

# Eve Mini<sup>™</sup> Manual



# OUTSIDE



# INSIDE

Model with charging cable





# Step-by-step Eve Mini installation and commissioning

Congratulations with your new Alfen charging station for electric vehicles, and thank you for your purchase.

To ensure a safe installation process and to fully utilise all advanced features of your new system, we advise you to read this manual carefully. Properly store this manual for future usage.

We have invested a great amount of care to provide you with a complete and comprehensible manual. As we continue to modify and further improve its contents, please refer to the following link to download the most recent version: <u>http://alfen.com/en/icu-eve-mini</u>.

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### **DECLARATION OF CONFORMITY**

Manufacturer information: Alfen ICU B.V. Hefbrugweg 28 1332 AP Almere The Netherlands
Declares that the charging station of the type Alfen Eve Mini <sup>TM</sup> , to which this declaration applies,
complies with:

- 1) The provisions of the low voltage directive 2014/35/EU
- 2) The provisions of the EMC guideline 2014/30/EU
- 3) The following harmonised standards:
  - IEC 61851-1 (2010)- Electric vehicle conductive charging system

– General requirements, implemented at a national level with:

- NEN-EN-IEC 61851-1: 2011
- NBN EN 61851-1: 2011
- NF-EN 61851-1: 2012
- DIN-EN 61851-1: 2013
- BS-EN 61851-1:2011
- CEI EN 61851-1:2012

 EC 61851-22 (2001) - Electric vehicle conductive charging system - AC charging station for electric vehicles, implemented on a national level with:

- NEN-EN-IEC 61851-22: 2002
- NBN EN 61851-22: 2002
- NF-EN 61851-22: 2002
- DIN-EN 61851-22: 2002
- BS-EN 61851-22: 2002
- CEI EN 61851-22:2003

All mentioned products are labelled with the CE mark.

Almere, The Netherlands, 2 October 2017.

M. Roeleveld, MŚc. CEO

# **1. SAFETY AND USAGE INSTRUCTIONS**

#### 1.1 Purpose and intended audience

The Alfen Eve Mini<sup>™</sup> charging station is intended exclusively for charging electric vehicles and, when installed correclty, may be used by untrained individuals. Make use of this manual to properly install and commission the charging station.

Installing, commissioning and maintaining this installation may only be performed by a qualified electrician (Alfen ICU certified partner).

This qualified technician must meet the following requirements:

- Expertise of all relevant general and specific rules regarding safety and incident prevention.
- Awareness of the applicable regulations regarding electricity.
- The ability to identify risks and avoid potential hazards
- Awareness of these installation and operation instructions.

This manual applies to the product Alfen Eve Mini<sup>TM</sup>, equipped with firmware version 3.3 (or higher).

#### 1.2 General safety



The safety instructions are intended to ensure proper practical usage. If you do not comply with these safety regulations and instructions, you may expose yourself to the risk of electric shock, fire and/or severe injuries.

Using this product is expressly prohibited in the following situations:

- In the vicinity of explosive or highly flammable substances.
- If the product is located in or close to water.
- · If the product is or individual components are damaged.
- Usage by children or individuals not properly able to
   assess the risks associated with using this product.

In the following cases, Alfen ICU B.V. shall not be liable in any possible way for any kind of damages while all warranties on the product and its accessories become void:

- Non-compliance with these installation and operation instructions.
- Improper use.
- Improper handling.
- Installation and/or usage by unqualified staff.
- Independently applied expansions to or modifications of the product.
- Usage of replacement parts not manufactured or approved by Alfen.
- Ambient temperatures below -25 °C or above 40 °C.
- Force majeure.

More extensive safety information is available in the relevant sections of this document.

#### 2.1 The charging station

Pages 2 and 3 of this manual contain corresponding images of the charging station. This section provides more information about the content of the product and how use it to charge your vehicle.

#### The charging station, model with power socket Exterior

#### Colour display

(2) RFID card reader (optional)

(3) Type 2 plug connection

#### Interior

- (5) UTP (Ethernet) connector
- 6 R|11 (P1) connector
- ⑦ SIM card holder
- ③ Terminal block for power cable
- a. Screws for wall mounting frame
- D. Screws for wall mounting frame with earth connection
- Screws front cover

#### The charging station, model with charging cable Exterior

- ② RFID card reader (optional)
- ④ RGB Status LED

#### Interior

- ⑤ UTP (Ethernet) connector
- ⑥ RJ11 (P1) connector
- SIM card holder
- Iterminal block for power cable
- ③ Clamps for outbound charging cable
- a. Screws for wall mounting frame
- D. Screw for wall mounting frame with grounding connection
- Screws front cover

#### Bottom side charging station

- Identification label
- Cable screw connection (cable gland) for supply cable
- (14) Cable screw connection (cable gland) for charging cable
- 15 Frame for wall mounting
- 16 Grommet for UTP cable
- ③ Grommet for P1 cable

#### Identification label

The identification label (2) on the bottom side of the charging station specifies the elements such as:

- Model, production date and serial number.
- Technical specification number.
- Article number and maximum charging current.
- When contacting Alfen, always have your serial number available to enable quick support.

#### 2.2 Status indications

The Eve Mini is available in two editions, one with a Status LED and one with a colour display to indicate the status of the charging station and inform the user about the progress of the charging session.

#### 2.2.1 Status indications LED

#### Status indications during smart charging

Once smart charging is activated on the Eve Mini, this is indicated on the charging station. Users with the models that feature a display can directly keep track of the charging speed. The models equipped with a LED status indicate the load balancing status as follows:



#### Indications during error status

If an undesired situation occurs, this is indicated by the charging station with a red status LED..



