ARCAS

Cantilever system for rail and tram installations

Elektroline

The ARCAS cantilever system delivers a strong response to individual customer requirements and maximum versatility in use. A patented Kummler+Matter development, designed on the tried and tested modular system. Since 1999, the system has been used successfully in many different projects. It forms basic part of comprehensive overhead contact line system ARCAS-EL manufactured in license K+M by Elektroline.

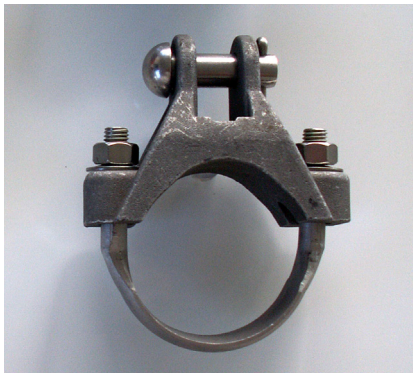
High flexibility

Based on tubular sections, ARCAS offers solutions for all material requirements and tube dimensions, using the same connection products. Available in aluminium, steel or synthetic material, with diameters from 38mm to 90mm, models can be assembled in the range from urban transport up to high speed intercity trains.

Skilfully selected interfaces in the individual products permit many different combinations and hence new applications with a narrow variety of parts.

Individual functionality

A very large number of the products are designed for a wider dimension



range. So, for example, the same castings can be used on the tube for diameters from 38-60mm and 60-90mm.

Or, by turning the clamping plate, the same messenger wire clamp can be used for either one or two messenger wires, even with different cross-sections. With just two

sizes of fastenings, the use of tools is reduced. Similarly, with pole mountings, individual products are assembled simply by joining the positive-locking parts together.

Renowned quality

All products are made from stainless material. Aluminum and bronze casting alloys, tried and tested over decades, form the basis. Complemented by the screw and

plug connections made from stainless CrNi steel, they guarantee a long service life with lasting quality.

For successful certification by NS Dutch Railways for the supply of various trolley wire systems, the products not only fulfill extensive static, dynamic, and environmental conditions, but also go through a full quality assurance system.

Simple assembly / maintenance / stock-holding

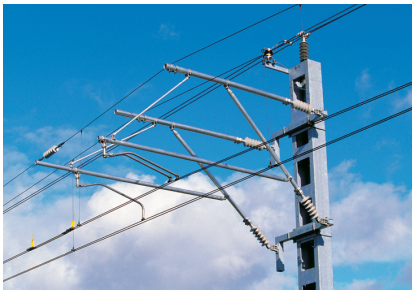
With just a few screw and plug connections, fast preassembly and on-site assembly is guaranteed. This affects maintenance too, if - together with the visual inspection - a connection part ever has to be readjusted or even replaced. The multifunctional parts noticeably simplify stockholding.

What's more, individual products can be used in existing, older installations, thanks to a very high compatibility.

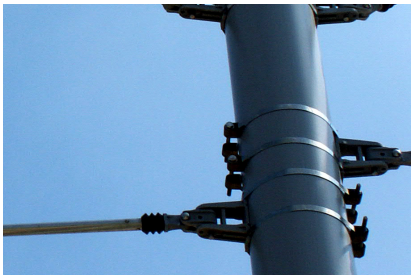
Extensive product possibilities

Pole mountings

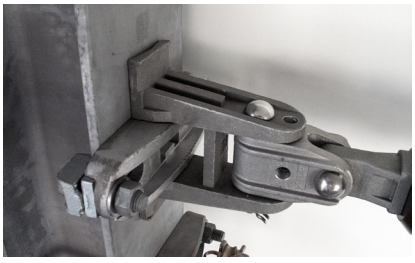
A wide variety of pole mountings can be assembled with just a few parts. These can be swivel, clevis or tab mountings for circular or profile section poles in a very wide range of sizes.



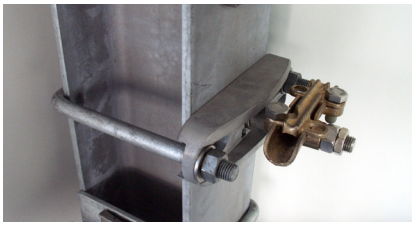
Cross arms for double support structures are equipped with the same swivel joint as the single support structure.



Reusable swivel joint mountings with steel bands on circular or profile section poles, using Lindapters or U-bolts, meet individual customer requirements.



Together with positive-locking connections of pole cross-arms and diverse connection parts, with no fastenings, the range of mounting variants is extended with the least variety of parts.



