

## 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.

### Quick-Finder

Model	Hardness scale		Page
<b>SAUTER</b>			
HO 3M	HV 0,3		68
HO 5M	HV 0,5		68
HO 8M	HV 0,8		68
HO 1K	HV 1		66
HO 2K	HV 2		66
HO 5K	HV 5		66
HO 10K	HV10		66
HO 10M	HV1		68



PREMIUM  
★★★



## 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:** Means that the testing is almost nondestructive, 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: 2 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, can be reordered at any time, SAUTER AHMO D
- **3 Support ring, flat**, SAUTER HO-A04
- **4 Support ring, small cylinder**, SAUTER HO-A05
- **5 Support ring, large cylinder**, SAUTER HO-A06
- **6 Deep-hole protective cover**, SAUTER HO-A07
- **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  
 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

### STANDARD



### OPTION



Model	Hardness scale	Min. weight of test item	Min. thickness of test item	Option	
				Factory calibration certificates	
<b>SAUTER</b>		g	mm	KERN	
HO 1K	HV 1	300	2	961-270	
HO 2K	HV 2	300	2	961-270	
HO 5K	HV 5	300	2	961-270	
HO 10K	HV10	300	2	961-270	



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, 1 connection cable sensor/display device, 1 USB cable, 1 hardness comparison plate, 1 power supply (EU), 1 Allen key, software to transfer the saved data to a PC

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
- **Motorised sensor** as an accessory for models in the SAUTER HO range  
 Test force 3 N, HO-A15  
 Test force 5 N, HO-A16  
 Test force 8 N, HO-A17  
 Test force 10 N, HO-A18
- **Display device,** as standard, can be re-ordered, SAUTER HO-A03
- **5** **Transport case with standard accessories** for operation with a motorised sensor, as standard, can be re-ordered, SAUTER HO-A21

STANDARD

MEMORY USB SOFTWARE UNIT TOL ACCU 230 V 1 DAY

OPTION

ISO +4 DAYS

Model	Hardness scale	Test force	Attachment ring $\varnothing$ mm	Sensor length mm	Min. weight of test item g	Min. thickness of test item mm	Option	
							Factory calibration certificates	
SAUTER		N					KERN	
HO 3M	HV 0,3	3	46	198	300	2	960-270	
HO 5M	HV 0,5	5	46	198	300	2	960-270	
HO 8M	HV 0,8	8	46	198	300	2	960-270	
HO 10M	HV 1	10	46	198	300	2	960-270	