Installation Instructions

Single-pole conductor-rail system
Program 0815

Order-Number
0815xx-…

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1 Brief description of the system

Fig. 1: System layout

*The installation spacing depends on the current-collector type (65 mm, 80 mm, 92 mm)

<table>
<thead>
<tr>
<th>Item</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>End cap</td>
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<td>2</td>
<td>Connectors</td>
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<tr>
<td>3</td>
<td>Hanger clamp</td>
</tr>
<tr>
<td>4</td>
<td>Power feed</td>
</tr>
<tr>
<td>5</td>
<td>Air gap insulation section with expansion travel</td>
</tr>
<tr>
<td>6</td>
<td>Transition caps/&quot;long&quot; end caps</td>
</tr>
<tr>
<td>7</td>
<td>Current collector</td>
</tr>
<tr>
<td>8</td>
<td>Hanger clamp with anchor point caps</td>
</tr>
<tr>
<td>9</td>
<td>Air gap insulation section without expansion travel</td>
</tr>
</tbody>
</table>

A detailed product description can be found in chapter 4 of the BAL0815-0002.
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2 Assembly

2.1 Safety

- Installation and initial commissioning may only be carried out by specially trained technicians.

Required protective equipment:

![Protective Equipment Icons]

**Risk of death due to suspended loads!**
Falling loads can lead to severe injuries or even death.

- Never walk under suspended loads.
- Only move loads under supervision.
- Set down the load when leaving the workplace.
- Use personal protective equipment!

**Injury due to improper installation and initial commissioning!**
Improper installation and initial commissioning can result in serious injury to persons and/or material damage.

- Before starting work, make sure there is sufficient space for assembly.
- Handle open, sharp-edged components carefully.
- Make sure the installation area is tidy and clean! Loosely stacked or scattered components and tools are a source of hazards.
- Install components properly. Comply with the specified screw tightening torques.
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Poisonous gases in case of fire!
In case of fire in the facility, the plastic parts (PVC) of the conductor-rail system emit poisonous gases (HCL).
→ The system operator must take this into account accordingly when planning and take the appropriate protective measures.
→ The building must be evacuated immediately.
→ The fire brigade must be informed.

Risk of injury by crushing skin and limbs!
There is a danger of crushing of skin and limbs due to:
- Spring force/gravity (stored energy).
- Current collector (spring force) during installation, dismantling and maintenance.
- Falling conductor-rail system components if they have not been properly installed or if operated in inappropriate operating conditions (e.g. environment that contains solvents).
→ Have installation done only by trained technicians.
→ When working on the conductor-rail system, wear safety boots, safety gloves, and a safety helmet.
→ When changing the collector brush, follow the separate instructions for this task. See chapter 12.1 in BAL0815-0002-EN
→ Only install the conductor-rail system where suitable operating conditions prevail. See chapter 3.3 in BAL0815-0002-EN

Risk of injury due to grasping or impact!
Grasping and/or impact with moving conductor-rails (slip ring) or current collectors connected to the machine and other components must be prevented.
→ Cordon off the work area.
→ Caution when working in the vicinity of the danger zone, in particular if protective devices (covers, enclosures, control devices) have been removed or disabled.
→ Caution when working in the vicinity of the danger zone, in particular below the conductor-rail.
→ Falling conductor-rail system components if they have not been properly installed or if operated in inappropriate operating conditions (e.g. environment that contains solvents).
→ Use personal protective equipment!
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**DANGER!**
Risk of injury from cuts and cutting!
Cuts and amputations can occur:
- on sharp edges of the general components.
- on sharp edges of the conductor-rails.
- on cut edges when trimming the conductor-rails.
- on packaging materials (cartons, tapes, etc.)

→ Use personal protective equipment!

**CAUTION!**
Risk of puncture wounds and cuts!
The packaging material can contain sharp objects such as nails and wood splinters that can cause injury to limbs.

→ Use personal protective equipment!
→ Cordon off the work area!
→ Caution when working in the vicinity, in particular below the conductor-rail.

**DANGER!**
Risk of injury due to conductor-rails sliding out!
Risk of injury due to conductor-rails sliding out when the packaging units are held at an angle or carelessness with long loads.

→ Use personal protective equipment!
→ Cordon off the work area!

