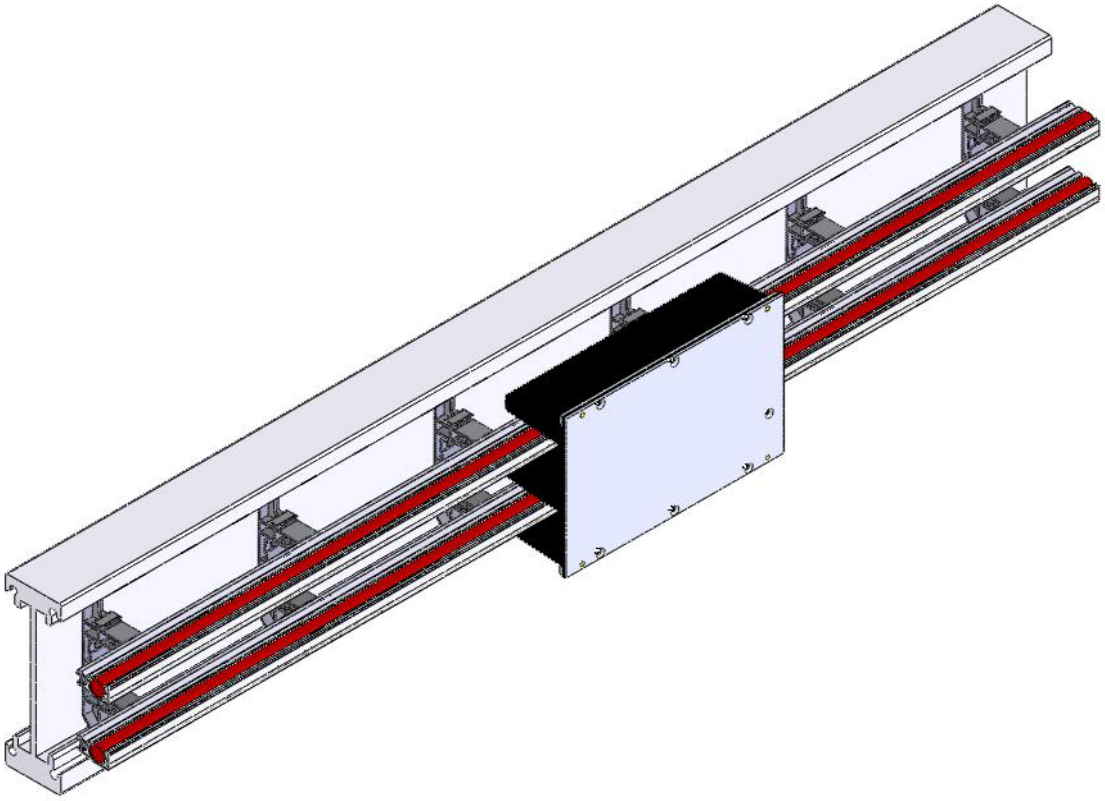
Installation Instructions

Installation of EMS

System with 125A Track Current



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Contents

IMPORTANT:

This document describes the installation of a 125 A primary track on EMS only. The manual does not include details about the interaction of the specified component with other components within a system.
Component related details please find in the component manuals. Refer always to those documents before starting any works on the system or components within the system or before operating the system.

1 Introduction

This installation instruction describes the correct handling, preparing and installing of the Conductix-Wampfler inductive power transfer system for an Electrified Monorail System (EMS). Depending on specific circumstances on-site and the design of the EMS, variations may become necessary. In this case refer to project specific documentation. Details to specific components and devices, such as Track Supplies, Tuning Boxes, Capacitor Boxes, pickups and regulators please find in the related documentations.

2 Overview

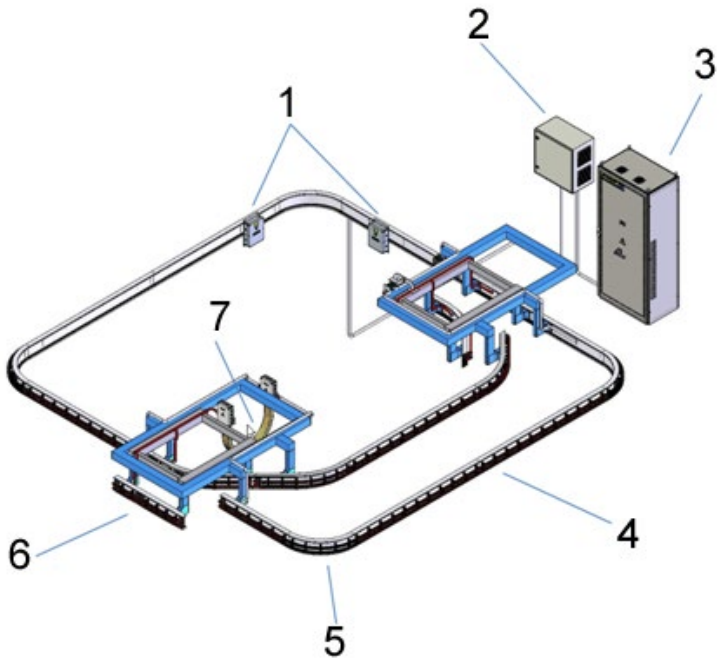


Figure 2.1: Example schematic of a simple EMS system powered with inductive power transmission. The Track Tuning Box (2) is an optional component.

Item	Description
1	Capacitor Box
2	Track Tuning Box
3	Track Supply
4	Straight Rail
5	Curved Rail
6	Switch
7	Cable Chain

3 Basic Understanding

The inductive power transmission is system which allows electrical energy to be supplied to mobile consumers without any electrical or mechanical contact.
The system combines two parts, primary and secondary which are magnetically coupled, similar to a conventional transformer. But compared to a conventional transformer, the system transfers the energy without making use of a coupling core. The energy is just transferred through the air. The primary consists basically of a Track Supply, Track Cable and Capacitor Boxes (see Figure 3.1) distributed along the path of electrification. The secondary consists of pickups and regulators.
Power may be transferred across air gaps, because of the high operating frequency creating a magnetic field of high density around the track. An track is basically one large cable loop.

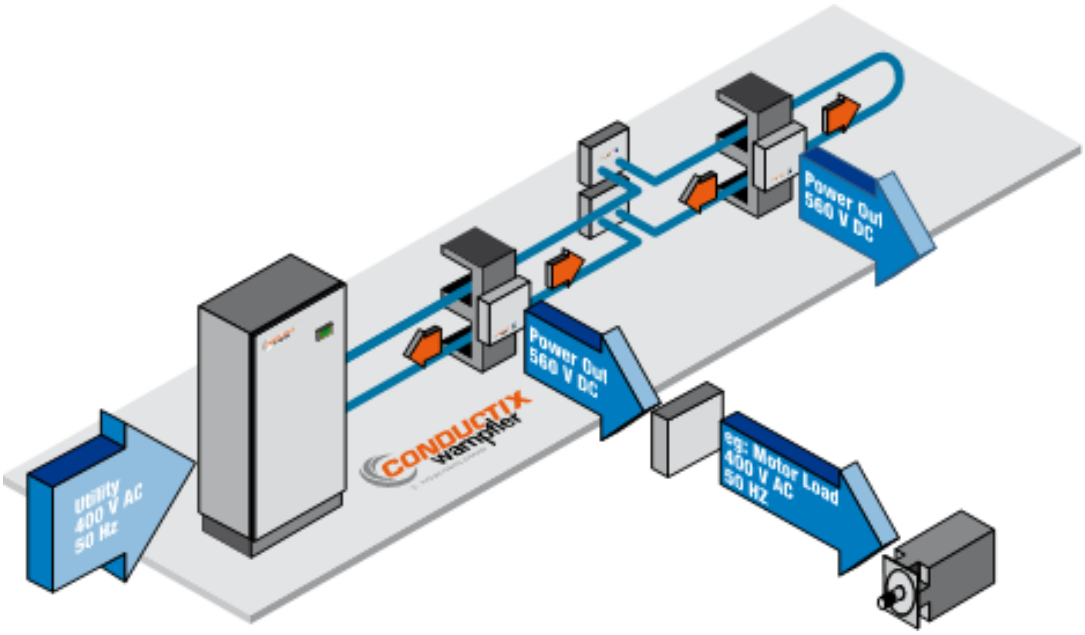


Figure 3.1: Basic operating mode

4 Basic information for the use

4.1 Area free of ferromagnetic material

ADVICE!

In order to maximize the efficiency of the inductive power transfer there must not be ferromagnetic material, such as iron, nickel, cobalt, etc. close to the Litz cables. Similarly, there should be no diamagnetic materials, such as copper, in close proximity to the Litz cables either.

4.1.1 Area free of ferromagnetic material for feed sections

Along feed sections an area equal to at least one cable diameter around the actual cables must be free of ferromagnetic material. This is illustrated in Figure 4.1 for 15.2 mm diameter cable. This value is rounded up to 16 mm. The actual separation, not the center-to-center distance, is used.

