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ACCREDITED CALIBRATION, VERIFICATION SERVICE

The DAkkS (German accreditation body)

The DAkkS is the national accreditation body of the Federal Republic of Germany. According to Regulation (EC) No. 765/2008 and the Accreditation Body Act (AkkStelleG), the DAkkS acts in the public interest as the sole service provider for accreditation in Germany.

In order to be able to fulfil its sovereign accreditation tasks, the DAkkS was entrusted by the Federal Government. As an entrusted body, the DAkkS is subject to federal supervision.

Only an accredited calibration laboratory can issue a DAkkS calibration certificate. This defines not only the measuring method as well as the measuring result, but also gives information on tracing the test medium to national standards and the relevant uncertainty of measurement.

-
- > **You are certified to ...**
ISO 9001, QS 9000, GLP, GMP, TS16949
 - > **You need ...**
to control your measuring equipment
 - > **Our solution ...**
DAkkS calibration certificate; (traceability, measuring uncertainty, internationally recognised)
-

KERN – Precision is our business

The KERN calibration laboratory for electronic balances and weights has been accredited by DKD since 1994 and today is one of the most modern and best-equipped DAkkS calibration laboratories for balances, test weights and force measurement in Europe.

Thanks to the high level of automation, we can carry out DAkkS calibration of balances, test weights and force-measuring devices 24 hours a day, 7 days a week.

Do you have any further requests or questions on this matter?
We would be pleased to help you or visit us on the web

Accredited calibration

Why? DAkkS calibration is always necessary when checking equipment (balance or test weight) is to be used in a QM process (e.g. to ISO 9000ff, GS 9000, TS 16949, VDA 6.1, FDA, GLP, GMP, GMP etc.)

What? Any checking equipment in proper condition can be DAkkS calibrated

How? Determination of accuracy throughout the world by a laboratory which is accredited to DIN EN ISO 17025. Traceability to internationally recognised standards. The DAkkS calibration certificate confirms both the measurement characteristics of the checking equipment and the general requirements for the control of checking equipment.

Where? Internationally recognised – this is monitored by ILAC (International Laboratory Accreditation Cooperation) and e.g. DAkkS (German calibration service) in Germany

When? The operator control the use of checking equipment and periodic recalibration time intervals themselves

Range of services:

Area accredited by DAkkS:

- DAkkS calibration of balances with a maximum load of up to 50.000 kg
- DAkkS calibration of weights in the range of 1 mg – 2.500 kg. Calibrations can be carried out in the following classes: E1, E2, F1, F2, M1, M2, M3
- DAkkS calibration of force gauges and force transducers
- Volume determination for weights of accuracy class E1
- DAkkS calibration of temperature and humidity sensors

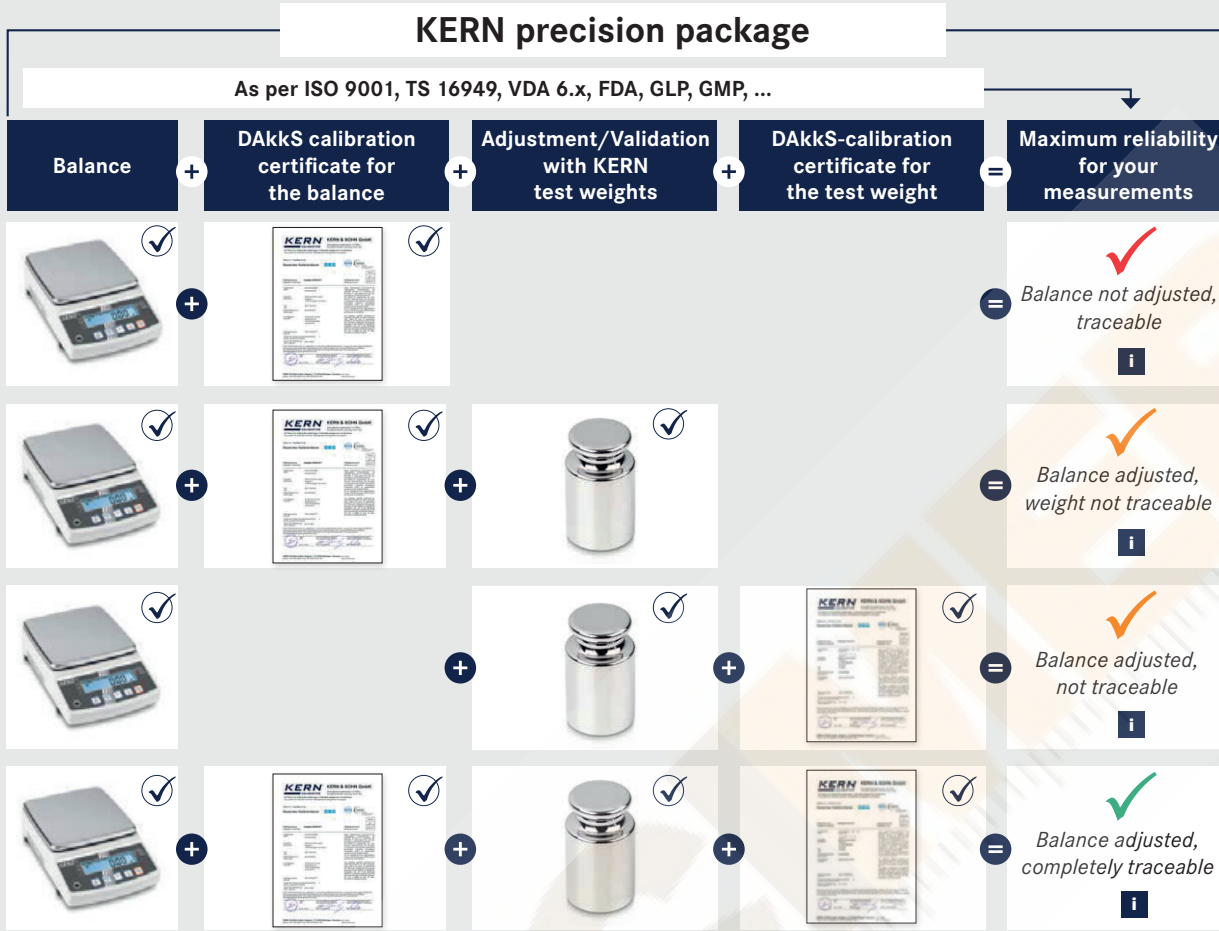
Area offered as factory calibration:

- Measuring of sensitivity (magnetic characteristics)
- Factory calibration in various sizes: Force (sensors and measuring devices), hardness (Shore, UCI, Leeb, etc.), thickness of coatings and walls, torque wrench testing devices, and much more
- Conformity assessments and recalibration of balances and weights at the KERN verification point, working closely with the verification authorities.

And on top of all these services, we also offer additional services.

Balance & weight in the quality management system

Do you already use all the modules of the KERN precision package for maximum accuracy and reliability of your balance?



Information and ordering:
kern-sohn.com/qmb

The KERN calibration laboratory (D-K-19408-01-00)

KERN has a highly-automated DAkkS laboratory with accreditation to DIN EN ISO/IEC 17025 in numerous fields. By using the most modern calibration technology with high-end calibration robots in fully air-conditioned laboratories, the measurement uncertainty and process times are reduced to a minimum, and also the quality of the calibration is increased.

As an accredited and certified calibration service provider with decades of experience, KERN offers you an extensive range of services, which will leave no demand unfulfilled. The accreditation applies to the extent specified in the appendix to the certificate D-K-19408-01-00.