**DANGER!**
Risk of death by electrocution!
Contact with components carrying electrical power can lead to death by electrocution or severe injury. Danger of injury due to shock reactions, falling, or being thrown across the room due to electrical shock.

→ The main power supply (from the building) must be disconnected in the installation area and secured against switching on again.
→ Disconnect all electricity-supply power feeds.
→ Check whether a voltage is still present in the components and take measures where necessary.
→ Install the conductor-rail out of manual reach.
→ Attach a sign saying "Risk of death by electrocution" with the relevant hazard symbol in all areas with live components.
→ The customer must ground metallic components.
→ The customer must provide protective devices.
→ Make sure there is sufficient stability in the area.
WARNING!

The system must be designed and operated in accordance with the prevailing ambient conditions!

Secure conductor-rails against falling

→ In application areas with personnel traffic and at an installation height of 3 m or more, conductor-rails must be secured against falling!

ATTENTION!

To the side of the conductor-rail there must, a clearance of at least 4 mm from metal components must be maintained (see Fig. 2) to prevent mechanical collisions and guarantee sufficient electrical insulation distances!

Fig. 2: Side clearance of at least 4 mm

2.2 Providing additional protection against accidental contact at the conductor-rail end

An end cap is attached to the conductor-rail end as protection against accidental contact. When using dual current collectors, one of the collector brushes, which will be live, might protrude from the end of the conductor-rail. Touching this collector brush might cause injury from an electric shock, as a result of falling or being thrown across the room. The system operator must ensure that the current collector does not project, instead remaining within the conductor-rails, or must make the danger area inaccessible (e.g. by providing protection against accidental contact).

CAUTION!

→ Use control technology to ensure that the current collector never travels beyond the end of the conductor-rail.

→ Also fit a contact guard that will safely cover the collector brush if it leaves the conductor-rail!
2.3 Procedure

2.3.1 Required tools

- Standard tool:
  - Measuring tape
  - Calipers
  - Scribe
  - Allen key (3 mm)
  - Cutting tool (e.g. cordless angle grinder). For producing short lengths.
  - File for deburring cut edges after trimming
  - Cordless drill and countersink bit
  - Screwdriver set

- Special tool:
  - Bending device (081091)
  - Rail-dismantling tool
  - Drilling jig for transition units
  - Torque wrench (2 Nm) with 3 mm Allen key for rail connector

Personnel:

- Installation by technical personnel only
- At least two people

2.3.2 Customizing components

The customization of components is limited to the bending and trimming of the conductor-rail.

**ATTENTION!**

The trimming of the conductor-rail must be done away from the installation area!

2.3.2.1 Trimming conductor-rail

The conductor-rails have a standard length of 4000 mm. Shorter lengths can be supplied but are generally produced at the building site.

**Required tools:**

- Cutting tool, preferably a battery angle grinder with 1 mm cutting disc
- Print cutter
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Work steps:

→ Cut the conductor material and insulation to the same length.

→ Saw off the metal rail and PVC insulation away from the contact area using a cutting tool.

→ Deburr the sawed end with a smooth file. Chamfer the contact surface in the whole rail base by 0.3–0.4 mm by 15° to guarantee a problem-free passage of the collector brushes over the rail joint.

**CAUTION!**

Sharp edges and burrs result in increased wear of the collector brushes!

A sharp edge and/or burr can rapidly wear away the carbon of the collector brushes.

→ Deburr the sawed end with a smooth file

→ Clean the profile well and remove sawing debris

![Fig. 3: Deburr the conductor-rail with a smooth file](image1)

![Fig. 4: PE plus rail without end machining](image2)
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Fig. 5: PE\textsubscript{plus} rail with end machining (plastic bar removed)

Fig. 6: Rear side of the rail

\textbf{ATTENTION!}

The PE\textsubscript{plus} rail has a plastic bar in the insulating profile!

\begin{itemize}
  \item Remove the plastic bar at each end using a print cutter or other suitable tool so that the connector or the end cap can be fitted
  \item The cutting tool 08-W100-0603 can be used for producing the end machining
\end{itemize}

Use the QR code ("click" or "scan"), to watch our animation

Cutting Phased Rail and PE\textsubscript{plus} Rail, Notching for PE\textsubscript{plus} Rail.
2.3.2.2 Making a bend in the conductor-rail

Read and respect the additional operating instructions!
You can find additional information on the making a bend in a conductor-rail in BAL0800-0004.

