Solutions for electromobility

Innovative charging technology for infrastructure and vehicles

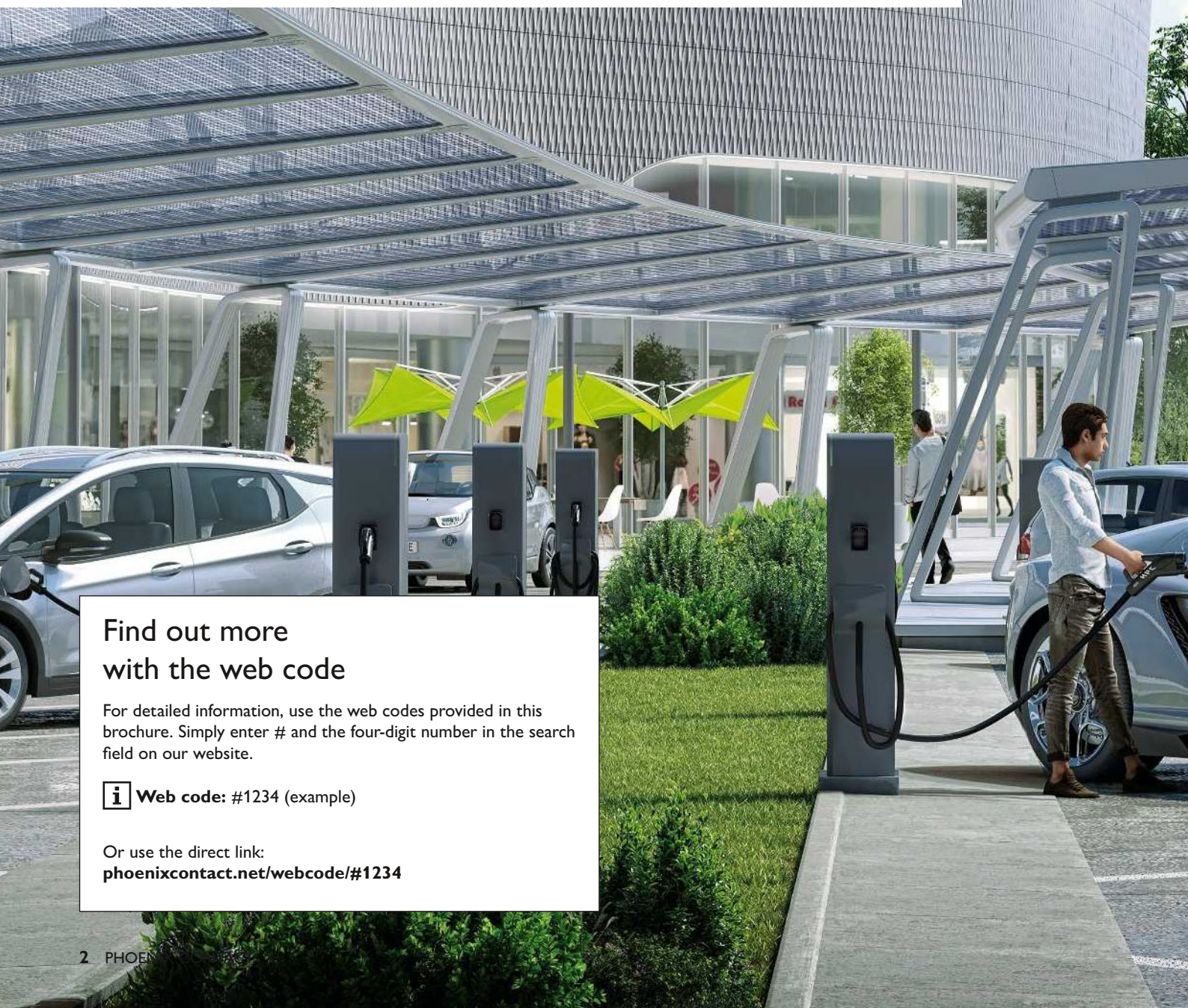
PHOENIX CONTACT
INSPIRING INNOVATIONS

Pioneers in fast charging technology

Within the Phoenix Contact Group, Phoenix Contact E-Mobility GmbH is the center of expertise in the field of charging technology for electromobility.

As an innovator in this sector, we are setting new standards in the further development and global standardization of state-of-the-art charging infrastructure suitable for everyday use – and at the same time we are a reliable partner to the automotive industry.

By developing pioneering technologies such as High Power Charging, we are a key driver in ensuring that electromobility is able to break through and become accepted in our modern society.



Find out more with the web code

For detailed information, use the web codes provided in this brochure. Simply enter # and the four-digit number in the search field on our website.

Web code: #1234 (example)

Or use the direct link:
phoenixcontact.net/webcode/#1234

"Electromobility is an integral part of the move towards climate-friendly mobility. If this transition is to prove successful, having a widespread network of fast charging points for electric vehicles will be key. With our broad product and solution portfolio, we are your reliable partner for setting up this infrastructure all over the world."

Joachim Pucker, Director Market Segment Infrastructure

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Our history

Phoenix Contact realized very early on that the future of mobility lies in electricity. Thanks to this vision, our Electromobility business unit is already able to look back on a decade of successful history. This is therefore the ideal time to take a look at the key milestones, successes, incorporations, and collaborations that have taken place over the years.

We are convinced that electrically driven vehicles are now an indispensable part of our lives, and we are proud to work together with our customers and partners on this transition.

2009

The beginnings
The first customer-specific connector is developed that offers combined signal and power transmission for charging electric vehicles.

2010

First series products
AC socket outlets for Chinese charging column manufacturers are produced and supplied in large quantities.

Start of CCS standardization
We develop and standardize a global charging standard for combined AC and DC charging (later to become CCS) along with leading automobile manufacturers.

