altitude	Up to 2000 m
Installation	Indoor or outdoor
Relative humidity	< 95% non-condensing
Mechanical	
Mounting method	Wall-mount Floor-mount pedestal (Optional)
Power input cable entry	Top[2], [3], bottom and back
Dimensions (W x H x D) in mm	415 x 663 x 168 (196 with payment terminal)
Weight	Up to 15 kg
Housing material	Bio-based polycarbonate
Ingress protection rating	IP55
Impact protection rating (charger)	IK10
Impact protection rating (payment terminal)	IK09
Impact protection rating (Energy meter window)	IK08
Protection	
Earth fault protection	RCCB Type A 30 mA + RDC-DD 6 mA
Overcurrent protection	40 A MCB 6 kA (Optional)
Welded contacts protection	Yes (shunt trip)
User interface and control	
User interface	LED strip status indicator MID energy meter display
Access control	ISO 15693, ISO 14443-A, ISO 14443-B, ISO15118-2 Plug & Charge
Payment terminal	Yes (Optional)
Connectivity	
Communication interface	Modbus TCP/IP, Modbus RTU
Network interface	Wi-Fi (IEEE 802.11a/b/g/n/ac), Ethernet (10/100 Mbps) LTE 4G
Protocol	OCPP 1.6J, upgradable to OCPP2.0.1
Remote monitoring	Yes
EV charging balancing	
Static and Dynamic load balancing	Yes, up to 16 EV chargers (32 charge points) in one cluster)
Branch load balancing	Yes, up to 8 clusters (128 EV chargers/256 charge points)
Phase balancing	Yes
Communication interface with energy meter	Modbus RTU, Modbus TCP/IP
Energy metering	
MID	Yes

[1] The actual power output may vary due to external factors, such as the available grid power, capacity of the electrical installations, and the electric vehicle model.
[2] In the case of outdoor installation, top entry requires additional overhead cover.
[3] Topside entry is not available for the RCCB version.
[4] Derating applies at +40 °C

2. Cautions

These instructions are intended for professional and qualified personnel.

Before carrying out any operations, ensure you have read and understood this manual. Do not make changes and do not carry out maintenance operations not described in this manual. The manufacturer does not accept responsibility for injuries to people and property damages if the information within this manual has not been read and followed.

Only professional and qualified personnel can carry out the installation.

The customer is responsible for ensuring that the professionals operating this equipment are qualified and in a suitable mental and physical state. Professionals must always use the personal protective equipment required by the laws of the destination country and any additional equipment provided by their employer.

It is strictly prohibited to open the unit except as described in this manual. The installation of the equipment must be carried out by professional and qualified personnel. They must not be under the influence of alcohol or drugs, or have prosthetic heart valves or pacemakers.

For any doubts or problems regarding the use of the system, even if not described here, please contact your Eaton sales representative via: bgtechsupport@eaton.com.

The unit must not be subjected to any type of modification. Eaton declines any responsibility if the rules for correct installation are not respected, and it is not responsible for the system upstream or downstream of the equipment it supplies.

The omission of protective devices is extremely dangerous and relieves the manufacturer of any responsibility for damage caused to people and property.

A first aid kit must be provided near the installation site so that it is readily available in case of emergency.

2.1 Operating environment and restrictions

Each system must be used exclusively for the operations it was designed for and within the operative ranges specified in the nameplate and/or in the relative technical datasheet, in accordance with the national and international safety standards.

Any use different from the intended use specified by the manufacturer is to be considered inappropriate and dangerous, and in this case the manufacturer declines all responsibility.

Check the regulations applied by the electricity provider.

The unit shall be connected to the distribution network in accordance with local rules.

The unit shall comply with all the technical specifications.

Improper or unauthorized use:

Although carefully constructed, all electrical appliances can catch fire.

The Green Motion Duo is intended for indoor or outdoor installation.

Recommended operating temperature range of the product is -30 °C to +50 °C.

The product must be transported and stored in indoor locations, in the temperature range -40 °C to +80 °C.

The product must be used and stored in locations with relative humidity below 95%.

The product must be used at an altitude not exceeding 2000 m above sea level.

The product must be used in locations free from acids, gases, or other corrosive substances.

In case of wall-mounting the product, the surface of the wall must be able to carry the product's weight (max. 15 kg).

2.2 Suggested protections during the installation

The equipment was built according to the highest safety standards and equipped with safety devices designed to protect operators and components.

For obvious reasons, the manufacturer cannot anticipate all potential types of installations and locations where the equipment will be installed; the customer must therefore clearly inform the manufacturer of specific conditions at the installation site. Eaton declines any responsibility if the unit is incorrectly installed.

The operators must be correctly instructed. The operators must therefore read and follow the technical instructions contained in the manual and in the enclosed documentation.

The instructions provided in this manual do not replace the safety regulations of the installation and operational technical data printed on the products, nor do they replace the current safety standards enforced in the country where the equipment is installed, and the rules dictated by common sense.

The manufacturer can provide theoretical or practical training to operators, either on their site or on the customer's premises, as specified at the time of drawing up the contract.

The equipment must not be used if any operational fault is identified.

Temporary repairs should be avoided; repair work must be carried out only with genuine spare parts, which must be installed according to the intended use.

The responsibilities deriving from the commercial components are delegated to the respective manufacturers.

Avoid touching the equipment housing during operation. The equipment housing could overheat during operation and cause burns on contact. The equipment may remain hot even after it is switched off.

In the event of fire, CO2 extinguishers must be used, and self-vacuum systems must be used to put out fires in enclosed spaces.

If the noise level exceeds legal limits, the working area must be restricted, and anyone who has access to the area must wear ear defenders or ear plugs.

During the installation process, special attention must be paid to fixing the equipment and its components. At this stage, restricting or preventing access to the installation area is recommended.

Professional and qualified personnel are recommended to wear clothing and personal protective equipment (PPE) provided by their employer. Operators must not wear clothes or accessories that could start fires or produce static electricity, or any item of clothing that could affect personal safety. When carrying out any operation on the equipment, clothes and instruments must be suitably insulated.

Professional and qualified personnel must NOT access the equipment with bare feet or wet hands.

The maintenance engineer must always ensure that nobody else is able to reset or operate the equipment during maintenance and must report any fault or deterioration caused by wear or by aging, in order to restore the correct safety conditions.

The professional and qualified personnel must always pay attention to the working environment to ensure it is well lit and has a suitable escape route.

2.3 Protection from electric shock

An electric shock can be fatal.

Avoid touching internal or external parts normally live while the system is powered on.

Cables and connections must always be secured, in good condition, insulated and suitably sized.

2.4 Electromagnetic fields and interference

Electromagnetic fields may have harmful effects (unknown to date) on the health of people who are subjected to long exposure. Avoid standing less than 20 cm from the equipment for long periods of time.

The professional and qualified personnel must be experts in the field, and are therefore responsible for commissioning the system in accordance with the manufacturer's instructions and local legislation. If electromagnetic interference is detected, the professional and qualified personnel should contact an Eaton technical support representative using the email address bgtechsupport@eaton.com

Connect the unit's external frame or other conductive parts to ground to ensure system protection and the highest level of safety for the operators.

National standards related to grounding must be complied with.

2.5 Warning decals and rating plate

The labels on the equipment must NOT be removed, damaged, soiled or hidden.

The labels must always be visible and in good condition.

The technical data shown in this manual do not replace those shown on the data plates on the equipment.

2.6 Residual risks

Despite the cautions and safety systems in place, some residual risks will still be present, which cannot be removed. These risks are listed in the following table, along with recommendations to prevent or mitigate them.

Table 5. Residual risks

Risk assessment	Recommended solution
Noise pollution caused by installations in unsuitable environments or where professionals work on a regular basis.	Reassess the installation environment or site.
Unsuitable ventilation in the location, causing equipment to overheat, leading to discomfort for people who are on the site.	Restore adequate ambient conditions and ventilate the site.
Protection from the elements, such as water ingress, low temperatures, high humidity, etc.	Maintain adequate ambient conditions for the equipment.
Surface temperature is high.	Do not obstruct openings on the equipment. Use suitable PPE or wait for the equipment to cool down before accessing it.
Dirt affects the system and prevents the safety labels from being read.	Adequately clean the equipment, the labels and the workplace.
Poor installation.	Request a training course.
During the installation stage, provisionally fixing the equipment or its components can be hazardous.	Take care and restrict access to the installation area.
Accidentally disconnecting the quick connectors while the equipment is operational or making incorrect connections can produce electrical arcs.	Take care and restrict access to the installation area.

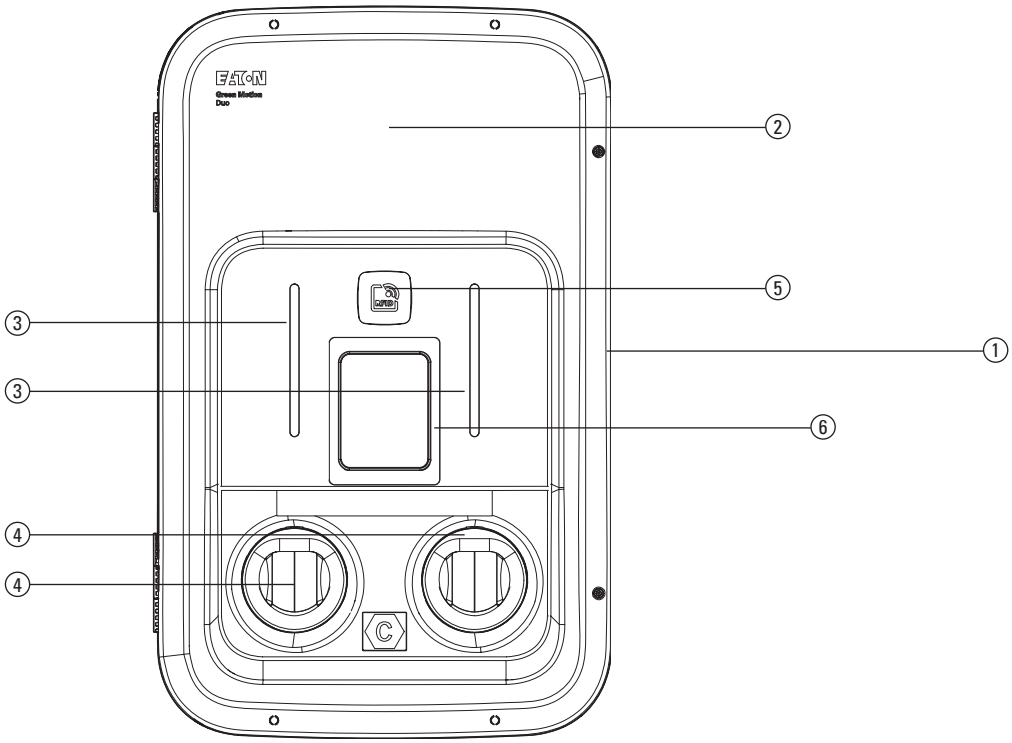
3. General description

Eaton Green Motion Duo is an AC electric vehicle charger designed for both indoor and outdoor use in private and public parking facilities for multi-residential, light commercial and industrial applications. This EV charger provides multiple benefits:

- Convenient simultaneous charging with safety features rooted in years of technical expertise
- Wall and floor-mount installation options to help space optimization
- Static and dynamic load balancing algorithms

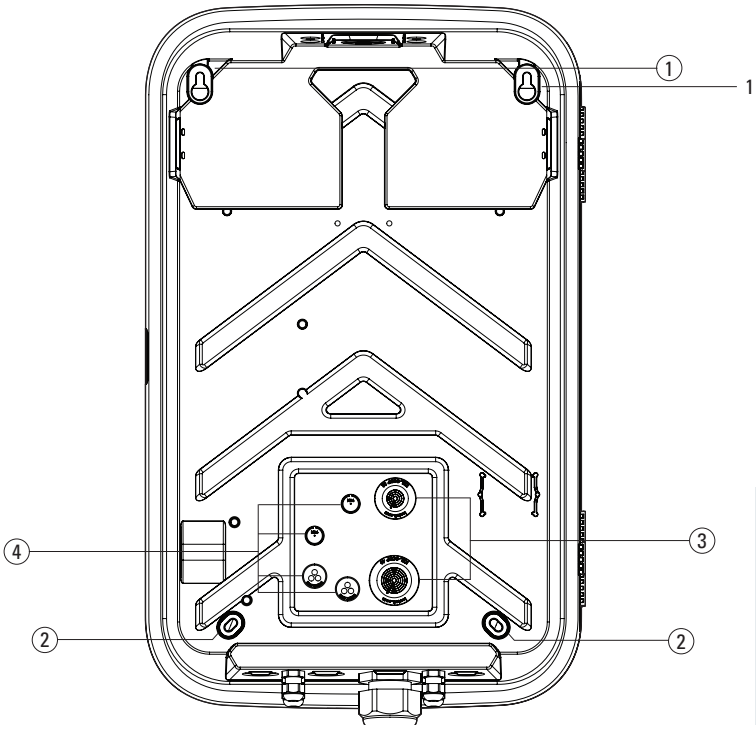
3.1 Front and back views

Figure 1. Front view of Green Motion Duo EV charger



Tag	Description
1	Housing
2	First door
3	LED status indicators (chargepoint 1 and 2)
4	Type 2 sockets (chargepoint 1 and 2)
5	RFID reader
6	Payment terminal (optional)

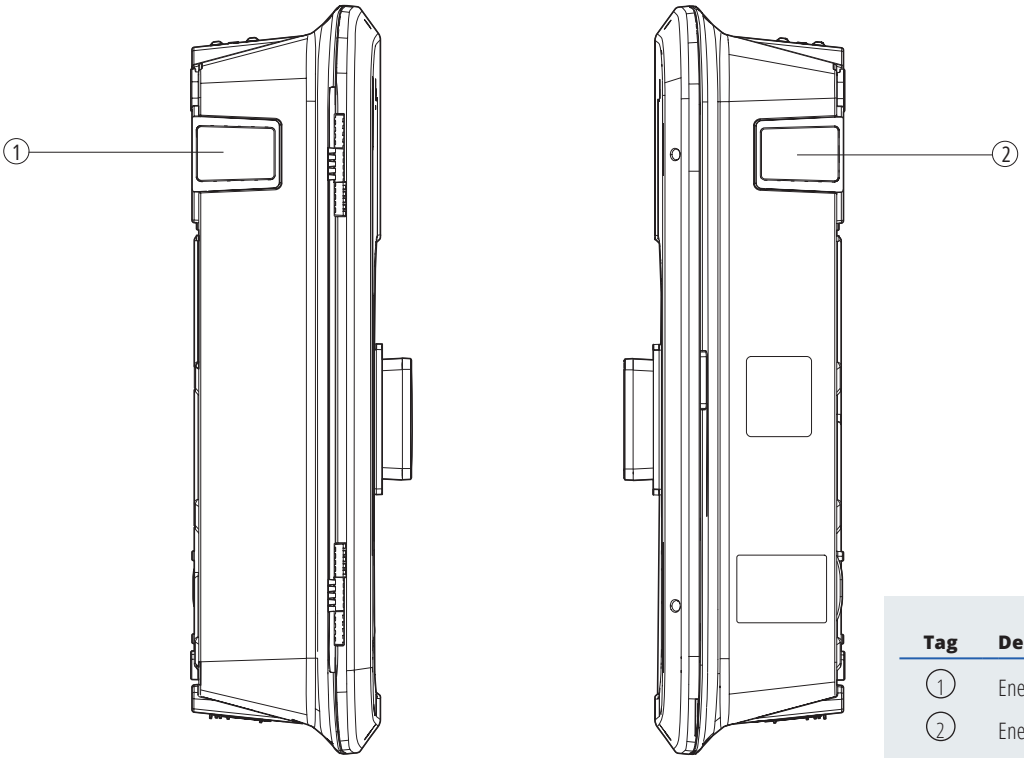
Figure 2. Back view of Green Motion Duo EV charger



Tag	Description
1	Top mounting slots
2	Bottom mounting holes
3	AC power cable knockouts, back entry
4	Communication/signal cable knockouts, back entry

3.2 Left and right views

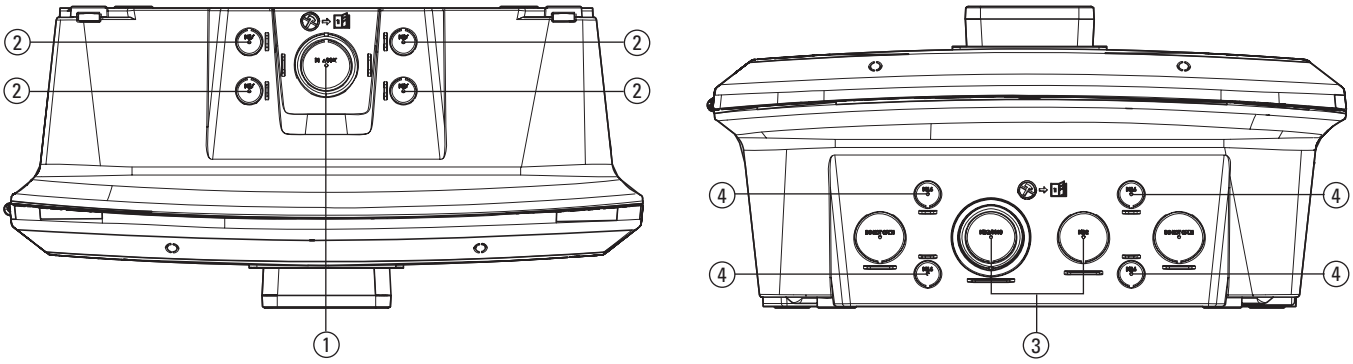
Figure 3. Left and right views of Green Motion Duo EV charger



Tag	Description
1	Energy meter display (chargepoint 1)
2	Energy meter display (chargepoint 2)

3.3 Top and bottom views

Figure 4. Top and bottom views of Green Motion Duo EV charger



Tag	Description
1	AC power cable knockout, top entry
2	Communication/signal cable knockouts, top entry
3	AC power cable knockouts, bottom entry
4	Communication/signal cable knockouts, bottom entry

Note: Top-side cable entry is not available for the RCCB product variant.

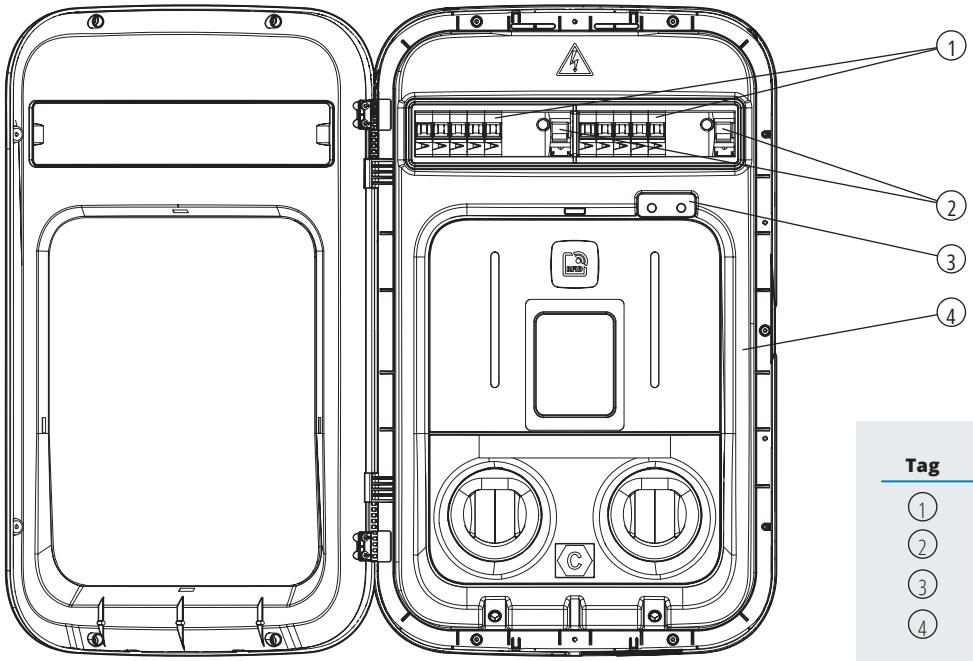
Note: The top-side cable entry shall not be used in case of uncovered outdoor installations. The installer shall consider environmental impact and maintenance of the relative cable gland when making the decision.

3.4 Safety components and second door buttons

Green Motion Duo's safety switchgear components and buttons are located behind the first door and are accessible on the second door. Location is shown in Figure 5. Refer to chapter 7.1. for more details about opening the GM Duo EV charger.

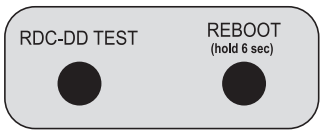
For the technical details about the miniature circuit breakers (MCB) and the residual current circuit breakers (RCCB) refer to Table 11. For wiring diagram, see chapter 4.6.2.

Figure 5. Green Motion Duo safety switchgear components and buttons



Tag	Description
1	Miniature Circuit Breaker (optional)
2	Residual Current Circuit Breaker
3	RDC-DD and REBOOT buttons
4	Second door

Figure 6. "RDC-DD TEST" and "REBOOT" buttons



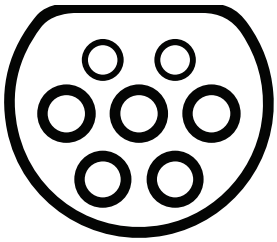
The "RDC-DD TEST" button is intended for performing a test on the integrated residual direct current detection devices (RDC-DD). Refer to chapter 7.3 for details.

The "REBOOT" button is intended for rebooting the Green Motion Duo charger.

Do not depress the buttons with a sharp object (e.g. a screwdriver). By doing so, ingress protection of the Green Motion Duo charger can be defied.

3.5 EV sockets

Figure 7. Type 2 socket



The Green Motion Duo EV charger is equipped with:

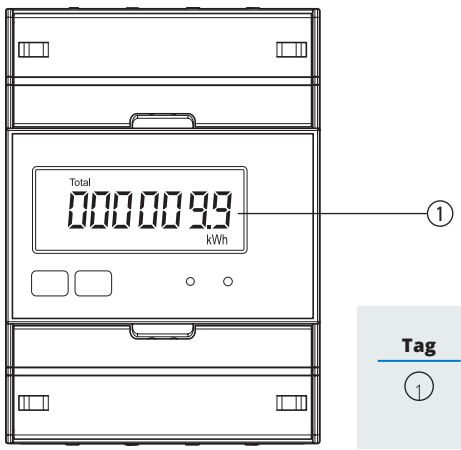
- Type 2 sockets with protective shutters (Mode 3)
  - Supports 400 V, 32 A, single- or three-phase connection
  - Maximum charging power: up to 22 kW per socket

The maximum output power per socket is 22 kW, regardless of the overall rated power of the EV charger. Charging performance may vary depending on the electric vehicle's onboard charger and the site's electrical installation.

3.6 Energy meter

The MID compliant Green Motion Duo EV charger is equipped with the energy meter Eastron SDM72D-M-2-MID. The energy meter displays the total energy consumption of the charger, accumulated from its initial use, and not the consumption of a single session.

Figure 8. Energy meter's display



Tag	Description
1	Total energy consumption

3.7 Master-Node architecture

The Green Motion Duo EV charger is provided either as a Master or as a Node variant. Refer to Table 2 for information on specific product part numbers.

Benefits of Master-Node Architecture

The main benefit of having the Master-Node architecture is that one Master charger is equipped with advanced features to control up to 15 Nodes, forming a cluster. The Master handles load balancing, authentication, and communication within the cluster. A Node must be part of a cluster with a Master to function. Additionally, a Master can operate independently in standalone mode.

It is possible to create a network with up to 8 clusters, totaling 128 chargers, and perform branch load balancing. This setup ensures efficient power distribution and seamless management of multiple charging points.

Interconnection

The Master EV charger and Node are interconnected by an RS485 serial bus (Modbus), using a standard UTP/Ethernet cable and RJ45 connectors.

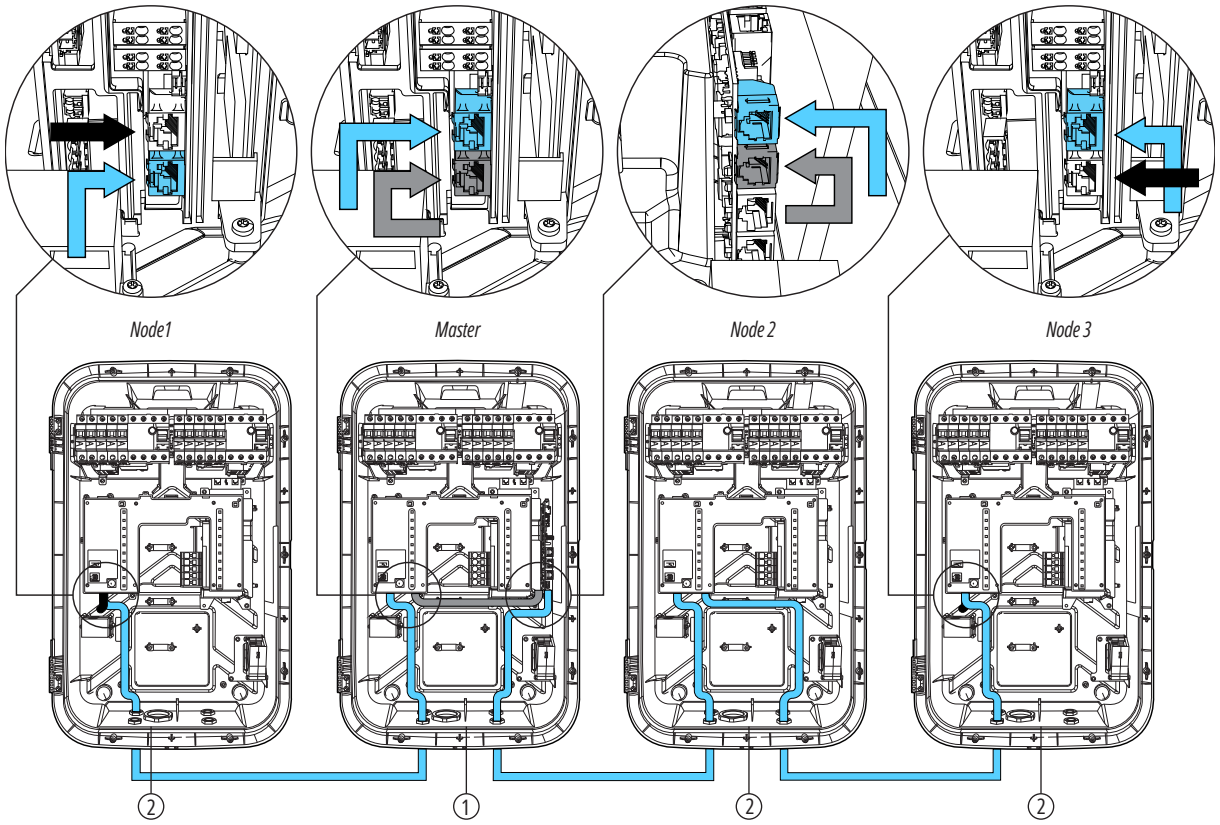
Master EV Charger

- Function: A Green Motion Duo Master provides control over and initiates commands to the other EV chargers on the Modbus, i.e., the Nodes. The Master is the only charger connected to the backend system (CSMS, typically cloud on the Internet, via 4G, LAN, or WIFI). Please refer to chapter 5 for more details on how to connect and configure the network.
- Components: The Master consists of additional components not present on the Node, such as the Charge Station Controller (CSC), which includes multiple network ports and a 4G modem with SIM support.