We offer the following services:

Balances

- ▶ Accredited calibration up to 50 t
- ▶ Minimum sample weight (in use)
- ▶ Usage accuracy
- ▶ Adjustment at the location of installation
- ▶ Certificate of conformity
- ▶ Equipment qualification:
 - > Design qualification (DQ)
 - > Installation qualification (IQ)
 - > Function qualification (OQ)
 - > Performance qualification (PQ)
 - > Maintenance qualification (MQ)
- ▶ Conformity assessment/Verification

Weights

- ▶ Accredited calibration up to 2.5 t (OIML classes E1 – M3)
- ▶ Volume determination for OIML class E1
- ▶ Measuring of sensitivity (magnetic characteristics)
- ▶ Verification (where possible)

Force measuring devices and force transducers

- ▶ Accredited calibration up to 5 kN

Temperature and humidity sensors

- ▶ Accredited calibration up to 50 °C resp. 75 %

Factory calibration for

- ▶ Force measuring devices and force transducers ≤ 250 kN
- ▶ Hardness
- ▶ Layer thickness
- ▶ Material thickness
- ▶ Temperature of moisture analysers

Our commitment to satisfy our customers never stops. Perhaps this is one of the reasons why our roots can perhaps be traced so far back in history. **Discover the KERN route to success: fast – competent – reliable – versatile!**

The order process

- 1 You will receive a **reminder** that your test equipment is due or you will generate online a quotation for new or existing test equipment
- 2 Submission or collection of your test equipment
- 3 Initial inspection of your goods, to check that they are suitable for calibration, and are complete, etc.
- 4 You will get a detailed **order confirmation**
- 5 Our experts will carry out **initial calibration**
- 6 Checked for conformity with required tolerances and if required, any **necessary actions** which arise from this are carried out
- 7 Before these actions are carried out, we will contact you (in so far as no **individual processing** has been agreed with you beforehand)
- 8 After your **approval** the necessary actions will be implemented and the calibration will be completed
- 9 After that your **test equipment will be returned** to you without delay, together with the appropriate calibration certificates
- 10 We will **monitor your recalibration periods** and will send you a reminder about your next calibration, free of charge

Our service

► Reminder service

The continuous cyclic recalibration of your checking equipment is an integral part of the reliable management of test equipment. You can rely on us to support you, and we will remind you in time, free of charge, when the next recalibration is due. In addition, you have the option of managing your test equipment online by yourself (cf. 1, 10).

► Quote generator

You will be impressed by our price-to-performance ratio. Request a non-binding quotation or create it yourself to suit your specifications at www.kern-lab.com (cf. 1)

► Collection service

We will be pleased to arrange a pick up by our forwarding agent the goods from your premises. You only need to tell us the weight and dimensions of your package and leave the rest to us (cf. 2)

► Repair and reconditioning of balances and weights

KERN will get your weights back up to standard, regardless of the manufacturer. Whether it is adjustment, marking, sand blasting or lacquering – the aim here is compliance and long-term stability. Any repairs of balances and instruments which may be necessary can be carried out quickly and easily (cf. 5, 6)

► Individual processing

In order to avoid delays with future orders, we would be pleased to incorporate your individual requirements for future processing of such calibration results. Even for smaller issues such as the printing of calibration certificates (stapling, punching, double-sided) we can work to your requirements (cf. 8).

► Express service and dispatch

If you need a particularly fast service, you can use your DAKkS express service. You will receive your test equipment after only 2 days (cf. 9).

www.kern-lab.com – the central portal for everything you need to know about the extensive KERN calibration services

On our website you will always find the latest news and useful information about testing and measuring devices, calibration, legal metrology and expansions to our range of services. You will also find numerous online services on the website.

Database supported management of test equipment

Information on your test equipment which has been calibrated by us is stored in our database. In this way it is possible to make trend calculations. You will therefore get an overview about the long-term stability and trend behaviour of your test equipment as well as the necessary recalibration period can easily be determined and specified.

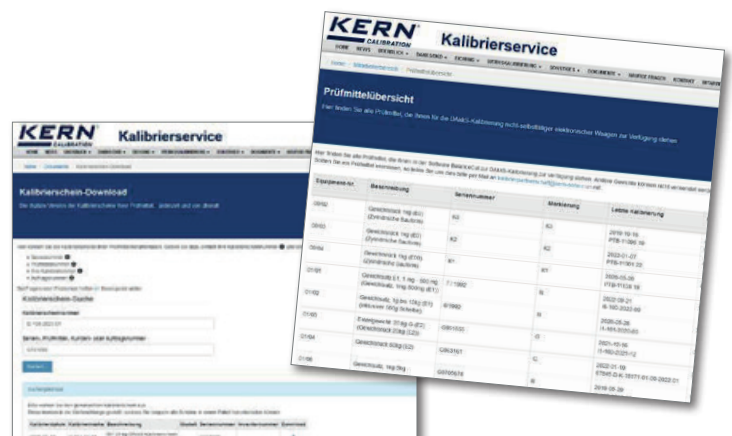
Paperless documentation

So there is no administrative effort, we can handle all calibration documentation in a paperless process. From quotation, through to order confirmation, delivery note and invoice right up to calibration certificate, you will receive all documents by e-mail or you can retrieve them online. Would you prefer to receive your certificate or your invoice in paper form, for example? Of course this is not a problem either.

We will send you everything you require by post.

Calibration certificate download

By using our download service you can easily download your calibration certificates as soon as the calibration work is complete and you will have access to them at any time in the future. Simply create your user account on www.kern-lab.com and you will never have to look for your certificates again.



Accredited Calibration of Balances

Any balance will only give correct results if it is checked regularly, i.e. calibrated correctly and adjusted when required. A balance is only a reliable measuring and checking tool if it is calibrated and this calibration is documented. The issued calibration certificates with accreditation symbol are proof of the metrological traceability to national and international standards, as required by the DIN EN ISO 9000 and DIN EN ISO/IEC 17025 standards, amongst others. KERN recommends a recalibration period of one year. The standard does not give a defined recalibration period. KERN recommends that, with intensive (daily) use, you to recalibrate your balance every 6 months and at normal (weekly) use, every 12 months.



The advantages of using on-site calibration:

- + **Calibration on-site** at your premises in the field of use
- + **Minimisation of measurement uncertainty** and guarantee of process accuracy strictly according to guideline EURAMET cg-18
- + **No risk of damage** during transportation
- + **Low downtime**
- + **Direct and personal contact** with the service technician
- + **Cross-brand servicing**, basic inspection and adjustment by a specialist
- + You tell us **when you would like us to come**
- + **Device training** for qualified users



a) KERN on-site calibration (we visit you)

In Germany, KERN has a close-knit network of KERN DAkkS calibration laboratory employees, who can carry out on-site calibration of balances up to 50 tonnes.

This on-site testing service is metrologically recommended, as your balance is in its field of use and can be calibrated without any possible transportation problems.

Lower downtime and personal contact with our expert are the major benefits of this service.

Preparatory maintenance work by agreement. Prices for on-site calibration on request.

You tell us when you would like us to come, giving us details of the balances to be tested. Our on-site DAkkS calibration team will then get in touch with you immediately and will discuss the process with you at your premises – it's straight forward and professional.

This KERN calibration service is also independent of the brand.



