



# TENSOREX C+

Spring Automatic Tensioning Device for  
Railway and Tramway Overhead Contact Lines

# TENSOREX C+

## Constant Tension from a Compact Design

The overhead contact lines of railways and tramways are exposed to variation in temperature – both from the day/night cycle and in the course of seasonal changes. This makes it necessary to constantly and reliably compensate for the resulting expansion and contraction of the contact wire in order to guarantee efficient train services. As a full-service provider in the field of rail infrastructure, PFISTERER has developed TENSOREX C+, an innovative solution that is clearly superior to conventional weight-based tensioning systems.

### For Local and Main-Line Transport Systems

Through the interaction of a spiral spring and a cam (pulley with variable radius), TENSOREX C+ exerts a constant pulling force on the contact line. This compensates for any temperature-dependent variation in length and keeps the contact line at a constant geometry. The high precision of the system response ensures reliable operation.

In modern tramway systems, TENSOREX C+ completely replaces conventional wheel tensioning equipment. In the rail sector, this innovative spring tensioning system is particularly suitable in stations, bridges, and tunnels – in other words, wherever space is limited – but it goes without saying that TENSOREX C+ can be also be used on open stretches of line.

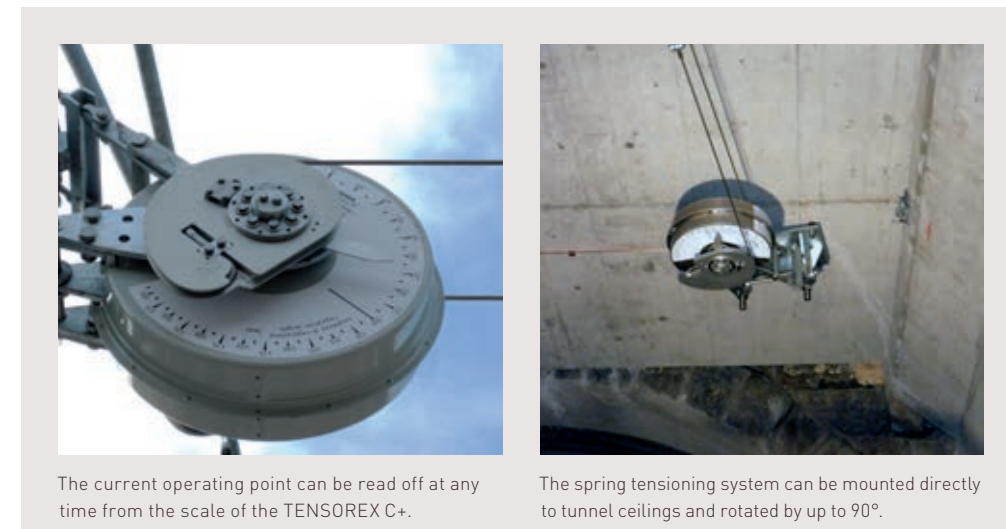
### The Most Compact Tensioning System on the Market

Installation is simple and avoids high labor costs – no additional training is necessary. TENSOREX C+ is supplied ready to install and can be mounted on all types of towers. The patented spring tensioning system is connected directly to the contact wire or carrying rope by means of a support system.

Compared to conventional wheel tensioning equipment, TENSOREX C+ has an impressive compact design and low overall weight, as no concrete or steel weights are required at all. This means, for example, that it can easily be installed in tunnels, where it takes up very little space. If required, TENSOREX C+ can be mounted directly to the tunnel walls or ceilings – rotated by up to 90°.

### Maintenance-Free and Cost-Effective

Once in service, the system is maintenance-free. Complicated and expensive repairs or storage of spare parts are now a thing of the past. There is no need for regular lubrication or greasing either. In the event of wire failures, the system is reuseable – the new wire is simply mounted to the existing system. Furthermore the actual operating point can be read at a glance at any time – no remeasuring is necessary.



