

DAKKS CALIBRATION SERVICE (DKD) AND VERIFICATION SERVICE

2017

PROFESSIONAL
MEASURING


KERN & Sohn GmbH

Älteste europäische Feinwaagen und Gewichtefabrik seit 1844
Oldest European Manufacturer of Precision Balances since 1844

akkreditiert durch die / accredited by the

Deutsche Akkreditierungsstelle GmbH

als Kalibrierlaboratorium im / as calibration laboratory in the

Deutschen Kalibrierdienst


 Deutsche
Akkreditierungsstelle
D-K-19408-01-00

Sample

 D-K-
19408-01-00

2017-01

 Kalibrierschein
Calibration certificate

 Kalibrierzeichen
Calibration mark

Gegenstand Object	Gewichtssatz, 1 mg - 1 kg Klasse E1 <i>Set of weights, 1 mg - 1 kg Class E1</i>
Hersteller Manufacturer	KERN & Sohn GmbH Ziegelei 1 D-72336 Balingen Germany
Typ Type	303-045
Fabrikate/Serien-Nr. Serial number	G123456789
Auftraggeber Customer	Mustermann GmbH Musterstraße 42 12345 Musterort Deutschland

Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem internationalen Einheitensystem (SI). Die DAKKS ist Unterzeichner der multilateralen Übereinkommen der European co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine. Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI). The DAKKS is signatory to the multilateral agreements of the European co-operation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates. The user is obliged to have the object recalibrated at appropriate intervals.

 Auftragsnummer 2017-12345678
Order No.

 Anzahl der Seiten des Kalibrierscheines 6
Number of pages of the certificate

 Datum der Kalibrierung 02.01.2017
Date of calibration

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung sowohl der Deutschen Akkreditierungsstelle GmbH als auch des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift haben keine Gültigkeit.

This calibration certificate may not be reproduced other than in full except with the permission of both the Deutsche Akkreditierungsstelle GmbH and the issuing laboratory. Calibration certificates without signature are not valid.

	Datum Date	Leiter des Kalibrierlaboratoriums Head of the Calibration Laboratory	Bearbeiter Person responsible
	02.01.2017	Otto Grunertberg	Rocco Scaramuzzo

 KERN & Sohn GmbH, Ziegelei 1, D-72336 Balingen, Germany
Phone +49-7433-99330, Fax +49-7433-9933-149

 Ser: [86178]
QXC175 (rev 4)

KERN Pictograms

	Internal adjusting: Quick setting up of the balance's accuracy with internal adjusting weight (motordriven).		Piece counting: Reference quantities selectable. Display can be switched from piece to weight.		Rechargeable battery pack: Rechargeable set.
	Adjusting program CAL: For quick setting up of the balance's accuracy. External adjusting weight required.		Recipe level A: Separate memory for the weight of the tare container and the recipe ingredients (net total).		Universal mains adapter: with universal input and optional input socket adapters for A) EU, GB B) EU, GB, CH, USA C) EU, GB, CH, USA, AUS
	Memory: Balance memory capacity, e.g. for article data, weighing data, tare weights, PLU etc.		Recipe level B: Internal memory for complete recipes with name and target value of the recipe ingredients. User guidance through display.		Mains adapter: 230V/50Hz in standard version for EU. On request GB, USA or AUS version available.
	Alibi memory: Electronic archiving of weighing results, complying with the 2009/23/EC standard. For details see page 199		Recipe level C: Internal memory for complete recipes with name and target value of the recipe ingredients. User guidance through display, multiplier function, adjustment of recipe when dosages are exceeded or barcode recognition.		Power supply: Integrated in balance. 230V/50Hz standard EU. More standards e.g. GB, USA or AUS on request.
	Data interface RS-232: To connect the balance to a printer, PC or network.		Totalising level A: The weights of similar items can be added together and the total can be printed out.		Weighing principle: Strain gauges Electrical resistor on an elastic deforming body.
	RS-485 data interface: To connect the balance to a printer, PC or other peripherals. High tolerance against electromagnetic disturbance.		Percentage determination: Determining the deviation in % from the target value (100 %).		Weighing principle: Tuning fork A resonating body is electromagnetically excited, causing it to oscillate.
	USB data interface: To connect the balance to a printer, PC or other peripherals.		Weighing units: Can be switched to e.g. nonmetric units at the touch of a key. See balance model. Please refer to KERN's website for more details.		Weighing principle: Electromagnetic force compensation Coil inside a permanent magnet. For the most accurate weighings.
	Bluetooth* data interface: To transfer data from the balance to a printer, PC or other peripherals.		Weighing with tolerance range: Upper and lower limiting values can be programmed individually for e.g. dosing, sorting and portioning		Weighing principle: Single cell technology Advanced version of the force compensation principle with the highest level of precision.
	WLAN data interface: To transfer data from the balance to a printer, PC or other peripherals.		Hold function: (Animal weighing program) When the weighing conditions are unstable, a stable weight is calculated as an average value.		Verification possible: The time required for verification is specified in the pictogram.
	Control outputs (optocoupler, digital I/O): To connect relays, signal lamps, valves, etc.		Protection against dust and water splashes IPxx: The type of protection is shown in the pictogram. For details see page 56.		DAKkS calibration possible (DKD): The time required for DAKkS calibration is shown in days in the pictogram.
	Interface for second balance: For direct connection of a second balance.		ATEX explosion protection: Suitable for use in hazardous industrial environments, in which there is explosion danger. The ATEX marking is specified for each device.		Package shipment: The time required for internal shipping preparations is shown in days in the pictogram.
	Network interface: For connecting the scale to an Ethernet network. With KERN products you can use a universal RS-232/LAN converter. See page 166		Stainless steel: The balance is protected against corrosion.		Pallet shipment: The time required for internal shipping preparations is shown in days in the pictogram.
	Wireless data transfer: between the weighing unit and the evaluation unit using an integrated radio module.		Suspended weighing: Load support with hook on the underside of the balance.		Warranty: The warranty period is shown in the pictogram.
	GLP/ISO log: The balance displays the weight, date and time, regardless of a printer connection.		Battery operation: Ready for battery operation. The battery type is specified for each device.		
	GLP/ISO log: With weight, date and time. Only with KERN printers, see "Accessories", see page 163.				



