**POWERCHOICE 350**

# User Manual

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# Glossary

**AC**
Alternating Current.

**CCS**
Combined Charging System, also referred to as “Combo”. DC fast charging method for electric vehicles.

DC fast charging method for electric vehicles.

**DC**
Direct Current.

**EV**
Electric Vehicle.

**HMI**
Human Machine Interface: the screen on the charger.

**Owner**
The legal owner of the charger.

**OCPP**
Open Charge Point Protocol. Open standard for communication with charge stations.

**PE**
Protective Earth: ground connection for safety and functional purposes.

**RCBO**
Residual-current Circuit Breaker with Overload protection. Breaks the connection if a residual current or overload is detected.

**RCD**
Residual Current Device. Breaks the connection if a residual current is detected.

**RFID**
Radio-Frequency Identification is a communication technology utilizing radio frequency electromagnetic waves to transfer data over a very short distance between the reader and an electronic tag or card.

**Site operator**
Person or company that controls the charge station. The site operator could be the owner, but not neces-sarily.

**User**
The driver of an EV who uses the charge station.

# 1. Introduction

## 1.1 Preface

This manual describes the general usage and daily operation instructions of the PowerChoice 350 charging station. PowerChoice 350 is a modular high power DC charging system with high output current capability, supporting both 400 VDC and 800 VDC vehicles. A single power cabinet system can deliver up to 375 A and 160 kW continuously, and 175 kW peak. With two power cabinets the system delivers up to 500 A and 350 kW.

## 1.2 Intended use of this document

This document serves:

- As a reference for site operators who are responsible for the charger's operation on site, performing daily inspection and maintenance activities and who are able to perform simple trouble shooting activities, after instruction of a certified DAF technician.
- As a reference to the operator's customers, the EV drivers who will mainly use the pictograms and texts on the display of the charger. The user interface design was thoroughly evaluated with user groups to optimize understandability and to get the best user experience. Besides the screens needed for the charging process, the interface has help screens available to provide additional information.

## 1.3 Intended use of the charger

A PowerChoice 350 system consists of at least one power cabinet and one charge post. The outlets of the charge post are solely used to charge electric vehicles that are compatible with the supported charging standards.

## 1.4 Owner responsibilities

The owner and site operator are required:

- To prepare the site where the charge station will be installed, according to the requirements described in this guide.
- To make sure that there is enough space around the charger to carry out maintenance work.
- To make sure all protective devices are correctly installed after carrying out installation or maintenance.
- To operate the charge station with the protective devices installed.
- To write an emergency plan that instructs people what to do in case of emergency.
- To appoint a person responsible for the safe operation of the charge station and for the coordination of all work. This person should be properly instructed by ABB or an ABB trained service partner.

The owner is cautioned that changes or modifications not expressly approved by ABB could void the owner's authority to operate the equipment or ABB's warranty. Neither ABB nor its affiliates shall be liable to the purchaser of this product or third parties for damages, losses, costs or expenses incurred by purchaser or third parties as a result of: an accident, misuse or abuse of this product, or unauthorized modifications, repairs or alterations to this product, or failure to strictly comply with ABB operating and maintenance instructions.

## 1.5 Signs

The following signs are used on the equipment and in this manual:

**DANGER**

**Hazardous voltage**

Identifies a hazard that could result in severe injury or death through electrocution.

**WARNING**

**Various**

Identifies a hazard that could result in severe injury or death, as well as damage to the machine, other equipment, and/or environmental pollution.

**WARNING**

**Pinch Hazard**

Identifies a hazard that could result in injuries, in which some body parts are pinched or crushed.

**NOTICE**

Contains remarks, suggestions or advice.

## 1.6 Safety regulations

**WARNING**

If a charge outlet is damaged, take the following steps:

1. Do not use the damaged charge outlet.
2. Contact the owner / site operator.

**WARNING**

Operation after damage or accidents

- If there is a fire in or nearby the charger;
- If the charger was immersed in water, or any other fluid;
- If the charger is damaged in any way.

Do not use the charger. Contact the owner / site operator.

**CAUTION**

**Connector locked**

Do not apply force to a locked charging cable during charging. This might damage the inlet and locking mechanism in the car or damage the charger.

**NOTICE**

When connecting or disconnecting a connector

1. Handle cables and connectors with care. Do not drop the cables or connectors. Place them back in their re-spective holders.

Only insert a connector into a suitable car inlet. Never use excessive force.

