

HARDNESS TESTING OF METALS (LEEB)

PROFESSIONAL
MEASURING



2020

KERN Pictograms

- 
Adjusting program (CAL):
 For quick setting of the instrument's accuracy. External adjusting weight required
- 
Data interface Infrared:
 To transfer data from the measuring instrument to a printer, PC or other peripheral devices
- 
Protection against dust and water splashes IPxx:
 The type of protection is shown in the pictogram.
- 
Calibration block:
 standard for adjusting or correcting the measuring device
- 
Control outputs (optocoupler, digital I/O):
 to connect relays, signal lamps, valves, etc.
- 
ZERO:
 Resets the display to "0"
- 
Peak hold function:
 capturing a peak value within a measuring process
- 
Analogue interface:
 to connect a suitable peripheral device for analogue processing of the measurements
- 
Battery operation:
 Ready for battery operation. The battery type is specified for each device
- 
Scan mode:
 continuous capture and display of measurements
- 
Analog output:
 for output of an electrical signal depending on the load (e.g. voltage 0 V - 10 V or current 4 mA - 20 mA)
- 
Rechargeable battery pack:
 rechargeable set
- 
Push and Pull:
 the measuring device can capture tension and compression forces
- 
Statistics:
 using the saved values, the device calculates statistical data, such as average value, standard deviation etc.
- 
Mains adapter:
 230V/50Hz in standard version for EU. On request GB, AUS or USA version available
- 
Length measurement:
 captures the geometric dimensions of a test object or the movement during a test process
- 
PC Software:
 to transfer the measurement data from the device to a PC
- 
Power supply:
 Integrated, 230V/50Hz in EU. More standards e.g. GB, AUS or USA on request
- 
Focus function:
 increases the measuring accuracy of a device within a defined measuring range
- 
Printer:
 a printer can be connected to the device to print out the measurement data
- 
Motorised drive:
 The mechanical movement is carried out by an electric motor
- 
Internal memory:
 to save measurements in the device memory
- 
Network interface:
 For connecting the scale to an Ethernet network
- 
Motorised drive:
 The mechanical movement is carried out by a synchronous motor (stepper)
- 
Data interface RS-232:
 bidirectional, for connection of printer and PC
- 
KERN Communication Protocol (KCP):
 It is a standardized interface command set for KERN balances and other instruments, which allows retrieving and controlling all relevant parameters and functions of the device. KERN devices featuring KCP are thus easily integrated with computers, industrial controllers and other digital systems
- 
Fast-Move:
 the total length of travel can be covered by a single lever movement
- 
Profibus:
 For transmitting data, e.g. between scales, measuring cells, controllers and peripheral devices over long distances. Suitable for safe, fast, fault-tolerant data transmission. Less susceptible to magnetic interference.
- 
Verification possible:
 The time required for verification is specified in the pictogram
- 
DAkKS calibration possible:
 The time required for DAkKS calibration is shown in days in the pictogram
- 
Data interface USB:
 To connect the measuring instrument to a printer, PC or other peripheral devices
- 
GLP/ISO record keeping:
 of measurement data with date, time and serial number. Only with SAUTER printers
- 
Factory calibration:
 The time required for factory calibration is specified in the pictogram
- 
Bluetooth® data interface:
 To transfer data from the balance to a printer, PC or other peripherals
- 
Measuring units:
 Weighing units can be switched to e.g. non-metric at the touch of a key. Please refer to website for more details
- 
Package shipment:
 The time required for internal shipping preparations is shown in days in the pictogram
- 
WLAN data interface:
 To transfer data from the balance to a printer, PC or other peripherals
- 
Measuring with tolerance range (limit-setting function):
 Upper and lower limiting can be programmed individually. The process is supported by an audible or visual signal, see the relevant model
- 
Pallet shipment:
 The time required for internal shipping preparations is shown in days in the pictogram

*The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by KERN & SOHN GmbH is under license. Other trademarks and trade names are those of their respective owners.

Sales conditions



All prices are valid as of January 1st 2020 until a new version of the SAUTER catalogue is released. In Europe, all prices do not include the applicable V.A.T.