Balances & Test service catalogue

Provides a complete overview of the KERN line of balances, test weights, and services such as verification, calibration, etc.



Medical scales catalogue

Complete line of medical scales, from infant scales to patient scales, chair scales and adiposity scales, as well as hand grip dynamometers, chemist's balances and veterinary scales.



Microscopes & refractometers catalogue

Extensive range in the area of optical instruments, such as, for example, biological microscopes, stereo microscopes, metallurgical microscopes, polarisation microscopes as well as analogue and digital refractometers.



SAUTER measuring equipment catalogue

Test instruments for industry and commerce, such as force, coating thickness, material thickness and calibration service.



DakKS calibration service brochure

Detailed information on topics pertaining to the calibration and verification of balances, test weights, and force measuring devices.

Your advantages

fast

- 24 hours delivery service – ordered today, on its way tomorrow
- Sales & service hotline available from 8:00 am to 6:00 pm

reliable


- 3 years warranty for balances over € 400,-
- Precision in weighing technology for more than 170 years


competent


- DakKS accreditation DIN EN ISO/IEC 17025
- Certified QM system DIN EN ISO 9001:2008
- Authorisation for initial verification by the manufacturer 2014/31/EU
- Medical certifications DIN EN ISO 13485 and 93/42/EEC


versatile

- One-stop shopping: from pocket balances through to floor scales – everything from one supplier
- Find the product you want at lightning speed with the “Balance Quick-Finder” at www.kern-sohn.com


 **Order hotline**
+49 [0] 7433 9933-0


 **Service hotline**
+49 [0] 7433 9933-199


 **Calibration hotline**
+49 [0] 7433 9933-196

 **Our team of consultants will assist you**
from Monday to Friday
from 8:00 am to 6:00 pm

 **Online Shop**
www.kern-sohn.com

 **E-mail order**
info@kern-sohn.com

 **Fax order**
+49 [0] 7433 9933-146

 **www.kern-sohn.com**
Information on current product availability, product data sheets, user instructions, useful knowledge, technical glossary, images and much for you to download, practical topic areas, which will guide you to the right product in your industry as well as a clever test weight and balance search engine.

DAkkS Calibration Service (DKD) and Verification service

The Deutsche Akkreditierungsstelle GmbH (DAkkS) (German accreditation body)

The Deutsche Akkreditierungsstelle GmbH (DAkkS), successor of the German Calibration Service (DKD), is responsible for measuring "correctly" in accordance with legally binding international standards. It is part of DAkkS = Deutsche Akkreditierungsstelle (German accreditation authority) which was founded in Germany. The basis is the European range of standards DIN EN ISO/IEC 17000 for conformity assessment, in particular the accreditation standard 17025, which governs the organisation of a calibration laboratory, as well as basic metrological technical requirements.

Only an accredited calibration laboratory can issue a DAkkS calibration (DKD) 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

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

standards and the relevant uncertainty of measurement.

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 DKD calibration laboratories for balances, test weights and force measurement in Europe.

Thanks to the high level of automation, we can carry out DAkkS calibration (DKD) 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 at www.kern-lab.com



Waldemar Fleitling
Product specialist Calibration service

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fleitling@kern-sohn.com

DAkkS calibration (DKD)

Why? DAkkS calibration (DKD) 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 (DKD)

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 (DKD) 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? Operator control the use of checking equipment and periodic recalibration time intervals themselves

Range of services:

- DAkkS calibration (DKD) of balances with a maximum load of up to 50.000 kg
- DAkkS calibration (DKD) 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 (DKD) of force-measuring devices
- Volume determination for weights of accuracy class E1
- 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 – see page 198.



KERN & Sohn GmbH
Älteste europäische Feinwaagen und Gewichtsfabrik seit 1844
 Oldest European Manufacturer of Precision Balances since 1844

akkreditiert durch die / accredited by the
Deutsche Akkreditierungsstelle GmbH
 als Kalibrierlaboratorium im / as calibration laboratory in
Deutschen Kalibrierdienst DKD

Kalibrierschein
Calibration Certificate

Gegenstand
Object: Präzisionswaage
Precision Balance

Hersteller
Manufacturer: KERN & Sohn GmbH
Ziegelstr. 1
72336 Balingen
GERMANY

Typ
Type: PLJ 600-3CM

Fabrikat-/Serien-Nr.
Serial number: 123456789

Kalibrierzeichen
Calibration mark

Sample: D-K-19408-01-00
2014-05

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Messergebnisse / Measurement results

1. Wiederholbarkeit / Repeatability

Messung	Prüflast	Waagenanzeige
No. 1	500 g	499,999 g
No. 2	500 g	499,999 g
No. 3	500 g	500,000 g
No. 4	500 g	500,000 g
No. 5	500 g	500,000 g

Standardabweichung: s = 0,0006 g

2. Richtigkeit / Linearity

Prüflast	Waagenanzeige
100 g	100,000 g
200 g	200,000 g
300 g	300,001 g
500 g	500,000 g
600 g	600,001 g

