



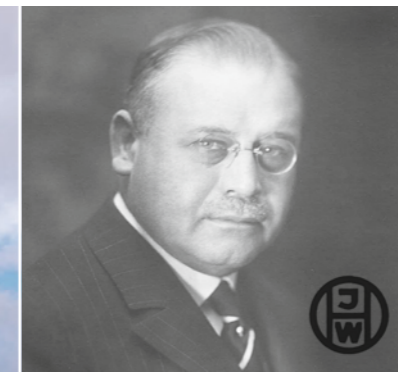
RIBE® Electrical Fittings – Local transport catenary components

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# LOCAL TRANSPORT CATENARY COMPONENTS

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**RIBE**<sup>®</sup>  
ELECTRICAL FITTINGS



RIBE® Electrical Fittings – Local transport catenary components

## A FAMILY BUSINESS WHERE TRADITION MEETS ENTREPRENEURSHIP AND INNOVATION

Johannes Wilhelm Hofmann founded his “Fabrik elektrischer Apparate” in Kötschenbroda (now Radebeul) near Dresden on 2 December 1902, which means it is the oldest manufacturer of electrical fittings in the world. The company was involved from the start in manufacturing products for connecting all kinds of electrical wires, with the aim of positioning itself as a full-range supplier with a comprehensive depth of manufacturing and technology at a very early stage.

RIBE® as legal successor took over all the patents and the technical know-how and developed the business unit to its present level of international importance as Richard Bergner Elektroarmaturen GmbH & Co. KG.

Since 1949, electrical fittings have been supplied for local transport systems (tram, trolleybus), industrial and mining railways and standard-gauge railways (Deutsche Reichsbahn).

Since then, RIBE® has produced a full range of electrical fittings for a wide variety of catenary systems.

These have been supplied for many large projects, such as the electrification of 3,800 km for the Deutsche Reichsbahn network taken into service up to the end of 1991. Major changes have taken place in the field of local transport catenary systems over the past years due to the use of corrosion-resistant materials and changes in design principles.

In order to meet these new requirements and offer our customers modern electrical fittings specifically designed for local transport systems, we have cooperated with AEG to develop a range of electrical fittings that can provide all the necessary subassemblies for a local transport line from a small number of corrosion-resistant components.

This has been achieved by a modular design of the range of electrical fittings and subassemblies based on the following principles:

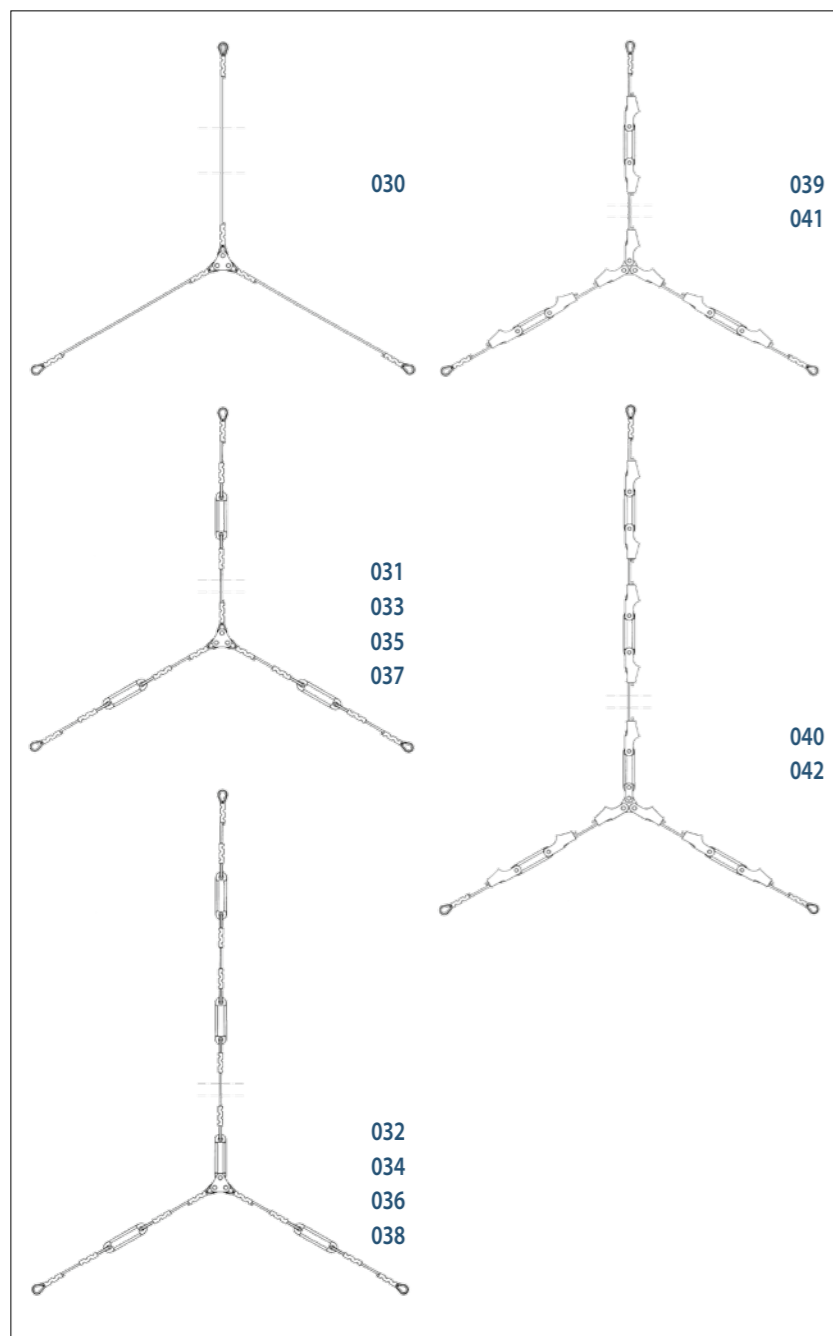
- Installation of tensioned contact wires with bridle-type suspension
- Use of GRP steady arms and curve pull-offs

◀ The RIBE® Group is one of today's leading international suppliers of electrical fittings, mechanical fasteners, systems engineering and technical springs. The RIBE® Group has around 1,300 employees at sites in Germany, the United States, Eastern Europe and Asia.

- Creation of cross-span equipment with Minoroc ropes (all-insulated) or metal ropes with double or triple insulation
- Use of GRP rods or tubes with a diameter of 55 or 70 mm for cantilevers
- Use of only one type of clamp for both diameters of the GRP rod or tube
- Fixing to the pole with pole cable loops, with swivel brackets and hinges for cantilevers and stainless steel punch-lock band or wall fixing.

## DESIGN OF SUBASSEMBLIES CROSS-SPAN EQUIPMENT

All cross-span equipment can be designed as plain, stitch suspension, double stitch suspension or as a horizontal catenary contact line of Minoroc rope with-out insulators or with double- or triple-insulated metal ropes. The initial insulation is the bridle-and-pulley suspension or an insulated line hanger.

