SC METROMAT SRL

Compartimentul Comercial: 505600 - Sacele - Piata Libertatii nr.2 - tel/fax: 0268 275 212; 0268 276 807
e-mail: sales@metromat.ro - comert@metromat.ro

INNOVATEST® Durimetru Vickers, Falcon 5000

FALCON 5000
Standard features



FALCON 5000 series
Micro/Macro Vickers & low force Brinell hardness tester

If merely the best and most versatile hardness testing machine has your interest...

The Innovatest® FALCON 5000 is the most revolutionary, advanced and powerful Micro Vickers, Vickers hardness testing machine currently available.

Apart from Micro Vickers, Vickers, Knoop and low force Brinell scales, configuration of the FALCON 5000 is freely to define and offers flawless upgrades to hardness testing according to standards of Superficial Rockwell, regular Rockwell & higher force Brinell hardness scales.
In its ultimate configuration and most advanced version, the FALCON 5000 offers fully automatic advanced coordinate pattern, weld pattern and free style testing of metallic and plastic parts in any common hardness scale;

- **Micro Vickers**
- **Vickers**
- **Knoop**
- Superficial Rockwell
- Rockwell
- KIC fracture toughness
- Brinell
- HVT (Vickers depth)
- HBT (Brinell depth)
- ISO 2039 1 & 2 for plastics

Stunning test force range
The servo driven testers force actuator allows test forces from **10gf up to 250kgf**, currently unique on the world market. Great efforts have been taken by INNOVATEST® in designing our own ultra-precise load cells and force control electronics, that are the foundation of this new product.

The load/force actuator driven by top class servo technology positions the test head at light speed and at sub-micron level accuracy, in any required position.

Setting the GLOBAL standards for advanced high speed turrets
The FALCON 5000's high speed, 8 position turret, has the first in the industry, standard built in: **laser positioning system**.

- The 8 position turret also contains 2 HD, camera's, with auto focus and optical zoom system, allowing stage (over)viewing at indenter postion
- Quick change stage & anvil post
- Ultra fast, dedicated system controller with i7 processor and 2 INTEL SSD hard drives.
- Advanced report generator with extended CSV export functionality

Quick Change stage & anvil post
Alternatively to the standard ultra-fast motorized CNC stages, there is the option to install larger T-slot stages, fixed stages and a number of anvils. To save time exchanging the nearly unlimited choice of stage & anvil options, the tester has another unique feature: The "Quick Change" accessories post. Tester reconfigurationat in just seconds!

Safety first / collision detection system
In order to ensure maximum safety for the user, and to protect the tester against user errors, all FALCON models have an advanced collision detection, warning & Z-axis/test head retraction system. This system is triggered by any uncommon force on the turret and will stop & retract the test head in milliseconds. Fingers, hands and work pieces are safe, but also damage to indenters and objectives belong to the past.

Clamping device
An integrated clamping device will firmly hold the work piece against the anvil or test table while performing Rockwell or other depth measuring tests. (Optional)

Software features
Single tests, running an earlier stored test program, pattern testing, CHD, NHT, or complex testing tasks such as welding patterns, jominy, are all part of the possible configuration of the IMPRESSIONS® software and work flow control.

2D/3D hardness chart
A newly developed tool for detailed screening of hardness distribution over the entire section of for instance heat treated samples. Welcomed in materials research, as well as testing of welded connections and last but not least to give visualisation to damage analysis. (Optional)

Crack Length measurement
For those investigators requiring more in depth knowledge on materials behavior, and wish to study on fracture and fatigue crack growth, the crack growth can be predicted by using the KIC tester set up. KIC testing is part of the tester's standard configuration and measurement possibilities.

Ultra fast, dedicated system controller
The heart of the FALCON 5000 is an embedded ultra-fast system controller with i7 processor and 2 INTEL SSD hard drives. Running on Windows 7 Embedded and protected against unwanted changes by "Deep Freeze" software for all machine settings.

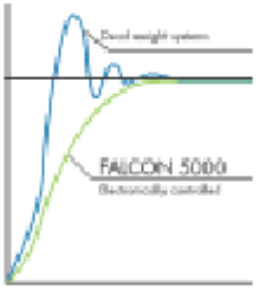
Reporting
The advanced report generator allows report set up and output control or helps to easily export CSV files for use in Excel or other MS applications.

Connectivity
Connectivity is the magic word nowadays and this goes for the FALCON too. USB3, 5 Axis Stage drivers, RJ45 LAN connection and W-LAN are standard on board.

All components and software are designed, manufactured, and integrated by INNOVATEST®, or supplied by global leading manufacturers in their particular field of industry.