At SAUTER there is no minimum order value. For orders less than € 15.00 there is no re-sale discount available.

Delivery Conditions: we supply ex works Balingen, i.e. the transport costs are invoiced. Any goods supplied, remain SAUTER's property until Measuring in a tolerance area (limit value function). Upper and lower limit value is programmable. The measurement process is supported by an acoustic and visual signal, see respective models complete payment for the goods sold has been received.



Delivery is usually via courier service.



When you see this symbol by truck, please ask for prices.

Extract from general terms and conditions:

Court of jurisdiction/Legal domicile: 72336 Balingen, Germany;
Commercial register N°: HRB 400865, AG Stuttgart;
Managing director: Albert Sauter. For the full Terms and Conditions, please refer to the website. www.kern-sohn.com/en/kern/agbs.html

Price changes and product changes are likely in individual cases due to product modifications as well as error.

Sale or return: within 14 days of purchase. Not valid for order-specific adaptations such as special productions, cable extensions, special weights, etc. or test services such as calibration etc. Depending on the time and effort involved, there may be processing and storage costs, please ask for details.

Warranty: 2 years. (Does not apply to consumables such as batteries, rechargeable battery packs, etc.)

After-Sales-Service



Repair services within 1 week at our plant in Balingen, transportation costs are additional. Our expert Service technicians will be pleased to assist you and will make sure that your device is quickly back in operation.

Price reduction on a new device: if repair costs are exceeding the current value of the defective device, a new device will be offered at a discount price. This offer is valid only up to 2 years after warranty expiration.

Spare parts service within 48 hours, transportation costs are additional.

Visit us our online shop: www.sauter.eu

Online-Shop

At your disposal round the clock. Delivery and service via your specialist dealer.

Measuring instruments Quick-Finde

Find the product you want with the "Measuring instruments Quick-Finder" in no time.

Calibration

In our accredited DAkks calibration laboratories, we produce internationally recognised DAkks and Factory calibration certificates for balances and test weights as well as measuring instruments.



Services



KERN DirectCash: The quick, secure COD procedure for protection against non-payment. With the KERN DirectCash COD system, you can safely deliver orders to end customers with unknown credit rating, with no risk of non-payment. Please request further details on this procedure.

Hire Purchase

Financing is available using KERN hire purchase – easy and convenient.

Hire Purchase gives you the option of purchasing any product from the range against a simple monthly installment. The product value is financed over the period of the agreement. On payment of the last installment, the ownership of the contract item automatically transfers from the contractor to the contractee.

The Hire Purchase Agreement can – if you so choose – be set for a period of between one and five years. This package includes the transfer of items as well as the guarantee for the entire transfer period.

Compared with buying the product, KERN hire purchase offers the advantage that the initial financial investment is largely not applicable. This is particularly relevant when purchasing a number of products, for example when refitting a laboratory, a company department or a hospital ward. In addition the monthly installments constitute a direct cost and the item does not have to be capitalised by the purchaser. Do you have queries to our hire purchase? Our customer consultants are glad to help you.

Marketing support



Catalogues, brochures, branch prospectuses – your own personalised marketing tools

Our catalogue and branch prospectuses are available free of charge. A neutral version of the catalogue, without the SAUTER address imprint, is also available for your marketing activities free of charge, larger quantities on request..

On demand we will print your company address on address labels free of charge, for the backside of the catalogue, larger quantities on request. In this way you will receive your individual marketing tool.

Our catalogues and branch prospectuses are available in following languages: DE, GB, FR, IT, ES

Special offers

Special offers, special models and opportunities – something for everybody and always up to date – just drop in!

One-Stop-Shopping

From force gauge to test stand – everything from one supplier.

Downloads

For each model there is an individual brochure, user manual or pictures.



Hardness testing of metals (Leeb)

Determining the hardness of metals is of particular significance during the preparation and use of metallic materials. Usually, hardness is determined using test machines in accordance with Vickers, Rockwell or Brinell.