The charging station detected an error. Contact the service department.



Presented charging card is not authorised for charging.

Charging cable is connected but no charging session takes place.



#### 2.2.2 Status indications with display



#### Image 1: Eve Mini display during charging

#### Charging station general information

① Date and time: automatically configured by your administration system, or during installation with the Service Installer. If no date and time are entered, this field remains invisible.

#### Status and information screen

The charging station informs the user about its actual status and provides feedback on input and actions. The following information is available:

- ② Status information
- ③ Status indicator, options

- ④ Maximum charging capacity of the socket
- S Current charging capacity for the connected vehicle
- 6 Currently consumed energy during the current transaction
- ⑦ Duration of the current transaction



-- --h

Charging

transaction active,

with charging speed

indication

X

Communicating with vehicle or charging completed



Error, notification with error code

#### Instruction box

③ User instructions are shown here. In case of an error, an error code is shown (ref. Appendix 1 for more information).

#### 2.3 Operation

Plug & Charge - Authorisation without charge card



The first and second step can be completed in a random order for the model with display. Upon detecting a charging cable, the Eve Mini will show the green status. The light blue (cyan) colour will only be displayed if and when a connection between the vehicle and the charging station is established.



ENGLISH

Eve Mini manual | version 1.06 | October 2017

**ENGLISH** 



The first, second and third step can be completed in a random order. Upon detecting a charging cable, or if a charge card is presented, the Eve mini will show the green status. The light blue (cyan) colour will only be displayed if and when a connection between the vehicle and the charging station is established, and the user has been authorised.



#### RFID - Charging station with user authorisation

#### 2.4 Technical specifications

2.4.1 Eve Mini model overview

#### Models

Model name	Article no.	OCPP chargePointModel
1 x type 1 charging cable 5 m, 1-phase, 16A, Plug & Charge	904460001A	ICU Eve Mini
1 x type 2 charging cable 5 m, 1-phase, 16A, Plug & Charge	904460001B	ICU Eve Mini
1 x type 1 charging cable 8 m, 1-phase, 16A, Plug & Charge	904460001C	ICU Eve Mini
1 x type 2 charging cable 8 m, 1-phase, 16A, Plug & Charge	904460001D	ICU Eve Mini
1 x type 1 charging cable 5 m, 1-phase, 16A, RFID	904460002A	ICU Eve Mini
1 x type 2 charging cable 5 m, 1-phase, 16A, RFID	904460002B	ICU Eve Mini
1 x type 1 charging cable 8 m, 1-phase, 16A, RFID	904460002C	ICU Eve Mini
1 x type 2 charging cable 8 m, 1-phase, 16A, RFID	904460002D	ICU Eve Mini
1 x type 2 socket, 1-phase, 16A, Plug & Charge, Display	904460003	ICU Eve Mini
1 x type 2 socket, 1-phase, 16A, RFID, Display	904460004	ICU Eve Mini
1 x type 2 socket shutters, 1-phase, 16A, Plug & Charge, Display	904460005	ICU Eve Mini
1 x type 2 socket shutters, 1-phase, 16A, RFID, Display	904460006	ICU Eve Mini
1 x type 1 charging cable 5 m, 1-phase, 32A, Plug & Charge	904460011A	ICU Eve Mini
1 x type 2 charging cable 5 m, 1-phase, 32A, Plug & Charge	904460011B	ICU Eve Mini
1 x type 1 charging cable 8 m, 1-phase, 32A, Plug & Charge	904460011C	ICU Eve Mini
1 x type 2 charging cable 8 m, 1-phase, 32A, Plug & Charge	904460011D	ICU Eve Mini
1 x type 1 charging cable 5 m, 1-phase, 32A, RFID	904460012A	ICU Eve Mini
1 x type 2 charging cable 5 m, 1-phase, 32A, RFID	904460012B	ICU Eve Mini
1 x type 1 charging cable 8 m, 1-phase, 32A, RFID	904460012C	ICU Eve Mini
1 x type 2 charging cable 8 m, 1-phase, 32A, RFID	904460012D	ICU Eve Mini
1 x type 2 socket, 1-phase, 32A, Plug & Charge, Display	904460013	ICU Eve Mini
1 x type 2 socket, 1-phase, 32A, RFID, Display	904460014	ICU Eve Mini
1 x type 2 socket shutters, 1-phase, 32A, Plug & Charge	904460015	ICU Eve Mini
1 x type 2 socket shutters, 1-phase, 32A, RFID, Display	904460016	ICU Eve Mini
1 x type 2 charging cable 5 m, 3-phase, 16A, Plug & Charge	904460021B	ICU Eve Mini
1 x type 2 charging cable 8 m, 3-phase, 16A, Plug & Charge	904460021D	ICU Eve Mini
1 x type 2 charging cable 5 m, 3-phase, 16A, RFID	904460022B	ICU Eve Mini
1 x type 2 charging cable 8 m, 3-phase, 16A, RFID	904460022D	ICU Eve Mini
1 x type 2 socket, 3-phase, 16A, Plug & Charge, Display	904460023	ICU Eve Mini
1 x type 2 socket, 3-phase, 16A, RFID, Display	904460024	ICU Eve Mini
1 x type 2 socket shutters, 3-phase, 16A, Plug & Charge, Display	904460025	ICU Eve Mini
1 x type 2 socket shutters, 3-phase, 16A, RFID, Display	904460026	ICU Eve Mini
1 x type 2 charging cable 5 m, 3-phase, 32A, Plug & Charge	904460031B	ICU Eve Mini
1 x type 2 charging cable 8 m, 3-phase, 32A, Plug & Charge	904460031D	ICU Eve Mini
1 x type 2 charging cable 5 m, 3-phase, 32A, RFID	904460032B	ICU Eve Mini
1 x type 2 charging cable 8 m, 3-phase, 32A, RFID	904460032D	ICU Eve Mini
1 x type 2 socket, 3-phase, 32A, Plug & Charge, Display	904460033	ICU Eve Mini
1 x type 2 socket, 3-phase, 32A, RFID, Display	904460034	ICU Eve Mini
1 x type 2 socket shutters, 3-phase, 32A, Plug & Charge, Display	904460035	ICU Eve Mini
1 x type 2 socket shutters, 3-phase, 32A, RFID, Display	904460036	ICU Eve Mini