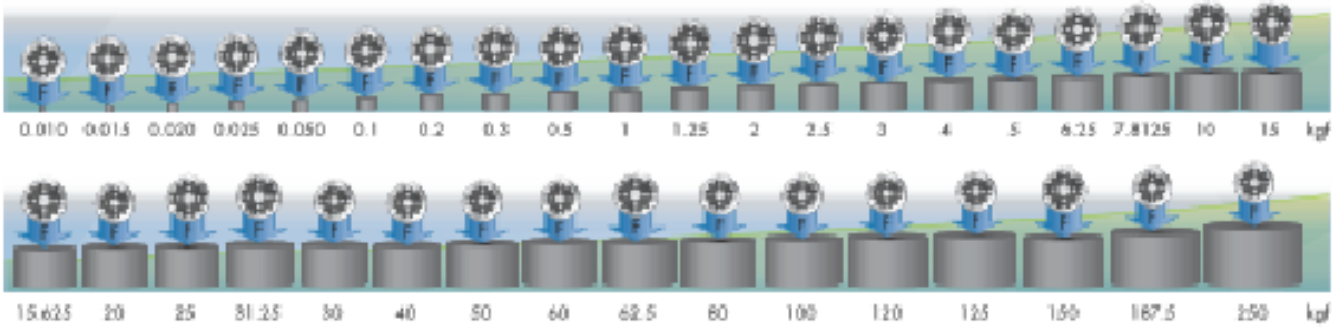
The FALCON 5000 is not only a state of the art product, it is also manufactured with great care, in The Netherlands, Europe, making use of the world's best quality components, for both electronics and mechanics.
Without a single doubt, quality is assured!
INNOVATEST® products are covered by 2 full years manufacturers guarantee, while software updates are guaranteed for 10 years. All of this, just to offer you an additional feeling of "being certain".

Stunning force range



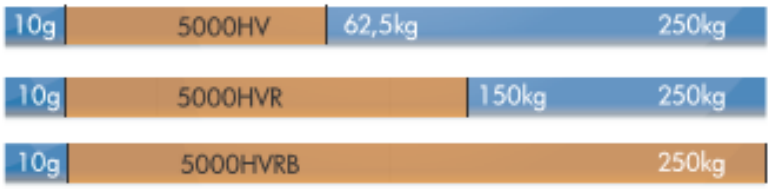
Stunning force range:
10gf up to 250Kgf over multi load cell, closed loop system.

Electronically controlled loads secure a quick and precise load application as well as a quick method change. A touch on the screen makes the correct setting and expedites automatic Z-axis positioning to the focus level, for any of the objectives or indenters chosen.



Overview of test force configurations

Test force versus model number



Note: See page 18 for order details

Scales and testing methods, depending on force configuration

Vickers - DIN EN ISO 6507, ASTM E-384



HV0.010	HV0.015	HV0.020	HV0.025	HV0.050	HV0.1	HV0.2
HV0.3	HV0.5	HV1	HV2	HV2.5	HV3	HV4
HV5	HV10	HV20	HV25	HV30	HV40	HV50
HV100	HV120					

* All test forces are also available for the HVT scales

Knoop - DIN EN ISO 4545, ASTM E-384



HK0.01	HK0.02	HK0.025	HK0.05	HK0.1	HK0.2
HK0.3	HK0.5	HK1	HK2	HK5	HK10
HK20	HK30	HK50			

Brinell - DIN EN ISO 6506, ASTM E-10



HB1/1kgf, HB1/2.5kgf, HB1/5kgf, HB1/10kgf, HB1/30kgf;
HB2.5/6.25kgf, HB2.5/15.625kgf, HB2.5/31.25kgf, HB2.5/62.5kgf;
HB5/25kgf, HB5/62.5kgf, HB5/125kgf HB5/250kgf;
HB10/100kgf, HB10/250kgf;

