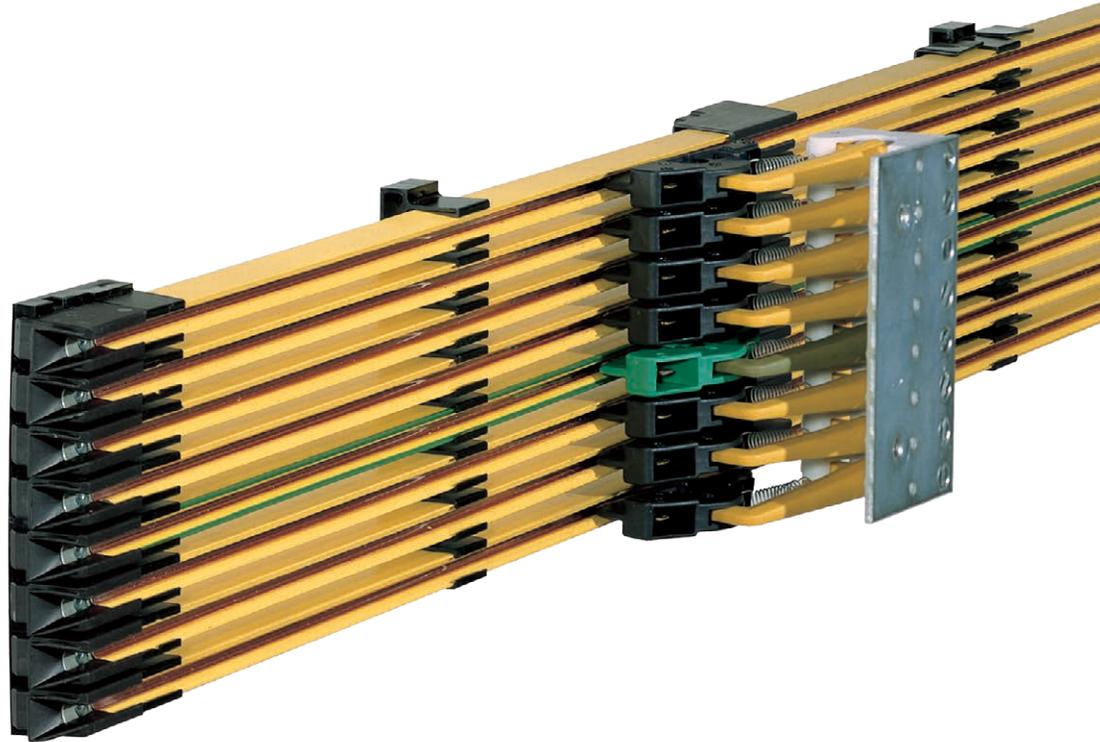


Single-Pole Insulated Conductor Rail Program 0815



CONDUCTIX
wampfler



KAT 0815-0004 – for General Applications

- Linear and curved applications
- Circular arrangements



KAT 0815-0003 – for Electrified Monorail Systems



KAT 0835 – for Shuttle Systems

Complementary Documents

Installation Instructions:

- MV0815-0007-EN Installation Instructions for Conductor Rail System 0815
- MV0815-0005-EN Expansion Module and Expansion Element
- MV0815-0008-0001-EN Mounting the BCB support profile (SEW)

Operating Instructions (for electrified monorail systems only):

- BAL0800-0002-EN Operating Instructions Rail Cleaner
- BAL0815-0001-EN Collector Brush Sensor Unit

Maintenance Instructions:

- WV0800-0001-EN Cleaning of Conductor Rails
- WV0800-0002-EN Maintenance Schedule Conductor Rails
- WV0800-0004-EN Copper Rail Applications

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System Description

The Conductix-Wampfler insulated conductor rail program 0815 is protected against direct contact and used for indoor installations in overhead monorails and slip rings. Simple and quick installation was a main design principle.

- 100 Amps
- protected against direct contact
- little space requirement
- vertical and horizontal installation
- easy and quick installation

Conductor Rails

The conductor rails are available in copper (max. nominal current 100 Amps¹⁾) and have a plastic cover insulation. Standard lengths are 4000 and 6000 mm; shorter rails available by request. The protective earth conductor insulation cover is marked with a green stripe on both sides over the total length.

Curves

Horizontal and vertical curves can be bent in the factory or on-site.

Suspension

The conductor rail sections are fitted into the hanger clamps which are constructed as a sliding support. The suspension spacing is max. 500 mm for linear installations and 400 mm for curved systems.

Depending on the type of plastic hanger clamps they can be screwed or clipped to special runway profiles. An adaption to specific customer profiles is easy to manufacture.

Rail Connections

The single rail sections are connected by a plug-in or a screw connection. Access to the connectors is easy from the frontside of the conductor rail. Every rail joint is protected against contact by an insulation cover.

Power Feed

The power feed is made by a power feed connector or a power feed end cap. The power feed connector can be installed instead of the rail connector at any point of the conductor rail system. The connection is made by crimp cable lugs with a cross section of 1.5 up to 10 mm². Furthermore it is possible to feed in at the end cap for transfer points or separating points. The connection is made by crimp cable lugs with a cross section of 1.5 up to 6 mm². The crimp cable lugs are included in the delivery.

End Caps for Transfer Points

Long end caps for transfer points are used at switches to enable an easy and smooth traversing. These end caps accommodate a lateral misalignment of ± 3 mm in all directions.

Air Gaps / Expansion Joints

Short end caps can be used to produce air gap separating points or expansion joints. The expansion joints can accommodate expansions during temperature changes.

Current Collectors

The compact current collector unit is made of few parts. Separate, fully insulated collector arms are able to move in all directions. Current collectors are easily exchangeable due to the snap-on method.

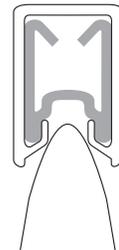
The protective earth collector is marked green and is mounted in a leading or lagging position. The carbon brushes can be checked without demounting and can be replaced easily. The current collectors can accommodate lateral and vertical misalignments of ± 10 mm. They transmit a continuous current of max. 50 Amps. Single or dual current collectors mounted on one collector arm are available. Collector units are available with various numbers of poles. The carbon brushes are made from copper graphite or from pure graphite for higher durability.

Installation

For detailed information please refer to our installation instruction (MV0815-0001-EN).

Protection against Direct Contact

In accordance with directive IP2x



Note: If rail connectors, power feeds, air gaps, and expansion units are not attached to the runway beam, they have to be fitted with hanger clamps on both sides, at intervals of 200 mm.

¹⁾Nominal current of the rail. Please note limitations due to cable type/power feed and current collector.

SingleFlexLine 0815 – Project Planning

The conductor rail system SingleFlexLine 0815 has been in use for several decades in a variety of applications, and has been adapted at component level for a wide variety of applications.

Intended Use

The components of the conductor line system are designed for use in systems with curves or ring applications. This means that industrial applications in indoor and non-public areas with installation against accidental contact or protected by other suitable measures. For other applications with use outside the technical data or other environmental parameters, a technical approval from the manufacturer must be obtained. All necessary information must be provided for the release and associated risk assessment.

Technical Characteristics and Warranty

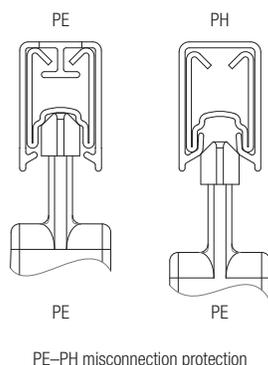
The system components of the conductor rail system are designed for use and function as power supply. Any use outside of this application, deviating application parameters or use of external components or modifications by the customer will void the warranty of the system. System responsibility is thus transferred to the system integrator, assembly partner or operator.

ProEMS 0815 for Electrified Monorail Systems

- **PE_{plus} protective earth system (to automotive standard)**

Conductix-Wampfler's PE_{plus} grounding system prevents the ground collector from being accidentally inserted into a phase rail. The grounding collector is wider than a phase collector and cannot be inserted into a phase rail by mistake, unless excessive force is used. Insertion of a PE_{plus} current collector into a phase rail is thus prevented and any faulty installation would be immediately obvious. The system is backward compatible with the old PE system and can be retrofitted in stages and is color coded. The current collectors have the same kinematics as phase current sensors (no limitation of the lifetime by limiting the envelope as with other systems on the market). The PE_{plus} system was developed in cooperation with the European automotive industry and specified in the factory standards and EMS guidelines. For existing systems, there is a version available with PE current collectors that do not have protection against misconnection and should not be used for new installations.