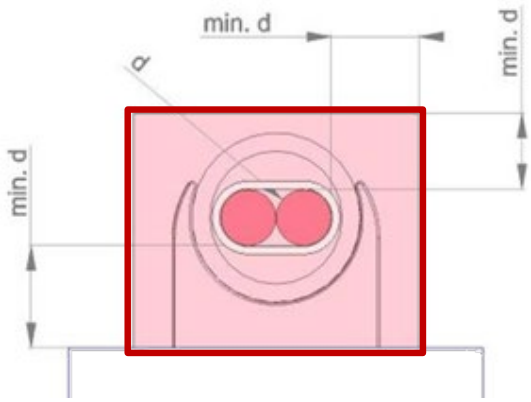


Figure 4.1: Area free of ferromagnetic material for feed section (d=16 mm – rounded up cable diameter of the Litz cable)

In feed sections, it is very important to secure the Litz cables together with cable ties every 200 mm, in order to minimize power loss.

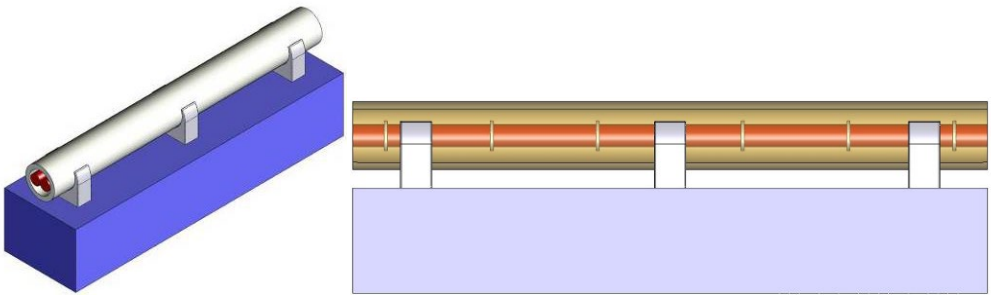


Figure 4.2: Area free of ferromagnetic material for feed section

Where multiple feeds run together, ensure that always the 2 corresponding Litz cables are tied together, i.e. those belonging to one Track Supply unit and having different current directions. For multiple parallel feeds each feed must be bundled separately, but remember the different current directions.

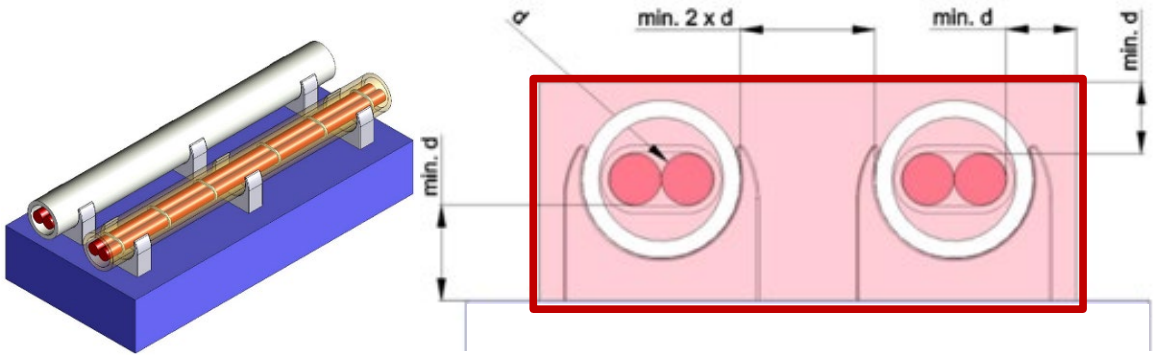


Figure 4.3: Bundling of feed and minimum distances between parallel feed sections (d=16 mm – rounded up cable diameter of the Litz cable)

In general, a separation of at least 32 mm between parallel feeds is to be maintained. In other words the distance is 2 times of the rounded up diameter of the Litz cable. It could be difficult to get the real distance because the Litz cables are installed inside the cable conduits, thus it is recommended to use the distance from the outer edges of these cable conduits. It is always better to have a greater distance than specified than a smaller one.
Even with the use of conduit the Litz cables have to be secured with cable ties to reduce the magnetic field. This also ensures the stability of System by keeping the track inductance constant. It is not permitted to put each Litz cable into an individual conduit because due to the greater magnetic field and the higher inductance per meter of the feed. For 2 parallel feeds each in a separate conduit the specified distances shown in Figure 4.3 have to be obeyed.

4.1.2 Area free of ferromagnetic material around the pickup

To ensure the effectiveness of the System it is very important to have an area free of ferromagnetic material around the pickup too. This means that the “iron-free” zone defined below must be observed over the entire length of the vehicle and may not contain frame of the vehicle, motors, sensors and actuators. Around the pickup must be an area that is free of ferromagnetic material too. In Figure 4.4 this area is shown.

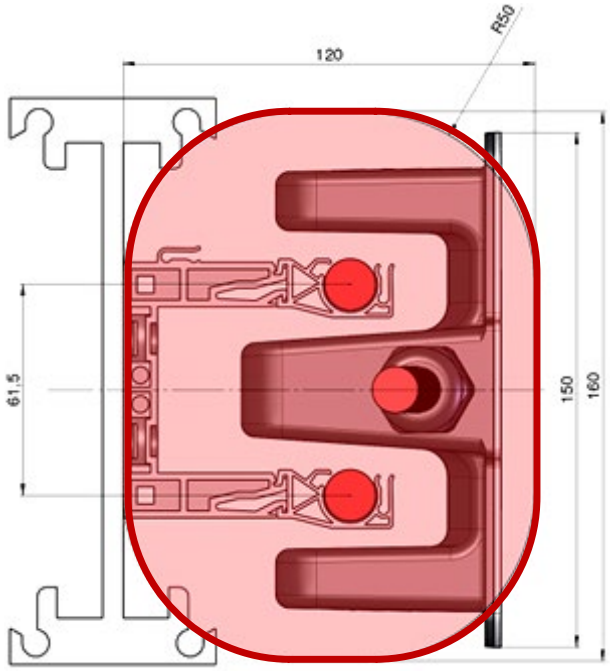


Figure 4.4: Area free of ferromagnetic material around the pickup

4.2 Screws, bolts, nuts and other accessories

- Any metal components in close proximity to cables shall be avoided or at least made of non-ferromagnetic material!
- No metal parts shall be placed between cables or within the envelope shown in chapter 4.1.
- Only the material supplied with the Track- /Track Holders has to be used to fix the Track- /Track Holder to the rail.

Ferromagnetic materials will create high track losses and become very hot!
Any exceptions from use of non-ferromagnetic materials inside the envelope free of ferromagnetic material do require the explicit approval by Conductix-Wampfler GmbH!

5 Requirements on installation

5.1 Personnel

For the mechanical installation of a 125 A primary track no special skills are required. Only connections of electrical relevance do require specific skills and trained personnel. All electric installation and commissioning works as well as repair works and disassembly have to be carried out by qualified staff (IEC 364 respectively CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN VDE 0110 and national safety rules).
Before starting commissioning or taking the system into operation, the installation needs to be checked carefully for completeness and correctness! Take care that the installation is correct before starting any automated operation!
Qualified staffs according to the safety regulations are persons that are familiar with the installation, assembly, commissioning and operation of the energy supply system and that have the appropriate qualifications.
The quality of installation work will have direct influence on the system performance in operation. Therefore installation has to be done carefully, correct and completely.

5.2 Pre-Installation Work

If possible, we recommend to pre-install components such as switches and lifts already in the production factory while being on ground level. Installation on site when the system is already installed elevated from the ground will require additional installation time and costs.
Be careful when transporting the pre-installed components to the final installation point. Use appropriate cover and safety equipment during transport.

5.3 On site conditions and requirements

Do observe all local safety and working standards and regulations including possible special standards on site regulations. Follow the directives of the OEM and the factory supervisors. Make sure no other personnel are endangered through your installation work. Make sure that all required tools are available on site before starting any installation work. Make sure that free access to the installation site is given before starting any installation work.
The general electrical operating conditions according to VDE0100 (installation and operation of electrical equipment up to 1000 V) have to be observed. If necessary, observe the local regulations when they go beyond these requirements.
Conductix-Wampfler GmbH cannot be responsible for damage or breakdowns that have been caused by disobeying this installation instruction.

6 Scope of Work

6.1 Pre-Installation of hardware

Specific tasks	Performed by
Installation of mains and control cables to Track Supply	EMS-supplier or other *
Preparation EMS installation e.g. drilling holes, performing cut-outs etc.	EMS-supplier or other *
Installation of support components	EMS-supplier or other *
Installation of Cable from the Track Supply to the EMS and along the EMS	EMS-supplier or other *
Preparation and installation of cable trays and conduits for feeding cable, switches, lifts etc.	EMS-supplier or other *
Installation EMS-components e.g. Synchronization Masters etc.	EMS-supplier or other *

Before the commissioning of an System can take place, above listed tasks have to be completed! Conductix-Wampfler reserves the right to refuse any commissioning work as long as necessary conditions are not given!

Specific tasks	Performed by
Termination of Cables with cable shoes	Conductix-Wampfler GmbH
Connection of track to Track Supply, Tuning Box etc.	Conductix-Wampfler GmbH
Connection of Capacitor Boxes, Junction Boxes etc.	Conductix-Wampfler GmbH
Tuning the System	Conductix-Wampfler GmbH
Powering up the System	Conductix-Wampfler GmbH

* Conductix-Wampfler in case of separate order

6.2 Commissioning by specially trained personnel

As listed above some tasks within the installation of an System do require specific skills and equipment.
Only Conductix-Wampfler personnel or staff authorized and trained by Conductix-Wampfler GmbH is allowed to do this work. If such work is not done by Conductix-Wampfler personnel or staff authorized by Conductix-Wampfler GmbH, no guarantee on system or component performance can be given. The specific rules for all electrical work have to be observed in any case!