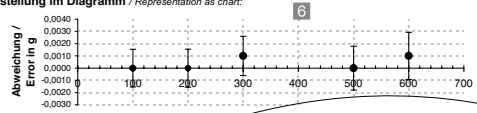
3. Außermittige Belastung / Eccentricity

Position	Prüflast	Waagenanzeige
No. 1	500 g	500,000 g
No. 2	500 g	499,999 g
No. 3	500 g	500,001 g
No. 4	500 g	500,001 g
No. 5	500 g	500,001 g

Messunsicherheit U / Measuring uncertainty U

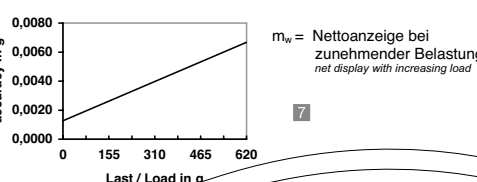
Last	Abweichung	Erweiterungs-faktor k	Unsicherheit	relative Unsicherheit
100 g	0,000 g	2,38	0,0016 g	0,00154 %
200 g	0,000 g	2,32	0,0016 g	0,00078 %
300 g	0,001 g	2,24	0,0017 g	0,00053 %
500 g	0,000 g	2,12	0,0018 g	0,00036 %
600 g	0,001 g	2,08	0,0020 g	0,00032 %

Darstellung im Diagramm / Representation as chart

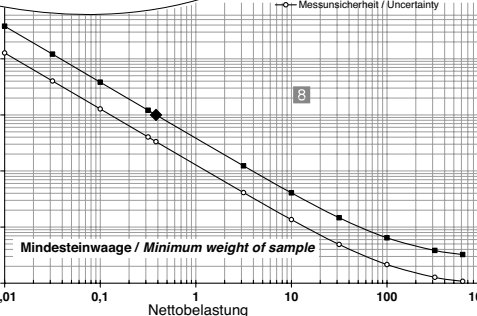


Verwendungsgenauigkeit G / Usage accuracy G

Diagramm der Verwendungsgenauigkeit / Graph of usage accuracy:
 $G = 0,0013 \text{ g} + 8,72 \cdot 10^{-6} \cdot m_w$



rel. Meßunsicherheit



DAkkS calibration certificate for balances (extract)

- 1 Official document
- 4 Identification/Applicant
- 7 Usage accuracy, see page 199
- 2 Item to be calibrated
- 5 Metrological component
- 8 Minimum weight of sample (additional price)
- 3 Traceability, see page 201
- 6 Measuring uncertainty, see page 201

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:

KERN in-house calibration

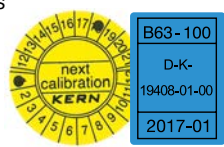
You send your balance to us. Recommendable with new equipment and for balances which can be transported economically, as the travel costs for on-site calibration are then not applied. On request, we can also provide a pick-up and collection service with our parcel service.

KERN on-site calibration

We visit you. For further details see page 193.

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	KERN	Price excl. of VAT ex works €
Weighing range		
Analytical balances		
[Max] ≤ 5 kg	963-101	138,-
[Max] > 5 kg	963-102	176,-
Precision balances/Industrial scales		
[Max] ≤ 5 kg	963-127	72,-
[Max] > 5 kg – 50 kg	963-128	88,-
[Max] > 50 kg – 350 kg	963-129	105,-
[Max] > 350 kg – 1500 kg	963-130	165,-
[Max] > 1500 kg – 2900 kg ¹⁾	963-131	220,-
[Max] > 2900 kg – 6000 kg ¹⁾	963-132	440,-
[Max] > 6000 kg – 12000 kg ¹⁾	963-133	500,-
Hanging scales/Crane scales		
[Max] ≤ 5 kg	963-127H	72,-
[Max] > 5 kg – 50 kg	963-128H	88,-
[Max] > 50 kg – 350 kg	963-129H	105,-
[Max] > 350 kg – 1500 kg	963-130H	165,-
[Max] > 1500 kg – 2900 kg	963-131H	250,-
[Max] > 2900 kg – 6000 kg	963-132H	500,-
[Max] > 6000 kg – 12000 kg ³⁾	963-133H	700,-
[Max] > 12000 kg – 31000 kg ⁴⁾ (recalibration only)	963-134HR	830,-
[Max] > 31000 kg – 50000 kg ⁴⁾ (recalibration only)	963-135HR	830,-
Preparation for recalibration (cleaning, adjustment, function test)	969-003R	20,-
Additional services		
Minimum weight of sample (for details see internet)	969-103	10,-
DAkkS Express service with delivery time 48 hours (only on initial purchase, details see p. 196)	962-116	50,- / scale
Express shipping: Express supplement for guaranteed delivery on the next working day (if ready for shipment before 12:00 noon)	in GER only	40,- / parcel

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

Note: KERN on-site calibration

Why not have your balances calibrated on site – it's so easy!

As well as KERN in-house calibration, which is carried out at the KERN factory, we can also offer to calibrate your electronic balances (independent of the brand) at your premises.

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

This on-site testing service is metrologically recommended, as your balances are in their field of use and can be calibrated without any possible transportation problems. Lower downtime as well as personal contact with our expert are the major benefits of this service. This KERN calibration service is also independent of the brand.



Info flyer for on-site calibration, available on kern-lab.com

What are the advantages of on-site calibration?

