

# ICU Eve™

MANUAL / HANDBOEK / ANLEITUNG /  
MANUEL / MANUALE



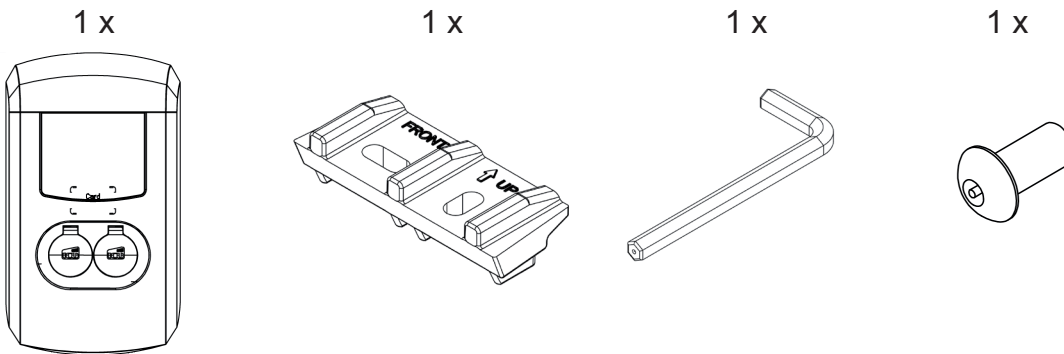
CHARGING EQUIPMENT



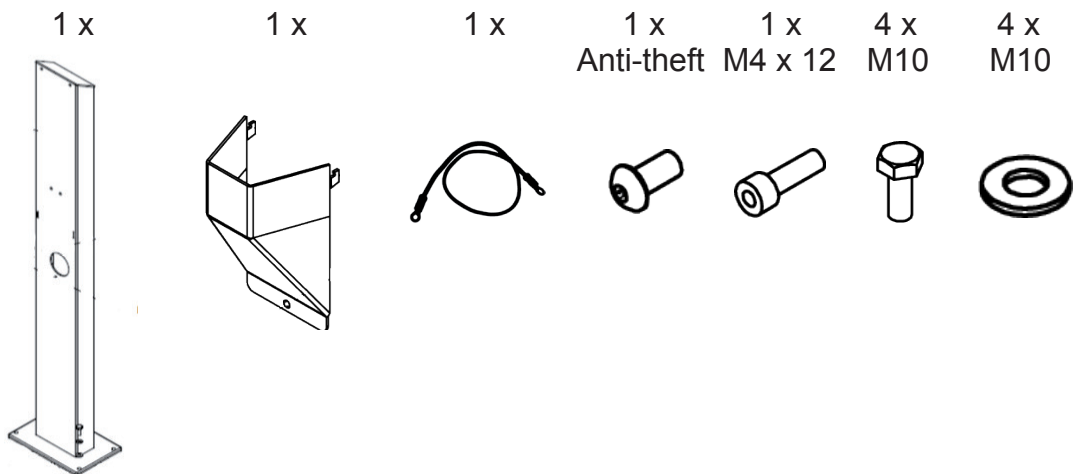
SOLID SMARTWARE

# Package Contents / Inhoud Verpakking / Inhalt Verpackung / Contenu de l'emballage / Contenuto della confezione

## ICU Eve



## Pole / Paal / Säule / Pôles / Polo



## Types / Varianten / Varianten / Variantes / Varianti



Plug & Charge

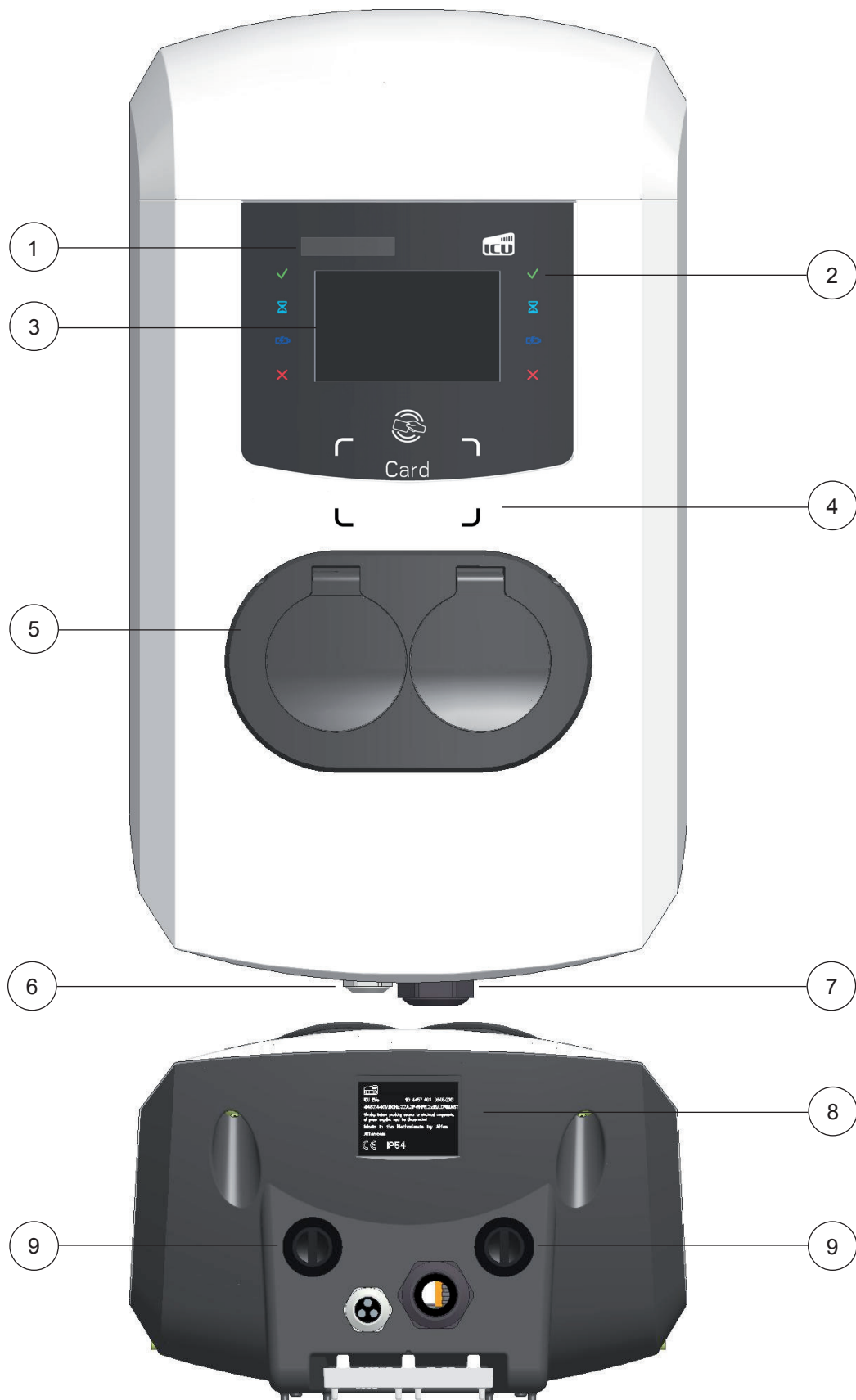


RFID



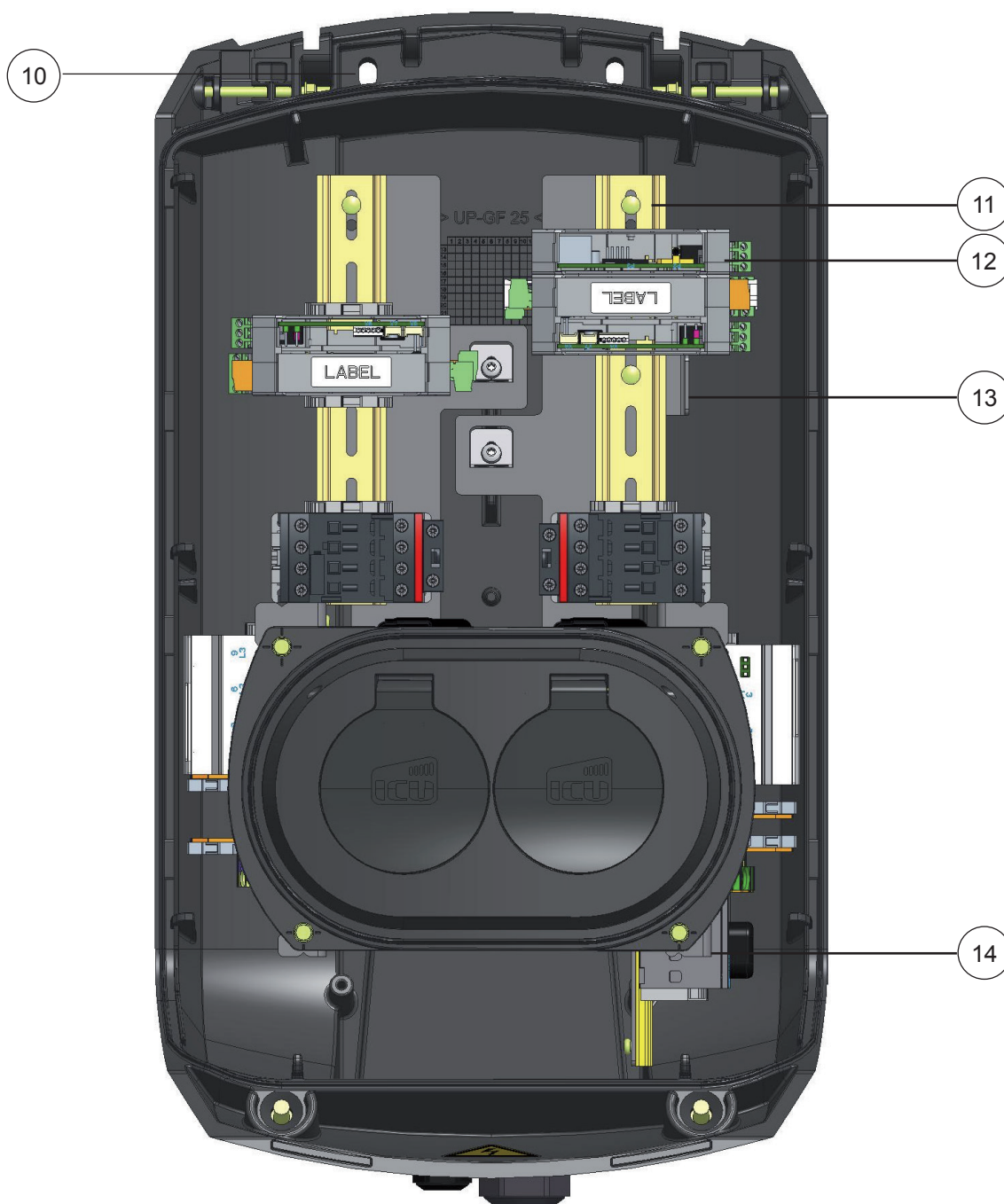