For mobile measurements, the rebound method according to Dietmar Leeb, which was first used in 1978, has prevailed. To do this, a standardised impact body (such as SAUTER AHMO D01) is shot against the item to be tested. The rebound of the impact body leads to a deformation of the upper surface, which results in a loss of kinetic energy. This loss of energy is determined by measuring the speed and herefrom the Leeb hardness value (HL) is calculated.

These measuring devices can be used in any location. Usually they are equipped with a large internal data memory, which allows to record the measurements at goods receipt or in production.

Our range is equipped with compact measuring devices of the so-called "Pen Type" shape (HN-D) or measuring devices with external sensors connected by cables.



Nadine Wenzler
Product specialist
Hardness testing of metals

Tel. +49 7433 9933-205
Fax +49 7433 9933-29205
nadine.wenzler@kern-sohn.com

Quick-Finder

Readout	Sensor	Model	Price excl. VAT, ex works €	Page
[d] HL		SAUTER		
1	D	HK-D.	1250,-	69
1	D	HK-DB	1281,-	69
1	D	HMM.	1090,-	70
1	D	HMO.	1770,-	72
1	D	HN-D.	1290,-	71
1	D	HMM-NP	870,-	70



Premium Leeb hardness tester – now also with hardness comparison block included

Features

- Measures all metallic samples (> 3 kg, thickness > 8 mm)
- **External impact sensor** standard (Type D)
- **Mobility:** In comparison with stationary table-top devices and testing devices with an internal sensor, using the SAUTER HK-D, offers the highest level of mobility and flexibility
- **All measurement directions possible (360°)** thanks to an automatic compensation function
- **1 SAUTER HK-DB.: Hardness comparison block**, hardness approx. 800 HLD, included in delivery
- **2 Delivered in a sturdy carrying case**
- **Measurement value display:** Rockwell (Type A, B, C), Vickers (HV), Shore (HS), Leeb (HL), Brinell (HB)
- **Internal memory** for up to 600 data groups, with up to 32 values per group forming the average value of the group
- **Mini statistics function:** displays the measured result, the average value, the impact direction, date and time
- **Automatic unit conversion:** The measuring result is automatically converted into all specified hardness units

- **Measuring with tolerance range (limit-setting function):** Upper and lower limiting can be programmed individually. The process is supported by an audible and visual signal.
- **Matrix display:** Backlit multi-function display for all relevant functions at a glance
- **Robust metal housing**

Technical data

- Measuring precision: ± 1 % at 800 HLD
- Minimum sample radius (concave/convex): 50 mm (with support ring: 10 mm)
- Minimum sample material thickness: 8 mm
- The lowest weight of the test item on solid support unit: 3 kg
- Dimensions W×D×H 132×82×31 mm
- Permissible ambient temperature -10 °C/40 °C
- Battery operation, batteries not standard 2× 1.5 V AA, operating time up to 200 h
- Net weight approx. 0,45 kg

Accessories

- **Plug-In for data transfer of measuring data** from the measuring instrument and transfer to a PC, e.g. in Microsoft Excel®, SAUTER AFI-1.0, € 90,-
- **Data transfer software**, KERN SCD-4.0, € 150,-
- **Support rings** for secure positioning, SAUTER AHMR 01, € 320,-
- **Impact body** Type D, net weight approx. 5,5 kg, hardness ≥ 1600 HV, tungsten carbide, Impact ball Ø 3 mm, in accordance with the standard ASTM A956-02, SAUTER AHMO D01, € 115,-
- **External impact sensor** Type C. Low energy sensor: requires only 25 % impact energy compared to type D, for testing tiny or light objects or the surface of hardened layer, SAUTER AHMR C, € 640,-
- **External impact sensor** Type D, SAUTER AHMR D, € 290,-
- **External impact sensor** Type D+15. Slim front section for holes, grooves or re-entrant surfaces, SAUTER AHMR D+15, € 640,-
- **External impact sensor** Type DL, for very narrow surfaces (Ø 4,5 mm), SAUTER AHMR DL, € 1590,-
- **External impact sensor** Type G. High energy sensor: 900 % impact energy compared to type D, SAUTER AHMR G, € 1590,-
- **Connection cable impact sensor** SAUTER HMO-A04, € 95,-
- **Test block** Type D/DC, Ø 90 mm (± 1 mm), net weight < 3 kg, hardness range 790 ± 40 HL, SAUTER AHMO D02, € 190,- 630 ± 40 HL, SAUTER AHMO D03, € 190,- 530 ± 40 HL, SAUTER AHMO D04, € 190,-
- **Factory calibration certificates** for SAUTER AHMO D02, AHMO D03, AHMO D04, SAUTER 961-132, € 120,-

