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WOLPERT **W** GROUP

75 YEARS HARDNESS TESTING



## WOLPERT GROUP

WOLPERT Group manufactures comprehensive ranges of hardness testers for over 75 years. Our program covers Vickers, Knoop, Rockwell, Brinell, Shore and combined Universal models. Beside that, we offer any type of hardness reference blocks, accessories, and fixtures.

WOLPERT hardness products are predominantly used to determine the hardness of metals, alloys, small precision parts, wire, and plastics ranging from the softest bearing materials to the hardest steels. Main customer base is heat treat analysis and the automotive, aerospace, steel, and transportation equipment industries.

WOLPERT Group is the exclusive worldwide distribution partner for WILSON Instruments USA (an Instron Corporation), outside of the America's. The state-of-the-art closed loop Rockwell 2000 Series and Tukon 2100 Series for Vickers/Knoop, are being used every day around the world to determine the hardness of countless parts and materials.

Our Vickers/Knoop hardness testers are widely used for determining the hardness of small precision parts, thin material or wire, coatings, and performing case depth determinations.

We also offer software-based measurement packages designed to increase productivity, accuracy and efficiency through automating the measurement and/or the stage navigation process.



# INDEX - WOLPERT VICKERS SELECTION GUIDE

	401-MVA	401-MVD	402-MVA	402-MVD	403-SVA	403-SVD	450-SVA	450-SVD	432-SVA	432-SVD	452-SVA	452-SVD	2100-TUKON (10N)	2100-TUKON (500N)	2100-TUKON (10N+500N)
Integrated hardness calculator	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Automatic load application	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Analogue eyepiece	■		■		■		■		■		■		■		■
Digital eyepiece		■		■		■		■		■		■	■	■	■
Built-in Printer		■		■		■		■		■		■	□	□	□
Vickers Indenter	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Knoop Indenter	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Load range 10g - 1000g	■	■											■		
Load range 10g - 2000g			■	■											
Load range 0,3kg - 30kg					■	■			■	■				■	■
Load range 1kg - 50kg							■	■			■	■		■	■
Load range 10g - 50kg															■
Magnification (total)															
40x													□	□	□
100x	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
200x													□	□	□
400x	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
500x		□		□		□		□		□		□	□	□	□
600x		□		□		□		□		□		□	□	□	□
800x													□	□	□
1000x													□	□	□
XY-stage	■	■	■	■	□	□	□	□	□	□	□	□	□	□	□
Upgradable with CCD-system	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Motorized Z-axis			■	■					■	■	■	■	■	■	■
Auto-turret													□	□	□

■ standard  
□ optional



# PORTABLE VICKERS DYNATESTOR Series WHV - 400

For portable accurate testing on metals, plastics and ceramics

- Suitable for hardness tests on metals, plastics, ceramics
- Direct reading in Vickers HV, and conversion to HRC, HRB, HB and UTS
- High reproducibility within  $\pm 1\%$
- Extensive range of applications at locations difficult to access
- Large memory, statistics and data output
- Windows software for testing, data processing and documentation
- Ultrasonic Contact Impedance test principle: very accurate!

