



SIEMENS



Product catalog

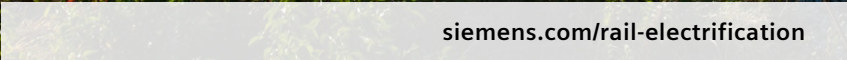


Contact line equipment

for mass transit and main-line railways



CL V2.0



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Product Catalog

Contact line equipment for mass transit and main-line railways

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Preface

This Product Catalog – Contact line equipment for mass transit and main-line railways describes the products which Siemens Mobility provides for the construction of modern contact line systems that supply power to electric railways used for mass transit, main-line railways, industry and mining, and truck trolley systems, as well as for systems of their customers.

With these products, it is possible to construct overhead contact line systems for railbound railways of all kinds, such as

- Vertical catenary systems,
- Trolley-type contact lines,
- Longitudinal span wire systems,
- Overhead contact lines in tunnels and under structures and
- Overhead conductor rails

as well as overhead contact lines for electrically driven road vehicles, such as overhead contact lines for trucks with hybrid-drives in open-cast mines.

This product range covers the usual power supply voltages between 600 V DC and 3000 V DC for mass transit and up to 25 kV AC for main-line railways in accordance with the standards listed in the Chapter “User notes, addresses”.

The components for cantilevers and supports basically are divided into three types:

- Products of copper-aluminium alloys combined with rods and tubes of glass-fiber reinforced plastics
- Products of aluminium alloys combined with aluminium tubes and composite, cast resin insulators or GRP loop insulators
- Products of hot-dip galvanized malleable cast iron combined with hot-dip galvanized steel tubes and composite or cast resin insulators or GRP loop insulators

The further products like tensioning equipment, insulators, tension wheel equipment, section insulators etc. have to be selected according to the desired system design. Factors like mechanical, electrical, operational, architectural and environmental requirements as well as life cycle costs affect dimensioning, material and design of the products.

We are continuously developing and expanding our range of products and are thus in a position to offer products that reflect high quality and the latest state of the art.

The present catalog contains up-to-date products, which cover the current needs and new developments. Nevertheless, should you require older products, Siemens Mobility will offer alternative solutions compatible with your system.

In addition to the technical information provided in this catalog, we are happy to make our years of experience available to you in the form of consulting and planning help. We will support you in the use of our products in conjunction with project planning, construction and operation, as well as with dimensioning and proper use in contact line systems.

This catalog has been prepared with the greatest of care, but errors and omissions cannot be ruled out entirely. If you have any questions, please feel free to contact your regional Siemens Mobility GmbH sales office.

Catalog outline

General

In the Chapter General you can find an overview about our systems and their typical application, notes for using the catalog as well as the index and the order number index.

Standard products

This catalog is structured according to the functions of the individual products in a contact line system:

Tensioning equipment

Products that are required to make up headspans as well as terminations and fixed terminations in longitudinal catenary systems and in trolley-type contact lines.

Thimbles, connectors, sleeves

Products that connect stranded wires and single wires to each other and to other products.

GRP cantilevers

Products that are required for construction and attachment of GRP cantilevers with copper-aluminium fittings.

Aluminium cantilevers

Products that are required for construction and attachment of aluminium cantilevers.

Steel cantilevers

Products that are required for construction and attachment of steel cantilevers.

Headspan supports

Products that are required for the assembly of contact wire and catenary wire supports in headspans for catenary and trolley-type contact lines.

Insulators

Insulators for the various voltages and applications on cantilevers, in headspans and in contact lines.

Contact lines under structures and bridge protection

Products that are suitable for overhead contact lines in restricted spaces in tunnels or under structures.

Clamps

Products that mechanically or electrically connect stranded wires and single wires to each other and to other components.

Tension wheel equipment

Products that tension overhead contact lines automatically to maintain constant tension forces.

Section insulators

Products that electrically separate overhead contact lines into individual sections while allowing the passage of pantographs along the catenary.

Disconnectors and drive mechanisms

Products that are required for the feeding and connection of contact line sections.

Earthing and protecting equipment

Products for traction current return and earthing of system parts, as well as for overvoltage protection and prevention of stray currents.

Contact wires, stranded wires, single wires

Products for overhead contact lines such as contact wires, various stranded wires and single wires.

Monitoring systems

Components for monitoring systems such as the Catenary Monitoring System and Disconnector Monitoring System.

Installation tools and equipment

Typical special tools, measuring and test equipment as well as operational safety concerning devices used for contact line construction which differ from conventional tools.

Chapter 01

Preamble

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Expertise in contact lines – systems and components

Securing the competitiveness of cities and the growth of industrial locations – those are Siemens' goals. With „Complete Mobility“, we offer integrated transportation and logistics solutions for the safe, economically efficient and environmentally compatible transport of people and goods. Siemens possesses all the necessary expertise: for rail-based transportation ranging from infrastructure such as railway electrification and automation to rolling stock and intelligent solutions for road traffic control.

Siemens has set innovative milestones for electrically operated railway lines time and again:

1879	First electric railway
1882	First electric tram using an overhead contact line in Berlin Charlottenburg
1889	First electric tram equipped with bow pantograph
1905	First overhead catenary line
1911	First overhead contact line system with auxiliary catenary wire
1933	Locomotive built for the Höllentalbahn (first railway line operated with 20 kV / 50 Hz)
1960	Contact lines for a running speed of up to 200 km/h
1980	Major involvement in the development of overhead contact lines with aluminum components for DB's new high-speed railway network
1988	Contact line for high speed record of 407 km/h
2002	Sicat® H1.0: the first system to be certified under TSI Energy for the transeuropean high-speed network, implemented on the Cologne – Rhine/ Main route and built for running speeds of up to 300 km/h

These Siemens innovations were important prerequisites for the development of electrically operated railway lines. Today's contact line systems have a high current carrying capacity and enable railway operation at speeds of well over 300 km/h.

System and component expertise

With the experience we have gained over many years, we are one of the few providers of complete solutions for railway electrification – from consulting and financing to installation and maintenance.

Our comprehensive portfolio of products and services covers the whole range of modern railway electrification – for direct and alternating current systems for mass transit and mainline services at speeds of up to 350 km/h:

- Trams and light railways
- Metros
- Main-line railways
- Industrial and mining railways
- Truck-trolley systems

Tailor-made solutions take all project-specific requirements into account, including traveling speed, train headway, level of traction current, type of power supply and regenerative feedback, route topography, energy efficiency, civil engineering structures and climatic conditions.

Combined with the lowest possible investment and life cycle costs, our systems know-how ensures the consistent high quality of our contact lines. We advise our customers on the selection and design of electrification solutions that meet their specific requirements, while at the same time keeping costs down.



Sicat contact line systems – requirements and common features

A clear profile for efficient operation

Sicat® contact line systems are characterized by their functional design and their reliable, corrosion-resistant, low-maintenance components. The decisive benefit of our modular Sicat systems lies in the realization of customer-specific solutions employing universally applicable, service-proven components. This keeps investment and maintenance costs at a consistent minimum and creates systems which display a high level of availability.

Sicat – contact line systems for every task

Sicat contact line systems are designed to cover the entire range of requirements that may arise in connection with

- various traction power supply systems,
- all speed ranges,
- various power levels and
- open line sections, tunnels, stations and depots.

Running speed	DC (direct current)	AC (alternating current)
≤ 80 km/h	Sicat 3S (mass transit)	–
≤ 120 km/h	Sicat LD (mass transit)	–
≤ 160 km/h	Sicat SD (mass transit and main-line railways)	Sicat LA (main-line railways)
≤ 230 km/h	Sicat HD (main-line railways)	Sicat SA (main-line railways)
≤ 250 km/h	–	Sicat SX / Sicat SR (main-line railways)
> 250 km/h	–	Sicat HA (main-line railways)

Besides cost-effectiveness, a long service life and consistently high quality are the hallmarks of Sicat contact line systems. They facilitate high-quality pantograph passage and meet both national and international safety standards.

Perfect technology – vast experience translated into efficient design

Whether disconnectors, elastic supports or electrical operated mechanisms, the crucial factors in the economic efficiency of components for contact line systems are not only their technical performance capability but also their long service life, which we can guarantee thanks to our well thought-out designs and use of corrosion-resistant materials.

However, there are also other benefits to consider: Components, such as the lightweight section insulator, are designed so that they can be installed with minimum personnel expenditure. That saves time and money. The latest generation of our tension wheel assemblies can handle tension forces of up to 40 kN, thus covering all requirements. Our vandal-proof, silicone composite insulators are a further example of our economically designed components. These insulators are encased in a flexible sheath which is resistant to mechanical influences. Extensive testing and the increasing number of certifications by rail companies around the world go to confirm the high level of acceptance of our components.



Sicat LD – DC overhead contact lines for urban lines

Sicat LD – many versions for just one function

Sicat LD unites the various preferred solutions for DC overhead contact line systems for mass transit. Sicat LD has the following features:

- Auto-tensioned catenary contact line without stitch wire
- Auto-tensioned and fixed-tension trolley-type contact line
- Supports for overhead contact lines in the form of cantilevers, headspans or elastic supports
- Overhead conductor rail made of copper profile

Supports for overhead contact lines

Various designs are possible, depending upon the task, the technical and architectural requirements, and the investment capacity:

- Glass-fiber reinforced plastic (GRP) tubes and bars, as well as copper-aluminium alloy fittings – fully insulating and corrosion-resistant for low maintenance costs.
- Aluminium can also be used as an alternative material in the cantilevers and fittings.
- Investment costs can be reduced by using galvanized steel for the cantilevers and hot-dip galvanized, malleable cast iron for the fittings.
- Our elastic supports are made of corrosion-resistant materials, such as copper-aluminium, stainless steel and GRP.

Insulators

We use, almost exclusively, our proven, composite insulators and silicone-coated loop insulators for aluminium and steel cantilevers, as well as for headspans and terminations.

Contact line and headspan

- Contact wire made of copper or copper alloys
- Copper catenary wires for catenary systems
- Headspans and curve sections made of bronze or stainless steel in connection with insulators and GRP profiles



Sicat LD – catenaries

The following criteria are major factors in deciding in favor of catenaries, in particular with regard to new lines and track upgrades:

- Transmission of high levels of electrical power through large transmission cross-sections in the longitudinal catenary system
- Reduced power losses, thanks to modular cross-section design such as the installation of a second catenary wire
- Avoiding additional feeder lines or feeder cables
- Greater distances between supports reduces the numbers of poles and foundations
- Uniform elasticity of the catenary system and little contact wire sag
- Reduction of maintenance work to a minimum, thanks to less wear on the contact wire and the carbon contacts
- High level of safety by suspending the contact wire in a vertical catenary system

Further criteria include the high level of operational reliability and the low number of feeding points.

Design

The simple catenary system is implemented using a vertical catenary system without stitch wire. The catenary wire runs vertically above the contact wire.

For optimum utilization of the traversing quality, the catenary is designed with separately tensioned contact wires and catenary wires. The fixed point of the catenary wire and of the contact wire as well as the tension wheel assemblies on both sides are included in the tensioning length.

Regular values	
Nominal voltage	up to 1.5 kV DC
Running speed	up to 120 km/h
System height	1.50 m
Contact wire acc. to EN 50149	AC-100 to 120, Cu-ETP / CuAg0.1
Catenary wire acc. to DIN 48201	up to 2× 150 mm ² , Cu-ETP
Dropper wire	10 mm ² , 16 mm ² , BzII
Contact wire tension force	10 kN at AC-100 12 kN at AC-120
Tension force per catenary wire	10 to 15 kN, depending on catenary wire cross-section
Span length	up to 65 m
Mechanical advantage reduction ratio of tension wheel assembly	1:3
Tensioning length	1500 m

Various combinations of catenary wire and contact wire are possible, depending on requirements and performance capability.

Catenary systems for a higher electrical load often consist of two catenary wires and one contact wire. The droppers are either of conductive or insulated design.

Supports can be economically installed as angled or straight cantilevers spanning two tracks.

Headspans can also be mounted on poles or buildings and similar structures – depending on the number of tracks to be spanned and/or the widths of roads or platforms.



Sicat LD – trolley-type contact lines

Trolley-type contact lines are especially suited to city centers with densely built-up areas and grand architecture or even listed buildings. They are also very practical for complex track arrangements such as can be found at inner-city intersections. By reducing the size of the contact line system to a minimum, the technical installation blends unobtrusively into the background of the urban environment.

The capacity of a trolley-type contact line largely depends on the cross section of the contact wire used. Underground feeder cables or elevated feeder wires are laid to provide higher capacities.

Elastic supports enable the contact line to have a particularly low design height in tunnel systems and under bridges. The system's good traversing characteristics are comparable to those of a catenary contact line.

Design

As far as trolley-type contact lines are concerned, the contact wire is suspended by:

- Bridle-and-pulley suspensions (with and without steady arms)
- Elastic supports
- Line hangers

Tensioning length of the trolley-type contact line includes the fixed point of the contact wire with the fixed point anchors as well as the tension wheel equipment for the contact wire on both sides.

Regular values	
Nominal voltage	up to 1.5 kV DC
Running speed	up to 50 km/h (70 km/h)
Contact wire acc. to EN 50149	AC-100 to 120, Cu-ETP / CuAg0.1
Number of contact wires	1 or 2
Bridle-and-pulley suspension	synthetic wire
Tension force per contact wire	10 kN at AC-100 12 kN at AC-120
Span length	up to 35 m
– auto-tensioned with bridle-and-pulley suspension	up to 25 m
– fixed tension	up to 12 m
– with elastic supports	
Mechanical advantage reduction ratio of tension wheel assembly	1:3
Tensioning length	1400 m

Straight cantilevers spanning two tracks have proven to be an economical solution in many projects. In inner-city areas, simple headspans help reduce the visual impact of contact line systems. These are used for tracks at intersections and near points as well as in depots.

Curve sections on bends in the track reduce the number of supports and make the contact line system less obtrusive.

Insulated line hangers are often used with fixed-tension trolley-type contact lines. These insulate, bear and guide the contact wire in just one component.



Sicat LD – special designs

We also offer contact line types suitable for special applications. The systems used for this are determined by a wide variety of local parameters. The majority of applications demand auto-tensioned vertical catenary systems – sometimes with additional line feeders. Auto-tensioned trolley-type contact lines are also used, for example for bulk material bunkers or for loading tracks.

Mining / power industry:

- Lateral contact lines in the loading areas of power stations and opencast mines
- Bench contact lines for movable trackworks in opencast mines and dumping areas

Individually selected solutions ensure safety for people, the environment and the equipment.

- Overhead conductor rails made of copper profiles in depots and tunnel systems
- Cantilevers with ceramic insulators for special environmental requirements
- Safety solutions for overhead contact lines for tracks in depots with roof work platforms
- Protective covers and protective insulation above overhead contact line systems when used on bridges and structures
- Special safety measures in connection with rail earthing and return current to minimize stray currents and avoid electric shocks
- Swiveling overhead contact line sections in maintenance and repair halls

The same principles apply to the technical design as to those in public transportation.



Sicat LA – AC overhead contact lines for simple applications

Sicat LA is a cost-effective type of overhead contact line for AC railways. It is used on main-line railways with low to medium power demands. It is particularly attractive for the electrification of lines previously served by diesel vehicles and for system modernization.

Design

- Sicat LA is characterized by the simple design of its contact line system and the use of low-cost, standard components with good traversing characteristics:
- Use of cantilevers made of aluminium or hot-dip galvanized steel
- Use of registration tube droppers between catenary wire support and registration tube
- Contact wire and catenary wire auto-tensioned together
- Increased power supply thanks to use of feeder lines
- Elastic supports where there is a shortage of space in tunnels or under structures

Regular values	
Nominal voltage	15 kV AC / 16.7 Hz 25 kV AC / 50/60 Hz
Running speed	up to 160 km/h
System height	1.80 m
Contact wire acc. to EN 50149	AC-100, Cu-ETP
Catenary wire acc. to DIN 48201	50 mm ² , BzII
Dropper wire	10 mm ² , bronze, highly flexible
Contact wire tension force	10 kN
Catenary wire tension force	10 kN
Span length	up to 80 m
Distance between droppers	12 m
Mechanical advantage reduction ratio of tension wheel assembly	1:3
Tensioning length	up to 1500 m



Sicat SR – aluminium overhead conductor rail

The Sicat SR overhead conductor rail is mainly designed for use in tunnels and under bridges as well as in maintenance halls and depots. It is positioned on the roof of the tunnel and represents a low-cost, space-saving alternative to other overhead contact lines. It can also be used for track sections with swiveling overhead contact lines in depots.

The overhead conductor rail consists of a rigid aluminium profile and a clamped contact wire.

- Low design height compared to trolley-type contact lines and overhead catenary lines
- The safety measure for traction system earthing is simplified by elimination of the overhead contact line section
- No need for tension wheel equipment for contact wire and catenary wire
- Simple design thanks to use of few components
- Long lifetime thanks to higher level of permissible contact wire wear
- High current carrying capacity and short-circuit strength in overhead conductor rail although no feeder lines are used
- Use of extremely robust extruded profile materials, also for connecting fittings
- Stable and vibration-proof joints through conductor rail guide grooves and screw locking devices
- High clamping and retention force as well as high conductivity of clamps at connection point to conductor rail thanks to special design of the conductor rail profile

Design

The running speed can be increased through the use of expansion joints.

Regular values	
Nominal voltage	up to 3 kV DC up to 25 kV AC
Permanent current load at 50 K excess temperature	2900 A
Short-circuit current	45 kA
Distance between supports	up to 12 m
Running speed	max. 200 km/h
Conductor rail cross section without contact wire	2300 mm ²
Conductor rail material	aluminium
Clampable contact wire acc. to EN 50149	AC-/BC-80 to 150
Specific mass of conductor rail without contact wire	6.2 kg/m

There are two functionally equivalent methods of suspending the Sicat SR overhead conductor rail:

- Supports with sliding conductor rails, preferred in small spaces where rotating support arms can only be very short (e.g. small round tunnels)
- Rotating supports, particularly suitable for small track radii

Sicat SRD – Retractable overhead conductor rail for depots

The Sicat SRD retractable overhead conductor rail for depots provides electrically powered rail vehicles with the necessary operating current for entering and leaving the depot as well as for electrical testing. During maintenance work, the overhead conductor rail can be pivoted to one side and earthed, thereby ensuring simple and safe access to the vehicles.

This considerably simplifies the procedures for roof-level maintenance work, the lifting of the train with lifting cylinders and any crane work in the clearance of the retractable overhead conductor rail.

Design

Sicat SRD comprises the pivoting part of the conductor rail including the supports with support arm and drive, the current connection, the controller, the signaling system as well as the control and power lines.

- During maintenance work, the overhead conductor rail can be pivoted away and out of the track area in the earthed state, thereby ensuring easy and safe access to the vehicles.
- Contrary to using a flexible overhead contact line, there are no hazards from torn and hanging contact lines. The overhead conductor rail increases the availability of the depot facilities.
- The overhead conductor rail has a high short-circuit strength and a large current-carrying capacity.
- Wear of the contact wire is possible up to 43 %, ensuring a long service life.

Regular values	
Nominal voltage	750 to 3000 V DC 15 to 25 kV AC
Permanent current load at 50 K excess temperature	2900 A
Short-circuit current	45 kA
Ambient temperature	≥ -40 °C
Max. temperature of conductor	max. 90 °C
Distance between supports	up to 12 m
Conductor rail cross section without contact wire	2300 mm ²
Conductor rail material	Aluminium
Clampable contact wire acc. to EN 50149	AC-/BC-80 to 150
Permissible section length (pivoting range)	max. 200 m
Specific mass of conductor rail without contact wire	6.2 kg/m

Essential operational characteristics:

- Release for start of maintenance work based on the five safety rules
- Visual and audible signalling of pivoting operation
- Control of the overhead conductor rail functions by means of a local control panel located alongside the maintenance track, as well as from the central control cabinet
- Soft start and stop of pivoting process due to integrated converter on the motor-gear unit



Sicat S – standard overhead contact lines

Sicat SA

The Sicat SA AC overhead contact line is suitable for new and expanding AC railways throughout the world, and complies with the Interoperability Directive for transeuropean high-speed railway systems. Sicat SA is certified as an interoperability component under TSI Energy.

- Medium-range electrical power capacities
- Overhead contact line supports as aluminium or steel cantilevers and headspans
- Little wear and long useful lifetime with low maintenance requirement thanks to optimized interaction between pantograph and contact line

Design

Sicat SA is an auto-tensioned catenary with stitch wires on the supports. Thanks to its design, it meets the demands of the interoperability directive for span lengths of 80m.

The fixed point of the catenary wire and of the contact wire as well as the tension wheel assemblies for the contact wire and the catenary wire on both sides are included in the tensioning length. There are three-span transition areas between the tensioning lengths.

Regular values	
Nominal voltage	15 kV AC / 16.7 Hz 25 kV AC / 50/60 Hz
Running speed	up to 230 km/h
System height	1.60 m
Contact wire acc. to EN 50149	AC-100 to 120, Cu-ETP
Catenary wire acc. to DIN 48201	70 mm ² , BzII
Stitch wire acc. to DIN 48201	25 mm ² , BzII
Dropper wire	10 mm ² , Bz
Contact wire tension force	12 kN
Catenary wire tension force	12 kN
Span length	up to 80 m
Distance between droppers	10 m
Mechanical advantage reduction ratio of tension wheel assembly	1:3
Tensioning length	up to 1800 m



Sicat SD

The Sicat SD DC overhead contact line is particularly suited for the upgrading or refurbishment of existing systems. Its current carrying capacity is of major significance due to the high traction currents. The suspension of the contact wires is designed to interact with pantographs with high contact forces in DC systems.

The overhead contact line supports are designed as aluminum or steel cantilevers, or as headspans.

Design

Sicat SD is an auto-tensioned catenary with twin contact wire. Its dynamic characteristics meet the requirements of EN 50119.

Its high current carrying capacity comes from two parallel, silver alloyed contact wires with high thermal stability. The design of the contact wire suspensions ensures an optimal power transfer between the contact wires and the pantograph.

Regular values	
Nominal voltage	up to 3 kV DC
Running speed	up to 160 km/h
System height	1.60 m
Contact wire acc. to EN 50149	2x AC-120, CuAg0.1
Catenary wire acc. to DIN 48201	120 mm ² , Cu
Dropper wire	16 mm ² , BzII
Contact wire tension force	2x 12 kN
Catenary wire tension force	12 kN
Span length	up to 70 m
Distance between droppers	10 m
Mechanical advantage reduction ratio of tension wheel assembly	1:3 or 1:1.5
Tensioning length	up to 2000 m

Connecting elements such as droppers and line feeder clamps are also designed for a high current carrying capacity.

In cramped spaces, such as in tunnels or under bridges, elastic supports with two contact wires and feeder lines are used.



Sicat SX

The Sicat SX overhead contact line system is characterized by savings in terms of material and a reduced number of parts. This helps to cut the cost of the first-time electrification of railway lines. The non-parallel design of the catenary and the high tensile forces in the contact wire and catenary wire are intended to achieve, among other things, a maximization of the span lengths and, as a result, a reduction in the number of overhead contact line supports in the contact line system.

Alternative materials to copper or copper alloys help cut material costs. Valuable resources are saved, and the theft of raw materials is reduced.

- Catenary without stitch wire
- Overhead contact line supports in the form of fully zinc-coated steel cantilevers
- Low installation costs
- Resources are conserved thanks to the use of less material

Design

Sicat SX is an auto-tensioned catenary without stitch wires on the supports and with outstanding dynamic traversing characteristics. The catenary wire and contact wire of the catenary system are installed with oppositely aligned lateral positions with low impact from own weight. This design ensures a high degree of elasticity in the overhead contact line.



Regular values	
Nominal voltage	up to 25 kV AC
Running speed	up to 230 km/h
System height	1.40 m
Contact wire acc. to EN 50149	AC-80, CuMg0.5
Catenary wire acc. to EN 50182	152.8 mm ² , aluminium-steel
Dropper wire	10 mm ² , Bz
Contact wire tension force	15 kN
Catenary wire tension force	30 kN
Span length	up to > 100 m
Distance between droppers	≤ 10 m
Mechanical advantage reduction ratio of tension wheel assembly	1:1.5
Tensioning length	up to 2000 m

As with all Sicat systems, service-proven standard components are used.

The overhead contact line system Sicat SX has been certified under the European rail system interoperability directive and the associated Energy TSI as an interoperability component.

Sicat H – high-speed overhead contact lines

Sicat HA

The Sicat HA AC overhead contact line is extremely suitable for new lines for AC railways all around the world. It was the first high-speed overhead line to be certified under the Interoperability Directive for transeuropean high-speed railway systems and the associated TSI Energy Directive.

- High electrical power capacities up to 20 MW per train
- Overhead contact line supports as aluminium or steel cantilevers
- Little wear and long useful lifetime with low maintenance requirement thanks to optimized interaction between pantograph and contact line; can be traversed with one or with two pantographs

Sicat HA is suitable for cross-border traffic and can be traversed by pantographs with 1600 mm and 1950 mm-wide pan heads.

The low maintenance requirement and the long lifetime play a particularly important role here, as train services can often only be interrupted for a short time to carry out maintenance work.

Design

Sicat HA is an auto-tensioned catenary with stitch wires on the supports. High-strength contact wires and high tensile forces in the contact wire ensure compliance with the requirements for speeds above 350 km/h, even with span lengths of up to 70 m.

Regular values	
Nominal voltage	15 kV AC / 16.7 Hz 25 kV AC / 50/60 Hz
Running speed	up to 350 km/h
System height	1.60 m
Contact wire acc. to EN 50149	AC-120, CuMg0.5
Catenary wire acc. to DIN 48201	120 mm ² , BzII
Stitch wire acc. to DIN 48201	25 mm ²
Dropper wire	10 mm ² , Bz
Contact wire tension force	27 kN
Catenary wire tension force	21 kN
Span length	up to 70 m
Distance between droppers	10 m
Mechanical advantage reduction ratio of tension wheel assembly	1:3
Tensioning length	up to 1400 m

There are types with a lower system height and modified span lengths for situations in which space requirements need to be kept to a minimum.

The fixed point of the catenary wire and of the contact wire as well as the tension wheel assemblies for the contact wire and the catenary wire on both sides are included in the tensioning length. The contact wire and the catenary wire are tensioned separately. There are three and five-span versions of the transition areas between the tensioning lengths.



Sicat HD

The Sicat HD DC overhead contact line is particularly suited for the expansion or refurbishment of existing systems. Its current-carrying capacity is of major significance due to the high traction currents. This is the reason for using double contact wires. The suspension of the contact wires is designed to interact with pantographs with high contact forces in DC systems.

The overhead contact line supports are aluminium or steel cantilevers.

Design

Sicat HD is an auto-tensioned catenary with stitch wires on the supports.

Its high current carrying capacity comes from two parallel, silver-alloyed double contact wires with high thermal stability. The design also ensures an optimal power transfer between the contact wires and the pantograph.

Connecting elements such as droppers and line feeder clamps are also designed for a high current carrying capacity.

Regular values	
Nominal voltage	3 kV DC
Running speed	up to 250 km/h
System height	1.60 m
Contact wire acc. to EN 50149	2× AC-120, CuAg0.1
Catenary wire acc. to DIN 48201	150 mm ² , Cu
Stitch wire acc. to DIN 48201	25 mm ² , BzII
Dropper wire	16 mm ² , BzII
Contact wire tension force	2× 15 kN
Catenary wire tension force	15 kN
Span length	up to 70 m
Distance between droppers	10 m
Mechanical advantage reduction ratio of tension wheel assembly	1:3 or 1:1.5
Tensioning length	up to 1500 m



Sicat TT – overhead contact lines for truck-trolley systems

Large opencast mines are a typical field of operation for large diesel-electric dump trucks. However, the high level of fuel consumption and diesel exhaust emissions often cause both economic and ecological problems. Our truck-trolley system provides a convincing solution.

Sicat TT is the overhead contact line system that supplies the dump trucks with electrical power. The vehicles are supplied with electrical power via the overhead contact line to ease the load on the diesel drives when the trucks drive up inclines and need to work under full load. As soon as the pantographs make contact with the contact line, the dump trucks automatically switch over from diesel-electric to electric operation with the help of a control unit.

High nominal voltages of up to 2.4 kV DC lead to lower power losses and ease the strain on the contact wires while ensuring a longer useful lifetime for the system.

The overhead contact line systems and the substation containers can be moved quickly and flexibly to adapt to changes in the mine working areas.

Design

Two separate, parallel catenaries are responsible for infeed and return current in the Sicat TT system. The catenary cantilevers are installed on lateral poles. The dump trucks need to be equipped with two pantographs besides their electrical equipment.

Regular values	
Nominal voltage	1.2 kV to 2.4 kV DC
Contact wire height	up to 9 m
Catenary per pole	2 contact wires 2 catenary wires, 150 mm ² each
Current connectors in catenary	120 mm ²
Earthing cable	150 mm ²
Tensioning	tension wheel assemblies
Tensioning length	up to 1500 m
Tension force per catenary	2× 20 kN or 2× 24 kN
Poles	steel round slip-over pole with flange plate, height up to 15 m
Cantilevers	steel profile, length up to 11 m
Foundations	drilled foundation with flange plate

Separately tensioned contact wires and catenary wires compensate for temperature-related changes in the length of the catenary system. This ensures a high traversing quality for the contact line with little wear on the pantographs. Current connectors between the contact wire and the catenary wire boost the performance of the catenaries.

Drilled foundations with flange plates in connection with standardized slip-over poles ensure that the overhead contact line system is easy to relocate.

Poles, cantilevers and foundations are integrated into the overall power supply protection system by means of an earthing cable.



Sicat 3S – conductor rail contact systems

A third rail laid parallel to the running rails is a solution recommended for supplying power to commuter rail lines and metros running for the most part in tunnels or on rights-of-way not accessible to the public. It has proven itself many times in practice

Requiring little space and providing a high level of power transfer, these systems are particularly attractive for tunnels with small cross sections and for powerful metros. The third rail makes little or no visual impact, is extremely rugged and transfers high levels of power.

Design

Borne by insulating conductor rail supports attached to the sleepers or structures, conductor rails can be contacted by current collectors from different sides. In new systems, current collection from underneath has become the most commonly used system: As the rail is covered for the most part, it cannot be touched accidentally, thereby offering the highest possible levels of safety. It is also protected from precipitation.

Good operating experience has led to aluminium-stainless steel compound rails becoming the international standard. They transfer high levels of electric power to the traction unit and display good conductivity while keeping power losses low. Aluminium-stainless steel compound rails are connected current-carrying with aluminium straps. Soft steel conductor rails can be used as an alternative.

Regular values	
Nominal voltage	1.5 kV DC
Running speed	up to 80 km/h, 100 km/h if required
Conductor rail system	– contacted from below – contacted from above
Conductor rail	– aluminium stainless steel compound rail – soft-iron conductor rail
Conductor rail supports	– fully insulating – steel wire with insulators
Protective covers	– halogen-free plastics (GRP) – PVC

Expansion joints or gaps in the system are used to compensate for changes in length due to temperature fluctuations in the conductor rail. The third rail slides in the insulating mountings of the conductor rail supports.

At points and crossings, gaps with suitable ramps ensure a smooth and therefore low-wear passage of the current collectors.

The conductor rail covers have a modular design and are easy to mount. Halogen-free plastics meet high fire protection safety requirements.



Engineering contact line systems

Overhead contact line systems for mass transit and main-line railways are frequently part of a complex infrastructure project with many interfaces. In the context of such projects, overhead contact line systems can only be implemented if all the necessary aspects are thoroughly thought out and linked together logically.

Preliminary planning

Preliminary planning includes selection of the systems and design of the installations for the respective electrification project. We advise our customers, analyze the project requirements in close collaboration with them and work out the requirements so that we can design the system they need.

System design

When an overhead contact line system for a given application has to be designed, the basic parameters of the overhead contact line equipment are defined on the basis of the mechanical and electrical investigations. The result is an optimized system design for the planned application.

IT systems support the simulation of the dynamic interaction between the pantograph and the overhead contact line. We also carry out basic simulations and calculations to take various operating requirements and exceptional circumstances into account. Traction current return and the earthing and bonding systems are also designed in relation to the system as a whole.

Basic design

Standard solutions are used for contact line equipment such as cantilevers and tension wheel assemblies. In the basic design phase, this equipment is adapted to suit any specific requirements the application may demand. Complex projects require a great variety of solutions, not only for open sections of track but also for tunnels, stations and depots.

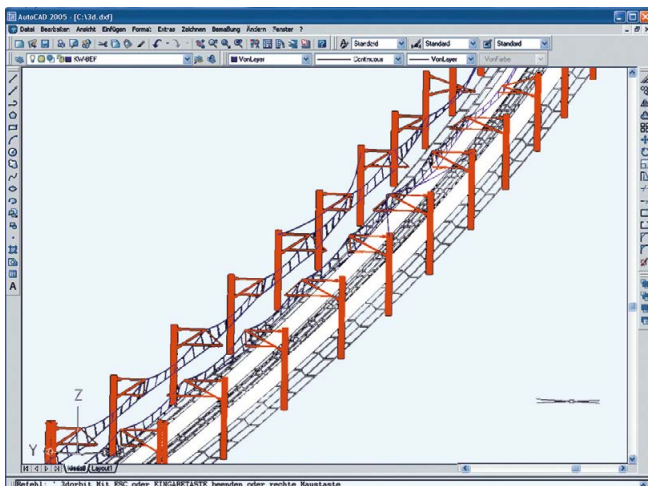
Allocation design

Allocation design supplies the necessary planning documents for construction work and material procurement, thereby forming the basis for future maintenance of the contact line system.

In addition to the parameters for the selected system, local conditions along the route, such as tunnels, bridges or way structures, play an important role. The IT tools used for this task increase the planning quality and reduce the amount of time needed.

Construction design

Construction design supplements the basic design and allocation design by providing individual solutions. These may be, for example, designing equipment for bridges and for tunnels with a particular cross-section or designing system separation sections. These individual solutions can also be largely implemented with standard components. The design effort and construction time can therefore be reduced.



Installation and service

Installation

Our installation service includes the construction of complete overhead contact line systems with our own personnel as well as the integration of personnel employed by the operator or by local companies. We assume responsibility for site management and the supervision of work performed by third parties as well as the training and instruction of personnel.

Contact lines often have to be installed under the most adverse conditions. Our skilled personnel are prepared for everything, have mastered highly demanding installation technologies, and can assess hazards appropriately. We keep the personnel up to the mark in technical matters through specific training and advanced training courses. And we attach a great deal of importance to industrial safety.

Maintenance

Although Siemens Mobility systems are designed for low maintenance, appropriate measures are necessary in order to make sure they remain in good working condition. Siemens Mobility produces maintenance recommendations for this purpose.

Depending on requirements, maintenance can be carried out by the customer's own personnel or alternatively by local companies. In such cases, we can provide supervising services.

Documentation

With comprehensive documentation according to IEC 82079-1, such as operating and installation instructions, we support reliable and safe product use in connection with the installation and maintenance of contact line systems.



High-quality contact line components, competent engineering

Efficient overhead contact line systems require high-quality, durable materials for the components used. Modern types of overhead contact lines must require little maintenance so that a high level of availability is ensured while keeping down lifecycle costs.

Although requirements vary, we place a great deal of importance on the practical, efficient standardization of our components. Fewer components speed up the configuration process and reduce maintenance costs.

Component engineering

Requirements

The ideal materials are selected according to function, safety requirements and product costs. The following requirements are taken into account:

- Mechanical loads such as tensile and thrust forces, bending and torsion, taking high safety standards into account
- Safe transfer of electrical power in the contact line system and in the return current system taking thermal conditions and short circuit strength into account
- High level of environmental compatibility and resistance against weather and operating influences

Component development

Sound knowledge of system design for contact line systems and experience gathered from many years of product support are the best prerequisites for successful component development.

Draft designs of components and constructions are verified by means of FEM calculations during the development

phase. Producing models and prototypes using modern methods such as Rapid Prototyping represents an important milestone for making decisions in the development process. The test criteria for the contact line components are determined on the basis of the required product characteristics and the relevant standards.

Tests

The reliability of the contact line components in operation with railway operators around the world is given top priority at Siemens Mobility. Our components meet current national and international standards, also in terms of safety.

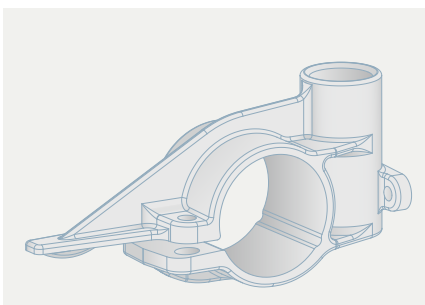
Design reviews are held to verify sophisticated fundamental developments. The components and modules we develop undergo electrical and mechanical type testing by certified test laboratories.

All our products are subject to continuous improvement. This is based on our intensive research and development work and on the close contact we have with our customers. From the experience we accumulate from everyday operational practice, we know what is particularly important in our contact line components.

The high quality of our components is confirmed by the growing number of certifications, which are issued by railway authorities only after extensive tests.

Quality assurance

The consistent high quality of Siemens Mobility contact line components is maintained by means of a certified quality assurance management system. Our logistics center has its own test laboratory at its disposal, where tests can be conducted quickly and in line with requirements.



Materials and their use

The following materials are used for contact line components:

- **Electrolytic copper and copper alloys with silver and magnesium, primarily for contact wires and stranded wires**
Magnesium-alloy contact wires are characterized by their outstanding mechanical strength and high resistance to abrasion, particularly in high-speed applications. Silver-alloyed contact wires combine high strength and thermal stability and are especially well-suited for DC systems. Copper alloys with magnesium or electrolytic copper are also used for catenary wires. This depends on whether strength or electrical conductivity is more important.
- **Electrolytic copper and copper alloys for clamps**
Connecting elements made of copper alloys with a high current-carrying capacity are used to connect catenary wires and contact wires with droppers, feeder lines, switch wires and disconnectors.
- **Copper-aluminium alloys for components for GRP cantilevers**
Copper-aluminium alloys combine high strength with slim designs, and are also highly resistant to environmental influences.
- **Aluminium and aluminium alloys for cantilevers**
Aluminium is not only low in cost but also corrosion-resistant, thus requiring little maintenance.
- **Hot-dip galvanized steel and malleable cast iron for cantilevers**
Hot-dip galvanized steel together with hot-dip galvanized malleable cast iron fittings offer the most advantages in terms of procurement costs.

- **Plastics for cantilevers and insulators**
Using GRP tubes and rods in overhead contact line supports saves additional insulators. They provide a high level of safety and come in a slim design.
- **Silicone composites for insulators in overhead contact line supports, catenary systems and single catenaries, as well as in disconnectors and grounding switches**
Components with composite insulators and silicone sheaths not only have hydrophobic properties for high electrical resistance, but are also resistant to vandalism.
- **Stainless steel and stainless steel precision castings for high-strength connecting elements and standard parts**
In addition to their great strength, connecting elements made of stainless steel and fittings made of stainless steel precision castings also offer advantages in terms of dimensional precision and resistance to environmental influences.

New materials and innovations

Besides using proven material and solutions, more prominence is being given to increasingly sophisticated contact line components which provide innovative answers to increasingly demanding requirements. Take our switch contacts, for example, with silver graphite to minimize maintenance or the Sicat CMS catenary monitoring system.

Chapter 01

Preamble

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Product designations

The product designations are the names customarily used in contact line construction. It cannot be avoided, however, that different product types may be listed under the same nominal designation. To ensure unambiguous identification, each part is given a machine-readable factory designation which begins with the preliminary number 8WL and consists of a four-digit number followed by a hyphen and a

further digit (or a number and a letter). These identify the various types of a specific product, for example, if it is available in different materials or sizes.

Drawings in different scales are also connected to the products listed and indicate the major dimensions and functions of the products. In the drawings, the load direction is indicated with F →.

Material designations

Abbreviations are used in this text for the materials customarily used in contact line construction. The most important ones are explained below:

AC	Grooved contact wire circular, clamping groove type A acc. to EN 50149
Al	Aluminium wrought alloy (AlMgSi0.5, AlMgSi1.0 or AlSiMgMn)
AL1	Hard drawn aluminium (for wires)
Alcu	Aluminium-copper sheet
BC	Grooved contact wire circular, clamping groove type B acc. to EN 50149
BF	Grooved contact wire flat, clamping groove type B acc. to EN 50149
Bz	Bronze
BzII	Bronze, strength grade II
ctAl	Cast aluminium alloy (AlSi7Mg, AlSi12Mg or AlSi10MgMn)
Cu	Copper
Cu-ETP	Electrolytic copper
Cu5	Copper-nickel wrought alloy for screws and nuts (CuNi1SiF59)
CuAg	Copper-silver alloy (for contact wires)
CuAl	Copper-aluminium alloy (aluminium bronze)
CuMg	Copper-magnesium alloy (for contact wires)

CuNiSi	Kupfer-Nickel-Knetlegierung für Produkte (CuNi1Si, CuNi2Si oder CuNi3Si)
CuSn	Copper-tin alloy (tin bronze)
CuZn	Copper-zinc alloy (brass)
EP resin	Epoxy resin
GF-EP	Glass-fiber reinforced plastic with epoxy resin
GF-UP	Glass-fiber reinforced plastic with unsaturated polyester resin
GRP	Glass-fiber reinforced plastic
htgSt	Steel, hot-dip galvanized
mICI	Malleable cast iron white, hot-dip galvanized
PTFE	Polytetrafluorethylen
PVC	Polyvinyl chloride
St	Steel
stlSt	Stainless steel
ST1A	Zinc coated steel (for wires)

The following thread designations are used in this catalog:

M.....	Metric ISO thread acc. to DIN 13-1
R.....	Whitworth pipe thread acc. to EN 10226-1
G.....	Pipe thread acc. to ISO 228-1

Regulations and standards

The products contained in this catalog correspond to the standards listed and to the relevant provisions or guidelines listed below.

Standard	Edition	Title
IEC 61109	2008-05	Insulators for overhead lines – Composite suspension and tension insulators for a.c. systems with a nominal voltage greater than 1000 V – Definitions, test methods and acceptance criteria
IEC 61952	2008-05	Insulators for overhead lines – Composite line post insulators for a.c. systems with a nominal voltage greater than 1000 V – Definitions, test methods and acceptance criteria
IEC 62271-1 + Amendment 1	2007-10 2011-06	High-voltage switchgear and controlgear – Part 1: Common specifications
IEC/TS 60815-1	2008-10 (Prestandard)	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 1: Definitions, information and general principles
ISO 228-1	2000-09	Pipe threads where pressure-tight joints are not made on the threads – Part 1: Dimensions, tolerances and designation
ISO 1234	1997-11	Split pins
EN 755-1	2008-03	Aluminium and aluminium alloys – Extruded rod/bar, tube and profiles – Part 1: Technical conditions for inspection and delivery
EN 755-2	2016-03	Aluminium and aluminium alloys – Extruded rod/bar, tube and profiles – Part 2: Mechanical properties
EN 10210-1	2006-04	Hot finished structural hollow sections of non-alloy and fine grain steels – Part 1: Technical delivery
EN 10210-2	2006-04	Hot finished structural hollow sections of non-alloy and fine grain steels – Part 2: Tolerances, dimensions and sectional properties
EN 10226-1	2004-07	Pipe threads where pressure tight joints are made on the threads – Part 1: Taper external threads and parallel internal threads – Dimensions, tolerances and designation
EN 10305-1	2016-03	Steel tubes for precision applications – Technical delivery conditions – Part 1: Seamless cold drawn tubes
EN 12385-4 + Amendment 1	2008-03 2008-03	Steel wire ropes – Safety – Part 4: Stranded ropes for general lifting applications
EN 50119	2009-09	Railway applications – Fixed installations – Electric traction overhead contact lines
EN 50122-1 + Amendment 1	2011-01 2011-06	Railway applications – Fixed installations – Electrical safety, earthing and the return circuit – Part 1: Protective provisions against electrical shock
EN 50122-2	2010-10	Railway applications – Fixed installations – Electrical safety, earthing and the return circuit – Part 2: Protective provisions against the effects of stray currents caused by d.c. traction systems
EN 50123-1	2003-02	Railway applications – Fixed installations; D.C. switchgear – Part 1: General
EN 50123-4	2003-02	Railway applications – Fixed installations; D.C. switchgear – Part 4: Outdoor d.c. switch-disconnectors, switch-disconnectors and earthing switches
EN 50124-1 + Amendment 1 + Amendment 2 + Corrigendum	2001-03 2003-10 2005-06 2007-12 / 2010-05	Railway applications – Insulation coordination – Part 1: Basic requirements; Clearances and creepage distances for all electrical and electronic equipment
EN 50149	2012-06	Railway applications – Fixed installations – Electric traction – Copper and copper alloy grooved contact wires
EN 50152-1 + Amendment 1	2012-11 2013-09	Railway applications – Fixed installations – Particular requirements for AC switchgear – Part 1: Circuit-breakers with nominal voltage above 1 kV
EN 50152-2	2012-11	Railway applications – Fixed installations – Particular requirements for AC switchgear – Part 2: Disconnectors, earthing switches and switches with nominal voltage above 1 kV
EN 50153	2014-05	Railway applications – Rolling stock – Protective provisions relating to electrical hazards
EN 50163 + Amendment 1 + Corrigendum	2004-11 2007-07 2013-01	Railway applications – Supply voltages of traction systems

Standard	Edition	Title
EN 50182 + Corrigendum	2001-05 2005-06 / 2013-07	Conductors for overhead lines – Round wire concentric lay stranded conductors
EN 60383-1 + Amendment 11	1996-11 1999-10	Insulators for overhead lines with a nominal voltage above 1 kV – Part 1: Ceramic or glass insulator units for a.c. systems – Definitions, test methods and acceptance criteria Note: Also applies to insulators in DC contact lines.
EN 60865-1	2012-03	Short-circuit currents – Calculation of effects – Part 1: Definitions and calculation methods
EN 62621	2016-02	Railway applications – Fixed installations – Electric traction – Special requirements for composite insulators used for overhead contact line systems
DIN 13-1	1999-11	ISO general purpose metric screw threads – Part 1: Nominal sizes for coarse pitch threads; nominal diameter from 1 mm to 68 mm
DIN 43136	1978-12	Span wires for overhead equipment
DIN 43137	1978-06	Electric traction; wires for earthing and return current
DIN 43138	1980-09	Flexible cables for overhead equipment and return current
DIN 43154	1977-04	Open thimbles for wires and cables
DIN 43156	1978-03	Electric traction; conductor rail; dimensions and characteristics
DIN 43161	1983-06	Pins for overhead equipment
DIN 46235	1983-07	Cable lugs; for compression connections, cover plate type, for copper conductors
DIN 48075-1	1967-05	Parallel groove clamps for stranded conductors and for aluminium conductors steel-reinforced for overhead power lines
DIN 48085-2	1985-04	Full tension compression joints, for aluminium conductors, for overhead lines
DIN 48085-3	1985-04	Full tension compression joints, for ACSR-conductors, for overhead lines
DIN 48201-1	1981-04	Copper stranded conductors
DIN 48201-2	1981-04	Bronze stranded conductors
DIN 48217	1978-06	Notch connectors for high-tension contact wires and rail overhead equipment
DIN VDE 0141	2000-01	Earthing system for special power installations with nominal voltages above 1 kV
DIN VDE 0216	1986-02	Fittings for overhead and conductor rail equipment; static mechanical behaviour; requirements and testing
DIN VDE 0228-3	1988-09	Proceedings in the case of interference on telecommunication installations by electric power installations; interference by alternating current traction systems
DIN VDE 0228-4	1987-12	Proceedings in the case of interference on telecommunication; installations by electric power installations; interference by d.c. traction systems
DIN VDE 0446-2	1971-03	Regulations for insulators for overhead power lines, overhead equipment and telecommunication lines; Part 2: Regulations for insulators for high-tension overhead lines and overhead equipment up to 1000 V as well as telecommunication overhead lines
DIN VDE 0446-3	1973-05	Regulations for insulators for overhead power lines, overhead equipment and telecommunication lines; Part 3: Regulations for fittings permanently connected to the insulators

Quality management

It is the stated aim of the Rail Electrification Business Segment in the Siemens Mobility GmbH to make products of the highest quality.

The management of the division has therefore authorized the required measures to

- fulfill the agreed or required expectations of the customers,
- to meet legal specifications, standards, technical regulations and environmental provisions,
- to apply the methods of quality management consistently at all levels of the value creation chain,
- and to constantly improve all methods and instructions based on experience in daily application.

The management system of Siemens Mobility GmbH is conform to the following Occupational Health and Safety Management System standards:

ISO 9001:2015

ISO 14001:2015

BS OHSAS 18001:2007

The certificate is valid for the following scope:

Project planning, acquisition, engineering, procurement, production, assembly, commissioning and service of products, systems, nets and product-independent and product-related services for the Business Units Rail Infrastructure (SMO RI), Rolling Stock (SMO RS), Turnkey Projects (SMO TK), Intelligent Traffic Systems (SMO ITS) and Customer Services (SMO CS).

The corresponding proof of compliance was provided to DNV GL Business Assurance Zertifizierung & Umweltgutachter GmbH and is confirmed by regular audits.

Ordering

Siemens asks you to send your queries or orders to our offices to the addresses listed below. We will process your queries and orders immediately.

In particular, we ask you to come to us when you require products or systems that you cannot find in our catalog. We hope to be able to offer you products that meet your requirements in these cases as well.

The delivery conditions listed below for the electrical industry apply to the execution of your orders. We will be happy to provide them to you in their complete wording.

In connection with the use of the SAP system at Siemens, we have assigned the corresponding A2V number to the 8WL product numbers in the order number index.

Conditions of sale and delivery

Domestic business

The general sales conditions and general delivery conditions for products and services of the electrical industry apply.

Prices are in € ex works, exclusive of transport and packaging.

Prices do not include sales tax (VAT). These are invoiced separately.

International business

The general sales conditions and general delivery conditions for products and services of the electrical industry and all other conditions agreed upon with the price list recipients apply.

Note

Unless otherwise noted on the individual pages of the catalog, we reserve the right to make changes, in particular to the values, dimensions and weights stated. All graphics are non-binding.

We reserve the right to change prices and will invoice the prices valid at the time of delivery.

Safety notes

All applicable national and international standards, guidelines and regulations, etc., must be observed in the planning and erection of the systems in which the products of this catalog will be used.

The operating and installation instructions of the individual products must be observed.

The products in this catalog must be assembled, installed, operated and maintained by qualified personnel only.

The user is responsible both for the proper handling of the products and for their use in accordance with legal, etc., provisions. Your Siemens Mobility representatives are naturally available to you in case of questions.

If the aforementioned measures are not observed, this can result in death, serious physical injury, considerable damage to property and environmental damage.

Replaced products

In the following list you can find an overview about the products no longer available in this catalog edition and their respective replacements.

dispensed product	replaced by
8WL2105-6D	8WL2105-6G
8WL2105-6E	8WL2105-6H
8WL2114-0	on request
8WL2128-7	on request
8WL2131-8C	on request
8WL2131-8D	on request
8WL2131-8E	on request
8WL2131-8F	on request
8WL2200-0	8WL2121-4
8WL2200-1	8WL2121-5
8wL2723-3	on request
8wL2723-4	on request
8WL2860-6	on request
8WL2861-6	on request
8WL2861-7	on request
8WL3022-6	on request
8WL3022-7	on request
8WL3517-5	on request
8WL3517-6	on request
8WL3537-1	on request

dispensed product	replaced by
8WL3537-3	on request
8WL3581-1	on request
8WL3584-6	on request
8WL3584-6A	on request
8WL3601-6	on request
8WL4534-1	on request
8WL4534-2	on request
8WL4618-5A	8WL4618-5
8WL4627-0	on request
8WL4628-0	on request
8WL4628-3	on request
8WL5055-3K	on request
8WL5167-5	on request
8WL5545-5A	8WL5545-5B
8WL5545-6A	8WL5545-6B
8WL7101-1	on request
8WL7103-5	on request
8WL7108-2	on request
8WL7108-8	on request
8WL7110-0	on request
8WL7110-5	on request
8WL7233-4	8WL7233-4BA/-4BB

Addresses

Siemens Rail Electrification in Germany

Location	Postal address	Contact
Head office Erlangen	Siemens Mobility GmbH Rail Infrastructure Electrification Mozartstraße 33b 91052 Erlangen Germany	Email: electrification.mobility@siemens.com
Halle	Magdeburger Str. 51 06112 Halle Germany	
Ludwigshafen	Bruchwiesenstraße 5 67059 Ludwigshafen am Rhein Germany	

Siemens Rail Electrification worldwide

Location	Postal address	Contact
Latin America (without Brazil)	Siemens Mobility S.A. Vicente Lopez Julian Segundo Aagueero 2830 Buenos Aires B1605EBQ Munro Argentina	
Australia and New Zealand	Siemens Mobility Pty Ltd 380 Docklands Drive Victoria 3008 Melbourne VIC Australia	
Austria	Siemens Mobility Austria GmbH Siemensstr. 90 1210 Vienna Postal address Postbox 83 1211 Vienna Austria	+43 (51707) 0
Belgium	Siemens Mobility S.A. / N.V Industriezone Neerdorp Huizingen Guido Gezellestraat 125 Vlaams Brabant 1654 Beersel Belgium	+32 (2) 536 2111
Brazil	Siemens Mobility Solucoes de Mobilidade Ltda. Jardim Santo Elias Av Mutinga, 3800 São Paulo 05110-902 Sao Paulo-SP Brazil	+55 (11) 3833 4647

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China	Siemens Mobility Electrification Equipment (Shanghai) Co., Ltd. Baoshan District 3015 Pan Jing Road Shanghai Shi 200949 Shanghai P. R. China	
China	Siemens Ltd. 500, Da Lian Road, Yangpu District 200082 Shanghai P. R. China	+86 (21) 3889-3066
China	Siemens Ltd. 22/F, AIA Kowloon Tower, Landmark East 100 How Ming Street Kwun Tong Kowloon Hong Kong	+852 (2583) 3388
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Denmark	Siemens Mobility A/S Borupvang 9 Region Hovedstaden 2750 Ballerup Denmark	+45 (4477) 4477
Finland	Siemens Mobility Oy Tarvonsalmenkatu 19 Uusimaa 02600 Espoo Finland	
Greece	SIEMENS MOBILITY RAIL AND ROAD TRANSPORTATION SOLUTIONS SINGLE-MEMBER SOCIETE ANONYME 6-8 Agisilaour Str. Amaroussio Attiki 15123 Athen Greece	+30 (210) 686 4111
Hungary	Siemens Mobility Kft. Gizella ut 51-57 1143 Budapest Hungary	+36 (1) 471 1410
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Location	Postal address	Contact
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Norway	Siemens Mobility AS Oestre Aker vei 88 0596 Oslo Norway	+47 (2263) 3000
Romania	Siemens Mobility S.R.L. Centru Sprij. Afaceri Strada Preciziei, Nr. 24 062204 Bucuresti Romania	+40 (21) 6296 400
Russia	Siemens Mobility Russia ul. Bolshaya Tatarskaya 9 115184 Moscow Russian Federation	+7 (495) 737 1000
Serbia	Siemens d.o.o. Beograd c/o Airport City Omladinskih brigada 90v 11070 Belgradee Serbia	+381 (11) 2096 305
South Africa	Siemens Mobility (Pty) Ltd North Riding 46 Newmarket Road Gauteng 2169 Randburg South Africa	
Spain	SIEMENS MOBILITY, S.L.U. Ronda de Europa, 5 Madrid 28760 Tres Cantos Spain	+34 (91) 514 8000
Sweden	Siemens Mobility AB Evenemangsgatan 21 Stockholms laen 169 79 Solna Postal address Postbox 4091 169 04 Solna Sweden	
Switzerland	Siemens Mobility AG Hammerweg 1 Zürich 8304 Wallisellen Postal address Postbox 141 8304 Wallisellen Switzerland	+41 (58) 558 5585

Location	Postal address	Contact
Thailand	Siemens Mobility Limited Huaykwang 2922/300-303 New Petchburi Road Krung Thep Maha Nakhon 10310 Bangkok Thailand	+66 (2) 715 4000
Turkey	Siemens Mobility Ulasim Sistemleri Anonim Sirketi Esentepe mahallesi, Kartal Yakacik Caddesi No 111 34870 Istanbul Turkey	
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USA	Siemens Mobility, Inc 20393 SW Avery Court Oregon 97062 Tualatin, OR United States	

Chapter 01

Preamble

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8WL3002-7	A2V00000202367	413	8WL3122-2	A2V00000202457	421
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8WL5546-3.	A2V00001750726.	641	8WL6144-3E.	A2V00002511149.	714
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8WL5570-0AK.	A2V00002244672.	639	8WL6200-2P.	A2V00001986211.	737
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8WL6134-0C.	A2V00002162299.	692	8WL6221-1A.	A2V00000200058.	110
8WL6134-0F.	A2V00002308531.	694	8WL6221-2.	A2V00000206340.	766
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8WL6134-3.	A2V00001407197.	678	8WL6222-0.	A2V00000203454.	764
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8WL6134-4.	A2V00001215400.	682	8WL6223-0A.	A2V00000200059.	111
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8WL6134-5.	A2V00001439656.	686	8WL6225-0.	A2V00000203458.	762
8WL6134-5F.	A2V00002326526.	688	8WL6225-2.	A2V00000203459.	754
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8WL6228-2C.	A2V00001797494.	769	8WL6253-5.	A2V00002056924.	730
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Technical comments

Application

Tensioning equipment from Siemens is suitable for multiple uses in overhead contact line systems such as for the installation of cross-catenaries, terminations, supports or cable fixings. All products are distinguished in particular by high corrosion resistance, long service life and minimal maintenance work.

Punch-lock bands in combination with loops or locks allow easy installation of cantilever swivel brackets for cantilevers and headspans with very little expenditure on preparations.

Turnbuckles allow easy subsequent regulating in the overhead contact line system thanks to their adjustable length.

Catenary poles can be avoided through the use of damping devices. This allows the contact line system to inconspicuously fit into the cityscape from an architectural point of view. The damping devices reduce the transfer of wire vibrations on wall mounts to buildings, thus preventing any negative impact on quality of life and the building materials. Since the damping devices insulate up to 1.5 kV DC, no further insulators are needed here.

Types

Depending on the use and application, the products are available in various designs and materials.

- Stainless steel
- Copper alloys
- Aluminium or aluminium alloys
- Hot-dip galvanized cast steel or malleable cast iron

Note

The products are designed to the loads and connecting dimensions of the cables, wires and fittings and are divided into the following three groups.

Minimum failing load	Pin diameter
up to 36 kN	13 mm
up to 60 kN	16 mm
up to 96 kN	19 mm

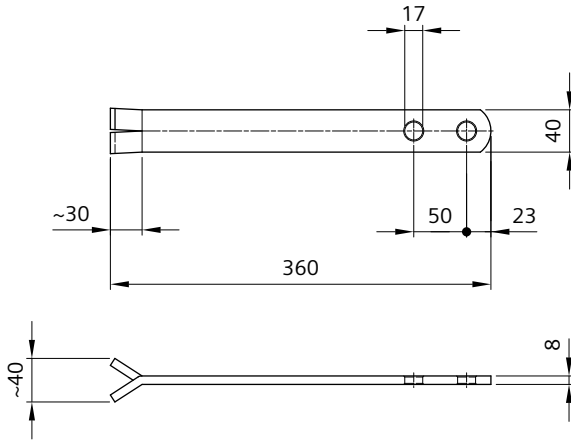
The minimum failing loads indicated for all clevis links with pins and split pins apply only to a lateral play of less than 2 mm between the straps.

According to standard EN 50119:2010, the use of wedge-type dead-end clamps and dead-end clamps is limited to 85 % of the rated failing load specified and computed for the contact wires or wires.

The load-bearing capacity of the punch-lock bands depends on the mast diameters and the cantilever swivel brackets used as well as on the load directions. If necessary, the application criteria are to be reviewed on a case-by-case basis, taking into account the local conditions.

Anchoring bracket

for terminations at buildings

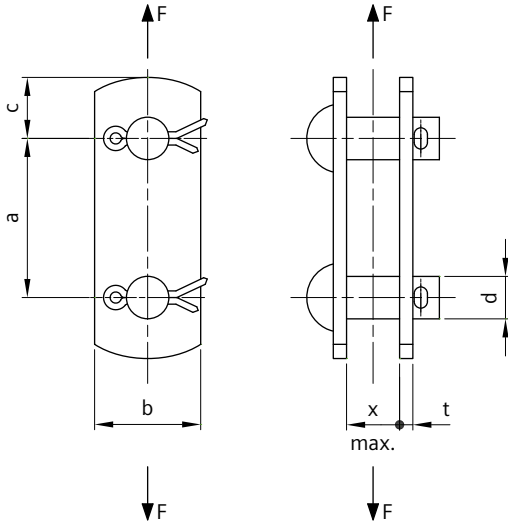


Order no.	8WL1010-5
Designation	Anchoring bracket 360
Material	stlSt
Weight	0.84 kg

The bearing capacity of the anchoring bracket depends on the wall and has to be checked from case to case.
Other lengths on request.

Two pin clevis link 13-16-19

for span guy arrangements

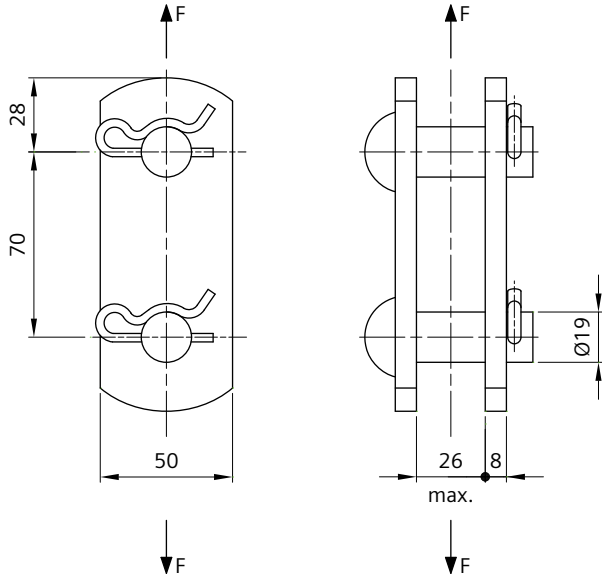


Order no.	8WL1013-2	8WL1016-6	8WL1018-0	8WL1018-2
Designation	Two pin clevis link 13	Two pin clevis link 16	Two pin clevis link 19	Two pin clevis link 19
Material				
Straps	stlSt	stlSt	htgSt	stlSt
Pins 13x34	stlSt	-	-	-
Pins 16x40	-	stlSt	-	-
Pins 19x52	-	-	htgSt	stlSt
Split pins 5x28	Cu	Cu	Cu	Cu
Weight	0.22 kg	0.46 kg	0.98 kg	0.74 kg
Perm. operating load	12 kN	20 kN	32 kN	32 kN
Min. failing load	36 kN	60 kN	96 kN	96 kN
a	50 mm	60 mm	70 mm	70 mm
b	35 mm	40 mm	50 mm	50 mm
c	20 mm	23 mm	28 mm	28 mm
d	13 mm	16 mm	19 mm	19 mm
t	3 mm	5 mm	8 mm	5 mm
x	18 mm	20 mm	26 mm	32 mm

The loads indicated only apply for a lateral play of less than 2 mm between the straps.

Two pin clevis link 19 (Al)

for span guy arrangements

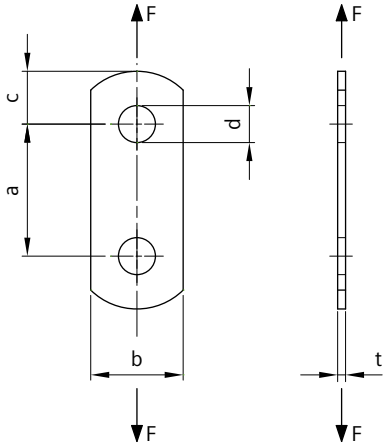


Order no.	8WL1018-3
Designation	Two pin clevis link 19
Material	
Straps	Al
Pins 19x52	Al
Beta-Split pins	stlSt
Weight	0.34 kg
Perm. operating load	32 kN
Min. failing load	96 kN

The loads indicated only apply for a lateral play of less than 2 mm between the straps.

Two pin strap 13-16-19

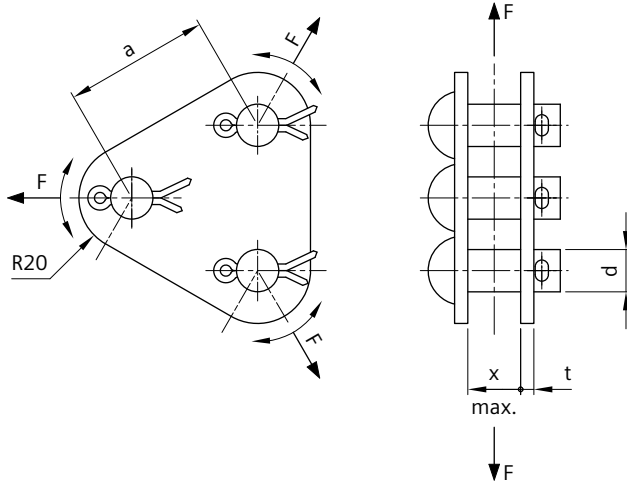
for span guy arrangements



Order no.	8WL1023-2	8WL1026-5	8WL1028-2	8WL1028-0	8WL1028-3
Designation	Two pin strap 13	Two pin strap 16	Two pin strap 19	Two pin strap 19	Two pin strap 19
Material	stlSt	stlSt	stlSt	htgSt	Al
Weight	0.07 kg	0.14 kg	0.20 kg	0.33 kg	0.12 kg
Perm. operating load	6 kN	10 kN	16 kN	16 kN	16 kN
Min. failing load	18 kN	30 kN	48 kN	48 kN	48 kN
a	50 mm	60 mm	70 mm	70 mm	70 mm
b	35 mm	40 mm	50 mm	50 mm	50 mm
c	20 mm	23 mm	28 mm	28 mm	28 mm
d	14 mm	17 mm	20 mm	20 mm	20 mm
t	3 mm	5 mm	5 mm	8 mm	8 mm

Three pin clevis link 13-16

for span guy arrangements

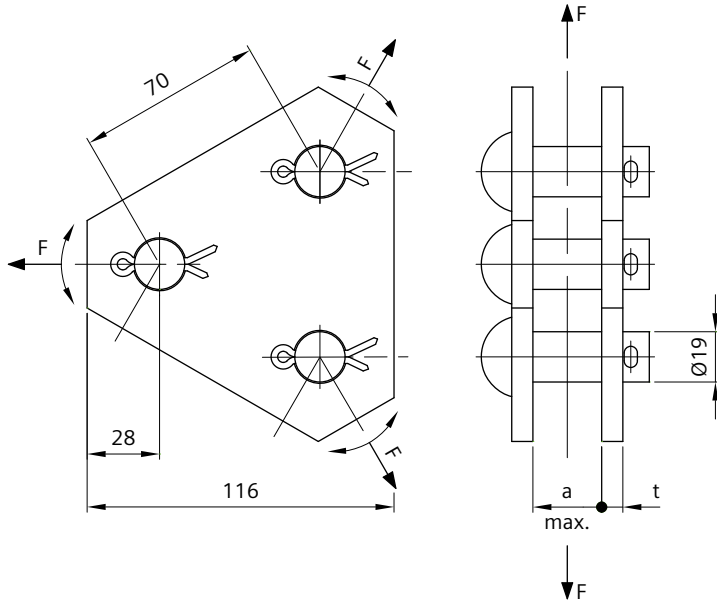


Order no.	8WL1033-2	8WL1036-7
Designation	Three pin clevis link 13	Three pin clevis link 16
Material		
Straps	stlSt	stlSt
Pins 13x40	stlSt	-
Pins 16x40	-	stlSt
Split pins 5x28	Cu	Cu
Weight	0.38 kg	0.68 kg
Perm. operating load	12 kN	20 kN
Min. failing load	36 kN	60 kN
a	45 mm	55 mm
d	13 mm	16 mm
t	3 mm	5 mm
x	24 mm	20 mm

The loads indicated only apply for a lateral play of less than 2 mm between the straps.

Three pin clevis link 19

for span guy arrangements

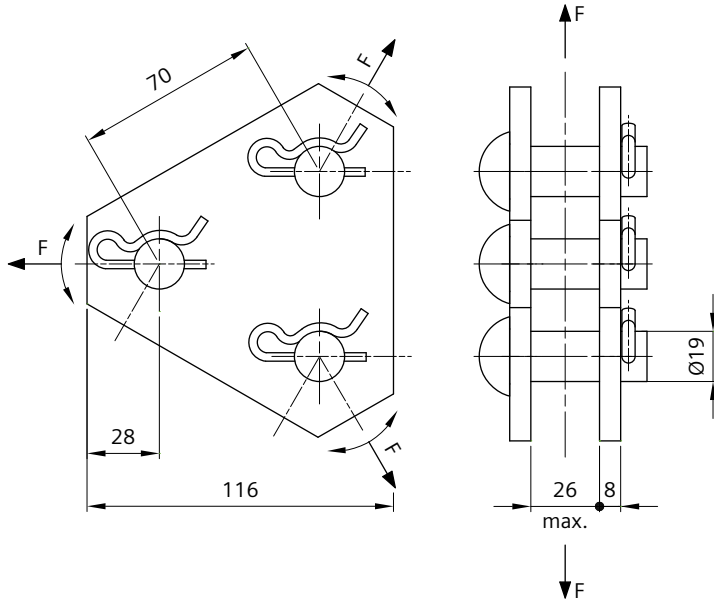


Order no.	8WL1038-0	8WL1038-2
Designation	Three pin clevis link 19	Three pin clevis link 19
Material		
Straps	htgSt	stlSt
Pins 19x52	htgSt	stlSt
Split pins 5x28	Cu	Cu
Weight	1.78 kg	1.10 kg
Perm. operating load	32 kN	32 kN
Min. failing load	96 kN	96 kN
a	26 mm	34 mm
t	8 mm	4 mm

The loads indicated only apply for a lateral play of less than 2 mm between the straps.

Three pin clevis link 19 (Al)

for span guy arrangements

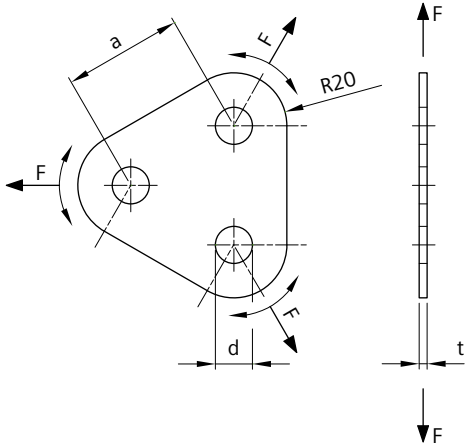


Order no.	8WL1038-3
Designation	Three pin clevis link 19
Material	
Straps	Al
Pins 19x52	Al
Beta-Split pins	stlSt
Weight	0.60 kg
Perm. operating load	32 kN
Min. failing load	96 kN

The loads indicated only apply for a lateral play of less than 2 mm between the straps.

Three pin strap 13-16

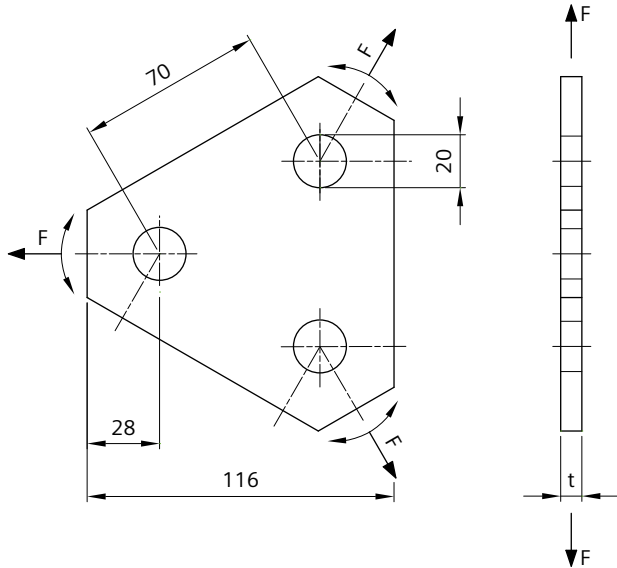
for span guy arrangements



Order no.	8WL1043-2	8WL1046-5
Designation	Three pin strap 13	Three pin strap 16
Material	stlSt	stlSt
Weight	0.11 kg	0.20 kg
Perm. operating load	6 kN	10 kN
Min. failing load	18 kN	30 kN
a	45 mm	55 mm
d	14 mm	17 mm
t	3 mm	5 mm

Three pin strap 19

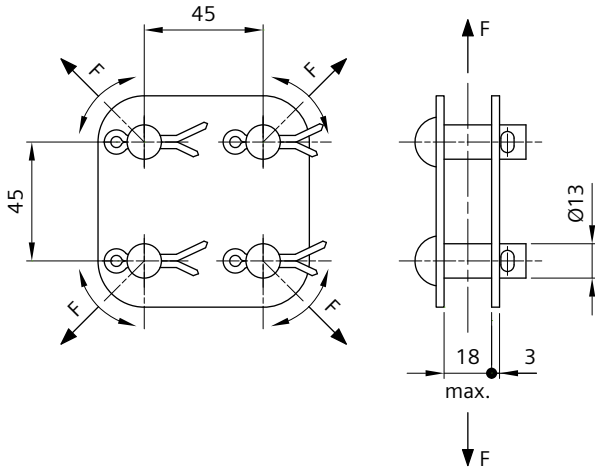
for span guy arrangements



Order no.	8WL1048-0	8WL1048-2	8WL1048-3
Designation	Three pin strap 19	Three pin strap 19	Three pin strap 19
Material	htgSt	stlSt	Al
Weight	0.61 kg	0.31 kg	0.22 kg
Perm. operating load	16 kN	16 kN	16 kN
Min. failing load	48 kN	48 kN	48 kN
t	8 mm	4 mm	8 mm

Four pin clevis link 13

for span guy arrangements

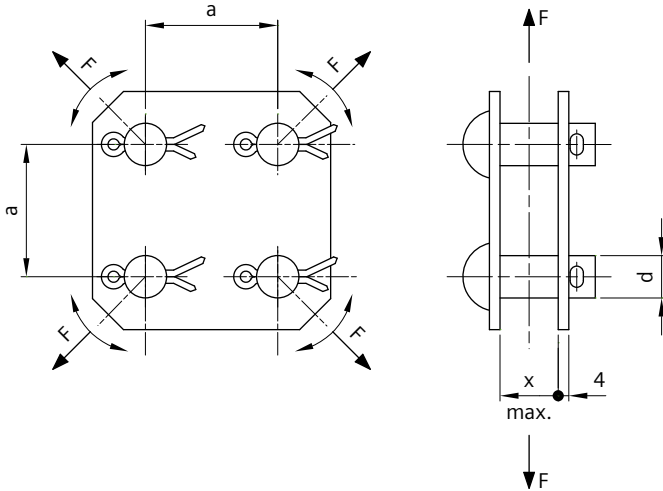


Order no.	8WL1053-2
Designation	Four pin clevis link 13
Material	
Straps	stlSt
Pins 13x34	stlSt
Split pins 5x28	Cu
Weight	0.46 kg
Perm. operating load	12 kN
Min. failing load	36 kN

The loads indicated only apply for a lateral play of less than 2 mm between the straps.

Four pin clevis link 16-19

for span guy arrangements

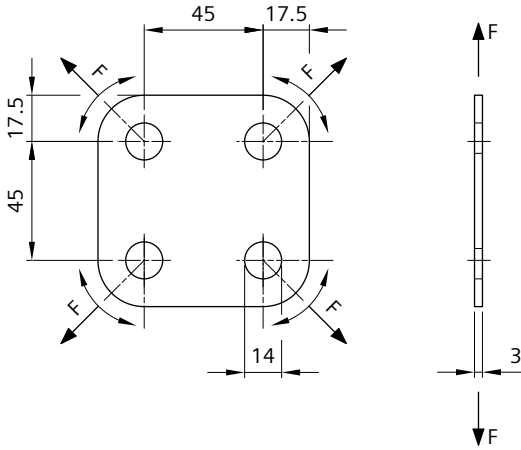


Order no.	8WL1056-2	8WL1058-2
Designation	Four pin clevis link 16	Four pin clevis link 19
Material		
Straps	stlSt	stlSt
Pins 16x40	stlSt	-
Pins 19x52	-	stlSt
Split pins 5x28	Cu	Cu
Weight	1.23 kg	1.65 kg
Perm. operating load	20 kN	32 kN
Min. failing load	60 kN	96 kN
a	50 mm	70 mm
d	16 mm	19 mm
x	22 mm	32 mm

The loads indicated only apply for a lateral play of less than 2 mm between the straps.

Four pin strap 13

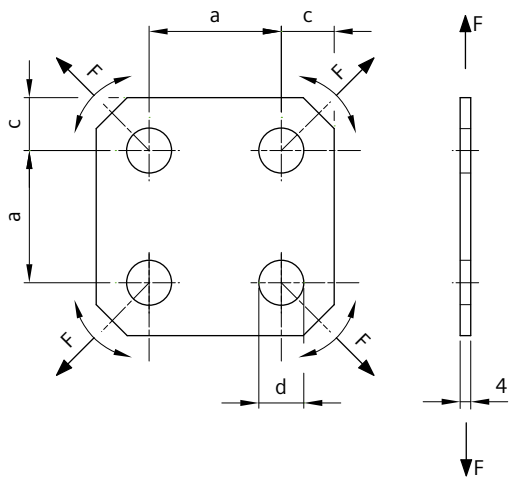
for span guy arrangements



Order no.	8WL1063-2
Designation	Four pin strap 13
Material	stlSt
Weight	0.13 kg
Perm. operating load	6 kN
Min. failing load	18 kN

Four pin strap 16-19

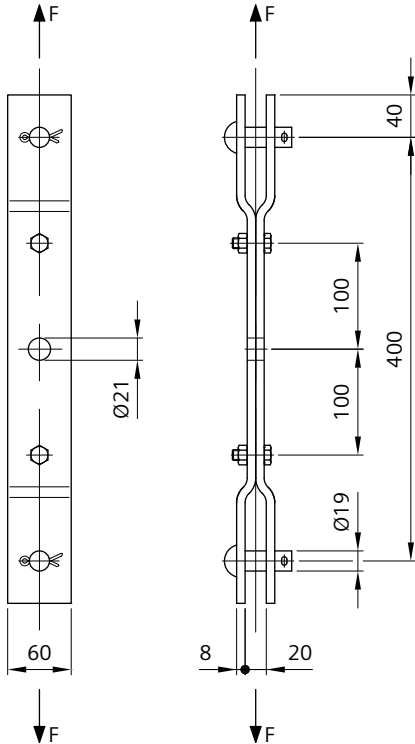
for span guy arrangements



Order no.	8WL1066-2	8WL1068-2
Designation	Four pin strap 16	Four pin strap 19
Material	stlSt	stlSt
Weight	0.22 kg	0.52 kg
Perm. operating load	10 kN	16 kN
Min. failing load	30 kN	48 kN
a	50 mm	70 mm
c	20 mm	28 mm
d	17 mm	20 mm

Double strap 400, offset

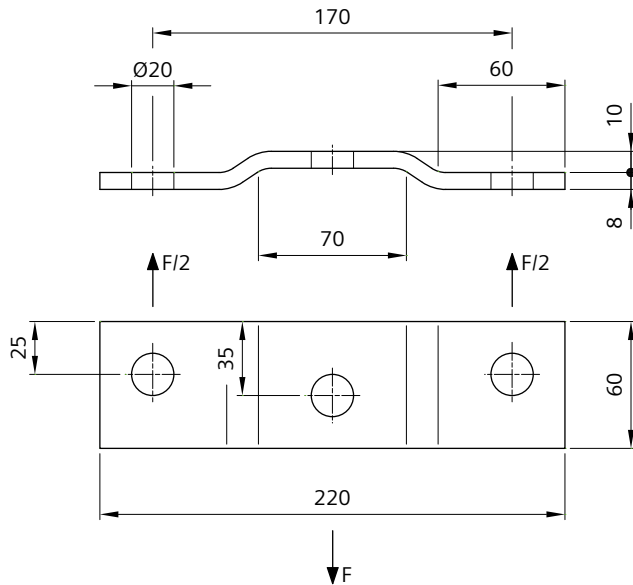
for insulation of headspan wires, fixed terminations in headspans and suspensions



Order no.	8WL1052-0
Designation	Double strap 400, offset
Material	
Straps	htgSt
Pins 19x52	htgSt
Split pins 5x28	Cu
Bolts M10	stlSt
Nuts	stlSt
Weight	3.86 kg
Perm. operating load	13.33 kN
Min. failing load	40 kN

Strap 170, offset

for intermediate insulation of cross-span wire, fixed point in headspan and spring-loaded termination

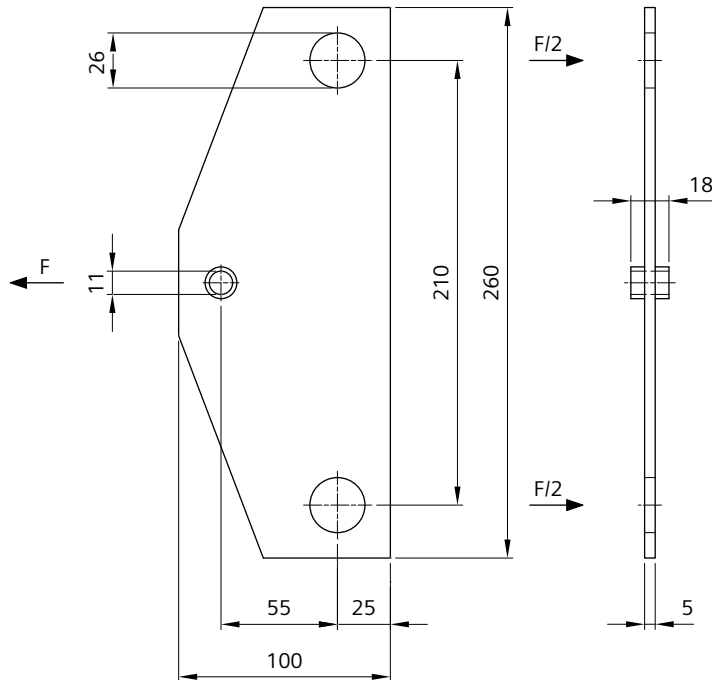


Order no.	8WL1052-1
Designation	Strap 170, offset
Material	htgSt
Weight	0.82 kg
Perm. operating load	12 kN
Min. failing load	36 kN

To be used by pairs.

Three pin connection strap

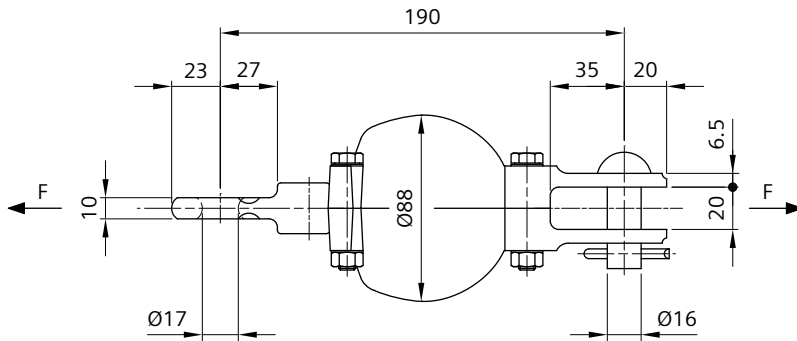
for pull-off



Order no.	8WL1047-3
Designation	Three pin connection strap
Material	stlSt
Weight	0.80 kg
Perm. operating load	5 kN
Min. failing load	15 kN

Damping device eye/clevis

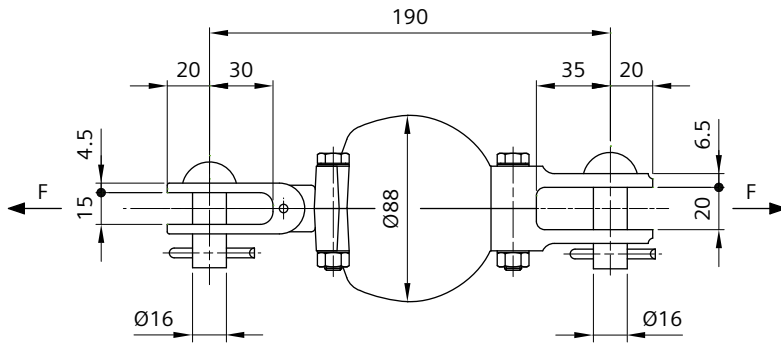
for terminations at buildings



Order no.	8WL1076-0
Designation	Damping device eye/clevis 16
Material	
Casing	CuAl
Fittings	CuAl
Torsion element	Rubber
Pin 16x45	stlSt
Split pin 5x28	Cu
Bolts M8	stlSt
Nuts	stlSt
Weight	1.78 kg
Perm. operating load	10 kN
Min. failing load	30 kN

Damping device clevis/clevis

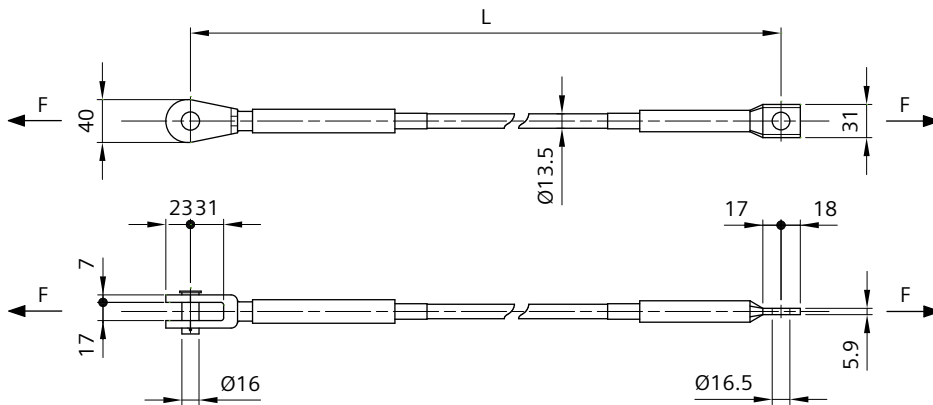
for terminations at buildings



Order no.	8WL1076-2
Designation	Damping device clevis/clevis 16
Material	
Casing	CuAl
Fittings	CuAl
Torsion element	Rubber
Pins 16x40, 16x45	stlSt
Split pins 5x28	Cu
Bolts M8	stlSt
Nuts	stlSt
Weight	1.86 kg
Perm. operating load	10 kN
Min. failing load	30 kN

Damping device made of synthetic wire up to 1.5 kV DC, insulating

for sound attenuation and insulation for terminations at buildings



Order no.	8WL1077-7D	8WL1077-7E
Designation	Damping device eye/clevis 16	Damping device eye/clevis 16
Material		
Fittings	stlSt	stlSt
Synthetic wire	Parafil-wire (Polyester with polyethylene sheath)	Parafil-wire (Polyester with polyethylene sheath)
Weight	0.63 kg	0.70 kg
Perm. operating load	10 kN (2.5 % extension)	10 kN (2.5 % extension)
Min. failing load	35 kN (\geq 6.5 % extension)	35 kN (\geq 6.5 % extension)
Nominal voltage	1.5 kV DC	1.5 kV DC
Min. creepage distance	1150 mm	1650 mm
L	1500 mm	2000 mm

Can also be supplied in other lengths and with other connecting fittings, order numbers:

8WL1077-7F eye/clevis 16 L=1000 mm

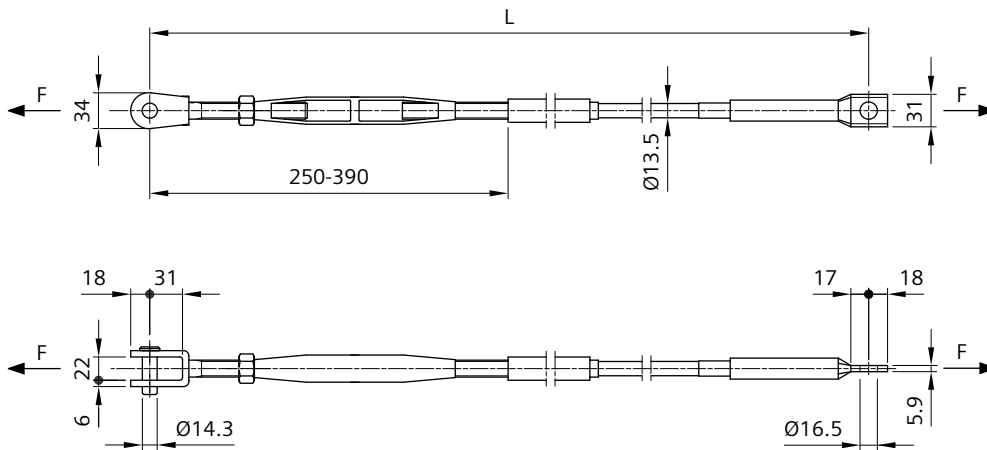
8WL1077-7H eye/clevis 16 L=3000 mm

8WL1077-7G clevis/clevis 16 L=1500 mm

8WL1077-7M eye/eye 16 L=1500 mm

Damping device made of synthetic wire up to 1.5 kV DC, insulating, with turnbuckle

for sound attenuation and insulation for terminations at buildings

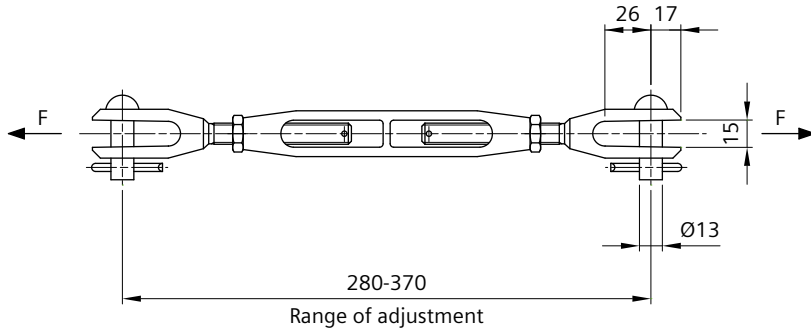


Order no.	8WL1077-7K	8WL1077-7L
Designation	Damping device eye/clevis	Damping device eye/clevis
Material		
Fittings	stlSt	stlSt
Synthetic wire	Parafil-wire (Polyester with polyethylene sheath)	Parafil-wire (Polyester with polyethylene sheath)
Weight	1.4 kg	1.47 kg
Perm. operating load	10 kN (2.5 % extension)	10 kN (2.5 % extension)
Min. failing load	32 kN (≥ 6.5 % extension)	32 kN (≥ 6.5 % extension)
Nominal voltage	1.5 kV DC	1.5 kV DC
Min. creepage distance	850 mm	1350 mm
L	1500 mm	2000 mm

Other lengths and with other connecting fittings on request.

Turnbuckle M12 clevis/clevis

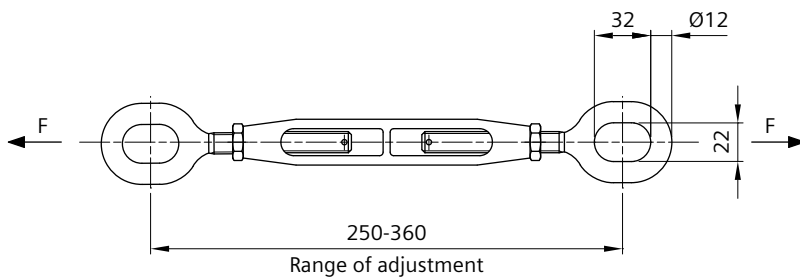
for terminations



Order no.	8WL1078-1
Designation	Turnbuckle M12
Material	
Turnbuckle	CuAl
Pins 13x40	Cu
Split pins 5x28	Cu
Weight	0.65 kg
Perm. operating load	11 kN
Min. failing load	33 kN

Turnbuckle M12 eye/eye

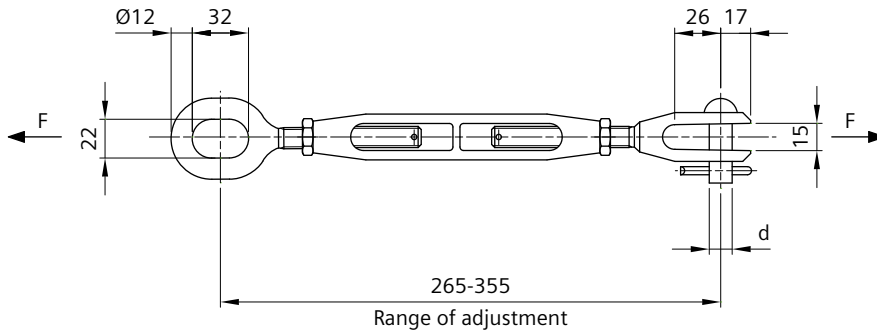
for terminations



Order no.	8WL1078-3
Designation	Turnbuckle M12
Material	CuAl
Weight	0.63 kg
Perm. operating load	11 kN
Min. failing load	33 kN

Turnbuckle M12 eye/clevis

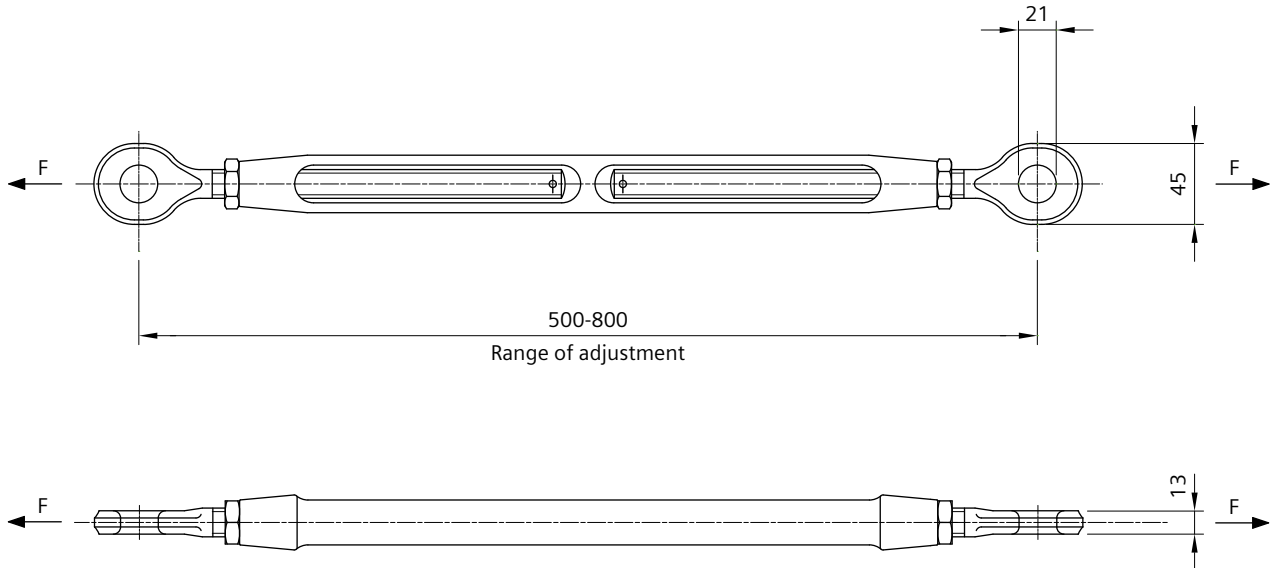
for terminations



Order no.	8WL1078-4	8WL1078-5
Designation	Turnbuckle M12	Turnbuckle M12
Material		
Turnbuckle	CuAl	CuAl
Pin 13x40	Cu	-
Pin 16x40	-	Cu
Split pin 5x28	Cu	Cu
Weight	0.68 kg	0.72 kg
Perm. operating load	11 kN	11 kN
Min. failing load	33 kN	33 kN
d	13 mm	16 mm

Turnbuckle M16 eye/eye

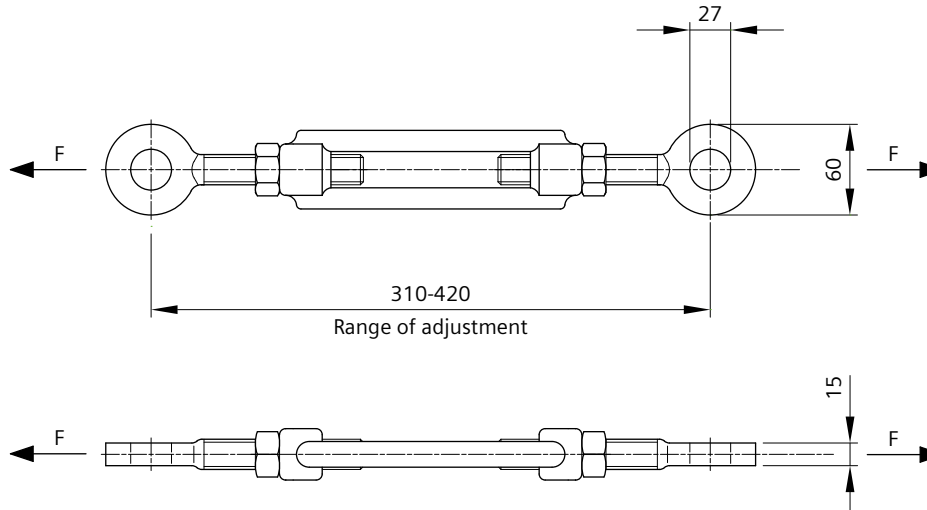
for terminations



Order no.	8WL1080-5
Designation	Turnbuckle M16
Material	CuAl
Weight	1.66 kg
Perm. operating load	22 kN
Min. failing load	66 kN

Turnbuckle M20 eye/eye

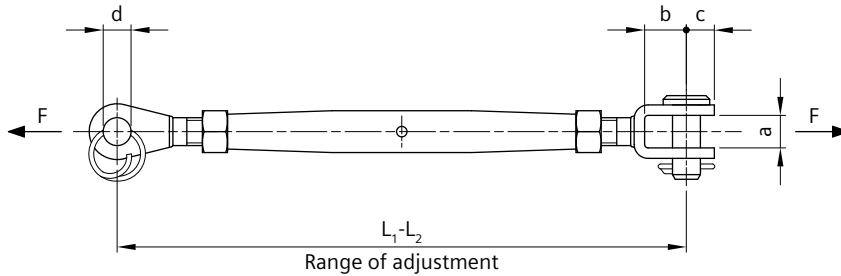
for terminations



Order no.	8WL1097-3A
Designation	Turnbuckle M20
Material	htgSt
Weight	1.80 kg
Perm. operating load	15 kN
Min. failing load	45 kN

Turnbuckle clevis/clevis

for terminations



Part 1

Order no.	8WL1082-0	8WL1082-1	8WL1082-2	8WL1082-3	8WL1082-4
Designation	Turnbuckle M6	Turnbuckle M8	Turnbuckle M10	Turnbuckle M12	Turnbuckle M16
Material	stlSt	stlSt	stlSt	stlSt	stlSt
Weight	0.09 kg	0.14 kg	0.24 kg	0.52 kg	1.02 kg
Perm. operating load	3.34 kN	5.00 kN	9.34 kN	12.34 kN	21.67 kN
Min. failing load	10 kN	15 kN	28 kN	37 kN	65 kN
a	7 mm	10 mm	10 mm	14 mm	22 mm
b	11 mm	13 mm	16 mm	25 mm	35 mm
c	6 mm	7 mm	8 mm	13 mm	18 mm
d	5 mm	6 mm	8 mm	12 mm	14 mm
L ₁ - L ₂	140 - 210 mm	165 - 240 mm	190 - 270 mm	245 - 360 mm	310 - 450 mm

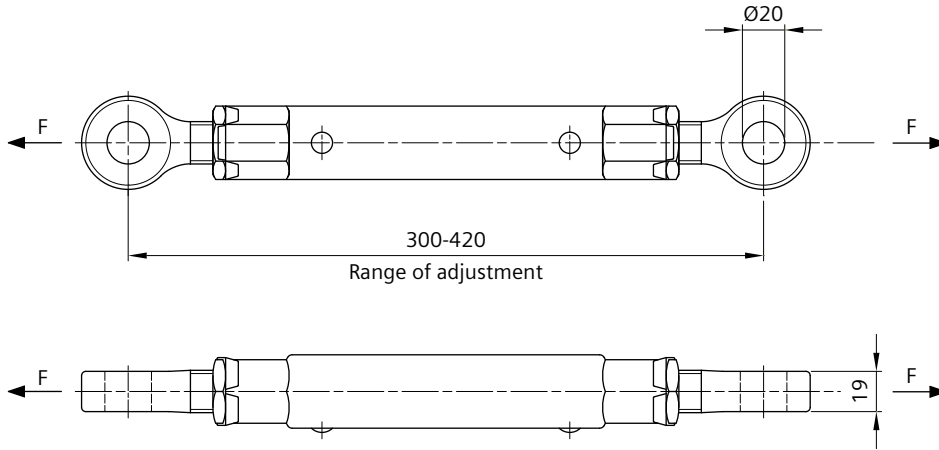
Part 2

Order no.	8WL1082-5
Designation	Turnbuckle M20
Material	stlSt
Weight	2.02 kg
Perm. operating load	36.67 kN
Min. failing load	110 kN
a	26 mm
b	49 mm
c	21 mm
d	19 mm
L ₁ - L ₂	385 - 545 mm

Types eye/eye on request.

Turnbuckle M20 eye/eye

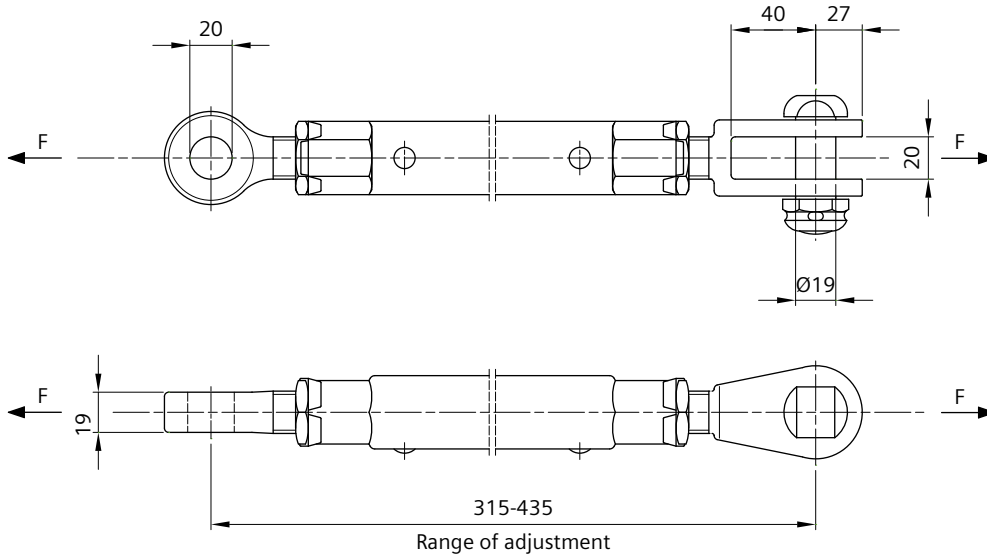
for terminations



Order no.	8WL1078-7A
Designation	Turnbuckle M20
Material	htgSt
Weight	2.05 kg
Perm. operating load	61.7 kN
Min. failing load	185 kN

Turnbuckle M20 eye/clevis

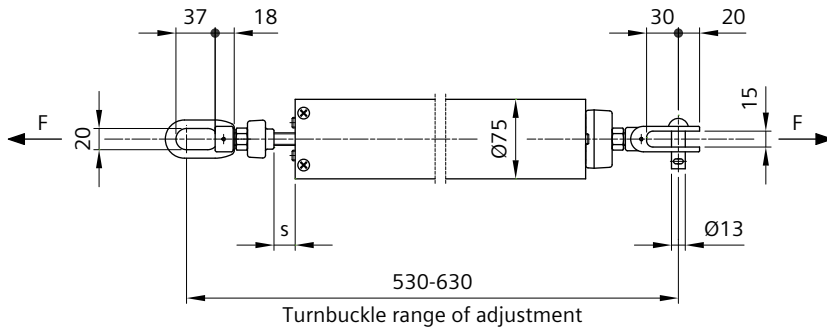
for terminations



Order no.	8WL1078-7B
Designation	Turnbuckle M20
Material	htgSt
Weight	2.15 kg
Perm. operating load	61.7 kN
Min. failing load	185 kN

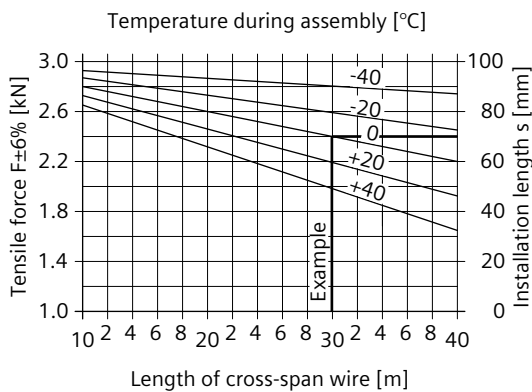
Cross-span tensioning spring with integrated turnbuckle

for tensioning cross-span wire



Order no.	8WL1086-5A
Designation	Cross-span tensioning spring
Material	
Casing	Plastic
Eye-bolt, nuts	stlSt
Spring	Spring steel
Spring plate	Al
Eye-bolt flange	Al
Clevis, eye	CuAl
Pin 13x40	stlSt
Split pin 5x28	Cu
Weight	4.48 kg
Tensile force	1 - 3 kN (working range)
Working stroke (spring)	100 mm
Pretension of spring	1 kN

Diagram for determination of installation length „s“:

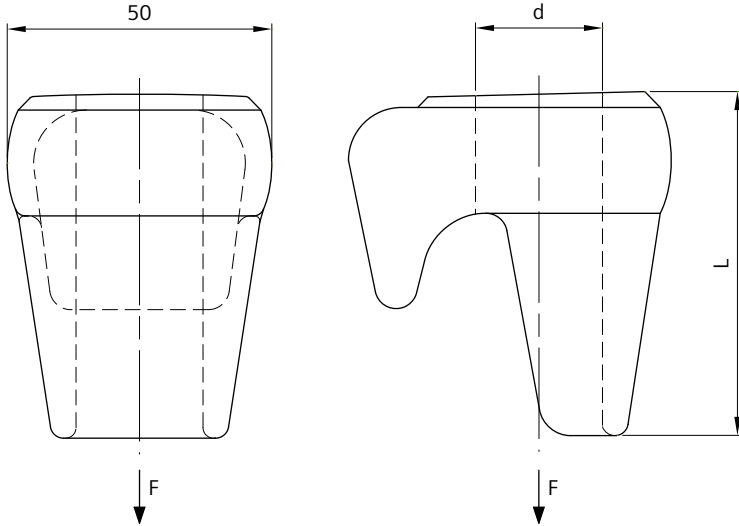


Example:

Length of cross-span wire = 30 m, temperature during assembly = 0 °C, results in an installation length s of = 70 mm

Dog

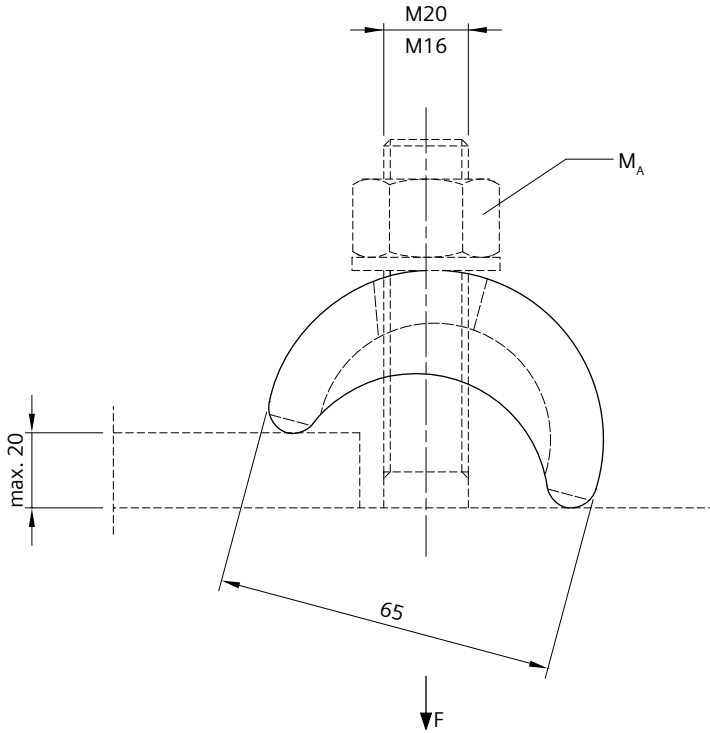
for fixing of components at L- and U-sections



Order no.	8WL1090-0	8WL1090-1
Designation	Dog M12/16	Dog M20/22
Material	mCl	mCl
Weight	0.17 kg	0.49 kg
Perm. operating load	13.34 kN	26.7 kN
Min. failing load	40 kN	80 kN
d	17 mm	24 mm
L	32 mm	65 mm

Dog

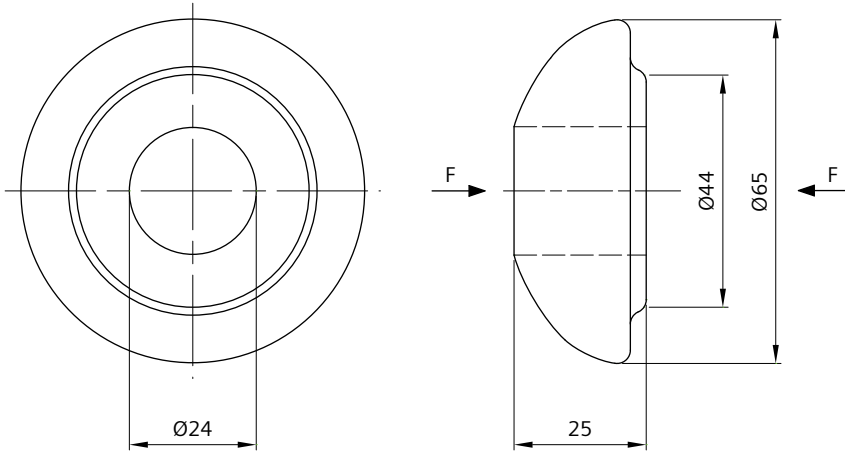
for fixing of components at steel section poles



Order no.	8WL1094-0	8WL1094-1
Designation	Dog M16	Dog M20
Material	mICI	mICI
Weight	0.28 kg	0.25 kg
Perm. operating load	26.7 kN	20 kN
Min. failing load	80 kN	60 kN
Tightening torque M_A	60 Nm	80 Nm

Ball washer 24

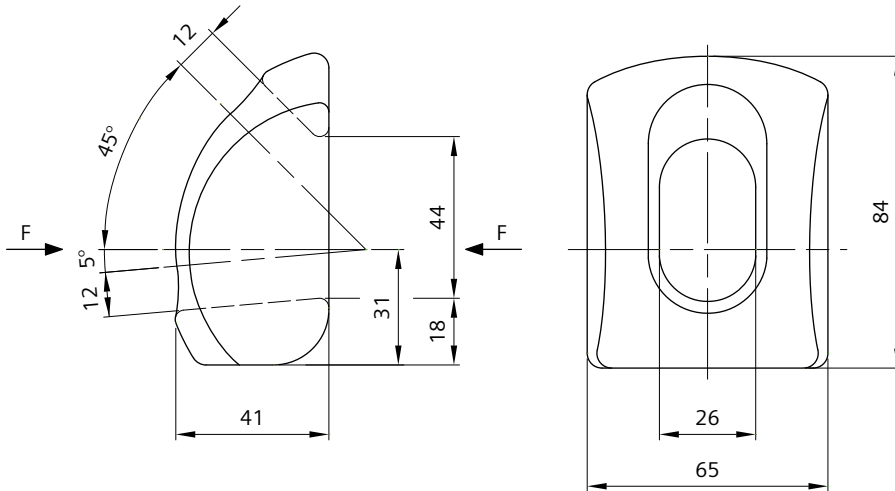
for fixed terminations



Order no.	8WL1091-0	8WL1091-1
Designation	Ball washer 24	Ball washer 24
Material	htgSt	ctAl
Weight	0.36 kg	0.12 kg
Perm. operating load	32 kN	32 kN
Min. failing load	96 kN	96 kN

Adjustable washer

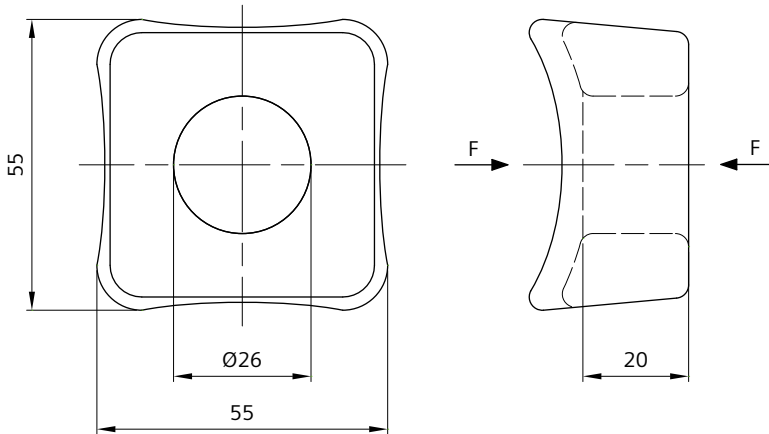
for fixed terminations



Order no.	8WL1092-0	8WL1092-1
Designation	Adjustable washer	Adjustable washer
Material	mCl	ctAl
Weight	0.86 kg	0.29 kg
Perm. operating load	32 kN	32 kN
Min. failing load	96 kN	96 kN

Concave washer for adjustable washer

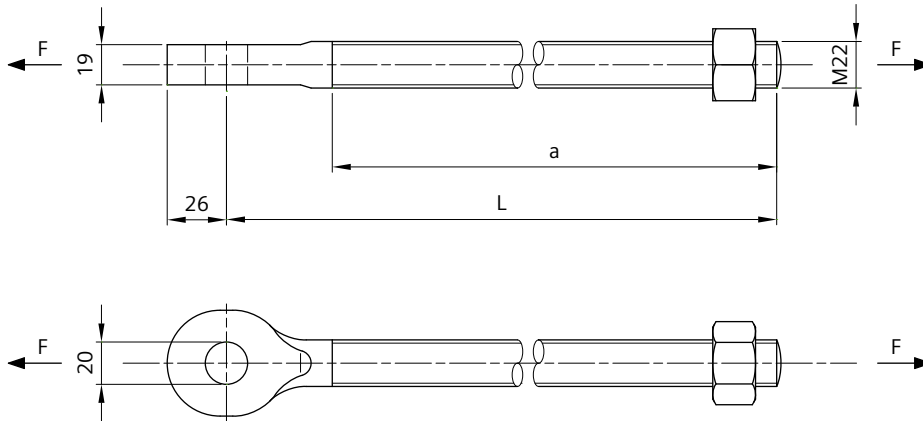
for adjustable washer 8WL1092-0/-1



Order no.	8WL1093-0	8WL1093-1
Designation	Concave washer for adjustable washer 8WL1092-0	Concave washer for adjustable washer 8WL1092-1
Material	htgSt	ctAl
Weight	0.40 kg	0.13 kg
Perm. operating load	32 kN	32 kN
Min. failing load	96 kN	96 kN

Eye-bolt M22 with nut

for anchoring of poles, for terminations at lattice steel poles and cantilever fixing

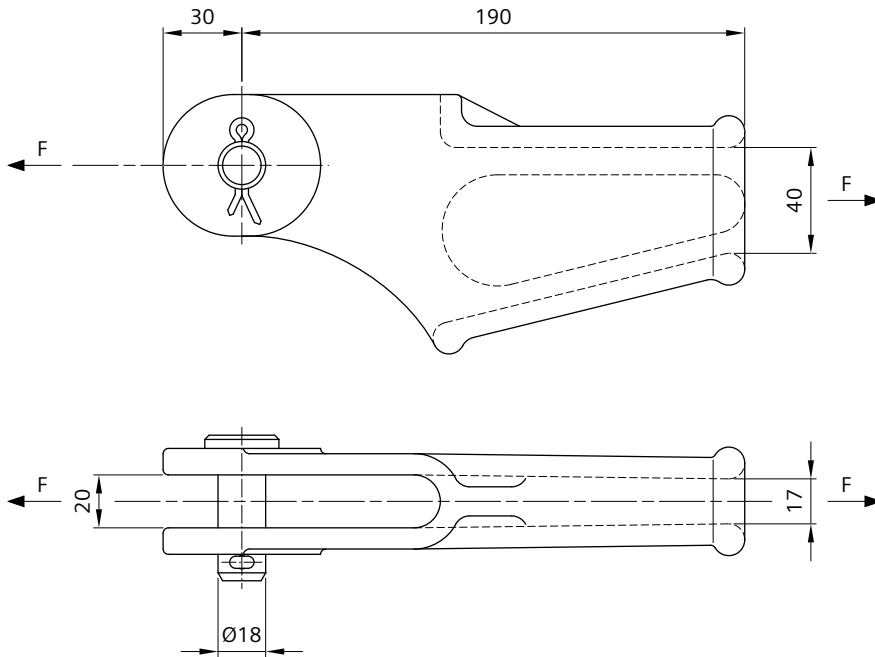


Order no.	8WL1272-1	8WL1272-2	8WL1272-3	8WL1272-5
Designation	Eye-bolt M22x350	Eye-bolt M22x650	Eye-bolt M22x900	Eye-bolt M22x1300
Material	htgSt	htgSt	htgSt	htgSt
Weight	1.34 kg	1.92 kg	2.64 kg	4.16 kg
Perm. operating load	32 kN	32 kN	32 kN	32 kN
Min. failing load	96 kN	96 kN	96 kN	96 kN
a	300 mm	500 mm	500 mm	500 mm
L	350 mm	650 mm	900 mm	1300 mm

Other lengths on request.

Wedge-type dead-end clamp for pole anchor

for anchoring of poles with wire 8WL7091-7

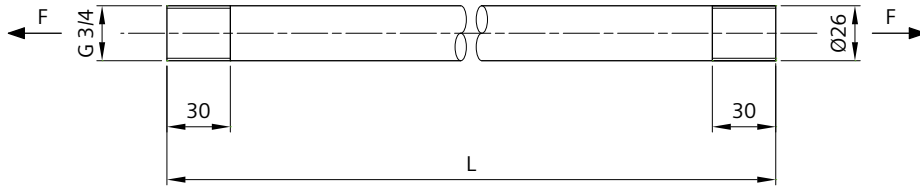


Order no.	8WL1192-0
Designation	Wedge-type dead-end clamp
Material	
Clamp body	mCl
Wedge	mCl
Pin 18x50	stlSt
Split pin 5x28	Cu
Weight	2.05 kg

The clamp supports the wire given with at least 85 % of its rated failing load.

Round bar 26 for pole anchor

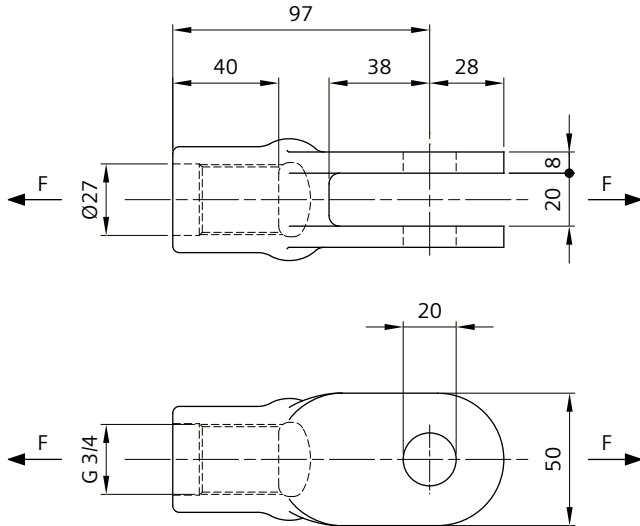
for anchoring of poles



Order no.	8WL1276-0	8WL1277-0
Designation	Round bar 26	Round bar 26
Material	htgSt	htgSt
Weight	19.8 kg	28.6 kg
Perm. operating load	40 kN	40 kN
Min. failing load	120 kN	120 kN
L	4500 mm	6500 mm

Clevis end fitting 26

for anchoring of poles

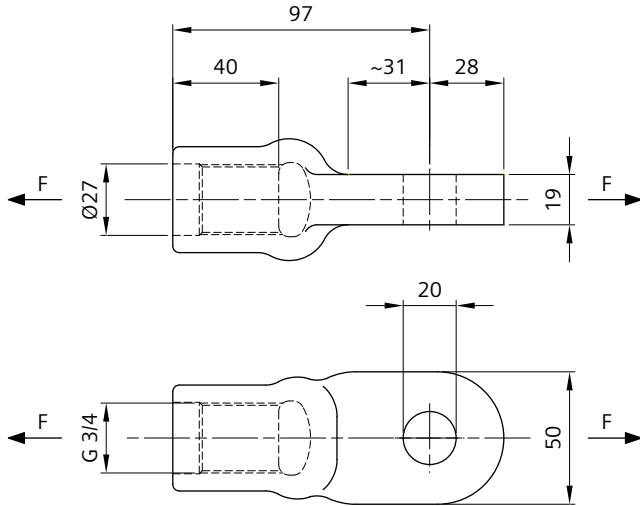


Order no.	8WL6221-1A
Designation	Clevis end fitting 26
Material	mICI
Weight	0.72 kg
Perm. operating load	40 kN
Min. failing load	120 kN

Pin 8WL1110-0 (19x52-htgSt) and split pin 8WL1115-1 (5x28-Cu) must be ordered separately, see Chapter 02-01.

Tongue end fitting 26, straight

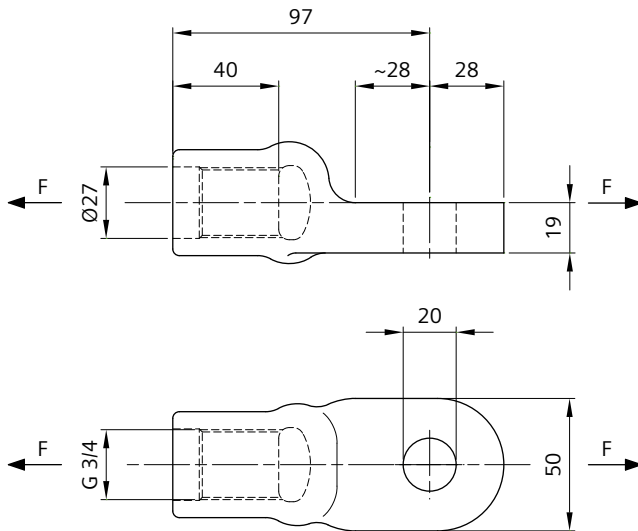
for anchoring of poles



Order no.	8WL6223-0A
Designation	Tongue end fitting 26
Material	mCl
Weight	0.78 kg
Perm. operating load	40 kN
Min. failing load	120 kN

Tongue end fitting 26, offset

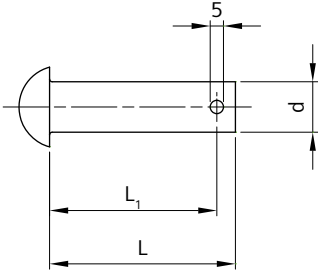
for anchoring of poles



Order no.	8WL6226-0A
Designation	Tongue end fitting 26
Material	mICI
Weight	0.74 kg
Perm. operating load	40 kN
Min. failing load	120 kN

Pin (DIN 43161)

for clevis links, clamps, tensioning straps etc.



Part 1

Order no.	8WL1100-2	8WL1101-2	8WL1102-2	8WL1116-4	8WL1104-2
Designation	Pin 13x34	Pin 13x40	Pin 13x45	Pin 13x55	Pin 16x40
Material	stlSt	stlSt	stlSt	stlSt	stlSt
Weight	0.043 kg	0.053 kg	0.054 kg	0.066 kg	0.087 kg
d	13 mm	13 mm	13 mm	13 mm	16 mm
L	34 mm	40 mm	45 mm	55 mm	40 mm
L ₁	27 mm	33 mm	38 mm	48 mm	33 mm

Part 2

Order no.	8WL1105-0	8WL1105-2	8WL1106-2	8WL1110-0	8WL1110-2
Designation	Pin 16x45	Pin 16x45	Pin 16x50	Pin 19x52	Pin 19x52
Material	htgSt	stlSt	stlSt	htgSt	stlSt
Weight	0.092 kg	0.097 kg	0.103 kg	0.157 kg	0.156 kg
d	16 mm	16 mm	16 mm	19 mm	19 mm
L	45 mm	45 mm	50 mm	52 mm	52 mm
L ₁	38 mm	38 mm	43 mm	45 mm	45 mm

Part 3

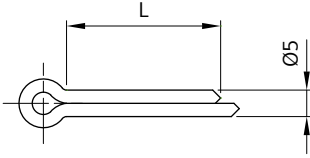
Order no.	8WL1110-3	8WL1111-0	8WL1111-2	8WL1111-3	8WL1112-0
Designation	Pin 19x52	Pin 19x70	Pin 19x70	Pin 19x70	Pin 19x100
Material	Al	htgSt	stlSt	Al	htgSt
Weight	0.054 kg	0.197 kg	0.192 kg	0.069 kg	0.264 kg
d	19 mm	19 mm	19 mm	19 mm	19 mm
L	52 mm	70 mm	70 mm	70 mm	100 mm
L ₁	45 mm	63 mm	63 mm	63 mm	93 mm

Part 4

Order no.	8WL1112-2	8WL1112-3
Designation	Pin 19x100	Pin 19x100
Material	stlSt	Al
Weight	0.263 kg	0.090 kg
d	19 mm	19 mm
L	100 mm	100 mm
L ₁	93 mm	93 mm

Split pin (ISO 1234)

for securing pins and prestressed sleeves

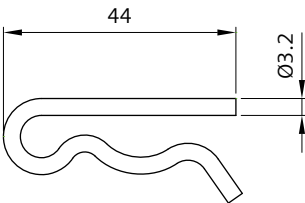


Order no.	8WL1115-1	8WL1115-2	8WL1115-3	8WL1115-4
Designation	Split pin 5x28	Split pin 5x28	Split pin 5x28	Split pin 5x80
Material	Cu	stlSt	Al	Al
Weight	5.0 kg/1000 pcs.	5.0 kg/1000 pcs.	2.0 kg/1000 pcs.	4.0 kg/1000 pcs.
L	28 mm	28 mm	28 mm	80 mm

Other sizes and lengths on request.

Beta-Split pin

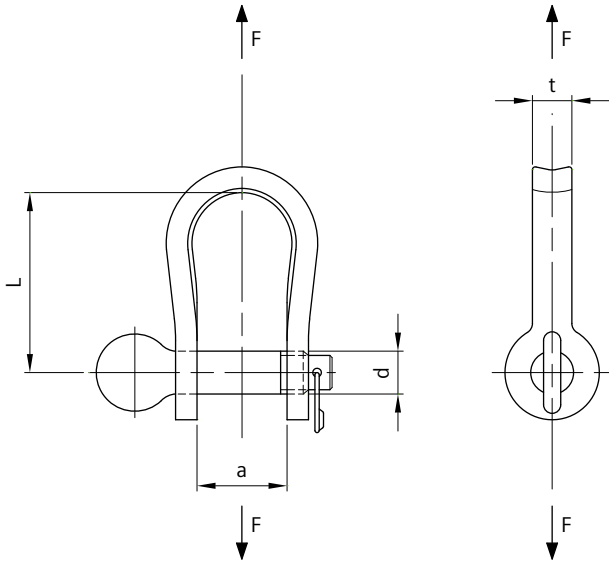
for securing pins, for pins d=19 mm



Order no.	8WL1114-8
Designation	Beta-Split pin
Material	stlSt
Weight	6.0 kg/1000 pcs.

Shackle with threaded pin and split pin ring

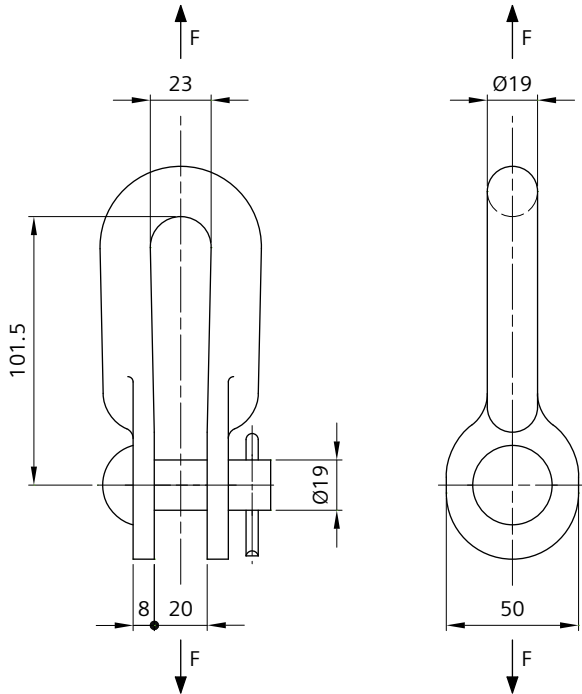
for terminations



Order no.	8WL1118-4	8WL1118-5	8WL1118-6	8WL1118-7
Designation	Shackle 6	Shackle 8	Shackle 10	Shackle 12
Material	stlSt	stlSt	stlSt	stlSt
Weight	0.023 kg	0.045 kg	0.09 kg	0.17 kg
Perm. operating load	5 kN	8 kN	12 kN	16 kN
Min. failing load	15 kN	24 kN	36 kN	48 kN
a	~16 mm	~18 mm	~21 mm	~27 mm
d	6 mm	8 mm	10 mm	12 mm
t	8 mm	8 mm	11.5 mm	14.5 mm
L	~23 mm	~30 mm	~40 mm	~50 mm

Shackle 19 with pin

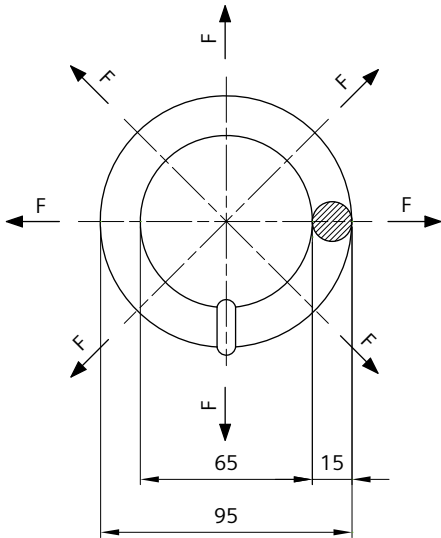
for terminations



Order no.	8WL1123-1
Designation	Shackle 19-90
Material	
Shackle	htgSt
Pin 19x52	htgSt
Split pin 5x28	Cu
Weight	0.84 kg
Perm. operating load	32 kN
Min. failing load	96 kN

Terminal ring

for terminations

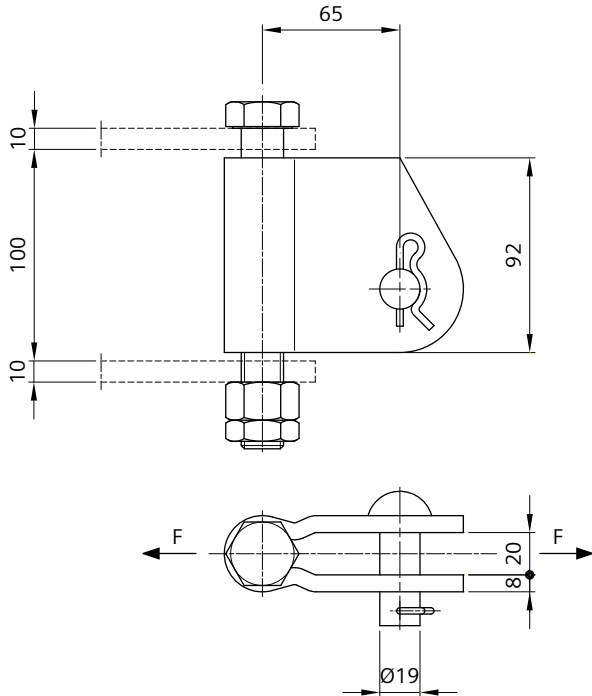


Order no.	8WL1135-0
Designation	Terminal ring
Material	stlSt
Weight	0.36 kg
Perm. operating load	12.5 kN
Min. failing load	37.5 kN

The stated loads apply for max. 8 equally distributed terminations only.

Strain hinge

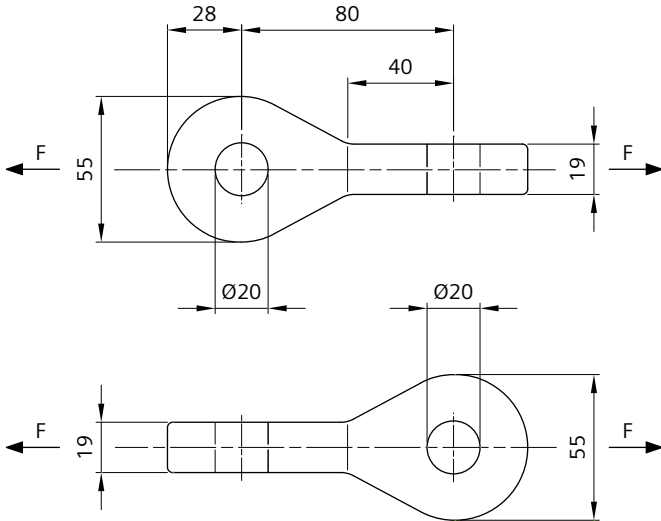
for terminations of feeder lines



Order no.	8WL1127-1
Designation	Strain hinge BN19-19-100-8
Material	
Strain hinge	stlSt
Bolt M20	stlSt
Nuts	stlSt
Pin 19x25	stlSt
Beta-Split pin	stlSt
Weight	1.72 kg
Perm. operating load	53.33 kN
Min. failing load	160 kN

Cross link 19 eye/eye

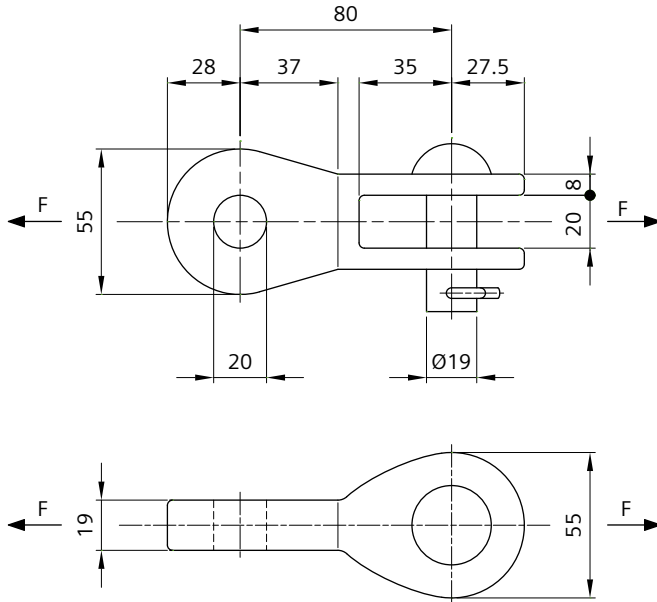
for span guy arrangements



Order no.	8WL1134-5
Designation	Cross link 19
Material	ctAl
Weight	0.24 kg
Perm. operating load	20 kN
Min. failing load	60 kN

Cross link 19 eye/clevis

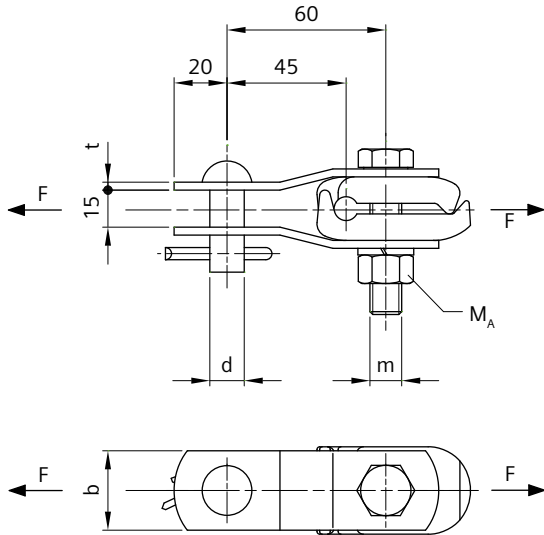
for span guy arrangements



Order no.	8WL1135-6
Designation	Cross link 19
Material	
Cross link	ctAl
Pin 19x52	Al
Beta-Split pin	stlSt
Weight	0.34 kg
Perm. operating load	20 kN
Min. failing load	60 kN

Pull-off clamp

for pull-off made of copper/bronze stranded wires acc. to DIN 48201 or wire ropes 8WL7093-2 to -4

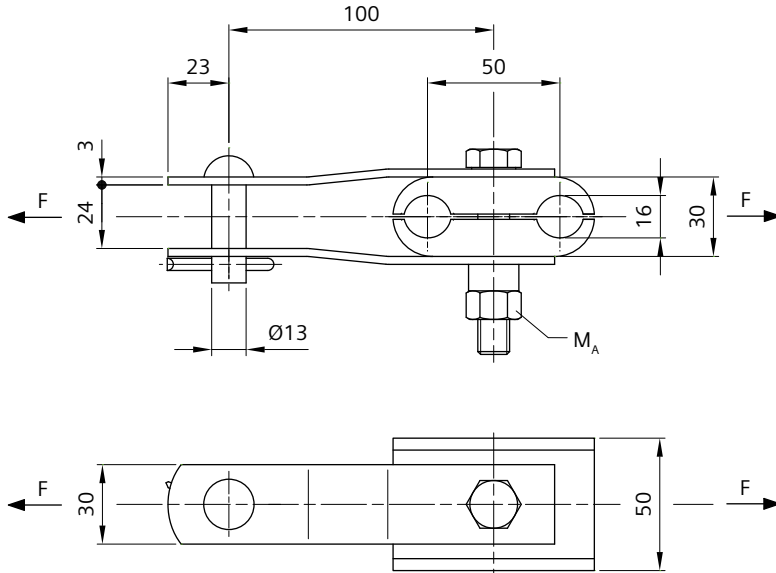


Order no.	8WL1141-0	8WL1141-1
Designation	Pull-off clamp 13-70	Pull-off clamp 16-70
Material		
Clamp body	CuZn	CuZn
Straps	stlSt	stlSt
Pin 13x34	stlSt	-
Pin 16x40	-	stlSt
Split pin 5x28	Cu	Cu
Bolt M12	stlSt	-
Bolt M16	-	stlSt
Nut, spring washer	stlSt	stlSt
for wires	6 - 10.5 mm 6 - 10 mm (8WL7093-2 to -4)	6 - 10.5 mm 6 - 10 mm (8WL7093-2 to -4)
Weight	0.50 kg	0.66 kg
Perm. operating load	10 kN	12 kN
Min. failing load	30 kN	36 kN
Tightening torque M_A	56 Nm	135 Nm
b	30 mm	35 mm
d	13 mm	16 mm
t	3 mm	4 mm
m	M12	M16

Protection sleeves must be ordered separately, see Chapter 02-02.

Pull-off clamp for twin catenary wires

for pull-off with twin catenary wires made of copper or bronze acc. to DIN 48201



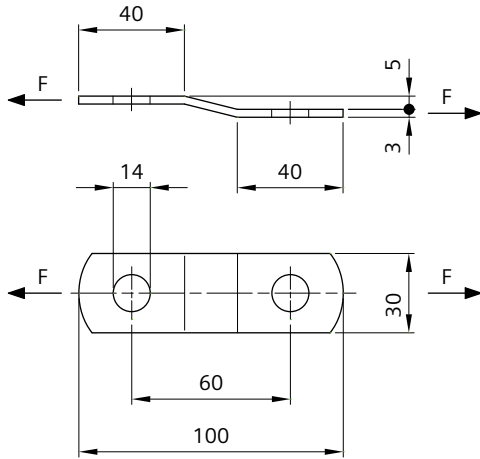
Order no.	8WL1141-7
Designation	Pull-off clamp 13-150
Material	
Clamp body	CuAl
Straps	stlSt
Pin 13x40	Cu
Split pin 5x28	Cu
Spacer	Cu5
Bolt M12	stlSt
Nut	stlSt
for wires	up to 150 mm ²
Weight	0.72 kg
Perm. operating load	6 kN
Min. failing load	18 kN
Tightening torque M_A	56 Nm

Protection sleeves must be ordered separately, see Chapter 02-02.

Two straps 8WL1143-3 for twin pull-off clamp must be ordered separately, see page 125.

Strap 60, offset

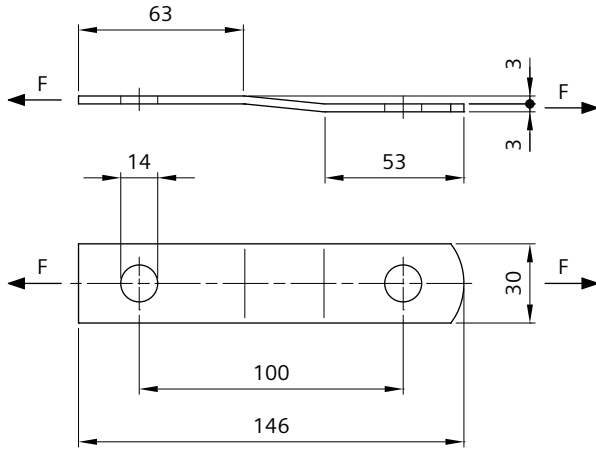
for pull-off clamp 8WL1141-0



Order no.	8WL1142-5
Designation	Strap 60, offset
Material	stlSt
Weight	0.06 kg
Perm. operating load	5 kN
Min. failing load	15 kN

Strap 100, offset

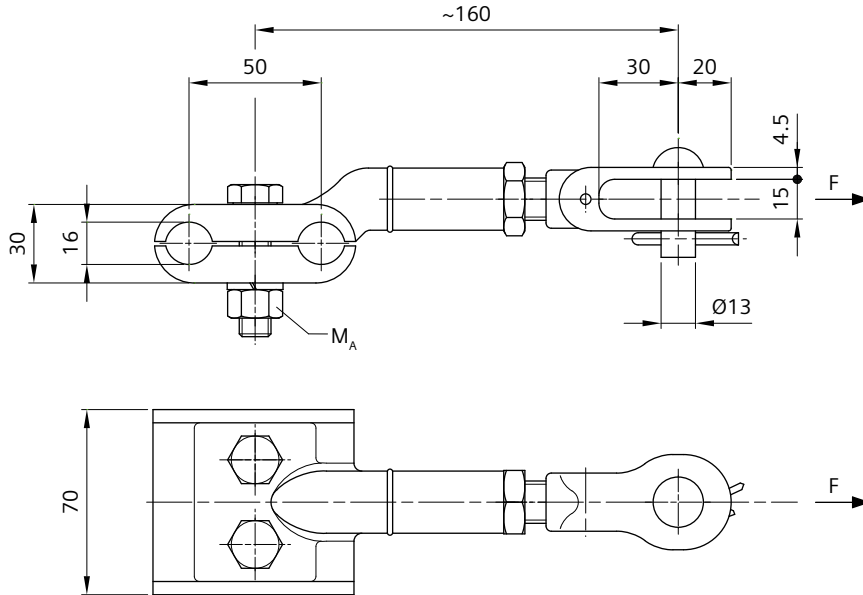
for pull-off clamp 8WL1141-7



Order no.	8WL1143-3
Designation	Strap 100, offset
Material	stlSt
Weight	0.09 kg
Perm. operating load	3 kN
Min. failing load	9 kN

Multiple purpose clamp for pull-offs

for wires acc. to DIN 48201

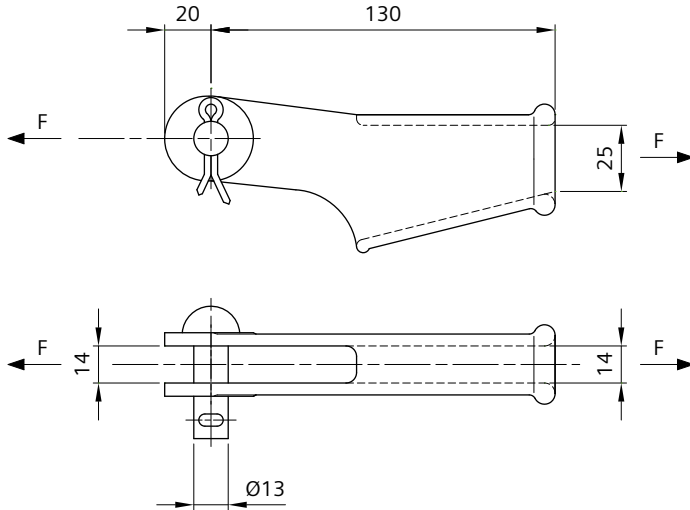


Order no.	8WL1145-1
Designation	Multiple purpose clamp clevis 13
Material	
Clamp body	CuAl
Pin 13x34	Cu
Split pin 5x28	Cu
Bolts M12	stlSt
Nuts	stlSt, Cu2
Spring washers	stlSt
Grooved pin	stlSt
for wires	up to 150 mm ²
Weight	1.09 kg
Perm. operating load	6 kN
Min. failing load	18 kN
Tightening torque M_A	56 Nm

Protection sleeves must be ordered separately, see Chapter 02-02.

Wedge-type dead-end clamp 13

for terminating single wires acc. to DIN 43146, stranded wires acc. to DIN 48201 and contact wires acc. to EN 50149



Order no.	8WL1160-8
Designation	Wedge-type dead-end clamp 13
Material	
Clamp body	CuAl
Pin 13x40	stlSt
Split pin 5x28	Cu
for single wires	5 and 6 mm
for wires	25 to 70 mm ²
for contact wires	AC-80 to 100, Cu-ETP / CuAg0.1 BC-100, Cu-ETP / CuAg0.1
Weight	0.42 kg

The clamp supports the wires or contact wires given with at least 85 % of their rated failing load.

Wedge in CuZn must be ordered separately:

One-hole wedge 8WL1201-1

Two-hole wedge 8WL1202-1

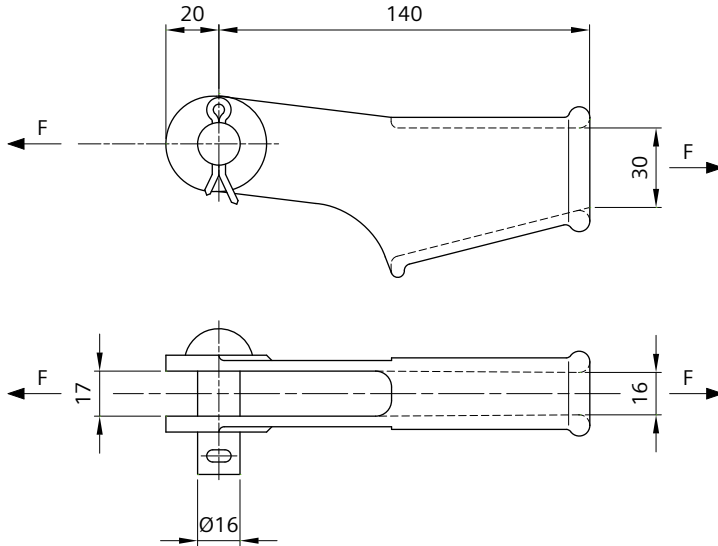
Three-hole wedge 8WL1203-1

Applications see page 136.

Type made of mCl on request.

Wedge-type dead-end clamp 16

for terminating single wires acc. to DIN 43146, stranded wires acc. to DIN 48201 and contact wires acc. to EN 50149



Order no.	8WL1170-8
Designation	Wedge-type dead-end clamp 16
Material	
Clamp body	CuAl
Pin 16x45	stlSt
Split pin 5x28	Cu
for single wires	6 mm
for wires	25 to 95 mm ²
for contact wires	AC-80 to 120, Cu-ETP / CuAg0.1 BC-100 to 120, Cu-ETP / CuAg0.1
Weight	0.60 kg

The clamp supports the wires or contact wires given with at least 85 % of their rated failing load.

Wedge in CuZn must be ordered separately:

One-hole wedge 8WL1201-1

Two-hole wedge 8WL1202-1

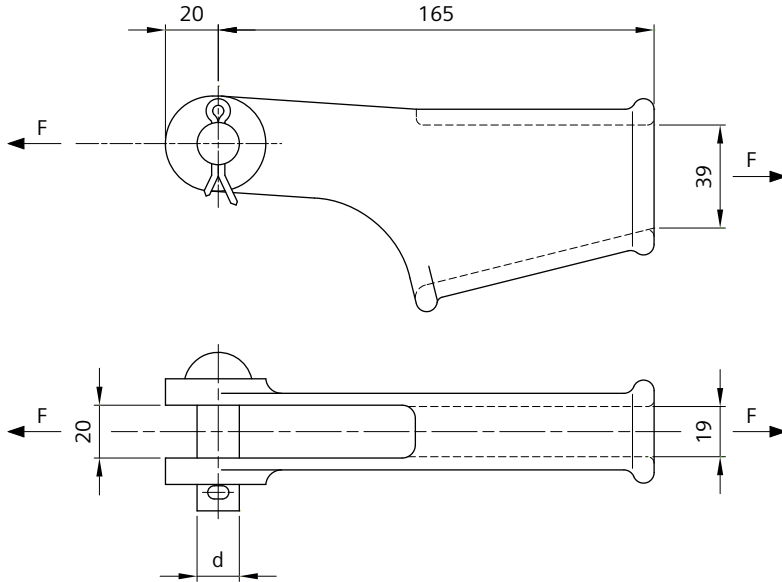
Three-hole wedge 8WL1203-1

Applications see page 136.

Type made of mCl on request.

Wedge-type dead-end clamp 16-19

for terminating wires acc. to DIN 48201 and contact wires acc. to EN 50149



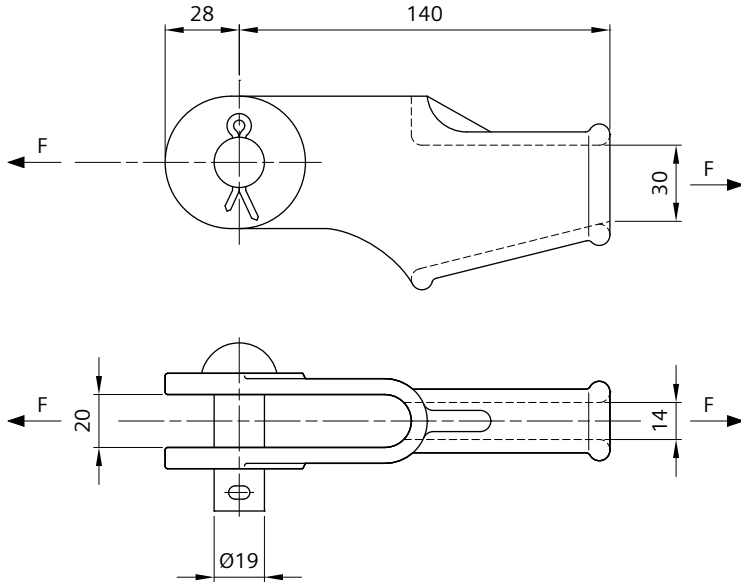
Order no.	8WL1195-7	8WL1195-8
Designation	Wedge-type dead-end clamp 16	Wedge-type dead-end clamp 19
Material		
Clamp body	CuAl	CuAl
Pin 16x50	stlSt	-
Pin 19x52	-	stlSt
Split pin 5x28	Cu	Cu
for wires	120 to 150 mm ²	120 to 150 mm ²
for contact wires	AC-120 to 150, Cu-ETP / CuAg0.1 BC-120 to 150, Cu-ETP / CuAg0.1	AC-120 to 150, Cu-ETP / CuAg0.1 BC-120 to 150, Cu-ETP / CuAg0.1
Weight	0.91 kg	0.94 kg
d	16 mm	19 mm

The clamp supports the wires or contact wires given with at least 85 % of their rated failing load.

Bronze wedge 8WL1195-5 must be ordered separately, see page 136.

Wedge-type dead-end clamp 19

for terminating single wires acc. to DIN 43146, stranded wires acc. to DIN 48201 and contact wires acc. to EN 50149



Order no.	8WL1180-7
Designation	Wedge-type dead-end clamp 19
Material	
Clamp body	mICI
Pin 19x52	stlSt
Split pin 5x28	Cu
for single wires	6 mm
for wires	25 to 95 mm ²
for contact wires	AC-100 to 120, Cu-ETP / CuAg0.1 BC-100 to 120, Cu-ETP / CuAg0.1
Weight	0.92 kg

The clamp supports the wires or contact wires given with at least 85 % of their rated failing load.

Wedge in mICI must be ordered separately:

One-hole wedge 8WL1201-0

Two-hole wedge 8WL1202-0

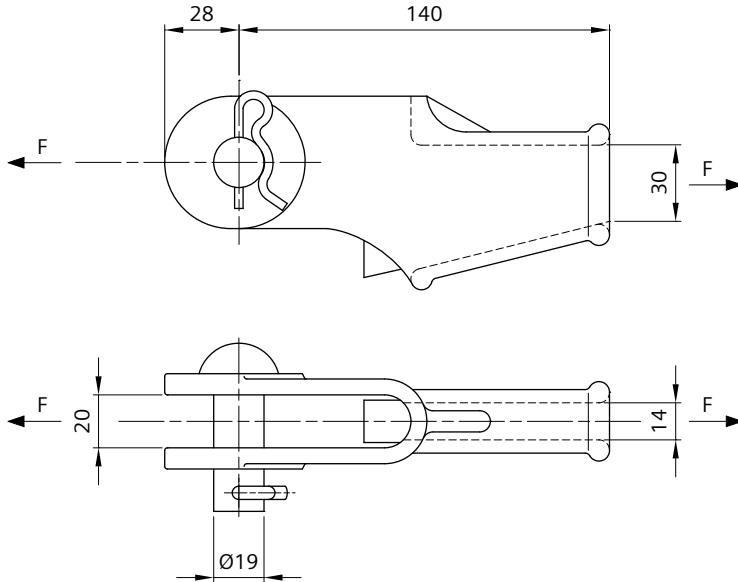
Three-hole wedge 8WL1203-0

Special wedge 50 8WL1202-3 for steel wire 8WL7090-0/-0A

Applications see page 136.

Wedge-type dead-end clamp 19

for terminating stranded wires acc. to DIN 48201 and contact wires acc. to EN 50149



Order no.	8WL1180-8
Designation	Wedge-type dead-end clamp 19
Material	
Clamp body	ctAl
Wire casing	Alcu
Pin 19x52	Al
Beta-Split pin	stlSt
for wires	25 to 95 mm ²
for contact wires	AC-80 to 120, Cu-ETP / CuAg0.1 BC-100 to 120, Cu-ETP / CuAg0.1
Weight	0.45 kg

The clamp supports the wires or contact wires given with at least 85 % of their rated failing load.

Wedge in mICI must be ordered separately:

One-hole wedge 8WL1201-0

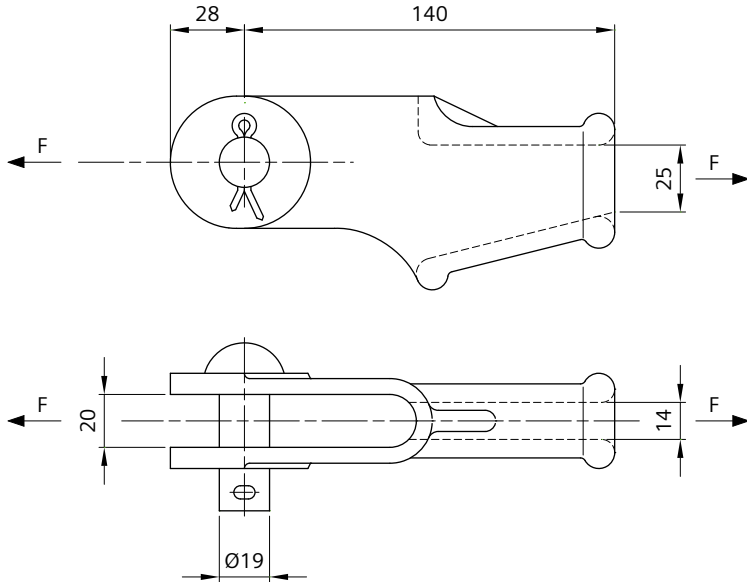
Two-hole wedge 8WL1202-0

Three-hole wedge 8WL1203-0

Applications see page 136.

Wedge-type dead-end clamp 19

for stainless steel wire ropes 8WL7093-2 or -3

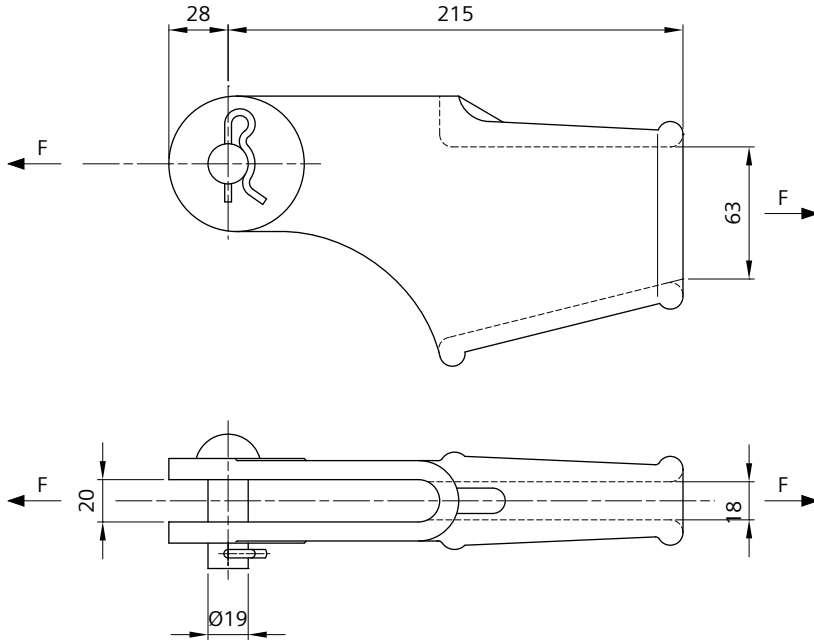


Order no.	8WL1181-7
Designation	Wedge-type dead-end clamp 19
Material	
Clamp body	ctAl
Pin 19x52	Al
Split pin 5x28	Al
for wires	6 mm (8WL7093-2) 8 mm (8WL7093-3)
Weight	0.41 kg

The clamp supports the wires given with at least 85 % of their rated failing load.
Three-hole wedge 8WL1203-0 (mICI) must be ordered separately, see page 135.

Wedge-type dead-end clamp 19-0

for terminating stranded wires acc. to DIN 48201 and contact wires acc. to EN 50149 or British Standard 23



Order no.	8WL1190-3
Designation	Wedge-type dead-end clamp 19-0
Material	
Clamp body	mICI
Pin 19x52	htgSt
Beta-Split pin	stlSt
for wires	95 to 150 mm ²
for contact wires	AC/BC-150, Cu-ETP / CuAg0.1 Ri161, Cu-ETP (British Standard 23)
Weight	3.34 kg

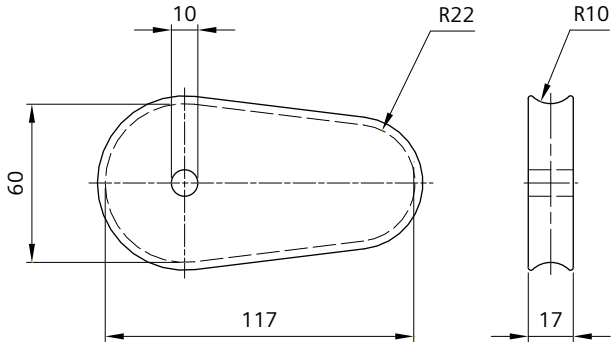
The clamp supports the wires or contact wires given with at least 85 % of their rated failing load.

Wedge 8WL1200-0 (mICI) must be ordered separately, see page 134.

Can also be supplied with wedge, order no. 8WL1190-0.

One-hole wedge 19-0

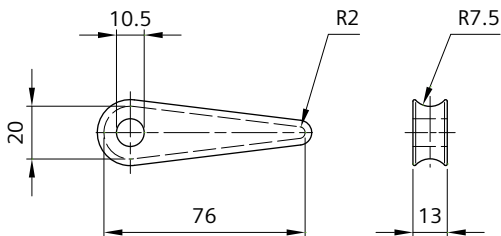
for wedge-type dead-end clamp 8WL1190-3



Order no.	8WL1200-0
Designation	One-hole wedge 19-0
Material	mCl
Weight	0.69 kg

One-hole wedge

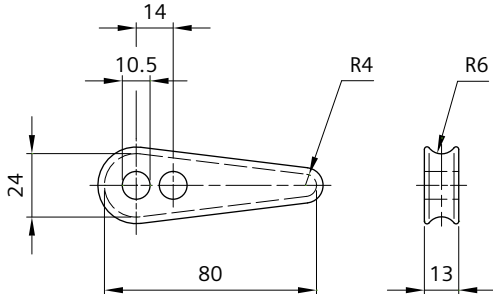
for wedge-type dead-end clamps 13, 16, 19



Order no.	8WL1201-0	8WL1201-1
Designation	One-hole wedge	One-hole wedge
Material	mCl	CuZn
Weight	0.09 kg	0.12 kg

Two-hole wedge

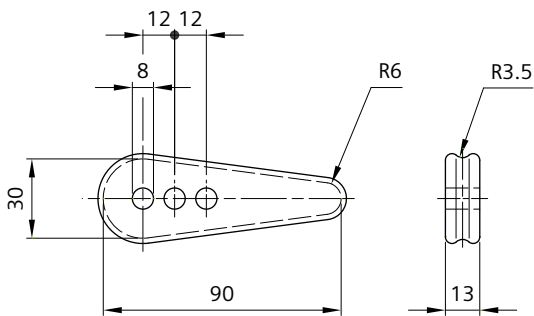
for wedge-type dead-end clamps 13, 16, 19



Order no.	8WL1202-0	8WL1202-1
Designation	Two-hole wedge	Two-hole wedge
Material	mCl	CuZn
Weight	0.13 kg	0.15 kg

Three-hole wedge

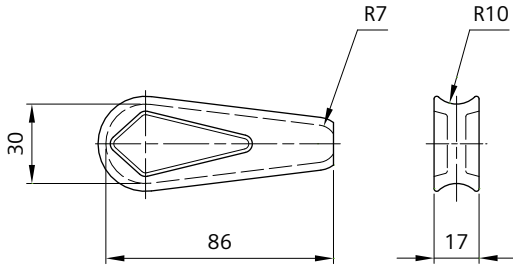
for wedge-type dead-end clamps 13, 16, 19



Order no.	8WL1203-0	8WL1203-1
Designation	Three-hole wedge	Three-hole wedge
Material	mCl	CuZn
Weight	0.17 kg	0.22 kg

Bronze wedge

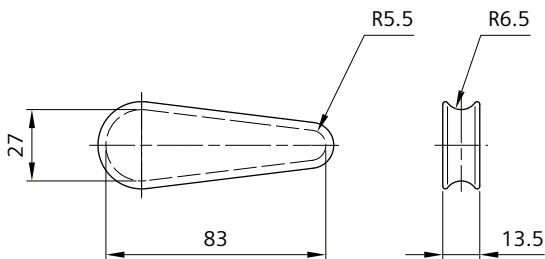
for wedge-type dead-end clamps 8WL1195-7 and 8WL1195-8



Order no.	8WL1195-5
Designation	Bronze wedge
Material	CuAl
Weight	0.23 kg

Special wedge

for steel wire 50 mm² (8WL7090-0/-0A)



Order no.	8WL1202-3
Designation	Special wedge 50
Material	mIcI
Weight	0.18 kg

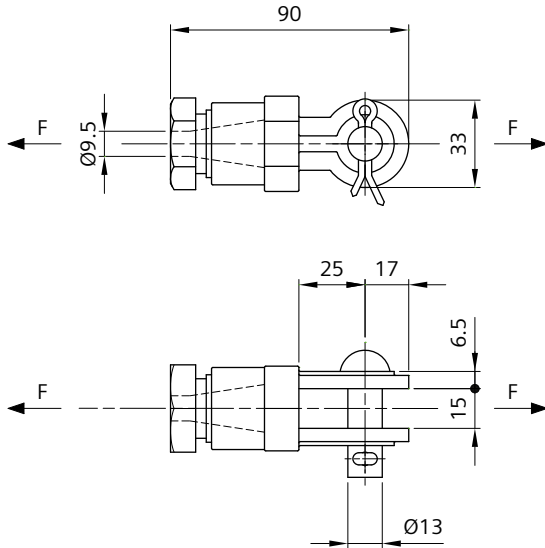
Applications for wedge-type dead-end clamps and wedges

	Dia- meter	Wedge-type dead-end clamp Three-hole wedge			Wedge-type dead-end clamp Two-hole wedge			Wedge-type dead-end clamp One-hole wedge			Wedge-type dead-end clamp Special wedge		
		[mm]	13	16	19	13	16	19	13	16	19	19-0	19
Tension wire acc. to DIN 43136													
	5	•••											
	6	•••	•••	•••									
Wire, stranded (Cu-ETP / Bz) acc. to DIN 48201													
25 mm ²	6.3	•••	•••	•••									
35 mm ²	7.5		•••	•••	••								
50 mm ²	9.0				••	••	••	•					
70 mm ²	10.5					••	••	•	•				
95 mm ²	12.5									•	•		
120 mm ²	14.0										•		
150 mm ²	15.8										•		
Wire, flexible (Cu-ETP / Bz) acc. to DIN 43138 (not high-tensile)													
35 mm ²	9.0		•••	•••	••	••	••	•					
50 mm ²	10.5					••	••	•					
70 mm ²	13.0								•	•			
Steel wire 8WL7090-0/-0A													
50 mm ²	9.5											•	
Contact wire acc. to DIN EN 50149													
AC/BC-80 Cu-ETP / CuAg0.1	10.6					••	••	•	•	•			
AC/BC-100 Cu-ETP / CuAg0.1	12.0					••	••	•	•	•			
AC/BC-107 Cu-ETP	12.3						••		•	•			
AC/BC-120 Cu-ETP / CuAg0.1	13.2								•	•			
AC/BC-150 Cu-ETP / CuAg0.1	14.8										•		

Wedge-type dead-end clamp 8WL1237-2 must be used for contact wire AC-120 made of CuMg0.5.

Cone-type dead-end clamp 13

for terminating bronze and copper wires acc. to DIN 48201

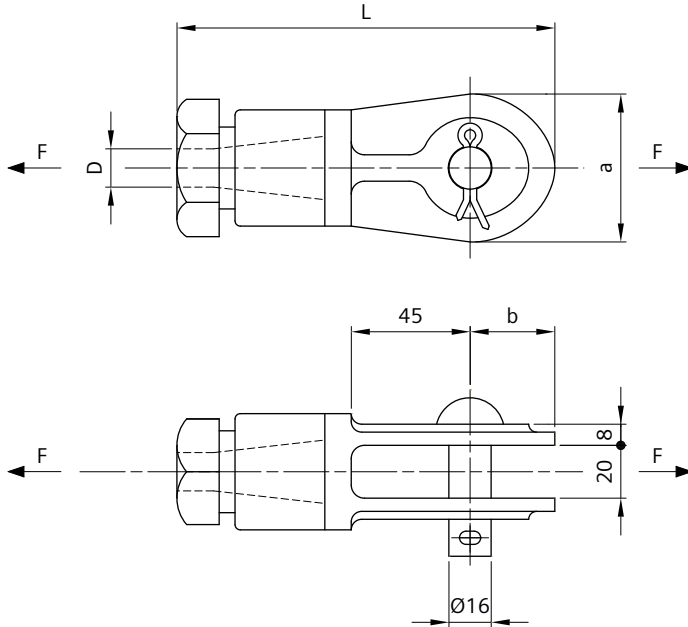


Order no.	8WL1207-0
Designation	Cone-type dead-end clamp 13-50/7
Material	
Clevis head	CuAl
Adjusting screw	CuAl
Clamping cone	CuAl
Pin 13x40	Cu
Split pin 5x28	Cu
for wires	50/7 mm ²
Weight	0.36 kg

The clamp supports the wires given with at least 85 % of their rated failing load.

Cone-type dead-end clamp 16

for terminating bronze and copper wires acc. to DIN 48201

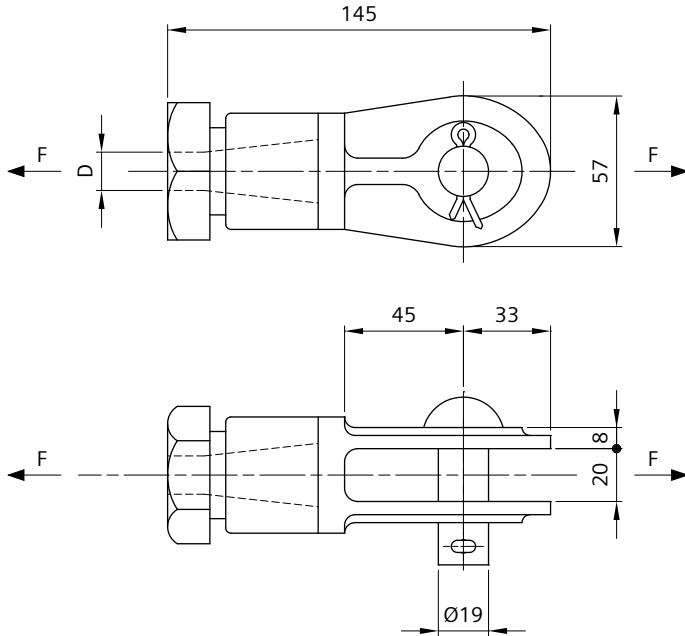


Order no.	8WL1220-2	8WL1210-0	8WL1211-0	8WL1212-0
Designation	Cone-type dead-end clamp 16-70	Cone-type dead-end clamp 16-95	Cone-type dead-end clamp 16-120	Cone-type dead-end clamp 16-150
Material				
Clevis head	CuAl	CuAl	CuAl	CuAl
Adjusting screw	CuAl	CuAl	CuAl	CuAl
Clamping cone	CuAl	CuAl	CuAl	CuAl
Pin 16x50	Cu	Cu	Cu	Cu
Split pin 5x28	Cu	Cu	Cu	Cu
for wires	70 mm ²	95 mm ²	120 mm ²	150 mm ²
Weight	0.66 kg	0.66 kg	1.02 kg	1.02 kg
a	50 mm	50 mm	50 mm	57 mm
b	29 mm	29 mm	29 mm	33 mm
L	125 mm	125 mm	125 mm	145 mm
D	11 mm	13 mm	14.5 mm	16.5 mm

The clamp supports the wires given with at least 85 % of their rated failing load.

Cone-type dead-end clamp 19

for terminating bronze and copper wires acc. to DIN 48201

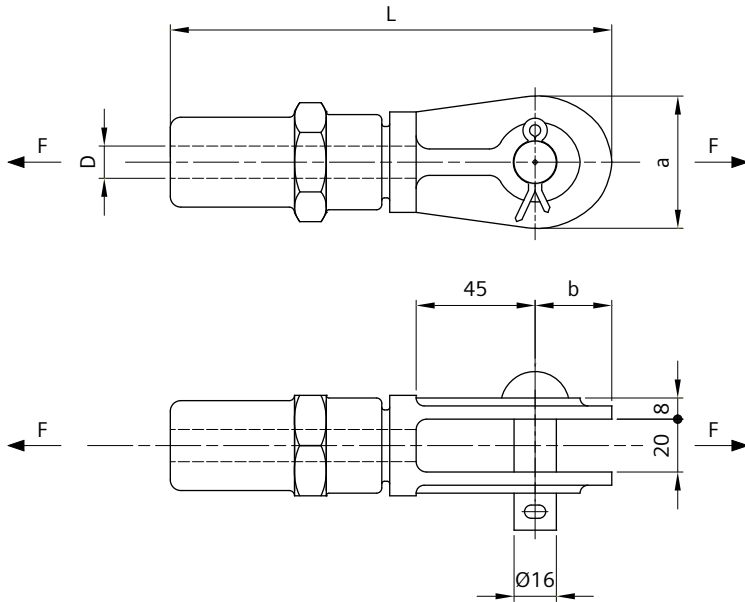


Order no.	8WL1220-5	8WL1213-0	8WL1214-0	8WL1215-0
Designation	Cone-type dead-end clamp 19-70	Cone-type dead-end clamp 19-95	Cone-type dead-end clamp 19-120	Cone-type dead-end clamp 19-150
Material				
Clevis head	CuAl	CuAl	CuAl	CuAl
Adjusting screw	CuAl	CuAl	CuAl	CuAl
Clamping cone	CuAl	CuAl	CuAl	CuAl
Pin 19x52	Cu	Cu	Cu	Cu
Split pin 5x28	Cu	Cu	Cu	Cu
for wires	70 mm ²	95 mm ²	120 mm ²	150 mm ²
Weight	0.70 kg	0.60 kg	1.09 kg	1.09 kg
a	50 mm	50 mm	57 mm	57 mm
b	29 mm	29 mm	33 mm	33 mm
L	125 mm	125 mm	145 mm	145 mm
D	11 mm	13 mm	14.5 mm	16.5 mm

The clamp supports the wires given with at least 85 % of their rated failing load.

Cone-type dead-end clamp 16

for terminating contact wires acc. to EN 50149



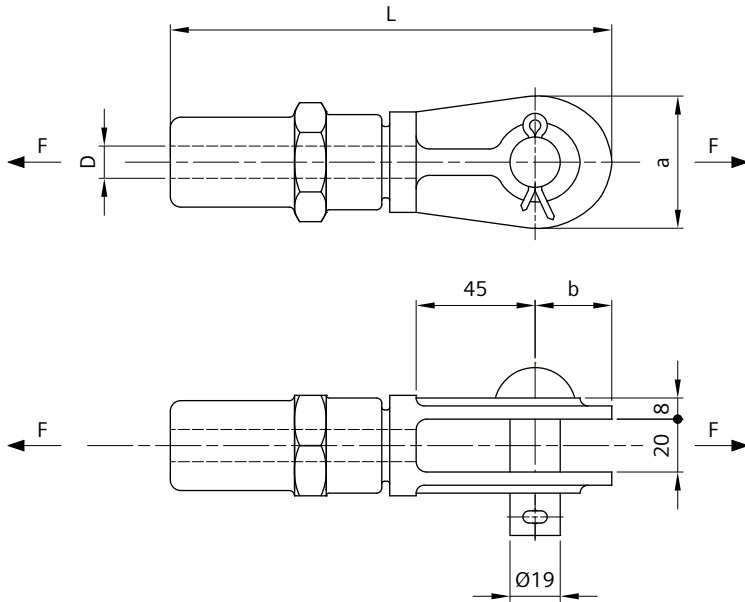
Order no.	8WL1236-0	8WL1237-0	8WL1234-0
Designation	Cone-type dead-end clamp 16/AC-100	Cone-type dead-end clamp 16/AC-120	Cone-type dead-end clamp 16-AC/BC-150
Material			
Clevis head	CuAl	CuAl	CuAl
Sleeve nut	CuAl	CuAl	CuAl
Clamping cone	CuAl	CuAl	CuAl
Clamping ring	CuAl	CuAl	CuAl
Pin 16x50	Cu	Cu	-
Pin 19x52	-	-	Cu
Split pin 5x28	Cu	Cu	Cu
for contact wires	AC-100, Cu-ETP / CuAg0.1 ¹⁾ AC-107, Cu-ETP ¹⁾	AC-120, Cu-ETP / CuAg0.1 ²⁾	AC-150, Cu-ETP / CuAg0.1 / CuMg0.5 ²⁾ BC-150, Cu-ETP / CuAg0,1 / CuMg0,5 ²⁾
Weight	0.94 kg	0.94 kg	1.05 kg
a	50 mm	50 mm	55 mm
b	29 mm	29 mm	30 mm
L	165 mm	165 mm	173 mm
D	12.2 mm	13.5 mm	14.5 mm

¹⁾ The clamp supports the contact wires given with at least 85 % of their rated failing load.

²⁾ The clamp supports the contact wires given with at least 95 % of their rated failing load.

Cone-type dead-end clamp 19

for terminating contact wires acc. to EN 50149



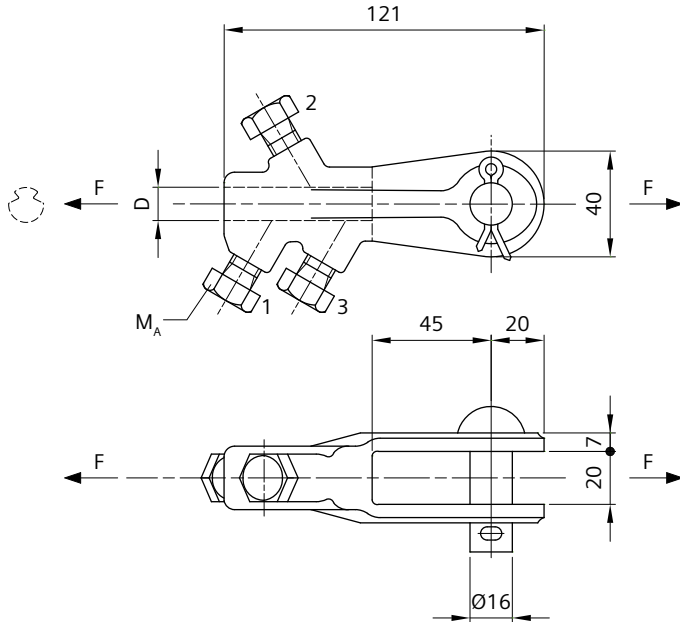
Order no.	8WL1236-2	8WL1237-2	8WL1234-1
Designation	Cone-type dead-end clamp 19/AC-100	Cone-type dead-end clamp 19/AC-120	Cone-type dead-end clamp 19-AC/BC-150
Material			
Clevis head	CuAl	CuAl	CuAl
Sleeve nut	CuAl	CuAl	CuAl
Clamping cone	CuAl	CuAl	CuAl
Clamping ring	CuAl	CuAl	CuAl
Pin 19x52	Cu	Cu	stlSt
Split pin 5x28	Cu	Cu	stlSt
for contact wires	AC-100, Cu-ETP / CuAg0.1 ¹⁾ AC-107, Cu-ETP ¹⁾	AC-120, Cu-ETP / CuAg0.1 / CuMg0.5 ²⁾	AC-150, Cu-ETP / CuAg0.1 / CuMg0.5 ²⁾ BC-150, Cu-ETP / CuAg0,1 / CuMg0,5 ²⁾
Weight	1.12 kg	0.98 kg	1.05 kg
a	50 mm	50 mm	55 mm
b	29 mm	29 mm	30 mm
L	165 mm	165 mm	173 mm
D	12.2 mm	13.5 mm	14.5 mm

¹⁾ The clamp supports the contact wires given with at least 85 % of their rated failing load.

²⁾ The clamp supports the contact wires given with at least 95 % of their rated failing load.

Dead-end clamp 16 with cup-point screws

for terminating contact wires acc. to EN 50149



Order no.	8WL1240-0	8WL1240-1	8WL1240-2
Designation	Dead-end clamp 16/AC-80/100	Dead-end clamp 16/AC-120	Dead-end clamp 16/AC-150
Material			
Clamp body	CuAl	CuAl	CuAl
Cup-point screws M10	stlSt	stlSt	stlSt
Pin 16x45	Cu	Cu	Cu
Split pin 5x28	Cu	Cu	Cu
for contact wires	AC-80 to 100, Cu-ETP / CuAg0.1	AC-120, Cu-ETP / CuAg0.1	AC-150, Cu-ETP / CuAg0.1
Weight	0.54 kg	0.54 kg	0.54 kg
Tightening torque M_A	20 Nm ¹⁾ 30 Nm ²⁾	40 Nm ³⁾	40 Nm ³⁾
D	12.6 mm	13.50 mm	15.25 mm

¹⁾ for AC-80 (2x following 1 to 3)

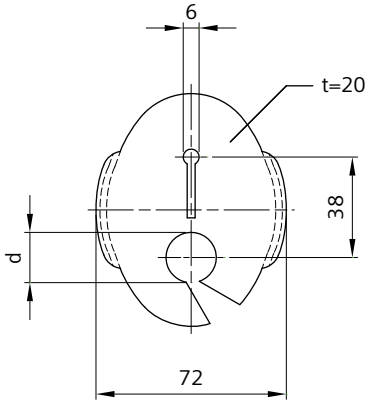
²⁾ for AC-100 (2x following 1 to 3)

³⁾ 2x following 1 to 3

The clamp supports the contact wires given with at least 85 % of their rated failing load.

Cable strap

for attachment at cross-span wires

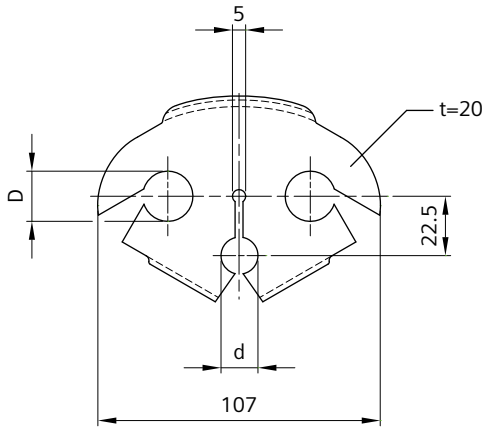


Order no.	8WL6730-5	8WL6730-6
Designation	Cable strap for 1 cable $d=20-24$ mm	Cable strap for 1 cable $d=25-30$ mm
Material	Rubber, black	Rubber, black
Weight	0.08 kg	0.08 kg
d	19 mm	24 mm

Punch-lock bands 8WL6751-0 to 5 (see page 151) or 8WL6740-1 (see page 150) must be ordered separately.

Cable strap

for attachment at cross-span wires

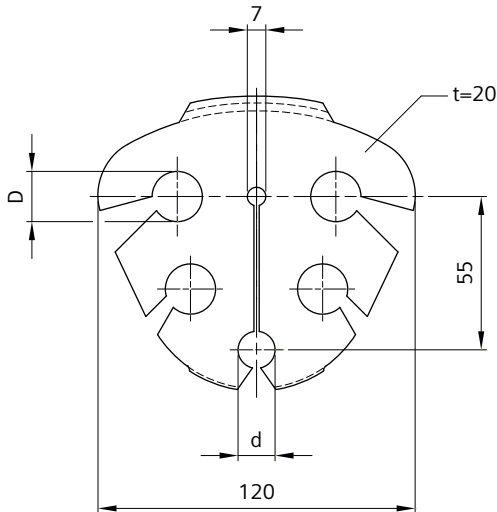


Order no.	8WL6731-5	8WL6731-6	8WL6731-7	8WL6731-8
Designation	Cable strap for 2 cables d=20-24 mm and 1 cable d=14 mm	Cable strap for 2 cables d=25-30 mm and 1 cable d=14 mm	Cable strap for 3 cables d=20-24 mm	Cable strap for 3 cables d=25-30 mm
Material	Rubber, black	Rubber, black	Rubber, black	Rubber, black
Weight	0.12 kg	0.12 kg	0.12 kg	0.12 kg
d	14 mm	14 mm	19 mm	24 mm
D	19 mm	24 mm	19 mm	24 mm

Punch-lock bands 8WL6751-0 to 5 (see page 151) or 8WL6740-1 (see page 150) must be ordered separately.

Cable strap

for attachment at cross-span wires

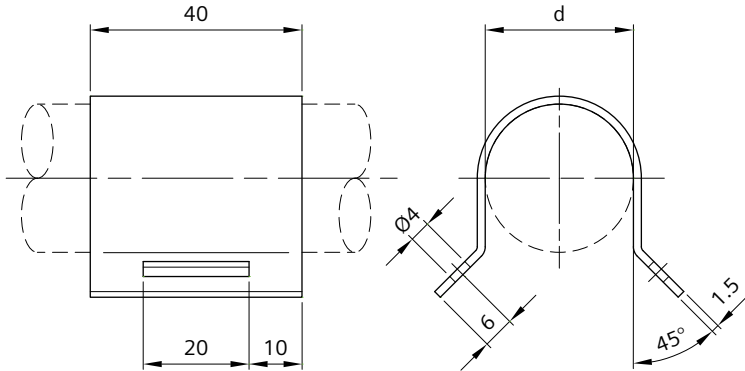


Order no.	8WL6732-5	8WL6732-6	8WL6732-7	8WL6732-8
Designation	Cable strap for 4 cables d=20-24 mm and 1 cable d=14 mm	Cable strap for 4 cables d=25-30 mm and 1 cable d=14 mm	Cable strap for 5 cables d=20-24 mm	Cable strap for 5 cables d=25-30 mm
Material	Rubber, black	Rubber, black	Rubber, black	Rubber, black
Weight	0.18 kg	0.18 kg	0.18 kg	0.18 kg
d	14 mm	14 mm	19 mm	24 mm
D	19 mm	24 mm	19 mm	24 mm

Punch-lock bands 8WL6751-0 to 5 (see page 151) or 8WL6740-1 (see page 150) must be ordered separately.

Clip

for plastic tubes acc. to DIN 49016

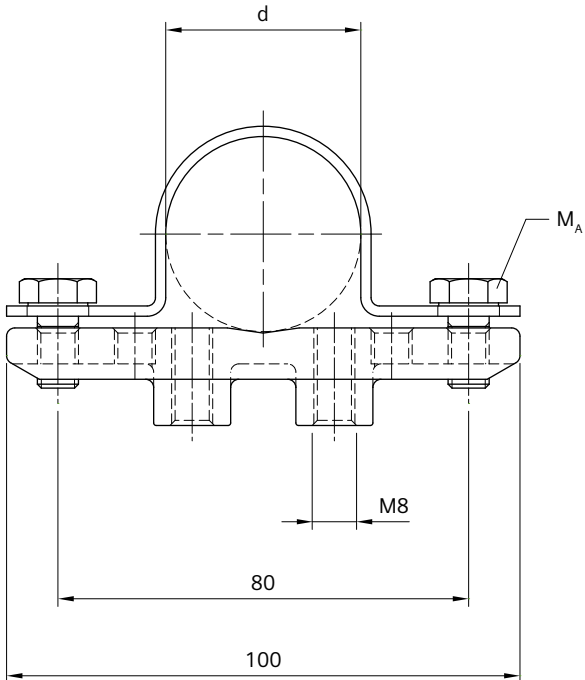


Order no.	8WL6752-0	8WL6752-1	8WL6752-2	8WL6752-3	8WL6752-4
Designation	Clip for plastic tube 16	Clip for plastic tube 21	Clip for plastic tube 29	Clip for plastic tube 36	Clip for plastic tube 42
Material	stlSt	stlSt	stlSt	stlSt	stlSt
Weight	0.038 kg	0.044 kg	0.056 kg	0.070 kg	0.075 kg
Cable d	22 mm	28 mm	37 mm	47 mm	54 mm

Punch-lock band 8WL6743-0 must be ordered separately, see page 152.

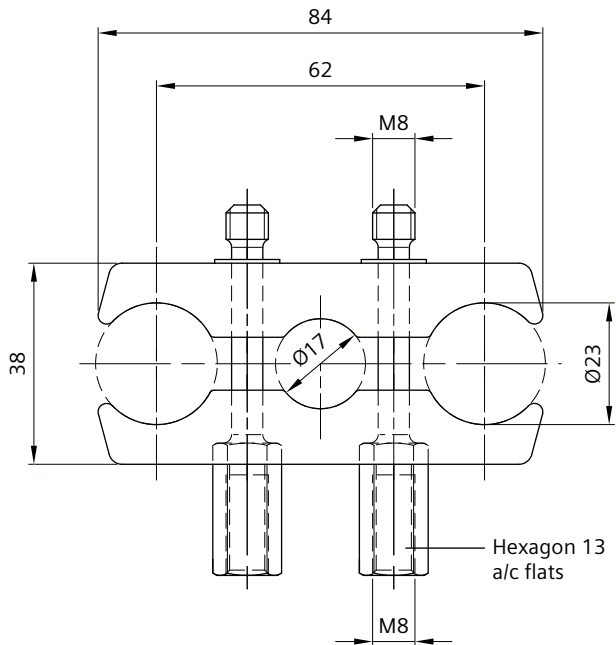
Clips for plastic tubes acc. to EN 61386 on request.

Base element for cable holder



Order no.	8WL6738-1	8WL6738-2	8WL6738-3
Designation	Base element for cable holder at tube 55	Base element for cable holder at tube 38	Base element for cable holder at wire d=7.5-10.5 mm
Material			
Mounting plate	CuAl	CuAl	CuAl
Hoop	stlSt	stlSt	stlSt
Bolts M8	stlSt	stlSt	stlSt
Weight	0.25 kg	0.23 kg	0.22 kg
Tightening torque M_A	16 Nm	16 Nm	16 Nm
d	55 mm	38 mm	7.5 - 10.5 mm

Cable holder for two cables

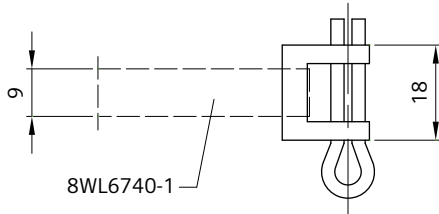


Order no.	8WL6738-4
Designation	Cable holder for two cables d=23 mm and 1 cable d=17 mm
Material	
Clamping jaws	Polyamide
Clamping bolts M8	st1St
Locking washers	CuSn
Weight	0.15 kg

The quantity of holders can be extended as needed to install any number of cables.

