

# Flexible Hardness testing modules for automated systems



powered by  
**ecos** Workflow™

## DuraPro

1-3000 kgf

Brinell

Vickers

Rockwell

Super Rockwell

Knoop

Plastic testing

HBD, HVD

**Kemet**

**EMHO TEST**  
YOUR FACTOR OF SAFETY

# Hardness testing modules with know-how.

Premium technology in modular units.



**DuraPro 100**  
15–187,5 kgf

MODULES FOR DEPTH MEASUREMENTS



**DuraPro 300**  
1–250 kgf

**DuraPro 400**  
3–750 kgf

**DuraPro 500**  
10–3000 kgf

MODULES FOR DEPTH- AND OPTICAL MEASUREMENTS



## Brinell

according to EN ISO 6506, ASTM E-10

1/1	1/2,5	1/5	1/10
1/30	2,5/6,25	2,5/15,6	2,5/31,25
2,5/62,5	2,5/187,5	5/25	5/62,5
5/125	5/250	5/750	10/250
10/500	10/1000	10/3000	
HBT (nicht genormt)			



## Rockwell

according to EN ISO 6508, ASTM E-18

HRA - HRV	HR15-N/T/W/X/Y
HR30-N/T/W/X/Y	HR45-N/T/W/X/Y



## Vickers

according to EN ISO 6507, ASTM E-384

HV 1	HV 2	HV 2,5	HV 3
HV 5	HV 10	HV 20	HV 30
HV 50	HV 60	HV 100	HV 120
HV 125	HV 150	HVT (nicht genormt)	



## Knoop

according to EN ISO 4545, ASTM E-384

HK 1	HK 2		
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## Plastic testing

according to EN ISO 2039

49,03 N	132,9 N	357,9 N	961 N
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- DuraPro 100 • 147–1840 N (15–187,5 kgf)
- DuraPro 300 • 9,8–2450 N (1–250 kgf)
- DuraPro 400 • 29–7350 N (3–750 kgf)
- DuraPro 500 • 98–29430 N (10–3000 kgf)

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# The DuraPro — series.

Hardness testing especially for automated systems.



## Expand existing systems

This testing module is ideal for the task of expanding on existing systems. Hence expense can be spared as there is no need to acquire special machinery, plants or lines.



## Integration into new systems

The testing module can also be integrated into new plants, systems and production lines. This enables hardness testing to be added directly to the flow of production as early as the planning phase. Work pieces do not need to be removed from the production process and 100% of the pieces can be tested.



## Customised Hardness Testers

Logical interfaces and exact assembly instructions facilitate the construction of custom-built hardness testing systems, tailored to the exact needs of each user. The only precondition is the existence of a device capable of accommodating and moving the testing module according to the technical information provided.



## Universal application

Whether expanding and upgrading an existing plant, integrating hardness testers into a new production line or setting up a hardness tester as a stand-alone solution, the modular construction of the DuraPro series means it can be used in any situation.

## All the main features at a glance.

For end users and plant builders.

### Use

- ✓ 100% checks possible during manufacture
- ✓ Savings made due to upgradability of existing plants
- ✓ Low maintenance
- ✓ Simple operation
- ✓ Various languages
- ✓ Ports for data link-ups

### Planning

- ✓ Logical interfaces
- ✓ Space saving construction
- ✓ Durable and can be used in heavy machine building
- ✓ Exact assembly instructions
- ✓ Flexible integration
- ✓ Downloadable DXF files for plant construction
- ✓ Communication with other control systems
- ✓ Can be used in new systems/lines/plants
- ✓ Can be used in existing systems/lines/plants
- ✓ Can be used as a stand-alone solution

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# DuraPro 100.

## Quickest possible Rockwell tests.

DuraPro 100 uses the indent depth gauging hardness testing method. Since optical evaluation of the test indentation is not required, results can be obtained very quickly. Load application occurs via the tried and tested spring bushing system. Spring bushing can be used for a broad spectrum of load ranges and can be changed as required.

