EV-SET-T2AC-BAS-RCM1-20AC5MES
HOME charging technology set with AC charging cable

Quick start guide

UM EN EV-SET-T2AC-BAS-RCM1-20AC5MES

PHOENIX CONTACT
INSPIRING INNOVATIONS

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2017-05-11

Designation: UM EN EV-SET-T2AC-BAS-RCM1-20AC5MES

Version: 00

This quick start guide is valid for:

Designation	Version	Order No.
EV-SET-T2AC-BAS-RCM1-20AC5MES	00	1628077

Please observe the following notes

User group of this manual

The use of products described in this manual is oriented exclusively to:

- Qualified electricians or persons instructed by them, who are familiar with applicable standards and other regulations regarding electrical engineering and, in particular, the relevant safety concepts.
- Qualified application programmers and software engineers, who are familiar with the safety concepts of automation technology and applicable standards.

Explanation of symbols used and signal words

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety measures that follow this symbol to avoid possible injury or death.

There are three different categories of personal injury that are indicated with a signal word.

DANGER This indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING This indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION This indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

This symbol together with the signal word **NOTE** and the accompanying text alert the reader to a situation which may cause damage or malfunction to the device, hardware/software, or surrounding property.

This symbol and the accompanying text provide the reader with additional information or refer to detailed sources of information.

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Table of contents

1 Intended use

The HOME charging technology set is designed for assembling a charging station for electrically driven vehicles (electric cars).

It consists of the following components:

– AC charging cable with Vehicle Connector, protective cap, and open cable end
– Park position/holder
– EV Charge Control Basic AC charging controller
– 1-channel residual current monitoring device (RCM)
– Accessory kit with connection accessories
– Documentation (circuit diagram, this instruction manual, documentation on the individual components)

Additionally required components are to be provided by the customer and can be removed, see Section 5.

Only operate the charging technology set in accordance with the information in this instruction manual. Do not make any changes, additions or alterations to the charging technology set which are not described in this document. The use of third-party products and components must be recommended and/or approved by Phoenix Contact. Third-party products must be installed in accordance with the associated technical documentation. The safety risks posed by the charging technology set must be verified and assessed following the installation of third-party products in the existing system/in the plant. Error-free and safe operation of the charging technology set can only be ensured through correct

– Transport,
– Storage,
– Mounting/setup,
– Installation,
– Startup,
– Operation and
– Maintenance

Observe the permissible ambient conditions.

At regular intervals, check the charging technology set according to the respective applicable national regulations, e.g.,

– “DGUV regulation 3 and 4 – electrical installations and equipment”
– German Ordinance on Industrial Safety and Health in association with TRBS 1201 and TRBS 1203
– “Electrical systems for electric road vehicles - Electric vehicle conductive charging system - Part 1: General requirements (IEC 61851-1:2010)”; German version EN 61851-1:2011

The operator is responsible for specifying the inspection interval.

Installation location

– The national laws, directives, ordinances, and regulations for the installation and operation of electrical equipment which are valid at the installation location must be observed.
– The charging technology set is intended for stationary use.
– The charging technology set is designed for fixed mounting in a suitable housing.
– The charging technology set must be freely accessible at all times in case of emergency, for operation, and for maintenance work.

- Protect the charging technology set from direct sunlight.
- Electromagnetic compatibility: this product is suitable for environment B. For the requirements for environments A and B, refer to the standard DIN EN 61439-1 as well as the following standards:
  - Environment A (industrial environments): EN 61000-6-2:2005 + AC: 2005
  - Environment B (residential, commercial, and light-industrial environments): EN 61000-6-4:2007 + A1: 2011

Only operate the charging technology set in the approved environment.

Important: read the instruction manual carefully before mounting, installing, and starting up the charging technology set. Pay particular attention to the safety notes. Keep the instruction manual and circuit diagram in a safe place for later use.

Make sure you always use the latest documentation for the individual components. The documentation can be downloaded at phoenixcontact.net/products.

2 General safety notes

Observe the country-specific installation, safety, and accident prevention regulations. During startup and maintenance work, proceed in accordance with the five safety rules of DIN EN 50110-1. Observe the rules in the specified order:

1. Disconnect safely.
2. Ensure power cannot be switched on again.
3. Verify safe isolation from the supply.
4. Ground and short circuit.
5. Cover or safeguard adjacent live parts.

Once the work is complete, perform the above steps again in reverse order.

WARNING: Dangerous contact voltage!

- Any work on the charging technology set may only be carried out by qualified specialist personnel who are familiar with the necessary safety precautions.
- The charging technology set or parts thereof are live. Maintenance work on live equipment may only be carried out by qualified specialist personnel who are familiar with the necessary safety precautions.
- Before working on the charging technology set, disconnect the power.
- During installation, observe the instructions on grounding in “Starting up the charging technology set” on page 22. The operator must ensure that suitable safety precautions have been taken.

DANGER: Faulty insulation

Risk of electric shock.

- Only use cables that satisfy the specified installation requirements regarding voltage, current, insulation material, load-carrying capacity, etc.

NOTE: Electrostatic discharge!

Electrostatic discharge (ESD) can damage or destroy the components of the charging technology set.

– When handling the charging technology set, observe the necessary safety precautions against electrostatic discharge (ESD) according to EN 61340-5-1 and IEC 61340-5-1.

NOTE: When using a surge protective device, note the following:

– Remove connectors and disconnect protective devices when performing insulation measurements.

Installation only in networks with grounded star point, e.g., in TT systems or in TN-S systems.

3 Transport

– Observe the humidity specifications and the temperature range specified for transport (see Section “Technical data” on page 12).
– Secure the charging technology set during transport. The same applies when relocating, moving or returning the equipment. Internal transport is only permitted if the transported goods are adequately secured against slipping and falling.
– Never climb onto the devices or packaging.
– Protect devices and packaging against damage.
– When transporting the equipment or storing it temporarily, make sure that the packaged devices are protected from the elements and any external influences, and that they are kept dry and clean.

