

Brake force measuring system

Type 2899A...

For maintenance, assessment and research of railway brake systems

The brake force measuring system enables simple and reliable verification of the locomotive and carriage braking system. The system verifies proper operation of the mechanical and pneumatic brake systems via force measurement. Features of the test system include:

- Reliable, accurate and robust force sensor for shoe and disc brakes verification
- Sensors suitable for typical railway brake systems deployed worldwide
- Simultaneously measures the brake system air pressure
- Determination of railway brake system specific parameters by dedicated analysis software
- Reliable data reporting
- Robust cabling, suitable for the everyday use
- Flexible configurations from 1 to 8 simultaneous force sensors. Additional pressure and trigger sensors are available
- Full ground isolation between railway and workshop mass
- Battery powered for mobile use
- WiFi-connection between sensors and laptop.
- Self-contained solution in one case for in-field testing

Description

The system consists of force sensors for brake shoe and disc brakes, signal conditioning, data acquisition and analysis.

The force sensors are based on our long-term proven piezoelectric force sensors. The mechanical adaptation meets the specification of UIC and the robust sensors are built to withstand the harsh conditions encountered in the railway environment.

The userfriendly data acquisition system is pre-configured to transmit the measured data to the dedicated railway brake force analysis and reporting software.

Detection of wear and damage to the pneumatic and mechanical parts of the brake system are monitored and recorded. This data enables engineering and maintenance personnel to extend the maintenance cycle of the brake system and confidently ensure safety and security.



Fig. 1: All components are integrated in a rugged case

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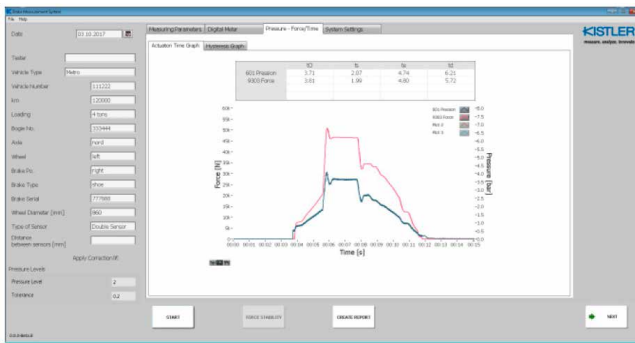


Fig. 2: The application specific brake force analysis software records the measured signals and calculates brake specific parameters

Brake force sensors

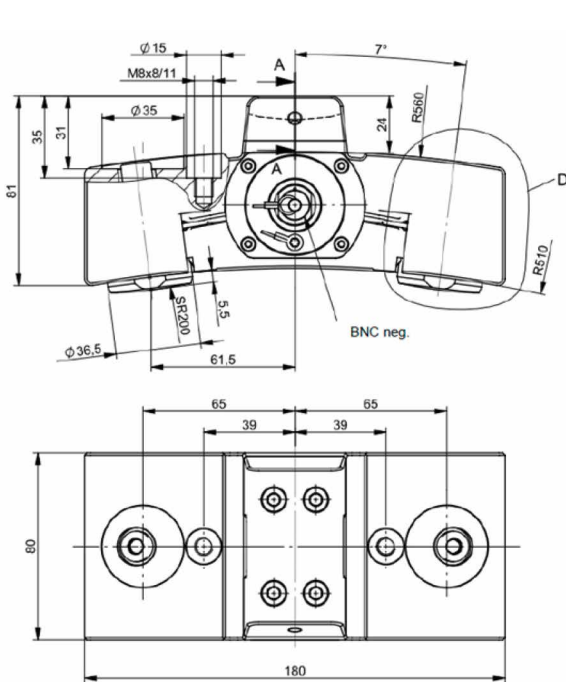


Fig. 3: Type 9305A1B brake force measuring element for shoe brakes

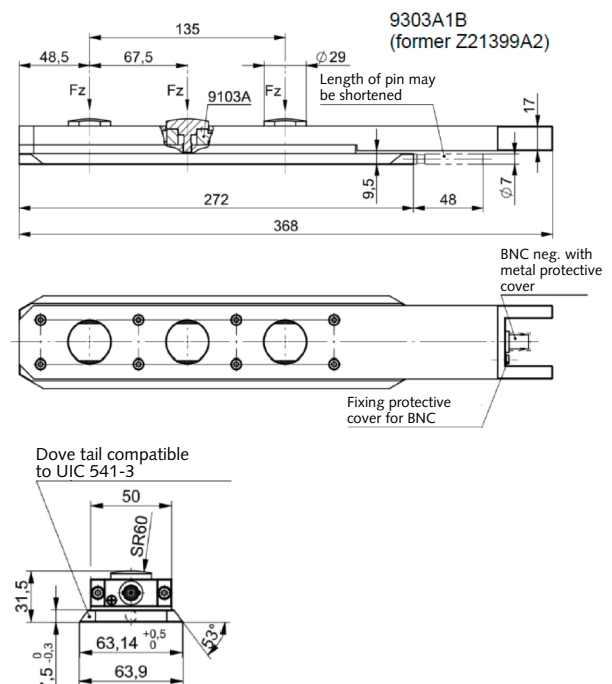


Fig. 4: Type 9303A1B brake force measuring element for disc brakes

Technical data Type 9305A1B

| | | |
|-----------------------|------|-------------|
| Measuring range | kN | 0 ... 60 |
| Calibrated range | kN | 60 |
| Overload capacity | kN | 70 |
| Nominal sensitivity | pC/N | -4.2 |
| Linearity deviation | %FSO | ≤±0.5 |
| Hysteresis | %FSO | ≤±0.5 |
| Operating temperature | °C | -40 ... 120 |
| Connector | | BNC neg. |
| Force contact radius | mm | 200 |
| Backside radius | mm | 560 |
| Number of sensors | | 2 |