Node EV Charger

- Function: A Node variant of the Green Motion Duo responds to the commands of the Master EV charger on the Modbus. One charging cluster can consist of a maximum of one Green Motion Duo Master and up to fifteen Green Motion Duo Node chargers.
- Components: The main control unit of the Node is the Supply Equipment Controller (SEC).

Figure 9. Green Motion Duo Master-Node cluster architecture



Tag	Description
1	Green Motion Duo Master
2	Green Motion Duo Node

The GM Duo Master charger with multiple connected Nodes is called a Cluster see more details in the chapter 4.8-

4. Mounting and installation

Installation must be carried out only by professional and qualified personnel.

Installation, commissioning, maintenance or retrofitting of the EV charger must be performed by professional and qualified personnel who are responsible for complying with existing standards and local installation regulations.

During the installation, ensure that the equipment is powered off.

4.1 Tools required for installation

To perform the installation, professional and qualified personnel should have the following tools:

Table 6. Tools for installation

Step	Tools
Opening the housing, attaching cable clamps	T20 screwdriver
Unlocking input power terminal blocks	Flathead screwdrivers 1 x 5 and 1 x 3
Fastening M40 cable glands	Open-ended wrench 53 mm
Fastening M32 cable glands	Open-ended wrench 42 mm
Fastening M16 cable glands	Open-ended wrench 22 mm
Cutting tips of cable zip ties	Cutting pliers or cable tie gun
Drilling mounting holes in the wall	Power drill
Opening knockouts	Step drill bit

4.2 Package contents

The Green Motion Duo EV charger package contains the following items:

- Green Motion Duo EV charger
- Quick start guide
- Safety guidelines
- Drilling pattern template
- Cable gland kit
    - MCB + RCCB variant: M40 (1 piece), M16 (4 pieces)
    - RCCB variant: M32 (2 pieces), M16 (4 pieces)
- Cable grommets M16 (2 pieces)
- Sealing caps (2 pieces)
- Cable fixation kit:
    - Cable metal clamp,
    - Cable zip ties
    - Screws (K50 x 16)

The QR code for the EV charger Wi-Fi hotspot password is provided on a sticker on the charger. This password is unique to the device and is required to connect to the EV charger during commissioning. It is important to store the password safely for future use.

4.3 Lifting, transportation and unloading instructions

Transportation and handling

Transportation of the equipment, especially on the road, must be carried out in such a way as to protect the system components (especially electronic components) from major impacts, humidity, vibrations, etc.

During handling, sudden or fast movements that could cause the system to sway dangerously must be avoided.

Lifting

Eaton packs and protects each component by using devices that ease its transportation and handling. These operations must be carried out by professional and qualified personnel specialized in loading and unloading components.

The ropes and vehicles used for lifting must be able to withstand the weight of the equipment. Do not lift multiple units or parts of the equipment at the same time, unless otherwise advised. The Green Motion Duo EV charger is not equipped with specific lifting tools.

Do not underestimate the weight of the Green Motion Duo EV charger; check the technical specifications.

Do not move or stop the hanging load above people or things.

Do not let it drop with too much force.

4.4 Unpacking

Remember that the packaging elements (cardboard, cellophane, staples, adhesive tape, straps, etc.) can cause cuts and/or injuries, if not handled with care. They must be removed with appropriate tools and must not be handled by non-responsible people (i.e. children).

The packaging components must be removed and disposed of in accordance with the local regulations and laws of the country of installation.

Check the integrity of the packaging before opening.

Open the packaging and remove the Green Motion Duo EV charger carefully to avoid damaging the external casing or the internal electronic parts.

Before commissioning, ensure that the external casing of the Green Motion Duo EV charger is in good condition and free from any damage sustained during transportation.

4.5 Mounting the Green Motion Duo EV charger

4.5.1 Preparing the Green Motion Duo

Do not mount the EV charger above or under flammable building materials.

Do not install the EV charger in areas where highly flammable substances are present.

Do not install the EV charger in areas subject to explosion hazard.

To prevent the risk of electric shock or other injury, check that there are no electrical or hydraulic lines in the walls before drilling the mounting holes of the EV charger.

Make sure there is enough free space for air circulation around the EV charger. Local regulations may require larger clearances. It is recommended to mount the Green Motion Duo with spacers when installing it on the wall to ensure unobstructed access to the charging socket.

Eaton is committed to minimizing the cybersecurity risk in its products and deploying cybersecurity best practices in its products and solutions, making them more secure, reliable, and competitive for customers.
For more information related to secure installation, please refer to product documentation at www.eaton.com/greenmotionduo.

Step 1. Open the product by unfastening two captive screws (A) on the first door (Figure 10) and five captive screws (B, C) from the second door (Figure 11) with a Torx Tx20 screwdriver.

Figure 10. Location of first door screws

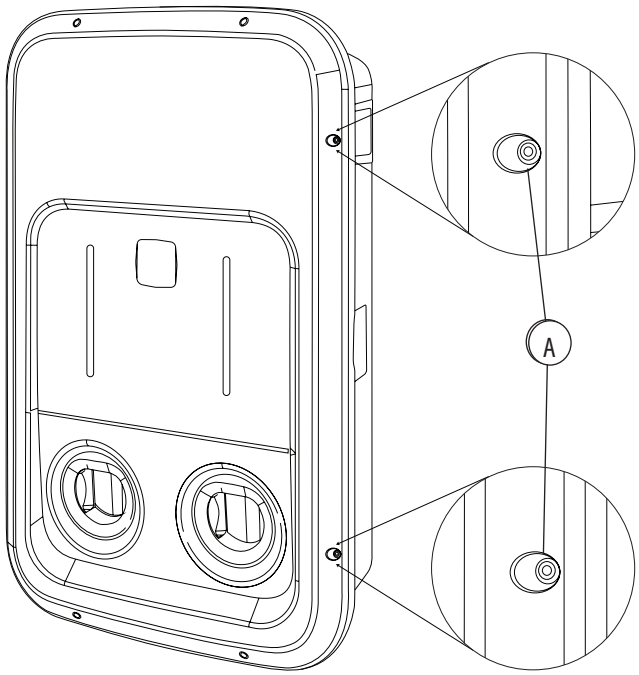
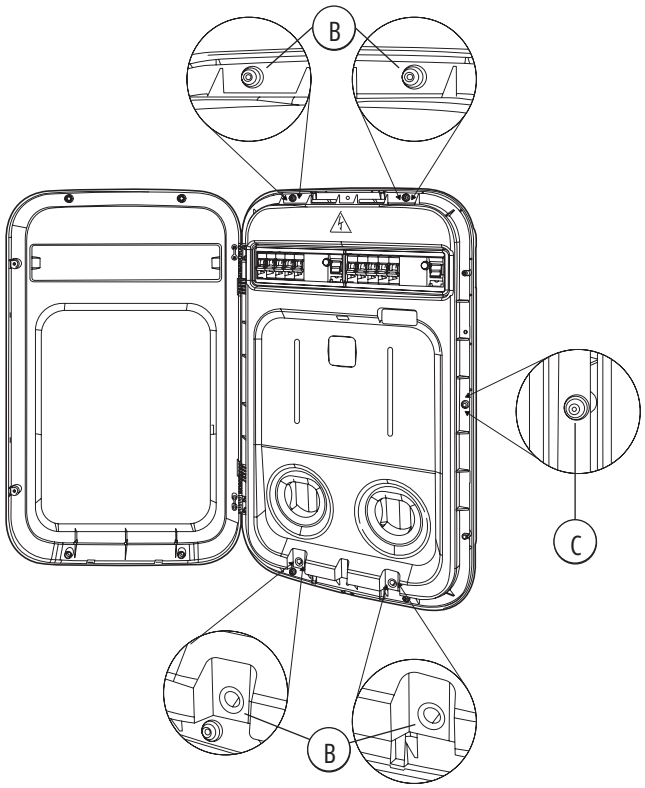


Figure 11. Location of second door screws

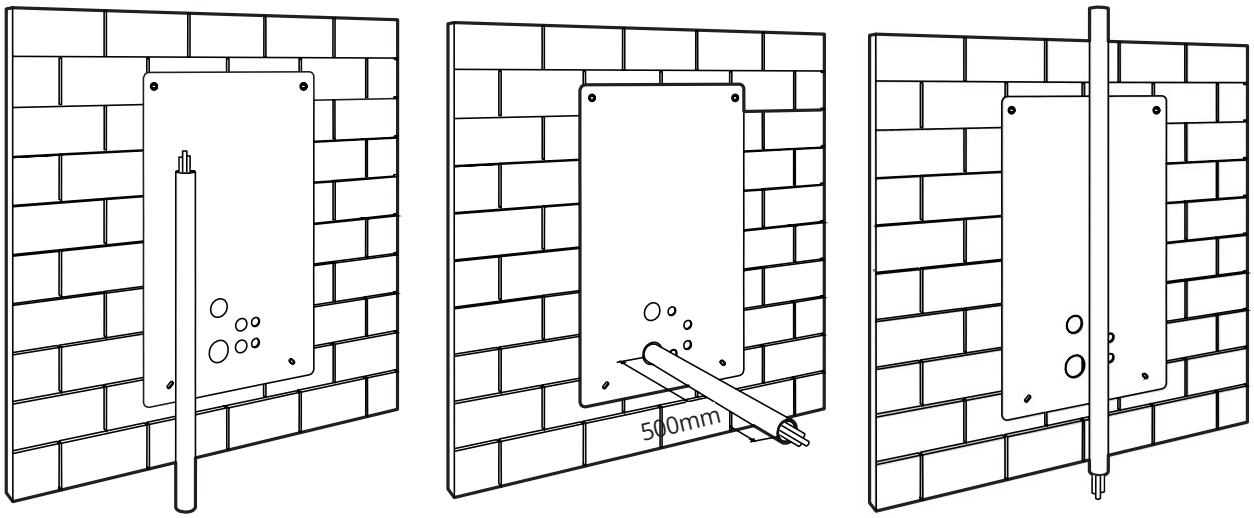


Step 2. Select the preferred cable entry side (top, bottom, or back). See Figure 12. Leave sufficient length of the AC power supply cable (~500 mm) for feeding inside the product.

Table 7. Parameters of Green Motion Duo cable entries

Variant	Bottom entry	Top entry	Back entry
RCCB	2x M32 glands (cable Ø18-25 mm)	X	2x M32 grommets (max cable Ø21 mm)
MCB+RCCB	1x M40 gland (cable Ø22-30 mm)	1x M40 gland (cable Ø22-30 mm)	1x M40 grommet (max cable Ø28 mm)

Figure 12. Cable entry side selection



Step 3. Remove the selected knockouts.

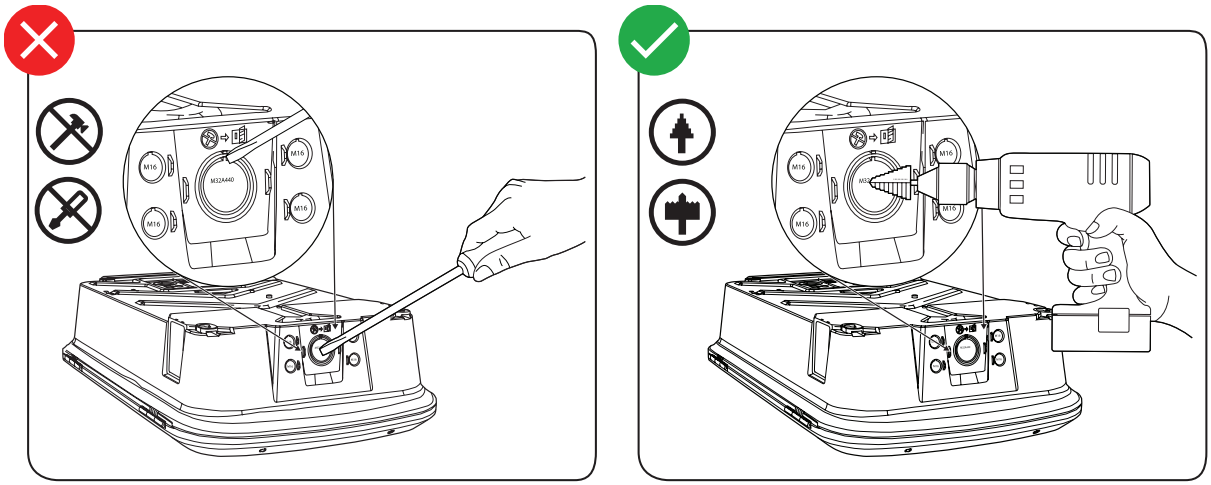
The installer is responsible for opening the holes while maintaining the integrity of the housing. Select and use appropriate tools intended for knockout holes removal. The recommended list below is not exhaustive.

For optimal performance, prepare the housing in an ambient temperature range of 10 °C to 30°C. Choose a step drill bit, or a hole saw bit that matches the selected knockout hole size. Align the tip of the drill with the pilot point. Start drilling at low speed, applying steady pressure. Smooth any rough edges left by the drilling process. Ensure that no plastic splinters are left inside the EV charger.

Do not use a hammer or a screwdriver to remove the knockouts.

See Figure 13.

Figure 13. Knockouts removal



Topside entry is not available for the RCCB version.

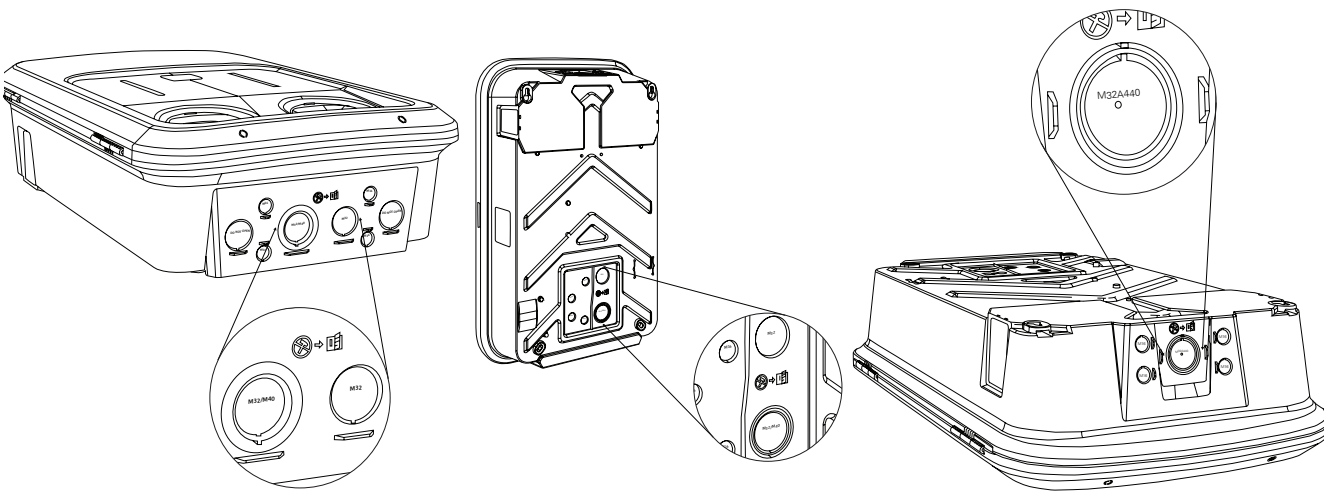
Top entry requires an additional overhead cover.

Protect the charger from scratches when knocking out the holes.

Step 4. In the case of top or bottom cable entry, place the relevant glands from the provided cable gland kit into the prepared holes, respecting the recommended torque values (M16 = 3 Nm; M32 = 10 Nm; M40 = 13 Nm).

Step 5. In the case of back entry, place the relevant grommets from the provided grommet kit.

Figure 14. Cable entry location



Bottom entry **Back entry** **Top entry**

4.5.2 Mounting the Green Motion Duo on the wall

Step 1. Place the drilling pattern template against the wall and align using a spirit level. Make sure the template's top is at a height of 1500 mm from ground level, for optimal accessibility (Figure 15). Mark with a pencil four mounting points on the wall.

Step 2. Drill four mounting holes and place wall plugs inside (Figure 16). The appropriate type of wall plugs and screws must be selected by a professional installer, based on the installation location and the type of the wall.

Step 3. Insert two M6x25 screws into the top mounting holes. Keep 5 mm clearance between the screw heads and the wall surface, adjust the clearance if needed. It is recommended to use stainless steel screws to prevent corrosion.

Step 4. Mount the product on the two top screws (Figure 17) using the keyhole slots on the back of the product. In the case of back cable entry, carefully tilt the Green Motion Duo charger and feed the cables through the grommets.

Step 5. Fix the unit to the wall with two M6x25 screws through the mounting holes in the bottom part of the product (Figure 18). Add a flat washer to help in compressing the plastic.

Step 6. Cover the mounting holes with two provided caps to ensure waterproofness of the product (Figure 18).

Figure 15. Drilling pattern

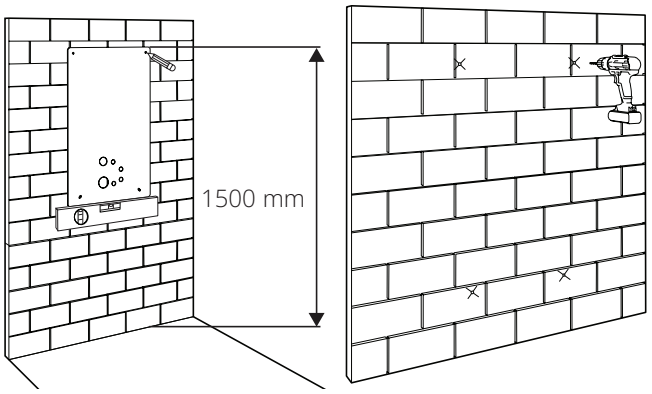


Figure 16. Wall plugs

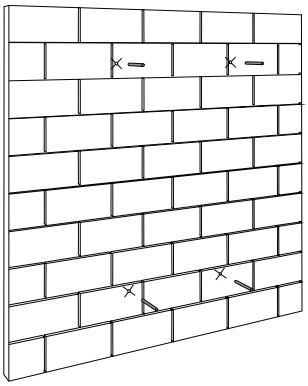


Figure 17. Mounting top screws and keyhole slot

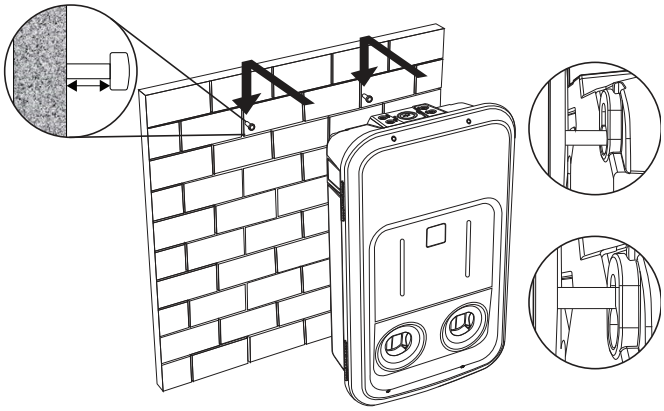
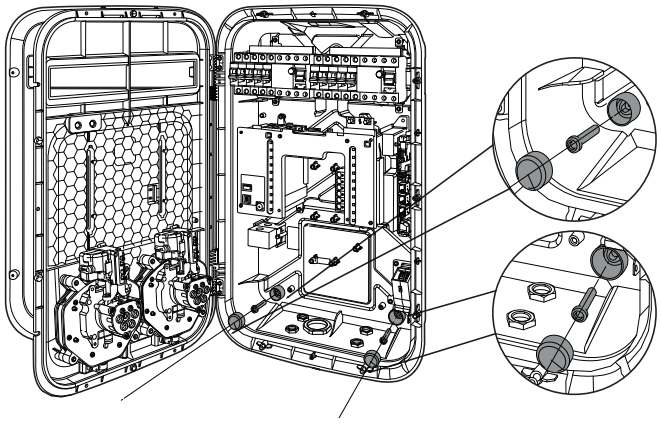


Figure 18. Finalizing wall fixation and sealing mounting holes



4.5.3 Mounting the Green Motion Duo on the pedestal

As an alternative to wall installation, a standalone pedestal is provided for setting up the Green Motion Duo charger in exterior spaces.

The Single floor-mount pedestal supports one Green Motion Duo EV charger. When extended with a Dual Extension Kit, the pedestal supports two EV chargers installed back-to-back. See Figure 19.

Tools required for installation

The following tools are required for the installer to execute the installation effectively:

- Torx Screwdrivers Tx25 (for fastening M5x20 screws), Tx20 (for fastening M4x8 screw).
- Ratchet socket 8mm or equivalent (for mounting a Green Motion Duo charger and connecting a protective earth).
- Wrench or ratchet socket 17mm (in case of using M10 base nuts).

Figure 19. Green Motion Duo Floor-Mount Pedestal; single and dual back-to-back installation holes

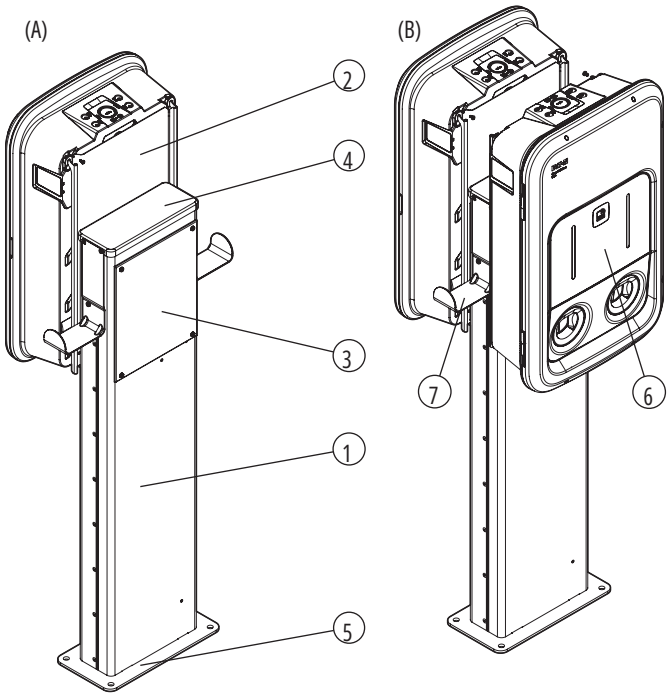
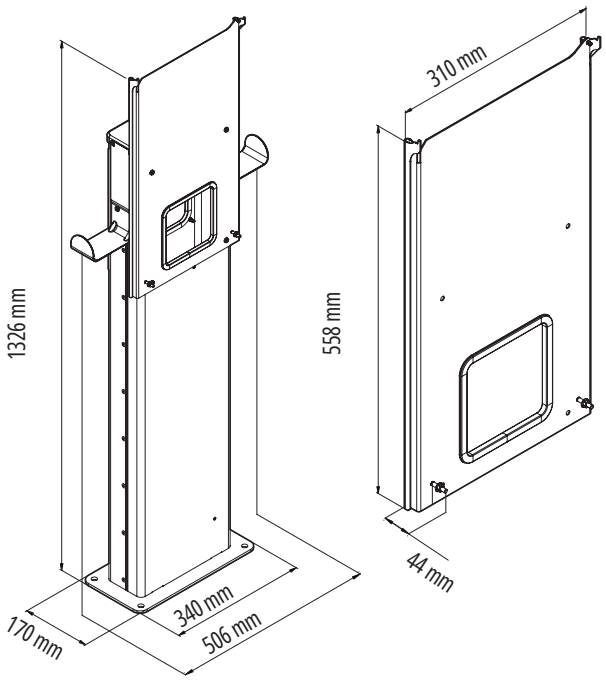


Figure 20. Outline dimensions of Green Motion Duo Floor-Mount Pedestal Single and the Dual Extension Kit.