4 Scope of supply

Make sure you always use the latest documentation. The documentation for the individual components can be downloaded at phoenixcontact.net/products. To access the download area, enter the desired order number in the search field and confirm the entry. Then select the “Downloads” tab on the product page.

Overview of components

Number/designation/type	Order No.
1 x park position/holder - EV-T2AC-PARK	1624148
1 x AC charging cable, type 2, 5 m - EV-T2G3C-1AC20A-5,0M2,5ESBK01	1627354
1 x AC charging controller - EV-CC-AC1-M3-CC-SER-HS	1622459
1 x residual current monitoring - EV-RCM-C1-AC30-DC6	1622450
Accessory kit with connection accessories:	
3 x feed-through terminal block - PT 6-TWIN 3 x feed-through terminal block - PT 6-TWIN BU 3 x protective conductor terminal block - PT 6-TWIN-PE	3211929 3211485 3211498
2 x feed-through terminal block - PT 2,5 1 x feed-through terminal block - PT 2,5 BU 1 x feed-through terminal block - PT 2,5-PE	3209510 3209523 3209536
1 x fuse terminal block - PT 4-HESI (5X20)	3211861
1 x plug-in bridge - FBS 2-8 1 x plug-in bridge - FBS 3-8 BU	3030284 3032570
1 x end cover D-ST 4 2 x end cover D-PT 6-TWIN	3030420 3211508
13 x end bracket - CLIPFIX 35-5	3022276
Available as download (see attachment with QR code):	
Documentation UM EN EV-SET-T2AC-BAS-RCM1-20AC5MES	107839
Circuit diagram EPLAN-EV-SET-T2AC-BAS-RCM1-20AC5MES-1628077_en_03 with wiring example	–

Checking the delivery

- Check the delivery for transport damage. Damaged packaging is an indicator of potential damage to the charging technology set that may have occurred during transportation. This could result in a malfunction.
- Submit claims for any transport damage immediately, and inform the manufacturer and/or your supplier as well as the shipping company without delay. Enclose photos which clearly document the damage to the packaging or delivery together with your claim.
- Immediately after delivery, refer to the delivery note to check the completeness of the contents of the packaging.
- Keep the box and packaging material in case it is necessary to return the product.

Packaging when returning equipment

We strongly recommend using the original packaging to return equipment. If the original packaging is no longer available, observe the following points.

- Observe the humidity specifications and the temperature range specified for storage and transport (see Section “Technical data” on page 12).
- If necessary, use dehumidifying agents.
- Protect components that are sensitive to electrostatic discharge and secure loose parts.
- Make sure that the packaging you select is large enough and sufficiently thick.
- Only use plastic bubble wrap sheets as wadding.
- Make sure that the goods cannot make contact with the outer walls of the cardboard packaging.
- If necessary, attach warnings to the transport packaging so that they are clearly visible.
- Observe the breaking load classes. Pack the least fragile parts at the bottom.
- Please be aware that the delivery note is to be placed inside the package in the case of packages that are to remain within the same country.
- If the package is being sent abroad, the delivery note must be placed inside a delivery note pocket and attached to the outside so that it is clearly visible.
- Take appropriate measures to secure bulky goods.

5 Additional accessories to be provided

NOTE:

The charging technology set is designed for fixed mounting on a mounting plate in a housing.

- The mounting plate must be sufficiently dimensioned and suitable for installation in the housing. Carefully read the manufacturer's instructions. Material recommended: steel plate.
- Use a housing that corresponds to the currently applicable national requirements for charging stations. The housing must be designed for the conditions at the installation location (see page 7) and due to the heat generation of components during operation, it must be sufficiently dimensioned.
- Select the type of cable entry suitable for AC charging cable EV-T2G3C-3AC32A-5,0M6,0ESBK01 (Order No. 1627354) and for feeding the external supply. The cable entry must be sufficiently dimensioned and offer a sufficient strain relief (e.g., G-INS-M20-S68N-PNES-LG, Order No.: 1414568)

6 Technical data

6.1 AC charging controller

General data	
Standard	IEC 61851-1, GB/T 18487.1-2015, SAE J1772
Charging mode and case	3 C
Type of charging current	AC
Dimensions (W x H x D in mm)	124 x 128 x 64
Device supply	
Supply voltage	230 V AC
Current consumption	Max. 40 mA
Nominal power consumption	< 1 W (no load)
Frequency range	50 Hz ... 60 Hz
Inputs	
Number of digital inputs	5
Nominal current I_N	≤ 1 mA
Nominal input voltage U_N	12 V
Input voltage range	U1 (Off): 0 V ... 3 V U2 (On): 9 V ... 15 V
Digital outputs	
Number of digital outputs	4
Output current of digital output	Max. 0.5 A (total current for all outputs, internally supplied) Max. 0.6 A (per output, externally supplied)
Output voltage of digital output	Max. 30 V
Switching outputs	
Control of charging contactor	Relay output C1,C2
Switching capacity	Max. 1500 VA
Switching voltage	Max. 250 V AC
Switching current	Max. 6 A
Data interfaces	
Number of data interfaces	1 x RS-485 (2-wire)
Data flow control/protocols	Modbus/RTU (slave)
Transmission speed	9.6 kbps (standard), 9.6 kbps ... 19.2 kbps (adjustable)
Connection data	
Conductor cross section, stranded	0.2 mm^2 ... 2.5 mm^2
Conductor cross section, solid	0.2 mm^2 ... 4 mm^2
Connection method	Screw connection
Torque	0.5 Nm ... 0.6 Nm