For further information on Electrified Monorail Systems please see catalog KAT0815-0003



Technical Data

Conductor Rail	Copper, Roll formed	
Type	081516	
Field of application ¹⁾	Indoor industrial applications with linear and curved tracks, e.g., logistics applications, amusement rides	
Installation orientation	Horizontal with entry from the side or from below	
Installation clearances	Minimum distance between the rail insulation and the metallic structure: 5 mm	
Rail length	[mm]	Standard length 4000 ± 2 mm; shortening possible on-site, special length of 6 m by request
Maximum suspension interval	[mm]	500 on linear tracks; 400/250 in horizontal/vertical curves
Maximum speed	[m/min]	Uninterrupted linear track: 400
Max. transition speed	[m/min]	40
Nominal voltage	[V]	230/400, max. 500
External dimensions	[mm]	9.6 x 15.2 (single rail)
Max. gap dimension at rail transitions (switches/lifters)	[mm]	≤ 6 mm
Max. offset at rail transitions	[mm]	± 3 mm (horizontal/vertical)
Rated rail current at 100% duty cycle and 30°C	[A]	100 (please note limitations due to connecting cables)
Rated system current at 100% duty cycle and 30°C	[A]	54 ²⁾
Rated current for current collector	[A]	See "Current collectors" Section starting on page 21.
Protection class	IP2x	
Conductor cross section (rail)	[mm²]	25
Ohmic resistance	[Ω/m]	0.000745 (at 35°C)
Impedance for a 14-mm pole spacing / 50 Hz	[Ω/m]	0.000748 (at 35°C)
Ambient temperature range	-5°C to +55°C (extended temperature range on request)	
Storage temperature range	-30°C to +55°C (without condensation)	
Max. ambient temperature difference	43 K ³⁾	
Protection against accidental contact	In accordance with VDE 0470 Part 1 / EN 60 529 / IEC 60 529 and EN 60 204 Part 1/32	
PE position	4 th pole from top (recommended by automotive standard)	
Air clearance and creepage distances	In accordance w. pollution degree 3; creepage distances in accordance w. DIN VDE 0110 Part 1	
Overvoltage category	III in accordance with DIN VDE 0100-443	
Max. humidity	50% rel. at 40°C	
Insulating profile (stabilized hard PVC, color yellow (similar to RAL 1018))		
Dielectric strength	22.4 kV/mm in accordance with DIN 53481	
UL rating/combustibility	Compliant with requirements for insulating materials in accordance with UL94 V-0; flame-retardant and self-extinguishing (IEC) DIN EN 60695-11-10B3, 3	

Relevant standards	
DIN EN 60664-1; VDE 0110-1: 2008-01	Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests (IEC 60664-1:2007); German version EN 60664-1:2007
DIN EN 60204-1; VDE 0113-1: 2007-06	Safety of machines – electrical equipment of machines – Part 1: General requirements (IEC 60204-1:2005, modified); German version EN 60204-1:2006
DIN EN 60529; VDE 0470-1: 2014-09	Degrees of protection provided by enclosures (IP code) (IEC 60529:1989 + A1:1999 + A2:2013); German version EN 60529:1991 A1:2000 A2:2013

Note: Subject to technical changes. Applications other than those described here or different framework conditions require consultation to check their technical feasibility. Technical specifications may be mutually restrictive. In case of doubt, we also recommend checking the suitability.

1) EMS vehicles are supplied in sections via several power feed points. The system is designed with a conductor cross section of 25 mm². The maximum current-carrying capacity is determined by the wiring and number of power feeds.

2) The current-carrying capacity of power feed connectors, end-cap units, and current collectors is determined by the type of the connecting cable, the type of installation, and the ambient temperature. The permissible currents are given in the local guidelines. The maximum current-carrying capacity and protection depends on the field of application and regional specifications.

3) In accordance with VDI 4441, a typical temperature range of +2°C to +45°C is to be used for EMSs.

Layout Tips

Circuit Breakers / Overload Protection

Depending on the system layout, the maximum permissible loads of the individual components must be taken into account in addition to the cable lengths / loop resistances.

Permissible Current Load

The conductor rail system is designed with a conductor cross section of 25 mm². The maximum current-carrying capacity is determined by the power feed and the type of cable used, the cross section, and the type of installation of the power feed. The installation space limits expansion modules and the factory cabling to 54 A.

Temperature-dependent Expansion

Increases in ambient temperature result in thermal expansion. These expansions are compensated for by expansion modules. The configuration of the expansion modules is based on the system layout and the ambient temperatures.

Product Approvals

The conductor rail has been developed in accordance with European and international standards, guidelines, and specifications. In addition to CE conformity and the regulations applicable to the product and production, the product meets further requirements such as UL, CSA, and GOST-R.

Current-carrying Capacity of the Current Collector

Specification of the rated current at 100% duty cycle, in motion, and at 20°C ambient temperature. At a standstill, the current-carrying capacity at 100% duty cycle is to be reduced. Reduction factors are available on request (depending on current collector and rail type). Higher current-carrying capacities are possible for short duty cycles, e.g., additional lifting movements / peaks (short-term operation).

Connecting Cable (mechanical load)

The customer must provide strain reliefs for connecting cables. Cable terminations must be provided with wire-end ferrules. Only fine-wired copper cables may be used.

Curves

Rail Curves

The conductor rail system is designed for the on-site preparation of curves or curved sections. For larger radii, the profile can be manually adjusted to the contour of the carrier rail during installation in the hanger clamps. A manual bending device is used for smaller bends or high system speeds.

Rail Curves for PE_{plus} Protective Conductors with Rail Polarity Protection

For PE_{plus} bends with radii less than 1500 mm, the rail profile has to be modified with incisions, or the rail component already prepared at the factory has to be used (see below).

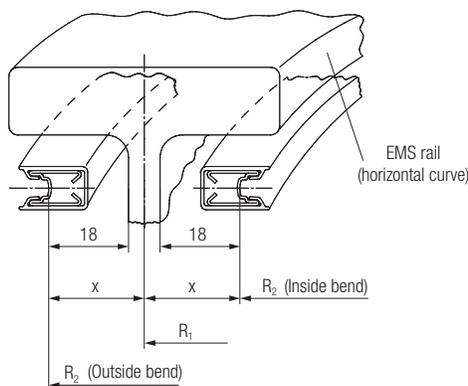
The PE_{plus} rail with rail polarity protection has an additional fixing of the insulating profile (T-profile on the insulating profile base).

Prefabricated Rail Curves

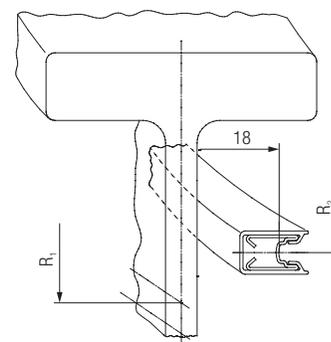
We also supply prefabricated rail curves and segments. Note that ordering and handling prefabricated curves increases the cost of the system and its installation.

Standard Curves and the associated Suspension Intervals

Conductor rail curve (side entry)



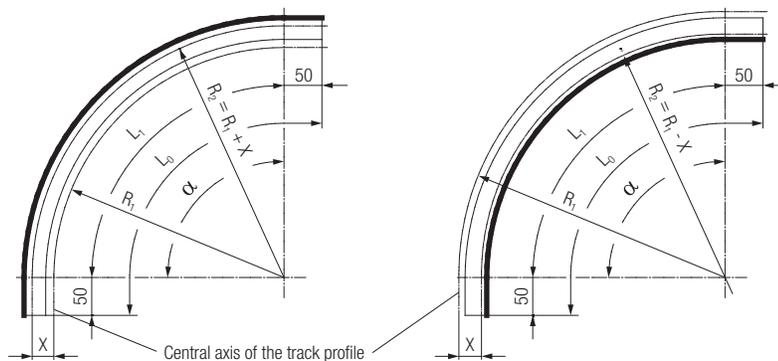
Inclined section (side entry)



Outside bend

Rail side open; side entry

Inside bend



$$L_0 = L_1 + 2 \times 50$$

$$L_1 = \frac{R_2 \times \pi \times \alpha}{180}$$

L_0 = Length of rail

L_1 = Length of curved rail

α = Bending angle

R_1 = Radius of the track profile

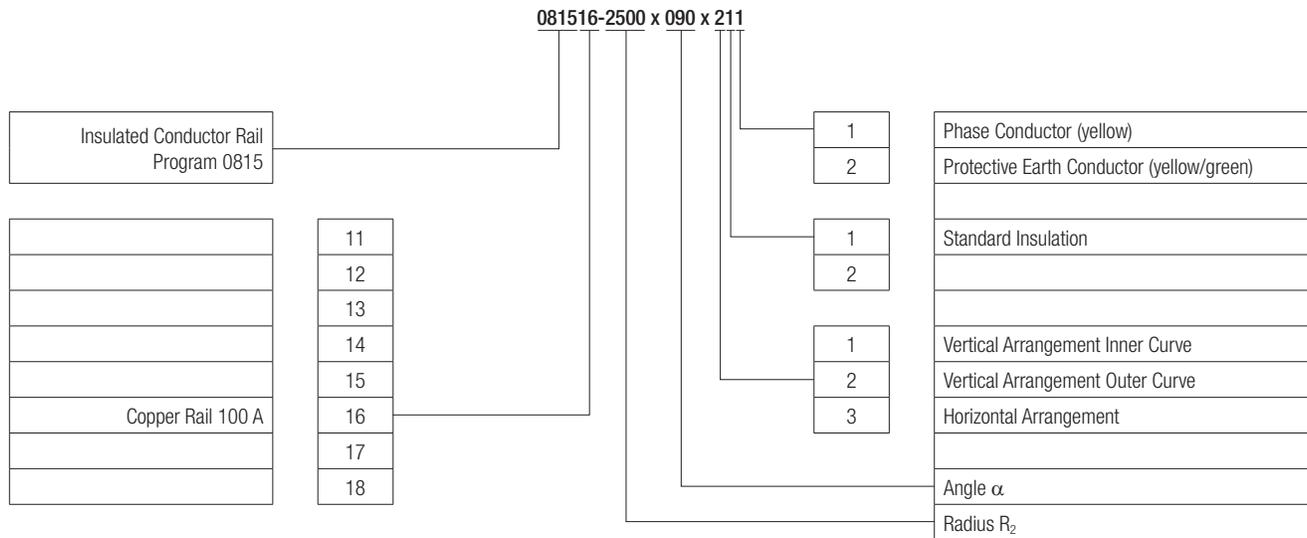
R_2 = Radius of the conductor rail

Maximum speed: 80 m/min

Layout	Min. bending radius		Suspension interval [mm]
	Ex works [mm]	On site [mm]	
Side entry	450	450	250
Entry from below	1000	1200	400