Tag	Description
1	Floor-Mount Pedestal
2	Backplate
3	Blanking plate
4	Top cover
5	Footplate
6	Green Motion Duo EV charger
7	Cable holder

The appropriate type of fasteners (threaded rods, nuts) must be selected by professional and qualified personnel, based on the following considerations:

Mounting the Pedestal on a concrete base

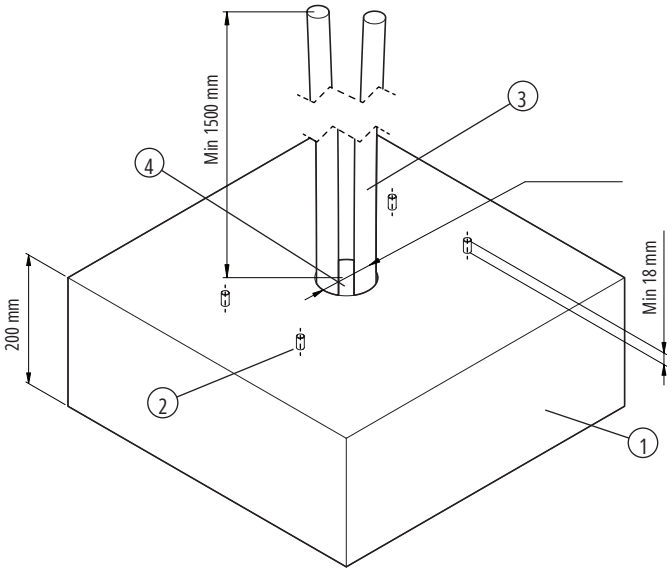
Consider the following factors

- The installation location.
- The type of surface on which the floor-mount pedestal is to be mounted.
- Local rules and regulations.

Step 1. Prepare the concrete base.

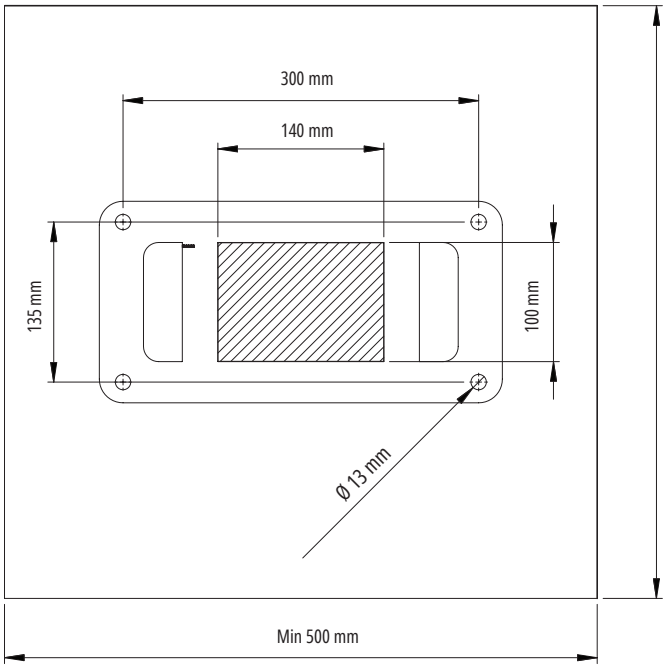
1. Follow all local building codes and best workman practices.
2. Ensure the base meets the following requirements (see Figure 21 and Figure 22):
   - Minimum outline dimensions: 500 mm x 500 mm
   - Minimum depth: 200 mm
   - Four M10 stainless steel threaded rods protruding at least 18 mm above the surface
   - An opening with a recommended diameter of 80 mm for AC power supply cables and communication cables in the center of the block
   - Use a PVC conduit to protect the cables

Figure 21. Concrete base for floor mounting with dimensions.



Tag	Description
1	Concrete base
2	Threaded rods (4 pcs)
3	Power and communication cables
4	Cable conduit

Figure 22. Concrete base for floor mounting with dimensions.



Step 2. Install the grounding rod.

1. While the concrete is wet, prepare a grounding rod for connecting a protective earth (PE) conductor to the pedestal.
2. Follow all applicable local building codes and electrical codes.
3. Ensure the grounding rod is located within the hatched area measuring 140 mm x 100 mm (see Figure 22).

Step 3. Feed the cables.

1. Feed an AC power supply cable and a communication cable (if applicable) through the opening in the concrete base.
2. Ensure the cables protrude by at least 1.5 m to reach the charger when mounted.

Note: Do not strip the insulation from the cable yet, as it will impede insertion through the grommets on the back of the Green Motion Duo EV charger.

Step 4. Insert the cables into the pedestal.

1. Insert the prepared cables into the pedestal's internal chamber.
2. Extract the cables through the window on the selected side of the pedestal (see Figure 23).
3. Repeat the process for the communication cable (if applicable).

Step 5. Mount the pedestal.

1. Place the pedestal on the concrete base over the installed threaded rods.
2. Fit four M10 nuts with a suitable set of washers (not provided) onto the threaded rods.
3. Securely lock the nuts.

Note: The selection of the correct types of nuts and flat washers should be carried out by professionally qualified personnel.

Managing cables

The pedestal is equipped with 2 cable tie mounts on the internal side of the wider walls, below the service windows.

Fix the AC power cables onto the integrated cable tie mounts, using nylon cable zip ties (not provided). Refer to Figure 23 and Figure 24.

Cable ties up to 12.7 mm wide are supported.

Figure 23. Insertion of cables into the Green Motion Duo floor-mount pedestal's internal chamber.

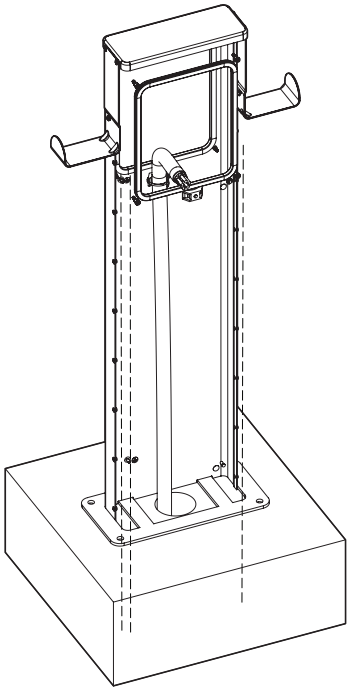
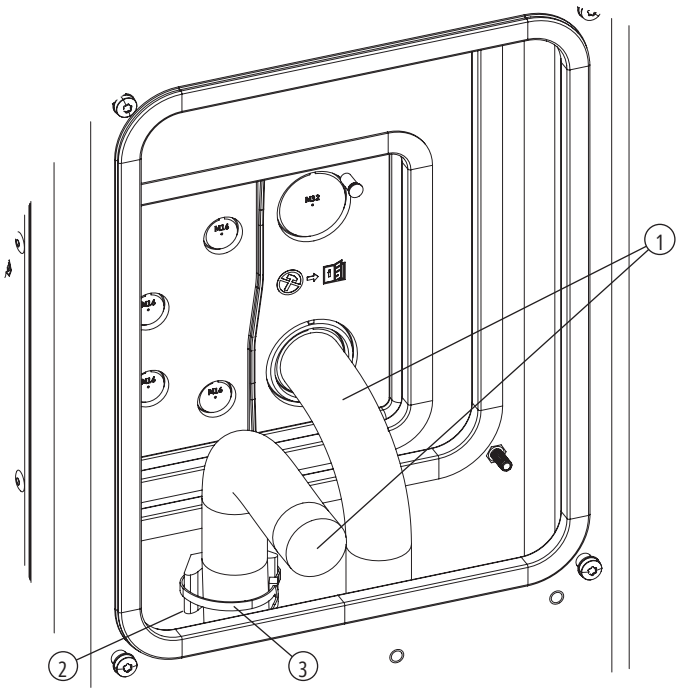


Figure 24. Insertion of cables into the Green Motion Duo floor-mount pedestal's internal chamber.



Tag	Description
①	Power cable
②	Cable tie mount
③	Cable zip tie

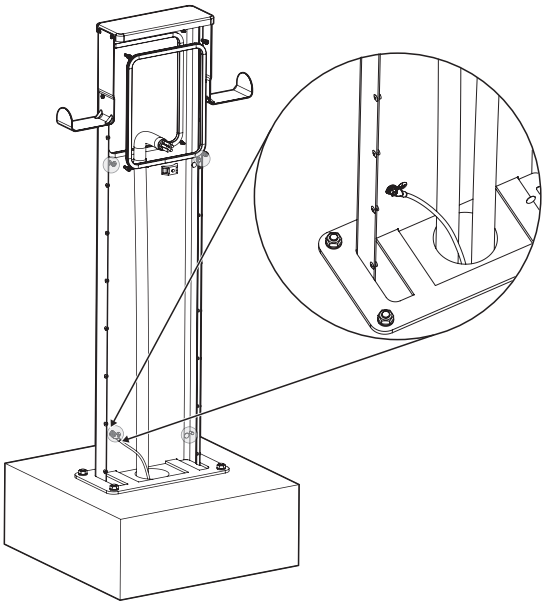
Grounding

The pedestal is equipped with 4 grounding studs in the bottom part and in the upper part of the pedestal, symmetrically on both of the wider walls (see Figure 25).

- The bottom-side grounding studs, located ~140 mm from the floor level, are recommended for connecting a PE bonding conductor in a case of using dedicated local grounding rods. A recommended length of the PE conductor is 200 mm.
- The top-side grounding studs can be used optionally when required by the installation conditions.

PE conductors shall be terminated with cable lugs with an internal diameter allowing for connection to an M5 stud.

Figure 25. Grounding studs location.



Connect the PE Conductor

1. Place the star washer from the provided fastener kit over the selected grounding stud.
2. Connect the PE conductor to the selected stud using the provided serrated washers and nuts.
3. Ensure that the protective earth connection is done correctly in accordance with local regulations.
4. After mounting the Green Motion Duo charger, verify continuity of grounding between the PE conductor and the backplate (threaded studs).

Mounting the Green Motion Duo on the pedestal (single)

Step 1. Prepare the charger.

1. Ensure that the knockout holes on the back are removed for the preferred wiring configuration and power cable's cross-section.
2. Verify that the sealing grommets are securely attached.

Step 2. Mount the backplate.

1. Mount the backplate onto the pedestal body.
2. Securely fasten with the four M5x20 screws with M5 flat washers from the provided fastener kit (see Figure 26).
3. Ensure that both gaskets are firmly attached on both the pedestal body and the backplate.

Step 3. Hang the charger.

1. Hang the Green Motion Duo on the two top hooks using the mounting holes on the charger's back side (see Figure 27).
2. Tilt the Green Motion Duo slightly to allow for easier insertion of AC power and communication cables.
3. Feed the cables through the respective grommets on the charger's back side.

Step 4. Secure the charger.

1. Attach the provided thread-rolling M4x8 screw through the rear side of the backplate (Figure 27), securely locking the charger in its position.
2. Securely fasten the Green Motion Duo with the two provided M5 flange nuts.
3. Cover the mounting holes with the two sealing caps provided with the charger.

Figure 26. Backplate installation.

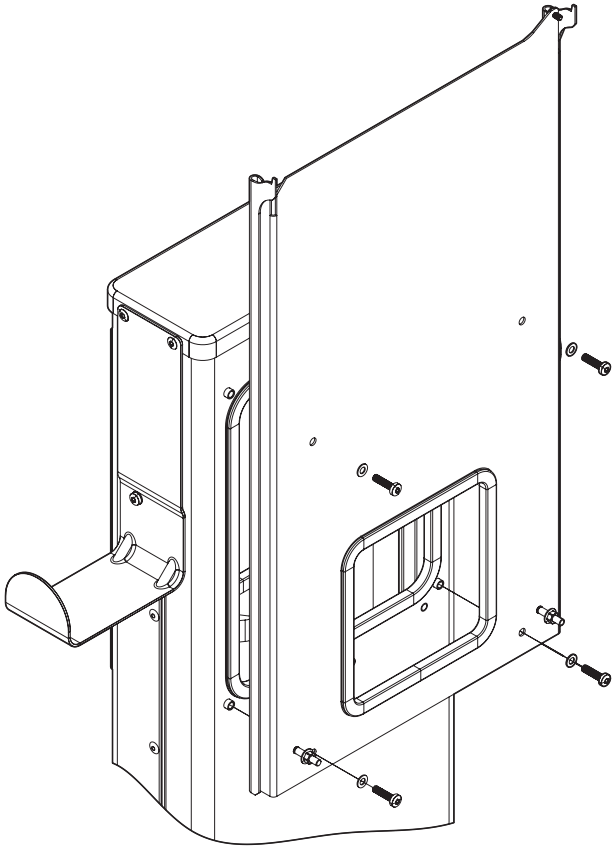
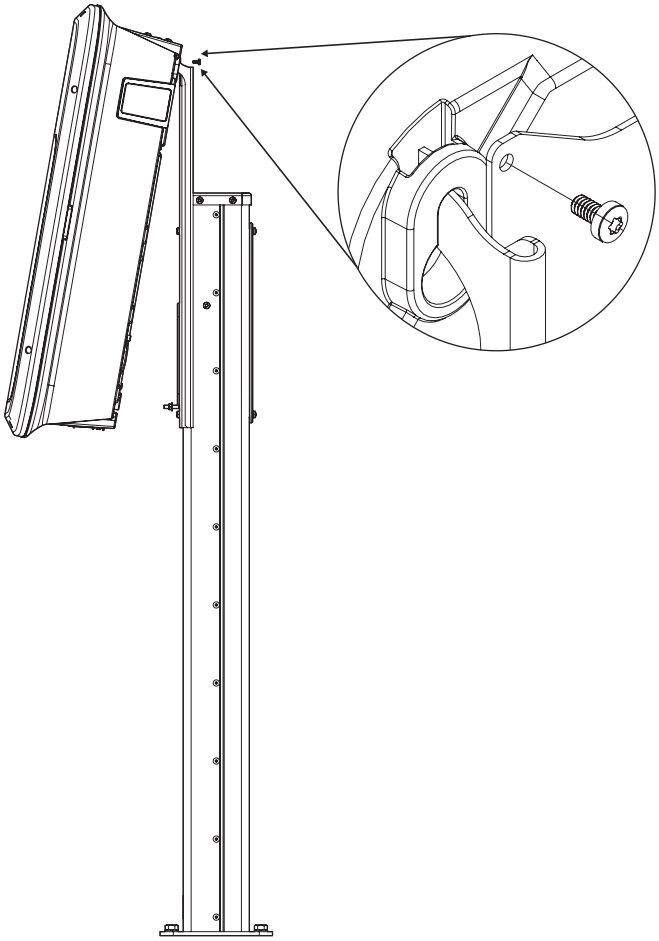


Figure 27. Mounting of Green Motion Duo onto the backplate.



Step 5. Complete wiring and commissioning.

1. Close the second door and the first door, ensuring proper sealing of the housing.
2. Ensure that the blanking plate is snugly covering the unused window, and that the top cover cap is firmly attached to the top of the pedestal.
3. Fasten the screws on both parts if needed.

Step 6. Mount cable holders.

1. Mount cable holders on the sides of the pedestal, using the pre-installed M5x20 screws, as shown in Figure 29.

Figure 28. Fixation and sealing of Green Motion Duo.

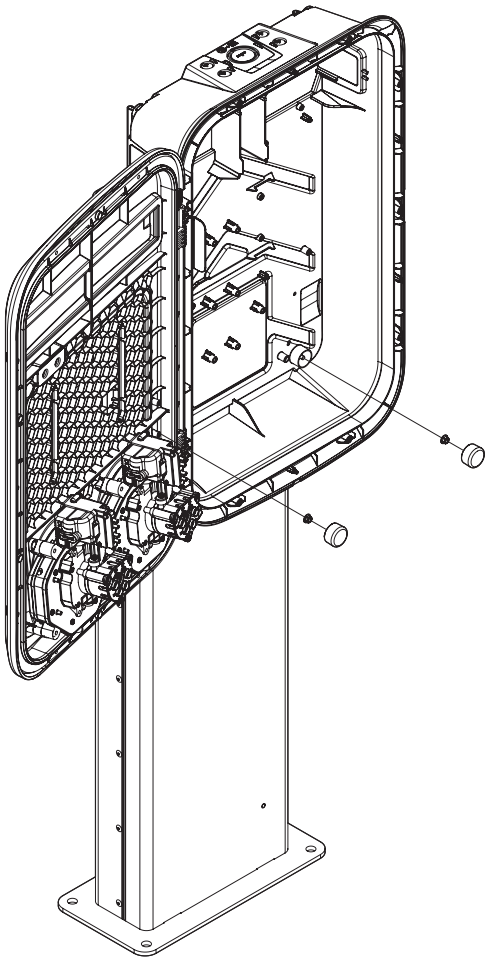
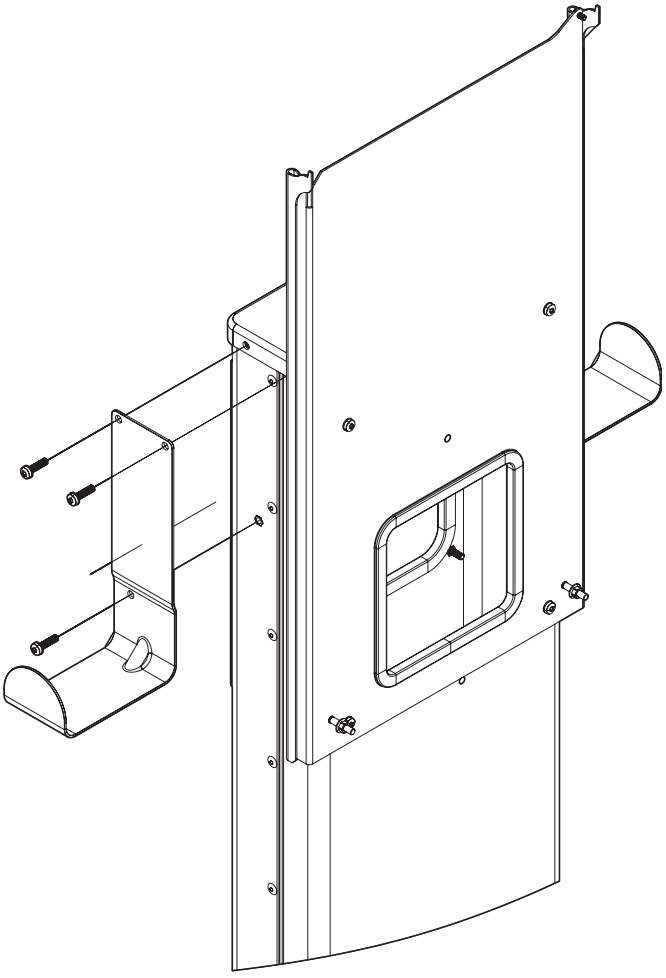


Figure 29. Mounting of cable holders.



Mounting the Green Motion Duo with a Dual Extension Kit

In case of installing two Green Motion Duo EV chargers on the floor-mount pedestal using a Dual Extension Kit, follow these additional steps:

Step 1. Remove the blanking plate.

1. Remove the blanking plate from the pedestal.
2. Ensure that the gasket is firmly attached to the edge of the window.

Step 2. Place the backplate.

1. Place the backplate from the Dual Extension Kit onto the newly available side of the pedestal, re-using the available M5x20 screws (see Figure 30).

Repeat steps 3 to 5 (line 1) from the Single Pedestal installation procedure.

Figure 30. Mounting of the Dual Extension backplate onto the Single Pedestal.

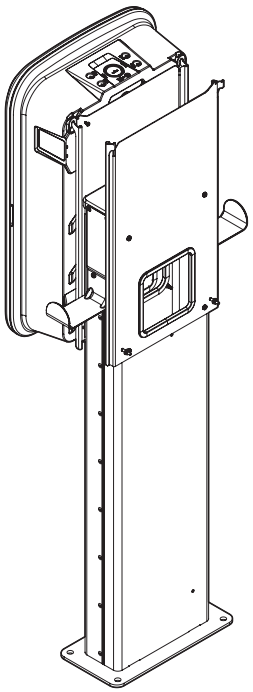


Figure 31. Recommended position of a single pedestal

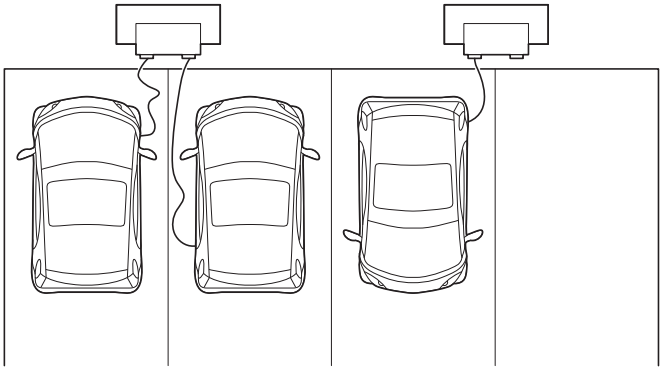
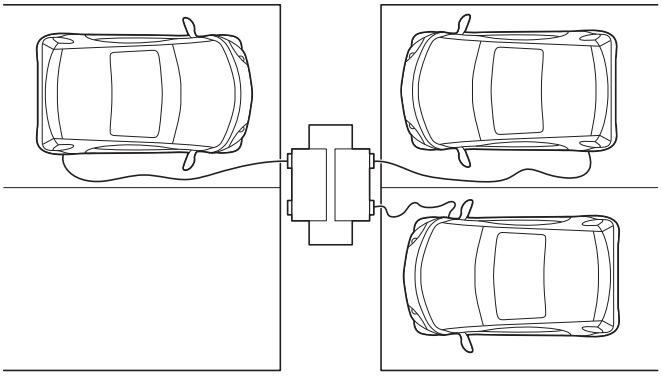


Figure 32. Recommended position of a back-to-back pedestal



4.6 Wiring the Green Motion Duo EV charger

4.6.1 Cautions

Installation, commissioning, maintenance or retrofitting of the EV charger must be performed by professional and qualified personnel, who are responsible for complying with existing standards and local installation regulations.

For safety reasons, an appropriately rated input load disconnector must be provided for each individual product. No load should be connected directly to the product during installation.

Connect only one EV charger per circuit breaker and residual current device (RCD) (if required by local regulations). The circuit breaker serves as a mains disconnector.

The protective earth conductor must have a cross-section at least equal to or greater than the cross-section of the cables for connection to the public grid (AC) and in accordance with the requirements of local regulations.

Before starting connection operations, ensure that the external AC-line main switch is disconnected, and circuit breakers are open.

Any operation requiring the main converter box to be opened can lead to electric shock hazards.

4.6.2 General wiring considerations

To connect the EV charger to the electrical power distribution network, professional and qualified personnel should consider the following guidelines.

Green Motion Duo EV charger can be connected in different ways depending on several factors, such as:

- Single-phase or three-phase supply
- 16 A or 32 A feeder capacity
- Type and length of the power supply cable
- Variant of the charger

Tables

- Table 8: Used when installing the RCCB variant of the Green Motion Duo charger.
- Table 9: Used when installing the MCB + RCCB variant of the Green Motion Duo charger.

Table 8. Parameters for external protective devices dimensioning; Green Motion Duo RCCB-variant

Parameter	Value			
No. of phases	Single-phase		Three-phase	
Charging power per socket	3.7 kW	7.4 kW	11 kW	22 kW
Nominal input voltage	230 V	230 V	400 V	400 V
Max current limitation (per supply cable)	1 x 16 A	1 x 32 A	1 x 16 A	1 x 32 A
Power supply terminal block max. cross-section	16 mm^2			
Min. recommended cable cross-section [2]	2.5 mm^2	6 mm^2	2.5 mm^2	6 mm^2
Max cable diameter acceptable by glands	21 mm (back entry), 25 mm (bottom entry)			
External MCB rating (per supply cable)	20 A	40 A	20 A	40 A

Table 9. Parameters for external protective devices dimensioning; Green Motion Duo MCB + RCCB-variant.

Parameter	Value			
No. of phases	Single-phase		Three-phase	
Charging power per socket	3.7 kW	7.4 kW	11 kW	22 kW
Nominal input voltage	230 V	230 V	400 V	400 V
Max current limitation (per supply cable)	2 x 16 A	2 x 32 A	2 x 16 A	2 x 32 A
Power supply terminal block max. cross-section	25 mm^2 (stranded), 16 mm^2 (solid)			
Min. recommended cable cross-section [2]	6 mm^2	16 mm^2	6 mm^2	16 mm^2
Max cable diameter acceptable by glands	28 mm (back entry), 32 mm (top and bottom entry)			
External MCB current rating [1]	40 A	80 A	40 A	80 A

[1] In case of connecting the Green Motion Duo with an AC power supply cable longer than 3 meters (see Figure 33 and Figure 34).

[2] Rigid wires are recommended for the power supply. These cross sections must be re-assessed by professional and qualified personnel depending on the length of the wires.

[3] Always refer to your local installation regulations.

The power losses on the power supply line must be less than +/- 10 percent of the rated power in accordance with IEC 60038 and local standards. Cable cross sectional area must be defined by professional and qualified personnel according to national wiring regulations and depending on cable length, protective devices and other site specific factors. Also, when dimensioning the power supply line, observe the possible reduction factors and the increased environmental temperatures inside the connection area of the EV charger. See the temperature rating of the supply terminals. Under certain circumstances, this can increase the cable cross-section and change the temperature resistance of the power supply line.

Professional and qualified personnel must define the types of RCD and circuit breaker.

EACH EV CHARGER MUST BE CONNECTED VIA A SEPARATE FAULT-CURRENT CIRCUIT BREAKER. NO OTHER CONSUMERS MAY BE CONNECTED TO THIS CIRCUIT.

THE CIRCUIT BREAKERS AND THE POWER CABLE MINIMAL CROSS-SECTIONS MUST BE DEFINED BY PROFESSIONAL AND QUALIFIED PERSONNEL.

DURING INSTALLATION, OTHER IMPORTANT ISSUES SUCH AS "CASCADING" OF RCDS AND SELECTION OF A SUITABLE LINE CIRCUIT BREAKER MUST BE CONSIDERED.

When dimensioning the line circuit breaker, the increased ambient temperatures in the control cabinet must also be considered. Under certain circumstances, this can make a reduction of the charging current specification necessary in order to increase the system availability.

For recommendations on selecting the upstream circuit breaker devices, refer to Table 10.

Table 10. Eaton recommended external upstream protective devices.

Installation type	Green Motion Duo	Item	Part number
1- or 3-phase 16 A charging current	RCCB-variant	20 A circuit breaker (2 pcs)	FAZ-C20/3N
1- or 3-phase 32 A charging current	RCCB-variant	40 A circuit breaker (2 pcs)	FAZ-C40/3N
1- or 3-phase 16 A charging current, > 3m supply cable	MCB+RCCB-variant	40 A circuit breaker	FAZ-C40/3N
1- or 3-phase 32 A charging current, > 3m supply cable	MCB+RCCB-variant	80 A circuit breaker	AZ-3N-C80

The installer should refer to local installation regulations to select the correct protection device.

