

Product Information

Supplementary unit „Optics“ 065242.00.00/TC-HTHUOPT.001



Range of application

- Can be used for all hardness test methods that evaluate via optical measurement of the indentation:
 - Vickers hardness to DIN EN ISO 6507
 - Knoop hardness to ASTM E 9385
 - Brinell hardness to DIN EN ISO 6506
- Setting the indentation for the test is realised with the hardness measurement head.
- Test loads between 5 and 2500 N or 2 and 200 N can be applied via combination with the hardness measurement head.

Advantages/Features

- Use of the hardness measurement head together with the supplementary unit "Optics" in conjunction with a materials testing machine produces tailor made solutions for customised requirements.
- In this combination, this universal hardness tester covers all indentation depth measurement based, and optical indentation measurement hardness test methods.
- All hardness test methods can be carried out with one single machine.
- The supplementary unit "Optics", inclusive of the hardness measurement head, can be integrated in any materials testing machine.
- It consists of a microscope at an angle of 90° and a CCD camera and a linear slide unit.

- Up to 4 objective lenses can be mounted on the objective revolver.
- Changing the position between lowering and measuring the indentation is made via the linear slide unit. The specimen is not shifted. This slide unit is contained in the supplementary unit "Optics".
- The combination of the supplementary unit "Optics" and the hardness measurement head leads to extraordinary properties via the *testXpert*[®] intelligence. In addition to the known advantages, such as automated test sequences and simple adaption to changing test conditions, documentation of the force-indentation depth sequence is mentioned at optical hardness test procedures.
- The master test program developed for the hardness measurement head enables hardness tests to universal and Rockwell hardness, ball indentation hardness. This program can be optionally expanded to enable hardness tests to Vickers, Knoop and Brinell to be carried out. Further options are:
 - Automatic indentation measurement
 - Automatic focussing
 - Hardness sequence measurements
- Compound tables are available for the variants manual, manual with data transmission and motorised.

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Order item	065242.00.00/TC-HTHUOPT.001
Testing method (in combination with hardness measurement head)	
Vickers	HV0.2; HV0.3; HV0.5; HV1; HV2; HV3; HV5; HV10; HV20; HV30; HV50; HV100
Knoop	HK1
Brinell	HBW 1/1 ... 1/30; HBW 2.5/5.15 ... 2.5/187.5; HBW 5/25 ... 5/250; HBW 10/100 ... 10/250
Dimensions (height x width x depth)	340 x 300 x 160 mm
Weight with HU head	approx. 11 kg
CCD Camera / resolution	1/2" Chip / 752 x 582 Pixel
Linear slide device for position changes of hardness measurement head/microscope (H x W x D)	75 x 300 x 160 mm

Objective lens for 065242.00.00/TC-HTHUOPT.001

Order item	3212.02	3212.03	3212.04	3212.05	3212.06
Inherent magnification	5:1	10:1	20:1	40:1	60:1
Standard equipment¹					
Total magnification ¹ (for 17" monitor)	approx. 136-x	approx. 275-x	approx. 550-x	approx. 1100-x	approx. 1600-x
Field of view ² horizontal	1760 µm	880 µm	440 µm	220 µm	147 µm
vertical	1320 µm	660 µm	330 µm	165 µm	110 µm
Picture resolution	2.3 µm/Pixel	1.2 µm/Pixel	0.6 µm/Pixel	0.3 µm/Pixel	0.2 µm/Pixel
Optional equipment³ (Order item 065244.00.00)					
Total magnification (for 17" monitor)	approx. 85-x	approx. 170-x	approx. 340-x	approx. 680-x	approx. 1000-x
Field of view ⁴ horizontal	2720 µm	1360 µm	680 µm	340 µm	227 µm
vertical	2040 µm	1020 µm	510 µm	255 µm	171 µm
Picture resolution	3.6 µm/Pixel	1.8 µm/Pixel	0.9 µm/Pixel	0.45 µm/Pixel	0.3 µm/Pixel

¹ The standard equipment includes a video adapter with a high inherent magnification (approx. 40 fold) that is integrated in the measurement microscope in front of the CCD camera.

² The permissible measurement ranges are described in detail in the corresponding test standards. A Vickers indentation should be at least 1/3 of the vertical field of view to be able to achieve a resolution of 0.2 µm ($d < 40 \mu\text{m}$) or 0.5% of d ($d \geq 40 \mu\text{m}$) to, for example, DIN EN ISO 6507-2.

³ The optional equipment includes an interchangeable video adapter with a low inherent magnification (approx. 17 fold) for a higher field of view (compared to the standard equipment). It is integrated in the measurement microscope in front of the CCD camera. This is mandatory for Brinell hardness testing.

⁴ The degree of loading to DIN EN ISO 6506-1/2 is to be selected so that it is $0.24 \cdot D < \text{indentation dia.} < 0.6 \cdot D$. The remaining indentation diameter is therefore within the prescribed limits:

1 mm ball:	0.240 mm	< indentation diameter	< 0.6 mm
2.5 mm ball:	0.6 mm	< indentation diameter	< 1.5 mm
5 mm ball:	1.2 mm	< indentation diameter	< 3 mm

The measurement device should have a scale graduation of 0.5% of d .

Compound tables

Description	Order item
Compound table with F_{max} 2.5 kN (Table size 135 x 135 mm)	
- travel 25 x 25 mm, manual micrometer	065240.80.00
- travel 25 x 25 mm, digital micrometer, digital display and transmission of the position	065240.81.00
Compound table with F_{max} 1 kN (Table size 200 x 200 mm)	
- travel 25 x 25 mm, manual micrometer	3212.34
Compound table with F_{max} 500 N (Table size 135 x 135 mm)	
- travel 50 x 50 mm, manual micrometer	065243.05.00
- travel 25 x 25 mm, digital micrometer, digital display and transmission of the position	065243.06.00
- travel 50 x 50 mm, motorised movement, control via PC RS232	065243.07.00
Adapter plate for compound tables at the materials testing machine, fixing direct to the base crosshead	3212.34.01