Curves

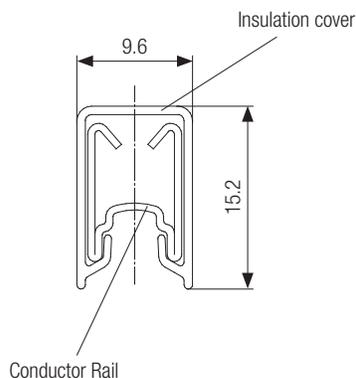
How to Order Standard Curves



Example: Insulated Conductor Rail Program 0815; $R_2 = 2500$ mm; $\alpha = 90^\circ$; vertical Arrangement (Outer curve), standard insulation, phase, copper rail 100 A.
 Part No.: 081516-2500x090x211

Conductor Rails/Rail Connectors

Insulated Conductor Rails

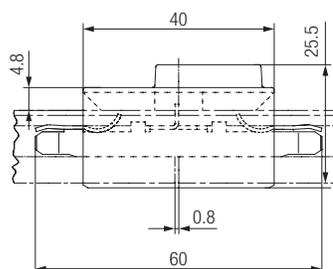
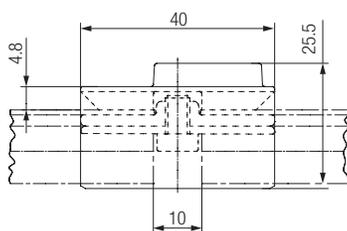


Type	Material	Part No.		Length [m]	Weight [kg]
		Phase (PH)	Protective earth (PE)		
Conductor Rail 100 A	Rail: Copper Insulation: rigid PVC	081516-4x11*	081516-4x12*	4	1.092
		081516-6x11	081516-6x12	6	1.638

Note: Special length 6000 mm and shorter lengths available by request
 Rails (PE) with with misconnection protection see EMS-Catalog (KAT0815-0003-E)

* Standard range

Rail Connectors



Rail Connector 081526-....:

- for use on linear track profiles only.
- once unfastened, the connector needs to be replaced with a new one!

Type	Part No.	Max. current load [A]	Weight [kg]
Rail Connector	screw-on	100	0.016
	plug-in	67	0.010

Please also note mounting instruction MV0815-0001-D-E

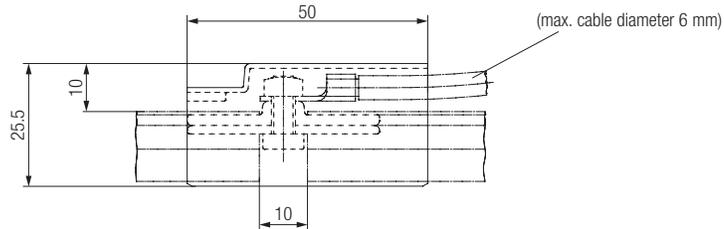
Rail Connectors for connections in circular applications. For other applications use screwable connector version.

* Standard range

Power Feed

Power Feeds

The power feed is based on the basic principle of the rail connector. They are supplied as individual power feeds without cable or as bundles with pre-assembled and installed connection braids. The insulation caps are supplied loose. The cable length of 1 m is sufficient to reach the nearest clamping point. Special lengths can be prepared on-site.



Power Feeds with prefabricated Connecting Cable

Type	AWG	Variant	Order No.		Weight [kg]
			PH	PE / PE _{plus}	
Power Feed 2.5 mm ²	16	With 1 m cable – 2.5 mm ²	081551-1-001	081551-1-002	0.22
Power Feed 6.0 mm ²	10	With 1 m cable – 6.0 mm ²	081551-2-001	081551-2-002	0.22

Delivered as a bundle with pre-assembled clamping part. Caps are supplied loose in the bag. UL cables/low-temperature cables on request.

Power Feeds with ring terminal without connecting cable

Type	AWG	Variant	Order No.		Weight [kg]
			PH / PE / PE _{plus}		
Power Feed 1.5–2.5 mm ²	16–14	Without cable	081551-1		0.02
Power Feed 4.0–6.0 mm ²	12–10		081551-2		0.02

Delivery as bulk material in bags or in cartons separately by article depending on the order quantity.

Power Feeds can be used for PH, PE, and PE_{plus} rails.

Cables for Power Feeds / Hanger Clamps

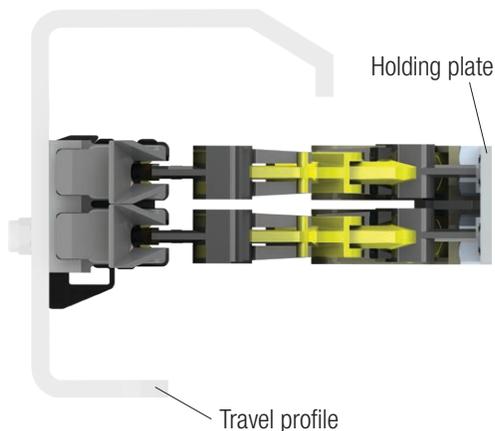
Lead wires and Ring Cable Lugs for on-site assembly of Cables

Type / Sales Quantity	Cross section	AWG	Order No.	
			PH black	PE yellow-green
Single Core Wires (by the meter)	2.5 mm ²	14	H07V-K-1x2.5-SW	H07V-K-1x2.5-GNGE
	6.0 mm ²	10	H07V-K-1x6-SW	H07V-K-1x6-GNGE
Cable Lugs (Minimum lot size 300 pcs.)	1.5 – 2.5 mm ²	16–14	08-1630/4	
	4.0 – 6.0 mm ²	12–10	08-1650/4	

UL cables / low-temperature cables on request

Hanger Clamps – Customized

Customer-specific solutions are available to allow for screwless installation on the rail track (e.g. with clip-on brackets).



Design – a note on support-rail tolerances:

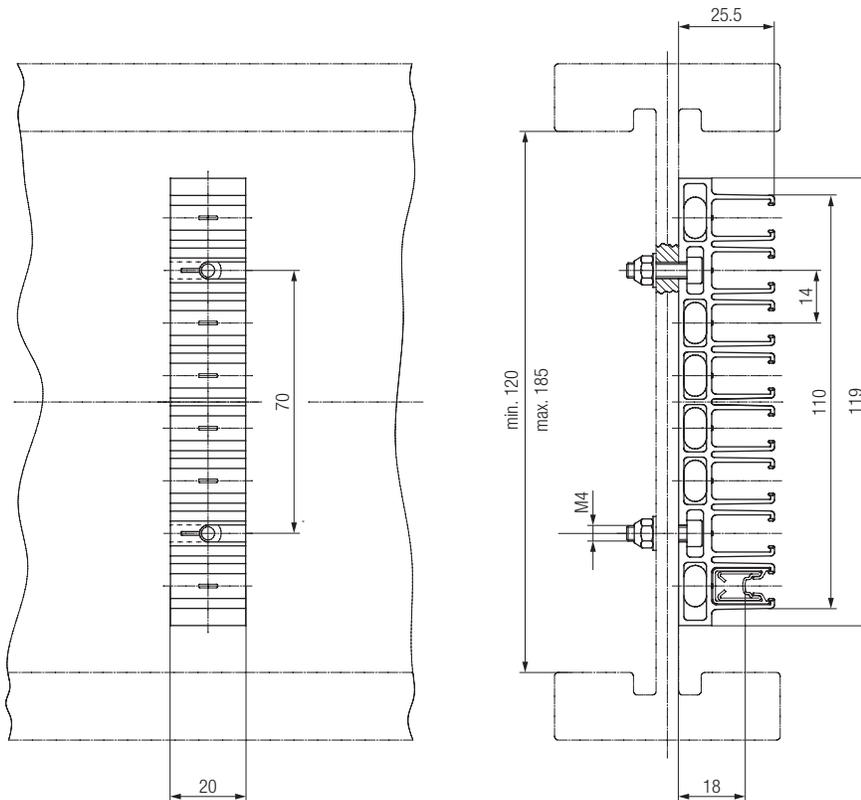
The conductor rail is integrated into the aluminum track profiles with hanger clamps in accordance with the internal track geometry of the rail. The track tolerances for the extrusion of the aluminum rails must be decided by the system engineer and Conductix-Wampfler to ensure the secure clipping in and hold of the hanger clamps. Since these dimensions are not primarily functional and are only test dimensions for the system engineer, these requirements are not always passed on to the extruder. As a result, there may be “wandering” of the hanger clamps or excessively high pre-tensioning with a risk of breakage.

Hanger Clamps

Standard Screw-on Version

Maximum suspension interval:

- 500 mm in straight sections
- 400 mm in horizontal curves
- 250 mm in vertical curves



14 mm pole spacing. The 8-pole hanger clamp is shown.

