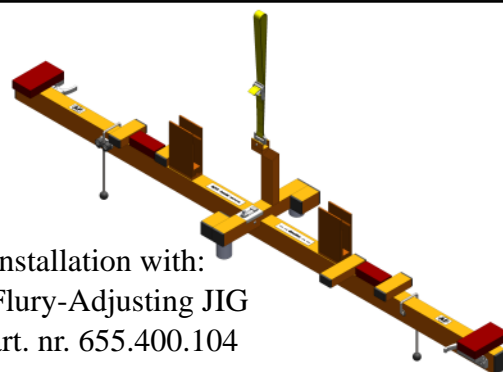


INSTALLATION INSTRUCTION

SECTION INSULATOR ZS / ZSD / ZSK

V1116



Installation with:
Flury-Adjusting JIG
art. nr. 655.400.104

Accessories for installation of the Flury section insulator

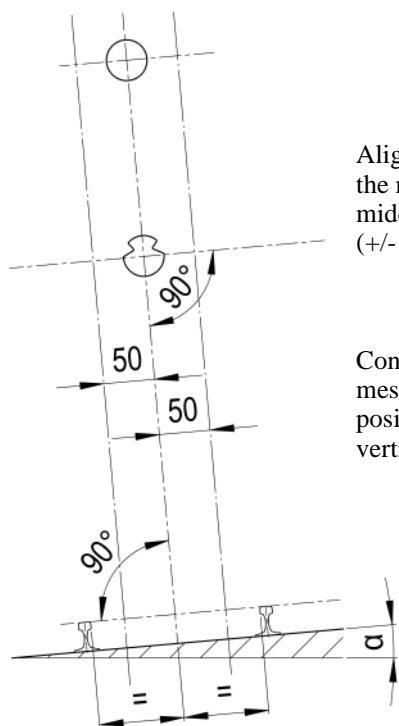
- 1 ring spanner 17 mm
- 1 torque wrench 16 and 17 mm (50 N m)
- 1 Flury-Adjusting JIG (art. nr. 655.400.104)
- 1 level gauge with adjustable spirit level (art. nr. 655.141.000)
- 1 bolt cutter (+ maybe 1 metal saw)
- 1 rail support for JIG (art. nr. 696.016.010)
- 1 hammer

- 1 flat nose pliers or gas pliers
- 1 measuring scale
- 1 spring balance (art. nr. 655.181.000)
- Additionally for:
 - *cut-in-the messenger wire insulator*
 - *replacement of a used section insulator*
- 1 pulley block with 2 cable sockets

Preparation of contact and messenger wire

Make sure the contact wire does not have any kinks or twists at installation location!

Every section insulator should be well centred and aligned parallel to the track. Make sure the section insulator is positioned so the carbon trip is always gliding centred to the section insulator.



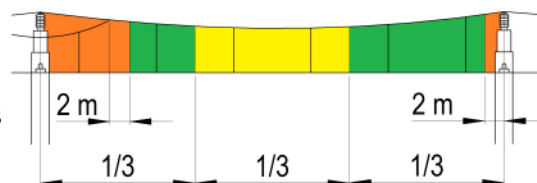
Align the contact wire and the messenger wire in the middle of the track (+/- 50 mm).

Contact wire and the messenger wire must be positioned within 50 mm vertically above each other.

Installation location

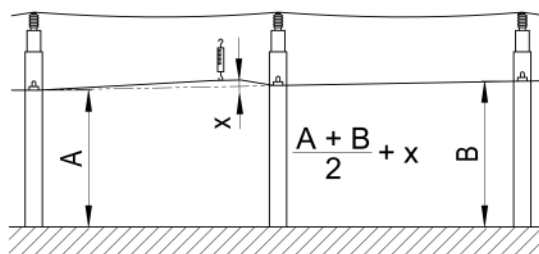
The section insulator is preferably installed in the green zone, at least 2 m away from the guide arm or stitch wire. The yellow zone is less optimal and the orange zone is least recommendable.

The sloping angle of the messenger wire insulator should not exceed 5° if saddle clamps are able to glide.