Conductor-rail bends can be fabricated in the factory or on site. They are prepared using the bending device 081091. For large installations, electrically driven bending devices available upon request.

![Image of conductor-rail bends and horizontal bend]

Fig. 7: Outside/inside bends and horizontal bend

<table>
<thead>
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<tbody>
<tr>
<td>1</td>
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<tr>
<td>2</td>
<td>Outside bend</td>
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<td>3</td>
<td>Horizontal bend</td>
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</table>

Use of bends in horizontal and vertical curves

<table>
<thead>
<tr>
<th></th>
<th>Engagement direction of the current collector</th>
<th>Horizontal (from the side)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Horizontal curve</strong></td>
<td>Vertical (from below)</td>
<td>Horizontal (from the side)</td>
</tr>
<tr>
<td></td>
<td>Horizontal curve</td>
<td>Internal/external bend</td>
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<tr>
<td></td>
<td>suspension interval: 400 mm</td>
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<td>bend radius: 1000 mm to $\infty$</td>
<td>bend radius: 450 mm to $\infty$</td>
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<td><strong>Vertical curve</strong></td>
<td>Internal/external bend</td>
<td>Horizontal curve</td>
</tr>
<tr>
<td></td>
<td>suspension interval: 250 mm</td>
<td>suspension interval: 400 mm</td>
</tr>
<tr>
<td></td>
<td>Bend radius: 450 mm to $\infty$</td>
<td>bend radius: 1000 mm to $\infty$</td>
</tr>
</tbody>
</table>

To avoid undesired deformations of the conductor-rail, the plastic insert supplied must be inserted in the slit in the contact surface before forming the bend and the removed once the bending process is complete.
Fig. 8: Producing a horizontal bend with a plastic insert

ATTENTION!

Ensure that the insert PE\textsubscript{plus} is installed in the correct position!

→ When bending the PE\textsubscript{plus} rail, make sure that the installation position is correct.
→ If necessary, re-measure (cut surfaces 5.3 mm or see surface A in Fig. 9)

Fig. 9: Insert PE\textsubscript{plus}

Required tools:

- Bending device 081091
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Work steps:

→ Scribe the required bend on a flat surface (e.g., the floor).
→ When making horizontal bends: Insert the plastic insert in the slot on the conductor-rail contact surface with the insulating profile slid open.
→ Using the setting spindle, move the upper bending roller upwards until the rail section can be inserted into the cutout provided in the bending device.
→ Adjust the position of the bending roller downwards and move the rail section back and forth.
→ Bend the rail section by progressively advancing the central pressure roller.
→ Repeat this process until the required radius is achieved.
→ All subsequent rail sections that are to be formed to the same radius can now be bent using the existing setting.
→ The rollers are designed for the various bends (horizontal/vertical, see BAL0800-0004 for the bending device for product ranges 0811 and 0815).

ATTENTION!

Use modified PEplus rails for conductor-rail bends with radii < 1500 mm!

→ Use modified PEplus rails (order no.: 081516-4x15) for preparing conductor-rail bends with radii < 1500 mm.

These rails are slotted on the rear side and can be bent without deformation of the insulation.

Use the QR code ("click" or "scan"), to watch our animation Bending Rail.
2.3.3 Assembling the conductor-rail system

ATTENTION!

To the side of the conductor-rail there must, a clearance of at least 4 mm from metal components must be maintained (see Fig. 12) to prevent mechanical collisions and guarantee sufficient electrical insulation distances!

ATTENTION!

Fig. 12: Side clearance of at least 4 mm

Procedure during installation:

It makes sense to start the assembly at one end cap and to assemble the conductor-rail along the route.

Work steps:

→ Indicate the positions/installation locations for power feed, customer’s fixed points, junction boxes, expansion elements, isolating gaps and the guideway profile on the installation structure in accordance with the layout and allocation plan.

→ Prepare the power feed and section transitions.

→ Assembling the conductor-rail (see chapter 2.3.3.1).

→ Install conductor-rail sections including cut sections, lifters, conductor-rail bends and fixed points.

→ Prepare the cut sections and conductor-rail bends in the switches.

→ Check the mechanical installation.