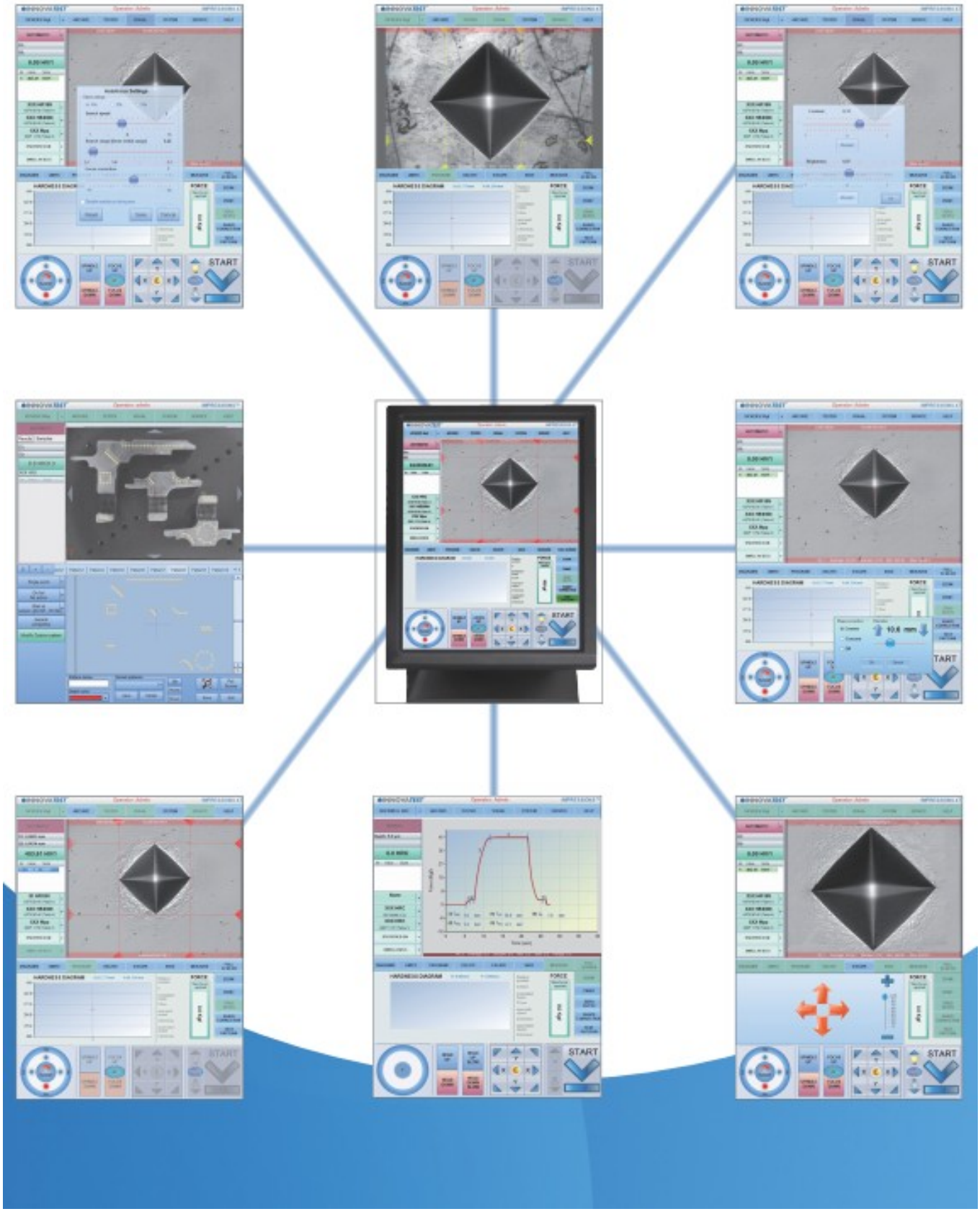
* All test forces are also available for the HBT scales

Rockwell - DIN EN ISO 6508, ASTM E-18



PRE LOAD 3kgf & 10kgf
MAIN LOAD 15kgf, 30kgf, 45kgf, 60kgf, 100kgf & 150kgf

IMPRESSIONS™



Standard functionality

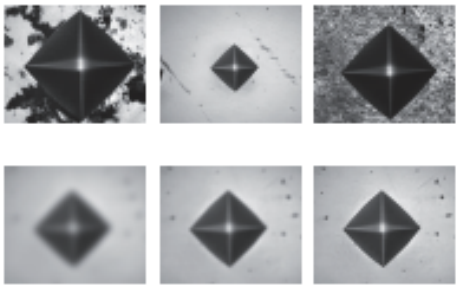
Intuitive operator interface IMPRESSIONS™

IMPRESSIONS™ is the ultra-modern user interface of all Innovatest hardness testing machines. IMPRESSIONS™ offers unparalleled simplicity in operation but yet, includes the most advanced functions found in hardness testing.
With only a minimum of operator skills required, IMPRESSIONS™ leads you through the set up process, in just seconds, not even minutes. Standard features, complex tasks and advanced work flow at your fingertips.

Typical examples are:
Scale setting, Test methods setting, Limits, Conversion to other hardness scales, Graphics, File saving, Test program saving, Zoom function, Full screen, Test pattern, CNC stage control, Focus control, Z-Axis control.