STANDARD



OPTION



Model	Sensor	Measuring range	Readout	Test block	Price excl. of VAT ex works €	Option Factory calibration certificates	
						KERN	€
SAUTER HK-D.	Typ D	[Max] HL 170-960	[d] HL 1	Typ D/DC approx. 800 HL not standard	1250,-	961-131	120,-
SAUTER HK-DB	Typ D	[Max] HL 170-960	[d] HL 1	standard	1281,-	961-131	120,-

Price reduction



Advanced features for demanding applications

Features

- **1 Impact (rebound) sensor:** The bounce module is accelerated by a spring against the item being tested. Depending on how hard the object is, the kinetic energy of the module will be absorbed. The speed reduction will be measured and converted to Leeb hardness values.
- **External impact sensor (Type D)** included
- **Mobility:** In comparison with stationary table-top devices and testing devices with an internal sensor, using the SAUTER HMM. offers the highest level of mobility and flexibility
- **All measurement directions possible (360°)** thanks to an automatic compensation function
- **2 Standard block for calibration** included (approx. 790 ± 40 HL)
- **3 Delivered in a robust carrying case**
- **Internal memory** for up to 9 measured values
- **Mini statistics function:** displays the measured result, the average value, the impact direction, date and time
- SAUTER HMM-NP: identical product features as the SAUTER HMM. model, but comes without the printer

- **Measurement value display:** Rockwell (B & C), Vickers (HV), Brinell (HB), Shore (HSD), Leeb (HL), tensile strength (MPa)
- **Automatic unit conversion:** The measuring result is automatically converted into all specified hardness units

Technical data

- Measuring precision: 1 % at 800 HLD (± 6 HLD)
- Measuring range tensile strength: 375–2639 MPa (steel)
- Min. sample weight on a solid and stable support: 3 kg
- Minimum sample material thickness: 8 mm
- Minimum sample radius (concave/convex): 50 mm (with support ring: 10 mm)
- Dimensions W×D×H 80×30×150 mm
- SAUTER HMM.: External mains adaptor for printer, as standard
- Ready for use: Batteries included, 3× 1.5 V AAA, block, operating time up to 30 h, AUTO-OFF function to preserve battery life
- Net weight approx. 0,2 kg

Accessories

- Connection cable, without impact sensor, SAUTER HMM-A02, € 105,-
- **5 Attachment rings** for secure positioning, SAUTER AHMR 01, € 320,-
- **4 Impact body**, SAUTER AHMO D01, € 115,-
- **Test block** Type D/DC, ø 90 mm (± 1 mm), net weight < 3 kg, hardness range 790 ± 40 HL, SAUTER AHMO D02, € 190,- 630 ± 40 HL, SAUTER AHMO D03, € 190,- 530 ± 40 HL, SAUTER AHMO D04, € 190,-
- **Paper roll**, 1 piece, SAUTER ATU-US11, € 15,-
- **Factory calibration certificates** for SAUTER AHMO D02, AHMO D03, AHMO D04, SAUTER 961-132, € 120,-

STANDARD



OPTION



Model	Sensor	Measuring range	Readout	Price excl. of VAT ex works €	Option Factory calibration certificates	
					KERN	€
SAUTER HMM.	Typ D	[Max] HL 170-960	[d] HL 1	1090,-	961-131	120,-
HMM-NP	Typ D	170-960	1	870,-	961-131	120,-



