

# LD 3000 AX

UNIVERSAL  
Rockwell, Brinell and Vickers



**NEW!**

Touchscreen 15"  
Motorized turret  
Autofocus  
Automatic reading with camera  
Clamping system

**AFFRI**<sup>®</sup>

# LD 3000 AX

## INNOVATIVE VERTICAL MEASURE

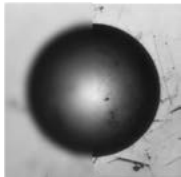
The LD 3000 AX AFFRI® hardness tester is a fully motorized system for automatic preloading, loading and measurements. AFFRI® System hardness testers achieve the highest level of depth accuracy and measurement resolution available for Rockwell tests. Thanks to the AFFRI® System, the real indentation measurement is guaranteed without any external interference in any condition.

## ONE BUTTON MEASUREMENTS

Just push the start button and the head moves down performing the hardness test cycle in automatic succession without breaching a phase:

1. Automatic contact with the specimen
2. Automatic active sliding clamping
3. Automatic preloading and loading
4. Automatic switching to optic lens
5. Autofocus by image brightness scanning
6. Automatic measure through camera
7. Automatic return stroke at programmed distance

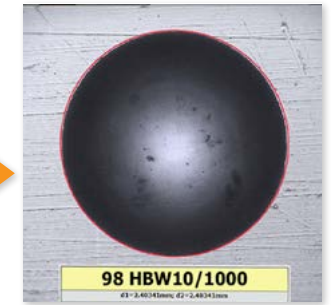
The entire test cycle is complete and the result appears on a large display.



The Auto Focus performs an automatic focus adjustment for the selected optic with precise positioning at any magnification by mean of real image brightness scanning. This system assures high reading accuracy and reduces reading time.



! Fully motorized and automatic, the test is not affected by operator influences and can easily be used by operators of every level.



## AUTOMATIC READING AND MEASURING

Rockwell, Superficial Rockwell, Brinell, Vickers, Knoop and Shore.

Conform to standards ASTM E18 - E10 - E103 - E384 - D2240 / ISO 6506 - 6507 - 6508 - 4545 - 2039



This hardness tester provides fully automatic measurements for each hardness scale. The measurement is driven by buttons on the stand or by the software icon and the touchscreen.

The automatic succession of preloading and loading as well as autofocusing and autoreading produce results where the measuring parameters are always the same, in any condition. This means that the hardness results don't change depending on the operator's sight or way of testing and the statistical deviation is not affected by human error.

The automatic measure and autofocus can be bypassed using manual focusing and manual reading (see image on the left).

### LOAD FORCE RANGE

9.807	19.60	24.52	29.42	49.03	61.29	98.07	147.1	153.2	196	245.2	294.2	306.5	441.3	490.35	588.4	612.9	980.7	1226	1471	1839	2452	4903	7335	9807	14709	29421	N
1	2	2.5	3	5	6.25	10	15	15.6	20	25	30	31.2	45	50	60	62.5	100	125	150	187.5	250	500	750	1000	1500	3000	kgf

### BRINELL HBW / HBWT TESTS - DIN EN ISO 6506 / ASTM E-10

1/1	1/2.5	1/5	1/10	1/30	2.5/6.25	2.5/15.625	2.5/31.25	2.5/62.5	2.5/187.5	5/25	5/62.5	5/125	5/250	5/750	10/100	10/250	10/500	10/1000	10/1500	10/3000
-----	-------	-----	------	------	----------	------------	-----------	----------	-----------	------	--------	-------	-------	-------	--------	--------	--------	---------	---------	---------

### ROCKWELL TESTS - DIN EN ISO 6508 / ASTM E-18

HRA	HRB	HRC	HRD	HRE	HRF	HRG	HRH	HRK	HRL	HRM	HRP	HRR	HRS	HRV	HR15	HR30	HR45	N/T/S/W/X/Y
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	-------------

### VICKERS TESTS - DIN EN ISO 6507 / ASTM E-384 (Generate indentation)

HV1	HV2	HV3	HV5	HV10	HV15	HV20	HV30	HV60	HV100
-----	-----	-----	-----	------	------	------	------	------	-------

SHORE A/D (Optional) Plastic and rubber EN-ISO 2039: 49 - 132 - 358 - 961 N TEMPERATURE: Measure range from - 40.0 to + 80.0 °C



# LD 3000 AX

## SWIVELLING MOTORIZED TURRET

Automatic turret with one indenter and one interchangeable objective as standard. Auto-rotating, auto-tool-switching and auto-centring for a completely automatic single or multi indentation measurement cycle. Each tool can be easily changed by screwing manually.



