

Ratio Start Charger

MANUAL



ratio

Thank you for choosing the Ratio Start Charger

Manufacturer

Ratio Electric B.V.

Ambachtsstraat 12
NL – 3861 RH Nijkerk
The Netherlands
Tel. +31-33-2452360
info@ratio.nl
www.ratio.nl

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Preface

About this document

This manual contains technical descriptions and instructions for the following product:

Category of product	Charger for Electric Vehicles
Product name	Start Charger
Art. No.	388xx
Serial number	

Write down the serial number of your product in the table above for future reference.

This manual contains all instructions and safety information for installation, commissioning, use and maintenance of the product.

This manual is intended for:

- the qualified technician who installs the product;
- the end-user who uses the charger;
- the product owner who maintains the product.

Original instructions

This manual has been translated into multiple languages. The original manual is written in UK English. All other language versions are translations of the original manual.

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Disclaimer of liability

Ratio Electric B.V. cannot be held responsible for personal injury, damage to the product or property damage caused by incorrect use, foreseeable misuse or failure to follow the instructions in this manual. This also applies to unauthorized modifications of the product and the use of non-approved spare parts, tools or accessories.

Ratio Electric B.V. reserves the right to modify this manual without notification beforehand.

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1. Safety

Please make sure you have fully read and understood the instructions in this manual before you start installing or using the product. If you fail to follow the instructions from this manual you can put persons, surroundings, the environment and the product at risk. Store this manual in an accessible place near the product for future reference.



Always comply with the information, such as labels and the nameplate, attached directly to the product and keep the information in a legible condition.

Always comply with any applicable laws and regulations that have not been accounted for in this manual.

1.1. Symbols and labels

1.1.1. Safety warnings

This manual contains safety warnings that may result in injury when ignored. Each safety warning is indicated with a signal word. The signal word corresponds with the level of risk of the described hazardous situation, see the table below.

Signal word	Risk of injury	Result when instruction is ignored or not followed correctly
 WARNING	Medium	Could result in death or serious injury
 CAUTION	Low	Could result in minor or moderate injury

Safety warnings at the start of a section, apply to the entire section.

Safety warnings that refer to a particular sentence or procedure step are embedded in the running text.

1.1.2. Notices

Messages that are not hazard-related are indicated with the signal word **NOTICE**. These messages do not have a safety alert symbol.

Signal word	Meaning
NOTICE	Could result in damage to the product when instruction is ignored or not followed correctly
Note	Additional information or emphasis on an instruction

1.2. Intended use

The Ratio Start Charger is both a non-restricted and restricted charger intended to charge electrical vehicles using power from the household power grid. The product can be operated indoors and outdoors.

The product must only be operated within its performance limits and under the permitted ambient conditions, as stated in the technical specifications in chapter 3.

The product can be mounted flush to a wall, or to a separately available pole for pavement or soil.

Safe use of the product is only guaranteed if it is used as intended.

1.3. Reasonably foreseeable misuse

The following is considered foreseeable misuse:

- Use in an environment that varies from or exceeds the given environmental conditions.
- Use that varies from or exceeds the given operating conditions.
- Failure to comply with the instructions in this manual.
- Failure to eliminate faults, malfunctions or defects of the product that impose safety risks.
- Failure to carry out the inspections and maintenance operations as described in this manual.
- Unauthorised removal or modification of parts or safety devices of the product.
- Use of spare parts or accessories that have not been approved by the manufacturer.
- Operation in a flammable and/or explosive environment.
- Operation in closed-off or poorly ventilated rooms.

1.4. Qualification of personnel

Only authorised technicians are allowed to perform installation and maintenance of the product. They must possess the following qualifications:

- are legal of age;
- are familiar and abide by the safety instructions and sections of this manual related to installation and maintenance of the product;
- are familiar with and abide by the applicable local, national and international laws and regulations;
- are able to recognise the possible dangers of the product and take the necessary measures to protect persons and property;
- have received adequate training in the safe installation and maintenance of this product;
- have obtained authorisation to access the product.

1.5. Personal protective equipment

Wear the appropriate personal protective equipment (PPE) according to the manual of any tools you use during installation of the charger.

Wear insulating gloves when installing wires and touching electrical components to avoid damaging the product by static discharge.

1.6. Safety precautions

Despite the safe design and construction of the product and the prescribed protective measures, the product possesses residual risks. This manual provides safety messages to indicate these risks. The formatting and appearance of safety messages that are dedicated to a particular section or sentence is explained in chapter 1.1.

Read all the safety warnings and instructions before using the product. Failure to follow the warnings and the instructions may result in electric shock, fire and/or serious injury.

WARNING

- This device should be supervised when used around children.
- Do not put fingers into the electric vehicle connector.
- Do not use this product if the flexible power cord or EV cable are frayed, have broken insulation, or any other signs of damage.
- Do not use this product if the enclosure or EV connector are broken, cracked, open, or show any other indication of damage.
- Switch off the MCB in your electrical cabinet and immediately contact Customer Support for service if at any time you think the equipment is unsafe. Do not use your Start Charger until the problem is identified and corrected.
- Improper connection of equipment-grounding conductor can result in a risk of electric shock. Check with a qualified electrician or serviceman if you doubt whether the product is properly grounded.
- Do not use this product if it does not function according to the instructions in this manual. Seek advice from Ratio, your vendor, or a qualified electrician or serviceman.
- Do not remove the charging plug while a charging session is active.
- Children should not be allowed to use this product. Do not allow children to play in or around the product.

⚠ CAUTION

- Make certain the supply cable of the product is positioned so it will not be stepped on, tipped over, or otherwise subjected to damage or stress.
- There are no user serviceable parts inside. Refer to the Customer Support section in this manual for service information. Do not attempt to repair or service the product yourself.
- Do not operate this product if it or the supply cable or housing is visibly damaged. Switch off the MCB in the electrical cabinet and contact your Service Representative for service immediately. Refer to the Customer Support section in the manual for information on the Service Representative in your area.
- Only use this product to charge electric vehicles equipped with a conductive charge port. See the vehicle's owner's handbook to determine if the vehicle is equipped with a conductive charge port.
- Use of any adaptors is not allowed with this product.
- Only use certified type 1 or type 2 charging cables with this product.

NOTICE

- Do not drop the product and avoid bumping.
- Do not store the product in an environment that exceeds the ambient conditions as stated in this manual.
- Do not expose the internal components product to moisture.
- Do not immerse the product in water or any other liquid.

