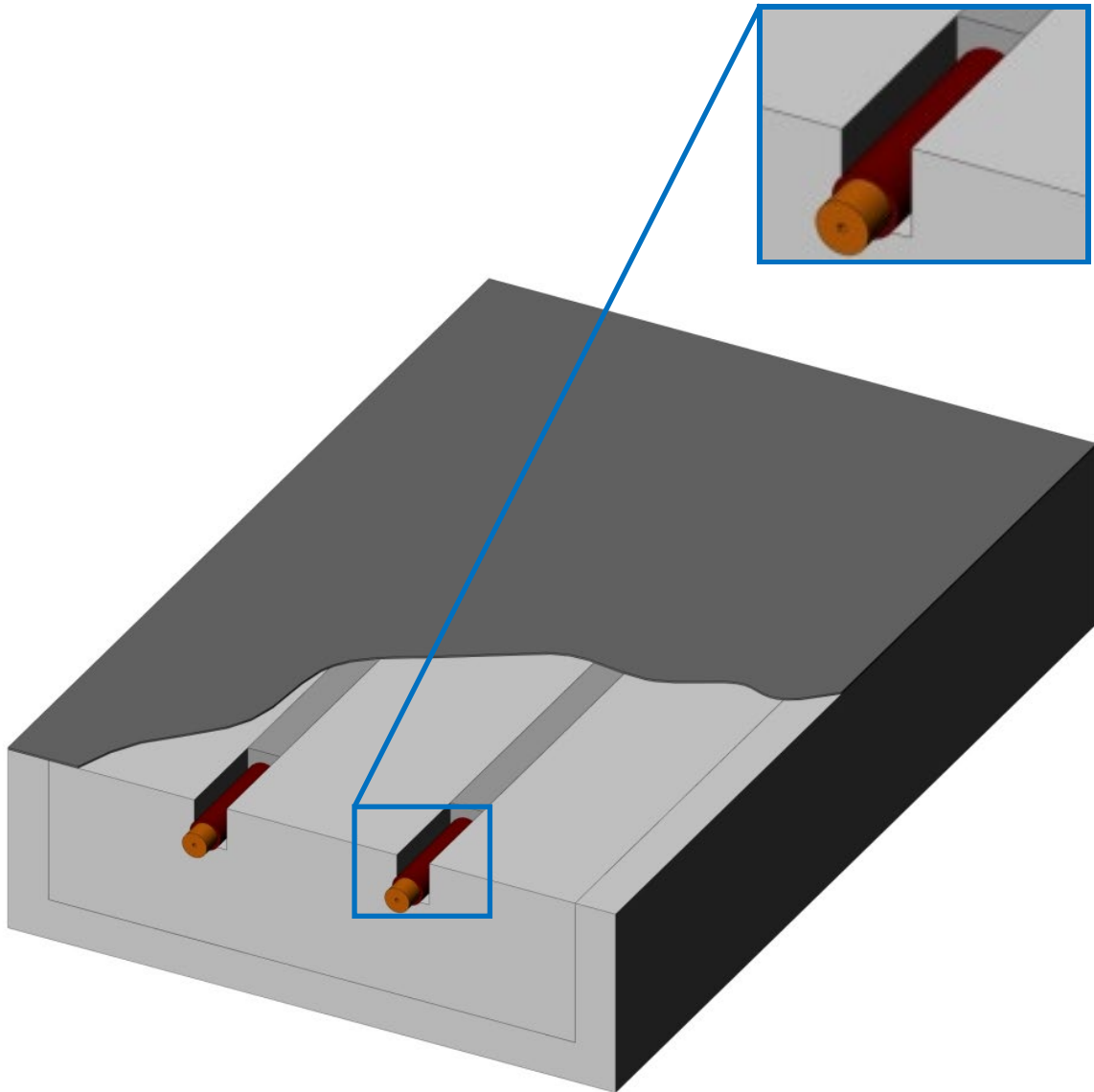


Floor installation
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Note:

We reserve the right to make technical changes to the illustrations and specifications in this installation manual for the purpose of improvement of the power supply system and its functions. System details can be found in the documentation. Please note the system documentation during any work on the system or when operating the system. Reprinting and copies, even in excerpt, only with our approval.

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Floor installation without floor clips

1 Basic information

The following illustration shows a simple basic structure for the floor installation of inductive power transfer to mobile consumers.

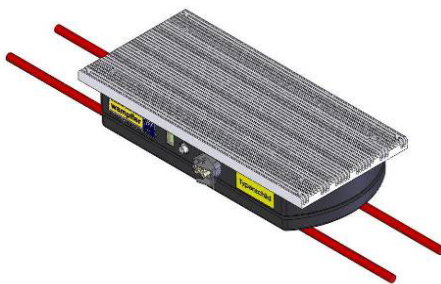


Figure 1.1: Basic structure

Litz cables are generally laid in ground slots in the floor provided for them. Depending on the installation method, the cables may be fastened with plastic cable carriers that are clipped into the slots, or simply by laying them into the slot. It is important to take care with the slot depth and width. After laying the cables, concrete is poured into the slots. Then the floor is entirely coated with a floor surface according to the instructions of the floor coating manufacturer.

The laying of Litz cable for a Conductix-Wampfler floor system in the floor looks like the following:

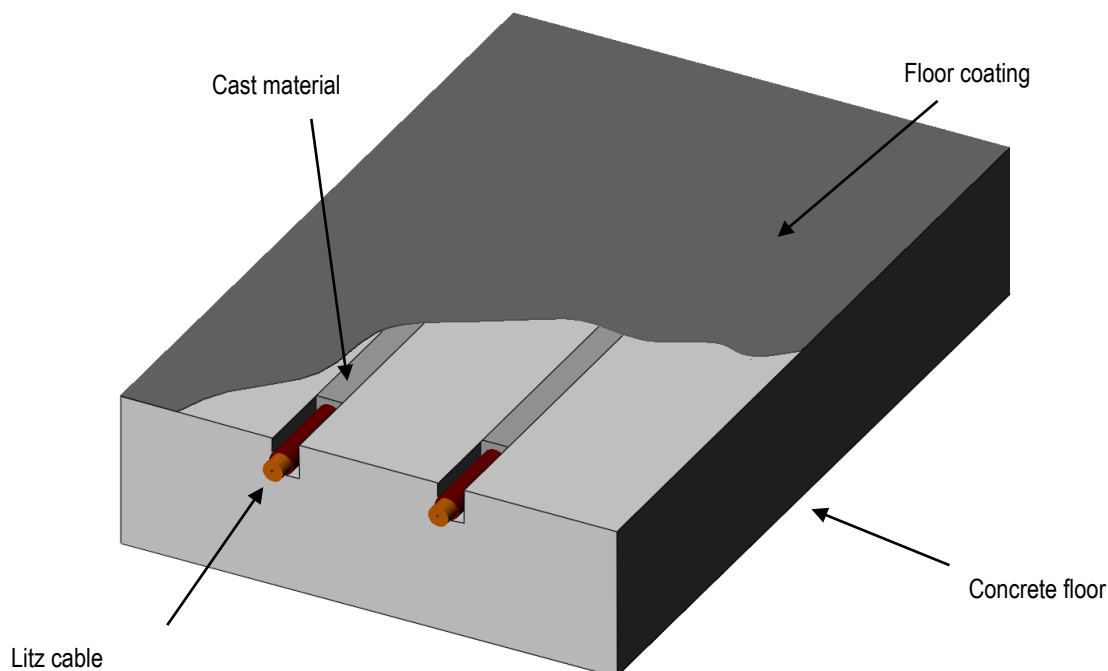


Figure 1.2: Basic structure for laying cable in the floor

Depending on the application, a floor coating can be applied to the basic floor.

Floor installation without floor clips

2 Basic floor information

2.1 General information

The following illustration shows a flowchart explaining how the grinding work should generally be carried out.

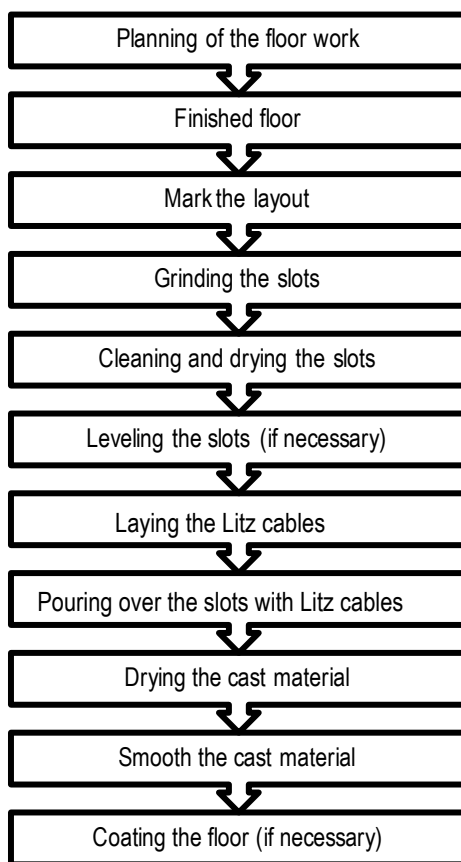


Figure 2.1: Floor work process

For the use in floors, the floor must have particular characteristics. First, all other work must be finished, and second, it must be free of ferromagnetic materials in the vicinity of the cables (see also chapter 3.1 "Zone free of ferromagnetic materials"), and must be smooth and horizontal. Compliance with the following points, listed values, and tolerance ranges is of utter importance for the function of the overall system.

Floor installation without floor clips

2.2 New floors

2.2.1 Concrete and screed

Before pouring over the Litz cables, the following points must be observed:

2.2.1.1 Concrete

Cement concrete generally has a fine mortar layer on its surface that must be removed due to its lower strength and slight adhesion to the floor. Suitable methods include: grinding, sandblasting, steel ball blasting, flame blasting, or etching with acid followed by neutralization, rinsing, and drying. The instructions of the floor/screen supplier are definitive.

2.2.1.2 Screeds

In addition to its task as "Filling and leveling material", screed should especially be seen as a load distribution layer. It can also be a directly useful layer.

Cement and hard screeds can have a very sense surface, so the pores of these surfaces must be opened by etching or blasting. In cement screeds, the residue layer must be removed by grinding or blasting. Hard screeds can best be roughened by steel ball blasting. The instructions of the floor/screen supplier are definitive.

2.2.2 Load capacity

The prerequisite for installation is generally a concrete/screed floor with a pressure resistance of at least 30 N/mm² and a wear resistance of at least 1.5 N/mm². The values effectively required for the pressure resistance of the floor must be matched to the application in which the inductive power transmission system will be used and is not within the scope of Conductix-Wampfler.

The floor may not have any metal framework or ferromagnetic components in the routing area of the cables (see also chapter 3.1. "Zone free of ferromagnetic materials").

2.2.3 Residual moisture

The floor should have a moisture of less than 3% before grinding. Depending on humidity and/or heating, this level is generally reached about one month after application of the concrete/screed layer. This time can be reduced by the use of special additives ("fast-drying screed").

Rising moisture can be tested by gluing an area of about a square meter with a thick PR film. If the glued area darkens within 24 hours, rising moisture should be suspected. The instructions of the floor/screen supplier are definitive.

2.2.4 Porous and strippable parts

Cement residue, mortar residue, and any strippable components that adhere to the floor must be thoroughly removed so that the pores of the floor are open for later coating; that is, cement skins must be removed by blasting or grinding. These processes, however, must be carried out before laying the Litz cables in order to avoid damaging them. The instructions of the floor/screen supplier are definitive.

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2.3 Existing floors

2.3.1 Materials

The foundation should be a concrete or screed floor with a pressure resistance of at least 30 N/mm² and a wear resistance of at least 1.5 N/mm². The values effectively required for the pressure resistance of the floor must be matched to the application in which the inductive power transmission system will be used and is not within the scope of Conductix-Wampfler.

The floor may not have any metal framework or other ferromagnetic components in the routing area of the cables (see also chapter 3.1. "Zone free of ferromagnetic materials").

2.3.2 Damage and contamination

Since coatings cannot adhere to contaminated floor, the floor must be cleaned of all contaminants and/or abraded until a fully open porous state, e.g. using industrial vacuums, high-pressure water jets, grinding, or sandblasting. Damage to the floor must be corrected by appropriate measures, e.g. holes, loose areas, or large cracks that cannot be smoothed by the coating. During improvement work it must be ensured that, in addition to customer specifications, the floor also meets DIN 18202 smoothness requirements (see also 2.2.5 "Smoothness tolerances"). The guidelines of the floor and/or screed suppliers must be followed.

2.3.3 Frameworks

The foundation may not have any ferromagnetic components or metals of other kinds in the area of cable routes. If ferromagnetic objects are present near the cables, e.g. framework or rails, they must be removed before grinding and cable laying. It is practical to inspect the floor for load capacity, concrete moisture, coating capacity, and freedom from iron before grinding the slots.

Floor installation without floor clips

2.4 Potting the Litz cables

After the Litz cable is laid into the ground slots, the slots must be filled with a corresponding cast material to protect the Litz cables from damage. The Litz cables in the floor are also held in place by the cast material, forming the basis for permanent, effective power transmission.

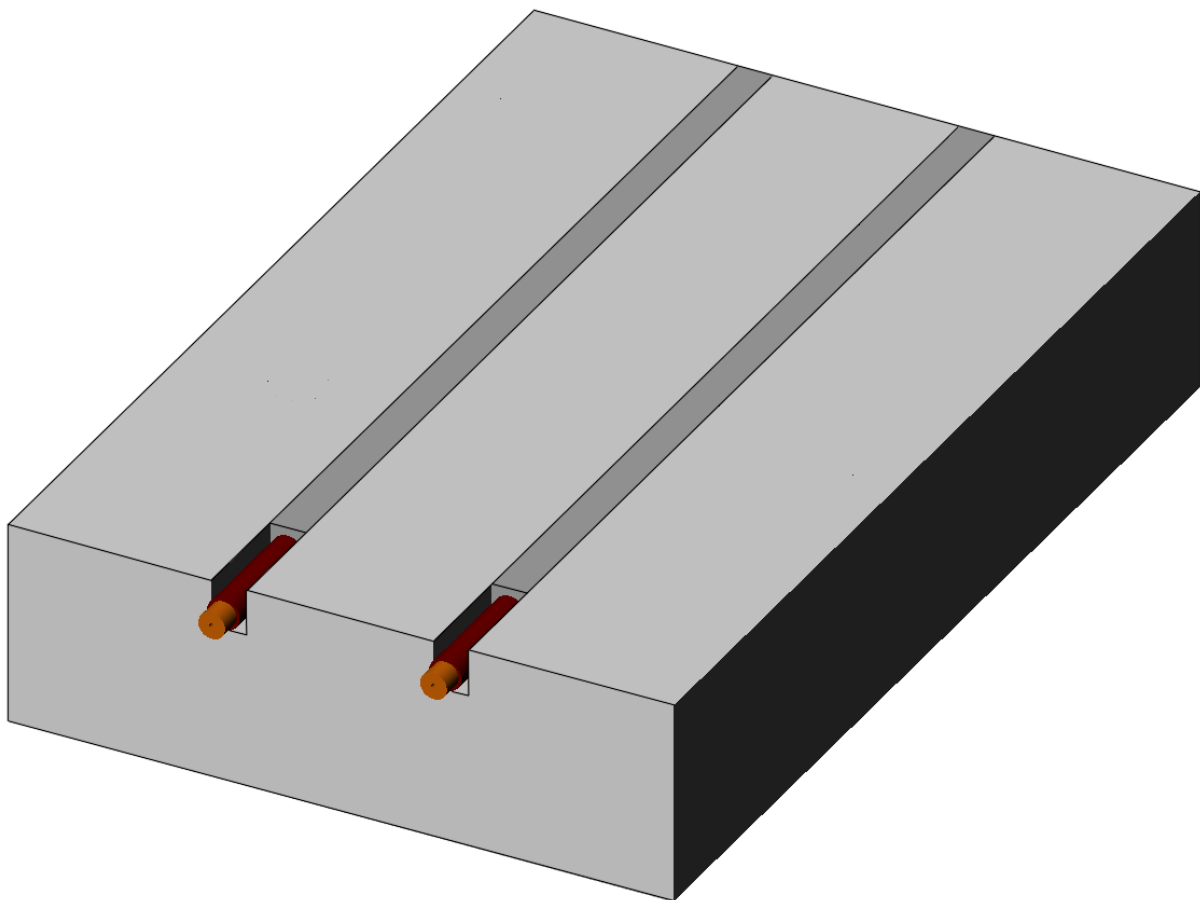


Figure 2.2: Litz lines after potting

Before using the cast material, it must be ensured that the floor is dry, can bear load, and is free of foreign substances that could cause cracking. Weaker layers and mud must be removed. The cast material must achieve a firm connection to the existing load-bearing layer of the floor. It must also be ensured that the cast material used can tolerate the floor layer to be applied subsequently and binds to it firmly. The specifications of the specific manufacturer must be followed.

Floor installation without floor clips

A two-component epoxy resin-based binder is generally used as the cast material. This makes it possible to prepare a plastic mortar with high mechanical and chemical resistance. The following products have already been used:

- StoPox MH 105 by sto
- Icosit®-255 by Sika
- AB-POX 460 AS by AB-Polymerchemie GmbH

Before using one of these cast materials, tolerability with the components used with the materials to be used must be investigated. Further information can be obtained from the manufacturers of these products. However, the specifications of the system builder and the supplier of the floor and/or floor coating are definitive.

If needed, colored shavings can be mixed into the cast material as indication and warning of the presence of inductive power transfer during later floor work. For example, if a drill were to enter the cast mast, red shavings would appear, which in this case would function as a warning signal. Which type of shavings can be used can be learned from the supplier of the cast material. The admixture of sand is also possible.

During casting, it must be ensured that the Litz cable is not unintentionally flooded. Thus during the drying phase of the cast material, the orientation of the Litz cable should be inspected again throughout the system in order to avoid later problems due to bloated Litz cables.

After the pouring of the slots, the cast material must be smoothed to provide an even surface (generally compliant with DIN 18202 Table 3).

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2.5 Smoothness tolerances

The available power of an pickup (illustrated here by a 2.5 kW pickup, material no. 3050777) depends on the strength of the primary field, that is, it is import what position the pickup is in above the main track. The power specifications are based on a nominal air gap of 10 mm (floor surface to the lower edge of the pickup) and positioning above the main track horizontally in the middle. The following curves show the typically available output power over a straight main track as functions:

- of a vertical and
- a horizontal offset.

The non-variable parameter should be understood as compliant with the nominal position.

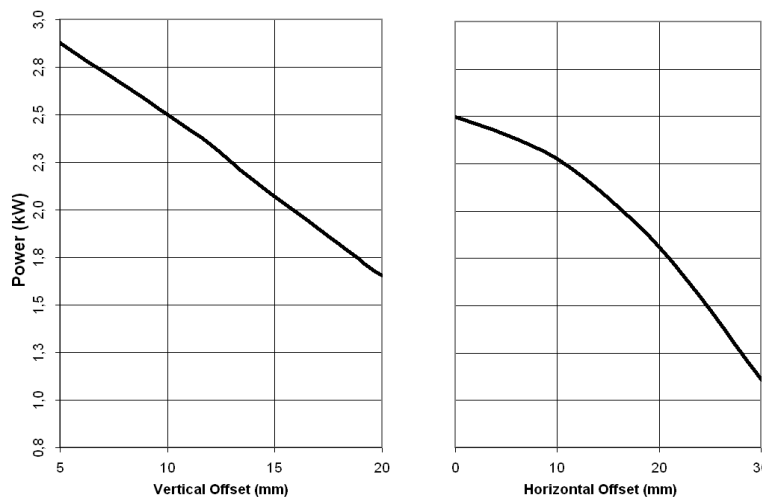


Figure 2.1: Power specifications during operation above the nominal air gap

If the pickup is not operated within the specification of the nominal air gap, a significant power penalty can be assumed. The floor smoothness thus takes on a significant role in inductive power transfer. The strict requirements for smoothness of industrial floors in the warehouse and production areas are defined in the DIN standard DIN18202. Floors must be built at least with a smoothness according to DIN 18202 Table 3, line 3.

Measurement point distances in m, maximum permissible						
	m	0,1	1 ¹⁾	4 ¹⁾	10 ¹⁾	15 ¹⁾²⁾
	mm	2	4	10	12	15
Surface finished floors for assimilating of floor coverings						

¹⁾ Intermediate values can be found in Figures 1 and 2 of DIN 18202 for Table 3 and rounded up to whole mm.

²⁾ The smoothness tolerances of the last column also apply to measurement point distances over 15 m.

Smoothness tolerances along and across the direction of travel of the floor transport system can be found in DIN 15185.

Floor installation without floor clips

2.6 Floor coating

2.6.1 Layer thickness

The layer thickness of the floor coating depends on customer-specific requirements and load. It is determined by the floor coating company. For the system, only the thickness of the layer is important, since this has an influence on the laying depth of the Litz cable. In general, layer thicknesses from 1 to 5 mm are applied, and the grinding depth can also vary (see also chapter 3.2.3). Depending on requirements, the floor coating may consist of primer, conductive layers, and conductive epoxy coatings.

2.6.2 Electrostatic discharge (ESD)

Depending on the construction of a system, static charge may result on the vehicle that are not caused by the inductive power transmission system. This is particularly the case if on the one hand the charge is encouraged by the vehicle structure, and on the other hand discharge through the floor is prevented. If there is a random or intentional discharge, the electronics on the vehicle can be affected. There are different options for avoiding this.

Grounding-capable wheels

The wheels of a vehicle can either support or avoid electrostatic discharge, depending on the material used. It is always possible to design all wheels properly or only to use an additional electrostatic discharge wheel on the vehicle. In any case, the entire vehicle (frame, grounding potential on the vehicle) must be electrically well-connected to the discharge wheel so that even a small discharge can be conducted through the wheel to the floor. If an additional discharge wheel is used, it must be noted that it may wear faster due to the materials used. This would reduce the pressure against the floor and minimize its ESD protection.

Conductive brushes or bands

If it is not possible to provide a conductive wheel on the vehicle, a conductive brush or grounding strap can also be used. In any case, the entire vehicle (frame, grounding potential on the vehicle) must be electrically well-connected to the conductive brush or grounding strap so that even a small discharge can be conducted through the brush or strap to the floor.

Floor installation without floor clips

2.6.3 Conductive floor

An electrically conductive coating on the floor on which the vehicle is moving can delay or prevent the charging of the vehicle. It must be ensured that the floor has an electrically good connection to ground potential. The use of such a floor has worked well to date in a variety of applications to ensure protection against the effects of electrostatic discharge. These are floors that have a sufficiently low resistance to conduct charges away quickly if they are grounded or connected to an arbitrarily low potential. It is important for them to have no magnetically active components such as metal shavings, etc. in the area of the inductive power transmission system, since these could have an influence on the function of the system. DIN EN 61340-5-1 recommends that the grounding resistance in such floors that are also used as the primary grounding measure have a system resistance between 7.5×10^5 und 3.5×10^7 ohms.

When using copper bands under the conductive layer of electrostatically conductive floors, it must be ensured that the copper band is not routed directly through power loops (see chapter 3.3.3) nor along the Litz cables in a loop, as shown in Figure 2.3. This is because in a grid layout, an inductive power transmission-induced current may also flow.

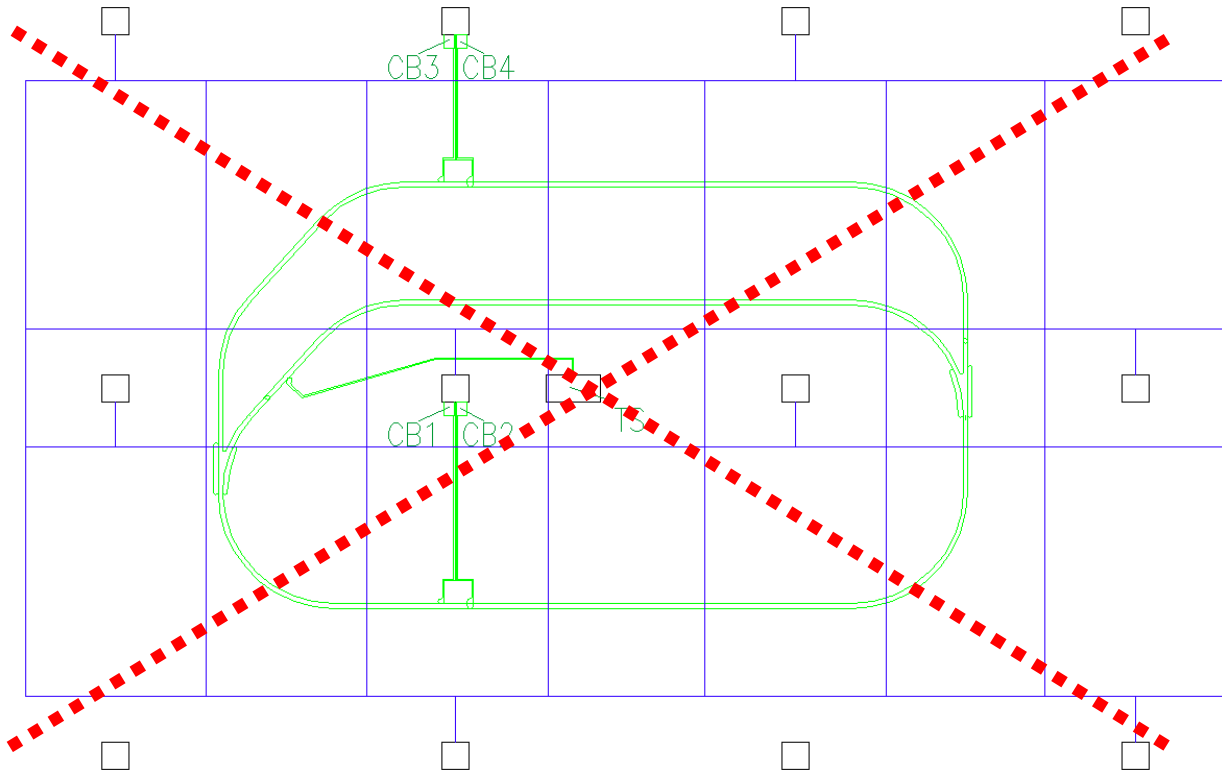


Figure 2.3: Copper bands (blue) as they may *not* be laid!

This routing of the copper bands must be avoided in order to ensure personnel safety and damage to the floor coating due to induced current and the associated heat buildup in the copper band. This is avoided by not laying the copper bands in a predefined grid, but rather in U shapes grounded on one side, as can also be seen in the following illustration.

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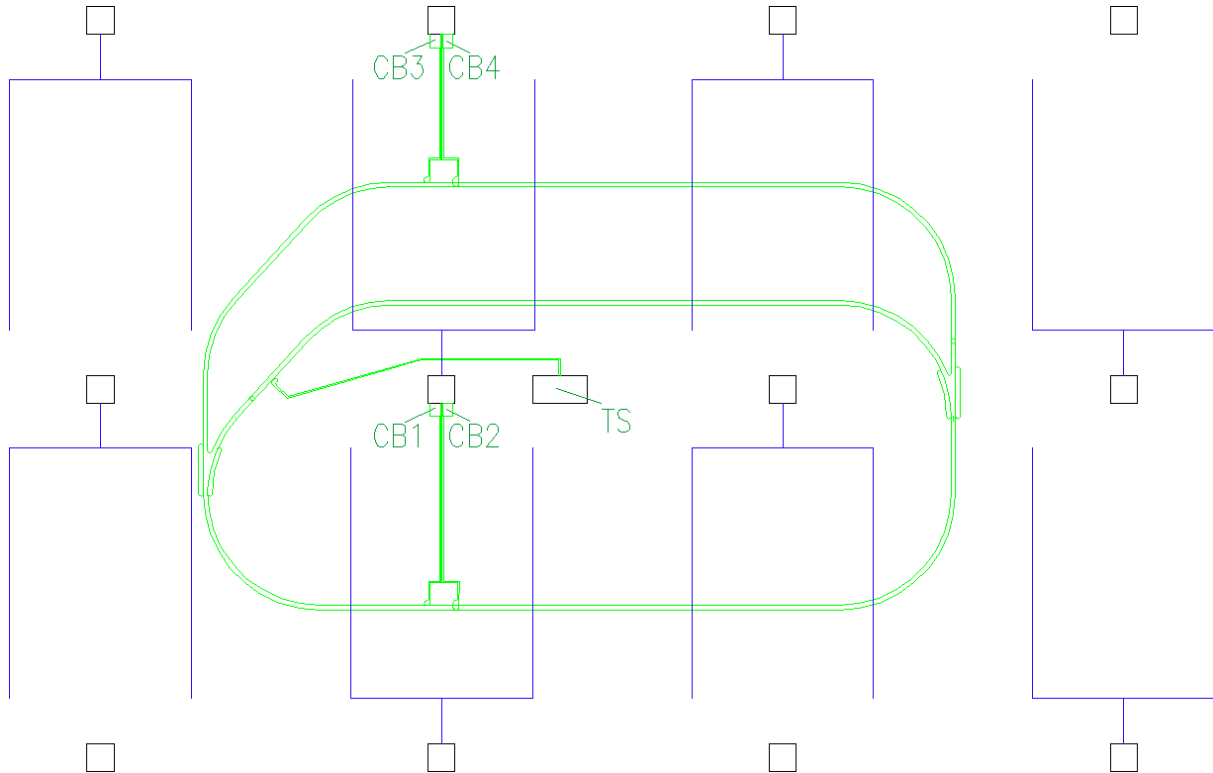


Figure 2.4: Copper bands (blue) as they should be laid

Each copper band segment must be grounded on one side. It is not permitted to leave ungrounded copper bands in the immediate vicinity of the system, since induction can cause very high voltages to occur and safety cannot be guaranteed. It must therefore be ensured that in any case the distance between two copper band ends is 2 m or greater.

Floor installation without floor clips

3 Basic information

3.1 Zone free of ferromagnetic materials

To maintain effective power transfer to mobile consumers and minimal power loss on the segment, no ferromagnetic materials such as iron, nickel, cobalt, etc. may be located in the area of the Litz cables. Moreover, to ensure high efficiency of inductive power transfer, no diamagnetic materials (such as copper) may be in the same zone.

3.1.1 Floor in general

Screeds and industrial floors have steel mesh or steel fibers for reinforcement in the classical sense (prevention of height variance and to limit the spread of cracks) and fibers to minimize shrinkage cracking.

Mesh reinforcement

The mesh width of steel mesh depends on the manufacturer. In order for the inductive energy transfer system to be used effectively, the coverage must be at least 70 mm from the upper edge of the steel mesh to the upper edge of the floor including any floor coating.

Steel fiber reinforcement

Steel fibers may also be used for reinforcement, mixed in at a dosage of 12.5 to 25 kg per m³ (depending on the type of fiber). The length and thickness of a steel fiber can differ according to the manufacturer.

When using an system, the steel fibers must be removed from the vicinity of the cable. This can be ensured by grinding a wider channel so that the required region is free of ferromagnetic material. The size of the zone that must be free of ferromagnetic materials depends entirely on the type of routing of the cables in use there (power supply segment or a main segment).

3.1.2 Area to keep free of ferromagnetic materials in power supply segments

In the layout of power supply segments, the area to be kept free of ferromagnetic materials corresponds to a zone around the power supply segment based on the rounded value of the diameter of the Litz cable in use. This is shown in Figure 3.1.

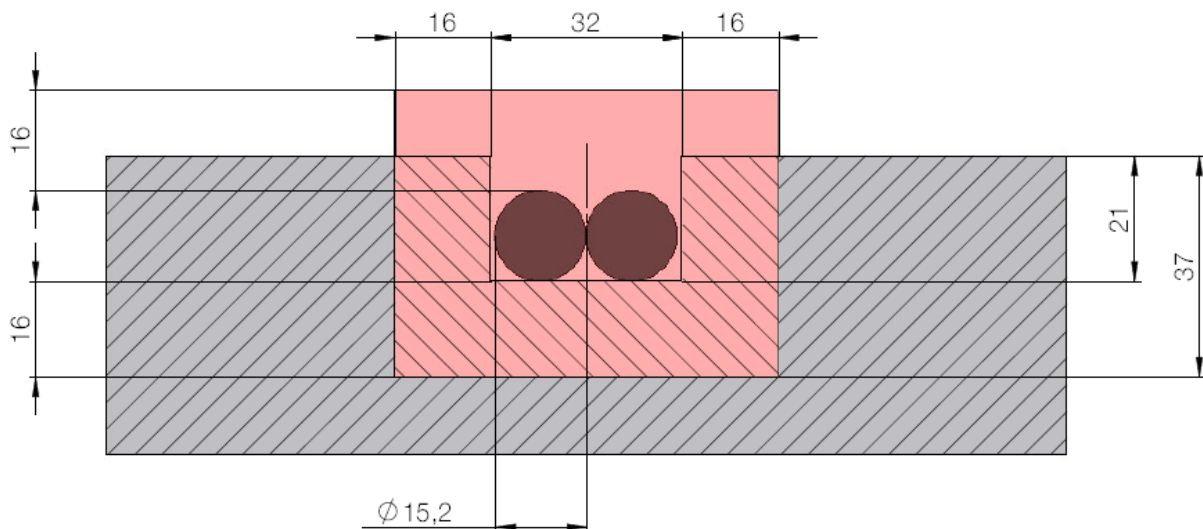


Figure 3.1: Area to keep free of ferromagnetic materials in power supply segments

Floor installation without floor clips

Here, the key dimension is always the outer edge of the Litz cable. This distance from the outer edge of the upper Litz cable must also be maintained for ferromagnetic materials on the floor (e.g. wire cages) directly above the Litz cables.

The close bundling every 100 mm of the Litz cables in the power supply segment is important to keep losses as low as possible. Be sure that for multiple power supply segments the cables are bundled in pairs with opposing current directions.

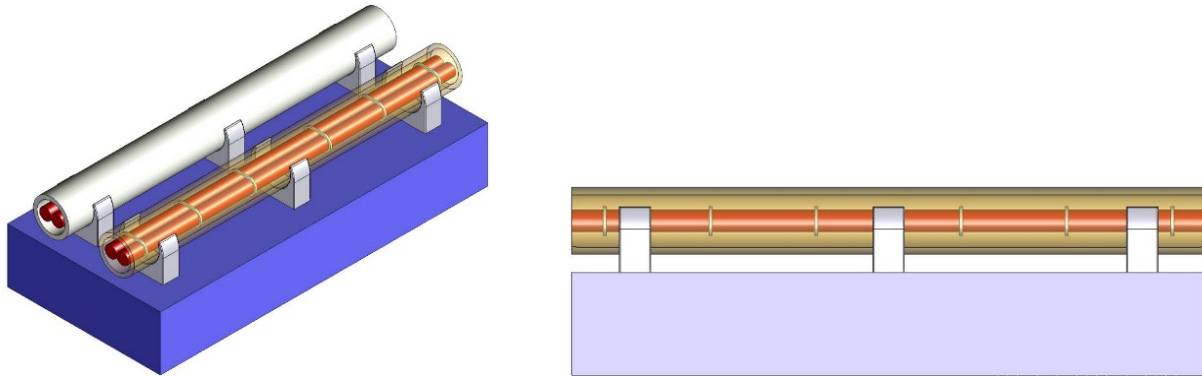
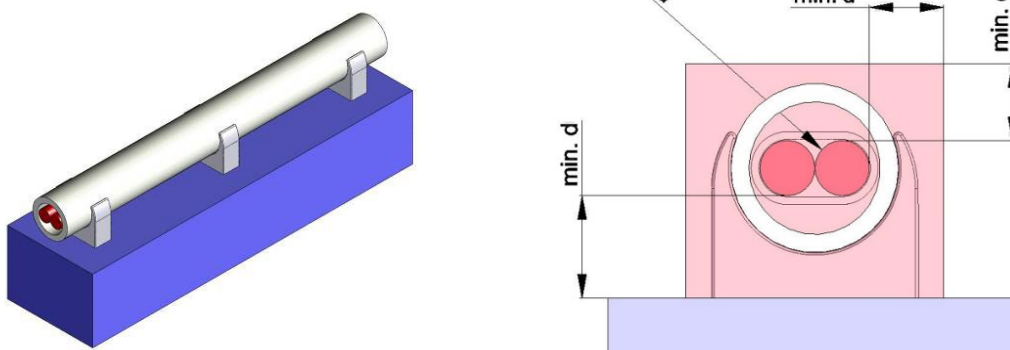


Figure 3.2: Bundling of power supply segments with cable ties

For multiple power supply segments running in parallel, the individual segments must be laid separately. Such parallel routing of power supply segments are shown in chapters 5.3 to 7.1 with the required minimum distances.

Power supply segments may be installed outside the floor area if the capacitor boxes or the power feed cabinet are not placed in the immediate vicinity of the segment itself or if cast installation is not possible at the place of installation. This can lead to laying of the Litz cables on pillars, walls, steel beams, etc. Just as when laying in the floor, it is essential to observe the predefined area that must be kept free of ferromagnetic materials. Figure 3.3 shows the routing outside the floor of a power supply segment and/or two power supply segments running in parallel (see Figure 3.4).

It is also recommended to provide mechanical support around the power supply segment in order to protect the lines from damage. For power supply segments that are not installed in the floor, the following arrangement should be followed:



**Figure 3.3: Power supply segment outside the floor
(d = Litz cable diameter rounded up to 16 mm)**

Here, too, the power supply segment should be bundled despite being routed through conduit, in order to keep the magnetic field as small as possible. This also ensures that the adjustment of the system will remain stable over a longer period of time. Be sure that both Litz cables are within one conduit and attached with cable ties if necessary. It is not permitted to install each Litz cable in separate conduit.

For two power supply segments laid in parallel outside the floor, similar conditions apply to those described above. The following distances must be observed:

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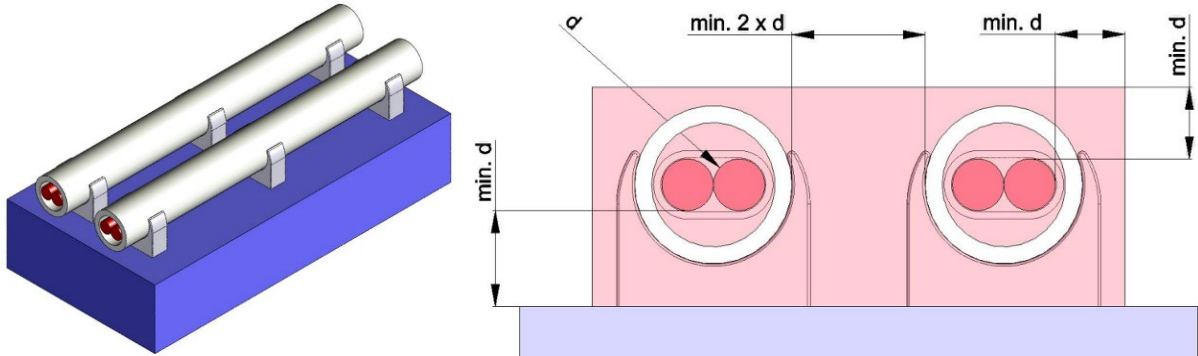


Figure 3.4: Laying of two parallel power supply segments outside the floor (d = Litz cable diameter rounded up to 16 mm)

The usual distance between two power supply segments from outer edge to outer edge is 32 mm, or twice the rounded Litz cable diameter. Since it is problematic to determine this distance, for safety's sake the dimension between the outer edges of the conduit is used (see also Figure 3.4).

3.1.3 Zone free of ferromagnetic materials on the main segment

The zone that must be kept free of ferromagnetic materials is shown in Figure 3.5 below:

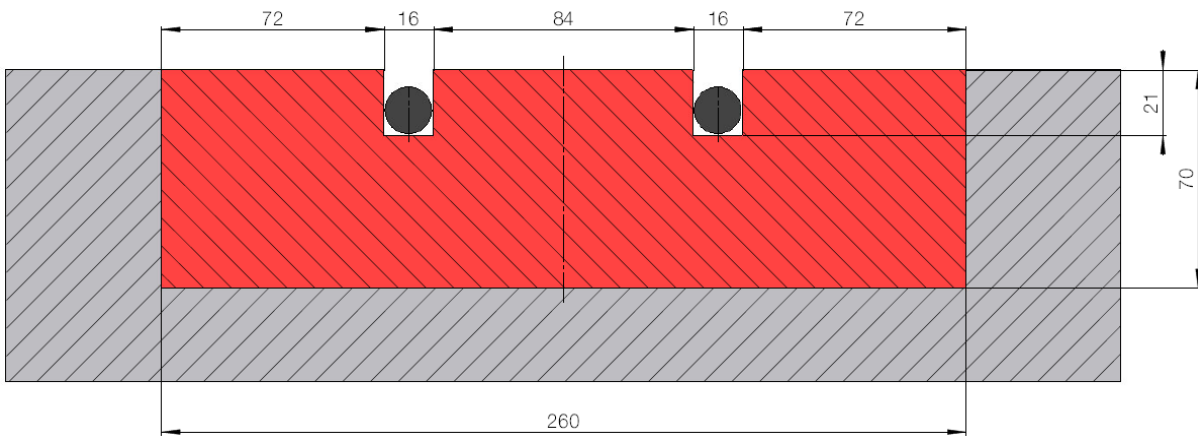


Figure 3.5: Zone free of ferromagnetic materials (e.g. iron) on the main segment

Here, the key dimension is always the midpoint of the Litz cable. If there is no knowledge of the composition of the floor, a special meter can be used to scan the floor. Conductix-Wampfler can be contacted about this.

The ferromagnetic-free zone in the floor should be at least as wide as the pickup (at least 260 mm). Metallic objects such as cover plates, etc., may not be located within the zone shown in red in Figure 3.5, grinding and cable laying information. In track switches and other main segments, the ferromagnetic-free zone must be adjusted appropriately. These areas can be found in chapter 4.

Floor installation without floor clips

3.1.4 Zone free of ferromagnetic materials around the pickup

To ensure the process reliability of the system, it is also important to maintain the ferromagnetic-free zone for mobile consumers as well; that is, in this area for the entire mobile consumer, there may be no iron or other ferromagnetic materials present, e.g. in the form of the vehicle body, motors, sensors, and actuators. A iron-free zone must also be ensured around the pickup.

Figure 3.6 makes it clear that this zone also continues around the pickup. The pickup has a minimum width of 350 mm and a height above ground of 85 mm starting from the upper edge for the floor.

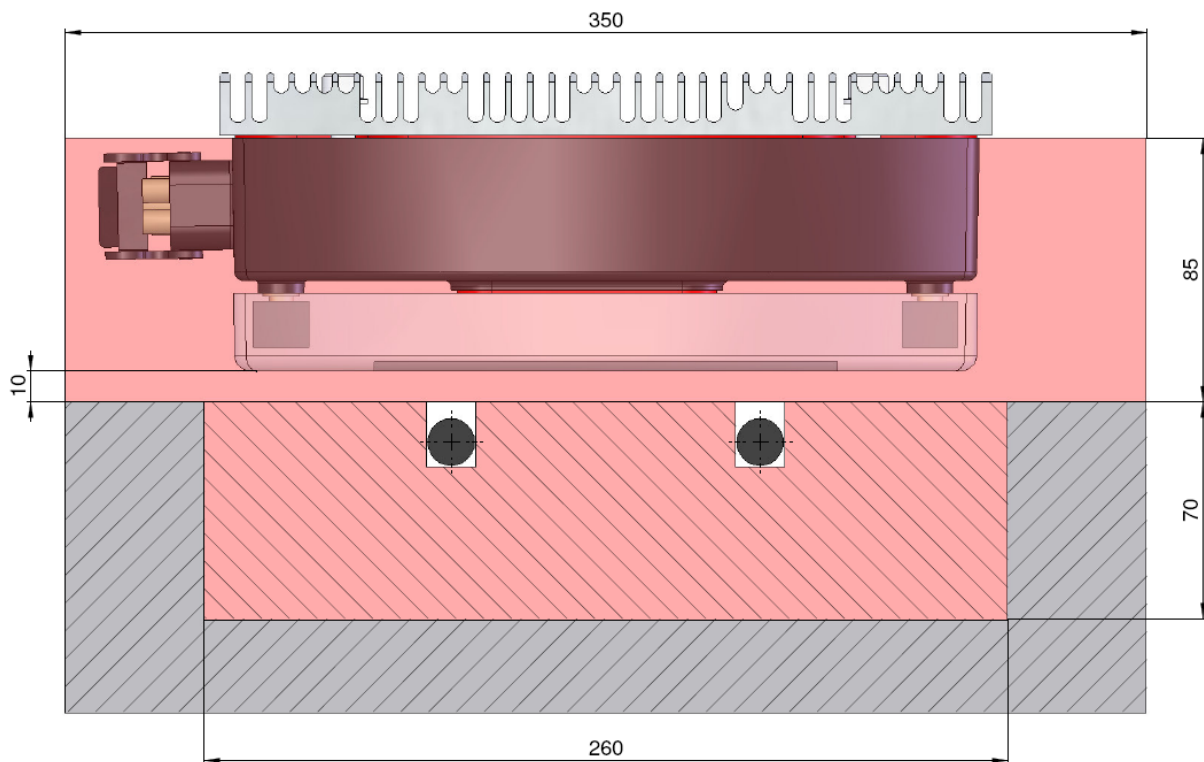


Figure 3.6: Zone free of ferromagnetic materials around the main equipment

Floor installation without floor clips

3.2 Floor work

3.2.1 General information about grinding

The type of Litz cable routing shown here eliminates cable holders. The Litz cable is simply laid directly into the ground slots. The grinding must be carried out with the greatest of care. The depth of the grinding depends on whether and what floor coating has been applied to the floor.

