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SINOWON[®]

Portable Universal Dynasonic Hardness Tester

SU-400

One Instrument
with Two Applications

Integrate Dynamic
and Static Methods



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SU-400

Introduction:

- SU-400 is a combined portable hardness tester which integrated the ultrasonic hardness testing method and dynamic Leeb hardness testing. It supports not only the UCI measurement of ultrasonic including manual probe 1kg, 2kg, 5kg, 10kg and motorized probe 0.3kg, 1kg but also the seven dynamic impact devices of Leeb measurement that is D, DC, DL, D+15, C, E, G to do rebound measurement.
- SU-400 is an instrument with two applications. It can test thin, bright and clean specimen with the ultrasonic method and rough big specimens with Leeb rebound method. It solves the dilemma that Leeb method can not test electroplated coatings and hard coatings and ultrasonic method can not test coarse-grained materials.

Features:

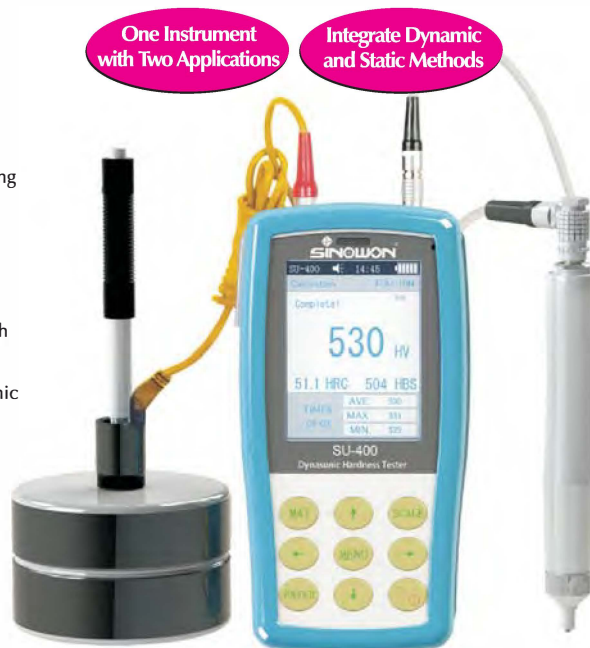
- One Instrument Two Applications**—Support ultrasonic probe and Leeb impact device.
- Metal Shell**—Metallic texture, shield electromagnetic interference effectively, improve instrument stability.
- Color Screen Display**—Display the current measurement value, accumulative measurement value, Max, Min and Ave value.
- Bluetooth Transferring**—Support wireless Bluetooth print and data transferring.
- Mass Storage**—Save 1000 groups data.
- Calibration Access**—Save 20 groups calibration data without doing calibration for the same material over and over.

Application



Specifications:

Product Name	Portable Universal Dynasonic Hardness Tester
Model	SU-400
Code #	882-151
Ultrasonic Probe	Standard delivery: 2Kg(optional Manual 1Kg, 5Kg, 10Kg, motorized 0.3Kg and 1Kg)
Impact Devices	Standard delivery: D(optional DC, DL, D+15, C, G)
Hardness Scales	HL, HV, HB, HRC, HRB, HRA, HS, etc.
Measuring Range	HV: 50~1599; HRC: 20~68; HB: 76~650; HRB: 41~105; HLD: 170~960
Measuring Accuracy	HV: ±3%HV; HRC: ±1.5HRC; HB: ±3%HB; HL: ±8HL
Resolution	0.1HR, 1HV, 1HB, 1HLD, 0.1HS
Data Storage	1000 group test results and 20 group calibration data
Result Display	Measurement value, Max, Min, Ave, single mode, batch mode, etc.
Data Transfer	Bluetooth
Continuous Working Period	10h(turn off the back light)
Operating Environment	Temperature: -10°C to 50°C; Humidity: 30%-80%
Operating Voltage	4.2V
Dimension	160x80x31mm
Weight	≤500g(probe not included)



SU-400(#882-151)

Standard Delivery:

Product Name	Code#
Instrument Main Body	882-151
2Kg Manual Probe	882-321
Impact Devices Type D	882-410
Rockwell Hardness Block	882-641
Leeb Hardness Block	882-630
Probe Cable	882-801
USB Recharger	882-851
Anti Vibration Case	882-901
Operation Manual	SU-400