Lock for punch-lock band

for cable straps



Order no.	8WL6750-3
Designation	Lock for punch-lock band 9x0.4 mm
Material	stlSt
Weight	0.008 kg

Punch-lock band 8WL6740-1 must be ordered separately.

Punch-lock band

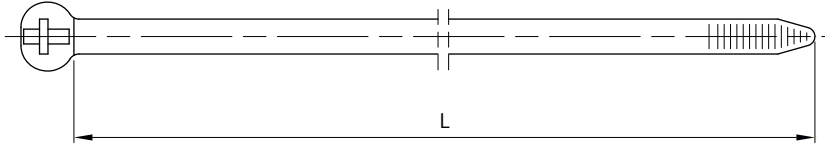
for lock 8WL6750-3

Order no.	8WL6740-1
Designation	Punch-lock band 9x0.4 mm
Material	stlSt
Weight	0.04 kg/m

Punch-lock band on reels 30.5 m long each.

Punch-lock band

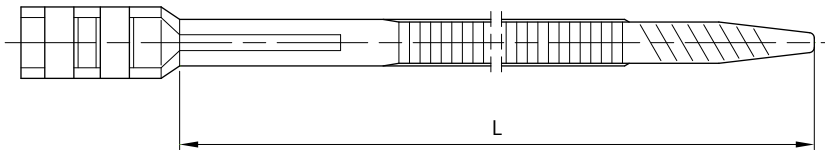
for cable straps



Order no.	8WL6751-0	8WL6751-1
Designation	Punch-lock band for one to three cables	Punch-lock band for four and five cables
Material	Polyamide, black, UV resistant	Polyamide, black, UV resistant
Weight	0.004 kg	0.011 kg
L	330 mm	760 mm

Punch-lock band

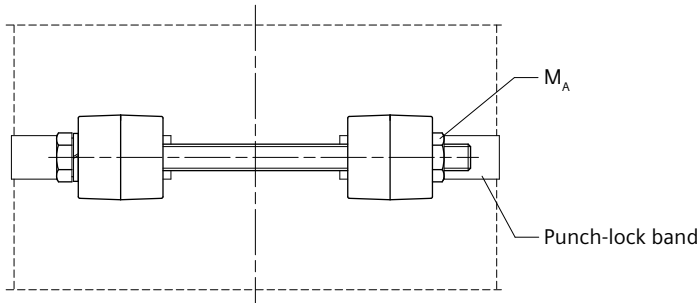
for cable straps



Order no.	8WL6751-3	8WL6751-4	8WL6751-5
Designation	Punch-lock band for four and five cables	Punch-lock band for one to three cables	Punch-lock band
Material	Polyamide, black, UV resistant	Polyamide, black, UV resistant	Polyamide, black, UV resistant
Weight	0.014 kg	0.005 kg	0.004 kg
L	720 mm	320 mm	230 mm

Lock, adjustable

for punch-lock band 8WL6743-0, to be used with cantilever swivel brackets 8WL2124-0/-3



Order no.	8WL6748-6
Designation	Lock, adjustable
Material	
Lock	CuAl
Bolt M10x150	stlSt
Nut	stlSt
Spring washer	stlSt
Weight	0.42 kg
Tightening torque M_A	20 Nm

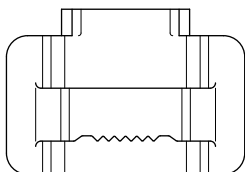
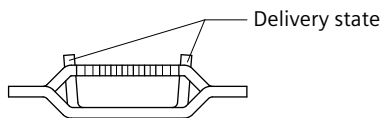
The bearing capacity of the punch-lock band depends of the pole cross-section and load direction and has to be checked from case to case.

Punch-lock band

Order no.	8WL6740-0	8WL6742-0	8WL6743-0
Designation	Punch-lock band 9.5x0.63 mm	Punch-lock band 16x0.76 mm	Punch-lock band 19x1.00 mm
Material	stlSt	stlSt	stlSt
Weight	0.05 kg/m	0.09 kg/m	0.135 kg/m
Min. failing load	4.0 kN	8.3 kN	13.2 kN

Punch-lock band on reels 30 m long each.

Loop



Order no.	8WL6745-0	8WL6747-0	8WL6748-0	8WL6748-1
Designation	Loop 10	Loop 16	Loop 20	Loop 20 without teeth
Material	stlSt	stlSt	stlSt	stlSt
for punch-lock band	8WL6740-0	8WL6742-0	8WL6743-0	8WL6743-0
Weight	0.004 kg	0.014 kg	0.024 kg	0.024 kg

Chapter 02

Standard Products

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Technical comments

Application

The products listed in this section provide a comprehensive program for the mechanical or electrical connection and protection of wires.

Thimbles ensure that the specified bending radii of wires are not exceeded and that wires safely transfer the loads.

Wire connectors provide a joint between the two wires to be connected which has approximately the same properties as the wires themselves.

Sleeves, packers and washers not only protect the wire against mechanical damage in clamping and installation points but also compensate for differences in cross section in proper use.

Compression cable lugs are used as connecting elements for electrical lines in overhead contact line systems.

Types

Depending on the application and cross section of the wire used, thimbles are available in copper, stainless steel and plastic.

Crimped connectors are used for connecting wires, compression joints are used for connecting wires with resistance to tensile stress.

Aluminium compression clamps and stainless steel compression joints are used together with stainless steel thimbles to crimp stainless steel wires.

Protection sleeves and packers made of copper are preferably used.

If copper and aluminium materials are connected to each other, protection sleeves and washers made of aluminium-copper materials prevent the electrochemical corrosion of adjacent components.

Note

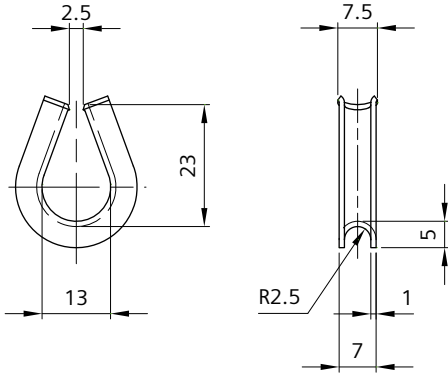
In the crimped connector, the wire ends being connected parallel to one another are squeezed in a sleeve.

In high-tensile compression joints, two wires come in contact with one another in a sleeve and are crimped at several points all round with the sleeve.

If the prescribed compression tools are used and if installed properly, the compression connections can hold at least 85 % of the rated failing load of the wires.

Thimble 10f

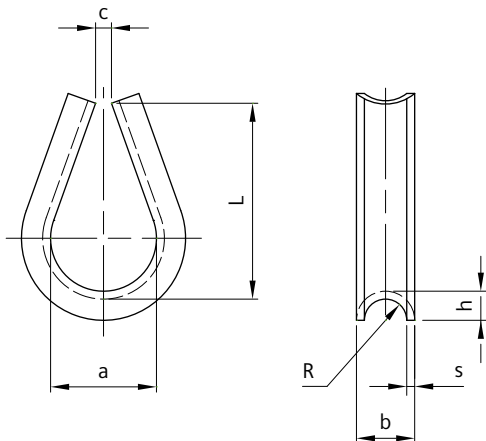
for bronze wire 8WL7060-2



Order no.	8WL1500-2
Designation	Thimble 10f
Material	stlSt
for wires	10 mm ²
Weight	0.30 kg/100 pcs.

Thimble (DIN 43154)

for bronze, copper and steel wires acc. to DIN 48201 or DIN 43138

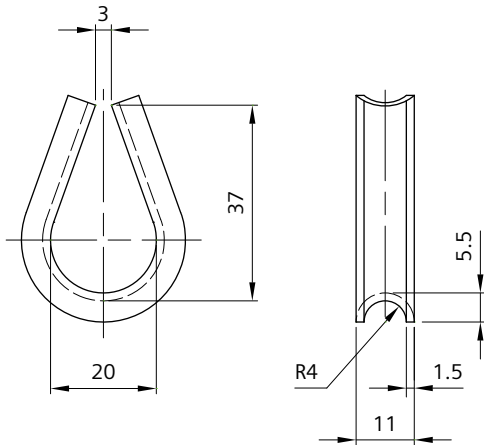


Order no.	8WL1500-0	8WL1501-0	8WL1502-0	8WL1503-0
Designation	Thimble 16	Thimble 16f, 35	Thimble 50	Thimble 70
Material	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
for wires	up to 16 mm ²	16f, 25 to 35 mm ²	50 mm ²	70 mm ²
Weight	0.70 kg/100 pcs.	1.90 kg/100 pcs.	2.00 kg/100 pcs.	5.50 kg/100 pcs.
a	14 mm	20 mm	24 mm	30 mm
b	8 mm	11 mm	13 mm	15 mm
c	3 mm	3 mm	3 mm	4 mm
s	1.2 mm	1.5 mm	1.5 mm	2.0 mm
h	5 mm	5.5 mm	6.5 mm	8 mm
L	21 mm	37 mm	45 mm	58 mm
R	2.8 mm	4 mm	5 mm	5.5 mm

f = wires acc. to DIN 43138

Thimble (DIN 43154)

for stainless steel wires or bronze wire acc. to DIN 43138

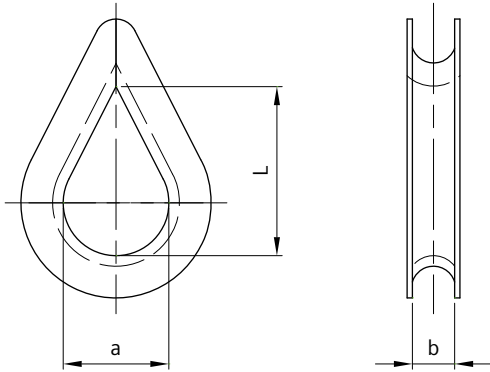


Order no.	8WL1501-1
Designation	Thimble 16f, 35
Material	stlSt
for wires	up to 8 mm, 16f mm ²
Weight	1.60 kg/100 pcs.

f = wires acc. to DIN 43138

Thimble

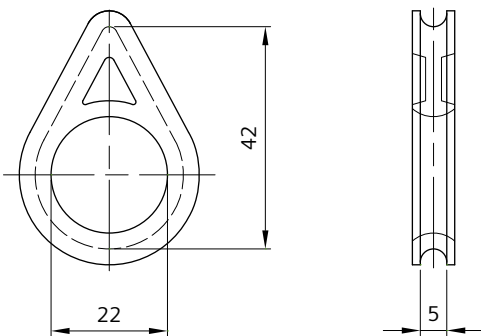
for stainless steel wires



Order no.	8WL1516-1	8WL1516-2	8WL1516-3
Designation	Thimble 6	Thimble 8	Thimble 10
Material	stlSt	stlSt	stlSt
for wires	up to 6 mm	up to 8 mm	up to 10 mm
Weight	1.00 kg/100 pcs.	1.90 kg/100 pcs.	2.70 kg/100 pcs.
a	16 mm	20 mm	26 mm
b	6 mm	8 mm	10 mm
L	25 mm	32 mm	40 mm

Insulated thimble 10f

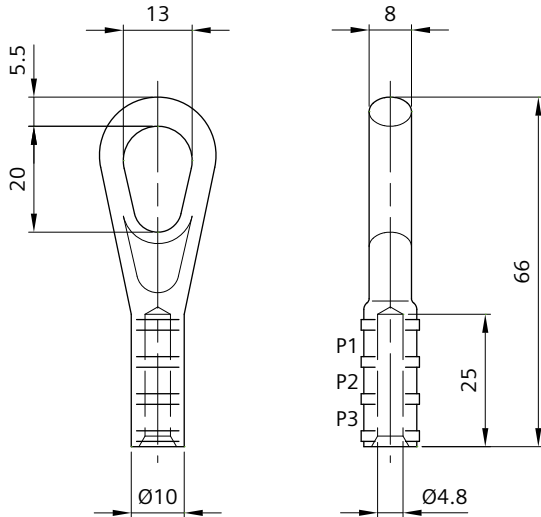
for insulated and current-carrying droppers, for bronze wire 8WL7060-2 or acc. to DIN 43138 (8WL7060-0)



Order no.	8WL1515-0
Designation	Insulated thimble 10f
Material	Polypropylene
for wires	10 mm ²
Weight	0.30 kg/100 pcs.

Compression thimble

for bronze wire acc. to DIN 43138 (8WL7060-0)



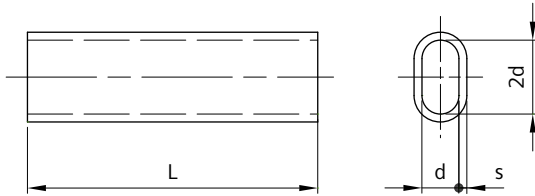
Order no.	8WL1518-0
Designation	Compression thimble 10f
Material	Cu-ETP
for wires	10 mm ²
Weight	0.04 kg
Pressing die	8WL7153-6
Pressing markings	P1 to P3

Pressing according to markings (following P1 to P3)

The compression thimble supports the wire given with at least 85% of its rated failing load.

Crimped/compression connector

for bronze and copper wires acc. to DIN 48201 or DIN 43138 or bronze wire 10 mm² 8WL7060-2



Part 1

Order no.	8WL1520-0	8WL1521-2	8WL1521-1	8WL1522-0	8WL1522-1
Designation	Crimped/compression connector 10f-20	Crimped/compression connector 16-98	Crimped/compression connector 25-20	Crimped/compression connector 25-55	Crimped/compression connector 25-112
Material	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
for wires	10f mm ²	16 mm ²	16f, 25 mm ²	16f, 25 mm ²	16f, 25 mm ²
Weight	0.40 kg/100 pcs.	4.40 kg/100 pcs.	1.10 kg/100 pcs.	3.30 kg/100 pcs.	6.00 kg/100 pcs.
Pressing die	8WL7152-1 ¹⁾ 8WL7152-1A ²⁾	8WL7152-2	8WL7152-3	8WL7152-3	8WL7152-3
d	5 mm	6 mm	7 mm	7 mm	7 mm
s	0.75 mm	1.5 mm	1.5 mm	1.5 mm	1.5 mm
L	20 mm	98 mm	20 mm	55 mm	112 mm

Part 2

Order no.	8WL1523-0	8WL1523-1	8WL1524-0	8WL1524-1	8WL1525-0
Designation	Crimped/compression connector 35-126	Crimped/compression connector 35-60	Crimped/compression connector 50-180	Crimped/compression connector 50-90	Crimped/compression connector 70-198
Material	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
for wires	25f, 35 mm ²	25f, 35 mm ²	35f, 50 mm ²	35f, 50 mm ²	50f, 70 mm ²
Weight	8.10 kg/100 pcs.	3.90 kg/100 pcs.	14.0 kg/100 pcs.	6.9 kg/100 pcs.	16.0 kg/100 pcs.
Pressing die	8WL7152-4	8WL7152-4	8WL7152-5	8WL7152-5	8WL7152-7
d	8 mm	8 mm	10 mm	10 mm	11.5 mm
s	1.5 mm	1.5 mm	1.5 mm	1.5 mm	1 mm
L	126 mm	60 mm	180 mm	90 mm	198 mm

f = wires acc. to DIN 43138

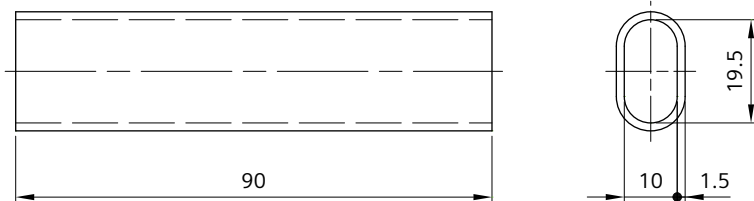
¹⁾ for wires acc. to DIN 43138

²⁾ for wire 8WL7060-2

Pressing according to markings on the component.

Crimped/compression connector for synthetic wire

(Minoroc wire) 8WL7097-0

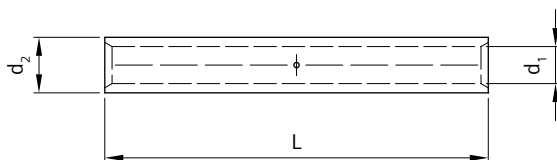


Order no.	8WL1524-2
Designation	Crimped/compression connector
Material	Cu-ETP
for wires	9 mm
Weight	6.90 kg/100 pcs.
Pressing die	8WL7152-8
Number of pressures	9

Pressing according to markings on the component.

Compression joint

for high-tensile connections of copper wires acc. to DIN 48201

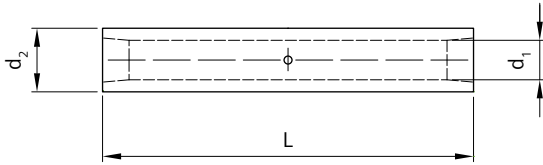


Order no.	8WL1560-0	8WL1561-0	8WL1562-0	8WL1563-0	8WL1564-0
Designation	Compression joint 50	Compression joint 70	Compression joint 95	Compression joint 120	Compression joint 150
Material	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
for wires	50 mm ²	70 mm ²	95 mm ²	120 mm ²	150 mm ²
Weight	7.4 kg/100 pcs.	9.5 kg/100 pcs.	28.0 kg/100 pcs.	36.0 kg/100 pcs.	38.0 kg/100 pcs.
Pressing die	8WL7154-1	8WL7154-2	8WL7154-5	8WL7154-6	8WL7154-7
L	95 mm	95 mm	145 mm	160 mm	160 mm
d₁	10 mm	11.5 mm	14 mm	15 mm	17 mm
d₂	14.5 mm	16.5 mm	21 mm	23 mm	25 mm

Pressing according to markings on the component.

Compression joint

for high-tensile connections of bronze and steel-copper wires acc. to DIN 48201

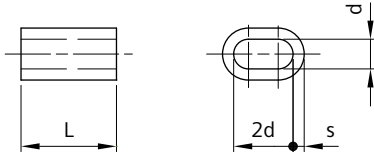


Order no.	8WL1560-2	8WL1561-2	8WL1563-2
Designation	Compression joint 50	Compression joint 70	Compression joint 120
Material	CuNiSi	CuNiSi	CuNiSi
for wires	50 mm ²	70 mm ²	120 mm ²
Weight	15.2 kg/100 pcs.	19.6 kg/100 pcs.	32.5 kg/100 pcs.
Pressing die	on request (characteristic number 17)	on request (characteristic number 19)	on request (characteristic number 23)
L	110 mm	110 mm	140 mm
d₁	10 mm	11.4 mm	14.9 mm
d₂	17.5 mm	20 mm	24 mm

Pressing according to markings on the component.

Compression clamp

for stainless steel wires

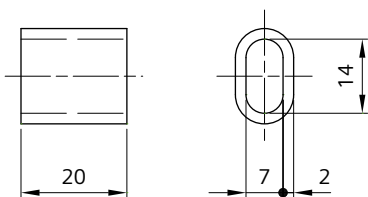


Order no.	8WL1650-1	8WL1650-2	8WL1650-3
Designation	Compression clamp 5	Compression clamp 6	Compression clamp 8
Material	Al	Al	Al
for wires	5 mm	6 mm	8 mm
Weight	0.30 kg/100 pcs.	0.60 kg/100 pcs.	1.20 kg/100 pcs.
Pressing die	8WL7152-0	8WL7152-3	8WL7152-5
d	5.6 mm	6.6 mm	8.8 mm
s	2.1 mm	2.5 mm	3.3 mm
L	18 mm	21 mm	28 mm

Please don't use material containing copper near (above) the compression connections.

Compression joint

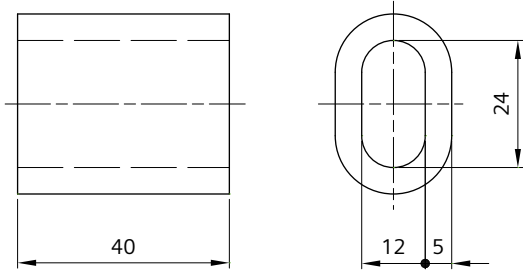
for stainless steel wire rope 8WL7093-2



Order no.	8WL1553-0
Designation	Compression joint 16f-20
Material	stlSt
for wires	6 mm
Weight	1.30 kg/100 pcs.
Pressing die	8WL7152-3

Compression clamp

for Z-wires at fixed point, for wires acc. to DIN 48201

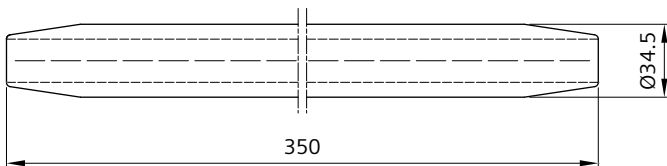


Order no.	8WL1554-0
Designation	Compression clamp 70-40
Material	Cu
for wires	70 mm ²
Weight	0.30 kg/100 pcs.
Pressing die	on request ¹⁾

¹⁾ with hydraulic press only

Compression joint, high-tensile (DIN 48085)

for aluminium wires acc. to EN 50182

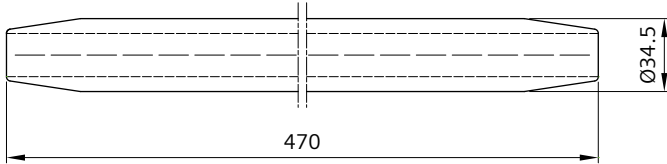


Order no.	8WL1565-4
Designation	Compression joint
Material	Al
for wires	20.3 mm
Weight	63.0 kg/100 pcs.
Pressing die	on request (Characteristic number 34)

Pressing according to markings on the component.

Compression joint, high-tensile (DIN 48085)

for aluminium-steel wires acc. to EN 50182

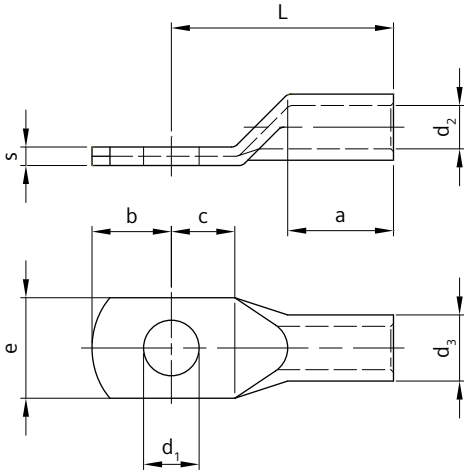


Order no.	8WL1566-4
Designation	Compression joint
Material	Al, htgSt
for wires	21.8 mm
Weight	77.0 kg/100 pcs.
Pressing die	on request (Characteristic number 34)

Pressing according to markings on the component.

Cable lug (DIN 46235)

for copper wires acc. to DIN 48201 or DIN 43138



Part 1

Order no.	8WL1575-0	8WL1576-0	8WL1577-0	8WL1578-0	8WL1578-1
Designation	Cable lug 10-16	Cable lug 10-25	Cable lug 10-35	Cable lug 10-50	Cable lug 12-50
Material	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
for wires	10f, 16 mm ²	16f, 25 mm ²	25f, 35 mm ²	35f, 50 mm ²	35f, 50 mm ²
Weight	1.3 kg/100 pcs.	1.5 kg/100 pcs.	2.9 kg/100 pcs.	4.2 kg/100 pcs.	4.0 kg/100 pcs.
Pressing die	8WL7153-4	8WL7153-6	8WL7153-8	8WL7154-1	8WL7154-1
a	20 mm	20 mm	20 mm	28 mm	28 mm
b	15 mm	15 mm	15 mm	15 mm	16 mm
c	12 mm	12 mm	12 mm	12 mm	13 mm
s	2.5 mm	3 mm	3.5 mm	4 mm	4 mm
L	36 mm	38 mm	42 mm	52 mm	52 mm
d ₁	10.5 mm	10.5 mm	10.5 mm	10.5 mm	13 mm
d ₂	5.5 mm	7 mm	8.2 mm	10 mm	10 mm
d ₃	8.5 mm	10.0 mm	12.5 mm	14.5 mm	14.5 mm
e	17 mm	17 mm	19 mm	22 mm	24 mm

Part 2

Order no.	8WL1578-2	8WL1580-0	8WL1580-1	8WL1580-2	8WL1581-1
Designation	Cable lug 16-50	Cable lug 10-70	Cable lug 12-70	Cable lug 16-70	Cable lug 12-95
Material	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
for wires	35f, 50 mm ²	50f, 70 mm ²	50f, 70 mm ²	50f, 70 mm ²	70f, 95 mm ²
Weight	4.5 kg/100 pcs.	6.0 kg/100 pcs.	6.0 kg/100 pcs.	6.0 kg/100 pcs.	9.0 kg/100 pcs.
Pressing die	8WL7154-1	8WL7154-2	8WL7154-2	8WL7154-2	8WL7154-3
a	28 mm	28 mm	28 mm	28 mm	35 mm
b	19 mm	15 mm	16 mm	19 mm	16 mm
c	16 mm	12 mm	13 mm	16 mm	13 mm
s	4 mm	4.5 mm	4.5 mm	4.5 mm	5 mm
L	52 mm	55 mm	55 mm	55 mm	65 mm
d ₁	17 mm	10.5 mm	13 mm	17 mm	13 mm
d ₂	10 mm	11.5 mm	11.5 mm	11.5 mm	13.5 mm
d§3	14.5 mm	16.5 mm	16.5 mm	16.5 mm	19.0 mm
e	28 mm	24 mm	24 mm	30 mm	28 mm

Part 3

Order no.	8WL1581-2	8WL1582-0	8WL1582-1	8WL1583-1	8WL1584-0
Designation	Cable lug 16-95	Cable lug 12-120	Cable lug 16-120	Cable lug 16-150	Cable lug 16-185
Material	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
for wires	70f, 95 mm ²	95f, 120 mm ²	95f, 120 mm ²	120f, 150 mm ²	185 mm ²
Weight	10.0 kg/100 pcs.	11.8 kg/100 pcs.	12.0 kg/100 pcs.	16.0 kg/100 pcs.	18.0 kg/100 pcs.
Pressing die	8WL7154-3	8WL7154-5	8WL7154-5	8WL7154-6	on request (characteristic number 25)
a	35 mm	35 mm	35 mm	35 mm	40 mm
b	19 mm	16 mm	19 mm	19 mm	19 mm
c	16 mm	13 mm	16 mm	16 mm	16 mm
s	5 mm	5.5 mm	5.5 mm	6 mm	6 mm
L	65 mm	70 mm	70 mm	78 mm	82 mm
d ₁	17 mm	13.0 mm	17.0 mm	17 mm	17,0 mm
d ₂	13.5 mm	15.5 mm	15.5 mm	17.5 mm	19 mm
d§3	19.0 mm	21.0 mm	21.0 mm	23.5 mm	25.5 mm
e	32 mm	32 mm	32 mm	34 mm	37 mm

Part 4

Order no.	8WL1585-0
Designation	Cable lug 16-240
Material	Cu-ETP
for wires	240 mm ²
Weight	26.0 kg/100 pcs.
Pressing die	on request (Characteristic number 28)
a	40 mm
b	19 mm
c	16 mm
s	6.5 mm
L	92 mm
d₁	17 mm
d₂	21.5 mm
d§3	29.0 mm
e	42 mm

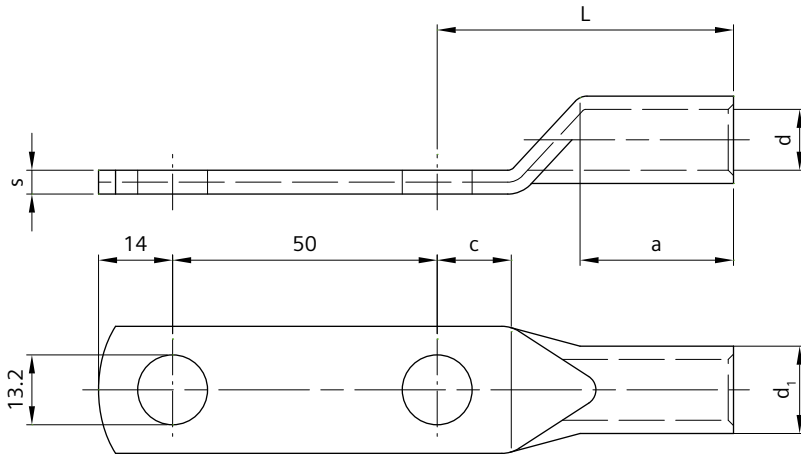
f = wires acc. to DIN 43138 (have to be re-pressed with the next smaller characteristic number of pressing die)

Types tin-plated on request.

Pressing according to markings on the component.

Cable lug 2/12

for copper wires acc. to DIN 48201 or DIN 43138, suitable for tube connecting fittings 8WL4652-0 to 8WL4652-2



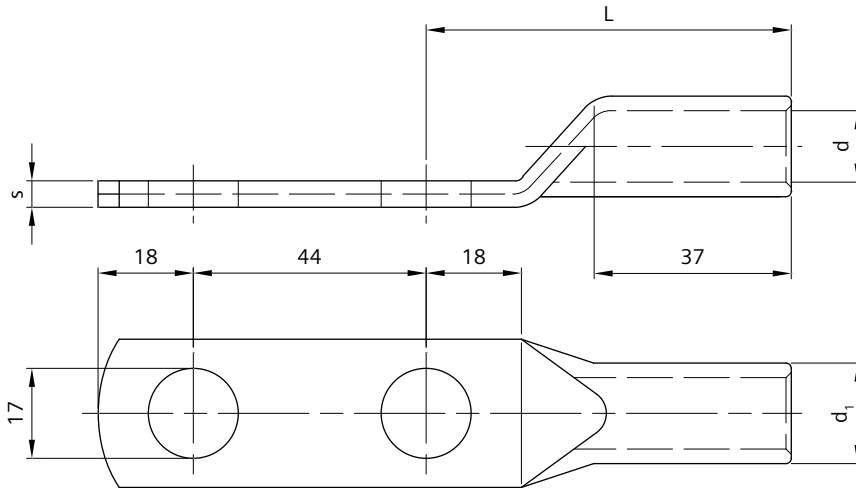
Order no.	8WL1587-2	8WL1588-2	8WL1590-2	8WL1591-2	8WL1592-2
Designation	Cable lug 2/12-50	Cable lug 2/12-70	Cable lug 2/12-95	Cable lug 2/12-120	Cable lug 2/12-150
Material	Cu-ETP, tin-coated	Cu-ETP, tin-coated	Cu-ETP, tin-coated	Cu-ETP, tin-coated	Cu-ETP, tin-coated
for wires	35f, 50 mm ²	50f, 70 mm ²	70f, 95 mm ²	95f, 120 mm ²	120f, 150 mm ²
Weight	8.0 kg/100 pcs.	10.8 kg/100 pcs.	15.2 kg/100 pcs.	18.6 kg/100 pcs.	26.1 kg/100 pcs.
Pressing die	8WL7154-1	8WL7154-2	8WL7154-3	8WL7154-5	8WL7154-6
a	29 mm	29 mm	36 mm	40 mm	40 mm
c	14 mm	14 mm	14 mm	18 mm	19 mm
d	10 mm	11.5 mm	13.5 mm	15.5 mm	17 mm
s	4 mm	4.5 mm	5 mm	5.5 mm	6 mm
L	56 mm	56 mm	66 mm	71 mm	79 mm
d_r	14.5 mm	16.5 mm	19.0 mm	21.0 mm	23.5 mm

f = wires acc. to DIN 43138 (have to be re-pressed with the next smaller characteristic number of pressing die)

Pressing according to markings on the component.

Cable lug 2/16

for copper wires acc. to DIN 48201 or DIN 43138



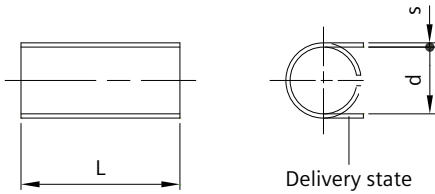
Order no.	8WL1590-1	8WL1591-1	8WL1591-4
Designation	Cable lug 2/16-95	Cable lug 2/16-120	Cable lug 2/16-150
Material	Cu-ETP	Cu-ETP	Cu-ETP
for wires	70f, 95 mm ²	95f, 120 mm ²	120f, 150 mm ²
Weight	13.5 kg/100 pcs.	23.5 kg/100 pcs.	21.5 kg/100 pcs.
Pressing die	8WL7154-3	8WL7154-5	8WL7154-6
d	13.5 mm	15.0 mm	17.2 mm
s	5 mm	5.5 mm	6 mm
L	69 mm	70 mm	71 mm
d₁	19.0 mm	21.0 mm	23.5 mm

f = wires acc. to DIN 43138 (have to be re-pressed with the next smaller characteristic number of pressing die)

Pressing according to markings on the component.

Protection sleeve (Cu-ETP)

for protecting wires or wire cross-section adjustment, for bronze and copper wires acc. to DIN 48201 or DIN 43138



Part 1

Order no.	8WL1600-0	8WL1601-0	8WL1601-1	8WL1602-0	8WL1602-1
Designation	Protection sleeve 25-35	Protection sleeve 35-35	Protection sleeve 35-60	Protection sleeve 50-80	Protection sleeve 50-130
Material	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
for wires	25 mm ²	35 mm ²	35 mm ²	50 mm ²	50 mm ²
Weight	1.10 kg/100 pcs.	0.60 kg/100 pcs.	2.00 kg/100 pcs.	2.0 kg/100 pcs.	5.0 kg/100 pcs.
d	6.5 mm	7.7 mm	7.7 mm	9.2 mm	9.2 mm
s	1.5 mm	0.8 mm	1.5 mm	1.0 mm	1.5 mm
L	35 mm	35 mm	60 mm	80 mm	130 mm

Part 2

Order no.	8WL1602-3	8WL1603-1	8WL1603-2	8WL1608-3	8WL1603-3
Designation	Protection sleeve 50-900	Protection sleeve 70f-40	Protection sleeve 70-80	Protection sleeve 70-120	Protection sleeve 70-130
Material	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
for wires	50 mm ²	70f mm ²	70 mm ²	70 mm ²	70 mm ²
Weight	35.0 kg/100 pcs.	2.00 kg/100 pcs.	2.0 kg/100 pcs.	7.10 kg/100 pcs.	3.00 kg/100 pcs.
d	9.2 mm	13 mm	10.7 mm	10.7 mm	10.5 mm
s	1.5 mm	1.5 mm	0.8 mm	2.0 mm	0.8 mm
L	900 mm	40 mm	70 mm	120 mm	130 mm

Part 3

Order no.	8WL1604-0	8WL1604-3	8WL1604-1	8WL1604-2	8WL1604-4
Designation	Protection sleeve 95-30	Protection sleeve 95-80	Protection sleeve 95f-40	Protection sleeve 95f-70	Protection sleeve 95f-80
Material	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
for wires	95 mm ²	70f, 95 mm ²	95f mm ²	95f mm ²	95f mm ²
Weight	0.90 kg/100 pcs.	2.80 kg/100 pcs.	1.30 kg/100 pcs.	2.80 kg/100 pcs.	3.20 kg/100 pcs.
d	12.7 mm	13.5 mm	14.9 mm	14.9 mm	14.9 mm
s	0.8 mm	1.0 mm	0.8 mm	1.0 mm	1.0 mm
L	30 mm	80 mm	40 mm	70 mm	80 mm

Part 4

Order no.	8WL1606-0	8WL1606-0A	8WL1606-1	8WL1606-4	8WL1607-0
Designation	Protection sleeve 120-70	Protection sleeve 120-80	Protection sleeve 120-130	Protection sleeve 120f-80	Protection sleeve 150-70
Material	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
for wires	120 mm ²	120 mm ²	120 mm ²	120f mm ²	150 mm ²
Weight	4.0 kg/100 pcs.	1.50 kg/100 pcs.	2.50 kg/100 pcs.	1.80 kg/100 pcs.	3.10 kg/100 pcs.
d	14.2 mm	14 mm	14.2 mm	16.6 mm	16 mm
s	1.5 mm	0.5 mm	0.5 mm	0.5 mm	1.0 mm
L	70 mm	80 mm	130 mm	80 mm	70 mm

Part 5

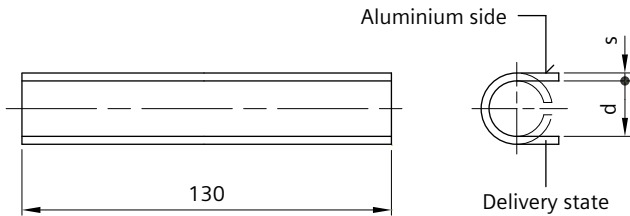
Order no.	8WL1607-1
Designation	Protection sleeve 150-130
Material	Cu-ETP
for wires	150 mm ²
Weight	8.70 kg/100 pcs.
d	16 mm
s	1.5 mm
L	130 mm

f = wires acc. to DIN 43138

Other types on request.

Protection sleeve (Alcu)

for corrosion protection between bronze or copper wires and aluminium components, for bronze and copper wires acc. to DIN 48201 or DIN 43138

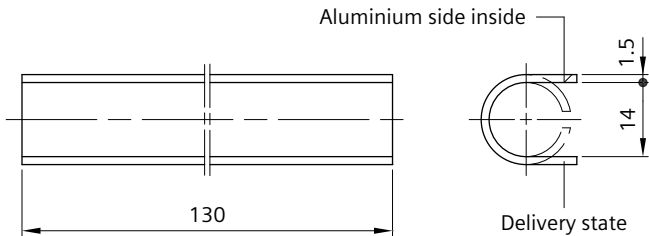


Order no.	8WL1614-0	8WL1614-1	8WL1614-2	8WL1614-3	8WL1614-4
Designation	Protection sleeve 50-130	Protection sleeve 70-130	Protection sleeve 95-130	Protection sleeve 120-130	Protection sleeve 150-130
Material	Alcu	Alcu	Alcu	Alcu	Alcu
for wires	35f, 50 mm ²	50f, 70 mm ²	70f, 95 mm ²	95f, 120 mm ²	120f, 150 mm ²
Weight	3.40 kg/100 pcs.	2.60 kg/100 pcs.	5.30 kg/100 pcs.	4.10 kg/100 pcs.	4.10 kg/100 pcs.
d	9 mm	10.5 mm	13 mm	14 mm	15.8 mm
s	2 mm	1.5 mm	2 mm	1.5 mm	1.5 mm

f = wires acc. to DIN 43138

Protection sleeve (Alcu), aluminium side inside

for corrosion protection between aluminium wires and copper or bronze components, for aluminium wires acc. to EN 50182

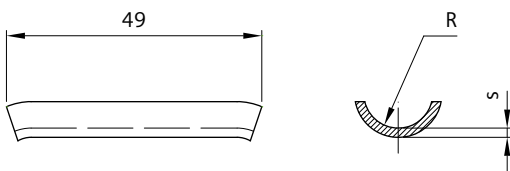


Order no.	8WL1614-3A
Designation	Protection sleeve 120-130
Material	Alcu
for wires	120 mm ²
Weight	4.10 kg/100 pcs.

Protection sleeves for other wire diameters on request.

Packer

for protecting wires and wire cross-section adjustment, for bronze and copper wires acc. to DIN 43138

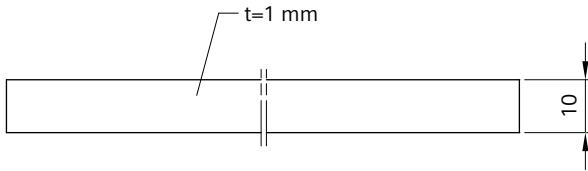


Order no.	8WL1615-0	8WL1616-0
Designation	Packer 70f	Packer 95f
Material	Cu-ETP	Cu-ETP
for wires	70f mm ²	95f mm ²
Weight	1.90 kg/100 pcs.	1.00 kg/100 pcs.
s	1.5 mm	0.8 mm
R	6.5 mm	7.4 mm

Please order by pairs.

Winding tape

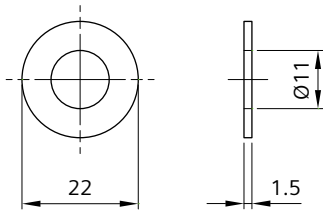
for protecting wires at catenary wire clamps



Order no.	8WL1620-0
Designation	Winding tape
Material	Cu-ETP
Weight	0.09 kg/m

Washer, round

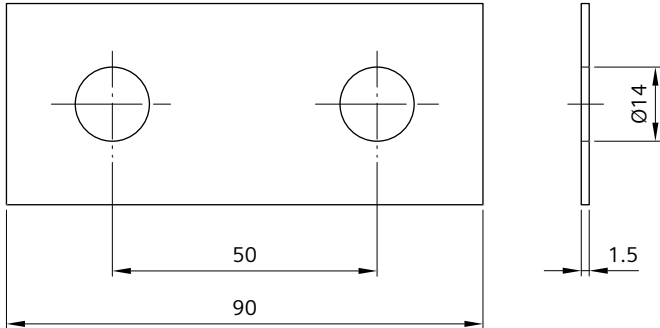
for corrosion protection between copper and aluminium components



Order no.	8WL1631-0
Designation	Washer
Material	Alcu
Weight	0.20 kg/100 pcs.

Washer, rectangular

for corrosion protection between copper and aluminium components, suitable for tube connecting fittings 8WL4652-0 to 8WL4652-2



Order no.	8WL1631-3
Designation	Washer
Material	Alcu
Weight	2.60 kg/100 pcs.

Chapter 02

Standard Products

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Swivel clip holder 55 for contact wire clip M16	234
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Twin eye clamp 55	209
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Twin tube clamp 55	211
Twin tube clamp 55 with eye 25	212

Technical comments

Application

This section lists the products that are used for setting up supports as GRP cantilevers with fittings made of copper-aluminium alloys.

Cantilever supports hold the catenary wire and contact wire in the required position over the rail and insulate the overhead contact line system.

Types

The design of the cantilevers depends on the mechanical and electrical requirements of the overhead contact line system.

Top wires made of bronze are generally insulated using loop insulators.

Contact wire clips made of copper-aluminium alloys are available for different contact wire profiles, see Chapter 02-09.

Tubes made of glass-fiber reinforced epoxy resin

For tubes made of glass-fiber reinforced epoxy resin (GF-EP), glass-fibers soaked in resin are wound around a core of closed-cell polyurethane. This type of production prevents the formation of an electrically conductive layer on the inside. The low weight of the GRP tubes makes installation considerably easier.

Solid rods made of glass-fiber reinforced polyester

Solid plastic rods are made of glass-fiber reinforced polyester resin (GF-UP) in the pultrusion process and then wrapped with a meshed surface texture.

Copper-aluminium alloys

For the production of overhead contact line fittings, Siemens uses a copper-aluminium multi-alloy bronze that is extremely corrosion-resistant.

The outstanding characteristics of these alloys permit the production of especially secure fittings with high strength and low weight compared to conventional bronze.

Special features

Copper-aluminium alloys

- No inter-crystalline corrosion
- High accuracy due to high-precision chilled casting method
- High resistance to environmental pollution, particularly on streets
- Aggressive materials do not penetrate due to smooth, unbroken surface
- Inconspicuous fittings thanks to thin-walled and sleek design
- Very high tensile strength and elongation at break of the material
- No brittling at low temperatures

Tubes and solid rods made of GRP

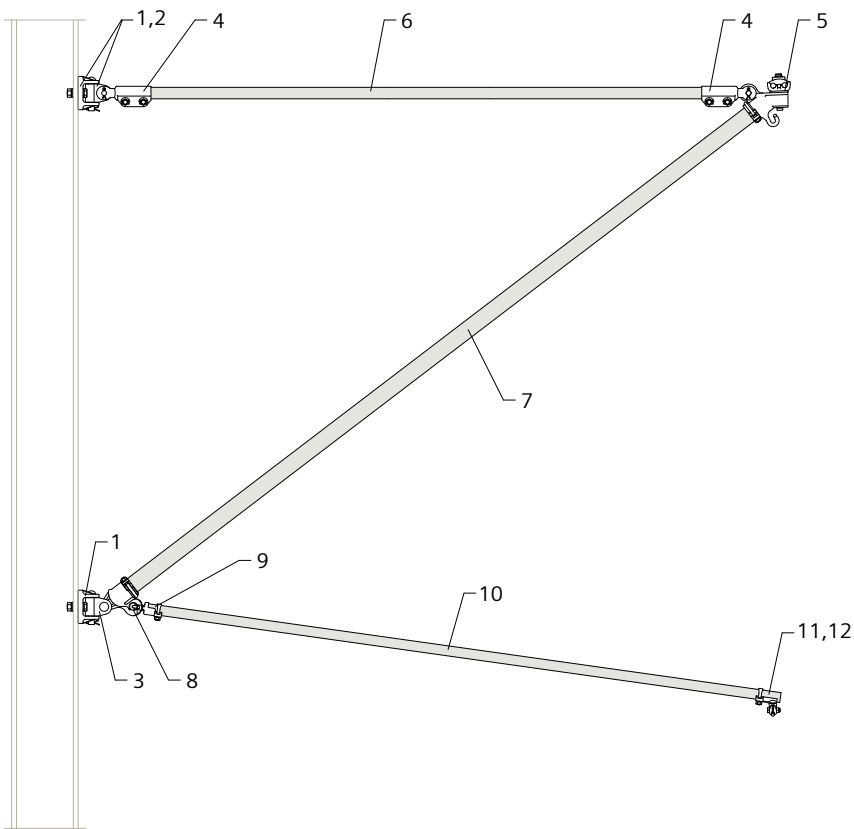
- Easy and installation-friendly design of a wide variety of cantilever supports thanks to uniform geometries
- High mechanical strength
- Fully insulated, thus high electrical resistance and safe to touch
- High degree of protection against atmospheric influences and UV radiation due to
 - additional final surface treatment of the GRP tubes
 - enrichment of additional pigment-rich polyester resin in the surface fleece of the GRP rods
 - unbroken surface thanks to meshed web structure of the surface texture
- Appealing architectural design of the cantilevers due to individual coloring
- Increased availability due to omission of insulators

Examples for assemblies

On the following pages you can find a number of typical application examples for the configuration of GRP cantilevers in catenary and trolley-type contact lines.

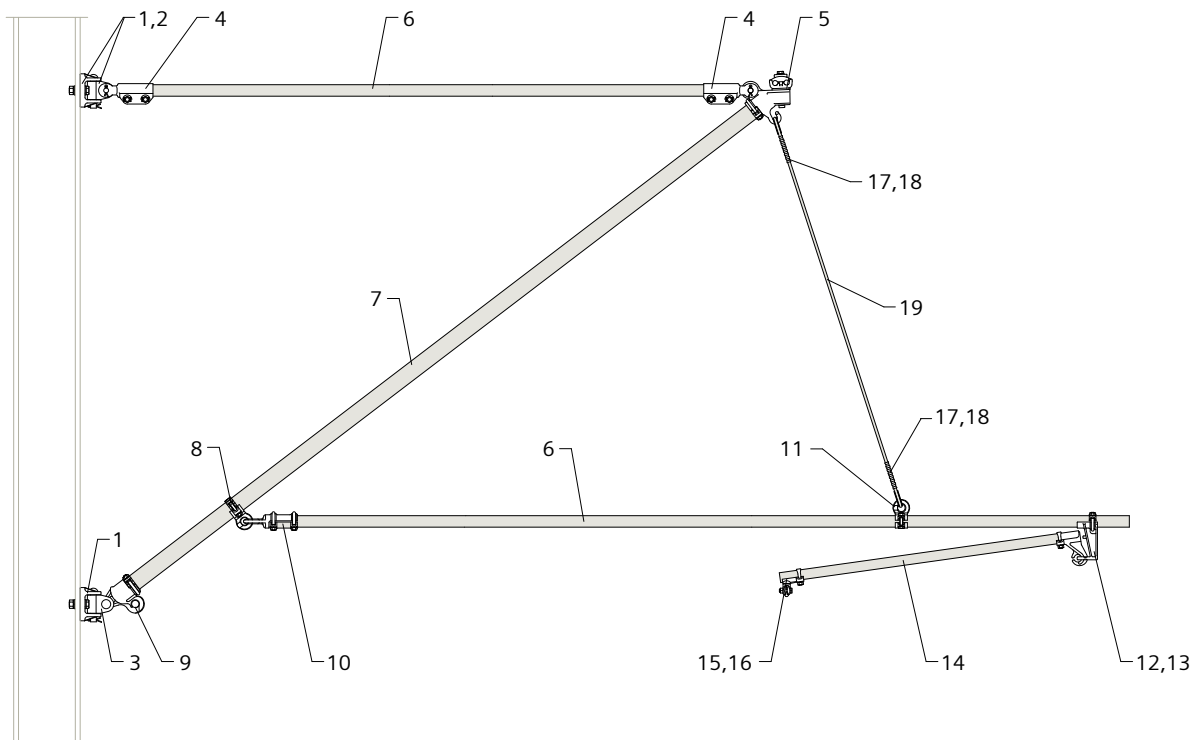
The exact configuration of the cantilever depends on the specific plant and the local situation.

Single cantilever on steel pole for catenary system



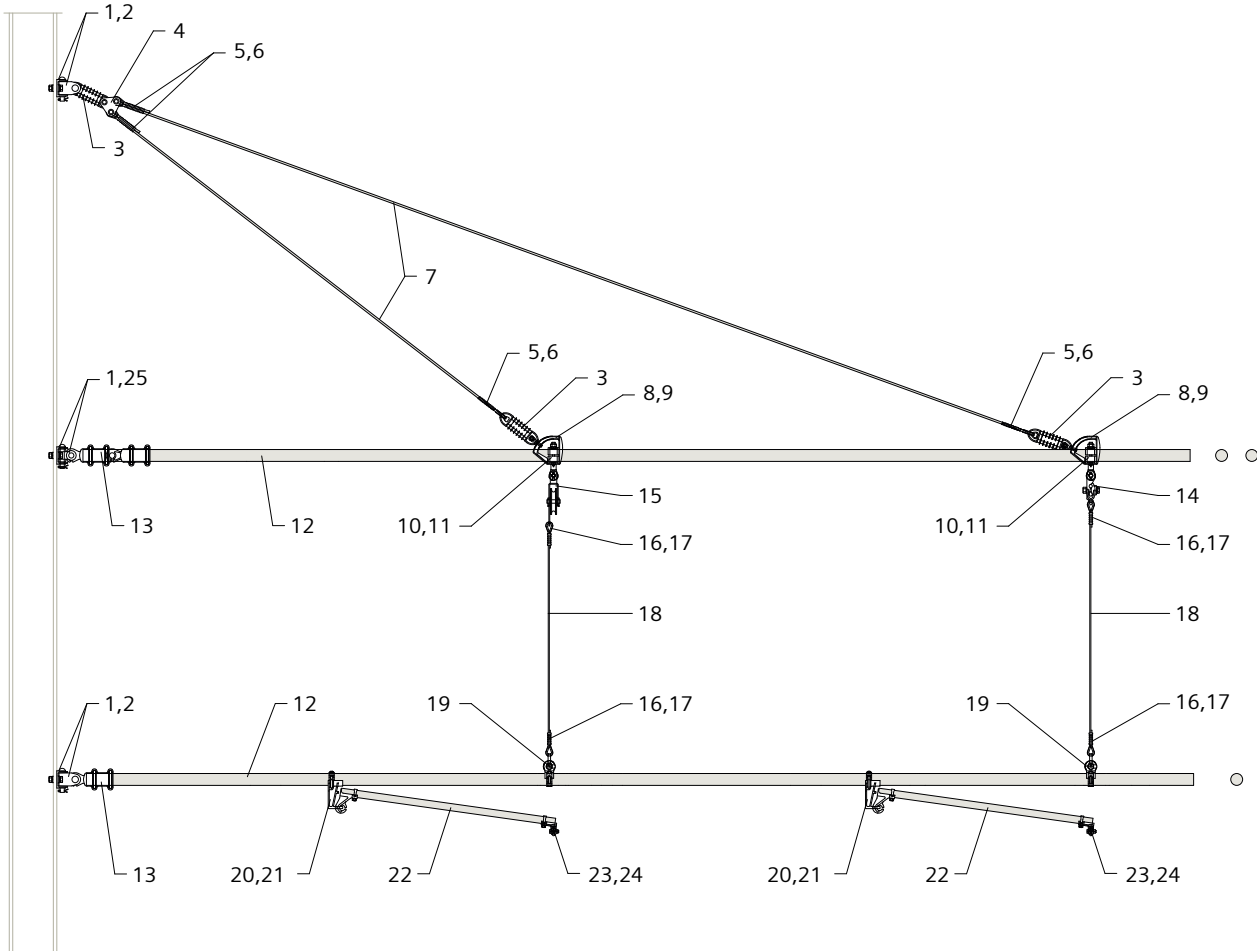
Position	Designation	Order no.
1	Cantilever swivel bracket	8WL2125-5
2	Swivel with eye	8WL2127-3
3	Swivel with clevis	8WL2126-2
4	Clevis end fitting 38, clamped	8WL2832-1
5	Catenary wire support clamp	8WL2054-7
6	GRP round rod 38 (length and color as needed)	8WL2811-0/-1
7	GRP round rod 55 (length and color as needed)	8WL2813-0/-1
8	Tube end fitting 55	8WL2828-0
9	Hook end fitting for GRP oval rod 23x33	8WL2833-0
10	GRP oval rod 23x33 (length and color as needed)	8WL2815-0/-1
11	Swivel clip holder for GRP oval rod 23x33	8WL2833-1
12	Contact wire clip	8WL4517-1K

Cantilever on steel pole for catenary system



Position	Designation	Order no.
1	Cantilever swivel bracket	8WL2125-5
2	Swivel with eye	8WL2127-3
3	Swivel with clevis	8WL2126-2
4	Clevis end fitting 38, clamped	8WL2832-1
5	Catenary wire support clamp	8WL2054-7
6	GRP round rod 38 (length and color as needed)	8WL2811-0/-1
7	GRP round rod 55 (length and color as needed)	8WL2813-0/-1
8	Eye clamp 55	8WL2824-6
9	Tube end fitting 55	8WL2828-0
10	Hook end fitting 38, clamped	8WL2838-1
11	Eye clamp 38	8WL2824-2
12	Drop bracket 38	8WL2720-0
13	Hook end clamp for GRP oval rod 23x33	8WL2833-4
14	GRP oval rod 23x33 (length and color as needed)	8WL2815-0/-1
15	Swivel clip holder for GRP oval rod 23x33	8WL2833-1
16	Contact wire clip	8WL4517-1K
17	Thimble 50	8WL1502-0
18	Compression/crimped connector for synthetic wire d=9 mm	8WL1524-2
19	Synthetic wire d=9 mm (length as needed)	8WL7097-0

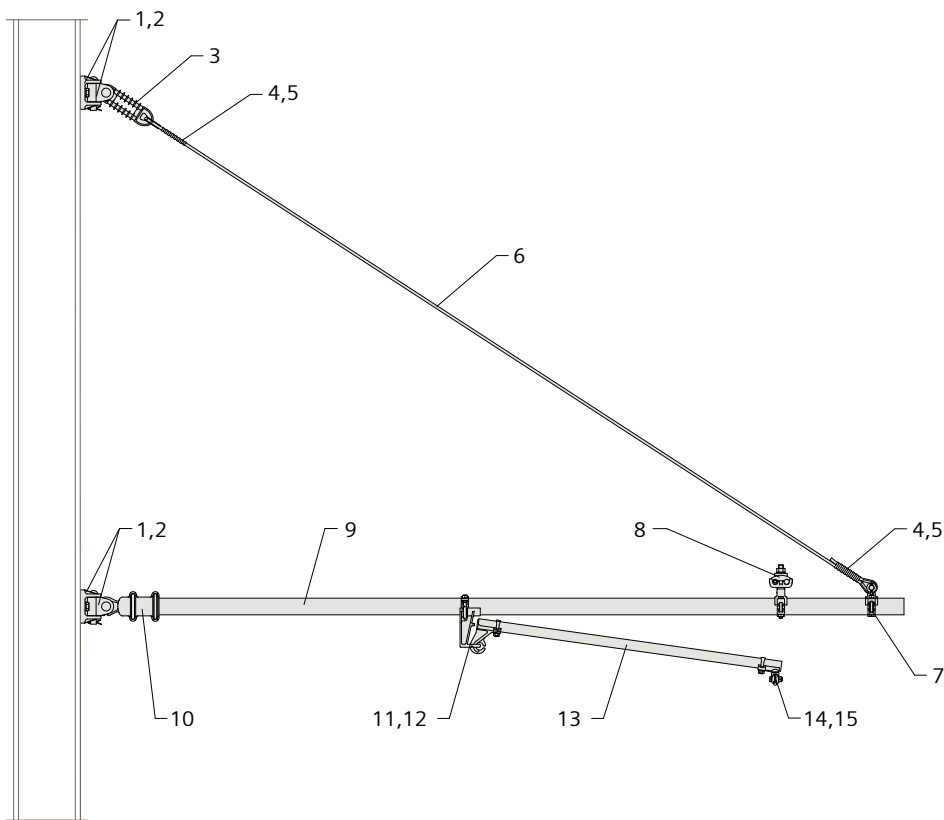
Cantilever across two tracks on steel pole for catenary system



Pos.	Designation	Order no.
1	Cantilever swivel bracket	8WL2125-5
2	Swivel with clevis	8WL2126-2
3	Loop insulator 1.5 kV DC	8WL3001-2
4	Three pin clevis link 16	8WL1036-7
5	Thimble 50	8WL1502-0
6	Compression/crimped connector 50-90	8WL1524-1
7	Bronze wire 50 (length as needed)	8WL7034-0
8	Shackle12	8WL1118-7
9	Suspension bracket for twin tube clamp	8WL2827-0
10	Twin tube clamp 55	8WL2826-1
11	Eye for twin tube clamp	8WL2827-3
12	GRP round rod 55 (length and color as needed)	8WL2813-0/-1

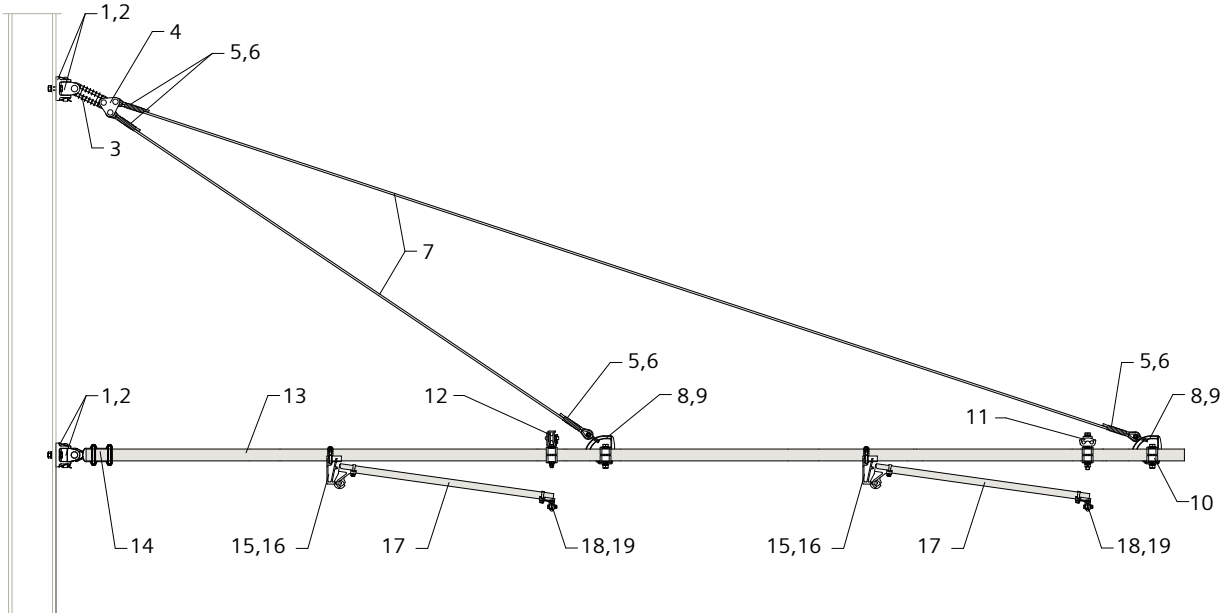
Pos.	Designation	Order no.
13	Hook end fitting 55, clamped	8WL2838-3
14	Pulley 88 with suspension	8WL2131-0
15	Conductor suspension clamp with hook	8WL2095-0
16	Thimble 35	8WL1501-0
17	Compression/crimped connector 25-112	8WL1522-1
18	Synthetic wire d=6 mm (length as needed)	8WL7095-0
19	Eye clamp 55	8WL2824-6
20	Drop bracket 55	8WL2721-0
21	Hook end clamp for GRP oval rod 23x33	8WL2833-4
22	GRP oval rod 23x33 (length and color as needed)	8WL2815-0/-1
23	Swivel clip holder for GRP oval rod 23x33	8WL2833-1
24	Contact wire clip	8WL4517-1K

Cantilever on steel pole for trolley-type contact line



Position	Designation	Order no.
1	Cantilever swivel bracket	8WL2125-5
2	Swivel with clevis	8WL2126-2
3	Loop insulator 1.5 kV DC	8WL3001-2
4	Thimble 50	8WL1502-0
5	Compression/crimped connector 50-90	8WL1524-1
6	Bronze wire 50 (length as needed)	8WL7034-0
7	Clamp hoop 55 with clevis	8WL2830-7
8	Bridle suspension 55	8WL2097-8C
9	GRP round rod 55 (length and color as needed)	8WL2813-0/-1
10	Hook end fitting 55, clamped	8WL2838-3
11	Drop bracket 55	8WL2721-0
12	Hook end clamp for GRP oval rod 23x33	8WL2833-4
13	GRP oval rod 23x33 (length and color as needed)	8WL2815-0/-1
14	Swivel clip holder for GRP oval rod 23x33	8WL2833-1
15	Contact wire clip	8WL4517-1K

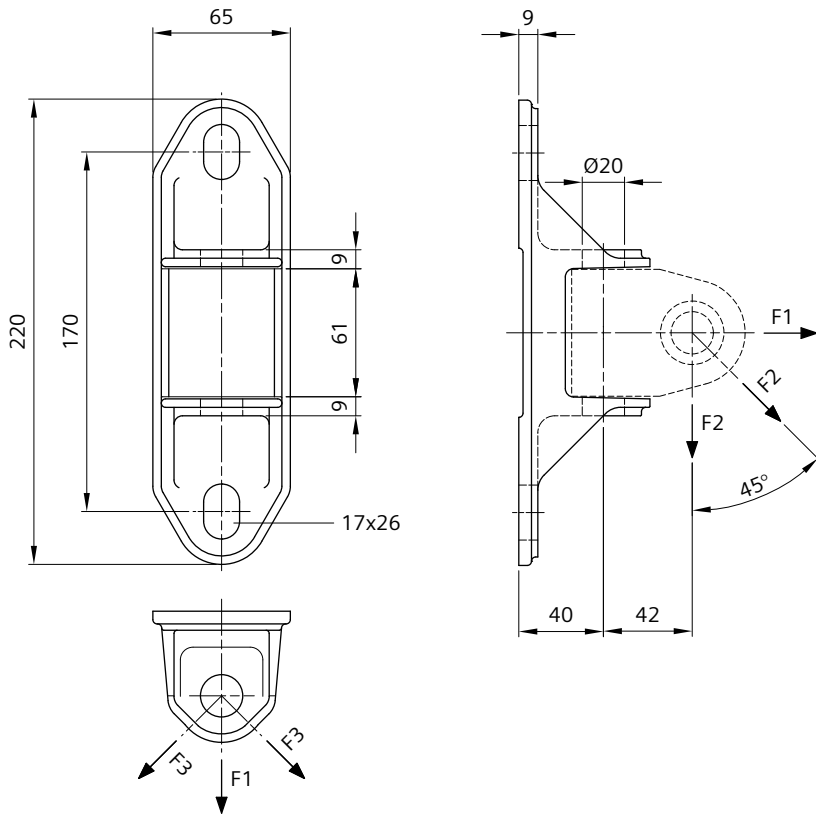
Cantilever across two tracks on steel pole for trolley-type contact line



Position	Designation	Order no.
1	Cantilever swivel bracket	8WL2125-5
2	Swivel with clevis	8WL2126-2
3	Loop insulator 1.5 kV DC	8WL3001-2
4	Three pin clevis link 16	8WL1036-7
5	Thimble 50	8WL1502-0
6	Compression/crimped connector 50-90	8WL1524-1
7	Bronze wire 50 (length as needed)	8WL7034-0
8	Shackle12	8WL1118-7
9	Suspension bracket for twin tube clamp	8WL2827-0
10	Twin tube clamp 55	8WL2826-1
11	Bridle suspension 2x55	8WL2097-8E
12	Bridle guiding device2x55	8WL2097-8F
13	GFK-Rundstab 55 (Länge und Farbe nach Bedarf)	8WL2813-0/-1
14	Hook end fitting 55, clamped	8WL2838-3
15	Drop bracket 55	8WL2721-0
16	Hook end clamp for GRP oval rod 23x33	8WL2833-4
17	GRP oval rod 23x33 (length and color as needed)	8WL2815-0/-1
18	Swivel clip holder for GRP oval rod 23x33	8WL2833-1
19	Contact wire clip	8WL4517-1K

Cantilever swivel bracket at steel pole

for hinged cantilevers



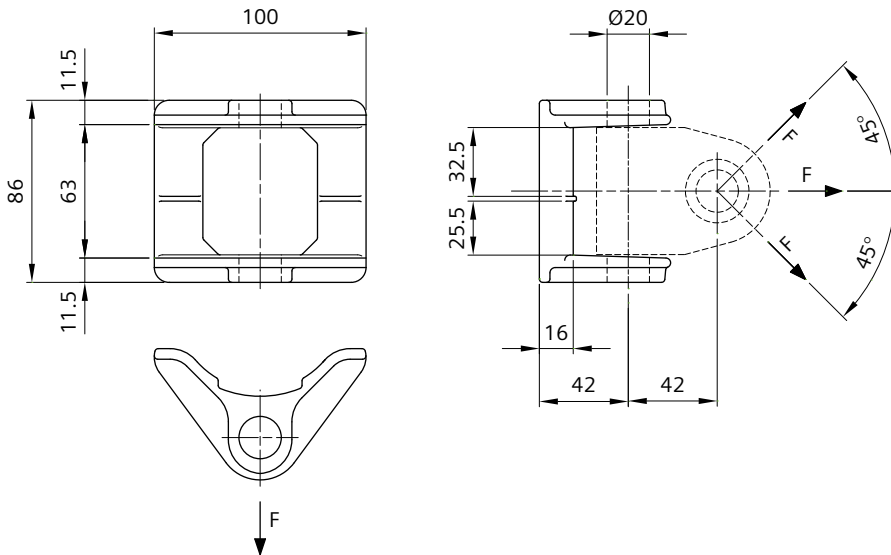
Order no.	8WL2123-8
Designation	Cantilever swivel bracket
Material	CuAl
Weight	0.66 kg
Perm. operating load (F1)	17 kN
Min. failing load (F1)	51 kN
Perm. operating load (F2/F3)	10 kN
Min. failing load (F2/F3)	30 kN

Pin 8WL1112-2 (19x100-stISt) and split pin 8WL1115-1 (5x28-Cu) must be ordered separately, see Chapter 02-01.

Can also be supplied completely mounted.

Cantilever swivel bracket for fastening of punch-lock band

for hinged cantilevers at circular shaped pole ≥ 120 mm



Order no.	8WL2124-0
Designation	Cantilever swivel bracket
Material	CuAl
Weight	0.48 kg
Perm. operating load	15 kN
Min. failing load	45 kN

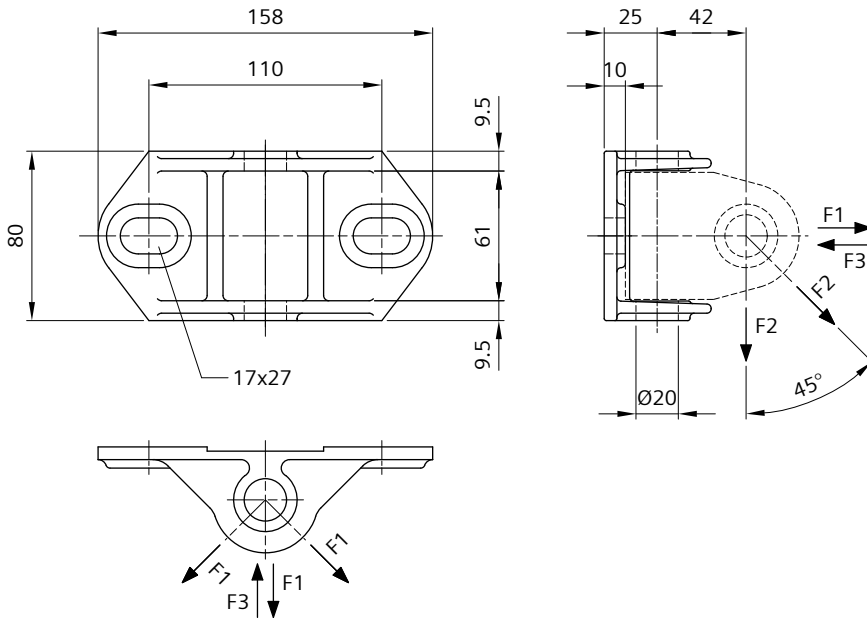
The bearing capacity of the connection depends on the pole diameter, punch-lock band, lock or loop used which, type of the installation and mounting tool and has to be checked from case to case.

Pin 8WL1112-2 (19x100-stlSt), split pin 8WL1115-1 (5x28-Cu), punch-lock band 8WL6743-0 and lock 8WL6748-6 or loop 8WL6748-1 must be ordered separately, see Chapter 02-01.

Can also be supplied completely mounted.

Cantilever swivel bracket

for hinged cantilevers



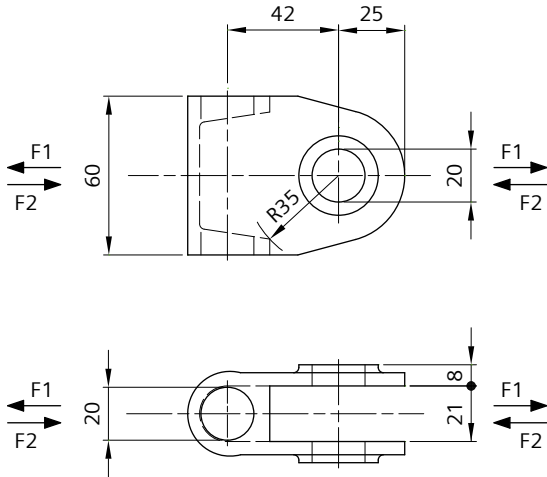
Order no.	8WL2125-5
Designation	Cantilever swivel bracket
Material	CuAl
Weight	0.56 kg
Perm. operating load/ tension (F1)	21.7 kN
Min. failing load/ tension (F1)	65 kN
Perm. operating load/ tension (F2)	10 kN
Min. failing load/ tension (F2)	30 kN
Perm. operating load/ pressure (F3)	30 kN
Min. failing load/ pressure (F3)	90 kN

Pin 8WL1112-2 (19x100-stlSt) and split pin 8WL1115-1 (5x28-Cu) must be ordered separately, see Chapter 02-01.

Can also be supplied completely mounted.

Swivel with clevis

for hinged cantilevers



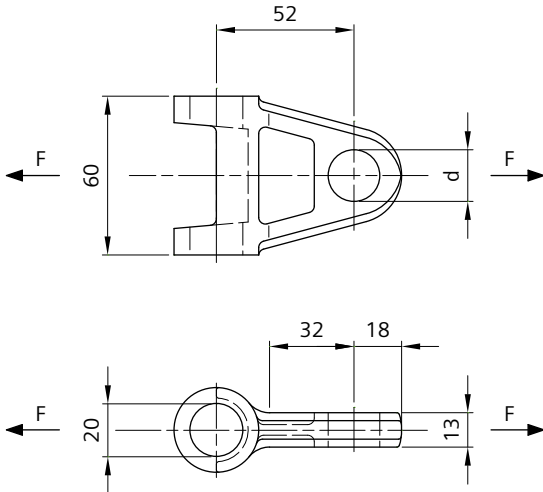
Order no.	8WL2126-2
Designation	Swivel with clevis 21
Material	CuAl
Weight	0.34 kg
Perm. operating load/ tension (F1)	26.7 kN
Min. failing load/ tension (F1)	80 kN
Perm. operating load/ pressure (F2)	30 kN
Min. failing load/ pressure (F2)	90 kN

Pin 8WL1110-2 (19x52-st1St) and split pin 8WL1115-1 (5x28-Cu) must be ordered separately, see Chapter 02-01.

Can also be supplied completely mounted.

Swivel with eye

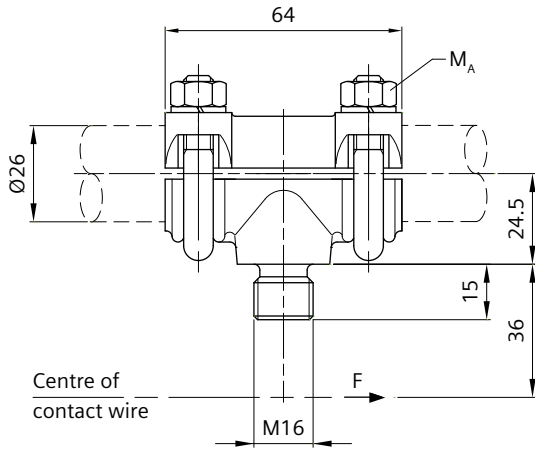
for hinged cantilevers



Order no.	8WL2127-2	8WL2127-3
Designation	Swivel with eye 20	Swivel with eye 17
Material	CuAl	CuAl
Weight	0.26 kg	0.27 kg
Perm. operating load	13.4 kN	13.4 kN
Min. failing load	40 kN	40 kN
d	19.5 mm	16.5 mm

Swivel clip holder 26

for GRP tube/rod d=26 mm

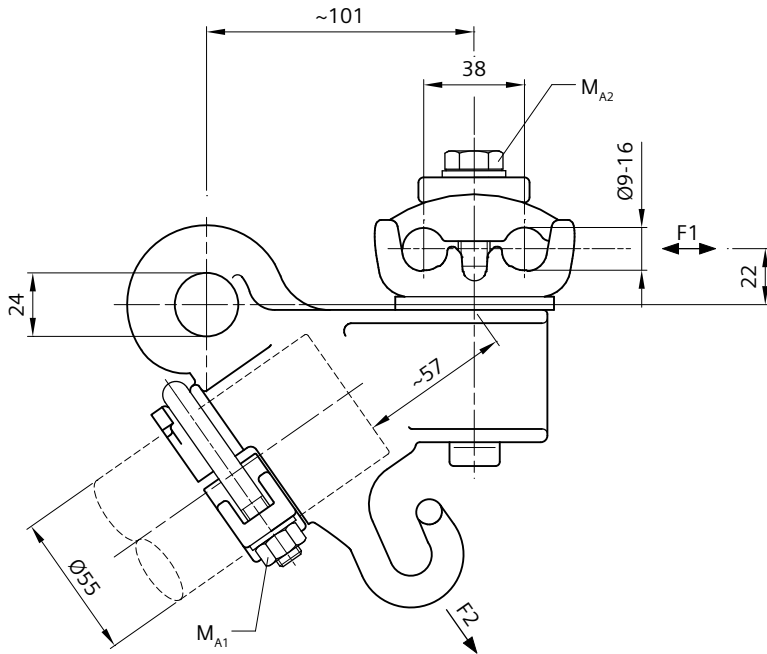


Order no.	8WL2007-1
Designation	Swivel clip holder 26
Material	
Swivel clip holder	CuAl
U-bolts M8	stlSt
Nuts, spring washers	stlSt
Weight	0.34 kg
Perm. operating load	2.0 kN
Min. failing load	6.0 kN
Tightening torque M_A	12.5 Nm

Contact wire clips see Chapter 02-09.

Catenary wire support clamp 55

for GRP tubes/rods $d=55$ mm, for bronze and copper wires acc. to DIN 48201

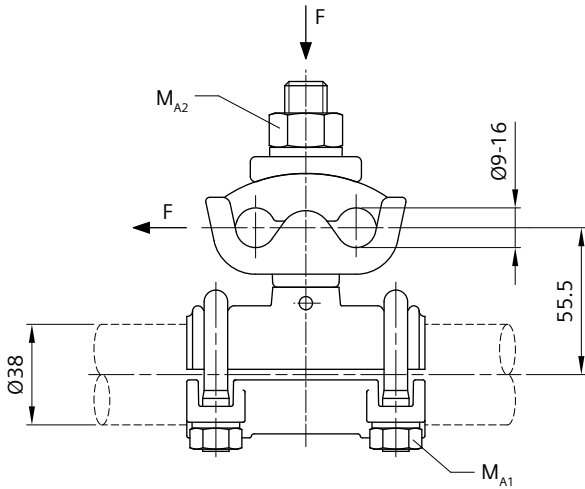


Order no.	8WL2054-7
Designation	Catenary wire support clamp 55/16
Material	
Clamp body	CuAl
Clamp cover	CuAl
Clamp holder	CuAl
U-bolt M10	stlSt
Bolt M12	stlSt
Nuts, washers	stlSt
for wires	50 to 150 mm ²
Weight	2.33 kg
Perm. operating load (F1)	10 kN
Min. failing load (F1)	30 kN
Perm. operating load (F2)	2.5 kN
Min. failing load (F2)	7.5 kN
Tightening torque M_{A1}	25 Nm
Tightening torque M_{A2}	56 Nm

Protection sleeves must be ordered separately, see Chapter 02-02.

Bridle suspension 38

for fixed bridle or catenary wire suspension at GRP tubes/rods $d=38$ mm, for bronze or copper wires acc. to DIN 48201 or synthetic wire 8WL7097-0

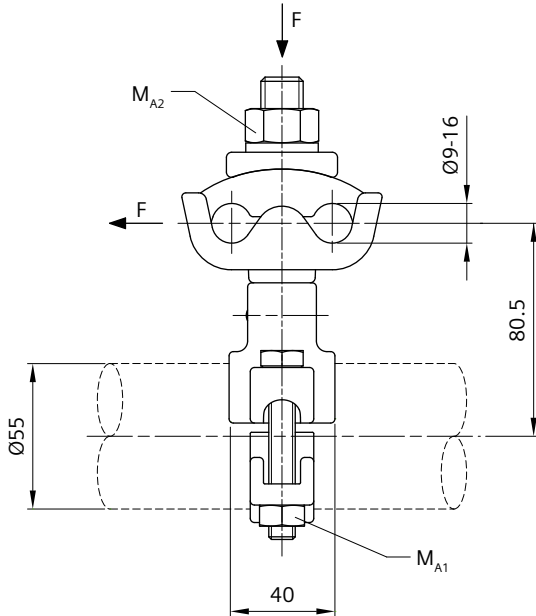


Order no.	8WL2097-8L
Designation	Bridle suspension 38
Material	
Clamp body	CuAl
Clamp cover	CuAl
Clamp holder	CuAl
Equalizer washer	CuAl
Threaded pin M16	stlSt
U-bolts M10	stlSt
Nuts, spring washers	stlSt
Prestressed sleeve	stlSt
for wires	50 to 150 mm ² , BzII / Cu-ETP 35 mm ² , BzII 9 mm (8WL7097-0)
Weight	1.55 kg
Perm. operating load	1 kN
Min. failing load	3 kN
Tightening torque M_{A1}	32 Nm
Tightening torque M_{A2}	70 Nm

Protection sleeves for bronze wire 35 mm² must be ordered separately, see Chapter 02-02.

Bridle suspension 55

for fixed bridle or catenary wire suspension at GRP tubes/rods $d=55$ mm, for bronze or copper wires acc. to DIN 48201 or synthetic wire 8WL7097-0

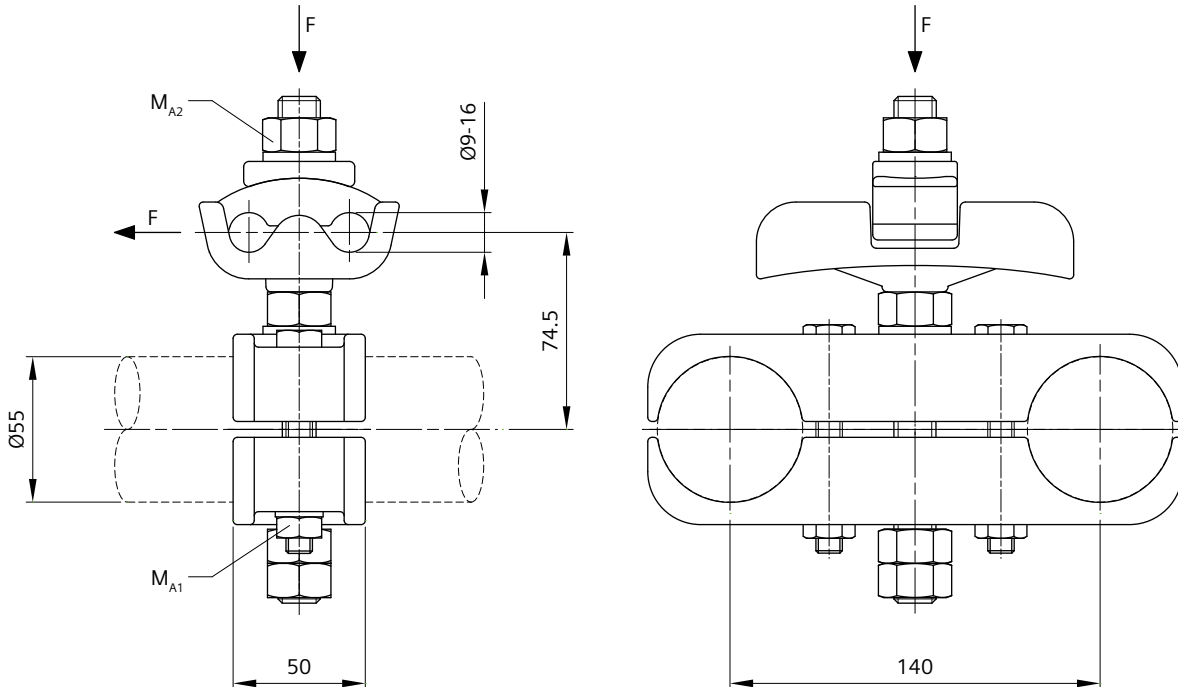


Order no.	8WL2097-8C
Designation	Bridle suspension 55
Material	
Clamp body	CuAl
Clamp cover	CuAl
Clamp holder	CuAl
Equalizer washer	CuAl
Threaded pin M16	stlSt
Bolts M10	stlSt
Nuts, spring washer	stlSt
Prestressed sleeve	stlSt
for wires	50 to 150 mm ² , BzII / Cu-ETP 35 mm ² , BzII 9 mm (8WL7097-0)
Weight	1.43 kg
Perm. operating load	1 kN
Min. failing load	3 kN
Tightening torque M_{A1}	32 Nm
Tightening torque M_{A2}	70 Nm

Protection sleeves for bronze wire 35 mm² must be ordered separately, see Chapter 02-02.

Bridle suspension 2x55

for fixed bridle or catenary wire suspension at cantilevers across two tracks made of GRP tubes/rods $d=55$ mm, for bronze or copper wires acc. to DIN 48201 or synthetic wire 8WL7097-0

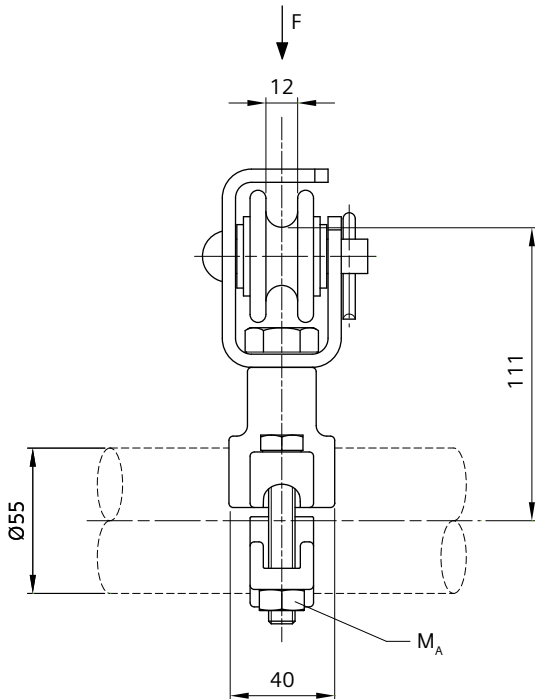


Order no.	8WL2097-8E
Designation	Bridle suspension 2x55
Material	
Clamp body	CuAl
Clamp cover	CuAl
Twin tube clamp	CuAl
Equalizer washer	CuAl
Threaded pin M16	stlSt
Bolts M10	stlSt
Nuts, washers	stlSt
Spring washers	stlSt
for wires	50 to 150 mm ² , BzII / Cu-ETP 35 mm ² , BzII 9 mm (8WL7097-0)
Weight	2.78 kg
Perm. operating load	1 kN
Min. failing load	3 kN
Tightening torque M_{A1}	32 Nm
Tightening torque M_{A2}	70 Nm

Protection sleeves for bronze wire 35 mm² must be ordered separately, see Chapter 02-02.

Bridle guiding device 55

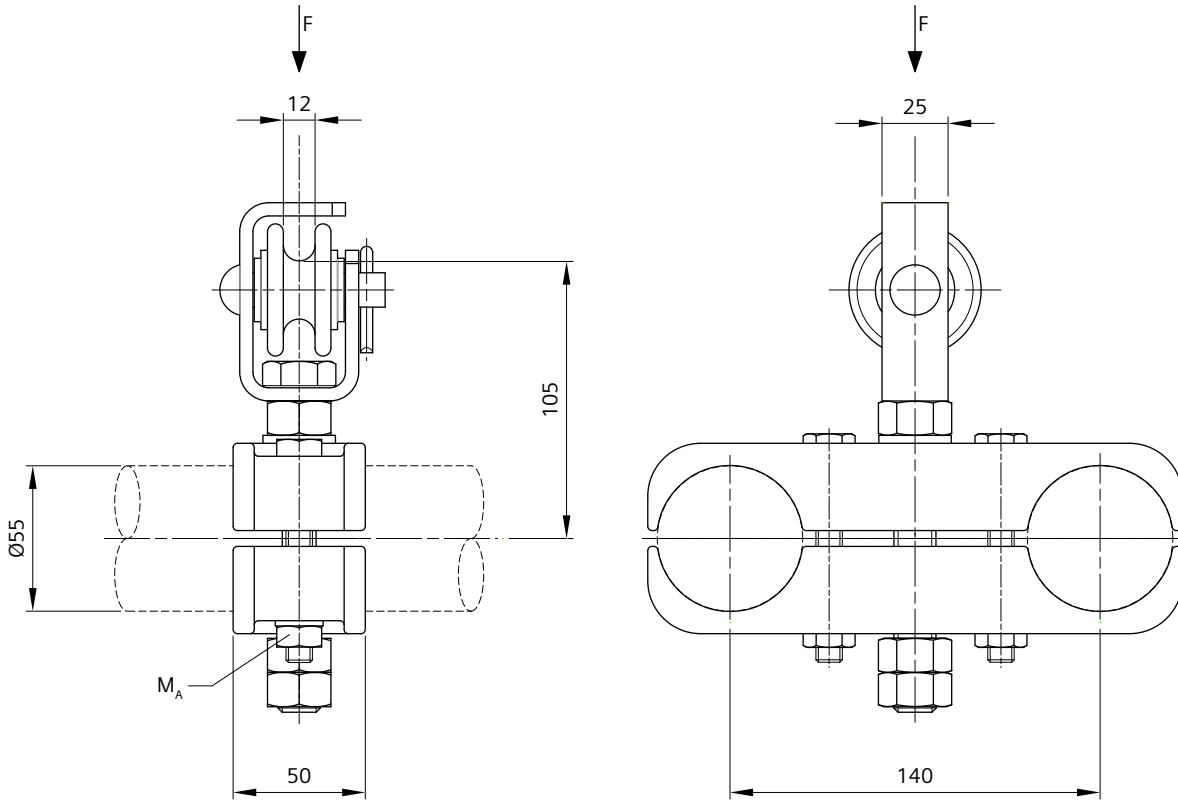
for flexible bridle or catenary wire suspension at GRP tubes/rods $d=55$ mm, for bronze wires acc. to DIN 48201 or synthetic wire 8WL7097-0



Order no.	8WL2097-8D
Designation	Bridle guiding device 55
Material	
Clamp holder	CuAl
Pulley	Polyamide
Clevis, pin 13x55	stlSt
Split pin 5x28	Cu
Bolts M10	stlSt
Nuts, washers	stlSt
for wires	35 to 70 mm ² 9 mm (8WL7097-0)
Weight	0.9 kg
Perm. operating load	1 kN
Min. failing load	3 kN
Tightening torque M_A	32 Nm

Bridle guiding device 2x55

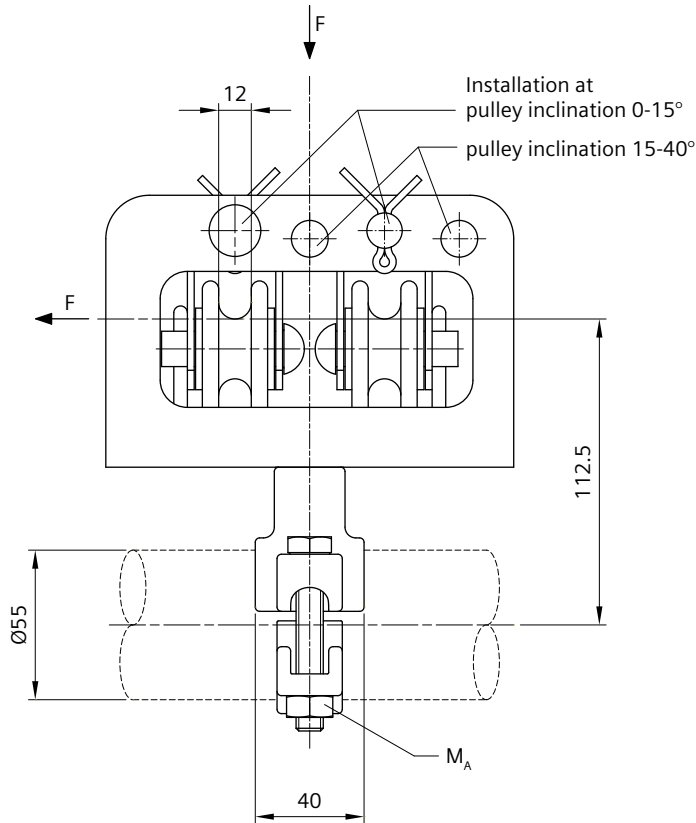
for flexible bridle or catenary wire suspension at cantilevers across two tracks made of GRP tubes/rods d=55 mm, for bronze wires acc. to DIN 48201 or synthetic wire 8WL7097-0



Order no.	8WL2097-8F
Designation	Bridle guiding device 2x55
Material	
Twin tube clamp	CuAl
Pulley	Polyamide
Clevis, pin 13x55	stlSt
Split pin 5x28	Cu
Bolt M16	stlSt
Bolts M10	stlSt
Nuts, washers	stlSt
Spring washers	stlSt
for wires	35 to 70 mm ² 9 mm (8WL7097-0)
Weight	2.25 kg
Perm. operating load	1 kN
Min. failing load	3 kN
Tightening torque M_A	32 Nm

Twin bridle guiding device 55

as flexible suspension for two bridle-and-pulley suspensions or catenary wires at GRP tubes or rods $d=55$ mm, for bronze wires acc. to DIN 48201 or synthetic wire 8WL7097-0

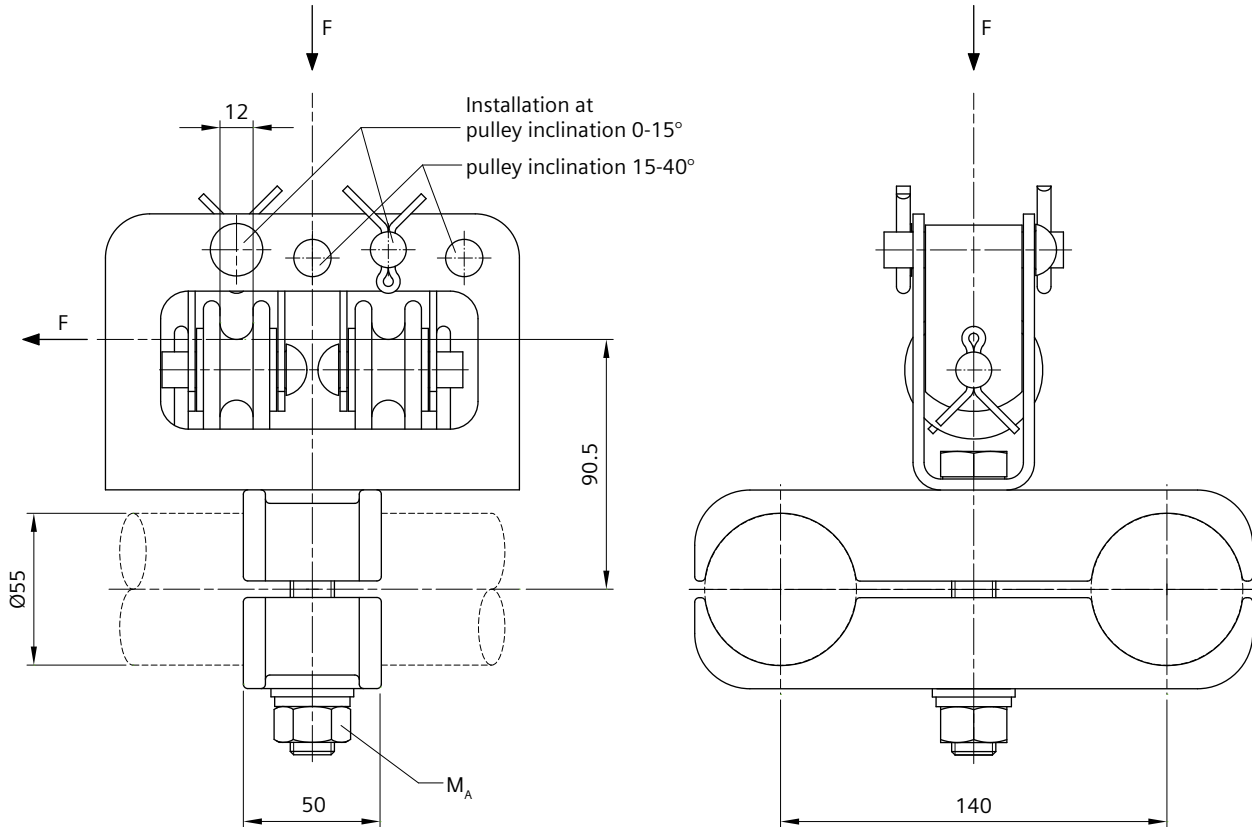


Order no.	8WL2097-8G
Designation	Twin bridle guiding device 55
Material	
Clamp holder	CuAl
Pulleys	Polyamide
Pulley holders	stlSt
Pins 13x45, 13x55	stlSt
Split pins 5x28	Cu
Bolts M10	stlSt
Nuts, washers	stlSt
for wires	35 to 70 mm ² 9 mm (8WL7097-0)
Weight	1.78 kg
Perm. operating load	1 kN
Min. failing load	3 kN
Tightening torque M_A	32 Nm

Pulley movable in the Z-axis of 0° to 40°.

Twin bridle guiding device 2x55

as flexible suspension for two bridle-and-pulley suspensions or catenary wires for cantilevers across two tracks made of GRP tubes or rods $d=55$ mm, for bronze wires acc. to DIN 48201 or sythetic wire 8WL7097-0

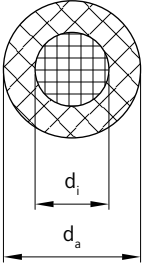


Order no.	8WL2097-8H
Designation	Twin bridle guiding device 2x55
Material	
Tube clamp	CuAl
Pulleys	Polyamide
Pulley holders	stlSt
Pins 13x45, 13x55	stlSt
Split pins 5x28	Cu
Bolt M16	stlSt
Nut, washer	stlSt
for wires	35 to 70 mm ² 9 mm (8WL7097-0)
Weight	2.90 kg
Perm. operating load	1 kN
Min. failing load	3 kN
Tightening torque M_A	135 Nm

Pulley movable in the Z-axis of 0° to 40°.

GRP tube

for insulated cantilevers or steady arms



Order no.	8WL2800-0	8WL2801-0	8WL2802-0
Designation	Tube 26	Tube 38	Tube 55
Material	GF-EP, color RAL7034 (yellow grey)	GF-EP, color RAL7034 (yellow grey)	GF-EP, color RAL7034 (yellow grey)
Weight	0.73 kg/m	1.40 kg/m	2.62 kg/m
Max. delivery length	3.20 m	6.00 m	12 m
Tensile/Bending strength	550 N/mm ²	550 N/mm ²	550 N/mm ²
Pressure strength, axial	400 N/mm ²	400 N/mm ²	400 N/mm ²
Elastic modulus (bending)	40000 N/mm ²	40000 N/mm ²	40000 N/mm ²
Operating temperature	-50 °C to +80 °C	-50 °C to +80 °C	-50 °C to +80 °C
Disruptive strength, transversal	20 kV/mm	20 kV/mm	20 kV/mm
Disruptive strength, longitudinal	15 - 30 kV/cm	15 - 30 kV/cm	15 - 30 kV/cm
Discharge current, dry/wet ¹⁾	approx. 20 µA/approx. 1 mA	approx. 20 µA/approx. 1 mA	approx. 20 µA/approx. 1 mA
d_i	15 mm	24 mm	40 mm
d_a	26 mm	38 mm	55 mm

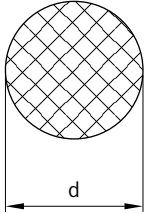
¹⁾ at 100 kV, 50 Hz (tube length 3 m)

Other lengths up to 6.0 m and colors on request.

If necessary, the end cap 8WL2184-0, -2 or -3 must be ordered separately, see page 330.

GRP round rod

with meshed surface texture, for insulated cantilevers



Part 1

Order no.	8WL3007-0	8WL3007-1	8WL2810-0	8WL2810-1	8WL2811-0
Designation	Round rod 10	Round rod 10	Round rod 26	Round rod 26	Round rod 38
Material	GF-UP, color RAL1020 (olive yellow)	GF-UP, color RAL6022 (olive drab)	GF-UP, color RAL1020 (olive yellow)	GF-UP, color RAL6022 (olive drab)	GF-UP, color RAL1020 (olive yellow)
Weight	0.15 kg/m	0.15 kg/m	1.00 kg/m	1.00 kg/m	2.15 kg/m
Max. delivery length	6.00 m	6.00 m	8.00 m	8.00 m	8.00 m
Tensile/Bending strength	–	–	500 N/mm ²	500 N/mm ²	500 N/mm ²
Pressure strength, axial	–	–	400 N/mm ²	400 N/mm ²	400 N/mm ²
Elastic modulus (bending)	> 40000 N/mm ²	> 40000 N/mm ²	> 40000 N/mm ²	> 40000 N/mm ²	> 40000 N/mm ²
Operating temperature	-50 °C to +80 °C	-50 °C to +80 °C	-50 °C to +80 °C	-50 °C to +80 °C	-50 °C to +80 °C
Dielectric power factor	$\tan \delta 12.9 \times 10^{-3}$	$\tan \delta 12.9 \times 10^{-3}$	$\tan \delta 12.9 \times 10^{-3}$	$\tan \delta 12.9 \times 10^{-3}$	$\tan \delta 12.9 \times 10^{-3}$
Tracking resistance	> CTI 600	> CTI 600	> CTI 600	> CTI 600	> CTI 600
Tensile strength	> 500 N/mm ²	> 500 N/mm ²	–	–	–
Discharge current, dry/wet ¹⁾	approx. 20 µA/ approx. 2 mA	approx. 20 µA/ approx. 2 mA	approx. 20 µA/ approx. 2 mA	approx. 20 µA/ approx. 2 mA	approx. 20 µA/ approx. 2 mA
d	10 mm	10 mm	26 mm	26 mm	38 mm

Part 2

Order no.	8WL2811-1	8WL2813-0	8WL2813-1
Designation	Round rod 38	Round rod 55	Round rod 55
Material	GF-UP, color RAL6022 (olive drab)	GF-UP, color RAL1020 (olive yellow)	GF-UP, color RAL6022 (olive drab)
Weight	2.15 kg/m	4.51 kg/m	4.51 kg/m
Max. delivery length	8.00 m	8.00 m	8.00 m
Tensile/Bending strength	500 N/mm ²	500 N/mm ²	500 N/mm ²
Pressure strength, axial	400 N/mm ²	400 N/mm ²	400 N/mm ²
Elastic modulus (bending)	> 40000 N/mm ²	> 40000 N/mm ²	> 40000 N/mm ²
Operating temperature	-50 °C to +80 °C	-50 °C to +80 °C	-50 °C to +80 °C
Dielectric power factor	$\tan \delta 12.9 \times 10^{-3}$	$\tan \delta 12.9 \times 10^{-3}$	$\tan \delta 12.9 \times 10^{-3}$
Tracking resistance	> CTI 600	> CTI 600	> CTI 600
Tensile strength	–	–	–
Discharge current, dry/wet ¹⁾	approx. 20 µA/approx. 2 mA	approx. 20 µA/approx. 2 mA	approx. 20 µA/approx. 2 mA
d	38 mm	55 mm	55 mm

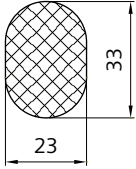
¹⁾ 100 kV, 50 Hz (rod length 3 m)

Other lengths and colors on request.

If necessary, the end cap 8WL2184-0, -2 or -3 must be ordered separately, see page 330.

GRP oval rod

with meshed surface texture, for insulated cantilevers



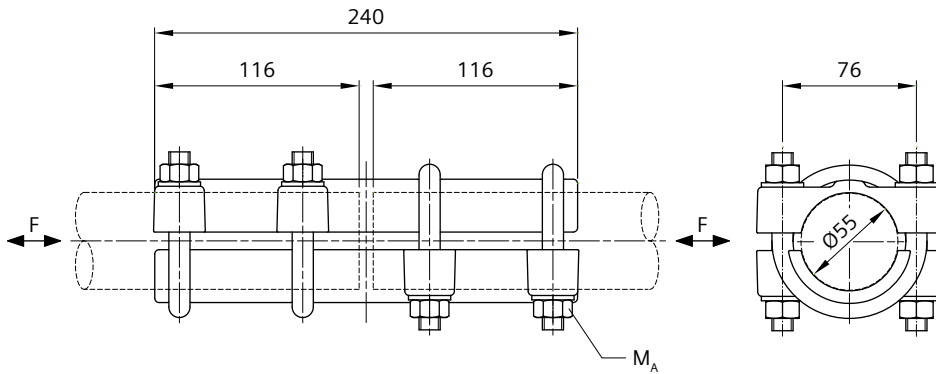
Order no.	8WL2815-0	8WL2815-1
Designation	Oval rod 23x33	Oval rod 23x33
Material	GF-UP, color RAL1020 (olive yellow)	GF-UP, color RAL6022 (olive drab)
Weight	1.22 kg/m	1.22 kg/m
Max. delivery length	6.00 m	6.00 m
Tensile/Bending strength	500 N/mm ²	500 N/mm ²
Pressure strength, axial	400 N/mm ²	400 N/mm ²
Elastic modulus (bending)	> 40000 N/mm ²	> 40000 N/mm ²
Operating temperature	-50 °C to +80 °C	-50 °C to +80 °C
Dielectric power factor	tan δ 12.9x10 ⁻³	tan δ 12.9x10 ⁻³
Tracking resistance	> CTI 600	> CTI 600
Discharge current, dry/wet ¹⁾	approx. 20 µA/approx. 2 mA	approx. 20 µA/approx. 2 mA

¹⁾ at 100 kV, 50 Hz (rod length 3 m)

Other lengths and colors on request.

Coupling socket 55

for connection of GRP tubes/rods d=55 mm

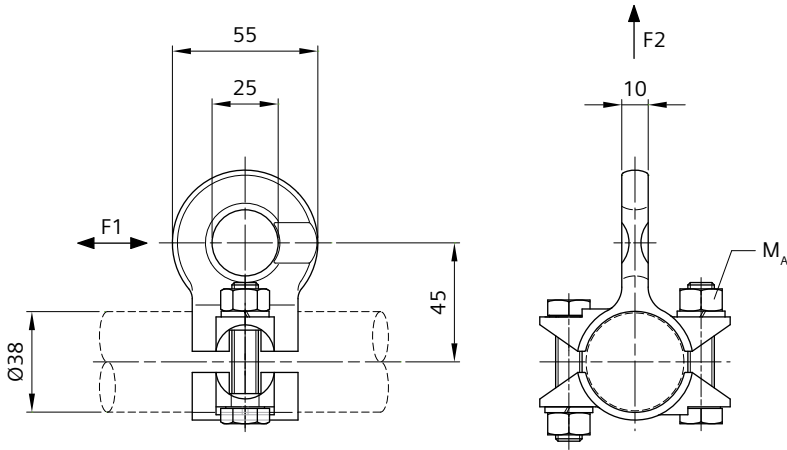


Order no.	8WL2878-1
Designation	Coupling socket 55
Material	
Clamp bodies	CuAl
U-bolts M12	stlSt
Nuts, washers	stlSt
Weight	3.34 kg
Perm. operating load	20 kN
Min. failing load	60 kN
Tightening torque M_A	56 Nm

The bearing capacity of the cantilever has to be proved project-specifically.

Eye clamp 38

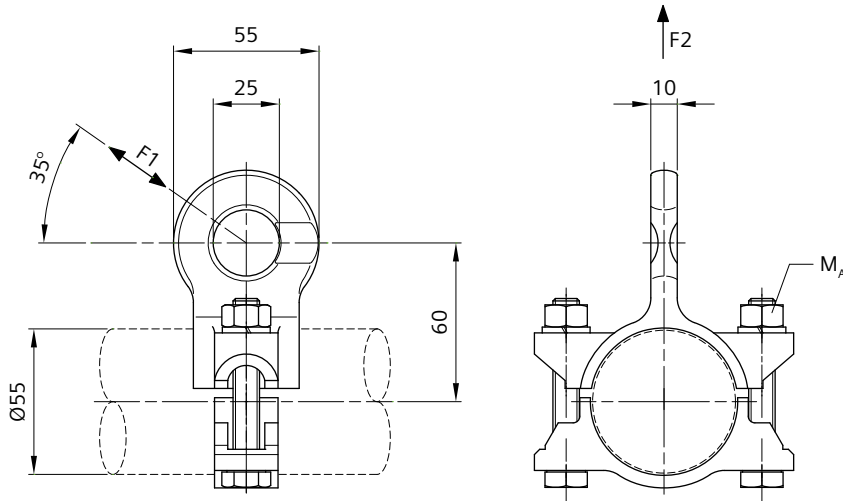
for clamping at GRP tube/rod d=38 mm



Order no.	8WL2824-2
Designation	Eye clamp 38
Material	
Eye clamp	CuAl
Clamp hoop	CuAl
Bolts M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	0.36 kg
Perm. operating load (F1)	5 kN
Min. failing load (F1)	15 kN
Perm. operating load (F2)	8 kN
Min. failing load (F2)	24 kN
Tightening torque M_A	32 Nm

Eye clamp 55

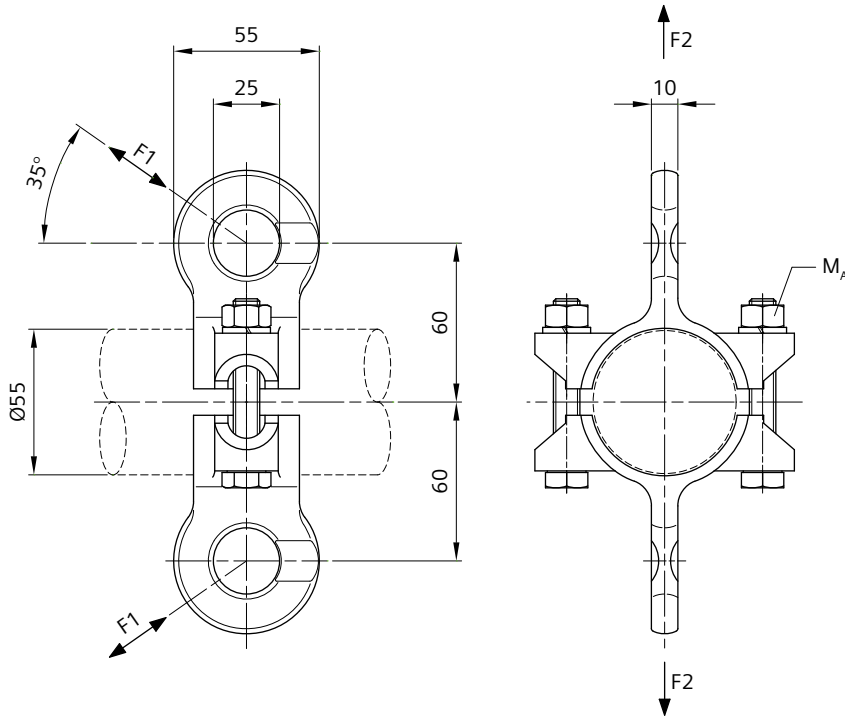
for clamping at GRP tube/rod d=55 mm



Order no.	8WL2824-6
Designation	Eye clamp 55
Material	
Eye clamp	CuAl
Clamp hoop	CuAl
Bolts M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	0.58 kg
Perm. operating load (F1)	6 kN
Min. failing load (F1)	18 kN
Perm. operating load (F2)	8 kN
Min. failing load (F2)	24 kN
Tightening torque M_A	32 Nm

Twin eye clamp 55

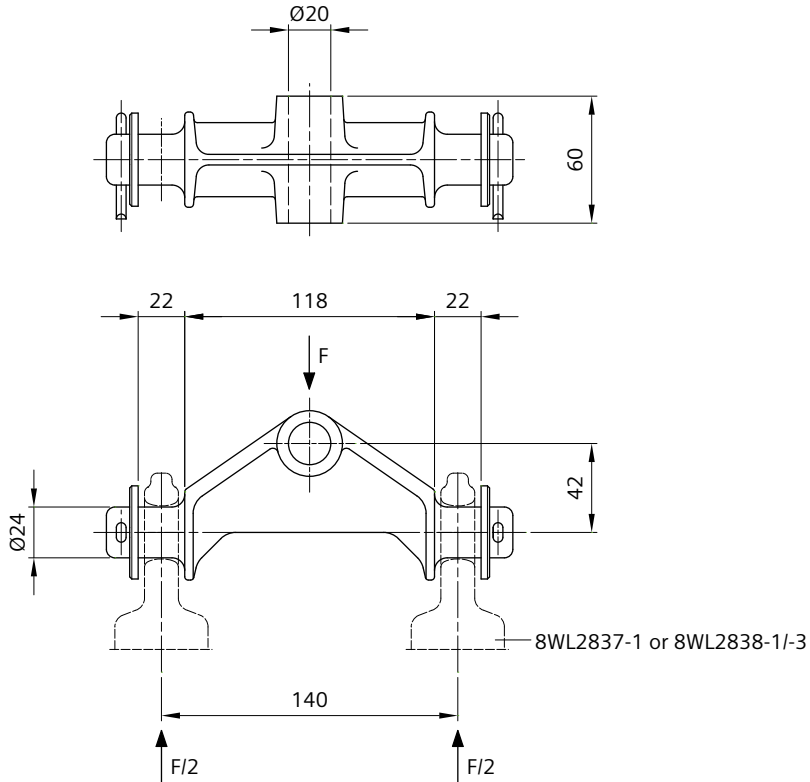
for clamping at GRP tube/rod d=55 mm



Order no.	8WL2824-8
Designation	Twin eye clamp 55
Material	
Eye clamp	CuAl
Clamp hoop	CuAl
Bolts M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	0.80 kg
Perm. operating load (F1)	6 kN
Min. failing load (F1)	18 kN
Perm. operating load (F2)	8 kN
Min. failing load (F2)	24 kN
Tightening torque M_A	32 Nm

Twin swivel

for cantilevers across two tracks made of GRP tubes/rods, for connection of hook end fitting

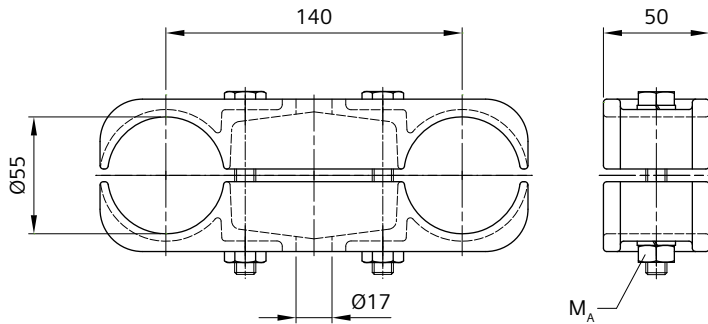


Order no.	8WL2825-0
Designation	Twin swivel
Material	
Twin swivel	CuAl
Washers	stlSt
Split pins 5x40	Cu
Weight	0.88 kg
Perm. operating load	30 kN
Min. failing load	90 kN

Hook end fitting 8WL2837-1, 8WL2838-1 or 8WL2838-3 must be ordered separately, see pages 227 to 229.

Twin tube clamp 55

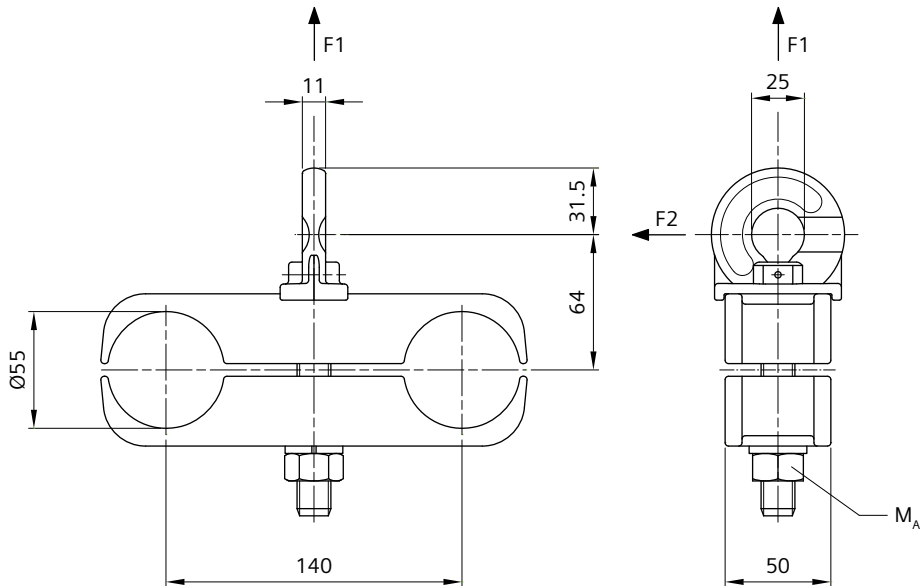
for cantilevers across two tracks made of GRP tubes/rods d=55 mm



Order no.	8WL2826-1
Designation	Twin tube clamp 55
Material	
Tube clamp	CuAl
Bolts M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	1.64 kg
Tightening torque M_A	32 Nm

Twin tube clamp 55 with eye 25

for centric installation of registration tube at GRP cantilevers with twin tube or rod $d=55$ mm

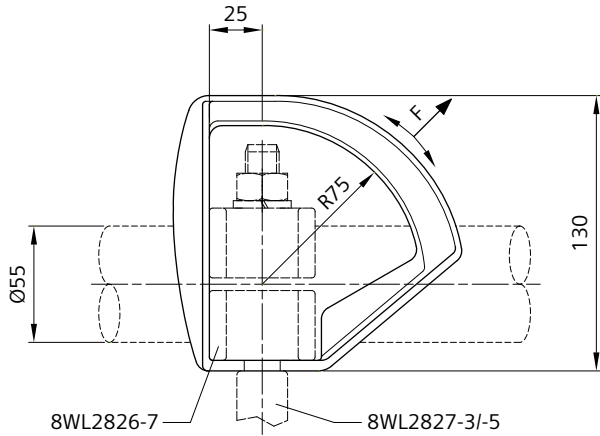


Order no.	8WL2827-2
Designation	Twin tube clamp 55 with eye 25
Material	
Clamp	CuAl
Eye	CuAl
Threaded pin M16	stlSt
Nut	stlSt
Spring washer	stlSt
Grooved pin	stlSt
Weight	1.94 kg
Perm. operating load (F1)	8 kN
Min. failing load (F1)	24 kN
Perm. operating load (F2)	4 kN
Min. failing load (F2)	12 kN
Tightening torque M_A	135 Nm

The eye can vertically be turned by 90°.

Suspension bracket for twin tube clamp

for cantilevers across two tracks made of GRP tubes/rods d=55 mm

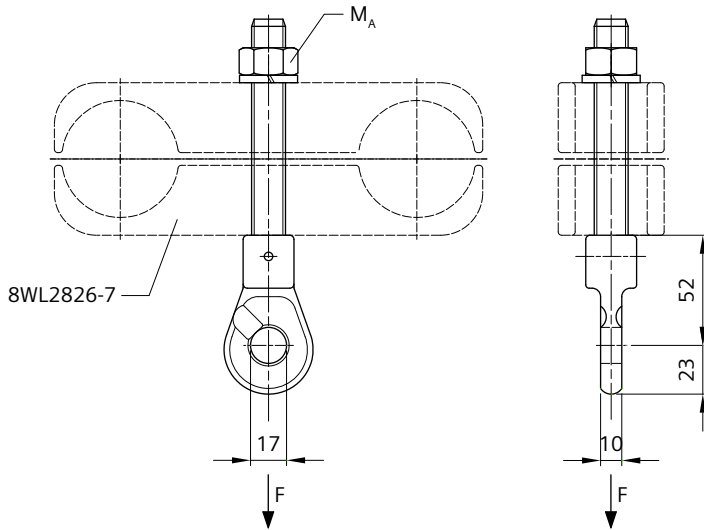


Order no.	8WL2827-0
Designation	Suspension bracket for twin tube clamp 55
Material	CuAl
Weight	0.43 kg
Perm. operating load	8 kN
Min. failing load	24 kN

Two clamping jaws 8WL2826-7 and eye 8WL2827-3 or clevis 8WL2827-5 must be ordered separately, see pages 217 and 214 or 215.

Eye for twin tube clamp

for cantilevers across two tracks made of GRP tubes/rods d=55 mm

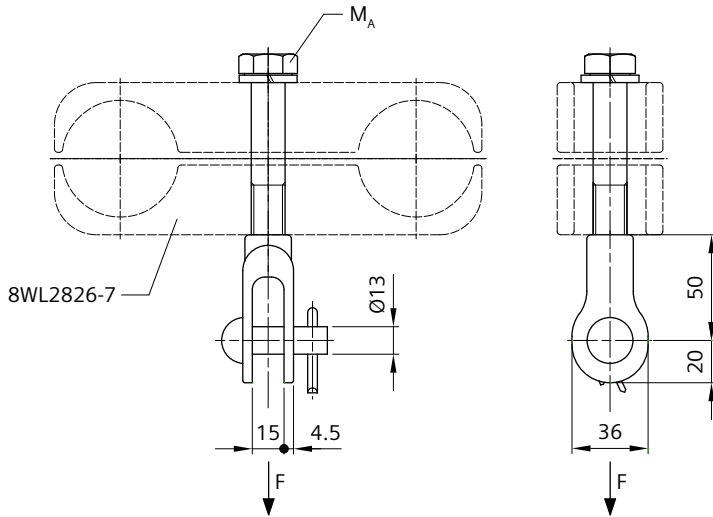


Order no.	8WL2827-3
Designation	Eye for twin tube clamp 55
Material	
Eye	CuAl
Threaded pin M16	stlSt
Nut	stlSt
Spring washer	stlSt
Grooved pin	stlSt
Weight	0.35 kg
Perm. operating load	8 kN
Min. failing load	24 kN
Tightening torque M_A	135 Nm

Two clamping jaws 8WL2826-7 must be ordered separately, see page 217.

Clevis for twin tube clamp

for cantilevers across two tracks made of GRP tubes/rods d=55 mm

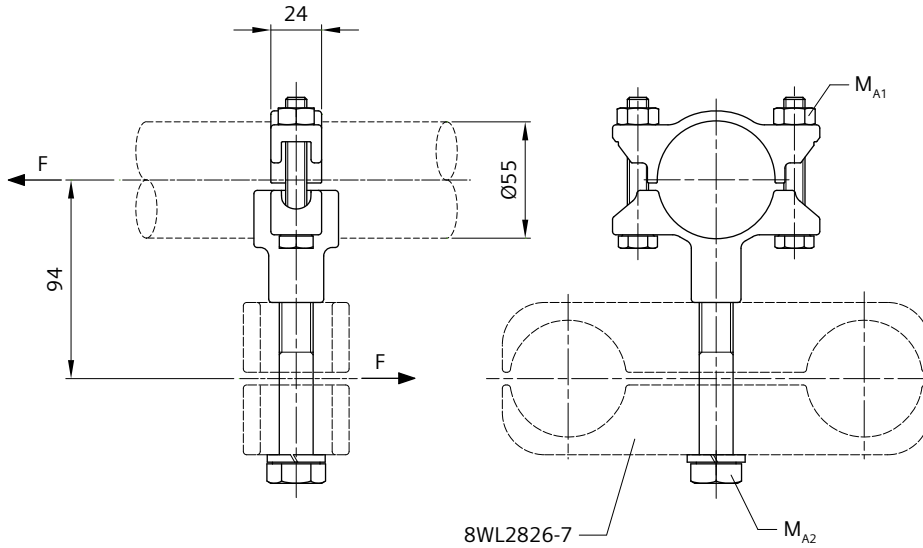


Order no.	8WL2827-5
Designation	Clevis for twin tube clamp 55
Material	
Clevis	CuAl
Bolt M16x90	stlSt
Spring washer	stlSt
Pin 13x40	stlSt
Split pin 5x28	Cu
Weight	0.36 kg
Perm. operating load	8 kN
Min. failing load	24 kN
Tightening torque M_A	135 Nm

Two clamping jaws 8WL2826-7 must be ordered separately, see page 217.

Clamp holder 55 for twin tube clamp 55

for triple strut at cantilever across two tracks made of GRP tubes/rods d=55 mm

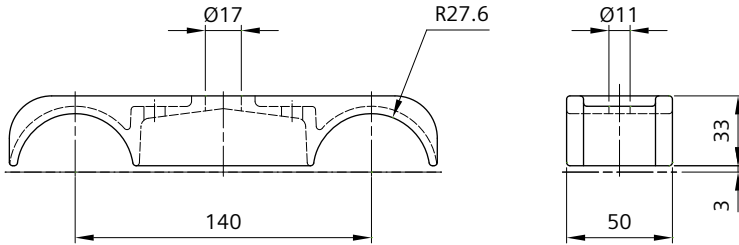


Order no.	8WL2827-7A
Designation	Clamp holder 55 for twin tube clamp 55
Material	
Clamp holder	CuAl
Bolts M10	stlSt
Bolt M16	stlSt
Nuts	stlSt
Spring washer	stlSt
Weight	0.71 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_{A1}	32 Nm
Tightening torque M_{A2}	135 Nm

Two clamping jaws 8WL2826-7 must be ordered separately, see page 217.

Clamping jaw for twin tube clamp 55

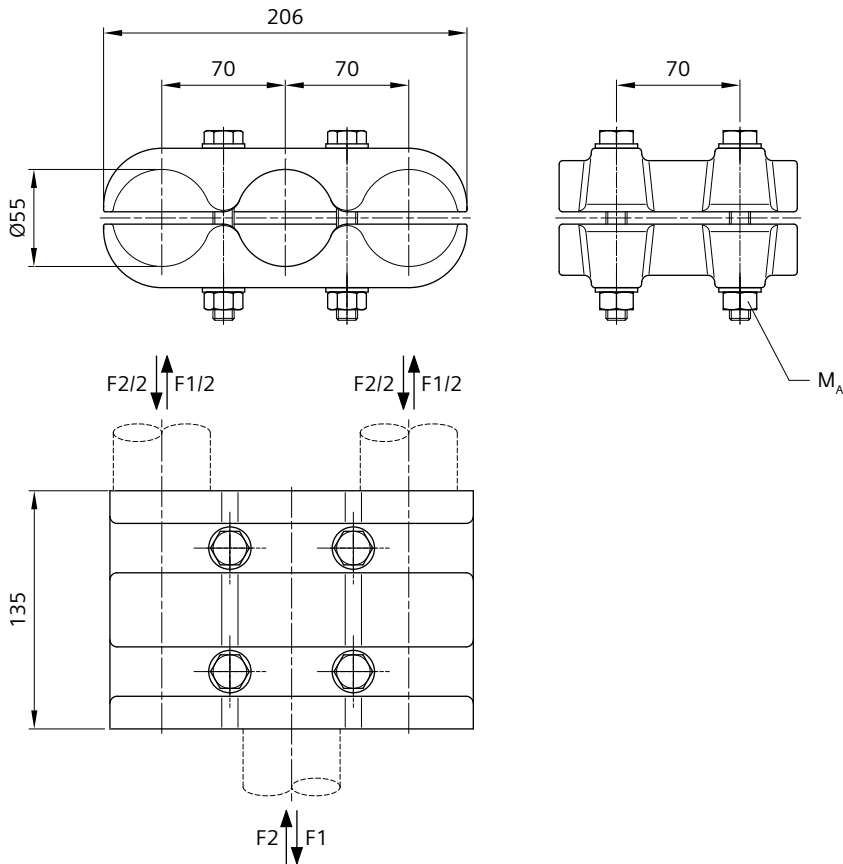
for use with eye 8WL2827-3, clevis 8WL2827-5 or clamp holder 8WL2827-7A



Order no.	8WL2826-7
Designation	Clamping jaw
Material	CuAl
Weight	0.76 kg

Triple tube clamp 55

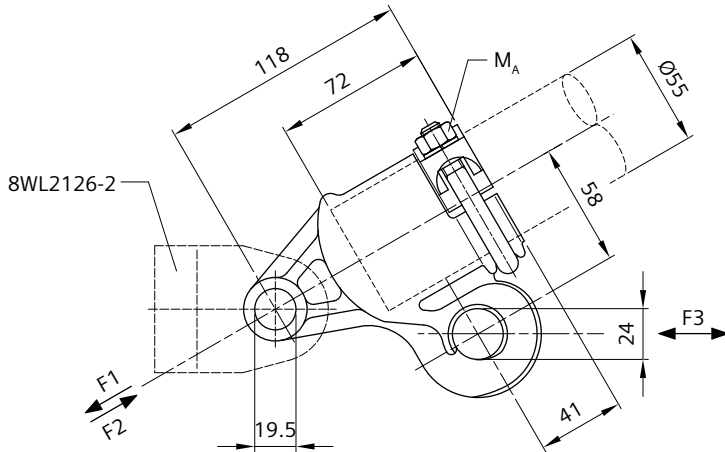
for cantilevers across two tracks made of GRP tubes/rods d=55 mm



Order no.	8WL2825-3
Designation	Triple tube clamp 55
Material	
Tube clamp	CuAl
Bolts M12	stlSt
Nuts, washers	stlSt
Weight	3.83 kg
Perm. operating load/ tension (F1)	2 kN
Min. failing load/ tension (F1)	6 kN
Perm. operating load/ pressure (F2)	20 kN
Min. failing load/ pressure (F2)	60 kN
Tightening torque M_A	56 Nm

Tube end fitting 55

for cantilever tube/rod d=55 mm

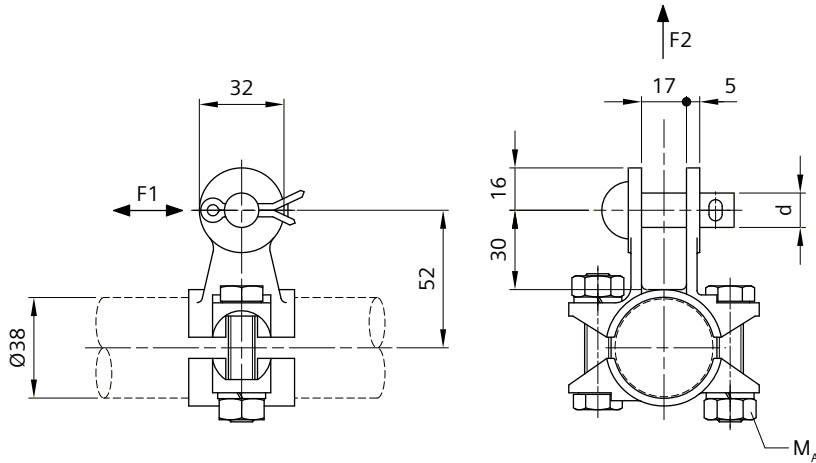


Order no.	8WL2828-0
Designation	Tube end fitting 55
Material	
Tube end fitting	CuAl
U-bolt M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	0.92 kg
Perm. operating load/ tension (F1)	6 kN
Min. failing load/ tension (F1)	18 kN
Perm. operating load/ pressure (F2)	20 kN
Min. failing load/ pressure (F2)	60 kN
Perm. operating load (F3)	6 kN
Min. failing load (F3)	18 kN
Tightening torque M_A	32 Nm

Swivel 8WL2126-2 (CuAl) must be ordered separately, see page 191.

Clamp hoop 38 with clevis

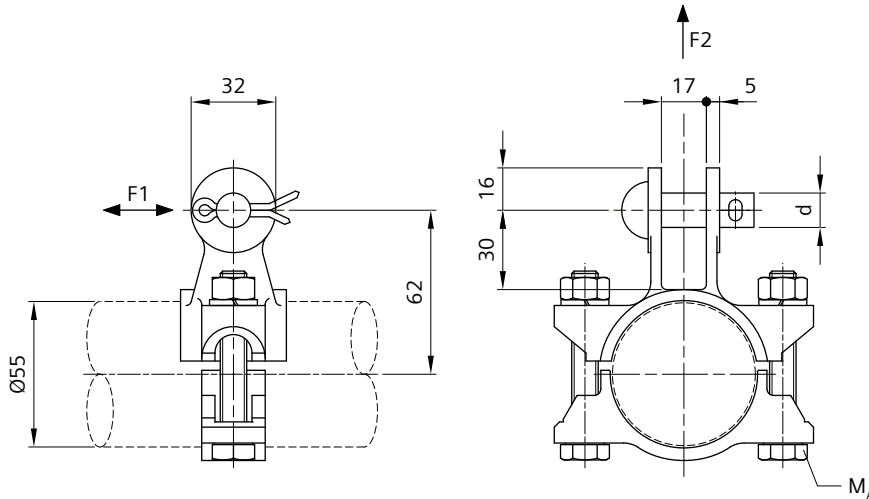
for registration or cantilever tube/rod $d=38$ mm



Order no.	8WL2830-1	8WL2830-3
Designation	Clamp hoop 38-13	Clamp hoop 38-16
Material		
Clamp hoop	CuAl	CuAl
Bolts M10	stlSt	stlSt
Nuts	stlSt	stlSt
Spring washers	stlSt	stlSt
Pin 13x40	stlSt	-
Pin 16x40	-	stlSt
Split pin 5x28	Cu	Cu
Weight	0.37 kg	0.41 kg
Perm. operating load (F1)	5 kN	5 kN
Min. failing load (F1)	15 kN	15 kN
Perm. operating load (F2)	9 kN	9 kN
Min. failing load (F2)	27 kN	27 kN
Tightening torque M_A	32 Nm	32 Nm
d	13 mm	16 mm

Clamp hoop 55 with clevis

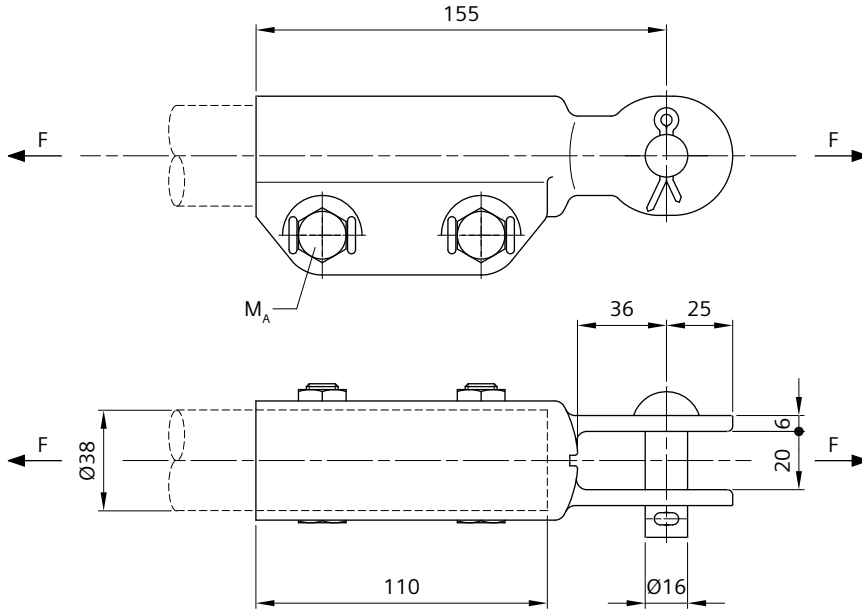
for registration or cantilever tube/rod d=55 mm



Order no.	8WL2830-5	8WL2830-7
Designation	Clamp hoop 55-13	Clamp hoop 55-16
Material		
Clamp hoop	CuAl	CuAl
Bolts M10	stlSt	stlSt
Nuts	stlSt	stlSt
Spring washers	stlSt	stlSt
Pin 13x40	stlSt	-
Pin 16x40	-	stlSt
Split pin 5x28	Cu	Cu
Weight	0.58 kg	0.62 kg
Perm. operating load (F1)	5 kN	5 kN
Min. failing load (F1)	15 kN	15 kN
Perm. operating load (F2)	9 kN	9 kN
Min. failing load (F2)	27 kN	27 kN
Tightening torque M_A	32 Nm	32 Nm
d	13 mm	16 mm

Clevis end fitting 38, clamped

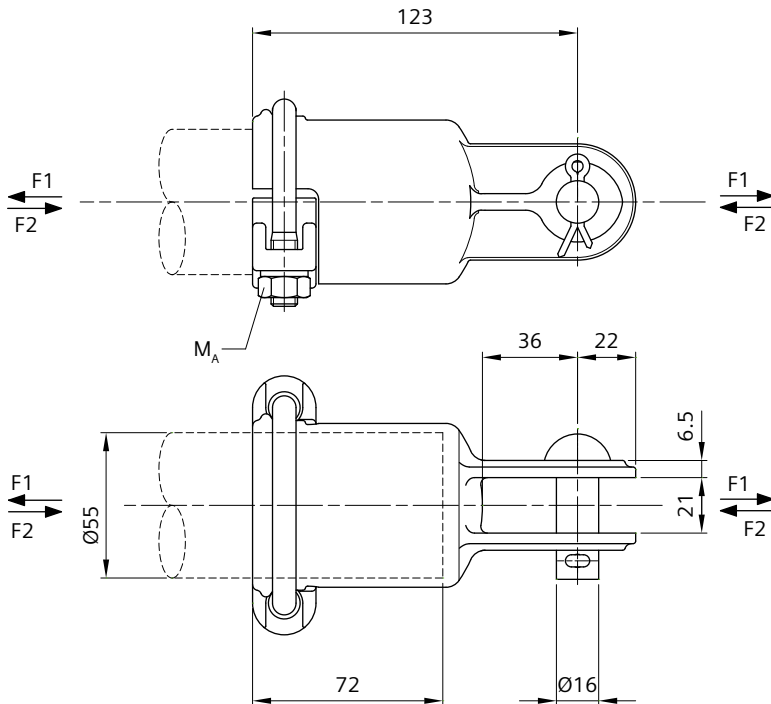
for GRP tube/rod d=38 mm



Order no.	8WL2832-1
Designation	Clevis end fitting 38-16
Material	
Clamping clevis	CuAl
Bolts M12	stlSt
Nuts	stlSt
Spring washers	stlSt
Pin 16x45	stlSt
Split pin 5x28	Cu
Weight	1.04 kg
Perm. operating load	10 kN
Min. failing load	30 kN
Tightening torque M_A	56 Nm

Clevis end fitting 55

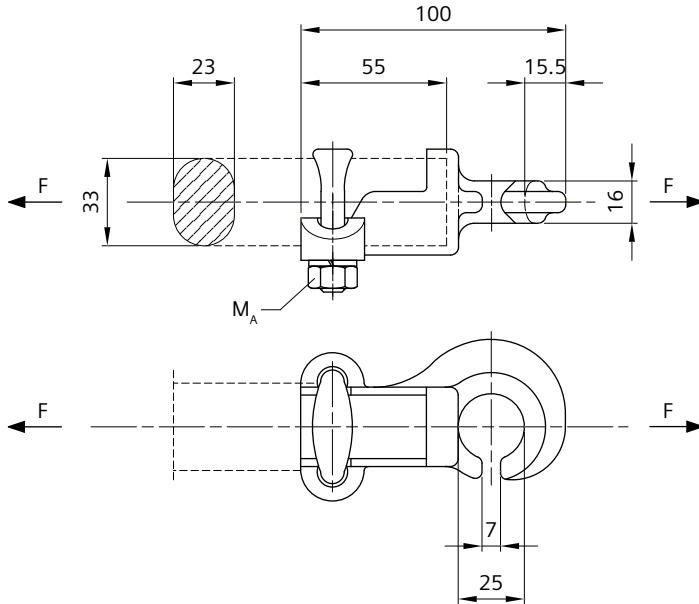
for GRP tube/rod d=55 mm



Order no.	8WL2828-4
Designation	Clevis end fitting 55-16, clamped
Material	
Clamping clevis	CuAl
Clamp hoop	CuAl
U-bolt M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Pin 16x45	stlSt
Split pin 5x28	Cu
Weight	0.93 kg
Perm. operating load/ tension (F1)	6 kN
Min. failing load/ tension (F1)	18 kN
Perm. operating load/ pressure (F2)	20 kN
Min. failing load/ pressure (F2)	60 kN
Tightening torque M_A	32 Nm

Hook end fitting for GRP rod

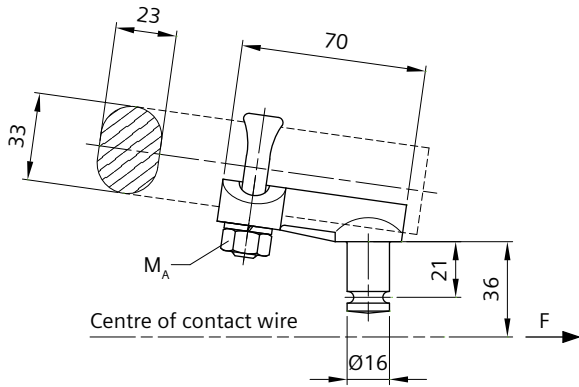
for steady arms made of GRP rod 23x33 mm



Order no.	8WL2833-0
Designation	Hook end fitting for GRP rod 23x33
Material	
Hook end fitting	CuAl
U-bolt M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	0.32 kg
Perm. operating load	2.5 kN
Min. failing load	8.0 kN
Tightening torque M_A	40 Nm

Swivel clip holder 16R for GRP rod

for steady arms made of GRP rod 23x33 mm



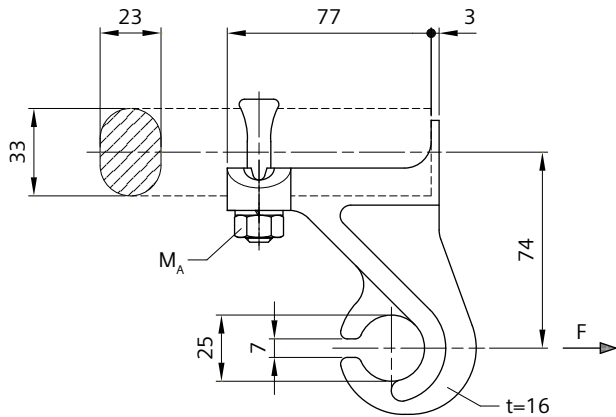
Order no.	8WL2833-1
Designation	Swivel clip holder 16R for GRP rod 23x33
Material	
Swivel clip holder	CuAl
U-bolt M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	0.24 kg
Perm. operating load	2.5 kN
Min. failing load	8.0 kN
Tightening torque M_A	40 Nm

Contact wire clips see Chapter 02-09.

Types with threaded stud M16 or 5/8" on request.

Hook end clamp for GRP rod

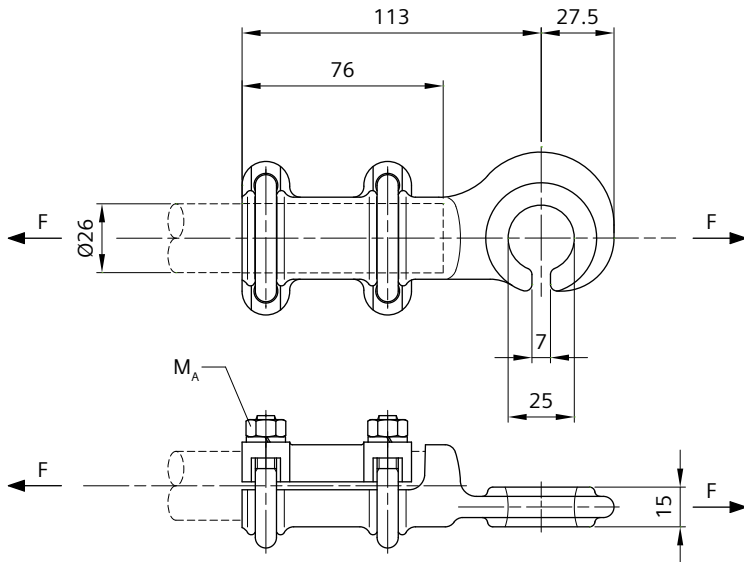
for steady arms made of GRP rod 23x33 mm



Order no.	8WL2833-4
Designation	Hook end clamp for GRP rod 23x33
Material	
Hook end clamp	CuAl
U-bolt M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	0.38 kg
Perm. operating load	2.5 kN
Min. failing load	8.0 kN
Tightening torque M_A	40 Nm

Hook end fitting 26, clamped

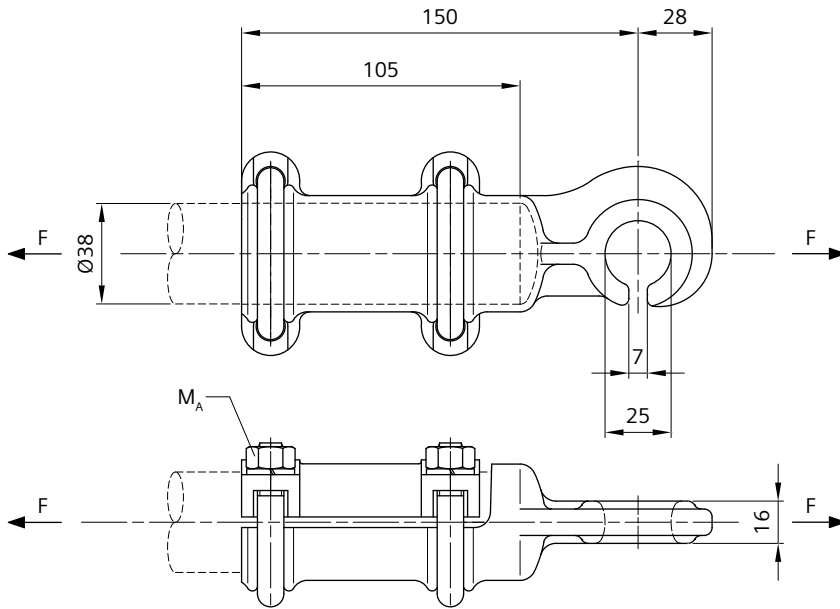
for GRP tube/rod d=26 mm



Order no.	8WL2837-1
Designation	Hook end fitting 26
Material	
Hook end fitting	CuAl
U-bolts M8	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	0.44 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	16 Nm

Hook end fitting 38, clamped

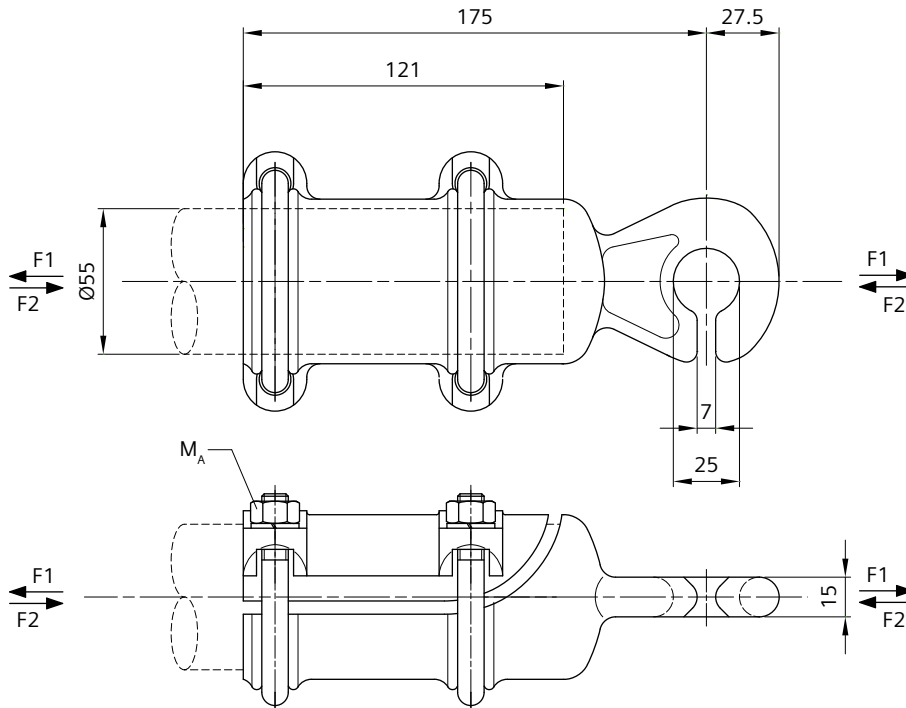
for GRP tube/rod d=38 mm



Order no.	8WL2838-1
Designation	Hook end fitting 38
Material	
Hook end fitting	CuAl
U-bolts M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	0.84 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	40 Nm

Hook end fitting 55, clamped

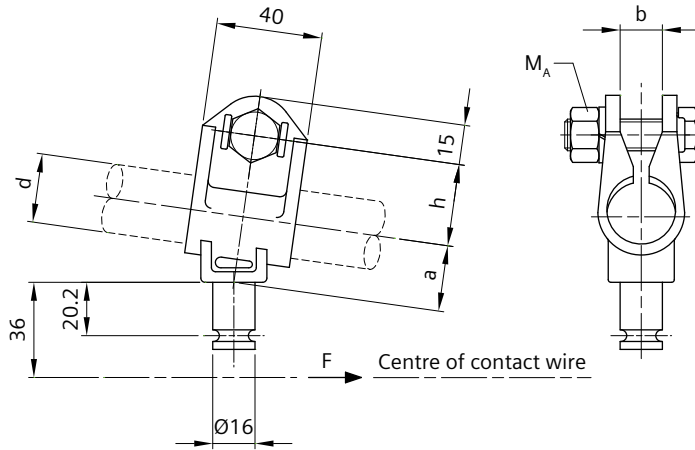
for GRP tube/rod d=55 mm



Order no.	8WL2838-3
Designation	Hook end fitting 55
Material	
Hook end fitting	CuAl
U-bolts M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	1.26 kg
Perm. operating load/ tension (F1)	6 kN
Min. failing load/ tension (F1)	18 kN
Perm. operating load/ pressure (F2)	15 kN
Min. failing load/ pressure (F2)	45 kN
Tightening torque M_A	32 Nm

Swivel clip holder 26-38 for contact wire clip 16R

for GRP steady arms, for tube d=26 or 38 mm



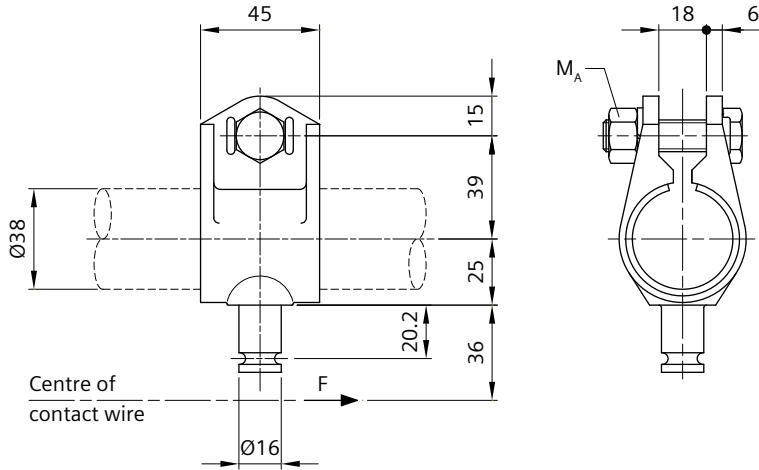
Order no.	8WL2847-6	8WL2848-3
Designation	Swivel clip holder 26-16R	Swivel clip holder 38-16R
Material		
Swivel clip holder	CuAl	CuAl
Bolt M12	stlSt	stlSt
Nut	stlSt	stlSt
Spring washer	stlSt	stlSt
Weight	0.32 kg	0.34 kg
Perm. operating load	2.5 kN	2.5 kN
Min. failing load	7.5 kN	7.5 kN
Tightening torque M_A	35 Nm	35 Nm
a	25 mm	26 mm
b	16 mm	18 mm
d	26 mm	38 mm
h	31 mm	37 mm

Contact wire clips see Chapter 02-09.

Types with threaded pin M16 or 5/8" on request.

Swivel clip holder 38 for contact wire clip 16R

for GRP tube/rod d=38 mm

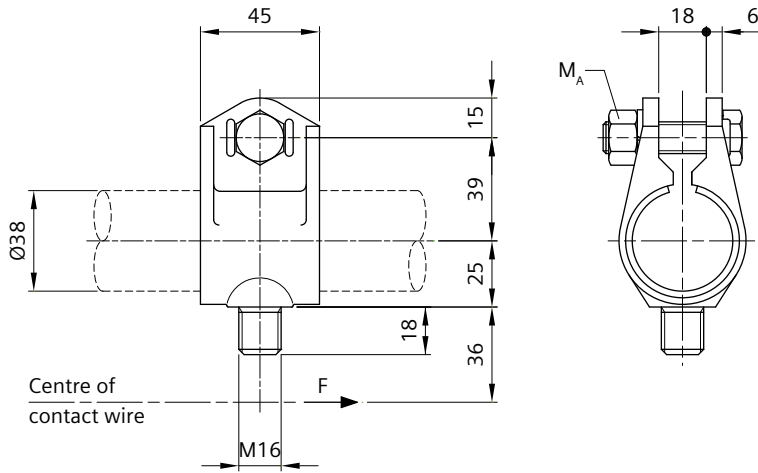


Order no.	8WL2006-8
Designation	Swivel clip holder 38-16R
Material	
Swivel clip holder	CuAl
Insert	Cu-ETP
Bolt M12	stlSt
Nut	stlSt
Spring washer	stlSt
Weight	0.45 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	35 Nm

Contact wire clips see Chapter 02-09.

Swivel clip holder 38 for contact wire clip M16

for GRP tubes/rods d=38 mm

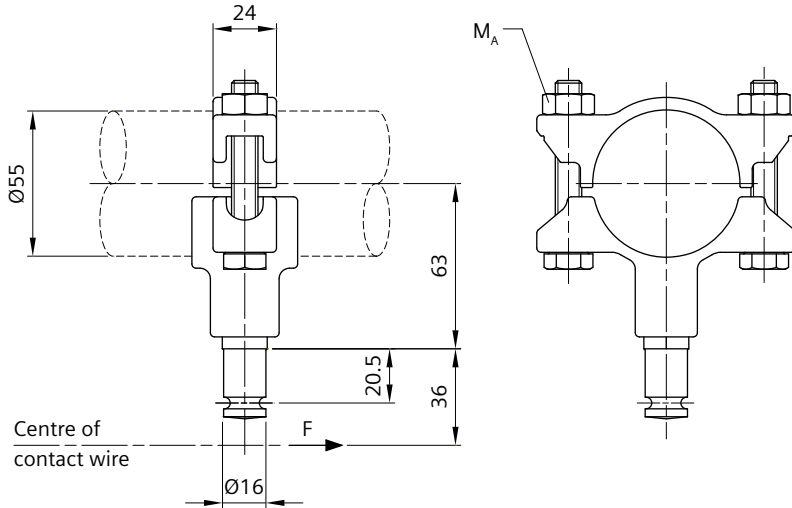


Order no.	8WL2006-8A
Designation	Swivel clip holder 38-M16
Material	
Swivel clip holder	CuAl
Insert	Cu-ETP
Bolt M12	stlSt
Nut	stlSt
Spring washer	stlSt
Weight	0.45 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	35 Nm

Contact wire clips see Chapter 02-09.

Swivel clip holder 55 for contact wire clip 16R

for GRP tube/rod d=55 mm

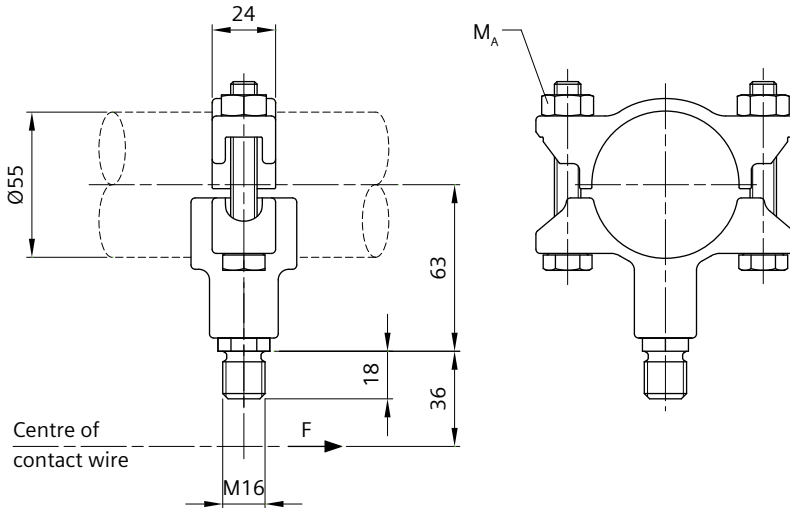


Order no.	8WL2006-0A
Designation	Swivel clip holder 55-16R
Material	
Swivel clip holder	CuAl
Grooved stud	stlSt
Bolts M10	stlSt
Nuts	stlSt
Weight	0.59 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	32 Nm

Contact wire clips see Chapter 02-09.

Swivel clip holder 55 for contact wire clip M16

for GRP tube/rod d=55 mm

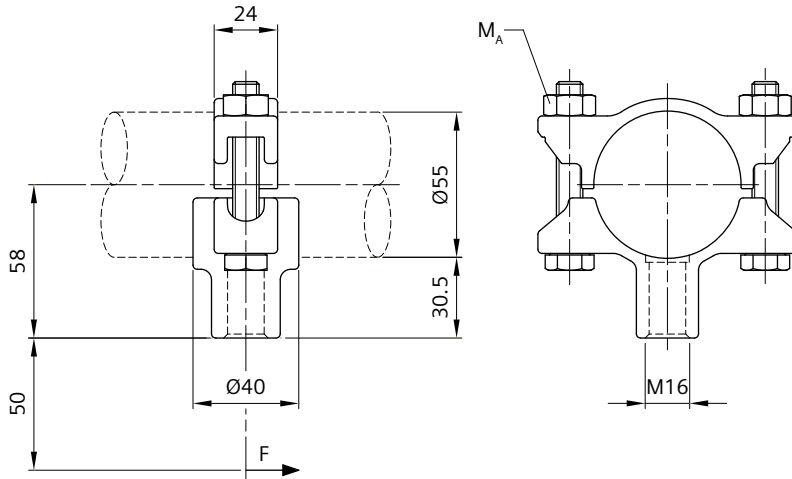


Order no.	8WL2006-0B
Designation	Swivel clip holder 55-M16
Material	
Swivel clip holder	CuAl
Threaded stud	stlSt
Bolts M10	stlSt
Nuts	stlSt
Weight	0.59 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	32 Nm

Contact wire clips see Chapter 02-09.

Clamp holder 55 with threaded bush M16

for GRP tube/rod d=55 mm

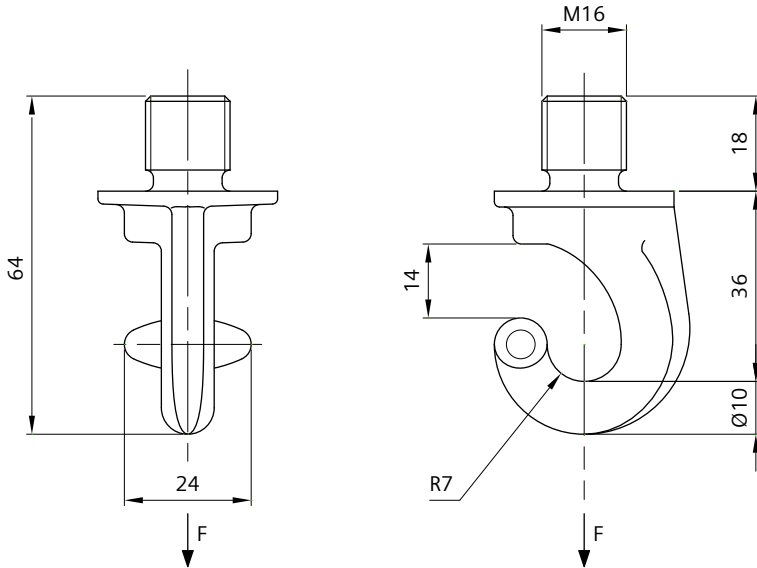


Order no.	8WL2850-6
Designation	Clamp holder 55 with threaded bush M16
Material	
Clamp holder	CuAl
Bolts M10	stlSt
Nuts	stlSt
Weight	0.52 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	32 Nm

With hook 8WL2196-1 (see page 236) substitute for 8WL2844-1.

Hook M16

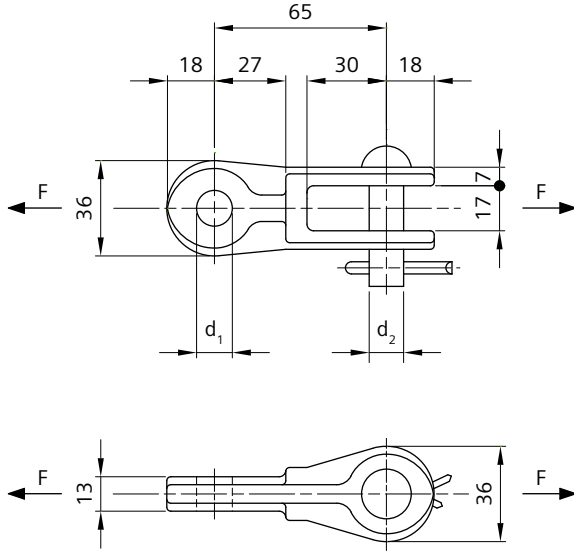
with pulley 8WL3521-0 for bridle-and pulley suspensions 8WL3520-3/-3A at insulated line hangers, with clamp holder 8WL2850-6 for GRP cantilevers



Order no.	8WL2196-1
Designation	Hook M16
Material	CuAl
Weight	0.12 kg
Perm. operating load	1.5 kN
Min. failing load	4.5 kN

Cross link eye/clevis

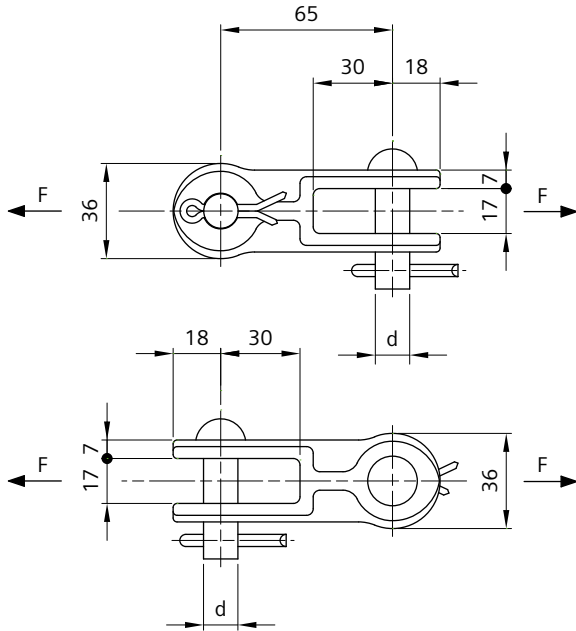
for catenary wire supports in cantilevers across several tracks and headspan



Order no.	8WL1137-2	8WL1137-5	8WL1137-8
Designation	Cross link 13	Cross link 16	Cross link 19
Material			
Cross link	CuAl	CuAl	CuAl
Pin 13x45	stlSt	-	-
Pin 16x45	-	stlSt	-
Pin 19x52	-	-	stlSt
Split pin 5x28	Cu	Cu	Cu
Weight	0.30 kg	0.32 kg	0.42 kg
Perm. operating load	12 kN	20 kN	20 kN
Min. failing load	36 kN	60 kN	60 kN
d₁	13.5 mm	17.5 mm	19.5 mm
d₂	13 mm	16 mm	19 mm

Cross link clevis/clevis

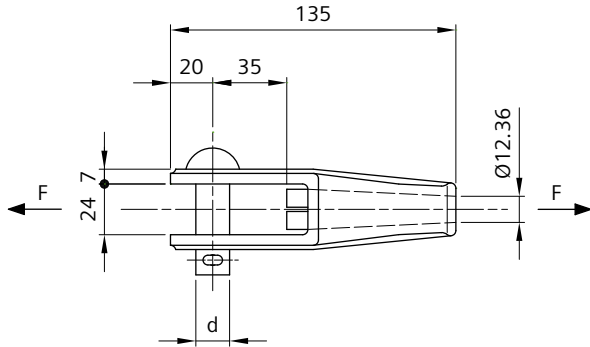
for catenary wire supports in cantilevers across several tracks and headspan



Order no.	8WL1138-2	8WL1138-5	8WL1138-8
Designation	Cross link 13	Cross link 16	Cross link 19
Material			
Cross link	CuAl	CuAl	CuAl
Pins 13x45	stlSt	-	-
Pins 16x45	-	stlSt	-
Pins 19x52	-	-	stlSt
Split pins 5x28	Cu	Cu	Cu
Weight	0.39 kg	0.45 kg	0.59 kg
Perm. operating load	12 kN	20 kN	20 kN
Min. failing load	36 kN	60 kN	60 kN
d	13 mm	16 mm	19 mm

Dead-end clamp

for GRP rod 10 (8WL3007-0/-1)

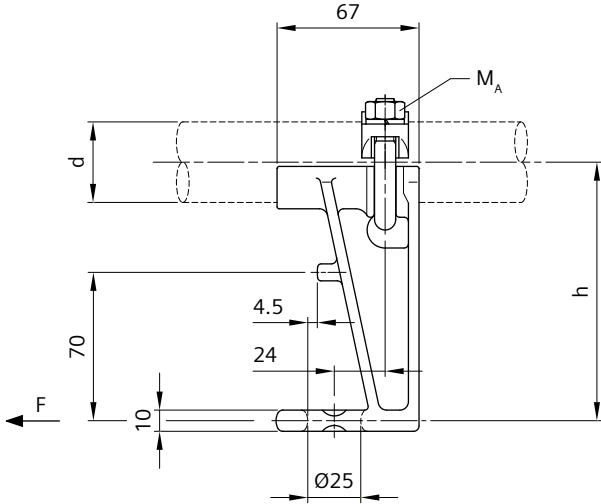


Order no.	8WL3006-1	8WL3006-3
Designation	Dead-end clamp 16	Dead-end clamp 19
Material		
Clamping sleeve	CuAl	CuAl
Clamping cone	CuZn	CuZn
Pin 16x50	stlSt	-
Pin 19x52	-	stlSt
Split pin 5x28	Cu	Cu
Weight	0.54 kg	0.56 kg
Perm. operating load	10 kN	10 kN
Min. failing load	32 kN	32 kN
d	16 mm	19 mm

Mounting tool 8WL3020-8 see page 844.

Drop bracket 38-55

for GRP steady arm connection at registration tube d=38 or 55 mm

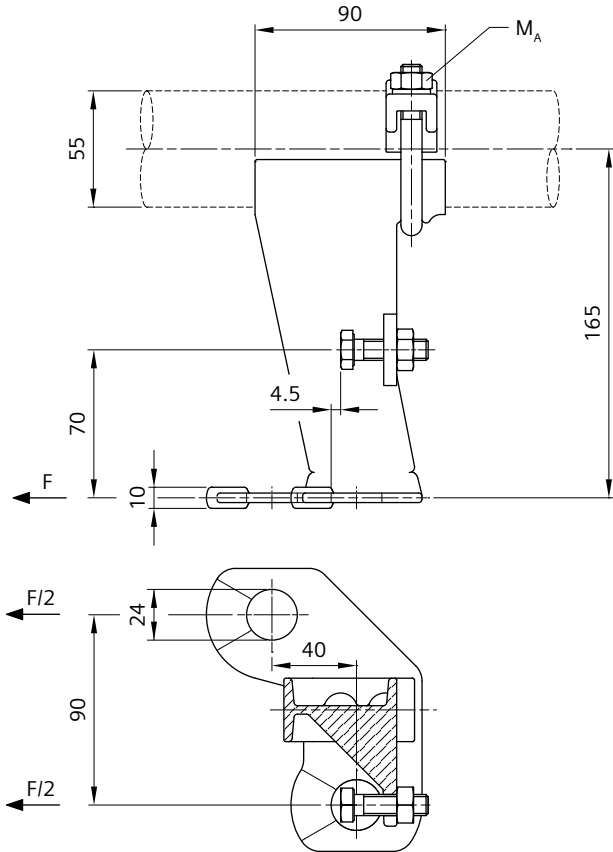


Order no.	8WL2720-0	8WL2721-0
Designation	Drop bracket 38	Drop bracket 55
Material		
Drop bracket	CuAl	CuAl
U-bolt M10	stlSt	stlSt
Nuts	stlSt	stlSt
Spring washers	stlSt	stlSt
Weight	0.65 kg	0.80 kg
Perm. operating load	2.5 kN	2.5 kN
Min. failing load	7.5 kN	7.5 kN
Tightening torque M_A	25 Nm	25 Nm
d	38 mm	55 mm
h	122 mm	130 mm

For steady arms with hook end clamp 8WL2860- to 8WL2862-, 8WL3514-3 and 8WL3515-7.

Twin drop bracket 55

for GRP steady arms connection at registration tube d=55 mm

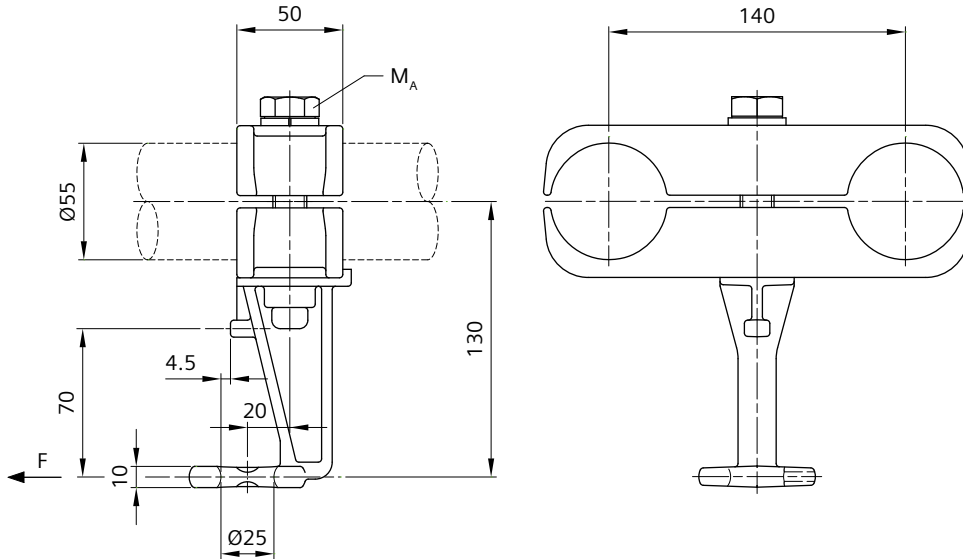


Order no.	8WL2721-2
Designation	Twin drop bracket 55
Material	
Drop bracket	CuAl
U-bolt M10	stlSt
Bolt M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	1.41 kg
Perm. operating load	5 kN
Min. failing load	15 kN
Tightening torque M_A	25 Nm

For steady arms with hook end clamp 8WL2860- to 8WL2862-, 8WL3514-3 and 8WL3515-7.

Drop bracket for twin tube/rod 55

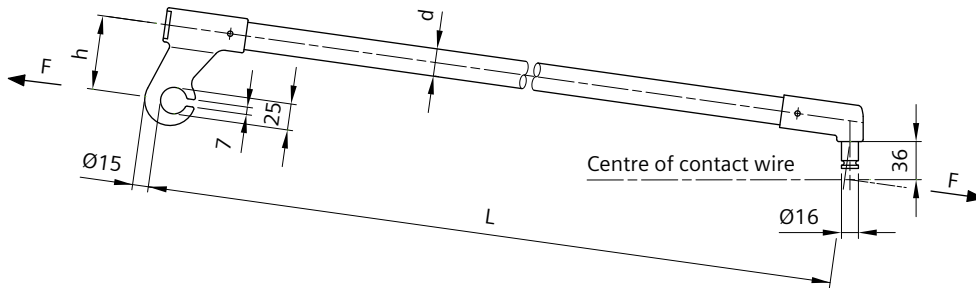
for steady arm connection at GRP cantilever with twin tube or rod d=55 mm



Order no.	8WL2721-3
Designation	Drop bracket for twin tube/rod 55
Material	
Drop bracket	CuAl
Clamping jaws	CuAl
Bolt M16	stlSt
Spring washer	stlSt
Weight	2.07 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	135 Nm

For steady arms with hook end clamp 8WL2860- to 8WL2862-, 8WL3514-3 and 8WL3515-7.

Steady arm with GRP rod/tube and hook end clamp



Part 1

Order no.	8WL2862-0	8WL2862-6	8WL2862-1	8WL2862-7	8WL2860-0
Designation	Steady arm tube 26	Steady arm tube 26	Steady arm tube 38	Steady arm tube 38	Steady arm rod 26
Material					
Fittings	CuAl	CuAl	CuAl	CuAl	CuAl
Insulating part	GRP, color RAL7034 (yellow grey)	GRP, color RAL7034 (yellow grey)	GRP, color RAL7034 (yellow grey)	GRP, color RAL7034 (yellow grey)	GRP, color RAL1020 (olive yellow)
Grooved pins	stlSt	stlSt	stlSt	stlSt	stlSt
Weight	1.12 kg	1.27 kg	1.84 kg	2.12 kg	1.34 kg
Perm. operating load	2.0 kN	2.0 kN	2.5 kN	2.5 kN	2.0 kN
Min. failing load	6.0 kN	6.0 kN	7.5 kN	7.5 kN	6.0 kN
Min. creepage distance	645 mm	845 mm	630 mm	830 mm	645 mm
d	26 mm	26 mm	38 mm	38 mm	26 mm
h	70 mm	70 mm	67 mm	67 mm	70 mm
L	800 mm	1000 mm	800 mm	1000 mm	800 mm

Part 2

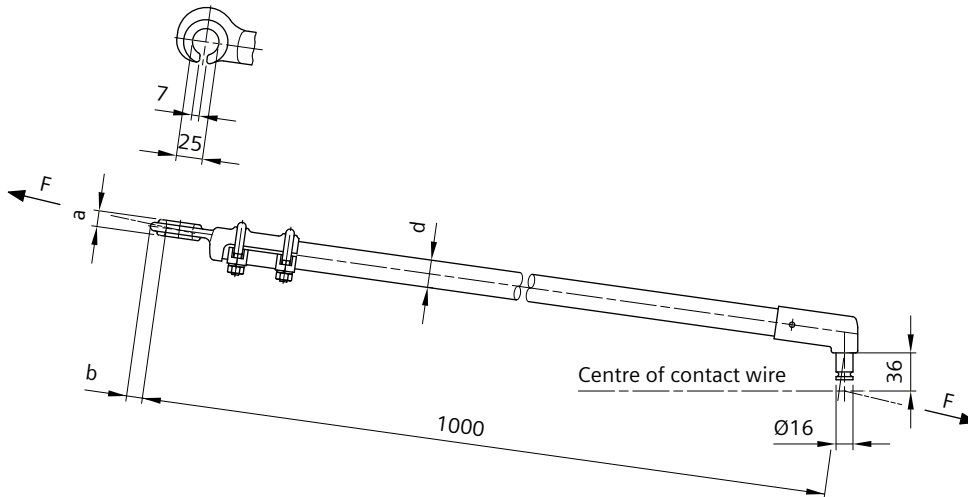
Order no.	8WL2861-0
Designation	Steady arm rod 26
Material	
Fittings	CuAl
Insulating part	GRP, color RAL1020 (olive yellow)
Grooved pins	stlSt
Weight	1.54 kg
Perm. operating load	2.0 kN
Min. failing load	6.0 kN
Min. creepage distance	845 mm
d	26 mm
h	70 mm
L	1000 mm

Hook end clamp and clip holder bonded.

Other lengths, colors and with threaded pin M16 or 5/8" on request.

Contact wire clips see Chapter 02-09.

Steady arm with GRP rod/tube and hook end fitting



Order no.	8WL2870-3	8WL2870-0	8WL2871-6	8WL2872-0
Designation	Steady arm tube 26	Steady arm rod 26	Steady arm rod 26	Steady arm rod 38
Material				
Fittings	CuAl	CuAl	CuAl	CuAl
Insulating part	GRP, color RAL7034 (yellow grey)	GRP, color RAL1020 (olive yellow)	GRP, color RAL6022 (olive drab)	GRP, color RAL1020 (olive yellow)
Grooved pin	stlSt	stlSt	stlSt	stlSt
Weight	1.38 kg	1.65 kg	1.65 kg	3.20 kg
Perm. operating load	2.0 kN	2.0 kN	2.0 kN	2.5 kN
Min. failing load	6.0 kN	6.0 kN	6.0 kN	7.5 kN
Min. creepage distance	800 mm	800 mm	800 mm	755 mm
a	15 mm	15 mm	15 mm	16 mm
b	15.0 mm	15.0 mm	15.0 mm	15.5 mm
d	26 mm	26 mm	26 mm	38 mm

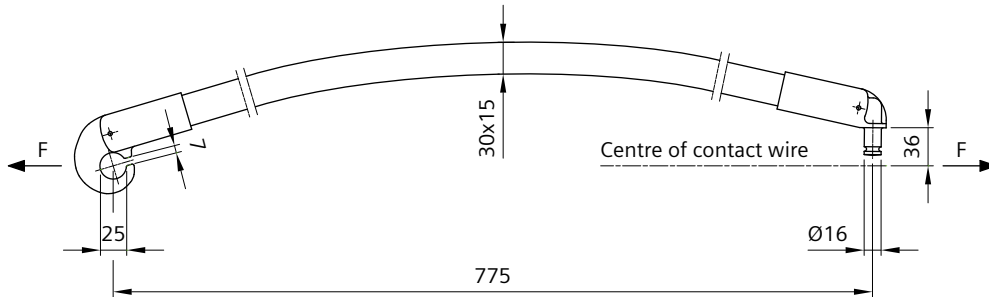
Hook end fitting clamped, clip holder bonded.

Other lengths, colors and with threaded pin M16 or 5/8" on request.

Contact wire clips see Chapter 02-09.

Steady arm with GRP rod and hook end fitting

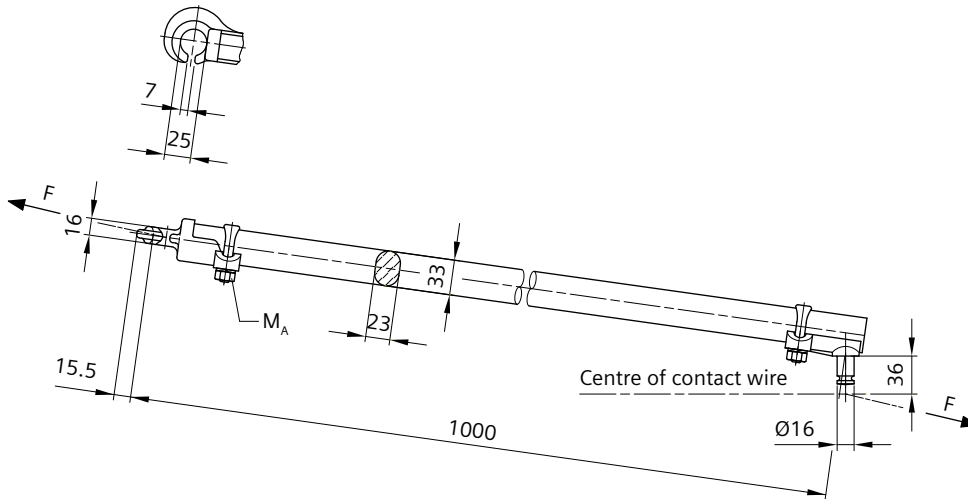
for insulated pull-off



Order no.	8WL3508-0
Designation	Steady arm with GRP rod 30x15
Material	
Fittings	CuAl
Insulating part	GRP
Grooved pins	stlSt
Weight	1.18 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN

Contact wire clips see Chapter 02-09.

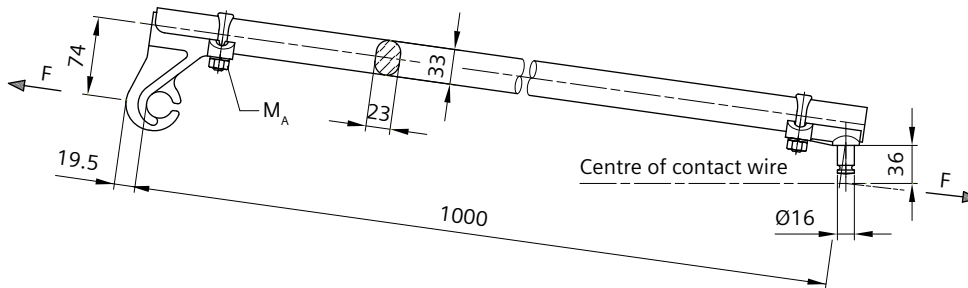
Steady arm with GRP rod and hook end fitting



Order no.	8WL3514-0	8WL3515-6
Designation	Steady arm with GRP rod 23x33	Steady arm with GRP rod 23x33
Material		
Fittings	CuAl	CuAl
Insulating part	GRP, color RAL1020 (olive yellow)	GRP, color RAL6022 (olive drab)
U-bolts M10	stlSt	stlSt
Nuts	stlSt	stlSt
Weight	1.80 kg	1.80 kg
Perm. operating load	2.5 kN	2.5 kN
Min. failing load	7.5 kN	7.5 kN
Tightening torque M_A	40 Nm	40 Nm
Min. creepage distance	850 mm	850 mm

Other lengths and colors on request.
Contact wire clips see Chapter 02-09.

Steady arm with GRP rod and hook end clamp



Order no.	8WL3514-3	8WL3515-7
Designation	Steady arm with GRP rod 23x33	Steady arm with GRP rod 23x33
Material		
Fittings	CuAl	CuAl
Insulating part	GRP, color RAL1020 (olive yellow)	GRP, color RAL6022 (olive drab)
U-bolts M10	stlSt	stlSt
Nuts	stlSt	stlSt
Weight	2.00 kg	2.00 kg
Perm. operating load	2.5 kN	2.5 kN
Min. failing load	7.5 kN	7.5 kN
Tightening torque M_A	40 Nm	40 Nm
Min. creepage distance	860 mm	860 mm

Other lengths and colors on request.

Contact wire clips see Chapter 02-09.

Chapter 02

Standard Products

Tensioning equipment	70
Thimbles, connectors, sleeves	154
GRP cantilevers	179
Aluminium cantilevers	249
Steel cantilevers	331
Headspan supports	374
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Clamps	492
Tension wheel equipment	582
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Earthing and protecting equipment	772
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Installation tools and equipment	816

Additional electrical connector	324
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Bridle suspension 42-70	285
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Cantilever swivel bracket at concrete pole	260
Cantilever swivel bracket for fastening of punch-lock band	261
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Catenary wire support clamp 55/16, insulated	290
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Drop bracket 42-55 H=70	303
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Drop bracket 42-55 H=90, steplessly adjustable	306
Drop bracket 55 H=70	308
Drop bracket 55 H=90	309
Drop bracket 70/80 H=70	304
End cap	330
Eye clamp 42-55 for windstay	327
Eye clamp 42-70	279
Eye clamp 42-80	281
Eye clamp 55-70	282
Eye clamp 80	280
Eye clamp for tube-type drop bracket 55-70	311
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Hook clip 70/80	298
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Spade end fitting 42-55	272

Stay tube holder 55/55-70	310
Steady arm made of aluminium	316
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Twin tube clamp 55-70	288
Twin tube clamp with double eye	277
Twin tube clamp with eye	276
Windstay for steady arm	328

Technical comments

Application

This section lists the products that are used for setting up overhead contact line supports made of aluminium in mass transit and main-line railways.

Cantilever supports hold the catenary wire and contact wire in the required position over the rail and insulate the overhead contact line system.

Types

The design of the cantilevers depends on the mechanical and electrical requirements of the overhead contact line system.

The portfolio includes all required aluminium components for setting up cantilevers in catenary and trolley-type contact lines:

- Angled cantilevers with horizontal registration tube
- Angled cantilevers with vertical registration tube
- Angled cantilevers with detached catenary wire for low system heights
- Angled cantilevers with a current carrying capability for operation current transmission
- Angled cantilevers with two steady arms for two contact wires
- Straight cantilevers across several tracks for catenary contact lines up to 1.5 kV DC
- Straight cantilevers for trolley-type contact lines with bridle-and-pulley suspension up to 1.5 kV DC
- Cantilevers with double insulation up to 1.5 kV DC

The insulation in the aluminium cantilevers is implemented using proven composite insulators. For nominal voltages up to 3 kV DC, cast resin insulators can also be used as an alternative. Insulators in top wires with nominal voltages up to 1.5 kV DC are generally designed with silicone-coated loop insulators.

In addition to the catenary and insulating functions, conductive cantilevers also have the task of transmitting operating currents between the contact wire and catenary wire. They could therefore replace current connectors and current carrying droppers in the catenary system.

Contact wire clips made of copper-aluminium alloy are available for different contact wire profiles, see Chapter 02-09.

The aluminium tubes used are manufactured by means of a pultrusion process. The fittings are cast from an aluminium-magnesium-silicon alloy, then heat-treated, and remachined if necessary.

Special features

The aluminium alloys are distinguished by the following characteristics:

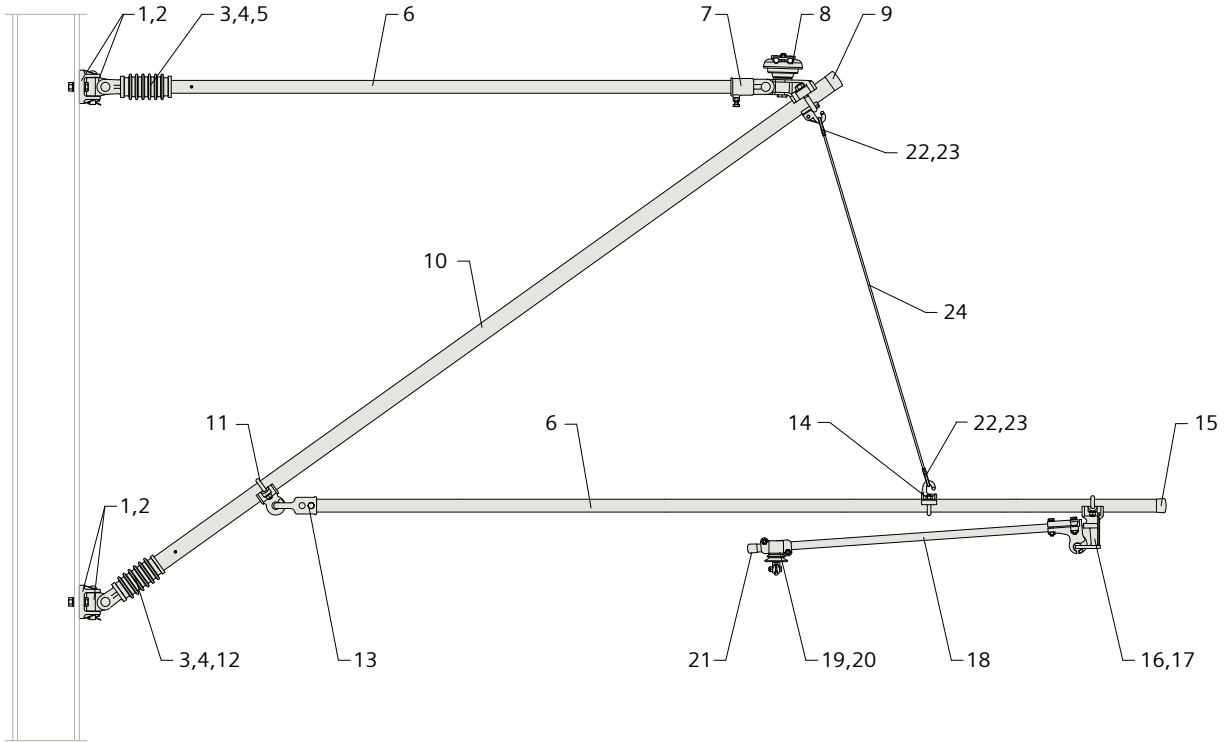
- Above-average high mechanical strength and thus high load capacity
- Easy installation due to the low weight of the components and clamp connections
- Long service life due to corrosion resistance
- Low maintenance expenditure due to the elimination of corrosion protection tasks

Examples for assemblies

Some typical application examples for aluminium cantilevers in catenary and trolley-type contact lines are described below.

The exact configuration of the cantilever depends on the specific plant and the local situation.