7 Procedure of Installing an EMS

7.1 Basic points to remember

This installation instruction describes the installation of inductive power transmission on an EMS. Before starting installation, do internalize the following points:

- Rolling the cable off the cable reel, no pre-bending in the cable should remain.
- Any metal components (screws, nuts and other accessories) have to have a minimum distance of 16 mm to Cables if they are installed in a feed section (cables bundled close together)! In the track area even bigger distances have to be obeyed! For exact values see Figure 4.4.
- All cables have to be installed in a fixed way because of inductivity sensibility.
- Cable have to be installed in a way that no waves are build into the cable during installation and that the nominal distance between cables and pickups is guaranteed.
- Cable loops have to be avoided at any place of the installation (Junction Boxes, Capacitor Boxes, Track Supplies, Tuning Boxes, etc.) unless specified.
- The Conductix-Wampfler cable is marked with the words “Conductix-Wampfler”. Always use the label for orientation. On the upper cable mounted on the EMS the label in direction of reading; for the lower cable it is turned 180°.
- Ambient temperature for installation shall be between +10 °C and +40 °C.

7.2 Chronological order of Installation of an System

1. Define the position (within allowed limits) of all stationary cabinets (Track Supply, Tuning Box, Synchronization Master, etc.). Fix them and insure clean environment. Install the main cables and the control cables with the corresponding connectors.
2. Define the way the switches, parallel switches or lifts are powered.
3. Distribute the Capacitor Boxes along the EMS track (according to Conductix-Wampfler GmbH layout).
4. Mount Clips, Track Profiles and Track Holders. Snap the cable profiles into the holder.
5. A visual inspection for interference points and parts remaining from installation, e.g. cut off cables, must be done. In case of doubts, check critical interference points with a shuttle/trolley manually moved through the critical section.
6. Install all feeding and track cables.
7. Termination of the cables which have to be connected to the Track Supply, Capacitor Boxes, Junction Boxes etc.
8. Connection of the cables.
9. Tuning of the track to minimize the losses of the system and optimize the energy transfer towards the pickup.
10. Start-up of the Track Supply and final adjustments to the system.

8 General rules regarding cabling

8.1 Cable cross section

The cable cross section for the 125A EMS systems is 35mm². The required cable is a special Litz Cable for 20kHz applications provided by Conductix-Wampfler. Only for the moving part of a switch or lift, a flexible cable installed inside an energy guiding chain is used.
Please be aware that accessories for installation and components can be customized to your application. Please refer to the project documentation for details about the necessary material in your project.

8.2 Cable orientation

8.2.1 Cable orientation on Track

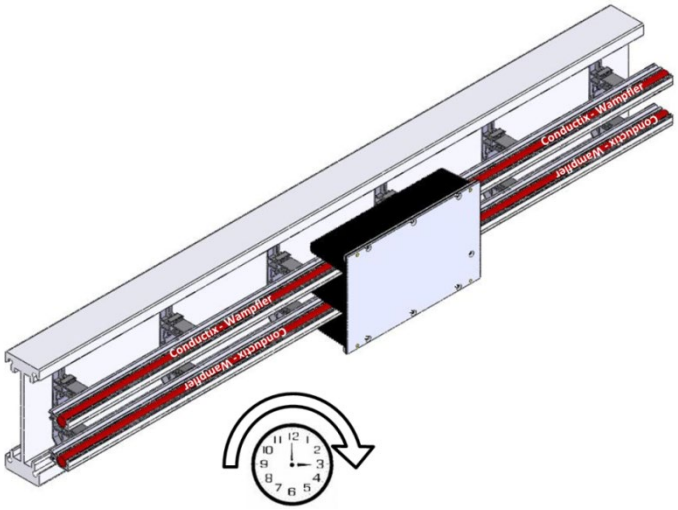


Figure 8.1: Cable orientation on track

General rules for the installation of Litz cable on the track profile:

- The “Conductix-Wampfler” writing on the cable should always be clockwise.
- Cable at the top goes from left to right (Indication: print on cable).
- Cable at the bottom goes from right to left (Indication: print on cable).

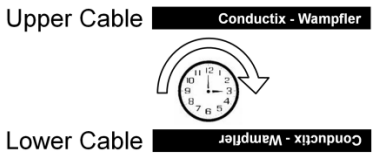


Figure 8.2: Conductix-Wampfler writing

8.2.2 Cable orientation to Track Supplies

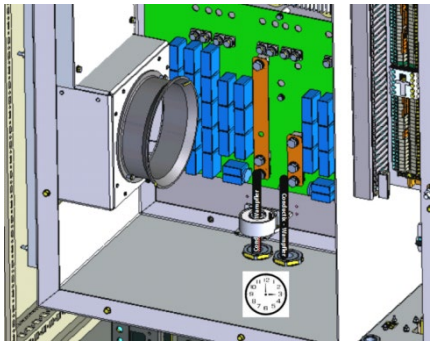


Figure 8.3: Cable orientation to Track Supplies

The orientation of the track cable to the Track Supply has to be similar to the cable orientation on the track. The “Conductix-Wampfler” label on the cable should always be “clockwise”.

8.3 Cutting cable

During installation enough cable length (min 1000 mm each if not specified with a different length) has to remain for the termination and connections to the Capacitor Boxes or other stationary cabinets. Insufficient remaining cable length may result in replacement of entire cable segments.

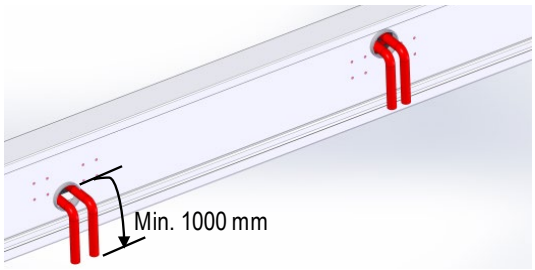


Figure 8.4: Cutting cable

Generally recommended remaining cable length is 1000 mm (length behind rail after pre-installation, before commissioning). By specific circumstances it may become necessary to have longer cable. If there is any indication that more than 1000 mm of cable remaining is necessary, do cut cable according to the specific project documentation or only after approval by the site manager.

8.4 Preparing cable ends

Preparing cable ends and soldering cable lugs requires specific skills and equipment and can therefore only be performed by Conductix-Wampfler GmbH personnel or staff trained and authorized by Conductix-Wampfler GmbH. For further details please refer to chapter 7.

8.5 Cable Profiles

The universal profile should be used on straight rails.

Figure 8.5: Universal profile

The slotted profile has to be used on curved rails.
Exception: On long straight rails the slotted profile can be used as an expansion joint to allow some temperature based expansions of the cable. Please refer to the project documentation of your project whether this solution shall be applied.

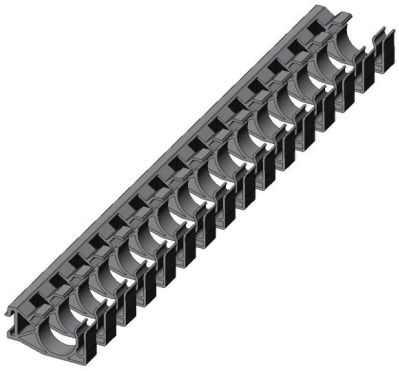
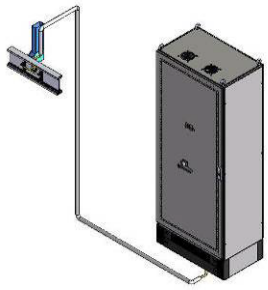


Figure 8.6: Slotted profile

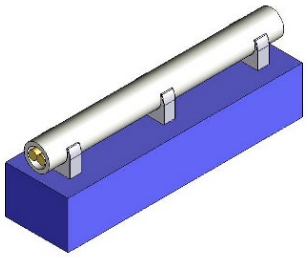
9 Feeding cables

9.1 Cabling

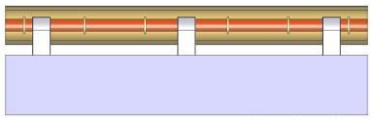


9.1
Feeding cables have to be mounted wherever no magnetic field is used (e.g. from Track Supply to track). They are physically identical to track cables but have to run close together to minimize losses.

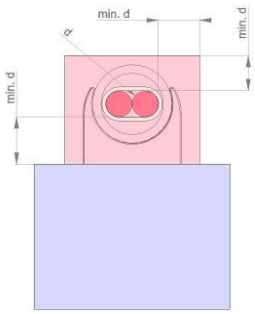
9.2
Do run feeding cables always in pairs of opposite Conductix-Wampfler label orientation. They have to be mounted close together (tight together with cable ties every 200 mm) and …



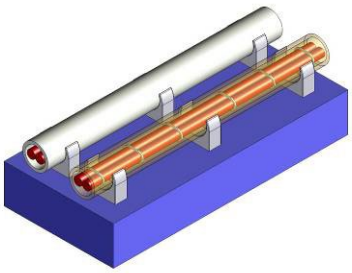
9.3
… have to be protected in a non-metallic conduit.



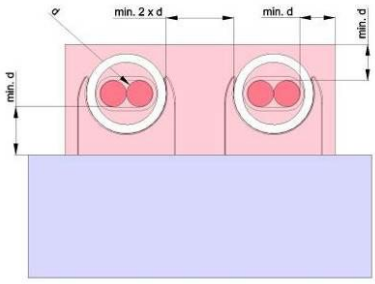
9.4
It is important at this installation stage to insure that cable ties are available to keep the cables together.



