

# LD SERIE



**NEW!**

LD 3000 A

Automatic Brinell HBW measurement  
On-board LCD with portable probe  
From 10 to 3000 kgf

**AFFRI**

# LD SERIE

## LD 3000

Manual - Only indentation



Semi-automatic Brinell hardness tester. Reading of indentation is made through standard microscope or through optional electronic microscope with auto-measure.

## LD 3000 A

Automatic Brinell and Vickers readings



Automatic Brinell hardness tester with on-board LCD and portable probe. Real Brinell HBW in compliance with ASTM E10 and ISO 6506.

## LD 3000 B

Automatic Brinell HBWT and Rockwell



Automatic Brinell hardness tester with depth hardness measurement for Brinell HBWT and Rockwell in compliance with ASTM E18 and ISO 6508. On-board LCD.

### LOAD FORCE RANGE

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
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

1/5	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
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### 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/XY
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### VICKERS TESTS - DIN EN ISO 6507 / ASTM E-384 (Generate indentation)

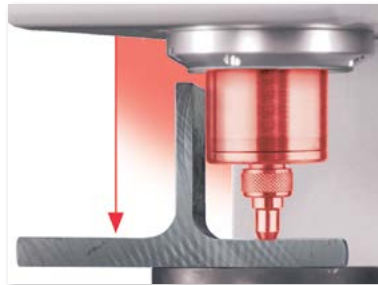
HV3	HV5	HV10	HV15	HV20	HV30	HV60	HV100
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SHORE A/D (Optional) Plastic and rubber EN-ISO 2039: 49 - 132 - 358 - 961 N TEMPERATURE: Measure range from - 40.0 to + 80.0 °C

## ONE-BUTTON AUTOMATIC MEASUREMENTS

Spin the levelling screw handle and bring your sample to make contact with the clamping hood blocking the piece. Press the START button and the measuring head approaches the sample, applies the load to perform the indentation and goes back upward; all in automatic succession without breaching a phase.

The measuring cycle is a fully motorized electronic system for automatic preloading, loading and measurements. AFFRI® System hardness testers achieve the highest level of loading, depth accuracy and measurement resolution available. Thanks to the AFFRI® System, the real indentation measurement is guaranteed without any external interference in any work environment condition.



Specimens with side steps or "U" shape can be tested in the inside area.



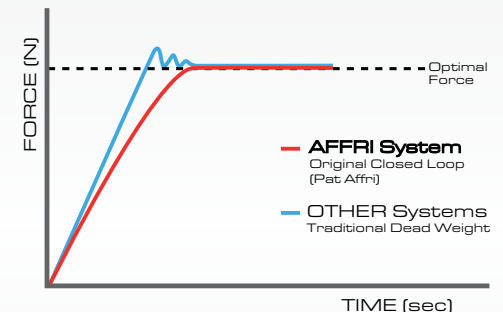
! Fully motorized and automatic, the test cycle is not affected by operator influences and can easily be used by operators of every level.

## LOAD CELL AND CLOSED LOOP TECHNOLOGY

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 result is correct and absolute, saving time and money, thus increasing output and productivity



# LD SERIE

## MOTORIZED VERTICAL STROKE

The LD3000 measuring head is fully motorized with a vertical sliding stroke of 30 mm / 1.2". When testing unstable samples or deflective parts, the measuring head will follow the sample without losing contact, compensating any frame deflection during the test cycle. Accurate results are assured even with oiled, dusty or dirty pieces. Easy and fast hardness measurements on pieces with different thicknesses without acting on the tester head or elevating screw.

The top surface referencing and the auto-compensation system 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 30 mm / 1.2" of vertical stroke.

## CLAMPING SYSTEM

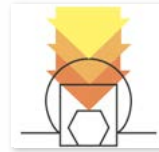
Secure contact with the specimen is always maintained, even in the unlikely event of any specimen movement during the operation cycle. No additional support accessories are required.

The clamping system assures perfect stability of any test piece throughout the test cycle.





## ANY TEST POINTS



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.

## EXTREME PRECISION

The LD3000 hardness tester guarantees maximum reliability even in bad conditions. The synergy between the tester features allows for a correct result even if the piece is badly positioned. The measurement is not compromised if the piece is dirty with oil or dust.

## ELEVATING WORKING BASE

Vertically sliding chromed work table capable of bearing masses up to 3000 kg which allows for steady hardness measurements on bulky or irregular pieces. It is possible to install different types of piece holder anvils: from large plane tables to V shaped anvils or special solutions for irregular specimens.