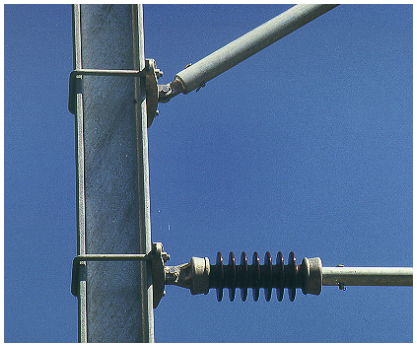
The lug and clevis interfaces are extremely versatile in use. Together with tube connections, transverse turnbuckle wires etc. can be attached too.

Field of application of the pole mountings:

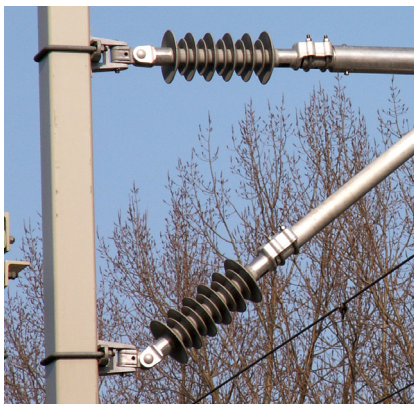
- Profile section poles from 100mm to 300mm wide.
- Circular poles from 115-500mm diam.
- Double support structure mountings

Insulators and pole mountings

No matter whether the Kummler+Matter insulators are porcelain or synthetic, they have the same pluggable fixing method as the rest of the tube mountings. Thanks to suitable interfaces, even third-party products such as silicone insulators can be used too.



The plug system with only one bolt and the same diameter over the entire field of application increases flexibility and reduces assembly time. In addition, it allows a fast and simple tube adaptation on site, if required.



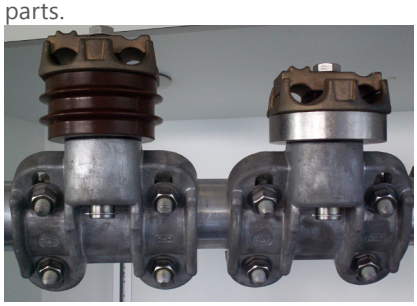
Field of application of insulators and tube mountings:

- Up to 3kV DC and 25kV AC
- Porcelain, cast resin and silicone insulators
- Single and double insulation systems
- Tube mountings from 38mm -Ø90mm diam. using plug system

Messenger wire clamps

The modularity of ARCAS is particularly demonstrated with the messenger wire clamps, which take account of different cross-sections, numbers of conductors and supplementary insulation in the DC field of application.

Whether it be a supported, sliding suspension, a suspended mounting or a supported suspension with a common cantilever/strut mounting, the modular construction offers a wealth of solutions with just a few parts.



With the special geometry of the tube supporting surface, the same messenger wire clamp can be used for the most frequently-used tube

diameters and materials.

The fixed messenger wire clamp, insulated or non-insulated at the cantilever/strut, uses the same interface and pluggable mounting on different tube diameters.

Field of application of the messenger wire clamps:

- Messenger wires up to 255mm2, Ø21mm
- With supplementary insulation up to 1.5kV DC
- Standard basis for tube range from Ø60-90mm
- Special versions possible, such as:
  - suspended application
  - two insulators for high loads

Lateral support mountings

The ARCAS flexibility for customer requirements and different ranges of application is put into practice with the lateral support mountings too.

Few mountings, clear interfaces up to the integration of the K+M insulator system for tram installations form the basis, together with the Ø38mm stainless steel tube.

Supplied in various lengths, or individually cut to length on site, connected to the insulator via swivel or fixed mounting, widely different applications are possible.

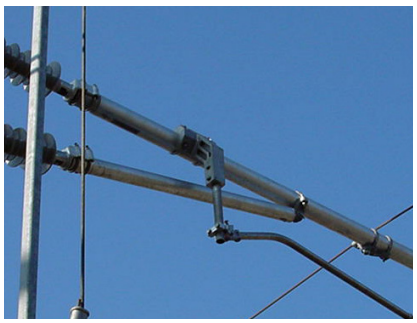
Appropriate connection products, some with lift limiting, complete the picture.