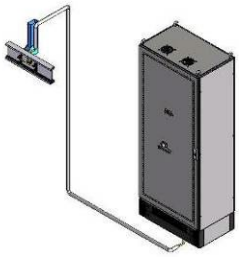
9.5
Distance from feeding cables to any metal structure has to be at least d = 16 mm (rounded up cable diameter of the Litz cable). Cable glands with metal rings or any other metal components have to be avoided.
The area which has to be free of metals is marked in the picture.



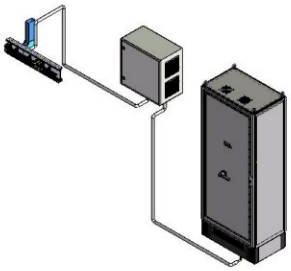
9.6
If 2 feeds are needed they can be mounted in parallel with a minimum distance of 2 x “d” (where d = 16 mm is the rounded up cable diameter of the Litz cable) to each other.
For exact dimensioning see figure 9.7



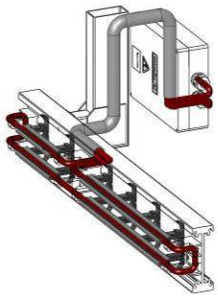
9.7
The area which has to be free of metals for 2 parallel feeds is marked in picture (where d = 16 mm is the rounded up cable diameter of the Litz cable).



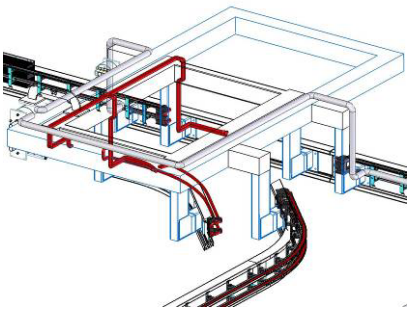
9.8
The feeding cables are used to make a connection between Track Supply and EMS start point ...



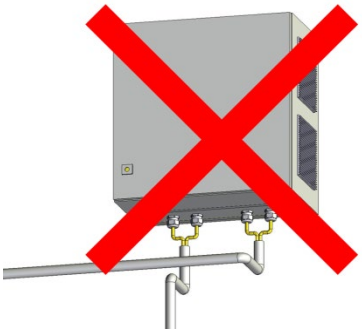
9.9
... between Track Supply and Tuning Box, as well as between Tuning Box and EMS start point.



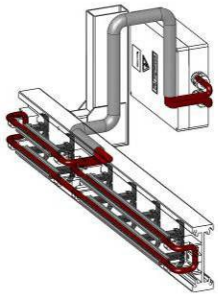
9.10
The connection between the track and a Capacitor Box is carried out as a feed.



9.11
Feeding cables are also used to install along metal structures (e.g. switches) to feed the cable from one point to another point.



9.12
The cables to a Tuning Box etc. should be connected in direction installation to avoid crossed feed lines or even worth crossed tracks.



9.13

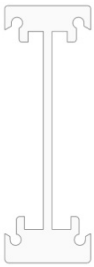
Feeding cables should be as short as possible. But please remember the envelope which has to remain free not to block the moving parts of the EMS.

9.2 Points to consider

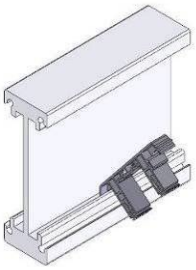
- Please remember the Conductix-Wampfler GmbH requirements for the tubing may not meet all the requirements of the end users installation. Please refer to the end users electrical guidelines before purchasing the material.
- Please remember to keep mounting screws at least one cable diameter away from the track and feed cables (to keep the required envelope free of ferromagnetic material).
- Please remember to keep an envelope free of any obstacles for the moving parts of the EMS (near start points, Capacitor Boxes etc. as well as on straight lines).
- Installation temperature: +10 °C to +40 °C

10 Mounting Track Holder, Feed Holder and Profile

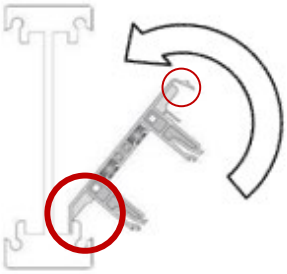
10.1 Mounting of the Track Holder



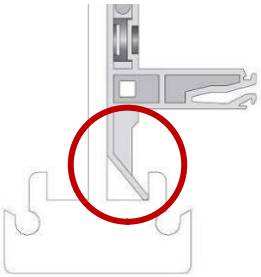
10.1
Track Holders are the base for the profile guiding the Litz cable (see chapter 10.2). For every rail …



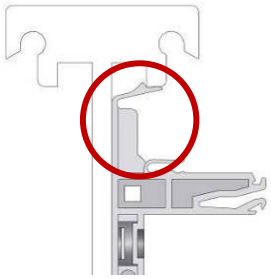
10.2
…cross-section there is a specific Track Holder. Check if the Track Holder fits into the aluminium profile.



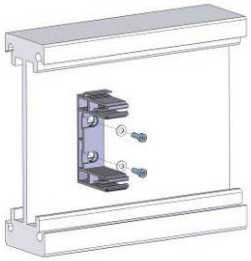
10.3
Start at the bottom with the 45° bottom part of the ...



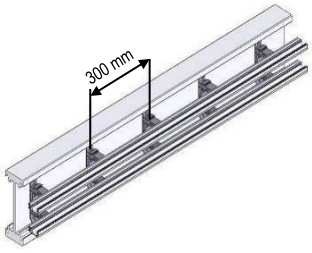
10.4
...Track Holder and clip the 90° top part of the Track Holder...



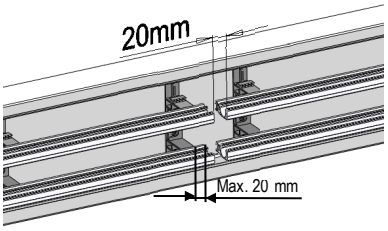
10.5
...into the aluminium profile.
If there is no corresponding Track Holder for the rail, …



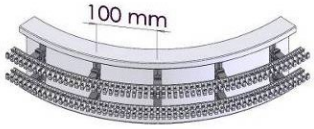
10.6
…there are also special Track Holders which can be fixed with stainless steel screws.



10.7
The distance between Track Holders on straight rails with solid profile should be 300 mm.



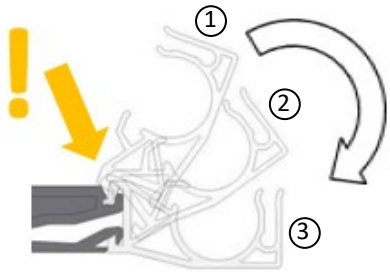
10.8
Try to place a Track Holder at every changeover of 2 profiles to fix the connection.



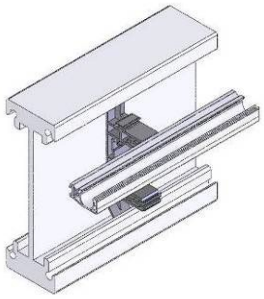
10.9
Place a Track Holder every 100 mm on curved rails up to 1,5 m radius, every 200 mm up to 3 m radius and every 250 mm for curve radius bigger than 3 m.

10.2 Mounting of the Profile

10.10
The profile is designed to guide the Litz cable. It is mounted onto the Track Holder. To mount the profile onto...

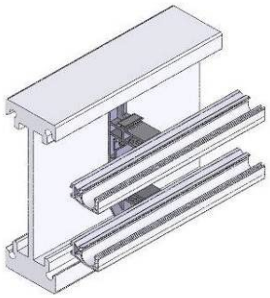


10.11
...the Track Holder, start with an angle of 80° of the profile. Ensure that the profile is engaged properly to the Track Holder, than move...

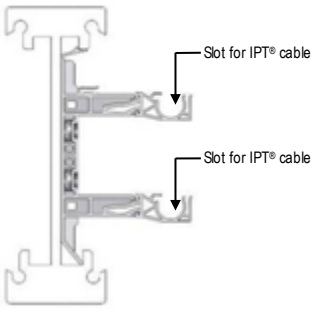


10.12
...the profile in by turning it down until hearing a clicking noise. The profile is fixed on the Track Holder now.

10.13
Ensure that the bottom part of the profile is as well properly engaged to the Track Holder.



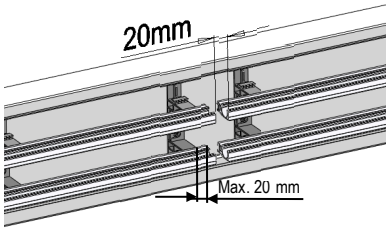
10.14
Place the other profile in the same way. Each profile is equipped with 2 slots.



10.15
On the inner side the (bigger) slot for the cable and on the outer side the slot for the iDAT®-cable.

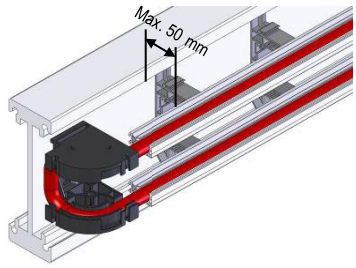
10.16
Solid Profile is used on straight rails…

10.17
…while the slotted profile is used for curved rails.