### Efficient data administration

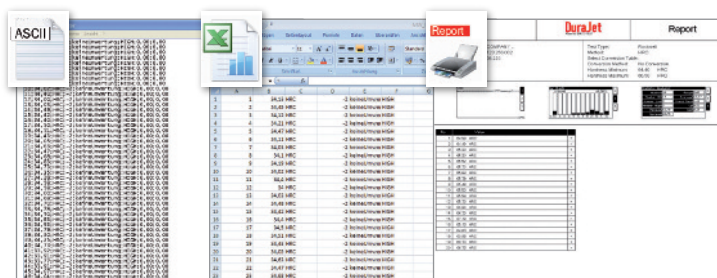
All hardness testing data can be output in the ASCII - format via RS232 interface or USB interface. Test result data can be processed and centrally archived by a wide range of software systems such as Q-DAS, Oracle, SAP, Microsoft Office Package. This facilitates the central and complete administration of data.

### Data export

All hardness testing results can be stored via USB as Excel files (.csv) or text documents (.txt).

### Direct print-outs

A4 test report print-outs can be produced conveniently via the direct link to the USB printer. Test protocols contain all relevant information of your test objects and series. Lists of test results, freely definable user fields, bar charts, line charts, statistical calculations (CP, CPK) and your corporate logo can all be integrated into the report.



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## Control unit

The LCD-touch-screen display and the whole measurement electronics are integrated into a compact control cabinet. Being diminutive in stature the control unit can easily be integrated into any given line or plant.

## Test unit

The test unit is "non clamping" and is not able to conduct clamping and testing cycles itself. This must be done by a maneuverable device. The area of use focuses on production lines in which the distances from the subject and tester vary greatly.

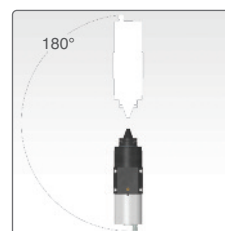
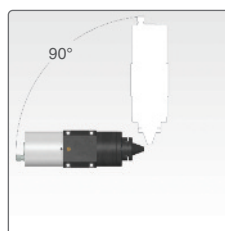
## Communication with plant/line controls

The measurement electronics in use can communicate with other controls either via Profibus or via hardware contacts. Therefore an easy integration into the plants, lines and systems is given.

## Installation and clamping



- Positioning movements (customer system)
- Clamping / releasing movement (customer system)
- Test cycle movement (EMCO-TEST)



The test module can also be used in a horizontal position or upside-down.

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# Uncomplicated hardness testing.

Mode “Remote” for full automated systems”.



## Remote mode – locked operation

Especially for integration into fully automated systems, which should work without manual intervention, this mode of operation is advantageous. Locking the operation prevents unintentional changes to the settings of the hardness testing module. This ensures that hardness tests are always carried out with the correct settings.

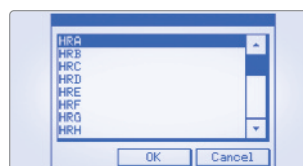


## Intuitive control element

The clearly structured and well-lit touch-screen display can be operated using fingers or with a screen pin.

## Test methods, re-evaluation, measurement

The desired Rockwell test method and conversion can be customised in test mode. (DIN EN 50150, EN ISO 18265, ASTM E140)