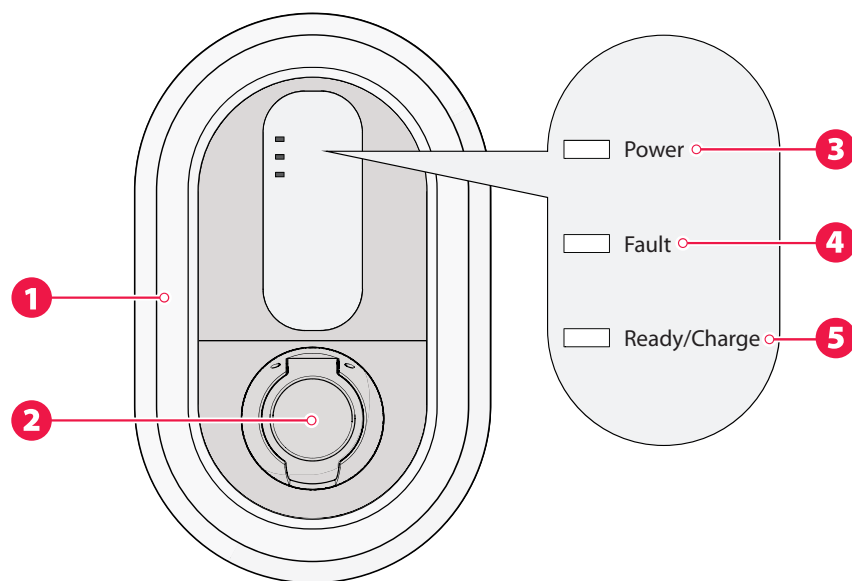
2. Description of the product

The Start Charger is a Mode 3 charger for charging electrical vehicles (EV) that complies with the IEC61851 standard.

The Start Charger is a simple, economical charger.

The Start Charger is available with a socket (outlet) or with a fixed cable.

2.1. Charger components



1 Front cover ring

2 Charge socket

3 Power LED

4 Fault LED

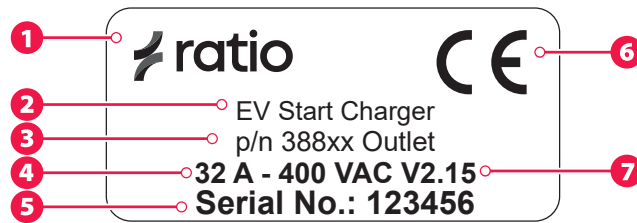
5 Ready/Charge LED

3. Technical data

Product name	Start Charger
Art. no.	388xx
Charging System	IEC61851, Mode 3
Cable version car connector	IEC 62196, type 1 or type 2
Outlet version	IEC 62196, type 2 Outlet
Power input	single-phase or 3 phase, 230V-400V AC, 16A-32A
Max Power output	7,4 kW, 22 kW
Frequency	50 Hz 5%
Protection against electric shock	Class I
Residual current detection	DC 6mA
Dimensions	400 mm × 250 mm × 105 mm
Housing	PC/ABS-VO
Weight	4 kg (incl. cable)
IP Protection rating	IP54, rain-tight
Altitude	Up to 2000 m.
Ambient temperature	-25 °C to +40 °C
External magnetic field	Not exceeding five times the earth's magnetic field in any direction.
Sinusoidal wave distortion	Not exceeding 5%
Relative humidity (maximum value at 40 °C)	75%
Markings	CE
Ventilation	Not supported
Required protection device type	Type A
Required protection device rating	30 mA

3.1. Nameplate/Marking

The product is marked in accordance with the applicable legislation requirements. The nameplate/marking is located on the bottom of the housing, above the cable inlets.



1 Manufacturer

2 Product name

3 Product number

4 Rated input power

5 Product serial number

6 CE marking

7 Firmware/hardware version

4. Transport and storage

4.1. Transport

Transport the product in the original packaging, or suitable replacement packaging that provides adequate protection from vibrations, bumps, moisture, dust, and debris.

Be careful not to drop the product and prevent it from moving or bumping into objects while transporting.

Excessive vibrations could loosen wire connections and cause the product to malfunction.

4.2. Storage

Always disconnect the product from the power supply when storing the product.

Store the product in environmental conditions within the limits stated in chapter of 3 this manual.

Store the product in the original packaging or a suitable replacement packaging to protect the product from moisture, dust, and debris.

Do not store anything on top of the product.

5. Installation

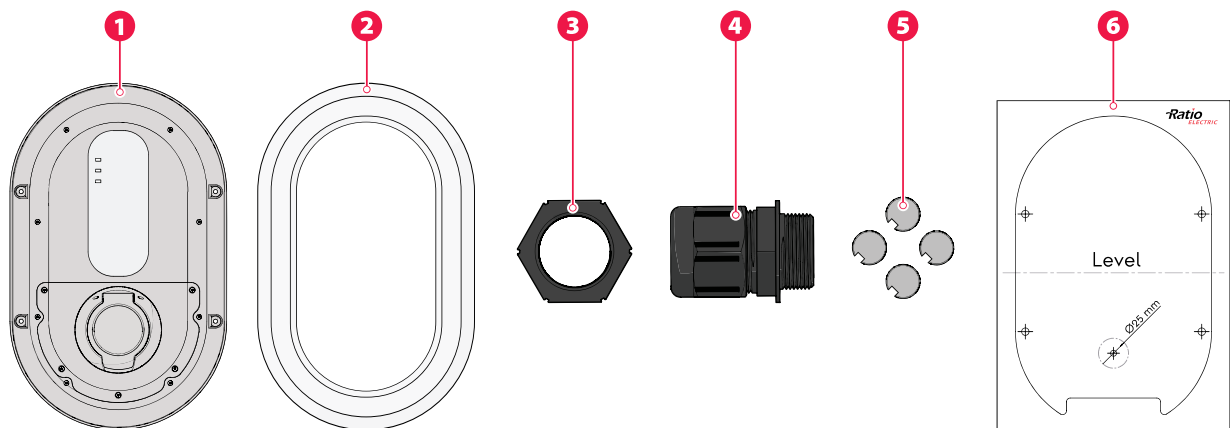
5.1. Preparation

⚠ WARNING

- The installation must be done by a qualified and licensed electrician according the local legislation.
- The electrical installation must be free of power during the entire installation period.
- Since this charger uses circuits that reference to ground, no megging must be done after connecting to power.

5.1.1. Check the contents

1. Open the box and remove the contents.
2. Place all parts on an empty surface to avoid losing any parts.
3. Check if all parts are present and undamaged using the overview below. In case of any parts missing or damaged, please see chapter Service.