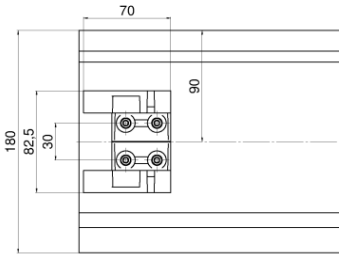


10.18
Leave a gap of min. 20 mm between 2 connecting profiles to allow thermal extension.

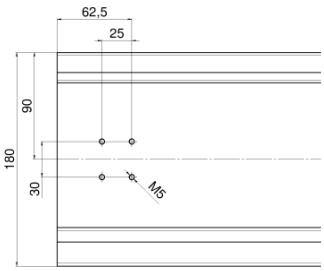
10.3 Mounting of the Track Holder at track end



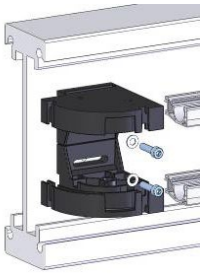
10.19
Track Holders are guiding the cable at the entry-/exit points of the track. They are used for feeding-points, Capacitor Box ex-its and return points.



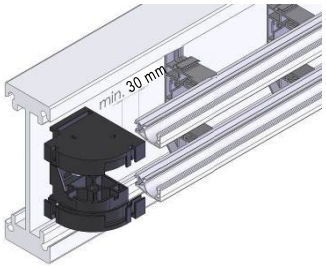
10.20
Dimensions of the Track Holder. For asymmetric rail cross-sections mount the Track Holder centred in the vacuity.



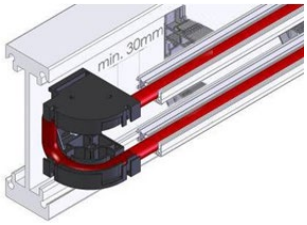
10.21
Mounting holes for the Track Holder. **Note:** Fix each Track Holder with 2 screws!



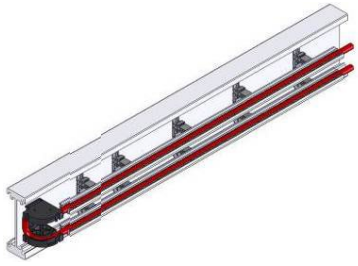
10.22
The Track Holder has to be mounted onto the rail.
Note: Only use original or at least A4 quality screws with the Track Holder!



10.23
Leave a gap of min. 30 mm between Track Holder and end of connecting profile to al-low thermal expansion

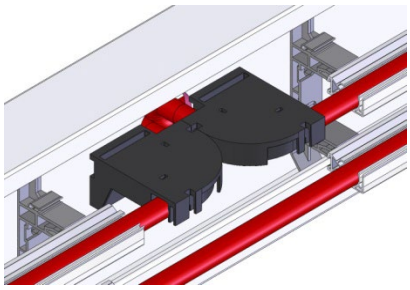


10.24
To mount the cable it is simply clipped into the Track Holder.

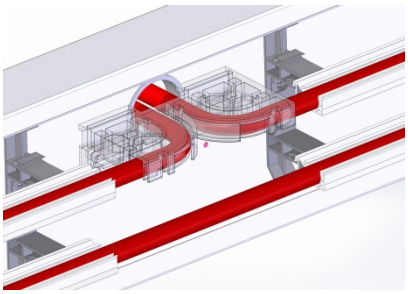


10.25
Use the described cable routing at any al-uminium profile end, (EMS start or end points, switches lifts etc.).

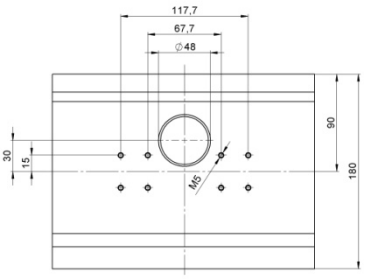
10.4 Mounting of the Track Holder in the middle of the track



10.26
One pair of Feed Holders has to be used, whenever the cable is passing from 1 side to the other side of the aluminium profile.

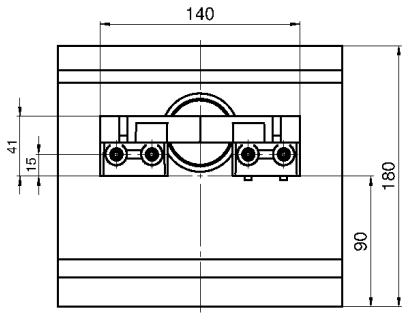


10.27
As soon as the magnetic field is no longer necessary to transfer energy, the cables run as feed to minimize the losses.



Back side

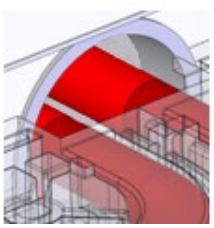
10.28
Exits should be realized close to a traverse to ensure easy installation at traverse side (for Capacitor Box etc.).
Note: Fix each Feed Holder with 2 screws!



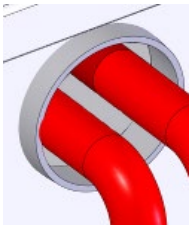
Front side

10.29
Dimension and position for mounting holes for 2 Feed Holders. For asymmetric rail cross-sections mount the Feed Holder centred in the vacuity.
Note: Change distances accordingly for lower exit!

10.30
To drill the holes, Conductix-Wampfler recommends the application of a hole saw (Ø 48 mm). The holes have to be burred after drilling. The application of a subland twist drill is not recommended.



Front side



Back side

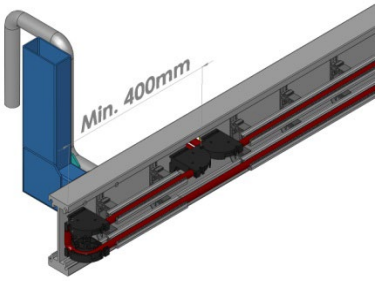
10.31 10.32
Cut the cable gland crosswise with cutter. Insert the cable gland into hole.
Pull the cable through (from front side to back side).

10.5 Points to consider

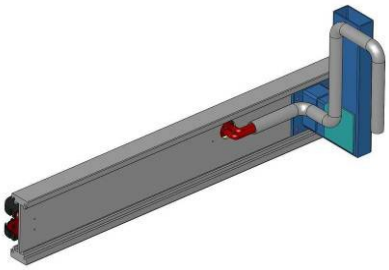
- Use a hole saw to cut the hole for the exit to Capacitor Boxes etc. Do not use a subland twist drill!
- Burr the holes drilled into the rail.
- Installation temperature: +10 °C to +40 °C.
- The orientation of the Litz cable should always be clockwise (see chapter 8.2).
- Do not lay the cables on steel structures. Keep the prescribed distance (see chapter 4.1).

11 EMS Start and End Points

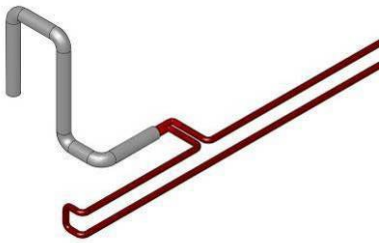
11.1 EMS Start Point at the profile end



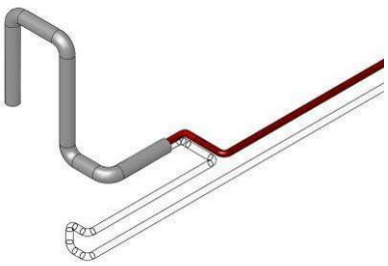
11.1
For start/end of the track at the start/end of the rail figure 11.1 shows the typical wiring.



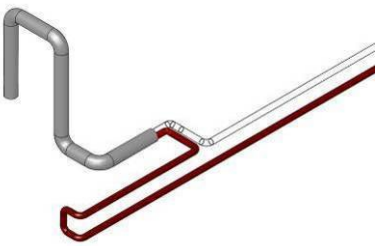
11.2
One hole with a diameter of 48 mm has to be drilled ….



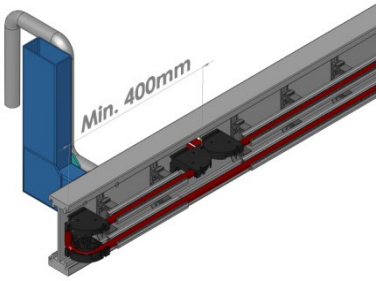
11.3
… for cabling through the aluminium rail.



11.4
Wire 1 feeding cable through hole and turn left to cable along the track.

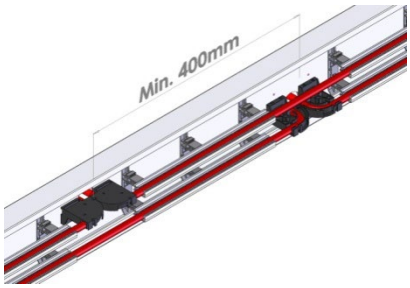


11.5
Wire the other feeding cable through the hole, turn right and towards the profile end, through the return point and continue cabling along the track.

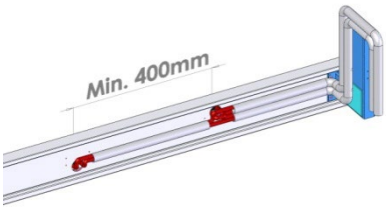


11.6
Minimum distance between 2 track elements (e.g. feed for Capacitor Box etc.) is 400 mm to avoid interferences of the magnetic field.

11.2 EMS Start Point in the middle of the profile



11.7
This picture shows two neighbouring EMS start or end points (from 2 different Track Supplies) in the middle of the track.

