AC SMART

ECO / VALUE / ADVANCED

Operating instructions

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1 About these instructions

These instructions are intended for the operator of the product and for all persons handling the product during its life cycle.

► Read the operating instructions completely before you start using the product.

► Keep the operating instructions after reading.

The operating instructions are considered part of the product.

► If you pass on the product to a third party, also pass on the operating instructions and the applicable documents.

1.1 Applicable documents:

– Assembly and installation instructions

All documents can be downloaded from the Weidmüller website www.weidmueller.com.

1.2 Illustrations and icons

► Action step

– Numbered lists

Sections of text next to this arrow contain information which is not related to safety, but which provides important information regarding correct and effective work.

⚠ WARNING!

A notice with the signal word “**WARNING!**” warns against a danger that can result in serious injury or death if it is not avoided.

⚠ CAUTION!

A note with the signal word “**CAUTION!**” warns against a danger that can result in injuries if it is not avoided.

ATTENTION!

A note with the signal word “**ATTENTION!**” warns against a danger that can result in damage to property or malfunctions of the product if it is not avoided.

Note for an electrician

Note referring to further documentation

Note for required tool

2 For your safety

2.1 Intended use

The EV charging boxes in the AC SMART product family are designed for charging electric vehicles and hybrid vehicles. The EV charging boxes can be installed individually on private property, or installed in larger numbers in parking lots or underground garages belonging to companies and institutions. Charge the EV charging boxes with mode 3 in accordance with IEC 61851-1 and with power plugs in accordance with IEC 62196.

An EV charging box may only be operated if it is installed as stationary on a wall or a stand. Usage of extension cables is not permitted.

The EV charging box is intended for use in accordance with these operating instructions. Any use that deviates from these operating instructions is considered improper use.

Observe the country-specific requirements set forth in IEC 61439-7, IEC 61851-1, IEC 61851-22, IEC 61851-21-2, IEC 62196-1, IEC 62196-2 and IEC 63000. Also observe the applicable national regulations.

2.2 Personnel

All work on the domestic installation and electrical installation of the EV charging box must be carried out by an electrician.

2.3 Safety notes

- ► Check with the responsible grid operator regarding applicable regulations and provisions for EV charging boxes.
- ► A commissioning protocol for initial commissioning is available in our online catalogue.

- ► If you wear a cardiac pacemaker or another electrical medical device, you may not be present in the vehicle or near the vehicle, the charging cable, the charging housing or the charging station during the charging process.
- ► Ask your doctor about other precautionary measures, and comply with these instructions.

⚠ WARNING!

Risk to life due to electric shock

There is a risk of electric shock when working on the electrical installation of the EV charging box.

► Ensure that the following equipment is present in the domestic installation:
  – one residual current circuit breaker for each charging point in accordance with DIN EN 61008-1, DIN EN 61009-1
  – one circuit breaker for each charging point in accordance with DIN EN 60898,
    DIN EN 60947-2
► When working on the electrical installation, ensure that power to the EV charging box and supply line are switched off.
► Do not operate the EV charging box without a residual current circuit breaker in the domestic installation, see Chapter 15.
► Do not operate the EV charging box without a circuit breaker, see Chapter 15.
► Carry out a visual inspection and create a commissioning protocol before initial commissioning.
► Observe the requirements for the installation site, see Chapter 15.

Improper installation may cause water to get into EV charging box. This could result in an electric shock.

► Only operate the EV charging box if it has been assembled and installed as described in the assembly and installation instructions.
► The IP protection class is only achieved if the EV charging box is assembled and installed as described in the assembly and installation instructions.
► Do not use a pressure washer to clean the EV charging box.
► Only clean the EV charging box with a soft, lightly moistened cloth.

Risk to life due to fire

Foreign objects or dirt in the plug contacts can cause a fire.

► Check the plug contacts for foreign objects and contamination.
► Do not insert any objects into the plug contacts.
► Remove light contamination, for instance dust or sand, by blowing it out.
► Heavy contamination must be cleaned by an electrician.

⚠ CAUTION!

Risk of injury if the EV charging box is damaged

A damaged or incomplete EV charging box can lead to malfunctions and hazards.

► Only use the EV charging box and its accessories if all parts are undamaged.

► If you find damage on the EV charging box, commission an electrician to disconnect the EV charging box from the power supply.

Risk of injury from falling parts

Falling parts can cause hazards and injure personnel.

► Do not place any objects on the installed EV charging box.

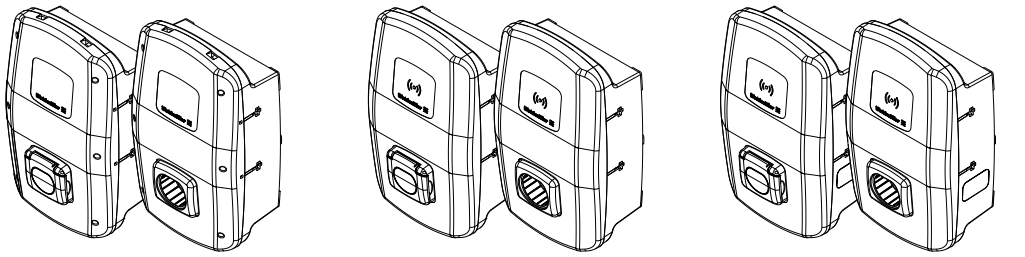
► Hang the charging cable on the cable tray when it is not in use.

2.4 Product modifications

The EV charging box may not be modified in any way. Product modifications interfere with the safety and proper function of the EV charging box.

3 Product description

3.1 AC SMART product family



ECO Socket

CH-W-S-A7.4-S-E
CH-W-S-A11-S-E
CH-W-S-A22-S-E

ECO Plug

CH-W-S-A7.4-P-E
CH-W-S-A11-P-E
CH-W-S-A11-P7.5-E
CH-W-S-A11-P10-E
CH-W-S-A22-P-E
CH-W-S-A22-P7.5-E

VALUE Socket

CH-W-S-A11-S-V
CH-W-S-A22-S-V

VALUE Plug

CH-W-S-A11-P-V
CH-W-S-A11-P7.5-V
CH-W-S-A11-P10-V
CH-W-S-A22-P-V
CH-W-S-A22-P7.5-V

ADVANCED Socket

CH-W-S-A11-S-A
CH-W-S-A22-S-A

ADVANCED Plug

CH-W-S-A11-P-A
CH-W-S-A11-P7.5-A
CH-W-S-A11-P10-A
CH-W-S-A22-P-A
CH-W-S-A22-P7.5-A

Figure 3.1 Product variants

Equipment feature or function	Product line		
	ECO	VALUE	ADVANCED
Max. charging power 7.4 kW (max. 1-phase, 32 A)	✓	–	–
Max. charging power 11 kW (max. 3-phase, 16 A)	✓	✓	✓
Max. charging power 22 kW (max. 3-phase, 32 A)	✓	✓	✓
PLUG: connected charging cable incl. type 2 plug	✓	✓	✓
SOCKET: charging socket with integrated shutter type 2	✓	✓	✓
Fault current detection (DC)	✓	✓	✓
Max. charging current adjustable	✓	✓	✓
Digital inputs and outputs configurable	✓	✓	✓
Serial communication (RS485/Modbus RTU)	✓	✓	✓
Ethernet communication (Modbus TCP)	✓	✓	✓
WLAN interface	✓	✓	✓
Bluetooth interface	✓	✓	✓
Can be operated with the AC SMART app	✓	✓	✓
Data communication acc. to OCPP 1.6 (J)	–	✓	✓
Access control via RFID	–	✓	✓
Storage and export of charging data	–	✓	✓
PV optimised charging	–	✓	✓
Load/charge management integrated (static)	–	✓	✓
Load/charge management integrated (dynamic)	–	–	✓
MID compliant energy meter	–	–	✓
Wireless modem incl. SIM card (LTE) with data volume included	–	–	✓
Powerline communication with the vehicle	–	–	✓

3.2 Type plate

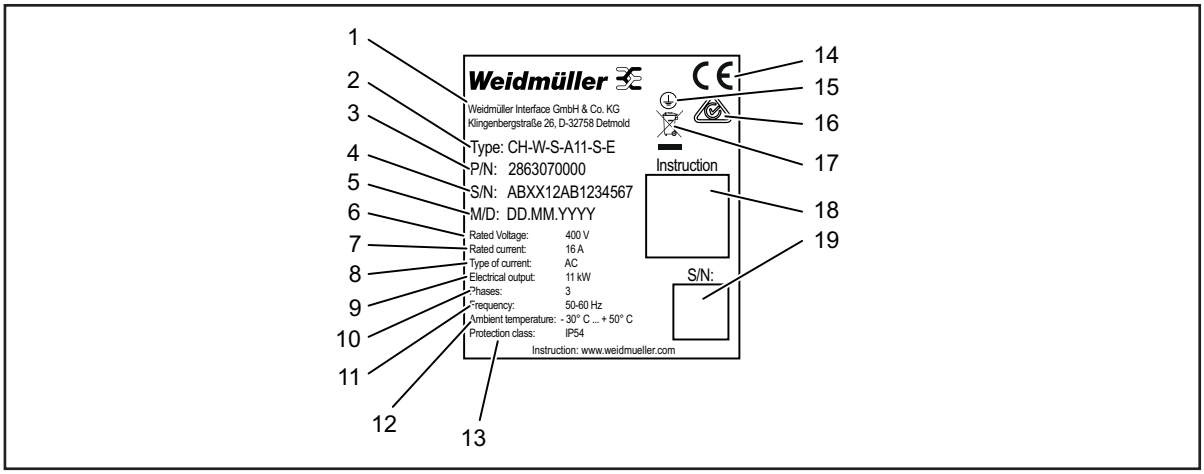


Figure 3.2 Type plate (example)

1 Manufacturer
2 Type designation (product variant)
3 Item number
4 Serial number
5 Date of manufacture
6 Rated voltage
7 Rated current
8 Type of current
9 Power rating
10 Connectible phases
11 Nominal frequency
12 Ambient temperature range (operation)
13 IP protection class (dust and water)
14 CE conformity
15 Earthing icon
16 RCM icon
17 Disposal information
18 Link to online documentation (QR code)
19 Serial number (QR code)

3.3 Product components

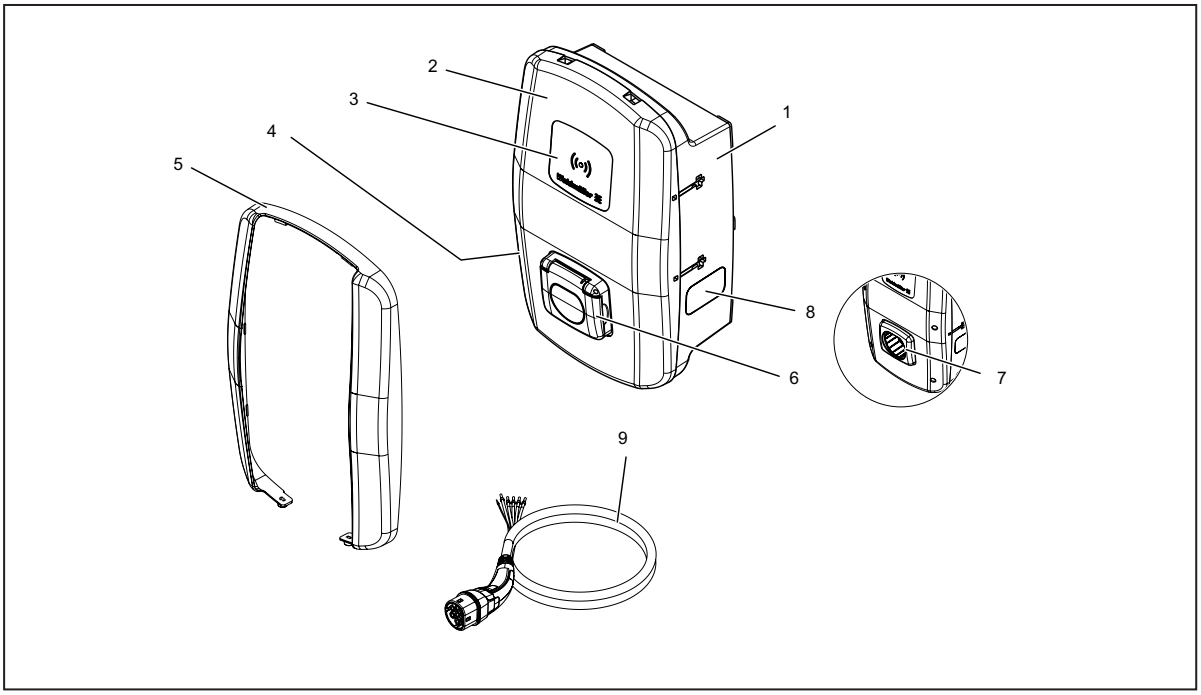


Figure 3.3 Product components

Pos.	Last name	Description
1	Housing base part	
2	Housing cover	The housing cover is fastened to the right side of the EV charging box with hinges.
3	Interaction field	Status LED and RFID field (only VALUE and ADVANCED)
4	Type plate	
5	Design frame	Cover over the lid screw fittings (only VALUE and ADVANCED)
6	Charging socket	SOCKET variant: Charging socket type 2 with integrated shutter function
7	Plug holder	PLUG variant: Holding fixture for unused charging plug
8	Vision panel	To display the energy meter (ADVANCED only)
9	Charging cable	PLUG variant: charging cable with type 2 plug and open cable ends for installation in the EV charging box

3.4 Connections and electronic components

ATTENTION!

Damage or fault due to product modifications

Removing or modifying the electronic components may cause damage to or faults in the EV charging box.

► Do not modify the electronic components contained in the product.

► Observe the Assembly and installation instructions.