**CAUTION**

No User serviceable parts inside

Do not allow any user to repair or manage the electronics inside.

# 2. Description of the product

## 2.1 Charge post overview

A. Antenna.
B. Touchscreen display.
C. RFID card reader with (optional) payment terminal.
D. CCS2 Connector.
E. Ventilation grill.

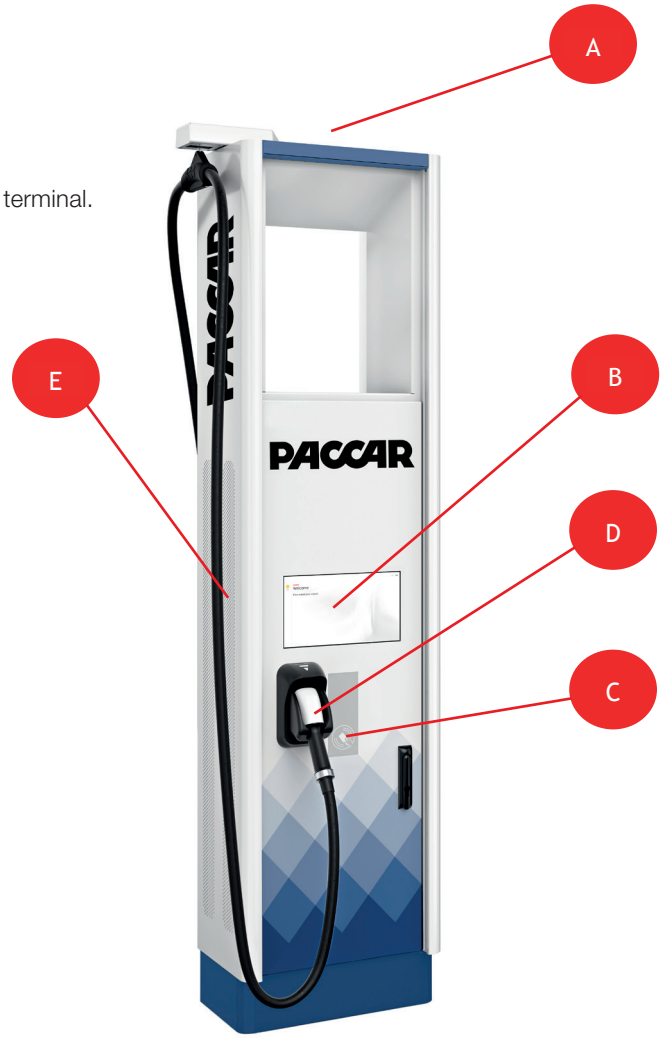



Figure 1: PowerChoice 350 post overview

## 2.2 Charge post configurations

The PowerChoice 350 supports the following DC charging protocols:

| Indicator | Description |
|---|---|
| C | CCS outlet with liquid cooled cable. Up to 375 A and 175 kW with one power cabinet, and up to 500 A and 350 kW with two power cabinets. |

## 2.3 System configurations

### Static system

In a static system a charge post is paired with one or two power cabinets.


**350 kW**

### Dynamic DC

With unique DAF Dynamic DC power sharing technology two charge posts can be powered by just two instead of four power cabinets, whereby available power is dynamically shared between the charge posts. This is a cost effective solution for sites with multiple charge posts.

Please note that Dynamic DC is only supported on PowerChoice 350, whereby the D indi-cates suitability for Dynamic DC.