“Pen type” Leeb hardness tester for mobile hardness testing of metals

Features

- **User-friendly operation:** The compact version enables the product to be used in a significantly wider range of applications compared with traditional devices
- The measuring device has been designed for one-hand operation and this allows the user to work more quickly and flexibly
- **Modern LCD display:** Optimised for industrial applications: increased luminosity and backlight can be switched on, that way the display can be read from any angle
- **All measurement directions possible (360°)** thanks to an automatic compensation function
- **Internal impact sensor** included (Type D)
- **Measurement value display:** Rockwell (B & C), Vickers (HV), Brinell (HB), Leeb (HL)
- **Hardness comparison block** not included
- **Internal data memory** for up to 500 measurements with date and time
- **USB data output:** Easy to install on any PC
- **1 Delivered in a robust carrying case**

Technical data

- Measurement uncertainty ± 4 HLD
- Dimensions W×D×H 35×25×145 mm
- Operation by rechargeable battery, standard, operating time without backlight 16 h, charging time 3 h
- Mains adapter, external, standard
- Net weight approx. 0,07 kg

Accessories

- **Plug-In for data transfer of measuring data** from the measuring instrument and transfer to a PC, e.g. in Microsoft Excel®, SAUTER AFI-1.0, **€ 90,-**
- **2 Test block** Type D/DC, $\varnothing 90$ mm (± 1 mm), Net weight < 3 kg, hardness range 790 ± 40 HL, SAUTER AHMO D02, **€ 190,-** 630 ± 40 HL, SAUTER AHMO D03, **€ 190,-** 530 ± 40 HL, SAUTER AHMO D04, **€ 190,-**
- **Factory calibration certificates** for SAUTER AHMO D02, AHMO D03, AHMO D04, SAUTER 961-132, **€ 120,-**

07

STANDARD



OPTION



Model	Sensor	Measuring range	Readout	Price excl. of VAT ex works €	Option Factory calibration certificates	
					KERN	€
SAUTER HN-D.	Typ D	[Max] HLD 170-960	[d] HL 1	1290,-	961-131	120,-



Advanced features for professional applications

Features

- **Innovative touchscreen**
- **Automatic recognition of the impact (rebound) sensor** connected to the HMO.
- **Mobility:** In comparison with stationary table-top devices and hardness testing devices with internal sensor, the SAUTER HMO offers the highest level of mobility and flexibility
- **All measurement directions possible (360°)** by defining the direction of impact on the device
- **USB interface** for connection to the printer and charging the batteries
- **1 Standard block for calibration** included
- **Internal memory** up to 500 values
- **Mini statistics function:** Displays the measure value, the average value, the difference between the maximum and minimum values, date and time
- **Measurement value display:** Rockwell (B & C), Vickers (HV), Brinell (HB), Leeb (HL), tensile strength (MPa)
- **Automatic unit conversion:** The measuring result is automatically converted into all specified hardness units
- **2 Delivered in a robust carrying case**

Technical data

- Measuring precision: 1 % at 800 HLD (± 6 HLD)
- Measuring range tensile strength: 375–2639 MPa (steel)
- Min. sample weight on a solid and stable support:
Sensor D + DC: 3 kg
Sensor G: 15 kg
- Minimum sample material thickness:
Sensor D + DC: 8 mm
Sensor G: 10 mm
- Minimum sample radius (concave/convex): 50 mm (with support ring: 10 mm)
- Dimensions W×D×H 83×24×135 mm
- Rechargeable battery pack internal, operating time up to 50 h
- Mains adapter included
- Net weight approx. 228 g

Accessories

- **Operation by rechargeable battery pack**, operating time up to 50 h, SAUTER HMO-A03, € 75,-
- **External impact sensor** Type D, as standard, can be reordered, SAUTER AHMO D, € 340,-
- **3 External impact sensor** Type DC. Short impact sensor for tests in holes or hollowed objects, SAUTER AHMO DC, € 490,-
- **4 External impact sensor** Type G. High energy sensor: 900 % impact energy compared to type D, SAUTER AHMO G, € 990,-
- **Support rings** for bended testing samples available on request, SAUTER AHMR 01, € 320,-
- **5 Impact body**, SAUTER AHMO D01, € 115,-
- **Connection cable impact sensor**, SAUTER HMO-A04, € 95,-
- **Test block** Type D/DC, 90×50 mm (± 1 mm), net weight < 3 kg, hardness range 790 \pm 40 HL, SAUTER AHMO D02, € 190,- 630 \pm 40 HL, SAUTER AHMO D03, € 190,- 530 \pm 40 HL, SAUTER AHMO D04, € 190,-
- **Paper roll**, 1 piece, SAUTER ATU-US11, € 15,-

