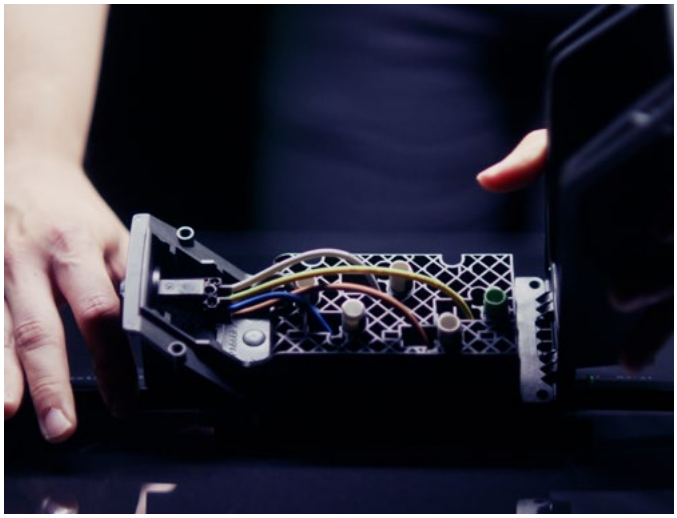
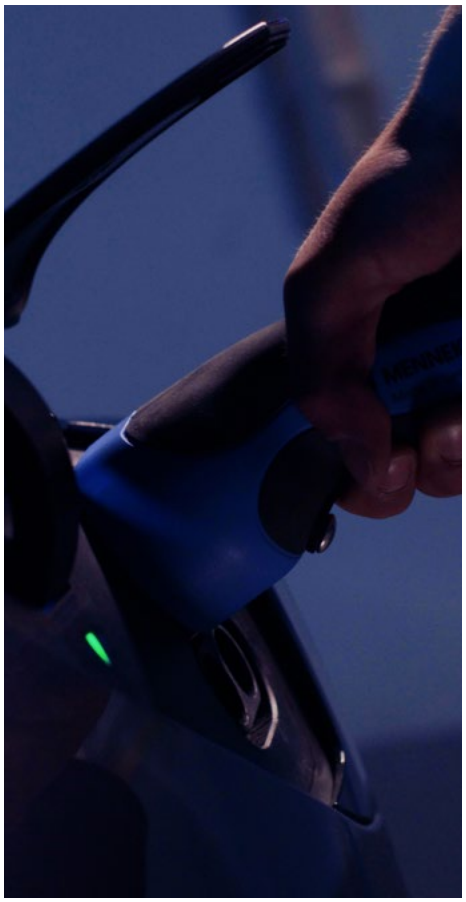
wieland

podis® smart charging infrastructure

EV CHARGING DEEP DIVE

Hands-on guide – from planning to implementation.





UNDERSTANDING EV CHARGING – PLANNING INFRASTRUCTURE PROPERLY

This brochure is aimed at anyone who wants to learn more about the technical background of modern charging infrastructure.
It highlights the planning, normative, and electrotechnical aspects behind the podis® system solution and shows how well-thought-out components and decentralized concepts make it possible to implement future-proof charging infrastructures efficiently, scalably, and economically.

EV charging is developing rapidly – and with it the requirements for scalable, safe, and future-ready charging infrastructure. While installing individual chargepoints often still seems straightforward, implementing larger charging solutions – especially in existing buildings – quickly becomes a planning and electrical engineering challenge.

This is exactly where our technical Deep Dive brochure comes in. It provides you with a comprehensive insight into the key building blocks of a high-performance charging infrastructure with podis®: from energy distribution and protection modules to various connection and installation concepts – for both conventional and pluggable systems.

In addition to our standard brochure (0438 Behind EV-Charging), which provides an overview, this brochure gives in-depth answers to frequently asked practical questions and explains the technical background that is crucial for proper planning and implementation.

podis® stands for an intelligent, modular solution that can be flexibly adapted to the requirements of buildings, user behavior, and technical framework conditions – today and in the future.

APPLICATIONS

+ **For underground garages and parking structures**
+ **For charging stations up to 22 kW**
+ **Up to 20 charging stations on one line**

”podis® stands for an intelligent, modular solution that can be flexibly adapted to the requirements of buildings, user behavior, and technical framework conditions – today and in the future.“

EV CHARGING INFRASTRUCTURE

OVERVIEW

With limitations, see page 6

BICYCLES

INDOORS
Normal charging
(AC / up to ~22 kW)

OUTDOORS
Normal charging
(AC / up to ~22 kW)

CARS

INDOORS
Normal charging
(AC / up to ~22 kW)
Fast charging
(AC / ~44 kW)
High-power charging
(DC / ~350 kW)

OUTDOORS
Normal charging
(AC / up to ~22 kW)
Fast charging
(AC / ~44 kW)
High-power charging
(DC / ~350 kW)

MOTORCYCLES

INDOORS
Normal charging
(AC / up to ~22 kW)

OUTDOORS
Normal charging
(AC / up to ~22 kW)

BUSES + TRUCKS

INDOORS
High-power charging
(DC / ~350 kW)

OUTDOORS
High-power charging
(DC / ~350 kW)

PODIS® SCOPE OF APPLICATION

		AC CHARGING	DC CHARGING	INDUCTIVE CHARGING
NORMAL CHARGING	WALLBOX	3.7 kW		3.7 kW
		7.4 kW		7.4 kW
		11 kW	10 kW	11 kW
		22 kW	20 kW	22 kW
FAST CHARGING		44 kW	50 kW	
HIGH-POWER CHARGING			150 kW	
			400 kW	

CHARGING INFRASTRUCTURE ELEMENTS

POWER SUPPLY

The podis® flat cable system is optimized for charging stations with AC-power supply and power up to 22 kW.

LOAD MANAGEMENT

Load management is used to distribute the available energy and for phase balancing. You can obtain all information about the possibilities from your chargepoint manufacturer.

COMMUNICATION

Communication to the chargepoints can – depending on the chargepoint – take place in parallel to the flat cable or via WLAN.

DIFFERENT CHARGING TYPES AND ENVIRONMENTS

PARKING GARAGE + UNDERGROUND PARKING

AC charging stations / ~22 kW

RESTAURANT

APARTMENT BLOCK

CINEMA

COMPANY

SHOPPING CENTER

CURBSIDE

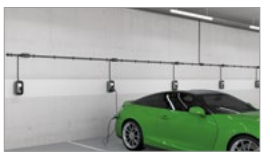
DC charging stations / 50 to 350 kW

VARIOUS INSTALLATION OPTIONS

IN OR ON THE WIRE BASKET OR ON THE CABLE TRAY

ON THE WALL

ON THE CEILING



podis® flat cable system for EV CHARGING

Installation for EV charging stations now on
/ **WielandElectric**

wieland

PODIS® OUTDOORS

Can podis® be used outdoors?

The flat cable system has IP degree of protection 65. The first digit “6” means that the system is completely dust-tight and fully protected against contact. The second digit “5” means that protection is provided against water jets from all directions. This is not equivalent to unrestricted, permanent outdoor use. Therefore, the system is generally intended for indoor use. If podis® is nevertheless to be used outdoors, the following must be taken into account:

- When used outdoors, pay attention to temperature, including frost and strong heating. For example, water that has remained on the connecting module for a longer period can freeze and potentially cause damage. Also, if the module is operated at full load in the midday sun, the system could overheat without preventive limitations. Therefore, precautions must be taken against standing water and constant sunlight.
- If possible, find the most suitable location for installing the charging stations. Parking spaces in front of a building with a canopy protect the podis® connecting modules against permanently standing water. If the parking spaces are not protected by a canopy, an additional cover must be installed for the connecting module, (e.g., item no. 07.433.8753.0). Direct sunlight on the system should be avoided.
- Moreover, for an application outdoors, UV resistance must also be considered. This is ensured in the podis® system by appropriately high-quality material.

OPERATING CONDITIONS

- The connecting modules as well as RST® connector must be installed in such a way that the ingress of moisture – e.g., caused by rain – is prevented, for example by installation under a canopy or by additional protection (e.g., cover 07.433.8753.0)
- Direct sunlight on the connecting modules must be avoided
- The standard ratings of 63 A / 690 V must be observed

SUITABLE COMPONENTS

- **Feed-in flat cable**
  Connecting module | 75.456.0053.1
  Feed-in module | 75.450.0014.3
- **Tap-off flat cable**
  Connecting module | 75.456.0053.1
  Connecting module | 75.453.0053.1 (max. 16 A)

- **Flat cable and accessories**
  Flat cable | 00.771.0307.1
  Flat cable | 99.099.0000.8
  Cable end piece | Z6.564.7053.1
  Mounting clamp | 05.569.7453.0
  Mounting clamp | 05.569.7553.0
  Cover | 07.433.8753.0

Cable assemblies with RST25i5 on request.

QUALITY THAT CONVINCES

Approvals for areas of application under demanding conditions such as shipbuilding, or in the North American region.

