

FABA

Conductor Bar System

Installation Instructions



MAGNETEK
UNCOMMON POWER

Electromotive Systems

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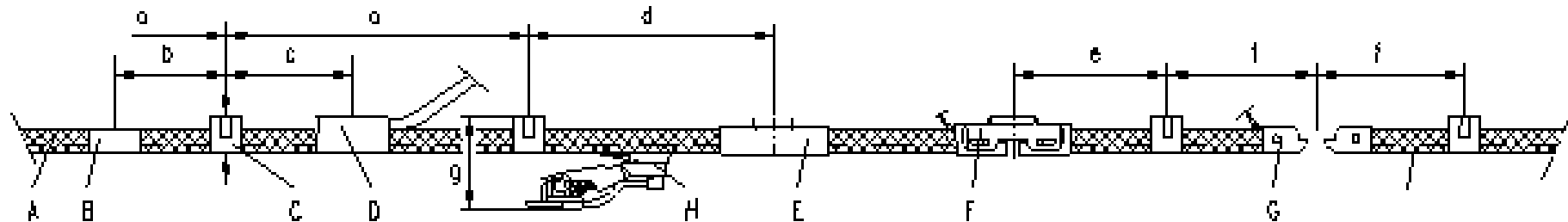
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Installation Instructions

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Basic Diagram



- Dimension a **The hanger clamp distance:** max. 800 mm in the straight sections; in bends max. 400 mm; to the end of the conductor rail min. 100mm; max. 300mm where no transfer sections are present. Separation of support clamps; required at least on one side as follows:
- Dimension b **For the rail connector** of the conductor rail: min. 100 mm; max. 200 mm.
- Dimension c **For the feed:** min. 100 mm; max. 200 mm.
- Dimension d **For the expansion:** min. 100 mm; max. 200 mm.
- Dimension e **For electrical separations:** min. 100 mm; max. 200 mm supported both sides.
- Dimension f **For transfer sections:** min. 50 mm; max. 100 mm. Please refer to the FABIA Standard Components, Section IS 100 U
- Dimension g **The height of the system** = upper edge of support clamp to lower edge of current collector fastening
Note: The assembly height is the height of the hanger clamp.

- A** Conductor rail
B Rail Connector
C Hanger Clamp
D Power Feed Connector
E Expansion
F Electrical Separation
G Transfer section for switches and lifts
H Current Collector

for the assembly height 40 = 111 mm

With standard small collector

for the assembly height 27 = 71 mm
 for the assembly height 32 = 76 mm
 for the assembly height 40 = 84 mm

with long double arm collector

for the assembly height 27 = 108 mm
 for the assembly height 32 = 113 mm
 for the assembly height 40 = 121 mm
 for the assembly height 40 = 121 mm

With double shoe collector

for the assembly height 27=98 mm
 for the assembly height 32 = 103 mm
 for the assembly height 40 = 111 mm

Introduction

This installation instructions described here refer to the standard type installation assuming the site has already been prepared. The complete project description, planning instructions and technical information for installation are covered in detail in the publication FABA Standard Components. These publications may be requested and are available for download at www.electromotive.com.

Preparation activities

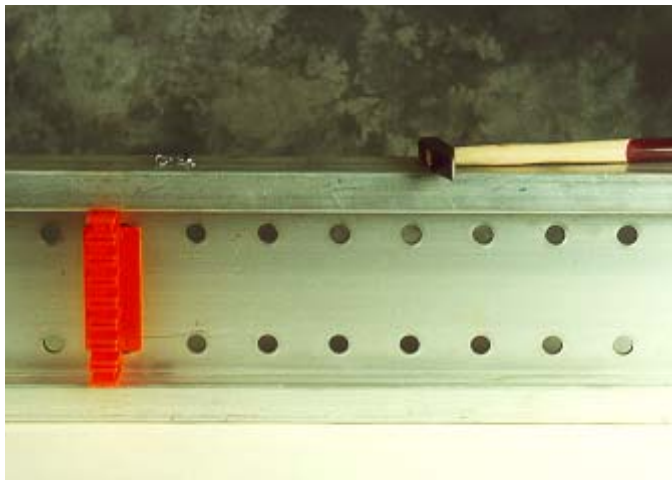
1. Mark a line on the monorail track with a felt pen where separations for zone sections, expansion rails, and fixing points should be located. The monorail track surface must be free from dust, oil and grease.
2. Before assembling the conductor rails, the tolerances of the monorail track at switches and lifts must be checked. Maximum permissible vertical and lateral misalignment is +/- 2 mm. Assemble the switches and the lift sections first, working away from these points.
3. All the hanger clamps are designed to fit precisely into the AMS-profile; the backsides are provided with a durable adhesive strip at the factory to prevent lateral slip in the AMS-profile (AMS = Automated Monorail System).

Installation Instructions

Hanger – Clamp

For General Information refer to FABA Standard Components, Section IS 100 K and IS 100 B: Page 7-8

Hanger Clamp - Stud mounting with spring clip



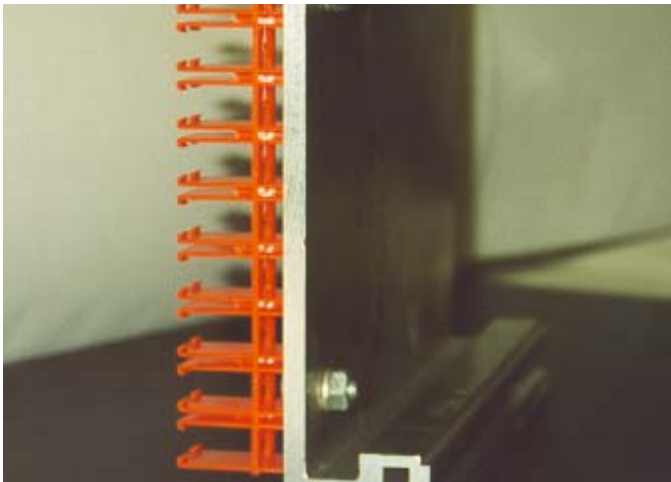
Depending on the type of the installation the hanger clamps are fastened directly or by means of a base plate to the track/conductor rail so that they align perfectly. The conductor rails are simply clipped into the hanger clamp until they snap in with a click.



The plastic plugs are passed through the pre-drilled holes in the monorail track web. Push the clips into the grooves on the plastic plugs.

Hanger Clamp - Screw type

For General Information refer to FABA Standard Components, Section IS 100 K: Page 3



Hanger clamps are fastened to the web of the monorail using a screw-on connection. Special hanger clamps with 15mm hole spacing are provided for this application.

Hanger - Clamp - Clip-type

For General Information refer to theFABA Standard Components, Section IS 100 K: Pages 4,5,6



Remove the protective film before installing.



Clip the hanger clamp in the rail and press firmly till it engages.

Conductor Rails

For General Information refer to FABA Standard Components, Section IS 100 B: Pages 3, 4

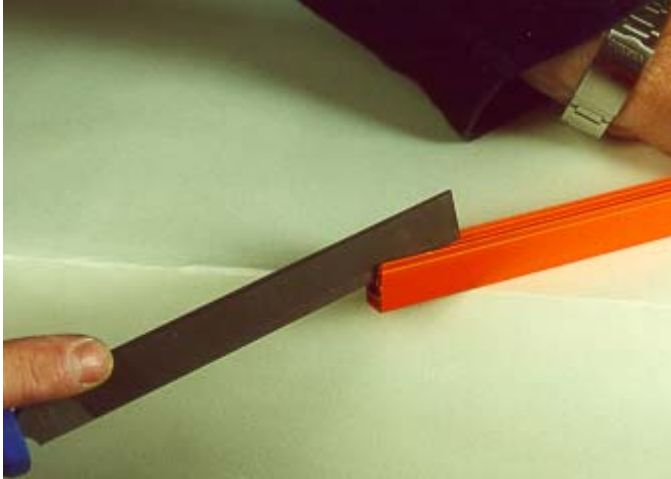


Conductor rails are delivered complete with sleeving (cover). The sleeving is shorter because it expands more than the metal rail. All conductor rails are delivered with de-burred ends.

Shortening



Use a fine-toothed hacksaw. (For large installations an electric jig saw is recommended.)



De-burr and bevel all cut ends with a fine file to prevent unnecessary collector shoe wear

Conductor Rail Curves

For General Information refer to FABBA Standard Components, Section IS 100 B: Pages 3, 4



Figure 1:

For horizontal and vertical bending insert the 7 x 3 mm black plastic strip in the space between the back of the metal rail and the cover. When using the “screw-type” rail connectors or separating or transfer caps, insert the bending strip 40 mm shorter than usual. The strip must not be removed after bending. After bending retract the strip by 20 mm.

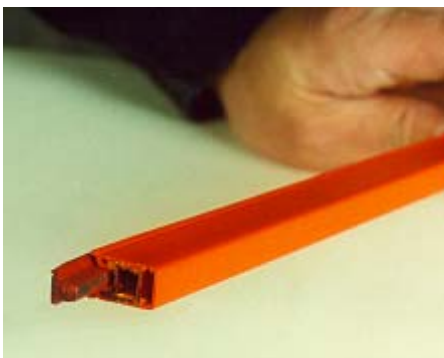
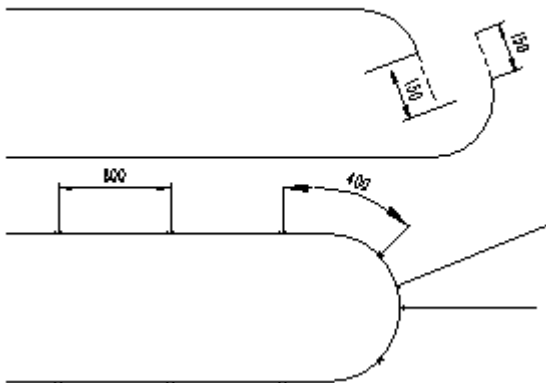


Figure 2:

When bending over the wide side of the rail, the red bending profile has to be inserted into the slit of the conductor surface and the black bending strip has to be inserted into the back of the rail. Leave approximately 20 mm clear length on both ends when using the screw-on rail connectors. The red strip can be reused. The black strip must remain in the rail.



For bending on a building site; determine the length of the curve, e.g.: measure the length of the curve of the monorail track with a tape, transfer the length onto the conductor rail and make an additional 150 mm mark on the rail leaving a small amount to the end of a rail to be cut. Insert the conductor rail into the bending machine to the point where the pen mark is even with the outside of the bending machine. This corresponds to the original radius mark of 150 mm in the middle of the roller. Lower the top roller according to the required radius. Roll the rail through the machine up to the 2nd marking. It is possible to change the curve radius by reinserting the rail into the machine.