Hogging

In case the section insulator is installed at a new location, use a spring balance and pull the contact wire with 120 N - 150 N to measure the possible access height (value x).

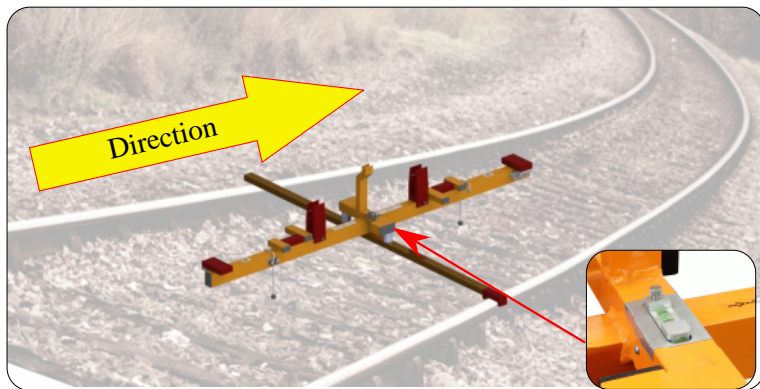


When replacing an existing section insulator measure the height of the contact wire at masts A and B. Calculate the average value. The hogging value should be minimum $x = 70$ mm.

! RISK OF DEATH !

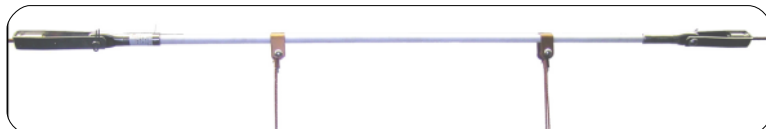
Do not begin to work on the overhead line before you have ensured that it is switched off and correctly grounded on both sides at a distance of at least 70 m!

1. Alignment of the JIG

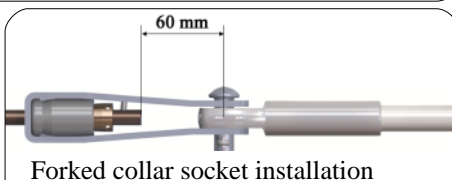


Place the JIG in a user-defined installation position. Adjust the level gauge.

2. Install messenger wire insulator

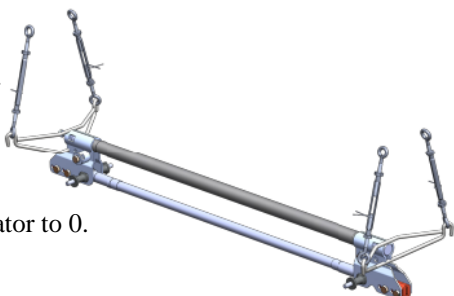


First install the messenger wire insulator with saddle clamp and cable hangers.

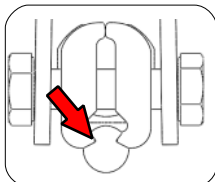


3. Preparation for installation

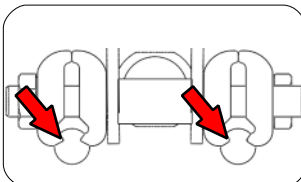
Remove runners, all counternuts and turnbuckles locking wires. Loosen contact wire clamps and open turnbuckles completely. Renewed installation: Set the compression insulator to 0.



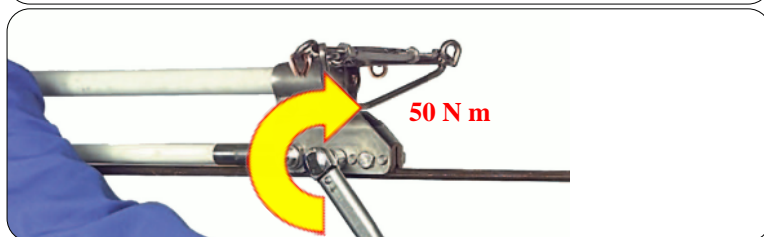
4. Mount section insulator onto contact wire



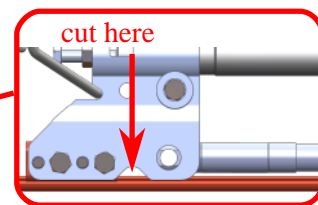
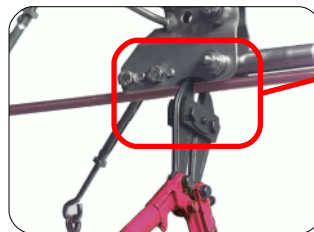
Warning!
The teeth of the contact wire clamps must grip over the full length!