#### 2.4.2 Input / power supply



Your installation must comply with the standards and regulations of the location (country) where it is installed. The tables below are advisory and based on proper practical functioning of the charging stations; provided that all prerequisites are satisfied.

Printing errors expressly reserved

Input: minimum advised cable diameters (based on assumed max. 50m cable length)	1-phase 3.7kW charging, 16A per phase: 3 x 4 mm² 3-phase 11kW charging, 16A per phase: 5 x 4 mm² 1-phase 7.4kW charging, 32A per phase: 3 x 6mm² 3-phase 22kW charging, 32A per phase: 5 x 6 mm²
Nominal voltage (+/-10%)	230V, 1-phase models 400V (3x 230V), 3-phase models
Nominal frequency	50 Hz
Connection terminals	Cable gland, range for cable thicknesses 14mm to 25,5mm Cable clamps on the input filter block. Range: • 10mm <sup>2</sup> per wire: massive (VD) wire • Max. 6mm <sup>2</sup> per wire: multi-core (VDS) wire with wire-end ferrules
Grounding	TN-system (PE-cable) TT-system (separately installed grounding electrode < 100 Ohm spreading resistance)

#### 2.4.3 Output / vehicle connection

Vehicle connection	3 options: • 1 x type 2 socket, compliant with IEC62196-2 • 1 x type 1 plug (SAE J1772) • 1 x type 2 plug (VDE-AR-E 2623-2-2)	
Output voltage (+/- 10%)	230V (1-phase models) 400V (3x 230V) (3-phase models)	
Max. charging current	16A per phase 32A per phase (optional)	
Max. output	3.7kW (90446000x) 7.4kW (90446001x) 11kW (90446002x) 22kW (90446003x)	
Load balancing	Optional: Active or in Smart Charging Network	

#### 2.4.4 External safety features

Short-circuit protection	With circuit breakers: 1 phase 16A (3.7kW): 1 × 20A, 2P, type B or C 3 phase 16A (11kW): 1 × 20A, 4P, type B or C 1 phase 32A (7.4kW): 1 × 40A, 2P, type B or C 3 phase 32A (22kW): 1 × 40A, 4P, type B or C	With fuses: 1 phase 16A (3.7kW): 1 × 20A gG 3 phase 16A (11kW): 3 × 20A gG 1 phase 32A (7.4kW): 1 × 35A gG 3 phase 32A (22kW): 3 × 35A gG
Residual current protection (optionally combined with circuit breaker)	Residual current device , Type A or B, 30mA: 3.7kW/11kW charging: minimal 20A 7.4kW/22kW charging: 40A	

#### 2.4.5 Integrated components

Residual current protection	Max. 6mA DC leakage current detection
Energy meter	kWh meter, MID certified
Power relay	Integrated, simultaneous activation Additional safety relais in series
Overcurrent protection	Integrated in firmware; shutdown at: 105% after 1,000 seconds; 110% after 100 seconds; 120% after 10 seconds; 150% after 2 seconds

#### Controllers Central unit for sockets and communication Communication with vehicle Mode 3 compliant with IEC 61851-1 Status indication RGB LED (models with charging cable) Integrated in the display (editions with socket) Display 3,5" TFT colour display, resolution: 320 x 240 pixel RFID (NFC) ISO/IEC 14443A/B, Mifare 13,56 MHz, DESFire Card reader Internet / Networking capabilities GPRS, Ethernet/ LAN Communication protocol OCPP 1.5 (ISON), OCPP 1.6 (ISON) Back-end connection ICU Connect (optional) or other back-end system (upon request) Communication with Smart Meter DSMR 4.0 and higher via P1 port (RI11/RI12)

#### 2.4.6 Communication and status indications

#### 2.4.7 Operating conditions

Operating temperature	-25°C up to 40°C
Relative humidity	5 % up to 95 %
Electric Protection class	l
Degree of protection (casing)	IP55
IK protection (mechanische impact)	IK10
Stand-by consumption	Edition with charging cable: approx. 3.5 to 3.8W / Edition with socket: approx. 3.9 - 4.1W

NOTICE!

The operating temperature assumes the **ambient temperature** of a product delivered in the standard casing colour-RAL9016. Direct exposure to sunlight may have an adverse effect on the temperature range.

The temperatures mentioned above apply for the ambient temperature of the product, assuming the standard colour of the casing: RAL9016. Other (darker) colours may have an adverse effect on the product. If the product is exposed to lower or higher temperatures, continuous operation cannot be guaranteed. If temperatures exceed the maximum values, the charging station will automatically decrease the charging current to stabilise the internal temperature.