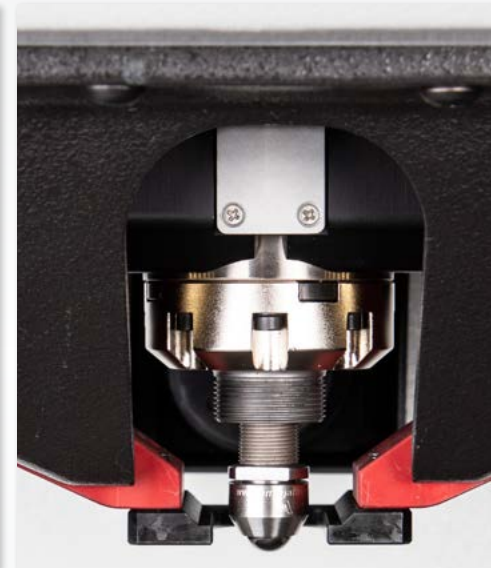
From round to flat surfaces, the tester automatically and quickly makes contact with any test area, up or down, outside or inside it. Special accessories are available for testing inside tubes or over inclined plates.

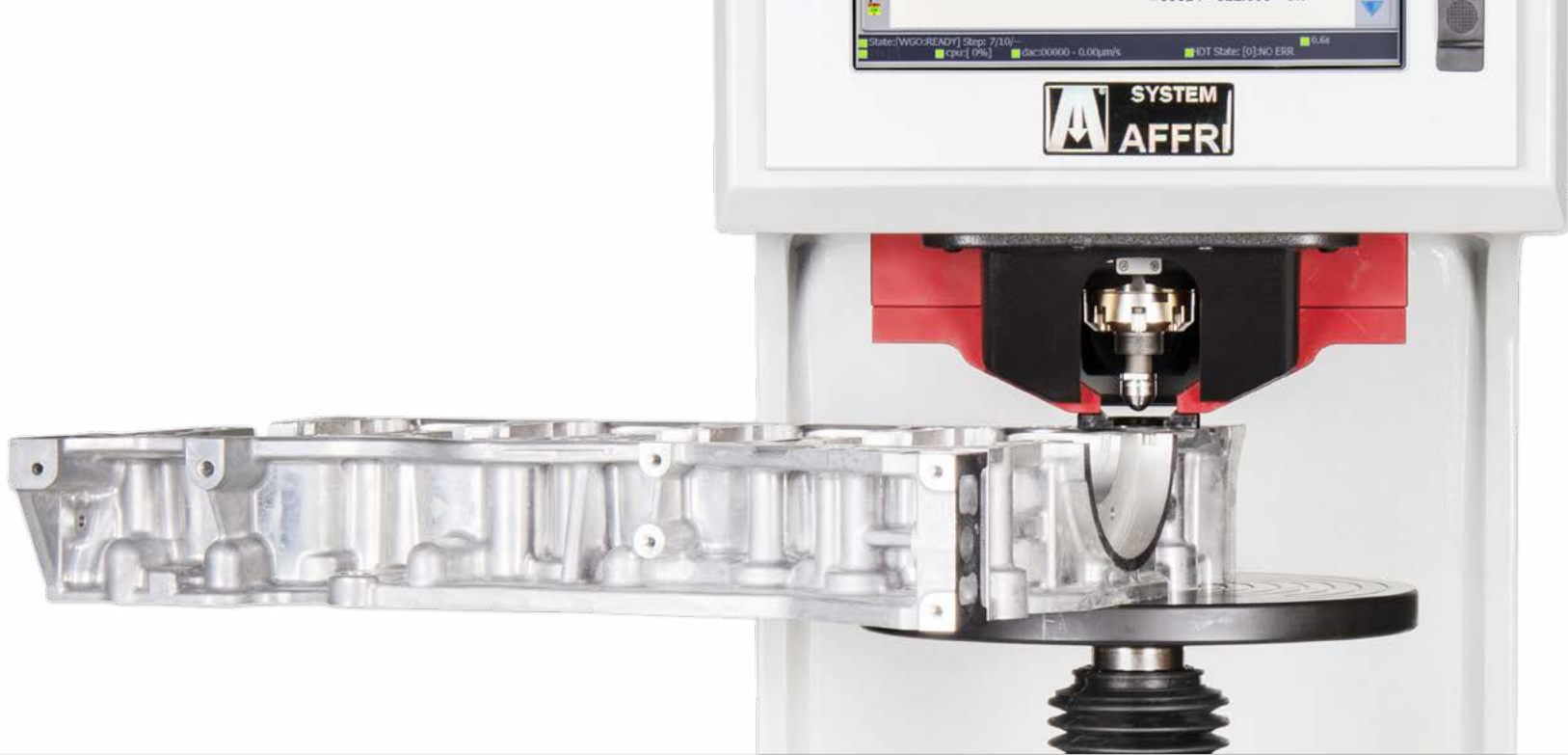


## MOTORIZED INDENTER STROKE

The hardness tester is equipped with an additional motor which moves the indenter and the clamping hood for a stroke of 20 mm / 0.8". This is a stand-alone extra stroke which works separately from the total head stroke. When testing unstable samples or deflective parts, the measuring head follows the sample without losing contact. The top surface referencing design minimizes errors caused by problems associated with dirt or scale. This reduces sample preparation time and increases both accuracy and speed.

**The activation of the test cycle is automatic, it starts when the head makes contact with the specimen which is automatically recognized at any position within the 20 mm / 0.8" of vertical stroke.**





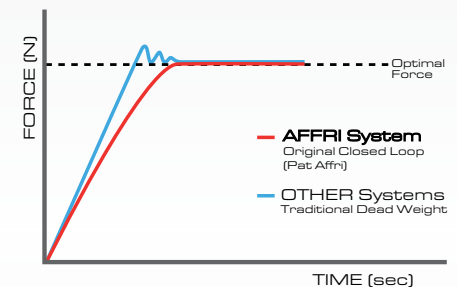
## CLAMPING SYSTEM (Pat. AFFRI)

Secure contact with the specimen is always maintained achieving absolute accuracy under any condition even on unstable, oily or dirty samples. The clamping hood applies constant pressure and prevents accidental sample movements. The clamping system assures perfect stability of any test piece throughout the test cycle. No additional accessories are required.