CE & UKCA Declaration of Conformity based on the following standards:

- EN IEC 60670-1
- EN 60670-22
- EN 60998-1
- EN 60998-2-3
- EN 61439-2
- EN IEC 63000

Connecting modules

USA / Canada

- Approval: cULus Listed
- Standard USA: UL 2238, Cable Assemblies and Fittings for Industrial Control and Signal Distribution
- Standard Canada: CSA C22.2 No. 182.3, Special Use Attachment Plugs, Receptacles and Connectors

Flat cables

USA

- Approval: UL Listing
- Standard: UL 1277, Electrical Power and Control Tray Cables

Canada

- Approval: cUR Recognition
- Standard: CSA C22.2 NO. 210:15 Appliance wiring material products

System approval connecting modules & flat cable

USA

- Approval: UL Listed
- Standard: UL 2875, Outline of Investigation for Modular Cable System Assemblies and Fittings for Industrial Control, Signal and Power Distribution

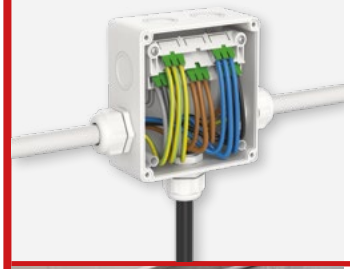
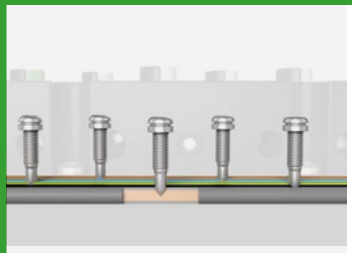
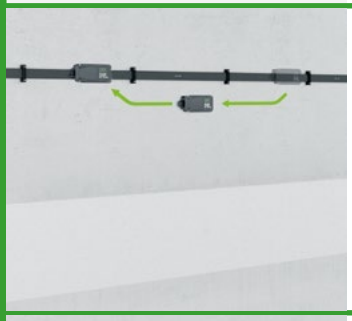
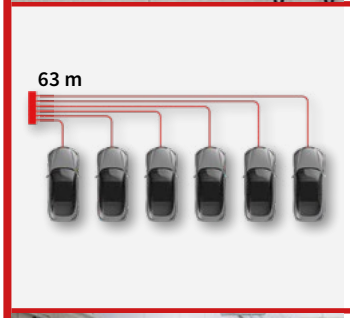
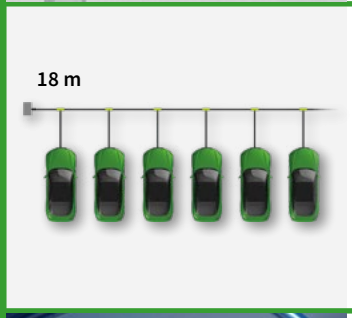
System approval for shipbuilding

- Another quality feature of the podis® flat cable system is the Lloyd's Register approval. This permits the system to be used under demanding conditions in shipbuilding.
- Approval: Lloyd's Register

wieland

ADVANTAGES OF **PODIS®**

Compared to conventional installation

Conventional		podis®	
	High installation time		Piercing technology makes junction boxes unnecessary.
	Changing the location of charging stations is very time-consuming.		An existing tap-off can be easily moved.
	Subsequent expansion with charging stations requires considerable effort.		Each parking space is prepared for an additional charging station.
	The installation of many cables increases the fire load and requires a significantly larger distributor distribution board.		The decentralized system keeps the distribution cabinet as well as installation effort and fire load small.
	Aesthetics are becoming increasingly important in parking structures.		The flat cable system offers a modern and aesthetically appealing installation.

ADVANTAGES OF **PODIS®**

Compared to busbar systems

RATED DATA

- For many EV charging applications, busbar systems are oversized and therefore not cost-efficient

LOGISTICAL EFFORT

- Busbar systems are large and heavy

COMPLICATED INSTALLATION OF BUSBAR SYSTEMS

- Many different mounting elements
- Rigid rail busbar system – less flexible than flat cable
- Hard to install in corners, special modules
- Different tools, screws, etc. necessary

APPEARANCE

- Busbar systems have a very industrial look, clearly less aesthetic than Wieland flat cable systems, especially in combination with very modern-looking charging stations

PODIS® PORTFOLIO AT A GLANCE

The basic components

Flat cable

	Art.no.
5G16 black	00.771.0307.1
5G25 dark gray	99.099.0000.8
5G16 black North America	00.729.0307.1
5G16 black Australia	00.707.0307.1

Cable end cap

	Art.no.
Black	Z6.564.7053.1

Cable clip

	Art.no.
Screw model	05.569.7453.0
Nail model	05.569.7553.0

Connecting module for cable gland

	Art.no.
Single in / output	75.456.0053.1
Double output	75.456.0353.1
Cable gland M32, for Ø 18 - 25 mm	Z5.507.1653.1
Locknut M32	05.505.0353.1

Pluggable connecting module

	Art.no.
Single	75.453.0053.1
Double output	75.453.0353.1

Pipe clamp

	Art.no.
D20	F0.000.0055.7
D25	F0.000.0056.3
D32	F0.000.0056.4
D40	F0.000.0056.5
D50	F0.000.0056.6

Components for further time savings + functions

Circuit breaker module for cable gland

	Art.no.
4-pole RCD/MCB type A C32 A / 30 mA	75.456.0955.1
4-pole RCD/MCB type A C16 A / 30 mA	75.456.0855.1
4-pole MCB C32 A	75.456.1755.1
Cable gland M32, for Ø 18 - 25 mm	Z5.507.1653.1
Cable gland M32, for Ø 10 - 21 mm	Z5.507.1753.1
Locknut M32	05.505.0353.1

Pluggable circuit breaker module

	Art.no.
4-pole RCD/MCB type A C32 A / 30 mA, pluggable with RST25	75.456.1255.1
4-pole RCD/MCB type A C20 A / 30 mA, pluggable with RST20	75.452.1353.1
4-pole RCD/MCB type A C16 A / 30 mA, pluggable with RST20	75.456.1155.1
4-pole MCB C32 A pluggable with RST25	75.453.1755.1

Feed-in module

	Art.no.
Model plastic M50	75.450.2253.1
Cable gland M50	Z5.507.3753.1
Locknut M50	05.505.0900.1
Model metal (incl. cable gland)	75.450.0014.3
Model metal M25 (none cable gland)	75.450.2114.3

Overvoltage protection module

	Art.no.
Type 2 none indicator light	75.459.8553.1
Type 2 + 3 with indicator light	75.459.7553.1

Cable assembly

Length	Art.no. RST25 with 5G6	Art.no. RST20 with 5G2.5
0.5 m	99.456.0124.0	99.473.0124.0
1.0 m	99.453.0124.0	99.474.0124.0
1.5 m	99.454.0124.0	99.475.0124.0
2.0 m	99.455.0124.0	99.476.0124.0
2.5 m	99.459.0124.0	99.477.0124.0
3.0 m	99.460.0124.0	99.478.0124.0

Technical information can be found in brochure 0438.1.

PODIS® LIGHT-GRAY SYSTEM PORTFOLIO AT A GLANCE

For those who place great value on aesthetics, the podis® flat cable system is a compelling choice, as it not only features an attractive design but also integrates harmoniously into various color schemes. In addition to the black standard portfolio, Wieland offers the light-gray portfolio for underground garages and parking structures with light-painted walls or a concrete-gray background.

Flat cable

Art.no.
00.771.0307.3

Cable end cap

Art.no.
Z6.564.7053.3

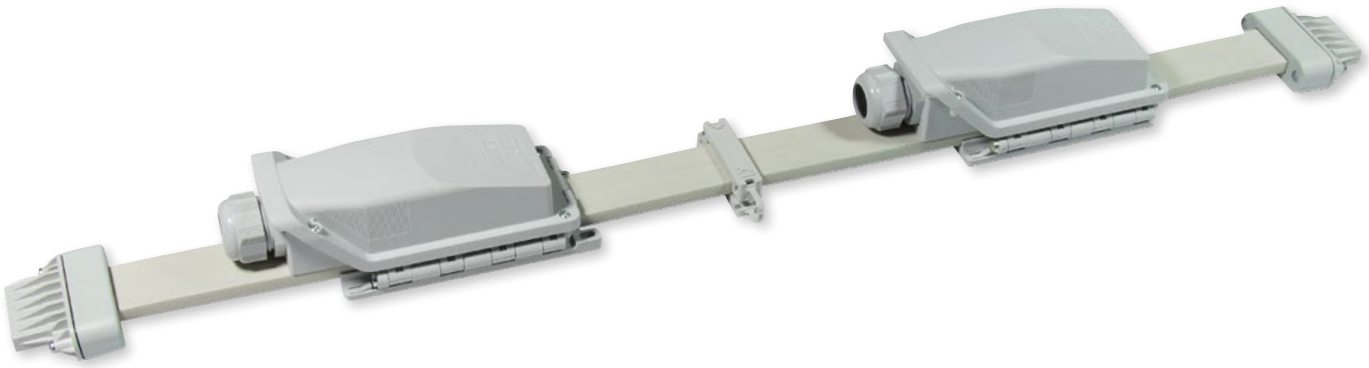
Cable clip

Art.no.
05.569.7453.3

Connecting module for cable gland

	Art.no.
Connecting module (none cable gland and Locknut)	75.456.0053.3
Cable gland M32	Z5.507.3753.0
Locknut M32	05.505.0900.0

Technical information can be found in brochure 0438.1.