**350 kW**


**175 kW** **175 kW**


**350 kW**

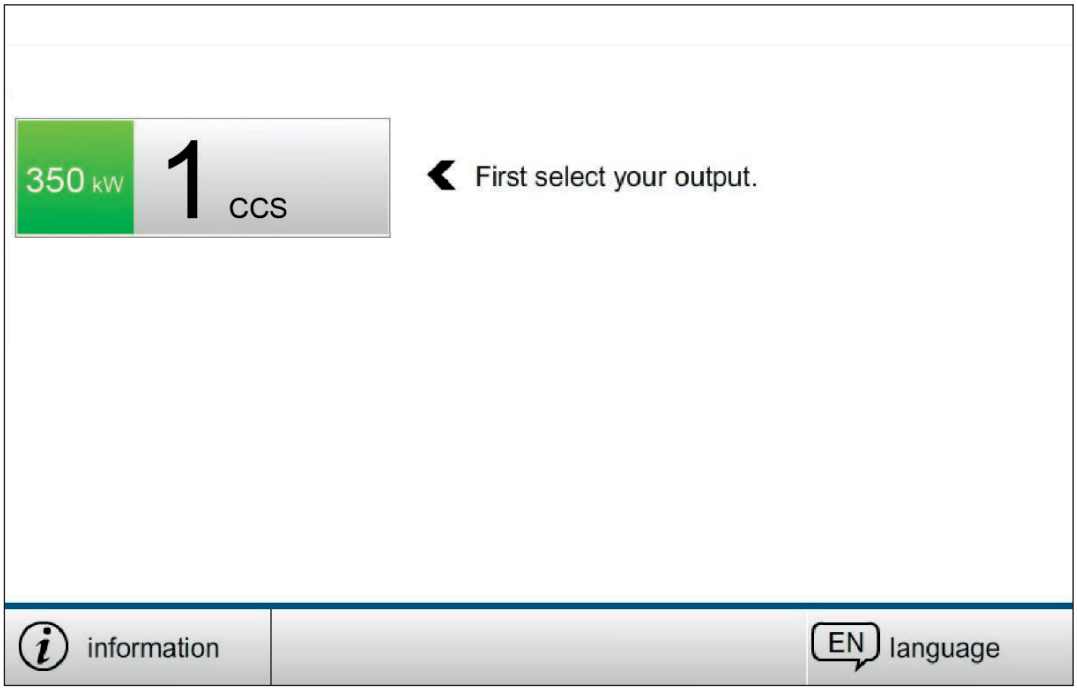
## 2.4 Authorization to charge

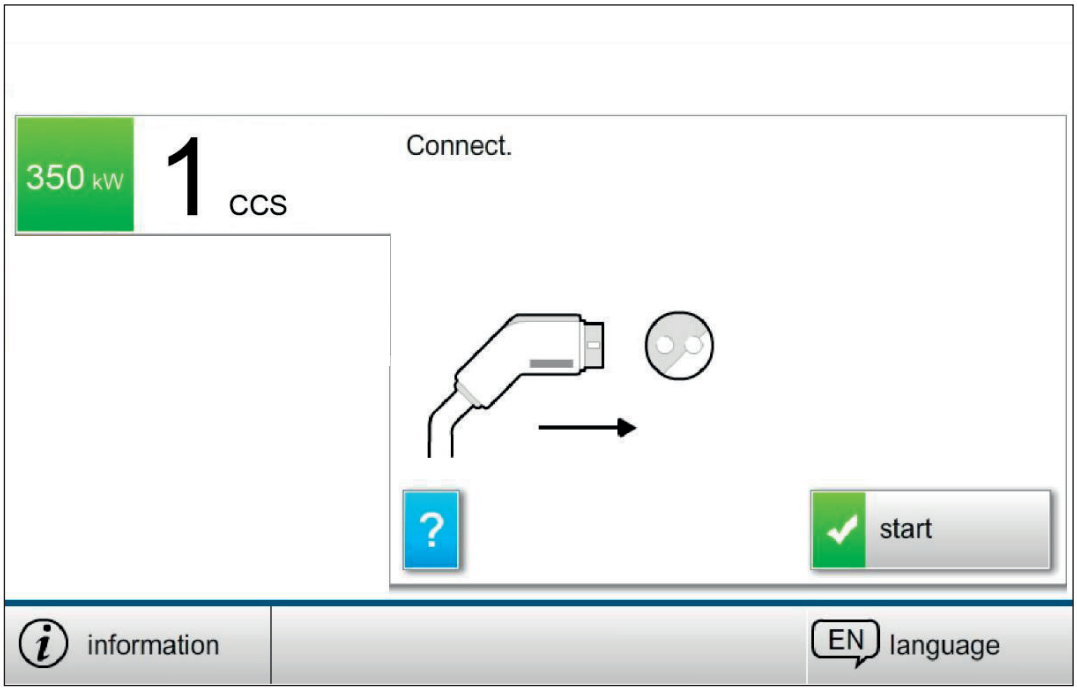
Operation of the charger is possible with or without authorization. The authorization to charge can be based on RFID or credit card payment methods. Operating a charger with authorization requires a sub-scription to a back office. Authorization can either be an PACCAR supplied standard solution, or from an external company offering authorization solutions via OCPP.

# 3. Charging

To charge an electric vehicle (EV):

1. Park the EV with the charge inlet within reach of the connector, and turn it off.
2. Connect the charger's connector to the vehicle's charge inlet.