## LOAD CELL AND CLOSED LOOP

Load forces are applied through load cells and electronically controlled in "Closed Loop" (Pat. AFFRI) with a frequency of 1 kHz. Each load force is automatically programmed and controlled assuring perfect linearity in every range eliminating the problems associated with traditional dead weight system testers. Results are not affected by any structural deflection, misalignment or external vibration.

Accurate measurements, even on the first test, eliminate the need for multiple tests. There is no need to perform a second test, the first one is absolutely precise. The R&R (repeatability and reproducibility) data is at the top of its class.

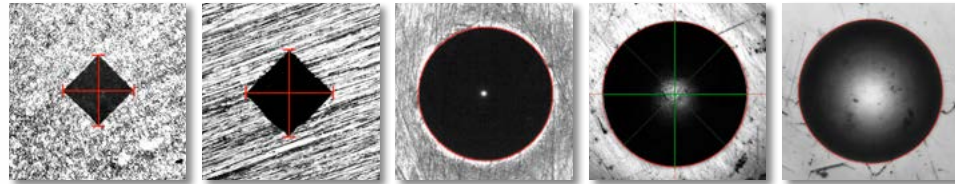


**THE FIRST TEST RESULT IS CORRECT AND ABSOLUTE, SAVING TIME AND MONEY, THUS INCREASING OUTPUT AND PRODUCTIVITY**

# LD 3000 AX

## AUTOMATIC VICKERS AND BRINELL READING

The AFFRI® LD 3000 AX can perform Vickers, Brinell and Knoop test methods in compliance with ASTM and ISO standards. Automatic indentation reading through camera and optic system. With software-controlled focus, image cleaning, shading correction and regulated light source, reproducible results are obtained regardless of the number of indents measured.



Auto-measure on critical surfaces: from perfectly polished to rough & etched samples, the software will automatically measure indents on any sample surface.

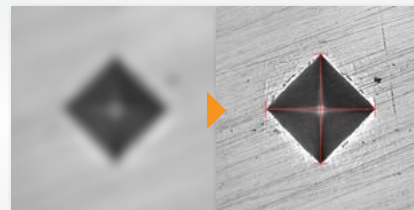


Automatic light and contrast adjustment with live immediate correction. The lighting feature optimizes the visibility on any dark or bright sample surface without any manual action. The indent will be visible with sharp diameter or edges for both manual and automatic reading.