1 Charger

2 Front cover ring

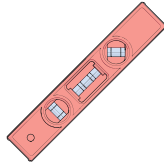
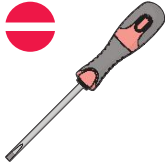



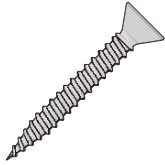

3 Locknut for cable gland

4 M25 cable gland

5 Screw caps (4×)

6 Drilling template

5.1.2. Required tools

Spirit level	Size 3 flathead	TX10 Torx	Voltage tester
			
Hammer	Screws 5x35 mm (4x)	Appropriate wall plugs (4x) (if applicable)	
			

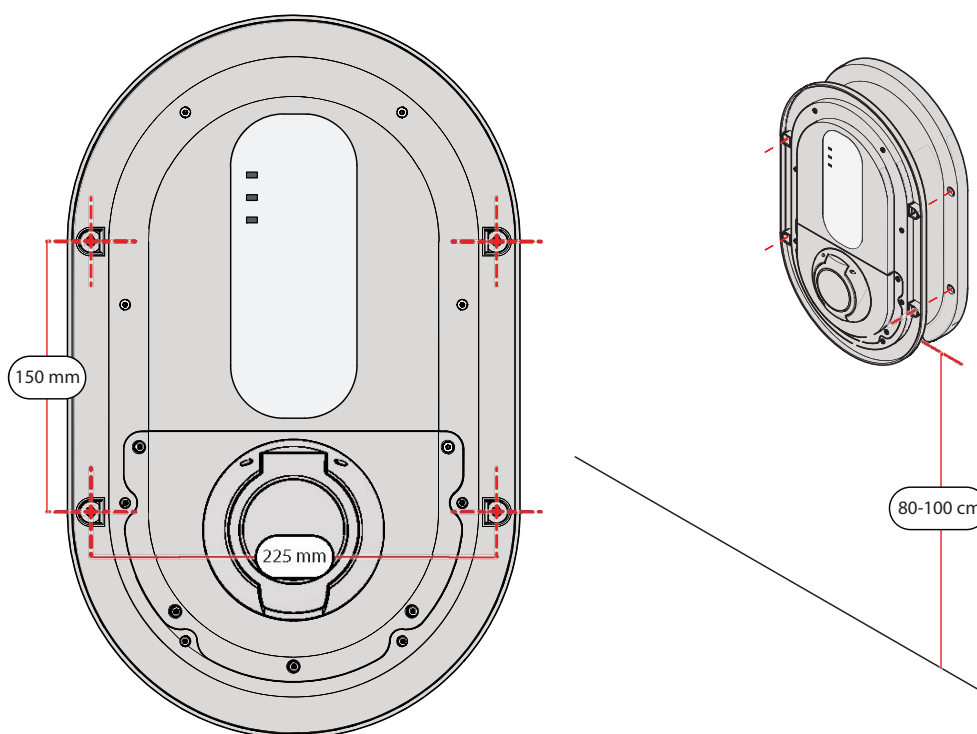
5.1.3. Required wiring and electrical protection

	16 A	32 A
Wiring cross section 1-phase*	3 × 2,50 mm ² , solid wire*	3 × 6,00 mm ² , solid wire*
Wiring cross section 3-phase*	5 × 2,50 mm ² , solid wire*	5 × 6,00 mm ² , solid wire*
Mains Circuit Breaker (MCB)	20 A, B/C-characteristic	40 A, B/C-characteristic
Residual Current Device (RCD)	30 mA, Type A	

* max 25 m cable length

5.2. Install the power cable in the consumer unit

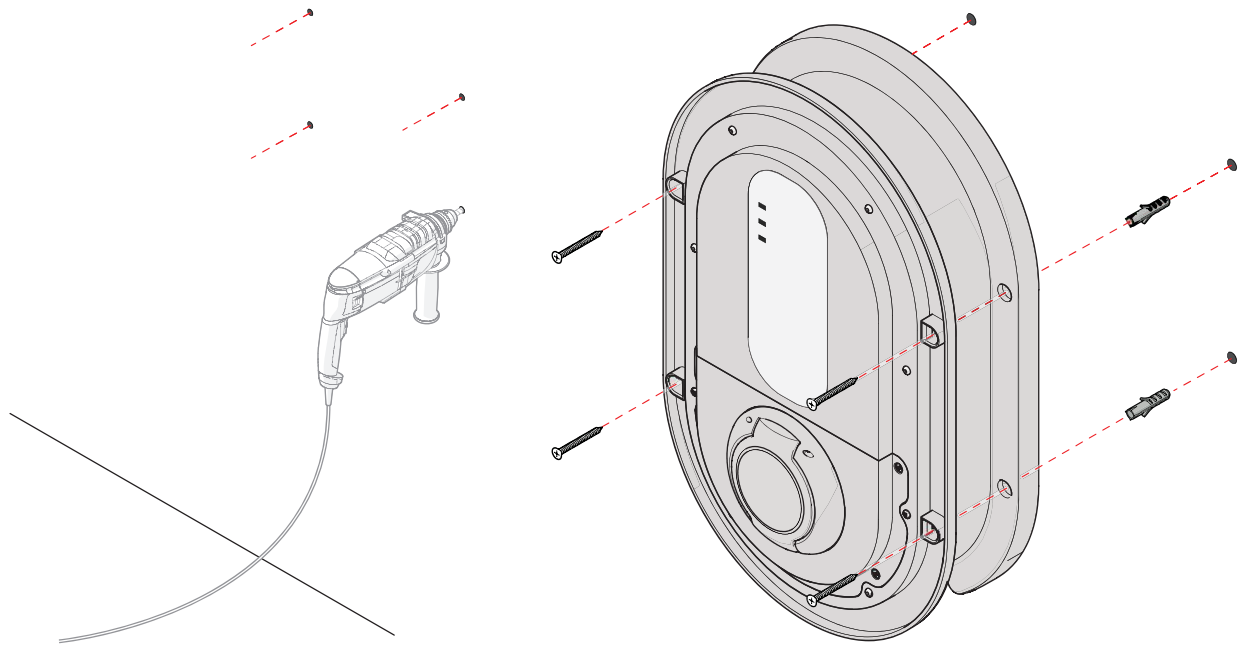
1. Switch off the Main Circuit Breaker (MCB) in the consumer unit to cut power to the main grid.
2. Lay down a power cable between the consumer unit and the installation location of the charger.
3. Install a dedicated 30 mA, Type A Residual Current Device (RCD), or use an available 30 mA, Type RCD.
4. Strip the wires of the power cable.
5. Connect the power cable wires to the dedicated RCD in the consumer unit.



1. Tape the provided drilling template to the wall at the installation location, with the bottom of the template about 80-100 cm above the ground.
2. Ensure the template is level. Use a spirit level.