## L.I.S.A.

Laser pointing system (Pat. AFFRI). Allows for a precise test position pointing before the contact between the indenter and the sample. Excellent solution for gear teeth, blades and cutting tools edges.



## 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.

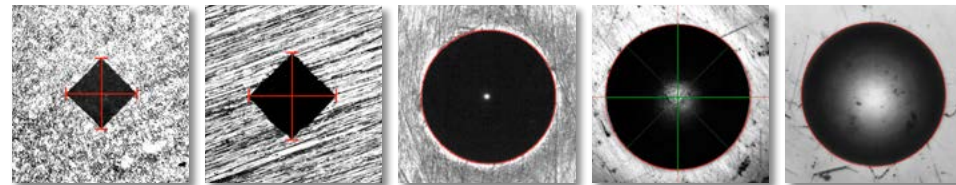


# LD 3000 A



## AUTOMATIC MICROSCOPE

The LD3000A measuring probe is a light and handy system which can work in any direction. The microscope uses a high definition camera for the automatic reading of the indentation diagonals or diameter. It is equipped with a powerful LED light source with a long life span.



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

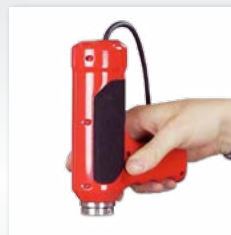
The software controls the whole measurement avoiding settings errors or operators mistakes. The repeatability of the automatic measure avoid human subjectivity.

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

HBW 2.5/15.62	HBW 2.5/31.25	HBW 2.5/62.5	HBW 2.5/187.5	HBW 5/25
HBW 5/62.5	HBW 5/125	HBW 5/250	HBW 5/750	HBW 10/100
HBW 10/250	HBW 10/500	HBW 10/1000	HBW 10/1500	HBW 10/3000

### ISO 6507 - ASTM E384 (Vickers HV tests):

HV3	HV5	HV10	HV20	HV30	HV50	HV100
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### AVAILABLE PROBES:

Probe A:	Objective 20X - For ball indenters of $\varnothing$ 5-10 mm and $>$ HV10
Probe B:	Objective 40X - For ball indenters of $\varnothing$ 1-2.5 mm and HV3 - HV5



## EASY TO USE

It is extremely simple to use: Put the test probe on the surface to find the indentation and push the red button on the side of the handle. The result immediately appears on the wide graphic display and the tester is once again ready for a new measurement.



Magnetic base for safe clamping on any iron sample. Stable positioning when reading the indent with no need to hold the probe with the hand.



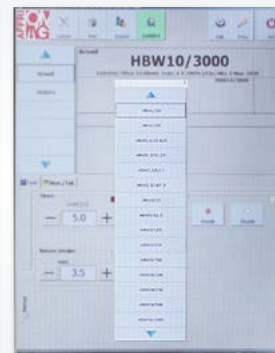
Automatic light and contrast adjustment with live immediate correction on any dark or bright sample surface.

## THE TOUCHSCREEN AND THE SOFTWARE

Wide touchscreen for easy test planning and a clear view of results. User friendly Windows® interface. Setup 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.



Clear view of the indent and the tested area



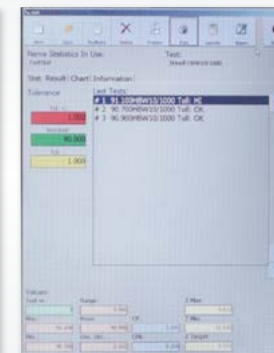
Selection of the hardness scale and the test parameters



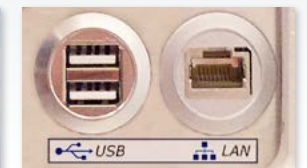
List of results with tolerances LOW-OK-HIGH and statistics



Three types of graphic charts including standard deviation



Managing of results, report templates and printing



USB and LAN outputs. Connect to database networks, PC's and printers, to download data or for final custom reports.

# LD 3000 B



## AUTOMATIC ROCKWELL AND BRINELL HBWT

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 clamping and activation of the reference surface point
3. Automatic preloading and loading
4. Automatic measure
5. Automatic return stroke at programmed distance

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



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
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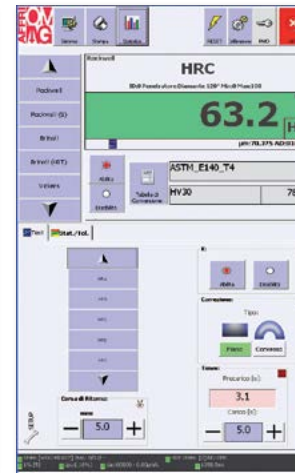
## DIRECT DEPTH READING

The LD3000B 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. Thanks to the AFFRI® System, the real indentation measurement is guaranteed without any external interference in any condition.