← Lift limiter

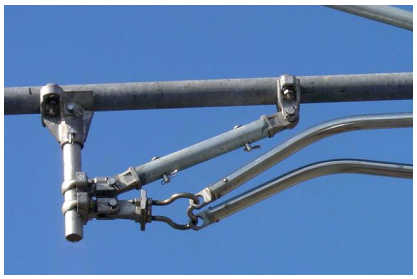
← Horizontal clevis

← Vertical clevis

← Connection for two lateral supports



Even special applications for lateral mounting of the lateral support directly on the cantilever tube with reduced system heights are simple



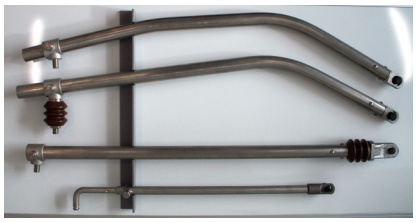
to implement. Very high loads require stiffeners and, if required, a double lateral support mounting. The problem is easily solve with the same parts from the ARCAS range.

Field of application of the lateral support mountings:

- Tube Ø38mm fixed/swivelling up to 90°
- Standard basis for tube range from Ø45-60mm and Ø60-90mm
- For single and double lateral supports incl. lift limiting

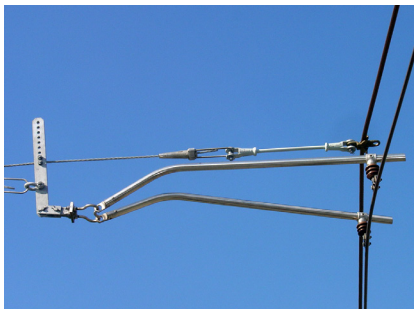
Lateral support

The use of a standard 1 inch tube for the lateral support in aluminium or stainless steel enables supports to be designed for almost any service application.



Insulated and non-insulated lateral supports for DC and AC operation, with fixed or sliding trolley wire clamp, combined with a straight, single or double curved tube, offer a host of possibilities and so allow cost-effective customer solutions in various lengths and shapes.

For maintenance work or where clearances are not clearly defined by the design, the lateral support offers the advantage that it can easily be cut to the required length on site.



Field of application of the lateral supports:

- Aluminium or CrNi steel tube Ø1" L=900-2300mm
- With supplementary insulation up to 3kV DC
- M16, 5/8" or D=16mm (U-pin) Connection for FDR clamp

Summary of the ARCAS advantages and the field of application:

- A cantilever system for tram, urban and intercity rail installations, irrespective of the catenary type.
- Use of the most common tube materials such as aluminium, steel or synthetic material in a diameter range from 38-80mm
- High flexibility and individual functionality thanks to modular system
- Efficient assembly because of simple plug system and narrow variety of mountings
- Economical due to possibility of integration in existing systems and reduced stockholding
- Use of porcelain, cast resin or silicone insulators up to 3kV DC and 25kV AC
- Double insulated systems in DC area
- Application specific and heavy-duty models possible:
  - Trolley wire cross-section up to 180mm2 (350MCM, USA) at 25kN tensile load
  - Messenger wire cross-section up to 255mm2 (500MCM, USA) at 45kN tensile load
- Quality approved products by means of static, dynamic and environmental tests.
- Successful, tried and tested implementations in the entire field of application

Winning ARCAS applications

In the 25kV AC urban, intercity and freight transport fields, the two ARCAS B4 and B5 cantilever systems are certified for the Dutch Railways They are installed on several routes, including the Utrecht-Amsterdam route (up to 200km/h) and through Rotterdam harbour. (Havenspoorlijn as part of the Betuwe Route freight line). The same system has also proved itself at Slovakian Railways, Czech republic or Bulgaria on Danube bridge II to Romanian Calafat.

ARCAS applications in the DC field are in service by now on various continents. So, in America, for example, the RTD in Denver, NJTransit in New Jersey and also the RTS in Sacramento have been successfully running on routes with ARCAS cantilevers for some years. In Europe, the Randstadrail in Rotterdam, various private railways in Switzerland and several tracks in Czech republic are on the move on routes equipped with ARCAS cantilevers.

The versatility of ARCAS knows virtually no boundaries It offers solutions for almost all catenary applications, irrespective of the electrical and mechanical requirements. Elektroline and K+M is more than happy to support you with your ARCAS solution.

Competent partner

For decades now, K+M's engineers and fitters have been developing, planning and building trolley wire systems for urban transport and railway installations. Elektroline continues to this tradition by establishing license production of system ARCAS. As a general contractor, we are equally responsible for development, production, installation and maintenance. So we know from our own experience all the demands that are placed on the modern-day trolley wire. As a result, products are created that really do stand up to the harsh demands of operational practice. K+M guarantees financially and technically optimal solutions for all trolley wire schemes.

More practical applications

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