This prevents unexpected interruptions during transactions.

If the product is directly exposed to sunlight, the automated temperature management may automatically start below the maximum ambient temperature.

#### 2.4.8 Casing

Туре	Wall-mounted unit
Mounting options	Wall mounting or mounting post (accessory)
Material	Polycarbonate, UV resistant and flame retardant
Colour	RAL 9016 (Traffic White) : front side RAL 7043 (Traffic Grey B) : back side
Locking	Torx T20 screws
Dimensions (H x W x D) Casing packaging packaging	370 x 240 x 130 mm 460 x 315 x 250 mm (editions with socket) 480 x 340 x 360 mm (editions with charging cable)
Weight Casing Packaging	Approx. 4 kg Approx. 4,5 kg

#### 2.5 Optional factory settings

Factory settings	Options
Authorisation	Plug & Charge, RFID
Maximum available charging current	16A, 32A
Smart charging options	Off Active load balancing (P1) * Smart Charging Network (zie Bijlage 2) *
Own logo shown on display	Off (Alfen logo) On (Your own logo) *
Supported languages	English, Dutch, German, French, Spanish, Portuguese, Italian, Norwegian, Swedish, Finnish
User availability if temporarily offline	Accepts all RFID cards Only valid cards registered in the database Not available
Action if vehicle plug is disconnected	Terminate transaction and unlock socket Charging put on hold until plug is reconnected
Optional back-office system	Standalone, ICU Connect*, Many others upon request *
Communication via *	Autodetect, GPRS, UTP/LAN

The settings marked with an asterisk (\*) may incur additional costs. The default settings are always mentioned first. For more information about the optional settings, please refer to Appendix 2.

#### 2.6 Accessoires

Mounting post	Art. 803873023-ICU
Dimensions post (H x W x D) Dimensions mounting plate (H x W x D)	1,850 x 94 x 94 mm 348 x 196 x 3 mm
Material	Electrolytic galvanised steel, powder coating with fine structure
Colour	RAL 7043 (Traffic grey B)
Packaging (H x W x D)	1,905 x 235 x 150 mm
Weight	12 kg
Wall bracket for type 1 socket	Art. 803857251-ICU
Dimensions (H x W x D)	186 x 72 x 74 mm
Material	Aluminium with powder coating
Colour	RAL 7011
Wall bracket for type 2 socket	Art. 803857252-ICU
Dimensions (H x W x D)	199 x 98 x 74 mm
Material	Aluminium with powder coating
Colour	RAL 7011
Replacing charging cable Type 1, 5m, 1 phase, to 32A (7.4kW)	Art. 203100301-ICU
Replacing charging cable Type 2, 5m, 1 phase, to 32A (7.4kW)	Art. 203100306-ICU
Replacing charging cable Type 1, 8m, 1 phase, to 32A (7.4kW)	Art. 203100302-ICU
Replacing charging cable Type 2, 8m, 1 phase, to 32A (7.4kW)	Art. 203100303-ICU
Replacing charging cable Type 2, 4m, 3 phase, to 32A (22kW)	Art. 203100287-ICU
Replacing charging cable Type 2, 8m, 3 phase, to 32A (22kW)	Art. 203100305-ICU
Additional RFID card	Art. 203120010-ICU

#### Package content

Content of the package of the charging station consists of:Alfen Eve Mini™, installation manual, wall mounting block and assembly accessories, RFID charge cards (depending on the selected options)



#### Mounting post (optional)



#### 3.1 Installing and connecting

Carefully read these instructions prior to installing the charging station. Alfen ICU B.V. is not liable for any consequential damage caused by usage of this manual.

#### REMARK

The installation must be carried out by a qualified professional who has read this manual and works in compliance with IEC 60364 standards. Neglecting this may lead to severe injuries or hazardous situations while working with electricity.

#### REMARK

This work may not be carried out during rain or if air humidity exceeds 95%.

#### REMARK

A charging station must always be installed on a dedicated power circuit.



Hazard of fatal injury if installed incorrectly! Non-compliance with the installation and environment requirements may lead to hazardous situations while working with electricity.

# DANGER!

The charging station contains electric components that may still contain electrical charge after being disconnected. Wait at least 10 seconds after disconnection before commencing work.

# DANGER!

The electric system must be entirely disconnected from every power source prior to performing installation or maintenance work!

#### **3.2 Mounting and installation requirements** Refer to the tabel, sections 2.4.2 and 2.4.4 to review the safety features and the required cable thicknesses to ensure a proper connection.

Ensure that the following requirements for installing the Eve Mini have been met:

- The cable trajectory from the main distributor up to the Eve Mini must be secured against short-circuiting and overcurrent with:
  - a B or C type circuit breaker, (or different in compliance with local standards and regulations).
     - gG type fuses (or different, pursuant to local standards and regulations).
- The cable trajectory must be equipped with a 30 mA fault current protection with a type A or B residual current device (type A recommended). The residual current device must be protected against the maximum currents the charging station can process (20A or 40A).
- The cable trajectory and charging station are part of a TN-S system; the equipment must be earthed at the main distributor, or with an earth pin (TT). An energy grid without a neutral conductor is not supported.
- The cable trajectory must be installed pursuant to the usual professional locally applicable standards.

#### REMARK

The conditions at the specific location may influence the installation requirements.

#### REMARK

The system and cables must be installed based on the maximum charging speed at the entry or entries of the charging station. This must assume a continuous load (no diversity). The cable diameters mentioned in this manual are indicative. The technician remains responsible for determining the correct cable diameter and compliance with applicable standards and regulations.