2011

Charging system for electric buses
We develop a high-performance connector that enables large batteries for electric buses to be exchanged. The discharged batteries are replaced in the depot with fully charged batteries completely automatically and in the shortest possible time, thus optimizing the utilization of the buses.

2012

Charging cables and controllers
Charging column manufacturers are supplied with the first AC charging cables and controllers, as well as prototypes of the combined charging cable (later to become CCS) in accordance with the preliminary standard.

2013

E-Mobility GmbH founded
Phoenix Contact E-Mobility GmbH is founded at the new Schieder-Schwalenberg facility. The new company brings together all of the product and technology expertise available within the Phoenix Contact Group in the field of charging technology for electromobility.

2014

Fast charging in accordance with the CCS standard
The IEC 62196-3 standard, which describes fast DC charging with CCS, is adopted. Series production of vehicle inlets and charging cables that comply with the standard begins.

2009 2010 2011 2012 2013

2014 2015 2016 2017 2018 2019

2016

New subsidiary founded in China
Phoenix Contact responds to the rapidly growing electromobility market in Asia by founding its own electromobility subsidiary in China.

High Power Charging prototype
Barack Obama and Angela Merkel get their hands on the future of fast charging technology at the Hannover Messe.

2018

Production expanded
In order to keep pace with increasing international demand, we expand our production capacity by constructing new facilities.

High Power Charging market launch
The first series-produced HPC charging cables are delivered and installed in fast charging stations throughout the whole of Europe.

© CharIN e.V.

2015

CharIN founded
We join forces with Audi, BMW, Daimler, Ford, Opel, Porsche, Volkswagen, and more to form the Charging Interface Initiative e.V. (CharIN) to further develop, promote, and establish fast charging globally with the Combined Charging System (CCS).


CERTIFICATE

PHOENIX CONTACT E-Mobility GmbH

IATF 16949:2016

2017

IATF certification
Phoenix Contact E-Mobility GmbH successfully attains IATF 16949:2016 certification. This attests that we satisfy the high demands of the automotive industry in terms of quality and process, and that we are a reliable partner.

2019

German Design Award
Our type 2 AC charging cables are acclaimed for their modern styling and ergonomic design.

Charging technology becomes more intelligent
We launch a software suite for the intelligent automation of charging parks and develop new, pioneering concepts for charging controllers.

Overview of charging standards worldwide

Various charging standards, which have their own specific connector geometries originating in North America, Europe, and China, have become established throughout the world.

We can provide you with a complete range of charging technology products for any region from a single source – both for conventional charging on the AC power grid and for fast charging with DC power.

Thanks to our involvement in developing the Combined Charging System (CCS), AC and DC charging with just one vehicle inlet is now possible throughout most of the world.

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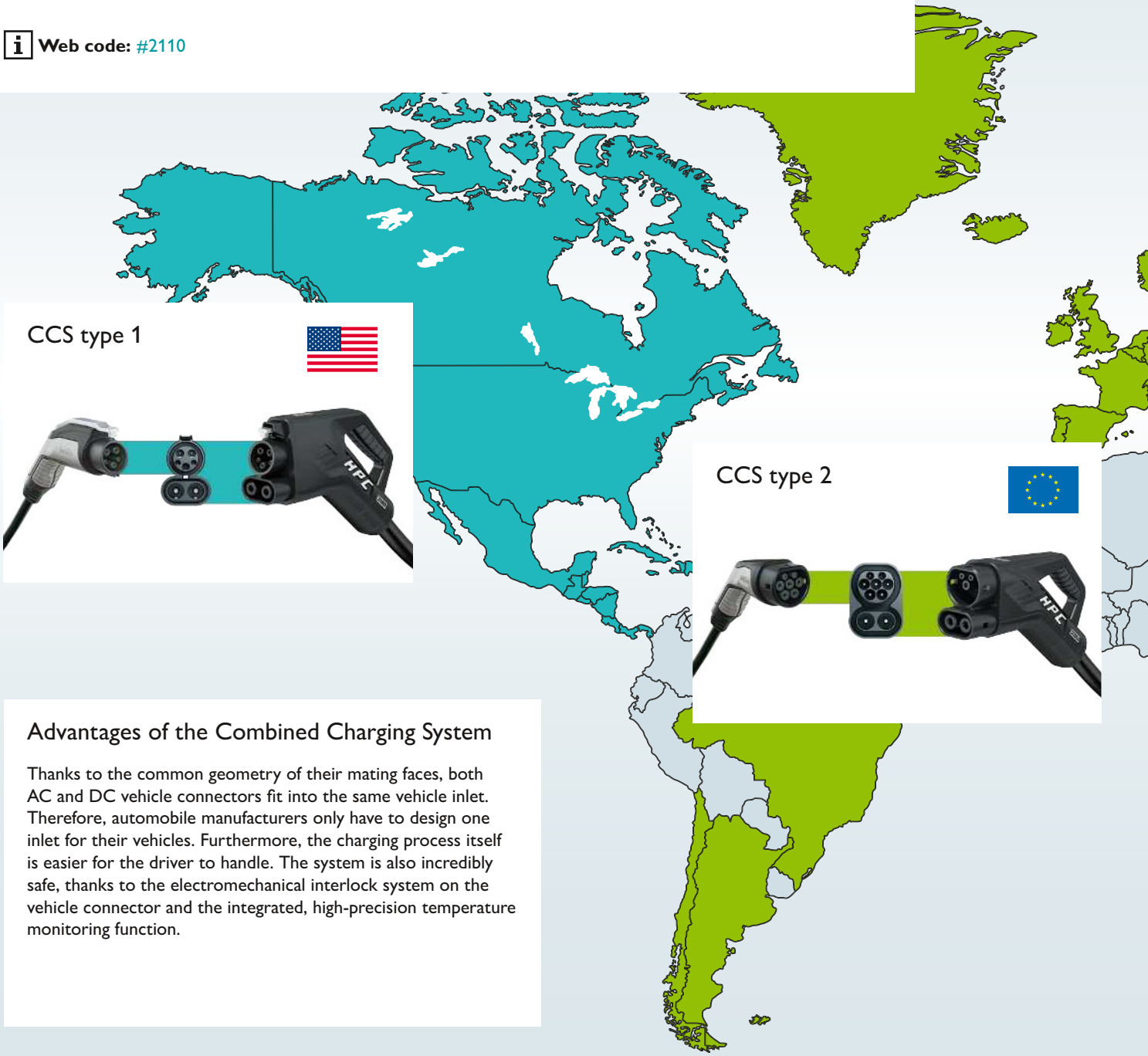