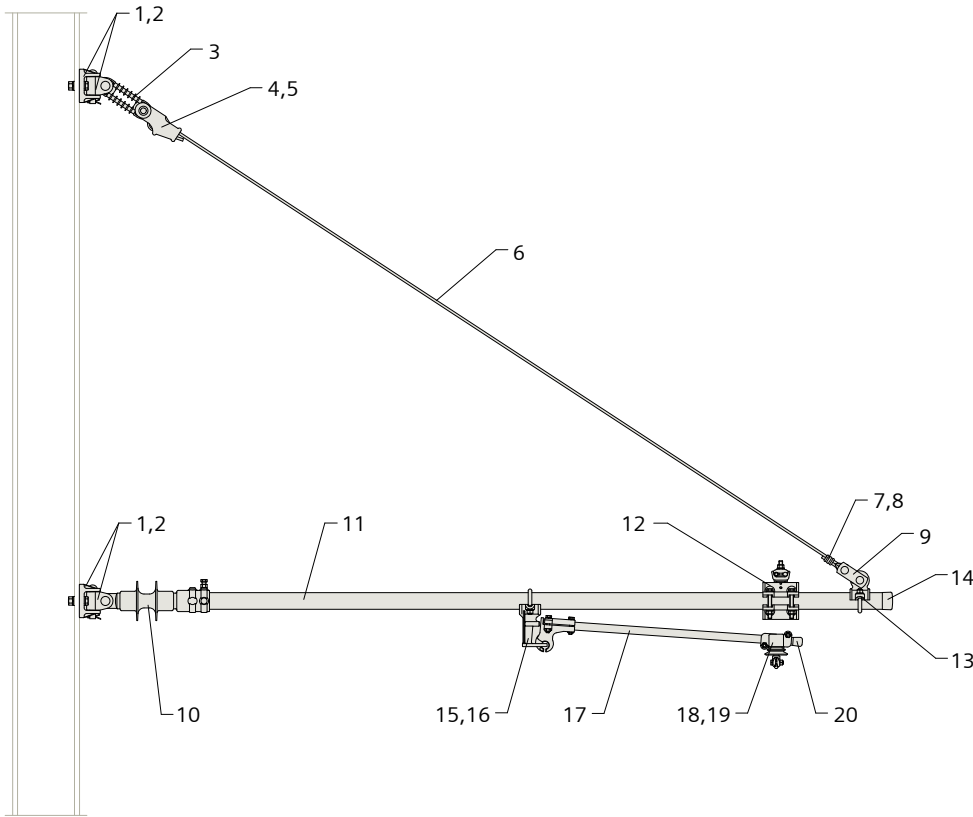
Cantilever on steel pole for catenary system in mass transit



Pos.	Designation	Order no.
1	Cantilever swivel bracket	8WL2124-4
2	Swivel with clevis	8WL2126-1
3	Clevis end fitting for connection with insulator	8WL2201-0
4	Insulator body 3 kV DC	8WL3120-5
5	Tube end fitting 42	8WL2207-0
6	Aluminium tube 42x4 (length as needed)	8WL2165-0
7	Clevis end fitting 42	8WL2121-4
8	Catenary wire support clamp, insulated	8WL2071-4
9	End cap 55	8WL2184-3
10	Aluminium tube 55x6 (length as needed)	8WL2167-0
11	Eye clamp 55	8WL2114-1
12	Tube end fitting 55	8WL2206-0

Pos.	Designation	Order no.
13	Hook end fitting 42	8WL2104-1
14	Hook clip 42	8WL2148-5
15	End cap 42	8WL2184-7
16	Drop bracket 42	8WL2118-1
17	Hook end clamp 26	8WL2101-4
18	Aluminium tube 26x3.5 (length as needed)	8WL2161-0
19	Swivel clip holder, insulated	8WL2012-4
20	Contact wire clip	8WL4517-1K
21	End cap 26	8WL2184-0
22	Thimble 6	8WL1516-1
23	Compression joint	8WL1553-0
24	Wire rope 6 (length as needed)	8WL7093-2

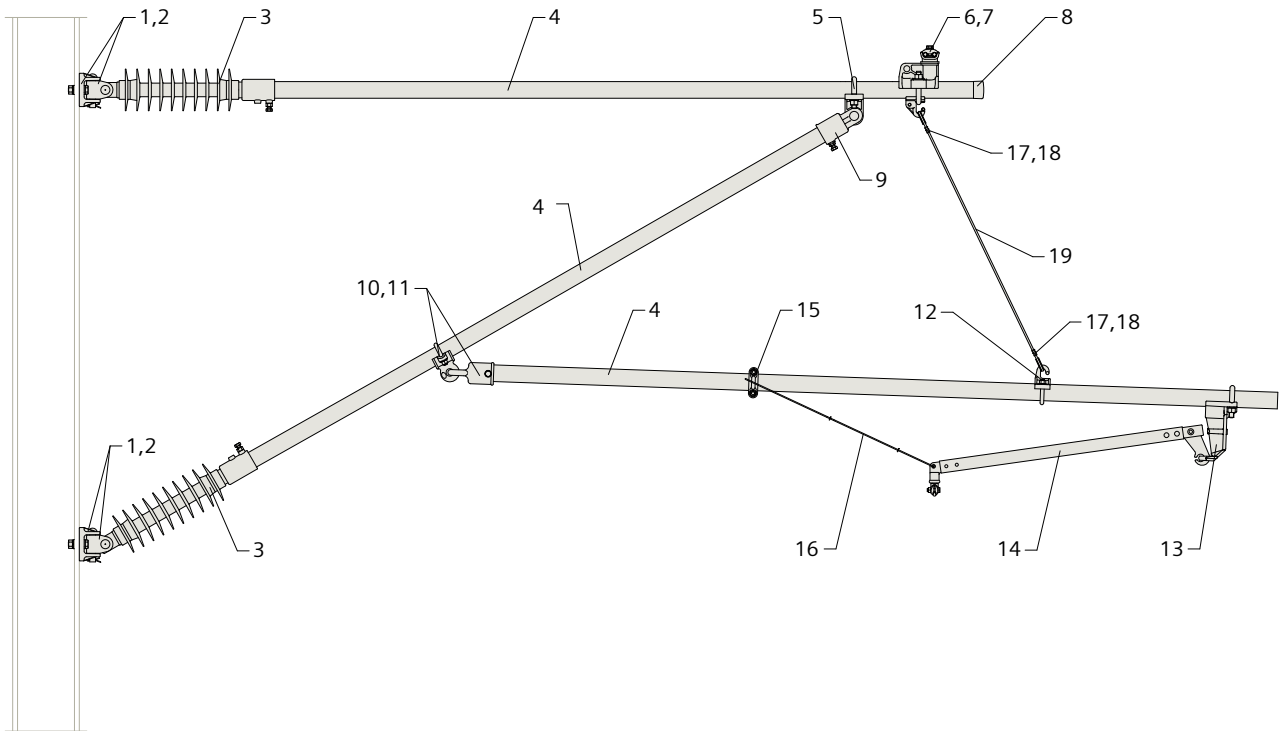
Cantilever on steel pole for trolley-type contact lines in mass transit



Pos.	Designation	Order no.
1	Cantilever swivel bracket	8WL2124-4
2	Swivel with clevis	8WL2126-1
3	Loop insulator 1,5 kV DC	8WL3001-2
4	Wedge-type dead-end clamp	8WL1181-7
5	Three-hole wedge	8WL1203-0
6	Wire rope 8 (length as needed)	8WL7093-3
7	Compression clamp 8	8WL1650-3
8	Thimble 8	8WL1516-2
9	Two pin clevis link	8WL1016-6
10	Composite insulator up to 3 kV DC	8WL3088-2E

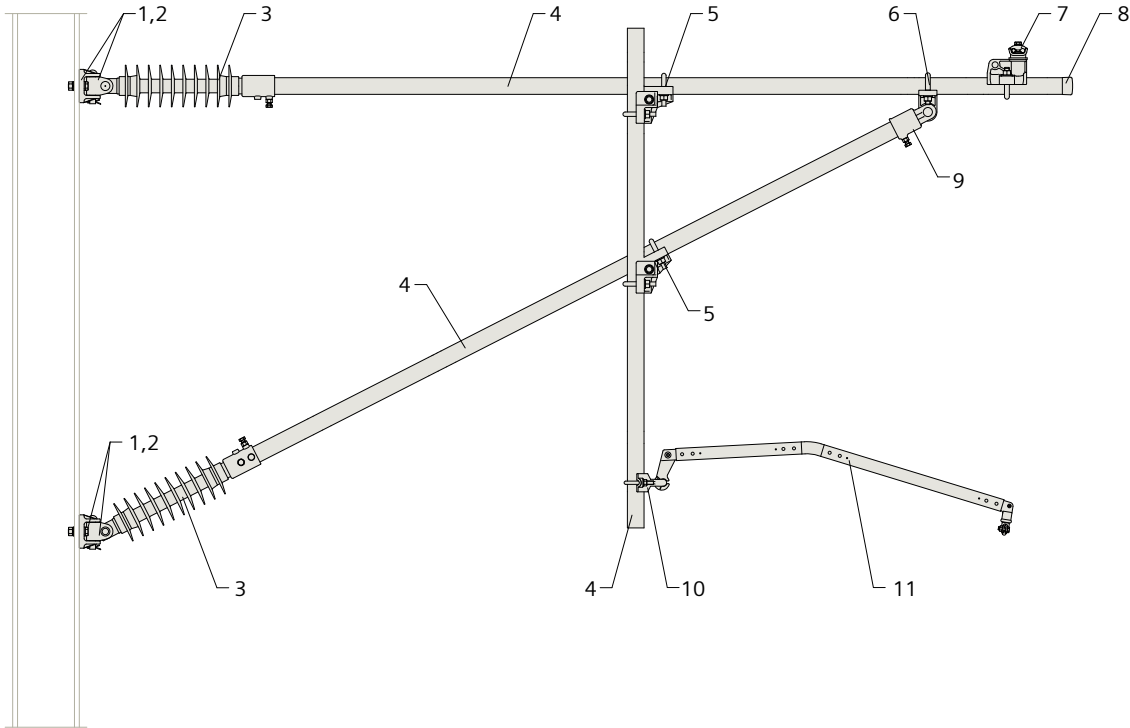
Pos.	Designation	Order no.
11	Aluminium tube 55x6 (length as needed)	8WL2167-0
12	Bridle suspension	8WL2097-0
13	Eye clamp 55	8WL2114-1
14	End cap 55	8WL2184-3
15	Drop bracket 42	8WL2118-1
16	Hook end clamp 26	8WL2101-4
17	Aluminium tube 26x3.5 (length as needed)	8WL2161-0
18	Swivel clip holder, insulated	8WL2012-4
19	Contact wire clip	8WL4517-1K
20	End cap 26	8WL2184-0

Cantilever, push-off on steel pole in main-line railways



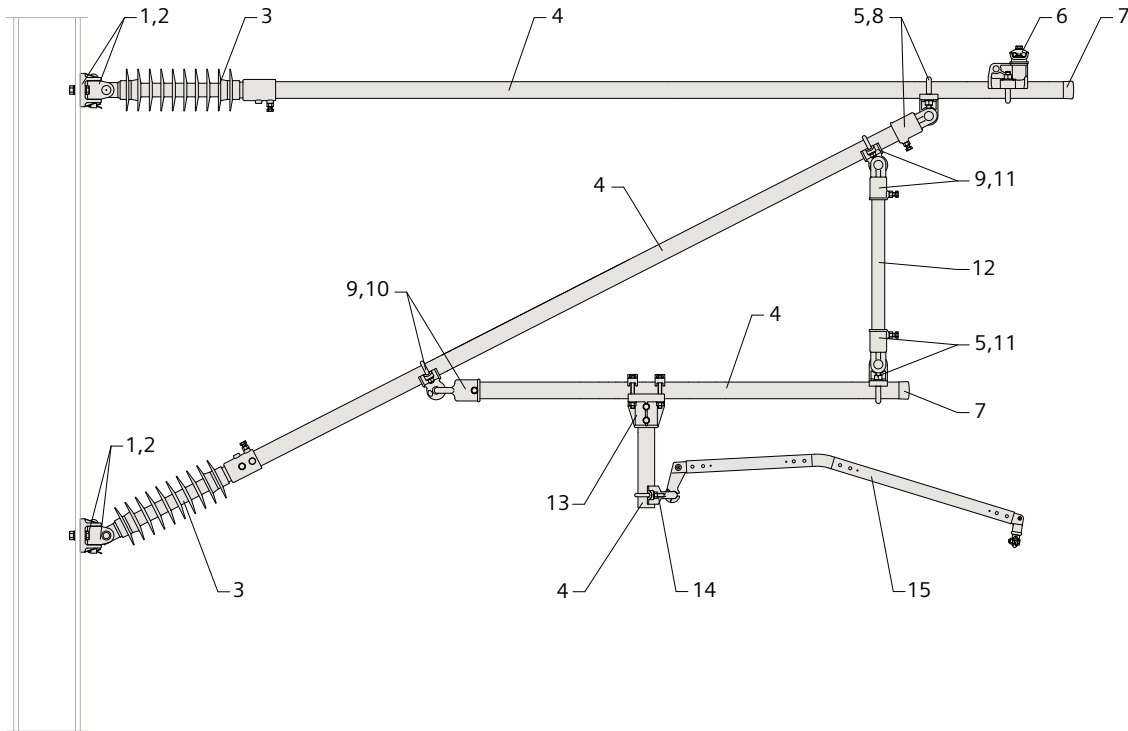
Position	Designation	Order no.
1	Cantilever swivel bracket	8WL2124-4
2	Swivel with clevis	8WL2126-1
3	Composite insulator 25 kV AC	8WL3078-2A
4	Aluminium tube 55x6 (length as needed)	8WL2167-0
5	Eye clamp 55	8WL2115-1
6	Catenary wire support clamp 55/14	8WL2032-3
7	Hook clip for U-bolt	8WL2196-3
8	End cap 55	8WL2184-3
9	Clevis end fitting 55	8WL2121-5
10	Eye clamp 55	8WL2114-1
11	Hook end fitting 55	8WL2104-2
12	Hook clip 55	8WL2148-6
13	Drop bracket 55	8WL2118-4B
14	Steady arm (length as needed)	8WL3500-3A to -3K
15	Eye clamp 55 for windstay	8WL2112-5H
16	Windstay for steady arm	8WL2112-8B
17	Thimble 35	8WL1501-1
18	Compression joint	8WL1553-0
19	Wire rope 6 (length as needed)	8WL7093-2

Cantilever with vertical registration tube on steel pole in main-line railways



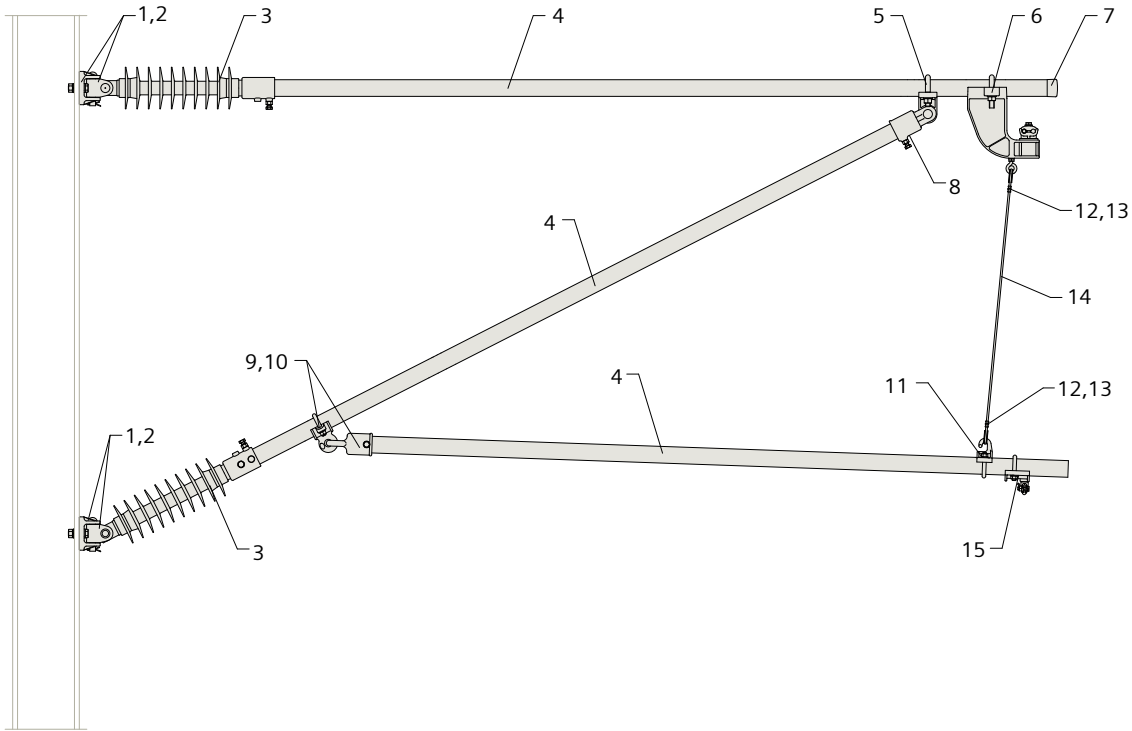
Position	Designation	Order no.
1	Cantilever swivel bracket	8WL2124-4
2	Swivel with clevis	8WL2126-1
3	Composite insulator 25 kV AC	8WL3078-2A
4	Aluminium tube 55x6 (length as needed)	8WL2167-0
5	Twin tube clamp 55-70	8WL2217-0
6	Eye clamp 55	8WL2115-1
7	Catenary wire support clamp 55/14	8WL2032-3
8	End cap 55	8WL2184-3
9	Clevis end fitting 55	8WL2121-5
10	Eye clamp for tube-type drop bracket 55	8WL2114-1A
11	Steady arm, angled (length as needed)	8WL3500-8L to -8U

Cantilever with horizontal registration tube on steel pole in main-line railways



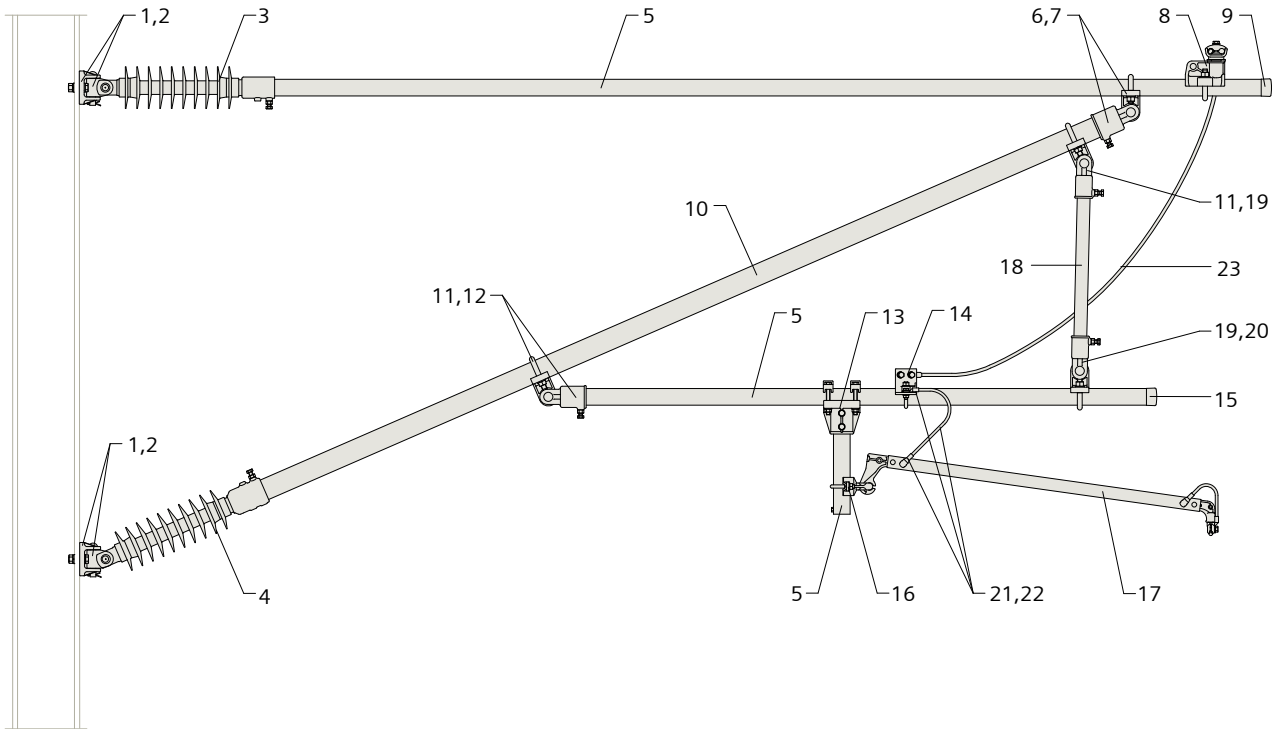
Position	Designation	Order no.
1	Cantilever swivel bracket	8WL2124-4
2	Swivel with clevis	8WL2126-1
3	Composite insulator 25 kV AC	8WL3078-2A
4	Aluminium tube 55x6 (length as needed)	8WL2167-0
5	Eye clamp 55	8WL2115-1
6	Catenary wire support clamp 55/14	8WL2032-3
7	End cap 55	8WL2184-3
8	Clevis end fitting 55	8WL2121-5
9	Eye clamp 55	8WL2114-1
10	Hook end fitting	8WL2104-2
11	Clevis end fitting 42	8WL2121-4
12	Aluminium tube 42x4 (length as needed)	8WL2165-0
13	Stay tube holder 55-55	8WL2244-0
14	Eye clamp for tube-type drop bracket 55	8WL2114-1A
15	Steady arm, angled (length as needed)	8WL3500-8L to -8U

Cantilever, lifted for low system heights on steel pole in main-line railways



Position	Designation	Order no.
1	Cantilever swivel bracket	8WL2124-4
2	Swivel with clevis	8WL2126-1
3	Composite insulator 25 kV AC	8WL3078-2A
4	Aluminium tube 55x6 (length as needed)	8WL2167-0
5	Eye clamp 55	8WL2115-1
6	Catenary wire support clamp 55/14 with hook	8WL2027-0C
7	End cap 55	8WL2184-3
8	Clevis end fitting 55	8WL2121-5
9	Eye clamp 55	8WL2114-1
10	Hook end fitting 55	8WL2104-2
11	Hook clip 55	8WL2148-6
12	Thimble 35	8WL1501-1
13	Compression joint	8WL1553-0
14	Wire rope 6 (length as needed)	8WL7093-2
15	Clamp holder 55	8WL3508-5

Cantilever, current-carrying on steel pole in main-line railways

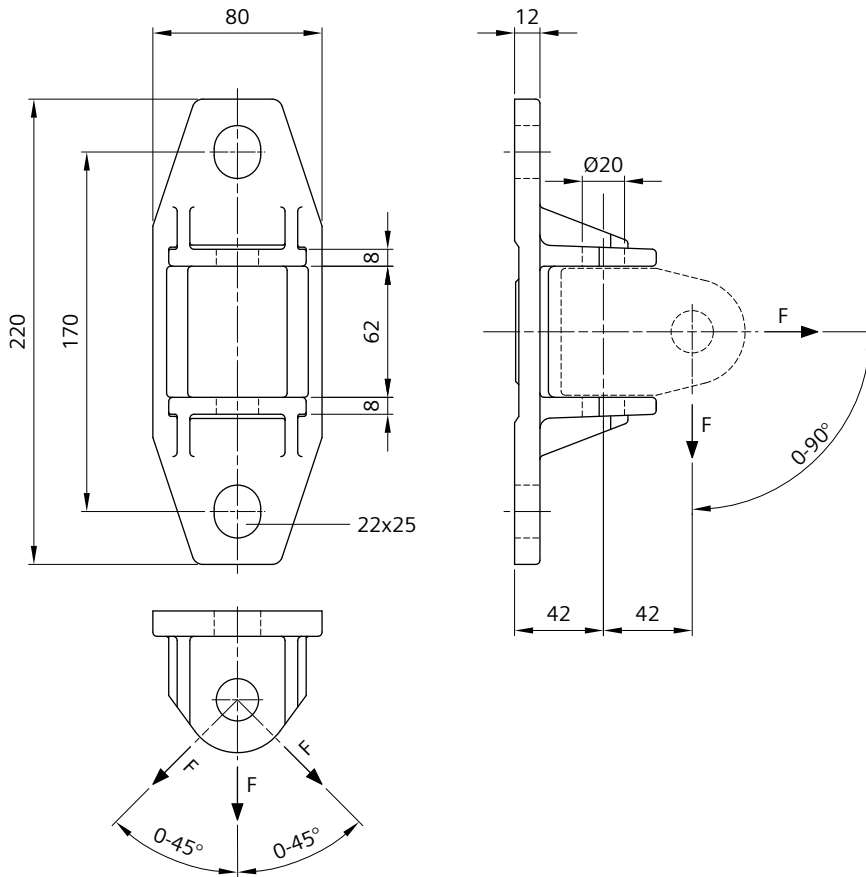


Pos.	Designation	Order no.
1	Cantilever swivel bracket	8WL2124-4
2	Swivel with clevis	8WL2126-1
3	Composite insulator 25 kV AC for tube 55	8WL3078-2A
4	Composite insulator 25 kV AC for tube 70	8WL3078-2B
5	Aluminium tube 55x6 (length as needed)	8WL2167-0
6	Eye clamp 55	8WL2115-1
7	Clevis end fitting 70	8WL2120-7
8	Catenary wire support clamp 55/19	8WL2034-3
9	End cap 55	8WL2184-3
10	Aluminium tube 70x6 (length as needed)	8WL2170-0
11	Eye clamp 70	8WL2116-0
12	Clevis end fitting 55	8WL2121-5

Pos.	Designation	Order no.
13	Stay tube holder 55 for registration tube 55	8WL2244-0
14	Tube connecting fitting 55	8WL4652-1
15	End cap 55	8WL2184-3
16	Eye clamp for tube-type drop bracket 55	8WL2114-1A
17	Steady arm, current carrying (length as needed)	8WL3500-3BS bis -3GS
18	Aluminium tube 42x4 (length as needed)	8WL2165-0
19	Clevis end fitting 42	8WL2121-4
20	Eye clamp 55	8WL2115-1
21	Cable lug 10-35	8WL1577-0
22	Copper wire 25x133	8WL7071-0
23	Wire and connecting parts at tube connecting fitting and catenary wire have to be defined project-specifically.	

Cantilever swivel bracket at concrete pole

for hinged cantilevers



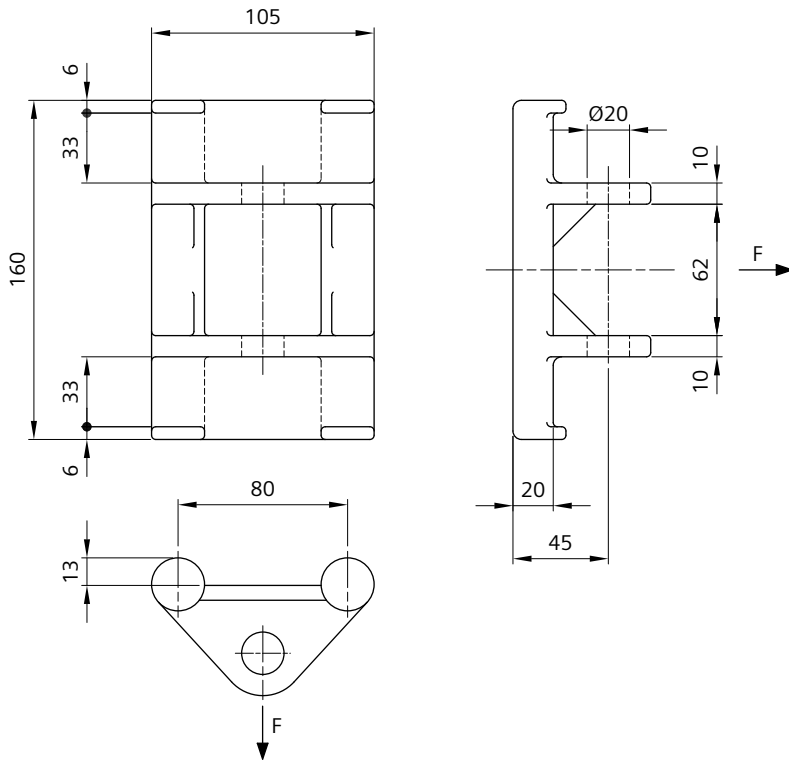
Order no.	8WL2123-3
Designation	Cantilever swivel bracket
Material	ctAl
Weight	0.61 kg
Perm. operating load	18.4 kN
Min. failing load	55 kN

Pin 8WL1112-3 (19x100-Al) and split pin 8WL1115-3 (5x28-Al) must be ordered separately, see Chapter 02-01.

Can also be supplied completely mounted.

Cantilever swivel bracket for fastening of punch-lock band

for hinged cantilevers at round pole



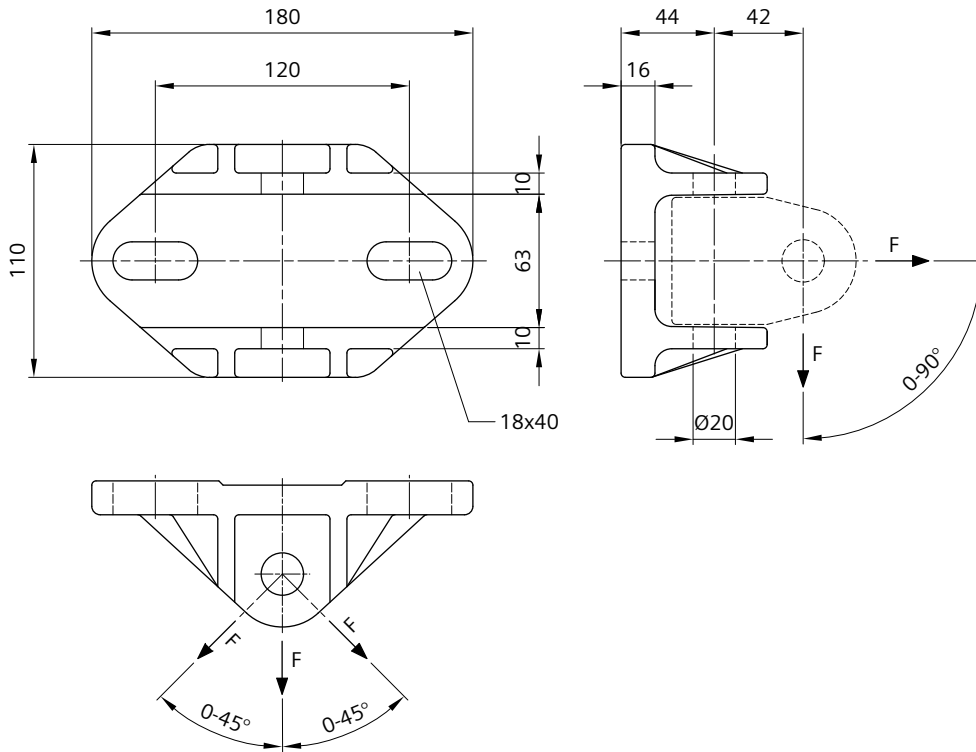
Order no.	8WL2124-3
Designation	Cantilever swivel bracket
Material	ctAl
Weight	0.58 kg
Perm. operating load	13.4 kN
Min. failing load	40 kN

Pin 8WL1112-3 (19x100-Al), split pin 8WL1115-3 (5x28-Al), punch-lock band 8WL6743-0 and lock 8WL6748-6 or loop 8WL6748-1 must be ordered separately, see Chapter 02-01.

Can also be supplied completely mounted.

Cantilever swivel bracket 100-120

for hinged cantilevers, for fixing at U-sections 100 to 120



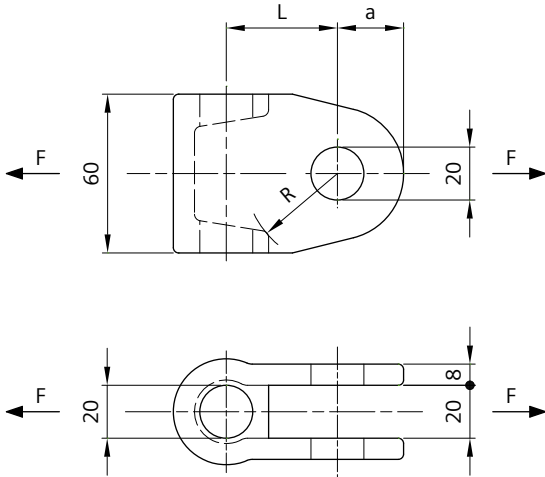
Order no.	8WL2124-4
Designation	Cantilever swivel bracket
Material	ctAl
Weight	0.78 kg
Perm. operating load	21.7 kN
Min. failing load	65 kN

Pin 8WL1112-3 (19x100-Al) and split pin 8WL1115-3 (5x28-Al) must be ordered separately, see Chapter 02-01.

Can also be supplied completely mounted.

Swivel with clevis

for hinged cantilevers



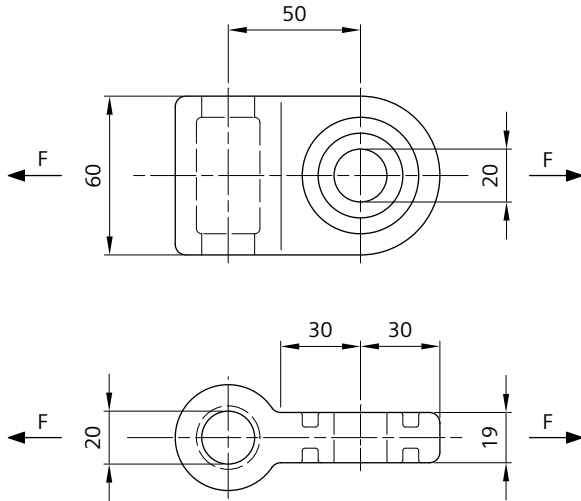
Order no.	8WL2126-1	8WL2126-3
Designation	Swivel with clevis 20	Swivel with clevis 20
Material	ctAl	ctAl
Weight	0.20 kg	0.29 kg
Perm. operating load	21.7 kN	21.7 kN
Min. failing load	65 kN	65 kN
a	25 mm	28 mm
L	42 mm	62 mm
R	35 mm	41 mm

Pin 8WL1110-3 (19x52-Al) and split pin 8WL1115-3 (5x28-Al) must be ordered separately, see Chapter 02-01.

Can also be supplied completely mounted.

Swivel with eye

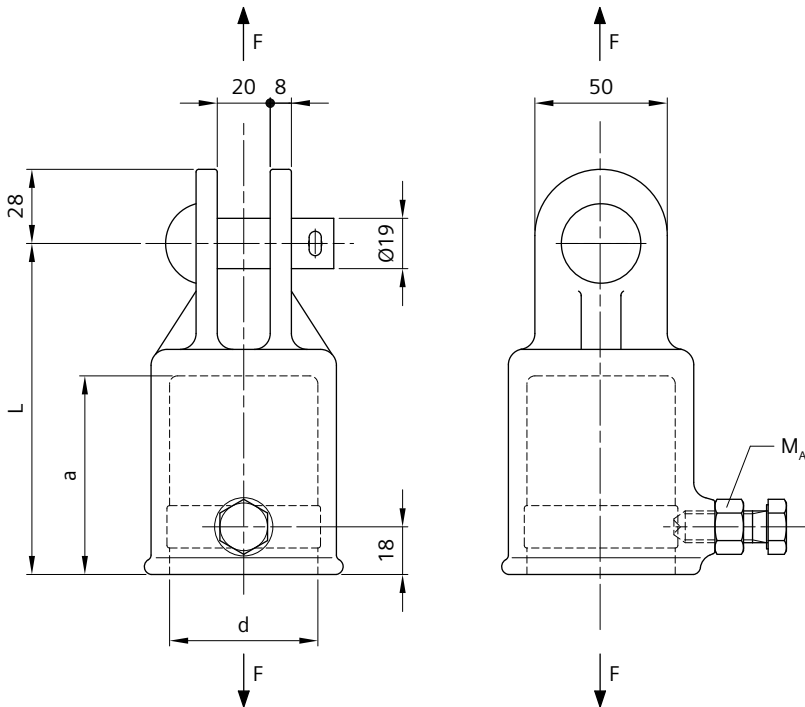
for hinged cantilevers



Order no.	8WL2127-1
Designation	Swivel with eye 20
Material	ctAl
Weight	0.25 kg
Perm. operating load	21.7 kN
Min. failing load	65 kN

Clevis end fitting 42-70

for hinged cantilevers, for tube d=42 to 70 mm

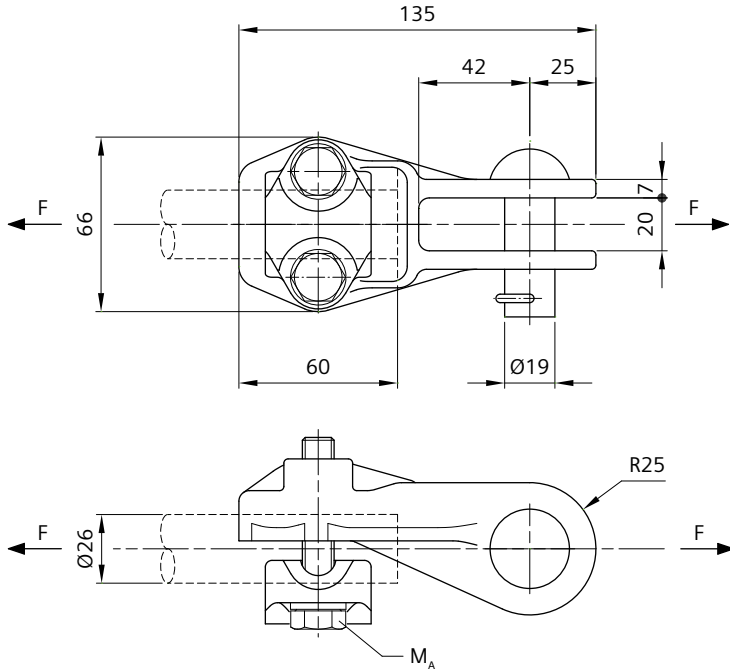


Order no.	8WL2121-4	8WL2121-5	8WL2120-7
Designation	Clevis end fitting 42	Clevis end fitting 55	Clevis end fitting 70
Material			
Clevis end fitting	ctAl	ctAl	ctAl
Cup-point screw M12	stlSt	stlSt	stlSt
Nut	stlSt	stlSt	stlSt
Pin 19x52	Al	Al	Al
Split pin 5x28	Al	Al	Al
Weight	0.48 kg	0.68 kg	0.72 kg
Perm. operating load	4 kN	4 kN	4 kN
Min. failing load	12 kN	12 kN	12 kN
Tightening torque M_A	50 Nm	50 Nm	50 Nm
a	65 mm	75 mm	75 mm
d	43 mm	56 mm	71 mm
L	115 mm	125 mm	125 mm

Clevis end fitting 8WL6221-2 for tube 26 see page 766.

Clevis end fitting 26

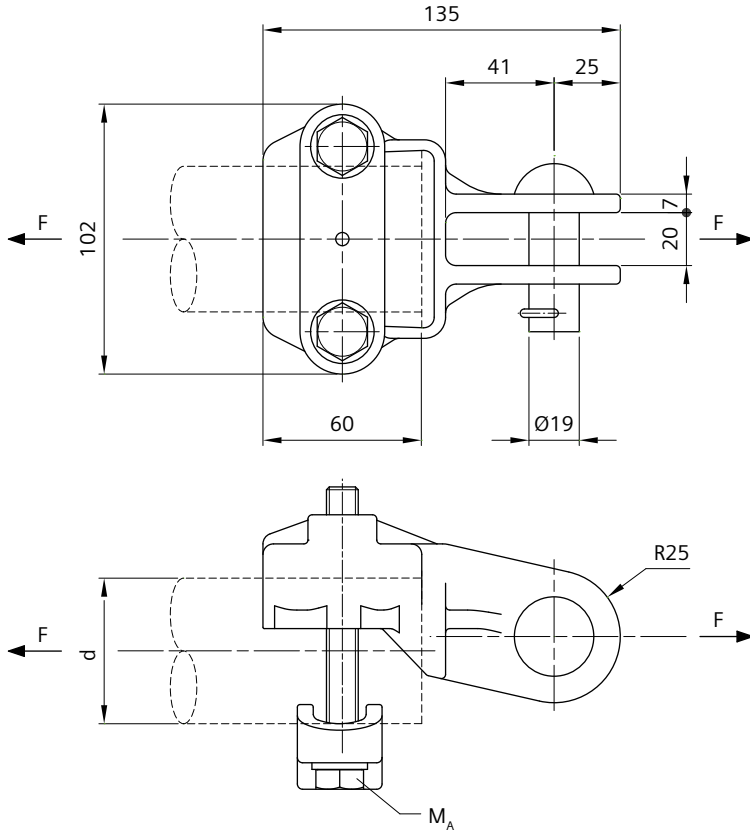
for hinged cantilevers and operating linkages, for tube d=26 mm, for higher loads



Order no.	8WL6222-4
Designation	Clevis end fitting 26
Material	
Clevis end fitting	ctAl
Clamp cover	ctAl
Bolts M12	stlSt
Pin 19x52	Al
Beta-Split pin	stlSt
Spring washers	stlSt
Weight	0.54 kg
Perm. operating load	10 kN
Min. failing load	30 kN
Tightening torque M_A	56 Nm

Clevis end fitting 42-55

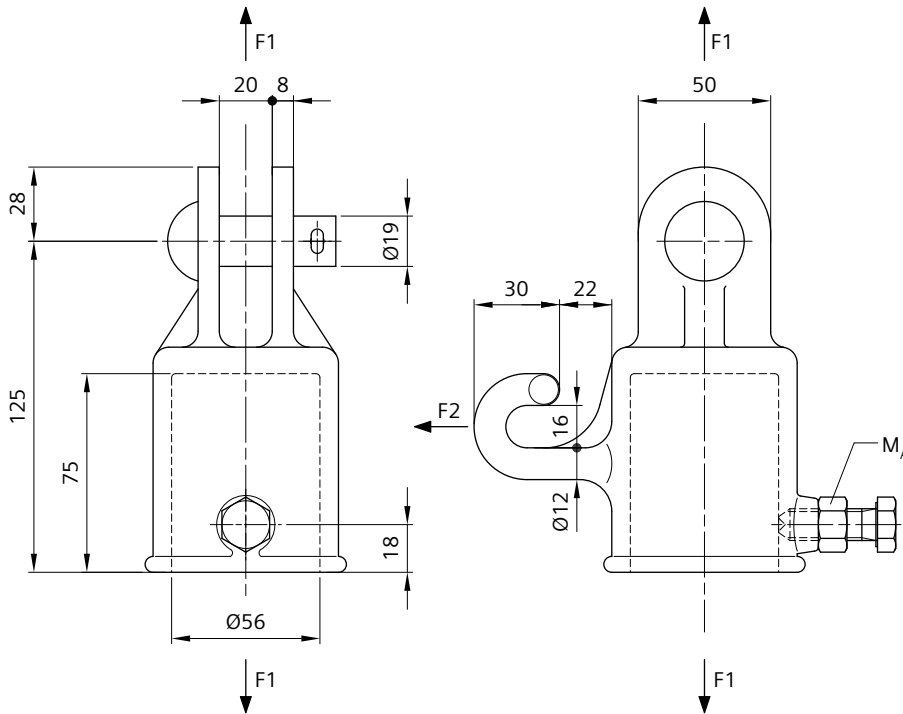
for hinged cantilevers, for tube d=42 or 55 mm, for higher loads



Order no.	8WL2122-5E	8WL2122-5F
Designation	Clevis end fitting 42	Clevis end fitting 55
Material		
Clevis end fitting	ctAl	ctAl
Clamp cover	ctAl	ctAl
Bolts M12	stlSt	stlSt
Pin 19x52	Al	Al
Beta-Split pin	stlSt	stlSt
Spring washers	stlSt	stlSt
Weight	0.74 kg	0.76 kg
Perm. operating load	12.5 kN	12.5 kN
Min. failing load	37.5 kN	37.5 kN
Tightening torque M_A	56 Nm	56 Nm
d	42 mm	55 mm

Clevis end fitting 55 with hook

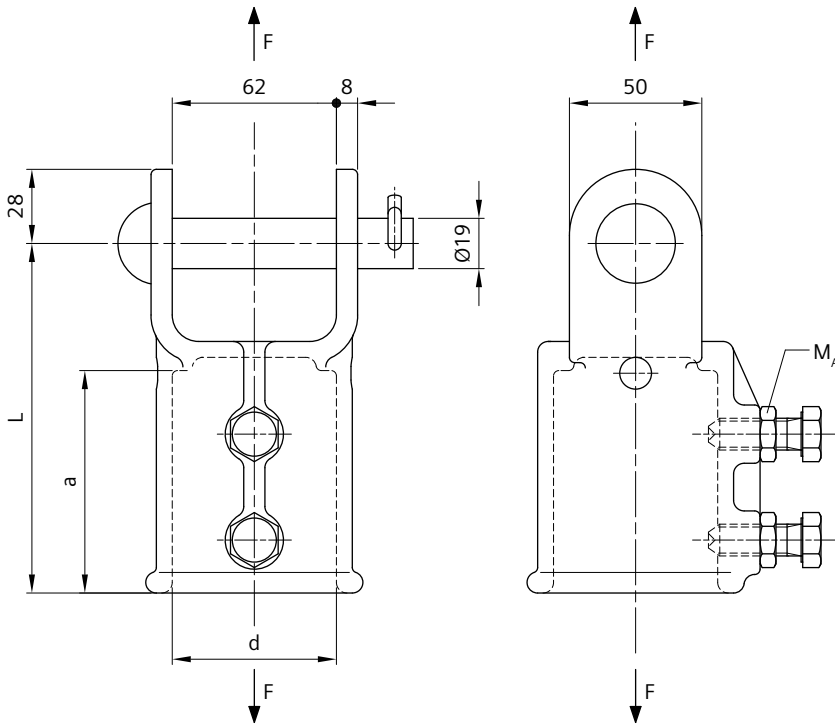
for hinged cantilevers, for tube d=55 mm



Order no.	8WL2120-4
Designation	Clevis end fitting 55
Material	
Clevis end fitting	ctAl
Cup-point screw M12	stlSt
Nut	stlSt
Pin 19x52	Al
Split pin 5x28	Al
Weight	0.72 kg
Perm. operating load (F1)	4 kN
Min. failing load (F1)	12 kN
Perm. operating load (F2)	1.25 kN
Min. failing load (F2)	3.75 kN
Tightening torque M_A	50 Nm

Clevis end fitting 42-55

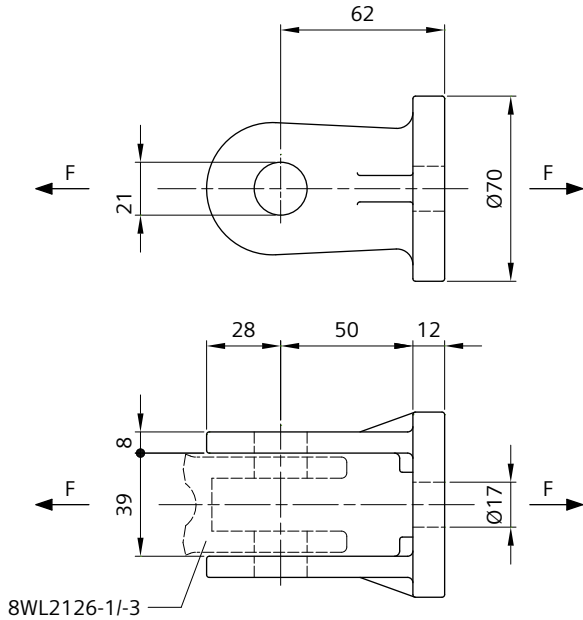
for connection of registration tube d=42 or 55 mm at cantilever tube d=80 mm



Order no.	8WL2121-4B	8WL2121-5B
Designation	Clevis end fitting 42	Clevis end fitting 55
Material		
Clevis end fitting	ctAl	ctAl
Cup-point screws M12	stlSt	stlSt
Nuts	stlSt	stlSt
Pin 19x100	Al	Al
Beta-Split pin	stlSt	stlSt
Weight	0.68 kg	0.76 kg
Perm. operating load	12 kN	10 kN
Min. failing load	36 kN	30 kN
Tightening torque M_A	50 Nm	50 Nm
a	70 mm	84 mm
d	48 mm	62 mm
L	118 mm	132 mm

Clevis end fitting for connection with insulator

for hinged cantilevers, for connection at swivels with clevis

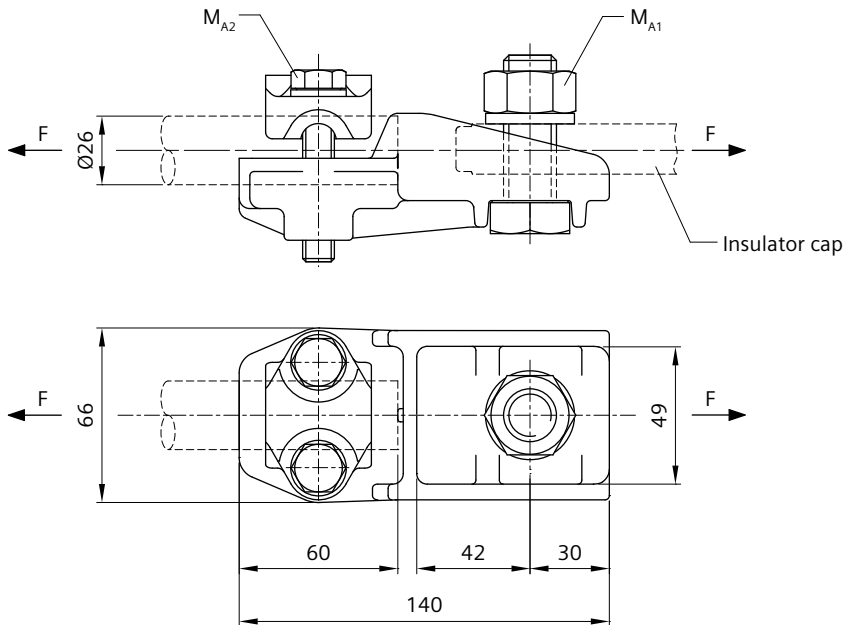


Order no.	8WL2201-0
Designation	Clevis end fitting
Material	ctAl
Weight	0.26 kg
Perm. operating load	13.4 kN
Min. failing load	40 kN

Pin 8WL1111-3 (19x70-Al) and split pin 8WL1115-3 (5x28-Al) must be ordered separately, see Chapter 02-01.

Spade end fitting 26

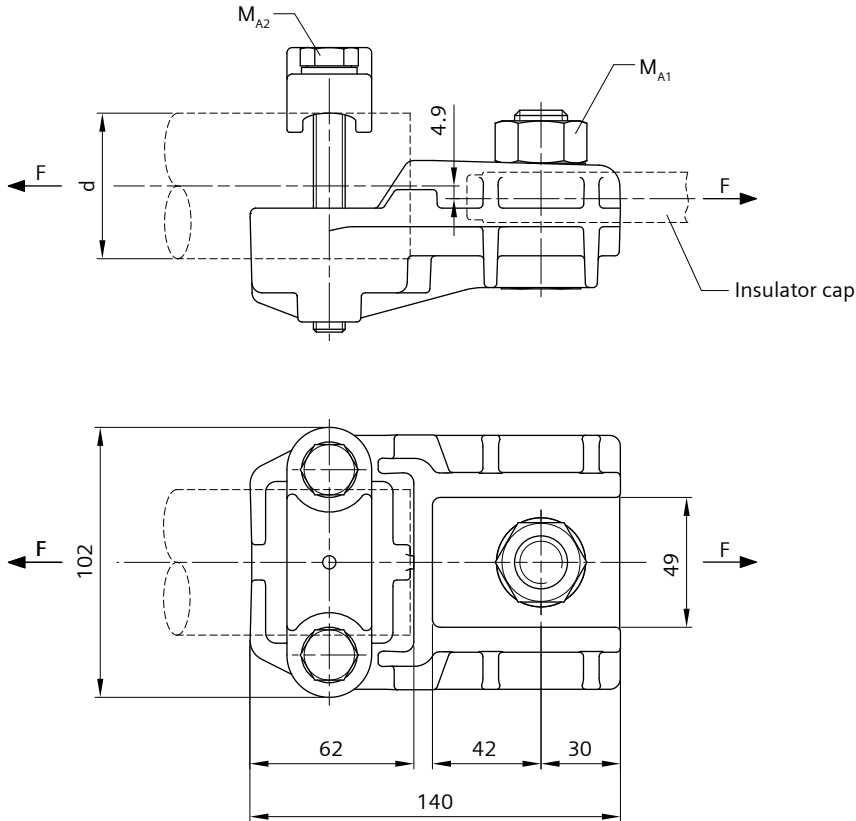
for insulator connection at top tube d=26 mm



Order no.	8WL2105-8
Designation	Spade end fitting 26
Material	
Spade end fitting	ctAl
Clamp cover	ctAl
Bolts M12	stlSt
Bolt M20	stlSt
Nut	stlSt
Spring washers	stlSt
Weight	0.79 kg
Perm. operating load	10 kN
Min. failing load	30 kN
Tightening torque M_{A1}	135 Nm
Tightening torque M_{A2}	56 Nm

Spade end fitting 42-55

for insulator connection at top tube d=42 or 55 mm



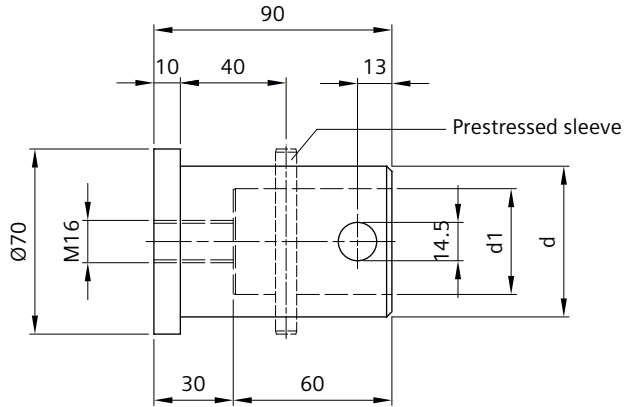
Order no.	8WL2105-6G	8WL2105-6H
Designation	Spade end fitting 42 ¹⁾	Spade end fitting 55 ²⁾
Material		
Spade end fitting	ctAl	ctAl
Clamp cover	ctAl	ctAl
Bolts M12	stlSt	stlSt
Bolt M20	stlSt	stlSt
Nut	stlSt	stlSt
Spring washers	stlSt	stlSt
Weight	1.17 kg	1.19 kg
Perm. operating load	10 kN	10 kN
Min. failing load	30 kN	30 kN
Tightening torque M_{A1}	135 Nm	135 Nm
Tightening torque M_{A2}	56 Nm	56 Nm
d	42 mm	55 mm

¹⁾ Substitute for 8WL2150-6D

²⁾ Substitute for 8WL2105-6E

Tube end fitting 42-70

for tube d=42 to 70 mm

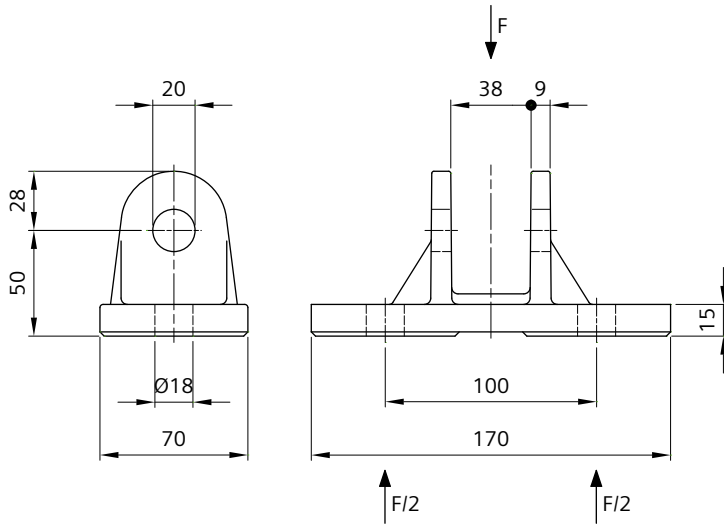


Order no.	8WL2207-0	8WL2206-0	8WL2205-0
Designation	Tube end fitting 42	Tube end fitting 55	Tube end fitting 70
Material	Al	Al	Al
Weight	0.24 kg	0.31 kg	0.42 kg
Prestressed sleeve	8x45 mm	8x55 mm	8x70 mm
d	33 mm	42 mm	57 mm
d₁	13.5 mm	25.0 mm	40.0 mm

Prestressed sleeve acc. to EN ISO 8752 (st1St) must be ordered separately.

Clevis end fitting for twin tube

for cantilevers across two tracks

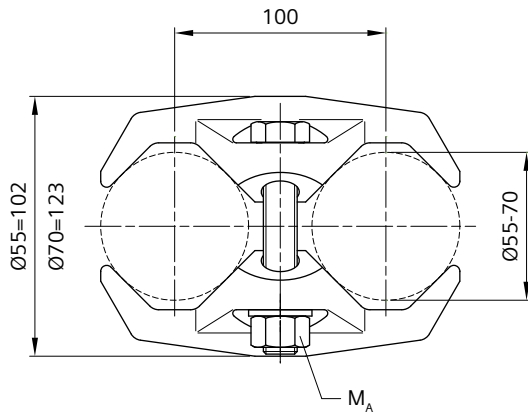


Order no.	8WL2210-0
Designation	Clevis end fitting
Material	ctAl
Weight	0.55 kg
Perm. operating load	13.4 kN
Min. failing load	40 kN

Pin 8WL1111-3 (19x70-Al) and split pin 8WL1115-3 (5x28-Al) must be ordered separately, see Chapter 02-01.

Twin tube clamp

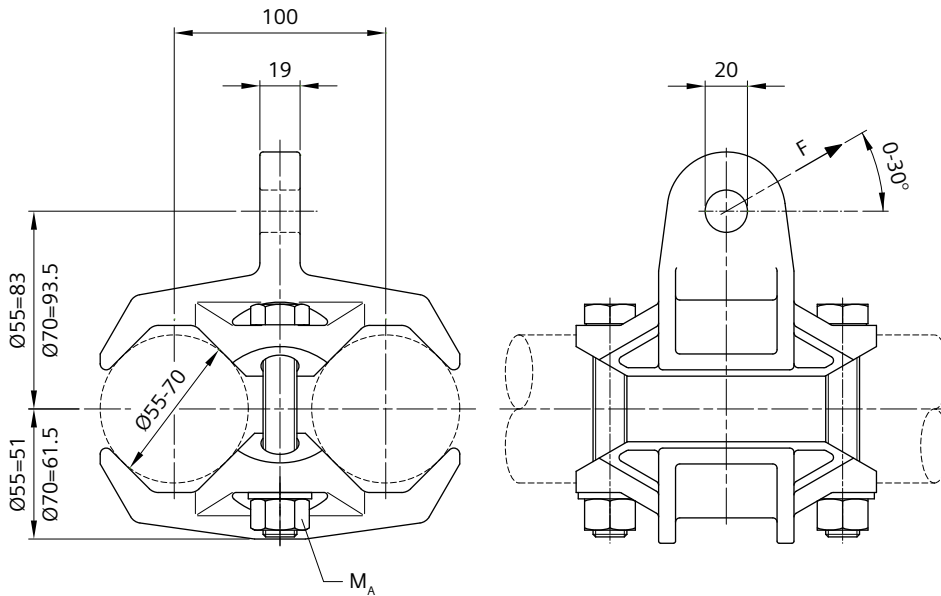
for cantilevers across two tracks, for tubes d=55 to 70 mm



Order no.	8WL2214-0
Designation	Twin tube clamp 55-70
Material	
Tube clamps	ctAl
Bolts M16x100	stlSt
Nuts	stlSt
Washers	stlSt
Weight	1.81 kg
Tightening torque M_A	135 Nm

Twin tube clamp with eye

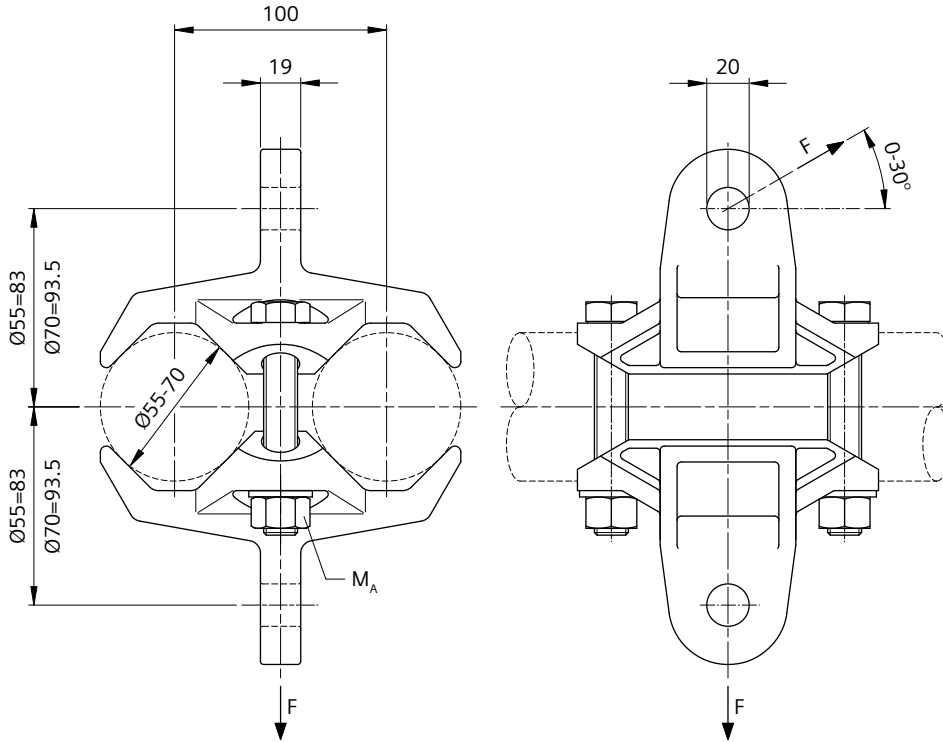
for cantilevers across two tracks, for tubes d=55 to 70 mm



Order no.	8WL2215-0
Designation	Twin tube clamp 55-70
Material	
Tube clamps	ctAl
Bolts M16x100	stlSt
Nuts	stlSt
Washers	stlSt
Weight	1.95 kg
Perm. operating load	8 kN
Min. failing load	24 kN
Tightening torque M_A	135 Nm

Twin tube clamp with double eye

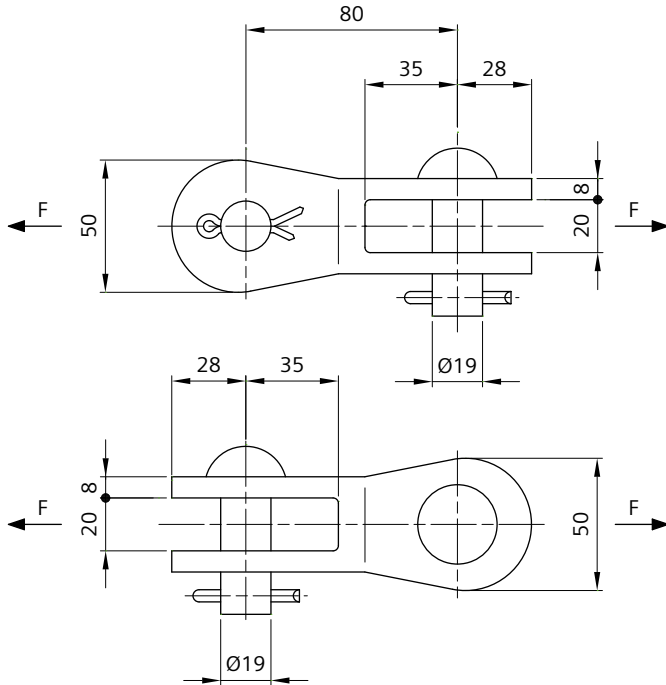
for cantilevers across two tracks, for tubes d=55 to 70 mm



Order no.	8WL2216-0
Designation	Twin tube clamp 55-70
Material	
Tube clamps	ctAl
Bolts M16x100	stlSt
Nuts	stlSt
Washers	stlSt
Weight	2.08 kg
Perm. operating load	8 kN
Min. failing load	24 kN
Tightening torque M_A	135 Nm

Cross link clevis/clevis

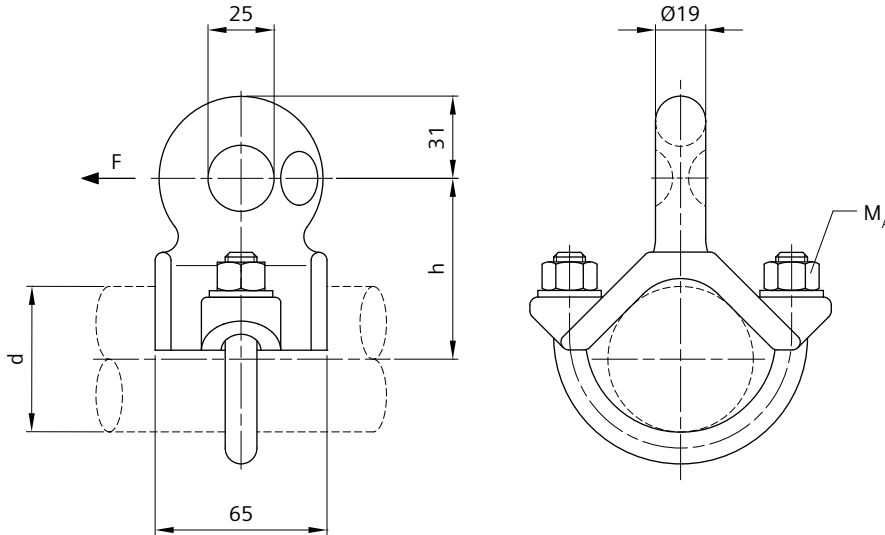
for catenary wire supports in cantilevers across several tracks



Order no.	8WL1135-7
Designation	Cross link 19
Material	
Cross link	ctAl
Pins 19x52	Al
Split pins 5x28	Al
Weight	0.34 kg
Perm. operating load	20 kN
Min. failing load	60 kN

Eye clamp 42-70

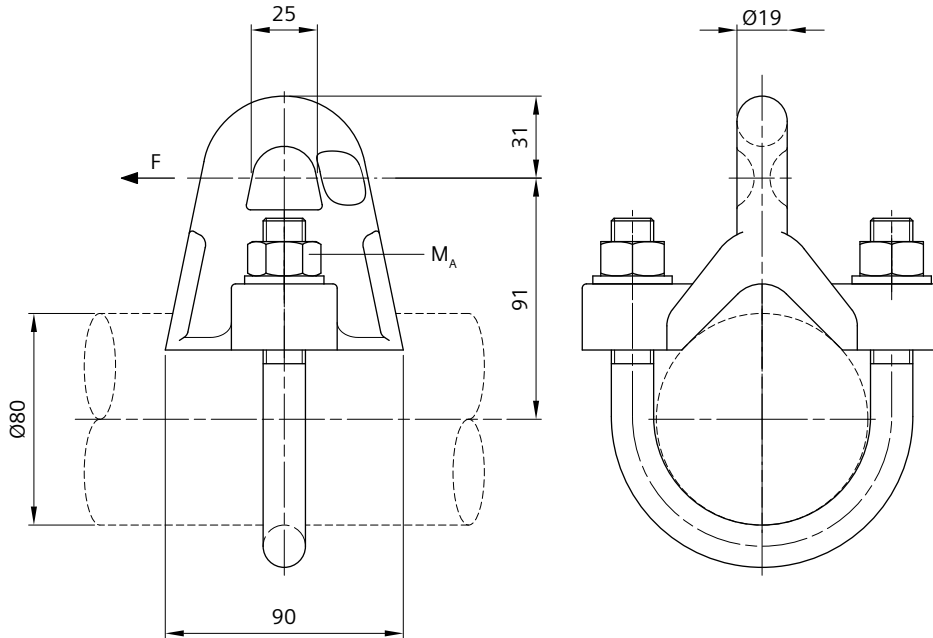
for hinged cantilevers, for tube d=42 to 70 mm



Order no.	8WL2113-1	8WL2114-1	8WL2114-4
Designation	Eye clamp 42	Eye clamp 55	Eye clamp 70
Material			
Eye clamp	ctAl	ctAl	ctAl
U-bolt M12	stlSt	stlSt	stlSt
Nuts	stlSt	stlSt	stlSt
Washers	stlSt	stlSt	stlSt
Weight	0.40 kg	0.45 kg	0.48 kg
Perm. operating load	3.4 kN	3.4 kN	3.4 kN
Min. failing load	10 kN	10 kN	10 kN
Tightening torque M_A	35 Nm	35 Nm	35 Nm
d	42 mm	55 mm	70 mm
h	63 mm	70 mm	78 mm

Eye clamp 80

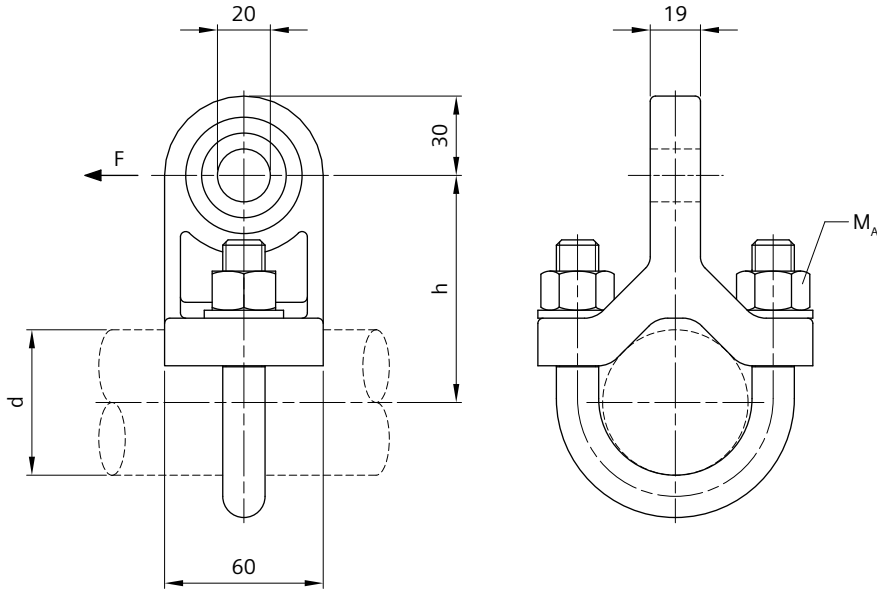
for hinged cantilevers, for tube d=80 mm



Order no.	8WL2114-8E
Designation	Eye clamp 80
Material	
Eye clamp	ctAl
U-bolt M16	stlSt
Nuts	stlSt
Washers	stlSt
Weight	0.83 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	70 Nm

Eye clamp 42-80

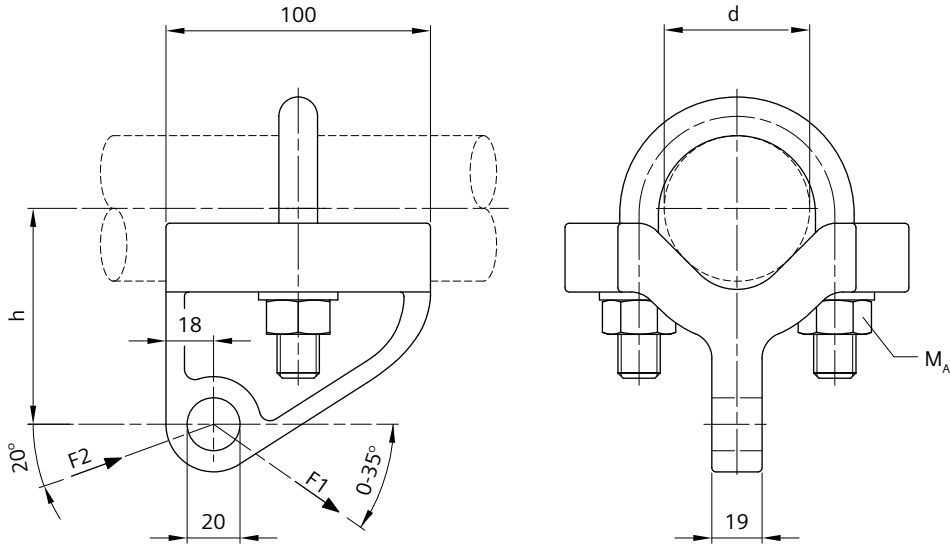
for hinged cantilevers and soffit posts, for tube d=42 to 80 mm



Order no.	8WL2115-0	8WL2115-1	8WL2116-0
Designation	Eye clamp 42	Eye clamp 55	Eye clamp 70/80
Material			
Eye clamp	ctAl	ctAl	ctAl
U-bolt M16	stlSt	stlSt	stlSt
Nuts	stlSt	stlSt	stlSt
Washers	stlSt	stlSt	stlSt
Weight	0.60 kg	0.67 kg	0.78 kg
Perm. operating load	5 kN	5 kN	5 kN
Min. failing load	15 kN	15 kN	15 kN
Tightening torque M_A	70 Nm	70 Nm	70 Nm
d	42 mm	55 mm	70/80 mm
h	75 mm	85 mm	93/100 mm

Eye clamp 55-70

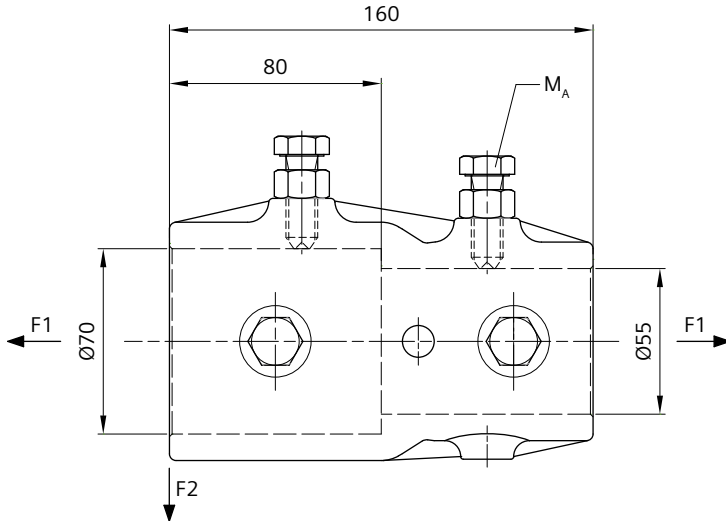
for hinged cantilevers and soffit posts, for tube d=55 to 70 mm, for higher loads



Order no.	8WL2115-2A	8WL2115-2B
Designation	Eye clamp 55	Eye clamp 70
Material		
Eye clamp	ctAl	ctAl
U-bolt M16	stlSt	stlSt
Nuts	stlSt	stlSt
Washers	stlSt	stlSt
Weight	0.99 kg	1.01 kg
Perm. operating load/ tension (F1)	10 kN	10 kN
Min. failing load/ tension (F1)	30 kN	30 kN
Perm. operating load/ pressure (F2)	16 kN	16 kN
Min. failing load/ pressure (F2)	48 kN	48 kN
Tightening torque M_A	70 Nm	70 Nm
d	55 mm	70 mm
h	82 mm	92 mm

Reducing socket 70/55

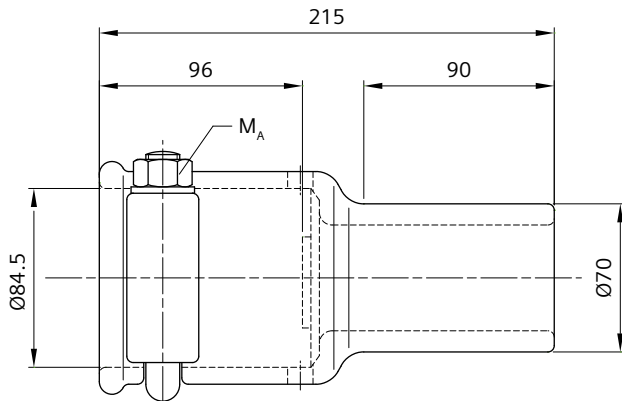
for hinged cantilevers



Order no.	8WL2128-5A
Designation	Reducing socket 70/55
Material	
Reducing socket	ctAl
Cup-point screws M12	stlSt
Nuts	stlSt
Weight	1.20 kg
Perm. operating load/ tension (F1)	4 kN
Min. failing load/ tension (F1)	12 kN
Perm. operating load/ bending (F2)	2 kN
Min. failing load/ bending (F2)	6 kN
Tightening torque M_A	50 Nm

Reducing socket 80/70

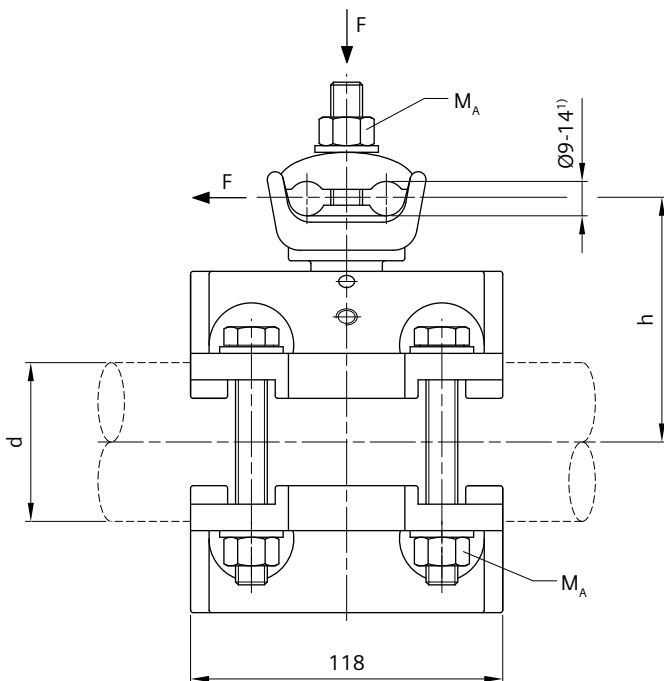
for hinged cantilevers



Order no.	8WL2128-4
Designation	Reducing socket 80/70
Material	
Reducing socket	ctAl
U-bolt M16	stlSt
Nuts	stlSt
Washers	stlSt
Weight	1.87 kg
Tightening torque M_A	70 Nm

Bridle suspension 42-70

for fixed bridle or catenary wire suspension at aluminium tubes $d=42$ to 70 mm and steel tubes $d=42.4$ mm (1 1/4"), 55 mm or 60.3 mm (2"), for bridle-and-pulley suspensions 8WL3520-2/-2A/-3/-3A, synthetic wire 8WL7097-0 or bronze and copper wires acc. to DIN 48201



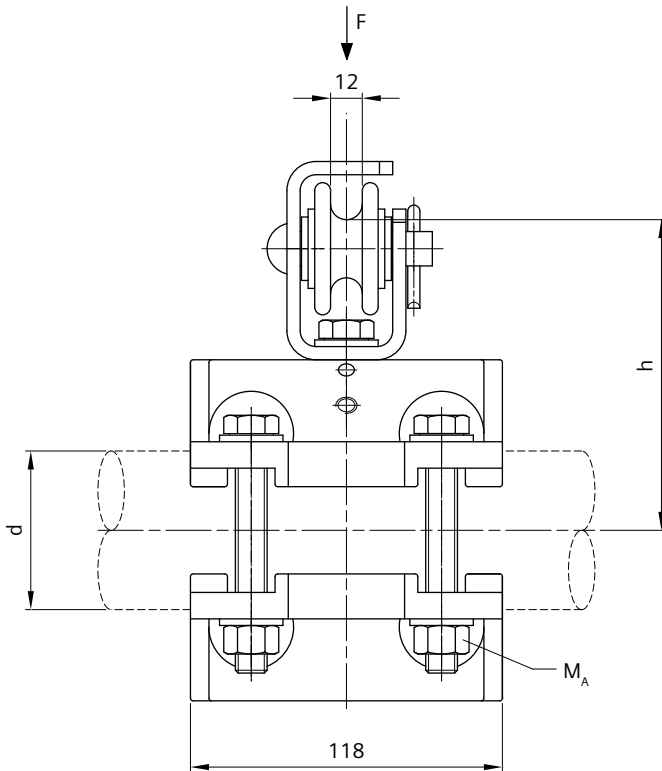
Order no.	8WL2097-6	8WL2097-0	8WL2097-0B
Designation	Bridle suspension 42/42.4	Bridle suspension 55-60.3	Bridle suspension 70
Material			
Clamp body	ctAl	ctAl	ctAl
Clamp cover	ctAl	ctAl	ctAl
Clamping cover	ctAl	ctAl	ctAl
Bolts M12	stlSt	stlSt	stlSt
Nuts, washers	stlSt	stlSt	stlSt
Weight	1.67 kg	1.72 kg	1.79 kg
Perm. operating load	1 kN	1 kN	1 kN
Min. failing load	3 kN	3 kN	3 kN
Tightening torque M_A	56 Nm	56 Nm	56 Nm
d	42/42.4 mm (1 1/4")	55 - 60.3 mm (2")	70 mm
h	80 mm	89/92.5 mm	100 mm

¹⁾ Diameter including protection sleeve

Protection sleeves must be ordered separately, see Chapter 02-02.

Bridle guiding device 42-70

for flexible bridle or catenary wire suspension at aluminium tubes $d=42$ to 70 mm or steel tubes $d=42.4$ mm (1 1/4"), 55 mm and 60.3 mm (2"), for bridle-and-pulley suspensions 8WL3520-2/-2A/-3/-3A, synthetic wire 8WL7097-0 or bronze and copper wires acc. to DIN 48201

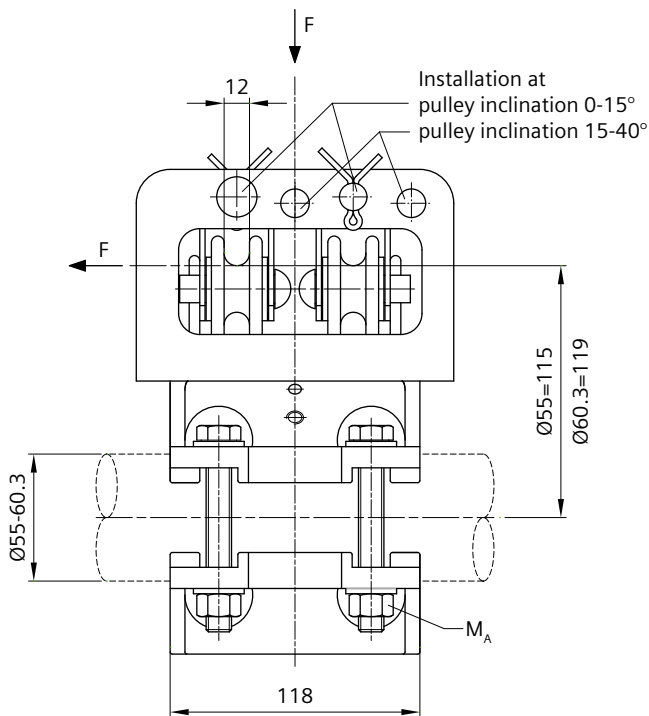


Order no.	8WL2097-7	8WL2097-1	8WL2097-1B
Designation	Bridle guiding device 42/42.4	Bridle guiding device 55-60.3	Bridle guiding device 70
Material			
Clamping covers	ctAl	ctAl	ctAl
Pulley	Polyamide	Polyamide	Polyamide
Clevis, pin 13x55	stlSt	stlSt	stlSt
Split pin 5x28	Cu	Cu	Cu
Bolts M12, nuts, washers	stlSt	stlSt	stlSt
for wires	35 to 70 mm ² 9 mm (8WL7097-0)	35 to 70 mm ² 9 mm (8WL7097-0)	35 to 70 mm ² 9 mm (8WL7097-0)
Weight	1.73 kg	1.78 kg	1.86 kg
Perm. operating load	1 kN	1 kN	1 kN
Min. failing load	3 kN	3 kN	3 kN
Tightening torque M_A	56 Nm	56 Nm	56 Nm
d	42/42.4 mm (1 1/4")	55 - 60.3 mm (2")	70 mm
h	105 mm	114/117.5 mm	125 mm

Protection sleeves must be ordered separately, see Chapter 02-02.

Twin bridle guiding device 55-60.3

for flexible suspension of two bridle-and-pulley suspensions or catenary wires at aluminium tubes $d=55$ mm or steel tubes $d=60.3$ mm (2"), for bridle-and-pulley suspensions 8WL3520-2/-2A/-3/-3A, synthetic wire 8WL7097-0 or bronze wires acc. to DIN 48201

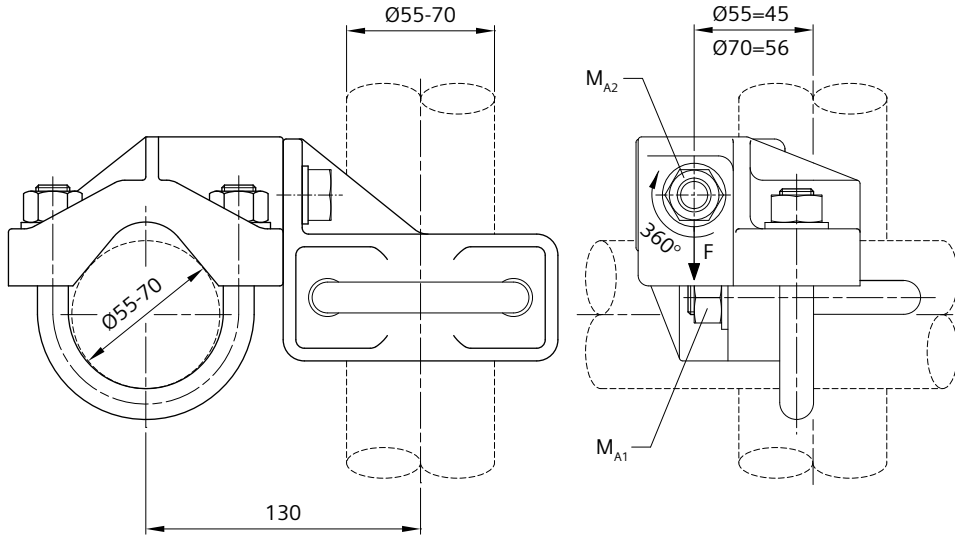


Order no.	8WL2097-1C
Designation	Twin bridle guiding device 55-60.3
Material	
Clamping covers	ctAl
Pulleys	Polyamide
Pulley holders	stlSt
Pins 13x45, 13x55	stlSt
Split pins 5x28	Cu
Bolts M12	stlSt
Nuts, washers	stlSt
for wires	35 to 70 mm ² 9 mm (8WL7097-0)
Weight	2.76 kg
Perm. operating load	1 kN
Min. failing load	3 kN
Tightening torque M_A	56 Nm

Pulley movably in the Z-axis of 0° to 40°.

Twin tube clamp 55-70

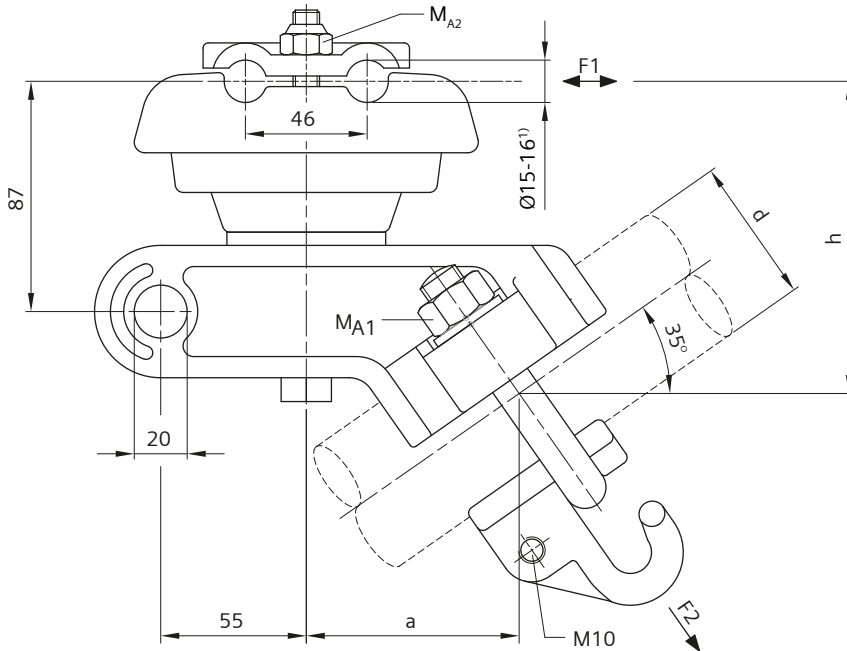
for connection of vertical registration tube d=55 to 70 mm at top or cantilever tube d=55 to 70 mm



Order no.	8WL2217-0
Designation	Twin tube clamp 55-70
Material	
Tube clamps	ctAl
U-bolts M16	stlSt
Bolt M16	stlSt
Nuts, washers	stlSt
Spring washer	stlSt
Weight	2.02 kg
Perm. operating load	6 kN
Min. failing load	18 kN
Tightening torque M_{A1}	70 Nm
Tightening torque M_{A2}	135 Nm

Catenary wire support clamp 42-70/16, insulated

adjustable at cantilever tube d=42 to 70 mm, for bronze and copper wires acc. to DIN 48201



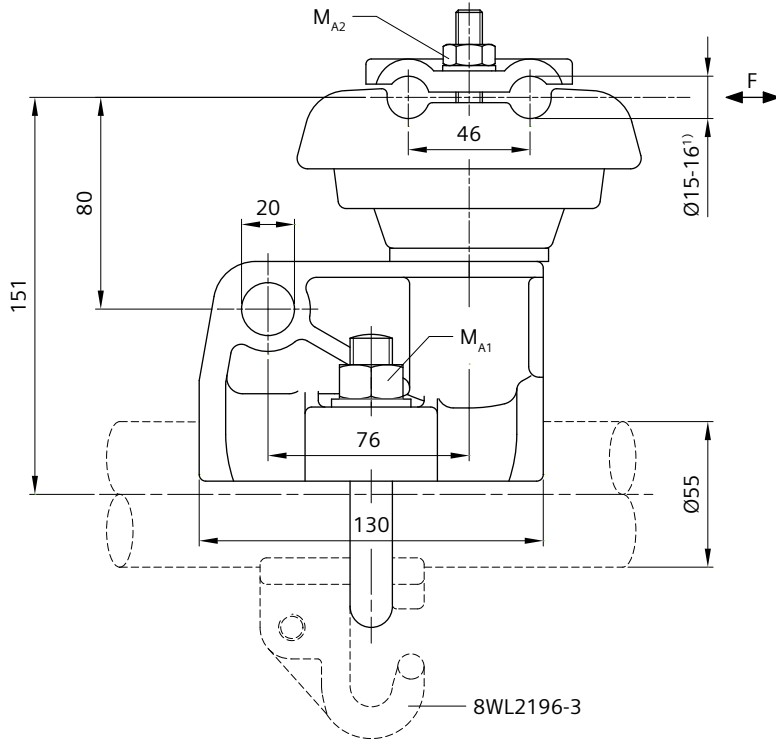
Order no.	8WL2071-4	8WL2072-4
Designation	Catenary wire support clamp 42-55/16	Catenary wire support clamp 70/16
Material		
Clamp body	Cast resin, brown	Cast resin, brown
Clamp cover	CuAl	CuAl
Clamp holder	ctAl	ctAl
Hook clip	ctAl	ctAl
U-bolt M16, stud bolts M10, nuts, washers	stlSt	stlSt
Weight	2.55 kg	2.65 kg
Perm. operating load (F1)	2.5 kN/wire	2.5 kN/wire
Min. failing load (F1)	8.0 kN/wire	8.0 kN/wire
Perm. operating load (F2)	1.5 kN	1.5 kN
Min. failing load (F2)	4.5 kN	4.5 kN
Tightening torque M_{A1}	70 Nm	70 Nm
Tightening torque M_{A2}	25 Nm	25 Nm
Nominal voltage	1.5 kV DC	1.5 kV DC
a	77/83 mm	87 mm
d	42/55 mm	70 mm
h	113/121 mm	126 mm

¹⁾ Diameter including protection sleeve

Protection sleeves must be ordered separately, see Chapter 02-02.

Catenary wire support clamp 55/16, insulated

adjustable at top tube d=55 mm, for bronze and copper wires acc. to DIN 48201



Order no.	8WL2037-3
Designation	Catenary wire support clamp 55/16
Material	
Clamp body	Cast resin, brown
Clamp cover	CuAl
Clamp holder	ctAl
U-bolt M16, stud bolts M10, nuts, washers	stlSt
Weight	2.56 kg
Perm. operating load	2.5 kN/wire
Min. failing load	8.0 kN/wire
Tightening torque M_{A1}	70 Nm
Tightening torque M_{A2}	25 Nm
Nominal voltage	1.5 kV DC

¹⁾ Diameter including protection sleeve

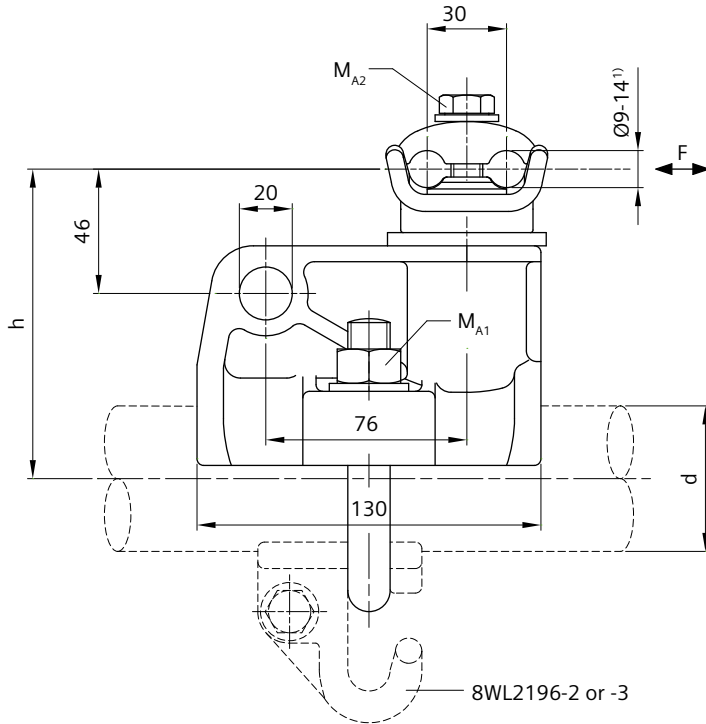
If necessary, the hook clip 8WL2196-3 must be ordered separately, see page 293.

Protection sleeves must be ordered separately, see Chapter 02-02.

Types for other tubes diameter on request.

Catenary wire support clamp 42-80/14

adjustable at top tube d=42 to 80 mm, for bronze and copper wires acc. to DIN 48201



Order no.	8WL2032-2	8WL2032-3	8WL2033-3
Designation	Catenary wire support clamp 42/14	Catenary wire support clamp 55/14	Catenary wire support clamp 70-80/14
Material			
Clamp body, clamp cover, Clamp holder	ctAl	ctAl	ctAl
U-bolt M16, bolt M12, nuts, washers	stlSt	stlSt	stlSt
Weight	1.73 kg	1.66 kg	1.75 kg
Perm. operating load	6 kN	6 kN	6 kN
Min. failing load	18 kN	18 kN	18 kN
Tightening torque M_{A1}	70 Nm	70 Nm	70 Nm
Tightening torque M_{A2}	56 Nm	56 Nm	56 Nm
d	42 mm	55 mm	70/80 mm
h	118 mm	117 mm	127.5/134.5 mm

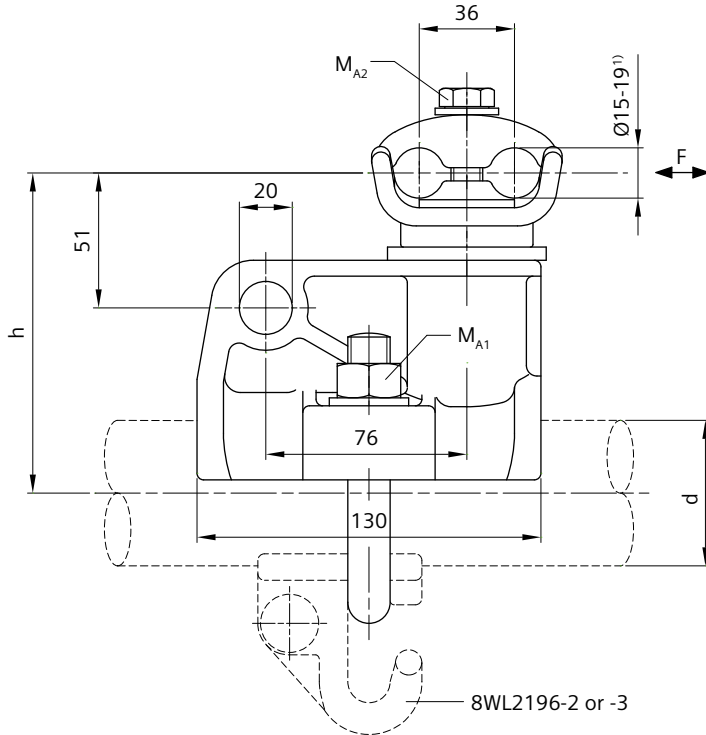
¹⁾ Diameter including protection sleeve

If necessary, the hook clip 8WL2196-2 or -3 must be ordered separately, see page 293.

Protection sleeves must be ordered separately, see Chapter 02-02.

Catenary wire support clamp 42-80/19

adjustable at top tube d=42 to 80 mm, for bronze and copper wires acc. to DIN 48201



Order no.	8WL2034-2	8WL2034-3	8WL2034-4
Designation	Catenary wire support clamp 42/19	Catenary wire support clamp 55/19	Catenary wire support clamp 70-80/19
Material			
Clamp body, clamp cover, Clamp holder	ctAl	ctAl	ctAl
U-bolt M16, bolt M12, nuts, washers	stlSt	stlSt	stlSt
Weight	1.89 kg	1.76 kg	1.80 kg
Perm. operating load	6 kN	6 kN	6 kN
Min. failing load	18 kN	18 kN	18 kN
Tightening torque M_{A1}	70 Nm	70 Nm	70 Nm
Tightening torque M_{A2}	56 Nm	56 Nm	56 Nm
d	42 mm	55 mm	70/80 mm
h	122 mm	121 mm	131.5/138.5 mm

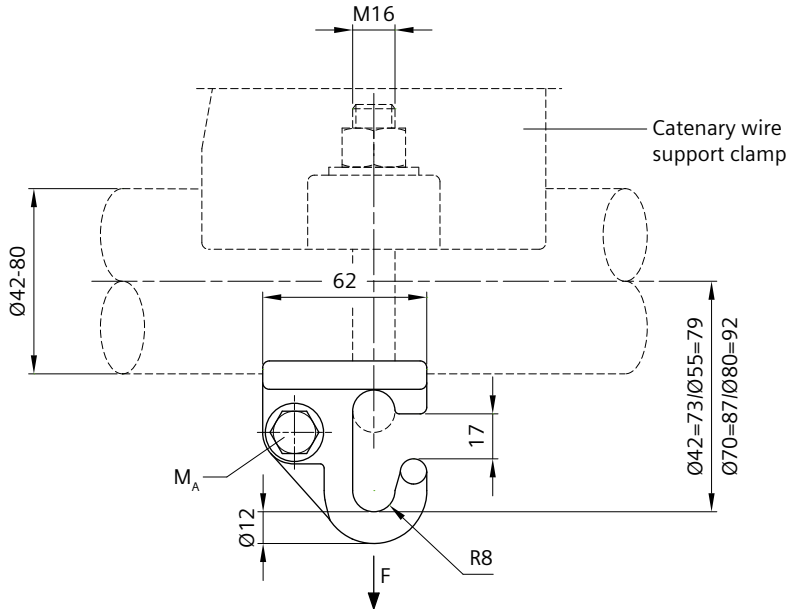
¹⁾ Diameter including protection sleeve

If necessary, the hook clip 8WL2196-2 or -3 must be ordered separately, see page 293.

Protection sleeves must be ordered separately, see Chapter 02-02.

Hook clip 42-80 for U-bolt M16

for dropper connection at catenary wire support clamps adjustable at top or cantilever tube $d=42$ to 80 mm, with connection for current connector

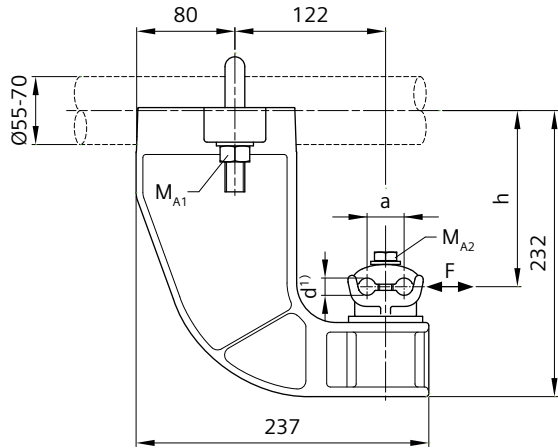


Order no.	8WL2196-2	8WL2196-3
Designation	Hook clip 42-80	Hook clip 42-80, without bolt and washer
Material		
Hook clip	ctAl	ctAl
Bolt M10	stlSt	-
Washer	stlSt	-
Weight	0.14 kg	0.11 kg
Perm. operating load	1.5 kN	1.5 kN
Min. failing load	4.5 kN	4.5 kN
Tightening torque M_A	32 Nm	-

Catenary wire support clamp must be ordered separately.

Catenary wire support clamp 55-70

adjustable at top tube d=55 to 70 mm, for cantilevers with low system height, for bronze and copper wires acc. to DIN 48201



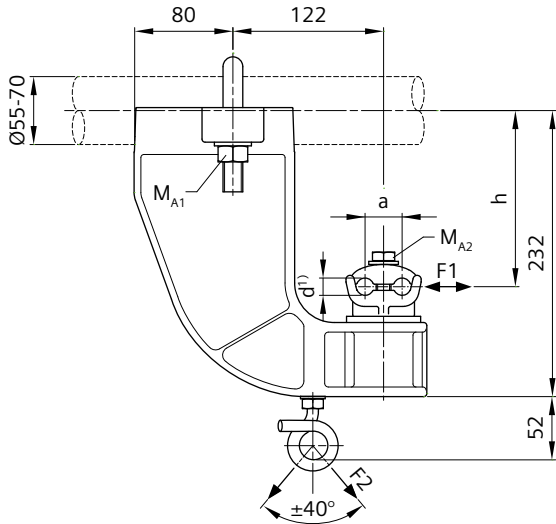
Order no.	8WL2027-0A	8WL2027-0B
Designation	Catenary wire support clamp 55-70/14	Catenary wire support clamp 55-70/19
Material		
Clamp body	ctAl	ctAl
Clamp cover	ctAl	ctAl
Clamp holder	ctAl	ctAl
U-bolt M16	stlSt	stlSt
Bolt M12	stlSt	stlSt
Nuts, washers	stlSt	stlSt
Weight	2.44 kg	2.54 kg
Perm. operating load	10 kN	10 kN
Min. failing load	30 kN	30 kN
Tightening torque M_{A1}	70 Nm	70 Nm
Tightening torque M_{A2}	56 Nm	56 Nm
a	30 mm	36 mm
d	9 - 14 mm ¹⁾	15 - 19 mm ¹⁾
h	141/153 mm	138/150 mm

¹⁾ Diameter including protection sleeve

Protection sleeves must be ordered separately, see Chapter 02-02.

Catenary wire support clamp 55-70 with hook

for dropper connection, adjustable at top tube d=55 to 70 mm, for cantilevers with low system height, for bronze and copper wires acc. to DIN 48201



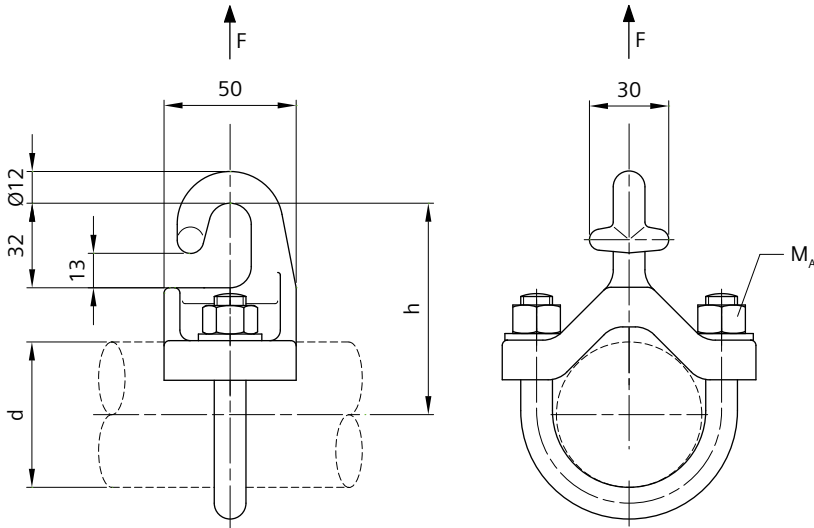
Order no.	8WL2027-0C	8WL2027-0D
Designation	Catenary wire support clamp 55-70/14	Catenary wire support clamp 55-70/19
Material		
Clamp body	ctAl	ctAl
Clamp cover	ctAl	ctAl
Clamp holder	ctAl	ctAl
U-bolt M16	stlSt	stlSt
Bolt M12	stlSt	stlSt
Ring shaped hook M10	stlSt	stlSt
Nuts, washers	stlSt	stlSt
Weight	2.55 kg	2.64 kg
Perm. operating load (F1)	10 kN	10 kN
Min. failing load (F1)	30 kN	30 kN
Perm. operating load (F2)	2 kN	2 kN
Min. failing load (F2)	6 kN	6 kN
Tightening torque M_{A1}	70 Nm	70 Nm
Tightening torque M_{A2}	56 Nm	56 Nm
a	30 mm	36 mm
d	9 - 14 mm ¹⁾	15 - 19 mm ¹⁾
h	141/153 mm	138/150 mm

¹⁾ Diameter including protection sleeve

Protection sleeves must be ordered separately, see Chapter 02-02.

Hook clip 42-55

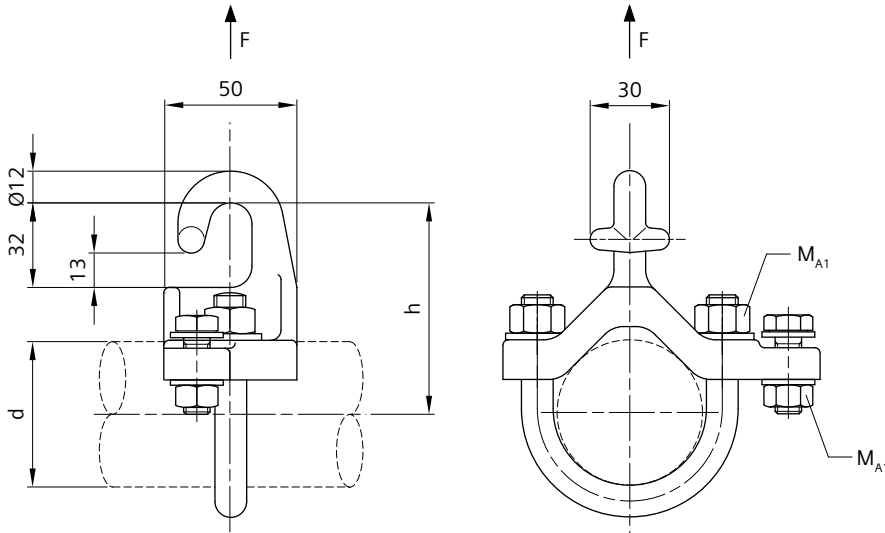
for dropper connection at registration tube d=42 or 55 mm



Order no.	8WL2148-5	8WL2148-6
Designation	Hook clip 42	Hook clip 55
Material		
Hook clip	ctAl	ctAl
U-bolt M12	stlSt	stlSt
Nuts, washers	stlSt	stlSt
Weight	0.33 kg	0.34 kg
Perm. operating load	1.5 kN	1.5 kN
Min. failing load	4.5 kN	4.5 kN
Tightening torque M_A	35 Nm	35 Nm
d	42 mm	55 mm
h	70 mm	80 mm

Hook clip 42-55

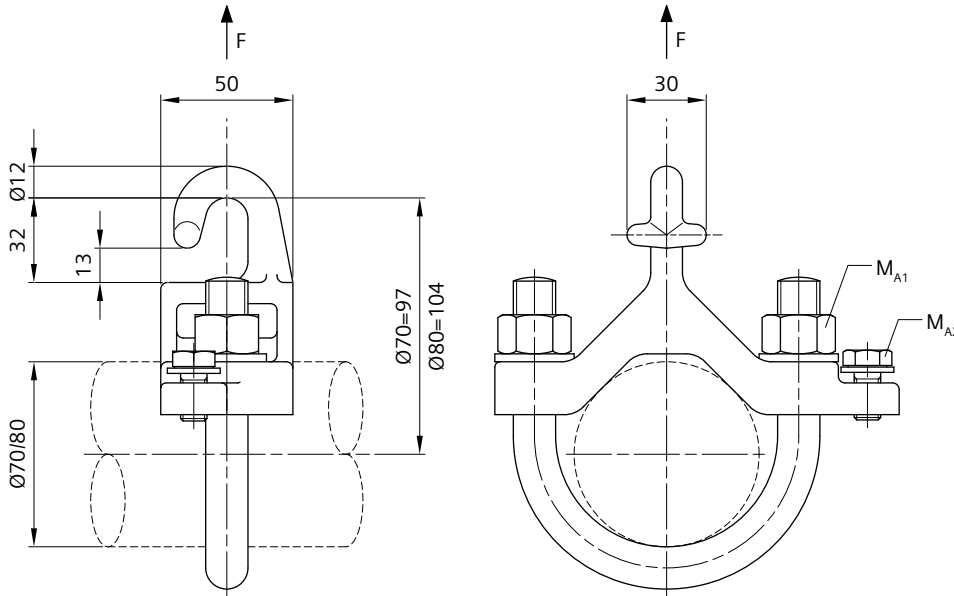
for dropper connection at registration tube d=42 or 55 mm, with connection for current connector



Order no.	8WL2148-7A	8WL2148-7B
Designation	Hook clip 42	Hook clip 55
Material		
Hook clip	ctAl	ctAl
U-bolt M12	stlSt	stlSt
Bolt M10	stlSt	stlSt
Nuts, washers	stlSt	stlSt
Spring washer	stlSt	stlSt
Weight	0.36 kg	0.38 kg
Perm. operating load	1.5 kN	1.5 kN
Min. failing load	4.5 kN	4.5 kN
Tightening torque M_{A1}	35 Nm	35 Nm
Tightening torque M_{A2}	32 Nm	32 Nm
d	42 mm	55 mm
h	70 mm	79.5 mm

Hook clip 70/80

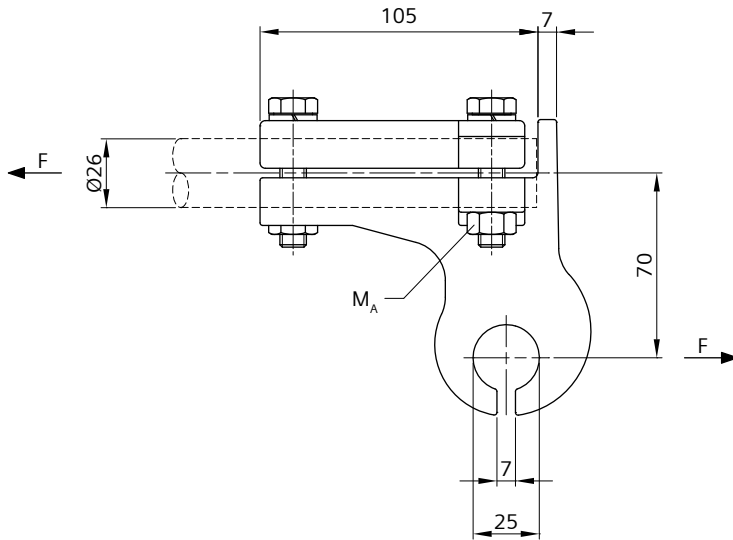
for dropper connection at registration tube d=70 or 80 mm, with connection for current connector



Order no.	8WL2148-7
Designation	Hook clip 70/80
Material	
Hook clip	ctAl
U-bolt M16	stlSt
Bolt M10	stlSt
Nuts, washers	stlSt
Weight	0.73 kg
Perm. operating load	1.5 kN
Min. failing load	4.5 kN
Tightening torque M_{A1}	70 Nm
Tightening torque M_{A2}	32 Nm

Hook end clamp 26

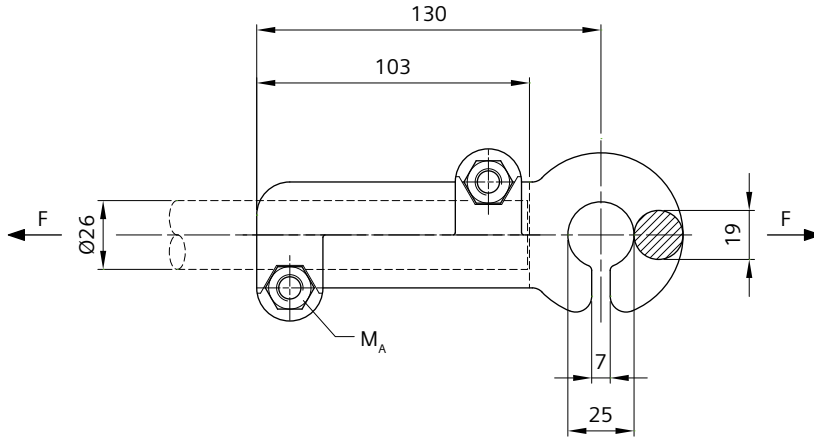
for aluminium tube or insulating rod $d=26$ mm



Order no.	8WL2101-4
Designation	Hook end clamp 26
Material	
Hook end clamp	ctAl
Clamp cover	ctAl
Bolts M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	0.44 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	32 Nm

Hook end fitting 26

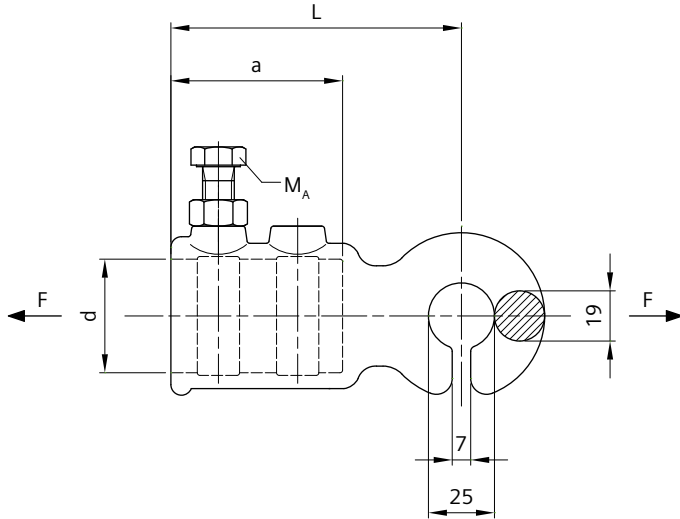
for aluminium tube or insulating rod $d=26$ mm



Order no.	8WL2102-7
Designation	Hook end fitting 26
Material	
Hook end fitting	ctAl
Clamp cover	ctAl
Bolts M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	0.44 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	32 Nm

Hook end fitting 42-55

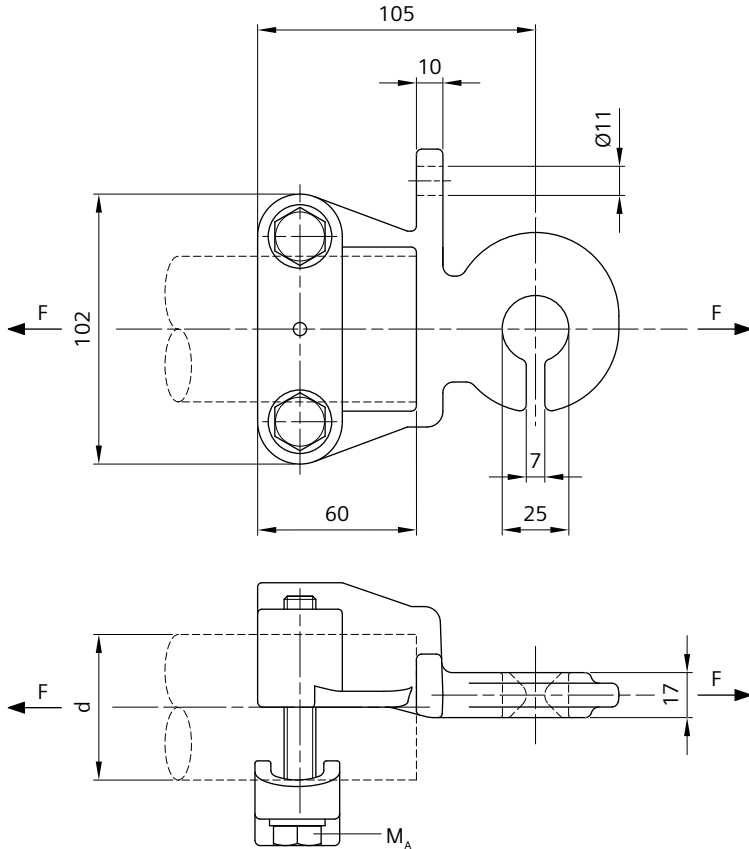
for registration tube connection at cantilever tube $d=42$ or 55 mm



Order no.	8WL2104-1	8WL2104-2
Designation	Hook end fitting 42	Hook end fitting 55
Material		
Hook end fitting	ctAl	ctAl
Cup-point screw M12	stlSt	stlSt
Nut	stlSt	stlSt
Weight	0.36 kg	0.52 kg
Perm. operating load	2.5 kN	2.5 kN
Min. failing load	7.5 kN	7.5 kN
Tightening torque M_A	50 Nm	50 Nm
a	65 mm	75 mm
d	43 mm	56 mm
L	110 mm	120 mm

Hook end fitting 42-55

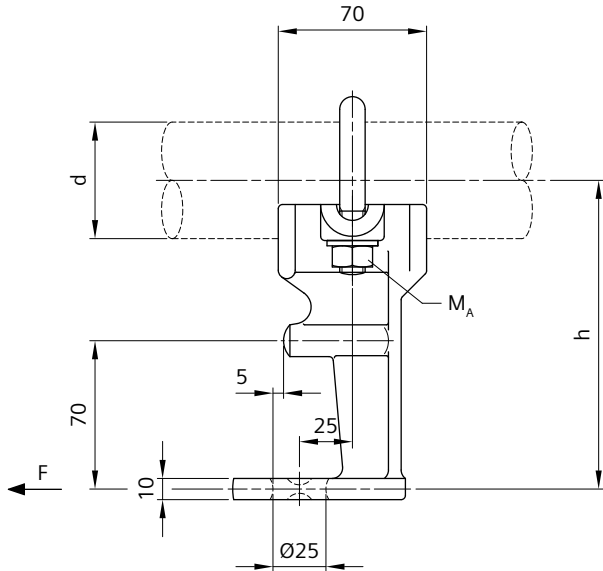
for registration tube connection at cantilever tube $d=42$ or 55 mm, for higher loads, with connection for current connector



Order no.	8WL2122-6D	8WL2122-6E
Designation	Hook end fitting 42	Hook end fitting 55
Material		
Hook end fitting	ctAl	ctAl
Clamp cover	ctAl	ctAl
Bolts M12	stlSt	stlSt
Spring washers	stlSt	stlSt
Weight	0.67 kg	0.70 kg
Perm. operating load	3.5 kN	3.5 kN
Min. failing load	10.5 kN	10.5 kN
Tightening torque M_A	56 Nm	56 Nm
d	42 mm	55 mm

Drop bracket 42-55 H=70

for steady arm connection at registration tube d=42 or 55 mm

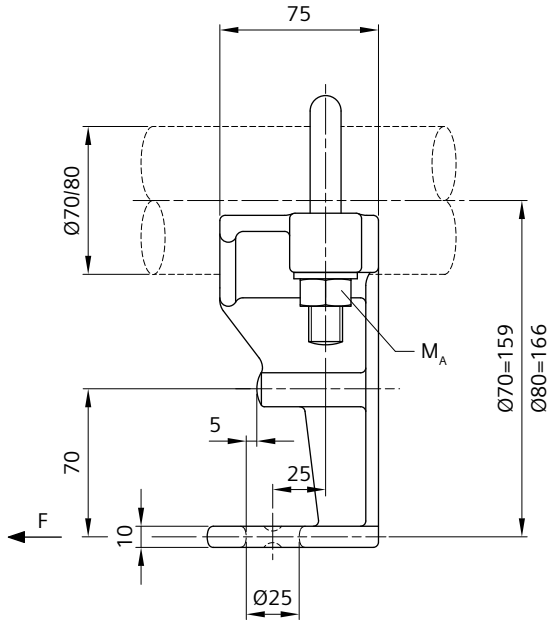


Order no.	8WL2118-1	8WL2118-2
Designation	Drop bracket 42	Drop bracket 55
Material		
Drop bracket	ctAl	ctAl
U-bolt M12	stlSt	stlSt
Nuts, washers	stlSt	stlSt
Weight	0.51 kg	0.53 kg
Perm. operating load	2.5 kN	2.5 kN
Min. failing load	7.5 kN	7.5 kN
Tightening torque M_A	35 Nm	35 Nm
d	42 mm	55 mm
h	136 mm	146 mm

For steady arms 8WL3501-, see page 315.

Drop bracket 70/80 H=70

for steady arm connection at registration tube d=70 and 80 mm

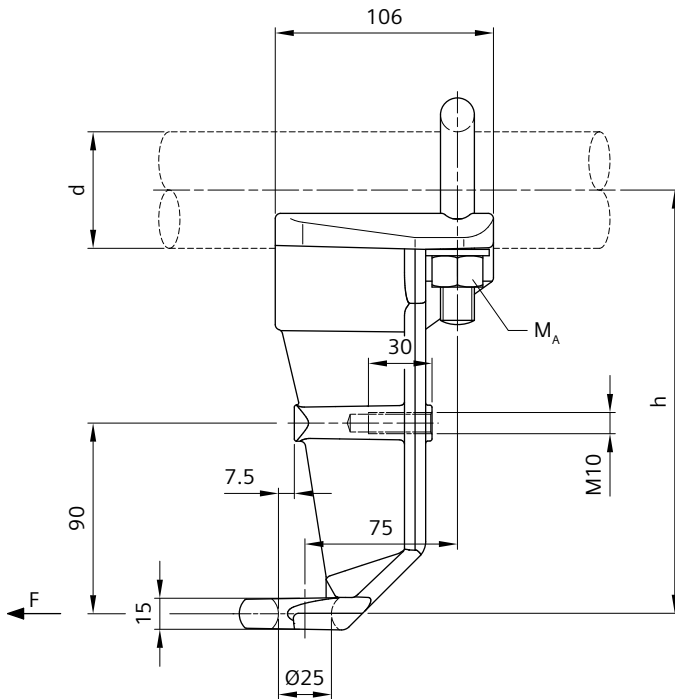


Order no.	8WL2118-2A
Designation	Drop bracket 70/80
Material	
Drop bracket	ctAl
U-bolt M16	stlSt
Nuts, washers	stlSt
Weight	0.94 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	70 Nm

For steady arms 8WL3501-, see page 315.

Drop bracket 42-55 H=90

for steady arm connection at registration tube d=42 or 55 mm, with connection for current connector

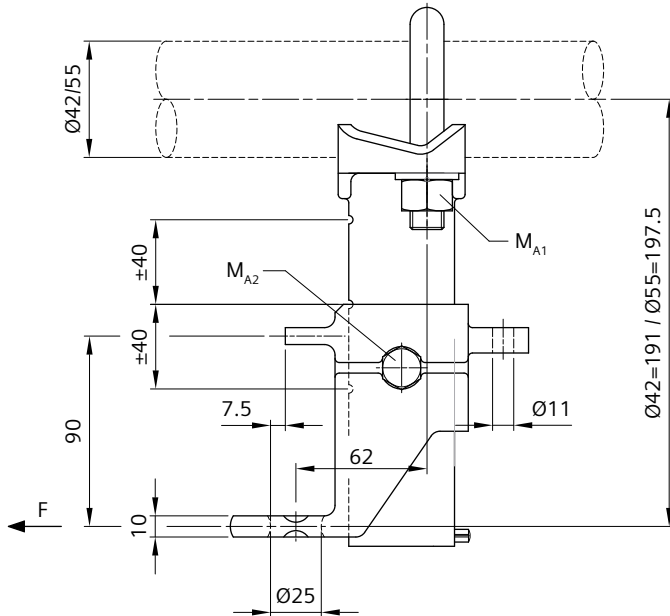


Order no.	8WL2118-4A	8WL2118-4B
Designation	Drop bracket 42	Drop bracket 55
Material		
Drop bracket	ctAl	ctAl
U-bolt M16	stlSt	stlSt
Nuts, washers	stlSt	stlSt
Weight	1.19 kg	1.24 kg
Perm. operating load	3.5 kN	3.5 kN
Min. failing load	10.5 kN	10.5 kN
Tightening torque M_A	70 Nm	70 Nm
d	42 mm	55 mm
h	191 mm	200 mm

For steady arms 8WL3500-, see page 317 to page 322.

Drop bracket 42-55 H=90, steplessly adjustable

for steady arm connection at registration tube d=42 or 55 mm, with connection for current connector

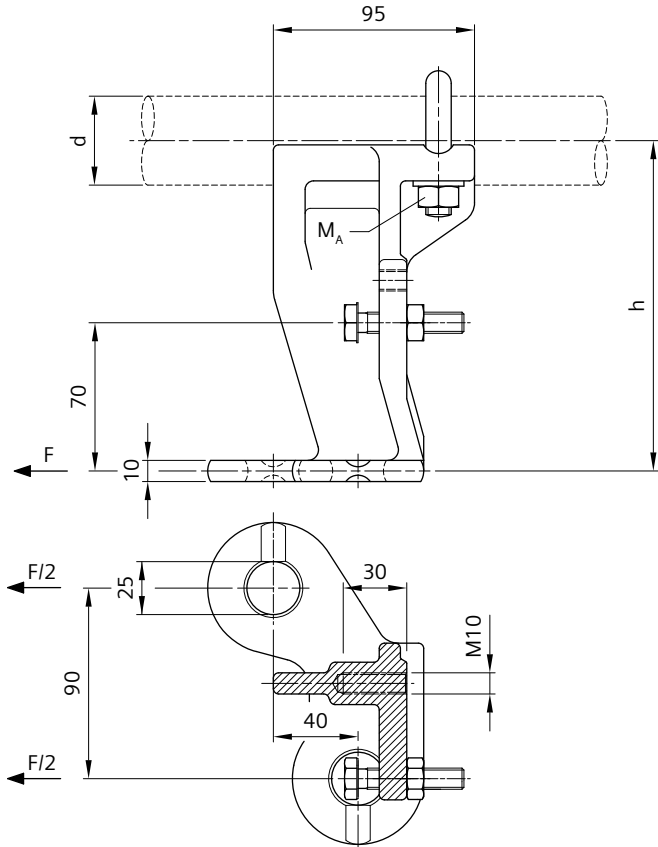


Order no.	8WL2120-3
Designation	Drop bracket 42-55
Material	
Drop bracket	ctAl
U-bolt M16	stlSt
Nuts, washers	stlSt
Cup-point screw M12	stlSt
Grooved pin	stlSt
Weight	0.99 kg
Perm. operating load	3.5 kN
Min. failing load	10.5 kN
Tightening torque M_{A1}	70 Nm
Tightening torque M_{A2}	50 Nm

For steady arms 8WL3500-, see page 317 to page 322.

Twin drop bracket 42-55 H=70/90

for steady arm connection at registration tube made of aluminium d=42 or 55 mm and steel d=42.4 mm (1 1/4"), with connection for current connector

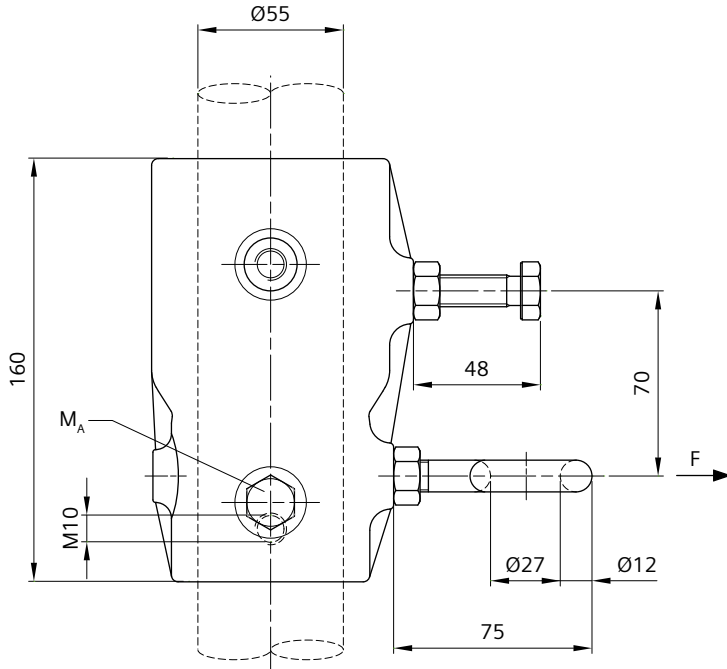


Order no.	8WL2116-7A	8WL2116-7B
Designation	Twin drop bracket 42/42.4	Twin drop bracket 55
Material		
Drop bracket	ctAl	ctAl
U-bolt M12	stlSt	stlSt
Bolt M10	stlSt	stlSt
Nuts, washers	stlSt	stlSt
Weight	1.12 kg	1.14 kg
Perm. operating load	5 kN	5 kN
Min. failing load	15 kN	15 kN
Tightening torque M_A	35 Nm	35 Nm
d	42/42.4 mm (1 1/4")	55 mm
h	156 mm	165 mm

For steady arms 8WL3501- (H=70 mm) or 8WL3500- (H=90 mm), see pages 315 and 317 and page 322.

Drop bracket 55 H=70

for steady arm connection at vertical tube d=55 mm, with connection for current connector

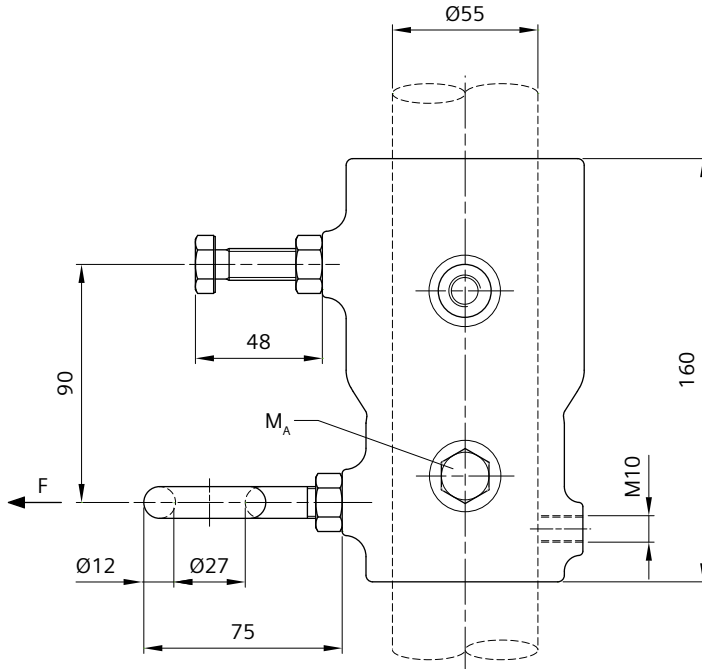


Order no.	8WL2128-5B
Designation	Drop bracket 55
Material	
Drop bracket	ctAl
Cup-point screw M12	stlSt
Eye bolt M12	stlSt
Bolt M12	stlSt
Nuts	stlSt
Weight	1.23 kg
Perm. operating load	4 kN
Min. failing load	12 kN
Tightening torque M_A	50 Nm

For steady arm 8WL3501-, see page 315.

Drop bracket 55 H=90

for steady arm connection at vertical tube d=55 mm, with connection for current connector

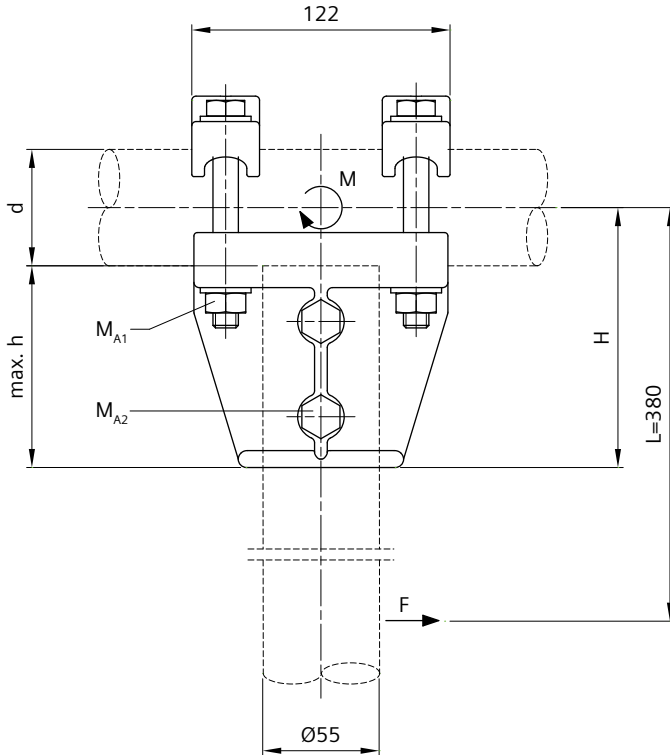


Order no.	8WL2128-5C
Designation	Drop bracket 55
Material	
Drop bracket	ctAl
Cup-point screw M12	stlSt
Eye bolt M12	stlSt
Bolt M12	stlSt
Nuts	stlSt
Weight	1.23 kg
Perm. operating load	4 kN
Min. failing load	12 kN
Tightening torque M_A	50 Nm

For steady arm 8WL3500-, see page 317 to page 322.

Stay tube holder 55/55-70

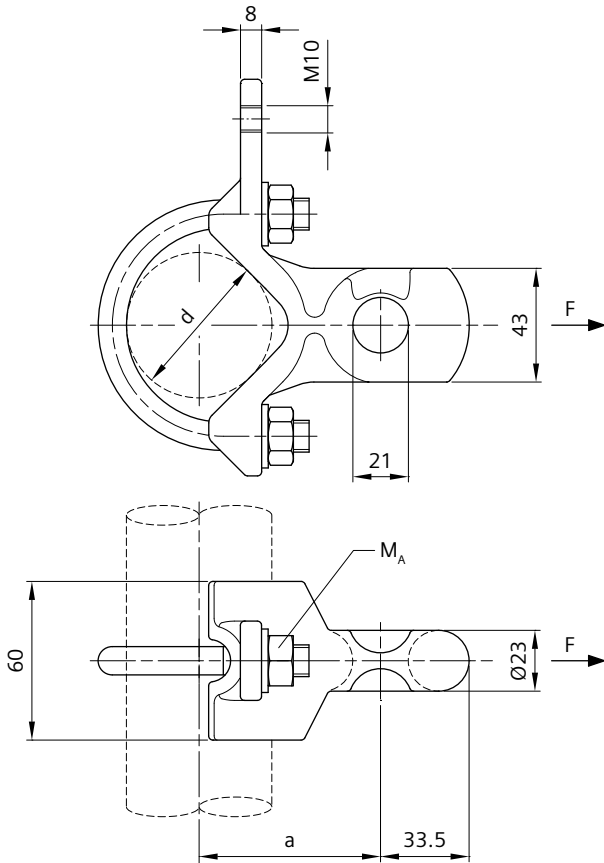
for connection of stay tube $d=55$ mm at registration tube $d=55$ or 70 mm



Order no.	8WL2244-0	8WL2244-1
Designation	Stay tube holder 55-55	Stay tube holder 55-70
Material		
Tube holder	ctAl	ctAl
Clamp cover	ctAl	ctAl
Bolts M12	stlSt	stlSt
Nuts, washers	stlSt	stlSt
Cup-point screws M12	stlSt	stlSt
Weight	1.65 kg	1.75 kg
Perm. operating load	4.7 kN	4.7 kN
Min. failing load	14.2 kN	14.2 kN
Max. operating moment M (F×L)	1.8 kNm	1.8 kNm
Tightening torque M_{A1}	56 Nm	56 Nm
Tightening torque M_{A2}	40 Nm	40 Nm
d	55 mm	70 mm
Max. h	95 mm	98 mm
H	123 mm	133 mm

Eye clamp for tube-type drop bracket 55-70

for steady arm connection at vertical tube $d=55$ or 70 mm, with connection for current connector

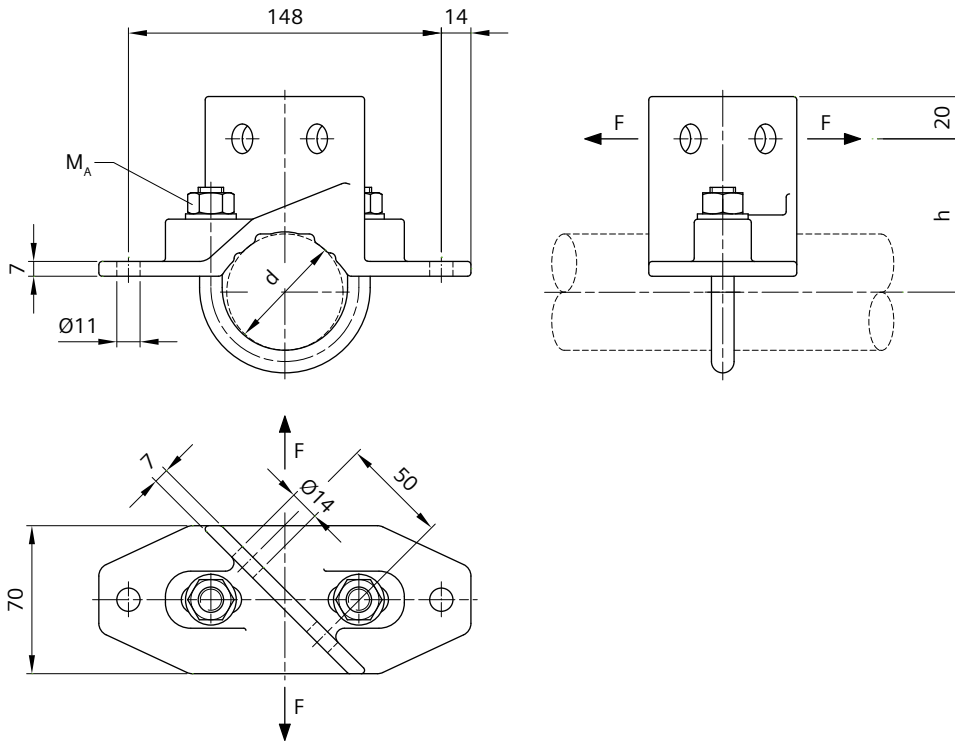


Order no.	8WL2114-1A	8WL2114-4A
Designation	Eye clamp 55	Eye clamp 70
Material		
Eye clamp	ctAl	ctAl
U-bolt M12	stlSt	stlSt
Nuts, washers	stlSt	stlSt
Weight	0.48 kg	0.45 kg
Perm. operating load	3.5 kN	3.5 kN
Min. failing load	10.5 kN	10.5 kN
Tightening torque M_A	35 Nm	35 Nm
a	68.6 mm	79.2 mm
d	55 mm	70 mm

For steady arms 8WL3500- and 8WL3501-, see page 317 to page 322 and page 315.

Tube connecting fitting 42-70

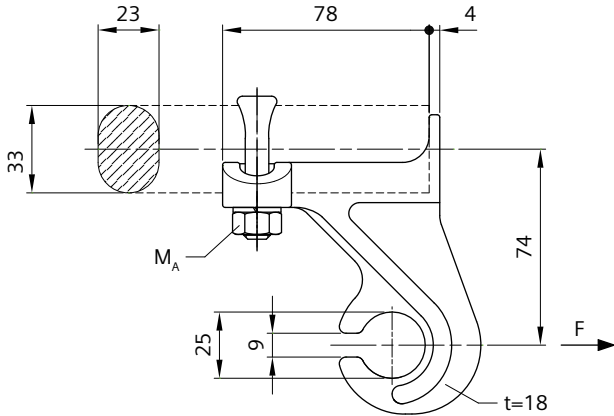
for current carrying cantilevers, for connection of current connector at tube $d=42$ to 70 mm



Order no.	8WL4652-0	8WL4652-1	8WL4652-2
Designation	Tube connecting fitting 42	Tube connecting fitting 55	Tube connecting fitting 70
Material			
Clamping body	ctAl	ctAl	ctAl
U-bolt M12	stlSt	stlSt	stlSt
Nuts, washers	stlSt	stlSt	stlSt
Weight	0.55 kg	0.58 kg	0.61 kg
Perm. operating load	1 kN	1 kN	1 kN
Min. failing load	3 kN	3 kN	3 kN
Tightening torque M_A	35 Nm	35 Nm	35 Nm
Perm. permanent current at 50 K temperature rise	420 A	420 A	420 A
Rated short-time current	54.9 kA	54.9 kA	54.9 kA
Rated short-time duration	60 ms	60 ms	60 ms
d	42 mm	55 mm	70 mm
h	65 mm	73 mm	83 mm

Hook end clamp for GRP rod

for steady arms made of GRP rod 23x33 mm, for connection at drop brackets made of aluminium

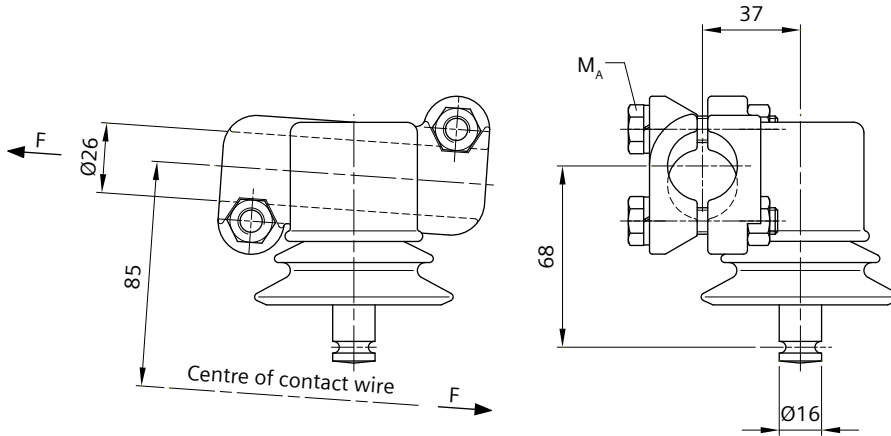


Order no.	8WL2833-4B
Designation	Hook end clamp for GRP rod 23x33
Material	
Hook end clamp	ctAl
U-bolt M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	0.22 kg
Perm. operating load	2.5 kN
Min. failing load	8.0 kN
Tightening torque M_A	40 Nm

Swivel clip holder 8WL2833-1 for GRP rod 23x33 mm see page 225.

Swivel clip holder 26, insulated

for aluminium and steel tube or insulating rod d=26 mm

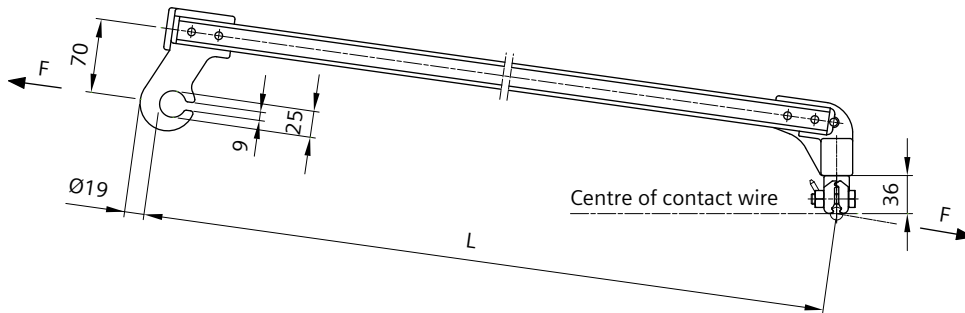


Order no.	8WL2012-4
Designation	Swivel clip holder 26, insulated
Material	
Swivel clip holder	ctAl
Clamp cover	ctAl
Insulator body	Cast resin, brown
Grooved stud	stlSt
Bolts M10	stlSt
Nuts	stlSt
Spring Washers	stlSt
Weight	0.74 kg
Perm. operating load	2.5 kN
Min. failing load	8.0 kN
Tightening torque M_A	32 Nm
Nominal voltage	1.5 kV DC
Creepage distance	73 mm

Contact wire clips see Chapter 02-09.

Steady arm made of aluminium H=70

for contact wires acc. to EN 50149, with connection for windstay



Order no.	8WL3501-5A	8WL3501-5B	8WL3501-5D	8WL3501-5E
Designation	Steady arm L=650	Steady arm L=875	Steady arm L=1050	Steady arm L=1200
Material				
Hook end clamp	ctAl	ctAl	ctAl	ctAl
U-section	Al	Al	Al	Al
Clip holder	ctAl	ctAl	ctAl	ctAl
Grooved stud	CuNiSi	CuNiSi	CuNiSi	CuNiSi
Round head rivets	Al	Al	Al	Al
Contact wire clip 16R	CuAl	CuAl	CuAl	CuAl
U-pin	Cu	Cu	Cu	Cu
for contact wires	AC-80 to 150	AC-80 to 150	AC-80 to 150	AC-80 to 150
Weight	0.96 kg	1.07 kg	1.15 kg	1.25 kg
Perm. operating load	2.5 kN	2.5 kN	2,5 kN	2.5 kN
Min. failing load	7.5 kN	7.5 kN	7.5 kN	7.5 kN
L	650 mm	875 mm	1050 mm	1200 mm

Can also be supplied without contact wire clip, Order no:

8WL3501-1A for L=650 mm

8WL3501-1B for L=875 mm

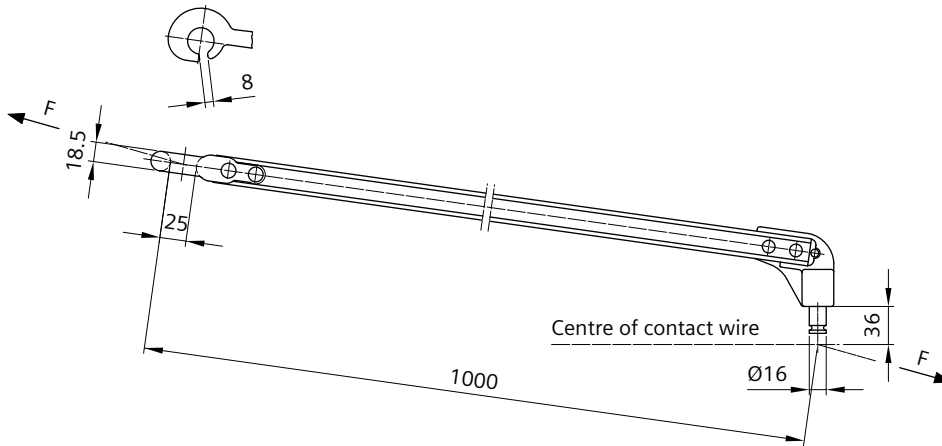
8WL3501-1C for L=1050 mm

8WL3501-1D for L=1200 mm

Other lengths on request.

Steady arm made of aluminium

hook end clamp straight, without contact wire clip, with connection for windstay



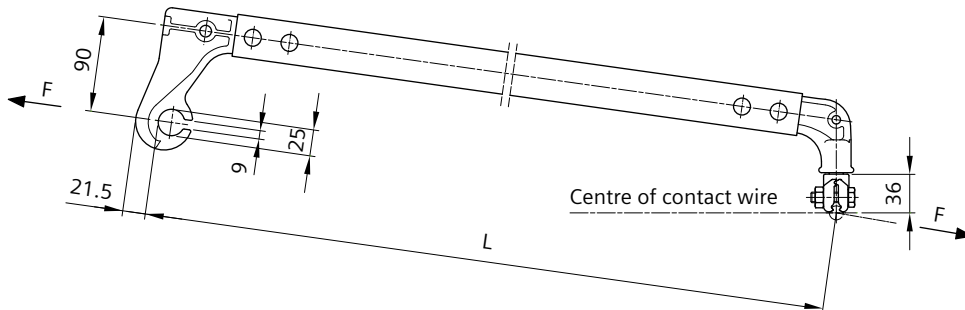
Order no.	8WL3501-2A
Designation	Steady arm
Material	
Hook end clamp	ctAl
U-section	Al
Clip holder	Al
Grooved stud 16R	CuNiSi
Round head rivets	Al
Weight	0.83 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN

Contact wire clip 16R must be ordered separately, see page 511.

Can also supplied in other lengths.

Steady arm made of aluminium H=90

for contact wires acc. to EN 50149, with connection for windstay and current connector



Part 1

Order no.	8WL3500-3A	8WL3500-3B	8WL3500-3C	8WL3500-3D	8WL3500-3E
Designation	Steady arm L=900	Steady arm L=1000	Steady arm L=1050	Steady arm L=1100	Steady arm L=1150
Material					
Hook end clamp, clip holder	ctAl	ctAl	ctAl	ctAl	ctAl
Tube rectangular, round head rivets	Al	Al	Al	Al	Al
Threaded stud	CuNiSi	CuNiSi	CuNiSi	CuNiSi	CuNiSi
Contact wire clip M16	CuAl	CuAl	CuAl	CuAl	CuAl
for contact wires	AC-80 to 150	AC-80 to 150	AC-80 to 150	AC-80 to 150	AC-80 to 150
Weight	1.41 kg	1.48 kg	1.52 kg	1.56 kg	1.60 kg
Perm. operating load	3 kN	3 kN	3 kN	3 kN	3 kN
Min. failing load	9 kN	9 kN	9 kN	9 kN	9 kN
L	900 mm	1000 mm	1050 mm	1100 mm	1150 mm

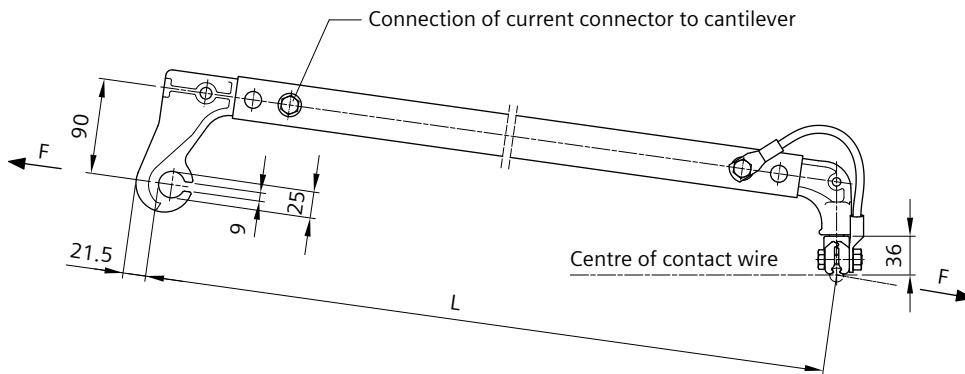
Part 2

Order no.	8WL3500-3F	8WL3500-3G	8WL3500-3H	8WL3500-3K
Designation	Steady arm L=1250	Steady arm L=1300	Steady arm L=1350	Steady arm L=1450
Material				
Hook end clamp, clip holder	ctAl	ctAl	ctAl	ctAl
Tube rectangular, round head rivets	Al	Al	Al	Al
Threaded stud	CuNiSi	CuNiSi	CuNiSi	CuNiSi
Contact wire clip M16	CuAl	CuAl	CuAl	CuAl
for contact wires	AC-80 to 150	AC-80 to 150	AC-80 to 150	AC-80 to 150
Weight	1.67 kg	1.71 kg	1.75 kg	1.82 kg
Perm. operating load	3 kN	3 kN	3 kN	3 kN
Min. failing load	9 kN	9 kN	9 kN	9 kN
L	1250 mm	1300 mm	1350 mm	1450 mm

Other lengths or types for BC/BF contact wires on request.

Steady arm made of aluminium H=90, current carrying

for current carrying cantilevers, for contact wires acc. to EN 50149

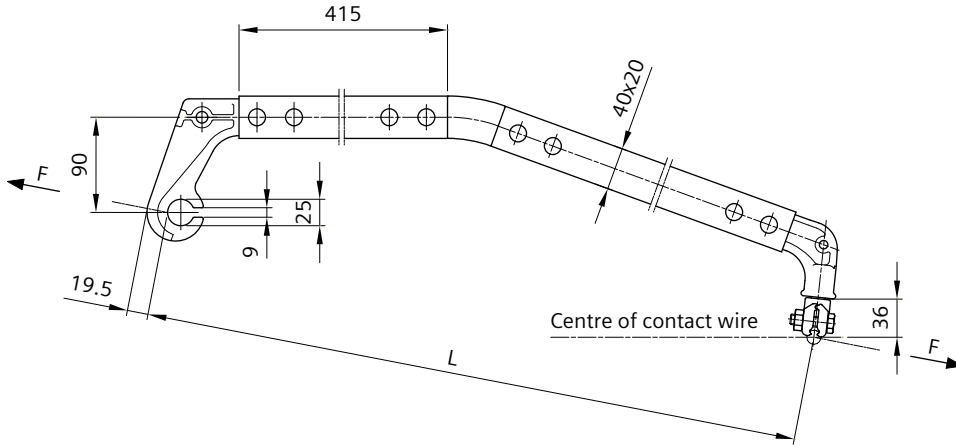


Order no.	8WL3500-3BS	8WL3500-3ES	8WL3500-3GS
Designation	Steady arm L=1000	Steady arm L=1150	Steady arm L=1300
Material			
Hook end clamp	ctAl	ctAl	ctAl
Tube rectangular	Al	Al	Al
Clip holder	ctAl	ctAl	ctAl
Threaded stud	CuNiSi	CuNiSi	CuNiSi
Round head rivets	Al	Al	Al
Contact wire clip M16	CuAl	CuAl	CuAl
Bolts, nuts	stlSt	stlSt	stlSt
Washers	stlSt, Alcu	stlSt, Alcu	stlSt, Alcu
Cable lugs	Cu-ETP	Cu-ETP	Cu-ETP
Wire 25x133	Cu-ETP	Cu-ETP	Cu-ETP
for contact wires	AC-80 to 150	AC-80 to 150	AC-80 to 150
Weight	1.73 kg	1.84 kg	1.95 kg
Perm. operating load	3 kN	3 kN	3 kN
Min. failing load	9 kN	9 kN	9 kN
Perm. permanent current at 50 K temperature rise	600 A	600 A	600 A
Rated short-time current	44.2 kA	44.2 kA	44.2 kA
Rated short-time duration	60 ms	60 ms	60 ms
L	1000 mm	1150 mm	1300 mm

Other lengths or types for BC/BF contact wires on request.

Steady arm made of aluminium H=90, angled

for contact wires acc. to EN 50149, with connection for windstay and current connector



Part 1

Order no.	8WL3500-8L	8WL3500-8M	8WL3500-8N	8WL3500-8O	8WL3500-8P
Designation	Steady arm L=1000	Steady arm L=1050	Steady arm L=1150	Steady arm L=1250	Steady arm L=1300
Material					
Hook end clamp	ctAl	ctAl	ctAl	ctAl	ctAl
Angle bar	Al	Al	Al	Al	Al
Tube rectangular	Al	Al	Al	Al	Al
Clip holder	ctAl	ctAl	ctAl	ctAl	ctAl
Threaded stud	CuNiSi	CuNiSi	CuNiSi	CuNiSi	CuNiSi
Round head rivets	Al	Al	Al	Al	Al
Contact wire clip M16	CuAl	CuAl	CuAl	CuAl	CuAl
for contact wires	AC-80 to 150	AC-80 to 150	AC-80 to 150	AC-80 to 150	AC-80 to 150
Weight	1.76 kg	1.79 kg		1.87 kg	1.95 kg
Perm. operating load	3 kN	3 kN	3 kN	3 kN	3 kN
Min. failing load	9 kN	9 kN	9 kN	9 kN	9 kN
L	1000 mm	1050 mm	1150 mm	1250 mm	1300 mm

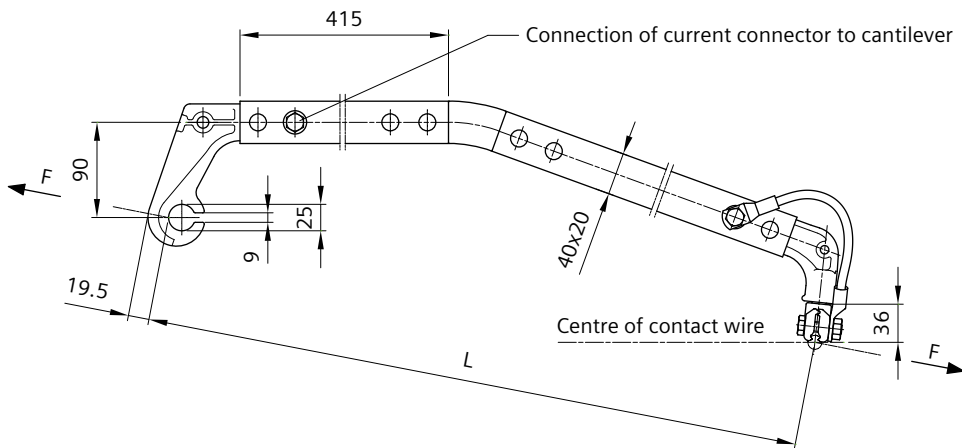
Part 2

Order no.	8WL3500-8T	8WL3500-8U
Designation	Steady arm L=1350	Steady arm L=1450
Material		
Hook end clamp	ctAl	ctAl
Angle bar	Al	Al
Tube rectangular	Al	Al
Clip holder	ctAl	ctAl
Threaded stud	CuNiSi	CuNiSi
Round head rivets	Al	Al
Contact wire clip M16	CuAl	CuAl
for contact wires	AC-80 to 150	AC-80 to 150
Weight	1.98 kg	2.02 kg
Perm. operating load	3 kN	3 kN
Min. failing load	9 kN	9 kN
L	1350 mm	1450 mm

Other lengths and types for BC/BF contact wires on request.

Steady arm made of aluminium H=90, angled, current carrying

for current carrying cantilevers, for contact wires acc. to EN 50149

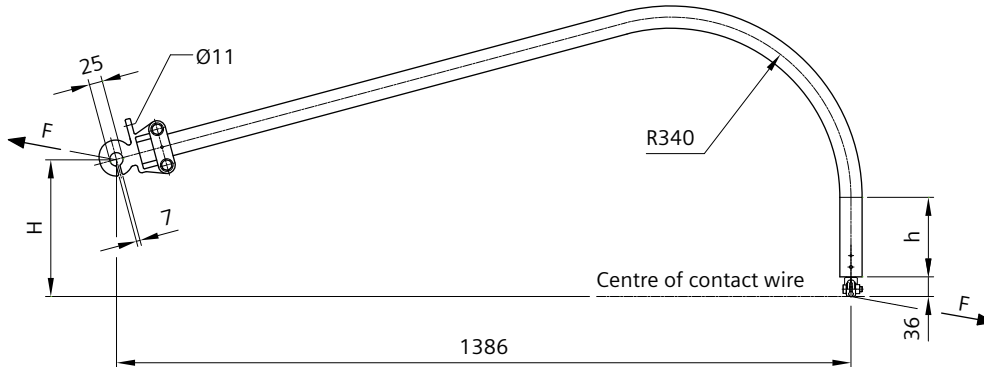


Order no.	8WL3500-8LS	8WL3500-8NS	8WL3500-8PS
Designation	Steady arm L=1000	Steady arm L=1150	Steady arm L=1300
Material			
Hook end clamp	ctAl	ctAl	ctAl
Tube rectangular	Al	Al	Al
Clip holder	ctAl	ctAl	ctAl
Threaded stud	CuNiSi	CuNiSi	CuNiSi
Round head rivets	Al	Al	Al
Contact wire clip M16	CuAl	CuAl	CuAl
Bolts, nuts	stlSt	stlSt	stlSt
Washers	stlSt, Alcu	stlSt, Alcu	stlSt, Alcu
Cable lugs	Cu-ETP	Cu-ETP	Cu-ETP
Wire 25x133	Cu-ETP	Cu-ETP	Cu-ETP
for contact wires	AC-80 to 150	AC-80 to 150	AC-80 to 150
Weight	2.00 kg	2.12 kg	2.23 kg
Perm. operating load	3 kN	3 kN	3 kN
Min. failing load	9 kN	9 kN	9 kN
Perm. permanent current at 50 K temperature rise	600 A	600 A	600 A
Rated short-time current	44.2 kA	44.2 kA	44.2 kA
Rated short-time duration	60 ms	60 ms	60 ms
L	1000 mm	1150 mm	1350 mm

Other lengths and types for BC/BF contact wires on request.

Steady arm made of aluminium, curved

for contact wires acc. to EN 50149, with connection for current connector

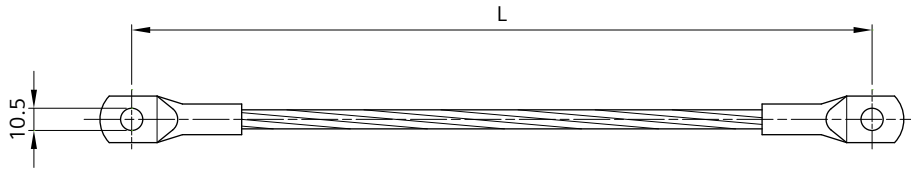


Order no.	8WL3508-7	8WL3508-7B	8WL3508-8
Designation	Steady arm ¹⁾	Steady arm ¹⁾	Steady arm
Material			
Hook end fitting	ctAl	ctAl	ctAl
Tube 42x4	Al	Al	Al
Threaded stud	CuNiSi	CuNiSi	CuNiSi
Contact wire clip M16	CuAl	CuAl	CuAl
for contact wires	AC-80 to 150	BC/BF-100 to 150	AC-80 to 150
Weight	2.97 kg	3.32 kg	2.68 kg
Perm. operating load	1.5 kN	1.5 kN	2.5 kN
Min. failing load	4.5 kN	4.5 kN	7.5 kN
h	150 mm	150 mm	60 mm
H	266 mm	266 mm	258 mm

¹⁾ for high-speed routes

Additional electrical connector

for steady arm with connection for current connector

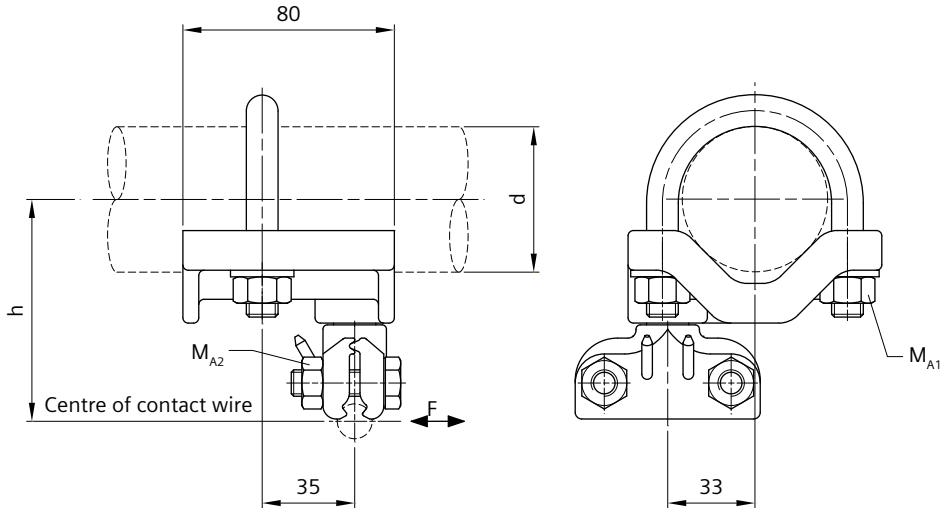


Order no.	8WL3503-8A	8WL3503-8B
Designation	Additional electrical connector	Additional electrical connector
Material		
Cable lugs	Cu-ETP	Cu-ETP
Wire 35x133	Cu-ETP	Cu-ETP
Weight	0.19 kg	0.23 kg
L	350 mm	450 mm

Other lengths on request.

Clamp holder for contact wire

for contact wires acc. to EN 50149

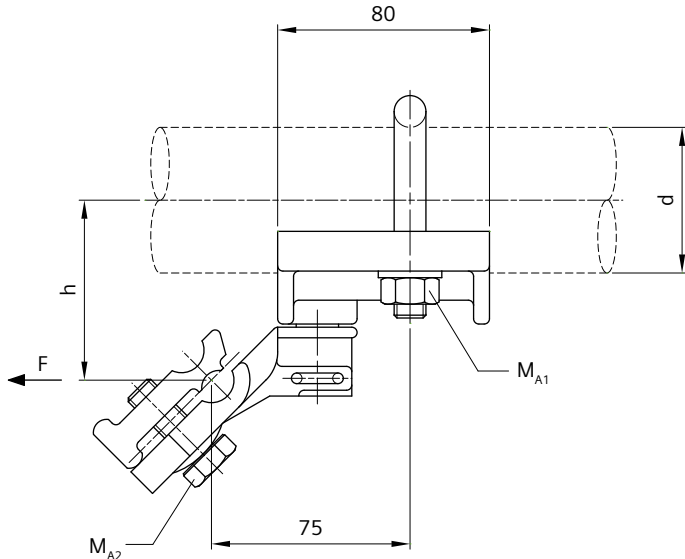


Order no.	8WL3508-4	8WL3508-5
Designation	Clamp holder 42	Clamp holder 55
Material		
Clamp holder	ctAl	ctAl
U-bolt M12	stlSt	stlSt
Nuts, washers	stlSt	stlSt
Contact wire clip 16R	CuAl	CuAl
for contact wires	AC-80 to 150	AC-80 to 150
Weight	0.76 kg	0.77 kg
Perm. operating load	3.5 kN	3.5 kN
Min. failing load	10.5 kN	10.5 kN
Tightening torque M_{A1}	35 Nm	35 Nm
Tightening torque M_{A2}	32 Nm	32 Nm
d	42 mm	55 mm
h	75 mm	84 mm

Types for BC/BF contact wires on request.

Clamp holder for wire

for wire fixing at aluminium tubes $d=42$ or 55 mm without the vertical load capacity, for wires acc. to DIN 48201



Order no.	8WL4524-1A	8WL4524-1B
Designation	Clamp holder 42	Clamp holder 55
Material		
Clamp holder	ctAl	ctAl
Pull-off clamp	CuAl	CuAl
U-bolt M12	stlSt	stlSt
Bolt M12	stlSt	stlSt
Nuts, washers	stlSt	stlSt
U-pin	Cu	Cu
for wires	50 to 150 mm ²	50 to 150 mm ²
Weight	0.93 kg	0.95 kg
Perm. operating load	2.5 kN	2.5 kN
Min. failing load	7.5 kN	7.5 kN
Tightening torque M_{A1}	35 Nm	35 Nm
Tightening torque M_{A2}	56 Nm	56 Nm
d	42 mm	55 mm
h	59 mm	68 mm

The pull-off clamp description corresponds with the delivery state.
The clamp cover must be turned for 120 and 150 mm² wires.

Protection sleeves must be ordered separately, see Chapter 02-02:

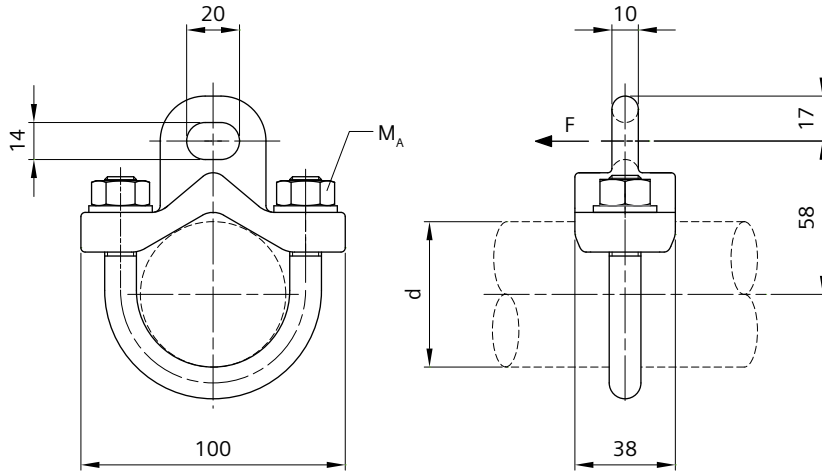
8WL1602-0 for wire 50 mm²,

8WL1603-2 for wire 70 mm²,

8WL1606-0 for wire 120 mm²

Eye clamp 42-55 for windstay

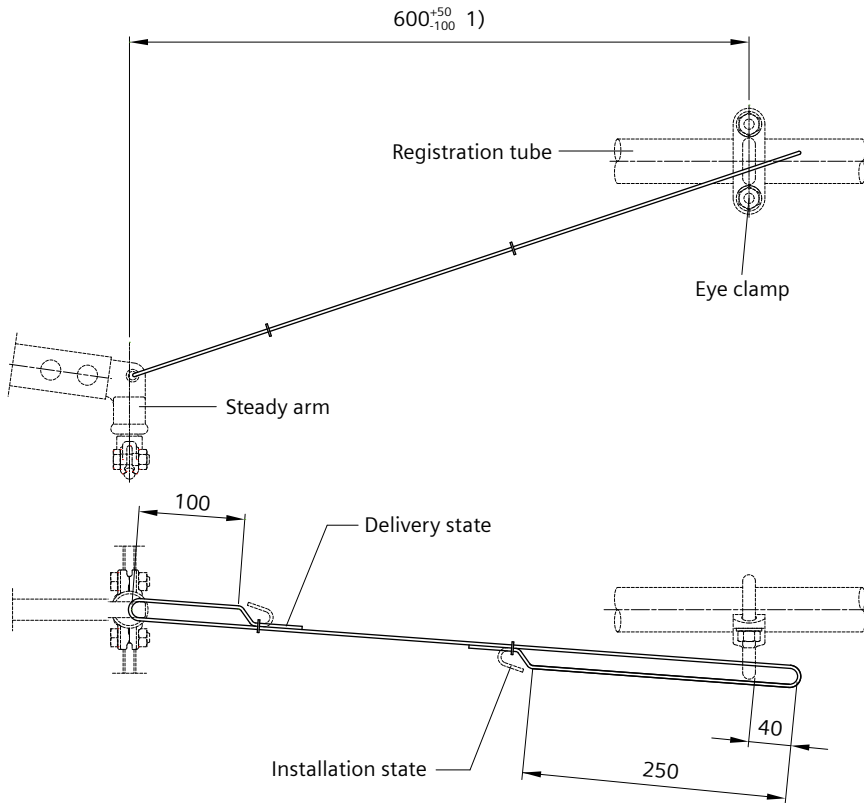
for aluminium tubes d=42 to 55 mm



Order no.	8WL2112-5G	8WL2112-5H
Designation	Eye clamp 42 for windstay	Eye clamp 55 for windstay
Material		
Eye clamp	ctAl	ctAl
U-bolt M12	stlSt	stlSt
Nuts, washers	stlSt	stlSt
Weight	0.26 kg	0.28 kg
Perm. operating load	1.75 kN	1.75 kN
Min. failing load	5.25 kN	5.25 kN
Tightening torque M_A	35 Nm	35 Nm
d	42 mm	55 mm

Windstay for steady arm

for steady arm 8WL3500- or 8WL3501- at registration tube



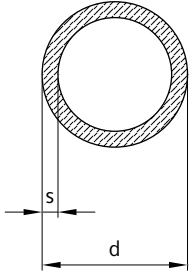
Order no.	8WL2112-8B
Designation	Windstay for steady arm
Material	
Wire d=3 mm	stlSt
Washers	stlSt
Weight	0.15 kg

Eye clamp must be installed always in the direction of the tension wheel assembly.

¹⁾ Applies to straight registration tube. Exact distance has to be defined project-specifically.

Aluminium tube

for cantilevers, tensioning weight guidance and operating linkage



Order no.	8WL2161-0	8WL2165-0	8WL2167-0	8WL2170-0	8WL2173-0
Designation	Aluminium tube 26x3.5	Aluminium tube 42x4.0	Aluminium tube 55x6.0	Aluminium tube 70x 6.0	Aluminium tube 80x 6.0
Material	EN AW-ALSi1MgMn ¹⁾	EN AW-ALSi1MgMn ¹⁾	EN AW-ALSi1MgMn ¹⁾	EN AW-ALSi1MgMn ¹⁾	EN AW-ALSi1MgMn ¹⁾
Weight	0.67 kg/m	1.29 kg/m	2.50 kg/m	3.26 kg/m	3.79 kg/m
Max. delivery length	8.0 m	8.0 m	8.0 m	8.0 m	8.0 m
Tensile strength R_m (at 20 °C)	310 N/mm ²	310 N/mm ²	310 N/mm ²	310 N/mm ²	310 N/mm ²
Proof strength R_{p0.2} (at 20 °C)	250 N/mm ²	250 N/mm ²	260 N/mm ²	260 N/mm ²	260 N/mm ²
Elastic modulus (at 20 °C)	70000 N/mm ²	70000 N/mm ²	70000 N/mm ²	70000 N/mm ²	70000 N/mm ²
d	26 mm	42 mm	55 mm	70 mm	80 mm
s	3.5 mm	4.0 mm	6.0 mm	6.0 mm	6.0 mm

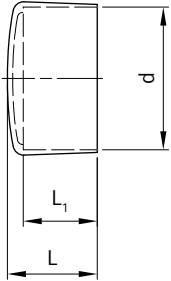
¹⁾ acc.to EN 755-2, temper T6 acc. to EN 515

Other lengths on request.

End caps see page 330.

End cap

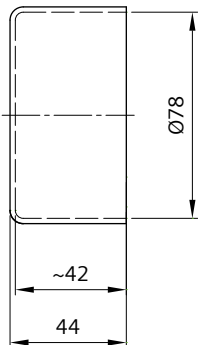
for tubes made of aluminium and steel $d=26$ to 70 mm or GRP $d=26$ and 55 mm



Order no.	8WL2184-0	8WL2184-2	8WL2184-7	8WL2184-3	8WL2184-4
Designation	End cap 26	End cap 38	End cap 42/42.4 (1 1/4")	End cap 55	End cap 70
Material	Plastic-soft, black	Plastic-soft, black	Plastic-soft, black	Plastic-soft, black	Plastic-soft, black
Weight	0.50 kg/100 pcs.	1.30 kg/100 pcs.	1.30 kg/100 pcs.	1.80 kg/100 pcs.	3.30 kg/100 pcs.
d	26.0 mm	37.5 mm	41.0 mm	54.0 mm	69.0 mm
L	~30.0 mm	~32.0 mm	~32.0 mm	~35.0 mm	~37.0 mm
L_1	~24.0 mm	~25.0 mm	~24.5 mm	~28.0 mm	~27.0 mm

End cap

for tube made of aluminium $d=80$ mm



Order no.	8WL2185-0
Designation	End cap 80
Material	Plastic, black
Weight	4.50 kg/100 pcs.

Chapter 02

Standard Products

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Tube end fitting 60.3	341
Twin drop bracket 42-60.3 H=70/90	361

Technical comments

Application

This section lists the products that are used for setting up supports as steel cantilevers with fittings made of hot-dip galvanized malleable cast iron.

Cantilever supports hold the catenary wire and contact wire in the required position over the rail and insulate the overhead contact line system.

Types

The design of the cantilevers depends on the mechanical and electrical requirements of the overhead contact line system.

The portfolio includes all required components made of hot-dip galvanized malleable cast iron for setting up cantilevers in catenary and trolley-type contact lines:

- Angled cantilevers with horizontal registration tube
- Angled cantilevers for contact lines in tunnels with low system heights
- Cantilevers for one or two contact wires
- Straight cantilevers across several tracks for catenary contact lines up to 1.5 kV DC
- Straight cantilevers for trolley-type contact lines with bridle-and-pulley suspension up to 1.5 kV DC
- Cantilevers with double insulation up to 1.5 kV DC

The insulation in the steel cantilevers is implemented using proven composite insulators. For nominal voltages up to 3 kV DC, cast resin insulators can also be used as an alternative. Insulators in top wires with nominal voltages up to 1.5 kV DC are generally designed with silicone-coated loop insulators.

The fittings can be used with:

- Hot-dip galvanized steel tubes (imperial system)
- Hot-dip galvanized precision steel tubes (metric system)

Contact wire clips made of copper-aluminium alloy are available for different contact wire profiles, see Chapter 02-09.

Special features

The fittings are made of hot-dip galvanized malleable cast iron and are distinguished by the following characteristics:

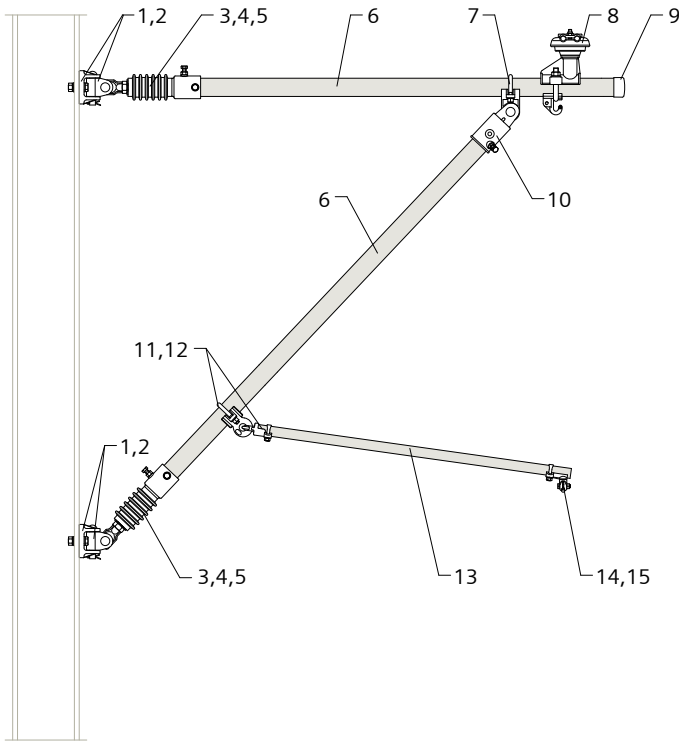
- High mechanical strength and thus high load capacity
- Simplified installation thanks to the clamp connections of the components
- Long service life due to the hot-dip galvanization
- Cost-effective initial investment
- Easy compliance with local content specifications through the use of internationally standardized steel tubes

Examples for assemblies

Some typical application examples for stainless steel cantilevers in catenary and trolley-type contact lines are described below.

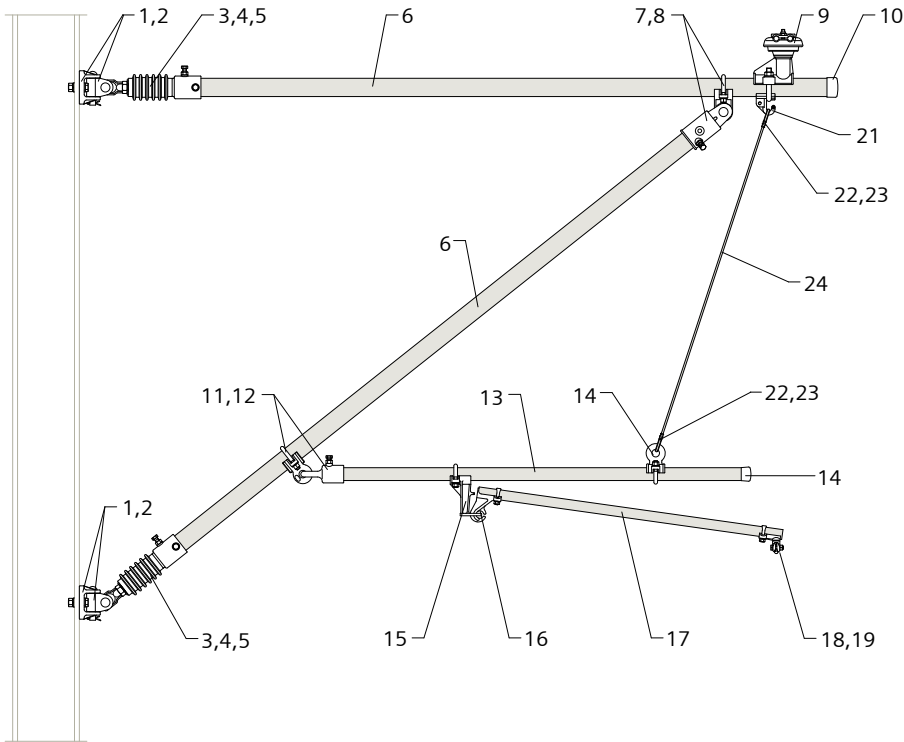
The exact configuration of the cantilever depends on the specific plant and the local situation.

Single cantilever on steel pole for catenary systems in mass transit



Position	Designation	Order no.
1	Cantilever swivel bracket	8WL2124-4
2	Swivel with clevis	8WL2126-0
3	Eye-bolt	8WL2190-3
4	Insulator body 3 kV DC	8WL3120-5
5	Tube end fitting 60.3	8WL2188-3
6	Steel tube 60.3x4 (length as needed)	8WL2175-4B
7	Eye clamp 60.3	8WL2115-4
8	Catenary wire support clamp 60.3/16, insulated	8WL2036-3A
9	End cap 60.3	8WL2184-8
10	Clevis end fitting 60.3	8WL2724-1
11	Eye clamp 60.3	8WL2114-7
12	Hook end fitting for GRP oval rod 23x33	8WL2833-0
13	GRP oval rod 23x33 (length and color as needed)	8WL2815-0/-1
14	Swivel clip holder for GRP oval rod 23x33	8WL2833-1
15	Contact wire clip	8WL4517-1K

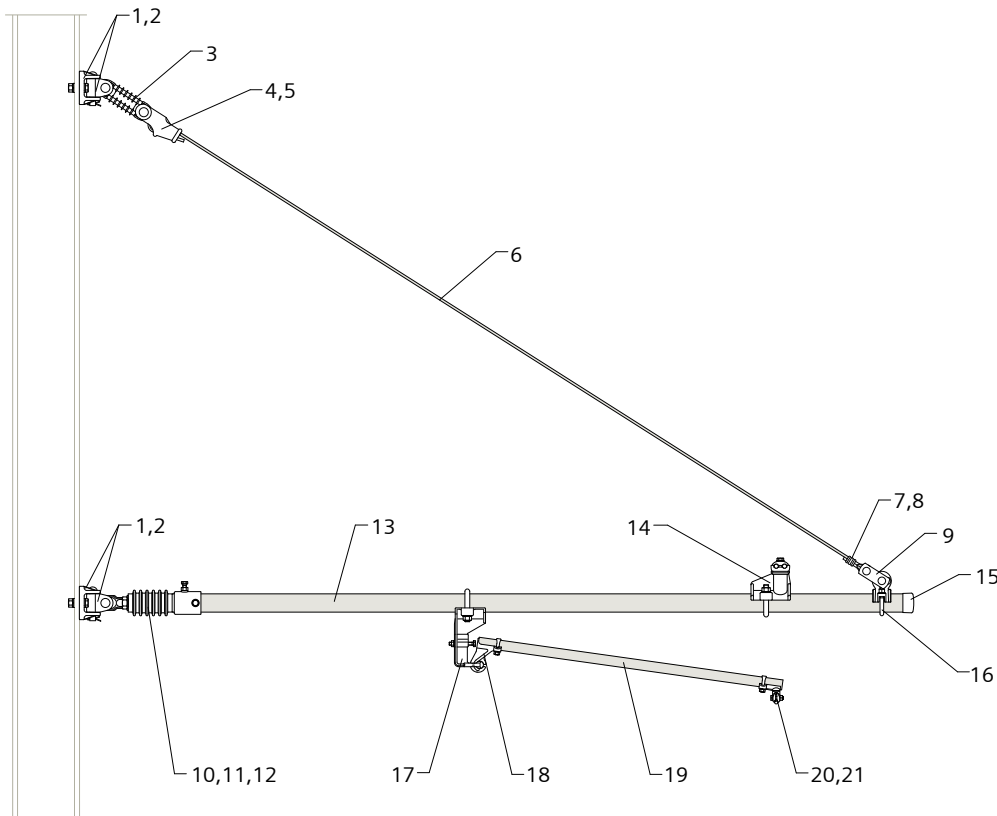
Cantilever on steel pole for catenary system in mass transit



Pos.	Designation	Order no.
1	Cantilever swivel bracket	8WL2124-4
2	Swivel with clevis	8WL2126-0
3	Eye-bolt	8WL2190-3
4	Insulator body 3 kV DC	8WL3120-5
5	Tube end fitting 60.3	8WL2188-3
6	Steel tube 60.3x4 (length as needed)	8WL2175-4B
7	Eye clamp 60.3	8WL2115-4
8	Clevis end fitting 60.3	8WL2724-1
9	Catenary wire support clamp 60.3/16, insulated	8WL2036-3A
10	End cap 60.3	8WL2184-8
11	Eye clamp 60.3	8WL2114-7
12	Hook end fitting 42/42.4	8WL2104-5

Pos.	Designation	Order no.
13	Steel tube 42.4x4 (length as needed)	8WL2175-2B
14	End cap 42/42.4	8WL2184-7
15	Drop bracket 33.7-42.4	8WL2117-5
16	Hook end clamp for GRP oval rod 23x33	8WL2833-4
17	GRP oval rod 23x33 (length and color as needed)	8WL2815-0/-1
18	Swivel clip holder for GRP oval rod 23x33	8WL2833-1
19	Contact wire clip	8WL4517-1K
20	Eye clamp 33.7-42.4	8WL2113-5
21	Hook clip 40-80	8WL2196-4
22	Thimble 35	8WL1501-1
23	Compression joint	8WL1553-0
24	Wire rope 6 (length as needed)	8WL7093-2

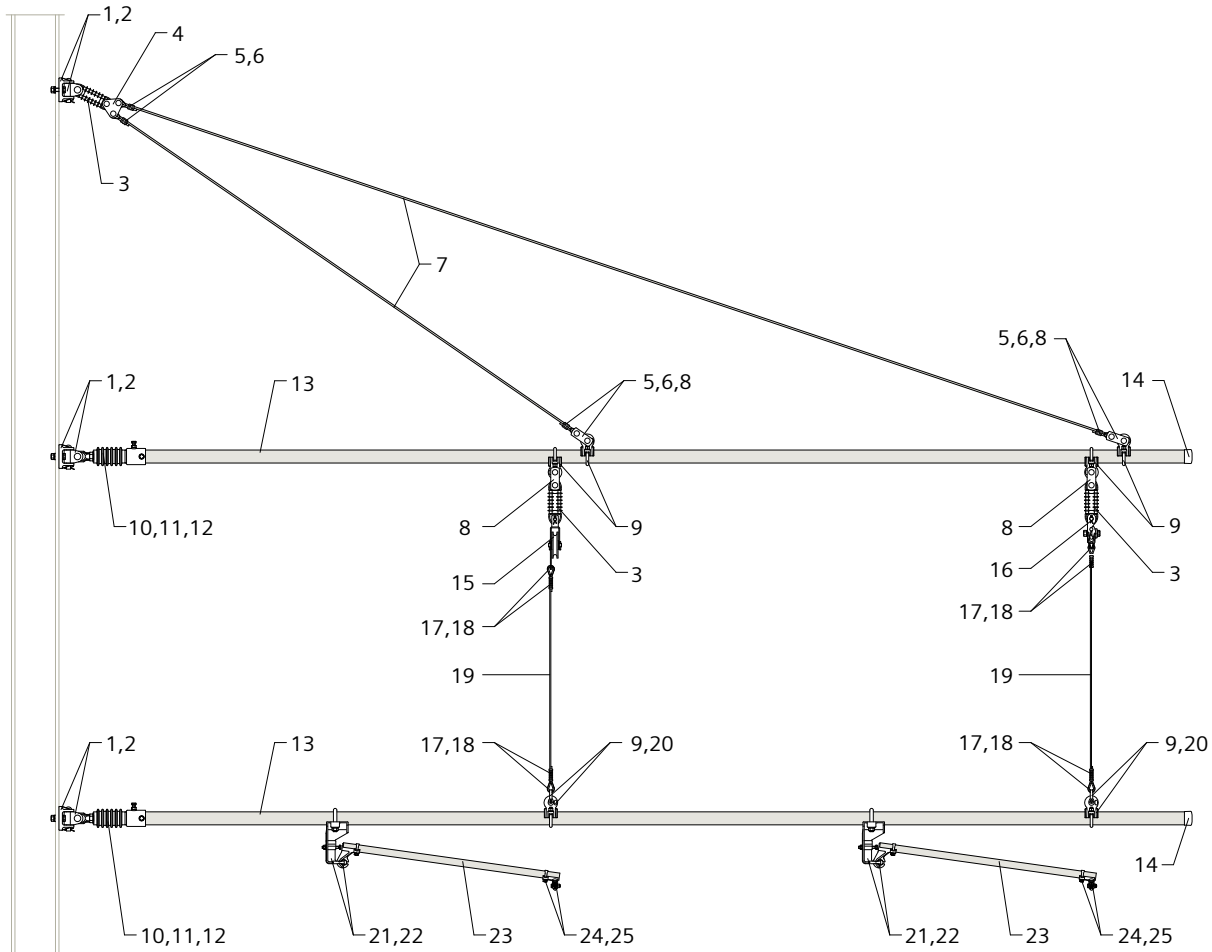
Cantilever on steel pole for trolley-type contact lines in mass transit



Pos.	Designation	Order no.
1	Cantilever swivel bracket	8WL2124-4
2	Swivel with clevis	8WL2126-0
3	Loop insulator 1.5 kV DC	8WL3001-2
4	Wedge-type dead-end clamp	8WL1181-7
5	Three-hole wedge	8WL1203-0
6	Wire rope 8 (length as needed)	8WL7093-3
7	Compression clamp 8	8WL1650-3
8	Thimble 8	8WL1516-2
9	Two pin clevis link	8WL1016-6
10	Eye-bolt	8WL2190-3
11	Insulator body 3 kV DC	8WL3120-5

Pos.	Designation	Order no.
12	Tube end fitting 60.3	8WL2188-3
13	Steel tube 60.3x4 (length as needed)	8WL2175-4B
14	Catenary wire support clamp 60.3/12	8WL2031-4B
15	End cap 60.3	8WL2184-8
16	Eye clamp 60.3	8WL2114-7
17	Drop bracket 60.3	8WL2723-1
18	Hook end clamp for GRP oval rod 23x33	8WL2833-4
19	GRP oval rod 23x33 (length and color as needed)	8WL2815-0/-1
20	Swivel clip holder for GRP oval rod 23x33	8WL2833-1
21	Contact wire clip	8WL4517-1K

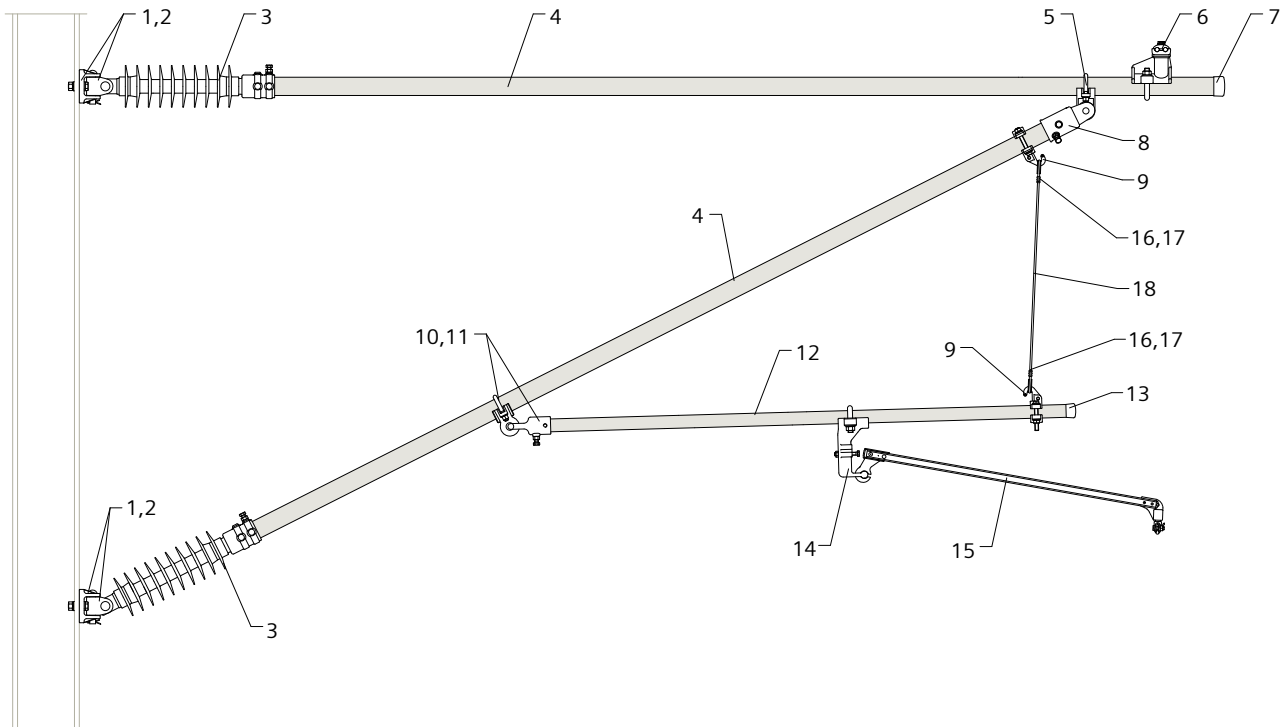
Cantilever across two tracks on steel pole for catenary system in mass transit



Pos.	Designation	Order no.
1	Cantilever swivel bracket	8WL2124-4
2	Swivel with clevis	8WL2126-0
3	Loop insulator 1.5 kV DC	8WL3001-2
4	Three pin clevis link 16	8WL1036-7
5	Compression clamp 8	8WL1650-3
6	Thimble 8	8WL1516-2
7	Wire rope 8 (length as needed)	8WL7093-3
8	Two pin clevis link 16	8WL1016-6
9	Eye clamp 60.3	8WL2114-7
10	Eye-bolt	8WL2190-3
11	Insulator body 3 kV DC	8WL3120-5
12	Tube end fitting 60.3	8WL2188-3
13	Steel tube 60.3x4 (length as needed)	8WL2175-4B

Pos.	Designation	Order no.
14	End cap 60.3	8WL2184-8
15	Pulley 88 with suspension	8WL2131-0
16	Conductor suspension clamp with hook	8WL2095-0
17	Thimble 35	8WL1501-0
18	Compression/crimped connector 25-112	8WL1522-1
19	Synthetic wire d=6 mm (length as needed)	8WL7095-0
20	Shackle 10	8WL1118-6
21	Drop bracket 60.3	8WL2723-1
22	Hook end clamp for GRP oval rod 23x33	8WL2833-4B
23	GRP oval rod 23x33 (length and color as needed)	8WL2815-0/-1
24	Swivel clip holder for GRP oval rod 23x33	8WL2833-1
25	Contact wire clip	8WL4517-1K

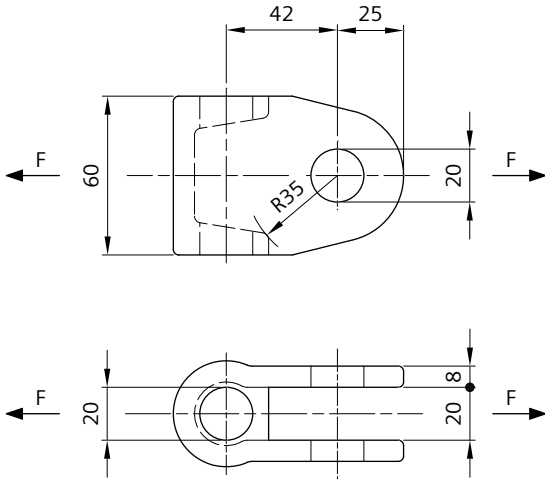
Cantilever, pull-off on steel pole in main-line railways



Position	Designation	Order no.
1	Cantilever swivel bracket	8WL2124-4
2	Swivel with clevis	8WL2126-0
3	Composite insulator 25 kV AC	8WL3078-2D
4	Steel tube 60.3x4 (length as needed)	8WL2175-4B
5	Eye clamp 60.3	8WL2115-4
6	Catenary wire support clamp 60.3/12	8WL2031-4B
7	End cap 60.3	8WL2184-8
8	Clevis end fitting 60.3	8WL2724-1
9	Hook clip 33.7-60.3	8WL2196-6
10	Eye clamp 60.3	8WL2114-7
11	Hook end fitting 42/42.4	8WL2104-5
12	Steel tube 42.4x4 (length as needed)	8WL2175-2B
13	End cap 42/42.4	8WL2184-7
14	Drop bracket 33.7-42.4	8WL2723-0
15	Steady arm (length as needed)	8WL3500-5A to -5K
16	Thimble 35	8WL1501-0
17	Compression/crimped connector 16-20	8WL1521-1
18	Bronze wire 16x84	8WL7061-1

Swivel with clevis

for hinged cantilevers



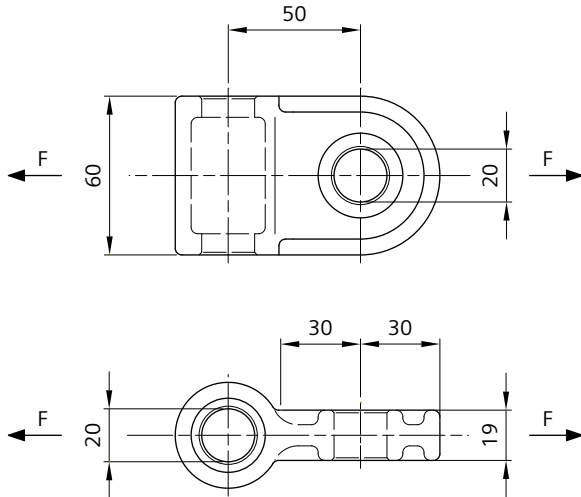
Order no.	8WL2126-0
Designation	Swivel with clevis 20
Material	mCl
Weight	0.51 kg
Perm. operating load	26.7 kN
Min. failing load	80 kN

Pin 8WL1110-0 (19x52-St-tZn) and split pin 8WL1115-1 (5x28-Cu) must be ordered separately, see Chapter 02-01.