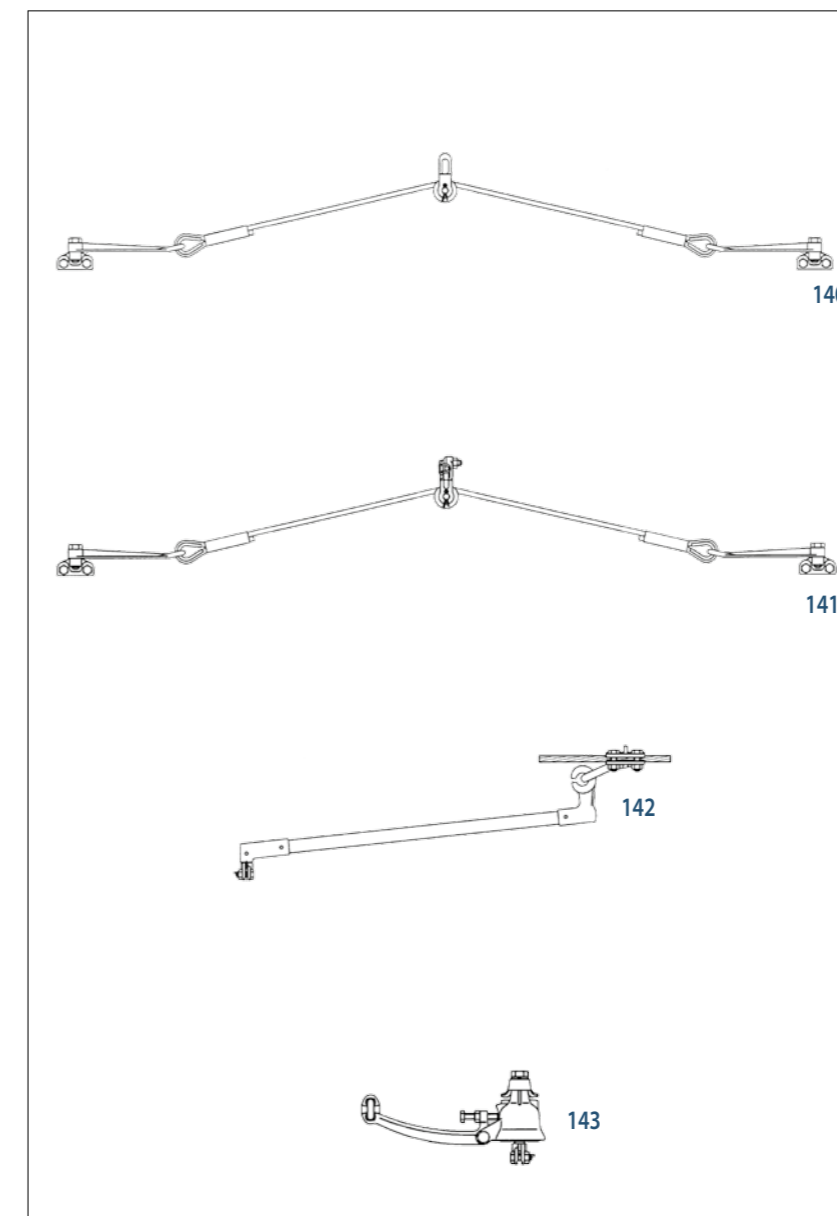


- Figure 1  
Cross-span equipment, stitch suspension, with various components and insulation
- 030 **T/NTC<sup>1</sup>**  
all-insulated, Minoroc rope
  - 031 **Cu-T/NTC<sup>1</sup>**  
double-insulated, rope 50
  - 032 **Cu-T/NTC<sup>1</sup>**  
triple-insulated, rope 50
  - 033 **Cu-T/NTC<sup>1</sup>**  
double-insulated, rope 35
  - 034 **Cu-T/NTC<sup>1</sup>**  
triple-insulated, rope 35
  - 035 **A2-T/NTC<sup>1</sup>**  
double-insulated, rope 50
  - 036 **A2-T/NTC<sup>1</sup>**  
triple-insulated, rope 50
  - 037 **A2-T/NTC<sup>1</sup>**  
double-insulated, rope 35
  - 038 **A2-T/NTC<sup>1</sup>**  
triple-insulated, rope 35
  - 039 **Wedge-type dead end clamp**  
double-insulated, rope 50
  - 040 **Wedge-type dead end clamp**  
triple-insulated, rope 50
  - 041 **Wedge-type dead end clamp**  
double-insulated, rope 35
  - 042 **Wedge-type dead end clamp**  
triple-insulated, rope 35

<sup>1</sup>T/NTC = Thimble and Notch Type Connector

## SUPPORT POINTS FOR TROLLEY-TYPE CONTACT LINES

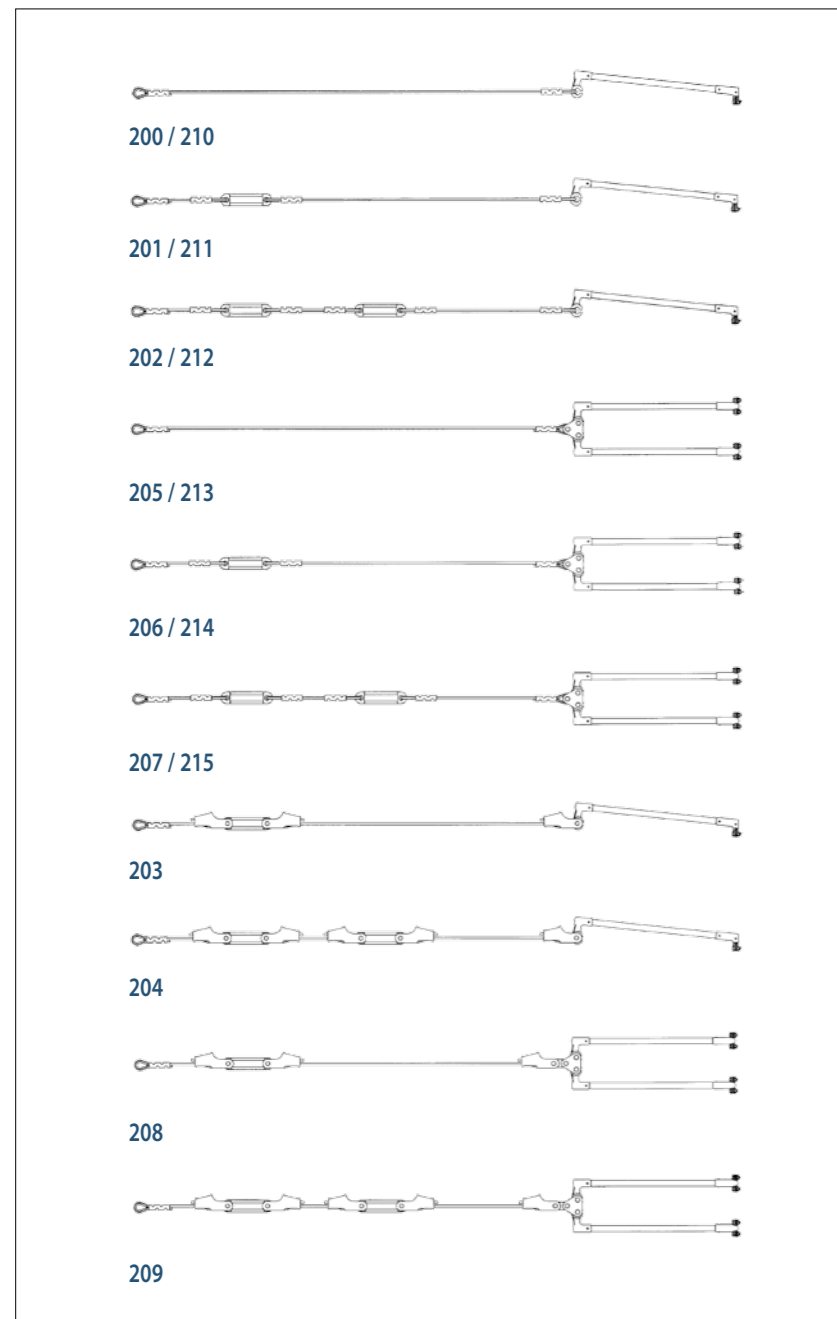
The bridle-and-pulley suspension with Minoroc rope and lengths of 2.0-5.0 m is the most important support point variant used for the tensioned trolley-type contact line at both the cantilever and the cross-span equipment. Depending on the requirement, this suspension variant can be combined with a GRP steady arm.



- Figure 2  
Bridle-and-pulley suspensions for cantilever and cross-span equipment GRP steady arm on the cross-spanwire
- 140 **Bridle-and-pulley suspension for cantilever support**
  - 141 **Bridle-and-pulley suspension for cross-span equipment**
  - 142 **Steady arm for bridle-and-pulley suspension in cross-span equipment**
  - 143 **Insulated line hanger for curves**  
 $F_{SMFL} = 2.5 \text{ kN}$

## CURVE PULL-OFFS

Curve pull-offs are provided with GRP steady arms with lengths of 600 - 1,200 mm. The GRP rods have a diameter of 26 mm. A wide range of variants to meet all requirements can also be made here using only a few components. Double curve pull-offs are used for forces larger than 2.5 kN. These are also made with GRP steady arms, whose hooks are angled at 90° to the clamp holders. The curve pull-offs can be used for 2 contact wires similar to these solutions.



