Solutions for E-Mobility
PHOENIX CONTACT – in dialog with customers and partners worldwide

Phoenix Contact is a global market leader in the field of electrical engineering, electronics, and automation. Founded in 1923, the family-owned company now employs around 14,000 people worldwide. A sales network with over 50 sales subsidiaries and more than 30 additional global sales partners guarantees customer proximity directly on site, anywhere in the world.

Our range of services consists of all kinds of products with a wide range of electrotechnical applications. This includes numerous connection technologies for device manufacturers and machine building, components for modern control cabinets and tailor-made solutions for many applications and industries such as the automotive industry, wind energy, solar energy, the process industry, or applications in the fields of water supply, power transmission/distribution and transportation infrastructure.

Global player with personal customer contact
Company independence is an integral part of our corporate policy. Phoenix Contact therefore relies on in-house competence and expertise in a range of contexts: the design and development departments constantly come up with innovative product ideas, developing special solutions to meet customer requirements. Numerous patents emphasize the fact that many of Phoenix Contact’s products have been developed in-house.
Within the Phoenix Contact Group, Phoenix Contact E-Mobility GmbH is the center of expertise for components and solutions in E-Mobility. We develop charging systems and charging controllers for DC and AC charging. Our customers see us as a complete provider of components for devices within the charging infrastructure, for both static and mobile equipment.

As an innovator in this field, we set new standards with the further development and standardization of components and solutions for a worldwide and modern charging infrastructure.

PHOENIX CONTACT E-Mobility GmbH – your competent partner for E-Mobility

Reliable connection technology for E-Mobility
Phoenix Contact offers a product and technology portfolio that enables you to implement various concepts for your charging infrastructure.

Flexible, programmable charging controllers
The E-Mobility controllers from Phoenix Contact enable the setup of charging stations in accordance with current requirements and standards. Optimum controller solutions are available for private, commercial, and public applications.

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Phoenix Contact offers the complete range of charging connectors from a single source: Type 1, Type 2, and GB/T standard. Whether it's conventional charging on the AC power grid or fast DC charging, you'll find the perfect solutions in our product range.

We also offer individual combinations of cables and customer-specific housing colors and designs.

In addition to the comprehensive portfolio, Phoenix Contact also develops individual solutions for special customer requirements, even those not covered by standards.

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1) The Type 1 standard does not call for a charging plug within the infrastructure. In Europe, an adapter charging cable is used here, which consists of a Type 1 charging connector in the vehicle and a Type 2 charging plug in the infrastructure.
A wide range of stranded cables:
- Various AC and DC cable cross sections depending on the current capacity
- Metric and AWG cables (VDE- and UL-certified)
- Spiraled and straight cables
- Various cable colors

Modern charging stations increasingly feature special designs and colors. Choose charging plugs in custom matching colors.

<table>
<thead>
<tr>
<th>Type 1/North America</th>
<th>Type 2/Europe</th>
<th>GB/T standard/China</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Type 1/North America" /></td>
<td><img src="image2" alt="Type 2/Europe" /></td>
<td><img src="image3" alt="GB/T standard/China" /></td>
</tr>
</tbody>
</table>

1) Type 2
The Combined Charging System (CCS) is a standard-compliant charging system for electric vehicles, which supports both conventional AC charging and fast DC charging. Both vehicle connectors fit into the CCS vehicle inlet. The CCS was developed in collaboration with leading automobile manufacturers.

**Advantages of the Combined Charging System (CCS)**

**Safe charging**

An electromechanical actuator locking mechanism prevents the vehicle connector from being withdrawn during the charging process or prior to completion of all necessary transactions such as payment. This guarantees a high level of functional safety.

**Fast charging**

The DC contacts, which are larger than those used for AC charging, enable fast charging at up to 200 A. The ergonomic handle design and the low insertion and withdrawal forces of the vehicle connector guarantee fast, convenient, and easy handling.

**Intelligent charging process**

Predefined charging mechanisms and sequences are performed for both AC and DC charging. For both charging types, the signal and control contacts, CP and PP, are used for communication and control.
The vehicle inlet is compatible with the AC and DC vehicle connector.

**Type 1**
The CCS Type 1, which complies with SAE J1772 and IEC 62196-3, is used for fast DC charging in the USA.

**Type 2**
In early 2013, the European Commission specified the use of the CCS Type 2 charging system according to IEC 62196 as a uniform standard throughout Europe.
The CCS Type 1 was developed for the North American market on the basis of SAE J1772 and IEC 62196-3. The universal vehicle CCS inlet permits both single-phase AC and fast DC charging.

In contrast to the European Type 2, safety is guaranteed throughout the charging process by means of a lever locking mechanism. As soon as the lever is actuated, the charging process is immediately interrupted, which makes it impossible to withdraw the vehicle connector under load.