Can also be supplied completely mounted.

Swivel with eye

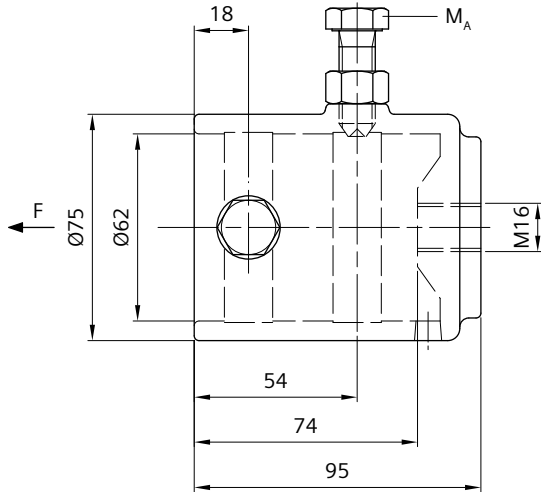
for hinged cantilevers



Order no.	8WL2127-0
Designation	Swivel with eye 20
Material	mCl
Weight	0.64 kg
Perm. operating load	15.8 kN
Min. failing load	47.4 kN

Tube end fitting 60.3

for hinged cantilevers, for tube d=60.3 mm (2")

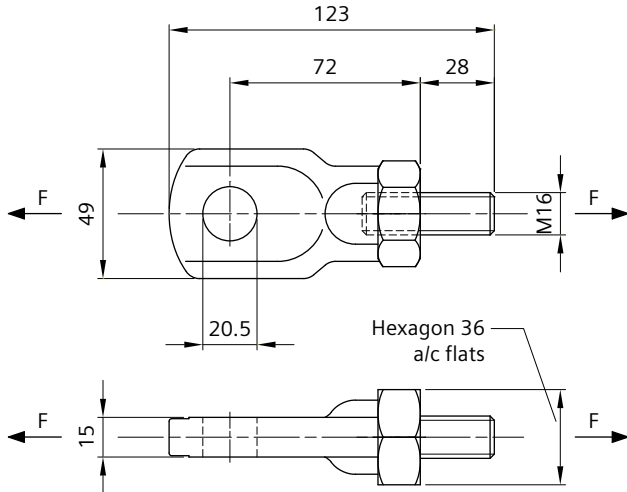


Order no.	8WL2188-3
Designation	Tube end fitting 60.3
Material	
Tube end fitting	mCl
Cup-point screws M12	stlSt
Nuts	stlSt
Weight	1.29 kg
Perm. operating load/ tension	7.5 kN
Min. failing load/tension	22.5 kN
Tightening torque M_A	40 Nm

Can also be supplied without cup-point screws and nuts, order no. 8WL2188-2.

Eye-bolt 19

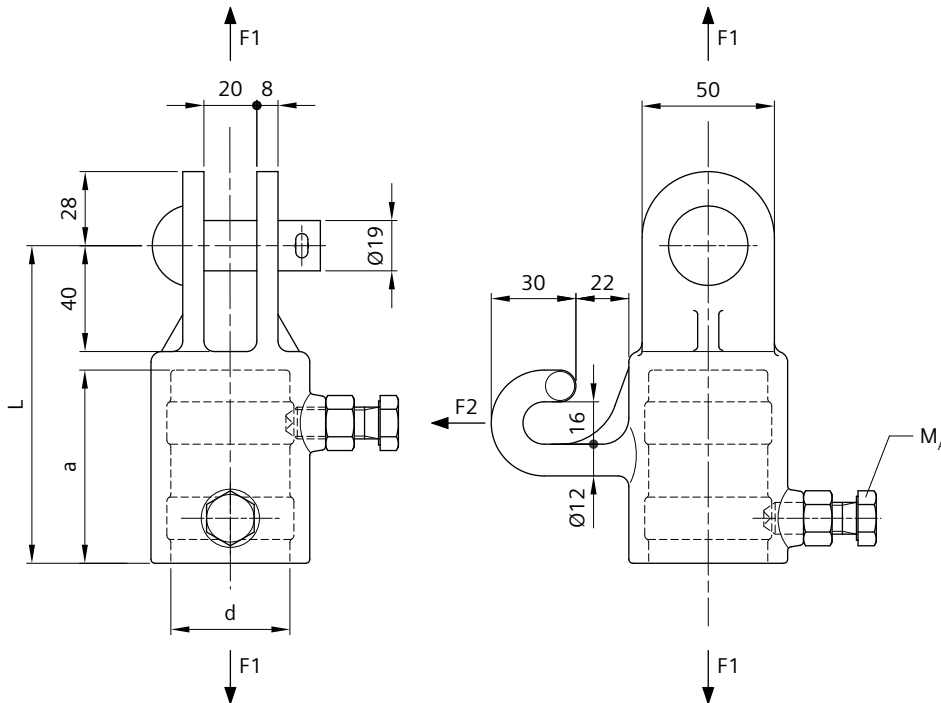
for jointing insulator bodies with threaded bush M16



Order no.	8WL2190-3
Designation	Eye-bolt 19
Material	
Eye-bolt	mCl
Threaded pin M16x50	stlSt
Weight	0.40 kg
Perm. operating load	20 kN
Min. failing load	60 kN

Clevis end fitting 42-60.3 with hook

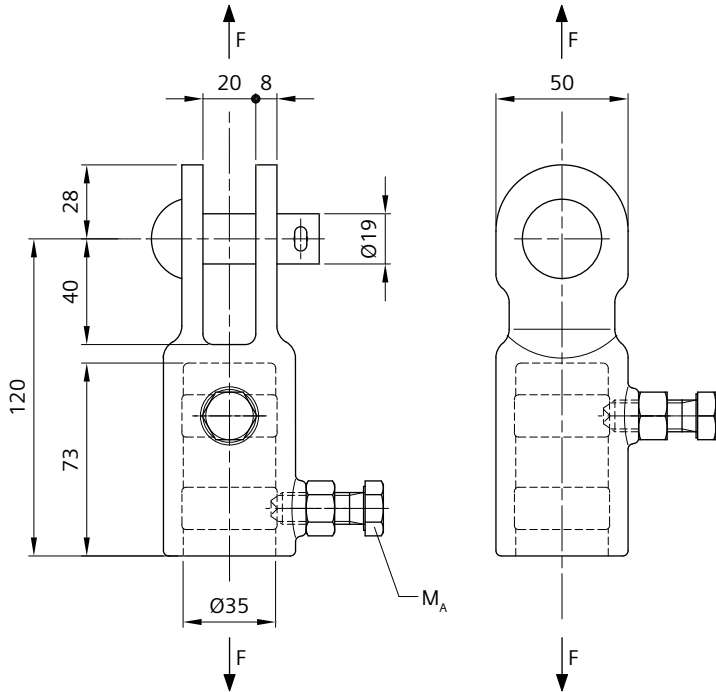
for hinged cantilevers, for tube d=42 and 42.4 mm (1 1/4") or 60.3 mm (2")



Order no.	8WL2121-8	8WL6221-7
Designation	Clevis end fitting 42/42.4	Clevis end fitting 60.3
Material		
Clevis end fitting	mICI	mICI
Cup-point screws M12	stlSt	stlSt
Nuts	stlSt	stlSt
Pin 19x52	htgSt	htgSt
Split pin 5x28	Cu	Cu
Weight	1.38 kg	1.71 kg
Perm. operating load (F1)	7.5 kN	7.5 kN
Min. failing load (F1)	22.5 kN	22.5 kN
Perm. operating load (F2)	2.6 kN	2.6 kN
Min. failing load (F2)	8 kN	8 kN
Tightening torque M_A	40 Nm	40 Nm
a	73 mm	75 mm
d	45 mm	62 mm
L	120 mm	122 mm

Clevis end fitting 32/33.7

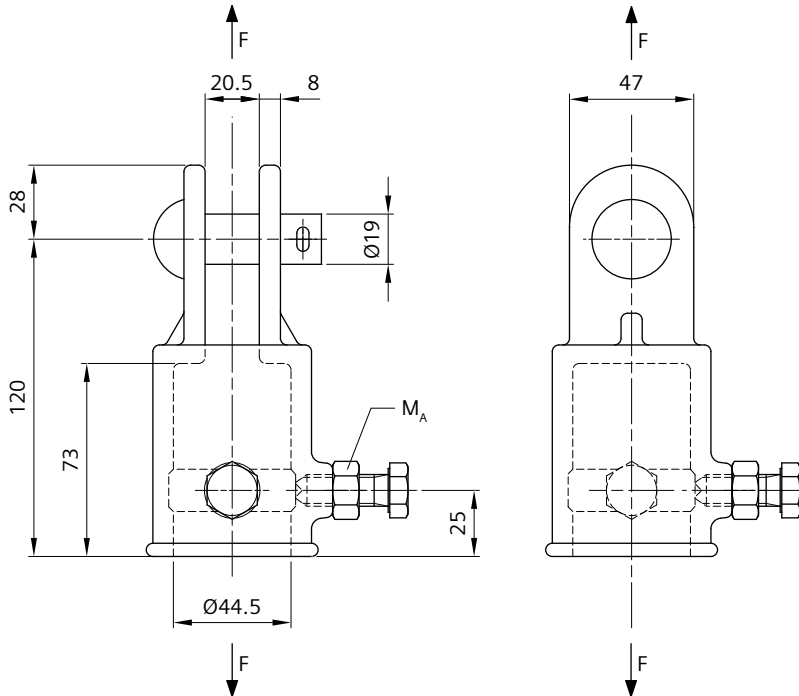
for hinged cantilevers, for tube d=32 and 33.7 mm (1")



Order no.	8WL6221-4
Designation	Clevis end fitting 32/33.7
Material	
Clevis end fitting	mCl
Cup-point screws M12	stlSt
Nuts	stlSt
Pin 19x52	htgSt
Split pin 5x28	Cu
Weight	1.00 kg
Perm. operating load	8.4 kN
Min. failing load	25 kN
Tightening torque M_A	40 Nm

Clevis end fitting 42/42.4

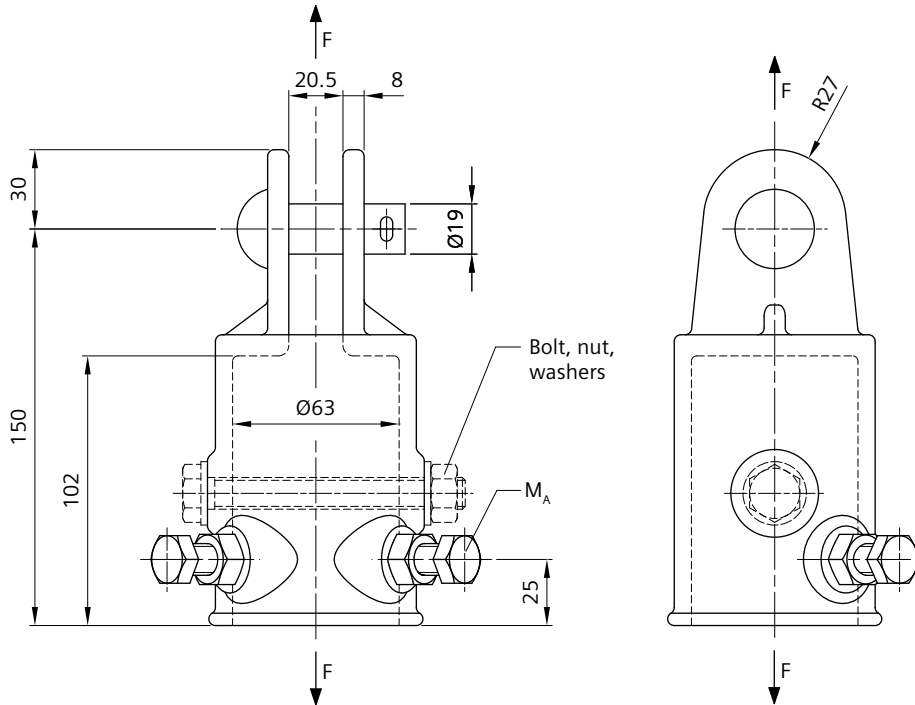
for hinged cantilevers, for tube d=42 und 42.4 mm (1 1/4")



Order no.	8WL2724-0
Designation	Clevis end fitting 42/42.4
Material	
Clevis end fitting	mICI
Cup-point screws M12	stlSt
Nuts	stlSt
Pin 19x52	htgSt
Split pin 5x28	Cu
Weight	1.44 kg
Perm. operating load	7 kN
Min. failing load	21 kN
Tightening torque M_A	40 Nm

Clevis end fitting 55-60.3

for hinged cantilevers, for tube d=55 und 60.3 mm (2")

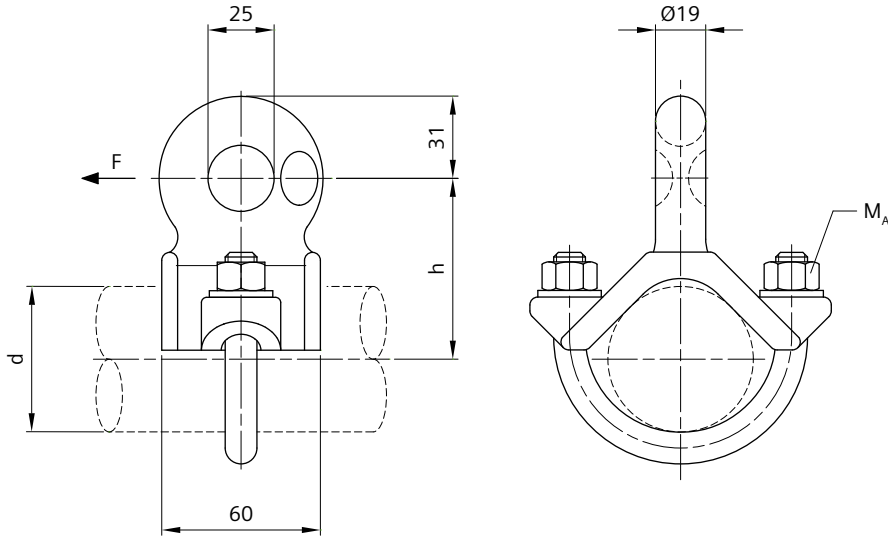


Order no.	8WL2724-1
Designation	Clevis end fitting 55-60.3
Material	
Clevis end fitting	mIcI
Cup-point screws M12	stISt
Nuts	stISt
Pin 19x52	stISt
Split pin 5x28	Cu
Weight	2.07 kg
Perm. operating load	9 kN
Min. failing load	27 kN
Tightening torque M_A	40 Nm

One bolt ISO 4017-M12x100 (stISt), with nut ISO 4032-M12 (stISt) and two washers ISO 7089-A13 (stISt) must be used additional for operating load of more than 9 kN to 15.8 kN. Please order separately.

Eye clamp 32-60.3

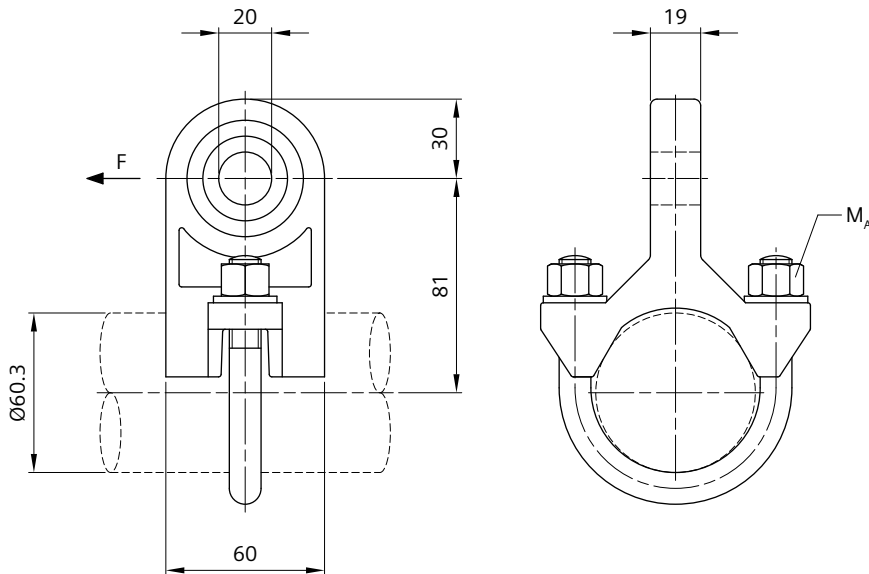
for hinged cantilevers, for tube d=32 and 33.7 mm (1") to 42 and 42.4 mm (1 1/4"), 55 mm or 60.3 mm (2")



Order no.	8WL2113-5	8WL2114-7
Designation	Eye clamp 32/33.7 to 42/42.4	Eye clamp 60.3
Material		
Eye clamp	mICI	mICI
U-bolt M12	htgSt	htgSt
Nuts	htgSt	htgSt
Washers	htgSt	htgSt
Weight	0.85 kg	1.10 kg
Perm. operating load	5 kN	5 kN
Min. failing load	15 kN	15 kN
Tightening torque M_A	25 Nm	25 Nm
d	32/33.7 (1") - 42/42.4 mm (1 1/4")	60.3 mm
h	60/70 mm	73 mm

Eye clamp 60.3

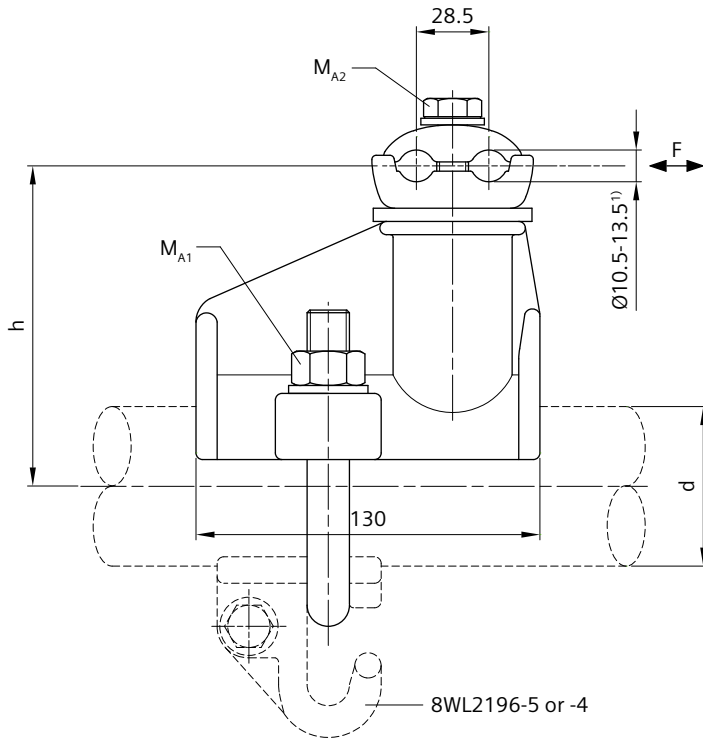
for hinged cantilevers and soffit posts, for tube $d=60.3$ mm (2")



Order no.	8WL2115-4
Designation	Eye clamp 60.3
Material	
Eye clamp	mICI
U-bolt M12	htgSt
Nuts	htgSt
Washers	htgSt
Weight	1.10 kg
Perm. operating load	7 kN
Min. failing load	21 kN
Tightening torque M_A	25 Nm

Catenary wire support clamp 40-60.3/12

adjustable at top tube d=40 to 60.3 mm (2"), for bronze and copper wires acc. to DIN 48201



Order no.	8WL2031-4A	8WL2031-4B
Designation	Catenary wire support clamp 40-42.4/12	Catenary wire support clamp 55-60.3/12
Material		
Clamp body	mCl	mCl
Clamp cover	mCl	mCl
Clamp holder	mCl	mCl
U-bolt M16	stSt	stSt
Bolt M12	stSt	stSt
Nuts, washers	stSt	stSt
Weight	2.57 kg	2.66 kg
Perm. operating load	12 kN	12 kN
Min. failing load	36 kN	36 kN
Tightening torque M_{A1}	70 Nm	70 Nm
Tightening torque M_{A2}	56 Nm	56 Nm
d	40 - 42.4 mm (1 1/4")	55 - 60.3 mm (2")
h	107 mm	117/121 mm

¹⁾ Diameter including protection sleeve

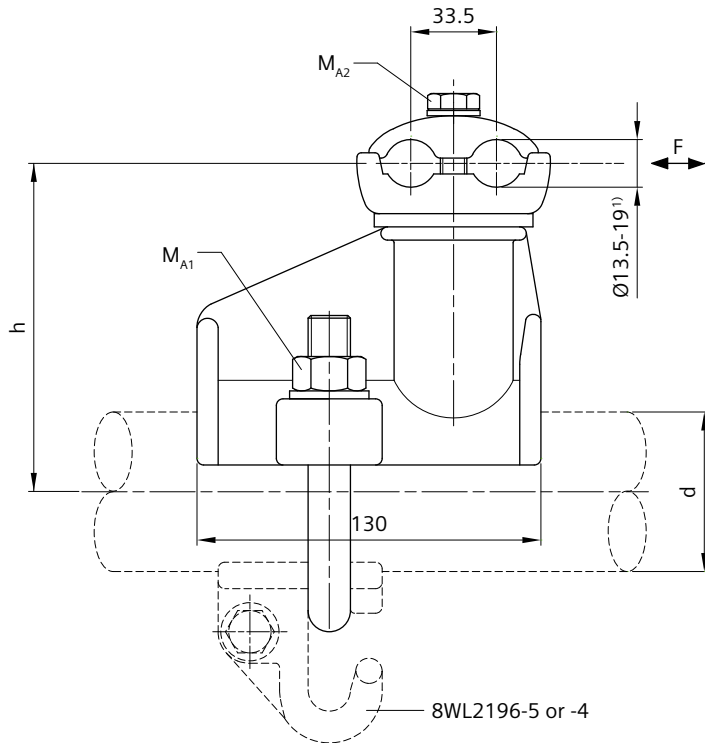
If necessary, the hook clip 8WL2196-5 or -4 must be ordered separately, see page 353.

Protection sleeves must be ordered separately, see Chapter 02-02.

Types for other tube diameters on request.

Catenary wire support clamp 40-60.3/18

adjustable at top tube d=40 to 60.3 mm (2"), for bronze and copper wires acc. to DIN 48201



Order no.	8WL2031-5A	8WL2031-5B
Designation	Catenary wire support clamp 40-42.4/18	Catenary wire support clamp 55-60.3/18
Material		
Clamp body	mICI	mICI
Clamp cover	mICI	mICI
Clamp holder	mICI	mICI
U-bolt M16	stSt	stSt
Bolt M12	stSt	stSt
Nuts, washers	stSt	stSt
Weight	2.71 kg	2.80 kg
Perm. operating load	12 kN	12 kN
Min. failing load	36 kN	36 kN
Tightening torque M_{A1}	70 Nm	70 Nm
Tightening torque M_{A2}	56 Nm	56 Nm
d	40 - 42.4 mm (1 1/4")	55 - 60.3 mm (2")
h	109 mm	119/123 mm

¹⁾ Diameter including protection sleeve

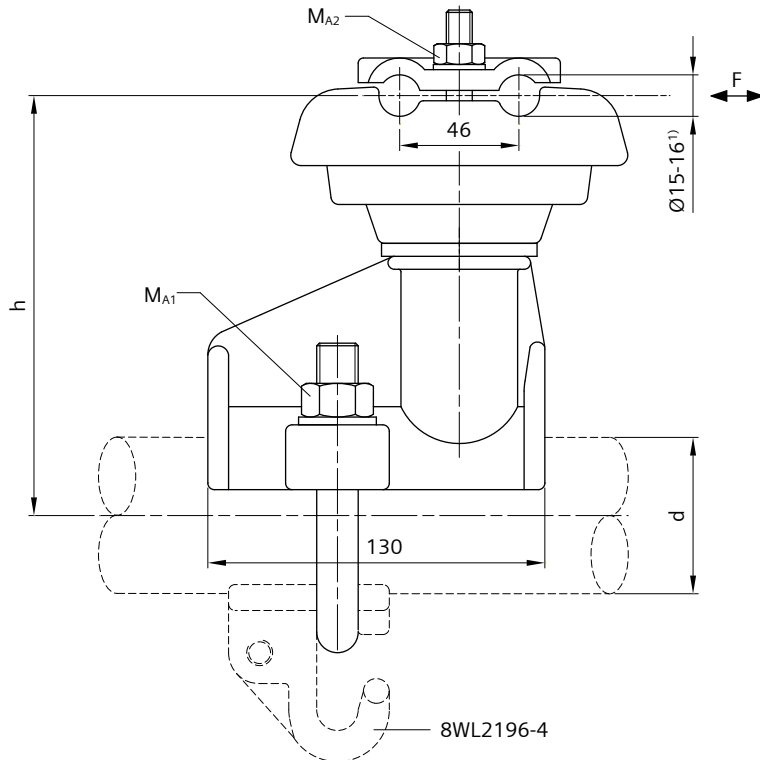
If necessary, the hook clip 8WL2196-5 or -4 must be ordered separately, see page 353.

Protection sleeves must be ordered separately, see Chapter 02-02.

Types for other tube diameters on request.

Catenary wire support clamp 40-60.3, insulated

adjustable at top tube d=40 to 60.3 mm (2"), for bronze and copper wires acc. to DIN 48201



Order no.	8WL2036-3B	8WL2036-3A
Designation	Catenary wire support clamp 40-42.4/16	Catenary wire support clamp 55-60.3/16
Material		
Clamp body	Cast resin, brown	Cast resin, brown
Clamp cover	CuAl	CuAl
Clamp holder	mCl	mCl
U-bolt M16	stSt	stSt
Stud bolts M10	stSt	stSt
Nuts, washers	stSt	stSt
Weight	3.38 kg	3.57 kg
Perm. operating load	2.5 kN/wire	2.5 kN/wire
Min. failing load	8.0 kN/wire	8.0 kN/wire
Tightening torque M_{A1}	70 Nm	70 Nm
Tightening torque M_{A2}	25 Nm	25 Nm
Nominal voltage	1.5 kV DC	1.5 kV DC
d	40 - 42.4 mm (1 1/4")	55 - 60.3 mm (2")
h	150 mm	158/162 mm

¹⁾ Diameter including protection sleeve

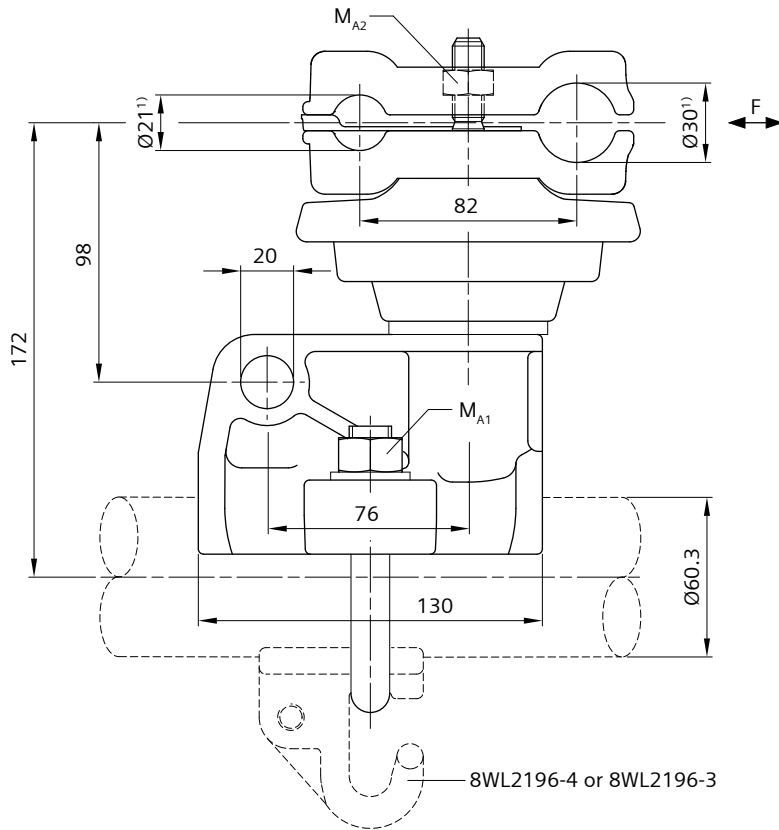
If necessary, the hook clip 8WL2196-4 must be ordered separately, see page 353.

Protection sleeves must be ordered separately, see Chapter 02-02.

Types for other tube or wire diameters on request.

Catenary wire support clamp 60.3-21/30, insulated

adjustable at top tube made of steel $d=60.3$ mm (2"), for bronze and copper wires up to 500 mm²



Order no.	8WL2037-5A
Designation	Catenary wire support clamp 60.3-21/30
Material	
Clamp body	Cast resin, brown
Clamp cover	CuAl
Clamp holder	ctAl
U-bolt M16	stlSt
Stud bolts M12	stlSt
Nuts, washers	stlSt
Weight	4.05 kg
Perm. operating load	6.25 kN
Min. failing load	20 kN
Tightening torque M_{A1}	70 Nm
Tightening torque M_{A2}	50 Nm
Nominal voltage	1.5 kV DC

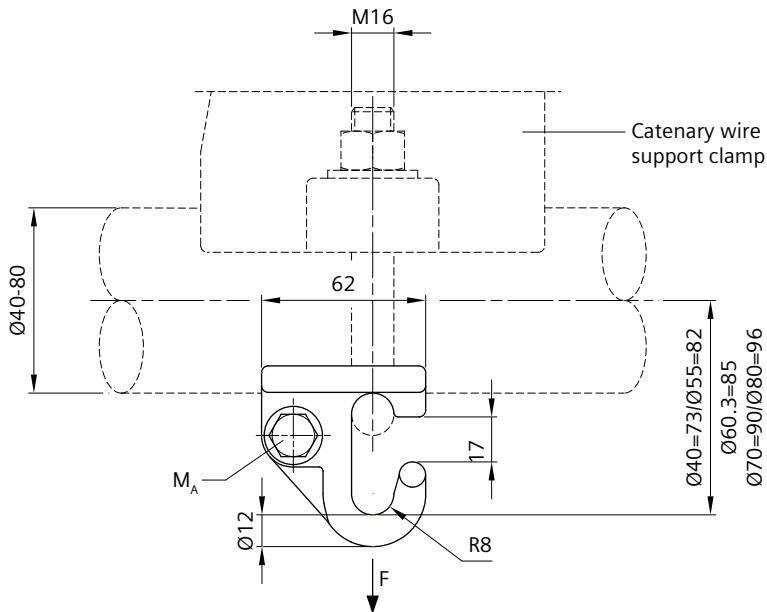
¹⁾ Diameter including protection sleeve

If necessary, the hook clip 8WL2196-4 (mICI), see page 353, or 8WL2196-3 (ctAl), see page 293, must be ordered separately.

Protection sleeves must be ordered separately, see Chapter 02-02.

Hook clip 40-80 for U-bolt M16

for dropper connection at catenary wire support clamps adjustable at top tube d=40 to 80 mm, with connection for current connector

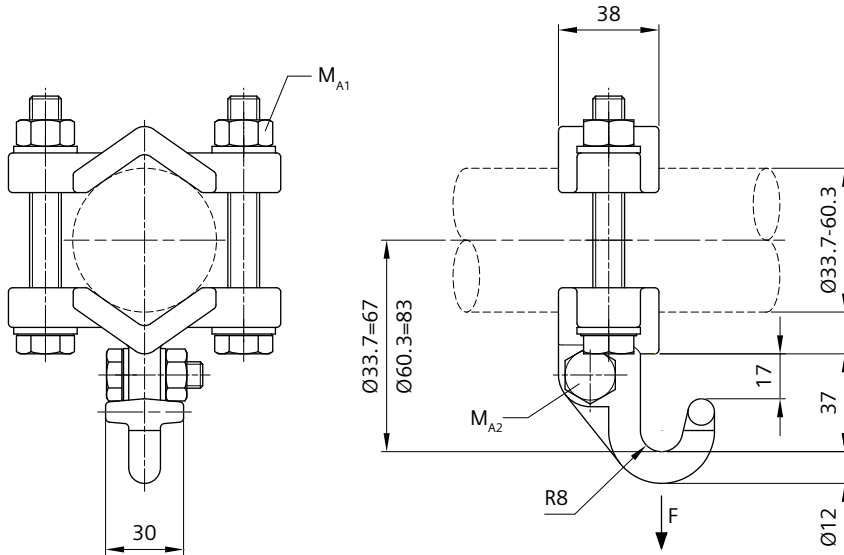


Order no.	8WL2196-5	8WL2196-4
Designation	Hook clip 40-80	Hook clip 40-80, without nut and washer
Material		
Hook clip	mICI	mICI
Hook clip	mICI	mICI
Bolt M10	stlSt	-
Washer	stlSt	-
Weight	0.38 kg	0.35 kg
Perm. operating load	2 kN	2 kN
Min. failing load	6 kN	6 kN
Tightening torque M_A	32 Nm	-

Catenary wire support clamp must be ordered separately.

Hook clip 33.7-60.3

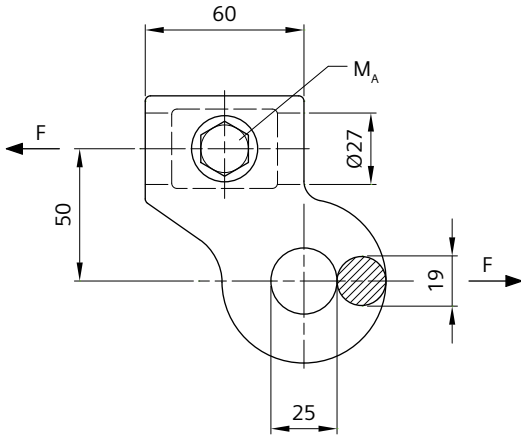
for dropper connection at cantilever tube $d=33.7$ mm (1") to 60.3 mm (2"), with connection for current connector



Order no.	8WL2196-6
Designation	Hook clip 33.7-60.3
Material	
Hook clip	mCl
Clamp cover	mCl
Bolts M12	stlSt
Bolt M10	stlSt
Nuts, washers	stlSt
Weight	0.79 kg
Perm. operating load	2 kN
Min. failing load	6 kN
Tightening torque M_{A1}	56 Nm
Tightening torque M_{A2}	32 Nm

Eye clamp 26

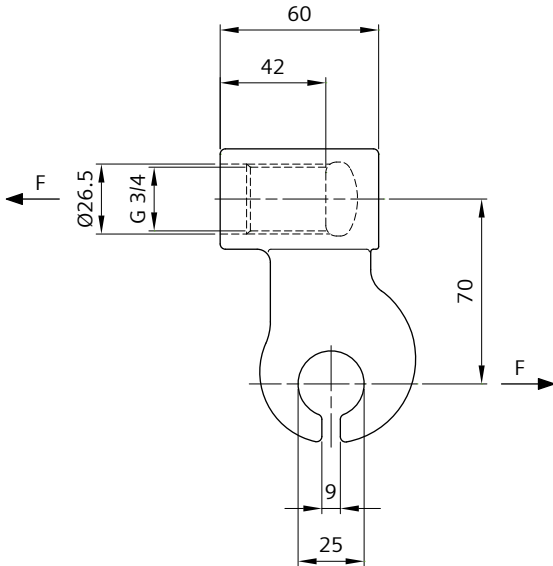
for second tube-type steady arms $d=26$ mm made of steel or aluminium



Order no.	8WL2100-0
Designation	Eye clamp 26
Material	
Tongue end fitting	mICI
Cup-point screw M12	stlSt
Nut	stlSt
Weight	0.66 kg
Perm. operating load	5 kN
Min. failing load	15 kN
Tightening torque M_A	40 Nm

Hook end clamp 26

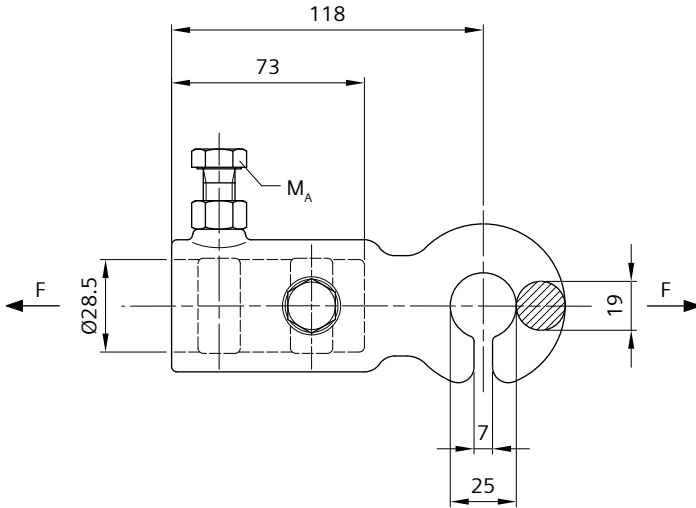
for tube-type steady arms $d=26$ mm made of steel or aluminium



Order no.	8WL2101-0
Designation	Hook end clamp 26
Material	mCl
Weight	0.58 kg
Perm. operating load	6 kN
Min. failing load	18 kN

Hook end fitting 26-26.9

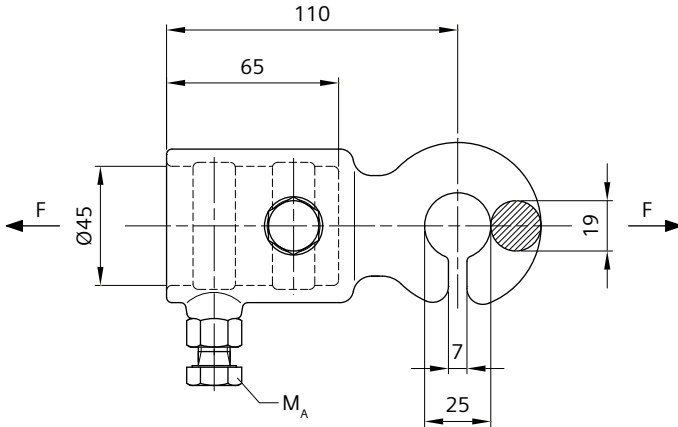
for steel tube-type steady arms $d=26$ and 26.9 mm ($3/4''$)



Order no.	8WL2102-2
Designation	Hook end fitting 26/26.9
Material	
Hook end fitting	mCl
Cup-point screws M12	stlSt
Nuts	stlSt
Weight	1.0 kg
Perm. operating load	6 kN
Min. failing load	18 kN
Tightening torque M_A	40 Nm

Hook end fitting 42/42.4

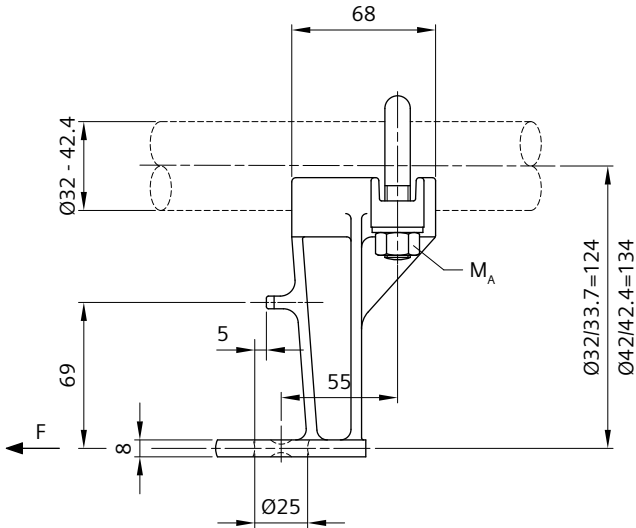
for steel tube-type steady arms $d=42$ and 42.4 mm (1 1/4")



Order no.	8WL2104-5
Designation	Hook end fitting 42/42.4
Material	
Hook end fitting	mCl
Cup-point screws M12	stlSt
Nuts	stlSt
Weight	1.06 kg
Perm. operating load	6 kN
Min. failing load	18 kN
Tightening torque M_A	40 Nm

Drop bracket 32-42.4

for steady arm connection at registration tube d=32 and 33.7 mm (1") to 42 and 42.4 mm (1 1/4")

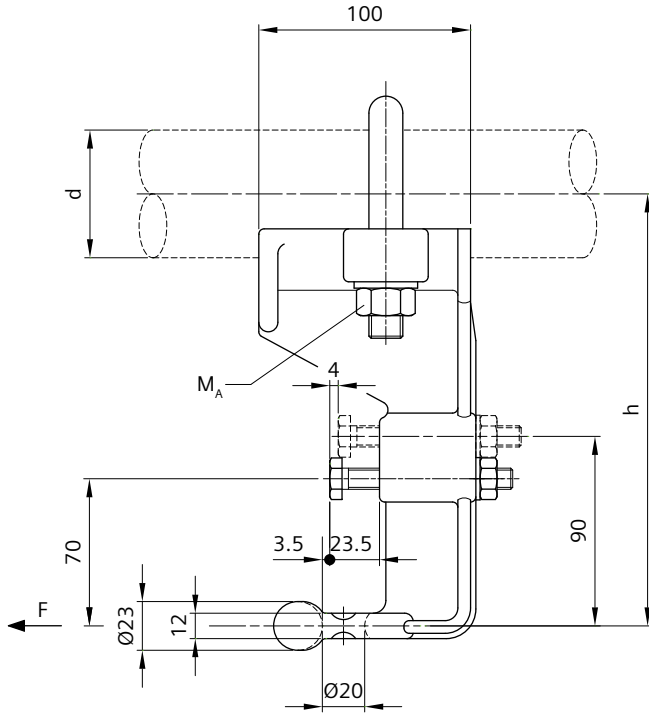


Order no.	8WL2117-5
Designation	Drop bracket 32/33.7 to 42/42.4
Material	
Drop bracket	mICI
U-bolt M12	htgSt
Nuts, washers	htgSt
Weight	0.90 kg
Perm. operating load	4 kN
Min. failing load	12 kN
Tightening torque M_A	25 Nm

Steady arms 8WL3501- see page 315.

Drop bracket 33.7-60.3 H=70/90

for steady arm connection at registration tube $d=33.7$ mm (1") to 60.3 mm (2"), with current connector



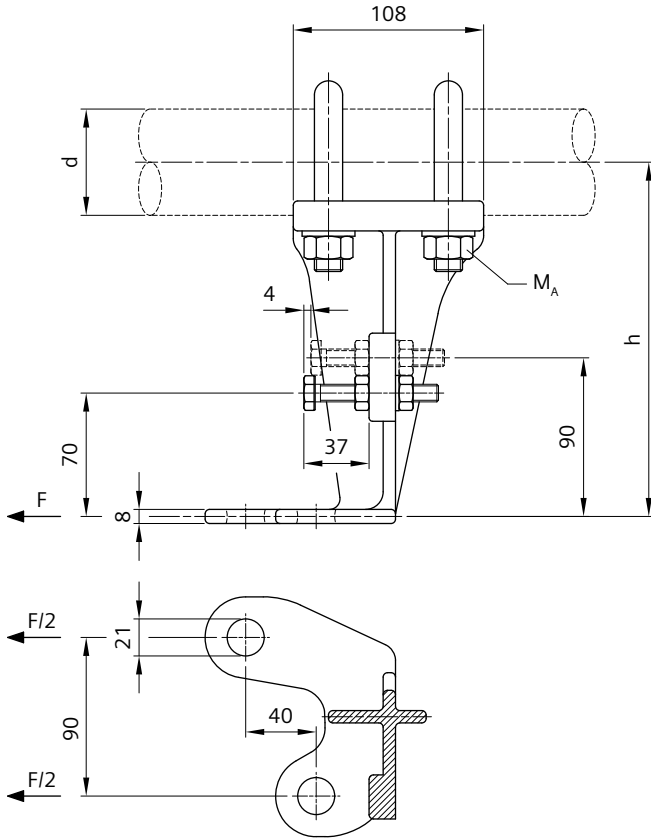
Order no.	8WL2723-0	8WL2723-1
Designation	Drop bracket 33.7-42.4	Drop bracket 48.3-60.3
Material		
Drop bracket	mICI	mICI
U-bolt M16	stlSt	stlSt
Bolt M10	stlSt	stlSt
Nuts, washers	stlSt	stlSt
Weight	2.16 kg	2.24 kg
Perm. operating load	4.3 kN	4.3 kN
Min. failing load	12.9 kN	12.9 kN
Tightening torque M_A	70 Nm	70 Nm
d	33.7 (1") - 42.4 mm (1 1/4")	48.3 (1 3/4") - 60.3 mm (2")
h	186/191 mm	198/201 mm

Steady arms for H=70 mm 8WL3503- see page 369.

Steady arm for H=90 mm on request.

Twin drop bracket 42-60.3 H=70/90

for steady arm connection at registration tube $d=42$ mm and 42.4 mm (1 1/4") to 60.3 mm (2"), with current connector



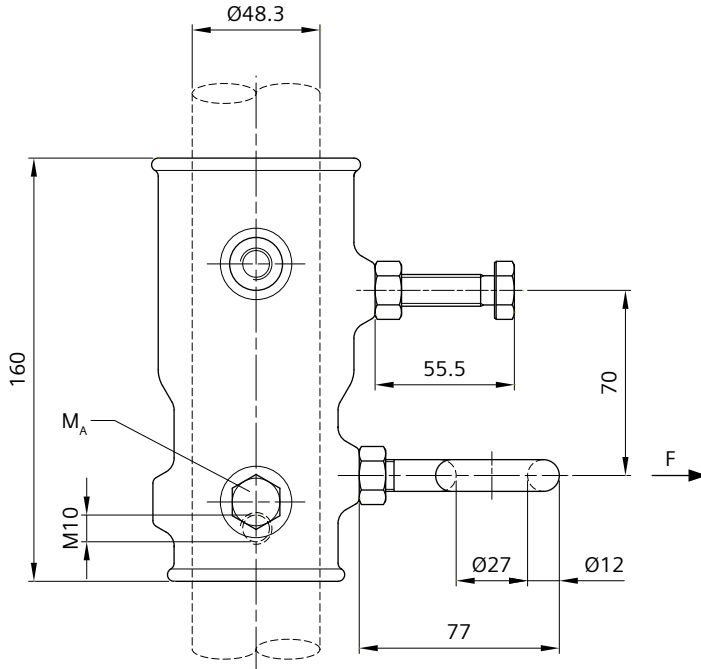
Order no.	8WL2116-6B	8WL2116-6C
Designation	Twin drop bracket 42/42.4	Twin drop bracket 48.3-60.3
Material		
Drop bracket	mCl	mCl
U-bolts M16	stlSt	stlSt
Bolt M10	stlSt	stlSt
Nuts, washers	stlSt	stlSt
Weight	3.42 kg	3.58 kg
Perm. operating load	7 kN	7 kN
Min. failing load	21 kN	21 kN
Tightening torque M_A	70 Nm	70 Nm
d	42/42.4 mm (1 1/4")	48.3 (1 3/4") - 60.3 mm (2")
h	190 mm	195/201 mm

Steady arms for H=70 mm 8WL3501-, see page 315, or 8WL3503-, see page 369.

Steady arms for H=90 mm on request.

Drop bracket 48.3 H=70

for steady arm connection at vertical tube d=48.3 mm (1 3/4"), with current connector

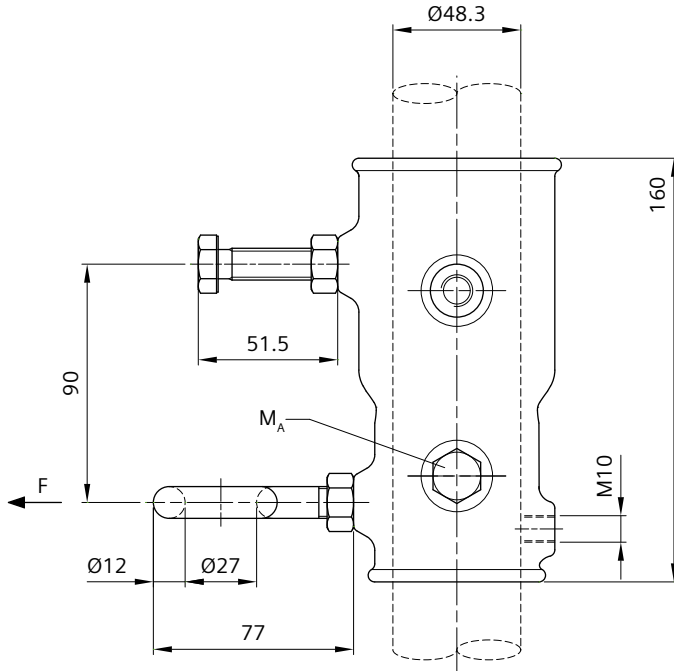


Order no.	8WL2128-6B
Designation	Drop bracket 48.3
Material	
Drop bracket	mCl
Cup-point screw M12	stlSt
Eye-bolt M12	stlSt
Bolt M12	stlSt
Nuts	stlSt
Weight	1.78 kg
Perm. operating load	4.3 kN
Min. failing load	12.9 kN
Tightening torque M_A	40 Nm

Steady arms 8WL3503- see page 369.

Drop bracket 48.3 H=90

for steady arm connection at vertical tube $d=48.4$ mm (1 3/4"), with connection for current connector

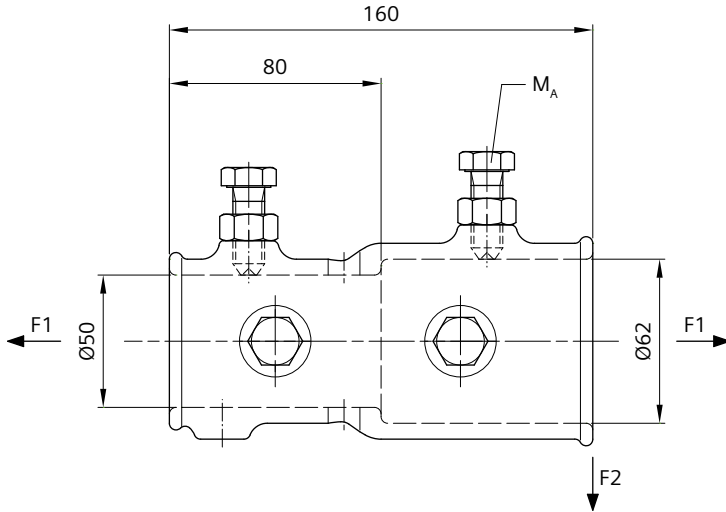


Order no.	8WL2128-6C
Designation	Drop bracket 48.3
Material	
Drop bracket	mICI
Cup-point screw M12	stlSt
Eye-bolt M12	stlSt
Bolt M12	stlSt
Nuts	stlSt
Weight	1.78 kg
Perm. operating load	4.3 kN
Min. failing load	12.9 kN
Tightening torque M_A	40 Nm

Steady arms on request.

Reducing socket 60.3/48.3

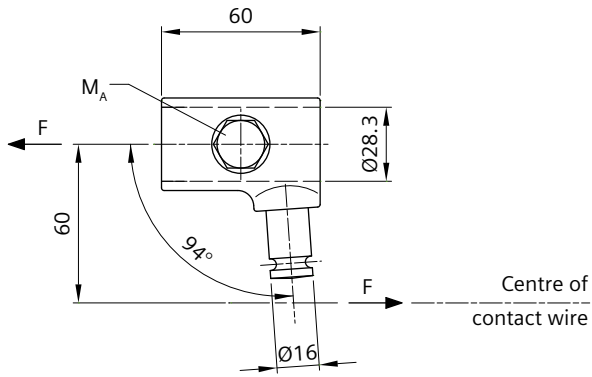
for hinged cantilevers



Order no.	8WL2128-6A
Designation	Reducing socket 60.3 (2") / 48.3 (1 3/4")
Material	
Reducing socket	mCl
Cup-point screws M12	stlSt
Nuts	stlSt
Weight	1.73 kg
Perm. operating load/ tension (F1)	4 kN
Min. failing load/ tension (F1)	12 kN
Perm. operating load/ bending (F2)	2 kN
Min. failing load/ bending (F2)	6 kN
Tightening torque M_A	40 Nm

Swivel clip holder 26/26.9-60

for tube-type steady arms $d=26$ and 26.9 mm ($3/4$ "

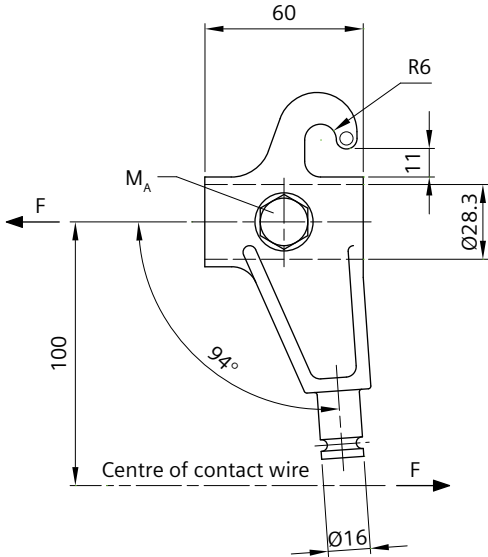


Order no.	8WL2003-3
Designation	Swivel clip holder 26/26.9-60-R
Material	
Swivel clip holder	CuAl
Cup-point screw M12	stlSt
Weight	0.24 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	40 Nm

Contact wire clips see Chapter 02-09.

Swivel clip holder 26/26.9-100 with hook

for tube-type steady arms $d=26$ mm and 26.9 mm (3/4")

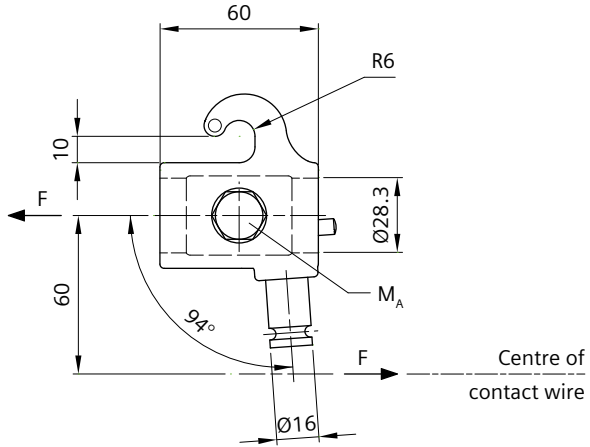


Order no.	8WL2004-0
Designation	Swivel clip holder 26/26.9-100-R
Material	
Swivel clip holder	CuAl
Cup-point screw M12	stlSt
Weight	0.40 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	40 Nm

Contact wire clips see Chapter 02-09.

Swivel clip holder 26/26.9-60 with hook

for tube-type steady arms $d=26$ and 26.9 mm ($3/4"$)

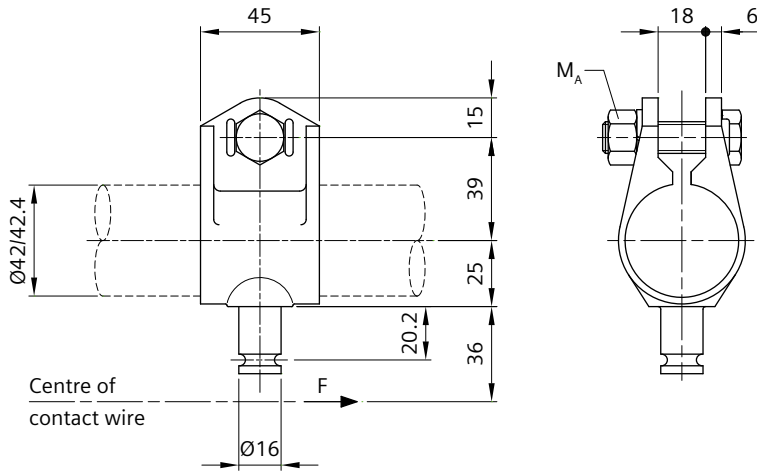


Order no.	8WL2000-0
Designation	Swivel clip holder 26/26,9-60-R
Material	
Swivel clip holder	mICI
Cup-point screw M12	stISt
Grooved stud 16R	CuNiSi
Prestressed sleeve	stISt
Weight	0.45 kg
Perm. operating load	3.5 kN
Min. failing load	10.5 kN
Tightening torque M_A	40 Nm

Contact wire clips see Chapter 02-09.

Swivel clip holder 42/42.4

for tubes and tube-type steady arms $d=42$ or 42.4 mm (1 1/4")



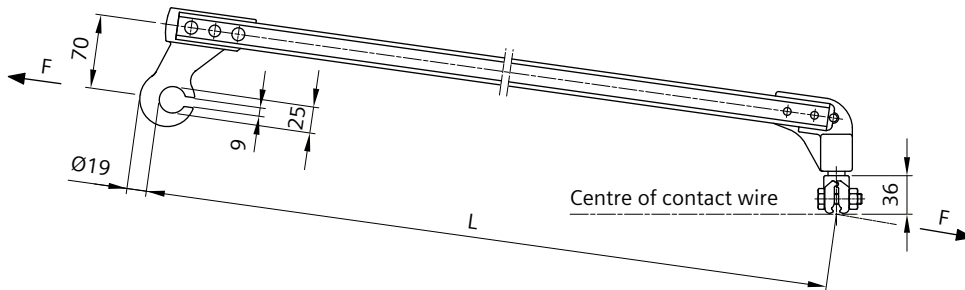
Order no.	8WL2005-0
Designation	Swivel clip holder 42/42.4-16R
Material	
Swivel clip holder	CuAl
Bolt M12	stlSt
Nut	stlSt
Spring washer	stlSt
Weight	0.36 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	35 Nm

Types with threaded stud M16 or 5/8" on request.

Contact wire clips see Chapter 02-09.

Steady arm made of aluminium H=70

with hook end clamp made of stainless steel, for contact wires acc. to EN 50149, with connection for windstay

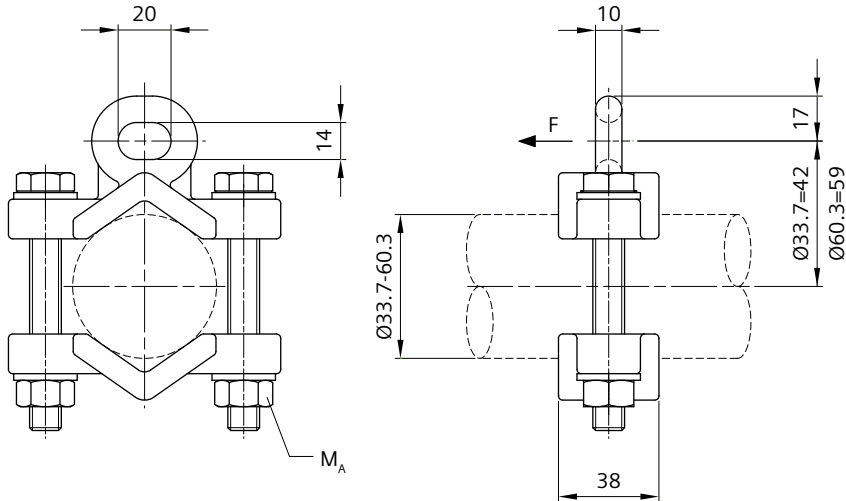


Order no.	8WL3503-5A	8WL3503-5F	8WL3503-5K
Designation	Steady arm L=650	Steady arm L=875	Steady arm L=1050
Material			
Hook end clamp	stlSt	stlSt	stlSt
U-section	Al	Al	Al
Clip holder	Al	Al	Al
Grooved stud	CuNiSi	CuNiSi	CuNiSi
Contact wire clip 16R	CuAl	CuAl	CuAl
Round head rivets	Al	Al	Al
for contact wires	AC-80 to 150	AC-80 to 150	AC-80 to 150
Weight	1.08 kg	1.19 kg	1.28 kg
Perm. operating load	2.5 kN	2.5 kN	2.5 kN
Min. failing load	7.5 kN	7.5 kN	7.5 kN
L	650 mm	875 mm	1050 mm

Other lengths on request.

Eye clamp for windstays

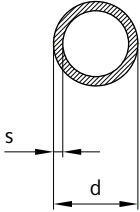
for tube $d=33.7$ mm (1") to 60.3 mm (2")



Order no.	8WL2112-5D
Designation	Eye clamp 33.7-60.3
Material	
Eye clamp	mICI
Clamp cover	mICI
Bolts M12	stlSt
Nuts	stlSt
Washers	stlSt
Weight	0.70 kg
Perm. operating load	1.7 kN
Min. failing load	5.1 kN
Tightening torque M_A	56 Nm

Steel tube (EN 10305)

for steady arms, tensioning weight guidance, operating linkage and cantilevers



Order no.	8WL2160-0	8WL2162-0	8WL2164-0	8WL2166-0
Designation	Steel tube 26x3.5	Steel tube 32x3.5	Steel tube 42x4.0	Steel tube 55x4.0
Material	E355+A hot dip galv.	E355+A hot dip galv.	E355+A hot dip galv.	E355+A hot dip galv.
Weight	2.04 kg/m	2.64 kg/m	3.87 kg/m	5.20 kg/m
Max. delivery length	7.0 m	7.0 m	7.0 m	7.0 m
d	26 mm	32 mm	42 mm	55 mm
s	3.5 mm	3.5 mm	4,0 mm	4.0 mm

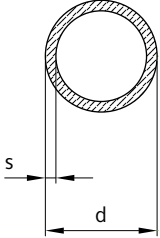
Other lengths on request.

End caps for tube 26 mm, 42 mm and 55 mm see page 330.

End cap for tube 32 mm see page 373.

Steel tube (EN 10210)

for steady arms, tensioning weight guidance, operating linkage and cantilevers



Order no.	8WL2175-0A	8WL2175-1B	8WL2175-2B	8WL2175-4B
Designation	Steel tube 26.9x3.6 (3/4") ¹⁾	Steel tube 33.7x3.2 (1") ²⁾	Steel tube 42.4x4.0 (1 1/4")	Steel tube 60.3x4.0 (2")
Material	S235JRH, hot dip galv.	S355J2H, hot dip galv.	S355J2H, hot dip galv.	S355J2H, hot dip galv.
Weight	2.07 kg/m	2.41 kg/m	3.79 kg/m	5.55 kg/m
Max. delivery length	7.0 m	7.0 m	7.0 m	7.0 m
d	26.9 mm	33.7 mm	42.4 mm	60.3 mm
s	3.6 mm	3.2 mm	4.0 mm	4.0 mm

¹⁾ For order quantities up to 3 tons as 26.9x4.0 in material P235GH TC1, hot dip galvanized acc.to EN 10216-2 deliverable.

²⁾ For order quantities up to 3 tons in material P235GH TC1, hot dip galvanized acc.to EN 10216-2 deliverable.

Other lengths on request.

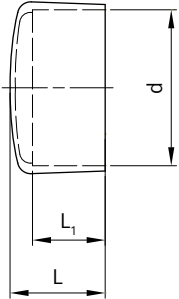
End caps for tube 26.9 mm, 33.7 mm and 60.3 mm see page 373.

End cap for tube 42.4 mm see page 330.

Steel tube 48.3 mm (1 3/4") on request.

End cap

for steel tubes $d=26.9$ mm (3/4") to 60.3 mm (2")



Order no.	8WL2184-5	8WL2184-1	8WL2184-6	8WL2184-8
Designation	End cap 26.9 (3/4")	End cap 32	End cap 33.7 (1")	End cap 60.3 (2")
Material	Plastic-soft, black	Plastic-soft, black	Plastic-soft, black	Plastic-soft, black
Weight	0.50 kg/100 pcs.	0.90 kg/100 pcs.	1.00 kg/100 pcs.	2.10 kg/100 pcs.
d	27.0 mm	31.0 mm	33.0 mm	59.0 mm
L	~30.0 mm	~31.0 mm	~31.5 mm	~36.0 mm
L₁	~25.5 mm	~26.0 mm	~25.0 mm	~27.5 mm

Chapter 02

Standard Products

Tensioning equipment	70
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Bridle-and-pulley suspension with synthetic wire	394
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Conductor suspension clamp 13-19 with hook	377
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Technical comments

Application

Supports hold the catenary wires and contact wires in headspans in the required position over the rail and insulate the overhead contact line system.

Conductor suspension clamps and pulleys hold catenary wires and bridle-and-pulley suspensions.

Cross-span eye clamps, cross-span hook clamps and line hangers are used to set up contact wire supports.

Types

The portfolio includes components for setting up supports as:

- Catenary wire supports in the headspan at span wires or at straight cantilevers
- Catenary wire supports for one or two catenary wires
- Contact wire supports in the headspan or at straight cantilevers
- Contact wire supports for one or two contact wires
- Contact wire supports with bridle-and-pulley suspensions
- Contact wire supports with line hangers for one or two contact wires

Depending on the use and application, the products are available in various designs and materials:

- Copper-aluminium alloys
- Copper-tin alloys
- Hot-dip galvanized malleable cast iron
- Stainless steel

Plastic or copper-aluminium materials are used for pulleys.

Special features

The fittings of the supports are distinguished by the following characteristics:

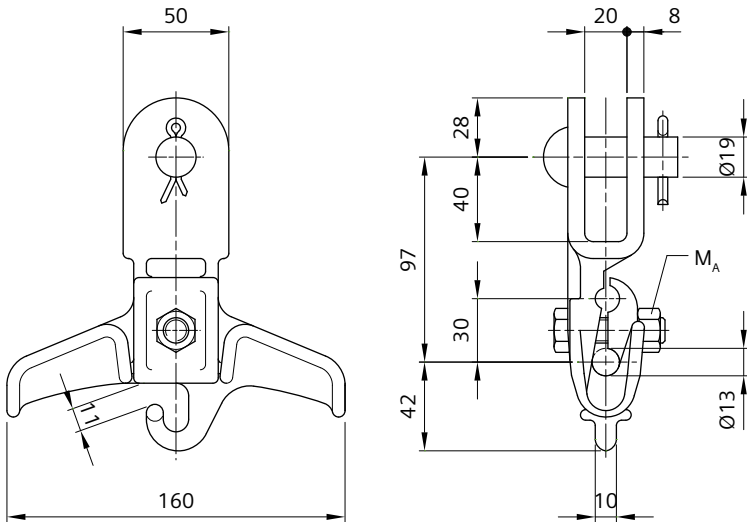
- Long useful life thanks to the use of corrosion-resistant materials or the carrying out of suitable corrosion protection measures during production
- Easy installation and setting due to harmonized component geometries
- Multi-faceted use of fittings in different overhead contact line systems for mass transit and main-line railways

Note

Steady arms and steady arm components are found in Chapters 02-03 and 02-04, depending on the product line. See Chapter 02-09 for selecting the appropriate contact wire clips for the specific application.

Conductor suspension clamp 13-19 with hook

for catenary wire suspension, for wires acc. to DIN 48201

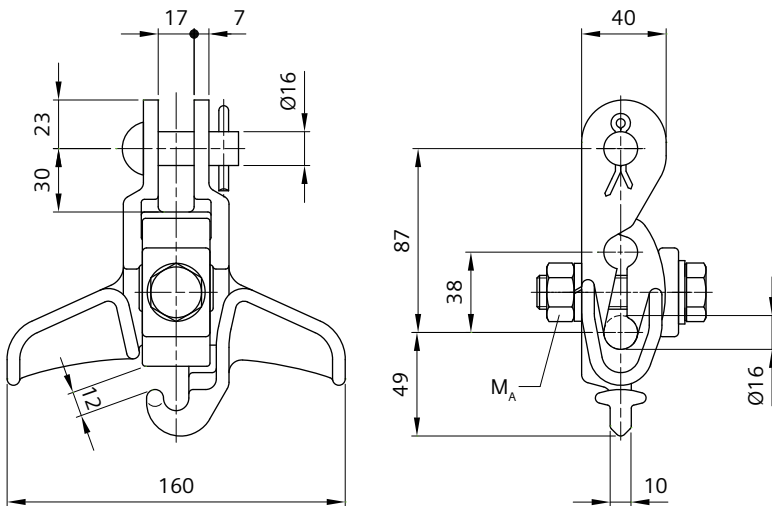


Order no.	8WL2082-0
Designation	Conductor suspension clamp 13-19
Material	
Clamp body	mCl
Pin 19x52	stlSt
Split pin 5x28	Cu
Bolt M12	stlSt
Nut	stlSt
for wires	50 to 70 mm ²
Weight	1.30 kg
Tightening torque M_A	56 Nm

Protection sleeves must be ordered separately, see Chapter 02-02.

Conductor suspension clamp 16-16 with hook, twisted 90°

for catenary wire suspension, for wires acc. to DIN 48201



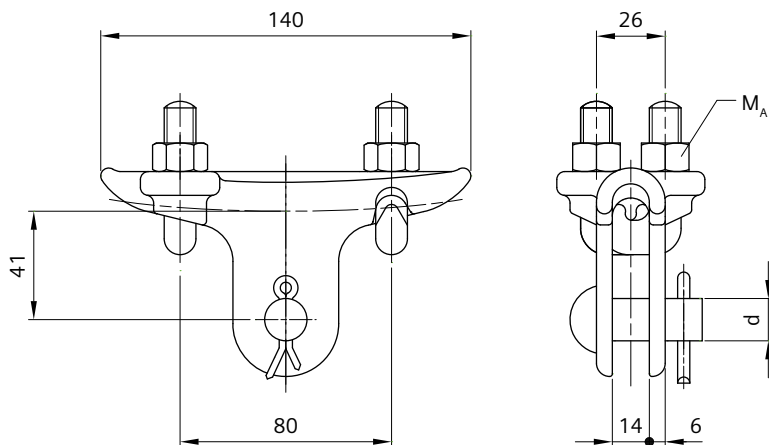
Order no.	8WL2095-0
Designation	Conductor suspension clamp 16-16
Material	
Clamp body	CuAl
Pin 16x45	stlSt
Split pin 5x28	Cu
Bolt M16	stlSt
Nut, washer	stlSt
Spring washer	stlSt
for wires	50 to 150 mm ²
Weight	1.60 kg
Tightening torque M_A	135 Nm

Protection sleeves must be ordered separately, see Chapter 02-02.

With cross link 8WL1137-5 substitute for 8WL2082-6. Cross link must be ordered separately, see Chapter 02-03.

Conductor suspension clamp

for suspensions in headspans, for wires acc. to DIN 48201

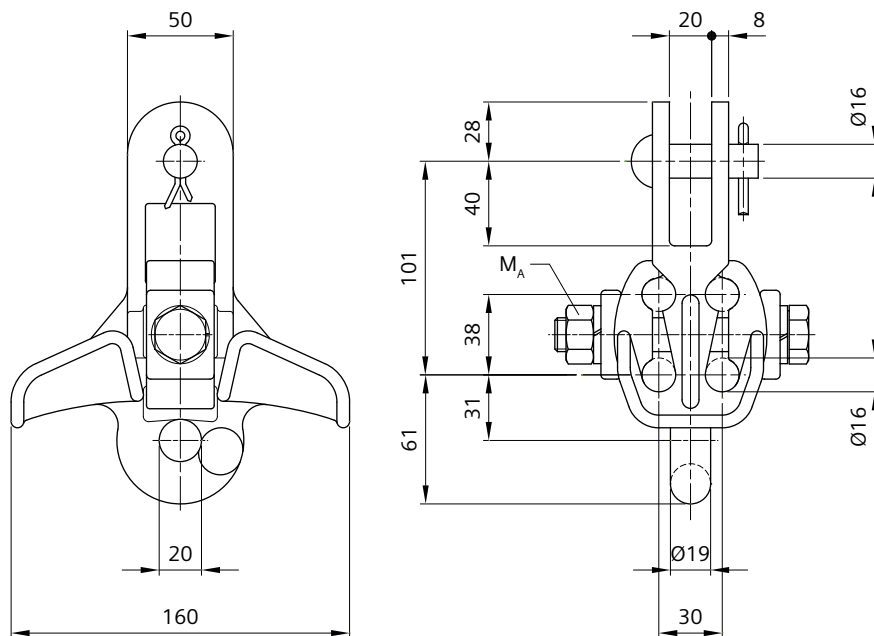


Order no.	8WL2083-4	8WL2083-5
Designation	Conductor suspension clamp 35-70/13 ¹⁾	Conductor suspension clamp 35-70/16
Material		
Clamp body	CuAl	CuAl
Pin 13x40	stlSt	-
Pin 16x40	-	stlSt
Split pin 5x28	Cu	Cu
Hook bolts M12	stlSt	stlSt
Nuts	stlSt	stlSt
for wires	35 to 70 mm ²	35 to 70 mm ²
Weight	0.85 kg	0.87 kg
Tightening torque M_A	56 Nm	56 Nm
d	13 mm	16 mm

¹⁾ With cross link 8WL1137-2 substitute for 8WL2080-8. Cross link must be ordered separately, see Chapter 02-03.

Twin catenary suspension clamp with eye

for supports with two catenary wires, for wires acc. to DIN 48201

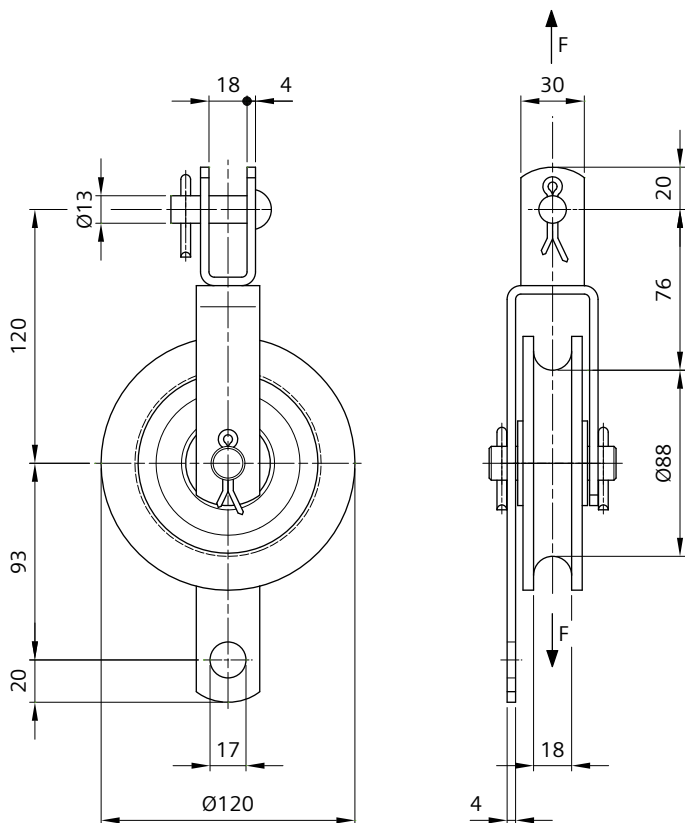


Order no.	8WL2091-1
Designation	Twin catenary suspension clamp 16-16
Material	
Suspension clamp	CuSn
Pin 16x50	stlSt
Split pin 5x28	Cu
Bolt M16	stlSt
Nut	stlSt
Spring washers	stlSt
for wires	50 to 150 mm ²
Weight	2.56 kg
Tightening torque M_A	135 Nm

Protection sleeves must be ordered separately, see Chapter 02-02.

Pulley 88 with suspension, single

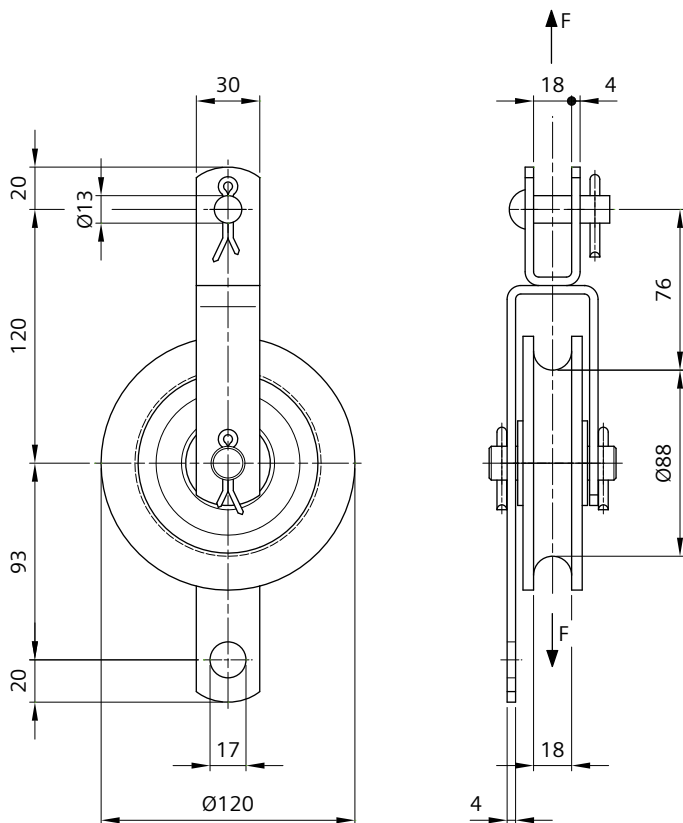
for suspension of auto-tensioned wires in headspan



Order no.	8WL2131-0
Designation	Pulley 88, single, connecting clevis twisted 90°
Material	
Pulley	Plastic
Suspension	stlSt
Axle	stlSt
Pin 13x40	stlSt
Split pins 5x28	Cu
for wires	up to 18 mm
Weight	0.75 kg
Perm. operating load	4 kN
Min. failing load	12 kN

Pulley 88 with suspension, single

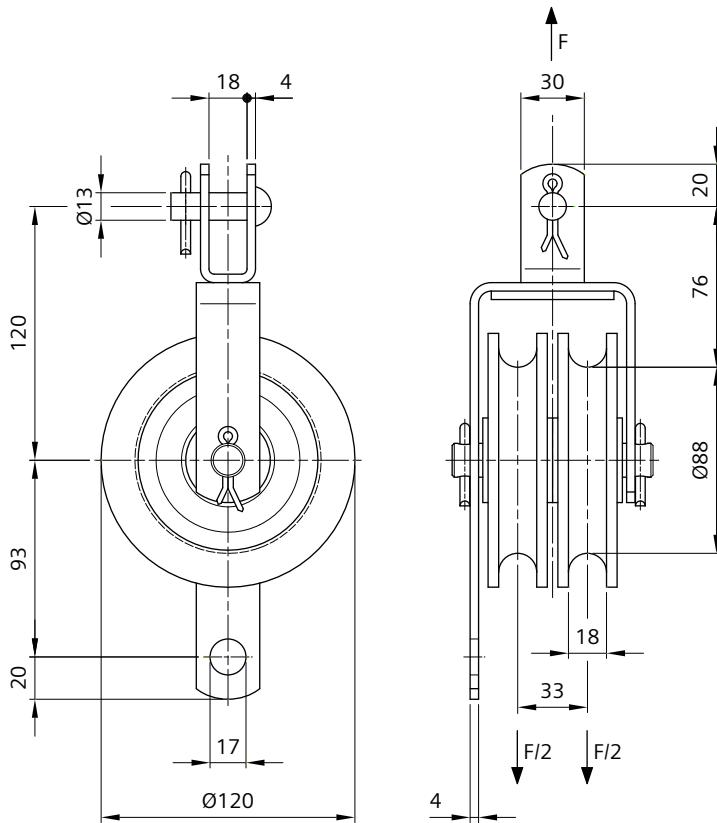
for suspension of auto-tensioned wires in headspan



Order no.	8WL2131-6
Designation	Pulley 88, single, connecting clevis parallel
Material	
Pulley	Plastic
Suspension	stlSt
Axle	stlSt
Pin 13x40	stlSt
Split pins 5x28	Cu
for wires	up to 18 mm
Weight	0.75 kg
Perm. operating load	4 kN
Min. failing load	12 kN

Pulley 88 with suspension, twin

for suspension of auto-tensioned wires in headspan

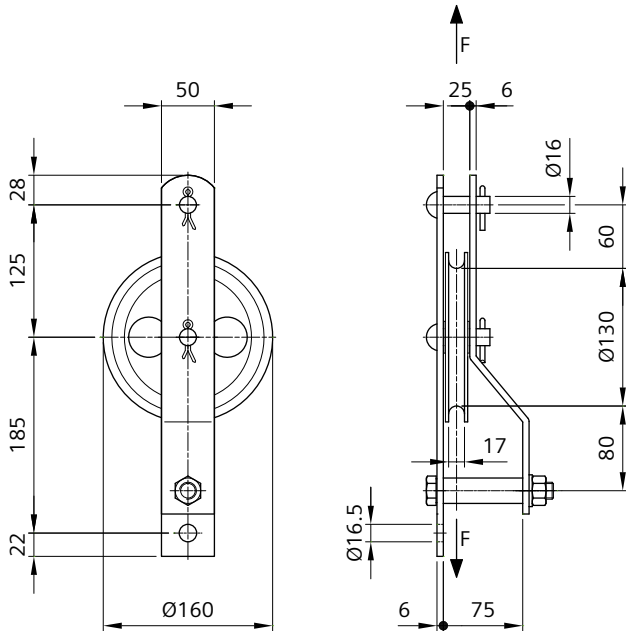


Order no.	8WL2130-0
Designation	Pulley 88, twin, connecting clevis twisted 90°
Material	
Pulley	Plastic
Suspension	stlSt
Axle	stlSt
Pin 13x40	stlSt
Split pins 5x28	Cu
for wires	up to 18 mm
Weight	1.06 kg
Perm. operating load	4 kN
Min. failing load	12 kN

Type with connecting clevis parallel on request.

Pulley 130 with suspension

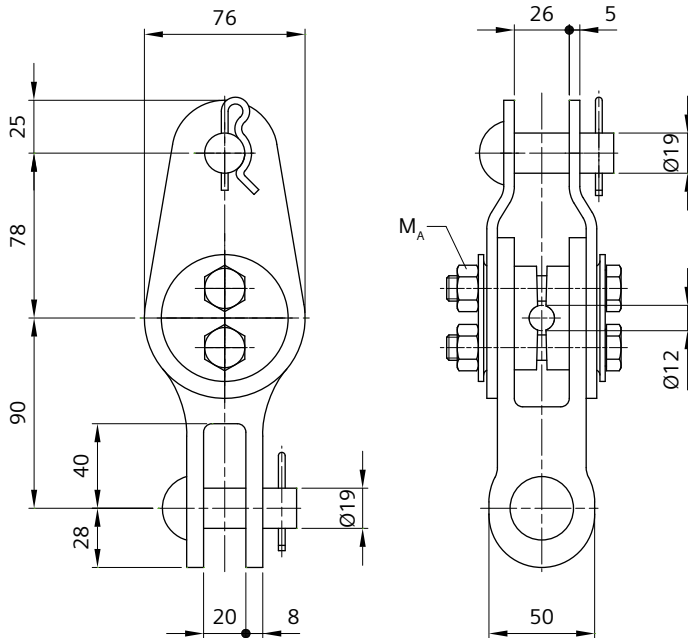
for suspension of auto-tensioned catenary wires



Order no.	8WL2132-0
Designation	Pulley 130
Material	
Pulley	CuAl
Suspension	Cu
Spacer tube	Cu
Bolt M16	stlSt
Nut, washer	stlSt
Pins 16x50	stlSt
Split pins 5x28	Cu
for wires	up to 17 mm
Weight	3.06 kg
Perm. operating load	5 kN
Min. failing load	15 kN

Cross-span wire clamp 19

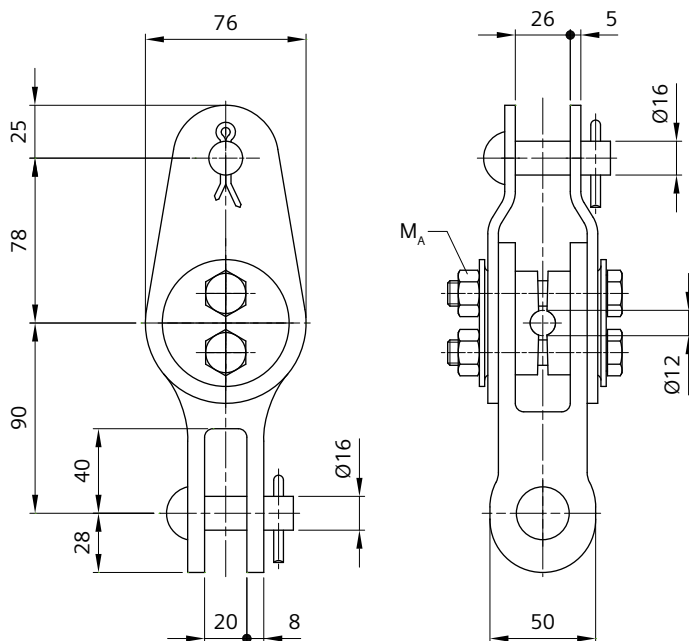
for wires acc. to DIN 48201



Order no.	8WL2140-0
Designation	Cross-span wire clamp 50-95/19
Material	
Cranked clevis	mCl
Straps	htgSt
Adjustable washers	CuAl
Bolts M12	stlSt
Nuts	stlSt
Pins 19x52	htgSt
Beta-Split pins	stlSt
for wires	50 to 95 mm ²
Weight	2.33 kg
Tightening torque M_A	56 Nm

Cross-span wire clamp 16

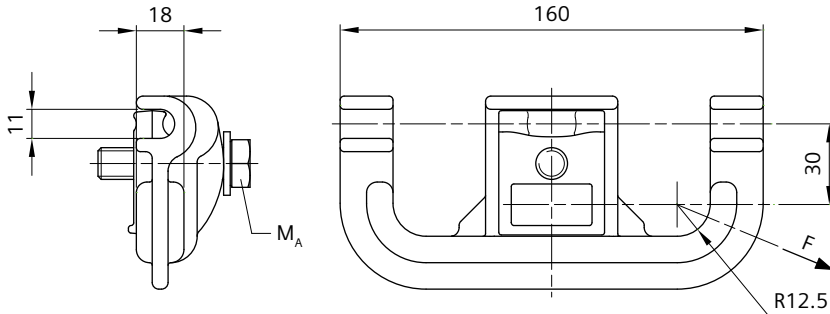
for wires acc. to DIN 48201



Order no.	8WL2140-2
Designation	Cross-span wire clamp 50-95/16
Material	
Cranked clevis	CuAl
Straps	CuAl
Adjustable washers	CuAl
Bolts M12	stlSt
Nuts	stlSt
Pins 16x50	stlSt
Split pins 5x28	Cu
for wires	50 to 95 mm ²
Weight	2.44 kg
Tightening torque M_A	56 Nm

Cross-span eye clamp

for fixing of steady arms or pull-offs at lower cross-span wire, for bronze wires acc. to DIN 48201 and stainless steel wire ropes 8WL7093-3/-4



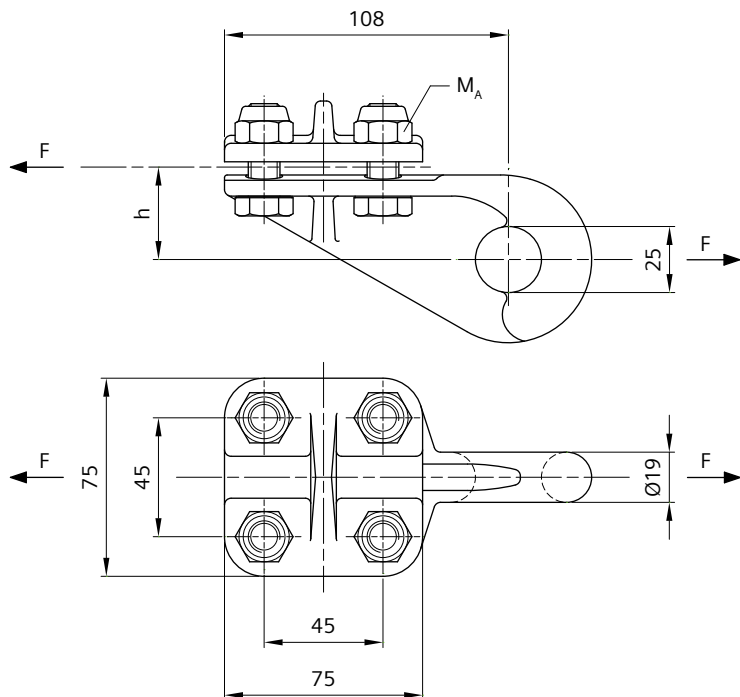
Order no.	8WL2158-0A
Designation	Cross-span eye clamp 25-70
Material	
Hoop	CuAl
Clamp cover	CuAl
Bolt M12	stlSt
Washer	stlSt
for wires	25 to 70 mm ² 8 mm (8WL7093-3) 10 mm (8WL7093-4)
Weight	0.95 kg
Perm. operating load	3 kN
Min. failing load	9 kN
Tightening torque M_A	56 Nm

The clamp cover shows one wire groove each side for wires 25 to 35 mm² respectively 50 to 70 mm².

The small groove has to be used for the stainless steel wire rope.

Cross-span eye clamp

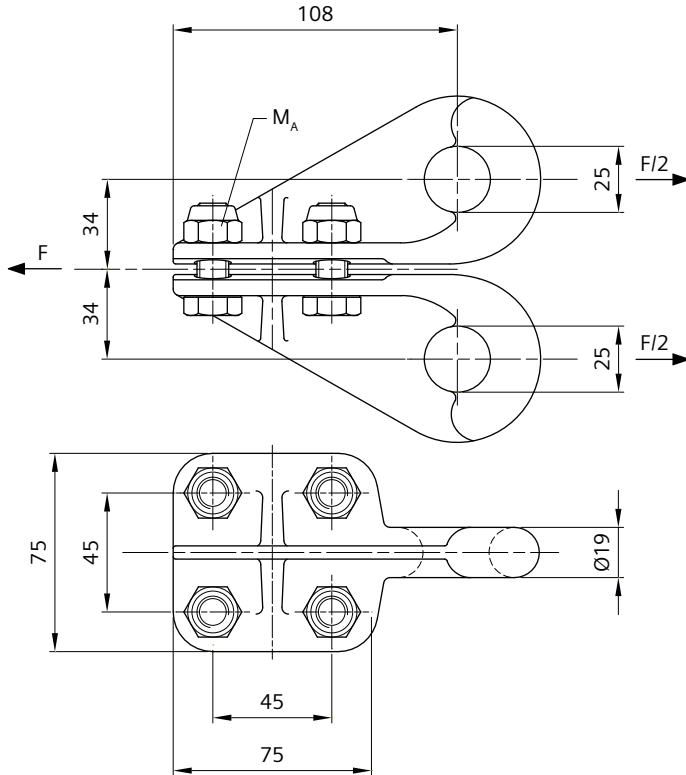
for fixing of steady arms or pull-offs at lower cross-span wire, for wires acc. to DIN 48201



Order no.	8WL2142-0	8WL2142-1
Designation	Cross-span eye clamp 50/70	Cross-span eye clamp 95
Material		
Clamp body	mICI	mICI
Clamp cover	mICI	mICI
Bolts M12	stISt	stISt
Nuts	stISt	stISt
for wires	50 and 70 mm ²	95 mm ²
Weight	1.04 kg	1.06 kg
Perm. operating load	2.5 kN	2.5 kN
Min. failing load	7.5 kN	7.5 kN
Tightening torque M_A	56 Nm	56 Nm
h	35 mm	37 mm

Double eye clamp

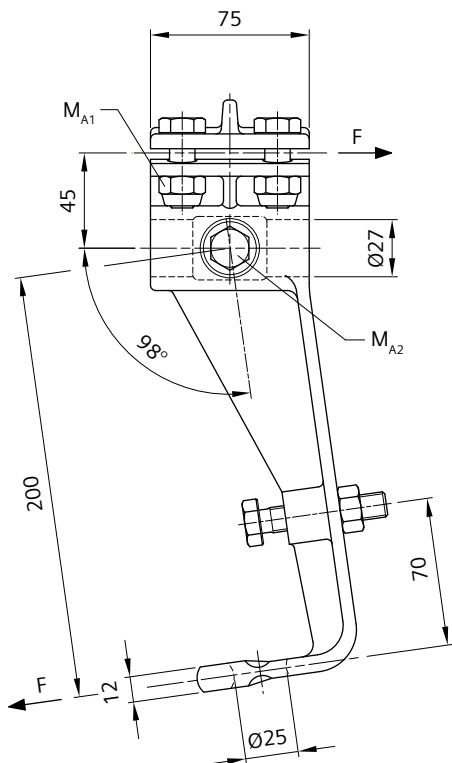
for fixing of pull-offs at lower cross-span wire, for wires acc. to DIN 48201



Order no.	8WL2142-8
Designation	Double eye clamp 50/70
Material	
Clamp body	mICI
Bolts M12	stISt
Nuts	stISt
for wires	50 and 70 mm ²
Weight	1.39 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	56 Nm

Cross-span drop bracket

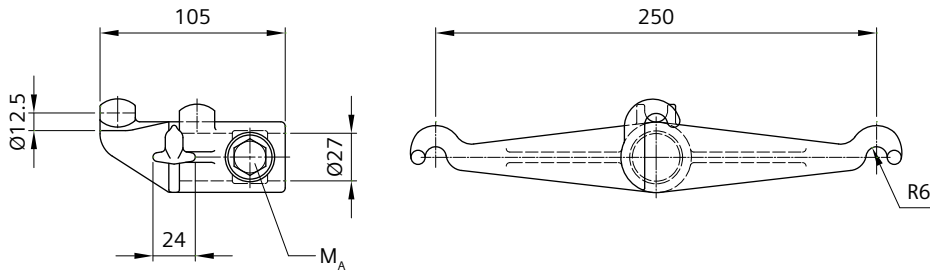
at lower cross-span wire, for wires acc. to DIN 48201, for steel tube d=26 mm



Order no.	8WL2146-0	8WL2146-1
Designation	Cross-span drop bracket 50/70	Cross-span drop bracket 95
Material		
Clamp body	mICI	mICI
Clamp cover	mICI	mICI
Cup-point screw M12	stlSt	stlSt
Bolts M12	stlSt	stlSt
Nuts	stlSt	stlSt
for wires	50 and 70 mm ²	95 mm ²
Weight	2.08 kg	2.14 kg
Perm. operating load	2.5 kN	2.5 kN
Min. failing load	7.5 kN	7.5 kN
Tightening torque M_{A1}	56 Nm	56 Nm
Tightening torque M_{A2}	40 Nm	40 Nm

Yoke for steady arm

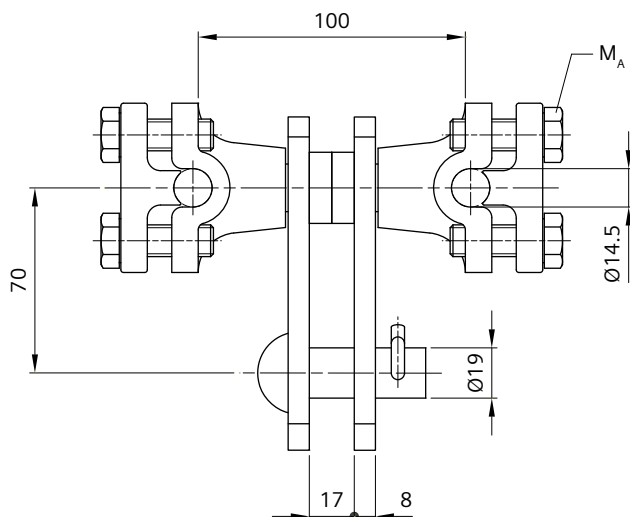
for suspension of steady arm made of steel tube $d=26$ mm at lower cross-span wire, for wires acc. to DIN 48201



Order no.	8WL2147-0
Designation	Yoke 50-95 for steady arm 26
Material	
Yoke	mICI
Cup-point screw M12	stlSt
for wires	50 to 95 mm ²
Weight	0.88 kg
Tightening torque M_A	40 Nm

Headspan wire clamp with suspension for tongue connection

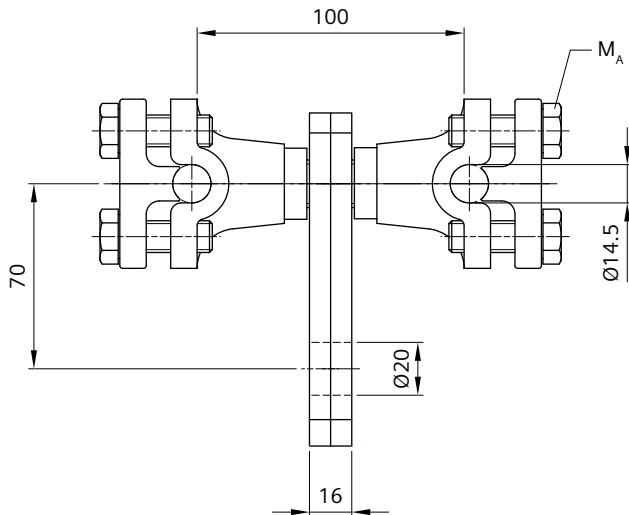
for supports on two parallel headspan wires, for bronze and copper wires acc. to DIN 48201



Order no.	8WL2144-0
Designation	Headspan wire clamp
Material	
Clamp body, cover	mIcI
Straps	Al
Bolts M12	stlSt
Nuts	stlSt
Pin 19x52	htgSt
Beta-Split pin	stlSt
for wires	50 to 120 mm ²
Weight	1.48 kg
Tightening torque M_A	56 Nm

Headspan wire clamp with suspension for clevis connection

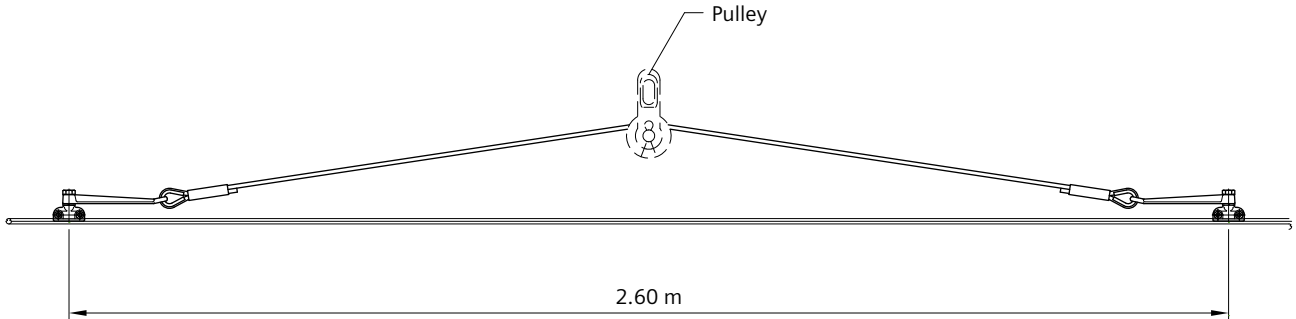
for supports on two parallel headspan wires, for bronze and copper wires acc. to DIN 48201



Order no.	8WL2144-1
Designation	Headspan wire clamp
Material	
Clamp body, cover	mCl
Straps	Al
Bolts M12	stlSt
Nuts	stlSt
for wires	50 to 120 mm ²
Weight	1.30 kg
Tightening torque M_A	56 Nm

Bridle-and-pulley suspension with synthetic wire

for auto-tensioned trolley contact wire at cantilever and cross-span support, without pulley, for contact wires acc. to EN 50149



Order no.	8WL3520-2	8WL3520-2A
Designation	Bridle-and-pulley suspension for single contact wire	Bridle-and-pulley suspension for twin contact wire
Material		
Synthetic wire d=9 mm	Polyester with polyamide sheath (Minoroc-wire)	Polyester with polyamide sheath (Minoroc-wire)
Contact wire clips	CuAl	-
Twin contact wire clips	-	CuAl
Pull-off arms	CuAl	CuAl
Thimbles	Cu-ETP	Cu-ETP
Crimped connectors	Cu-ETP	Cu-ETP
Spring washers	stlSt	stlSt
Bolts M16	stlSt	stlSt
for contact wires	AC-80 to 150	AC-80 to 150
Weight	1.71 kg	1.91 kg
Pressing die	8WL7152-8	8WL7152-8

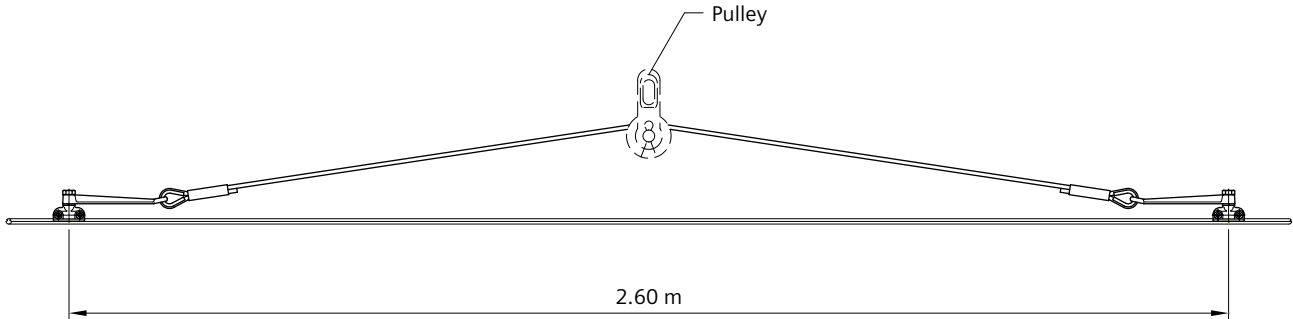
Minoroc-wire tested acc. to EN 50345.

Pulley 8WL3521-0 must be ordered separately, see page 397.

Types for other contact wires on request.

Bridle-and-pulley suspension with bronze wire

for auto-tensioned trolley contact wire at cantilever and cross-span support, without pulley, for contact wires acc. to EN 50149



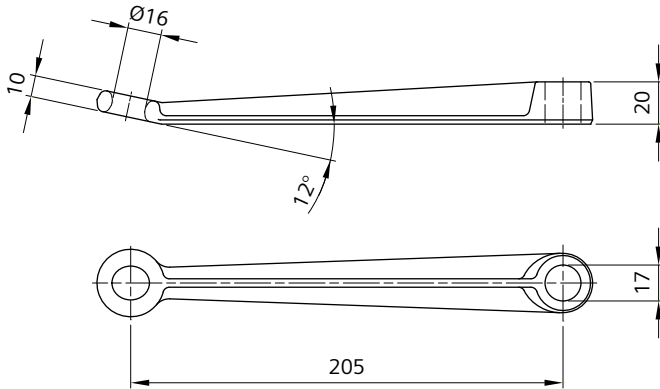
Order no.	8WL3520-3	8WL3520-3A
Designation	Bridle-and-pulley suspension for single contact wire	Bridle-and-pulley suspension for twin contact wire
Material		
Wire DIN 48201-35/7	BzII	BzII
Contact wire clips	CuAl	-
Twin contact wire clips	-	CuAl
Pull-off arms	CuAl	CuAl
Thimbles	Cu-ETP	Cu-ETP
Crimped connectors	Cu-ETP	Cu-ETP
Spring washers	stlSt	stlSt
Bolts M16	stlSt	stlSt
for contact wires	AC-80 to 150	AC-80 to 150
Weight	2.34 kg	2.54 kg
Pressing die	8WL7152-4	8WL7152-4

Pulley 8WL3521-0 must be ordered separately, see page 397.

Types for other contact wires on request.

Pull-off arm

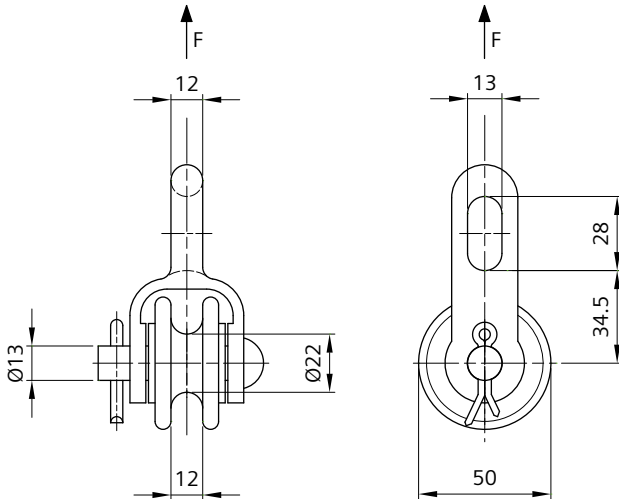
for bridle-and-pulley suspension



Order no.	8WL3523-0
Designation	Pull-off arm
Material	CuAl
Weight	0.28 kg

Rope pulley

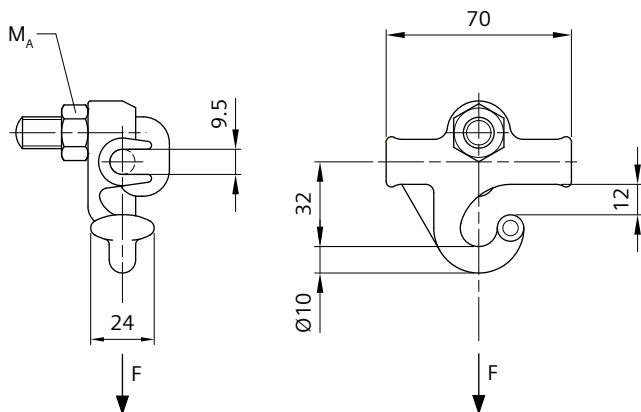
for bridle-and-pulley suspension



Order no.	8WL3521-0
Designation	Rope pulley
Material	
Clevis	CuAl
Pulley	Polyamide
Pin 13x55	Cu
Split pin 5x28	Cu
for wires	up to 12 mm
Weight	0.26 kg
Perm. operating load	1.5 kN
Min. failing load	4.5 kN

Cross-span hook clamp

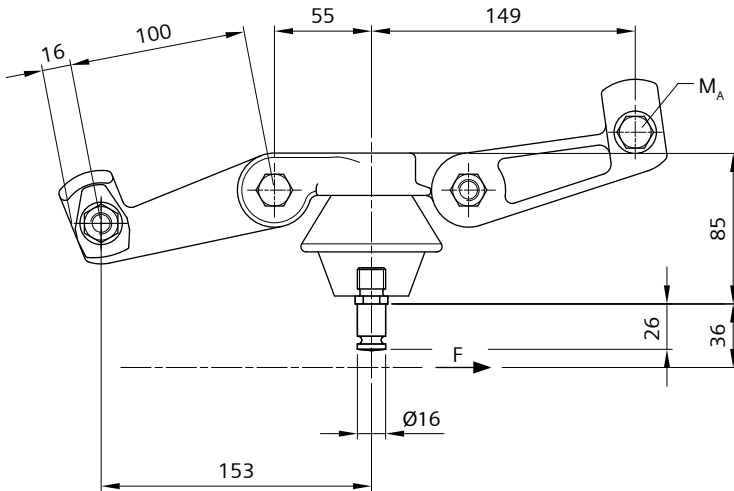
for suspension of auto-tensioned contact wires in cross-span, for wires acc. to DIN 48201 and stainless steel wire ropes
8WL7093-3/-4



Order no.	8WL2150-0
Designation	Cross-span hook clamp 25-50
Material	
Cross-span hook clamp	CuAl
Hook bolt M12	stlSt
Nut	stlSt
for wires	25 to 50 mm ² 8 mm (8WL7093-3) 10 mm (8WL7093-4)
Weight	0.23 kg
Perm. operating load	2.5 kN
Min. failing load	7.5 kN
Tightening torque M_A	56 Nm

Line hanger 16R, insulated

for curves and straight lines, for stranded wires acc. to DIN 48201, single wires and stainless steel wire ropes 8WL7093-3/-4

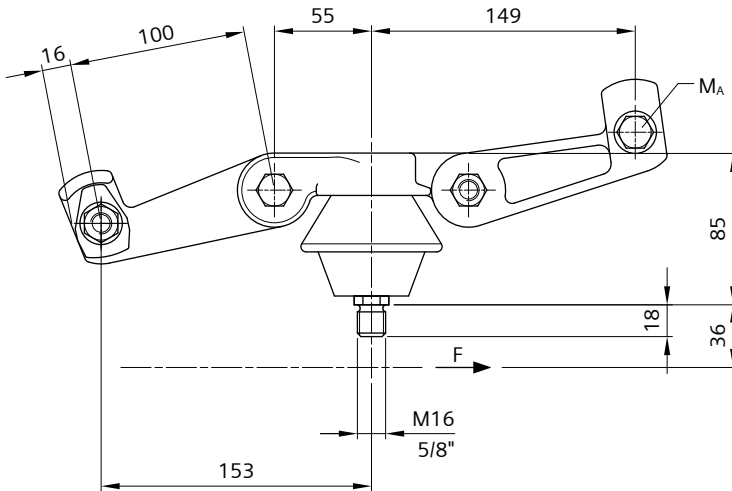


Order no.	8WL3554-6
Designation	Line hanger 16R
Material	
Insulator body	Cast resin, brown
Fittings	CuAl
Grooved stud	stlSt
Bolts M12	stlSt
Nuts, washers	stlSt
for single wires	5 - 6 mm
for wires	35 to 50 mm ² 8 mm (8WL7093-3) 10 mm (8WL7093-4)
Weight	2.0 kg
Perm. operating load	2.5 kN
Min. failing load	8.0 kN
Tightening torque M_A	56 Nm
Nominal voltage	1.5 kV DC
Creepage distance	75 mm

Contact wire clips see Chapter 02-09.

Line hanger M16-5/8", insulated

for curves and straight lines, for stranded wires acc. to DIN 48201, single wires and stainless steel wire ropes 8WL7093-3/-4

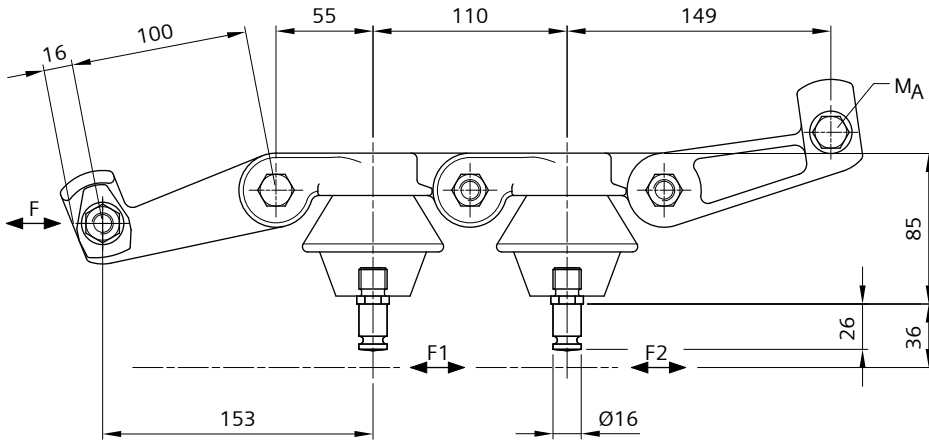


Order no.	8WL3554-7	8WL3554-8
Designation	Line hanger M16	Line hanger 5/8"
Material		
Insulator body	Cast resin, brown	Cast resin, brown
Fittings	CuAl	CuAl
Threaded stud	stlSt	stlSt
Bolts M12	stlSt	stlSt
Nuts, washers	stlSt	stlSt
for single wires	5 - 6 mm	5 - 6 mm
for wires	35 to 50 mm ² 8 mm (8WL7093-3) 10 mm (8WL7093-4)	35 to 50 mm ² 8 mm (8WL7093-3) 10 mm (8WL7093-4)
Weight	2.0 kg	2.0 kg
Perm. operating load	2.5 kN	2.5 kN
Min. failing load	8.0 kN	8.0 kN
Tightening torque M_A	56 Nm	56 Nm
Nominal voltage	1.5 kV DC	1.5 kV DC
Creepage distance	75 mm	75 mm

Contact wire clips see Chapter 02-09.

Double line hanger 16R, insulated

for curves and straight lines, for stranded wires acc. to DIN 48201, single wires and stainless steel wire ropes 8WL7093-3/-4

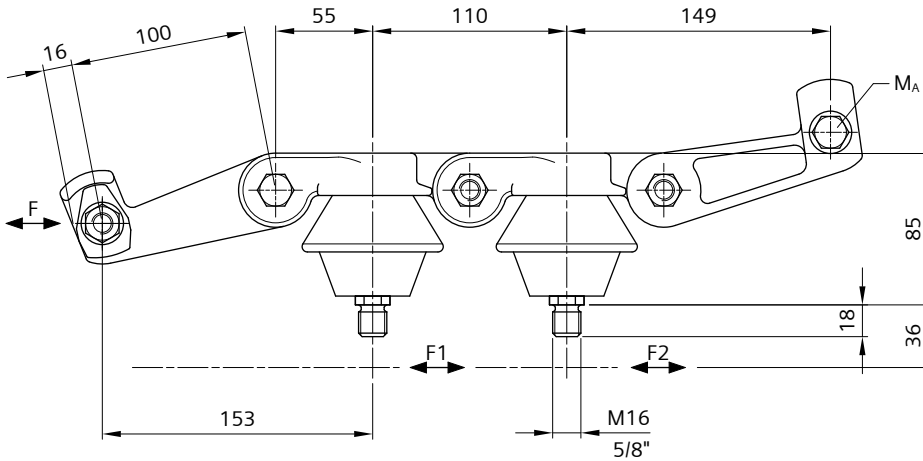


Order no.	8WL3555-6
Designation	Double line hanger 16R
Material	
Insulator bodies	Cast resin, brown
Fittings	CuAl
Grooved studs	stlSt
Bolts M12	stlSt
Nuts, washers	stlSt
for single wires	5 - 6 mm
for wires	35 to 50 mm ² 8 mm (8WL7093-3) 10 mm (8WL7093-4)
Weight	3.0 kg
Perm. operating load (F)	3.0 kN
Min. failing load (F)	9.6 kN
Perm. operating load (F1/ F2)	2.5 kN
Min. failing load (F1/F2)	8.0 kN
Tightening torque M_A	56 Nm
Nominal voltage	1.5 kV DC
Creepage distance	75 mm

Contact wire clips see Chapter 02-09.

Double line hanger M16-5/8", insulated

for curves and straight lines, for stranded wires acc. to DIN 48201, single wires and stainless steel wire ropes 8WL7093-3/-4

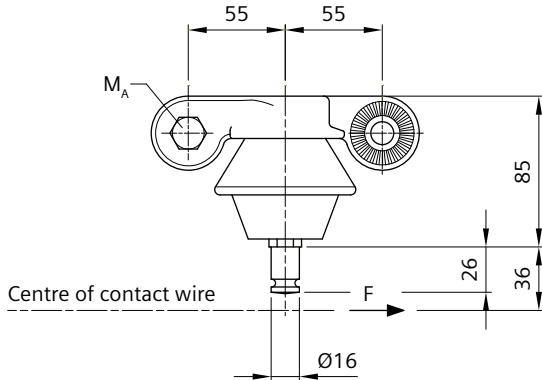


Order no.	8WL3555-7	8WL3555-8
Designation	Double line hanger M16	Double line hanger 5/8"
Material		
Insulator bodies	Cast resin, brown	Cast resin, brown
Fittings	CuAl	CuAl
Threaded studs	stlSt	stlSt
Bolts M12	stlSt	stlSt
Nuts, washers	stlSt	stlSt
for single wires	5 - 6 mm	5 - 6 mm
for wires	35 to 50 mm ² 8 mm (8WL7093-3) 10 mm (8WL7093-4)	35 to 50 mm ² 8 mm (8WL7093-3) 10 mm (8WL7093-4)
Weight	3.0 kg	3.0 kg
Perm. operating load (F)	3.0 kN	3.0 kN
Min. failing load (F)	9.6 kN	9.6 kN
Perm. operating load (F1/ F2)	2.5 kN	2.5 kN
Min. failing load (F1/F2)	8.0 kN	8.0 kN
Tightening torque M_A	56 Nm	56 Nm
Nominal voltage	1.5 kV DC	1.5 kV DC
Creepage distance	75 mm	75 mm

Contact wire clips see Chapter 02-09.

Intermediate line hanger 16R, insulated

for triple line hanger, for stranded wires acc. to DIN 48201, single wires and stainless steel wire ropes 8WL7093-3/-4

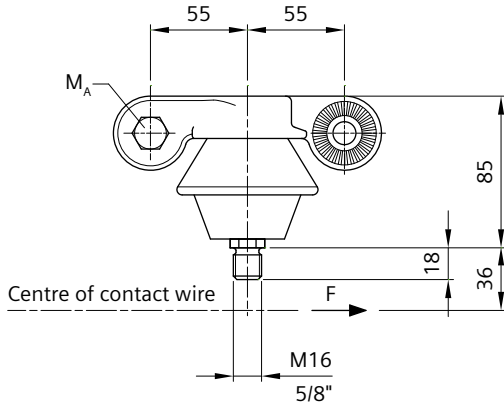


Order no.	8WL3553-7
Designation	Intermediate line hanger 16R
Material	
Insulator body	Cast resin, brown
Fittings	CuAl
Grooved stud	stlSt
Bolt M12	stlSt
Nut, washer	stlSt
for single wires	5 - 6 mm
for wires	35 to 50 mm ² 8 mm (8WL7093-3) 10 mm (8WL7093-4)
Weight	1.2 kg
Perm. operating load	2.5 kN
Min. failing load	8.0 kN
Tightening torque M_A	56 Nm
Nominal voltage	1.5 kV DC
Creepage distance	75 mm

The load limit is 2.5 respectively 8.0 kN summed up for several intermediate line hangers following each other.
Contact wire clips see Chapter 02-09.

Intermediate line hanger M16-5/8", insulated

for triple line hanger, for stranded wires acc. to DIN 48201, single wires and stainless steel wire ropes 8WL7093-3/-4

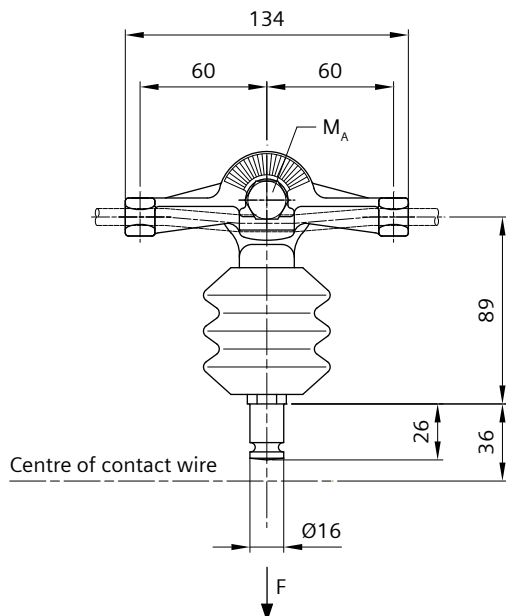


Order no.	8WL3553-7A	8WL3553-8
Designation	Intermediate line hanger M16	Intermediate line hanger 5/8"
Material		
Insulator body	Cast resin, brown	Cast resin, brown
Fittings	CuAl	CuAl
Threaded stud	stlSt	stlSt
Bolt M12	stlSt	stlSt
Nut, washer	stlSt	stlSt
for single wires	5 - 6 mm	5 - 6 mm
for wires	35 to 50 mm ² 8 mm (8WL7093-3) 10 mm (8WL7093-4)	35 to 50 mm ² 8 mm (8WL7093-3) 10 mm (8WL7093-4)
Weight	1.2 kg	1.2 kg
Perm. operating load	2.5 kN	2.5 kN
Min. failing load	8.0 kN	8.0 kN
Tightening torque M_A	56 Nm	56 Nm
Nominal voltage	1.5 kV DC	1.5 kV DC
Creepage distance	75 mm	75 mm

The load limit is 2.5 respectively 8.0 kN summed up for several intermediate line hangers following each other.
Contact wire clips see Chapter 02-09.

Line hanger 16R, insulated

for supports at cross-spans in straight line, for stranded wires acc. to DIN 48201, single wires and stainless steel wire ropes 8WL7093-3/-4



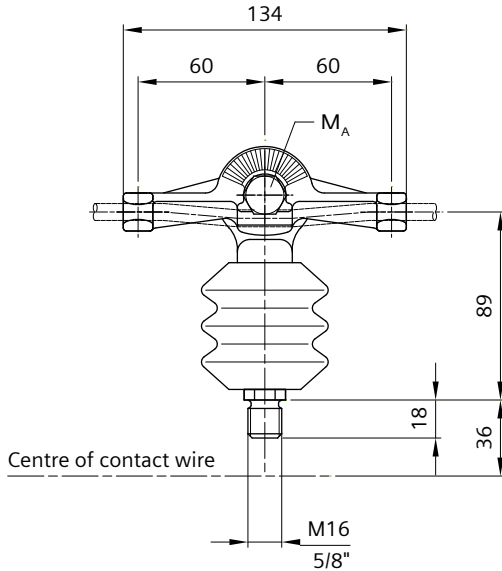
Order no.	8WL3600-1
Designation	Line hanger 16R
Material	
Insulator body	Cast resin, brown
Fittings	CuAl
Grooved stud	stlSt
Bolt M12	stlSt
Nut	stlSt
Spring washer	stlSt
for single wires	5 - 6 mm
for wires	up to 50 mm ² 8 mm (8WL7093-3) 10 mm (8WL7093-4)
Weight	0.70 kg
Perm. operating load	1 kN
Min. failing load	3.2 kN
Tightening torque M_A	35 Nm
Nominal voltage	1.5 kV DC
Creepage distance	85 mm

Twin arm adjustable up to 25°.

Contact wire clips see Chapter 02-09.

Line hanger M16-5/8", insulated

for supports at cross-spans in straight line, for stranded wires acc. to DIN 48201, single wires and stainless steel wire ropes 8WL7093-3/-4



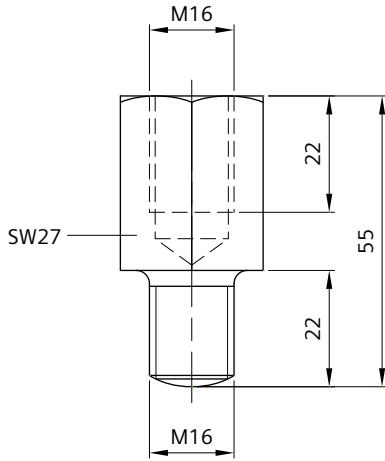
Order no.	8WL3600-3	8WL3600-5
Designation	Line hanger M16	Line hanger 5/8"
Material		
Insulator body	Cast resin, brown	Cast resin, brown
Fittings	CuAl	CuAl
Threaded stud	stlSt	stlSt
Bolt M12	stlSt	stlSt
Nut	stlSt	stlSt
Spring washer	stlSt	stlSt
for single wires	5 - 6 mm	5 - 6 mm
for wires	up to 50 mm ² 8 mm (8WL7093-3) 10 mm (8WL7093-4)	up to 50 mm ² 8 mm (8WL7093-3) 10 mm (8WL7093-4)
Weight	0.70 kg	0.70 kg
Perm. operating load	1 kN	1 kN
Min. failing load	3.2 kN	3.2 kN
Tightening torque M_A	35 Nm	35 Nm
Nominal voltage	1.5 kV DC	1.5 kV DC
Creepage distance	85 mm	85 mm

Twin arm adjustable up to 25°.

Contact wire clips see Chapter 02-09.

Extension piece

for line hanger



Order no.	8WL3534-4
Designation	Extension piece M16
Material	stlSt
Weight	0.16 kg

Other sizes and threads on request.

Chapter 02

Standard Products

Tensioning equipment	70
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Contact wires, single and stranded wires	788
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Technical comments

Application

Insulators separate energized components of the contact line from each other and from earth. They must fulfill both electrical and mechanical requirements. Environmental resistance plays an equally important role.

Contact wire insulators with emergency traversing properties are installed in overlap sections in the lifted and terminated contact wire.

Types

Siemens offers the following insulator types:

- Silicone composite insulators for catenary systems, head-spans, cantilevers and feeder lines
- Contact wire insulators with emergency traversing properties
- Silicone-coated loop insulators to insulate stranded wires and single wires against high environmental pollution
- Low-cost loop insulators as alternative for optimal environmental conditions
- Insulating rods made of GRP with copper-aluminium fittings, e.g. for catenary wire insulations
- Insulator bodies of cast resin for steady arms, line hangers, cantilevers, etc.

Special features

The **silicone composite insulators** offer additional outstanding advantages in comparison to ceramic and glass insulators:

- Soil and water-repellent plastic surface of the composite insulators
- Resistant to breakage and against vandalism
- Easy to install due to lower weight and robustness

Silicone-coated loop insulators offer further special features:

- Flexible application thanks to very sleek geometry
- Stainless steel as combination-neutral thimble material
- Patent-protected thimble design with optimal transfer of load of various pin diameters or wire thimbles
- Installation of two thimbles in an angle of approx. 90 ° with wires BzII up to 35 mm², e.g. for cross-spans

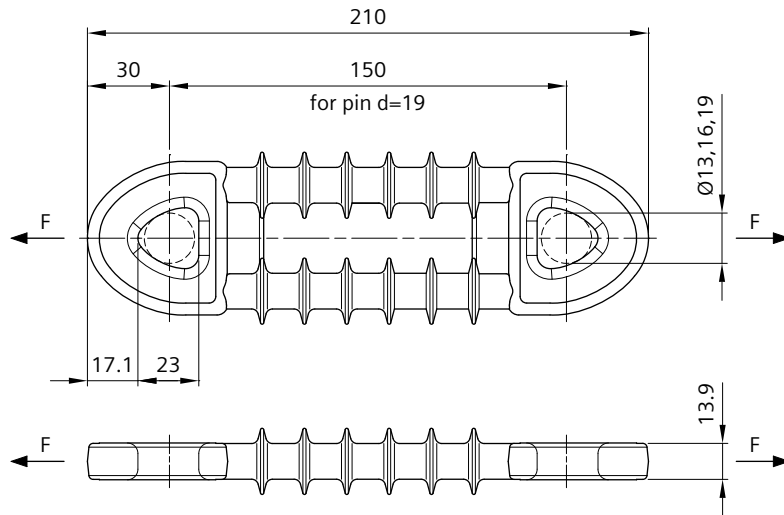
Thanks to their sleek design and light weight, **contact wire insulators** allow a reduction of the vertical installation height of the insulator, e.g. when there is limited space such as in tunnels or under structures. In this way, they allow cost-effective system solutions in overhead contact line systems such as a reduced arrangement of overlap sections in the overall system.

Note

In addition to considering the technical characteristics when selecting insulators, you must also determine the creepage distance due to contamination at the installation location. The relevant standards must be complied with. Further information can be found in the relevant product descriptions.

Loop insulator with silicone coating up to 1.5 kV DC

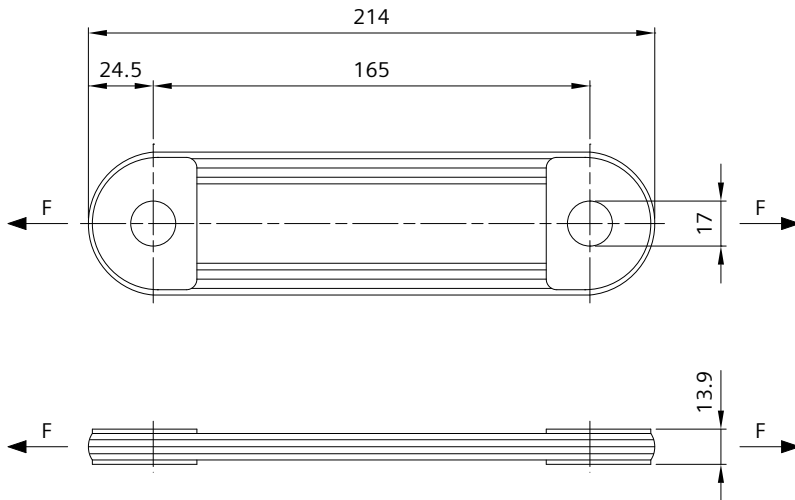
for insulation of wires and section insulator suspension, for pin diameter 13, 16 and 19 mm and thimbles



Order no.	8WL3001-2
Designation	Loop insulator with silicone coating
Material	
Insulating strip	ECR glass, EP resin
Strip coating, sheds	Silicone, color grey
Thimbles	stlSt
Weight	0.31 kg
Specified Mechanical Load (SML)	70 kN
Perm. operating load	23 kN
Nominal voltage	1.5 kV DC
Rated insulation voltage	1.8 kV DC
Min. creepage distance	150 mm
Min. clearance in air	108 mm
Lightning impulse withstand voltage	84 kV
Power-frequency withstand voltage, wet	31 kV

Loop insulator up to 1,5 kV DC

for section insulator suspension and insulation of wires

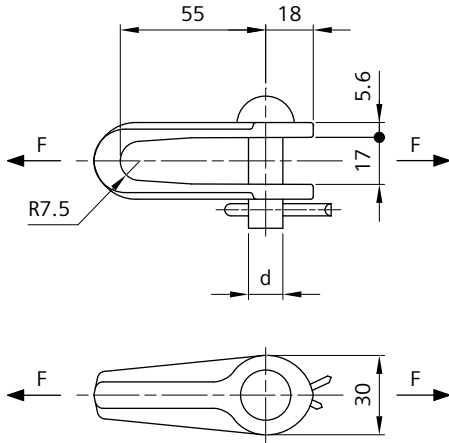


Order no.	8WL3001-8
Designation	Loop insulator
Material	
Insulating strip	ECR glass, EP resin, color brown
Thimbles	CuAl
Weight	0.24 kg
Specified Mechanical Load (SML)	70 kN
Perm. operating load	23 kN
Nominal voltage	1.5 kV DC
Min. creepage distance/ clearance in air	130 mm
Lightning impulse withstand voltage	95 kV
Power-frequency withstand voltage, wet	21 kV

Only for optimal environmental conditions. The optical appearance of the surface can decrease due to environmental influences.

Shackle with pin

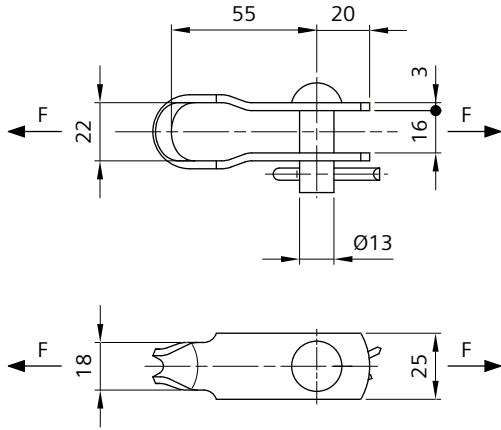
for loop insulators



Order no.	8WL3002-5	8WL3002-7
Designation	Shackle 13	Shackle 16
Material		
Shackle	CuAl	CuAl
Pin 13x40	stlSt	-
Pin 16x40	-	stlSt
Split pin 5x28	Cu	Cu
Weight	0.20 kg	0.22 kg
Perm. operating load	12 kN	20 kN
Min. failing load	36 kN	60 kN
d	13 mm	16 mm

Shackle with pin

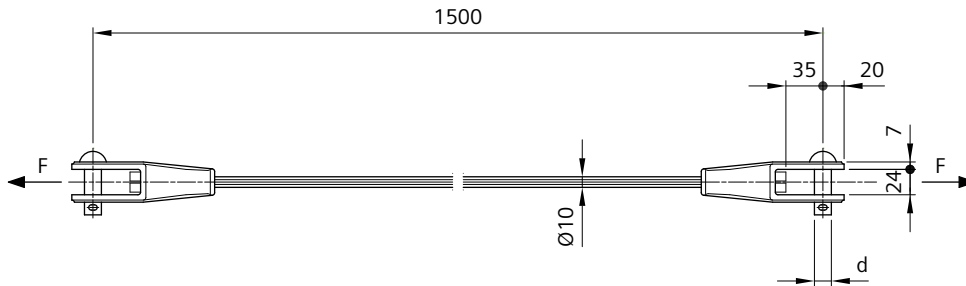
for loop insulators



Order no.	8WL3004-2
Designation	Shackle 13
Material	
Shackle	stlSt
Pin 13x34	stlSt
Split pin 5x28	Cu
Weight	0.12 kg
Perm. operating load	10 kN
Min. failing load	32 kN

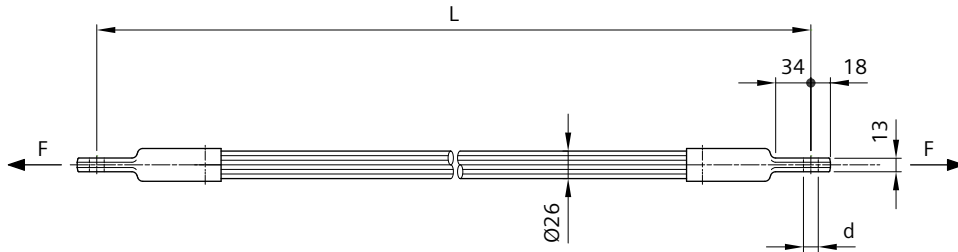
Insulating rod 10 clevis/clevis

for insulation of tension-loaded components



Order no.	8WL3020-1	8WL3020-6
Designation	Insulating 10 rod clevis/clevis 16	Insulating rod 10 clevis/clevis 19
Material		
Insulating rod	GRP, color RAL1020 (olive yellow)	GRP, color RAL1020 (olive yellow)
End fittings	CuAl	CuAl
Pins 16x50	stlSt	-
Pins 19x52	-	stlSt
Split pins 5x28	Cu	Cu
Weight	1.20 kg	1.20 kg
Perm. operating load	10 kN	10 kN
Min. failing load	32 kN	32 kN
Nominal voltage	1.5 kV DC	1.5 kV DC
Min. creepage distance	1270 mm	1270 mm
d	16 mm	19 mm

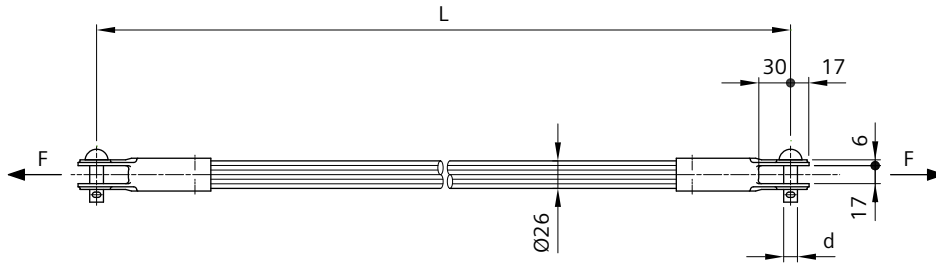
Insulating rod 26 eye/eye



Order no.	8WL3021-0	8WL3021-1	8WL3021-1A
Designation	Insulating rod 26 eye/eye 14	Insulating rod 26 eye/eye 17	Insulating rod 26 eye/eye 17
Material			
Insulating rod	GRP, color RAL1020 (olive yellow)	GRP, color RAL1020 (olive yellow)	GRP, color RAL1020 (olive yellow)
End fittings	CuAl	CuAl	CuAl
Grooved pins	stlSt	stlSt	stlSt
Weight	1.45 kg	1.45 kg	1.90 kg
Perm. operating load	10 kN	20 kN	20 kN
Min. failing load	32 kN	66 kN	66 kN
Nominal voltage	1.5 kV DC	1.5 kV DC	1.5 kV DC
Min. creepage distance	760 mm	760 mm	1260 mm
d	14 mm	17 mm	17 mm
L	1000 mm	1000 mm	1500 mm

Other lengths and colors on request.

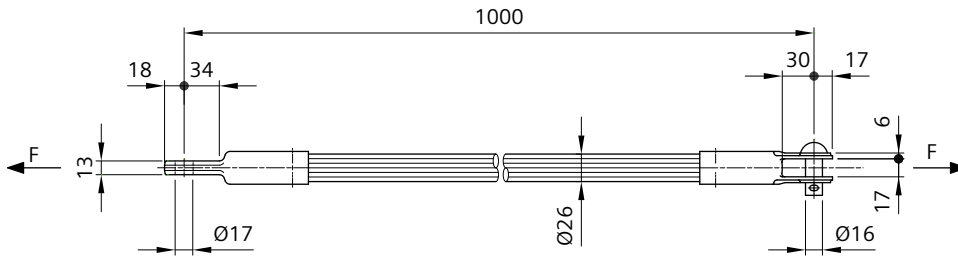
Insulating rod 26 clevis/clevis



Order no.	8WL3021-2	8WL3021-3	8WL3021-3B
Designation	Insulating rod 26 clevis/clevis 13	Insulating rod 26 clevis/clevis 16	Insulating rod 26 clevis/clevis 16
Material			
Insulating rod	GRP, color RAL1020 (olive yellow)	GRP, color RAL1020 (olive yellow)	GRP, color RAL6022 (olive drab)
End fittings	CuAl	CuAl	CuAl
Grooved pins	stlSt	stlSt	stlSt
Pins 13x45	stlSt	-	-
Pins 16x45	-	stlSt	stlSt
Split pins 5x28	Cu	Cu	Cu
Weight	1.50 kg	1.56 kg	2.02 kg
Perm. operating load	10 kN	20 kN	20 kN
Min. failing load	32 kN	66 kN	66 kN
Nominal voltage	1.5 kV DC	1.5 kV DC	1.5 kV DC
Min. creepage distance	780 mm	780 mm	1280 mm
d	13 mm	16 mm	16 mm
L	1000 mm	1000 mm	1500 mm

Other lengths and colors on request.

Insulating rod 26 eye/clevis

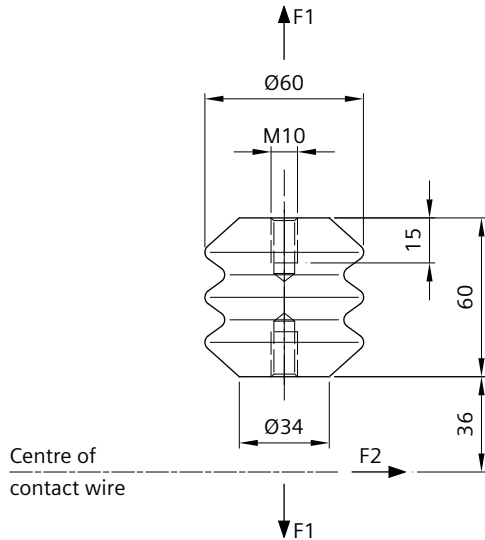


Order no.	8WL3021-7
Designation	Insulating rod 26 eye/clevis 16
Material	
Insulating rod	GRP, color RAL1020 (olive yellow)
End fittings	CuAl
Grooved pins	stlSt
Pin 16x45	stlSt
Split pin 5x28	Cu
Weight	2.00 kg
Perm. operating load	20 kN
Min. failing load	66 kN
Nominal voltage	1.5 kV DC
Min. creepage distance	770 mm

Other lengths and colors on request.

Insulator body 1.5 kV DC

for steady arms, contact wire and elastic supports, cantilevers and feeder lines



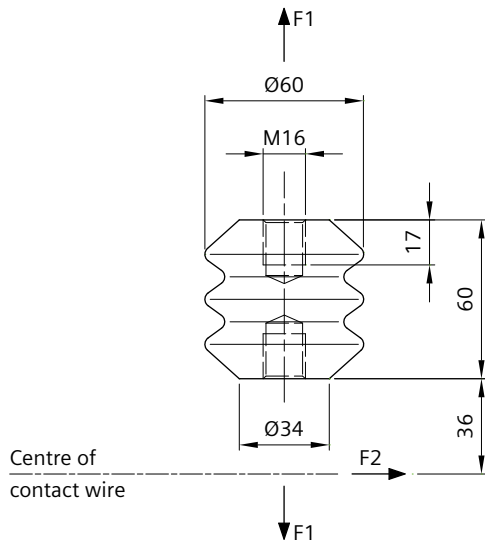
Order no.	8WL3122-3
Designation	Insulator body M10/M10
Material	Cycloaliphatic cast resin, brown
Weight	0.26 kg
Perm. operating load/ tension (F1)	3.75 kN
Min. failing load/ tension (F1)	12 kN
Perm. operating load/ bending (F2)	1.0 kN
Min. failing load/ bending (F2)	3.2 kN
Nominal voltage	1.5 kV DC
Creepage distance	85 mm
Lightning impulse withstand voltage	60 kV
Power-frequency withstand voltage, wet	15 kV

Max. tightening torque for fastening screws M10 is 32 Nm.

The bolted joints have to be protected against humidity after the assembly (e.g. with sealing compound).

Insulator body 1.5 kV DC

for steady arms, contact wire and elastic supports, cantilevers and feeder lines

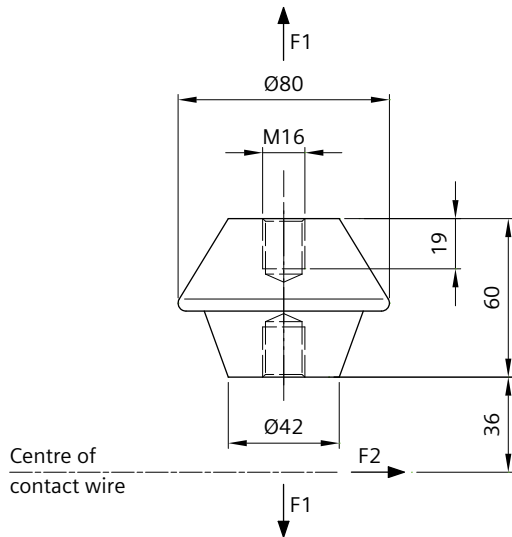


Order no.	8WL3122-1
Designation	Insulator body M16/M16
Material	Cycloaliphatic cast resin, brown
Weight	0.27 kg
Perm. operating load/ tension (F1)	7.5 kN
Min. failing load/ tension (F1)	24 kN
Perm. operating load/ bending (F2)	2.0 kN
Min. failing load/ bending (F2)	6.4 kN
Nominal voltage	1.5 kV DC
Creepage distance	85 mm
Lightning impulse withstand voltage	60 kV
Power-frequency withstand voltage, wet	15 kV

Max. tightening torque for fastening screws M16 is 135 Nm. The bolted joints have to be protected against humidity after the assembly (e.g. with sealing compound).

Insulator body 1.5 kV DC

for steady arms, contact wire and elastic supports, cantilevers and feeder lines

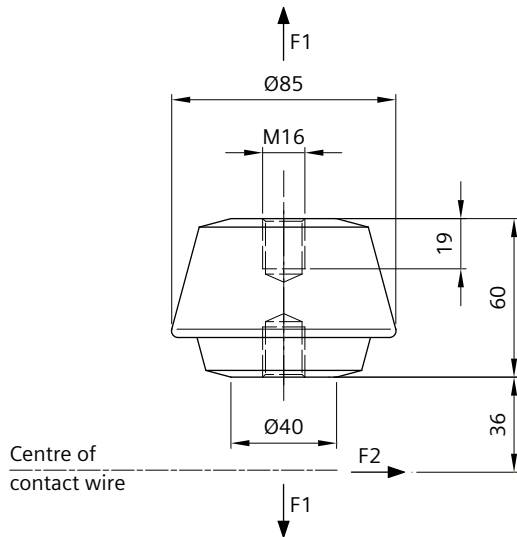


Order no.	8WL3122-2
Designation	Insulator body M16/M16
Material	Cycloaliphatic cast resin, brown red
Weight	0.34 kg
Perm. operating load/ tension (F1)	9.4 kN
Min. failing load/ tension (F1)	30 kN
Perm. operating load/ bending (F2)	2.5 kN
Min. failing load/ bending (F2)	8.0 kN
Nominal voltage	1.5 kV DC
Creepage distance	75 mm
Lightning impulse withstand voltage	60 kV
Power-frequency withstand voltage, wet	15 kV

Max. tightening torque for fastening screws M16 is 135 Nm. The bolted joints have to be protected against humidity after the assembly (e.g. with sealing compound).

Insulator body 1.5 kV DC

for steady arms, contact wire and elastic supports, cantilevers and feeder lines

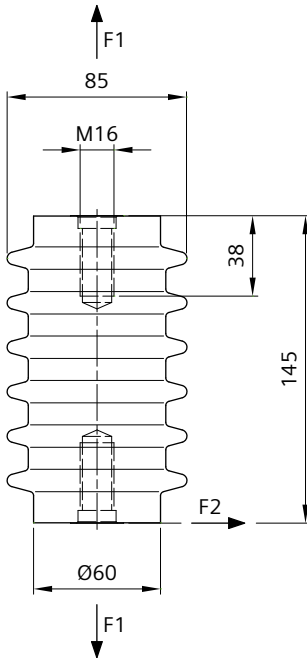


Order no.	8WL3122-4
Designation	Insulator body M16/M16
Material	Cycloaliphatic cast resin, brown
Weight	0.54 kg
Perm. operating load/ tension (F1)	10 kN
Min. failing load/ tension (F1)	32 kN
Perm. operating load/ bending (F2)	2.5 kN
Min. failing load/ bending (F2)	8.0 kN
Nominal voltage	1.5 kV DC
Creepage distance	90 mm
Lightning impulse withstand voltage	60 kV
Power-frequency withstand voltage, wet	15 kV

Max. tightening torque for fastening screws M16 is 135 Nm. The bolted joints have to be protected against humidity after the assembly (e.g. with sealing compound).

Insulator body 3 kV DC

for cantilevers and feeder lines



Order no.	8WL3120-5
Designation	Insulator body M16/M16
Material	Cycloaliphatic cast resin, brown red
Weight	1.24 kg
Perm. operating load/ tension (F1)	16 kN
Min. failing load/ tension (F1)	51 kN
Perm. operating load/ bending (F2)	3.0 kN
Min. failing load/ bending (F2)	9.6 kN
Nominal voltage	3 kV DC
Creepage distance	220 mm
Lightning impulse withstand voltage	95 kV
Power-frequency withstand voltage, wet	35 kV

Min. screwed-in depth of threaded pins: 25 to 30 mm.

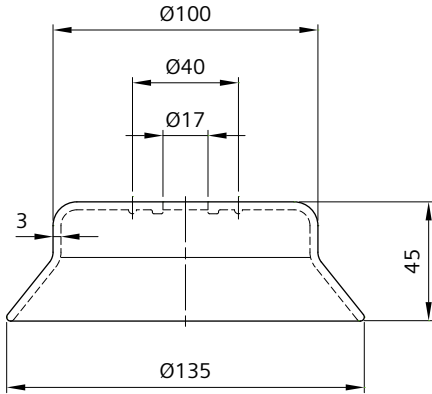
Max. tightening torque for fastening screws M16 is 135 Nm.

The bolted joints have to be protected against humidity after the assembly (e.g. with sealing compound).

Cantilever connecting parts 8WL2188-3 and 8WL2190-3 see Chapter 02-05.

Protection cap

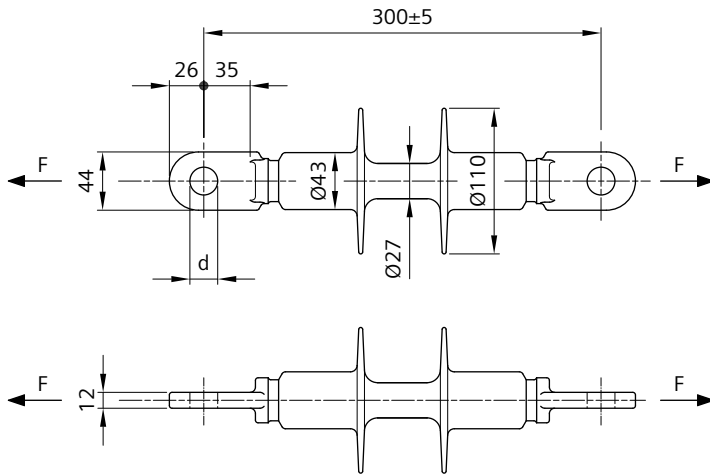
for insulator body 8WL3120-5



Order no.	8WL3126-0
Designation	Protection cap
Material	Polyamide, black
Weight	0.08 kg

Composite insulator up to 3 kV DC, tongue/tongue

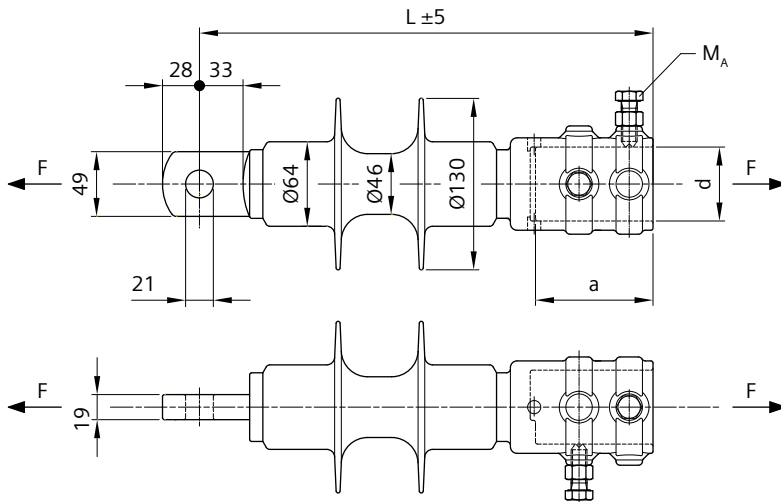
for catenaries and terminations



Order no.	8WL3088-1A	8WL3088-1B
Designation	Composite insulator tongue 21	Composite insulator tongue 17
Material		
Insulator body	GRP, silicone	GRP, silicone
Fittings	htgSt	htgSt
Weight	1.5 kg	1.5 kg
Specified Cantilever Load (SCL)	3.2 kN	3.2 kN
Max. design cantilever load (MDCL)	1 kN (equivalent to 300 Nm)	1 kN (equivalent to 300 Nm)
Specified Mechanical Load (SML)	90 kN	90 kN
Perm. operating load/ tension	30 kN	30 kN
Nominal voltage	3 kV DC	3 kV DC
Min. creepage distance	315 mm	315 mm
Min. clearance in air	195 mm	195 mm
Lightning impulse withstand voltage	145 kV	145 kV
Power-frequency withstand voltage, wet	50 kV	50 kV
d	21 mm	17 mm

Composite insulator up to 3 kV DC, tongue/tube 55-70

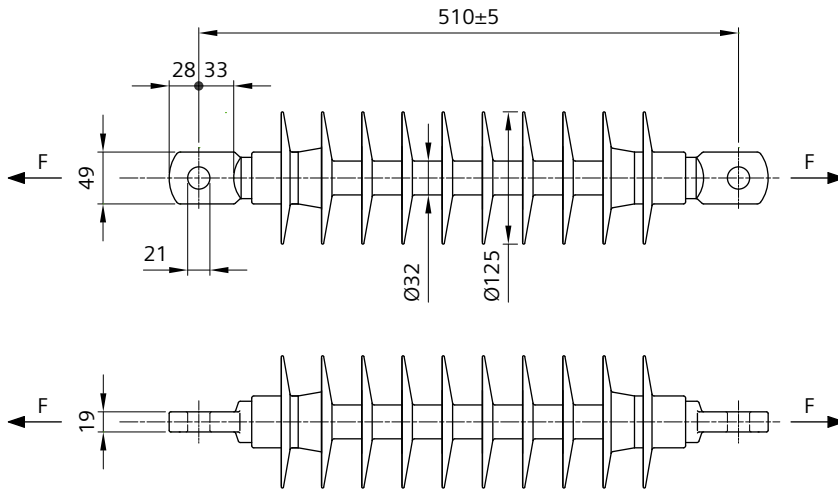
for cantilevers, for aluminium tube $d=55$ mm and 70 mm resp. Steel tube $d=60.3$ mm (2")



Order no.	8WL3088-2E	8WL3088-2C	8WL3088-2F
Designation	Composite insulator tongue 21/tube 55	Composite insulator tongue 21/tube 60.3	Composite insulator tongue 21/tube 70
Material			
Insulator body	GRP, silicone	GRP, silicone	GRP, silicone
Fittings	Al	Al	Al
Cup-point screws M12	stlSt	stlSt	stlSt
Weight	2.0 kg	2.1 kg	2.2 kg
Specified Cantilever Load (SCL)	6 kN	6 kN	6 kN
Max. design cantilever load (MDCL)	1.9 kN (equivalent to 657 Nm)	1.9 kN (equivalent to 657 Nm)	1.9 kN (equivalent to 684 Nm)
Specified Tensile Load (STL)	60 kN	60 kN	60 kN
Perm. operating load/tension	10 kN	10 kN	10 kN
Tightening torque M_A	50 Nm	50 Nm	50 Nm
Nominal voltage	3 kV DC	3 kV DC	3 kV DC
Min. creepage distance	305 mm	305 mm	305 mm
Min. clearance in air	185 mm	185 mm	185 mm
Lightning impulse withstand voltage	110 kV	110 kV	110 kV
Power-frequency withstand voltage, wet	50 kV	50 kV	50 kV
a	89 mm	89 mm	100 mm
d	56 mm	61 mm	71.5 mm
L	346 mm	346 mm	360 mm

Composite insulator 25 kV AC, tongue/tongue

for catenaries and terminations

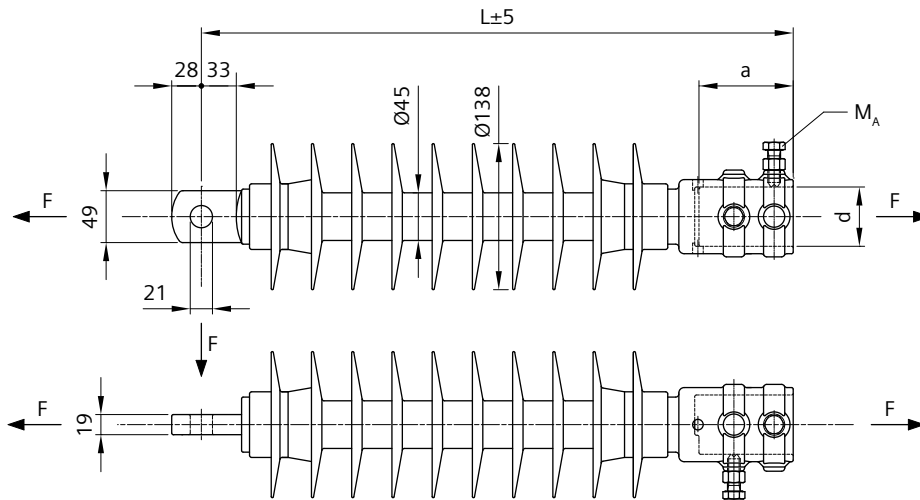


Order no.	8WL3078-1A
Designation	Composite insulator tongue/tongue
Material	
Insulator body	GRP, silicone
Fittings	htgSt
Weight	3.0 kg
Specified Cantilever Load (SCL)	3 kN
Max. design cantilever load (MDCL)	1 kN (equivalent to 510 Nm)
Specified Mechanical Load (SML)	135 kN
Perm. operating load/tension	30 kN
Nominal voltage	25 kV AC
Min. creepage distance	1230 mm
Min. clearance in air	450 mm
Lightning impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	125 kV

Types with other fittings on request.

Composite insulator 25 kV AC, tongue/tube 55-70

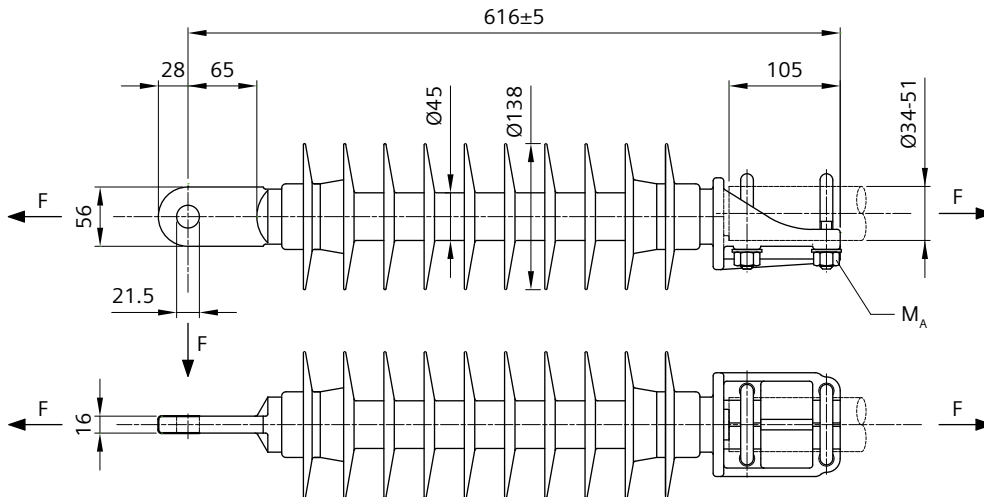
for cantilevers, for aluminium tube d=55 or 70 mm



Order no.	8WL3078-2A	8WL3078-2B
Designation	Composite insulator tongue/tube 55	Composite insulator tongue/tube 70
Material		
Insulator body	GRP, silicone	GRP, silicone
Fittings	Al	Al
Cup-point screws M12	stlSt	stlSt
Weight	3.5 kg	3.6 kg
Specified Cantilever Load (SCL)	6 kN	6 kN
Max. design cantilever load (MDCL)	1.9 kN (equivalent to 1062 Nm)	1.9 kN (equivalent to 1089 Nm)
Specified Tensile Load (STL)	60 kN	60 kN
Perm. operating load/tension	12 kN	12 kN
Tightening torque M_A	50 Nm	50 Nm
Nominal voltage	25 kV AC	25 kV AC
Min. creepage distance	1215 mm	1215 mm
Min. clearance in air	445 mm	445 mm
Lightning impulse withstand voltage	250 kV	250 kV
Power-frequency withstand voltage, wet	125 kV	125 kV
a	89 mm	100 mm
d	56 mm	71.5 mm
L	559 mm	573 mm

Composite insulator 25 kV AC, tongue/tube 34-51

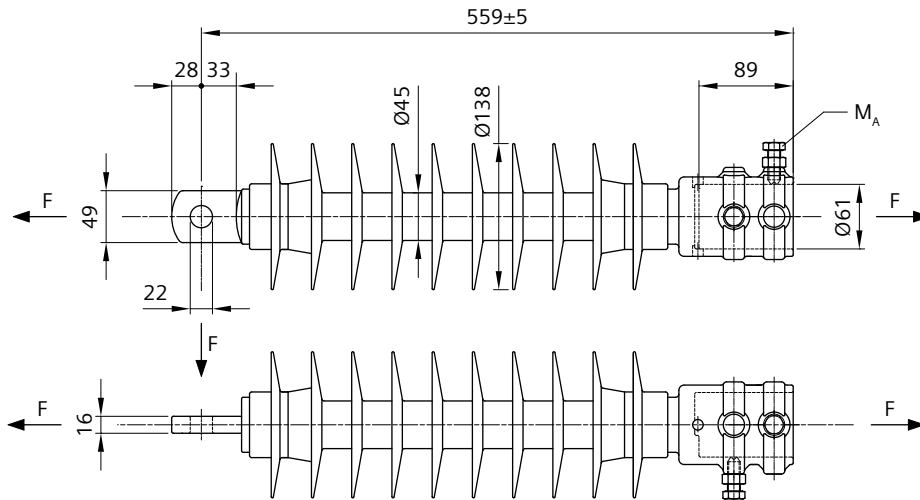
for cantilevers, for steel tube d=34 to 51 mm



Order no.	8WL3078-2C
Designation	Composite insulator tonque/tube 34-51
Material	
Insulator body	GRP, silicone
Fittings	htgSt
U-bolts M12	stlSt
Nuts, washers	stlSt
Weight	6.6 kg
Specified Cantilever Load (SCL)	6 kN
Max. design cantilever load (MDCL)	1.9 kN (equivalent to 1170 Nm)
Specified Tensile Load (STL)	60 kN
Perm. operating load/ tension	12 kN
Tightening torque M_A	35 Nm
Nominal voltage	25 kV AC
Min. creepage distance	1215 mm
Min. clearance in air	445 mm
Lightning impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	125 kV

Composite insulator 25 kV AC, tongue/tube 60.3

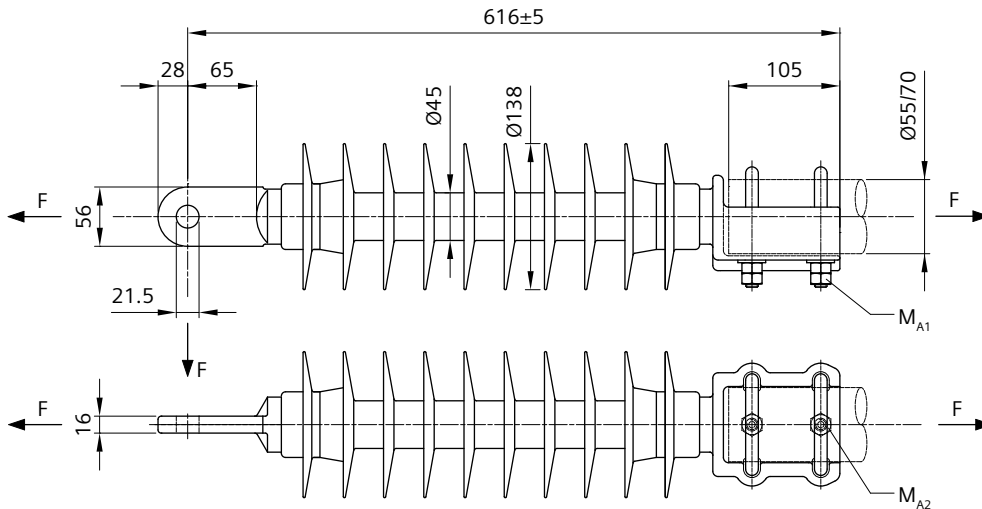
for cantilevers, for steel tube d=60.3 mm (2")



Order no.	8WL3078-2D
Designation	Composite insulator tongue/tube 60.3
Material	
Insulator body	GRP, silicone
Fittings	Al
Cup-point screws M12	stlSt
Weight	3.2 kg
Specified Cantilever Load (SCL)	6 kN
Max. design cantilever load (MDCL)	1.9 kN (equivalent to 1062 Nm)
Specified Tensile Load (STL)	40 kN
Perm. operating load/tension	12 kN
Tightening torque M_A	50 Nm
Nominal voltage	25 kV AC
Min. creepage distance	1215 mm
Min. clearance in air	445 mm
Lightning impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	125 kV

Composite insulator 25 kV AC, tongue/tube 55/70

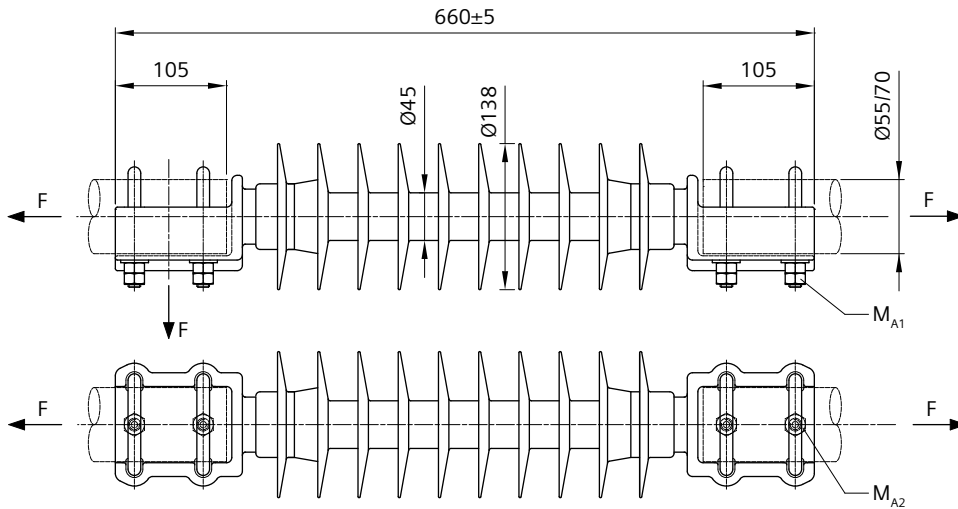
for cantilevers, for aluminium tube d=55 and 70 mm



Order no.	8WL3078-2L
Designation	Composite insulator tongue/tube 55/70
Material	
Insulator body	GRP, silicone
Fittings	htgSt
U-bolts M12	stlSt
Nuts, washers	stlSt
Cup-point screws M12	stlSt
Weight	8.1 kg
Specified Cantilever Load (SCL)	6 kN
Max. design cantilever load (MDCL)	1.9 kN (equivalent to 1170 Nm)
Specified Tensile Load (STL)	60 kN
Perm. operating load/ tension	12 kN
Tightening torque M_{A1}	35 Nm
Tightening torque M_{A2}	50 Nm
Nominal voltage	25 kV AC
Min. creepage distance	1215 mm
Min. clearance in air	445 mm
Lightning impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	125 kV

Composite insulator 25 kV AC, tube/tube 55/70

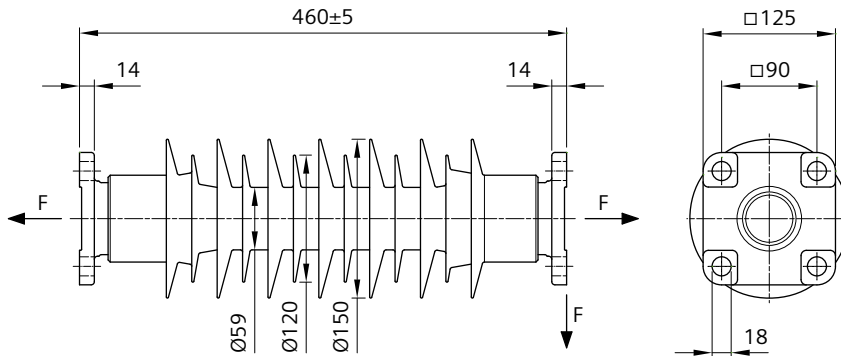
for cantilevers, for aluminium tube d=55 and 70 mm



Order no.	8WL3078-2M
Designation	Composite insulator tube/tube 55/70
Material	
Insulator body	GRP, silicone
Fittings	htgSt
U-bolts M12	stlSt
Nuts, washers	stlSt
Cup-point screws M12	stlSt
Weight	9.0 kg
Specified Cantilever Load (SCL)	6 kN
Max. design cantilever load (MDCL)	1.9 kN (equivalent to 1155 Nm)
Specified Tensile Load (STL)	60 kN
Perm. operating load/ tension	12 kN
Tightening torque M_{A1}	35 Nm
Tightening torque M_{A2}	50 Nm
Nominal voltage	25 kV AC
Min. creepage distance	1215 mm
Min. clearance in air	445 mm
Lightning impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	125 kV

Composite insulator 25 kV AC with flat connections

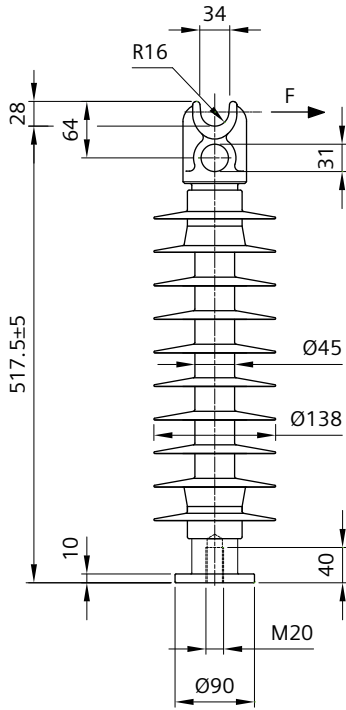
for soffit conductor rail



Order no.	8WL3078-6D
Designation	Composite insulator with flat connections
Material	
Insulator body	GRP, silicone
Fittings	htgSt
Weight	8.9 kg
Specified Cantilever Load (SCL)	19.2 kN
Max. design cantilever load (MDCL)	6 kN (equivalent to 2760 Nm)
Specified Tensile Load (STL)	60 kN
Perm. operating load/tension	12 kN
Nominal voltage	25 kV AC
Min. creepage distance	1255 mm
Min. clearance in air	430 mm
Lightning impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	125 kV

Composite line post insulator 25 kV AC

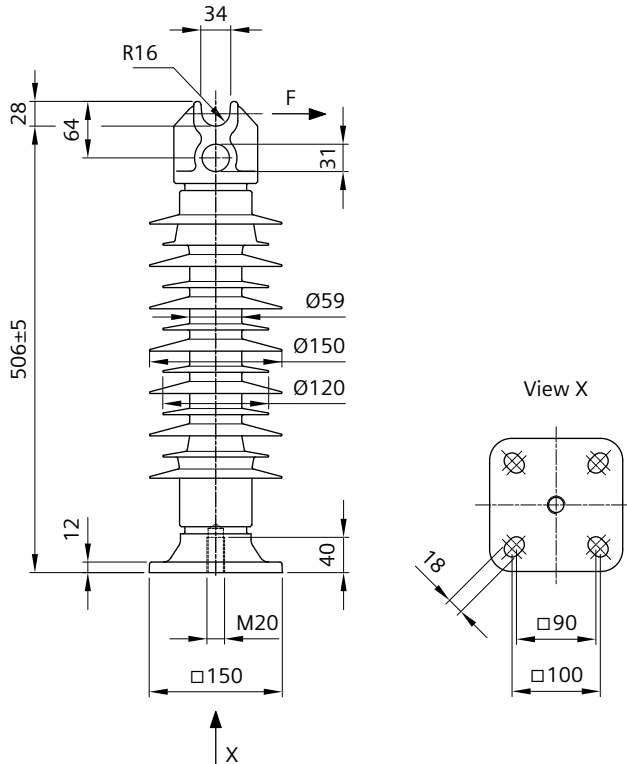
for feeder lines



Order no.	8WL3078-7A
Designation	Composite line post insulator
Material	
Insulator body	GRP, silicone
Fittings	htgSt
Weight	6.4 kg
Specified Cantilever Load (SCL)	8 kN
Max. design cantilever load (MDCL)	2.5 kN (equivalent to 1329 Nm)
Specified Tensile Load (STL)	60 kN
Perm. operating load/ tension	12 kN
Nominal voltage	25 kV AC
Min. creepage distance	1215 mm
Min. clearance in air	445 mm
Lightning impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	125 kV

Composite line post insulator 25 kV AC

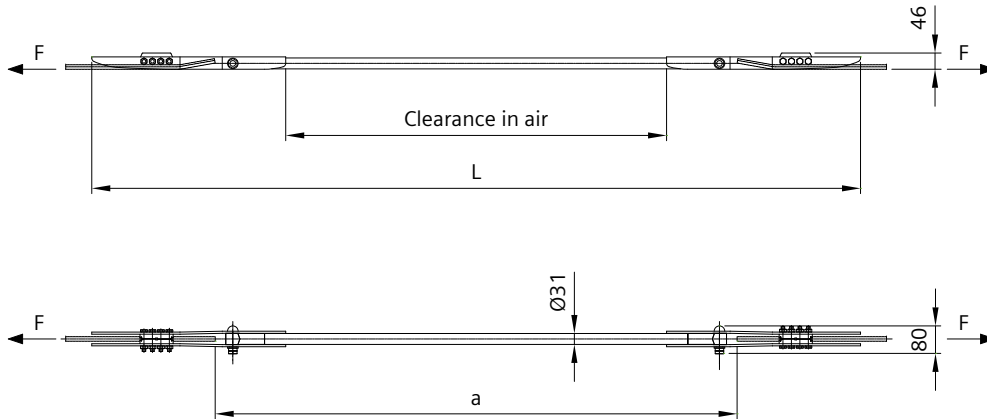
for feeder lines



Order no.	8WL3078-6A
Designation	Composite line post insulator
Material	
Insulator body	GRP, silicone
Fittings	htgSt
Weight	9.6 kg
Specified Cantilever Load (SCL)	19.2 kN
Max. design cantilever load (MDCL)	6 kN (equivalent to 3122 Nm)
Specified Tensile Load (STL)	60 kN
Perm. operating load/ tension	12 kN
Nominal voltage	25 kV AC
Min. creepage distance	1230 mm
Min. clearance in air	410 mm
Lightning impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	125 kV

Contact wire insulator 3 kV DC to 25 kV AC

with emergency traversing properties as a substitute for contact wire insulators, for contact wires acc. to EN 50149 and contact wires made in China

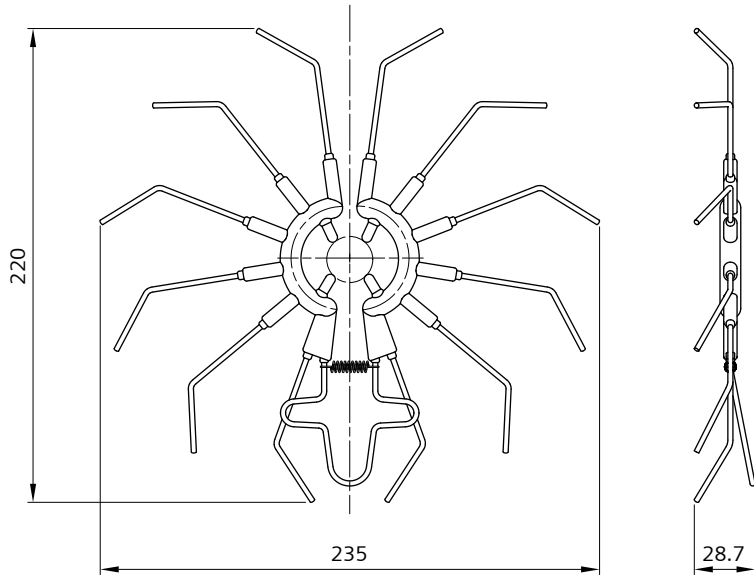


Order no.	8WL3092-1A	8WL3092-1B	8WL3092-1C
Designation	Contact wire insulator 3 kV DC	Contact wire insulator 15 kV AC	Contact wire insulator 25 kV AC
Material			
Insulating rod	ECR glass, EP resin with silicone coating	ECR glass, EP resin with silicone coating	ECR glass, EP resin with silicone coating
Clamps, straps	stlSt	stlSt	stlSt
Connecting strips	htgSt	htgSt	htgSt
Bolts, nuts	stlSt	stlSt	stlSt
Washers	stlSt	stlSt	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1 AC-80/-120, CuMg0.5 BC-100 to 150, Cu-ETP / CuAg0.1 CTHA-85/-120, CuAg0.1 (China)	AC-80 to 150, Cu-ETP / CuAg0.1 AC-80/-120, CuMg0.5 BC-100 to 150, Cu-ETP / CuAg0.1 CTHA-85/-120, CuAg0.1 (China)	AC-80 to 150, Cu-ETP / CuAg0.1 AC-80/-120, CuMg0.5 BC-100 to 150, Cu-ETP / CuAg0.1 CTHA-85/-120, CuAg0.1 (China)
Weight	5.73 kg	6.13 kg	6.68 kg
Perm. operating load	30 kN	30 kN	30 kN
Min. failing load	90 kN	90 kN	90 kN
Nominal voltage	3 kV DC	15 kV AC	25 kV AC
Creepage distance	450 mm	760 mm	1200 mm
Clearance in air	330 mm	640 mm	1080 mm
a	730 mm	1040 mm	1480 mm
L	1430 mm	1740 mm	2180 mm

In exceptions the pantograph can slide over the insulator.

Electrostatic animal guard

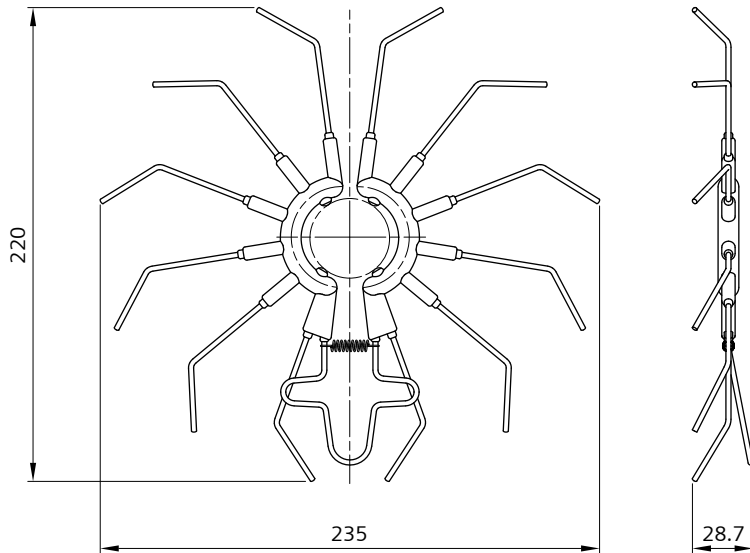
for insulators up to 25 kV AC, for insulator trunk d=19-38 mm (with knobs) or d=38-58 mm (without knobs)



Order no.	8WL3067-0A
Designation	Electrostatic animal guard
Material	
Clamp halves	Polypropylene, UV resistant, color RAL7047 (telegrey)
Spikes	stlSt
Connecting piece	stlSt
Tension springs	stlSt
Weight	0.06 kg

Electrostatic animal guard

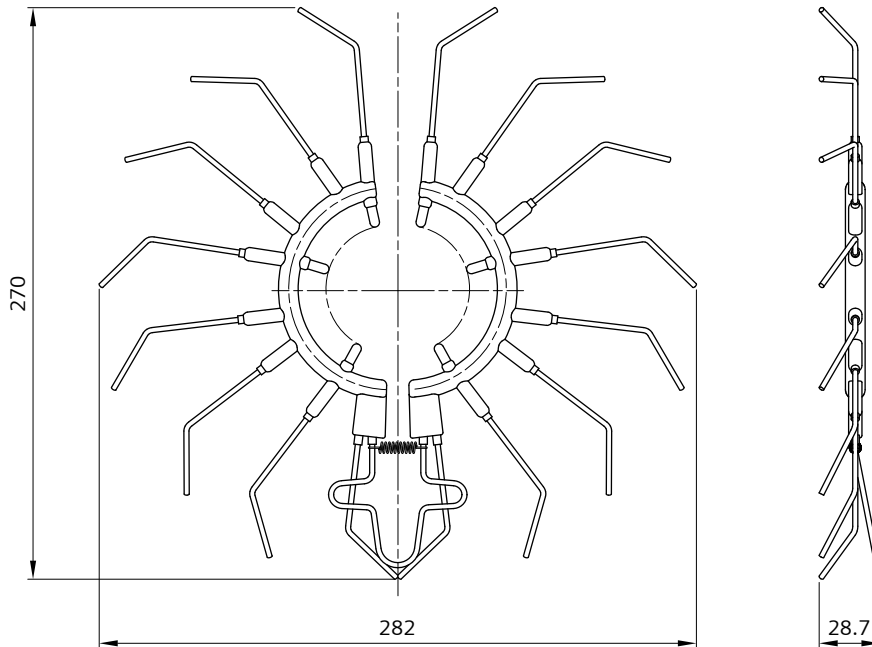
for insulators up to 25 kV AC, for insulator trunk d=38-58 mm



Order no.	8WL3067-0B
Designation	Electrostatic animal guard
Material	
Clamp halves	Polypropylene, UV resistant, color RAL7047 (telegrey)
Spikes	stlSt
Connecting piece	stlSt
Tension springs	stlSt
Weight	0.06 kg

Electrostatic animal guard

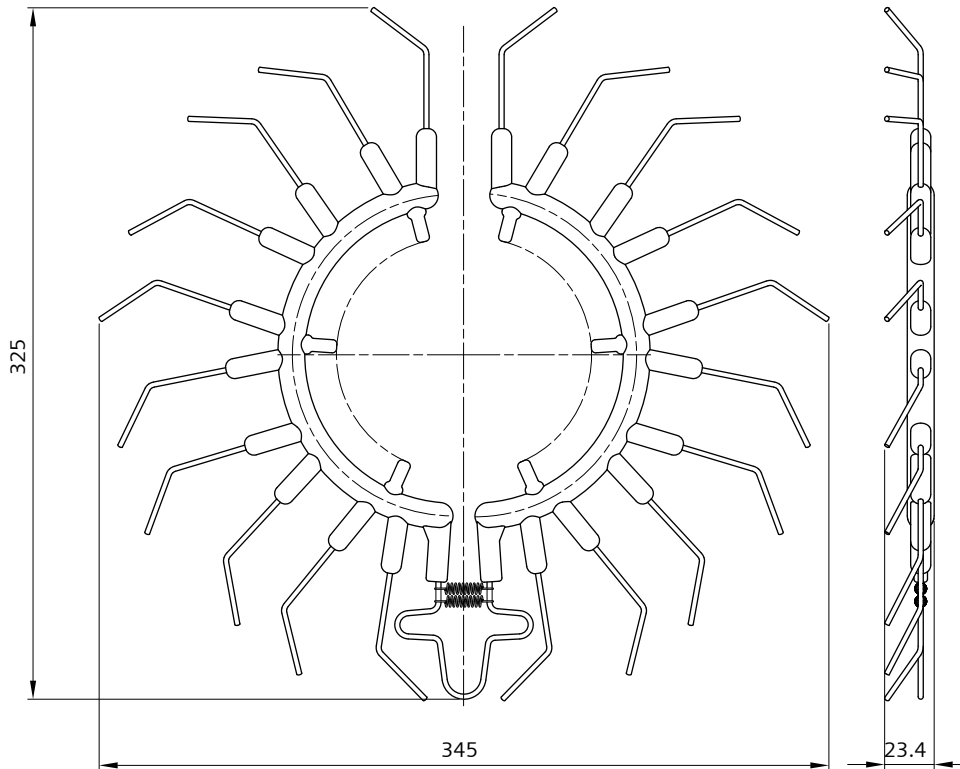
for insulators up to 25 kV AC, for insulator trunk d=58-75 mm (with knobs) or d=75-115 mm (without knobs)



Order no.	8WL3067-0C
Designation	Electrostatic animal guard
Material	
Clamp halves	Polypropylene, UV resistant, color RAL7047 (telegrey)
Spikes	stlSt
Connecting piece	stlSt
Tension springs	stlSt
Weight	0.10 kg

Electrostatic animal guard

for insulators up to 25 kV AC, for insulator trunk d=115-140 mm (with knobs) or d=140-166 mm (without knobs)



Order no.	8WL3067-0D
Designation	Electrostatic animal guard
Material	
Clamp halves	Polypropylene, UV resistant, color RAL7047 (telegrey)
Spikes	stlSt
Connecting piece	stlSt
Tension springs	stlSt
Weight	0.16 kg

Chapter 02

Standard Products

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Technical comments

Application

In this chapter, you can select from products for the construction of contact lines under structures or in tunnels including mechanical and electrical protection.

Insulating underbridge and tunnel supports aid in the fastening of catenary wires or contact wires.

Elastic supports are used for fastening one or two contact wires with high traversing quality.

Overhead conductor rails can be used to implement very powerful contact line systems.

The **bridge protection** serves to provide extensive insulating coverage of structures such as bridges and supporting structures, as well as contact protection for contact line sections that are live and thus results in a high degree of safety when working in contact line systems.

Types and special features

Insulating underbridge and tunnel supports allow easy fastening of wires and contact wires at structures.

Elastic supports serve to provide an elastic suspension of fixed and auto-tensioned overhead contact lines without catenary wires in tunnels and under bridges. The low design height and the special dynamics make the elastic support an optimal solution for tunnel sections in mass transit and main-line railways.

The elastic response of the supports and the short distance between supports allow very high traversing quality, which is comparable to a catenary contact line. Wear of the contact wire is minimized by means of attenuation of contact line oscillation.

The portfolio encompasses the following types:

- Elastic supports up to 1.5 kV DC
- Elastic supports up to 25 kV AC for one or two contact wires

Various mounting types or flexible adjustment options allow the installation of contact lines in the narrowest of spaces in round and shallow tunnels or under bridges.

Overhead conductor rail

For small vehicle clearance envelopes in tunnels and for the equipment for stations and workshops, Siemens offers overhead conductor rails that are mounted on the tunnel or structure roof. They are a space-saving, very reliable alternative to conventional overhead contact lines in tunnels. The large cross sections of the profiles guarantee the transfer of high operating currents.

The portfolio includes types with:

- Aluminium hollow profile for AC and BC contact wires according to EN 50149
- Copper solid profile

Depending on the type, the temperature depending variation in length can be compensated via swiveling and sliding suspensions or via a sinusoidal lateral deflection.