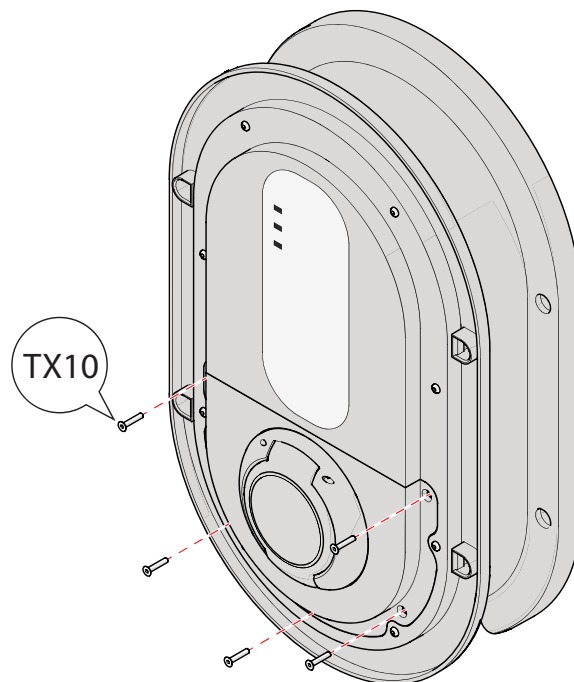
Alternatively

1. Hold the charger against the wall at the installation location, with the bottom of the charger about 80-100 cm above the ground.
2. Ensure the charger is level. Use a spirit level.
3. Mark the locations of the holes in the charger housing on the wall.
4. Carefully remove the charger and lay it on a flat, stable and dry surface.



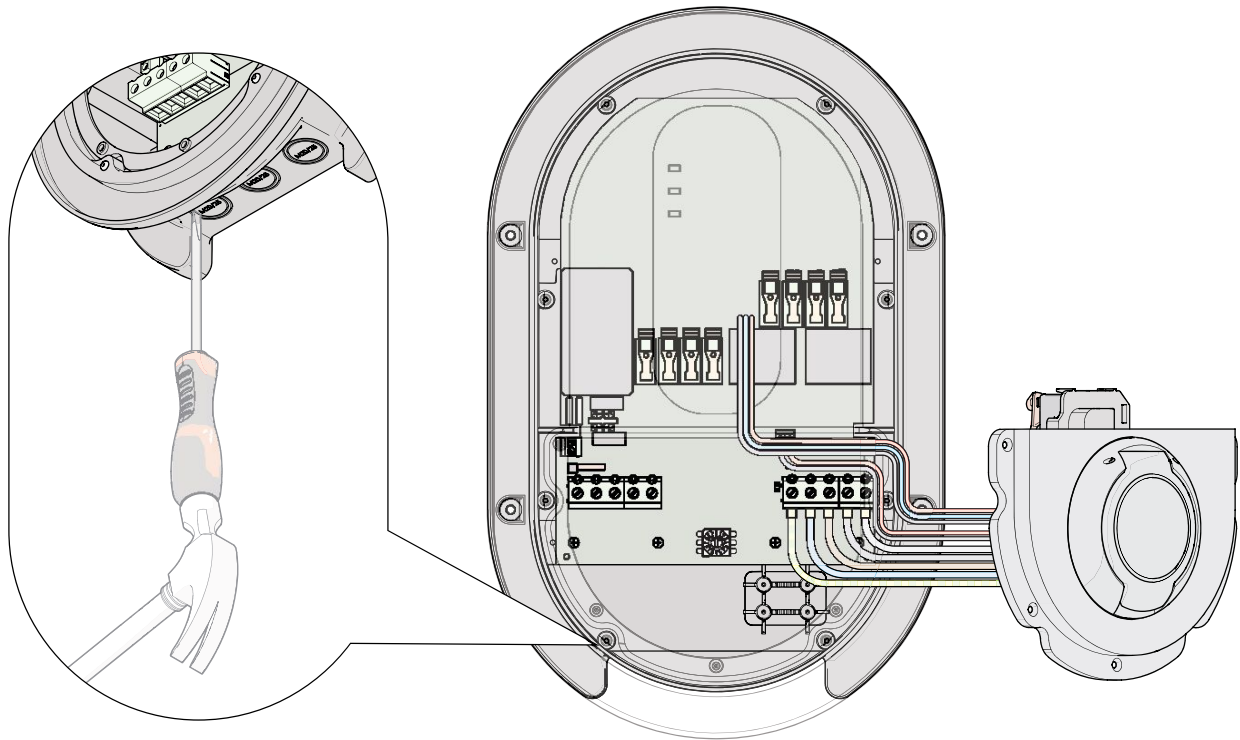
-
5. Drill the holes in the wall. Use an appropriate drill and drill bit.
 6. Insert wall plugs, if applicable.
 7. Align the charger with the holes in the wall and secure it with four 5×35 mm screws (not included).

5.3. Connect the power cable to the charger

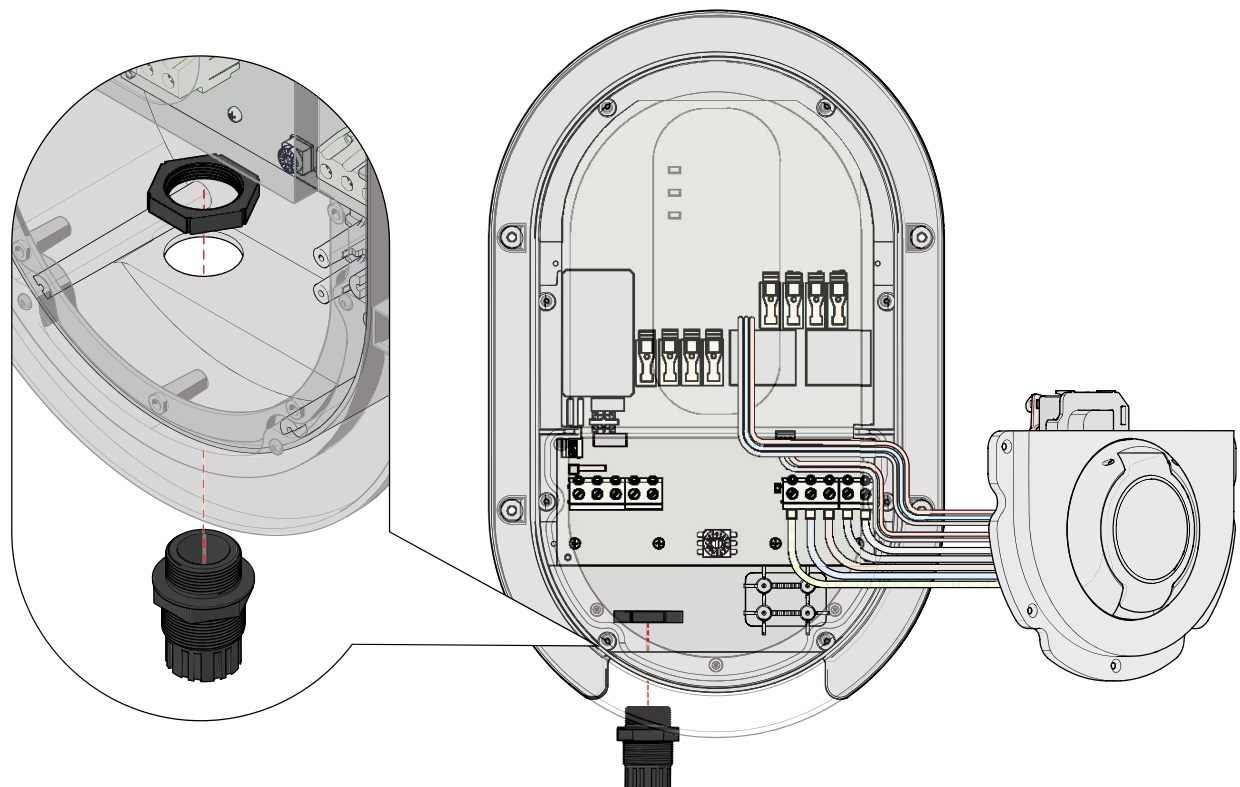


-
1. Remove the five Torx screws from the housing lid. Use a size TX10 screwdriver.