- Calibration in your field of use
- Low downtime
- Reduces measuring uncertainty and guarantees strict compliance with EC Guideline EURAMET/cg-18 in terms of process accuracy
- Cross-brand servicing, basic inspection and adjustment by a specialist
- No transportation risks
- Device training for your qualified users
- Preparation for verification
- We will take your preferred date into account

Just tell us when you would like us to come and give us the relevant technical details for the balances you would like us to test. Our DAKS calibration colleague will then get in touch with you immediately and will discuss the calibration process with you – it's straightforward and professional. We would be delighted to put together a customised quotation for you.

Note: KERN adjustment at the location of installation

KERN will adjust your balance to the individual location of installation!

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.

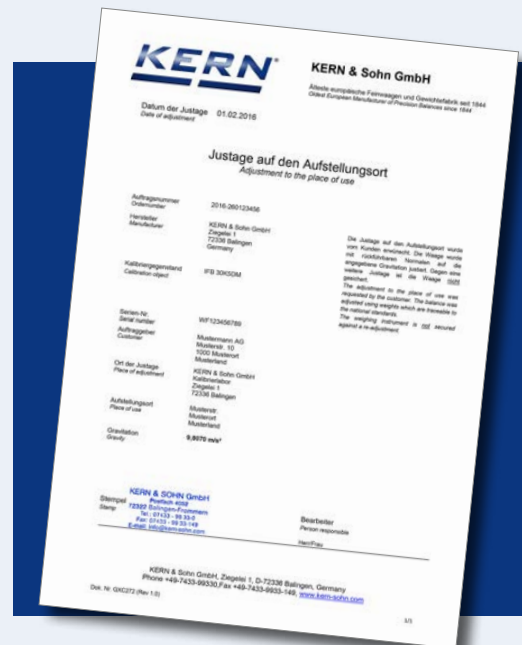
KERN can carry this out just before shipping at the factor, individually to suit the location of installation.

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
- You do not need any additional weights
- The balance is ready for immediate use

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 <60,000 d.

For higher resolutions we recommend a balance with an internal adjusting weight or adjustment with a calibrated adjusting weight at the location of installation.



Waldemar Fleitling

Product specialist calibration service

Tel. +49 [0] 7433 9933-163

Fax +49 [0] 7433 9933-29163

fleitling@kern-sohn.com



KERN	Weighing range	Price excl. of VAT ex works €
961-247	[Max] ≤ 5 kg	36,-
961-248	[Max] > 5 – 50 kg	44,-
961-249	[Max] > 50 – 350 kg	52,-
961-250	[Max] > 350 – 1500 kg	83,-
961-251	[Max] > 1500 – 2900 kg	110,-
961-252	[Max] > 2900 – 6000 kg	220,-
961-253	[Max] > 6000 – 12000 kg	250,-

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 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 without delay, together with the appropriate calibration certificates
- 10** We will monitor your recalibration periods and will send you, free of charge, a reminder about your next calibration

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 depend on us to support you, and we will remind you in good time, free of charge, when the next recalibration is due. In addition, you have the option of managing your test equipment yourself online (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 for our shipping company to pick up the goods from your premises. Simply 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**).

► 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 just 2 days (cf. **9**).

www.kern-lab.com – the central portal for ... Services, News, Calibration

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 of the long-term stability and trend behaviour of your test equipment and the necessary recalibration period can easily be determined and specified.

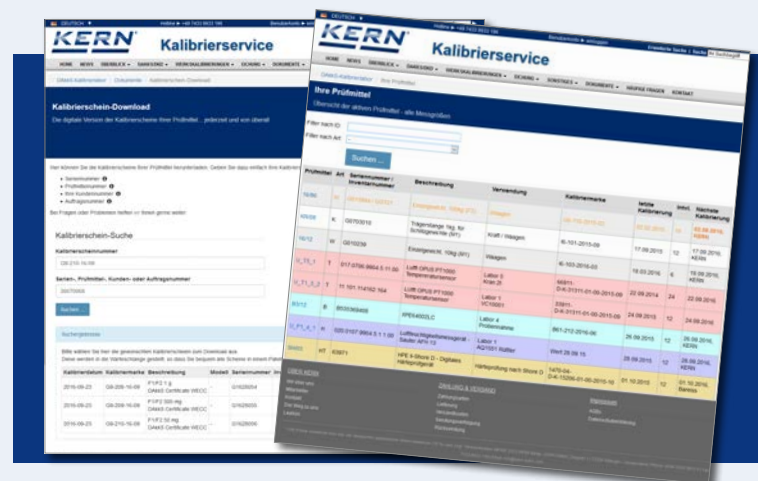
Paperless documentation


So that 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, for example, in paper form? Of course this is not a problem either.

We will send you everything you require by post.

Calibration certificate download

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 need to look for your certificates again.





KERN & Sohn GmbH
Älteste europäische Feinwaagen und Gewichtefabrik seit 1844
 Oldest European Manufacturer of Precision Balances since 1844

akkreditiert durch die / accredited by the
Deutsche Akkreditierungsstelle GmbH

als Kalibrierlaboratorium im / as calibration laboratory in the
Deutschen Kalibrierdienst DKD

Kalibrierschein
Calibration certificate

Gegenstand
Object

Hersteller
Manufacturer

Typ
Type

Fabrikate/Serien-Nr.
Serial number

Auftragsgeber
Customer

Auftragsnummer
Order number

KERN & Sohn GmbH

als Kalibrierlaboratorium im / as calibration laboratory in the
Deutschen Kalibrierdienst DKD

Kalibrierverfahren:
Calibration method

Umgebungsbedingungen:
Ambient conditions

Referenzgewichte:
Standard weights

Material / angenommene Dichte:
Material / assumed density

Nennwert <small>nominal value</small>	Dichte <small>density</small>	Unsicherheit <small>uncertainty</small>	Material <small>material</small>	Form <small>shape</small>
1 mg - 500 mg	7950 kg/m ³	140 kg/m ³	Edelstahl <small>Stainless steel</small>	Draht <small>Wire</small>
1 g - 1 kg	8000 kg/m ³	100 kg/m ³	Edelstahl <small>Stainless steel</small>	Knopf <small>Cylindrical form</small>