CCS type 1

CCS type 2

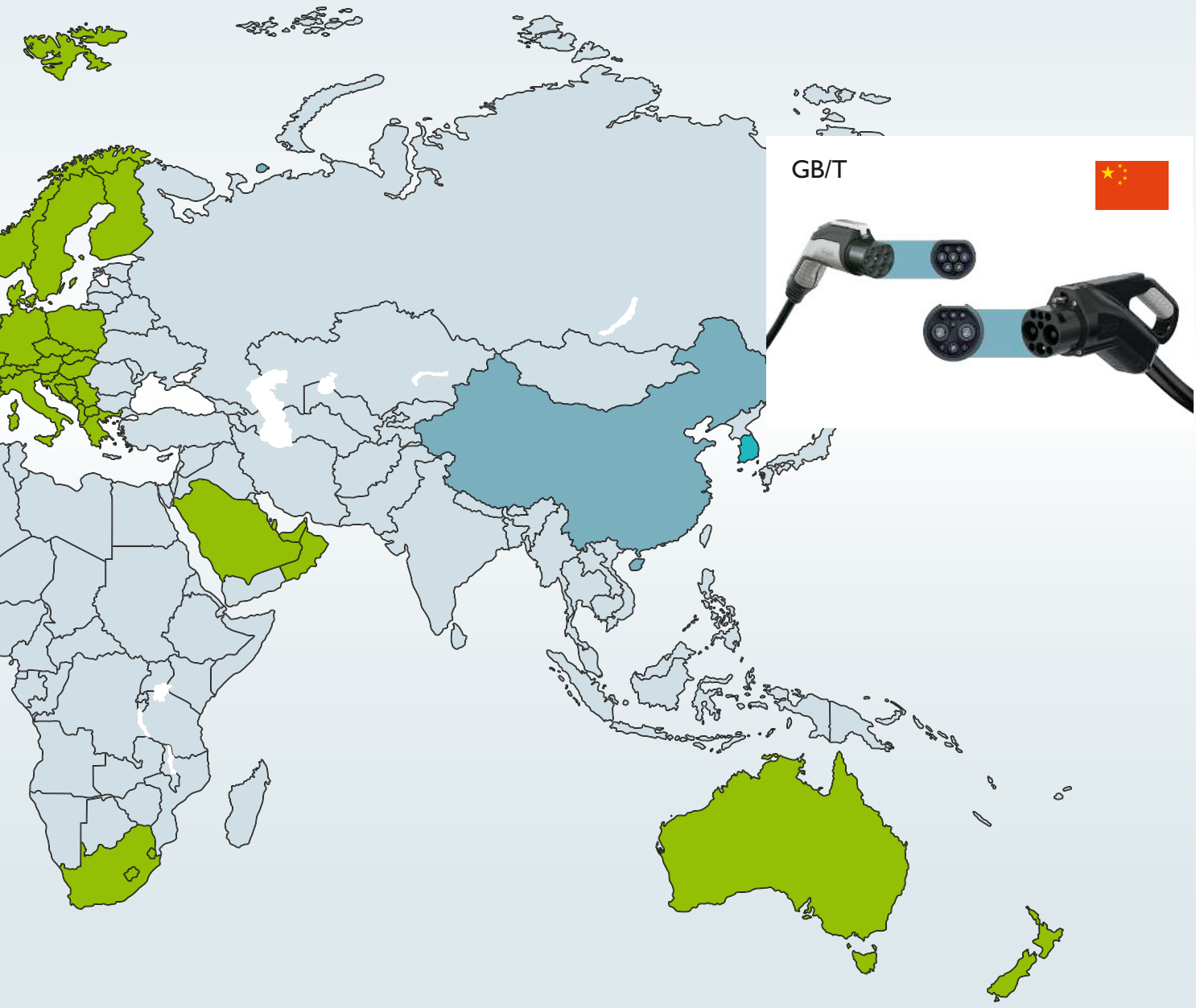
Advantages of the Combined Charging System

Thanks to the common geometry of their mating faces, both AC and DC vehicle connectors fit into the same vehicle inlet. Therefore, automobile manufacturers only have to design one inlet for their vehicles. Furthermore, the charging process itself is easier for the driver to handle. The system is also incredibly safe, thanks to the electromechanical interlock system on the vehicle connector and the integrated, high-precision temperature monitoring function.

The Charging Interface Initiative e.V. organization

We are a founding member of the Charging Interface Initiative e.V. (CharIN) organization. The initiative, which also includes leading automobile manufacturers, operates globally. The objective is to promote and establish the CCS combined charging system worldwide. Learn more at www.charinev.org.

CHARIN



GB/T

The right products for every application

From a simple wall box through to fast charging columns – each charging solution satisfies particular demands in terms of performance and functional scope. With our broad, scalable portfolio, we can supply you with an optimized, coordinated package of components and software – and support you throughout planning and integration.

To ensure environmentally sound charging, we can provide all of the interfaces necessary for feeding renewable energies into your charging columns and for integrating them into building and energy management systems, as well as power distribution control systems.

