PFISTERER

Connectors, Clamps, Compensating Devices, Insulators and Safety Equipment for Overhead Catenary Lines

RAILWAY CATENARY SYSTEMS

Components and Systems for the Electrification of Railway Lines.

THE POWER CONNECTION

CABLE SYSTEMS | CONNECTORS | ACCESSORIES

ibemo Kazakhstan - 090301 Republic of Kazakhstan, West Kazakhstan Oblast, Aksai, Pramzone, BKKS office complex
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Welcome to the RAILWAY CATENARY SYSTEM Centre of Competence.

PFISTERER provides perfect solutions for railway systems. The technology developed in-house for the production of safe and reliable railway electrification material offers a comprehensive program of clamps and compensating devices. This also includes all necessary auxiliary equipment and tools.

We have extended this line to include a broad range of silicon and section insulators, as well as catenary geometry measuring devices.

All these products are complemented by a full range of voltage detectors and grounding equipment.

RAILWAY CATENARY SYSTEMS offers you connectors and systems for the electrification of railway lines:

- **Hangers and Connectors**
- **Insulators and Suspensions**
- **Tools**
- **TENSOREX® System**
- **Safety Equipment**

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Excellent Products for Excellent Means of Transport.

PFISTERER has been supplying products for railway electrification for more than 30 years which has shaped our product program. Our products have been installed worldwide in subway, tramway and high-speed lines becoming a reference for Railway Administrations.

The length of the subway, tramway and high-speed rail networks will more than double worldwide in the next 10 years due to an expanding market and changes in consumer demands. PFISTERER will be present in this growth supplying not only products but knowledge as well.

Our products are adapted to customer needs providing application and design support.

For example our patented **TENSOREX®** system has demonstrated a definite improvement in catenary systems, introducing an innovative solution for the mechanical compensation of catenary cables, increasing efficiency and substantially reducing maintenance.

Our **hangers and connectors** have been successfully installed by major Railway Administrations both in local tramway, and in high-speed lines satisfying demanding requirements and achieving a high grade of performance.

Nowadays, **silicon insulators** are becoming more and more accepted due to their advantages: customized fittings, light weight, simple installation.

And in **safety equipment**, we have increased our range including variants to cover all the different operating voltages of the Railway Administrations.

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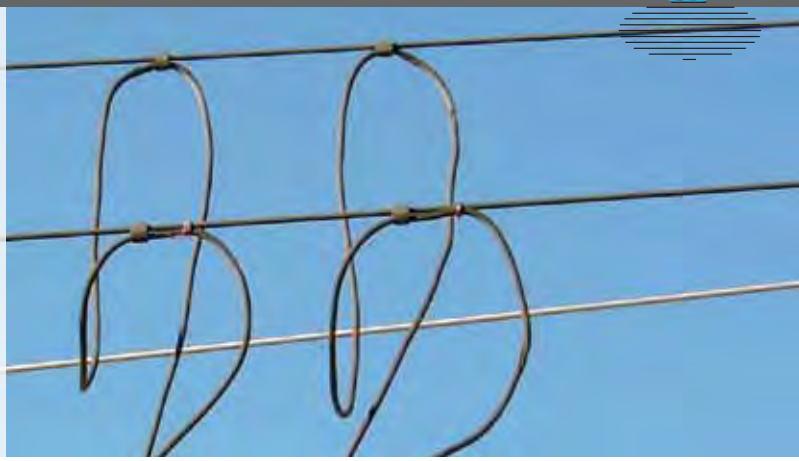
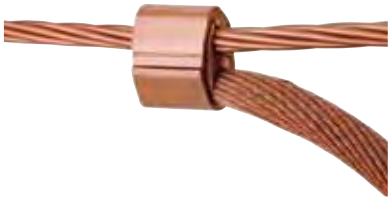
RAILWAY CATENARY SYSTEMS: Hangers and connectors

The program includes bolt and compression connections, clamps and hangers produced by cold or hot forging. Assembly tools, for example, manual and hydraulic compression tools round off the program. All our products have been tested and approved by Official Certification Companies, with whom we develop new products in accordance with new demanding requirements and standards such as EN-50119.



