

# HARDNESS TESTING OF METALS (LEEB)

PROFESSIONAL MEASURING



# 2018

# KERN Pictograms



**Adjusting program (CAL):**  
For quick setting of the instrument's accuracy. External adjusting weight required.



**Calibration block:**  
standard for adjusting or correcting the measuring device.



**Peak hold function:**  
capturing a peak value within a measuring process.



**Scan mode:**  
continuous capture and display of measurements.



**Push and Pull:**  
the measuring device can capture tension and compression forces.



**Length measurement:**  
captures the geometric dimensions of a test object or the movement during a test process.



**Focus function:**  
increases the measuring accuracy of a device within a defined measuring range.



**Internal memory:**  
to save measurements in the device memory.



**Data interface RS-232:**  
bidirectional, for connection of printer and PC.



**Data interface USB:**  
To connect the measuring instrument to a printer, PC or other peripheral devices.



**Data interface Infrared:**  
To transfer data from the measuring instrument to a printer, PC or other peripheral devices.



**Control outputs (optocoupler, digital I/O):**  
to connect relays, signal lamps, valves, etc.



**Analogue interface:**  
to connect a suitable peripheral device for analogue processing of the measurements



**Statistics:**  
using the saved values, the device calculates statistical data, such as average value, standard deviation etc.



**PC Software:**  
to transfer the measurement data from the device to a PC.



**Printer:**  
a printer can be connected to the device to print out the measurement data.



**GLP/ISO record keeping:**  
of measurement data with date, time and serial number. Only with SAUTER printers



**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.



**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



**ZERO:**  
Resets the display to "0".



**Battery operation:**  
Ready for battery operation. The battery type is specified for each device.



**Rechargeable battery pack:**  
rechargeable set.



**Mains adapter:**  
230V/50Hz in standard version for EU. On request GB, AUS or USA version available.



**Power supply:**  
Integrated, 230V/50Hz in EU. More standards e.g. GB, AUS or USA on request.



**Motorised drive:**  
The mechanical movement is carried out by an electric motor.



**Motorised drive:**  
The mechanical movement is carried out by a synchronous motor (stepper).



**Fast-Move:**  
the total length of travel can be covered by a single lever movement.



**DAkKS calibration possible:**  
The time required for DAkKS calibration is shown in days in the pictogram.



**Factory calibration:**  
The time required for factory calibration is specified in the pictogram.



**Package shipment:**  
The time required for internal shipping preparations is shown in days in the pictogram.



**Pallet shipment:**  
The time required for internal shipping preparations is shown in days in the pictogram.

## Sales conditions



**All prices are valid as of January 1st 2018** 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, Martin Sauter.  
For the full Terms and Conditions, please refer to the website.  
[www.kern-sohn.com/en/kern/agbs.html](http://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](http://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. Traditionally, hardness is determined using test machines in accordance with Vickers, Rockwell or Brinell.

Since 1978, a rebound test was used for the first time for mobile measuring, in accordance with Dietmar Leeb. 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.



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Hardness testing of metals

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## Quick-Finder

Readout	Sensor	Model	Price excl. VAT, ex works €	Page
[d] HL		<b>SAUTER</b>		
1	D	HK-D.	1250,-	54
1	D	HK-DB	1390,-	54
1	D	HMM.	1190,-	55
1	D	HMO.	1770,-	57
1	D	HN-D.	1290,-	56
1	D	HMM-NP	950,-	55

■ New 2018



## Premium Durometer for hardness testing – now also with hardness comparison block included

### Features

- Measures all metal 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 760+/-30 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
- **USB interface**, included
- **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

- 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× 1.5V 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 g, 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, € 640,-
- **External impact sensor** Type D+15. Slim front section for holes, grooves or re-entrant surfaces, SAUTER AHMR D+15, € 290,-
- **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** SAUTER HMO-A04, € 95,-
- **3 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		[Max] HL	[d] HL	Typ D/DC approx. 800 HL			
HK-D.	Typ D	170-960	1	not standard	1250,-	961-131	120,-
HK-DB	Typ D	170-960	1	standard	1390,-	961-131	120,-