Laying cable without cable holders can under some circumstances save costs in comparison to laying cable with holders.

Note:

The grinding layouts shown in this documentation should be considered recommendations. Depending on local conditions or layouts, the floor grinding required may deviate from the recommendations shown.

Conductix-Wampfler must be contacted in this case.

3.2.2 Grinding tolerances

The grinding is subject to the general tolerances for length dimensions without individual tolerance entries according to the tolerance table in DIN ISO 2768-1. The tolerance class "very rough" is used. The most important tolerances for grinding work in the system are listed below:

- Over 6 mm to 30 mm: ± 1 mm
- Over 30 mm to 120 mm: ± 1.5 mm

3.2.3 Preparation for laying cable without cable holders

Slots are ground in the material zone with a width of 16 mm and a center-to-center spacing of 100 mm. This applies to the 35 mm² cable used exclusive for this application. When laying cable without cable channel, the grinding depth refers to the laying depth, since the cable is laid directly into the ground channel. It can vary depending on the number of layers to be placed on the floor (primer, conductive layer, protective layer, etc.) and should be 21 mm if no coating is used.



Figure 3.7: Grinding depth without floor coating

The depth of the cable is oriented towards the upper edge of the finished floor including the floor coating in order to achieve an optimum distance from the pickup. In case of later coating, the thickness of the coating must be subtracted from the grinding depth, e.g. coating thickness 4 mm → grinding depth 17 mm.

Floor installation without floor clips

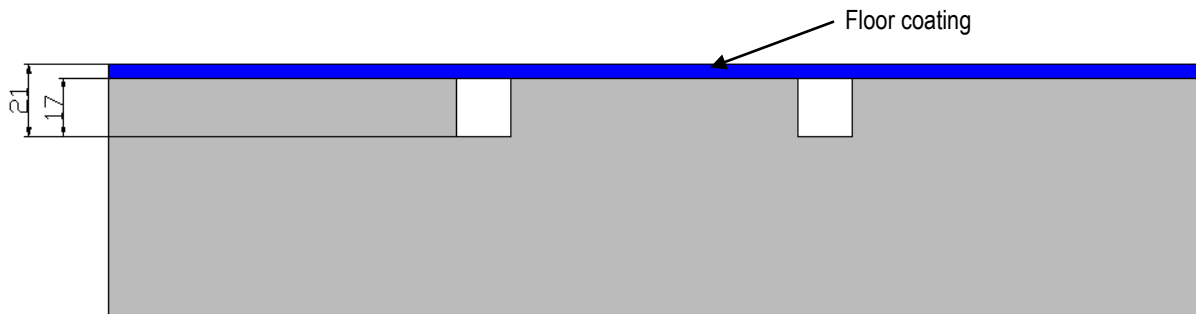


Figure 3.8: Grinding depth with 4 mm thick floor coating

The grinding should always take place at a right angle to the surface of the floor to avoid any narrowing of the slot and thus guaranteeing complete filling around the Litz cables.

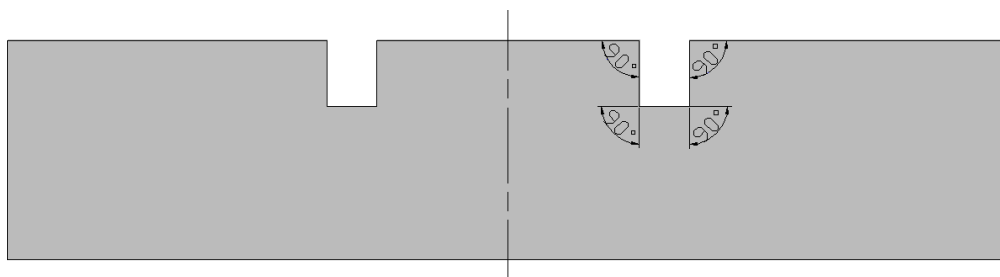


Figure 3.9: Right-angle grinding of the channels

Important:

- It must also be ensured that there are no sharp edges that can damage the lines, particularly near feed points, reversal points and track switches.
- For the Litz cable to lie straight in case of very rough grinding, the floor of the slot must be leveled to guarantee the required distance to the pickup. This can be achieved with simple sand and a gauge by leveling the sand filled into the slot with the gauge.

3.2.4 Post-handling of lines laid

After the lines are laid, another visual inspection must be carried out to check whether the lines are free of twists, scratches, cracks, etc. Between the laying of the cable and pouring, there should ideally not be any great window of time, in order to rule out any damage/sinking of the Litz cables or the penetration of any ferromagnetic parts that could be heated by the magnetic field.

3.3 General information about laying cable

3.3.1 Litz cable

Only Litz cable approved by Conductix-Wampfler may be used. The Litz cable is delivered to the construction site wound on a drum and must be unwound without twists (using a drum wagon, not included in the scope of delivery by Conductix-Wampfler). Then the line can be laid in the cleaned slots in the floor. When pouring into the slots, it is important for the cable not to rise to the surface and thus not be completely protected by the cast material.

Floor installation without floor clips

3.3.2 Litz cable orientation

The following rules apply to the laying of Litz cables, whether power supply segments or main segments:
The arrows or the text "Wampfler" on the Litz cables must always be readable in the clockwise direction when viewed from above.

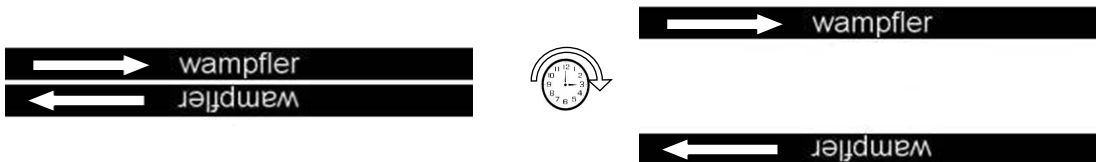


Figure 3.10: Litz cable orientation for a power supply segment (left) and a main segment (right)

This also applies to the connection of track supplies or capacitor boxes.

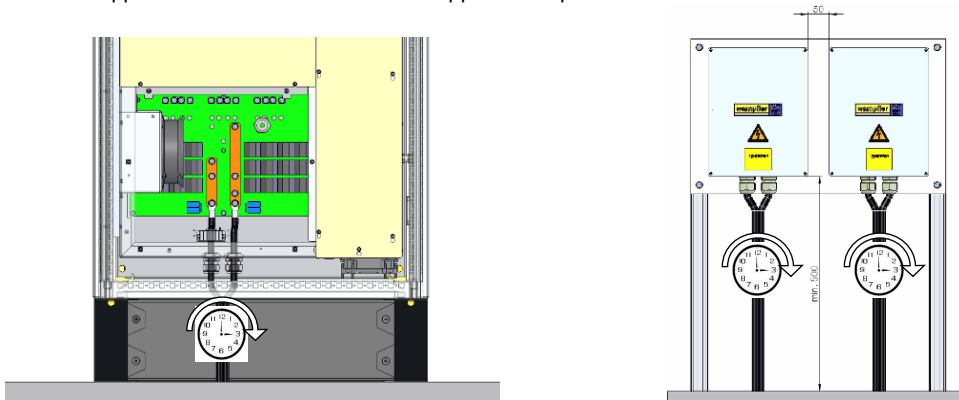


Figure 3.11: Litz cable orientation for track supplies and capacitor boxes

3.3.3 Power loops

In principle, it is always possible to implement crossings, track switches, and similar elements in the layout. Depending on the layout of the Litz cables, however, a reduction in the magnetic field may result, which will in turn cause reduced transmission of power to the energy pickup of the vehicle. In such a case, it is possible to add so-called power loops to the geometry to ensure sufficient transmission of power. It is therefore essential to calculate an exact balance of energy transmission for each vehicle. Only in this way can a decision be made as to whether power loops are necessary or not.

However, it should be ensured that the power pickups do not stop above power loops for longer times, that is, any stop over a power loop should be avoided.

Floor installation without floor clips

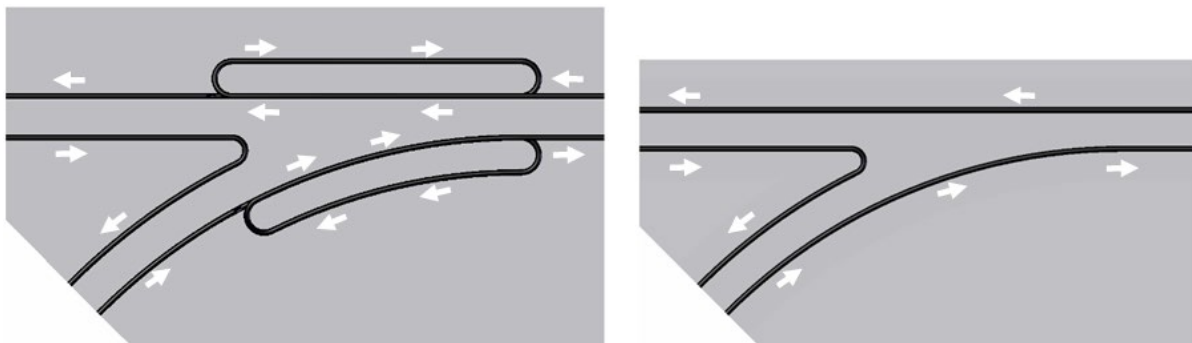


Figure 3.12: Examples of power loops (left with and right without)

The white arrows represent the Litz cable orientation as explained in chapter 3.3.2.

It should be noted in power loops that the outgoing Litz cable in the main direction of travel is always on top. This permits more exact steering of inductively guided vehicles. The layout of a power loop naturally also changes the layout of the specific system elements and thus the size of the ferromagnetic zone. Details can be found in chapter 4.

3.3.4 Minimum distance between two segments

The spacing between two segments must be at least 500 mm for the two segments not to influence one another negatively.

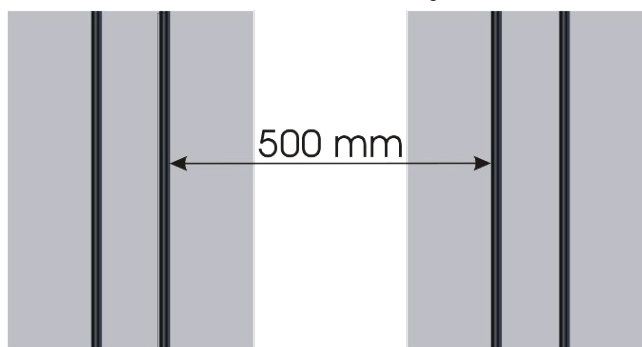


Figure 3.13: Minimum spacing between parallel main segments

3.3.5 Minimum distance between two system elements

Depending on the layout, it may happen that different system elements such as curves, track switches, crossings, etc. may follow one another very closely, resulting in a negative influence on the homogeneous magnetic field required for power transmission. It is therefore important that a spacing of at least 500 mm be maintained between the system elements, to avoid unnecessary losses through the cables and to ensure a more exact inductive track guidance.

Floor installation without floor clips

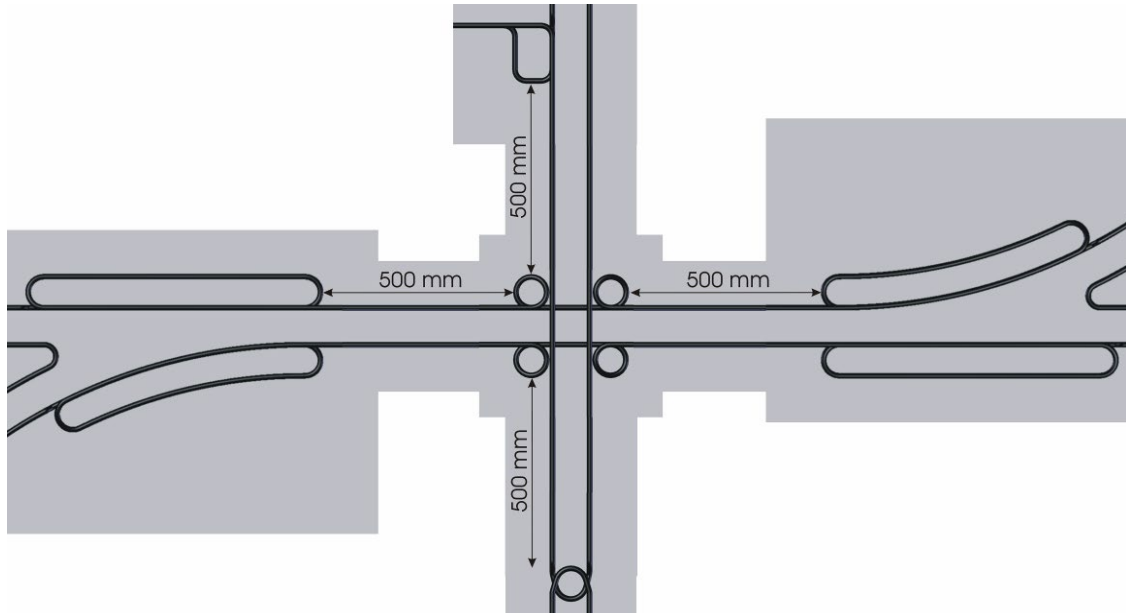


Figure 3.14: Minimum distance between two system elements

For example, a space of at least 500 mm must be left between the outermost Litz cable of a power loop in a crossing and the outermost Litz cable of a power loop in a track switch (see also Figure 3.14).

3.3.6 Outputs, power feed points, reversal points

Required geometries such as outputs, power feed points, reversal points, etc. may only be installed in straight segments due to their influence on the magnetic field and the associated reduction in power transmission, and may not be installed in curves, track switches, etc. Here, too, at least 500 mm spacing is required between the individual geometries in order to avoid unnecessary line loss and ensure accurate inductive trace guidance.

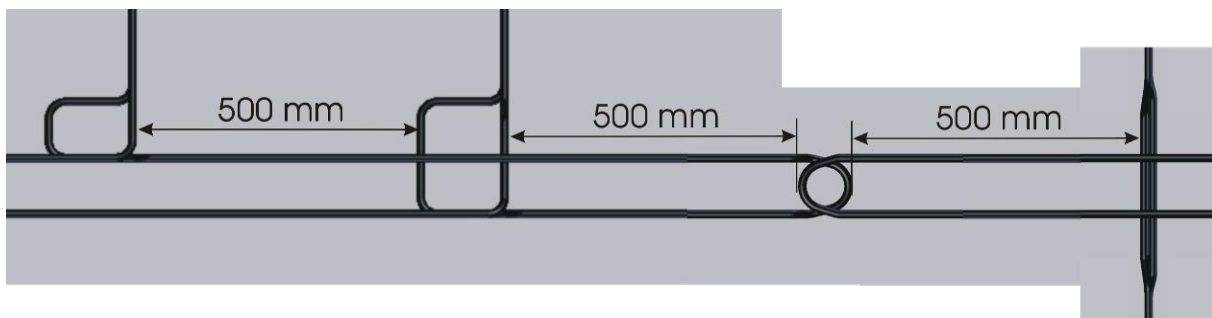


Figure 3.15: Examples of geometries (outputs, reversal point and crossing of power supply segment with main segment)

Floor installation without floor clips

4 Grinding and cable layout information

The following cable laying information is broken down into three main parts: an overview, cable installation, and grinding information:

- The overview provides information to be taken into consideration during the implementation of each system element.
- The cable installation section specifies how and in what order the Litz cable can be laid in the ideal case.
- The grinding information also shows the zone that must be free of ferromagnetic materials (e.g. iron).
- The grinding depth listed corresponds to the grinding depth required with no additional floor coating is applied to the floor.

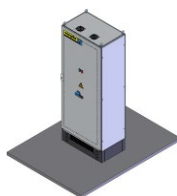
It should be noted that the grinding information listed here is recommendations. Depending on local conditions, it may be necessary to adapt the specific aspects for inductive power transmission.

4.1 Overview of system elements

4.1.1 Core elements

The core elements are system elements that occur in nearly every system. These are:

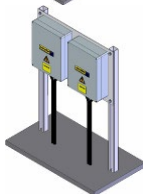
- Track supply
- Capacitor boxes
- Power supply segments
- Power supply segments laid in parallel
- Power feed point or capacitor box output
- Opposing capacitor box output
- Double capacitor box output
- Straight main segment
- Curve
- Reversal point within main segment



Track supply

Chapter 5.1

10 kW and 35 kW
track supply

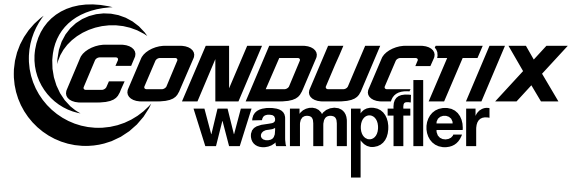


Capacitor boxes

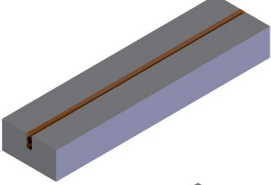
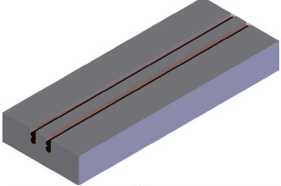
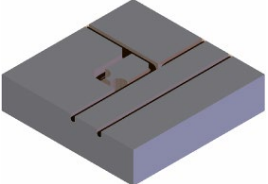
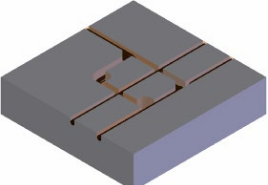
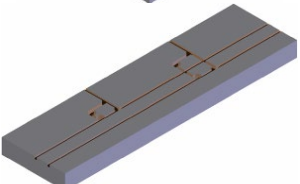
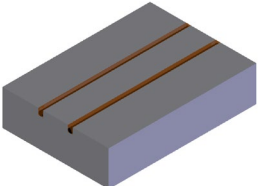

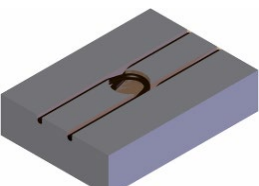
Chapter 5.2

Installation possible on one
or both sides of the main
track.

Installation instructions



Floor installation without floor clips

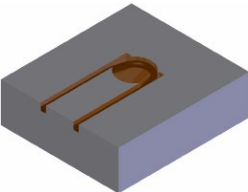
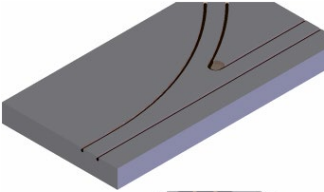
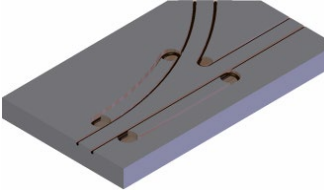
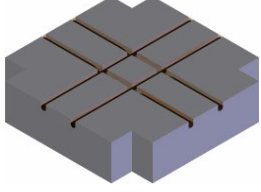
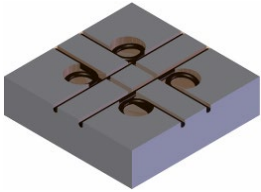
	Power supply segments	Chapters 5.3 and 5.4	Power supply segments with Litz cable layout next to or under one another
	Power supply segments laid in parallel	Chapters 5.5 and 5.6	Parallel power supply segments with Litz cable layout next to or under one another
	Power feed point or capacitor box output	Chapter 5.7	Output to track supply or capacitor box
	Opposing capacitor box output	Chapter 5.8	Output only to capacitor box
	Double capacitor box output	Chapter 5.9	Combination of power feed point and opposing capacitor box output
	Straight main segment	Chapter 5.10	Optimum power transmission possible
	Curve	Chapter 5.11	Minimum radius: 1 m
	Reversal point within main segment	Chapter 5.12	Connection point between two power feeds or two branch lines of one power feed.

Floor installation without floor clips

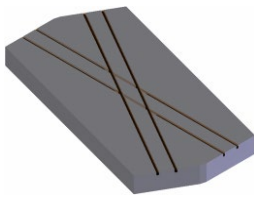
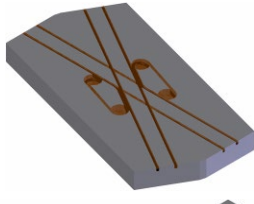
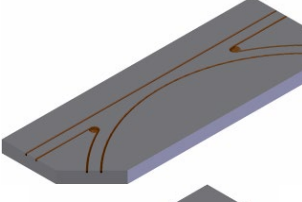
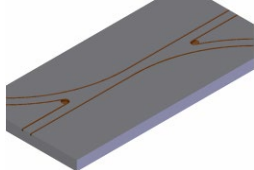
4.1.2 Base elements

The following elements are system elements that are typical and need not be present in every inductive floor system implemented. These would be:

- Reversal point at the end of a main segment
- Standard track switch
- Standard track switch with power loops
- Right-angled crossing
- Right-angled crossing with power loops
- Crossing
- Crossing with power loops
- Double track
- Double crossing track switch

	Reversal point at the end of a main segment	Chapter 6.1	Exclusively for branch lines
	Standard track switch	Chapter 6.2	Track switch with power reduction
	Standard track switch with power loops	Chapter 6.3	Track switch without power reduction
	Right-angled crossing	Chapter 6.4	Right-angled crossing with power reduction
	Right-angled crossing with power loops	Chapter 6.5	Right-angled crossing without power reduction

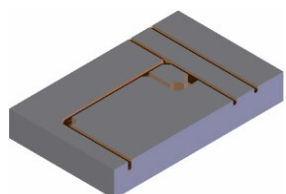
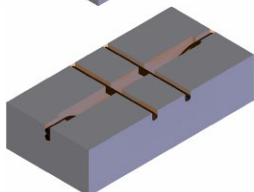
Floor installation without floor clips

	Crossing	Chapter 6.6	30°/150° crossing with power reduction
	Crossing with power loops	Chapter 6.7	30°/150° crossing without power reduction
	Double track switch	Chapter 6.8	Power reduction
	Double crossing track switch	Chapter 6.9	Power reduction

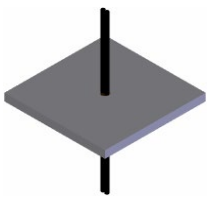
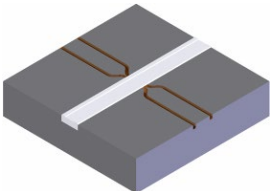
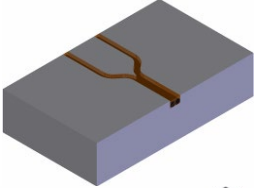
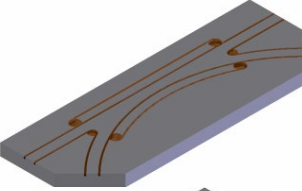
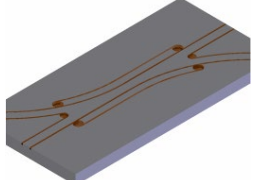
4.1.3 Special elements

These are system elements that occur less often in standard installations of bond transport systems. Such system elements are:

- Power supply segments running parallel to the main segment
- Power supply segment crosses main segment
- Ceiling or wall penetration of the power supply segment
- Track underpass for rail-guided systems
- Power feed for rail-guided systems
- Double track switch with power loops
- Double crossing track switch with power loops

	Power supply segments running parallel to the main segment	Chapter 7.1	Minimum spacing between the main segment and the power supply segment
	Power supply segment crosses main segment	Chapter 7.2	To reduce the length of the power supply segment

Floor installation without floor clips

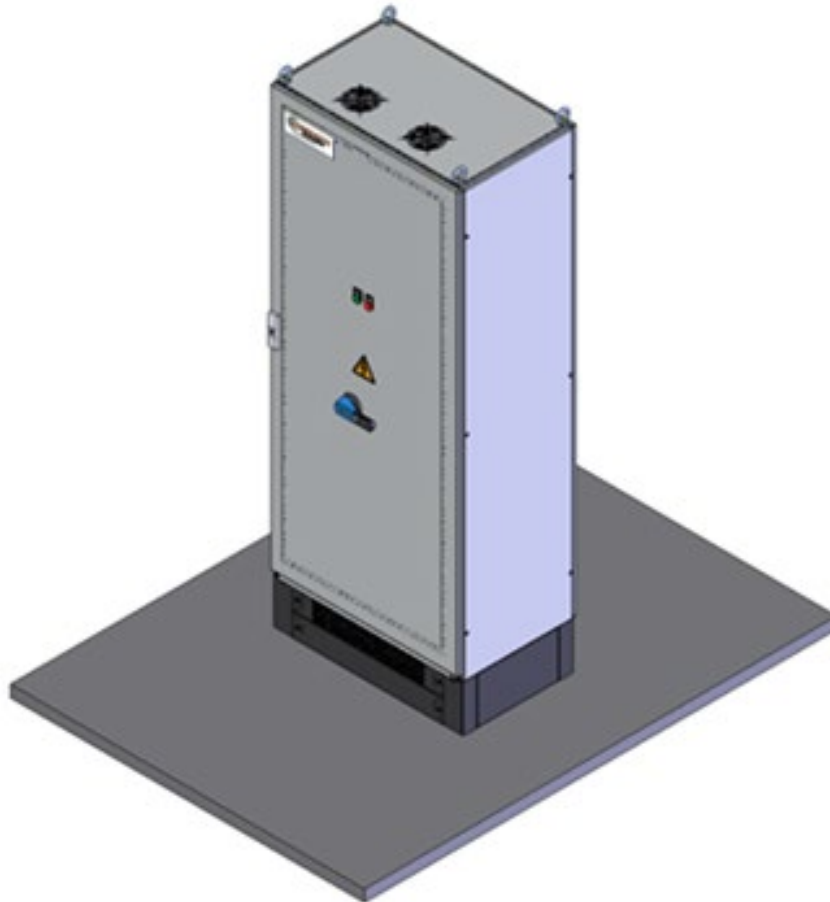
	<p>Ceiling or wall penetration of the power supply segment</p>	<p>Chapter 7.3</p>	<p>Connection between multiple buildings or floors with a track supply</p>
	<p>Track underpass for rail-guided systems</p>	<p>Chapter 7.4</p>	<p>Use of multiple pickups may be necessary</p>
	<p>Power feed for rail-guided systems</p>	<p>Chapter 7.5</p>	<p>Exclusively for branch lines</p>
	<p>Double track switch with power loops</p>	<p>Chapter 7.6</p>	<p>Grinding information upon request</p>
	<p>Double crossing track switch with power loops</p>	<p>Chapter 7.7</p>	<p>Grinding information upon request</p>

Floor installation without floor clips

5 Core elements

5.1 Track supply

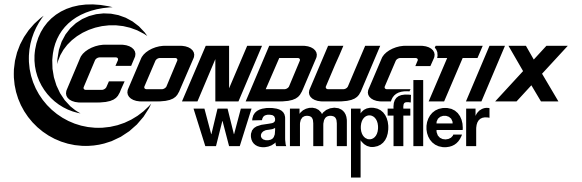
Overview



When connecting Litz cables to the track supply (10 kW and 35 kW), the following points must be observed:

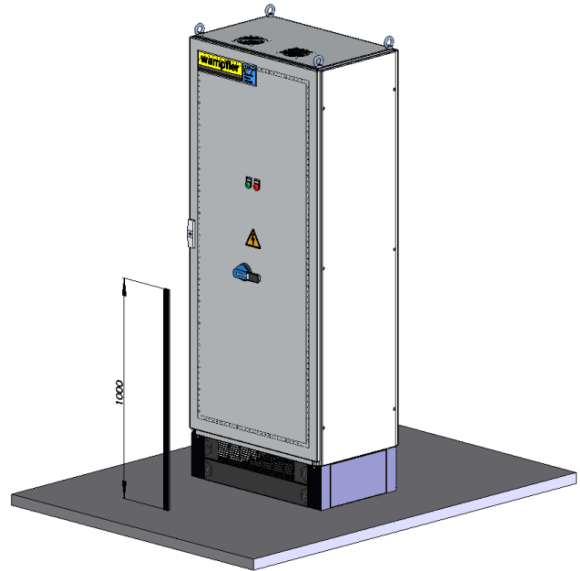
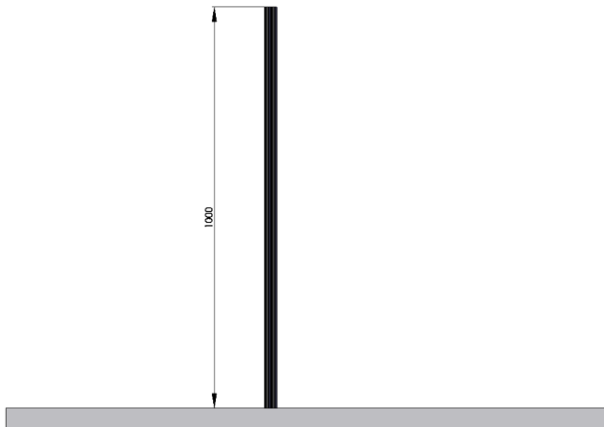
- The track supply must be set up according to its installation instructions.
- The minimum length of the Litz cable outside the floor must be 1000 mm.
- The lines of power supply segments must be bundled with cable ties and remain bundled to the closest point possible before the cable screw connectors.
- The base of the switching cabinet may not contain **any** loops or coils of Litz cable.
- The area free of ferromagnetic materials must also be obeyed in the base of the switching cabinet.
- The switching cabinet of the power feed convert must be bolted firmly to the floor.

Installation instructions

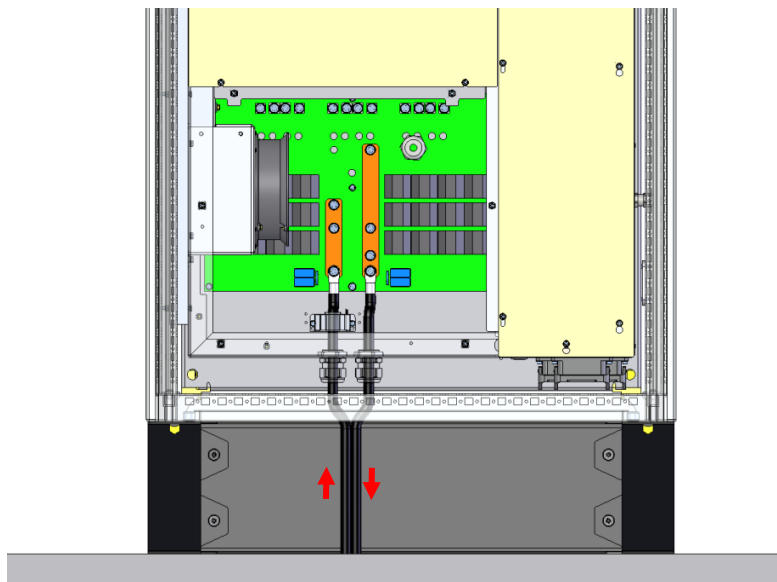


Floor installation without floor clips

Installation sequence



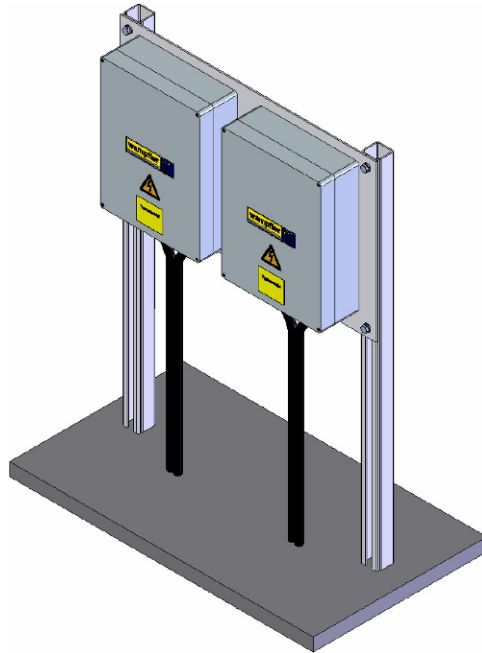
Track Supply not yet in final position.



Floor installation without floor clips

5.2 Capacitor boxes

Overview

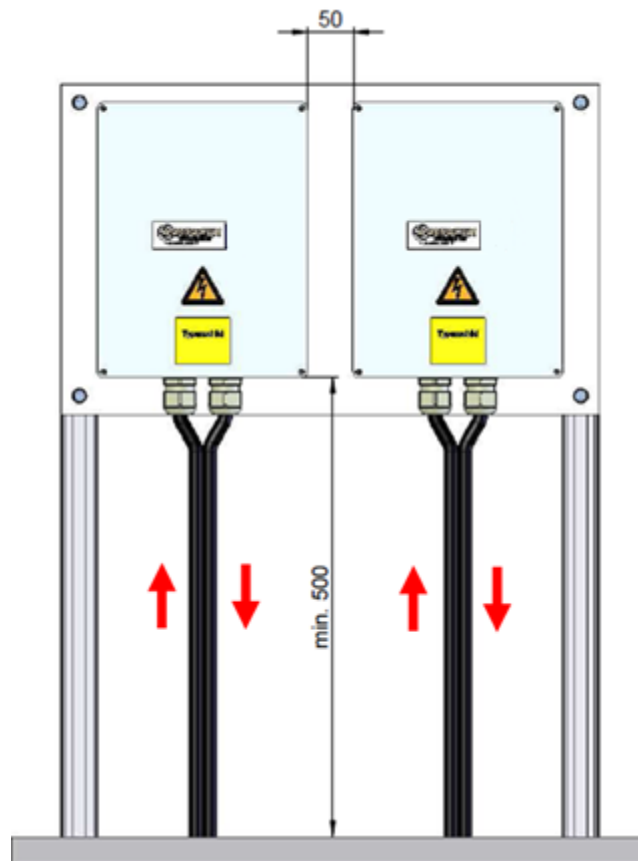
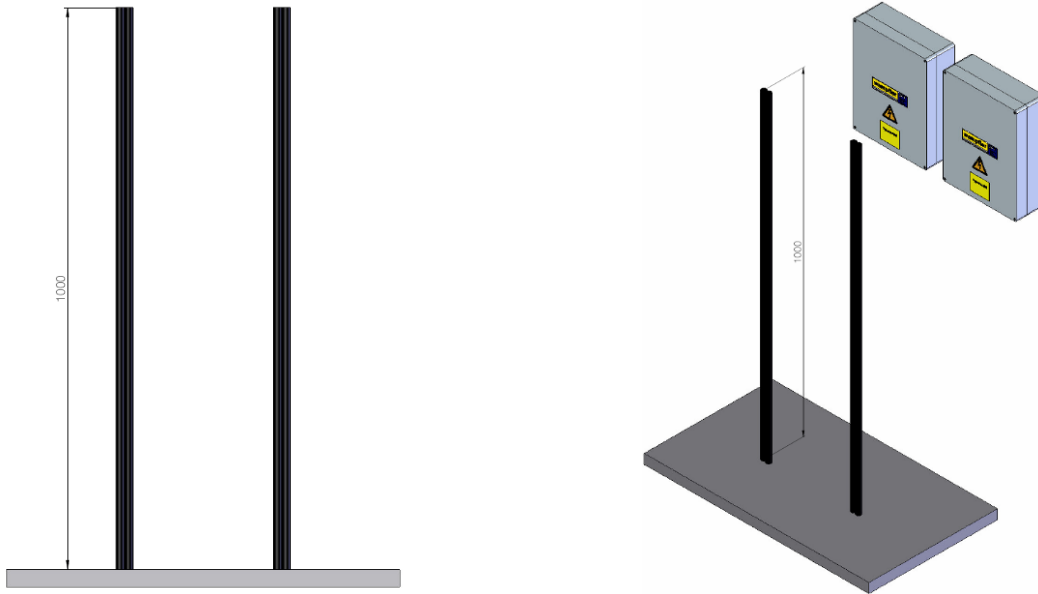


When laying Litz cable to the capacitor boxes, the following points must be observed:

- A capacitor box pair - one box per Litz cable - must be integrated into the system at predefined intervals of about 30 m due to parasitic inductivity of the Litz cables.
- Under certain circumstances, only one box may be required.
- The exact project planning for these capacitor boxes will be carried out by Conductix-Wampfler.
- The boxes must be mounted on the wall, a mounting stand, or the like.
- The minimum distance between the lower edge of the capacitor box and the floor is 500 mm.
- The minimum length of the Litz cable outside the floor before commissioning must be 1000 mm.
- The lines of power supply segments must be bundled with cable ties.
- The installation of the boxes should take place without iron, that is, as far as possible, use brass or stainless steel screws to main the box.
- Litz cables emerging from the floor must be protected from damage with a ram guard.
- If multiple capacitor boxes are installed next to one another, they must be mounted with a minimum spacing of 50 mm.
- If capacitor boxes are mounted one above the other, a minimum spacing of upper edge to lower edge of the capacitor boxes of 300 mm must be observed.
- The orientation of Litz cables is described in chapter 3.3.2.

Floor installation without floor clips

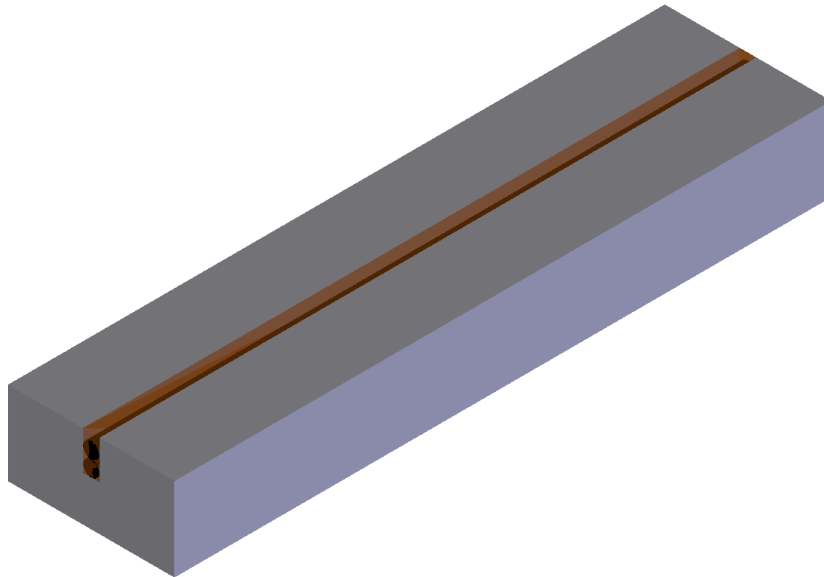
Installation sequence



Floor installation without floor clips

5.3 Individual power supply segments in the floor, one under the other

Overview



Application: areas in which no power transmission is required. This includes connections between the main segment and capacitor boxes, main segment and track supply, or connections between two main segments.

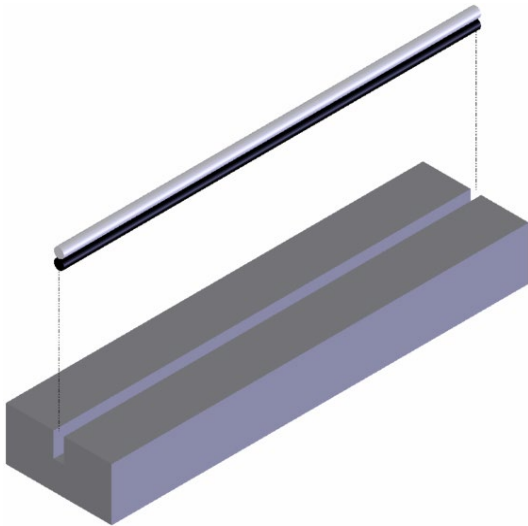
When laying the Litz cables one under another, the following points must be observed:

- The lines of power supply segments must be bundled with cable ties. This ensures that the magnetic field in this area is minimum.
- At a distance of less than 500 mm from the main segment, the Litz cable must be laid at a 90° angle to it. This minimizes the influence on the magnetic field of the main track.
- When laying in conduit, ferromagnetic materials may not be used!

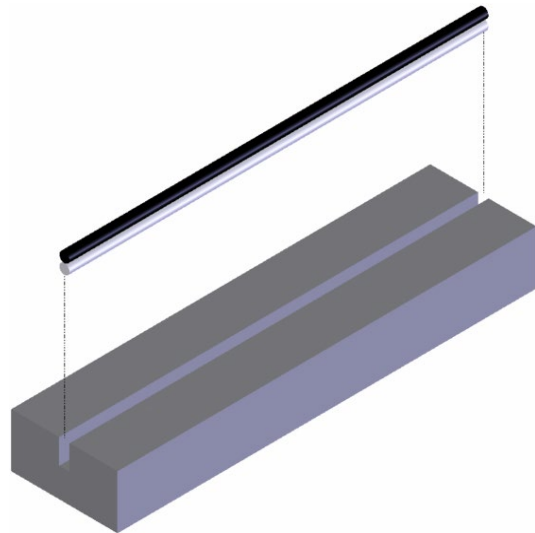
Floor installation without floor clips

Installation sequence

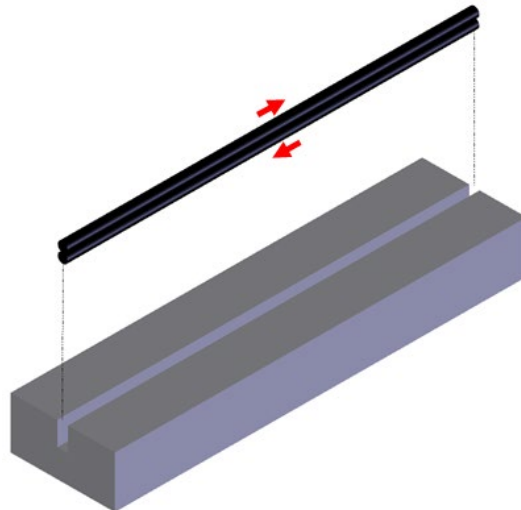
1.



2.

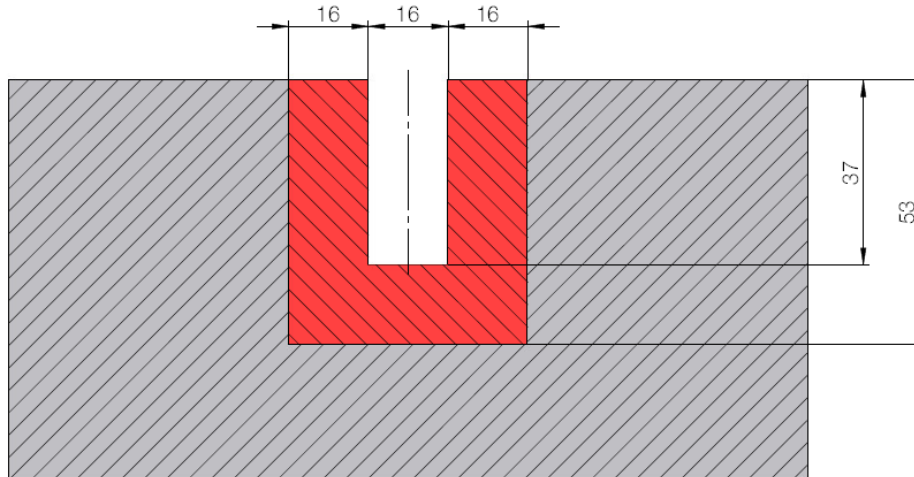


Overview



Floor installation
without floor clips

Grinding information*)

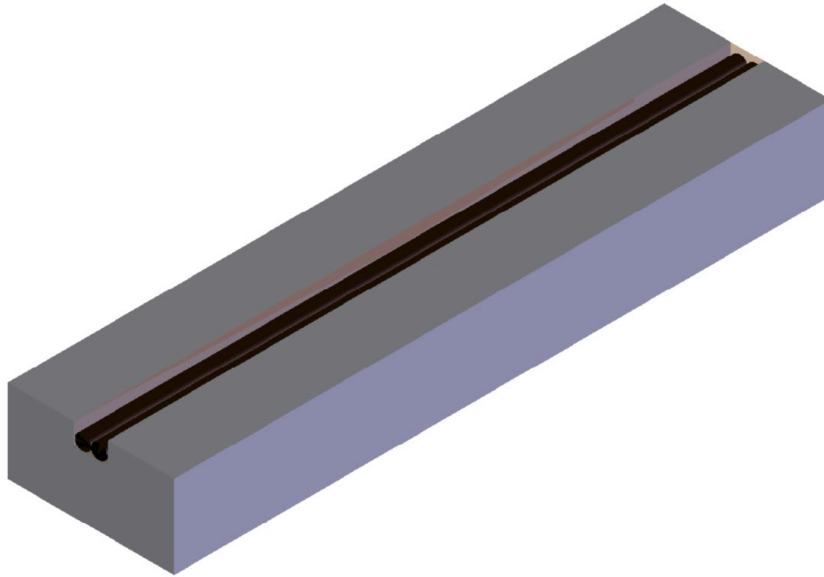


*) The **red area** must be free of ferromagnetic materials.