**Main features**
- 3 + 2 positions for DC charging
- Robust, high-quality materials
- Convenient handling
- Low insertion and withdrawal forces
- Complies with SAE J1772/IEC 62196-3
- Locking and unlocking by means of a lever system with additional actuator locking mechanism at the inlet
- Frost-proof lever locking mechanism
- Temperature sensors for measuring the temperature of the power contacts
**Technical data – Combined Charging System – Type 1**

**Standards**
SAE J1772, IEC 62196-3

**AC unit Type 1**
- Rated voltage: Up to 250 V AC
- Rated current 1-phase: Up to 32 A

**DC unit Type 1**
- Rated voltage: Up to 600 V DC
- Rated current: Up to 200 A*  

**Degree of protection**
- IP degree of protection when plugged in/in road position: IP55
- IP degree of protection when not plugged in: IP24
- IP degree of protection with protective cap: IP54

* Higher currents available on request

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**CCS vehicle inlet Type 1**

**AC vehicle connector Type 1**
Type 1 – conventional AC charging for North America and Japan

The AC vehicle connector Type 1 carries out single-phase AC charging in charging modes 2 and 3. It has two signal contacts, which ensure that the charging process is controlled safely. The locking between the vehicle and the vehicle connector is closed by means of a lever system. The AC charging system Type 1 is based on the requirements of SAE J1772 and IEC 62196-2.
Main features

• 3 + 2 positions for 1-phase charging
• Complies with IEC 62196-2 and SAE J1772
• Convenient handling
• Locking and unlocking by means of a lever system
• Robust, high-quality materials
• Locking and unlocking by means of a lever system with additional actuator locking mechanism at the inlet
• Frost-proof lever locking mechanism

Technical data – AC vehicle connector Type 1

<table>
<thead>
<tr>
<th>Standards</th>
<th>IEC 62196-2/SAE J1772</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>Up to 250 V</td>
</tr>
<tr>
<td>Rated current 1-phase</td>
<td>Up to 70 A</td>
</tr>
</tbody>
</table>

Degree of protection

| IP degree of protection when plugged in | IP54 |
| IP degree of protection with protective cap | IP44 |

Adapter charging cable Type 1 to Type 2

The Type 1 standard does not call for a plug-in connection to the charging station. This charging cable enables electric vehicles with a Type 1 vehicle inlet to be charged at European charging stations equipped with a Type 2 infrastructure socket outlet. As a type of adapter, this charging cable consists of a Type 1 vehicle connector and a Type 2 infrastructure plug.
The Combined Charging System (CCS) Type 2 is the ideal charging interface for everyday charging situations in Europe. This means that the electric vehicle is suitable for both conventional AC charging and for DC charging on the move. The CCS vehicle connector transmits DC current up to 200 A. It is inserted into the vehicle inlet with the greatest of ease and very little force.

Main features
- 3 + 2 positions for DC charging
- Robust, high-quality materials
- Convenient handling
- Low insertion and withdrawal forces
- Complies with IEC 62196
- Temperature sensors for measuring the temperature of the power contacts
An electromechanical actuator locks the vehicle connector during the vehicle charging process. The actuator bolt is designed to withstand the highest pull-out forces. The integrated temperature monitoring prevents overheating.

### Technical data – Combined Charging System – Type 2

<table>
<thead>
<tr>
<th>Standard</th>
<th>IEC 62196-3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AC unit Type 2</strong></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>Up to 480 V AC</td>
</tr>
<tr>
<td>Rated current 3-phase</td>
<td>Up to 32 A</td>
</tr>
<tr>
<td><strong>DC unit Type 2</strong></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>Up to 850 V DC</td>
</tr>
<tr>
<td>Rated current</td>
<td>Up to 200 A*</td>
</tr>
<tr>
<td><strong>Degree of protection</strong></td>
<td></td>
</tr>
<tr>
<td>IP degree of protection when plugged in/in road position</td>
<td>IP54</td>
</tr>
</tbody>
</table>

* Higher currents available on request
Single- or three-phase AC charging is carried out in charging modes 2 and 3 with the standardized Type 2 charging connectors from Phoenix Contact. As part of the safety concept, both PP and CP signal contacts assume control functions. These detect whether the vehicle connector is correctly inserted in the inlet and which level of power may be used for charging, for example.
Main features
• 5 + 2 positions for 3-phase charging
• Mechanical locking
• Robust, high-quality materials
• Convenient handling
• Strong strain relief
• Low insertion and withdrawal forces
• Complies with IEC 62196
• Optional: temperature sensor outputs for measuring the temperature of the power contacts

Technical data – AC Type 2

<table>
<thead>
<tr>
<th>Standard</th>
<th>IEC 62196-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>Up to 480 V AC</td>
</tr>
<tr>
<td>Rated current</td>
<td>Up to 63 A</td>
</tr>
</tbody>
</table>

Degree of protection

<table>
<thead>
<tr>
<th>IP degree of protection when plugged in</th>
<th>IP44</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP degree of protection with protective cap</td>
<td>IP44</td>
</tr>
</tbody>
</table>
Type 2 – conventional AC charging with a charging socket in the infrastructure

The standardized Type 2 infrastructure socket outlet from Phoenix Contact is designed for single- and three-phase AC charging. The space-saving design enables the infrastructure socket outlet to be installed in a compact wall charging station or standard charging station. A separate connection on the lock actuator is used to control the lock and query the lock state. The socket also enables a panel mounting frame or hinged cover to be mounted and a drainage tube to be connected.

