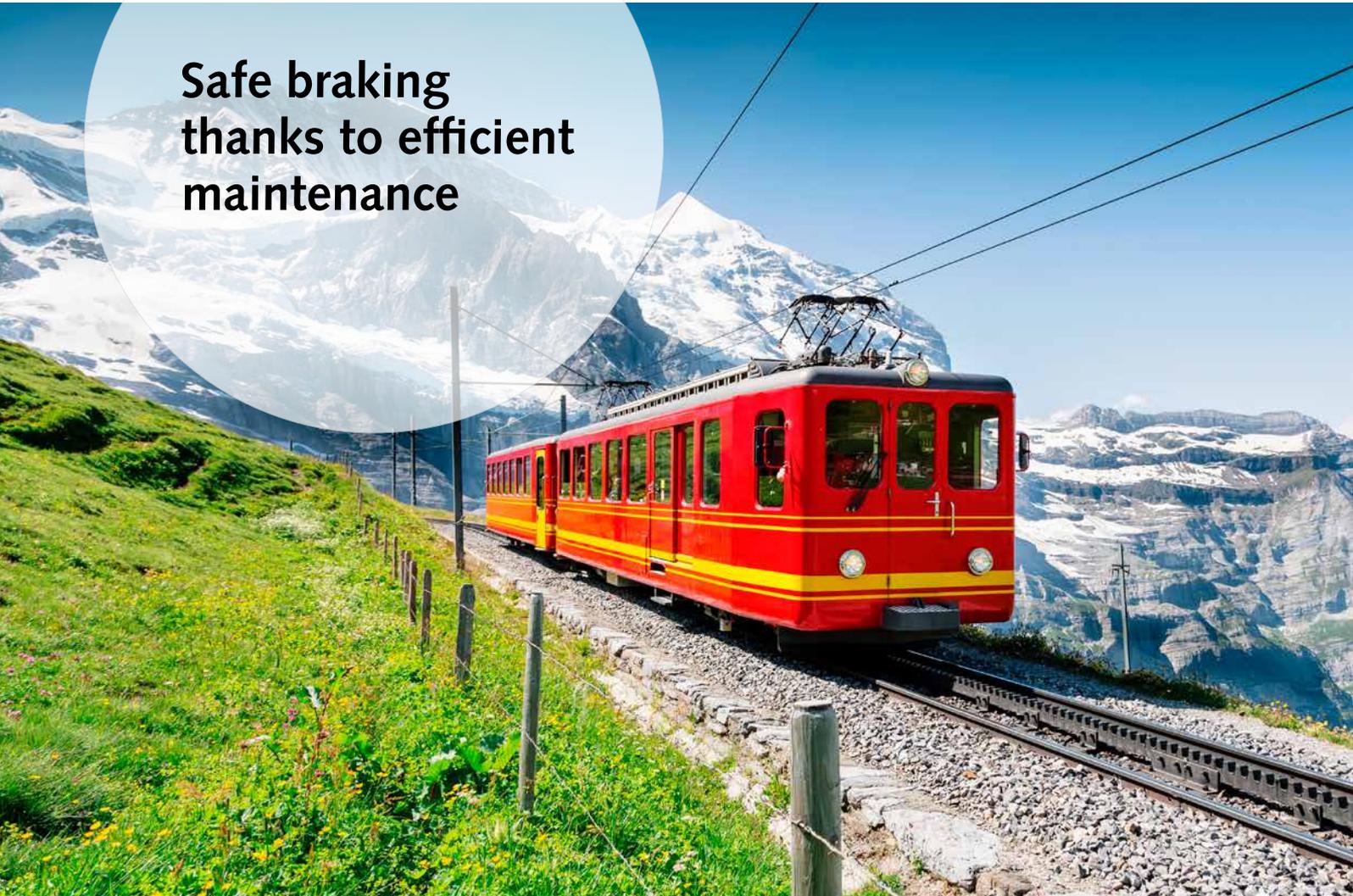


**Safe braking  
thanks to efficient  
maintenance**



## **Brake force measurement in the Rail transport sector**

Sensors and accessories for periodic brake force testing



Kistler brake force measuring elements fitted in place of the brake shoe: ready to test brake force

## High-precision brake force measurements

**Reliable brakes play a critical part in the safety of rail transportation – and regular verifications of brake force will ensure that train brakes operate reliably.**

Kistler brake force measuring elements are used for maintenance of shoe and disk brakes. The braking effect can be determined by taking measurements directly on the wheel or on the brake disk. This allows users to switch from time-based to condition-based maintenance. The benefits: improved brake maintenance and increased safety in your railway operation.