Floor installation without floor clips

5.4 Individual power supply segments in the floor, side by side

Overview



Application: areas in which no power transmission is required. This includes connections between the main segment and capacitor boxes, main segment and track supply, or connections between two main segments.

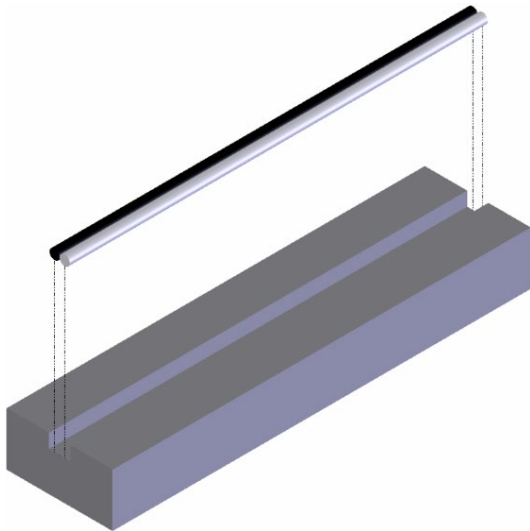
Alternatively to laying cables one under another (see also 5.1), the Litz cables for the power supply segment can also be laid side by side. The following points must be observed:

- The lines of power supply segments must be bundled with cable ties. This ensures that the magnetic field in this area is minimum.
- At a distance of less than 500 mm from the main segment, the Litz cable must be laid at a 90° angle to it. This minimizes the influence on the magnetic field of the main track.
- When laying in conduit, ferromagnetic materials may not be used!

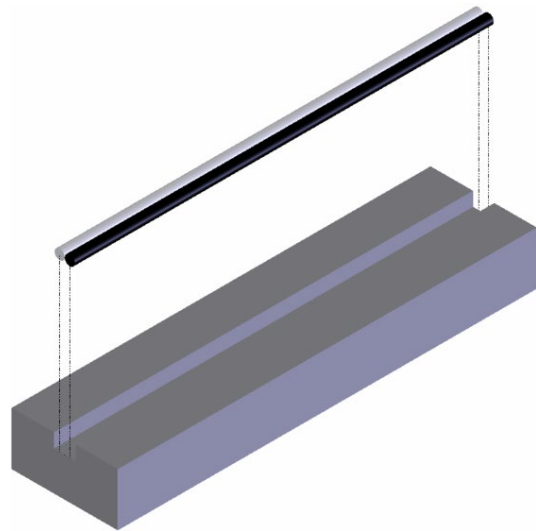
Floor installation without floor clips

Installation sequence

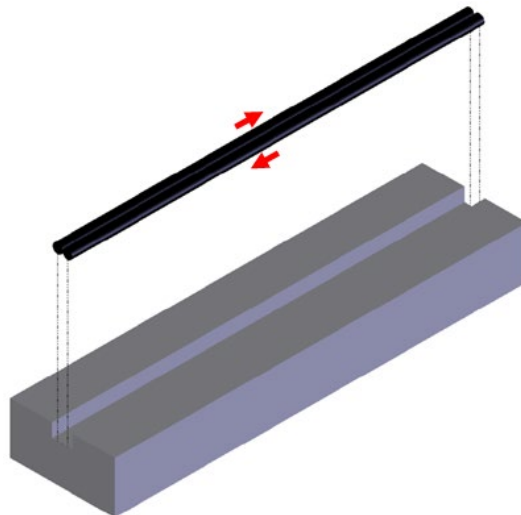
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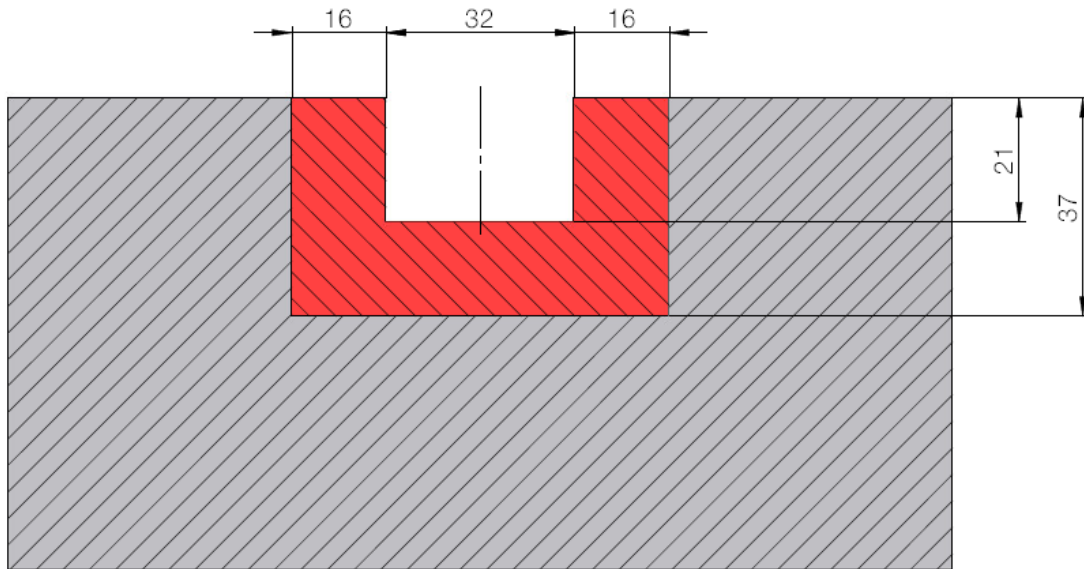


Overview



Floor installation
without floor clips

Grinding information*)

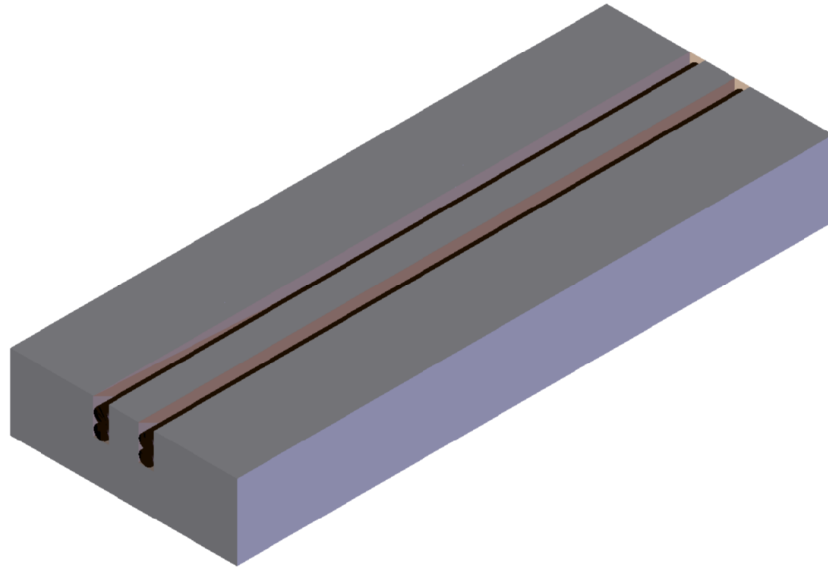


*) The **red area** must be free of ferromagnetic materials.

Floor installation without floor clips

5.5 Power supply segments laid in parallel, one under another

Overview



Application: areas in which no power transmission is required. This includes connections between the main segment and capacitor boxes, main segment and track supply, or connections between two main segments.

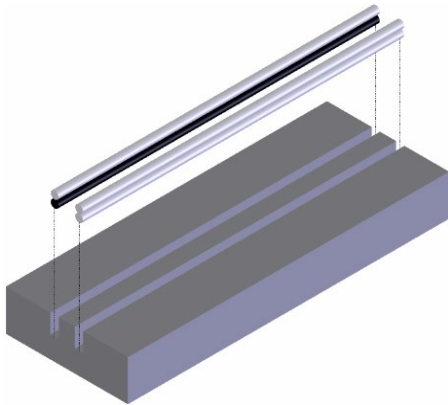
In power supply segments parallel to one another in which the Litz cables are laid under one another, the following points must be observed:

- Power supply segments to capacitor boxes or to two power feed cabinets next to one another must be spaced apart. This spacing - relative to the two inner Litz cables - should be at least 32 mm from outer edge to outer edge of the Litz cables, corresponding to twice the diameter of the Litz cable.
- The lines of power supply segments must be bundled with cable ties. This ensures that the magnetic field in this area is minimum.
- When laying two parallel power supply segments outside the floor, the same spacing applies (see also chapter 3.1.2).
- At a distance of less than 500 mm from the main segment, the Litz cable must be laid at a 90° angle to it. This minimizes the influence on the magnetic field of the main track.
- When laying in conduit, ferromagnetic materials may not be used!

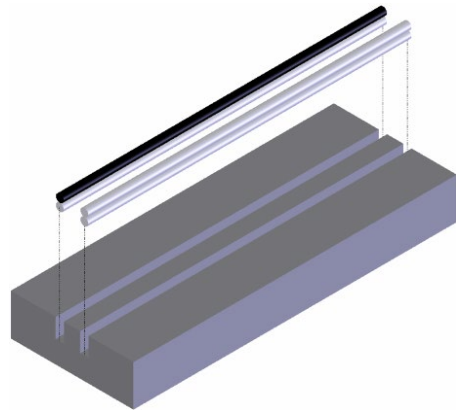
Floor installation without floor clips

Installation sequence

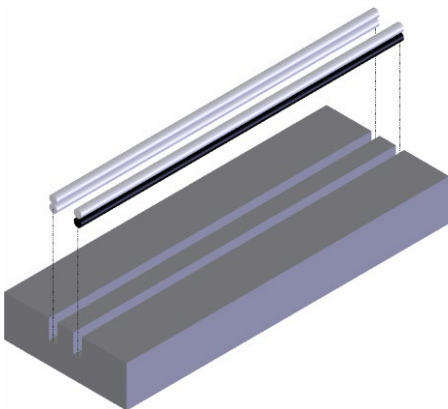
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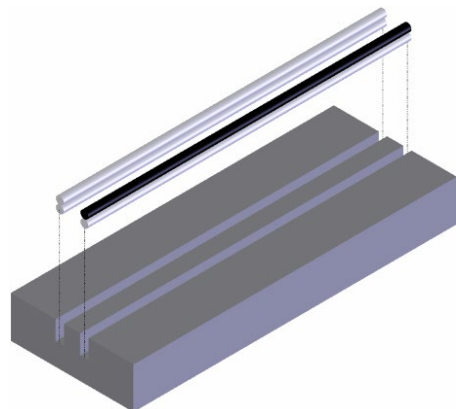
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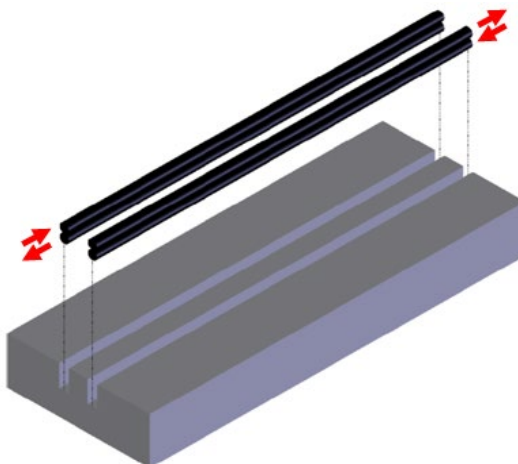
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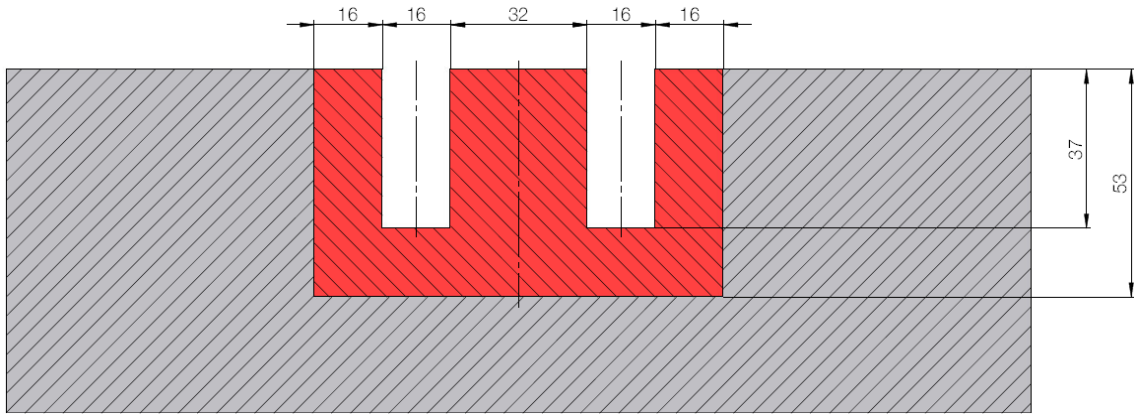


Overview



Floor installation
without floor clips

Grinding information*)

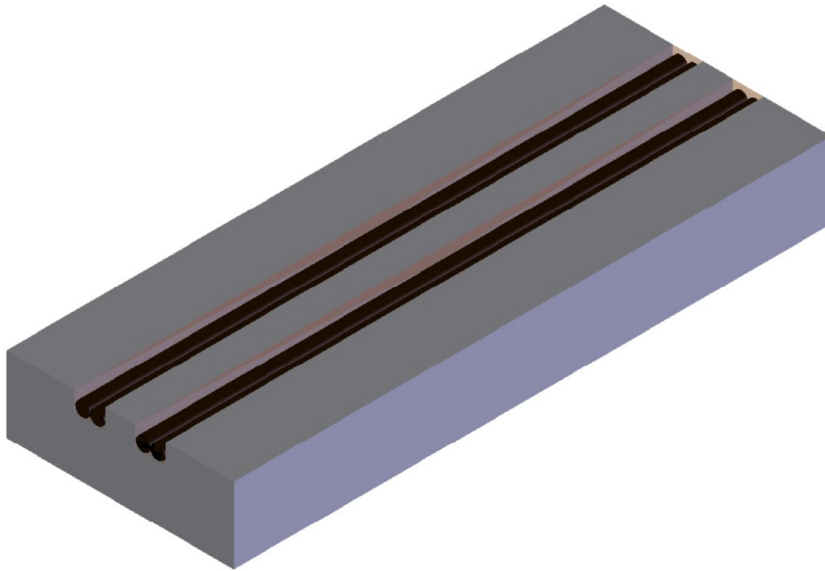


*) The **red area** must be free of ferromagnetic materials.

Floor installation without floor clips

5.6 Power supply segments laid in parallel, side by side

Overview

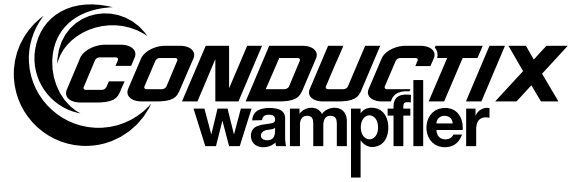


Application: areas in which no power transmission is required. This includes connections between the main segment and capacitor boxes, main segment and track supply, or connections between two main segments.

In power supply segments parallel to one another in which the Litz cables are laid side by side, the following points must be observed:

- Power supply segments to capacitor boxes or to two power feed cabinets next to one another must be spaced apart. This spacing - relative to the two inner Litz cables - should be at least 32 mm from outer edge to outer edge of the Litz cables, corresponding to twice the diameter of the Litz cable.
- The lines of power supply segments must be bundled with cable ties. This ensures that the magnetic field in this area is minimum.
- When laying two parallel power supply segments outside the floor, the same spacing applies (see also chapter 3.1.2).
- At a distance of less than 500 mm from the main segment, the Litz cable must be laid at a 90° angle to it. This minimizes the influence on the magnetic field of the main track.
- When laying in conduit, ferromagnetic materials may not be used!

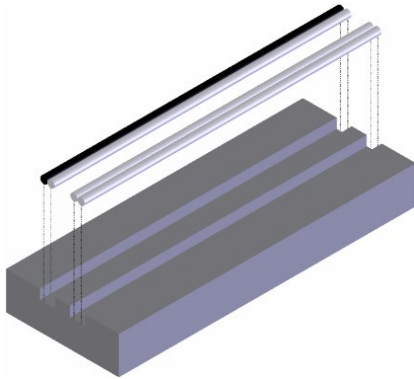
Installation instructions



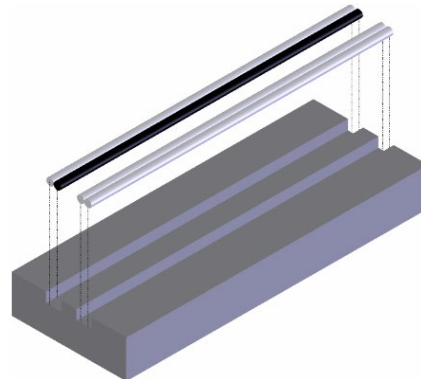
Floor installation without floor clips

Installation sequence

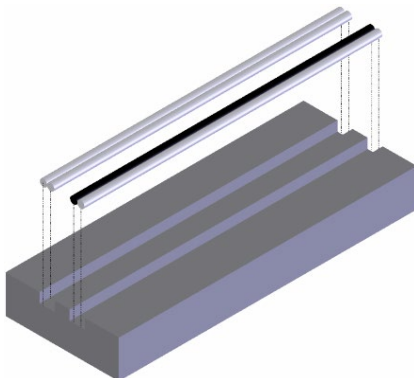
1.



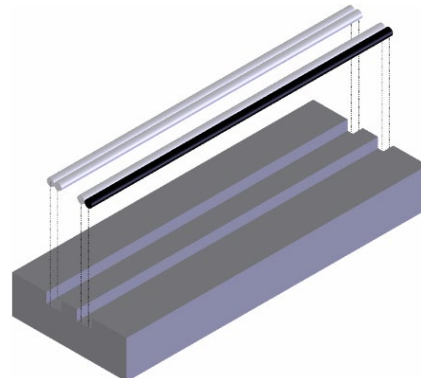
2.



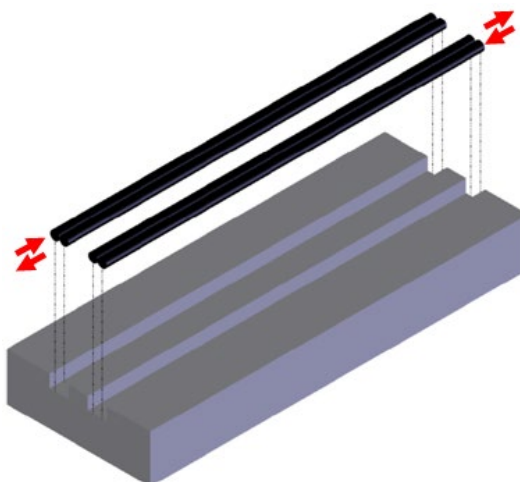
3.



4.

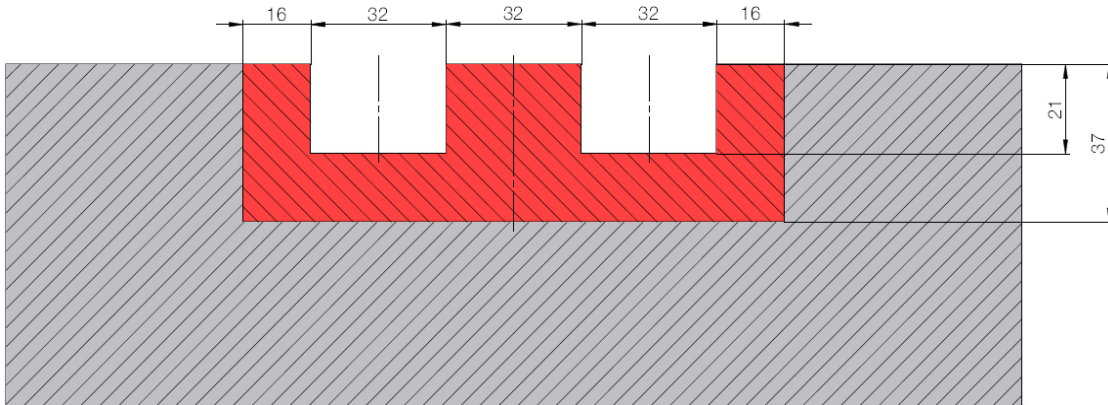


Overview



Floor installation
without floor clips

Grinding information*)

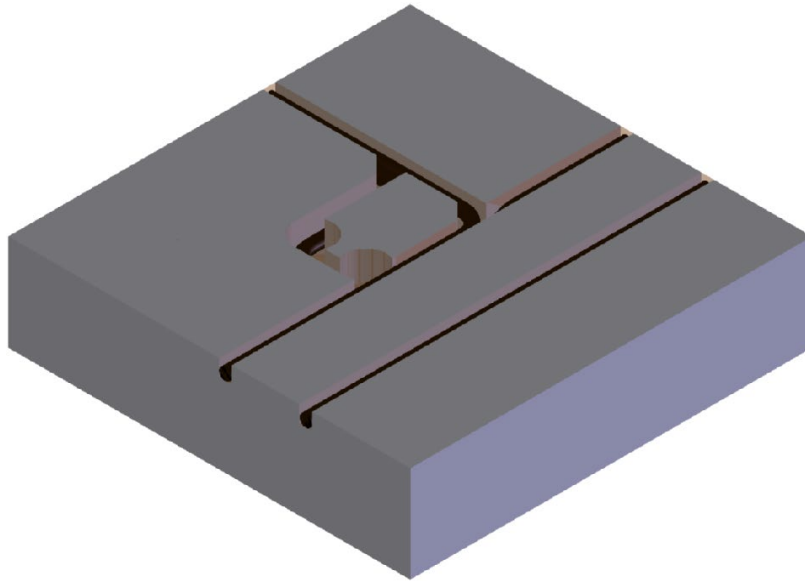


*) The **red area** must be free of ferromagnetic materials.

Floor installation without floor clips

5.7 Power feed point or capacitor box output

Overview



Application: Transition from the main segment to a power supply segment, for example to connect the main segment to a capacitor box, track supply, or another main segment.

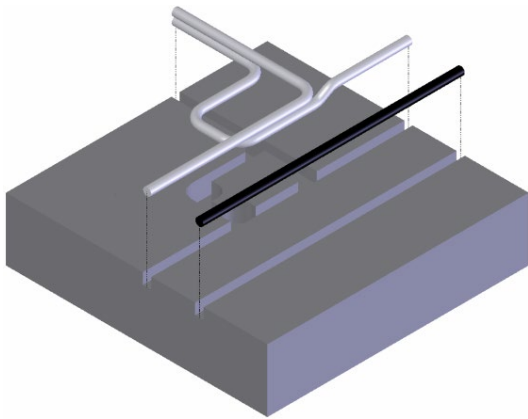
When installing power feed points and capacitor outputs, the following points must be observed:

- Power feed points and capacitor box outputs should not be placed near points with reduced power density such as reversal points, curves, track switches, and crossings.
- Keep a minimum distance of 500 mm (outer edge to outer edge of the Litz cables) from another power feed, crossing, reversal point, or track switch. This will avoid negative influence on the homogeneous magnetic field needed for power transmission, losses will remain low, and inductive track guidance will remain effective.
- The power supply segments must always be 90° from the direction of travel for at least 500 mm, to neutralize the resulting magnetic fields.
- The lines of power supply segments must be bundled with cable ties. This ensures that the magnetic field in this area is minimum.
- The Litz cable on which the main flow of traffic takes place is always laid on top for effective track guidance.

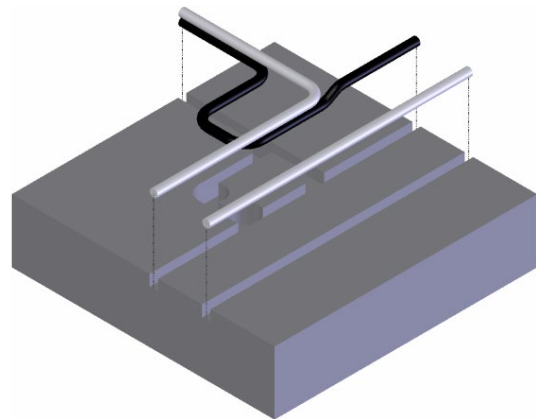
Floor installation without floor clips

Installation sequence

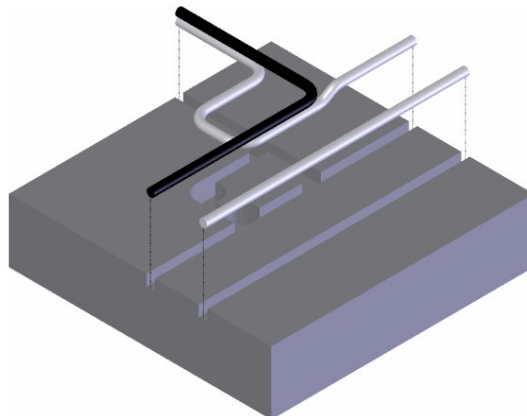
1.



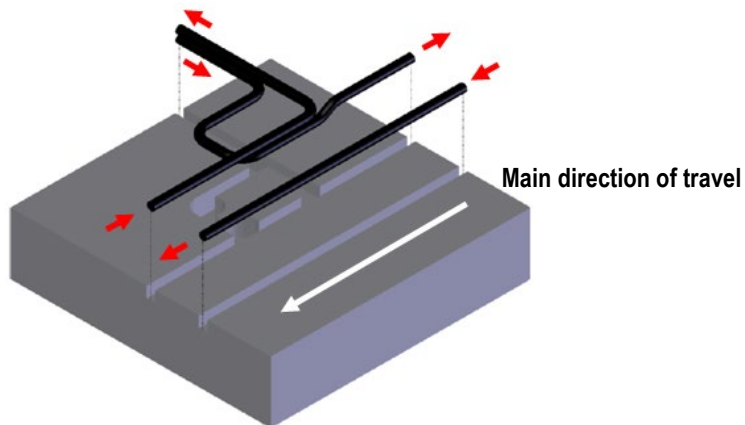
2.



3.

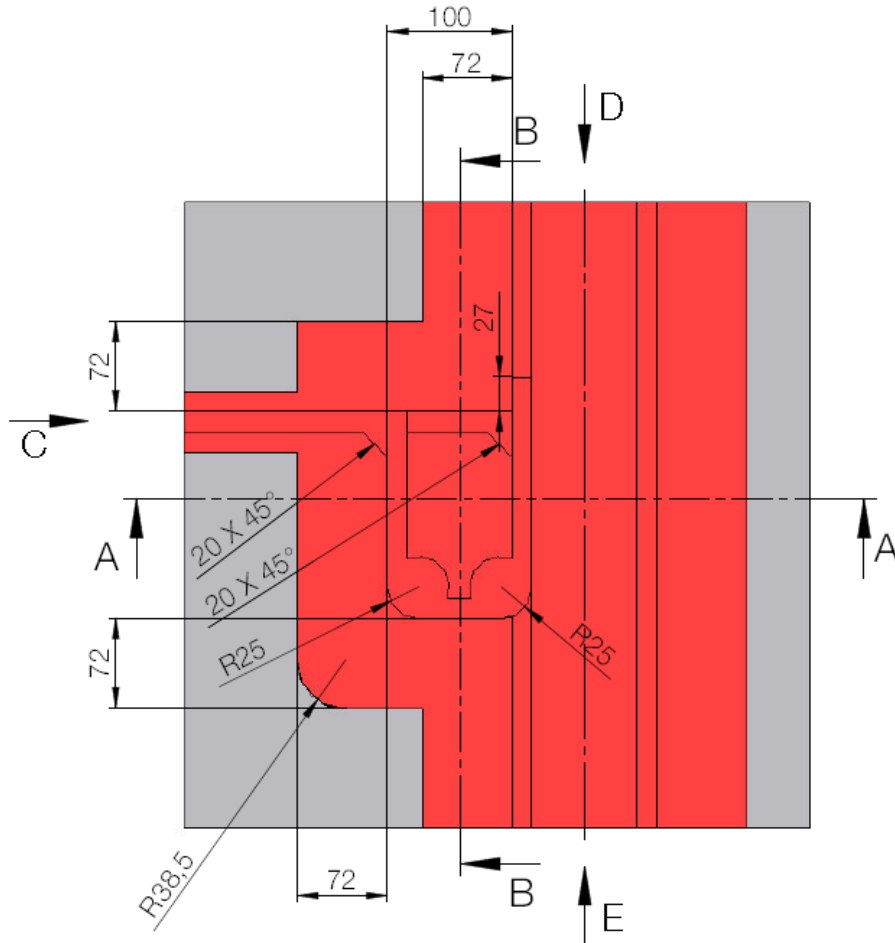


Overview



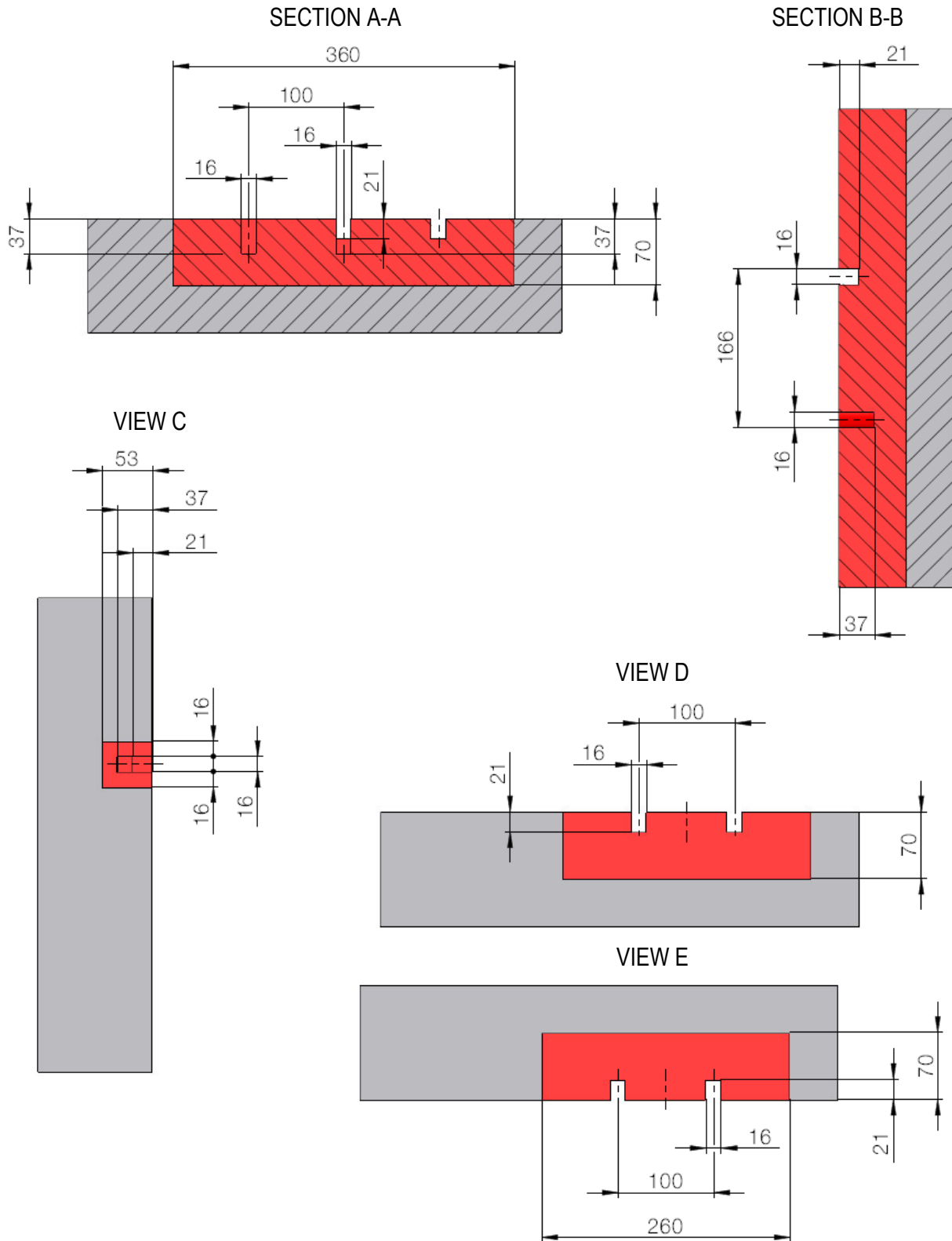
Floor installation
without floor clips

Grinding information*)



*) The **red area** must be free of ferromagnetic materials.

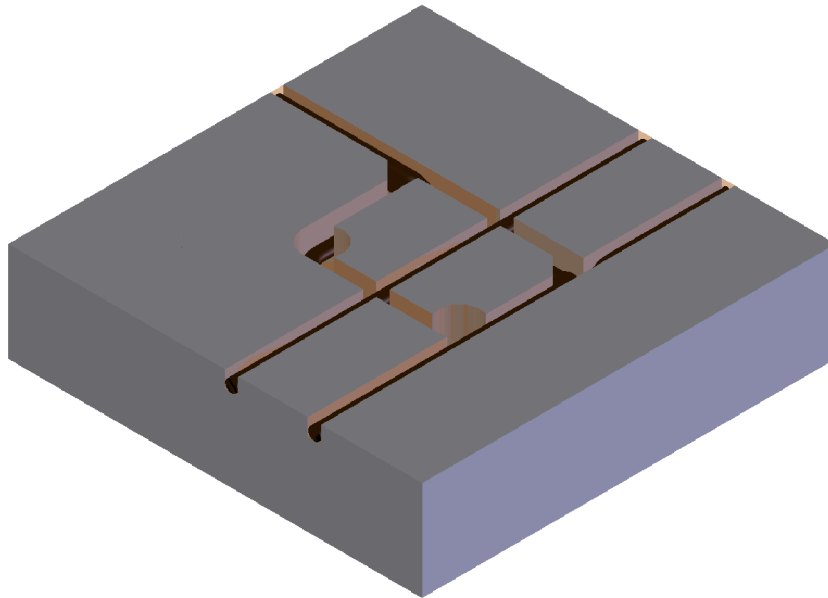
Floor installation
without floor clips



Floor installation without floor clips

5.8 Opposing capacitor box output

Overview



Application: Transition from the main segment to a power supply segment in order to connect the main segment to a capacitor box.

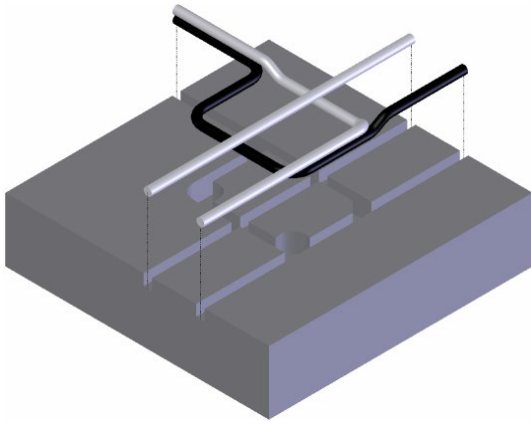
When installing opposing power feed points and capacitor outputs, the following points must be observed:

- Power feed points and capacitor box outputs should not be placed near points with reduced power density such as reversal points, curves, track switches, and crossings.
- Keep a minimum distance of 500 mm (outer edge to outer edge of the Litz cables) from another power feed, crossing, reversal point, or track switch. This will avoid negative influence on the homogeneous magnetic field needed for power transmission, losses will remain low, and inductive track guidance will remain effective.
- The power supply segments must always be 90° from the direction of travel for at least 500 mm, to neutralize the resulting magnetic fields.
- The lines of power supply segments must be bundled with cable ties. This ensures that the magnetic field in this area is minimum.
- The Litz cable on which the main flow of traffic takes place is always laid on top for effective track guidance.

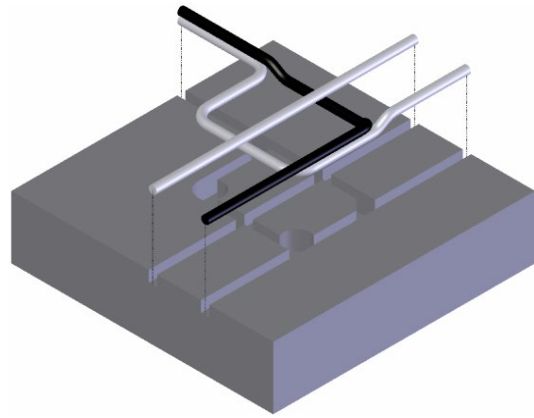
Floor installation without floor clips

Installation sequence

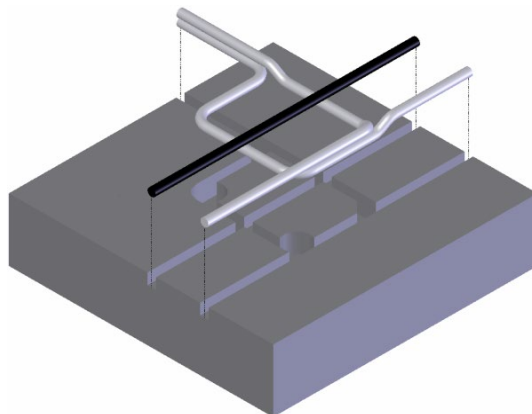
1.



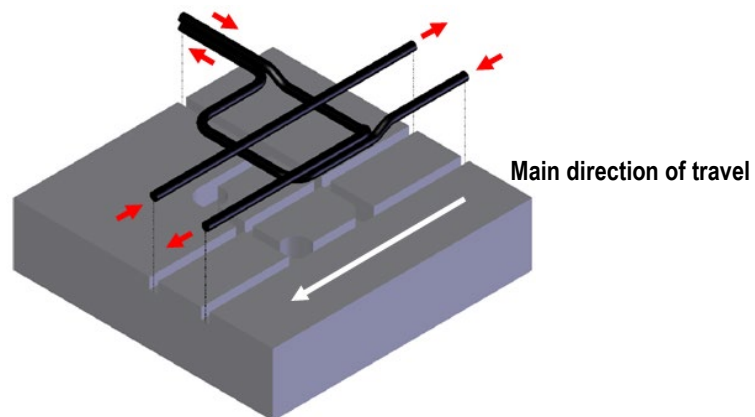
2.



3.

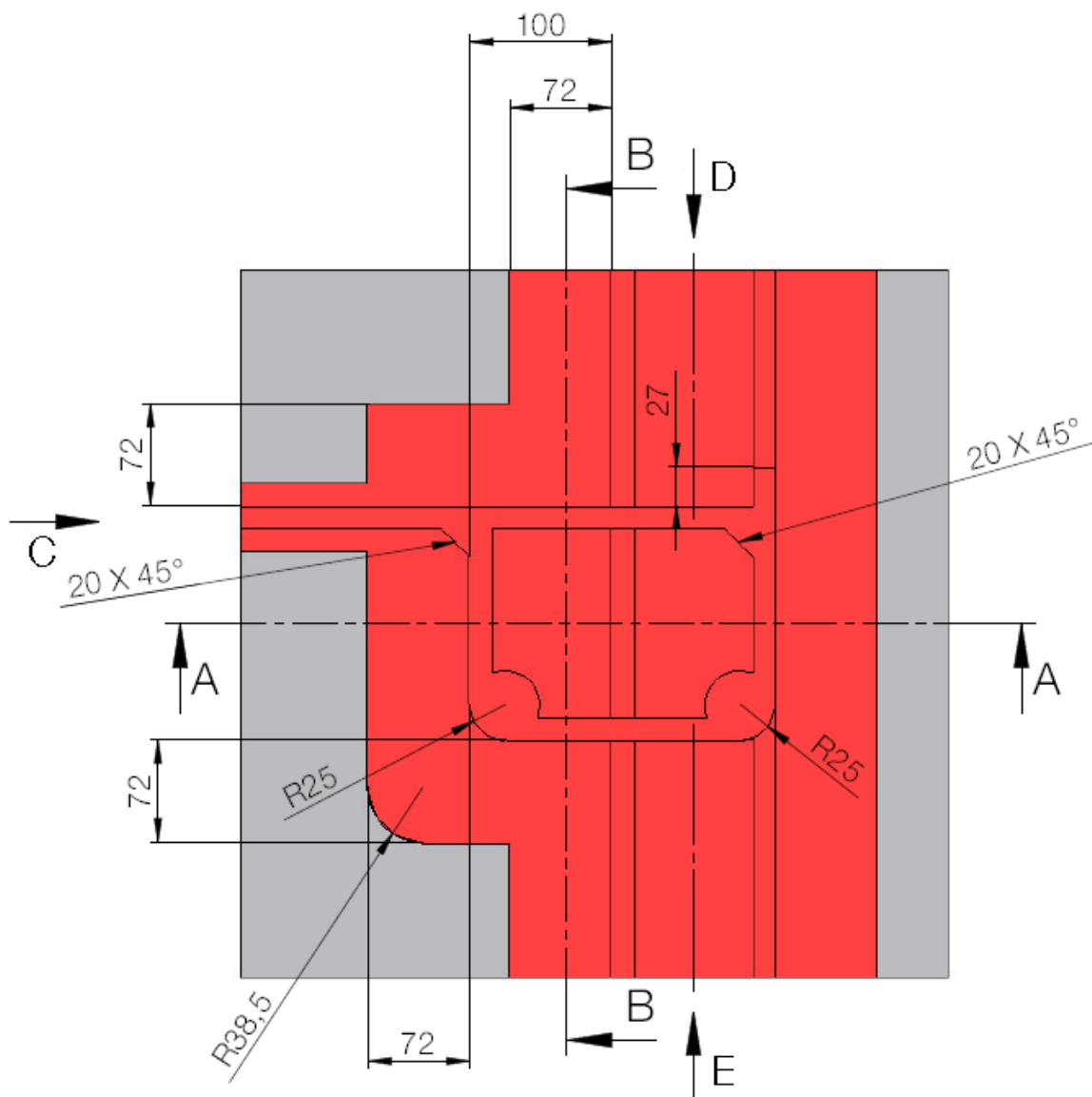


Overview



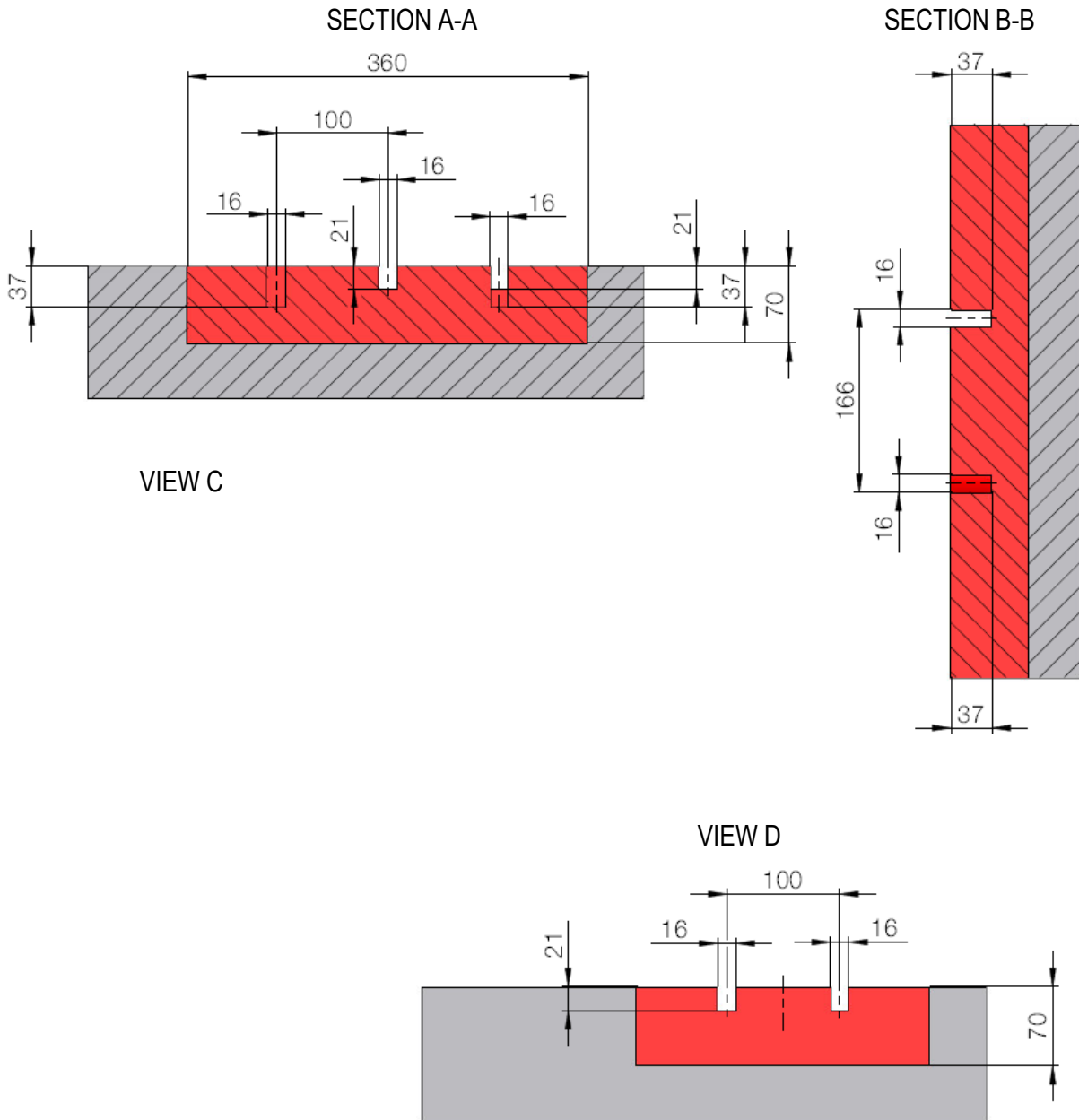
Floor installation
without floor clips

Grinding information*)

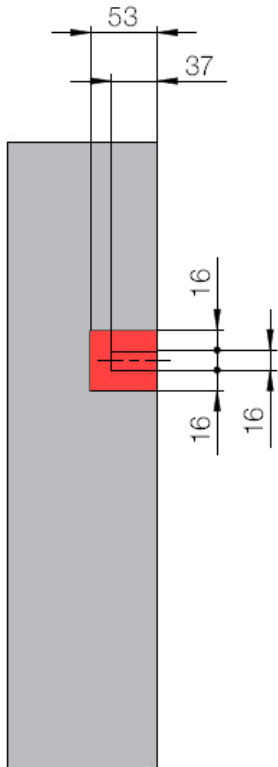


*) The **red area** must be free of ferromagnetic materials.