All standardized hardness testing methods have been programmed in the software and can be selected at any time.

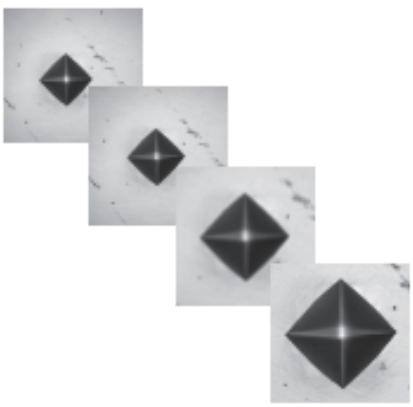
Fully automatic image evaluation



IMPRESSIONS™ tester control evaluates sharpness and brightness of all camera images and measures the indentation independent of the operator.
The automatic adjustment of the picture parameters ensures reproducible test results, even for different materials and difficult, scratched or damaged test surfaces.

The standard fast auto-focus technology guarantees a sharp image of the indentation, in just a few seconds.

Indent zoom magnification



Calibrated stepless zoom of the indent image provided by the objective, while maintaining the same high standard of image quality.
This unique zoom system is a standard feature on the entire FALCON series.

Combined with the 4 objectives installed on the 8 position turret, the zoom system allows a further magnification of the indentation, even up to 2500X.

More standard functionality...

Dynamic Z-Axis height adjustment



Intelligent Precision positioning of the work piece is a standard feature on the FALCON series.

The 2 button control system allows ultra-fast pre-positioning, while the scroll wheel provides a pulse by pulse control on the actual fine adjustment on the focus position.

A dynamic system, as the speed depends on the selected magnification of the vertical microscope and camera system.
Speed varies further by the velocity of the scroll wheel and is therefore in perfect harmony with the displacement feeling feedback to the operator.

* All FALCON models have a standard auto-focus system!

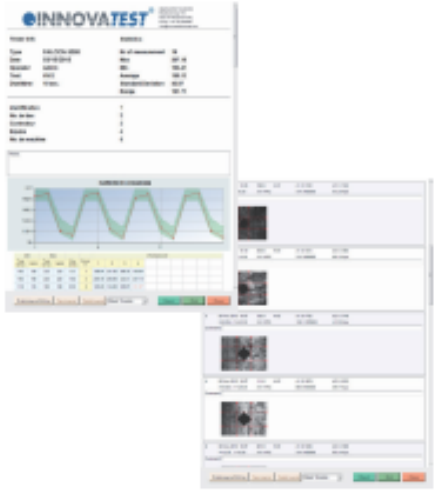
User defined programs



Save/load/delete work piece tester settings.
Set up your tester as required for your work piece, save the settings with a specific name or number. This function reduces the tester setup efforts for the operator and significantly increases safety and efficiency.

All user-specific settings for the particular work piece such as; test method, objective, pattern settings etc., are stored on the testers dual SSD drives, RAID system.

Report generator



The IMPRESSIONS™ system incorporates a very advanced report generator.
The report generator allows you to publish all testing results and graphics, including pictures of the indentations in an easy to edit and easy to customize file size.
You can add your company details and change the reporting lay-out to your requirements.

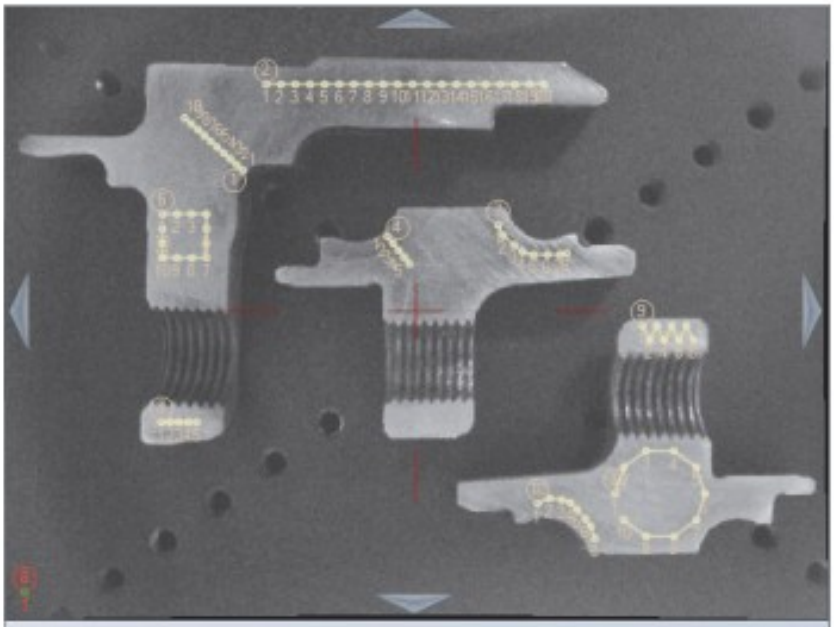
All reports can be printed on a connected (optional) standard printer without the need of a personal computer or any interface.