**The software controls the whole measurement avoiding settings errors or operator mistakes. The repeatability of the automatic measure avoids human subjectivity.**

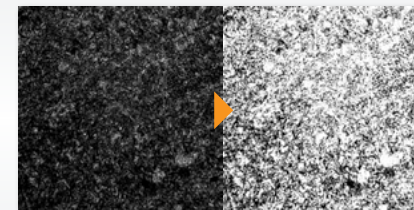
### AUTOFOCUS

Motorized focus at the right point



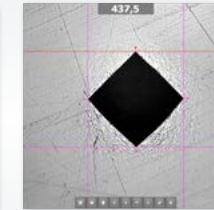
### AUTO-LIGHTING

Automatic illumination adjustment



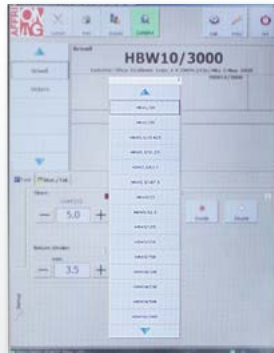
### MANUAL MEASURE

Manual indent evaluation.



## THE TOUCHSCREEN AND THE SOFTWARE

Wide touchscreen for easy test planning and a clear view of results. User friendly Windows® interface. Set the hardness test scales, the properties of the camera and the test method settings. Choose result conversion in any other hardness scale. Use offset and round correction values for tests on convex cylindrical surfaces or various diameters. Manage the instrument tools and check if the installed tool is correct for the selected hardness test method. Statistics charts and custom reports can be generated at a touch of a button. All results and testing sessions can be stored on the large archive using the on-board software database.



Selection of the hardness scale and the test parameters



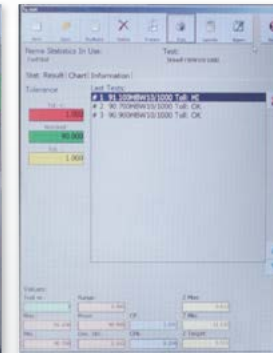
Clear view of the indent and the tested area



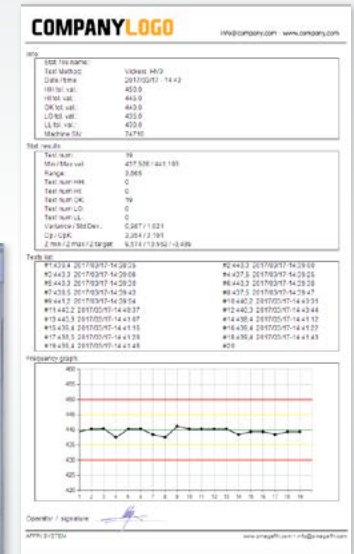
List of results with tolerances LOW-OK-HIGH and statistics



Three types of graphic charts including standard deviation



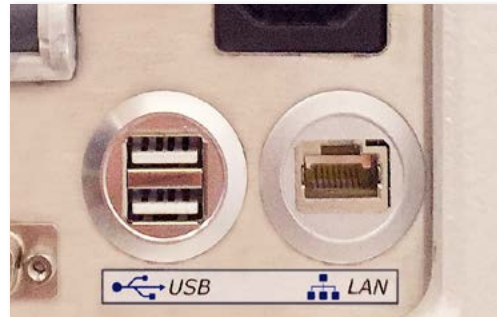
Managing of results, report templates and printing



Customizable test report with client logo, specimen information, statistics and graphs or export as CSV file.

## TEST DATA IMPORT AND EXPORT

Data enter via code bar scanning. Test cycles or sample drawings can be loaded directly from a central system by means of a bar code scanner. This hardness tester gets all the information fully automatically. After running the test, the bar code data are added with results and immediately returned to the order management system. File import and export is freely configurable and therefore individually adaptable. USB and LAN outputs. Connect to database networks, PCs and printers.



# LD 3000 AX

## AUTOMATIC ROCKWELL AND BRINELL HBWT

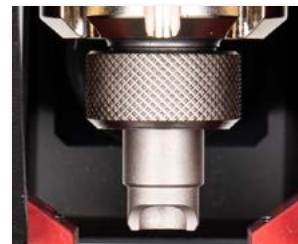
Thanks to the AFFRI® System, the real indentation measurement is guaranteed without any external interference in any condition. Repeatability and reproducibility are guaranteed for years!