The LD3000B can generate Vickers and Brinell indentations which can be measured using the optional microscope and the relative tables.



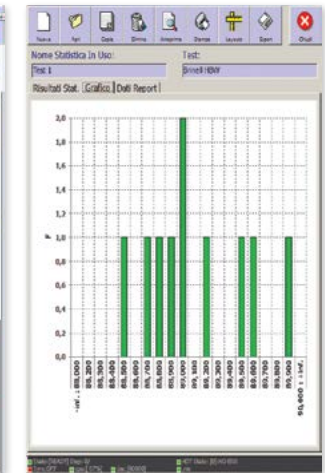
Brinell HBWT tests



Rockwell HRC test

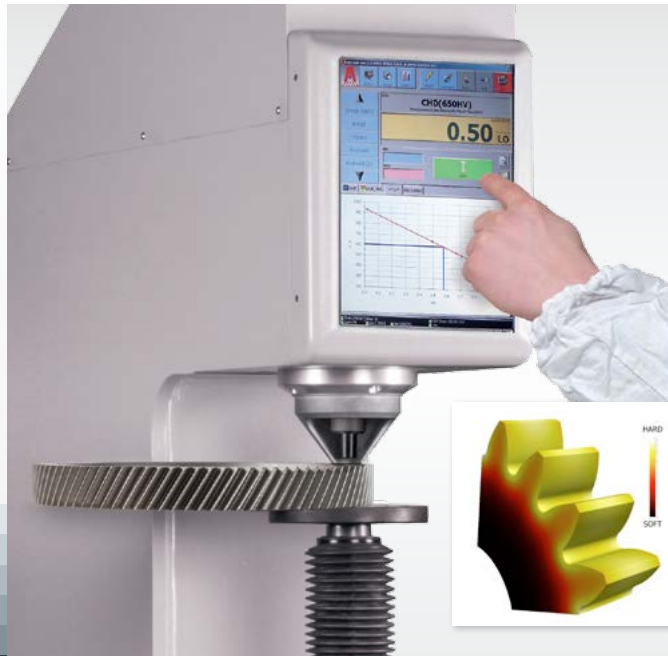


List of results, statistic and graphic chart



Standard deviation chart

The LD3000B performs every hardness scale for universal use in your own laboratory. It perform direct reading for Rockwell and Brinell HBWT up to 3000kgf and can also be used to generate Vickers and Brinell HBW indentation.

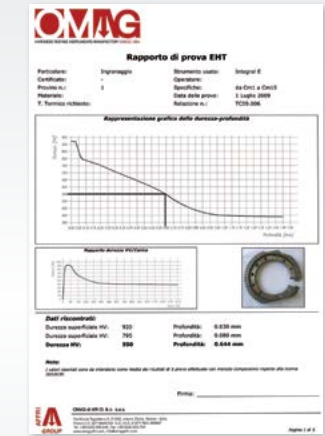


## SPECIAL MODEL FOR HEAT TREATMENT

AUTOMATIC CHD WITH NON DESTRUCTIVE METHOD (Model LD3000AF)

The hardness tester LD 3000 AF 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!



## 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 thinplate  
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

O22.0.3.010 - Clamping base for a secure lock of the sample  
A010.0.021 - Bench table for hardness tester  
A010.0.040 - Table to move test piece from indentation to optic position  
A022.0.002 - AUTO START command trough pedal for series tests  
431216 - Microscope 20x div 0.01 field 6 mm, including LED  
A022.0.003 - EASYBRINELL Automatic portable microscope including camera and tablet  
A095.0.009 - Probe with objective 40x for ball 2.5 (for EASYBRINELL)  
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 solution 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.