Messergebnisse:
Measurement results

Nennwert <small>nominal value</small>	Kennzeichnung <small>marking</small>	konventioneller Wägewert <small>conventional mass</small>	Unsicherheit k=2 <small>uncertainty</small>	Fehlergrenze <small>max. perm. error</small>	Klasse* <small>class*</small>
1 mg		1 mg + 0.0010 mg	0.0020 mg	± 0.0060 mg	E2 ✓
2 mg		2 mg + 0.0005 mg	0.0020 mg	± 0.0060 mg	E2 ✓
2 mg	*	2 mg + 0.0016 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 + 0.0009 mg	0.0020 mg	± 0.0080 mg	E2 ✓
20 mg		20 mg - 0.001 mg	0.003 mg	± 0.010 mg	E2 ✓
20 mg	*	20 mg + 0.001 mg	0.003 mg	± 0.010 mg	E2 ✓
50 mg		50 mg + 0.001 mg	0.004 mg	± 0.012 mg	E2 ✓
100 mg		100 mg + 0.001 mg	0.005 mg	± 0.016 mg	E2 ✓
200 mg		200 mg + 0.002 mg	0.006 mg	± 0.020 mg	E2 ✓
200 mg	*	200 mg + 0.003 mg	0.006 mg	± 0.020 mg	E2 ✓
500 mg		500 mg + 0.005 mg	0.006 mg	± 0.025 mg	E2 ✓
1 g		1 g + 0.002 mg	0.010 mg	± 0.030 mg	E2 ✓
2 g		2 g + 0.002 mg	0.013 mg	± 0.040 mg	E2 ✓
2 g	*	2 g + 0.002 mg	0.013 mg	± 0.040 mg	E2 ✓
5 g		5 g + 0.010 mg	0.016 mg	± 0.050 mg	E2 ✓
10 g		10 g - 0.007 mg	0.020 mg	± 0.060 mg	E2 ✓
20 g		20 g + 0.005 mg	0.026 mg	± 0.080 mg	E2 ✓
20 g	*	20 g + 0.015 mg	0.026 mg	± 0.080 mg	E2 ✓
50 g		50 g + 0.02 mg	0.03 mg	± 0.10 mg	E2 ✓
100 g		100 g + 0.01 mg	0.05 mg	± 0.16 mg	E2 ✓
200 g		200 g + 0.05 mg	0.10 mg	± 0.30 mg	E2 ✓
200 g	*	200 g - 0.00 mg	0.10 mg	± 0.30 mg	E2 ✓
500 g		500 g + 0.10 mg	0.26 mg	± 0.80 mg	E2 ✓
1 kg		1 kg + 0.1 mg	0.5 mg	± 1.6 mg	E2 ✓

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 (for tolerance tables, see page 190), 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
 - DAkkS standard service: 4 working days
 - DAkkS 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 DAkkS calibration certificates 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 standardisation, no particular recalibration interval is specified.
- We would recommend that you recalibrate your test weights every 6 months if they are used intensively, and every 12 months with normal use.
- We would be pleased to monitor your recalibration schedule.

DAkkS calibration certificate for test weights (extract)

For more details on our calibration service and other useful information, please see the internet on www.kern-lab.com

- 1 Official document
- 2 Item to be calibrated
- 3 Traceability, see page 201
- 4 Identification/Applicant
- 5 Environmental conditions
- 6 Metrological component
- 7 Conventional mass
- 8 Measuring uncertainty, see page 201



Note:

For more information on this subject, please see our KERN DAkkS calibration service brochure or visit www.kern-lab.com

Recalibration price of test weights (DAkkS calibration)