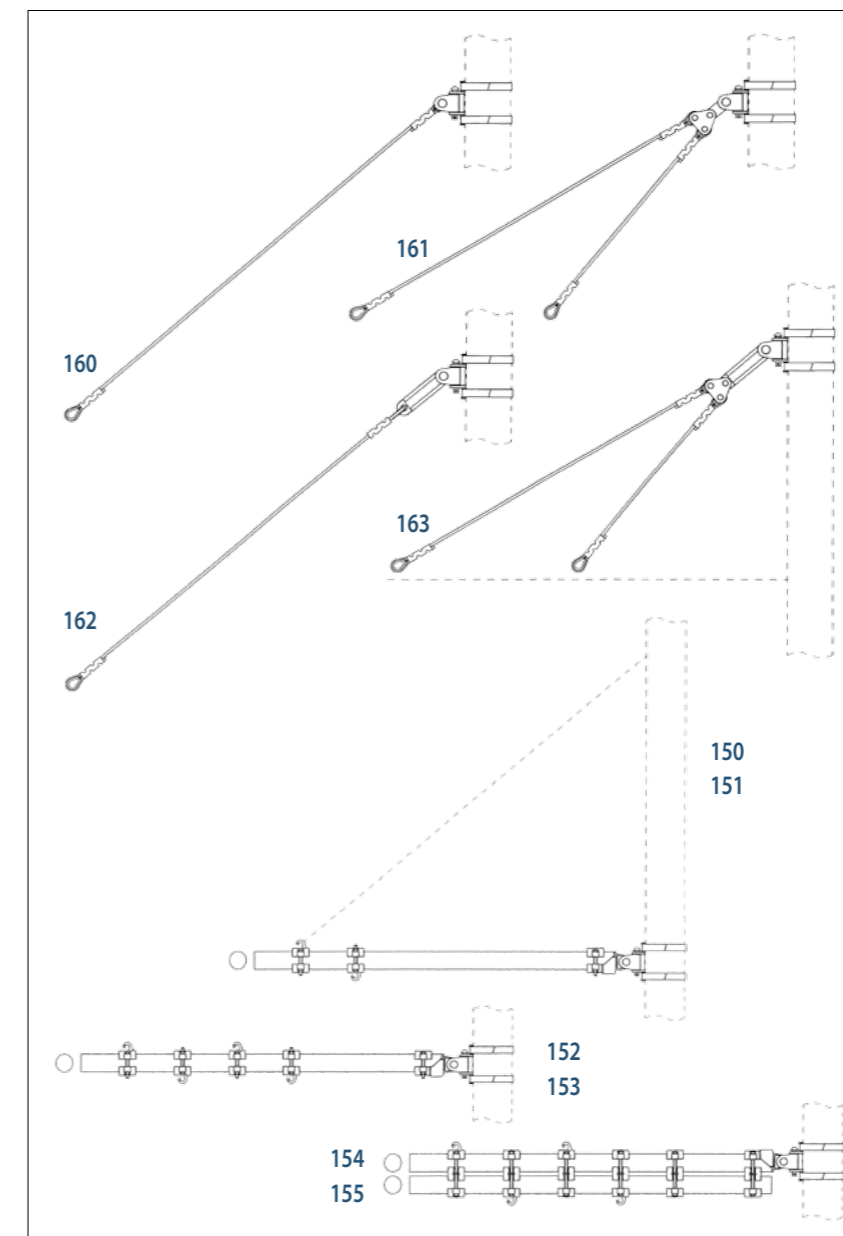
- Figure 3  
Single and double curve pull-offs for 1 contact wire
- 200 **Cu-T/NTC<sup>2</sup>**  
single, all-insulated, Minoroc rope
  - 201 **Bz 35 II, Cu-T/NTC<sup>2</sup>**  
single, double-insulated
  - 202 **Bz 35 II, Cu-T/NTC<sup>2</sup>**  
single, triple-insulated
  - 203 **Bz 35 II, wedge-type dead end clamp**  
single, double-insulated
  - 204 **Bz 35 II, wedge-type dead end clamp**  
single, triple-insulated
  - 205 **Cu-T/NTC<sup>2</sup>**  
double, all-insulated, Minoroc rope
  - 206 **Bz 35 II, Cu-T/NTC<sup>2</sup>**  
double, double-insulated
  - 207 **Bz 35 II, Cu-T/NTC<sup>2</sup>**  
double, triple-insulated
  - 208 **Bz 35 II, wedge-type dead end clamp**  
double, double-insulated
  - 209 **Bz 35 II, wedge-type dead end clamp**  
double, triple-insulated
  - 210 **A2-T/NTC<sup>2</sup>**  
single, all-insulated, Minoroc rope
  - 211 **Bz 35 II, A2-T/NTC<sup>2</sup>**  
single, double-insulated
  - 212 **Bz 35 II, A2-T/NTC<sup>2</sup>**  
single, triple-insulated
  - 213 **A2-T/NTC<sup>2</sup>**  
double, all-insulated, Minoroc rope
  - 214 **Bz 35 II, A2-T/NTC<sup>2</sup>**  
double, double-insulated
  - 215 **Bz 35 II, A2-T/NTC<sup>2</sup>**  
double, triple-insulated

<sup>2</sup>T/NTC = Thimble and Notch Type Connector

## GRP CANTILEVER SUPPORT FOR PUNCH-LOCK BAND FIXING

All the cantilever variants shown, which consist of one or two GRP rods with a diameter of 55 or 70 mm, can be made from as few as 20 different parts. This small number of parts is achieved by the use of clamps that can be used almost unchanged for both GRP rod diameters and for the different numbers of rods. All parts are also used on cantilevers for overhead contact lines.

The cantilevers can be completed with various attachments like pull-off fittings with steady arm and/or bridle-and-pulley suspensions.



- Figure 4  
GRP cantilever supports and associated tensions
- 150 **GRP cantilever support**  
single-tracked, tube 55
  - 151 **GRP cantilever support**  
single-tracked, tube 70
  - 152 **GRP cantilever support**  
double-tracked, tube 55
  - 153 **GRP cantilever support**  
double-tracked, tube 70
  - 154 **GRP cantilever support**  
double-tracked, 2 tubes 55
  - 155 **GRP cantilever support**  
double-tracked, 2 tubes 70
  - 160 **Tension for cantilever support**  
single tension, Minoroc rope
  - 161 **Tension for cantilever support**  
double tension, Minoroc rope
  - 162 **Tension for cantilever support**  
single tension, rope Bz 35 II
  - 163 **Tension for cantilever support**  
double tension, rope Bz 35 II

# GRP CANTILEVERS FOR OVERHEAD CONTACT LINES

With the exception of the catenary wire support clamp, which is available in variants for one or two GRP rods/ tubes with a diameter of 55 mm or 70 mm and one or two messenger wires with cross-sections of 50 mm<sup>2</sup> and 70 mm<sup>2</sup> and 95 - 150 mm<sup>2</sup>, the GRP cantilevers for overhead contact lines are produced from the same components as the GRP cantilever supports. They can also be equipped with diagonal tubes if necessary.

The modular design enables more than 70 different variants of cantilevers to be produced with the necessary 24 components. As the connecting dimensions of all parts comply with DIN standards, the variants can also be combined with existing parts. They can naturally be assembled as all-insulated with Minoroc rope and with metal ropes and insulators.

A special advantage is that the catenary wire support clamp can be slid along the GRP rod/ tube.