If two rail curves are to be joined, the straight ends must be cut off.

Rail Connector

Rail Connector - Screw type

For General Information refer to FABA Standard Components, Section IS 100 B: Page 6



Loosen the socket head with the 4 mm Allen Key Screwdriver.

Note: Use only the type of Allen Key shown as it allows sufficient torque. (Torque 6-7 Nm). When a twisting motion is felt on the handle the torque is then sufficient.



Loosen the clamp and slide the clamp plates in between the upper part of the copper. Slide the cover over the clamp, so that it sits firmly in the sleeving rims. Carry out the same procedure with the adjacent rail and press the connection into the hanger clamp.



Finally, push the two rails together and then tighten. If the rail has to be removed, loosen the connection before pulling out of the rail. This prevents buckling the steel plate of the connector. Make sure a hanger clamp is situated within 200 mm from the screw-in type connector so that the connection remains rigid.

Rail Connector (Plug-in Type)

For General Information refer to *FABA Standard Components, Section IS 100 B: Page 5*

Figure 1:



Figure 2:



Figure 1:

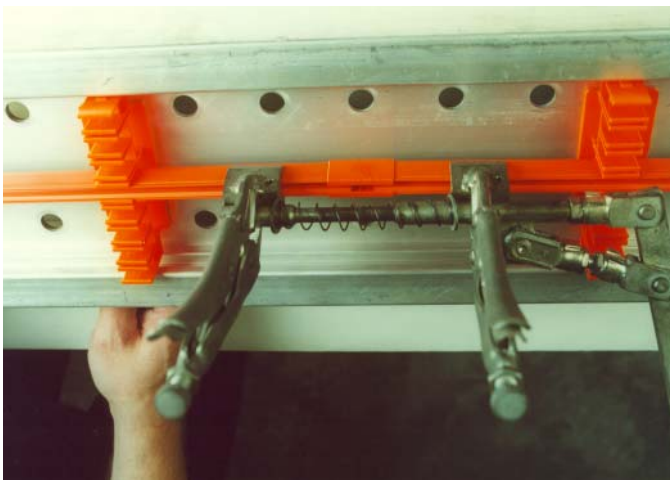
Push the plug-in rail connector into the holding tool.

Figure 2:

Tap in the connector until the stop point is felt. (It is situated in the middle.)



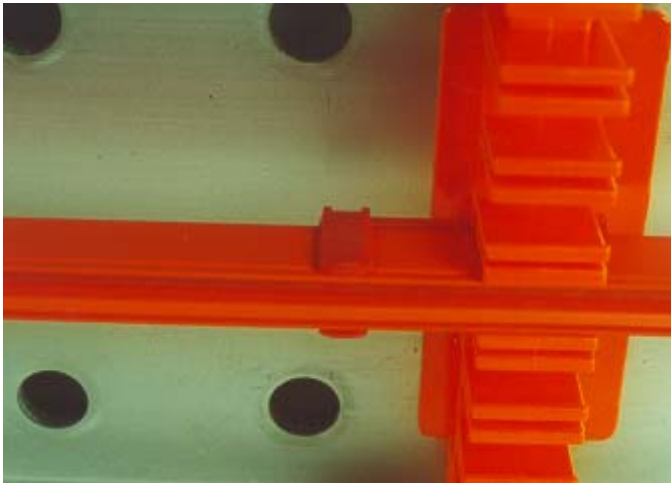
Slide the insulating splice cover into the grooves of the conductor sleeve until the stop point is reached. Press the end of the insulated cover together and align the opposite rail into the cover. Check that both insulating rims are embraced by the housing after clipping in the hanger clamps.



Snap the rail connecting tool fully expanded on the conductor rails, and pull the right hand lever downward until the rails are joined.

Fixing point

For General Information refer to FABA Standard Components, Section IS 100 B: Page 12



Place the fixing clip into the hanger clamp and push the rail into the hanger clamp. If possible do not let it clip in.



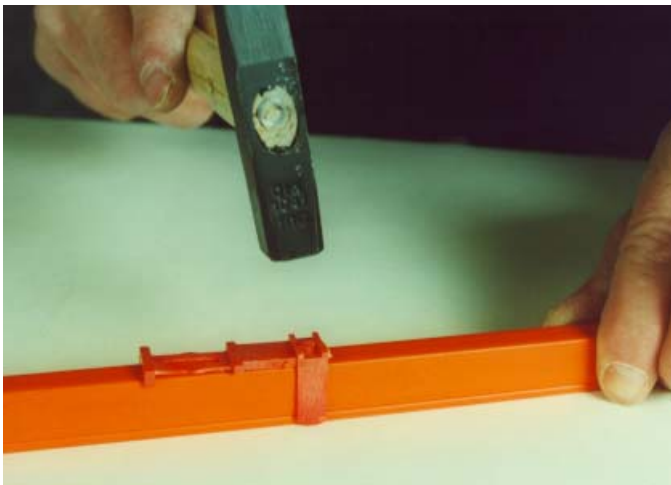
Mark the position of the fixing clip on the cover.



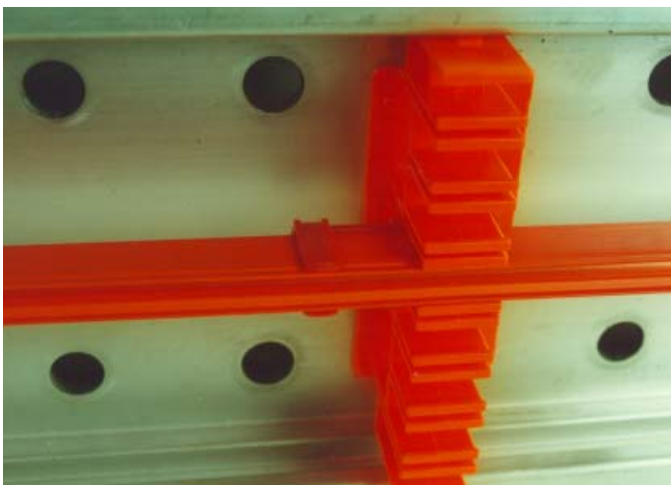
Drill a 3 mm hole through the cover and through the back of the metal rail. Do not drill through the contact surface.



Break off the sharpened pin to prepare it for the mounting. Place the pin in the existing hole.



Mount the fixing clip according to the marking, using it as a template. If the rail is clipped in, remove it from the hanger with a dismantling tool. Hammer the fixing clip into the drilled hole until flush.



Press the conductor rail with the fixing clip firmly into the hanger clamp until it engages.

Power Feed

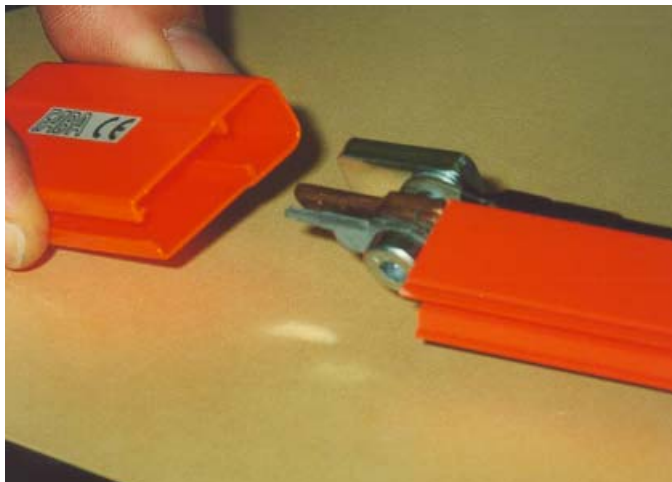
For General Information refer to FABA Standard Components, Section IS 100 B: Pages 9,10

Power Feed Connector 100 Amp

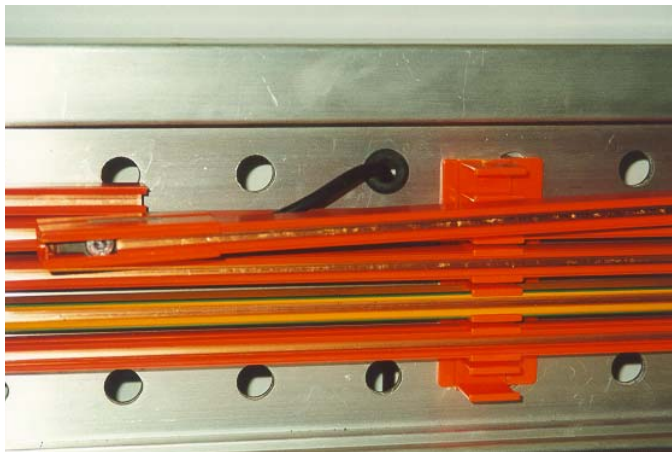


Suitable for assembly height 32mm or above (distance from monorail track to the bottom of the conductor rail sleeving see page 24)

Assemble the cable on the connector, as shown, leaving the connector screw loose.



Note that the threaded plate on the top should face the open end of the insulated cover. The feed cable is situated as shown.

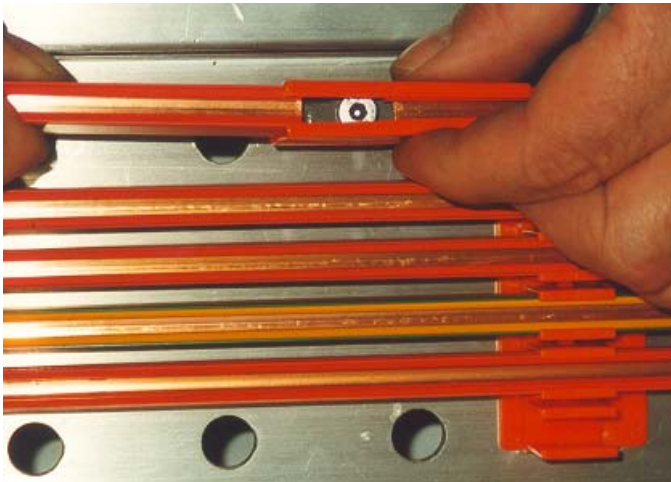


The cable exit holes in the monorail web should be protected by an insulating grommet.