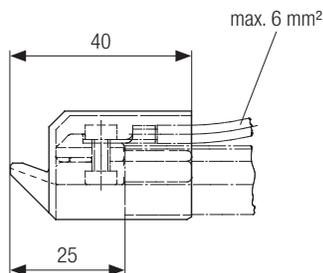
Type	Order No.	Number of poles	A [mm]	B [mm]	C [mm]	D [mm]	Weight [kg]
Hanger clamps	081543-04x14	4	28	54	56	7	0.009
	081543-06x14	6	42	92	94	21	0.01
	081543-08x14	8	70	110	119	24	0.02

Delivery includes screw set DIN 912 4x16 + washers + nuts

Hanger clamps for 2 and 3 poles or clip-on solutions in customized designs available on request

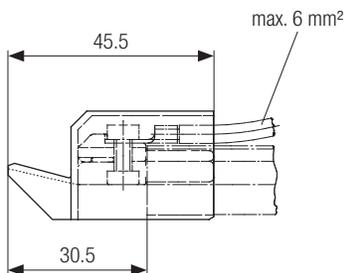
End Caps for Transfer Points, End Caps, Air Gaps

End Caps for Transfer Points, End Caps “long” and “short”



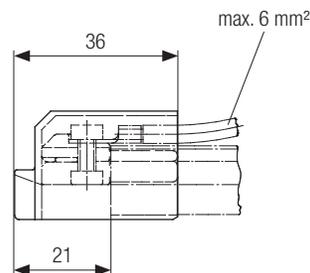
081574-...:

- also used as end cap
- max. horizontal and vertical deflections: ± 3 mm



081576-...:

- max. vertical deflection: ± 3 mm
- max. horizontal deflection: ± 5 mm



081577-...:

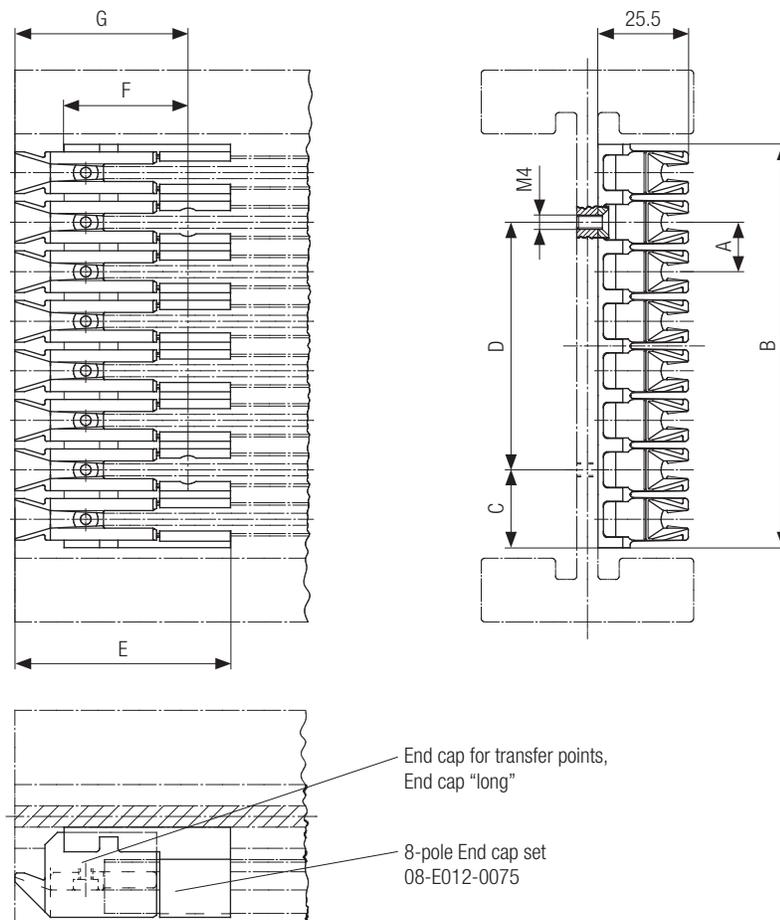
- used for air gaps

Type	Part No.	Cross section [mm ²]	Weight [kg]
End Cap for Transfer Points, End Cap “long” for 12 mm pole distance	081574-01x12x0*	without power feed	0.016
	081574-01x12x2*	1.5 - 2.5	0.018
	081574-01x12x6*	4 - 6	0.018
End Cap for Transfer Points, End Cap “long” for 14 mm pole distance	081574-01x14x0	without power feed	0.016
	081574-01x14x2	1.5 - 2.5	0.018
	081574-01x14x6	4 - 6	0.018
End Cap for Transfer Points “long” for 14 mm pole distance, horizontal deflection ± 5 mm	081576-01x14x0	without power feed	0.016
	081576-01x14x2	1.5 - 2.5	0.018
	081576-01x14x6	4 - 6	0.018
End Cap for Transfer Points “short” for 12 and 14 mm pole distance	081577-01x12x0*	without power feed	0.016
	081577-01x12x2*	1.5 - 2.5	0.018
	081577-01x12x6*	4 - 6	0.018

* Standard range

End Cap Sets Complete

For Transfer Points with 6 and 8 poles / with or without Power Feed



8-pole "End Cap Set complete" without power feed is shown. (8-pole "End Cap Set complete" = End cap set + 8 pcs. end caps for transfer points/end cap "long").

This end cap set is screwed onto the overhead runway beam section. The end caps of the individual conductor rail poles are clipped into it.

End cap sets no. 081573-... can only be used in connection with dual current collectors. As an alternative to dual current collectors, two single current collectors can be used in succession, with reduced horizontal deflection (± 4 mm).

Type	Part No.	Poles	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	Cross section [mm ²]	Weight [kg]
End Cap Set complete 6-pole	081571-06x14x0	6	14	114	22	70	61	35	49	¹⁾	0.140
	081571-06x14x2									1.5 - 2.5	0.142
	081571-06x14x6									4 - 6	0.145
End Cap Set complete 8-pole	081571-08x14x0	8	14	114	22	70	61	35	49	¹⁾	0.172
	081571-08x14x2									1.5 - 2.5	0.182
	081571-08x14x6									4 - 6	0.185
End Cap Set complete 6-pole ²⁾	081573-06x14x0	6	14	114	22	70	66.5	35	54.5	¹⁾	0.140
	081573-06x14x2									1.5 - 2.5	0.142
	081573-06x14x6									4 - 6	0.145
End Cap Set complete 8-pole ²⁾	081573-08x14x0	8	14	114	22	70	66.5	35	54.5	¹⁾	0.172
	081573-08x14x2									1.5 - 2.5	0.182
	081573-08x14x6									4 - 6	0.185

¹⁾ = without power feed ²⁾ = lateral deflection ± 5 mm

Note: 2-pole end cap sets are available on request

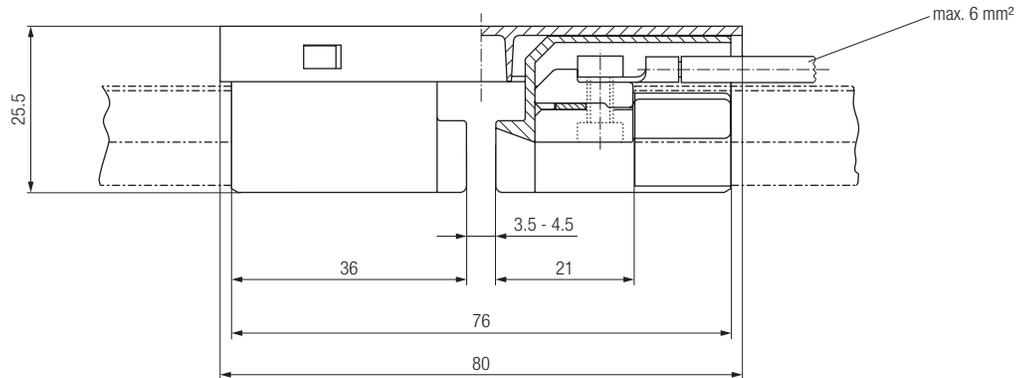
Air Gaps, Expansion Units

Air Gaps – without Expansion

Air gaps are used for electrical (galvanic) separation, e.g., for electrical segmentation or block separation. These are used on all poles or single poles depending on the required function.

Scope of delivery: 2 x end cap including connecting bar and clamping part with power feed option.

Note: Conversion of the power feed is possible by the customer by replacing the clamping part with a cable lug.



Type	Variant	AWG	Order No.		Weight [kg]
			PH/PE	PE _{plus}	
Air gap with a power feed option	1.5–2.5 mm ²	16–14	081594-2	081594-5	0.04
	4.0–6.0 mm ²	12–10	081594-3	081594-7	

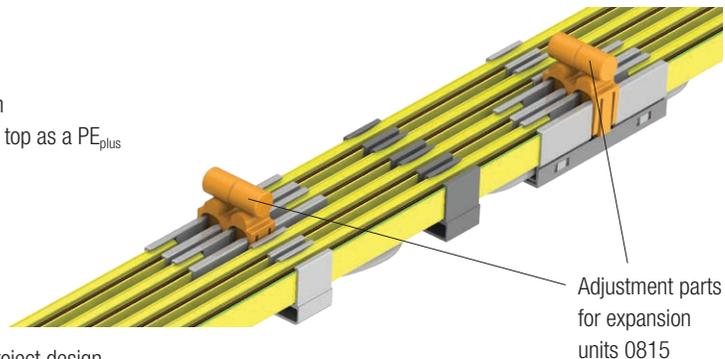
Expansion Units for Electrified Monorail Systems

Pre-assembled multi-pole expansion units are used to compensate for thermal expansion of the conductor rail system and of the building (track profile expansion joints). Larger expansion distances (e.g., support profile expansion joints) can be achieved by installing expansion units in a row. The units can be adjusted with separately available adjustment parts for an installation temperature range between +10° and +25° C. The adjustment parts are removed before commissioning the system and are used to adjust the gap dimensions of the expansion points.

