KISTLER

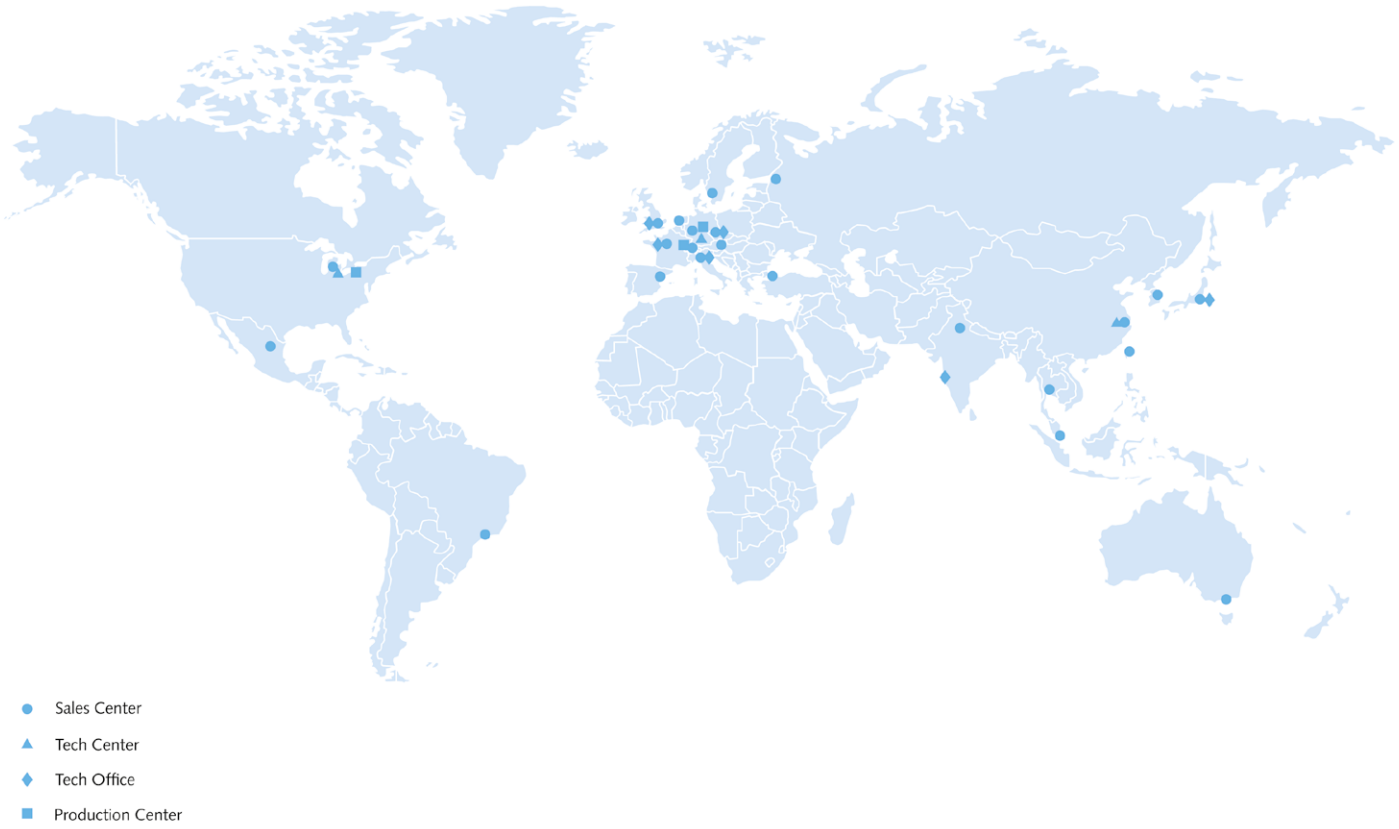
measure. analyze. innovate.

Absolute confidence in your measurement equipment and data

Calibration services

Your success is our precise goal

www.kistler.com



Kistler calibration services – worldwide

Kistler is a world market leader in dynamic measurement technology. Quality and highest precision are our daily goals – for the high-tech products we manufacture as well as our customer-focused services.

In the field of measurement technology, traceable calibrations and service calibrations are the base for precise measurements. Kistler offers a full range of calibration services tailored to your specific needs.

Wherever you are in the world, calibration services from Kistler are available to you through our Tech Centers, Tech Offices and Production Centers; we also offer onsite and in-situ calibration to minimize your logistics effort. You benefit from calibration services that are traceable to national or international standards, with short lead times and low shipping costs.

Your benefits from Kistler calibration services:

- Expertise: decades of calibration experience
- Calibration also available for third-party products
- One-stop service provider for all your needs

Contact us for a quote!
You can rely on our specialists to find the best solution for your specific calibration needs.

Periodic calibrations by Kistler give you greater confidence in your measurement equipment.