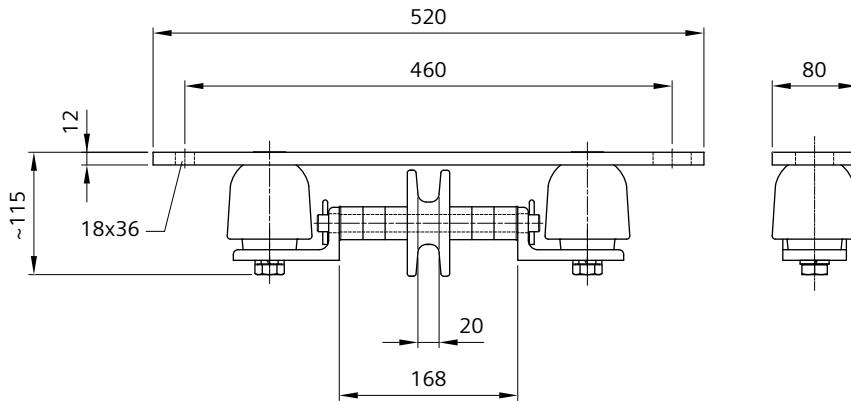
The **bridge protection** consists of insulating GRP guard plates in a sandwich construction and the appropriate fastening material.

Notes

The selection, usage, configuration, mounting on the structure, etc. of the components named in the portfolio depend on their usage in the system and the local conditions. Further information can be found in the relevant product descriptions.

Underbridge and tunnel support for one catenary wire, insulated

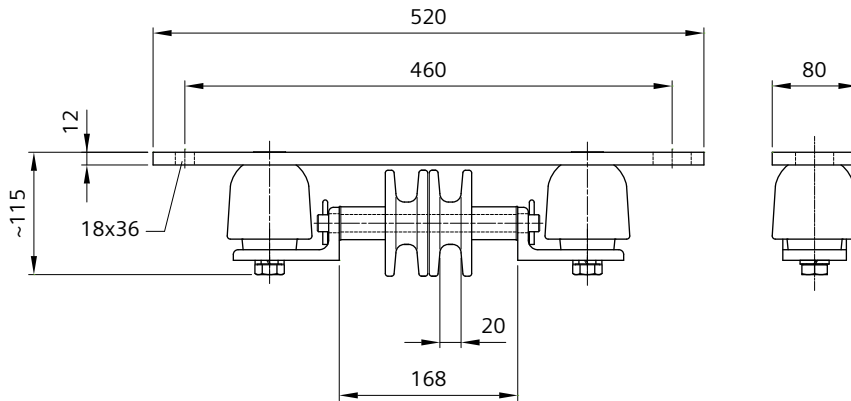
for supports of auto-tensioned catenary wires under structures, for wires acc. to DIN 48201



Order no.	8WL3526-8
Designation	Underbridge and tunnel support
Material	
Plate	GF-UP
Pulley, spacer tube	Polyamide
Support angles	htgSt
Insulators	Cast resin
Axle	stlSt
Bolts	stlSt
Spring washers	stlSt
Split pins 5x28	Cu
for wires	up to 185 mm ²
Weight	4.75 kg
Nominal voltage	750 V DC
Creepage distance	96 mm

Underbridge and tunnel support for two catenary wires, insulated

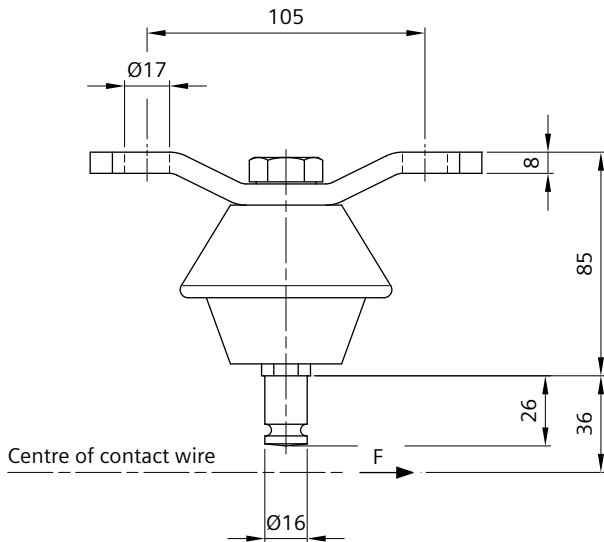
for supports of auto-tensioned catenary wires under structures, for wires acc. to DIN 48201



Order no.	8WL3527-0
Designation	Underbridge and tunnel support
Material	
Plate	GF-UP
Pulleys, spacer tube	Polyamide
Support angles	htgSt
Insulators	Cast resin
Axle	stlSt
Bolts	stlSt
Spring washers	stlSt
Split pins 5x28	Cu
for wires	up to 185 mm ²
Weight	5.0 kg
Nominal voltage	750 V DC
Creepage distance	96 mm

Underbridge and tunnel support for contact wire 16R, insulated

for contact wire supports under structures

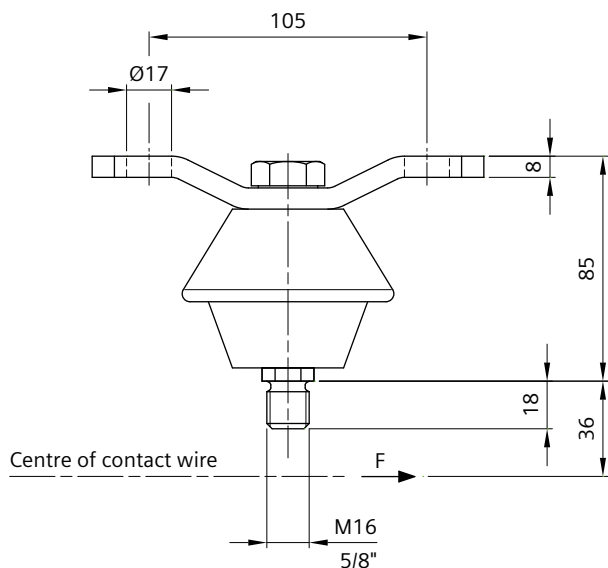


Order no.	8WL3570-4
Designation	Underbridge and tunnel support for contact wire 16R
Material	
Insulator body	Cast resin, brown
Underbridge fastening	htgSt
Grooved stud	stlSt
Bolt M16	stlSt
Weight	1.02 kg
Perm. operating load	2.5 kN
Min. failing load	8.0 kN
Nominal voltage	1.5 kV DC
Creepage distance	75 mm

Fastening bolts must be ordered separately.
 Contact wire clips see Chapter 02-09.

Underbridge and tunnel support for contact wire M16-5/8", insulated

for contact wire supports under structures



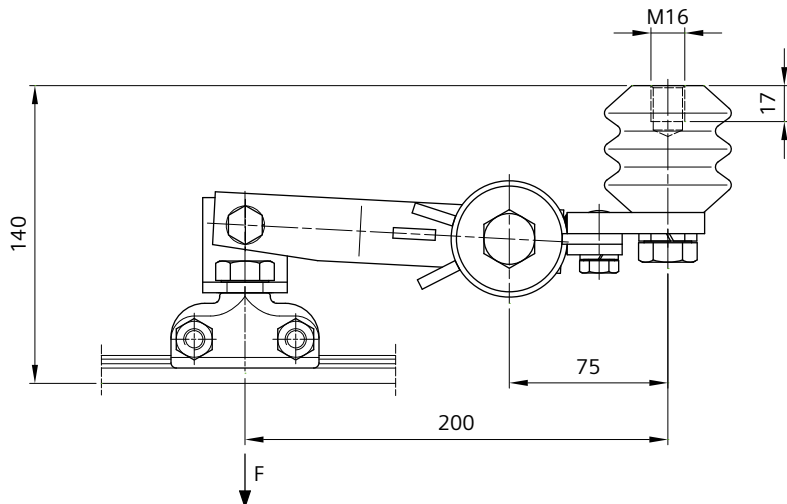
Order no.	8WL3570-5	8WL3570-6
Designation	Underbridge and tunnel support for contact wire M16	Underbridge and tunnel support for contact wire 5/8"
Material		
Insulator body	Cast resin, brown	Cast resin, brown
Underbridge fastening	htgSt	htgSt
Threaded stud	stlSt	stlSt
Bolt M16	stlSt	stlSt
Weight	0.82 kg	0.82 kg
Perm. operating load	2.5 kN	2.5 kN
Min. failing load	8.0 kN	8.0 kN
Nominal voltage	1.5 kV DC	1.5 kV DC
Creepage distance	75 mm	75 mm

Fastening bolts must be ordered separately.

Contact wire clips see Chapter 02-09.

Elastic support 1.5 kV DC

for fixed terminated contact wire, for contact wires acc. to EN 50149

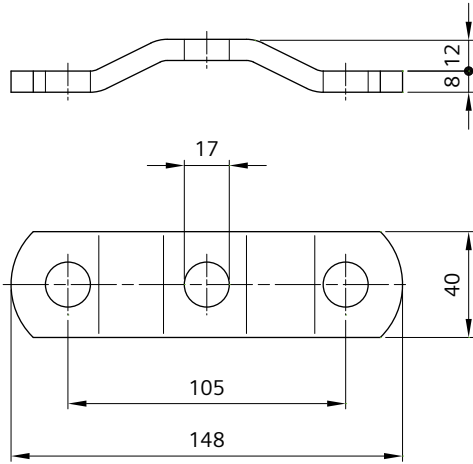


Order no.	8WL4000-0
Designation	Elastic support without underbridge fastening
Material	
Basic frame	htgSt
Torsion element	stlSt, rubber
Insulator body	Cast resin, brown
Contact wire clip	CuAl
Bolts, nuts	stlSt
Spring washers	stlSt
for contact wires	AC-80 to 150
Weight	2.50 kg
Perm. operating load	0.4 kN
Min. failing load	1.28 kN
Nominal voltage	1.5 kV DC
Creepage distance	85 mm

Underbridge fastening 8WL3575-0 must be ordered separately, see page 450.

Underbride fastening

for elastic support 8WL4000-0

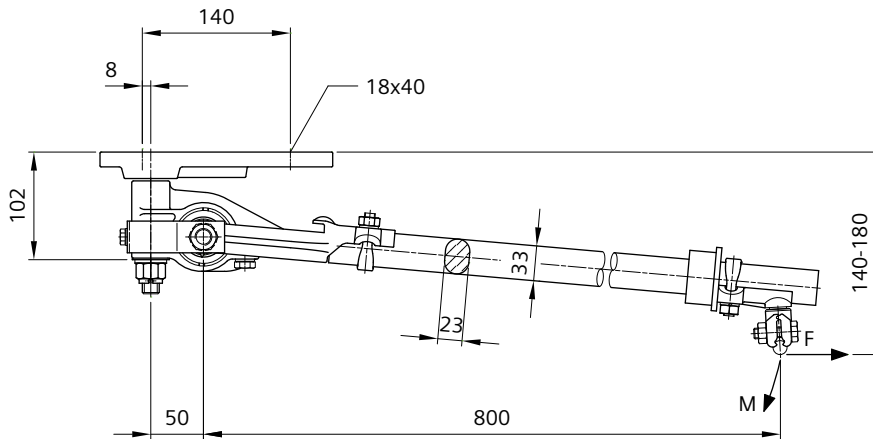


Order no.	8WL3575-0
Designation	Underbride fastening
Material	htgSt
Weight	0.34 kg

Bolt EN ISO 4017-M16x20-stlSt must be ordered separately.

Elastic support 1.5 kV DC with baseplate and GRP steady arm

for auto-tensioned contact wire, fastening directly onto tunnel soffit, for contact wires acc. to EN 50149



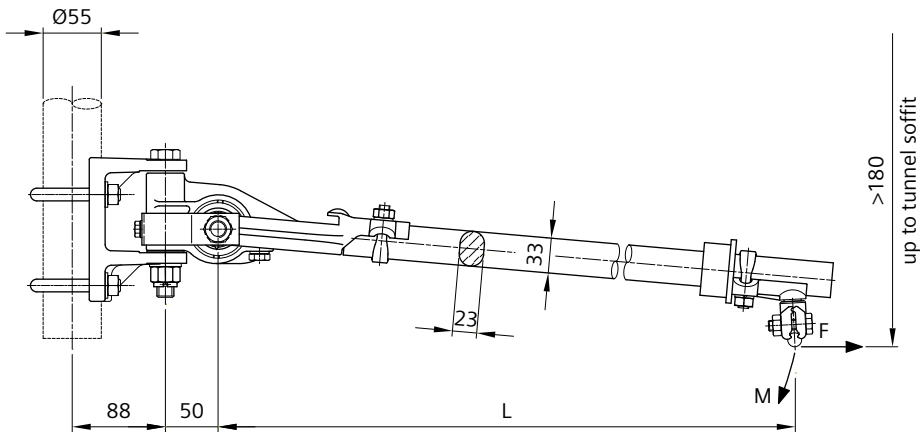
Order no.	8WL4044-0A	8WL4044-1A
Designation	Elastic support L=800 mm	Elastic support L=1000 mm
Material		
Baseplate	ctAl	ctAl
Articulation joint	CuAl	CuAl
Hoop	CuAl	CuAl
Torsion element	stlSt, rubber	stlSt, rubber
Steady arm	GRP, color RAL6022 (olive drab)	GRP, color RAL6022 (olive drab)
Clamp holder	CuAl	CuAl
Contact wire clip	CuAl	CuAl
U-bolts	stlSt	stlSt
Bolts, nuts	stlSt	stlSt
Spring washers, washers	stlSt	stlSt
for contact wires	AC-80 to 150	AC-80 to 150
Weight	5.30 kg	5.60 kg
Perm. operating load	1.25 kN	1.25 kN
Max. bending moment	100 Nm	100 Nm
Max. running speed	100 km/h	100 km/h
Nominal voltage	1.5 kV DC	1.5 kV DC
Min. creepage distance	550 mm	750 mm
L	800 mm	1000 mm

Adjusting spanner 8WL4061-0 must be ordered separately, see page 834.

Other lengths and colors on request.

Elastic support 1.5 kV DC with cantilever swivel bracket and GRP steady arm

for auto-tensioned contact wire, fastening on soffit post for different tunnel heights, steplessly adjustable, for contact wires acc. to EN 50149



Order no.	8WL4044-3A	8WL4044-4A
Designation	Elastic support L=800 mm	Elastic support L=1000 mm
Material		
Cantilever swivel bracket	ctAl	ctAl
Articulation joint	CuAl	CuAl
Hoop	CuAl	CuAl
Torsion element	stlSt, rubber	stlSt, rubber
Steady arm	GRP, color RAL6022 (olive drab)	GRP, color RAL6022 (olive drab)
Clamp holder	CuAl	CuAl
Contact wire clip	CuAl	CuAl
U-bolts	stlSt	stlSt
Bolts, nuts	stlSt	stlSt
Spring washers, washers	stlSt	stlSt
for contact wires	AC-80 to 150	AC-80 to 150
Weight	5.50 kg	5.80 kg
Perm. operating load	1.25 kN	1.25 kN
Max. bending moment	100 Nm	100 Nm
Max. running speed	100 km/h	100 km/h
Nominal voltage	1.5 kV DC	1.5 kV DC
Min. creepage distance	550 mm	750 mm
L	800 mm	1000 mm

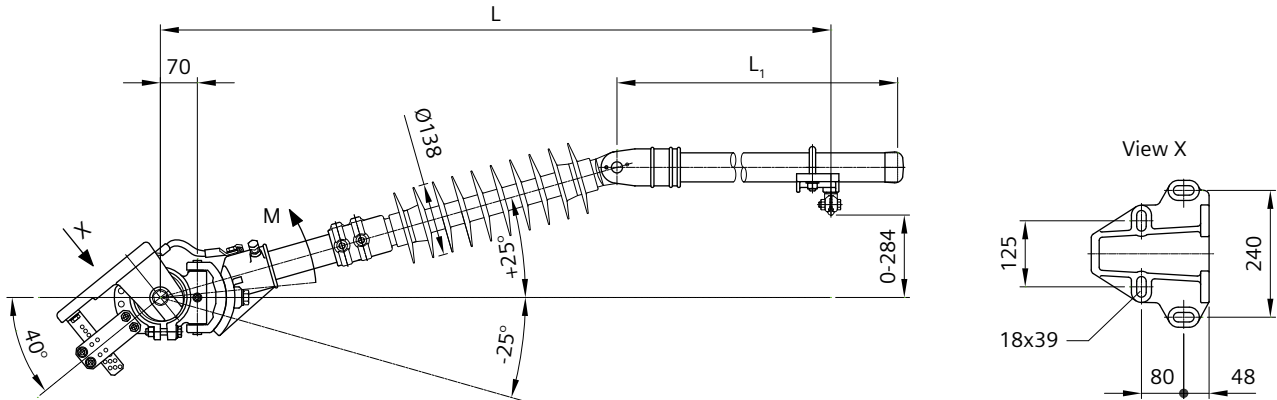
Support frame for soffit post 8WL4044-2 must be ordered separately, see page 484.

Adjusting spanner 8WL4061-0 must be ordered separately, see page 834.

Other lengths and colors on request.

Elastic support 25 kV AC, single contact wire

for fixed-terminated or auto-tensioned contact wire in tunnel or under structures with limited space, for contact wires acc. to EN 50149



Order no.	8WL4200-0	8WL4200-0C
Designation	Elastic support L=1400 mm	Elastic support L=1530 mm
Material		
Basic frame	ctAl	ctAl
Torsion element	stlSt, rubber	stlSt, rubber
Insulator	GRP, silicone	GRP, silicone
Tubes 55x6	Al	Al
Clamp holder	ctAl	ctAl
Contact wire clip	CuAl	CuAl
End cap	Plastic	Plastic
Bolts, nuts	stlSt	stlSt
Washers, spring washers	stlSt	stlSt
for contact wires	AC-80 to 150	AC-80 to 150
Weight	18.38 kg	18.70 kg
Max. bending moment	500 Nm	500 Nm
Torsion constant	60 Nm/degree	60 Nm/degree
Ambient temperature	-40 °C to +50 °C	-40 °C to +50 °C
Max. running speed	160 km/h ¹⁾ 130 km/h ²⁾	160 km/h ¹⁾ 130 km/h ²⁾
Nominal voltage	25 kV AC	25 kV AC
Min. creepage distance	1200 mm	1200 mm
L	1400 mm	1530 mm
L₁	665 mm	795 mm

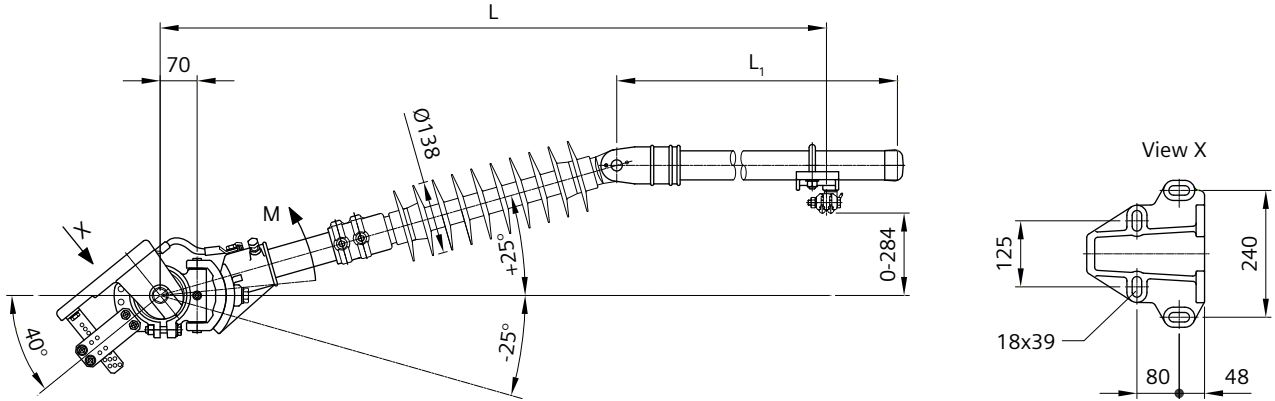
¹⁾ at two supports arranged in succession

²⁾ at more than two supports arranged in succession

Adjusting spanner 8WL4203-2 must be ordered separately, see page 834.

Elastic support 25 kV AC, twin contact wire

for fixed-terminated or auto-tensioned contact wire in tunnel or under structures with limited space, for contact wires acc. to EN 50149



Order no.	8WL4200-0A	8WL4200-0B	8WL4200-0D
Designation	Elastic support L=1420 mm	Elastic support L=1570 mm	Elastic support L=1740 mm
Material			
Basic frame	ctAl	ctAl	ctAl
Torsion element	stlSt, rubber	stlSt, rubber	stlSt, rubber
Insulator	GRP, silicone	GRP, silicone	GRP, silicone
Tubes 55x6	Al	Al	Al
Clamp holder	ctAl	ctAl	ctAl
Twin contact wire clip	CuAl	CuAl	CuAl
End cap	Plastic	Plastic	Plastic
Bolts, nuts	stlSt	stlSt	stlSt
Washers, spring washers	stlSt	stlSt	stlSt
Bolts, nuts	stlSt	stlSt	stlSt
Washers, spring washers	stlSt	stlSt	stlSt
for contact wires	AC-80 to 150	AC-80 to 150	AC-80 to 150
Weight	18.55 kg	18.93 kg	19.14 kg
Max. bending moment	500 Nm	500 Nm	500 Nm
Torsion constant	60 Nm/degree	60 Nm/degree	60 Nm/degree
Ambient temperature	-40 °C to +50 °C	-40 °C to +50 °C	-40 °C to +50 °C
Max. running speed	160 km/h ¹⁾ 130 km/h ²⁾	160 km/h ¹⁾ 130 km/h ²⁾	160 km/h ¹⁾ 130 km/h ²⁾
Nominal voltage	25 kV AC	25 kV AC	25 kV AC
Min. creepage distance	1200 mm	1200 mm	1200 mm
L	1420 mm	1570 mm	1740 mm
L₁	695 mm	845 mm	1045 mm

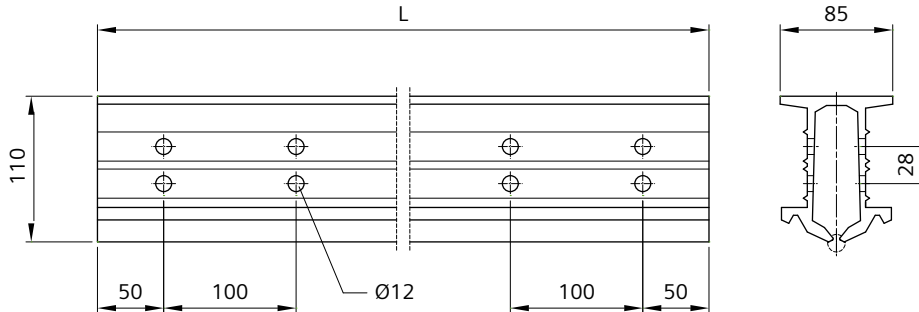
¹⁾ at two supports arranged in succession

²⁾ at more than two supports arranged in succession

Adjusting spanner 8WL4203-2 must be ordered separately, see page 834.

Soffit conductor rail (Al)

for overhead contact line in tunnel or on structures, for contact wires acc. to EN 50149



Order no.	8WL7230-0A	8WL7230-0C	8WL7230-0B
Designation	Soffit conductor rail L=10 m	Soffit conductor rail L=11 m	Soffit conductor rail L=12 m
Material	Al	Al	Al
for contact wires	AC/BC-80 to 150	AC/BC-80 to 150	AC/BC-80 to 150
Weight	62.18 kg	68.40 kg	74.62 kg
Nominal cross-section	2300 mm ²	2300 mm ²	2300 mm ²
Perm. permanent current at 50 K temperature rise	2900 A	2900 A	2900 A
Rated short-time current	45 kA	45 kA	45 kA
Rated short-time duration	100 ms	100 ms	100 ms
L	10 m	11 m	12 m

Drilled holes suitable to rail joint 8WL7231-0.

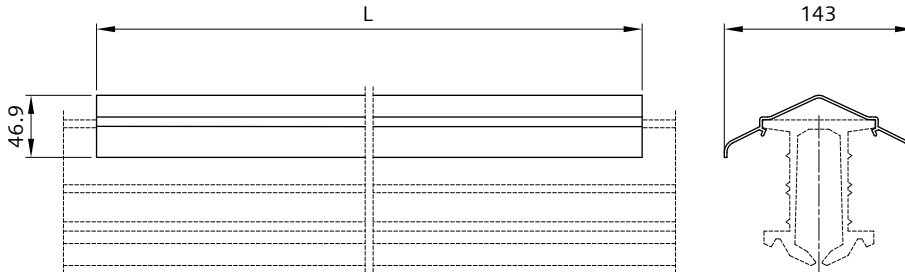
Other lengths on request (max. 12 m).

If necessary, cutting tool 8WL7236-1 and drilling tool 8WL7236-0 have to be ordered separately, see page 836 and 835.

Contact wire insertion device 8WL7236-4A see page 837.

Protection cover for soffit conductor rail

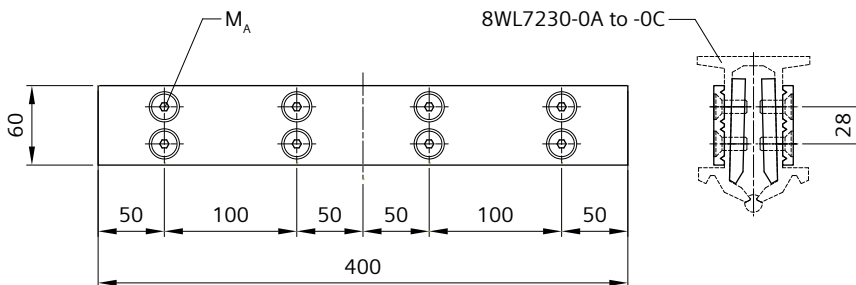
for soffit conductor rail 8WL7230-, as wetness protection in tunnel or under structures



Order no.	8WL7237-0A	8WL7237-0B	8WL7237-0C
Designation	Protection cover L=4 m	Protection cover L=5 m	Protection cover L=5.5 m
Material	Plastic, black	Plastic, black	Plastic, black
Weight	1.90 kg	2.38 kg	2.61 kg
L	4 m	5 m	5.5 m

Rail joint, bolted (Al)

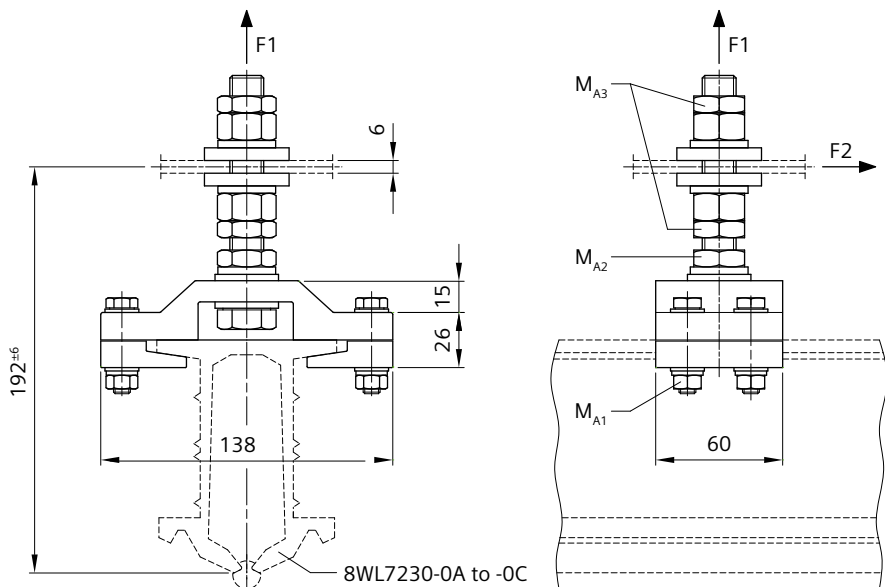
for soffit conductor rail 8WL7230-0A to -0C



Order no.	8WL7231-0
Designation	Rail joint, bolted
Material	
Straps	Al
Countersunk head screws M10	stlSt
Weight	2.86 kg
Tightening torque M_A	40 Nm
Perm. permanent current at 50 K temperature rise	2900 A
Rated short-time current	45 kA
Rated short-time duration	100 ms

Suspension clamp M16, fixed

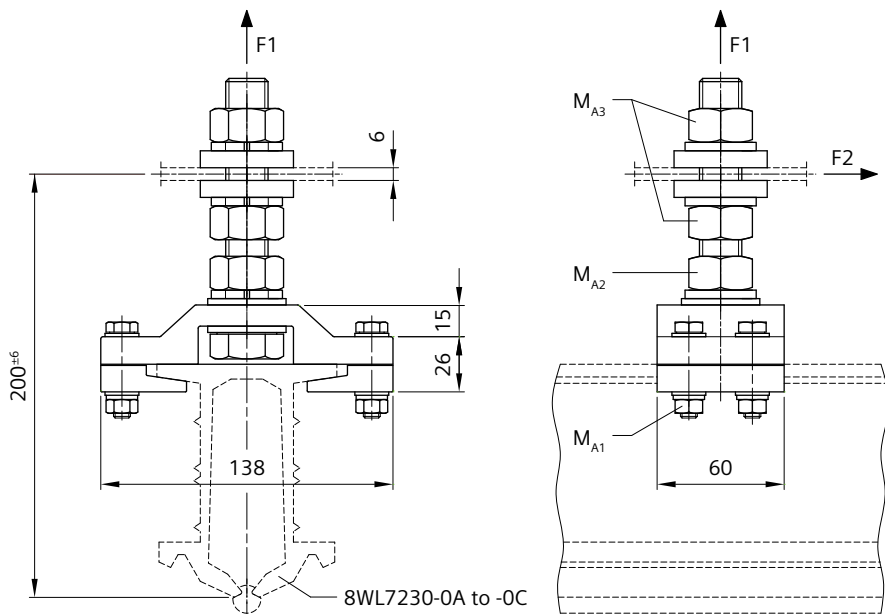
for connection of soffit conductor rail 8WL7230-0A to -0C at fixed point



Order no.	8WL7232-0
Designation	Suspension clamp M16, fixed
Material	
Clamp body	Al
Bolts M8, M16	stlSt
Nuts, washers	stlSt
Spring washers	stlSt
Weight	1.0 kg
Perm. operating load (F1)	5 kN
Min. failing load (F1)	15 kN
Perm. operating load (F2)	4 kN
Min. failing load (F2)	12 kN
Tightening torque M_{A1}	16 Nm
Tightening torque M_{A2}	135 Nm
Tightening torque M_{A3}	135 Nm
Rated short-time current	up to 30 kA

Suspension clamp M20, fixed

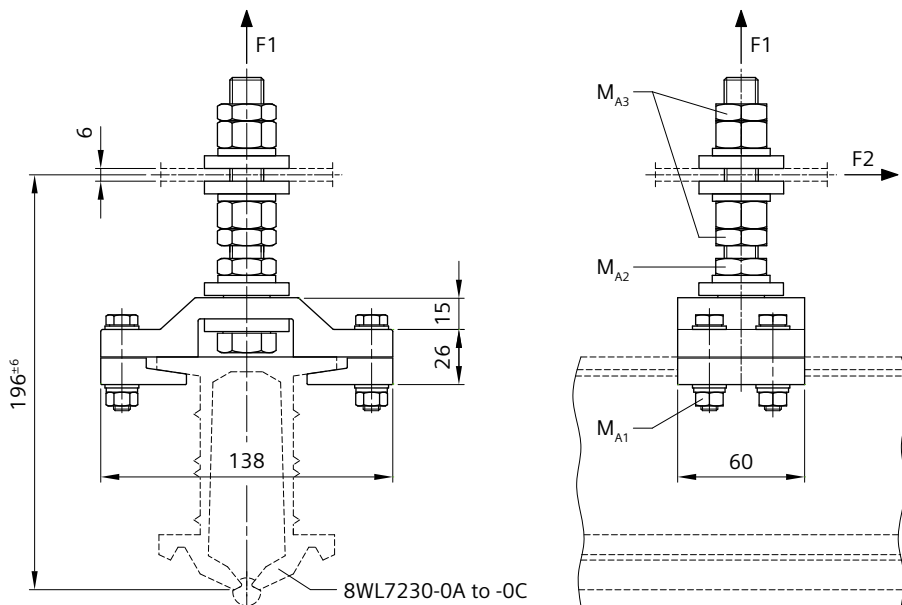
for connection of soffit conductor rail 8WL7230-0A to -0C at fixed point



Order no.	8WL7232-0A
Designation	Suspension clamp M20, fixed
Material	
Clamp body	Al
Bolts M8, M20	stlSt
Nuts	stlSt
Washers	stlSt
Spring washers	stlSt
Weight	1.1 kg
Perm. operating load (F1)	5 kN
Min. failing load (F1)	15 kN
Perm. operating load (F2)	4 kN
Min. failing load (F2)	12 kN
Tightening torque M_{A1}	16 Nm
Tightening torque M_{A2}	280 Nm
Tightening torque $M_{A\text{§}3}$	280 Nm
Rated short-time current	up to 40 kA

Suspension clamp M16, pivotable

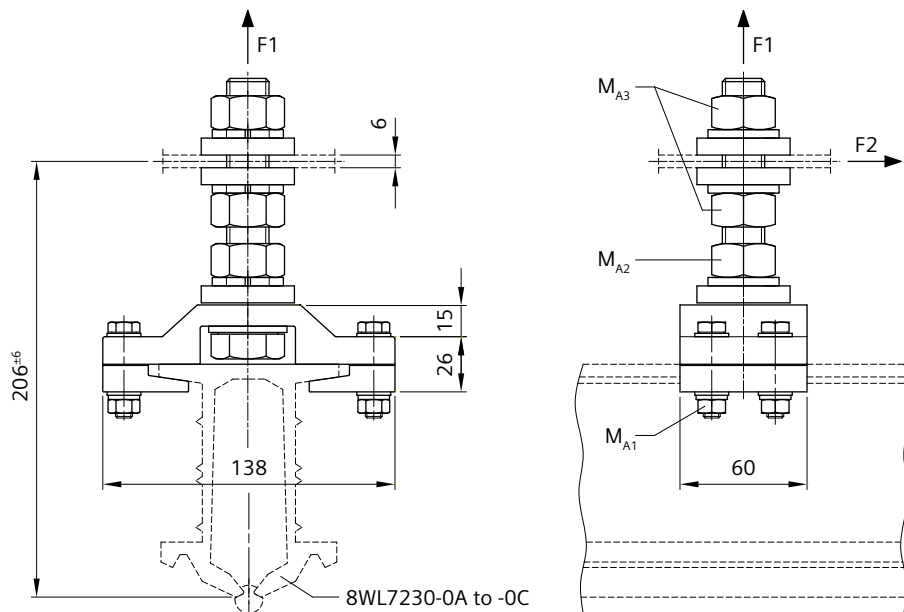
for connection of soffit conductor rail 8WL7230-0A to -0C at pivotable support



Order no.	8WL7232-3
Designation	Suspension clamp M16, pivotable
Material	
Clamp body	Al
Distance sleeve	stlSt
Bolts M8, M16	stlSt
Nuts	stlSt
Washers	stlSt
Spring washers	stlSt
Weight	1.1 kg
Perm. operating load (F1)	5 kN
Min. failing load (F1)	15 kN
Perm. operating load (F2)	4 kN
Min. failing load (F2)	12 kN
Tightening torque M_{A1}	16 Nm
Tightening torque M_{A2}	110 Nm
Tightening torque M_{A3}	135 Nm
Rated short-time current	up to 30 kA

Suspension clamp M20, pivotable

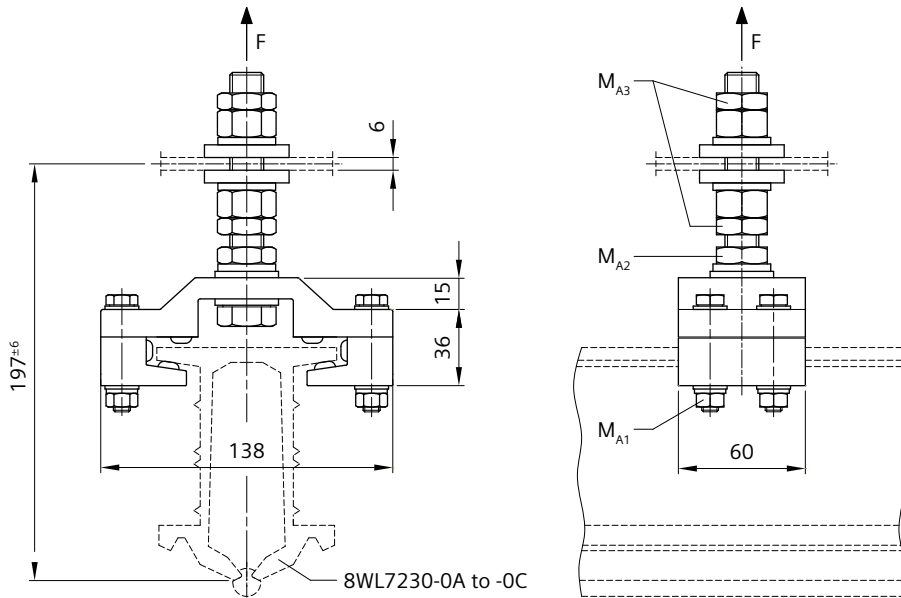
for connection of soffit conductor rail 8WL7230-0A to -0C at pivotable support



Order no.	8WL7232-3A
Designation	Suspension clamp M20, pivotable
Material	
Clamp body	Al
Distance sleeve	stlSt
Bolts M8, M20	stlSt
Nuts	stlSt
Washers	stlSt
Spring washers	stlSt
Weight	1.21 kg
Perm. operating load (F1)	5 kN
Min. failing load (F1)	15 kN
Perm. operating load (F2)	4 kN
Min. failing load (F2)	12 kN
Tightening torque M_{A1}	16 Nm
Tightening torque M_{A2}	135 Nm
Tightening torque $M_{A\text{§}3}$	280 Nm
Rated short-time current	up to 40 kA

Suspension clamp M16, sliding

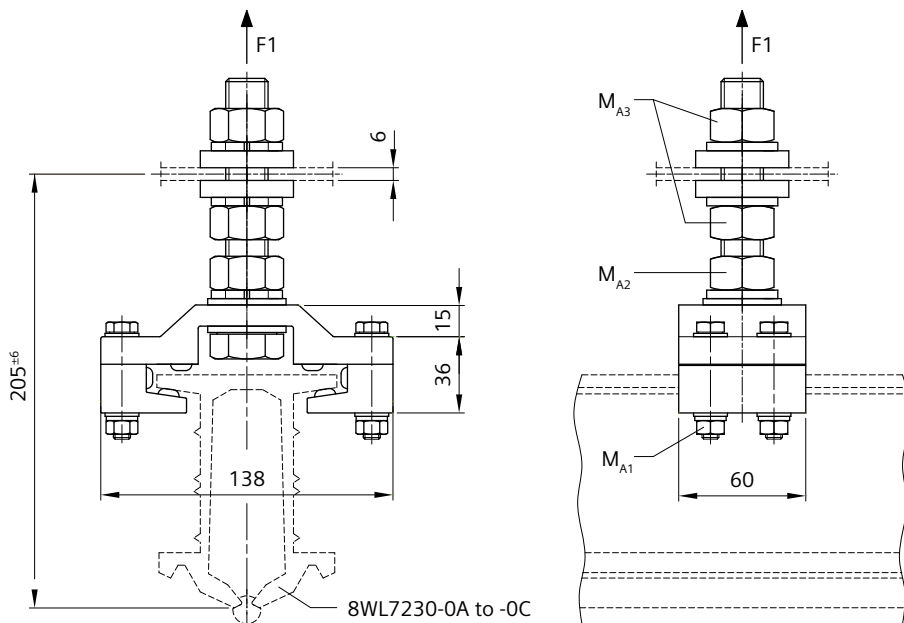
for connection of soffit conductor rail 8WL7230-0A up to -0C at sliding support



Order no.	8WL7233-0
Designation	Suspension clamp M16, sliding
Material	
Clamp body	Al
Sliding elements	Plastic
Bolts M8, M16	stlSt
Nuts	stlSt
Washers	stlSt
Spring washers	stlSt
Weight	1.08 kg
Perm. operating load	5 kN
Min. failing load	15 kN
Tightening torque M_{A1}	16 Nm
Tightening torque M_{A2}	135 Nm
Tightening torque $M_{A\text{§}3}$	135 Nm
Rated short-time current	up to 30 kA

Suspension clamp M20, sliding

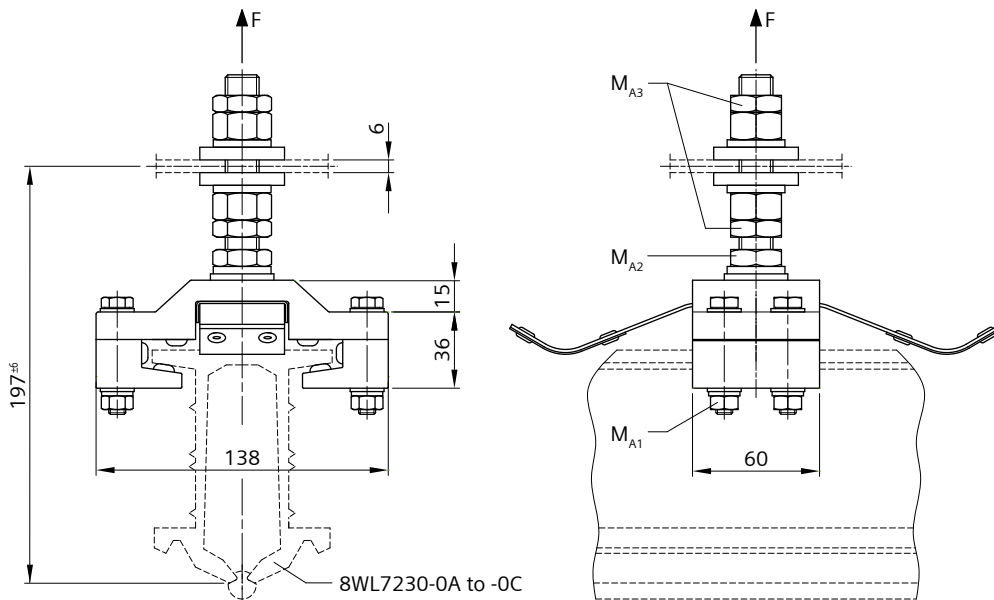
for connection of soffit conductor rail 8WL7230-0A up to -0C at sliding support



Order no.	8WL7233-0A
Designation	Suspension clamp M20, sliding
Material	
Clamp body	Al
Sliding elements	Plastic
Bolts M8, M20	stlSt
Nuts	stlSt
Washers	stlSt
Spring washers	stlSt
Weight	1.18 kg
Perm. operating load	5 kN
Min. failing load	15 kN
Tightening torque M_{A1}	16 Nm
Tightening torque M_{A2}	280 Nm
Tightening torque M_{A3}	280 Nm
Rated short-time current	up to 40 kA

Suspension clamp M16, sliding with contact spring

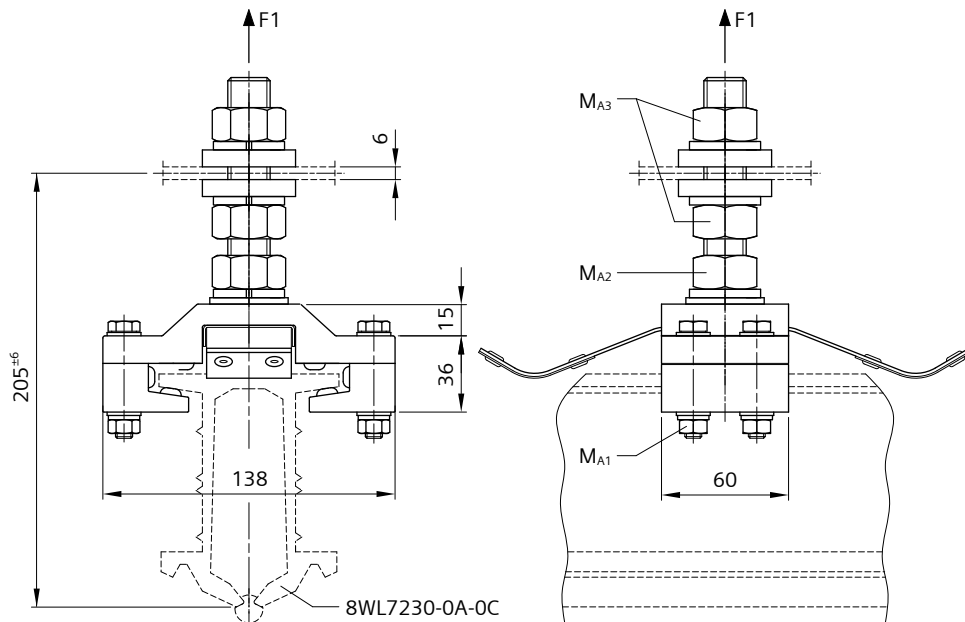
for connection of soffit conductor rail 8WL7230-0A to -0C at sliding support in AC systems



Order no.	8WL7233-1
Designation	Suspension clamp M16, sliding with contact spring
Material	
Clamp body	Al
Sliding elements	Plastic
Bolts M8, M16	stlSt
Nuts	stlSt
Spring washers	stlSt
Washers	stlSt, Alcu
Contact spring	CuSn, stlSt
Weight	1.20 kg
Perm. operating load	5 kN
Min. failing load	15 kN
Tightening torque M_{A1}	16 Nm
Tightening torque M_{A2}	135 Nm
Tightening torque M_{A3}	135 Nm
Rated short-time current	up to 30 kA

Suspension clamp M20, sliding with contact spring

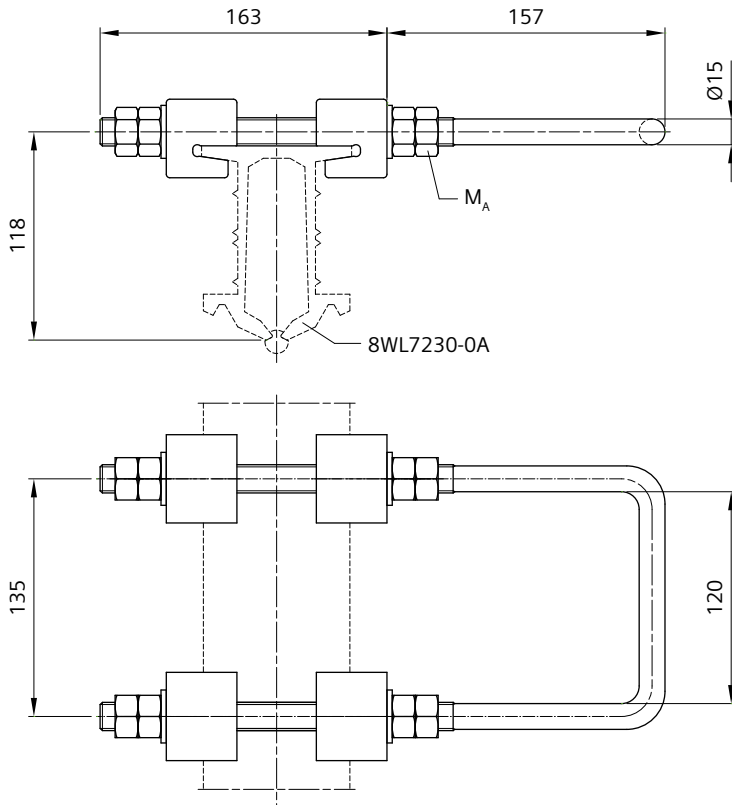
for connection of soffit conductor rail 8WL7230-0A up to -0C at sliding support in AC systems



Order no.	8WL7233-1A
Designation	Suspension clamp M20, sliding with contact spring
Material	
Clamp body	Al
Sliding elements	Plastic
Bolts M8, M20	stlSt
Nuts	stlSt
Spring washers	stlSt
Washers	stlSt, Alcu
Contact spring	CuSn, stlSt
Weight	1.38 kg
Perm. operating load	5 kN
Min. failing load	15 kN
Tightening torque M_{A1}	16 Nm
Tightening torque M_{A2}	280 Nm
Tightening torque M_{A3}	280 Nm
Rated short-time current	up to 40 kA

Earthing clamp

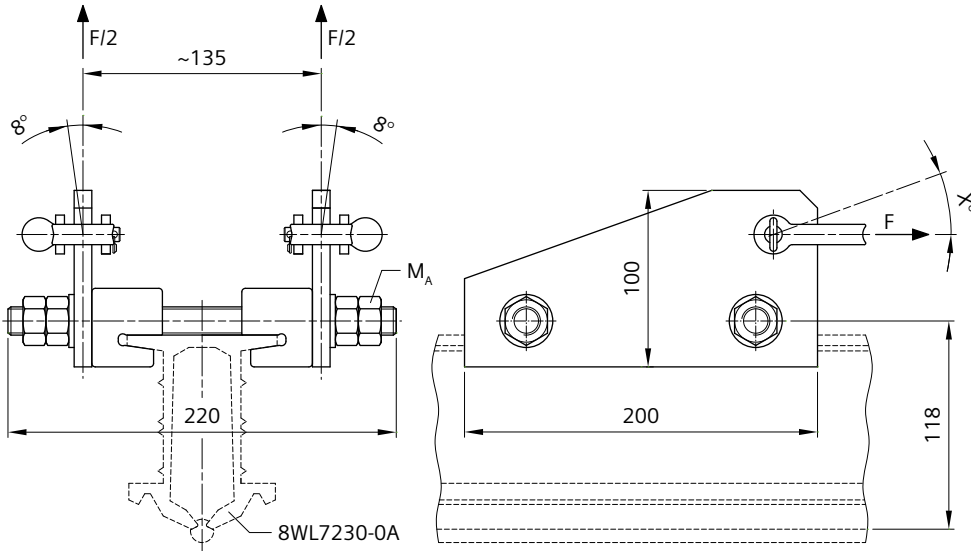
for soffit conductor rail 8WL7230-0A, for connection of earthing sticks



Order no.	8WL7234-0A
Designation	Earthing clamp
Material	
Clamping jaws	Al
U-bolt M16	stlSt
Nuts, washers	stlSt
Weight	2.32 kg
Tightening torque M_A	60 Nm
Rated short-time current	45 kA
Rated short-time duration	100 ms

Anchoring clamp

for soffit conductor rail 8WL7230-0A, for fixed termination of contact wire in transition from catenary to conductor rail

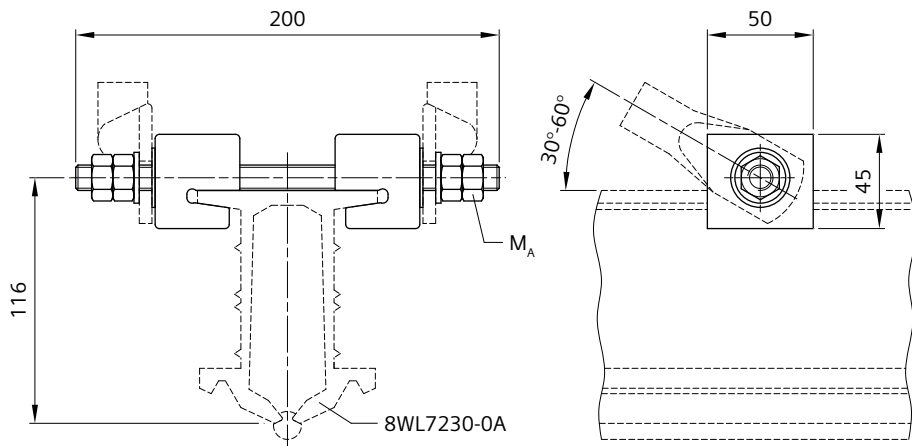


Order no.	8WL7234-3
Designation	Anchoring clamp
Material	
Clamping jaws	Al
Straps	Al
Shackles 10	stlSt
Threaded pin M16	stlSt
Nuts, washers	stlSt
Weight	2.74 kg
Perm. operating load	16 kN
Min. failing load	48 kN
Tightening torque M_A	60 Nm

Angle X has to be defined project-specifically.

Feeder clamp

for soffit conductor rail 8WL7230-0A

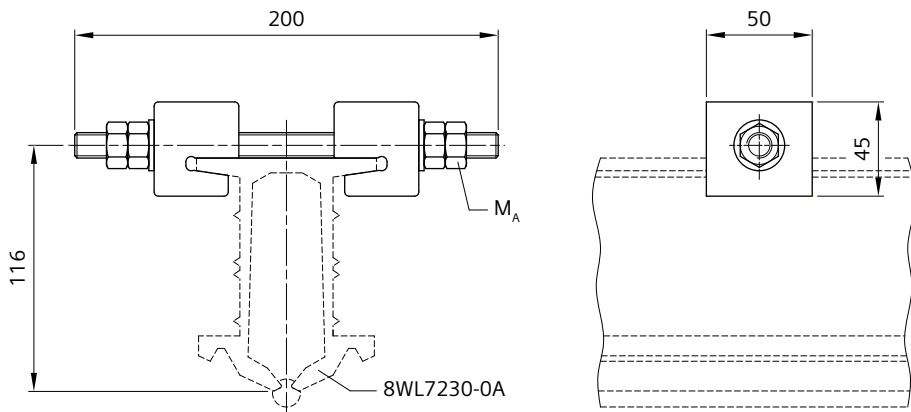


Order no.	8WL7235-0A
Designation	Feeder clamp
Material	
Clamping jaws	Al
Threaded pin M12	stlSt
Nuts, washers	stlSt
Washers	Alcu
Weight	0.64 kg
Tightening torque M_A	60 Nm
Perm. permanent current at 50 K temperature rise	2900 A
Rated short-time current	45 kA
Rated short-time duration	100 ms

Cable lugs must be ordered separately depending on wire diameter, see Chapter 02-02.

Guy clamp

for connection of soffit conductor rail 8WL7230-0A at fixed point with sliding suspension clamp 8WL7233-0

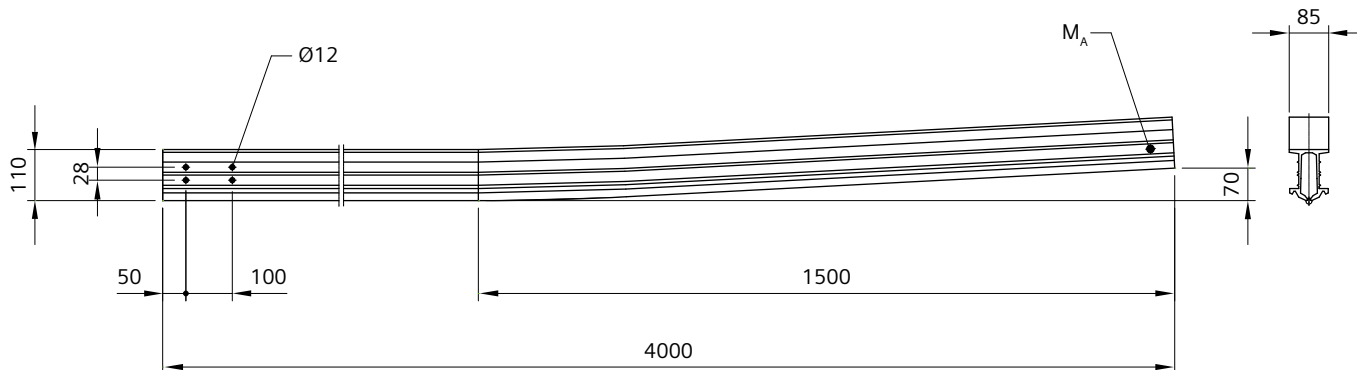


Order no.	8WL7235-0B
Designation	Guy clamp
Material	
Clamping jaws	Al
Threaded pin M12	stlSt
Nuts, washers	stlSt
Weight	0.63 kg
Tightening torque M_A	60 Nm

Mounting on the both sides of the suspension clamp.

Soffit conductor rail ramp

for section change

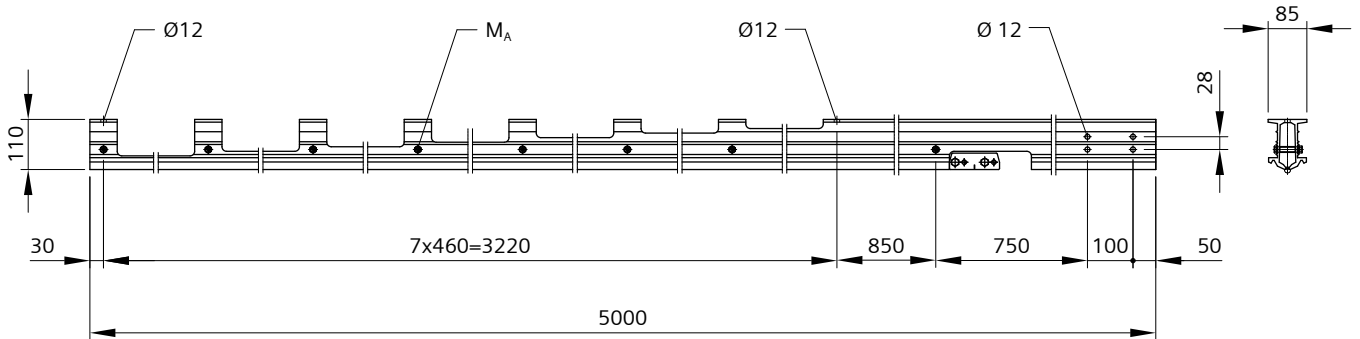


Order no.	8WL7230-1A
Designation	Soffit conductor rail ramp
Material	
Ramp	Al
Distance sleeve	stlSt
Bolt M8	stlSt
Nut, washers	stlSt
Spring washer	stlSt
Weight	24.77 kg
Tightening torque M_A	16 Nm
Nominal cross-section	2300 mm ²
Perm. permanent current at 50 K temperature rise	2900 A
Rated short-time current	45 kA
Rated short-time duration	100 ms

Drilled holes suitable for rail joint 8WL7231-0.

Transition element, complete

for connection of soffit conductor rail on the catenary



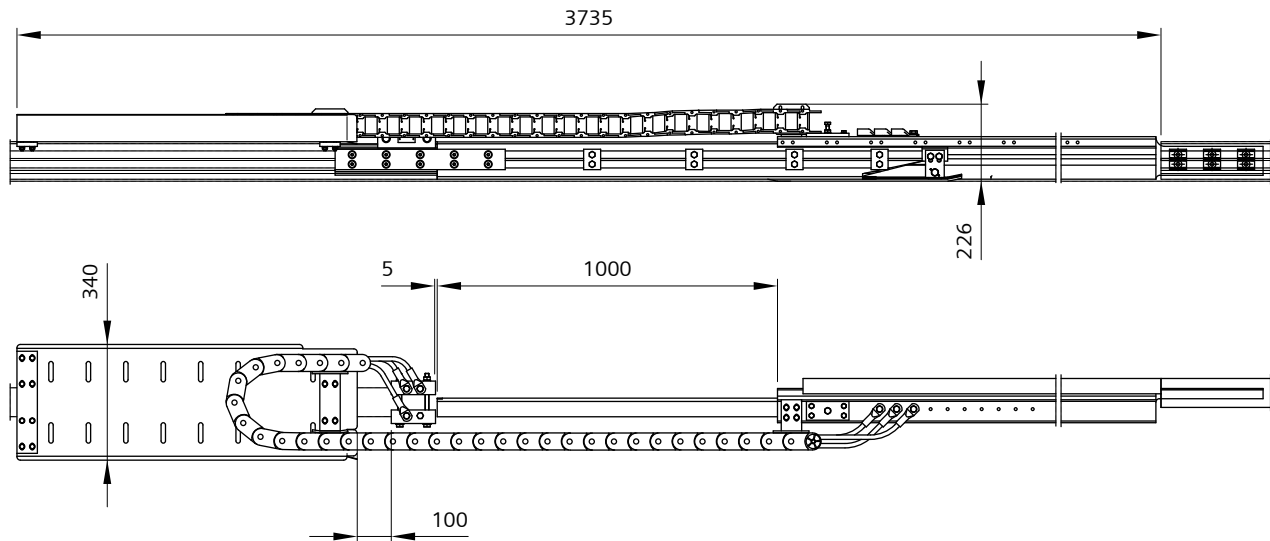
Order no.	8WL7230-2A
Designation	Transition element
Material	
Transition element	Al
Distance sleeves	stlSt
Bolts M8	stlSt
Nuts, washers	stlSt
Spring washers	stlSt
Contact wire splice	CuNiSi
Weight	20.17 kg
Tightening torque M_A	16 Nm

Drilled holes suitable for rail joint 8WL7231-0.

Expansion joint for soffit conductor rail

25 kV AC, 3 conductors, 1224 A

for systems with 25 kV AC, for contact wires acc. to EN 50149



Order no.	8WL7238-0A	8WL7238-0B	8WL7238-0C	8WL7238-0D	8WL7238-0E
Designation	Expansion joint AC-80	Expansion joint AC-100	Expansion joint AC-107	Expansion joint AC-120	Expansion joint AC-150
Material					
Profiles, plates	Al	Al	Al	Al	Al
Clamps	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi
Straps, angles	Al, stlSt	Al, stlSt	Al, stlSt	Al, stlSt	Al, stlSt
Trough	stlSt	stlSt	stlSt	stlSt	stlSt
Energy chain	Plastic	Plastic	Plastic	Plastic	Plastic
Wires 70x189	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
Cable lugs	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated
Bolts, nuts	stlSt	stlSt	stlSt	stlSt	stlSt
Washers, spring washers	stlSt	stlSt	stlSt	stlSt	stlSt
for contact wires	AC-80, Cu-ETP / CuAg0.1	AC-100, Cu-ETP / CuAg0.1	AC-107, Cu-ETP / CuAg0.1	AC-120, Cu-ETP / CuAg0.1	AC-150, Cu-ETP / CuAg0.1
Weight	54 kg	54 kg	54 kg	54 kg	54 kg
Number of conductors	3x 70f	3x 70f	3x 70f	3x 70f	3x 70f
Working range (length compensation)	2x 500 mm	2x 500 mm	2x 500 mm	2x 500 mm	2x 500 mm
Perm. Permanent current ¹⁾	1224 A	1224 A	1224 A	1224 A	1224 A
Rated short-time current	45 kA	45 kA	45 kA	45 kA	45 kA
Rated short-time duration	100 ms	100 ms	100 ms	100 ms	100 ms
Peak current factor	1.0	1.0	1.0	1.0	1.0

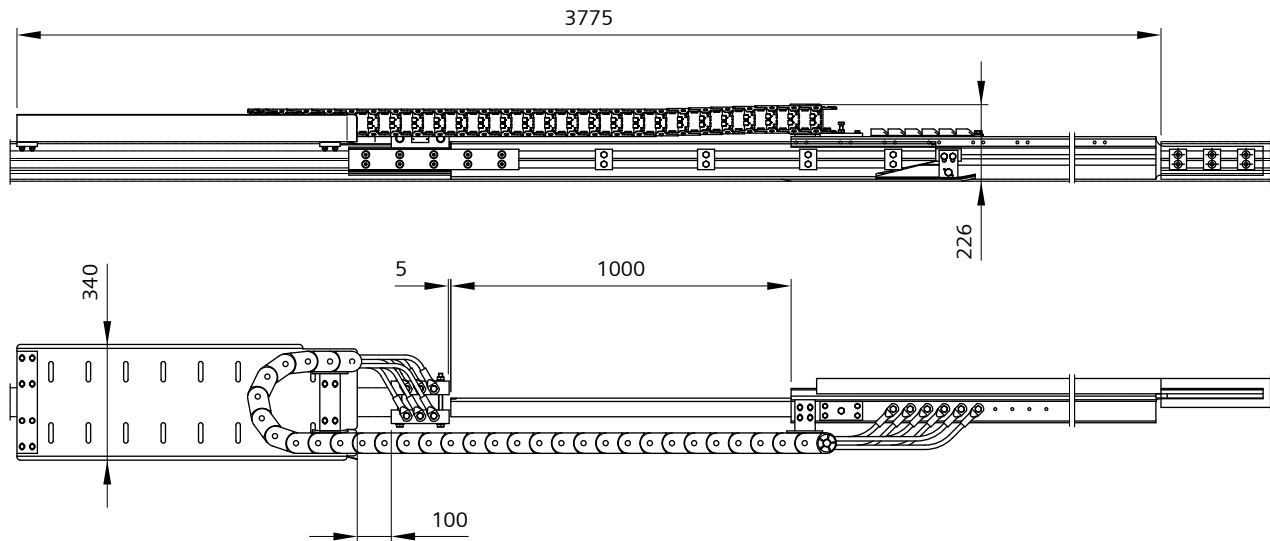
¹⁾ at 1 m/s wind speed and 35 °C conductor initial temperature

Mounting tool 8WL7238-3A must be ordered separately, see page 842.

Expansion joint for soffit conductor rail

25 kV AC, 6 conductors, 2075 A

for systems with 25 kV AC, for contact wires acc. to EN 50149



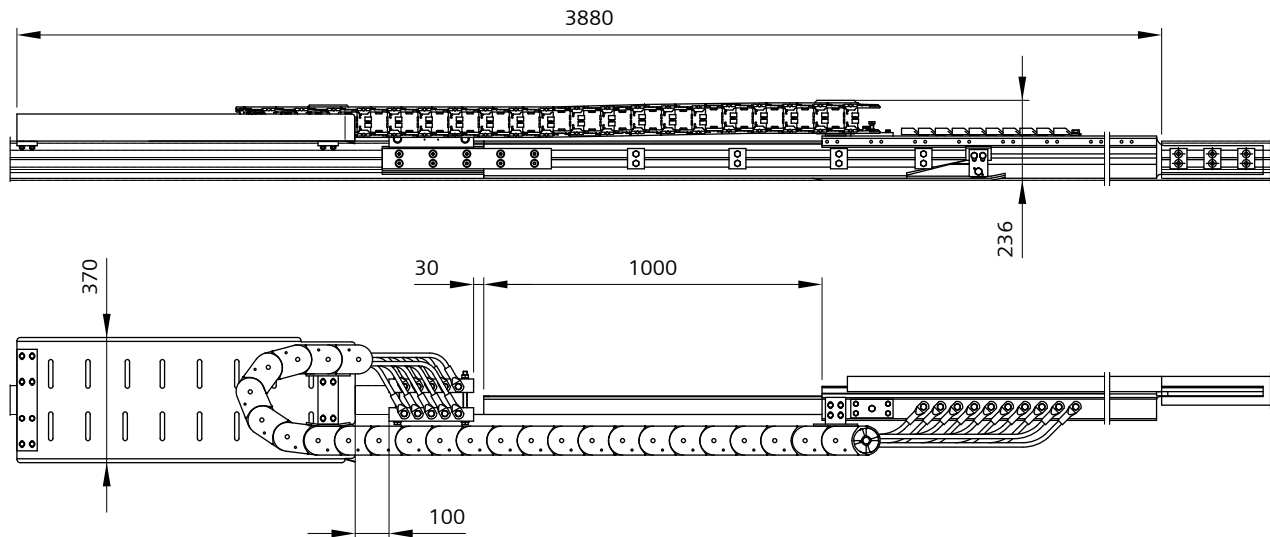
Order no.	8WL7238-0F	8WL7238-0G	8WL7238-0H	8WL7238-0I	8WL7238-0J
Designation	Expansion joint AC-80	Expansion joint AC-100	Expansion joint AC-107	Expansion joint AC-120	Expansion joint AC-150
Material					
Profiles, plates	Al	Al	Al	Al	Al
Clamps	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi
Straps, angles	Al, stlSt	Al, stlSt	Al, stlSt	Al, stlSt	Al, stlSt
Trough	stlSt	stlSt	stlSt	stlSt	stlSt
Energy chain	Plastic	Plastic	Plastic	Plastic	Plastic
Wires 70x189	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
Cable lugs	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated
Bolts, nuts	stlSt	stlSt	stlSt	stlSt	stlSt
Washers, spring washers	stlSt	stlSt	stlSt	stlSt	stlSt
for contact wires	AC-80, Cu-ETP / CuAg0.1	AC-100, Cu-ETP / CuAg0.1	AC-107, Cu-ETP / CuAg0.1	AC-120, Cu-ETP / CuAg0.1	AC-150, Cu-ETP / CuAg0.1
Weight	61 kg	61 kg	61 kg	61 kg	61 kg
Number of conductors	6x 70f	6x 70f	6x 70f	6x 70f	6x 70f
Working range (length compensation)	2x 500 mm	2x 500 mm	2x 500 mm	2x 500 mm	2x 500 mm
Perm. Permanent current ¹⁾	2075 A	2075 A	2075 A	2075 A	2075 A
Rated short-time current	45 kA	45 kA	45 kA	45 kA	45 kA
Rated short-time duration	100 ms	100 ms	100 ms	100 ms	100 ms
Peak current factor	1.0	1.0	1.0	1.0	1.0

¹⁾ at 1 m/s wind speed and 35 °C conductor initial temperature

Mounting tool 8WL7238-3A must be ordered separately, see page 842.

Expansion joint for soffit conductor rail 25 kV AC, 10 conductors, 2768 A

for systems with 25 kV AC, for contact wires acc. to EN 50149



Order no.	8WL7238-0K	8WL7238-0L	8WL7238-0M	8WL7238-0N	8WL7238-0P
Designation	Expansion joint AC-80	Expansion joint AC-100	Expansion joint AC-107	Expansion joint AC-120	Expansion joint AC-150
Material					
Profiles, plates	Al	Al	Al	Al	Al
Clamps	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi
Straps, angles	Al, stlSt	Al, stlSt	Al, stlSt	Al, stlSt	Al, stlSt
Trough	stlSt	stlSt	stlSt	stlSt	stlSt
Energy chain	Plastic	Plastic	Plastic	Plastic	Plastic
Wires 70x189	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
Cable lugs	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated
Bolts, nuts	stlSt	stlSt	stlSt	stlSt	stlSt
Washers, spring washers	stlSt	stlSt	stlSt	stlSt	stlSt
for contact wires	AC-80, Cu-ETP / CuAg0.1	AC-100, Cu-ETP / CuAg0.1	AC-107, Cu-ETP / CuAg0.1	AC-120, Cu-ETP / CuAg0.1	AC-150, Cu-ETP / CuAg0.1
Weight	77 kg	77 kg	77 kg	77 kg	77 kg
Number of conductors	10x 70f	10x 70f	10x 70f	10x 70f	10x 70f
Working range (length compensation)	2x 500 mm	2x 500 mm	2x 500 mm	2x 500 mm	2x 500 mm
Perm. Permanent current ¹⁾	2768 A	2768 A	2768 A	2768 A	2768 A
Rated short-time current	45 kA	45 kA	45 kA	45 kA	45 kA
Rated short-time duration	100 ms	100 ms	100 ms	100 ms	100 ms
Peak current factor	1.0	1.0	1.0	1.0	1.0

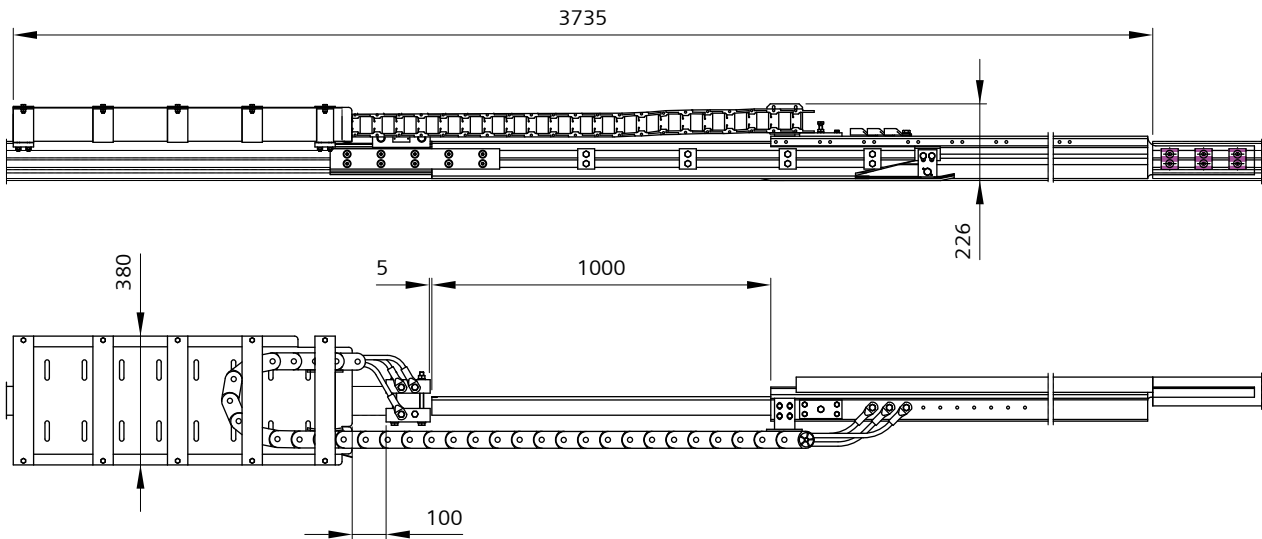
¹⁾ at 1 m/s wind speed and 35 °C conductor initial temperature

Mounting tool 8WL7238-3A must be ordered separately, see page 842.

Expansion joint for soffit conductor rail

15 kV AC / DC, 3 conductors, 1224 A

for systems with 15 kV AC and DC, for contact wires acc. to EN 50149



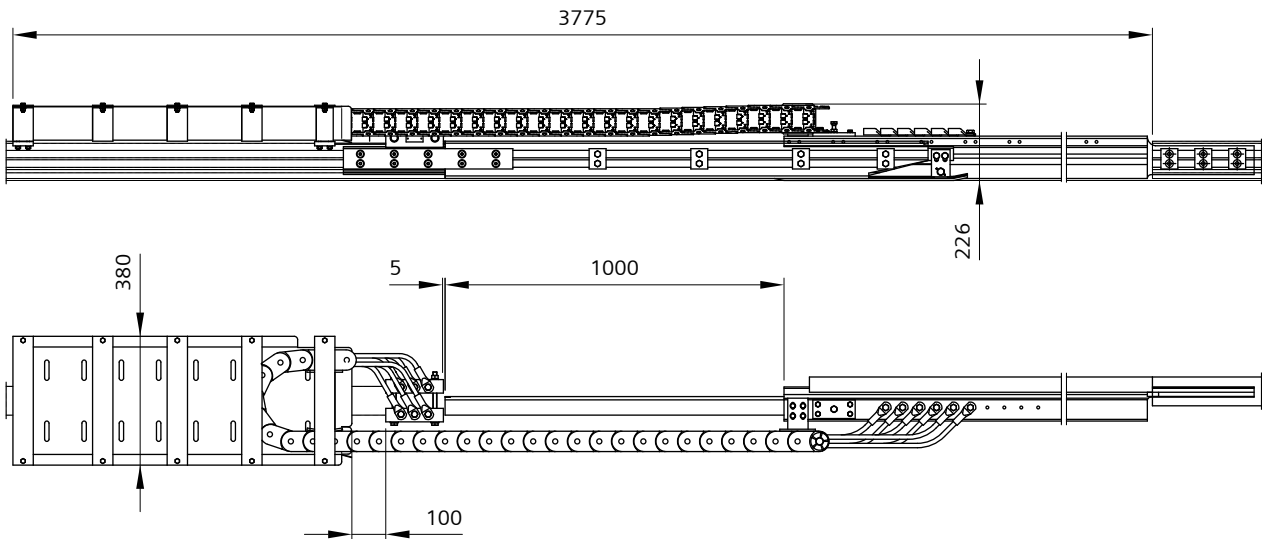
Order no.	8WL7238-0Q	8WL7238-0R	8WL7238-0S	8WL7238-0T	8WL7238-0U
Designation	Expansion joint AC-80	Expansion joint AC-100	Expansion joint AC-107	Expansion joint AC-120	Expansion joint AC-150
Material					
Profiles, plates	Al	Al	Al	Al	Al
Clamps	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi
Straps, angles	Al, stlSt	Al, stlSt	Al, stlSt	Al, stlSt	Al, stlSt
Trough	stlSt	stlSt	stlSt	stlSt	stlSt
Energy chain	Plastic	Plastic	Plastic	Plastic	Plastic
Wires 70x189	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
Cable lugs	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated
Bolts, nuts	stlSt	stlSt	stlSt	stlSt	stlSt
Washers, spring washers	stlSt	stlSt	stlSt	stlSt	stlSt
for contact wires	AC-80, Cu-ETP / CuAg0.1	AC-100, Cu-ETP / CuAg0.1	AC-107, Cu-ETP / CuAg0.1	AC-120, Cu-ETP / CuAg0.1	AC-150, Cu-ETP / CuAg0.1
Weight	62 kg	62 kg	62 kg	62 kg	62 kg
Number of conductors	3x 70f	3x 70f	3x 70f	3x 70f	3x 70f
Working range (length compensation)	2x 500 mm	2x 500 mm	2x 500 mm	2x 500 mm	2x 500 mm
Perm. Permanent current ¹⁾	1224 A	1224 A	1224 A	1224 A	1224 A
Rated short-time current	45 kA	45 kA	45 kA	45 kA	45 kA
Rated short-time duration	60 ms	60 ms	60 ms	60 ms	60 ms
Peak current factor	2.5	2.5	2.5	2.5	2.5

¹⁾ at 1 m/s wind speed and 35 °C conductor initial temperature

Mounting tool 8WL7238-3A must be ordered separately, see page 842.

Expansion joint for soffit conductor rail 15 kV AC / DC, 6 conductors, 2075 A

for systems with 15 kV AC and DC, for contact wires acc. to EN 50149



Order no.	8WL7238-0V	8WL7238-0W	8WL7238-0X	8WL7238-0Y	8WL7238-0Z
Designation	Expansion joint AC-80	Expansion joint AC-100	Expansion joint AC-107	Expansion joint AC-120	Expansion joint AC-150
Material					
Profiles, plates	Al	Al	Al	Al	Al
Clamps	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi
Straps, angles	Al, stlSt	Al, stlSt	Al, stlSt	Al, stlSt	Al, stlSt
Trough	stlSt	stlSt	stlSt	stlSt	stlSt
Energy chain	Plastic	Plastic	Plastic	Plastic	Plastic
Wires 70x189	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
Cable lugs	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated
Bolts, nuts	stlSt	stlSt	stlSt	stlSt	stlSt
Washers, spring washers	stlSt	stlSt	stlSt	stlSt	stlSt
for contact wires	AC-80, Cu-ETP / CuAg0.1	AC-100, Cu-ETP / CuAg0.1	AC-107, Cu-ETP / CuAg0.1	AC-120, Cu-ETP / CuAg0.1	AC-150, Cu-ETP / CuAg0.1
Weight	69 kg	69 kg	69 kg	69 kg	69 kg
Number of conductors	6x 70f	6x 70f	6x 70f	6x 70f	6x 70f
Working range (length compensation)	2x 500 mm	2x 500 mm	2x 500 mm	2x 500 mm	2x 500 mm
Perm. Permanent current ¹⁾	2075 A	2075 A	2075 A	2075 A	2075 A
Rated short-time current	45 kA	45 kA	45 kA	45 kA	45 kA
Rated short-time duration	60 ms	60 ms	60 ms	60 ms	60 ms
Peak current factor	2.5	2.5	2.5	2.5	2.5

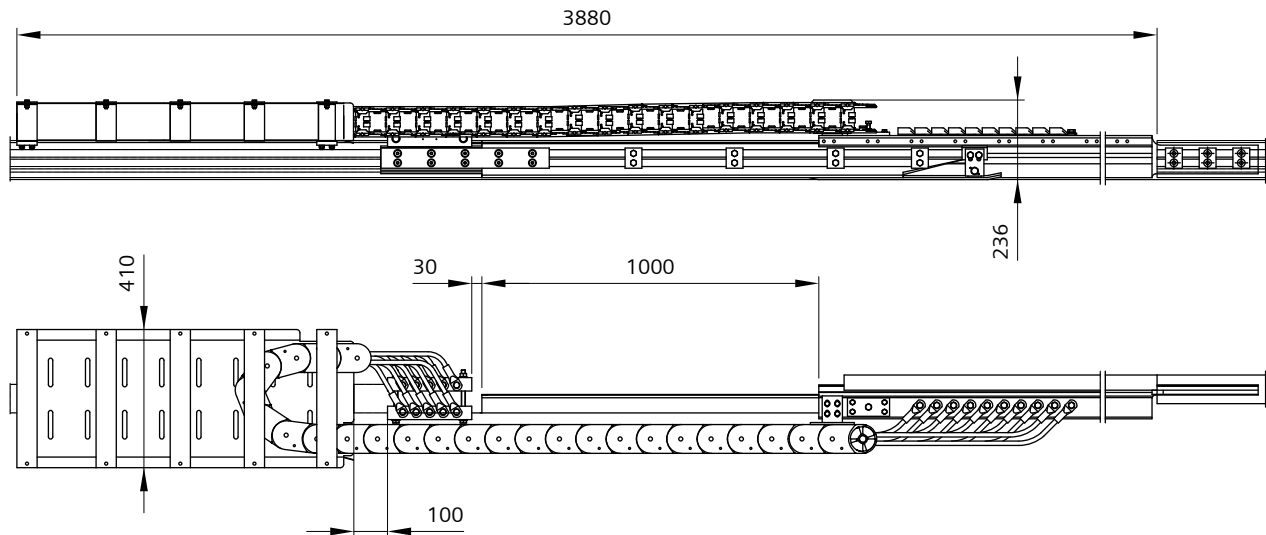
¹⁾ at 1 m/s wind speed and 35 °C conductor initial temperature

Mounting tool 8WL7238-3A must be ordered separately, see page 842.

Expansion joint for soffit conductor rail

15 kV AC / DC, 10 conductors, 2768 A

for systems with 15 kV AC and DC, for contact wires acc. to EN 50149



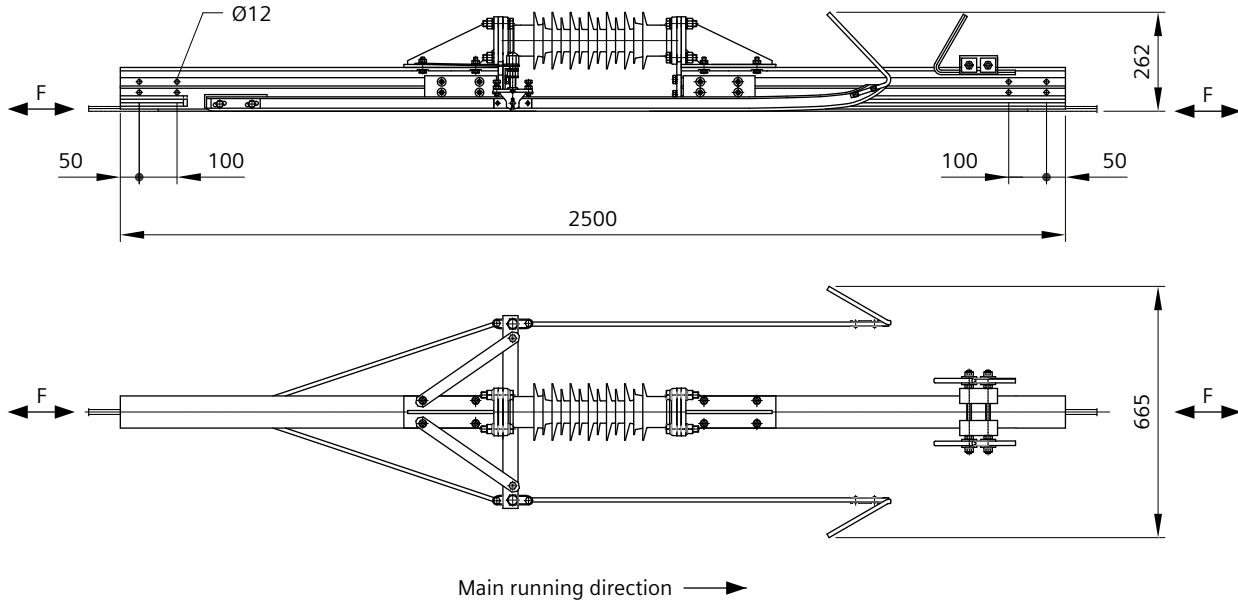
Order no.	8WL7238-0KA	8WL7238-0LA	8WL7238-0MA	8WL7238-0NA	8WL7238-0PA
Designation	Expansion joint AC-80	Expansion joint AC-100	Expansion joint AC-107	Expansion joint AC-120	Expansion joint AC-150
Material					
Profiles, plates	Al	Al	Al	Al	Al
Clamps	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi	Al, CuNiSi
Straps, angles	Al, stlSt	Al, stlSt	Al, stlSt	Al, stlSt	Al, stlSt
Trough	stlSt	stlSt	stlSt	stlSt	stlSt
Energy chain	Plastic	Plastic	Plastic	Plastic	Plastic
Wires 70x189	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
Cable lugs	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated	Cu, tin-coated
Bolts, nuts	stlSt	stlSt	stlSt	stlSt	stlSt
Washers, spring washers	stlSt	stlSt	stlSt	stlSt	stlSt
for contact wires	AC-80, Cu-ETP / CuAg0.1	AC-100, Cu-ETP / CuAg0.1	AC-107, Cu-ETP / CuAg0.1	AC-120, Cu-ETP / CuAg0.1	AC-150, Cu-ETP / CuAg0.1
Weight	85 kg	85 kg	85 kg	85 kg	85 kg
Number of conductors	10x 70f	10x 70f	10x 70f	10x 70f	10x 70f
Working range (length compensation)	2x 500 mm	2x 500 mm	2x 500 mm	2x 500 mm	2x 500 mm
Perm. Permanent current ¹⁾	2768 A	2768 A	2768 A	2768 A	2768 A
Rated short-time current	45 kA	45 kA	45 kA	45 kA	45 kA
Rated short-time duration	60 ms	60 ms	60 ms	60 ms	60 ms
Peak current factor	2.5	2.5	2.5	2.5	2.5

¹⁾ at 1 m/s wind speed and 35 °C conductor initial temperature

Mounting tool 8WL7238-3A must be ordered separately, see page 842.

Section insulator for soffit conductor rail 25 kV AC

for contact wires acc. to EN 50149



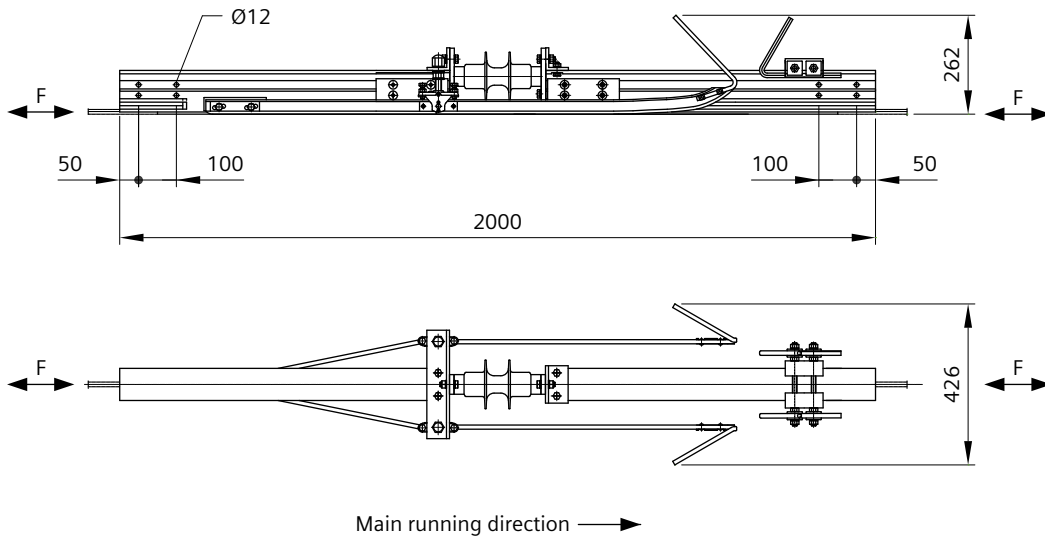
Order no.	8WL7238-5A	8WL7238-5B	8WL7238-5D	8WL7238-5E
Designation	Section insulator AC-80	Section insulator AC-100	Section insulator AC-120	Section insulator AC-150
Material				
Conductor rail	Al	Al	Al	Al
Fittings	Al	Al	Al	Al
Insulator	GRP, silicone	GRP, silicone	GRP, silicone	GRP, silicone
Runners	Cu	Cu	Cu	Cu
Arcing horns	Cu	Cu	Cu	Cu
Bolts, nuts, washers	stlSt	stlSt	stlSt	stlSt
Spring washers	stlSt	stlSt	stlSt	stlSt
for contact wires	AC-80, Cu-ETP / CuAg0.1	AC-100, Cu-ETP / CuAg0.1	AC-120, Cu-ETP / CuAg0.1	AC-150, Cu-ETP / CuAg0.1
Weight	45.4 kg	45.4 kg	45.4 kg	45.4 kg
Perm. operating load	10 kN	10 kN	10 kN	10 kN
Min. failing load	32 kN	32 kN	32 kN	32 kN
Nominal voltage	25 kV AC	25 kV AC	25 kV AC	25 kV AC
Creepage distance	1255 mm	1255 mm	1255 mm	1255 mm
Clearance in air	185 mm	185 mm	185 mm	185 mm

Connecting drilling holes Ø12 suitable to rail joint 8WL7231-0.

Types for contact wire AC-107 or for BC contact wires on request.

Section insulator for soffit conductor rail 3 kV DC

for contact wires acc. to EN 50149



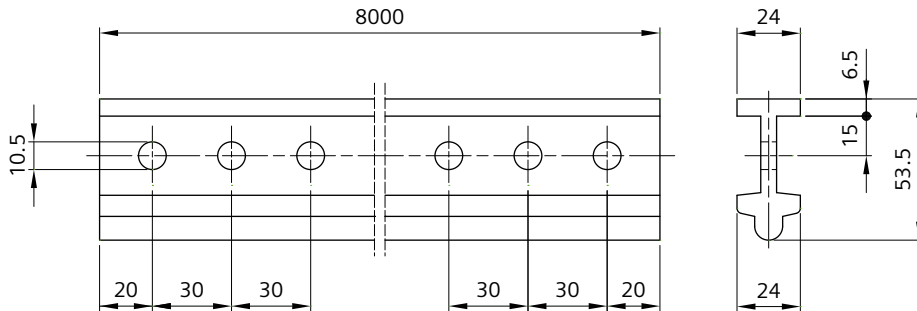
Order no.	8WL7238-7A	8WL7238-7B	8WL7238-7D	8WL7238-7E
Designation	Section insulator AC-80	Section insulator AC-100	Section insulator AC-120	Section insulator AC-150
Material				
Conductor rail	Al	Al	Al	Al
Fittings	Al	Al	Al	Al
Insulator	GRP, silicone	GRP, silicone	GRP, silicone	GRP, silicone
Runners	Cu	Cu	Cu	Cu
Arcing horns	Cu	Cu	Cu	Cu
Bolts, nuts, washers	stlSt	stlSt	stlSt	stlSt
Spring washers	stlSt	stlSt	stlSt	stlSt
for contact wires	AC-80, Cu-ETP / CuAg0.1	AC-100, Cu-ETP / CuAg0.1	AC-120, Cu-ETP / CuAg0.1	AC-150, Cu-ETP / CuAg0.1
Weight	31.1 kg	31.1 kg	31.1 kg	31.1 kg
Perm. operating load	10 kN	10 kN	10 kN	10 kN
Min. failing load	32 kN	32 kN	32 kN	32 kN
Nominal voltage	3 kV DC	3 kV DC	3 kV DC	3 kV DC
Creepage distance	305 mm	305 mm	305 mm	305 mm
Clearance in air	60 mm	60 mm	60 mm	60 mm

Connecting drilling holes Ø12 suitable to rail joint 8WL7231-0.

Types for contact wire AC-107 or for BC contact wires on request.

Soffit conductor rail (Cu)

for overhead contact line in tunnel



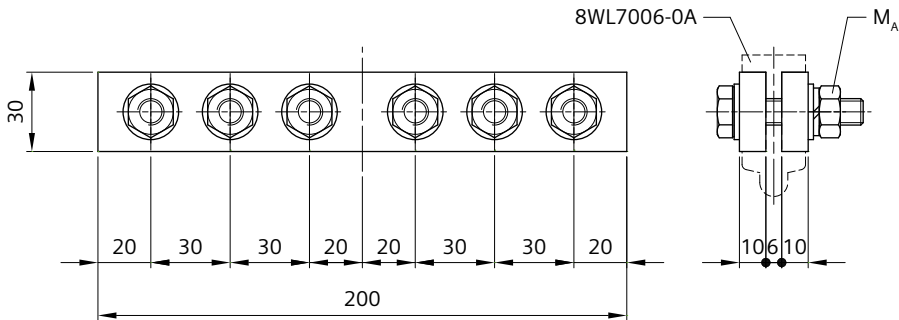
Order no.	8WL7006-0A
Designation	Soffit conductor rail 600 mm ²
Material	Cu-ETP
Weight	42.96 kg

Drilled holes suitable for rail joint 8WL7006-1ZA.

Other lengths on request.

Rail joint, bolted (Cu)

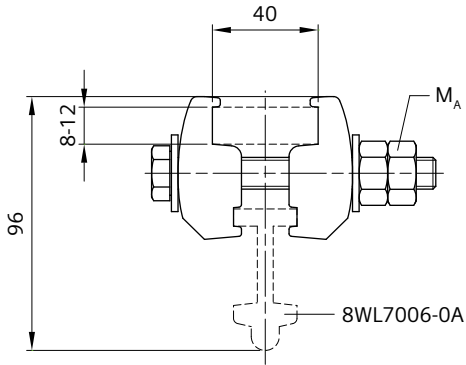
for soffit conductor rail 8WL7006-0A



Order no.	8WL7006-1ZA
Designation	Rail joint, bolted
Material	
Straps	Cu-ETP
Bolts M10	stlSt
Nuts	stlSt
Washers	stlSt
Spring washers	stlSt
Weight	1.25 kg
Tightening torque M_A	32 Nm

Feeder clamp for soffit conductor rail

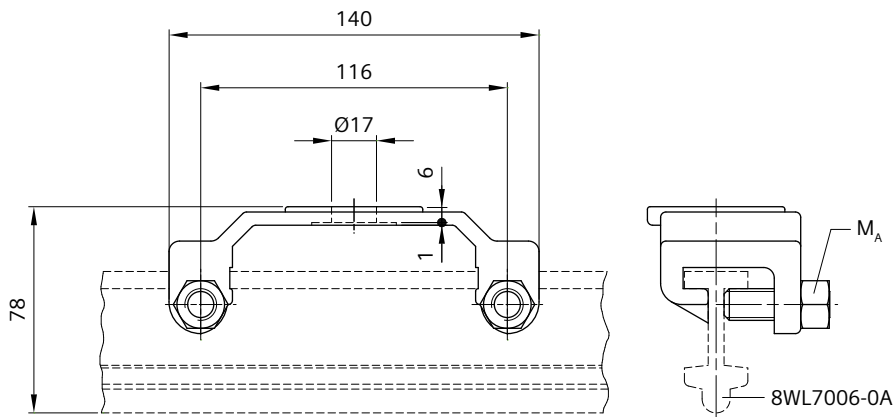
for connection of flat sections 40x8 to 40x12 mm on soffit conductor rail 8WL7006-0A



Order no.	8WL6715-0
Designation	Feeder clamp
Material	
Clamp body	Cu-ETP
Bolt M12	stlSt
Nuts	stlSt
Washers	stlSt
Weight	0.62 kg
Tightening torque M_A	56 Nm

Conductor rail clamp

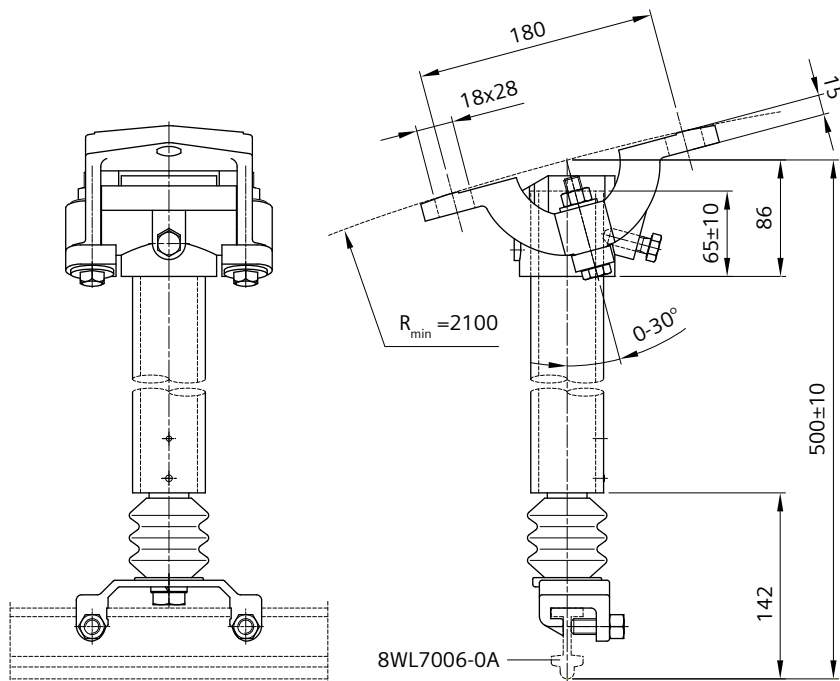
for conductor rail support on soffit conductor rail 8WL7006-0A



Order no.	8WL3582-5
Designation	Conductor rail clamp
Material	
Clamp body	CuAl
Threaded pins M12	stlSt
Nuts	stlSt
Weight	0.60 kg
Tightening torque M_A	20 Nm

Conductor rail support 1.5 kV DC, support frame adjustable up to 30°

for fastening of conductor rail 8WL7006-0A on soffit in circular-shaped tunnel, radius of tunnel ≥ 2.10 m

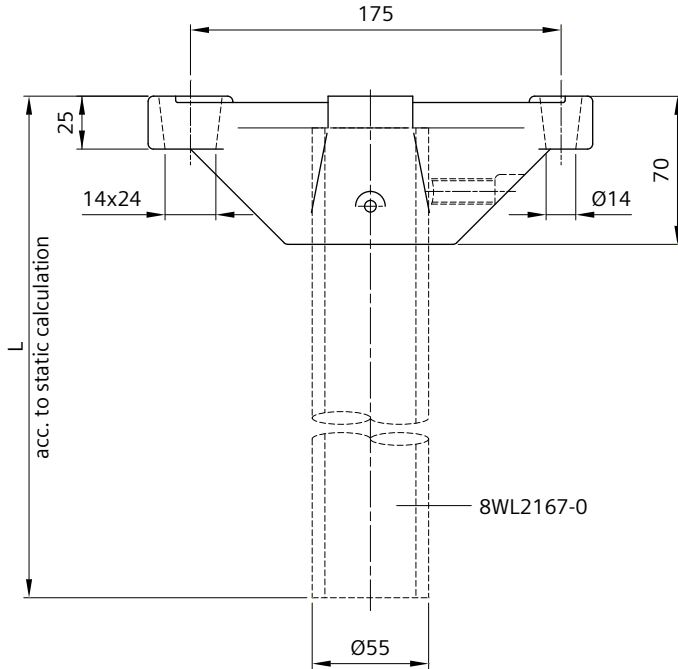


Order no.	8WL3586-5
Designation	Conductor rail support
Material	
Support frame	ctAl
Torsion element	stlSt, rubber
Insulator body	Cast resin, brown
Conductor rail clamp	CuAl
Tube 55x6	Al
Bolts, nuts	stlSt
Spring washers, washers	stlSt
Prestressed sleeves	stlSt
Weight	4.78 kg
Nominal voltage	1.5 kV DC
Creepage distance	85 mm

Other lengths on request.

Support frame

for conductor rail and elastic supports on soffit posts d=55 mm

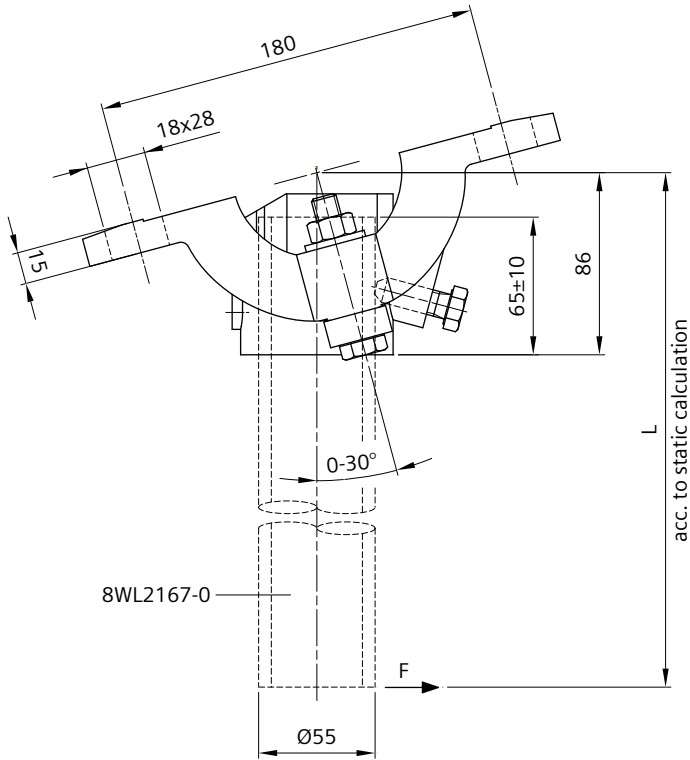


Order no.	8WL4044-2
Designation	Support frame for tube 55
Material	
Support frame	ctAl
Prestressed sleeve	stlSt
Threaded pin M12	stlSt
Weight	0.92 kg

Tube 8WL2167-0 (55x6-Al) must be ordered separately (length as needed).
 Adapter for installation on tie bars see 8WL3581-1.

Support frame, adjustable up to 30°

for conductor rail and elastic supports on soffit posts d=55 mm, for radius of tunnel ≥ 2.10 m



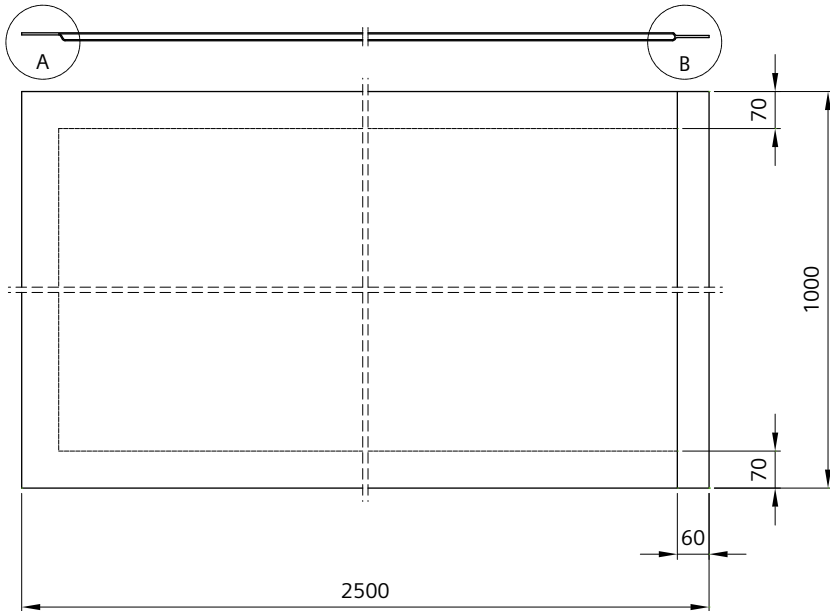
Order no.	8WL3586-0
Designation	Support frame for tube 55
Material	
Support frame	ctAl
Bolts, nuts	stlSt
Prestressed sleeve Ø6	stlSt
Weight	1.90 kg
Perm operating moment (F×L)	400 Nm

Tube 8WL2167-0 (55x6-Al) must be ordered separately (length as needed).

When trespassing the permissible operating moment the use of an anchoring wire is unavoidable.

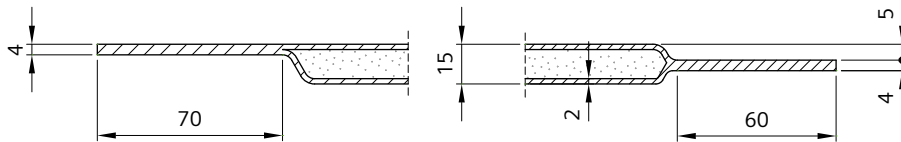
Insulated plate

for protection under structures



Detail A

Detail B



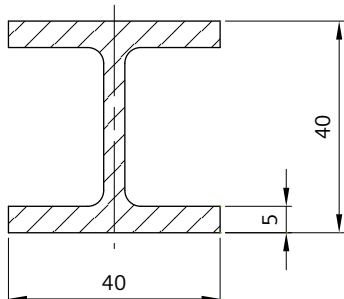
Order no.	8WL8101-1A
Designation	Insulated plate 1000 x 2500
Material	GF-UP, mat reinforced, color RAL6022 (olive drab)
Weight	15.0 kg
Tracking resistance ¹⁾	CTI 600
Nominal voltage	1.5 kV DC

¹⁾ on the visible side

Other colors on request.

I-beam

for insulated plates 8WL8101-1A

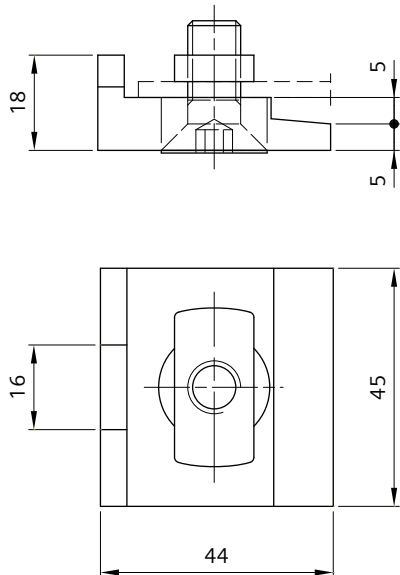


Order no.	8WL8101-4
Designation	I-beam
Material	GF-UP, color RAL6022 (olive drab)
Weight	1.15 kg/m
Max. delivery length	6.00 m
Bending strength, longitudinal	> 250 N/mm ²
Bending strength, transversal	> 150 N/mm ²
Elastic modulus	> 20000 N/mm ²
Water absorption	< 3 %
Tracking resistance	CTI 380
Tensile strength	> 250 N/mm ²

Other colors on request.

Clamping plate for I-beam

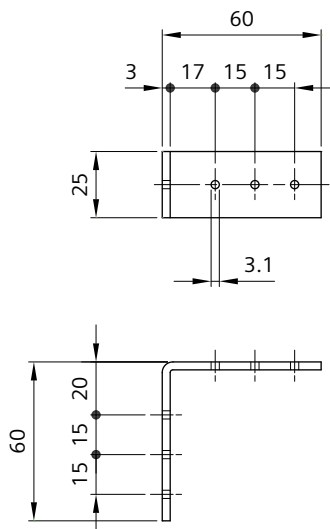
for fixing of I-beam 8WL8101-4 on tie bar 8WL8102-6



Order no.	8WL8102-7A
Designation	Clamping plate for I-beam
Material	
Clamping plate	htgSt
Threaded plate M10	stlSt
Countersunk head screw M10x25	stlSt
Weight	0.15 kg

Support angle

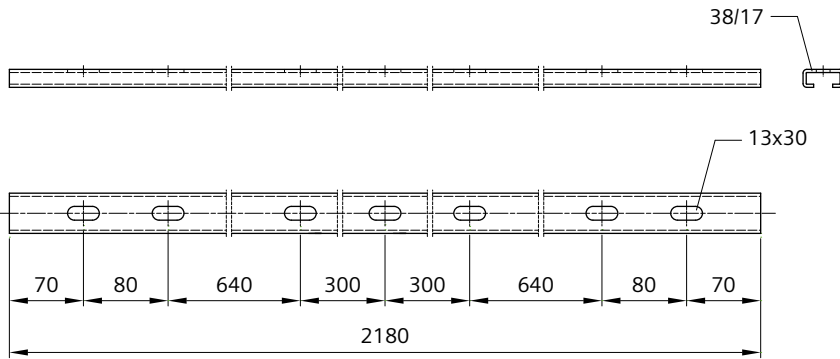
for guard plate 8WL8102-4



Order no.	8WL8102-5
Designation	Support angle
Material	stlSt
Weight	0.07 kg

Tie bar

for fixing of I-beam 8WL8101-4 onto soffit

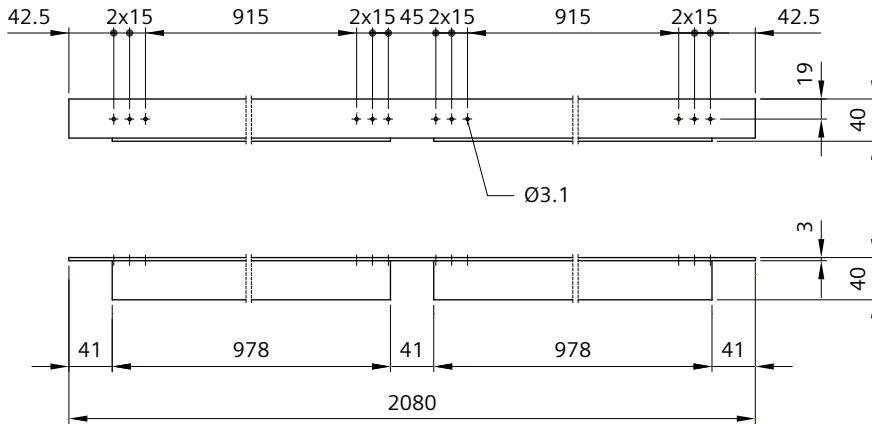


Order no.	8WL8102-6
Designation	Tie bar 38/17
Material	stlSt
Weight	4.20 kg

Other lengths and types on request.

Guard plate

as visual protection at beginning or end of bridge

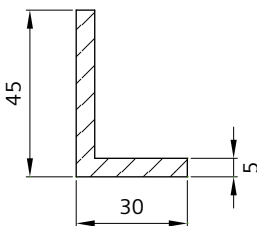


Order no.	8WL8102-4
Designation	Guard plate
Material	GRP, color RAL6022 (olive drab)
Weight	1.06 kg

Other colors on request.

L-section for guard plate

as visual protection at beginning or end of bridge



Order no.	8WL8101-3
Designation	L-section 45x30x5
Material	GF-UP, color RAL6022 (olive drab)
Weight	0.60 kg/m

Other colors on request.

Chapter 02

Standard Products

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Twin dropper clip	558, 559
U-clamp (DIN 1142)	510
Universal dropper clip	546, 547, 548, 549
Universal parallel groove clamp	543
Wedge-type tension clamp	557
Wire clip	581

Technical comments

Application

Clamps are used for mechanical or electrical connections in catenary systems, trolley-type contact lines, and within the cross-span equipment. They are especially used for connecting components with stranded wires and single wires.

Types

The portfolio contains clamps for a wide variety of applications, such as:

- Contact wire clips
- Contact wire connection clamps
- Dropper clips
- Feeder clamps

Depending on their design and application, the clamps are made of copper, copper alloys, copper-aluminium alloys or aluminium.

If copper and aluminium materials are connected to each other, protection sleeves and washers made of aluminium-copper materials prevent the electrochemical corrosion of adjacent components. A choice of these protection sleeves and washers can be found in Chapter 02-03..

The guide rails of the overhead contact line crossings are provided in two designs:

- Stainless steel
- Copper

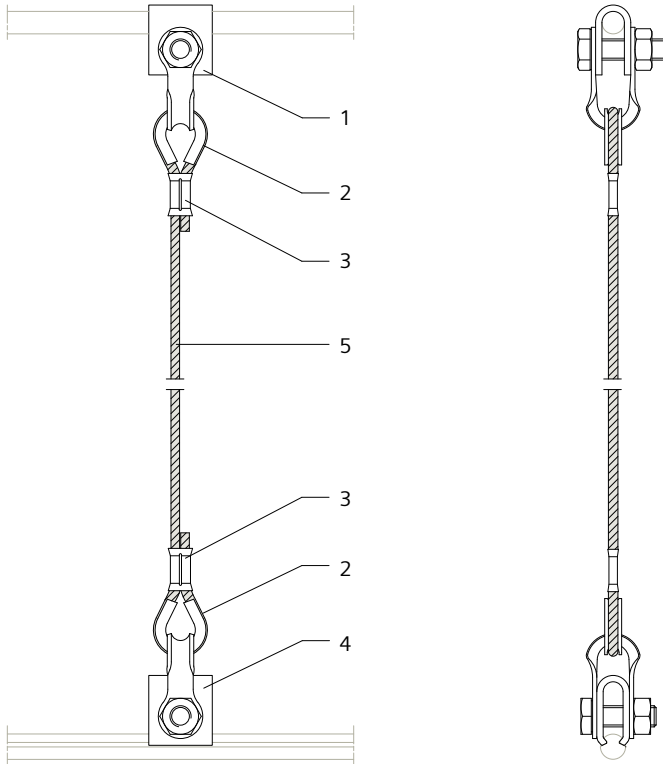
Special features

- Long service life thanks to the use of environment-resistant materials and stainless steel standard parts
- Extremely high elongation at break and no inter-crystalline corrosion of the clamps made of copper-aluminium alloy due to their material properties

Note

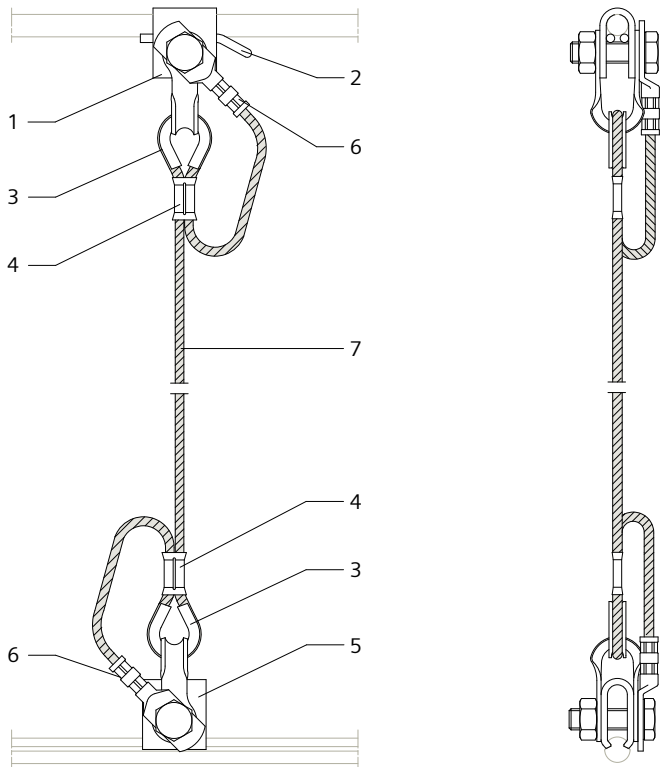
The proper usage must be checked according to the respective requirements and local conditions. Note the information on the individual products.

Catenary dropper Bz 10 mm²



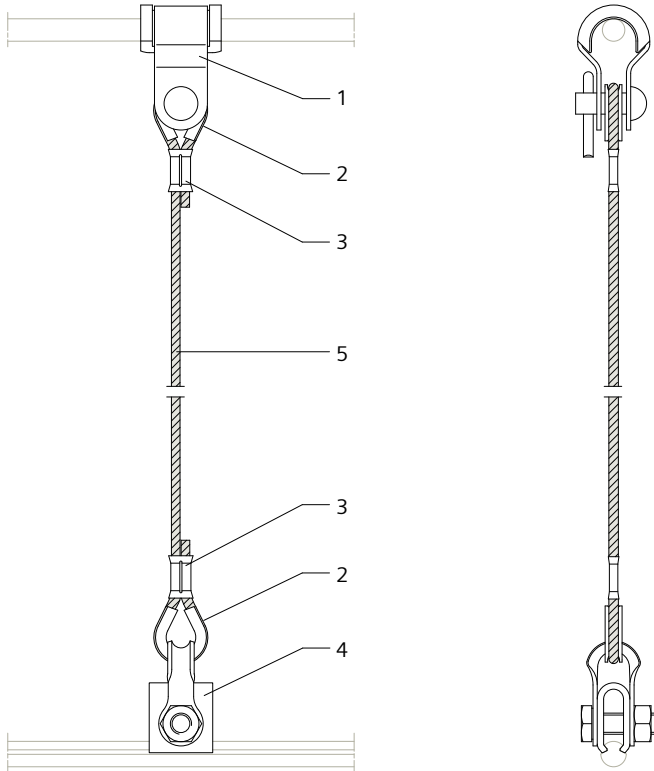
Position	Designation	Order no.
1	Dropper clip 70	8WL4624-3
2	Thimble 10f	8WL1500-2
3	Crimped/compression connector 10f-20	8WL1520-0
4	Dropper clip 50	8WL4620-0A
5	Bronze wire 10x49 (length as needed)	8WL7060-2

Catenary dropper Bz 10 mm², current-carrying



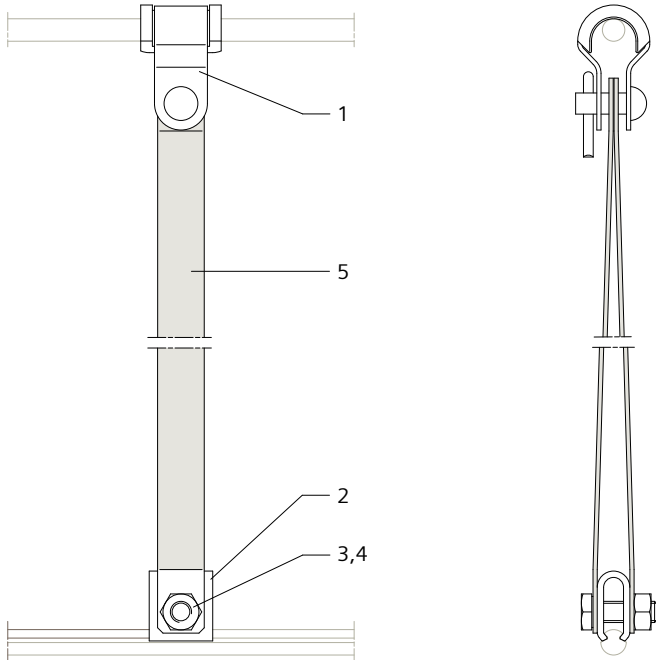
Position	Designation	Order no.
1	Dropper clip 70	8WL4624-3
2	Clip M4	8WL4622-0
3	Thimble 10f	8WL1500-2
4	Crimped/compression connector 10f-20	8WL1520-0
5	Dropper clip 50	8WL4620-0A
6	Cable lug 10-16	8WL1575-0
7	Bronze wire 10x49 (length as needed)	8WL7060-2

Sliding dropper Bz 10 mm², height > 300 mm



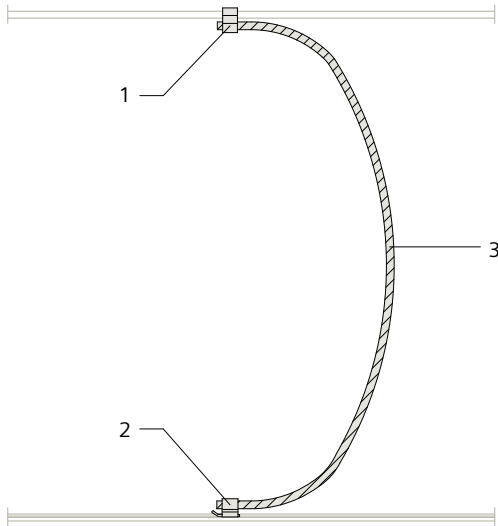
Position	Designation	Order no.
1	Sliding dropper clip 35-185	8WL4612-0
2	Thimble 10f	8WL1500-2
3	Crimped/compression connector 10f-20	8WL1520-0
4	Dropper clip 50	8WL4620-0A
5	Bronze wire 10x49 (length as needed)	8WL7060-2

Sliding dropper Bz 10 mm², height 56-300 mm



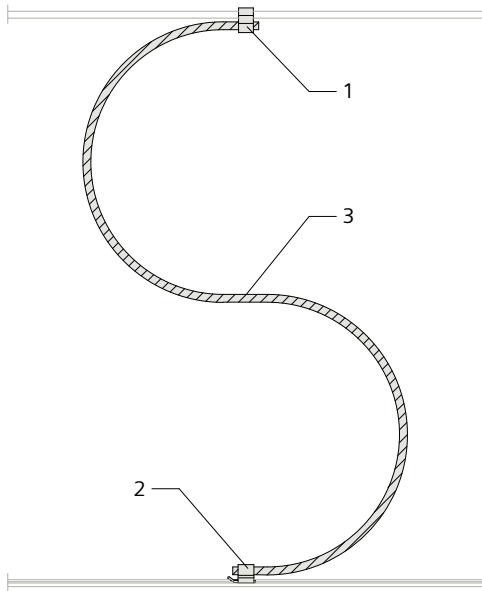
Position	Designation	Order no.
1	Sliding dropper clip 35-185	8WL4612-0
2	Clamp strap	8WL4621-0
3	Hexagon bolt ISO 4017-M10x30-stlSt	
4	Hexagon nut ISO 4032-M10-stlSt	
5	Spacer have to be defined projekt-specifically	

Electrical connector catenary wire – contact wire, height < 1 m



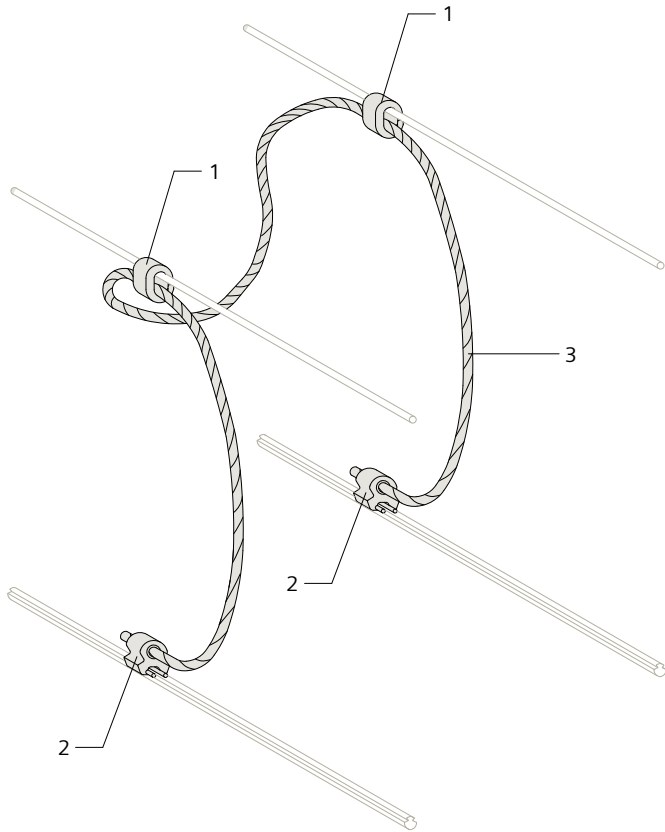
Position	Designation	Order no.
1	Compression conductor clamp 70/95f-70/120	8WL4556-1
2	Feeder compression clamp 95f	8WL4572-0
3	Copper wire 95x259 (length as needed)	8WL7075-0

Electrical connector catenary wire – contact wire, height from 1 m



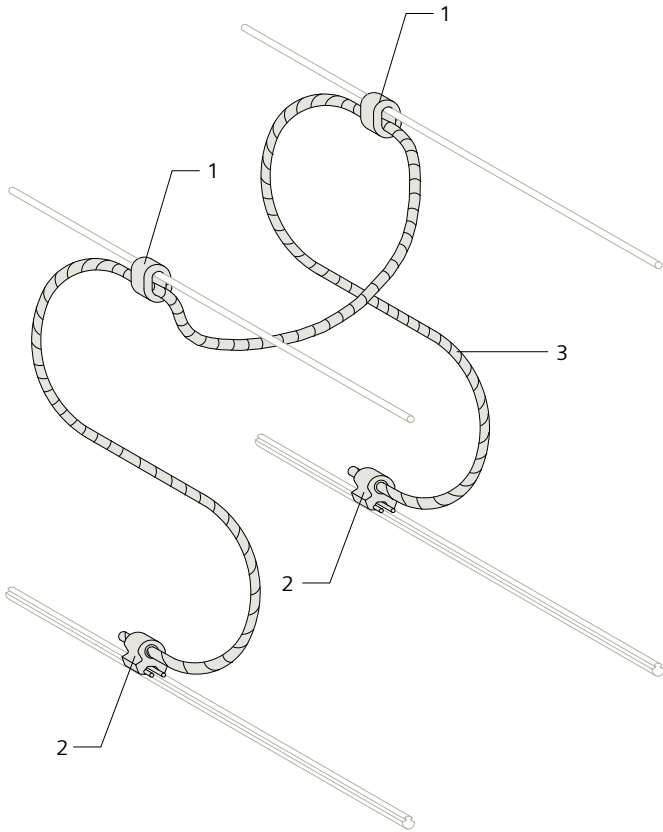
Position	Designation	Order no.
1	Compression conductor clamp 70/95f-70/120	8WL4556-1
2	Feeder compression clamp 95f	8WL4572-0
3	Copper wire 95x259 (length as needed)	8WL7075-0

Electrical connector between two catenaries, height < 1 m



Position	Designation	Order no.
1	Compression conductor clamp 70/95f-70/120	8WL4556-1
2	Feeder compression clamp 95f	8WL4572-0
3	Copper wire 95x259 (length as needed)	8WL7075-0

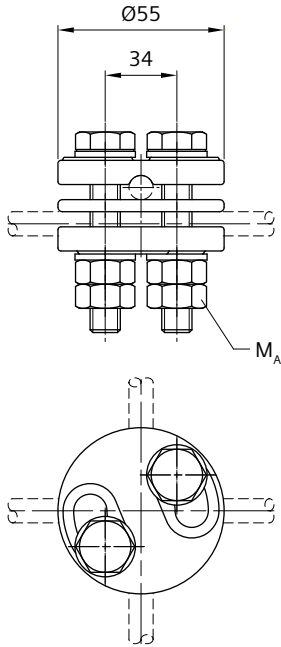
Electrical connector between two catenaries, height from 1 m



Position	Designation	Order no.
1	Compression conductor clamp 70/95f-70/120	8WL4556-1
2	Feeder compression clamp 95f	8WL4572-0
3	Copper wire 95x259 (length as needed)	8WL7075-0

Crossing clamp, adjustable

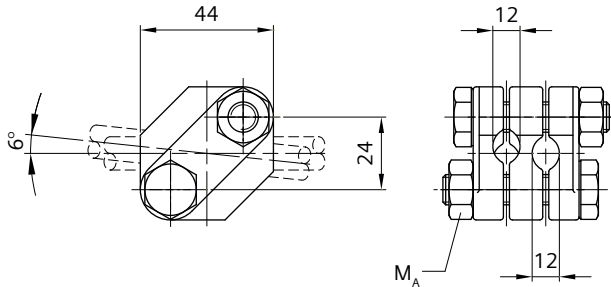
for span guy arrangements, for wires acc. to DIN 48201



Order no.	8WL4500-0
Designation	Crossing clamp, adjustable
Material	
Clamping plates	CuZn
Bolts M10	stlSt
Nuts, washers	stlSt
for wires	up to 50 mm ²
Weight	0.46 kg
Tightening torque M_A	32 Nm

Crossing clamp, fixed

for acute-angled and right-angled crossings of catenary wires and earthing of cross-span wires, for wires acc. to DIN 48201

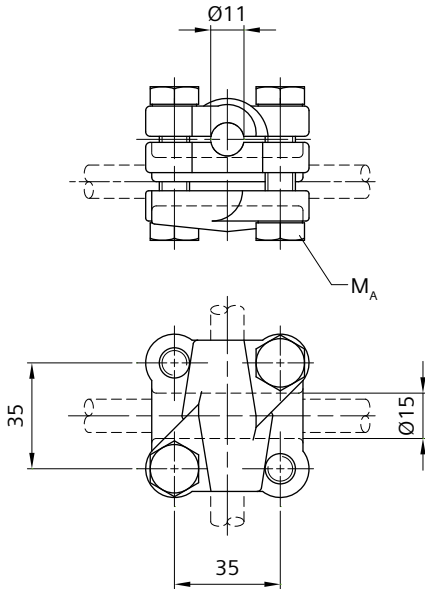


Order no.	8WL4501-0
Designation	Crossing clamp, fixed
Material	
Clamping jaws	CuNiSi
Bolts M10	stlSt
Nuts	stlSt
for wires	up to 70 mm ²
Weight	0.40 kg
Tightening torque M_A	32 Nm

For wire cross-sections < 50 mm² protection sleeves must be ordered separately, see Chapter 02-02.

Conductor crossing clamp

for crossing of catenary wires acc. to DIN 48201

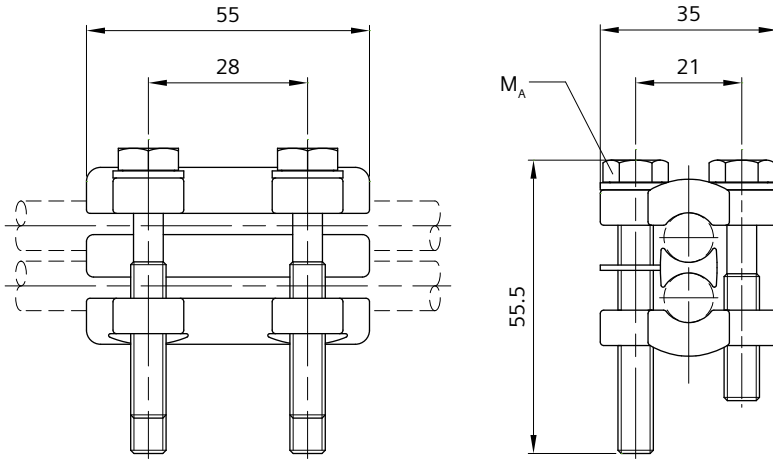


Order no.	8WL4502-0
Designation	Conductor crossing clamp 50-95
Material	
Clamping jaws	CuNiSi
Bolts M10	stlSt
for wires	50 to mm ²
Weight	0.54 kg
Tightening torque M_A	32 Nm

For wire cross-sections < 50 mm² protection sleeves must be ordered separately, see Chapter 02-02.

Connection clamp

mechanically high-tensile for bronze and copper wires acc. to DIN 48201 in the following wire connections:
 25 mm² with 25 to 70 mm², 35 mm² with 35 to 70 mm², 50 mm² with 50 to 70 mm² and 70 mm² with 70 mm²



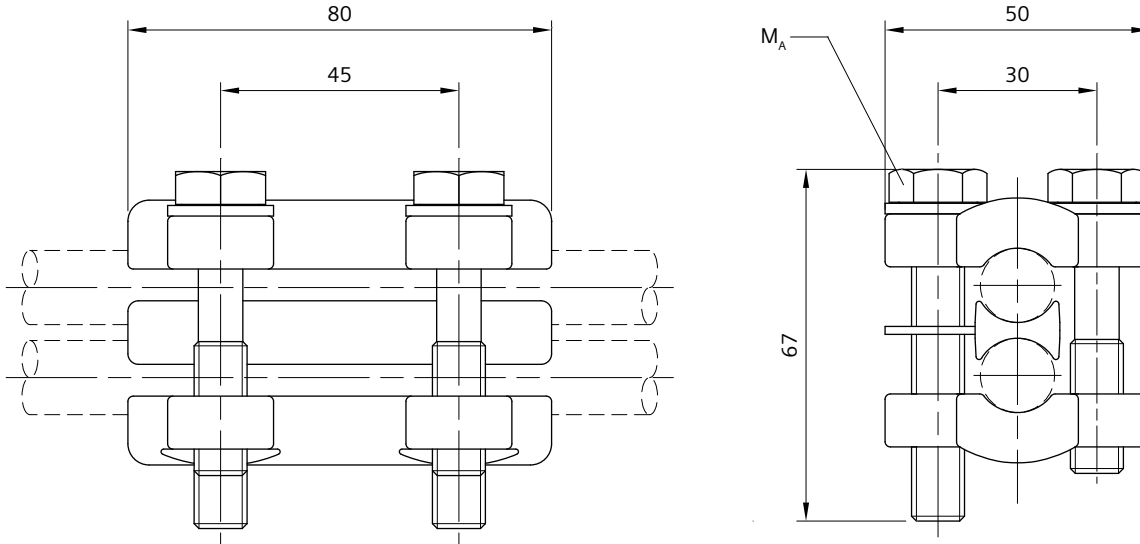
Order no.	8WL4505-5
Designation	Connection clamp 25-70
Material	
Clamp body	CuNiSi
Bolts M8	stlSt
Washers	Cu
Weight	0.28 kg
Tightening torque M_A	23 Nm

The clamp supports the wires given with at least 85 % of their rated failing load.

Two clamps must be used for connection of two bronze wires 70 mm².

Connection clamp

mechanically high-tensile for bronze and copper wires acc. to DIN 48201 in the following wire connections:
70 mm² with 70 to 150 mm² and 95 mm² with 95 to 150 mm²

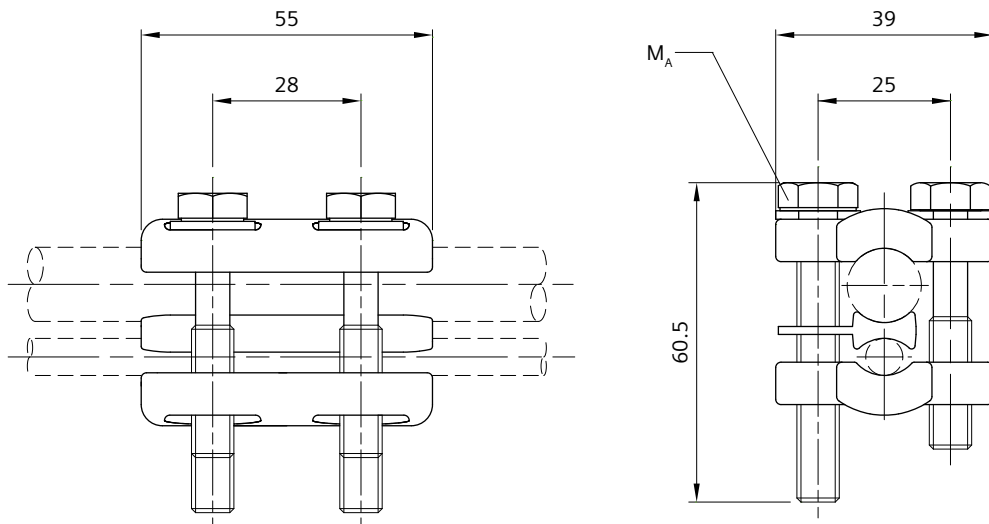


Order no.	8WL4505-6
Designation	Connection clamp 70-150
Material	
Clamp body	CuNiSi
Bolts M10	stlSt
Washers	Cu
for wires	70 to 120 mm ² , BzII / Cu-ETP 150 mm ² , Cu-ETP
Weight	0.67 kg
Tightening torque M_A	46 Nm

The clamp supports bronze or copper wires 70 and 95 mm² and copper wires 120 mm² with at least 85 % of their rated failing load.
The clamp supports bronze wires 120 mm² and copper wires 150 mm² with at least 40 kN. Two clamps must be used for a retention load of 85 % of the rated failing load of this wires.

Stitch wire clamp

mechanically high-tensile for bronze and copper wires acc. to DIN 48201 in the following wire connections:
25 and 35 mm² with 35 to 150 mm² and 50 mm² with 50 to 150 mm²



Order no.	8WL4505-7
Designation	Stitch wire clamp 25-50/35-150
Material	
Clamp body	CuNiSi
Bolts M8	stlSt
Washers	Cu
Weight	0.31 kg
Tightening torque M_A	23 Nm

The clamp supports the wires given with at least 85 % of their rated failing load.

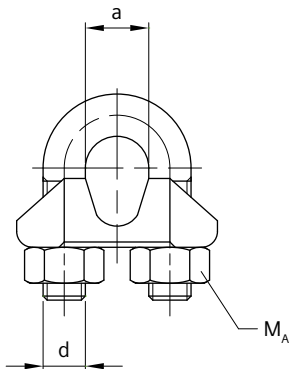
Connection clamp 8WL4505-6 must be used for other wire connections.

Installation note:

The centre piece must not contact the clamping parts. The upper and lower clamping parts must be tightened parallel.

U-clamp (DIN 1142)

for stranded or single wire connections under low tensile loads, for bronze/copper wires acc. to DIN 48201

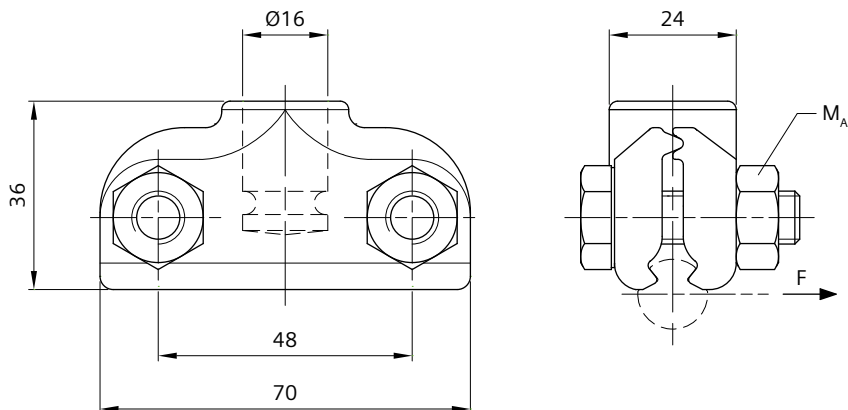


Order no.	8WL4507-0	8WL4507-1	8WL4507-3
Designation	U-clamp 8	U-clamp 10	U-clamp 13
Material			
Clamp body	Malleable cast iron, galvanic galv.	Malleable cast iron, galvanic galv.	Malleable cast iron, galvanic galv.
U-bolt M8	Steel, galvanic galv.	Steel, galvanic galv.	-
U-bolt M12	-	-	Steel, galvanic galv.
Nuts	Steel, galvanic galv.	Steel, galvanic galv.	Steel, galvanic galv.
for wires	35 mm ²	50 mm ²	95 mm ²
Weight	0.08 kg	0.10 kg	0.24 kg
Tightening torque M_A	6 Nm	9 Nm	33 Nm
a	10 mm	12 mm	15 mm
d	M8	M8	M12

If wire connections are subjected to heavy loads, other clamps must be used, e. g. the connection clamps 8WL4505-5 or 8WL4505-6.
Types made of stainless steel on request.

Contact wire clip 16R

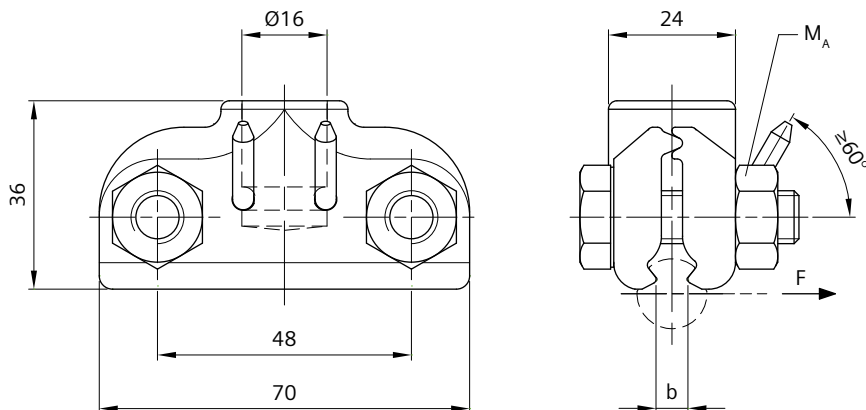
for contact wires acc. to EN 50149, for grooved stud installation without U-pin



Order no.	8WL4517-1K
Designation	Contact wire clip 16R
Material	
Clamp body	CuAl
Bolts M10	stlSt
Nuts	stlSt
for contact wires	AC-80 to 150
Weight	0.30 kg
Perm. operating load	3.5 kN
Min. failing load	10.5 kN
Tightening torque M_A	32 Nm

Contact wire clip 16R with U-pin

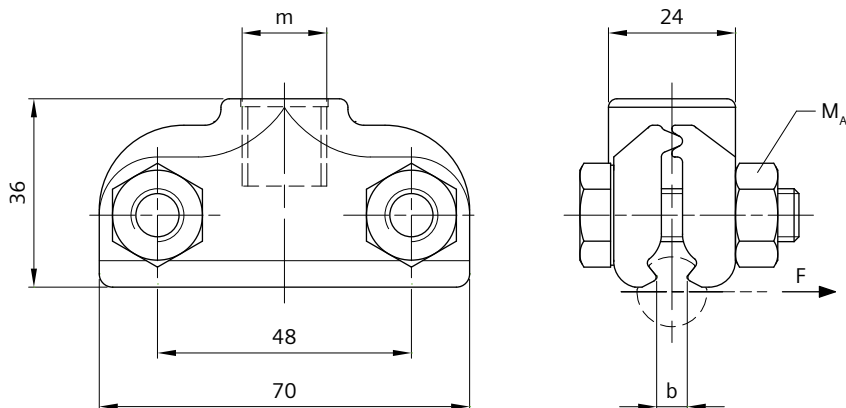
for contact wires acc. to EN 50149 and made in China, for grooved stud installation with U-pin



Order no.	8WL4517-1L	8WL4517-1E
Designation	Contact wire clip 16R with U-pin	Contact wire clip 16R with U-pin
Material		
Clamp body	CuAl	CuAl
U-pin	Cu	Cu
Bolts M10	stlSt	stlSt
Nuts	stlSt	stlSt
for contact wires	AC-80 to 150	BC/BF-100 to 150 CTHA-85/-120 (China)
Weight	0.30 kg	0.30 kg
Perm. operating load	3.5 kN	3.5 kN
Min. failing load	10.5 kN	10.5 kN
Tightening torque M_A	32 Nm	32 Nm
b	5.60 mm	6.92 - 7.24 mm

Contact wire clip M16-5/8"

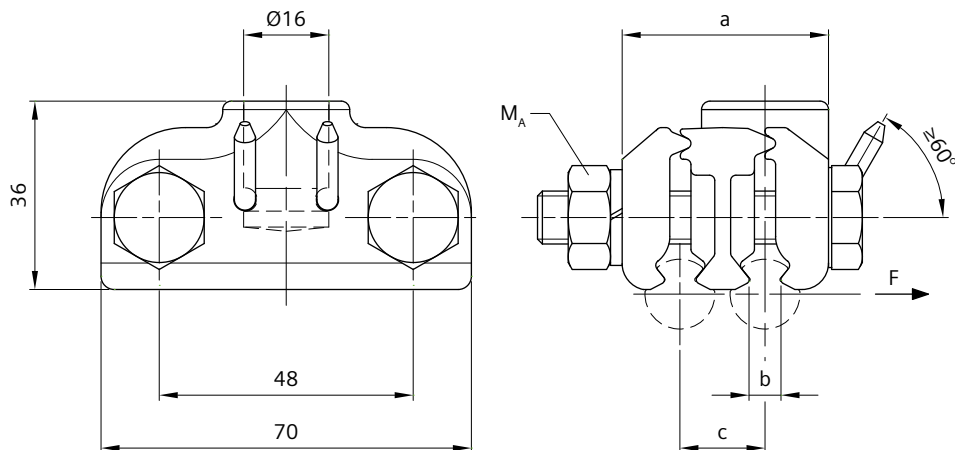
for contact wires acc. to EN 50149



Order no.	8WL4517-1M	8WL4517-1F	8WL4517-1N
Designation	Contact wire clip M16		Contact wire clip 5/8"
Material			
Clamp body	CuAl	CuAl	CuAl
Bolts M10	stlSt	stlSt	stlSt
Nuts	stlSt	stlSt	stlSt
for contact wires	AC-80 to 150	BC/BF-80 to 150	AC-80 to 150
Weight	0.29 kg	0.30 kg	0.29 kg
Perm. operating load	3.5 kN	3.5 kN	3.5 kN
Min. failing load	10.5 kN	10.5 kN	10.5 kN
Tightening torque M_A	32 Nm	32 Nm	32 Nm
b	5.60 mm	6.92 mm	5.60 mm
m	M16	M16	5/8"

Twin contact wire clip 16R

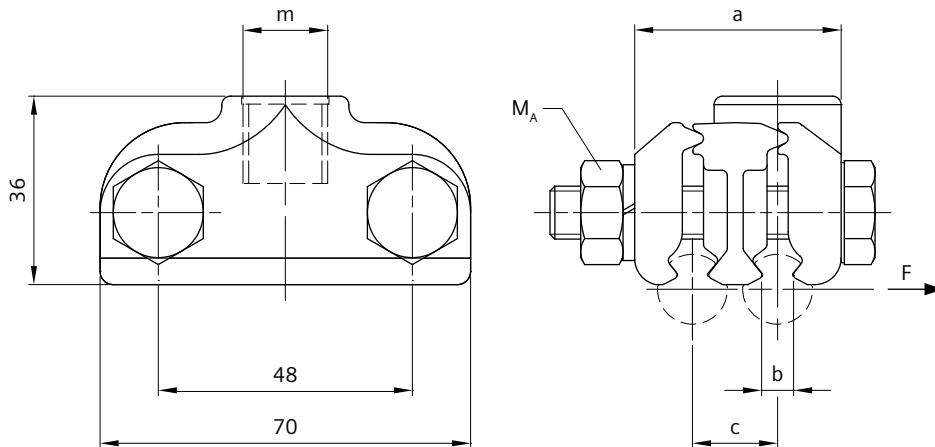
for contact wires acc. to EN 50149 and made in China, for grooved stud installation with U-pin



Order no.	8WL4517-2B	8WL4517-2E
Designation	Twin contact wire clip 16R with U-pin	Twin contact wire clip 16R with U-pin
Material		
Clamp body	CuAl	CuAl
U-pin	Cu	Cu
Bolts M10	stlSt	stlSt
Nuts	stlSt	stlSt
Spring washers	stlSt	stlSt
for contact wires	AC-80 to 150	BC/BF-100 to 150 CTHA-85/-120 (China)
Weight	0.40 kg	0.40 kg
Perm. operating load	3.5 kN	3.5 kN
Min. failing load	10.5 kN	10.5 kN
Tightening torque M_A	32 Nm	32 Nm
a	39 mm	42 mm
b	5.60 mm	6.92 - 7.24 mm
c	16 mm	18 mm

Twin contact wire clip M16-5/8"

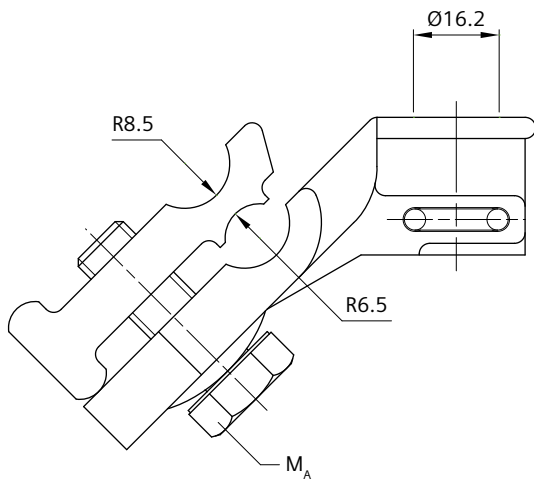
for contact wires acc. to EN 50149 and made in China



Order no.	8WL4517-2C	8WL4517-2F	8WL4517-2D
Designation	Twin contact wire clip M16	Twin contact wire clip M16-BC/BF	Twin contact wire clip 5/8"
Material			
Clamp body	CuAl	CuAl	CuAl
Bolts M10	stlSt	stlSt	stlSt
Nuts	stlSt	stlSt	stlSt
Spring washers	stlSt	stlSt	stlSt
for contact wires	AC-80 to 150	BC/BF-100 to 150 CTHA-85 to 120 (China)	AC-80 to 150
Weight	0.39 kg	0.39 kg	0.39 kg
Perm. operating load	3.5 kN	3.5 kN	3.5 kN
Min. failing load	10.5 kN	10.5 kN	10.5 kN
Tightening torque M_A	32 Nm	32 Nm	32 Nm
a	39 mm	42 mm	39 mm
b	5.60 mm	6.92 - 7.24 mm	5.60 mm
c	16 mm	18 mm	16 mm
m	M16	M16	5/8"

Pull-off clamp for stranded wires

for clamp holders with grooved stud, for wires acc. to DIN 48201



Order no.	8WL4524-0
Designation	Pull-off clamp 50-150
Material	
Clamp body	CuAl
Bolt M12	stlSt
U-pin	Cu
for wires	50 to 150 mm ²
Weight	0.75 kg
Tightening torque M_A	56 Nm

The clamp discription corresponds with the delivery state.
The clamp cover must be turned for 120 and 150 mm² wires.

Protection sleeves must be ordered separately, see Chapter 02-02:

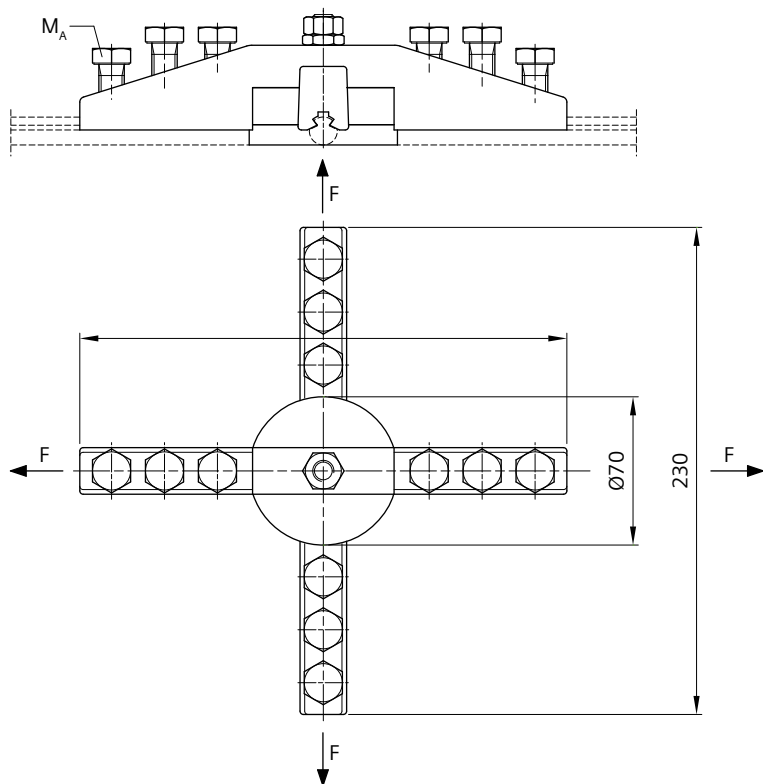
8WL1602-0 for wire 50 mm²

8WL1603-2 for wire 70 mm²

8WL1606-0 for wire 120 mm²

Contact wire clip for wire crossing

for connection of contact wires at crossings, for contact wires acc. to EN 50149

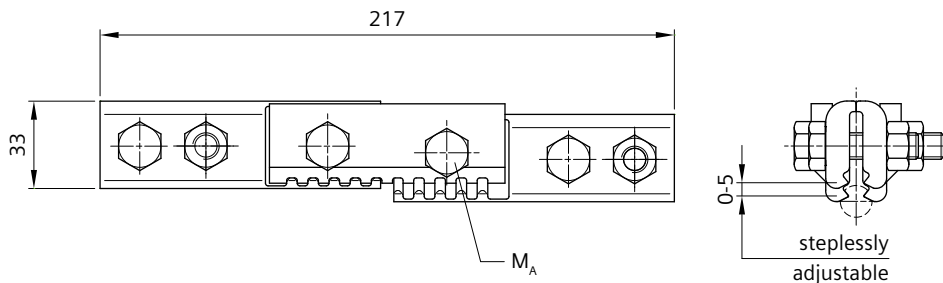


Order no.	8WL4530-5A	8WL4530-5
Designation	Contact wire clip for wire crossing for contact wire AC-100	Contact wire clip for wire crossing for contact wire AC-120
Material		
Clamp body	CuAl	CuAl
Washer Ø70	Cu	Cu
Cup-point screws M12	stlSt	stlSt
Bolt M10, nuts	stlSt	stlSt
for contact wires	AC-100	AC-120
Weight	2.48 kg	2.60 kg
Perm. operating load	8 kN	8 kN
Min. failing load	24 kN	24 kN
Tightening torque M_A	1 turning after contacting contact wire	1 turning after contacting contact wire

Not to be used in wheel-tensioned contact lines.

Contact wire splice, adjustable

for contact wires acc. to EN 50149

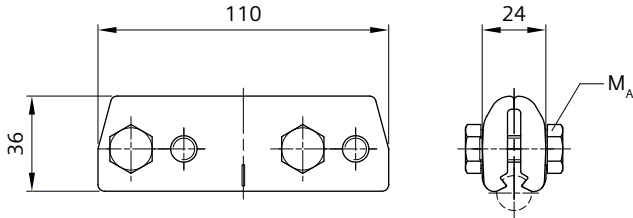


Order no.	8WL4532-5
Designation	Contact wire splice
Material	
Clamp body	CuNiSi
Bolts M10	stlSt
Nuts	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1
Weight	1.35 kg
Tightening torque M_A	50 Nm (the bolts are fastened in sequence starting near the joint and working outwards)

The clamp supports the contact wires given with at least 85 % of their rated failing load.

Contact wire splice, bolted

for high-tensile connection of contact wires acc. to EN 50149

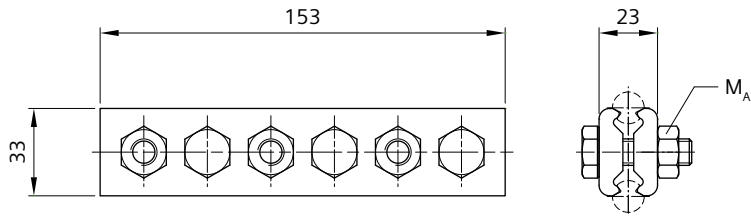


Order no.	8WL4533-1
Designation	Contact wire splice
Material	
Clamp body	CuNiSi
Bolts M10	stlSt
for contact wires	AC-80 to 120, Cu-ETP / CuAg0.1
Weight	0.64 kg
Tightening torque M_A	50 Nm (the bolts are fastened in sequence starting near the joint and working outwards)

The clamp supports the contact wires given with at least 85 % of their rated failing load.

Contact wire splice with six bolts

for high-tensile connection of contact wires acc. to EN 50149



Order no.	8WL4534-0
Designation	Contact wire splice with six bolts
Material	
Clamp body	CuNiSi
Bolts M10	stlSt
Nuts	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1 AC/BC-80, CuMg0.5 BC/BF-100 to 150, Cu-ETP / CuAg0.1
Weight	0.81 kg
Tightening torque M_A	43 Nm (the bolts are fastened in sequence starting near the joint and working outwards)

The clamps supports the contact wires given with at least 85 % of their rated failing load.

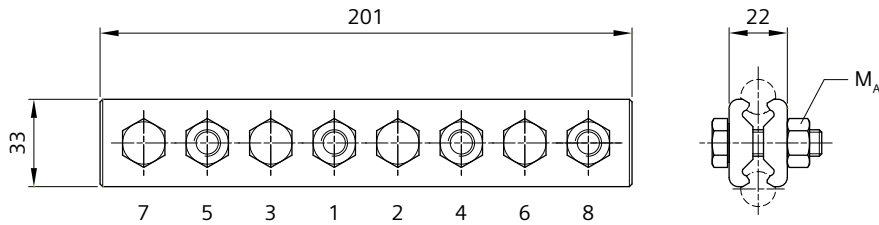
Also available in further types:

8WL4534-1 Contact wire splice with four bolts

8WL4534-2 Contact wire splice with two bolts

Contact wire splice with eight bolts

for high-tensile connection of contact wires acc. to EN 50149

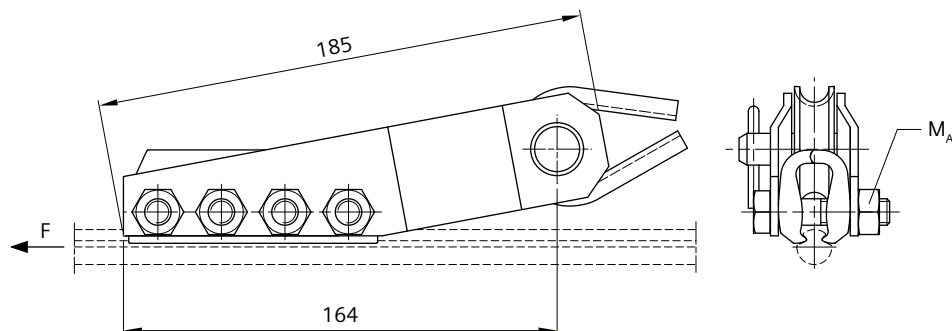


Order no.	8WL4533-8
Designation	Contact wire splice with eight bolts
Material	
Clamp body	CuNiSi
Bolts M10	st1St
Nuts	st1St
for contact wires	AC-120 and 150, Cu-ETP / CuAg0.1 / CuMg0.5
Weight	1.08 kg
Tightening torque M_A	50 Nm (the bolts are fastened in sequence starting near the joint and working outwards, 3x following 1 to 8)

The clamp supports the contact wires given with at least 85 % of their rated failing load.

Guy clamp contact wire - catenary wire

for connecting contact wire with catenary wire at fixed point, for contact wire acc. to EN 50149, British Standard 23 and contact wires made in China



Order no.	8WL4647-2
Designation	Guy clamp
Material	
Clamping jaws	stlSt
Straps	stlSt
Bolts M10	stlSt
Nuts, washers	stlSt
Thimble 70	Cu
Pin	stlSt
Split pin 4x25	Cu
for contact wires	AC-80 bis 150, Cu-ETP / CuAg0,1 / CuMg0,5 BC-100 bis 150, Cu-ETP / CuAg0,1 / CuMg0,5 Ri161, Cu-ETP (British Standard 23) CTHA-85 to 150, CuAg0.1 (Chinese Standard) CTMH-110 to 150, CuMg0.5 (Chinese Standard)
Weight	0.95 kg
Tightening torque M_A	60 Nm

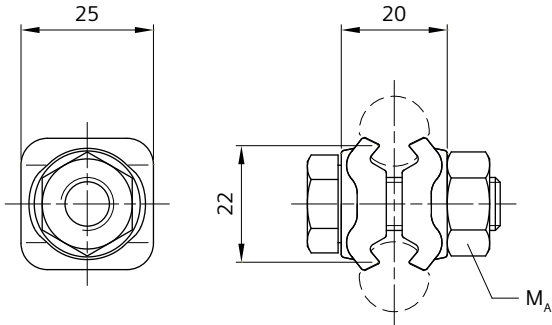
The clamp supports the contact wires given with at least 85 % of their rated failing load.

The maximum inclined angle of the clamp (at 25 % abrasion of contact wire AC-80) is 12°.

Maximum inclined angle for other contact-wire cross-sections on request.

Parallel groove clamp 22

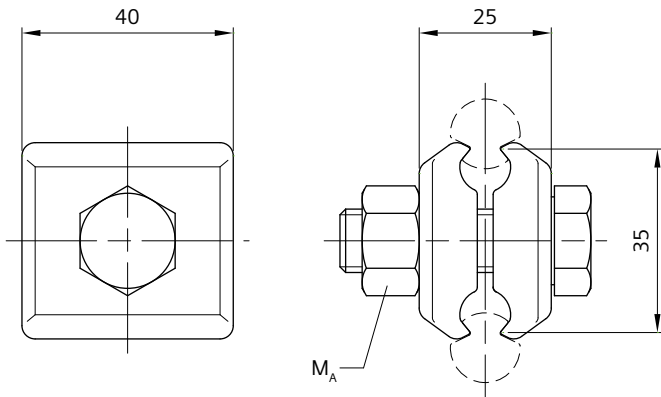
for contact wire bridging at switches, for contact wires acc. to EN 50149



Order no.	8WL4536-1
Designation	Parallel groove clamp 22
Material	
Clamping jaws	CuNiSi
Bolt M10	stlSt
Nut	stlSt
for contact wires	AC-80 to 150
Weight	0.10 kg
Tightening torque M_A	32 Nm

Parallel groove clamp 35

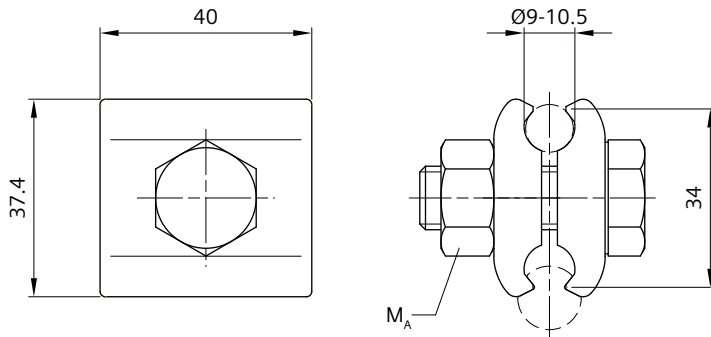
for contact wire connections, for contact wires acc. to EN 50149



Order no.	8WL4537-2
Designation	Parallel groove clamp 35
Material	
Clamp body	CuZn
Bolt M12	stlSt
Nut	stlSt
for contact wires	AC-80 to 150
Weight	0.26 kg
Tightening torque M_A	56 Nm

Parallel groove clamp 34

for bronze and copper wires acc. to DIN 48201 or DIN 43138, for contact wires acc. to EN 50149 and for earthing wire 8WL7015-1

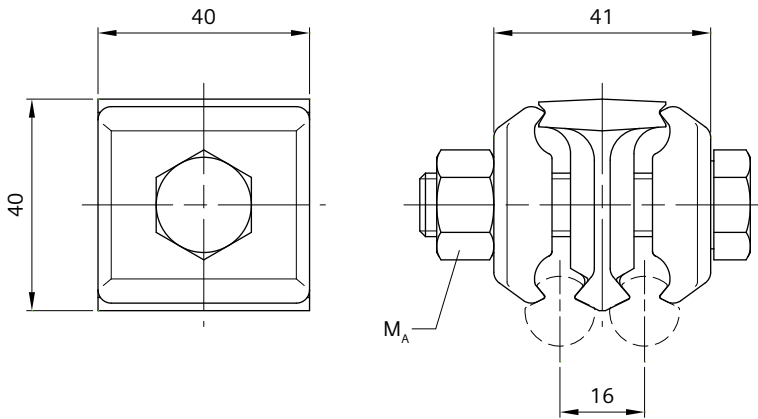


Order no.	8WL4538-0
Designation	Parallel groove clamp 34
Material	
Clamp body	CuNiSi
Bolt M12	stlSt
Nut	stlSt
for wires	50f, 50 to 70 mm ² 10 mm (8WL7015-1)
for contact wires	AC-80 to 150
Weight	0.25 kg
Tightening torque M_A	56 Nm

f = wires acc. to DIN 43138

Contact wire connection clamp

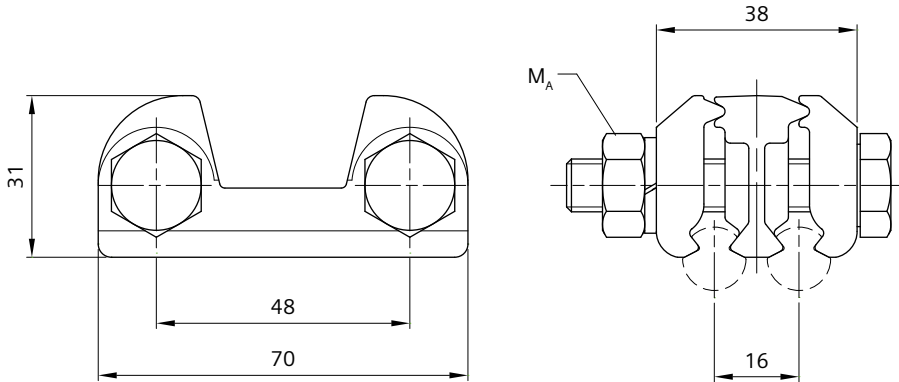
for connection of two parallel or crossing contact wires acc. to EN 50149



Order no.	8WL4545-2
Designation	Contact wire connection clamp
Material	
Clamp body	CuZn
Centre piece	CuZn
Bolt M12	stlSt
Nut	stlSt
for contact wires	AC-80 to 150
Weight	0.42 kg
Tightening torque M_A	56 Nm

Contact wire connection clamp with two bolts

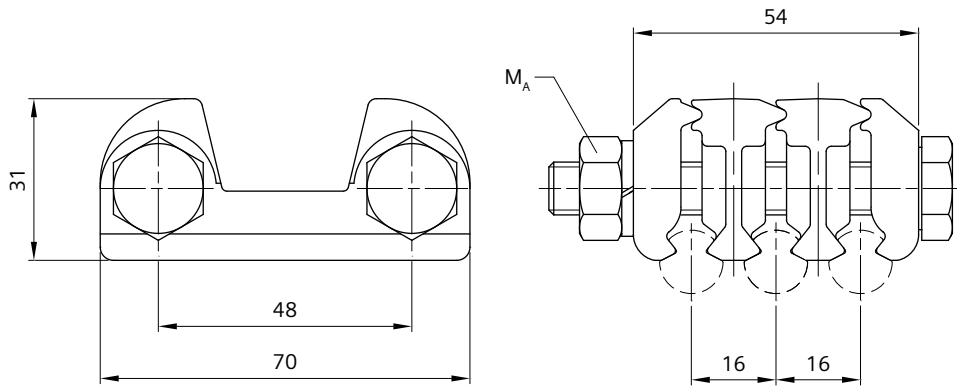
for connection of two parallel or crossing contact wires acc. to EN 50149



Order no.	8WL4517-2H
Designation	Contact wire connection clamp
Material	
Clamp body	CuAl
Centre piece	CuAl
Bolts M10	stlSt
Nuts	stlSt
Spring washers	stlSt
for contact wires	AC-80 to 150
Weight	0.34 kg
Tightening torque M_A	32 Nm

Contact wire connection clamp with two bolts for three contact wires

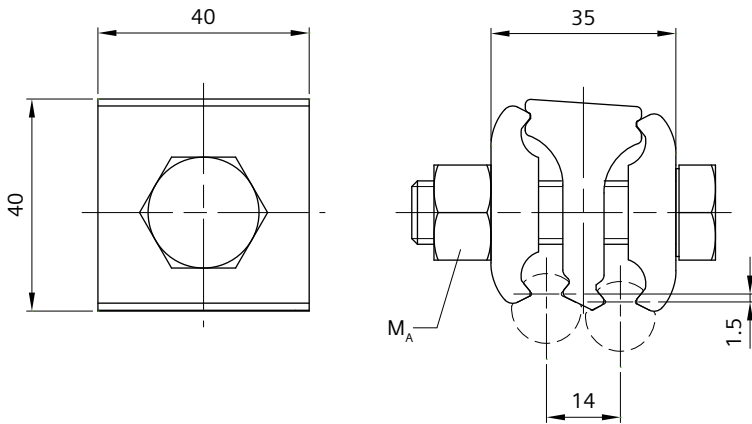
for connection of three parallel or crossing contact wires acc. to EN 50149



Order no.	8WL4517-3H
Designation	Contact wire connection clamp with two bolts for three contact wires
Material	
Clamp body	CuAl
Centre pieces	CuAl
Bolts M10	stlSt
Nuts	stlSt
Spring washers	stlSt
for contact wires	AC-80 to 150
Weight	0.44 kg
Tightening torque M_A	32 Nm

Contact wire connection clamp 1.5

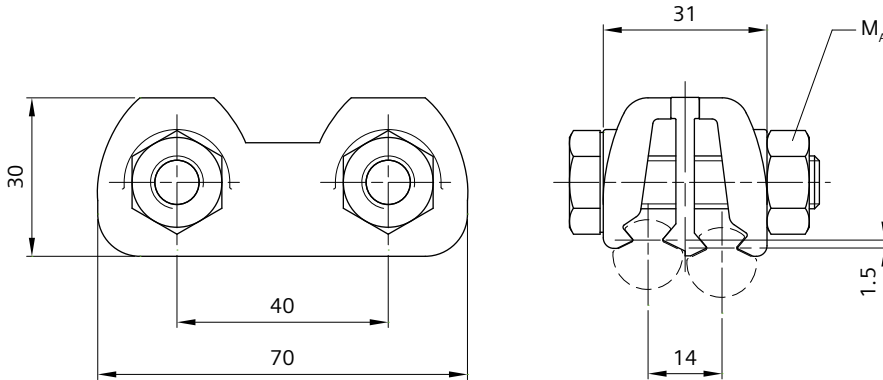
for connection of two parallel or crossing contact wires acc. to EN 50149 with 1.5 mm difference in height between contact wires



Order no.	8WL4538-4
Designation	Contact wire connection clamp 1.5
Material	
Clamp body	CuNiSi
Centre piece	CuNiSi
Bolt M12	stlSt
Nut	stlSt
for contact wires	AC-80 to 150
Weight	0.35 kg
Tightening torque M_A	56 Nm

Contact wire connection clamp 1.5 with two bolts

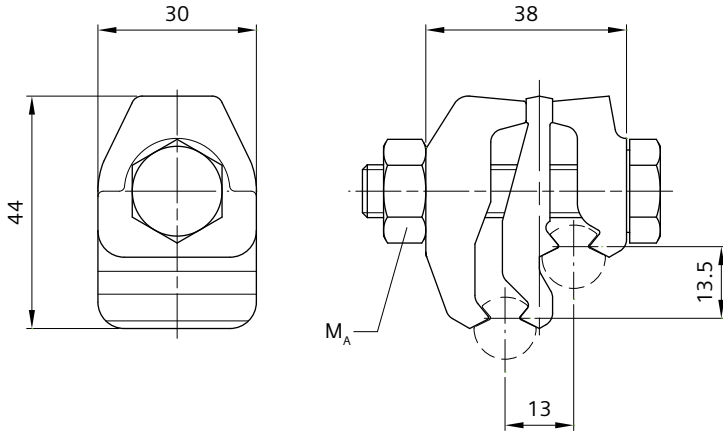
for connection of two parallel or crossing contact wires acc. to EN 50149 with 1.5 mm difference in height between contact wires



Order no.	8WL4542-0
Designation	Contact wire connection clamp 1.5
Material	
Clamp body	CuZn
Centre piece	CuZn
Bolts M10	stlSt
Nuts	stlSt
for contact wires	AC-80 to 150
Weight	0.30 kg
Tightening torque M_A	32 Nm

Contact wire connection clamp 13.5

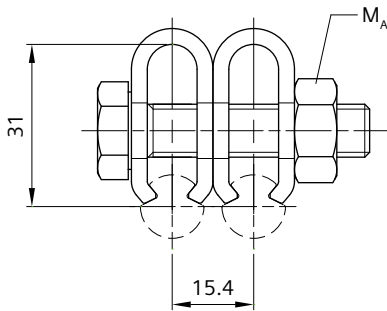
for connection of two parallel or crossing contact wires acc. to EN 50149 with 13.5 mm difference in height between contact wires



Order no.	8WL4540-1
Designation	Contact wire connection clamp 13.5
Material	
Clamp body	CuZn
Centre piece	CuZn
Bolt M12	stlSt
Nut	stlSt
for contact wires	AC-80 to 120
Weight	0.24 kg
Tightening torque M_A	32 Nm

Contact wire connection clamp for two contact wires

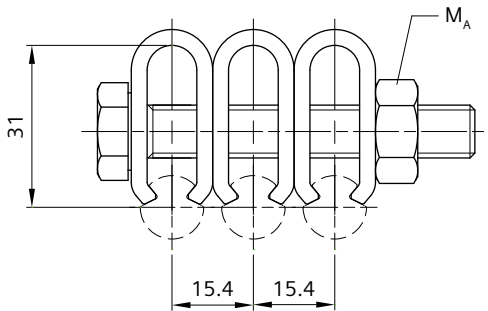
for contact wires acc. to EN 50149



Order no.	8WL4602-2
Designation	Contact wire connection clamp for two contact wires
Material	
Clamp hoops	CuNiSi
Bolt M10	stlSt
Nut	stlSt
for contact wires	AC-80 to AC-150
Weight	0.14 kg
Tightening torque M_A	10 Nm

Contact wire connection clamp for three contact wires

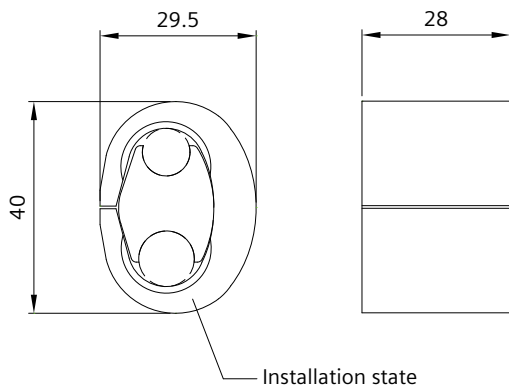
for contact wires acc. to EN 50149



Order no.	8WL4602-4
Designation	Contact wire connection clamp for three contact wires
Material	
Clamp hoops	CuNiSi
Bolt M10	stlSt
Nut	stlSt
for contact wires	AC-80 to 150
Weight	0.21 kg
Tightening torque M_A	10 Nm

Compression conductor clamp

for short-circuit-proof and maintenance-free connection of copper wires acc. to DIN 43138 and bronze or copper wires acc. to DIN 48201



Part 1

Order no.	8WL4550-0	8WL4551-0	8WL4552-0	8WL4553-0	8WL4555-0
Designation	Compression conductor clamp	Compression conductor clamp	Compression conductor clamp	Compression conductor clamp	Compression conductor clamp
Material					
Compression body	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
Packer	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
of wires	35f, 50 mm ²	50 mm ²	50 mm ²	50 mm ²	70 mm ²
with wires	70 mm ²	35f, 50 mm ²	70f, 95 mm ²	95f, 120 mm ²	70f, 95 mm ²
Weight	0.18 kg	0.16 kg	0.19 kg	0.17 kg	0.18 kg

Part 2

Order no.	8WL4555-1	8WL4556-1	8WL4556-0	8WL4560-0	8WL4560-1
Designation	Compression conductor clamp	Compression conductor clamp	Compression conductor clamp	Compression conductor clamp	Compression conductor clamp
Material					
Compression body	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
Packer	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
of wires	70 mm ²	70 mm ²	70f, 95 mm ²	95f, 120 mm ²	120 mm ²
with wires	70 mm ²	95f, 120 mm ²	95f, 120 mm ²	95f, 120 mm ²	120f mm ²
Weight	0.20 kg	0.20 kg	0.17 kg	0.17 kg	0.20 kg

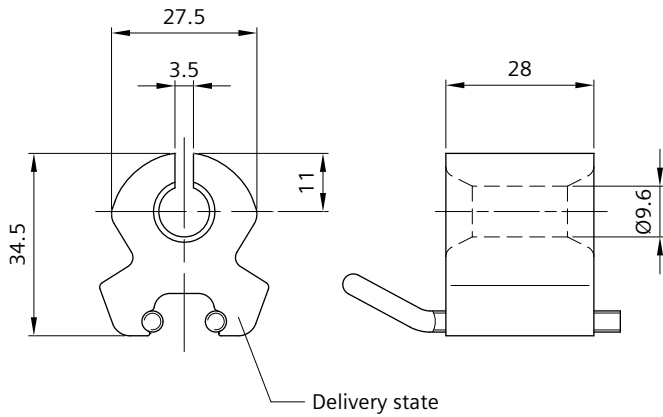
f = wires acc. to DIN 43138

The different wire diameters are accommodated by the appropriate packers.

Pressing tools and dies on request.

Feeder compression clamp

for short-circuit-proof connection of copper wires acc. to DIN 43138 with contact wires acc. to EN 50149



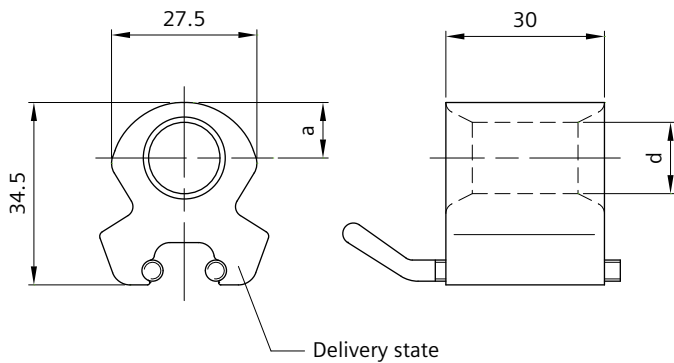
Order no.	8WL4570-0
Designation	Feeder compression clamp 35f
Material	
Compression body	Cu-ETP
Clip	Cu
of wires	35f mm ²
with contact wires	AC-80 to 150
Weight	0.15 kg

f = wires acc. to DIN 43138

Pressing tools and dies on request.

Feeder compression clamp

for short-circuit-proof connection of copper wires acc. to DIN 43138 with contact wires acc. to EN 50149



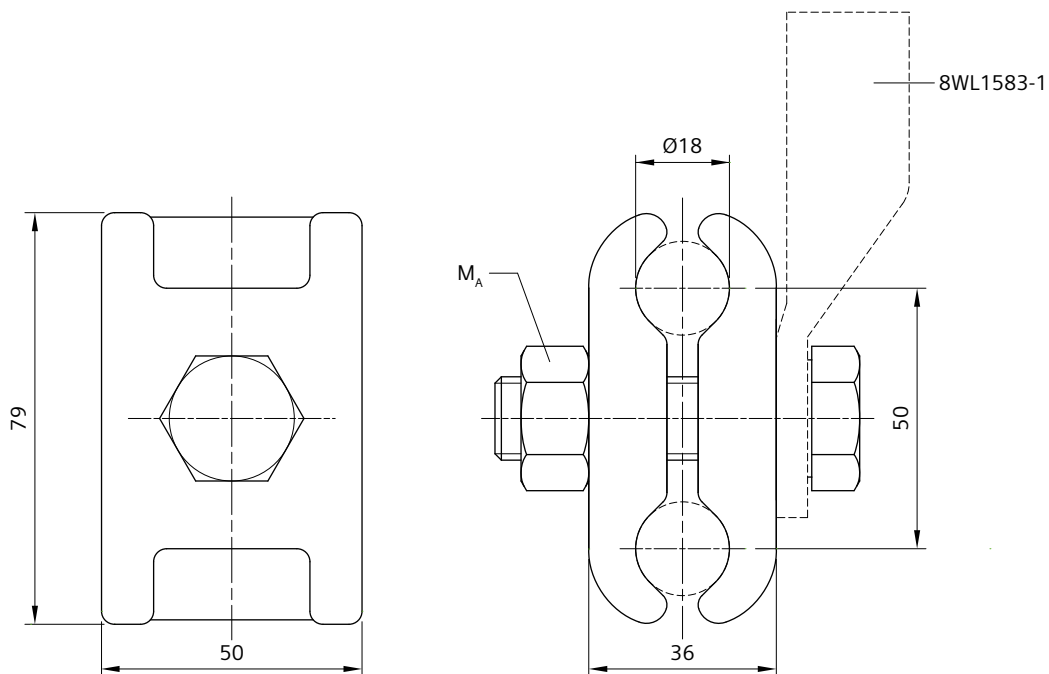
Order no.	8WL4571-0	8WL4572-0
Designation	Feeder compression clamp 70f	Feeder compression clamp 95f
Material		
Compression body	Cu-ETP	Cu-ETP
Clip	Cu	Cu
of wires	70f mm ²	95f mm ²
with contact wires	AC-80 to 150	AC-80 to 150
Weight	0.17 kg	0.15 kg
a	10.5 mm	11.5 mm
d	13.5 mm	15.5 mm

f = wires acc. to DIN 43138

Pressing tools and dies on request.

Parallel groove clamp

for bronze and copper wires acc. to DIN 48201 and copper wires acc. to DIN 43138



Order no.	8WL4578-2
Designation	Parallel groove clamp 120-185
Material	
Clamping jaws	CuAl
Bolt M16	stlSt
Nut	stlSt
for wires	95f, 120 to 185 mm ²
Weight	0.75 kg
Tightening torque M_A	135 Nm

f = wires acc. to DIN 43138

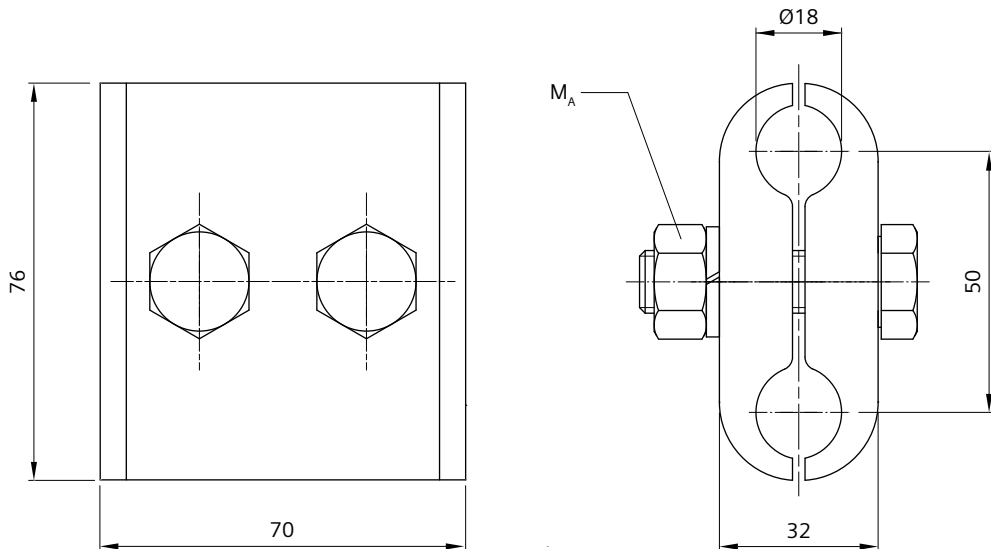
Protection sleeve 8WL1604-2 for wire 95 mm² acc. to DIN 43138 must be ordered separately, see page 174.

With cable lug 8WL1583-1 use as feeder clamp for connection of wires 120 mm² acc. to DIN 43138.

Cable lug must be ordered separately, see page 169.

Conductor clamp

for copper wires acc. to DIN 43138 and bronze or copper wires acc.to DIN 48201



Order no.	8WL4581-2
Designation	Conductor clamp 95f-150f/120-185
Material	
Clamping jaws	CuAl
Bolts M12	stlSt
Nuts	stlSt
Spring washers	stlSt
for wires	95f to 150f, 120 to 185 mm ²
Weight	0.65 kg
Tightening torque M_A	56 Nm

f = wires acc. to DIN 43138

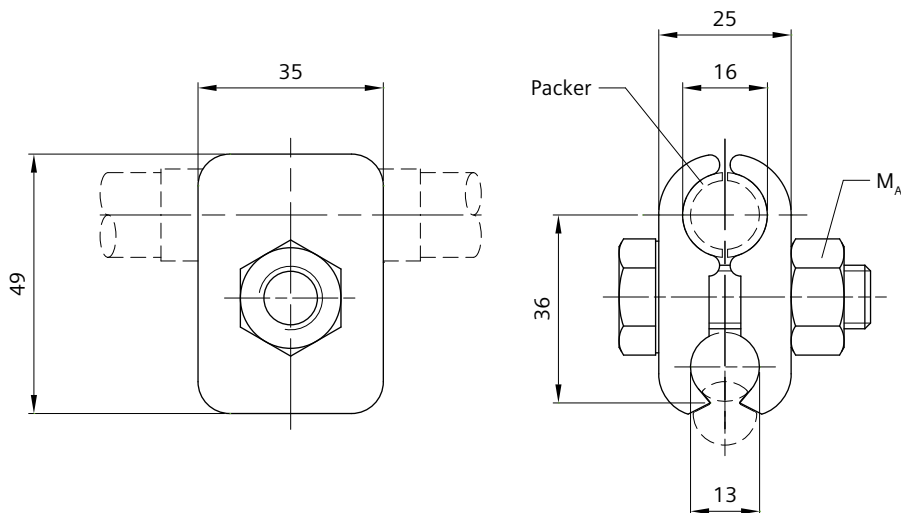
Protection sleeves must be ordered separately, see Chapter 02-02:

8WL1604-2 for wire 95 mm² acc. to DIN 43138

8WL1606-2 for wire 120 mm² acc. to DIN 48201

Feeder clamp

for connecting feeder wires made of copper acc. to DIN 43138 at contact wires acc. to EN 50149



Order no.	8WL4580-2
Designation	Feeder clamp 120f
Material	
Clamping jaws	Cu
Bolt M12	stlSt
Nut	stlSt
of wires	70 to 120 mm ²
with contact wires	AC-80 to 150
Weight	0.24 kg
Tightening torque M_A	56 Nm

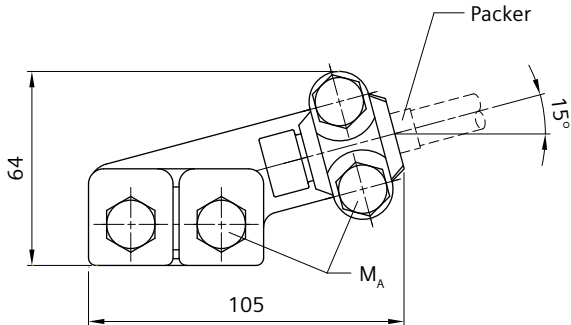
Packers (two pieces) must be ordered separately, see page 176:

8WL1615-0 for wire 70 mm²

8WL1616-0 for wire 95 mm²

Feeder clamp

for connecting feeder wires made of copper acc. to DIN 43138 at contact wires acc. to EN 50149 for small mounting height



Order no.	8WL4583-0
Designation	Feeder clamp 120f
Material	
Clamp body	Cu
Bolts M10	stlSt
of wires	70 to 120 mm ²
with contact wires	AC-80 to 150
Weight	0.54 kg
Tightening torque M_A	30 Nm

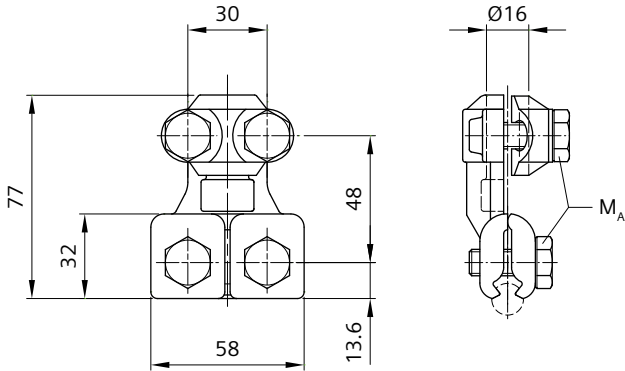
Packers (two pieces) must be ordered separately, see page 176:

8WL1615-0 for wire 70 mm²

8WL1616-0 for wire 95 mm²

Feeder clamp

for connecting feeder wires made of copper acc. to DIN 43138 at contact wires acc. to EN 50149



Order no.	8WL4582-2
Designation	Feeder clamp 120f
Material	
Clamp body	Cu
Bolts M10	stlSt
of wires	70 to 120 mm ²
with contact wires	AC-80 to 150
Weight	0.52 kg
Tightening torque M_A	30 Nm

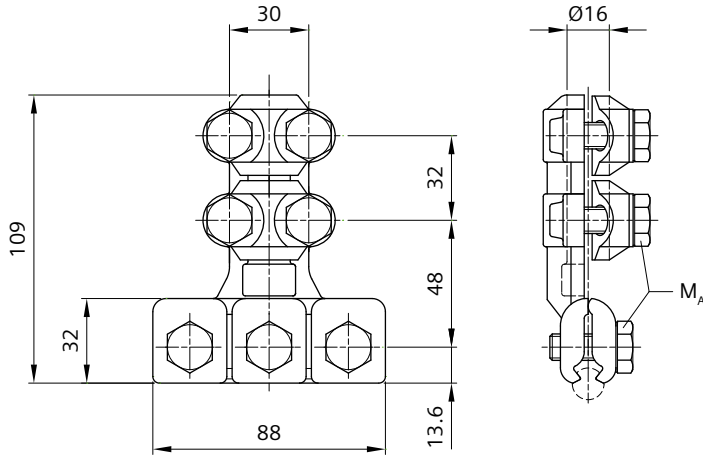
Packers (two pieces) must be ordered separately, see page 176:

8WL1615-0 for wire 70 mm²

8WL1616-0 for wire 95 mm²

Feeder clamp

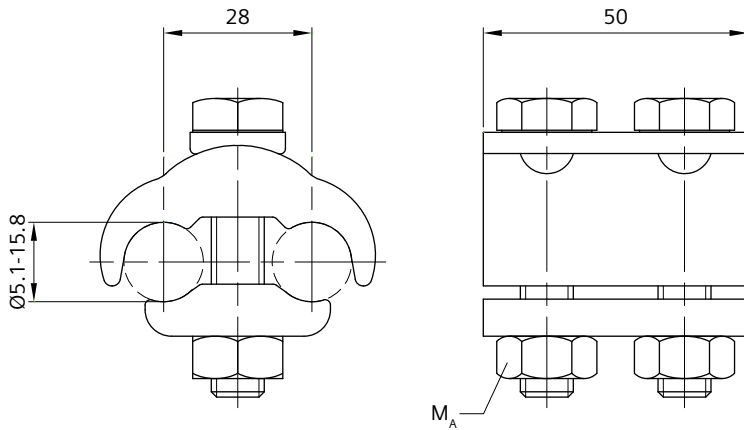
for connecting feeder wires made of copper acc. to DIN 43138 at contact wires acc. to EN 50149



Order no.	8WL4584-0
Designation	Feeder clamp 120f
Material	
Clamp body	Cu
Bolts M10	stlSt
of wires	120 mm ²
with contact wires	AC-80 to 150
Weight	0.88 kg
Tightening torque M_A	30 Nm

Universal parallel groove clamp

for copper wires acc. to DIN 48201 and DIN 43138



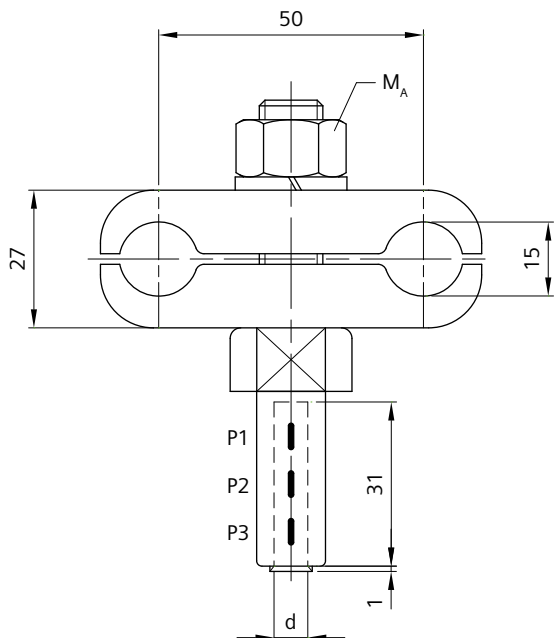
Order no.	8WL4588-0
Designation	Universal parallel groove clamp 16-150
Material	
Clamp body	Cu
Bolts M10x50	Cu5
Nuts	Cu (Marking Cu1)
for wires	16f to 95f, 16 to 150 mm ²
Weight	0.42 kg
Tightening torque M_A	39 Nm

f = wires acc. to DIN 43138

If wires acc. to DIN 43138 are used, protection sleeves must be applied. Please order separately, see Chapter 02-02.