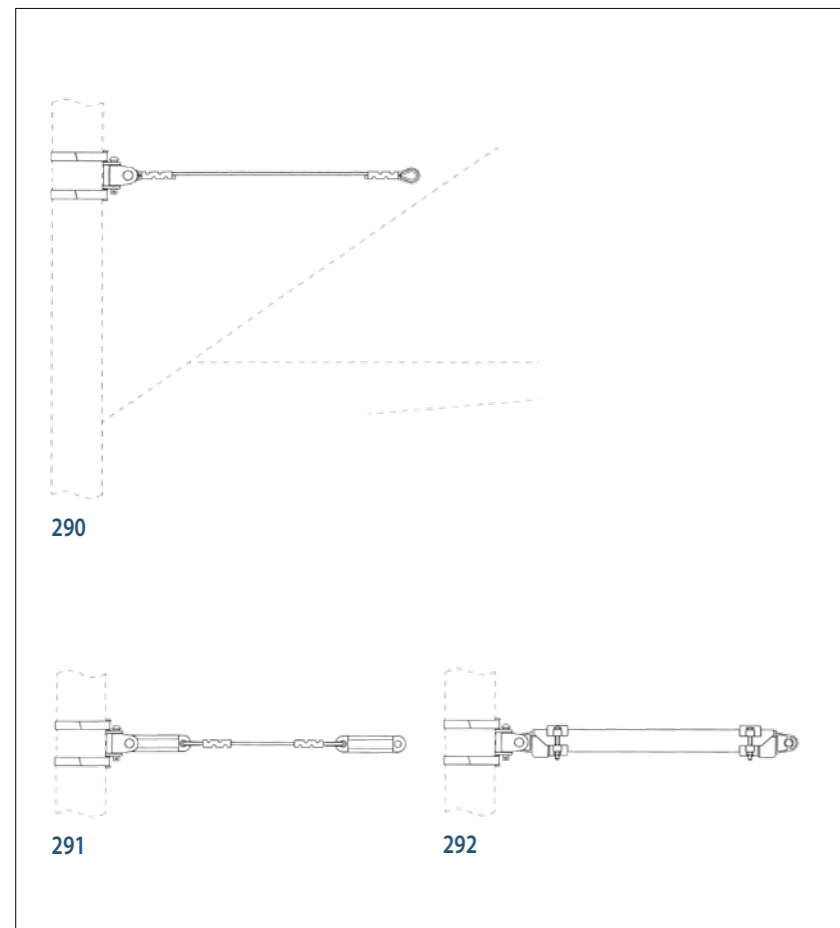


Figure 5  
Peak bracings for GRP cantilevers for overhead contact lines

- 290 **Peak bracing**  
All-insulated with Minoroc rope
- 291 **Peak bracing**  
Double-insulated, rope Bz 35 II
- 292 **Peak bracing**  
All-insulated with GRP rod

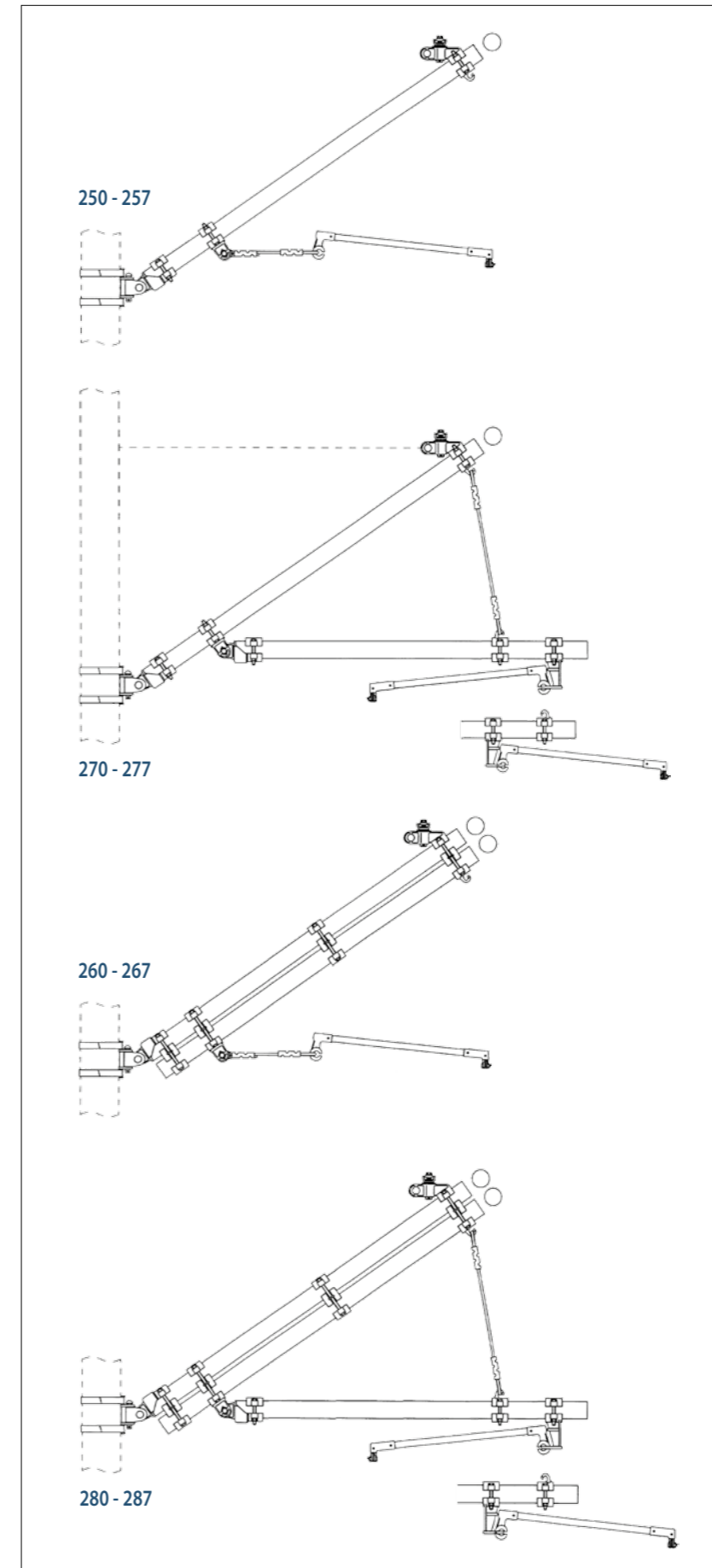


Figure 6  
GRP cantilevers for overhead contact lines with and without registration tube

- 250 - 257 **Without registration tube**  
for 1 tube Ø 55 or Ø 70 messenger wire 50 mm<sup>2</sup> to 150 mm<sup>2</sup>
- 260 - 267 **Without registration tube**  
for 2 tubes Ø 55 or Ø 70 messenger wire 50 mm<sup>2</sup> to 150 mm<sup>2</sup>
- 270 - 277 **With registration tube**  
for 1 tube Ø 55 or Ø 70 messenger wire 50 mm<sup>2</sup> to 150 mm<sup>2</sup>
- 280 - 287 **With registration tube**  
for 2 tubes Ø 55 or Ø 70 messenger wire 50 mm<sup>2</sup> to 150 mm<sup>2</sup>

# OVERVIEW OF COMPONENTS

## › PULL-OFF ARM



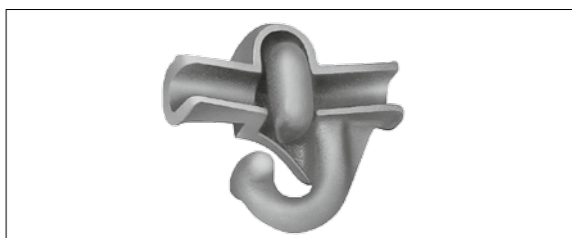
Order no.	511.912.1.201
Application	Pull-off arm for bridle-and-pulley suspension with M 16 contact wire clamp
Technical parameters	Material: copper alloy $F_{SMDL} = 3.5 \text{ kN}$

## › PULLEY



Order no.	511.941.1
Application	Pulley for bridle-and-pulley suspension and messenger wire up to $\varnothing 9 \text{ mm}$
Technical parameters	Material: copper alloy Pulley polyamide $F_{SMDL} = 3.0 \text{ kN}$

## › SUSPENSION CLAMP



Order no.	533.113.1
Application	Suspension for bridle-and-pulley suspension on cross-span equipment, fixing dropper on head-span wire
Technical parameters	Material: copper alloy Clip bolt A2 $F_{SMDL} = 1.5 \text{ kN}$ for rope up to $50 \text{ mm}^2$