Ambient conditions	
Degree of protection	IP20
Ambient temperature (operation)	-35 °C ... 70 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Permissible humidity	30% to 95%, non-condensing

6.2 Residual current monitoring device

General data	
Standard	IEC 61851-1
Charging mode	3 C
Design	Single-channel
Dimensions (W x H x D in mm)	36 x 90 x 70.5

Device supply	
Supply voltage range	100 V AC ... 240 V AC (nominal voltage)
Current consumption	Max. 22 mA
Nominal power consumption	< 0.5 W (no load)
Frequency range	45 Hz ... 60 Hz

Switching outputs	
Control of charging contactor	Alarm relay 1 $I_{\Delta n}$: DC residual currents
Switching voltage	Max. 250 V
Switching current	5 A (1 N/O contact each)
Number of contacts as N/O contacts	1
Note regarding the switch contact	Closed-circuit current
Switching cycles	10000

Measuring current transducer	
Connection method	Connectors
Supply	Via RCM module
Diameter of measuring coil	15 mm
Length of connecting cable, measuring current transducer	1.5 m

Residual current measuring range	
Rated frequency	≤ 2000 Hz
Nominal residual current	± 300 mA (peak)
Current measuring range	50 A (45 Hz ... 50 Hz)
Residual current Id1, $I_{\Delta n1}$	30 mA
Residual current Id2, $I_{\Delta n2}$	6 mA
Rated current I_n	32 A
Tripping time for $I_{\Delta n}$	< 180 ms
Response time for 2 x $I_{\Delta n}$	< 70 ms
Tripping time for 5 x $I_{\Delta n}$	< 20 ms
Tripping time for I_N	< 500 ms
Reload function	3 switch-on attempts at intervals of 15 minutes

Connection data	
Conductor cross section solid/stranded	0.2 mm^2 ... 2.5 mm^2
Connection method	Spring connection
Ambient conditions	
Degree of protection	IP20 (terminals) IP30 (inserts)
Ambient temperature (operation)	-25°C ... 75°C

6.3 AC charging cable

General data	
Standard	AC type 2 (according to IEC 62196)
Charging mode and case	3 C
Dimensions (W x H x D in mm)	see Section 7.2
Weight	1.25 kg
Electrical properties	
Charging power	Max. 5 kW
Number of phases	1
Number of power contacts	3 (L1, N, PE)
Rated current for power contacts	20 A
Rated voltage for power contacts	250 V AC
Number of signal contacts	2 (CP, PP)
Rated current for signal contacts	2 A
Rated voltage for signal contacts	30 V AC
Type of signal transmission	Pulse width modulation
Resistor coding	680 Ω (between PE and PP)
Mechanical properties	
Cable structure, power contacts	3 x 2.5 mm^2
Cable structure, signal contacts	1 x 0.5 mm^2
External cable diameter	10.5 mm
Insertion cycles	> 10000
Insertion/withdrawal force	< 100 N
Cable length	5 m
Ambient conditions	
Degree of protection	IP44 (plug-in) IP54 (protective cap)
Ambient temperature (operation)	-30°C ... 50°C
Ambient temperature (storage/transport)	-40°C ... 80°C

6.4 Park position

General data	
Standard	AC type 2 (according to IEC 62196)
Charging mode and case	3 C
Dimensions (W x H x D in mm)	see Section 7.1
Weight	80 g

Ambient conditions	
Degree of protection (when plugged in)	IP54
Ambient temperature (operation)	-30°C ... 50°C
Ambient temperature (storage/transport)	-40°C ... 80°C

7 Dimensions

7.1 Park position

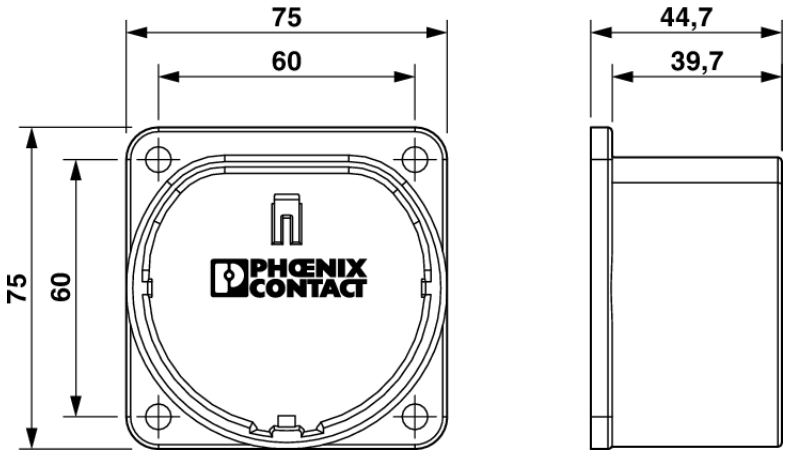


Figure 7-1 Park position - view of front and side

7.2 Vehicle Connector of the charging cable

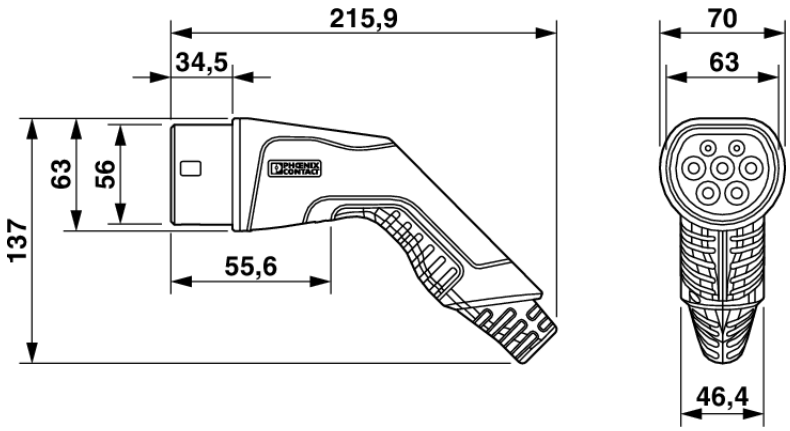


Figure 7-2 Vehicle Connector of the charging cable - view of front and side

8 Mounting

8.1 Space limits

When working on the charging technology set, make sure that there is room to move. Also ensure that there is sufficient space available for mounting, operation, and maintenance.