Test steps to be performed during installation:

→ Check the design against the layout and allocation plan.

→ Maintain the hanger-clamp intervals; the rails must be properly engaged in the hanger clamp.

→ All screw connections for the power feeds, connectors and end caps must be tightened to 2 Nm.

→ All transitions and bends must be tested for functionality. Current collectors must not jam when passing through. Check for free passage with a single current collector.

→ The cabling must be checked (routing, labeling, etc.).

→ Conduct a continuity and insulation check.

→ Check the set dimension of the expansion element.
2.3.3.1 Setting the hanger clamps

The following must be observed when setting the hanger clamps:

→ Set the hanger clamps at intervals of approx. 500 mm and at intervals of 400 mm and 250 mm respectively for internal and external horizontal bends. Mount the hanger clamps at a distance of 100 mm – 150 mm from the end cap (see Fig. 14).

→ At transitions and connection points, a minimum distance to end caps, connectors and expansion elements of at least 200 mm must be maintained. Here, the hanger clamps must be set such that collisions of hanger clamps with other components of the system are avoided on expansion of the system.

Hanger clamps are screwed or snapped into customer-specific guideway profiles. When installing, ensure that the pretensioning is not too great. Excessive pretensioning will distort the hanger clamp. There is a risk that the hanger clamp will no longer rest flat on the central bar of the EMS rails.

Nevertheless, the hanger clamp must be so firmly seated in its position that it cannot dislocate freely in the guideway profile.

Frequently, the hanger clamps only become firmly seated in the EMS rail when the conductor-rails have been installed.

→ Provide additional fixing for clip-in hanger clamps that do not remain in their positions.

Fig. 13: Hanger clamp in EMS rail

Fig. 14: Distance of the hanger clamp to the end cap
Fig. 15: Comparison of correctly and incorrectly engaged rail

Fig. 16: Clip the hanger clamp into the conductor-rail

### Standard hanger clamp for screwing on:

To fasten the standard hanger clamps, drill holes must be made in the EMS rail. The drilling jig for support profile height 180 mm (Material-Nr. 2: 08-V015-0474-001) and the drilling jig for support profile 240 mm (Material-Nr. 2: 08-V015-0474-002) are available to set the drill holes quickly and easily.

The holes for the hanger clamps are placed via the row of the female connector (1). The row of the female connector has markings (2 and 3 see Fig. 18 and Fig. 19) indicating the distance between the drill holes of the hanger clamps (detail C). The drill hole distance depends on the number of poles. The position of the holes can be adjusted in y-direction via the slotted holes (4).
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Fig. 17: Drilling jig for hanger clamp

Fig. 18: Drill hole distance of the female connectors

Fig. 19: Drill hole distance of the female connectors (detail C)

Use the QR code ("click" or "scan"), to watch our animation

Mounting Hanger Clamps (clip-in, screwable and turnable).
2.3.3.2 Installing conductor-rail and connectors

→ After installation of the hanger clamps and preparations of the transitions and power feed points, push the conductor-rails into the hanger clamps. Make sure that the conductor-rails engage correctly and the hanger clamp covers the insulation above and below (see Fig. 15).

→ To simplify the installation of the subsequent conductor-rail, it makes sense not to engage the final meter of the current conductor-rail. This provides better accessibility of the conductor-rail joint (EMS).

According to the guidelines of the automotive industry, the protective conductor (PE) is provided as the 4th pole counted from above. This also corresponds to the standards of conductor-rail manufacturers.

Fig. 20: Connector and 2 conductor-rails

Screw connections are used to connect 2 conductor-rails. The connectors have a contact part and a rear clamping part.

→ Push the connector into the conductor-rail such that the contact part sits in the interior of the conductor-rail and the clamping part engages between the conductor-rail and the rear insulation (see Fig. 22 and Fig. 23).

A light pressure on both sides of the side surface of the conductor-rail may make it easier to push the connector in.

→ Push the connector into the two conductor-rails as far as the stops and then lightly tighten the connector from the front. Then tighten the connector to 2 Nm with a torque wrench (see Fig. 24).

→ Put the insulating cap on from the back, engage it and check for secure hold.

→ Push the conductor-rail into the hanger clamp next to the connection point until it engages.