While selecting a location to install the Eve, the following criteria must be taken into account:

- Never install in a potentially explosive atmosphere.
- Never install in areas prone to flooding without implementing compensating measures.
- Always fully comply with local technical requirementsand safety regulations.
- An on-site connection is created that complies with the specifications mentioned in paragraphs 2.4.2 and 2.4.4.
- The installation site must have a levelled and solid underground.

- Maximum atmospheric humidity of 95%.
- Ambient temperature of -25 °C to 40 °C.
- Temperature difference within 24 hours max. < 35 °C.</li>
- The recommended installation height is 80 to 120 cm from the ground to the bottom side of the casing.
- Ensure that the charging station is located in a way that makes the socket easy to reach for the charging cable.
- Ensure that the charging station is placed at a location where users can use their charging cable (approx. 5 to 8 meters) without putting tension on the cable.
- Prevent road users from being able to drive over the cable.
- Prevent pedestrians from being able to trip over cables.

#### 3.3 Mechanical installation

Use the following tools and equipment to install the Eve Mini:

- Spirit level;
- Impact drill with 8mm stone drill bit;
- Phillips screwdriver (PZ2);
- Phillips screwdriver (PH4);
- Wire stripper;
- Torx T20 wrench (included);
- 4x 5x50mm screw (included);
- 4 x M8 x 12mm screw (included);
- 4 x plug 4.5 5, 8mm (included);
- 4 x M6 washer (included).

#### Preparing detached installation (on mounting post)

- Place the bars displayed below in the corresponding orifices at the bottom of the post; ref. image 2. Together they form the ground anchor.
- 2. Dig a hole of approx. 50x50cm with a 65cm depth.
- 3. Place the post in this hole.
- Guide the earth wire through the post and the base to the charging station. Use the slit on the backside of the post for this purpose.
- 5. Refill the hole in which the pedestal is placed and level the surface.
- Once completed, cover the area with a levelled protection such as tiles.



Image 2: installation on a mounting post

#### Preparing the charging station

The front cover is firmly attached to the charging station and is secured with two screws at the top, centre and bottom section. Before installation, the white cover must be removed from the charging station. This is done as follows:

- Lay the charging station in its front. Use a soft underground to prevent it from damaging or being scratched.
- 2. Loosen the six screws with the included Torx 20 wrench, or a T20 screwdriver.
- Save these screws somewhere safe, they are require later.
- 4. Place the charging station on its back.
- 5. Now carefully detach the front cover in an upward movement.

#### Wall mounting of the charging station

#### REMARK

A free space of 50cm must always be available while installing the Eve Mini for placing and storing the front cover

To properly mount the charging station, the frame must be used as a drilling template.

#### 5. Drill the holes on the indicated points.

- 6. Push the (nylon) plugs into the four drilling holes.
- Attach the frame of the charging station to the wall with the included screws (5x50mm) and the washers.
- Put the Eve Mini on the frame. Although it is directly supported by the frame, continue to hold it to prevent it from falling and damaging.
- Screw the Eve Mini onto the subframe with the included m8 x 12mm screws. Put the yellow/green earth wire under the head of the right bottom screw before tightening it.

#### Installation on mounting post



Image 4: Pole monted installation

- Remove the frame on the backside of the casing. This is not required if the charging station is installed on the mounting post.
- Put the Eve Mini on the screw tips. Although the product is directly supported, continue to hold it to prevent it from falling and damaging.
- Attach the Eve Mini to the post with the included m8 x 12mm screws. Put the yellow/green earth wire under the head of the right bottom screw before tightening it.

# 3.4 Electrical installation

# WARNING

Carefully read and follow all safety instructions in this manual!

# DANGER!

The electric system must be completely disconnected from every power supply prior to carrying out installation and maintenance work!



Image 3: wall mounting with included frame

- 1 Remove the frame from the backside of the casing, remove the strips of tape for this purpose.
- 2. Hold the frame on the desired place.
- Use a spirit level to verify if the frame was placed levelled.
- 4. Indicate the drilling holes.

#### REMARK

Verify the distances with a tape measure. The distances between the drilling holes are: horizontal, top side 132mm / horizontal bottom side 150mm / vertical 210.5mm.

- Detach the cable gland (M32) on the bottom side, remove the gland and separate it.
- 2. Shove the ring over the power cable / charging cable.
- Slide the power cable / charging cable into the charging station and shove the gland, optionally the spacer ring and the bolt over the cable.
- Remove the insulation with a wire stripper to expose the cores of the cables sufficiently to put them into the terminal blocks.
- Attach the supply cables on the clamps in the filter block (also ref. image 6).

To install the edition with a socket, proceed to step 11.

- 6. Remove the closure cap ( (14) on page 2).
- 7. Repeat the previous steps 2 to 4 for the included charging cable.
- 8. Remove the transparent subframe by unscrewing the three Torx T20 screws.
- Slide the charging cable further in and confirm the wires to the outbound clamps of the platform. Refer to image 5 for the location in the 3-phase model, The 1-phase model only has the N and L1 connection points available.



Image 5: Connection points for the wires of the charging cable.

 Connect the Control Pilot (CP) connector with the red connection cable. This is located next to the connection terminal of the supply cables. Ref. image 6.



Image 6: Connection clamps supply side, and Contral Pilot (CP) connector for charging cable (red)

- 11. Tightly fasten the cable entry so that the supply cable and/or charging cable have no remaining slack.
- Screw the transparent subframe back on if it was detached earlier.
- **13**. Press the front cover back on to the charging station.
- 14. Screw the front cover onto the charging station with the included Torx T20 wrench.