GUIDE TO CORRECT **COMPONENT SELECTION**

Prerequisites you need to know for correct component selection:

1 **EXPECTED TOTAL VOLTAGE DROP**
The flat cable system offers 5 x 16 mm^2 flat cables and a 5 x 25 mm^2 flat cable. If the expected Voltage drop according to VDE 0100-520/IEC 60364-5-52 (max. 4% up to the load) is too high with the 5 x 16 mm^2 cable, you can switch to the 5 x 25 mm^2 flat cable.

2 **REQUIRED WIRE SIZE OF THE ROUND CABLE BETWEEN MAIN DISTRIBUTION AND POWER SUPPLY SYSTEM TO THE FLAT CABLE SYSTEM**
As a rule, 16 mm^2 is fed into the flat cable system; the connecting module can be used for flexible center power supply system. For conductor cross-sections larger than 16 mm^2, a feed-in module must be used, which is positioned at the end of the flat cable.

3 **NUMBER OF FLAT CABLE RUNS**
The number of runs determines the number of cable end caps. When using the connecting module for center power supply system, two cable end caps are required per run. When using the feed-in modules at the end of the cable, one cable end cap is required per run.

4 **LENGTH OF THE RESPECTIVE FLAT CABLE RUNS**
The length of the runs can be designed, for example, from the center of the first to the center of the last parking space or from the beginning of the first parking space to the end of the last parking space. Take into account obstacles as well as the associated bending radius of the flat cable (for 00.771.0307.1 at least 57.5 mm).

5 **CABLE CLIP MODELS**
Two models of the cable clip are available. One model with “HILTI” contour for fastening with a nail-setting tool for concrete and steel substrates. Further information on the nail model can be found on page 23. The second model offers a long-slot for classic screw fastening. Only one nail or one screw is required to fasten to the substrate.

6 **PLUGGABLE OR CONVENTIONAL TAP-OFFS**
The connecting modules as well as the circuit breaker modules are available both for conventional installation and for pluggable installation for additional time savings.

7 **WHICH CHARGING STATION IS USED AND HOW MUST IT BE PROTECTED?**
According to IEC 60364-7-722:2018, the overcurrent and residual current protective devices for protecting the charging stations must be arranged in the branching final circuits of each charging station. These must either be integrated or installed separate. Based on this information, it can be derived whether a connecting module or a circuit breaker module must be used as a tap-off.

8 **NUMBER OF CHARGING STATIONS**
Based on the number of charging stations, it can be derived how many connecting modules or circuit breaker modules are needed for the tap-off and how many cable assemblies are required.

9 **DISTANCE BETWEEN FLAT CABLE AND CHARGING STATIONS**
The pre-assembled RST leads for the pluggable variants of the connecting or circuit breaker module are available in 0.5 m steps.

10 **WHICH OVERVOLTAGE PROTECTION IS REQUIRED FOR THE PROJECT?**
Wieland offers overvoltage protection modules with type 2 or a combined model type 2 + type 3. When exactly which SPD must be used is explained separately on pages 28 – 32.

11 **COLOR OF THE MOUNTING SURFACE**
The standard color of the system is black. If the project is to be carried out in an underground garage or a parking structure with light surfaces, we offer the light-gray portfolio in the basic model.

Example 1 with explanation and order list:

	Application conditions / customer request		Solution with podis®			
1	Expected total Voltage drop	With 5 x 16 mm² flat cable lower than 4 %	The flat cable 5 x 16 mm² can be used	item no. under point 4		
2	Required Wire size of the round cable between main distribution and power supply system into the flat cable system	16 mm²	The connecting module for flexible center power supply system can be used. Cable gland and Locknut are separate art.no	1 x 1 x 1 x	75.456.0053.1 Z5.507.1653.1 05.505.0353.1	Connecting module Cable gland M32 Locknut M32
3	Number of flat cable runs	1	Since the flexible center power supply system is used, two cable end caps are required	2 x	Z6.564.7053.1	Cable end cap black
4	Length of the flat cable run	36 m	Length of the required flat cable is 36 meters	36 m	00.771.0307.1	Flat cable 5G16
5	Cable clip model	Fastening with HILTI nail-setting tool is desired	Every 80 cm a cable clip must be set.	45 x	05.569.7553.0	Cable clip nail
6	Pluggable or conventional tap-offs	Pluggable	For pluggable installation, in addition to the tap-offs a cable assembly is required	art.no. under point 8		
7	How must the charging station be protected?	A separate 4-pole RCD/ MCB type A C16 A / 30 mA is necessary	For each tap-off to the charging station, the corresponding pluggable circuit breaker module can be used	art.no. under point 8		
8	Number of charging stations	12	One circuit breaker module is required for each charging station.	12 x	75.456.1155.1	Circuit breaker module RCD/MCB 16 A RST20
9	Distance between flat cable and charging stations	1 m	circuit breaker modules and charging stations are connected with the pre-assembled RST leads	12 x	99.474.0124.0	Connection lead 5G2.5 RST20
10	Which and how many overvoltage protection modules?	Indicator light is desired	The project does not form a Faraday cage, as defined on page 29 of this brochure. Therefore, two SPDs must be used to protect the 36 m of the flat cable run	2 x	75.459.7553.1	Overvoltage protection module type 2 + 3 with indicator light

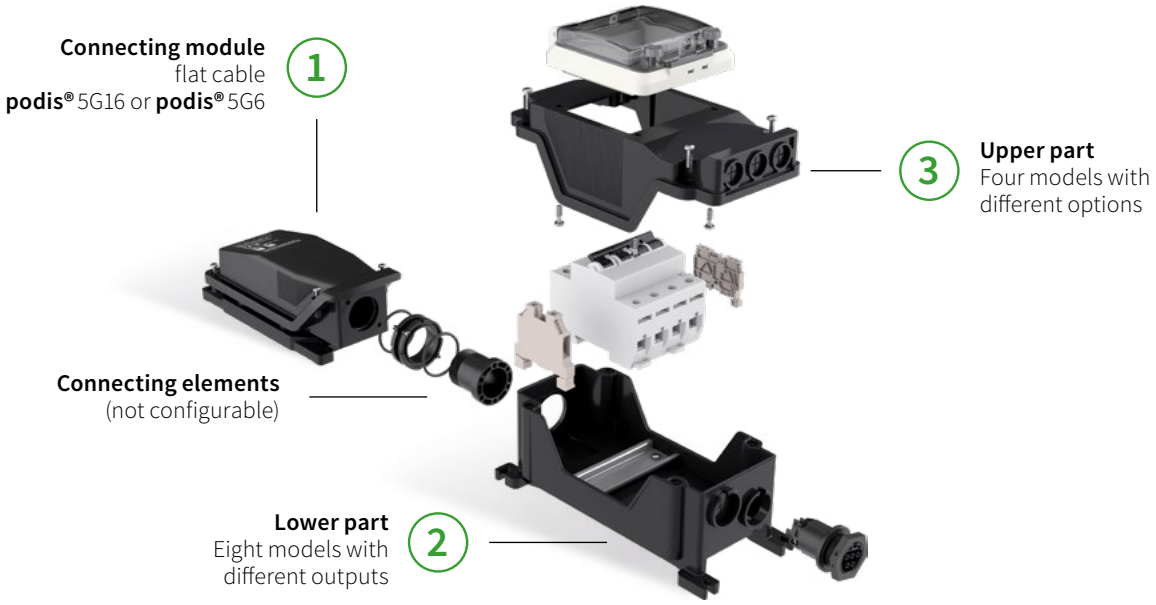
Example 2 with explanation and order list:

	Application conditions / customer request		Solution with podis®			
1	Expected total Voltage drop	With 5 x 16 mm² flat cable, the Voltage drop is higher than 4%	You can switch to the 5 x 25 mm² flat cable to reduce the Voltage drop.	Item no. under point 4		
2	Required Wire size of the round cable between main distribution and power supply system into the flat cable system	35 mm²	The feed-in module that is mounted at the end of the flat cable must be used.	1 x 1 x 1 x	75.450.2253.1 Z5.507.3753.1 05.505.0900.1	Feed-in module cable gland M50 Locknut M50
3	Number of flat cable runs	1	Since the feed-in module is used, one cable end cap is required per run.	1 x	Z6.564.7053.1	Cable end cap black
4	Length of the flat cable run	50 m	Length of the required flat cable is 50 meters.	50 m	99.099.0000.8	Flat cable 5G25
5	Cable clip model	Screw fastening is desired	Every 80 cm a cable clip must be set	63 x	05.569.7453.0	mounting clip screw
6	Pluggable or conventional tap-offs	conventional	For pluggable installation, in addition to the tap-offs a cable assembly is required	Art.no. under point 8		
7	How must the charging station be protected	A separate 4-pole RCD/ MCB type A C32 A / 30 mA is necessary	For each tap-offs to the charging station, the corresponding conventionally connectable circuit breaker module can be used	Art.no. under point 8		
8	Number of charging stations	16	One circuit breaker module is required for each charging station	16 x	75.456.0955.1 Z5.507.1753.1 05.505.0353.1	Circuit breaker module RCD/ MCB 32 with associated cable gland and Locknut
9	Distance between flat cable and charging stations	2 m	Since conventionally connectable tap-offs were chosen, the necessary round cable must be provided by the customer.	-	-	-
10	Which overvoltage protection is required for the project	No indicator light is desired	The project forms a Faraday cage, as defined on pages 30 - 31 of this brochure. Therefore, the use of one overvoltage protection module is sufficient.	1 x	75.459.8553.1	Overvoltage protection module type 2 none indicator light

These examples cannot be applied 1:1;
the overvoltage protection must always be checked individually.