The advantages of using in-house calibration:

- + **Short calibration time:** Test time in the laboratory is only four working days
- + **Competence:** Calibration laboratory, which complies with the highest standards in the area of metrology
- + **Independent management** of the recalibration calendar for your individual measuring instrument is possible
- + **Cross-brand service:** Measuring devices from any manufacturer can be calibrated independently
- + **Repair:** Any necessary repairs can be carried out immediately, if you wish

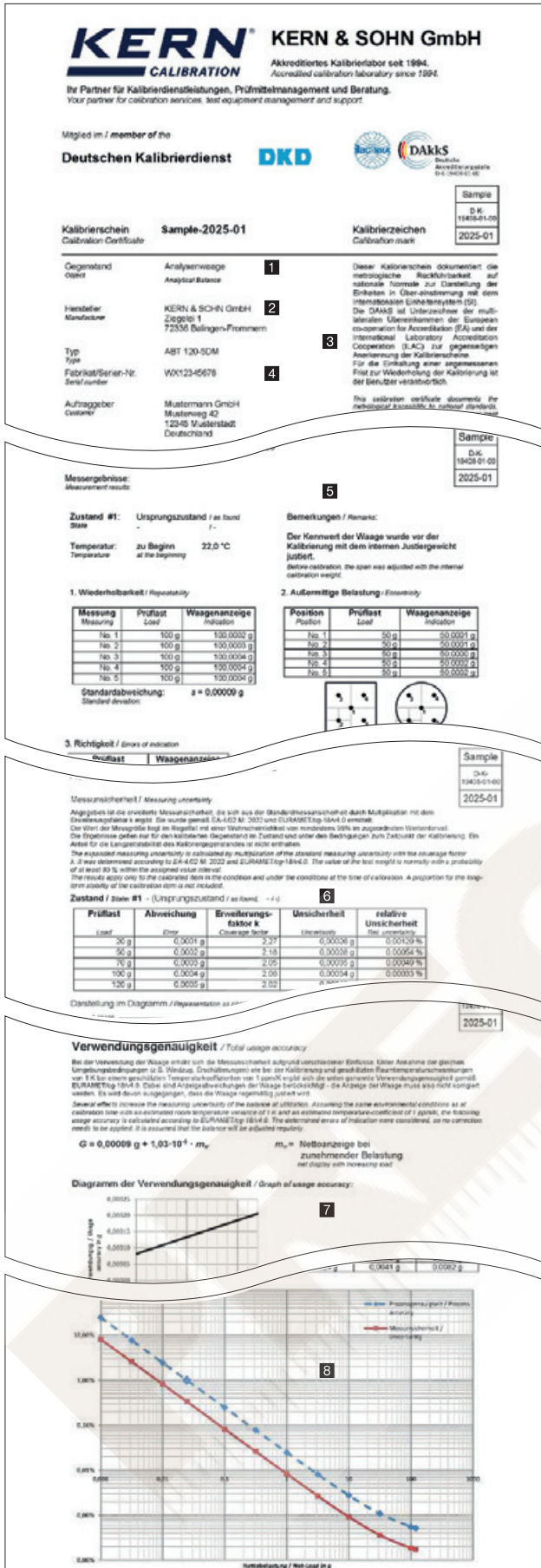


b) Calibration at the KERN factory (you send your balance to us)

Recommended for new devices and for balances which can be affordably transported, as then there is no need for us to travel to carry out the calibration on-site. Repairs can be carried out at the same time, quickly and in full.

The process would be as follows:

- Day 1: Send your balance to the KERN calibration laboratory in Balingen.
- Day 2 to 3: Evaluation and calibration of your balance by our specialists.
- Day 4: After positive validation, your balance is returned.



To get reliable weighing results you need to have calibrated balances. KERN offers you an extensive calibration service for your balances – You have the choice:

Recalibration

- The recalibration schedule depends on the frequency of use, the conditions of use and the safety requirements.
- We would recommend that you recalibrate your balances every 6 months if they are used intensively, and every 12 months with normal use.
- The KERN calibration service is independent of the brand.



Initial calibration and recalibration of balance at the KERN factory

Weighing capacity		
Analytical balances		
[Max] ≤ 5 kg		963-101
[Max] > 5 kg		963-102
Precision balances/Industrial scales		
[Max] ≤ 5 kg		963-127
[Max] > 5 kg – 50 kg		963-128
[Max] > 50 kg – 350 kg		963-129
[Max] > 350 kg – 1500 kg		963-130
[Max] > 1500 kg – 2900 kg ¹⁾		963-131
[Max] > 2900 kg – 6000 kg ¹⁾		963-132
[Max] > 6000 kg – 12000 kg ¹⁾		963-133
Hanging scales/Crane scales		
[Max] ≤ 5 kg		963-127H
[Max] > 5 kg – 50 kg		963-128H
[Max] > 50 kg – 350 kg		963-129H
[Max] > 350 kg – 1500 kg		963-130H
[Max] > 1500 kg – 2900 kg		963-131H
[Max] > 2900 kg – 6000 kg		963-132H
[Max] > 6000 kg – 12000 kg ³⁾		963-133H
Preparation for recalibration (cleaning, function test)		969-003R
Additional services		
Minimum weight of sample (for details see page 221)		969-103
Additional measurement points (as part of the) weighing test		963-140
Additional measurement points (as part of the) repeatability testing		963-140
Express service with delivery time 48 hours (only on initial purchase)		962-116
Express shipping: Express supplement for guaranteed delivery on the next working day (if ready for shipment before 12:00 noon)		in GER only <i>(other countries on request)</i>

1) Floor scales & axle load scales only (Price per weighing panel). Please ask for further details.
 2) On request
 3) Processing time 4 working days
 4) Processing time 15 working days

18 Calibration certificate with accreditation symbol for balances (extract)

- 1 Official document
- 4 Identification/Applicant
- 7 Application accuracy, see the *Glossary*
- 2 Item to be calibrated
- 5 Metrological component
- 8 Minimum weight of sample (additional price)
- 3 Traceability, see the *Glossary*
- 6 Uncertainty of measurement, see the *Glossary*

Minimum weight of sample (in use)

What is the lightest item you can weigh on your balance, while still achieving accurate and reliable weighing results? What exactly is the limit?

The KERN minimum sample weight protocol accounts for the established minimum sample weight of your balance and its location of installation and use with the relative measuring uncertainty. With various safety coefficients and required weighing accuracy (process accuracy), depending on standard or quality-related requirements on the balance being used.

The higher the selected safety coefficient, the higher the safety when using the balance in a particular process.

Typical perturbations when using the balance e.g. small fluctuations in temperature are taken into account. In easily predictable conditions in a professional environment of use, KERN recommends a safety coefficient of 3. For critical processes, a correspondingly higher factor should be selected. The minimum sample weight protocol contains a diagram as well as a table, from which you can ascertain the minimum sample weight for your balance, depending on the process.

Adjustment at the location of installation

Why?

Adjustment at the location of installation is necessary, as the measuring results of balances depend on the local gravitational force (gravitational acceleration) and therefore depend on the location of use. KERN can carry this out just before shipping at the factor, individually to suit the location of installation.

What are the advantages of carrying out adjustment at the location of installation?

- The balance gives reliable measurement results at the location of installation.
- No time-consuming on-site adjustment necessary.
- You do not need a Service Engineer or any additional weights.
- The balance is ready for immediate use.

