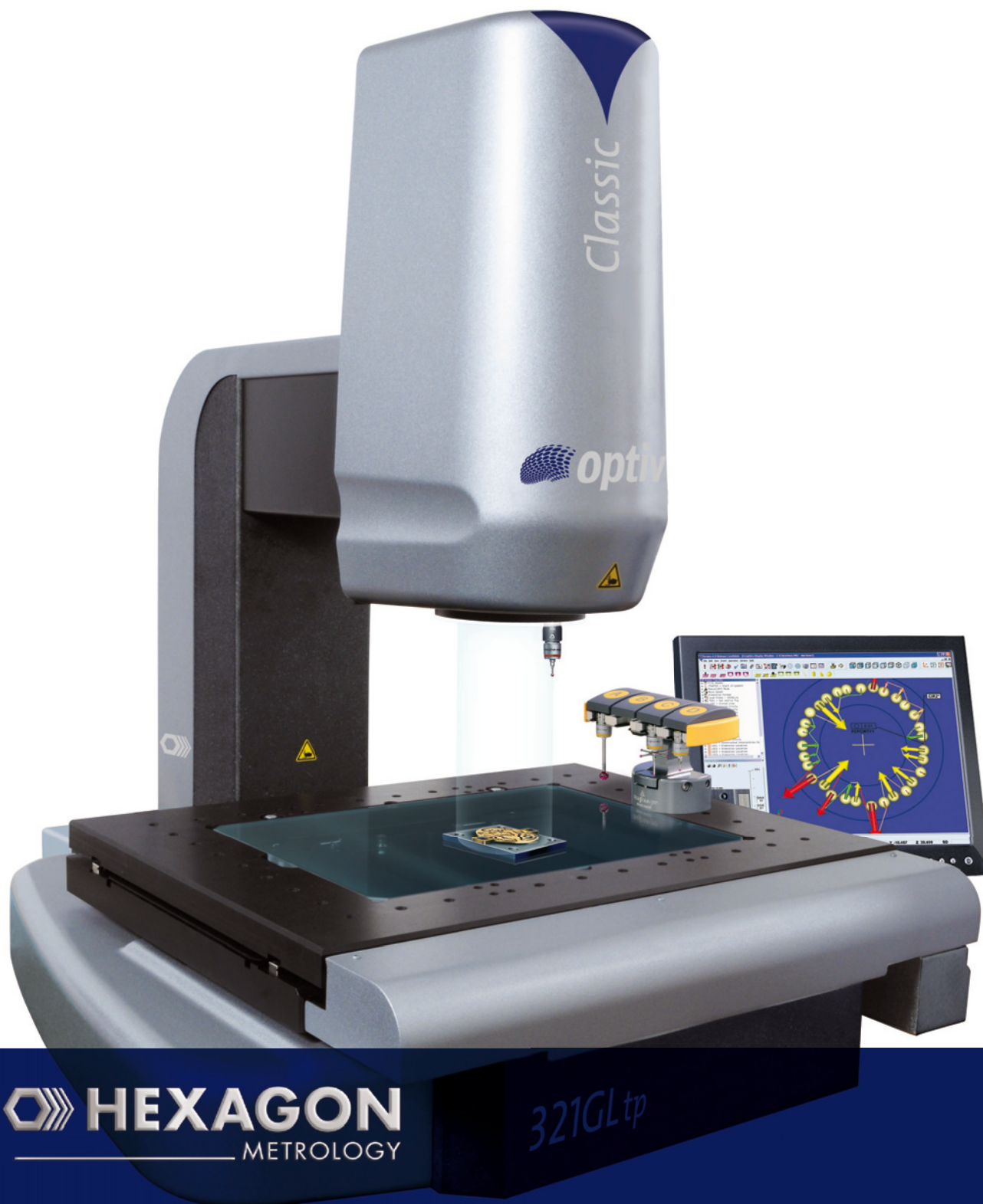


Optiv Classic 321 GL tp
Technical Data
Version 07/2011



3D multi-sensor metrology



 **HEXAGON**
METROLOGY

321GLtp

Product description

The Optiv Classic 321 GL tp combines optical and tactile measurement in one system. The system supports multi-sensor measurements using the Vision sensor (color camera, motorised CNC zoom) and the touch-trigger probes TESASTAR-p, TESASTAR-mp or TP200.