The current operating point can be read off at any time from the scale of the TENSOREX C+.

The spring tensioning system can be mounted directly to tunnel ceilings and rotated by up to 90°.

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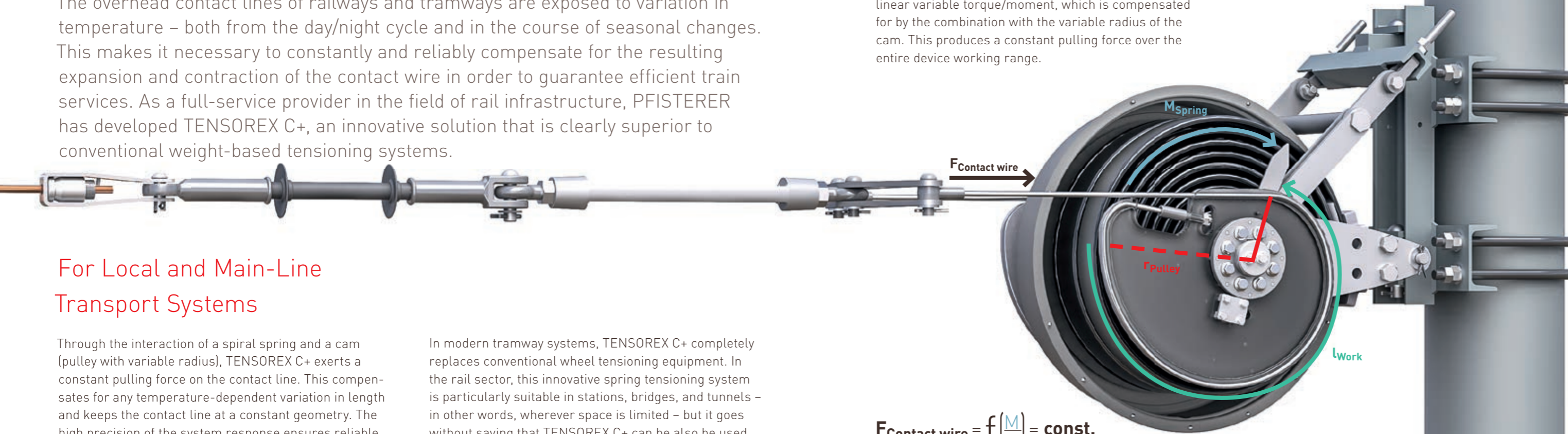
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### How It Works

By means of a support cable, TENSOREX C+ exerts a constant tension on the contact wire, regardless of any changes in length due to temperature. The special spiral spring is firmly connected to two cams on the same shaft. The degree of rotation of the shaft results in a linear variable torque/moment, which is compensated for by the combination with the variable radius of the cam. This produces a constant pulling force over the entire device working range.