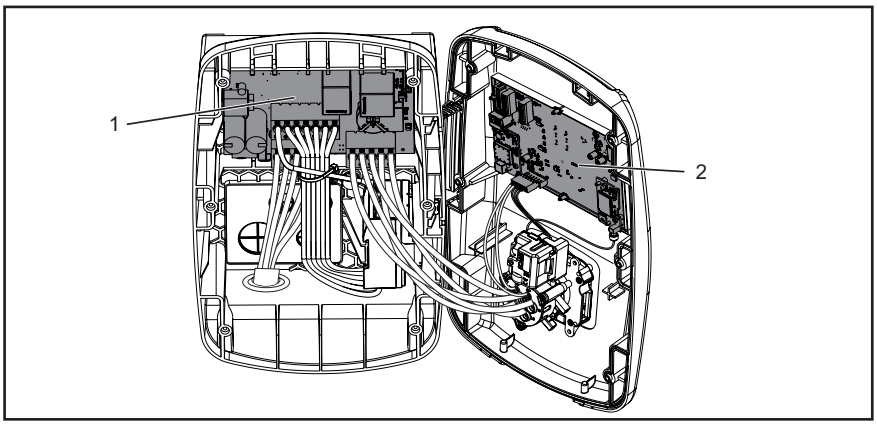


Figure 3.4

1	Power board in the housing base part
2	Control board in the housing cover

Power board in the housing base part

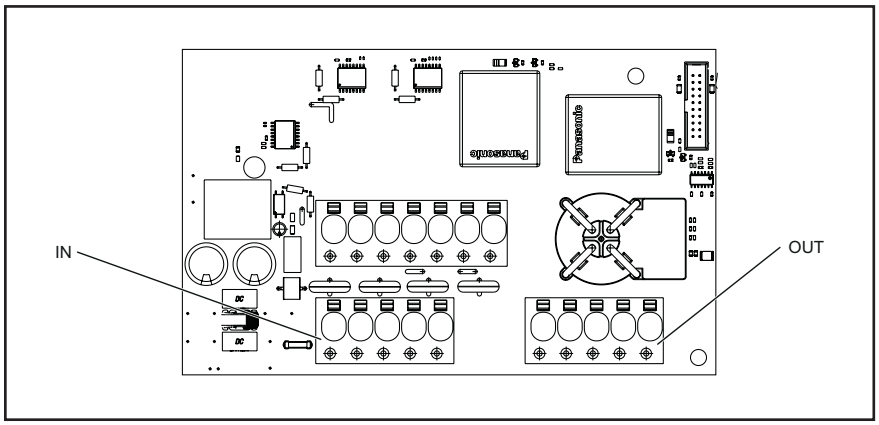


Figure 3.5

Identification	Description
IN	Connection terminal supply line
OUT	Only PLUG variant; charging cable connection terminal

Control board in the housing cover

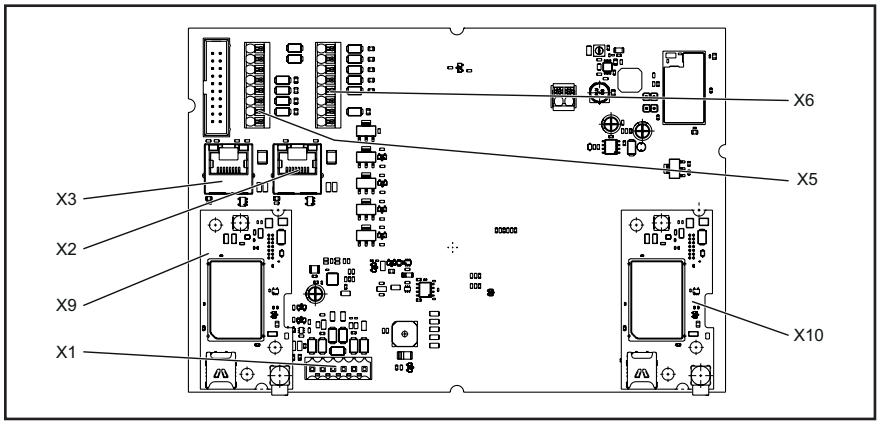


Figure 3.6

Identification	Description
X1	Only PLUG variant: plug-in connector to connect the CP conductor
X2	RJ45 Ethernet interface (VALUE and ADVANCED only)
X3	RJ45 Ethernet interface
X5	8-pin connection for 4 x digital outputs, 1 x serial interface (RS485 Modbus RTU A/B) and 2 x ground
X6	8-pin connection for 5 x digital inputs, 2 x 12 V supply and 1 x ground
X9	Attachment for Powerline module (ADVANCED only)
X10	Attachment for wireless modem (ADVANCED only)

3.5 Status LED and acoustic signals

The colour and flash pattern of the LED indicate the operational status of the EV charging box.

	LED state	Meaning
	Green illuminated	The EV charging box is switched on and ready for operation.
	Blue flashing	The EV charging box is in Bluetooth pairing mode with the AC SMART app.
	Blue illuminated	The EV charging box has detected a connection to a vehicle and is ready for a charging process.
	Blue pulsing	The charging process is running.
	White pulsing	The EV charging box expects authentication, for instance with an RFID tag.
	White illuminated	The LED indicates the position of the RFID interface.
	Red illuminated	The EV charging box has detected a fault. The charging process was ended. For troubleshooting information, see Chapter 12.
	Red flashing	The EV charging box has detected a fault. The charging process was ended. For troubleshooting information, see Chapter 12.

Acoustic signal	Meaning
Rising sequence of tones	The RFID tag was detected. The authentication was successful.
Falling sequence of tones	The authentication was not successful. The RFID tag is not registered or not released.

For notes on troubleshooting, see Chapter 12.

4 Product functions

This chapter describes the product functions of the EV charging box. The product functions described here are available only with the current firmware version and vary by product line, see Chapter 3.1. The firmware and release notes are provided in our online catalogue. The instructions on operation and configuration are provided in Chapter 9.

4.1 Network capability

Each EV charging box can be integrated into a network via LAN or WLAN. The EV charging boxes in the VALUE and ADVANCED product line each have two Ethernet ports and an integrated switch function, so that they can be used to form a line structure, see Chapter 9.1.

4.2 Communication capability

Each EV charging box supports the following communication protocols:
– Serial communication (RS485/Modbus RTU)
– Ethernet communication (Modbus TCP)
– Bluetooth (Low Energy)

Powerline communication

EV charging boxes in the ADVANCED product line allow for Powerline communication with the connected vehicle, if the connected vehicle supports this function as well. The charging process is released simultaneously with the unique system identification.

OCPP 1.6 (J)

The EV charging boxes in the VALUE and ADVANCED product lines can communicate via the Open Charge Point Protocol OCPP 1.6 (J) with a backend.

The EV charging box can transmit the following messages to the backend:
– Bootnotification (first message after establishing the connection)
– Authorise (query whether a tag or RFID tag is able to authorise a charging process)
– Heartbeat (notification that the charging controller is still reachable)
– MeterValues (values for the energy metre)
– StartTransaction (start of a charging process)
– StopTransaction (end of a charging process)
– Statusnotification (current status of the charging controller)

The EV charging box can receive the following messages:
– ReserveNow
– CancelReservation
– ChangeAvailability
– RemoteStartTransaction
– RemoteStopTransaction
– Reset
– UnlockConnector
– GetConfiguration

- GetDiagnostics
- ChangeConfiguration
- Updatefirmware (There must be no redirect.)
- GetCompositeSchedule
- ClearChargingProfile
- SetChargingProfile
  - StackLevel: 0-9
  - ChargingRateUnit: Current
  - A maximum of 10 profiles can be stored
  - Up to 10 schedules possible per profile
  - The ChargePointMaxProfile, TxDefaultProfile and TxProfile profiles are supported
  - The profile types absolute, relative and recurring are supported

  For ChargePointMaxProfile only:
  If the profile refers to connector ID 0 and the charging station is set up as a control box in load and charge management, the profile is related to the GlobalCurrent of the LLM and applied to all EV charging boxes in the charging network. The backend only needs to control one EV charging box, and this EV charging box ensures optimum utilisation locally without overloading the mains connection, see Chapter 4.12. If no LLM is active or the EV charging box is not defined as a control box, ChargePointMaxProfile is not taken into account.

The following configuration keys are supported:
- ConnectionTimeOut
- HeartbeatInterval
- MeterValueSampleInterval
- NumberOfConnectors (read only)
- TransactionMessageAttempts
- TransactionMessageRetryInterval
- ConnectorMaximumCurrent
- WebSocketPingInterval
- GetConfigurationMaxKeys (read only)
- MeterValuesSampledData (read only)
- ConnectorPhaseRotation (read only, not applicable)
- ChargeProfileMaxStackLevel (read only)
- ChargeScheduleAllowedChargingRateUnit (read only)
- ChargingScheduleMaxPeriods (read only)
- ConnectorSwitch3to1PhaseSupported (read only)
- MaxChargingProfilesInstalled (read only)

Cellular

The EV charging boxes in the ADVANCED product line contain a wireless modem with a SIM card. The wireless connection is intended only for the OCPP connection. The SIM card is already enabled upon delivery. Once the EV charging box is supplied with current, the wireless modem connects automatically with the wireless network. The included inclusive data volume comprises 1 GB and is valid for a run-time of 10 years worldwide, regardless of the mobile phone provider.

The SIM card supplied is linked to the mobile modem and is not suitable for other purposes (IMEI lock). If necessary, you can replace the included SIM card with another SIM card. The new SIM card must be configured in the web server of the EV charging box, see Chapter 9.3. The required data is provided by the mobile phone provider.

4.3 Web server and AC SMART app operating software

Two software products are available for the operation and configuration of EV charging boxes: the integrated web server and the AC SMART app. The AC SMART app is available free of charge from the App Store (iOS) and the Google Play Store (Android).
The scope of functions of the web server and AC SMART app differ, as shown in the following overview. The web server is always required to configure the EV charging box during initial commissioning.

Function or setting option	Web server	AC SMART app
Monitor the status of the EV charging box	✓	✓
Download charging data	✓	✓
Delete charging data	✓	–
Release or end the charging process	✓	✓
Adjust the maximum charging current	✓	✓
Set LED inactivity	✓	✓
Adjust LED brightness	✓	✓
Register, manage, and delete RFID tags	✓	✓
Integrate EV charging box in a network (LAN/ WLAN)	✓	✓
Manage network settings	✓	✓
Configure authentication method	✓	✓
Adjust maximum charging current limit during initial commissioning	✓	–
Monitor charging process	✓	✓
Communication with the EV charging box via network connection (LAN, WLAN) and via Bluetooth	–	✓
Network settings (Modbus RTU, Modbus TCP, Bluetooth communication)	✓	–

Function or setting option	Web server	AC SMART app
Configuration of digital inputs	✓	–
Configuration of digital output	✓	–
Configuration of an OCPP backend connection	✓	–
Configuration of load/charge management	✓	–
Firmware update	✓	✓
Set system time	✓	✓
Reset the EV charging box to factory settings	✓	–
Restart the EV charging box	✓	–

4.4 Charging the vehicle

Depending on the configuration of the EV charging box, charging is possible without authentication (Freemode) or with authentication. If charging is possible only after authentication, then the ways in which a charging process can be started, interrupted, or ended depend on the authentication method, see Chapter 9.3.

4.5 Status information and error display

The status of the EV charging box and any errors are displayed in the web server and in the AC SMART app. The EV charging box is also equipped with a status LED.

4.6 Download and delete charging data

The charging data can be downloaded as a csv file for the VALUE and ADVANCED product lines. In addition, the charging data can also be deleted in the web server. The charging data for a charging process is saved with the following information:

- Consecutive number (ID)
- Name of the tag
- Authorisation tag (Authorisation tag ID)
- Start of the charging process with date and time, time format GMT (Start time)
- End of the charging process with date and time, time format GMT (End time)
- Consumption in Wh (Energy)

At least 3260 charging processes can be saved. Once the storage capacity is reached, the entries will be overwritten, starting with the oldest entries.

Ensure that the date and time are set correctly in the web server of the EV charging box. If the EV charging box has been separated from the current, you must reset the time and date, see Chapter 9. The charging data is always given in UTC (GMT) time. The time information may therefore differ from the set time due to time differences.

4.7 Monitor charging process

The technical characteristics of the charging process, such as duration and quantity of energy can be displayed in the web server and in the AC SMART app. In addition, the electrical values for the individual phases, effective power, reactive power, apparent power, power factor, mains frequency, overall power and device temperature can be displayed in the web server.

4.8 Maximum charging current

During initial commissioning, the electrician defines the maximum limit for the charging current that can be provided for the connected EV charging boxes in the web server. This maximum limit is dependent on the domestic installation and the locally applicable specifications and provisions, and may be adjusted only by the electrician.
The maximum available charging current can be reduced if necessary. This adjustment can be completed at any time in the web server or the AC SMART app.
The maximum charging current is dependent on the power rating of the EV charging box, see the type plate. The value can be adjusted in one ampere increments.

Power rating	Charging current
7.4 kW	6 – 32 amperes
11 kW	6 – 16 amperes
22 kW	6 – 32 amperes

4.9 Maximum asymmetrical phase current

The maximum asymmetrical phase current can be adjusted in the web server for the VALUE and ADVANCED product lines. This value describes the maximum current with which a vehicle may charge that does not use all three phases of the network. The maximum asymmetrical current is dependent on the domestic installation and the locally applicable specifications and provisions.
The ECO product line cannot monitor phase symmetry. Therefore, the maximum charging current is limited to the set maximum asymmetrical phase current. If it can be ensured that the asymmetry of phases does not exceed the local specifications, then the value in the EV charging box can be increased.

4.10 LED inactivity

The LED inactivity function can be used to switch off the status LED if the status of the EV charging box does not change during a defined time period, for instance during the charging process. Once the status of the EV charging box changes, the status LED is active once again and the timer is reset. The function is disabled upon delivery.