Main features
• Modular design (front and rear mounting possible)
• Low installation height and depth
• Drainage system with discharge nozzle
• Lock recognition
• Theft/vandalism protection thanks to panel mounting frame or hinged cover

Panel mounting frame for the infrastructure socket outlet
Hinged cover for the infrastructure socket outlet
Rear and front mounting
The infrastructure socket outlet can be mounted on the housing panel from both the front and the rear.

Secure locking
A lock prevents the connector from being removed prematurely. The lock actuator secures the infrastructure plug with a bolt lowered from above. The lock is controlled via electronics integrated in the actuator and the current state can be queried.

| **Technical data – AC infrastructure socket outlet Type 2** |
|---------------------------------|-------|
| **Standard**                    | IEC 62196-2 |
| **Rated voltage**               | Up to 480 V |
| **Rated current**               | Up to 32 A |
| **Degree of protection**        |       |
| IP degree of protection when plugged in | IP44 |
| IP degree of protection with hinged cover | IP54 |
Conventional AC charging with charging cable for charging mode 2

With the In-Cable Control and Protection Device (IC-CPD), electric vehicles can be charged easily and safely both on the go and at home. The vehicle is charged via a normal household socket with a power rating of up to 3 kW. The standardized communication with the vehicle as well as the safety equipment are integrated into the cable box and guarantee standard-compliant and safe vehicle charging according to IEC 61851 in charging mode 2.

IC-CPD
Charging cable with AC vehicle connector Type 2 and Schuko plug
Main features
• Transportable charging system
• Easy operation
• Automatic charging process
• Integrated temperature and residual current monitoring
• Compatible with Type 1 and Type 2 charging systems
• Vehicle charging in charging mode 2 according to IEC 61851
• Vehicle charging with a household plug (Schuko CEE 7/7, type EF)
• Controllable charging current

Technical data – IC-CPD

<table>
<thead>
<tr>
<th>Standard</th>
<th>EC 61851/Mode 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>200 … 250 V AC</td>
</tr>
<tr>
<td>Charging current</td>
<td>6 … 13 A</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50 Hz</td>
</tr>
<tr>
<td>Charging power*</td>
<td>1.4 … 3 kW</td>
</tr>
<tr>
<td>Tripping characteristics</td>
<td>Type A/30 mA</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-32 °C … +40 °C</td>
</tr>
</tbody>
</table>

Degree of protection

| Electronics module        | IP67            |

* Depending on charging current specification

Easy and safe charging via a household socket

* For vehicles on the European market with a Type 1 vehicle inlet.
  Further product versions on request.
GB/T standard – fast DC charging for China

The DC charging system that complies with the GB/T standard provides fast DC charging for Chinese charging stations in charging mode 4. The unique locking mechanism is integrated in the vehicle connector and was developed by Phoenix Contact. The locking mechanism, which is controlled by the charging station, prevents the vehicle connector from being withdrawn during the charging process, thereby ensuring maximum safety.
Main features
• 2 DC contacts, PE and communication contacts
• Locking and unlocking by means of a lever system with additional locking mechanism integrated in the vehicle connector
• Complies with GB/T Part 3
• Convenient handling
• Robust, high-quality materials
• Frost-proof lever locking mechanism
• Temperature sensors for monitoring inside the charging station

Technical data – DC charging system GB/T standard

<table>
<thead>
<tr>
<th>Standard</th>
<th>GB/T Part 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>Up to 750 V DC</td>
</tr>
<tr>
<td>Rated current</td>
<td>Up to 250 A</td>
</tr>
</tbody>
</table>

Degree of protection

<table>
<thead>
<tr>
<th>IP degree of protection when plugged in</th>
<th>IP55</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP degree of protection with protective cap</td>
<td>IP54</td>
</tr>
</tbody>
</table>

Innovative and unique:
Integrated locking mechanism in the PHOENIX CONTACT vehicle connector

1 Actuate the lever and insert the connector into the vehicle inlet. The lever snaps into the vehicle inlet.
2 The locking mechanism integrated in the vehicle connector closes. The lever can no longer be actuated and the charging process starts. The vehicle connector cannot be removed during the charging process.
3 Once the charging process is complete, the locking mechanism integrated in the vehicle connector opens. The vehicle connector can be removed by pressing the lever.
GB/T standard – conventional AC charging for China

The AC charging system standardized according to the Chinese GB/T standard enables both single- and three-phase charging in charging mode 3. A special lever locking mechanism guarantees safe charging. In the vehicle, an implemented, electric locking bolt also locks the vehicle connector. This prevents the connector from being removed during the charging process.
Main features
• 5 + 2 positions for 3-phase charging
• Mechanical locking
• Robust, high-quality materials
• Convenient handling
• Strong strain relief
• Low insertion and withdrawal forces
• Complies with IEC 62196