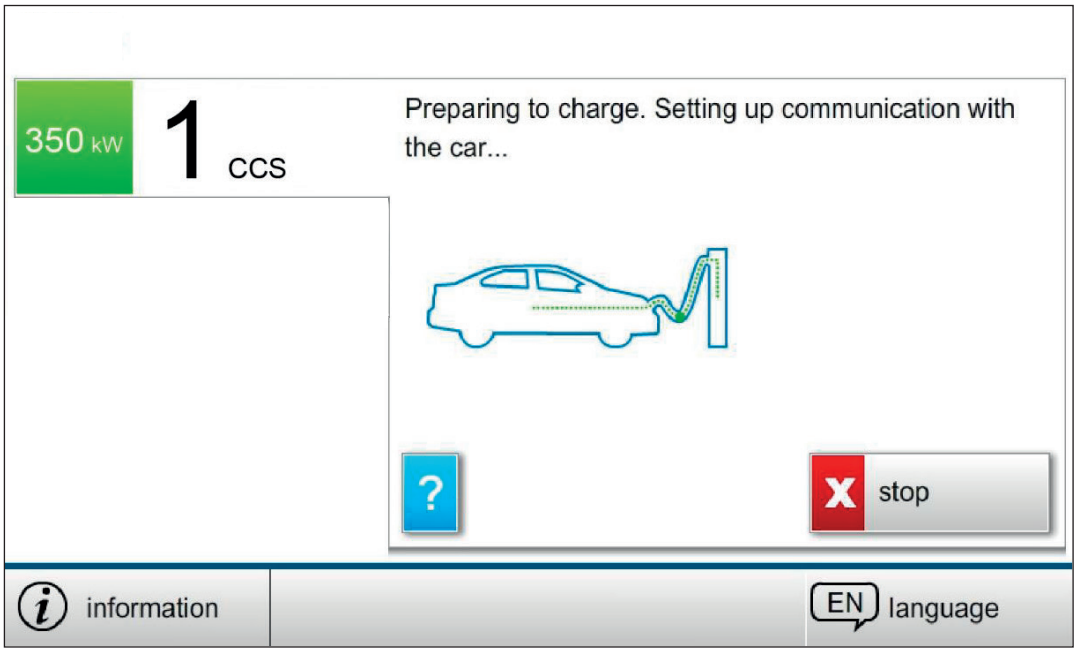


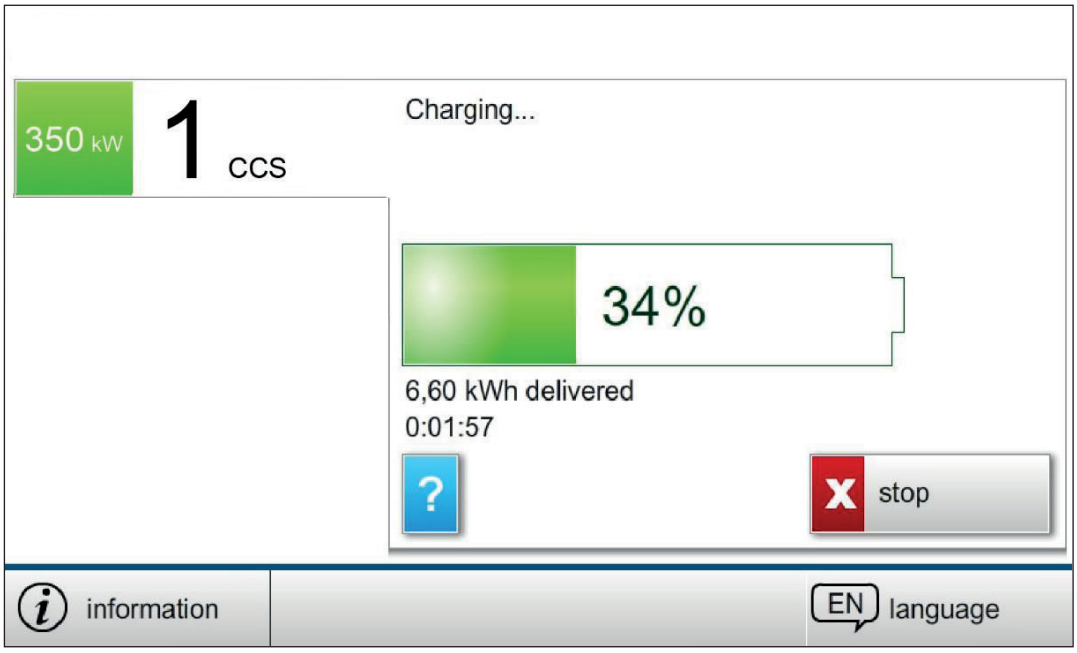

3. Follow charging instructions of your BEV truck.
   Authorize using your phone or by PIN code, or with a RFID card payment.