INDIVIDUALLY **CONFIGURABLE**

You can configure modules yourself according to your wishes. The modules consist of two main assembly groups – the connecting module (1) and the flange-mount housing. The flange-mount housing consists of various upper (3) and lower parts (2). In addition, DIN-rail devices, pluggable outputs, cable glands, and pre-wiring can be integrated as desired. The connecting elements for the two main assembly groups cannot be configured.



Example configurations

MOTOR PROTECTIVE CIRCUIT BREAKER MODULE

Combines flat cable tap-off and overload protection; internally, a motor protective circuit breaker and an auxiliary switch are installed and wired; with integrated pluggable output RST20i5 and signal connector M12-A

- → Combination of **C1** + **VB4** + **VC2**
- → Integration of wired **motor protective circuit breaker**, auxiliary switch, **RST20** and **M12-A** outputs

MAINTENANCE SWITCH MODULE

Combines flat cable tap-off and switching of the branch; internally, a maintenance switch and an auxiliary contact are installed and wired; for M25 cable gland output and an integrated signal connector M12-A

- → Combination of **C2** + **VB2** + **VC3**
- → Integration of **wired maintenance switch**, **auxiliary contact** and **M12-A** output

CIRCUIT BREAKER MODULE

Combines flat cable tap-off and decentralized protection; internally, a miniature circuit breaker is installed and wired; with two integrated pluggable outputs GST18i5

- → Combination of **C2** + **VB6** + **VC2**
- → Integration of **wired miniature circuit breaker** and **2 x GST18i5** outputs

1 Connecting module

Connecting module podis® 5G16
Tap-off for flat cable system
5 x 16 mm²
Rated data
690 V / 63 A

Connecting module podis® 5G6
Tap-off for flat cable system
5 x 6 mm²
Rated data
690 V / 41 A

2 Lower parts

+

MODELS WITH OUTPUTS FOR ROUND CABLE

1 x breakout **M32**
1 x knock-out M20

1 x breakout **M25**
1 x knock-out M25

2 x breakout **M25**

MODELS WITH OUTPUTS TO PLUGGABLE SYSTEMS

1 x **RST20/25**
1 x knock-out RST20/25

2 x breakout **RST20/25**

2 x breakout **GST18i5**

FURTHER OPTIONS

Not combinable with connecting module

1 x breakout flat cable **7 x 4**
1 x knock-out flat cable 7 x 4

Closed

3 Upper parts

+

Closed cover
3 x knock-out M12

Breakout for hinged lid
1 x breakout M12
2 x knock-out M12

Breakout for maintenance switch
1 x breakout M12
2 x knock-out M12

Breakout for hinged lid
3 x knock-out M12

INSTALLATION

Take all necessary safety precautions at the workplace!

Also think in advance about whether the outgoing cables of the connecting modules should point to the right or left. This is determined by the flat cable: If the coding is oriented at the top, the output of the connecting module is to the left. If the coding is oriented at the bottom, the output is to the right.

1

Mark the mounting height of the flat cable with a laser. This simplifies the installation of the flat cable on wall and ceiling.

2

Now define the spacing of the cable clips and mark the positions along the entire length. We recommend 80 cm spacing for the cable clips.

If applicable, also include the adapter mountings, provided these will lie at the specified spacing for the mounting bracket.

3

Now drill the holes for the cable clips and install them.

Alternatively, you can also use a nail-setting tool in combination with the FLATCABLE Nail cable clip.

Further instructions for handling the nail model can be found on page 22 & 23.

INSTALLATION

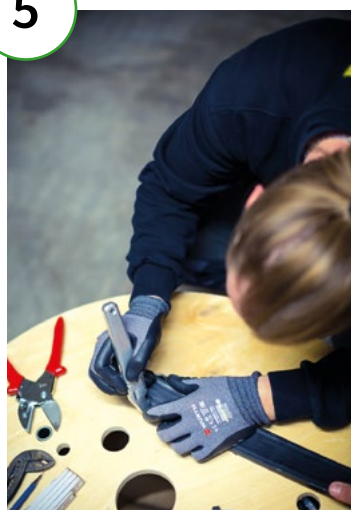
wieland

4

Unroll the cable over the entire length. If possible, use a pay-off device.

Keep the cable as clean as possible and avoid scuff and wipe marks. If the cable has to be moved on the floor, preferably do so on the back side.

5



Strip the flat cable. The Wieland stripping knife 5G16 (article number 95.350.1000.0) is particularly suitable for this.

6

A separate instruction is available for installing the cable end piece.

Scan the QR code and download the associated PDF.

INSTALLATION CABLE END PIECE

7

Continuously mount the flat cable into the cable clips. For this step, it helps to relieve the cable clips as much as possible from the weight of the cable.

Install the flat cable so that, for example, the printed text on the cable is readable from the front. The cable contour faces upward. Connecting modules can be inserted from below.

INSTALLATION

8

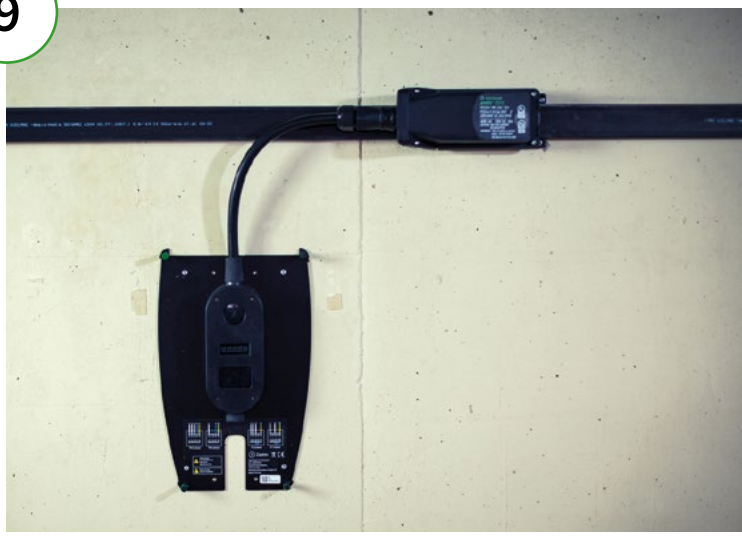
INSTALLATION CONNECTING MODULE

The supply line is fed into the connecting module with M32 cable gland.

Strip the supply line and cut and insulate the strands as described in the assembly instruction. The QR code takes you to download the assembly instruction as a PDF.

Important note
Piercing the flat cable should only be done at the end, as the terminal connections of the round cables in the connecting module are placed sideways.

9



Install the chargepoint or the base plate.

Observe the height of the chargepoint with regard to the lengths of the pre-assembled cables.

Consider the bending radius at the connector.

(10)

Circuit breaker module

Install pluggable circuit breaker modules with integrated fuse as a tap-off instead of connecting modules if the charging station does not have suitable protection.

INSTALLATION

11

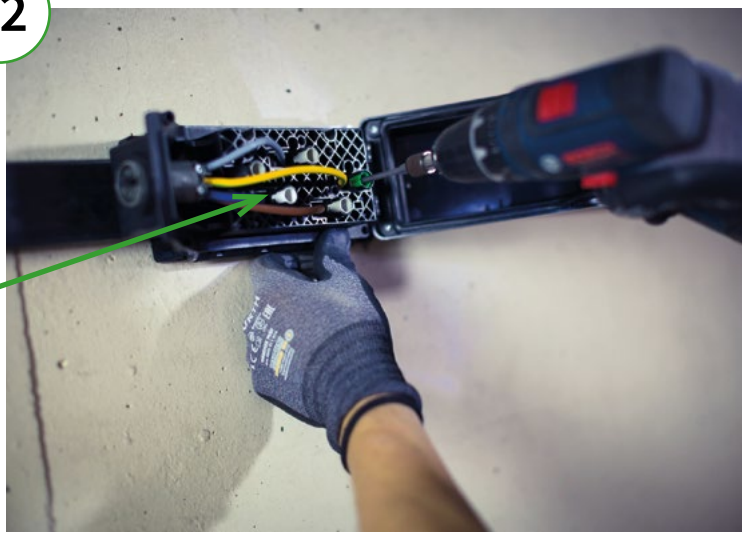
INSTALLATION CONNECTING MODULE

Determine the position of the connecting module for the drop. The connecting module is fastened to the background with suitable screws.