The Optiv Classic 321 GL tp provides easy pallet station integration with good accessibility to the table from all sides. Measurement software is PC-DMIS Vision.

Fields of application

- Shop floor and inspection room
- Versatile geometry measurements and GD&T analysis

Design

- Design principle:
 - » Benchtop unit of proven cross-table design
- Guides:
 - » Mechanical linear guides on all axes, counterbalance on Z axis
- Drives:
 - » DC servo motors, power transmission via drive belts
- Length measuring system:
 - » Incremental length measuring system
- Resolution of the scales:
 - » 0.05 µm

Measuring range (X x Y x Z)

⁽¹⁾ Vision sensor <—> Touch-trigger probe (X offset = 70 mm)

	Optiv Classic 321 GL tp – Single Z (one vertical axis)	
	Measuring range single sensor	Mutual measuring range ⁽¹⁾
X	300 mm (12 in.)	230 mm (9 in.)
Y	200 mm (8 in.)	200 mm (8 in.)
Z	150 mm (6 in.)	150 mm (6 in.)

Loading capacity

- Load-bearing capacity of the table up to 20 kg

Dimensions in mm and weights in kg

- Dimensions see machine layout on page 5
- Machine weight 170 kg

Measuring accuracy ⁽²⁾

⁽²⁾ The conditions of acceptance of Hexagon Metrology Vision apply.

L = measurement length in mm

At 20°C, with Vision sensor, at 4-times magnification with standard lens for XY and max. zoom for Z, standard measuring plane ⁽²⁾

X, Y measuring accuracy

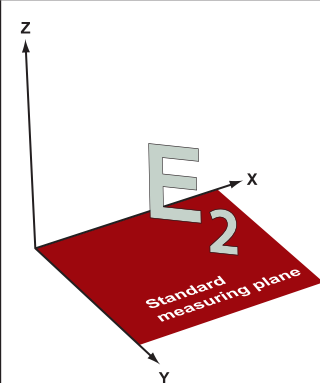
$$\text{MPE (Ex, Ey)} = (1.6 + L/250) \mu\text{m}$$

XY measuring accuracy

$$\text{MPE (Exy)} = (2.0 + L/250) \mu\text{m}$$

Z measuring accuracy

$$\text{MPE (Ez)} = (3.9 + L/200) \mu\text{m}$$



At 20°C, with touch-trigger probe ⁽²⁾

X, Y measuring accuracy

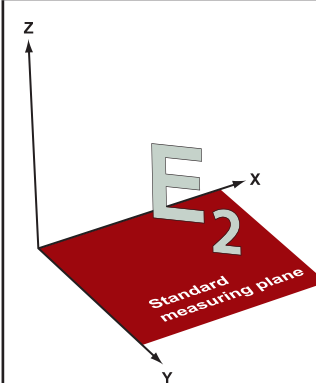
$$\text{MPE (Ex, Ey)} = (2.0 + L/250) \mu\text{m}$$

XY measuring accuracy

$$\text{MPE (Exy)} = (2.5 + L/250) \mu\text{m}$$

Z measuring accuracy

$$\text{MPE (Ez)} = (2.9 + L/200) \mu\text{m}$$



Airborne noise emissions	<ul style="list-style-type: none"> The A-weighted emission sound pressure level at operator's position is less than 70 db(A).
Environmental requirements	<ul style="list-style-type: none"> Air humidity 40 % - 70 % RL, non-condensing Environmental temperature 20 °C ± 1 K Permissible temperature gradient 0.8 K/h, 1.0 K/d, 0.6 K/m
Throughput	<ul style="list-style-type: none"> Max. traversing speed <ul style="list-style-type: none"> » X, Y = 160 mm/s » Z = 160 mm/s