Select test method



Help menu



Select the conversion table



Re-evaluation from/to

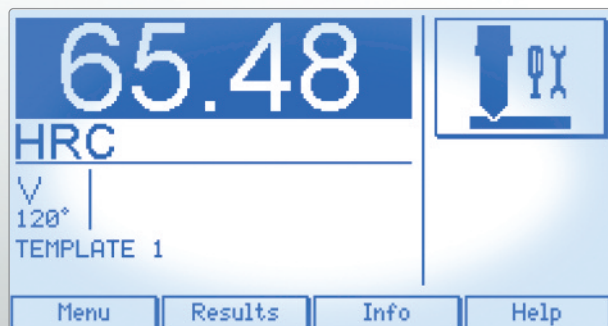
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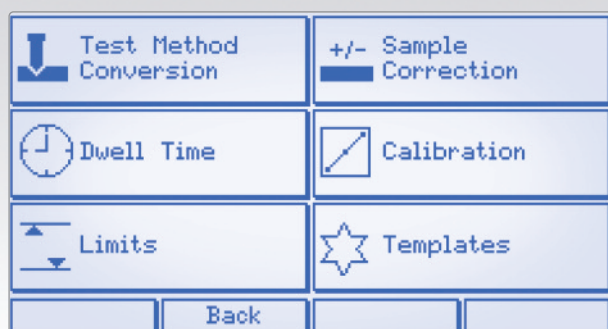
# No compromises.

The “Test” mode fulfils all requirements with further adjustments.



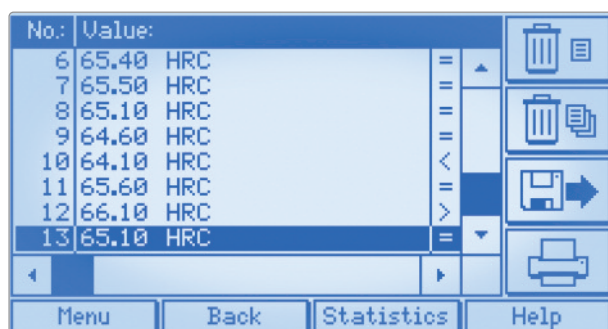
## Extended measurement – Test

Test mode offers a comprehensive range of settings. Tests carried out in this mode can be statistically evaluated.



## Comprehensive settings

There are plenty of means of setting your desired parameters such as work piece corrections and limits etc. These can also be stored as parameter templates in order to be able to repeat the same test conditions later.



## Documentation and evaluation of measurement results

Your results are stored in a measurement list and can be statistically analyzed and displayed in diagram form. Additionally it is possible to print out your test results directly or to export it as an Excel document (.csv) or text document (.txt).



# DuraPro 300/400/500.

Universal hardness testing module with automatic image analysis.

DuraPro 300/400/500 are universal hardness testing modules with a high definition 1/2" camera for fully automatic, standardised image analysis of optical testing methods. Load application is done via the tried and tested closed control loop method facilitating a larger test load range.

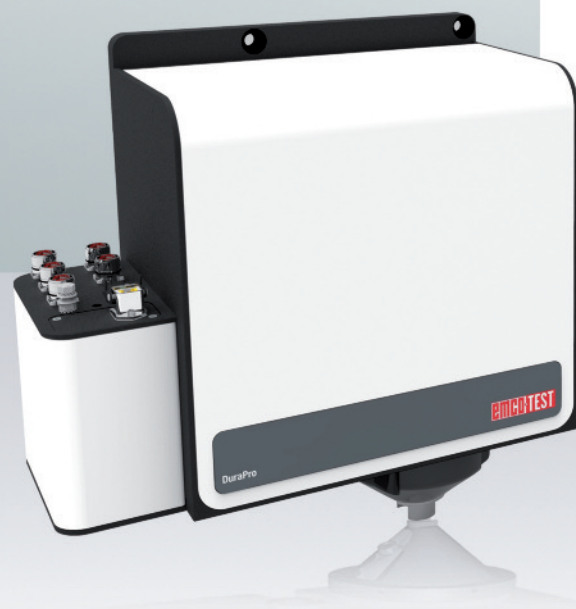
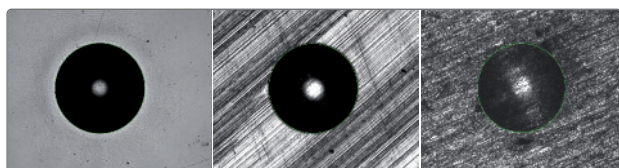
## Ultramodern autofocus technology

The autofocus function is based on the principle of direct pressure gauging by which the integrated weighing cell registers exactly when the indenter touches the surface. In this way the focusing can already be determined while testing.