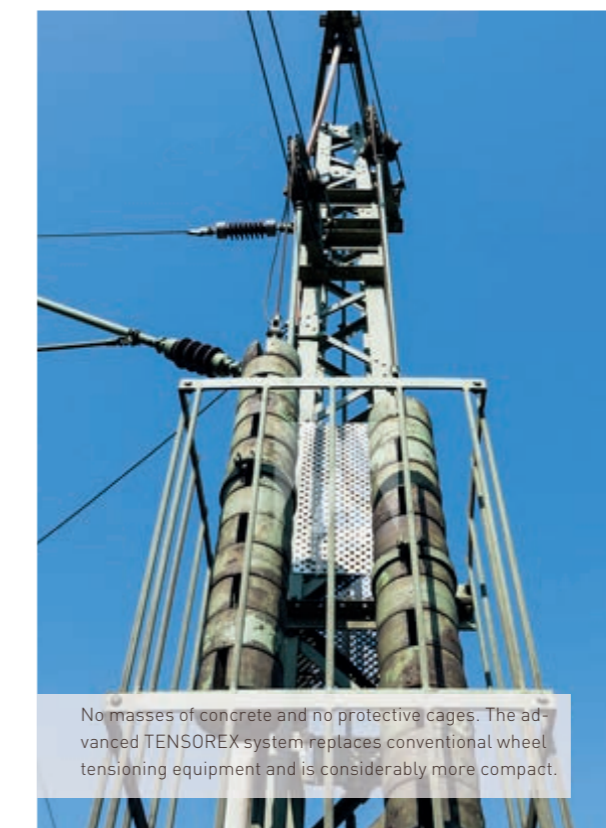
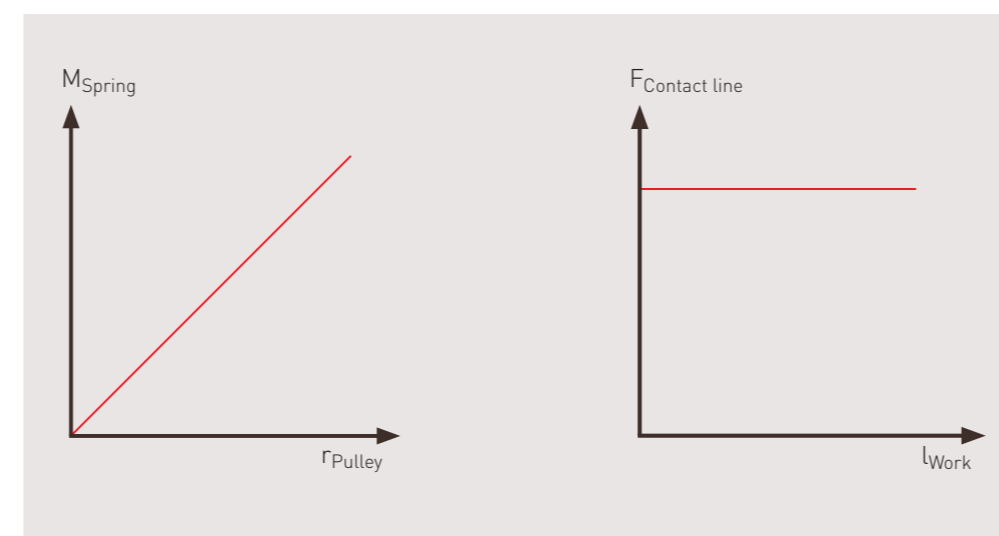


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$$F_{\text{Contact wire}} = f\left(\frac{M}{r}\right) = \text{const.}$$

- $F_{\text{Contact wire}}$  >> Force on contact line
- $M_{\text{Spring}}$  >> Torque/moment applied by spring (variable on linear basis)
- $r_{\text{Pulley}}$  >> Radius of cam (variable)
- $l_{\text{Work}}$  >> Device working range correspond to variable pulley profile length



### Greater Reliability in Operation

Especially in and around stations, the use of TENSOREX C+ offers significant safety advantages. No weights are required and all moving parts are mounted in locations inaccessible to the public. There is no need for protective cages and, even in the event of damage, there is no danger from flying or falling parts. The system is also largely immune to vandalism.



#### Benefits

- More compact and lighter than wheel tensioning systems
- High precision of response
- High level of safety
- Easy installation – lower installation costs
- Practically maintenance-free
- Virtually immune to vandalism

#### TENSOREX C+ in Numbers

- Compensating capability: 250 to 1100 mm
- Pulling force: 4.5 to 40 kN



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PFISTERER is an independent full-service provider for rail electrification solutions and a leading manufacturer of cable fittings and overhead line accessories for sensitive interfaces in energy networks. PFISTERER develops, produces, and markets internationally successful solutions for voltage levels from 110 V to 1100 kV. With a full range of products for use in energy networks, and services such as consulting, installation, and training, PFISTERER is a valued partner worldwide to companies specializing in energy supply, plant construction, and electrified rail transport.

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