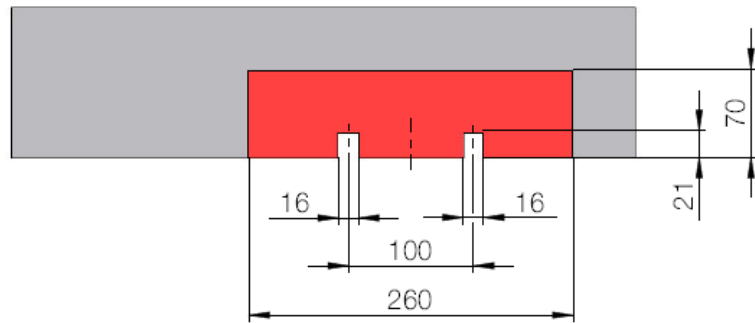
Floor installation
without floor clips



Floor installation
without floor clips



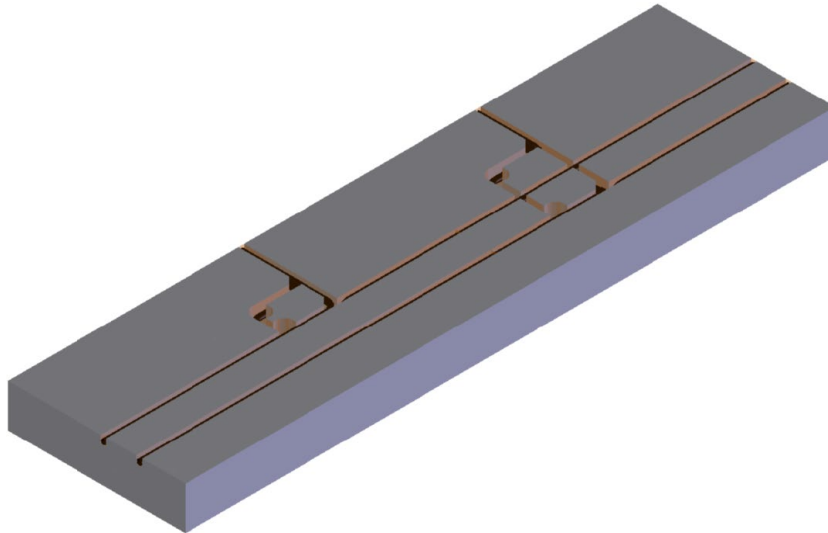
VIEW E



Floor installation without floor clips

5.9 Double capacitor output

Overview



Application: Transition from the main segment to a power supply segment in order to connect the main segment to two capacitor boxes.

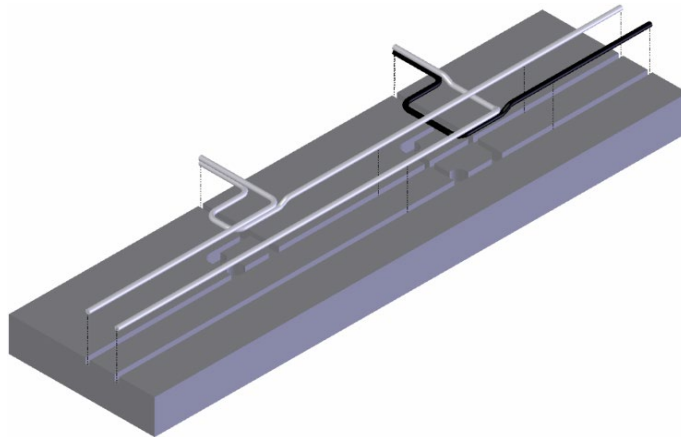
When installing a double capacitor output, the following points must be observed:

- Due to the parasitic inductivity of the Litz cable, a capacitor box pair must be connected to the main segment in predefined intervals of about 30 m. Both boxes are mounted on the wall, a mounting stand, or the like, on one side of the segment. This requires a power feed point and an opposing power feed point - more information can be found in chapter 5.1.
- In a double capacitor output, both boxes lie on one side of the segment, so a power feed point and an opposing power feed point are required.
- At the power feed points, the Litz cables are laid at least 500 mm orthogonally from the segment, before the segment leads to the capacitor boxes, possibly with a mutual distance of 32 mm (outer edge of the two Litz cables).
- The Litz cable on which the main flow of traffic takes place is always laid on top for effective track guidance.
- The length of the power supply segment should be as short as possible in order to minimize line losses. The routing technology and grinding information for the individual elements can be found in chapter 5.7 and chapter 5.8.

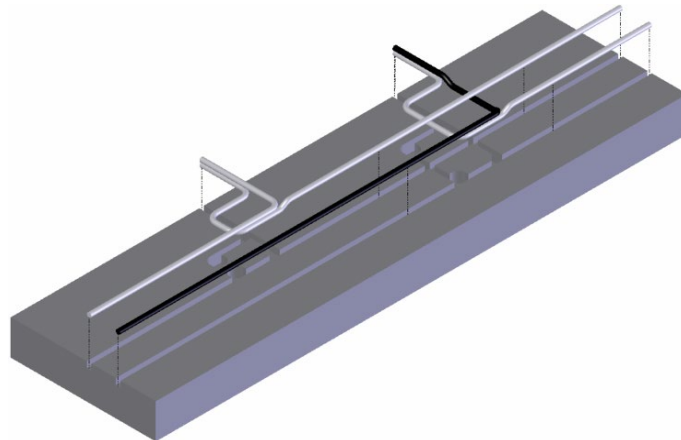
Floor installation without floor clips

Installation sequence

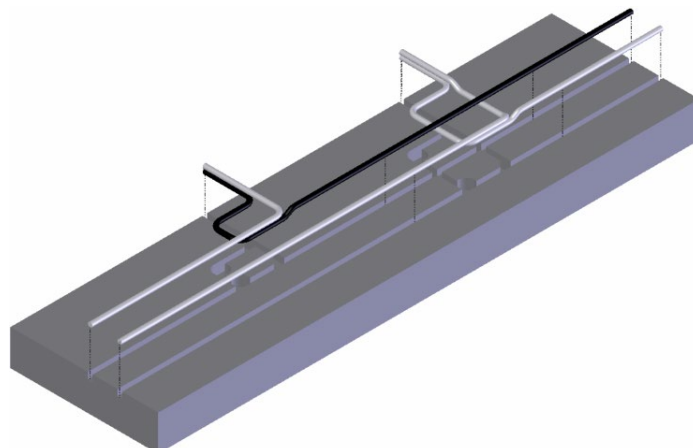
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2.

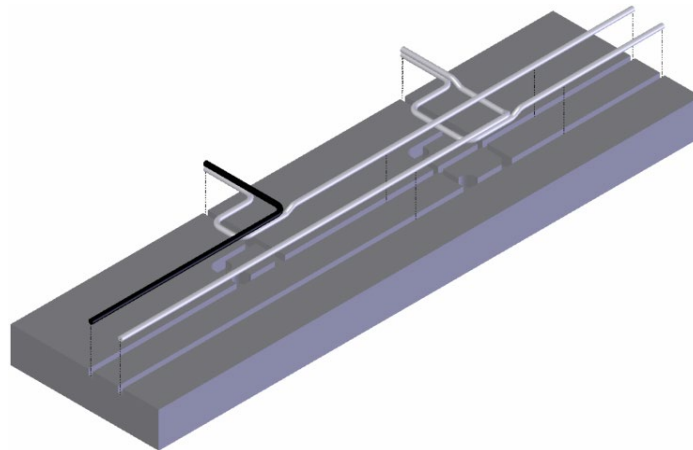


3.

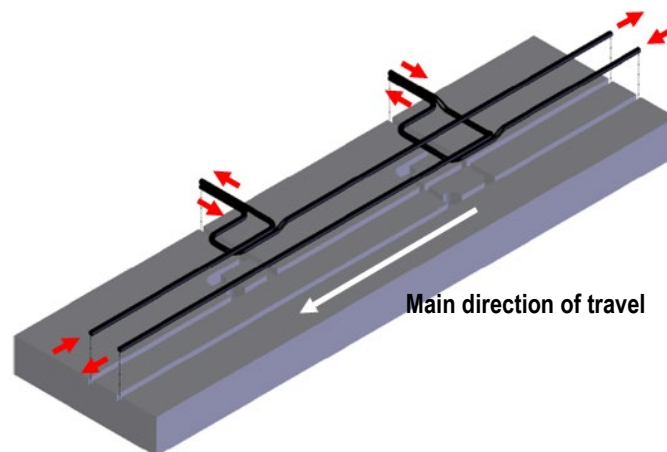


Floor installation without floor clips

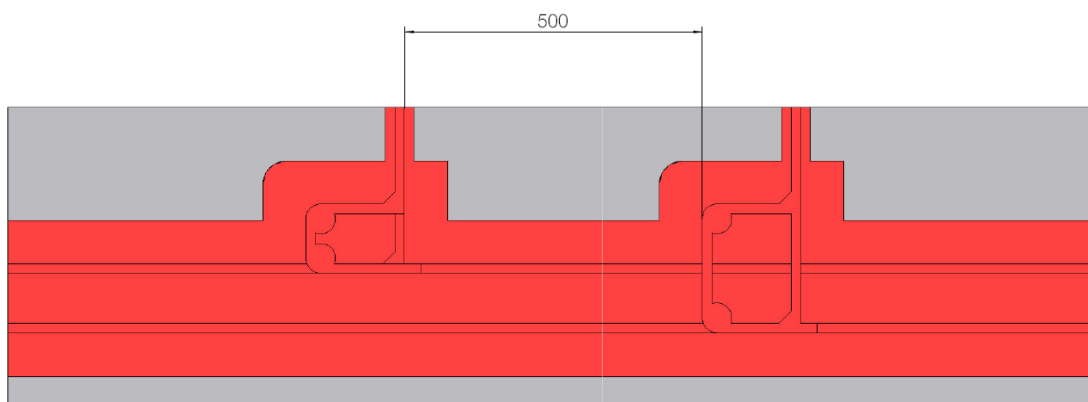
4.



Overview



Grinding information*)

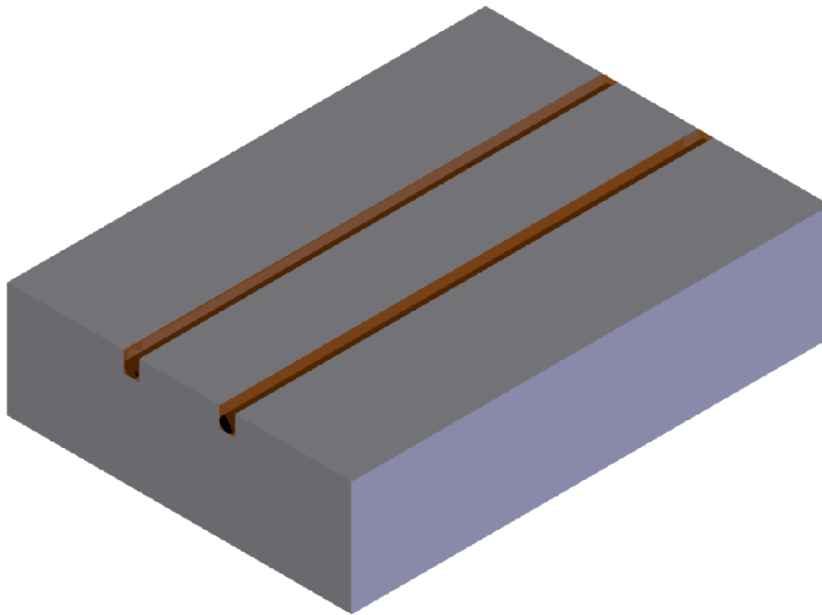


*) The **red area** must be free of ferromagnetic materials. Detailed grinding information can be found in chapters 5.7 and 5.8.

Floor installation without floor clips

5.10 Straight main segment

Overview



Application: Straight segment on which inductive power transfer takes place.

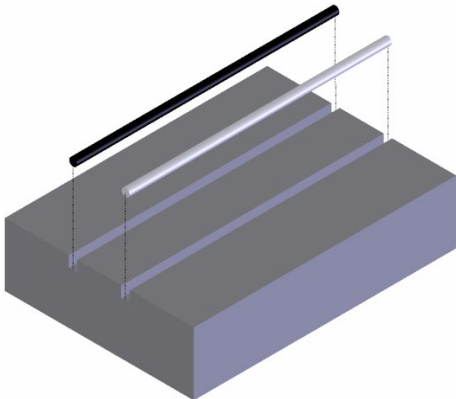
When installing the straight main segment, the following points must be observed:

- The straight main segment consists of two slots which, without floor coating, are each 16 mm wide and 21 mm deep. The grinding depth can vary according to the floor coating to be applied (see also chapter 3.2.3).
- Outputs to capacitor boxes, power feed points, reversal points, etc. can be integrated into straight segments. It is therefore important that a spacing of at least 500 mm be maintained between the system elements, to avoid unnecessary losses through the cables and to ensure a more exact inductive track guidance (see also chapter 3.3.5).

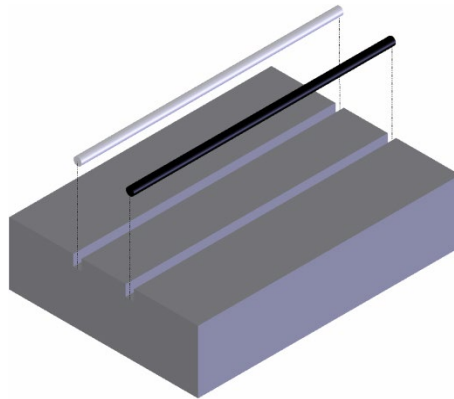
Floor installation without floor clips

Installation sequence

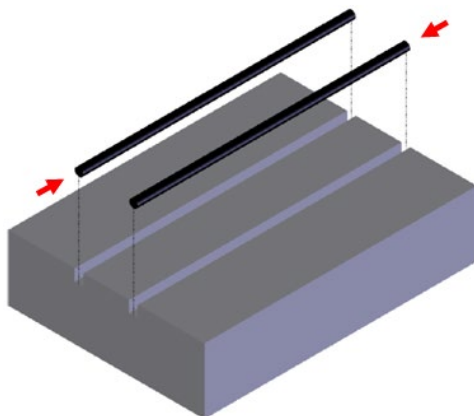
1.



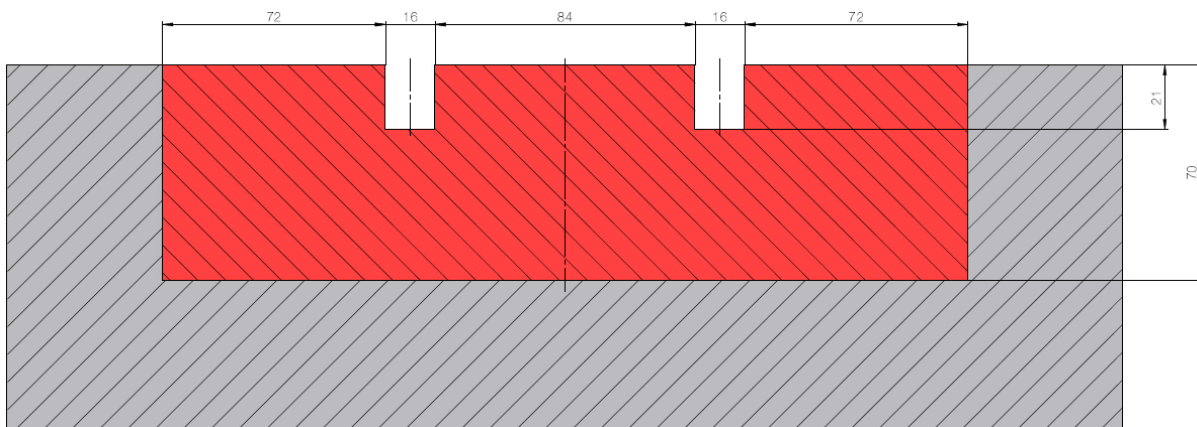
2.



Overview



Grinding information*)

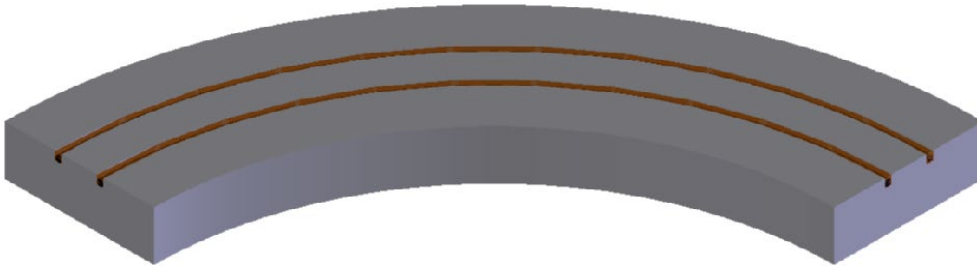


*) The **red area** must be free of ferromagnetic materials.

Floor installation without floor clips

5.11 Curves

Overview



Application: Curved segment on which inductive power transfer takes place.

When installing curves, the following points must be observed:

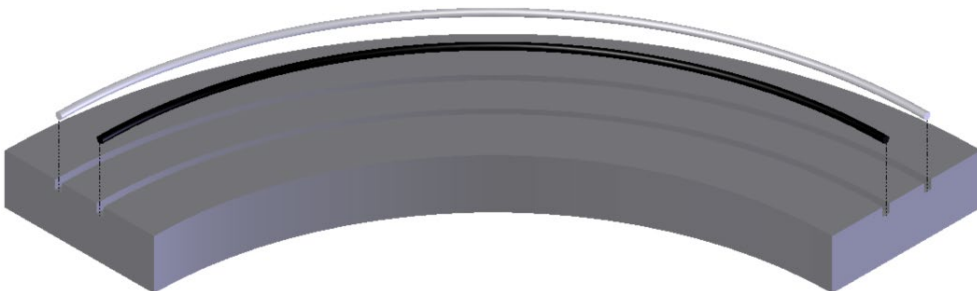
- No additional elements such as capacitor box outputs or power feed points etc. should be integrated into curves, regardless of the radius of curvature.
- As the radius of the curve falls, the power available also falls, since the pickup no longer sits precisely over the main track.
- The radius of curvature can be selected arbitrarily, but a minimum radius of 1000 mm is recommended.
- **Recommendation:** The radii can be ground with a compass for grinding precision.

Installation sequence

1.



2.

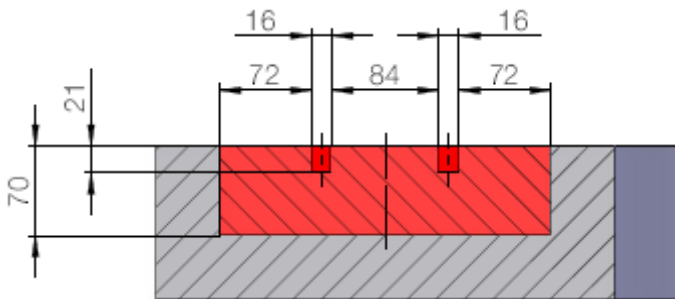


Floor installation without floor clips

Overview



Grinding information*)

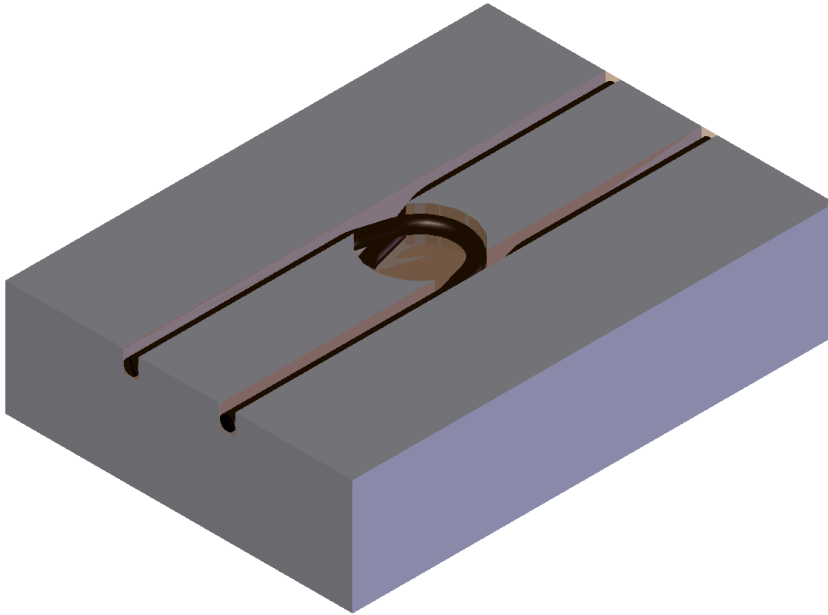


*) The **red area** must be free of ferromagnetic materials.

Floor installation without floor clips

5.12 Reversal point within main segment

Overview



Application: Interface between two areas supplied by different track supply, or two spur lines fed by one track supply.

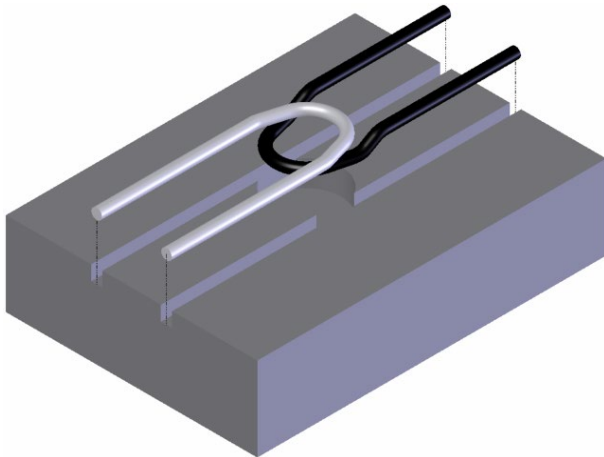
When installing a reversal point within a main segment, the following points must be observed:

- Reversal points should always be on straight segments and maintain a minimum distance of 500 mm (outer edge to outer edge of the Litz cables) from a track switch, crossing, or power feed point. This will avoid negative influence on the homogeneous magnetic field needed for power transmission, losses will remain low, and inductive track guidance will remain effective.
- The Litz cable on which the main flow of traffic takes place is always laid on top for effective track guidance.
- During commissioning, both segments should be checked for phase equivalence in order to keep the inductive power transfer optimum above the reversal point.

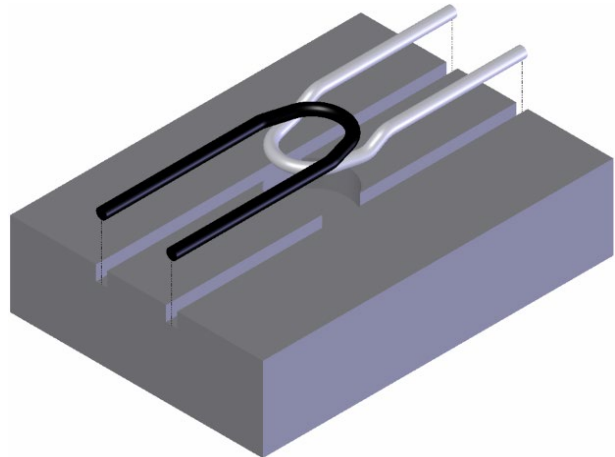
Floor installation without floor clips

Installation sequence

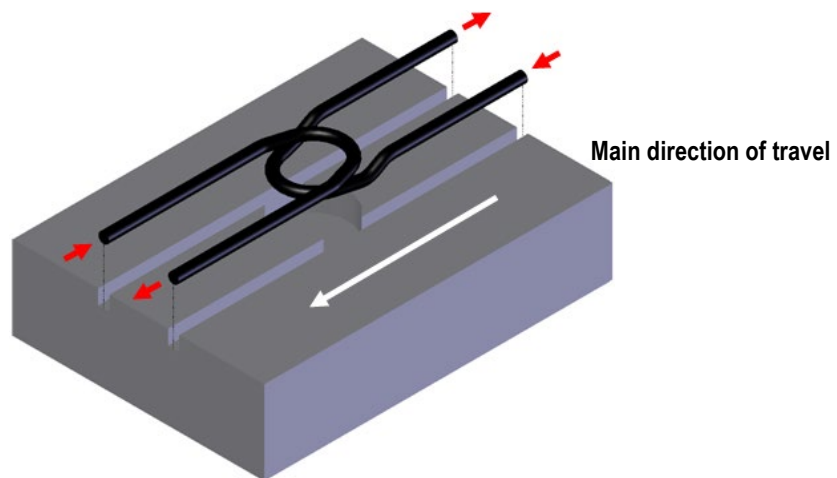
1.



2.

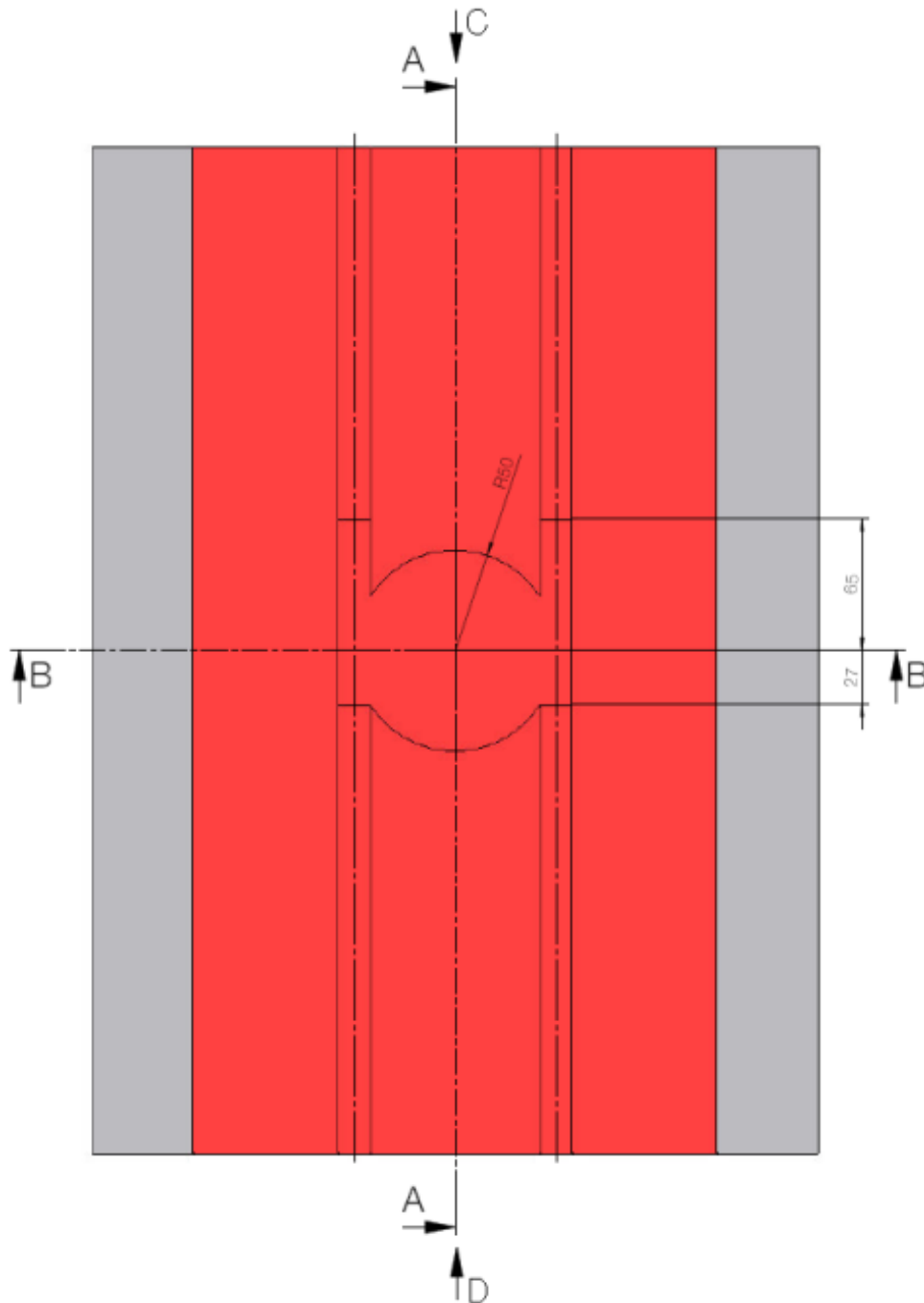


Overview



Floor installation
without floor clips

Grinding information*)

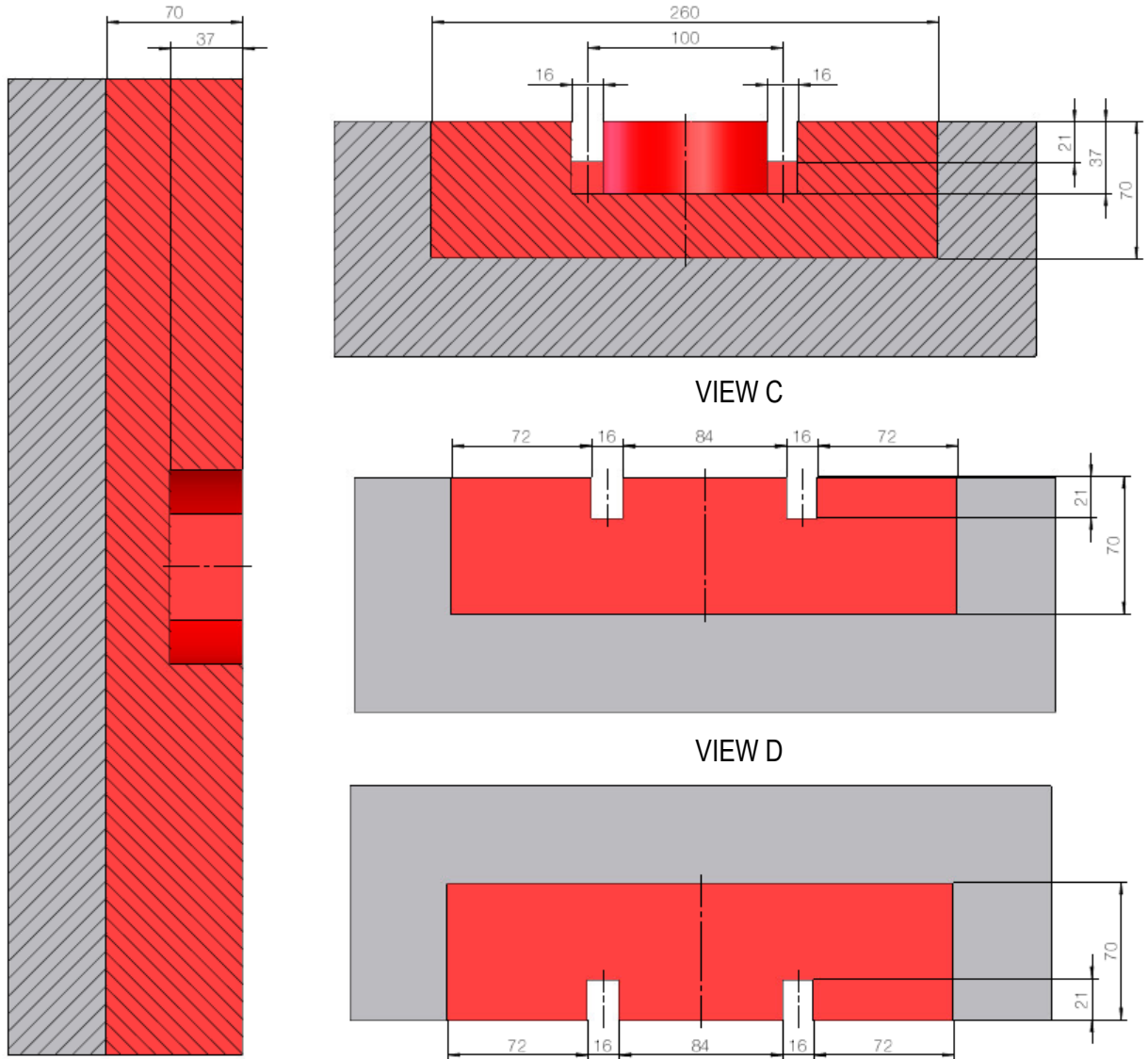


SECTION A-A

SECTION B-B

*) The **red area** must be free of ferromagnetic materials.

Floor installation
without floor clips

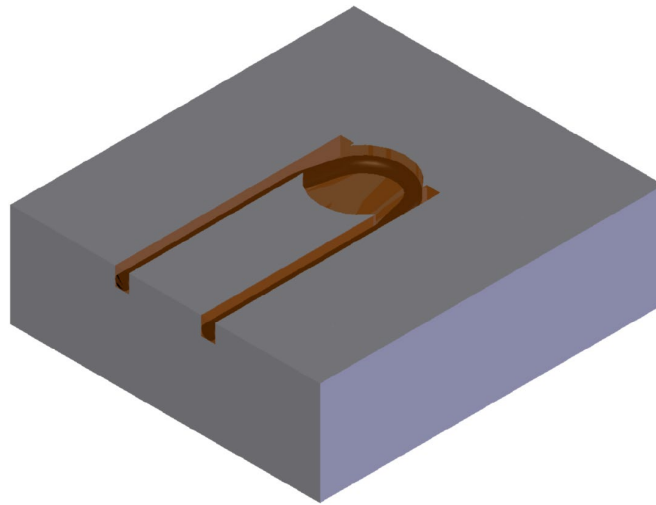


Floor installation without floor clips

6 Base elements

6.1 Reversal point at the end of a main segment

Overview



Application: End of a spur segment.

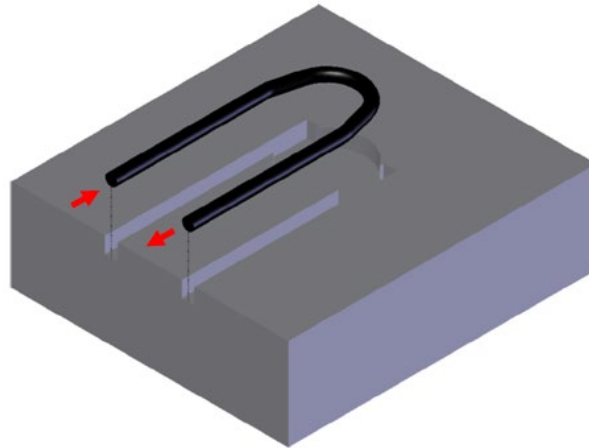
When installing a reversal point at the end of a main segment, the following points must be observed:

- Reversal points at the end of the main segment should always be on straight segments and maintain a minimum distance of 500 mm (outer edge to outer edge of the Litz cables) from a track switch, crossing, or power feed point.
- Reversal points should always be installed where maximum power transfer is required.

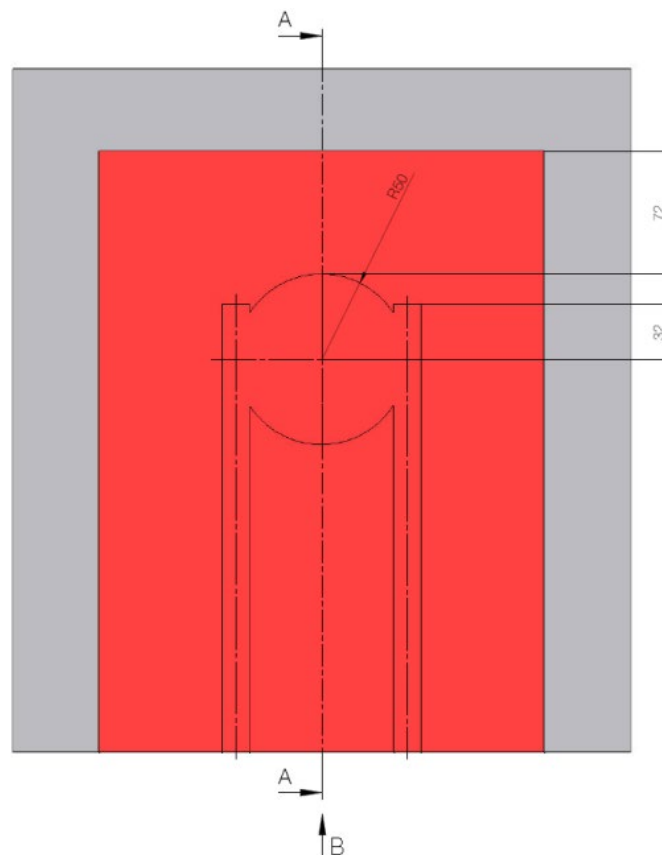
Floor installation without floor clips

Installation sequence

Overview

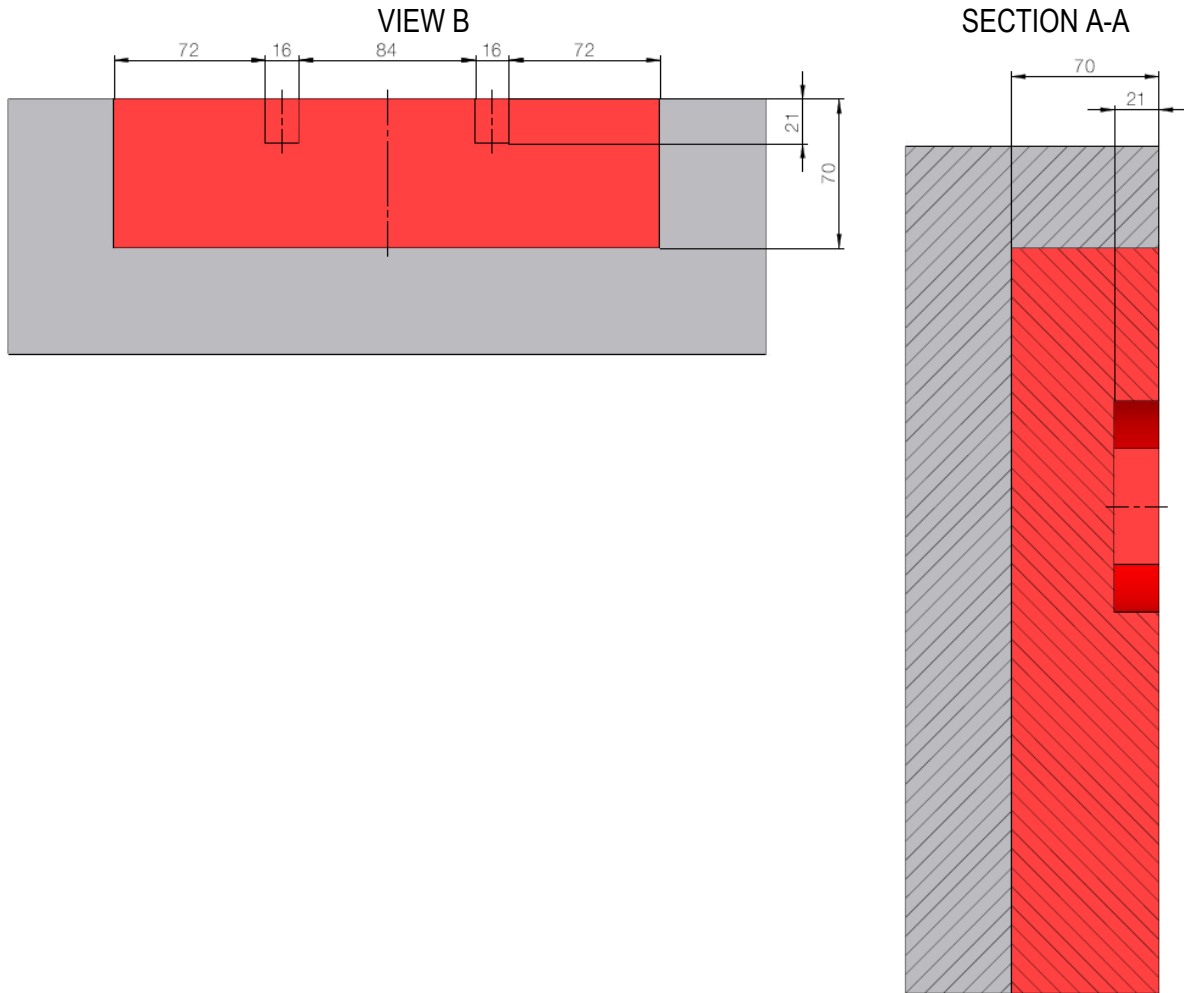


Grinding information*)



*) The **red area** must be free of ferromagnetic materials.

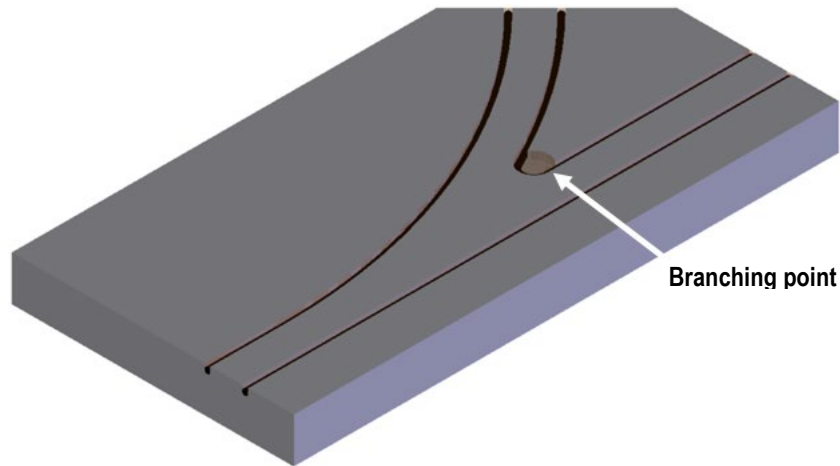
Floor installation
without floor clips



Floor installation without floor clips

6.2 Standard track switch

Overview



Application: Transition from one main segment to another main segment (entry track switch) or from two to one main segment (exit track switch).

