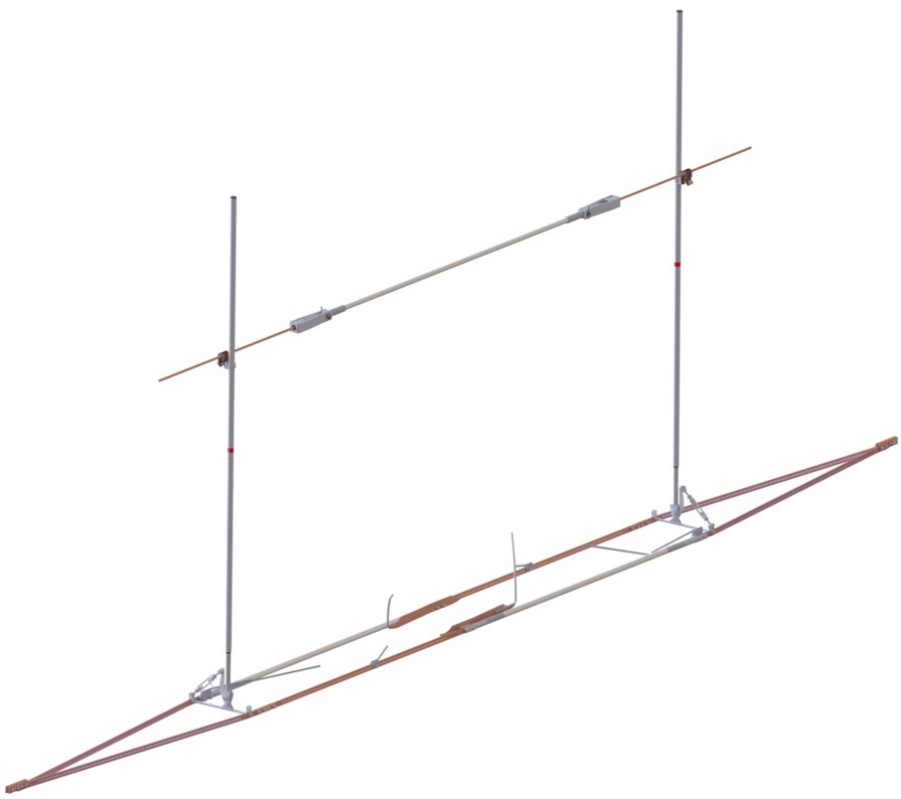
Installation instruction

Section insulator HI15 and HI25

with and without lever
(lever recommended above approx. 120 km/h)



Tools for installation:
1 Alignment Bar (art. no. 696.016.010)
1 Adjustable spirit level (art. no. 655.141.000)
1 Pulley block (minimum 8 m) with 2 cable clamps
1 Metal saw
1 File
1 Copper hammer
1 Straightening wood
1 Ring and open-end spanner 13/17 mm
1 Torque wrench 13/17 mm for 25/50 Nm
1 Flat nose pliers or gas pliers

RISK OF DEATH
Before start working in the overhead line:
Make sure that the overhead line is switched off and correctly grounded on both sides.

A Planning/Preparation

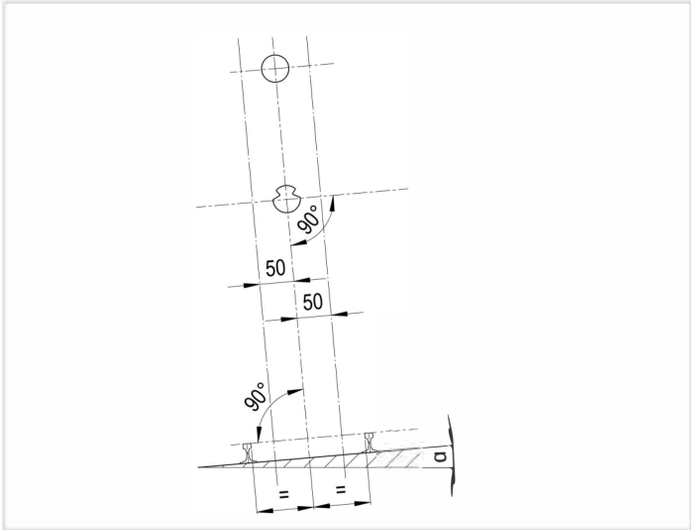
Preparation of contact and messenger wire

Straighten the contact wire at the installation location and make sure it is not twisted.

Each section insulator should be well centred and aligned parallel to the track. The carbon strip must run centered over the section insulator.

Align the contact wire and the messenger wire in the middle of the track (+/50 mm).

The contact wire and messenger wire must be positioned vertically within 50 mm above each other.

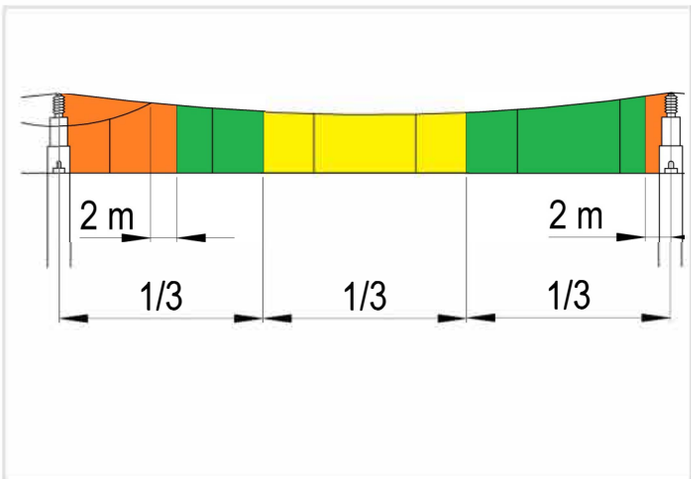


Installation location

It is recommended to install the section insulator in the green zone, at least 2 m away from the guide arm or the Y-cable (Stitch wire).

If the suspension is able to glide on the messenger wire the maximum allowable angle of the messenger wire is 5°.

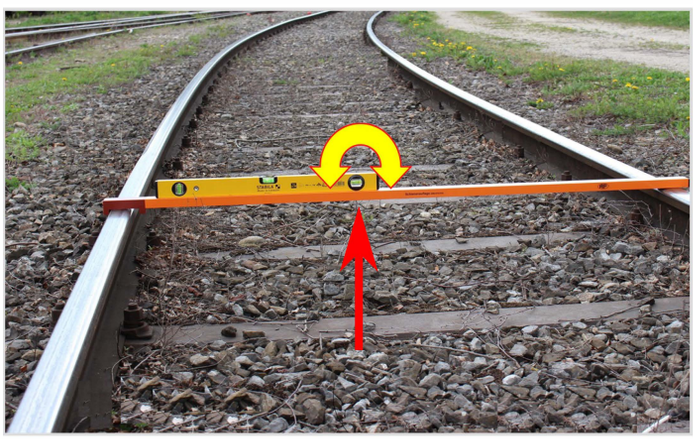
In case the contact wire is worn by >2 mm it must be replaced over a complete length of a span on both sides of the section insulator.



1. Take the level of the track

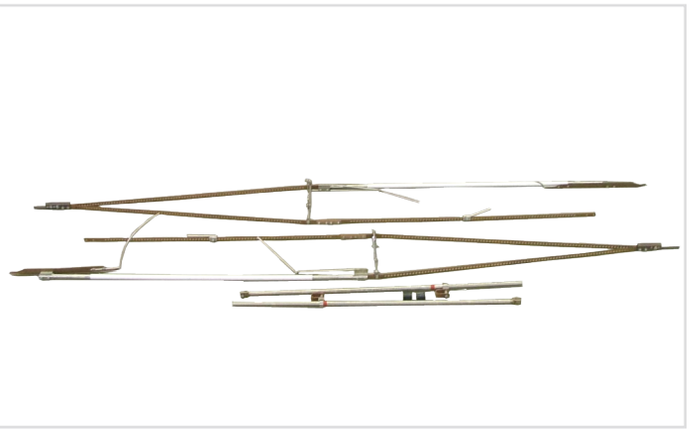
Place the adjustable spirit level as shown and remember the driving direction.

Measure the cant of the track with an adjustable spirit level.



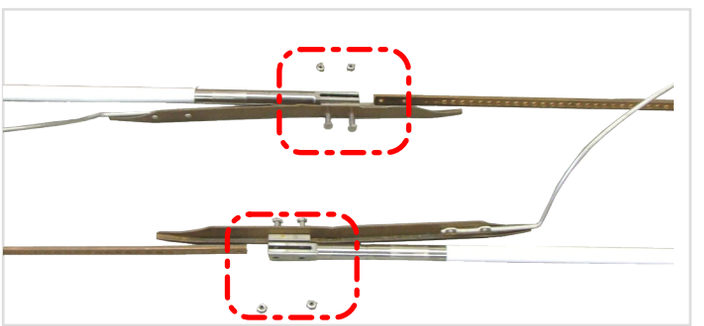
2. Installation preparation

a) Check the delivered parts.

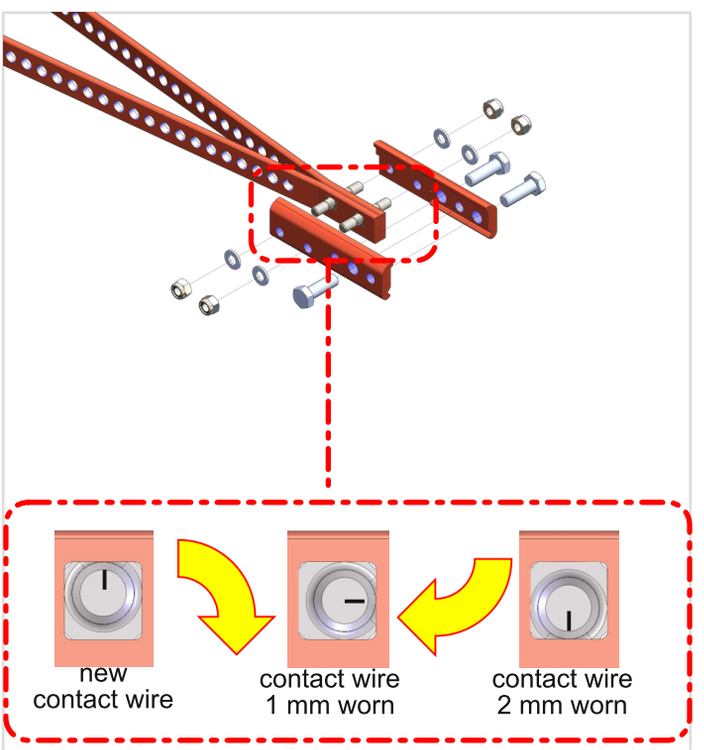


b) Assemble the section insulator on a flat surface and tighten with **25 Nm**. The arcing horns must be installed 2 mm elevated.

If no flat surface is available only half tighten the bolts and fully tighten them at point 12.



c) Setting of the adjustable splice. First measure the wear on the contact wire. Then adjust the special off-centred bolts accordingly.



B Install messenger wire insulator

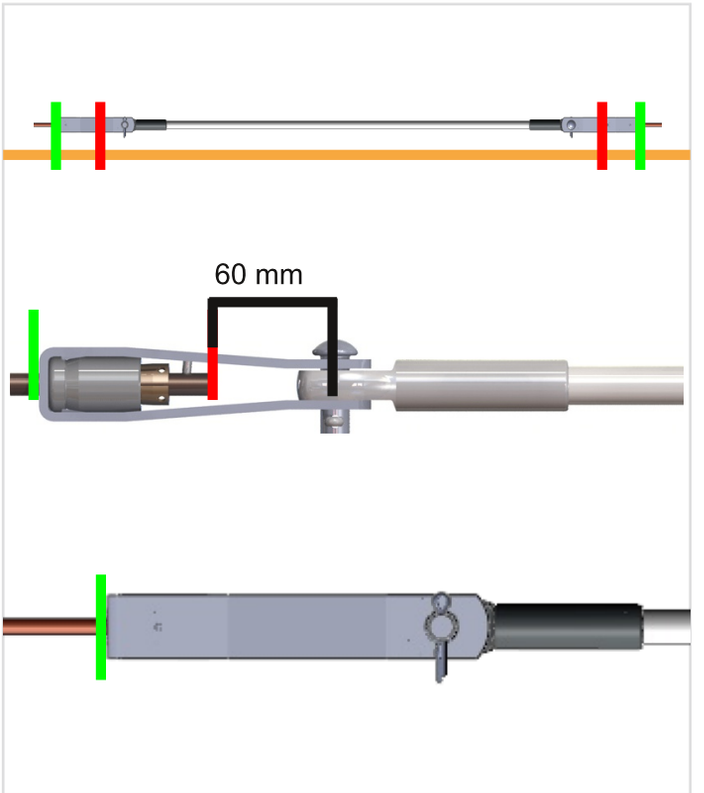
3. Cutting

Hold messenger wire insulator with forked collar socket onto messenger wire.

Apply marking on messenger wire at end position (green) and the cutting position (red).

Mount the pulley block and apply tension.

Cut at the red marking.



4. Mounting

Install the forked collar socket onto the messenger wire until the green marking is at the postion as shown.

Manually push the collet into the sleeve.

Remove the pulley block. The collet will be pulled into the sleeve when tension is restored.

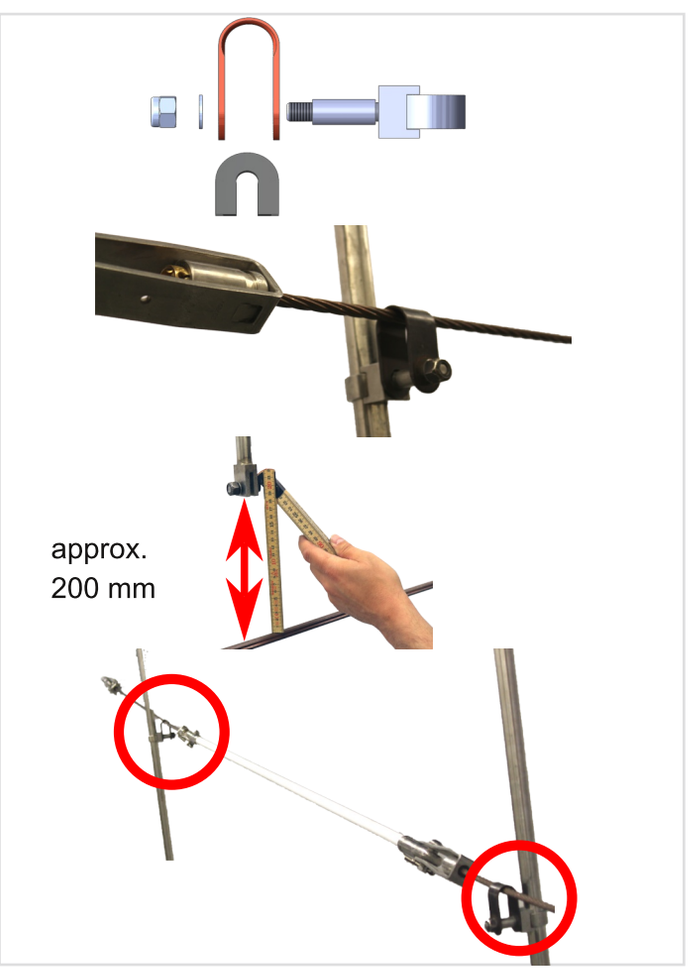
C Mount section insulator

5. Install spring droppers

Prepare and install the spring droppers to the approximate height.

Use insert with small size messenger wires.

Tightening torque 25 Nm.



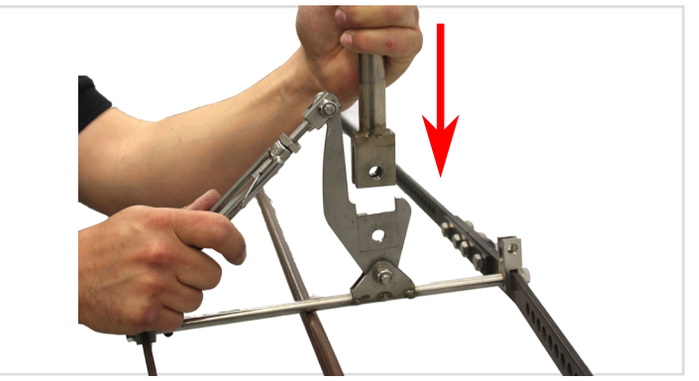
Attention: The spring droppers must be mounted on the correct side of the messenger wire. In driving direction the first spring dropper is to the right and the second to the left of the messenger wire.

6. Connect section insulator with spring droppers

Lift section insulator onto contact wire.

Pull down spring droppers and attach it to the section insulator.

Tightening torque 25 Nm.



7. Apply cutting mark to contact wire

Attention: Make sure section insulator is not moved during marking on both sides.

8. Apply tension with pulley block

9. Cut contact wire

Cut contact wire at the marking. Deburr the cutting surface.

10. Mount the section insulator onto the contact wire

The bolts marked yellow (wrench size 17 mm) which hold the tension of the contact wire must be tightened with a torque wrench with **50 Nm**. **Retighten 2 times**.

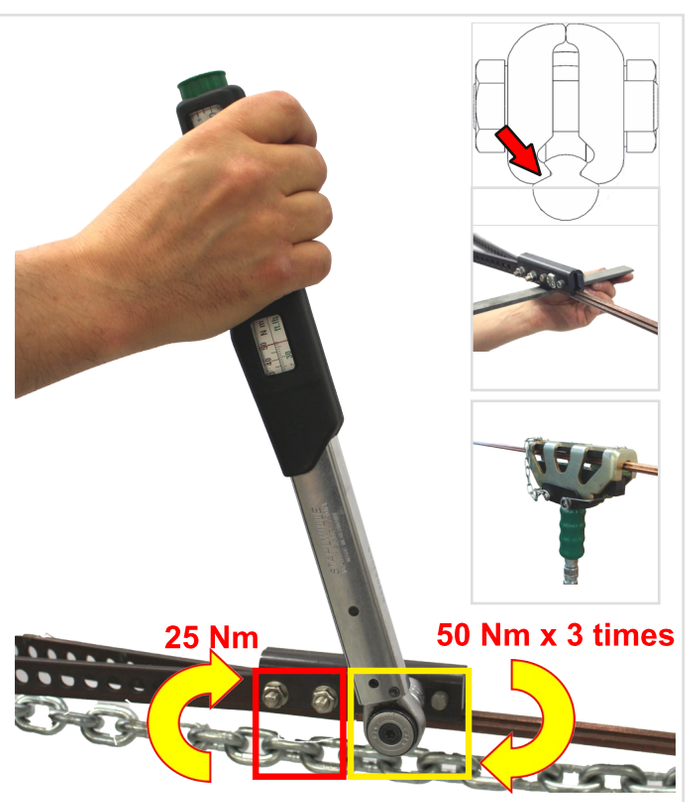
The special off-centred bolts marked red (wrench size 13 mm) must be tightened with **25 Nm**.

Warning: The teeth of the contact wire splice must grip over the complete length of the contact wire groove.

11. Remove pulley block

12. Straighten the contact wire

Attention: The transition from the contact wire to the section insulator must be smooth. Should this not be the case it is important to file any sharp edges smooth. If the contact wire and the end ferrule are not on the same height, a ramp must be filed with a length of at least 200 mm.

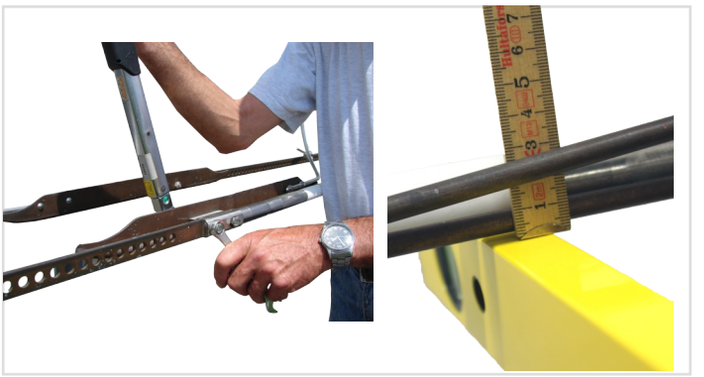


13. Tighten bolts

Tighten the 4 bolts in the middle of the section insulator (separated for transport) if this has not already been performed during preparation.

Tightening torque 25 Nm.

Attention:
- The skids must be on the same level as the gliders (smooth transition).
- The arcing horns must be installed 2 mm elevated.



D Adjust section insulator

14. Final setting of spring droppers

Set the spring droppers to the black mark +/- 20 mm. The mark shows the centre of the spring deflexion and guarantees free movement during pantograph passage.

Tightening torque 25 Nm.

In reduced height systems the excess tube above the messenger wire can be cut above the blue marking.

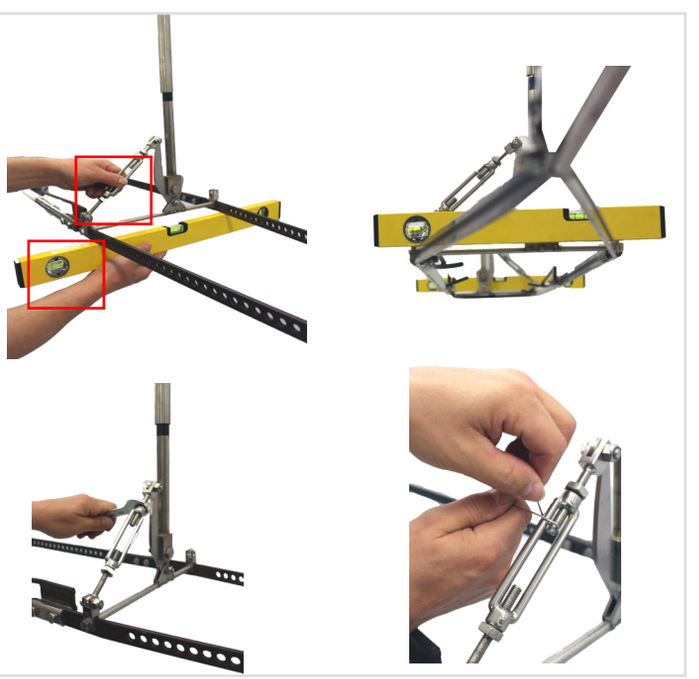
Reuse the plug on the cut end.

15. Setting of the cant

Adjust the cant of the section insulator with the turnbuckle to match the cant of the track.

Block the turnbuckle with the counter nuts and insert locking wire.

The section insulator should not be twisted.

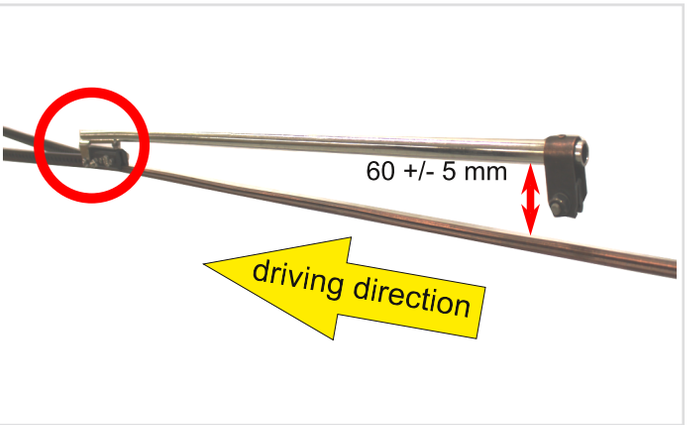


E Installation of lever (optional)

16. Mount lever onto splice

Install the lever on the entry side, on bidirectional lines on both sides. The lever reduces wear underneath the splice and is recommended above 120 km/h (depending on the system).

Remove the inner M8 nut on the splice. Mount the lever onto the bolt and then retighten the nut.



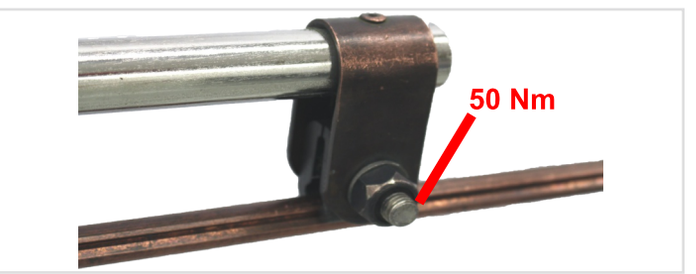
17. Adjust lever setting (optional)

Add or remove washers until the 60 +/- 5 mm are reached.

Tighten the lever clamp onto the contact wire with **50 Nm**.

Thighten the M8 nut with **25 Nm**.

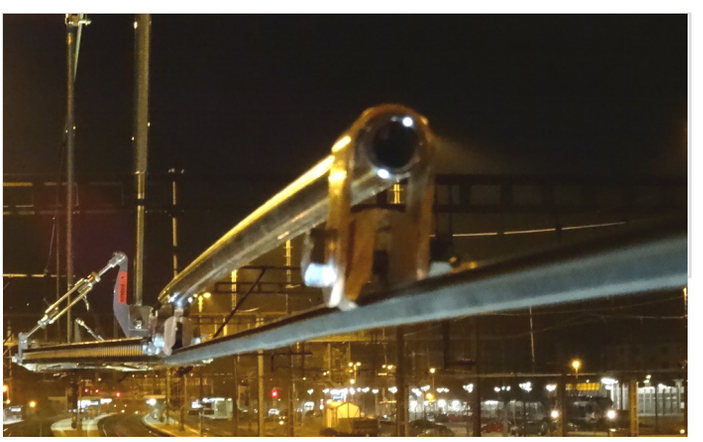
The setting of the lever is system specific and can vary depending on line tension, contact wire size, installation location etc.



Perform an optical check if the entry splice is now level/parallel to the track. Use an adjustable spirit level or straight edge tool for the check.

A soft contact wire system or a low prestress in the lever can result in excessive wear at the entry splice.

A high prestress in the lever can result in excessive wear underneath the lever splice.



F Final check

18. Check gliding and cant

Check with dummy pantograph for optimal gliding (optional with spirit level).

Check cant with an adjustable spirit level over the full length of the section insulator.

Check the droppers adjacent to the section insuator. They may need to be readjusted.

Caution! Danger of accident if these points are not observed:

- The splice bolts must be tightened with 50 Nm and retightened 2 times. Otherwise the splice teeth will not sufficiently grip the contact wire. This could result in a contact wire slippage and subsequent damage.
- All nuts and bolts must be tightened in accordance with the manual. when tightening the counter nuts the bolt heads must be held firmly to avoid loosening of the bolts through vibration.
- The contact wire and the messenger wire must be vertical above each other. The operation of the spring droppers is otherwise not guaranteed and the section insulator cannot function properly.
- The skids and arcing horns must be mounted and aligned as described. Impacts can destroy the pantograph and the section insulator.
- The turnbuckles must be secured with the locking wire and counter nut. They could otherwise open and change the level setting of the section insulator. Incorrectly adjusted section insulators can lead to disturbances in the railway traffic.

- **Arthur Flury AG rejects responsibility for any damage caused by not observing this installation instruction.**

Maintenance instruction

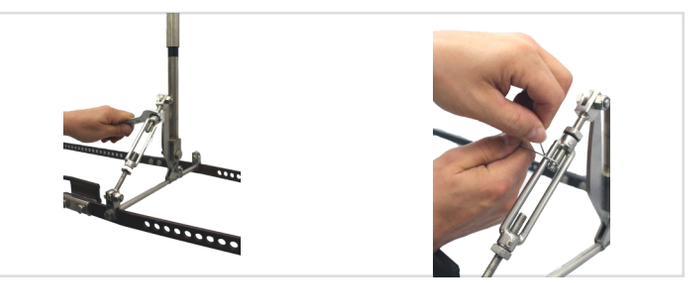
1. Cant of the section insulator

Perform a visual check of the alignment of the section insulator. The section insulator should not be twisted.

It can be seen from the wear pattern if the installation of the section insulator was correct so far.

If the wear pattern is one-sided (wear on gliders unequal) the section insulator has to be realigned with the track in accordance with point 1 of the installation instruction.

Block the counter nut and reattach the locking wire after readjustment.

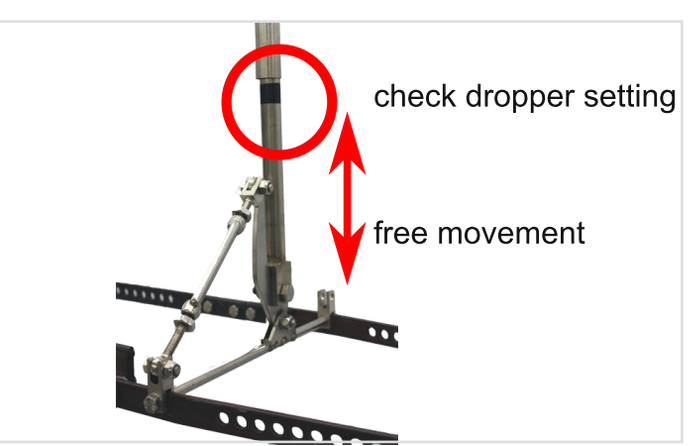


2. Spring droppers

Check the correct mounting orientation
For a proper functioning the first spring dropper needs to be to the right and the second to the left of the messenger wire (seen in the direction of traffic). If this is not the case it must be corrected in accordance with point 5 of the installation instruction.

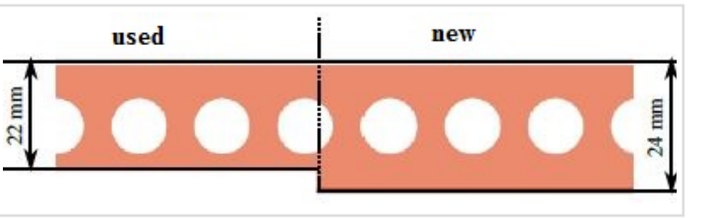
Functional test
For a trouble-free operation the vertical movement of the spring dropper should only be held back by the spring force. In case the movement is impaired or there are any visible or audible damages the spring dropper must be replaced in accordance with the installation instruction.

Possible faults:
- Spring force insufficient
- Excessive scraping or wear on the tubes
- Corrosion
- Electrical damage / arc splatter



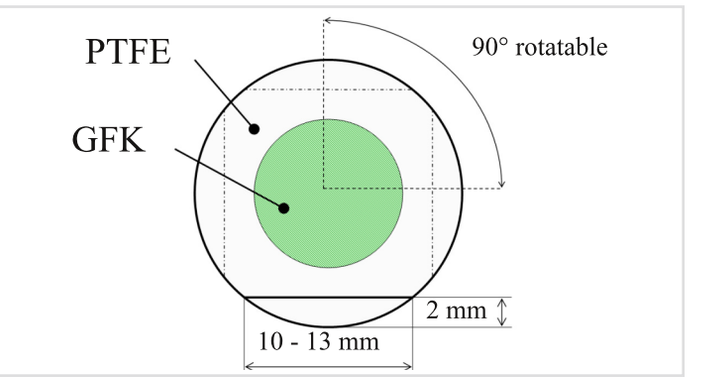
Check the spring dropper setting
For an optimal movement of the spring during pantograph passage the end of the outer tube must be aligned with the black marking (+/- 20 mm). Otherwise the setting must be corrected in accordance with point 5 of the installation instruction.

3. Gliders



Wear
The section insulator must be replaced once the thickness of the gliders is eroded to 22 mm or less.

4. Insulators



The insulators can be worn on 4 sides after which they need to be replaced.

Allowable wear on the insulators is 2 mm in height and 10-13 mm in width. After reaching the max. allowable wear the insulator must be rotated or replaced.

Rotating the insulators

The turning of the insulators can be done under full tension (no pulley needed). Grip the metal sleeve with a pipe wrench as seen on the picture. After rotating a quarter turn a distinct latching is noticeable and the marking on the metal sleeve must align.

Replacing the insulators

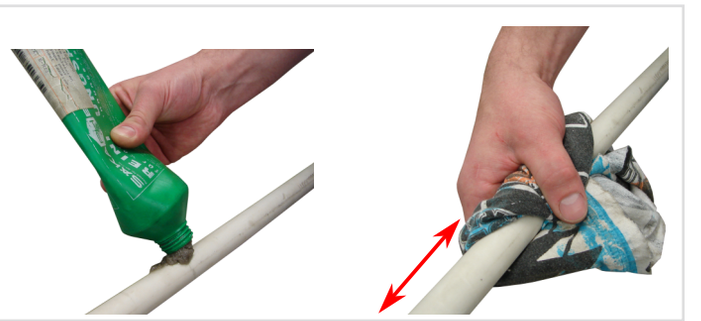
Tension the pulley block until there is no tension on the insulators.

- Remove the nuts, washers, skids, arcing horns and bolts.
- Remove the worn insulator and insert the new one.
- Reattach the nuts, washers, skids, arcing horns and bolts.
- Remove the pulley block.

Tighten all bolts with **25 Nm** (always tighten bolts after removing the pulley).

Attention:
- The skids must be on the same level as the gliders (smooth transition).
- Arcing horns must be installed 2 mm elevated from the contact wire height.

Cleaning the insulators



The PTFE cover of the insulating rod is cleaned well enough by rain water under normal circumstances. In case of exceptionally strong dirt accumulation (for instance from frequent diesel traffic, installation in a tunnel and so on) we suggest cleaning the insulator every 2-3 years with our special cleaner for high voltage insulators (order no 655.168.000).

5. Arcing horns

Check the condition of all arcing horns for impact and arcing damage. If slight impact wear is visible, the arcing horn must be readjusted and lifted above the height of the insulator. If severe impact damage is visible, the arcing horn must be replaced. If severe arcing damage is visible the arcing horn must be replaced. Superficial arc splatter and welding spots from arcing can be tolerated.

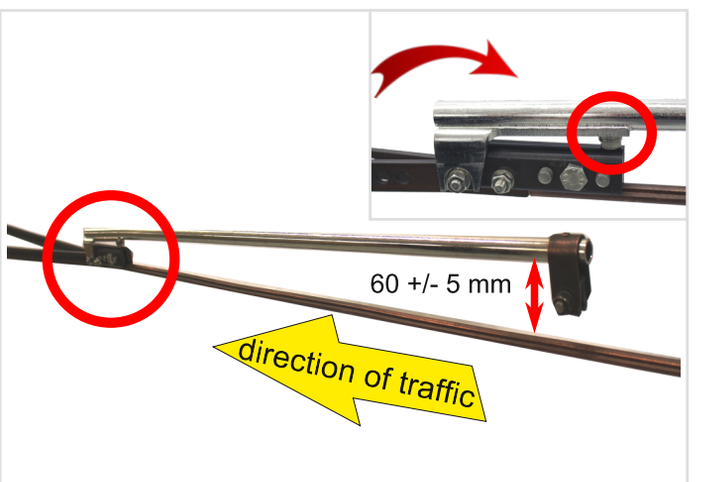
6. Splice clamps

The contact wire head on the first 20 mm inside the splice clamp must be checked for cracks. This is easiest performed with a borescope. In case of visible cracks, the contact wire must be replaced over a complete length of a span.

7. Lever

If there is an uneven wear pattern under the splice clamp and no lever is installed, it is recommended to install such a lever. AF recommends to install the lever at operating speeds above 120 km/h. Depending on the system specification a lever will show benefits at lower operating speeds.

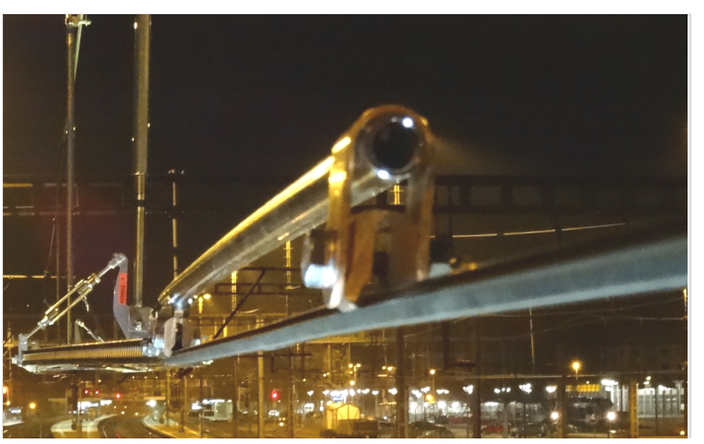
If a lever is used and the wear at the entry or under the lever clamp is still excessive the lever setting must be adjusted.



Excessive wear at the splice fitting:

Add 1-2 washers to the lever.

A soft contact wire system or a low prestress in the lever can result in excessive wear at the entry splice. A high prestress in the lever can result in excessive wear underneath the lever splice.



Excessive wear underneath the lever clamp:

Remove 1-2 washers from the lever.

Perform an optical check if the entry splice is now level/parallel to the track. Use a spirit level or straight edge tool for the check.