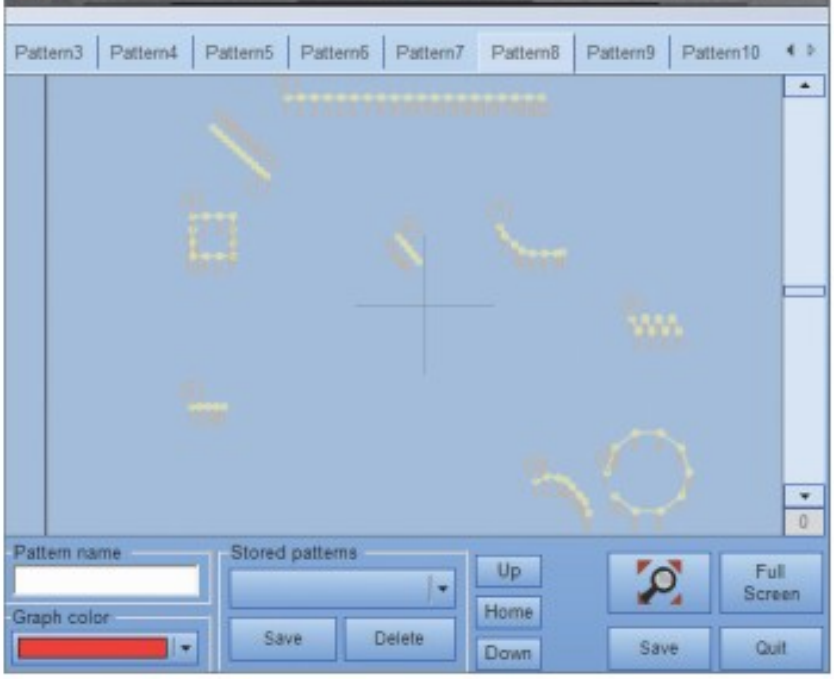
Reports can be exported to Excel or Word or simply stored as PDF on the system's hard disks.

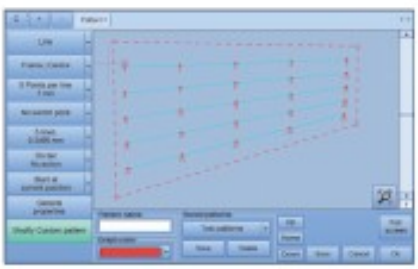
Overview camera & pattern testing

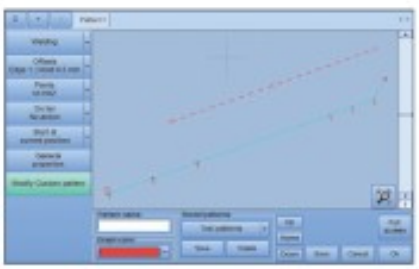
Advanced measuring methodes

Standard overview camera
Perfect "live" stage overview.
Make any fixed pattern or design custom patterns. Multi pattern testing on multi-samples, based on live overview and macro viewing technology. Copy test patterns, modify or "drag & drop" patterns from one test sample to the other test sample. Live vision technique over zoom and macro camera's, no image stitching required.
Edge recognition (Optional) allows to make a test pattern following the test sample surface line.











Single measurement
This function allows you to set individual test points wherever you like.
The test measurement can be started using the surface view or the overview.



Serial measurement
One or more test rows with positioning coordinates can be recorded.
The measuring process can be started in the surface view or the overview.



CHD/Nht/Rht measurement
For the performance of test series for CHD/Nht/Rht data of specimen according to standard. The test can be started directly from the surface view or from the overview. Additional core points of hardness can be defined separately for Nht measurements.