## Fully automatic image evaluation

One important factor in ensuring the accuracy of test results is the measurement of the test indentation. Exact results can only be achieved with clearly distinguishable test indentations, optimal contrast settings and ideal brightness. The camera electronics regulate picture settings independently of the operator, thus maximising image recognition. Particularly when testing unpolished surfaces, this function is a prerequisite for automatic, operator-independent indentation recognition.



## Communication with plant/line controls

There are hardware inputs and outputs in the control unit to allow the testing module to be slaved by a master control unit. This enables simple integration into plants, lines and machines.

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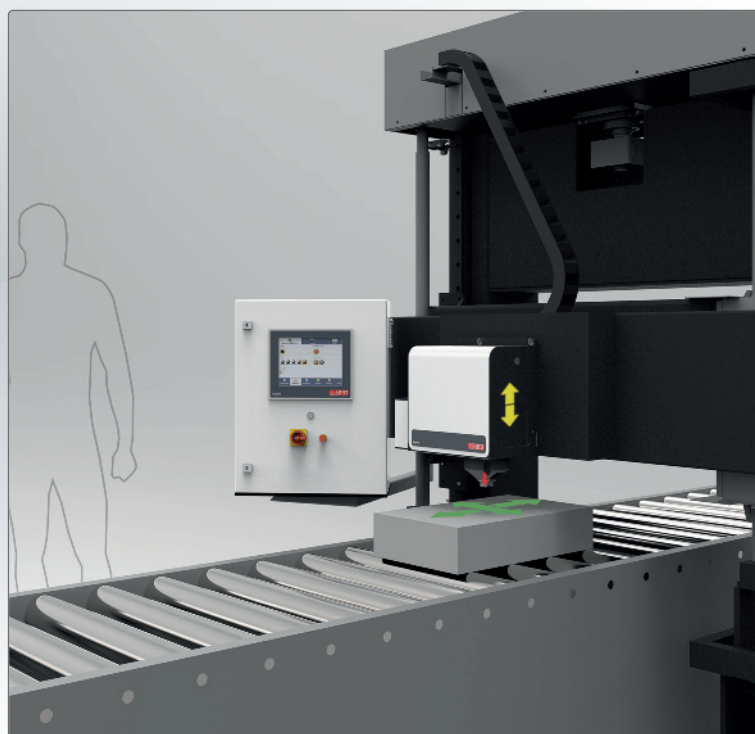
## Areas of use

Since optical and depth gauging methods can be carried out this module is very flexible. Nevertheless, for optical test methods it is important, the test object surface must be prepared dependant upon the test method and the respectively valid hardness testing norms.

## Control unit and gauging electronics

DuraPro 300/400/500 uses the common G4 gauging electronics also used in standard hardness testing equipment. The entire gauging electronics and LCD touch screen display are contained in a compact control unit.

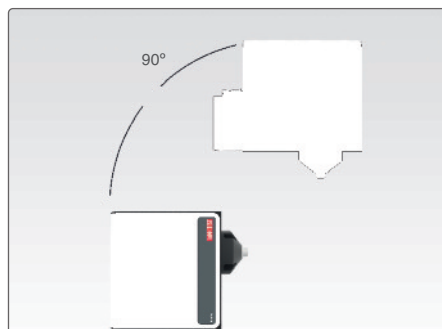
## Installation and clamping



- Positioning movements (customer system)
- Clamping / releasing movement (customer system)
- Test cycle movement (EMCO-TEST)

## Data export

All hardness testing data can be transported with the optional export tool as .csv or .txt via the Ethernet interface, facilitating continuous, unbroken data administration.




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# Hardness testing software that shows the way.