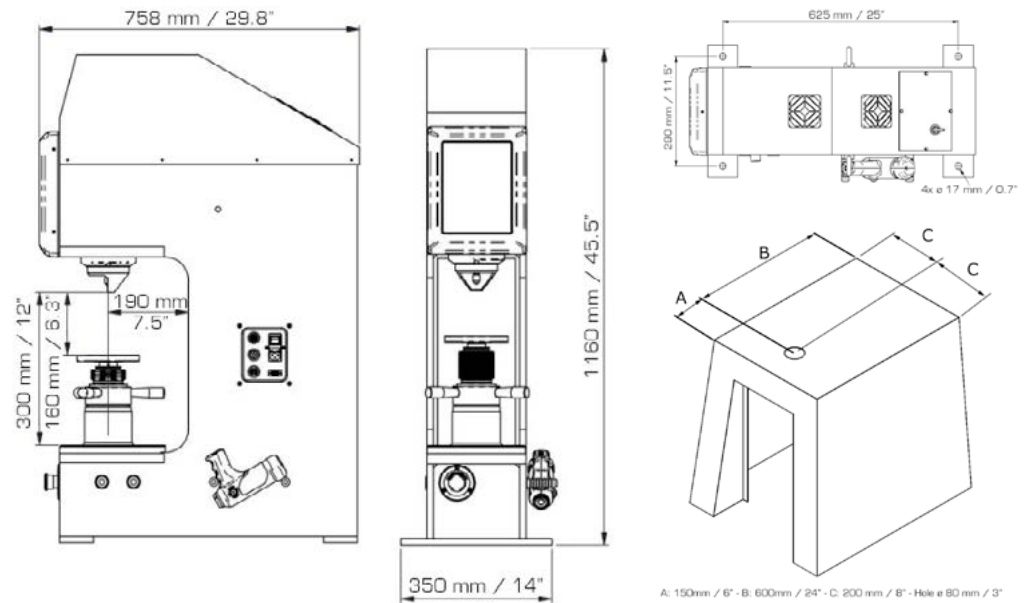
**All AFFRI accessories are customizable according to customers specifications, depending on dimensions and geometry of the samples and finished products.**

## REAL TIME SUPPORT

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

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





## NEED MORE SPACE?

INCREASE HEIGHT CAPACITY UP TO 300mm / 12"

The hardness tester LD 3000 is equipped with an elevating screw which holds the sample and can move towards the indenter from a distance of 160mm / 6.3". 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.



**AFFRI**<sup>®</sup>

# LD SERIE

## FORCE RANGE

Preload:	29.42 - 98,1 N (3 - 10 kgf)
Rockwell:	588.4 - 980.7 - 1471 N (60 - 100 - 150 kgf)
Superficial Rockwell:	147.1 - 294.2 - 441.3 N (15 - 30 - 45 kgf)
Brinell:	98.07 - 153.2 - 294.2 - 306.5 - 612.9 - 1839 - 2450 - 4900 - 7350 - 9807 - 29403 N (10 - 15.6 - 30 - 31.2 - 62.5 - 187.5 - 250 - 500 - 750 - 1000 - 3000 kgf)
Vickers:	29.42 - 49.03 - 98.07 - 147.1 - 294.2 - 490.3 - 980.7 N ( 3 - 5 - 10 - 15 - 30 - 50 -100 kgf)

## LD3000 FEASIBLE TESTS

Brinell / Vickers:	Generate indentation
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## LD3000A FEASIBLE TESTS - Automatic indentation reading with onboard LCD and portable probe

Brinell HBW:	1/10 - 1/30 - 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
Vickers:	HV 3 - HV 5 - HV 10 - HV 20 - HV 30 - HV 50 - HV 100

## LD3000B FEASIBLE TESTS - Automatic Brinell HBWT and Rockwell measurements

Rockwell:	HRA - HRB - HRC - HRD - HRF - HRG - HRL - HRM - HRR
Superficial Rockwell:	HR15N - HR30N - HR45N - HR15T - HR30T - HR45T - HR15S - HR30S - HR45S - HR15W - HR30W - HR45W - HR15X - HR30X - HR45X - HR15Y - HR30Y - HR45Y
Brinell HBWT:	2.5/62.5 - 2.5/187.5 - 5/125 - 5/250 - 5/750 - 10/500 - 10/1000 - 10/1500 - 10/3000
Brinell HBW / Vickers:	Generate indentation

## TECHNICAL DATA

Accuracy:	Better than 0.5 %
Principle of Operation:	Load Cell and Closed Loop (Affri patent)
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-E384 / JIS
Indenter Stroke:	30 mm
Vertical Stroke:	Screw stroke 150 mm. Removing the elevating screw, the vertical capacity increase till 300 mm for large parts.
Depth Capacity:	190 mm
Tolerable weight:	2000 kg. Removing the elevating screw, the tolerable weight can be increased to more than 3000kg.
Dwell Time:	From 5 to 60 seconds programmable
Temperature Range:	From 10 °C to 35 °C
Data Output:	LD3000:RS232 / LD3000A - LD3000B: USB and LAN
Power Supply:	110 or 220 V / 50÷60 Hz
Software:	Affri - OMAG
Fields Of Use:	For all metals: iron, steel, tempered steel, brass, aluminum and nitriding, cementation, hard facing, plastics
Packaging:	140x 100 x 65 cm / 350 kg



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