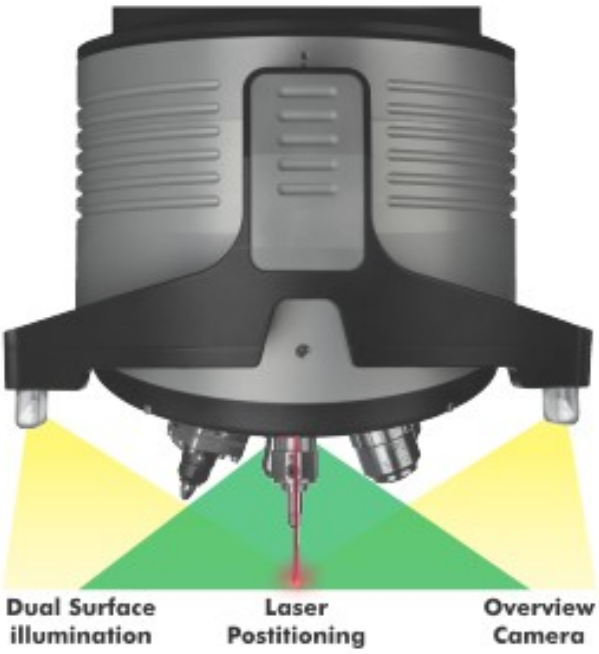
2D/3D hardness chart

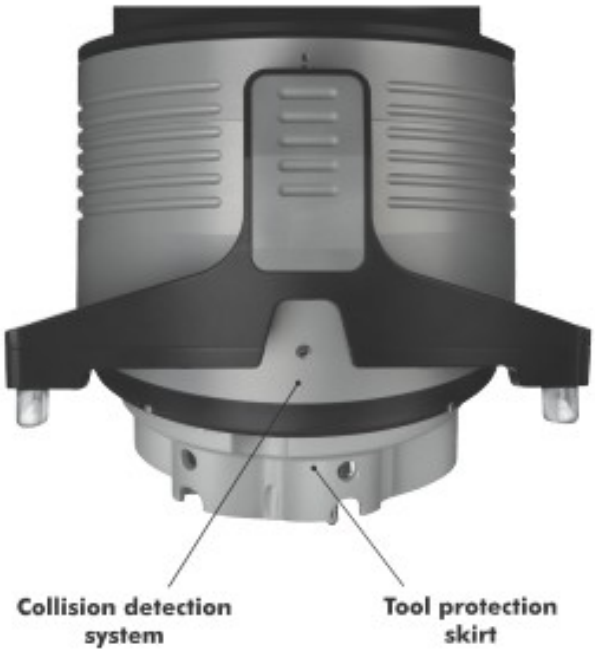


Weld inspection
ISO setup for testing of the heat affected zone's of welded samples.

What FALCON 5000 offers more...

Overview & full view zoom cameras





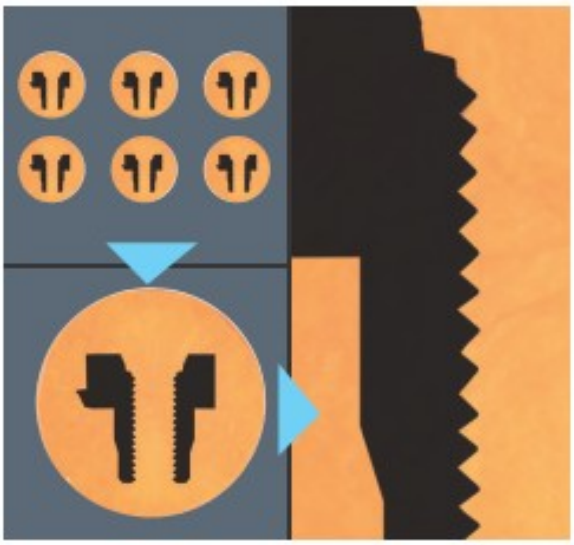
The standard overview / full view autofocus zoom cameras with additional surface illumination, ensure a perfect overview or full view on your sample or samples.

IMPRESSIONS™ "click and go" functionality allows random test point selection on the screen, while the high speed motorized CNC X-Y stage perfectly positions the selected test point under the indenter and measuring objective.

Setting the GLOBAL standard for advanced high speed turrets.
The FALCON 5000's high speed, 8 position turret, has the first in the industry, standard built in:
Laser Positioning System.



Picture: Embedded sample(s),
Top left multi sample overview by zoom overview camera,
Down left zoom on one sample,
Right zoom on segment of one sample.



Ultra precise & safe...

Advanced turret / precision Z-axis

Depth reading accuracy
The high precision depth reading of the Falcon 5000 is based on a single moving part, the linear force actuator. The 8 position turret is directly connected to the linear actuator, and therefore there are no other linear moving parts that influence the depth reading. Every micron the indenter moves into the surface of the tested part, the actuator moves as well, 100% 1-on-1.

The linear movement is measured by a high-end Heidenhain® linear glass scale, which covers the entire test height.
This displacement is recorded with 0,1micron accuracy (standard) or 0,01 micron accuracy (enhanced version for standardizing laboratories).