4. Wait for verification.

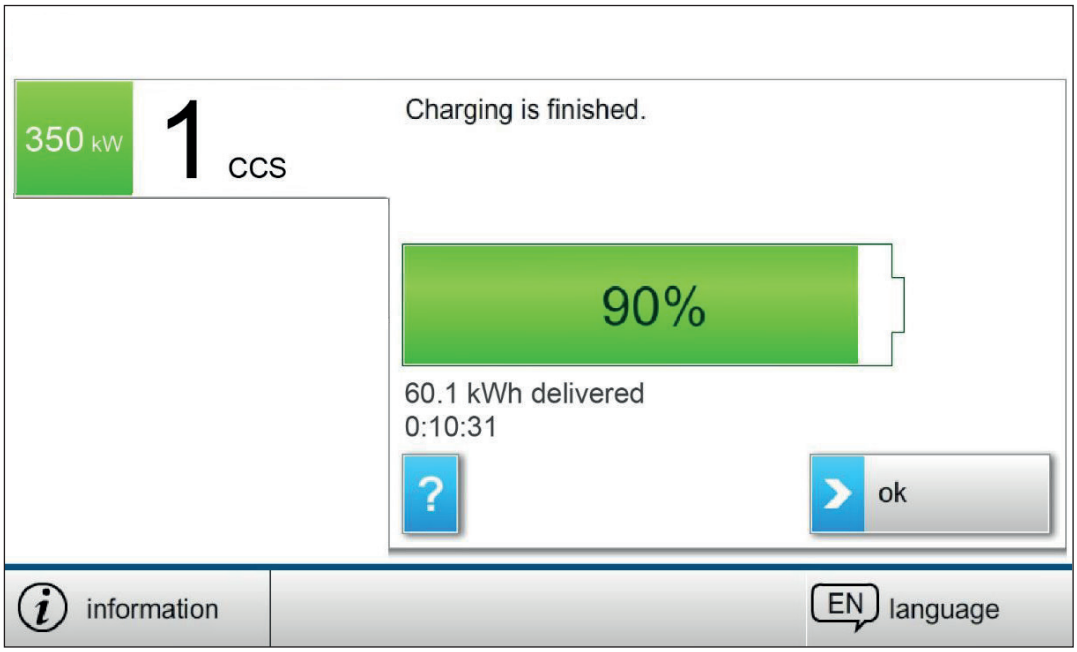

5. Preparing: the charger and the vehicle perform a handshake and the necessary safety tests. Charging will start automatically when successful.



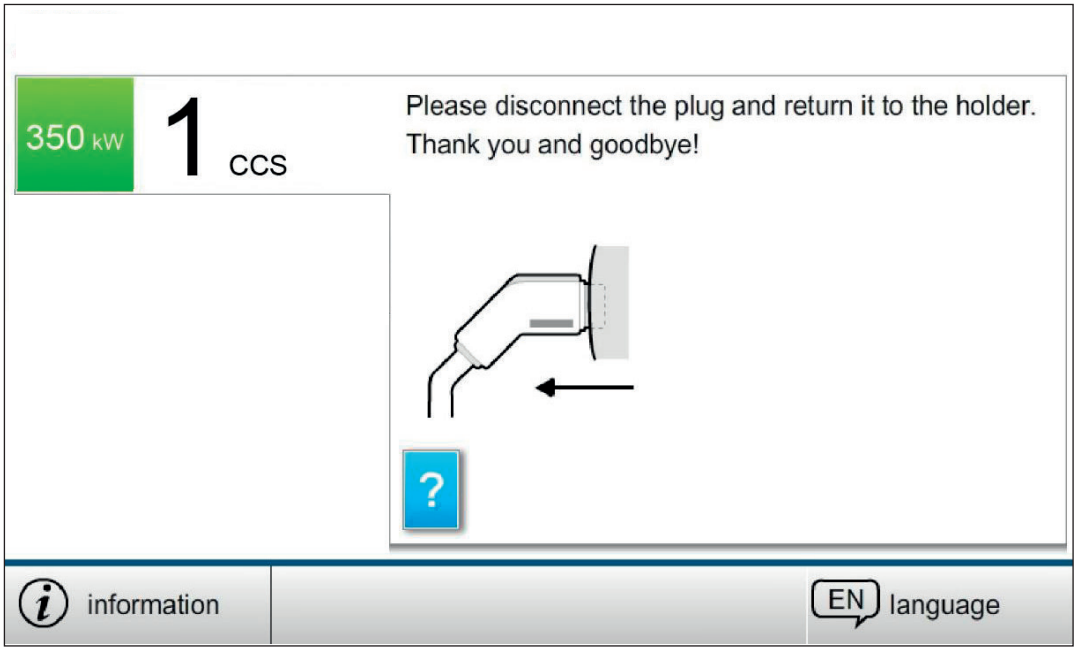
6. During charging the user is informed about the progress. Wait until the charging process is done or press the stop button on vehicle or charger, depending on the instructions of your BEV.