RFID / Display

# Outside / Buiten / Außen / Extérieur / Esterno

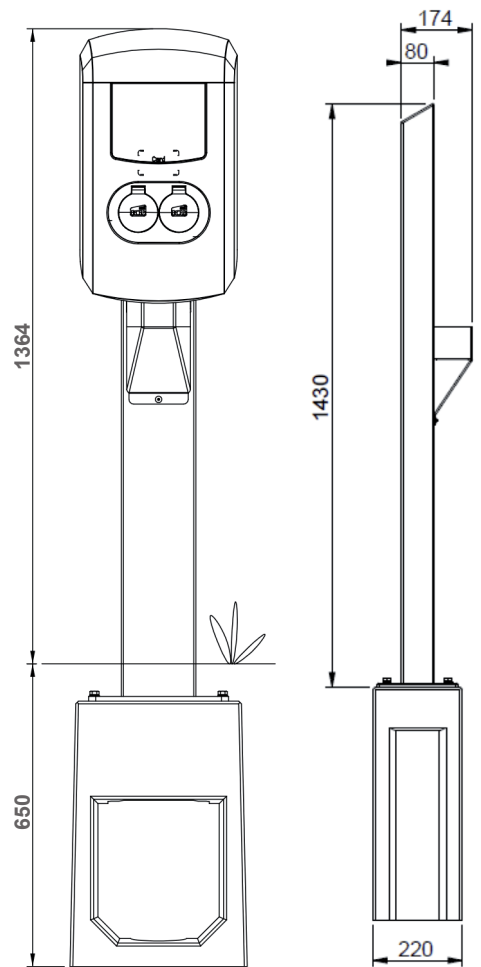
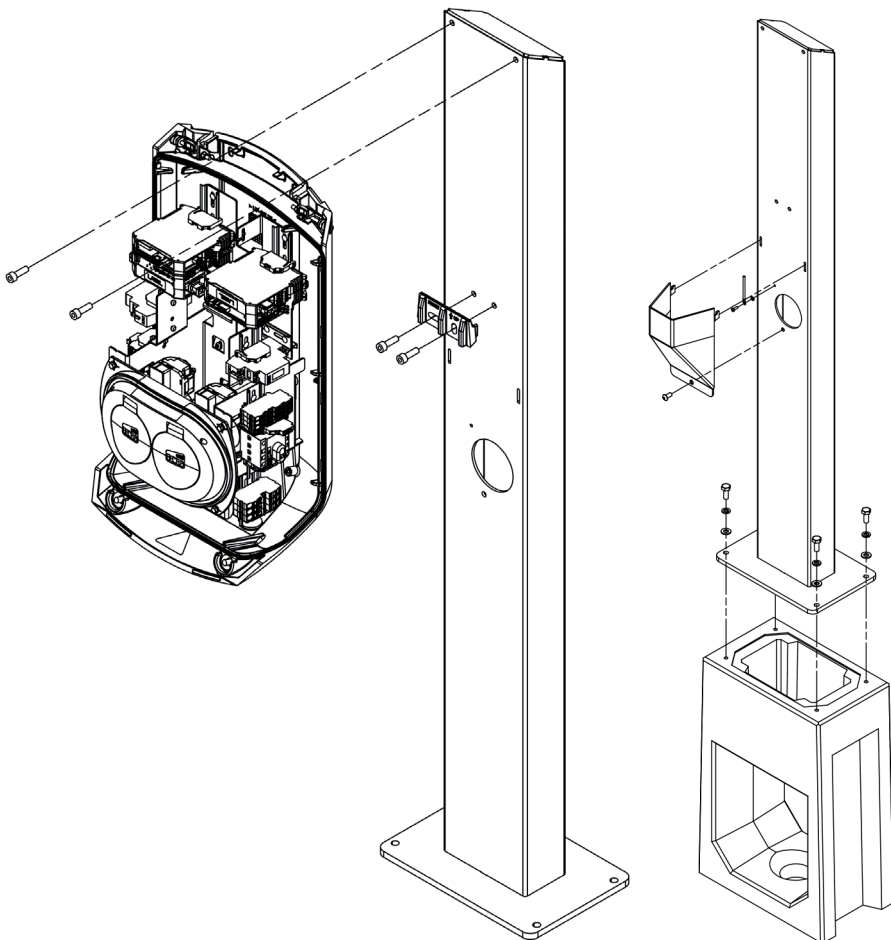
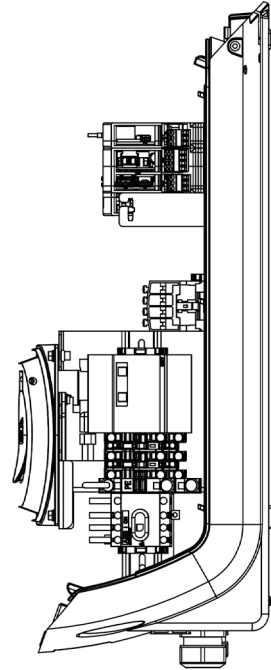
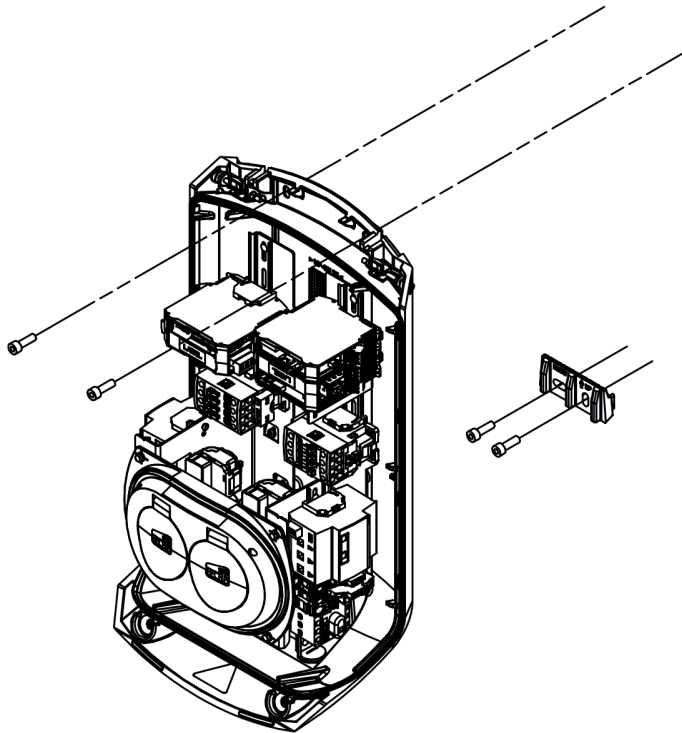