Rockwell **HRC**  
ID:0 Penetratore:Diamante 120° Min:0 Max:100

**63.2** HI

Brinell **HBWT 2.5/187.5**  
ID:0 Penetratore:Sfera Min:0 Max:100

**363.2** HI



### PROTECTED INDENTER

The indenter is protected and retracted, it only moves down after the specimen is fully clamped and stable, minimizing the risk of accidental damages. The exclusive Affri diamond indenter has a longer life-span than any other indenter on the market.



The test cycle is quick! The time needed for one complete measurement is 15" including 10" (ASTM std.) of dwell time. With HBWT and Rockwell scales it is possible to test up to 200pcs per hour.

### ISO 6506 - ASTM E10 (Brinell HBWT tests):

HBWT 2.5/62.5	HBWT 2.5/187.5	HBWT 5/62.5	HBWT 5/125	HBWT 5/250
HBWT 5/750	HBWT 10/100	HBWT 10/250	HBWT 10/500	HBWT 10/1000
HBWT 10/1500	HBWT 10/3000			

### ISO 6508 - ASTM E18 (Rockwell HR tests):

HRA	HRB	HRC	HRD	HRE	HRF	HRG	HRH
HRK	HRL	HRM	HRP	HRR	HRS	HRV	

### ISO 6508 - ASTM E18 (Superficial Rockwell HR tests):

HR15 N/T/S/W/X/Y	HR30 N/T/S/W/X/Y	HR45 N/T/S/W/X/Y
------------------	------------------	------------------





## DIRECT DEPTH READING

The LD3000AX hardness tester is a fully motorized system for automatic preloading, loading and measurements. AFFRI® System hardness testers achieve the highest level of depth accuracy and measurement resolution available for Rockwell and HBWT tests.

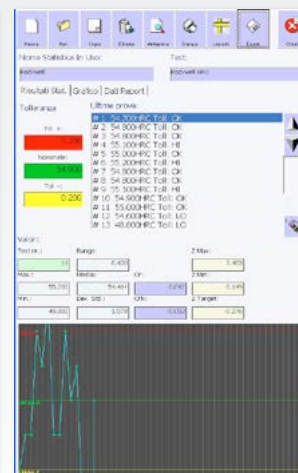
The LD3000AX performs every hardness scale for universal use in the production site or in your own laboratory.