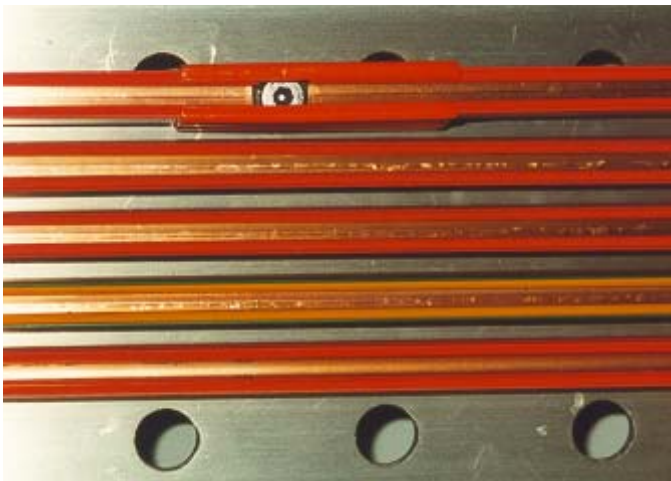
Be sure to install the feed cable with a little slack so that it can follow the linear expansion of the rail; for the installation through webs.



Slide the power feed cover over the connector pressing the cover together so that it aligns in the retaining grooves of the rail cover. Push until the stop point is reached.



Taking the adjacent rail, press the cover again to align with both rail sleeving grooves. Slide both rails together.



Push joint cover slightly until it locks into the recess then tighten with a 4mm Allen Key. Make sure the rails are aligned and the screw head is recessed straight below the rail surface.

Note: The power feed cover when assembled is off center.

Power Feed Connector 50A

For General Information refer to FABBA Standard Components, Section IS 100 B: Pages 9,10



This power feed connector for 50A is used only for 27mm height. See page 24 referring to installation heights. Install feed clamp with the cable as shown leaving it loose.



Push the cover by itself off center down over the clamp and sleeving, as shown. Push both of the cover rims separately until they engage in the sleeving. Then push the adjacent rail together in the cover and tighten. Make sure the cover is tight in the sleeving rims.

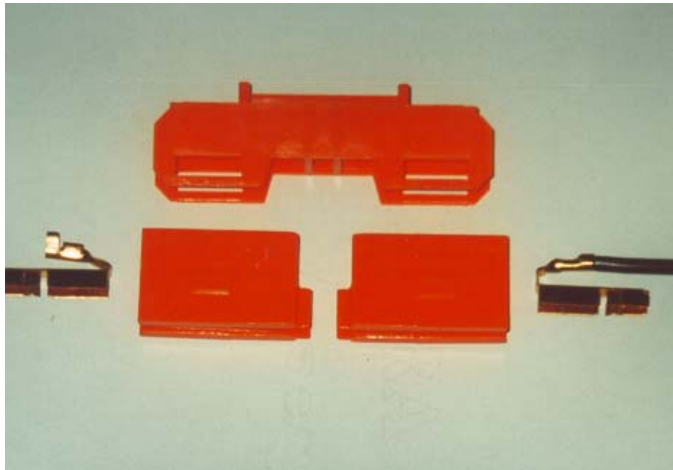


Note: The cover is off the center when completed.

Seperation

Separation Unit with one feed connection

For General Information refer to FABA Standard Components, Section IS 100 B: Pages 19, 20



The picture (left) is a layout of the parts required for the separation with one feed connection.



Press the terminal with the feed wire bending it down over the insulating sleeve only. This prevents kinking the terminal.



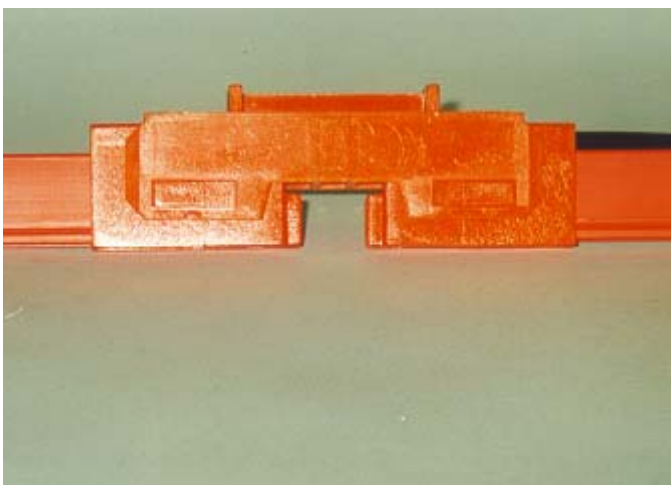
Push the rims of the cap together so that they engage in the sleeving rims and tap in.



De-bur straight over the contact surface.
This insures that no plastic is higher than
the contact surface.



Clip the completed feed connection into
the sliding holes of the housing.



The picture (left) shows a completely
assembled separation with one feed wire.
Expansion setting is to be carried out by
leaving open every third separation and
installing a fixing clip. This sequence
should be repeated along the entire length
of the conductor rail. Where separation
expansions have been set, no additional
expansion is required within 30 meters,
except building expansions. If the system
is installed with the contact surface facing
downwards (as shown) 2 hanger clamps
must support each section of a rail to pre-
vent a seesaw effect on the unit.

Separation Unit without feed connection

For General Information refer to the FABA Standard Components, Section IS 100 B: Pages 19, 20



Regardless of whether a feed wire is required, **the wire terminal must be installed** as it wedges the transfer cap tight.



Insert the wire terminal and snip off the longer part of the terminal end piece, leaving the small section free or tap the terminal slightly down with a hammer. The separation cap now has room to slide over the terminal.



Press the rims of the cap together so that they align in the grooves of the sleeving, and de-burr straight to the contact surface.

Expansions

For General Information refer to FABA Standard Components, Section IS 100 B; Pages 16,17,18

Expansion splices are suitable for 50A and require no bridging cables. They must to be installed every 30 meters in the middle of straight sections. Expansions must not be installed in curves. Distances above 20 meters between switches or lift sections must have an expansion in the middle. Lift or switch sections are to be considered as fixed points.

Hanger clamps must support the expansion housing on both sides. Maximum distance is 200 mm. Where separation caps are assembled on signal rails with the expansion gaps set (see page 18), expansion rails are not necessary, except on building expansions.

Figure 1: Standard Expansion splice max 50A with the built in spring contacts

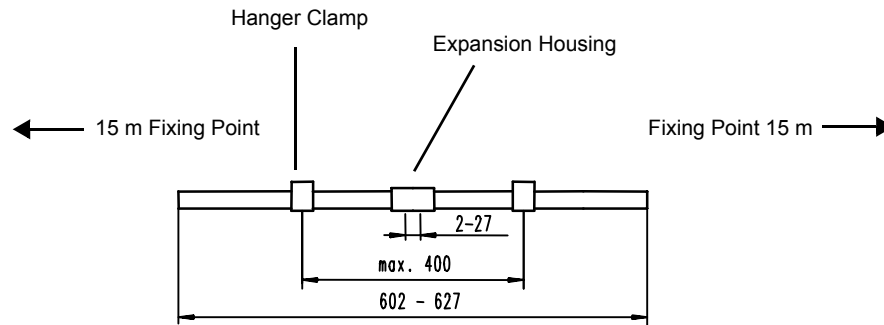
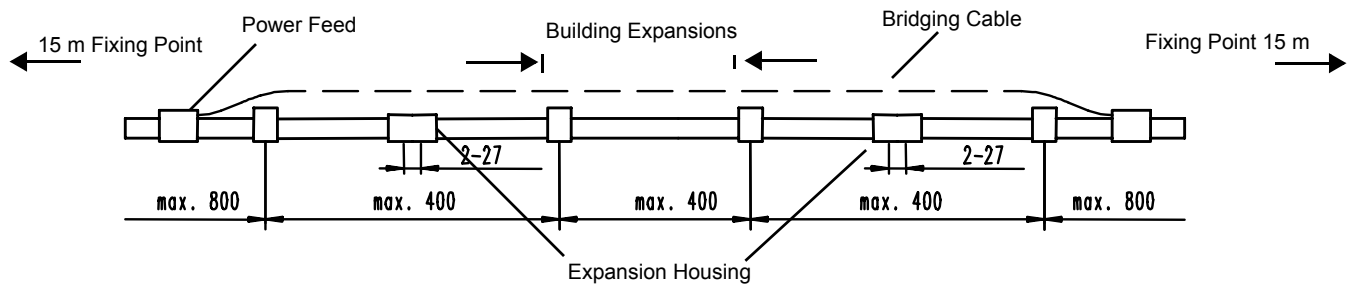
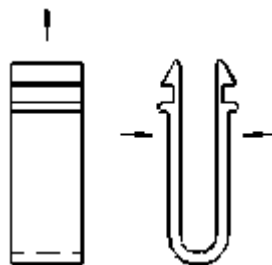
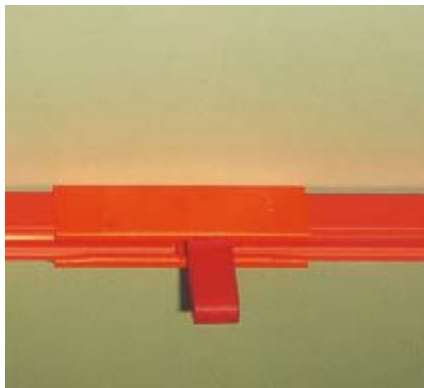


Figure 2: Building Expansion layout using two expansions splices



Note: Bridging cables for building expansions are 1600 mm long and are required for above 50A. They are connected to feed connections spaced at 1500 mm apart on the conductor rails. For the standard expansion applications the bridging cable is one meter.

Expansion setting clip



Expansion Clip Setting Guide

- Room temperature under 15°C - 2 clips
- Room temperature from 15°C – 30°C - 1 clip
- Room temperature above 30°C - 1/2 clip

Pull the expansion apart and insert the yellow clip using the guide above in each expansion housing. After inserting the clip, push the rails together and install the fixing point 15 meters away. Switches and lift sections are to be considered as a fixed point. The clip must be removed after the fixing points have been installed.



This picture shows the spring loaded 50A pre- assembled expansion housing. Remove both pins from the housing.

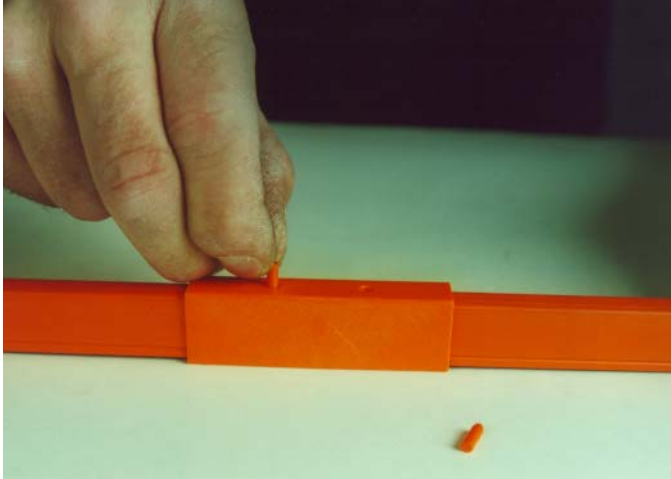


Use two de-burred conductor rail ends. Slide the housing into the conductor rails to the stop point in the middle.