8.2 Before mounting

- Make sure that the mounting location is free from contamination and humidity.
- Ensure that the charging technology set is not in the proximity of frequency inverters or devices with high power ratings.
- Heat generation and interference from neighboring devices can cause malfunctions. In order to counteract this, follow the requirements of DIN EN 61439 during mounting.
  - Make sure that the specified temperature limits for the installation location are observed (see Section “Technical data” on page 12).
  - Do not place the charging technology set directly next to heat sources.
  - The components are designed to be cooled by convection. Prevent the build up of heat, and make sure that none of the openings are covered, e.g., by adjacent cables.

8.3 Wiring example

The circuit diagram available as a download (see attachment with QR code) shows a wiring example for components on the mounting plate.

Other arrangements are possible depending on the actual application. However, do ensure that the components are sufficiently cooled by convection. To do so, refer to the information detailed in Section 8.2 and in the documentation of the individual components (can be downloaded at phoenixcontact.net/products).

8.4 Mounting the charging technology set

WARNING: Risk of injury!

– Observe the information in “Intended use” on page 7 and “General safety notes” on page 8.
– Always wear your personal protective equipment during all work on the charging technology set.

NOTE: Reducing the degree of protection

– Avoid unnecessary openings in the housing, in which the charging technology set is to be mounted. Each opening that has not been produced and sealed properly may lead to a lower degree of protection.
– Place the corresponding or matching filler plugs in any unused openings.

Do not install the charging technology set on pulsating or vibrating machinery or equipment parts.

Protect bore holes and bare machining areas against corrosion. The charging technology sets must not be started up if the housing is damaged.

Procedure:

1. Mount the components of the charging technology set on a suitable mounting plate (see Section “Additional accessories to be provided” on page 11. Wiring example available as download (see attachment with QR code):
   – Place the respective device onto a standardized NS-35 DIN rail from above.
   – Push the front of the device toward the mounting surface until it audibly snaps into place.

   The covering hood of the AC charging controller is not latched upon delivery. Once the mounting and connection work has been performed (see Section 9, “Installation and startup”), you can remove these for device configuration (see Section 9.3, “Configuring the AC charging controller”).
2. Mount the charging technology set in a housing that corresponds to the currently applicable national requirements for charging stations. Carefully read the manufacturer's instructions.
3. Mount the housing to the wall. Carefully read the manufacturer's instructions.

8.5 Mounting the park position

1. Mount the park position from the front on a flat surface. We recommend attaching the park position to a metal or plastic wall. Note that the wall must be able to bear the weight of the connector.
2. Observe the dimensions of the park position (see section 7.1 on page 16).
3. Maintain the permitted mounting position (see Figure 8-1). The park position must only be installed straight and with a front incline of 0 to 45 degrees. Otherwise, the latching function of the integrated snap-on hook will not work, with which the Vehicle Connector is snaps into place and is secured.

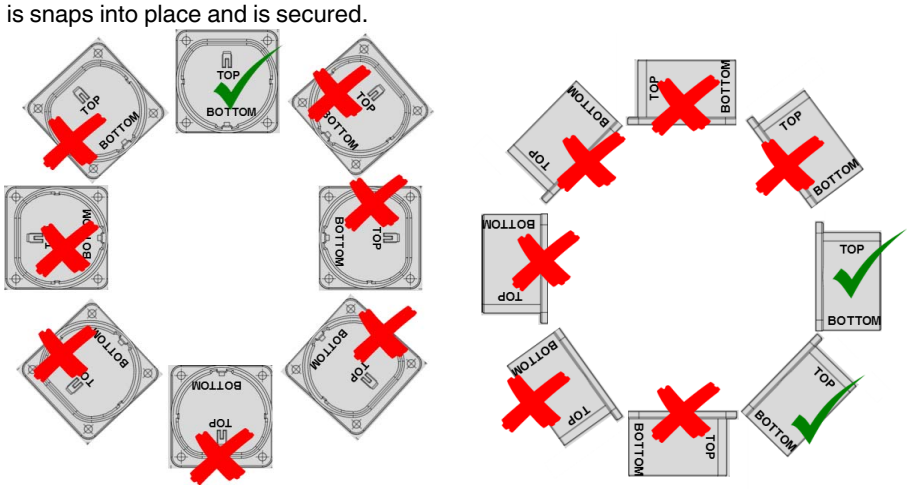


Figure 8-1 Mounting position and alignment

4. We recommend securing the park position with M5 screws with 1.2 Nm.

8.6 Checking the assembly

1. Check the park position is securely fixed in the mounting location.
2. Check the secure positioning of the charging technology set in the housing.
3. Make sure that all of the retaining brackets are locked in place and the components are securely seated on the DIN rail.
4. Following mounting, check all devices and components for damage.
5. Make sure that the required clearance distances for mounting have been observed.

9 Installation and startup

WARNING: Startup only by electrically skilled persons

- Installation and startup may only be carried out by qualified specialist personnel. The relevant country-specific regulations must be observed.
- Always wear your personal protective equipment during all work on the charging technology set.
- The electrical equipment for your system must be implemented according to applicable standards and directives, e.g.:
  - Low-voltage directive
  - EMC directive
- The charging technology set may only be started up following correct mounting (see Section 8).
- In the case of installation and operation in Germany, the charging technology set must be tested prior to first startup according to DGUV regulation 3 to ensure it is in good condition.