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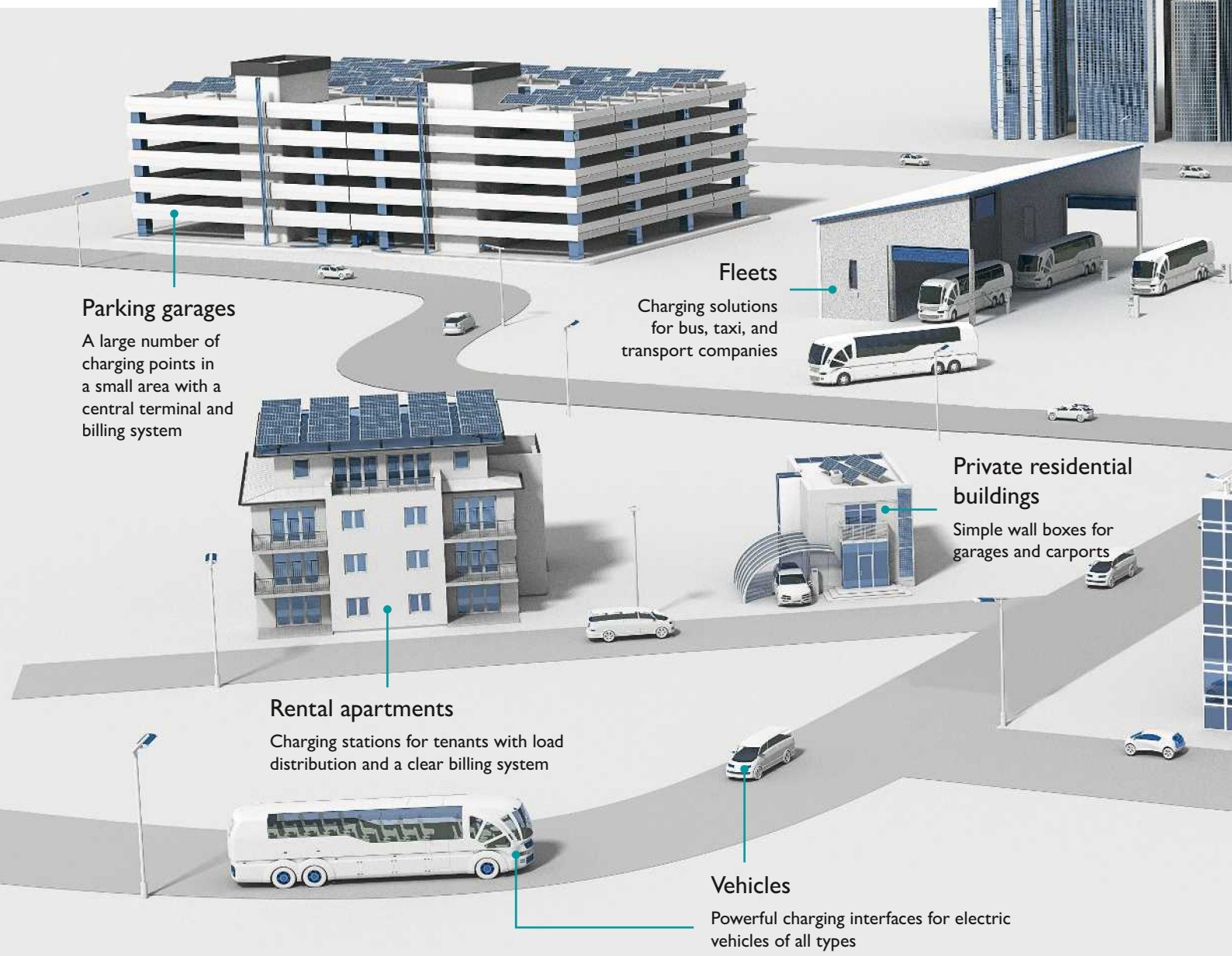
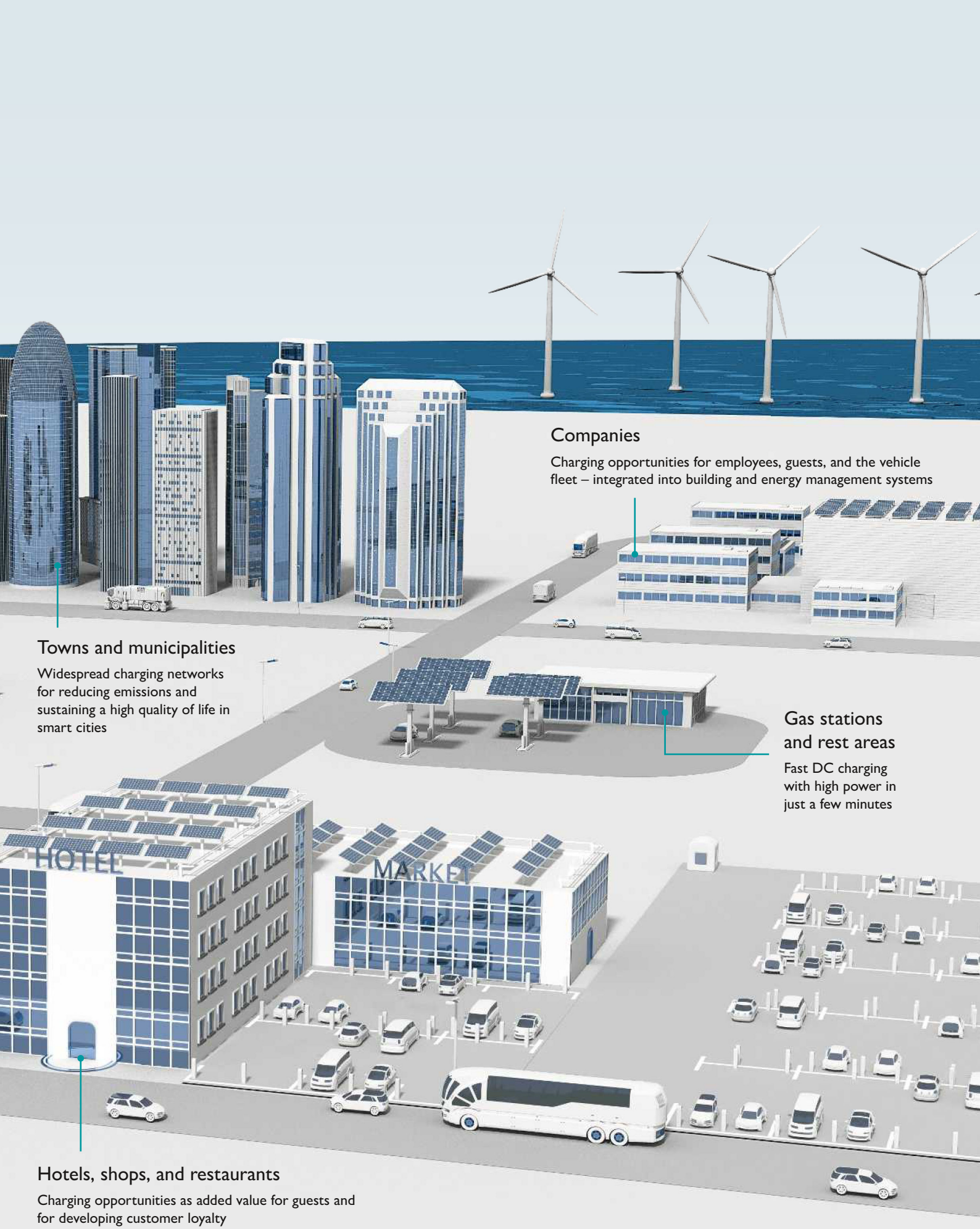