Tighten the bolts of the contact wire clamp with **50 N m** by using a torque wrench and **retighten 2 times** (until each bolt has been tightened 3 times).



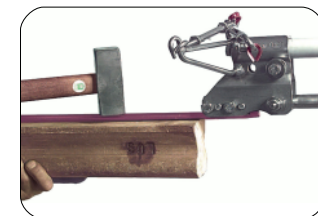
5. Cut contact wire



6. Bend contact wire ends up

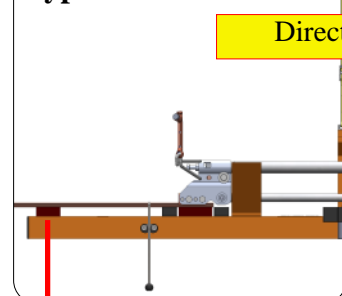


7. Repair buckling ends up

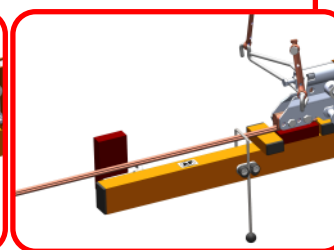
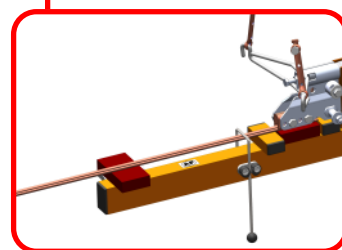
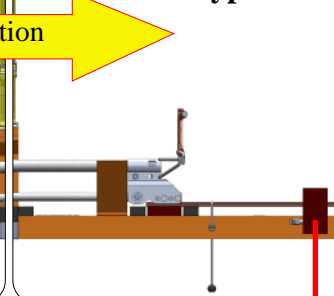


8. Installation of the JIG, fix the rope

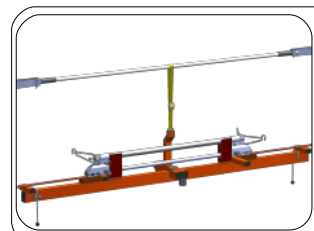
Type ZS / ZSD



Type ZSK

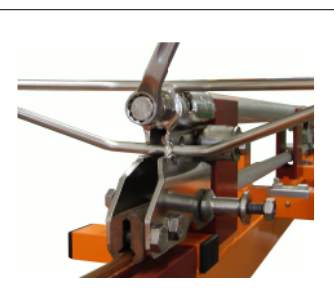


9. Hogging

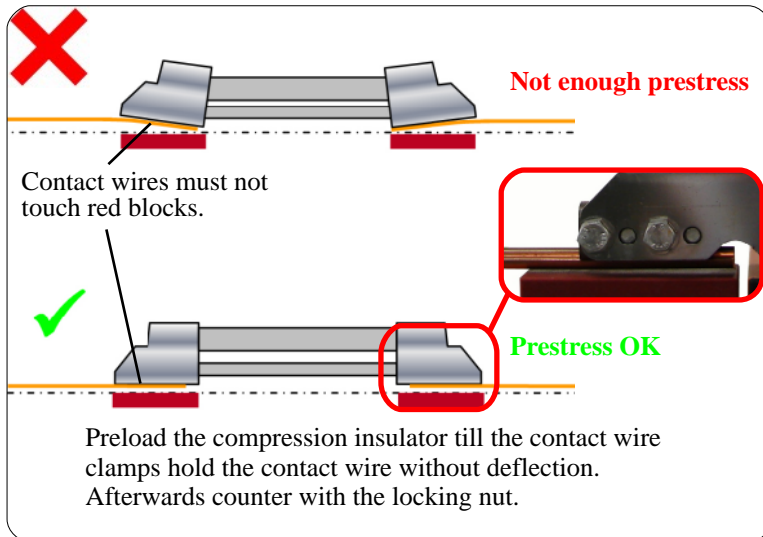


Use the rope on the JIG for the adjustment of the hogging. Adjust the section insulator height according to hogging instruction on page 1 (if not known value = 70 mm).