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<th>Item</th>
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<tr>
<td>1</td>
<td>Connector cap</td>
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<tr>
<td>2</td>
<td>Connectors</td>
</tr>
<tr>
<td>3</td>
<td>Conductor-rail</td>
</tr>
</tbody>
</table>
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Fig. 21: Push the rails onto the connector

Fig. 22: Correct position of the clamp

Fig. 23: Incorrect position of the clamp

Fig. 24: Tighten the connector

ATTENTION!

Make sure that the connector cap is completely engaged on both sides of the insulating profile!

→ Attach the connector cap centrally from behind clip it into the insulating profile.

→ Engage the conductor-rails in the hanger clamps (see Fig. 26).
**Conductor rails can become deformed when bent!**

→ Check conductor-rail bends for the correct profile, because conductor-rails can deform when bent in the area of the insulation.

→ Push a current collector through the conductor-rail by hand. The current collector must slide through the conductor-rail bend without jamming.

→ For a PEplus rail use a PEplus current collector with a broader brush.

→ If the connector cap cannot rest on the guideway profile, hanger clamps must be placed at maximum distances of 200 mm on both sides of the connector position (see Fig. 27).

![Fig. 26: Support profile with a conductor-rail installed](image)

**Use the QR code (“click” or “scan”), to watch our animation Connecting Rails.**
During installation, it can happen that a conductor-rail has to be taken out of a hanger clamp again. There is a dismantling tool for this (order no.: 081092). This is used to dismantle the conductor-rail fixed in the hanger clamp and end caps bars (see Fig. 28–Fig. 30; see chapter 11.2 in BAL0815-0002-EN).

Fig. 28: Dismantling tool

Fig. 29: Dismantling tool (side view)

Fig. 30: Dismantling tool in use (side view)

Fig. 31: Dismantling tool in use (front view)

Use the QR code ("click" or "scan"), to watch our animation Using Dismantling Tool.

2.3.3.3 Installing a section power feed

→ The section power feed is installed instead of a connector. Here, a different clamping part and a power feed cap with room for a connecting cable to run out of it are used.
Fig. 32: Correct position of the clamping unit

Fig. 33: Incorrect position of the clamping unit

Fig. 34: Slightly loosen the screw connection with a screwdriver (½ turn), locking the square nut to facilitate loosening if necessary

Fig. 35: Push the rail section into the free end of the section power feed as far as the stop

Fig. 36: Slide the power feed cover over the preassembled rail connector.

Fig. 37: Tighten the hexagonal screw to 2 Nm

By using a section power feed, power can be supplied at any connection point in the route. The connection is made using a crimping cable lug of 1.5 mm² to 10 mm² max. For phases, doubly insulated connecting cables must be provided for voltages > 48 V (max conductor diameter 7 mm, see Fig. 38).
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→ Trim the feed cable and strip the insulation to the desired length.

→ Crimp the crimping cable lug of the section power feed onto the end of the cable. Do not remove the crimping cable lug from the connector for this. Use a suitable crimping tool to connect the cable and cable lug.

→ Loosen the screw with a SW-3 hexagonal screwdriver and insert the connector parts into the installed rail with insulation profile (see Fig. 34).

→ Push the next rail section into the free end of the section power feed as far as the stop (see Fig. 35).

→ Tighten the hexagonal-socket-headed screw to 2 Nm (see Fig. 36).

→ Slide the contact-preventing power feed cap over the preassembled rail connector. Make sure that the square nut is aligned in the recess of the connector cap. Engage the power feed cap on both sides of the insulating profile (see Fig. 37).

ATTENTION!

Make sure that the connector cap is completely engaged on both sides of the insulating profile!

→ Provide a constructional strain relief for the feed cable.

If needed, any connector can be replaced by a power feed. If a power feed has to be introduced into the route after completion of the installation, a 10-mm gap is cut into the rail. Then proceed as described above.

Fig. 38: Power feed cover

If the power feed cover cannot rest on the guideway profile, hanger clamps must be placed at maximum distances of 200 mm on both sides of the power feed position.

Preassembled power feed cables with clamping units installed can be ordered as a unit!
2.3.3.4 Installing end caps and end power feeds

 Drill the guideway profile in accordance with the layout and allocation plan. The use of a drilling jig is recommended in order to ensure the exact position of the end caps. The drilling jig can be used both for straight transitions (e.g., entry into a lifter) and for angled cuts (e.g., switches). For further information see MV0815-0006. Mount the hanger clamps at a distance of 100 mm – 150 mm from the end cap (see Fig. 14).