Pricing table for adjustment at the location of installation

Weighing capacity	KERN
[Max] ≤ 5 kg	961-247
[Max] > 5 - 50 kg	961-248
[Max] > 50 - 350 kg	961-249
[Max] > 350 - 1500 kg	961-250
[Max] > 1500 - 2900 kg	961-251
[Max] > 2900 - 6000 kg	961-252
[Max] > 6000 - 12000 kg	961-253

For adjustment to the location of installation you need the value for gravitational acceleration at the location of installation, which KERN can calculate using the point of use. The procedure is suitable for balances with a resolution of <math><60,000\text{ d}</math>. For higher resolutions we recommend a balance with an internal adjusting weight or adjustment with a calibrated adjusting weight at the location of installation.

Certificate of conformity

With a certificate of conformity you get a statement about whether the balance meets your defined requirements. In conjunction with a calibration certificate with accreditation symbol it serves as documented proof that the balance fulfils the required process demands. When doing this the process owner for the balance can select from different temperature specifications – depending on its individual requirements:

Conformity evaluation on the basis of the:

	KERN	
Usage accuracy*	relative	969-511
	absolute	969-512
Calibration results*	relative	969-513
	absolute	969-514
Measurements as manufacturer or customer specification	Foreign device	969-515
	Customer specifications	969-516
	KERN devices	969-517

relative = % / absolute = g *as attachment to the calibration certificate with accreditation symbol

Example for absolute customer tolerance (absolute) (Item no. 969-511):

No.	Tare	Load	Display	Deviation	Uncertainty	Customer tolerance	Conformity ¹⁾
1	0 g	500 g	500,00 g	0,00 g	± 0,013 g	± 0,05 g	☑
2	0 g	1000 g	1000,00 g	0,00 g	± 0,015 g	± 0,05 g	☑
3	0 g	1500 g	1500,01 g	0,01 g	± 0,017 g	± 0,05 g	☑
4	0 g	2000 g	2000,01 g	0,01 g	± 0,020 g	± 0,10 g	☑
5	0 g	3000 g	3000,02 g	0,02 g	± 0,022 g	± 0,10 g	☑

¹⁾Evaluation criteria: |[Deviation]| + [extended measuring uncertainty] ≤ [tolerance]

Documented quality of your balances in the log book

Consistently high product quality requires the use of measuring and test equipment that provides comprehensible, consistent and reproducible results. Hence, quality management systems require that measuring and test equipment produces a detailed traceable description and documentation of calibration results and conformity statements. According to the guiding principle of GMP/GLP: "Work not documented is work not done."

Equipment qualification is documentary evidence that a equipment is suitable for the intended purpose and is working faultlessly. A balance log book as well as our EQS (Equipment Qualification Software) is used to record all activities and results required for the qualification and monitoring of balances during routine operation. This includes the installation and commissioning of the balances, routine tests, maintenance as well as the recording of special events (failures, repairs, change of location).

The structure of the balance log book is based on the qualification process of the balance. The requirements for the qualification system such as DIN EN ISO 9001, DIN EN ISO/IEC 17025, GLP/GMP, VDA must be taken into account. The log book supports the user in his/her daily work with the balance and is meant to serve as necessary evidence during inspections and audits. The responsibility for maintaining the log book and its appropriate use is to be borne by the user.

Our proposal: Count on our support!

KERN offers this qualification concept throughout. Our validation services are carried out on the spot by technicians of our calibration laboratory and comprise among other things: installation, measurement test inclusive DAkks calibration certificate as well as records in your qualification log book of the EQS software (Equipment Qualification Software).

We give you advice about the options of device qualification, as required and will be happy to set up an appointment for qualification at the place of installation.

We offer individual calibration and maintenance agreements for the periodically required requalification.



Important elements of equipment qualification:



Design qualification (DQ)

With the design qualification, which is carried out under consideration of a requirement specification/functional description, all the requirements on which you as a user depend on, are defined. The purchase decision is made on the basis of the design specifications and the available devices. Careful selection in the DQ can prevent subsequent deficiencies.



Installation qualification (IQ)

During the installation qualification based on a FMEA, we perform a documented installation, up to the qualified commissioning of your device. Points of this qualification are:

- Scope of delivery and identification
- Visual inspection of the system components
- Evaluation of the installation site
- Hardware installation and device settings
- Cleaning
- Query of work instructions during use
- Clarification of deviations
- Document review and approval

We carry out our qualifications in accordance with the GMP standard.



Function qualification (OQ)

Instruction is given to the user/s. Items of the OQ are:

- Function test of the system
- Initial adjustment on site
- Metrological verification including USP & Ph.Eur.
- Creation of test protocols
- Check of menu function and error message
- Review and approval of documents
- Evaluation of performance and determination of further test procedure



Performance qualification (PQ)

The PQ represents documented evidence that the balance or weighing system functions in the selected application as intended. This will be assured by a qualification test of the equipment under real conditions with respect to its surroundings and the problem definition (such as traceable data transmission).



Maintenance qualification (MQ)

The periodical maintenance, cleaning work and complete metrological test of the balance/weighing system is documented in the MQ by a trained authorised engineer. Maintenance is carried out with the help of a maintenance schedule. The maintenance times are determined by you. We are happy to support you with a maintenance contract for the entire organisation of your measuring system.



If you are interested in a training for equipment qualification, please feel free to contact us

KERN CALIBRATION KERN & SOHN GmbH
 Akkreditiertes Kalibrierlabor seit 1994. Accredited calibration laboratory since 1994.
 Ihr Partner für Kalibrierdienstleistungen. Profimittelmanagement und Beratung. Your partner for calibration services, test equipment management and support.

Mitglied im / member of the
Deutschen Kalibrierdienst **DKD** **DAkkS**

Sample
 D-K-19408-01-00
 2025-01

Kalibrierschein
 Calibration certificate

Sample-2025-01 **1** Kalibrierzeichen
 Calibration mark

Gegenstand
 Objekt Klasse E2 Gewichtsatz, 1 mg - 1 kg **2**
 Set of weights, 1 mg - 1 kg Class E2

Hersteller
 Manufacturer KERN & Sohn GmbH
 Ziegeler 1
 D-72336 Balingen
 Germany **3**

Typ
 Type 313-052

Fabrikate/Serien-Nr.
 Serial number G122456789

Auftraggeber
 Customer Muslermann GmbH **4**

Auftragsnummer
 Order No. 2023-123456789

Ort der Kalibrierung
 Place of calibration Kalibrierlaboratorium KERN
 Calibration - Laboratory KERN

Umgebungsbedingungen
 Ambient conditions Die Kalibrierung wurde bei folgenden Umgebungsbedingungen ausgeführt:
 The calibration was carried out under the following ambient conditions:

	von from	bis to	Unsicherheit uncertainty
Temperatur (°C) temperature	22,9	24,1	0,1
rel. Luftfeuchte (%) relative humidity	48,5	53,4	2,0
Luftdruck (hPa) air pressure	942,5	948,5	0,3

Magnetische Eigenschaften
 Magnetic properties Der Hersteller hat bestätigt, dass die Gewichtsstücke die magnetischen Eigenschaften gemäß R111:2004 erfüllen.
 The manufacturer has confirmed the compliance of the magnetic properties of the weight pieces with the OIML R111:2004.