## › RING CLAMP



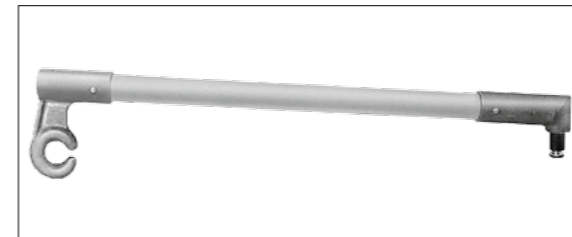
Order no.	534.119.1
Application	Fixing of curve pull-offs or GRP steady arms on cross-span wire
Technical parameters	Material: copper alloy $F_{SMPL} = 5 \text{ kN}$ for rope $35 \text{ mm}^2 \dots 70 \text{ mm}^2$

## › TRIANGLE DOUBLE CLIP 13 CU



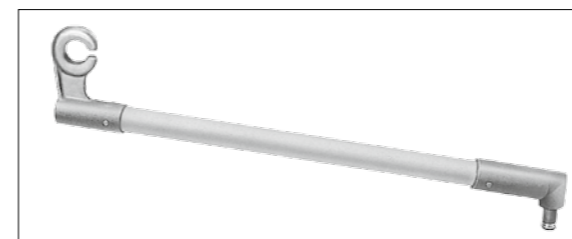
Order no.	537.421.2
Application	All-purpose bracing element
Technical parameters	Material: Cu Strap distance: 18.5 mm $F_{SMDL} = 10 \text{ kN}$

## › GRP STEADY ARM, REGULAR



Order no.	525.212.1
Application	GRP steady arm for cantilevers and curve pull-offs
Technical parameters	Material: connecting fittings copper alloy Length: 0.6 - 1.2 m $F_{SMDL} = 2.5 \text{ kN}$ , suitable for $U = 1.5 \text{ kV DC}$ for a length $\geq 0.6 \text{ m}$

## › GRP STEADY ARM, ANGLED 180°



Order no.	525.211.1
Application	GRP steady arm for fixing to cross-span equipment and cantilever
Technical parameters	Material: connecting fittings copper alloy Length: 0.6 - 1.2 m $F_{SMDL} = 2.5 \text{ kN}$ , suitable for $U = 1.5 \text{ kV DC}$ for a length $\geq 0.6 \text{ m}$

## › GRP STEADY ARM, ANGLED 90° RIGHT OR LEFT



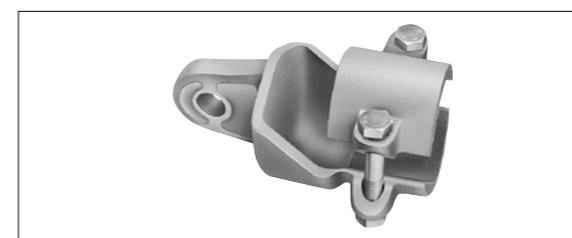
Order no.	525.213.1 (angled right) 525.214.1 (angled left)
Application	GRP steady arm for double curve pull-off
Technical parameters	Material: connecting fittings copper alloy Length: 0.6 - 1.2 m $F_{SMDL} = 2.5 \text{ kN}$ , suitable for $U = 1.5 \text{ kV DC}$ for a length $\geq 0.6 \text{ m}$

## › SWIVEL BRACKET AND HINGE FOR CANTILEVER



Order no.	529.218.1
Application	Swivel bracket and hinge for cantilever for tautband fixing to round or hexagonal/octagonal pole
Technical parameters	Material: copper alloy $F_{SMDL} = 16 \text{ kN}$ Max. width of punch-lock band: 25 mm

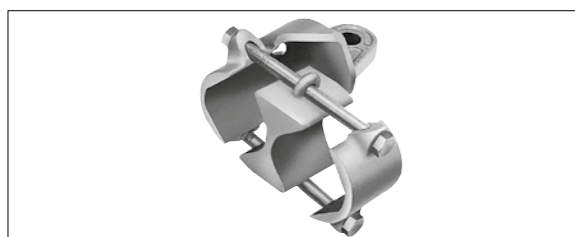
## › TUBE END FITTING WITH EYE



Order no.	521.151.1
Application	Connecting piece for GRP rod/ tube with $\varnothing 55$ or $70 \text{ mm}$
Technical parameters	Material: copper alloy $F_{SMDL} = 5 \text{ kN}$ referred to the start of slipping of a GRP rod with $\varnothing = 55 \text{ mm}$

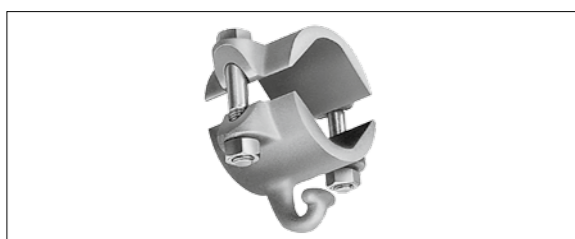
# OVERVIEW OF COMPONENTS

## › TUBE END FITTING WITH EYE FOR TWO TUBES



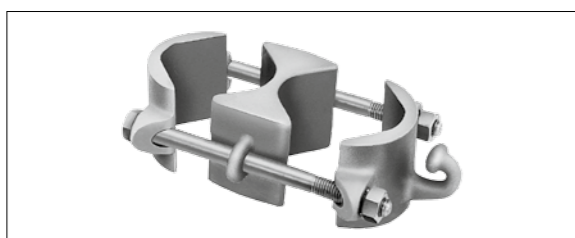
Order no.	521.152.1
Application	Connecting piece for 2 GRP rods/ tubes with $\varnothing$ 55 or 70 mm
Technical parameters	Material: copper alloy $F_{SMDL} = 5$ kN referred to the start of slipping of a GRP rod with $\varnothing = 55$ mm

## › HOOK CLIP



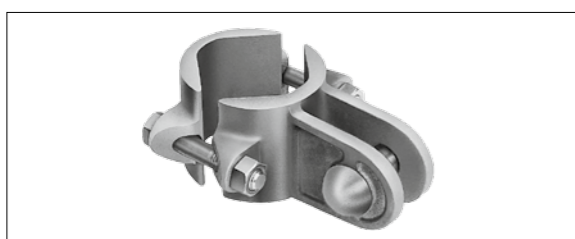
Order no.	523.350.1
Application	Connecting piece for bridle-and-pulley suspension or fixing rope to GRP rod/ tube with $\varnothing$ 55 or 70 mm
Technical parameters	Material: copper alloy $F_{SMDL} = 2.5$ kN Suitable for thimbles up to a rating of 50

## › TWIN-TUBE HOOK CLIP



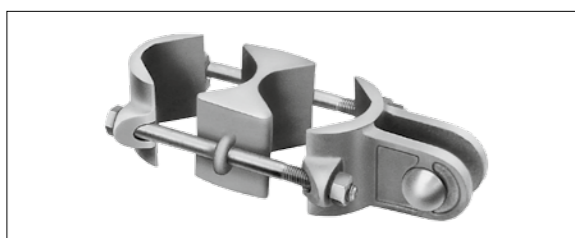
Order no.	523.351.1
Application	Clamp for bridle-and-pulley suspension or fixing rope for 2 GRP rods/ tubes with $\varnothing$ 55 or 70 mm
Technical parameters	Material: copper alloy $F_{SMDL} = 2.5$ kN Suitable for thimbles up to a rating of 50

## › CLAMP STRAP WITH CLEVIS



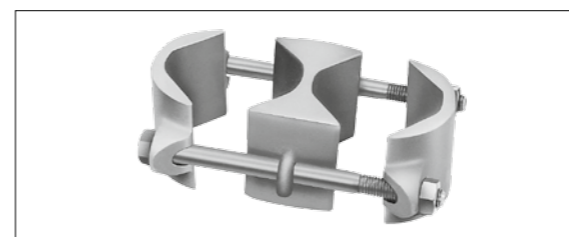
Order no.	523.151.1
Application	Clamp for fastening registration tube and diagonal tube and for fixing all other ropes
Technical parameters	Material: copper alloy $F_{SMDL} = 2.5$ kN