This design offers unparalleled repeatability and system accuracy for any depth measurement and also allows, in combination with the geared servo drive to apply ultra-low forces.
In combination with the high speed data transferring load cells, allowing force to be measured with up to 0,01% accuracy.

Speed
The electronic closed loop system controls the servo drive within Nano seconds. Not only is force applied with high speed, but also with the touch of a feather, so that force overshoot (as seen with traditional hardness testers) simply cannot happen.

Crash safe / Collision protection
In order to protect the valuable turret and turret tooling such as objectives, indenters, camera's & cross over illumination, the entire turret and its accessories are protected against operator failure, collisions with work pieces or accidental high speed operation that could damage the testers integrity.



High precision motorized CNC X-Y stages & anvils
The Falcon 5000 can be equipped with a number of high speed, ultra-precise motorized CNC X-Y stages (repeatability 2 micron). Besides that, the tester has a quick change system for all stages, test tables and anvils. Test anvils for the Falcon series are all hardened to 56HRC and polished to the highest degree.

Technical specifications

FALCON 5000

Hardness scale	Micro/Macro Vickers, Knoop (Optional Brinell, Rockwell, Superficial Rockwell, HVT, HBT, ISO 2039 1/2)
Load application	Load cell, force feedback, closed loop system
Load range	10gf up to 250Kgf
Motorized turret	8 positions; 2 indenter positions, 4 objectives positions, overview camera, laserpointer 1 position for 3kgf-250kgf; 6.35mm diam. shaft, 1 position for 10gf-187.5kgf; 3mm diam. shaft
Optical system	High definition, 5Mpx machine Vision system
Objectives	2.5x, 5x, 10x, 20x, 40x, 60x, 80x, 100x
Overview camera Cam 2	5Mpx optical ZOOM camera, field of view 50 x 37mm / 200 x 160mm
Electronic system	High performance embedded micro system controller, MS Windows®, 15" full color industrial touch screen, automatic and manual measurement
Software	IMPRESSIONS™ Workflow system & tester control
Test loads	10gf, 15gf, 20gf, 25gf, 50gf, 100gf, 200gf, 300gf, 500gf, 1kgf, 1.25kgf, 2kgf, 2.5kgf, 3kgf, 4kgf, 5kgf, 6.25kgf, 7.8125kgf, 10kgf, 15kgf, 15.625kgf, 20kgf, 30kgf, 31.25kgf, 40kgf, 50kgf, 60kgf, 62.5kgf, 80kgf, 100kgf, 120kgf, 125kgf, 150kgf, 187.5kgf, 250kgf
Vickers	HV0.010, HV0.015, HV0.020, HV0.025, HV0.050, HV0.1, HV0.2, HV0.3, HV0.5, HV1, HV2, HV2.5, HV3, HV4, HV5, HV10, HV20, HV25, HV30, HV40, HV50, HV100, HV120; All test forces are also available for the HVT scales
Knoop	HK0.01, HK0.02, HK0.025, HK0.05, HK0.1, HK0.2, HK0.3, HK0.5, HK1, HK2, HK5, HK10, HK20, HK30, HK50
Rockwell & Superficial Rockwell	Pre Load 3kgf & 10kgf Main Load 15kgf, 30kgf, 45kgf, 60kgf, 100kgf & 150kgf
Brinell	HB1/1kgf, HB1/2.5kgf, HB1/5kgf, HB1/10kgf, HB1/30kgf; HB2.5/6.25kgf, HB2.5/15.625kgf, HB2.5/31.25kgf, HB2.5/62.5kgf; HB5/25kgf, HB5/62.5kgf, HB5/125kgf HB5/250kgf; HB10/100kgf, HB10/250kgf; All test forces are also available for the HBT scales
ISO 2039 1/2	For plastics
Indenters	Certified indenters (ISO / ASTM) (standard included, 1 Vickers, 1 Rockwell)
Test cycles	Fully automatic, automatic and manual
Standards	Complies to or exceeds, ISO, ASTM, JIS (Nadcap) standards
Test force tolerance	<0.5% for test force 100gr to 62.5kg, <1% for test force below 100gr <0.1% for test force 100gr to 62.5kg, (Optional standardizing model) <0.1% for test force below 100gr, (Optional standardizing model)
Display resolution	0.1 HV, HK, 0.5 HB, 0.01HR
Hardness conversion	Rockwell, Rockwell Superficial, Brinell, Vickers, Leeb & Tensile
Statistics	Total test, max, min, average, range, standard deviation, all in real time after each test
Data storage capacity	Dual SSD 80Gb, RAID system
Connectivity	USB, RJ45 LAN, W-LAN & HDMI
Dwell time setting	Default 10 seconds, user defined 1 to 99 seconds (1 sec increments)
Printer	A4, A3 full colour laser printer (optional)
Motorized CNC X-Y stage dimensions	Stage 400mm x 225mm, Travel X-Axis: 220mm x Y-Axis: 120mm Repeatability 0.002mm
Operating temperature	10°C to 35°C, non-condensing
Humidity	10% to 90% non-condensing
Machine dimensions	695mm x 425mm x 1100mm
Machine weight	180kg
Power consumption	100W
Power supply	100VAC to 240VAC, 50/60Hz, single phase