Technical data – AC charging system GB/T standard

<table>
<thead>
<tr>
<th>Standard</th>
<th>GB/T Part2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>Up to 440 V AC</td>
</tr>
<tr>
<td>Rated current</td>
<td>Up to 32 A</td>
</tr>
</tbody>
</table>

Degree of protection

<table>
<thead>
<tr>
<th>IP degree of protection when plugged in</th>
<th>IP55</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP degree of protection with protective cap</td>
<td>IP54</td>
</tr>
</tbody>
</table>
DC charging system for utility vehicles

In addition to the standardized connection systems for automobiles, Phoenix Contact also offers high-performance connectors for DC charging large battery units. The DC replacement battery concept is particularly suitable for utility vehicles used by local and municipal authorities as well as for forklift trucks, haulage vehicles, and passenger transport vehicles.

Main features
- Current: up to 400 A
- Voltage: up to 750 V DC
- Tolerance compensation for the plug-in process and vibration damping during the journey
- More than 10,000 insertion/withdrawal cycles
- Battery and thermal management as well as charging state monitoring via integrated data module
PHOENIX CONTACT E-Mobility GmbH develops vehicle inlets especially for the automotive industry. The use of CCS vehicle inlets means that only a single one of these is required in an electric vehicle to encompass all charging situations. These CCS vehicle inlets can accommodate both AC and DC vehicle connectors, making them the optimal interface for charging all types of electric vehicles.

**Your advantages:**
- CCS vehicle inlets for everyday charging situations thanks to AC and DC charging in one
- Application-specific development – a perfect fit for your electric vehicle
- Low installation heights and depths
- Easy to configure for commercial and special vehicles

If you are interested in learning more about automotive products, please contact:
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Phone: +49 (0) 52 35 34 38 90
Fax: +49 (0) 52 35 34 38 91
E-mail: emobility@phoenixcontact.com
phoenixcontact-emobility.com

**Technical data**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>CCS Type 1</th>
<th>CCS Type 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>IEC 62196-3, SAE J1772</td>
<td>IEC 62196-3</td>
</tr>
<tr>
<td>AC charging power</td>
<td>Up to 32 A / 250 V AC</td>
<td>Up to 32 A / 250 V AC</td>
</tr>
<tr>
<td>DC charging power</td>
<td>Up to 125 A / 600 V DC*</td>
<td>Up to 125 A / 850 V DC*</td>
</tr>
<tr>
<td>IP degree of protection (when plugged in)</td>
<td>IP54</td>
<td>IP54</td>
</tr>
<tr>
<td>IP degree of protection with protective caps</td>
<td>IP54</td>
<td>IP54</td>
</tr>
</tbody>
</table>

* Higher currents available on request
Charging controllers for every E-Mobility application

The E-Mobility controllers from Phoenix Contact enable the setup of charging stations in accordance with current requirements and standards, and ensure a high degree of security and interoperability with electric vehicles. Optimum controller solutions are available for the entire range of applications – private, commercial, or public as well as AC or DC charging technologies.

The charging controllers can be easily combined with the EV-RCM residual current modules.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC charging points (IEC 61851-1)</td>
<td>1</td>
</tr>
<tr>
<td>AC charging points (DIN SPEC 70121/ISO 15118)</td>
<td></td>
</tr>
<tr>
<td>Charging case</td>
<td>B, C</td>
</tr>
<tr>
<td>Vehicle connector release in the event of mains failure</td>
<td>●</td>
</tr>
<tr>
<td>Load and energy management</td>
<td>●</td>
</tr>
<tr>
<td>Programmable</td>
<td></td>
</tr>
<tr>
<td>TCP/IP communication</td>
<td></td>
</tr>
<tr>
<td>Mobile phone interface</td>
<td></td>
</tr>
<tr>
<td>OCPP 1.2/1.5</td>
<td></td>
</tr>
<tr>
<td>RS-485, Modbus RTU</td>
<td>Slave</td>
</tr>
<tr>
<td>RS-232</td>
<td></td>
</tr>
<tr>
<td>CAN</td>
<td></td>
</tr>
<tr>
<td>Available as a printed-circuit board</td>
<td>●</td>
</tr>
</tbody>
</table>
**Integration into your charging infrastructure**

In addition to its E-Mobility charging systems and controllers, Phoenix Contact also offers a wide range of electrical connection technology and electronics for use in charging stations.

These components function alongside the specific E-Mobility software modules to form the basis of intelligent charging infrastructures which can be used to promote cost-effective operation.