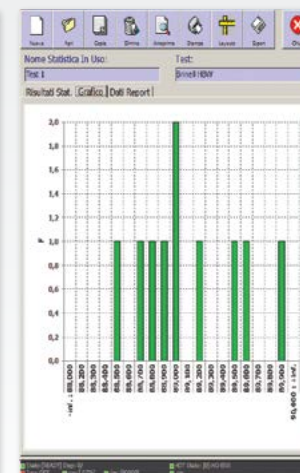
Brinell HBWT tests



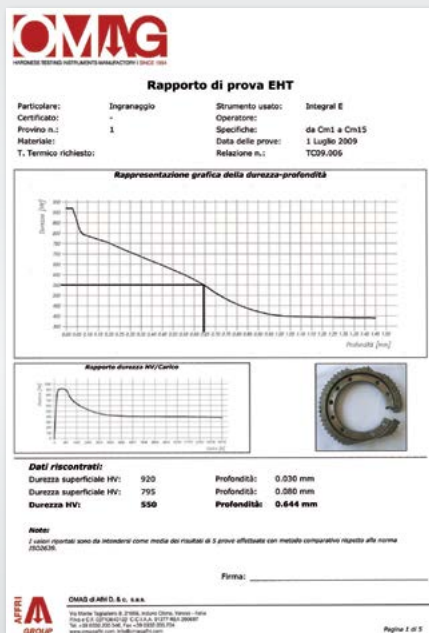
Rockwell HRC test



List of results, statistic and graphic chart



Standard deviation chart

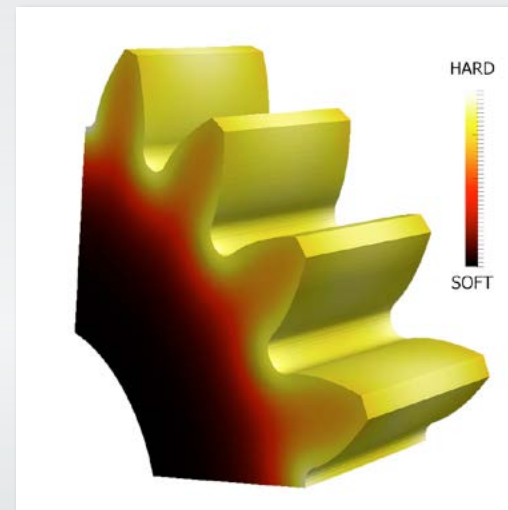


## SPECIAL FOR HEAT TREATMENT

### AUTOMATIC CHD WITH NON-DESTRUCTIVE METHOD

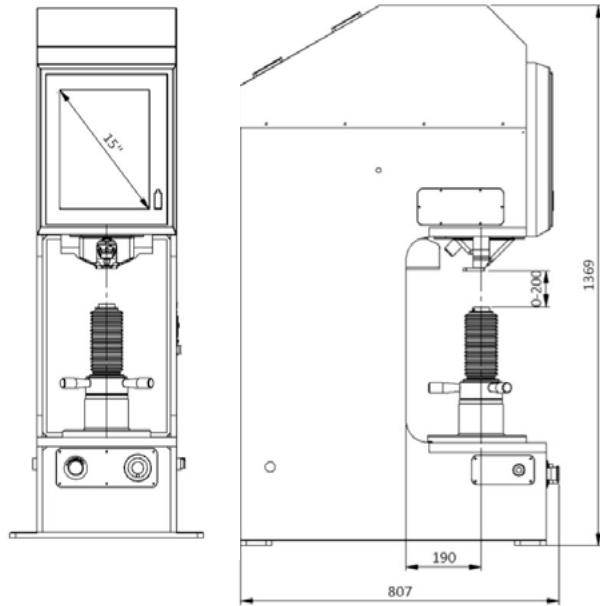
The hardness tester LD 3000 AF (specific model) determine the case hardness depth (CHD). Testing can be performed on a non-metallographic prepared specimen. The system will determine the superficial hardness and its effective depth (CHD), from 0.12 to 1.8 mm, without having to destroy and test the specimen. Hence all the manufactured pieces can be tested. Great precision and minimal operator intervention on finished products: there's no need for sample preparation, no need to separate material types or to polish the cross section as for the Vickers method. In just one minute the tester generates the report with the CHD graph.

Ask for more info!

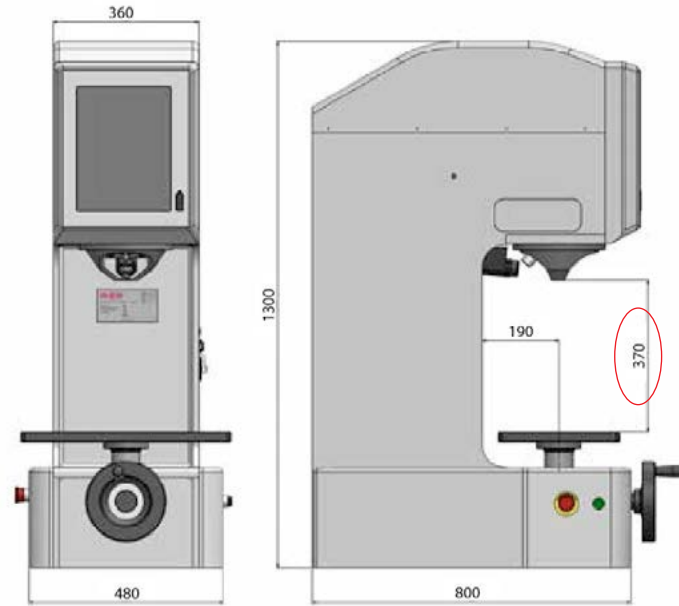


# LD 3000 AX

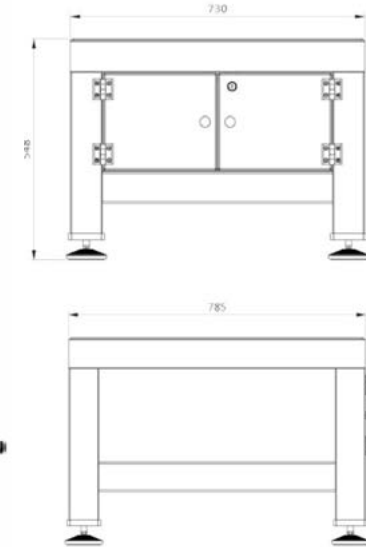
## STANDARD DIMENSIONS



## INCREASED FRAME



## TABLE DIMENSIONS



## NEED MORE SPACE?

INCREASE HEIGHT CAPACITY

The hardness tester LD 3000 AX is equipped with an elevating screw which holds the sample and can move towards the indenter from a distance of 200mm / 240mm. The elevating screw can be easily removed and replaced using just a standard Allen key. For better stability a large metal plate can be fixed on the tester base.