DANGER: Return of the supply voltage

Make sure that switching on the input voltage cannot lead to unexpected hazardous situations.
Any work on the charging technology set may only be carried out by qualified specialist personnel who are familiar with the necessary safety precautions.

DANGER: Dangerous contact voltage

With the EV-CC-...-HS DIN rail devices, parts with dangerous contact voltage can be accessed after the covering hood has been removed.

Only install, remove, and configure the device when it is disconnected from the voltage. The device may only be operated in a housing that corresponds to the currently applicable national requirements for charging stations.

Safety concept

In order to use the device described in this document, you must have drawn up an appropriate safety concept for your machine or system. This includes a hazard and risk analysis according to the corresponding directives (EMC and Low Voltage Directive) and standards, as well as a test report for validating the safety function.

9.1 Preparing cables and lines

For a reliable and touch-proof connection, use appropriate cable cross sections. Strip the cable ends according to the specifications in the table.

Components

Component	Solid conductor	Stranded conductor	Stripping length
AC charging controller	0.2 mm^2 ... 4 mm^2	With and without ferrule: 0.2 mm^2 ... 2.5 mm^2	7 mm
Residual current monitoring device	0.2 mm^2 ... 2.5 mm^2	Without ferrule: 0.2 mm^2 ... 2.5 mm^2 With ferrule: 0.2 mm^2 ... 1.5 mm^2	10 mm

Terminal blocks

Terminal block	Solid conductor	Stranded conductor	Stripping length
Feed-through terminal block PT 6-TWIN PT 6-TWIN BU **Protective conductor terminal block** PT 6-TWIN-PE	0.5 mm^2 ... 10 mm^2	With and without ferrule: 0.5 mm^2 ... 6 mm^2	10 mm ... 12 mm
	Use a conductor with a cross section of at least 4 mm^2 for the PE terminal of the supply terminal strip.		
Feed-through terminal block PT 2,5 PT 2,5 BU PT 2,5-PE	0.14 mm^2 ... 4 mm^2	With and without ferrule: 0.14 mm^2 ... 2.5 mm^2	8 mm ... 10 mm
Fuse terminal block PT 4-HESI (5X20)	0.2 mm^2 ... 6 mm^2	Without ferrule: 0.2 mm^2 ... 4 mm^2 With ferrule: 0.25 mm^2 ... 4 mm^2	10 mm ... 12 mm

9.2 Starting up the charging technology set

1. Make sure that the supply voltage is switched off prior to connection.
2. Open the housing in which the charging technology set is mounted.

Internal wiring of components

3. Lay the internal wiring of components (see Section 9.1) with the prepared cables. To do so, refer to the product documentation for the components (attached and can be downloaded at phoenixcontact.net/products):

Component	Order No.	Document type and title	Document order No.
AC charging controller EV-CC-AC1-M3-CC-SER-HS	1622459	Packing slip “Startup of charging controller EV Charge Control Basic (EV-CC-AC1-M3-C...)” PACKB.EV-CC-AC1-M3-C	175800
Residual current monitoring EV-RCM-C1-AC30-DC6	1622450	Packing slip “Residual current monitoring device” PACKB.EV-RCM-Cx-AC30-DC6	179174

WARNING: Risk of fire

If the AC charging controller and residual current measuring device is incorrectly connected, an electric or a fire may result.

– Only connect the devices with backup fuses (recommended: 6 A)

Notes on connection to the terminal blocks

The stripped conductors of the respective cables can be connected as follows to the terminal blocks provided:

Spring-cage terminal blocks:

– Open the terminal point with a screwdriver.
– Insert the stripped conductor into the clamping space.
– Remove the screwdriver. The conductor makes contact automatically.

Screw terminal blocks:

– Use a screwdriver to loosen the screw of the terminal block.
– Insert the stripped conductor into the clamping space.
– Tighten the screw with a torque of 0.5 to 0.6 Nm.

Inserting cables

4. Loosen the cable entries.
5. Guide the prepared cables (see Section 9.1) and the open end of the charging cable through the desired cable entry into the housing.
6. Place sealing plugs in unused cable entries.
7. Tighten the cable entries.

Establishing connections

8. Establish the desired connections according to the description below (step 9 to 12).

Notes on connection to the terminal blocks

The stripped conductors of the respective cables can be connected as follows to the terminal blocks provided:

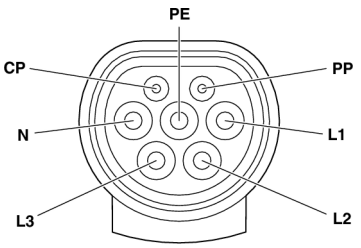
- Insert solid conductors or conductors with ferrules into the round opening of the terminal block without using a tool.
- For conductors with a small cross section or stranded conductors without ferrules, push in the orange push button and hold it down. This opens the spring, enabling you to insert the conductor in the clamping space. To connect the conductor to the clamping space, release the orange push button.
- To release the conductor from the terminal block again, push in the orange push button using a screwdriver. You can then pull the conductor out of the terminal block.

Connecting the AC charging cable

9. The PP signal contact is not connected to the AC charging cable, but rather to a resistor connected with the PE. It provides the vehicle with the information that an AC charge is taking place with a particular charging current.

   For the use of the charging cable, professional installation and commissioning at the charging station are required. Before commissioning, the manufacturer of the charging station must ensure that the charging process is shut down whenever there is a malfunction.

   - Strip the open end of the charging cable by 60 mm (± 15 mm).
   - Strip off each single wire by 8 to 10 mm.
   - Attach the single wires to the terminal strip provided. When doing so, observe the information in the following table.

Illustration	Marking	Wire color
	L1	BN
	L2	–
	L3	–
	N	BU
	PE	GNYE
	CP	BKWH BKVT

Grounding the charging technology set and connecting the supply voltage

10. Ground the mounting plate.
11. Make sure that all devices and metal components of the charging technology set are grounded.
12. Connect the supply voltage cable to terminal strip provided.