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**EV Charge Control Advanced**

*EV Charge Control Advanced* is the advanced controller solution for commercial applications:

- Suitable for connection to load and energy management systems
- Suitable for company premises and parking lots

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**EV Charge Control Professional**

*EV Charge Control Professional* is the controller solution for charging stations with increased operating expenditure:

- For AC and DC charging
- For the public charging infrastructure

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<table>
<thead>
<tr>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>B, C</td>
<td>B, C</td>
</tr>
<tr>
<td>With extra module EM-EV-CLR-12V</td>
<td></td>
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<tr>
<td></td>
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<td>Master</td>
<td>Master</td>
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<td></td>
<td>•</td>
</tr>
</tbody>
</table>
EV Charge Control Basic – AC charging controller for the simple charging station

The EV Charge Control Basic not only fulfills the key functions required for charging an electric vehicle in accordance with IEC 61851 (communication via CP and PP, charging connector lock and release), but also integrates the power supply for the charging connector lock and a mains failure unlocking module for charging scenario B (with infrastructure socket outlet).

**Your advantages:**
- Integration of all required controller functions
- Release of the infrastructure plug in the event of main failure
- PCB or mounting rail device
- Configurable digital inputs and outputs
- Modbus RTU RS-485 interface (slave) for remote control and monitoring

**Simple**

EVCC Basic lets you implement simple charging stations – called wall boxes – for home use, without a significant increase in time or expense. No additional activation is required for the contactor acting as the switching element.

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**Technical data**

<table>
<thead>
<tr>
<th>Parameters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage range</td>
<td>110 V AC … 240 V AC</td>
</tr>
<tr>
<td>Digital inputs</td>
<td>4</td>
</tr>
<tr>
<td>Digital outputs</td>
<td>4</td>
</tr>
<tr>
<td>Configurable charging current</td>
<td>16 A, 20 A, 32 A, 63 A</td>
</tr>
<tr>
<td>Ambient temperature range</td>
<td>-35 °C … +70 °C</td>
</tr>
</tbody>
</table>
EV Charge Control Advanced – AC charging controller for commercial vehicle fleets and parking lots

The EV Charge Control Advanced integrates all the necessary controller functions for commercial charging points and offers extensive configuration possibilities. The charging controller has many applications, and even supports load and energy management systems on company premises and in parking lots.

Your advantages:
• All of the necessary charging point controller functions are integrated
• Ethernet interface for configuration and operation
• Set up any arrangement of scalable charging infrastructures
• Charging initiation, status monitoring, and energy monitoring via Modbus TCP

Technical data

<table>
<thead>
<tr>
<th>Parameters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage range</td>
<td>110 V AC … 240 V AC</td>
</tr>
<tr>
<td>Digital inputs</td>
<td>4</td>
</tr>
<tr>
<td>Digital outputs</td>
<td>4</td>
</tr>
<tr>
<td>Configurable charging current</td>
<td>6 to 80 A</td>
</tr>
<tr>
<td>Ambient temperature range</td>
<td>-25 °C … +60 °C</td>
</tr>
</tbody>
</table>
EV Charge Control Professional – AC and DC charging controller

The EV Charge Control Professional integrates all interfaces of a sophisticated charging station – TCP/IP communication, GSM/UMTS, serial communication, digital and analog I/Os, and vehicle interfaces – into a single device. Communication with the electric vehicle is facilitated during DC charging in accordance with ISO/IEC 15118 / DIN SPEC 70121 (Combined Charging System). The charging station can also be integrated into billing systems via the Open Charge Point Protocol (OCPP).

Programmable
The charging controller is freely programmable in line with IEC 61131 and optimized for the functional requirements of E-Mobility. It is also as robust and reliable as an industrial PLC.

Your advantages:
- High-level communication in accordance with ISO IEC 15118 and DIN SPEC 70121
- Controller solution for AC and DC charging in accordance with the Combined Charging System (CCS)
- Extensive I/Os and serial interfaces for system integration
- Communication with management systems (OCPP)

Technical data

<table>
<thead>
<tr>
<th>Parameters</th>
<th>AC and DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charging methods</td>
<td>AC and DC</td>
</tr>
<tr>
<td>Standard</td>
<td>IEC 61851-1, ISO/IEC 15118, DIN SPEC 70121</td>
</tr>
<tr>
<td>Vehicle interfaces</td>
<td>2 (1 x AC, 1 x DC)</td>
</tr>
<tr>
<td>Interfaces</td>
<td>Digital I/Os</td>
</tr>
<tr>
<td></td>
<td>Serial communication (RS-485, RS-232, CAN)</td>
</tr>
<tr>
<td></td>
<td>Temperature monitoring</td>
</tr>
<tr>
<td></td>
<td>Ethernet</td>
</tr>
<tr>
<td></td>
<td>GSM</td>
</tr>
<tr>
<td>Protocols</td>
<td>OCPP</td>
</tr>
</tbody>
</table>
The EV-RCM residual current monitoring modules detect AC and DC residual currents based on the requirements in IEC 62752. In combination with existing residual current devices, the modules increase the voltage protection level required by the standard when charging electric vehicles. An optional connection to charging controllers from Phoenix Contact enables convenient status monitoring as well.