 **ecos** Workflow™ for DuraPro 300/400/500.

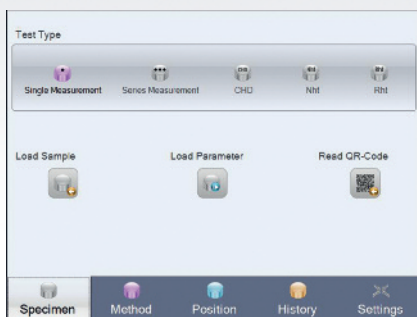
## Workflow in five steps

Specimen, method, position, result and history are the five steps of the intuitive operator software ecos Workflow. Logic, transparency and simple operation are the cornerstones of the workflow. Available in the following languages (DE/EN/IT/FR/SP/CS/HU/JA/PL/RU/FI/TR).



### 1 Specimen

Select a type of test out of single measurement, series measurement, CHD-, Rht- and Nht- runs or load a sample respectively read a QR code.



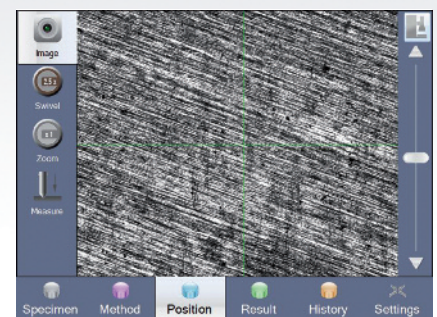
### 2 Method

Select a measurement type, lens, test method, use of ring light and zoom level; and if required conversions, hardness limits and standardised device corrections.



### 3 Position

Position your test point on the work piece. Using the tools provided it's child's play. Then start the test.



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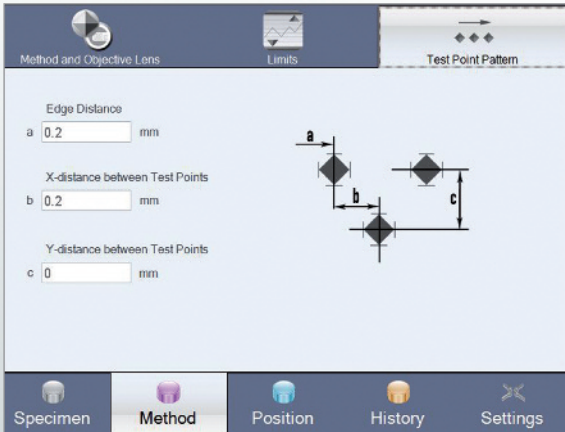
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## Serial measurement

A test point wizard is available for serial, CHD, Nht or Rht testing. The wizard supports you at the creation of test point patterns when carrying out standardised serial tests (EN ISO 2639, 10328, 50190).



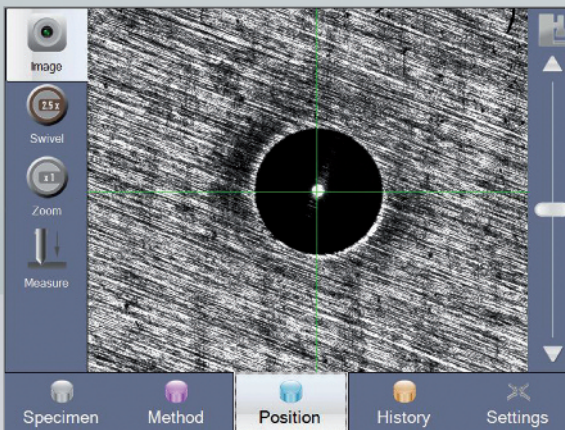
## Intuitive operation

The software informs the operator for example which lens and indenter are currently in position. The lens and indenter can be swiveled into position by clicking the touch display.



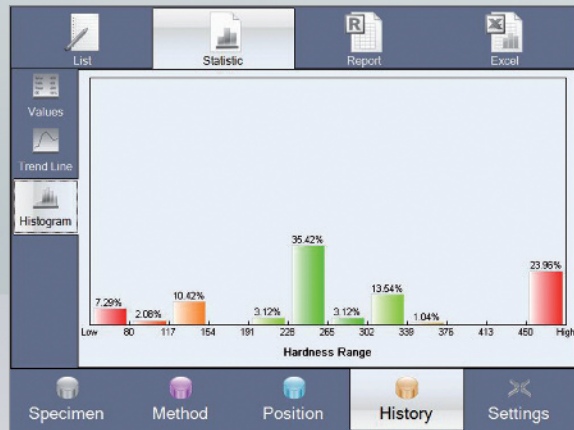
## Autofocus

Automatic specimen height recognition produces automatic focussing.