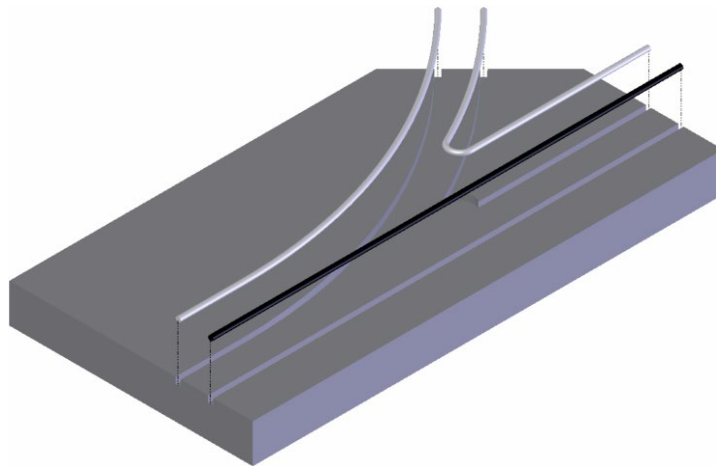
When installing a standard track switch, the following points must be observed:

- There is no continuous magnetic field in a track switch as there is on a straight segment. Power reductions of up to 50% can be expected in these areas. The energy requirements for passing the switch must therefore be known.
- The radius of the branch main segment is variable but is at least 1000 mm. A radius of 1500 mm is recommended.
- **Recommendation:** For grinding accuracy, the radii should be ground with a grinder mounted on a type of compass.
- To ensure effective track guidance, the bore in the branching point of the track switch has a radius of 40 mm.
- The change in the zone that must be kept free of ferromagnetic materials must be noted.

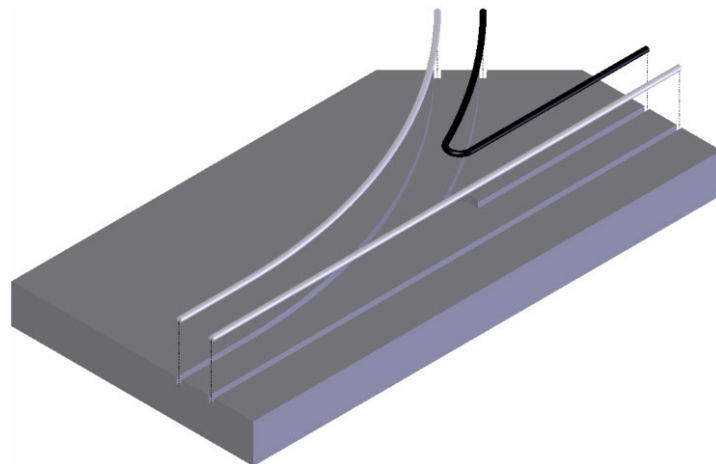
Floor installation
without floor clips

Installation sequence

1.

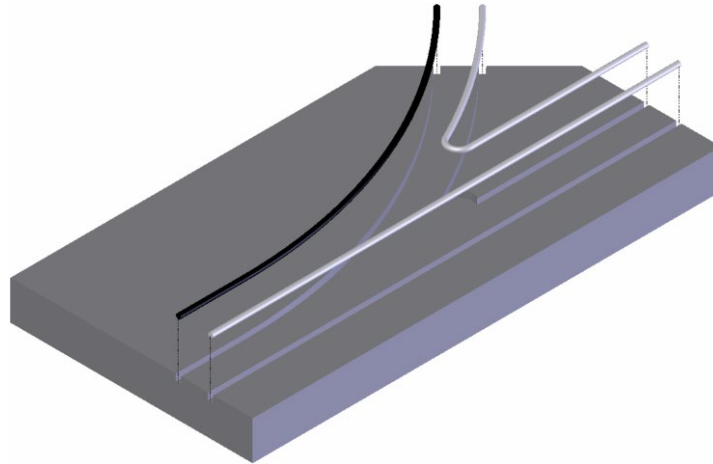


2.

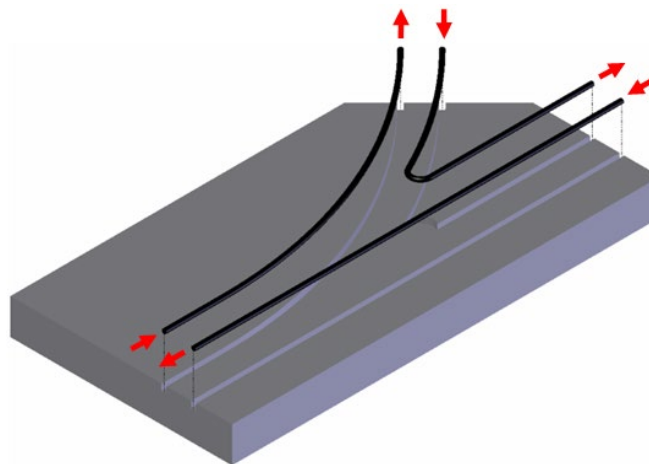


Floor installation
without floor clips

3.

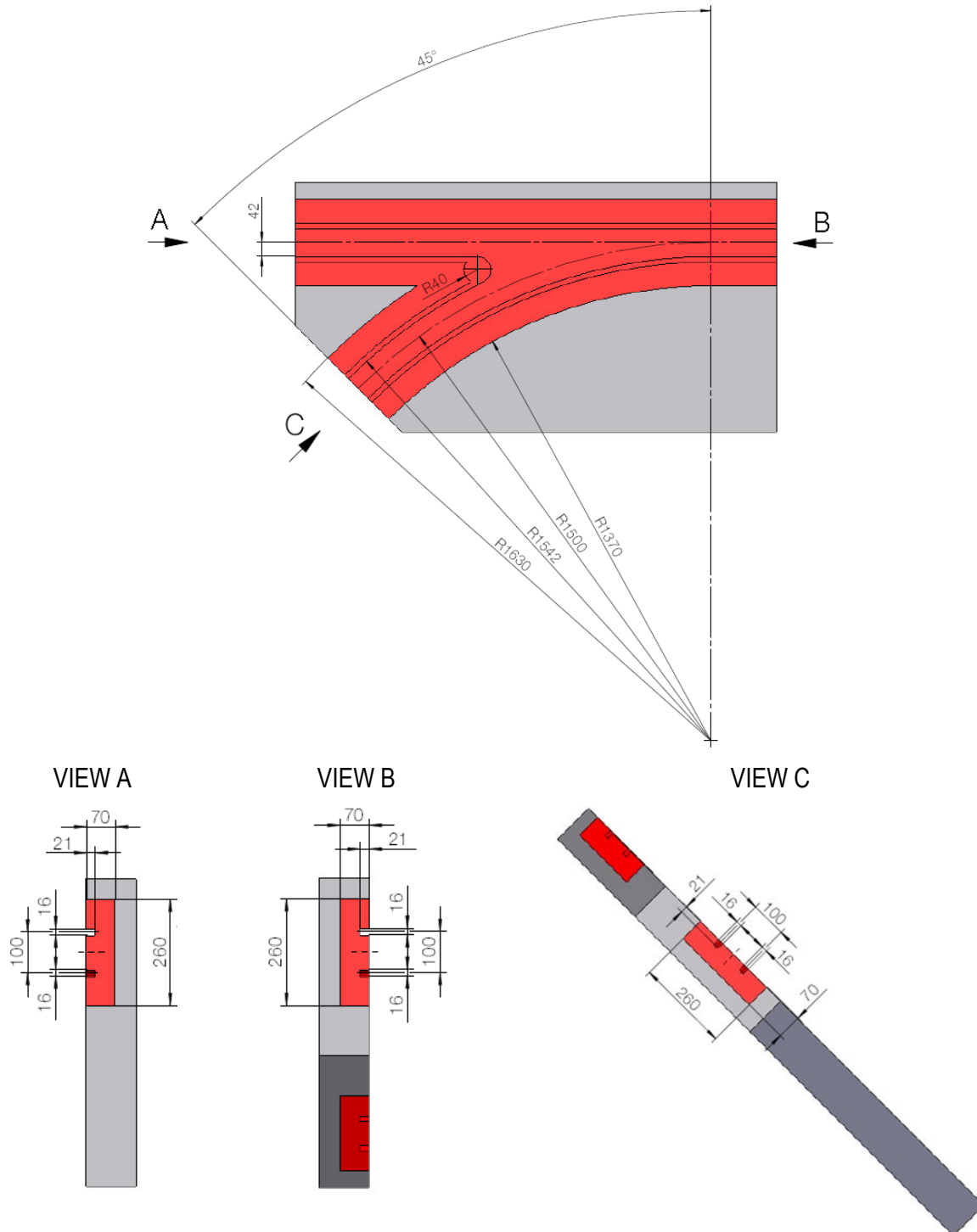


Overview



Floor installation without floor clips

Grinding information*)

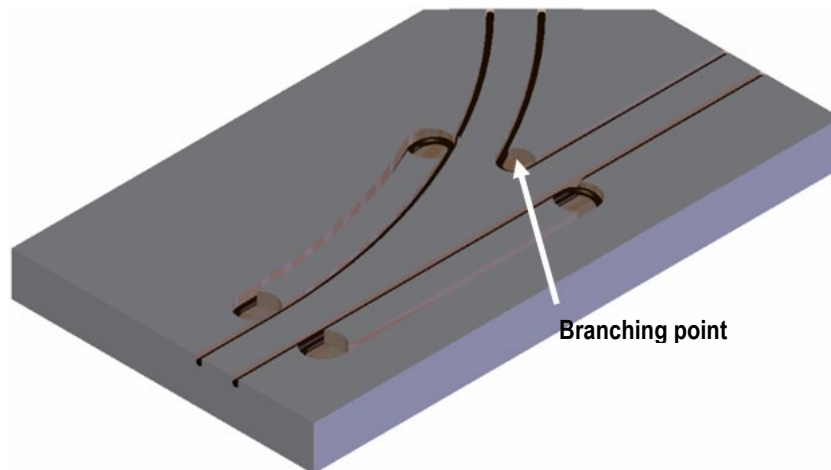


*) The **red area** must be free of ferromagnetic materials.

Floor installation without floor clips

6.3 Standard track switch with power loops

Overview



Application: Transition from one main segment to another main segment (entry track switch) or from two to one main segment (exit track switch) with optimum power transmission.

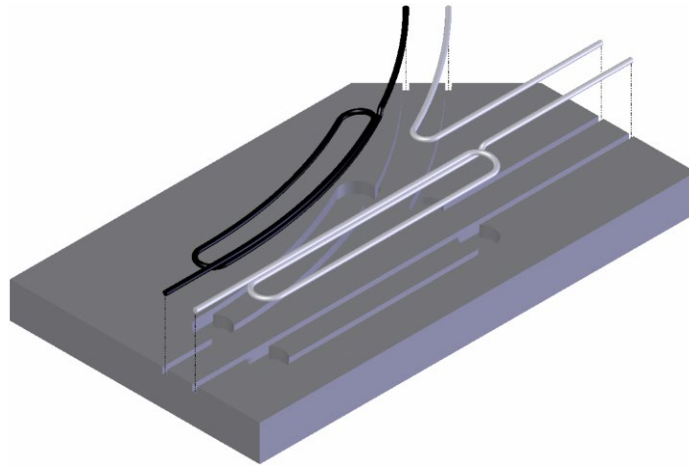
When installing a standard track switch with power loops, the following points must be observed:

- For the standard track switch with power loops grinding work in addition to that for the standard track switch is required in order to install the power loops in the floor. These are necessary to ensure continuous 100% power supply to the vehicle over the entire track switch area.
- The pickup may not remain in the vicinity of the power loop for longer periods.
- To ensure effective track guidance, the bore in the branching point of the track switch has a radius of 40 mm.
- The radius of the branching main segment is variable but should be at least 1000 mm. A radius of 1500 mm is recommended.
- The length of the power loop depends on the radius of the track switch.
- The Litz cable on which the main flow of traffic takes place is always laid on top for effective track guidance.
- **Recommendation:** For grinding accuracy, the radii should be ground with a grinder mounted on a type of compass.
- The change in the zone that must be kept free of ferromagnetic materials must be noted.

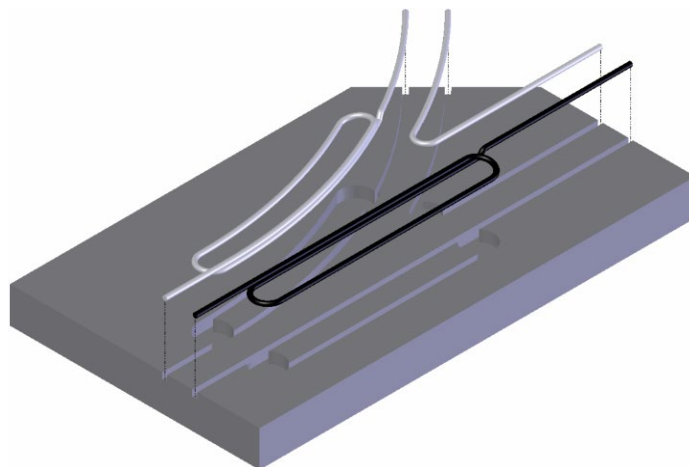
Floor installation without floor clips

Installation sequence

1.

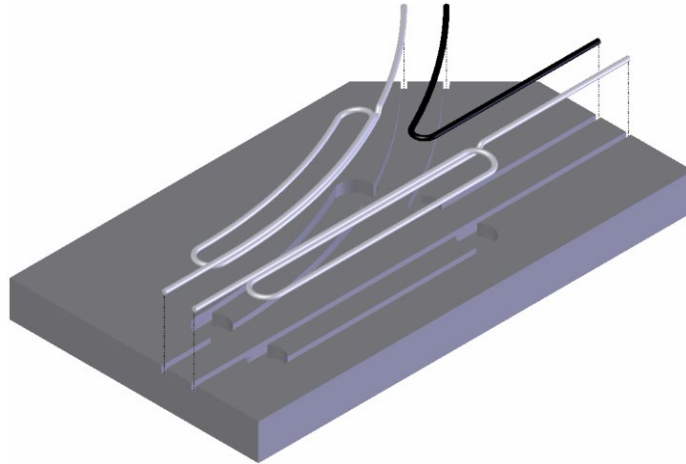


2.

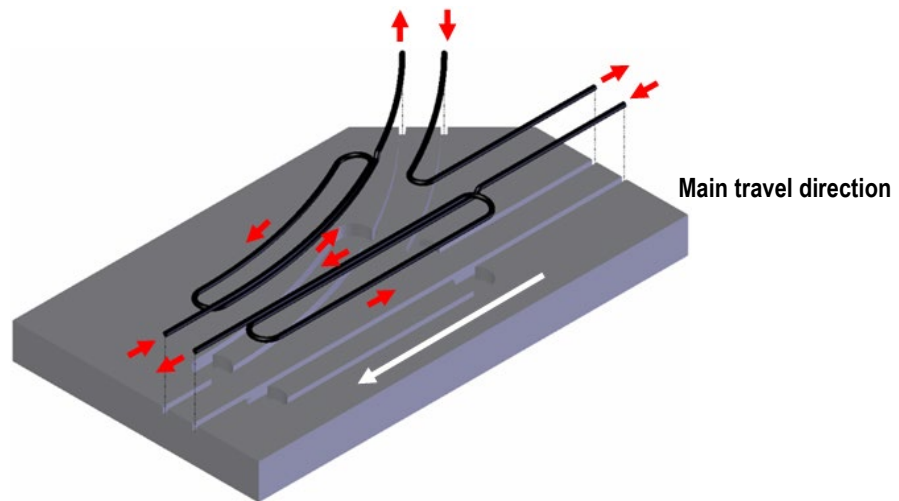


Floor installation
without floor clips

3.

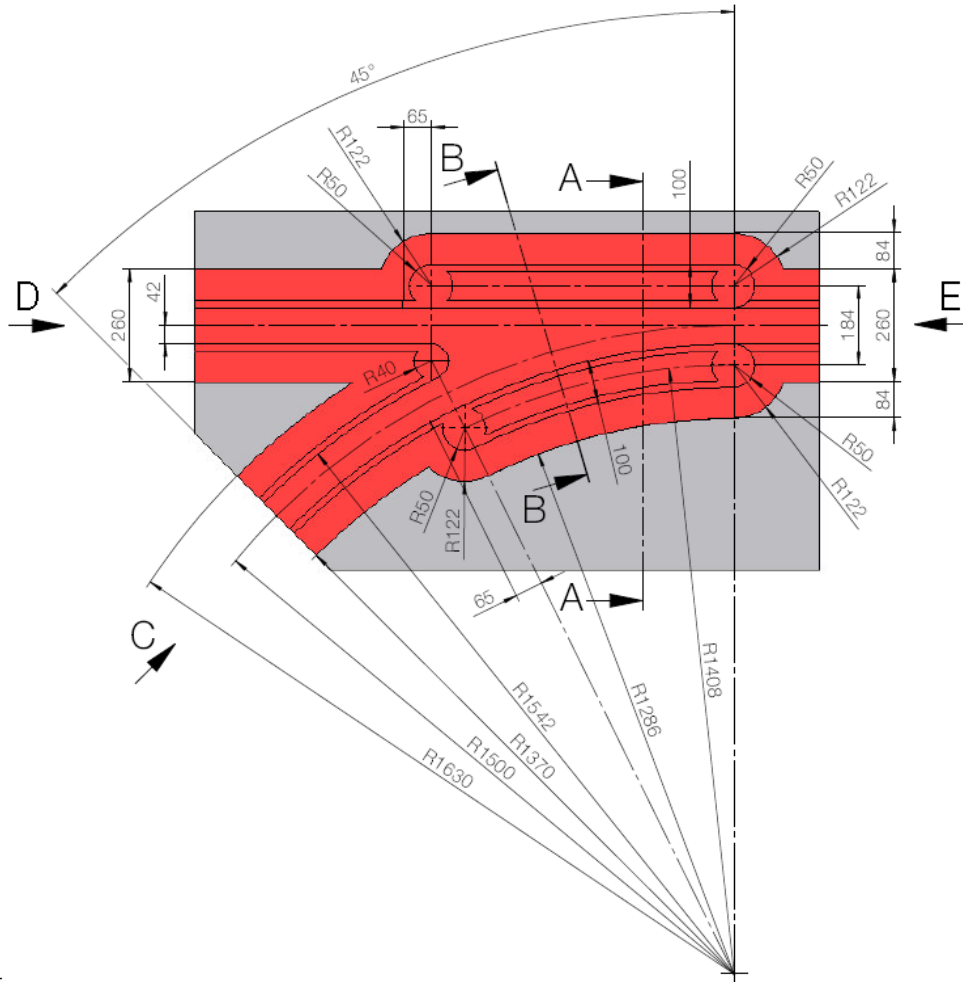


Overview



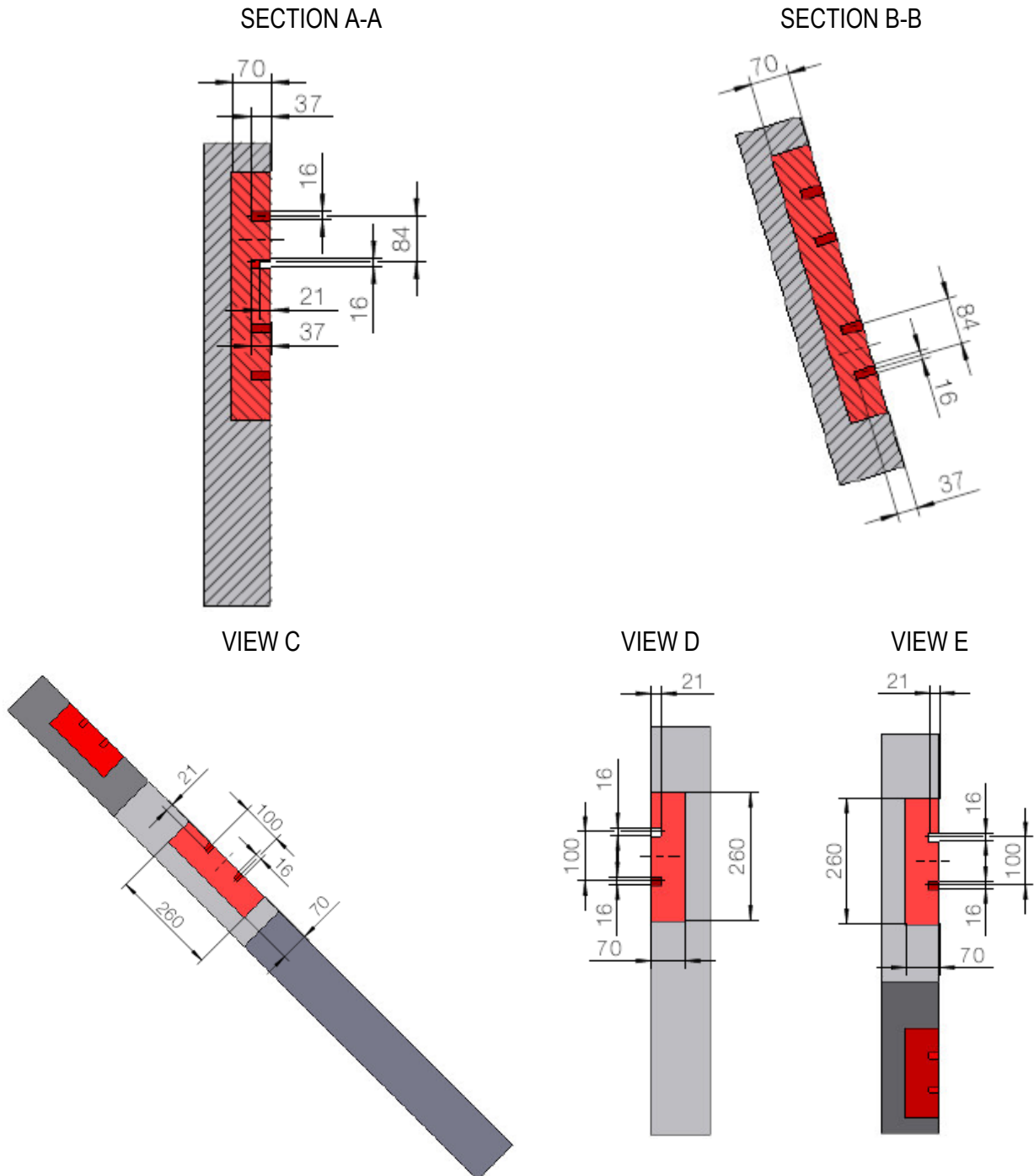
Floor installation
without floor clips

Grinding information*)



*) The **red area** must be free of ferromagnetic materials.

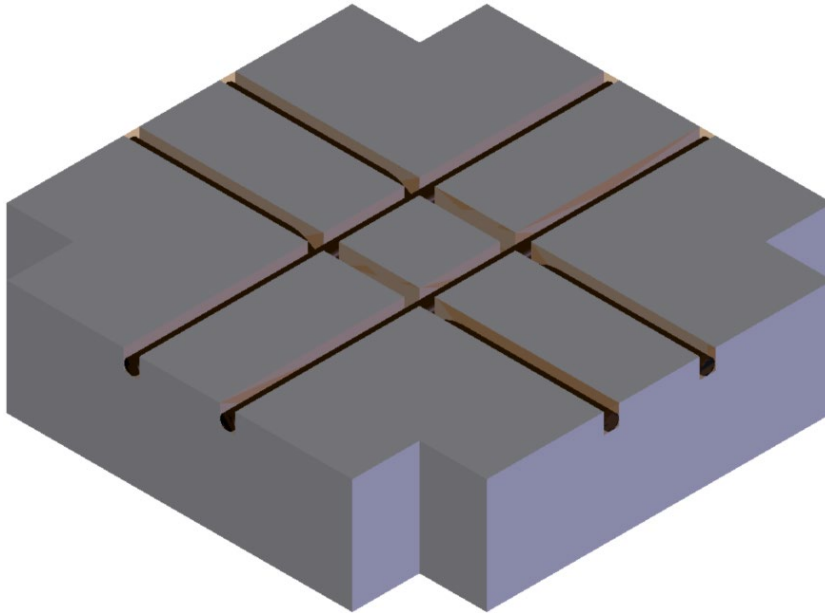
Floor installation
without floor clips



Floor installation without floor clips

6.4 Right-angled crossing

Overview



Application: Crossing of two main segments.

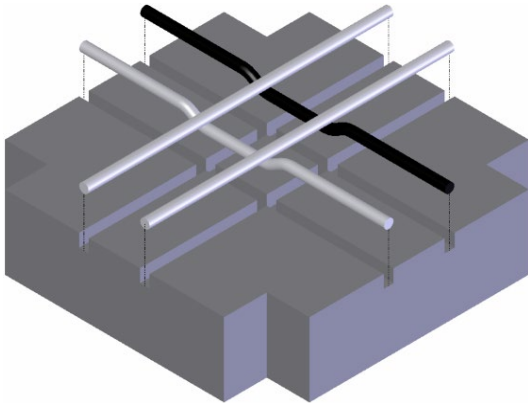
When installing a 90° crossing, the following points must be observed:

- There is no continuous magnetic field in the underpassing main segment in a crossing as there is on a straight segment. Power reductions of up to 50% can be expected in these areas. The energy requirements for passing the crossing overpass must therefore be known.
- The Litz cable on which the main flow of traffic takes place is always laid on top for effective track guidance.
- The change in the zone that must be kept free of ferromagnetic materials must be noted.

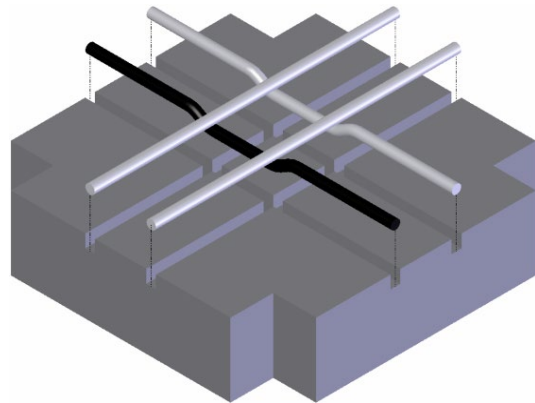
Floor installation without floor clips

Installation sequence

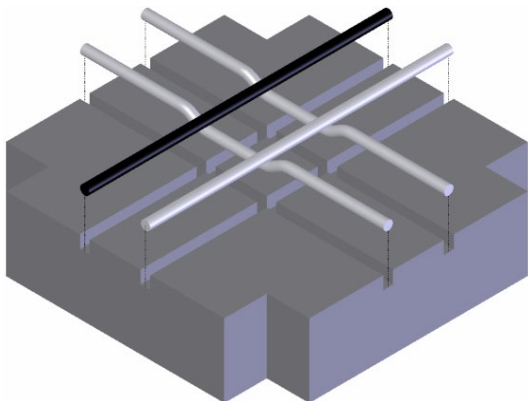
1.



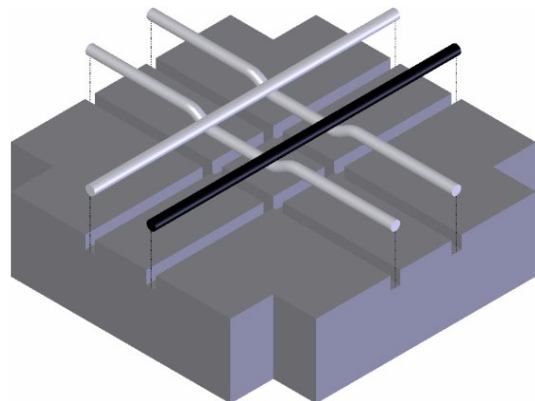
2.



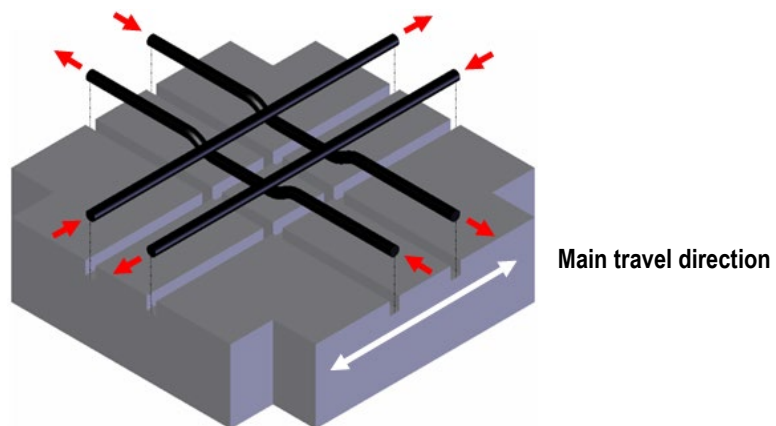
3.



4.

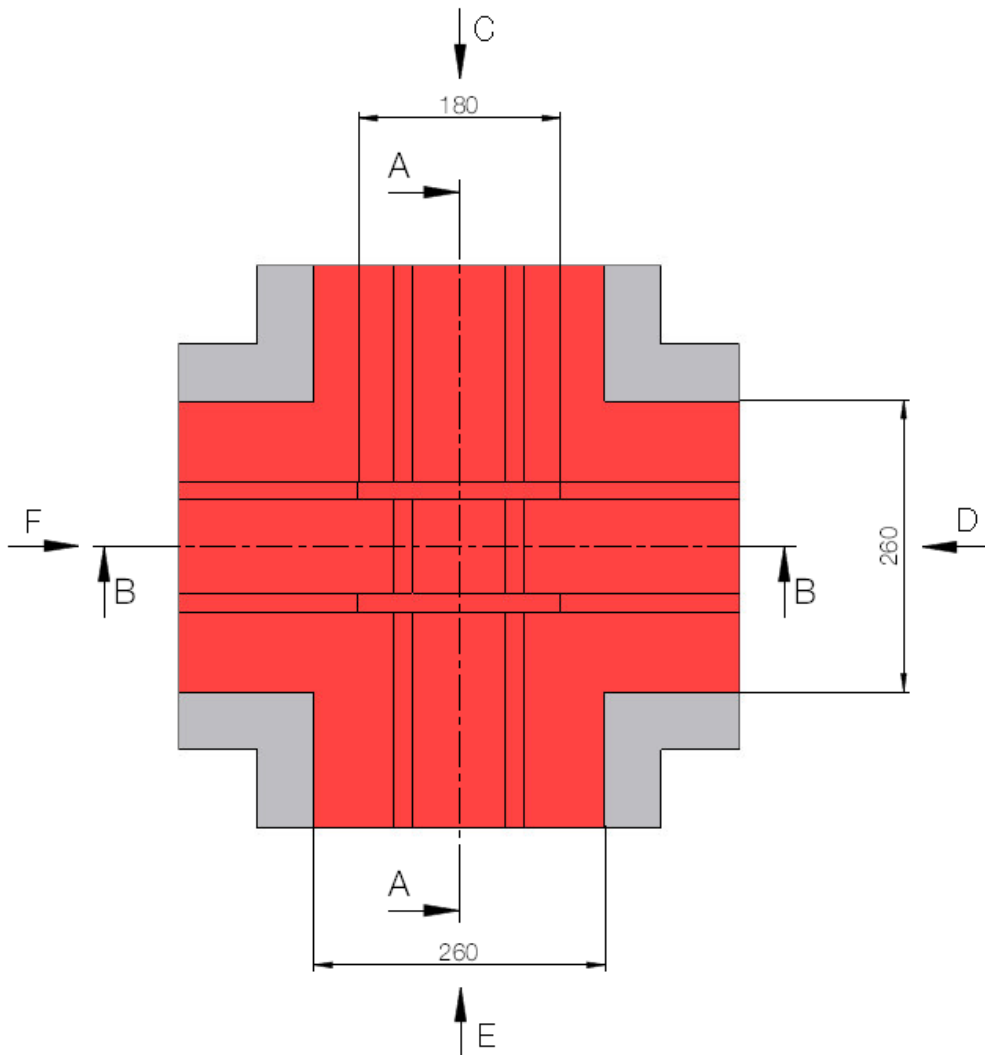


Overview



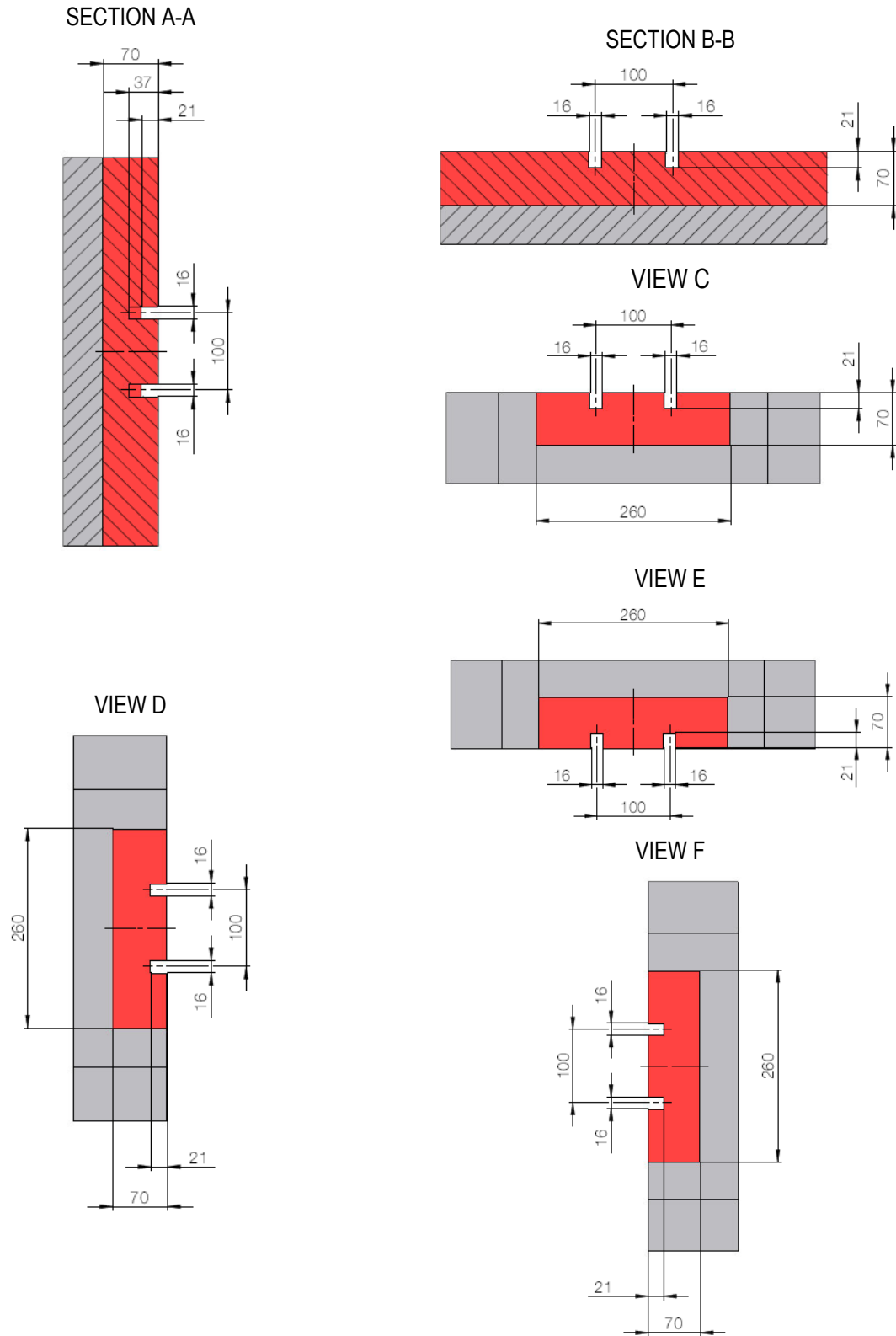
Floor installation
without floor clips

Grinding information*)



*) The **red area** must be free of ferromagnetic materials.

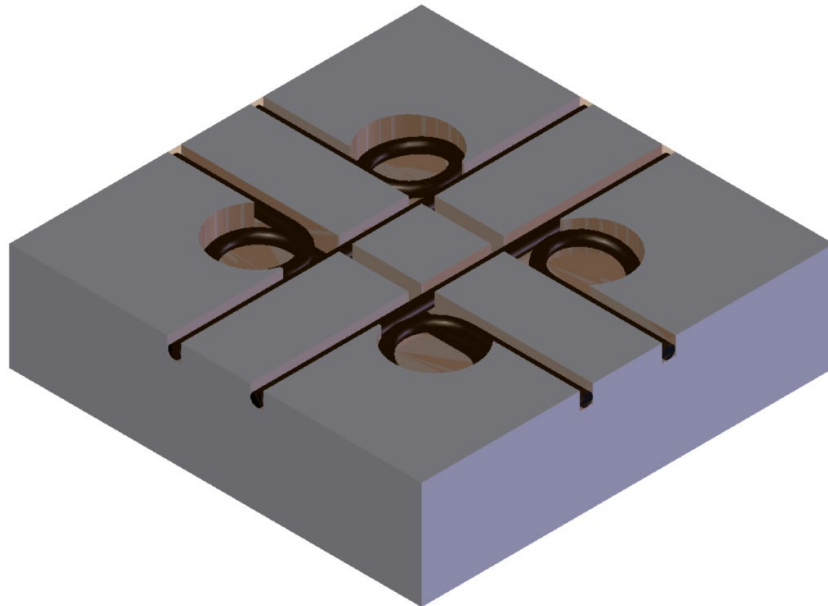
Floor installation
without floor clips



Floor installation without floor clips

6.5 Right-angled crossing with power loops

Overview



Application: Crossing of two main segments with optimum power transmission.

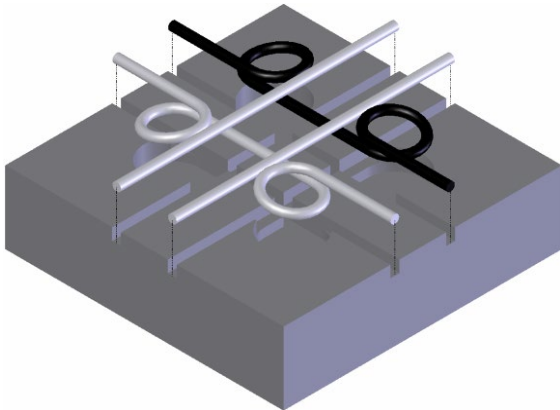
When installing a 90° crossing with power loops, the following points must be observed:

- There is no continuous magnetic field in the underpassing main segment as there is on a straight segment. However, due to the power loop, if the pickup is guided accurately, no power reduction need be anticipated in this area.
- The pickup may not remain in the vicinity of the power loop for longer periods.
- The Litz cable on which the main flow of traffic takes place is always laid on top for effective track guidance.
- The change in the zone that must be kept free of ferromagnetic materials must be noted.

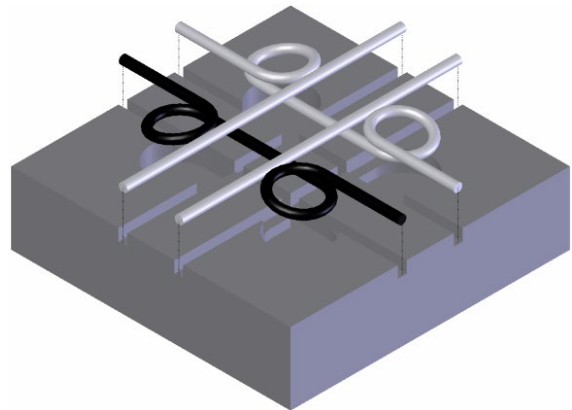
Floor installation without floor clips

Installation sequence

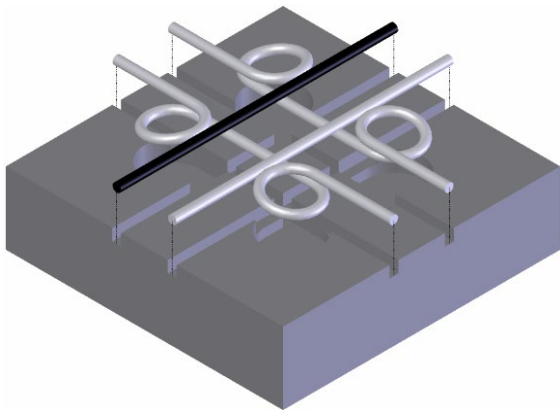
1.



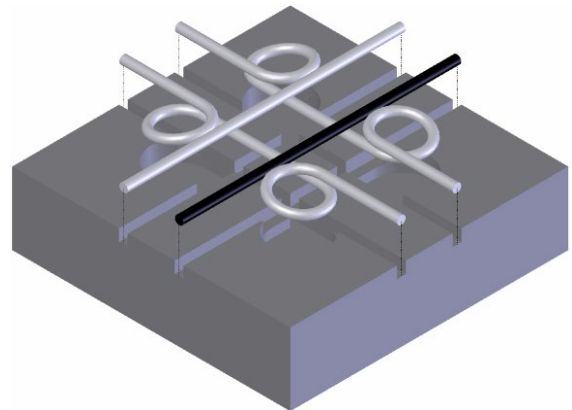
2.



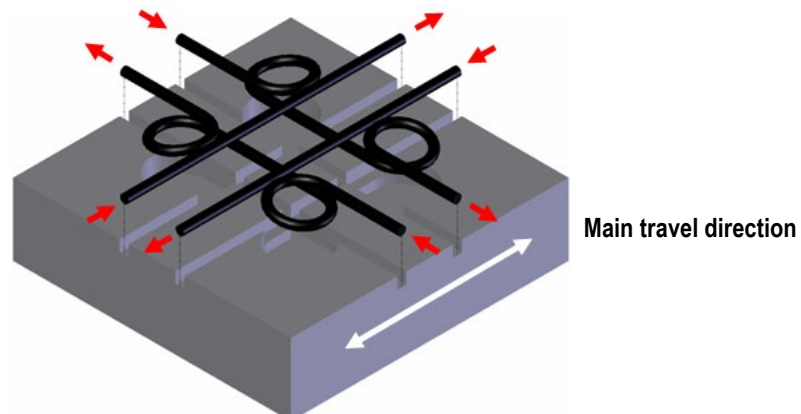
3.



4.