## 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 data groups, with up to 9 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
- **New:** SAUTER HMM-NP! This model has identical product features as the SAUTER HMM, model, but comes without the wireless infrared 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

- 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× 1.5V AAA, block, operating time up to 30 h, AUTO-OFF function to preserve battery life, Battery charge indicator
- Net weight approx. 0,2 kg

### Accessories

- Connection cable, without impact sensor, SAUTER HMM-A02, € 105,-
- **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,-
- **5 SAUTER HMM.: Wireless IR printer** standard for on-site printing of measurement protocols (rechargeable battery operated), can be reordered, SAUTER AHN-02, € 340,-
- **Paper roll**, 1 piece, for SAUTER AHN-02, SAUTER ATU-US11, € 15,-

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	1190,-	961-131	120,-
SAUTER HMM-NP <small>NEW</small>	Typ D	170-960	1	950,-	961-131	120,-

NEW New model



## “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-PC data output:** Easy to install on any PC
- **Delivered in a robust carrying case**

### Technical data

- Accuracy  $\pm 4$  HLD
- Dimensions W×D×H 35×25×145 mm
- Operation by rechargeable battery, standard
- 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,-**
- **Attachment rings** for secure positioning, SAUTER AHMR 01, **€ 320,-**
- **Test block** Type D/DC,  $\varnothing 90$  mm ( $\pm 1$  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,-**
- **Factory calibration certificates** for SAUTER AHMO D02, AHMO D03, AHMO D04, SAUTER 961-132, **€ 120,-**
- **Wireless IR printer** for on-site printing of measurement protocols (battery operated), SAUTER AHN-02, **€ 340,-**
- **Paper roll**, 1 piece, for SAUTER AHN-02, SAUTER ATU-US11, **€ 15,-**

#### STANDARD



#### OPTION



Model	Sensor	Measuring range	Readout	Price excl. of VAT ex works €	Option Factory calibration certificates	
					KERN	€
SAUTER HN-D.	Typ D	[Max] HL 0-999	[d] HL 1	<b>1290,-</b>	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°)** thanks to an automatic compensation function
- **USB interface** for connection to the printer and charging the batteries
- **1 Standard block for calibration** included
- **2 Delivered in a robust carrying case**
- **Internal memory** up to 800 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

### Technical data

- Precision: 1 % 800 HLD ( $\pm 6$  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, € 1100,-
- **Support rings** for bended testing samples available on request, SAUTER AHMR 01, € 320,-
- **5 Impact body**, SAUTER AHMO D01, € 115,-
- **Connection cable**, SAUTER HMO-A04, € 95,-
- **Test block** Type D/DC, 90×50 mm ( $\pm 1$  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,-
- **6 Wireless IR printer** standard for on-site printing of measurement protocols (rechargeable battery operated), can be reordered, SAUTER AHN-02, € 340,-
- **Paper roll**, 1 piece, for SAUTER AHN-02, 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,-





## Hardness testing of metals (UCI)

Ultrasonic contact impedance (UCI) hardness testing devices are filling wisely a void in the area of hardness testing.

This area of testing is, on one hand, dominated by mobile hardness testing devices which are using the Leeb procedure and, on the other hand, by stationary hardness testing devices which are predominantly carrying out destructive tests.

Because of the high demands required by this system on the minimum weight and thickness of the test object, the Leeb procedure is not suitable for the majority of tests for small test objects. A good example of this is hardness testing of the flanks of gear wheels. Often in this test, the question is whether the flanks have been hardened or whether the hardened layer has already been removed.

UCI hardness testing devices therefore are offering significantly better measurement performance at small test objects in comparison with Leeb hardness testing devices.

One advantage of the UCI hardness testing devices compared with stationary hardness testing machines is, that the test object does not have to be cut out of the whole object.

By using the optional support rings, the minimum weight of the test object can even be reduced from 300 g to 100 g.

By means of optional ISO calibration, SAUTER UCI hardness testing devices can be used not only for internal testing purposes but also for measurements where the results have to be changed externally.