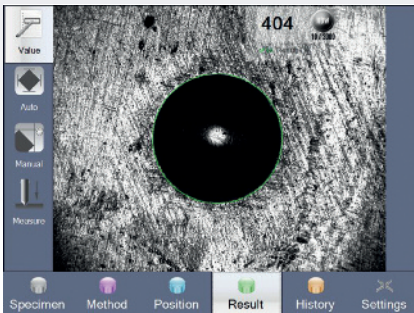
## Statistics and graphs

All test results are presented as clear figures, tables or diagrams.



## 4 Result

The result is displayed clearly and is available for further uses. If necessary there is also the option of re-measuring either automatically or manually.



## 5 History

All results are stored permanently in a clear form. The data can be archived in your network, in other systems and used to print out a report with any installed printer.

No.	Method	Status	Diagonal	Diagonal	Diagonal	Units	Units	Name
85	880	MP 1	47.82	47.88	47.85	180	200	1.06G
91	385	MP 1	74.1	74.05	74.08	180	200	1.06G
40	384	MP 1	74.57	74.57	74.58	180	200	1.06G
40	347	MP 1	58.04	58.12	58.07	180	200	1.06G
94	530	MP 1	58.05	58.07	58.06	180	200	1.06G
05	38	MP 1	216.85	216.58	216.72	180	200	1.06G
05	682	MP 1	45.31	45.21	45.25	180	200	1.06G
07	680	MP 1	44.42	44.2	44.31	180	200	1.06G
08	375	MP 1	76.24	76.16	76.21	180	200	1.06G
05	680	MP 3	61.42	61.28	61.35	180	200	1.06G
100	1407	MP 18	442.43	441.35	441.89	180	200	1.06G
101	375	MP 1	130.136	130.136	130.116	180	200	1.06G
102	321	MP 1	130.136	130.136	130.116	180	200	1.06G



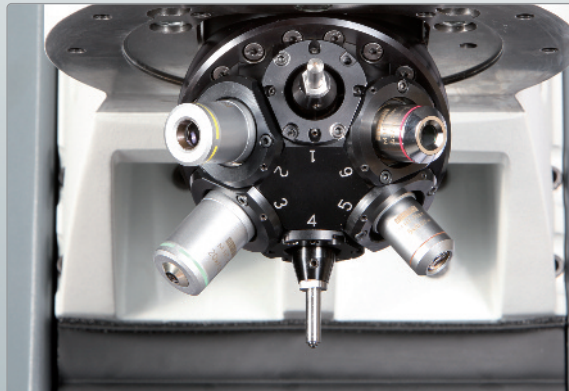
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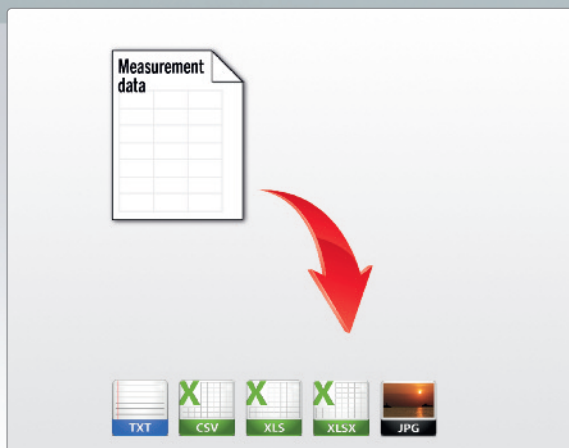
# Options for DuraPro 300/400/500.

Adapt the DuraPro to suit your needs.