H x W x D: 590 x 338 x 230 mm

# Inside / Binnenzijde / Innen / Intérieur / Interno

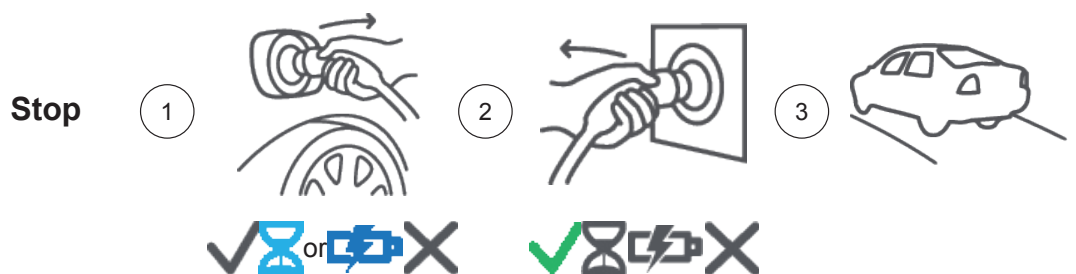
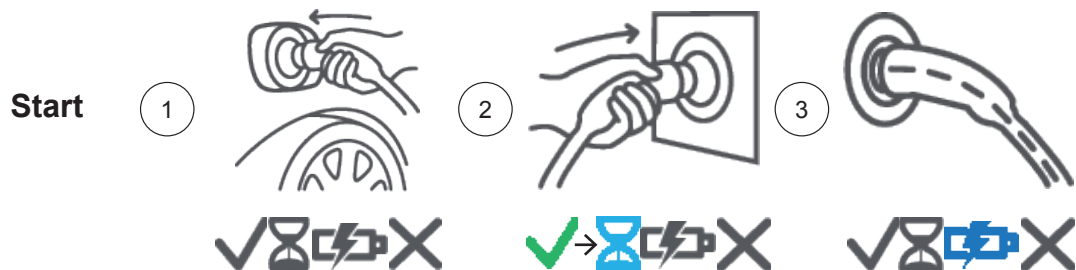


# Installation / Installatie / Installation / Installation / Installazione



# Operating / Operating / Betrieb / Opération / Operazione

## Plug & Charge – Authorisation without charging card



## Charging station with RFID card



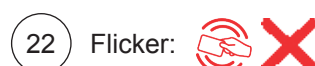
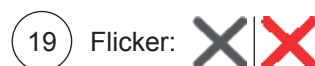
## Contact / Contact / Kontakt / Contact / Contatto

Alfen ICU B.V.  
Splijtbakweg 15  
1333 HC Almere  
The Netherlands

Postbus 1042  
1300 BA Almere

Tel: +31 36 54 93 400  
E-mail: [info@icu-charging-stations.com](mailto:info@icu-charging-stations.com)  
Website: [www.icu-charging-stations.com](http://www.icu-charging-stations.com)

## Status LED / Status LED / Status-LED / LED d'état / LED di stato



Subject to modifications and amendments.