## › TWIN-TUBE CLEVIS CLIP



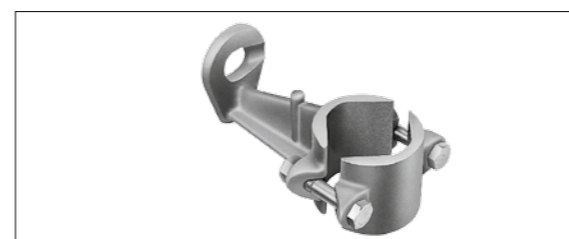
Order no.	523.152.1
Application	Clamp for fastening registration tube and diagonal tube and for fixing all other ropes, for 2 GRP rods/tubes with $\varnothing$ 55 or 70 mm
Technical parameters	Material: copper alloy $F_{SMDL} = 2.5$ kN

## › TWIN-TUBE CLIP



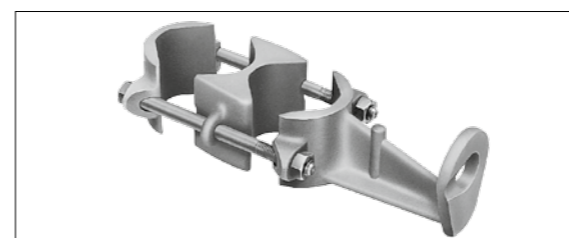
Order no.	523.851.1
Application	Clamp for connecting two GRP rods/ tubes with $\varnothing$ 55 or 70 mm
Technical parameters	Material: copper alloy

## › PULL-OFF FITTING



Order no.	523.451.1
Application	Suspension for steady arm on cantilever tube with $\varnothing$ 55 or 70 mm
Technical parameters	Material: copper alloy $F_{SMDL} = 5$ kN

## › TWIN-TUBE PULL-OFF FITTING



Order no.	523.452.1
Application	Suspension for steady arm on cantilever tube with $\varnothing$ 55 or 70 mm, for 2 GRP rods/ tubes
Technical parameters	Material: copper alloy $F_{SMDL} = 5$ kN

## › GRP ROD



Order no.	525 211 1.203
Application	GRP rod for steady arm and section insulator suspension
Technical parameters	Material: GRP, UV-resistant Color: RAL 7035, $\varnothing = 26$ mm Length: up to 6 m, $F_{SMDL} = 59$ kN

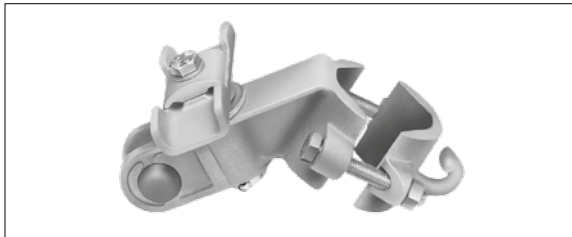
## › LOOP INSULATOR



Order no.	583.902.1
Application	All-purpose insulating element for tension
Technical parameters	Material: connecting fittings copper alloy Insulation GRP, UV-resistant $F_{SMDL} = 20$ kN Suitable for 1.5 kV DC and 1 kV AC

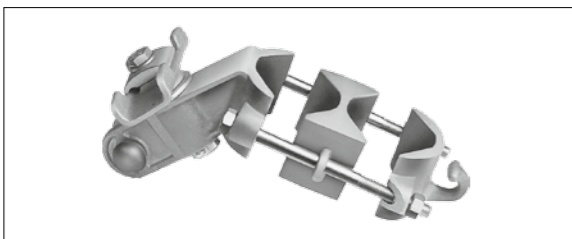
# OVERVIEW OF COMPONENTS

## ▶ CATENARY WIRE SUPPORT CLAMP 50/70



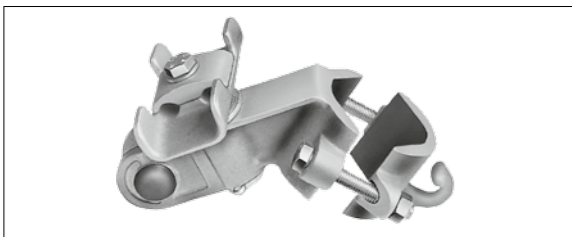
Order no.	521.153.1
Application	Catenary wire support clamp for cantilever with 1 GRP rod/ tube with Ø 55 or 70 mm
Technical parameters	Material: copper alloy for messenger wire 50 mm <sup>2</sup> and 70 mm <sup>2</sup> F <sub>SMDL</sub> = 6 kN

## ▶ CATENARY WIRE SUPPORT CLAMP 50/70 FOR TWO TUBES



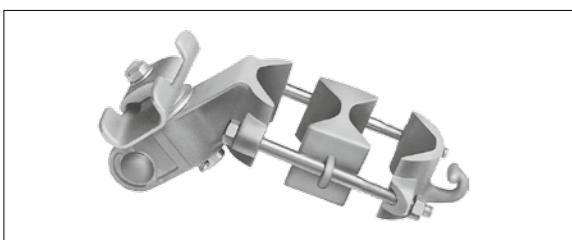
Order no.	521.154.1
Application	Catenary wire support clamp for cantilever with 2 GRP rods/tubes with Ø 55 or 70 mm
Technical parameters	Material: copper alloy for messenger wire 50 mm <sup>2</sup> and 70 mm <sup>2</sup> F <sub>SMDL</sub> = 6 kN

## ▶ CATENARY WIRE SUPPORT CLAMP 95-150



Order no.	523.155.1
Application	Catenary wire support clamp for cantilever with 1 rod/tube with Ø 55 or 70 mm
Technical parameters	Material: copper alloy for messenger wire 95 mm <sup>2</sup> to 150 mm <sup>2</sup> F <sub>SMDL</sub> = 6 kN

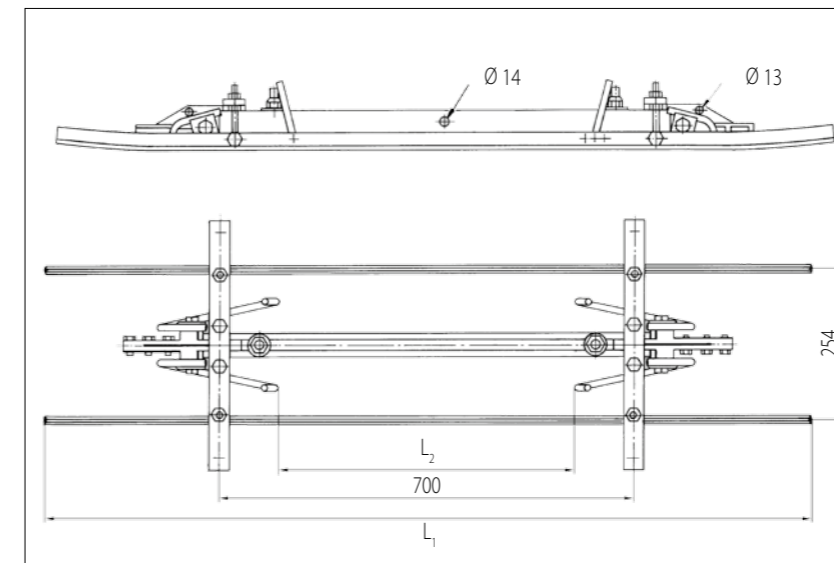
## ▶ CATENARY WIRE SUPPORT CLAMP 95-150 FOR TWO TUBES



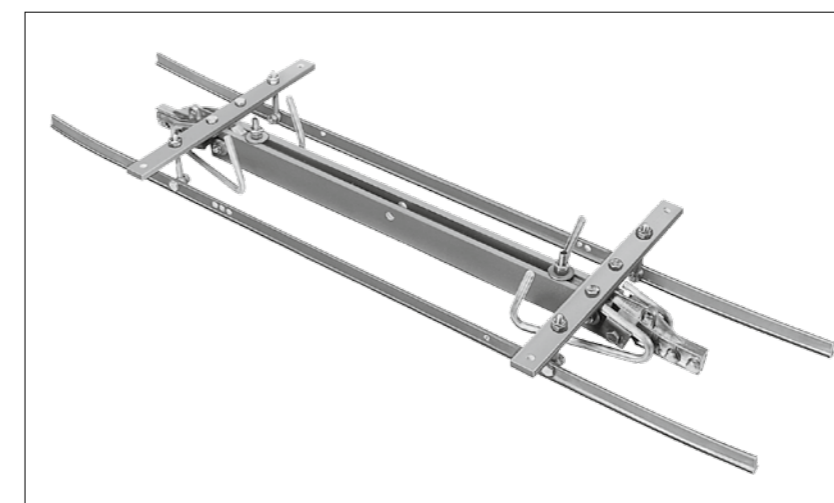
Order no.	523.156.1
Application	Catenary wire support clamp for cantilever with 2 rods/tubes with Ø 55 or 70 mm
Technical parameters	Material: copper alloy for messenger wire 95 mm <sup>2</sup> to 150 mm <sup>2</sup> F <sub>SMDL</sub> = 6 kN

# SECTION INSULATOR

A section insulator for the wide range of local transport applications has been developed from previous models and is available in two variants with different sizes and versions and a variety of suspension options to meet all requirements. The outstanding features of this insulator are its simple adjustment, easy installation and long life.