Make sure the cover engages both rims of the sleeving.



Using the housing as a template, drill through the existing holes into the top layer of copper only (use a 3mm drill).



Push both pins fully through the housing using a small diameter drill end or the like.



Check that both rails slide freely back and forth and remove any drilling residue.



Open the rails and place the expansion setting clip as described on page 17.

Transfer Points for Sliding Switches and Lift Sections

For General Information refer to the FABA Standard Components, Section IS 100 B: Pages 22, 23



Before marking the monorail track for drilling the holes, check the assembly height of the hanger clamp.

See page 21.

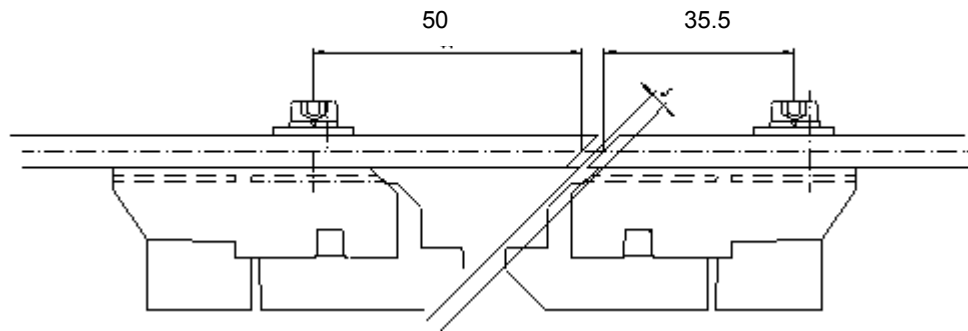


Use the drill jig at the straight edge and mark a line across the monorail track web. Slide the drill jig holes over the line on the web and drill two holes $\varnothing 5\text{mm} - 5.1\text{mm}$. The jig can be removed once you have made two indents with the drill.

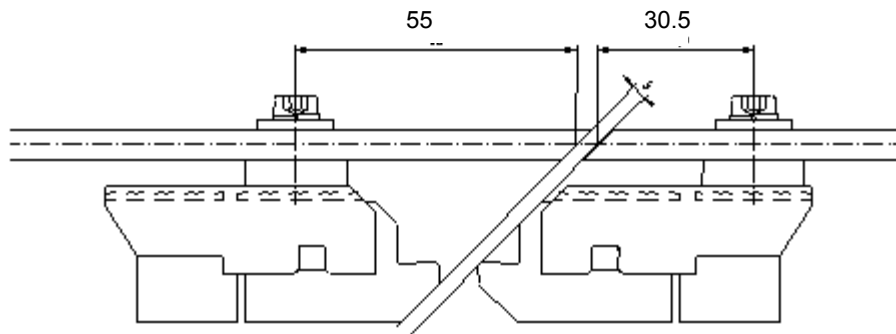


Slide the drill jig holes over the line on the web and drill two holes $\varnothing 5\text{mm} - 5.1\text{mm}$. The jig can be removed once you have made two indents with the drill.

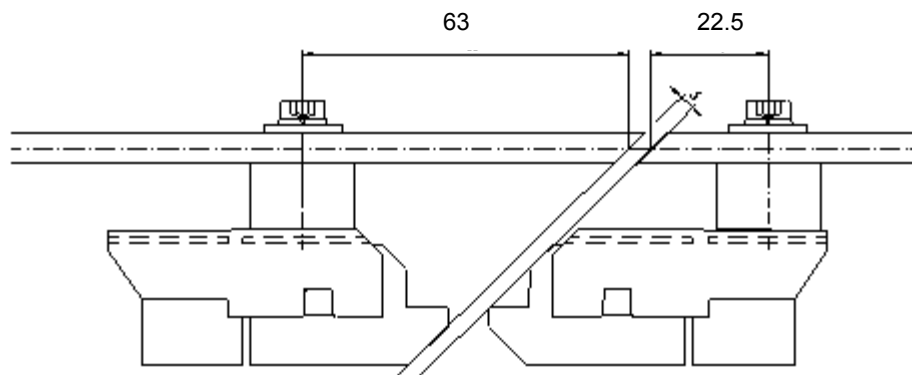
Drill spacing instructions for different height systems



For the assembly height of 27 mm drill a hole $\varnothing 7.2+0.3$ mm



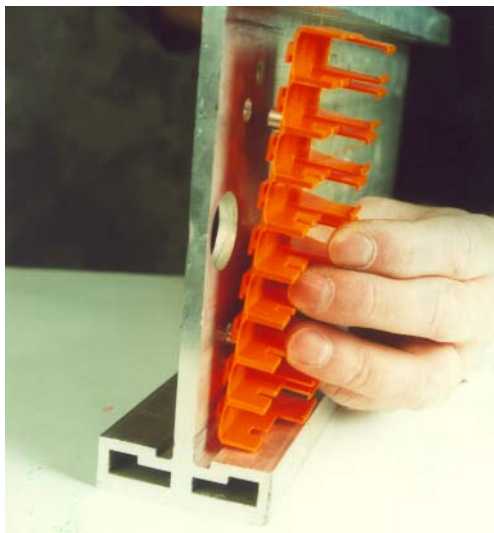
For the assembly height of 32 mm drill a hole $\varnothing 5.2+0.5$ mm



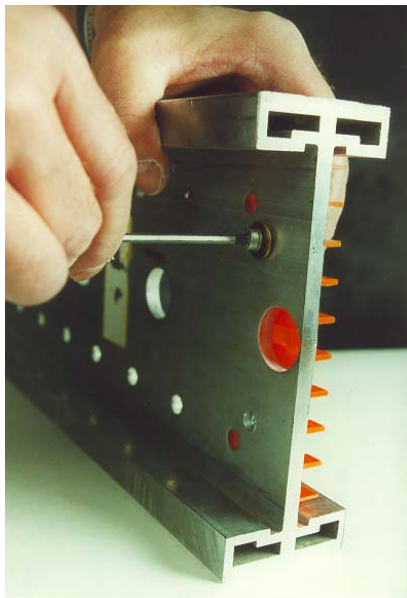
For the assembly height of 40 mm drill a hole $\varnothing 5.0+0.5$ mm



Place the two square retaining nuts into the sliding holes of the bracket.



Place the spacer piece (if required) over the nuts (used when the overall height is 32mm and above). The spacer piece is used to equal the height of the hanger clamp. The Hanger clamp can vary from system to system. Place the nuts through the pre-drilled holes in the web.



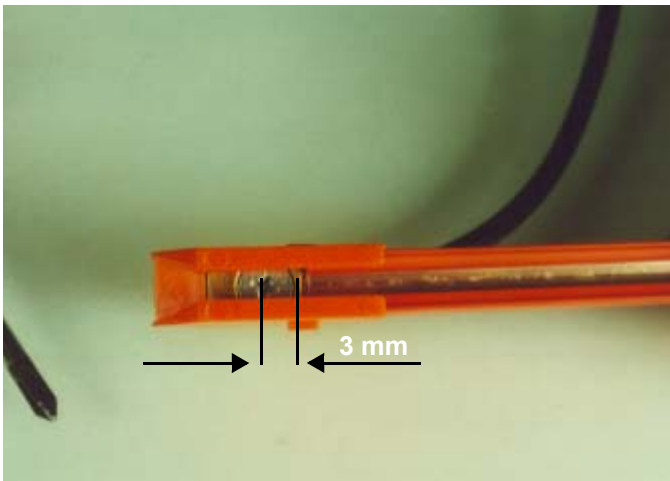
Using the nuts and bolts provided, tighten only slightly as the unit must slide later for alignment.

Transfer Caps with feed cable

For General Information refer to FABA Standard Components, Sections IS 100 B: Pages 22, 23 and IS 100 U



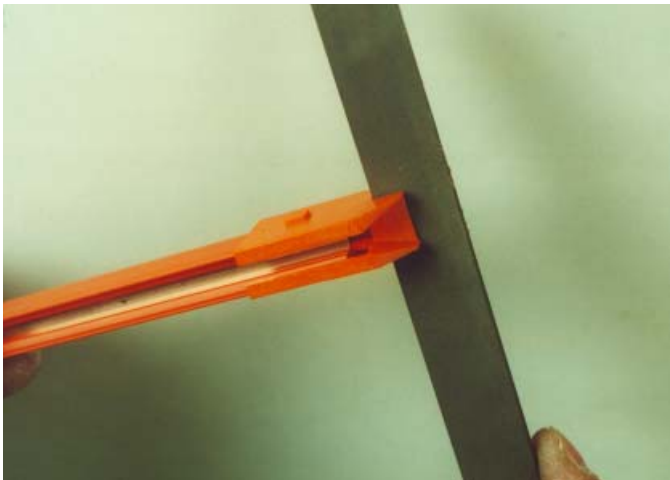
Install the feed cable ring terminal under the nut of the feed clamp, leaving the connection loose. Slide the clamp into the transfer cap until it locks into the recess in front.



Slide the unit (still loose) into the conductor rail so that it engages in the rims of the slewing. Tighten with a Phillips screwdriver and smooth off straight with a file. Caps can be adjusted 3 mm for alignment in the holding bracket.