Optional Accessories:

Product Name	Code#
1Kg Manual Probe HP-1K	882-311
5Kg Manual Probe HP-5K	882-331
10Kg Manual Probe HP-10K	882-341
0.3 Kg Motorized Probe MP-300	882-221
1Kg Motorized Probe MP-1000	882-251
Deep Hole Probe Cap	882-721
Rockwell Hardness Block HRC	882-611
Vickers Hardness Block HV	882-651
Plan Support Ring	882-511
Small Cylinder Support Ring	882-521
Big Cylinder Support Ring	882-531
Handy Silicone Shell	882-861
Mini-Printer	882-831
Software	882-381
Testing Stand	882-301

Manual Probe

Features:

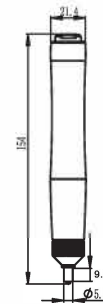
- Introduced latest ultrasonic sensor technology.
- Obtain accurate hardness value without auxiliary devices.
- Support 360° quick measuring.
- Excellent human engineering design easy to hold.
- Suitable dimension and weight of probe is convenient to control.
- Quick and accurate measuring for edge and fixed position of specimen.
- Micro indentation, Non- Destructive for specimen.



Standard Probe Cap
(#882-711)



Deep Hole Probe Cap
(#882-721)



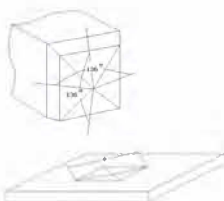
Drawings of Manual Probe

Manual Probe

HP-1K	HP-2K	HP-5K	HP-10K
882-311	882-321	882-331	882-341

Specifications:

Probe Type	HP-1K	HP-2K	HP-5K	HP-10K
Code#	882-311	882-321	882-331	882-341
Loading Force	10N	20N	50N	98N
Diameter	22mm	22mm	22mm	22mm
Length	154mm	154mm	154mm	154mm
Oscillating Rod Diameter	2.4mm	2.4mm	3mm	3mm
Roughness of measuring surface	Ra<2.5um	Ra<5um	Ra<10um	Ra<15um
Min weight of test material	0.3kg	0.3kg	0.3kg	0.3kg
Min thickness of test material	2mm	2mm	2mm	2mm



Ultrasonic Hardness Tester Indenter Illustration

$$\Delta f = f(E_{\text{eff}}, A); \quad HV = F/A$$

Δf = Frequency Shift

A = Indentation area

E_{eff} = Effective elastic modulus

HV = Vickers hardness value

F = Force applied in the hardness

$$HV = \frac{F}{A}$$

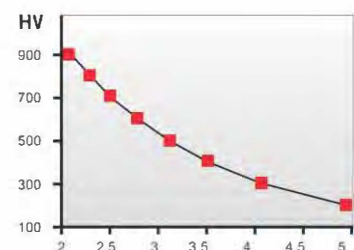
$$A = \frac{F}{HV}$$

$$\Delta f = f(E_{\text{eff}}, A)$$

$$A = f(E_{\text{eff}}, \Delta f)$$

$$E_{\text{eff}} = \frac{\Delta f_1}{\Delta f_2}$$

Ultrasonic Hardness Tester Calculation Formula



UCI Method: Hardness Value versus Frequency Shift

Ultrasonic Hardness Tester Motorized Probe



Hardness Block

(28~35)HRC	(38~43)HRC	(48~53)HRC	(58~63)HRC
882-611	882-621	882-631	882-641

Block Specification:

Hardness Range	Code#	Uniformity	Roughness	Dimension
(28~63)HRC	882-611	±1.5HRC	Ra=0.02um	Ø90x16mm
(300~800)HV1	882-621	±3%HV	Ra=0.02um	Ø90x16mm
(300~800)HV5	882-631	±3%HV	Ra=0.02um	Ø90x16mm
(300~800)HV10	882-641	±3%HV	Ra=0.02um	Ø90x16mm
(180~500)HB	882-681	±2%HB	Ra=0.02um	Ø90x16mm



Small Cylinder Support Ring (#882-521)

Big Cylinder Support Ring (#882-531)

Plan Support Ring (#882-511)

Support Ring Specifications:

Support Ring Name	Plan Support Ring	Small Cylinder Support Ring	Big Cylinder Support Ring
Code#	882-511	882-521	882-531
Application	Plan Test Piece	Diameter 8-22mm Test Piece	Diameter 16-80mm Test Piece



10KG/5KG Probe Counterweight



Carrier and Stand



Plan Support Ring



Manual Probe Test Stand MU-100

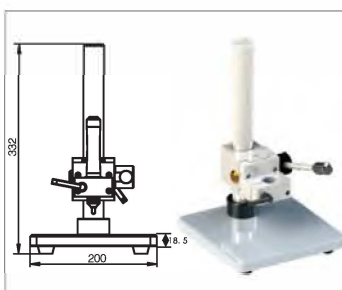


Motorized Probe Test Stand MU-200

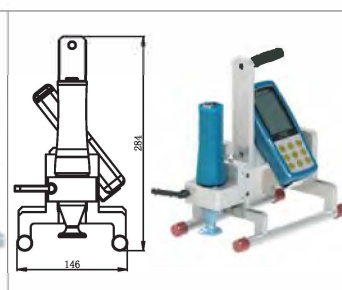
Testing Stand

MU-100 testing stand is applicable with ultrasonic hardness tester for the accurate measurement, MU-200/MU-300/MU-400 in the laboratory, it must be used when Manual Probe calibrated.

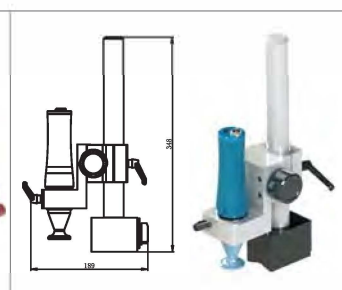
Testing Stand	MU-100	MU-200	MU-300	MU-400
Code#	882-311	882-321	882-331	882-341
Material	Stainless Steel	magnesium aluminum alloy	Aluminum	Stainless Steel
Weight	8.8Kg	1.6Kg	4.5Kg	9.5Kg
Dimension(LxWxH)	200 x 200 x 332mm	205 x 142 x 284mm	200 x 120 x 348mm	200 x 200 x 332mm
Packing Dimension	320 x 320 x 440mm	405 x 340 x 580mm	398 x 310 x 540mm	398 x 398 x 530mm
Application	Manual Probe Test Stand	Motorized Probe Test Stand for Roller Materials	Motorized Probe Magnet Test Stand	Motorized Probe Test Stand



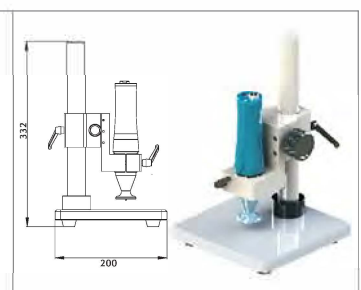
MU-100(#882-311)



MU-200(#882-321)