 Tools:

- Self-tapping screws DIN 7500-1 M4, length \( \leq \) profile bar width
- Drill diam. 3.6 mm

After installation of the end-cap bar (existing systems) or the retaining plate (new systems) for the transition caps, the end caps (with or without power feed) are installed.

**CAUTION!**

Ensure the correct positioning of the clamping unit!

Push the clamping unit of the end cap into the conductor-rail such the contact part sits in the interior of the conductor-rail and the clamping part engages between the conductor-rail and the rear insulation (see Fig. 41 and Fig. 42).
For end power feeds, the power can be supplied at the end of the route. An end power feed consists of an end cap with a power feed clamping unit. The connection is made using a crimping cable lug with a conductor cross section of 1.5 mm² to 6 mm². For phases, doubly insulated connecting cables must be provided for voltages > 48 V.

→ Only for end power feeds:
   Trim the feed cable and strip the insulation to the desired length.
   Crimp the crimping cable lug of the end power feed onto the end of the cable. Do not remove the crimping cable lug from the connector for this.

→ Tighten the hexagonal-socket-headed screw to 2 Nm (see Fig. 43).
→ Provide a constructional strain relief for the end power feed cable.
→ For power feed with preassembled cable part, push the clamping unit onto the end of the rail. Possibly loosen the clamping screw somewhat and push the end cap onto the clamping part and the conductor-rail.

ATTENTION!

It is recommended that the conductor-rail is not yet engaged in the adjacent hanger clamp!
Fig. 44: Snap the conductor-rail into place

→ Engage the end cap/end power feed into the retaining plate (see Fig. 44).

Use the QR code ("click" or "scan"), to watch our animation
Mounting End Cap for End Cap Base and Clipping Rail.

2.3.3.5 Mounting the fixed point

A fixed point consists of a hanger clamp and 2 fixed point clamps per pole. The positions of the fixed points are determined when planning the system. The correct positioning of the fixed points is crucial for the thermal expansion behavior of the conductor-rail system.

Establishing a fixed point:

→ Install a fixed point left and right of a hanger clamp per conductor-rail pole. The fixed-point cap is secured by an engagement cam in a hole in the side wall of the conductor-rail.

→ Scribe the position on the conductor-rail before installation.

→ Put the fixed-point cap on the conductor-rail as a drilling jig and drill a 3-mm hole through the insulation and copper profile on one side.

→ Remove the fixed-point cap and replace it after rotating through 180° and insert an engagement cam into the hole.
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Fig. 45: Drill the hole for the engagement cam, insulating profile and copper element

Fig. 46: Rotate the fixed-point cap through 180°

Fig. 47: Insert the engagement cam into the hole

Fig. 48: Fully assembled fixed point

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<td>Hanger clamp</td>
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<td>4</td>
<td>Track profile</td>
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<tr>
<td>5</td>
<td>Screw</td>
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CAUTION!
Additional fixing of the hanger clamp is required for clip-in hanger clamps!
For clip-in hanger clamps, the hanger clamp that is to be used as the fixed point must be additionally secured to the support profile/building structure with a screw.
2.3.4 Installing the current collector

Different current collectors are used for existing and new systems:

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<td>10</td>
<td>70</td>
<td>120</td>
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Fig. 49: Single current collector (081506…, 081507…)

Tolerances in the X-axis and Y-axis: ± 10 mm
1 = strain relief (optional)

<table>
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<th>Number of Poles</th>
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<th>B</th>
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<td>110</td>
</tr>
<tr>
<td>10</td>
<td>70</td>
<td>120</td>
</tr>
</tbody>
</table>

Fig. 50: Dual current collectors (081508…, 081509…)

Tolerances in the X-axis and Y-axis: ± 10 mm
1 = strain relief (optional)
New systems

Fig. 51: EMS current collector (08150A / B…)

*The screw is not part of the scope of supply. It must be ordered separately.