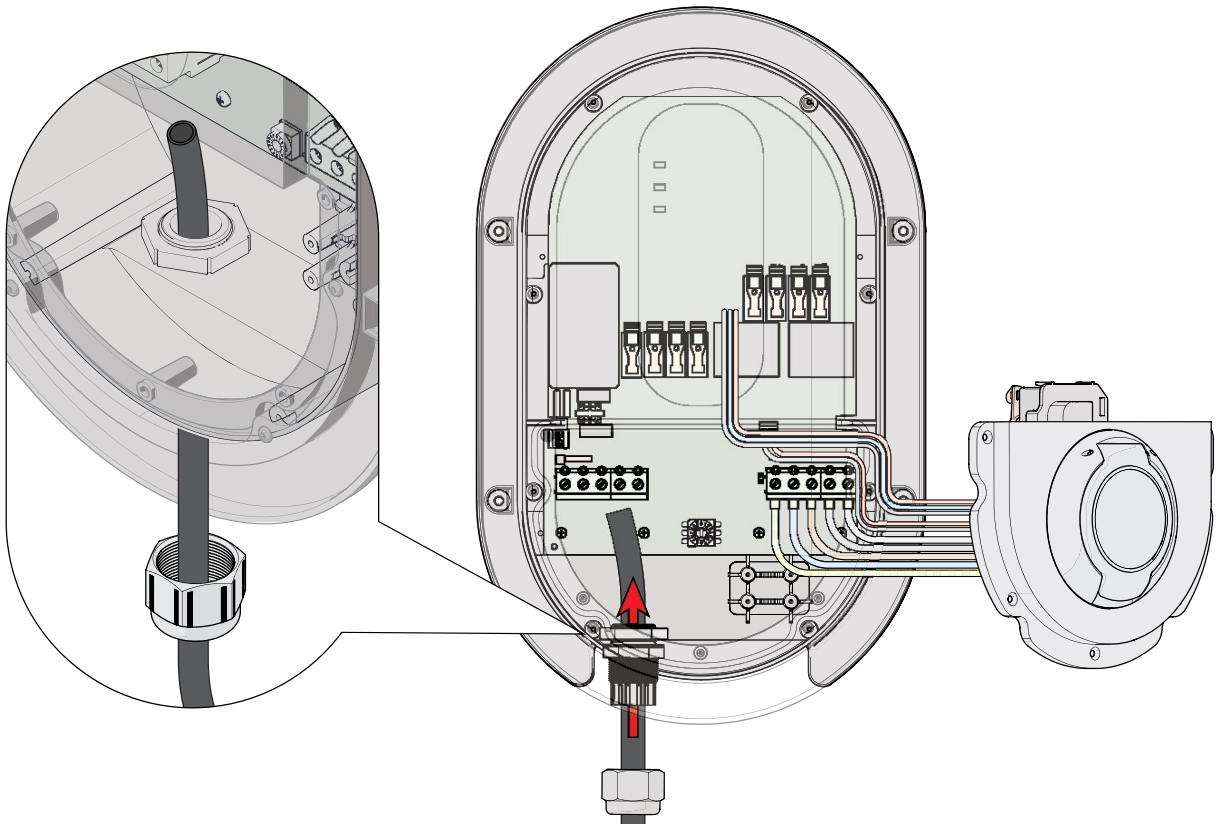
2. Move the housing lid to the side to access the inner circuitry of the product.



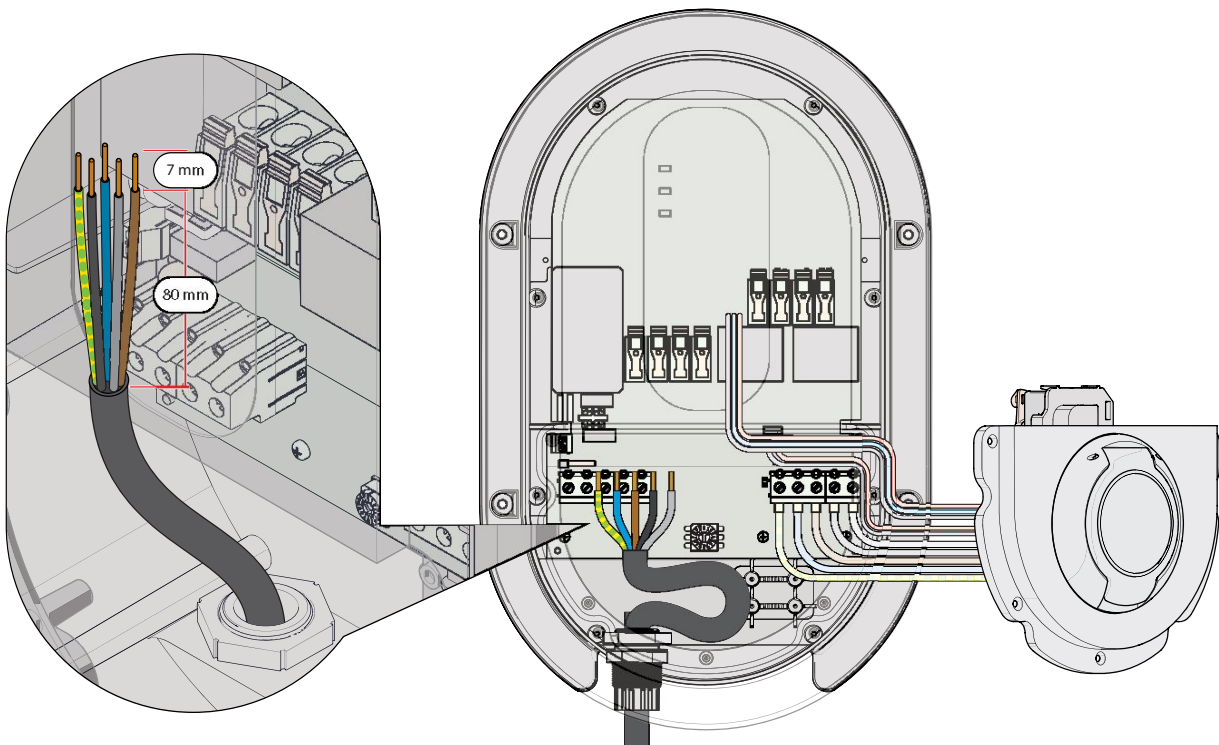
3. Carefully remove the left cable inlet cover. Use a flathead screwdriver and hammer.



