



### VISUAL INSPECTION ON SHORT-CIRCUITING DEVICES FOR UNDERGROUND RAILWAY SYSTEMS

Short-circuiting devices for underground railway systems are to be examined immediately before use, (see DIN EN 61230:2009-07, C.3.2.1), as all devices for earthing and short circuiting. The examination is to contribute to identification of unsafe or inoperable devices, and to exclude them from further use.

The examination is carried out as visual inspection, and to some extent also as function check. In the case that damages or impairments will be found, at first the short circuiting device is to be withdrawn from further use.

The following examinations are applicable for short circuiting devices of construction B (current tapping from the underside of the rail).

### CHECKLIST FOR EVALUATION:

#### General:

Test characteristics	Type of examination	Hints
Is the short-circuiting device classified for the respective earthing point?	Visual inspection	Important in particular when different short-circuiting devices are available at the location!
Is the instruction for use attached or is it available on site?	Visual inspection	With lack of knowledge about correct use, function and safety are jeopardised!
Are type label and other markings clearly legible?	Visual inspection	Required for clear identification of the short-circuiting device!
Is the short-circuiting device complete - as far as recognisable?	Visual inspection	Missing parts may jeopardise the faultless function!
Are all detachable connections (bolted connections) tight – as far as recognisable?	Visual inspection	Loose connections may jeopardise faultless function!

#### Insulating tubes:

Test characteristics	Type of examination	Hints
Is the varnish of the insulating tubes still in good order?	Visual inspection	In case of defective varnish water may enter and reduce the insulating properties. Furthermore, free glassfibres may cause hand injuries!
Are the insulating tubes free of fissures, cracks, or other distortions?	Visual inspection	Fissures, cracks, etc., reduce mechanic stability and may cause accidents when the short-circuiting device is handled!



Picture:  
Construction B

### Running rail contact:

Test characteristics	Type of examination	Hints
Are the contact shells complete? (Width of foot shell approx. 15cm: 2 contact shells, width of foot shell approx. 25cm: 4 contact shells)	Visual inspection	Missing contact shells may jeopardise faultless function!
Is the surface of the contact shells metallic bright, and free of roughness, burnings, fissures or cracks?	Visual inspection	This area needs to be free of damage, otherwise a safe electric contact towards the head of the running rail is not given!
Only applicable with foot shell width approx. 25cm: Are both magnets movable within the foot shell, and is the spring force perceptible?	Function check	Missing or unmovable magnets may jeopardise a safe mechanic contact towards the head of the running rail!



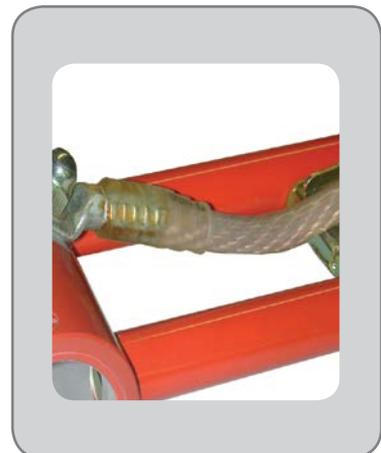
### Current rail contact:

Test characteristics	Type of examination	Hints
Is the surface of the contact piece metallic bright, and free of roughness, burnings, fissures, or cracks?	Visual inspection	This area needs to be free of damage, otherwise a safe electric contact towards the head of the current rail is not given!
Models with 3 contacts: Is the centre contact piece movable, and is the spring force perceptible?	Function check	An unmovable contact piece may jeopardise a safe electric contact towards the head of the current rail!
Is the limit stop for the rail head free of fissures or cracks?	Visual inspection	A damaged limit stop may jeopardise the faultless function!



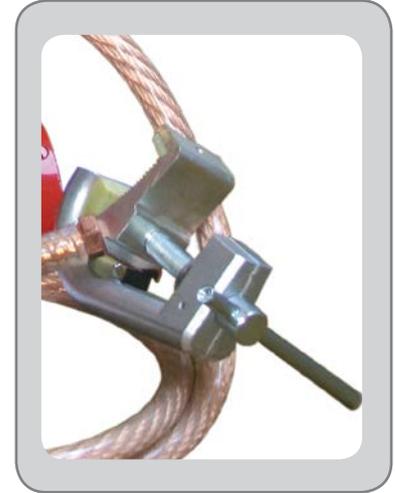
### Earthing cables:

Test characteristics	Type of examination	Hints
Is the insulation of the cables sufficiently transparent to be able to inspect the copper strands?	Visual inspection	Colour change or haze of the insulation prevent evaluation of copper strands in the cables!
Is the insulation of the cables free of damages (abrasion, fissures, holes, bare copper strands)?	Visual inspection	Damaged insulation will not sufficiently protect the copper strands against outside influences!
Is the insulation of the cables free of damages from heat (heat penetration, discolouring, burning)?	Visual inspection	Damage from heat may be an indication of high current load caused by a short circuit!
Are the copper strands of the cable free from discolouring?	Visual inspection	Discolouring may be an indication of corrosion!
Are the copper strands free of breakages?	Visual inspection	Broken copper strands jeopardise safe current transfer!



### Rail head clamp (not on all models):

Test characteristics	Type of examination	Hints
Is the clamp complete – as far as recognisable?	Visual inspection	Missing parts may jeopardise the faultless function!
Is the spindle easy-moving and movable in full range?	Function check	With a rough-running spindle the necessary contact forces may not be reached which jeopardises safety!
Are the contact areas metallic bright and free of roughness, heat penetration, or burnings?	Visual inspection	The contact areas need to be free of damage, otherwise a safe electric and mechanic contact is not given!
Are all other clamp parts free of fissures or deformations which may influence stability?	Visual inspection	Fissures, breakages, etc., reduce mechanic stability and may lead to accidents!



### Folding mechanism:

Test characteristics	Type of examination	Hints
Is it easy to open or fold the contact arm?	Function check	A rough-running contact arm may jeopardise a faultless function!
Is it easy to safely secure the contact arm in transport position?	Function check	An unsecured contact arm may lead to accidents during transport of the short circuiting device!
Is the effect of the tension spring clearly perceptible even before the contact arm is in rectangular position towards the frame?	Function check	With an ineffective tension spring a safe electric and mechanic contact is not given!
Is it possible to press the contact arm downwards over the rectangular position, against the spring force?	Function check	With a blocked contact arm it is not possible to fit the short-circuiting device between the rails!





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