# **4 COMMISSIONING THE CHARGING STATION**

#### 4.1 Safety instructions prior to usage

Ensure the following safety instructions are complied with prior to commissioning your charging station:

- Ensure the charging station is properly connected to the power supply as described in this manual.
- Ensure that the distribution of the electricity supply is separately protected by an appropriate circuit breaker (MCB or fuses) and an RCD.
- Ensure the charging station is installed in compliance with this manual.
- Ensure that the casing always remains closed during regular usage.
- 5. Ensure that the charging cable is not twisted and the cable, plug and casing are undamaged.

#### 4.2 Commissioning edition with charging cable

Switch on the power at the power cable. The charging station will now run a self-diagnostic. During this process, the following actions are performed:

- 1. Testing internal relays, switching is audible.
- 2. The LED illuminates 3 x red; 1 x long, 2 x short.
- 3 The Eve Mini is now ready for use. If the charging station is configured to connect with an administration system, this will happen automatically and directly.
- The charging station may be configured further if desired. Use the Service Installer software application to gain access.
- Did you have your charging station configured with a smart charge feature? Then please verify its settings with the Service Installer to optimally configure the charging station for local requirements. For more information, please refer to Appendix 2.

#### REMARK

For more information about the Service Installer, please visit our website for the latest version and an extensive user manual.

https://alfen.com/en/ev-charge-points

#### 4.3 Commissioning edition with socket

Turn on the power at the local installation. The charging station runs a self-diagnostic. During this process, the following actions are performed:

- 1. The sockets are tested individually:
  - testing locking;
  - testing internal relays, switching is audible.
- 2. The display briefly illuminates.
- The display switches on and shows the notification 'Charge point starting up'.
- 4. The start screen appears on the display, showing the logo.
- The Eve Mini is now ready for use. If the charging station is configured to connect with an administration system, this will happen automatically and directly.
- The charging station may now be configured further if so desired. Use the Service Installer software application to gain access.
- Did you have your charging station configured with a smart charging feature? Then please verify its settings with the Service Installer to optimally configure the charging station for local requirements. For more information, please refer to Appendix 2.

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# **5 CONNECTIVITY**

#### 5.1 Administration systems

Your Alfen charging station is an intelligent solution able to communicate with an online administration system. These systems enable functions such as monitoring energy consumption of individual users, remote management of the charging process and simplifying maintenance of your charging station.

If, during the purchase of your charging station, you chose for additional services with a (back-end) partner or Alfen ICU B.V. (the ICU EZ services), your charging station has been configured with factory settings for the back-end system you selected. The internet connection is established via GPRS or a UTP (Ethernet) cable connection. If you chose for a GPRS (SIM card) connection,your charging station is already equipped with it and will automatically connect once your product is commissioned. If the SIM card, then please contact your back-end provider or Alfen Sales Support

#### 5.2 Establishing a connection

#### 5.2.1 Wireless connection

To establish a wireless connection, the charging station must be equipped with a GPRS-capable SIM card Additionally, correct settings must be configured in order to connect with the preferred administration system. To configure these settings, a number of options (shortcuts) are available in the Service Installer. Use these shortcuts to easily select the preferred system with the corresponding settings. Once installation is complete, always verify the signal strength using the Service Installer.

#### REMARK

A connection with an administration system can only be established if you made arrangements with the supplier to start your services. Services delivered by third parties are not part of the scope of delivery of Alfen.

If, during the order process, you opted to use ICU Connect, the charging station is already equipped with a SIM card. The Eve Mini will then automatically connect with ICU Connect during commissioning

If you opted for another administration system during your order, it might be required to install the SIM card yourself. Image 7 shows the locations of the SIM card holder.



Image 7: Location of the SIM card holder.

# 

The SIM card holder must be approached very carefully. To properly access the SIM card holder, the transparent synthetic clamp must be disconnected (3x Torx T20 screw). Approach the SIM card holder from the left to place a card, this provides you with more space. Ensure that no cables are trapped while putting the clamp back in place.

# 5.2.2 UTP (Ethernet) connection What cable type is required?

A CAT5 UTP cable (max. 20 metres) is the minimum requirement to be able to connect to the internet. This cable can process speeds up to 100 Mbps.

#### Installation

- 1. Connect the UTP cable with your router.
- Ensure that the charging station is switched off (deenergised) in the local installation.
- Put the UTP cable through one of the grommets on the backside of the casing. Connect the connector to the cable and put it in the Ethernet port on the lefttop of the casing. ((5) on page 3).
- Connect the charging station as described in paragraph 3.4 and turn on the power on the local installation.
- To enable communication between your charging station and ICU EZ over a UTP Ethernet connection, it may be required to adjust your network settings if security settings are configured. The information required to access ICU EZ over your network is displayed below::
  - IP address ICU EZ: 93.191.128.6
  - Port: 9090
  - FTP port: 21
  - Inbound / Outbound)

# **5 CONNECTIVITY**

It might also be required to fill in a MAC address. You can find this address on the inspection certificate of the charging station. Please contact Alfen to receive a copy of this certificate.

#### REMARK

Make sure that your network configurations enable secured FTP connections to the Alfen servers. This makes it possible to exchange software updates and run diagnostics.

#### 5.3 Registering your ICU EZ account

If you wish to subscribe to the ICU EZ back-end services, then register at:

http://alfen.com/en/registration-form-connect.