For adapters with direct connection, connect the outgoing cable first. Then connect the flat cable using the piercing screws. More detailed information can be found in the assembly instruction.

If you are using a combined circuit breaker module, install it together with the connecting module at this point.

12



Now plug in and connect the outgoing cable. As a final step, screw all piercing screws into the flat cable (tightening torque 2.0 Nm).

The piercing screws are fully screwed in when the white depth sleeves are flush with the surface of the screw shafts.

PODIS® CABLE CLIP NAIL MODEL

Optimal processing result

The podis® cable clips are specially designed for the quick processing and flexible installation of flat cables in e-mobility projects. Thanks to the integrated quick lock, they enable time-saving installation while also offering well-thought-out additional functions:

- Optimized heat dissipation due to increased distance from the wall
- Enable easy retrofitting of connecting modules
- Compatibility with pipe clamps for carrying additional communication cables (see also page 35)

The standard variant features a long-slot for secure screw fastening to wall or ceiling. Alternatively, installation on wire trays or cable trays is also possible.

For maximum time savings when installing on concrete substrates, the nail model with integrated HILTI geometry offers a particularly fast fastening solution. Please observe the processing instructions on the following page.

Cable clips
Detailed technical information on the cable clips can be found in the Behind EV Charging brochure 0438.1

PODIS® CABLE CLIP NAIL MODEL

Processing instructions for concrete substrates

For the best possible processing result when installing the cable clip Nail (Art. no. 05.569.7553.0) on concrete substrates, please observe the following notes.

USABLE SETTING TOOL

- BX 3-ME (02) battery-powered setting tool (HILTI Art. no. 2184454)
- Or alternative/successor product confirmed by HILTI

USABLE BOLT GUIDE

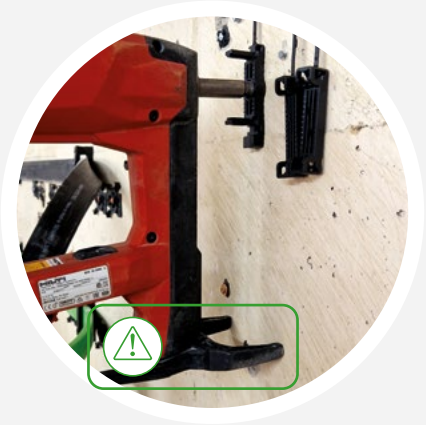
- X-FG B3-FE (HILTI Art. no. 2208570)

RECOMMENDED LENGTH OF THE NAIL USED

- 20 mm (HILTI Art. no. 2156217)

APPLICATION OF THE SETTING TOOL

- A shot position of 90° to the mounting surface must be ensured by the three-point support of the setting tool tool
- Do not apply additional pressure to the setting tool during installation



PREPARATION

- Preheating the parts to approx. 20 °C is recommended and can improve the processing result

Important information about the HILTI setting tool.
Please also observe HILTI's specifications regarding the recommended resistance and adhesion rate for the BX 3 system.

wieland

SYSTEM IN OPERATION **WITH 80 A/100 A**

The flat cable system is designed for a rated current of 63 A. Under certain circumstances, and considering the following specifications, the system can be operated with higher currents.

TECHNICAL REQUIREMENTS

- By using appropriate protection of the flat cable, it must be ensured that even under overload the high test current of 100 A is never exceeded.
- Installation must be carried out according to installation method E (“free in air”) as described in NIN 2025; Sec. 5.2 or VDE 0298-4. For mounting we recommend our cable clips art. no. 05.569.7453.0 or 05.569.7553.0.
- The ambient temperature when using the connecting module with cable gland (75.456.0053.1) must not exceed 30 °C. When using the pluggable connecting module with RST25i5 output (75.453.0053.1), the derating curve with max. 28 °C must be observed.
- The charging stations can be hard-wired to the tap-offs – for this, CON outlet modules with cable gland are available. Alternatively, pluggable connection with the RST® installation connector system is possible – outlet modules with pluggable RST25i5 connection are available for this purpose.
- Max. 32 A can be tapped from the connecting modules and podis® CON double outlet modules.
- In the field of EV charging, load management must limit the max. load of the flat cable to 100 A.
- The 5 x 25 mm^2 flat cable must be used.
- Furthermore, the selection of approved components must be taken into account. Our corresponding statement lists the components. The statement will be provided on request.

The entire wiring system must be protected against overcurrents, i.e., against overload and short circuit. For the selection and coordination of suitable overcurrent protective equipment, we refer to the Wieland Electric statement on the use of podis® in charging infrastructures.

SYSTEM IN OPERATION **WITH 80 A/100 A**

Technical specifications

Feed-in module
required

Observe
distance to the substrate

Max. 32 A
current-carrying capacity

- Max. current-carrying capacity of the connecting modules: 32 A
- Use of the feed-in module required
- Wieland statement with all important details on request
- Same components as for 5G16 flat cable

COORDINATE THE MINIATURE CIRCUIT BREAKERS SO THAT THE CURRENT NEVER EXCEEDS 100 A

- Except short-circuit current
- Ensure that your load management does not exceed max. 100 A

CONSIDER THE MAX. AMBIENT TEMPERATURE

- Connecting module with cable gland: 30 °C
- Connecting module with RST25i5: 28 °C/derating curve

INSTALLATION METHOD TYPE E

- Wall distance > 0.3 x D

The conditions are a perfect match for EV charging applications with 22 kW chargers in parking garages.

OVERCURRENT AND RESIDUAL-CURRENT **PROTECTIVE EQUIPMENT**

According to IEC 60364-7-722:2018, an overcurrent and residual-current protective equipment (AC and DC) must be arranged in the branching final circuits of each charging station to protect the charging stations. These must either be integrated in the charging station or installed separately. For both options, Wieland offers the right solution. Before the correct component can be selected, it must be clear whether and which safety devices the intended charging stations provide.

FOR CHARGING STATIONS WITHOUT OVERCURRENT AND RESIDUAL-CURRENT PROTECTIVE EQUIPMENT

Most charging stations are at least equipped with an electronic DC residual-current protective device. The missing necessary protective equipment can be supplemented with Wieland circuit breaker modules with integrated RCD/MCB type A (e.g., 75.456.1255.1).

FOR CHARGING STATIONS WITH INTEGRATED RESIDUAL-CURRENT PROTECTION TYPE B

For charging stations that have an RCD type B integrated in the charging station, a circuit breaker module with integrated MCB can be used (e.g., 75.453.1755.1).

FOR CHARGING STATIONS WITH FULLY INTEGRATED PROTECTIVE EQUIPMENT

Charging stations equipped with the necessary protective equipment are connected with the connecting modules without integrated protective equipment and, taking into account the notes on the following page, can be supplied with reduced cross-section (75.456.0053.1 or 75.453.0053.1).

OVERCURRENT AND RESIDUAL-CURRENT **PROTECTIVE EQUIPMENT**

Further notes on overcurrent protection

FLAT CABLE

The common supply lead of the charging stations is protected against overload and short circuit by the upstream overcurrent protective equipment.

BRANCH LINE TO THE CHARGING STATION WITH REDUCED CROSS-SECTION

The lines branching off from the flat cable are clamped directly into the connecting modules or connected to the connecting modules with an RST® connector. The branching leads are protected against overload by the downstream overcurrent protective equipment. According to DIN VDE 0100-433.2.2, these overcurrent protective equipment may be arranged along the lead, i.e.:

- in the charging equipment itself or
- immediately in front of the charging equipment or
- in the cable runs of the lines branching off from the flat cable.

Since this overcurrent protective equipment is not located immediately in front of the reduced cross-section as required in DIN VDE 433.2.1, one of the following two conditions (1) or (2) must be met for short-circuit protection in accordance with DIN VDE 0100-433.2.2.

(1) The lines branching off from the flat cable and reduced in cross-section are co-protected against short circuit by the overcurrent protective equipment installed on the supply side of the flat cable in accordance with DIN VDE 0100-434.2.2. In the event of a short circuit, the impedance of the fault loop may only be so large that the upstream overcurrent protective equipment trips before the section of lead with reduced cross-section overheats impermissibly ($k2 \cdot s2 \geq I2 \cdot t$) – further notes see DIN VDE 0100-434.5.2. At the same time, the permissible disconnection time according to DIN VDE 0100-411.3.2 Table 41.1 must not be exceeded.

(2) The length of the branch unprotected against short circuit, sheathed lead is no more than 3 m and is laid short-circuit and earth-fault safe – DIN VDE 0100-434.2.1. According to DIN VDE 0100-521.11, accessible cables or leads laid not near combustible materials are considered laid short-circuit and earth-fault safe if the risk of mechanical damage is prevented. This requirement can be met with a metal electrical installation conduit according to DIN EN 61386 (VDE 0605). If a metal electrical installation conduit with a length > 1 m is used for mechanical protection of the lead, the change in installation method from C to B2 must be taken into account; see DIN VDE 0298-4:2013 (Tab. 3).