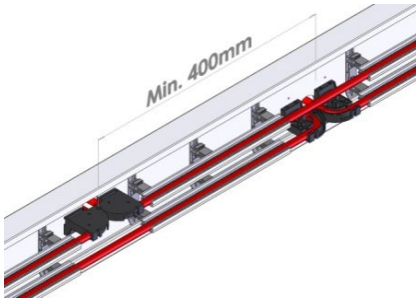


11.8
A minimum distance of 400 mm between the 2 elements is mandatory. The wiring is done similar to a pair of Capacitor Boxes (see chapter 13.1).

11.9
2 holes have to be drilled for the cabling. Avoid cabling around yokes. There is 1 hole for the upper cable and 1 for the lower cable.

11.10
For the right track 1 of the feeding cables has to be wired through the right part of the lower hole and the other one through the right part of the upper hole.

11.11
The wiring for the left track has to be done accordingly.



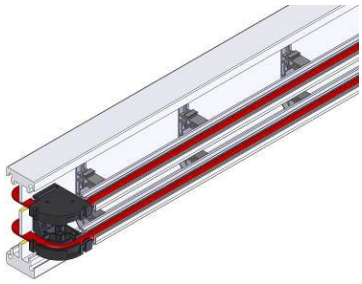
11.12
Obey the minimum distance of 400 mm between two entry points, to avoid interference of the magnetic field.

11.3 Point to consider

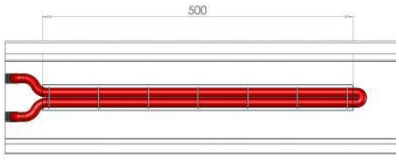
- The orientation of the Litz cable should always be clockwise (see chapter 8.2).
- The distance between 2 exit holes is minimum 400 mm.
- Do not lay the cables on steel structures. Keep the prescribed distance (see chapter 4.1).
- Obey specified distances during installation.
- Installation temperature: +10 °C to +40 °C.

12 EMS Return Point

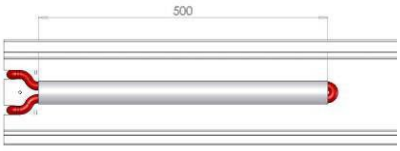
12.1 EMS Return Point at the profile end



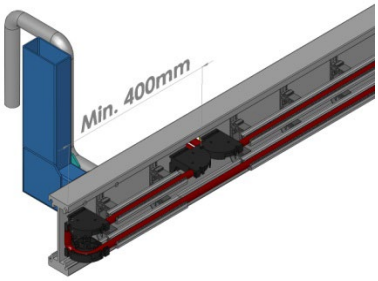
12.1
A return point can be placed at the end of an EMS rail with no bordering Track Supply, Capacitor Box etc.



12.2
At the backside of the rail a loop of app. 500 mm length should remain e.g. to place an additional Capacitor Box. As long as no Capacitor Box is placed, the cable is installed like a feed area…

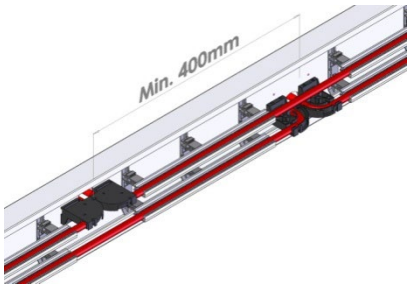


12.3
… (the cables are tied together and the area free of ferromagnetic substances has to be obeyed). It is recommended to use a non ferromagnetic tube to protect cable loop.

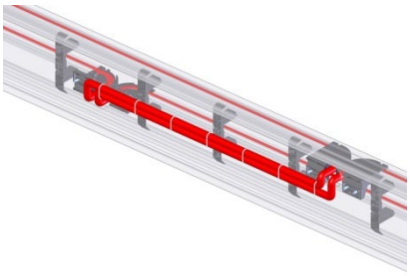


12.4
Obey minimum distance between 2 track elements (e.g. return point at track end and feed for Capacitor Box etc.) is 400 mm to avoid interferences of the magnetic field.

12.2 EMS Return Point on the profile



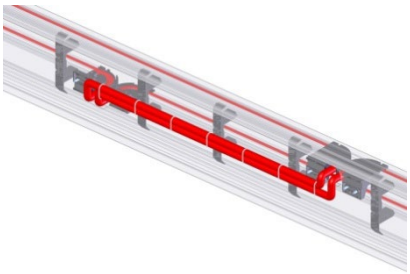
12.5
Some return points also need to be placed along the track. Than the cabling at the track side looks similar to an exit of a pair of Capacitor Boxes. The minimum distance between the 2 parts of the return point on track is 400 mm.



12.6
From the opposite side of the rail the difference to a feeding point for a pair of Capacitor Boxes and the return point gets visible.

12.7
The upper cable from the left track is wired through the upper hole and returns to the left track through the lower hole.

12.8
The cable for the right track is wired accordingly.



12.9
At the non track side of the rail the cables are wired as feed (cables are tied together and the area free of ferromagnetic substances has to be obeyed).

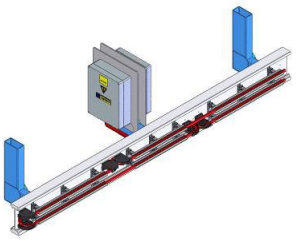
12.10
It is recommended to use a non ferromagnetic tube to protect the feed.

12.3 Points to consider

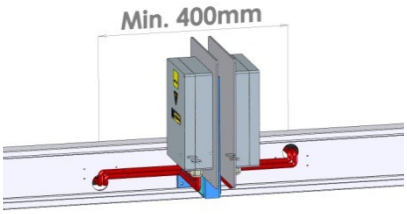
- The length between 2 parts of the return point is minimum l = 400 mm.
- The orientation of the Litz cable should always be clockwise (see chapter 8.2).
- Please remember to treat the cable at the backside of the EMS rail like a feed regarding distance of the cables to themselves and towards the rail.
- Obey specified distances during installation.
- Installation temperature: +10 °C to +40 °C.

13 Cabling of Capacitor Boxes

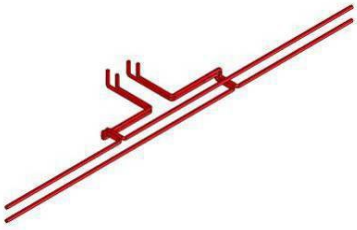
13.1 Cabling



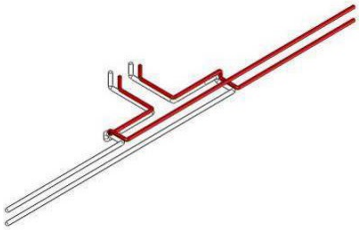
13.1
At certain distances, a pair of Capacitor Boxes has to be inserted into the track to reduce inductive losses. Consider the cable length for the cabling through the hole to the Capacitor Box (see chapter 8.3).



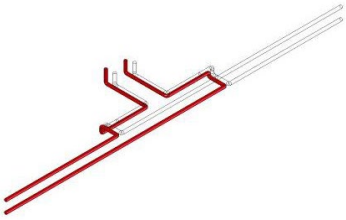
13.2
Each cable (upper and lower one) has to have a hole to exit towards one Capacitor Box. Avoid cabling around yokes!



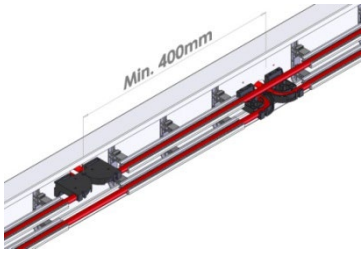
13.3
The upper 2 cables pass in one Capacitor Box and the lower two cables pass in the other Capacitor Box.



13.4
Cables approaching the exits from the right are fed through the corresponding hole in the rail. They are wired to 1 Capacitor Box each.



13.5
The cables approaching from the left side are wired accordingly.
Note: 2 cables fed through 1 hole have to connect to 1 Capacitor Box!



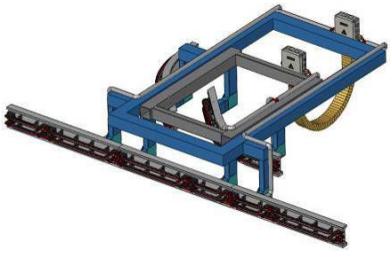
13.6
The minimum distance of 400 mm between the two exits for the Capacitor Boxes has to be obeyed.

13.2 Points to consider

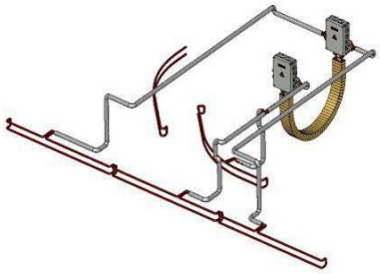
- For feed length > 30 m place a pair of Capacitor Boxes at the EMS start point to avoid additional installation work.
- A pair of Capacitor Boxes should be placed at certain distances. Please refer to the layout documentation. If the position of these Capacitor Boxes interferes with other parts of the installation, please contact Conductix-Wampfler GmbH.
- The orientation of the Litz cable should always be clockwise (see chapter 8.2).
- The length between 2 exits is minimum l = 400 mm.
- Do not lay the cables on steel structures. Keep the prescribed distance (see chapter 4.1).
- Obey specified distances during installation.
- Installation temperature: +10 °C to +40 °C.
- Avoid cabling around yokes.