#### REMARK

You can register for ICU EZ once you received your charging station. During the registration process, the information of your first charging station is required. We use this information to identify you. Once your account is created, Alfen will send you your login information.

Did you forget to register while ordering ICU EZ? No problem: If you chose to have your charging station preconfigured for ICU EZ, it is already registered and active in the administration system. All transactions and other past events are stored and are available for your inspection.

- 1. Complete the registration form on the Alfen website.
- Please fill in the numbers on the back of the charge cards delivered to you in the 'Remarks' field.
- 3. C;ick on 'submit'..
- Alfen will process your application and activate your account. You will receive your login information at the earliest opportunity.
- Use your login information to login at <u>http://alfen.com/en/login.</u>
- 6. Once you are logged into ICU EZ, you can directly monitor your charging station and its status.

#### 5.4 Registering the charging station within your own administration system

If you use your own administration system, or if this service is delivered by a third party, ensure that the charging station type is registered correctly. Every Eve Mini model has its own so called ChargePoint Model that is automatically sent along during the registration process pursuant to OCPP specifications. The table following provides an overview of the various article number and OCPP code combinations:

Art. no.	OCPP chargePointModel
90446000x	ICU Eve Mini
90446001x	ICU Eve Mini
90446002x	ICU Eve Mini
90446003x	ICU Eve Mini

# **APPENDIX 1: ERROR CODES AND PROBLEM SOLVING**

This appendix provides an overview of the error codes that can be generated by the Eve Mini charging station and an initial instruction towards solving the problem. If you are not able to find a working solution, please contact the seller of the charging station, or contact Alfen Support using the contact information displayed on the back of this manual.

Code	Description	Solution	
001	General error. Contact the service department.	Contact the service department.	
002	Unknown error. Contact the service department.	Contact the service department.	
003	The charging process was started and stopped too often in a short time. The charging session was terminated to protect the vehicle and the charging station. To resume charging, terminate your current session and start a new session.	Terminate your session and disconnect the plug. You can now start a new session.	
004	A charging error has occurred. Contact the service department to request a detailed error notification.	Contact the service department to request a detailed error notification	
005	The vehicle was charging more rapidly than permitted by the charging station. The charging station therefore (temporarily) shut itself down.	The charging process will restart up to three times. If the error continues to return, contact the service department for further analysis. The vehicle might be responding incorrectly.	
006	The charging process was started and stopped too often in a short time. To charging session was terminated to protect the vehicle and the charging station. To continue charging, terminate your current session and then start a new session.	Terminate your session and disconnect the plug. You can now start a new session.	
007	Charging error, vehicle will not shut down.	Contact the service department, the vehicle might not be responding correctly.	
101	Residual current device deactivated.	Contact your installation engineer to reactivate the internal residual current device.	
102	Problem occurred while (de)activating the charging station.	Contact your installation engineer, or the service department	
103	An undervoltage was detected.	Have your installation inspected by your installation engineer.	
104	Problem occurred with internal power supply.	Contact the service department.	
201	Received incorrect signals from the vehicle. Cannot start charging.	Contact the service department for an extensive analysis.	
202	Internal kWh meter communicates no or incorrect information. Contact the service department.	Contact the service department.	
203	The charging process will continue at a slower pace to manage the internal temperature. Charging might be temporarily paused if necessary.	This might occur if the ambient temperature is high. Should this happen more often, then contact the service department.	
204	The charging station is not available for usage.	Contact the administrator of your charging station.	
	A plug is connected without an active transaction taking place. After a specific timeframe (configurable by your administrator) you are requested to remove the cable. If you do want to charge your vehicle, reconnect your plug and register on the charging station.	Remove the plug and restart the process by plugging back in and authorising a new charging session.	
	Charge card is not recognised.	Use a functioning and valid charge card.	
	Connected cable is not supported.	Use an IEC 62196 compliant cable equipped with a type 2 plug (VDE-AR-E 2623-2-2).	

### APPENDIX 2: DEFAULT CONFIGURATION OF OPTIONAL FACTORY SETTINGS

The Eve Mini charging station has the following smart charging options:

 Active load balancing: offers the same feature for managing the charging speed as standard load balancing for double charging stations.

Managing the maximum charging output is now however carried out dynamically. Your charging station communicates with the smart meter in your installation or home and takes the actual consumption and maximum capacity of your grid connection into account.

 Smart Charging Network: With this feature, the Alfen charging stations recognise one another within a local network, a so called charging hub.

If this option is enabled, the configurations of the grid connection are divided over the charging stations. The stations then jointly decide how much of the total capacity is awarded to each socket or charging cable to which a vehicle is connected. To simplify the order process for smart charging functionalities, various parameters are delivered with default settings. This appendix indicates the values for these settings. If your installation deviated from the standard shown, use the Service Installer to optimally configure the charging station.

#### Actief Load Balancing

Required for the installation:

- Alfen charging station with an activated load balancing feature.
- Communication cable with RJ11/RJ12 plugs (with 4 wires, maximum 20 m length).
- Smart meter with available P1 port.
   Communication over DSMR4.0 or higher.

The charging station and the smart meter communicate with each other over the P1 port using the DSMR protocol (version 4.0 or higher). Data about the actual consumption and charging needs is regularly exchanged. Whenever smart meter capacity is limited, the charging station will apply load balancing to manage the connected vehicles. This prevents the charging station from overloading, or prevents additional grid costs from being incurred. In effect, this features provides for 'peak shaving', managing the power supply during peak moments.

If the Pl port of the smart meter is already being used by another device, a splitter can be used



Not all splitters are compatible. Using splitters with two cables may prevent your charging cable from being able to communicate with the smart meter.

