The **new standard**

More than a 100 years ago, the "4-wire measurement" became the standard for precision resistance measurements. This method is still extensively used whenever ultra-low noise measurements are necessary, e. g. for sensors and in material science. Every 4-wire measurement projects the resistivity tensor of the specimen onto a single resistance value.

- 4-wire measurements are limited by exactness of specimen geometry
- Measurement results change when contacts drift

The Tensormeter solves this challenge by measuring the resistivity tensor, which makes measurements resilient against measurement geometry changes and provides greater precision.

- Determine individual tensor components
- Grants a new dimension of information
- Look and feel of a 4-wire resistance measurement but better results
- Tensor resolution even without sample patterning
- Massive process time savings
- Critical advantages in several research areas
- Zero error due to bad Hall cross geometry
- Full backwards compatibility with traditional layouts and devices due to flexible architecture

The Tensormeter is set to replace existing devices today and become the new standard for resistance measurements tomorrow.

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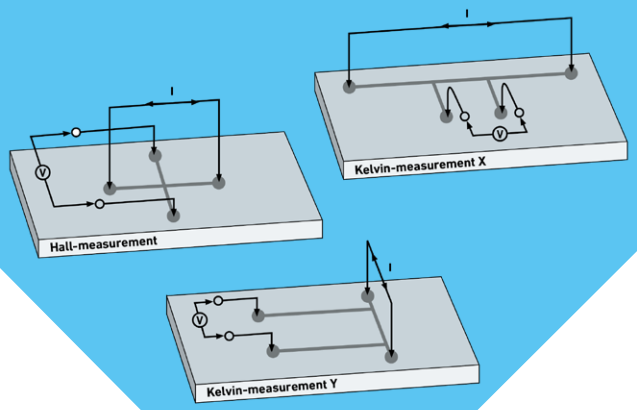
TENSORMETER

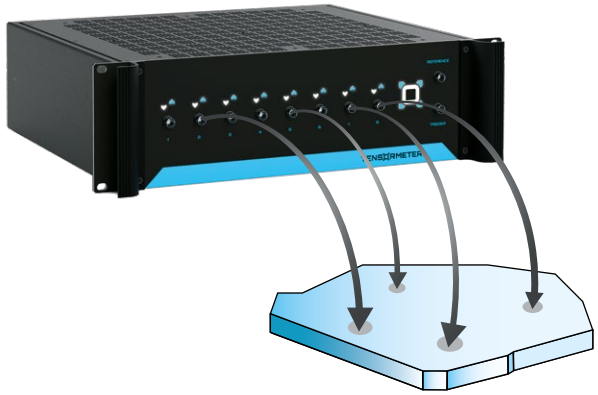
A new dimension of **resistance measurements**

One Device & One Measurement
fits all your needs:

- High precision & lowest noise
- 8 digits continuous dynamic range
- DC and AC measurements
- Harmonic distortion measurements
- Thin film Resistance Tensor measurement
- Integrated switching matrix
- Succeeds SMU and Lock-In amplifiers

Traditional measurements use several sample layouts – one targeted at each component of the resistivity tensor. This leads to several sources of error such as imperfect layout geometry and different specimens for different tensor components.





One Tensor measurement replaces several Kelvin and Hall type measurements.

Emergent **high-tech electronic materials**

Many materials under study for future electronics show either pronounced anisotropies of resistivity or spontaneous Hall resistivity.

- 2D-Materials like Graphene or MoS_2, topological insulators, chiral materials, (anti)ferromagnets
- Target applications affect the whole resistivity tensor
- A single 4-wire measurement cannot capture this behavior
- Tensor measurement is needed for research and application

Improved **Wafer Testing**

Quality testing of your wafers will become faster and more efficient: The Tensormeter provides a 2x speed-up compared to conventional testing (van-der-Pauw & Hall) at the same precision and contact count.

- Excellent Hall resistivity resolution grants access to ultra-low doped semiconductor charge carrier concentration
- Thermal conductivity can be tested through harmonic resistance measurements offering even more throughput
- Accurate dielectric properties

Flexible **Electronics**

Flexible electronic sensors show great promise for applications that combine human movement with virtual realities, such as: entertainment, motion tracking, remote medical care, robotics, cybernetics, and many more.

- Alignment of the sensor in space changes its resistance
- Bending of the sensor also imposes dramatic changes
- Distinction between alignment and bending possible only when knowing all tensor components
- Tensor measurements make the sensor resilient against deformation