Referenzgewichte
 Standard weights 123-D-K-19408-01-00-2022-05

Material / angenommene Dichte
 Material / assumed density

Nennwert nominal value	Dichte density	Unsicherheit uncertainty	Material material	Form shape
1 mg - 500 mg	7800 kg/m³	140 kg/m³	Edelstahl Stainless steel	Prism Wedge
1 g - 1 kg	8000 kg/m³	100 kg/m³	Edelstahl Stainless steel	Knopf Cylindrical form

Messergebnisse:
 Measurement results

Nennwert nominal value	Kennzeichnung marking	Konventioneller Wegewert conventional mass	Unsicherheit M2 uncertainty	Fehlergrenze max. perm. error	Klasse* class*
1 mg		1 mg + 0.0010 mg	0.0020 mg	± 0.0060 mg	E2 ✓
2 mg	*	2 mg + 0.0020 mg	0.0020 mg	± 0.0060 mg	E2 ✓
5 mg		5 mg + 0.0010 mg	0.0020 mg	± 0.0060 mg	E2 ✓
10 mg		10 mg + 0.0020 mg	0.0020 mg	± 0.0060 mg	E2 ✓
20 mg		20 mg + 0.0010 mg	0.0020 mg	± 0.010 mg	E2 ✓
50 mg	*	50 mg + 0.0010 mg	0.0020 mg	± 0.010 mg	E2 ✓
100 mg		100 mg + 0.0010 mg	0.0020 mg	± 0.016 mg	E2 ✓
200 mg		200 mg + 0.0020 mg	0.0020 mg	± 0.020 mg	E2 ✓
500 mg	*	500 mg + 0.0020 mg	0.0020 mg	± 0.020 mg	E2 ✓
1 g		1 g + 0.0020 mg	0.010 mg	± 0.030 mg	E2 ✓
2 g		2 g + 0.0020 mg	0.013 mg	± 0.040 mg	E2 ✓
5 g	*	5 g + 0.0020 mg	0.013 mg	± 0.040 mg	E2 ✓
10 g		10 g + 0.010 mg	0.016 mg	± 0.050 mg	E2 ✓
20 g		20 g + 0.005 mg	0.025 mg	± 0.080 mg	E2 ✓
50 g	*	50 g + 0.015 mg	0.028 mg	± 0.080 mg	E2 ✓
100 g		100 g + 0.02 mg	0.03 mg	± 0.10 mg	E2 ✓
200 g		200 g + 0.05 mg	0.10 mg	± 0.30 mg	E2 ✓
500 g	*	500 g + 0.10 mg	0.10 mg	± 0.30 mg	E2 ✓
1 kg		1 kg + 0.1 mg	0.5 mg	± 1.0 mg	E2 ✓

* Bewertung der Klasse bzw. der Fehlergrenze (wenn keine Klassenangabe vorhanden ist) bezieht sich nur auf den konventionellen Wegewert.
 The assessment of the class / the max. perm. error if no class assessment is given only refers to the conventional mass.

Fehlt Keine Dokumentvariable verfügbar. | Fehlt Keine Dokumentvariable verfügbar. | Fehlt Keine Dokumentvariable verfügbar. | Fehlt Keine Dokumentvariable verfügbar. | Fehlt Keine Dokumentvariable verfügbar. | Fehlt Keine Dokumentvariable verfügbar.

Traceable KERN test weights – Calibration of test weights

Calibrated measuring equipment requires calibrated checking equipment. For balances, these are calibrated test weights, also called “standard weights”.

KERN will calibrate your test weights

- In all classes with permissible error limits E1–M3 according to OIML R111:2004 in sizes 1 mg to 2500 kg
- With free nominal value
- Newton (N)
- Independent of design (special designs)

The advantages of using the KERN in-house calibration

You send your test weights to us.

- Excellent price performance ratio
- The quickest processing time
 - Standard service: 4 working days
 - Express service: 48 hrs (new weights)
- The most modern calibration methods with robot controlled comparators allow the most accurate calibration results and fastest throughput time
- KERN calibration certificates with accreditation symbol are internationally recognised
- A calibration service which is independent of the brand
- KERN also reconditions existing customer weights (e.g. cleaning or readjustment)
- On request, we can also provide a pick-up and collection service with our parcel service

The advantages of using the KERN on-site calibration

We visit you.

We would be pleased to visit you within Germany and carry out the calibration of your reference standards to OIML classes M1–M3, 10 kg–2500 kg with permissible error limits, using our mobile MACOS system. Minimized downtime of your checking equipment and direct contact with our expert are the major benefits of this service. Price on request.

Recalibration

- The recalibration schedule depends on the frequency of use, the conditions of use and the safety requirements
- In terms of standardization, no particular recalibration interval is specified
- We would recommend that you recalibrate your test weights every six months if they are used intensively, and every 12 months with normal use
- We would be pleased to monitor your recalibration schedule

Calibration certificate with accreditation symbol for test weights (extract).

For more details on our calibration service and other useful information, please see the internet

- 1** Official document
- 2** Item to be calibrated
- 3** Traceability, see the *Glossary*
- 4** Identification/Applicant
- 5** Environmental conditions
- 6** Metrological component
- 7** Conventional mass
- 8** Uncertainty of measurement, see the *Glossary*

Recalibration Price of Test Weights (Accredited Calibration)

Class acc.	→ E1 ²⁾ with volume determination	E1 ¹⁾ without volume determination	E2 ¹⁾	F1/F2 ¹⁾ * F2 only	M1/M2/M3 ¹⁾
Nominal value ↓	KERN	KERN	KERN	KERN	KERN
1 mg	-	962-251R	962-351R	962-451R	962-651R
2 mg	-	962-252R	962-352R	962-452R	962-652R
5 mg	-	962-253R	962-353R	962-453R	962-653R
10 mg	-	962-254R	962-354R	962-454R	962-654R
20 mg	-	962-255R	962-355R	962-455R	962-655R
50 mg	-	962-256R	962-356R	962-456R	962-656R
100 mg	-	962-257R	962-357R	962-457R	962-657R
200 mg	-	962-258R	962-358R	962-458R	962-658R
500 mg	-	962-259R	962-359R	962-459R	962-659R
1 g	963-231	962-231R	962-331R	962-431R	962-631R
2 g	963-232	962-232R	962-332R	962-432R	962-632R
5 g	963-233	962-233R	962-333R	962-433R	962-633R
10 g	963-234	962-234R	962-334R	962-434R	962-634R
20 g	963-235	962-235R	962-335R	962-435R	962-635R
50 g	963-236	962-236R	962-336R	962-436R	962-636R
100 g	963-237	962-237R	962-337R	962-437R	962-637R
200 g	963-238	962-238R	962-338R	962-438R	962-638R
500 g	963-239	962-239R	962-339R	962-439R	962-639R
1 kg	963-241	962-241R	962-341R	962-441R	962-641R
2 kg	963-242	962-242R	962-342R	962-442R	962-642R
5 kg	963-243	962-243R	962-343R	962-443R	962-643R
10 kg	963-244	962-244R	962-344R	962-444R	962-644R
20 kg	963-245	962-245R	962-345R	962-445R	962-645R
50 kg	963-246	962-246R	962-346R	962-446R	962-646R
100 kg	-	-	-	962-591R*	962-691R
200 kg	-	-	-	962-592R*	962-692R
500 kg	-	-	-	962-593R*	962-693R
1000 kg	-	-	-	-	962-694R
2000 kg	-	-	-	-	962-695R
1 mg-500 mg	-	962-250R	962-350R	962-450R	962-650R
1 mg-50 g	963-201	962-201R	962-301R	962-401R	962-601R
1 mg-100 g	963-202	962-202R	962-302R	962-402R	962-602R
1 mg-200 g	963-203	962-203R	962-303R	962-403R	962-603R
1 mg-500 g	963-204	962-204R	962-304R	962-404R	962-604R
1 mg-1 kg	963-205	962-205R	962-305R	962-405R	962-605R
1 mg-2 kg	963-206	962-206R	962-306R	962-406R	962-606R
1 mg-5 kg	963-207	962-207R	962-307R	962-407R	962-607R
1 mg-10 kg	963-208	962-208R	962-308R	962-408R	962-608R
1 g-50 g	963-215	962-215R	962-315R	962-415R	962-615R
1 g-100 g	963-216	962-216R	962-316R	962-416R	962-616R
1 g-200 g	963-217	962-217R	962-317R	962-417R	962-617R
1 g-500 g	963-218	962-218R	962-318R	962-418R	962-618R
1 g-1 kg	963-219	962-219R	962-319R	962-419R	962-619R
1 g-2 kg	963-220	962-220R	962-320R	962-420R	962-620R
1 g-5 kg	963-221	962-221R	962-321R	962-421R	962-621R
1 g-10 kg	963-222	962-222R	962-322R	962-422R	962-622R