Measuring principle	According to the UCI method
Indenter	Vickers diamond (angle 136°)
Test load probes	3N, 10N, 20N, 30N, 49N, 98N (selectable)
Measuring range	Vickers HV 10 - 3000 (direct)
	Rockwell HRC 20 - 68 (conversion)
	Rockwell HRB 41 - 99.5 (conversion)
	Brinell HB 76 - 447 (conversion)
	UTS N/mm <sup>2</sup> 255 - 2180 (conversion)
Reproducibility	Vickers HV $\pm 1\%$
	Rockwell HRC $\pm 0.5$
	Rockwell HRB $\pm 1.2$
	Brinell HB $\pm 1\%$
Applicable test materials	Primarily metals and plastics or ceramics may be tested using a standard calibration block
Display	Large graphical backlit display, contrast and brightness adjustable, display of hardness scales HV, HRC, HB
Calibration	Storage of up to 20 calibrations for different materials
Memory	1000 readings, storage in batches with date, hour, and go/no go judgment
	Optional memory for 30.000 readings
Statistics	Mean value, minimum, maximum, standard deviation absolute and relative. Delete single readings
Interface	Serial: RS-232C and RS485
	Parallel: Printer
Printer output	Prints hardness values, hour and date
	Prints statistics of stored data
Power	Power supply 100-240V / 50-60Hz
Batteries	Rechargeable 9.6V / 1700 mAh
	(2.5 hours charging, 5 hours continuous use)
Operating temperature	0 - 50°C
Dimensions	Display unit: 85 x 225 x 198mm
	Probe: 19.5 diameter x 175mm length
Weight	2200gr (including probe 190gr)



# PORTABLE VICKERS DYNATESTOR Series WHV - 400

For portable accurate testing on metals, plastics and ceramics

## Accessories

*Check with your WOLPERT agent for specified packages of standard delivery equipment included with this hardness tester.*

Main unit

Probe with one fixed load (to be selected)

Cable

Suitcase

High precision stand for probe WH4S

Probe shoes for flat surfaces

Probe shoes for convex surfaces 10-50mm

Probe shoes for convex surfaces 50- 250mm

Probe SL type (slim nose)

Probe shoes for probe SL type (width 21mm)

Windows software program WH4DAT for data transmission to the PC (incl. cable)

Windows software program WH4CON for production-following hardness testing

Plastic handle for probe WH4G

Carrier bag for main unit and accessories

SPS Option for use in automated testing systems

Measurement of hardening depth or sinter materials



# VICKERS Series 401/402 MVA/MVD

## Microhardness testers for HV0.01 to HV2

The Series 400 Vickers and Knoop testers are versatile, user-friendly, and provide an affordable, reliable solution for accurate Vickers and Knoop hardness scale testing, both for quality assurance or metallurgical research. The 400 Series is available with manual or automatic turrets and comes equipped with crisp optics that have a total magnification of 100x and 400x for microhardness and 100x and 200x for macro Vickers readings. The systems feature eight dial selectable test forces ranging from 10g to 50kg (see table). For easy sample mounting, models are equipped with a 100x100mm precision XY stage with 25mm movement in each direction.

HV0.01 up to HV2, and HK0.01 to HK2  
Direct load selection automatically changes in test settings

Solid eyepiece with analogue reading or automatic encoder

Two optical paths, for eyepiece and ccd-camera

Manual or motorized turret operation enabling automated test cycle by the push of start button

Smooth XY-stage 100x100mm, travel 25x25mm, motorised versions available

HV0.3 up to HV50, and HK0.3 to HK50  
Direct load selection automatically changes in test settings

Hardness diagonals, value, statistics and conversions on backlit display

Easy WOLPERT+ menu for safe & sound operation. Language selection

Built-in thermal printer on all models MVD/SVD

Adjustable halogen light source, with green or blue filter, for crisp images

WHV-CCD system for semi- and full-automatic traverse and pattern testing by pc support and motorised XY stage

# VICKERS Series 430/432/450/452 SVA/SVD

Micro/Macro hardness testers for HV0.3 to HV50

## Applications Series 400

- Steels, non ferrous metals, IC wafer
- Thin plastic, metallic foils, plating, coating, surface layers, laminated metals
- Effect of heat treatment
- Hardness depths of carburized layer and flame hardened layer
- Cemented carbide, ceramics, steels, non-ferrous metals
- Thin plates, metallic foils, plating, miniature objects
- Hardness resulting from welding or deposition

Technical specs

## Accessoires

*Check with your WOLPERT agent for specified packages of standard delivery equipment included with the hardness tester.*