Transfer Caps without feed cable

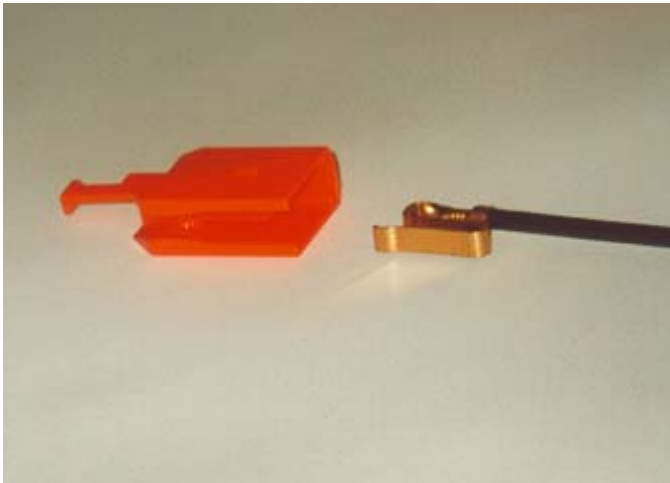
For General Information refer to the FABA Standard Components, Sections IS 100 B: Pages 19, 20 and IS 100 U



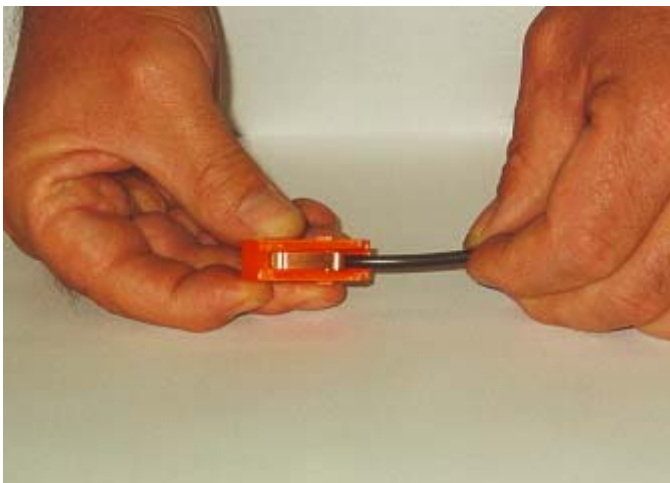
Tap in the transfer cap with a side of the file and de-burr straight to the contact surface. All tap-in caps can be removed by tapping with quick short blows on the side of the cap with a file.

Transfer Caps with adjustable 4 mm feed wedge terminal

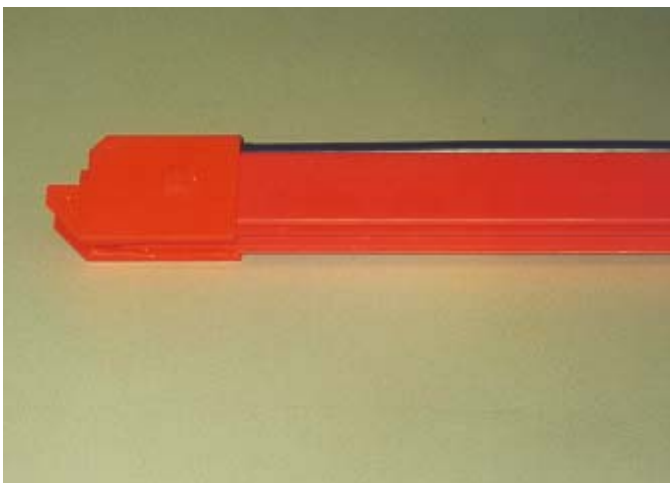
For General Information refer to the FABA Standard Components, Sections IS 100 B: Pages 22, 23 and IS 100 U



Parts shown in the picture at left are required for a transfer cap with one feed connection. If a feed connection is not required, the terminal must still be used for the installation. This will allow an additional 4 mm adjustment on the “unfed” side. Cut crimping area off before installation.



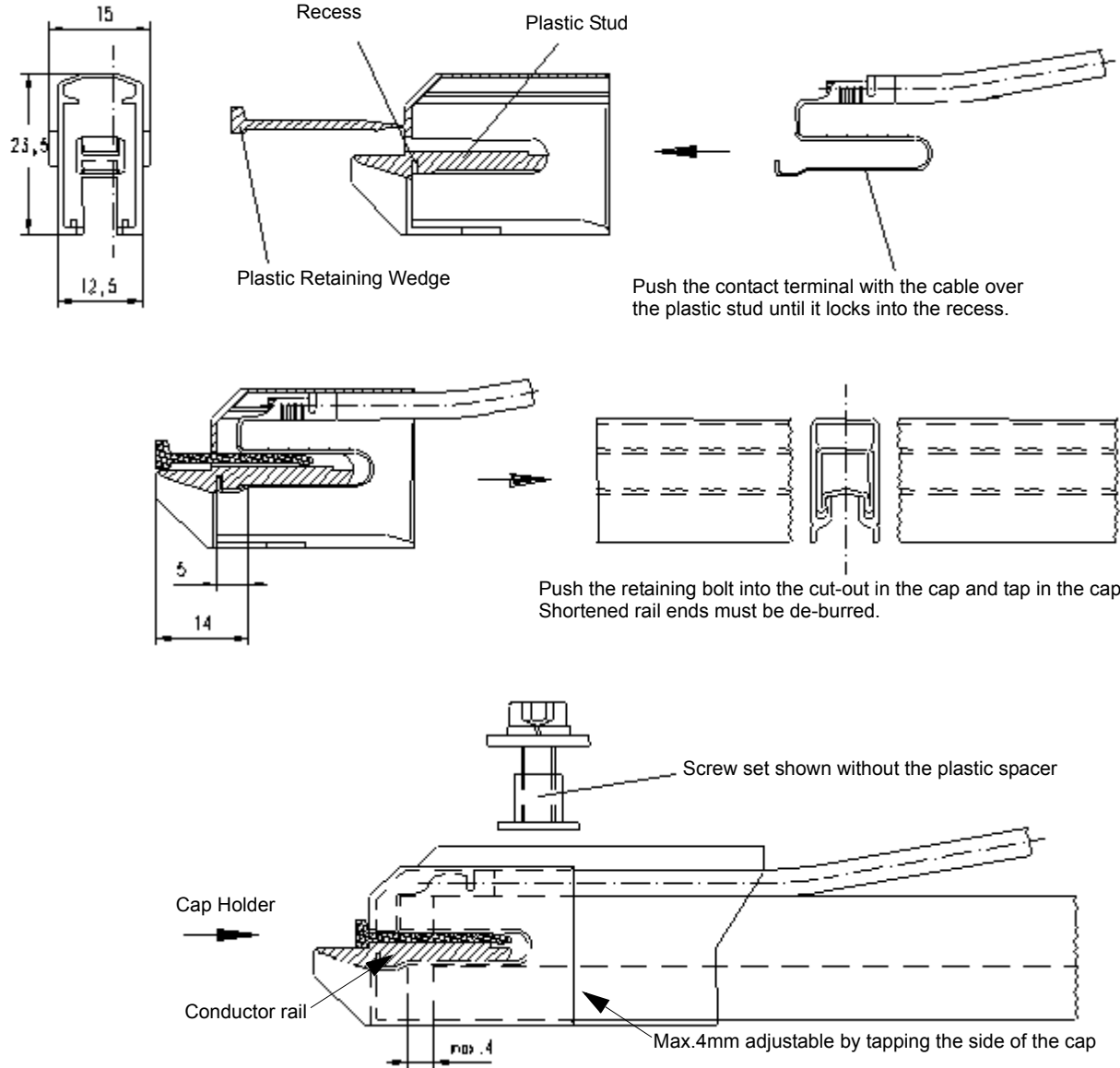
Push the contact terminal with cable over the plastic stud and push upward until it locks in the recess.



Push the retaining wedge fully into the slit in the cap.

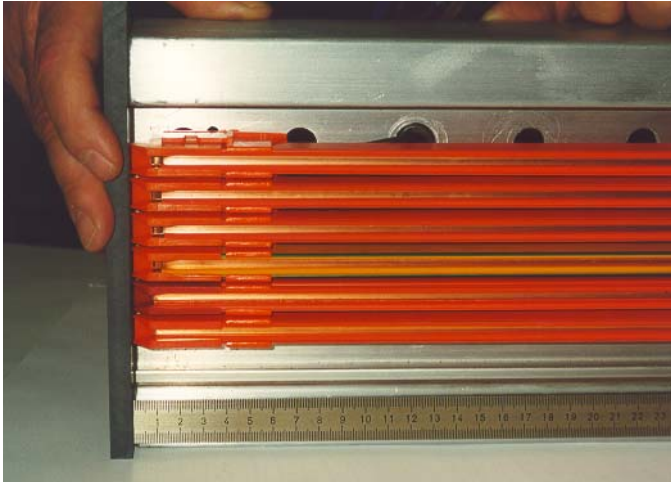
Tap in the cap so that both sleeving rims are engaged. The cap can be adjusted by tapping on the side with a file

For the phase and ground FABA100 Rail:

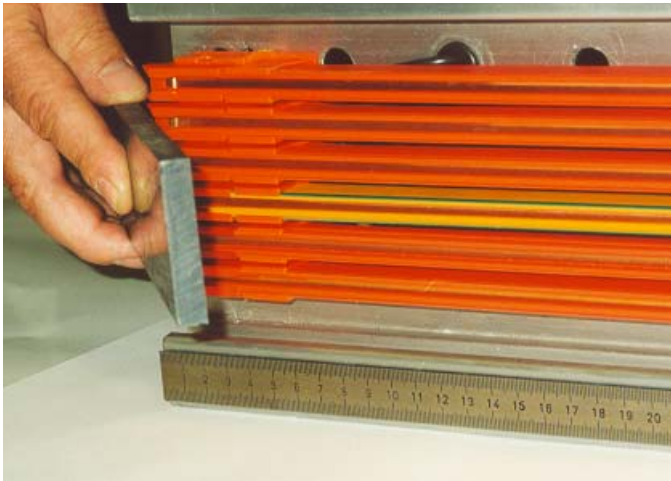


Adjust the caps until they align with the cut-out in holder. (Transfer caps are 4 mm adjustable.) Lock into the cut-out in holder bracket. Line up assembly to cut on monorail track and tighten the screw-set behind.