7. Charging is finished.



8. Unplug the outlet from the vehicle and place it on the plug holder.




To stop charging:

1. Follow the instructions of your BEV truck.
2. Potentially you have to authorize again to stop, using the same authentication method as was used to start. Note that for:
3. Take the connector out of the car and put it back in the connector holder on the charger.

**NOTICE**

**Locked connector**

In CCS charging the EV locks the connector. If the user wants to take the connector out of the car, it may be necessary to unlock all doors of the EV, or use the 'unlock charge connector button' on the car key, if present.

**NOTICE**

**Session end**

Charging will stop without user interaction:

- When the EV indicates to the charger that charging is completed.
- When the maximum charge time set by the opertor/owner has been reached.

If the battery is not full, a new charge session can be started.

In general, topping up the battery is slow-charging.

# 4. Operator Instructions

## 4.1 Cleaning the enclosures

The Power Cabinet and Charge Post are powder coated. This coating must be kept in good condition. The customer facing charge post is coated in RAL 9003, which is a fresh bright white. It gives a modern appearance and matches well with branding stickers in all kinds of colors. RAL 9003 (signal white) is also used in PowerChoice 350. RAL 9003 needs periodic cleaning to remove dirt. To limit maintenance costs the power cabinet's default color is RAL 9002 (grey white) on which dirt is less visible.

Clean the Power Cabinet and Charge Post at least three times a year in the following way:

- Remove rough dirt by spraying with low-pressure tap water.
- Apply a neutral or weak alkaline cleaning solution and let it soak.
- Remove dirt by hand with a non-woven nylon hand pad.
- Rinse thoroughly with tap water.
- Optionally, apply wax on the front for extra protection and gloss.
- Check the coating for damage.

**NOTICE**

**Ordinary cleaning**

Keep the air inlets clean and free from snow and leaves or from any other materials.

**NOTICE**

**Rust forming**

When the charger is placed in a corrosion sensitive environment, the forming of superficial rust is possible on the welding points. This rust is merely visual, there is no risk for the cabinet's integrity. The rust can be removed with the cleaning procedure described above. To prevent the rust from reappearing; prime the areas with a transparent or color-like priming finish (separate Service Instructions are available).

**NOTICE**

When the PowerChoice 350 is exposed to rain, it is sufficient to clean it twice a year.

**CAUTION**

Do not apply high-pressure water jets. Water may leak into the Power Cabinet. If a high-pressure water jet has been used, make sure that the inside of the Power Cabinet is dry.

- Only use cleaning agents with a pH value between 6 and 8.
- Do not use cleaning agents with abrasive components.
- Do not use abrasive tools.

## 4.2 Preventive maintenance

The charger must be inspected and serviced yearly by an DAF trained/certified technician.

### 4.2.1 Service inspection of the cabinets

The following points must be checked regularly:

- Internal RCDs and RCBOs need to be tested on correct functioning on a regular basis. During the yearly maintenance visit a check is advised, to be executed by a certified DAF technician.
- Cable and connector
  → Check for cracks or ruptures on the connector or cable, check whether no internal wires of the cable are visible.
- Display screen
  → Check for damage and cracks.
- Powder coating
  → Look for damage, cracks or ruptures.

### 4.2.2 Special inspections

In the following cases the Charger must be checked by DAF service personnel before further use:

- If it was struck by lightning.
- If it is damaged due to an accident or fire.
- If its location has been flooded.