Class acc. →	E1 with volume determination		E1 without volume determination		E2		F1/F2 * F2 only		M1/M2/M3	
	Nominal value ↓	Price € excl. of VAT ex works	KERN	Price € excl. of VAT ex works	KERN	Price € excl. of VAT ex works	KERN	Price € excl. of VAT ex works	KERN	Price € excl. of VAT ex works
1 mg	-	-	962-251R	52,-	962-351R	26,-	962-451R	18,-	962-651R	15,-
2 mg	-	-	962-252R	52,-	962-352R	26,-	962-452R	18,-	962-652R	15,-
5 mg	-	-	962-253R	52,-	962-353R	26,-	962-453R	18,-	962-653R	15,-
10 mg	-	-	962-254R	52,-	962-354R	26,-	962-454R	18,-	962-654R	15,-
20 mg	-	-	962-255R	52,-	962-355R	26,-	962-455R	18,-	962-655R	15,-
50 mg	-	-	962-256R	52,-	962-356R	26,-	962-456R	18,-	962-656R	15,-
100 mg	-	-	962-257R	52,-	962-357R	26,-	962-457R	18,-	962-657R	15,-
200 mg	-	-	962-258R	52,-	962-358R	26,-	962-458R	18,-	962-658R	15,-
500 mg	-	-	962-259R	52,-	962-359R	26,-	962-459R	18,-	962-659R	15,-
1 g	963-231	193,-	962-231R	52,-	962-331R	26,-	962-431R	18,-	962-631R	15,-
2 g	963-232	193,-	962-232R	52,-	962-332R	26,-	962-432R	18,-	962-632R	15,-
5 g	963-233	193,-	962-233R	52,-	962-333R	26,-	962-433R	18,-	962-633R	15,-
10 g	963-234	193,-	962-234R	52,-	962-334R	26,-	962-434R	18,-	962-634R	15,-
20 g	963-235	193,-	962-235R	52,-	962-335R	26,-	962-435R	18,-	962-635R	15,-
50 g	963-236	193,-	962-236R	52,-	962-336R	26,-	962-436R	18,-	962-636R	15,-
100 g	963-237	193,-	962-237R	52,-	962-337R	33,-	962-437R	20,-	962-637R	16,-
200 g	963-238	193,-	962-238R	52,-	962-338R	33,-	962-438R	20,-	962-638R	16,-
500 g	963-239	193,-	962-239R	52,-	962-339R	33,-	962-439R	20,-	962-639R	16,-
1 kg	963-241	193,-	962-241R	52,-	962-341R	33,-	962-441R	20,-	962-641R	16,-
2 kg	963-242	465,-	962-242R	64,-	962-342R	41,-	962-442R	25,-	962-642R	17,-
5 kg	963-243	465,-	962-243R	64,-	962-343R	41,-	962-443R	25,-	962-643R	17,-
10 kg	963-244	465,-	962-244R	64,-	962-344R	41,-	962-444R	25,-	962-644R	17,-
20 kg	963-245	1160,-	962-245R	590,-	962-345R	52,-	962-445R	28,-	962-645R	22,-
50 kg	963-246	1360,-	962-246R	660,-	962-346R	64,-	962-446R	39,-	962-646R	24,-
100 kg	-	-	-	-	-	-	962-591R*	116,-	962-691R	63,-
200 kg	-	-	-	-	-	-	962-592R*	116,-	962-692R	63,-
500 kg	-	-	-	-	-	-	962-593R*	116,-	962-693R	63,-
1000 kg	-	-	-	-	-	-	-	-	962-694R	136,-
2000 kg	-	-	-	-	-	-	-	-	962-695R	250,-
1 mg – 500 mg	-	-	962-250R	350,-	962-350R	190,-	962-450R	100,-	962-650R	63,-
1 mg – 50 g	963-201	1070,-	962-201R	560,-	962-301R	315,-	962-401R	167,-	962-601R	106,-
1 mg – 100 g	963-202	1170,-	962-202R	580,-	962-302R	340,-	962-402R	178,-	962-602R	112,-
1 mg – 200 g	963-203	1350,-	962-203R	630,-	962-303R	385,-	962-403R	199,-	962-603R	125,-
1 mg – 500 g	963-204	1440,-	962-204R	660,-	962-304R	410,-	962-404R	210,-	962-604R	131,-
1 mg – 1 kg	963-205	1530,-	962-205R	700,-	962-305R	435,-	962-405R	220,-	962-605R	137,-
1 mg – 2 kg	963-206	2000,-	962-206R	750,-	962-306R	495,-	962-406R	250,-	962-606R	152,-
1 mg – 5 kg	963-207	2450,-	962-207R	770,-	962-307R	530,-	962-407R	265,-	962-607R	160,-
1 mg – 10 kg	963-208	2900,-	962-208R	800,-	962-308R	560,-	962-408R	285,-	962-608R	167,-
1 g – 50 g	963-215	770,-	962-215R	245,-	962-315R	127,-	962-415R	67,-	962-615R	42,-
1 g – 100 g	963-216	860,-	962-216R	270,-	962-316R	150,-	962-416R	77,-	962-616R	49,-
1 g – 200 g	963-217	1040,-	962-217R	320,-	962-317R	196,-	962-417R	98,-	962-617R	61,-
1 g – 500 g	963-218	1130,-	962-218R	350,-	962-318R	220,-	962-418R	109,-	962-618R	68,-
1 g – 1 kg	963-219	1230,-	962-219R	375,-	962-319R	245,-	962-419R	119,-	962-619R	74,-
1 g – 2 kg	963-220	1780,-	962-220R	425,-	962-320R	305,-	962-420R	151,-	962-620R	89,-
1 g – 5 kg	963-221	2230,-	962-221R	450,-	962-321R	340,-	962-421R	166,-	962-621R	96,-
1 g – 10 kg	963-222	2690,-	962-222R	485,-	962-322R	370,-	962-422R	182,-	962-622R	104,-

Additional costs for preparation, overhaul and adjustment before the calibration	KERN	Price excl. of VAT ex works €
Preparation of weights (e.g. cleaning, etc.)		
Single weight	969-001R	3,-
Weight set	969-002R	16,-
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	T & M basis
Adjustment, per weight only available for weights with adjustment chamber (F1 – M3)	969-010R	12,-
Second calibration after adjustment or substitution, per weight		
Class E1	969-210R	40,-
Class E1 incl. volume determination	969-211R	80,-
Class E2	969-310R	14,-
Class F1/F2	969-410R	14,-
Class M1-M3	969-610R	14,-
Testing of magnetic properties according to OIML R 111-2004, per weight	972-000	12,-
Calibration of NON-OIML test weights, additional price per weight	-	8,-

KERN DAkkS Express Service	
DAkkS standard service Class E2 – M3	4 working days
DAkkS 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 – 2 kg, incl. volume determination (new weights)	15 working days



DAkkS 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 DAkkS Express Service, for each KERN test weight KERN KERN 962-115 € 20,-
- For Express shipping, see page 192