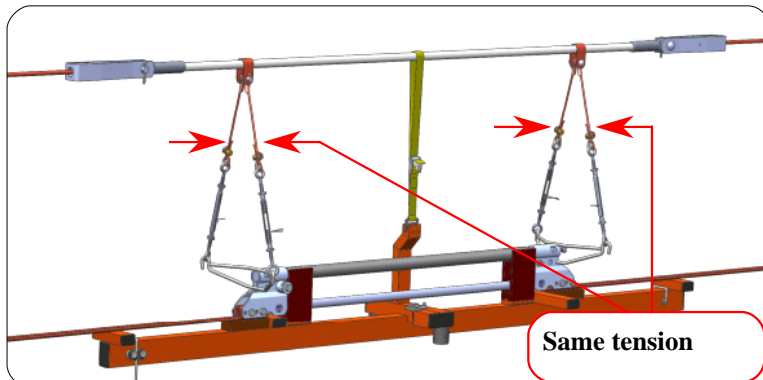
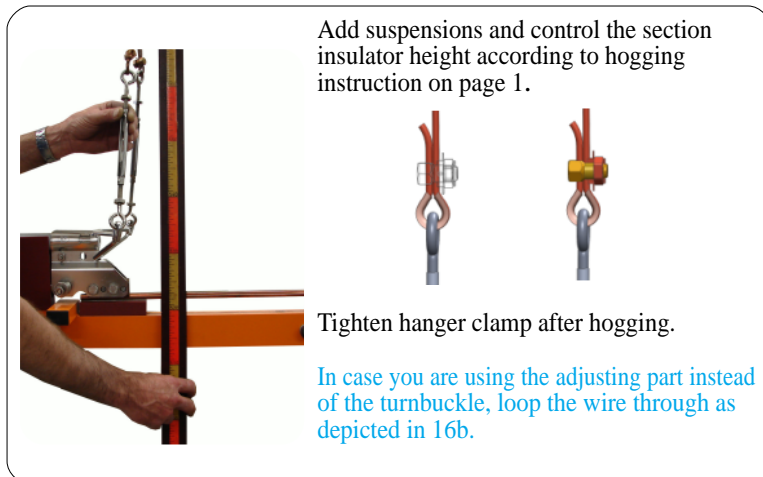
10a. Adjust the prestress



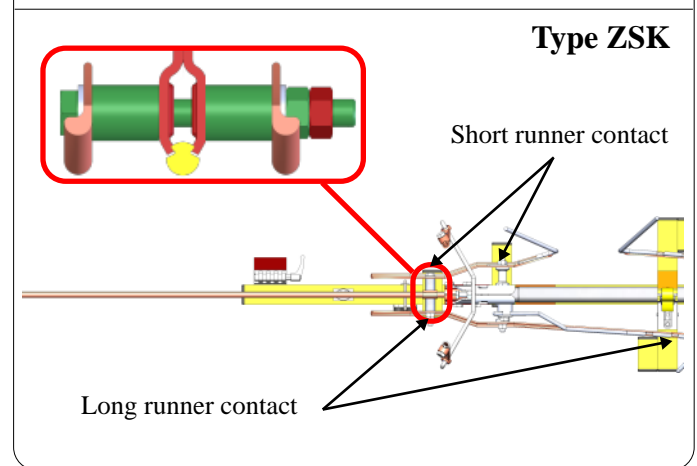
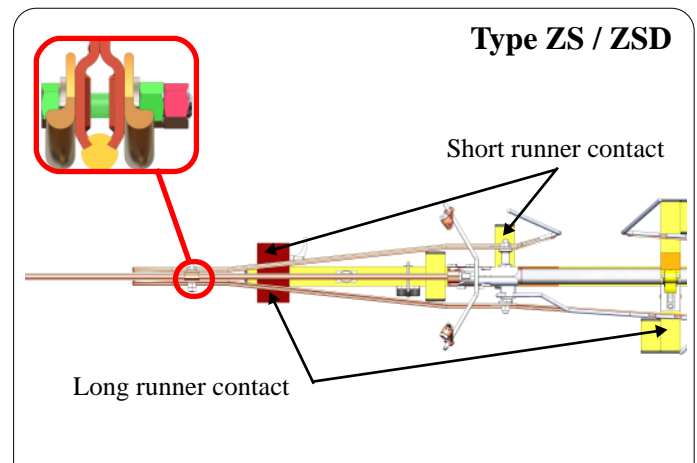
10b. Control the prestress