Technical specifications

- Max. expansion distance per element and pole $2 \times 8 = 16$ mm
- Protective conductor implemented in the 4th position from the top as a PE_{plus}
- Suitable for PE and PE_{plus} current collectors
- Max. current-carrying capacity 54 A

The position and the number of expansion modules depend on the system layout and the ambient temperature range. Our application engineers will specify them in conjunction with the existing fixed points and partial lengths as part of the project design.

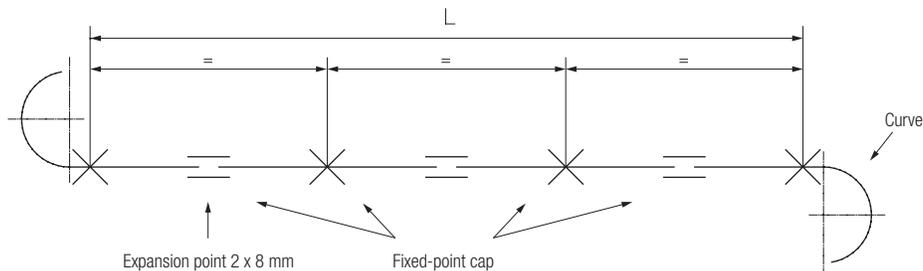


Type	Expansion	Length	Order No.	Weight [kg]
Expansion unit, 4-pole, PE _{plus} /PE	2 x 8 mm	1200	081563-611-3425	2.50
Expansion unit, 6-pole, PE _{plus} /PE		1200	081563-611-3625	3.20
Expansion unit, 8-pole, PE _{plus} /PE		1200	081563-611-3825	4.40

Expansion Units/Current Collectors

With 2 x 8 mm expansion / number of expansion points / gap adjustment

Determination of the number of expansion points required:



L = Length* [m]	Δt 10 °C	Δt 20 °C	Δt 30 °C	Δt 40 °C
20	–	–	1	1
40	–	1	2	2
60	1	2	2	3
80	1	2	3	4
100	2	3	4	5
120	2	3	4	6

* = Distance between end caps, curves (90–180° curves with $R \leq 1000$ mm can be regarded as fixed points) or other parts of the installation acting as fixed points.

$$\Delta t = \Delta t_u + \Delta t_{sch}$$

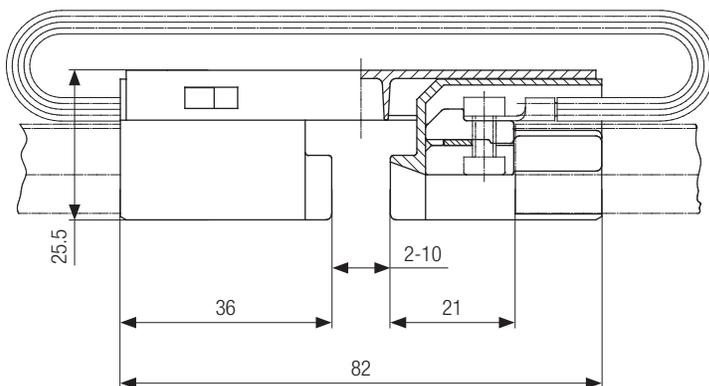
Δt_u = Variation in the ambient temperature
 Δt_{sch} = Temperature increase of the current-carrying rail
 up to 40% of duty cycle $\Delta t_{sch} = 10^\circ\text{C}$
 up to 65% of duty cycle $\Delta t_{sch} = 20^\circ\text{C}$
 up to 100% of duty cycle $\Delta t_{sch} = 30^\circ\text{C}$

Gap Adjustment Expansion Units

The expansion units are supplied pre-assembled at the factory, including spacers in the expansion gap. The set expansion gap corresponds to an operating temperature range of 30 to 40 °K and an installation temperature of 10 to 25 °C. The spacers remain in the expansion unit until the section/equipment has been completely assembled and are removed before the transitions and the carriers are checked.

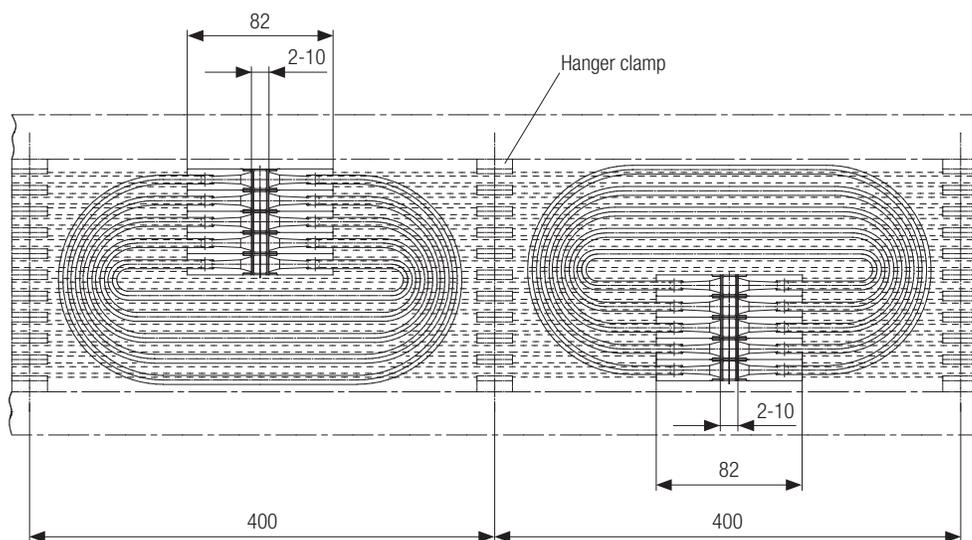
Expansion Joints

With 8 mm Expansion



Expansion joints delivered with connection cables in different lengths.

Type	Part No.	Expansion range [mm]	Cross section [mm ²]	Number of expansion gaps	Weight [kg]
Expansion Joint	081561-311	8	6	1	0.050

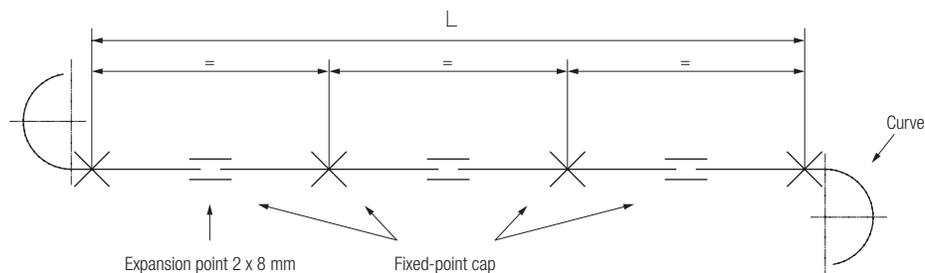


Type	Part No.	Expansion range [mm]	Cross section [mm ²]	Number of expansion gaps	Poles
Expansion Joint	081561-381	8	6	1	8
	081561-391	8	6	1	9
	081561-301	8	6	1	10

Expansion Joints

With 8 mm Expansion / Number of Expansion Joints / Air Gap adjustment

Calculating the necessary number of expansion joints:



L = Length* [m]	Δt 10	Δt 20	Δt 30	Δt 40	Δt 50	Δt 60
10	–	–	1	1	2	2
20	–	1	2	2	3	3
30	1	2	2	3	4	4
40	1	2	3	4	5	6
50	2	3	4	5	6	7
60	2	3	4	6	7	8

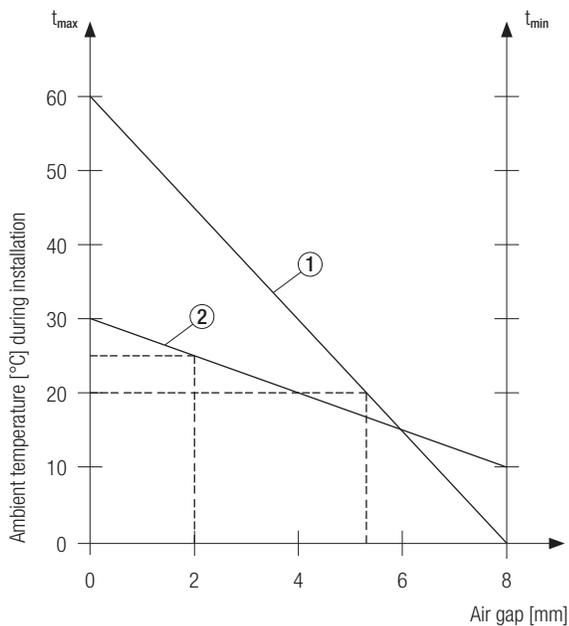
Δt in °C

* = track length between end cap sets, curves (with 90° – 180° curves and $R \leq 1000$ mm the curves act as anchor points) or other components of the installation, which serve as anchor points.