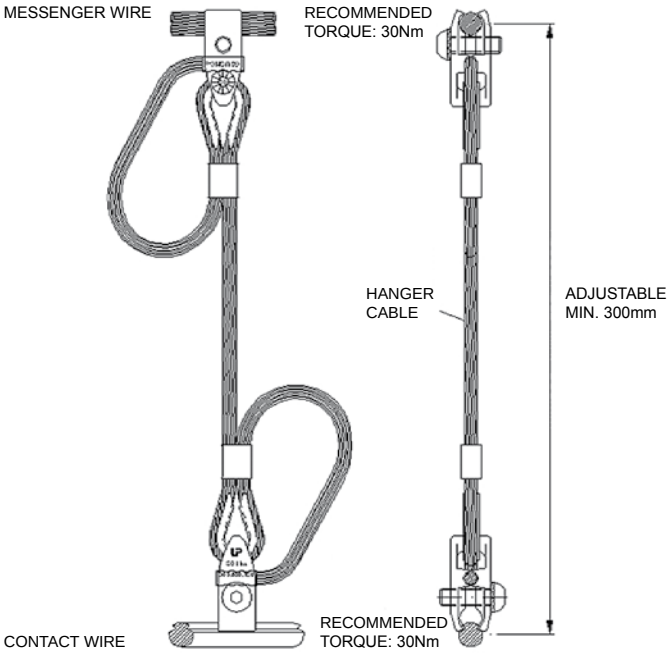
Connectors.

- Bolted and compression technique
- Full range. Suitable for cables from 10 – 300 mm^2
- Any type of cables. High quality aluminum and copper alloys to guarantee a safe and reliable connection
- Perfect contact. Excellent design to permit the correct circulation of current



Hangers.

- Produced both by hot or cold forging
- Large clamping range: 25 – 300 mm^2 catenary cables and 80 – 161 mm^2 contact wires
- Simple. Quick and easy installation
- Accurate. Assembly desk produced on demand which substantially improves the assembly of hangers and their length with an excellent minimum tolerance



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CuNiSi Clamps.

- High resistant copper alloy
- Excellent mechanical and electrical properties
- Light and durable
- Outstanding performance in very demanding high speed lines



Power Substation Clamps.

PFISTERER manufactures and markets a comprehensive range of both aluminum and copper alloy clamps for use in all electrical conductor and/or tubular busbar applications.

- Large voltage range: 500 V – 400 kV
- Minimum and steady contact resistance
- For busbar diameters up to 250 mm
- Current conduction capacity up to 6300 A



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RAILWAY CATENARY SYSTEMS: Composite Insulators and Suspensions

Electrical insulators are a key component in the electric power system such as substations and railway lines. In the early days, insulators were made of ceramic and glass but since polymeric insulators were developed they have become a reference for the railways administrations. They consist of a fiberglass core rod covered by skirts of silicone rubber and equipped with metal end fittings. Composite insulators have many advantages over ceramic and glass insulators and as a result they are gaining popularity worldwide and replacing conventional insulators.

Railway Composite Insulators.

With 30 years' knowledge and experience in the design and production of composite insulators using Silicone Rubber technology as well as the corresponding feedback from operational service, PFISTERER offers solutions for all railway networks.

PFISTERER runs its own laboratories for high voltage testing and material investigations. In these laboratories, design, type and sample testing are carried out in accordance with the appropriate standards and in the presence of inspectors if required.

Technical features:

- Silicone insulators with fiberglass rod core
- Full range: from traditional 750 Vdc lines to 25 kVac high speed lines
- Steel or aluminum end fittings

Advantages:

- Light weight
- No risk of vandalism
- Self cleaned by rain
- Suitable for polluted areas
- Easy to store and handle

Suspensions.

PFISTERER supplies the full range of cantilevers, tunnel suspensions and steady arms for AC and DC systems for railways, light trains, metro, tramways and rigid catenaries, in galvanized steel, stainless steel and aluminium.

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RAILWAY CATENARY SYSTEMS: Tools

Nowadays the Railway Administrations have very demanding requirements with very low tolerances in the electrification of the overhead contact lines. To comply with this PFISTERER supply perfect tools and equipment which improve the installation and performance of the system. Connections and measurements must be very accurate to permit a constant power supply to trains running even at up to 350 km/h.

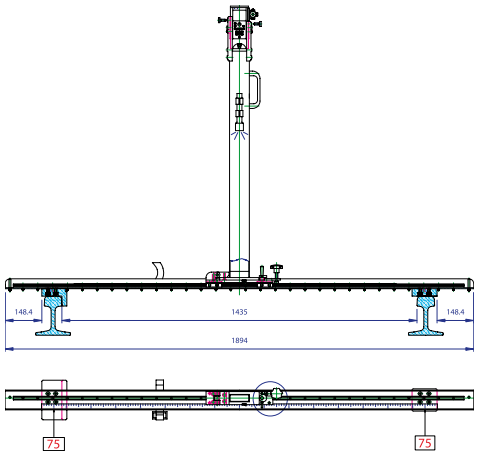
Assembly Tools.

- Tools to install all connectors and accessories
- For bolted or compression technique
- Large range of compression dies and heads
- Hand-operated and electro-hydraulic tools and pumps

Catenary Geometry Measuring Devices.

