

# HARDNESS TESTING OF METALS (UCI)

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 (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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## 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](http://www.sauter.eu)



## Our team of consultants will assist you

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



## [www.sauter.eu](http://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

## 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.”

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Do you have questions about our products?  
Our customer consultants will be pleased to assist you:

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