Example images

## INDENTERS

700.1.5.013 - Ball indenter W  $\varnothing$ 2,5 mm  
700.1.5.014 - Ball indenter W  $\varnothing$ 5 mm  
700.1.5.015 - Ball indenter W  $\varnothing$ 10 mm  
700.1.5.016 - Rockwell diamond indenter 120°  
700.1.5.017 - Vickers diamond indenter 136°  
700.1.5.018 - Ball indenter W  $\varnothing$ 1/16 " for

## TEST BLOCKS

601.0.0.001 - HRA  
601.0.0.002 - HRB  
601.0.0.003 - HRC  
600.0.0.003 - HBW 2.5/62.5  
601.0.0.005 - HBW 2.5/187.5  
600.0.0.001 - HBW 5/125  
600.0.0.010 - HBW 5/250  
600.0.0.013 - HBW 5/750  
600.0.0.008 - HBW 10/250  
600.0.0.007 - HBW 10/500  
600.0.0.006 - HBW 10/1000  
600.0.0.005 - HBW 10/1500  
600.0.0.015 - HBW 10/3000  
602.0.0.001 - HV30

## ANVILS

A014.0.001 - Flat anvil  $\varnothing$ 60 mm  
A014.0.002 - Flat anvil  $\varnothing$ 150 mm  
A014.0.003 - V face anvil  $\varnothing$ 60 mm for  $\varnothing$  8 to 220 mm  
A014.0.004 - Anvil  $\varnothing$ 25 mm flat + V for  $\varnothing$  5 to 30 mm  
A014.0.005 - Ball Anvil reclining self aligning  
A014.0.006 - Diamond spot anvil for thin plates  
A014.0.011 - Spherical anvil Radius 10 mm  
A014.0.012 - Spherical anvil Radius 15 mm  
A014.0.013 - Spherical anvil Radius 40 mm

## EXTRA ACCESSORIES

A010.0.021 - Bench table for hardness tester  
A022.0.002 - AUTO START command trough pedal for series tests  
E008.010 - L.I.S.A. Laser indicator patented Affri System  
A049.1.001 - Adjustable vice from 0 to 50 mm  
A009.0.001 - Manual table 100x100 mm with 10  $\mu$ m step



## ACCESSORIES

Affri provides a large variety of accessories to fulfil any purpose of test. Customized solutions based on client needs can be made for perfect tests on rough pieces. A series of different anvils is available to test every size of test piece. Variety of accessories to facilitate testing on small or oddly shaped items. Large variety of high quality indenters with certificate. Ball, cone, tungsten or diamond indenters for each hardness scale Rockwell, Vickers, Brinell, Knoop and Shore. Test blocks for the hardness tester periodic calibration with UKAS/ACCREDIA certificate, for any hardness scale and value.

**All AFFRI accessories are customizable according to customers specifications, depending on dimensions and geometry of the samples and finished products.**

## REAL TIME SUPPORT

Real Time Support. Connect your hardness tester to Internet, so that we can remotely diagnose any technical issue, provide additional operator training and update software version.

Connect to [www.affri.com](http://www.affri.com) for more details.



# LD 3000 AX

## MODELS

LD3000AX: from 1 to 250 kgf (HR - HRS - HB - HV - HK) / from 1 to 250 kgf (HB - HV - HK) / from 3 to 3000 kgf (HR - HRS - HB - HV - HK) / from 3 to 3000 kgf (HB - HV - HK)