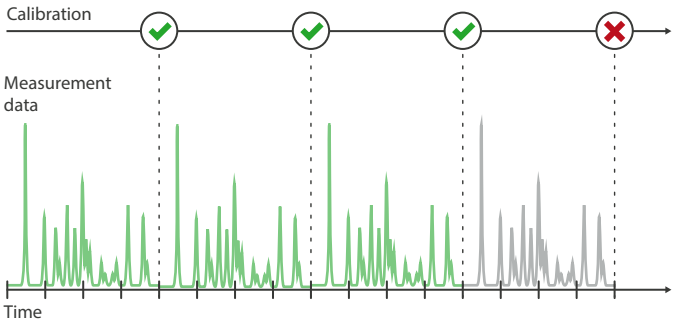
Calibration delivers added value

A calibration gives you feedback about a measurement instrument's metrological behavior. Is it precise? Is it repeatable? Does it have linear characteristics? These questions can only be answered once a calibration has been performed.

After a second or third calibration (ideally carried out by the same calibration provider), confidence in the instrument can also be proven by data: this creates the basis for further decisions on topics such as recalibration intervals. All measurement instruments are exposed to environmental influences throughout their lifetimes. Wear and tear, an overload or a crash can damage your equipment or change its properties: these events could falsify the data you obtain – but instrument users might not even be aware of such problems.

For all these reasons, periodic calibrations are essential to ensure that your measurement equipment operates precisely and reliably.

Why calibrate?
- Industry standards (e.g. ISO 9001, IATF 16949) require frequent calibration
- Recently calibrated test equipment is the basis for precise measurements
- Calibration supplies proof that measurement equipment is accurate and reliable



Your success is our goal
If a calibration shows that the properties of your equipment have not changed (green tick), this verifies that your equipment is in proper condition to obtain correct measurement data.

However, the calibration results could also indicate changes to the properties of your equipment (red cross). The exact point in time when the properties changed is unknown – but from then on, any measurements would be incorrect because the settings should have been adjusted. Confidence in your measurement data is lost. You have to doubt the results of all measurements taken since the last calibration. Periodic calibration at suitable intervals will increase confidence in your measurement data and your equipment. Precision is a safety issue.

Traceable calibration in our accredited laboratories according to DIN EN ISO/IEC 17025

Choose your type of calibration

Calibration services of different types are available depending on your application and requirements. For each of these types, Kistler offers dedicated services and the laboratories are linked to national institutions. Get the precision you need – rely on Kistler as your experienced calibration partner.

Service calibration
Service calibrations are available worldwide at the Kistler sites shown on the map. A service calibration ensures that your measurement equipment is performing properly, and it includes documentation of readings for the instrument's key parameters.

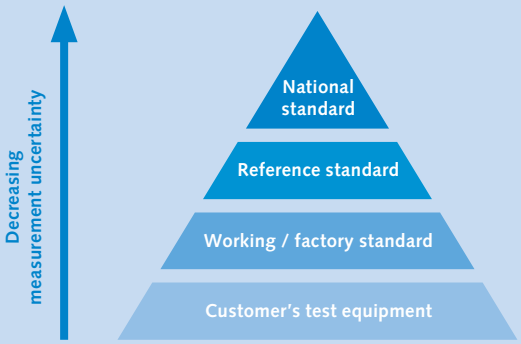
Standard service calibration at Kistler is based on the measuring ranges shown on the relevant datasheet. We welcome requests for customized calibrations to cover additional ranges, preloading or other requirements.

Traceable calibration
Traceable calibrations are performed by laboratories accredited in accordance with DIN EN ISO/IEC 17025. This standard implements the definitions and specifications of the International Vocabulary of Metrology and ensures the quality of the laboratory's performance.

A calibration is basically defined as the recording of measured values with the associated measurement uncertainty. A calibration records the measured values and lists them on the calibration certificate together with the respective measurement uncertainties.

Only a traceable calibration in an accredited laboratory guarantees a complete metrological proof up to the national standards.

Reference standards for accredited calibration laboratories



Kistler laboratories are accredited by national accreditation bodies:

Location	Accreditation body
Switzerland	SAS
Germany	DAkkS
USA	ANAB
	A2LA
United Kingdom	UKAS

We are happy to provide our services in your facility.

Onsite calibration
Kistler also offers onsite calibrations at our customers' premises. We provide all the test and measurement equipment needed to perform calibrations at customers' locations, and traceable calibrations are also available.

In-situ calibration
To meet customers' special requirements, we can perform in-situ calibrations in cases where the measurement setup may not be disassembled (in medical technology applications, for example).

In-situ calibrations may also be needed for regulatory reasons or because disassembly is time-consuming, and to minimize downtime.

Test and measurement equipment management

Customers are often left alone to answer questions and take decisions about calibration and equipment management:

- Why calibrate at all?
- How often to calibrate / how to set intervals?
- Single sensor or measurement chain calibration?
- Traceable or service calibration?