In addition, country-specific regulations must be observed.

LIGHTNING CURRENT AND **OVERVOLTAGE PROTECTION**

In the absence of protective equipment against lightning current and overvoltage, the impacts can be significant. Electric vehicles can be damaged by correspondingly high voltage peaks, which can lead to an immediate failure of the driving function. This not only results in operational restrictions, but can also entail considerable repair costs. In chargepoints with integrated load management, additional electronic components are used, which must also be considered. For effective protection, the implementation of a suitable overvoltage protection concept is necessary, which is defined in technical regulations. The podis® overvoltage protection module supports effective implementation of the protection concept.

NORMATIVE REQUIREMENTS

In general, for lightning current and overvoltage protection for charging stations, the regulation IEC 60364-7-722 or DIN VDE 0100-722, Low-voltage electrical installations, applies. Section 722-443 must be observed. This states that a publicly accessible connection point is considered part of a public facility and must therefore be protected against transient overvoltages.
Furthermore, IEC 60364-5-53 or DIN VDE 0100-534 explains the correct selection of the overvoltage protective equipment.
Additional regional requirements may have to be considered. These may exist, for example, at locations with high thunderstorm incidence.

PROTECTION OF THE UPSTREAM INFRASTRUCTURE

Charging stations often do not have integrated, high-performance surge protective devices according to IEC 61643-11. To reliably protect charging equipment and electric vehicles against the effects of direct and indirect lightning strikes, high-performance protection concepts are required in the infrastructure. With the podis® circuit breaker module, this necessary protection can be ensured in accordance with normative requirements.

PROTECTION OF VEHICLES

The charging interface of EVs is usually only voltage-resistant up to approx. 2,500 V. However, even distant lightning strikes can induce significantly higher voltages. Without sufficient protection in the infrastructure, this can lead to damage to the charging infrastructure and the vehicle.

REDUNDANCY AND SELECTIVITY

A multi-stage protection concept is common in electrical engineering. Type 1, type 2, and type 3 arresters are combined to intercept both lightning currents and overvoltages. Often, no protective devices according to IEC 61643-11 are installed in the charging stations. Therefore, upstream use of high-performance protective devices is necessary to reduce the energy load on the integrated protective device and extend its service life.

LIGHTNING CURRENT AND **OVERVOLTAGE PROTECTION**

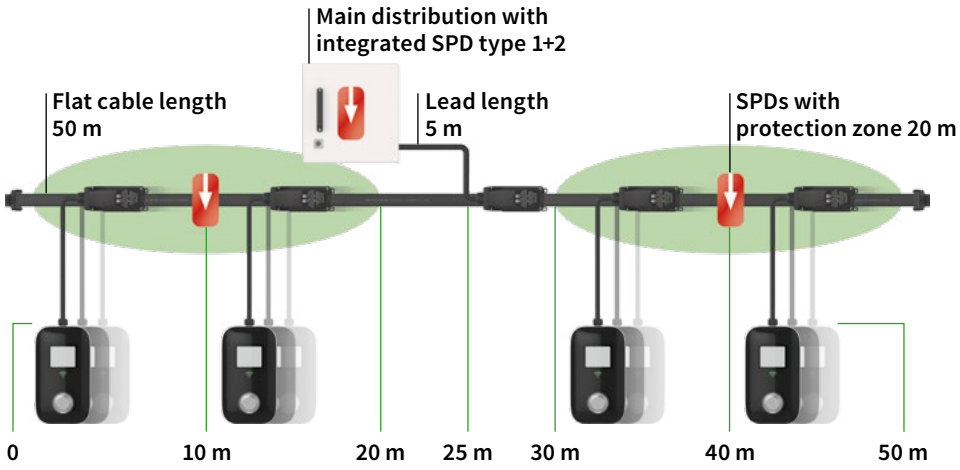
10-meter protection zone rule

Basically: For lead lengths of < 10 m to the building main distribution with integrated lightning current and overvoltage arrester, the charging station is within the protection zone according to IEC 60364-5-53 or DIN VDE 0100-534. For lead lengths > 10 m the charging station and thus also the electric vehicle are outside the protection zone.
This means that the protection zone rule for type 2+3 – SPD – must be observed here. This states that the protection zone applies to a total of 20 m, i.e., 10 m in each direction. It is therefore not necessary to install an overvoltage protection device every 10 m.

EXAMPLE 1

- Main distribution with integrated SPD type 1+2
- Power supply system into the flat cable in the middle of the run
- Distance between main distribution and the most distant charging station: 30 m (including the lead length between tap-off on the flat cable and charging station)

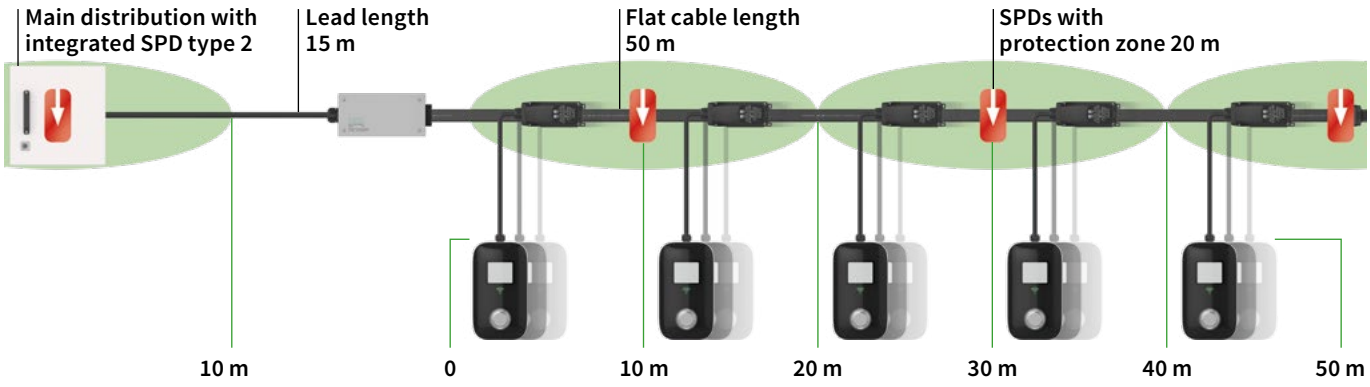
→ **Two additional SPDs type 2 are required**



EXAMPLE 2

- Main distribution with integrated SPD type 1+2
- Power supply system into the flat cable at the end of the run
- Distance between first charging station after main distribution and the most distant charging station: 50 m (including the lead length between tap-off on the flat cable and charging station)

→ **Three additional SPDs type 1+2 are required**



LIGHTNING CURRENT AND **OVERVOLTAGE PROTECTION**

Elimination of the basic “10-meter protection zone rule”

In certain structural and technical constellations, the basic protection zone rule according to DIN VDE 0100-443/534 can be omitted. This applies in particular to charging infrastructures in underground garages and parking structures when the following conditions are met:

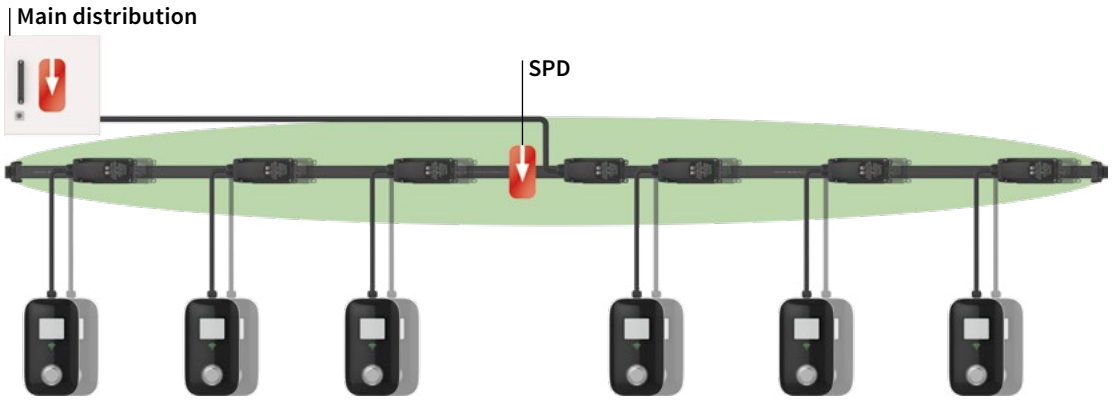
- The entire charging circuit / flat cable system is equipped on the input side with a suitable overvoltage protection.
- Only charging stations are connected to this charging circuit – there are no other loads such as ventilation motors, lighting devices or smoke detectors, and no sub-distributions in the same circuit.
- The underground garage consists entirely of reinforced concrete and thus forms an almost closed Faraday cage. In addition, a continuous grounding and equipotential bonding system is present.