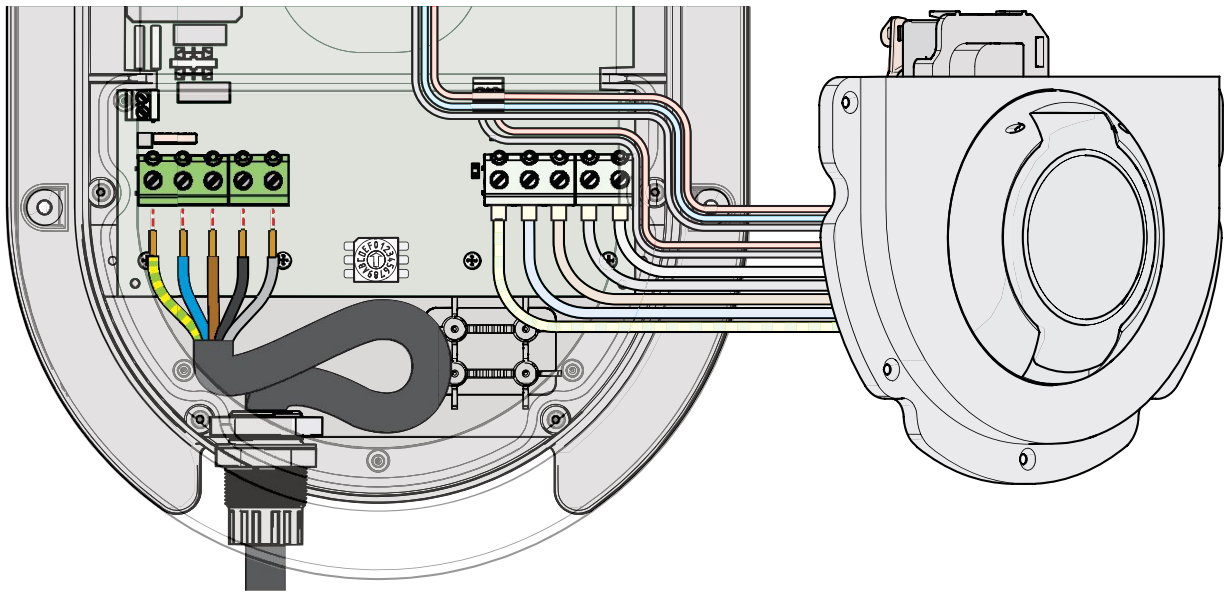
4. Remove the sealing nut from the cable gland.
5. Insert the cable gland through the left cable inlet.
6. Secure the cable gland with the locknut.



7. Guide the power cable through the sealing nut.
8. Guide the power cable through the cable gland.



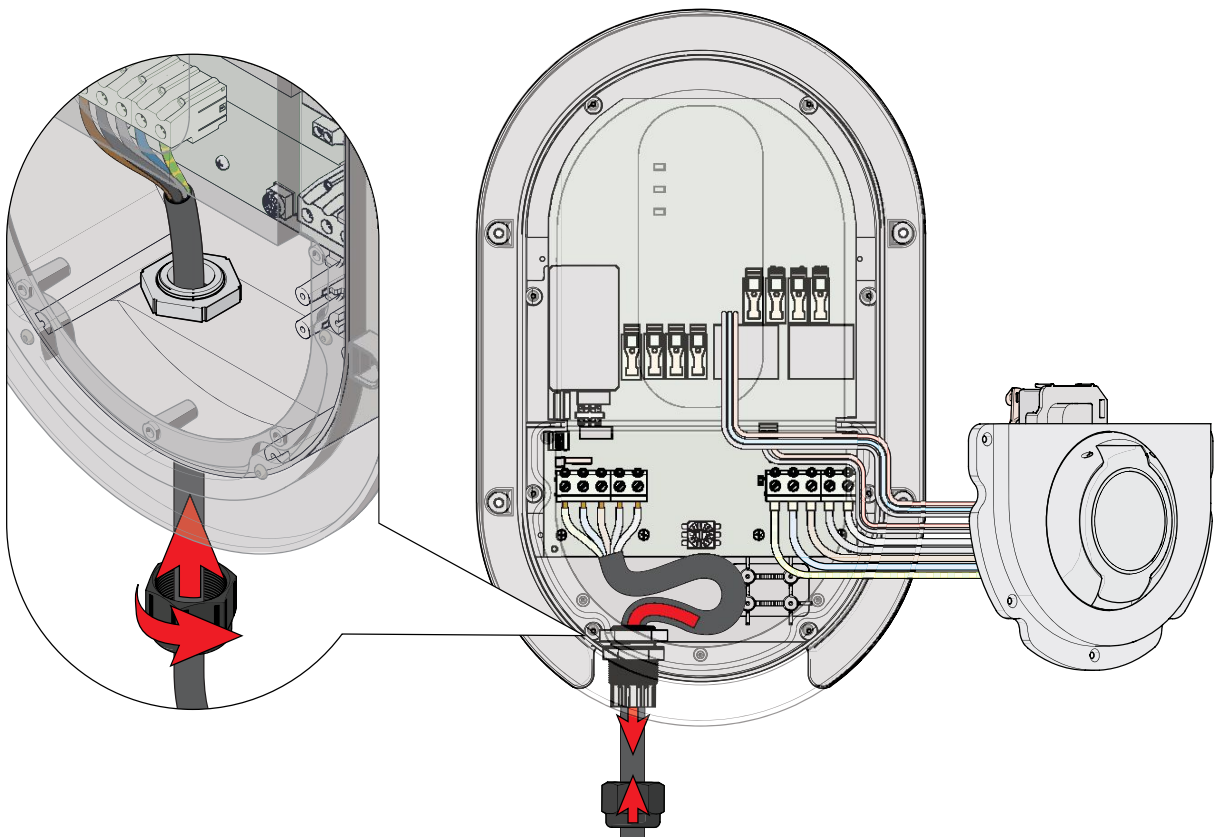
9. Strip the wires of the power cable.