Do not power on until the charger has been inspected and approved.

## 4.3 Problem resolving

The site operator or helpdesk is the first response to a customer call. The helpdesk can remotely solve simple problems for the customer.
In special cases the site operator with knowledge of the charger can be asked by DAF Service to report about the status of some internal components of the charger. Therefore, a brief description of the position and function of these components is described on the next pages.

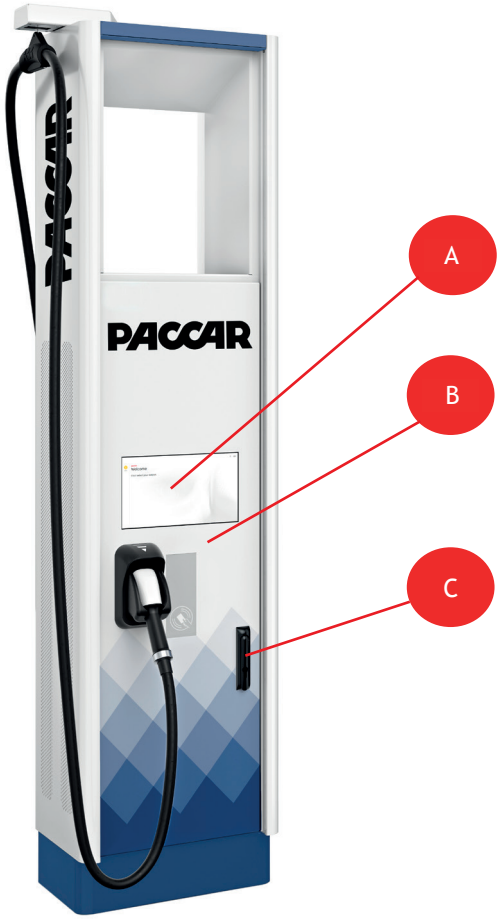
**DANGER**
**Hazardous voltage**
Do not open any cabinet if you are not certified to work with high voltage and high current. Risk of electric shock causing severe in-jury or death.

**WARNUNG**
Note that the charge post is powered from the power cabinet.

### 4.3.1 Overview of the charge post

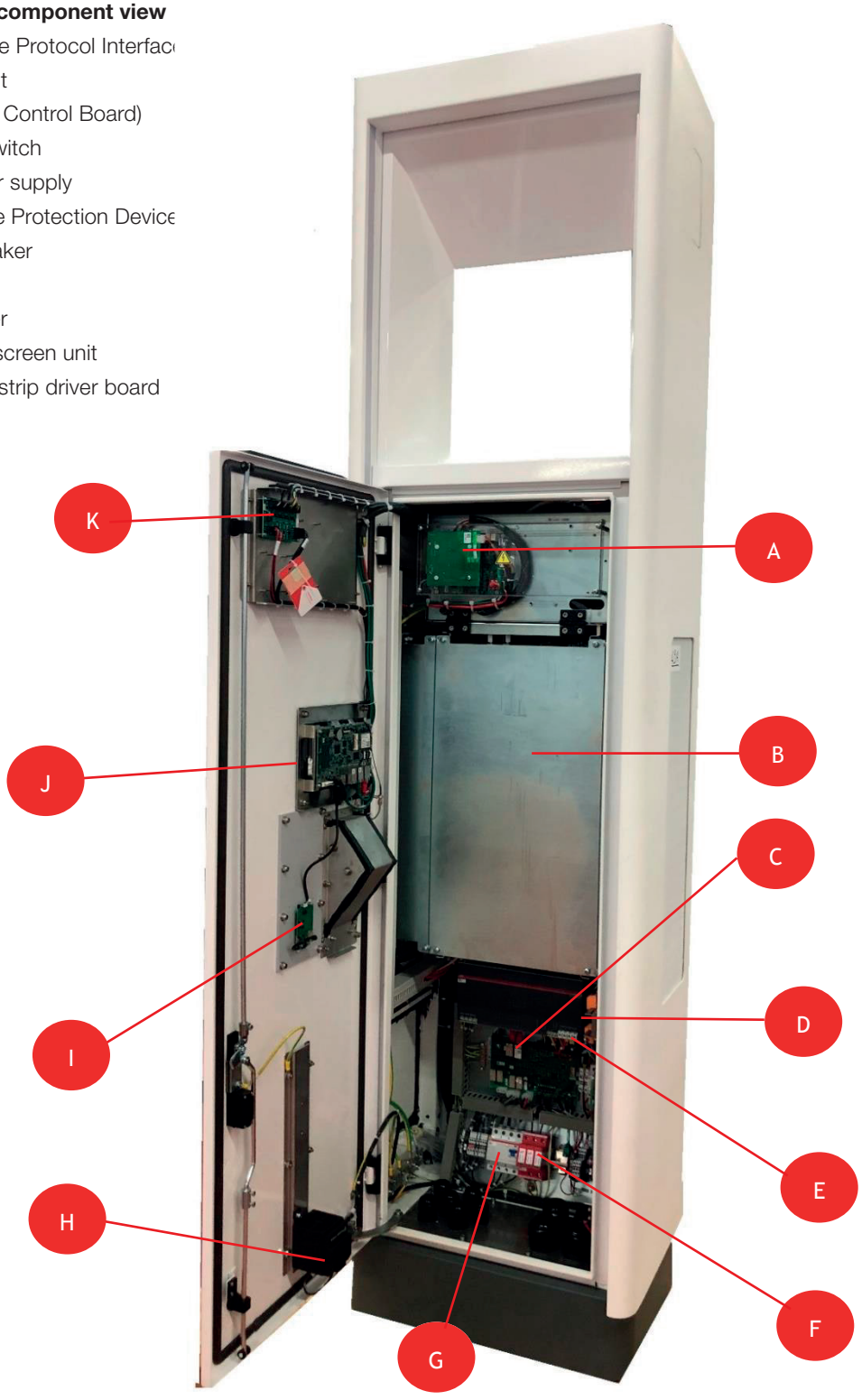
A. HMI touchscreen display
B. Front door
C. Key lock