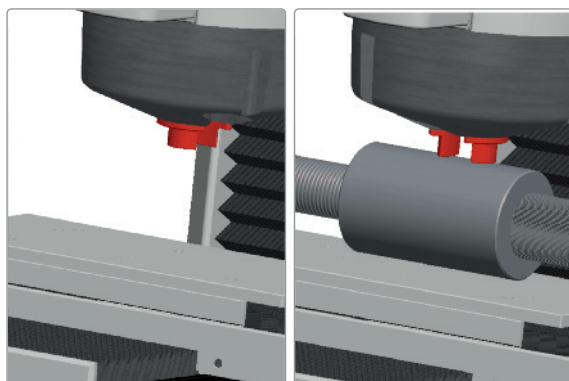
## 6-fold turret

A true all-rounder. The turret can be used freely with various indenters and lenses depending on requirements making the DuraPro a true all-rounder. Hence, you can cover the full range of test methods with just a single machine. Not only does the 6-fold turret rotate at a great speed, it also recognises the shortest rotation way to the selected position. Significant ease of use is provided by the integrated function "automatic lens selection". Thereby the turret uses automatically the optimal lens, for evaluation of an indent.



## Export Editor

The Export Editor makes it significantly easier to export and save hardness testing results. The exported data cannot only be individually adjusted but also automatically saved after each measurement in a directory of your choice. The data can be exported in .csv, .txt, .xls or .xlsx data format, depending on the format needed for further processing. In addition, it is also possible to export images of the hardness indents in the worldwide common .jpg data format. Through this automatic export of data including images it is ensured, that all important information of a hardness measurement is saved and can be easily tracked.



Schematic depiction of nose cone inserts in red.

## Installation position of swivel body/turret rotated 90°

To increase clamping flexibility, the nose cone also can be delivered rotated by 90°. This can be useful when testing cylindrical parts.

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# Detailed documentation for planning purposes. Construction drawings, assembly plans etc.



## Documentation for planning purposes

To give users and plant constructors as much support as possible we provide plenty of detailed documentation for our DuraPro series products as early as the planning phases for plants, lines and machines etc. As well as technical data for installation and drilling plans we also provide complete DXF files in 2D und 3D for each individual hardness testing module allowing testing modules to be added to, and positioned in construction drawings simply and easily. All documents needed for planning and construction can be downloaded from our website [www.emcotest.com](http://www.emcotest.com).

## Documentation for operation

On receiving a hardness testing module the customer also receives detailed documentation on each individual DuraPro product. This includes assembly and installation instructions, and operating instructions, to ensure the module is installed and used correctly. These instructions are produced in five languages: DE/EN/IT/FR/SP.

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# Excellent service.

Expertise and design make the difference.

## Service network

Our service duties don't end once you've purchased your EMCO-TEST product. We continue to offer the EMCO-TEST quality you expect in the support we provide. We have service support providers available in 40 countries. Check out our website [www.emcotest.com](http://www.emcotest.com) for a support team in your area.

## Certified service technicians

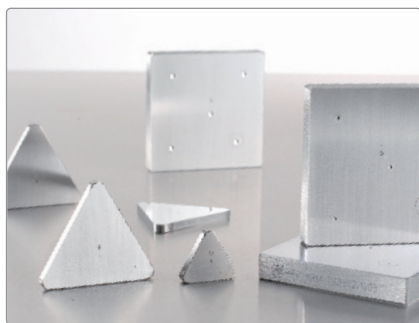
Our aim is to guarantee the best possible support for you and your equipment. In order to achieve this goal every one of our service technicians is called in for regular training at EMCO-TEST headquarters to ensure he/she is completely prepared and up-to-date. That's the only way we can guarantee our service standards!

## Service friendly design

To be able to provide a perfect product, every single EMCO-TEST product is itself subjected to stringent testing. Close attention is paid to ensuring the machines are easily serviceable - starting at the design phase. This resulted in the integration of a menu-driven error display, tools for self-diagnosis, modular electronic components that can be easily and quickly replaced and the possibility of remote maintenance, when an internet access is available, ensuring the shortest possible fault correction period. Furthermore, the system enables users to trigger the automatic installation of software updates via a USB stick or a network. This secures the value of your investment in view of the fact that processes, norms and conversion tables can change from time to time.