Check

13. On the residual current monitoring device, ensure that the slide switch **S1** is above the LEDs at position “0” (default setting). Any error messages must be reset manually or using the AC charging controller.

14. Check all conductive connections and tighten these as necessary with a torque screwdriver. When doing so, observe the information in the following table and documentation of the device manufacturer:

Component	Torque
AC charging controller	0.5 Nm ... 0.6 Nm

15. Make sure that the supply line is protected by a miniature circuit breaker suitable for the supply (see “Technical data” on page 12).
16. Make sure that all components are connected.
17. Switch on the supply voltage.
18. Check supply voltage.
19. Check and document the wiring.

Configuring the AC charging controller (optional)

20. If required, adjust the configuration of the AC charging controllers (see Section 9.3).

Completing startup

21. Carry out an I/O check and document the results. To do so, refer to the documentation for the components (can be downloaded at phoenixcontact.net/products).
22. Close the housing.

9.3 Configuring the AC charging controller

DIP switches of the AC charging controller are pre-configured by default. The AC charging controller is also pre-configured in terms of software for connection of the residual current monitoring device. If required, you must adjust the configuration.

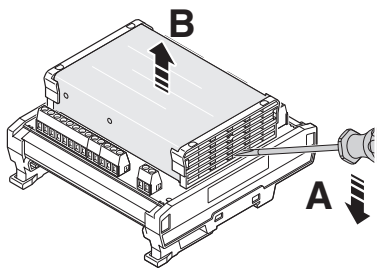
DANGER: Dangerous contact voltage

With the EV-CC-...-HS DIN rail devices, parts with dangerous contact voltage can be accessed after the covering hood has been removed.

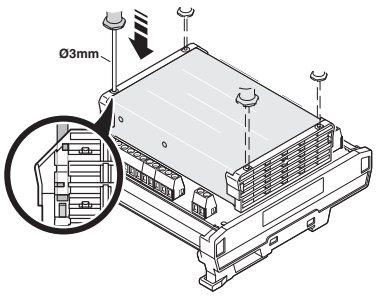
Only install, remove, and configure the device when it is disconnected from the voltage.

Procedure:

1. The covering hood of the AC charging controller is not latched upon delivery. This can be removed to configure the device:
   – To remove the latched covering hood, lift the side part. To do so, insert the tip of a screwdriver into the lowest slot.



– Once the configuration is complete, re-fit the covering hood so it engages with a click. To latch the lateral elements, push the four safety elements into the PCB (tool recommended: mandrel ø 3 mm).



DIP switch configuration

2. DIP switches of the AC charging controller are pre-configured by default as follows:

Switch	No.	Function	Item	Explanation		
S1	1	Connection case B/C	ON	Charging station with Vehicle Connector (case C)		
	2	XR evaluation	OFF	The XR input is evaluated in a modified way according to Modbus register 4011		
	3	Locking function	OFF	Connector locking in status B		
	4	Evaluation of 13 A charging cable	OFF	13 A charging cable is permissible		
	5 + 6	Default setting for charging current		Dependent on CCR digital input		CCR = 0
				5 = OFF	6 = ON	20 A
	7	Evaluation of Proximity Plug	OFF	Evaluation according to IEC 61851-1		
	8	Optional interlock	OFF	Locking of the Vehicle Connector and evaluation of the locking confirmation LD1/LD2		
S2	1	Baud rate	ON	19200		
	2 ... 6	Modbus address	ON	ON = 1, OFF = 0 0, 0, 0, 0, 1 = Modbus address 1 0, 0, 0, 1, 0 = Modbus address 2 … 1, 1, 1, 1, 0 = Modbus address 30 1, 1, 1, 1, 1 = reserved		
	7 + 8	–	ON	Reserved for future expansions		

– If required, you can adjust the configuration. Observe the detailed information in the associated documentation (see Section 9.4).

Modbus configuration

3. For Modbus configuration, connect the PC to the “RS-485” interface of the AC charging controller via the interface converter (USB to RS-485).
4. For configuration purposes, use the “EV CC Device Monitor” software from Phoenix Contact (free to download at phoenixcontact.net/products).
5. The Modbus address can be set via DIP switch **S2**, Position “2” to “6”.

6. For the automatic device test of the residual current monitoring device, the “XR” input of the AC charging controller is evaluated in a modified way according to Modbus register 4011. The device test is required prior to each charging process. During this, the device generates a testing current that triggers the two alarm relays. The regular testing increases the safety of the charging procedure and prevents long-term drift of the residual current measurement.
7. Set the value “1” for the configuration:

Modbus address	Value	Function	
		Automatic resetting of error messages	**Automatic EV-RCM device test**
4011	0	–	–
	1	**Active**	**Active**
	2	Inactive	Active
	3	Active	Inactive*
	4	Inactive	Inactive*

* The device test can also be carried out manually or from a higher-level controller.

8. For further information on the Modbus configuration, refer to the corresponding documentation (see Section 9.4).

9.4 Further information on the configuration

Further information on the configuration can be found in the following documents (can be downloaded at phoenixcontact.net/products)

Type/description	Designation	Order No.
Packing slip “Startup of the EV Charge Control Basic charging controller (EV-CC-AC1-M3-C...)”	PACKB.EV-CC-AC1-M3-C	175800
User manual “EV Charge Control Basic - Installation and startup of the charging controller”	UM EN EV-CC-AC1-M3-C	106377
Application example “Application Guide EVCC Basic - quick start guide for installation of charging stations with the EVCC Basic charging controller”	2016-10-07 EN Application Notes EV CC Basic	–
User manual “EV CC Device Monitor - Configuration software tool for the Charge Controller EVCC Basic”	2016-11-21Manual EV CC Device Monitor.pdf	–

10 Operation

WARNING: Dangerous contact voltage!