To correctly configure active load balancing, the following parameters must be configured as follows:

- Station-maxCurrent: maximum configuration for standard load balancing. This limits the maximum current(s) on the circuit(s) of the charging station.
- Installation-MaxCurrent: This is the capacity of your grid connection. In case of doubt, this can be verified with your grid operator.

The table below show the standards settings for the mentioned parameters:

Product with max input current	Socket side	Assumed settings	Active Load Balancing on 1-phase connection	Active Load Balancing on 3-phase connection
16A	1x3.7kW 1x11kW	Station- MaxCurrent	16	16
per phase		Installation- MaxCurrent	25	25
32A	1x7.4kW 1x22kW	Station- MaxCurrent	32	32
per phase		Installation- MaxCurrent	40	35

Are these value inconsistent with yours? The technician can use the Service Installer to modify these settings.

#### Smart Charging Network

The Smart Charging Network (SCN) is the smart charging functionality that turns individually connected Alfen charging stations into a charging hub. While taking the entirety into account, the charging speed is automatically determined. To achieve this, all charging stations mutually exchange information about the actual total charging capacity of all connected users.

### APPENDIX 2: DEFAULT CONFIGURATION OF OPTIONAL FACTORY SETTINGS



Image 8: Smart Charging Network with Eve Minis

To ensure that this feature works optimally, it is important the all settings are configured correctly. Once the communication network for the charging station is connected, the charging hub automatically obtains the following settings:

- Total capacity available for the charging stations as a group.
- Maximum charging current per socket; determined by the group in the local installation and the maximum charging current of the charging station.
- Minimum charging current per socket; this configuration is a:
  - Safety setting; if a charging station loses its network connection, all other charging stations take this value into account. The charging station that was disconnected will continue to charge at this minimum charging speed while the remaining charging stations reserve this charging current and will temporarily not use it.
  - Minimum speed as preferred configuration; once an extra socket is used for charging, and insufficient capacity is available to deliver the minimum charging current the SCN alternates between pausing individual charging stations every 15 minutes.
- Alternating periods (pauses) during insufficient capacity is configured at 15 minutes by default. The administrator can change this setting if so preferred.

Prerequisites for a properly operating Smart Charging Network:

- All charging stations must be registered within the same network (subnet, IP-range). The default setting is 169.254.x.x.
- CAT5 UTP/Ethernet cable (minimum), CAT6 for cable trajectories exceeding a 100m length.
- Minimum 10Mbps network.
- UDP port: 36549, inbound-outbound.
- Use DHCP server if possible.
- Without a DHCP server, the charging stations are awarded an IP address using Auto-IP.
- All charging stations must withdraw electricity from the

same connection point; no layered energy grid.

 An (existing) switch or router with sufficient ports is available to interconnect the charging stations.
 Looping from one charging station to another is not possible.

- Tip: always ensure that one port remains available to connect a laptop with the Service Installer. Ensure that this laptop is registered in the same subnet as the charging stations.

#### REMARK

If network components such as the switch or router are placed outdoor, this aspect must be taken into account while purchasing this equipment. A proper installation box or similar solution must be available to securely host the equipment.

# Adding a charging station to the Smart Charging Network

With the help of the Service Installer, all charging stations within a Smart Charging Network are configured simultaneously. All charging stations within the same subnet are identified by the Service Installer.

Initiating a Smart Charging Network is done with the Service Installer. Select a charging station and use the 'Device' menu to go to 'Add to new SCN'. Then complete the following steps:

- Name your SCN (your charging hub).
- Select a different charging station and click '+'. The charging station is then added to the applicable SCN. The charging station is automatically configured with the network settings.
- Repeat step 2 until all charging stations are registered in the SCN.

It might occur that a charging station cannot be added to

### APPENDIX 2: DEFAULT CONFIGURATION OF OPTIONAL FACTORY SETTINGS

an SCN. If this occurs, verify the following:

- The firmware of the charging station: The Eve Mini supports the SCN from version 3.2 and up. If an Alfen Eve is selected, it must be equipped with firmware 3.3 or up.
- Was this feature purchased? If not, the charging station will not register on a network.

# 

After being configured for a Smart Charging Network, the newly registered charging stations must reboot. Once rebooted, they will automatically register on the shared SCN.

# Combining a Smart Charging Network (SCN) with communication over OCPP

The functionalities of the SCN are available over the UTP/ Ethernet connection of the charging stations. It is also possible to route the communication over OCPP using the same connection, or a GPRS connection. If using the latter, each charging station requires a SIM card. To limit the costs, you can also use a router combined with a 2G/3G/4G modem, in which case the charging stations must be configured for communication with a wired network. The router is then configured for the (secured) APN of the applicable backend partner.

#### How to configure

Network selection	Per charging station	OCPP setting
Smart Charging Network with OCPP GPRS	SCN ON	OCPP management system selection for GPRS
Smart Charging Network with OCPP UTP	SCN ON	OCPP management system selection for UTP
Smart Charging Network with OCPP using an external GPRS router	SCN ON	OCPP management system selection for UTP
Electric facility (local installation)	Ref. paragraphs 2.4.2 and 2.4.4, always configure for maximum output per charging station	
Settings	Factory settings configured per charging station (max. output)	

#### REMARK

Want to learn more about the Smart Charging Network? Visit our website to download the smart charging manual, or the Service Installer manual, at: <a href="https://alfen.com/en/ev-charge-points">https://alfen.com/en/ev-charge-points</a>

# Contact

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