Highly accurate measuring systems are needed when erecting and maintaining catenary systems. Most measuring systems are often cumbersome and therefore difficult to transport and handle. A better option is our contact wire measuring equipment. Maximum precision. Minimum weight. Perfect handling.

- Laser or mechanical device
- Precise. Accurate measurement of the height and stagger of the contact wire
  - Contact wire height measurement: 1.3 to 7 m with an accuracy of +/- 5 mm
  - Contact wire stagger measurements: +/- 75cm with an accuracy of +/- 5 mm
- Easy to operate and handle
- Available for international track gauge (1435 mm), narrow track gauges (1000 mm) and special track gauges on request



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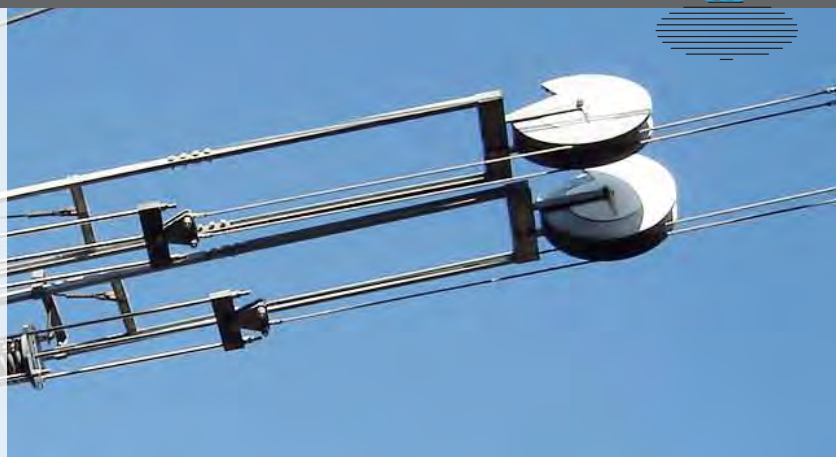
RAILWAY CATENARY SYSTEMS: TENSOREX®

Modern railway tracks make new demands for tensioning systems: High speed tracks with lots of tunnels need tensioning devices which can be integrated easily into the tunnel geometry. Urban transport systems are increasingly designed to aesthetic aspects and ask for tensioning devices which blend in the general view almost invisibly. TENSOREX, the spring operated tensioning system offers solutions for both applications.



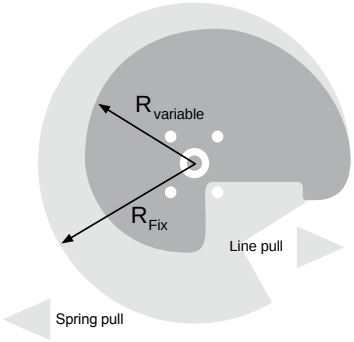
Constant Tension in the most Compact Form

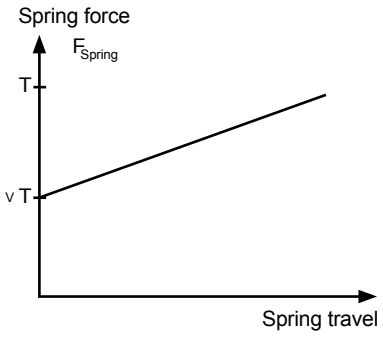
Railway contact wires are continually exposed to elongation and contraction due to changes in temperature. Tensioning devices reduce this and help to maintain the constant pull of the wires. However, conventional wheel tensioning devices with counter weights take up a lot of space. Very often it is necessary to install these devices vertically up a mast or in tunnels.

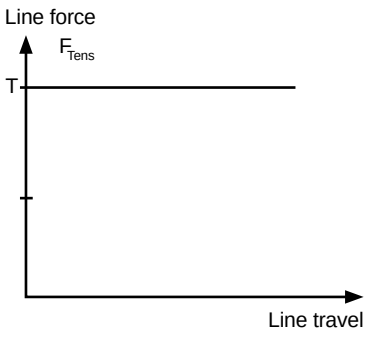
More progressive: TENSOREX® is a patented automatic tensioning system with compact dimensions so it takes up less space than conventional devices. Special fittings or installation niches in tunnels are no longer necessary.

Further Advantages:

- Constant tension/pull of railway contact wires and/or messenger wires using spring tensioners
- Suitable for all temperature ranges and many tension lengths
- Minimal storage and maintenance costs
- Constant tension along the total length of the wires
- Highly accurate
- Suits all types of poles
- Simple installation – lower staffing levels required
- Moving parts inaccessible – no need for protective cage
- Optional extra: remote monitoring system on request







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TENSOREX® for Railways.

- Wide range of pull force values up to 2500 kg
- Good alternative to the traditional device above all in tunnels and portal applications
- No auxiliary pulley
- No need for protection cage for weights
- No need for niches in tunnel applications
- Better installation conditions and procedures
- Possible installation with horizontal pulley

TENSOREX® Phantom for Light Train Lines and Tramways.