– Any work on the charging technology set may only be carried out by qualified specialist personnel who are familiar with the necessary safety precautions.

DANGER: Danger of death, serious personal injury, and burns

Improper handling of the AC charging cable can cause explosions, electric shock, and short circuits.

The generally applicable safety precautions and the following information must be observed.

– Protect the park position against damage, dirt, water, humidity, and other liquids.
– Always check the AC charging cable and the contacts for damage and contamination before using them.
– Never use a damaged AC charging cable or Vehicle Inlet.
– Never use contacts that are dirty or damp.
– Do not use the AC charging cable with an extension cable or an adapter.
– Only connect the AC charging cable to Vehicle Inlets that are protected against water, moisture and other liquids.
– There are electric vehicles that can be started with the AC charging cable connected. Always make sure to disconnect the AC charging cable before driving away.
– If the connector is smoking or melting, never touch the AC charging cable. If possible, stop the charging process.
– Make sure that the AC charging cable is out of the reach of children. Only persons with a valid driver's license for motor vehicles can use the AC charging cable.

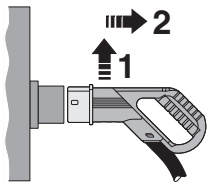
NOTE: Degree of protection of the park position and Vehicle Connector

In a plugged-in state, the park position and Vehicle Connectors offer IP54 protection according to IEC 62196.

The degree of protection is only ensured if the plug-in elements used are either made by Phoenix Contact or are standard-compliant products.

Procedure:

1. During operation, observe the instructions for the electric vehicle.
2. Turn off the vehicle. The vehicle must not yet be connected to the charging station.
3. Move the switch for the charging enable on the housing of the charging station to the desired position.
4. Take the Vehicle Connector out of the parking position.
   – Lift the Vehicle Connector (1). It is then released from the integrated snap-on hook.
   – Take the Vehicle Connector out of the parking position (2).



5. Insert the Vehicle Connector in the Vehicle Inlet. Check whether the connector is plugged in correctly and completely.
6. Start the charging process at the charging station. The Vehicle Inlet automatically locks the Vehicle Connector. Also observe the notes in the operating instructions of the connected vehicle.

7. Once the charging process is finished, you can disconnect the Vehicle Connector.

DANGER: Death or serious injury caused by electric arc

Never use force to unplug the Vehicle Connector. Dangerous electric arcs could result in serious injury or death.

Depending on the charging station and electric vehicle, the shutting down of the charging process and the duration of unlocking may vary.

8. Immediately re-insert the Vehicle Connector in the parking position. Ensure that the Vehicle Connector engages with a click.

Charging time

The duration of the charging process depends on the capacity and the charging state of the high-voltage battery of the vehicle and the permissible charging power of the charging cable and the charging station. Very low and very high temperatures can impair the charging capacity.

11 Maintenance

As stipulated by the relevant standards and regulations, all electrical equipment must be kept in good condition. The applicable standards and regulations in Germany include, for example:

- DIN VDE 0105-100
- DGUV regulation 3 (electrical installations and equipment, previously accident prevention regulation BGV A3)
- DGUV rule 103-011 (working on live electrical installations and equipment)
- DGUV rule 103-012 (working on live electrical installations and equipment)
- “Electrical systems for electric road vehicles - Electric vehicle conductive charging system - Part 1: General requirements (IEC 61851-1:2010)”; German version EN 61851-1:2011

Observe the applicable national requirements at the installation location regarding the following points:

- Maintenance and cleaning
- Working on electrical installations and equipment
- Electrical safety
- Accident prevention

11.1 Maintenance interval

Check the charging technology set at regular intervals (at least once a year). The maintenance interval also depends on the operating and ambient conditions. Check parts and components that are subject to frequent use or loads at shorter intervals, as appropriate (e.g. residual current protective device).

11.2 In the case of defects

You must eliminate any defects on the charging technology set as soon as they are identified (see Section “Troubleshooting” on page 33). You must discontinue operation if a defective electrical system poses an immediate danger. If there is any risk of damage to equipment or personal injury, the charging technology set must be stopped immediately. Restore the charging technology set to a safe, correct condition before starting it up again.

11.3 Documenting maintenance

Document all maintenance steps performed. Example information:

- Date, serial or device number, equipment identification
- State of the object being checked
- Activity carried out
- Electrically skilled person carrying out the work

Note the points described in the following sections for maintenance of the charging technology set. You must also observe the requirements set out in the corresponding standards and directives.

11.4 Diagnostics and status indicators

WARNING: Dangerous contact voltage!

All maintenance work must only be carried out by qualified specialist personnel who are familiar with the necessary safety precautions.

The AC charging controller and residual current monitoring device include LEDs to indicate system states and faults.
In the event of an error, you can find further information on the “EV CC Device Monitor” software from Phoenix Contact (free to download at phoenixcontact.net/products).

11.4.1 AC charging controller

– Evaluate the LED status of the AC charging controller using the following table:

LED	Color	Status	Explanation
PWR	Green	On	AC charging controller ready
		Flashing	AC charging controller is starting up
CON	Yellow	On	AC charging cable is connected to the charging station and the vehicle
		Flashing	AC charging cable is connected to the charging station
ERR	Red	On	Error
		Flashing	Errors that originate at the vehicle or AC charging cable
CHR	Blue	On	Charging contactor closed
		Flashing	Vehicle connected, charging current ready, PWM signal switched on, charging contactor open

11.4.2 Residual current monitoring device

– Evaluate the LED status of the residual current monitoring device using the following table:

LED	Color	Status	Explanation	
AL1	Yellow	On	Error message at relay 1	Residual current ≥ 6 mA DC or residual current ≥ 30 mA (rms)*
AL2	Yellow	On	Error message at relay 2	
ON	Green	On	Ready for operation	
		Off	No LED lights up: supply voltage not applied. If AL1 and AL2 light up simultaneously: – Device error – No (or incorrect) measuring current transducer connected – Measuring range exceeded	

* If both relays are connected for the 1 channel device, relay 1 reacts to both fault current types and relay 2 reacts to a residual current ≥ 30 mA (rms).