10. Connect the stripped wires to the correct terminals of the left terminal block.

- | | |
|----------------------|----------------------------------|
| Earth = Green/Yellow | L2 = Black* |
| N = Blue | L3 = Gray* |
| L1 = Brown | * for 3 phase installation only. |

11. Secure the wires to the terminals using a voltage tester screwdriver.



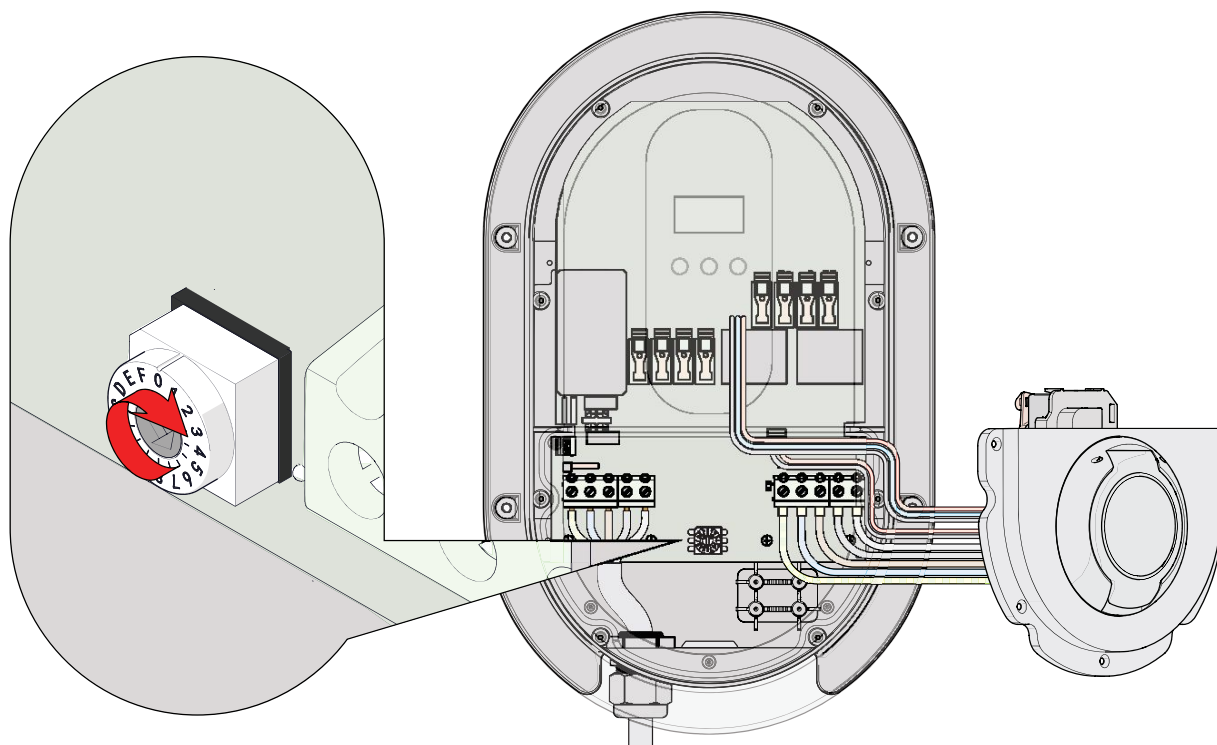
12. Gently pull the excess power cable out of the charger.

13. Secure the power cable in place by tightening the sealing nut onto the cable gland.

5.4. Configure the charging current

Select the desired maximum charging current of the Start Charger using the rotary switch.

Note Do not set the maximum charging current higher than the rating of the household power grid.



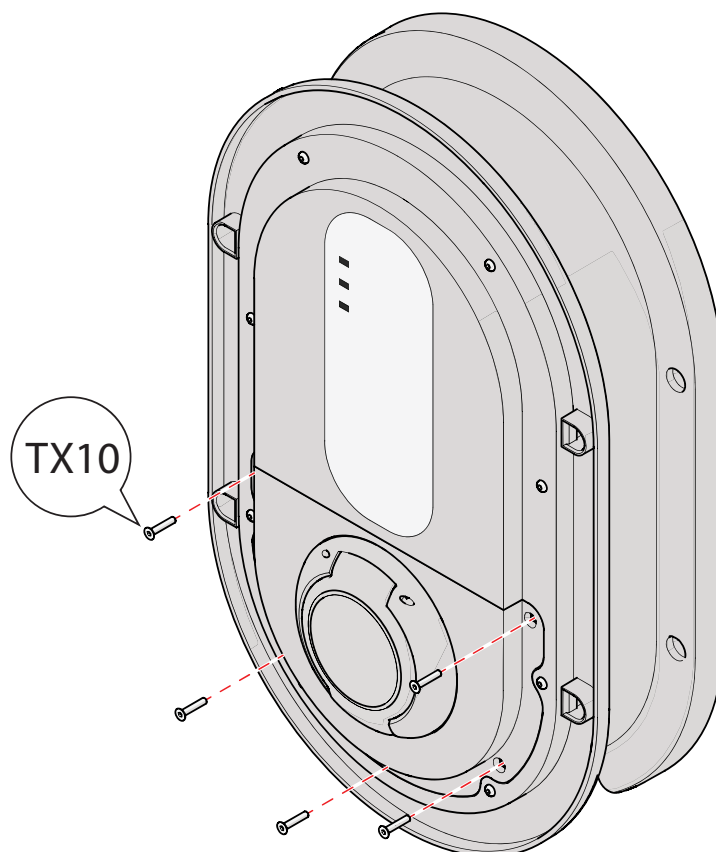
Position	Charging current		
	16A with fixed cable	32A with fixed cable	Outlet version
0	6 A		6 A
1	8 A		8 A
2	10 A		10 A
3	12 A		12 A
4	14 A		14 A
5	16 A		16 A
6	16 A		20 A
7	16 A		24 A
8	16 A		28 A
9 - F	16 A		32 A

Note Charging at a lower current produces less heat, which is better for your battery and also lowers the risk of overloading your Mains grid.

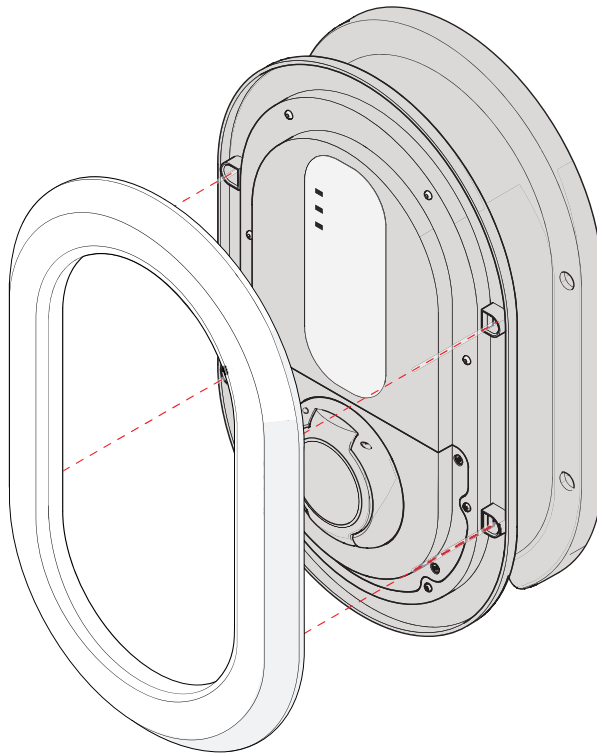
5.5. Checks before finishing the installation

- Check if all phase, neutral and earthing wires are properly connected.
- Check if all cables are free of damage and are properly secured.
- Check if the housing is correctly closed and no loose wires are visible or exposed.