Vickers and Knoop indenters  
Objectives 10x, 20x, 40x and 50x  
XY-stage with analogue or digital micrometers  
Analogue or digital eyepiece 10x  
Built-in thermal printer  
RS232 data output  
Four adjustable feet  
Level gauge  
Hardness reference blocks HV/HK  
Spare halogen lamp  
Fuse  
Precision vices  
CCD-Video test systems Level 1-4  
Motorised XY-stages

# VICKERS Series 401/402 MVA/MVD

## Microhardness testers for HV0.01 to HV2



Model	401-MVA	401-MVD	402-MVA	402-MVD
Vickers scales	HV0.01, HV0.025, HV0.05, HV0.1, HV0.3, HV0.5, HV1 (HV2)			
Test loads	10 - 25 - 50 - 100 - 200 - 300 - 500 - 1000gf			
Test force selection	Dial			
Accuracy conform to	EN-ISO 6507, ASTM and JIS			
Load control	Automatic (loading/dwell/unloading)			
Load duration (Dwell time)	5 to 99 sec			
Turret	Manual		Motorized	
Eyepiece magnification	10x			
Analog encoder	■	-	■	-
Digital encoder	-	■	-	■
Resolution	0.5µm	0.1µm	0.5µm	0.1µm
Objectives	10x, 40x (for MVD 20x, 50x, 60x optional)			
Total magnification	400x (for measurement) 100x (for observation)			
Measuring range	200µm			
Optical path	2-way switchable : eyepiece/camera			
Light filter	Green and Blue			
Light source	Halogen lamp			
Display	Length of diagonal, hardness converted value, test force N, kg			
Hardness value	5-digit			
Diagonal length	4-digit (D1, D2)			
Built-in printer (values & statistics), RS232 serial	-	■	-	■
No., average, S.dev., range, real time after each test	-	■	-	■
Conversion: Brinell, Tensile, Rockwell, Superficial Rockwell	-	■	-	■
Maximum specimen height	85mm (2.55")			
Depth from the centreline	120mm(3.35")			
XY stage	100 x 100mm			
Dimensions	25 x 25mm			
Travel range	0.01mm			
Minimum reading	Range: 10 to 38°C (50 to 100F)			
Operating temperature	10% to 90% non condensing			
Humidity	513 x 320 x 470 mm			
Dimensions	36 kg			
Weight	110-220V AC, 60/50Hz			
Power supply				

## VICKERS INDENTERS AND VICKERS REFERENCE BLOCKS

With calibration certificates UKAS, DKD or NVLAP/ASTM

WOLPERT Group offers a wide range of indenters & reference blocks. All certified indenters and reference blocks will be issued with a certificate traceable to internationally recognised standards such as UKAS, DKD or ASTM. We also offer factory certified indenters and reference plates.

Indenters type WOLPERT with UKAS, DKD, ASTM  
 Vickers Pyramid 136° (≥HV5)  
 Low load Vickers Pyramid 136° (HV0,2 to < HV5)  
 Micro Vickers Pyramid 136° (HV0,01 to < HV0,2)  
 Knoop