Type description	Type	Mass (kg)	L <sub>1</sub> (mm)	L <sub>2</sub> (mm)
with basic insulation and short Cu sliding skids	a	13.00	1300	500
with improved insulation and short Cu sliding skids	b	13.60	1300	500
with basic insulation and long Cu sliding skids	c	13.85	1500	500
with improved insulation and long Cu sliding skids	d	14.45	1500	500



The section insulators can also be supplied in different sizes on request.

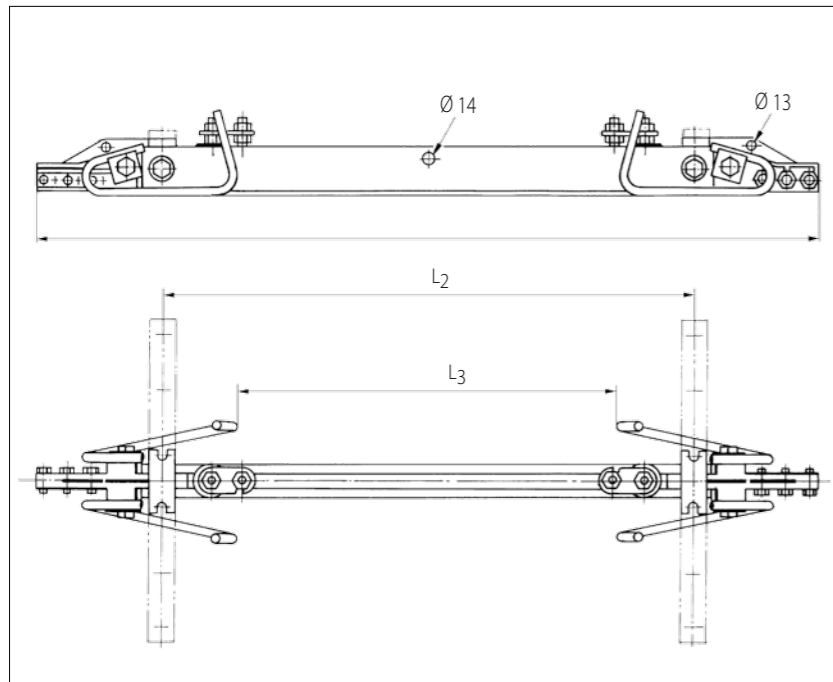
◀ Figure 7  
Section insulator with Cu sliding skids, with basic and improved insulation

◀ Figure 8  
Section insulator with Cu sliding skids Type d

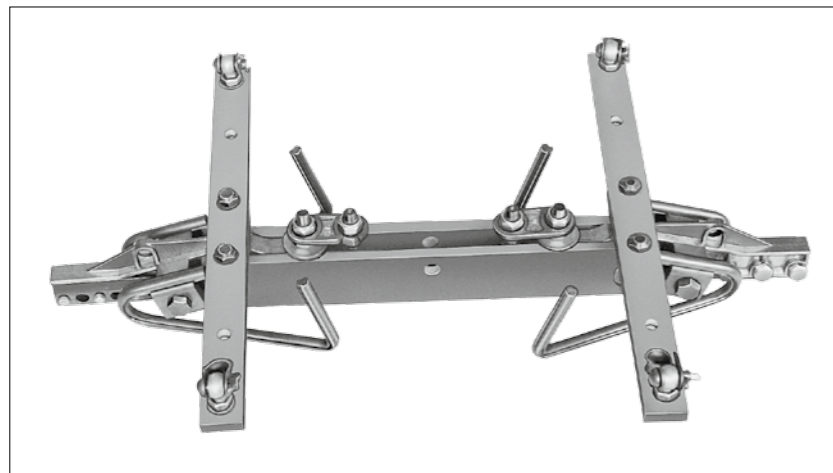
The section insulator is particularly easy to install, as it can be placed ready for use on the uncut contact wire and fixed. The contact wire of the insulation distance is then cut out between the fixing clamps. The tensile force is borne by the two plastic insulating straps. The copper skids can also be connected to a voltage on one side or used as a switching element.



# SECTION INSULATOR



Type description		Type	Mass (kg)	L <sub>1</sub> (mm)	L <sub>2</sub> (mm)	L <sub>3</sub> (mm)
Neutral section zone	with					
	Suspension on insulating straps	a	7.20	1030	700	500
	with one insulating traverse	b	7.55	1030	700	500
	with two insulating traverses	c	7.90	1030	700	500
	without					
	Suspension on dead end clamps	d	6.20	680	350	150
with one insulating traverse	e	6.55	680	350	150	
with two insulating traverses	f	6.90	680	350	150	



The section insulators can also be supplied in different sizes on request.

Figure 9  
Section insulator with insulating skid

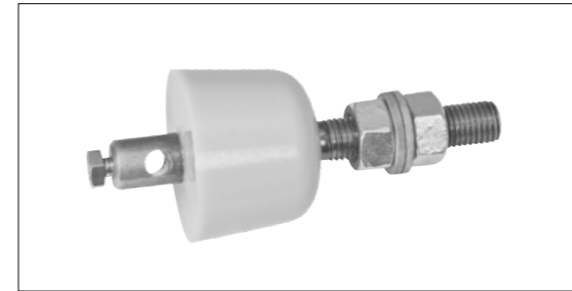
Figure 9  
Section insulator with insulating skid Type c

The arcing horns, the insulating skid of high-strength plastic material moved by the pantograph, the copper skids and the suspensions can be aligned and adjusted separately, which means the section insulator can be very easily adapted to different installation requirements.

All parts are fitted with selflocking nuts.

# STRAY CURRENT MINIMIZATION

## VOLTAGE LIMITER DS-BR (LIGHTNING-RESISTENT)



Order no.	B636005
Application	Lightning-resistant Voltage Limiter separates the connected plant components electrically, tamper proof
Technical parameters	Elektrodes based on CuNiSi, Insulating body weather-proofed cast resin, DC 100 V, Short-circuit load Integral 12 kA <sup>2</sup> s