Verification prices for test weights and (crane) scales

Class acc. → OIML R 111-2004	E2 with verification certificate		F1/F2 with verification certificate		M1 with verification certificate	
	Nominal value ↓	KERN	Price € excl. of VAT ex works	KERN	Price € excl. of VAT ex works	KERN
1 mg	952-351	40,-	952-451	35,-	952-651	24,-
2 mg	952-352	40,-	952-452	35,-	952-652	24,-
5 mg	952-353	40,-	952-453	35,-	952-653	24,-
10 mg	952-354	40,-	952-454	35,-	952-654	24,-
20 mg	952-355	40,-	952-455	35,-	952-655	24,-
50 mg	952-356	40,-	952-456	35,-	952-656	24,-
100 mg	952-357	40,-	952-457	35,-	952-657	24,-
200 mg	952-358	40,-	952-458	35,-	952-658	24,-
500 mg	952-359	40,-	952-459	35,-	952-659	24,-
1 g	952-331	40,-	952-431	35,-	952-631	24,-
2 g	952-332	40,-	952-432	35,-	952-632	24,-
5 g	952-333	40,-	952-433	35,-	952-633	24,-
10 g	952-334	40,-	952-434	35,-	952-634	24,-
20 g	952-335	40,-	952-435	35,-	952-635	24,-
50 g	952-336	40,-	952-436	35,-	952-636	24,-
100 g	952-337	45,-	952-437	35,-	952-637	24,-
200 g	952-338	45,-	952-438	36,-	952-638	24,-
500 g	952-339	45,-	952-439	36,-	952-639	24,-
1 kg	952-341	45,-	952-441	36,-	952-641	24,-
2 kg	952-342	51,-	952-442	40,-	952-642	25,-
5 kg	952-343	51,-	952-443	40,-	952-643	25,-
10 kg	952-344	51,-	952-444	40,-	952-644	32,-
20 kg	952-345	59,-	952-445	42,-	952-645	36,-
50 kg	952-346	67,-	952-446	50,-	952-646	37,-
1 mg – 500 mg	952-350	200,-	952-450	105,-	952-650	66,-
1 mg – 50 g	952-301	330,-	952-401	175,-	952-601	111,-
1 mg – 100 g	952-302	360,-	952-402	187,-	952-602	117,-
1 mg – 200 g	952-303	405,-	952-403	210,-	952-603	131,-
1 mg – 500 g	952-304	430,-	952-404	220,-	952-604	137,-
1 mg – 1 kg	952-305	455,-	952-405	230,-	952-605	144,-
1 mg – 2 kg	952-306	520,-	952-406	260,-	952-606	159,-
1 mg – 5 kg	952-307	560,-	952-407	280,-	952-607	168,-
1 mg – 10 kg	952-308	590,-	952-408	300,-	952-608	175,-
1 g – 50 g	952-315	133,-	952-415	76,-	952-615	50,-
1 g – 100 g	952-316	157,-	952-416	81,-	952-616	54,-
1 g – 200 g	952-317	205,-	952-417	103,-	952-617	64,-
1 g – 500 g	952-318	235,-	952-418	114,-	952-618	71,-
1 g – 1 kg	952-319	255,-	952-419	125,-	952-619	78,-
1 g – 2 kg	952-320	320,-	952-420	158,-	952-620	93,-
1 g – 5 kg	952-321	355,-	952-421	174,-	952-621	101,-
1 g – 10 kg	952-322	390,-	952-422	191,-	952-622	109,-

KERN verification delivery time	
Standard verification service Class E2 – M1	6 working days

Additional costs for preparation, overhaul and adjustment before the verification	KERN	Price excl. of VAT ex works €
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Preparation of weights (e.g. cleaning, etc.)		
Single weight	969-008R	3,-
Weight set	969-009R	16,-

Subsequent services are carried out after confirmation

Continued overhaul of weights (e.g. wet-cleaning, markings, repair, special packaging, adjustment E2 ...)	969-005R	T & M basis
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Adjustment, per weight only available for weights with adjustment chamber (F1/F2 – M1)	969-010R	12,-
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Verification after adjustment or substitution, per weight

Class E2	969-310R	14,-
Class F1/F2	969-410R	14,-
Class M1	969-610R	14,-

Verification prices for balances	Initial verification	Price excl. of VAT ex works €	Reverification	Price excl. of VAT ex works €
	KERN		KERN	
Accuracy class I (precision balances) ¹⁾				
[Max] ≤ 5 kg ¹⁾	965-201	110,-	950-101R	180,-
[Max] > 5 kg ¹⁾	965-202	110,-	950-102R	230,-
Accuracy class II (precision balances) ¹⁾				
[Max] ≤ 5 kg ¹⁾	965-216	66,-	950-116R	90,-
[Max] > 5 kg – 50 kg ¹⁾	965-217	77,-	950-117R	110,-
[Max] > 50 kg – 350 kg ¹⁾	965-218	110,-	950-118R	170,-
Accuracy class III-IV ¹⁾				
Bench scales and industrial scales (excl. crane scales)				
[Max] ≤ 5 kg ¹⁾	965-227	55,-	950-127R	86,-
[Max] > 5 kg – 50 kg ¹⁾	965-228	55,-	950-128R	86,-
[Max] > 50 kg – 350 kg ¹⁾	965-229	93,-	950-129R	138,-
[Max] > 350 kg – 1500 kg ¹⁾	965-230	132,-	950-130R	200,-
[Max] > 1500 kg – 2900 kg ¹⁾	965-231	220,-	950-131R	280,-
[Max] > 2900 kg – 6000 kg ¹⁾	965-232	320,-	950-132R	430,-
Crane scales				
[Max] > 50 kg – 350 kg ¹⁾	950-129H	105,-	950-129HR	150,-
[Max] > 350 kg – 1500 kg ¹⁾	950-130H	200,-	950-130HR	250,-
[Max] > 1500 kg – 2900 kg ¹⁾	950-131H	270,-	950-131HR	360,-
[Max] > 2900 kg – 6000 kg ¹⁾	950-132H	500,-	950-132HR	550,-
[Max] > 6000 kg – 12000 kg ¹⁾	950-133H	700,-	950-133HR	870,-
[Max] > 12000 kg – 31000 kg ²⁾	-	-	950-134HR	1060,-
[Max] > 31000 kg – 50000 kg ²⁾	-	-	950-135HR	1060,-