# VICKERS Series 430/432/450/452 SVA/SVD

## Micro/Macro hardness testers for HV0.3 to HV50

Model	430-SVA	430-SVD	432-SVA	432-SVD	450-SVA	450-SVD	452-SVA	452-SVD
Vickers scales	HV0.3, HV0.5, HV1, HV3, HV5, HV10, HV20, HV30				HV1, HV2, HV3, HV5, HV10, HV20, HV30, HV50			
Test loads	0.3 -0.5- 1- 3- 5- 10- 20- 30kgf				1 - 2 - 3 - 5 - 10 - 20 - 30- 50kgf			
Test force selection	Dial							
Accuracy conform to	EN-ISO 6507, ASTM and JIS							
Load control	Automatic (loading/dwell/unloading)							
Load duration (Dwell time)	5 to 99 sec							
Turret	Manual		Motorized		Manual		Motorized	
Eyepiece magnification	10x							
Analog encoder	■	-	■	-	■	-	■	-
Digital encoder	-	■	-	■	-	■	-	■
Resolution	0.5µm	0.1µm	0.5µm	0.1µm	0.5µm	0.1µm	0.5µm	0.1µm
Objectives	10x, 20x (for SVD 40x, 50x, 60x optional)							
Total magnification	100x, 200x							
Measuring range	100x: 800µm; 200x: 400µm							
Optical path	2-way switchable : eyepiece/camera							
Light filter	Green and Blue							
Light source	Halogen lamp							
Display	Length of diagonal, hardness converted value, test force N, kg							
Hardness value	5-digit							
Diagonal length	4-digit (D1, D2)							
Built-in printer (values & statistics), RS232 serial	-	■	-	■	-	■	-	■
No., average, S.dev., range, real time after each test	-	■	-	■	-	■	-	■
Conversion: Brinell, Tensile, Rockwell, Superficial Rockwell	-	■	-	■	-	■	-	■
Maximum specimen height	210mm,							
Depth from the centreline	160mm							
XY stage	Optional							
Dimensions	Optional							
Travel range	Optional							
Minimum reading	Optional							
Operating temperature	Range: 10 to 38°C (50 to 100F)							
Humidity	10% to 90% non condensing							
Dimensions	566 x 300 x 710mm							
Weight	55 kg							
Power supply	110-220V AC, 60/50Hz							

WOLPERT hardness reference blocks are used for annual verification and calibration of hardness testing machines, as well as for periodical check and sometimes for overtaking of hardness scales on a hardness testing machine. That's why hardness reference blocks are a necessary help of industrial Quality Management. Only the use of high quality, precise hardness reference blocks calibrated to applicable standards can ensure the functionality and relative reliability and accuracy of measurement of a hardness testing machine. A hardness reference block shall only be used as according to the standards to that method and test condition for which it was calibrated.

All WOLPERT hardness reference block certificates for Vickers are based on following international standards:

Vickers DIN-EN-ISO 6507-3 or ASTM E 92/ E 384  
 Knoop ISO 4545-3 or ASTM E 384

Order your blocks based on nominal values. Please ask for our separate hardness block list of nominal hardness values available per hardness scale and type of certificate. Of course WOLPERT can also supply certified indenters and reference blocks for other Hardness scales such as Brinell and Rockwell.



## High-end Vickers/Knoop testers ranging from HV0.005 to HV50

The Tukon 2100 tester is ideal for quality assurance, quality control, research and development and metallurgical departments. It can be used to monitor hardness during development, fabrication, heat treatment and the performance analysis of a variety of products and components.

The WILSON design team has used its rich experience to create the industry standard for accuracy and repeatability in hardness testing. The Series 2100 closed-loop control electronics system instantly measures and controls the force applied to the specimen, resulting in unmatched accuracy.

State-of-the art sensors and closed loop control technology combine to make the Tukon 2100 the most precise, consistent and accurate instrument for hardness testing. The system is built around precision force sensors and electromechanical drive systems to produce the most repeatable, error-free and accurate test results.

The Tukon 2100 has a five position turret that can be custom configured to meet your individual requirements and budget. Start off with the Tukon 2100 base frame and then build up your own tester by filling the five positions with additional load cells or objectives, or leave them empty and upgrade later. The Tukon 2100 is entirely modular and can be easily upgraded at your facility with most options.

### Superior Test Control

Traditional hardness testing systems use 'open-loop' design, which lack the ability to measure and ensure that proper loading conditions have been achieved. The Tukon 2100 uses 'closed-loop' control technology to constantly measure and control the force applied to the sample. The dramatically improved accuracy and flexibility leads to a nearly unlimited selection of test loads and loading/unloading rates for virtually any test condition imaginable.