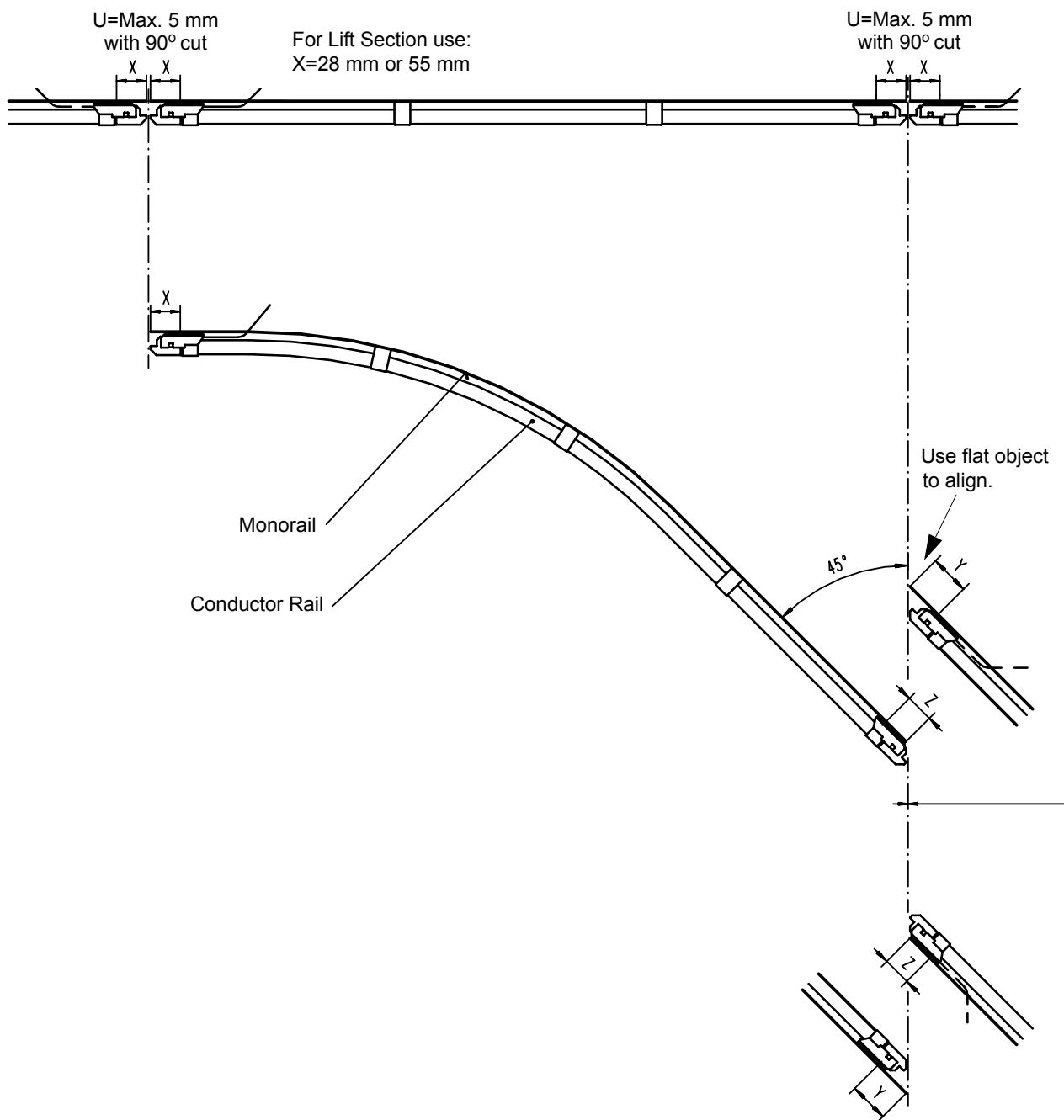
Transfer Assembly Line up Procedure



Using a flat object, tap the unit flush with the cut on the monorail and tighten the retaining screws behind.



For 45° angled cuts; place a flat object on the cut on the monorail. Adjust the unit until the 45° angle on the caps correspond with the flat object and tighten behind.



Depending on the hanger clamp height measurement y and z change (see page 21)		
Height	y	z
27mm	50	38
32mm	55	33
40mm	63	25

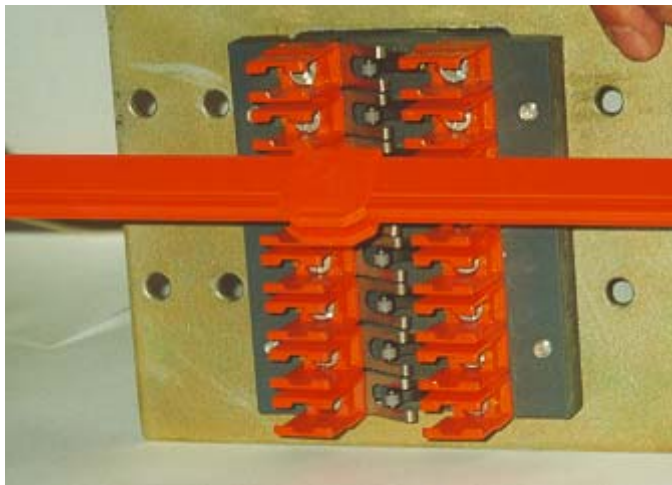
Collector Shoe Wear Indicator

For General Information refer to FABA Standard Components, Section IS 100 M

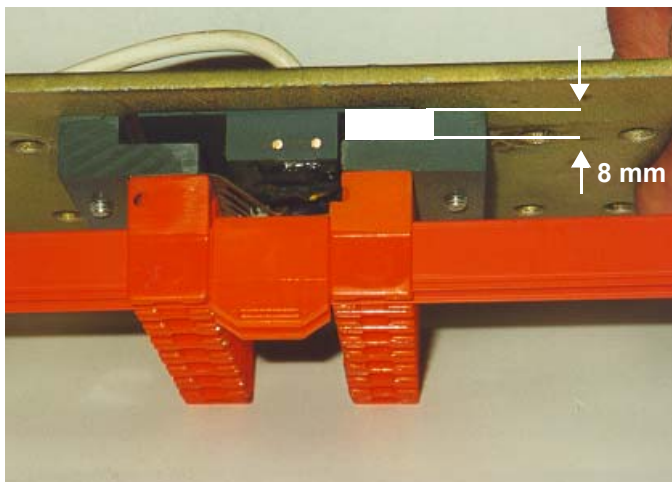


Before assembling the unit a cut out must be made in the monorail web. Three nuts are used for the micro switch timing. (Factory set). If a change is required, counter lock the two left hand nuts and set the right hand nut to 8 mm and lock.

The setting is shown in the drawing delivered with the indicator as well as the dimensions for the cut-out, and the holes to be drilled.



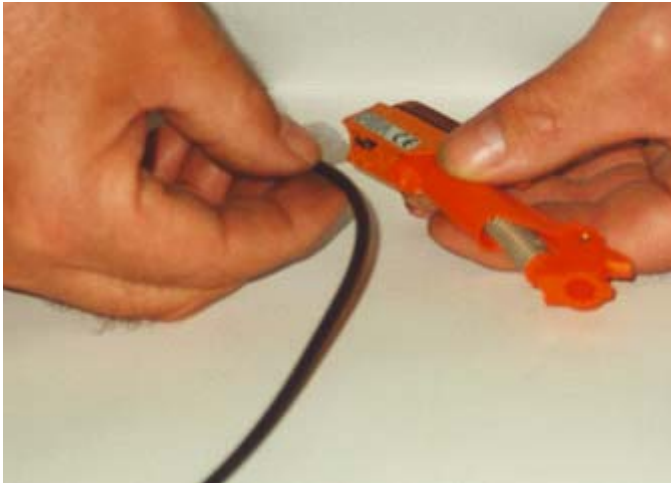
This is the front view of the collector shoe wear indicator prior to the installation of the conductor rails.



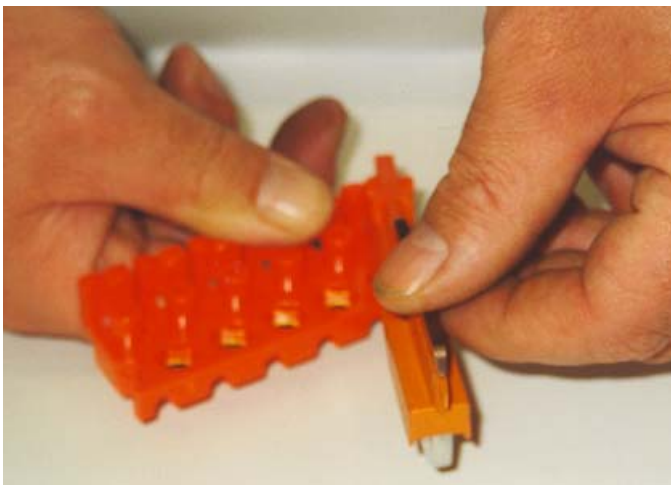
Place the plastic plunger over the rail, and clip it in between the two hangers. Make sure the plunger moves up and down freely. By loosening the 8 screws behind and sliding the hanger clamps apart, one can provide more play sideways for the plunger. Retighten after setting.

Current Collector (Standard Type)

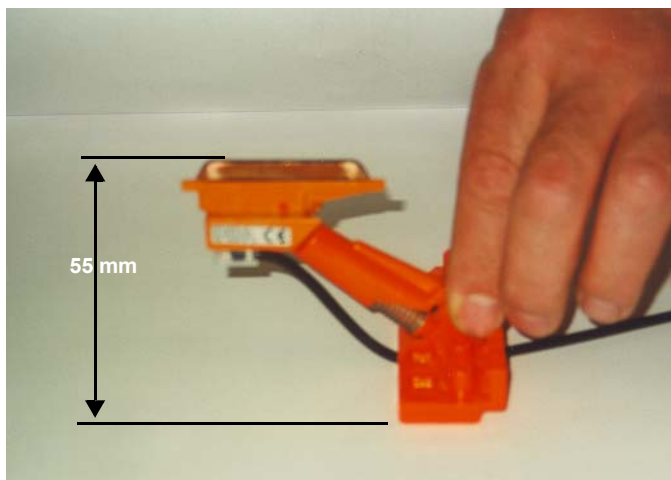
For General Information refer to the FABA Standard Components, Section IS 100 B: Pages 24-34



Push angled connector on the lead cable into the collector shoe terminal.



To assemble collector on the mounting base, place the collector 30 degrees to the side. Press the collector head down and pivot to the middle. Pass the wire through the base-plate cut-out. The cable must not exert any tensile, compressive, or torsion stress on the collector. The shoe must be completely free to rotate and pivot.



Tighten the base-plate after aligning the current collectors level with the conductor rails. The collector cables must have free movement under the base-plate. If the cables are taut shoe wear is uneven and excessive. Collector heads should be positioned centerline to the carrier drive.

The installation height is 55mm.