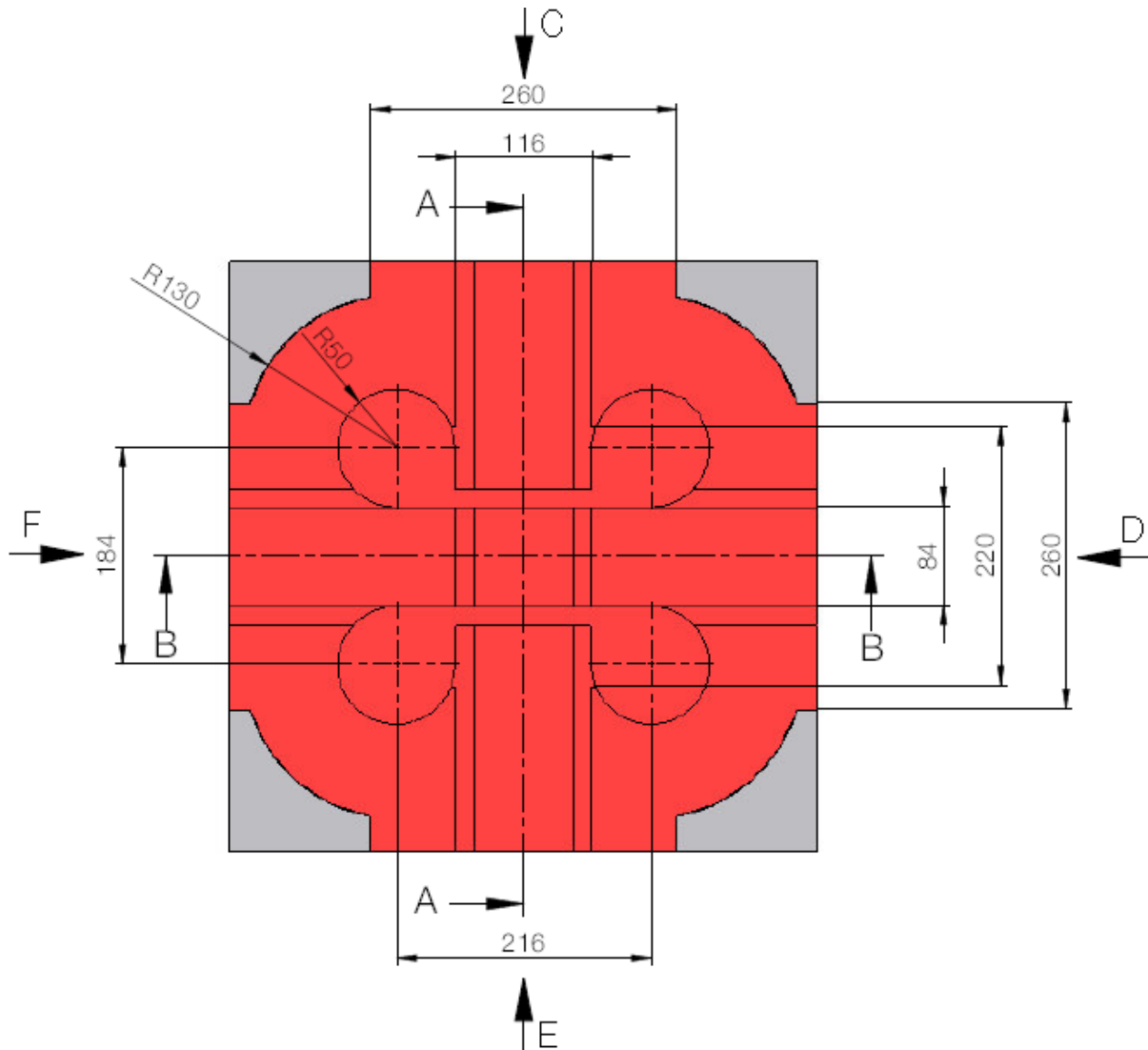


Overview



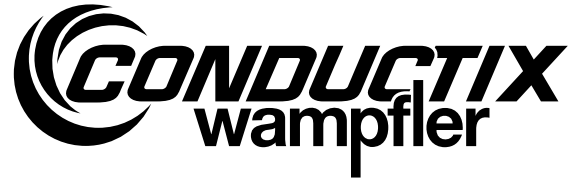
Floor installation
without floor clips

Grinding information*)

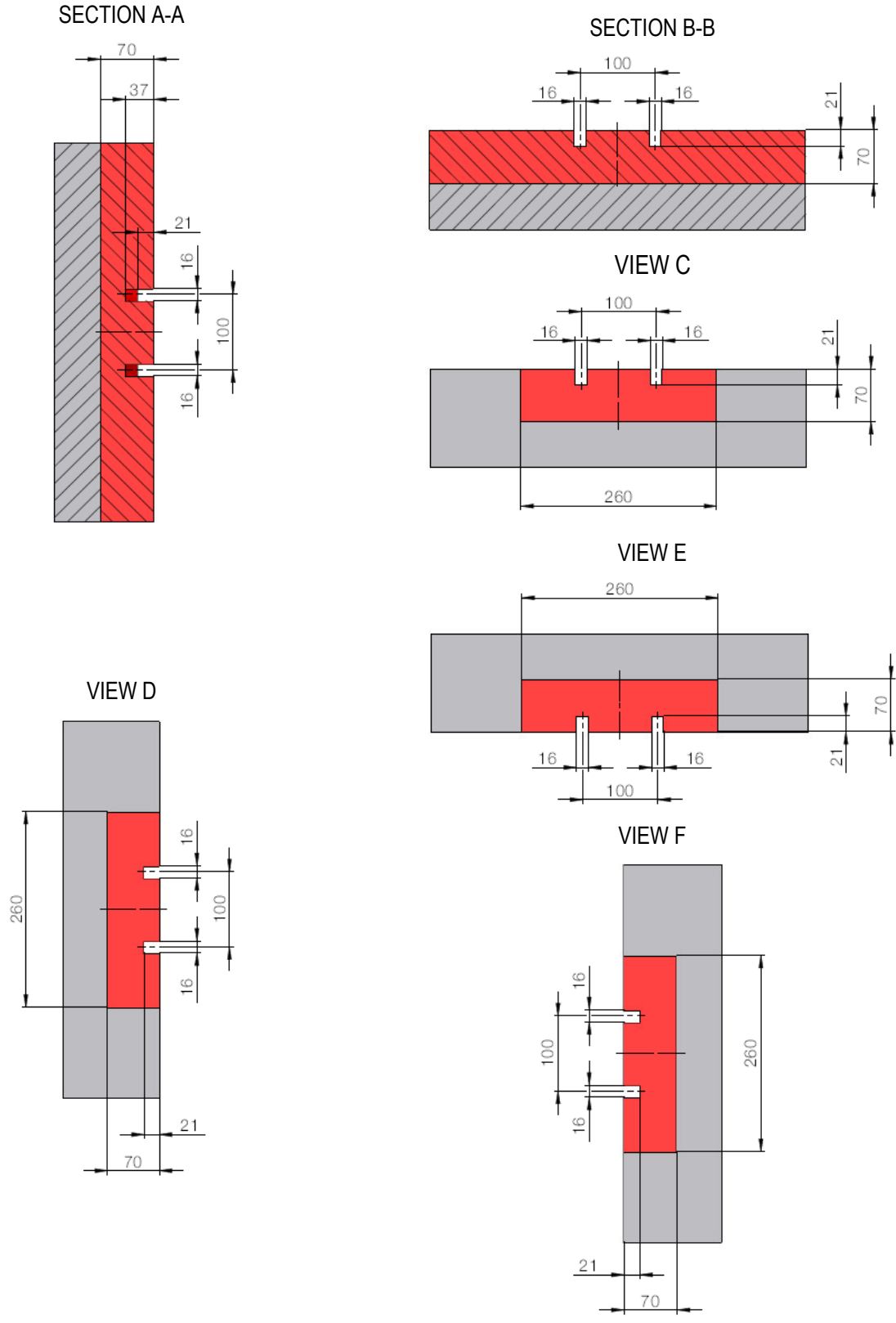


*) The **red area** must be free of ferromagnetic materials.

Installation instructions



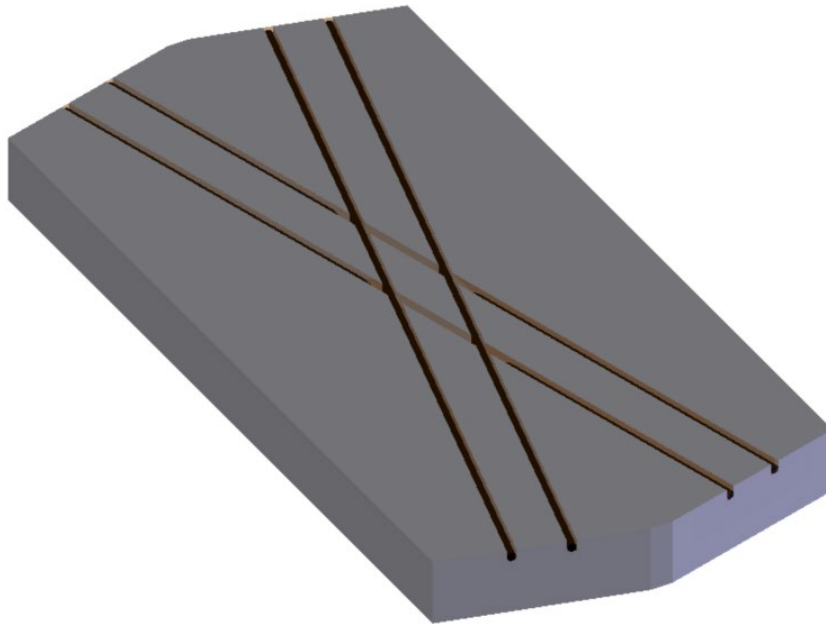
Floor installation without floor clips



Floor installation without floor clips

6.6 Non-right angled crossing

Overview



Application: Crossing of two main segments.

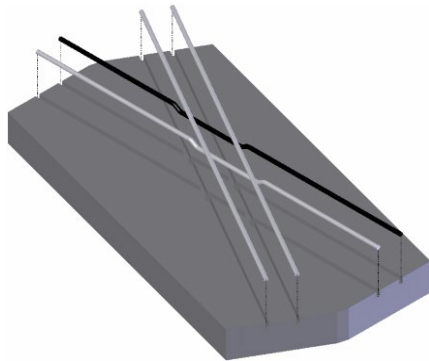
When installing a 30°/150° crossing, the following points must be observed:

- There is no continuous magnetic field in the underpassing main segment as there is on a straight segment. Power reductions of up to 50% can be expected in these areas. The energy requirements for passing the crossing overpass must therefore be known.
- The Litz cable on which the main flow of traffic takes place is always laid on top for effective track guidance.
- The change in the zone that must be kept free of ferromagnetic materials must be noted.
- For crossings at other angles, here a 30°/150° crossing as an example, Conductix-Wampler can be contacted.

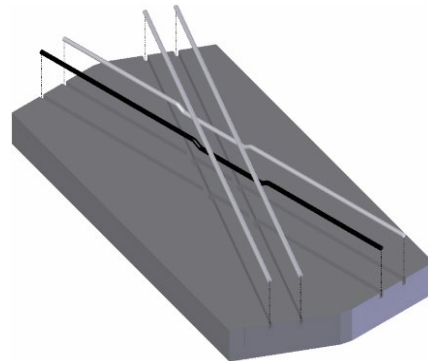
Floor installation without floor clips

Installation sequence

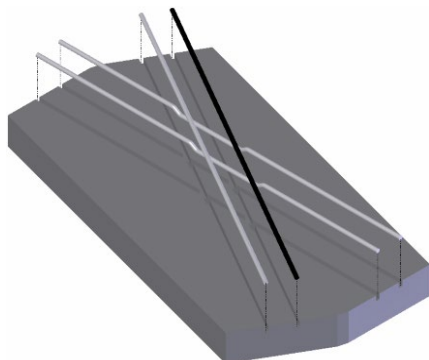
1.



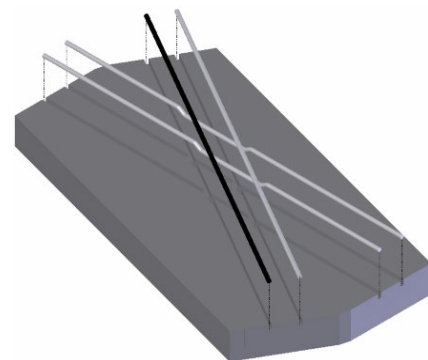
2.



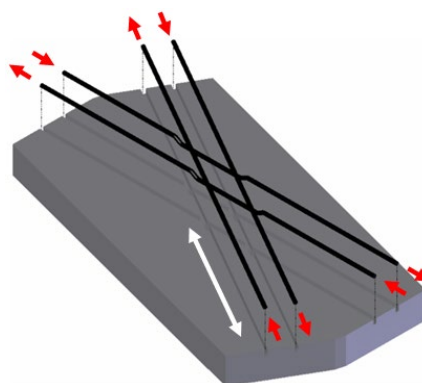
3.



4.



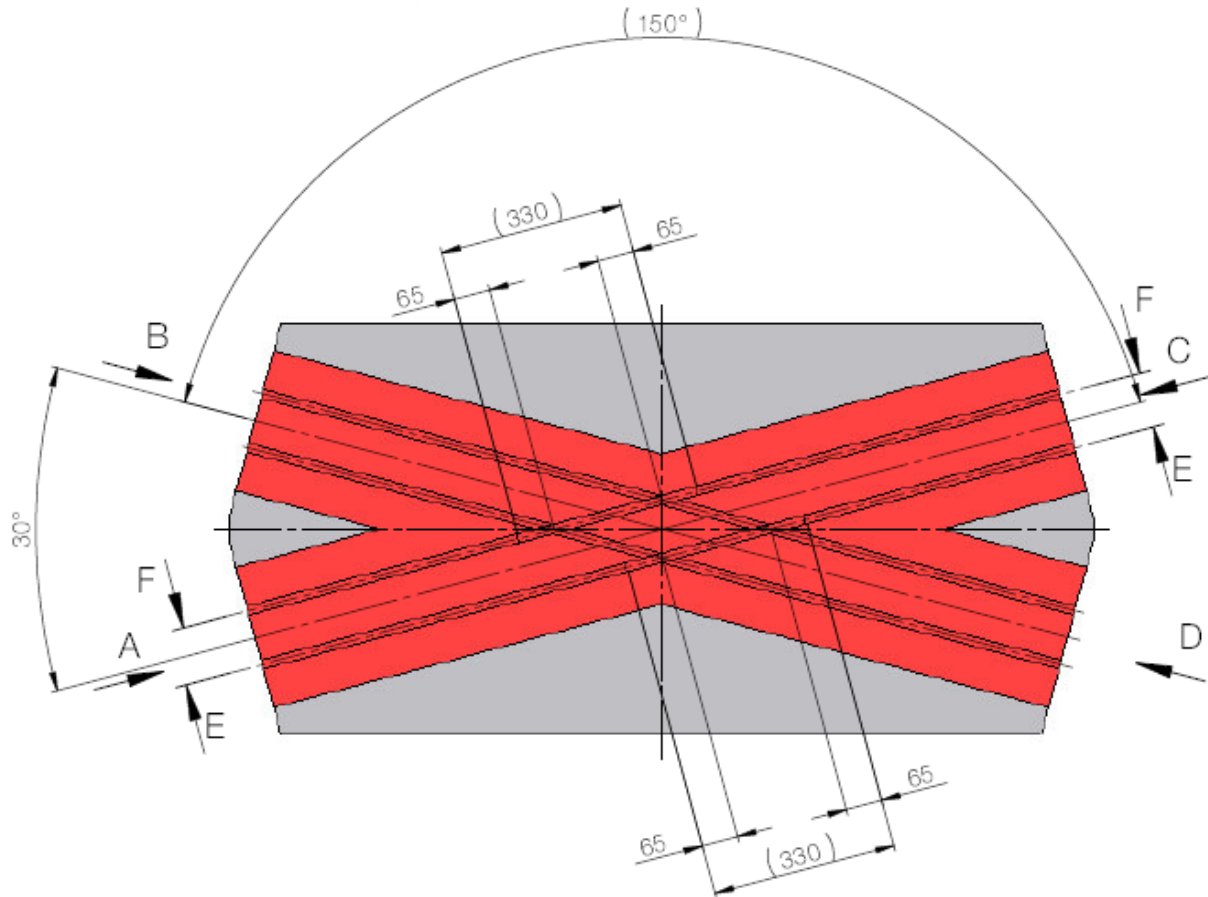
Overview



Main travel direction

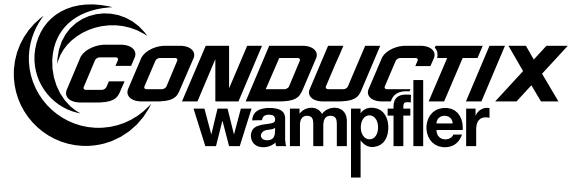
Floor installation
without floor clips

Grinding information*)



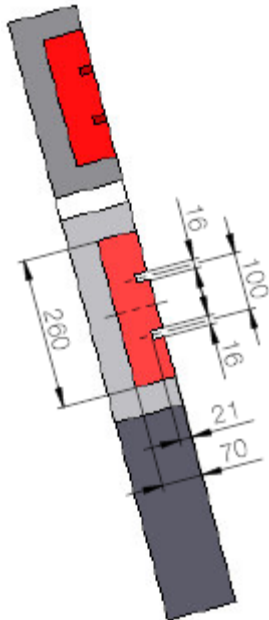
*) The **red area** must be free of ferromagnetic materials.

Installation instructions

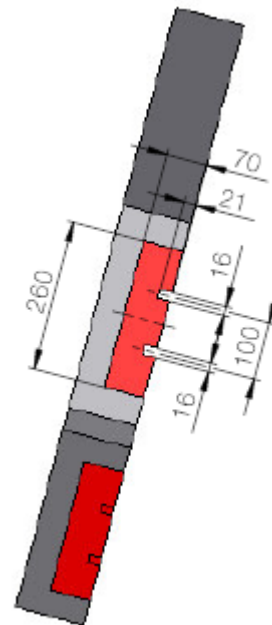


Floor installation without floor clips

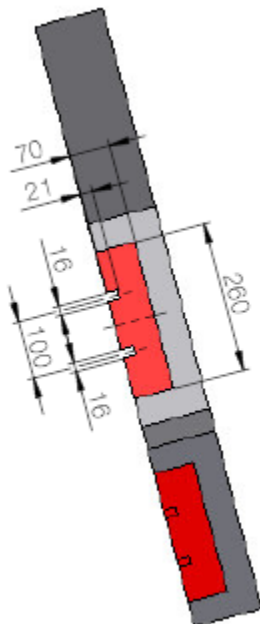
VIEW A



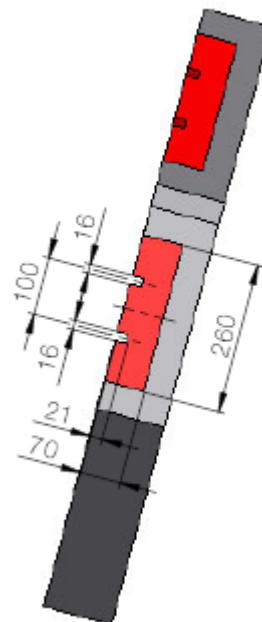
VIEW B



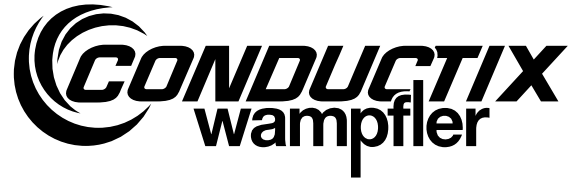
VIEW C



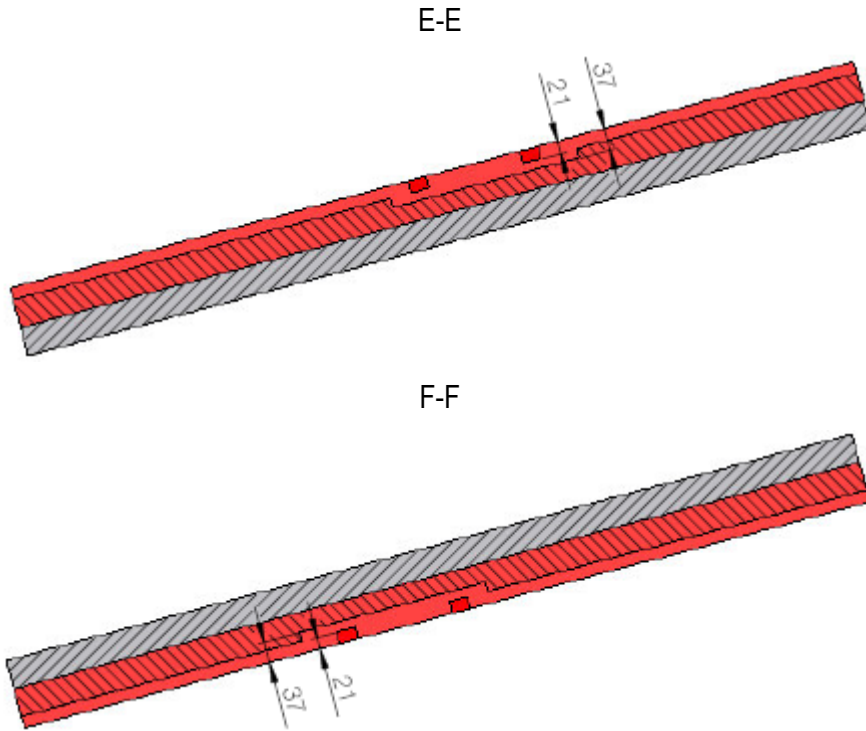
VIEW D



Installation instructions



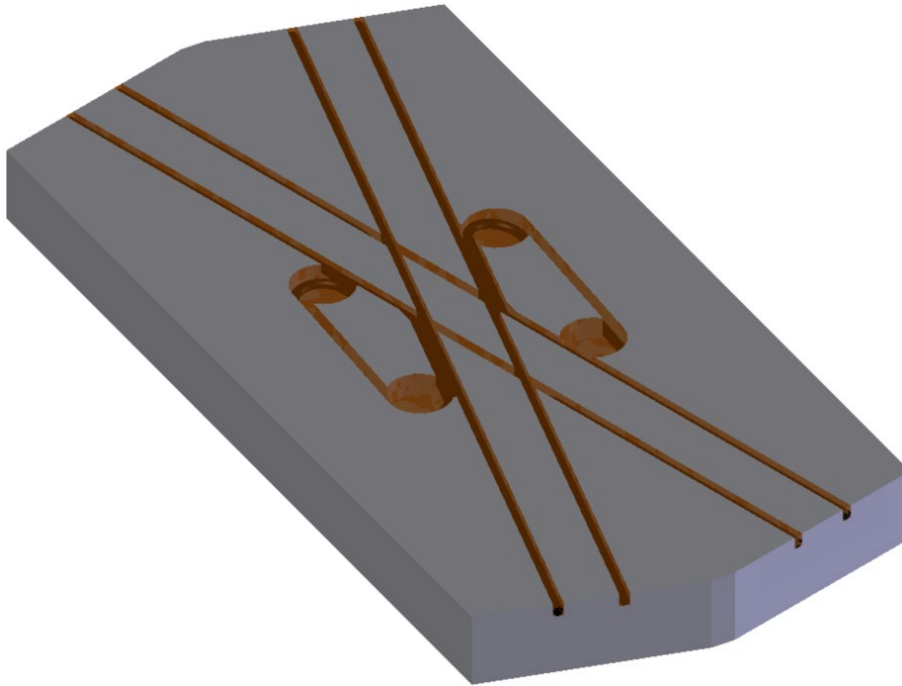
Floor installation without floor clips



Floor installation without floor clips

6.7 Non-right-angled crossing with power loops

Overview



Application: Crossing of two main segments with optimum power transmission.

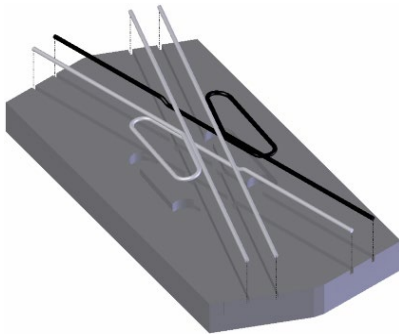
When installing a 30°/150° crossing with power loops, the following points must be observed:

- There is no continuous magnetic field in the underpassing main segment as there is on a straight segment. However, due to the power loop, if the pickup is guided accurately, no power reduction need be anticipated in this area.
- The pickup may not remain in the vicinity of the power loop for longer periods.
- The Litz cable on which the main flow of traffic takes place is always laid on top for effective track guidance.
- The change in the zone that must be kept free of ferromagnetic materials must be noted.
- For crossings at other angles, here a 30°/150° crossing as an example, Conductix-Wampfler can be contacted.

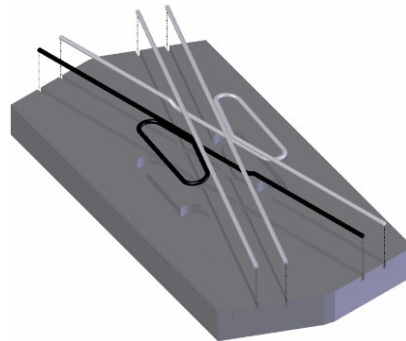
Floor installation without floor clips

Installation sequence

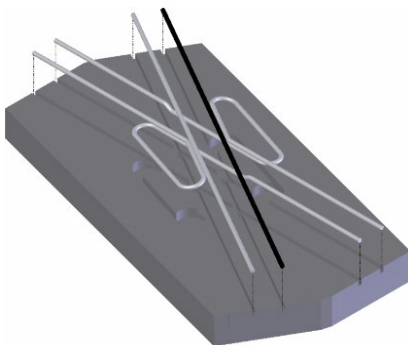
1.



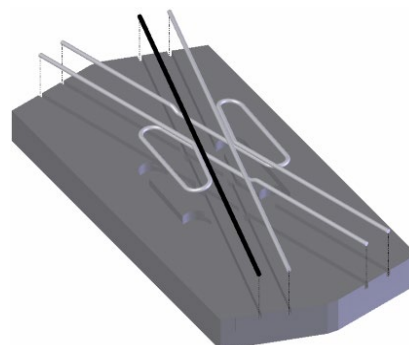
2.



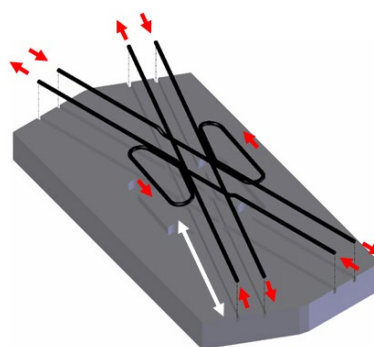
3.



4.



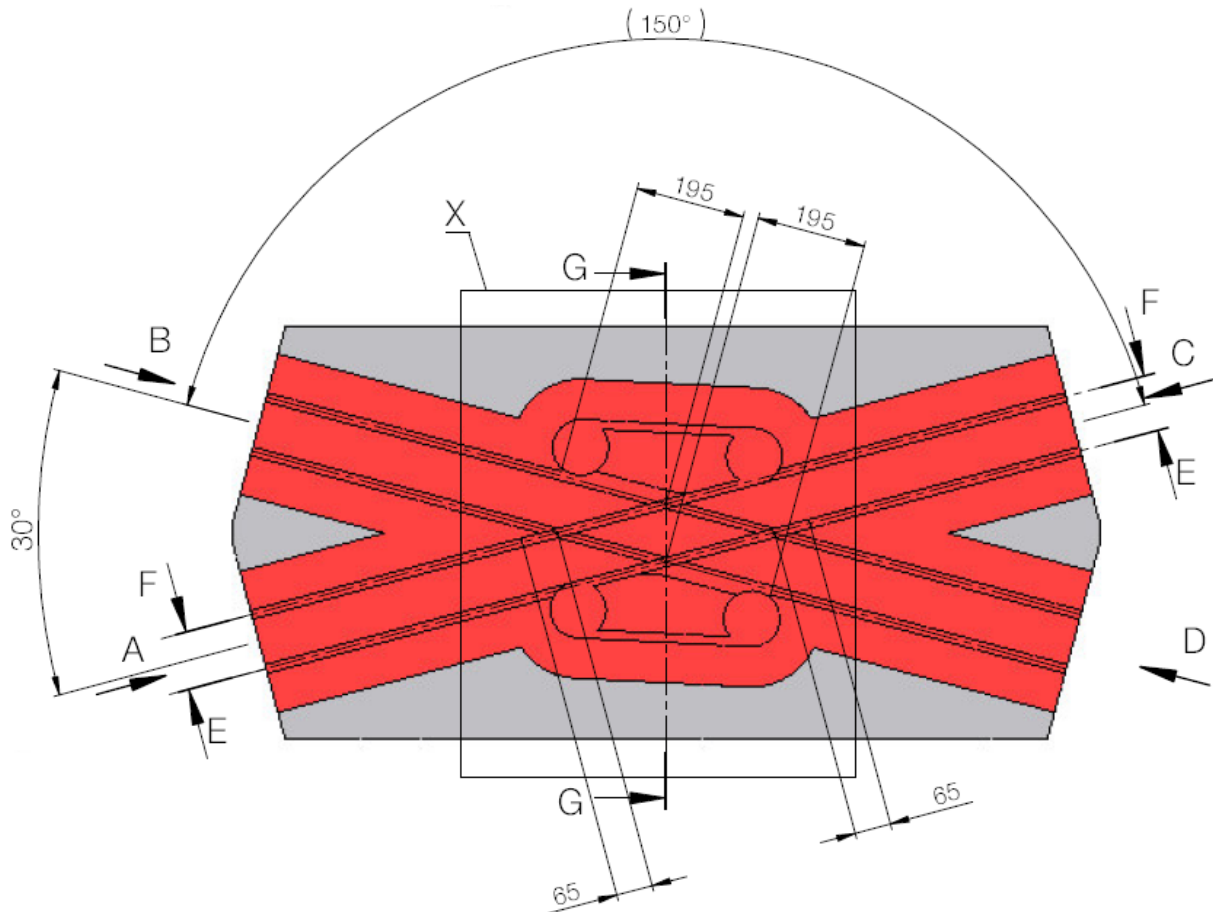
Overview



Main travel direction

Floor installation
without floor clips

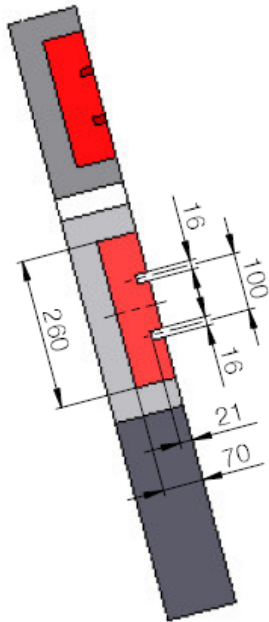
Grinding information*)



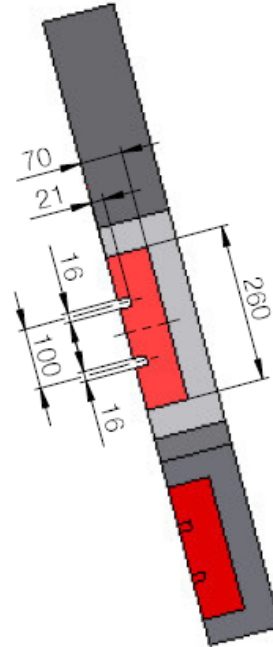
*) The **red area** must be free of ferromagnetic materials.

Floor installation
without floor clips

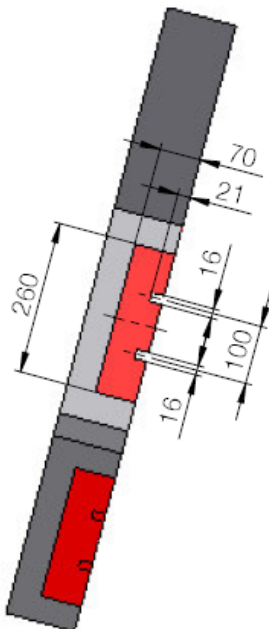
VIEW A



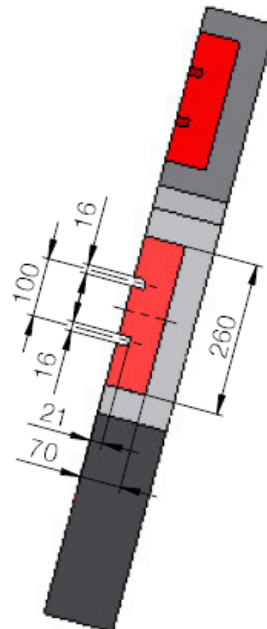
VIEW C



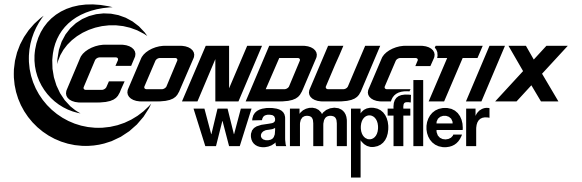
VIEW B



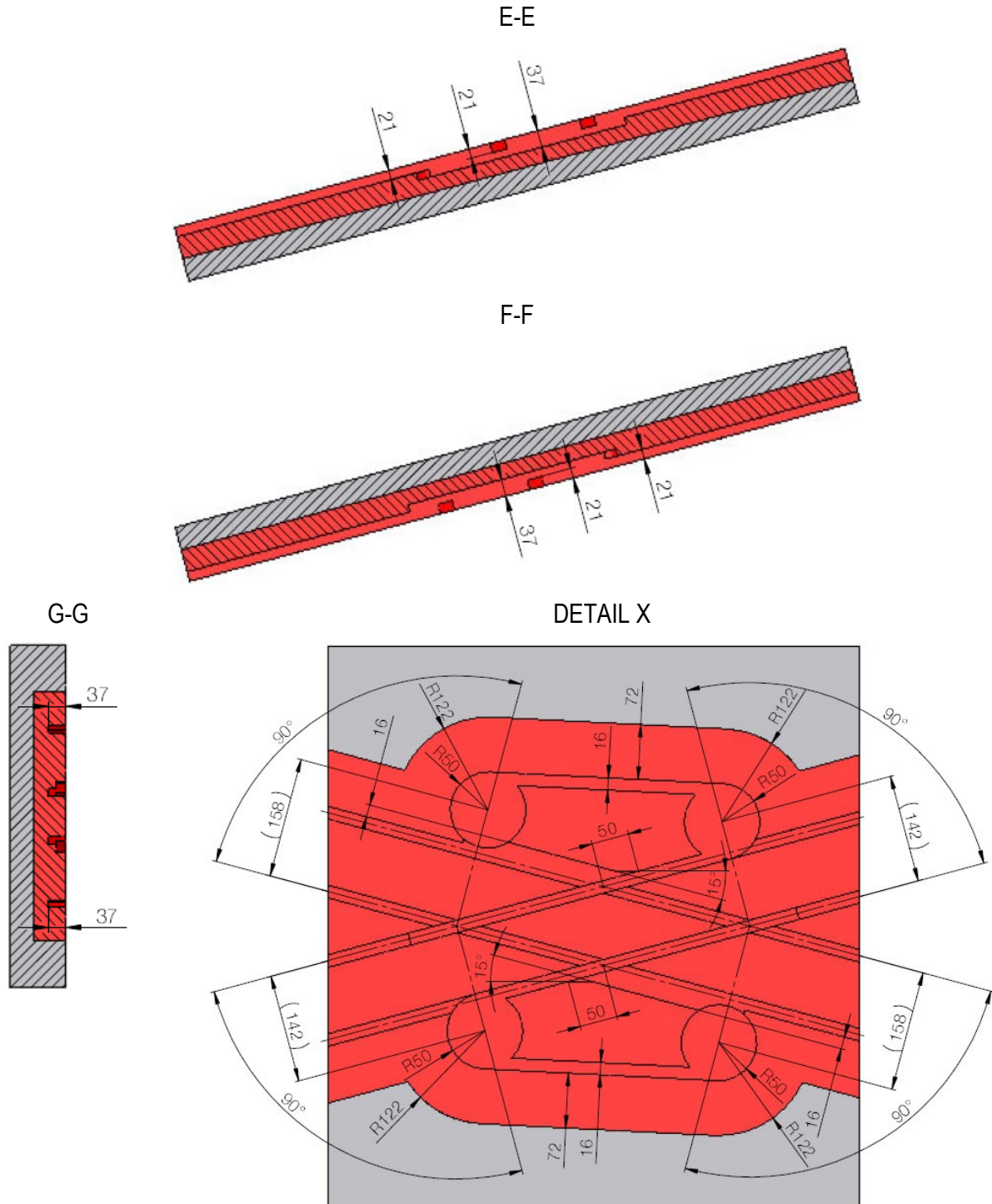
VIEW D



Installation instructions



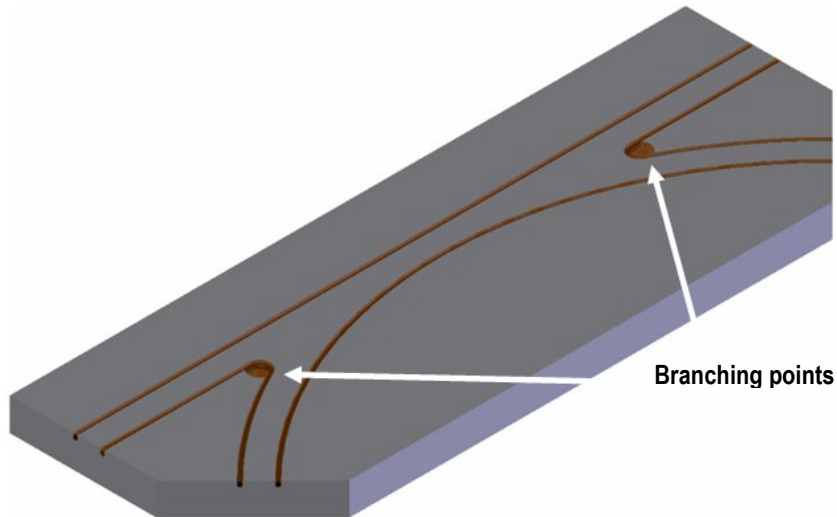
Floor installation without floor clips



Floor installation without floor clips

6.8 Double track

Overview



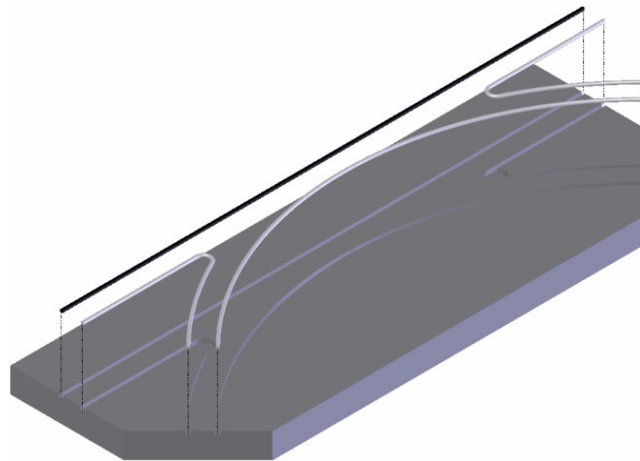
Application: Combination of incoming and outgoing track switches in narrow space.
When installing a double track switch, the following points must be observed:

- There is no continuous magnetic field in a track switch as there is on a straight segment. Power reductions of up to 50% can be expected in these areas. The energy requirements for passing the switch must therefore be known.
- The radius of the branch main segment is variable but is at least 1000 mm. A radius of 1500 mm is recommended.
- **Recommendation:** For grinding accuracy, the radii should be ground with a grinder mounted on a type of compass.
- To ensure effective track guidance, the bore in the branching point of the track switch has a radius of 40 mm.
- The change in the zone that must be kept free of ferromagnetic materials must be noted.
- **Note:** This type of track switch should only be used when space is truly tight. In any other case, separation into two standard track switches with a minimum separation of 500 mm is recommended.

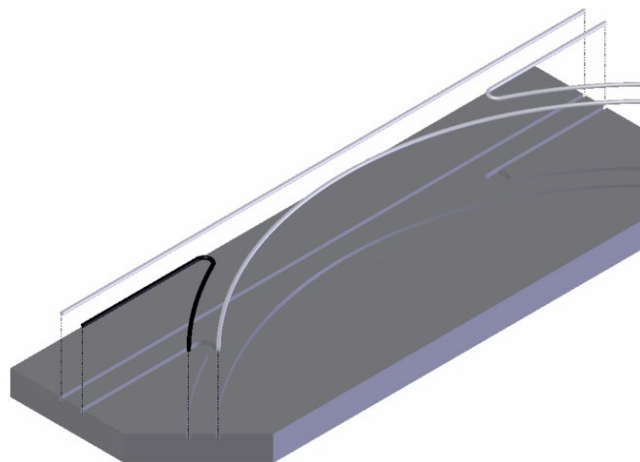
Floor installation
without floor clips

Installation sequence

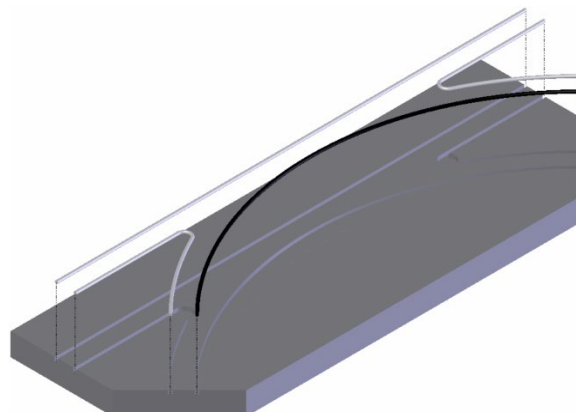
1.



2.

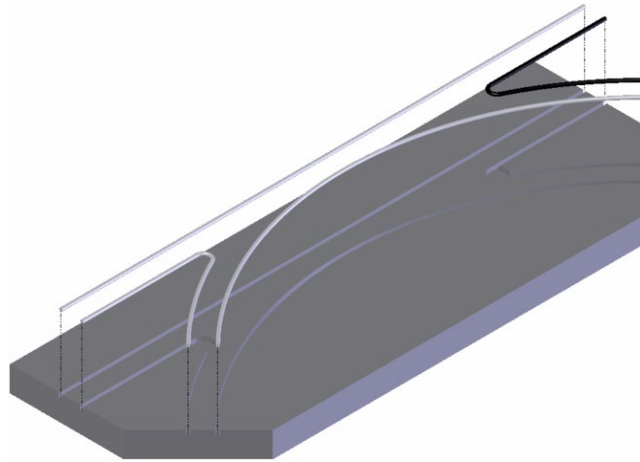


3.

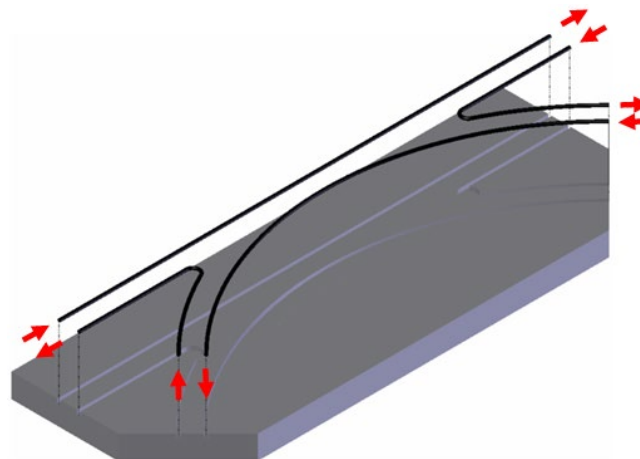


Floor installation
without floor clips

4.

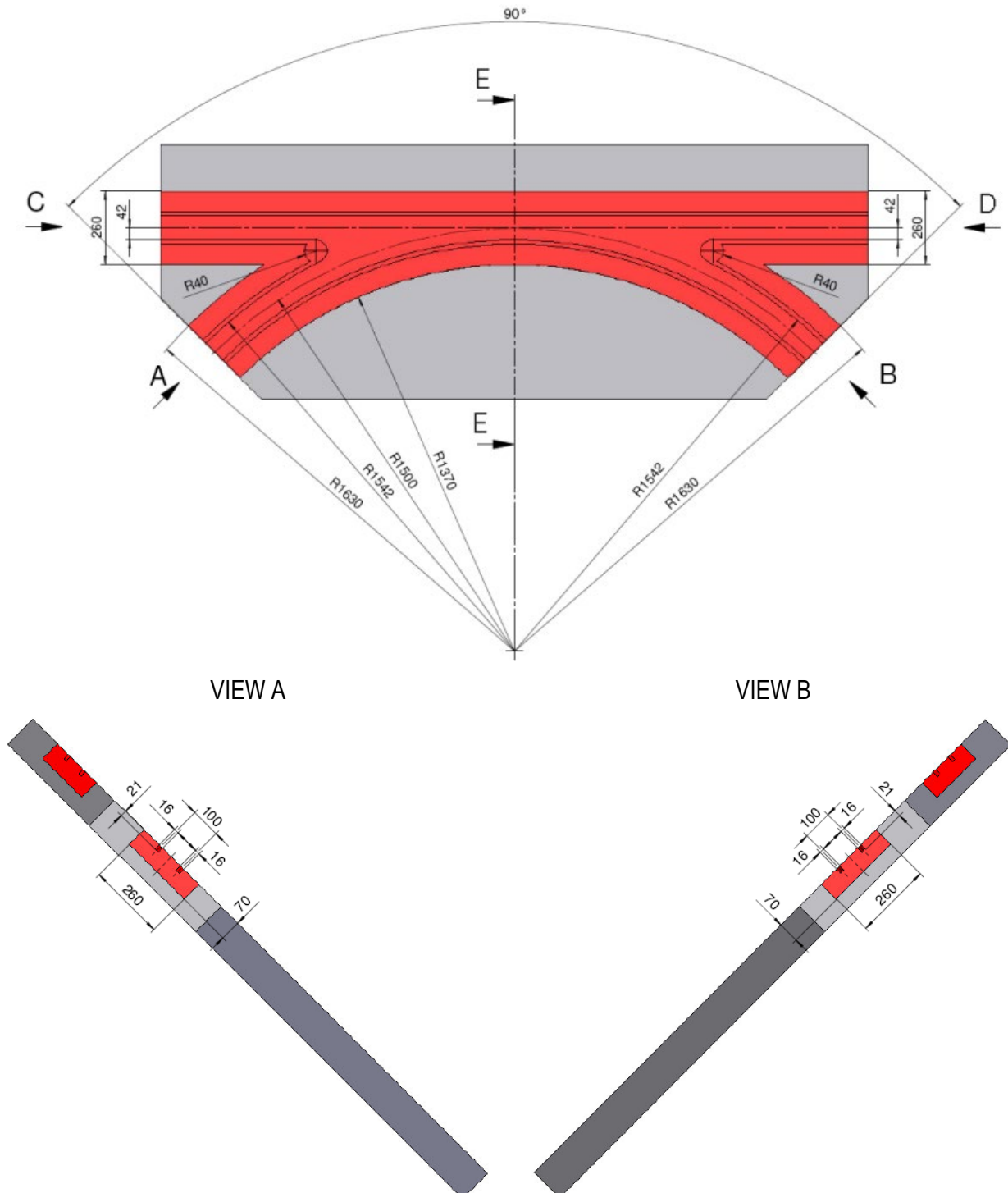


Overview



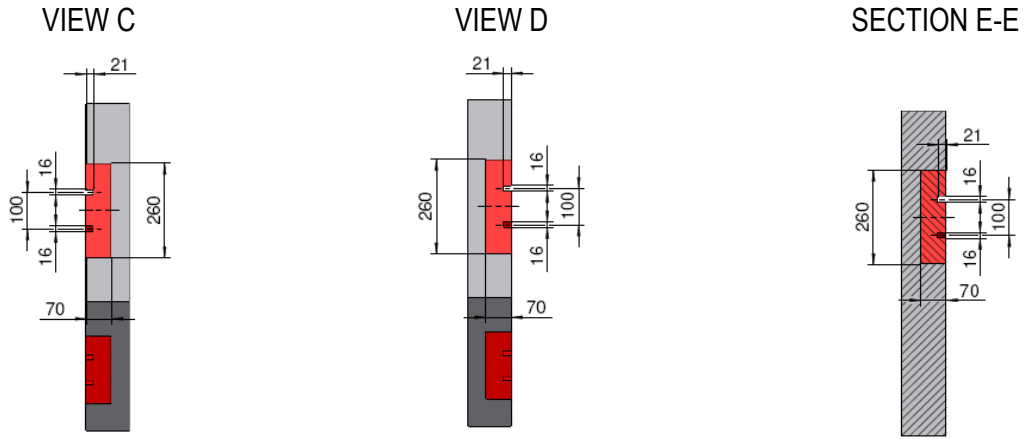
Floor installation
without floor clips

Grinding information*)



*) The **red area** must be free of ferromagnetic materials.