### Superior Accuracy

One of the many sources of inaccurate results is the improper application of the test force. Traditional systems have mechanical components that can wear over time, resulting in overshoot and higher than expected loads. The result is potentially, inaccurate hardness readings. The control system in the Tukon 2100 virtually eliminates overshoot through sophisticated algorithms that detect contact with the surface and anticipate the maximum desired test load.

### Superior Repeatability

Accurate results depend on the ability to produce consistent, repeatable test conditions. The Tukon 2100 is in a class by itself in this category by virtue of the control it has over loading rate, dwell time and unloading rate.

### Superior Productivity

Since the application and removal of the test loads are fully automatic, repeatability is excellent, testing time is reduced, and throughput is increased. As a result, costly and time consuming rework is eliminated. An optional multi-mount clamping fixture is also available for specialized applications to further increase the productivity and throughput of a Tukon 2100 microhardness test system. When used with VD-TESTOR computerised system, up to six mounts can be programmed to automatically indent and read individual hardness data in one continuous event. Utilizing its pre-set load and program features, the system will automatically indent at designated surface locations. Once the indent operation is complete, the automated image analysis function performs indentation readings along the traverse of each of the mounted samples. As a result, operator time is reduced to the set up of blocks and the recall of pre-programmed indent and measurement patterns, eliminating time associated with manual operation, leading to greater testing efficiency and productivity.



## High-end Vickers/Knoop testers ranging from HV0.005 to HV50

### Features

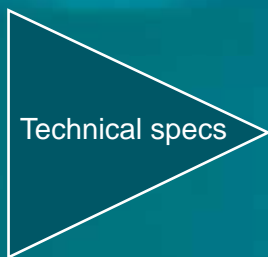
Indenter mounted directly on load cell - improves accuracy and repeatability of results

Exclusive turret design – choose from a selection of indenters, load cells and objectives to suit your application

Easy to use, adjustable, ergonomic, backlit user interface

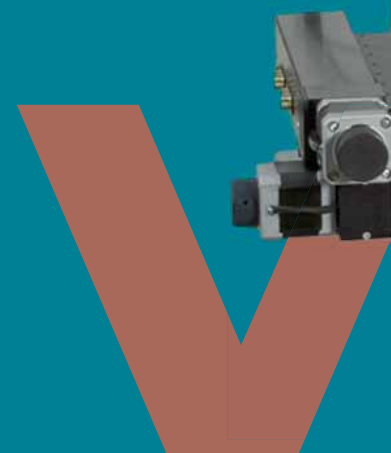
Precision X-Y stage for precise positioning of samples