¹⁾ Processing time 4 working days, ²⁾ Processing time 15 working days, ¹⁾ Preparation of reverification of balances, 969-006R

Additional costs for preparation, overhaul and adjustment before the calibration	KERN
Preparation of weights (e.g. cleaning, etc.)	
Single weight	969-001R
Weight set	969-002R
Subsequent services are carried out after confirmation	
Continued overhaul of weights (e.g. wet-cleaning, markings, repair, special packaging, adjustment E1 (DAkkS only), E2 ...)	969-005R
Adjustment, per weight only available for weights with adjustment chamber (F1- M3)	969-010R
Second calibration after adjustment or substitution, per weight	
Class E1	969-210R
Class E1 incl. volume determination	969-211R
Class E2	969-310R
Class F1/F2	969-410R
Class M1- M3	969-610R
Testing of magnetic properties according to OIML R111:2004, per weight	961-115R
Calibration of NON-OIML test weights, additional price per weight	-

KERN Standard Service Time*¹

Standard service Class E2 - M3	4 working days
Standard service Class E1, 1 mg - 500 mg, and recalibration 1 g - 10 kg with a known volume	10 working days
Class E1, ≥ 1 g, incl. volume determination (new weights)	15 working days

¹⁾ The delivery time for recalibrations can vary depending on the order situation as well as in case of queries, bottlenecks, etc.



Express service in 48 hours
except for class E1

- Urgent order is received at KERN by 12:00 noon at the latest
- Ready for shipping at KERN within two working days, at 12:00 noon
- Return by standard parcel service or express shipping (Costs and processing time on request)
- Additional cost for Express Service, for each test weight, KERN 962-115
- For Express shipping

Verification Prices for Test Weights and (Crane) Scales

Class acc. OIML R 111:2004	→ E2 ¹⁾ with verification certificate	F1 ¹⁾ with verification certificate	M1 ¹⁾ with verification certificate
Nominal value ↓	KERN	KERN	KERN
1 mg	952-351	952-451	952-651
2 mg	952-352	952-452	952-652
5 mg	952-353	952-453	952-653
10 mg	952-354	952-454	952-654
20 mg	952-355	952-455	952-655
50 mg	952-356	952-456	952-656
100 mg	952-357	952-457	952-657
200 mg	952-358	952-458	952-658
500 mg	952-359	952-459	952-659
1 g	952-331	952-431	952-631
2 g	952-332	952-432	952-632
5 g	952-333	952-433	952-633
10 g	952-334	952-434	952-634
20 g	952-335	952-435	952-635
50 g	952-336	952-436	952-636
100 g	952-337	952-437	952-637
200 g	952-338	952-438	952-638
500 g	952-339	952-439	952-639
1 kg	952-341	952-441	952-641
2 kg	952-342	952-442	952-642
5 kg	952-343	952-443	952-643
10 kg	952-344	952-444	952-644
20 kg	952-345	952-445	952-645
50 kg	-	952-446	952-646
1 mg-500 mg	952-350	952-450	952-650
1 mg-50 g	952-301	952-401	952-601
1 mg-100 g	952-302	952-402	952-602
1 mg-200 g	952-303	952-403	952-603
1 mg-500 g	952-304	952-404	952-604
1 mg-1 kg	952-305	952-405	952-605
1 mg-2 kg	952-306	952-406	952-606
1 mg-5 kg	952-307	952-407	952-607
1 mg-10 kg	952-308	952-408	952-608
1 g-50 g	952-315	952-415	952-615
1 g-100 g	952-316	952-416	952-616
1 g-200 g	952-317	952-417	952-617
1 g-500 g	952-318	952-418	952-618
1 g-1 kg	952-319	952-419	952-619
1 g-2 kg	952-320	952-420	952-620
1 g-5 kg	952-321	952-421	952-621
1 g-10 kg	952-322	952-422	952-622

KERN verification delivery time

Standard verification service Class E2 - M1 6 working days

Additional costs KERN
for preparation, overhaul
and adjustment before
the verification

Preparation of weights (e.g. cleaning, etc.)

Single weight 969-008R

Weight set 969-009R

Subsequent services are carried out after confirmation

Continued overhaul
of weights
(e.g. wet-cleaning,
markings, repair,
special packaging,
adjustment E2 ...)

969-005R

Adjustment, per weight
only available for weights
with adjustment chamber
(F1/F2 - M1)

969-010R

Verification after adjustment or substitution, per weight

Class E2 969-310R

Class F1/F2 969-410R

Class M1 969-610R

Verification prices for balances

Reverification ²⁾

	KERN
Accuracy class I (precision balances) ¹⁾	
[Max] ≤ 5 kg ¹⁾	950-101R
[Max] > 5 kg ¹⁾	950-102R
Accuracy class II (precision balances) ¹⁾	
[Max] ≤ 5 kg ¹⁾	950-116R
[Max] > 5 kg - 50 kg ¹⁾	950-117R
[Max] > 50 kg - 350 kg ¹⁾	950-118R
Accuracy class III-IV ¹⁾	
Bench scales and industrial scales (excl. crane scales)	
[Max] ≤ 5 kg ¹⁾	950-127R
[Max] > 5 kg - 50 kg ¹⁾	950-128R
[Max] > 50 kg - 350 kg ¹⁾	950-129R
[Max] > 350 kg - 1500 kg ¹⁾	950-130R
[Max] > 1500 kg - 2900 kg ¹⁾	950-131R
[Max] > 2900 kg - 6000 kg ¹⁾	950-132R
Crane scales	
[Max] > 50 kg - 350 kg ¹⁾	950-129HR
[Max] > 350 kg - 1500 kg ¹⁾	950-130HR
[Max] > 1500 kg - 2900 kg ¹⁾	950-131HR
[Max] > 2900 kg - 6000 kg ¹⁾	950-132HR
[Max] > 6000 kg - 12000 kg ¹⁾	950-133HR

¹⁾ Preparation of reverification of balances, 969-006R

²⁾ Verification ("reverification") only in Germany

Accredited calibration with calibration certificate for force gauges

The KERN calibration laboratory is at your side when you need an accredited calibration. From the transducer to the full measuring chain, we are happy to take care of traceable calibration of your test equipment for you.