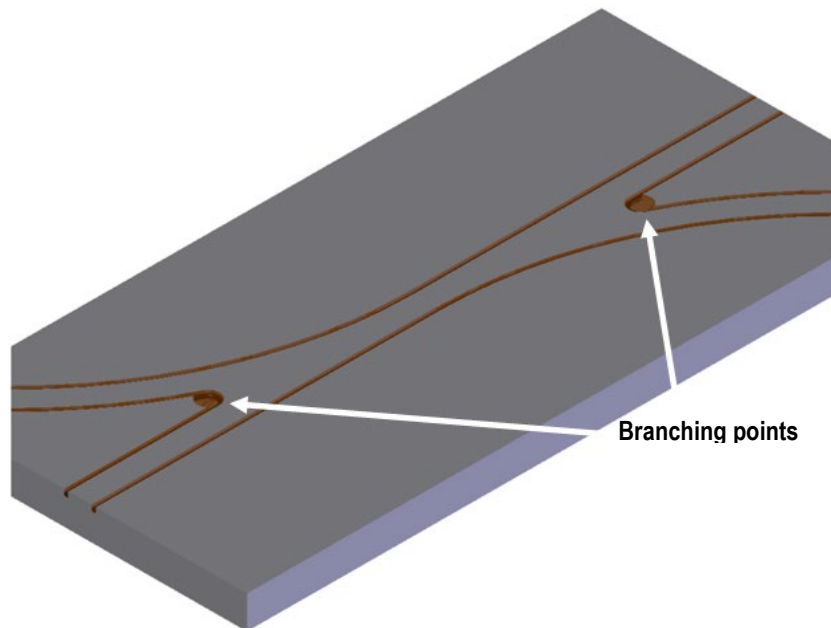
Floor installation
without floor clips



Floor installation without floor clips

6.9 Double crossing track switch

Overview



Application: Combination of incoming and outgoing track switches in narrow space.

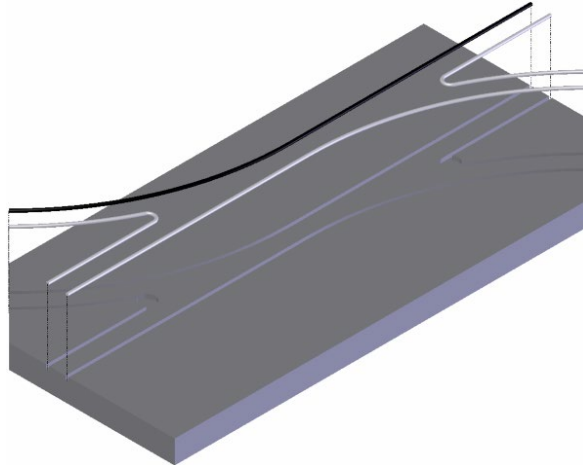
When installing a double crossing track switch, the following points must be observed:

- There is no continuous magnetic field in a track switch as there is on a straight segment. Power reductions of up to 50% can be expected in these areas. The energy requirements for passing the switch must therefore be known.
- The radius of the branch main segment is variable but is at least 1000 mm. A radius of 1500 mm is recommended.
- **Recommendation:** For grinding accuracy, the radii should be ground with a grinder mounted on a type of compass.
- To ensure effective track guidance, the bore in the branching point of the track switch has a radius of 40 mm.
- The change in the zone that must be kept free of ferromagnetic materials must be noted.
- **Note:** This type of track switch should only be used when space is truly tight. In any other case, separation into two standard track switches with a minimum separation of 500 mm is recommended.

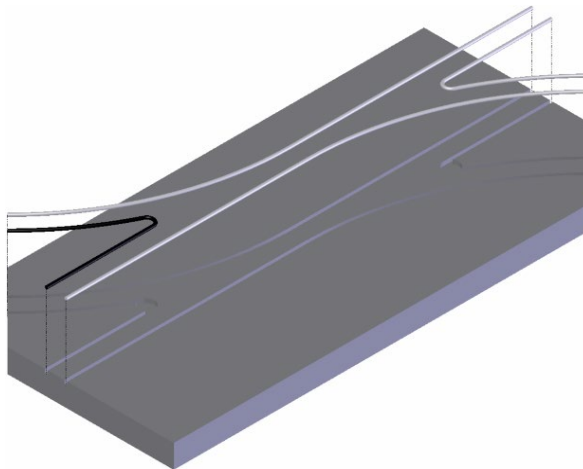
Floor installation without floor clips

Installation sequence

1.

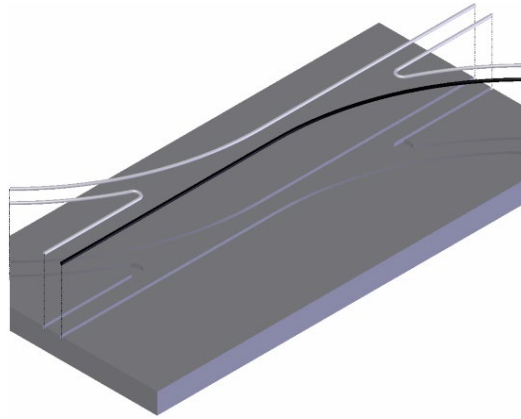


2.

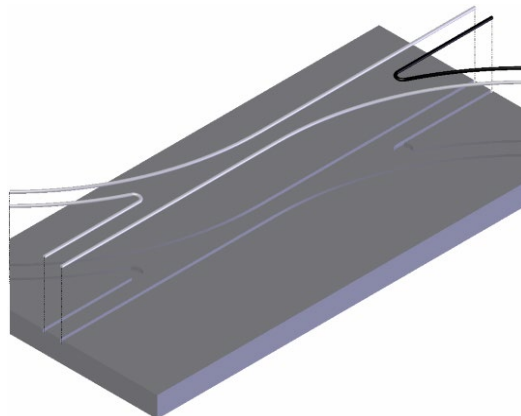


Floor installation
without floor clips

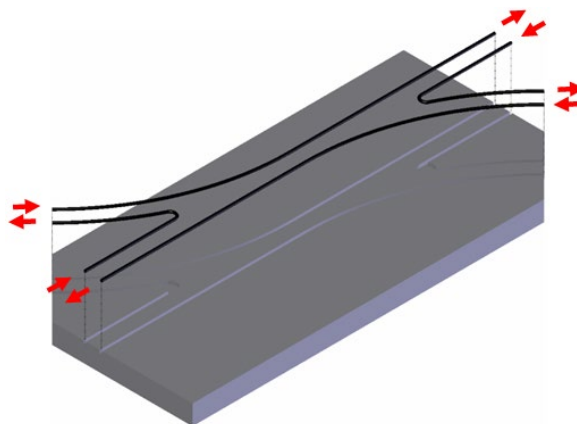
3.



4.

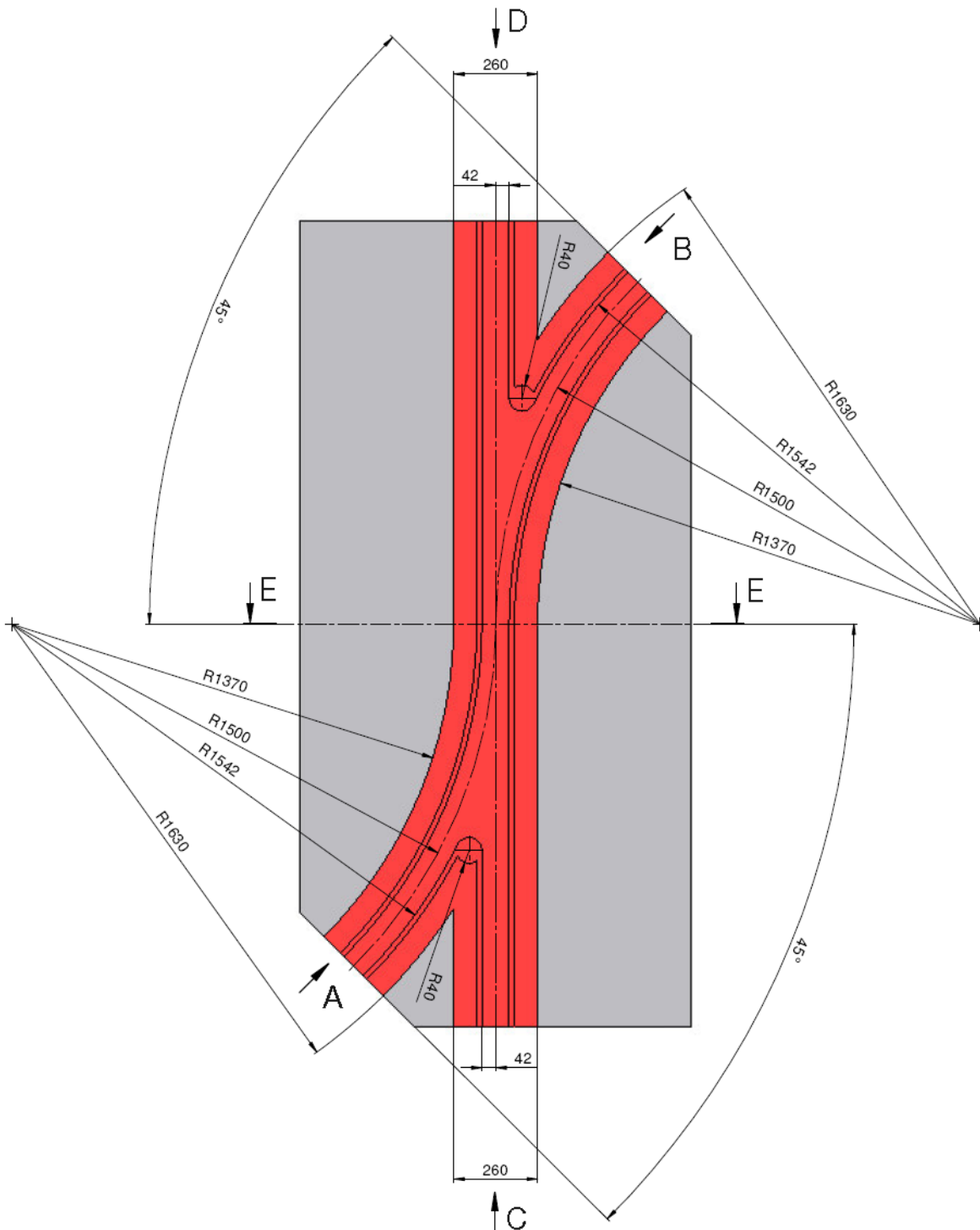


Overview



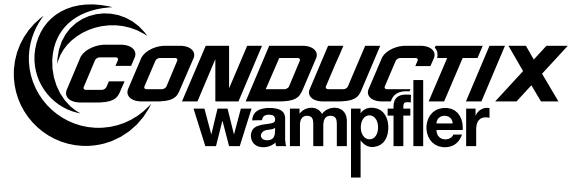
Floor installation
without floor clips

Grinding information*)



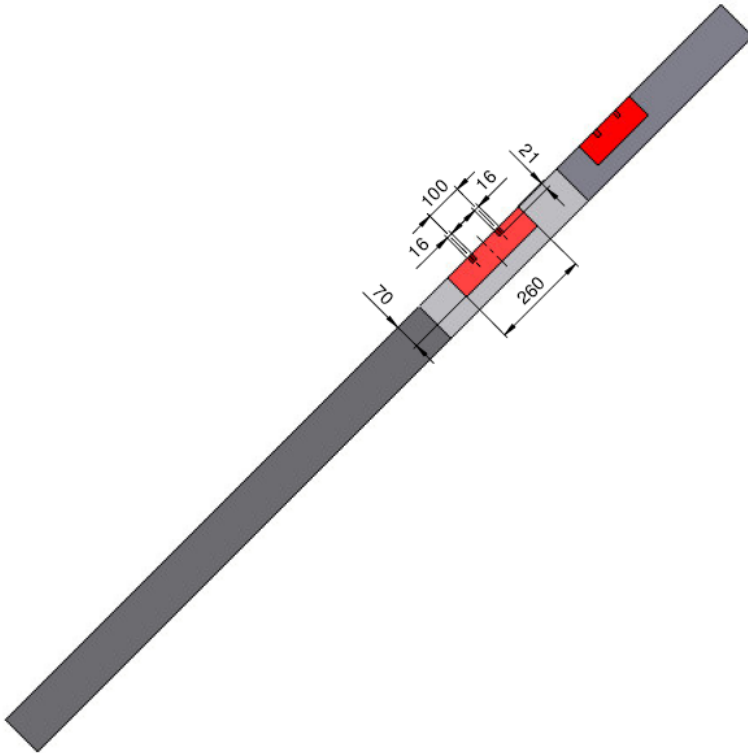
*) The **red area** must be free of ferromagnetic materials.

Installation instructions

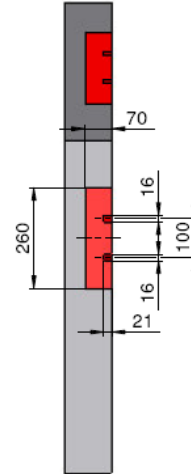


Floor installation without floor clips

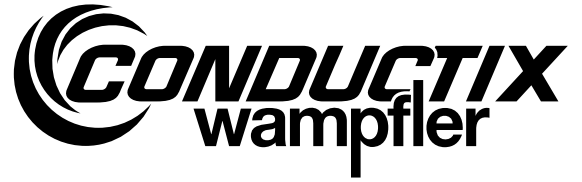
VIEW A



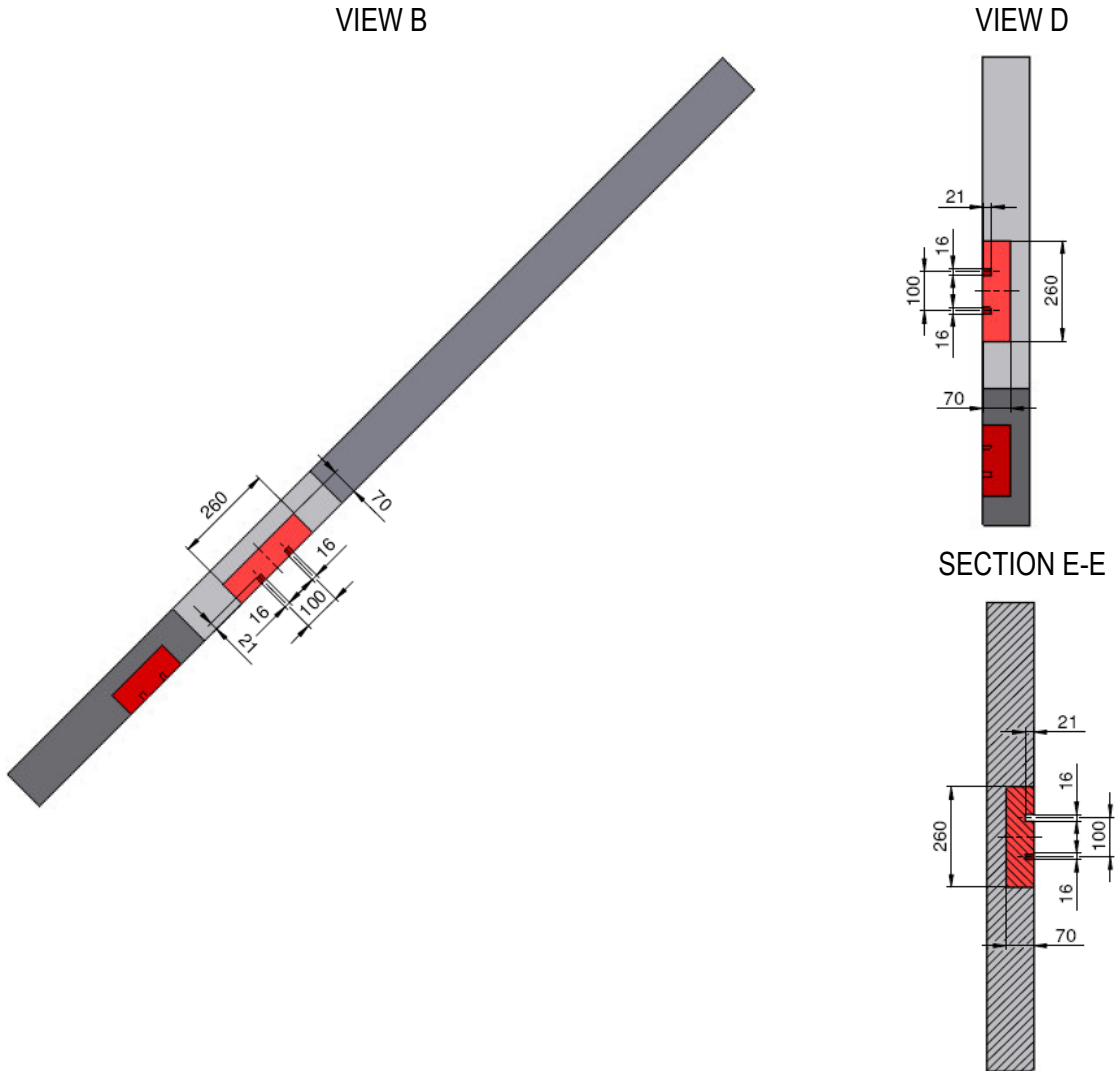
VIEW C



Installation instructions



Floor installation without floor clips

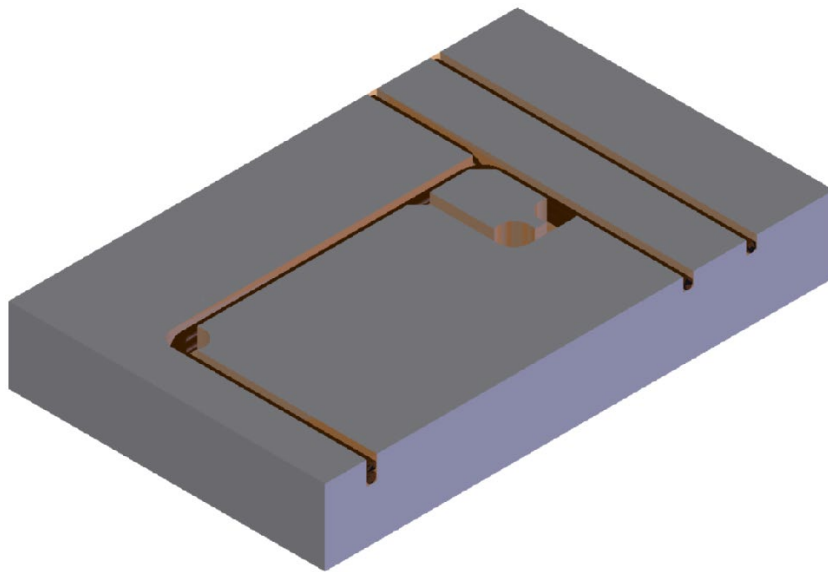


Floor installation without floor clips

7 Special elements

7.1 Power supply segments running parallel to the main segment

Overview



Application: Power supply segments running parallel to the main segment.

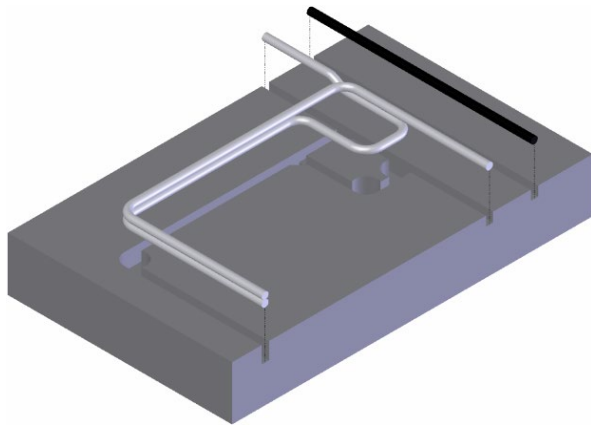
When a power supply segment runs in parallel with the main segment, the following points must be observed:

- To avoid mutual influence of the magnetic fields, the distance between the main segment and a parallel power supply segment - between the outer edges of the Litz cables - must be at least 500 mm.
- It must also be ensured that the power supply segments are not laid directly in the area of the rollers of a vehicle, so they are not exposed to the resulting stress and damaged.
- Routing of the power supply segments either side by side or one under the other.
- The lines of power supply segments must be bundled with cable ties. This ensures that the magnetic field in this area is minimum.
- The Litz cable on which the main flow of traffic takes place is always laid on top for effective track guidance.

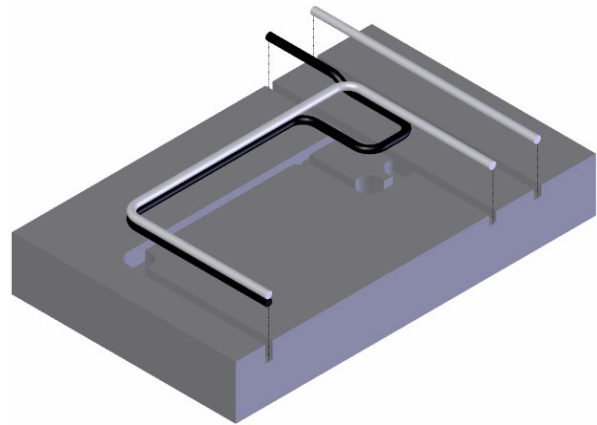
Floor installation without floor clips

Installation sequence

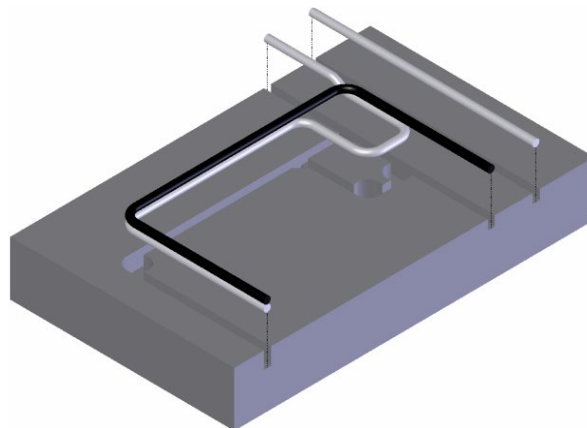
1.



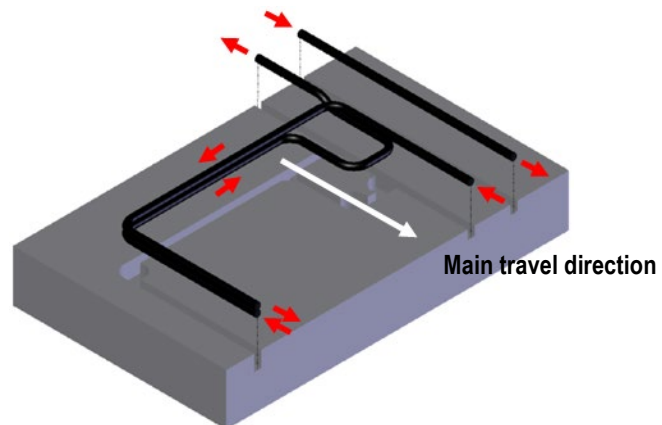
2.



3.

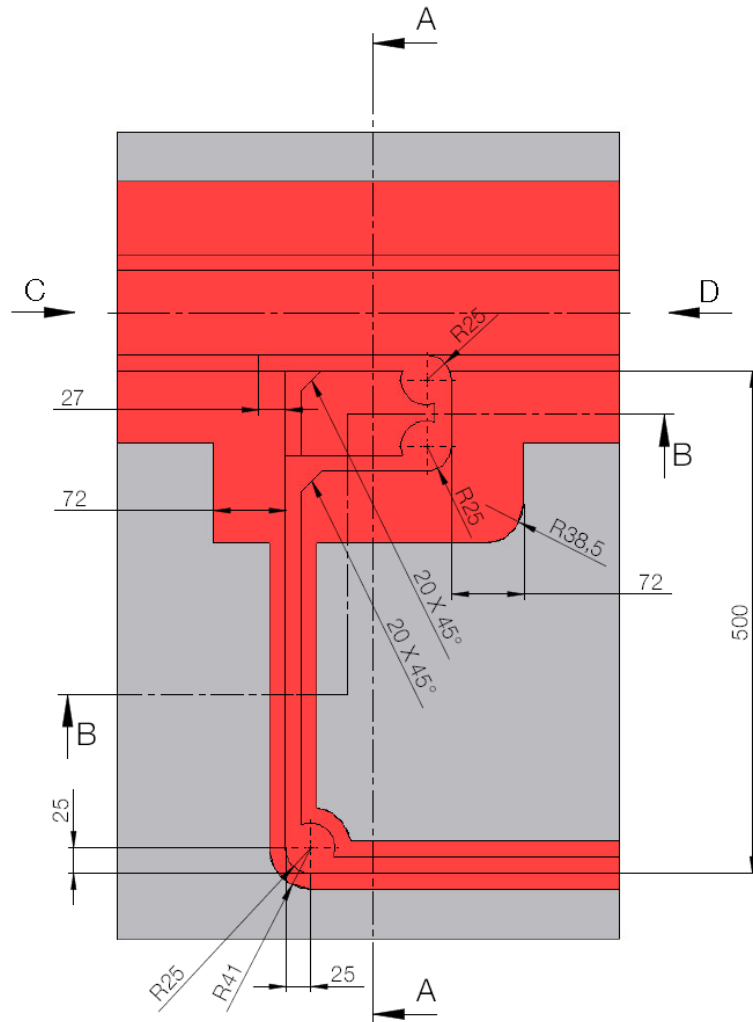


Overview



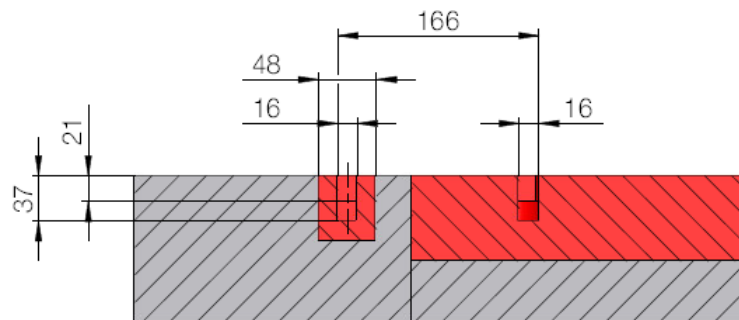
Floor installation
without floor clips

Grinding information*)



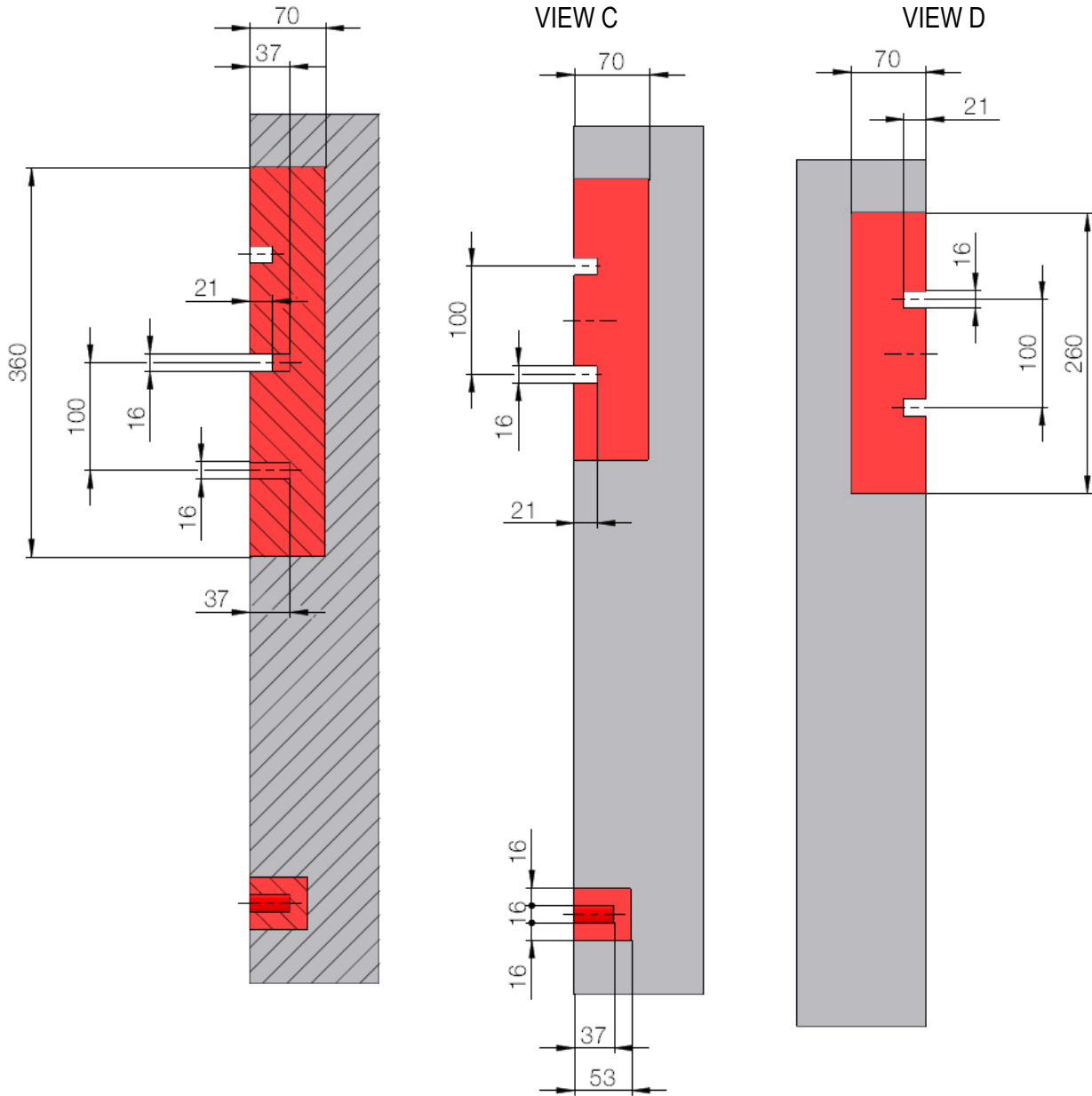
SECTION A-A

SECTION B-B



*) The **red area** must be free of ferromagnetic materials.

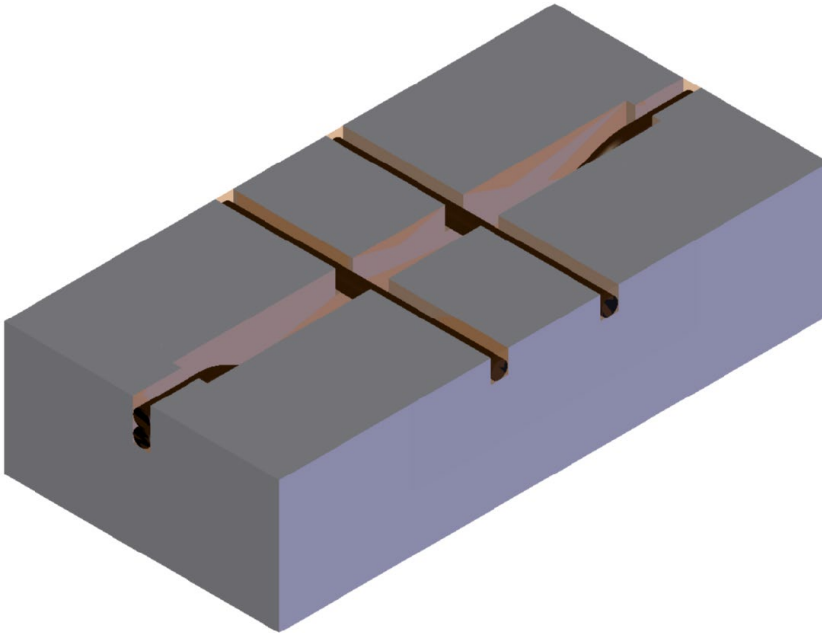
Floor installation
without floor clips



Floor installation without floor clips

7.2 Power supply segment crosses main segments

Overview



Application: Crossing of the main segment with the power supply segment to save length in the power supply segment.

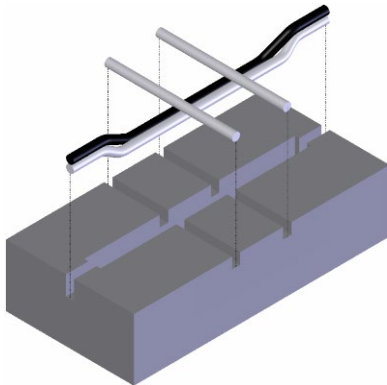
When a power supply segment crosses the main segment, the following points must be observed:

- For the power supply segment outside the area shown here, the Litz cables can be routed either side by side or one under the other. See also chapters 5.1 and 5.4.
- Lowering the level of the power supply segment 200 mm to the left and right of the center of the main segment.
- The vertical distance from the outer edge of the main segment cable to the outer edge of the power supply segment is 16 mm, or one Litz cable diameter.
- Always route the power supply segments under the main segment cable side by side instead of one under the other in order to save grinding depth.
- The lines of power supply segments must be bundled with cable ties. This ensures that the magnetic field in this area is minimum.

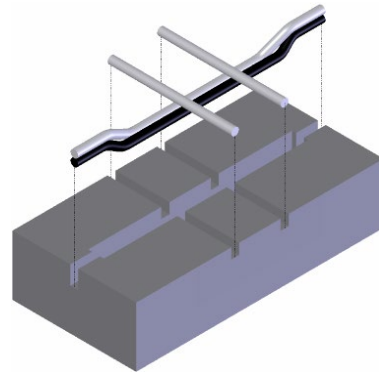
Floor installation without floor clips

Installation sequence

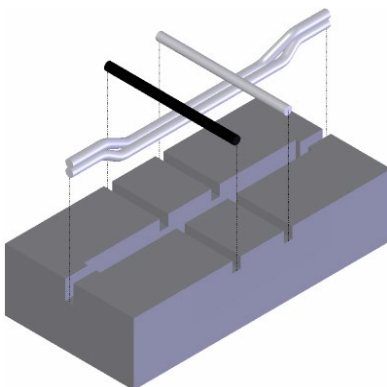
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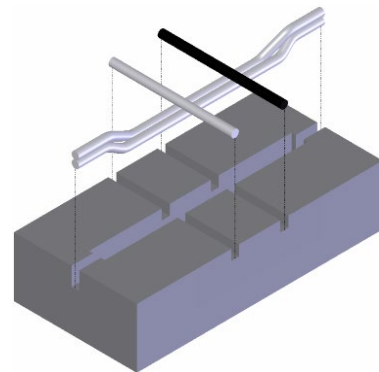
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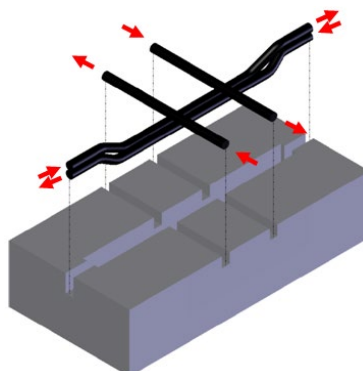
3.



4.

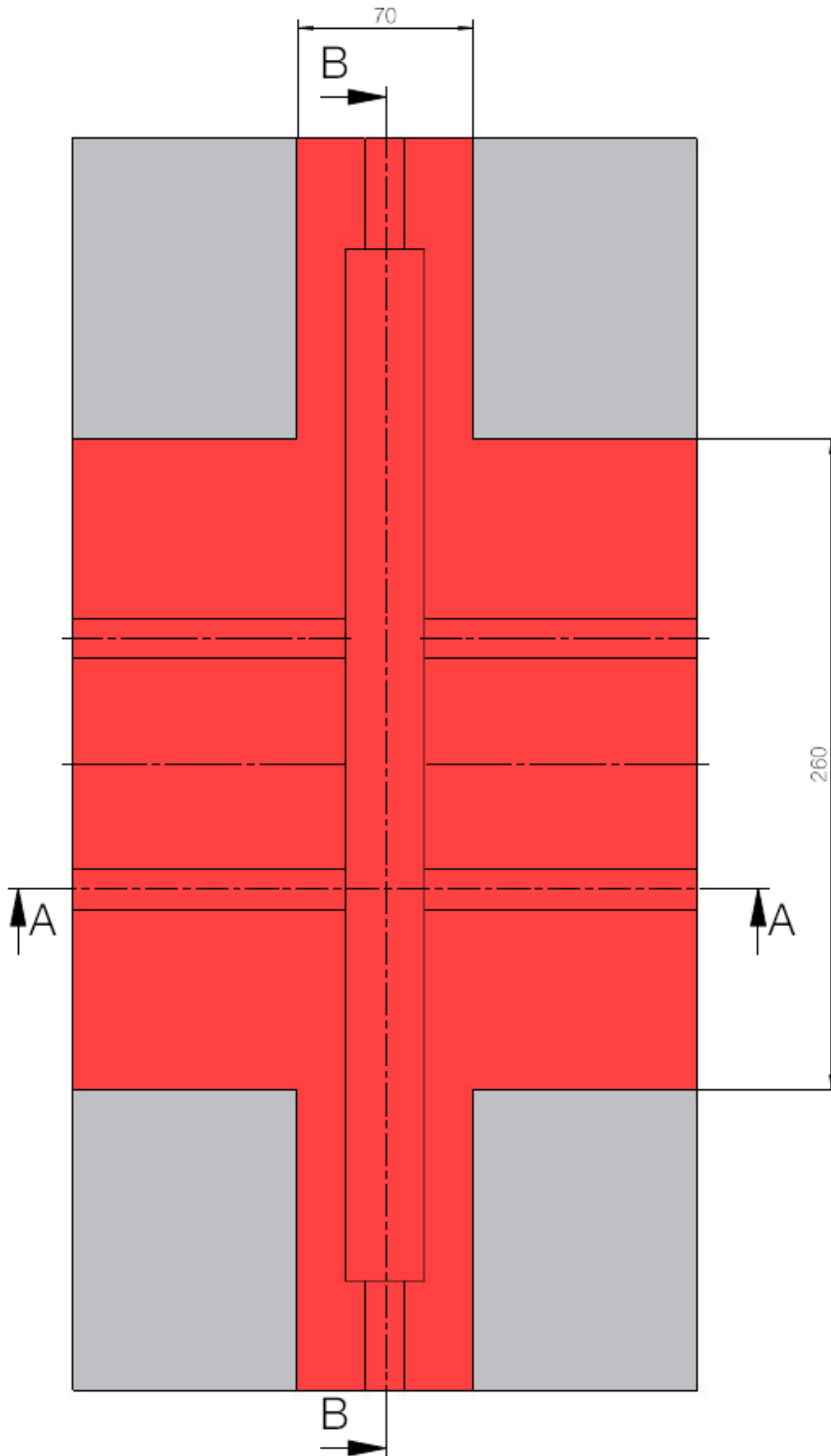


Overview



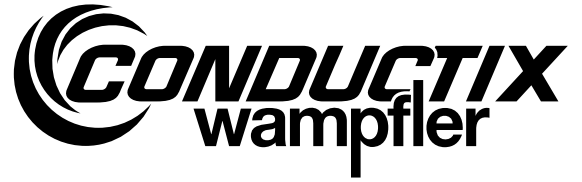
Floor installation
without floor clips

Grinding information*)

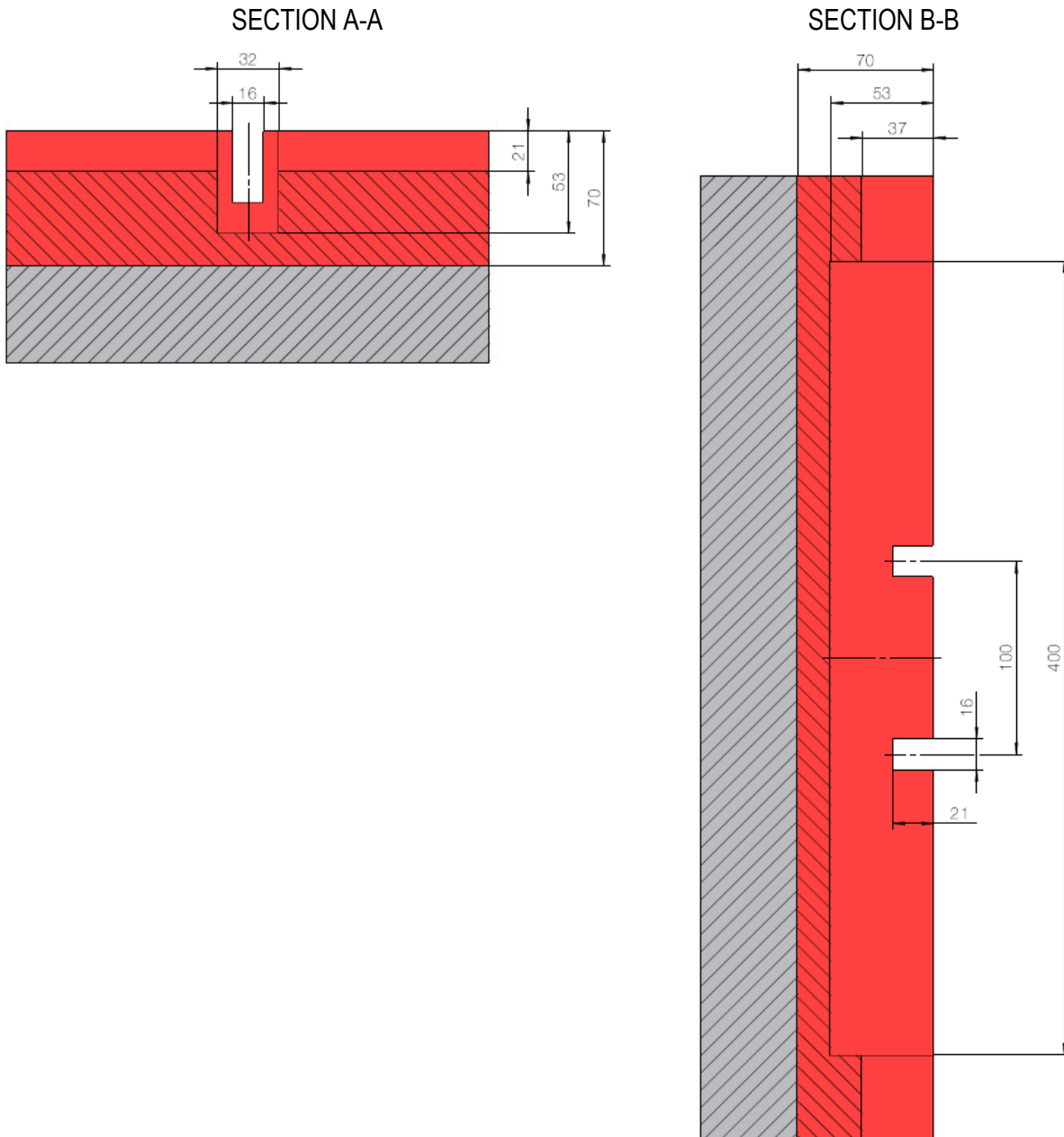


*) The **red area** must be free of ferromagnetic materials.