$\Delta t = \Delta t_u + \Delta t_{sch}$

Δt_u = temperature range of the ambient temperature
 Δt_{sch} = temperature rise of the conductor rail
 up to 40% duty cycle $\Delta t_{sch} = 10^\circ\text{C}$
 up to 65% duty cycle $\Delta t_{sch} = 20^\circ\text{C}$
 up to 100% duty cycle $\Delta t_{sch} = 30^\circ\text{C}$

Air gap adjustment of the expansion joints:



Instruction:

t_{min} = lowest temperature that occurs in the respective area of application
 t_{max} = highest operational temperature that occurs in the respective area of application

1. Draw a connecting line from t_{min} to t_{max}
2. Mark the ambient temperature during operation horizontally t_{min} to t_{max}
3. Draw a line from the intersection vertically down and read the air gap to be set

Example:

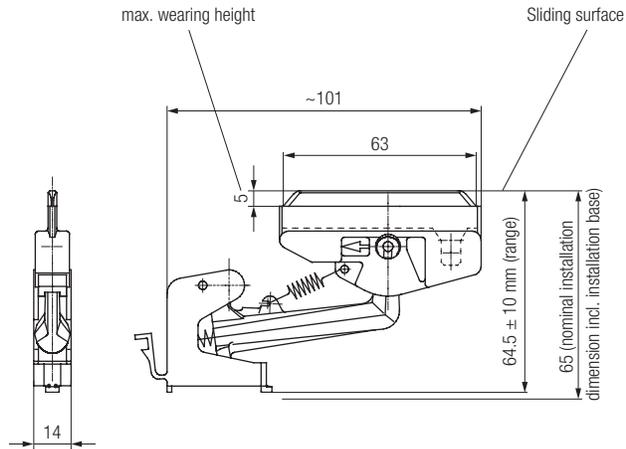
- ① = Temperature range from 0°C to +60°C.
 Ambient temp. during installation: +20°C
 Air gap: ca. 5 mm
- ② = Temperature range from +10°C bis +30°C.
 Ambient temp. during installation: +25°C
 Air gap: ca. 2 mm

Current Collectors

Current Collector with 63 mm Contact Length for 16 A / 35 A, Single Pole; with Plug Connection

Connection: 6.3 mm flat plug
 Implementation: Reversing mode
 Max. stroke: ± 10 mm
 Max. lateral offset: ± 10 mm

Note: Maximum current depends on the type of conductor used, the cross section, the installation method, and the ambient temperature. The limit values and reduction factors of the cable must be observed in the design and execution.



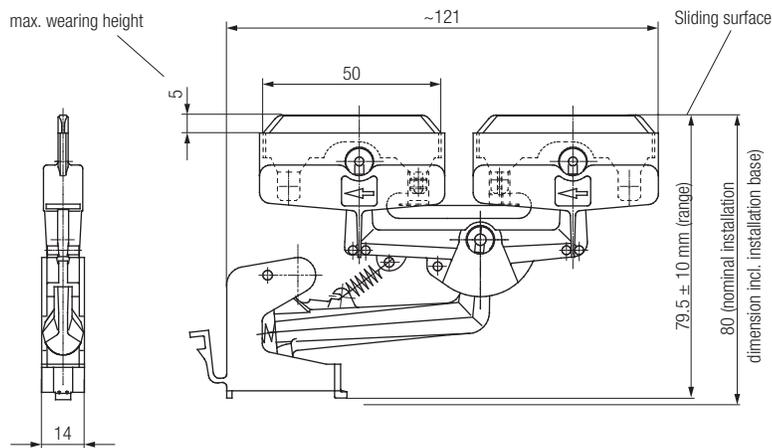
Brush material: graphite / copper graphite

Type	Material	Order No.	For pole spacing [mm]	Weight [kg]	
Current collector (existing systems)	16 A, PH	Graphite	081506-0141	14	0.03
	16 A, PE	Graphite	081506-0142	14	0.03
	35 A, PH	Copper graphite	081507-0141	14	0.03
	35 A, PE	Copper graphite	081507-0142	14	0.03

Double Current Collector with 2 x 50 mm Contact Length for 2 x 16 A / 2 x 25 A, Single Pole; with 2 Plug Connections

Connection: 6.3 mm flat plug
 Implementation: Towing mode
 Max. stroke: ± 10 mm
 Max. lateral offset: ± 10 mm

Note: Maximum current depends on the type of conductor used, the cross section, the installation method, and the ambient temperature. The limit values and reduction factors of the cable must be observed in the design and execution.



Brush material: graphite / copper graphite

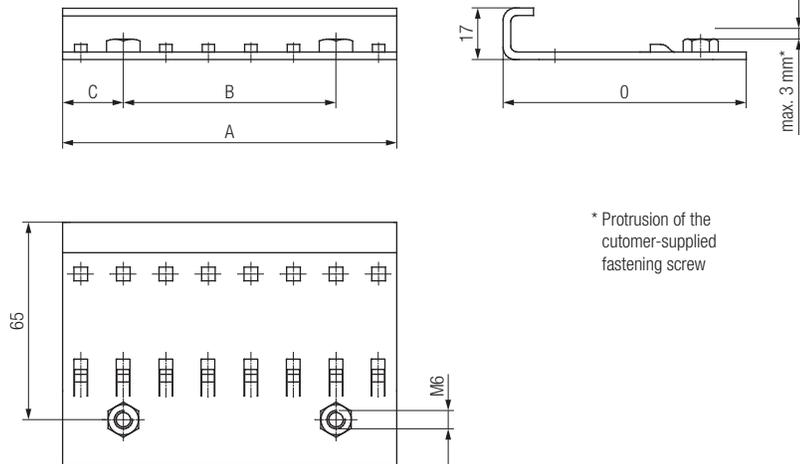
Supply details with 2 x 2.5 mm² connecting leads

Type	Material	Order No. (for towing mode)	Order No. (for reversing mode)	For pole spacing [mm]	Weight [kg]	
Double current collector (existing systems) Towing mode	2 x 16 A, PH	Graphite	081508-0141	081508-01415	14	0.04
	2 x 16 A, PE	Graphite	081508-0142	081508-01425	14	0.04
	2 x 16 A, PE _{plus}	Graphite	081508-0144	—	14	0.04
	2 x 25 A, PH	Copper-graphite	081509-0141	081509-01415	14	0.05
	2 x 25 A, PE	Copper-graphite	081509-0142	081509-01425	14	0.05
	2 x 25 A, PE _{plus}	Copper-graphite	081509-0144	—	14	0.05

Current Collectors and Accessories

Installation Base Plate for Current Collector Types 081506- / 081509-

The 8-pole version is shown.



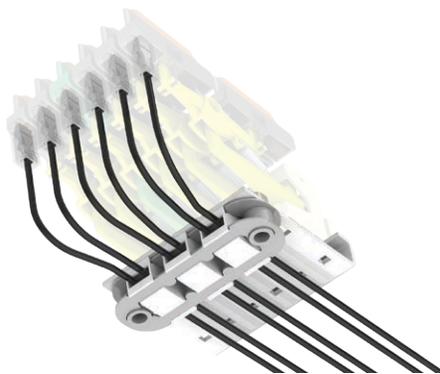
Type	Order No.	Number of poles	Pole spacing [mm]	A [mm]	B [mm]	C [mm]	Weight [kg]
Installation base plate for current collector	08-S138-0056	4	14	54	42	6	0.11
	08-S138-0054	6	14	82	70	6	0.16
	08-S138-0052	8	14	110	70	20	0.21

Note: customized designs for 2 and 3 poles available on request (space-saving design to be used instead of 4-pole base plate)

Recommended Cable Package with Strain Relief

The optional cable package is recommended to prevent the connecting cables from interfering with the free movement of the the current collectors. The unit is installed under the installation base plate and ensures that the cable is guided without tension or directional forces.

Note: The cable package is configured according to the number of poles, cross section, and cable length for the order.



Dimensions and design instructions:
See Technical Data Sheet TDB0815-0004-EN
"Cable package with strain relief – 08-L020-0210"

Configuration item	Ordering parameter				
	Cross section	Number of poles	Current-collector type	Cable length	PE in 4th position (coding)
08-L020-0210	1.5 mm ²	2/4	081506-.../ 081507-...	0.2 to 2 m	PE in 4th position (coding)
	2.5 mm ²	6			
	4.0 mm ²	8	081508-.../ 081509-...		Yes/No

Note: version with 2 poles is based on 4 poles version, with two cables only

Connection Cables for Existing Systems

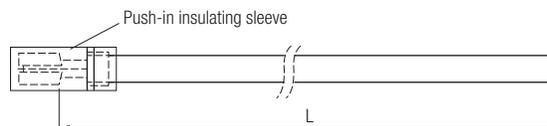
Connecting Cables with Straight Connectors for Free Installation, Applications in Power Supplies > 48 V

These connecting cables are highly flexible and **double** insulated for phase conductors / **individually** insulated for protective conductors.

They must be ordered in the required sizes and lengths.

Connecting cables: PH = black, PE = yellow/green

UL/CSA-listed cables



Cross section [mm ²]	AWG	Order No.		Length [m]	Cable diameter [mm]	Current * [A]	Weight [kg]
		Phase (PH)	Protective earth (PE)				
1.5	16	081109-0.5 x 1.5 x 21	081109-0.5 x 1.5 x 42	0.5	4/3	24/24	0.02
1.5	16	081109-1 x 1.5 x 21	081109-1 x 1.5 x 42	1	4/3	24/24	0.02
2.5	14	081109-0.5 x 2.5 x 21	081109-0.5 x 2.5 x 42	0.5	5/3.5	30/32	0.04
2.5	14	081109-1 x 2.5 x 21	081109-1 x 2.5 x 42	1	5/3.5	30/32	0.04
4	12	081109-1 x 4 x 21	081109-1 x 4 x 42	1	6	40/42	0.06

Other lengths and sizes on request

Cable configurator (SAP CONFIG 3126191)

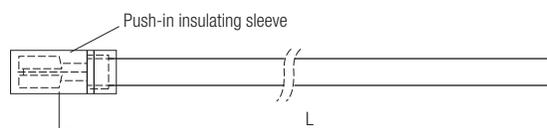
Connecting Cables with Straight Connectors for Protected Installation

The connecting cables are highly flexible and **individually** insulated.