Green Motion Duo charger is equipped with electrical protective and switchgear devices, as depicted in Figure 33 and Figure 34. Parameters and part numbers are described in Table 11.

Table 11. Internal electrical protection and switchgear devices

Item	Part number	Parameters	Green Motion Duo
Miniature circuit breaker	FAZ6-C40/3N	40 A 3p+N poles 6 kA short-circuit characteristic C	MCB + RCCB variant
Residual current circuit breaker	FRCMM-63/4/003-A	63 A 30 mA fault rating Type A	Any
Contactor	Z-SCH230/40-40	40 A 4 poles AC-1 category	Any
Residual direct current detecting device	N/A	6 mA fault rating Type DC	Any

Figure 33. Recommended single-phase wiring of Green Motion Duo for maximum charging current; (A) RCCB-variant, (B) MCB+RCCB-variant, short supply cable, (C) MCB+RCCB-variant, long supply cable.

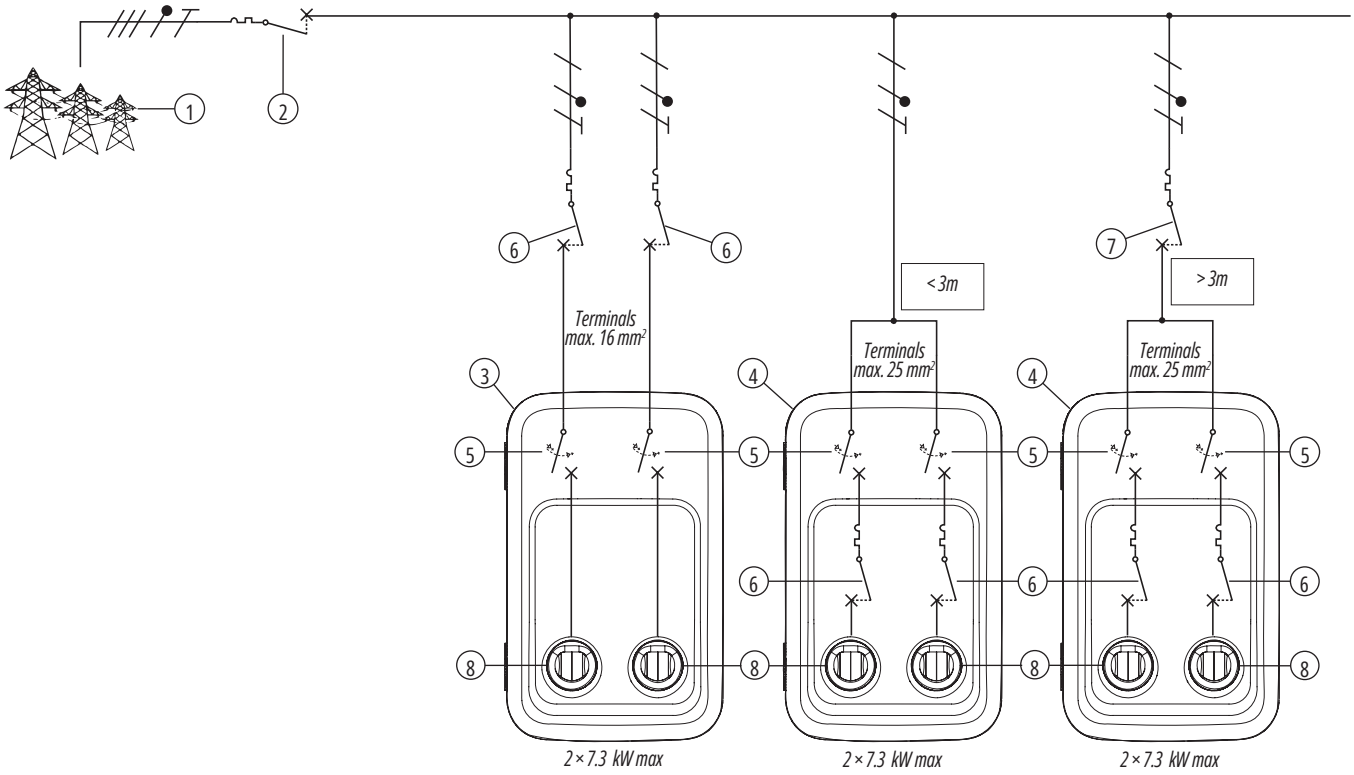
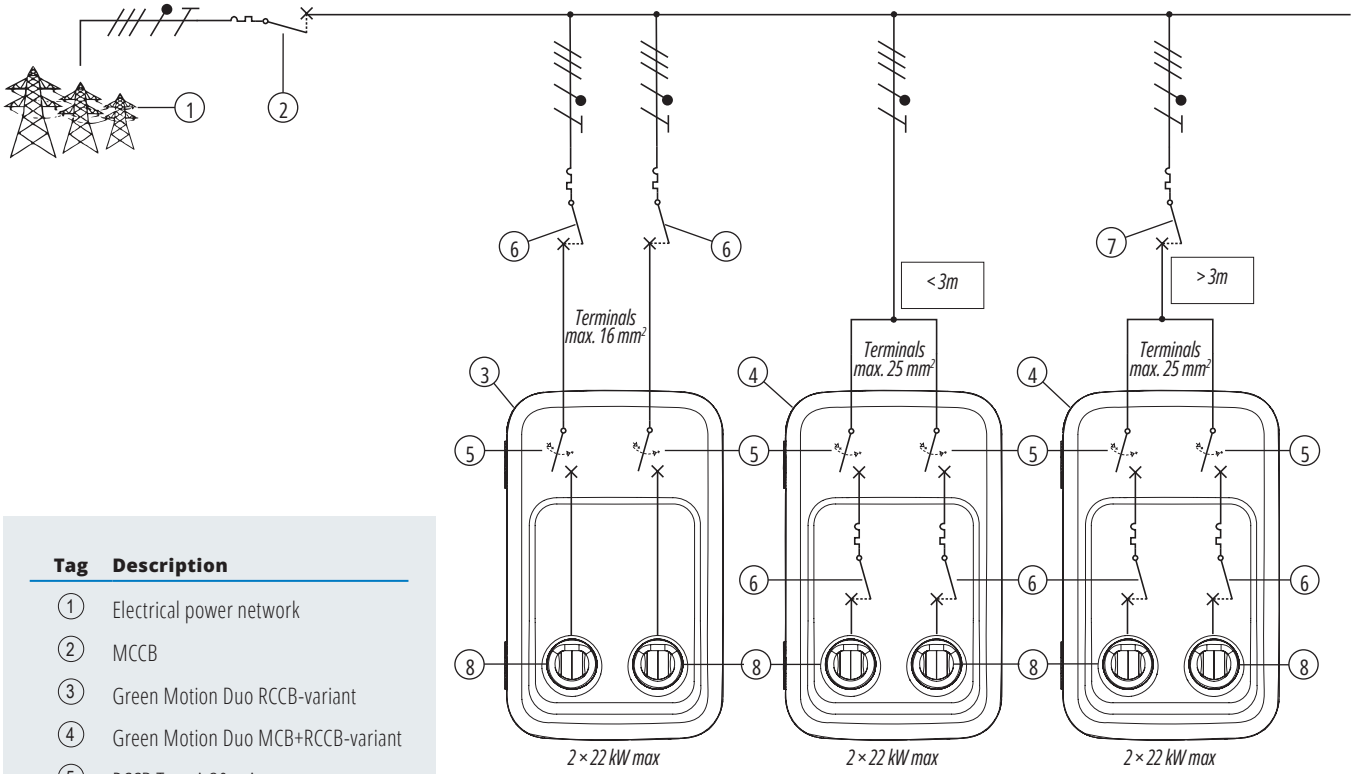


Figure 34. Recommended three-phase wiring of Green Motion Duo for maximum charging current; (A) RCCB-variant, (B) MCB+RCCB-variant, short supply cable, (C) MCB+RCCB-variant, long supply cable



Tag	Description
1	Electrical power network
2	MCCB
3	Green Motion Duo RCCB-variant
4	Green Motion Duo MCB+RCCB-variant
5	RCCB Type A 30 mA
6	MCB 40A
7	MCB 80A
8	Socket

Please always consult national wiring regulations to ensure appropriate protections are in place.

4.6.3 Connecting the Green Motion Duo to the power distribution network

It is prohibited to connect the unit terminals to a circuit with a 3-phase IT grid configuration.

Before starting the connection operations, ensure that the external AC-line main switch is disconnected, and circuit breakers are open.

It is possible to install a Green Motion Duo in a 1-phase IT distribution network, with a nominal line-to-line voltage 230 V.

Step 1. Insert the Cables.

1. Insert the AC power cable from the distribution network and the signal cables through the cable glands on the selected product side.
2. Secure the cable with metal cable clamps (15-30 mm diameter cables) or with zip ties (max 15 mm diameter cables).
    - The metal clamp can be placed on any of the three mounting post pairs depending on the entry side and either in a downward or in an upward orientation.
    - Select the orientation based on the outer diameter of the cable:
        - 15 to 22 mm – downward orientation
        - 22 to 30 mm – upward orientation

Step 2. Connect the AC Supply Cable.

1. Connect the AC supply cable to the power terminal block phase terminals (L1, L2, L3), neutral terminal (N), and protective earth terminal (PE), respecting the correct assignment.

For RCCB Product Variant

1. Connect one power cable (rated for the maximum selected charging current) intended for charge point 1 to the top part of the terminal block.
2. Similarly, connect another power cable intended for charge point 2 to the bottom part of the same terminal block (see Figure 35).

For RCCB+MCB Product Variant

1. Connect only one power cable rated for the total charging current of both charge points to the terminal block (see Figure 36).

For Single Phase Power Supply

2. Connect the phase wire to the terminal (L1) of the terminal block.

Figure 35. Wiring AC power supply cables to the terminal block of the RCCB variant; (A) Three-phase connection; (B) Single-phase wiring.

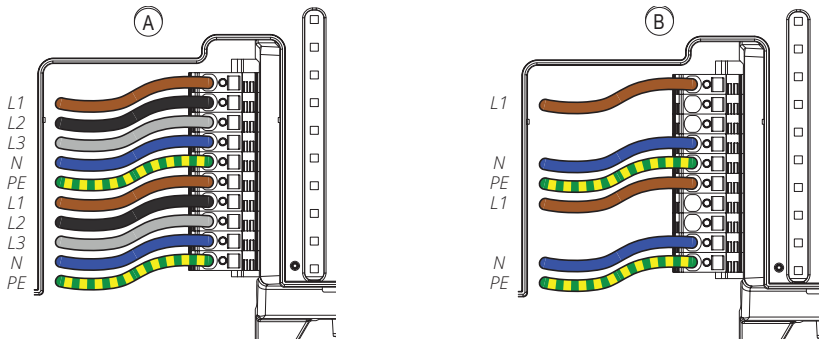
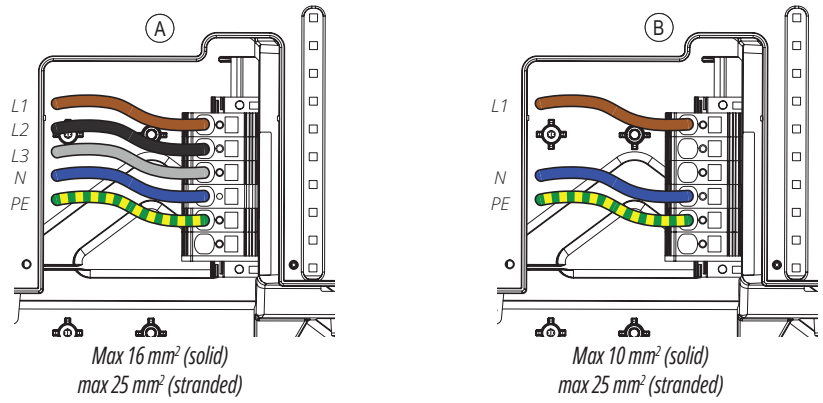


Figure 36. Wiring AC power supply cables to the terminal block of the MCB+RCCB variant; (A) Three-phase connection; (B) Single-phase wiring.



Be careful not to confuse the phases with the neutral. The device can malfunction in case of incorrect wiring. The control unit does not need to be dismantled to perform wiring. Doing so will void the product warranty.

4.6.4 Phase rotation and alternating the phase connections

The default phase connection sequence setup assumes that the phases from the grid are connected to the corresponding AC terminal block inputs as follows:

- Connect wire L1 to terminal L1.
- Connect wire L2 to terminal L2.
- Connect wire L3 to terminal L3.

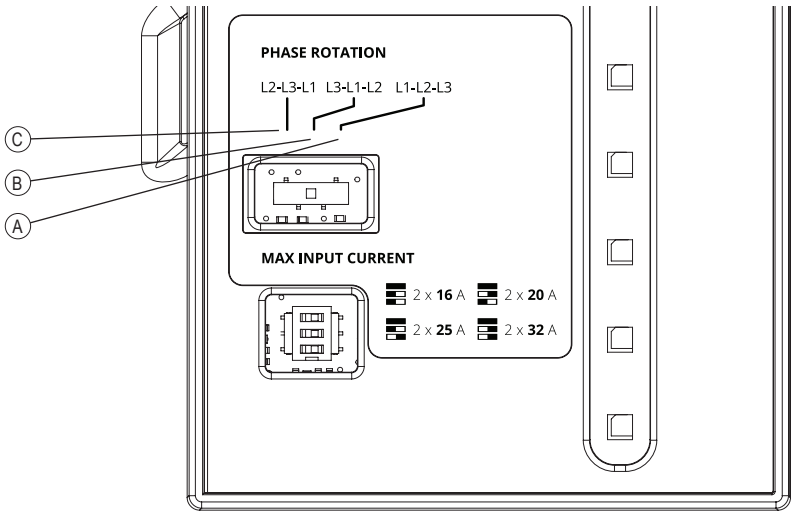
To prevent phase unbalance when installing EV chargers as specified later in this chapter, additional setup changes are required.

To change the phase rotation setting of the Green Motion Duo EV charger, follow these steps:

Step 1. Open the first and the second door of the Green Motion Duo EV charger. Refer to chapter 7.1 of this manual for detailed instructions.

Step 2. Locate and set the selector switch (See Figure 37) on the left bottom side of the control panel, respecting the phase wiring per Figure 38.

Figure 37. Phase rotation



Tag	Description
A	EV charger 1: Standard phase wiring
B	EV charger 2: Alternate phase wiring
C	EV charger 3: Second alternate phase wiring

Alternating the phase connections:

A: EV Charger 1

Connect the wires of EV Charger 1 as follows:

- Connect wire L1 to terminal L1.
- Connect wire L2 to terminal L2.
- Connect wire L3 to terminal L3.

B: EV Charger 2

Connect the wires of EV charger 2 with the phases alternated one way:

- L3 on terminal L1
- L1 on terminal L2
- L2 on terminal L3

C: EV Charger 3

Connect the wires of EV charger 3 with the phases alternated the other way:

- L2 on terminal L1
- L3 on terminal L2
- L1 on terminal L3

Repeat this sequence (A, B, C) for all remaining chargers.

The schematics in Figure 38 and Figure 39 explain how to wire multiple Green Motion Duo EV chargers (A, B, C).

Figure 38. Wiring options for MCB+RCCB variant phase rotation. (See Figure 37 for more information about the selector settings.)

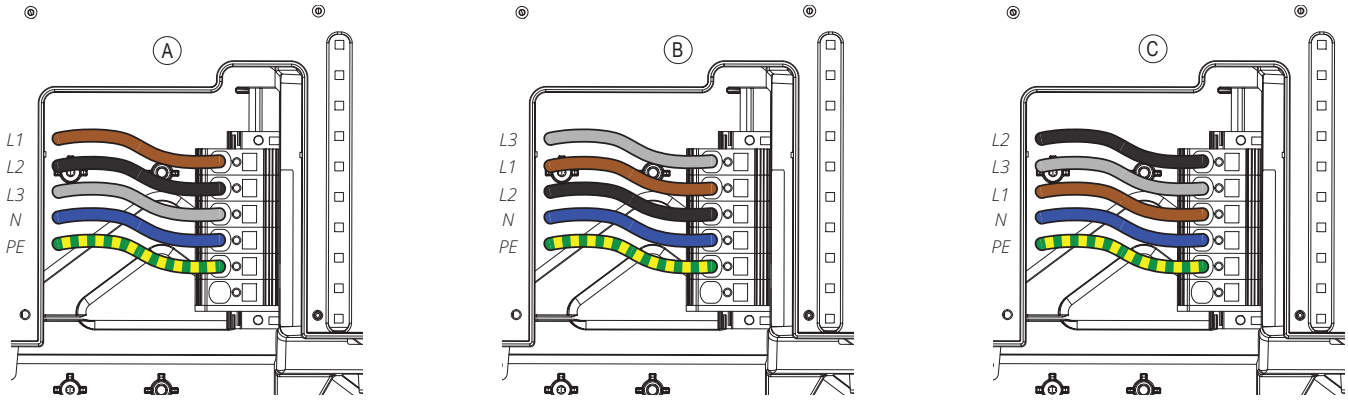
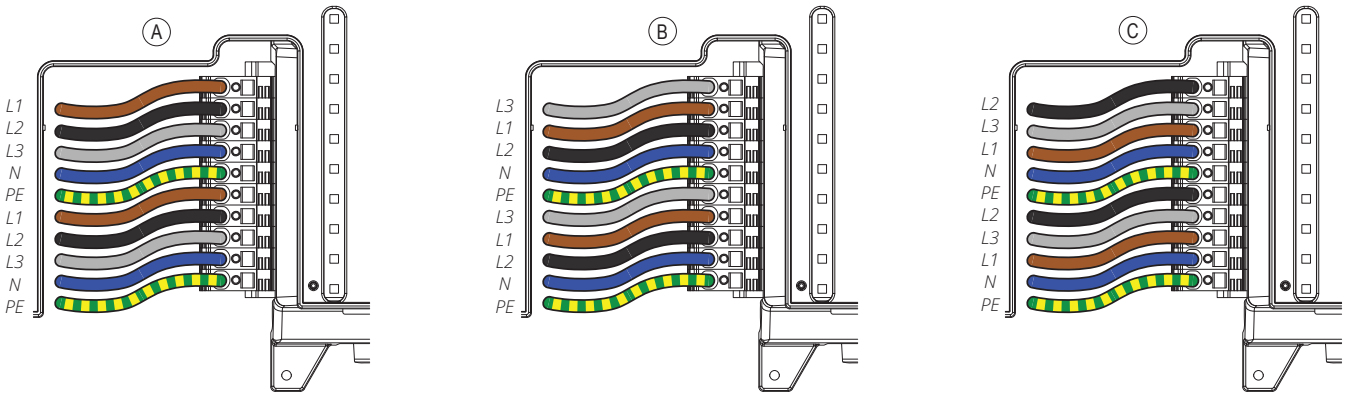


Figure 39. Wiring options for RCCB variant phase rotation



4.7 Configuring the Green Motion Duo

The maximum current limit of the product can be configured with the DIP switch located on the control panel. Select the phase rotation preference using the 3-position slider (See chapter 4.6.4).

4.7.1 Output current limitation

By default, the charging current is limited to 32 A per each charge point for the Green Motion Duo 22 kW EV charger.

In case the maximum capacity of the electrical installation is lower than 32 A, the maximum charging current for the Green Motion Building EV charger can be reduced through a DIP switch located on the backside of the Green Motion Building front cover.

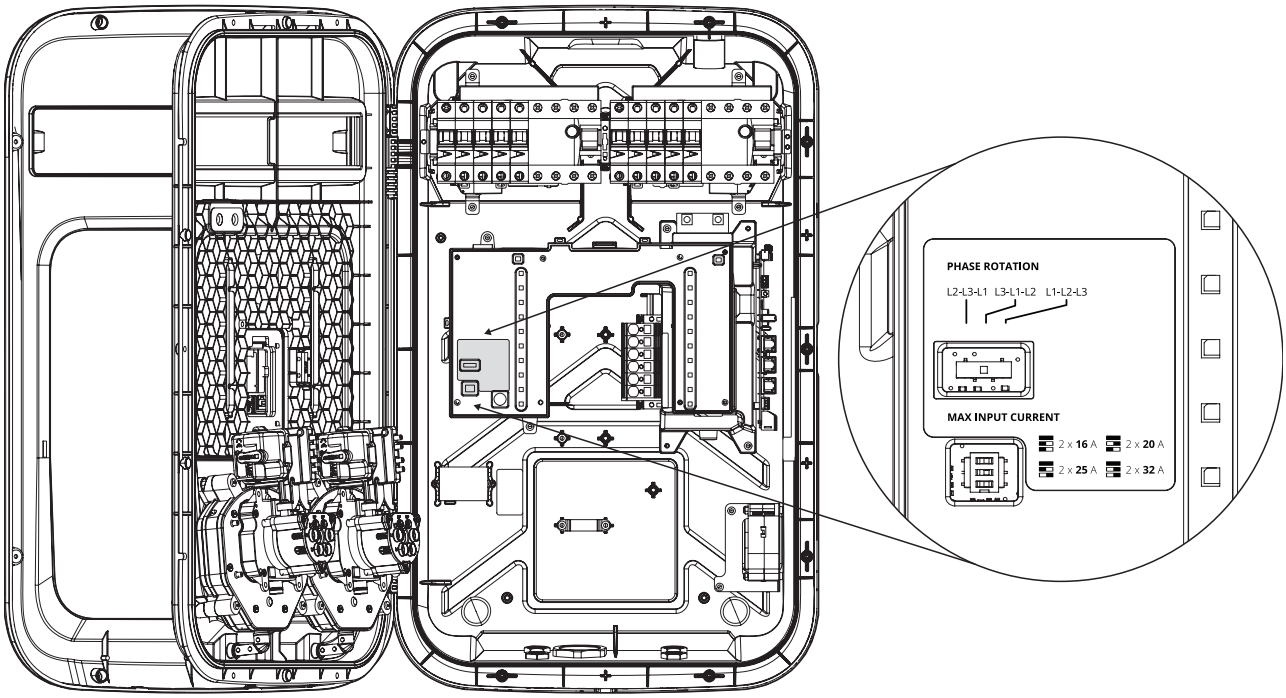
In the event of damage caused by improper current adjustment, the product guarantee is void and no returns will be accepted. Eaton declines any responsibility for improper current adjustment and cannot be liable for any inappropriate operation.

To limit the maximum charging current for the Green Motion Duo EV charger, follow these steps:

Step 1. Open the first door and the second door of the Green Motion Duo EV charger. Refer to chapter 7.1 of this manual for detailed instructions.

Step 2. Locate the DIP switch on the left bottom side of the control panel.See Figure 40.

Figure 40. DIP switch location



Step 3. Determine the maximum capacity of the electrical installation in which the Green Motion Duo EV charger is installed.

Step 4. Use Table 12 to select a maximum charging current for the EV charger lower than the maximum capacity of the electrical installation and configure the DIP switch accordingly.

Table 12. Configuration to limit the maximum current of the EV charger

Maximum input current		DIP switch configuration
Green Motion Duo MCB + RCCB variant	*Green Motion Duo RCCB variant*	
32 A	2 x 16 A	
40 A	2 x 20 A	
50 A	2 x 25 A	
64 A	2 x 32 A	

4.8 Create the EV charging cluster

Every EV charger must be interconnected into the charging cluster consisting of one Green Motion Duo Master and (up to 15) Nodes.

The connection between the Master and its Nodes in one cluster is RS485 (modbus RTU) and uses standard UTP CAT5/6 cables with RJ45 connectors.

Green Motion Duo/DC Master

Master board (CSC) and charger controller (SEC) are interconnected during manufacturing and related RJ45 connectors are marked as "Do not remove".

Terminators are connected in the "Node connection left(right)/terminator" connectors.

Connecting Green Motion Duo Node

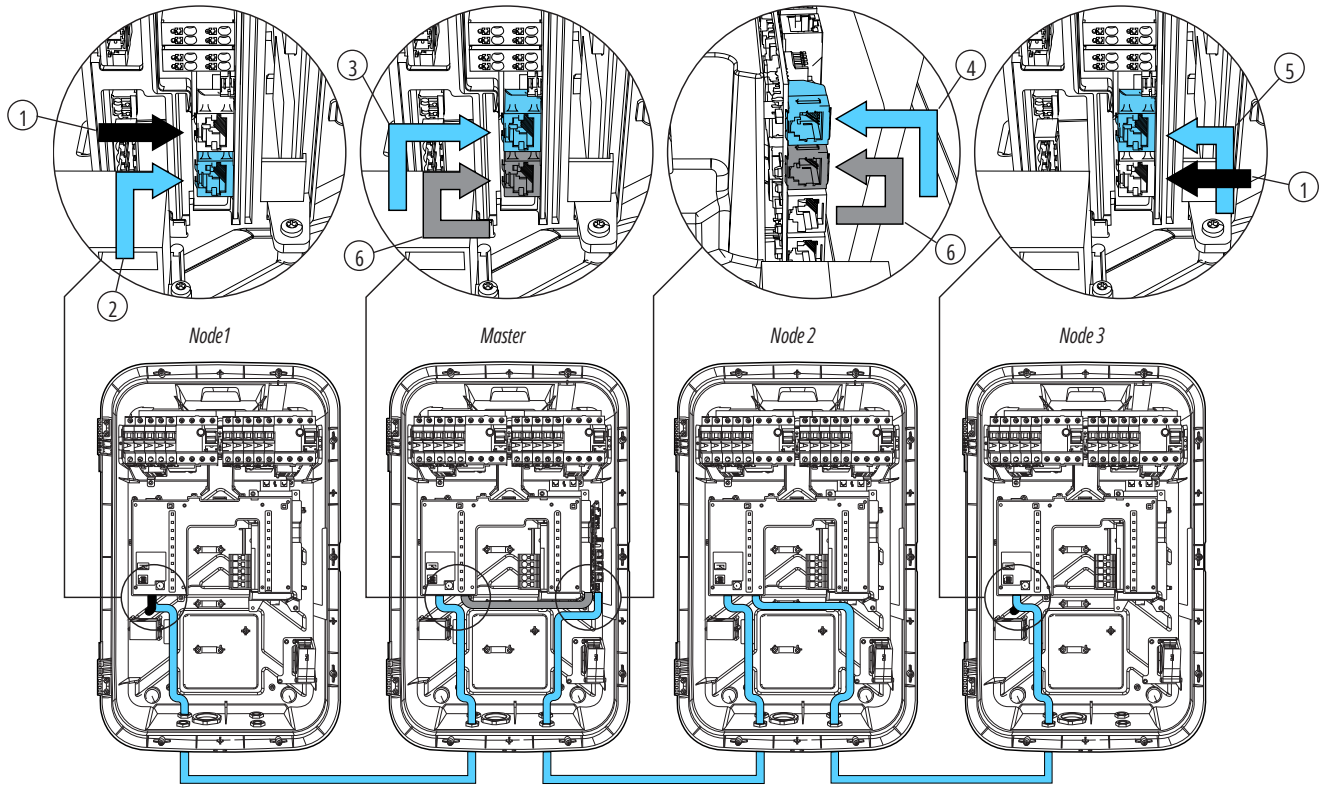
Step 1. Remove the terminator from one of the chargers already installed in the group (or Master).