Installation instructions



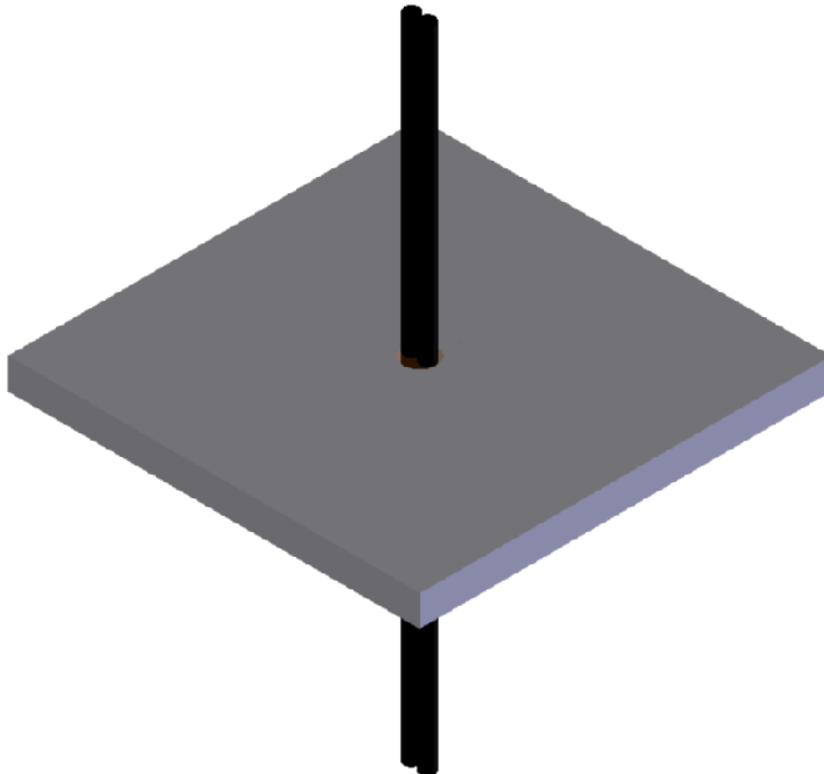
Floor installation without floor clips



Floor installation without floor clips

7.3 Ceiling or wall penetrations of the power supply segment

Overview



Application: Penetration of power supply segments through walls into other rooms or through ceilings onto other floors.

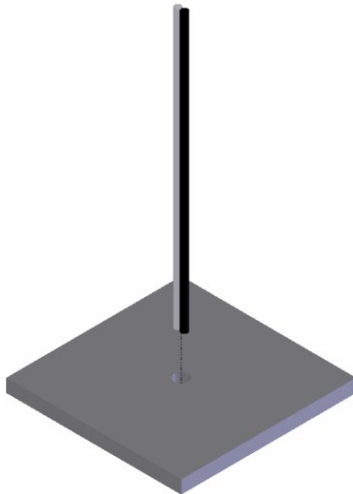
For penetrations of power supply segments, the following points should be observed:

- The Litz cables must maintain a distance of at least 15 mm (the Litz cable diameter) from the outer edge of the Litz cable to any ferromagnetic material in the penetrated floor or wall.
- The lines of power supply segments must be bundled with cable ties. This ensures that the magnetic field in this area is minimum.

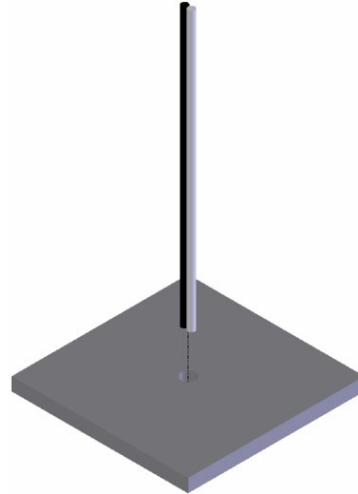
Floor installation without floor clips

Installation sequence

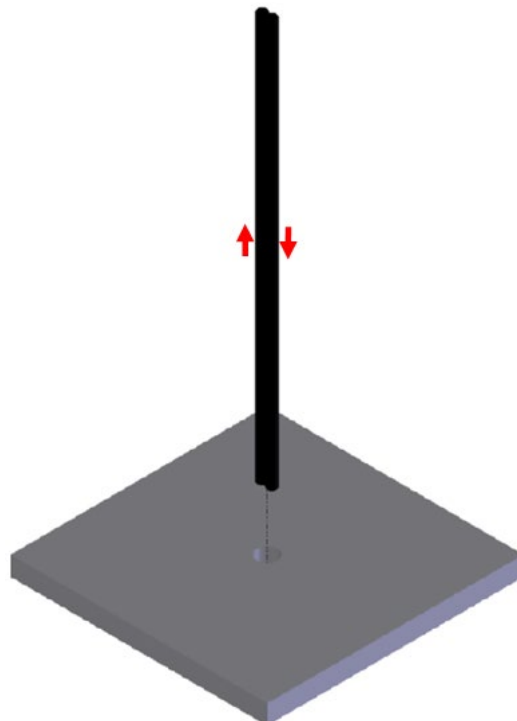
1.



2.

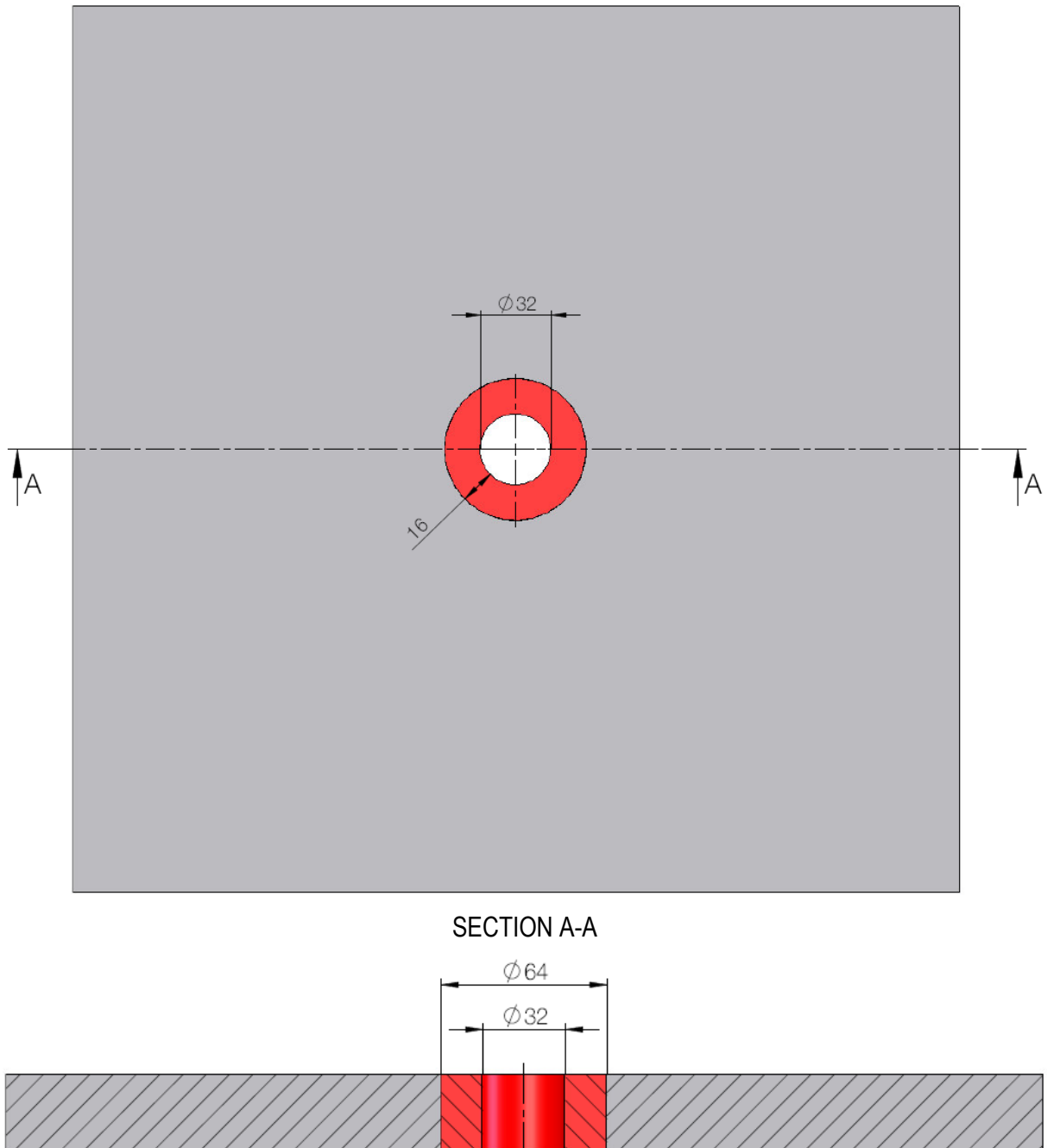


Overview



Floor installation
without floor clips

Grinding information*)

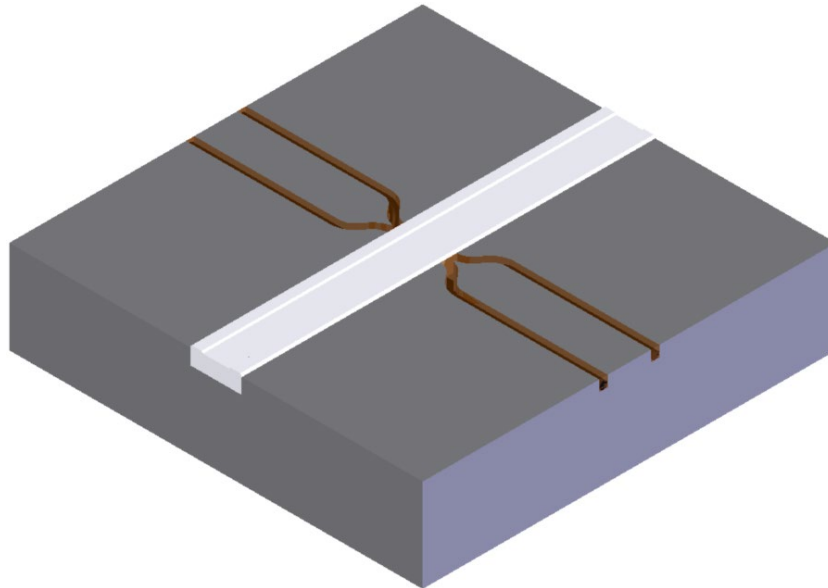


*) The **red area** must be free of ferromagnetic materials.

Floor installation without floor clips

7.4 Track underpass for rail-guided systems

Overview



Application: Crossing of rails for rail-guided systems with the Litz cable, for example in order to permit travel of the system at right angles to the rail.

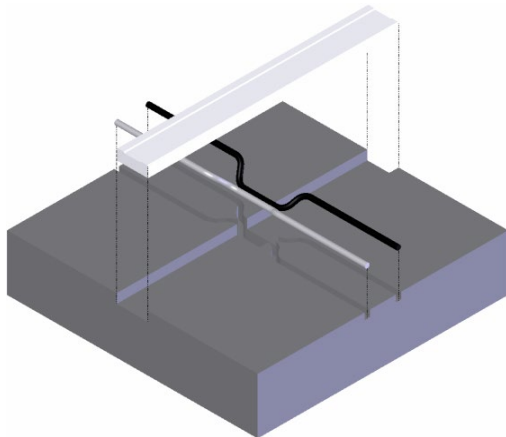
For installation of a track underpass, the following points must be observed:

- The width of the rail is shown as 100 mm. For wider or narrower rails, certain dimensions will vary. Conductix-Wampfler must be contacted in this case.
- The installation depth of the rail is shown as 30 mm. For shallower or deeper installation depths, certain dimensions will vary. Conductix-Wampfler must be contacted in this case.
- The Litz cables must maintain a minimum distance of 16 mm (Litz cable diameter) from the outer edge of the Litz cable to the ferromagnetic rail.
- The cables under the rail must be bundled with cable ties. This ensures that the magnetic field in this area is minimum.
- The power penalty in the vicinity of the rail is significant and may even consist of an absence of power transmission. In this case, the use of multiple pickups will be necessary.

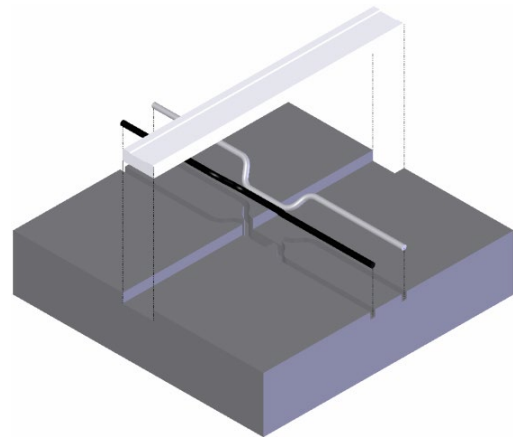
Floor installation without floor clips

Installation sequence

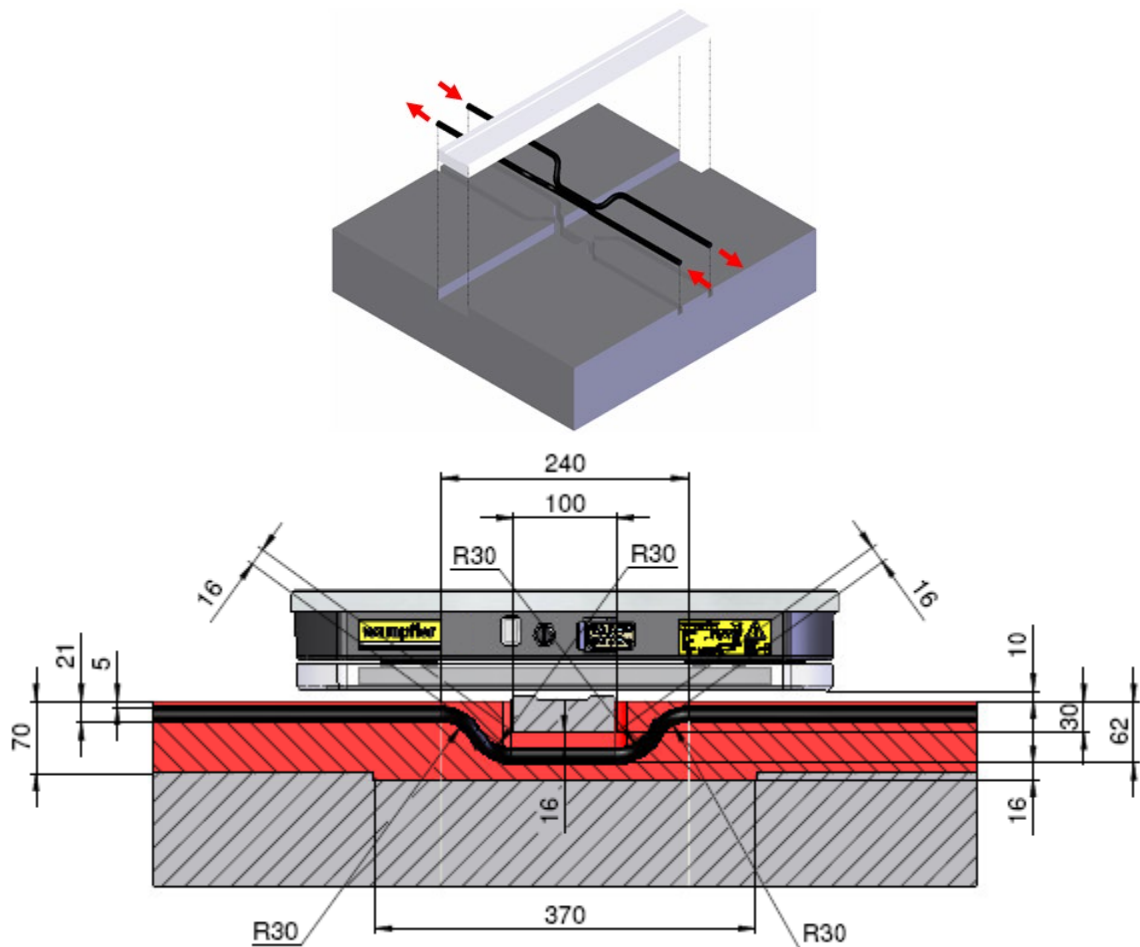
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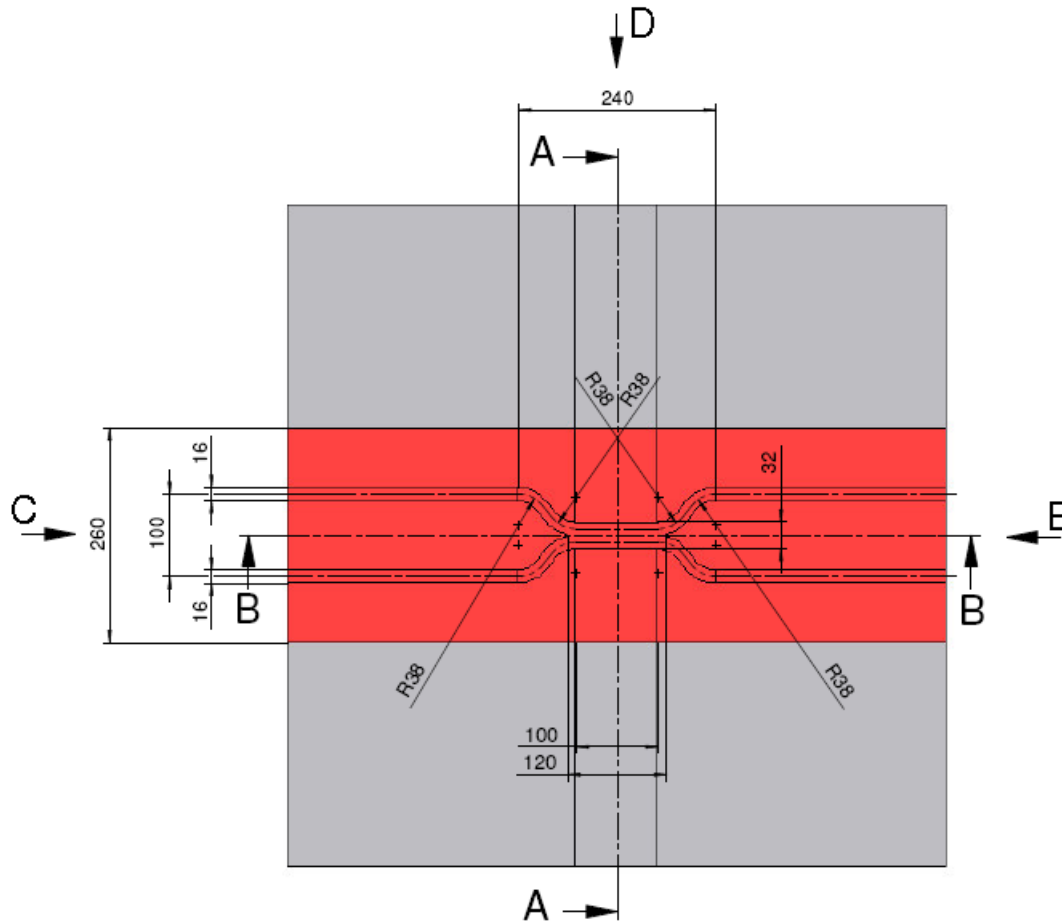


Overview



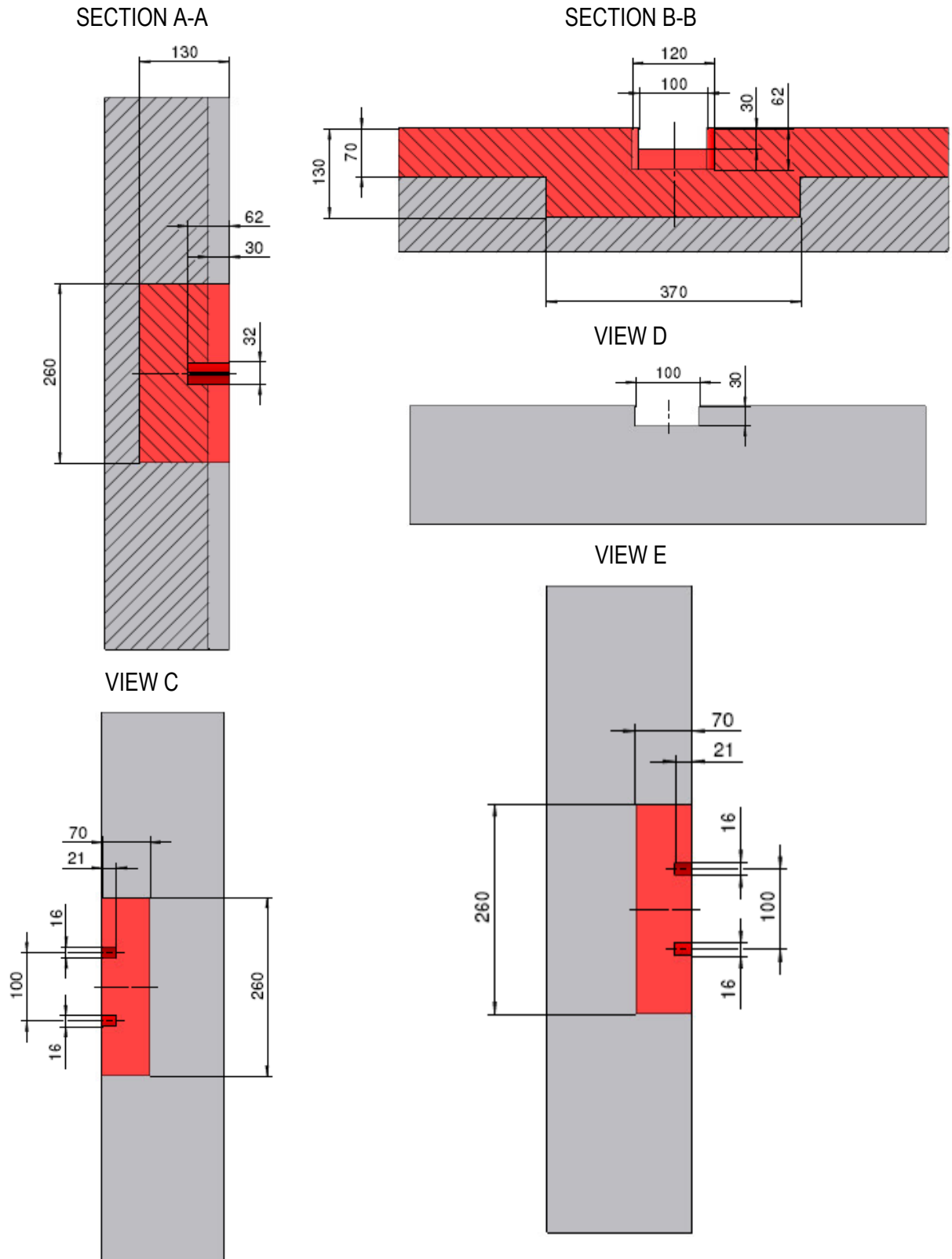
Floor installation
without floor clips

Grinding information*)



*) The **red area** must be free of ferromagnetic materials.

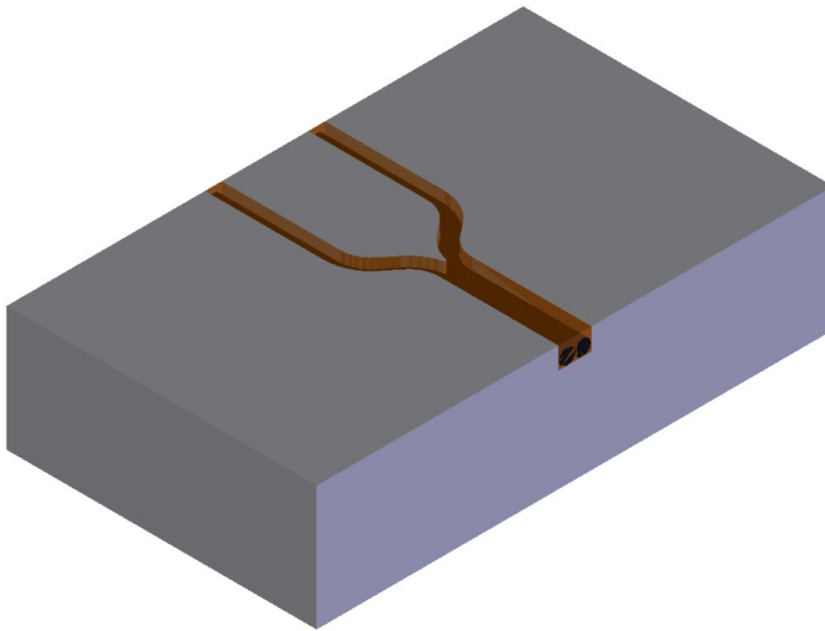
Floor installation
without floor clips



Floor installation without floor clips

7.5 Power feed for rail-guided systems

Overview



Application: Transition from a main segment in the form of a branch line to a power supply segment, for example to connect the main segment to a capacitor box, track supply, or another main segment.

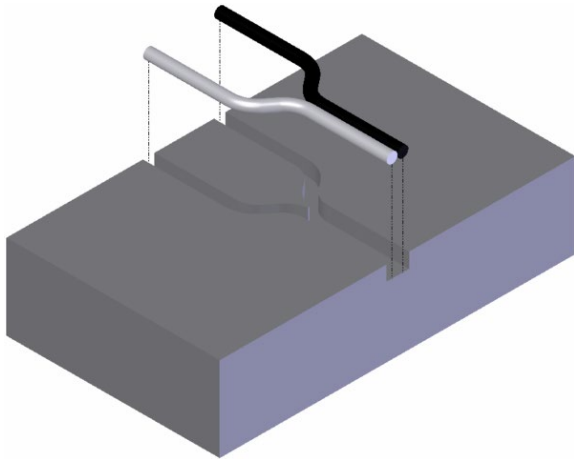
When installing a power feed for rail-guided systems, the following point must be noted:

- This power feed may only be installed at points where no inductive energy transmission is required, that is, that the pickup never moves over the area. For example, at the ends of branch lines.

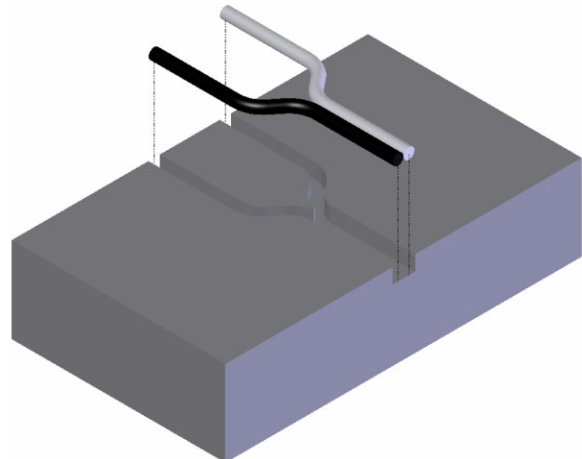
Floor installation without floor clips

Installation sequence

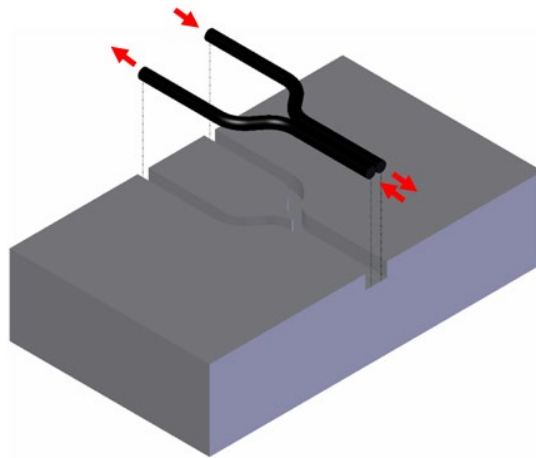
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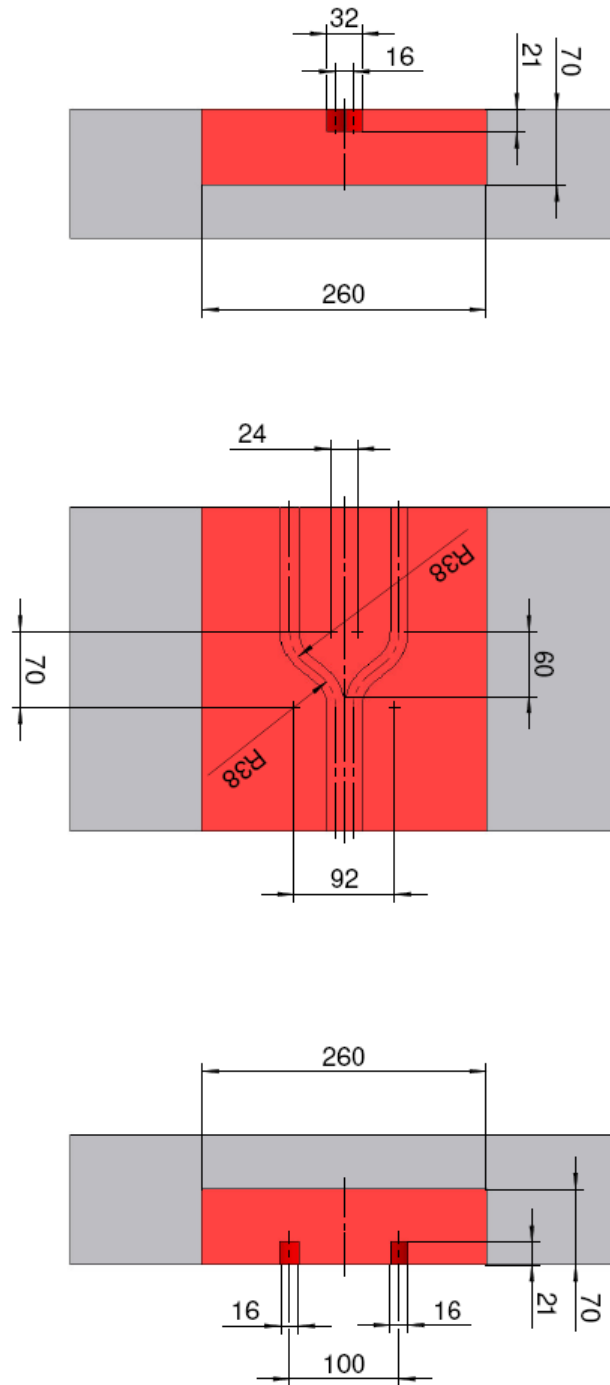


Overview



Floor installation
without floor clips

Grinding information*)

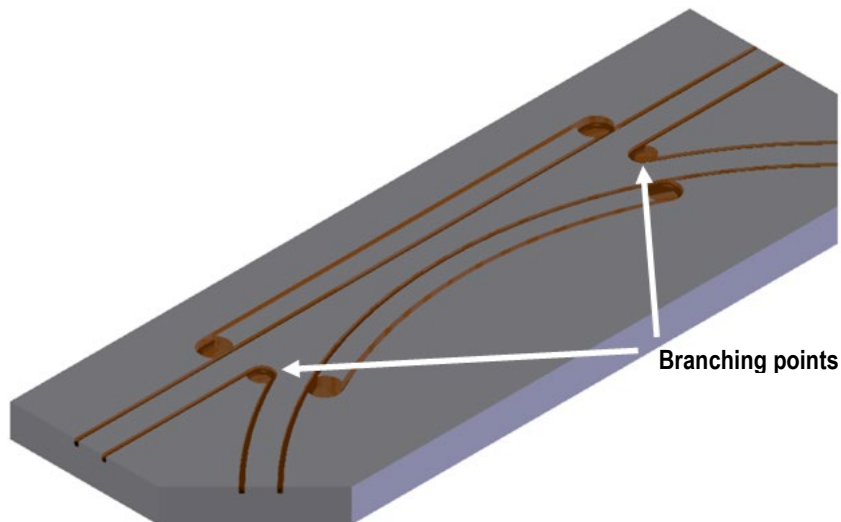


*) **red area** must be free of ferromagnetic materials.

Floor installation without floor clips

7.6 Double track switch with power loops

Overview



Application: Combination of incoming and outgoing track switches in narrow space with optimum power transmission.

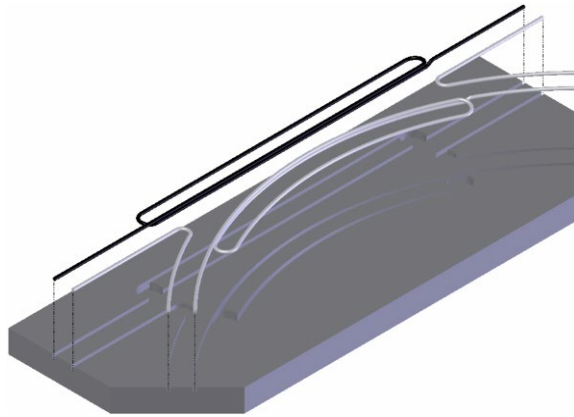
When installing a double track switch with power loops, the following points must be observed:

- For the double track switch with power loops, grinding work in addition to that for the double track switch is required in order to install the power loops in the floor. These are necessary to ensure continuous ideal power supply to the vehicle over the entire track switch area.
- The radius of the branch main segment is variable but is at least 1000 mm. A radius of 1500 mm is recommended.
- The length of the power loop depends on the radius of the track switch.
- The Litz cable on which the main flow of traffic takes place is always laid on top for effective track guidance.
- **Recommendation:** For grinding accuracy, the radii should be ground with a grinder mounted on a type of compass.
- To ensure effective track guidance, the bore in the branching point of the track switch has a radius of 40 mm.
- The change in the zone that must be kept free of ferromagnetic materials must be noted.
- **Note:** This type of track switch should only be used when space is truly tight. In any other case, separation into two standard track switches with power loops with a minimum separation of 500 mm is recommended.
- The pickup may not remain in the vicinity of the power loop for longer periods.

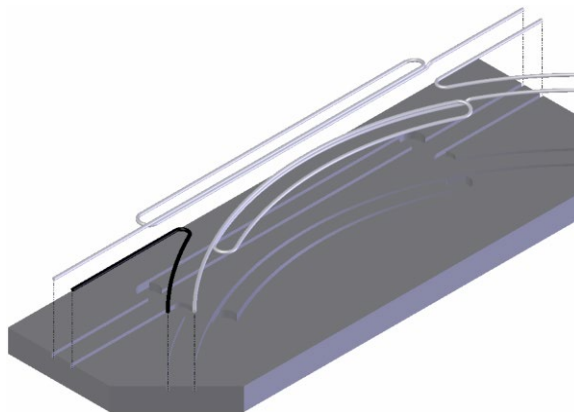
Floor installation without floor clips

Installation sequence

1.

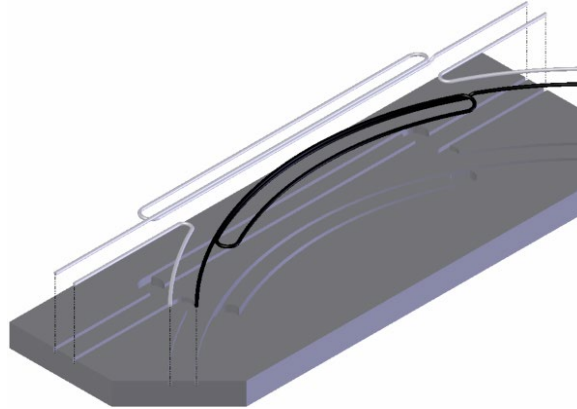


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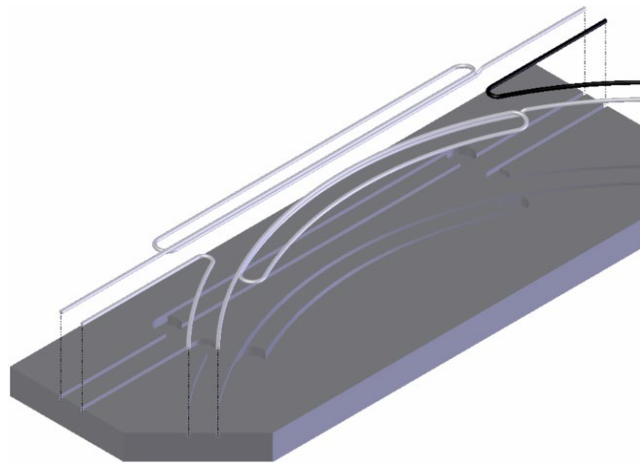


Floor installation
without floor clips

3.

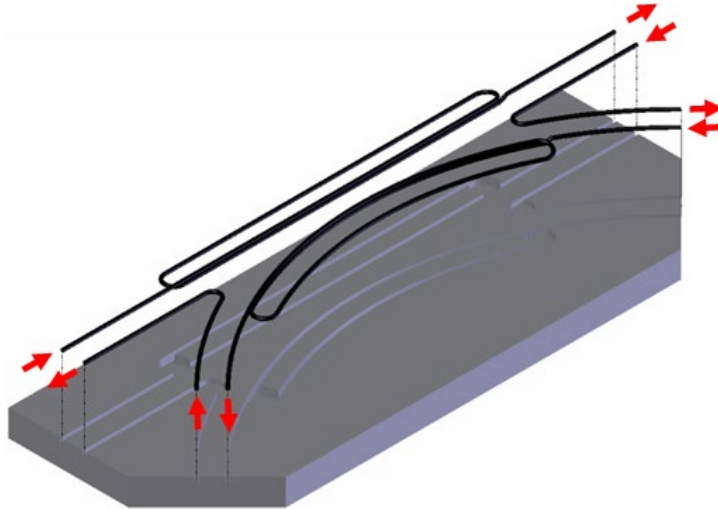


4.



Floor installation without floor clips

Overview



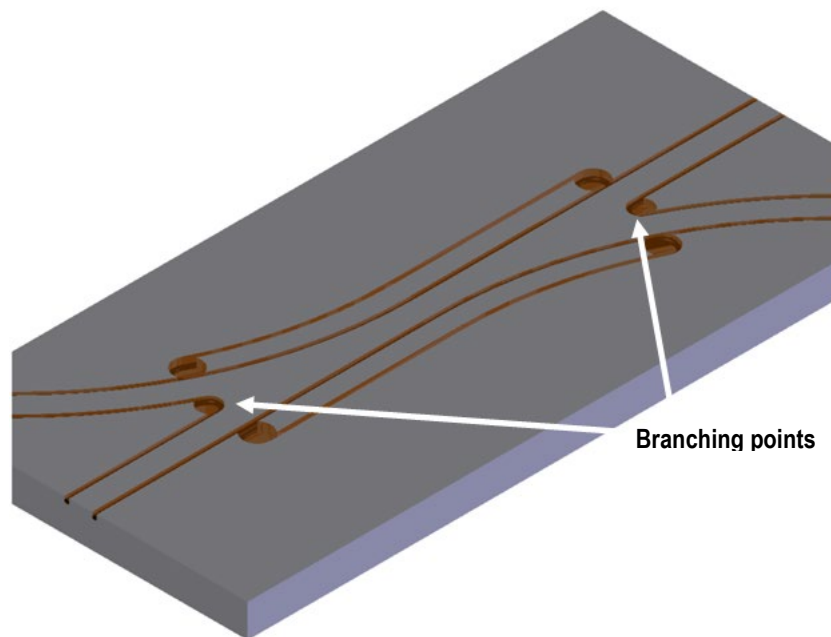
Grinding information

Upon request from Conductix-Wampfler.

Floor installation without floor clips

7.7 Double crossing track switch with power loops

Overview



Application: Combination of incoming and outgoing track switches in narrow space with optimum power transmission.

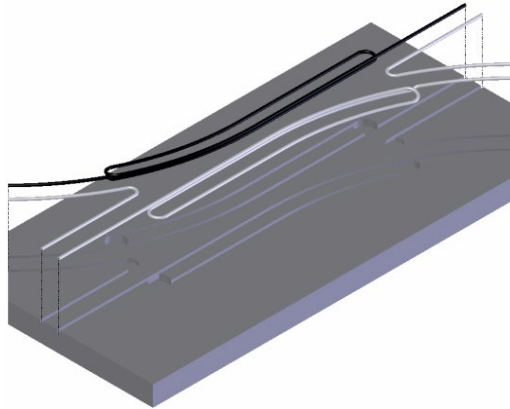
When installing a double cross track switch with power loops, the following points must be observed:

- For the double cross track switch with power loops, grinding work in addition to that for the double cross track switch is required in order to install the power loops in the floor. These are necessary to ensure continuous 100% power supply to the vehicle over the entire track switch area.
- The radius of the branch main segment is variable but is at least 1000 mm. A radius of 1500 mm is recommended.
- The length of the power loop depends on the radius of the track switch.
- The Litz cable on which the main flow of traffic takes place is always laid on top for effective track guidance.
- **Recommendation:** For grinding accuracy, the radii should be ground with a grinder mounted on a type of compass.
- To ensure effective track guidance, the bore in the branching point of the track switch has a radius of 40 mm.
- The change in the zone that must be kept free of ferromagnetic materials must be noted.
- **Note:** This type of track switch should only be used when space is truly tight. In any other case, separation into two standard track switches with power loops with a minimum separation of 500 mm is recommended.
- The pickup may not remain in the vicinity of the power loop for longer periods.

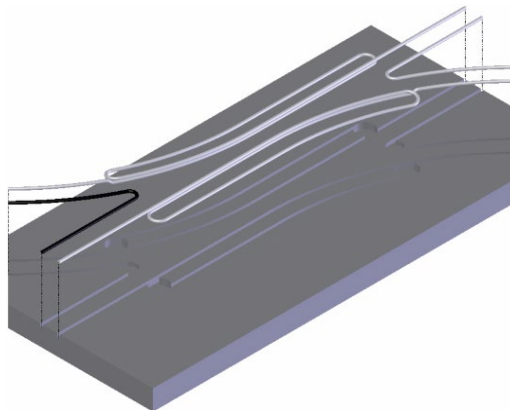
Floor installation without floor clips

Installation sequence

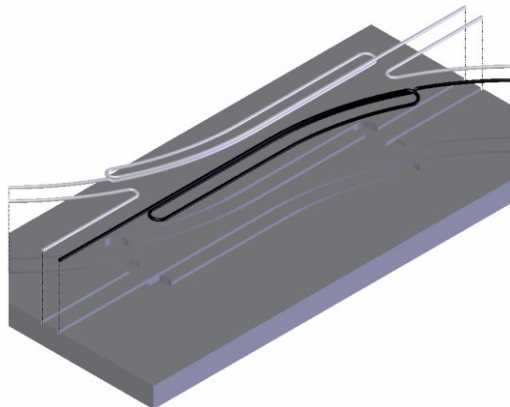
1.



2.

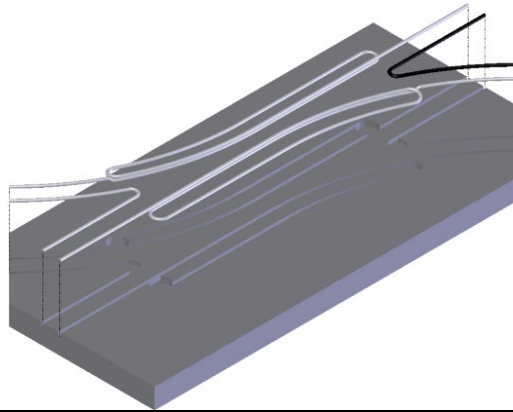


3.

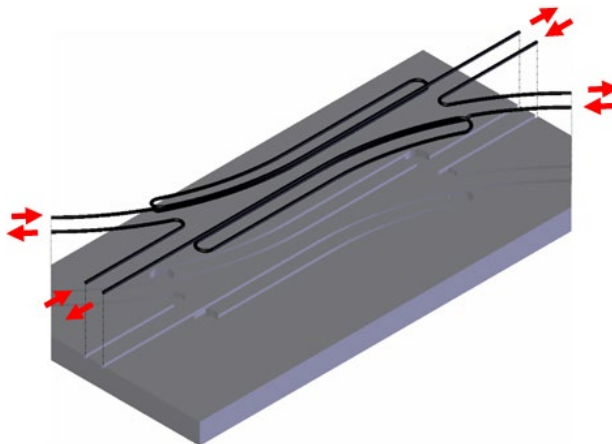


Floor installation without floor clips

4.



Overview



Grinding information

Upon request from Conductix-Wampfler.

Floor installation without floor clips

8 Further work steps

After the installation of Litz cables is complete, the following steps must be carried out:

- Soldering of the Litz cables according to MV9100-0021-E "Termination of Litz cables".
- Commissioning of the system by Conductix-Wampfler commissioners.
- Commissioning of the entire conveyor system by the system builder.

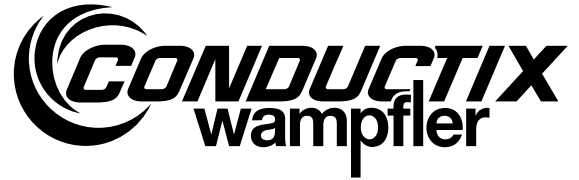
All electrical connections and commissioning are carried out exclusively by qualified personnel!

Floor installation without floor clips

9 Trademarks used

- StoPox MH 105
is a trademark of Sto AG, Ehrenbachstraße 1, D-79780 Stühlingen
- Icosit®-25
is a trademark of Sika Deutschland GmbH, Kornwestheimer Str. 107, D-70439 Stuttgart
- AB-POX 460 AS
is a trademark of AB-Polymerchemie GmbH, Tjüchkampstr 24, D-26605 Aurich

Installation instructions



Floor installation without floor clips

10 Creator of this document

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