**Technical data**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage range</td>
<td>100 ... 240 V AC 50/60 Hz</td>
</tr>
<tr>
<td>AC residual current ldn1</td>
<td>30 mA</td>
</tr>
<tr>
<td>DC residual current ldn2</td>
<td>6 mA</td>
</tr>
<tr>
<td>Load current In</td>
<td>32 A</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-25 °C ... +80 °C</td>
</tr>
</tbody>
</table>

**Your advantages:**
- Universal residual current detection with a measuring transducer
- Use and continued operation of type A residual current circuit breaker possible
- Status monitoring in conjunction with Phoenix Contact charging controllers
- Optional feedback using Phoenix Contact charging controllers in the event of errors
Charging infrastructure billing and management systems have a wide range of different requirements to live up to. In addition to communicating with the vehicle, they also have to offer functions for integrating the charging infrastructure into billing systems.

As charging controllers from Phoenix Contact come complete with standard interfaces, they can be used in conjunction with appropriate software modules for charging management purposes, intuitive user handling, or integration into billing systems with OCPP (Open Charge Point Protocol).

And this is exactly how we can offer our support no matter whether you’re setting up an individual charging point or an entire system of charging stations.

Note
If you are interested in learning more about how we can offer support with structuring and networking your charging infrastructure, please contact:

PHOENIX CONTACT E-Mobility GmbH
Hainbergstraße 2
32816 Schieder-Schwalenberg, Germany
Phone: +49 (0) 52 35 34 38 90
Fax: +49 (0) 52 35 34 38 91
E-mail: emobility@phoenixcontact.com
phoenixcontact-emobility.com

The charging station can be integrated into your management system using communication protocols such as OCPP or SQL.
**Individual designs**

Let us help you to design your personal charging infrastructure:

<table>
<thead>
<tr>
<th>Software modules for…</th>
<th>Semi-public charging infrastructure</th>
<th>Public charging infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key switch</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>RFID card</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Smartphone app</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Billing systems</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Management systems</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

We supply software modules in accordance with IEC 61815 and ISO 15118 to facilitate communication between vehicles, charging stations, and even back-end systems.

**Our expertise**

Let us help you with the different charging types and the communication methods that go with them:

### Functions

<table>
<thead>
<tr>
<th>Charging methods</th>
<th>AC and DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocols</td>
<td>OCPP, SQL, CAN, Modbus RTU</td>
</tr>
<tr>
<td>Interfaces</td>
<td>Ethernet</td>
</tr>
<tr>
<td></td>
<td>Digital I/Os</td>
</tr>
<tr>
<td></td>
<td>Serial communication (RS-485, RS-232)</td>
</tr>
</tbody>
</table>

### Libraries

| EM-CP-PP                | E-Mobility Lib                               | Communication with charging controllers |
| EVCC Basic              | E-Mobility Lib                               | Communication with charging controller   |
| OCPP                    | OCPP Lib                                     | Communication with back-end systems      |
| SQL                     | SQL Library                                  | Connection to central databases          |
| Modbus                  | Modbus Lib                                   | Reading energy values from measuring devices |
| Serial communication    | COM Serial                                   | Integration of RFID readers              |
In addition to our charging systems, we also offer a complete product range for constructing a modern charging infrastructure – from the power supply to the vandalism-proof operator interface. Our solution expertise is rounded off by professional consultation and software services.

**Solution for the charging infrastructure**

Alternatively, a charging infrastructure can be designed in various ways, locally or in conjunction with a management system. Users are offered a vandalism-proof operator panel with extended temperature range.

Wired or wireless integration in management systems is supported. Secure data transmission is implemented via VPN tunnel.

Additional I/O devices can be connected thanks to the support of standard interfaces.
We offer a wide range of operator panels for operating and, to some extent, controlling charging stations – these also include outdoor and vandalism-proof versions. They are designed as touch and web panels or as operator terminals with function buttons. The devices can be integrated or connected to I/O devices via various interfaces such as USB or Ethernet. If required, they can also perform control tasks.

CLIPLINE complete features terminal blocks and function terminals for supply, potential distribution, and signal distribution. Thanks to the free choice of connection technology and the use of hybrid terminal blocks, the installation can be specifically tailored to the application.

Stable operation is ensured through the use of power supplies. Various performance classes and compact designs enable use in a wide range of applications. Uninterruptible power supplies are available to increase availability.

Thanks to standard interfaces such as Ethernet, WLAN, GSM/GPRS, Trusted Wireless etc., open communication with management systems is possible. Component versions featuring various functions and designs enable custom integration according to customer-specific requirements.

Various EMpro energy meters are available for obtaining data on energy consumption or power characteristics for billing purposes. Connection for data evaluation is supported via Ethernet or serial interfaces.