Feeder and dropper clamp

for bronze/copper twin catenary wires acc. to DIN 48201 and dropper/current wires acc. to DIN 43138



Order no.	8WL4591-0	8WL4591-1	8WL4591-2
Designation	Feeder and dropper clamp 120/150-10f	Feeder and dropper clamp 120/150-16f	Feeder and dropper clamp 120/150-25f
Material			
Clamp body	CuAl	CuAl	CuAl
Compression sleeve	CuAl	CuAl	CuAl
Nut M12	stlSt	stlSt	stlSt
Spring washer	stlSt	stlSt	stlSt
of wires	10f mm ²	16f mm ²	25f mm ²
with wires	95 to 150 mm ²	95 to 150 mm ²	95 to 150 mm ²
Weight	0.36 kg	0.36 kg	0.34 kg
Tightening torque M_A	56 Nm	56 Nm	56 Nm
Pressing die	8WL7154-0	8WL7154-0	8WL7154-0
Pressing markings	P1 to P3	P1 to P3	P1 to P3
d	5.0 mm	6.4 mm	7.5 mm

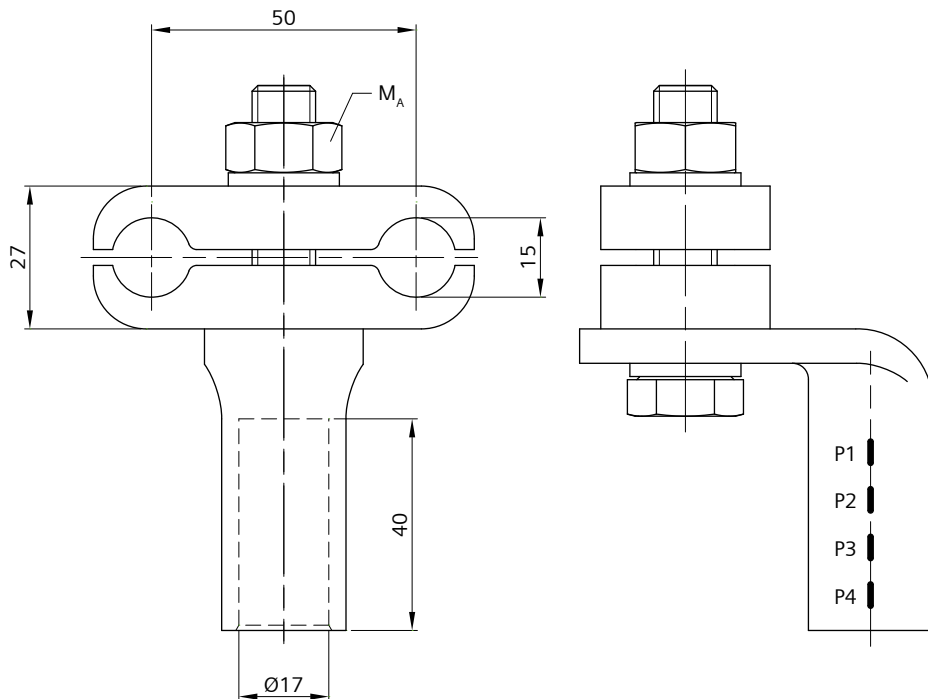
f = wires acc. to DIN 43138

Pressing according to markings (following P1 to P3).

Two protection sleeves 8WL1604-3 for twin catenary wires 95 mm² must be ordered separately, see page 174.

Feeder and dropper clamp

for bronze/copper twin catenary wires acc. to DIN 48201 and dropper/current wires acc. to DIN 43138



Order no.	8WL4591-5A
Designation	Feeder and dropper clamp 120/150-120f
Material	
Clamp body	CuAl
Compression cable lug	Cu-ETP
Bolt M12	stlSt
Nut	stlSt
Spring washer	stlSt
of wires	120f mm ²
with wires	95 to 150 mm ²
Weight	0.53 kg
Tightening torque M_A	56 Nm
Pressing die	8WL7154-6, 8WL7154-5
Pressing markings	P1 to P4

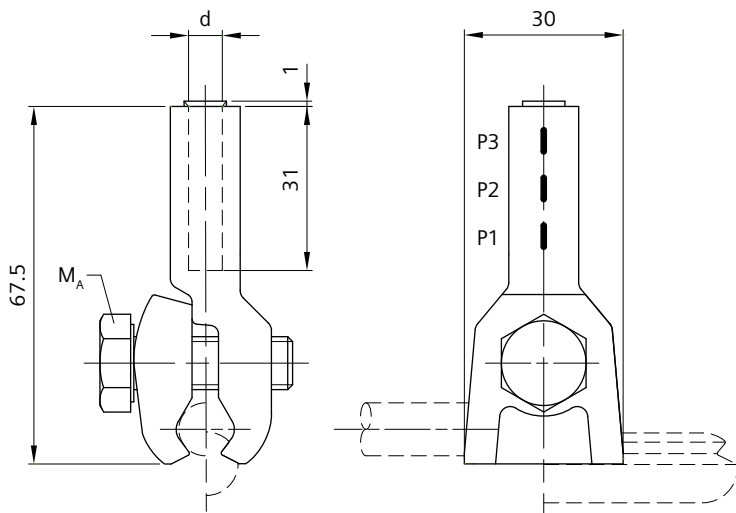
f = wires acc. to DIN 43138

Pressing according to markings (following P1 to P4) with pressing die 8WL7154-6, re-pressing with 8WL7154-5.

Two protection sleeves 8WL1604-3 for twin catenary wires 95 mm² must be ordered separately, see page 174.

Universal dropper clip

for dropper/current wires acc. to DIN 43138 at catenary wires acc. to DIN 48201 or contact wires acc. to EN 50149



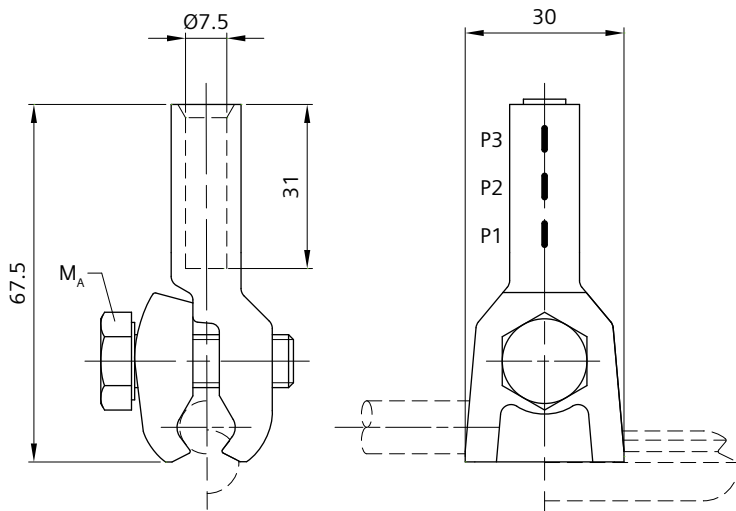
Order no.	8WL4591-6	8WL4591-7
Designation	Universal dropper clip 10f/35-95	Universal dropper clip 16f/35-95
Material		
Clamp body	CuAl	CuAl
Bolt M10	stlSt	stlSt
of wires	10f mm ²	16f mm ²
with wires	35 to 95 mm ²	35 to 95 mm ²
with contact wires	AC-80 to 150	AC-80 to 150
Weight	0.14 kg	0.14 kg
Tightening torque M_A	32 Nm	32 Nm
Pressing die	8WL7154-0	8WL7154-0
Pressing markings	P1 to P3	P1 to P3
d	5.0 mm	6.4 mm

f = wires acc. to DIN 43138

Pressing according to markings (following P1 to P3).

Universal dropper clip

for dropper/current wires acc. to DIN 43138 at catenary wires acc. to DIN 48201 or contact wires acc. to EN 50149



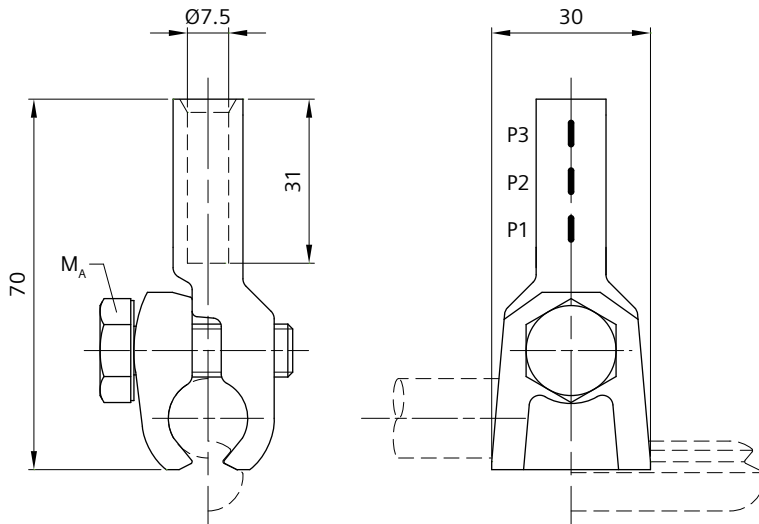
Order no.	8WL4591-8
Designation	Universal dropper clip 25f/35-95
Material	
Clamp body	CuAl
Bolt M10	stlSt
of wires	25f mm ²
with wires	35 to 95 mm ²
with contact wires	AC-80 to 150
Weight	0.14 kg
Tightening torque M_A	32 Nm
Pressing die	8WL7154-0
Pressing markings	P1 to P3

f = wires acc. to DIN 43138

Pressing according to markings (following P1 to P3).

Universal dropper clip

for dropper/current wires acc. to DIN 43138 at catenary wires acc. to DIN 48201 or contact wires acc. to EN 50149



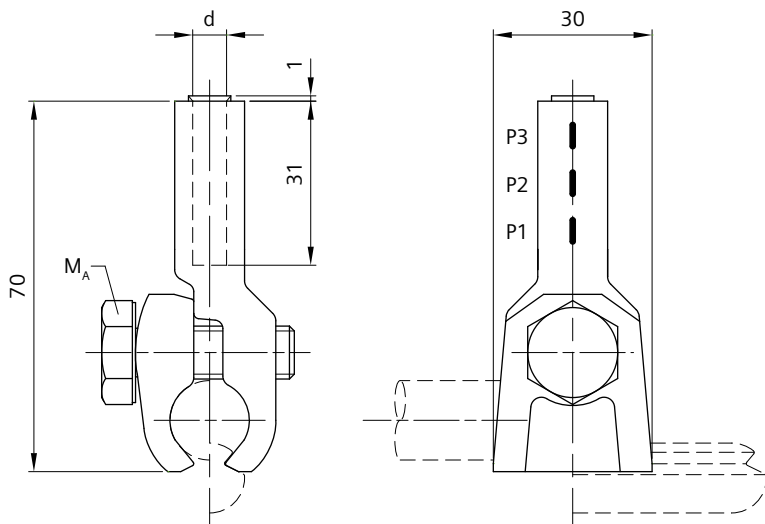
Order no.	8WL4592-5
Designation	Universal dropper clip 25f/120-150
Material	
Clamp body	CuAl
Bolt M10	stlSt
of wires	25f mm ²
with wires	120 to 150 mm ²
with contact wires	AC-80 to 150
Weight	0.15 kg
Tightening torque M_A	32 Nm
Pressing die	8WL7154-0
Pressing markings	P1 to P3

f = wires acc. to DIN 43138

Pressing according to markings (following P1 to P3).

Universal dropper clip

for dropper/current wires acc. to DIN 43138 at catenary wires acc. to DIN 48201 or contact wires acc. to EN 50149



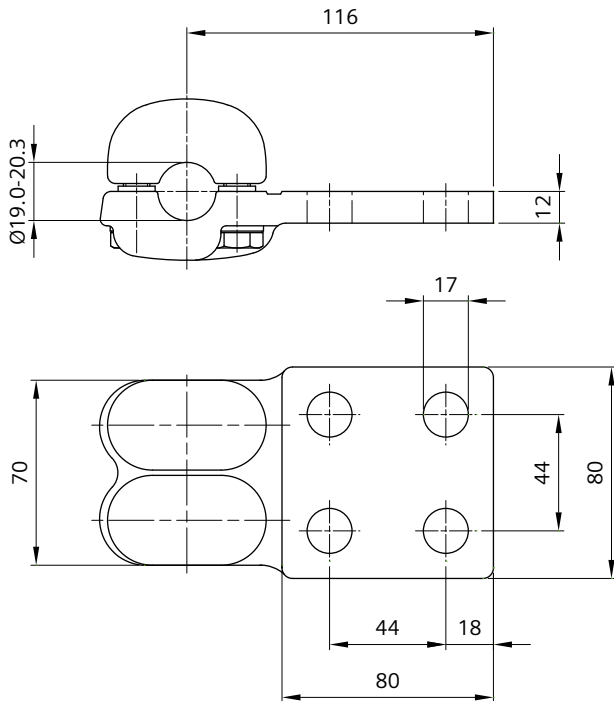
Order no.	8WL4593-5	8WL4592-8
Designation	Universal dropper clip 10f/120-150	Universal dropper clip 16f/120-150
Material		
Clamp body	CuAl	CuAl
Bolt M10	stlSt	stlSt
of wires	10f mm ²	16f mm ²
with wires	120 to 150 mm ²	120 to 150 mm ²
with contact wires	AC-80 to 150	AC-80 to 150
Weight	0.15 kg	0.15 kg
Tightening torque M_A	32 Nm	32 Nm
Pressing die	8WL7154-0	8WL7154-0
Pressing markings	P1 to P3	P1 to P3
d	5.0 mm	6.4 mm

f = wires acc. to DIN 43138

Pressing according to markings (following P1 to P3).

T-flat connection clamp

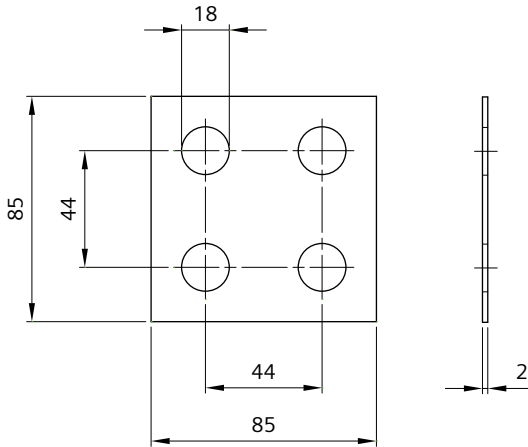
for aluminium and aluminium-steel wires



Order no.	8WL4567-0A
Designation	T-flat connection clamp
Material	Al
for wires	19.0 - 20.3 mm
Weight	0.68 kg
Rated short-time current	65 kA
Rated short-time duration	1 s

Plate

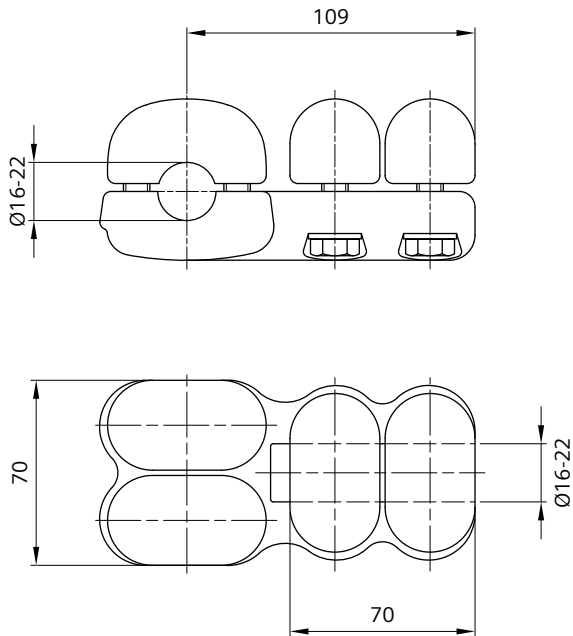
for corrosion protection between copper and aluminium components, for T-flat connection clamp 8WL4567-0A



Order no.	8WL4567-8
Designation	Plate
Material	Alcu
Weight	5.2 kg/100 pcs.

T-connection clamp

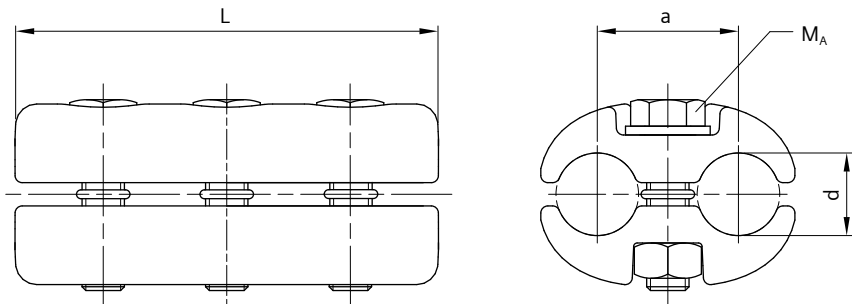
for aluminium wires



Order no.	8WL4567-1A
Designation	T-connection clamp
Material	Al
for wires	16 - 22 mm
Weight	1.04 kg
Rated short-time current	65 kA
Rated short-time duration	1 s

Parallel groove clamp (DIN 48075)

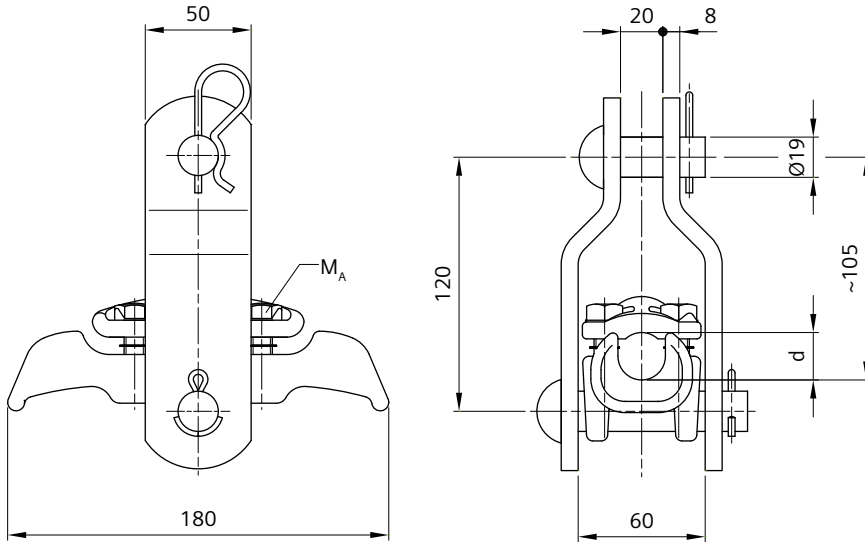
for aluminium and aluminium-steel-wires



Order no.	8WL4578-8A	8WL4578-8B
Designation	Parallel groove clamp DIN 48075-AI21	Parallel groove clamp DIN 48075-AI23
Material		
Clamp body	Al	Al
Bolts M12	stlSt	stlSt
Nuts	stlSt	stlSt
Washers	stlSt	stlSt
for wires	19.1 - 21.0 mm	21.1 - 23.4 mm
Weight	0.62 kg	0.80 kg
Tightening torque M_A	56 Nm	56 Nm
a	34 mm	40 mm
d	19.1 - 21.0 mm	21.1 - 23.4 mm
L	100 mm	120 mm

Suspension clamp with straps

for aluminium and aluminium-steel wires

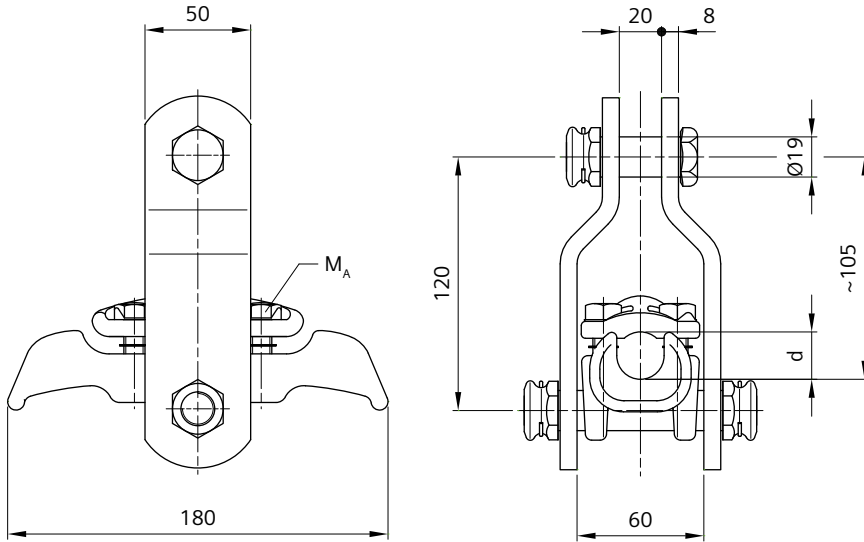


Order no.	8WL4618-0
Designation	Suspension clamp with straps
Material	
Clamp body	Al
Straps	Al
Pin Ø19	Al
Beta-split pin	stlSt
Split pin	stlSt
Bolts M10	stlSt
for wires	19 - 22.4 mm
Weight	1.2 kg
Tightening torque M_A	44 Nm
d	19 - 22.4 mm

Types for other wire diameters on request.

Suspension clamp with straps

for aluminium and aluminium-steel wires

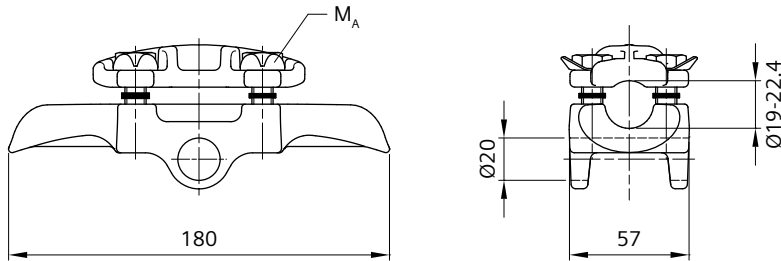


Order no.	8WL4618-1
Designation	Suspension clamp with straps
Material	
Clamp body	Al
Straps	htgSt
Screw bolts	htgSt
Bolts M10	stlSt
for wires	19 - 22.4 mm
Weight	2.0 kg
Tightening torque M_A	44 Nm
d	19 - 22.4 mm

Types for other wire diameters on request.

Suspension clamp

for aluminium and aluminium-steel wires

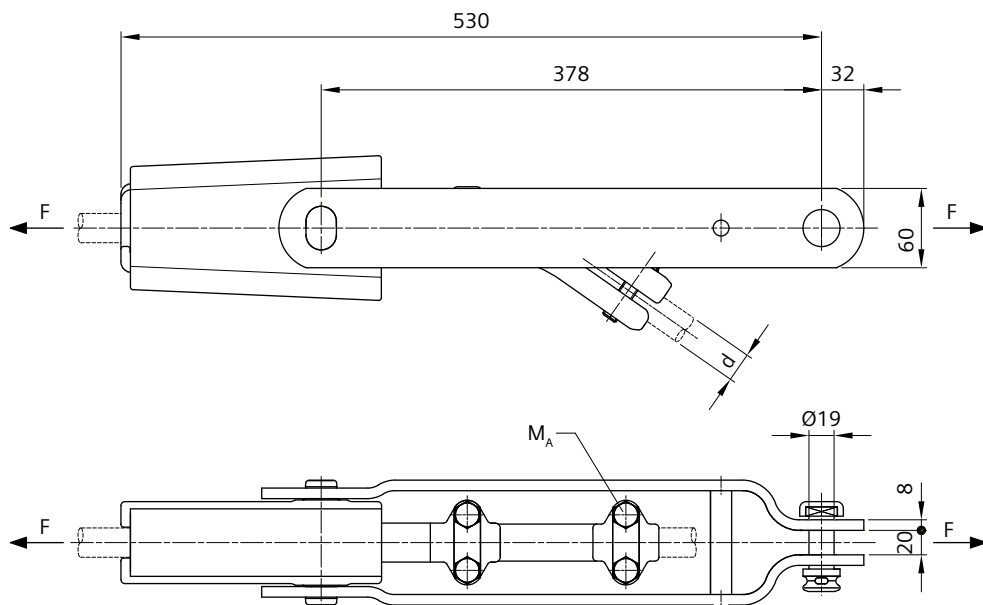


Order no.	8WL4618-0A
Designation	Suspension clamp
Material	
Clamp body	Al
Bolts M10	stlSt
for wires	19 - 22.4 mm
Weight	0.30 kg
Tightening torque M_A	44 Nm

Types for other wires diameters on request.

Wedge-type tension clamp

for aluminium and aluminium-steel wires

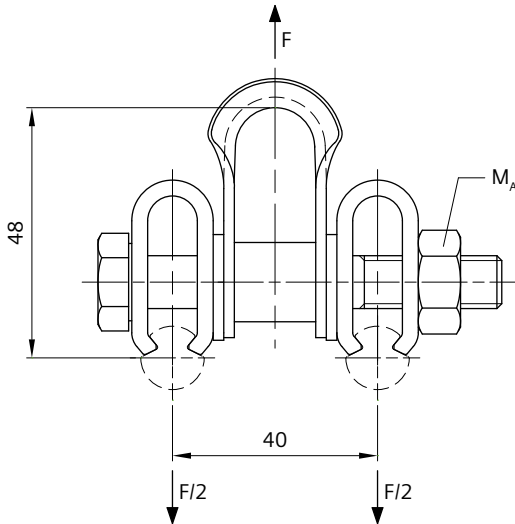


Order no.	8WL4618-5
Designation	Wedge-type tension clamp
Material	
Clamp body	Al
Straps	htgSt
Screw bolt	htgSt
Bolts M12	stlSt
for wires	20.1 - 22.5 mm
Weight	6.8 kg
Perm. operating load	53.3 kN
Min. failing load	160 kN
Tightening torque M_A	44 Nm
d	20.1 - 22.5 mm

Types for other wires diameters on request.

Twin dropper clip

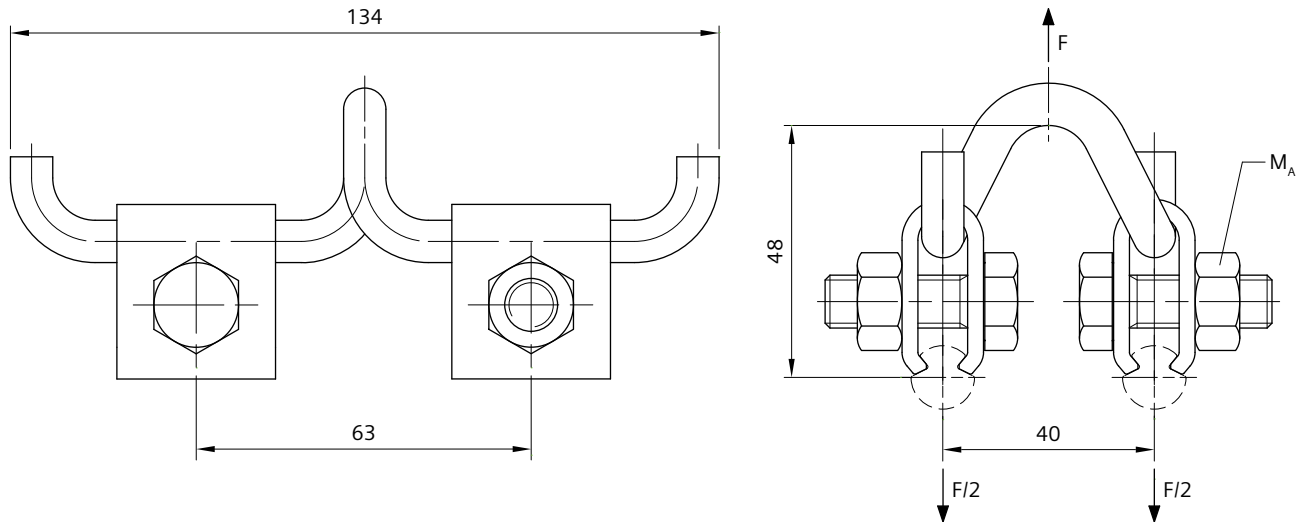
for contact wires acc. to EN 50149



Order no.	8WL4600-0
Designation	Twin dropper clip
Material	
Clamp hoop	CuNiSi
Dropper strap	CuNiSi
Spacer tube	Cu
Bolt M10	stlSt
Nut, washers	stlSt
for contact wires	AC-80 to 150
Weight	0.20 kg
Perm. operating load	2 kN
Min. failing load	6 kN
Tightening torque M_A	25 Nm

Twin dropper clip

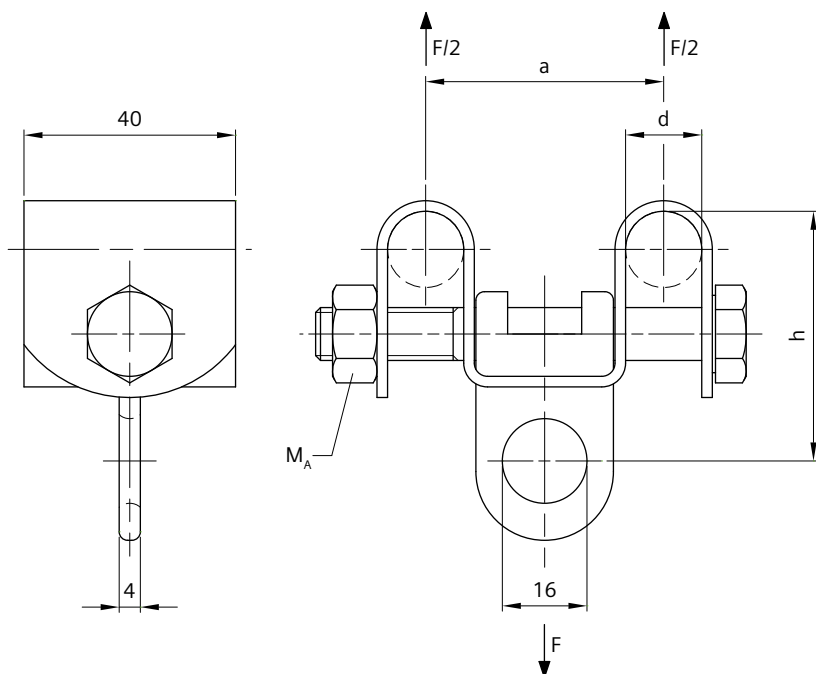
for contact wires acc. to EN 50149



Order no.	8WL4600-1
Designation	Twin dropper clip
Material	
Clamp hoop	CuNiSi
Dropper strap	stlSt
Bolts M10	stlSt
Nuts	stlSt
for contact wires	AC-80 to 150
Weight	0.35 kg
Perm. operating load	1.10 kN
Min. failing load	2.75 kN
Tightening torque M_A	25 Nm

Dropper clip for twin catenary wire

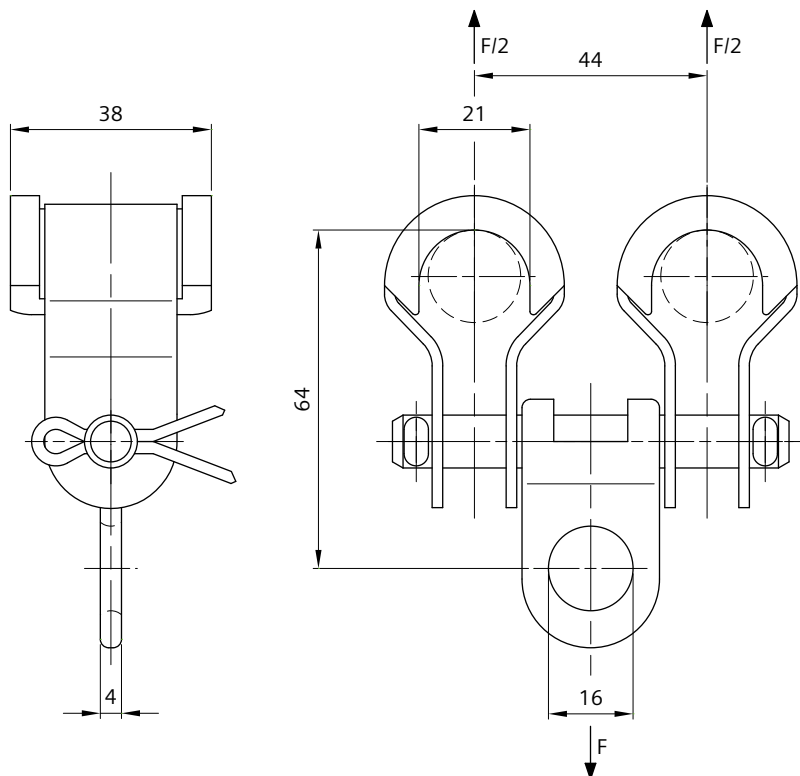
for bronze or copper wires acc. to DIN 48201



Order no.	8WL4604-0	8WL4605-0	8WL4606-0
Designation	Dropper clip for twin catenary wire 95 mm ²	Dropper clip for twin catenary wire 120 mm ²	Dropper clip for twin catenary wire 150 mm ²
Material			
Hoop	Cu-ETP	Cu-ETP	Cu-ETP
Suspension strap	CuAl	CuAl	CuAl
Bolt M10	stlSt	stlSt	stlSt
Nut	stlSt	stlSt	stlSt
for wires	95 mm ²	120 mm ²	150 mm ²
Weight	0.22 kg	0.22 kg	0.22 kg
Perm. operating load	2 kN	2 kN	2 kN
Min. failing load	6 kN	6 kN	6 kN
Tightening torque M_A	25 Nm	25 Nm	25 Nm
a	44 mm	45 mm	47 mm
d	13.0 mm	14.4 mm	16.0 mm
h	46.5 mm	47 mm	48 mm

Sliding dropper clip for twin catenary wire

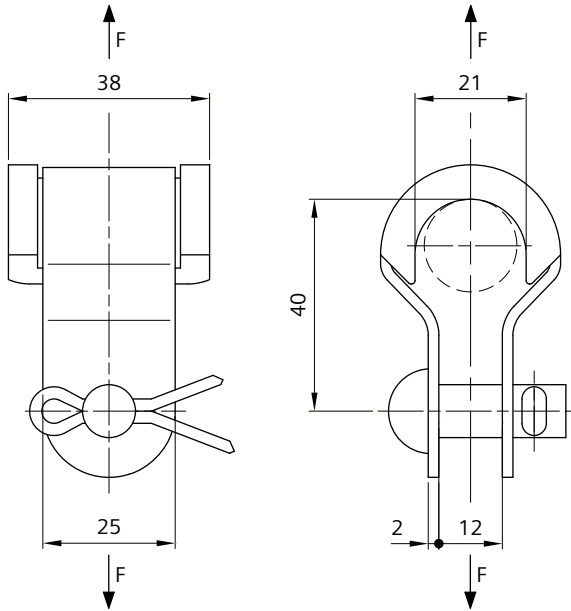
for wires acc. to DIN 48201



Order no.	8WL4610-0
Designation	Sliding dropper clip for twin catenary wire
Material	
Suspension strap	CuAl
Sliding insert	Polyamide
Dropper strap	CuNiSi
Pin Ø10	stlSt
Split pins 5x28	Cu
for wires	95 to 185 mm ²
Weight	0.21 kg
Perm. operating load	2 kN
Min. failing load	6 kN

Sliding dropper clip for catenary wire

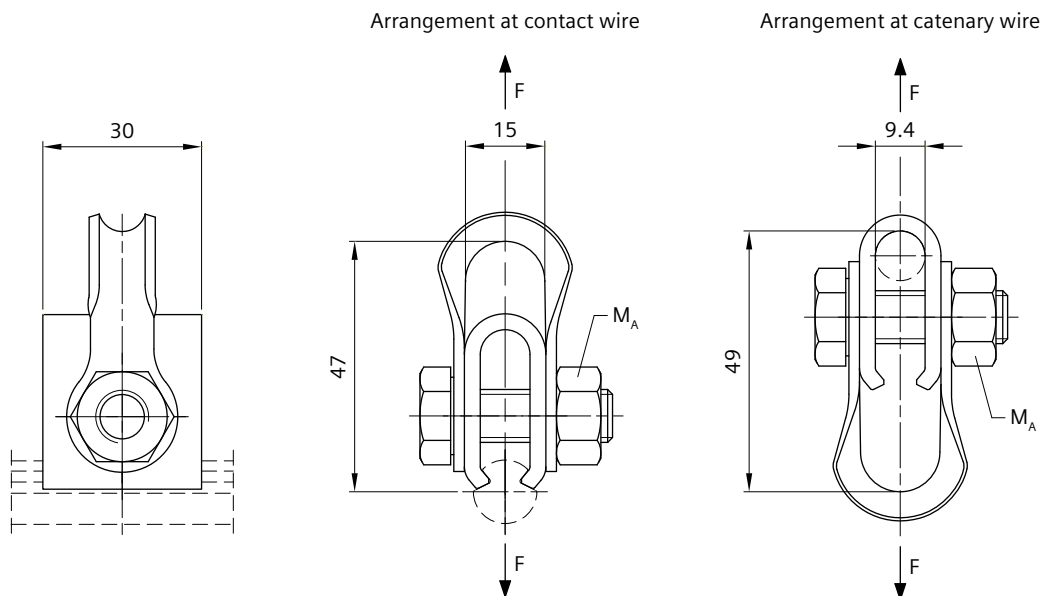
for wires acc. to DIN 48201



Order no.	8WL4612-0
Designation	Sliding dropper clip for catenary wire
Material	
Dropper strap	CuNiSi
Sliding insert	Polyamide
Pin 10x26	Cu
Split pin 5x28	Cu
for wires	35 to 185 mm ²
Weight	0.10 kg
Perm. operating load	2 kN
Min. failing load	6 kN

Dropper clip 50

for connecting dropper wires with catenary wires acc. to DIN 48201 or contact wires acc. to EN 50149



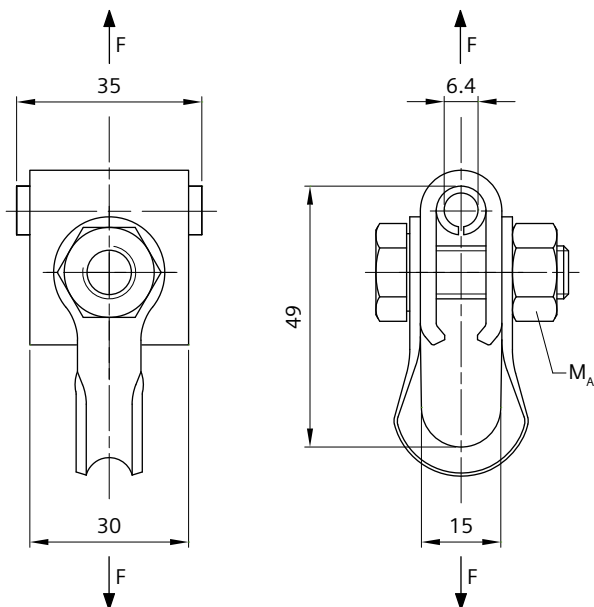
Order no.	8WL4620-0	8WL4620-0A
Designation	Dropper clip 50	Dropper clip 50
Material		
Clamp hoop	CuNiSi	stlSt
Dropper strap	CuNiSi	stlSt
Bolt M10	stlSt	stlSt
Nut	stlSt	stlSt
for wires	50 mm ²	50 mm ²
for contact wires	AC-80 to 150	AC-80 to 150
Weight	0.11 kg	0.11 kg
Perm. operating load	2 kN	2 kN
Min. failing load	6 kN	6 kN
Tightening torque M_A	25 Nm	25 Nm

Clip 8WL4622-0 for current-carrying droppers must be ordered separately, see page 567.

Types for BC/BF contact wires on request.

Dropper clip 25

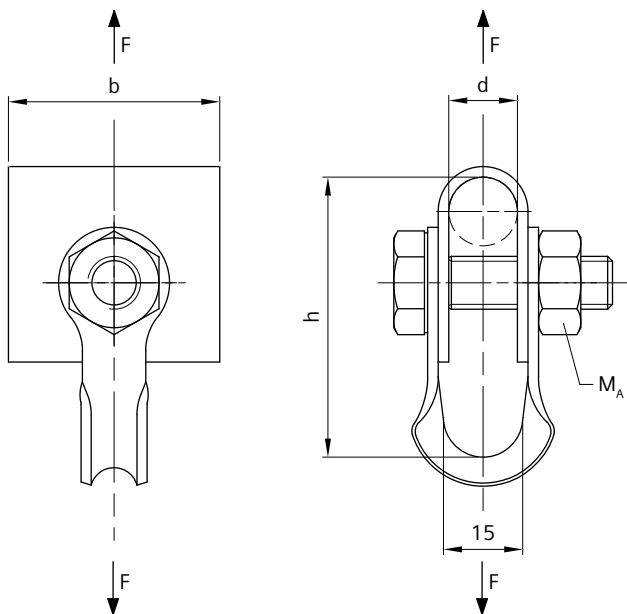
for connecting dropper wires with stitch wires acc. to DIN 48201



Order no.	8WL4620-1
Designation	Dropper clip 25
Material	
Clamp hoop	CuNiSi
Dropper strap	CuNiSi
Bolt M10	stlSt
Nut	stlSt
Protection sleeve	Cu
for wires	25 mm ²
Weight	0.12 kg
Perm. operating load	2 kN
Min. failing load	6 kN
Tightening torque M_A	25 Nm

Dropper clip

for connecting dropper wires with catenary or cross-span wires acc. to DIN 48201



Order no.	8WL4624-2	8WL4624-3	8WL4624-0	8WL4624-4	8WL4624-1
Designation	Dropper clip 35	Dropper clip 70	Dropper clip 95	Dropper clip 120	Dropper clip 150
Material					
Clamp hoop	CuNiSi	CuNiSi	Cu-ETP	CuNiSi	Cu-ETP
Dropper strap	CuNiSi	CuNiSi	CuNiSi	CuNiSi	CuNiSi
Bolt M10	stlSt	stlSt	stlSt	stlSt	stlSt
Nut	stlSt	stlSt	stlSt	stlSt	stlSt
for wires	35 mm ²	70 mm ²	95 mm ²	120 mm ²	150 mm ²
Weight	0.11 kg	0.12 kg	0.12 kg	0.11 kg	0.12 kg
Perm. operating load	2 kN	2 kN	2 kN	2 kN	2 kN
Min. failing load	6 kN	6 kN	6 kN	6 kN	6 kN
Tightening torque M_A	25 Nm	25 Nm	25 Nm	25 Nm	25 Nm
b	30 mm	30 mm	40 mm	30 mm	40 mm
d	7.6 mm	10.6 mm	13.0 mm	14.0 mm	17.0 mm
h	47 mm	51 mm	53 mm	55 mm	56 mm

Clip for current-carrying droppers must be ordered separately, see page 567:

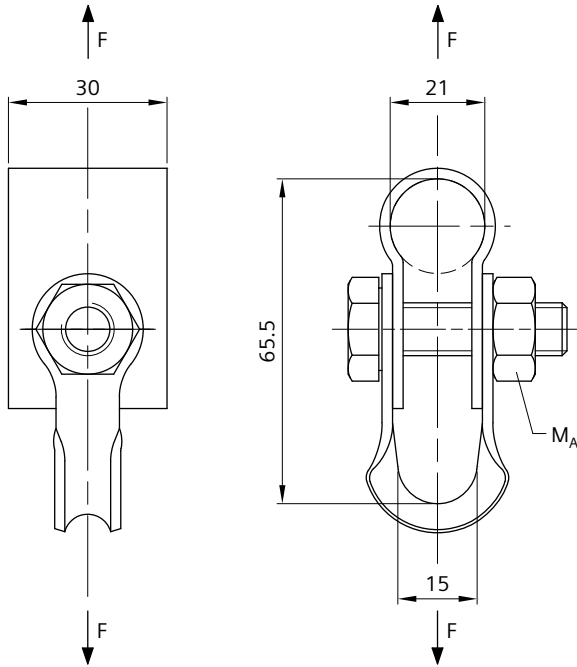
8WL4622-2 for wire 35 mm²

8WL4622-0 for wire 50/70 mm²

8WL4622-1 for wire 95 mm²

Dropper clip

for connecting dropper wires with catenary or cross-span wires acc. to DIN 48201

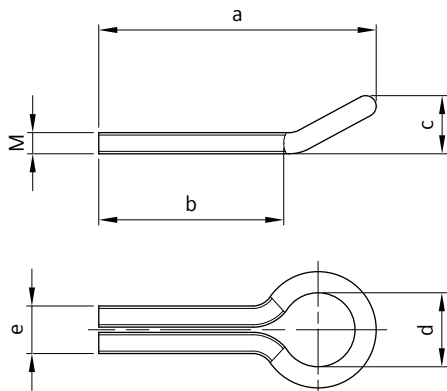


Order no.	8WL4626-3
Designation	Dropper clip 240
Material	
Clamp hoop	Cu-ETP
Dropper strap	CuNiSi
Bolt M10	stlSt
Nut	stlSt
for wires	240 mm ²
Weight	0.20 kg
Perm. operating load	2 kN
Min. failing load	6 kN
Tightening torque M_A	25 Nm

Types for other wire diameters on request.

Clip

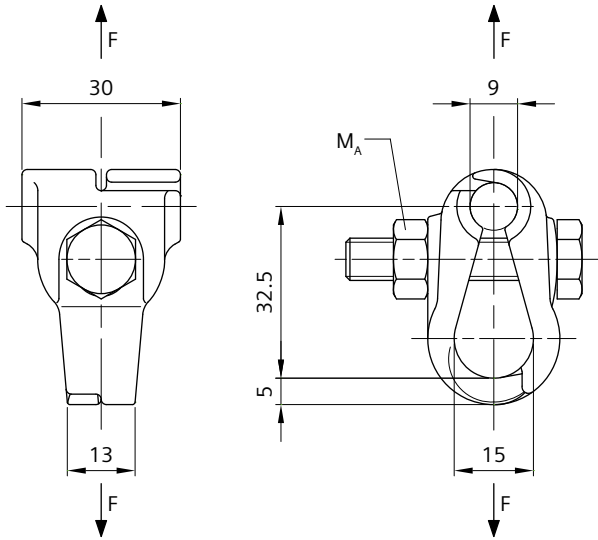
for current-carrying dropper clips, for bronze and copper wires acc. to DIN 48201



Order no.	8WL4622-2	8WL4622-0	8WL4622-1
Designation	Clip M3	Clip M4	Clip M4.5
Material	BzII	BzII	BzII
for wires	35 mm ²	50/70 mm ²	95 mm ²
Weight	0.50 kg/100 pcs.	1.00 kg/100 pcs.	1.70 kg/100 pcs.
a	52.5 mm	52.5 mm	72.0 mm
b	35 mm	35 mm	45 mm
c	11 mm	11 mm	15 mm
d	14 mm	14 mm	20 mm
e	9 mm	9 mm	13 mm
M	M3	M4	M4.5

Dropper clip

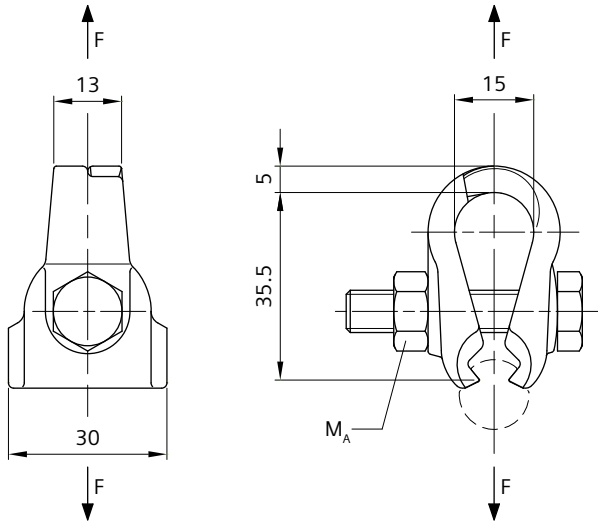
for connecting dropper wires with catenary wires acc. to DIN 48201



Order no.	8WL4623-3
Designation	Dropper clip 25-70
Material	
Clamping jaws	CuAl
Bolt M8	stlSt
Nut	stlSt
for wires	25 to 70 mm ²
Weight	0.07 kg
Perm. operating load	0.55 kN
Min. failing load	1.375 kN
Tightening torque M_A	16 Nm

Dropper clip

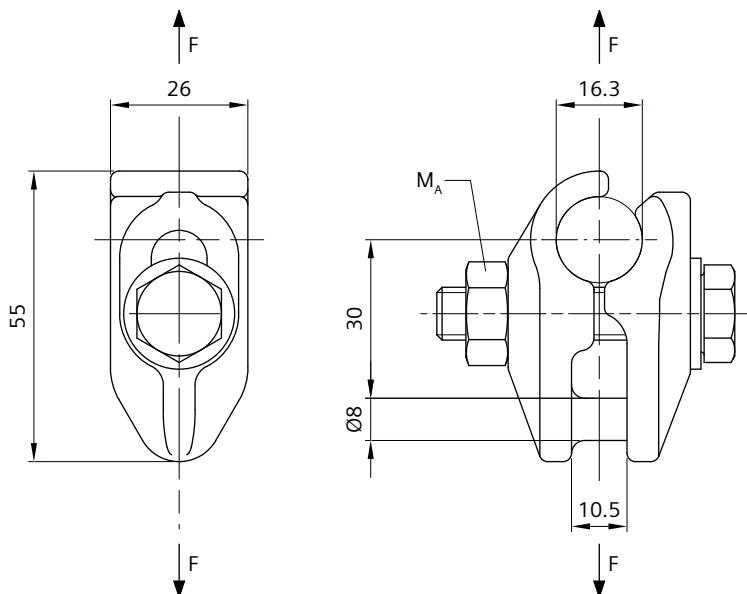
for connecting dropper wires with contact wires acc. to EN 50149



Order no.	8WL4623-5
Designation	Dropper clip AC-80 to AC-150
Material	
Clamping jaws	CuAl
Bolt M8	stlSt
Nut	stlSt
for contact wires	AC-80 to 150
Weight	0.06 kg
Perm. operating load	0.55 kN
Min. failing load	1.375 kN
Tightening torque M_A	16 Nm

Dropper clip

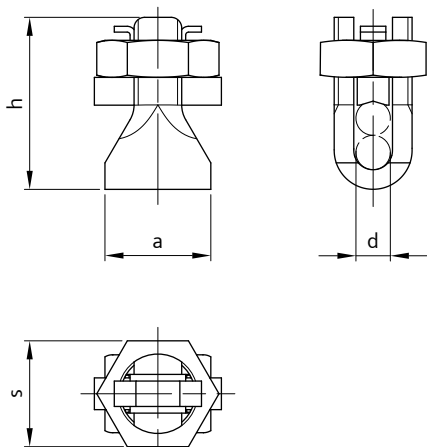
for connection dropper wires with catenary wires acc. to EN 50182



Order no.	8WL4628-3A
Designation	Dropper clip
Material	
Clamping jaws	ctAl
Bolt M10	stlSt
Nut, washer	stlSt
for wires	15.8 - 16.3 mm
Weight	0.10 kg
Perm. operating load	1 kN
Min. failing load	3 kN
Tightening torque M_A	32 Nm

Groove clamp

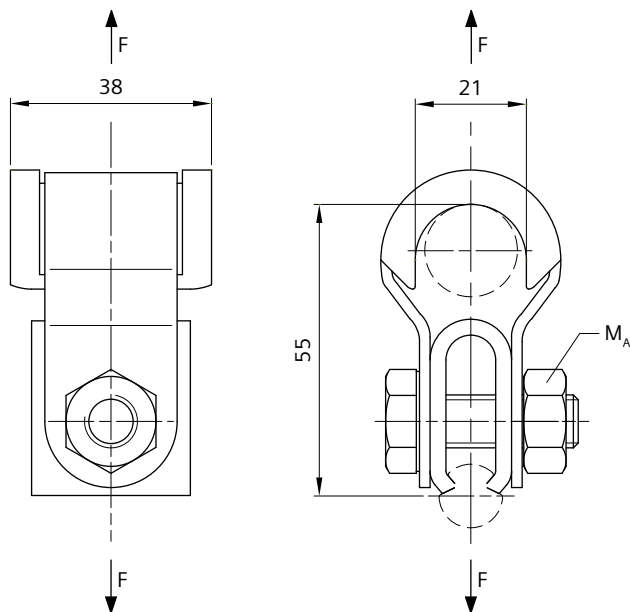
for height-adjustable droppers



Order no.	8WL4622-4	8WL4622-4A
Designation	Groove clamp 16	Groove clamp 25
Material		
Clamp bolt	Cu-ETP	Cu-ETP
Adjustable washer	Cu-ETP	Cu-ETP
Nut	Cu-ETP	Cu-ETP
for wires	up to 5.1 mm	6.5 mm
Weight	2.3 kg/100 pcs.	4.5 kg/100 pcs.
a	15 mm	20 mm
d	5.1 mm	6.5 mm
s	17 mm	20 mm
h	25 mm	32.5 mm

Sliding dropper clip

for droppers at catenary wires acc. to DIN 48201 and contact wires acc. to EN 50149

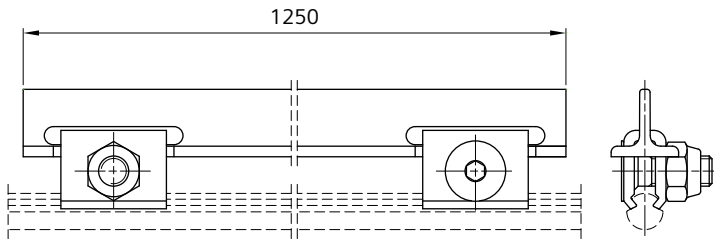


Order no.	8WL4630-0A
Designation	Sliding dropper clip
Material	
Clamp hoop	CuNiSi
Dropper strap	CuNiSi
Sliding insert	Polyamide
Bolt M10	stlSt
Nut	stlSt
for wires	up to 185 mm ²
for contact wires	AC-80 to 150
Weight	0.15 kg
Perm. operating load	2 kN
Min. failing load	6 kN
Tightening torque M_A	25 Nm

Other heights on request.

Overhead line crossing

for crossing of contact wires acc. to EN 50149

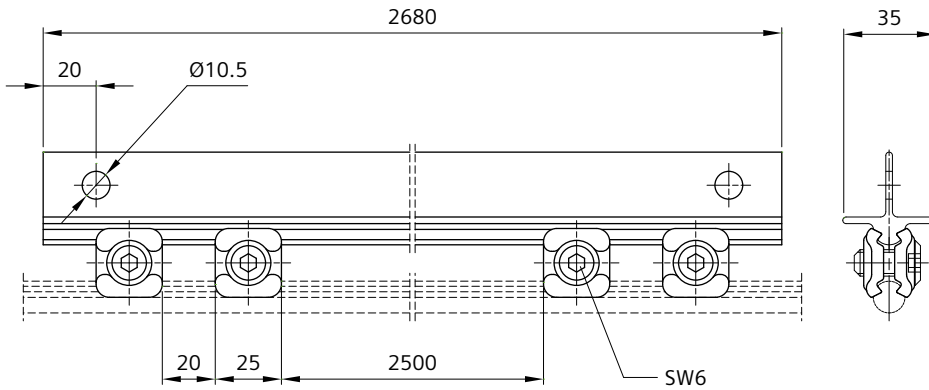


Order no.	8WL4636-0
Designation	Overhead line crossing
Material	
Guide strap	stlSt
Clamping jaws	Cu
Countersunk head screws M10	stlSt
Nuts	stlSt
for contact wires	AC-80 to 150
Weight	1.8 kg

Other lengths on request.

Overhead line crossing

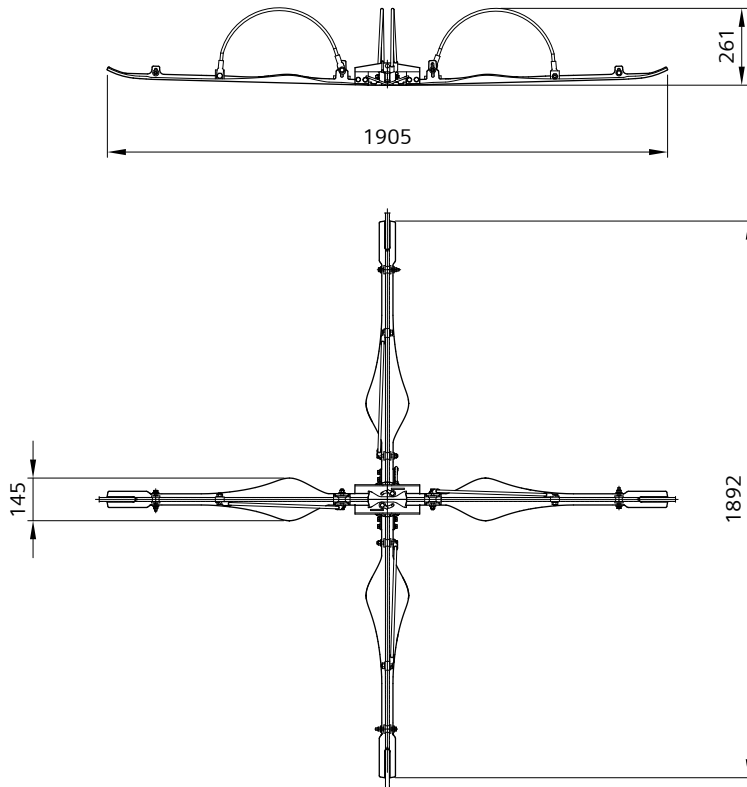
for crossing of contact wires acc. to EN 50149



Order no.	8WL4637-0
Designation	Overhead line crossing
Material	
Guide bar	Cu-ETP
Clamping jaws	CuNiSi
Countersunk head screws M10	stlSt
for contact wires	AC-80 to 150
Weight	5.50 kg

Contact wire crossing

for contact wires acc. to EN 50149

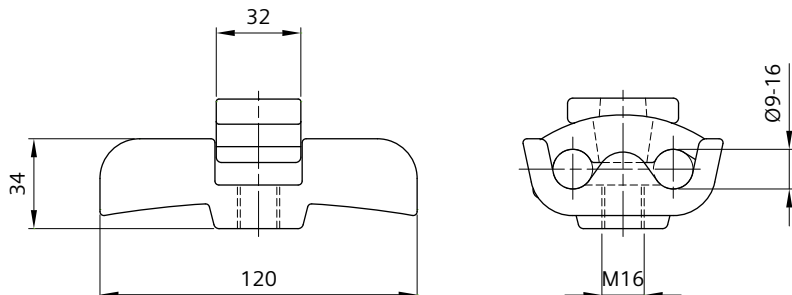


Order no.	8WL4636-5A
Designation	Contact wire crossing
Material	
Clamping fittings	CuAl, stlSt, CuNiSi
Pulley	Plastic
Contact wire guide	Plastic
Wires 25x133, 35x133	Cu-ETP
Cablelugs	Cu-ETP
Bolts	stlSt
Nuts	stlSt
Washers	stlSt
Spring washers	stlSt
for contact wires	AC-80 to 150
Weight	14.85 kg
Nominal voltage	up to 750 V DC

Parts are delivered partly unasssembled.

Feeder line and earth wire support clamp

for suspending feeder lines and earth wires made of copper, bronze, aluminium and stainless steel

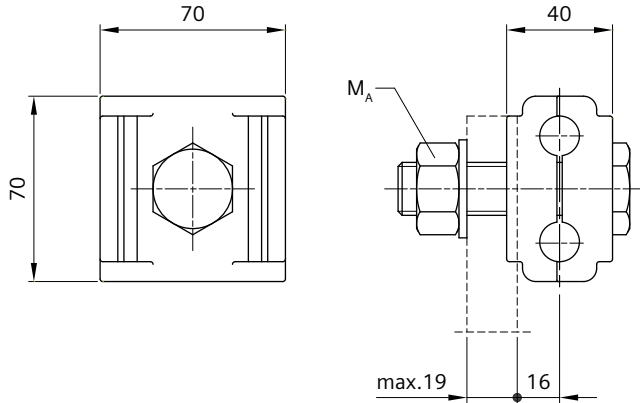


Order no.	8WL4640-0
Designation	Feeder line and earth wire support clamp 50-150
Material	
Clamp body	CuAl
Clamping jaw	CuAl
Equalizer washer	CuAl
for wires	50 to 150 mm ²
Weight	0.30 kg

Corresponding protection sleeves (inside in Al, outside in Cu) have to be used for aluminium wires:
 8WL1614-3A for 120 mm², see page 176
 Protection sleeves for other wire cross-sections on request.

Guide clamp

for guiding of wire on insulator tongue cap, for copper wires acc. to DIN 43138 or DIN 48201



Order no.	8WL4651-0
Designation	Guide clamp 95f
Material	
Clamping jaws	CuAl
Bolt M20	stlSt
Nut, washer	stlSt
for wires	70f to 95f, 95 to 120 mm ²
Weight	1.19 kg
Tightening torque M_A	145 Nm

f = wires acc. to DIN 43138

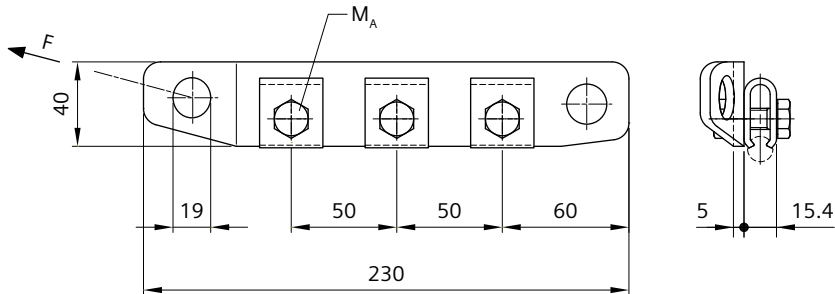
Two protection sleeves must be ordered separately, see page 174:

8WL1604-3 for wire 70 mm² acc. to DIN 43138 and for wire 95 mm² acc. to DIN 48201

8WL1606-0A for wire 120 mm² acc. to DIN 48201

Bridle suspension dead-end clamp, left-hand

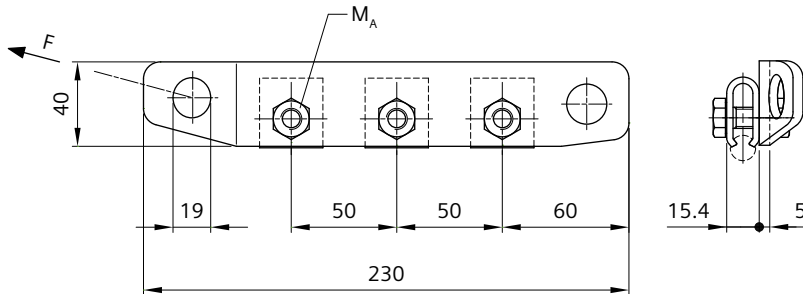
for bridle suspension, for contact wires acc. to EN 50149



Order no.	8WL4645-0
Designation	Bridle suspension dead-end clamp, left-hand
Material	
Strap	Cu-ETP
Clamp hoop	CuNiSi
Bolts M10	stlSt
Nuts	stlSt
for contact wires	AC-80 to 150
Weight	0.64 kg
Perm. operating load	5 kN
Min. failing load	15 kN
Tightening torque M_A	32 Nm

Bridle suspension dead-end clamp, right-hand

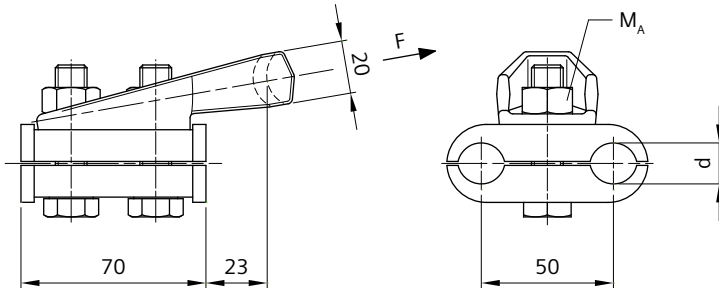
for bridle suspension, for contact wires acc. to EN 50149



Order no.	8WL4645-1
Designation	Bridle suspension dead-end clamp, right-hand
Material	
Strap	Cu-ETP
Clamp hoop	CuNiSi
Bolts M10	stlSt
Nuts	stlSt
for contact wires	AC-80 to 150
Weight	0.64 kg
Perm. operating load	5 kN
Min. failing load	15 kN
Tightening torque M_A	32 Nm

Guy clamp

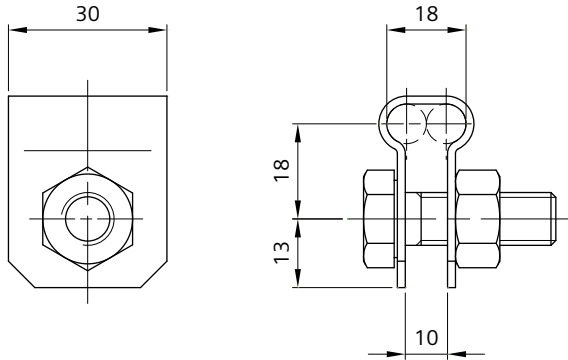
for fixed point on twin catenary wire acc. to DIN 48201



Order no.	8WL4650-1	8WL4650-0
Designation	Guy clamp 120	Guy clamp 150
Material		
Clamping jaws	CuAl	CuAl
Hoop	CuAl	CuAl
Bolts M12	stlSt	stlSt
Nuts	stlSt	stlSt
for wires	120 mm ²	150 mm ²
Weight	0.77 kg	0.80 kg
Perm. operating load	10 kN	10 kN
Min. failing load	30 kN	30 kN
Tightening torque M_A	56 Nm	56 Nm
d	14 mm	18 mm

Wire clip

for fixing of wire loops around poles, for wires acc. to DIN 48201



Order no.	8WL4655-1
Designation	Wire clip 50
Material	
Clip	Cu
Bolt M10	stlSt
Nut	stlSt
for wires	50 mm ²
Weight	0.070 kg

Chapter 02

Standard Products

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Technical comments

Application

Tension wheel equipment with tension wheel assemblies serve to separately tension contact wires or catenary wires at the end of each tension section for tensile forces up to a maximum of 40 kN.

The tension wheel equipment ensures a constant tensile force in both the catenary wire and the contact wire, irrespective of variations in catenary wire or contact wire lengths caused by temperature changes. The constantly maintained contact wire sag of the contact line ensures high quality pantograph passage and contact quality of the pantograph on the overhead contact line.

The latching function of the tension wheel assemblies engages in case of rupture of the contact wire or catenary wire. This may minimize subsequent damage to the overhead contact line system or to adjacent infrastructure.

Tensioning springs are used for tensioning contact wires or catenary wires in tensioning sections with tension lengths of up to 180 m in order to compensate for temperature-related changes in the length of the catenary wires or contact wires. The tensioning spring can be used to apply tension forces up to 12 kN.

Types

The catalog contains tension wheel equipment for the following requirements and installation situations:

- Tension wheel assembly with mechanical advantage reduction ratio 1:3 or 1:1.5
- Tension wheel assembly with tension forces up to 24 kN, up to 30 kN or up to 40 kN
- Fixing on steel or concrete poles at open line sections or installation in tunnels with restricted installation space
- With weights carried externally or internally on the pole

Special features

Tension wheel assemblies with cast aluminium wheels are distinguished by the following characteristics:

- Low life cycle costs due to maintenance-free bush bearings and use of corrosion-resistant materials
- Long service life thanks to symmetrical groove guided wire run, uniform load, and optimal alignment
- Tension wheel assemblies with a mechanical advantage reduction ratio of 1:1.5 result in a very short travel path of the weight stack and thus provide advantages for installation in catenary masts with internal weights
- Possible minimizing of follow-up damage in the event of a single wire/stranded wire break thanks to patent-protected design of the latching function of the tension wheel assembly

Notes

The selection, use, mounting, etc. of tension wheel equipment depends on requirements and installation conditions in the overhead contact line system.

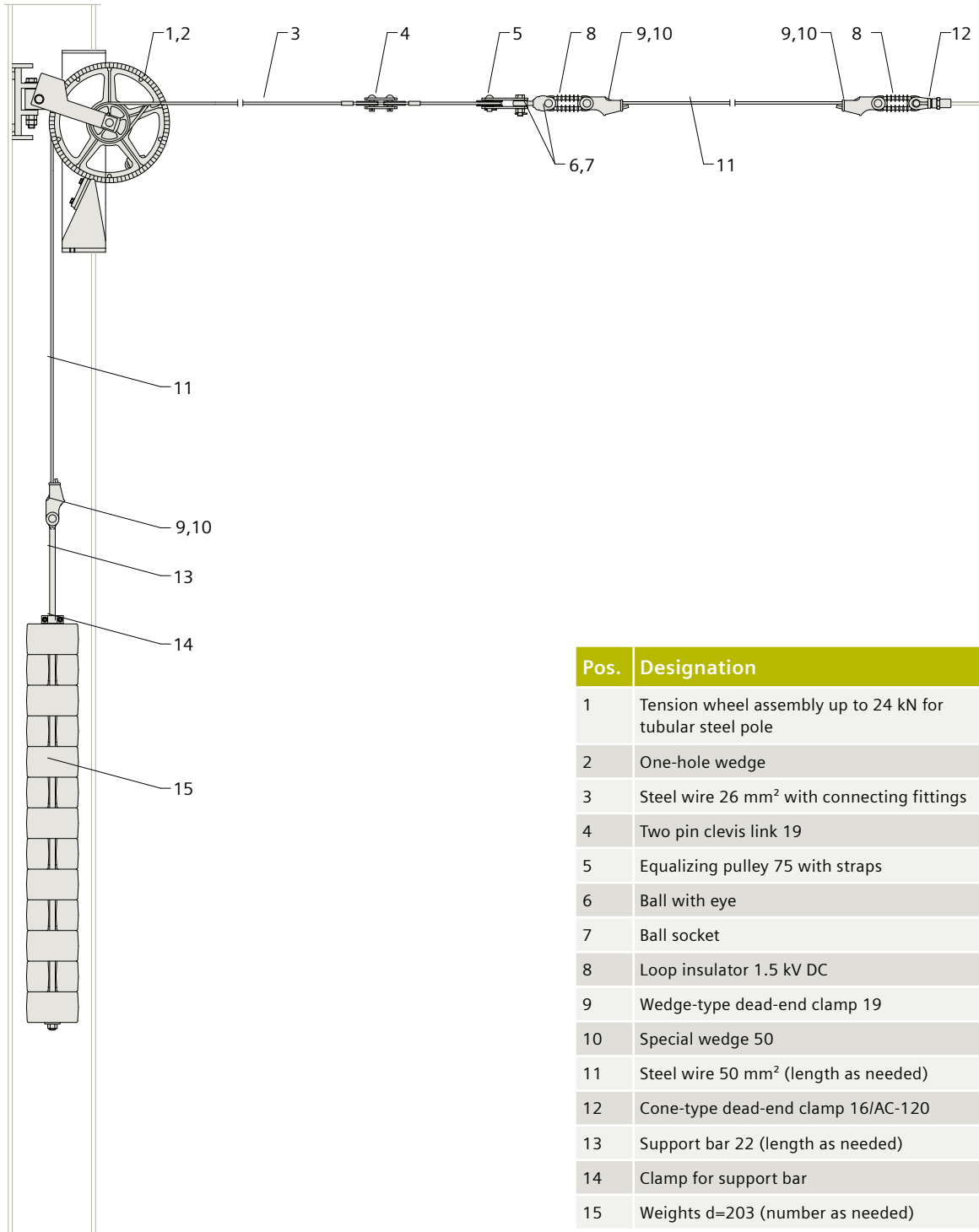
Further information can be found in the relevant product information.

Examples for assemblies

Some typical application examples of tension wheel equipment with tension wheel assemblies in catenary and trolley-type contact lines are described below.

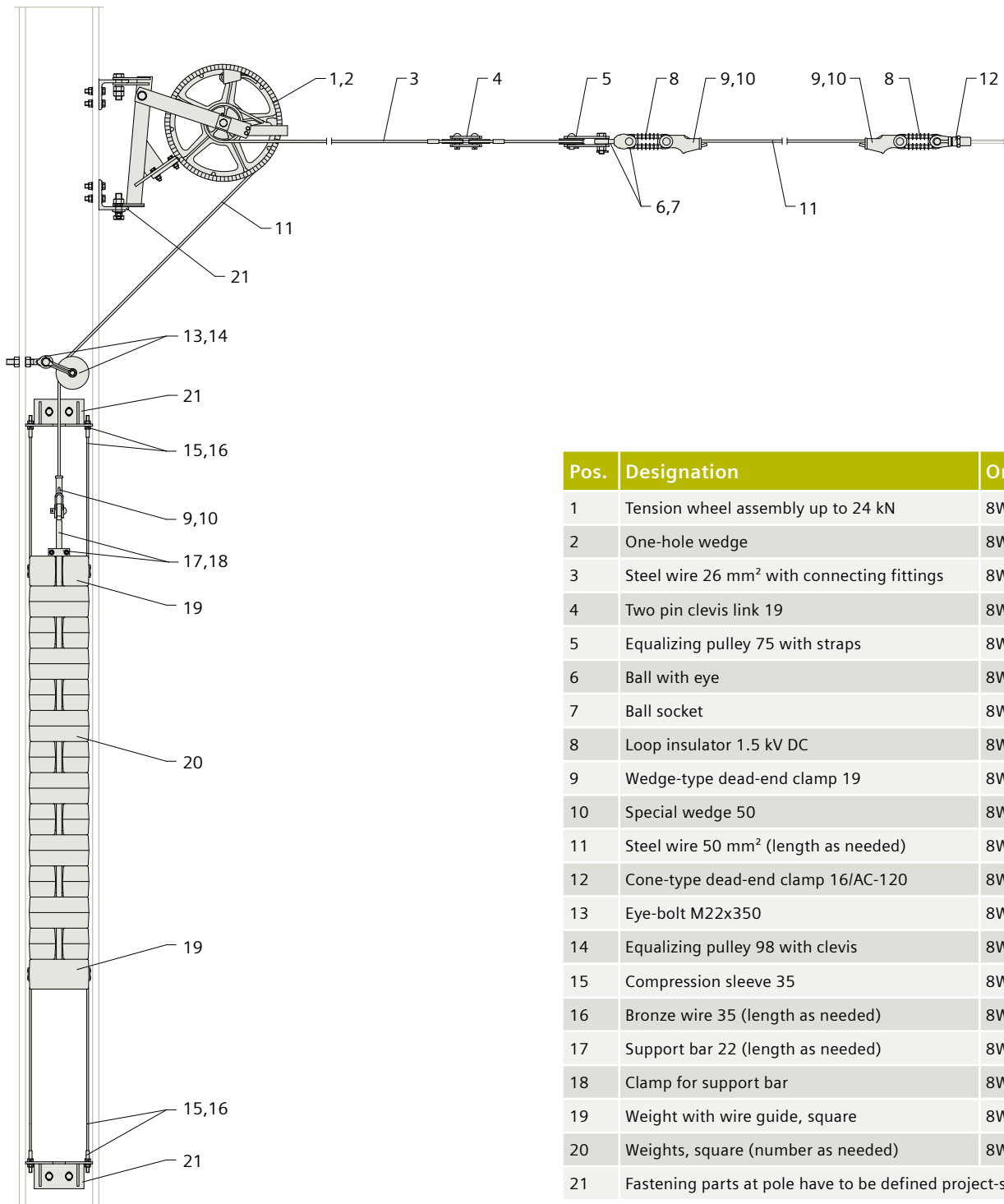
The exact configuration of the tension wheel equipment depends on the specific plant and the local situation.

Flexible termination up to 24 kN in tubular steel pole



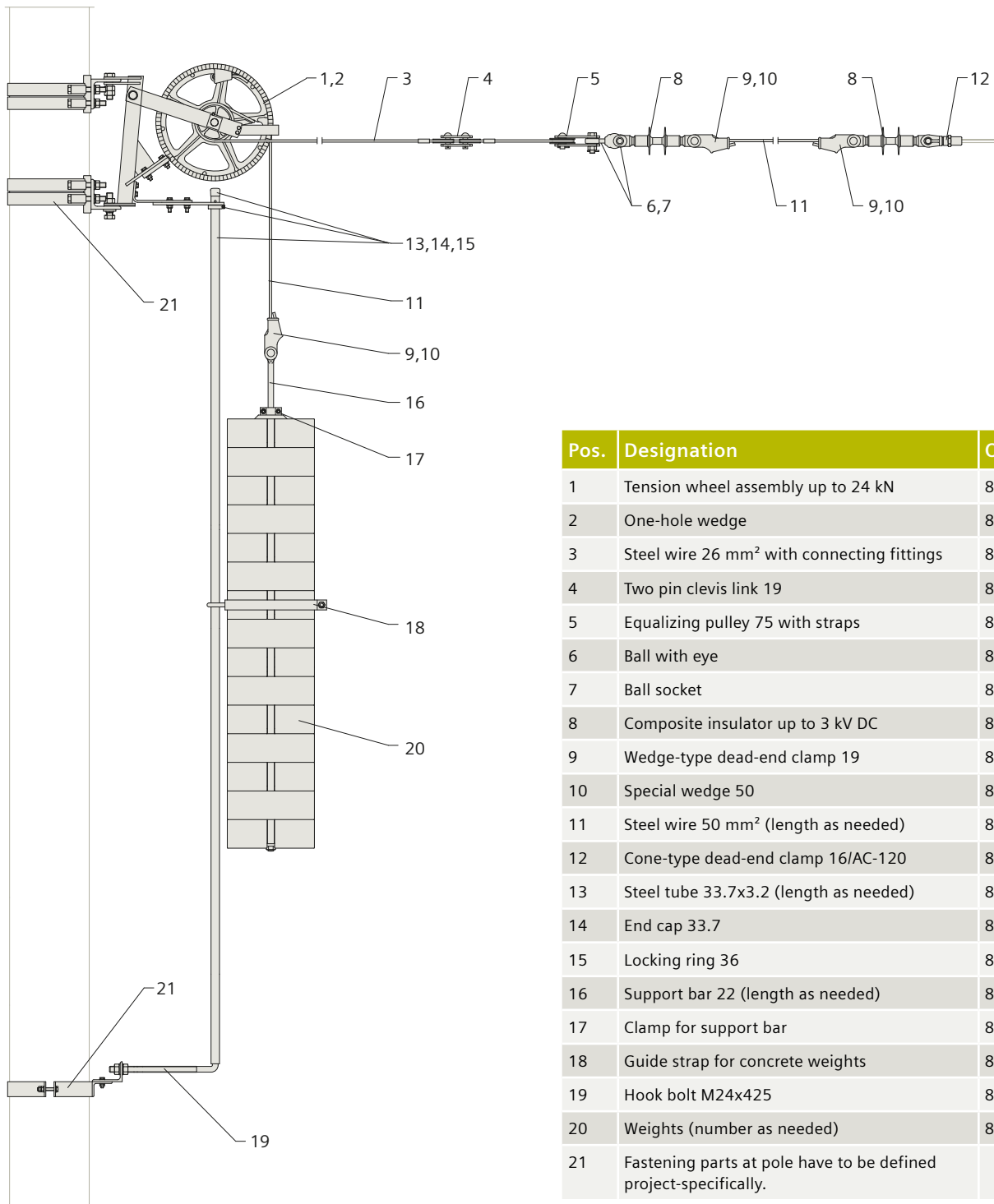
Pos.	Designation	Order no.
1	Tension wheel assembly up to 24 kN for tubular steel pole	8WL5078-2
2	One-hole wedge	8WL1201-0
3	Steel wire 26 mm ² with connecting fittings	8WL7090-1C
4	Two pin clevis link 19	8WL1018-0
5	Equalizing pulley 75 with straps	8WL5160-0
6	Ball with eye	8WL5167-0
7	Ball socket	8WL5165-0
8	Loop insulator 1.5 kV DC	8WL3001-2
9	Wedge-type dead-end clamp 19	8WL1180-7
10	Special wedge 50	8WL1202-3
11	Steel wire 50 mm ² (length as needed)	8WL7090-0
12	Cone-type dead-end clamp 16/AC-120	8WL1237-0
13	Support bar 22 (length as needed)	8WL5155-0
14	Clamp for support bar	8WL5170-0
15	Weights d=203 (number as needed)	8WL5101-0

Flexible termination up to 24 kN at HE pole



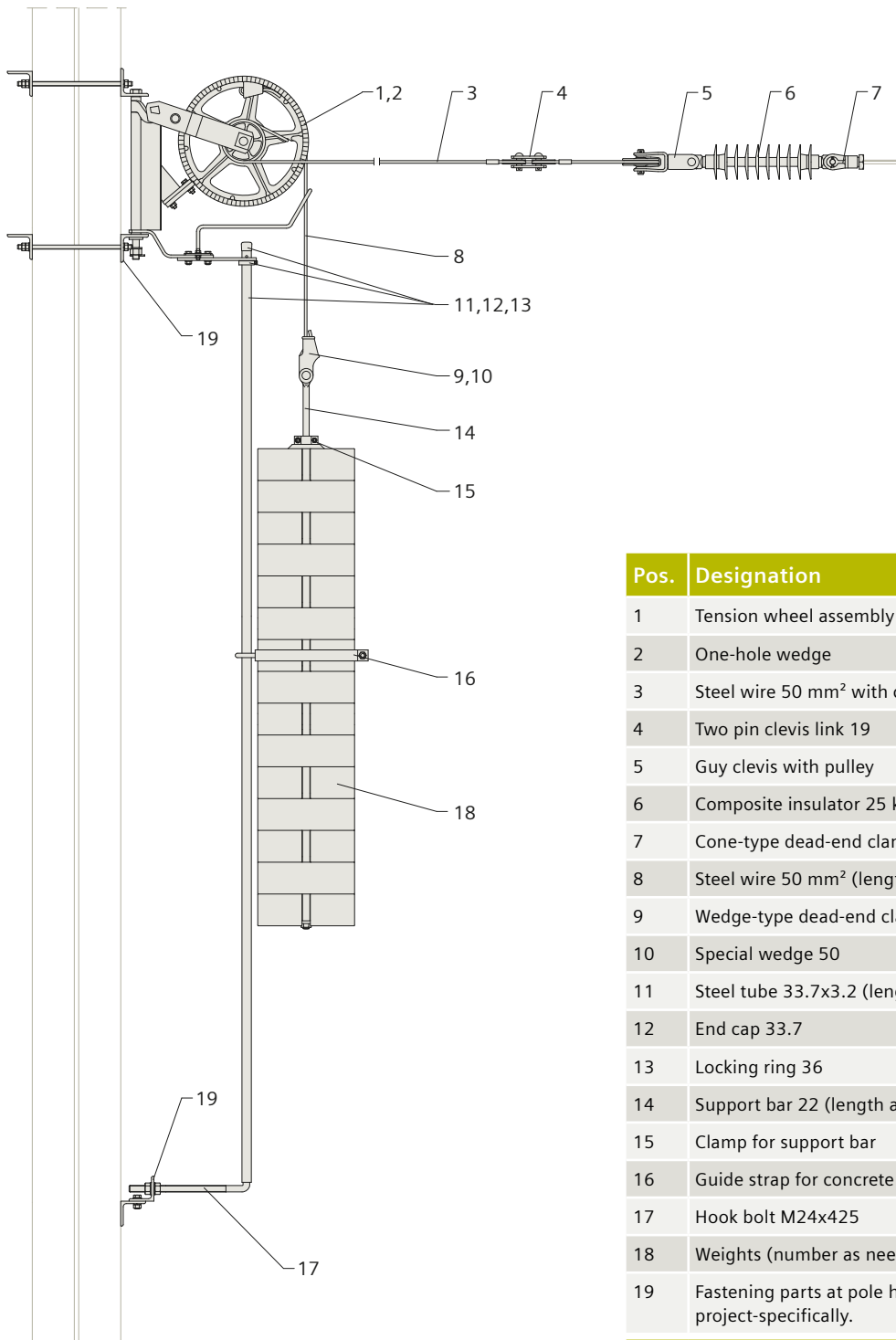
Pos.	Designation	Order no.
1	Tension wheel assembly up to 24 kN	8WL5078-0C
2	One-hole wedge	8WL1201-0
3	Steel wire 26 mm ² with connecting fittings	8WL7090-1C
4	Two pin clevis link 19	8WL1018-0
5	Equalizing pulley 75 with straps	8WL5160-0
6	Ball with eye	8WL5167-0
7	Ball socket	8WL5165-0
8	Loop insulator 1.5 kV DC	8WL3001-2
9	Wedge-type dead-end clamp 19	8WL1180-7
10	Special wedge 50	8WL1202-3
11	Steel wire 50 mm ² (length as needed)	8WL7090-0
12	Cone-type dead-end clamp 16/AC-120	8WL1237-0
13	Eye-bolt M22x350	8WL1272-1
14	Equalizing pulley 98 with clevis	8WL5162-1A
15	Compression sleeve 35	8WL4597-2
16	Bronze wire 35 (length as needed)	8WL7033-0
17	Support bar 22 (length as needed)	8WL5155-0
18	Clamp for support bar	8WL5170-0
19	Weight with wire guide, square	8WL5110-4
20	Weights, square (number as needed)	8WL5110-1
21	Fastening parts at pole have to be defined project-specifically.	

Flexible termination up to 24 kN at round pole



Pos.	Designation	Order no.
1	Tension wheel assembly up to 24 kN	8WL5078-0A
2	One-hole wedge	8WL1201-0
3	Steel wire 26 mm ² with connecting fittings	8WL7090-1C
4	Two pin clevis link 19	8WL1018-0
5	Equalizing pulley 75 with straps	8WL5160-0
6	Ball with eye	8WL5167-0
7	Ball socket	8WL5165-0
8	Composite insulator up to 3 kV DC	8WL3088-1A
9	Wedge-type dead-end clamp 19	8WL1180-7
10	Special wedge 50	8WL1202-3
11	Steel wire 50 mm ² (length as needed)	8WL7090-0
12	Cone-type dead-end clamp 16/AC-120	8WL1237-0
13	Steel tube 33.7x3.2 (length as needed)	8WL2175-1B
14	End cap 33.7	8WL2184-6
15	Locking ring 36	8WL5173-0
16	Support bar 22 (length as needed)	8WL5155-0
17	Clamp for support bar	8WL5170-0
18	Guide strap for concrete weights	8WL5130-0
19	Hook bolt M24x425	8WL5172-1
20	Weights (number as needed)	8WL5106-0
21	Fastening parts at pole have to be defined project-specifically.	

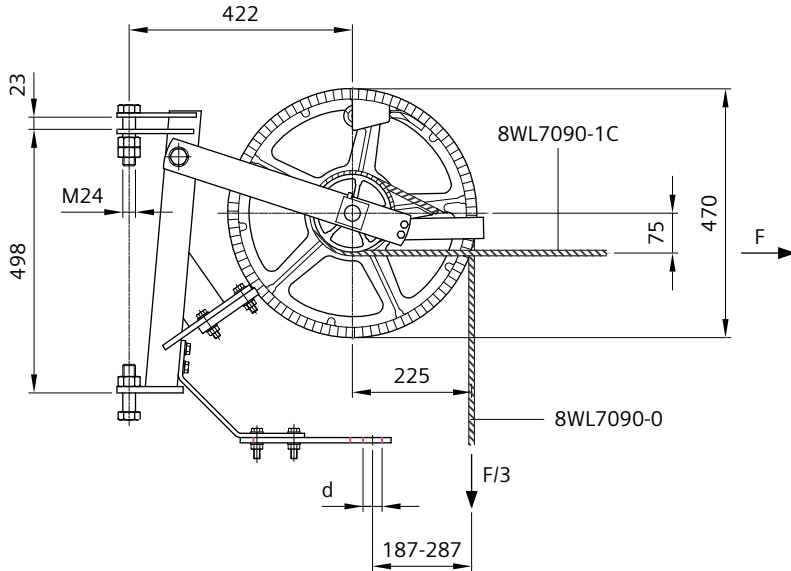
Flexible termination up to 40 kN at HE pole



Pos.	Designation	Order no.
1	Tension wheel assembly up to 40 kN	8WL5070-0B
2	One-hole wedge	8WL1201-0
3	Steel wire 50 mm ² with connecting fittings	8WL7090-0C
4	Two pin clevis link 19	8WL1018-0
5	Guy clevis with pulley	8WL5167-5
6	Composite insulator 25 kV AC	8WL3078-1A
7	Cone-type dead-end clamp 19/AC-120	8WL1237-2
8	Steel wire 50 mm ² (length as needed)	8WL7090-0
9	Wedge-type dead-end clamp 19	8WL1180-7
10	Special wedge 50	8WL1202-3
11	Steel tube 33.7x3.2 (length as needed)	8WL2175-1B
12	End cap 33.7	8WL2184-6
13	Locking ring 36	8WL5173-0
14	Support bar 22 (length as needed)	8WL5155-0
15	Clamp for support bar	8WL5170-0
16	Guide strap for concrete weights	8WL5130-0
17	Hook bolt M24x425	8WL5172-1
18	Weights (number as needed)	8WL5106-0
19	Fastening parts at pole have to be defined project-specifically.	

Tension wheel assembly up to 24 kN

with maintenance-free bush bearings, for automatic tensioning of contact resp. catenary wire at lattice steel or concrete poles, for guide tube up to $d=36$ or 43.5 mm



Order no.	8WL5078-0A	8WL5078-0B
Designation	Tension wheel assembly for guide tube up to $d=36$ mm	Tension wheel assembly for guide tube up to $d=43.5$ mm
Material		
Tension wheel	ctAl	ctAl
Suspension	htgSt	htgSt
Swing lever, hoop	htgSt	htgSt
Bolts	stlSt	stlSt
Nuts, washers	stlSt	stlSt
Weight	28.5 kg	28.5 kg
Perm. operating load	24 kN	24 kN
Min. failing load	72 kN	72 kN
Ambient temperature	-40 °C to +50 °C	-40 °C to +50 °C
Mechanical advantage reduction ratio	1:3	1:3
Max. perm. variation of length of contact and catenary wire	1.50 m	1.50 m
d	36 mm	43.5 mm

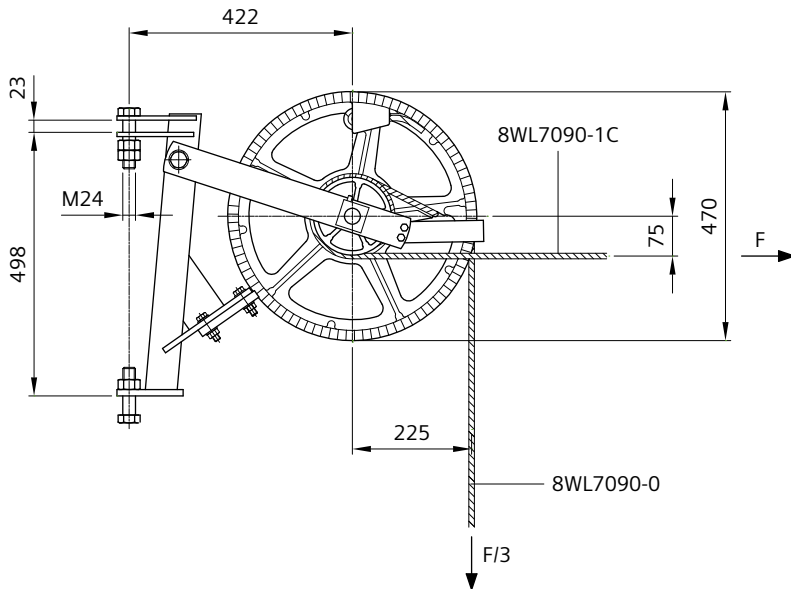
One wedge 8WL1201-0 (mICI) must be ordered separately, see page 134.

Steel wires 8WL7090-0 (length as needed) and 8WL7090-1C (L=7.5 m) must be ordered separately, see Chapter 02-14.

The tension wheel assemblies can also be supplied with fitted wires.

Tension wheel assembly up to 24 kN

with maintenance-free bush bearings, for automatic tensioning of contact resp. catenary wire at lattice steel or concrete poles, without mounting support for guide tube



Order no.	8WL5078-0C
Designation	Tension wheel assembly without mounting support for guide tube
Material	
Tension wheel	ctAl
Suspension	htgSt
Swing lever, hoop	htgSt
Bolts	stlSt
Nuts, washers	stlSt
Weight	28 kg
Perm. operating load	24 kN
Min. failing load	72 kN
Ambient temperature	-40 °C to +50 °C
Mechanical advantage reduction ratio	1:3
Max. perm. variation of length of contact and catenary wire	1.50 m

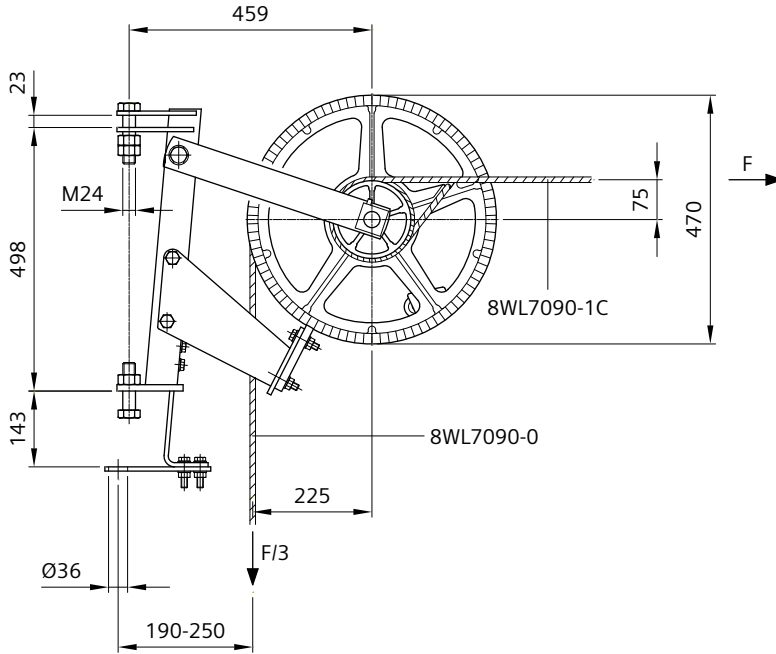
One wedge 8WL1201-0 (mICI) must be ordered separately, see page 134.

Steel wires 8WL7090-0 (length as needed) and 8WL7090-1C (L=7.5 m) must be ordered separately, see Chapter 02-14.

The tension wheel assembly can also be supplied with fitted wires.

Tension wheel assembly up to 24 kN

with maintenance-free bush bearings, for automatic tensioning of contact resp. catenary wire at lattice steel or concrete poles, for guide tube up to $d=36$ mm, for narrow installation space



Order no.	8WL5078-1A
Designation	Tension wheel assembly for guide tube up to $d=36$ mm
Material	
Tension wheel	ctAl
Suspension	htgSt
Swing lever	htgSt
Bolts, nuts	stlSt
Washers	stlSt
Weight	30.5 kg
Perm. operating load	24 kN
Min. failing load	72 kN
Ambient temperature	-40 °C to +50 °C
Mechanical advantage reduction ratio	1:3
Max. perm. variation of length of contact and catenary wire	1.50 m

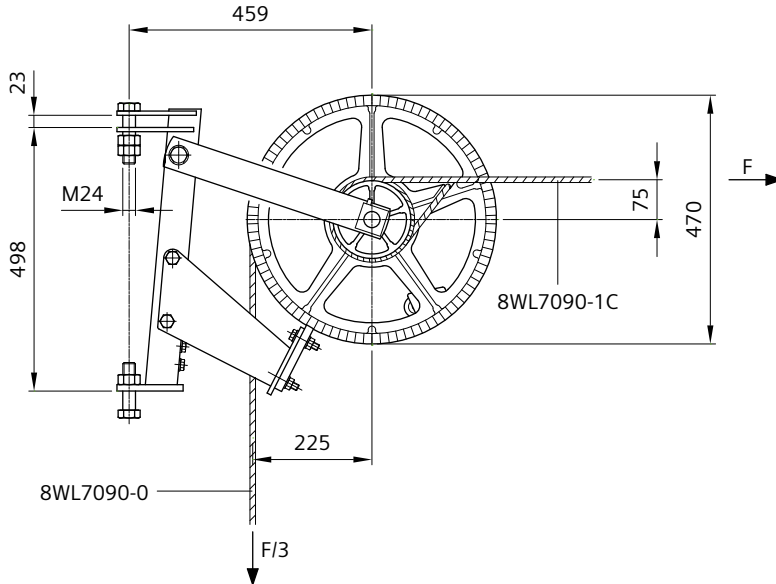
One wedge 8WL1201-0 (mICI) must be ordered separately, see page 134.

Steel wires 8WL7090-0 (length as needed) and 8WL7090-1C (L=7.5 m) must be ordered separately, see Chapter 02-14.

The tension wheel assembly can also be supplied with fitted wires.

Tension wheel assembly up to 24 kN on structures

with maintenance-free bush bearings, for automatic tensioning of contact resp. catenary wire on HE-poles or structures, for round weights up to $d=410$ mm or rectangular weights in tunnel



Order no.	8WL5078-1C	8WL5078-1D
Designation	Tension wheel assembly on structures	Tension wheel assembly on structures
Material		
Tension wheel	ctAl	ctAl
Suspension	htgSt	stlSt
Swing lever	htgSt	stlSt
Bolts, nuts	stlSt	stlSt
Washers	stlSt	stlSt
Weight	30 kg	30 kg
Perm. operating load	24 kN	24 kN
Min. failing load	72 kN	72 kN
Ambient temperature	-40 °C to +50 °C	-40 °C to +50 °C
Mechanical advantage reduction ratio	1:3	1:3
Max. perm. variation of length of contact and catenary wire	1.50 m	1.50 m

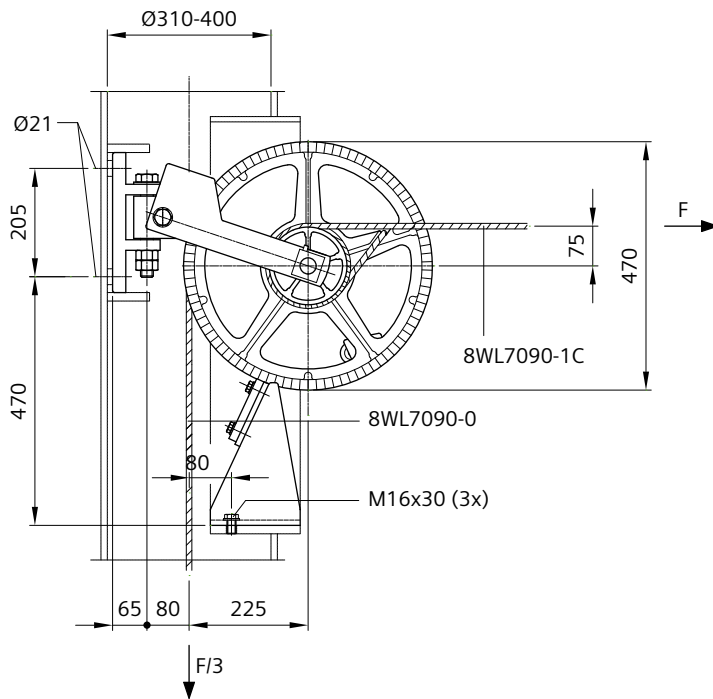
One wedge 8WL1201-0 (mICI) must be ordered separately, see page 134.

Steel wires 8WL7090-0 (length as needed) and 8WL7090-1C (L=7.5 m) must be ordered separately, see Chapter 02-14.

The tension wheel assemblies can also be supplied with fitted wires.

Tension wheel assembly up to 24 kN for tubular steel pole

with maintenance-free bush bearings, for automatic tensioning of contact resp. catenary wire, arrangement of weight sets inside the pole



Order no.	8WL5078-2
Designation	Tension wheel assembly for tubular steel pole
Material	
Tension wheel	ctAl
Suspension, swing lever	htgSt
Locking device	htgSt
Bolts, nuts	stlSt
Washers	stlSt
Weight	31.5 kg
Perm. operating load	24 kN
Min. failing load	72 kN
Ambient temperature	-40 °C to +50 °C
Mechanical advantage reduction ratio	1:3
Max. perm. variation of length of contact and catenary wire	1.50 m

One wedge 8WL1201-0 (mICI) must be ordered separately, see page 134.

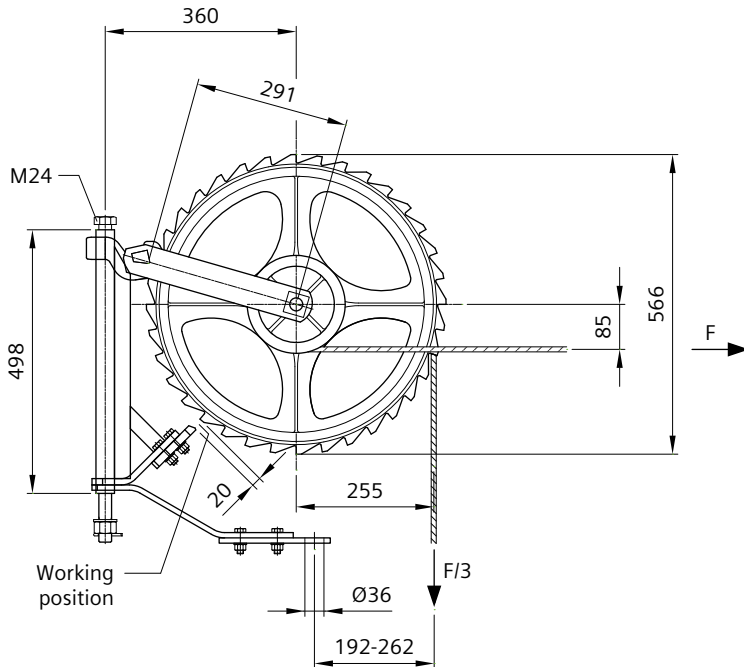
Steel wires 8WL7090-0 (length as needed) and 8WL7090-1C (L=7.5 m) must be ordered separately, see Chapter 02-14.

Information about pole construction on request.

The tension wheel assembly can also be supplied with fitted wires.

Tension wheel assembly up to 30 kN

with maintenance-free bush bearings, for automatic tensioning of contact or catenary wire at lattice steel or concrete pole, for guide tube up to $d=36$ mm



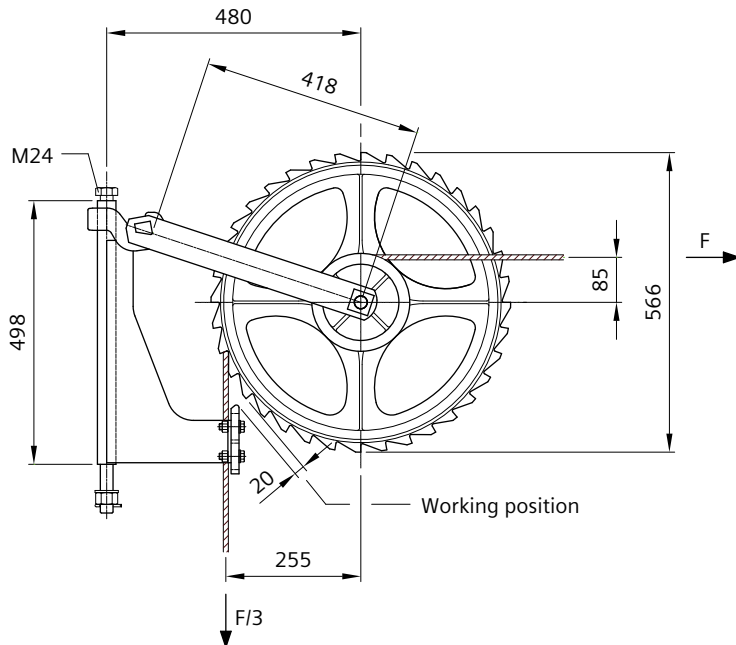
Order no.	8WL5000-0B
Designation	Tension wheel assembly for guide tube up to $d=36$ mm
Material	
Tension wheel	ctAl
Suspension	htgSt
Swing lever	htgSt
Bolts, nuts	stlSt
Washers	stlSt
Weight	27 kg
Perm. operating load	30 kN
Min. failing load	90 kN
Ambient temperature	-40 °C to +50 °C
Mechanical advantage reduction ratio	1:3
Max. perm. variation of length of contact and catenary wire	1.50 m

Three wedges 8WL1202-0 (mICI) must be ordered separately, see page 135.

Steel wire 8WL7090-0 (length as needed) must be ordered separately, see page 802.

Tension wheel assembly up to 30 kN on structures

with maintenance-free bush bearings, for automatic tensioning of contact or catenary wire on structures or tunnel walls



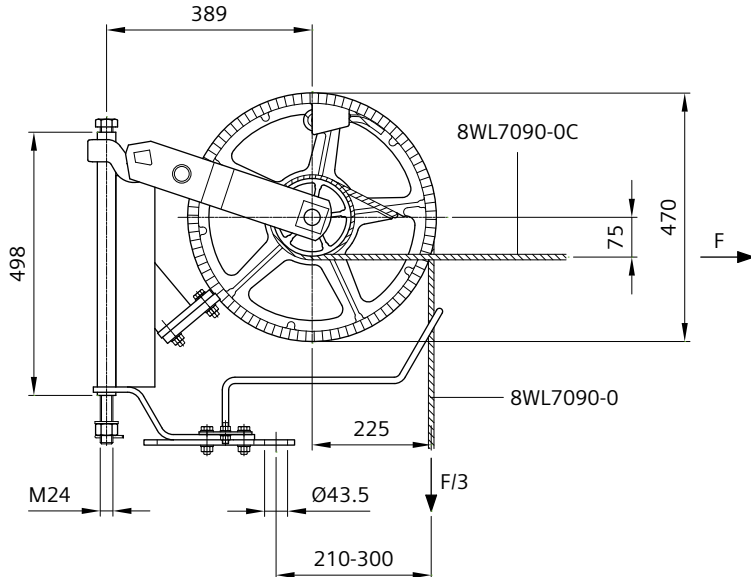
Order no.	8WL5031-0
Designation	Tension wheel assembly up to 30 kN
Material	
Tension wheel	ctAl
Suspension	stlSt
Swing lever	stlSt
Bolts	stlSt
Nuts	stlSt
Washers	stlSt
Weight	29 kg
Perm. operating load	30 kN
Min. failing load	90 kN
Ambient temperature	-40 °C to +50 °C
Mechanical advantage reduction ratio	1:3
Max. perm. variation of length of contact and catenary wire	1.33 m

Three wedges 8WL1202-0 (mICI) must be ordered separately, see page 135.

Steel wire 8WL7090-0 (length as needed) must be ordered separately, see page 802.

Tension wheel assembly up to 40 kN

with maintenance-free bush bearings, for automatic tensioning of contact or catenary wire at lattice steel or concrete poles, for guide tube up to $d=43.5$ mm



Order no.	8WL5070-0B
Designation	Tension wheel assembly for guide tube up to $d=43.5$ mm
Material	
Tension wheel	ctAl
Suspension, swing lever	htgSt
Hoop, bolts	stlSt
Nuts, washers	stlSt
Weight	32.5 kg
Perm. operating load	40 kN
Min. failing load	120 kN
Ambient temperature	-40 °C to +50 °C
Mechanical advantage reduction ratio	1:3
Max. perm. variation of length of contact and catenary wire	1.50 m

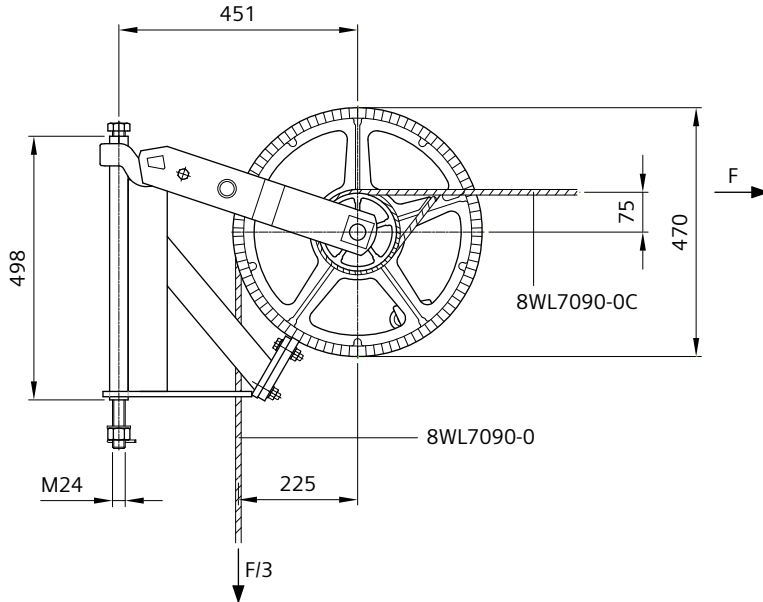
One wedge 8WL1201-0 (mICI) must be ordered separately, see page 134.

Steel wires 8WL7090-0 (length as needed) and 8WL7090-0C (L=7.5 m) must be ordered separately, see Chapter 02-14.

The tension wheel assembly can also be supplied with fitted wires.

Tension wheel assembly up to 40 kN on structures

with maintenance-free bush bearings, for automatic tensioning of contact resp. catenary wire on HE-poles or structures, for round weights up to $d=410$ mm or rectangular weights in tunnel



Order no.	8WL5070-1
Designation	Tension wheel assembly on structures
Material	
Tension wheel	ctAl
Suspension	htgSt
Swing lever	htgSt
Bolts	stlSt
Nuts	stlSt
Washers	stlSt
Weight	31 kg
Perm. operating load	40 kN
Min. failing load	120 kN
Ambient temperature	-40 °C to +50 °C
Mechanical advantage reduction ratio	1:3
Max. perm. variation of length of contact and catenary wire	1.50 m

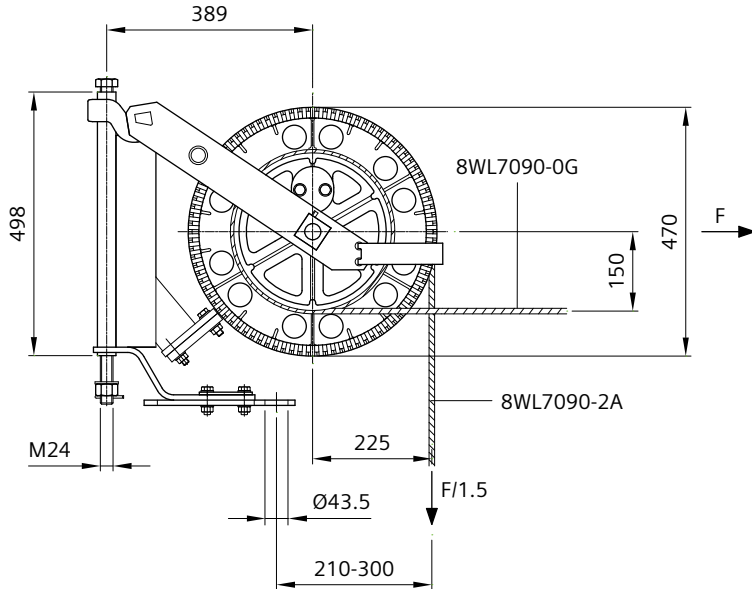
One wedge 8WL1201-0 (mICI) must be ordered separately, see page 134.

Steel wires 8WL7090-0 (length as needed) and 8WL7090-0C (L=7.5 m) must be ordered separately, see Chapter 02-14.

The tension wheel assembly can also be supplied with fitted wires.

Tension wheel assembly up to 40 kN (1:1.5)

with maintenance-free bush bearings, for automatic tensioning of contact resp. catenary wire at lattice steel or concrete poles, for guide tube up to $d=43.5$ mm



Order no.	8WL5071-0B
Designation	Tension wheel assembly for guide tube up to $d=43.5$ mm
Material	
Tension wheel	ctAl
Suspension	htgSt
Swing lever, hoop	htgSt
Bolts	stlSt
Nuts	stlSt
Washers	stlSt
Weight	37.9 kg
Perm. operating load	40 kN
Min. failing load	120 kN
Ambient temperature	-40 °C to +50 °C
Mechanical advantage reduction ratio	1:1.5
Max. perm. variation of length of contact and catenary wire	2.30 m

One wedge 8WL1201-0 (mICI) must be ordered separately, see page 134.

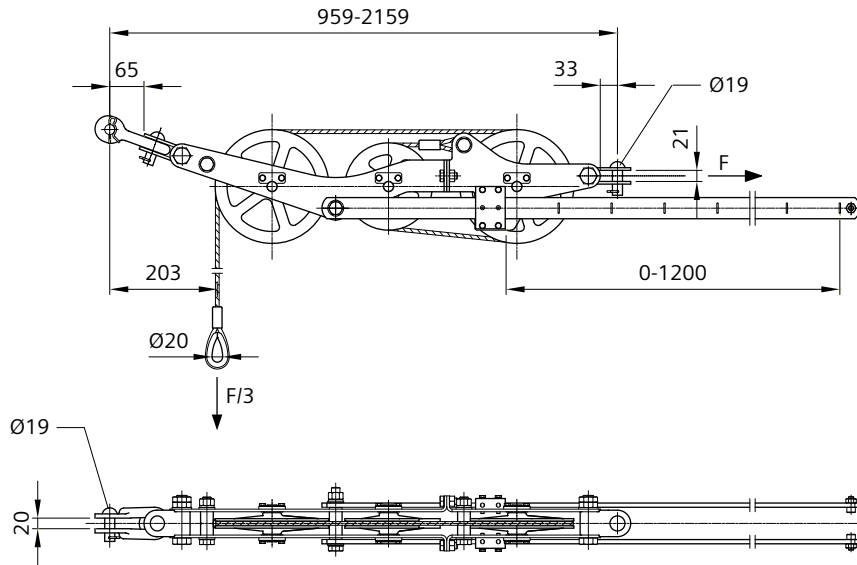
Steel wires 8WL7090-0G (L=9.5 mm) and 8WL7090-2A (L=5.83 m) must be ordered separately, see Chapter 02-14.

The tension wheel assembly can also be supplied with fitted wires.

Further types on request.

Pulley tensioner up to 30 kN

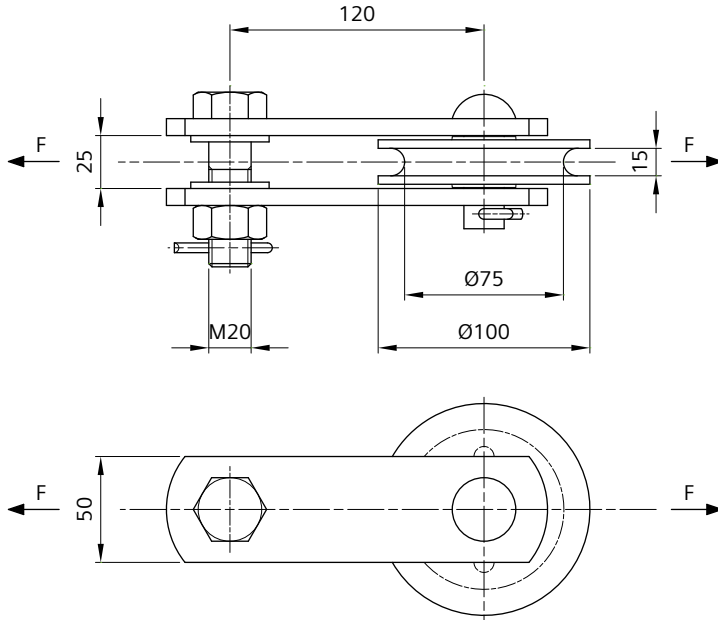
for automatic tensioning of contact or catenary wire at lattice steel or concrete poles



Order no.	8WL5080-0A
Designation	Pulley tensioner
Material	
Pulleys	ctAl
Strips	Al
Swivel	stlSt
Shackle	htgSt
Flanges	stlSt
Bolts, nuts	stlSt
Washers	stlSt
Pins, split pins	stlSt
Wire 26 mm ²	htgSt
Weight	15 kg
Perm. operating load	30 kN
Min. failing load	90 kN
Ambient temperature	-40 °C to +50 °C
Mechanical advantage reduction ratio	1:3
Max. perm. variation of length of contact and catenary wire	1.20 m

Equalizing pulley 75 with straps (Al)

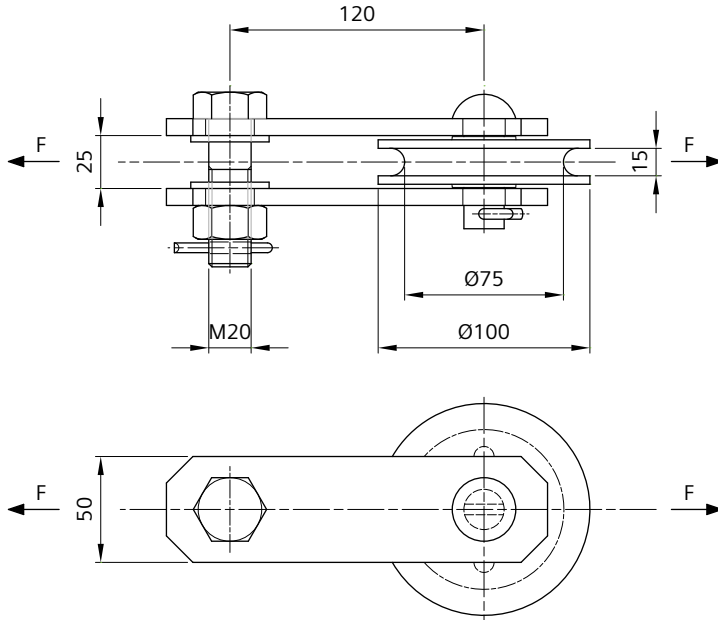
for connection of contact or catenary wire with tension wheel assembly, for steel wire $d=9.5$ mm (8WL7090-0/-0A/-0C/-0G) and $d=7$ mm (8WL7090-1C)



Order no.	8WL5161-4
Designation	Equalizing pulley 75 with straps (Al)
Material	
Pulley	ctAl
Straps	Al
Bolt M20	stlSt
Nut	stlSt
Washer	stlSt
Pin 19x52	Al
Split pin 5x28	stlSt
Beta-split pin	stlSt
Weight	0.86 kg
Perm. operating load	27 kN
Min. failing load	81 kN

Equalizing pulley 75 with straps (htgSt)

for connection of contact or catenary wire with tension wheel assembly, for steel wire $d=9.5$ mm (8WL7090-0/-0A/-0C/-0G) and $d=7$ mm (8WL7090-1C)

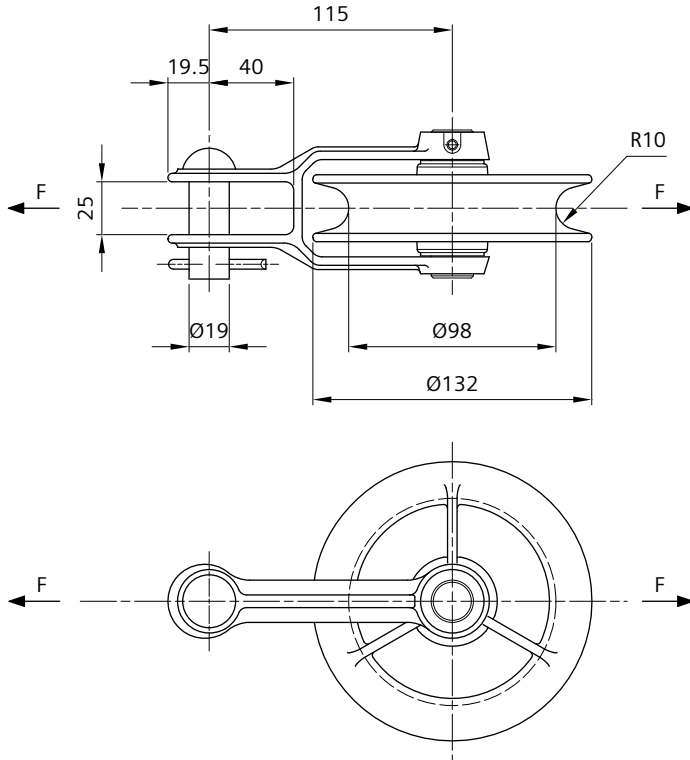


Order no.	8WL5161-4A
Designation	Equalizing pulley 75 with straps (htgSt)
Material	
Pulley	ctAl
Straps	htgSt
Bolt M20	htgSt
Nut	htgSt
Washer	htgSt
Pin 19x52	htgSt
Split pin 5x28	Cu
Beta-split pin	stlSt
Weight	1.64 kg
Perm. operating load	32 kN
Min. failing load	96 kN

Substitute for 8WL5160-0.

Equalizing pulley 98 with clevis

as running or load-equalizing pulley between contact and catenary wire when being tensioned in common, pulley with self-lubricating and maintenance-free sliding bearings



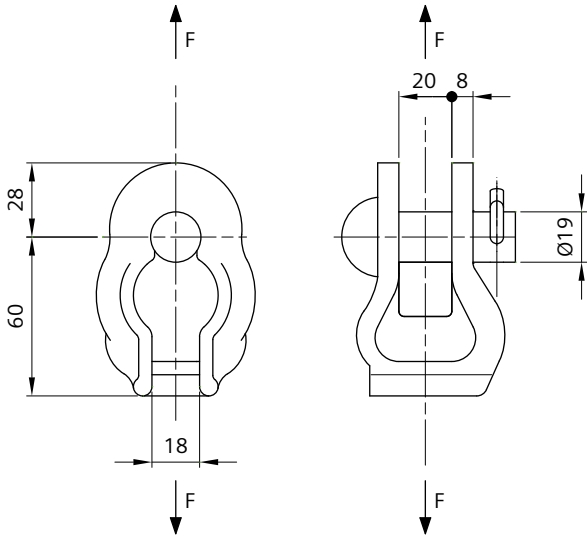
Order no.	8WL5162-1A
Designation	Equalizing pulley 98
Material	
Pulley	CuAl
Dropper strap	CuAl
Axle	stlSt
Flange bushings	Bz+Sintered bronze+PTFE
Pin 19x52	stlSt
Split pin 5x28	Cu
Prestressed sleeve	stlSt
Weight	1.58 kg
Perm. operating load	20 kN
Min. failing load	60 kN

Installation note:

The load transmission should happen central. If necessary, use washers.

Ball socket

for connection of contact or catenary wire and equalizing pulley with tension wheel assembly



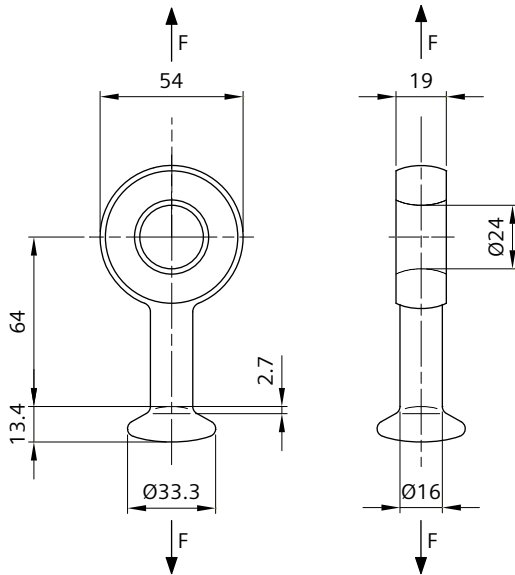
Order no.	8WL5165-0
Designation	Ball socket
Material	
Ball socket	mCl
Pin 19x52	htgSt
Beta-Split pin	stlSt
Weight	0.67 kg
Perm. operating load	32 kN
Min. failing load	96 kN

To be used with ball with eye 8WL5167-0 only.

The connection to the overhead contact line allow to turn out contact or catenary wire in an unloaded but assembled state.

Ball with eye

for connection of contact or catenary wire and equalizing pulley with tension wheel assembly



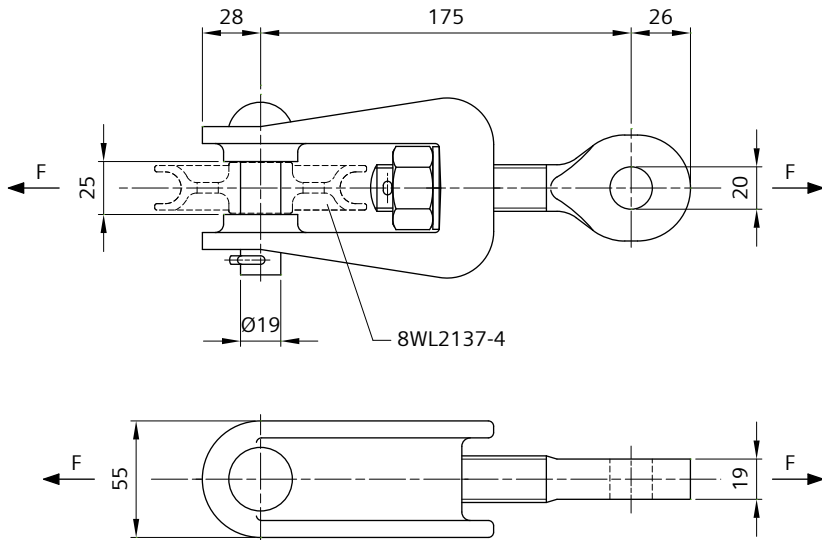
Order no.	8WL5167-0
Designation	Ball with eye
Material	htgSt
Weight	0.36 kg
Perm. operating load	32 kN
Min. failing load	96 kN

To be used with ball socket 8WL5165-0 only.

The connection to the overhead contact line allows to turn out contact or catenary wire in an unloaded but assembled state.

Guy clevis with eye-bolt

for connection of contact or catenary wire and equalizing pulley with tension wheel assembly

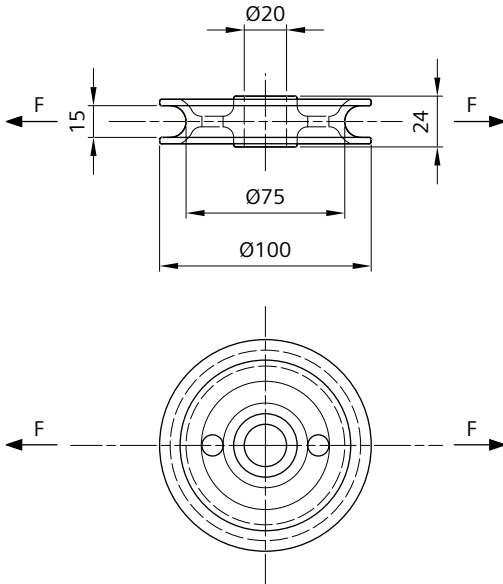


Order no.	8WL5167-4
Designation	Guy clevis with eye-bolt
Material	
Guy clevis	ctAl
Eye-bolt M22	htgSt
Nut	htgSt
Washer	stlSt
Pin 19x70	htgSt
Split pin 5x28	stlSt
Beta-Split pin	stlSt
Weight	1.22 kg
Perm. operating load	27 kN
Min. failing load	81 kN

Pulley 8WL2137-4 must be ordered separately, see page 606.

Equalizing pulley 75

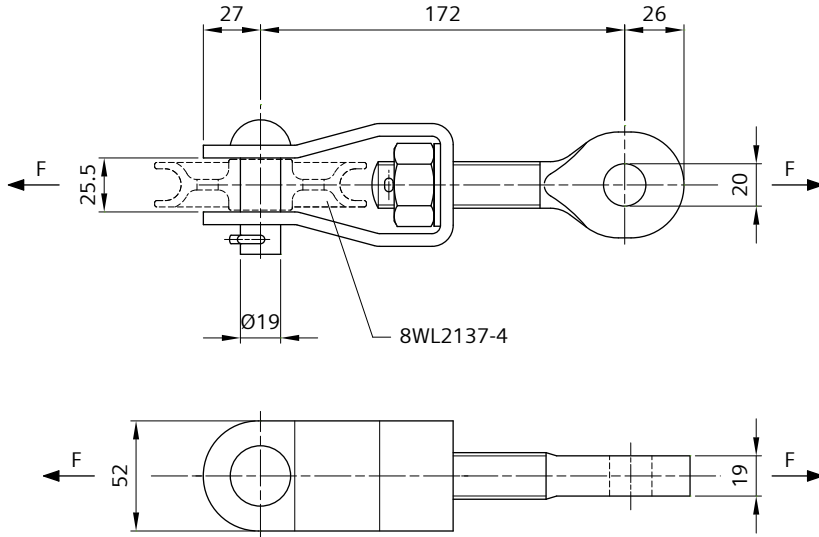
for connection of contact or catenary wire and guy clevis 8WL5167-4 or 8WL5167-6A with tension wheel assembly, for steel wire $d=9.5$ mm (8WL7090-0/-0A/-0C/-0G) and $d=7$ mm (8WL7090-1C)



Order no.	8WL2137-4
Designation	Equalizing pulley 75
Material	ctAl
Weight	0.16 kg
Perm. operating load	32 kN
Min. failing load	96 kN

Guy clevis with eye-bolt

for connection of contact or catenary wire and equalizing pulley with tension wheel assembly

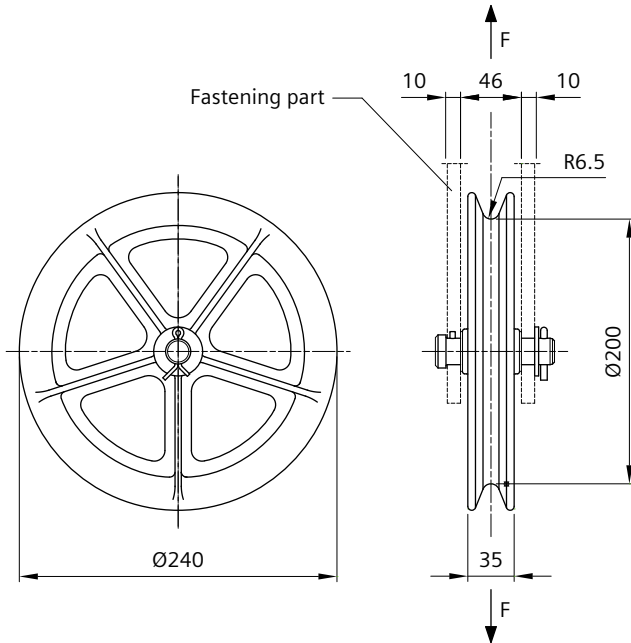


Order no.	8WL5167-6A
Designation	Guy clevis with eye-bolt
Material	
Guy clevis	htgSt
Eye-bolt M22	htgSt
Nut	htgSt
Washer	stlSt
Pin 19x52	htgSt
Split pin 5x28	stlSt
Beta-split pin	stlSt
Weight	1.42 kg
Perm. operating load	32 kN
Min. failing load	96 kN

Pulley 8WL2137-4 must be ordered separately.

Pulley 200 for tensioning weight guidance

for tension wheel assemblies in tunnel, pulley with self-lubricating and maintenance-free sliding bearings

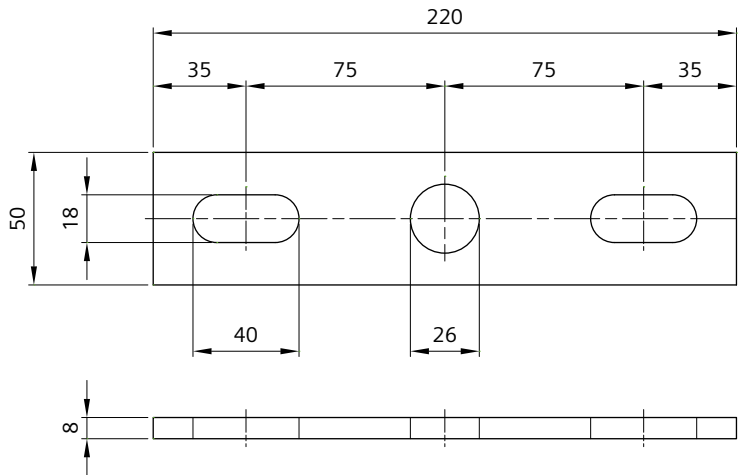


Order no.	8WL5168-0A
Designation	Pulley 200
Material	
Pulley	ctAl
Axle	stlSt
Flange bushings	St+Sintered bronze+PTFE
Washer	stlSt
Parallel pin	stlSt
Split pin 5x28	Cu
Weight	1.30 kg
Perm. operating load	21.3 kN
Min. failing load	64 kN

The fastening part has to be defined project-specifically.

Adjusting strap for tension wheel assembly, symmetrical

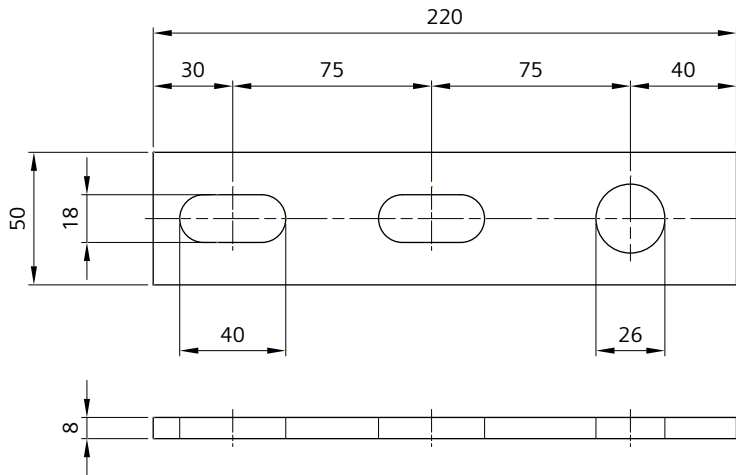
for perpendicular adjusting the axle of the tension wheel assembly at the fixing element



Order no.	8WL5006-1A
Designation	Adjusting strap for tension wheel assembly, symmetrical
Material	htgSt
Weight	0.59 kg

Adjusting strap for tension wheel assembly, asymmetrical

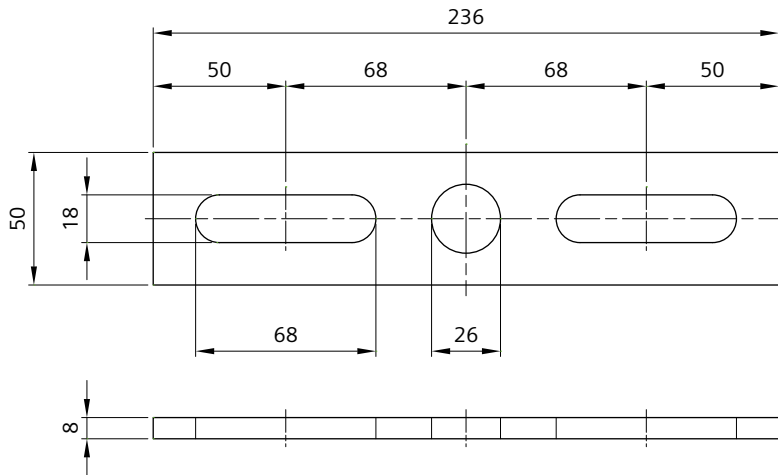
for perpendicular adjusting the axle of the tension wheel assembly at the fixing element



Order no.	8WL5006-2A
Designation	Adjusting strap for tension wheel assembly, asymmetrical
Material	htgSt
Weight	0.59 kg

Adjusting strap for tension wheel assembly in tunnel

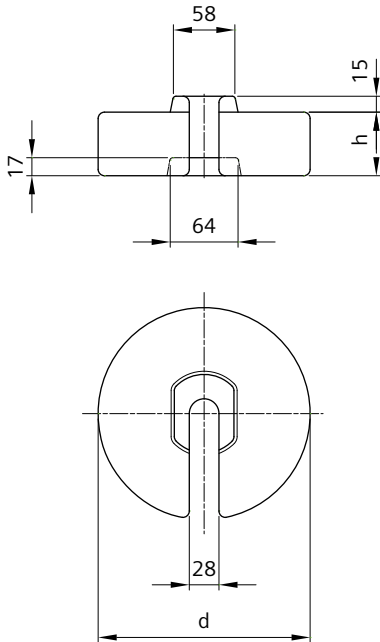
for perpendicular adjusting the axle of the tension wheel assembly at the fixing element



Order no.	8WL5006-3A
Designation	Adjusting strap for tension wheel assembly in tunnel
Material	htgSt
Weight	0.74 kg

Weight, circular

for weight sets of tension wheel assemblies

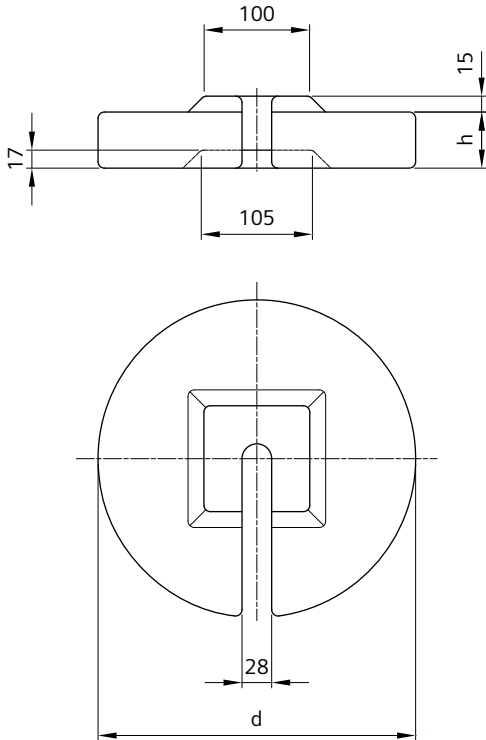


Order no.	8WL5100-0	8WL5101-0
Designation	Weight	Weight
Material	min. EN-GJL-150 acc. to EN 1561, coated with zinc powder paint grey	min. EN-GJL-150 acc. to EN 1561, coated with zinc powder paint grey
Weight	12.5 kg (± 0.3 kg)	25 kg (± 0.5 kg)
d	200 mm	203 mm
h	60 mm (+3 mm)	120 mm (+5 mm)

At the determination of the support bar length the tolerance of the weight height has to be considered.

Weight, circular

for weight sets of tension wheel assemblies

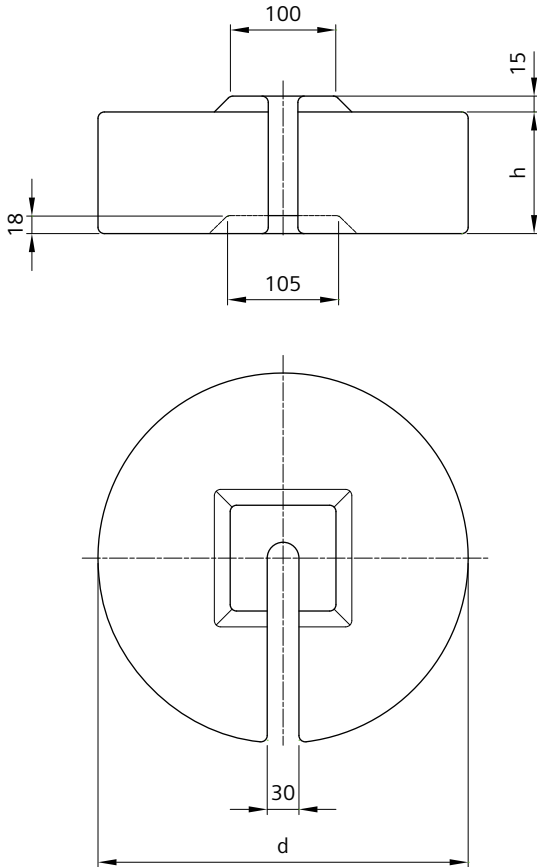


Order no.	8WL5102-0	8WL5103-0	8WL5104-0
Designation	Weight	Weight	Weight
Material	min. EN-GJL-150 acc. to EN 1561, coated with zinc powder paint grey	min. EN-GJL-150 acc. to EN 1561, coated with zinc powder paint grey	min. EN-GJL-150 acc. to EN 1561, coated with zinc powder paint grey
Weight	12.5 kg (± 0.3 kg)	25 kg (± 0.5 kg)	50 kg (± 1 kg)
d	300 mm	300 mm	410 mm
h	26 mm (+3 mm)	53 mm (+3 mm)	55 mm (+3 mm)

At the determination of the support bar length the tolerance of the weight height has to be considered.

Weight, circular

for weight sets of tension wheel assemblies

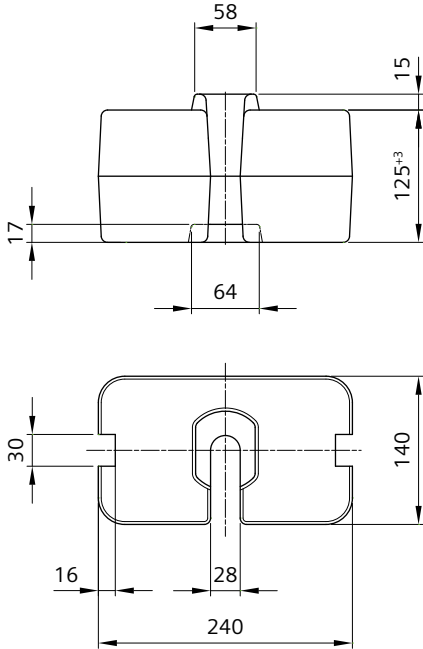


Order no.	8WL5106-0	8WL5106-1
Designation	Weight	Weight, circular
Material	Concrete B25	Concrete B25
Weight	25 kg (± 0.5 kg)	25 kg (± 0.5 kg)
d	350 mm	410 mm
h	115 mm (± 5 mm)	84 mm (± 4 mm)

At the determination of the support bar length the plus tolerance of the weight height has to be considered.

Weight with guide groove, square

for weight sets of tension wheel assemblies in poles from HE-B/M320

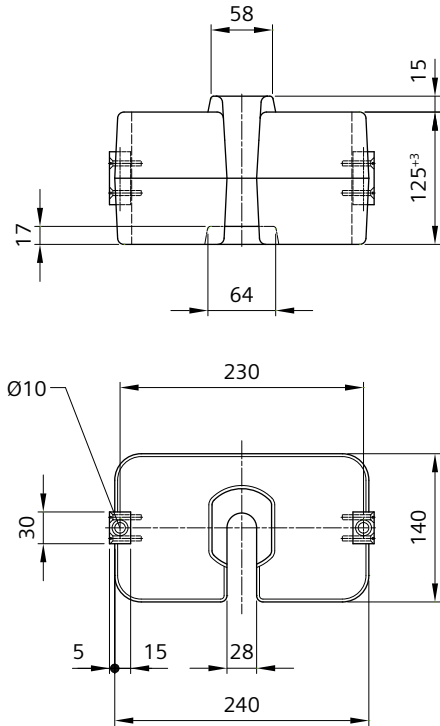


Order no.	8WL5110-1
Designation	Weight
Material	min. EN-GJL-150 acc. to EN 1561, coated with zinc powder paint grey
Weight	25 kg (±0.5 kg)

At the determination of the support bar length the tolerance of the weight height has to be considered.

Weight with wire guide, square

for weight sets of tension wheel assemblies in HE-B/M320 poles, wire guide for bronze wire $d=7.5$ mm

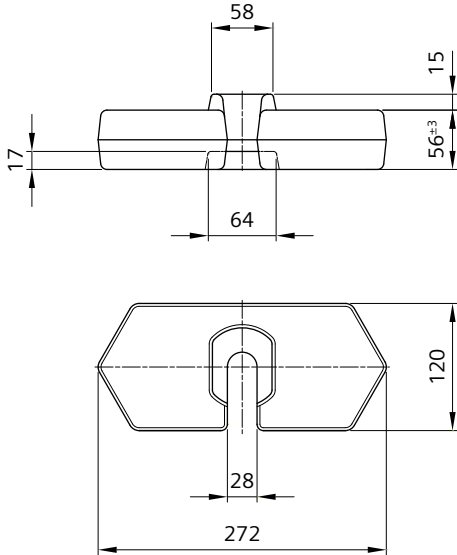


Order no.	8WL5110-4
Designation	Weight
Material	
Weight	min. EN-GJL-150 acc. to EN 1561, coated with zinc powder paint grey
Wire guide	CuZn
Countersunk head screws M6	stlSt
Weight	25 kg (± 0.5 kg)

At the determination of the support bar length the tolerance of the weight height has to be considered.

Weight, hexagon

for weight sets of tension wheel assemblies in hexagon-section poles

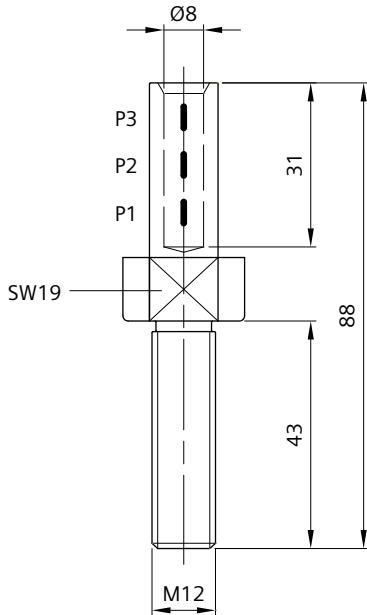


Order no.	8WL5110-5A
Designation	Weight
Material	min. EN-GJL-150 acc. to EN 1561, coated with zinc powder paint grey
Weight	10 kg (± 0.25 kg)

At the determination of the support bar length the plus tolerance of the weight height has to be considered.

Compression sleeve

for weight sets of tension wheel assemblies in HE-B/M poles, for bronze wires 35 mm² acc. to DIN 48201

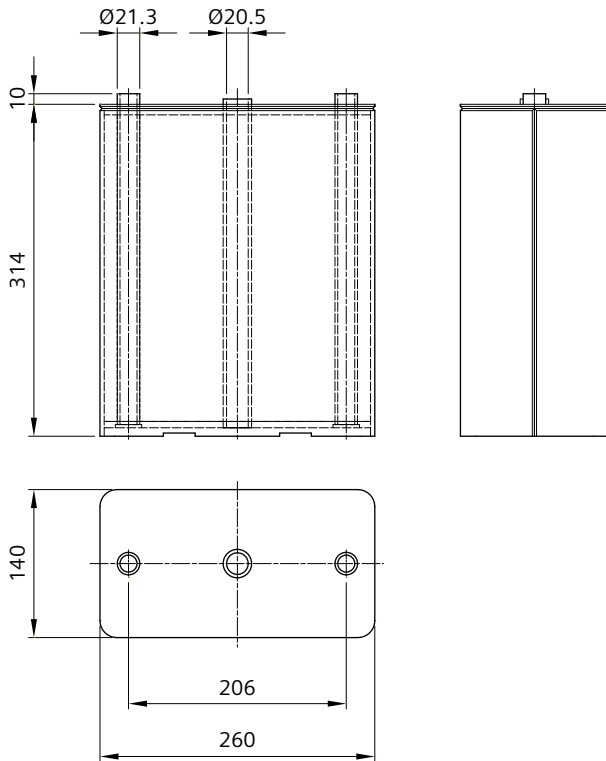


Order no.	8WL4597-2
Designation	Compression sleeve 35
Material	CuAl
Weight	0.083 kg
Pressing die	8WL7154-0
Pressing markings	P1 to P3

Pressing according to markings (following P1 to P3).

Weight made of lead

for weight sets of tension wheel assemblies in HE-B/M320 pole



Order no.	8WL5110-7A
Designation	Weight
Material	
Casing	stlSt
Filling	Lead
Weight	110 kg (±3 kg)

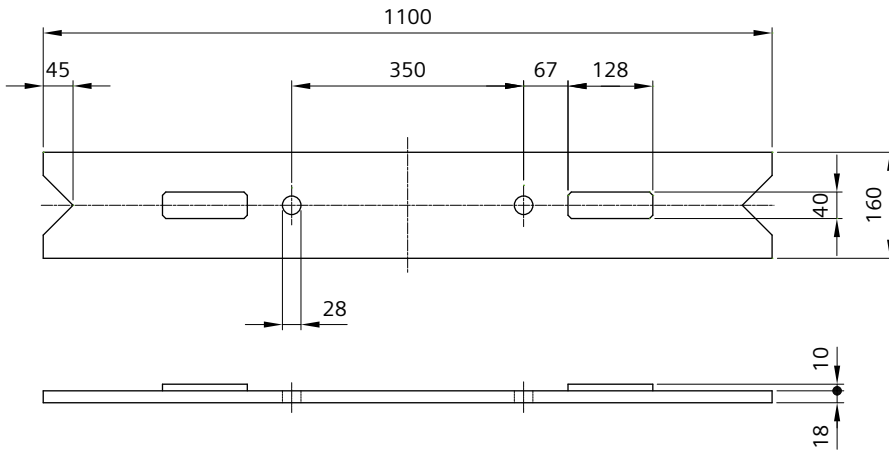
The lead filling is completely encapsulated in a stainless steel casing. This prevents environmental damage due to lead emissions.

Support bar DIN 975-M16-stlSt (length depending on the number of weights used) must be ordered separately.

Other weights on request.

Baseplate for weight set

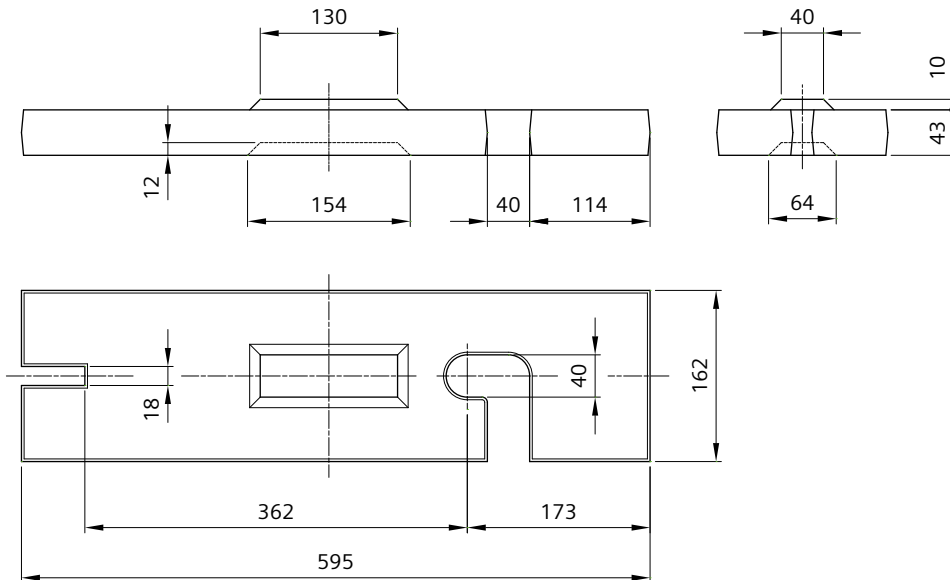
for tension wheel assemblies in tunnel



Order no.	8WL5112-0
Designation	Baseplate for weight set
Material	htgSt
Weight	25.7 kg

Weight plate

for weight sets of tension wheel assemblies

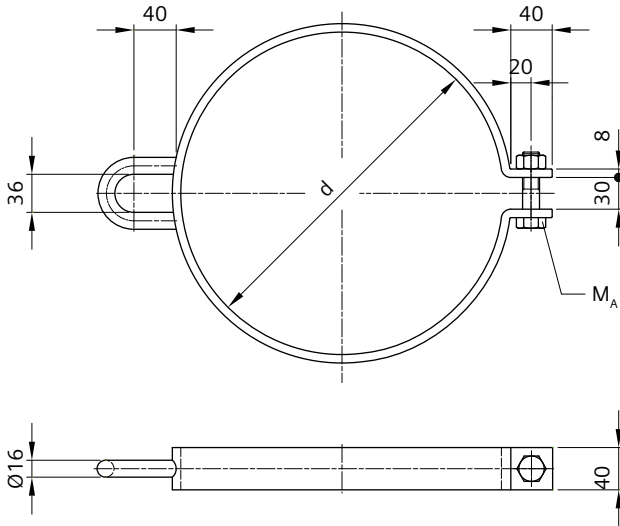


Order no.	8WL5112-1
Designation	Weight plate
Material	min. EN-GJL-150 acc. to EN 1561, coated with zinc powder paint grey
Weight	26.5 kg (± 0.5 kg)

Details about tensioning weight guidance on request.

Guide strap 32/33.7

for guide tube made of steel d=32 and 33.7 mm (1")

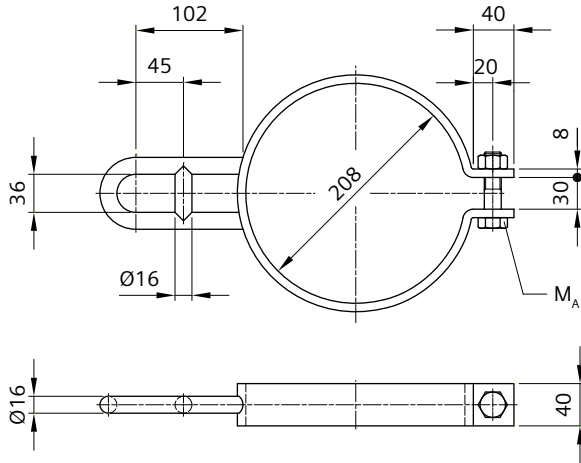


Order no.	8WL5134-0	8WL5130-0	8WL5133-0
Designation	Guide strap for cast iron weights 8WL5104-0	Guide strap for concrete weights 8WL5106-0	Guide strap for cast iron weights 8WL5102-0 and 8WL5103-0
Material			
Clamp	htgSt	htgSt	htgSt
Bolt M16	htgSt	htgSt	htgSt
Nut	htgSt	htgSt	htgSt
Weight	3.80 kg	3.32 kg	3.08 kg
Tightening torque M_A	60 Nm	60 Nm	60 Nm
d	415 mm	355 mm	305 mm

Guide straps for tube 42/42.4 mm or made of stainless steel on request.

Guide strap 32/33.7

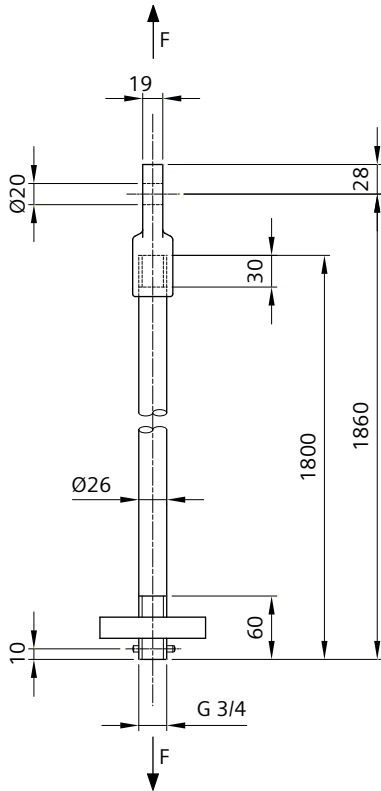
for guide tube made of steel $d=32$ and 33.7 mm (1"), for cast iron weights 8WL5100-0 and 8WL5101-0



Order no.	8WL5131-0
Designation	Guide strap
Material	
Clamp	htgSt
Bolt M16	htgSt
Nut	htgSt
Weight	2.54 kg
Tightening torque M_A	60 Nm

Support bar 26

for arrangement of weight sets on tension wheel assembly, for concrete weights 8WL5106-0 (max. 13 weights) or cast iron weights 8WL5102-0, 8WL5103-0, 8WL5104-0

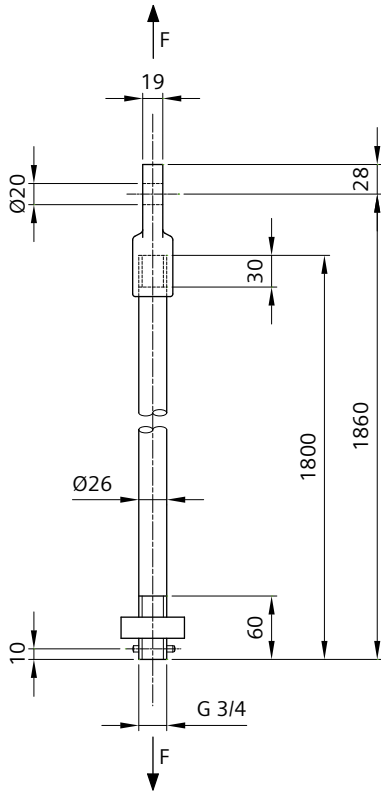


Order no.	8WL5148-0
Designation	Support bar 26 L=1860
Material	
Tongue end fitting	ctAl
Tube 26x3.5	Al
Plate 20x100x100	Al
Grooved pin	stlSt
Weight	1.94 kg
Perm. operating load	10 kN
Min. failing load	30 kN

Other lengths on request.

Support bar 26

for arrangement of weight sets on tension wheel assembly, for concrete weights 8WL5100-0, 8WL5101-0, 8WL5110-1, 8WL5110-4 and 8WL5110-5A

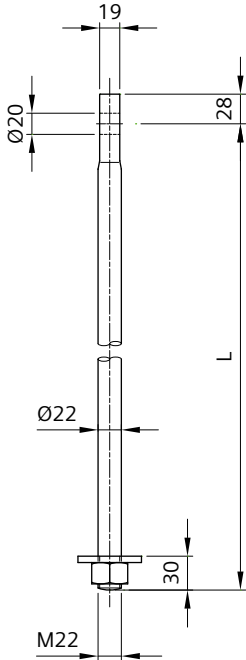


Order no.	8WL5148-8
Designation	Support bar 26 L=1860
Material	
Tongue end fitting	ctAl
Tube 26x3.5	Al
Plate 20x50x50	Al
Grooved pin	stlSt
Weight	1.54 kg
Perm. operating load	10 kN
Min. failing load	30 kN

Other lengths on request.

Support bar 22

for arrangement of weight sets on tension wheel assembly, for cast iron weights 8WL5101-0 or 8WL5100-0

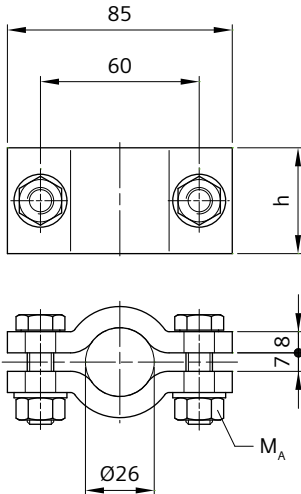


Order no.	8WL5150-0	8WL5152-0	8WL5154-0	8WL5155-0	8WL5157-0
Designation	Support bar 22	Support bar 22	Support bar 22	Support bar 22	Support bar 22
Material					
Bar	htgSt	htgSt	htgSt	htgSt	htgSt
Plate 6x60x60	htgSt	htgSt	htgSt	htgSt	htgSt
Nut	htgSt	htgSt	htgSt	htgSt	htgSt
Weight	3.0 kg	4.6 kg	5.9 kg	6.0 kg	7.8 kg
Weight 8WL5101-0	max. 8	max. 11	max. 14	max. 15	max. 20
Weight 8WL5100-0	max. 16	max. 22	max. 28	max. 31	max. 41
L	1000 mm	1400 mm	1800 mm	2000 mm	2600 mm

Other lengths on request.

Clamp for support bar 26

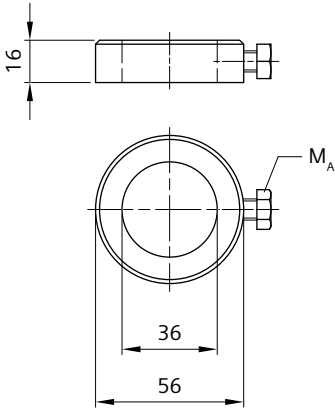
for securing weights, for steel or aluminium tube up to $d=26$ mm



Order no.	8WL5170-0	8WL5170-1
Designation	Clamp for support bar 26	Clamp for support bar 26
Material		
Clamp	htgSt	Al
Bolts M10x35	htgSt	stlSt
Nuts, washers	htgSt	htgSt
Weight	0.39 kg	0.24 kg
Tightening torque M_A	32 Nm	32 Nm
h	30 mm	40 mm

Locking ring 36

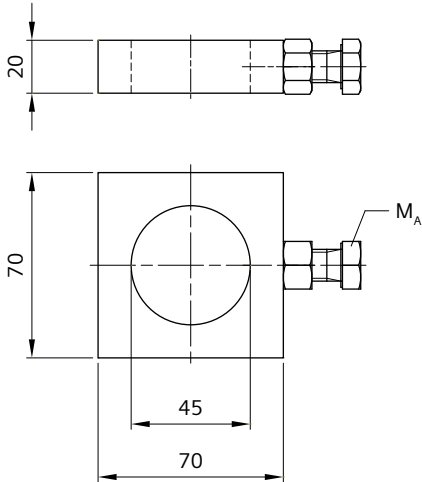
for securing the upper end of the guide tube made of steel $d=32$ and 33.7 mm (1")



Order no.	8WL5173-0
Designation	Locking ring 36
Material	
Locking ring	htgSt
Hexagon bolt M8	stlSt
Weight	0.19 kg
Tightening torque M_A	16 Nm

Locking ring 45

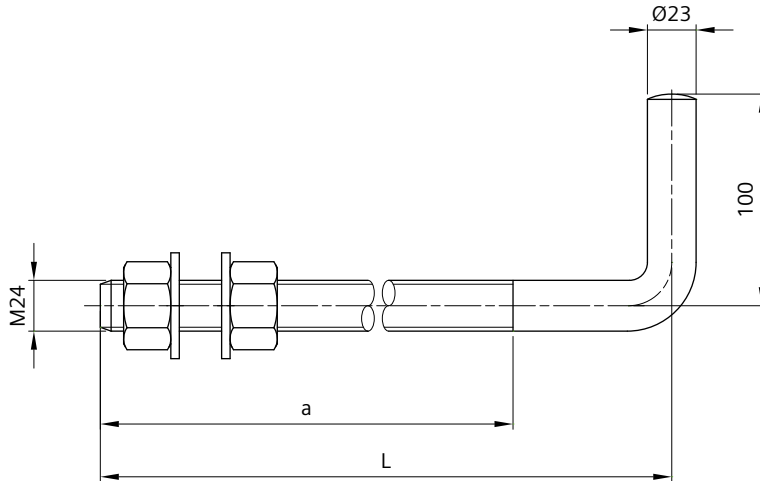
for securing the upper end of the guide tube made of aluminium $d=42$ mm or steel $d=42.4$ mm (1 1/4"), for tension wheel assembly up to 40 kN



Order no.	8WL5173-2
Designation	Locking ring 45
Material	
Locking ring	Al
Cup-point screw M12	stlSt
Nut	stlSt
Weight	0.15 kg
Tightening torque M_A	50 Nm

Hook bolt

for fixing the lower end of the guide tube made of steel $d=32$ and 33.7 mm (1")

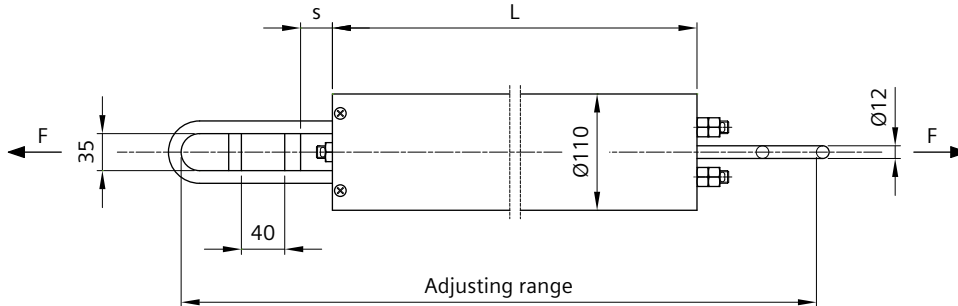


Order no.	8WL5172-0	8WL5172-1
Designation	Hook bolt M24x120	Hook bolt M24x425
Material		
Hook bolt	htgSt	htgSt
Nuts, washers	htgSt	htgSt
Weight	0.90 kg	1.78 kg
a	70 mm	350 mm
L	120 mm	425 mm

Fastening for guide tube 42/42.4 mm on request.

Tensioning spring 6-10 kN

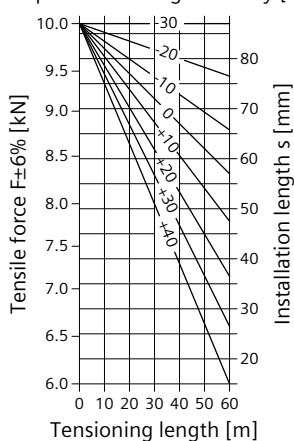
for tensioning contact wires, tensioning length 60, 120, 180 m



Order no.	8WL8037-0	8WL8037-1	8WL8037-2
Designation	Tensioning spring 60	Tensioning spring 120	Tensioning spring 180
Material			
Casing	Plastic	Plastic	Plastic
Eye-bolt, nuts	stlSt	stlSt	stlSt
Spring, spring plate	Spring steel, htgSt	Spring steel, htgSt	Spring steel, htgSt
Weight	10.58 kg	18.82 kg	27.72 kg
Tensile force	6 - 10 kN (working range)	6 - 10 kN (working range)	6 - 10 kN (working range)
Working stroke (spring)	72 mm	145 mm	215 mm
Adjusting range	650 - 740 mm	1045 - 1205 mm	1440 - 1670 mm
L	425 mm	820 mm	1210 mm

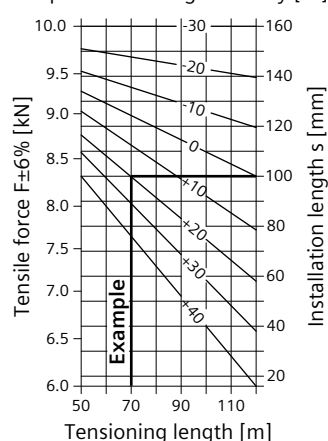
Diagram for determination of installation length „s“:

Temperature during assembly [°C]



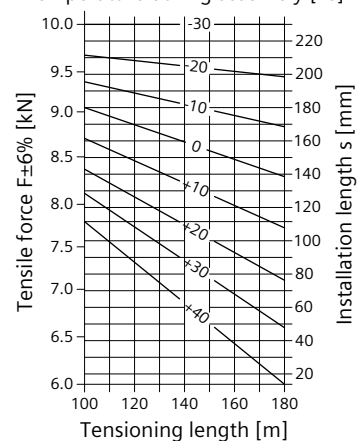
8WL8037-0

Temperature during assembly [°C]



8WL8037-1

Temperature during assembly [°C]



8WL8037-2

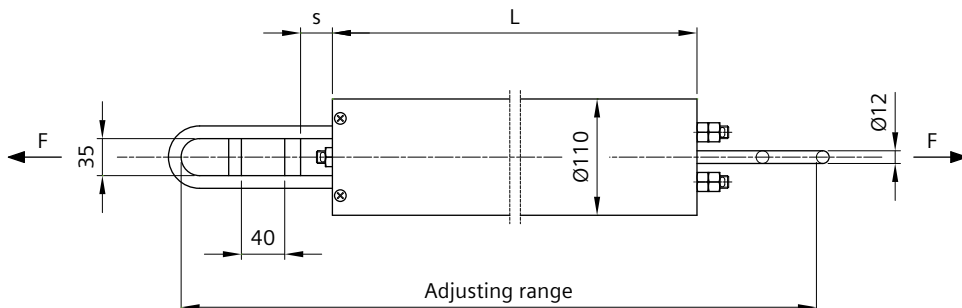
Example:

Tensioning length = 70 m, temperature during assembly = +20 °C, results in an installation length s of = 100 mm

The diagram must be adjusted depending on changing operating, temperature or tensioning range.

Tensioning spring 7-12 kN

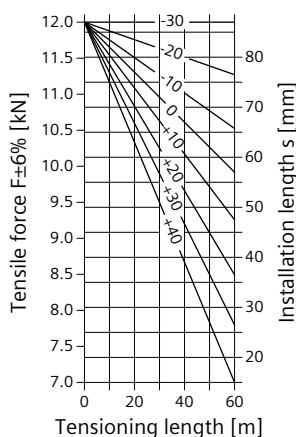
for tensioning contact wires, tensioning contact wires 60, 120, 180 m



Order no.	8WL8037-0A	8WL8037-1A	8WL8037-2A
Designation	Tensioning spring 60	Tensioning spring 120	Tensioning spring 180
Material			
Casing	Plastic	Plastic	Plastic
Eye-bolt, nuts	stlSt	stlSt	stlSt
Spring, spring plate	Spring steel, htgSt	Spring steel, htgSt	Spring steel, htgSt
Weight	11.5 kg	20.6 kg	30.4 kg
Tensile force	7 - 12 kN (working range)	7 - 12 kN (working range)	7 - 12 kN (working range)
Working stroke (spring)	72 mm	145 mm	215 mm
Adjusting range	650 - 740 mm	1045 - 1205 mm	1440 - 1670 mm
L	425 mm	820 mm	1210 mm

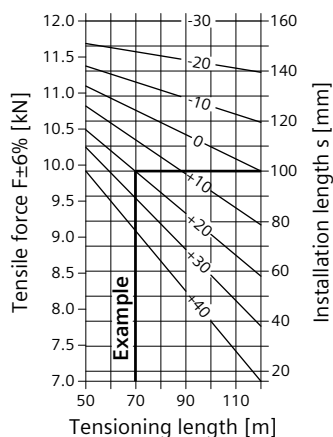
Diagram for determination of installation length „s“:

Temperature during assembly [°C]



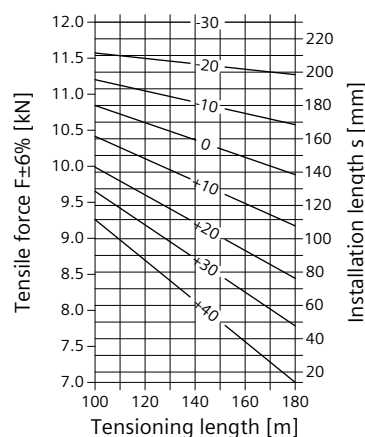
8WL8037-0A

Temperature during assembly [°C]



8WL8037-1A

Temperature during assembly [°C]



8WL8037-2A

Example:

Tensioning length = 70 m, temperature during assembly = +20 °C, results in an installation length s of = 100 mm

The diagram must be adjusted depending on changing operating, temperature or tensioning range.

Chapter 02

Standard Products

Tensioning equipment	70
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Turnbuckle with ring-shaped hook and wire clamp	666
Turnbuckle with two ring-shaped hooks	667

Technical comments

Application

Section insulators serve to separate the overhead contact line into individual switching and feeder sections and to insulate them from each other. Thus they enable the overhead contact line to be selectively switched off. Section insulators can be employed for the electrical isolation of the contact lines between the main tracks, between main tracks and side tracks, for isolation between track sections or, if used in pairs, for phase or system separation.

Electric traction units can traverse the section insulators at different running speeds, depending on the type of unit. They are installed with suspensions in the catenary system and in the trolley-type contact line and stand out due to their high mechanical strength and electrical insulation, good properties during pantograph passage, and high operational reliability. They are constantly subjected to various environmental and operational influences.

Types

The catalog contains all of the required section insulators and suspensions for use in different overhead contact line systems:

- Section insulators up to 1.5 kV DC, up to 3 kV DC and up to 25 kV AC
- Section insulators for one or two contact wires
- Section insulators with:
 - Insulating runners
 - Traversed copper runners
 - Insulation made of resistant GRP profiles
 - Insulation with Teflon encased GRP rods
- Neutral sections, used in pairs as phase or system isolation gaps

To ensure that the section insulators in the overhead contact line are stable, suspensions are provided for catenary and trolley-type contact lines and for various nominal voltages.

Rolling door insulators up to 3 kV DC permit closing and opening of rolling doors in rail vehicle halls while simultaneously closing or opening the overhead contact line.

Special features

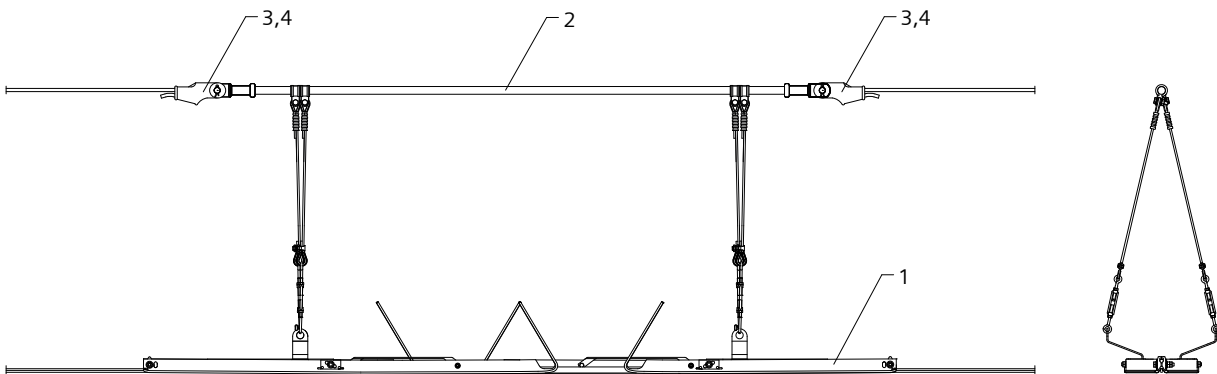
The lightweight section insulators and neutral sections of the 8WL5545 series are distinguished by the following characteristics:

- Can be used universally, because they are suited for many types and profiles of contact wire
- Suitable for single and twin contact wires
- Easy installation due to low weight and optimized design
- High running speed up to 200 km/h
- Long useful life due to good arc extinguishing capability
- Low life cycle costs due to the use of corrosion-resistant materials

Note

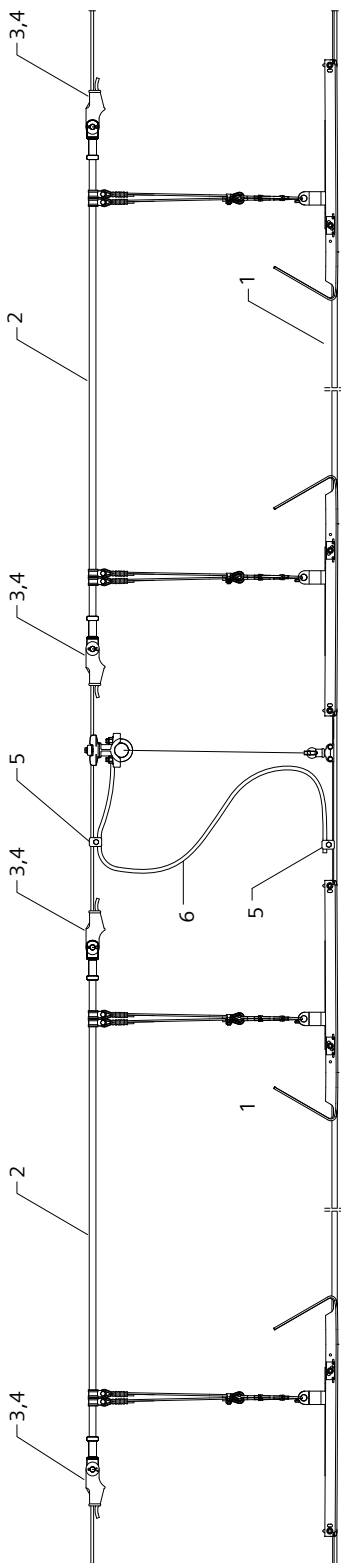
Further information can be found in the relevant product descriptions.

Section insulator 25 kV AC with suspension



Pos.	Designation	Order no.
1	Lightweight section insulator 25 kV AC (30 kN) for 1 contact wire	8WL5545-4A
2	Suspension with catenary wire insulation	8WL5545-6B
3	Wedge-type dead-end clamp 19	8WL1180-8
4	Two-hole wedge	8WL1202-0

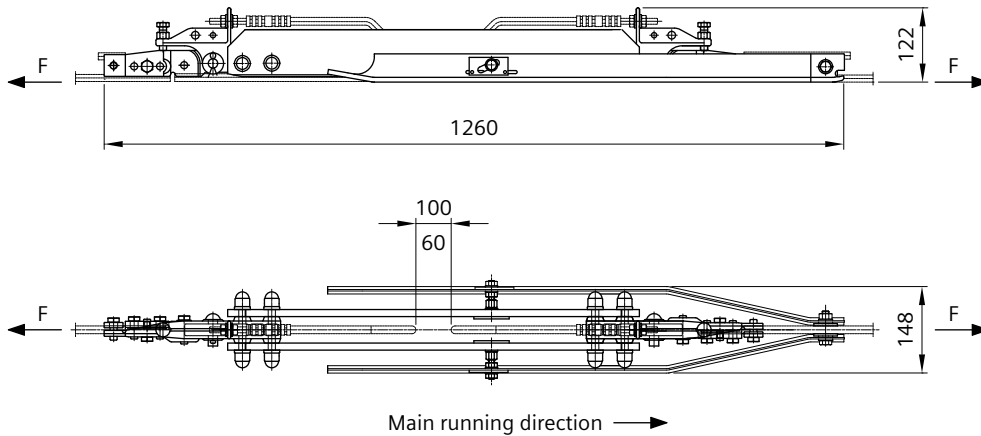
Phase separation 25 kV AC with suspension



Pos.	Designation	Order no..
1	Neutral section 25 kV AC for 1 contact wire	8WL5545-4D
2	Suspension with catenary wire insulation	8WL5545-6C
3	Wedge-type dead-end clamp 19	8WL1180-8
4	Two-hole wedge	8WL1202-0
5	Feeder clamp	8WL4580-2
6	Copper wire 70x189 (length as needed)	8WL7074-0

Section insulator with copper runners up to 1.5 kV DC

for single contact wire acc. to EN 50149, without setting loops



Order no.	8WL5570-1AF	8WL5570-1AK
Designation	Section insulator	Section insulator
Material		
Runners	Cu	Cu
Insulated runners	GRP	GRP
Tension bodies	CuAl	CuAl
Contact wire dead-end clamps	CuNiSi	CuNiSi
Bolts, nuts	stlSt	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1	BC-80 to 150, Cu-ETP / CuAg0.1
Weight	13.5 kg	13.5 kg
Perm. operating load	15 kN	15 kN
Min. failing load	48 kN	48 kN
Max. running speed	80 km/h	80 km/h
Nominal voltage	1.5 kV DC	1.5 kV DC
Creepage distance	350 mm	350 mm

Setting loops must be ordered separately, see page 652:

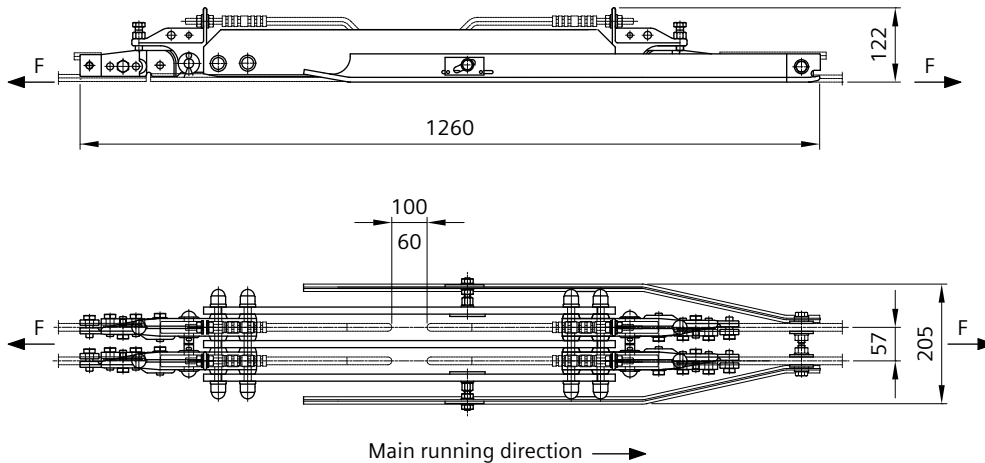
for clearance in air 100 mm: 8WL5531-0A (AC-100) or 8WL5533-0A (AC-120)

for clearance in air 60 mm: 8WL5531-2A (AC-100) or 8WL5533-2A (AC-120)

Setting loops for other contact wire cross-sections or clearances in air on request.

Section insulator with copper runners up to 1.5 kV DC

for twin contact wire acc. to EN 50149, without setting loops



Order no.	8WL5570-0AF	8WL5570-0AK
Designation	Section insulator	Section insulator
Material		
Runners	Cu	Cu
Insulated runners	GRP	GRP
Tension bodies	CuAl	CuAl
Contact wire dead-end clamps	CuNiSi	CuNiSi
Bolts, nuts	stlSt	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1	BC-80 to 150, Cu-ETP / CuAg0.1
Weight	18.8 kg	18.8 kg
Perm. operating load	30 kN	30 kN
Min. failing load	96 kN	96 kN
Max. running speed	80 km/h	80 km/h
Nominal voltage	1.5 kV DC	1.5 kV DC
Creepage distance	350 mm	350 mm

Setting loops must be ordered separately, see page 652:

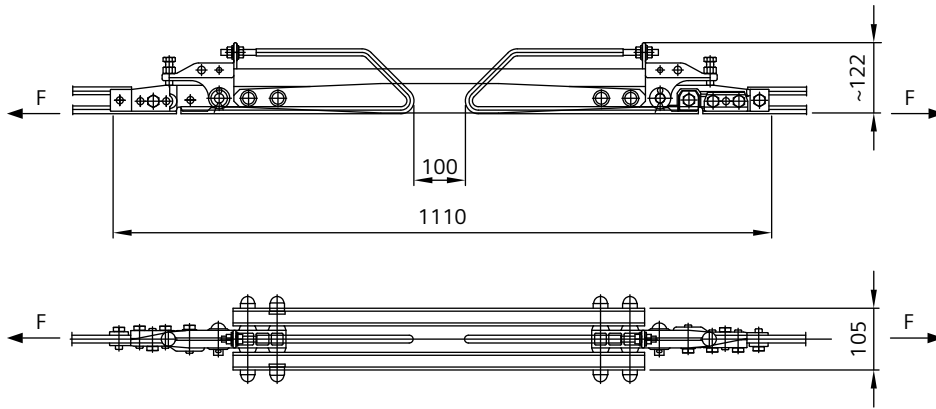
for clearance in air 100 mm: 8WL5531-0A (AC-100) or 8WL5533-0A (AC-120)

for clearance in air 60 mm: 8WL5531-2A (AC-100) or 8WL5533-2A (AC-120)

Setting loops for other contact wire cross-sections or clearances in air on request.

Section insulator with insulating runners up to 1.5 kV DC

for contact wires acc. to EN 50149, without setting loops



Order no.	8WL5510-0
Designation	Section insulator
Material	
Runners	GRP
Arcing protection	GRP
Tension bodies	CuAl
Contact wire dead-end clamps	CuNiSi
Bolts, nuts	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1
Weight	8.3 kg
Perm. operating load	12 kN
Min. failing load	38.4 kN
Max. running speed	80 km/h
Nominal voltage	1.5 kV DC
Creepage distance	300 mm

Setting loops for clearance in air 100 mm must be ordered separately, see page 653:

8WL5530-0 for AC-80

8WL5531-0 for AC-100

8WL5533-0 for AC-120

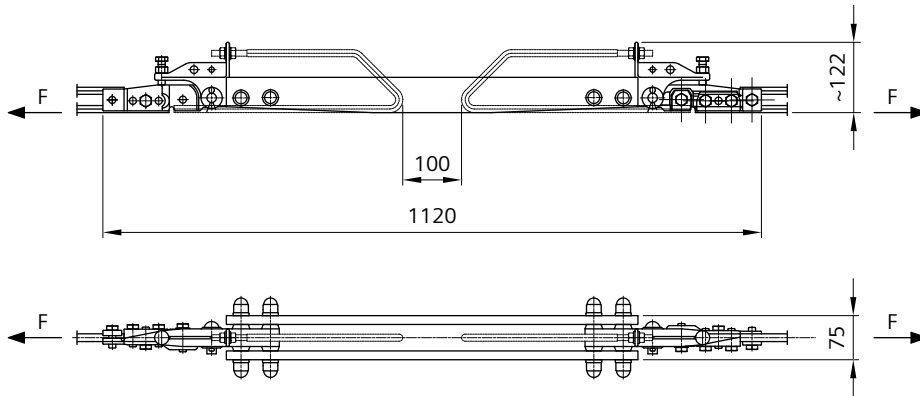
8WL5534-0 for AC-150

Setting loops for other cross-sections or clearances in air on request.

Type for twin contact wire or BC-contact wires on request.

Section insulator with insulating runners up to 1.5 kV DC

for contact wires acc. to EN 50149, without setting loops



Order no.	8WL5546-3
Designation	Section insulator
Material	
Runners	GRP
Tension bodies	CuAl
Contact wire dead-end clamps	CuNiSi
Bolts, nuts	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1
Weight	8.62 kg
Perm. operating load	12 kN
Min. failing load	38.4 kN
Max. running speed	80 km/h
Nominal voltage	1.5 kV DC
Creepage distance	300 mm

The runner material is self-extinguishing.

Setting loops for clearance in air 100 mm must be ordered separately, see page 653:

8WL5530-0 for AC-80

8WL5531-0 for AC-100

8WL5533-0 for AC-120

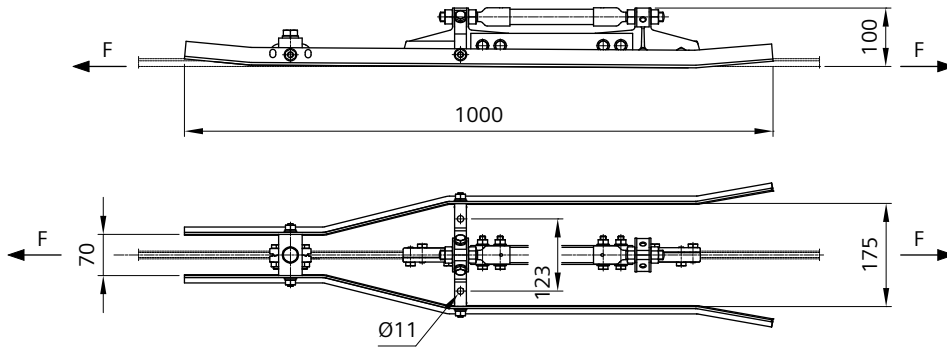
8WL5534-0 for AC-150

Setting loops for other cross-sections or clearances in air on request.

Type for twin contact wire or BC-contact wires on request.

Section insulator

for contact wires acc. to EN 50149

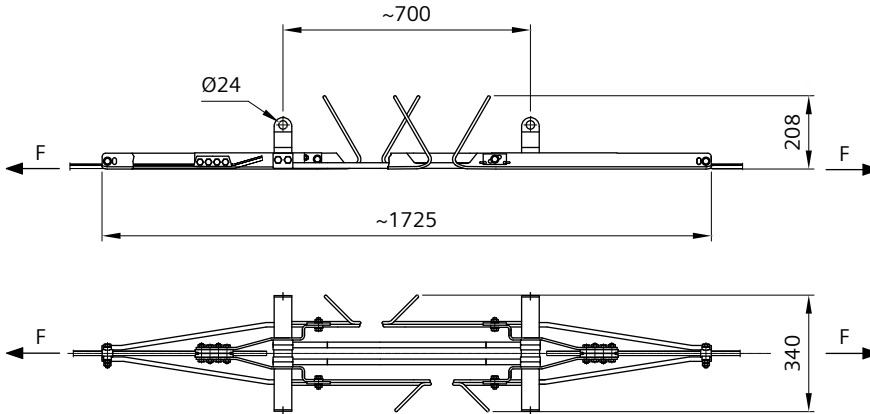


Order no.	8WL5517-5C
Designation	Section insulator
Material	
Clamping fittings	CuAl
Pressure tube	GRP
Insulating beam	GRP
Runners	Cu
Straps	stlSt, Cu-ETP
Bolts, nuts	stlSt
Washers, spring washers	stlSt
for contact wires	AC-80 to 120, Cu-ETP / CuAg0.1
Weight	7.4 kg
Perm. operating load	12 kN
Min. failing load	38.4 kN
Max. running speed	80 km/h
Creepage distance	140 mm
Clearance in air	65 mm

Suspension 8WL5517-7A must be ordered separately, see page 660.