¹⁾ Processing time 4 working days, ²⁾ Processing time 15 working days

DAkKS calibration

Force gauges, tensile force	Initial calibration Tensile force KERN	Recalibration Tensile force KERN	Price excl. of VAT ex works €
Force gauges [Max] 300 N, 400 N, 500 N	963-161	963-161R	250,-

Factory calibration (ISO calibration)

Force gauges, tensile force	Initial calibration Tensile force KERN	Recalibration Tensile force KERN	Price excl. of VAT ex works €
Force gauges [Max] ≤ 500 N	961-161	961-161R	135,-
Force gauges [Max] > 500 N - 2 kN	961-162	961-162R	165,-
Force gauges [Max] > 2 kN - 10 kN	961-163	961-163R	225,-
Force gauges [Max] > 10 kN - 20 kN	961-164	961-164R	350,-
Force gauges [Max] > 20 kN - 50 kN	961-165	961-165R	520,-
Force gauges [Max] > 50 kN - 120 kN	961-166	961-166R	940,-

Force gauges, compression force	Initial calibration Compression force KERN	Recalibration Compression force KERN	Price excl. of VAT ex works €
Force gauges [Max] > 50 N - 500 N	961-261	961-261R	135,-
Force gauges [Max] > 500 N - 2 kN	961-262	961-262R	165,-
Force gauges [Max] > 2 kN - 5 kN	961-263	961-263R	225,-

Force gauges, tensile and compression force	Initial calibration Tensile force/ Compression force KERN	Recalibration Tensile force/ Compression force KERN	Price excl. of VAT ex works €
Force gauges [Max] > 50 N - 500 N	961-361	961-361R	245,-
Force gauges [Max] > 500 N - 2 kN	961-362	961-362R	300,-
Force gauges [Max] > 2 kN - 5 kN	961-363	961-363R	405,-

Mechanical hanging scales	Initial calibration KERN	Recalibration KERN	Price excl. of VAT ex works €
Mechanical hanging scales (spring scales) [Max] ≤ 5 kg	961-100	961-100R	72,-
Mechanical hanging scales [Max] > 5 kg - 50 kg	961-101	961-101R	88,-
Mechanical hanging scales [Max] > 50 kg - 350 kg	961-102	961-102R	105,-
Mechanical hanging scales [Max] > 350 kg - 1500 kg	961-103	961-103R	165,-
Mechanical hanging scales [Max] > 1500 kg - 3000 kg	961-104	961-104R	220,-
Mechanical hanging scales [Max] > 3000 kg - 6000 kg	961-105	961-105R	440,-
Mechanical hanging scales [Max] > 6000 kg - 12000 kg	961-106	961-106R	500,-

Measuring instruments	Initial calibration KERN	Recalibration KERN	Price excl. of VAT ex works €
Hardness testing devices in accordance with Leeb tests (Type D)	961-131	961-131R	120,-
Coating thickness gauges 0 µm - 2000 µm (Ferro or NonFerro)	961-110	961-110R	120,-
Coating thickness gauges 0 µm - 2000 µm (Ferro and NonFerro)	961-112	961-112R	170,-
Ultrasonic material thickness testing devices 25 mm - 300 mm	961-113	961-113R	120,-
Calibration of torque wrench testing devices 2 directions of [Max] 1 Nm to 200 Nm	961-120	961-120R	170,-
Calibration of hardness testing devices in accordance with UCI	961-270	961-270R	260,-

Your advantages:

Universal use ▶ Calibration possible for variety of instruments shown in catalogue

Quick calibration ▶ duration four working days only in the calibration laboratory

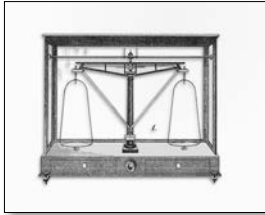
Express service ▶ 48 hour delivery 48 h: € 50,-/instrument (excl. of VAT)

Express shipping ▶ guaranteed delivery on the next working day (only in Germany): € 40,-/parcel (excl. of VAT)



Tradition and innovation for more than 170 years

An independent family business, KERN since already 7 generations is synonymous with quality and reliability in customer service.



► 1844

KERN is founded – precision balances are produced



► 1863

A proud Gottlieb Kern with his staff



► 1880

Pharmaceutical balance with Aesculap



► 1923

Inflation – KERN wages are paid with self printed currency



► 1980

The electronic balance ousts mechanical devices



► 1994

Accredited DKD laboratory (ISO 17025)



► 2000

New premises in Balingen



► 2002

Existing QM system certification in accordance with DIN EN ISO 9001:2000 standards



► 2007

Approval for the manufacture of medical products (DIN EN 13485 and 93/42/EEC)



► 2008

Authorisation for initial verification by the manufacturer (2009/23/EU)



► 2009

Approval for the manufacture and sale of height rods (DIN EN 13485 and 93/42/EEC)



► 2012

Verification point for non-automatic balances and test weights.

New customer portal www.kern-sohn.com goes live



► 2014

Expansion of the product range to include optical instruments (microscopes and refractometers)



► 2015

Inauguration of Ziegelei 2.0 with computer-controlled high-bay warehouse

KERN & SOHN GmbH

Balances, Test weights, DAkkS Calibration laboratory

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