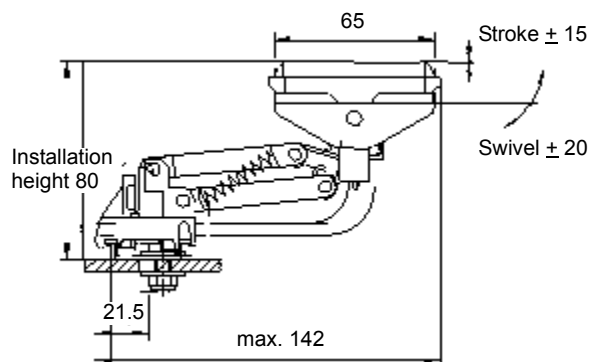
Double Arm Collector

Standard Monorail Version

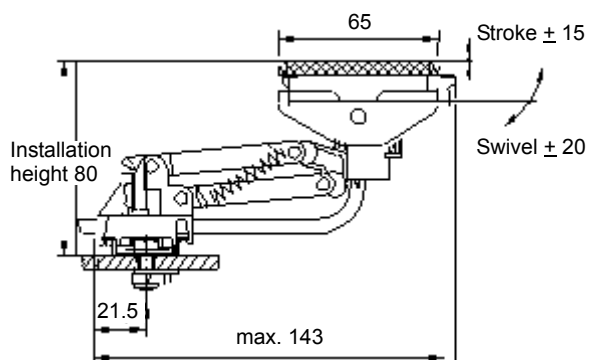
Installation height 80mm

with a screw connection M4 till 30A

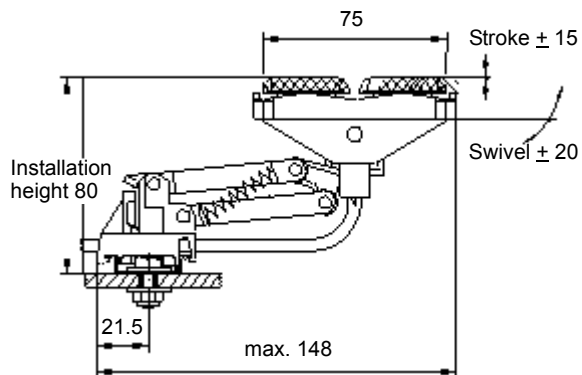
with a plug terminal 4.8 x 0.8 till 20A



With a screw connection M4 to 50A



With a space socket 4.8 x 0.8 to 20A

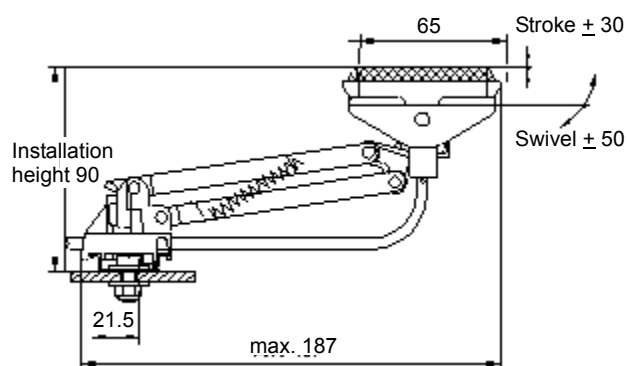


Longer Version for Cranes

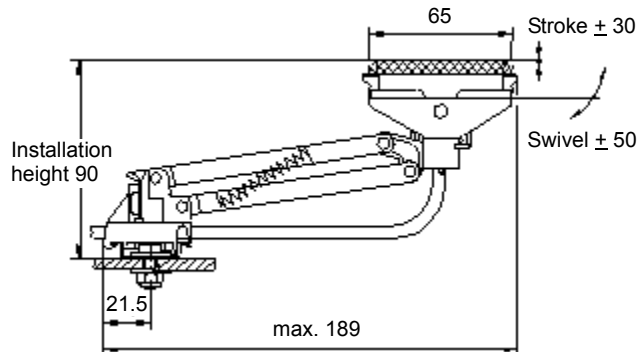
Installation height 90mm

with a screw connection M4 till 30A

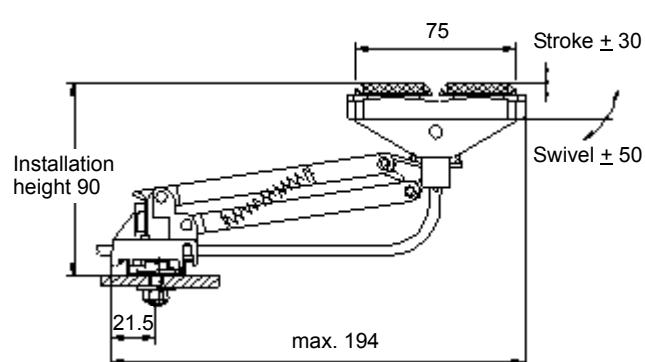
with a spade plug terminal 4.8 x 0.8 till 20A



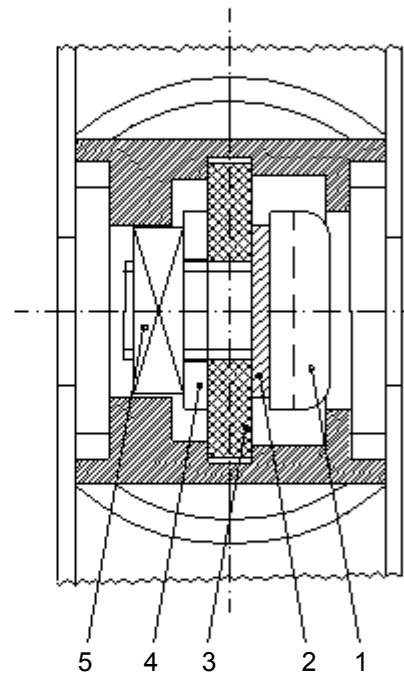
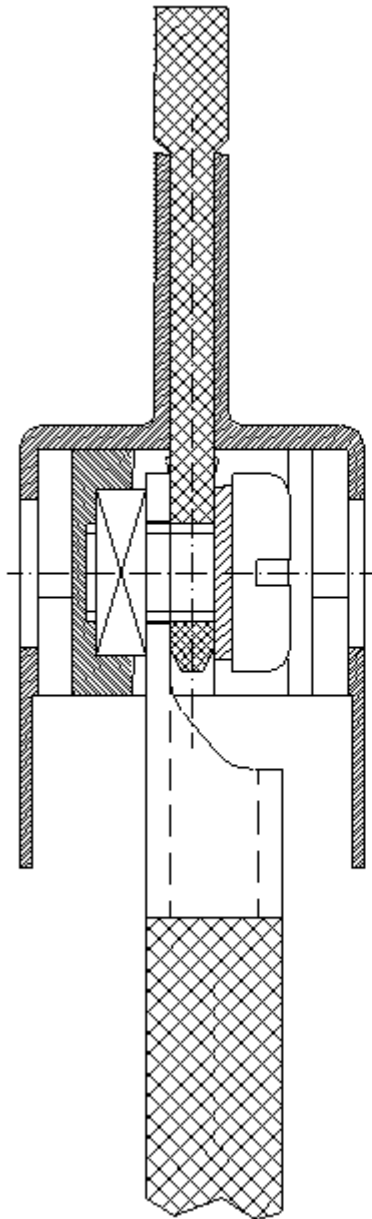
With a screw connection M4 to 50A



With a spade socket 4.8 x 0.8 to 20A



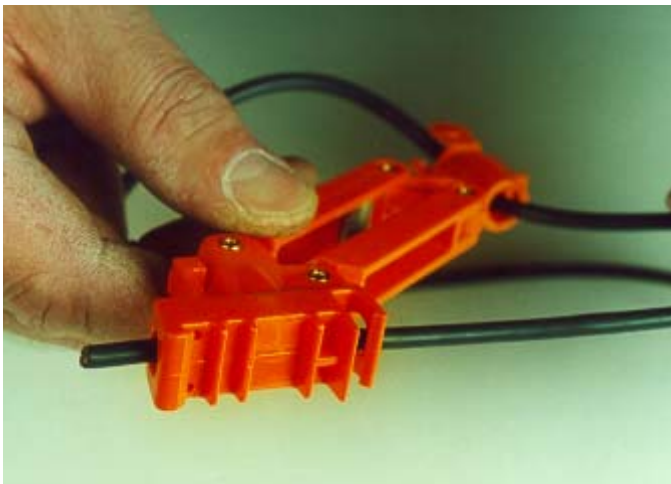
Cable Connection for the Single arm collector



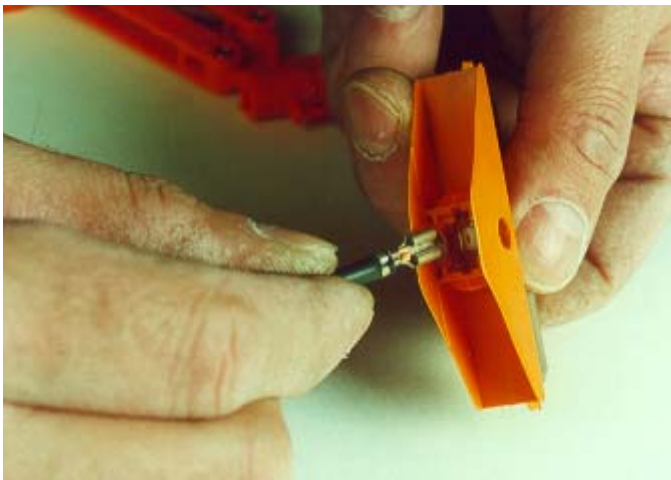
1. Screw
2. Lockwasher
3. Collector Shoe
4. Terminal
5. Nut



To remove the head push the head downwards and swivel outwards with a **quick motion**.



Insert the cable through the top pivot and pass it through the round hole in the plastic base making sure the cable is not twisted or pulled taut.



Push spade terminal firmly on the connection underneath and clip the collector head back onto the body.



To install the plastic mounting unit on the steel retaining profile, clip rear plastic tongue in steel rim and pivot forwards until it snaps firmly.



To assemble or disassemble collector on mounting unit, push the connector 30° down to the side and pivot to the middle. Pass the cable through the hole in the mounting unit. Screw on the red plastic retaining straps on both sides (this prevents lateral slip). The ground collector is higher for safety reasons. Cables must have free movement and must not be twisted or pulled taught.



This picture shows a completely mounted collector. Mount center drive roller.

Cleaning Collectors

For General Information refer to FABA Standard Components, Section IS 100 B; Page 27



Cleaning collectors are to be installed separately on a base plate and have the same installation height with base plate 55 mm as the standard collector (see page 29). At least five sets are required for an average system being 150 meters or one set for every 30 meters.

Note: Used for back and forth operations.