Step 2. Place the terminator into the newly added Node.

Step 3. Connect the cable between the original position of the terminator and the empty connector on the newly added charger.

The GM Duo Master can be connected at the end of the bus or anywhere between GM Duo Nodes.

Figure 41. Example with Green Motion Duo Master and three Node



Tag	Description
1	Terminator
2	Node connection right on Node
3	Node connection left on Master
4	Node connection right on Master
5	Node connection left on Node
6	DO NOT REMOVE

4.9 Charging network configurations

This chapter lists and explains typical network configurations.

GM Duo Masters are simplified and represented in diagrams by the communication controllers (CSC).

Green color in the charts represents local networking infrastructure (routers, switches, access points, etc.) outside of the GM chargers.

When all Masters are in the same LAN segment (visible to each other), Master-to-Master communication can be established, and all chargers can act as a charging network, including local load balancing.

When an installation consists of multiple EV charging clusters (e.g. having multiple GM Duo Masters), relevant clusters can:

- Work completely independently:
    - Each Master may not be visible to another and can maintain its own internet connectivity.
    - Autonomous Local Load balancing is possible only in the scope of each separate cluster (one Master and its Nodes)
    - Branch load balancing between the different clusters can only be achieved by a central system (CSMS or Energy Management Software).
- Be interconnected and act as a bigger unit – EV charging Network:
    - Sharing internet connectivity (e.g. all use the same 4G modem/SIM and saving communication costs).
    - Manage branch load balancing between clusters.
    - For this scenario it is most important that all Masters will see each other on the same LAN segment or be interconnected directly by daisy chain.

Three types of connection can be used, either individually or combined:

Daisy chain connection

Master chargers are interconnected or “daisy chained” using Ethernet cables (Figure 44). This is a simple and cost effective solution, but network reliability might be slightly reduced (if the first Master breaks, the following Masters might lose connectivity).

The recommended connection is: ETH0 port of the next Master is connected to the ETH1 port of the previous Master.

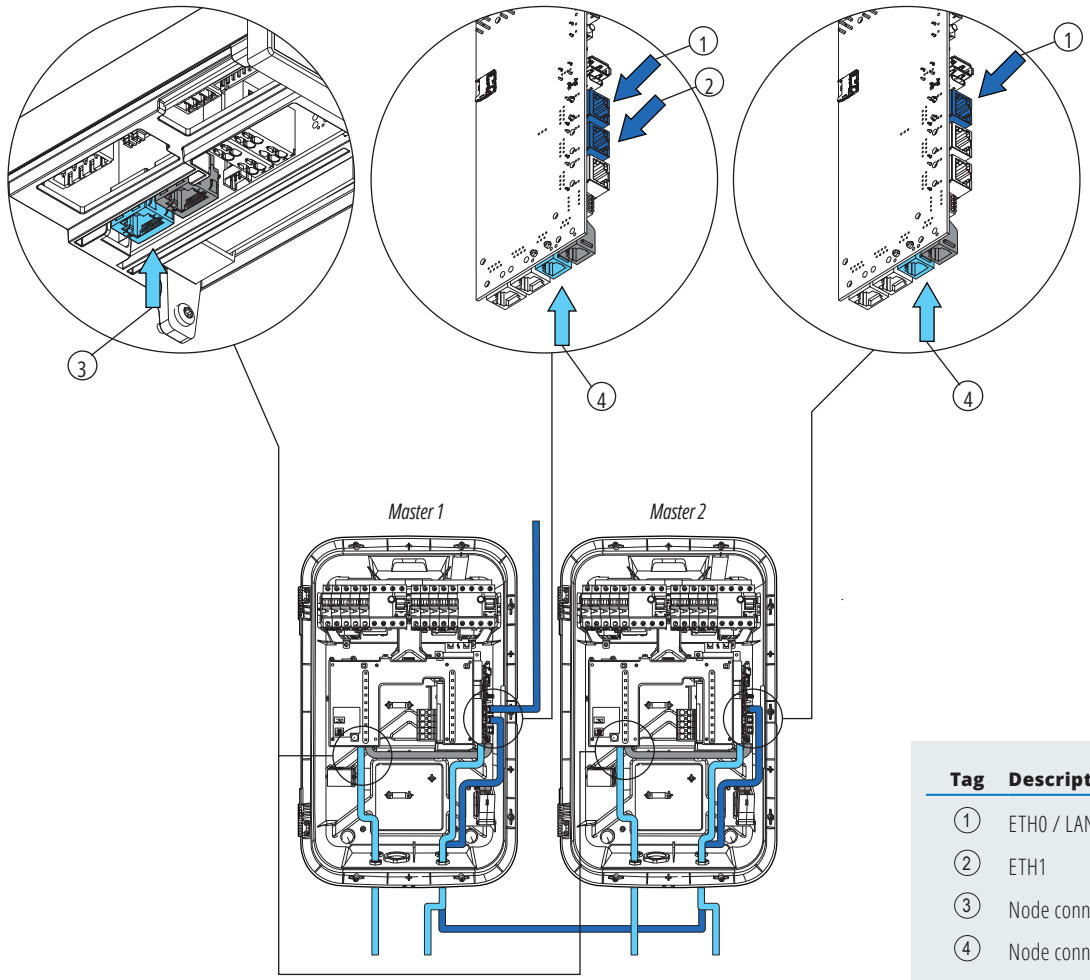
Star Ethernet connection

Each Master connects directly to the local Ethernet switch by its own dedicated Ethernet CAT5/6 cable connected to the port ETH0. Typically, it receives the IP address by DHCP in the LAN.

Star WIFI connection

Each Master connects to the same WIFI access point available at the installation location. No network cabling is needed.

Figure 42. ETH Daisy Chain



Tag	Description
①	ETH0 / LAN
②	ETH1
③	Node connection left / Terminator
④	Node connection right / Terminator

The current version of the GM Duo does not support WIFI interconnectivity between chargers (e.g., WIFI daisy chain or mesh).

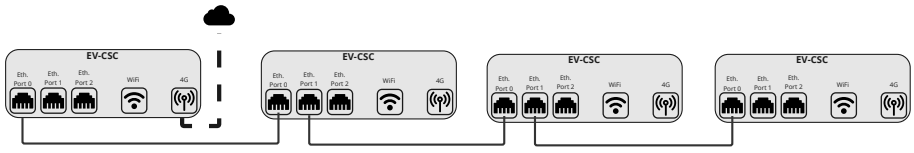
Star/Daisy Chain and even WIFI connections can be combined in one location (see chapter 5.4).

4.9.1 Standalone network with 4G modem internet connection and daisy chain

This is the typical installation for locations without local network infrastructure:

1. The first GM Duo Master connects to the Internet via its 4G modem and shares its connectivity with others.
2. The second Master connects to the first one via Ethernet cable (UTP CAT5/6) using the daisy chain method.
3. Subsequent Masters follow the same method.

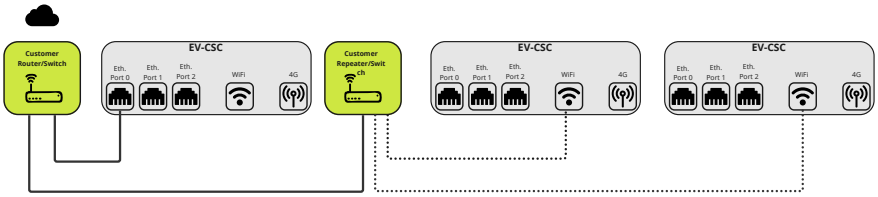
Figure 43. 4G and daisy chain



4.9.2 Star network combining WIFI and Ethernet

In this configuration, the first GM Duo Master connects directly to the existing LAN, while the other two connect to the local WIFI access point.

Figure 44. LAN and WIFI combined

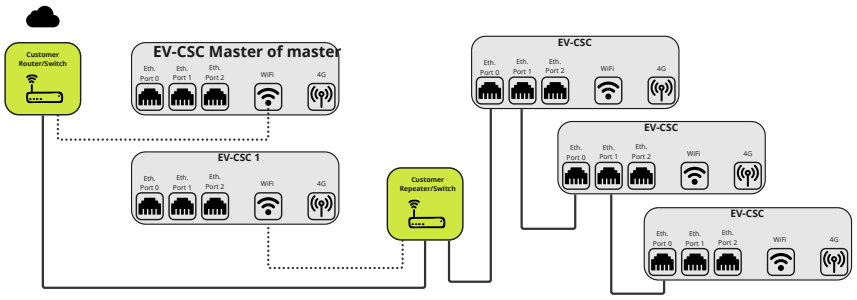


4.9.3 Daisy chain network combining WIFI and Ethernet

In this configuration:

1. The first GM Duo Master connects directly to the primary WIFI access point.
2. The second Master connects to a secondary WIFI access point (repeater/switch).
3. The third Master connects to the secondary switch via Ethernet LAN.
4. Other Masters connect to the third one via Ethernet cable using the daisy chain method.

Figure 45. WIFI and ethernet daisy chain



4.9.4 Other network configurations

The above are sample configurations, but it is impossible to list all possible options. For more complex scenarios, consult Eaton technical support. The basic rules for creating charging networks are:

1. All Masters should be visible in the same network segment.
2. The primary GM Duo Master with a 4G modem shares the Internet with others.
3. Daisy chain connecting Master to Master is possible only over Ethernet cable.
4. For wireless charger connectivity, local WIFI infrastructure (access points, mesh network) is needed.

When the GM Duo Master is connected to the local network over WIFI, daisy chaining will not work. The GM Duo Master connected via WIFI should be the last node in the charger network.

4.10 Connection to the building/installation energy meter

Building energy meter (EM) can be connected to the Green Motion Duo Master to perform the Dynamic load balancing via:

- Modbus TCP
- Modbus RTU (RS485)

The SW commissioning and testing of the EM data reading is described in the load balancing setup chapter (6.6.2).

Energy meter connected Modbus TCP

Prerequisites:

1. The energy meter must be in the supported EM list.
2. The energy meter must be installed in the building power distribution,.The energy meter must be on the same TCP/IP network segment and reachable via the local network (LAN/Wifi) by the Green Motion Duo Master.
3. The IP address of the EM needs to be known.

Energy meter connected via Modbus RTU (RS485)

Step 1. Prepare/crimp the cable to map the pins (+, -, GND) on the energy meter to the relevant pins of the RJ45 connector of CSC.

Step 2. Consult with documentation of the Energy meter or use Table 13 for mapping of the supported models of the Energy meters).

Step 3. Connect the Energy meter with Master charger CSC port "Energy Meter RS485" by prepared cable.

Figure 46. RJ45 pins of the CSC for the energy meter on RTU

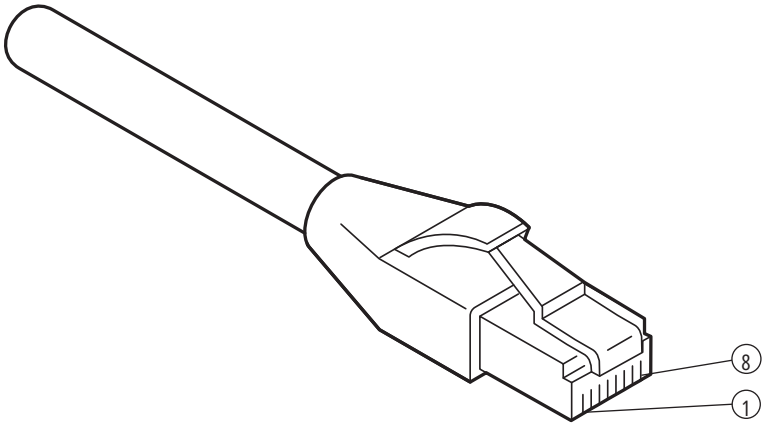


Table 13. Physical connections of the Energy Meter RS485 pins

Physical connections of Eaton Duo Master CSC RJ45			
Eaton Duo Master CSC RJ45	A(-)	B(+)	Ground
Connection numbers	5	4	8

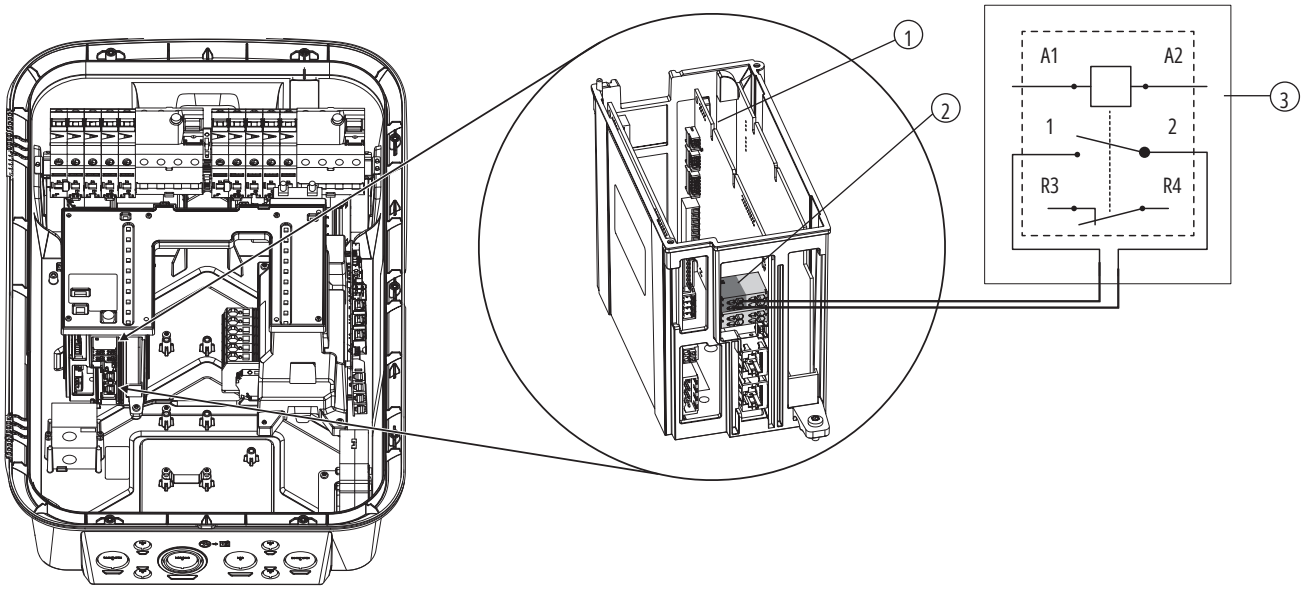
Table 14. Physical connections of the Energy Meter RS485 pins

Meter	Modbus connection method	Meter	Modbus connection method
Carlo Gavazzi EM112	RTU	Eaton EM20 IPH	TCP/IP
Carlo Gavazzi EM24DINAV23XE1X (65 A)	TCP/IP	Eaton EM20 M/MH	RTU
Carlo Gavazzi EM24DINAV53XE1X	TCP/IP	Eaton EMD3	TCP/IP RTU
Carlo Gavazzi EM330	RTU	Eaton EMI3P-Y2C0	RTU
Carlo Gavazzi EM340	RTU	Janitza UMG 604 PRO	TCP/IP
Eastron SDM120CTM	RTU	Janitza UMG 96 RM	TCP/IP
Eastron SDM630MCT	RTU	Lovato DME D330	RTU
Eastron SDM630TCP	TCP/IP	Temco SPM1	RTU

4.11 Remote shut-off connector location and wiring

For enabling the remote shut-off feature on the Green Motion Duo EV charger, connect an external contactor according to the circuit diagram in Figure 47.

Figure 47. Remote shut-off connector location



Tag	Description
①	Controller unit
②	Remote shut-off connector
③	External contactor

A dry contact group of the external contactor should be in an normally open mode. To connect the contactor to the Green Motion Duo EV charger, follow these steps:

Step 1. Open the Green Motion Duo EV charger per the regular procedure, as described in chapter 7.1.

Step 2. Locate the remote shut-off connector (J6) on the controller unit. See Figure 47.

Step 3. Pass a signal cable with a pair of wires from the external contactor through the communication cable gland of the EV charger.

Step 4. Connect the external contactor cables between the two furthermost terminals of connector J6, respecting the diagram shown in Figure 47.

Step 5. Verify correctness of the assembly and close the Green Motion Duo EV charger per the regular procedure.

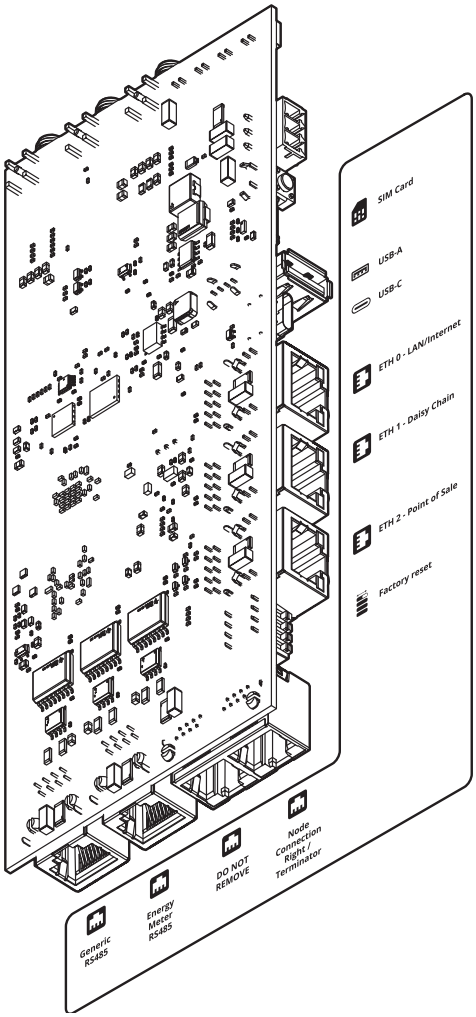
In case of a multi-charger cluster, the remote shut-off signal cable can be connected to the Master charger only. Activation of the external contactor (closing the contacts) will terminate charging sessions on all chargers of the cluster.

5. Internet connectivity

The CSC (PCBA board) is the main communication device for the whole EV charging cluster. It has multiple networking interfaces to connect the charging cluster to the Internet and control backend systems:

- Ethernet ports: ETH0, ETH1, ETH2 (10/100mbit)
- WIFI (2.4 and 5GHz)
- Cat4 4G modem

Figure 48. CSC control unit in the Master Green Motion Duo Charger and its (network) interfaces.



5.1 Master internet connection over ethernet

Green Motion Duo Master CSC has three Ethernet ports (ETH0, ETH1, ETH2) located on the right side of the PCB boards.

- ETH0 is for the LAN/Internet source (local switch, router, modem, etc.).
- ETH1 for the Daisy Chain connection to the next charger, as described in chapter 4.9.
- ETH2 is for the Point of Sale (POS) system, usually pre-connected during manufacturing if the Master charger includes a POS terminal.

To install, plug the LAN/ethernet CAT5/6 cable from local network switch/hub/router into the ETH0 port. If the LAN has a DHCP server, the Master charger will automatically obtain an IP address upon startup. Otherwise, set the IP address manually during software configuration.

5.2 Master internet connection over the local WIFI access point

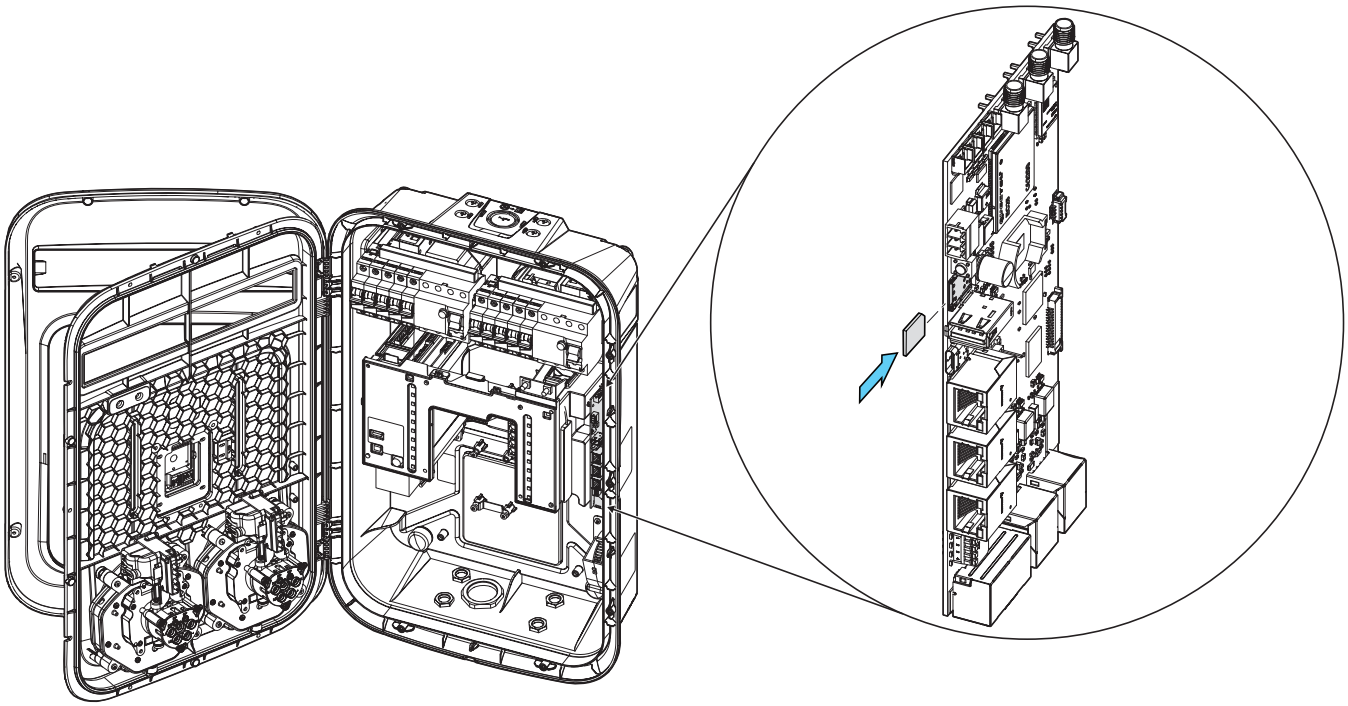
The GM Duo Master has a WIFI modem that can connect to 2.4 GHz and 5 GHz networks with the relevant antenna. No physical installation is needed.

5.3 Master internet connection over 4G/cellular network

Each GM Duo Master has a CAT4 4G/LTE modem for WAN connectivity using Mobile Network Operator (MNO) networks. The HW installation involves inserting the relevant MNO SIM card during installation:

1. Open the GM Duo Master.
2. Locate the SIM card slot on the CSC board.
3. Insert the SIM card, ensuring it is securely fitted.
4. Close the GM Duo Master.
5. Power it on.

Figure 49. Location of the sim card slot on the CSC board



The SIM card should be in Nano format (8.8x12.3 mm) and provide the following features:

- Universal Integrated Circuit Card (UICC) pin support
- Security measures against SIM cloning

Prefer MNOs that provide:

- Private Access Point Name (APN)
- Option to encrypt data communication
- SIM cards dedicated to IoT applications to reduce potential cybersecurity risks

The amount of data transferred between an EV charger and the backend server may vary, based on the network structure. It is recommended to select an unlimited data plan or at least a data plan that takes into account the usage pattern listed below:

- The expected average monthly data traffic may reach up to 100MB per each charger in the cluser (e.g for the cluster with one master and 4 nodes it is expected to be 500MB).
- Additional 50MB should be considered for the firmware and feature upgrade twice a year per each master.

In network installations where a single EV charger is used to route the traffic for the entire network, data usage will be multiplied by the number of EV chargers in the network.