They must be ordered in the required size and length.

Connecting cables: PH = black, PE = yellow/green

UL/CSA-listed cables



Cross section [mm ²]	AWG	Order No.		Length [m]	Cable diameter [mm]	Current * [A]	Weight [kg]
		Phase (PH)	Protective earth (PE)				
1.5	16	081109-0.5 x 1.5 x 41	081109-0.5 x 1.5 x 42	0.5	3	24/24	0.02
1.5	16	081109-1 x 1.5 x 41	081109-1 x 1.5 x 42	1	3	24/24	0.02
2.5	14	081109-0.5 x 2.5 x 41	081109-0.5 x 2.5 x 42	0.5	3.5	30/32	0.03
2.5	14	081109-1 x 2.5 x 41	081109-1 x 2.5 x 42	1	3.5	30/32	0.03

Other lengths and sizes on request

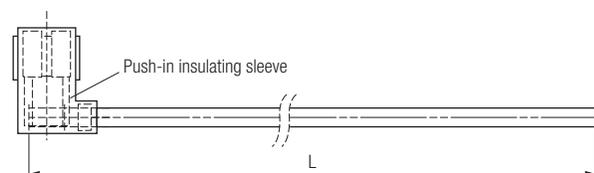
Cable configurator (SAP CONFIG 3126191)

Connecting cables with angled connectors for protected installation

The connecting cables are highly flexible and **individually** insulated.

They must be ordered in the required size and length.

UL/CSA-listed cables



Cross section [mm ²]	AWG	Order No.		Length [m]	Cable diameter [mm]	Current * [A]	Weight [kg]
		Phase (PH)	Protective earth (PE)				
1.5	16	081509-0.5 x 1.5 x 41	081509-0.5 x 1.5 x 42	0.5	3	24/24	0.02
1.5	16	081509-1 x 1.5 x 41	081509-1 x 1.5 x 42	1	3	24/24	0.01
2.5	14	081509-0.5 x 2.5 x 41	081509-0.5 x 2.5 x 42	0.5	3.5	30/32	0.03
2.5	14	081509-1 x 2.5 x 41	081509-1 x 2.5 x 42	1	3.5	30/32	0.03

Other lengths and sizes on request

Cable configurator (SAP CONFIG 3126191)

* Current of the cable with consideration of the insulating sleeve/without consideration of the insulating sleeve

Note:

Be sure to use double-insulated cables for voltages above 48 V. Load-carrying capacity is in accordance with VDE 0298-4, installation method C at 100% duty cycle, ambient temperature 30°C, 1.5 mm² max. 19.5 A, 2.5 mm² max. 27 A, 4.0 mm² max. 36 A, 6.0 mm² max. 46 A. Cables in accordance with DIN VDE 0298 Part 4; plug in accordance with DIN 46 257 Part 3.

Current Collector Heads

Selection Aid for Contact-Brush Material

Two different contact-brush materials are available for use in EMS applications:

- Copper–graphite brushes
- Graphite brushes

Areas of Application for Contact Brushes

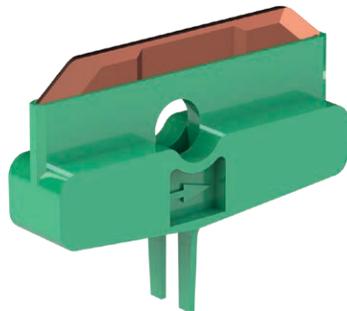
Copper–graphite contact brushes are preferably used for higher current loads and frequent peak currents.

The impedance/resistance of copper–graphite contact brushes is low. The voltage drop and thus the heating of the current collector head are lower than for graphite contact brushes. Copper–graphite contact brushes have a shorter service life and find use in systems with low traversing speeds and few vehicles (low throughput rates).

Graphite contact brushes have a significantly longer service life and are suitable for systems with high throughput rates. The impedance/resistance of the graphite contact brushes is slightly higher, which is reflected in the low permissible nominal currents.

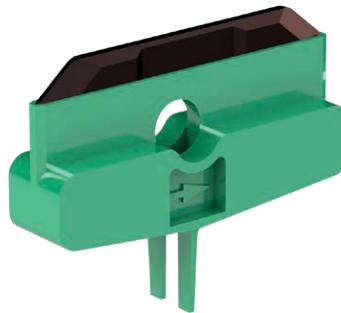
	Graphite	Copper–graphite
Current load	+	++
Service life	++	+
Breaking strength	+	++
Contact resistance	+	++
Resistance at transitions	++	+

Copper Graphite Contact Brush



Current Collector Head

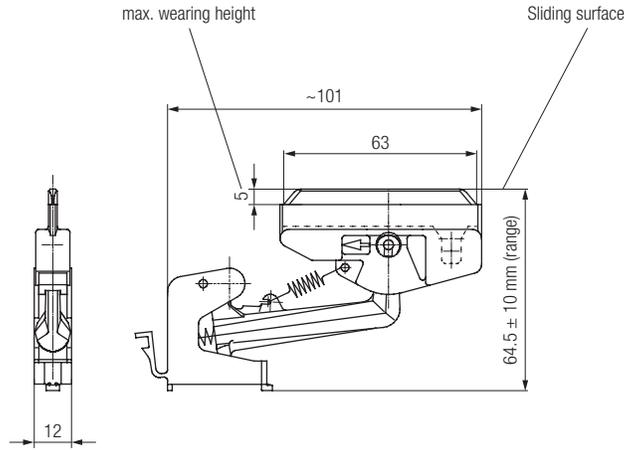
Graphite Contact Brush



Current Collector Head

Replacement and Spare Parts – Current Collectors with 12 mm phase distance (existing systems)

Current Collector Unit with 63 mm length, 16 A, 1 pole, with Terminal Lug Connection



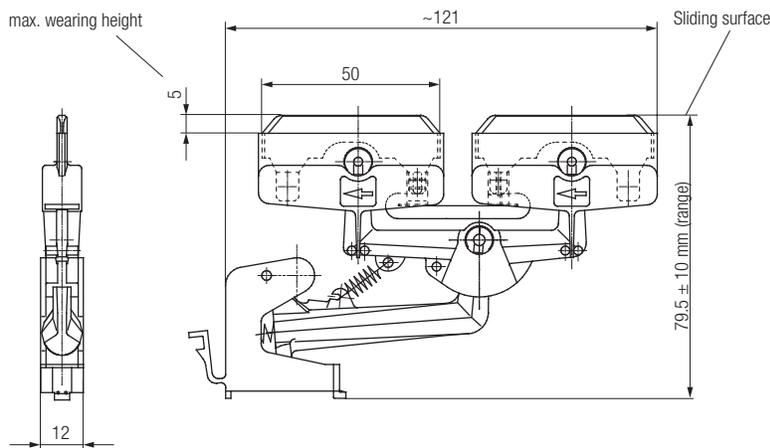
Brush material: pure graphite

Type		Part No.	Pole spacing [mm]	Weight [kg]
Current Collectors	16 A, PH	081506-0121*	12	0.026
	16 A, PE	081506-0122*	12	0.026

Visual distinction of current collector parts: see table page 18.

* Standard range

Dual Current Collector Unit with 2 x 50 mm length, 35 A, 1 pole; with 2 Terminal Lug Connections



Brush material: pure graphite

Type		Part No.		Pole spacing [mm]	Weight [kg]
		Towing operation	Reverse operation		
Dual Current Collectors	35 A, PH	081508-0121*	081508-01215*	12	0.042
	35 A, PE	081508-0122*	081508-01225*	12	0.042

Visual distinction of current collector parts: see table page 18.

* Standard range

Replacement and Spare Parts – Current Collectors with 12 mm phase distance (existing systems)

Current Collector Unit with 63 mm length, 35 A, 1 pole, with Terminal Lug Connection

Drawing see 081506-... (page 22)

Brush material: pure graphite

Type	Part No.	Pole spacing [mm]	Weight [kg]	
Current Collectors	35 A, PH	081507-0121*	12	0.032
	35 A, PE	081507-0122*	12	0.032

Visual distinction of current collector parts: see table page 18.

* Standard range

Dual Current Collector Unit with 2 x 50 mm length, 50 A, 1 pole; with 2 Terminal Lug Connections

Drawing see 081508-... (page 22)

Brush material: pure graphite

Type		Part No.		Pole spacing [mm]	Weight [kg]
		Towing operation	Reverse operation		
Dual Current Collectors	50 A, PH	081509-0121*	081509-01215*	12	0.050
	50 A, PE	081509-0122*	081509-01225*	12	0.050

Visual distinction of current collector parts: see table page 18.

* Standard range

Replacement and Spare Parts

Contact Brushes

Replacement contact brushes are installed as follows:

a) Single current collectors

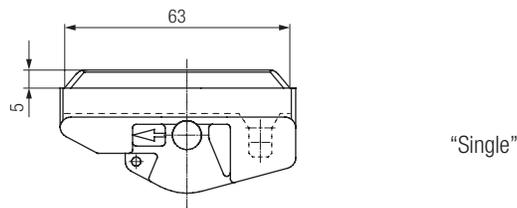
1. Disengage the stabilizing spring from the old current collector head
– do not overstretch.
2. Pull off the cable connection.
3. Swivel the current collector head sideways to the stop and pull it out through the insertion point.
4. Install the new current collector head in the reverse sequence.

b) Double current collector

1. Disengage the stabilizing spring from the rocker
– do not overstretch.
2. Pull off the cable connection.
3. Remove the pair of contact brushes from the rocker.
4. Install the new pair of contact brushes in the reverse sequence.