Kistler will be glad to advise you on answering these questions, and we will help you set up a management system for your test and measurement equipment that ensures you are audit-proof. Our experts are standing by to support you – simply contact us!

Our skilled experts perform validated calibrations.

Available measurands for traceable calibration

Force, torque and angle sensors

Force sensors and transducers are used in various applications where parts are pressed, formed or assembled in a desired way to meet specified requirements. Kistler offers calibration services that compare your equipment against a higher level standard. Different calibration types are available to match your device and your requirements.

- Multi-component sensor calibration
- Force calibration up to 20 MN
- Torque calibration up to 20 kNm
- ISO 17025 accredited laboratories

	Description	Measuring range	Smallest possible uncertainty
Torque / angle	**Measurement transducer and torque measuring chain**	0.01 N·m … 20 kN·m	0.01%
	Transfer tool	0.1 N·m … 3 kN·m	0.02%
	Torque wrench calibration device	0.2 N·m … 3 kN·m	0.1%
	Manually operated torque screwdrivers	0.01 N·m … 1 kN·m	0.2%
	Angle of rotation (rotary encoders on torque transducers and tools)	0.1° … 7,200°	0.05°

	Description	Measuring range	Smallest possible uncertainty
Force	**Force (piezoelectric force sensors, stepwise change of load)** 3-axis force sensor, wheel force transducer and dynamometer available	50N … 500 kN	0.15%
	Force (piezoelectric force sensors, continuous change of load) 3-axis force sensor, wheel force transducer and dynamometer available	1 kN … 500 kN	0.15%
	Force (piezoelectric force sensors, continuous change of load)	1 MN ... 20 MN	0.12%
	Force (strain gage sensors, stepwise change of load)	2 kN ... 20 kN	0.2%

Service calibrations can be offered with extended scope.

Acceleration sensors

Accurate acceleration sensors are essential for measuring vibrations or oscillations in various applications. To meet this need, Kistler offers a vast range of customized solutions, including calibration services for mono-axial, tri-axial and shock acceleration sensors and devices.

- 3-component sensor calibration
- Calibration up to 200 m/s²
- ISO 17025 accredited laboratories

Acceleration

Description	Measuring range	Measuring conditions	Smallest possible uncertainty
Sensors, measuring chain	1 m/s² … 80 m/s²	40 Hz, 80 Hz (APS)	0.8%
Sensors, measuring chain	10 m/s² … 200 m/s²	159.2 Hz	0.8%
Sensors, measuring chain	5 m/s² … 200 m/s²	40 Hz … 10k Hz	1%
Accelerometers, measuring chain	0.1 m/s² … 80 m/s²	0.5 … 100 Hz	0.5% / 0.9°

Service calibrations can be offered with extended scope.

Pressure sensors

Pressure sensors from Kistler can measure extremely small pressure pulsations as well as very high pressures of up to 8,000 bar. A continuous calibration procedure is used for piezoelectric pressure sensors: the output signal from the Unit Under Test (UUT) is compared with a reference sensor as the pressure is continuously increased from zero to full scale and then reduced back to zero. The test sensor's sensitivity is typically defined as the slope of a "best straight line" through the calibration curve.

- Extended temperature-controlled pressure calibration
- Calibration up to 10,000 bar
- ISO 17025 accredited laboratories

Deadweight calibration is also available.

Pressure

Description	Measuring range	Smallest possible uncertainty	Temperature range
Pressure sensors (piezoelectric, stepwise change of load)	1 bar … 8,000 bar	0.01%	RT
Pressure sensors (piezoresistive, continuous change of load)	0 bar … 5,000 bar	0.01%	RT
Pressure sensors (piezoelectric, continuous change of load)	0 bar … 600 bar	*	RT … 350°C
Pressure sensors (piezoresistive, stepwise change of load)	0.04 bar … 1,000 bar	*	-55 … 350°C

Service calibrations can be offered with extended scope.

Electrical measurands

In order to verify complete measuring chains, Kistler also offers calibration services for electronic equipment such as DAQ systems. Major electrical measurands available include resistor, capacitance, voltage, charge and current, etc.

- Static and dynamic calibration
- All major electrical measurands
- ISO 17025 accredited laboratories

Electrical

Description	Measuring range	smallest possible MU
Charge	1 pc … 3.1 µC	0.017%
Voltage (DC)	0 V … 100 V	0.00068% ppm + 2,7 µV
Voltage (AC, 1 Hz ... 1 kHz)	0 V … 30 V	0.0015% + 264 µV
Current (DC)	0 A … 1,000 mA	0.00046% + 34 nA
Resistance (DC)	0.01 Ω … 120 MΩ	0.00197%+122 µΩ
Capacitance (@ 1 kHz or 50 Hz ... 20 kHz)	1 pF … 1 µF	0.0029%

Service calibrations can be offered with extended scope.

* Service calibration only

Find out more about our applications:
www.kistler.com/applications

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Find your local contact at
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