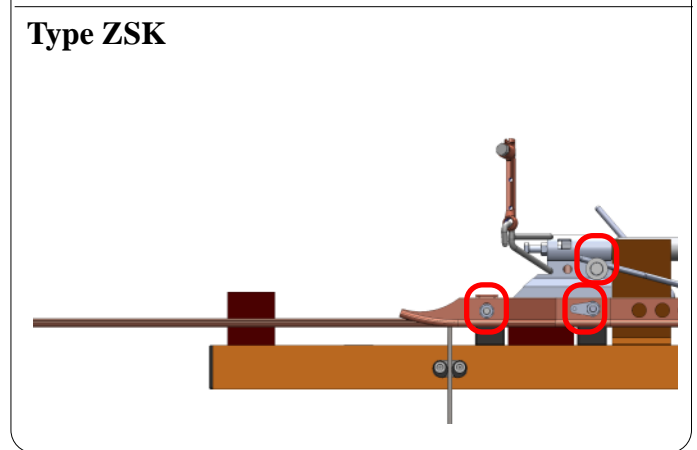
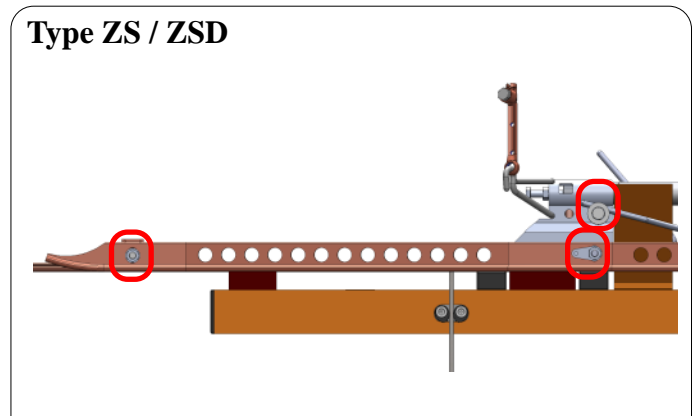
11. Mount and adjust the suspension



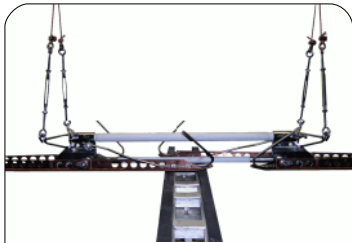
12. Mount the runners



13. Tighten the runner fixation and the nuts with 50 N m and counter with the second nut



14. Check gliding



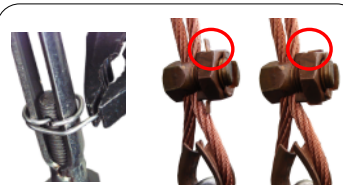
Check with spirit level or pantograph for optimal gliding.

15. Block turnbuckles

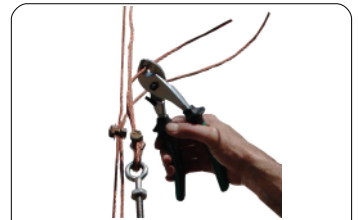


Check all counternuts once more. Block turnbuckles with counternuts.