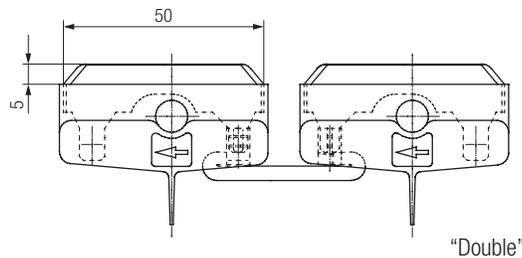
Contact Brushes (Pure Carbon)

- 63mm contact length; max. 16 A
- Brush material: Pure carbon



Type	Order No.	For pole spacing [mm]	Weight [kg]
16 A, PH	081006-124	14	0.01
16 A, PE	081006-224	14	0.01
16 A, PE _{plus}	081006-424	14	0.01

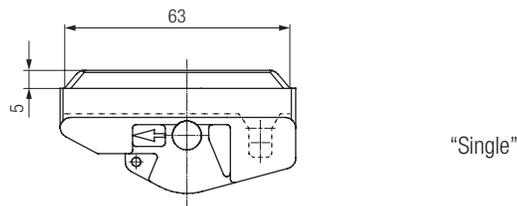
- 2 x 50 mm contact length; max. 2 x 16 A
- Brush material: Pure carbon



Type	Order No.	For pole spacing [mm]	Weight [kg]
2 x 16 A, PH	081006-114	14	0.02
2 x 16 A, PE	081006-214	14	0.02
2 x 16 A, PE _{plus}	081006-414	14	0.02

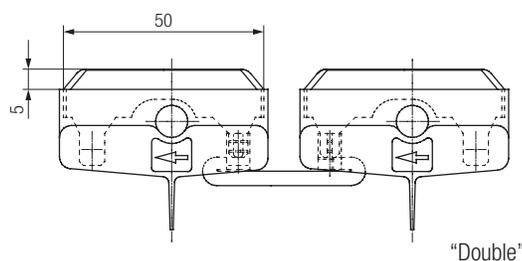
Contact Brushes (Copper–Graphite)

- 63 mm contact length; max. 35 A
- Brush material: Copper–graphite



Type	Order No.	For pole spacing [mm]	Weight [kg]
35 A, PH	081006-144	14	0.02
35 A, PE	081006-244	14	0.02
35 A, PE _{plus}	081006-444	14	0.02

- 2 x 50 mm contact length; max. 2 x 25 A
- Brush material: Copper–graphite



Type	Order No.	For pole spacing [mm]	Weight [kg]
2 x 25 A, PH	081006-134	14	0.03
2 x 25 A, PE	081006-234	14	0.03
2 x 25 A, PE _{plus}	081006-434	14	0.04

Replacement and Spare Parts / Accessories

RZ-... / Z-... Stabilizing springs for current collector heads

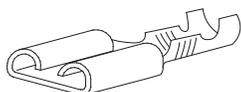


Type	For current collector	Contact length [mm]	Mode	Order No.
Stabilizing spring	081506-...	63	Towing mode / reverse mode	RZ-0371
	081507-...			
	081508-...	50	Towing mode	Z-066RI
	081509-...		Reverse mode	Z-073I

Accessories: Installation Materials

Push-in connector for 1.5 mm² to 4 mm²

– for plug connection on the current collector head

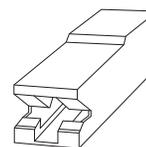


Type	Order No.
Push-in connector 1.5–2.5 mm ²	08-160304-2
Push-in connector 4–6 mm ²	08-160314-2

Minimum order quantity: 100 units

Insulating sleeve for max. ø 6 mm

– for use with push-in connector

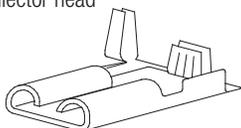


Type	Order No.
Insulating sleeve for max. ø 6 mm	08-925068-0

Minimum order quantity: 100 units

Push-in connector for 1 mm² to 2.5 mm²

– for plug connection on the current collector head

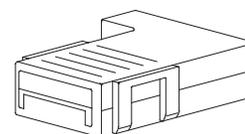


Type	Order No.
Push-in connector, 90° 1–2.5 mm ²	08-180429-2

Minimum order quantity: 100 units

Insulating sleeve for max. ø 3.5 mm

– for use with push-in connector

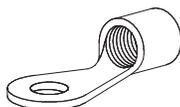


Type	Order No.
Insulating sleeve, 90° for max. ø 3.5 mm	08-180984-0

Minimum order quantity: 100 units

Crimping cable lug for 1.5 mm² to 2.5 mm²

– for infeed and transition cap

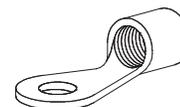


Type	Order No.
Crimping cable lug 1.5–2.5 mm ²	08-1630/4

Minimum order quantity: 100 units

Crimping cable lug for 4 mm² to 6 mm²

– for infeed and transition cap



Type	Order No.
Crimping cable lug 4–6 mm ²	08-1650/4

Minimum order quantity: 100 units

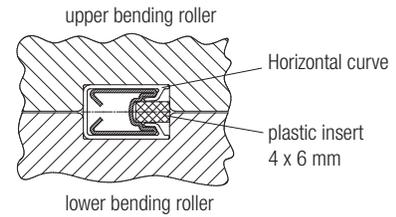
Tools

Bending Device 081091

The conductor rails can be bent with the insulation cover fitted using the three-roller bending device 081091. Any vertical curve can be produced with a bending radius of 450 mm to ∞ and any horizontal curve of 1200 mm to ∞ on site using the adjusting spindle.

In order to avoid undesirable deformation of the conductor rail, the plastic insert provided must be introduced beforehand into the contact surface slot for producing horizontal curves and removed again after the bending process. It is possible to produce curves with straight sections from one piece without additional connectors.

Electrically operated bending machines are available on request for extensive installation work.



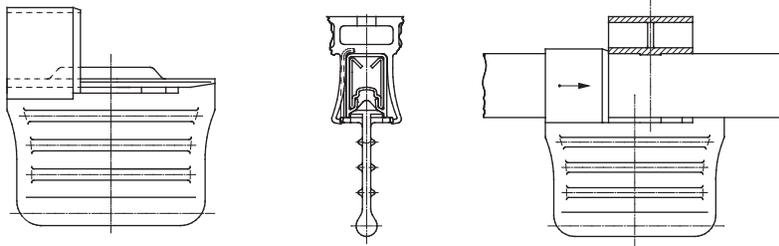
Type	Part No.	Weight [kg]
Bending Device	081091*	17.5

See also Installation instruction MV0815-0001-E

* Standard range

Disassembly Tool 081092

The disassembly tool is required to dismantle the conductor rails secured in hanger clamps and end cap sets.



Type	Part No.	Weight [kg]
Disassembly Tool	081092*	0.006

See also Installation instruction MV0815-0001-E

* Standard range

Other Products from Conductix-Wampfler

The products described in this catalog represent a few of the products from the broad spectrum of Conductix-Wampfler components and systems for the transfer of energy, data, gases, and fluids. The solutions we deliver for your applications are based on your specific requirements. In many cases, a combination of several different Conductix-Wampfler products are needed to fill the application. You can count on all of Conductix-Wampfler's business units for hands-on engineering support - coupled with the perfect solution to meet your energy management and control needs.



Motor driven cable reels

Motor driven reels by Conductix-Wampfler are the perfect solution for managing long lengths of heavy cable and hoses in very demanding industrial applications. Monospiral, level wind, and random wind spools.



Slip ring assemblies

Whenever powered machinery needs to rotate 360°, field proven slip ring assemblies by Conductix-Wampfler can flawlessly transfer energy and data. Here, everything revolves around flexibility and reliability.



Conductor bar

Whether they are enclosed conductor rails, expandable single-pole bar systems, or high amperage bar for demanding steel mill use up to 6000 amps. Conductix-Wampfler's conductor bar is the proven solution to reliably move people and material.



Spring driven cable reels

We have 60 years experience and trusted brands such as Insul-8, Wampfler, and IER. We offer small cord reels all the way to large multi-motor units, a wide range of accessories, and hazardous location reels.



Cable Festoon systems

It's hard to imagine Conductix-Wampfler cable trolleys not being used in virtually every industrial application. They are reliable and robust and available in an enormous variety of sizes and models.



Push Button Pendants

Our ergonomic pendants are ideally suited for industrial control applications. They are available in a wide range of configurations for overhead cranes and other machinery.



Radio remote controls

Safe, secure, and reliable radios use the latest in microprocessor technology. Available in several models for overhead crane control and other types of machinery.



Inductive Power Transfer IPT®

The contact-less system for transferring energy and data. For all tasks that depend on high speeds and absolute resistance to wear.



Data Transfer: ProfidAT® | Nexus

Safe & reliable wireless communication using slotted waveguide technology that's PROFSafe compatible.

Nexus NB for narrow band signal transfer over power conductors



LJU Automation EMS Controller

Specialized controllers Programmable by parameters, Ideal for Electrified Monorails at automotive plants, with over 1500 in service worldwide. Adaptable for other applications



BridgeGuard™

Prevents crane to crane and crane to end collisions. IP69K rated for indoor and outdoor use, with a 3 ft to 150 ft range. Compliant with IEC 60068-2-6:2007



Air & Spring balancers | Air hoists

Conductix-Wampfler offers the full line of ENDO positioning devices. Rugged, reliable steel construction increasing safety and decreasing fatigue and body stress.

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