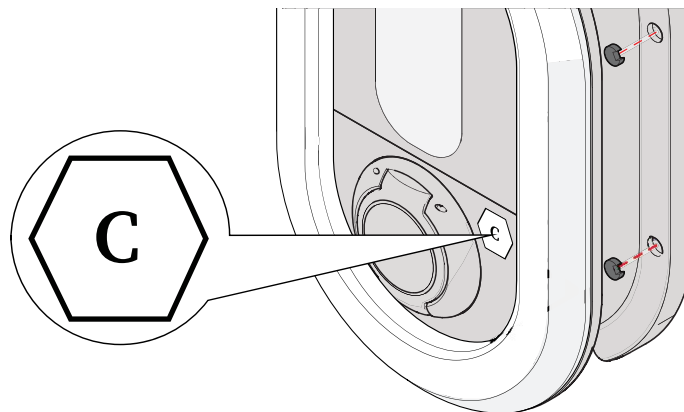
5.6. Finish the installation



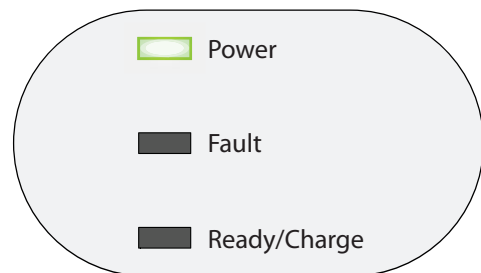
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1. Secure the housing lid in place with the five Torx screws using a size TX10 screwdriver.



2. Click the front cover ring on the charger housing.



3. Place the four screw caps to cover the mounting screws.
4. Apply the Fuel Identifier sticker on the housing, next to the outlet or plug holder.
5. Switch the Main Circuit Breaker (MCB) in the consumer unit back on to provide power from the main grid to the charger(s). The charger switches on and boots up. The power LED lights up green to indicate the charger is powered.



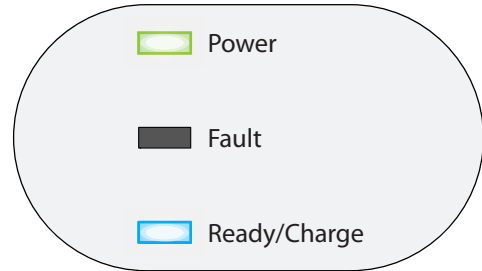
Congratulations, you have finished installing the charger.

6. Use

6.1. Start charging

1. Plug your charging cable into the socket of the charger. (socket version only)
2. Plug the other side of your charging cable into your EV.

The Ready/Charge LED lights up blue to indicate that a charging session is in progress.

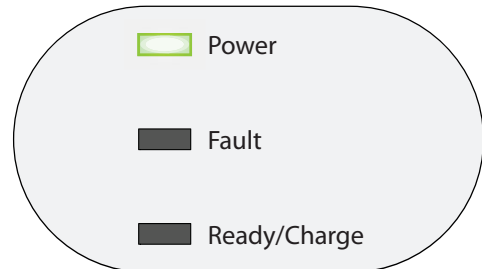


The charging session automatically starts with the configured current.

6.2. Stop charging

The charging session will stop automatically when the EV is charged to the maximum battery level, set in the EV.

The Ready/Charge LED switches off.



6.3. Key switch

In case your Start Charger is equipped with a built-in key switch, you can protect the charger from unauthorised use.

1. Turn the key counterclockwise and remove the key to lock the charger.
2. Re-insert the key and turn it clockwise to re-enable the charger.

Note: The key switch does not switch off the charger, but prevents it from starting a charge session.

7. Maintenance

Ratio chargers are practically maintenance-free, aside from periodic cleaning of the housing.

1. Switch off the charger before cleaning the housing.
2. Clean the Start Charger using a soft cloth lightly moistened with mild detergent solution.

⚠ WARNING

Risk of electric shock

- Switch off the charger before cleaning the housing.
- Be careful when cleaning the inlets and socket, do not use excessive amounts of water to avoid water leaking into the charger.

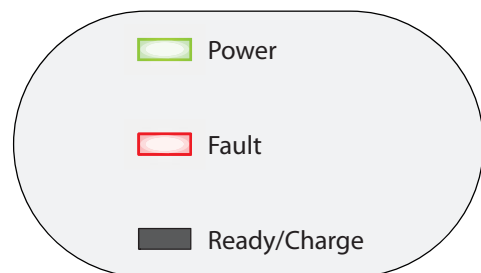
NOTICE

Risk of damage to the product

- Do not use aggressive chemicals to clean the charger.
- Do not use coarse cleaning tools that may damage or scratch the surface of the charger.
- Never use any type of abrasive pad, scouring powder, or flammable solvents such as alcohol or benzene.

8. Troubleshooting

The charger is equipped with monitoring software that detects faults. The Fault LED lights up red when a fault has been detected.



- Check the charger, charge cable and connector for any visible damage.
- Make sure the power LED on the charger is on.
- Make sure that the charge cable is properly inserted and locked into your EV.
- Try charging at a lower current by adjusting the rotary switch in the charger.

If you cannot find the reason why your charger is not working properly, please contact your local reseller or Ratio Electric B.V.

9. Service

To avoid risk of electric shock, only qualified electricians should perform service or maintenance on the charger. If your charger is in need of servicing, please contact Ratio, your local vendor or a qualified electrician.

10. Warranty

Ratio Electric B.V. warrants this product to be free from defects in material, manufacture and design for a period of 3 years after the date of purchase. If this product is defective in materials, manufacture or design during this warranty period, Ratio Electric B.V. will, at its option, repair or replace the product.

Repair parts and/or replacement products may be either new or reconditioned at Ratio Electric B.V. discretion.

This limited Carry-In Warranty does not include service to repair damage from improper installation, improper connections with peripherals, external electrical fault, accident, disaster, misuse, vandalism, unauthorized alteration or repair, abuse or modifications to the product not approved in writing by Ratio Electric B.V.

Any evidence of an attempt to disassemble the Start Charger will void this warranty.

Any service repair outside the scope of this limited warranty shall be at applicable rates and terms then in effect.

11. Disposal

If the charger is defective beyond repair, or you no longer wish to use the charger, please recycle the charger according to local applicable rules and guidelines regarding the disposal of electrical devices.