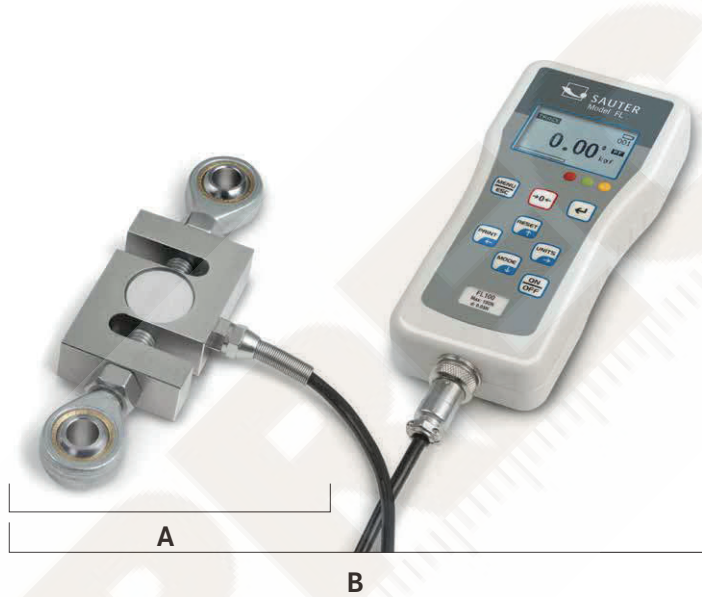
Our accreditation includes the calibration of tensile and pressure force up to 5 kN according to the standards DIN EN ISO 376 and DKD-R 3-3, each with the Newton (N) display unit for a complete measuring chain (situation A) or voltage ratio/transmission coefficient (mV/V, situation B).

Below you will find a comparison of which standard meets which criteria:

Comparison of DIN EN ISO 376 and DKD-R 3-3

	ISO 376	DKD-R 3-3
Standardization	ISO standard (internationally standardized)	Standard of the DKD (Germany)
Measuring equipment	Force transducers and complete measuring chains	Force transducers and complete measuring chains
Area of application	Specifically force gauges for the testing of testing equipment	General force gauges
Number of power stages	8	5
Classification/Assessment	Classification in classes 00; 0,5; 1 and 2	None in standard
Test sequences	Fixed procedure	Sequences A, B, C, D possible Standard is sequence A B, C and D are reduced sequences, relevant previous knowledge is necessary
Summary	Higher-quality calibration, as 8 force levels are calibrated	High-quality calibration, reduced sequences with less effort possible

We can offer you a calibration solution for the following situations:



Situation A:
Separate force transducer,
display unit mV/V

Situation B:
Complete force gauge (N),
consisting of transducer, amplifier
and display, display unit N

► See also tables, right side

KERN & SOHN GmbH
Akkreditiertes Kalibrierlabor seit 1994.
Accredited calibration laboratory since 1994.

Ihr Partner für Kalibrierdienstleistungen, Prüfmittelmanagement und Beratung.
Your partner for calibration services, test equipment management and support.

Mitglied im / member of the

Kalibrierschein **Sample-2025-01** **Kalibrierzeichen**
Calibration Certificate Calibration mark

Sample
D.Nr.
19405-01-00
2025-01

Gegenstand **Kraftmessgerät**
Objekt **Force gauge**
Max. 1000 N, Ø 8,5 N

Hersteller **Sauter GmbH**
Manufacturer **Zugelstr. 1**
72336 Balingen
Deutschland

Typ **PH 1K**
Type

Seriennummer **5A20-02287**
Serial number

Auftraggeber **Musterfirma GmbH**
Customer **Musterstraße 1**
53346

Messwerte (Zugkraft) / Measurement results (tension force)

Ausrichtung Kraft	Ausgangsposition / initial position							
	R1	R2	R3	R4	R5	R6	R7	R8
0 N	0,0 N	0,0 N	0,0 N	0,0 N	0,0 N	0,0 N	0,0 N	0,0 N
200,0 N	+199,5 N	+199,5 N	+199,5 N	+199,5 N	+199,5 N	+199,5 N	+199,5 N	+199,5 N
400,0 N	+399,5 N	+399,5 N	+399,5 N	+399,5 N	+399,5 N	+399,5 N	+399,5 N	+399,5 N
600,0 N	+599,5 N	+599,5 N	+599,5 N	+599,5 N	+599,5 N	+599,5 N	+599,5 N	+599,5 N
800,0 N	+799,5 N	+799,5 N	+799,5 N	+799,5 N	+799,5 N	+799,5 N	+799,5 N	+799,5 N
1000,0 N	+999,5 N	+999,5 N	+999,5 N	+999,5 N	+999,5 N	+999,5 N	+999,5 N	+999,5 N
0 N	0,0 N	0,0 N	0,0 N	0,0 N	0,0 N	0,0 N	0,0 N	0,0 N

Messergebnisse (Zugkraft) / Messend values (tension force)

Aus den oben aufgeführten Messwerten ergeben sich die folgenden Messergebnisse:
The following measurement results are calculated using the measured values above:

Rel. Kalibrierabweichung / Rel. cal. bias error: $\delta_k = 0,000 \%$
 Rel. Maßpunktabweichungen / Rel. zero error: $\delta_k = 0,000 \%$ (R1), 0,000 % (R2), 0,000 % (R3/R4), 0,000 % (R5/R6)

Kraft	Mittelwert \bar{x} average	rel. Wiederholbarkeit r rel. repeatability	rel. Vergleichs- präzision s rel. reproducibility	rel. Unsicherheiten v rel. uncertainty
200,0 N	+199,5 N	0,000 %	0,000 %	+0,201 %
400,0 N	+399,5 N	0,000 %	0,000 %	0,000 %
600,0 N	+599,5 N	0,000 %	0,000 %	0,000 %
800,0 N	+799,5 N	0,000 %	0,000 %	+0,063 %
1000,0 N	+999,5 N	+0,050 %	+0,050 %	0,000 %

Angaben in die erweiterte Messunsicherheit, die sich aus der Standardunsicherheit durch Multiplikation mit dem Erweiterungsfaktor $k=2$ ergibt. Sie wurde gemäß EN ISO 15:2012 und DKD-R 3-3 ermittelt und gilt jeweils für Belastungen zwischen der angegebenen Kraftstufe und der Kalibrierkraft. Der Wert der Messgröße liegt mit einer Wahrscheinlichkeit von mindestens 95% im zugeordneten Wertebereich.

Calibration certificate with accreditation symbol for force-measuring devices (extract).