### FORCE RANGE (Depending on the models)

Preload:	29.4 - 98.1 N (3 - 10 kgf)
Rockwell / Superficial R.:	588.4 - 980.7 - 1471 N (60 - 100 - 150 kgf) / 147.1 - 294.2 - 441.3 N (15 - 30 - 45 kgf)
Brinell:	9.807 - 24.52 - 49.03 - 61.29 - 98.07 - 153.2 - 245.2 - 294.2 - 306.5 - 612.9 - 1226 - 1839 - 2452 - 4903 - 7355 - 9870 - 29421 N (1 - 2.5 - 5 - 6.25 - 10 - 15.625 - 25 - 30 - 31.2 - 62.5 - 125 - 187.5 - 250 - 500 - 750 - 1000 - 3000 kgf)
Vickers/Knoop:	9.807 - 19.60 - 29.42 - 49.03 - 98.07 - 196.14 - 294.2 - 490.3 - 980.7 N (1 - 2 - 3 - 5 - 10 - 20 - 30 - 50 - 100 kgf)
Optional tests:	49 - 132 - 358 - 961 N (for plastic and rubber as per EN-ISO 2039)

### FEASIBLE TESTS (Depending on the models)

Rockwell / Superficial R.:	HRA - HRB - HRC - HRD - HRE - HRF - HRG - HRH - HRK - HRL - HRM - HRP - HRR - HRS - HRV - HR15N/T/S/W/X/Y - HR30N/T/S/W/X/Y - HR45N/T/S/W/X/Y
Brinell HBW:	1/1 - 1/2.5 - 1/5 - 1/10 - 1/30 - 2.5/6.25 - 2.5/15.625 - 2.5/31.25 - 2.5/62.5 - 2.5/187.5 - 5/25 - 5/31.25 - 5/62.5 - 5/125 - 5/250 - 5/750 - 10/100 - 10/125 - 10/250 - 10/500 - 10/1000 - 10/1500 - 10/3000
Brinell HBWT:	1/30 - 2.5/15.6 - 2.5/31.5 - 5/125(3) (Aluminum and alloys) - 2.5/62.5(2) (Aluminum and alloys) - 2.5/187.5(6) (Aluminum and alloys) - 2.5/187.5(5) (Carbon steel) - 2.5/187.5(1) (Cast iron) - 5/125 - 5/250 - 5/750 - 10/500 - 10/1000 - 10/1500 - 10/3000
Vickers:	HV 1 - HV 2 - HV 3 - HV 5 - HV 10 - HV 20 - HV 30 - HV 50 - HV 100
Shore (As Option):	ISO 2039, Shore A and D hardness scales for plastic
CHD (As Option):	Automatic Case Hardness Depth tests with automatic graph

## TECHNICAL DATA

Conformity Standards:	EN-ISO 6506-2 / EN-ISO 6507-2 / EN-ISO 6508-2 / EN-ISO 2039 / ISO 868 / ASTM-E10 / ASTM-E18 / ASTM-E103 / ASTM 2240 / ASTM-E384 / JIS
Accuracy:	Better than 0.5 %
Readout Division:	0.1 HBW / HBWT / HV - 0.01 HR
Lighting and Objectives	LED - Objectives for HB - HV - HK measurements
Focus and Reading	Automatic and Manual
Dwell Time	From 1 to 99 seconds
Indenter Stroke:	Motorized 20 mm / 0.8"
Height Capacity:	200 - 240 mm / 7.8 - 9.4" (More on request)
Depth Capacity:	190 mm / 7.4"
Tolerable Weight:	2000 kg
Temperature Range:	From 10 °C to 35 °C
Data Output:	USB - Ethernet (RS 232C, wireless upon request)
Power Supply:	110 or 220 V / 50±60 Hz
Software:	Affri - OMAG
Principle of Operation:	Load Cell and Closed Loop (Affri patent)
Fields Of Use	For all metals: iron, steel, tempered steel, cast iron, brass, aluminum, copper and metal alloys. Heat treatment, hardening, nitriding, cementation and hardfacing. Hard and soft plastics.
Packing:	600 kg - 110 x 108 x 174 cm / 44 x 43 x 70"



**Made by:**  
**OMAG di AFFRI D. S.r.l.**  
 Via M. Tagliaferra, 8, I-21056 INDUNO OLONA - CEE (VA) - ITALY  
 Tel. +39 0332 200546 Fax +39 0332 203704  
 info@omagaffri.com

**Europe/Asia:**  
**AFFRI®**  
 Via M. Tagliaferra, 8, I-21056 INDUNO OLONA - CEE - (VA) - ITALY  
 Tel. +39 0332 201533 +39 0332 206289 Fax +39 0332 203621  
 info@affri.com - www.affri.com

**America:**  
**AFFRI Inc.**  
 850 Dillon Dr. Wood Dale, IL 60191  
 Tel. 224 374 0931 - 630 303 1588  
 sales@affriusa.com - www.affri.com