14 Switch, powered by Energy Guiding Chain

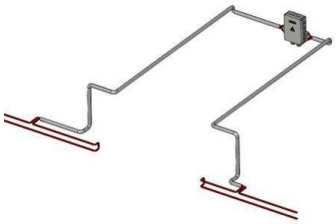
14.1 Overview



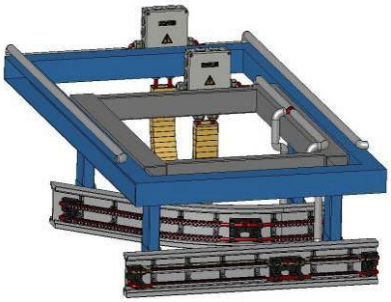
14.1
The chapter is about switches powered by Energy Guiding Chain. These switches are powered all the time, independent of the position of the movable part of the switch.



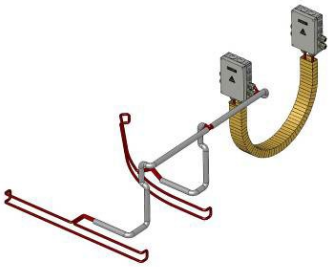
14.2
The switch is supplied by the main track via the flexible cable. Compared to the Litz cable the special flexible cable offers an increased flexibility which is necessary for the chain application.



14.3
The flexible cable is connected to the Litz cable in the Junction Box (static side).

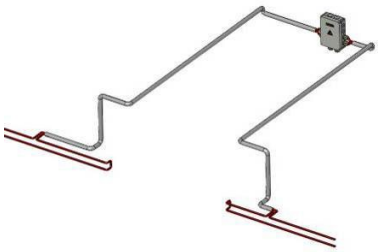


14.4
The switch segment consists of the straight and curved rail segment.

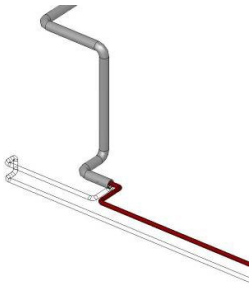


14.5
The movable part of a switch consists of the Energy Guiding Chain, the second Junction Box (moving side) and the track on the switch segment (straight and curved rail).

14.2 Main Track cabling

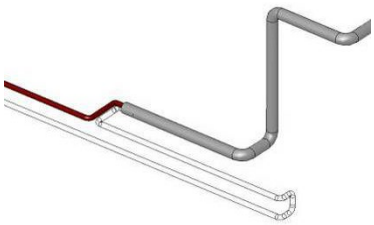


14.6
The main track does not directly power the switch. The track parts before and after the switch are connected with a feed which follows the support structure.

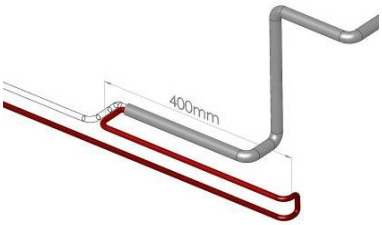


14.7
Regarding the “right” part of the main track: The upper cable is directly fed through the cutout.

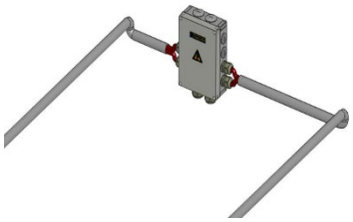
14.8
The corresponding lower cable at the “right” part of the main track goes to the profile end and turns before it is fed through the cutout. The distance between the end of the aluminium profile and the cutout is minimum 400 mm.



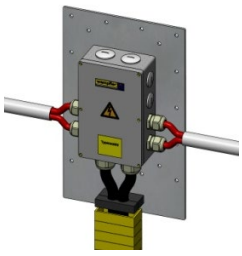
14.9
Cables for the other side of the main track are wired accordingly.



14.10
Similar to the other side of the main track, the distance between the end of the aluminium profile and the cutout is minimum 400 mm.



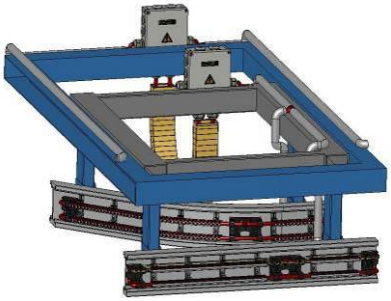
14.11
The cables from the “right” and “left” part of the main track which were fed through the aluminium rail are passed to the Junction Box.



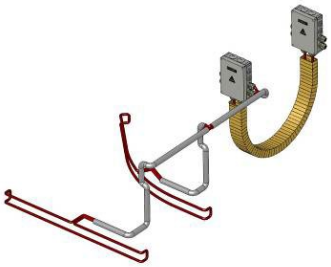
14.12
The Energy Guiding Chain is connected to the main track and the parts of the track on the switch segment in the Junction Boxes. Obey that the trolley’s movement window remains unblocked.

14.13
The Energy Guiding Chain as well as the flexible cable has to be fixed onto a corresponding mounting plate (if available). A tension relief for the cable shall be installed.

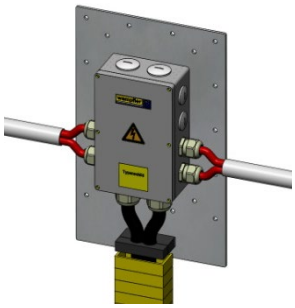
14.3 Switch Segment cabling



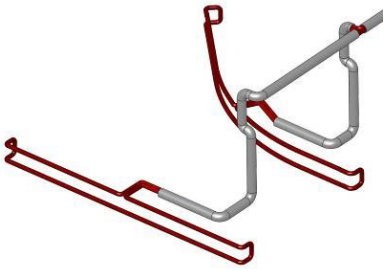
14.14
A cutout for each part of the switch segments have to be prepared.



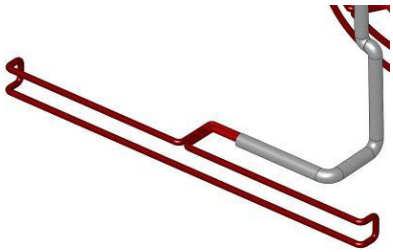
14.15
Because the switch is Energy Guiding Chain powered there is no need for additional Capacitor Boxes on the switch (the tuning is done in connection with the main track).



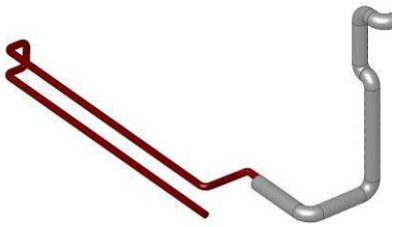
14.16
The correct orientation of the cables is necessary before they are connected inside both Junction Boxes (connect Litz cables of same label orientation to each other).



14.17
The whole switch segment is powered by the Energy Guiding Chain and forms 1 Litz cable loop. In this case it consists of a straight and a curved part.

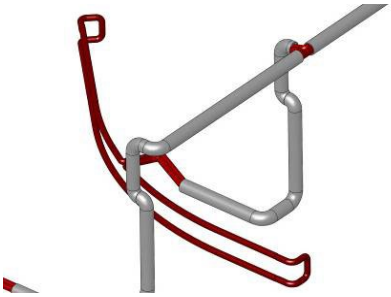


14.18
The loop starts at the Junction Box and runs to the straight segment of the switch. **Note:** That the entry point of the cable to the straight segment should be centred!

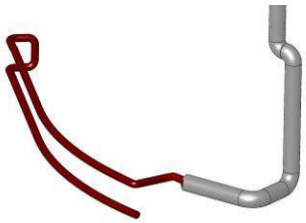


14.19
At the straight segment the Litz cable is wired through the cutout, continues to the right end of the segment (on the top side of the rail) turns and continues to the other end of the straight segment (on the bottom side of the rail).

14.20
Here the cable turns again and is wired back through the cutout, towards the curved part of the switch segment.

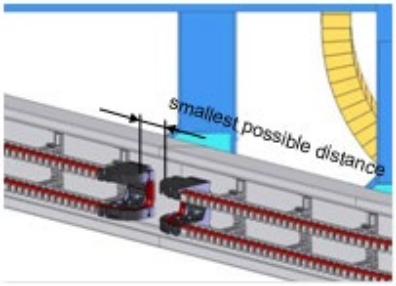


14.21
The wiring of the curved part is done similar to the straight part.
Note: That the entry point of the cable to the curved segment should be centred towards the length of the curved rail to get maximum distance between return points and entry point!

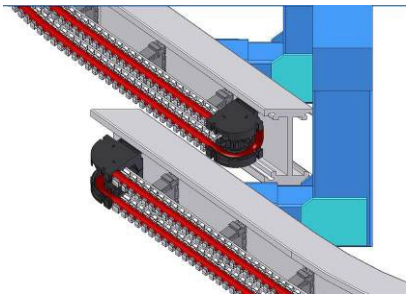


14.22
The Litz cable returning from the straight part is fed through the cutout, continues to the right end of the curved part (on the top side of rail). Here it turns and continues to the other end of the curved part (on the bottom side of the rail).

14.23
At the left hand end of the curved part of the switch the Litz cable turns again and is fed through the cutout towards the Junction Box again.



14.24
The Track Holders at the curved part of the switch have to be fixed in a way, that the gap to the neighbouring Track Holder (on the fixed side of the switch) has a smallest possible distance.