Test control panel with high speed jog, ultra fine focus and light control



## High-end Vickers/Knoop testers ranging from HV0.005 to HV50

Model	2100 low load	2101 high load	2102 low & high load
Loadcell	10N	500N	10N & 500N
Vickers scales	HV0.01, HV0.025, HV0.05, HV0.1, HV0.3, HV0.5, HV1	HV0.3, HV0.5, HV1, HV3, HV5, HV10, HV20, HV30, HV50	from HV0,01 to HV50
Test loads	10 - 25 - 50 - 100 - 200 300 - 500 - 1000gf	0.3 - 0.5- 1- 3 - 5 - 10 - 20 - 30 - 50kgf	from 10gf to 50kgf
Test force selection	Automatic		
Accuracy conform to	EN-ISO 6507, ASTM and JIS ±1.5% < 200g, ±1% > 200g		
Load control	Automatic (loading/dwell/unloading)		
Loading speed	Variable, user defined		
Load duration (Dwell time)	0,1 to 99 sec (ASTM E384 10 sec)		
Eyepiece	Dual line filar eyepiece with 10x Digital Encoder		
Resolution	0,03µm @ 500x		
Turret	5 position; Manual or Motorized rotating		
No. of objectives	4 objectives		3 objectives
Objectives	4x, 10x, 20x, 40x, 50x, 60x, 80x, 100x		
Total magnification	40x, 100x, 200x, 400x, 500x, 600x, 800x, 1000x		
Z-axis movement	Jogspeed 500mm per min & Fine Focus		
Optical path	2-way permanent : eyepiece/camera		
Light source	12V 30W Halogen lamp		
Light filter	Green, Blue, grey and Polarized		
Optical functions	Field aperture, numerical aperture (variable)		
Display	Length of diagonal, hardness converted value, test force N, kg		
Result display resolution	0,1HV or 0,1HK		
Hardness value	5-digit		
Diagonal length	4-digit (D1, D2)		
Memory	1000 results		
Output	Adjustable bi-directional RS232C, I/O Port TTL		
Statistics	No., highest/lowest hardness, average, S.dev., range, real time after each test		
Conversion	Rockwell, Superficial Rockwell, Brinell, Tensile		
Maximum specimen height	101mm (4.0 inches)		
Depth from the centreline	165mm (6.5 inches)		
XY stage (optinal)	90 x 90mm (3.5in x 3.5in)		
Dimensions	25,4 x 25,4mm (1 inch)		
Travel range	0.025mm (0.001in)		
Minimum reading	Range: 10 to 38°C (50 to 100F)		
Operating temperature	10% to 90% non condensing		
Humidity	952mm, 330mm, 597mm (37.5in, 13.0in, 23.5in)		
Dimensions	68kg (105lbs)		
Weight	100-240V AC, 60/50Hz, 340 Watts		
Power supply			



# VICKERS COMPUTERISED TEST SYSTEM DV-TESTOR

Full automatic hardness determination, featuring hardness depth graphics

WOLPERT DV-TESTOR computerised automatic test systems are software based measurement packages designed to increase productivity, accuracy and efficiency by automating the measurement and/or the stage navigation process. If you are looking for a way to lower testing costs while maintaining strict compliance with ISO/ASTM standards, DV-TESTOR can provide you with a system to meet your requirements. We offer four distinctive software levels from basic to full automatic testing. Please refer to the overview on next pages.

Increase productivity, accuracy and efficiency



Technical specs

# VICKERS COMPUTERISED TEST SYSTEM DV-TESTOR

Full automatic hardness determination, featuring hardness depth graphics

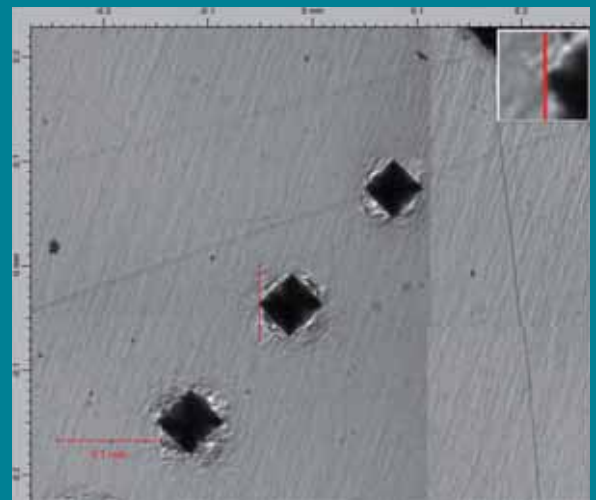
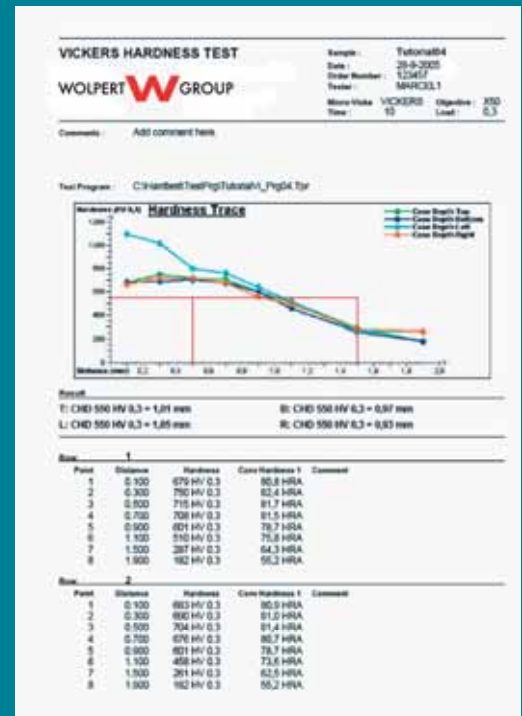
Unique, user friendly system combines the power, speed and flexibility of a personal computer with the precision of our micro- and MacroVickers hardness testers, both the 400-series and 2100 Tukon. It accommodates a full spectrum of microhardness testing requirements.