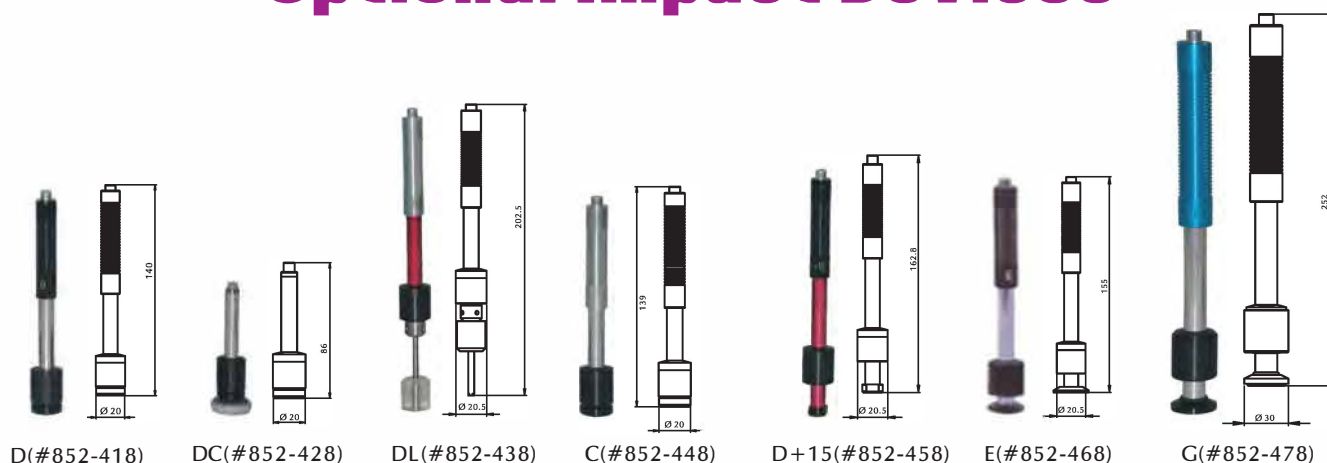


MU-300(#882-331)



MU-400(#882-341)

Optional Impact Devices



Specifications:

Impact Device	D	DC	DL	C	D+15	E	G	
Code#	852-410	852-420	852-430	852-440	852-450	852-460	852-470	
Impacting Energy	11mJ	11mJ	11mJ	2.7mJ	11mJ	11mJ	90mJ	
Weight of Impact Body	5.5g	5.5g	7.2g	7.8g	3.0g	5.5g	20g	
Test tip Hardness	1600HV	1600HV	1600HV	1600HV	1600HV	1600HV	1600HV	
Dia. Test tip	3mm	3mm	2.8mm	3mm	3mm	3mm	5mm	
Material of Test Tip	Tungsten carbide					Polycrystalline diamond	Tungsten carbide	
Impact Body								
Diameter	20mm	20mm	20mm	20mm	20mm	20mm	30mm	
Length	147mm	86mm	75mm	141mm	162mm	155mm	254mm	
Weight	50g	50g	50g	75g	80g	80g	250g	
Max. hardness of Sample	940HV	940HV	940HV	1000HV	940HV	1200HV	650HB	
Average Roughness Ra	1.6μm	1.6μm	1.6μm	0.4μm	1.6μm	1.6μm	6.3μm	
Min. weight of Sample								
Measurement Directly	>5kg	>5kg	>5kg	>1.5kg	>5kg	>5kg	>15kg	
Need Support Firmly	2~5kg	2~5kg	0.5~1.5kg	2~5kg	2~5kg	2~5kg	5~15kg	
Need Coupling Tightly	0.05~2kg	0.05~2kg	0.02~0.5kg	0.05~2kg	0.05~2kg	0.05~2kg	0.5~5kg	
Min. thickness of Sample								
Coupling Tightly	5mm	5mm	5mm	1mm	5mm	5mm	10mm	
Hardening Layers	≥0.8mm	≥0.8mm	≥0.8mm	≥0.2mm	≥0.8mm	≥0.8mm	≥1.2mm	
Indentation of Test tip								
Hardness 300HV	Diameter	0.54mm	0.54mm	0.54mm	0.38mm	0.54mm	0.54mm	1.03mm
	Depth	24μm	24μm	24μm	12μm	24μm	24μm	53μm
Hardness 600HV	Diameter	0.45mm	0.45mm	0.45mm	0.32mm	0.45mm	0.45mm	0.90mm
	Depth	17μm	17μm	17μm	8μm	17μm	17μm	41μm
Hardness 800HV	Diameter	0.35mm	0.35mm	0.35mm	0.30mm	0.35mm	0.35mm	
	Depth	10μm	10μm	10μm	7μm	10μm	10μm	
Error and Repeatability of Displayed Value								
Hardness Value	760±30HLD 530±40HLD	760±30HLDC 530±40HLDC	878±30HLDL 736±40HLDL	822±30HLC 590±40HLC	766±30HLD+15 544±40HLD+15	725±30HLE 508±40HLE	590±40HLG 500±40HLG	
Error of Value	±6 / ±10 HLD	±6 / ±10 HLDC	±12 HLDL	±12HLC	±12 HLD+15	±12HLE	±12 HLG	
Repeatability	6 /10 HLD	6 /10 HLDC	12 HLDL	12HLC	12 HLD+15	12HLE	12 HLG	

Optional Support Ring

Specifications of Support Ring:

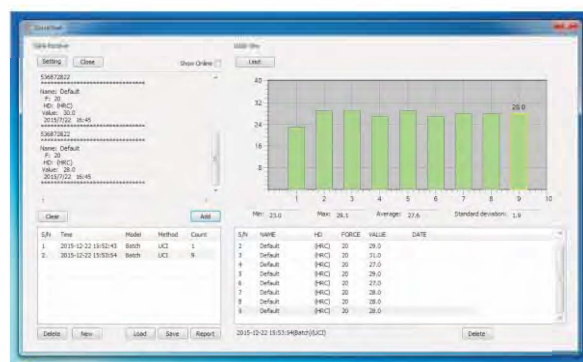
Product Name		Optional Support Ring
Code#		852-518
No.	Type	Remarks
1	K14.5-30	For testing spherical outside surface SR14.5~SR30
2	K10-15	For testing spherical outside surface SR10~SR15
3	HK16.5-30	For testing spherical inside surface SR16.5~SR30
4	HK12.5-17	For testing spherical inside surface SR12.5~SR17
5	HK11-13	For testing spherical inside surface SR11~SR13
6	Z10-15	For testing cylindrical outside surface R10~R15
7	Z14.5-30	For testing cylindrical outside surface R14.5~R30
8	Z25-50	For testing cylindrical outside surface R25~R50
9	HZ16.5-30	For testing cylindrical inside surface R16.5~R30
10	HZ12.5-17	For testing cylindrical inside surface R12.5~R17
11	HZ11-13	For testing cylindrical inside surface R11~R13
12	UN	For testing cylindrical outside surface, radius adjustable R10~∞



Impact Devices Application:

Type	Code#	Application Area	Impact Energy	Indenter
C	852-440	Reduced impact energy. For surface-hardened components, coatings, thin or impact-sensitive parts (small indentation).	3N mm	Tungsten carbide 3mm
D	852-410	Most widely used probe. For the majority of testing applications.	11N mm	Tungsten carbide 3mm
DC	852-420	Short impact device. For applications in restricted spaces, e.g. in bores, cylinders or for measurements in assembled machines.	11N mm	Tungsten carbide 3mm
DL	852-430	Slim measuring nose. For measurement under extreme space limitations or on the floor of grooves.	11N mm	Tungsten carbide 2.8mm
E	852-460	Diamond indenter. For measurements in extreme hardness ranges (above 50 HRC / 650 HV). Tool steels with high carbide content.	11N mm	Polycrystalline diamond 3mm
G	852-470	Increased impact energy. Solid components, e.g. heavy-duty casts and forged parts.	90N mm	Tungsten carbide 5mm

Software Data Pro DuraStat:



The software is a data processing software for Ultrasonic Hardness Tester/Leeb hardness tester, running in Microsoft Windows system. It can be connected to the instrument via communication port (Bluetooth/USB or COM port), read the measured data stored in Instrument memory, perform online configuration, transmit the measured data to PC, process the measurement data, display the visualized image, store the measurement data into database, load or remove the measurement data stored in database at any time, and output the measurement data to printer connected to computer.

Measuring Range / Materials:

Material	HLD	HRB	HRC	HB	HV	HSD
Steel and cast steel	300-900	38-100	20-68	81-654	81-955	32-100
Cold work tool steel	300-840	—	20-67	—	80-898	—
Stainless steel	300-800	46-101	—	85-655	85-802	—
Grey cast iron	360-650	—	—	93-334	—	—
Nodular cast iron	400-660	—	—	131-387	—	—
Cast aluminum alloys	170-570	23-84	—	19-164	—	—
Brass	200-550	13-95	—	40-173	—	—
Bronze	300-700	—	—	60-29	—	—
Copper	200-690	—	—	45-315	—	—

The Contrast of Digital Leeb Hardness Tester:

Model	SH-200	SH-300	SH-500	MH200	MH300
Code#	852-120	852-130	852-150	852-121	852-131
Warranty	1-Year	1-Year	2-Year	1-Year	1-Year
LCD Screen Size(mm)	48x26	60x32	67x51	24x11	29x9
Style	Portable			Pen-Style	
Shell Material	Plastic		Metal	Plastic	
Printer Style	Optional Built-out Mini-Printer	Built-in	Optional Blue Tooth printer	Built-out	
Standard Impact Device	D-type				
Optional Impact Device	DL, DC, D+15, C, E, G				