Companies

Charging opportunities for employees, guests, and the vehicle fleet – integrated into building and energy management systems

Towns and municipalities

Widespread charging networks for reducing emissions and sustaining a high quality of life in smart cities

Gas stations and rest areas

Fast DC charging with high power in just a few minutes

Hotels, shops, and restaurants

Charging opportunities as added value for guests and for developing customer loyalty

Reliable connection systems for charging points and vehicles

Our charging systems are setting new standards in the supply of energy for electric vehicles. Thanks to silver-plated power and signal contacts, high-precision temperature monitoring, and the integrated interlock system, our charging cables, socket outlets, and vehicle inlets are safe and reliable in operation. Due to their appealing, ergonomic design, they are easy and comfortable to handle.

With our High Power Charging Technology, we are setting yet another milestone in the history of electromobility – by reducing the charging time down to just a few minutes.

High Power Charging Technology

The HPC Technology found in our DC charging cables uses an environmentally sound and maintenance-friendly liquid cooling system. The contact carrier in the vehicle connector also acts as a heatsink, thanks to its outstanding thermal conductivity. The cooling power is regulated based on demand via real-time temperature measurements and safely prevents overheating.

Designed by PHOENIX CONTACT

Web code: #1631

1

DC charging cables

We provide standard-compliant charging cables for worldwide fast DC power charging. These cables support charging powers of up to 250 kW. The cooled versions for High Power Charging (HPC) can even reach charging powers of up to 500 kW, meaning that the charging process is comparable to that of refueling a combustion-engine vehicle.

Web code: #2099

2

AC charging cables

We provide a complete range of AC charging cables for conventional AC power charging, with charging powers of up to 26 kW. Along with versions with an open cable end for attaching to a charging station, we also provide mobile cables for the trunk. The ergonomic design has been honored with the German Design Award 2019.

Web code: #1022

3

AC infrastructure socket outlets

Our infrastructure socket outlets are used in AC charging columns and wall boxes, and enable vehicles to be charged anywhere via a mobile charging cable. The socket outlets are available for the European type 2 standard and for the Chinese GB/T standard. The type 1 standard for North America and Japan does not stipulate an infrastructure socket outlet.

Web code: #2100

4

Holders and protective covers

Our holders for AC and DC charging cables are mounted on the outside of the charging columns or wall boxes. They ensure the vehicle connector is held securely in place and protected from the elements whenever charging is not taking place. We also provide self-closing and self-opening protective covers to protect the AC infrastructure socket outlets from precipitation and vandalism.

Web code: #2101

5

Vehicle inlets*

Our universal vehicle inlets for the American and European Combined Charging System (CCS) enable both DC and AC charging with just one mating face. Thanks to the uniform dimensions, automobile manufacturers can design the same installation space into the car body for all vehicle models. In addition, we also provide DC inlets for the Chinese GB/T standard.

Web code: #2090

More in the product catalog

All of the products presented here are to be found with technical data and ordering data in our product catalog "Charging technology for electromobility".

If you would like to request a free copy of our catalog or to scan through an interactive electronic version, simply use the web code below.

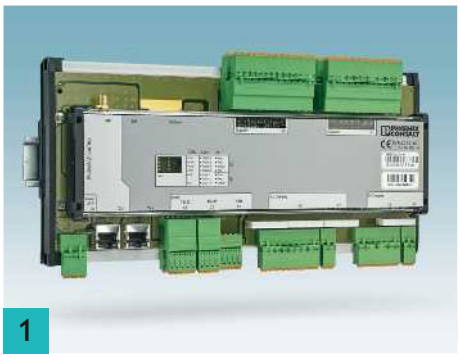
Web code: #2239

* Development, production, and distribution exclusively through PHOENIX CONTACT E-Mobility GmbH.

Control technology and software for intelligent charging infrastructure

You can operate any charging station with our flexible charging controllers – from a domestic AC wall box right through to HPC charging columns on the freeway. These devices monitor and control the electric vehicle charging process in accordance with internationally applicable norms and standards such as IEC, GB/T, and SAE.