11.5 Maintenance and cleaning with the power supply disconnected

WARNING: Dangerous contact voltage!

Before carrying out any maintenance work, observe the five safety rules, as far as these apply to your application:

- Disconnect safely.
- Ensure power cannot be switched on again.
- Verify safe isolation from the supply.
- Ground and short circuit.
- Cover or safeguard adjacent live parts.

All maintenance work must only be carried out by qualified specialist personnel who are familiar with the necessary safety precautions.

Space limits, safe mounting, installation location

- Check the space limits at the installation location. The prescribed space limits for operation and maintenance must be observed to ensure safe use. Restore the space limits in the event of any deviation.
- Check that the charging technology sets are securely fixed in the installation location (e.g., screw connection in the case of wall fastening).
- Make sure that the charging technology set is suitable for the conditions at the installation location.

Housing and seals

- Check the housing for visible damage and corrosion.
- Clean the outside surfaces of the housing with a damp cloth. Remove any dirt with a soft brush. To avoid any damage to the surface, do not use any aggressive or corrosive cleaning agents, thinners, abrasive cleaners or hard objects.
- Check that the housing door opens and closes correctly. If necessary, lubricate the hinges.
- Check that the housing door locks correctly and also check the function of the lock.
- Check that the housing is sealed. Make sure that there is no condensation inside.
- In order to maintain the degree of protection offered by the housing, test and maintain all seals at regular intervals. Check the seals for deformation, cracks, and dirt.
- Condition all seals with suitable care products.

Park position

- Clean the park position with a damp cloth.

AC charging cable

- Only clean the AC charging cable when it is not connected to the vehicle.
- Clean the AC charging cable and dirty contacts with a dry cloth.
- Do not use any water or steam jet cleaners, aggressive or corrosive cleaning agents, thinners, abrasive cleaners or hard objects.
- Never submerge the AC charging cable in liquids.

Cabling and components

- Check all components, cables, terminal points, conductor connections, and markings regularly.
- Check the strain relief of the cables.
- Check that all cable entries are fixed securely and sealed tight.
- Check the cable routing and bending radii. If cable ducts are available, make sure that the cables are guided through the cable ducts. An impermissible bending radius can result in damage to the cables. Avoid bending cables at excessively sharp angles.
- Check the cables, cable connections, and components for signs of overheating, e.g., discoloration or deformation. If you notice any problems, please contact your subsidiary to agree on further action. Subsidiary contact information is available at phoenixcontact.com. The source of overheating must be identified before the device can be started up again. The charging technology set may only be started up again once the component has been returned to a safe condition.
- Check the torque. Tighten any loose connections taking into account the maximum torque (see Section 6, “Technical data” as well as documentation of the components used).
- Check that all connectors are secure and functioning correctly.

Protective conductors

WARNING: Impairment of the protective conductor system following removal of components from the charging technology set

If a component is removed or replaced as part of a maintenance measure, the protective conductor system of the remaining components must not be adversely affected.

- Check the ground connection or PE protective conductor system and all grounding screws, bolts or rails.
- Make sure that all conductors are still connected reliably. Tighten any loose conductors.

Miniature circuit breakers

- The correct function of the miniature circuit breakers must be ensured at all times. Check the miniature circuit breakers at regular intervals.

Residual current protective devices

- Correct function of the residual current protective devices must be ensured at all times. Check the residual current protective devices at regular intervals.

11.6 Troubleshooting

NOTE:
The charging technology set must not be modified. Do not repair the charging technology set yourself. Repairs may only be carried out by the manufacturer.

Procedure:

1. Open the housing in which the charging technology set is mounted.
2. Perform a visual inspection.
3. Carry out troubleshooting inside the charging technology set.
4. Evaluate the diagnostics via the status LEDs for the control components (see Section 11.4). To do so, also refer to the documentation for the components (can be downloaded at phoenixcontact.net/products).
5. If necessary, perform voltage measurements.
6. If equipment is faulty, please contact your subsidiary to agree on further action. Subsidiary contact information is available at phoenixcontact.com.

12 Dismantling, decommissioning, disposal

12.1 Dismantling

WARNING: Risk of injury due to falling housing
The housing with the charging technology set is screwed in place on the wall. If the housing is not dismantled correctly, it may fall down. This could result in serious injuries.

- During dismantling, always wear your personal protective equipment and make sure that there is sufficient space available.
- Take appropriate measures to secure the housing during dismantling.
- Releasing the screws fastening the housing to the wall should always be carried out as the final step.

Procedure:

1. Disconnect the power.
2. Open the housing in which the charging technology set is mounted.
3. Loosen the wires.
4. Loosen the cable entries and pull out the cables.
5. Close the housing.
6. Secure the housing to prevent it from falling.
7. Release the mounting screws and remove the housing.

12.2 Decommissioning and disposal

To decommission a system, only proceed in accordance with the procedures specified by the machine or system manufacturer.

During decommissioning, wear your personal protective equipment and make sure that there is sufficient space available.

When decommissioning the charging technology set or parts thereof, ensure that the components used:

– Are correctly reused in another system or
– Are disposed of in accordance with the applicable environmental regulations, and in this case can never be reused

13 Storage

The storage location must meet the following requirements:

– Dry
– Protected from unauthorized access
– Protected from harmful environmental influences such as UV light
– For temperature range, air pressure, and permissible humidity, see Section 6, “Technical data”