→ **Possible interference variables that could be coupled in via the supply lead of the charging circuit are reliably intercepted by the podis® overvoltage protection module.**

→ **Due to these technical framework conditions, neither transient coupling from lightning strikes nor voltage spikes (SEMP), for example due to switching operations or inductive loads, are to be expected.**

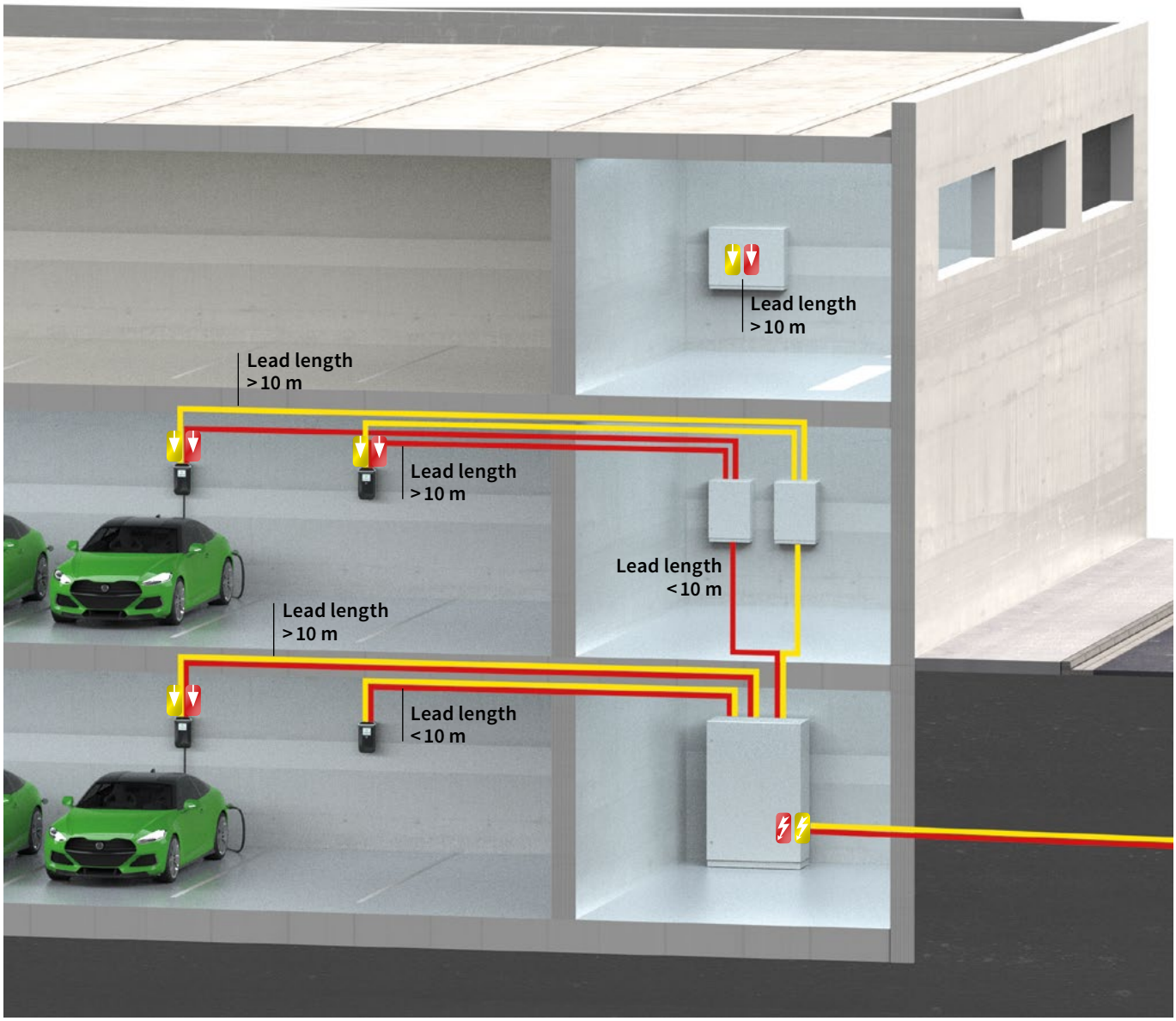
In this constellation, an individual risk assessment can determine that central overvoltage protection in the supply lead – by the podis® overvoltage protection module – is sufficient. However, if the above-mentioned requirements are not fully met, the general 10-meter rule must be applied in accordance with DIN VDE 0100-534. This approach corresponds to the risk assessment described in DIN VDE 0100-443.

Such cases always require an individual risk assessment.



LIGHTNING PROTECTION ZONE CONCEPT

Overvoltage protection Use case parking structure / underground garage



Note: External lightning protection is not shown in this illustration.

Overvoltage arrester Arrester type 2

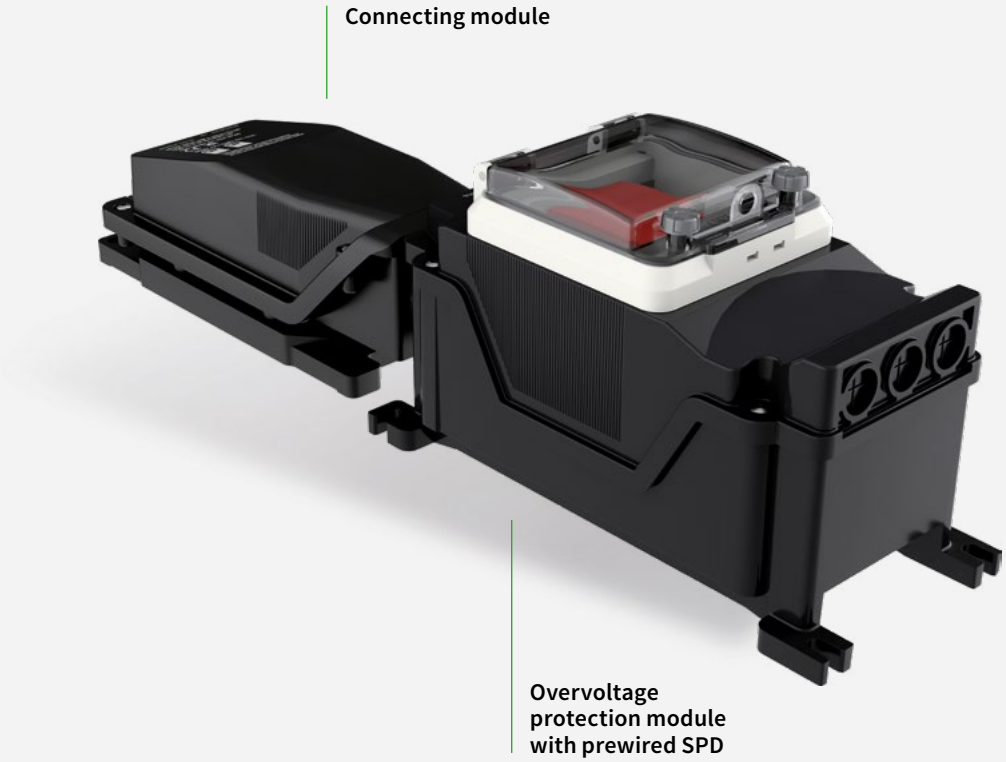
Charging point

Power supply

Combined lightning current and overvoltage arrester Arrester type 1

PODIS®
OVERVOLTAGE PROTECTION MODULE

podis® offers overvoltage protection modules for the correct protection concept.
These consist of a connecting module for connection to the flat cable and integrated and pre-wired SPDs. Two models are available, which are explained below.



BASIC MODEL (75.459.8553.1)

FEATURES

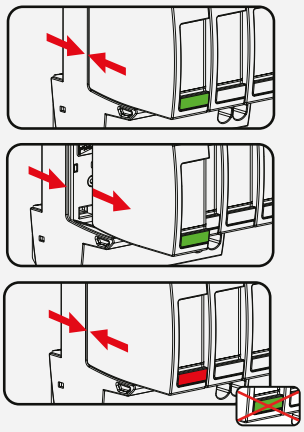
- Integrated and prewired SPD type 2
- Status visible when viewed from above through the viewing window (mounted on the wall from the front)
- If a red viewing window appears, the entire SPD module must be replaced

MODEL WITH ADDITIONAL FEATURES (75.459.7553.1)

FEATURES

- Integrated and prewired SPD type 2 + 3
- Integrated LED indicator
  - In the triggered state, the status is recognizable from a distance
- In the event of defective modules, these can be replaced individually

Integrated LED indicator



Overvoltage protection modules
Detailed technical information on the modules can be found in the Behind EV Charging brochure 0438.1

EMPTY MODEL (75.456.1055.1)

For projects in which a higher-level protection concept from a manufacturer other than DEHN is used, the empty model of the podis® module is available as an alternative.

This model can be equipped and wired individually according to your requirements. A standard M32 breakout is integrated, which can be closed if necessary with a locking screw and the corresponding Locknut.