**Alfen ICU B.V.** | Splijtbakweg 15 Almere NL | Tel: +31 36 - 549 34 00  
E-mail: [info@icu-charging-stations.com](mailto:info@icu-charging-stations.com) | [www.icu-charging-stations.com](http://www.icu-charging-stations.com)





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## Declaration of Conformity

### Name of manufacturer:

Alfen ICU B.V.  
 Splitsbakweg 15  
 1333 HC Almere  
 The Netherlands

### Declares the conformity of the product:

Charging stations of Type ICU Eve

### Following the European Directives:


Low Voltage Directive 2014/35/EU  
 EMC directive 2014/30/EU

### Applied (harmonized) standards:

NEN-EN-IEC 61851-1  
 NEN-EN-IEC 61851-22  
 NF-EN-IEC 61851-1  
 NF-EN-IEC 61851-22  
 DIN EN 61851-1  
 DIN EN 61851-22  
 BS EN 61851-1  
 BS EN 61851-22

All mentioned products are marked with the CE mark.

Almere, April 20<sup>th</sup>, 2016.



**Dipl.-Ing. M Roeleveld**

# 1. Safety and operation instructions

## 1.1 Aim of the manual and target group


The ICU Eve charging station is intended exclusively for charging of electric vehicles without the need for a separate grid connection (house connection box). Follow the instructions to ensure proper operation of the charging station.

The installation, commissioning and maintenance may only be performed by a qualified electrician (Alfen ICU certified partner).

The following requirements must be met by the qualified electrician:

- Knowledge of the general and specific safety and accident prevention regulations
- Knowledge of the relevant electrical regulations
- Ability to identify risks and avoid potential hazards
- Knowledge of the Installation and Operating Instructions

## 1.2 General safety

 **DANGER!**

The safety notes are intended to ensure proper operation in practice. An infringement or non-compliance with safety regulations and instructions in this manual and on the device can result in electric shock, fire and/or serious injury.

In the following cases the use of the product is prohibited:

- When explosive or highly flammable substances are close
- If the product is in the water
- At ambient temperatures of less than -30 °C or over 40 °C
- When the product or individual components are damaged
- For children or persons who can not assess the risk in handling the product

In the following cases Alfen ICU B.V. accepts no liability for damages. The warranty on products and accessories expires in the following cases:

- Failure to follow these Installation and Operation Instructions
- Improper use
- Improper handling
- Use of non-qualified personnel
- Additions or modifications to the product
- Use of replacement parts that are not manufactured or approved by Alfen ICU

Additional safety information is available in the relevant sections in this document.

## 2. Product

### 2.1 The charging station

In the cover of this manual you will find the corresponding pictures of the charging station. You will also find more information about the package contents and charging.

#### The charging station (outside)

- ① Identification Number
- ② LED Identifications
- ③ Color Display / Static Display
- ④ RFID-card reader
- ⑤ Type 2-charging socket
- ⑥ Cable screw connection for UTP cable
- ⑦ Cable screw connection for power cable
- ⑧ Identification label
- ⑨ Cable screw connection for tethered charging cable (car)

**The charging station (inside)**

- ⑩ Screws wall mouting
- ⑪ SIM Card Slot
- ⑫ UTP (Ethernet) Connection
- ⑬ Connection LEDs and display
- ⑭ Isolator switch

**Identification Label**

The identification label (⑧) specifies, for example, the model, production date and serial number. It can be found on the bottom side of the charging station.

Always make reference to the serial number when contacting to Alfen ICU so that you receive the fastest support.

**2.2 LED-status display**

The ICU Eve comes with separate LEDs on each side which indicate the status of each socket. Please find below an overview of the different states:

Status LED	Meaning
⑮	<ul style="list-style-type: none"> <li>• Available</li> </ul>
⑯	<ul style="list-style-type: none"> <li>• Cable is connected in the charging station and waiting</li> <li>• Identification with RFID is done and now waiting for cable to be connected</li> </ul>
⑰	<ul style="list-style-type: none"> <li>• The charging station and vehicle are communicating</li> <li>• Electric vehicle is full or charging is on hold</li> </ul>
⑱	<ul style="list-style-type: none"> <li>• Vehicle is charging</li> </ul>
⑲	<ul style="list-style-type: none"> <li>• External error</li> <li>• The cable has been left too long in the charging station without starting a charging process</li> </ul>
⑳	<ul style="list-style-type: none"> <li>• The charging station has an internal error</li> </ul>
㉑	<ul style="list-style-type: none"> <li>• The card reader is active</li> </ul>
㉒	<ul style="list-style-type: none"> <li>• The used card is not authorized</li> </ul>