Surge voltages caused by switching operations and lightning strikes, especially outdoors, can be discharged effectively. TRABTECH protects the charging infrastructure against disturbances on the signal, data, and power cables and ensures the availability of electric vehicles.
**AC charging cables Type 1**

<table>
<thead>
<tr>
<th>Mode 3, 1-phase, 250 V, 4 m cable, black:</th>
<th>Spiraled: 20 A, metric</th>
<th>Order No. 1621670</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight: 32 A, metric</td>
<td>Order No. 1621794</td>
<td></td>
</tr>
<tr>
<td>16 A, AWG</td>
<td>Order No. 1621484</td>
<td></td>
</tr>
<tr>
<td>30 A, AWG</td>
<td>Order No. 1409949</td>
<td></td>
</tr>
<tr>
<td>70 A, AWG</td>
<td>Order No. 1621482</td>
<td></td>
</tr>
<tr>
<td>32 A, metric</td>
<td>Order No. 1409952</td>
<td></td>
</tr>
</tbody>
</table>

**AC vehicle connector, infrastructure plug Type 1 and charging connector Type 2**

<table>
<thead>
<tr>
<th>Mode 3, 1-phase, 250 V, 4 m cable, black:</th>
<th>Spiraled: 20 A, metric</th>
<th>Order No. 1621669</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight: 20 A, metric</td>
<td>Order No. 1621481</td>
<td></td>
</tr>
<tr>
<td>16 A, metric</td>
<td>Order No. 1410090</td>
<td></td>
</tr>
</tbody>
</table>

**AC charging cables Type 2**

<table>
<thead>
<tr>
<th>Mode 3, 4 m cable:</th>
<th>Spiraled: 20 A, 1-phase, 250 V, red</th>
<th>Order No. 1405194</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 A, 1-phase, 250 V, black</td>
<td>Order No. 1405195</td>
<td></td>
</tr>
<tr>
<td>20 A, 3-phase, 480 V, black</td>
<td>Order No. 1405197</td>
<td></td>
</tr>
<tr>
<td>20 A, 1-phase, 250 V, red</td>
<td>Order No. 1405196</td>
<td></td>
</tr>
<tr>
<td>20 A, 1-phase, 250 V, black</td>
<td>Order No. 1405199</td>
<td></td>
</tr>
<tr>
<td>32 A, 1-phase, 250 V, black</td>
<td>Order No. 1405199</td>
<td></td>
</tr>
<tr>
<td>32 A, 3-phase, 480 V, black</td>
<td>Order No. 1405199</td>
<td></td>
</tr>
<tr>
<td>63 A, 3-phase, 480 V, black</td>
<td>On request</td>
<td></td>
</tr>
</tbody>
</table>

**Infrastructure socket outlets Type 2 and GB**

<table>
<thead>
<tr>
<th>Mode 3, 0.7 m single wires: 20 A socket with 12 V actuator, 3-phase</th>
<th>Order No. 1405213</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 A socket with 24 V actuator, 3-phase</td>
<td>Order No. 1405215</td>
</tr>
<tr>
<td>32 A socket with 12 V actuator, 3-phase</td>
<td>Order No. 1405214</td>
</tr>
<tr>
<td>32 A socket with 24 V actuator, 3-phase</td>
<td>Order No. 1405216</td>
</tr>
</tbody>
</table>

**AC infrastructure socket outlet Type 2 with actuator**

- **Hinged cover**
  - Order No. 1405217

**AC infrastructure socket outlet Type 2 – accessories**

- Panel mounting frame
  - Order No. 1405218
- As an option, the AC infrastructure socket outlet Type 2 can be secured with a hinged cover or a panel mounting frame

**AC infrastructure socket outlet GB/T with actuator**

<table>
<thead>
<tr>
<th>Mode 3, 0.7 m single wires: 32 A socket with 12 V actuator, 1-phase</th>
<th>Order No. 1408171</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 A socket with 12 V actuator, 3-phase</td>
<td>Order No. 1408172</td>
</tr>
</tbody>
</table>

**AC infrastructure socket outlet GB/T without actuator**

<table>
<thead>
<tr>
<th>Mode 3, 0.7 m single wires: 32 A socket without actuator, single-phase</th>
<th>Order No. 1408169</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 A socket without actuator, 3-phase</td>
<td>Order No. 1408170</td>
</tr>
</tbody>
</table>
**AC charging cables GB/T**

Mode 3, 5 m cable:
- 16 A, 1-phase, 220 V, orange, straight
  Order No. 1408166
- 32 A, 1-phase, 220 V, orange, straight
  Order No. 1408167
- 32 A, 3-phase, 440 V, orange, straight
  Order No. 1408168

**AC charging cables for charging mode 2**

Mode 3, 5 m cable:
- 16 A, 1-phase, 220 V, orange, straight
  Order No. 1408161
- 32 A, 1-phase, 220 V, orange, straight
  Order No. 1408163
- 32 A, 3-phase, 440 V, orange, straight
  Order No. 1408165

**DC charging cables**

Mode 4, cable: 5 m, black, straight, AWG:
- 60 A, 600 V DC
  Order No. 1621488
- 125 A, 600 V DC
  Order No. 1409950
- 200 A, 600 V DC
  Order No. 1621489

Mode 4, cable: 5 m, black, straight, metric:
- 60 A, 850 V DC
  Order No. 1618306
- 125 A, 850 V DC
  Order No. 1409060
- 200 A, 850 V DC
  Order No. 1621653