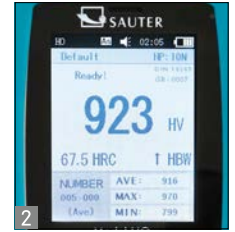
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## Quick-Finder

Model	Hardness scale	Price excl. VAT, ex works €	Page
<b>SAUTER</b>			
HO 1K	HV 1	4500,-	59
HO 3M	HV 1	8300,-	60
HO 2K	HV 2	4500,-	59
HO 5M	HV 2	8300,-	60
HO 5K	HV 5	4500,-	59
HO 8M	HV 5	8300,-	60
HO 10K	HV10	4500,-	59
HO 10M	HV10	8300,-	60

■ New 2018



## Premium UCI hardness testing device for Rockwell, Brinell and Vickers

### Features

- **Application:** This ultrasound hardness testing device is ideally suited for mobile hardness testing, where the main emphasis is on obtaining rapid and precise results.
- **Principle:** The SAUTER HO measures by using a vibrating rod which vibrates at ultrasonic frequency and is pressed onto the sample at a defined test force. At the lower end there is a Vickers indenter. Its resonant frequency increases as soon as an indentation is created when it comes into contact with the sample. Through appropriate adjustment of the device, the resulting change in resonant frequency is matched with the corresponding Vickers hardness.
- **Examples:** The HO ultrasound hardness testing system is primarily used for measuring small forgings, castings, welding points, punched parts, casting tools, ball bearings and the flanks of gear wheels as well as for measuring the influence of warmth or heat
- **Advantages compared with Rockwell and Brinell:** Less test force and therefore only microscopic, small penetrations means that the testing is less destructive
- **Advantages compared with Vickers:** Demanding optical measuring is not required. You can therefore carry out measurements directly on-site, for example, on a permanently installed workpiece

- **Advantages compared with Leeb:** The high requirements on the weight of the test object can be widely omitted
- **Standards:** The device meets following technical standards: DIN 50159-1-2008; ASTM-A1038-2005; JB/T9377-2013
- **Measurement data memory** saves up to 1000 measurement groups each with 20 individual values
- **Mini statistics function:** Display of the measuring result, the number of measurements, the maximum and minimum value as well as the average value and the standard deviation
- **Calibration:** The device can be set to both standard hardness test blocks and also to up to 20 reference calibration values. When doing this it is possible to measure different materials quickly, without having to re-adjust the device to the individual materials
- **Scope of delivery:** Display unit, UCI sensor unit, transport case, software to transfer the saved data to the PC, accessories

### Technical data

- Measuring ranges: HRC: 20,3–68; HRB: 41–100; HRA: 61–85,6; HV: 80–1599; HB: 76–618; Tensile strength: 255–2180 N/mm<sup>2</sup>
- Precision: ± 3 HV; ± 1,5 HR; ± 3 % HB
- Measuring time: adjustable from 1–5 sec.
- Display units: HRC, HV, HBS, HBW, HK, HRA, HRD, HR15N, HR30N, HR45N, HS, HRF, HR15T, HR30T, HR45T, HRB.
- Rechargeable battery integrated, standard, operating time up to 12 h without backlight, charging time approx. 8 h
- Minimum weight of the test object: 300 g for direct measurement with the sensor (included); 100 g with support ring (optional)
- Minimum thickness of the test object: 1 mm
- Minimum dimensions the test surface size around: approx. 5×5 mm (recommended)
- Overall dimensions W×D×H 160×83×28 mm
- Permissible ambient temperature -10 °C/40 °C
- Net weight approx. 0,7 kg