- Pull force up to 2500 kg
- Very low visual impact
- No need for tie beam
- Vandalism free
- No protection cage for weights
- Different types of poles
- Different surface treatment and colours
- Very fast installation

TENSOREX® C+ for Railways, Light Train Lines and Tramways.

- Pull force up to 1200 kg
- Compact overall dimensions
- Light weight
- Very low visual impact
- Vandalism free
- Installation on already existing poles
- Very fast installation
- Very low maintenance

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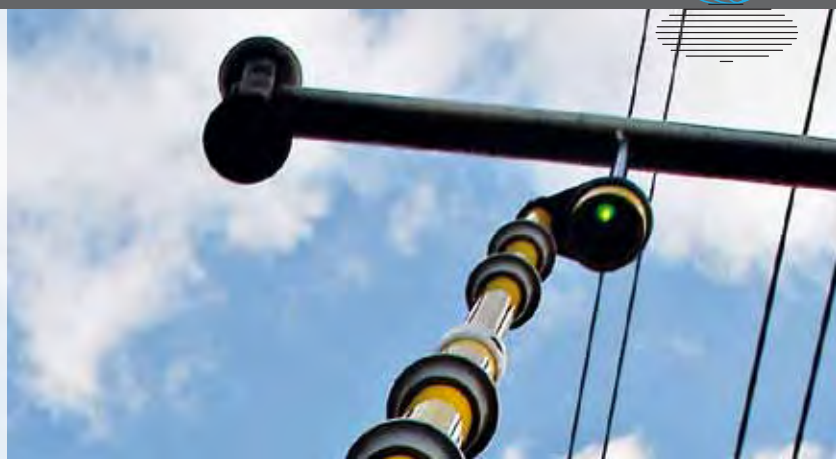
RAILWAY CATENARY SYSTEMS: Safety Equipment

PFISTERER safety equipment is regarded as standard in many countries around the world, for example the KP-Test series of voltage detectors. Decades of experience in development and production of earthing equipment stand for a maximum of quality and reliability in this sensitive field of application.



State-of-the-Art Safety and Convenience: KP-Test 5.

In the past, PFISTERER has also carried out fundamental research in the safety equipment field, which has found its way into international standards. But we haven't reached the end of our development yet, not by a long way, as the new PFISTERER voltage detector proves: wider range of application, simpler to use, improved signal indication – KP-Test 5 meets the increased requirements of the market and makes high-quality safety equipment possible.

Technical features:

- Integrated audible signal for reliable voltage tests, even under noisy environmental conditions
- Extremely bright LEDs in the optimal arrangement – for increased safety
- Self test includes the connection cable of DC voltage detectors extension
- An intelligent modular system which also includes light-weight and very compact voltage detectors
- Indoor and outdoor use with one device
- Optimised operator comfort – a light finger pressure and the KP-Test 5 is active
- Designed and constructed in accordance with international standards

Voltage Detector for Railroad Systems.

The electric railroad systems around the world are operated with different voltage systems. PFISTERER can supply voltage detectors for all common voltage systems.

- 15 kV at 16.7 Hz
- 25 kV at 50 Hz
- 1500 V d.c.
- 3000 V d.c.
- Voltage supply for trolley lines
- Voltage supply for urban track systems with third rail

Depending on type, our voltage detectors are suitable for use on railway catenaries and power lines, and also on switchgear.

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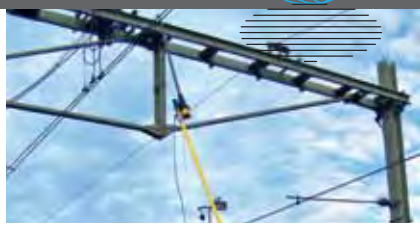


Real Lifesavers:
Earthing and Short-Circuiting Devices.

To be able to work perfectly in emergencies and safely prevent danger to personnel, earthing and short-circuiting devices must be optimally adapted to the situation they are to be used in. That's why PFISTERER offers a comprehensive range of conductor and earthing clamps for use in all cases. Because earth cables can lash about in a short-circuit situation and endanger personnel in the immediate vicinity, the earth cable selected should not be unnecessarily long. For this reason, PFISTERER produces all its earthing and short-circuiting devices with reference to each specific order and precisely geared to the particular customer requirements. IT-supported logistics processes – developed specially for this product group – enable short lead times.

We offer a comprehensive programme for every conceivable case of use:

- Earthing clamps for all applications
- Conductor screw clamps for all applications
- Cylindrical, ball and T-bolts as earthing bases

The broad programme comprises of

- Earthing poles for railroad systems
- Earthing devices for railroad systems
- Rail earthing clamps
- Contact wire earthing terminals




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