STANDARD



OPTION



Model	Sensor	Measuring range	Readout	Price excl. of VAT ex works €	Option Factory calibration certificates	
					KERN	€
SAUTER HMO.	Typ D	[Max] HL 170-960	[d] HL 1	1770,-	961-131	120,-

SAUTER service guarantee

“We at SAUTER are only satisfied when we’ve found the very best solution for you. After all, our heritage from the Swabian Jura Mountains and the famous inventive talent of the people that live here, means we have an exceptional reputation to maintain.”

fast

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

reliable

- 2 years warranty

diverse

- One-stop-shopping: from force gauges up to light measuring instruments – everything from one supplier
- Quick as a flash, find the product you want with the “Measuring instruments Quick-Finder” at www.sauter.eu



www.sauter.eu

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 smart search engine for measuring instruments



Our team of consultants will assist you

from Monday to Friday
 from 8:00 am to 6:00 pm

Do you have questions about our products?

Our customer consultants will be pleased to assist you:

Product specialist Measuring technology



Irmgard Russo

Tel. +49 7433 9933-208
 Fax +49 7433 9933-29208
 russo@kern-sohn.com

Product specialist Measuring technology



Nadine Wenzler

Tel. +49 7433 9933-205
 Fax +49 7433 9933-29205
 nadine.wenzler@kern-sohn.com

UK, IE, FR, Maghreb



Maren Möwert

Tel. +49 7433 9933-132
 Fax +49 7433 9933-29132
 Mobil +49 151 46143240
 maren.moewert@kern-sohn.com

DK, SE, FI, NO, PL, LV, LT, EE



Florian Bächle

Tel. +49 7433 9933-118
 Fax +49 7433 9933-29118
 Mobil +49- [0]151 44568364
 florian.baechle@kern-sohn.com

GR, CY, HU, BU, RO, SK, CZ, AL, Ex-Yugoslavia, GUS



Aleksandar Delić

Tel. +49 7433 9933-120
 Fax +49 7433 9933-29120
 Mobil +49 151 11196197
 aleksandar.delic@kern-sohn.com

North America, Near- & Middle East, Africa, Asia, Oceania, TR



Corinna Klaass

Tel. +49 7433 9933-215
 Fax +49 7433 9933-29215
 Mobil +49 [0]151 44568364
 klaass@kern-sohn.com

NL, Germany (CP 4)



Taras Mikitisin

Tel. +49 7433 9933-143
 Fax +49 7433 9933-29143
 Mobil +49 171 5590115
 mikitisin@kern-sohn.com

PT, ES, South & Central America



Jesús Martínez

Tel. +49 7433 9933-209
 Fax +49 7433 9933-29209
 Mobil +49 171 3059661
 jesus.martinez@kern-sohn.com

DAkKS Calibration Service



FR, BeNeLux, DK, TR, GR, Africa,
 America, Oceania, DE (CP 8, 9)

Friederike Alex

Tel. +49 7433 9933-123
 Fax +49 7433 9933-29123
 friederike.alex@kern-sohn.com

DAkKS Calibration Service



GB, IE, FI, NO, S, AUS, ES, PT, IT,
 DE (CP 5, 6, 7)

Sandra Turino

Tel. +49 7433 9933-162
 Fax +49 7433 9933-29162
 sandra.turino@kern-sohn.com

DAkKS Calibration Service



GR, TR, Eastern Europe, Baltic
 States, CIS, South East Asia, AT,
 CH, DE (CP 0, 1, 2, 3, 4)

Waldemar Fleitling

Tel. +49 7433 9933-163
 Fax +49 7433 9933-29163
 fleitling@kern-sohn.com

Technical Service

Tel. +49 7433 9933- 555

for all technical questions concerning our SAUTER measuring instruments, test benches, force measuring accessories (clamps etc.), SAUTER software