Lightweight section insulator up to 3 kV DC

for single contact wire acc. to EN 50149, British Standard 23 and contact wires made in China

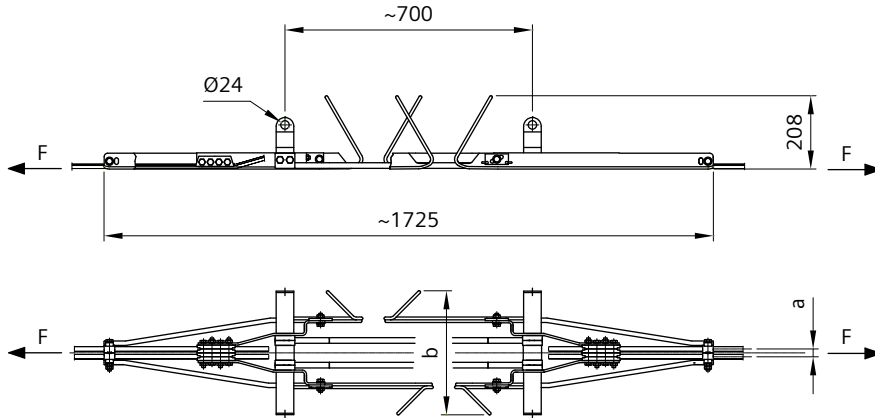


Order no.	8WL5545-7A
Designation	Lightweight section insulator
Material	
Clamping fittings	stlSt, Al, CuNiSi
Straps	stlSt
Runners	Cu
Arcing horns	Cu
Insulating rods	GRP
Bolts, nuts	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 BC-100 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 Ri161, Cu-ETP (British Standard 23) CTHA-85 to 150, CuAg0.1 (China) CTMH-110 to 150, CuMg0.5 (China)
Weight	13.0 kg
Perm. operating load	30 kN
Min. failing load	90 kN
Max. running speed	200 km/h
Nominal voltage	3 kV DC
Creepage distance	450 mm
Clearance in air	60 mm

Suspension 8WL5545-5B must be ordered separately, see page 661.

Lightweight section insulator up to 3 kV DC

for twin contact wires acc. to EN 50149, British Standard 23 and contact wires made in China

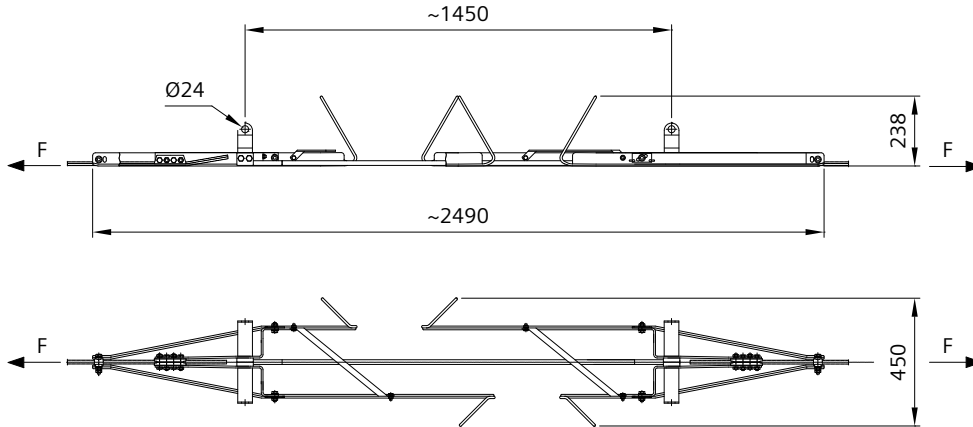


Order no.	8WL5545-8A	8WL5545-8AC
Designation	Lightweight section insulator	Lightweight section insulator
Material		
Clamping fittings	stlSt, Al, CuNiSi	stlSt, Al, CuNiSi
Straps	stlSt	stlSt
Runners	Cu	Cu
Arcing horns	Cu	Cu
Insulating rods	GRP	GRP
Bolts, nuts	stlSt	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 BC-100 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 Ri161, Cu-ETP (British Standard 23) CTHA-85 to 150, CuAg0.1 (China) CTMH-110 to 150, CuMg0.5 (China)	AC-80 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 BC-100 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 Ri161, Cu-ETP (British Standard 23) CTHA-85 to 150, CuAg0.1 (China) CTMH-110 to 150, CuMg0.5 (China)
Weight	13.8 kg	15.1 kg
Perm. operating load	30 kN	30 kN
Min. failing load	90 kN	90 kN
Max. running speed	200 km/h	200 km/h
Nominal voltage	3 kV DC	3 kV DC
Creepage distance	450 mm	450 mm
Clearance in air	60 mm	60 mm
a	28 mm	40 mm
b	366 mm	375 mm

Suspension 8WL5545-5B must be ordered separately, see page 661.

Lightweight section insulator up to 25 kV AC

for single contact wire acc. to EN 50149, British Standard 23 and contact wires made in China

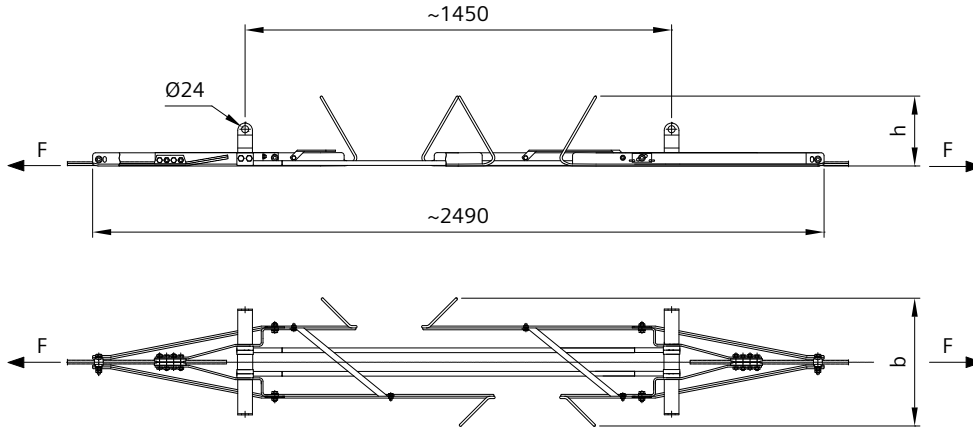


Order no.	8WL5545-3A
Designation	Lightweight section insulator
Material	
Clamping fittings	stlSt, Al, CuNiSi
Straps	stlSt
Runners	Cu
Arcing horns	Cu
Insulating rod	GRP
Bolts, nuts	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 BC-100 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 Ri161, Cu-ETP (British Standard 23) CTHA-85 to 150, CuAg0.1 (China) CTMH-110 to 150, CuMg0.5 (China)
Weight	14.1 kg
Perm. operating load	15 kN
Min. failing load	45 kN
Max. running speed	200 km/h
Nominal voltage	25 kV AC
Creepage distance	1200 mm
Clearance in air	220 mm

Suspension 8WL5545-6B must be ordered separately, see page 662.

Lightweight section insulator up to 25 kV AC

for single contact wire acc. to EN 50149, British Standard 23 and contact wires made in China

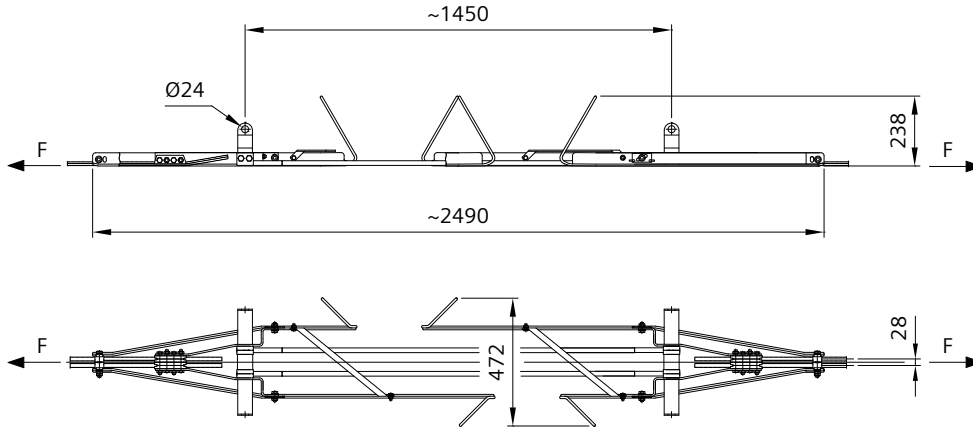


Order no.	8WL5545-4A	8WL5545-4AC
Designation	Lightweight section insulator	Lightweight section insulator
Material		
Clamping fittings	stlSt, Al, CuNiSi	stlSt, Al, CuNiSi
Straps	stlSt	stlSt
Runners	Cu	Cu
Arcing horns	Cu	Cu
Insulating rods	GRP	GRP
Bolts, nuts	stlSt	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 BC-100 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 Ri161, Cu-ETP (British Standard 23) CTHA-85 to 150, CuAg0.1 (China) CTMH-110 to 150, CuMg0.5 (China)	AC-80 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 BC-100 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 Ri161, Cu-ETP (British Standard 23) CTHA-85 to 150, CuAg0.1 (China) CTMH-110 to 150, CuMg0.5 (China)
Weight	15.9 kg	16.5 kg
Perm. operating load	30 kN	30 kN
Min. failing load	90 kN	90 kN
Max. running speed	200 km/h	200 km/h
Nominal voltage	25 kV AC	25 kV AC
Creepage distance	1200 mm	1200 mm
Clearance in air	220 mm	300 mm
b	450 mm	539 mm
h	238 mm	242 mm

Suspension 8WL5545-6B must be ordered separately, see page 662.

Lightweight section insulator up to 25 kV AC

for twin contact wires acc. to EN 50149, British Standard 23 and contact wires made in China

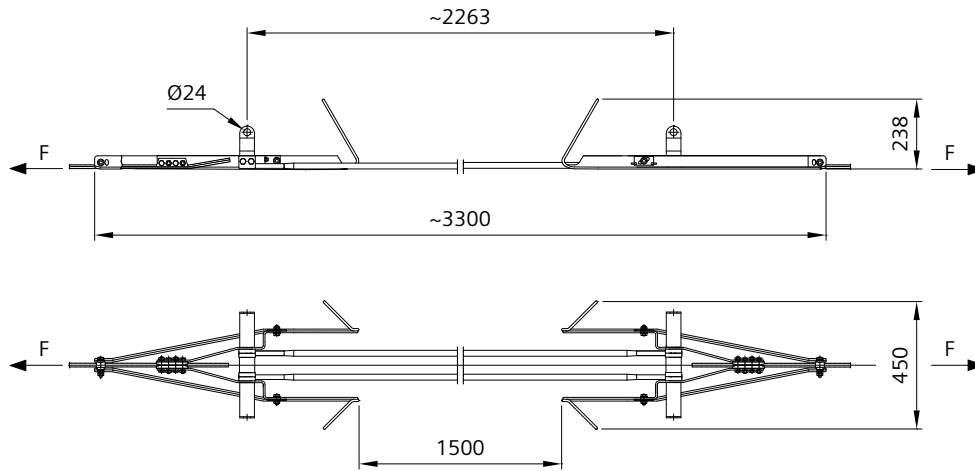


Order no.	8WL5545-2A
Designation	Lightweight section insulator
Material	
Clamping fittings	stlSt, Al, CuNiSi
Straps	stlSt
Runners	Cu
Arcing horns	Cu
Insulating rods	GRP
Bolts, nuts	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 BC-100 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 Ri161, Cu-ETP (British Standard 23) CTHA-85 to 150, CuAg0.1 (China) CTMH-110 to 150, CuMg0.5 (China)
Weight	15.9 kg
Perm. operating load	30 kN
Min. failing load	90 kN
Max. running speed	200 km/h
Nominal voltage	25 kV AC
Creepage distance	1200 mm
Clearance in air	220 mm

Suspension 8WL5545-6B must be ordered separately, see page 662.

Neutral section 25 kV AC

for single contact wire acc. to EN 50149, British Standard 23 and contact wires made in China



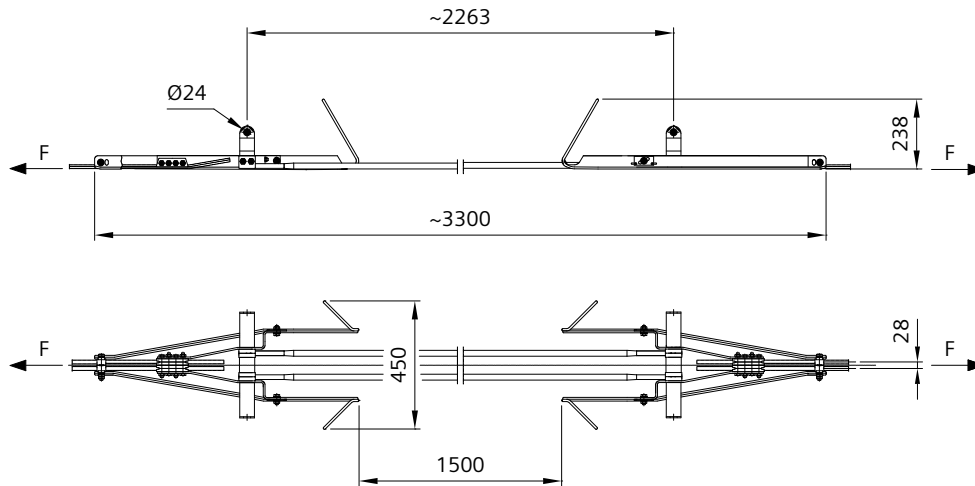
Order no.	8WL5545-4D
Designation	Neutral section
Material	
Clamping fittings	stlSt, Al, CuNiSi
Straps	stlSt
Runners	Cu
Arcing horns	Cu
Insulating rods	GRP
Bolts, nuts	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 BC-100 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 Ri161, Cu-ETP (British Standard 23) CTHA-85 to 150, CuAg0.1 (China) CTMH-110 to 150, CuMg0.5 (China)
Weight	14.8 kg
Perm. operating load	30 kN
Min. failing load	90 kN
Max. running speed	160 km/h
Nominal voltage	25 kV AC
Creepage distance	2010 mm
Clearance in air	1500 mm

Suspension 8WL5545-6C must be ordered separately, see page 663.

Two neutral sections and two suspensions have to be ordered for one phase separation section.
The connection between this one sections and the earthing have to be defined project-specifically.

Neutral section 25 kV AC

for twin contact wires acc. to EN 50149, British Standard 23 and contact wires made in China



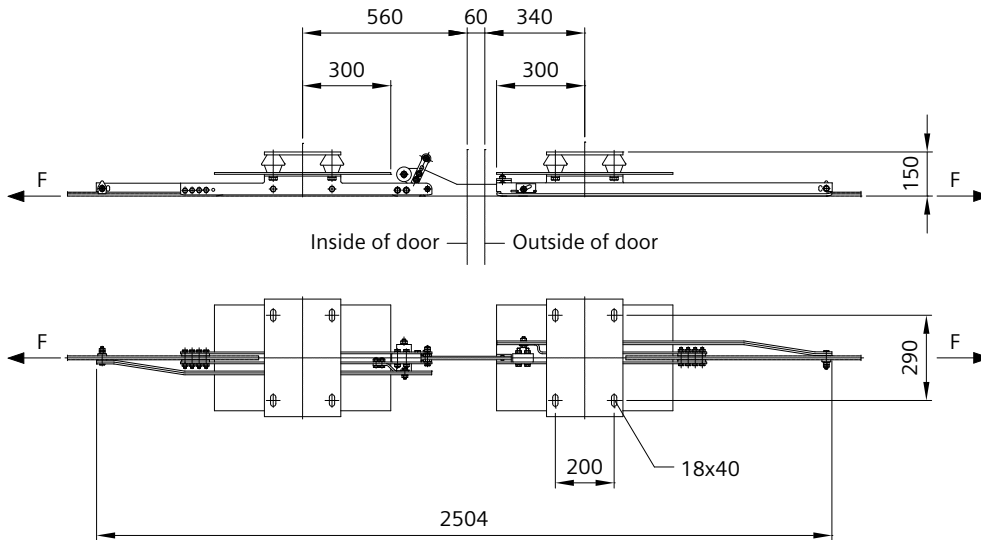
Order no.	8WL5545-4F
Designation	Neutral section
Material	
Clamping fittings	stlSt, Al, CuNiSi
Straps	stlSt
Runners	Cu
Arcing horns	Cu
Insulating rods	GRP
Bolts, nuts	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 BC-100 to 150, Cu-ETP / CuAg0.1 / CuMg0.5 Ri161, Cu-ETP (British Standard 23) CTHA-85 to 150, CuAg0.1 (China) CTMH-110 to 150, CuMg0.5 (China)
Weight	17.2 kg
Perm. operating load	30 kN
Min. failing load	90 kN
Max. running speed	160 km/h
Nominal voltage	25 kV AC
Creepage distance	2010 mm
Clearance in air	1500 mm

Suspension 8WL5545-6C must be ordered separately, see page 663.

Two neutral sections and two suspensions have to be ordered for one phase separation section.
The connection between this one sections and the earthing have to be defined project-specifically.

Rolling door insulator up to 1.5 kV DC

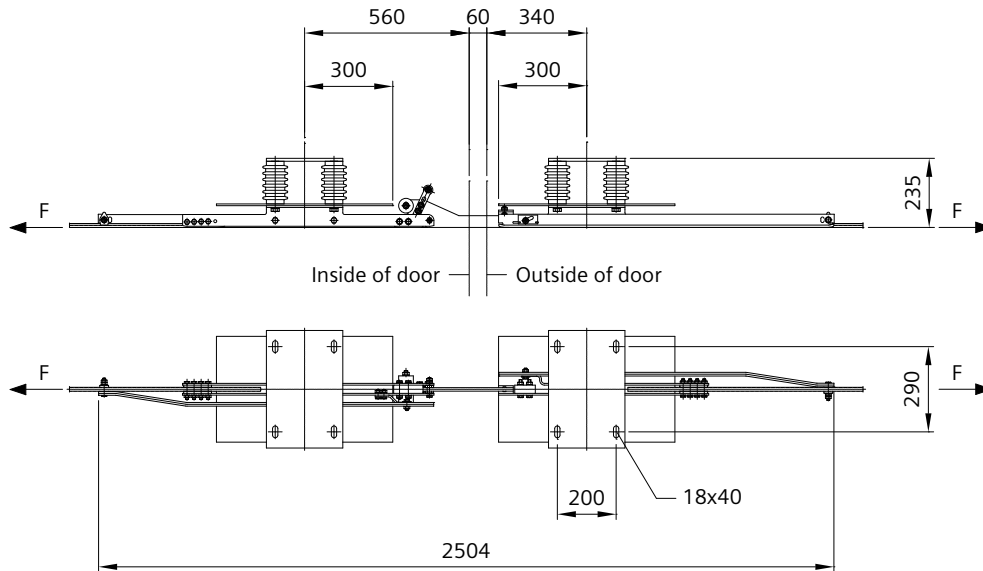
for automatic separation of contact line under rolling doors, for contact wires acc. to EN 50149 and contact wires made in China



Order no.	8WL5575-5A
Designation	Rolling door insulator
Material	
Mounting plates	stlSt
Straps	stlSt
Runners	Cu
Cover plates	GRP
Latch, stop	GRP
Insulator bodies	Cast resin, brown
Clamps	stlSt, CuNiSi
Bolts, nuts	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1 BC-100 to 150, Cu-ETP / CuAg0.1 CTHA-85/-120 (China)
Weight	42.8 kg
Perm. operating load	10 kN
Min. failing load	32 kN
Max. running speed	10 km/h
Nominal voltage	1.5 kV DC

Rolling door insulator up to 3 kV DC

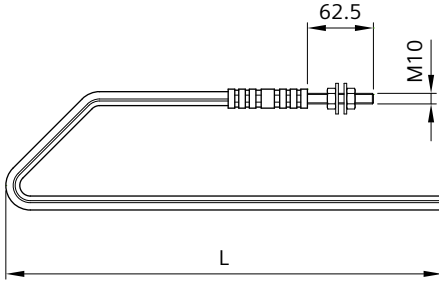
for automatic separation of contact line under rolling doors, for contact wiresacc. to EN 50149 and contact wires made in China



Order no.	8WL5575-5B
Designation	Rolling door insulator
Material	
Mounting plates	stlSt
Straps	stlSt
Runners	Cu
Cover plates	GRP
Latch, stop	GRP
Insulator bodies	Cast resin, brown
Clamps	stlSt, CuNiSi
Bolts, nuts	stlSt
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1 BC-100 to 150, Cu-ETP / CuAg0.1 CTHA-85/-120 (China)
Weight	50.5 kg
Perm. operating load	10 kN
Min. failing load	32 kN
Max. running speed	10 km/h
Nominal voltage	3 kV DC

Setting loop

with pressured thread piece M10 for section insulators 8WL5570-

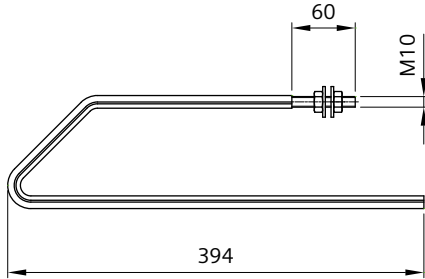


Order no.	8WL5531-0A	8WL5531-2A	8WL5533-0A	8WL5533-2A
Designation	Setting loop AC-100	Setting loop AC-100	Setting loop AC-120	Setting loop AC-120
Material				
Setting loop	CuAg0.1	CuAg0.1	CuAg0.1	CuAg0.1
Compression joint	Cu	Cu	Cu	Cu
Nuts M10	stlSt	stlSt	stlSt	stlSt
Locking washers	stlSt	stlSt	stlSt	stlSt
for clearance in air	100 mm	60 mm	100 mm	60 mm
Weight	0.76 kg	0.83 kg	0.88 kg	0.95 kg
L	393 mm	413 mm	393 mm	413 mm

Setting loops for other contact wire cross-sections or clearances in air on request.

Setting loop

for section insulators 8WL5510-0 and 8WL5546-3

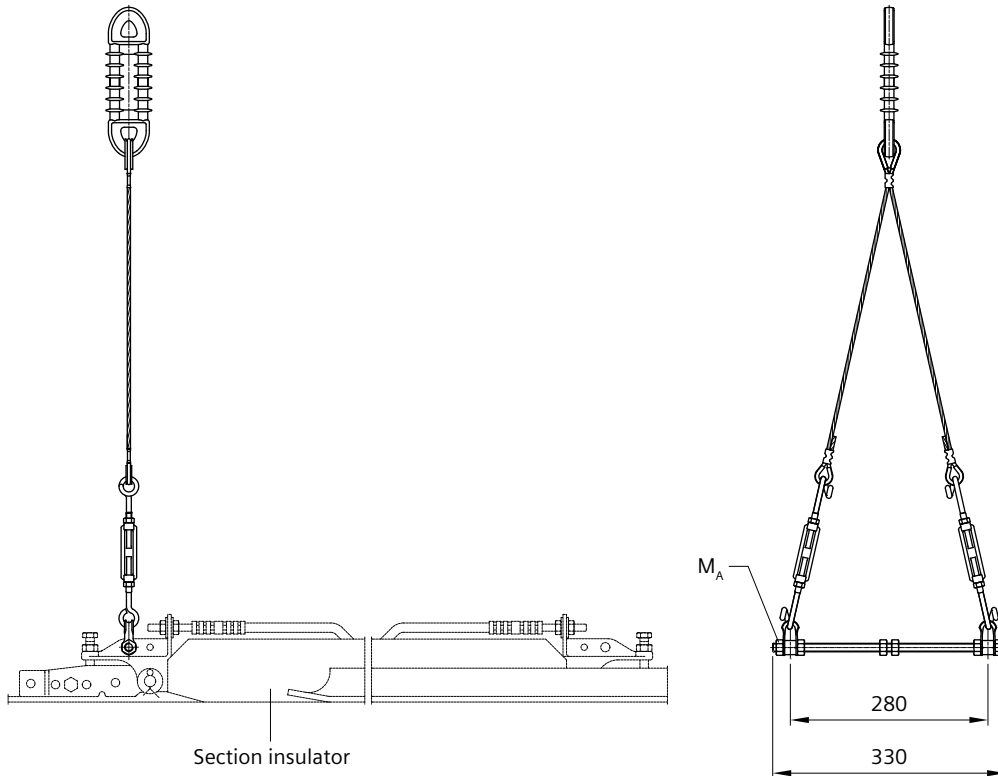


Order no.	8WL5530-0	8WL5531-0	8WL5533-0	8WL5534-0
Designation	Setting loop AC-80	Setting loop AC-100	Setting loop AC-120	Setting loop AC-150
Material				
Setting loop	Cu-ETP	CuAg0.1	CuAg0.1	Cu-ETP
Nuts M10	stlSt	stlSt	stlSt	stlSt
Locking washers	stlSt	stlSt	stlSt	stlSt
for clearance in air	100 mm	100 mm	100 mm	100 mm
Weight	0.57 kg	0.71 kg	0.84 kg	1.04 kg

Setting loops for other contact wire cross-sections or clearances in air on request.

Suspension up to 1.5 kV DC

for section insulators 8WL5510-0, 8WL5546-3, 8WL5570-1AF/-1AK and 8WL5570-0AF/-0AK



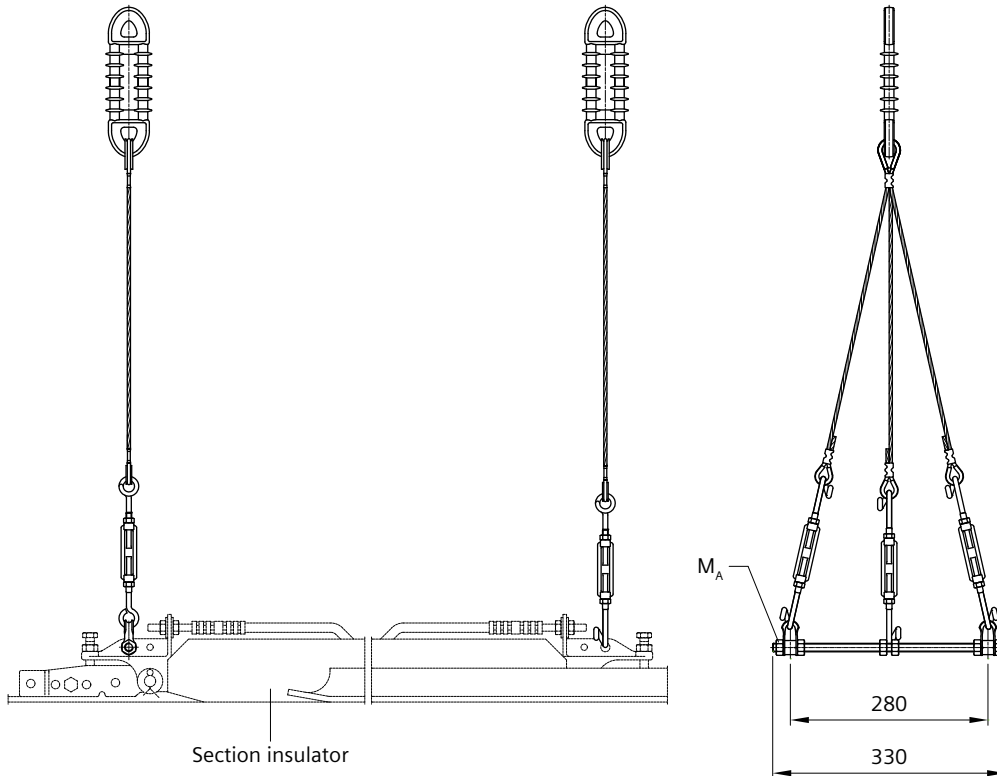
Order no.	8WL5575-0A
Designation	Suspension
Material	
Loop insulator	GRP
Thimbles	Cu-ETP
Crimped connectors	Cu-ETP
Dropper wire 10 mm ²	BzII
Turnbuckles	CuAl, stlSt
Dropper straps	CuNiSi
Threaded rod M12	stlSt
Nuts	stlSt
Spacer tubes	Sintered bronze
Weight	1.36 kg
Tightening torque M_A	56 Nm

Parts are delivered unasssembled.

Section insulator must be ordered separately.

Suspension up to 1.5 kV DC

for section insulators 8WL5510-0, 8WL5546-3, 8WL5570-1AF/-1AK and 8WL5570-0AF/-0AK, for running speed > 30 km/h



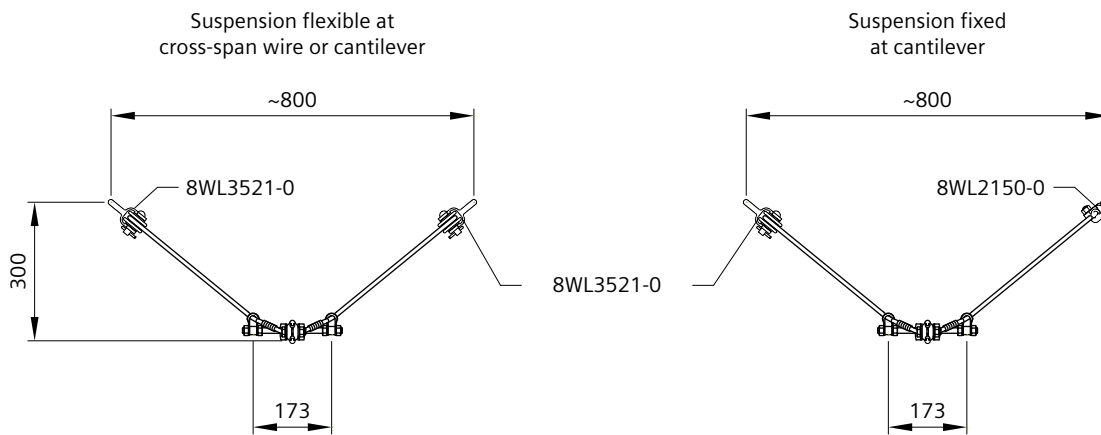
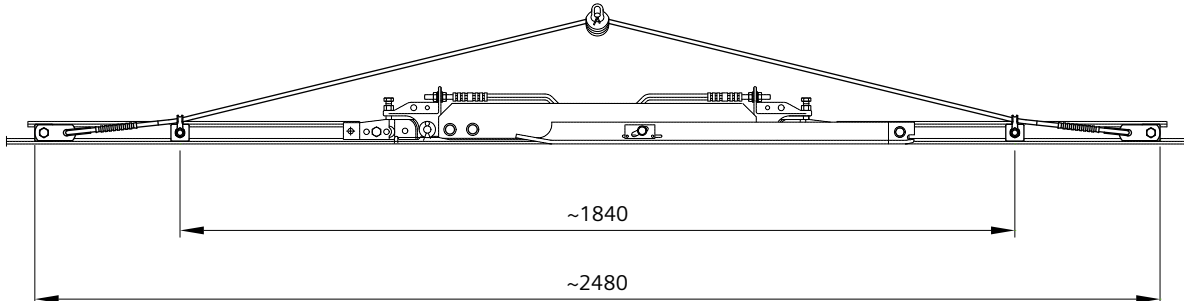
Order no.	8WL5575-1A
Designation	Suspension
Material	
Loop insulators	GRP
Thimbles	Cu-ETP
Crimped connectors	Cu-ETP
Dropper wire 10 mm ²	BzII
Turnbuckles	CuAl, stlSt
Dropper straps	CuNiSi
Threaded rod M12	stlSt
Nuts	stlSt
Spacer tubes	Sintered bronze
Weight	2.01 kg
Tightening torque M_A	56 Nm

Parts are delivered unasssembled.

Section insulator must be ordered separately.

Suspension up to 1.5 kV DC

for section insulators 8WL5510-0 and 8WL5570-1AF / -1AK in trolley-type contact line



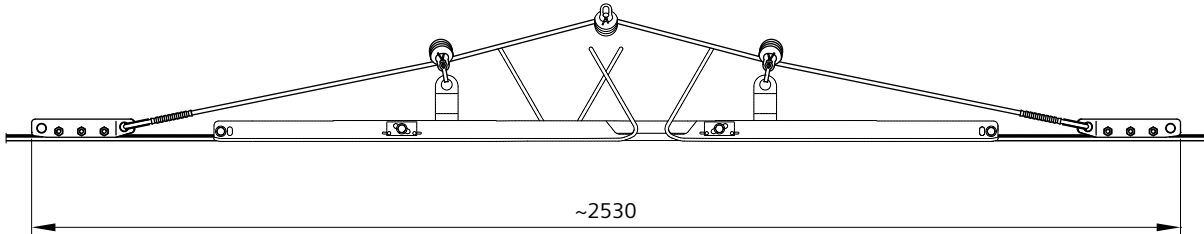
Order no.	8WL5575-8A
Designation	Suspension
Material	
Synthetic wire d=9mm	Polyester with polyamide sheath (Minoroc-wire)
Thimbles	Cu-ETP
Crimped connectors	Cu-ETP
Straps	stlSt
Dropper straps	CuNiSi
Clamping jaws	CuNiSi
Threaded pins M12	stlSt
Bolts M12	stlSt
Nuts	stlSt
Weight	4.7 kg

Synthetic wire mounted with thimbles resp. straps and pressed with crimped connectors. Other parts are delivered unassembled.

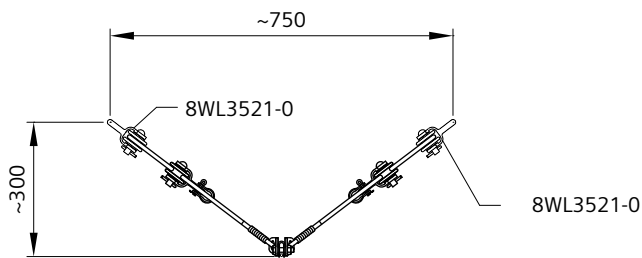
Pulleys 8WL3521-0 resp. hook clamp 8WL2150-0 and connecting parts at cross-span wire or cantilever (types as needed) must be ordered separately.

Suspension up to 1.5 kV DC

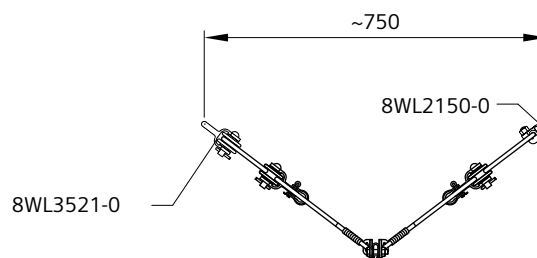
for section insulators 8WL5545-7A, -8A and -8AC in trolley-type contact line



Suspension flexible at
cross-span wire or cantilever



Suspension fixed
at cantilever



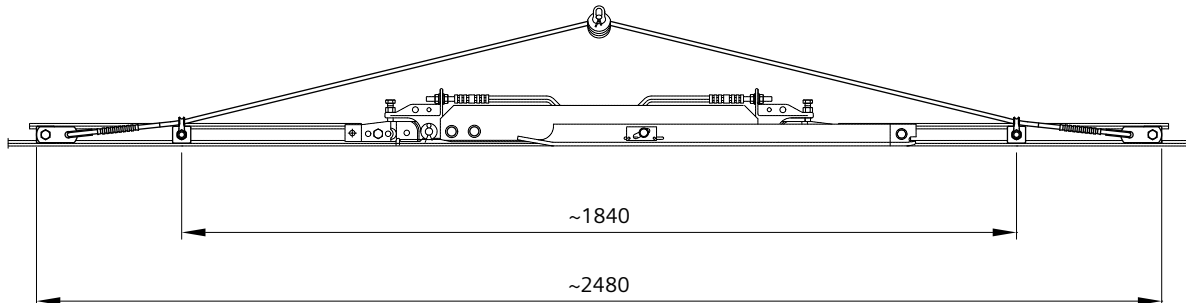
Order no.	8WL5575-8B
Designation	Suspension
Material	
Synthetic wire d=9mm	Polyester with polyamide sheath (Minoroc-wire)
Thimbles	Cu-ETP
Crimped connectors	Cu-ETP
Straps	Cu-ETP
Clamp straps	CuNiSi
Rope pulleys	Polyamide, CuAl
Shackles	stlSt
Bolts M10	stlSt
Nuts	stlSt
Weight	3.8 kg

Synthetic wire mounted with thimbles resp. straps and pressed with crimped connectors. Other parts are delivered unassembled.

Pulleys 8WL3521-0 resp. hook clamp 8WL2150-0 and connecting parts at cross-span wire or cantilever (types as needed) must be ordered separately.

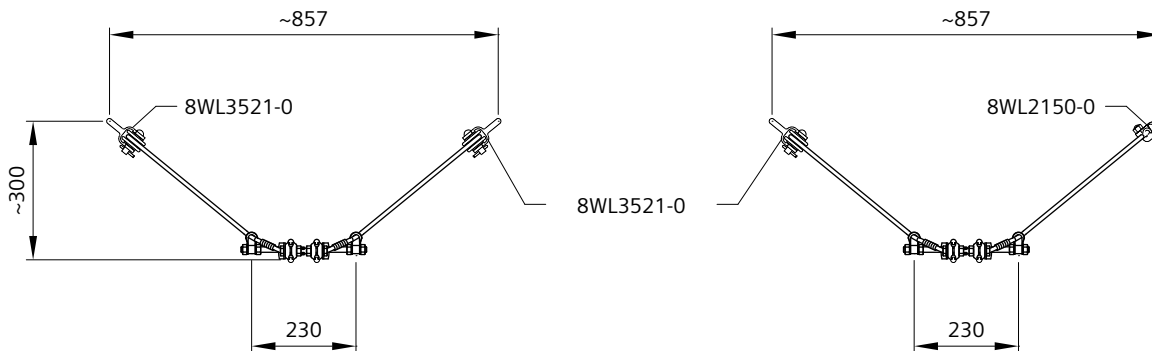
Suspension up to 1.5 kV DC

for section insulators 8WL5570-0AF / -0AK in trolley-type contact line



Suspension flexible at
cross-span wire or cantilever

Suspension fixed
at cantilever



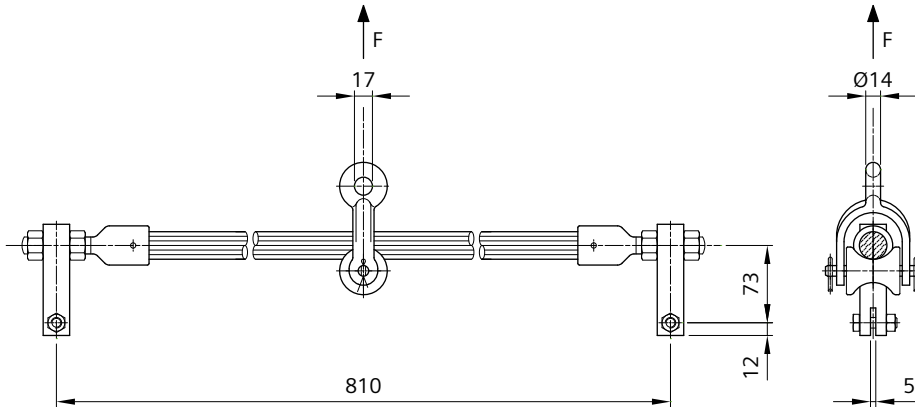
Order no.	8WL5575-8C
Designation	Suspension
Material	
Synthetic wire d=9mm	Polyester with polyamide sheath (Minoroc-wire)
Thimbles	Cu-ETP
Crimped connectors	Cu-ETP
Straps	stlSt
Dropper straps	CuNiSi
Clamping jaws	CuNiSi
Threaded pins M12	stlSt
Bolts M12	stlSt
Nuts	stlSt
Weight	5.7 kg

Synthetic wire mounted with thimbles resp. straps and pressed with crimped connectors. Other parts are delivered unassembled.

Pulleys 8WL3521-0 resp. hook clamp 8WL2150-0 and connecting parts at cross-span wire or cantilever (types as needed) must be ordered separately.

Suspension

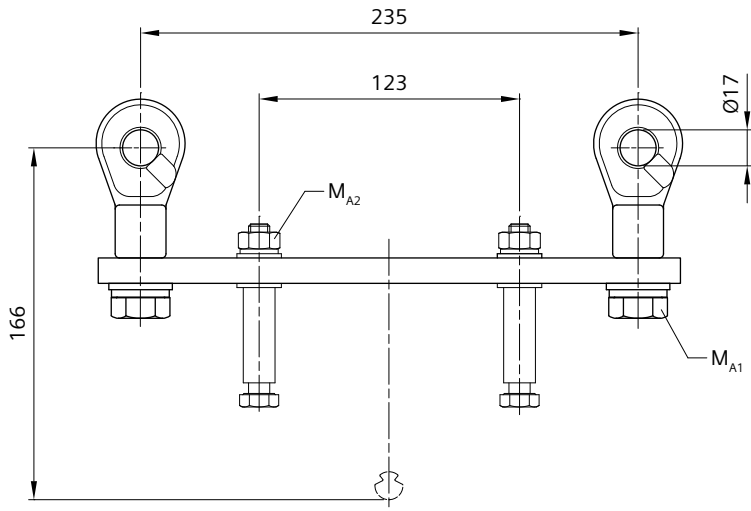
for section insulators 8WL5510-0 and 8WL5546-3



Order no.	8WL5575-1
Designation	Suspension
Material	
Square tubes 25x25	stlSt
Insulating rod 26	GRP
Sleeves	CuAl
Rod pulley	Polyamide, CuSn
Pin Ø10	Al
Split pins 4x25	Cu
Bolts, nuts	stlSt, Cu2
Weight	2.08 kg
Perm. operating load	0.6 kN
Min. failing load	1.8 kN

Suspension

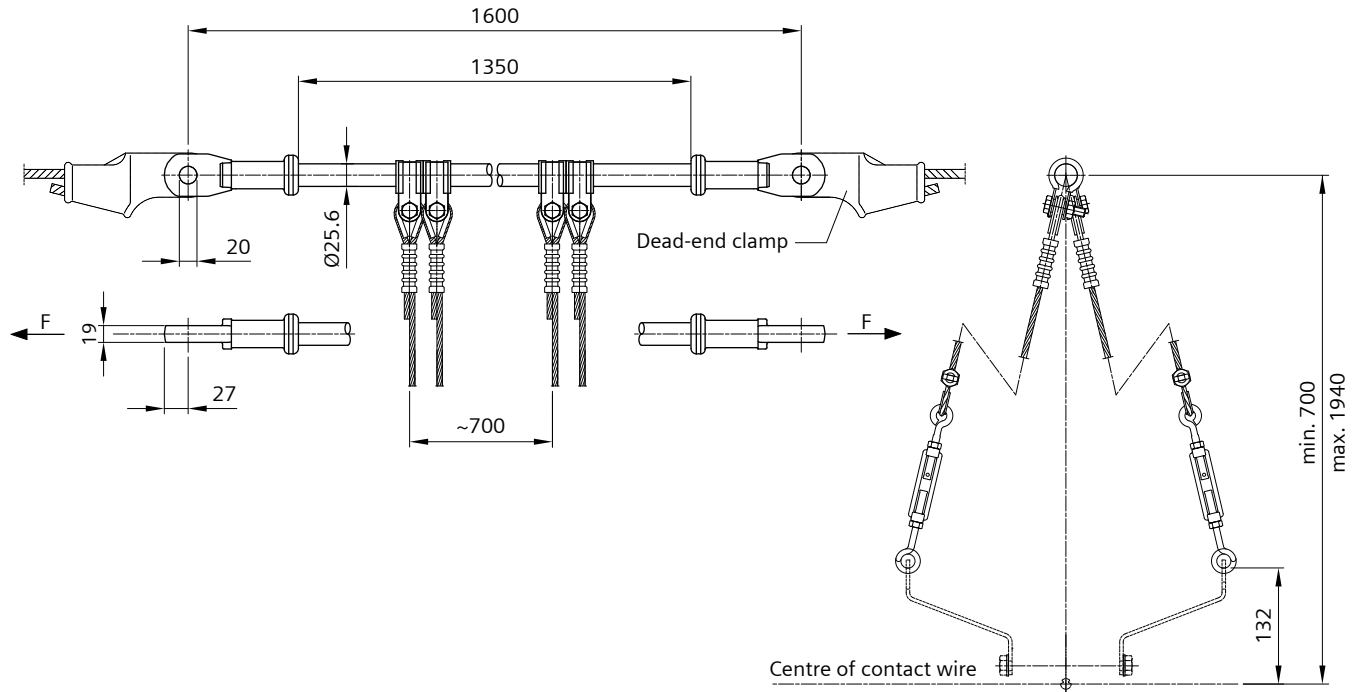
for section insulator 8WL5517-5C



Order no.	8WL5517-7A
Designation	Suspension
Material	
Clamping fittings	CuAl
Insulating beam	GRP
Spacer tubes	stlSt
Bolts M16	stlSt
Bolts M10	stlSt
Nuts, washers	stlSt
Spring washers	stlSt
Weight	0.93 kg
Tightening torque M_{A1}	135 Nm
Tightening torque M_{A2}	32 Nm

Suspension fixed with catenary wire insulation

for lightweight section insulators up to 3 kV DC 8WL5545-7A/-8A/-8AC



Order no.	8WL5545-5B
Designation	Suspension fixed
Material	
Insulating rod	GRP, silicone
End fittings	stlSt
Suspension clamps	stlSt
Dropper wire 16f	BzII
Groove clamps	Cu
Thimbles	stlSt
Crimped connectors	Cu-ETP
Turnbuckles	stlSt
Weight	5.85 kg
Perm. operating load	30 kN
Min. failing load	90 kN
Min. creepage distance	1350 mm

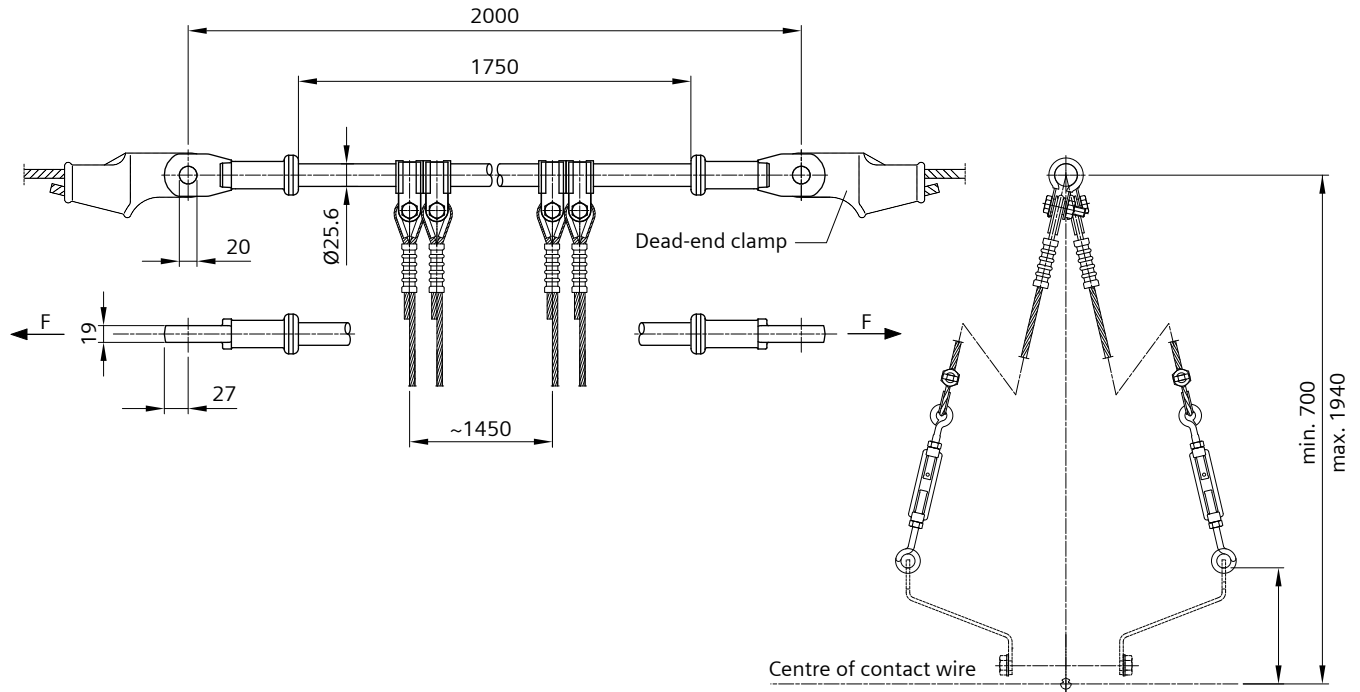
Dead-end clamps must be ordered separately depending on the catenary wire.

Suspension in trolley-type contact line on request.

Replacement for 8WL5545-5A.

Suspension fixed with catenary wire insulation

for lightweight section insulators up to 25 kV AC 8WL5545-2A/-3A/-4A/-4AC



Order no.	8WL5545-6B
Designation	Suspension fixed
Material	
Insulating rod	GRP, silicone
End fittings	stlSt
Suspension clamps	stlSt
Dropper wire 16f	BzII
Groove clamps	Cu
Thimbles	stlSt
Crimped connectors	Cu-ETP
Turnbuckles	stlSt
Weight	6.35 kg
Perm. operating load	30 kN
Min. failing load	90 kN
Min. creepage distance	1750 mm

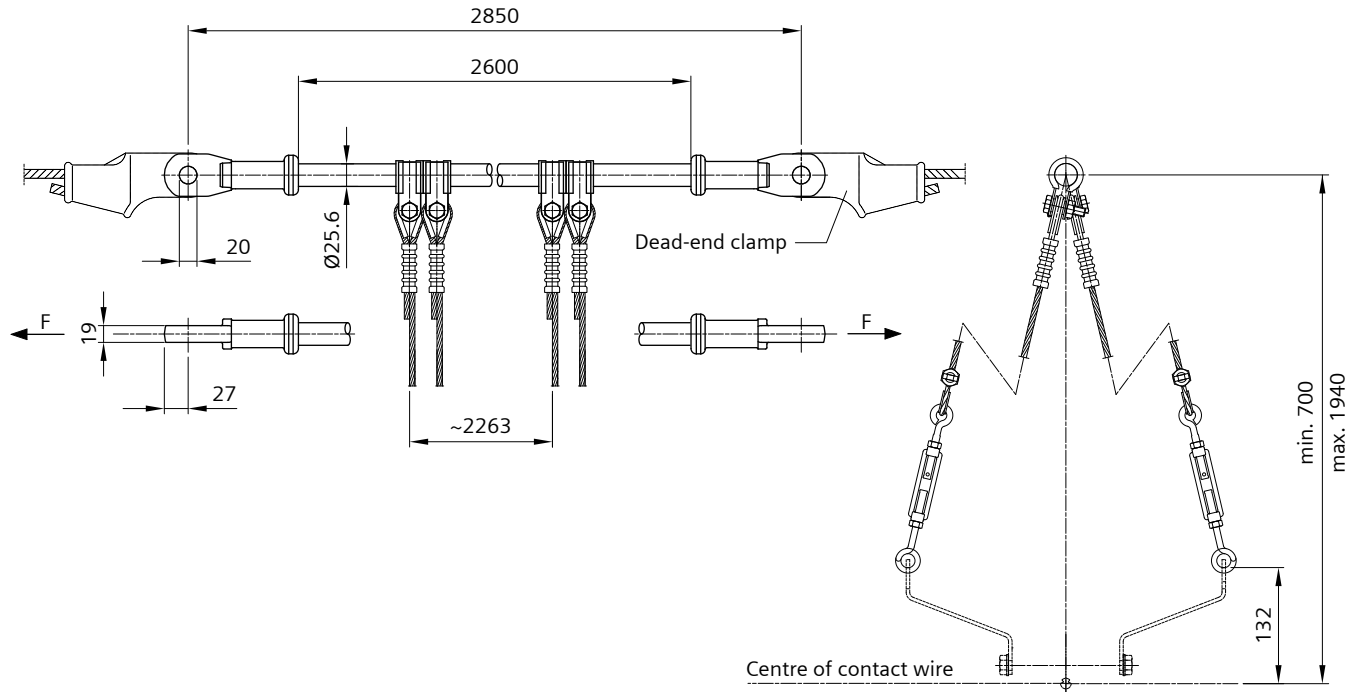
Dead-end clamps must be ordered separately depending on the catenary wire.

Suspension in trolley-type contact line on request.

Replacement for 8WL5545-6A.

Suspension with catenary wire insulation

for neutral section 8WL5545-4D and -4F

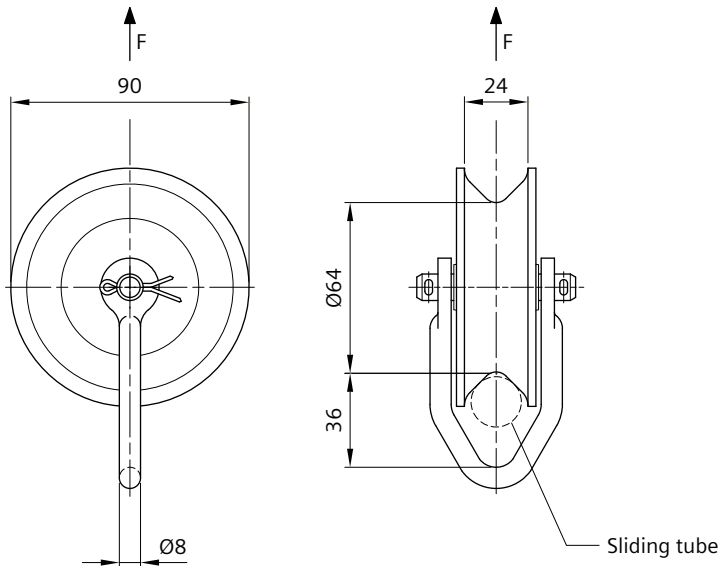


Order no.	8WL5545-6C
Designation	Suspension
Material	
Insulating rod	GRP, silicone
End fittings	stlSt
Suspension clamps	stlSt
Dropper wire 16f	BzII
Groove clamps	Cu
Thimbles	stlSt
Crimped connectors	Cu-ETP
Turnbuckles	stlSt
Weight	7.15 kg
Perm. operating load	30 kN
Min. failing load	90 kN
Min. creepage distance	2600 mm

Dead-end clamps must be ordered separately depending on the catenary wire.

Pulley 90 with hoop

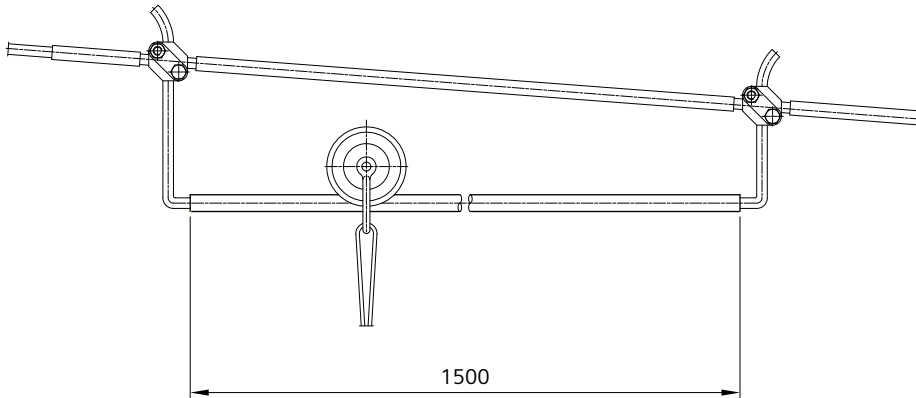
for section insulator suspension at sliding tube 8WL5563-3



Order no.	8WL5560-0
Designation	Pulley 90
Material	
Pulley	CuAl
Hoop	CuAl
Axle Ø10	stlSt
Split pins 3.2x18	Cu
Weight	0.60 kg
Perm. operating load	0.6 kN
Min. failing load	1.8 kN

Sliding tube

for section insulator suspension with pulley 8WL5560-0

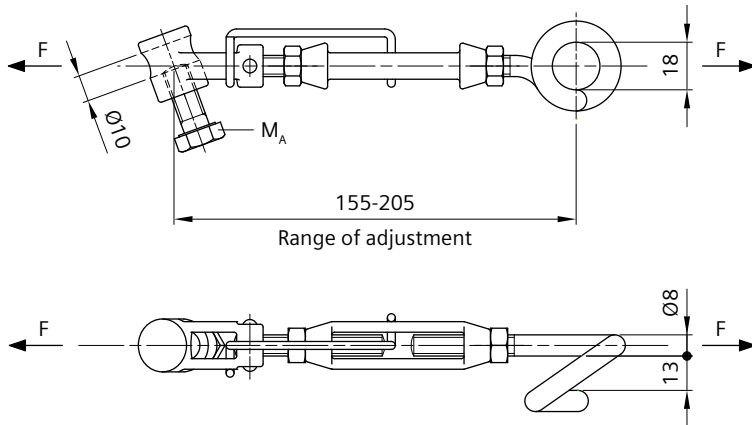


Order no.	8WL5563-3
Designation	Sliding tube 19x3
Material	Cu5
Weight	2.00 kg

Distance from fixed point above 500 m. Other lengths on request.

Turnbuckle with ring-shaped hook and wire clamp

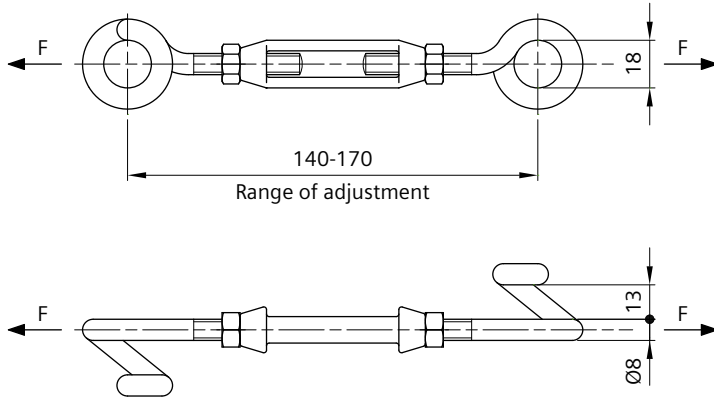
for section insulator suspension, for wires acc. to DIN 43138



Order no.	8WL5565-0
Designation	Turnbuckle
Material	
Turnbuckle	CuAl
Wire clamp	CuAl
Ring-shaped hook	stlSt
Threaded pin	stlSt
Locking hoop	stlSt
Bolt M10	stlSt
Nuts M8	stlSt
for wires	up to 9 mm
Weight	0.25 kg
Perm. operating load	1 kN
Min. failing load	3 kN
Tightening torque M_A	32 Nm

Turnbuckle with two ring-shaped hooks

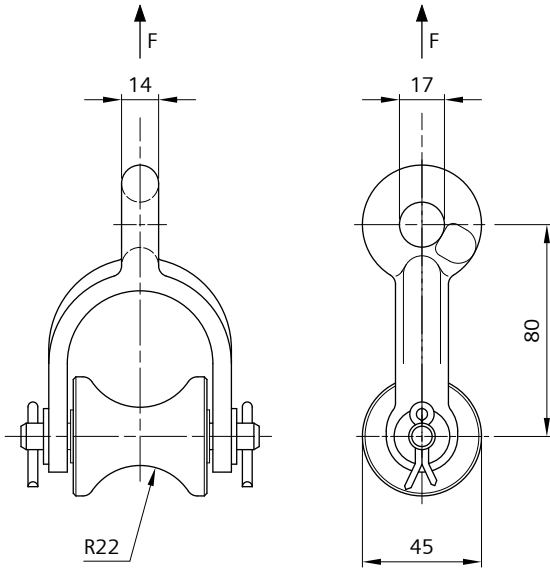
for section insulator suspension



Order no.	8WL5565-1
Designation	Turnbuckle
Material	
Turnbuckle	CuAl
Ring-shaped hooks	stlSt
Nuts M8	stlSt
Weight	0.16 kg
Perm. operating load	1 kN
Min. failing load	3 kN

Rod pulley

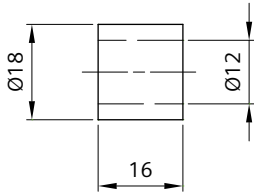
for section insulator suspension



Order no.	8WL3524-0
Designation	Rod pulley
Material	
Clevis	CuSn
Pulley	Polyamide
Pin Ø10	stlSt
Split pins 4x25	Cu
Washers	stlSt
Weight	0.48 kg
Perm. operating load	0.6 kN
Min. failing load	1.8 kN

Cylinder bearing

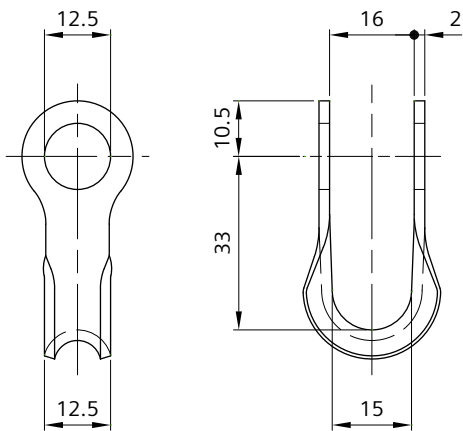
for section insulator suspension



Order no.	8WL4601-7
Designation	Cylinder bearing D18/12
Material	Sintered bronze
Weight	0.02 kg

Dropper strap

for section insulator suspension



Order no.	8WL4621-3
Designation	Dropper strap
Material	CuNiSi
Weight	0.03 kg

Chapter 02

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Technical comments

Application

Disconnectors are used to implement infeeds, to subdivide track sections, and to connect parallel contact lines. They are operated under no-load conditions but can also interrupt currents to a limited extent. The installation conditions, electric loads and safety distances must be taken into consideration.

Disconnectors with earth contacts also earth their switching section when they are opened.

Disconnectors in a bipolar arrangement are suited for use in autotransformer systems.

Disconnectors are operated via a linkage and remote-controlled using an electromechanical operated mechanism or by means of a manual operated mechanism.

Types

Disconnectors

- Disconnectors up to 3 kV DC and 4 kA
- Tandem disconnectors and tandem switch disconnectors up to 3 kV DC and 3 kA
- Disconnectors up to 25 kV AC and 2.5 kA
- Disconnectors for a bipolar arrangement in autotransformer systems with a drive shaft
- Earthing switch up to 25 kV AC

Drive mechanisms

- Electromechanical operated mechanism with linear stroke in GRP or stainless steel casing
- Motor operated mechanism with radial stroke
- Manual operated mechanism with or without key interlock

Operating linkage

For disconnectors and switch disconnectors up to 3 kV DC, the portfolio provides complete linkages with fixed tube lengths in GRP and steel versions.

For all other applications for disconnectors up to 3 kV DC and 25 kV AC, the various components for linkages made of GRP or with aluminium or steel tube are available.

Special features

Disconnectors

- Low maintenance thanks to grease-free contact set of contacts featuring a silver graphite coating with self-lubricating properties
- High current carrying capacity and environmental resistance due to silver plating
- Long service life thanks to corrosion-resistant materials and soil and water-repellent surfaces of the insulators
- Quick and easy installation and resistant to vandalism thanks to rugged and break-resistant insulators

Electromechanical operated mechanisms

- Reliable, low-maintenance, and robust operated mechanism
- High reliability due to safe mechanical interlocking in the limit positions
- Maximum actuating force development in the limit positions thanks to optimal load-displacement characteristic of the reversing Maltese gearbox
- Unobtrusive due to slim design of the casing
- Installation of GRP drive mechanisms in HE poles
- Long service life due to corrosion-resistant materials
- Isolated feedback of switch position depending on the type
- Integrated evaluator for Sicat DMS Disconnector Monitoring System for drive mechanisms with permanent power supply

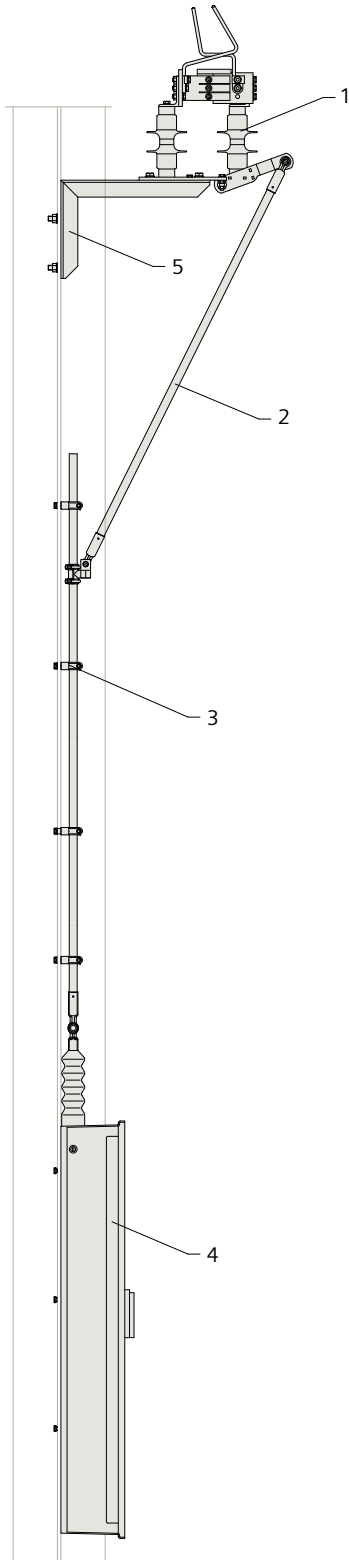
Further information can be found in the relevant product descriptions.

Examples for assemblies

In the following, you will find a series of typical application examples for the configuration of disconnectors with linkages and drive mechanisms.

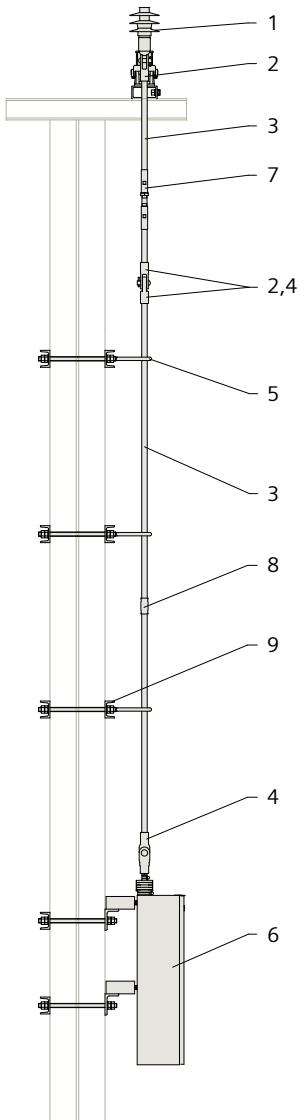
The exact configuration of the assembly depends on the specific plant and the local situation.

Disconnector up to 3 kV DC with electromechanical operated mechanism and GRP operating linkage



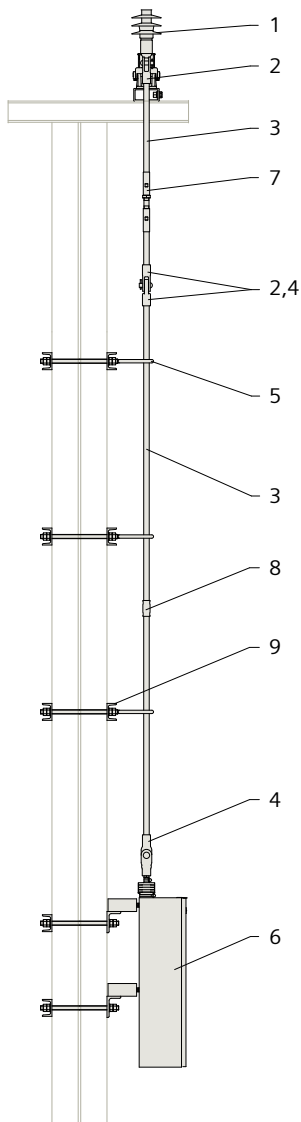
Pos.	Designation	Order no.
1	Disconnector up to 3 kV DC	8WL6134-3
2	GRP operating linkage	8WL6230-6B
3	Guide for operating linkage (number as needed)	8WL6247-8
4	Electromechanical operated mechanism in GRP casing (type as needed)	8WL6244-
5	Fastening parts at pole have to be defined project-specifically.	

Disconnector 25 kV AC with electromechanical operated mechanism and aluminium operating linkage



Pos.	Designation	Order no.
1	Disconnector 25 kV AC (type as needed)	8WL6144-0
2	Clevis end fitting 26	8WL6221-2
3	Aluminium tube 26x3.5 (length as needed)	8WL2161-0
4	Tongue end fitting 26, straight	8WL6223-1
5	Eye-bolt M16x160 / M16x240 (type and number as needed)	8WL6228-0/-1
6	Electromechanical operated mechanism in stainless steel casing (type as needed)	8WL6253-
7	Adjusting socket	8WL6229-0
8	Coupling socket (if necessary)	8WL6229-5A
9	Fastening parts at pole have to be defined project-specifically.	

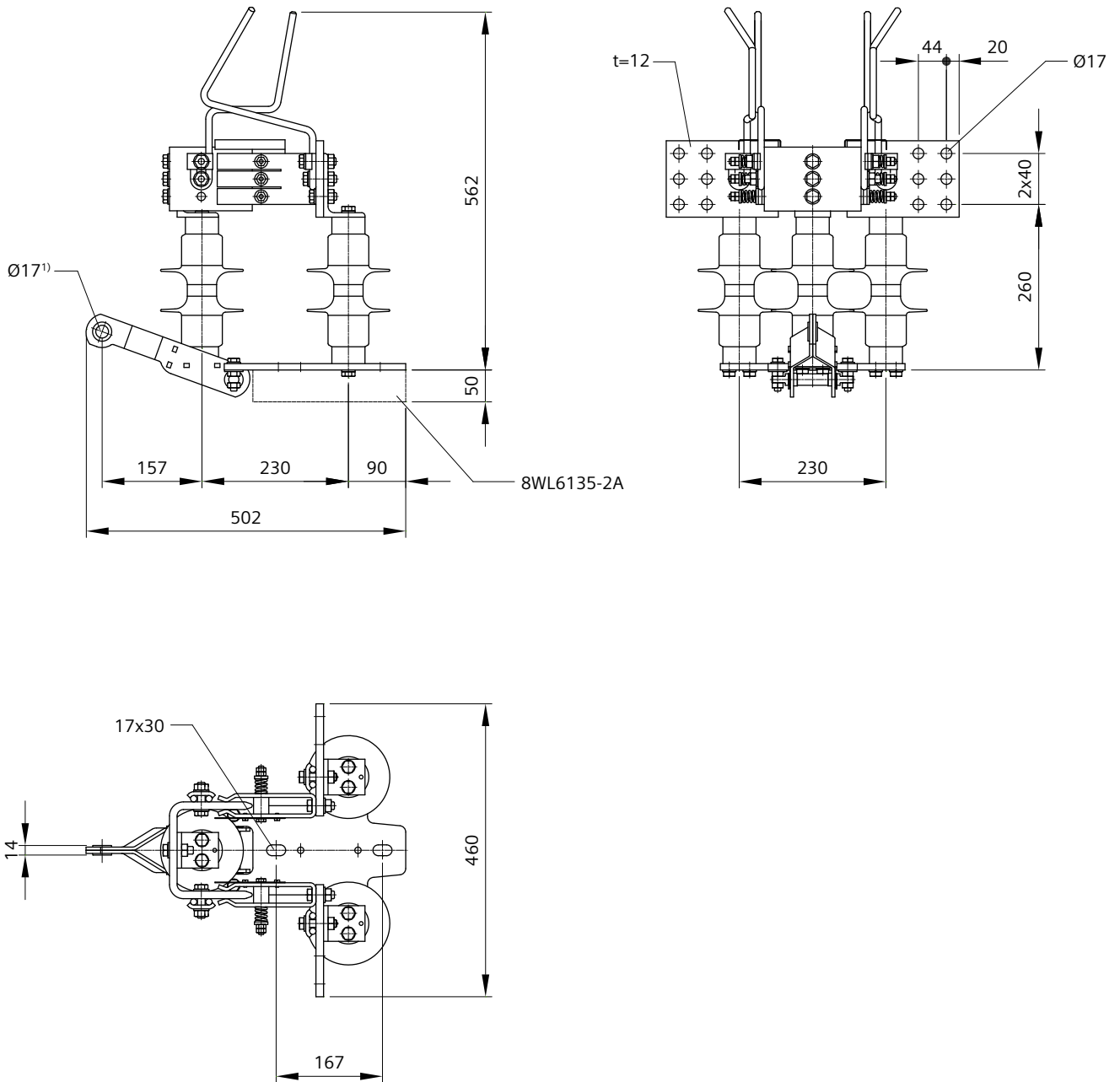
Disconnector 25 kV AC with manual operating mechanism and steel operating linkage



Pos.	Designation	Order no.
1	Disconnector 25 kV AC (type as needed)	8WL6144-
2	Clevis end fitting 26	8WL6221-2
3	Steel tube 26x3.5 (length as needed)	8WL2160-0
4	Tongue end fitting 26, straight	8WL6223-1
5	Eye-bolt M16x160 (number as needed)	8WL6228-0
6	Tongue end fitting 26, offset	8WL6225-0
7	Manual operating mechanism (type as needed)	8WL6214-
8	Coupling socket (if necessary)	8WL6229-5A
9	Fastening parts at pole have to be defined project-specific	

Switch disconnector up to 3 kV DC, operating current 2 kA

with rigid connections



Order no.	8WL6134-3
Designation	Switch disconnector
Material	
Baseplate	stlSt
Insulator bodies	GRP, silicone
Insulator caps	stlSt
Contact sets	Cu-ETP
Arcing horns	Cu-ETP
Weight	28.0 kg
Stroke	200 mm
Min. operating force	1.2 kN ²⁾
Utilization category	III ³⁾
Ambient temperature	-40 °C to +40 °C
Ice coverage category	10 mm
Nominal voltage	3 kV DC
Rated insulation voltage	4.8 kV DC
Operating current (I_{Nar}, I_{th})	2 kA
Creepage distance	300 mm
Clearance in air to earth/ above the isolating gap	180/90 mm
Rated impulse withstand voltage	40 kV
Power-frequency withstand voltage, wet	18.5 kV
Rated short-time current	40 kA
Short-time current dura- tion	250 ms

¹⁾ without bush Ø20

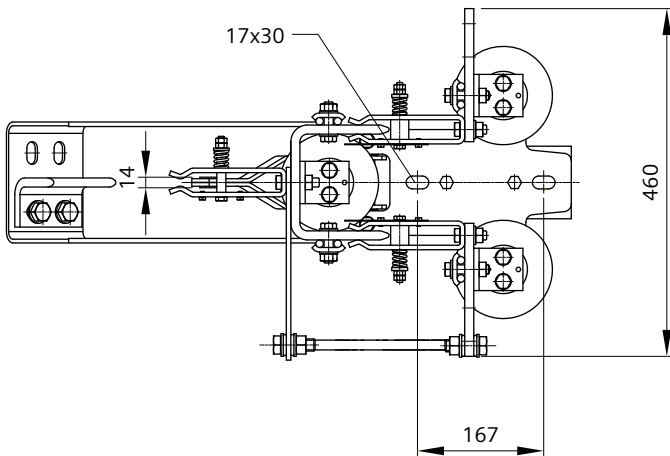
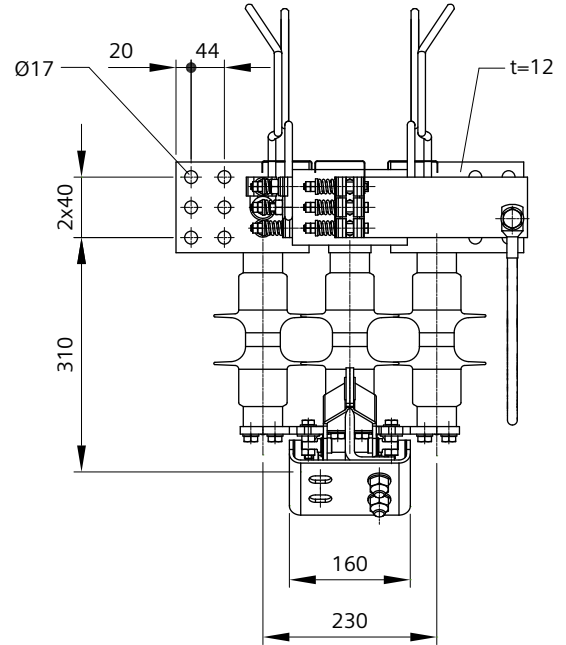
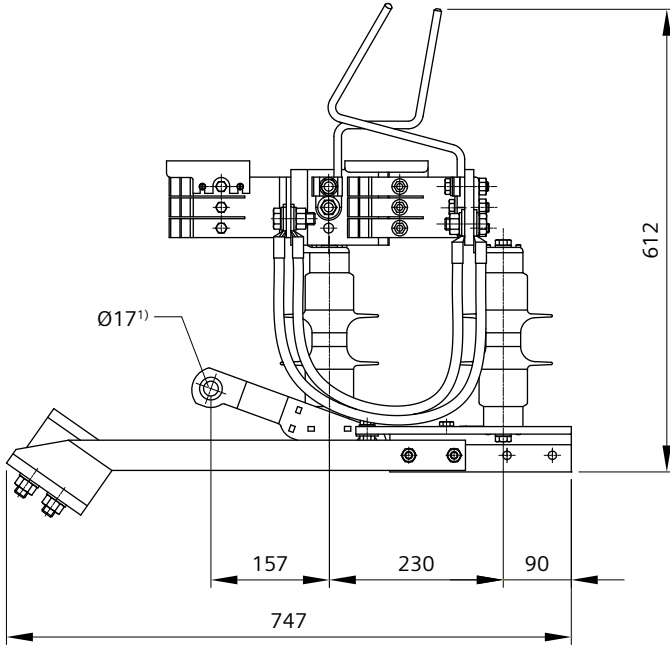
²⁾ At ice coating this value can be exceeded.

³⁾ Load switch function in connection with operating linkage with rapid opener 8WL6231-8A only.

If necessary, the disconnector bracket 8WL6135-2A must be ordered separately, see page 719.

Disconnector up to 3 kV DC, operating current 2 kA

with earth contact and rigid connections



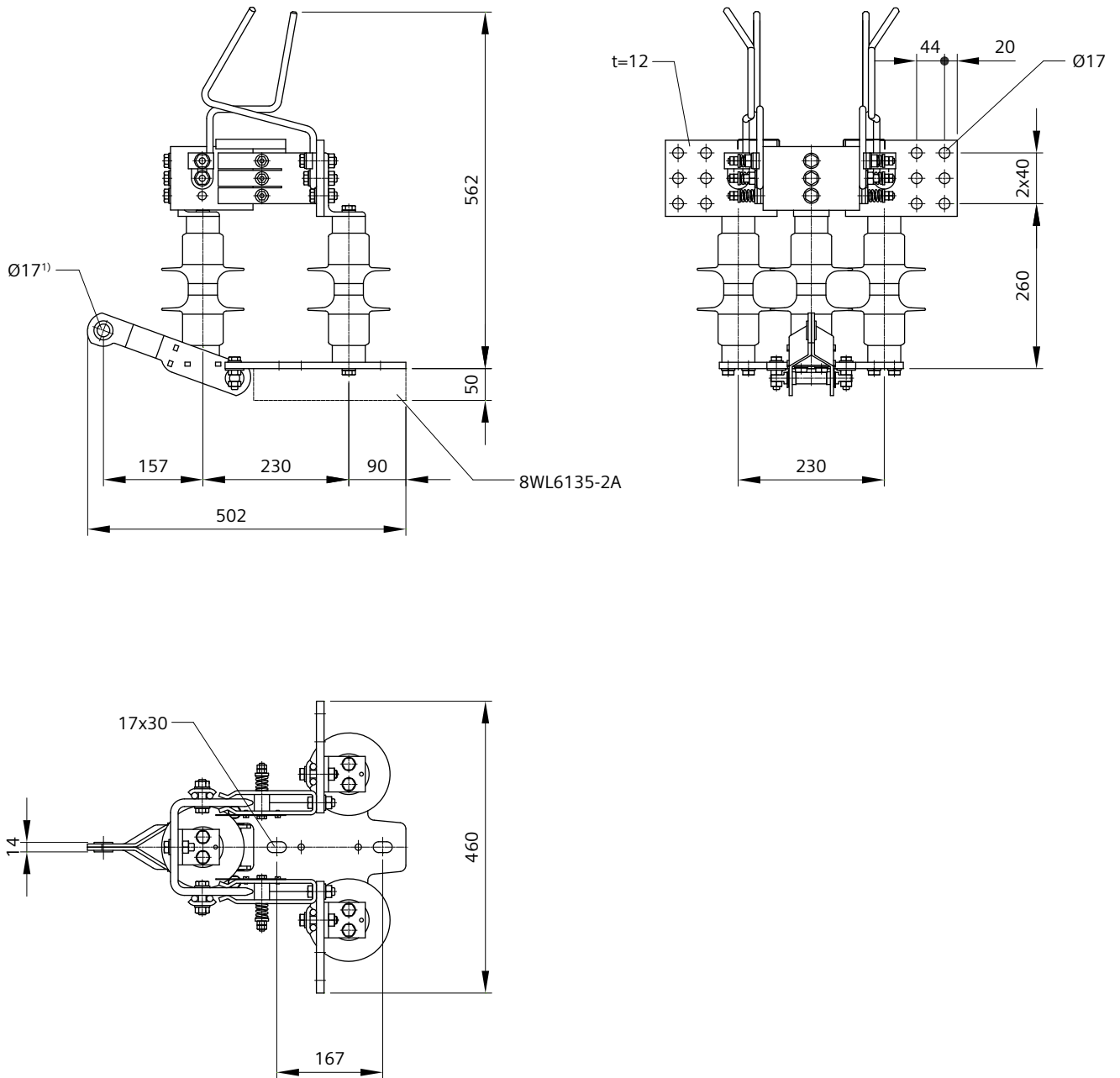
Order no.	8WL6134-3A
Designation	Disconnector
Material	
Baseplate	stlSt
Insulator bodies	GRP, silicone
Insulator caps	stlSt
Contact sets	Cu-ETP
Arcing horns	Cu-ETP
Weight	38 kg
Stroke	200 mm
Min. operating force	1.2 kN ²⁾
Utilization category	I
Ambient temperature	-40 °C to +40 °C
Ice coverage category	10 mm
Nominal voltage	3 kV DC
Rated insulation voltage	4.8 kV DC
Operating current (I_{Nar}, I_{th})	2 kA
Creepage distance	300 mm
Clearance in air to earth/ above the isolating gap	180/90 mm
Rated impulse withstand voltage	40 kV
Power-frequency withstand voltage, wet	18.5 kV
Rated short-time current	40 kA
Short-time current dura- tion	250 ms

¹⁾ without bush Ø20

²⁾ At ice coating this value can be exceeded.

Switch disconnector up to 3 kV DC, operating current 3 kA

with rigid connections, for higher current-load capacity and environmental resistance



Order no.	8WL6134-4
Designation	Switch disconnector
Material	
Baseplate	stlSt
Insulator bodies	GRP, silicone
Insulator caps	stlSt
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	28 kg
Stroke	200 mm
Min. operating force	1.2 kN ²⁾
Utilization category	III ³⁾
Ambient temperature	-40 °C to +40 °C
Ice coverage category	10 mm
Nominal voltage	3 kV DC
Rated insulation voltage	4.8 kV DC
Operating current (I_{Nar}, I_{th})	3 kA
Creepage distance	300 mm
Clearance in air to earth/ above the isolating gap	180/90 mm
Rated impulse withstand voltage	40 kV
Power-frequency withstand voltage, wet	18.5 kV
Rated short-time current	40 kA
Short-time current dura- tion	250 ms

¹⁾ without bush Ø20

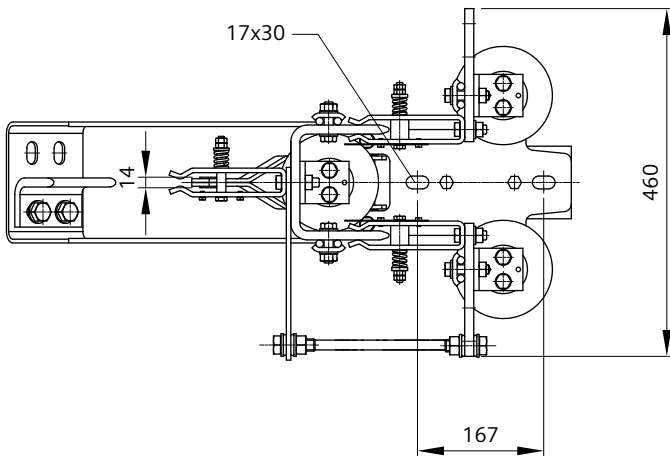
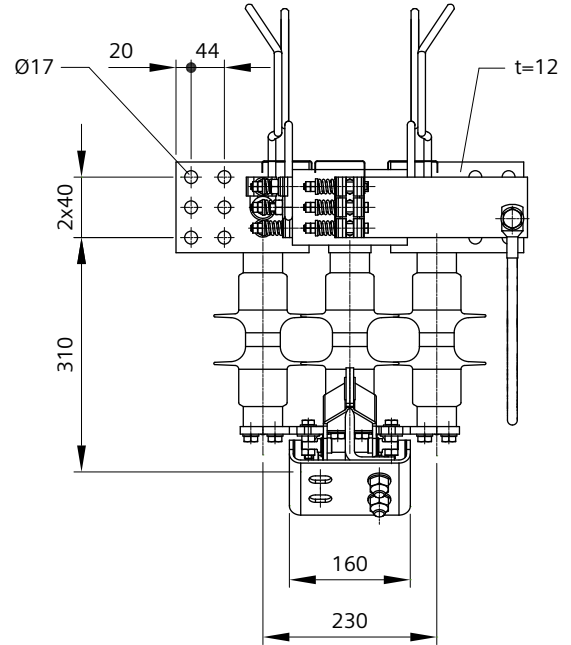
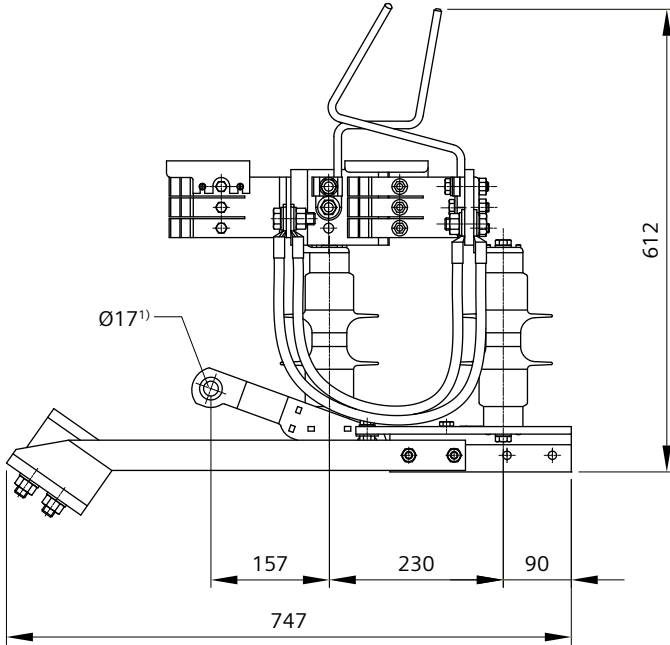
²⁾ At ice coating this value can be exceeded.

³⁾ Load switch function in connection with operating linkage with rapid opener 8WL6231-8A only.

If necessary, the disconnector bracket 8WL6135-2A must be ordered separately, see page 719.

Disconnector up to 3 kV DC, operating current 3 kA

with earth contact and rigid connections, for higher current-load capacity and environmental resistance



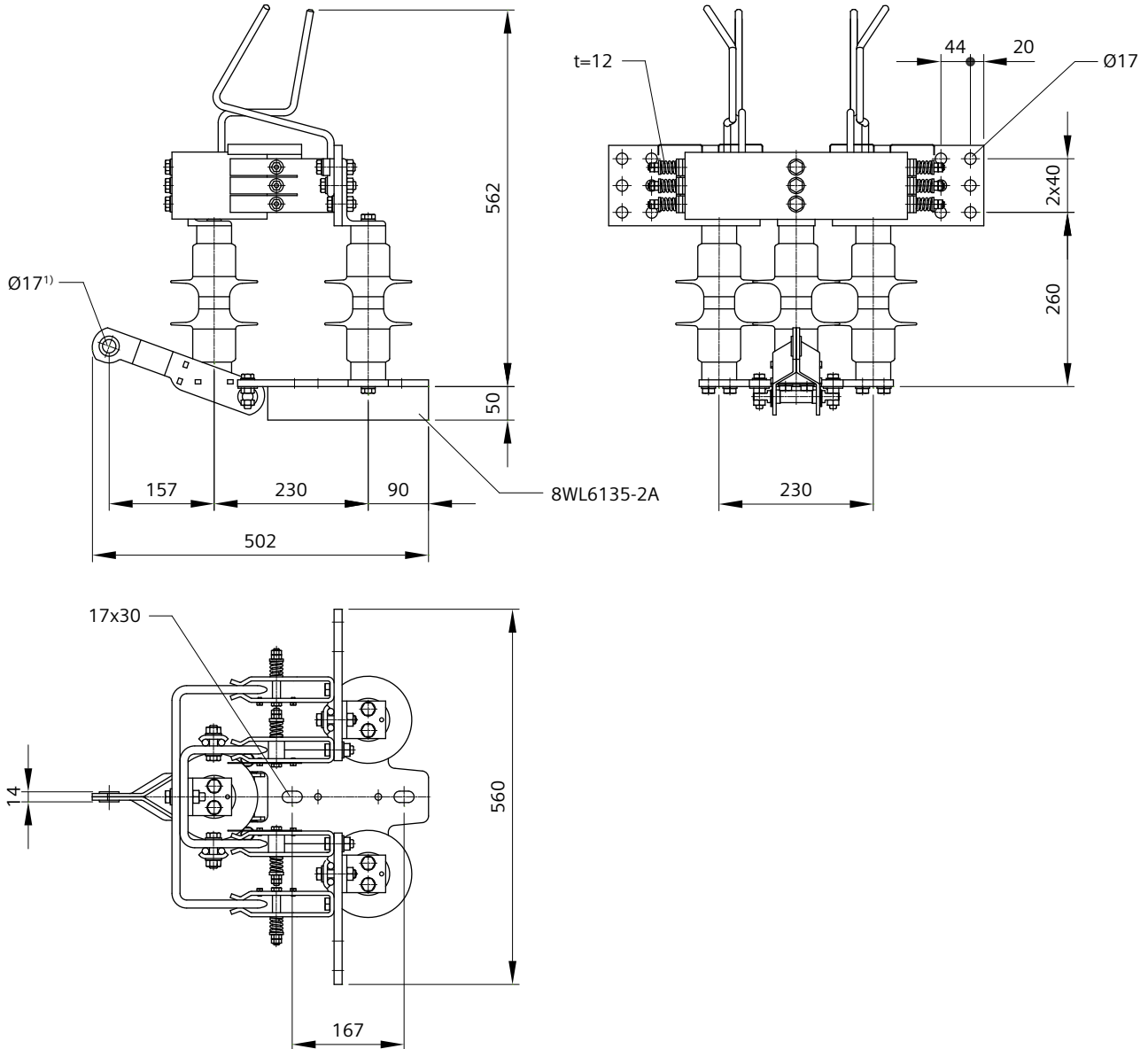
Order no.	8WL6134-4A
Designation	Disconnector
Material	
Baseplate	stlSt
Insulator bodies	GRP, silicone
Insulator caps	stlSt
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	38.0 kg
Stroke	200 mm
Min. operating force	1.2 kN ²⁾
Utilization category	I
Ambient temperature	-40 °C to +40 °C
Ice coverage category	10 mm
Nominal voltage	3 kV DC
Rated insulation voltage	4.8 kV DC
Operating current (I_{Nar}, I_{th})	3 kA
Creepage distance	300 mm
Clearance in air to earth/ above the isolating gap	180/90 mm
Rated impulse withstand voltage	40 kV
Power-frequency withstand voltage, wet	18.5 kV
Rated short-time current	40 kA
Short-time current dura- tion	250 ms

¹⁾ without bush Ø20

²⁾ At ice coating this value can be exceeded.

Disconnector up to 3 kV DC, operating current 4 kA

with rigid connections, for higher current-load capacity and environmental resistance



Order no.	8WL6134-5
Designation	Disconnector
Material	
Baseplate	stlSt
Insulator bodies	GRP, silicone
Insulator caps	stlSt
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	38.5 kg
Stroke	200 mm
Min. operating force	1.8 kN ²⁾
Utilization category	I
Ambient temperature	-40 °C to +40 °C
Ice coverage category	5 mm ³⁾ /10 mm ⁴⁾
Nominal voltage	3 kV DC
Rated insulation voltage	4.8 kV DC
Operating current (I_{Nar}, I_{th})	4 kA
Creepage distance	300 mm
Clearance in air to earth/ above the isolating gap	180/90 mm
Rated impulse withstand voltage	40 kV
Power-frequency withstand voltage, wet	18.5 kV
Rated short-time current/ duration	50 kA/250 ms 40 kA/1s

¹⁾ without bush Ø20

²⁾ At ice coating this value can be exceeded.

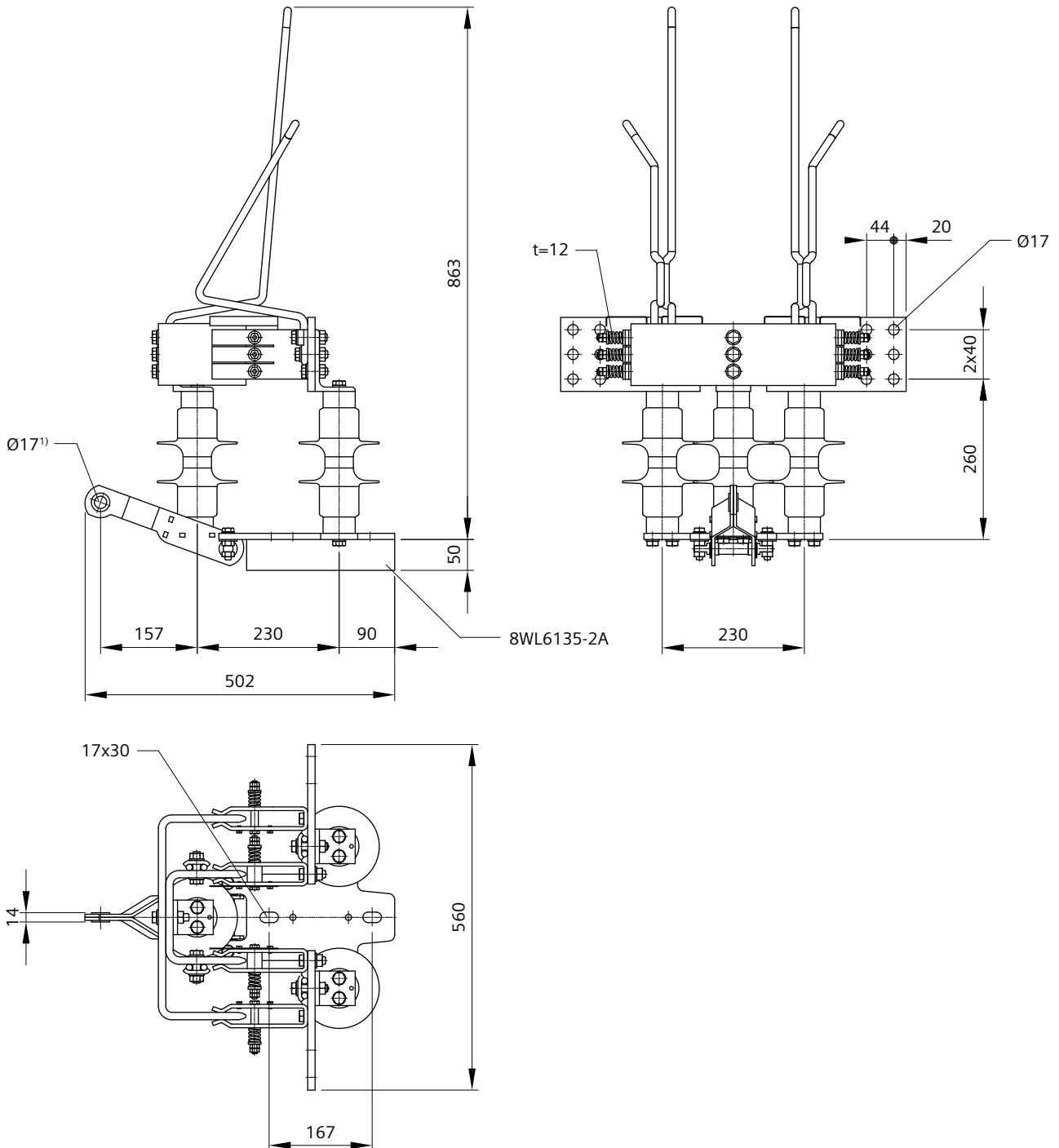
³⁾ for closing operation

⁴⁾ for opening operation

If necessary, the disconnector bracket 8WL6135-2A must be ordered separately, see page 719.

Switch disconnector up to 3 kV DC, operating current 4 kA

with rigid connections, for higher current-load capacity and environmental resistance



Order no.	8WL6134-5F
Designation	Switch disconnector
Material	
Baseplate	stlSt
Insulator bodies	GRP, silicone
Insulator caps	stlSt
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	39 kg
Stroke	200 mm
Min. operating force	1.8 kN ²⁾
Utilization category	IV ³⁾ / V ^x ³⁾ ⁴⁾
Ambient temperature	-40 °C to +40 °C
Ice coverage category	5 mm ⁵⁾ /10 mm ⁶⁾
Nominal voltage	3 kV DC
Rated insulation voltage	4.8 kV DC
Operating current (I_{Nar}, I_{th})	4 kA
Creepage distance	300 mm
Clearance in air to earth/ above the isolating gap	180/90 mm
Rated impulse withstand voltage	40 kV
Power-frequency withstand voltage, wet	18.5 kV
Rated short-time current/ duration	50 kA/250 ms 40 kA/1s

¹⁾ without bush Ø20

²⁾ At ice coating this value can be exceeded.

³⁾ Load switch function in connection with operating linkage with rapid opener 8WL6231-8A only, see page 759

⁴⁾ In connection with short-circuit shut-off within $t \leq 100$ ms over the feeding circuit-breaker only.

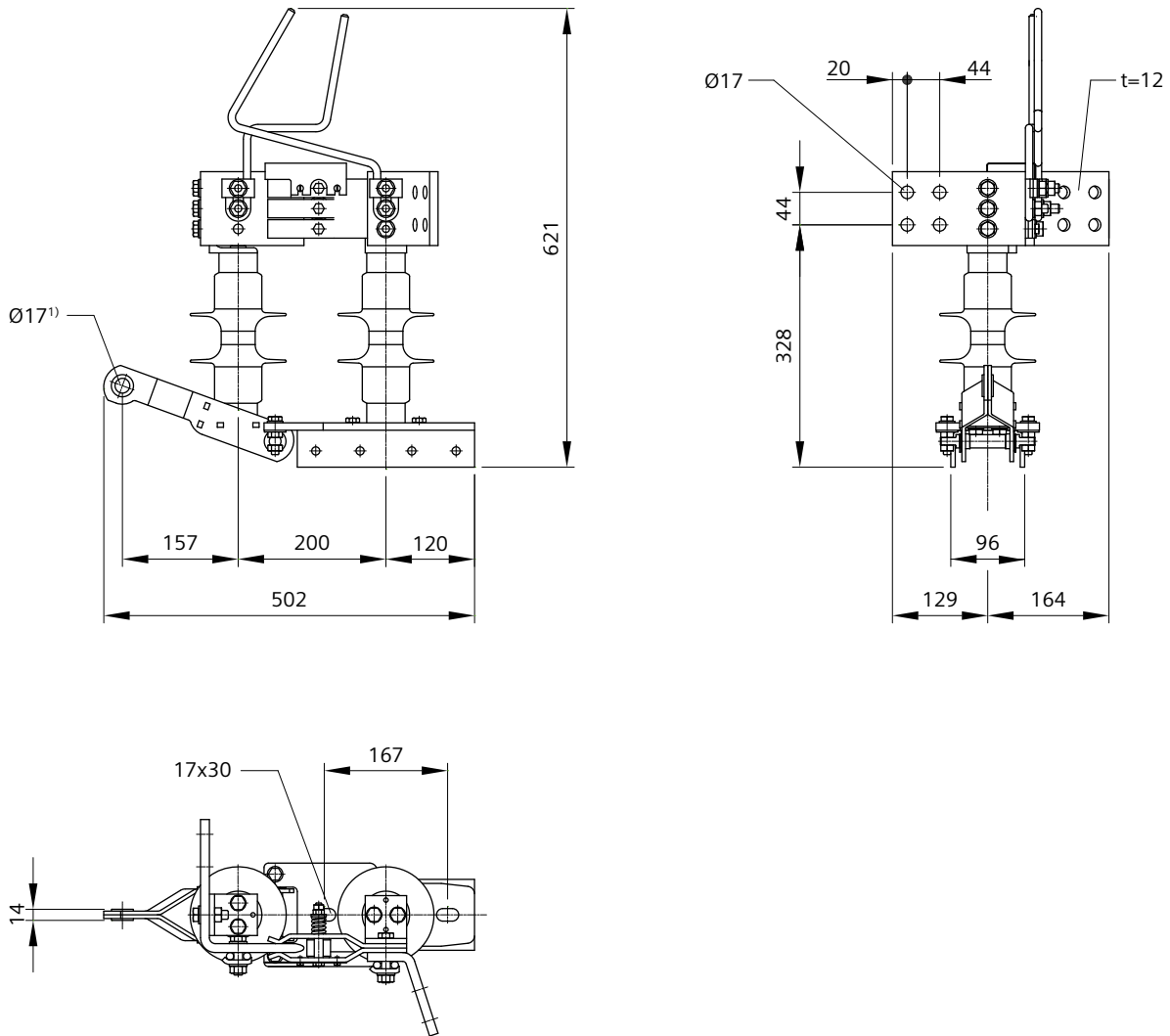
⁵⁾ for closing operation

⁶⁾ for opening operation

If necessary, the disconnector bracket 8WL6135-2A must be ordered separately, see page 719.

Switch disconnector up to 3 kV DC, operating current 3 kA

with flexible connections, for higher current-load capacity and environmental resistance



Order no.	8WL6134-0B
Designation	Switch disconnector
Material	
Baseplate	stlSt
Bracket	stlSt
Insulator bodies	GRP, silicone
Insulator caps	stlSt
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	19.8 kg
Stroke	200 mm
Min. operating force	0.8 kN ²⁾
Utilization category	III ³⁾
Ambient temperature	-40 °C to +40 °C
Ice coverage category	10 mm
Nominal voltage	3 kV DC
Rated insulation voltage	4.8 kV DC
Operating current (I_{Nar}, I_{th})	3 kA
Creepage distance	300 mm
Clearance in air to earth/ above the isolating gap	180/200 mm
Rated impulse withstand voltage	40 kV
Power-frequency withstand voltage, wet	18.5 kV
Rated short-time current	40 kA
Short-time current dura- tion	250 ms

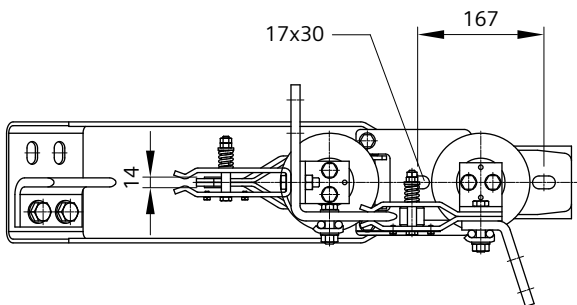
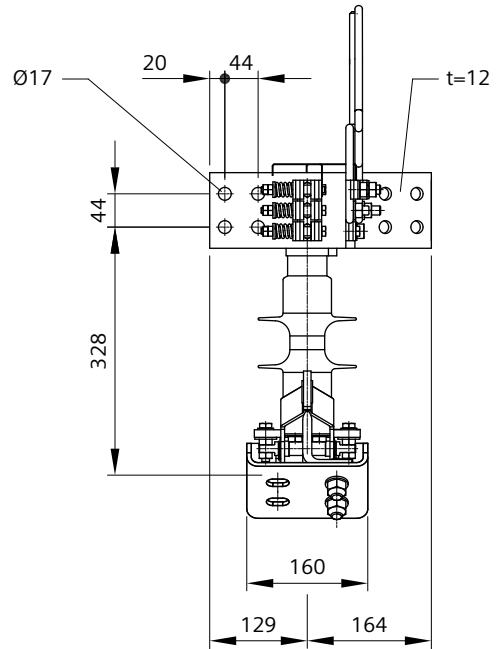
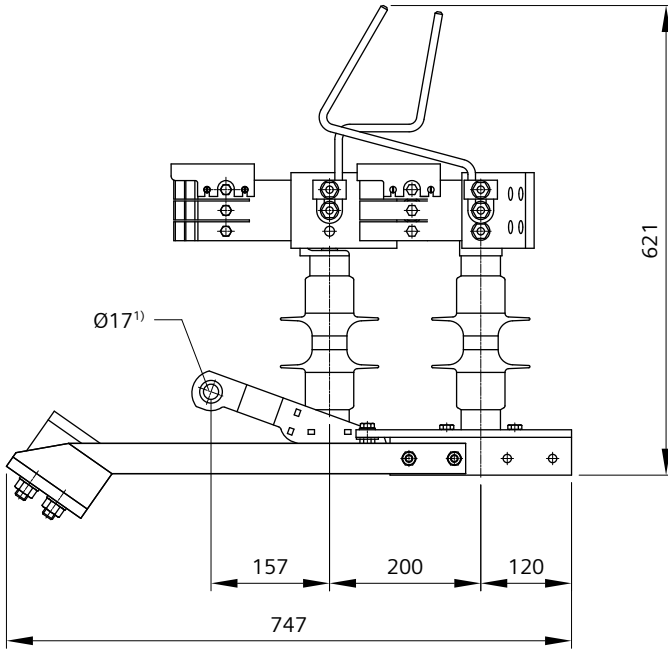
¹⁾ without bush Ø20

²⁾ At ice coating this value can be exceeded.

³⁾ Load switch function in connection with operating linkage with rapid opener 8WL6231-8A only, see page 759

Disconnector up to 3 kV DC, operating current 3 kA

with earth contact and flexible connections, for higher current-load capacity and environmental resistance



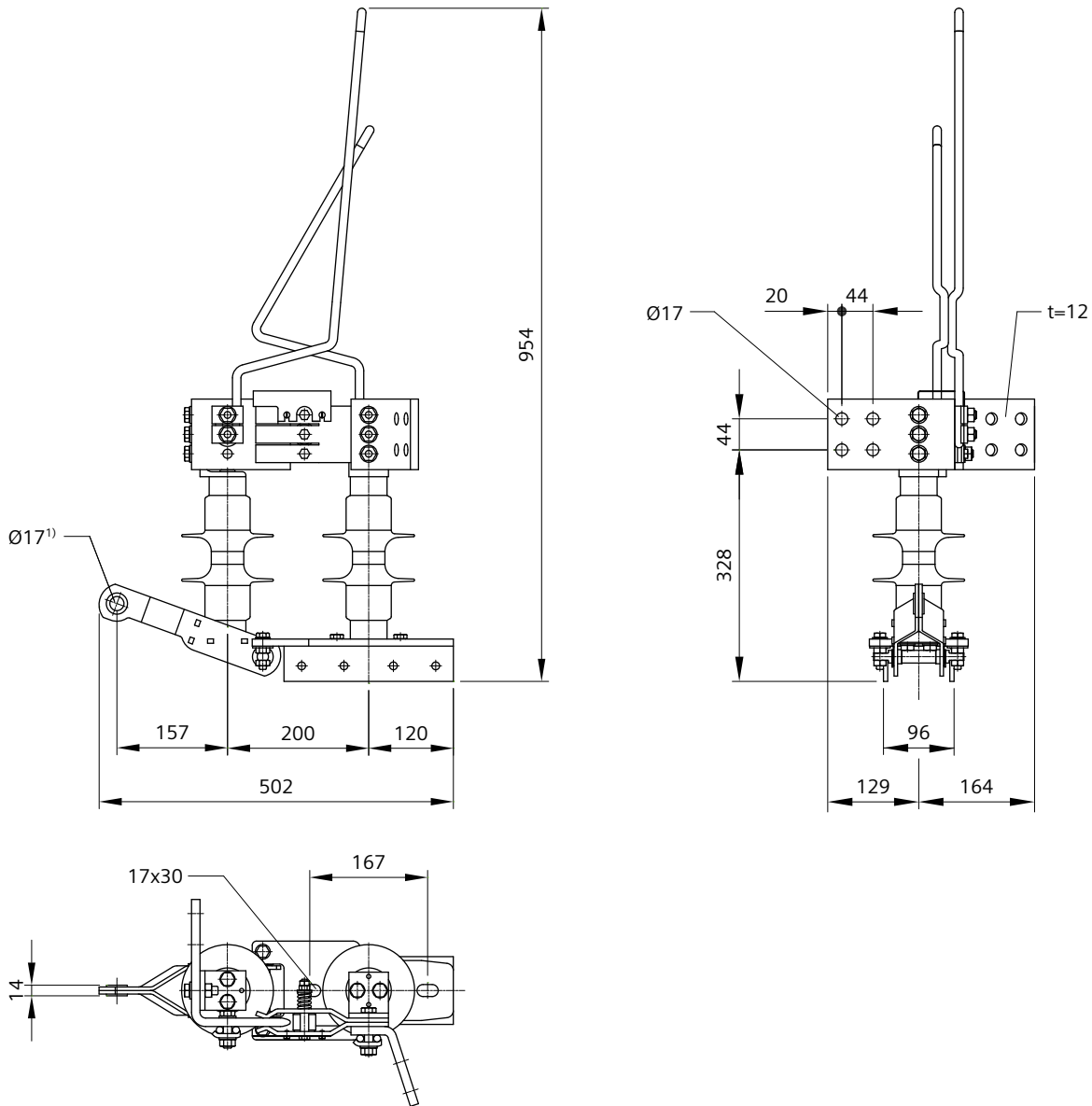
Order no.	8WL6134-0C
Designation	Disconnector
Material	
Baseplate	stlSt
Bracket	stlSt
Insulator bodies	GRP, silicone
Insulator caps	stlSt
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	26.8 kg
Stroke	200 mm
Min. operating force	0.8 kN ²⁾
Utilization category	I
Ambient temperature	-40 °C to +40 °C
Ice coverage category	10 mm
Nominal voltage	3 kV DC
Rated insulation voltage	4.8 kV DC
Operating current (I_{Nar}, I_{th})	3 kA
Creepage distance	300 mm
Clearance in air to earth/ above the isolating gap	180/200 mm
Rated impulse withstand voltage	40 kV
Power-frequency withstand voltage, wet	18.5 kV
Rated short-time current	40 kA
Short-time current dura- tion	250 ms

¹⁾ without bush Ø20

²⁾ At ice coating this value can be exceeded.

Switch disconnector up to 3 kV DC, operating current 3 kA

with flexible connections, for higher current-load capacity and environmental resistance



Order no.	8WL6134-0F
Designation	Switch disconnector
Material	
Baseplate	stlSt
Bracket	stlSt
Insulator bodies	GRP, silicone
Insulator caps	stlSt
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu
Weight	21 kg
Stroke	200 mm
Min. operating force	0.8 kN ²⁾
Utilization category	IV ³⁾ / V ^x ³⁾ ⁴⁾
Ambient temperature	-40 °C to +40 °C
Ice coverage category	10 mm
Nominal voltage	3 kV DC
Rated insulation voltage	4.8 kV DC
Operating current (I_{Nar} I_{th})	3 kA
Creepage distance	300 mm
Clearance in air to earth/ above the isolating gap	180/200 mm
Rated impulse withstand voltage	40 kV
Power-frequency withstand voltage, wet	18.5 kV
Rated short-time current	40 kA
Short-time current dura- tion	250 ms

¹⁾ without bush Ø20

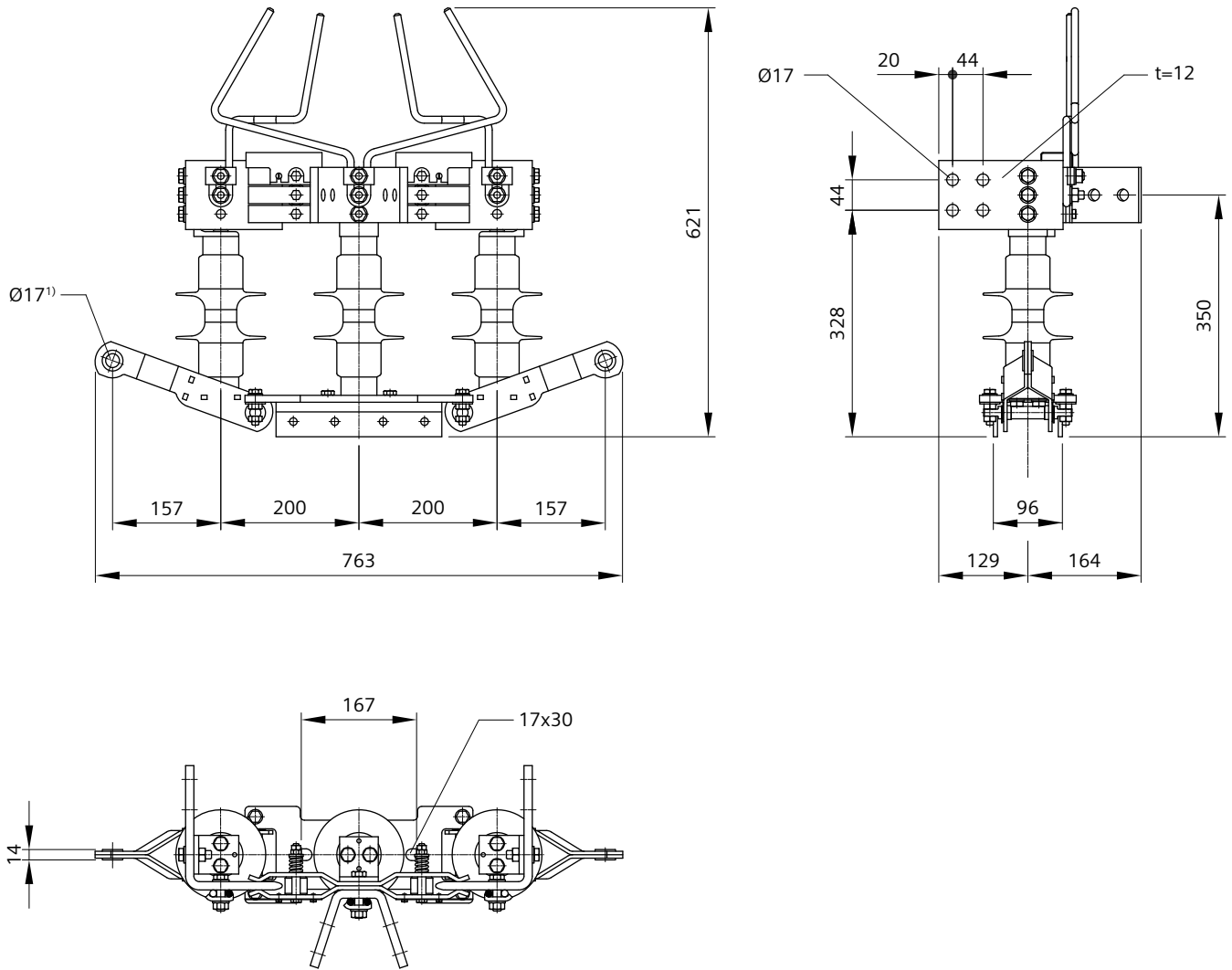
²⁾ At ice coating this value can be exceeded.

³⁾ Load switch function in connection with operating linkage with rapid opener 8WL6231-8A only, see page 759

⁴⁾ In connection with short-circuit shut-off within t<=100 ms over the feeding circuit-breaker only.

Tandem switch disconnector up to 3 kV DC, operating current 3 kA

with flexible connections, for higher current-load capacity and environmental resistance



Order no.	8WL6134-2
Designation	Tandem switch disconnector
Material	
Baseplate	stlSt
Bracket	stlSt
Insulator bodies	GRP, silicone
Insulator caps	stlSt
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	30.6 kg
Stroke	200 mm
Min. operating force	0.8 kN ^{2) 4)} 1,2 kN ^{3) 4)}
Utilization category	II ^{5) 6)} / III ^{5) 7)}
Ambient temperature	-40 °C to +40 °C
Ice coverage category	10 mm
Nominal voltage	3 kV DC
Rated insulation voltage	4.8 kV DC
Operating current (I_{Nar}, I_{th})	3 kA
Creepage distance	300 mm
Clearance in air to earth/ above the isolating gap	180/200 mm
Rated impulse withstand voltage	40 kV
Power-frequency withstand voltage, wet	18.5 kV
Rated short-time current	40 kA
Short-time current dura- tion	250 ms

¹⁾ without bush Ø20

²⁾ at operation of one connection

³⁾ at operation of both connections

⁴⁾ At ice coating this value can be exceeded.

⁵⁾ Load switch function in connection with operating linkage with rapid opener 8WL6231-8A only, see page 759

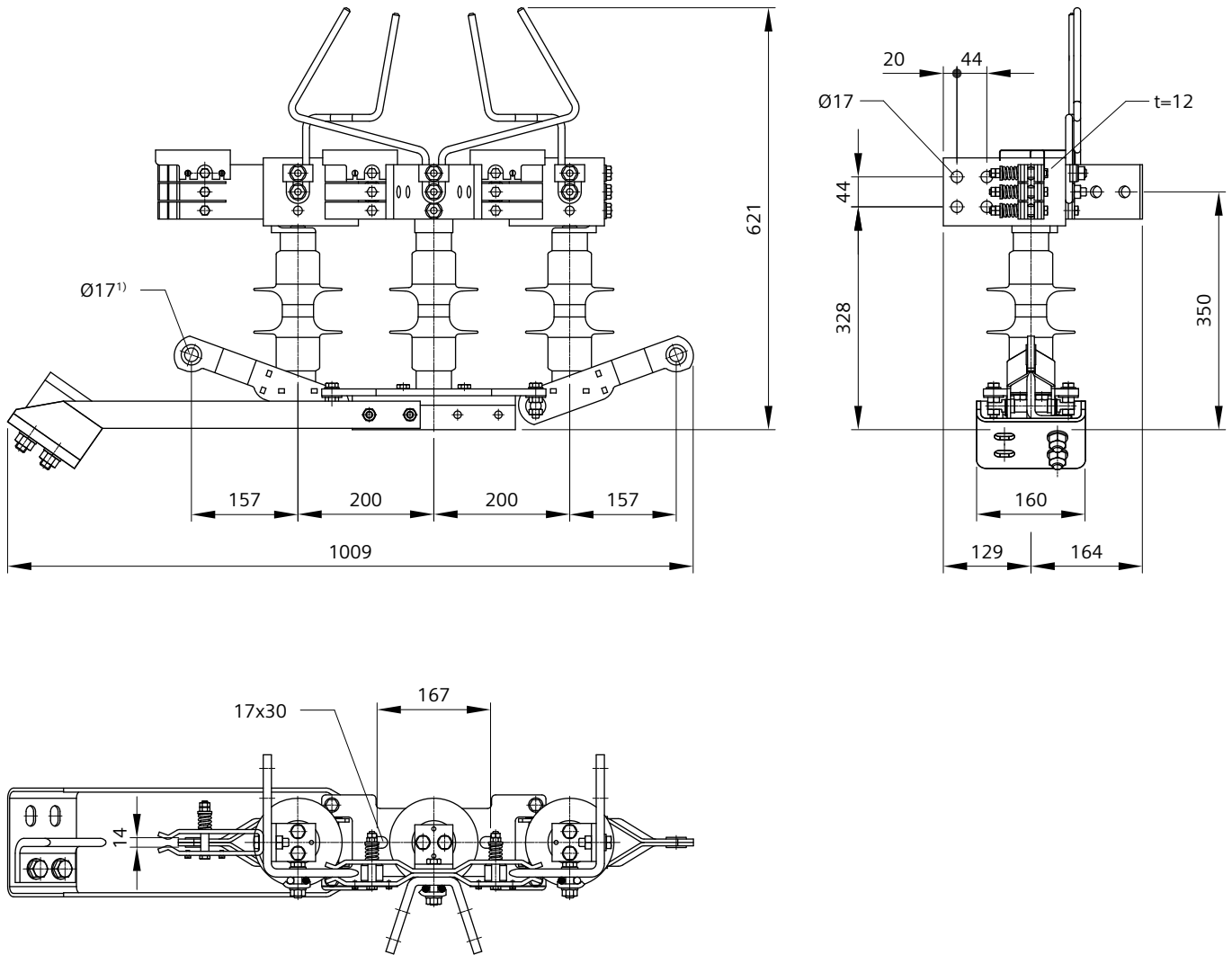
⁶⁾ In connection with one operating linkage with two rapid openers for simultaneous operation of both connections.

⁷⁾ In connection with two operating linkages with rapid opener for separat operation of the individual connections.

Type with one flexible connection or with earth contact on request.

Tandem disconnector up to 3 kV DC, operating current 3 kA

with one earth contact and flexible connections, for higher current-load capacity and environmental resistance



Order no.	8WL6134-2A
Designation	Tandem disconnector
Material	
Baseplate	stlSt
Bracket	stlSt
Insulator bodies	GRP, silicone
Insulator caps	stlSt
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	37.7 kg
Stroke	200 mm
Min. operating force	0.8 kN ^{2) 4)} 1,2 kN ^{3) 4)}
Utilization category	I
Ambient temperature	-40 °C to +40 °C
Ice coverage category	10 mm
Nominal voltage	3 kV DC
Rated insulation voltage	4.8 kV DC
Operating current (I_{Nar}, I_{th})	3 kA
Creepage distance	300 mm
Clearance in air to earth/ above the isolating gap	180/200 mm
Rated impulse withstand voltage	40 kV
Power-frequency withstand voltage, wet	18.5 kV
Rated short-time current	40 kA
Short-time current dura- tion	250 ms

¹⁾ without bush Ø20

²⁾ at operation of one connection

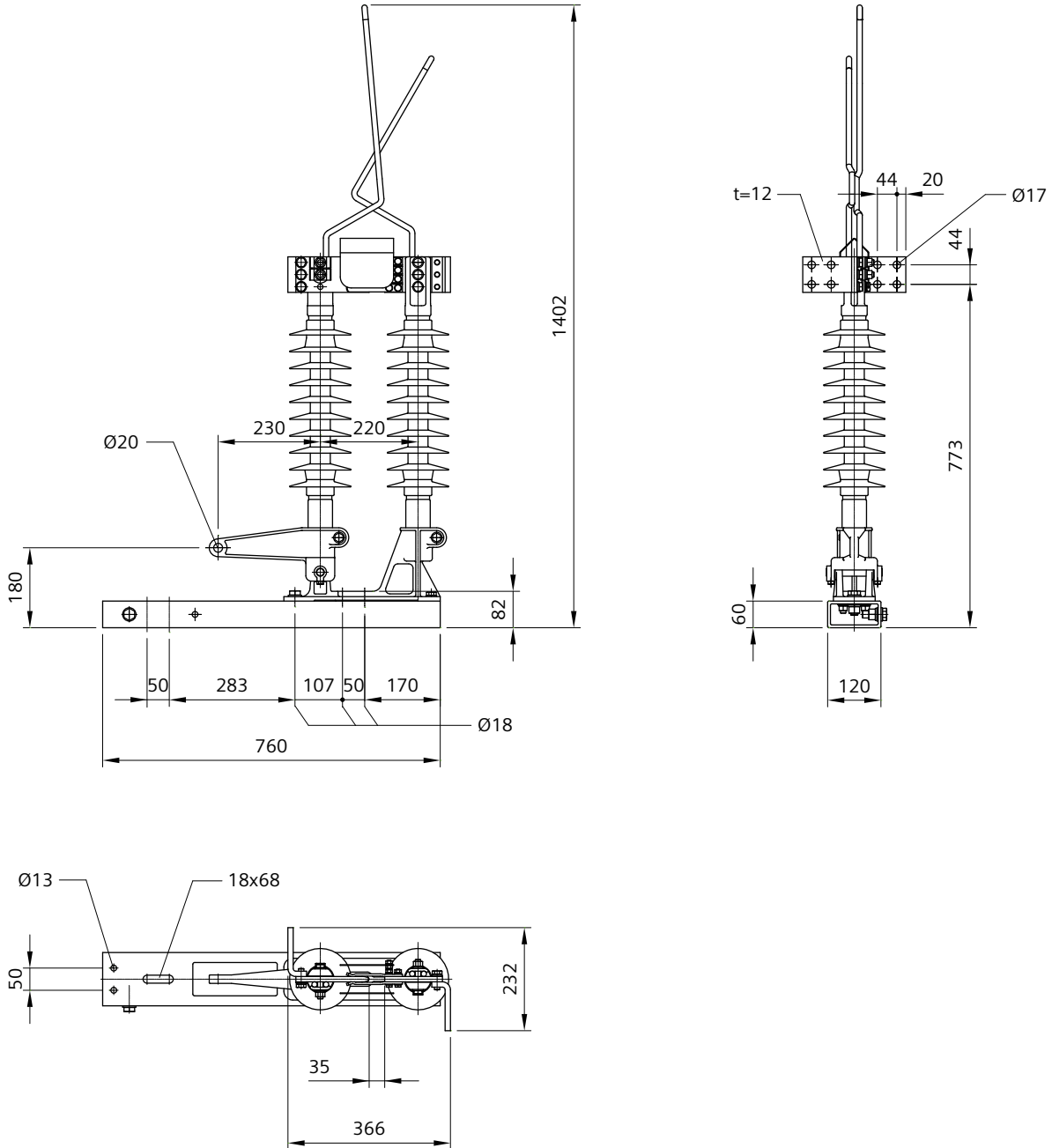
³⁾ at operation of both connections

⁴⁾ At ice coating this value can be exceeded.

Type with one flexible connection or with earth contact on request.

Disconnector 25 kV AC

for higher current-load capacity and environmental resistance



Order no.	8WL6144-0
Designation	Disconnector
Material	
Baseplate	Al
Insulator bodies	GRP, silicone
Fittings	Al, ctAl
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	22.7 kg
Stroke	200 mm
Min. operating force	1 kN
Ambient temperature	-45 °C to +45 °C ¹⁾ -45 °C to +50 °C ²⁾
Nominal voltage	25 kV AC
Nominal frequency	16.7 Hz, 50/60 Hz
Operating current	2.5 kA
Creepage distance	1200 mm
Clearance in air to earth/ above the isolating gap	420/460 mm
Rated impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	95 kV
Rated short-time current	40 kA
Rated short-time duration	1 s

¹⁾ up to 2.5 kA (60 Hz)

²⁾ up to 2.5 kA (16.7/50 Hz)

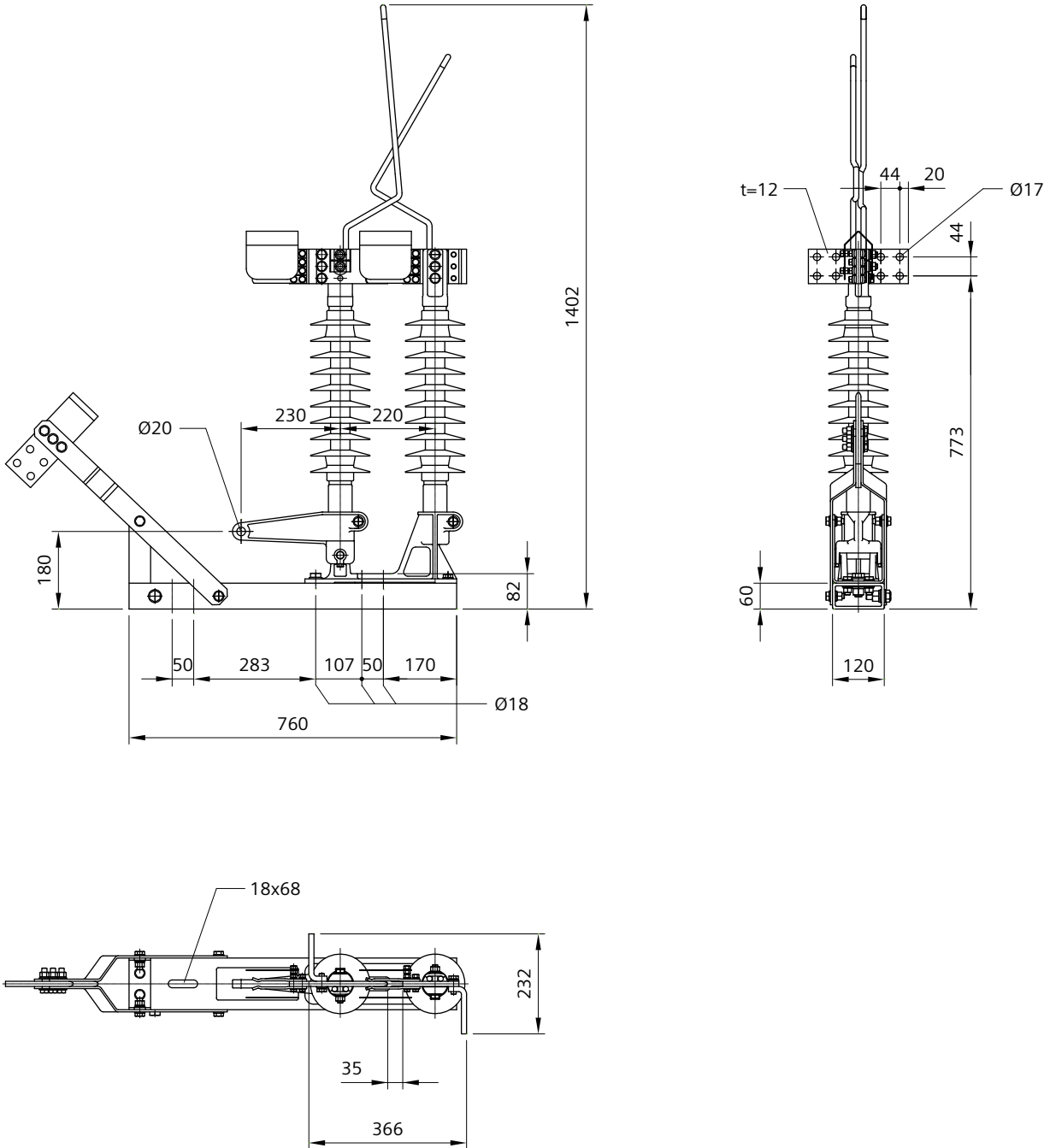
Order no.	8WL6144-0E
Designation	Disconnector
Material	
Baseplate	Al
Insulator bodies	GRP, silicone
Fittings	Al, ctAl
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	21.1 kg
Stroke	200 mm
Min. operating force	1 kN
Ambient temperature	-45 °C to +45 °C ¹⁾ -45 °C to +50 °C ²⁾
Nominal voltage	25 kV AC
Nominal frequency	16.7 Hz, 50/60 Hz
Operating current	2.5 kA
Creepage distance	1200 mm
Clearance in air to earth/ above the isolating gap	420/460 mm
Rated impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	95 kV
Rated short-time current	40 kA
Rated short-time duration	1 s

¹⁾ up to 2.5 kA (60 Hz)

²⁾ up to 2.5 kA (16.7/50 Hz)

Disconnector 25 kV AC with earth contact

for higher current-load capacity and environmental resistance



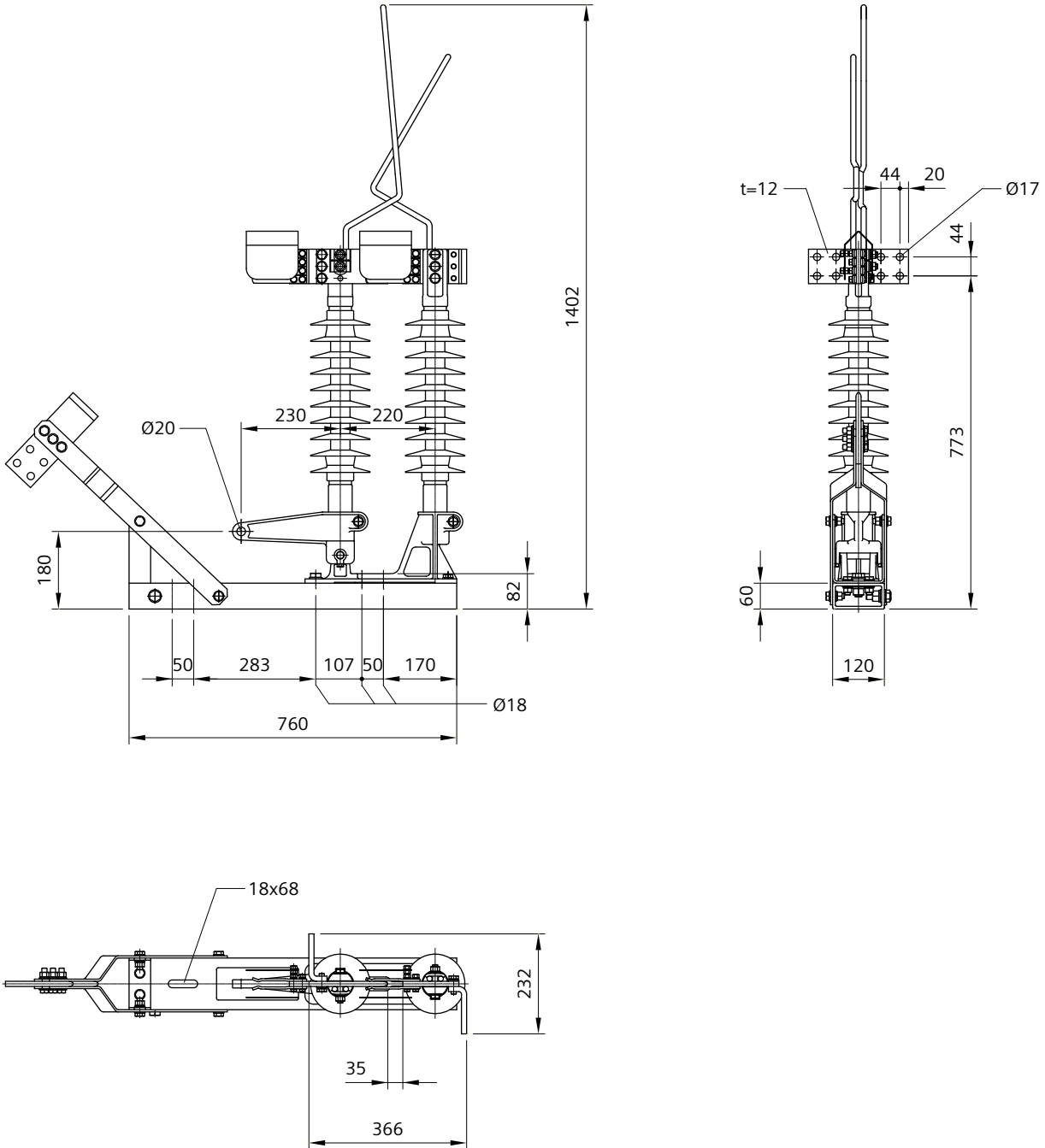
Order no.	8WL6144-1
Designation	Disconnector
Material	
Baseplate	Al
Insulator bodies	GRP, silicone
Fittings	Al, ctAl
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	30.1 kg
Stroke	200 mm
Min. operating force	1 kN
Ambient temperature	-45 °C to +45 °C ¹⁾ -45 °C to +50 °C ²⁾
Nominal voltage	25 kV AC
Nominal frequency	16.7 Hz, 50/60 Hz
Operating current	2.5 kA
Creepage distance	1200 mm
Clearance in air to earth/ above the isolating gap	420/460 mm
Rated impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	95 kV
Rated short-time current	40 kA
Rated short-time duration	1 s

¹⁾ up to 2.5 kA (60 Hz)

²⁾ up to 2.5 kA (16.7/50 Hz)

Disconnector 25 kV AC with earth contact

for higher current load capacity and environmental resistance, without breaking capacity



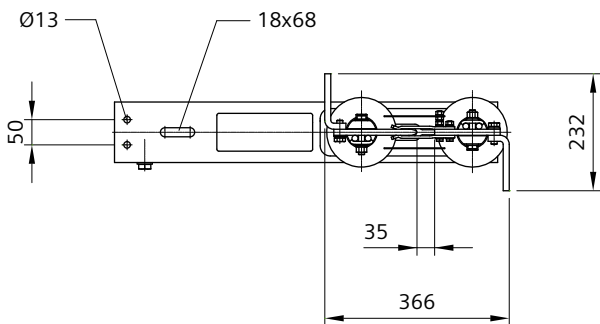
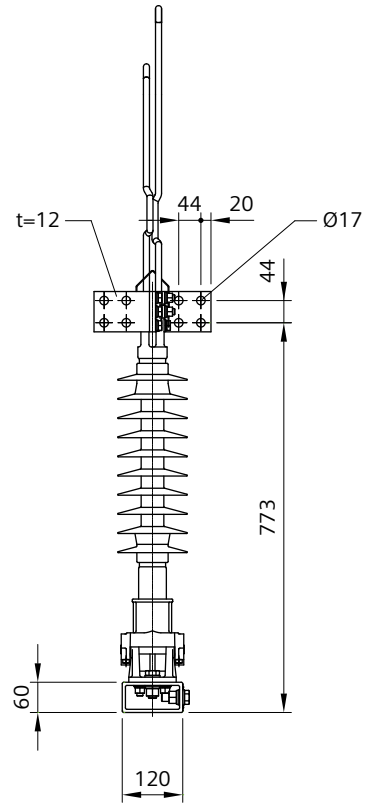
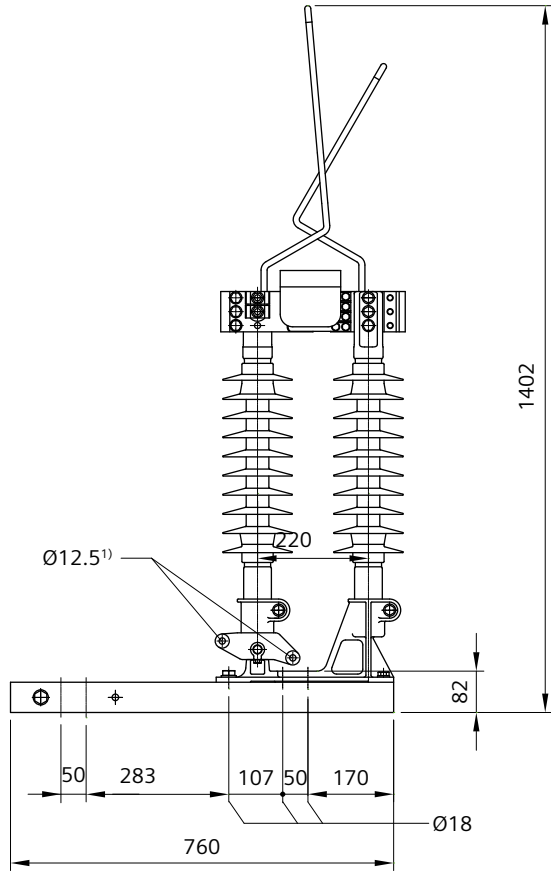
Order no.	8WL6144-1E
Designation	Disconnector
Material	
Baseplate	Al
Insulator bodies	GRP, silicone
Fittings	Al, ctAl
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	30.1 kg
Stroke	200 mm
Min. operating force	1 kN
Ambient temperature	-45 °C to +45 °C ¹⁾ -45 °C to +50 °C ²⁾
Nominal voltage	25 kV AC
Nominal frequency	16.7 Hz, 50/60 Hz
Operating current	2.5 kA
Creepage distance	1200 mm
Clearance in air to earth/ above the isolating gap	420/460 mm
Rated impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	95 kV
Rated short-time current	40 kA
Rated short-time duration	1 s

¹⁾ up to 2.5 kA (60 Hz)

²⁾ up to 2.5 kA (16.7/50 Hz)

Disconnecter 25 kV AC for bipolar arrangement

for higher current-load capacity and environmental resistance



Order no.	8WL6144-2
Designation	Disconnector for bipolar arrangement
Material	
Baseplate	Al
Insulator bodies	GRP, silicone
Fittings	Al, ctAl
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	22.5 kg
Stroke	200 mm
Min. operating force	1 kN
Ambient temperature	-45 °C to +45 °C ²⁾ -45 °C to +50 °C ³⁾
Nominal voltage	25 kV AC
Nominal frequency	16.7 Hz, 50/60 Hz
Operating current	2.5 kA
Creepage distance	1200 mm
Clearance in air to earth/ above the isolating gap	420/460 mm
Rated impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	95 kV
Rated short-time current	40 kA
Rated short-time duration	1 s

¹⁾ for connection of drive shaft 8WL6144-2F

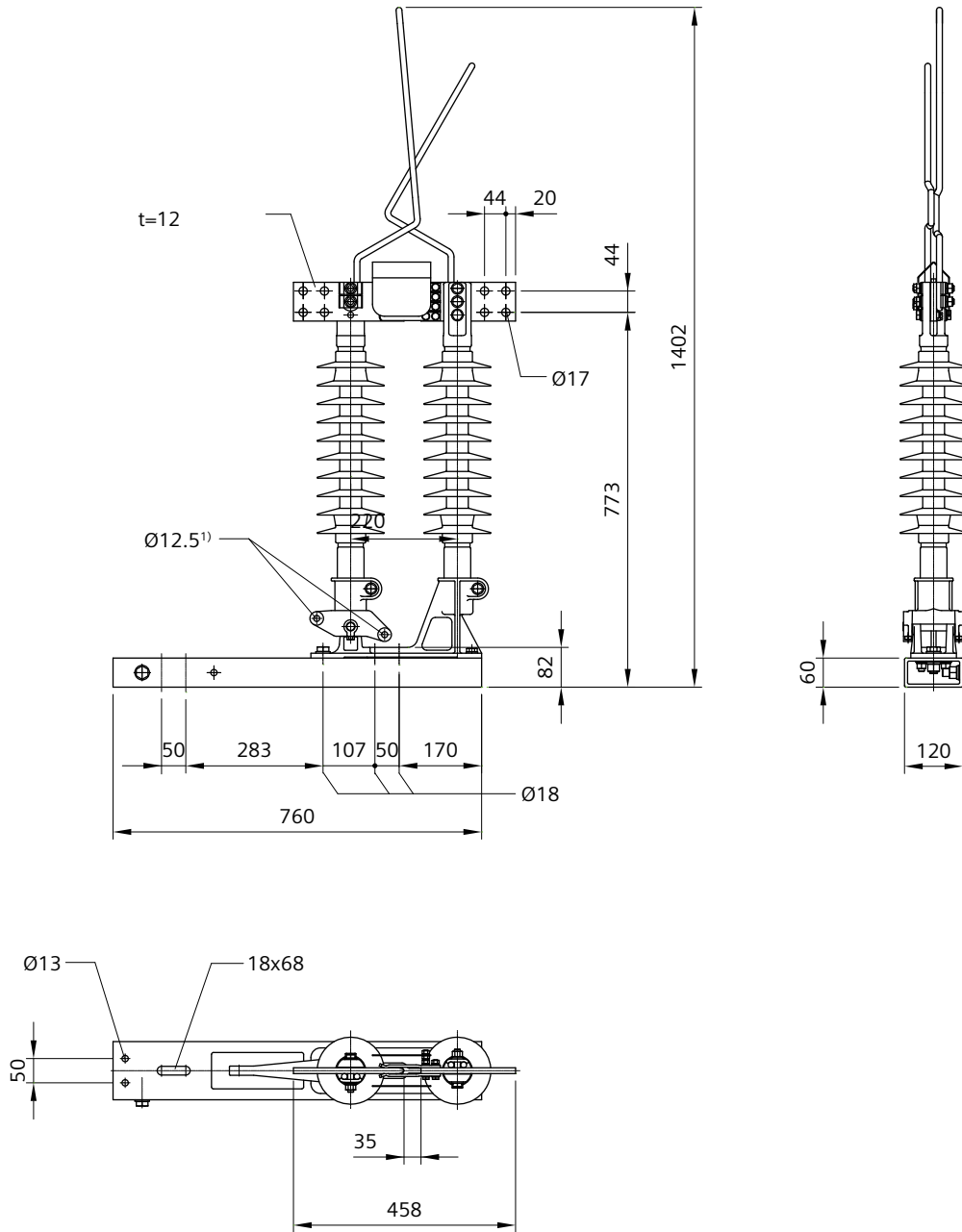
²⁾ up to 2.5 kA (60 Hz)

³⁾ up to 2.5 kA (16.7/50 Hz)

Drive shaft 8WL6144-2F must be ordered separately, see page 720.

Disconnector 25 kV AC for bipolar arrangement

for higher current load capacity and environmental resistance, without breaking capacity



Order no.	8WL6144-2E
Designation	Disconnector for bipolar arrangement
Material	
Baseplate	Al
Insulator bodies	GRP, silicone
Fittings	Al, ctAl
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	20.9 kg
Stroke	200 mm
Min. operating force	1 kN
Ambient temperature	-45 °C to +45 °C ²⁾ -45 °C to +50 °C ³⁾
Nominal voltage	25 kV AC
Nominal frequency	16.7 Hz, 50/60 Hz
Operating current	2.5 kA
Creepage distance	1200 mm
Clearance in air to earth/ above the isolating gap	420/460 mm
Rated impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	95 kV
Rated short-time current	40 kA
Rated short-time duration	1 s

¹⁾ for connection of drive shaft 8WL6144-2F

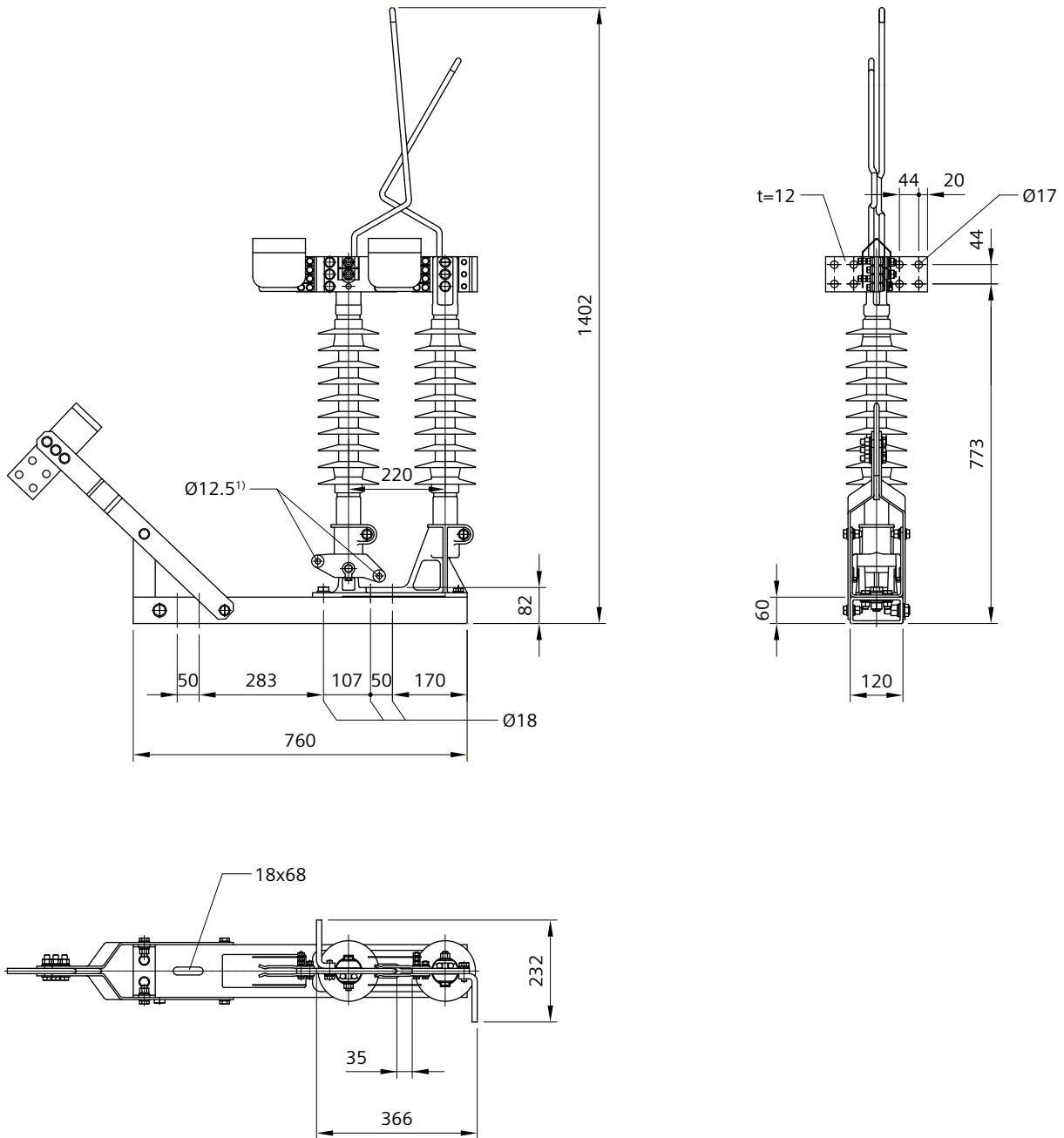
²⁾ up to 2.5 kA (60 Hz)

³⁾ up to 2.5 kA (16.7/50 Hz)

Drive shaft 8WL6144-2F must be ordered separately, see page 720.

Disconnector 25 kV AC with earth contact for bipolar arrangement

for higher current-load capacity and environmental resistance



Order no.	8WL6144-3
Designation	Disconnector with earth contact for bipolar arrangement
Material	
Baseplate	Al
Insulator bodies	GRP, silicone
Fittings	Al, ctAl
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	29.9 kg
Stroke	200 mm
Min. operating force	1 kN
Ambient temperature	-45 °C to +45 °C ²⁾ -45 °C to +50 °C ³⁾
Nominal voltage	25 kV AC
Nominal frequency	16.7 Hz, 50/60 Hz
Operating current	2.5 kA
Creepage distance	1200 mm
Clearance in air to earth/ above the isolating gap	420/460 mm
Rated impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	95 kV
Rated short-time current	40 kA
Rated short-time duration	1 s

¹⁾ for connection of drive shaft 8WL6144-2F

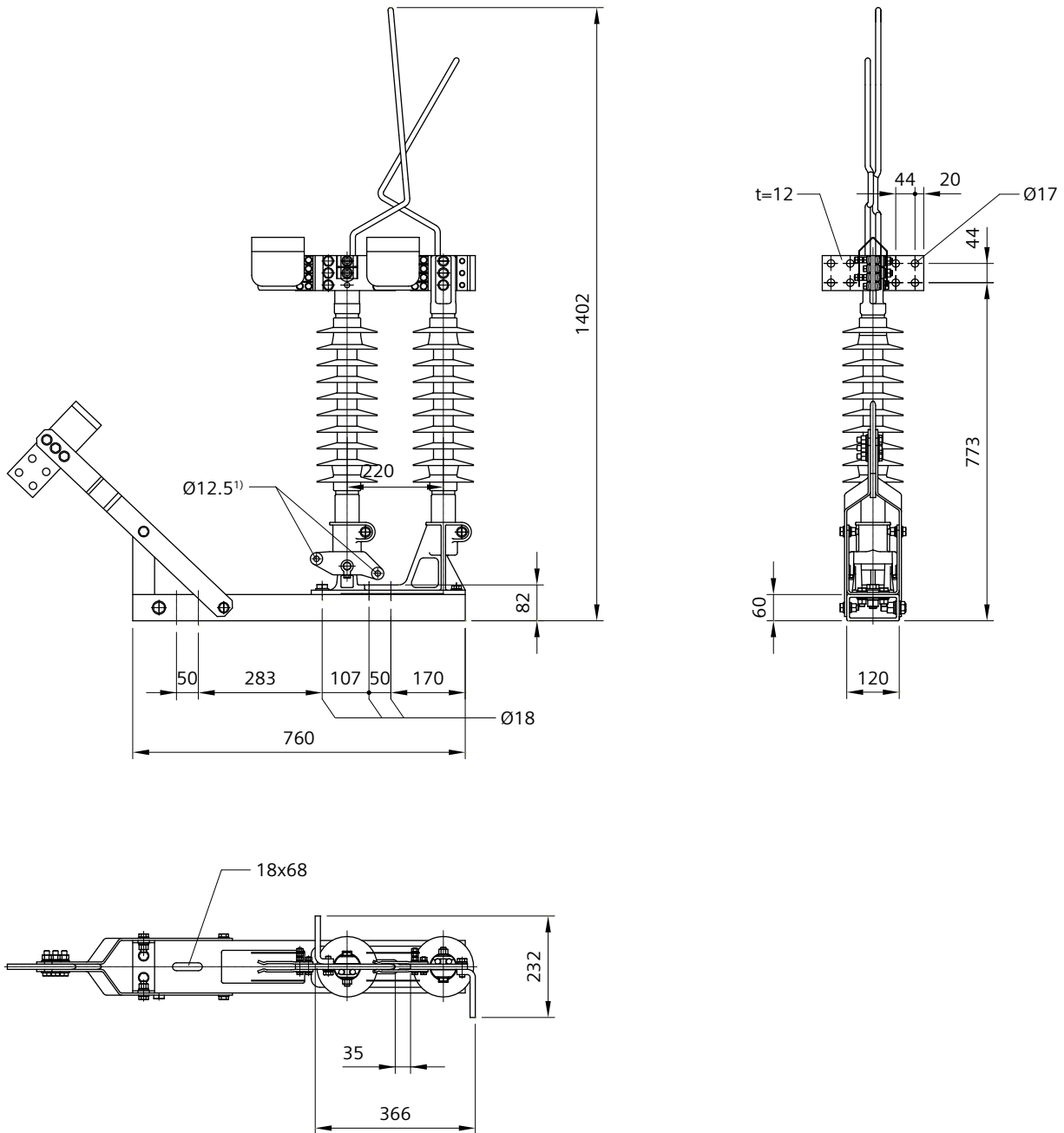
²⁾ up to 2.5 kA (60 Hz)

³⁾ up to 2.5 kA (16.7/50 Hz)

Drive shaft 8WL6144-2F must be ordered separately, see page 720.

Disconnector 25 kV AC with earth contact for bipolar arrangement

for higher current load capacity and environmental resistance, without breaking capacity



Order no.	8WL6144-3E
Designation	Disconnector with earth contact for bipolar arrangement
Material	
Baseplate	Al
Insulator bodies	GRP, silicone
Fittings	Al, ctAl
Contact sets	Cu-ETP, silver-coated
Arcing horns	Cu-ETP
Weight	29.9 kg
Stroke	200 mm
Min. operating force	1 kN
Ambient temperature	-45 °C to +45 °C ²⁾ -45 °C to +50 °C ³⁾
Nominal voltage	25 kV AC
Nominal frequency	16.7 Hz, 50/60 Hz
Operating current	2.5 kA
Creepage distance	1200 mm
Clearance in air to earth/ above the isolating gap	420/460 mm
Rated impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	95 kV
Rated short-time current	40 kA
Rated short-time duration	1 s

¹⁾ for connection of drive shaft 8WL6144-2F

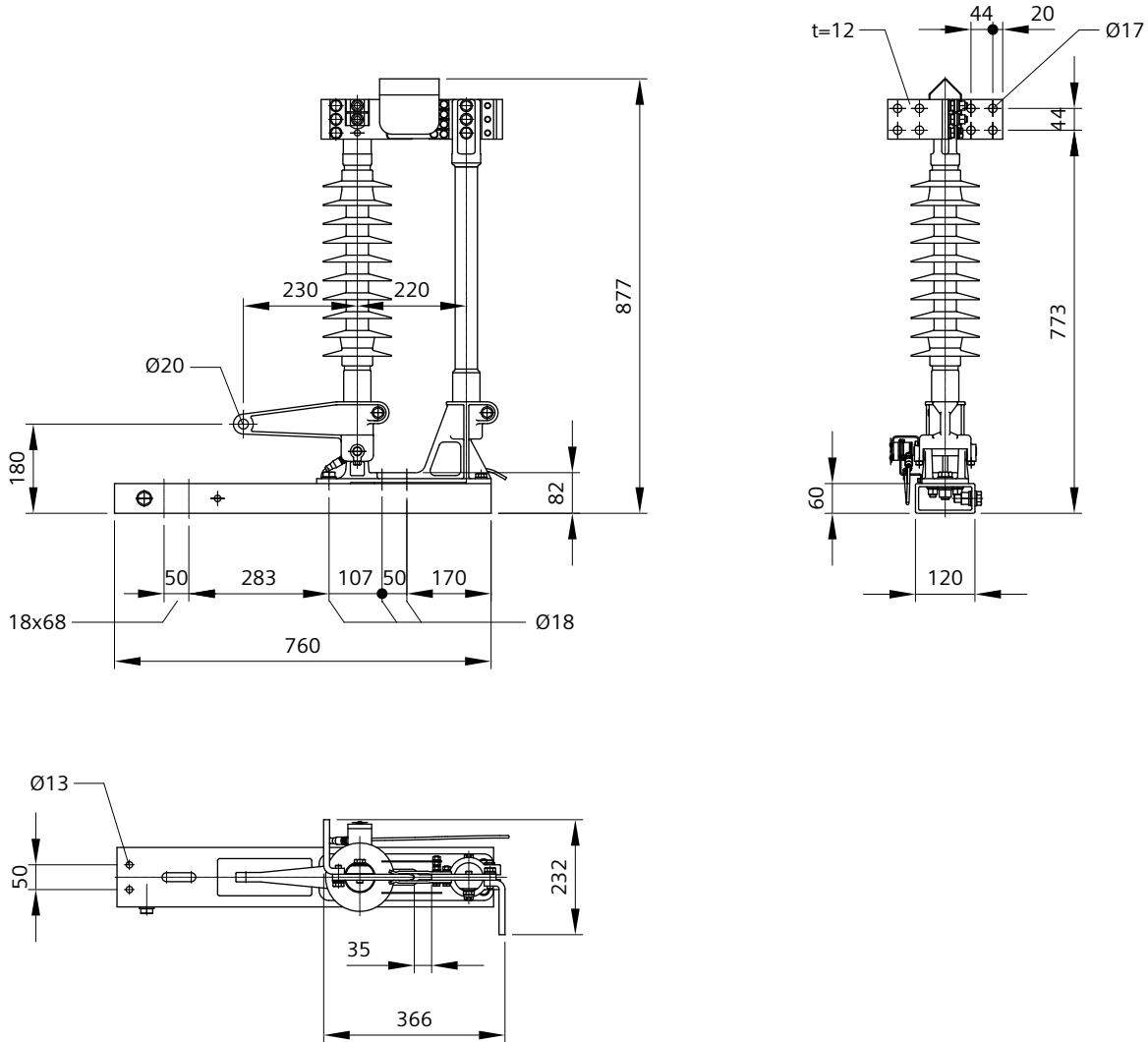
²⁾ up to 2.5 kA (60 Hz)

³⁾ up to 2.5 kA (16.7/50 Hz)

Drive shaft 8WL6144-2F must be ordered separately, see page 720.

Earthing switch up to 25 kV AC

with position indication (SIL 1)



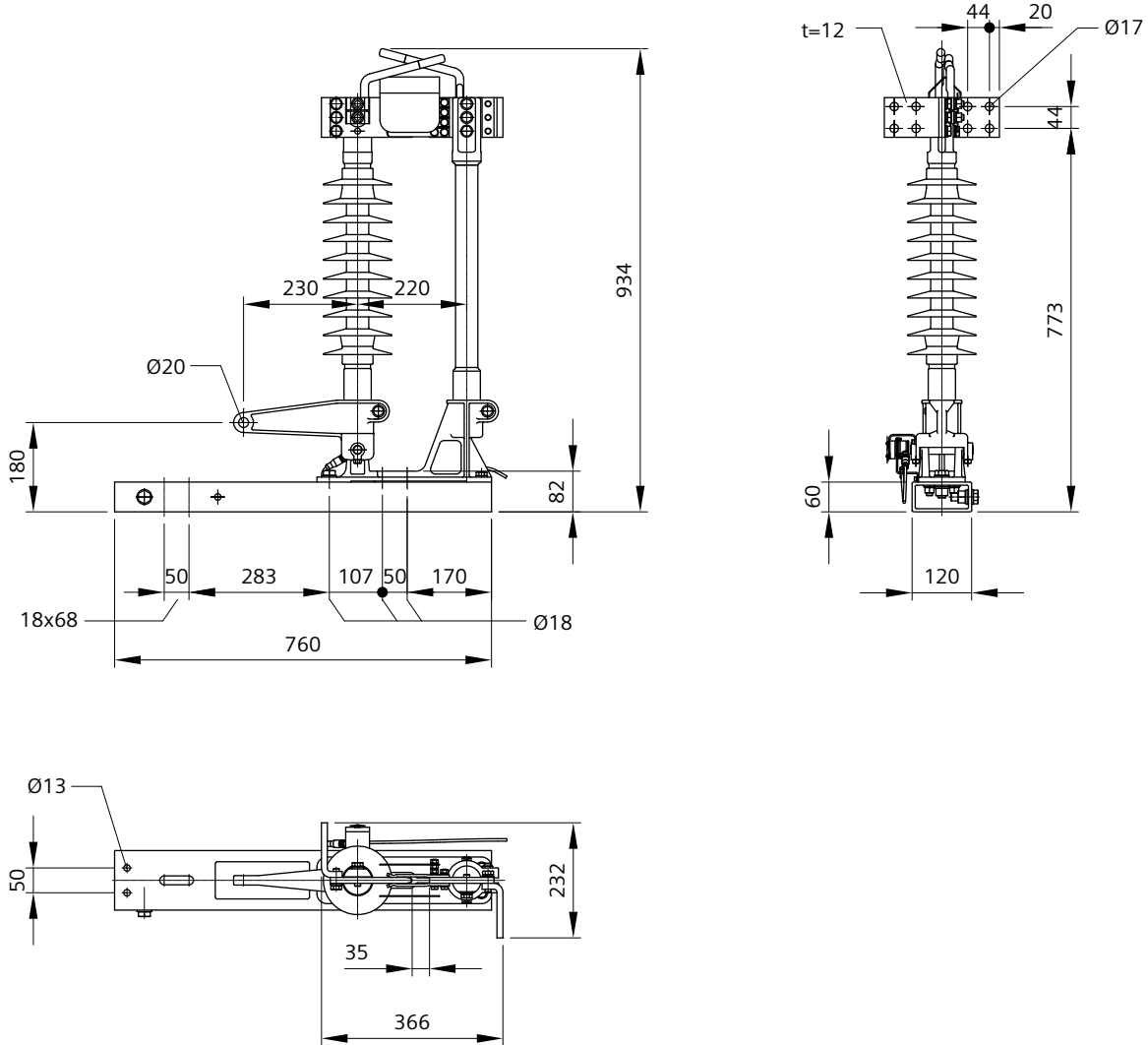
Order no.	8WL6144-1A
Designation	Earthing switch
Material	
Baseplate	Al
Insulator body	GRP, silicone
Strap connection	Al
Fittings	ctAl
Contact sets	Cu-ETP, silver-coated
Rotation angle sensor	stlSt, Al
Weight	20.9 kg
Stroke	200 mm
Min. operating force	1 kN
Class (EN 50152-2)	E0
Ambient temperature	-40 °C to +50 °C
Nominal voltage	25 kV AC
Nominal frequency	16.7 Hz, 50/60 Hz
Creepage distance	1200 mm
Clearance in air to earth/ between main contacts	420/460 mm
Rated impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	95 kV
Rated short-time current	40 kA
Rated short-time duration	1 s

Substitute for 8WL6127-1A.

DMS function in connection with evaluation station 8WL6255-7A or -7B only.

Earthing switch up to 25 kV AC

with pre-arcing horns and position indication (SIL 1)



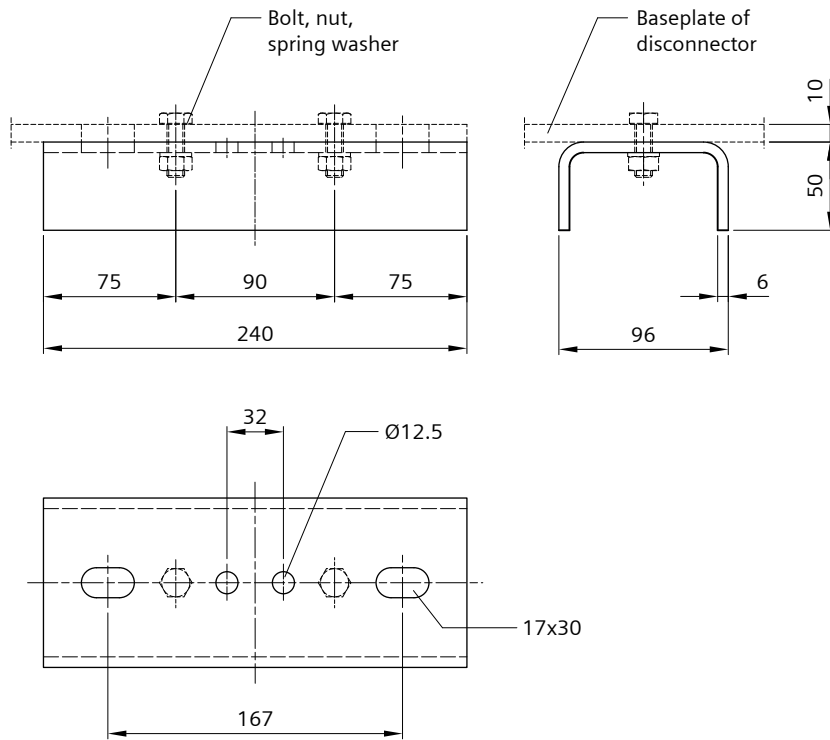
Order no.	8WL6144-1D
Designation	Earthing switch
Material	
Baseplate	Al
Insulator body	GRP, silicone
Strap connection	Al
Fittings	ctAl
Contact sets	Cu-ETP, silver-coated
Pre-arcing horns	Cu-ETP, ODS-Cu
Rotation angle sensor	stlSt, Al
Weight	22.2 kg
Stroke	200 mm
Min. operating force	1 kN
Class (EN 50152-2)	E0 ¹⁾
Ambient temperature	-40 °C to +50 °C
Nominal voltage	25 kV AC
Nominal frequency	16.7 Hz, 50/60 Hz
Creepage distance	1200 mm
Clearance in air to earth/ between main contacts	420/460 mm
Rated impulse withstand voltage	250 kV
Power-frequency withstand voltage, wet	95 kV
Rated short-time current	40 kA
Rated short-time duration	1 s

¹⁾ Restricted making capability with two making operations at up to 25 kA or one making operation at up to 40 kA, if the feeding circuit-breakers limit the current flow to a short-circuit duration of max. 100 ms.

DMS function in connection with evaluation station 8WL6255-7A or -7B only.

Disconnecter bracket

as accessories for disconnector with rigid connections 8WL6134-3, 8WL6134-4 and 8WL6134-5/-5F

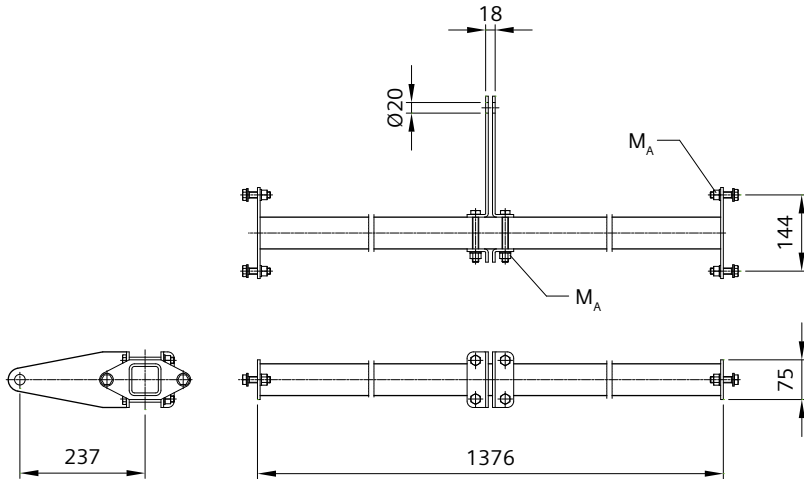


Order no.	8WL6135-2A
Designation	Disconnecter bracket
Material	stlSt
Weight	1.9 kg

Two bolts ISO 4017-M10x30 (stlSt), two nuts ISO 4032-M10 (stlSt) and two spring washers 8WL1128-3 (stlSt) must be ordered separately.

Drive shaft for bipolar disconnectors

for bipolar arrangement of disconnectors 8WL6144-2/-2E/-3/-3E, disconnector distance 1.5 m

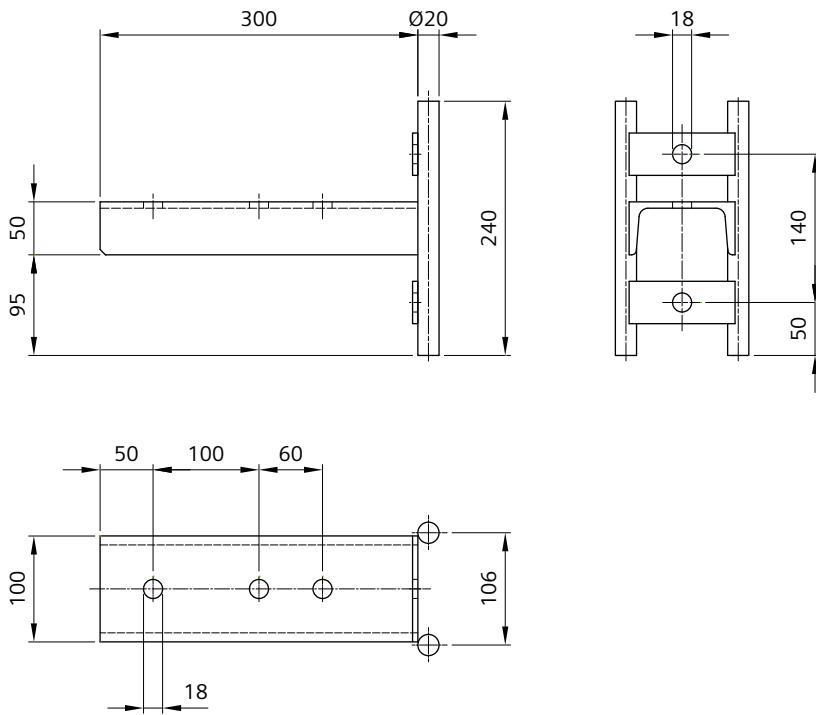


Order no.	8WL6144-2F
Designation	Drive shaft
Material	
Drive shaft	htgSt
Lever, angles	stlSt
Bolts M12	stlSt
Nuts, washers	stlSt
Spring washers	stlSt
Weight	11.76 kg
Tightening torque M_A	56 Nm

Drive shafts for other disconnector distances on request.

Bracket for disconnector

for punch-lock band and support fastening, for disconnectors 8WL6134- without earth contact

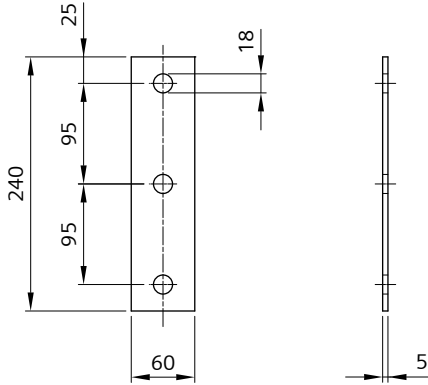


Order no.	8WL6233-5
Designation	Bracket
Material	htgSt
Weight	4.60 kg

For insulated variant, four straps 8WL6233-5C (see page 722) and fastening screws M16 (length as needed) must be ordered separately.

Strap for disconnector bracket

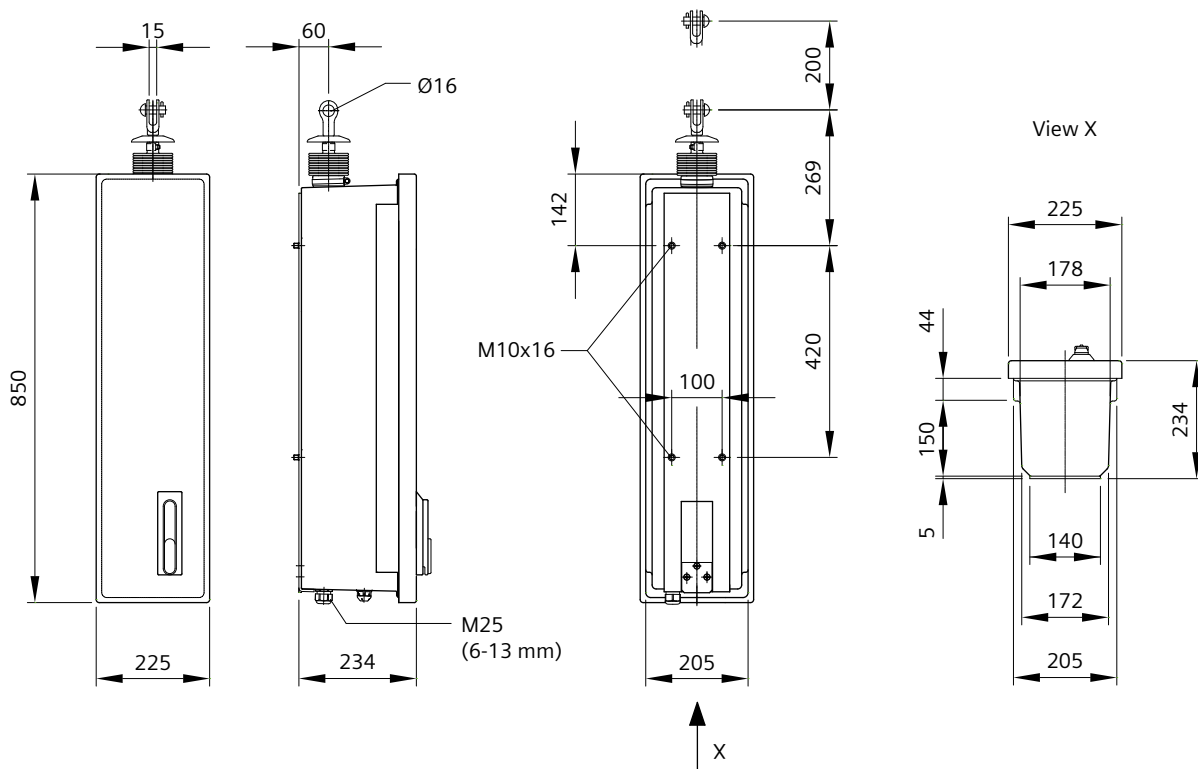
for insulated variant of bracket 8WL6233-5



Order no.	8WL6233-5C
Designation	Strap
Material	htgSt
Weight	0.57 kg

Electromechanical operated mechanism in short GRP casing

for remote-controlled operation of disconnectors with stroke 200 mm



Order no.	8WL6243-0	8WL6243-7	8WL6243-3	8WL6243-4	8WL6243-6
Designation	Operated mechanism 230 V AC ^{2) 4)}	Operated mechanism 230 V AC ²⁾	Operated mechanism 110 V DC ³⁾	Operated mechanism 60 V DC ³⁾	Operated mechanism 24 V DC ³⁾
Material					
Casing	GRP, color RAL6009 (fir green)	GRP, color RAL6009 (fir green)	GRP, color RAL6009 (fir green)	GRP, color RAL6009 (fir green)	GRP, color RAL6009 (fir green)
Casing support	stlSt	stlSt	stlSt	stlSt	stlSt
Actuating bar	stlSt	stlSt	stlSt	stlSt	stlSt
Bellow	Rubber, black	Rubber, black	Rubber, black	Rubber, black	Rubber, black
Connecting clevis	CuAl	CuAl	CuAl	CuAl	CuAl
Pin 16x40	stlSt	stlSt	stlSt	stlSt	stlSt
Split pin 5x28	Cu	Cu	Cu	Cu	Cu
Weight	38.5 kg	38.5 kg	38.5 kg	38.5 kg	38.5 kg
Vertical stroke	200 mm	200 mm	200 mm	200 mm	200 mm
Actuating force in end positions	min. 4 kN	min. 4 kN	min. 4 kN	min. 4 kN	min. 4 kN
Stroke speed	40 - 66 mm/s	40 - 66 mm/s	40 - 66 mm/s	40 - 66 mm/s	40 - 66 mm/s
Operating time	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)
Ambient temperature	-40 °C to +50 °C	-40 °C to +50 °C	-40 °C to +50 °C	-40 °C to +50 °C	-40 °C to +50 °C
Nominal voltage	230 V AC	230 V AC	110 V DC	60 V DC	24 V DC
Nominal frequency	50 - 60 Hz	50 - 60 Hz	–	–	–
Perm. voltage difference	0.8 - 1.1 Un	0.8 - 1.1 Un	0.8 - 1.1 Un	0.8 - 1.1 Un	0.8 - 1.1 Un
Nominal current	2 A	2 A	4 A	7.5 A	20 A
Protection class	IP54	IP54	IP54	IP54	IP54
Connection	4 wires+PE and floating return signal	3 wires and floating door signal	7 wires incl. door contact and floating return signal	7 wires incl. door contact and floating return signal	7 wires incl. door contact and floating return signal
Operating mode	electrical remote control/local opera- tion, manual local operation	electrical remote control operation, manual local opera- tion	electrical remote control/local opera- tion, manual local operation	electrical remote control/local opera- tion, manual local operation	electrical remote control/local opera- tion, manual local operation
Non-return blocking	positive	positive	positive	positive	positive
Operating switch	lockable	lockable	lockable	lockable	lockable
Locking system	Semi-lock barrel ¹⁾	Semi-lock barrel ¹⁾	Semi-lock barrel ¹⁾	Semi-lock barrel ¹⁾	Semi-lock barrel ¹⁾

¹⁾ not in delivery scope

²⁾ At use of the operating linkage 8WL6230-6B the protection conductor is insulated opposite earth.

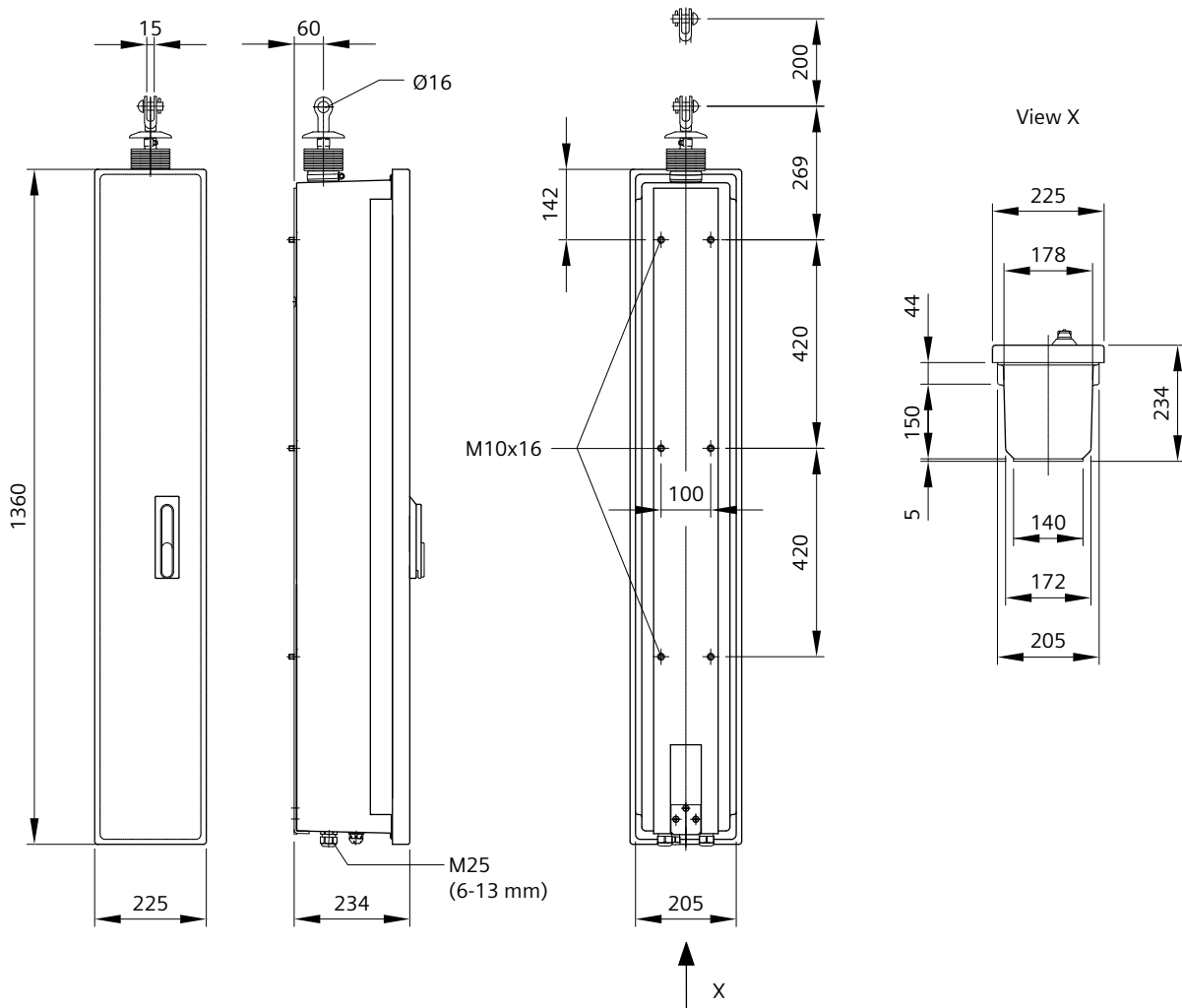
³⁾ At use of the operating linkage 8WL6230-6B the actuating unit is insulated opposite earth.

⁴⁾ Can also be supplied with activated disconnector position signal Sicat DMS 3 kV DC, order no. 8WL6243-0M.

Other types with activated disconnector position signal Sicat DMS 3 kV DC or 25 kV AC on request.

Electromechanical operated mechanism in long GRP casing

for remote-controlled operation of disconnectors with stroke 200 mm



Part 1

Order no.	8WL6244-0	8WL6244-3	8WL6244-4	8WL6244-6	8WL6244-0L
Designation	Operated mechanism 230 V AC ^{2) 4)}	Operated mechanism 110 V DC ³⁾	Operated mechanism 60 V DC ³⁾	Operated mechanism 24 V DC ^{3) 4)}	Operated mechanism 230 V AC with LAN connection ²⁾
Material					
Casing	GRP, color RAL6009 (fir green)	GRP, color RAL6009 (fir green)	GRP, color RAL6009 (fir green)	GRP, color RAL6009 (fir green)	GRP, color RAL6009 (fir green)
Casing support	stlSt	stlSt	stlSt	stlSt	stlSt
Actuating bar	stlSt	stlSt	stlSt	stlSt	stlSt
Bellow	Rubber, black	Rubber, black	Rubber, black	Rubber, black	Rubber, black
Connecting clevis	CuAl	CuAl	CuAl	CuAl	CuAl
Pin 16x40	stlSt	stlSt	stlSt	stlSt	stlSt
Split pin 5x28	Cu	Cu	Cu	Cu	Cu
Weight	46 kg	46 kg	46 kg	46 kg	46 kg
Vertical stroke	200 mm	200 mm	200 mm	200 mm	200 mm
Actuating force in end positions	min. 4 kN	min. 4 kN	min. 4 kN	min. 4 kN	min. 4 kN
Stroke speed	40 - 66 mm/s	40 - 66 mm/s	40 - 66 mm/s	40 - 66 mm/s	40 - 66 mm/s
Operating time	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)
Ambient temperature	-40 °C to +50 °C	-40 °C to +50 °C	-40 °C to +50 °C	-40 °C to +50 °C	-40 °C to +50 °C
Nominal voltage	230 V AC	110 V DC	60 V DC	24 V DC	230 V AC
Nominal frequency	50 - 60 Hz	–	–	–	50 - 60 Hz
Perm. voltage difference	0.8 - 1.1 Un	0.8 - 1.1 Un	0.8 - 1.1 Un	0.8 - 1.1 Un	0.8 - 1.1 Un
Nominal current	2 A	4 A	7.5 A	20 A	2 A
Protection class	IP54	IP54	IP54	IP54	IP54
Connection	4 wires+PE and floating return signal	7 wires incl. door contact and floating return signal	7 wires incl. door contact and floating return signal	7 wires incl. door contact and floating return signal	permanent power supply, 4 digital inputs, 1xRJ45 (Ethernet), commu- nication acc. to IEC 60870-5-104
Operating mode	electrical remote control/local opera- tion, manual local operation	electrical remote control/local opera- tion, manual local operation	electrical remote control/local opera- tion, manual local operation	electrical remote control/local opera- tion, manual local operation	electrical remote control/local opera- tion, manual local operation
Non-return blocking	positive	positive	positive	positive	positive
Operating switch	lockable	lockable	lockable	lockable	lockable
Locking system	Semi-lock barrel ¹⁾	Semi-lock barrel ¹⁾	Semi-lock barrel ¹⁾	Semi-lock barrel ¹⁾	Semi-lock barrel ¹⁾

Part 2

Order no.	8WL6244-6L
Designation	Operated mechanism 24 V DC with LAN connection ³⁾
Material	
Casing	GRP, color RAL6009 (fir green)
Casing support	stlSt
Actuating bar	stlSt
Bellow	Rubber, black
Connecting clevis	CuAl
Pin 16x40	stlSt
Split pin 5x28	Cu
Weight	46 kg
Vertical stroke	200 mm
Actuating force in end positions	min. 4 kN
Stroke speed	40 - 66 mm/s
Operating time	3 - 5 s (0.8 - 1.1 Un)
Ambient temperature	-40 °C to +50 °C
Nominal voltage	24 V DC
Nominal frequency	–
Perm. voltage difference	0.8 - 1.1 Un
Nominal current	20 A
Protection class	IP54
Connection	permanent power supply, 4 digital inputs, 1xRJ45 (Ethernet), communication acc. to IEC 60870-5-104
Operating mode	electrical remote control/local operation, manual local operation
Non-return blocking	positive
Operating switch	lockable
Locking system	Semi-lock barrel ¹⁾

¹⁾ not in delivery scope

²⁾ At use of the operating linkage 8WL6230-6B the protection conductor is insulated opposite earth.

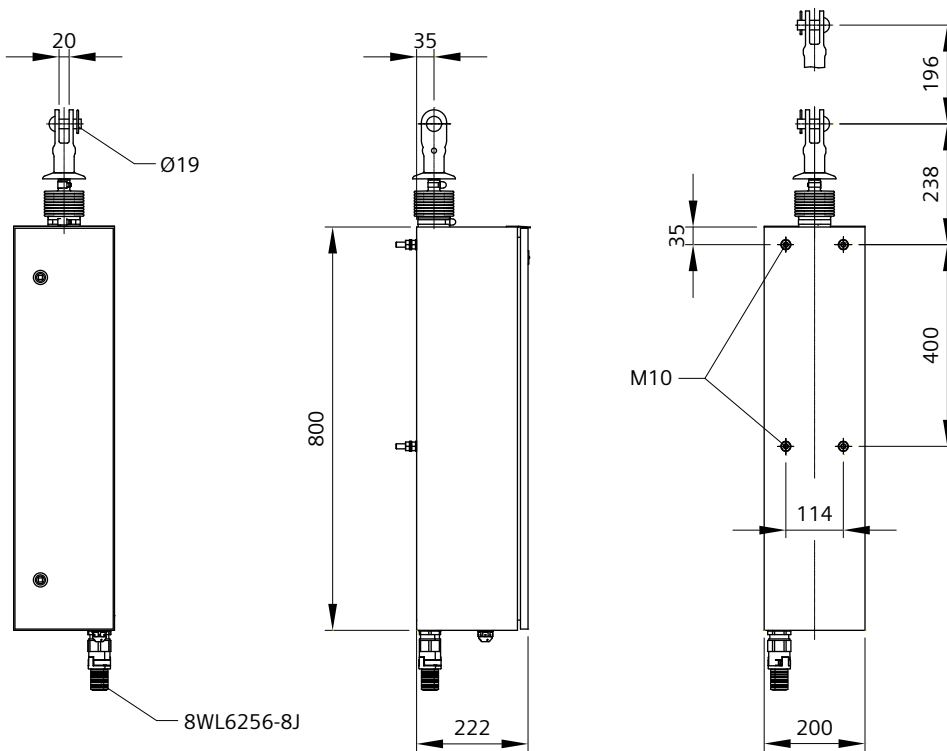
³⁾ At use of the operating linkage 8WL6230-6B the actuating unit is insulated opposite earth.

⁴⁾ Can also be supplied with activated disconnector position signal Sicat DMS 3 kV DC, order no. 8WL6244-0M resp. 8WL6244-6M.

Other types with activated disconnector position signal Sicat DMS 3 kV DC or 25 kV AC on request.