With the appropriate software, you can make your application even smarter and increase availability. You can automate entire charging parks including authorization, user guides, load management, and billing.



1

DC charging controllers

Our freely programmable EVCC Professional DC charging controller is the powerful control solution for your state-of-the-art fast charging station. It supports both fast DC charging and conventional AC charging, and at the same time takes care of all control and communication tasks, including visualization on the operator panel.

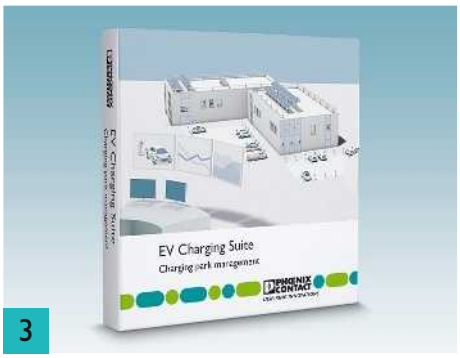
Web code: #1024

2

AC charging controllers

Our EVCC Basic AC charging controller is ideal for simple, private charging points such as wall boxes in garages and carports. The EVCC Advanced and EVCC Advanced Plus controllers are the perfect solution for public or commercial AC applications with several charging points, load and energy management, remote access, and billing.

Web code: #2102



3

Software

The EV Charging Suite forms the interface between the driver, charging park, grid operator, and backend provider. In addition to intelligent load management, this impressive software features convenient user and charging point management, an intuitive user guide, a range of authorization methods, and a consumption-based billing system via the backend provider.

Web code: #2020

Residual current monitoring

In combination with a type A residual current device, our EV-RCM residual current monitoring module saves you from having to use an expensive type B residual current device, because it interrupts the charging process in the event of an error. Once the residual current is no longer present, the charging controller automatically resets the module, making the charging point available for use again without the need for costly servicing.

Web code: #2103

Charging technology sets

Our AC charging technology sets are the perfect introduction to the world of charging technology for electrical engineers. The sets include a ready-made configuration of all the components an engineer will need to set up private or commercial AC charging stations simply and single-handedly. Thanks to the certified wiring diagrams, no additional development effort is required.

Set contents:

- AC charging cable with holder or AC socket outlet with protective cover
- AC charging controller
- Residual current monitoring module
- Terminal blocks, plug-in bridges, end covers, and end brackets
- Wiring diagram

Web code: #2071

Further products for setting up your charging columns and wall boxes

In addition to the actual charging technology, we also provide a complete portfolio of connection and automation technology – from terminal blocks through to weatherproof touch panels. This means we are able to supply you with practically all the components you will need to set up your charging stations – and all from a single source.

Our uniform and installation-friendly product design simplifies setup, startup, and maintenance work for your installers and service technicians, therefore reducing the manufacturing and operating costs of your charging stations.

1

Operator panels

We provide special HMIs and industrial PCs for intuitive touch-panel operation and also for controlling your charging columns. Thanks to their fronts with IP67 protection, extended temperature range, weatherproof materials, and displays that can be read in direct sunlight, they are ideal for permanent outdoor use in all weather conditions.

Web code: #2104

2

Communication technology

With standard interfaces such as Ethernet and the mobile network, you can connect your charging park flexibly and reliably to billing, building management, and energy management systems; remote control and remote maintenance are also possible. For this purpose, we provide you with a broad range of Ethernet switches, mobile network routers, and security routers.

Web code: #0936

3

Energy meters

We recommend that you use our energy meters in order to acquire precise data on the energy consumption and power characteristics of your charging points for billing purposes. These devices are MID-approved in accordance with EN 50470 and measure current, voltage, power, and energy. The connection required for data evaluation is established via Ethernet or serial interfaces.

Web code: #1267

4

Power supplies

You need a reliable power supply in order to ensure the stable operation of your charging station. In addition to being reliable, the devices in our STEP POWER range are space-saving, and thanks to their high level of efficiency and low standby losses, they are also very energy efficient. These devices can operate in extreme outdoor temperatures of between -25°C and +70°C, no problem at all.

Web code: #1930

5

Surge protection

Charging stations must be available at all times – both day and night, and in any weather. To adequately protect the charging point and vehicle against lightning strikes and surge voltages, at least one type 2 surge protective device should be installed in every sub-distribution station, charging column, and wall box.

Web code: #2105

6

Terminal blocks

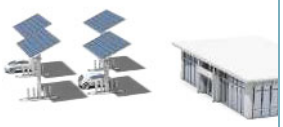
We provide you with a full range of terminal blocks for feed-in, potential distribution, and signal distribution in your charging columns and wall boxes. At the same time, you can choose whichever connection technology you like. With hybrid terminal blocks, you can neatly combine two connection technologies to satisfy the requirements for internal and external wiring at the same time.

Web code: #0567

Selection guide: Which products do you need for your charging solution?

			
Functions	**Private residential buildings**	**Rental apartments**	**Towns and municipalities**
AC charging*	• (11 kW)	• (11 kW)	• (22 kW)
DC charging*			• (150 kW)
Touch-panel operation			Optional (On each charging column)
Shutdown in the event of residual currents	•	•	•
User authorization, e.g., via RFID		Optional	•
Load management		Optional	
Billing via OCPP		Optional	•
Remote maintenance via DSL or mobile network			•
Integration into building or energy management systems		Optional	
For realizing these functions, we recommend …			
… for each charging point	- AC charging cable - Alternative: AC socket outlet - Basic AC charging controller - Residual current monitoring	- AC charging cable - Alternative: AC socket outlet - Advanced Plus AC charging controller - Optional: energy measuring device	- AC socket outlet - Alternative: AC charging cable - Advanced Plus (3G) AC charging controller - DC charging cable - Professional DC charging controller - Energy measuring device
… for each charging column/wall box (which may consist of several charging points)	- Terminal blocks - Surge protection	- Terminal blocks - Surge protection	- Terminal blocks - Surge protection - Power supply - Optional: touch panel - Optional: Ethernet switch
… for the entire application (which may consist of several charging columns/ wall boxes)		- Optional: software for charging park management - Optional: industrial PC - Optional: Ethernet switch	