Tolerances in the X-axis and Y-axis: ± 15 mm

1 = Hexagon screw M5 DIN EN 4017 (DIN 933)*

2 = integrated cable

<table>
<thead>
<tr>
<th>Number of Poles</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>4</td>
<td>56</td>
</tr>
<tr>
<td>6</td>
<td>84</td>
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<tr>
<td>8</td>
<td>112</td>
</tr>
<tr>
<td>10</td>
<td>140</td>
</tr>
</tbody>
</table>

Use the QR code (“click” or “scan”), to watch our animation EMS Current Collector Tolerances.

The single current collectors are mounted on base plates:

Fig. 52: Mount the single current collector (081506…, 081507…, 081508…, 081509…) on base plate
One screw can be put on each pole at the EMS current collector! The screw heads are be covered by the current collectors!

When installing current collectors, make sure the installation position is correct.

For types without an integrated cable guide, take care with the selection of the connecting cable and ensure the connecting cables are installed without tensile or directional forces:

- Only use highly flexible Conductix-Wampfler cables!
- For phases, doubly insulated connecting cables must be provided for voltages > 48 V.
- Do not bundle, fix or attach identification signs to the current-collector-connecting cable!
- Do not allow foreign objects to protrude into the moving range of the current collector and connecting cables!

For systems with curves/bends, make sure that the current collector is installed in the pivot or steering axis—only by doing this can it be ensured that the correct contact pressure is maintained when passing through (inside/outside) curves.

Danger of electric shock!
Always protect unoccupied sockets on the current-collecting heads with protective caps!
The open connection must always be protected with a protective cap. This must also be observed when changing current-collecting heads (see Fig. 54).
**WARNING!**

Risk of wear and damage!

The distance from the securing base surface of the current collector to the running surface of the conductor-rail is an important functional dimension. This dimension changes in curves if the current collector is not installed directly under the wheel contact point of the EMS hanger. If the distance from the wheel contact point is too great, the permissible tolerances may be exceeded in tighter curves. Result: Damage, high wear

→ Compliance with the installation tolerances must therefore be checked in the tightest curved section!

---

**ATTENTION!**

The protective cap is supplied pre-installed on the current collector. A replacement protective cap can be ordered as a packing unit with material number 08-A025-0080!

Install all current-collector cables highly flexibly and without tensile or directional forces!

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Fig. 54: Protect unoccupied current-collector-connecting cable with the protective cap provided (08150A / B…; 08150x…)

Fig. 55: Comparison of the correct and incorrect position of the socket sleeve
Bending up of the socket sleeve!
If the socket sleeve is placed incorrectly on the collector brush, the socket sleeve bends up, the socket sleeve is damaged and the contact with the brush is minimized.
→ Ensure the socket is correctly positioned to prevent the socket sleeve from bending up!

Contact problems or increased heating!
→ Clean the collector brush before commissioning and remove dirt, oxidation, pitting corrosion and other impurities by means of a brass brush or abrasive paper (320 grit).

Risk of damage when cleaning the conductor-rail!
When cleaning, only loose or lightly adhering dust or foreign substances may be removed.
→ Do not use contact spray (formation of silicon carbide/abrasive and/or damage of plastic parts)
→ Only use abrasives or brushes as tools for removing heavy build-ups at minor burns under supervision.
→ Persistent use with removal of the lubricant layer or running surface damages the rail (see also WV0800-0001 and WV0800-0004)

Typical installation errors that have a negative affect on the running behavior of the current collectors:
- Conductor-rails are not correctly engaged in the hanger clamp
- Rail bends are tapered due to progressive bending
- Switches and lifters are incorrectly set (end positions, dimensional tolerances) or yielding
- Incorrect current-collector-connecting cable
- Current-collector-connecting cable not used as (not free of directional and tensile forces)
- Installation positions are not within specification Permissible tolerances exceeded in bends and curves
- Rail joints and transitions have not been deburred

Use the QR code ("click" or "scan"), to watch our animation
Mounting EMS Current Collector on Base Plate.
2.4 Additional documents

Read and respect the additional operating instructions!
You can find further information on the installation of conductor-rail systems in the following instructions:
- MV0815-0005 Expansion module and expansion element
- MV0815-0006 Transitions
- MV0815-0007 Installation instructions for conductor-rail system 0815
- BAL0815-0001 Carbon-brush sensor unit
- BAL0800-0004 Bending device for product ranges 0811 and 0815