16a. Secure turnbuckles and hanger clamps



Lock turnbuckles with a locking wire. Fix the locking device.



After complete hogging and fine adjustment cut the unnecessary dropper wire.

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

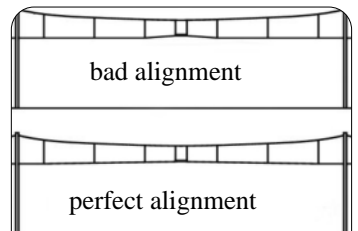
- The contact wire and messenger wire must lay vertically on each other at the installation location. Otherwise the hangers are not under continuous tension and optimal functioning is impossible. In extreme cases it may even occur that the current collector hooks into the runners at the spark gap which leads to damage.
- The screws at the contact wire clamps must be retightened three times. Otherwise the teeth do not grip the contact wire material completely. The contact wire could therefore slide out later and falling parts could cause damage of material or even injure people.
- The screws must be restrained with a ring wrench when tightening the counternuts at the contact wire clamps. The screws could otherwise get loosened when tightening the counternuts and this could cause the contact wire to slide out, damage material and injure people.
- The runners of the section insulator must be correctly adjusted as described. Otherwise shocks might damage the section insulator or the carbon sliders.
- Turnbuckles must be locked with counternuts and secured with locking wires. These could otherwise open and the resulting incorrect position of the section insulator could cause malfunction of the overhead line.
- All screws and nuts must be tightened correctly according to the description. They could otherwise become loosened by vibration and cause malfunction of the overhead line.
- Should the protective plastic finish of Silicone or PTFE of one of our insulators be so severely damaged, either that the glass fiber inside is visible or that humidity and dirt can obviously penetrate, the insulator must be replaced immediately. Otherwise a high-voltage flash-over could damage the insulator and the overhead line.
- **Arthur Flury AG rejects responsibility for any damage caused by not observing this installation instruction.**

16b. Secure Adjusting part



In case you are using the adjusting part instead of the turnbuckle, tighten the bolt with 25 N m before cutting

17. Check alignment



Adjust the next 3 hangers in both directions.

Maintenance and Service

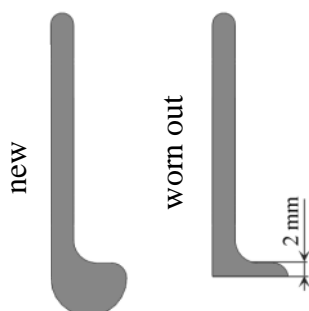
A well adjusted section insulator of Arthur Flury AG does not require any maintenance for a long period of time.

Insulator

The 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 once a year with slightly soaped water. The insulator must be replaced if the GRP rod becomes visible through damage of the cover.

Runners

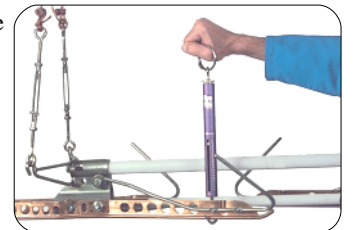
Well adjusted runners need to be checked first after approximately 200'000 to 300'000 passages of current collectors. Should the wear have reached the maximum value (bulb only 1-2 mm thick) the runners must be replaced.



Recommendations and trouble shooting of AF insulators

a) Notice:

A well adjusted section insulator can be raised by a spring balance at any extreme point of the runners (tips of runners at the arcing horns) applying 120 N without releasing the hanger load. If hangers get loose, the insulator must be hung higher step by step (each 10 mm) until it remains straight.



b) Performance:

The section insulator must provide a constant performance for passing current collectors and remain stable. Observe the suspension while passing current collectors. If it swings strongly or gets loose, the pantograph presses the section insulator too much and tries to lift it. In this case the section insulator must be positioned higher so that the suspension remains stable when being passed.

c) Excessive wear of runners:

It is a sign of inaccurate adjustment if the runners show excessive wear at the intake point. They must be readjusted according to the detailed installation instructions. Well adjusted runners show a constant wear from the beginning till the end of the section insulator.