Electromechanical operated mechanism in short stainless steel casing

for remote-controlled operation of disconnectors with stroke 200 mm



Part 1

Order no.	8WL6253-0	8WL6253-0A	8WL6253-1A	8WL6253-1	8WL6253-2
Designation	Operated mechanism 230 V AC	Operated mechanism 230 V AC	Operated mechanism 230 V AC / 220 V DC	Operated mechanism 220 V DC	Operated mechanism 110-125 V AC
Material					
Casing	stlSt	stlSt	stlSt	stlSt	stlSt
Actuating bar	stlSt	stlSt	stlSt	stlSt	stlSt
Bellow	Rubber, black	Rubber, black	Rubber, black	Rubber, black	Rubber, black
Connecting clevis	mICI	mICI	mICI	mICI	mICI
Pin 19x52	stlSt	stlSt	stlSt	stlSt	stlSt
Beta-Split pin	stlSt	stlSt	stlSt	stlSt	stlSt
Weight	33.5 kg	33.5 kg	33.5 kg	33.5 kg	33.5 kg
Vertical stroke	200 mm	200 mm	200 mm	200 mm	200 mm
Actuating force in end positions	min. 4 kN	min. 4 kN	min. 4 kN	min. 4 kN	min. 4 kN
Stroke speed	40 - 66 mm/s	40 - 66 mm/s	40 - 66 mm/s	40 - 66 mm/s	40 - 66 mm/s
Operating time	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)
Ambient temperature	-40 °C to +50 °C	-40 °C to +50 °C	-40 °C to +50 °C	-40 °C to +50 °C	-40 °C to +50 °C
Nominal voltage	230 V AC	230 V AC	230 V AC / 220 V DC	220 V DC	110 to 125 V AC
Nominal frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz / –	–	50 - 60 Hz
Perm. voltage difference	0.8 - 1.1 Un	0.8 - 1.1 Un	0.8 - 1.1 Un	0.8 - 1.1 Un	0.8 - 1.1 Un
Nominal current	2 A	2 A	2 A	2 A	4 A
Protection class	IP55	IP55	IP55	IP55	IP55
Connection	3 wires	6 resp. 7 wires, with separate return signal	3 wires	6 resp. 7 wires, with separate return signal	6 resp. 7 wires, with separate return signal
Operating mode	electrical remote control operation, manual local operation	electrical remote control operation, manual local operation	electrical remote control operation, manual local operation	electrical remote control operation, manual local operation	electrical remote control operation, manual local operation
Non-return blocking	positive	positive	positive	positive	positive
Operating switch	lockable	lockable	lockable	lockable	lockable
Locking system	2x lock square (8 mm)	2x lock square (8 mm)	2x lock square (8 mm)	2x lock square (8 mm)	2x lock square (8 mm)

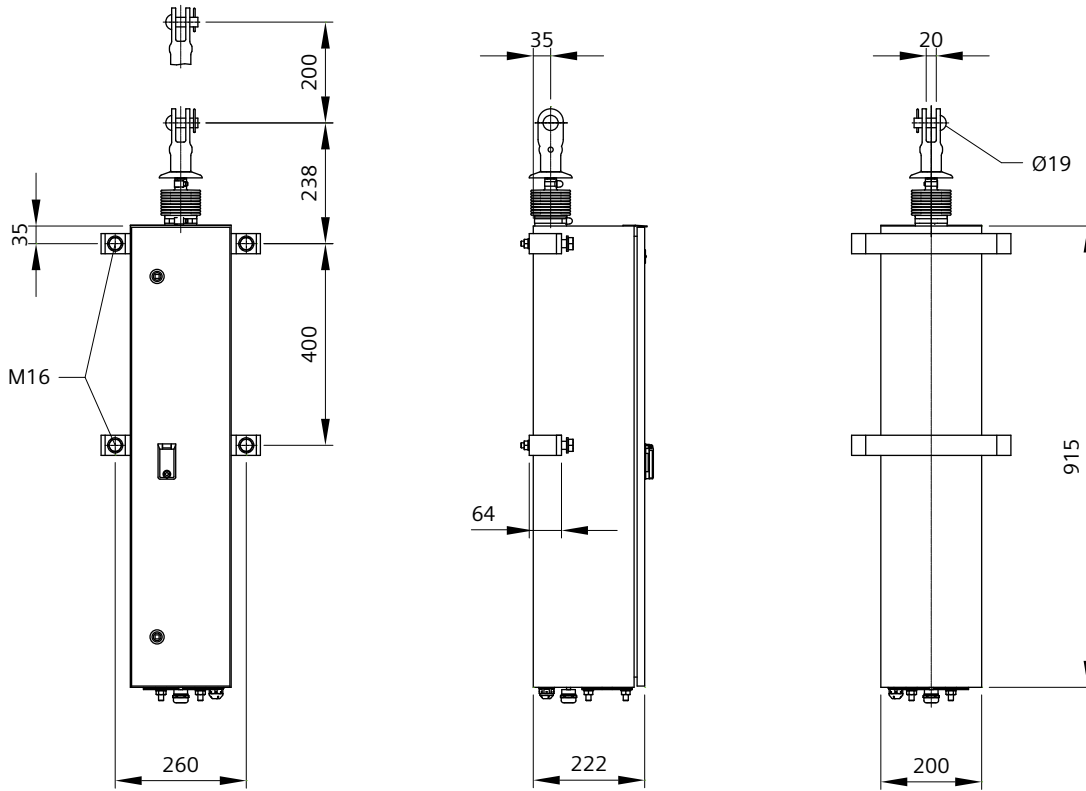
Part 2

Order no.	8WL6253-3	8WL6253-5	8WL6253-6
Designation	Operated mechanism 110-120 V DC	Operated mechanism 48 V DC	Operating mechanism 24 V DC
Material			
Casing	stlSt	stlSt	stlSt
Actuating bar	stlSt	stlSt	stlSt
Bellow	Rubber, black	Rubber, black	Rubber, black
Connecting clevis	mICl	mICl	mICl
Pin 19x52	stlSt	stlSt	stlSt
Beta-Split pin	stlSt	stlSt	stlSt
Weight	33.5 kg	33.5 kg	33.5 kg
Vertical stroke	200 mm	200 mm	200 mm
Actuating force in end positions	min. 4 kN	min. 4 kN	min. 4 kN
Stroke speed	40 - 66 mm/s	40 - 66 mm/s	40 - 66 mm/s
Operating time	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)
Ambient temperature	-40 °C to +50 °C	-40 °C to +50 °C	-40 °C to +50 °C
Nominal voltage	110 to 120 V DC	48 V DC	24 V DC
Nominal frequency	–	–	–
Perm. voltage difference	0.8 - 1.1 Un	0.8 - 1.1 Un	0.8 - 1.1 Un
Nominal current	4 A	9 A	20 A
Protection class	IP55	IP55	IP55
Connection	6 resp. 7 wires, with separate return signal	6 resp. 7 wires, with separate return signal	6 resp. 7 wires, with separate return signal
Operating mode	electrical remote control operation, manual local operation	electrical remote control operation, manual local operation	electrical remote control operation, manual local operation
Non-return blocking	positive	positive	positive
Operating switch	lockable	lockable	lockable
Locking system	2x lock square (8 mm)	2x lock square (8 mm)	2x lock square (8 mm)

Key with male square 8WL6203-8L, hand crank 8WL6256-6 and corrugated tube 8WL6256-8J (length as needed) must be ordered separately.

Electromechanical operated mechanism in long stainless steel casing

for remote-controlled operation of disconnectors with stroke 200 mm, with terminal cells

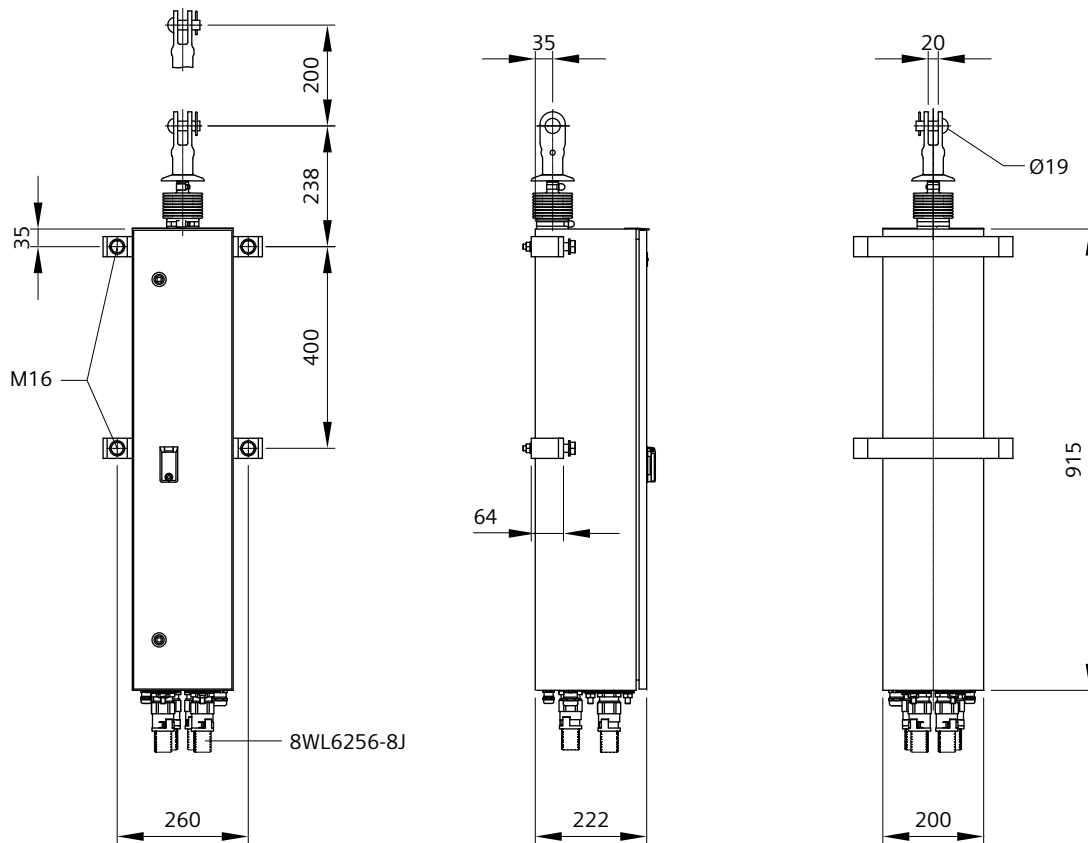


Order no.	8WL6254-0DA	8WL6254-0DB	8WL6254-0AB
Designation	Operating mechanism 230 V AC	Operating mechanism 230 V AC and short-circuit signal relay	Operating mechanism 230 V AC
Material			
Casing	stlSt	stlSt	stlSt
Actuating bar	stlSt	stlSt	stlSt
Bellow	Rubber, black	Rubber, black	Rubber, black
Connecting clevis	mCl	mCl	mCl
Pin 19x52	stlSt	stlSt	stlSt
Beta-Split pin	stlSt	stlSt	stlSt
Hand crank	stlSt	stlSt	stlSt
Adapter	htgSt	htgSt	htgSt
Weight	40.5 kg	40.5 kg	40.5 kg
Vertical stroke	200 mm	200 mm	200 mm
Actuating force in end positions	min. 4 kN	min. 4 kN	min. 4 kN
Stroke speed	40 - 66 mm/s	40 - 66 mm/s	40 - 66 mm/s
Operating time	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)
Ambient temperature	-40 °C to +50 °C	-40 °C to +50 °C	-40 °C to +50 °C
Nominal voltage	230 V AC	230 V AC	230 V AC
Nominal frequency	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Perm. voltage difference	0.8 - 1.1 Un	0.8 - 1.1 Un	0.8 - 1.1 Un
Nominal current	2 A	2 A	2 A
Protection class	IP55	IP55	IP55
Connection	3 wires, 11 additional terminal cells	3 wires, 9 additional terminal cells	3 wires with separate return signal, 9 additional terminal cells
Operating mode	electrical remote control operation, manual local operation	electrical remote control operation, manual local operation	electrical remote control operation, manual local operation
Non-return blocking	positive	positive	positive
Operating switch	lockable	lockable	lockable
Locking system	2x lock square (8 mm) and lock for key 8WL6210-1	2x lock square (8 mm) and lock for key 8WL6210-1	2x lock square (8 mm) and lock for key 8WL6210-1

Key with male square 8WL6203-8L and key 8WL6210-1 must be ordered separately.

Electromechanical operated mechanism in long stainless steel casing

for remote-controlled operation of disconnectors with stroke 200 mm, with evaluation unit Sicat DMS

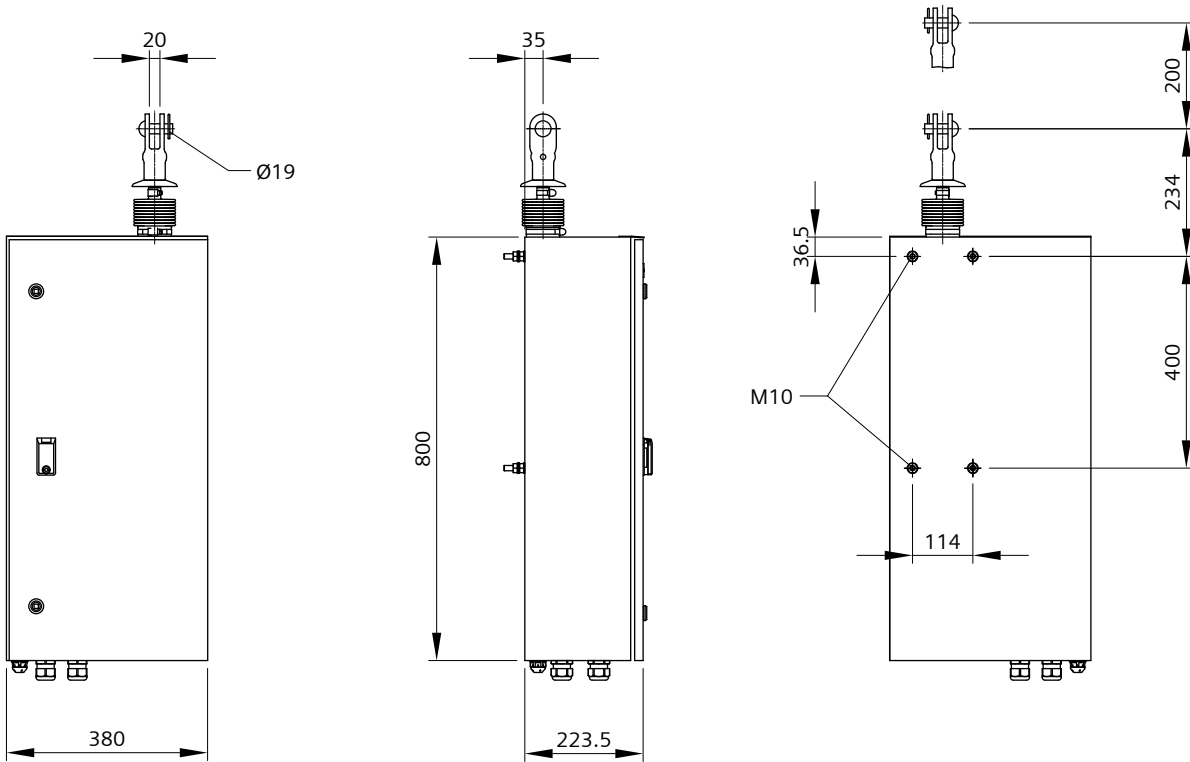


Order no.	8WL6254-0DC	8WL6254-0AD
Designation	Operating mechanism 230 V AC	Operating mechanism 230 V AC
Material		
Casing	stlSt	stlSt
Actuating bar	stlSt	stlSt
Bellow	Rubber, black	Rubber, black
Connecting clevis	mICl	mICl
Pin 19x52	stlSt	stlSt
Beta-Split pin	stlSt	stlSt
Hand crank	stlSt	stlSt
Adapter	htgSt	htgSt
Weight	40.5 kg	40.5 kg
Vertical stroke	200 mm	200 mm
Actuating force in end positions	min. 4 kN	min. 4 kN
Stroke speed	40 - 66 mm/s	40 - 66 mm/s
Operating time	3 - 5 s (0.8 - 1.1 Un)	3 - 5 s (0.8 - 1.1 Un)
Ambient temperature	-40 °C to +50 °C	-40 °C to +50 °C
Nominal voltage	230 V AC	230 V AC
Nominal frequency	50 - 60 Hz	50 - 60 Hz
Perm. voltage difference	0.8 - 1.1 Un	0.8 - 1.1 Un
Nominal current	2 A	2 A
Protection class	IP55	IP55
Connection	3 wires	3 wires with separate return signal
Operating mode	electrical remote control operation, manual local operation	electrical remote control operation, manual local operation
Non-return blocking	positive	positive
Operating switch	lockable	lockable
Locking system	2x lock square (8 mm) and lock for key 8WL6210-1	2x lock square (8 mm) and lock for key 8WL6210-1

Key with male square 8WL6203-8L, key 8WL6210-1 and corrugated tube 8WL6256-8J (length as needed) must be ordered separately.

Electromechanical operated mechanism in wide stainless steel casing

for remote-controlled operation of disconnectors with stroke 200 mm, with LAN connection

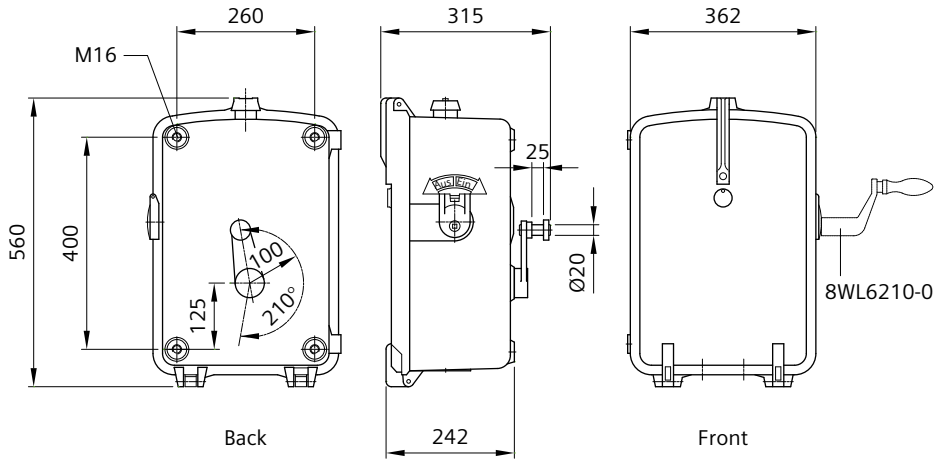


Order no.	8WL6253-OBL
Designation	Operating mechanism 230 V AC
Material	
Casing	stlSt
Actuating bar	stlSt
Bellow	Rubber, black
Connecting clevis	mICI
Pin 19x52	stlSt
Beta-Split pin	stlSt
Hand crank	stlSt
Weight	44.8 kg
Vertical stroke	200 mm
Actuating force in end positions	min. 4 kN
Stroke speed	40 - 66 mm/s
Operating time	3 - 5 s (0.8 - 1.1 Un)
Ambient temperature	-40 °C to +50 °C
Nominal voltage	230 V AC
Nominal frequency	50 - 60 Hz
Perm. voltage difference	0.8 - 1.1 Un
Nominal current	2 A
Protection class	IP55
Connection	3 wires with 1xRJ45 (Ethernet), communication acc. to IEC 61860-5-104
Operating mode	electrical remote control operation, manual local operation
Non-return blocking	positive
Operating switch	lockable
Locking system	2x lock square (8 mm) and lock for key 8WL6210-1

Key with male square 8WL6203-8L and key 8WL6210-1 must be ordered separately.

Motor-operated mechanism, radial stroke

for remote-controlled operation of disconnectors and earthing switches

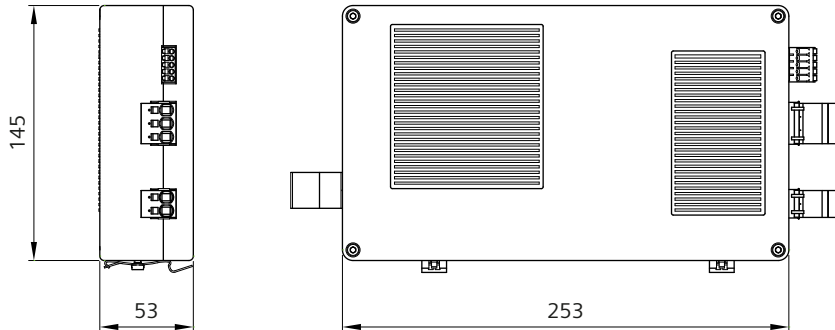


Order no.	8WL6200-2A	8WL6200-2G	8WL6200-2N	8WL6200-2P
Designation	Motor-operated mechanism (German lettering)	Motor-operated mechanism (English lettering)	Motor-operated mechanism (German lettering)	Motor-operated mechanism (English lettering)
Material	ctAl	ctAl	ctAl	ctAl
Weight	43.0 kg	43.0 kg	43.0 kg	43.0 kg
Torque at the crank	125 Nm	125 Nm	250 Nm	250 Nm
Vertical stroke	200 mm	200 mm	200 mm	200 mm
Max. power transmission (slipping clutch)	125 - 145 Nm	125 - 145 Nm	250 - 290 Nm	250 - 290 Nm
Operating time	3 - 10 s ¹⁾	3 - 10 s ¹⁾	3 - 10 s ¹⁾	3 - 10 s
Nominal voltage/frequency	230 V AC / 50 Hz	230 V AC / 50 Hz	230 V AC / 50 Hz	230 V AC / 50 Hz
Protection class (casing)	IP24D	IP24D	IP24D	IP24D
Connection type	three-wire principle	three-wire principle	six-wire principle	six-wire principle

¹⁾ depending on series resistance and cables

Hand crank 8WL6210-0, key 8WL6210-1 and fastening bolts M16 must be ordered separately.

Power supply with optional back-up battery



Order no.	8WL6240-1A	8WL6240-0A
Designation	Power supply AC/DC	Power supply DC/DC
Material		
Casing	Plastic	Plastic
Weight	0.85 kg	0.85 kg
Ambient temperature	-40 °C to +60 °C	-40 °C to +60 °C
Nominal voltage (primary side)	110 to 230 V AC	750 V DC
Working range primary voltage	140 to 350 V DC 85 to 265 V AC	400 to 900 V DC
Nominal voltage (secondary side)	24 V DC	24 V DC
Output voltage DO	24 V DC	24 V DC
Output voltage ¹⁾	24 to 29 V DC	24 to 29 V DC
Continuous power output	150 W	150 W
Max. power (min. > 60 s)	300 W	300 W
No-load losses (typical)	5.5 W	5.5 W
Max. continuous current ²⁾	50 A	50 A
Protection class (casing)	IP50	IP50
Min. protection class requirement for external casing at outdoor use	IP54	IP54

¹⁾ unregulated, in charging mode and battery

²⁾ of battery switch

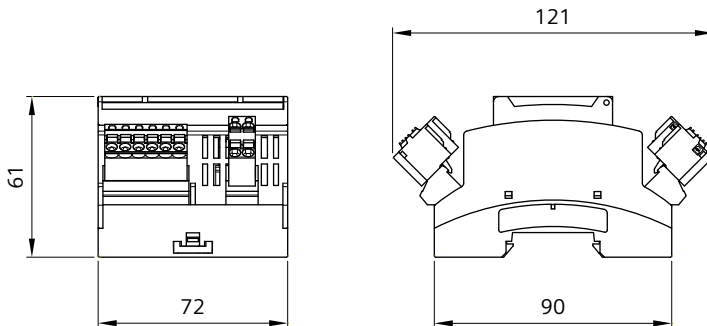
Batteries connectable (2x 12 V DC or 1x 24 V DC nominal voltage)

8 LEDs and 4 digital outputs (DO) for additional identification

Attachment on DIN rail (35 mm) via two fastening feets.

Control module for disconnector drives

for DIN rail attachment > 35 mm



Order no.	8WL6242-1	8WL6242-2
Designation	Control module with 3-/4-wire technology	Control module with 6-/8-wire technology
Material		
Casing	Plastic	Plastic
Weight	0.14 kg	0.14 kg
Ambient temperature	-20 °C to +65 °C	-20 °C to +65 °C
Storage temperature	-40 °C to +80 °C	-40 °C to +80 °C
Supply voltage (control unit)	24 V DC	24 V DC
Control pulses 24 V DC	running time or pulse-bound, depending on disconnector drive, no pulse prolongation integrated	running time or pulse-bound, depending on disconnector drive, no pulse prolongation integrated
Voltage ¹⁾	230 V AC	125 to 230 V AC 110 to 220 V DC
Max. continuous current ²⁾	16 A	16 A
Protection class (casing)	IP30 ³⁾ / IP10 ⁴⁾	IP30 ³⁾ / IP10 ⁴⁾
Protection disconnector drives	6.3 A surge-proof (typical)	6.3 A surge-proof (typical)
Overvoltage protection	integrated varistors, operating voltage > 430 V	integrated varistors, operating voltage > 430 V

¹⁾ power unit to disconnector drive

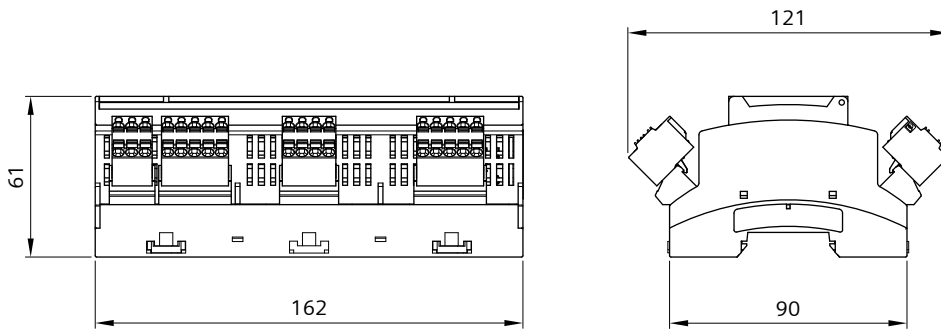
²⁾ at exit relays

³⁾ connectors plugged in

⁴⁾ connectors not plugged in

Control module with coupling relays for disconnector drives

for DIN rail attachment > 35 mm, six coupling relays (e.g. for connection on DMS evaluation unit 8WL6255-7A or -7B) and one command relay (e.g. for interlocking of the drive mechanism)



Order no.	8WL6242-3	8WL6242-4
Designation	Control module with 3-/4-wire technology with coupling relays	Control module with 6-/8-wire technology with coupling relays
Material		
Casing	Plastic	Plastic
Weight	0.33 kg	0.33 kg
Ambient temperature	-20 °C to +65 °C	-20 °C to +65 °C
Storage temperature	-40 °C to +80 °C	-40 °C to +80 °C
Supply voltage (control unit)	24 V DC	24 V DC
Control pulses 24 V DC	running time or pulse-bound, depending on disconnector drive, no pulse prolongation integrated	running time or pulse-bound, depending on disconnector drive, no pulse prolongation integrated
Voltage ¹⁾	230 V AC	125 to 230 V AC 110 to 220 V DC
Max. continuous current ²⁾	16 A	16 A
Protection class (casing)	IP30 ³⁾ / IP10 ⁴⁾	IP30 ³⁾ / IP10 ⁴⁾
Protection disconnector drives	6.3 A surge-proof (typical)	6.3 A surge-proof (typical)
Overvoltage protection	integrated varistors, operating voltage > 430 V	integrated varistors, operating voltage > 430 V

¹⁾ power unit to disconnector drive

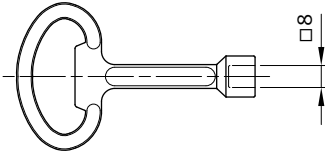
²⁾ at exit relays

³⁾ connectors plugged in

⁴⁾ connectors not plugged in

Key with male square

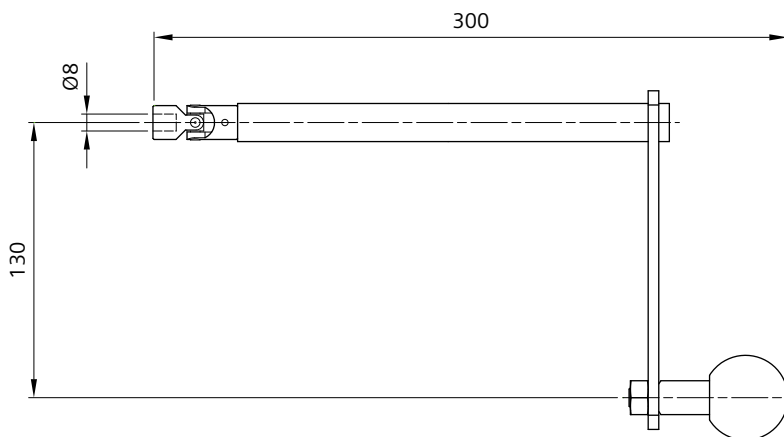
for electromechanical operated mechanism 8WL6253- and 8WL6254-



Order no.	8WL6203-8L
Designation	Key with male square
Material	St
Weight	0.04 kg

Hand crank

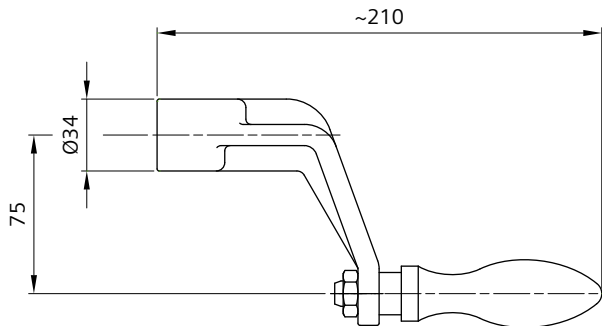
for electromechanical operated mechanism 8WL6253-



Order no.	8WL6256-6
Designation	Hand crank
Material	stlSt
Weight	0.76 kg

Hand crank

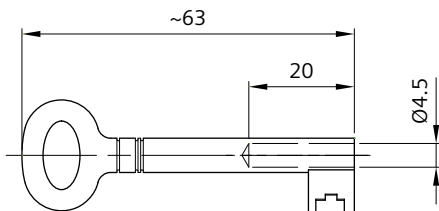
for motor-operated mechanism 8WL6200-



Order no.	8WL6210-0
Designation	Hand crank
Material	ctAl
Weight	0.36 kg

Key

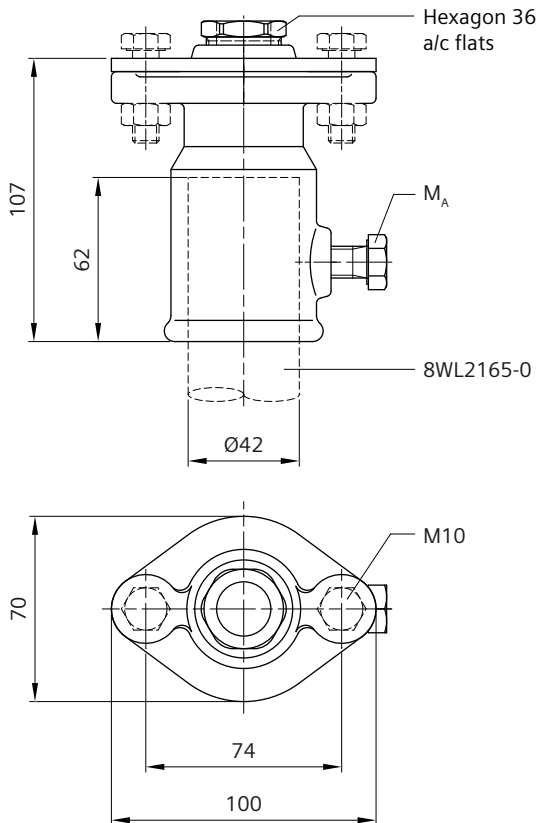
for motor-operated mechanism 8WL6200- and 8WL6254-



Order no.	8WL6210-1
Designation	Key
Material	St
Weight	0.017 kg

Cable sealing box for cable protection with aluminium tube

for electromechanical operated mechanism 8WL6253- and 8WL6254-

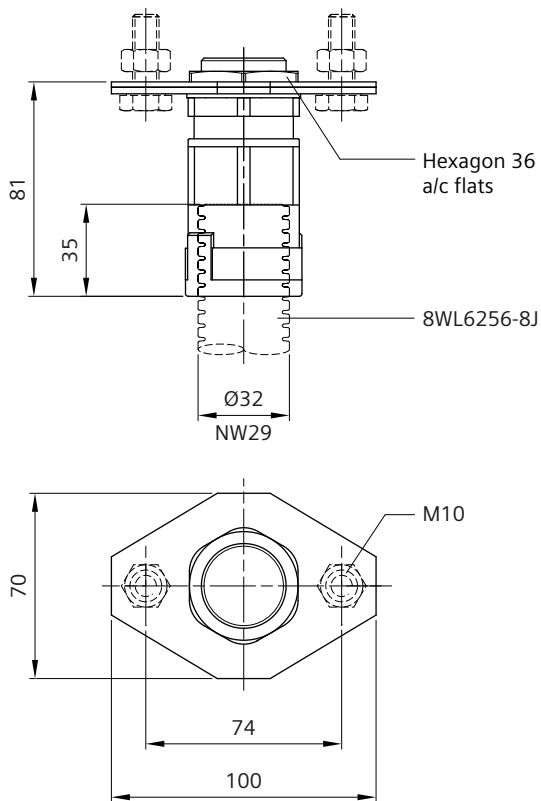


Order no.	8WL6212-7
Designation	Cable sealing box
Material	
Casing	ctAl
Flange	ctAl
Compression ring/bolt	htgSt, plastic
Sealing ring, O-ring	Rubber
Cup-point screw M12	stlSt
Weight	0.51 kg
Tightening torque M_A	50 Nm

Two fastening bolts M10 are available at the drive mechanism. Aluminium tube 8WL2165-0 (length as needed) must be ordered separately.

Cable sealing box for cable protection with corrugated tube

for electromechanical operated mechanism 8WL6253- and 8WL6254-

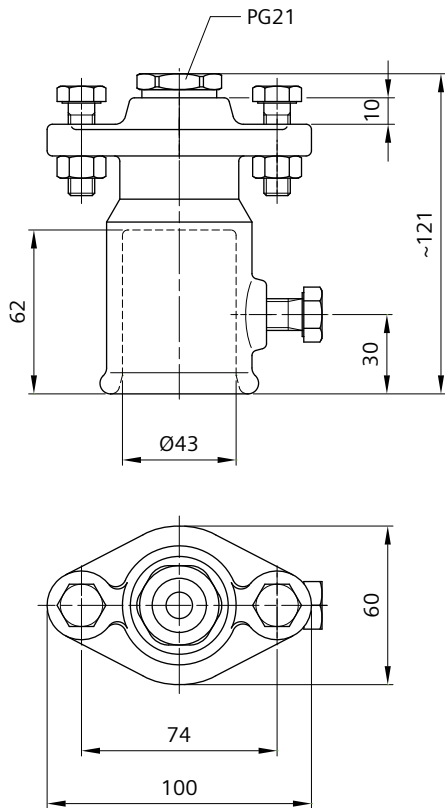


Order no.	8WL6212-7B
Designation	Cable sealing box
Material	
Screw connection	Plastic
Sealing	Plastic
Flange	Al
Locknut	CuZn
Weight	0.38 kg

Two fastening bolts M10 are available at the drive mechanism. Corrugated tube 8WL6256-8J (length as needed) must be ordered separately.

Cable sealing box

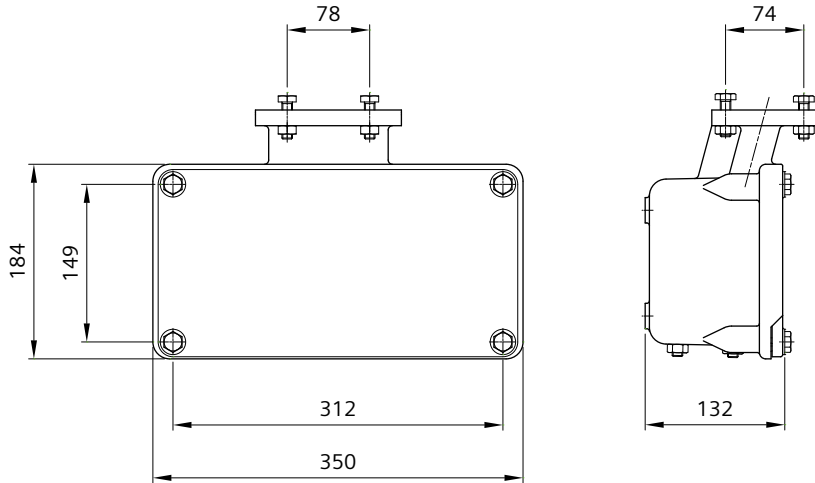
for motor-operated mechanism 8WL6200-



Order no.	8WL6212-0
Designation	Cable sealing box
Material	
Casing, flange	ctAl
Compression ring	htgSt
Sealing ring	Rubber
Compression bolt	Plastic
Bolts M10	stlSt
Nuts	stlSt
Cup-point screw M12	stlSt
Weight	0.43 kg

Short-circuit signal relay in additional casing

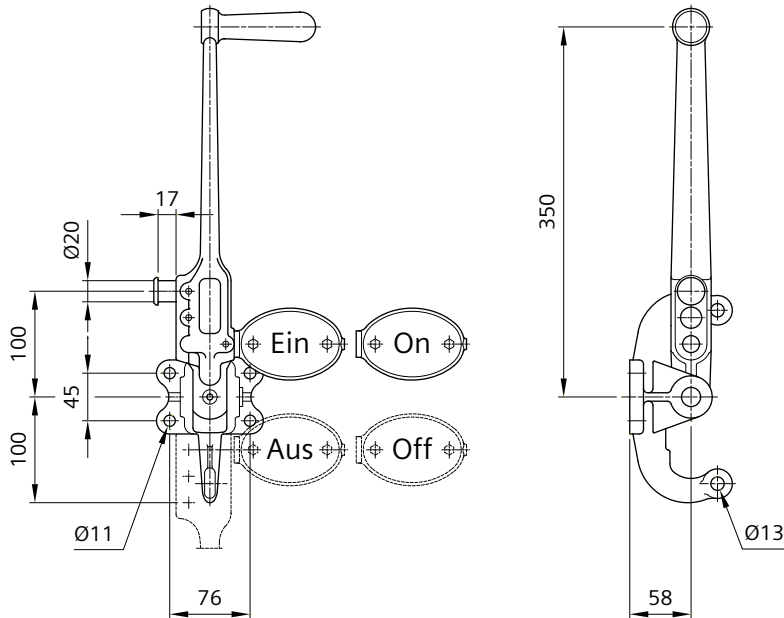
for motor-operated mechanism 8WL6200-



Order no.	8WL6207-0
Designation	Short-circuit signal relay in additional casing
Material	
Casing, flange	ctAl
Sealings	Rubber
Bolts	stlSt
Nuts	stlSt
Washers	stlSt
Weight	6.62 kg
Nominal voltage	230 V AC
Nominal frequency	50 Hz
Max. short-time carrying capacity	40 - 50 A

Manual operating mechanism

for disconnector operation, stroke 200 mm



Order no.	8WL6214-0	8WL6214-1
Designation	Manual operating mechanism (German lettering Ein/Aus)	Manual operating mechanism (English lettering On/Off)
Material		
Base	ctAl	ctAl
Handle	ctAl	ctAl
Indicator plates	ctAl	ctAl
Pins	stlSt	stlSt
Prestressed sleeves	stlSt	stlSt
Weight	1.64 kg	1.64 kg

Padlock 8WL6215-0 must be ordered separately, see page 749.

Bracket 8WL6217-8 for fastening at pole with punch-look band, see page 748.

Can also be supplied in other languages:

8WL6214-2 (French lettering)

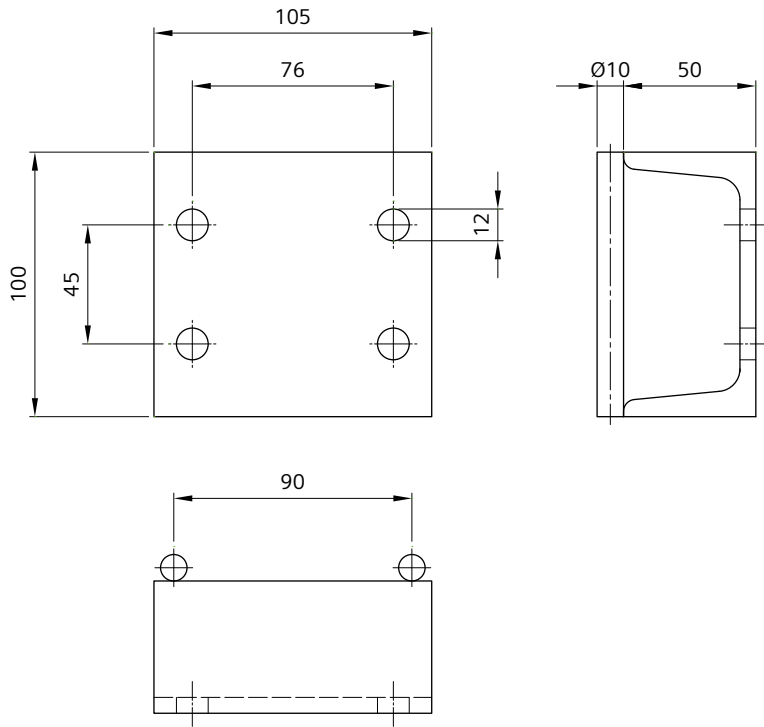
8WL6214-3 (Spanish lettering)

8WL6214-4 (Dutch lettering)

8WL6214-8 (Swedish lettering)

Bracket for manual operating mechanism 8WL6214-

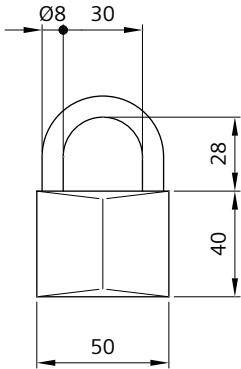
for fastening with punch-lock band



Order no.	8WL6217-8
Designation	Bracket
Material	htgSt
Weight	1.25 kg

Padlock

for manual operating mechanism 8WL6214-

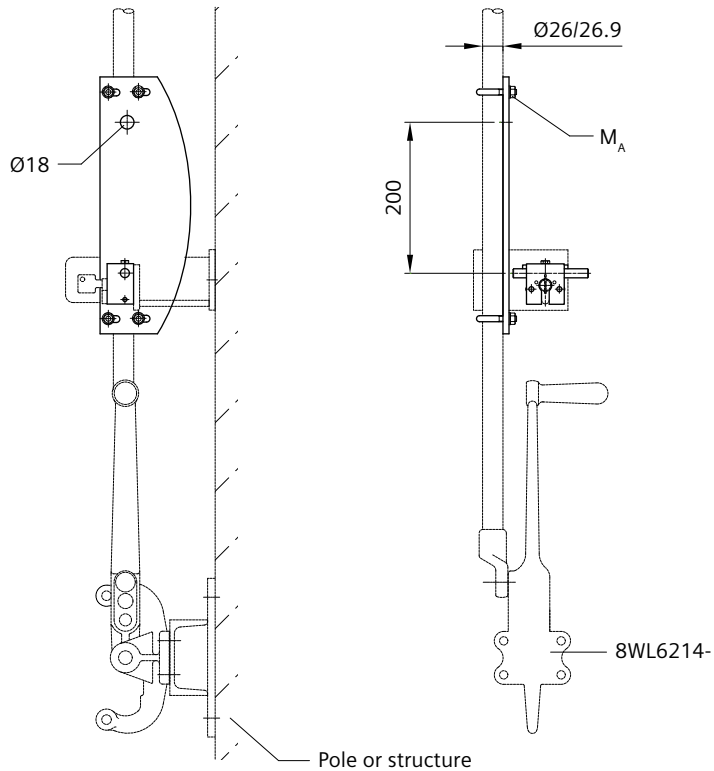


Order no.	8WL6215-0
Designation	Padlock
Material	CuZn
Weight	0.28 kg

incl. two keys

Key lock with locking plate

as mechanical safety device for manual operating mechanism 8WL6214- in depots or workshops, for operating linkage made of tubes $d=26$ and 26.9 mm ($3/4$ "")



Order no.	8WL6227-2
Designation	Key lock
Material	
Lock (casing)	CuZn
Locking plate	htgSt
U-bolts M8	stlSt
Nuts, washers	stlSt
Weight	2.93 kg
Tightening torque M_A	16 Nm

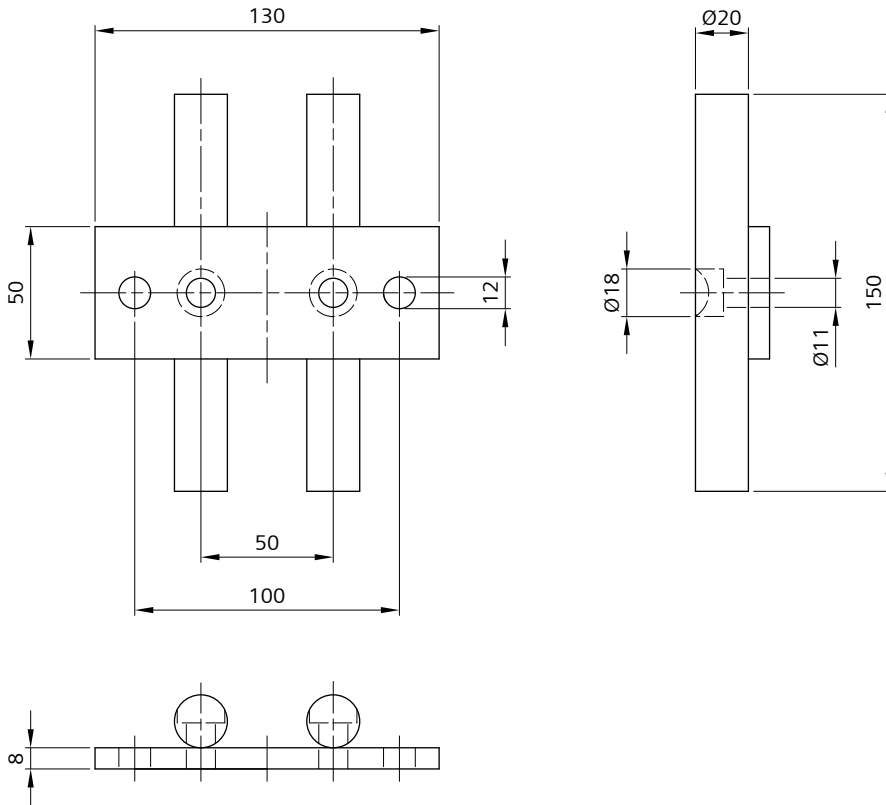
Lock barrel acc. to DIN 18252 and key must be ordered separately.

Manual operated mechanism 8WL6214- (type as needed) must be ordered separately, see page 747.

Can also be supplied without locking plate and U-bolts, order no. 8WL6227-3.

Bracket for drive mechanism

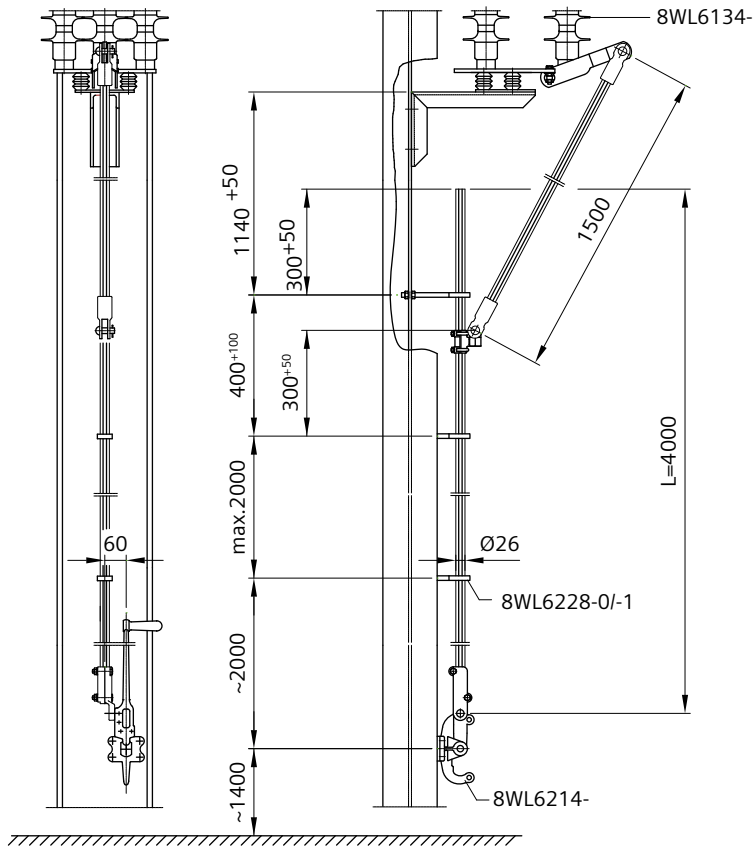
for fastening with punch-lock band, for drive mechanisms 8WL6243- and 8WL6244-



Order no.	8WL6257-1GC
Designation	Bracket
Material	htgSt
Weight	1.25 kg

Operating linkage made of GRP rods

for manual operating mechanism 8WL6214-, for disconnectors up to 3 kV DC 8WL6134-



Order no.	8WL6230-5B
Designation	GRP operating linkage
Material	
Insulating rods	GRP, color RAL6022 (olive drab)
Fittings	ctAl, CuAl, CuZn
U-bolts	stlSt
Nuts	stlSt
Weight	12 kg
Max. pressure load	2 kN

Guide 8WL6228-0 or -1 (3x) (see page 768), manual operated mechanism 8WL6214- (type as needed, see page 747) and disconnector 8WL6134- (type as needed, see pages 678 to 698) must be ordered separately.

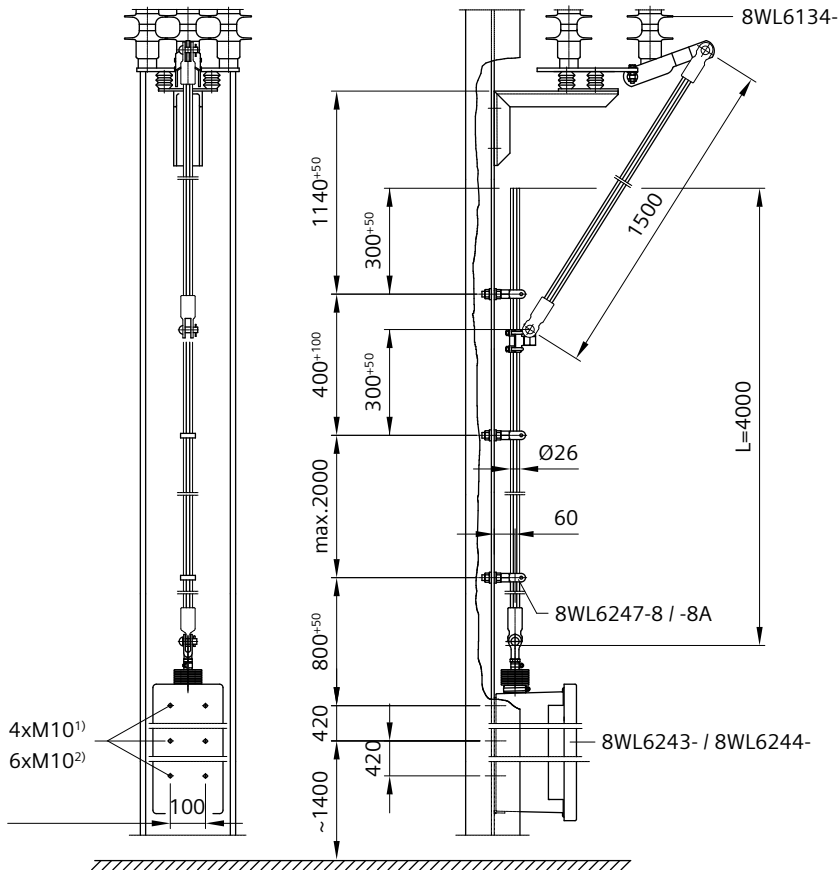
Further single components see pages 754 to 759.

Other colors and lengths on request.

Type for pressure load higher than 2 kN on request.

Operating linkage made of GRP rods

for electromechanical operated mechanism 8WL6243- and 8WL6244-, for disconnectors up to 3 kV DC 8WL6134-



Order no.	8WL6230-6B
Designation	GRP operating linkage
Material	
Insulating rods	GRP, color RAL6022 (olive drab)
Fittings	CuAl, CuZn
U-bolts	stlSt
Nuts	stlSt
Weight	12 kg
Max. pressure load	2 kN

¹⁾ for 8WL6243-

²⁾ for 8WL6244-

Guide 8WL6247-8 or -8A (3x) (see page 756), fastening parts at the pole, drive mechanism 8WL6243-/8WL6244- (type as needed, see pages 724 to 726) and disconnector 8WL6134- (type as needed, see pages 678 to 698) must be ordered separately.

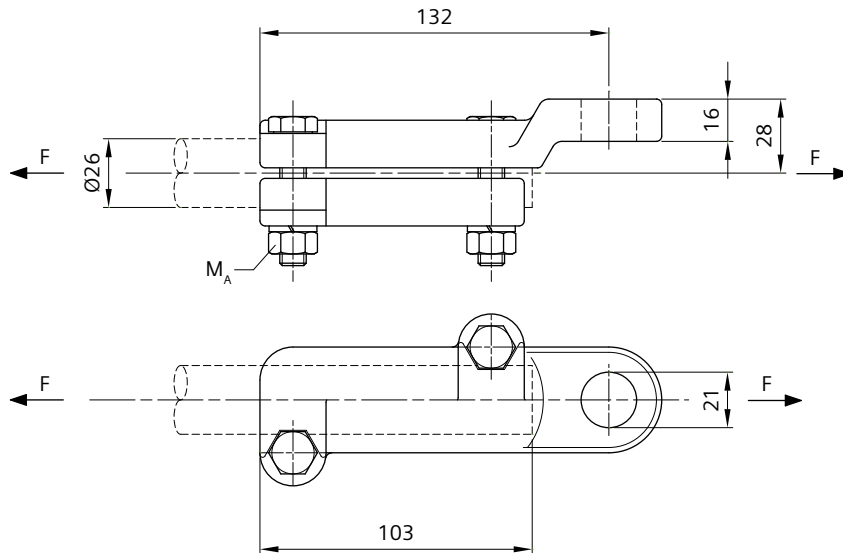
Further single components see pages 755 to 759.

Other colors, lengths or types on request.

Type for pressure load higher than 2 kN on request.

Tongue end fitting 26, offset

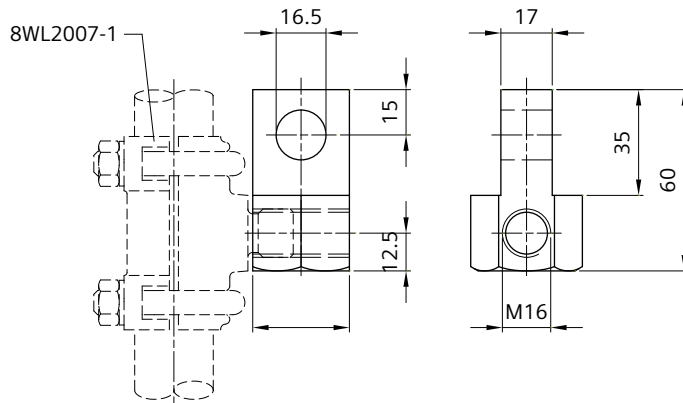
for connection of GRP operating linkage at manual operating mechanism 8WL6214-1, for insulating rod
d=26 mm



Order no.	8WL6225-2
Designation	Tongue end fitting
Material	
Tongue end fitting	ctAl
Clamp cover	ctAl
Bolts M10	stlSt
Nuts	stlSt
Spring washers	stlSt
Weight	0.38 kg
Perm. operating load	3.4 kN
Min. failing load	10 kN
Tightening torque M_A	32 Nm

Fitting for guiding of operating linkage

for operating linkage made of GRP, for connection at swivel clip holder 8WL2007-1

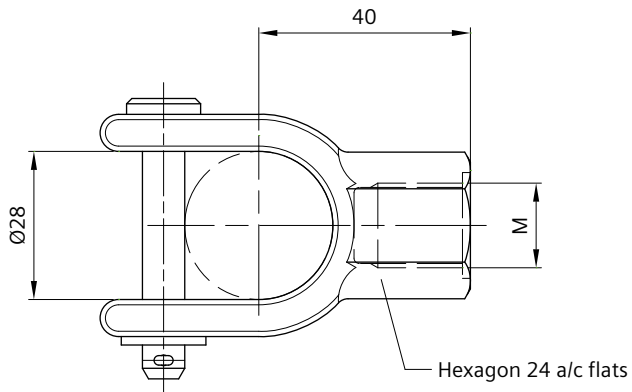


Order no.	8WL6231-6
Designation	Fitting
Material	CuZn
Weight	0.26 kg

Clip holder 8WL2007-1 see page 193.

Guide 26-M10/M16

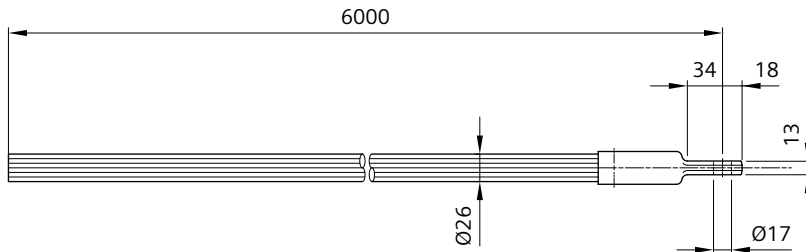
for operating linkage made of GRP



Order no.	8WL6247-8	8WL6247-8A
Designation	Guide 26-M10	Guide 26-M16
Material		
Guide	CuAl	CuAl
Pin 8x50	stlSt	stlSt
Split pin 2x20	stlSt	stlSt
Washer	stlSt	stlSt
Weight	0.19 kg	0.17 kg
M	M10	M16

Insulating rod 26 with eye

for GRP operating linkage

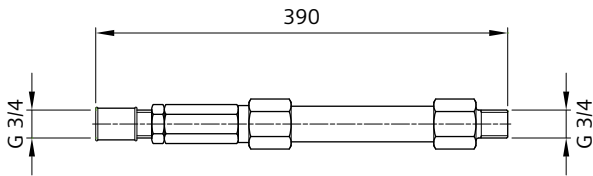


Order no.	8WL3021-8
Designation	Insulating rod 26 with eye 17
Material	
Insulating rod	GRP, color RAL6022 (olive drab)
End fitting	CuAl
Grooved pin	stlSt
Weight	6.73 kg

Other lengths and colors on request.

Rapid opener

for operating linkage made of steel tubes



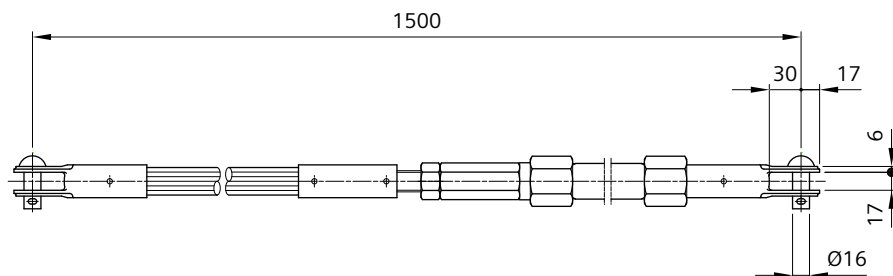
Order no.	8WL6237-0
Designation	Rapid opener
Material	
Coupling socket	mIcI
Compression spring	stlSt
Tube-type sheath	stlSt
Coupling nuts	CuZn
Tension rod	stlSt
Sealing ring	Rubber
Grooved pins	stlSt
Weight	2.12 kg

It should only be used when the operating stroke is 200 mm.

Not suitable for disconnectors with earth contact.

Upper operating linkage, insulated

with rapid opening, for GRP operating linkage



Order no.	8WL6231-8A
Designation	Upper operating linkage
Material	
Linkage insert	stlSt, CuZn
Clevis fittings	CuAl
Threaded rod M20	stlSt
Sleeve	CuAl
Insulating rod 26	GRP, color RAL6022 (olive drab)
Grooved pins	stlSt
Pins 16x45	stlSt
Split pins 5x28	Cu
Weight	5 kg
Max. pressure load	2 kN

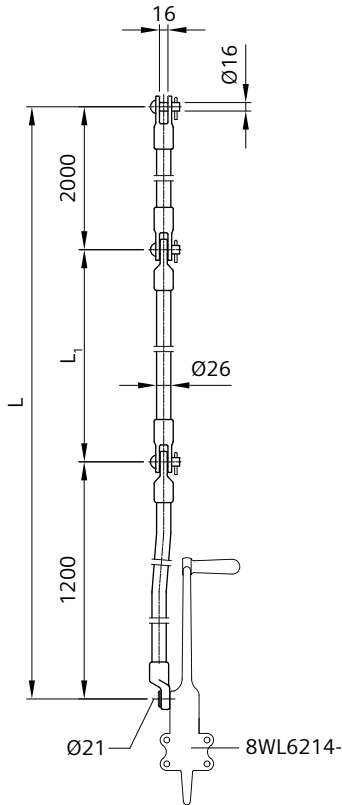
It should only be used when the operating stroke is 200 mm.

Not suitable for disconnectors with earth contact.

Other colors and lengths on request.

Operating linkage made of steel tubes

for manual operating mechanism 8WL6214-, for disconnectors up to 3 kV DC 8WL6134-



Order no.	8WL6230-0A	8WL6230-0D
Designation	Operating linkage	Operating linkage
Material		
Tubes 26	htgSt	htgSt
Fittings	mICI	mICI
Pins 16x45	htgSt	htgSt
Split pins 5x28	Cu	Cu
Weight	12.0 kg	14.4 kg
Max. pressure load	4.5 kN	4.5 kN
L	6000 mm	7200 mm
L₁	2800 mm	4000 mm

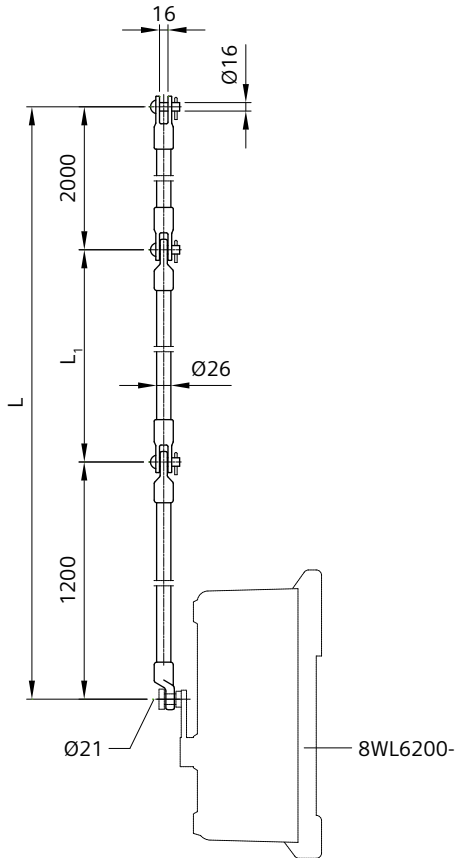
Fastening parts 8WL6228-0/-1 (see page 768) or 8WL6247-8 (see page 756) and manual operated mechanism 8WL6214- (type as needed, see page 747) must be ordered separately.

Other lengths on request.

Single components see pages 762 to 764.

Operating linkage made of steel tubes

for motor-operated mechanism 8WL6200-, for disconnectors up to 3 kV DC 8WL6134-



Order no.	8WL6230-1A	8WL6230-1D
Designation	Operating linkage	Operating linkage
Material		
Tubes 26	htgSt	htgSt
Fittings	mICI	mICI
Pins 16x45	htgSt	htgSt
Split pins 5x28	Cu	Cu
Weight	12.0 kg	14.4 kg
Max. pressure load	4.5 kN	4.5 kN
L	6000 mm	7200 mm
L₁	2800 mm	4000 mm

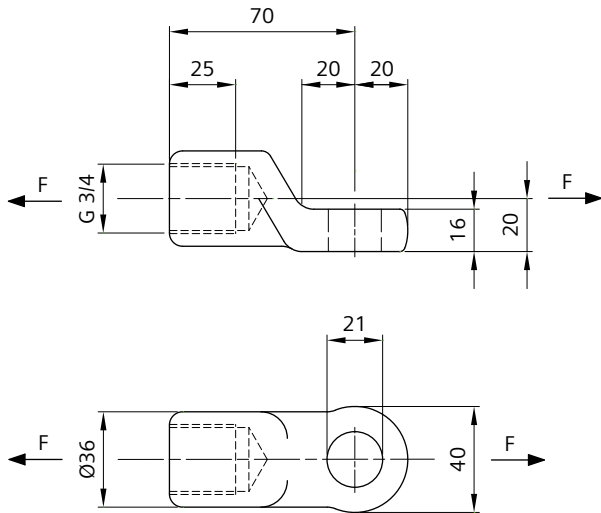
Fastening parts 8WL6228-0/-1 (see page 768) or 8WL6247-8 (see page 756) and motor-operated mechanism 8WL6200 (type as needed, see page 737) must be ordered separately.

Other lengths on request.

Single components see pages 762 to 764.

Tongue end fitting 26, offset

for connection of operating linkage at manual operating mechanism 8WL6214- for disconnectors up to 3 kV DC 8WL6134- or 25 kV AC 8WL6144- and at motor-operated mechanism 8WL6200- for disconnectors up to 3 kV DC 8WL6134- , for aluminium tube d=26 mm and steel tube d=26 mm or 26,9 mm (3/4")



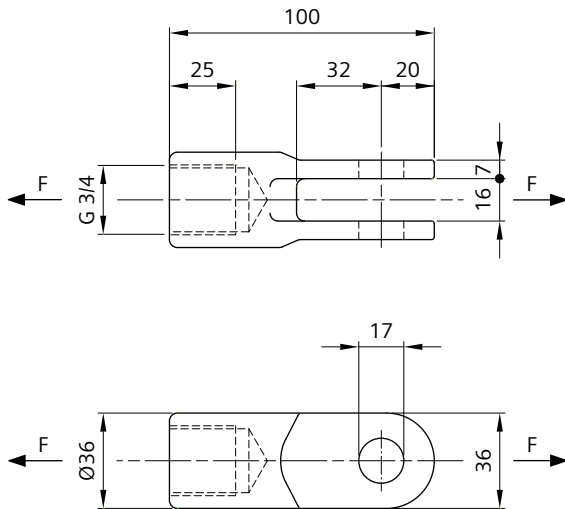
Order no.	8WL6225-0
Designation	Tongue end fitting
Material	mICI
Weight	0.34 kg
Perm. operating load	10 kN
Min. failing load	30 kN

Aluminium tube 26 mm see page 329.

Steel tube 26 mm or 26.9 mm see pages 371 and 372.

Clevis end fitting 26/26.9-16

for operating linkage to disconnectors up to 3 kV DC 8WL6134-, for steel tube d=26 m or 26,9 mm (3/4")

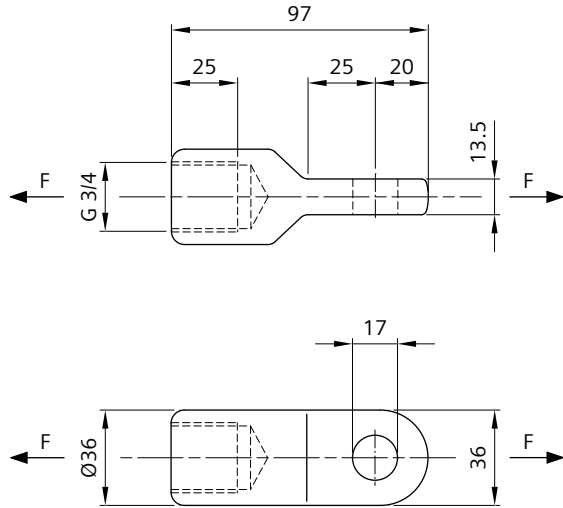


Order no.	8WL6220-1
Designation	Clevis end fitting
Material	mICI
Weight	0.39 kg
Perm. operating load	20 kN
Min. failing load	60 kN

Pin 8WL1105-0 (16x45-htgSt) and split-pin 8WL1115-1 (5x28-Cu) must be ordered separately, see Chapter 02-01.

Tongue end fitting 26/26.9-16, straight

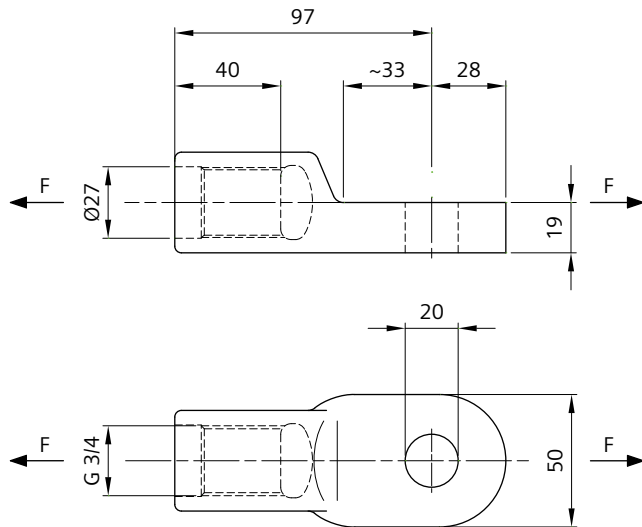
for operating linkage to disconnectors up to 3 kV DC 8WL6134-, for steel tube d=26 mm or 26,9 mm (3/4")



Order no.	8WL6222-0
Designation	Tongue end fitting
Material	mCl
Weight	0.32 kg
Perm. operating load	20 kN
Min. failing load	60 kN

Tongue end fitting 26, offset

for connection of operating linkage to disconnectors 25 kV AC 8WL6144- at motor-operated mechanism 8WL6200-, for aluminium or steel tube d=26 mm



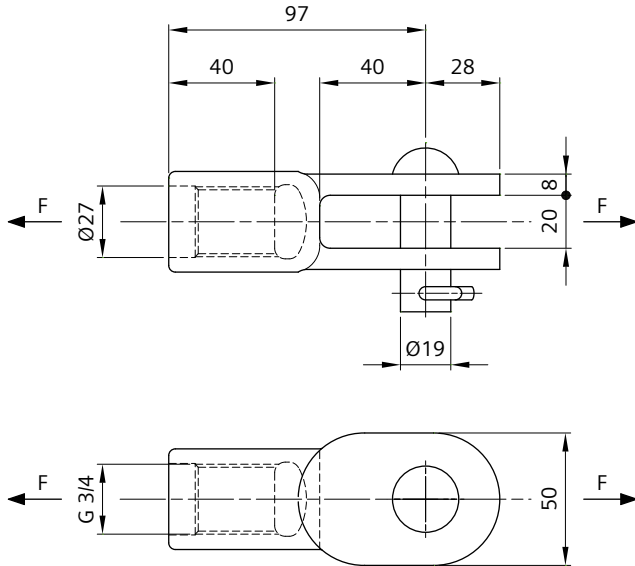
Order no.	8WL6226-1
Designation	Tongue end fitting
Material	ctAl
Weight	0.24 kg
Perm. operating load	9.4 kN
Min. failing load	28 kN

Aluminium tube 26 mm see page 329.

Steel tube 26 mm see page 371.

Clevis end fitting 26

for operating linkage to disconnectors 25 kV AC 8WL6144- and cantilevers with top tube, for aluminium or steel tube d=26 mm



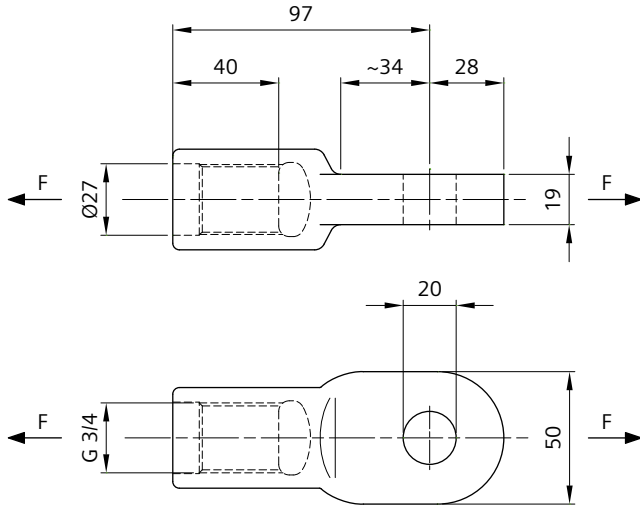
Order no.	8WL6221-2
Designation	Clevis end fitting
Material	
Clevis end fitting	ctAl
Pin 19x52	Al
Beta-Split pin	stlSt
Weight	0.28 kg
Perm. operating load	9.4 kN
Min. failing load	28 kN

Aluminium tube 26 mm see page 329.

Steel tube 26 mm see page 371.

Tongue end fitting 26, straight

for operating linkage to disconnectors 25 kV AC 8WL6144-, for aluminium or steel tube d=26 mm



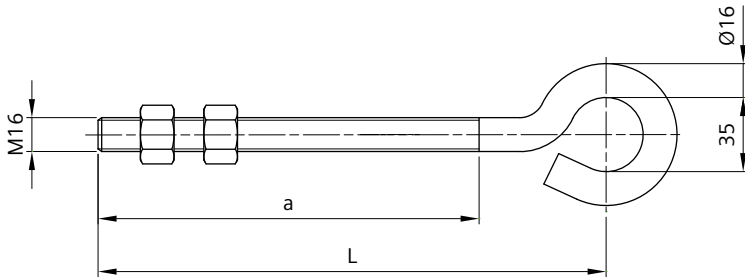
Order no.	8WL6223-1
Designation	Tongue end fitting
Material	ctAl
Weight	0.24 kg
Perm. operating load	9.4 kN
Min. failing load	28 kN

Aluminium tube 26 mm see page 329.

Steel tube 26 mm see page 371.

Eye-bolt

for guiding of operating linkage made of tubes $d=26$ to 33.7 mm (1")



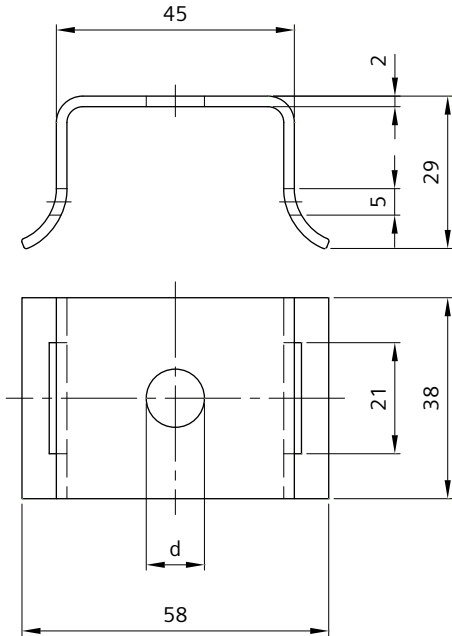
Order no.	8WL6228-0	8WL6228-1
Designation	Eye-bolt M16x160	Eye-bolt M16x240
Material		
Eye-bolt	stlSt	stlSt
Nuts	stlSt	stlSt
Weight	0.48 kg	0.56 kg
a	100 mm	180 mm
L	160 mm	240 mm

Punch-lock band holder for guide 8WL6228-2A to -2C see page 769.

Punch-lock band 8WL6247-0 see page .

Punch-lock band holder for guide

for punch-lock band width up to 19 mm



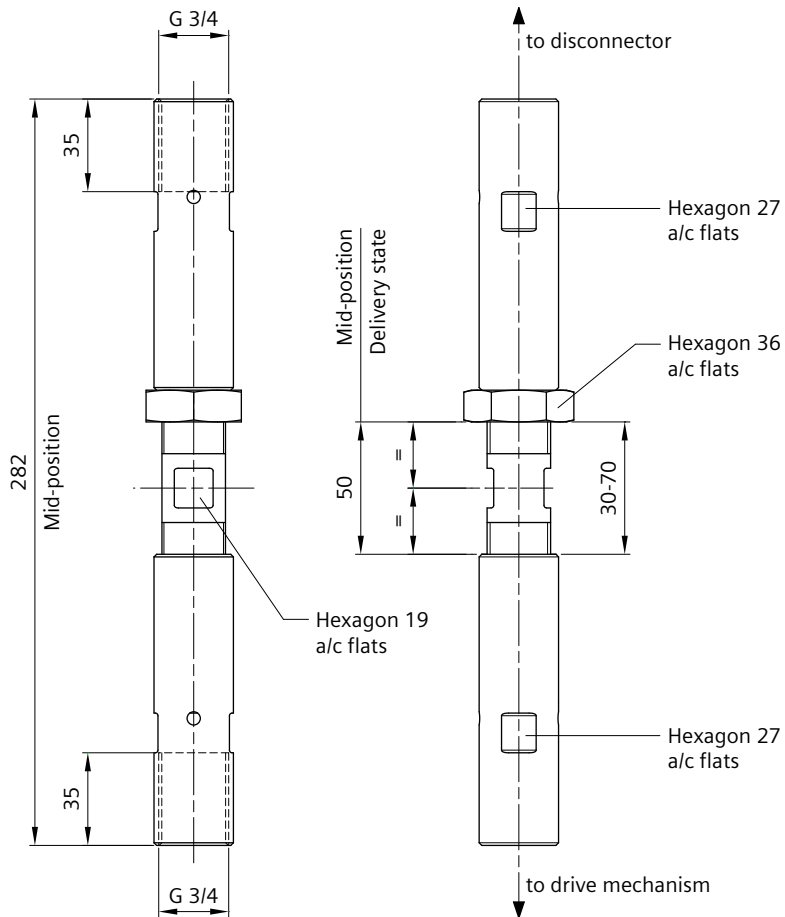
Order no.	8WL6228-2A	8WL6228-2B	8WL6228-2C
Designation	Punch-lock band holder d=11 mm	Punch-lock band holder d=13 mm	Punch-lock band holder d=17 mm
Material	stlSt	stlSt	stlSt
Weight	0.46 kg	0.46 kg	0.46 kg
d	11 mm	13 mm	17 mm

The bearing capacity of the punch-lock band holder depends of the pole cross-section.

Punch-lock band 8WL6743-0 see page 152.

Adjusting socket 26/26.9 for operating linkage

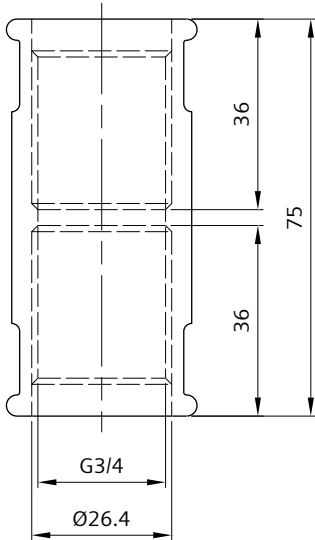
for disconnectors 25 kV AC 8WL6144-, for aluminium tube d=26 mm and steel tube d=26 mm or 26.9 mm (3/4")



Order no.	8WL6229-0
Designation	Adjusting socket 26/26.9
Material	stlSt
Weight	1.05 kg

Coupling socket 26 for operating linkage

for disconnectors 25 kV AC 8WL6144-, for aluminium tube d=26 mm and steel tube d=26 mm



Order no.	8WL6229-5A
Designation	Coupling socket 26
Material	mCl
Weight	0.16 kg

Chapter 02

Standard Products

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Technical comments

Application

Electric railways can affect other electrotechnical devices, system units, structures, and their equipment. Furthermore,

- increased rail potentials can occur in electrical railway operation and
- overhead contact line systems can be exposed to overvoltage or high voltage peaks, which overload the insulation of the system and its components.

Siemens offers many products for equipment protection and protective measures that are in line with the standards, codes of practice, and VDV codes.

The function of **voltage limiters** is to earth in a short-circuit proof manner all system components that are not earthed in operation if a specific voltage is exceeded. This protects people and system components from the danger of impermissibly high voltages. The use of voltage limiting devices prevents stray currents and ensures the required protection of neighboring systems.

In order to protect transformer substations and overhead contact line components from overvoltage, which, for example, may occur as a result of a lightning strike, protective equipment must be installed in the form of **surge arresters**.

Products for animal protection such as **catenary wire insulations** are solution-oriented answers for the increasingly important topic of nature conservation.

Types

Voltage limiter elements in the following designs are available for voltage limiters:

- Lightning-resistant
- Non-lightning-resistant

Depending on the type, the surge arresters are suitable for use both outdoors and indoors.

Special features

Voltage limiters

- Very robust and corrosion-resistant casing made of copper-aluminium alloys
- Easy installation on various rail profiles or on walls
- Reduced maintenance costs due to lightning-resistant voltage limiter elements with different response voltages

Surge arrester

- Easy installation and resistance to vandalism thanks to plastic composite casing
- High mechanical strength thanks to resistance to breaking under high electrical loads
- High degree of resistance to environmental influences due to corrosion-resistant materials

Catenary wire insulation

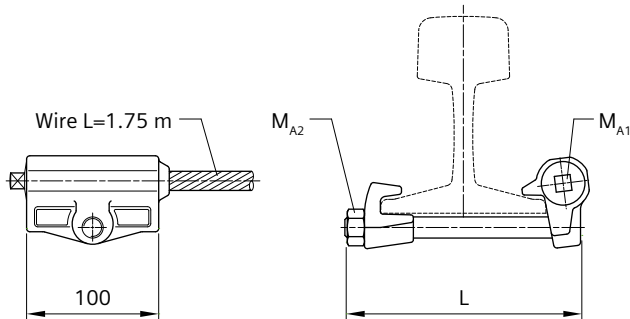
- Easy retrofit in existing systems, retrofitting without dismantling the wires by means of a mounting seam
- High electric strength due to overlapping plastic profile and bonded joint

Notes

The use and definition of protective measures are geared toward the operating requirements and local conditions. These depend on the respective applicable regulations, standards, and codes of practice.

Voltage limiter

for fastening to rail S49, S54, S64 and UIC60



Order no.	8WL6503-0A	8WL6503-1A
Designation	for rail foot width 125 mm (rail S49 and S54)	for rail foot width 150 mm (rail S64 and UIC60)
Material		
Casing	CuAl	CuAl
Contact bolt	CuAl	CuAl
Jaw	CuAl	CuAl
Earthing wire 50 mm ²	Cu with PVC-sheath	Cu with PVC-sheath
Insulating sleeve	Polyamide	Polyamide
Compression sleeve	Cu-ETP	Cu-ETP
Screw bolt M16	stlSt	stlSt
Nut	stlSt	stlSt
Weight	2.26 kg	2.30 kg
Tightening torque M_{A1}	10 Nm ¹⁾ 15 Nm ²⁾	10 Nm ¹⁾ 15 Nm ²⁾
Tightening torque M_{A2}	90 Nm	90 Nm
Short-time current	36 kA	36 kA
Short-time current duration	60 ms	60 ms
L	178 mm	203 mm

¹⁾ for voltage limiter element 8WL6504-0 to -3

²⁾ for voltage limiter element 8WL6504-5 to -8

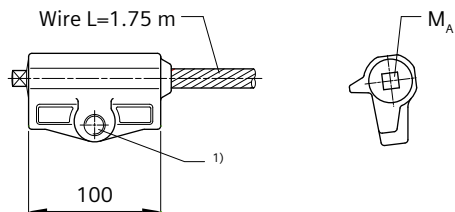
The voltage limiter element 8WL6504-0 to -3 or 8WL6504-5 to -8 (lightning resistant) must be ordered separately according to the operating voltage required, see page 778.

Cable lug 8WL1580-1 (12-70, Cu-ETP) must be ordered separately, see page 169.

Types for other rail foot widths on request.

Voltage limiter

for fastening at pole or structure



Order no.	8WL6503-7A
Designation	for fastening at pole or structure
Material	
Casing	CuAl
Contact bolt	CuAl
Insulating sleeve	Polyamide
Compression sleeve	Cu-ETP
Earthing wire 50 mm ²	Cu with PVC-sheath
Weight	1.98 kg
Tightening torque M_A	10 Nm ²⁾ 15 Nm ³⁾
Short-time current	36 kA
Short-time current duration	60 ms

¹⁾ Fastening with hexagon bolt M10 (length as needed)

²⁾ for voltage limiter element 8WL6504-2 and -3

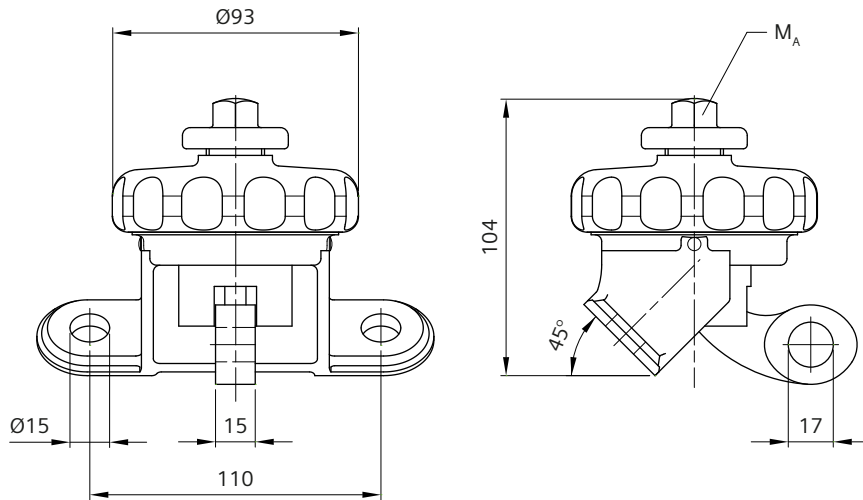
³⁾ for voltage limiter element 8WL6504-5

The voltage limiter element 8WL6504-0 to -3 or 8WL6504-5 to -8 (lightning resistant) must be ordered separately according to the operating voltage required, see page 778.

Details for fastening at pole or structure on request.

Voltage limiter with eye connection

for fastening at pole or structure



Order no.	8WL6530-0
Designation	Voltage limiter
Material	
Casing	CuAl
Cover	CuAl
Connecting piece	CuAl
Square head bolt	CuZn
Insulating bush	Fabric-base plastic
Lock ring	Spring steel
Grooved pins	stlSt
Weight	1.7 kg
Tightening torque M_A	7 Nm ¹⁾ 10.5 Nm ²⁾

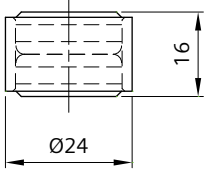
¹⁾ for voltage limiter element 8WL6504-0 to -3

²⁾ for voltage limiter element 8WL6504-5 to -8

The voltage limiter element 8WL6504-0 to -3 or 8WL6504-5 to -8 (lightning resistant) acc. to the operating voltage required must be ordered separately.

Voltage limiter element

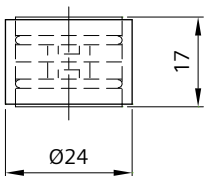
for voltage limiter 8WL6503-0A, -1A, -7A and 8WL6530-0



Order no.	8WL6504-0	8WL6504-1	8WL6504-2	8WL6504-3
Designation	Voltage limiter element 200 V DC	Voltage limiter element 300 V DC	Voltage limiter element 350 V DC	Voltage limiter element 1100 V AC
Material	Cu	Cu	Cu	Cu
Weight	0.04 kg	0.04 kg	0.04 kg	0.04 kg
Operating voltage	200 to 350 V	260 to 450 V	300 to 500 V	1000 to 1300 V
Withstand voltage	180 V	240 V	280 V	980 V

Voltage limiter element, lightning resistant

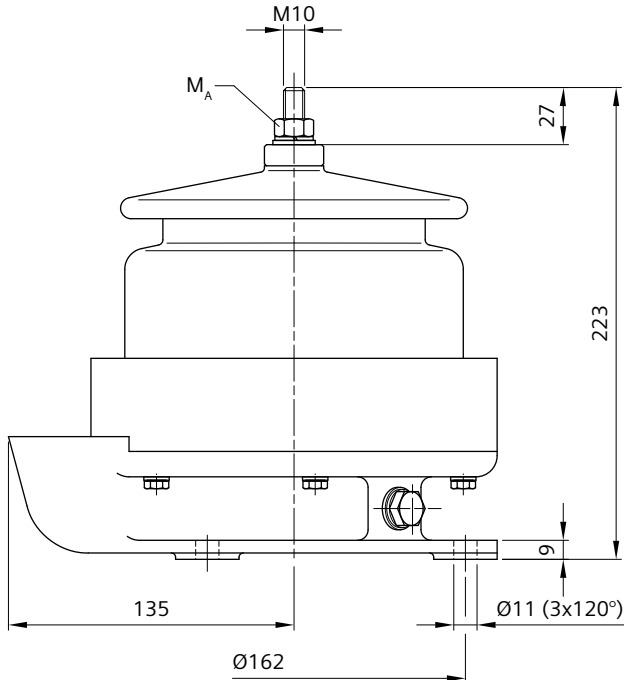
for voltage limiter 8WL6503-0A, -1A, -7A and 8WL6530-0



Order no.	8WL6504-8	8WL6504-7	8WL6504-6	8WL6504-5
Designation	Voltage limiter element 120 V DC	Voltage limiter element 230 V DC	Voltage limiter element 350 V DC	Voltage limiter element 1000 V AC / 600 V DC
Material	Cu	Cu	Cu	Cu
Weight	0.04 kg	0.04 kg	0.04 kg	0.04 kg
Operating voltage	120 V DC $\pm 20\%$	230 V DC $\pm 20\%$	350 V DC $\pm 20\%$	600 V DC $\pm 20\%$ < 940 V AC
Lightning impulse current (8/20 μs), reversible	20 kA	20 kA	10 kA	10 kA

Surge arrester with porcelain casing

as protection for electrical equipment up to 1 kV DC or 2 kV DC



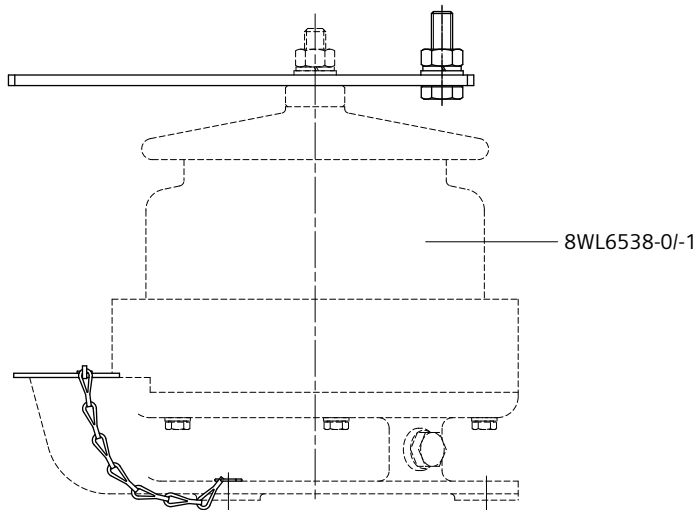
Order no.	8WL6538-0	8WL6538-1
Designation	Surge arrester 3EC 3010	Surge arrester 3EC 3020
Material		
Casing	Porcelain	Porcelain
Weight	6.0 kg	6.2 kg
Tightening torque M_A	20 Nm	20 Nm
Nominal voltage	0.75 kV DC	1.5 kV DC
Rated voltage	1 kV DC	2 kV DC
Continuous operating voltage	1 kV DC	2 kV DC
Nominal discharge current (8/20 μ s)	10 kA	10 kA
Peak current (4/10 μ s)	100 kA	100 kA
Residual voltage at 10 kA (8/20 μ s)	2.4 kV DC	4.8 kV DC
Min. creepage distance	165 mm	165 mm
Flashover distance	135 mm	135 mm
Lightning impulse withstand voltage	65 kV	65 kV
Power-frequency withstand voltage, wet	25 kV	25 kV

Accessories 8WL6537-4 must be ordered separately.

Other types on request.

Accessories

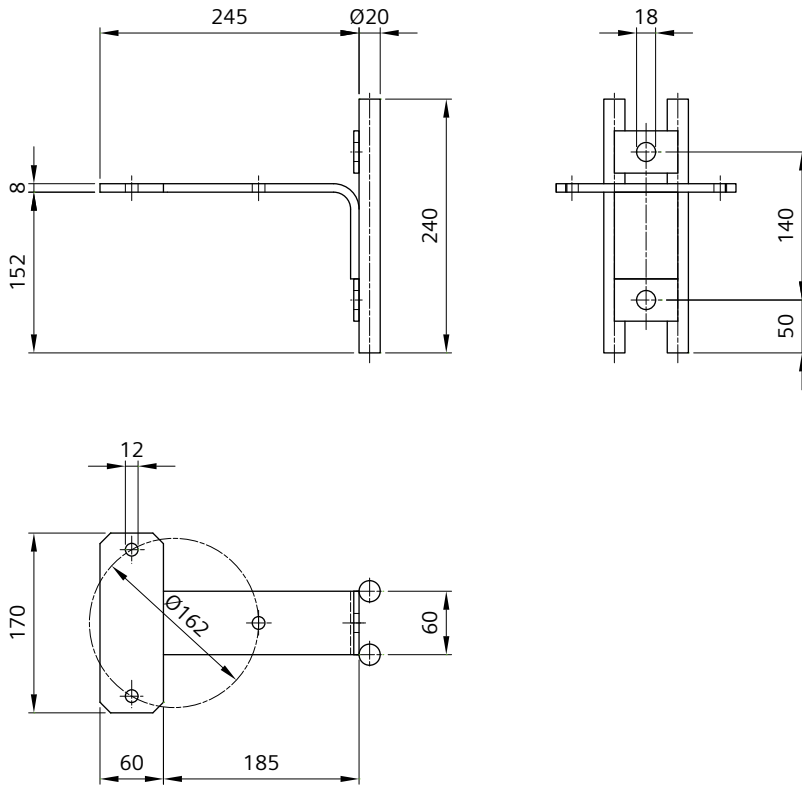
for surge arrester 8WL6538-0 and 8WL6538-1



Order no.	8WL6537-4
Designation	Accessories
Material	
Cover	Al, stlSt
Strap	Cu
Bolt M10x35	stlSt
Nut	stlSt
Washer	stlSt
Spring washer	stlSt
Weight	0.50 kg

Bracket for surge arrester

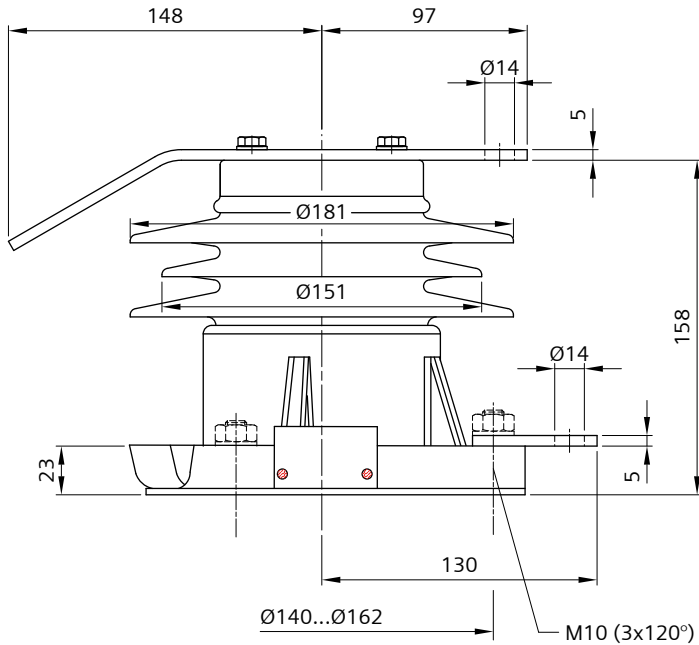
for punch-lock band and support fastening



Order no.	8WL6233-5B
Designation	Bracket
Material	htgSt
Weight	3.0 kg

Surge arrester with polymeric composite casing

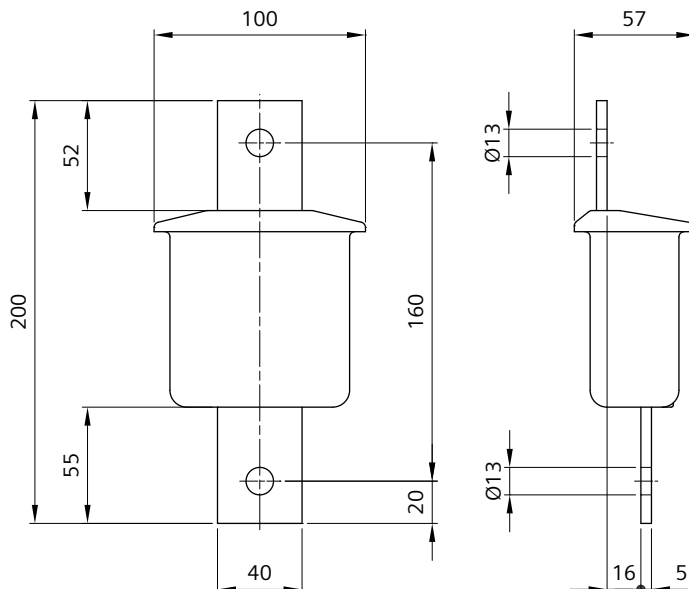
as protection for electrical equipment up to 1 kV DC



Order no.	8WL6537-2A
Designation	Surge arrester 3EB4 010-7DS32-0D
Material	
Casing	Polymeric composite
Weight	3.7 kg
Rated voltage	1 kV DC
Continuous operating voltage	1 kV DC
Nominal discharge current (8/20 µs)	20 kA
Peak current (4/10 µs)	100 kA
Residual voltage at 10 kA (8/20 µs)	2.4 kV DC
Min. creepage distance	243 mm
Lightning impulse withstand voltage	55 kV
Power-frequency withstand voltage, wet	30 kV

Surge arrester with polymeric casing

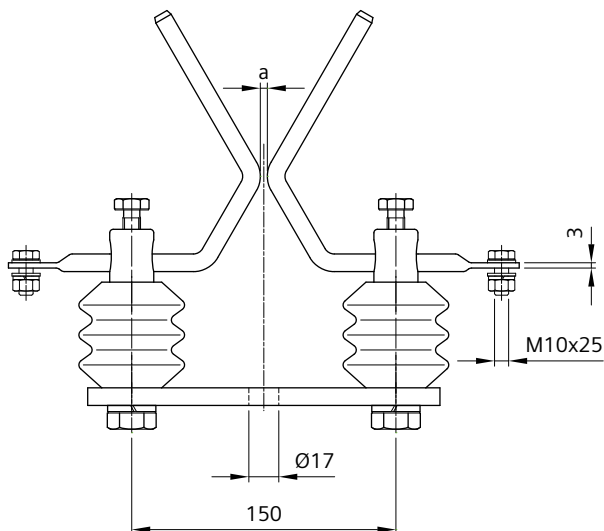
as protection against overvoltage, for connection between return conductor and earth



Order no.	8WL6537-3
Designation	Surge arrester 3EB2 003-7D
Material	–
Weight	1.2 kg
Rated voltage	0.3 kV DC
Continuous operating voltage	0.3 kV DC
Nominal discharge current (8/20 μs)	10 kA
Peak current (4/10 μs)	100 kA
Residual voltage at 10 kA (8/20 μs)	0.7 kV DC
Min. creepage distance	133 mm
Lightning impulse withstand voltage	25 kV
Power-frequency withstand voltage, wet	10 kV

Lightning protection gap up to 1.5 kV DC

as protection against overvoltage



Order no.	8WL6541-4
Designation	Lightning protection gap, baseplate plane
Material	
Baseplate	Cu
Insulator body	Cast resin, brown
Arcing horns	Cu-ETP
Bolts, nuts	stlSt
Washers, spring washers	stlSt
Weight	2.00 kg
Nominal voltage	1.5 kV DC

Distance „a“ must be adjusted depending on the relevant operating voltage:

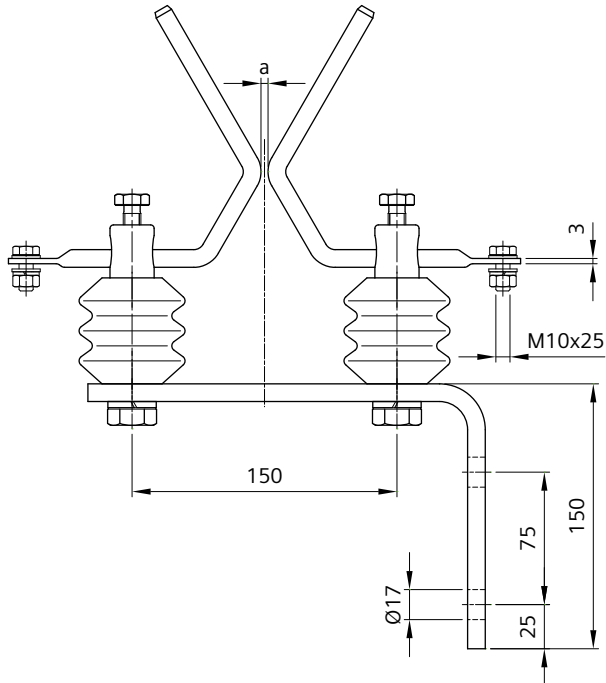
a=2 mm for nominal voltage 750 V DC

a=3 mm for nominal voltage 1.5 kV DC

Type up to 3 kV DC on request.

Lightning protection gap up to 1.5 kV DC

as protection against overvoltage



Order no.	8WL6541-4A
Designation	Lightning protection gap, baseplate bent
Material	
Baseplate	Cu
Insulator body	Cast resin, brown
Arcing horns	Cu-ETP
Bolts, nuts	stlSt
Washers, spring washers	stlSt
Weight	2.20 kg
Nominal voltage	1.5 kV DC

Distance „a“ must be adjusted depending on the relevant operating voltage:

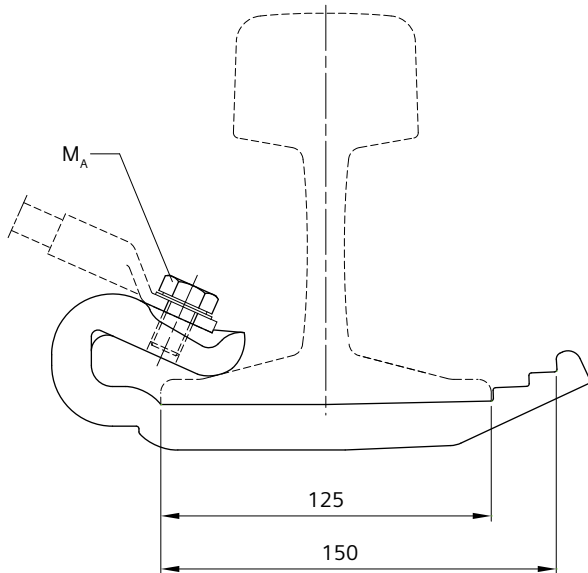
a=2 mm for nominal voltage 750 V DC

a=3 mm for nominal voltage 1.5 kV DC

Type up to 3 kV DC on request.

Earthing clamp

for rail foot width 125 to 150 mm, for connecting of earthing cables at rails S49, S54, S64 and UIC60



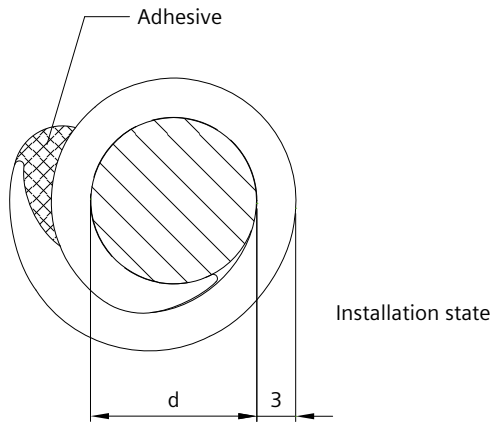
Order no.	8WL6563-0
Designation	Earthing clamp
Material	
Clamp	htgSt
Bolt M12	htgSt
Ribbed washer	htgSt
Locking plate	htgSt
Weight	0.86 kg
Tightening torque M_A	70 Nm

Cable lug must be ordered separately depending on the cable used.

Types for other rail foot widths on request.

Catenary wire insulation up to 3 kV DC and 25 kV AC

as animal guard for copper and bronze wires 70, 120 and 150 mm² acc. to DIN 48201



Order no.	8WL7035-5	8WL7035-5E	8WL7035-5F
Designation	Catenary wire insulation 70 mm ²	Catenary wire insulation 120 mm ²	Catenary wire insulation 150 mm ²
Material	Silicone rubber, color black	Silicone rubber, color black	Silicone rubber, color black
Weight	0.19 kg/m	0.25 kg/m	0.28 kg/m
Electric strength	37.5 kV	37.5 kV	37.5 kV
d	10.6 mm	14.0 mm	15.8 mm ¹⁾

Adhesive 8WL7035-6 (Silicone rubber liquid, color black) must be ordered separately.

¹⁾ Can also be used for aluminium-steel wires 8WL7084-2A (d=15.5 mm) and 8WL7083-0A (d=16 mm).

Chapter 02

Standard Products

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Technical comments

Application

Siemens supplies stranded wires and single wires for all contact line arrangements and applications.

Depending on application and selection of the electrical or mechanical functions, the stranded wires and single wires serve for optimized energy transfer to the rail vehicle.

Contact wires implement the direct contact of the pantograph to the overhead contact line system.

Stranded wires made of copper or bronze are mainly used as catenary wires in catenary systems or headspans. **Flexible wires** are available for high vibratory loads.

Feeder cables, feeder wires, and return wires can be made of copper and aluminium or aluminium-steel.

Steel wires with bituminous coating are used for connecting the tension wheel assemblies to catenary wires or contact wires. The pre-assembled wires are supplied with connecting fittings.

Synthetic wires are mainly used in GRP cantilevers, in catenary wire supports, and for bridle-and-pulley suspensions.

Types

The portfolio includes all required stranded wires and single wires for setting up catenary and trolley-type contact lines, for example:

- Contact wires made of electrolytic copper, copper-silver alloy or copper-magnesium alloy
- Wires made of bronze, copper or aluminium
- Steel and stainless steel wires
- Synthetic wires

Special features

Contact wires made of electrolytic copper have the best electrical conductivity. As a result of the increased thermal load capacities, contact wires made of copper-silver alloy have higher continuous current carrying capacities. Contact wires with very high tensile loads, as a result of the layout of the system, are made of magnesium-copper alloy.

Flexible wire for catenary droppers for high-speed overhead contact lines

The 8WL7060-2 wire is extremely resistant to alternating bending and tensile loads as a result of a copper alloy that is suited for high vibration loads.

Synthetic wires are very lightweight, break-resistant, corrosion-resistant, weather-proof, anti-magnetic, insulating and easily processed.

Notes

Standards

The permissible operating loads for the various stranded wires and single wires can be determined by consulting the relevant standards and specifications.

Flexible wire for catenary droppers for high-speed overhead contact lines

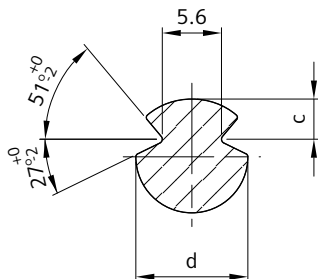
You can find details about the components of catenary droppers for high-speed overhead contact lines and their installation in the product information.

Synthetic wires (Minoroc wire)

Observe the processing information in connection with the specified minimum failing loads and when using them as an insulating wire.

Grooved contact wire AC, Cu-ETP

acc. to EN 50149



Order no.	8WL7000-0	8WL7001-0	8WL7004-0	8WL7002-0	8WL7003-0
Designation	Contact wire AC-80	Contact wire AC-100	Contact wire AC-107	Contact wire AC-120	Contact wire AC-150
Material	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
Weight	0.71 kg/m	0.89 kg/m	0.95 kg/m	1.07 kg/m	1.33 kg/m
Nominal cross-section	80 mm ²	100 mm ²	107 mm ²	120 mm ²	150 mm ²
Min. tensile strength	355 N/mm ²	355 N/mm ²	350 N/mm ²	330 N/mm ²	310 N/mm ²
Min. breaking load	27.5 kN	34.5 kN	36.3 kN	38.4 kN	45.1 kN
Perm. Permanent current ¹⁾	432 A	499 A	520 A	561 A	648 A
Resistance at 20 °C	0.22 Ω/km	0.18 Ω/km	0.17 Ω/km	0.15 Ω/km	0.12 Ω/km
Conductivity at DC (20 °C)	57 m/Ω mm ²	57 m/Ω mm ²	57 m/Ω mm ²	57 m/Ω mm ²	57 m/Ω mm ²
c	3.8 mm	4.0 mm	4.0 mm	4.0 mm	4.0 mm
d	10.6 mm	12.0 mm	12.3 mm	13.2 mm	14.8 mm

¹⁾ Valid at 80 °C limit temperature and 0.0178 Ωmm²/m spec.resistance.

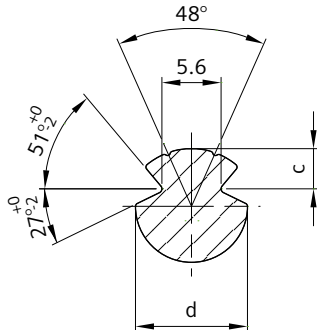
Calculations for other marginal conditions can be performed on request.

Available on drums in lengths up to 1500 m or as straightened rods in lengths up to 4 m.

Grooved contact wire BC and BF on request.

Grooved contact wire AC, CuAg0.1

acc. to EN 50149



Order no.	8WL7000-1	8WL7001-1	8WL7002-1	8WL7003-1
Designation	Contact wire AC-80	Contact wire AC-100	Contact wire AC-120	Contact wire AC-150
Material	CuAg0.1	CuAg0.1	CuAg0.1	CuAg0.1
Weight	0.71 kg/m	0.89 kg/m	1.07 kg/m	1.33 kg/m
Nominal cross-section	80 mm ²	100 mm ²	120 mm ²	150 mm ²
Min. tensile strength	365 N/mm ²	360 N/mm ²	350 N/mm ²	350 N/mm ²
Min. breaking load	28.3 kN	34.9 kN	40.7 kN	50.9 kN
Perm. Permanent current ¹⁾	517 A	599 A	675 A	780 A
Resistance at 20 °C	0.22 Ω/km	0.18 Ω/km	0.15 Ω/km	0.12 Ω/km
Conductivity at DC (20 °C)	56 m/Ω mm ²	56 m/Ω mm ²	56 m/Ω mm ²	56 m/Ω mm ²
c	3.8 mm	4.0 mm	4.0 mm	4.0 mm
d	10.6 mm	12.0 mm	13.2 mm	14.8 mm

¹⁾ Valid at 100 °C limit temperature and 0.0178 Ωmm²/m spec.resistance.

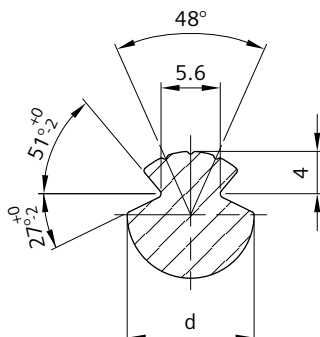
Calculations for other marginal conditions can be performed on request.

Available on drums in lengths up to 1500 m or as straightened rods in lengths up to 4 m.

Grooved contact wire BC and BF on request.

Grooved contact wire AC, CuMg0.5

acc. to EN 50149



Order no.	8WL7001-2	8WL7002-2
Designation	Contact wire AC-100	Contact wire AC-120
Material	CuMg0.5	CuMg0.5
Weight	0.89 kg/m	1.07 kg/m
Nominal cross-section	100 mm ²	120 mm ²
Min. tensile strength	510 N/mm ²	490 N/mm ²
Min. breaking load	49.5 kN	57.0 kN
Perm. Permanent current ¹⁾	502 A	565 A
Resistance at 20 °C	0.29 Ω/km	0.24 Ω/km
Conductivity at DC (20 °C)	36 m/Ω mm ²	36 m/Ω mm ²
d	12.0 mm	13.2 mm

¹⁾ Valid at 100 °C limit temperature and 0.0277 Ωmm²/m spec.resistance.

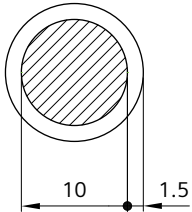
Calculations for other marginal conditions can be performed on request.

Available on drums in lengths up to 1500 m or as straightened rods in lengths up to 4 m.

Other cross-sections on request.

Earthing wire with plastic sheath

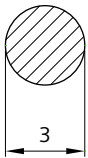
acc. to DIN 43137, for earth connections



Order no.	8WL7020-0
Designation	Earthing wire 10
Material	St34-htg, plastic sheath light- and weather-resistant
Weight	0.70 kg/m
Nominal cross-section	80 mm ²

Solid wire made of stainless steel

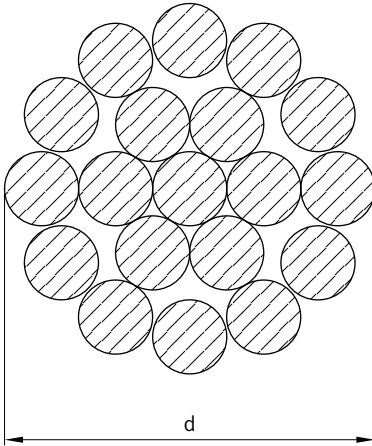
for windstay in steady arm arrangements



Order no.	8WL7025-0
Designation	Solid wire 3
Material	stlSt
Weight	0.055 kg/m
Nominal cross-section	7 mm ²

Wire, stranded made of BzII

acc. to DIN 48201, for span guy arrangements, catenary wires and stitch wires



Part 1

Order no.	8WL7032-0	8WL7033-0	8WL7034-0	8WL7034-1	8WL7035-0
Designation	Wire 25	Wire 35	Wire 50	Wire 50/19	Wire 70
Material	BzII	BzII	BzII	BzII	BzII
Weight	0.22 kg/m	0.31 kg/m	0.45 kg/m	0.45 kg/m	0.60 kg/m
Nominal cross-section	25 mm ²	35 mm ²	50 mm ²	50 mm ²	70 mm ²
Number of wires	7	7	7	19	19
Calculated breaking load	14.24 kN	20.17 kN	28.58 kN	28.39 kN	38.64 kN
Perm. Permanent current ¹⁾	150 A	187 A	236 A	233 A	283 A
d	6.3 mm	7.5 mm	9.0 mm	9.0 mm	10.5 mm

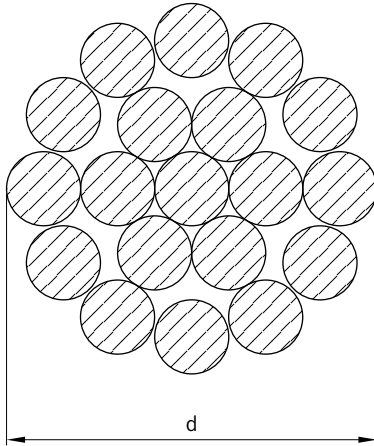
Part 2

Order no.	8WL7036-0	8WL7037-0
Designation	Wire 95	Wire 120
Material	BzII	BzII
Weight	0.85 kg/m	1.06 kg/m
Nominal cross-section	95 mm ²	120 mm ²
Number of wires	19	19
Calculated breaking load	54.76 kN	67.57 kN
Perm. Permanent current ¹⁾	353 A	407 A
d	12.5 mm	14.0 mm

¹⁾ Valid at 70 °C limit temperature and 0.0277 Ωmm²/m spec.resistance.
Calculations for other marginal conditions can be performed on request.
Further wire cross-sections on request.

Wire, stranded made of Cu-ETP

acc. to DIN 48201, for line feeders and catenary wires



Part 1

Order no.	8WL7051-0	8WL7052-0	8WL7053-0	8WL7054-0	8WL7055-0
Designation	Wire 35	Wire 50	Wire 70	Wire 95	Wire 120
Material	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
Weight	0.31 kg/m	0.45 kg/m	0.60 kg/m	0.85 kg/m	1.06 kg/m
Nominal cross-section	35 mm ²	50 mm ²	70 mm ²	95 mm ²	120 mm ²
Number of wires	7	7	19	19	19
Calculated breaking load	13.77 kN	19.84 kN	26.38 kN	37.40 kN	46.90 kN
Perm. Permanent current ¹⁾	227 A	285 A	343 A	427 A	493 A
d	7.5 mm	9.0 mm	10.5 mm	12.5 mm	14.0 mm

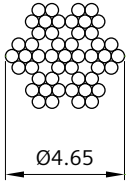
Part 2

Order no.	8WL7056-0
Designation	Wire 150
Material	Cu-ETP
Weight	1.34 kg/m
Nominal cross-section	150 mm ²
Number of wires	37
Calculated breaking load	58.98 kN
Perm. Permanent current ¹⁾	571 A
d	15.8 mm

¹⁾ Valid at 70 °C limit temperature and 0.0178 Ωmm²/m spec.resistance.
 Calculations for other marginal conditions can be performed on request.
 Further wire cross-sections on request.

Wire 10, flexible made of Bronze

for droppers

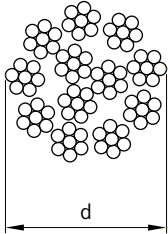


Order no.	8WL7060-2
Designation	Wire 10x49
Material	Bronze
Weight	0.09 kg/m
Nominal cross-section	10 mm ²
Number of wires	49
Min. tensile strength	589 N/mm ²
Perm. Permanent current ¹⁾	102 A
Electric conductivity	36 Sm/mm ²

¹⁾ Valid at 80 °C limit temperature and 0.0277 Ωmm²/m spec.resistance.
Calculations for other marginal conditions can be performed on request.

Wire, flexible made of BzII

acc. to DIN 43138, for droppers or stitch wires

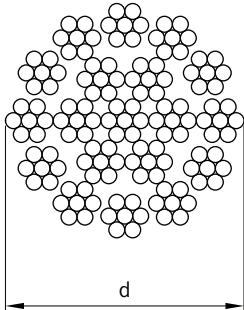


Order no.	8WL7061-0	8WL7061-1	8WL7062-0	8WL7063-0
Designation	Wire 16x49	Wire 16x84	Wire 25x133	Wire 35x133
Material	BzII	BzII	BzII	BzII
Weight	0.15 kg/m	0.15 kg/m	0.25 kg/m	0.35 kg/m
Nominal cross-section	16 mm ²	16 mm ²	25 mm ²	35 mm ²
Number of wires	49	84	133	133
Min. tensile strength	589 N/mm ²	589 N/mm ²	589 N/mm ²	589 N/mm ²
Perm. Permanent current ¹⁾	138 A	140 A	187 A	235 A
d	5.9 mm	6.2 mm	7.5 mm	9.0 mm

¹⁾ Valid at 80 °C limit temperature and 0.0277 Ωmm²/m spec.resistance.
Calculations for other marginal conditions can be performed on request.

Wire, flexible made of Cu-ETP

acc. to DIN 43138, for energized connections



Part 1

Order no.	8WL7070-0	8WL7071-0	8WL7072-0	8WL7073-0	8WL7074-0
Designation	Wire 16x49	Wire 25x133	Wire 35x133	Wire 50x133	Wire 70x189
Material	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP	Cu-ETP
Weight	0.15 kg/m	0.25 kg/m	0.35 kg/m	0.48 kg/m	0.68 kg/m
Nominal cross-section	16 mm ²	25 mm ²	35 mm ²	50 mm ²	70 mm ²
Number of wires	49	133	133	133	189
Tensile strength	< 300 N/mm ²	< 300 N/mm ²	< 300 N/mm ²	< 300 N/mm ²	< 300 N/mm ²
Perm. Permanent current ¹⁾	167 A	225 A	284 A	349 A	447 A
d	5.9 mm	7.5 mm	9.0 mm	10.5 mm	13.0 mm

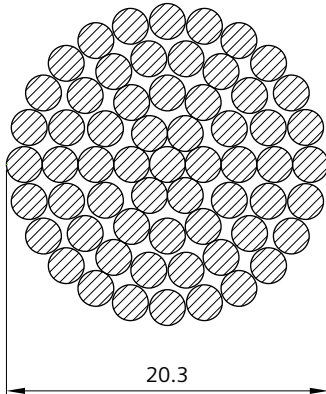
Part 2

Order no.	8WL7075-0	8WL7076-0	8WL7077-0
Designation	Wire 95x259	Wire 120x336	Wire 150x392
Material	Cu-ETP	Cu-ETP	Cu-ETP
Weight	0.93 kg/m	1.12 kg/m	1.42 kg/m
Nominal cross-section	95 mm ²	120 mm ²	150 mm ²
Number of wires	259	336	392
Tensile strength	< 300 N/mm ²	< 300 N/mm ²	< 300 N/mm ²
Perm. Permanent current ¹⁾	547 A	622 A	732 A
d	14.7 mm	16.4 mm	18.3 mm

¹⁾ Valid at 80 °C limit temperature and 0.0178 Ωmm²/m spec.resistance.
 Calculations for other marginal conditions can be performed on request.
 Further wire cross-sections on request.

Wire made of aluminium

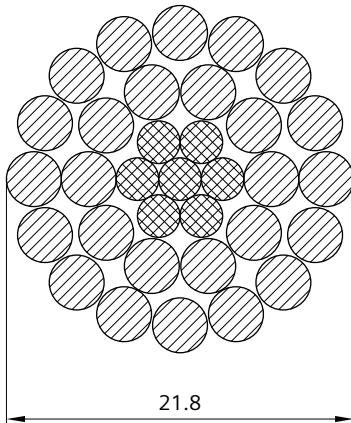
acc. to EN 50182, for feeder lines and return circuits



Order no.	8WL7083-3
Designation	Wire 243
Material	AL1
Weight	0.67 kg/m
Cross-section	242.5 mm ²
Number of wires	61
Calculated breaking load	43.66 kN
Perm. permanent current	625 A

Wire made of aluminium-steel

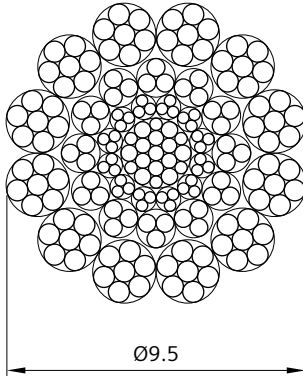
acc. to EN 50182, for feeder lines and return circuits



Order no.	8WL7084-3
Designation	Wire 243/39
Material	AL1/ST1A
Weight	0.98 kg/m
Nominal cross-section	282.5 mm ²
Number of wires	33 (26+7)
Calculated breaking load	85.12 kN
Perm. permanent current	645 A

Steel wire 50, flexible

for tension wheel assemblies

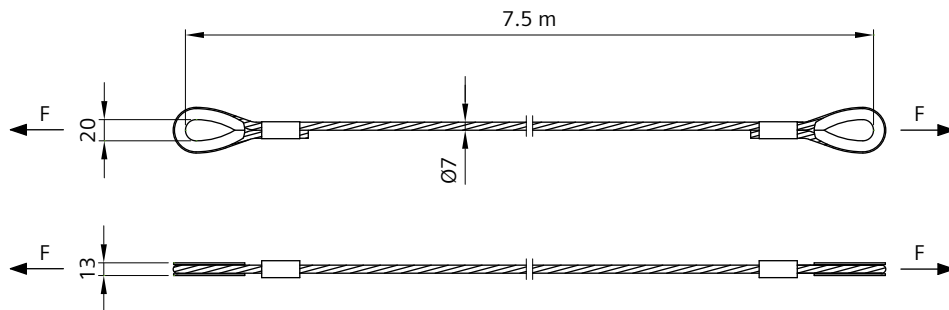


Order no.	8WL7090-0
Designation	Steel wire 50
Material	Stranded wires hot-dip galvanized, wires without twist, torsion-free, each strand coated with bitumen, without fibre core
Weight	0.42 kg/m
Nominal cross-section	50 mm ²
Number of wires	175
Calculated breaking load	74 kN

Can also be supplied on reels 13 m long each, order no. 8WL7090-0A.

Steel wire 26 with connecting fittings

for connection of tension wheel assemblies up to 24 kN 8WL5078- to the catenary system

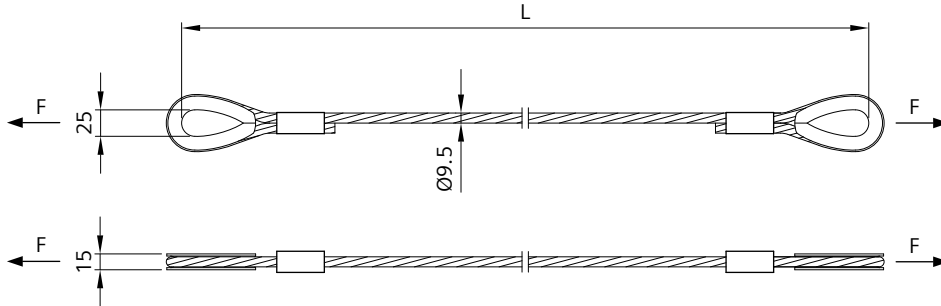


Order no.	8WL7090-1C
Designation	Steel wire 26 for tension wheel assemblies 8WL5078- (1:3)
Material	Steel wire 26 mm ²
	Stranded wires hot-dip galvanized, wires without twist, torsion-free, each strand coated with bitumen, without fibre core
Thimbles	htgSt
Compression clamps	Al
Weight	2.1 kg
Perm. operating load	2x12 kN
Min. failing load	2x36 kN

Connection strap 8WL1018-0 must be ordered separately, see page 75.

Steel wire 50 with connecting fittings

for connection of tension wheel assemblies up to 40 kN 8WL5070- and 8WL5071- to the catenary system

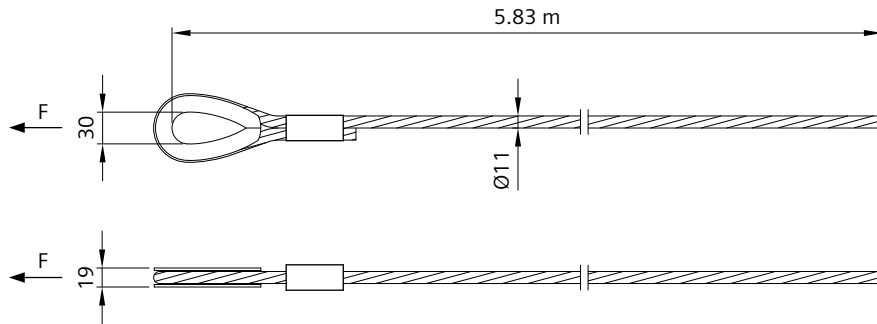


Order no.	8WL7090-0C	8WL7090-0G
Designation	Steel wire 50 for tension wheel assemblies 8WL5070-	Steel wire 50 for tension wheel assemblies 8WL5071-
Material		
Steel wire 50 mm ²	Stranded wires hot-dip galvanized, wires without twist, torsion-free, each strand coated with bitumen, without fibre core	Stranded wires hot-dip galvanized, wires without twist, torsion-free, each strand coated with bitumen, without fibre core
Thimbles	htgSt	htgSt
Compression clamps	Al	Al
Weight	4.1 kg	5.7 kg
Perm. operating load	2x20 kN	2x20 kN
Min. failing load	2x60 kN	2x60 kN
L	7.5 m	9.5 m

Connection strap 8WL1018-0 must be ordered separately, see page 75.

Steel wire d=11 mm with connecting fitting

for connection of tension wheel assemblies up to 40 kN 8WL5071- to the weight set

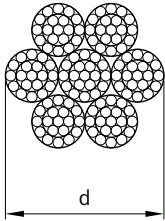


Order no.	8WL7090-2A
Designation	Steel wire d=11 mm
Material	
Steel wire	Stranded wires hot-dip galvanized, wires without twist, torsion-free, each strand coated with bitumen, without fibre core
Thimbles	htgSt
Compression clamps	Al
Weight	3.6 kg
Min. breaking force	128 kN

Connection strap to the weight set on request.

Stainless steel wire rope with wire strand core

for span guy arrangements



Order no.	8WL7093-2	8WL7093-3	8WL7093-4
Designation	Wire rope 6	Wire rope 8 ²⁾	Wire rope 10 ³⁾
Material	stlSt	stlSt	stlSt
Weight	0.138 kg/m	0.243 kg/m	0.381 kg/m
Rope class with core	6x19M-WSC ¹⁾	6x19M-WSC ¹⁾	6x19M-WSC ¹⁾
Rope grade	1570	1570	1570
Min. breaking force	20.5 kN	36.4 kN	56.8 kN
d	6 mm	8 mm	10 mm

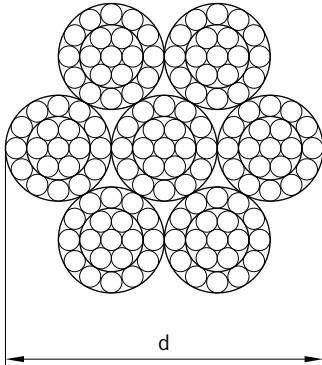
¹⁾ acc. to EN 12385-4

²⁾ Short-circuit current carrying capacity for t=100 ms (approx. value for max. final rope temperature of 150 °C): 2.4 kA

³⁾ Short-circuit current carrying capacity for t=100 ms (approx. value for max. final rope temperature of 150 °C): 3.8 kA

Steel wire rope with wire strand core

acc. to EN 12385-4, for anchoring of poles



Order no.	8WL7091-6	8WL7091-7
Designation	Steel wire rope 12	Steel wire rope 14
Material	–	–
Weight	0.548 kg/m	0.75 kg/m
Rope class with core	6x19M-WSC	6x19M-WSC
Rope grade	1770	1770
Min. breaking force	92.62 kN	125.6 kN
Surface finish	B ¹⁾	A(Zn/Al) ²⁾
Lay type and direction	sZ ³⁾	sZ ³⁾
d	12 mm	14 mm

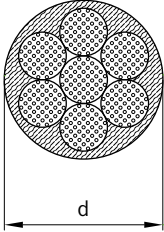
¹⁾ Zinc coated class B

²⁾ Zinc alloy coated class A

³⁾ ordinary lay, right

Synthetic wire (Minoroc wire)

for bridle-and-pulley suspensions and plastic cantilevers



Order no.	8WL7095-0	8WL7097-0
Designation	Synthetic wire 6	Synthetic wire 9
Material	Wire core made of 7 high-tensile fibres of polyester, the outer protective sheath made of polyamide	Wire core made of 7 high-tensile fibres of polyester, the outer protective sheath made of polyamide
Weight	0.03 kg/m	0.07 kg/m
Min. failing load	4 kN ¹⁾	15 kN ¹⁾
Thimble	8WL1501-0	8WL1502-0
Crimped connector	8WL1522-1	8WL1524-2
Pressing die	8WL7152-3	8WL7152-8
Number of pressures	6	9
d	6.0 mm	9.0 mm

¹⁾ The proved loads only in combination with the specified components and number of pressures.
The perm. operating load must be determined acc. to EN 50119.

Properties:

light in weight, high breaking strength, corrosion-resistant, maintenance-free, weather-resistant, antimagnetic, insulating, easy to process

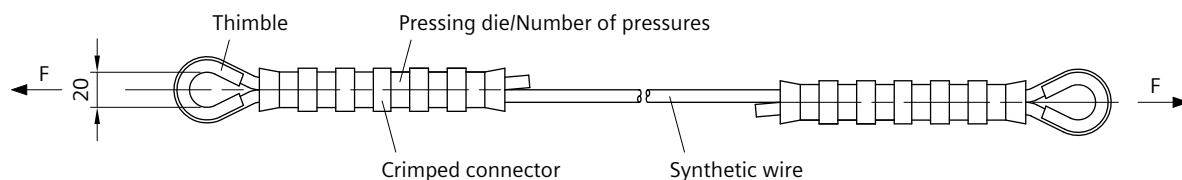
Hint:

When using as insulating wire consider that the interfaces must be protected against humidity penetrating the wire nucleus.

Tests acc. to EN 50345.

Thimbles, crimped connectors and pressing die must be ordered separately, see Chapter 02-02 and Chapter 02-16.

Example for wire connection/dead-end fitting:



Chapter 02

Standard Products

Tensioning equipment	70
Thimbles, connectors, sleeves	154
GRP cantilevers	179
Aluminium cantilevers	249
Steel cantilevers	331
Headspan supports	374
Insulators	408
Contact lines under structures and bridge protection	441
Clamps	492
Tension wheel equipment	582
Section insulators	633
Disconnectors and drive mechanism	670
Earthing and protecting equipment	772
Contact wires, single and stranded wires	788
Monitoring systems	809
Installation tools and equipment	816

Rotation angle sensor for DMS (Disconnecter Monitoring System)	813, 814
Rotation angle sensor SIL1 for DMS (Disconnecter Monitoring System)	815
Sensor for CMS (Catenary Monitoring System)	812

Technical comments

Application

Sicat CMS

The contactless catenary monitoring system Sicat CMS continuously monitors the tensile forces in the contact wire and catenary wire and also acquires the information of the sensor units at the tension wheel assemblies and evaluates them. The filtered sensor information is transmitted to the control center via the system infrastructure. The status of the overhead contact line and the location of specific damage events can be detected quickly and precisely, thereby increasing the availability of the system.

Sicat DMS

The contactless disconnecter monitoring system Sicat DMS monitors the position of the disconnecter. The position indication for the SCADA (Supervisory Control and Data Acquisition) concept is generated by detecting the position of the moving contact blade of the main contact and the contact spring of the earth contact, respectively by means of a rotary encoder.

Data transmission for remote-controlled disconnectors is carried out by integration into the control of the drive mechanism with permanent power supply. For other drive mechanisms or manually-operated disconnectors, an additional evaluation unit is necessary.

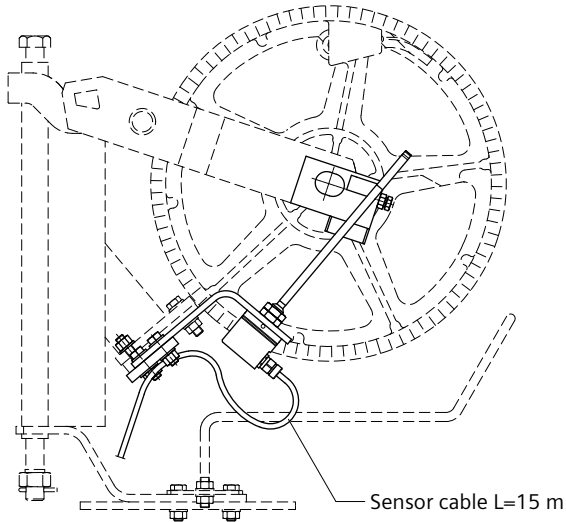
Monitoring of the switch position directly on the disconnecter rules out any signaling errors as a result of linkage failure, e.g. due to vandalism.

Notes

The here listed products serve as additional equipment for our standardized contact line components. The system integration of both monitoring systems depends on the specific plant and the local situation.

Sensor for CMS (Catenary Monitoring System)

on tension wheel assemblies up to 40 kN 8WL5070-/8WL5071- and up to 24 kN 8WL5078- (without 8WL5078-2/-3)



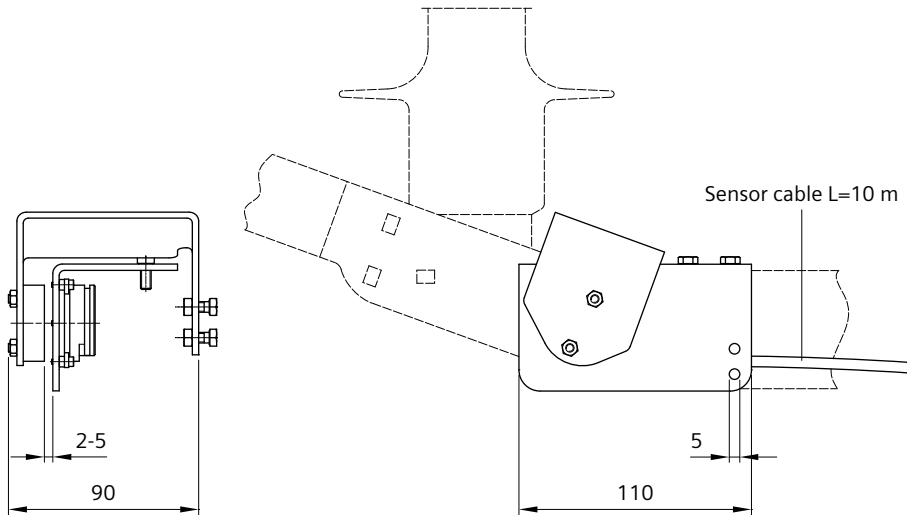
Order no.	8WL5067-0
Designation	Sensor for CMS (Catenary Monitoring System)
Material	
Fastening parts	Al
Bolts, nuts	stlSt
Washers	stlSt
Position indicator/permanent magnet (casing)	Plastic
Sensor (casing)	stlSt
Weight	3.33 kg

Parts are delivered unassembled.

CMS function in connection with data acquisition and evaluation station only. These have to be defined project-specifically.

Rotation angle sensor for DMS (Disconnecter Monitoring System)

for disconnectors up to 3 kV DC 8WL6134-



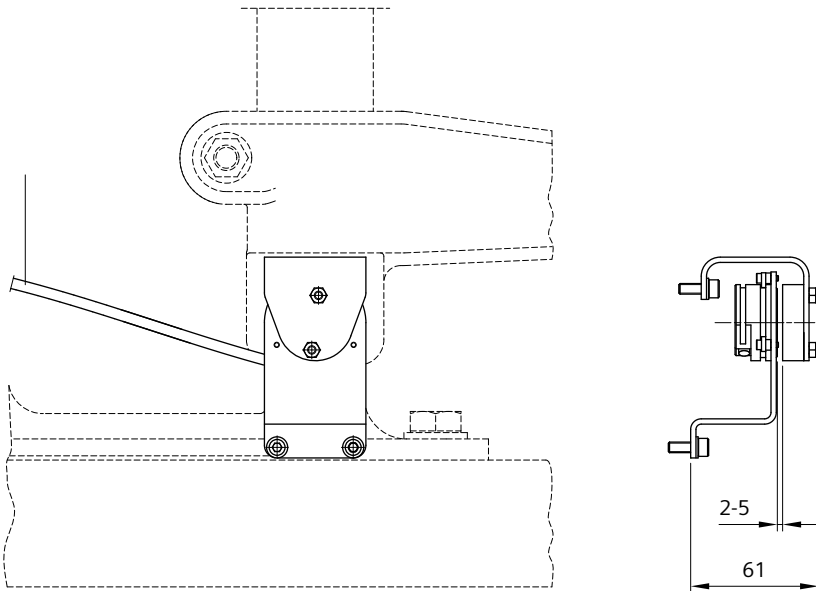
Order no.	8WL6136-0
Designation	Rotation angle sensor
Material	
Fastening parts	stlSt
Bolts, nuts	stlSt
Washers	stlSt
Position indicator/permanent magnet (casing)	Al
Sensor (casing)	Al
Weight	0.55 kg

Parts are delivered unassembled.

DMS function in connection with evaluation station only. This has to be defined project-specifically.

Rotation angle sensor for DMS (Disconnector Monitoring System)

for disconnectors 25 kV AC 8WL6144-



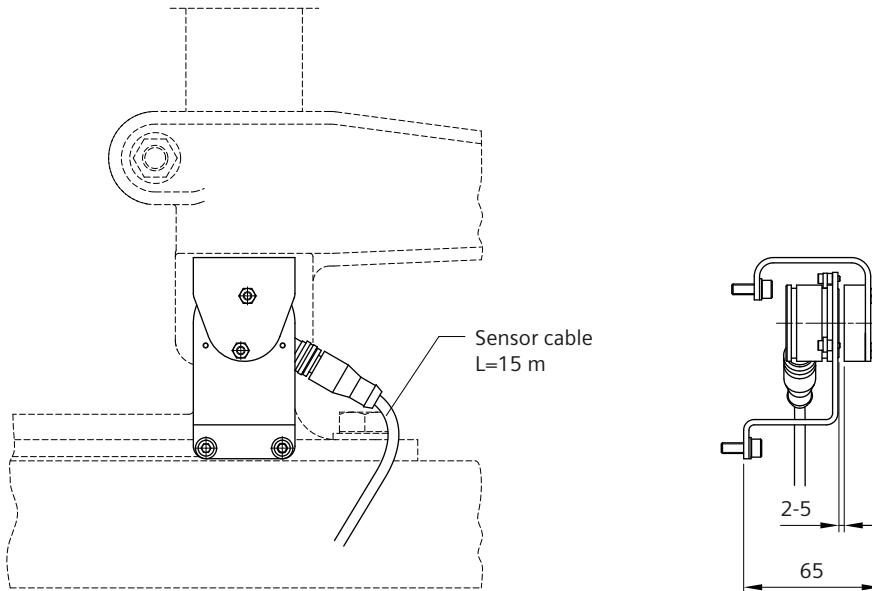
Order no.	8WL6144-7
Designation	Rotation angle sensor
Material	
Fastening parts	stlSt
Bolts, nuts	stlSt
Washers	stlSt
Position indicator / permanent magnet (casing)	Al
Sensor (casing)	Al
Weight	0.74 kg

Parts are delivered unassembled.

DMS function in connection with evaluation station only. This has to be defined project-specifically.

Rotation angle sensor SIL1 for DMS (Disconnector Monitoring System)

for disconnectors and earthing switch 25 kV AC 8WL6144-



Order no.	8WL6144-7D
Designation	Rotation angle sensor SIL1
Material	
Fastening parts	stlSt
Bolts, nuts	stlSt
Washers	stlSt
Position indicator / permanent magnet (casing)	Al
Sensor (casing)	Al
Weight	1.15 kg

Parts are delivered unassembled.

DMS function in connection with evaluation station 8WL6255-7A or -7B only.

Chapter 02

Standard Products

Tensioning equipment	70
Thimbles, connectors, sleeves	154
GRP cantilevers	179
Aluminium cantilevers	249
Steel cantilevers	331
Headspan supports	374
Insulators	408
Contact lines under structures and bridge protection	441
Clamps	492
Tension wheel equipment	582
Section insulators	633
Disconnectors and drive mechanism	670
Earthing and protecting equipment	772
Contact wires, single and stranded wires	788
Monitoring systems	809
Installation tools and equipment	816

Adaptor for greasing device	839
Adjusting spanner	834
Connecting rod for greasing adapter	838
Contact wire insertion device for soffit conductor rail	837
Contact wire measuring instrument	846
Contact wire stringing grips	832
Control casing for greasing device	839
Cutting tool for soffit conductor rail	836
Drilling tool for expansion joint	841
Drilling tool for soffit conductor rail	835
Earthing equipment 1.5 kV DC with earthing magnet	825
Earthing equipment 1.5 kV DC with earthing clamp	824
Grease for soffit conductor rail, UV active	840
Hexagon pressing die	822, 823
Mechanical hand pressing pliers	819
Mounting pulley, simple	831
Mounting tool for dead-end clamps	844
Mounting tool for expansion joint	842
Oval pressing die	820, 821
Portable short-circuiting device with earthing magnet	827
Ruler for section insulators	843
Short-circuiting device 750 V DC	826
Sling	833
Special grease paste	844
Telescopic height measuring rod up to 1 kV DC	829
Telescopic height measuring rod up to 3 kV DC and 30 kV AC	830
Telescopic voltmeter up to 1 kV DC	828
Twisting lever for grooved contact wire	833
UV LED flashlight	840
Wire cleaning brush	845

Technical comments

Application

Most of the work to be done in connection with the installation and maintenance of overhead contact lines can be performed with standard tools. Siemens offers a number of special tools and equipment for a professional and especially efficient installation and maintenance of contact line systems.

Types

The portfolio includes the following special tools, mechanisms, devices and measuring and test equipment:

- Special tools for contact line installation, for crimping and notching wires
- Special tools for mounting various specific fittings
- Occupational safety measuring and test equipment for the safe performance of overhead contact line work
- Earthing mechanism for nominal voltages up to 1.5 kV DC for the earthing and short-circuiting of overhead contact line systems
- Measuring devices for quality assurance during installation and maintenance of overhead contact line systems

Special features

The transport length of earthing equipment, voltage testers, and height measuring rods are dimensioned in such a way that they can be transported in a car.

The height measuring rods up to 30 kV AC are subjected to a routine electrical test with regard to their insulation strength.

Earthing equipment up to 1.5 kV DC

The overhead contact line clamp ensures easy handling of the earthing equipment, particularly suspending on the contact line. Thanks to the clamping function of the contact line clamp, the use of the earthing equipment for the various specified single wires and stranded wires is possible.

Versions with a rail foot clamp or with an earthing magnet are intended for use with an open or covered rail.

Notes

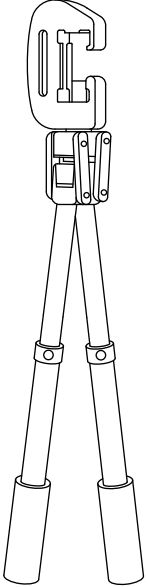
Testing, repairing and replacing spare parts in safety-relevant measuring devices and equipment may be performed by the manufacturer only.

Damaged earthing equipment and safety-relevant measuring and test equipment have to be suspended from usage.

Further information on the tools and devices can be found in the relevant product information.

Mechanical hand pressing pliers

open design with swivel compression head and steplessly adjustable telescopic handles, for pressing dies 8WL7152-, 8WL7153- and 8WL7154-



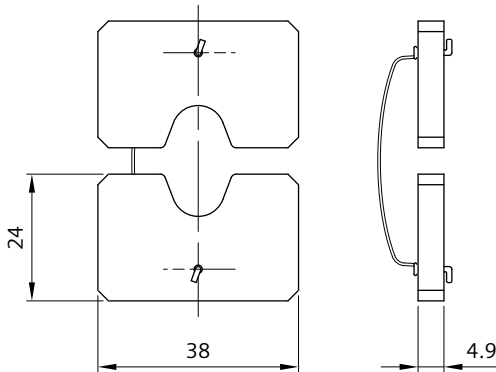
Order no.	8WL7157-0
Designation	Mechanical hand pressing pliers G06-T
Material	–
Weight	3.48 kg
Nominal compression force	60 kN

The open pressing head design simplifies the attachment and removal of the pliers and the replacement of the dies.

The pressing process is terminated when the handles are closed and the pressing dies then rest on each other.

Oval pressing die

for hand-pressing pliers 8WL7157-0, for compression collars and joints, pressing width 5 mm



Part 1

Order no.	8WL7152-0	8WL7152-1	8WL7152-2	8WL7152-3	8WL7152-4
Designation	Oval pressing die	Oval pressing die	Oval pressing die	Oval pressing die	Oval pressing die
Material	–	–	–	–	–
Weight	0.08 kg/1 pair	0.08 kg/1 pair	0.08 kg/1 pair	0.07 kg/1 pair	0.06 kg/1 pair
Characteristic number	8PO	10PO	12PO	16PO	18PO
Wire cross-section	10 mm ² (solid wire)	16 mm ² (solid wire) and 10 mm ² ¹⁾	16 mm ² ¹⁾ and 10 mm ² ²⁾	25 mm ² ¹⁾ and 16 mm ² ²⁾	35 mm ² ¹⁾ and 25 mm ² ²⁾

Part 2

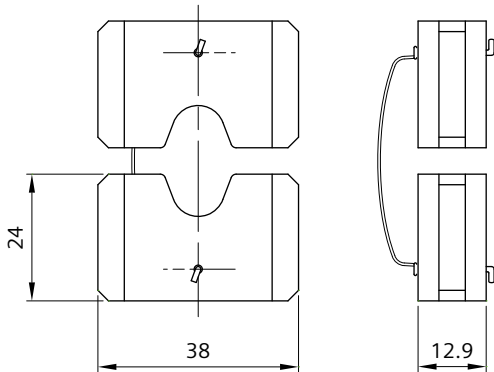
Order no.	8WL7152-5	8WL7152-7
Designation	Oval pressing die	Oval pressing die
Material	–	–
Weight	0.06 kg/1 pair	0.075 kg/1 pair
Characteristic number	20PO	22PO
Wire cross-section	50 mm ² ¹⁾ and 35 mm ² ²⁾	70 mm ² ¹⁾ and 50 mm ² ²⁾

¹⁾ for wires acc. to DIN 48201

²⁾ for wires acc. to DIN 43138

Oval pressing die

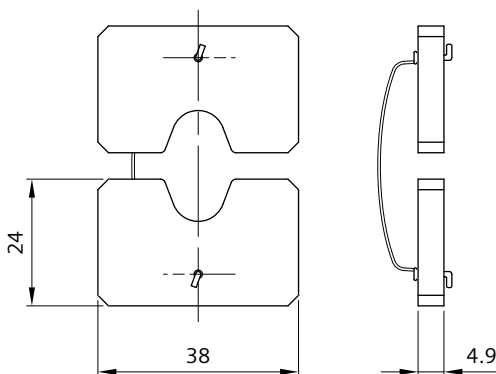
for hand-pressing pliers 8WL7157-0, for dropper wire 8WL7060-2, pressing width 13 mm



Order no.	8WL7152-1A
Designation	Oval pressing die
Material	–
Weight	0.20 kg/1 pair
Characteristic number	10PO
Wire cross-section	10 mm ²

Oval pressing die

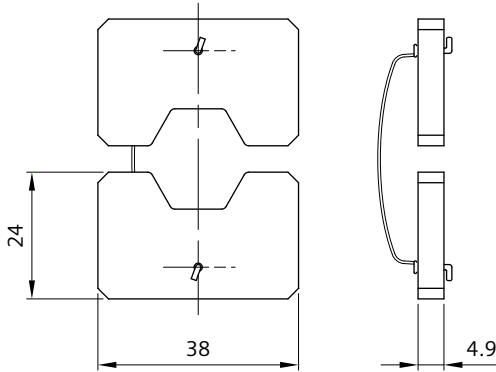
for hand-pressing pliers 8WL7157-0, for synthetic wire d=9 mm (Minoroc wire), pressing width 5 mm



Order no.	8WL7152-8
Designation	Oval pressing die
Material	–
Weight	0.07 kg/1 pair
Characteristic number	KS 9PO

Hexagon pressing die

for hand-pressing pliers 8WL7157-0, for copper compression cable lugs and compression joints, for copper wires acc. to DIN 48201, pressing width 5 mm



Part 1

Order no.	8WL7153-4	8WL7153-6	8WL7153-8	8WL7154-1	8WL7154-2
Designation	Hexagon pressing die	Hexagon pressing die	Hexagon pressing die	Hexagon pressing die	Hexagon pressing die
Material	–	–	–	–	–
Weight	0.073 kg/1 pair	0.072 kg/1 pair	0.06 kg/1 pair	0.07 kg/1 pair	0.06 kg/1 pair
Characteristic number	8	10	12	14	16
Wire cross-section	16 mm ² ¹⁾ 10 - 16 mm ² ²⁾	25 mm ² ^{1) 2)}	35 mm ² ^{1) 2)}	50 mm ² ^{1) 2)}	70 mm ² ^{1) 2)}

Part 2

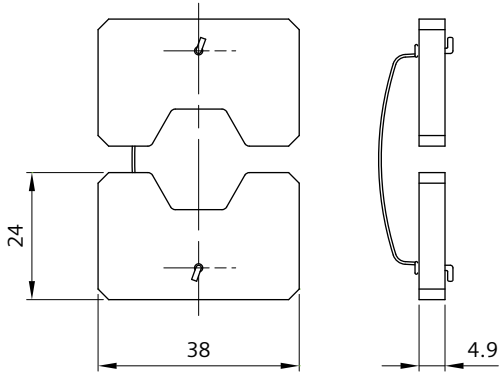
Order no.	8WL7154-3	8WL7154-5	8WL7154-6	8WL7154-7
Designation	Hexagon pressing die	Hexagon pressing die	Hexagon pressing die	Hexagon pressing die
Material	–	–	–	–
Weight	0.064 kg/1 pair	0.089 kg/1 pair	0.09 kg/1 pair	0.07 kg/1 pair
Characteristic number	18	20	22	25
Wire cross-section	95 mm ² ¹⁾	120 mm ² ¹⁾ 95 mm ² ²⁾	150 mm ² ¹⁾ 120 mm ² ²⁾	185 mm ² ¹⁾ 150 mm ² ²⁾

¹⁾ non-tensile

²⁾ high-tensile

Hexagon pressing die

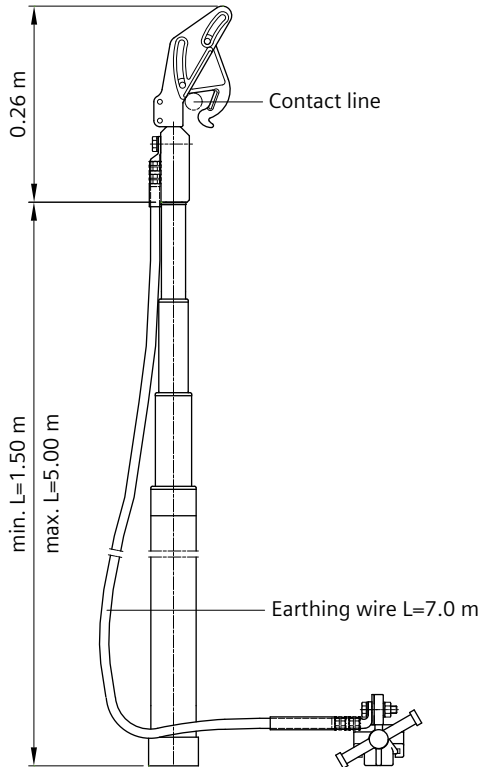
for hand-pressing pliers 8WL7157-0, for dropper clamps 8WL4591-0 to -8, 8WL4592-5/-8 and 8WL4593-5, pressing width 5 mm



Order no.	8WL7154-0
Designation	Hexagon pressing die for dropper clamps
Material	–
Weight	0.06 kg/1 pair
Characteristic number	13

Earthing equipment 1.5 kV DC with earthing clamp

for bronze and copper wires acc. to DIN 48201 or aluminium/aluminium-steel wires acc. to EN 50182 and contact wires acc. to EN 50149, transportation length 1.50 m

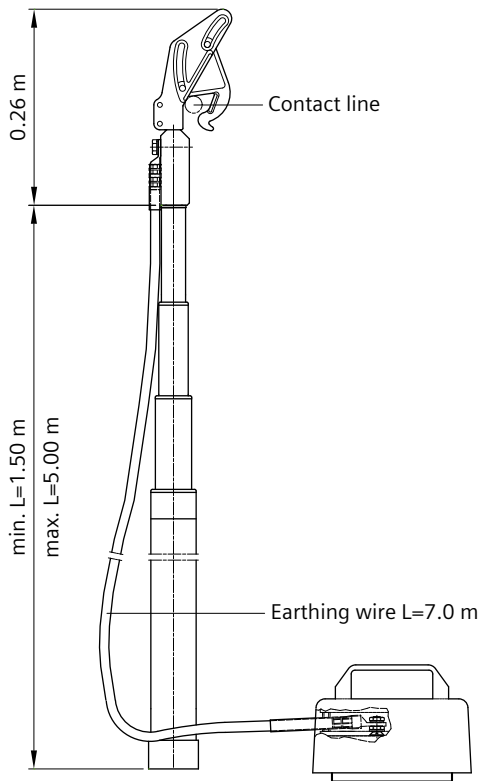


Order no.	8WL7168-0
Designation	Earthing equipment
Material	
Contact line clamp	Al
Earthing stick, 4-part	GRP
Earthing clamp	CuAl
Cable lugs	Cu, tin-coated
Earthing wire 50 mm ²	Cu with PVC-sheath
for wires	50 to 240 mm ² , BzII / Cu-ETP 17.5 to 21.8 mm, Al /AlSt
for contact wires	AC-80 to 150 or BC/BF-100 to 150, Cu-ETP / CuAg0.1
Weight	12.3 kg
Nominal voltage	1.5 kV DC
Rated short-circuit current	30 kA
Rated short-circuit duration	60 ms
Peak current factor	1.42

The unit carries the CE symbol.

Earthing equipment 1.5 kV DC with earthing magnet

for bronze and copper wires acc. to DIN 48201 or aluminium/aluminium-steel wires acc. to EN 50182 and contact wires acc. to EN 50149, transportation length 1.50 m

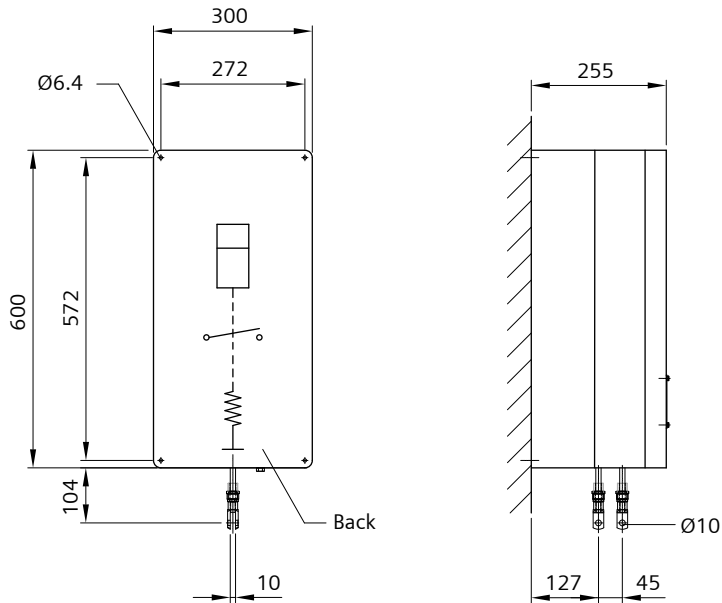


Order no.	8WL7168-1
Designation	Earthing equipment
Material	
Contact line clamp	Al
Earthing stick, 4-part	GRP
Earthing magnet (casing)	Plastic
Cable lugs	Cu, tin-coated
Earthing wire 50 mm ²	Cu with PVC-sheath
for wires	50 to 240 mm ² , BzII / Cu-ETP 17.5 to 21.8 mm, Al / AlSt
for contact wires	AC-80 to 150 or BC/BF-100 to 150, Cu-ETP / CuAg0.1
Weight	13.5 kg
Nominal voltage	1.5 kV DC
Rated short-circuit current	22 kA
Rated short-circuit duration	60 ms
Peak current factor	1.42

Earthing magnet can not be used again in case of short-circuit. The unit carries the CE symbol.

Short-circuiting device 750 V DC

for short-circuiting, for installation in tunnels and buildings, for permanent and provisional use

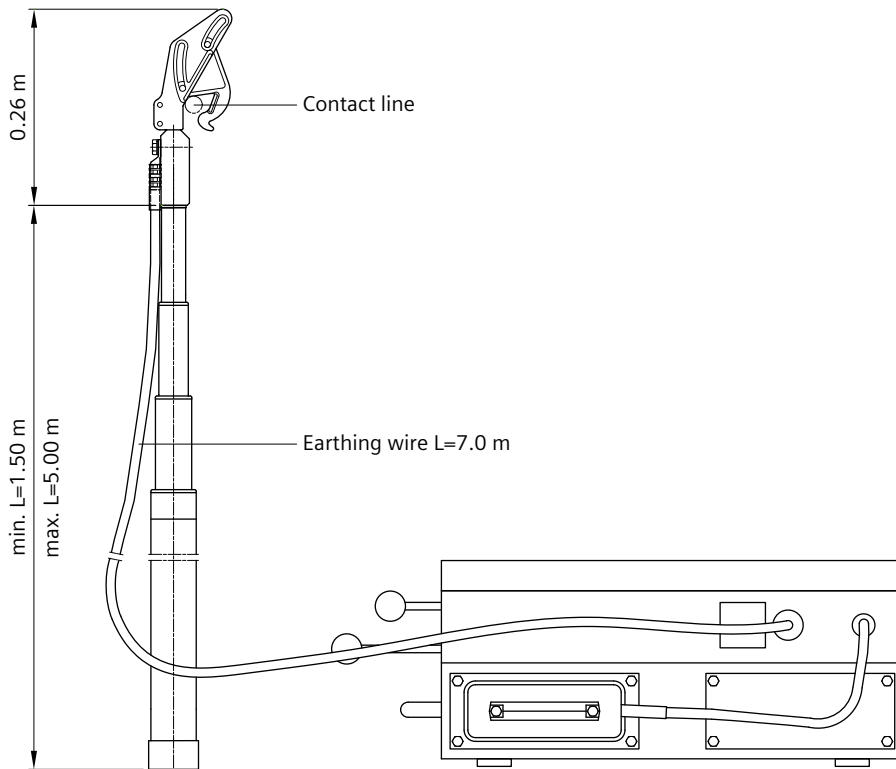


Order no.	8WL6610-0
Designation	Short-circuiting device
Material	Plastic
Weight	12.3 kg
Nominal voltage	750 V DC
Rated short-circuit current	10 kA
Rated short-circuit duration	200 ms

The unit carries the CE symbol.

Portable short-circuiting device with earthing magnet

for contact wires acc. to EN 50149, transportation length 1.50 m

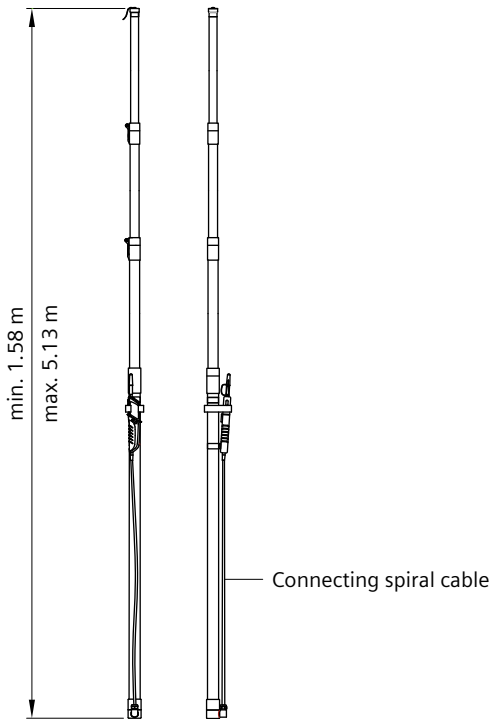


Order no.	8WL7168-7
Designation	Portable short-circuit device
Material	
Contact line clamp	Al
Earthing stick, 4-part	GRP
Earthing magnet (casing)	Plastic
Short-circuiting device (casing)	Plastic
Earthing wire 50 mm ²	Cu with PVC-sheath
for contact wires	AC-80 to 150 or BC/BF-100 to 150, Cu-ETP / CuAg0.1
Weight	31 kg
Nominal voltage	750 V DC
Rated voltage	900 V DC
Rated short-circuit current	10 kA
Rated short-circuit duration	200 ms
Peak current factor	1.42

Earthing magnet can not be used again in case of short-circuit. The unit carries the CE symbol.

Telescopic voltmeter up to 1 kV DC

for testing of the overhead contact line voltage



Order no.	8WL7175-0	8WL7175-0A
Designation	Telescopic voltmeter with carrying bag	Telescopic voltmeter ohne carrying bag ³⁾
Material		
Rod	GRP	GRP
Weight	4.0 kg	3.0 kg
Max. testing height	approx. 6.2 m	approx. 6.2 m
Test current	< 3.5 mA	< 3.5 mA
Protection class ¹⁾	IP65	IP65
Power-on duration ²⁾	30 s	30 s
Display on the measuring instrument	4 to 1000 V	4 to 1000 V

¹⁾ casing of the indicator

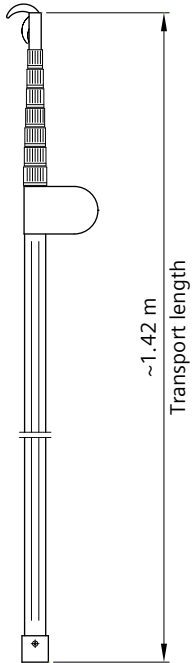
²⁾ max. testing duration of the overhead contact line

³⁾ If necessary, carrying bag 8WL7173-2 must be ordered separately.

The unit carries the CE-symbol.

Telescopic height measuring rod up to 1 kV DC

for measuring distances of energised overhead contact line components, with carrying bag

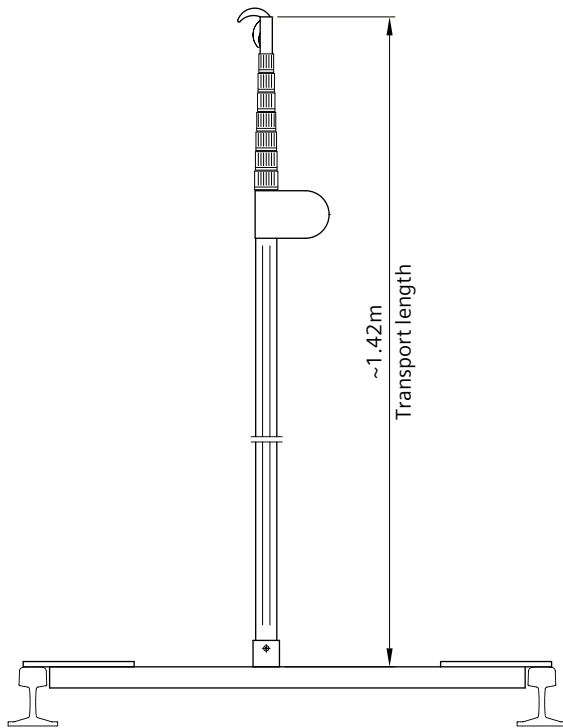


Order no.	8WL7171-0
Designation	Telescopic height measuring rod
Material	Plastic
Weight	3.0 kg
Nominal voltage	up to 1 kV DC
Measuring range	1.42 - 8.0 m
Measuring duration	max. 3 min (on energized parts)

The unit can also be used during precipitation and fog.

Telescopic height measuring rod up to 3 kV DC and 30 kV AC

for measuring distances of energised overhead contact line components, with mounting beam and carrying bag

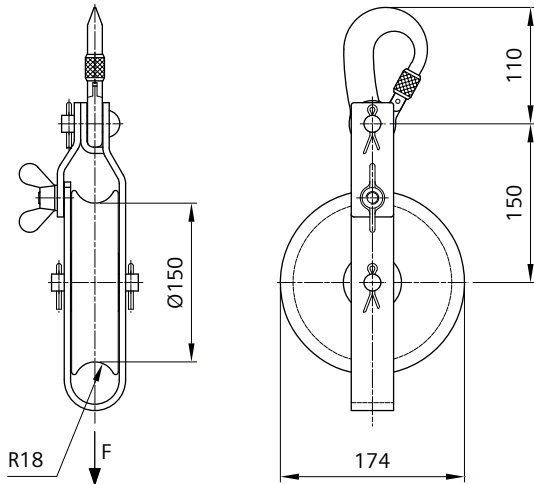


Order no.	8WL7173-0
Designation	Telescopic height measuring rod
Material	
Measuring rod	Plastic
Mounting beam	GRP
Weight	4.54 kg
Nominal voltage	up to 3 kV DC, 30 kV AC
Nominal frequency	16.7 Hz, 50/60 Hz
Measuring range	2.4 - 8.0 m
Measuring duration	max. 3 min (on energized parts)

The unit can also be used during precipitation and fog.

Mounting pulley, simple

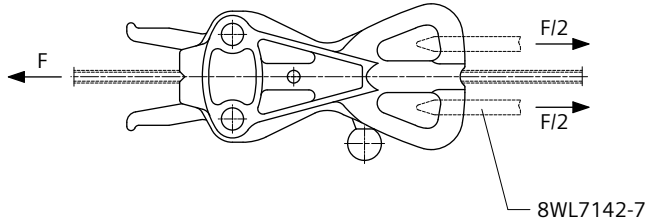
for stringing of catenary wire



Order no.	8WL7164-1
Designation	Mounting pulley, simple
Material	
Hoop, strap	htgSt
Snap hook	Al
Setting nut	Al
Pulley	Polyamide
Butterfly nut M12	Cu2
Pin, washer	stlSt
Pins 16x45	htgSt
Split pins 5x28	Cu
Weight	2.32 kg
Perm. operating load	4 kN
Min. failing load	12 kN

Contact wire stringing grips

as stringing grips for stringing or dead ending of contact wires and stranded wires, for contact wires acc. to EN 50149, for bronze wires acc. to DIN 48201

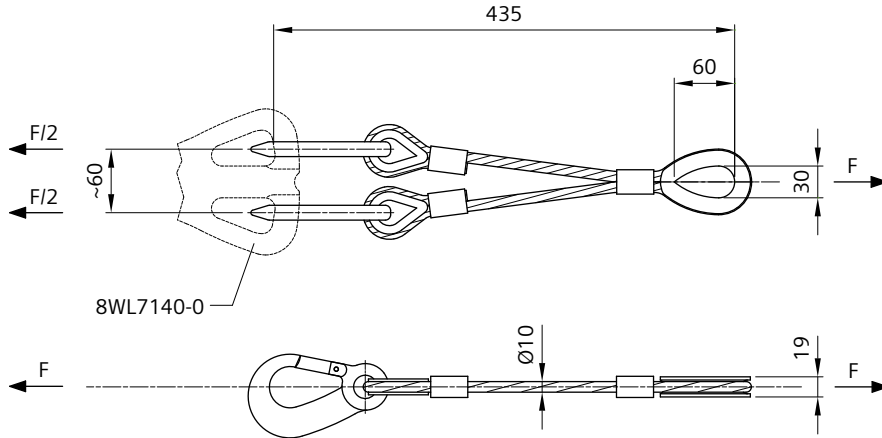


Order no.	8WL7140-0
Designation	Contact wire stringing grips
Material	ctAl, stlSt
for wires	25 to 70 mm ²
for contact wires	AC-80, Cu-ETP AC-100 to 120, Cu-ETP / CuAg0.1 AC-120, CuMg0.5
Weight	2.14 kg
Perm. operating load	7.0 kN for wire 25 mm ² 10.0 kN for wire 35 mm ² and AC-80 Cu-ETP 12.5 kN for AC-100 Cu-ETP 14.0 kN for wire 50 mm ² 15.0 kN for AC-120 Cu-ETP/CuMg0.5 16.0 kN for AC-100 CuAg0.1 19.0 kN for wire 70 mm ² and AC-120 CuAg0.1

The stated loads only apply for use with sling 8WL7142-7. Please order separately.

Sling

for contact wire stringing grips 8WL7140-0



Order no.	8WL7142-7
Designation	Sling
Material	
Snap hook	Al
Thimbles	htgSt
Compression clamps	Al
Wire 10 mm ²	St
Weight	1.12 kg
Perm. operating load	19 kN
Min. failing load	57 kN

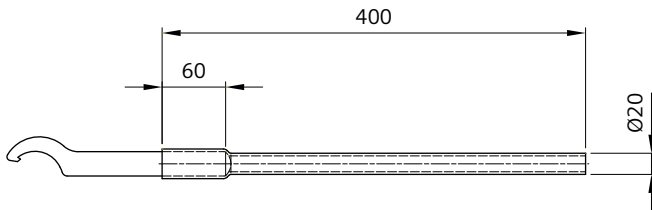
Twisting lever for grooved contact wire

for alignment of contact wires acc. to EN 50149

Order no.	8WL7156-0
Designation	Twisting lever for grooved contact wire
Material	St
for contact wires	AC-80 to 150, Cu-ETP / CuAg0.1
Weight	0.59 kg

Adjusting spanner

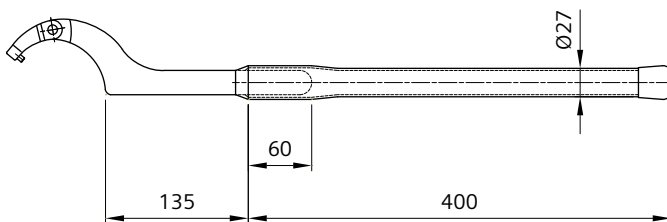
for elastic supports 1.5 kV DC 8WL4044-



Order no.	8WL4061-0
Designation	Adjusting spanner
Material	htgSt
Weight	0.58 kg

Adjusting spanner

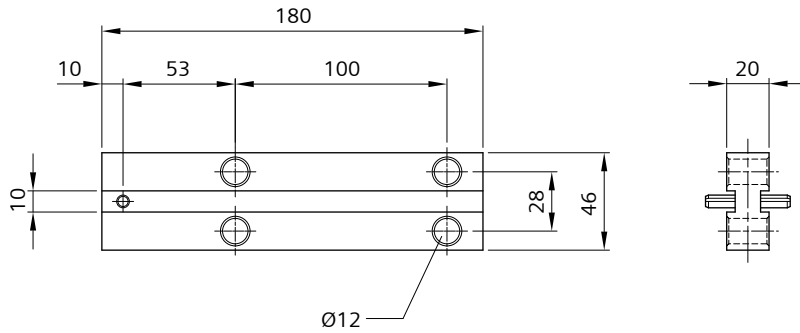
for elastic supports 25 kV AC 8WL4200-



Order no.	8WL4203-2
Designation	Adjusting spanner
Material	htgSt
Spanner	htgSt
End cap	Plastic
Weight	1.08 kg

Drilling tool for soffit conductor rail

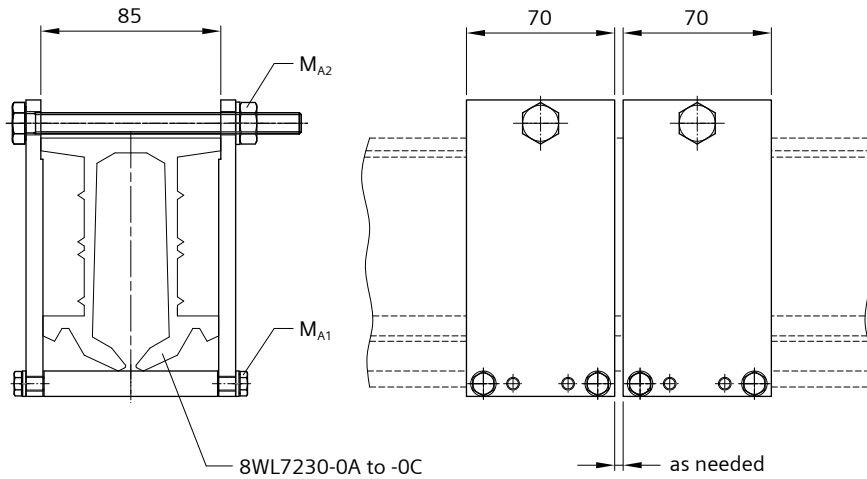
for working on conductor rail profiles 8WL7230-0A to -0C



Order no.	8WL7236-0
Designation	Drilling tool
Material	
Tool	stlSt
Prestressed sleeve	stlSt
Weight	1.30 kg

Cutting tool for soffit conductor rail

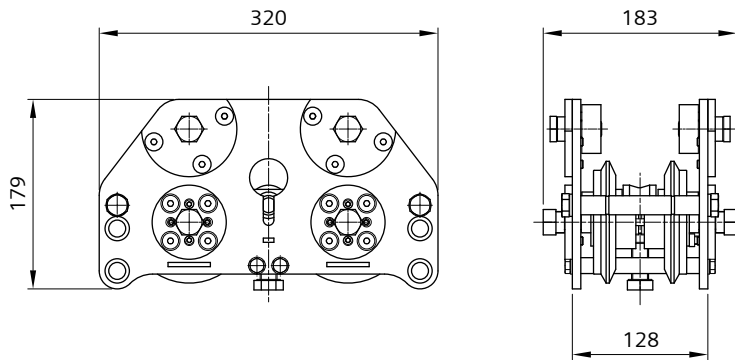
for working on conductor rail profiles 8WL7230-0A to -0C



Order no.	8WL7236-1
Designation	Cutting tool
Material	
Tool	stlSt
Bolts M6, M10	stlSt
Nuts	stlSt
Washers	stlSt
Weight	1.85 kg
Tightening torque M_{A1}	6 Nm
Tightening torque M_{A2}	32 Nm

Contact wire insertion device for soffit conductor rail

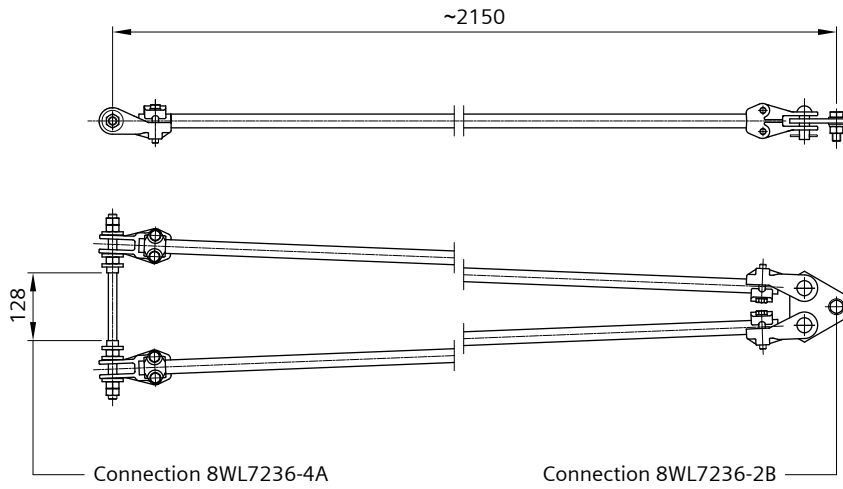
for contact wires acc. to EN 50149



Order no.	8WL7236-4A
Designation	Contact wire insertion device
Material	Steel, galvanic galv., stlSt
for contact wires	AC/BC-80 to 150
Weight	14.1 kg

Connecting rod for greasing adapter

for connection between adapter for greasing device 8WL7236-2B and contact wire insertion device for soffit conductor rail 8WL7236-4A



Order no.	8WL7236-2C
Designation	Connecting rod for greasing adapter
Material	
Clevis end fittings	ctAl
Three pin strap	Al
Tubes 26x3.5	Al
Threaded pin M16	stlSt
Nuts	stlSt
Washers	stlSt
Spring washers	stlSt
Weight	6.14 kg

Control casing for greasing device

for greasing the soffit conductor rail before inserting the contact wire, including control cables

Order no.	8WL7236-2A
Designation	Control casing for greasing device
Material	–
Weight	18.2 kg
Operating temperature	-10 °C - +50 °C
Max. operating pressure	200 bar
Operating speed	0.0 - 6.0 km/h
Operating voltage	100 - 240 V AC
Control voltage	24 V DC
Frequency	45 - 65 Hz
Nominal power	< 100 W
Protection class	IP44

Adaptor for greasing device

for greasing the soffit conductor rail before inserting the contact wire, including control cables and hoses

Order no.	8WL7236-2B
Designation	Adaptor for greasing device
Material	–
Weight	4.8 kg
Operating temperature	-10 °C - +50 °C
Max. operating pressure	200 bar
Operating speed	0.0 - 6.0 km/h

UV LED flashlight

for greasing check of soffit conductor rail

Order no.	8WL7236-2D
Designation	UV LED flashlight
Material	
Casing	Al
Weight	0.13 kg
Power supply	battery operated, 3x type AAA

incl. case, three batteries und six back-up batteries

Grease for soffit conductor rail, UV active

for greasing the soffit conductor rail before inserting the contact wire

Order no.	8WL7230-4
Designation	Grease for soffit conductor rail, UV active
Material	–
Weight	10 kg hobbock

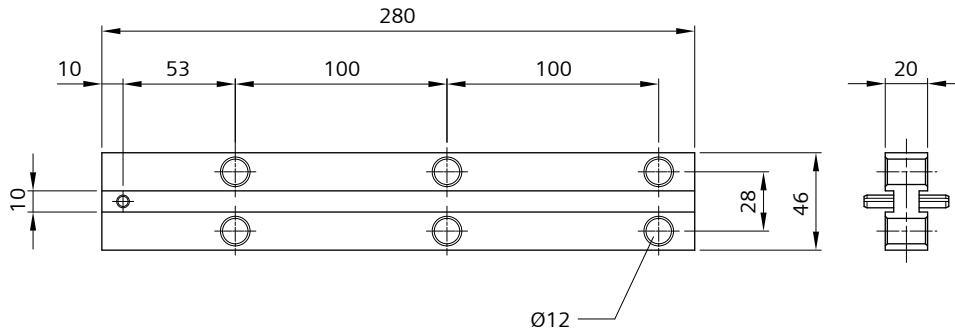
Consumption:

conductor rail with greasing device: approx. 5 kg / 1000 m

contact wire manually with a brush: approx. 15 kg / 1000 m

Drilling tool for expansion joint

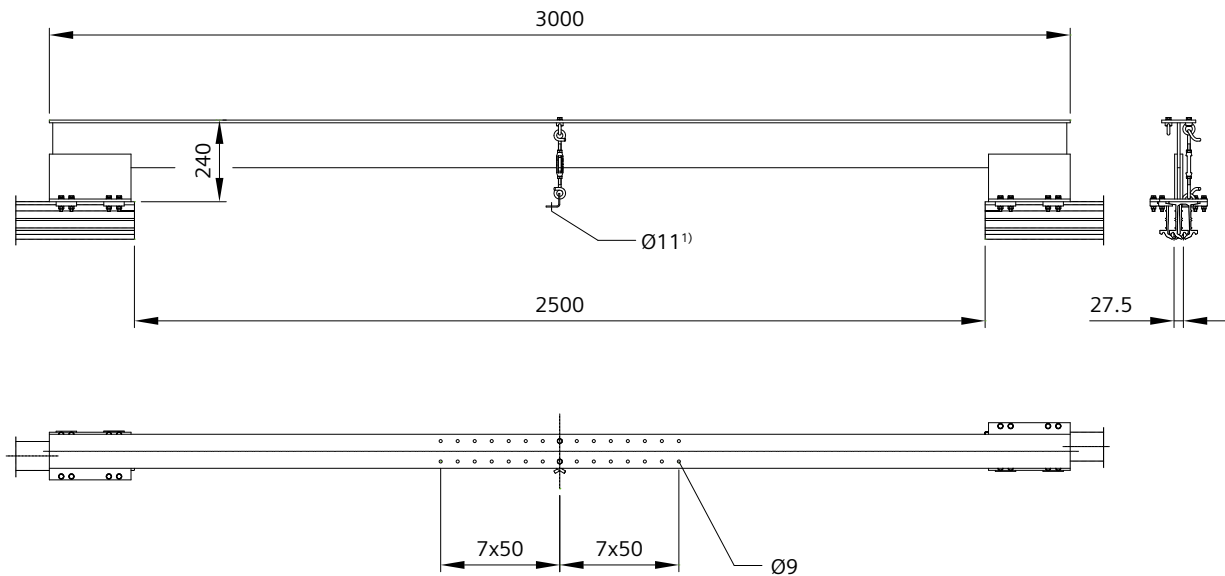
for working on the connecting elements to expansion joints for soffit conductor rail 8WL7238-0A to -0Z



Order no.	8WL7236-0A
Designation	Drilling tool for expansion joint
Material	
Tool	stlSt
Prestressed sleeve	stlSt
Weight	1.75 kg

Mounting tool for expansion joint

for mounting of expansion joints for soffit conductor rail 8WL7238-0A to 8WL7238-0Z

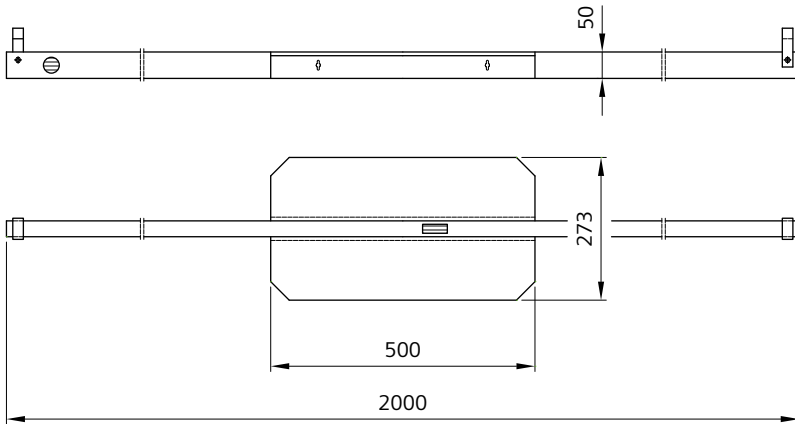


Order no.	8WL7238-3A
Designation	Mounting tool for expansion joint
Material	
Suspension element	Al
Support elements	Al
Mounting eye	stlSt
Turnbuckle	CuAl, stlSt
Bolts	stlSt
Nuts	stlSt
Washers	stlSt
Split washers	stlSt
Weight	18.1 kg

¹⁾ Mounting connection on expansion joint

Ruler for section insulators

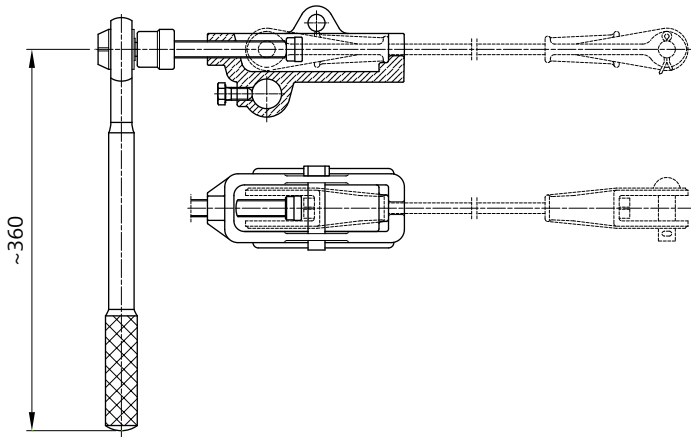
for installation of section insulators 8WL5510-, 8WL5546- and 8WL5570-



Order no.	8WL5578-0
Designation	Ruler
Material	
Spirit level	Al
Bracket	Al
Bolts	stlSt
Nuts	stlSt
Weight	3.08 kg

Mounting tool for dead-end clamps

for mounting of dead-end clamps 8WL3006-1 and -3 on GRP rods 8WL3007-0 and -1 (d=10 mm)



Order no.	8WL3020-8
Designation	Mounting tool for dead-end clamps
Material	
Casing	CuAl
Compression bolt M16	St
Adjustable washer	St
Torque wrench	St
Torque wrench insert (hexagon 24 a/c flats)	Chromium-vanadium-steel
Cup-point screw M12	stlSt
Weight	4.12 kg

Special grease paste 8WL8015-0 must be ordered separately, see page 844.

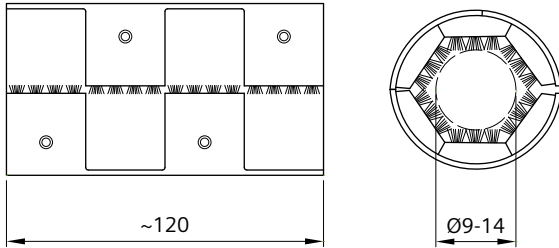
Special grease paste

for mounting tool 8WL3020-8

Order no.	8WL8015-0
Designation	Special grease paste (tin)
Material	–
Weight	1.0 kg

Wire cleaning brush

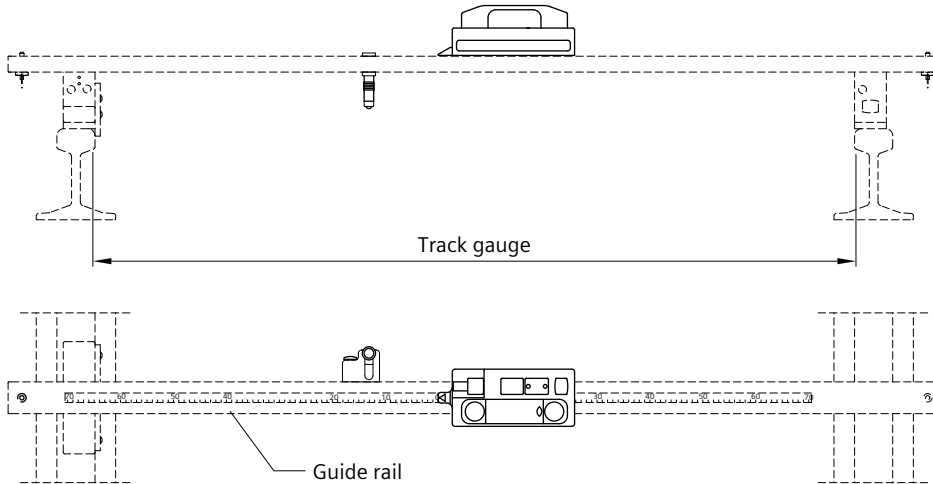
for removing oxide and soiling layers from the terminal-clamping points of used and corroded wires, for bronze and copper wires acc. to DIN 48201



Order no.	8WL7145-0
Designation	Wire cleaning brush
Material	
Casing	Al
Bristles	stlSt
for wires	50 to 120 mm ² , Bzll 95 to 120 mm ² , Cu
Weight	0.20 kg

Contact wire measuring instrument

for measurement of vertical and lateral position of catenary



Order no.	8WL8016-2
Designation	Contact wire measuring instrument
Material	–
Weight	6.0 kg
Ambient temperature	-20 °C to +50 °C
Protection class	IP64
Contact wire lateral position ¹⁾	±700 mm / ±5 mm
Contact wire height ²⁾	up to 60 m / ±3 mm
Delivery scope	Instrument with target optics and vertical laser beam, aluminium case, laser glasses, rechargeable batteries, charger and LED lighting device

¹⁾ from track centre, measuring range / accuracy

²⁾ above top of rail, measuring range / accuracy

If necessary, accessories must be ordered separately:

8WL8016-2A Guide rail for track gauge 1435 mm

8WL8016-2B Guide rail for track gauge 1435 mm, two-parts incl. carrying bag

Substitute for 8WL8016-1.

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Contact line equipment
for mass transit and main-line railways
Product catalog
No. A6Z00041185887 / Version CL V2.0

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