The front door can be opened by opening the key lock (C).
The key lock is covered with a lid to protect it from water and dirt. To open the lid, a Philips nr. 1 screw has to be removed.



### 4.3.2 Charge Post component view

A. CPI (Charge Protocol Interfac
B. Cooling unit
C. CCB (Core Control Board)
D. Ethernet switch
E. 24 V power supply
F. SPD (Surge Protection Device
G. Circuit breaker
H. Heater
I. RFID reader
J. HMI touchscreen unit
K. GPIO LED strip driver board



### 4.4 Troubleshooting

What to do in case of:

- **Vehicle crash or Fire**
  - → Do not use the charger.
  - → Make sure charger cannot be approached by anyone.
  - → Turn off the power from the distribution panel upstream.
  - → Contact your local ABB Service organization.

- **Damage of the connector or charge cable**
  - → Do not use the charger.
  - → Contact your local ABB Service organization in order to arrange a replacement of the cable.

- **Fluid leakage from the cooled CCS cable**
  The cable cooling system in the PowerChoice 350 charge post makes use of Huber and Suhner CP3-002 coolant. This is a biodegradable, nonhazardous synthetic oil. In short summary of the Huber and Suhner material safety data sheet:
  - o CP3-002 is readily biodegradable according OECD criteria (>80%, tested according OECD 301B).
  - o German Water Hazard Class (WGK) is 1 (according VwVwS), which is the lowest class: “slightly hazardous to water”.
  - o There is no indication of bioaccumulation potential.
  - o Mobility in soil is low.

The cooling system reservoir contains approximately 2 liters of CP3-002, and the cable contains approximately 0.4 liters.

Charge posts produced as of September 2018 are equipped with an internal spill containment reservoir. This will capture coolant leaking inside the charge post, and can be emptied during maintenance visits.

The cooling system is equipped with a fluid level sensor in the reservoir, and a pressure drop sensor. In case a leak emerges it will be detected by either causing a pressure drop or a drop of the fluid level in the reservoir, after which the pump it switched off immediately and the sys-tem cannot be operated until it is repaired. This means that any potential spills outside the charger will be of limited volume.

→ Be careful to avoid slipping on leaked/spilled product.

→ Take up with a liquid absorbing material (e.g. sand, diatomaceous earth, acid-or uni-versal binding agents) and proceed according to the waste disposal regulations. Do not discharge into the sewage system/surface water/ground water/suboil as well as the soil. In case of entry into waterways, soil or drains, inform the responsible authorities.

# 5. Contact information

Please contact your local ABB Service organization or Service partner for first line problem analysis and solving. In case they cannot solve the problem, they will contact the second line Service organization.

**Caution:** This equipment is not intended for use in residential environments and may not provide ade quate protection to radio reception in such environments

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