### Application

The measuring element is fitted into the vehicle brake in place of the normal brake lining. When the brake is operated, the measuring element is pressed against the wheel or the brake disk – so the brake force is measured directly at the point where it acts.

### Measuring principle

Brake force measuring elements are equipped with Kistler piezo-electric force sensors. This principle guarantees the very rigid structural design of the measuring elements. The result: you get optimal results from measurements taken under near-practical conditions. Thanks to high-resistance amplifier inputs, the charge signals generated are extremely insensitive to electromagnetic interference. This means that the signals are highly reliable, no matter what the conditions are.

### Brake force measuring Elements

A linear measurement signal is obtained thanks to preloaded force sensor installation. Wearing parts can be replaced flexibly as needed, so the sensors can be used for many years. Each individual Brake force measuring element is calibrated independently prior to delivery, to ensure the the highest measuring accuracy.

### Benefits of the system

- **Enhanced safety and reliability because brakes are tested directly on the wheel**
- **Predictive maintenance guarantees the availability of rolling stock**
- **Different force ranges up to 60 kN**
- **Compatible with various wheel diameters**
- **Available for disk brakes and shoe brakes**



Kistler brake force measuring elements are available for shoe brakes and disk brakes (Type 9305A1B) and disk brakes (Type 9303A2)

### Railway brake force measurements

In addition to maintenance measurements, we also offer additional solutions for the analysis of brake force and braking action.

- Correvit® S-Motion: high-precision slip-free measurements of displacement, speed and angle in dynamic vehicle testing. Mounted on any surface, S-Motion sensors deliver outstanding accuracy even under the harshest ambient conditions. Top-quality optics combined with cutting-edge optoelectronic components and high-performance signal conditioning based on DSP and FPGA yield superb accuracy with excellent dynamic characteristics.
- Brake force measurement with rail-based measuring systems: Rail-based measuring systems e.g. Rail WIM or special rail elements can be used for additional tests, for example: down-hill braking or motored tests. This makes it possible to monitor each axle of a rail vehicle.

### Kistler – Rail technology

Measurement and conditioning of operating parameters provide the foundations for implementing Industry 4.0 in railway technology. As a leading provider of sensors and measurement technology backed by in-depth experience of dynamic force measurement, Kistler is the ideal partner for Industry 4.0 and the requirements it sets:

- Brake force measurement for maintenance
- Rail Weight-In-Motion systems with monitoring of vehicle dynamics
- Vehicle dynamics analysis
- Derailment detection with monitoring sensors
- General measurements of force, pressure and acceleration in the railway technology sector

### Kistler – your partner for innovation

Kistler, the originator of piezoelectric measuring technology, is the global leader in dynamic pressure, force, torque and acceleration measurement. Cutting-edge technologies provide the basis for Kistler's modular systems and services. Customers benefit from Kistler's experience as a development partner, enabling them to optimize their products and processes so as to secure sustainable competitive edge.

### Please contact us with your questions:

[railway@kistler.com](mailto:railway@kistler.com)

### Kistler Group

Eulachstrasse 22,  
8408 Winterthur, Switzerland



**Kistler Group**

Eulachstrasse 22

8408 Winterthur

Switzerland

Tel. +41 52 224 11 11

The Kistler Group includes Kistler Holding AG and all its subsidiaries in Europe, Asia, the Americas and Australia.

Find your local contact on  
[www.kistler.com](http://www.kistler.com)

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measure. analyze. innovate.