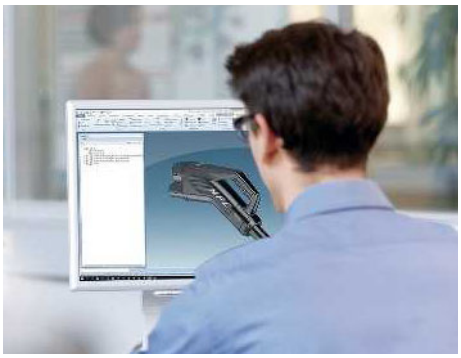
* The charging powers stated are typical for the respective applications and may deviate in individual cases.

				
Companies	**Fleets**	**Parking garages**	**Hotels, shops, and restaurants**	**Gas stations and rest areas**
• (22 kW)	• (22 kW)	• (22 kW)	• (11 kW)	• (22 kW)
• (50 kW)	• (150 kW)		• (50 kW)	• (500 kW HPC)
• (On each charging column)	• (On each charging column)	• (Centrally on the terminal)	• (On each charging column)	• (On each charging column)
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
Optional	•	•	Optional	•
Optional	•	•	Optional	•
Optional	•	•	Optional	•
- AC charging cable - Alternative: AC socket outlet - Advanced Plus AC charging controller - DC charging cable - Professional DC charging controller - Energy measuring device	- AC charging cable - Alternative: AC socket outlet - Advanced Plus AC charging controller - DC charging cable - Professional DC charging controller - Energy measuring device	- AC socket outlet - Alternative: AC charging cable - Advanced Plus AC charging controller - Energy measuring device	- AC socket outlet - Alternative: AC charging cable - Advanced Plus AC charging controller - DC charging cable - Professional DC charging controller - Energy measuring device	- AC socket outlet - Alternative: AC charging cable - Advanced Plus AC charging controller - Cooled DC charging cable with panel feed-through - Professional DC charging controller - Energy measuring device
- Terminal blocks - Surge protection - Power supply - Touch panel - Ethernet switch	- Terminal blocks - Surge protection - Power supply - Touch panel - Ethernet switch	- Terminal blocks - Surge protection	- Terminal blocks - Surge protection - Power supply - Touch panel - Ethernet switch	- Terminal blocks - Surge protection - Power supply - Touch panel - Ethernet switch
- Software for charging park management - Industrial PC - Optional: DSL/mobile network modem	- Software for charging park management - Industrial PC - DSL/mobile network modem	- Software for charging park management - Industrial PC with touch panel - DSL/mobile network modem - Ethernet switch	- Software for charging park management - Industrial PC - Optional: DSL/mobile network modem	- Software for charging park management - Industrial PC - DSL/mobile network modem

Expertise from a single source

Since inventing the terminal block in 1928, we have been driving the development of electrical connection technology forward – and we resolutely invest the expertise and experience gained back into new developments. This is also true of our charging technology for electromobility, which we have been continually developing for over 10 years now.

The high quality of our products and our innovative strength are therefore the result of us pooling our expert knowledge and technological expertise. Phoenix Contact E-Mobility GmbH provides you with the full range of this expertise from a single source.



Development and engineering

When our engineers develop new solutions, they are not just aiming to overcome technical challenges: the prototype must also be readied for series production. To achieve this goal, we sometimes take unusual paths, by developing our own production tools and processes.

Tests and quality assurance

Standard-compliant tests performed throughout development ensure the electrical safety, resistance to cold and heat, and mechanical durability of our products. They therefore guarantee a consistently high level of quality and reliability. Once manufactured, each product undergoes thorough functional testing.

Production and assembly

Qualified employees, transparent processes, a high level of flexibility, and fast response times characterize our state-of-the-art production processes. We also use the very latest technologies – such as special joining processes for particularly stable, high-performance electrical connections – in our charging systems.

IATF 16949 certified

Collaborating with automobile manufacturers brings with it particularly stringent demands in regard to work processes, product quality, and organizational structure. We have successfully passed the IATF 16949 and ISO 9001 audits, meaning that we are an expert partner and reliable supplier to the automotive industry.

Leading in technology

Thanks to our proximity to our customers and our active collaboration in standardization committees and electromobility networks, we are fully aware of the demands of the market. We are therefore in a position to develop future-oriented technologies aimed at making electromobility suitable for everyday use. The Combined Charging System (CCS) and High Power Charging (HPC) are two examples of this.

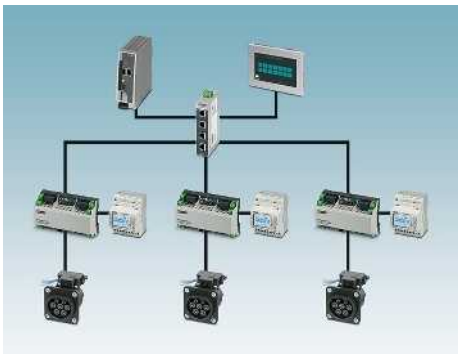
Expert advice

We will gladly help you on your journey to electromobility: our experts will select the right products for you and provide you with professional advice on the design of your charging stations and their integration into superordinate systems. Furthermore, we will develop the concept for connecting photovoltaic systems and wind turbine generators to your charging points.

Our service is your added value

Good service lies in exceeding expectations. The ingredients for this are customer focus, innovative strength, swiftness, and enthusiasm – these values are all part of the Phoenix Contact DNA.