STANDARD configuration, features & accessories

Standard features on all models



- Load cell, closed loop force control
- IMPRESSIONS™ operator workflow control & advanced report generator
- Auto Brightness, Contrast, Sharpness
- Auto Focus
- Automatic indent measurement
- Anti-collision system for objectives, indenters & illumination
- Calibrated step less Indent ZOOM system
- Auto save, program setup, data storage,
- Motorized Z-axis
- Z-axis intelli control
- Motorized CNC X-Y stage
- Click & Go software for random point testing
- Pattern testing for advanced pre program test patterns
- CHD, Nht, Rht according to standard
- KiC fracture toughness measurement
- Stage overview camera
- Laser position system
- Best in class optical system
- 5Mpx HD indent viewing camera
- Powerfull Embedded Micro Controller; MS Windows™, 80gb dual SSD data storage keyboard & mouse
- 15'' portrait mode, HD industrial touch screen
- Connectivity; USB, RJ45 LAN, W-LAN & HDMI

Standard configuration & accessories



- 2 Indenter positions installed
- Turret skirt
- 5Mpx overview ZOOM camera, field of view 50 x 37mm / 200 x 160mm
- Laser pointer
- Standard objectives supplied
  5000HV, 5x,10x, 20x,
  5000HVR, 5x,10x, 20x,
  5000HVRB, 5x, 10x, 20x, 40x
- Stage dimensions (top plate) 355 x 197mm
  travel 200 x100mm
- Wireless mouse and keyboard
- Vice for small work pieces
- Clamp for thin work pieces
- Chuck for round work pieces
- 4 Vibration dampers
- Installation & Operator manual
- Power cable
- Spare fuse
- Certificate of direct & indirect calibration

OPTIONAL configuration, features & accessories

Optional features (software)

- ISO weld pattern testing
- Automatic edge detection
- Automatic product recognition
- 2D/3D hardness chart
- Advanced communication protocol
- 5th Axis accessory control

Optional configuration & accessories

- Certified indenters (UKAS, DKD, ASTM)
- Certified reference hardness blocks (UKAS, DKD, ASTM)
- Motorized CNC precision, ultra-fast positioning X-Y stages
- Motorized CNC rotary table
- Motorized CNC dividing head
- High resolution, 13Mpx enhanced overview camera (CAM 2, Zoom Overview, auto focus)
- Quick change anvil base
- Flat anvil 80mm
- Flat testing table round 200mm
- V-anvil 80mm, 3.3-20mm
- V-anvil 80mm, 12-80mm
- V-anvil 80mm, 20-140mm
- Anvil 80mm swivel ball
- Irregual parts table support 150mm
- Spot anvil 10mm
- Jominy fixtures
- Objective 2,5X
- Objective 5X
- Objective 10X
- Objective 20X
- Objective 40X
- Objective 60X
- Objective 80X
- Objective 100X
- Precision vice 42mm
- Precision vice 75mm
- Precision vice 100mm
- Single sample holder 30-40-50mm
- 4 Sample holder 30-40-50mm
- 6 Sample holder 30-40-50mm
- Round 3-jaw chuck 80mm
- Vibration free table for low force testing
- Vibration free table top, for low force testing
- Full colour laser printer (A4, A3)
- Manual X-Y stage 150x150mm, travel 25x25mm
- 1 or 2 axis digital micrometer head for manual X-Y stage

Motorized CNC X-Y stages

Article code	Surface	Travel	Models
UN-XY572010	355 x 197mm	200 x 100mm	5000 (standard)
UN-XY674516	630 x 260mm	450 x 160mm	5000 (optional)



NOTA: Aceasta fisa a fost realizata sub rezerva modificarilor ulterioare de ordin tehnic sau a erorilor de editare.

Fotografia are caracter informativ.

NOTE: Products and specifications are subject to change without prior notice .Pictures may differ from original.