Technical data Type 9303A1B

| | | |
|-----------------------|------|-------------|
| Measuring range | kN | 0 ... 60 |
| Calibrated range | kN | 60 |
| Overload capacity | kN | 70 |
| Nominal sensitivity | pC/N | -4.0 |
| Linearity deviation | %FSO | ≤±1.5 |
| Hysteresis | %FSO | ≤±1.5 |
| Operating temperature | °C | -40 ... 120 |
| Connector | | BNC neg. |
| Force contact radius | mm | 60 |
| Backside profile | mm | UIC 541-3 |
| Number of sensors | | 3 |

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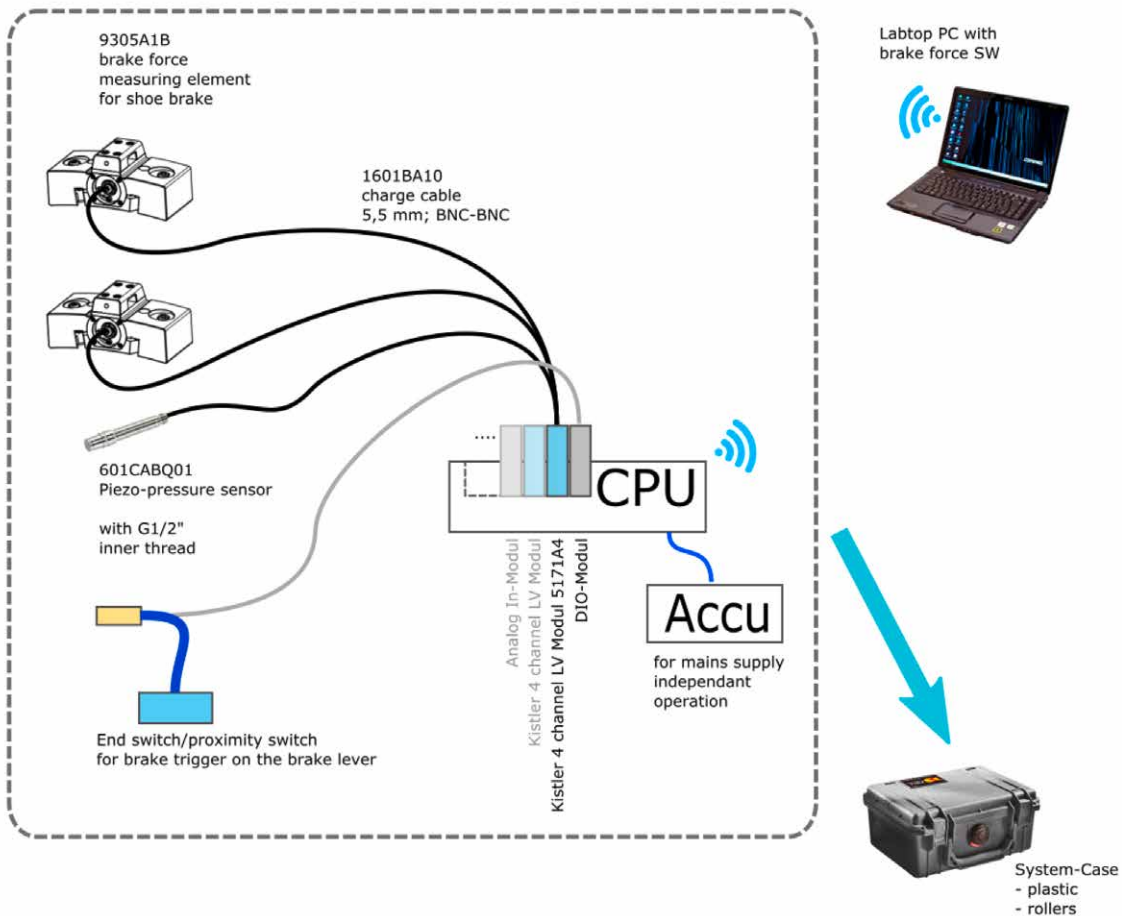


Fig. 5: Brake force measuring system overview

The system software provides the following features:

- Configurable system settings
- Supporting of multiple simultaneous measurement channels
- Calculation of wheel diameter correction-real time measurement of instant values (digital meter)
- Recording and analysis of signals (pressure, force) over time. Determination of characteristic brake build up and decay values
- Determination of brake process start with proximity switch on the brake handle
- Display of pressure vs. force
- Report generation

System components

Additional to the basic components such as power supply, DAQ-module, and case, the system is highly configurable with the following components:

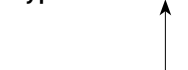
- | | |
|---|------------------------|
| • Brake force measuring element for shoe brakes | Type 9305B1B |
| • Brake force measuring element for disc brakes | 9303B... |
| • Air pressure sensor for railway applications | 601CABQ01 |
| • 4-channel charge amplifier module | 5171A4 |
| • Sensor connection cable | 1601BA10 |
| • Brake process trigger sensor with stand | |

Ordering key

Type of brakes

| | |
|--------------|----------|
| Block brakes | 1 |
| Disc brakes | 2 |

Type 2899A



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