## The complete accessories catalogue at [www.emcotest.com](http://www.emcotest.com)

Go to [www.emcotest.com](http://www.emcotest.com) for the entire range of accessories for the DuraPro hardness testing module, including the complete range of indenters (incl. certificate acc. to EN ISO/ASTM), special test anvils, adapters for additional indenters, lenses, etc.



Test blocks



Nose cone inserts



Indenters



Lenses

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# Find your suitable hardness testing module.



	DuraPro 100	DuraPro 300	DuraPro 400	DuraPro 500
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Test load range	147-1840 N (15-187,5 kgf)	9,8-2450 N (1-250 kgf)	29,4-7355 N (3-750 kgf)	98-29430 N (10-3000 kgf)
Nose cone contact surface (WxD)	12 mm	32 x 50 mm	32 x 50 mm	32 x 50 mm
High resolution ½" camera	-	CMOS 1,3 Mpix	CMOS 1,3 Mpix	CMOS 1,3 Mpix
Illumination	-	Power LED, 48lm	Power LED, 48lm	Power LED, 48lm

## Dimensions

Test unit (H x W x D)	380 x 110 x 120 mm	525 x 510 x 255 mm	525 x 510 x 255 mm	525 x 510 x 255 mm
Control unit (H x W x D)	550 x 400 x 250 mm	950 x 600 x 350 mm	950 x 600 x 350 mm	950 x 600 x 350 mm
Weight test unit	approx. 20 kg	approx. 60 kg	approx. 60 kg	approx. 60 kg
Weight control unit	approx. 20 kg	approx. 50 kg	approx. 50 kg	approx. 50 kg

## Movements to be performed

Positioning movement	customer system	customer system	customer system	customer system
Clamping- / releasing movement	customer system	customer system	customer system	customer system
Test cycle movement	Testing module	Testing module	Testing module	Testing module
2-position swivel body	-	Motor-driven	Motor-driven	Motor-driven
Image evaluation	-	manual/automatic	manual/automatic	manual/automatic
Brightness regulation	-	automatic	automatic	automatic
Zoom	-	2-step	2-step	2-step
Focusing	-	automatic	automatic	automatic
Depth gauging system	Length gauge 0,05µm	Length gauge 0,05µm	Length gauge 0,05µm	Length gauge 0,05µm
Display	4,7" Touch display	12" Touch display	12" Touch display	12" Touch display
Operator software	DuraJet/DuraPro	ecos Workflow	ecos Workflow	ecos Workflow

## Electrical connection

Voltage	230V~1/N/PE 110V~1/N/PE	230V~1/N/PE 110V~1/N/PE	230V~1/N/PE 110V~1/N/PE	230V~1/N/PE 110V~1/N/PE
Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Max. voltage variance	± 10 %	± 10 %	± 10 %	± 10 %
Main fuse	C 16 A	C 16 A	C 16 A	C 16 A
Power consumption	max. 120 W	max. 1500 W	max. 1500 W	max. 1500 W
Data interface	1x RJ45, 1x USB 2.0	Ethernet (RJ45)	Ethernet (RJ45)	Ethernet (RJ45)
Communication with controls	Profi Bus Hardware in-/output sockets	Hardware in-/output sockets	Hardware in-/output sockets	Hardware in-/output sockets

## Operating conditions

Protection EN 60529, control unit	IP54	IP54	IP54	IP54
Protection EN 60529, test unit	IP54	IP50	IP50	IP50
Room temperature	5 - 40°C	5 - 40°C	5 - 40°C	5 - 40°C
Relative humidity (not condensing)	up to 90%	up to 90%	up to 90%	up to 90%
Connection cables length*	10 m	10 m	10 m	10 m

\*optional also 20 or 30 meters available.

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- Sales and distribution partners

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**made in  
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