## User-friendly test procedure

Simple test procedure, user defines simple or complex pattern for automatic positioning and indentation. The software automatically measures and records indent size and determines accordingly the hardness result. Results display includes depth versus hardness XY plotting as well as statistics and individual indent results. Ideal for industrial, production, and research applications. Measurements are made through the high-resolution video camera system. Productivity is dramatically increased due to the elimination of the time consuming, stage and eyepiece manual intervention typically associated with high quantity pattern testing.

## Features

- Auto-focus (for Tukon & level 4 400-series)
- Automatic image measurement, standard on level 4
- High resolution video camera
- Standard reporting capabilities
- Data export to Microsoft Excel or Word
- PC-connection cables (RS-232)
- Filar image measurement capability
- Conversions per DIN/ISO 50150
- Pattern saving, and recall
- Return and remeasure capability
- Variable distance point plotting
- Tester software communication
- Save, print & export image
- Comprehensive results including graphing, statistics, individual values, case depth, effective case and return and remeasure individual point ability.
- Extensive load range (10g up to 50kg)



Full automatic hardness determination, featuring hardness depth graphics

## Video filar system level 1

PC-based video indent measuring system.  
Creates a video image of the indent on the PC.  
User can measure the indent by using the computer mouse, the software then calculates the hardness.  
User friendly, easy to use accurate measurements.  
Very suitable for small indents (hard materials, thin plates, hardened layers)  
Control test procedure over PC  
Auto-measuring optional

### Features:

Software level 1  
CCD Camera  
Frame grabber card

## Video filar system level 2

PC based video indent system with one digitalised axis of the XY-stage.

### Features:

Software level 1  
CCD Camera  
Frame grabber card  
Digital micrometer add-on

Level 1 plus: Digital micrometers to measure the displacement of the XY-table, allows an accurate control of the indent coordinates.

Digital displacement measurement of work piece by Digital micrometers on the XY-stage, coordinates displayed on PC.

Suitable for testing case hardness.  
Auto-measuring optional

## Video filar system level 3

Level 2 plus: Motorized XY-stage, allows work piece movement to be controlled by mouse over the computer. The CCD-system shows the displacement real-time.

Semi-automatic configuration.

### Features:

Software level 2  
CCD Camera  
Frame grabber card  
Motorized XY-stage, incl. control unit

## Video filar system level 4

Fully automatic Vickers/Knoop hardness testing system.

Level 3 plus: Motorized turret and Z-axis both controlled by computer, to do a completely automatic hardness measurement. Even a series of automatic tests is possible with the programming function. Automatic measuring of the indentation, included.

Tester can be fully controlled by computer. Ideal to perform case depth measurements, complex patterns and traverses. Can perform dozens of measurements without user interference. Time saving!

A series of automatic indents is possible with the programming function.

Auto-measuring optional

### Features:

Software full automatic  
CCD Camera  
Frame grabber card  
Motorized XY-stage, incl. control unit  
Motorized turret  
Z-axis control (Auto focus)





ROCKWELL

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