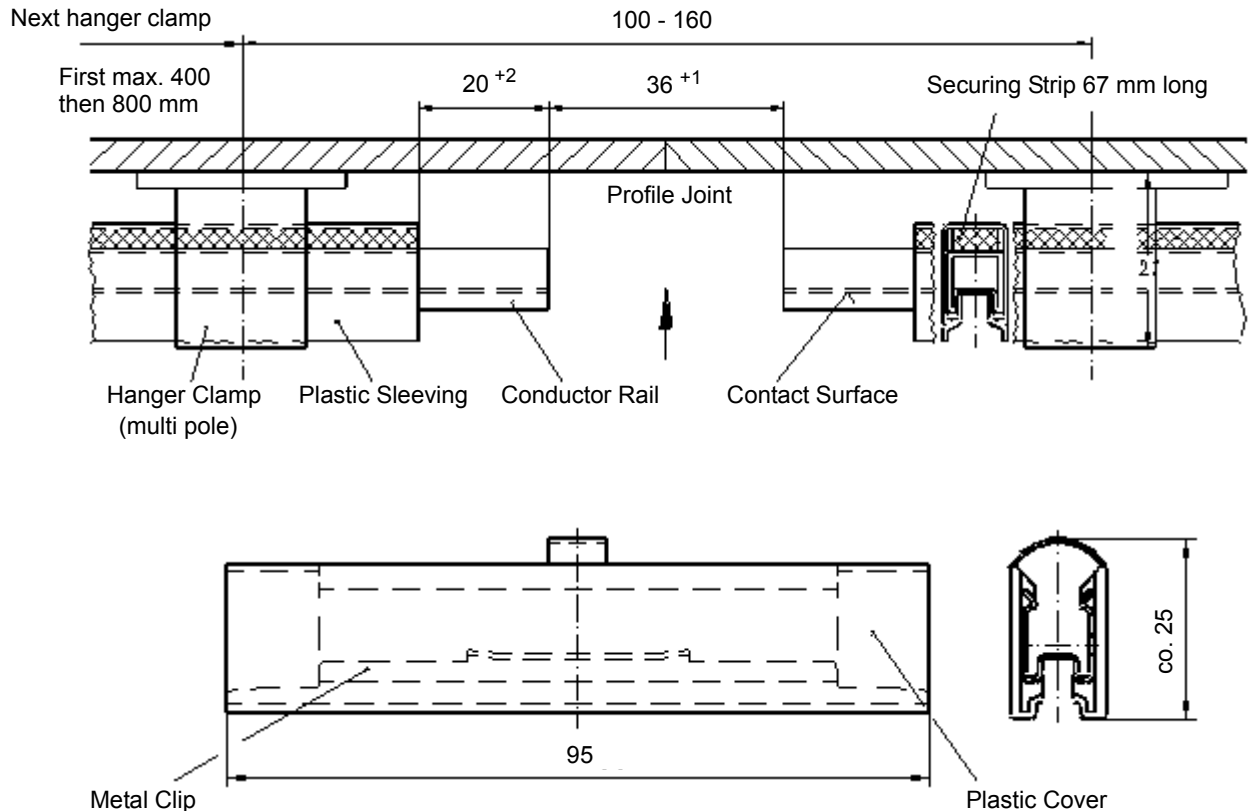


Cleaning collectors cannot transfer electrical current and are to be mounted to the following part of the carrier, center roller. Cleaning collectors are not suitable for continuous use and must be controlled continuously for wear. Once the system is cleaned they must be removed.

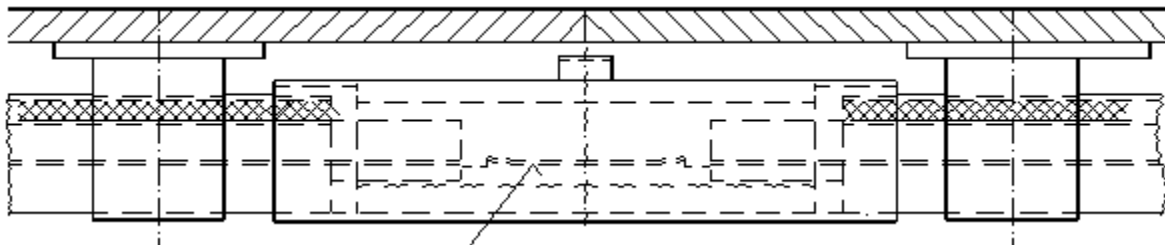
Note: Used for one direction only. The plastic tie gives added holding properties at switches and transfer points.

Prefabricated Conductor Rail System

Layout of Prefabricated Conductor Rails



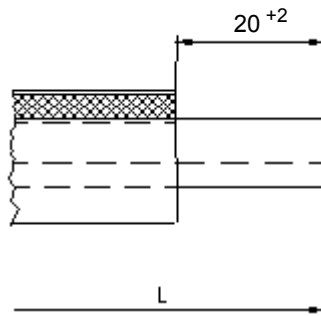
Conductor Rail Connector after Installation



Conductor Rail Connector Single unit comprising of the (metal clip/cover). The metal clip insures a mechanical and electrical bridging of the corresponding conductor rail end. After placing the metal clip in the middle of the tool, it is placed over the plastic sleeving and then tapped in with the installation tool.

Expansion Range $\pm 4\text{mm}$ The conductor rail must be secured in the middle with a fixing clip on the prefabricated section.

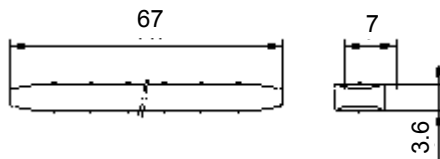
Conductor Rail: Lengths 2990 or 4990 mm



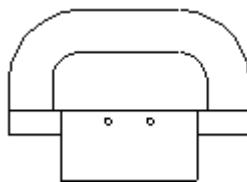
Standard length sleeving (cover) must be shortened on the site

Track length + 36 mm cut-out space left free for connector

Securing Strip: Order No. 241000060



Two pieces are required for each rail connector.



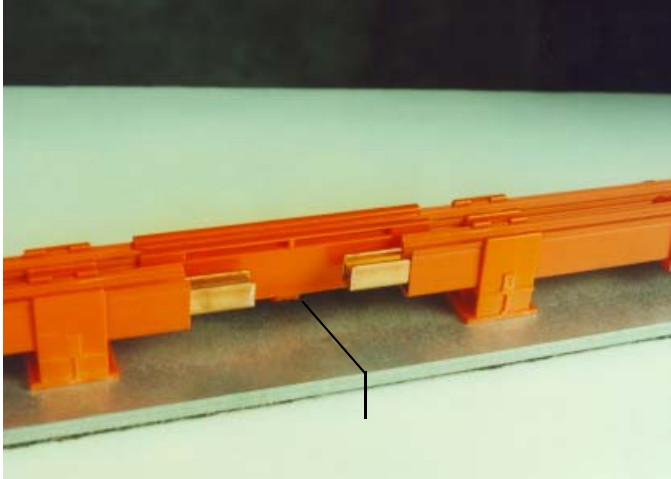
Side View of tool.



Installation Tool
with position of
connector Order
No. 241 046 085



Disassemble Tool:
Order No.
241 046 086

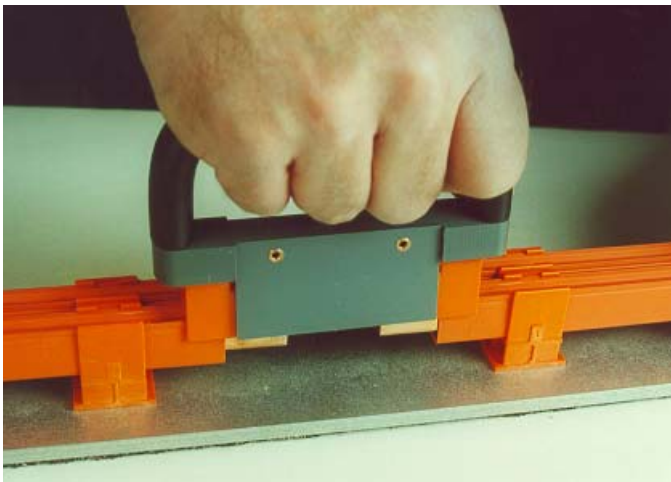


Situate the conductor rail ends 18 mm back from the monorail track joint (black line).

Shorten the conductor rail sleeving on both ends to 20^{+2} mm as shown in the drawing.



After the appropriate length of the conductor rails have been cut, slide the plastic strip 67 mm directly above copper and below sleeving in the conductor rail end. This prevents the rail being pushed backwards into the sleeving.



Place the rail connector over the sleeving in the middle of the open rail gap and tap the handle with plastic hammer using a short quick blow. Make sure the connector is completely level with the contact surface after completion.



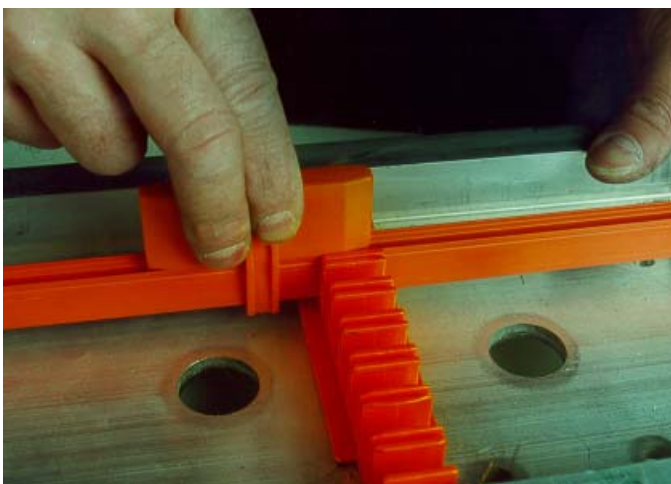
Inside view of the installation tools. Left hand side is the installation tool. Right hand side is the disassemble tool.



If the connector has to be removed, using the tool without the rim inside, snap the tool over the connector.

Using a quick turning motion remove the connector. Should the plastic bow be broken on the connector it is still reusable. (the bow is only for assembly purposes).

Removing the Conductor Rail from the Hanger Clamp



Slide the dismantling wedge along the conductor rail to pry apart the hanger jaws. Do not use a screwdriver or other tools that can damage the insulating cover.

End Check

- Are all the screws tightened?
- Are all the burrs removed?
- Are all the cables connected tightly?
- Do the switches and lifts sections close correctly without interference?
- Are the air gaps set correctly on the switches and lifts?
- Are all the fixing points assembled to anchor rail sections?
- Are all the gaps correct where the expansion points are situated?
- Is there a hanger clamp within 200mm from a rail separation?
- Have the yellow expansion setting clips been removed?

Maintenance Check

Every three months

- Check the transfer caps at switches zone and lift sections for damage. Change if needed.
- Check the brush wear on the collectors. Change when the brush is worn down to 1mm.

Every six months

- Check that alignment of switches are corrected. Transfer caps tolerances being +/- 2mm in these areas.
- Check that no oil is on the track. This will cause bad data transfer. Clean with oil free solvent.
- Check that cables are firm on the current collectors and are not twisted or taught.

Every year

- Check all the nuts and bolts are tight.
- Clean track with cleaning collectors if track is causing problems with contact.
- Check in general for damaged loose parts.

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NOTES: