

## Maintenance

A correct installed section insulator from Arthur Flury AG does not need any maintenance over a long period.

### Insulator

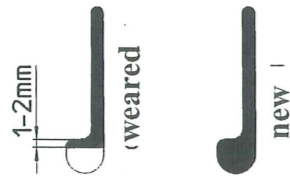
The silicone-cover of the flat beam insulator does not need any maintenance in normal use. It is self cleaning in the rain.

If there is a heavy pollution (driving with diesel locks etc.) we recommend to clean the insulator beam with soap water every 2-3 years.

**Attention!** For cleaning the silikon-insulator do not use oil, gasoline, petrol or similar solvents. It would destroy the silicone-cover.

### Runners

Check the runner wear after 200'000 to 300'000 passages of pantographs and regulate the runners if the wear exceeds 3mm. If the wear reaches the maximum amount (remaining thickness 1-2 mm) replace the runners.

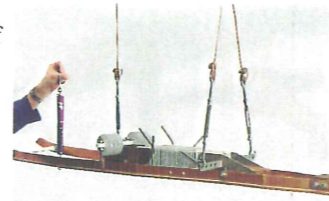


## Recommendations for trouble shooting at AF-Section Insulators

### a.) Special check:

A correct installed section insulator may be lifted at each extreme point of the runners with 120 N (spring balance) without relaxing of the hangers.

If the hangers get loose, then lift the section insulator in steps of 10 mm until the hangers stay straightened.



### b.) Running performance:

A correct installed AF-section insulator must be stable and show a smooth running whilst passing pantographs.

Otherwise watch the hangers whilst passing pantographs. If they swing or get loose, then see it as a sign that the pantograph creates too much uplift pressure onto the section insulator and tries to lift it up.

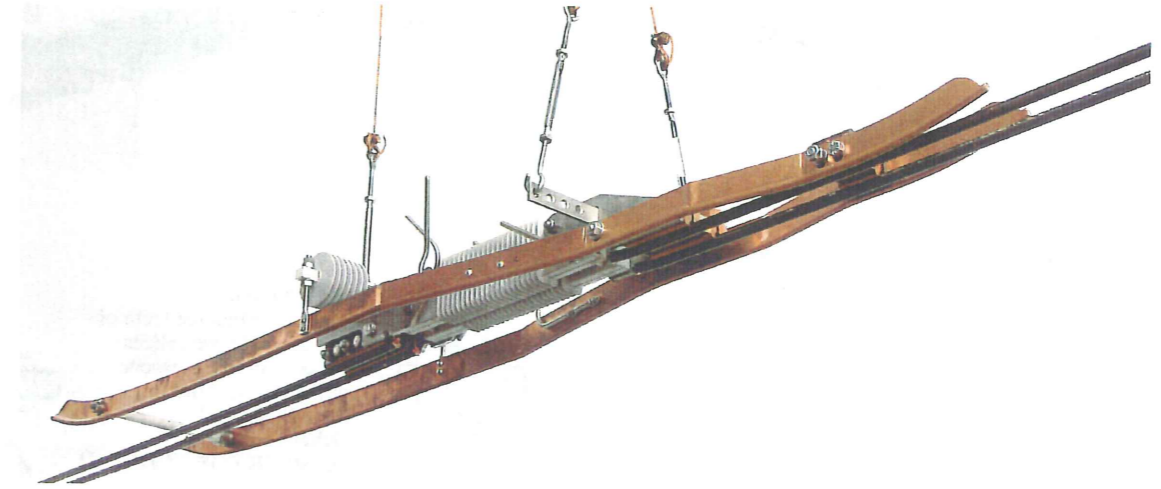
Then lift the section insulator until the hangers stay stable.

### c.) Increased runner wear:

If the entrance of the runners show an increased wear, improve the regulation of the runners according to the detailed installation instruction (clause 13).

Correct adjusted runners will show an equal wear from the beginning till the end of the section insulator.

# INSTALLATION INSTRUCTION



## SECTION INSULATOR FOR HEAVY CURRENT DRAW (WITH FLAT BEAM INSULATOR)

EDITION 2002/1

### Tools for installation of Flury-Section Insulators

- 1 Ring spanner 16/17 mm
- 1 Open-end spanner 16/17 mm
- 1 Torque wrench key 16/17 mm
- 1 Spirit level (if possible adjustable; Flury item no. 655.141.000)
- 1 Metal cutting saw (or iron cutter)
- 1 Hammer approx. 2 kg
- 1 Flat nose pleyer
- 1 Streightening wood for contact wires

if possible

- 1 Spring balance 0-200 N

For installation of messenger wire insulator additionally:

- 1 Pully block with 2 clamps

### Checklist for Section Insulator Installation (short eddition)

First install the messenger-wire insulator and the hangers centric above the Section Insulator installation location.

1. Measure the inclination of the track (cant).
2. Put the contact wires in the center of the track.
3. Streighten contact wires (kinks, twists).
4. Measure contact wire hight by steady arm before and after the section insulator installation location. Calculate the average hight. Evtl. measure uplifting X with spring balance.
5. Remove runners, counter nuts and safety wires; relax contact wire splices and turn-buckles completely.
6. Install section insulator without runners onto contact wire. Insert the teeth of the contact wire splice into the groove of the contact wires. Tight screw bolts with 50 Nm and retight 3 times. Use the 2-bolt clamp for centering of contact wires.
7. Tight lock nuts at insulator-beam with 40 Nm.
8. Cut the contact wires at the open space behind the contact wire splices on both sides.
9. Remove the pieces of contact wire.
10. Retight the screw bolts of the contact wire splices with 50 Nm. Put on the counter nuts and tight with 20 Nm; block the screw bolt with a second ring key whilst tightening.
11. Bend the ends of the contact wires slightly upwards with a hammer. Remove possibly kinks in the contact wire before and after the section insulator. Adjust the level of the fit ting with the leveling screw.
12. Assemble the runners temporarily. Assemble the suspension vertically  $\pm 5^\circ$  and adjust the section insulator hight. Use a super elevation of measure X as found in step 4. (If not measured use 25-30 mm) Adjust the body of the section insulator in parallel to the track with a spirit level. Put the safety wires into the turn buckles temporarily.
13. Adjust the runners at the 2-hole contact wire splice with a spirit level onto the same hight as the contact wire under side and in parallel to the track.
14. Adjust the runners at the lateral insulator with a spirit level 3-5 mm under the contact wire under side and in parallel to the track. Use the nuts at the vertical bolts for regulation and block them after finishing. Tight the special nuts of runner fastening near the suspension slightly.
15. Check the runner adjustment with a spirit level or a pantograph.
16. Tight the special nuts for runner fastening with 40 Nm.
17. Check every bolt and nut of well tightening.
18. Lock the turn buckles completely with the counter nuts and the safety wires.
19. Adjust hangers before and after section insulator until next steady arm.

### Caution: Danger of accidents if the following steps are not correctly made:

- If contact wire and messenger wire are not vertically above each other, then the hangers are not regularly tightend and the section insulator is not able to function optimal. In extreme cases it is possible that the pantograph intrudes into the gap by the arcing horns and will destroy some material.
- If the screw bolts of the contact wire splices are not retightened 3 times, then the theeth of the splices cannot fully work into the material of the contact wire. It is then possible that the contact wire may slip out and destroy material or hurt human peoples.
- It is important that the screw bolts of the contact wire splices are held with a ring key by tightening the counter nut. Otherwise they can get loose and the contact wire may slip out and destroy material or hurt human peoples.
- If the section insulator is not adjusted at the correct height as described, it will create hits onto passing pantographs. Then the wear of the runners and of the contact wires before and after the section insulator will be increased.
- If the runners of the section insulator are not well adjusted, then they will create hits and will destroy the carbon sliding pieces of passing pantographs.
- If the turn buckles are not correctly blocked, they will get loose and the section insulator will give troubles in the overhead line by misadjusting itself.
- If not every scew bolt and nut will be correctly tightend as described, they can get loose by vibrations and create troubles in the electric overhead line.
- If the turn buckles are not secured with the safety wires, they can get loose by vibrations and create troubles in the overhead line.
- If the protective PTFE- or silicone-cover of the insulators is badly damaged, so that the inside glass fibre is visible, then you should be sure that humidity and pollution may intrude and you have to replace the insulator as soon as possible. Otherwise you risk a flash over by high vol-tage, which may destroy material in the overhead line
- **Arthur Flury AG rejects responsibility for any damage caused by not observing this installation instruction.**

**Arthur Flury AG,  
the safe connection for you.**

### DANGER !

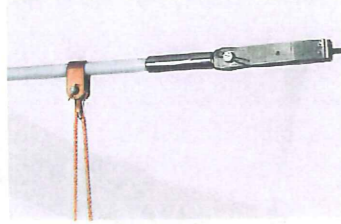
Before start working in the electric overhead line:

Be sure that the overhead line is switched-off and properly earthed!

Otherwise DANGER FOR LIVE!

## Installation in details

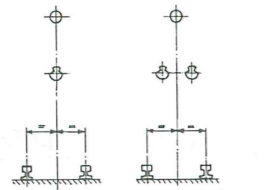
First install the messenger wire insulator and the hangers centric above the section insulator installation location.



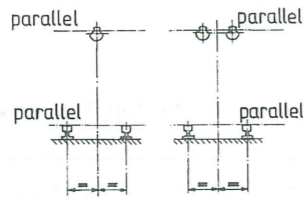
1. Measure the inclination of the rails with an adjustable spirit level. (Flury item No. 655.141.000)



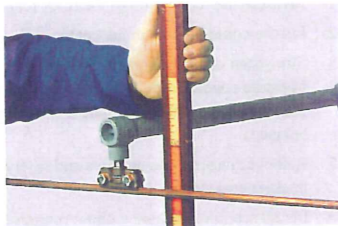
2. Move contact wires and messenger wires in the center of the track  $\pm 50$  mm. Contact wires and messenger wires must be in a vertical line within 50 mm.



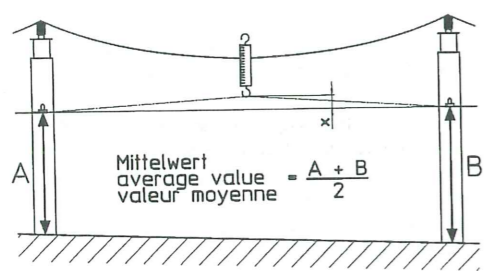
3. Remove kinks and twists of the contact wire.



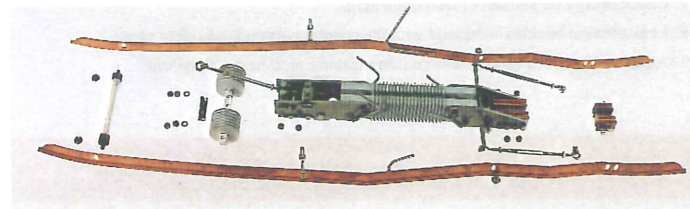
4. Measure from the mounting platform the unloaded contact wire height by the steady arm before and after the section insulator location. Calculate the average value. Do not move the height of the mounting platform afterwards.



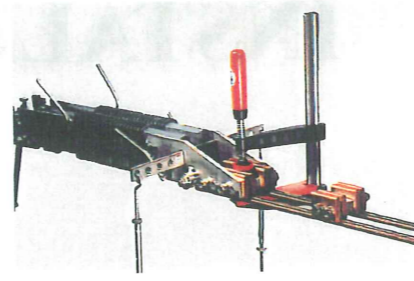
**Recommendation:** To get the real uplifting value of the contact wire (value X) pull the contact wire upwards by use of a spring balance with 120-150 N (dynamic pantograph uplift). This value X represents the realisting uplifting of the contact wire and is the optimal value for the superlevation of the section insulator.



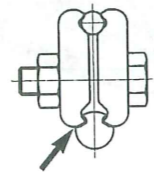
5. Remove the runners and the safety wires of the turn buckles. Slacken the contact wire splices and open the turn buckles completely. Remove all counter nuts of the splicers.



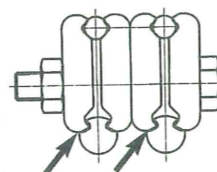
- 6a) Put the section insulator without runners onto the contact wires at the correct location. (watch hangers)



If necessary: Use the 2-bolt clamp for pre-centering of the contact wires.



**WARNING!** Make sure that the teeth of the contact wire splices are correct in the groove of the contact wire on the fully length! **Otherwise: DANGER FOR SLIDING!**



- b.) Tight the bolts of the contact wire splices with 50 Nm and retight 3 times, that the teeth may fully work into the material of the contact wire. Use a ring spanner to block the nuts of the 2 inner bolts whilst tightening.



7. Tight the locknuts at the insulator beam with 40 Nm.



8. Cut the contact wires at the open spaces behind the contact wire splices at both ends.

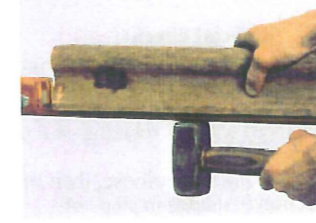
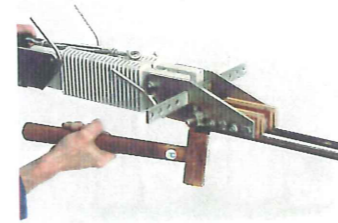


9. Remove the pieces of contact wire.

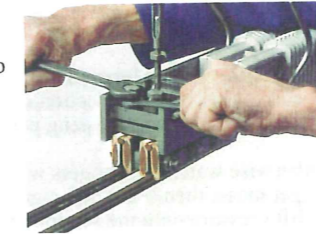
10. Retight the bolts of the contact wire splices once again with 50 Nm. Assemble the counter-nuts of the contact wire splices and tight with 20 Nm. Hold the screw-bolt with a ring key against loosening.



- 11 a.) Bend the ends of the contact wires upwards with a hammer. Straighten possibly kinks in the contact wires by use of a hammer and a strong piece of wood.

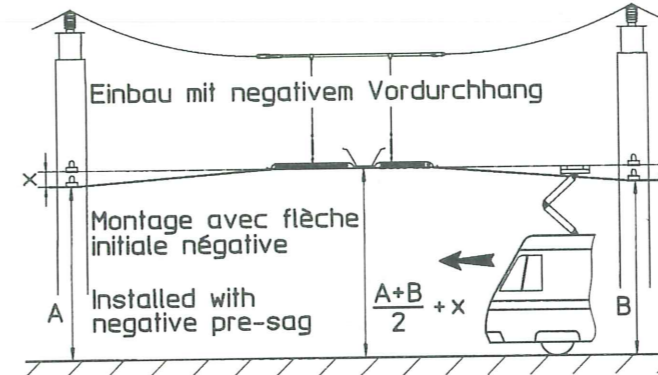


- 11 b.) Adjust the level of the fitting with the leveling screw. Contact wire and fitting have to be on a straight line. Secure leveling screw with locknut.

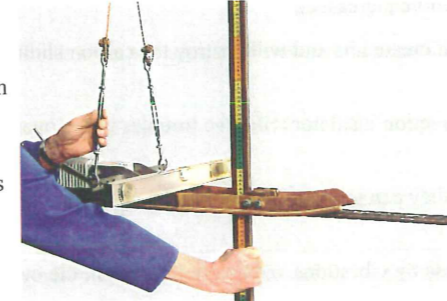


12. Assemble the lateral shed insulator and the runners with the 2-bolt contact wire splice temporarily. Do not tight the nuts. Assemble the hangers. They must be in a vertical position  $\pm 5^\circ$  along the track. Adjust the height of the section insulator with a super elevation of value X as measured in clause 4 in parallel to the track. (If not measured use 25-30 mm) Adjust the approx. height of the section insulator by use of the hanger cables directly.

### Adjustment of the Section Insulator height



Continue with fine adjustment at the turn-buckles. Adjust the section insulator body in parallel to the track by use of a spirit level. Assemble the safety wires of the turnbuckles temporarily.

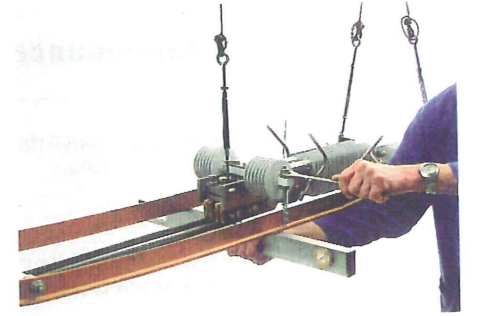


13. Adjust the runners in parallel to the track by use of a spirit level as follows:

- a.) At the 2-hole splicer place the underside of the runners at the same height as the underside of the contact wires. Tight the screw bolts and lock it with the counter nuts.



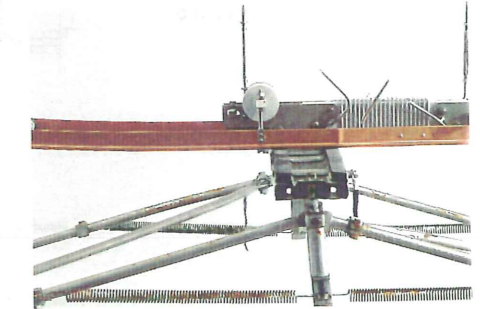
- b.) At the location of the lateral shed insulator place the underside of the runners 3-5 mm lower as the underside of contact wires. Tight the nuts and the counter nuts.



- c.) Tight the special-nuts to fasten the runners (near the suspension bracket) slightly to avoid milling a groove into the runner material.



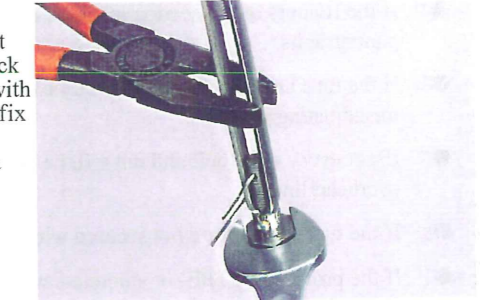
14. Check the installation at optimal sliding by use of a pantograph or a spirit level.



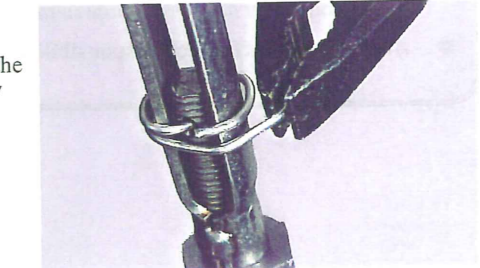
15. Firmly tight the special nuts with 40 Nm to fasten the runners by milling a circular groove into the runner material with the teeth of the special nut.



16. **Important!** Once again retight all screw bolts, lock the turn buckles with the lock nuts and fix the ends of the hanger cables in a loop.



17. Secure the turn-buckles with the safety wire into the hole of the screw bolt.



18. Readjust all hangers until the next steady arm before and after the section insulators location. Be sure that the section insulators adjustment will not be modified.