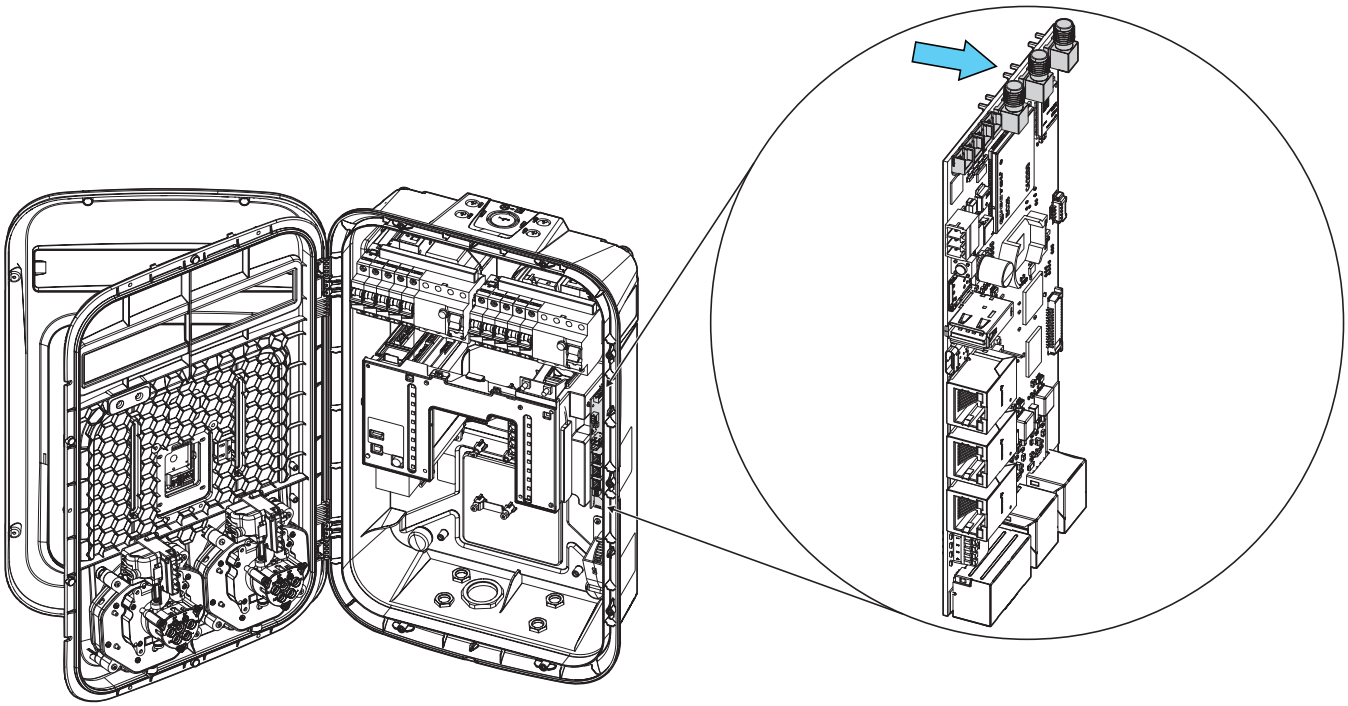
When using the 4G connection, ETH0 and ETH1 must not be connected to customer's local network to avoid DHCP conflicts.

5.3.1 Use of external antenna for 4G/Cellular Network

If the local MNO signal is weak, the internal 4G antenna can be replaced with an external one:

1. Open the GM Duo Master.
2. Locate the SMA connector for the 4G antenna (Figure 50) .
3. Unscrew the internal antenna connector.
4. Route the external antenna via the cable gland inside the charger.
5. Screw the SMA connector of the external antenna to the CSC PCBA of the charger.
6. Close the GM Duo Master.

Figure 50. Location of the 4G antenna SMA connector



6. Commissioning

SW commissioning is the process of configuring the GM Duo Master according to the primary use case and local networking possibilities. The basic steps for master commissioning are as follows:

1. Access the commissioning screen – mobile web page.
2. Set up internet connectivity.
3. Update the firmware:
   - Auto-discover the GM Duo cluster.
   - Auto-discover nodes connected to the master.
4. Configure EV charger parameters (anti-vandal, free charging, etc.).
5. Establish backend connectivity (CSMS, OCPP server).
6. Set up local cluster load balancing.

6.1 Accessing commissioning screen

The GM Duo Master is configured via the web portal using the configuration page. This page can be accessed using a laptop, tablet, or smartphone connected to the GM Duo Master via Wi-Fi hotspot or local LAN.

Figure 51. QR code for accessing the comissioning screen

6.1.1 WIFI hotspot

This is the preferred/standard method of the commissioning. Installer will need only smartphone with WIFI capability and built-in web browser. But alternatively, the installer can also use a tablet or PC.

During the first 30 minutes after power-up or restart, the GM Duo Master creates a WIFI hot spot. (The QR code or WIFI SSID information is on a product sticker).

The web browser of the phone/tablet/PC shall open automatically with the address of the charger Web UI.

Commissioning steps:

1. Turn the EV charger OFF and ON.
2. Enable WIFI on your phone (PC or tablet).
3. Scan the QR code (or retype the SSID/Passphrase) and connect to the WIFI network which is provided by the GM Duo Master. Then the landing page shall appear automatically in the open browser. If not, please open your web browser and type any web address, e.g. www.eaton.com.
4. The welcome commissioning screen of the Master charger should display. (See Figure 52).
5. Switch to an alternative Language if needed.
6. Press Next button to start the commissioning wizard.
7. Accept the security warning (the charger is not connected yet to internet, and it is not possible to verify certificate):
   - On the browser press Advanced button.
   - Select link: “Proceed to unsafe IP address”.

6.1.2 Local network

When the installer's PC/tablet/phone is connected to the customer's local area network, they can access the charger via its IP address (obtained from the customer's DHCP server).

Prerequisite: The charger is installed in the local LAN (via ETH0) and has a known IP address.

Commissioning steps:

1. Obtain the IP address of the Green Motion Duo Master (from local network support).
2. Using web browser, navigate to the address which is obtained in chapter 6.1.1.
3. Accept the unsecure access to offline web pages as shown in Figure 53.

Figure 52. Landing web page

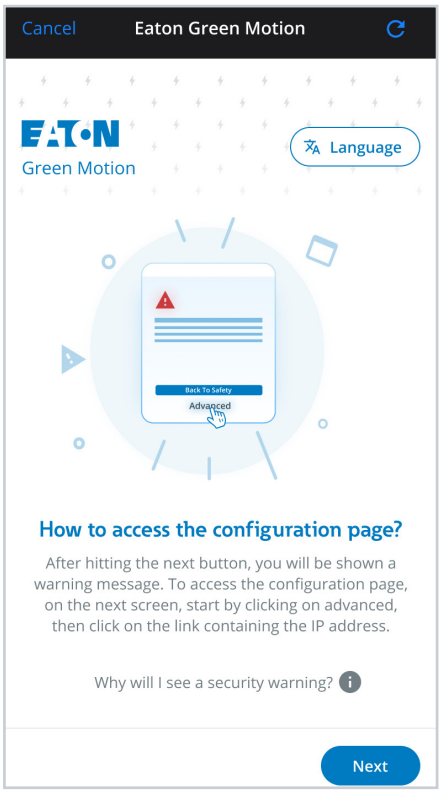
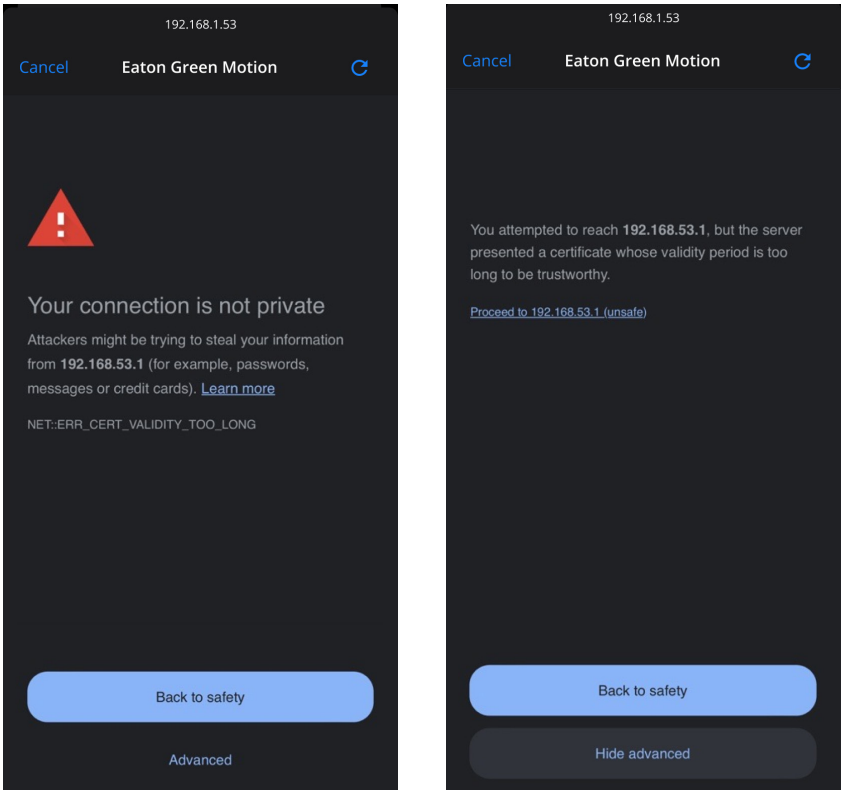


Figure 53. Access to offline web page



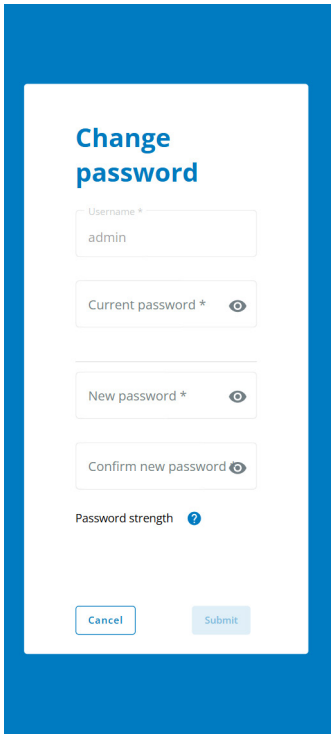
6.1.3 Access to the commissioning page

Access to configuration page requires to change admin user default password first.

Commissioning steps:

1. Change the default password ("admin"), complying with password complexity (See Figure 54).
2. Store the password securely.
3. Accept the End User Licence Agreement (EULA).

Figure 54. User login and password



6.2 Welcome screen, upload new FW or configuration file

If the latest Green Motion duo EV charger firmware has been downloaded to the device (phone, tablet, laptop), the firmware can be uploaded to the installed Master. The Master will then update all connected Nodes in its cluster automatically.

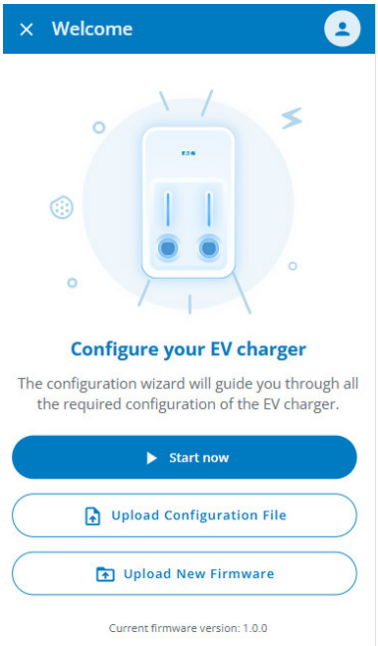
The firmware version is checked later on after the EV charger is connected to the internet automatically. Manual upload is optional but can speed up installation and reduce the charger's network traffic.

When the EV charger accepts the upload of a pre-downloaded configuration file, it can be uploaded to the Master.

Commissioning steps:

1. Select/press "Upload" button.
2. Browser is showing the local (phone/PC) file system.
3. Navigate to the location of the stored FW or configuration file.
4. Upload it to the EV charger.
5. Let the new configuration take effect (restart EV charger).
6. Reconnect.

Figure 55. Commissioning wizard

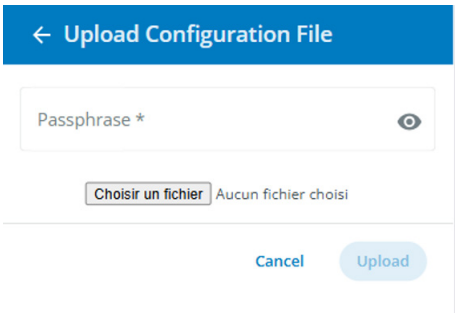


6.3 Upload configuration file

Configurations can be transferred between chargers using the configuration file import/export feature. The configuration file containing data from another charger can be uploaded on the initial page of the commissioning process, by selecting "Upload Configuration File."

The password used to encrypt the configuration file must be entered, and the relevant file in JSON format provided.

Figure 56. Firmware update



6.4 Upload new firmware

The firmware can be updated using a file stored locally on the device used for commissioning. A confirmation prompt will appear, and upon confirmation, the file will be transferred. The firmware update process will proceed through several steps, indicated by a loading bar. Upon completion of the firmware update, the charger will reboot.

6.5 Connection to Internet

Connected Charger operation

As described in chapter 5, the GM Duo Master (and its CSC) can connect to the internet via local network infrastructure (Ethernet LAN or Wi-Fi) or its own 4G modem.

OCPP protocols

Connected GM Duo chargers communicate with remote control systems using the standardized OCPP 1.6 (J) protocol (hardware ready for an upgrade to OCPP 2.01). This allows seamless integration with any compatible SCMS system. All OCPP 1.6 profiles are supported, except for Reservation. For details, refer to the GM Duo OCPP reference document.

Charge central

By default, GM Duo is configured to use the Eaton proxy (Charge central) between the charger and the CPO central system (CSMS). Charge central collects statistical EV charging usage data for remote support and preemptive maintenance.

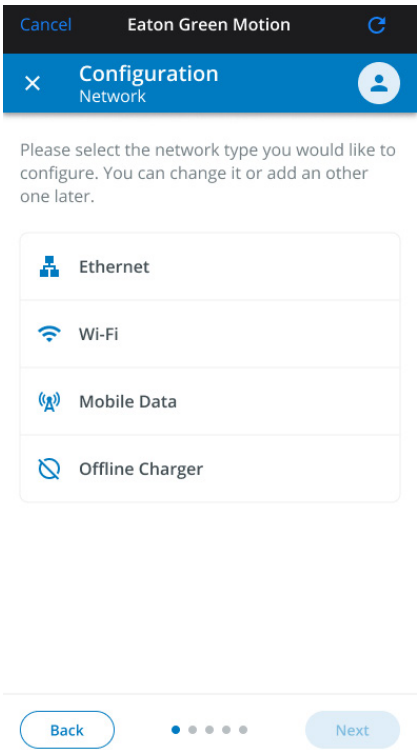
Island mode

In specific use cases, the charger can operate completely standalone/offline (without internet and cloud integration) in "Island mode." While this can save communication costs, it is generally not recommended as it limits the visibility of the GM Duo for remote support.

Commissioning steps:

1. Navigate to the first screen of the commissioning wizard.
2. Select the internet connection method according to the local network configuration.
3. Configure the details of the selected method.

Figure 57. Internet connection wizard



6.5.1 Ethernet

Prerequisite: Connection as described in chapter 5.1.

Normally, no further setup is needed. The GM Duo Master will get an IP address from the local network and can connect to the internet provided by the local network infrastructure. If not, refer to 6.5.3 Advanced settings.

6.5.2 WIFI connection

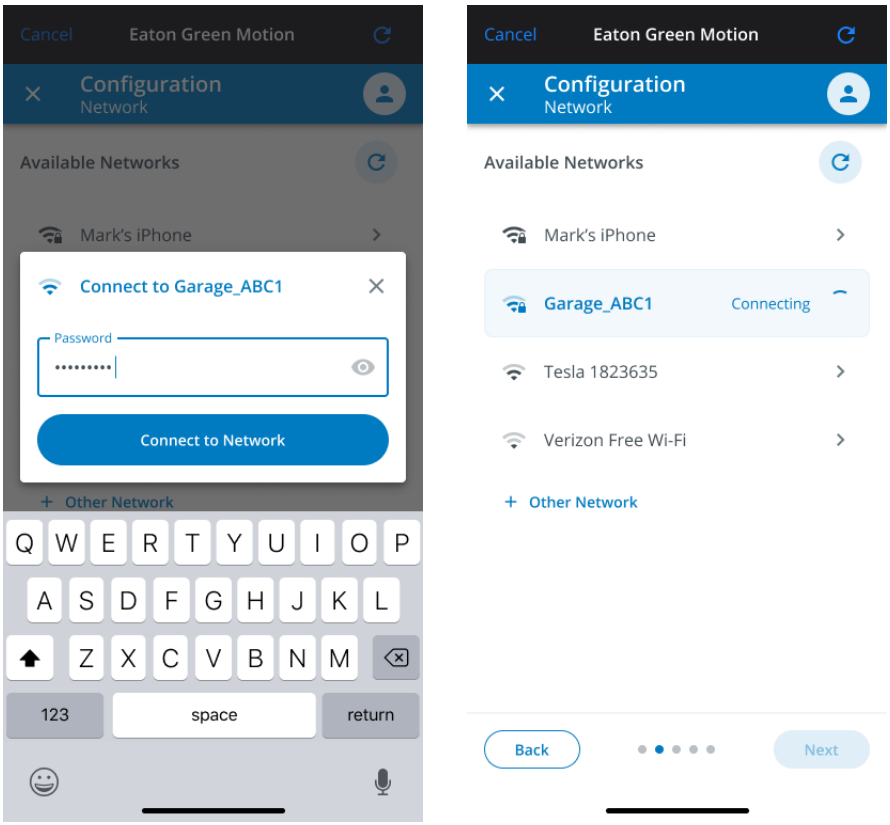
When WIFI is chosen for the GM Duo Master, the next screen of the configuration wizard will ask the installer to enter the local WIFI access point credentials.

Reminder: When the GM Duo Master is connected to the local network over WIFI, daisy chaining will not work (see chapter 5.3).

Commissioning steps:

1. Select WIFI and press “Next”.
2. Charger will search and display available WIFI networks.
3. Select the preferred wireless network or enter the SSID manually.
4. Enter the Password.
5. Check the Internet connectivity.

Figure 58. WIFI Access configuration



6.5.3 Internet access Advanced Setting

In most cases, the basic setup will connect to the internet (Figure 49). The Master charger tests the connection through the Eaton.com web page.

In some local situations, the basic setup may not be enough to connect to the internet. In these cases, you will need to use the “Advanced settings.” Consult local network experts for detailed parameters based on the local network configuration.

Advanced settings include the following parameters:

Hostname

Name of the Master charger in the local LAN.

IPv4

Select a static IP address or dynamic via DHCP. Configure the Netmask and Gateway.

IPv6

Select the operational mode (Disabled, Enabled in Manual, Enabled in Router). Configure the IP Address, Prefix, and Gateway.

DNS

Switch between DHCP and Manual selection of the primary and secondary DNS.

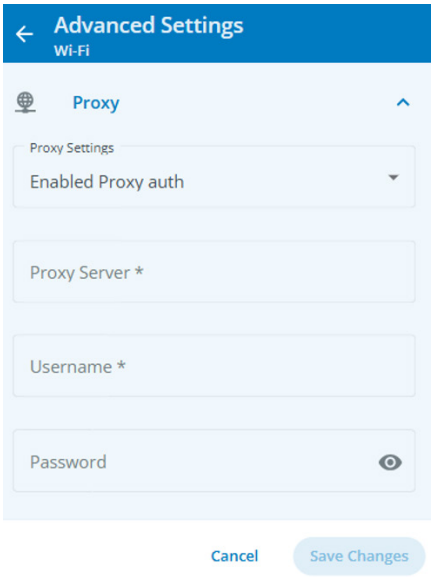
Proxy

When the proxy is enabled, store the credentials (username/password).

Connectivity Sharing commissioning steps:

1. Press the advanced settings button on the network wizard.
2. Configure the necessary settings as requested by the local network.
3. Save changes and check the results.
4. If not successful, repeat step one and consult local IT/network support.

Figure 59. WIFI Access configuration



6.5.4 Cellular (Mobile Data/4G)

When mobile data is chosen as the source of internet.

- SIM card should be inserted.
- The GM Duo Master can connect to the mobile network automatically.
- Typically, no settings need to be configured for cellular.
- Only if the SIM card is protected by a PIN, the GM Duo Master will ask for the PIN code.

Figure 60. SIM card PIN entry

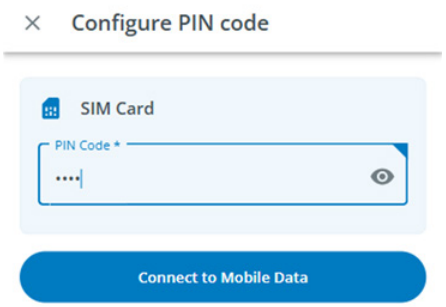
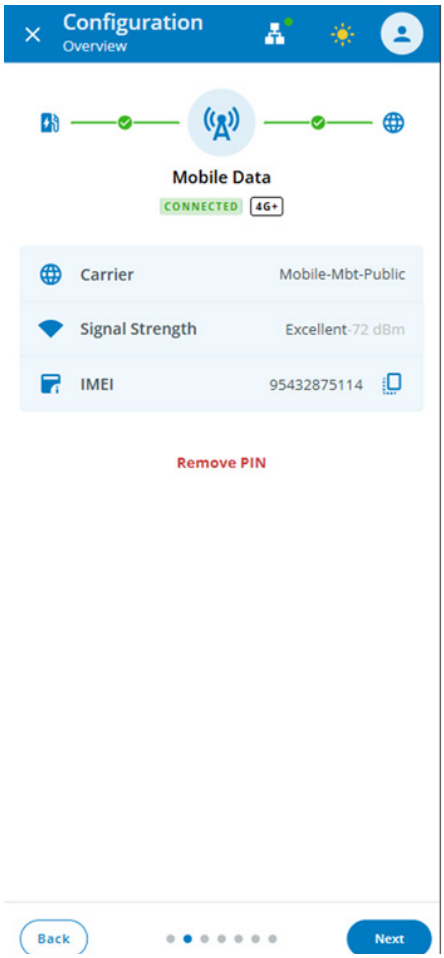


Figure 61. Successful 4G connection



6.6 Cluster commissioning (Node auto-discovery)

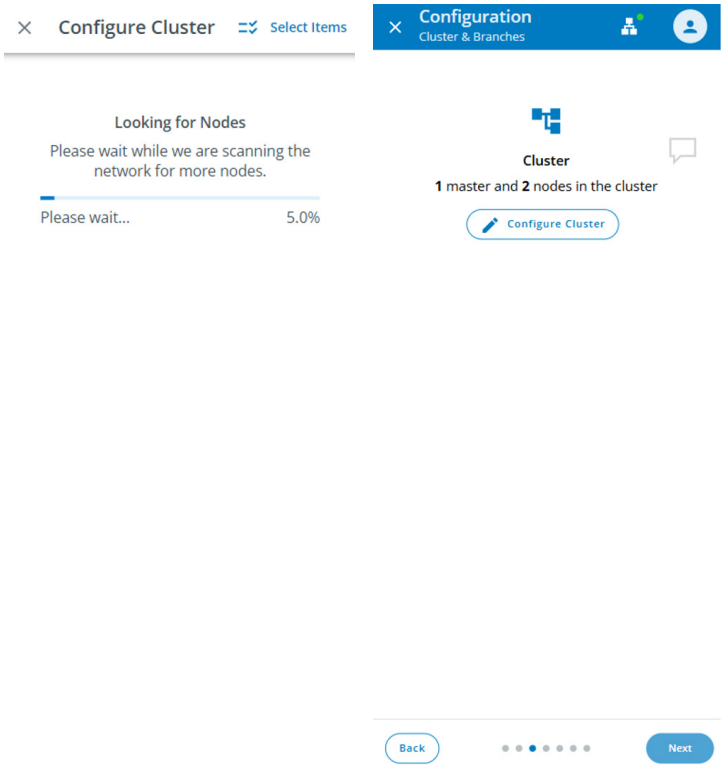
As described in chapter 4.8, the Green Motion DUO is delivered in two variants Master and Node. Only the Master charger is equipped by the communication and control board CSC.

To be able to see and control the Node chargers, those must be:

- Connected to Master by RS485 daisy chain.
- Securely paired together (to prevent cyber security issues)

Even the Master charger contains its own (default) Node, but it is pre-connected and pre-paired already out of the factory. When the installer starts commissioning of the cluster the one (default) Node should be already visible in the list of Nodes.

Figure 62. Auto-discovery in progress and with results



6.6.1 EV charger Node auto-discovery

Assuming the Nodes are properly connected by installer at previous steps, the commissioning auto-discovery process will scan the all devices connected to the RS485 daisy chain, identify and pair all discovered Node Green Motion Duo chargers.

At the end of the discovery process the number of the discovered chargers is reported and the system will allow detailed configuration of each discovered EV charger.

Discovery can be skipped in the case thet there are no connected Nodes and theMaster acts as the standalone EV charger.

Commissioning steps:

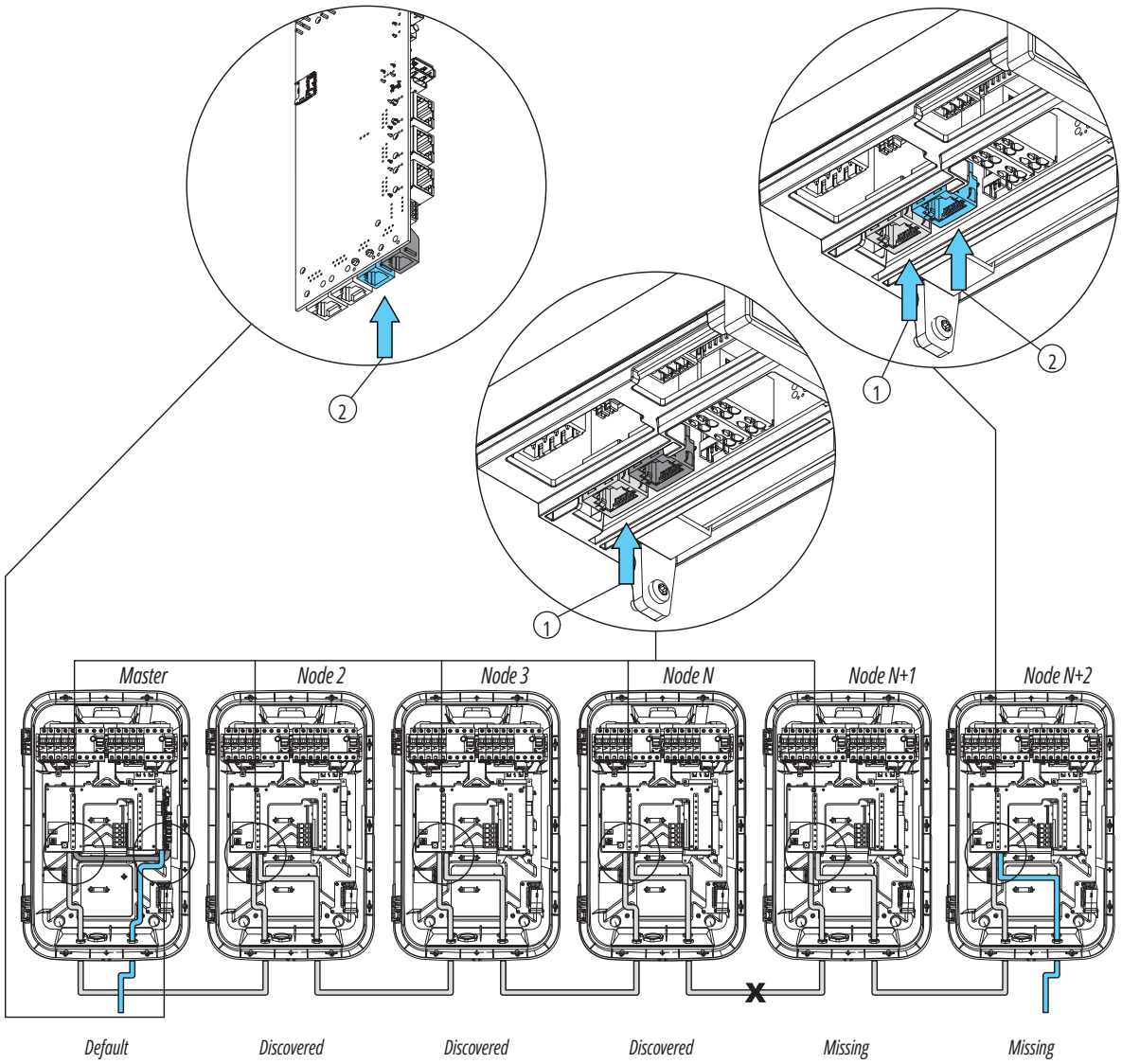
1. Press Next after the FW update starts the Node auto-discovery.
2. Monitor the progress of the discovery (typically running 20-30s).
3. Check the number of discovered EV chargers.
4. Once the number of Nodes is the same as the number of installed EV chargers (Master+Nodes) continue with individual EV charger configuration.

Troubleshooting:

If number of the discovered Nodes is lower than number of installed EV charger check the following:

- Check whether all EV chargers are powered and running.
- Check whether the EV charger is in the Factory reset/default mode (restore factory default mode).
- Check the physical RS485 connection including proper bus termination. If only first n chargers are discovered, then there is probability that there is wrong connection between n and n+1 EV charger (counted from Master).

Figure 63. Discovered less EV charger, problem hint



Tag	Description
①	Node cable
②	Terminator

- Once the problem preventing the discovery is fixed the installer should restart the Auto-discovery
  - Do not delete already discovered EV chargers.
  - Press Add Nodes again to re-run the auto-discovery for the remaining EV chargers.

6.6.2 Adding a new EV charger into the existing Cluster

The same process of auto-discovery can be repeated whenever a new EV charger is added into the same cluster (Master) or it is replaced. When replacing an EV charger, the installe should delete the original EV charger from the list before the auto-discovery.

6.6.3 List of EV chargers in the cluster – configuration

Once all EV charger Nodes are properly discovered and paired installer should check and configure them.

Basic configuration activities are:

1. Delete/remove an EV charger from cluster (Master default Node can't be deleted).
2. Rename EV charger (e.g. add the user-preferred name of each EV charger).
3. Switch on-off the antivandal socket (prevent plug without authentication)
4. Switch on-off Authentication (e.g. allow free charging in the Island mode for private parking.)

Access to the configuration activities is via the triple dot icon (menu).

Commissioning steps:

1. Choose the EV charger you want to configure.
2. Press the triple dot menu at the end of the row.
3. Choose and perform the configuration activity.

Figure 64. EV charger list

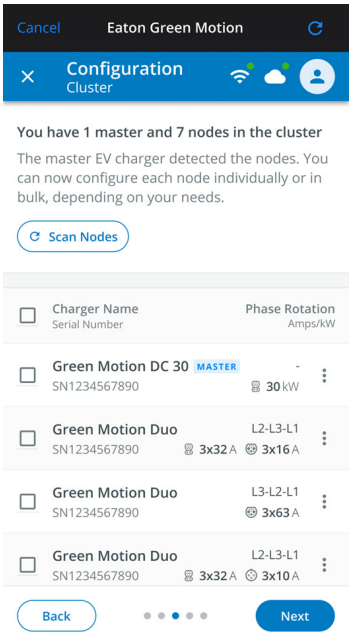
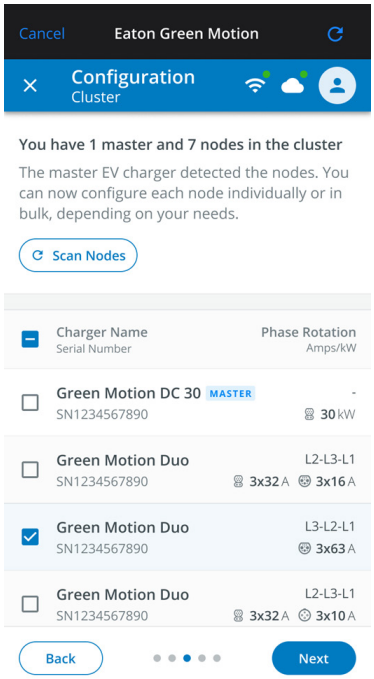


Figure 65. EV charger list configured



Some configuration activities can be applied to multiple EV chargers in a group.

Commissioning steps:

1. Press “Select Items” menu on the top right corner of the screen.
2. Using the checkbox at the start of the EV charger row, the select EV charger you want to configure.
3. Apply the configuration activity.

The following EV charger parameters are read only and cannot be changed by commissioning wizard/application:

- Maximum charging current in A
- Physical phase rotation

Both of those parameters must be selected by dip switch before the EV charger is powered, and cluster auto-discovery is run (see chapters 4.6.4 and 4.7.1)

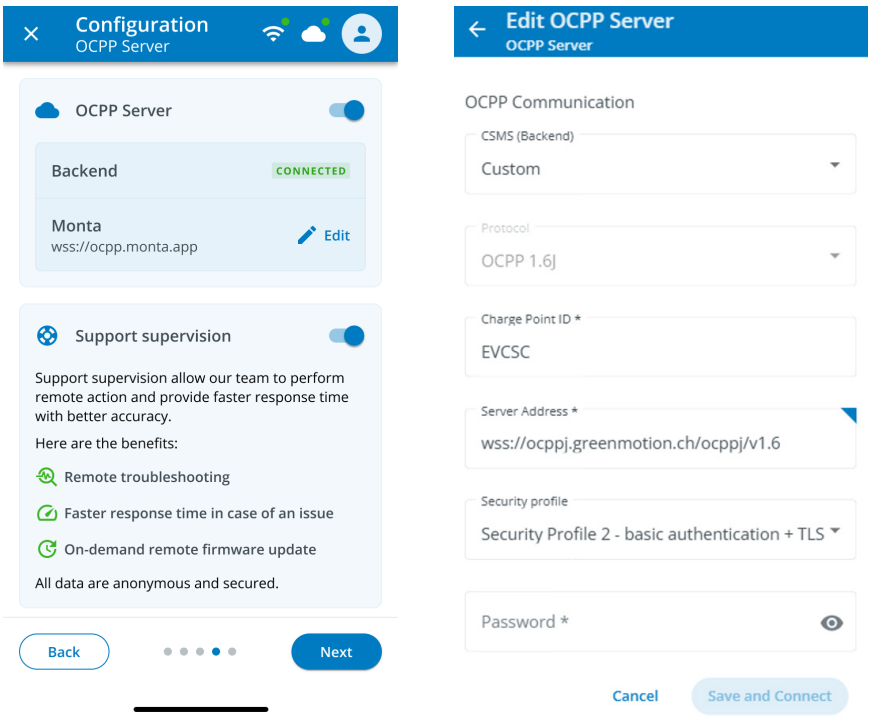
6.7 Backend connectivity

Once the Green Motion Duo Master EV charger is connected to internet and cluster is configured and unless installation should be running in the Island mode (without backend) the actual step is to connect it to the backed system (CSMS, OCPP server).

Eaton Green Motion DUO offers two basic modes of the backed connectivity:

- Using Eaton Charge Central Proxy to connect CSMS
- Direct connection to the CSMS

Figure 66. OCPP server selection



6.7.1 Charge central

Charge central is the secured cloud service hosted by Eaton, which is acting as the OCPP 1.6 proxy. EV charger primarily connects to Charge central and Charge central then connects to the final CSMS (OCPP server) of the customer choice. For the OCPP server this proxy is fully transparent.

Charge central features:

- Centralized connection to the CSMS.
- Automation of the FW update for connected chargers.
- Central integration management, issue identification, fixing.
- Collecting the anonymized statistical data on Eaton server will allow the effective preemptive maintenance.
- Readiness to implement additional features in future.

6.7.2 Direct CSMS connection

By default, the Green Motion Duo is configured to Support Supervision, but can be switched off, when CPO/eMSP wants to keep full control but without additional features brought by supervision.

6.7.3 Generic CSMS connection

You can select the CSMS of your choice through a predefined list. If you can't find your CSMS in the list, you can configure it manually

Commissioning steps:

1. Make sure EV charger is connected to internet.
2. On the Settings/OCPP server page press "Edit OCPP Server" button.
3. Enable the OCPP communication (radio button).

4. Select the OCPP server from the list.
5. Follow the instructions and populate the detailed parameters:
    - Choose OCPP protocol (actual product supports 1.6j, but HW ready for future versions).
    - Populate the server Address.
    - Choose the Security Profile.
    - Enter the credentials.
6. Press the "Save and Reconnect" button.

For troubleshooting of the OCPP server connection please consult with the support of this product or relevant experts of the CPO.

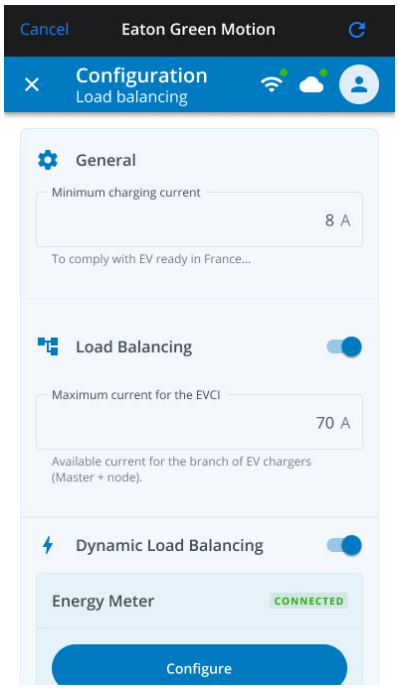
6.8 Load balancing setup – charging cluster with single Master

One GM Duo Master EV charger controls the load balancing of all connected GM Duo Nodes (up to 32 charging connectors). The GM Duo Master offers two basic methods of local load balancing:

- Static local load balancing
- Dynamic local load balancing

Alternatively, load balancing can be performed remotely through the cloud or locally installed systems (for example using OCPP Smart charging profiles and/or BEMS systems).

Figure 67. Cluster load balancing setup



6.8.1 Local load balancing (static)

This basic method enables charging the maximum number of connected EVs when the maximum AC current for EV charging available in the installation is not sufficient to cover all charging demand. The available charging current will be distributed using the selected load balancing algorithm between the connected EVs.

- The equal current distribution method will equally reduce the charging current for plugged EVs (with a defined minimum of 6 or 8 A) and/or suspend the charge transactions when just reducing the current is not sufficient. Conversely, when some charging transactions are finished, the relevant current is allocated to other running transactions or allows starting new transactions.
- Other load balancing algorithms (for example with priority to selected chargers) will be added in new versions of the GM Duo firmware.

6.8.2 Dynamic local load balancing

When a supported external building energy meter is connected to the Duo Master (over Modbus RTU or TCP/IP, see chapter 4.10), the load balancing algorithm considers the other building energy consumption and dynamically allocates the remaining energy for EV charging according to the formula:

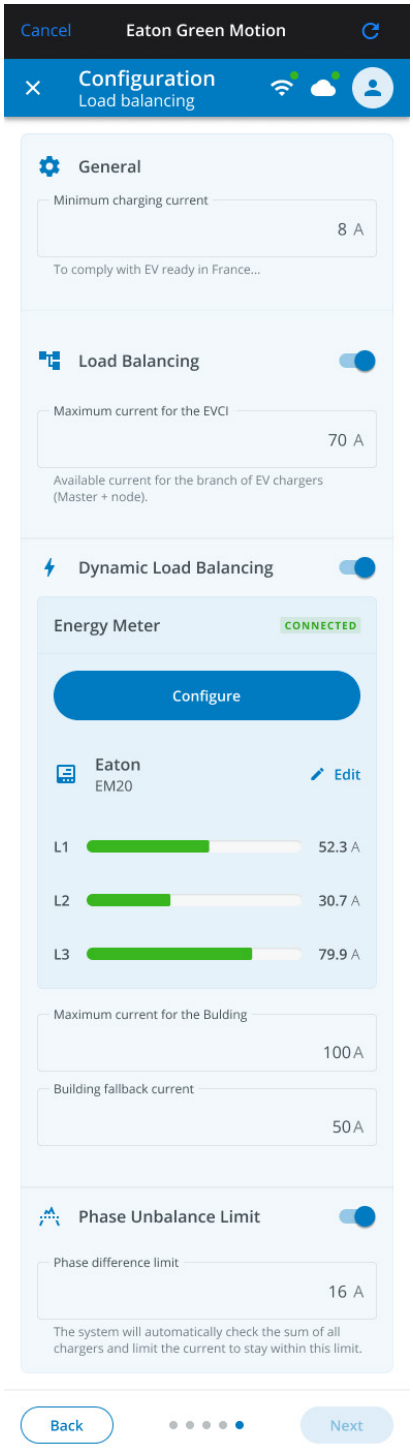
Dynamic current for EV charging=min(Maximum current for EVCI,Maximum Building Current−Other Building consumption,Building Fallback Current)

Building fallback current is used only situations, when communication with the external energy meter is lost and the load balancing algorithm is not able to consider the other building electricity consumption.

Commissioning steps for dynamic load balancing:

1. Ensure the building energy meter is connected to the charger.
2. Switch on the Dynamic Load Balancing.
3. Configure the Energy meter:
   a. Select Manufacturer.
   b. Select the model of the EM.
   c. For TCP/IP set up the EM IP address.
   d. For Modbus RTU configure its parameters.
4. Test the connection (message “CONNECTED” should appear next to the energy meter).
5. Set the Maximum Building current.
6. Set the Building fallback current.

Figure 68. Cluster dynamic load balancing setup



6.8.3 Phase balancing

When phase balancing is activated, the load balancing will consider EVs with single-phase on-board chargers, and the algorithm will respect the phase difference limit.

6.9 Summary

At the end of the commissioning flow, the installer will see a configuration summary of the charger (Figure 69). This page presents the charger configuration details for:

- Network
- CSMS (OCPP Server)
- Cluster (Master + Nodes)
- Load balancing

By clicking on “Edit” links, the installer can return to the related section of the commissioning flow to update the previously configured values. From this page, the installer can also download a JSON file that contains all the charger configuration data (see Figure 70). Sensitive data is protected with a passphrase. This file can then be used to apply the same configuration to another charger.

Figure 69. Charger configuration details

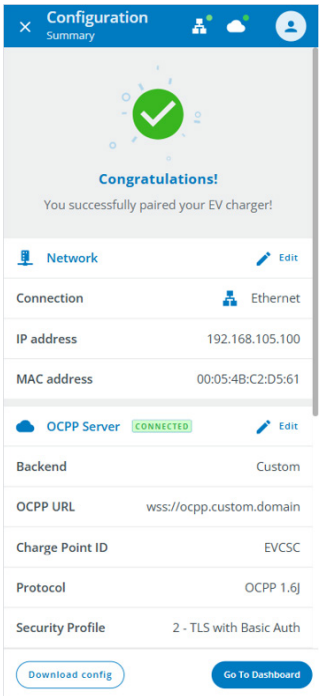
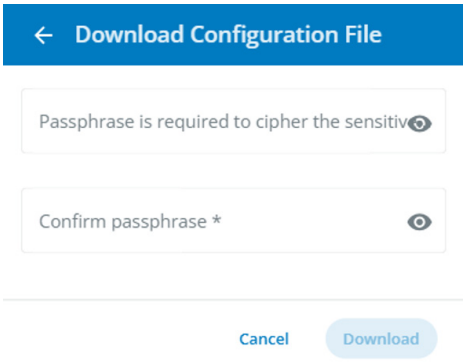


Figure 70. Configuration file download



6.10 Configuration of the Charging network

Multiple Green Motion DUO Master EV charger can be interconnected as described in chapter 4.8 and 4.9. and create the Charging Network.

In this chapter it is described how to configure it.

Installer should select one of the following options:

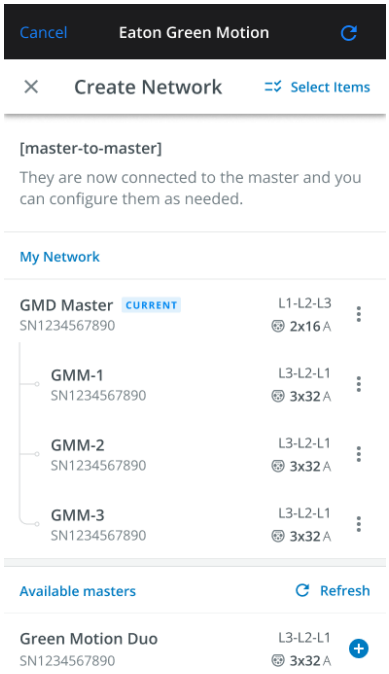
1. Create a new Network.
2. Add the new Master into the existing Network (join).

6.10.1 Adding the charger to the existing Network.

Commissioning steps:

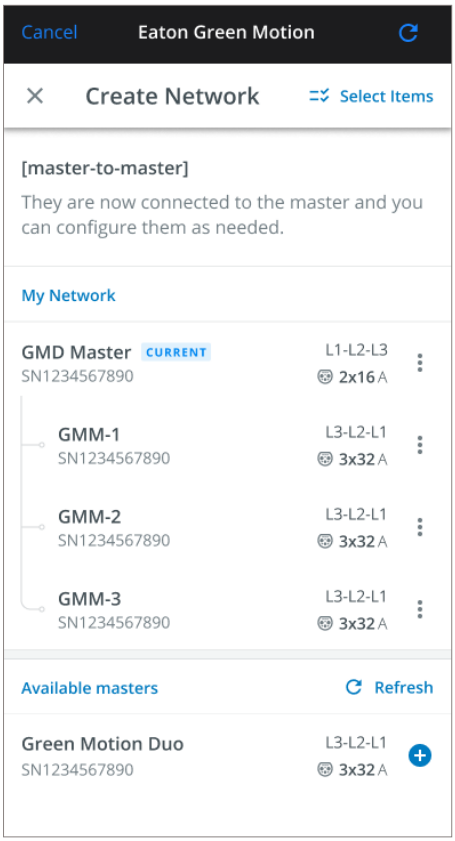
1. Make sure all Masters are interconnected as per chapter 4.8 o 5.4 (LAN or WiFi).
2. At least one charging network must exist.
3. Press the "Join Network" button.
4. Select the network that the charger should join.

Figure 71. Create Network



6.10.2 Creation of a new Charging Network

Figure 72. Create Network #2



Commissioning steps for Dynamic Load balancing:

1. Make sure all Masters are interconnected as per chapter 4.8 o 5.4 (LAN or WiFi).
2. Press “Create Network” button.
3. Actual Master is preselected as main in Network.
4. All other Masters are listed as “Available Masters”.
5. Use the (+) button to add the Masters to the Network.
6. Use triple dot button (...) to configure/remove the Master from Network.
7. As per local needs, rename the chargers in the Network.

Chargers connected to network are linked into the “tree” structure in the upper part of the screen.

For network load balancing, consult the Network Load Balancing Manual.

7. Maintenance

Installation, commissioning, maintenance or retrofitting of the EV charger must be performed by professional and qualified personnel, who are responsible for complying with existing standards and local installation regulations.

Before starting any connection operations, ensure that the external AC mains isolator switch is switched off and the circuit breakers are open.

Any operation requiring the EV charger's housing to be opened can lead to electric shock hazards.

Opening the housing of the EV charger, as well as any configuration changes, must be carried out by professional and qualified personnel in accordance with the local safety and electrical regulations and laws.

Wait at least 10 minutes after turning the power off before servicing or detaching the Green Motion Duo EV charger. The housing may overheat during operation or due to direct sunlight. To avoid burns from an overheated surface, use suitable PPE or wait for the product to cool down before accessing it.

The Green Motion Duo EV charger is equipped with tamper detection functionality. If the EV charger is opened while powered on, a notification will be sent to the backend server, and the charger will prevent a connected EV from initiating a charging session.

7.1 Opening/closing the Green Motion Duo EV charger

When removing the front cover, be careful not to damage the cable connections.

Follow these steps to open the housing of the Green Motion Duo EV charger:

Step 1. Loosen the two captive screws (A) on the right-hand side of the first door using a Torx T20 screwdriver, as shown in Figure 73.

Step 2. Open the first door and ensure that the internal circuit breakers (optional; if installed) are switched off.

Step 3. Loosen the five captive screws on the second door using a Torx T20 screwdriver (B, C). Location is depicted in Figure 74.

Step 4. Carefully open the first door, ensuring that the internal cables are not damaged.

Figure 73. Location of first door screws

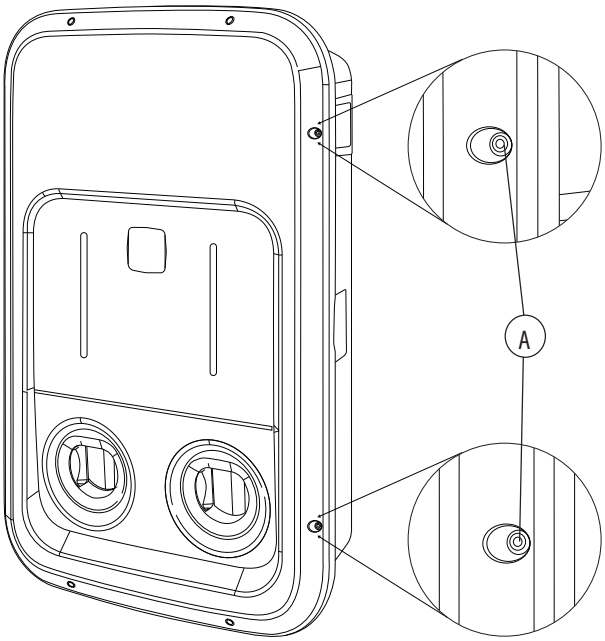
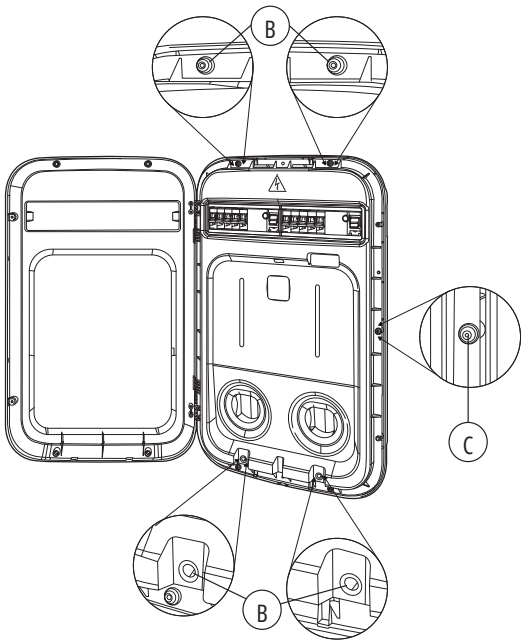


Figure 74. Location of second door screws



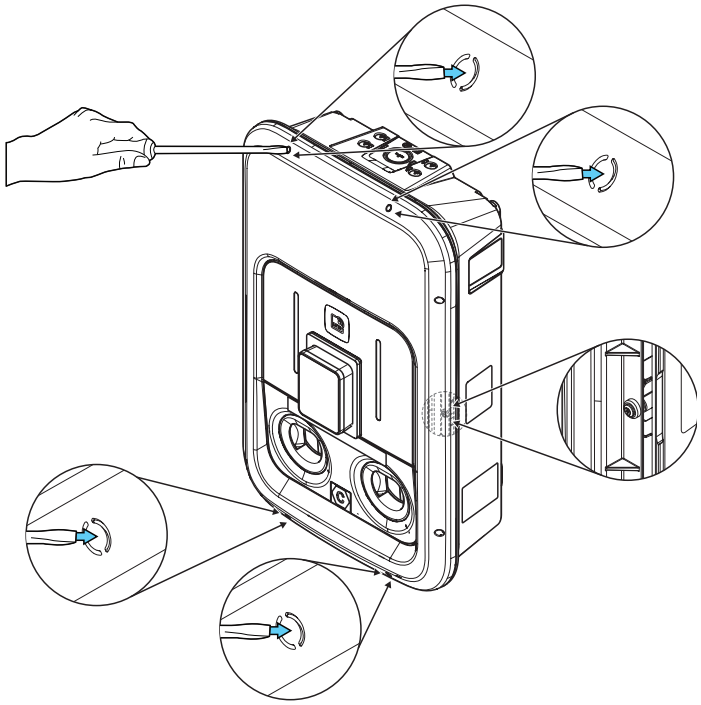
7.2 Manually unlocking the EV socket

If a charging cable gets locked in the socket due to a power outage, release it by following the next steps:

Step 1. Ensure that the external upstream circuit breaker and/or the mains disconnector is switched off (open).

Step 2. Break the four knock outs covering the four captive screws on the first door shown in Figure 75.

Figure 75. Location of first door openings



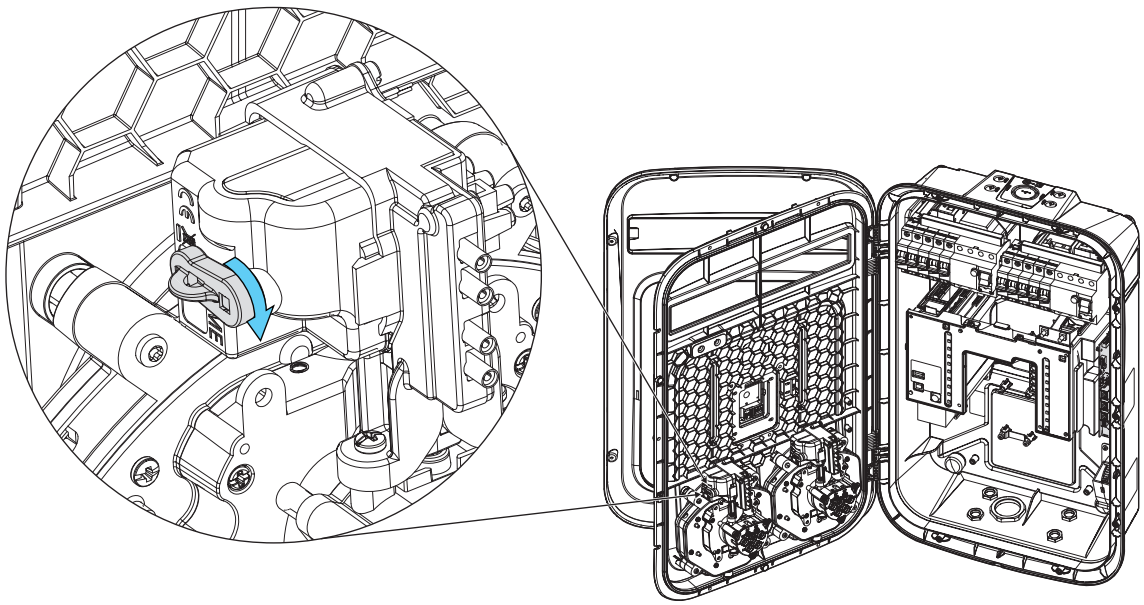
Step 3. Loosen the two captive screws shown (A) on the right-hand side of the first door, and the four captive screws (B) through the broken knockouts, using a Torx T20 screwdriver (see Figure 73 and Figure 74). Open the first door to aas much as possible.

Step 4. Loosen the last remaining captive screw (C) in the middle of the right-hand side on the first door, using a Torx T20 screwdriver. Carefully open the second door together with the charging cable plugged into the socket.

Step 5. Identify the actuator tool (red colored) provided with the charging socket on the back side of the second door in its bottom part, and detach it from the cable tie. Figure 76.

Step 6. Mount the actuator tool onto the square-shaped shaft of the required socket, and turn it 90 degrees clockwise for unlocking, as shown in Figure 76.

Figure 76. Unlocking the EV socket with the actuator tool



7.3 Testing of integrated residual current devices

Consult with local codes and regulations about the requirements for regular testing of residual current devices.

As described in chapter 3.4, Green Motion Duo is equipped with an RCCB and an RDC-DD components per each charge point. To test these safety devices, follow these steps:

Step 1. Ensure the Green Motion Duo charger is powered up.

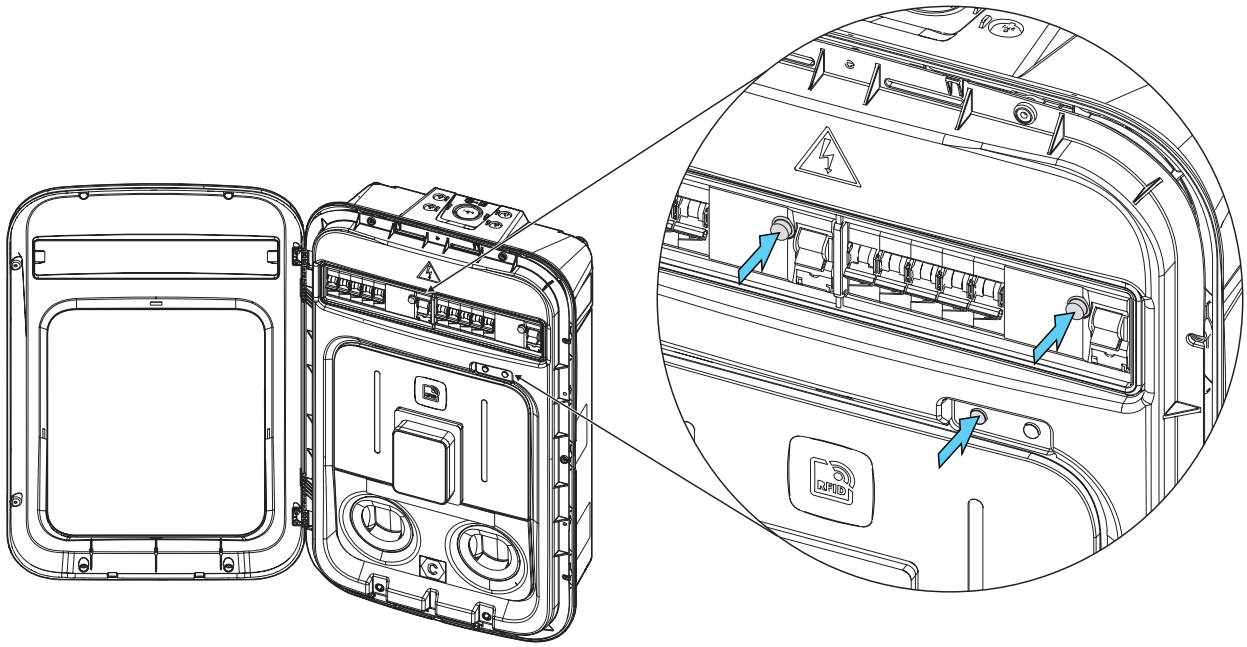
Step 2. Open the first door according to the regular procedure.

Step 3. Identify the RCCB test button on the front face of each RCCB device, and the RDC-DD test button on the second door panel. See Figure 77.

Step 4. Press the RCCB test button and verify that the RCCB trips. Re-arm the RCCB device using its lever. Repeat this step for the second RCCB.

Step 5. Press the RDC-DD test button and verify that the charger enters fault detection mode (LED indicator turns red on both charge points). Re-arm the RDC-DD protection by rebooting the charger using the REBOOT button on the first door.

Figure 77. RCCB and RDC-DD test buttons



7.4 Verifying and replacing the cooling fan

The Green Motion Duo charger is equipped with a centrifugal cooling fan, located inside the enclosure at the bottom right. This component is designed to ensure seamless operation throughout the product's lifetime. However, depending on environmental factors and actual usage, the fan might require replacement. Regular checkups of the fan are recommended.

For preventive maintenance of the fan, proceed as follows:

Step 1. Ensure that the external upstream circuit breaker and/or the main disconnector is switched off (open). Open the charger's housing by following the steps described in chapter 7.1.

Step 2. Examine the fan and verify that there are no foreign particles preventing it from normal operation. Assess the unobstructed rotation of the impeller by gently actuating it with your hand – the impeller should rotate freely without vibration or noticeable noise.

In a case, replacement of the fan is required, proceed with additional steps as follows:

Step 3. Disconnect the 12V power supply cables from the control board as shown in Figure 78. Untie the cables from the harness.

Step 4. Loosen the two screws (See Figure 78) that fix the bracket onto the housing, using a Torx T20 screwdriver. Detach the bracket fan assembly.

Step 5. Unmount the fan from the bracket by removing the two screws.

Step 6. Install and connect a new fan following Steps 3...5 in the reverse order.

Step 7. Ensure that the MCB and RCCB devices are re-armed. Close the charger per the regular procedure.

Figure 78. Fan replacement

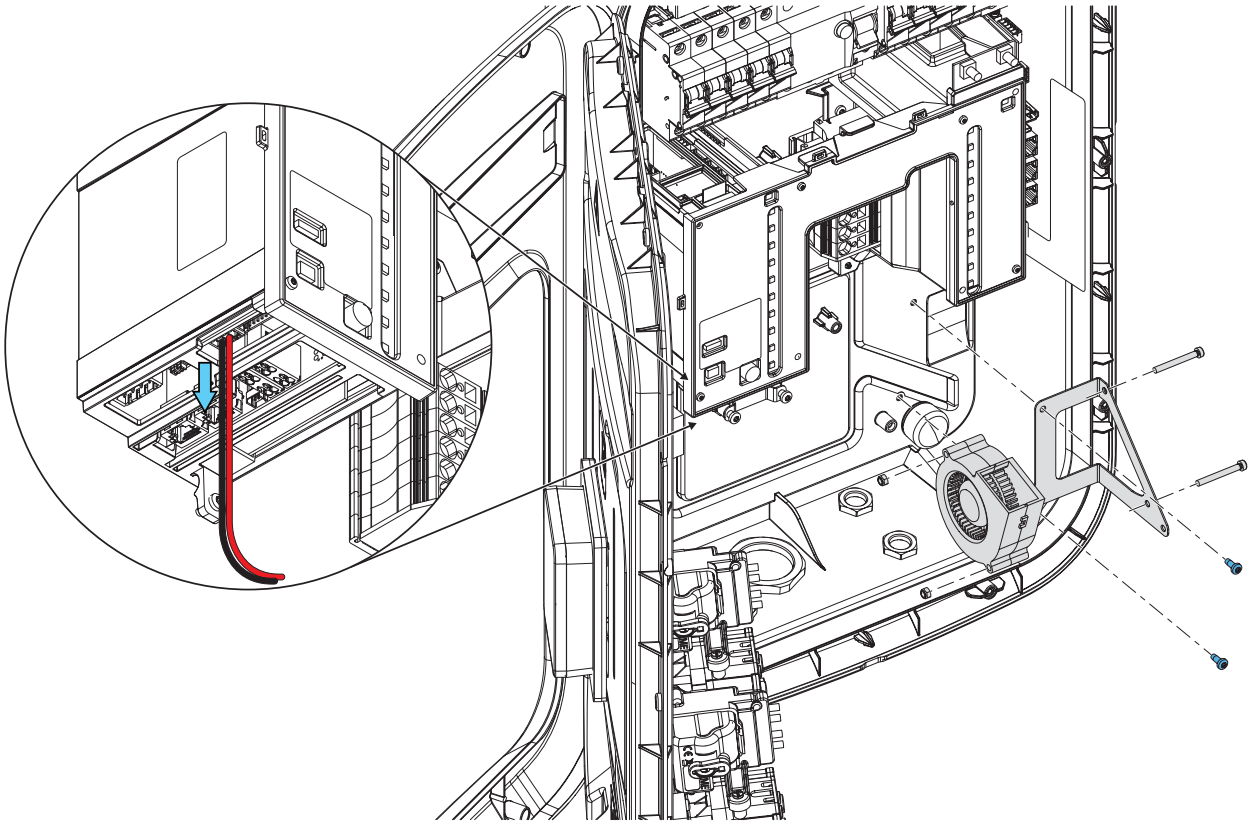
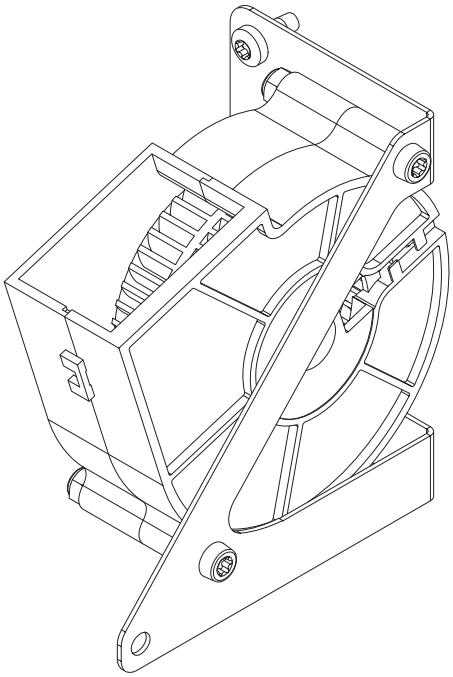


Figure 79. Fan overview



7.5 Dismounting the Green Motion Duo EV charger

To uninstall the EV charger proceed as follows:

Step 1. Disconnect any load.

Step 2. Open the housing following the steps described in chapter 7.1.

Step 3. Factory reset the charger.

Step 4. Disconnect the AC power supply cables from the main power terminal block and release them from the housing.

Step 5. Disconnect the communication cables (if present) and release them from the housing.

Step 6. Remove the sealing caps covering the two bottom mounting screws. Loosen the screws and remove them from the charger.

Step 7. Carefully lift the charger and remove it from the two top screws in the wall.

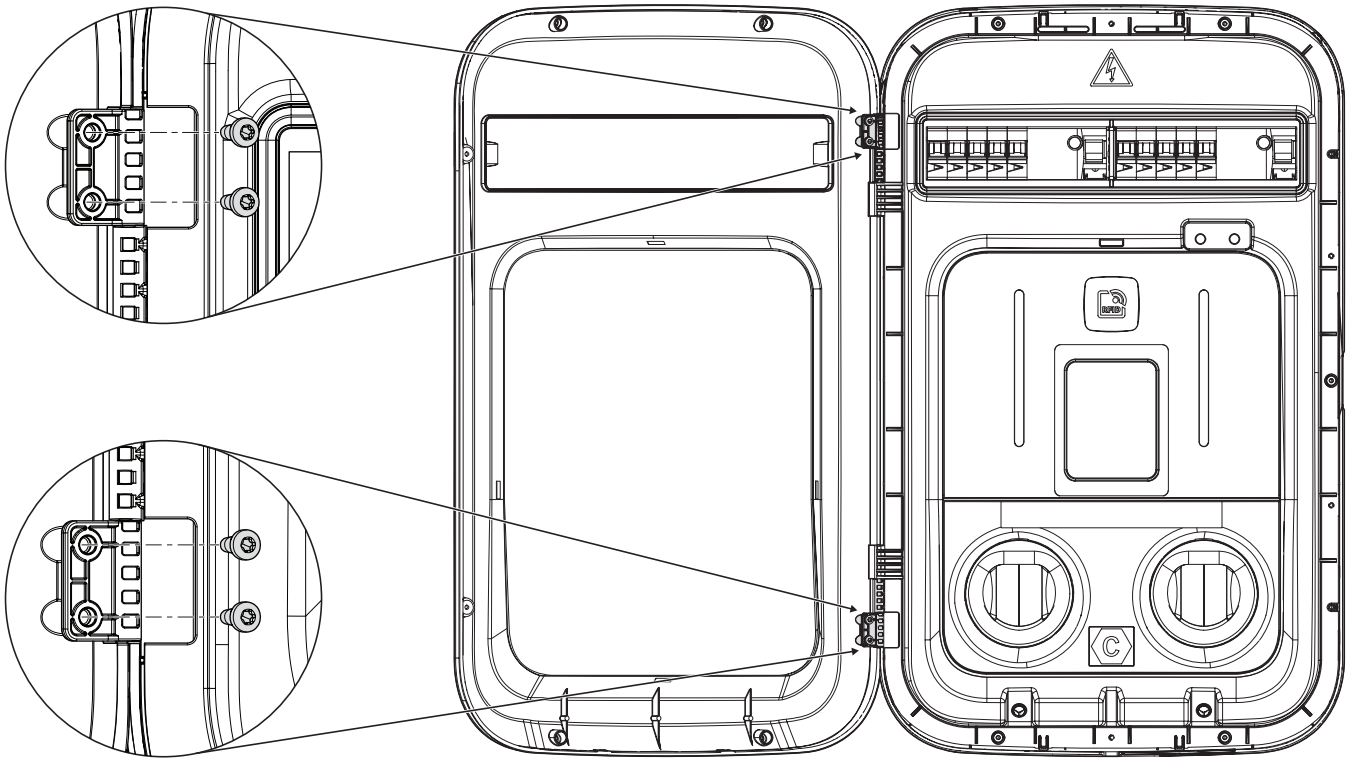
Step 8. Close the second door and the first door.

7.6 Replacement of first door

Step 1. Open the first door by untighten the two screws. (See Figure 10 in chapter 4.5.1).

Step 2. Unscrew the two fixing hinges. 4 screws (Figure 80).

Figure 80. Location of hinge screws



Step 3. Replace the door and screws of the new door.

7.7 Disposal

When disposing of the EV charger, the end user should contact professional and qualified personnel for disposal instructions. Please refer to www.eaton.com for further details.

The EU Directive on Waste Electrical and Electronic Equipment (WEEE) (Directive 2012/19/EU) establishes common rules on the management of electrical and electronic equipment to minimize its impact – from design until disposal – on the environment. As a manufacturer of electrical and electronic equipment, Eaton actively supports the requirements of the WEEE Directive.

In compliance with the EU standard EN 50419 for marking of electrical and electronic equipment, we include the crossed-out wheeled bin symbol on our products. This symbol alerts users that these products should be recycled in accordance with local environmental regulations and not discarded with household waste.

When end users recycle WEEE they are helping to ensure that these products are neither incinerated nor sent to landfill, minimizing the potential negative impact on human health and the environment.

Any device that is no longer needed must therefore be returned to the distributor or disposed to an authorized collection point or recycling center in the area. Eaton encourages all its customers and end users to make responsible decisions when it comes to disposing products.

Eaton is not responsible for the transportation of the device to the collection point or recycling center.

8. How to start and stop charging

On a Node variant, the charger controller does not have any cable or terminator pre-installed to it.

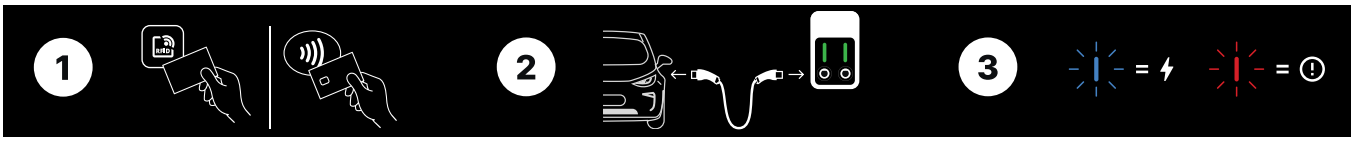
8.1 Before powering on the Green Motion Duo

- In case of a wall-mounted Green Motion Duo: verify that the product is securely mounted on the wall in accordance with local regulations.
- In case of pedestal mounting: verify that the product and the pedestal are correctly installed in accordance with local regulations.
- Verify that connection to the AC power distribution network (grid) is made correctly in accordance with local regulations.
- Perform checks on the protective earth conductor continuity, insulation resistance, RCD triggering current, triggering time, etc., in accordance with local regulations.
- Verify that the internal circuit breakers (if installed) are turned on.
- Verify that the second door and the first door are closed and securely locked with the provided captive screws. Torque max of 1.5 Nm for the captive screws.

8.2 How to start charging

1. Connect the Electric Vehicle (EV) to the Green Motion Duo charger using a Type 2 charging cable.
2. Authenticate the session by swiping a compatible RFID card or, optionally, performing a contactless payment with a supported bank card.
3. Monitor the charging status via the LED indicator. For detailed information, refer to the sticker (Figure 81) located on the right side of the product.

Figure 81. How to start charging



Contactless payment is an optional feature provided with Green Motion Duo EV chargers equipped with a point-of-sale terminal.

Table 15 summarizes the possible LED indicators during the operation.

Table 15. LED indicator

LED Color	LED state	Description
	No light	Green Motion Duo is stopped or not powered
	Solid	Charging session completed, Green Motion Duo is ready
	Pulsing	Authentication completed, Green Motion Duo is waiting for a chargepoint to be selected
	Breathing	Charging session in progress
	Solid	Error

8.3 How to stop charging

Unplug the connector from the vehicle and/or the EV charger.

Usually, the connector must first be released from inside the vehicle (please refer to the instruction manual of your vehicle for more information).

In case the charging session is authenticated with a RFID card, it is also possible to stop a charging session by passing the RFID card in front of the charger.

8.4 Restarting/rebooting the Green Motion Duo EV charger

HW Button:

- Press for 0-500ms: No action.
- Press for 500ms - 6s: Software reboot (ends transactions on the charger and restarts the charger control board).
- Press for more than 6s: Hardware reboot (turns off the charger; if done on the Master, it restarts the Master and ends transactions on the Master and all connected Nodes).

UI:

- End all transactions.
- Restart all chargers (Master and Nodes).

9. Technical data

9.1 Rating plate

Refer to Figure 82 to locate the rating plate on the Green Motion Duo charger.

The technical specifications provided in Table 1 of this manual do not replace those that appear on the rating plate attached to the product.

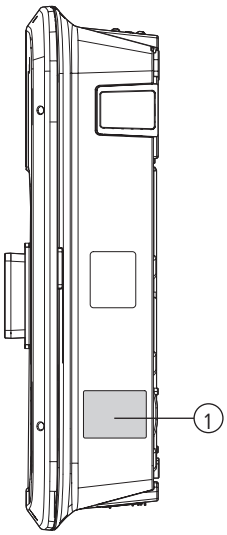
The labels attached to the equipment must NEVER be removed, damaged, soiled, or hidden for any reason.

The labels must NOT be obscured by foreign objects (e.g., rags, boxes, equipment). They must be cleaned periodically and always kept clearly visible.

The information displayed on the rating plate:

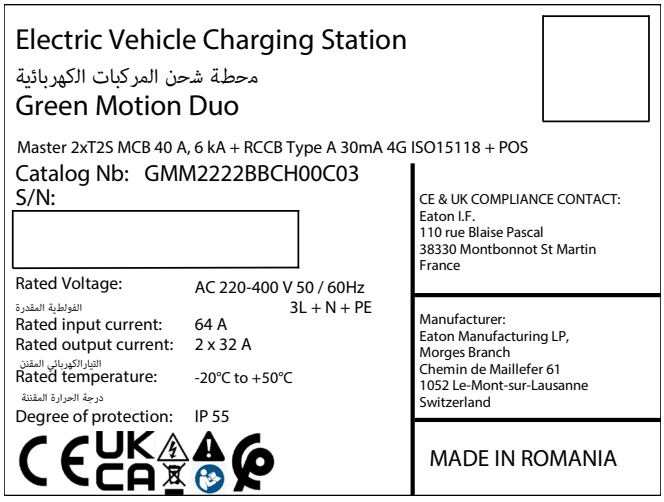
1. Manufacturer
2. Model and catalog number
3. Serial number
4. Ratings
5. Warnings and usage instructions
6. Certification marks

Figure 82. Location of the rating plate



Tag	Description
1	Rating plate

Figure 83. Example of Green Motion Duo EV charger rating plate



9.2 Technical datasheet

Table 16. Limits and certifications (including but not limited to).

Certifications and standards	
Conformity	IEC 61851-1
ISO15118-20 HW-ready	Yes for V2X applications
Plug and charge ISO15118-2	Yes
Charging mode	Mode 3 in accordance with EN/IEC 61851-1 AC charging
Electric vehicle charging infrastructure	IEC 63110-1:2022, IEC 63380-1, EN 17186, IEC 62196-1, IEC 60364-7-722
Electromagnetic compatibility	EN 61851-21-2, EN 61000-6-1, EN 61000-6-3, EN 61000-3-3, EN 61000-3-11, EN 61000-3-12
Cybersecurity	IEC 62443

10. Troubleshooting

This section contains information and procedures for solving possible problems that may occur with the Green Motion Duo EV charger.

If the problem persists, contact your Eaton technical support representative using the email address BGTechSupport@eaton.com.

Table 17. Troubleshooting

Possible problem	Recommended solution
The charger does not boot up.	Verify that the input power supply cables from the distribution network are properly connected into the input terminal block (see chapter 4.6), respecting the correct phase assignment. In case of a single-phase installation, ensure that the phase cable is connected to the terminal block labeled L1.
	Check that the external main circuit breaker or any disconnection devices are turned on (closed).
The charger is unresponsive; nothing happens when connecting it to a vehicle.	Verify that the integrated RCCB and MCB (if present) are turned on. Note that the control unit is supplied independently from the integrated switchgear.
The EV charger's LED indicator is green, but the vehicle does not get charged.	Verify that the charging cable connector is adequately plugged into the vehicle. Ensure that the Type 2 plug is pushed in until an audible click is heard.
	Some vehicles need to be locked before a charging session is allowed to start. Try locking the vehicle.
	Visually inspect the condition of the cable used for charging, its connector and sockets, the vehicle socket as well as the EV charger socket. Stop usage immediately if you see physical damage to any of these parts.
	Check that the vehicle does not have scheduled/delayed charging set up. In such cases it will only charge at certain hours of the day.
The EV charger's LED indicator is solid red.	There is an error or fault preventing a charging session to either start or resume. Attempt to reinitiate the charging session by unplugging the charging cable from the vehicle and reinserting it.
	If the problem persists, check any control messages displayed in the vehicle.
	Perform reboot of the EV charger via the first door REBOOT button, following the steps described in chapter 8.4.
Authentication refused	Verify that the connection of the EV charger to the backend is available (see chapter 5).
	In case of 4G connection, check that the SIM card is securely locked in its slot (see chapter 5.3). Alternatively, gently clean SIM card's contacts with a soft cotton swab. In case of using rubbing alcohol, ensure that the contact surface is completely dry before inserting into the EV charger.
The charging cable cannot be released from the vehicle.	In most cases the charging cable must first be released/unlocked by the vehicle to prevent injuries, accidental disconnection and misuse. Try unlocking the vehicle first. Alternatively, refer to the vehicle instruction manual.
The charging cable cannot be released from the EV charger.	Follow the steps described in chapter 7.2 on how to release a charging cable from the EV charger socket.

11. Product guarantee and technical support

In case of technical problems during the warranty period of the Green Motion Duo EV charger, contact your local installer or Eaton technical support at BGTechSupport@eaton.com.

Provide the following information when contacting Eaton technical support:

- Product model
- Serial number

Notes:

Notes:

Eaton Industries Manufacturing GmbH
Place de la Gare 2
1345 Le Lieu, Switzerland
eaton.com/greenmotionduo

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