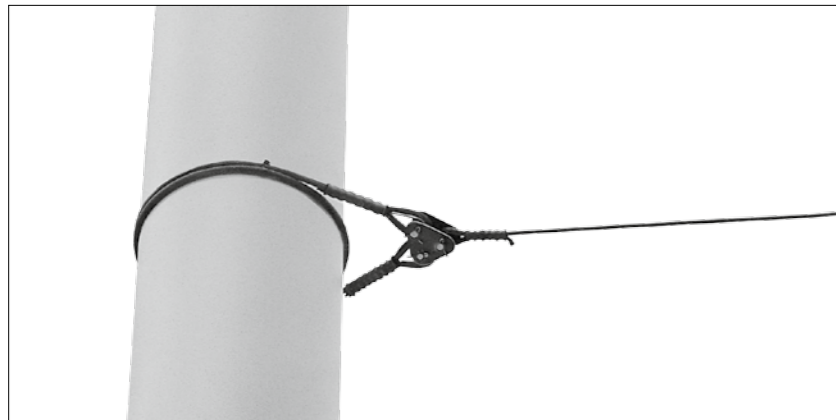
## EARTH SHORT-CIRCUITER ESC 100



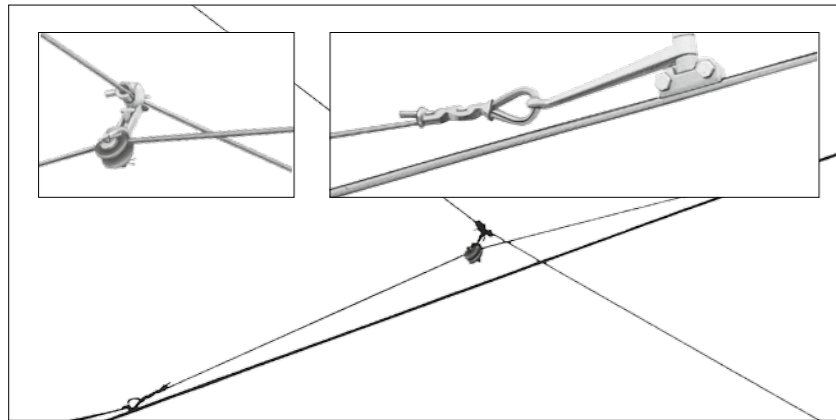
Order no.	ESC 100
Application	For direct current railways, the direct connection of the return conductor to water-earth must be avoided (damage of buildings and plants through corrosion). To protect people against impermissible contact voltages is the temporary short-circuiting of the various earthing systems. (DIN EN 50122-1/ VDE 0115 Teil 3)
Technical parameters	Short circuit current max. 25 kA, trigger voltage DC 25 – 500 V, tripping time max. 20 ms, closing time 10 s, operating range -20 to 50°C, protection class IP55, operation- and alarm signals via potential free contacts

# SELECTION OF COMPLETE COMPONENTS AND COMPONENT ASSEMBLIES

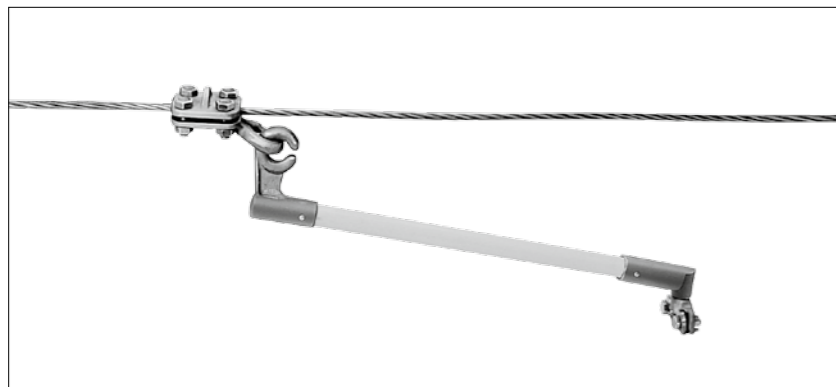
The figures below show various subassemblies and component combinations and the variety of solutions possible with the small number of components. Our component range opens up new and broad horizons for the construction of local transport catenary systems.



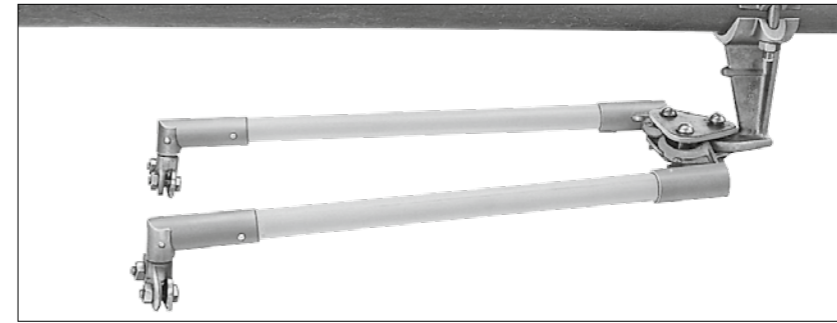
◀ Figure 11  
**Pole cable loop**  
Rope Bz 35 or Bz 50



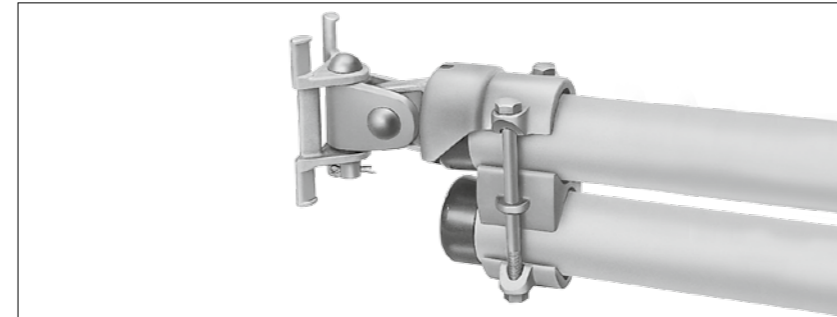
◀ Figure 12  
**Bridle-and-pulley suspension with Minoroc rope**  
Ø 9 mm



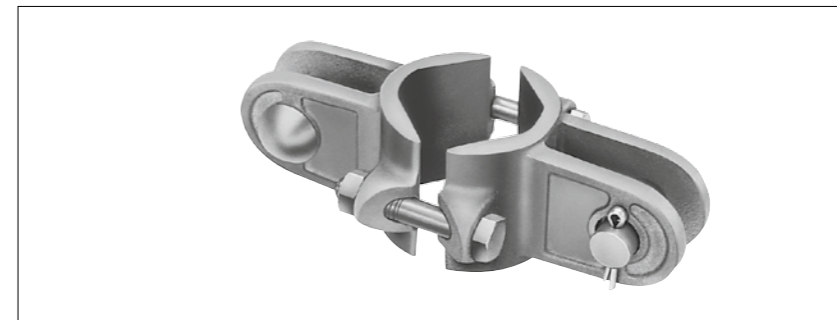
◀ Figure 13  
**GRP steady arm**  
angled 180°,  
with ring clamp



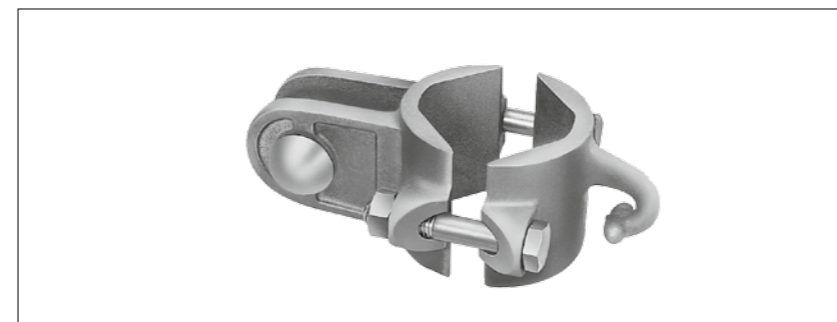
◀ Figure 14  
**Curve pull-off**  
double, on cantilever,  
for 1 contact wire



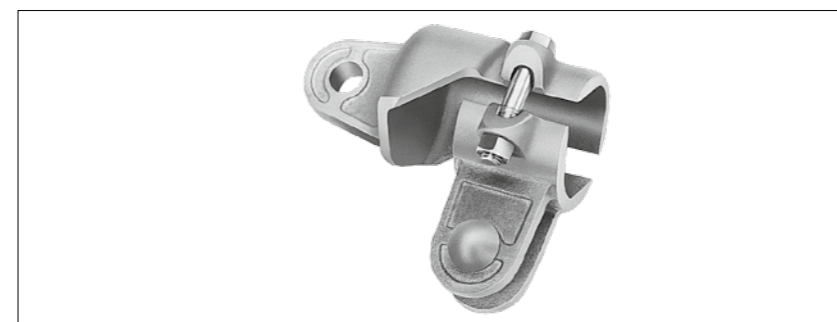
◀ Figure 15  
**Swivel bracket and hinge for cantilever**  
with tube end fitting



◀ Figure 16  
**Double clevis clip**



◀ Figure 17  
**Combination of clamp strap with clevis and hook clip**



◀ Figure 18  
**Combination of tube end fitting with eye and hook clip**

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COMPETENCE CONNECTS

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