4.11 Digital inputs

A charging process can be authorised via an external device. The external device can be connected to the digital inputs of the EV charging box.

Each EV charging box contains digital inputs (12 V DC) on the control board on connection terminal X6, the function of which can be individually configured in the web server. One digital input can be configured for the ECO product line. Five digital inputs can be configured for the VALUE and ADVANCED product lines. The following configurations are possible:

Charging release

A charging process is authorised via a switching signal (high signal) on the digital input (external charging release, e.g. using a key switch). Authorisation is active only with a logical 1 at the input. If there is a logical 0 at the input, there is no authorisation. An active charging process is ended and no new charging process is started.

Current limitation

A reduction of the charging current can be set for each input.
If the digital input is active, the maximum charging current according to the setting is made available. When the setting is at 100%, the maximum charging current is used; when the setting is at 0%, there is no charging at all, and any active charging process will pause. If multiple current limitations are active, the limitation with the lowest charging current is effective.

Input monitoring

Monitoring of the digital inputs can be enabled if necessary. Exactly one digital input with the current limitation function must display a logical one for this purpose; otherwise, the EV charging box will display a fault.

4.12 Load/charge management

Load/charge management regulates the simultaneous charging of vehicles at multiple charging points. The charging points must be networked together for this function to be used. One EV charging box is configured as the control box in each charging network, and all other boxes as satellite boxes. The maximum charging current available for the entire charging network is distributed over the released charging points according to the specified parameters. Load peaks, blackouts, and imbalances are avoided.

To start a charging process, each EV charging box requires at least 6 A charging current. If charging processes are already active in the charging network, and less than 6 A charging current is available for another vehicle to be charged, then this last connected vehicle is placed on a waiting list. Once the minimum charging current is available once again, the charging process for the last connected vehicle is started automatically. The charging processes are started in the sequence in which the vehicles were connected to the charging network.
Depending on the product line and technical requirements, static, dynamic, or external load/charge management can be implemented.

Static load/charge management

Prerequisite

Static load/charge management can be implemented only with an EV charging box from the VALUE or ADVANCED product lines as the control box. EV charging boxes from the VALUE and ADVANCED product lines can be connected as satellite boxes.

With static load/charge management, the total current for up to 16 networked charging points can be defined (Global current limit), including up to one control box and up to 15 satellite boxes. The maximum total current is determined based on the available connected power of the domestic installation or sub-distribution, minus the maximum power required by all other devices in the same distribution circuit.
The defined total current is set in the control box and distributed there evenly to all active charging points in the charging network. Whenever a vehicle in the network is registered or deregistered for charging, the distribution of the total current is adjusted accordingly.
The EV charging boxes in the VALUE and ADVANCED product lines can be configured in the web server as control boxes or satellite boxes.

Dynamic load/charge management

Prerequisite

Dynamic load/charge management can be implemented only with an EV charging box from the ADVANCED product line as control box. EV charging boxes from the VALUE and ADVANCED product lines can be connected as satellite boxes.

Dynamic load/charge management can be implemented in a variety of ways:
– via Modbus RTU with an additional bidirectional meter
– via Modbus TCP with an inverter or an energy management system.

Dynamic load/charge management with Modbus RTU

Prerequisite

There must be an additional bidirectional meter in the domestic installation that is connected to the Modbus RTU interface of the EV charging box. The following bidirectional metres are suitable:

– Weidmüller EM120-RTU-2P (7760051004)
– Weidmüller EM122-RTU-2P (7760051003)
– Weidmüller EM110-RTU-2P (7760051002)
– Weidmüller EM111-RTU-2P (7760051001)
– NZR Serie EcoCount S
– NZR Serie EcoCount SL

The total current that the EV charging boxes and other electrical devices in the building require is continuously monitored. The total current available for charging is continuously recalculated.

Dynamic load/charge management with Modbus TCP

Prerequisite

The inverter or energy management system must be connected with the EV charging box directly via a Modbus TCP interface.

The interfaces of inverters are not standardised. If the inverter is changed or replaced, there may be communication errors between the inverter and the EV charging box.

The inverter or energy management system communicates directly with the EV charging box and the energy meter in the domestic installation. An additional energy meter is not required.

The total current is distributed across all active charging points: when the other electrical devices require less energy, there is more current available for charging. When the other electrical devices require more power, the charging current is reduced.

External load/charge management

Prerequisite

All EV charging boxes must be connected in a network with an external controller for external load/charge management.

The available total current is determined and defined in this external controller, in the cloud, or in the web server. The EV charging boxes report the actual charged power to the controller. External load/charge management can be implemented, for instance, with Weidmüller SMARTcharge. Further information and application notes are available in our online catalogue.

4.13 PV optimised charging

Prerequisite

PV optimised charging is possible only with an EV charging box from the VALUE or ADVANCED product lines.

The PV optimised charging function makes it possible to use current produced from a personal photovoltaic system to charge an electric vehicle. The surplus current generated is used for charging processes and not fed into the public power grid. Three different modes can be selected in the web server and in the AC SMART app for PV optimised charging.

PV optimised charging can be implemented in a variety of ways:
– via Modbus RTU with an additional bidirectional meter
– via Modbus TCP with an inverter or an energy management system.

PV optimised charging with Modbus RTU

Prerequisite

There must be an additional bidirectional meter in the domestic installation that is connected to the Modbus RTU interface of the EV charging box. The following bidirectional metres are suitable:

– Weidmüller EM120-RTU-2P (7760051004)
– Weidmüller EM122-RTU-2P (7760051003)

– Weidmüller EM110-RTU-2P (7760051002)
– Weidmüller EM111-RTU-2P (7760051001)
– NZR Serie EcoCount S
– NZR Serie EcoCount SL

The bidirectional meter measures the power of the PV system. If sufficient power is available, the EV charging box can charge with PV current.

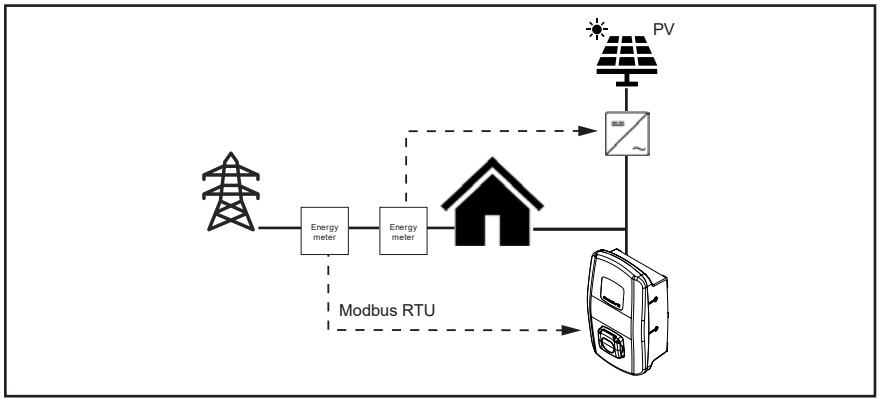


Figure 4.1 PV optimised charging with bidirectional meter (Modbus RTU)

PV optimised charging with Modbus TCP

Prerequisite

The inverter or energy management system must be connected with the EV charging box via a Modbus TCP interface.

The interfaces of inverters are not standardised. If the inverter is changed or replaced, there may be communication errors between the inverter and the EV charging box.

The inverter or energy management system communicates directly with the EV charging box and the energy meter in the domestic installation. An additional energy meter is not required. If sufficient power is available, the EV charging box can charge with PV current.

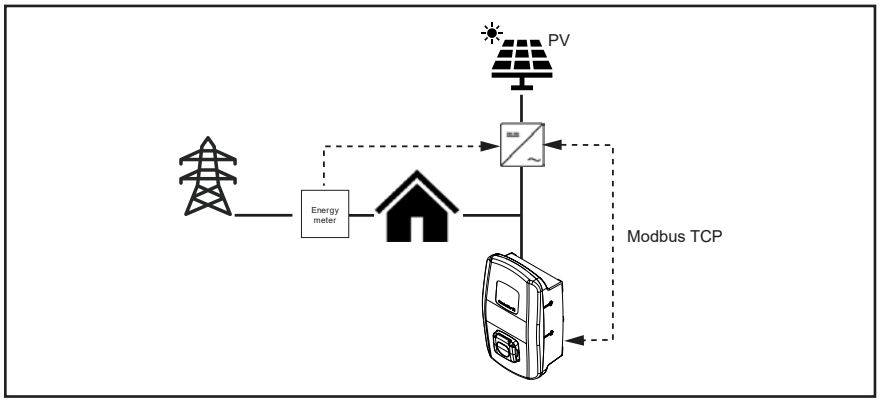


Figure 4.2 PV optimised charging with inverter (Modbus TCP)

Charging modes for PV optimised charging

There are three modes available for PV optimised charging in the web server and in the app:

Pure PV charging mode
Only PV current is used for charging. The EV charging box only charges if sufficient power is available from the PV system. There may be pauses in charging during fluctuations.

Mixed mode
For charging, a minimum current value and number of phases are defined at which charging can be carried out without pauses. The power is drawn from the PV system or from the grid, depending on availability. If the PV system produces more power than the specified minimum charging current, then more power and more phases are used for charging. As soon as less charging current is available, the number of phases is automatically adjusted.

Booster mode
The maximum available power provided by the PV system and the grid is used for charging. Either a maximum duration or a maximum quantity of energy can be defined for booster mode. Once the respective limit is reached, the mode changes to either pure PV charging mode or mixed mode, depending on the setting. This changeover can be disabled, so that booster mode is always active.

4.14 User authentication

Each EV charging box can be operated without user authentication (Free-mode). In order to prevent unauthorised use of EV charging boxes, user authentication via an RFID tag, an external switching device or Powerline communication can be configured in the AC SMART app or in the web server. In addition, a charging process can be authorised via the AC SMART app, the web server, Modbus TCP, Modbus RTU, OCPP and external tag list (such as with SMARTcharge). Further information and application notes are available in our online catalogue.

RFID tag (VALUE and ADVANCED only)

A charging process can be authorised with a registered RFID tag. 5 pre-registered RFID tags are included in the scope of delivery for each EV charging box. A maximum of 16 RFID tags can be registered for each EV charging box. The RFID tags can be managed in the AC SMART app and in the web server, see Chapter 9.3.

External switching device

The EV charging box is connected to an external switching device that controls the authorisation of the charging process, such as a key switch. The external switching device is connected to the EV charging box via the digital inputs; the inputs must be configured in the web server, see Chapter 9.3.

Powerline communication (ADVANCED only)

If the vehicle supports Powerline communication, the MAC address of the vehicle can be read out. This unique identification of the vehicle makes it possible to automatically start and end a charging process. Each EV charging box can manage a maximum of 16 MAC addresses. The MAC addresses can be managed in the AC SMART app and in the web server, see Chapter 9.3.

5 Unpacking and checking the scope of delivery

5.1 Unpacking the delivery

► Remove all parts of the EV charging box from the packaging, including the supplied documents.

You can use the cardboard with which you lifted the EV charging box out of the box as a drilling template.

► Keep the packaging in order to store the EV charging box in it when it is not installed, see Chapter 6.
► Dispose of the packaging according to local regulations.

5.2 Checking the scope of delivery

► Check that the delivery is complete and that all parts are undamaged.

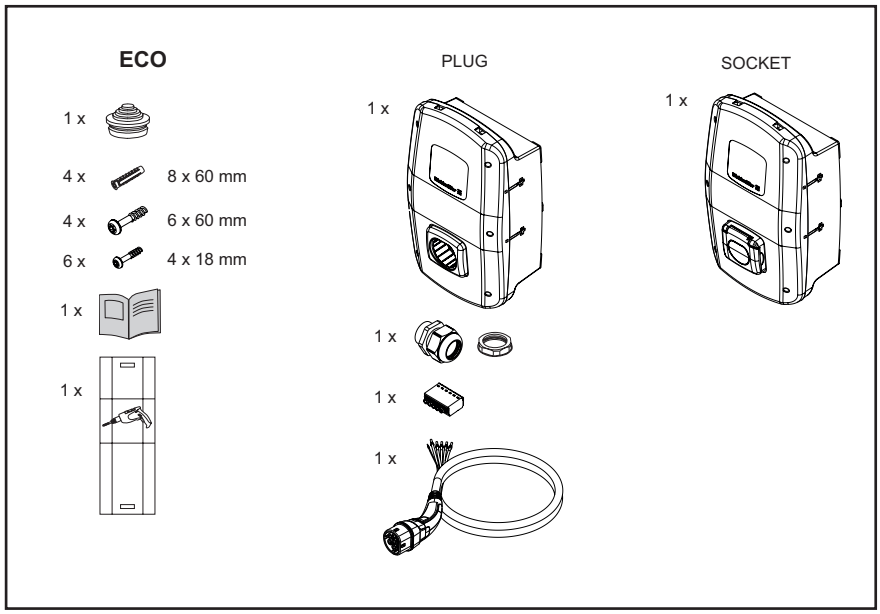


Figure 5.1 Scope of delivery for the product line ECO

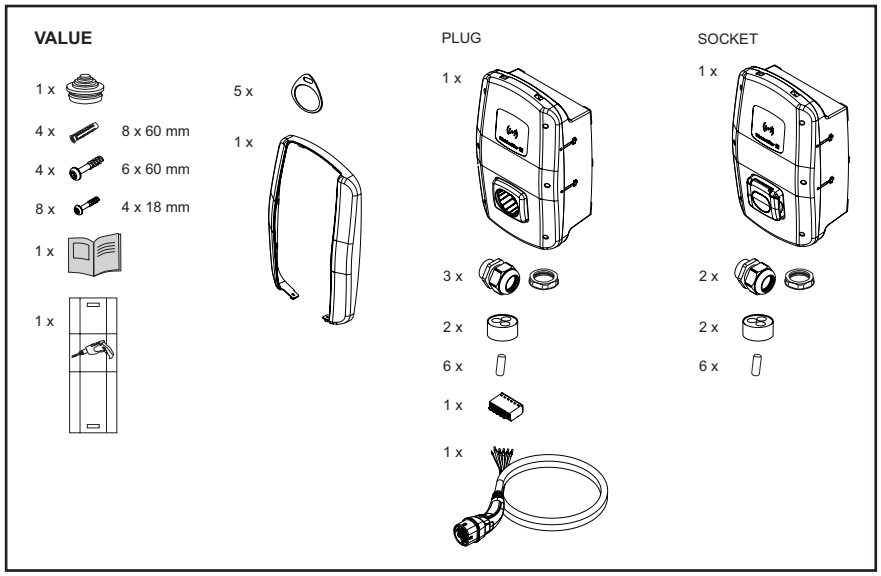


Figure 5.2 Scope of delivery for the product line VALUE

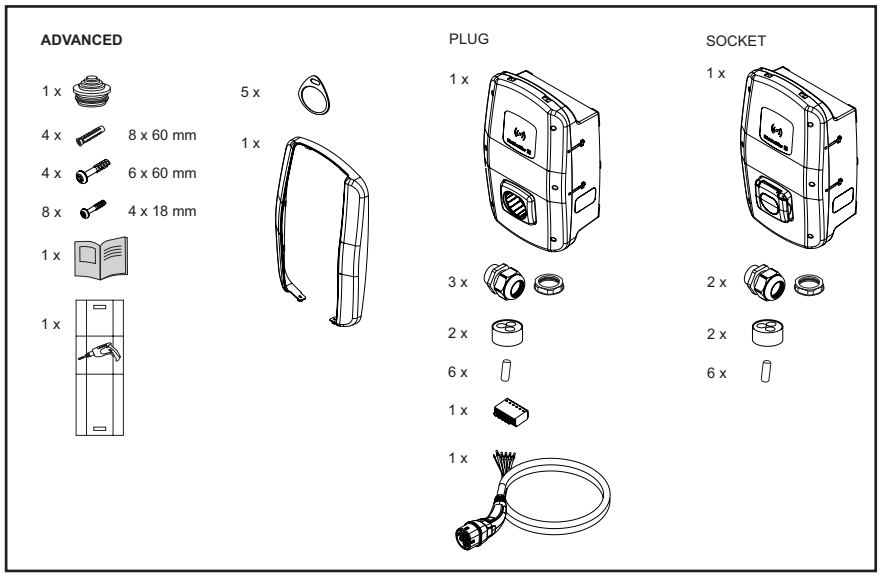


Figure 5.3 Scope of delivery for the product line ADVANCED

6 Storing the EV charging box

⚠ WARNING!

Risk of injury if the EV charging box is damaged

Improper storage can cause the EV charging box to be damaged due to penetration by dust, dirt, or humidity. In this case, operational reliability will no longer be ensured.

► Protect the unassembled EV charging box from dust, dirt and humidity, e.g. by storing it in its original packaging.

► Store the EV charging box according to the recommended ambient conditions (see Chapter 15).

7 Preparing for installation

7.1 Selecting the installation site

Select an installation site that meets the following requirements.
– Flat, vertical wall or stand
– Substrate suitable of supporting at least 100 kg. The substrate must be able to bear not only the weight of the EV charging box, but must also hold securely if there is an accidental tensile load, for instance caused by the charging cable or an impact.
– Sufficient space to operate the EV charging box
– Suitable ambient conditions

► Also observe the safety information (Chapter 2) and the information in the technical data (Chapter 15).

7.2 Ordering installation

► Contact your grid operator to determine the applicable specifications and provisions for using EV charging boxes in your location.
► Commission a qualified electrician to install the EV charging box.
► Observe the safety information in Chapter 2 as well as the Assembly and installation instructions enclosed with the EV charging box.

7.3 Tools required

Tools required	Recommended
Spirit level	
Pin	
Drill	
Drill bit diam. 8 mm, length > 60 mm	
Hammer	
Cable cutter	Weidmüller KT 45 R (9202040000)
Stripping tool	Weidmüller AM-X (2625720000)
Stripping tool	Weidmüller MULTI-STRIPAX 1.5-6.0S (9204560000) or Weidmüller MULTI-STRIPAX 6-16 (9202210000)
Crimping tool	Weidmüller STRIPAX PLUS 2.5 (9020000000)
Torx® screwdriver T20	Weidmüller SDIT SLIM T20 X 100 (2749720000)
Torx® screwdriver T30	Weidmüller SDIT SLIM T30 X 150 (2749740000)

Weidmüller tools are available in our online catalogue.

7.4 Checklist before installation

We recommend checking the following points before assembly and installation of the EV charging box:

- The locally applicable assembly and installation regulations are known and can be complied with.
- The circuit breaker and residual current circuit breaker are installed according to the desired power rating and the installed line lengths.
- The required tools and materials are available.
- The enclosed fastening materials have been checked and are suitable for the intended installation location. If not, other suitable installation materials are prepared.
- The required lines and cables are available:
  - Power supply cable (possible cable diameters: 14 – 54 mm)
  - Signal cable and data cable (optional)

8 Planning the installation

8.1 Installation guidance

► Commission an electrician with the installation of the EV charging box.
► Observe the assembly and installation instructions.

Installation guidance		
Earthing	TN system IT system	PE conductor
	TT system	Earthing electrode (to be installed separately)
Input	1-phase	230 V, 50 Hz (TN, IT/TT)
	Three-phase	400 V, 50 Hz (TN) 230 V, 50 Hz (TN, IT/TT)
Circuit breakers	C characteristic, selection according to the manufacturer's specification and current strength settings for the EV charging box	
Residual current circuit breaker	30 mA AC, type A	

► Ensure that the intended earthing connection conforms to the local valid specifications.
► Observe the required triggering characteristic for the residual current circuit breaker, depending on local specifications and on the vehicle manufacturer, e.g. type B.

8.2 Network systems

ATTENTION!

Possible destruction of the EV charging box

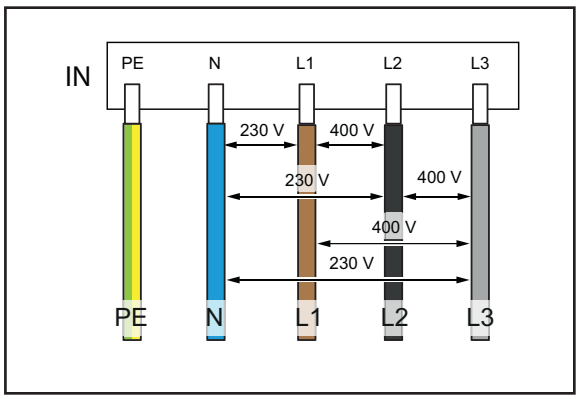
Incorrect installation may cause the destruction of the EV charging box.

► The connection terminals of the neutral conductor must always be connected in all network systems.

► Observe the Assembly and installation instructions.

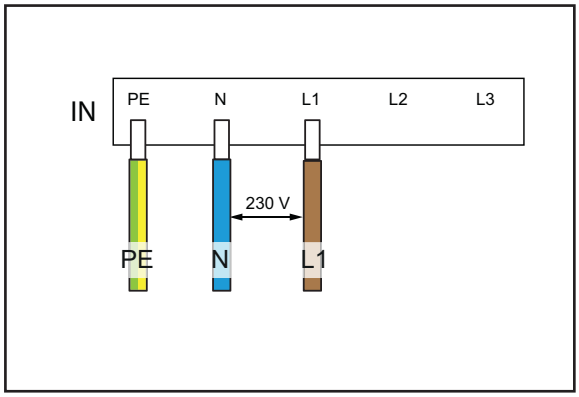
TN system

400 V 3-phase with neutral conductor



Each of the three phases, L1, L2, L3 must be connected to L1, L2, L3 of the PCB terminal block of the EV charging box. The neutral conductor is connected to N of the PCB terminal block. Each phase voltage must be within a range of 207 to 253 V rated voltage to the neutral conductor.

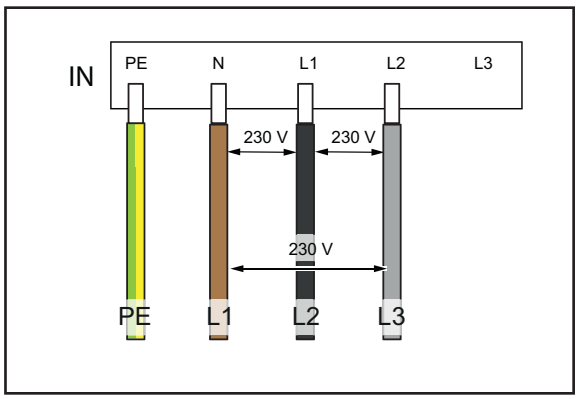
230 V 1-phase with neutral conductor



Any phase must be connected to L1 of the PCB terminal block of the EV charging box. The neutral conductor must be connected to N. The phase voltage between the conductor and neutral conductor must be in a range of 207 to 253 V rated voltage.

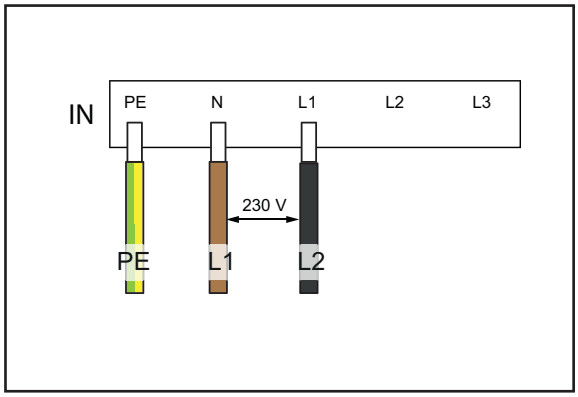
IT system / TT system

230 V 3-phase without neutral conductor



Without a neutral conductor, any three phases must be connected to L1, L2 and N of the PCB terminal block of the EV charging box. The phase voltage between the cables must be in a range of 207 to 253 V rated voltage.

230 V 1-phase without neutral conductor



Without a neutral conductor, any two phases must be connected to L1 and N of the PCB terminal block of the EV charging box. The phase voltage between the cables must be in a range of 207 to 253 V rated voltage.

8.3 Checklist for initial commissioning

A commissioning protocol is available in our online catalogue.

On the EV charging box has been mounted and all connections have been installed, the following points must be checked:

- ► Check to ensure all screws in the back of the EV charging box are tightened.
- ► Check to ensure all cables fit properly on the terminal connections.
- ► Ensure that all cable entries are fully sealed or fitted with blanking plugs.
- ► Ensure that all cable glands are firmly closed.
- ► Screw in the cover of the EV charging box firmly.
- ► Check to ensure all screws are tightened.
- ► If available, install the design frame.
- ► Switch on the power supply to the EV charging box.
- ► Check the status LED.
- ► Complete the initial electrical commissioning according to the commissioning protocol. Observe the requirements of applicable standards and locally applicable installation regulations.
- ► Complete the commissioning protocol .

9 Networking and configuring the EV charging box

You can integrate a single EV charging box into a local network using an Ethernet cable, for instance via a switch in the network, or via a central network router. In addition, you can connect multiple EV charging boxes together to form a charging network.

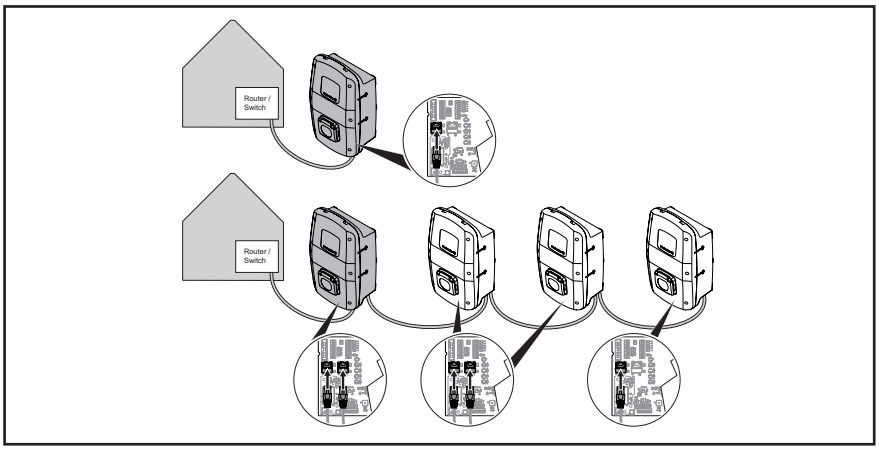


Figure 9.1 EV charging box with LAN connection and charging network

The first time the EV charging box is connected to the local network, the following steps must be carried out:

– Connecting the EV charging box with the local network via Ethernet cable
– Adjusting the network settings (assign an IP address)
– Starting the web server of the EV charging box
– Configuring the EV charging box in the web server
– If desired, connecting the EV charging box to an existing WLAN

If several EV charging boxes are to be installed: please note that DHCP is disabled on delivery and that all EV charging boxes have the same IP address. To prevent IP address conflicts, always change the IP address of each individual EV charging box before connecting the EV charging box to an existing network.

9.1 Connecting the EV charging box with the local network

⚠ WARNING!

Risk to life due to electric shock

There is a risk of electric shock when working on the electrical installation of the EV charging box.

► Commission a qualified electrician to network the EV charging box.

To integrate the EV charging box into an existing local network, proceed as follows:

► Ensure that the EV charging box is not connected to a vehicle.

► Ensure that power to the EV charging box is switched off.

► Dismount the design frame, if available.
► Unscrew the screws in the cover of the EV charging box and open the EV charging box.
► If no Ethernet cable was installed in the EV charging box during initial installation, add another cable entry in the housing of the EV charging box and insert a cable entry. Observe the Assembly and installation instructions.
► Route the Ethernet cable through the cable gland and connect the cable to Ethernet interface X3 of the control board in the housing cover.
► Close the EV charging box and screw the cover back on.
► Install the design frame, if available.
► Switch on the EV charging box.

The next steps:
– Adjust the network settings (assign an IP address), see Chapter 9.2.
– Configure the EV charging box in the web server, see Chapter 9.3.

9.2 Assigning the network settings and IP address

Prerequisite

The EV charging box must be connected to a local network via LAN cable, see Chapter 9.1.

► Start your computer.
► Press the **Win+R** buttons.
The **Execute** window opens.

► Enter the command `ncpa.cpl` and confirm by pressing **OK**.
► Right click on the cabled network connection and click **Properties**.

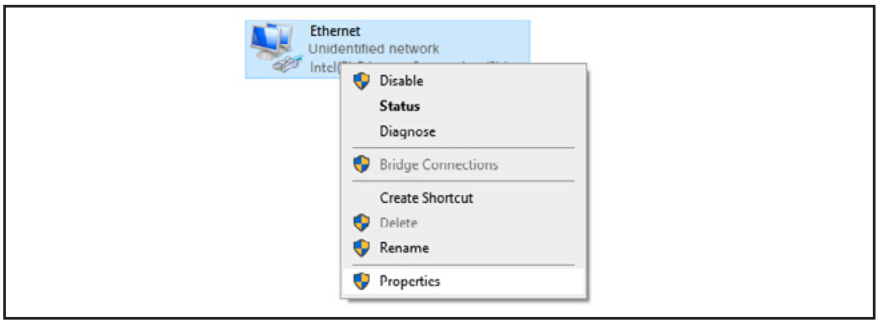


Figure 9.2 Selecting the network connection

► Click **Internet protocol, version 4 (TCP/IPv4)** and then click **Properties**.

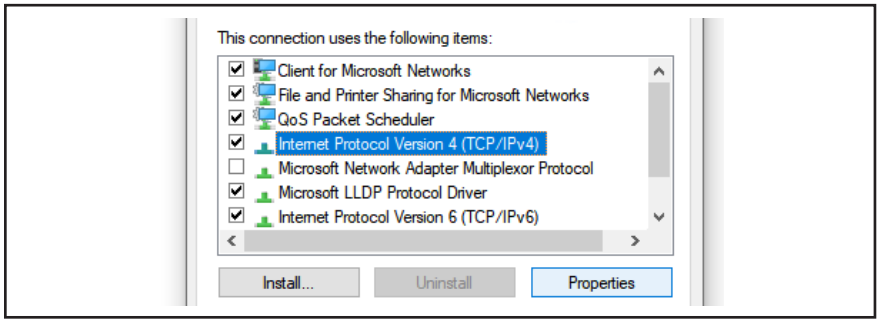


Figure 9.3 Selecting internet protocol

If there is already data in the fields, note the data and settings so that you will be able to access the network later on.
If there is no data present, you can select the point **Get IP address automatically** again later on.

► Enable the option **Use the following IP address.**
► Enter an IP address between 192.168.0.2 and 192.168.0.254 (except for 192.168.0.8).
► Enter 255.255.255.0 as the subnet mask.
► Confirm by pressing **OK**.

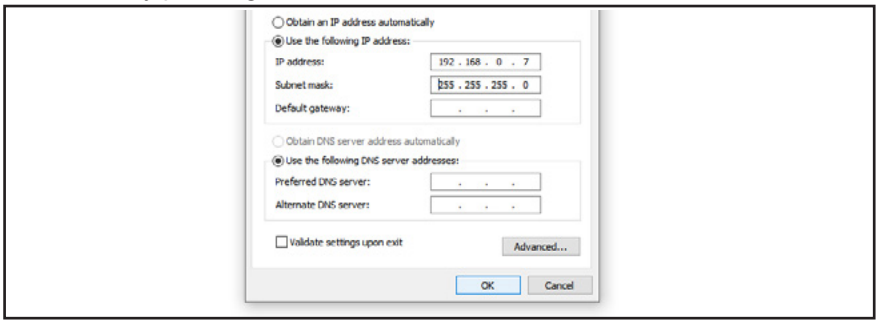


Figure 9.4 Define the IP address

192.168.0.8 is the default static IP address assigned for the EV charging box. DHCP is disabled on the Ethernet interface upon delivery. You can change the DHCP setting in the web server of the EV charging box. Please note that there may be IP address conflicts if you are still connected to other networks that use the same subnet.

9.3 Configuring the EV charging box in the web server

The electrical configuration of the EV charging box may only be carried out by an electrician.

Access to the web server is password protected, and there are two user roles with different rights. The electrician must log in as an **Admin** in order to complete the electrical configuration of the EV charging box. Operators or users of the EV charging box can change certain settings using the role **User**.

Starting up the web server

Prerequisite

To start the web server, the EV charging box must be connected to a local network via LAN cable and the network settings must be adjusted, see Chapter 9.1 and Chapter 9.2. A laptop or mobile device must also be connected to the network.

► Open a web browser.
► Enter the IP address of the EV charging box in the address line: http://192.168.0.8

The web server will be started up. Your login data will be requested.

The following login data apply on delivery:
– Role: Admin
– Password: zyVt45Nv0y

– Role: User
– Password: Detmold01

► Select the role and enter the password.
► Confirm the input.
The status page of the web server is displayed.

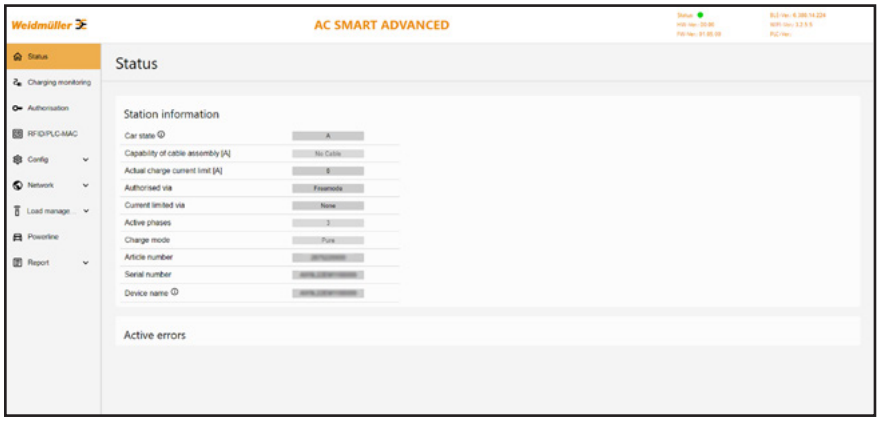


Figure 9.5 Status page of the web server

To prevent unauthorised access, you should change the password immediately. Observe the local data security regulations.

Changing a password

As a **User**, you can only change your own password. As an **Admin**, you can change all passwords.
► Click **Network/General**.
► Change the password.
► Click **Save**.

Connecting the EV charging box to an existing WLAN

You can connect the EV charging box to a WLAN network. You can search for available WLAN networks, or manually enter a known WLAN network.

Searching for WLAN networks

► Click **Network/WiFi**.
► Click **Start**.
All networks that are found will be displayed in a drop down menu.
► Select your network and click **Select**.
Your network will be displayed in the field SSID.
► Enter the network password.
► Click **Save**.
► To connect to the network, click **Connect**.
► Click **Update** to update the page.

Entering the WLAN network manually

► Enter the SSID for your WLAN network.
► Enter the network password.
► Click **Save**.
► To connect to the network, click **Connect**.
► Click **Update** to update the page.

The newly assigned IP address will be displayed in the field **IP address**. Make a note of the IP address, as you can use this IP address to access the web server of the EV charging box in your network.

Displaying the LAN connection and setting DHCP

► Click **Network/Ethernet**.
► Enter new network data if desired.
► If desired, enable **DHCP**.
► Click **Save**.

Changing the name of the EV charging box

► Click **Network/General**.
► Change the name.
► Click **Save**.

The change is adopted the next time the EV charging box is restarted.

► Click **Restart**.

Changing the date and time

You can enter the date and time manually or synchronise them with your computer.

► Click **Config/General**.
► Enter the date and time.

or

► Click **Sync time with PC** to synchronise the values with the PC.
► Click **Save**.

The date and time must be reset after a restart. The time is synchronised automatically if there is an active OCPP connection.

Adjusting the availability of the charging function

If the charging function of the EV charging box needs to be disabled, e. g. for a maintenance process, you can control the **availability** of the charging function using the functions **Available** and **Unavailable**.
There is also the **Unavailable scheduled** function. If a charging process is active, the charging function is only disabled once the vehicle is disconnected from the EV charging box. To start a new charging process, the availability of the charging function must be enabled once again.

► Click **Config/General**.
► Set the desired function.
► Click **Save**.

Setting the charging phases

Charging processes with one or three charging phases are possible, depending on the vehicle. You can switch between single phase and three phase charging during an active charging process.

► Click **Config/General**.
► Set the **Charging phases.**
► Click **Save**.

Setting the maximum limit for charging current during initial commissioning

Prerequisite You must be logged in as an Admin. Electrician only!

The maximum limit (**Installation current limit [A]**) is dependent on the domestic installation and the specifications and provisions applicable on site. The maximum limit cannot exceed the specified maximum limit (**Current limit of the charging station [A]**).

► Click **Config/General**.
► Change the value.
► Click **Save**.

Reducing the charging current

The value **User current limit [A]** describes the maximum available charging current. This value cannot exceed the maximum limit for the charging current (**Installation current limit [A]**). At least 6 A is required to be able to start a charging process. When the setting is 0 A there is no charging at all, and any active charging process pauses.

► Click **Config/General**.
► Change the value.
► Click **Save**.

Setting the maximum asymmetrical phase current

Prerequisite You must be logged in as an Admin. Electrician only!

The maximum charging current must be limited **(Max current asymmetrical)** for vehicles that do not use all three phases. The maximum asymmetrical current is dependent on the domestic installation and the locally applicable specifications and provisions.

► Click **Config/General**.
► Change the value.
► Click **Save**.

Adjusting the LED brightness

► Click **Config/General**.
► Change the value.
► Click **Save**.

Setting the LED inactivity

The LED inactivity function can be used to switch off the status LED whenever the status of the EV charging box does not change during a defined time period, for instance during the charging process. Once the status of the EV charging box changes, the status LED is active once again and the timer is reset. The function LED inactivity is enabled upon delivery.

► Click **Config/General**.
► Enable **LED inactivity.**
► Change the value.
► Click **Save**.

Setting up user authentication

Each EV charging box can be operated without user authentication (Freemode). User authentication can be configured in order to prevent unauthorised use of EV charging boxes. The following authentication methods are available:

– RFID
– Website, Modbus RTU, Modbus TCP and AC SMART app
– Digital input (via external switching device)
– Powerline (MAC address)
– External tag list

The EV charging box is set up as follows as a default:

– ECO: charging without authentication (Freemode is enabled)
– VALUE and ADVANCED: charging with authentication (Freemode is disabled)

► Click **Authorisation**.
► Enable the desired function (**Allowed authorisations**).
► If you are using the EV charging box with a backend, assign a **Local authorise tag**.

The **Local authorise tag** can be used for all functions that require a tag and for which no tag is available for authorisation as a standard. There is an individual tag as a standard for Powerline communication and RFID. A Local authorise tag can be used for the digital inputs, the web server, the AC SMART app and Modbus TCP. On delivery, the **Local authorise tag** is the serial number.

► Click **Save**.

Adjusting the transmission strength of the RFID module

The RFID module has two modes:

– Full power
– Half power

The **Full power** mode requires more power, but increases the transmission range. We recommend this mode if RFID cards are used for authentication. The **Half power** mode requires less power. This mode is sufficient for the included RFID tags.

► Click **RFID/PLC-MAC.**
► Select the desired **RFID power option.**
► Click **Save**.

Managing RFID tags

RFID tags can be registered, authorised, blocked and deleted.

To register a new RFID tag, proceed as follows:

► Click **RFID/PLC-MAC.**

► In the **Learn new tag** field, click **Start.**

► Hold the RFID tag in front of the interaction area of the EV charging box within 60 seconds.

After registration is complete, you will hear a confirmation signal.

► Click **Update**.

The ID of the detected RFID tag is displayed in the field **Last found tag** and in the tag list. The status **Accepted** is displayed in the **Status** selection field.

► If you want to assign the ID a name, enter it in the list.

► If you want to block a registered RFID tag, change its status in the **Status** selection field.

► Click **Save**.

To delete a registered RFID tag, you can execute an unlearn process or delete the tag from the tag list.

Unlearning a tag

► Click **RFID/PLC-MAC.**

► In the **Unlearn tag** field, click **Start.**

► Hold the RFID tag in front of the interaction area of the EV charging box within 60 seconds.

After deletion is complete, you will here a confirmation signal.

► Click **Update**.

The RFID tag is no longer displayed in the tag list.

Deleting from the tag list

► Click **Delete** beside the RFID tag you want to delete.

The RFID tag is no longer displayed in the tag list.

Managing MAC addresses

The MAC addresses of electric vehicles can be registered, authorised, blocked and deleted.

To register a new MAC address, proceed as follows:

► Click **RFID/PLC-MAC.**

► In the **Learn new tag** field, click **Start.**

► Connect your vehicle to the EV charging box within 60 seconds.

After registration is complete, you will hear a confirmation signal.

► Click **Update**.

The MAC address is displayed in the field **Last found tag** and in the tag list. The status **Accepted**is displayed in the **Status** selection field.

► If you want to assign the MAC address a name, enter it in the list.

► If you want to block a registered MAC tag, change its status in the **Status** selection field.

► Click **Save**.

To delete a registered MAC address, you can execute an unlearn process or delete the MAC address from the tag list.

Unlearning a tag

► Click **RFID/PLC-MAC.**

► In the **Unlearn tag** field, click **Start.**

► Connect your vehicle to the EV charging box within 60 seconds.

After deletion is complete, you will here a confirmation signal.

► Click Update.

The MAC address is no longer displayed in the tag list.

Deleting from the tag list

► Click **Delete** beside the MAC address you want to delete.

The MAC address is no longer displayed in the tag list.

Configuring digital inputs

Prerequisite

You must be logged in as an Admin. Electrician only!

You can configure the digital inputs for the following functions:

– Release charging process via external switching device (Charging release)

– Restricting the charging current (current limitation)

If the digital input is active, the maximum charging current according to the setting is made available. When the setting is at 100%, the maximum charging current is used; when the setting is at 0%, there is no charging at all.

► Click **Config/Digital inputs.**

► Change the function of the desired digital input.

► Enable the function.

► Enable **Input monitoring** if necessary.

► Click **Save.**

You can view the current switching status of the digital inputs in the **Status** field. If there is a signal at an input, a tick mark is added to the status field.

Setting up load/charge management

Prerequisite

You must be logged in as an Admin. Electrician only!

If you are working with Modbus TCP, the Modbus TCP interface must be configured as **WIFI** or **Ethernet**. If you are working with Modbus RTU, the Modbus RTU interface must be configured accordingly, see Chapter 9.4. The RTU interface is configured automatically for internal load/charge management and the stored energy meters (see Chapter 4.12).

There must be a control box in each charging network. Each additional EV charging box that is part of the same charging network must be configured as a satellite box.

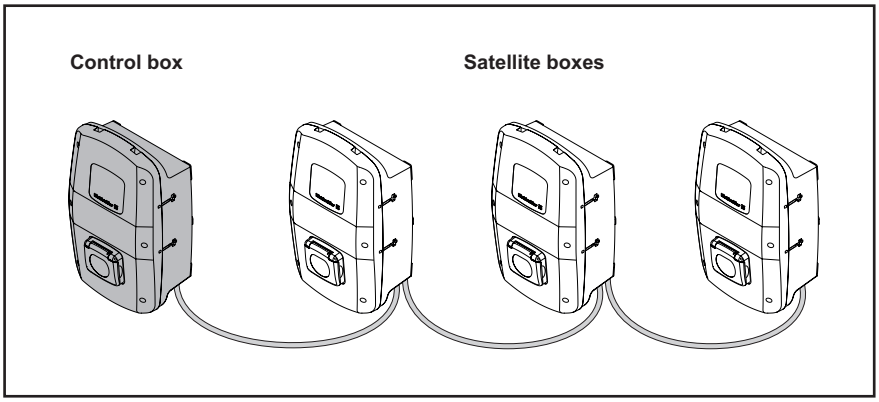


Figure 9.6 Charging network

► Click **Load management/General**.
► Enable **Satellite** or **Control box**.
► Only for dynamic load/charge management and only for the control box (Control box): Enable **Dynamic.**
► Only for the control box: Enter the desired value for the **global current limit [A]**.
► For **Connection to external measurement**, select the desired interface **TCP** or **RTU**.

Only with ADVANCED and with PV surplus charging of the VALUE variant: only the stored energy meters (see Chapter 4.12) can be used for Modbus RTU. The values for the installed energy meter must be separately entered in the **Load management/ External measurement** menu for Modbus TCP.

► Only for the control box: enter the IP addresses for all connected satellite boxes.
► Click **Save**.
► Click **Refresh**.

The **Connected** field shows whether communication between the satellite box and control box is possible. The page must be updated to view the current status.

Setting up PV optimised charging

Prerequisite

An EV charging box must be set up as the control box.

You can enable and disable PV optimised charging (PV optimised charging). You can also configure the following settings:
– Charging mode (PV charging mode)
– Charging mode after booster mode (PV charging mode after booster mode)
– End condition for booster mode (End condition for booster mode)
– Charge duration for booster mode (booster completion condition time [min])
– Quantity of energy for booster mode (booster completion condition energy [kWh])
– Minimum charging current in mixed mode (Minimum charging current in mixed mode [A])
– Minimum quantity of charging phases in mixed mode (Minimum number of phases for mixed mode)

If multiple EV charging boxes are connected, **PV optimised charging** may only be enabled in the control box. The control box regulates the satellite boxes according to the settings for PV optimised charging as well as for load/ charge management. The charging modes can be changed in the satellite boxes.

► Click **Load management/PV charging.**
► Select the desired **PV charging mode**.

Setting up pure PV mode

► Select **Pure PV.**
► Enable **PV optimised charging.**
► Click **Save**.

Setting up booster mode

► Select **Booster**.
► Select the desired **PV charging mode after booster mode**.
► Select the desired **Completion condition for booster mode**.
► Enter the desired value.
► Select the option **None** as the **Completion condition for booster mode** if there is to be no limit for booster mode.

If the option **None** is selected as the **Completion condition for booster mode**, the control box continues to regulate this EV charging box in accordance with the load/charge management so that the EV charging box is not overloaded.

► Enable **PV optimised charging.**
► Click **Save**.

Setting up mixed mode

► Select **Mixed**.
► Enter the desired value for **Minimum charging current in mixed mode [A]**.
► Enter the desired value for **Minimum number of phases for mixed mode**.
► Enable **PV optimised charging.**
► Click **Save**.

Setting up the OCPP backend connection

Prerequisite

You must be logged in as an Admin. Electrician only!
The data required to set up the OCPP connection is available from the provider of your OCPP backend. **OCPP manufacturer** and **OCPP model name** may be a maximum of 40 characters long. The data type for the characters is **unit** and the value range is from 0 to 4294967295.

► Click **Network/Cloud**.
► Select the desired **Interface**.
► Enter the data.
► Click **Save**.

Updating the firmware

Prerequisite

Firmware version 01.05.00. The EV charging box must be connected to a network via WLAN or LAN.
The release notes and the current firmware (.pak file) can be found in our online catalogue. Depending on the product variant, you can update the following components with the firmware file:

– Firmware for the EV charging box
– Bluetooth module
– WiFi module
– Powerline module

► From version 01.06.01: Select the desired language version.
► Download the latest firmware file.
► Click **Config/Firmware update**.
► Click **Select file**.
► Select the current firmware file.
► Click **Open**.
The available update options and the installed firmware versions are displayed.
► If desired, disable individual updates.
► To start the update, click **Start**.

The upload status is displayed in the overview. After a successful update, the EV charging box will restart automatically**.**

Resetting the EV charging box to factory settings

Prerequisite

All settings and data will be reset to factory settings or deleted.

You must be logged in as an Admin. Electrician only!
The EV charging box may not be connected to a vehicle.

You can reset the EV charging box in the web server or via the power supply.

Resetting the EV charging box in the web server
► Click **Config/General**.
► Click **Start**.
► Confirm the reset.

Resetting the EV charging box via the power supply
The EV charging box must be disconnected from the power grid ten times.
► Switch off the residual current circuit breaker and wait 30 seconds.
► Switch on the residual current circuit breaker.
► Wait 30 seconds and repeat the steps.

The EV charging box will be reset to factory settings and restarted automatically.

Configuring the digital output

You can freely configure the digital output. The following settings are available:
– The output is switched to be non-functional (continuously 0 V).
– The output puts out a high signal if a charging process is active (status C).

► Click **Config/General**.
► Select the desired setting.
► Click **Save**.

Downloading and deleting charging data

You can download the charging data for the charging processes as a csv file. You can also delete the available charging data.

Downloading charging data
► Click **Charge monitoring**.
► To download the charging data, click **Download**.

Deleting charging data

► To delete the charging data, click **Delete.**

► Confirm the input.

Configuring the SIM card

Prerequisite

You must be logged in as an Admin. Electrician only!

You can configure a new SIM card for the mobile modem. The required data is provided by the mobile phone provider.

► Click **Network/Cellular**.

► Enter the required data.

► Click **Save**.

The change is adopted the next time the EV charging box is restarted.

► Click **Restart**.

9.4 Connecting the EV charging box to an external device (Modbus)

EV charging boxes in the AC SMART product family can be controlled via Modbus RTU or Modbus TCP via an external management system. The external management system is the client. The EV charging boxes are configured as servers upon delivery. There may be only one client, but multiple servers. The Modbus TCP interface can be used by LAN and WLAN.

► Commission an electrician.

► Observe the Assembly and installation instructions.

Connection via Modbus TCP (LAN)

The EV charging boxes in the AC SMART product family can be connected to an external device via interfaces X2 or X3. Upon delivery, the Modbus TCP interface is configured as follows:

Ethernet interface	100Base-TX according to IEEE 802.3u / 10Base-T according to IEEE 802.3
Connection type	RJ45 socket /Ethernet
Protocol	Modbus TCP
Transfer rate	10/100 Mbit/s
Max. cable length	100 m
Recommended cable	CAT-6

DHCP is disabled upon delivery. The charging controller is accessible as follows:

IP address	192.168.0.8
Port	502
Device ID	255

Also observe the Modbus register. The tables are available in our online catalogue.

Connection via Modbus TCP (WLAN)

Prerequisite

To use the Modbus TCP interface via WLAN, the EV charging box must be connected to a WLAN network, see Chapter 9.3.

► Start the web server of the EV charging box.
► Click **Config/General**.
► Change the desired function (**Modbus TCP**).
► Click **Save**.

The change is adopted the next time the EV charging box is restarted.

► Click **Restart**.

Connection via Modbus RTU

The EV charging boxes in the AC SMART product family can be connected via interfaces X5.1 and X5.2 on the control board in the housing cover in a Modbus RTU network (RS485). Upon delivery, the Modbus RTU interface is configured as follows:

Address	100
Speed	19200
Parity	None

In the VALUE and ADVANCED product lines, the RTU interface has a switchable terminating resistor. The terminating resistor is enabled as a default.

► Connect the external device to the Modbus RTU interface (X5.1 and X5.2) of the control board in the housing cover.
► Start the web server, see Chapter 9.3.
► Click **Config/Modbus RTU server**.
► Change the values.
► Click **Save**.

The change is adopted the next time the EV charging box is restarted.

► Click **Restart**.

Also observe the Modbus register. The tables are available in our online catalogue.

9.5 Connecting the EV charging box to an external device (digital input)

You can connect each of the digital inputs in the EV charging box with an external switching device.

► Commission an electrician.

► Observe the Assembly and installation instructions.

The input can either be switched by the internal power supply of the EV charging box (X6.7 and X6.8) or by an external 12 V voltage source with jointly used GND (X6.6).

If there is a high signal on the selected digital input (logical 1), then the selected function is executed.

Voltage 0 … 3 V	logical 0
Voltage +9 ... +15 V	logical 1

Each digital input has an input resistance of 2 kOhm and generates a clearing current of 6 mA at 12 V.

9.6 Starting Bluetooth pairing mode

Via power supply

► If the EV charging box is connected to the power grid, switch the residual current circuit breaker or circuit breaker off.

► Switch the power supply on after 10 to 12 seconds and then back off after 10 to 12 seconds.

► Switch the power supply on a second time after 10 to 12 seconds and then back off after 10 to 12 seconds.

► Switch the power supply on a third time after 10 to 12 seconds.

The EV charging box will now be in pairing mode for 5 minutes. The status LED will flash blue.

After the pairing is complete, pairing mode is ended automatically.

Via integrated web server

► Start the web server, see Chapter 9.3.

► Click **Network/General**.

► Under **Pairing mode**, click **Start** to start pairing mode.

The EV charging box will now be in pairing mode for 5 minutes. The status LED will flash blue.

After the pairing is complete, pairing mode is ended automatically.

9.7 Pairing the EV charging box with the AC SMART app

Prerequisite

You have installed the AC SMART app on your mobile device.

► Start the app.
► If you are accessing the app for the first time, after the introduction you will be directed to the pairing menu.
► Start Bluetooth pairing mode, see Chapter 9.6.
► Follow the instructions in the app.

9.8 Configuring the EV charging box via the AC SMART app

Prerequisite

You have the AC SMART app installed on your mobile device and your EV charging box is coupled to the app, see Chapter 9.7.

An introduction and notes on settings are available in the app. The following functions are available in the app:

– Monitoring the status of the EV charging box
– Releasing and ending a charging process
– Setting the LED inactivity
– Setting the LED brightness
– Registering, managing and deleting RFID tags
– Registering, managing and deleting MAC addresses
– Connecting to a WLAN/LAN network
– User authentication
– Changing the name of the EV charging box
– Setting the maximum charging current (user current limit)
– Displaying the charging history
– Setting PV mode
– Update the firmware of the EV charging box

► Open the app.
► Tap the EV charging box you want to configure.
► In the detailed view, tap the gear icon to access the settings.

10 Operating the EV charging box

⚠ CAUTION!

Risk of injury if the EV charging box is damaged

A damaged or incomplete EV charging box can lead to malfunctions and hazards.

► Check the EV charging box and its accessories for obvious damage before each use.

Damage to the charging cable and the EV charging box

Pulling or tearing the charging cable can cause damage to the cable and the EV charging box.

► To remove the charging cable, always pull on the plug and not on the cable.

Danger of tripping due to a charging cable lying around

If the charging cable is lying on the floor, people may trip over it and the cable may be damaged by crushing or kinking.

► Lay the charging cable so that it cannot be crushed or bent and there is no risk of tripping.

10.1 Charging the vehicle

Prerequisite

The EV charging box is ready for operation and the status LED is continuously illuminated green. If the status LED is not illuminated green, either the status LED is inactive or the EV charging box is not ready for operation, see Chapter 12.

Starting the charging process (SOCKET variant)

Always connect the charging cable to the EV charging box first, and then to the vehicle.

► Connect the charging cable to the charging socket of the EV charging box.

► Connect the charging cable to the vehicle.

Both charging plugs are interlocked. The status LED on the EV charging box is illuminated blue.

If no authentication is configured (Freemode), then the charging process will start automatically. The status LED on the EV charging box is illuminated blue and pulsing.

If user authentication is configured, additional steps are required and will depend on the type of authentication, see Chapter 10.2.

Starting the charging process (PLUG variant)

Unwind the charging cable completely before starting a charging process.

► Connect the charging cable to the vehicle.

The charging plug on the connected vehicle is interlocked. The status LED on the EV charging box is illuminated blue.

If no authentication is configured, then the charging process will start automatically. The status LED on the EV charging box is illuminated blue and pulsing.

If user authentication is configured, additional steps are required and will depend on the type of authentication, see Chapter 10.2.

10.2 Performing authentication

Authentication with the AC SMART app

► Start the AC SMART app.

► Couple the app to the EV charging box, see Chapter 9.7.

► Select the EV charging box.

► Tap **Start charging process**.

The charging process will start. The status LED on the EV charging box is illuminated blue and pulsing.

Charging after authentication via RFID tag

The RFID icon will be illuminated white and pulsing.

► Hold a registered RFID tag in front of the interaction surface of the EV charging box.

After successful authentication, you will hear a rising sequence of tones. The RFID icon will be illuminated continuously white.

The charging process will start. The status LED is illuminated blue and pulsing.

Charging after authentication via web server

► Start the web server.

► Click **Authorisation**.

► Click **Start** to release a charging process.

The status **Enabled** is displayed. The charging process will start. The status LED on the EV charging box is illuminated blue and pulsing.

10.3 Disconnecting the vehicle from the EV charging box after charging

Once the charging process is complete, the status LED will be illuminated continuously blue.

► To release the charging plug on the connected vehicle, observe your vehicle manual.

► Separate the charging plug from the vehicle.

SOCKET variant

The plug on the EV charging box will be released.

► Separate the charging plug from the EV charging box.

► Store the charging cable.

PLUG variant

► Store the charging cable on the cable tray of the EV charging box.

10.4 Stopping the charging process

During the charging process, the status LED is illuminated blue and pulsing. You can stop the charging process before the vehicle is fully charged.

SOCKET variant Both charging plugs will remain interlocked. The plug can only be removed from the EV charging box once the plug on the vehicle is released.

Stopping the charging process without authentication

► To stop the charging process, observe your vehicle manual.

► Disconnect the vehicle from the EV charging box, see Chapter 10.3.

Stopping charging after authentication via the AC SMART app

► Start the AC SMART app.

► Select the EV charging box.

► Tap **Stop charging process**.

The charging process is stopped.

► Disconnect the vehicle from the EV charging box, see Chapter 10.3.

Stopping charging after authentication via RFID tag

If the charging process was started with an RFID tag, the RFID icon on the EV charging box will be illuminated continuously white.

► Hold the RFID tag in front of the interaction surface of the EV charging box.

After successful authentication, you will hear a rising sequence of tones. The RFID icon will be illuminated white and pulsing.

The charging process is stopped.

► Disconnect the vehicle from the EV charging box, see Chapter 10.3.

Stopping charging after authentication via web server

► Start the web server.

► Click **Authorisation**.

► Click **Stop** to stop the charging process.

The status **Disabled** is displayed.

The charging process is stopped.

► Disconnect the vehicle from the EV charging box, see Chapter 10.3.

11 Cleaning the EV charging box

WARNING!

Risk to life due to electric shock

If water enters the housing, there is a risk of electric shock.

► Never clean the EV charging box with a high-pressure cleaner.

ATTENTION!

Damage to the EV charging box due to improper cleaning

Cleaning agents can damage the EV charging box.

► Do not use cleaning agents.

► Use a soft, slightly moistened cloth for cleaning.
► Check the plug contacts for foreign objects and contamination.
► Do not insert any objects into the plug contacts.
► Remove light contamination, for instance dust or sand, by blowing it out.

In case of heavy soiling, the plug contacts must be cleaned by an electrician.

12 Troubleshooting

The status LED indicates faults in the operation of the EV charging box. If the EV charging box is connected to the AC SMART app or can be accessed via the web server, you will find detailed fault descriptions and troubleshooting measures in the AC SMART app and in the web server.

Firmware updates for troubleshooting errors and providing new functions are available in our online catalogue. Always keep your firmware up to date to avoid faults.

12.1 Status LED

LED state	Possible cause	Recommended action
The LED is not illuminated.	The function LED inactivity is active and the status LED went out after the set time.	► Check the settings in the AC SMART app or the web server.
		► Commission an electrician to correct the fault.
The LED is illuminated red briefly and you will hear a descending sequence of tones.	The RFID tag is not registered.	► Hold a registered RFID tag in front of the interaction surface to start a charging process.
	The charging process was started with another RFID tag.	► To stop a charging process, hold the same registered RFID tag in front of the interaction surface with which you released the charging process.
The LED will be illuminated continuously red.	There is an error associated with the connected vehicle.	► Disconnect the charging plug from the vehicle and the EV charging box. ► Connect the vehicle to the EV charging box once again. ► If the error is still present, start the AC SMART app or the web server. The error is displayed. ► Follow the troubleshooting instructions, see Page 55.
The LED flashes red.	There is an error.	► Switch off the residual current circuit breaker. ► Switch the residual current circuit breaker back on again after 10 seconds. ► If the error still occurs, start the AC SMART app or the web server. The error is displayed. ► Follow the troubleshooting instructions, see Page 55.
► If the fault cannot be corrected with the measures described, contact Weidmüller Service or commission an electrician to correct the fault.		

12.2 Handling load/charge management

Fault	Possible cause	Recommended action
The charging process does not start.	Load/charge management is enabled and the connected vehicle is on the waiting list.	► Provide the minimum charging current of 6 A.
The satellite box only charges with the minimum charging current.	The satellite box does not have a connection to the control box. The satellite box reduces the charging current to 6 A until the connection to the control box is restored.	► Connect the control box to the satellite box.

12.3 Error codes

Error ID	Description	Recommended action
1	The CP signal is invalid. The fault could be caused by the vehicle or the charging cable.	► Disconnect the charging cable from the vehicle. ► SOCKET variant: disconnect the charging cable from the EV charging box as well. ► Wait until the status LED is illuminated green. ► Connect the vehicle to the EV charging box once again. ► Start the charging process. ► If the error occurs again, try to start a charging process with another vehicle or another charging cable. ► If the error occurs again, contact an electrician.
2	The PP signal is invalid. The charging cable may be the cause of the fault.	► Disconnect the charging cable from the vehicle. ► SOCKET variant: disconnect the charging cable from the EV charging box as well. ► Wait until the status LED is illuminated green. ► Connect the vehicle to the EV charging box once again. ► Start the charging process. ► If the error occurs again, try to start a charging process with another charging cable. ► If the error occurs again, contact an electrician.
3	There is a diode error in the vehicle.	► Disconnect the charging cable from the vehicle. ► SOCKET variant: disconnect the charging cable from the EV charging box as well. ► Wait until the status LED is illuminated green. ► Connect the vehicle to the EV charging box once again. ► Start the charging process. ► If the error occurs again, try to start a charging process with another vehicle. ► If the error occurs again, contact an electrician.

Error ID	Description	Recommended action
4	A relay in the EV charging box is defective.	▶ Disconnect the vehicle from the EV charging box. ▶ Switch off the residual current circuit breaker. ▶ Switch the residual current circuit breaker back on again after 10 seconds. ▶ Wait until the status LED is illuminated green. ▶ Connect the vehicle to the EV charging box once again. ▶ Start the charging process. ▶ If the error occurs again, contact an electrician.
5	A DC fault-current detection was detected. The vehicle can be the cause of the fault.	▶ Disconnect the vehicle from the EV charging box. ▶ Wait until the status LED is illuminated green. ▶ Connect the vehicle to the EV charging box once again. ▶ Start the charging process. ▶ If the error occurs again, try to start a charging process with another vehicle. ▶ If the error occurs again, contact an electrician.
6	An AC residual current was detected. The vehicle can be the cause of the fault.	▶ Disconnect the vehicle from the EV charging box. ▶ Wait until the status LED is illuminated green. ▶ Connect the vehicle to the EV charging box once again. ▶ Start the charging process. ▶ If the error occurs again, try to start a charging process with another vehicle or another charging cable. ▶ If the error occurs again, contact an electrician.
7	The residual current measurement module in the EV charging box is defective.	▶ Disconnect the vehicle from the EV charging box. ▶ Switch off the residual current circuit breaker. ▶ Switch the residual current circuit breaker back on again after 10 seconds. ▶ Wait until the status LED is illuminated green. ▶ Connect the vehicle to the EV charging box once again. ▶ Start the charging process. ▶ If the error occurs again, contact an electrician.
8	The vehicle requires active ventilation of the charging station.	Active ventilation of the charging station cannot be ensured by the EV charging box. ▶ Contact the manufacturer of your vehicle.
9	The charging plug on the EV charging box cannot be interlocked.	▶ Remove the charging plug from the charging socket on the EV charging box. ▶ Disconnect the EV charging box from the power supply. ▶ Check the charging plug and charging socket for contamination. ▶ Remove slight contamination yourself, or commission an electrician to carry out cleaning, see Chapter 11. ▶ Connect the EV charging box to the power supply. ▶ Connect the vehicle to the EV charging box once again. Ensure the charging plug is connected correctly. ▶ Start the charging process. ▶ If the error occurs again, contact an electrician.

Error ID	Description	Recommended action
10	The charging plug on the EV charging box cannot be released.	► Check whether the charging plug has become tilted or if there is some other mechanical load. ► Switch off the residual current circuit breaker. ► Switch the residual current circuit breaker back on again after 10 seconds. ► If the error occurs again, contact an electrician.
11	The vehicle exceeds the current limit. The charging process is ended.	► Restart the charging process. ► If the error occurs again, contact the vehicle manufacturer.
12	The internal temperature sensor has detected that the temperature in the EV charging box is too high. The charging process was cancelled to prevent damage.	► Disconnect the vehicle from the EV charging box. ► Once the EV charging box has cooled down, the error will be reset. ► If the error occurs frequently or the error is not automatically reset, contact an electrician. ► Observe the permitted ambient conditions in the technical data, see chapter 15. ► If the permitted ambient conditions are complied with and the error occurs again, contact Weidmüller Service.
13	A power outage was detected.	► Check whether the circuit breaker and the residual current circuit breaker in the building distribution or sub-distribution are switched on. ► Check the charging cable and the EV charging box for obvious damage. Commission an electrician to complete the repair. or ► If the circuit breaker or residual current circuit breaker has tripped, contact an electrician. ► Check the wiring between the sub-distribution and the EV charging box. ► Check the EV charging box and charging cable for damage, and complete the inspection steps according to the commissioning protocol once again. ► If the error occurs again, contact Weidmüller Service.
14	There is an error in the load/charge management control box.	► Start the web server of the EV charging box that is defined as the control box. ► Follow the troubleshooting instructions.
15	The connection to the control box was disconnected.	► Check the connection to the control box. ► If the control box is connected via Modbus TCP interface, start the web server of the control box. ► Check whether the settings for the Modbus TCP interface match the connection used to the control box (WiFi/Ethernet).
16	Communication to the external energy metre for dynamic load/charge management is disrupted.	► Contact an electrician. ► Disconnect the EV charging box from the power supply. ► Check the RS485 connection between the external energy meter and the load/charge management control box. ► Connect the EV charging box to the power supply.

Error ID	Description	Recommended action
17	The charging station is not available (Status F). The EV charging box may be in maintenance mode.	▶ If further errors are displayed, correct these errors first using the recommended actions. ▶ If error 17 is still active, contact the operator of the EV charging box or an electrician.
18	The digital inputs are not working correctly.	▶ Contact an electrician. ▶ Check the wiring of the digital inputs. ▶ Check the settings of the EV charging box in the web server.
19	Communication between the internal energy meter and the control board is disrupted.	▶ Contact an electrician. ▶ Disconnect the EV charging box from the power supply. ▶ Check the RS485 connection between the internal energy meter and the control board. ▶ Connect the EV charging box to the power supply. ▶ If the error occurs again, contact Weidmüller Service.
20	There is an error in the internal current measurement.	▶ Contact an electrician. ▶ Disconnect the EV charging box from the power supply. ▶ Check the connection between the power board and control board. ▶ Connect the EV charging box to the power supply. ▶ If the error occurs again, contact Weidmüller Service.
21	The WIFI/BLE module is defective.	▶ Switch off the residual current circuit breaker. ▶ Switch the residual current circuit breaker back on again after 10 seconds. ▶ Wait until the status LED is illuminated green. ▶ If the error occurs again, contact an electrician.
22	WIFI error	▶ Switch off the residual current circuit breaker. ▶ Switch the residual current circuit breaker back on again after 10 seconds. ▶ Wait until the status LED is illuminated green. ▶ Check the strength of the WLAN connection. If necessary, use a repeater to increase the strength of the WLAN connection. ▶ If a connection is possible, then check the password. The password may not contain a comma. ▶ If the error occurs again, contact an electrician.
23	BT error	▶ Switch off the residual current circuit breaker. ▶ Switch the residual current circuit breaker back on again after 10 seconds. ▶ Wait until the status LED is illuminated green. ▶ If the error occurs again, contact an electrician.
24	Internal socket error	▶ Switch off the residual current circuit breaker. ▶ Switch the residual current circuit breaker back on again after 10 seconds. ▶ Wait until the status LED is illuminated green. ▶ If the error occurs again, contact an electrician.

Error ID	Description	Recommended action
25	Initialisation of the internal memory has failed.	► Switch off the residual current circuit breaker. ► Switch the residual current circuit breaker back on again after 10 seconds. ► Wait until the status LED is illuminated green. ► If the error occurs again, contact an electrician.
28	An OCPP message cannot be formed because the memory is full.	► Switch off the residual current circuit breaker. ► Switch the residual current circuit breaker back on again after 10 seconds. ► Wait until the status LED is illuminated green. ► If the error occurs again, contact an electrician.
29	The charging controller was rejected by the OCPP backend. The login data are invalid or there is a network error. A charging process is not possible.	► Contact an electrician or the provider of your OCPP backend.
30	The connection to the satellite box was disconnected.	► Check the connection to the satellite box.
31	No secure OCPP connection possible.	► Contact an electrician or the provider of your OCPP backend.
32	The internal memory is not accessible.	► Switch off the residual current circuit breaker. ► Switch the residual current circuit breaker back on again after 10 seconds. ► Wait until the status LED is illuminated green. ► If the error occurs again, contact an electrician.
33	The firmware will be updated.	► Wait until the firmware update is complete.
34	Communication with the Powerline module is disrupted.	► Switch off the residual current circuit breaker. ► Switch the residual current circuit breaker back on after 10 seconds. ► Wait until the status LED is illuminated green. ► If the error occurs again, contact an electrician.
35	There is an error in the internal wireless modem.	► Switch off the residual current circuit breaker. ► Switch the residual current circuit breaker back on again after 10 seconds. ► Wait until the status LED is illuminated green. ► If the error occurs again, contact an electrician. ► If you are not using a Weidmüller SIM card, check the settings in the web server. ► Check whether the selected reception type is available at the setup location for the EV charging box. ► Disconnect the EV charging box from the power supply. ► Check the fit of the SIM card. ► Connect the EV charging box to the power supply.

13 Dismounting the EV charging box

⚠ WARNING!

Risk to life due to electric shock

The EV charging box must be opened during disassembly. Live parts are accessible during this process and there is a risk of electric shock.

► Disconnect the EV charging box from the power supply before disassembly.

Disassembly and all electrical work on the domestic installation and on the EV charging box may only be carried out by an electrician.

► Ensure that the EV charging box is not connected to a vehicle.

► Dismount the EV charging box. Observe the Assembly and installation instructions.

14 Disposing of the EV charging box and packaging

The product contains substances that may be harmful to the environment and human health. In addition, it also contains substances that can be reused through targeted recycling.

Observe the instructions for proper disposal of the product. The instructions can be found at www.weidmueller.com/disposal.

The packaging of the EV charging box, including the special film, is made of environmentally friendly, decomposable materials. The packaging can therefore be disposed of completely with recyclable paper.

► Dispose of the packaging for the EV charging box in accordance with the applicable local regulations.

15 Technical data

ECO						
	PLUG			SOCKET		
Charging current, max.	**16 A**	**32 A**		**16 A**	**32 A**	
Width x height x depth	268 x 433 x 150 mm			268 x 433 x 150 mm		
Weight	...-P-E: 4.9 kg ...-P7.5-E: 5.4 kg ...-P10-E: 6.1 kg	...-P-E: 5.1 kg	...-A22-P-E: 6.1 kg ..A22-P7.5-E: 6.6 kg	3.6 kg		
Housing impact resistance rating	IK10			IK10		
Operating temperature	-30 °C to +50 °C			-30 °C to +50 °C		
Storage temperature	-40 °C to +70 °C			-40 °C to +70 °C		
Relative humidity during operation	5 ... 95 % (non-condensing)			5 ... 95 % (non-condensing)		
Relative humidity during storage	5 ... 95 % (non-condensing)			5 ... 95 % (non-condensing)		
Degree of protection	IP54			IP54		
Pollution severity	3			3		
Protection class	I			I		
Phases	1…3	1	1…3	1… 3	1	1…3
Rated voltage	207 ... 253 V / 360 ... 440 V	207 ... 253 V	207 ... 253 V / 360 ... 440 V	207 ... 253 V / 360 ... 440 V	207 ... 253 V	207 ... 253 V / 360 ... 440 V
Rated current	16 A	32 A		16 A	32 A	
Rated impulse voltage	4 kV			4 kV		
Insulation voltage	500 V			500 V		
Overvoltage category	III			III		
Mains frequency	50 / 60 Hz			50 / 60 Hz		
Circuit breaker max.[1)]	16 A	32 A		16 A	32 A	
Charging voltage	230 / 400 V	230 V	230 / 400 V	230 / 400 V	230 V	230 / 400 V
Charging power, max.	11 kW	7.4 kW	22 kW	11 kW	7.4 kW	22 kW
Short circuit current C16/C32 (energy limit class 3)	6 kA			6 kA		
AC residual current circuit breaker [1)]	Type A 30 mA			Type A 30 mA		
DC fault-current detection integrated	6 mA			6 mA		
Network design	TN / TT / IT			TN / TT / IT		
Charging mode	3			3		
Supported charging states	A, B, C, E, F			A, B, C, E, F		
EMC classification	Class B			Class B		
Socket in accordance with IEC 62196-1:2014 for charging cable	–			Type 2		
Plug in accordance with IEC 62196-1:2014 for charging cable	Type 2			–		
Permitted set-up area	indoor, outdoor			indoor, outdoor		
Static load/charge management integrated	–			–		
Dynamic load/charge management integrated	–			–		
MD conforming energy meter integrated	–			–		
AC SMART app	x			x		
Supported network protocols	Modbus RTU / TCP			Modbus RTU / TCP		
Interfaces	Bluetooth (Low Energy), WLAN (802.11 b/g/n), LAN / Ethernet, 1 x RS 485			Bluetooth (Low Energy), WLAN (802.11 b/g/n), LAN / Ethernet, 1 x RS 485		
Digital inputs	5 x 12 V / 6 mA			5 x 12 V / 6 mA		
Digital outputs	4 x 12 V / 100 mA			4 x 12 V / 100 mA		

[1)] must be present in the domestic installation

	VALUE			
	PLUG		SOCKET	
Charging current, max.	**16 A**	**32 A**	**16 A**	**32 A**
Width x height x depth	273 x 439 x 150 mm (167 mm incl. cover)		273 x 439 x 150 mm (167 mm incl. cover)	
Weight	...-P-V: 5.7 kg ...-P7.5-V: 7.1 kg ...-P10-V: 7.9 kg	...-P-V: 6.8 kg ...-P7.5-V: 7.3 kg	4.3 kg	
Housing impact resistance rating	IK10		IK10	
Operating temperature	-30 °C to +50 °C		-30 °C to +50 °C	
Storage temperature	-40 °C to +70 °C		-40 °C to +70 °C	
Relative humidity during operation	5 ... 95 % (non-condensing)		5 ... 95 % (non-condensing)	
Relative humidity during storage	5 ... 95 % (non-condensing)		5 ... 95 % (non-condensing)	
Degree of protection	IP54		IP54	
Pollution severity	3		3	
Protection class	I		I	
Phases	1…3		1…3	
Rated voltage	207 ... 253 V / 360 ... 440 V		207 ... 253 V / 360 ... 440 V	
Rated current	16 A	32 A	16 A	32 A
Rated impulse voltage	4 kV		4 kV	
Insulation voltage	500 V		500 V	
Overvoltage category	III		III	
Mains frequency	50 / 60 Hz		50 / 60 Hz	
Circuit breaker max. [1)]	16 A	32 A	16 A	32 A
Charging voltage	230 / 400 V	230 / 400 V	230 / 400 V	230 / 400 V
Charging power, max.	11 kW	22 kW	11 kW	22 kW
Short circuit current C16/C32 (energy limit class 3)	6 kA		6 kA	
AC residual current circuit breaker [1)]	Type A 30 mA		Type A 30 mA	
DC fault-current detection integrated	6 mA		6 mA	
Network design	TN / TT / IT		TN / TT / IT	
Charging mode	3		3	
Supported charging states	A, B, C, E, F		A, B, C, E, F	
EMC classification	Class B		Class B	
Socket in accordance with IEC 62196-1:2014 for charging cable	–		Type 2	
Plug in accordance with IEC 62196-1:2014 for charging cable	Type 2		–	
Permitted set-up area	indoor, outdoor		indoor, outdoor	
Static load/charge management integrated	x		x	
Dynamic load/charge management integrated	–		–	
MD conforming energy meter integrated	–		–	
AC SMART app	x		x	
Supported network protocols	Modbus RTU / TCP, OCPP 1.6 (J)		Modbus RTU / TCP, OCPP 1.6 (J)	
Interfaces	Bluetooth (Low Energy), WLAN (802.11 b/g/n), 2 x LAN / Ethernet, 1 x RS 485		Bluetooth (Low Energy), WLAN (802.11 b/g/n), 2 x LAN / Ethernet, 1 x RS 485	
Digital inputs	5 x 12 V / 6 mA		5 x 12 V / 6 mA	
Digital outputs	4 x 12 V / 100 mA		4 x 12 V / 100 mA	

[1)] must be present in the domestic installation

	ADVANCED			
	PLUG		SOCKET	
Charging current, max.	**16 A**	**32 A**	**16 A**	**32 A**
Width x height x depth	273 x 439 x 150 mm (167 mm incl. cover)		273 x 439 x 150 mm (167 mm incl. cover)	
Weight	...-P-V: 5.6 kg ...-P7.5-V: 6.3 kg ...-P10-V: 7.9 kg	...-P-V: 6.9 kg ...-P7.5-V: 7.9 kg	4.3 kg	
Housing impact resistance rating	IK10		IK10	
Operating temperature	-25 °C to +45 °C		-25 °C to +45 °C	
Storage temperature	-25 °C to +70 °C		-25 °C to +70 °C	
Relative humidity during operation	5 ... 95 % (non-condensing)		5 ... 95 % (non-condensing)	
Relative humidity during storage	5 ... 95 % (non-condensing)		5 ... 95 % (non-condensing)	
Degree of protection	IP54		IP54	
Pollution severity	3		3	
Protection class	I		I	
Phases	1…3		1…3	
Rated voltage	207 ... 253 V / 360 ... 440 V		207 ... 253 V / 360 ... 440 V	
Rated current	16 A	32 A	16 A	32 A
Rated impulse voltage	4 kV		4 kV	
Insulation voltage	500 V		500 V	
Overvoltage category	III		III	
Mains frequency	50 / 60 Hz		50 / 60 Hz	
Circuit breaker max. [1]	16 A	32 A	16 A	32 A
Charging voltage	230 / 400 V	230 / 400 V	230 / 400 V	230 / 400 V
Charging power, max.	11 kW	22 kW	11 kW	22 kW
Short circuit current C16/C32 (energy limit class 3)	6 kA		6 kA	
AC residual current circuit breaker [1]	Type A 30 mA		Type A 30 mA	
DC fault-current detection integrated	6 mA		6 mA	
Network design	TN / TT / IT		TN / TT / IT	
Charging mode	3		3	
Supported charging states	A, B, C, E, F		A, B, C, E, F	
EMC classification	Class B		Class B	
Socket in accordance with IEC 62196-1:2014 for charging cable	–		Type 2	
Plug in accordance with IEC 62196-1:2014 for charging cable	Type 2		–	
Permitted set-up area	indoor, outdoor		indoor, outdoor	
Static load/charge management integrated	x		x	
Dynamic load/charge management integrated	x		x	
MD conforming energy meter integrated	x		x	
AC SMART app	x		x	
Supported network protocols	Modbus RTU / TCP, OCPP 1.6 (J)		Modbus RTU / TCP, OCPP 1.6 (J)	
Mobile phone	x		x	
Interfaces	Bluetooth (Low Energy), WLAN (802.11 b/g/n), 2 x LAN / Ethernet, 1 x RS 485		Bluetooth (Low Energy), WLAN (802.11 b/g/n), 2 x LAN / Ethernet, 1 x RS 485	
Digital inputs	5 x 12 V / 6 mA		5 x 12 V / 6 mA	
Digital outputs	4 x 12 V / 100 mA		4 x 12 V / 100 mA	

[1] must be present in the domestic installation

16 CE conformity and standards

The EV charging box fulfils the requirements of the following EU directives:

– 2014/30/EU Electromagnetic compatibility of electrical and electronic equipment
– 2014/35/EU Making available on the market of electrical equipment designed for use within certain voltage limits
– 2011/65/EU Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

– Weidmüller Interface GmbH & Co. KG hereby declares that the types of wireless systems in the AC SMART product family conform to Directive 2014/53/EU. The complete text of the EU declaration of conformity is available at the following web address: www.weidmueller.de

Low voltage switching device combinations

– IEC 61439-7: 2018

Conductive charging systems for EVs

– IEC 61851-1: 2017
– EN 61851-22: 2002

RED tests

– ETSI EN 301 489-1: v2.2.3: 2019
– ETSI EN 301 511 v12.5.1: 2017
– ETSI EN 301 908-1 v13.1.1: 2019
– ETSI EN 300 328 v2.2.2: 2019
– ETSI EN 300 330 v2.1.1: 2017
– ETSI EG 203 367: v1.1.1: 2016
– ETSI EN 301 489-3 v2.3.0: 2022 (draft)
– ETSI EN 301 489-17 v3.2.5: 2022 (draft)
– ETSI EN 301 489-52 v1.2.1: 2021
– DIN EN 55011: 2022

EMC tests

– EN IEC 61851-21-2: 2021
– EN IEC 61000-6-2: 2019
– EN 61000-6-3: 2021
– EN 61000-3-2: 2019
– EN 61000-3-3: 2013 + A1:2019

Cables and lines

– EN 50620: 2017 + A1: 2019
– IEC 62893-1: 2017
– IEC 62893-2: 2017

Plug connector

– EN 62196-1: 2014
– EN 62196-2: 2017

RoHs

– IEC 63000: 2018