Prices for accredited calibration of force gauges and force transducers

Situation A: Force transducer (voltage ratio, in mV/V)*^{1,2}

ISO 376 (8 stages)		DKD-R 3-3 (5 stages, sequence A)	
KERN	Measuring range	KERN	Measuring range
Tensile force:			
963-161IV (R)	≤ 500 N	963-161V (R)	≤ 500 N
963-162IV (R)	≤ 2 kN	963-162V (R)	≤ 2 kN
963-163IV (R)	≤ 5 kN	963-163V (R)	≤ 5 kN
Compression force:			
963-261IV (R)	≤ 500 N	963-261V (R)	≤ 500 N
963-262IV (R)	≤ 2 kN	963-262V (R)	≤ 2 kN
963-263IV (R)	≤ 5 kN	963-263V (R)	≤ 5 kN
Tensile and Compression force:			
963-361IV (R)	≤ 500 N	963-361V (R)	≤ 500 N
963-362IV (R)	≤ 2 kN	963-362V (R)	≤ 2 kN
963-363IV (R)	≤ 5 kN	963-363V (R)	≤ 5 kN

Situation B: Complete force gauge (in N)*²

ISO 376 (8 stages)		DKD-R 3-3 (5 stages, sequence A)	
KERN	Measuring range	KERN	Measuring range
Tensile force:			
963-161I (R)	≤ 500 N	963-161 (R)	≤ 500 N
963-162I (R)	≤ 2 kN	963-162 (R)	≤ 2 kN
963-163I (R)	≤ 5 kN	963-163 (R)	≤ 5 kN
Compression force:			
963-261I (R)	≤ 500 N	963-261 (R)	≤ 500 N
963-262I (R)	≤ 2 kN	963-262 (R)	≤ 2 kN
963-263I (R)	≤ 5 kN	963-263 (R)	≤ 5 kN
Tensile and Compression force:			
963-361I (R)	≤ 500 N	963-361 (R)	≤ 500 N
963-362I (R)	≤ 2 kN	963-362 (R)	≤ 2 kN
963-363I (R)	≤ 5 kN	963-363 (R)	≤ 5 kN

Factory calibration for force

This is not an accredited calibration (no proof of metrological traceability).

Situation A: Force transducer (voltage ratio, in mV/V)*^{1,2}

Situation B: Complete force gauge (in N)*²

ISO 376 (8 stages)		DKD-R 3-3 (5 stages, sequence A)	
KERN	Measuring range	KERN	Measuring range
Tensile force:			
961-161V (R)	≤ 500 N	961-161 (R)	≤ 500 N
961-162V (R)	≤ 2 kN	961-162 (R)	≤ 2 kN
961-163V (R)	≤ 5 kN	961-163 (R)	≤ 5 kN
961-164V (R)	≤ 20 kN	961-164 (R)	≤ 20 kN
961-165V (R)	≤ 50 kN	961-165 (R)	≤ 50 kN
961-166V (R)	≤ 250 kN	961-166 (R)	≤ 250 kN
Compression force:			
961-261V (R)	≤ 500 N	961-261 (R)	≤ 500 N
961-262V (R)	≤ 2 kN	961-262 (R)	≤ 2 kN
961-263V (R)	≤ 5 kN	961-263 (R)	≤ 5 kN
961-264V (R)	≤ 20 kN	961-264 (R)	≤ 20 kN
961-265V (R)	≤ 50 kN	961-265 (R)	≤ 50 kN
961-266V (R)	≤ 250 kN	961-266 (R)	≤ 250 kN
Tensile and Compression force:			
961-361V (R)	≤ 500 N	961-361 (R)	≤ 500 N
961-362V (R)	≤ 2 kN	961-362 (R)	≤ 2 kN
961-363V (R)	≤ 5 kN	961-363 (R)	≤ 5 kN
961-364V (R)	≤ 20 kN	961-364 (R)	≤ 20 kN
961-365V (R)	≤ 50 kN	961-365 (R)	≤ 50 kN
961-366V (R)	≤ 250 kN	961-366 (R)	≤ 250 kN

(R): Recalibration

For each force gauge without interface or from other manufacturers we charge a surcharge

¹ Compatibility with our amplifiers required

² Installation in our measuring equipment required

Factory calibration certificates

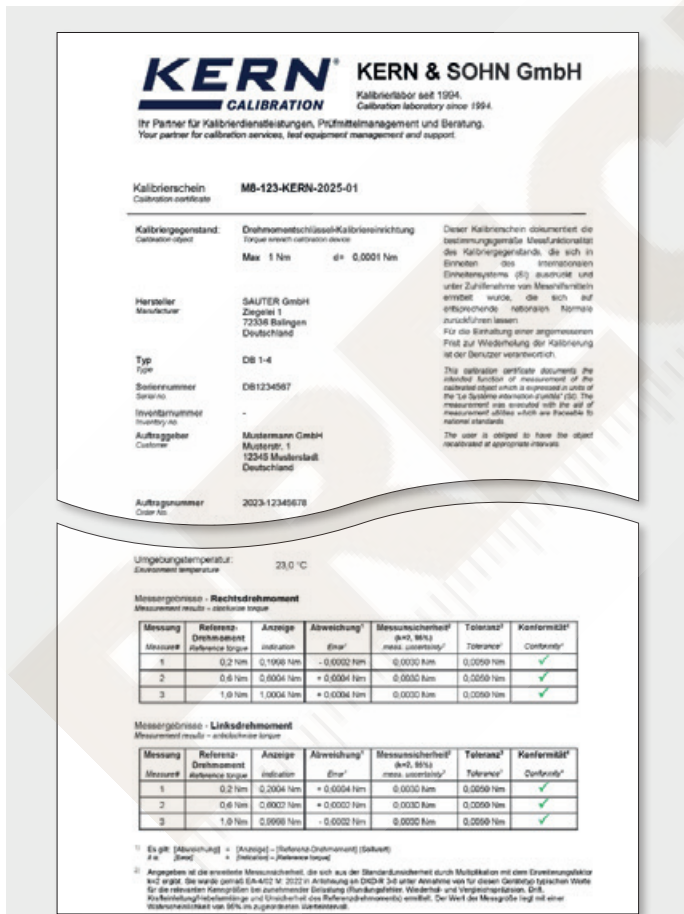
As calibration certificates with accreditation symbol cannot be offered for all measuring devices or measurement sizes, or where it is not customary, we then offer factory calibration certificates. This is not an accredited calibration (no proof of metrological traceability). These calibration certificates meet international standards and are particularly suitable as proof of exacting calibration in the monitoring of your checking equipment, for example:

- Mechanical balances (spring balances, etc.)
- Force-measuring devices up to 250 kN
- Measuring devices for layer thickness 0 µm – 2000 µm
- Hardness testing devices in accordance with Leeb tests
- Ultrasonic material thickness testing device 25 mm – 300 mm

We carry out calibrations independent of brand. In order to avoid any unnecessary delays when processing your order, please send us the technical documents and necessary accessories with the checking device. Calibration time 4 working days.

KERN	Measuring device	Measuring range
Factory calibration		
961-110	Coating thickness	≤ 2000 µm F or N
961-112	Coating thickness	≤ 2000 µm FN
961-113	Wall thickness (ultra sound)	≤ 300 mm (in stainless steel)
961-114	Wall thickness (Test blocks)	≤ 300 mm
961-170	Hardness comparison plate (Shore)	For sets up to 7 plates
961-131	Hardness tester (Leeb)	400 – 800 HLD
961-132	Hardness comparison plate (Leeb)	Hardness comparison plate (for Leeb durometer)
961-270	Hardness (UCI)	200 – 800 HV
961-150	Length	≤ 300 mm
961-190	Light	≤ 200000 lx
961-100	Mechanical balances / spring balances	≤ 5 kg
961-101	Mechanical balances / spring balances	> 5 – 50 kg
961-102	Mechanical balances / spring balances	> 50 – 350 kg
961-103	Mechanical balances / spring balances	> 350 – 1500 kg
961-102K	Digital dynamometer KERN MAP	≤ 130 kg
961-120 (R)	Torque wrench test devices	1 Nm - 200 Nm
964-305	Temperature calibration for moisture analyzer	
961-290	Refractometers	
Additional services		
962-116	Express service with 48 hour delivery	

(R): Recalibration
For each force gauge without interface or from other manufacturers we charge a surcharge



Factory calibration certificate for torque wrench test devices (extract from the factory calibration certificate) **Further details on the internet**