ACCESSORIES

- Locking screw M32
  05.506.7453.1
- Locknut M32
  05.505.0353.1

wieland

LOAD**MANAGEMENT**

Background and task

REASONS FOR LOAD MANAGEMENT

- The available power for EV charging applications is usually limited in existing buildings (e.g., 50 A)
- Even in new buildings, the connection power is not sufficient for 100% supply of all charging stations (due to already existing infrastructure around the building)
- Vehicles with different charging types: up to 11 kW or up to 22 kW

TASK OF LOAD MANAGEMENT

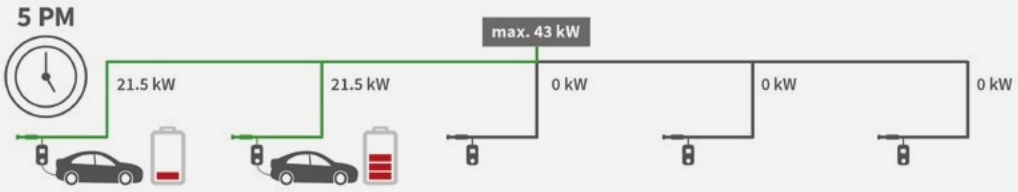
- Control of the available energy
- Distribution of the load evenly or alternately to all connected vehicles
- Prioritization of charging stations
- Phase balancing
- Consideration of all loads in the building
- PV surplus charging

Please note that various manufacturers offer corresponding solutions. Wieland itself currently does not offer its own solution in this area.

Example

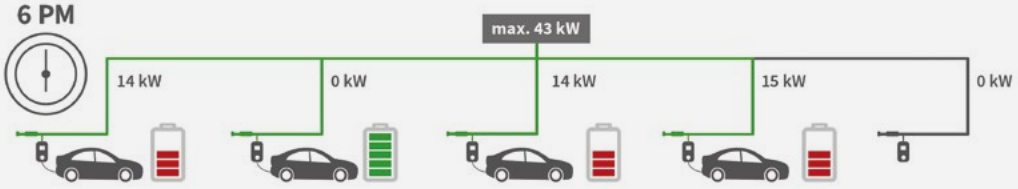
17:00

2 x 21.5 kW



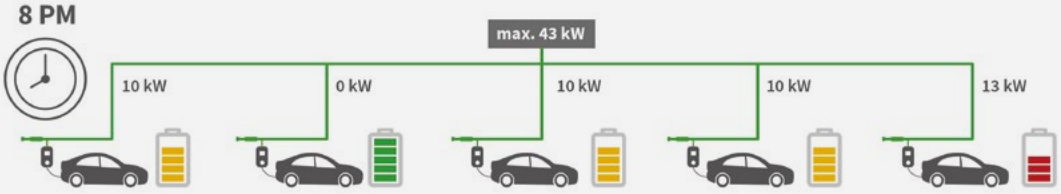
18:00

2 x 14 kW
1 x 15 kW



20:00

3 x 10 kW
1 x 13 kW



LOAD**MANAGEMENT**

Communication

Most charging stations can communicate wirelessly. In underground garages or parking structures, this is often difficult and wired communication between the charging stations is used. In addition to the flat cable, a separate data lead must therefore be laid. To create a clean installation appearance, Wieland offers pipe clamps D20 – D50, which can be adapted directly to the cable clip of the flat cable. This allows the pipes and leads for data transmission to be laid neatly and parallel to the flat cable.

Pipe clamp
adapted to the cable clip

D50
with retaining bracket

Pipe clamp for holding an installation conduit

Pipe clamp D20 | Ø 20 mm	Art.no. F0.000.0055.7 | VPE 50
Pipe clamp D25 | Ø 25 mm	Art.no. F0.000.0056.3 | VPE 50
Pipe clamp D32 | Ø 32 mm	Art.no. F0.000.0056.4 | VPE 50
Pipe clamp D40 | Ø 40 mm	Art.no. F0.000.0056.5 | VPE 25
Pipe clamp D50 | Ø 50 mm	Art.no. F0.000.0056.6 | VPE 25

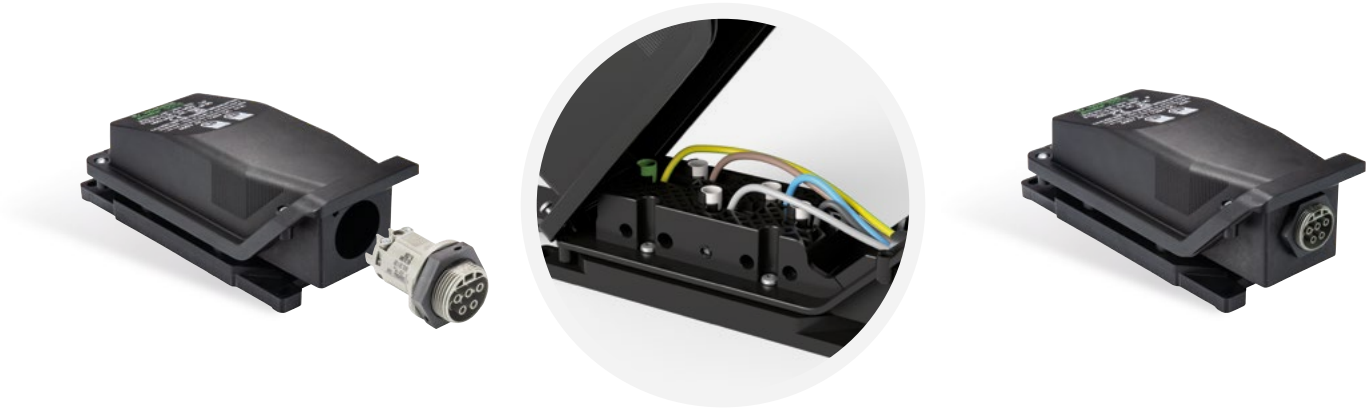
POWERLINE COMMUNICATION (PLC)

For data transmission via Powerline Communication (PLC) we provide a corresponding module that enables the integration of a DEVOLO PLC module. This serves the reliable connection and communication with ZAPTEC charging stations.
Order no. G0.000.0157.0

PLUG & PLAY CHARGING STATION

PLUGGABLE CONNECTING MODULE

To make installation even more efficient and further reduce sources of error, the connecting module has been equipped with an RST® device connector. In combination with the associated cable assembly, this eliminates further conventional installation work on the construction site.



CONNECTING MODULE WITH PLUGGABLE RST® DEVICE CONNECTOR + **INTERNAL PRE-WIRING** = **PLUGGABLE CONNECTING MODULE**

PLUGGABLE CHARGING STATION

To also benefit from this advantage on the charging station side, the counterpart of the RST® device connector can be integrated.

RST® DEVICE CONNECTOR + **CHARGING STATION** = **PLUGGABLE CHARGING STATION**

COMPLETELY PLUGGABLE SYSTEM

Wieland supplies the matching RST® extension cable, so the complete system is available as a pluggable model.

PLUGGABLE CONNECTING MODULE

+

CABLE ASSEMBLY

+

PLUGGABLE CHARGING STATION

EQUIP YOUR CHARGING STATION WITH AN ADDITIONAL FEATURE TO SAVE EVEN MORE INSTALLATION TIME!

RST® – EQUIVALENT TO FIXED INSTALLATION

The RST® system from Wieland Electric was designed and approved acc. to IEC 61535. The standard describes connector systems that are equivalent to fixed wiring.

In addition to higher efficiency, the use of connectors offers additional safety in the event of vandalism. If excessive tensile force is applied to the lead, the RST® connector opens. If this happens with hard-wired leads, dangerous pulling of the conductors out of the contact points can occur.

IEC 61535 proved

THE SYSTEM FEATURES

- **IP66/68 (3m;2h) /69**
- **Expandable and retrofittable**
- **Resource-saving**
- **Reusable**

DUST proof · internal WATER STOP · IP66 waterproof · IP68 waterproof · IP69 waterproof

WORLD OF WIELAND

You can find more information and brochures from Wieland Electric for download on our website:

https://www.wieland-electric.com/en/support/downloads/

PODIS®

Flexible system and decentralized automation technology
Order no. 0830.1

BEHIND EV CHARGING

The system solution for an innovative charging infrastructure
Order no. 0438.1

/ WielandElectric
See our solutions in motion

https://www.youtube.com/user/WielandElectric

Technical consulting:
Building Solutions

Phone: +49 951 9324-996
Mail: building@wieland-electric.com
Worldwide: https://wie.li/contactinternational

GO SHOPPING

https://eshop.wieland-electric.com

Our Wieland e-Shop:

In our online shop you will find all information about our products, prices and technical data.

Order easily and conveniently online with availability check.

SCAN IT FIND IT BUY IT

wieland

HEADQUARTER

Wieland Electric GmbH
Brennerstraße 10 – 14
96052 Bamberg · Germany

Phone +49 951 9324-0
Fax +49 951 9324-198
info@wieland-electric.com

THE INNOVATION BEHIND

0439.1 AC 02/26

Represented worldwide in over 70 countries:

www.**wieland**-electric.com