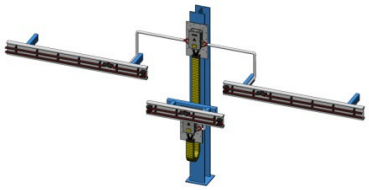
14.25
Note that the movable part of the switch should not have any interference due Track Holders, cables or other parts in any position. The mounting distance of the Track Holder on the curved switch part depends on the angle of the curved part.

14.4 Points to consider

- The flexible cables have to be fixed at both ends of the chain with a metal free relief of strain to prevent mechanical stress in the Junction Box.
- Keep the trolley's movement window unblocked.
- The orientation of the Litz cable should always be clockwise (see chapter 8.2).
- Do not lay the cables on steel structures. Keep the prescribed distance (see chapter 4.1).
- Obey specified distances during installation.
- Installation temperature: +10 °C to +40 °C.
- Avoid cabling around yokes.

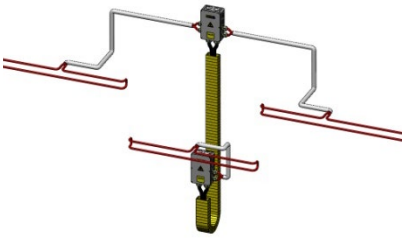
15 Lifter, powered by Energy Guiding Chain

15.1 Overview



15.1

The chapter is about lifters powered by Energy Guiding Chain. These lifters are powered all the time, independent of the position of the movable part of the lifter.

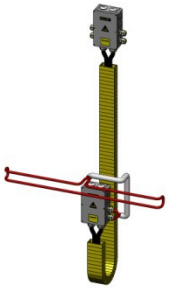


15.2

The lifter is supplied by the main track via the flexible cable. Compared to the Litz cable the special flexible cable offers an increased flexibility which is necessary for the chain application.

15.3

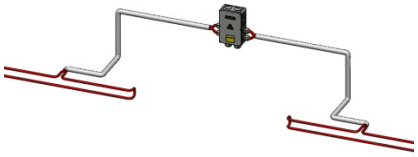
The flexible cable is connected to the Litz cable in the Junction Box (static side).



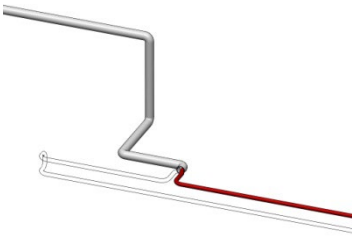
15.4

The movable part of a switch consists of the Energy Guiding Chain, the second Junction Box (moving side) and the track on the switch segment (straight and curved rail).

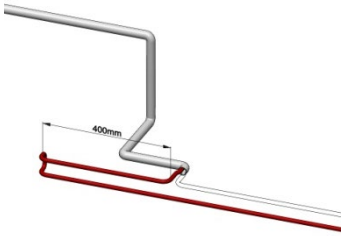
15.2 Main Track cabling



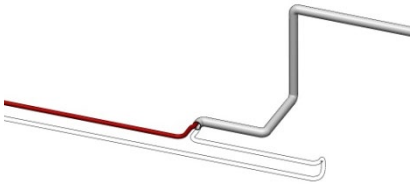
15.5
The main track does not directly power the lifter. The track parts before and after the lifter are connected with a feed which follows the support structure.



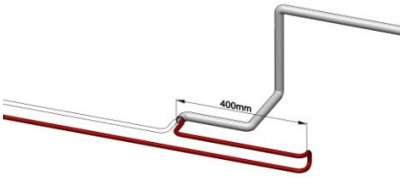
15.6
Regarding the “right” part of the main track: The upper cable is directly fed through the cutout.



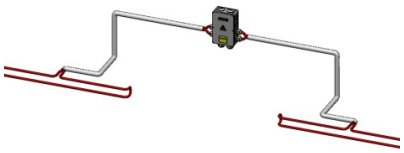
15.7
The corresponding lower cable at the “right” part of the main track goes to the profile end and turns before it is fed through the cutout. The distance between the end of the aluminium profile and the cutout is minimum 400 mm.



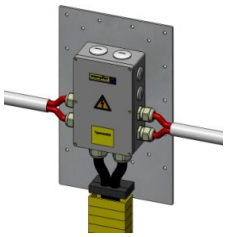
15.8
Cables for the other side of the main track are wired accordingly.



15.9
Similar to the other side of the main track, the distance between the end of the aluminium profile and the cutout is minimum 400 mm.



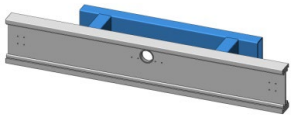
15.10
The cables from the “right” and “left” part of the main track which were fed through the aluminium rail are passed to the Junction Box.



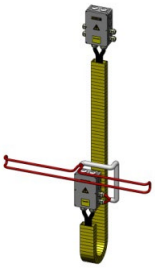
15.11
The Energy Guiding Chain is connected to the main track and the parts of the track on the lifter segment in the Junction Boxes.
Obey that the trolley's movement window remains unblocked.

15.12
The Energy Guiding Chain as well as the flexible cable has to be fixed to the corresponding mounting plate (if available). A tension relief for the cable shall be installed.

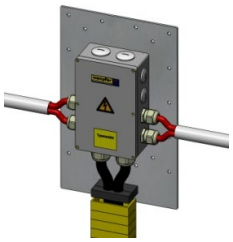
15.3 Lifter Segment cabling



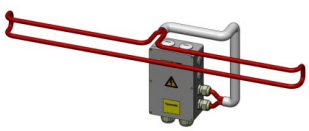
15.13
A cutout for the movable part of the lifter has to be prepared.



15.14
Because the lifter is powered by Energy Guiding Chain there is no need for additional Capacitor Boxes on the switch (the tuning is done in connection with the main track).



15.15
The correct orientation of the cables is necessary before they are connected inside both Junction Boxes (connect Litz cables of same label orientation to each other).



15.16
The whole switch segment is powered by the Energy Guiding Chain and forms one Litz cable loop. The loop starts at the Junction Box and is wired through the cut-out and along the Track on the rail.

15.4 Points to consider

- The flexible cables have to be fixed at both ends of the chain with a metal free relief of strain to prevent mechanical stress in the Junction Box.
- Keep the trolley's movement window unblocked.
- The orientation of the Litz cable should always be clockwise (see chapter 8.2).
- Do not lay the cables on steel structures. Keep the prescribed distance (see chapter 4.1).
- Obey specified distances during installation.
- Installation temperature: +10 °C to +40 °C.

16 Flexible cable Termination

16.1
At continuously powered switches or lifts (powered by an Energy Guiding Chain) a special flexible cable is used.
To properly connect the flexible cable inside the Junction Box, the flexible cable has to be terminated with a lug.
To terminate the cable cut the cable to the correct length, remove 50 mm of the outer insulation.

16.2
Afterwards remove 20 mm of the insulation of each of the conductor wires. Cut the filaments. Place lug over all wires and crimp the lug. Then use solder bath to solder the lug and get proper connection between wires and lug. Finish preparation by adding heat shrink according to picture. The termination as well as the connection has to be carried out by Conductix-Wampfler GmbH personnel.

16.3
Insert the 2 cables into the chain. Fix the cables at both ends using corresponding mounting plate (see picture if mounting plate is not installed use cable ties to fix the cables at the end of the chain).

17 EMS Parts

17.1 Primary Parts

17.1
Track Supply 6 kW, 125 A
91012-111-3090875
91012-111-3090878
In IP54 Housing:
91012-111-3130928
91012-111-3130930

17.2
Track Supply 16 kW, 125 A
91012-111-3090674
91012-111-3090676
In IP54 Housing:
91012-111-3130924
91012-111-3130926

17.3
Track Supply 35 kW, 125 A
91012-111-3090897
91012-111-3090900
91000-111-3090901 (Configurable version with air conditioning)

17.4
Synchronisation Master
91012-212-0172004 (5 channels)
91012-212-3017343 (10 channels)

17.5
Feed Holder 90°
a pair, 35 mm²
91112-205-3058418

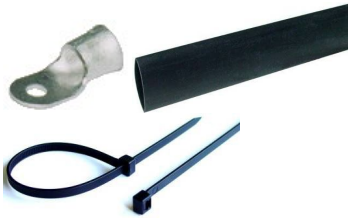
17.6
Cable gland
GPN 600 B479
91000-207-3096421

17.7
Track Holder
Various types available
Order number on request

17.8
Profile, straight
for Litz cable 35mm², 4 m
91012-203-3045402

17.9
Profile, curved
for Litz cable 35mm², 2,5 m
91012-203-3046170

17.10
Litz cable 35 mm²
91012-201-3033261



17.11
Installation Kit
for Litz cable 35mm²
Contains cable lugs, cable ties and heat shrink tubing
91012-200-3169891

17.12
Junction Box
91012-207-3029421

17.13
Track Tuning Box 125 A
91012-211-3047042

17.14
Capacitor Box
adjustable 2,04–2,72 µF
91012-210-3057788 (IEC)
91012-210-3101180 (UL)

17.15
Capacitor Box
adjustable 3–8 µF
91012-210-3055524 (IEC)
91012-210-3101367 (UL)

17.16
Energy Guiding Chain
LC25
Configurable
Order number on request

17.17
Flexible cable for energy guiding chain
Various types available
Order number on request

17.18
Caddy
For fixation of feed installations on EMS yokes.
Various types available
Order number on request

17.19
Tube for feeding cables (straight section)
Various types available
Order number on request

17.20
Tube for feeding cables (curved section)
Various types available
Order number on request

17.21
Tube Holder
Various types available
Order number on request

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