## 2.3 Technical specifications

Input/power supply	
Power supply	5 x 4 - 16 mm <sup>2</sup>
Rated voltage	400 V
Mains connection	25 A 1-phase 230 V 50 Hz (2 x 3.7 kW version); 40 A 1-phase 400 V 50 Hz (2 x 7.4 kW version, UK only); 40 A 3-phase 400 V 50 Hz (2 x 11 kW version); 64 A 3-phase 400 V 50 Hz (2 x 22 kW version)
Rated frequency	50 Hz
Back-up fuse	20 A - 80 A (required on site)
Connecting terminals	M32 terminal block, for cable sizes from 17mm to 25.5 mm, Cable-clamps max. 16 mm <sup>2</sup> (main switch)
Grounding	TN-system: PE-wire
Main switch	4-poled, 80 A, 400 V or 4-poled, 40 A, 400 V
Output/vehicle connection	
Connection system	1 or 2 x type 2 connector (type 2 S, France only) in accordance with IEC62196-2
Output Voltage	230 V or 400 V
Max. charging current	16 A, 1-phase or 16 A, 3-phase or 32 A, 3-phase
Max. output	3.7 kW or 7.4 kW or 11 kW or 22 kW
Shut down (Standby)	all contacts
Dynamic load balancing	yes (optional)
Protection/integrated components	
RCCB	integrated RCCB Type B (optional)
Energy meter	1 x kWh-meter per charging socket, integrated, MID certified, Modbus
Installation contactor	2-pole (charging procedure activation) at 230 V; 4-pole (charging procedure activation) at 400 V
Standards/Directives	
IEC 61851-1 (2010), IEC 61851-22 (2010), Renault Z.E. Ready Guidelines	

<b>Charge control/status indicators</b>	
Charge controller	1 or 2 x IB503 and 1 x communication module
Communication with vehicle	Mode 3, Renault Z.E. Ready
Operating status indicator	4 x RBG LED on each site
Display	TFT colour display with 800 x 480 pixel resolution (optional), customizable (on request)
Card reader	RFID (NFC) Mifare 13.56 Mhz, DESFire, integrated (optional)
Internet / Network ability	GPRS (900/1800Mhz), SIM lock free or TCP/IP (at least CAT5 Ethernet)
Communication protocol	OCPP 1.5 (JSON)
Backend-connection	ICU Connect (optional) or other backend (on request)
Communication with Smart Meter	P1 Port
<b>Operating conditions</b>	
Operating temperature	-30°C to 40°C
Relative humidity	5% to 95%
Class of protection	I
Degree of protection (housing)	IP54
IK Protection	IK10
Stand-By consumption	C. 20 W
<b>Housing</b>	
Type	Wall-mounted housing
Fixing type	Plug and screw mounting or screwed to a pole (optional)
Material (cover)	Fiberglass reinforced Duroplast (Sheet Moulding Compound - SMC)
Colour (cover)	RAL 9016 (Traffic white), individually paintable in RAL-colours (optional)
Material (housing)	Fiberglass reinforced (Sheet Moulding Compound - SMC)
Colour (housing)	RAL 7043 (grey)
Locking	Cover fixed with anti-theft screws
Weight	C. 15 kg (1-phase), C. 25 kg (3-phase)

### 3. Mounting and connecting

#### 3.1 Installation and connection

Read these instructions before installing the charging station carefully. Alfen ICU B.V. are not liable for any consequential damages that occur due to the use of this manual.

**NOTICE**

The installation must be performed by qualified personnel that have read this manual and operate in accordance with the guidelines IEC 60364. Otherwise it may result in injury or dangerous situations when dealing with electricity.

**NOTICE**

Work may not be performed when it is raining or the air humidity is higher than 95%.

**NOTICE**

A charging station should always be installed on a dedicated circuit.

**! DANGER!**

**Danger to life through improper installation!** Non-observance of the following installation and environmental requirements can lead to dangerous situations when dealing with electricity.

**! DANGER!**

The electrical system must be dead (disconnected from the power supply) during all installation and maintenance work.

#### 3.2 Requirements for assembly and installation

**NOTICE**

Cables should be laid based on maximum charging rate of the charging station under continuous load (no diversity). The cable diameters in this manual are indicative. The technician is responsible for determining the correct cable diameter and compliance with applicable standards.

Make sure that the following requirements for the installation of the ICU Eve are fulfilled:

- The cable route from the main distribution to the ICU Eve must be secured with a miniature circuit breaker (MCB) with characteristic B or a screw or blade fuse gG against overvoltage and short circuit
- The cable route must be secured against accidental contact 30 mA by a type A or B-residual-current circuit breaker
- The cable route and the charging station are part of a TN-S system; the device is grounded via the main distributor

The table below shows the safety options and the necessary cable diameters:

Type	Protection Option 1	Protection Option 2	Min. core cross section
1 x type 2 charging socket, 3-phase, 16 A	3 x 20 A gG fuses + 20 A - 30 mA residual-current circuit breaker	20 B - 30 mA 4p residual-current fuse	5 x 4 mm <sup>2</sup>
1 x type 2 charging socket, 3-phase, 32 A	3 x 35 A gG3 fuses + 40 A - 30 mA residual-current circuit breaker	40 B - 30 mA 4p residual-current fuse	5 x 6 mm <sup>2</sup>
2 x type 2 charging socket, 1-phase, 16 A	1 x 35 A gG fuses + 40 A - 30 mA residual-current circuit breaker	40 B - 30 mA 2p residual-current fuse	3 x 6 mm <sup>2</sup>
2 x type 2 charging socket, 3-phase, 16 A	3 x 35 A gG fuses + 40 A - 30 mA residual-current circuit breaker	40 B - 30 mA 4p residual-current fuse	5 x 6 mm <sup>2</sup>
2 x type 2 charging socket, 3-phase, 32 A	3 x 80 A gG fuses + 80 A - 30 mA residual-current circuit breaker	3 x 80 B system fuse + 80 A - 30 mA residual-current circuit breaker	5 x 16 mm <sup>2</sup>

- The cable route must be laid in accordance with applicable standards
- The cable tray is made of copper cable with a maximum conductor temperature of at least 90 °C

**NOTICE**

Installation requirements may be dependent on the location.

When selecting the installation site the following conditions must be assessed:

- Installation not in potentially explosive atmospheres
- Installation not in flood-prone areas
- Compliance with local technical connection requirements and safety rules
- The mounting surface should have a flat and sufficiently firm ground
- Humidity maximum 95% (non-condensing)
- Ambient temperature of -30 °C to 40 °C
- Average temperature within 24 hours < 35 °C
- As a installation height: a distance of 50 to 150 cm is recommended from the ground to the lower housing edge
- The charging socket on the vehicle should be easily reachable with the tethered charging cable or the charging cable intended for use. The charging cable must not be under tension when it is connected to the vehicle
- It should not be possible to drive over the cable

**3.3 Mechanical installation**

The following tools and materials to install the ICU Eve:

- Spirit level
- Impact Drill
- Screwdriver for an M5 cross recess hole
- Screwdriver for a terminal block
- Pencil and provided drilling template
- Torx M5 (T25)
- Wire Stripper
- Allen key
- 4 x M5 x 30mm screws
- 4 x M5 x 30mm plugs
- 4 x M5 rings

**Wall mounting: Drilling using the drilling template****NOTICE**

**Please check the indicated dimensions with a tape measure.**

The distance between holes is 123.8 mm (top), 39.6 mm (bottom) and 434.3 mm (vertical).

1. Cut the drilling template from the cardboard packaging
2. Place the template on the desired location
3. Check with a spirit level whether the template is applied straight
4. Draw the drill holes using the template
5. Drill holes at the marked points
6. Check the drilled holes

**Pole Mounting: Mounting the pole with the concrete base (optional):**

1. Dig a hole about 50 x 50 cm with a depth of 65 cm
2. Now place the concrete base
3. Mount the pole on the concrete base using four threaded bolts M10x25 mm and associated rings (see fig. on the cover)

4. Mount the suspension block using two threaded bolts M10x25 mm
5. Attach the charging station to the pole by using two threaded bolts M10x25 mm
6. Attach the ground wire to the pole by using M4x12 mm screws and one M4 circuit ring
7. Run the ground cable through the concrete base and the pedestal to the charging station

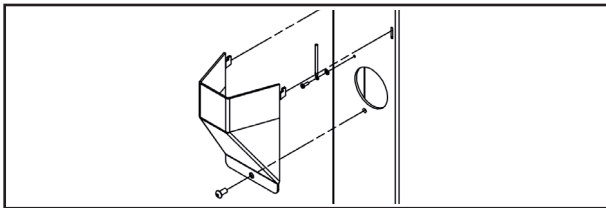


Fig. 1: Mounting cable cover

8. Attach the cover plate to the pole using the anti-theft bolt M8x16 mm (see Fig. 1)
9. Fill the hole and pave the area
10. Cover the area afterwards with a clean trim (e.g. tiles)

**Attaching the suspension block**

1. Insert appropriate wall plugs into the four holes
2. Attach the suspension block on the lower two holes with two screws on the wall

**Preparation of the charging station**

<b>NOTICE</b>
Never let the front cover hang on the wiring of the LEDs and the display.

The white front cover of the charging station must be removed before installing. Proceed as follows:

The front cover is firmly attached to the charging unit and is secured with two screws at the top and bottom.

1. Place the device on its back
2. Loosen the screws on the bottom with an Allen key

3. Loosen with a Torx M5 (T25) the two screws on the (side of the) rear housing
4. Keep the screws in a safe place; they will be required later
5. Lift the front cover from the bottom upwards
6. Loosen the wiring of the LED and optional on the display ( 13 on the left of the cover)
7. Now take off the front cover

**Mounting the charging station**

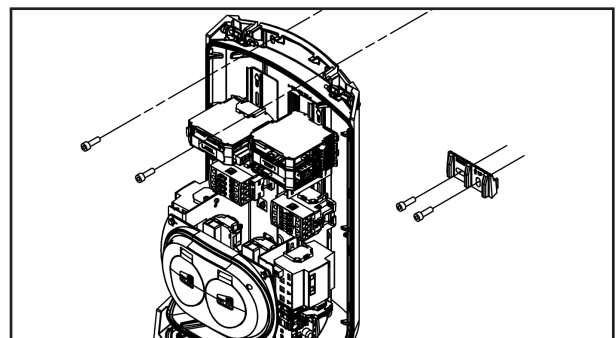


Fig. 2: Attachment to the wall

1. Place the rear cover vertically from above onto the previously mounted suspension block
2. Attach the rear spoiler at the top with two screws (diameter: at most 8 mm) at the designated location (see Fig. 2)

**3.4 Electrical installation**

<b>CAUTION!</b>
Read and follow all safety instructions in this manual!
<b>DANGER!</b>
The electrical system must be disconnected from the power supply during assembly and maintenance work!