# Mobile ultrasound hardness testing device SAUTER HO



## Accessories

- **External impact sensor** Type D, Leeb standard sensor, as standard, can be reordered at any time, SAUTER AHMO D, € 340,-
- **3 Support ring, flat**, SAUTER HO-A04, € 390,-
- **4 Support ring, small cylinder**, SAUTER HO-A05, € 450,-
- **5 Support ring, large cylinder**, SAUTER HO-A06, € 450,-
- **6 Deep-hole protective cover**, SAUTER HO-A07, € 230,-
- **7 Calibration and adjustment plate** (hardness test blocks) with defined and tested steel hardness for regular testing and adjustment of hardness testing devices. The hardness values are indicated. A key feature of the plates is the low-granular, homogenous finish of the steel,  $\varnothing$  90 mm, including calibration certificate, each, € 395,-  
 28 to 35 HRC: SAUTER HO-A09  
 38 to 43 HRC: SAUTER HO-A10  
 48 to 53 HRC: SAUTER HO-A11  
 58 to 63 HRC: SAUTER HO-A12
- **8 Test stand** for repeatable movements during testing. In this way you can avoid errors which could occur with manual handling of the sensor. This ensures even more stable measurements and more precise measuring results. Smooth-running mechanical system, stroke length 34 mm, maximum height of the test object within the test bench 240 mm, swivel probe device for measurements outside the base plate, very robust construction, net weight approx. 9 kg, SAUTER HO-A08, € 1550,-

### STANDARD



### OPTION



Model	Hardness scale	Min. weight of test item	Min. thickness of test item	Price excl. of VAT ex works €	Option Factory calibration certificates	
					KERN	€
SAUTER HO 1K	HV 1	300	2	4500,-	961-270	260,-
HO 2K	HV 2	300	2	4500,-	961-270	260,-
HO 5K	HV 5	300	2	4500,-	961-270	260,-
HO 10K	HV10	300	2	4500,-	961-270	260,-

NEW



Premium UCI hardness testing device for Rockwell, Brinell and Vickers with a motorised sensor for automated measurement processes

**Features**

- This range has identical product features as SAUTER HO range, but is fitted with a motorised sensor for automated measurement processes instead of the manual probe
- **1** The motorised sensor has got a magnetic support ring, which fixes the sensor on the test object in a safe way. For non-magnetic test items, the motorised sensor can be easily fixed by hand using an ergonomically-shaped support ring
- A motor inside the probe independently takes on the process of pressing the indenter into the test item, which helps to minimise incorrect use by the operator
- **2 One-button function:** the measurement process can be started with a single keypress. By this particularly easy operation, the user can carry out most demanding hardness tests without a longer training period.
- Virtually non-destructive testing: the resulting penetrations can only be seen under a microscope
- **Short duration of measurement:** only 2 seconds
- **Higher accuracy and repeatability** than with manual probes
- **Particularly suitable for small, thin parts** thanks to the automated testing procedure
- **Designed for parts with hardened surfaces,** because of the low penetration depth of the indenter
- Scope of supply: 1 display device, 1 motorised sensor, 1 transport case with standard accessories

**Accessories**

- **3 Test stand** for round, flat objects for use with these motorised sensors: HO-A15 to -A18. This test stand is ideal for hardness testing of round objects such as **4** pipes or rods up from  $\varnothing$  80 mm. Its lightweight aluminium construction enables a fatigue-free operation. The precise adjustment of the sensor position and the use of motorised sensors enables a very fast working procedure. Net weight approx. 1.6 kg, overall dimensions WxDxH 205x142x284mm, SAUTER HO-A19, **€ 1900,-**
- **Motorised sensor** as an accessory for models in the SAUTER HO range  
 HO-A15 (test force 3 N), **€ 6900,-**  
 HO-A16 (test force 5 N), **€ 6900,-**  
 HO-A17 (test force 8 N), **€ 6900,-**  
 HO-A18 (test force 10 N), **€ 6900,-**
- **Display device,** as standard, can be re-ordered, SAUTER HO-A03, **€ 1150,-**
- **5 Transport case with standard accessories** for operation with a motorised sensor, as standard, can be re-ordered, SAUTER HO-A21, **€ 450,-**



Model	Hardness scale	Test force	Attachment ring $\varnothing$ mm	Sensor length mm	Min. weight of test item g	Min. thickness of test item mm	Price excl. of VAT ex works €	Option	
								Factory calibration certificates	
		N						KERN	€
SAUTER HO 3M	HV 0.3	3	46	198	300	2	<b>8300,-</b>	960-270	260,-
SAUTER HO 5M	HV 0.5	5	46	198	300	2	<b>8300,-</b>	960-270	260,-
SAUTER HO 8M	HV 0.8	8	46	198	300	2	<b>8300,-</b>	960-270	260,-
SAUTER HO 10M	HV 1	10	46	198	300	2	<b>8300,-</b>	960-270	260,-

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