But this is not the only reason why we are more than just a component provider: we will support and assist you in realizing your charging solution or application with our wide range of services such as consultancy, design, programming, and customization. Upon request, we will also develop customer-specific product versions and tailored solutions that go way beyond what standards demand.



Planning and designing your charging infrastructure

We will support and assist you in all phases of your project – from planning through to startup. We will configure the appropriate products in accordance with your requirements and also create wiring diagrams. Furthermore, we will help you to integrate the solution into you building and energy management systems and into that of the billing provider. When doing so, we will take all of the latest charging standards and directives into consideration, as well as the relevant measurement and calibration regulations.

Configuring your cooled HPC solution

Are you an HPC fast charging solution manufacturer or planner? Based on the installation space available for your charging columns, the climatic conditions at the installation location, and additional factors, we will configure the ideal combination of HPC charging cables, panel feed-throughs, controllers, and other components just for you. We will also recommend appropriate cooling units and heat exchangers from one of our technology partners.

Programming your software solution

Do you have special requirements that are not covered by our standard software? We can also develop tailored software solutions by creating appropriate function blocks for communication between charging points and superordinate systems. At the same time we will design an intuitive user interface optimized for touch-panel operation in accordance with your requirements.

Vehicle connectors with your logo

We can also produce our AC vehicle connectors customized with your logo upon request. Your charging column or wall box will then be an integral part of your uniform branding concept and outward appearance. We can either emboss your logo into the soft components of the vehicle connector or, if you wish, we can print UV and weather-resistant adhesive labels in black and white or in color.

Charging cables as required

Choose between various lengths and cross sections, metric or AWG cables, and spiraled or straight cables from our broad product range. If you cannot find your preferred combination within our range, then we can also design and manufacture a customer-specific product. We can supply the cable end with a step cut, preassembled, or compacted upon request too.

Developing vehicle inlets*

We will develop inlets for your series vehicle production based on the available installation space, charging power, and functional scope. We can integrate functions such as LED displays, lighting, operating elements, and interlock systems for the vehicle connector and charging flap. Thanks to our intelligent cooling concepts and a high-precision temperature measurement system, we are able to reduce the conductor cross sections, thus reducing the costs of the overall charging system.

* Development, production, and distribution exclusively through PHOENIX CONTACT E-Mobility GmbH.

Successfully completed customer projects

With their commitment and application expertise, the work performed by our experts is often pioneering, because in the relatively new electromobility industry, no two projects are ever the same.

The following examples demonstrate how we, in collaboration with charging column manufacturers, infrastructure providers, transport companies, system integrators, and automotive manufacturers, have successfully completed exciting projects satisfying a wide range of different demands.

Web code: #2109

Sustainable: Germany's largest electric charging station

"Our installation has run without a hitch from the very beginning," says Torsten Kocher of Bechtle, the IT infrastructure specialists. A total of 50 charging points from the parking guidance specialist RTB have been integrated into the parking garage at Bechtle headquarters in Neckarsulm. These charging points draw their electricity from the PV system on the roof. Phoenix Contact supplied the charging technology.

Research project enables ultra-fast charging

Together with BMW, Porsche, Siemens, and Allego we have developed, realized, and introduced the world's first HPC charging station with a charging power of 450 kW as a part of the FastCharge research project. We supplied our cooled, CCS-compatible DC charging cables, as well as the control technology for this project. The charging columns at the Jettingen-Scheppach rest stop on the A8 interstate in Germany are available to electric vehicle drivers free of charge.

Affordable charging current from battery storage systems

Power Innovation GmbH, a manufacturer of switch-mode power supplies, focuses on connecting fast charging stations to battery storage systems, some of which are fed with energy from renewable sources. Thus, high energy requirements can be covered at short notice, without the need to retrofit a higher connection power. In this solution, the EVCC Professional charging controller manages, for example, communication between the battery storage system and the power electronics.

Charging park with intelligent energy management

GP Joule, the specialist for renewable energies, has equipped its on-site charging park with a load and energy management system. The objective: to charge the company's own fleet of 28 electric vehicles, making optimum use of self-generated biogas and solar power. Everything is controlled via a central control cabinet equipped with the EVCC Advanced AC charging controllers, calibrated energy meters, and the EV Charging Suite software.

Designer charging columns with technology in the tightest space

Plug'n Charge develops and produces charging points for electric vehicles and pedelecs that boast an extraordinary design and easy operation via smartphone. The challenge here was how to integrate the charging technology into a very tight installation space. But this did not present any difficulties for our particularly compact EVCC Basic and Advanced charging controllers, the residual current monitoring modules, or the MID-compliant energy meters.

Fast charging on the freeway with solar power

Fastned, a constructor of charging stations from the Netherlands, was on the lookout for a fast charging solution for their installations at freeway rest stops. The company decided to go for charging columns from ABB, which are equipped with our CCS vehicle connectors. With this technology, electric vehicles can be charged for a distance of 150 kilometers in just 15 to 20 minutes. Furthermore, Fastned only uses wind and solar power in these installations.

Charging stations with a remarkable CO_2 balance

Velocity Aachen, a provider of rental mobility systems, has developed a charging solution for its electric vehicles and bikes together with Pion Technology. The concrete material used for the charging column housings filters particulate matter out of the surrounding air and therefore achieves a remarkable ecological balance. Along with our AC charging technology and power supplies, Pion Technology also uses our communication technology for cloud-based billing.

In dialog with customers and partners worldwide

Phoenix Contact is a globally present, Germany-based market leader. Our group is synonym for future-oriented components, systems, and solutions in the fields of electrical engineering, electronics, and automation. A global network across more than 100 countries, and 16,500 employees ensure a close proximity to our customers, which we believe is particularly important.

The wide variety of our innovative products makes it easy for our customers to find future-oriented solutions for different applications and industries. We especially focus on the fields of energy, infrastructure, process and factory automation.

You will find our complete product range at:

phoenixcontact.com

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