1. Slide the power cable through the hole in the gland ( 7 on the left of the cover)
2. Pull the power cord about 150 mm wide into the housing. The power cord should be long enough that it can be drawn from the ground or



## 4. Commissioning the charging station

the wall into the housing

3. Attach the power cord into the gland by tightening them so that the power cord can't be removed
4. Remove the power cord insulation using a wire stripper so that the bare wires can be connected in the isolator switch ( 14 ) on the left of the cover)
5. Attach the wires to the right place in the residual current circuit breaker (optional)

 <b>CAUTION!</b>
Always attach proper earth conductor first!

6. Turn off the power and then press the power button
7. Connect all the leads of the LED connector on the back
8. Lower the front cover with the two screwcams into the slots on top of the rear cover
9. Tighten the two screws on top of the base unit firmly with a Torx M5 screwdriver
10. Now close the front cover by pressing and attaching the anti-theft screws M8 x 16 into the holes on the back
11. Finally remove the transparent film from the front cover

### 4.1 Safety instructions before operating

Follow the below safety instructions before putting your charger into operation:

1. Make sure that the charging station is securely connected to the house supply line as specified in this manual
2. Make sure that the supply line in the house distribution is separately protected by an appropriate circuit breaker (B-characteristic)
3. Make sure that the built-in charger or external upstream RCD is switched on
4. Make sure that the charging station has been installed in accordance with this guidance
5. Make sure that the housing is always locked in normal operation
6. Make sure that the charging cable is not twisted and make sure that cable, charging plug and housing are free of damage

### 4.2 Putting into operation

1. Turn on the power at the power supply cable

The charger now performs a self test. The following actions are performed by the charging station:

1. The door lock is activated
2. The red LED lights up for one second continuously
3. All LEDs light up for one second continuously
4. The red LED flashes five times, so that the electronics are started
5. All LEDs go out
6. The ICU Eve is now ready for charging

## 5. Connectivity

### 5.1 Back End Systems

You are in possession of an intelligent ICU charging station that can communicate with a back end system through an internet connection. Back end systems allow you for example to view the energy consumption of individual users, remotely control charging or monitor the charging station for service purposes.

If you signed a contract with a back end supplier or with Alfen ICU B.V. (for provision of ICU EZ back end services), your charging station is configured to connect to the respective back end ex-factory. The internet connection may be facilitated via GPRS (SIM card) or via UTP (Ethernet) cable connection. In case you opted for a GPRS (SIM card) connection, your charging station is already equipped with the correct SIM card. The charging station will establish a connection to the internet as soon as it is turned on. In case there is no SIM card in the SIM Card Slot (11) on the left of the cover), please contact your back end provider or Alfen ICU.

The following paragraphs describe how to connect your charging station via UTP (Ethernet) cable to the internet.

### 5.2 UTP (Ethernet) connection

#### Which cable is required?

A UTP cable of minimally CAT5 is needed to connect the charging station to the Internet. This cable is suitable for speeds up to 100Mbps.

#### Installation

1. Connect the UTP cable to your router
2. Turn off the power of the charging station by putting the main switch to the 0 position
3. Connect the UTP cable to the Communication Unit of the charging station (12) on the left of the cover)
4. Turn on the power of the charging station by putting the main switch to the 1 position

5. In order for your charging station to communicate with ICU EZ through a wired UTP ethernet connection, your network setting should be adjusted if these are additionally secured. Below you will find the necessary information to allow access through your network:

- IP address ICU EZ: 93.191.128.6
- Port: 9090
- Inbound – Outbound

It may be possible that a MAC address is required. This is stated on the FAT report of the charging station. This report can be provided by Alfen ICU.

#### NOTICE

Please also make sure that your network settings allow the charging station to run diagnostics and updates via a secure FTP connection to ICU servers.

### 5.3 Registering your ICU EZ account

If you would like to sign a contract with ICU for provision of ICU EZ back end services, go to [www.icu-charging-stations.com/ez-english](http://www.icu-charging-stations.com/ez-english)

#### NOTICE

Please always activate your ICU EZ account first. Only connect the charger via UTP cable to the Internet after ICU confirmed that your account has been activated.

1. Fill out the digital form. Please add the imprinted card numbers of all of your ICU charging cards supplied with your ICU charging station in the "Comment" field
2. Click on "Send"
3. ICU will process the form and activate your account. Your login details will be sent to you as soon as possible
4. You can login to the website [www.icu-ez.com](http://www.icu-ez.com) with your received account information
5. After logging on to ICU EZ you can see if your charging station is online. This will be shown with the status "Available". If your charging station is not yet connected, it will show the status "Planned"