**AC vehicle connector GB/T**

- Mode 3, 5 m cable:
  - 16 A, 1-phase, 220 V, orange, straight
    Order No. 1408166
  - 32 A, 1-phase, 220 V, orange, straight
    Order No. 1408167
  - 32 A, 3-phase, 440 V, orange, straight
    Order No. 1408168

**AC vehicle connector and infrastructure plug GB/T**

- Mode 3, 5 m cable:
  - 16 A, 1-phase, 220 V, orange, straight
    Order No. 1408161
  - 32 A, 1-phase, 220 V, orange, straight
    Order No. 1408163
  - 32 A, 3-phase, 440 V, orange, straight
    Order No. 1408165

**In-Cable Control and Protection Device (IC-CPD)**

- Mode 2, 4 m cable, 230 V, 13 A, vehicle connector Type 1, household plug CEE 7/7 (type EF)
  Order No. 1621797
- Mode 2, 4 m cable, 230 V, 13 A, vehicle connector Type 2, household plug CEE 7/7 (type EF)
  Order No. 1621516
- IC-CPD wall bracket
  Order No. 1622474

**DC vehicle connector CCS Type 1**

- Mode 4, cable: 5 m, black, straight, AWG:
  - 60 A, 600 V DC
    Order No. 1621488
  - 125 A, 600 V DC
    Order No. 1409950
  - 200 A, 600 V DC
    Order No. 1621489

**DC vehicle connector CCS Type 2**

- Mode 4, cable: 5 m, black, straight, metric:
  - 60 A, 850 V DC
    Order No. 1618306
  - 125 A, 850 V DC
    Order No. 1409060
  - 200 A, 850 V DC
    Order No. 1621653

**DC vehicle connector GB/T**

- Mode 4, cable: 5 m, black, straight, metric:
  - 60 A, 750 V DC
    Order No. 1621468
  - 125 A, 750 V DC
    Order No. 1409060
  - 250 A, 750 V DC
    On request
Vehicle charging interfaces

**CCS vehicle inlet Type 1**
Mode 2, 3, 4, mountable lock actuator, 2.0 single wires:
- **DC charging**
  - 200 A, 600 V DC
- **AC charging**
  - 32 A, 250 V DC

**CCS vehicle inlet Type 2**
Mode 2, 3, 4, mountable lock actuator, 2.0 single wires:
- **DC charging**
  - 125 A, 850 V DC
- **AC charging**
  - 32 A, 480 V AC

**DC Battery Connector**
- 400 A
- 750 V
- Tolerance compensation for the plug-in process
- Vibration damping

If you are interested in automotive products, please contact PHOENIX CONTACT E-Mobility GmbH, Hainbergstrasse 2, 32816 Schieder-Schwalenberg, Germany
Phone: + 49 5235 3-43890, Fax: + 49 5235 3-43891, E-mail: emobility@phoenixcontact.com, phoenixcontact-emobility.com

Components for charging stations

**Displays**
2.8” touch display
Order No. 2701257

Further touch panels are available from Sütron:
- **Outdoor Touch Panel 5.7”**
- **Outdoor Touch Panel 7”**
- **P Line Touch Panel 7”**
  - Mini touch and outdoor panels are also available as shock-proof versions

**Power supply**
1-phase DC voltage supply in a flat design
12 V: Order No. 2868570
24 V: Order No. 2868664
Uninterruptible power supply, 24 V, in a flat design
Order No. 2868703
Compact and efficient power supply
Order No. 2902993
Uninterruptible power supply, 24 V, in a compact design
Order No. 2905907

**Measuring technology**
Energy meter,
DIN rail mounting
Order No. 2901363
Current transformer
Order No. 2277019
- Power and energy measurement

**Surge protection**
3-phase surge protection type 2
Order No. 2859521
1-phase surge protection type 3
Order No. 2858357
Surge protection for Ethernet
Order No. 2881007
- Device protection for ensuring availability
Components for charging stations

**Charging controller**

**EV Charge Control Basic**
Order No. 1622452
- For charging scenarios with an infrastructure socket outlet (case B) and charging connector (case C)
- With housing for DIN rail mounting

**EV Charge Control Basic**
Order No. 1622459
- For charging scenarios with an infrastructure plug (case C)
- With housing for DIN rail mounting

**EV Charge Control Basic**
Order No. 1622460
- For charging scenarios with an infrastructure plug (case C)
- As a PCB version

**Add-on module for plug release**

**EM-EV-CLR-12V**
Order No. 2903246
- Power supply for releasing the charging connector following voltage failure

**Residual current monitoring**

**Order No. 1622450**
- 1-channel versions

**Order No. 1622451**
- 2-channel versions
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phoenixcontact.com

Product range

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- Connectors
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- Fieldbus components and systems
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- Industrial Ethernet
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- Modular terminal blocks
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- PCB terminal blocks and PCB connectors
- Power supply units and UPS
- Protective devices
- Relay modules
- Sensor/actuator cabling
- Software
- Surge protection and interference filters
- System cabling for controllers
- Tools
- Wireless data communication