Vision sensor

Technical description

- Sensor for non-contact measurement of smallest and closely toleranced features
 - » High resolution color CCD camera, for interference-free, low noise image reproduction
 - » Maximum optical precision due to low distortion optics
 - » CNC zoom with 0.5x, 0.75x, 1.5x or 2x lens
 - » Powerful image processing
 - » Fast, precision video autofocus
 - » Contour scanning mode
 - » Best fit routines
 - » Geometry filters and speckle filters
 - » MultiCapture:

MultiCapture allows all 2D features within a field of view to be captured simultaneously, regardless of the feature type. Inspection speeds can be increased by 35 % or more, depending on the feature size and density. The capture sequence for groups of features using MultiCapture is also automatically optimized, creating the most efficient possible path with the fewest number of stage movements.
 - » RGB Sensitivity Adjustments for color cameras:

Software controls for Red/Green/Blue (RGB) sensitivity in images from a color camera allow for fine control adjustment over image contrast. This capability improves overall consistency in vision inspection in general and is especially useful for colored parts where edges can be difficult to capture with grayscale or lighting modifications alone.

Illumination for Vision sensor

- Coaxial LED top light - white LED
- LED back light - green LED + diffusing plate
- Multi-segment LED ring light
 - » 4 x 90° + 8 x 45° segments

CNC zoom

- Motorized zoom, for a continuous adjustment of field of view and resolution
 - » Standard: 6.5x
 - » Option: 12x
- High resolution color CCD camera (H 752 x V 582 pixels)
- Available lenses: 0.5x, 0.75x, 1.5x, 2x

Magnification variants of the 6.5x CNC zoom on a 20 in. monitor					
Lens	Magnification	Working distance ⁽¹⁾ (mm)	Max. workpiece height (mm)	Max. field of view (mm)	Min. field of view (mm)
0.5x	15x to 90x	175	0 to 60	12.8 x 9.6	2.26 x 1.69
0.75	22.5x to 135x	110	0 to 120	8.5 x 6.4	1.51 x 1.13
Standard	30x to 180x	90	0 to 150	6.4 x 4.8	1.13 x 0.85
1.5x	45x to 270x	50	0 to 180	4.2 x 3.2	0.75 x 0.56
2x ⁽²⁾	60x to 360x	35	15 to 190	3.2 x 2.4	0.56 x 0.42

⁽¹⁾ The working distance is from bottom of lens with adapter to object plane (adapter thickness 6 - 10 mm).

⁽²⁾ The multi-segment LED ring light can not be used.

⁽¹⁾ The working distance is from bottom of lens with adapter to object plane (adapter thickness 6 - 10 mm).

⁽²⁾ The multi-segment LED ring light can not be used.

Magnification variants of the 12x CNC zoom on a 20 in. monitor					
Lens	Magnification	Working distance ⁽¹⁾ (mm)	Max. workpiece height (mm)	Max. field of view (mm)	Min. field of view (mm)
0.5x	13x to 130x	150	0 to 60	14.7 x 11	1.48 x 1.11
0.75	19.5x to 195x	95	0 to 120	9.8 x 7.3	0.91 x 0.69
Standard	26x to 260x	65	0 to 150	7.3 x 5.5	0.74 x 0.55
1.5x	39x to 390x	40	0 to 180	4.9 x 3.7	0.49 x 0.37
2x ⁽²⁾	52x to 520x	25	15 to 190	3.6 x 2.7	0.37 x 0.28

Touch-trigger probes
TESASTAR-p, TESASTAR-mp, TP200

TESASTAR-p	TESASTAR-mp	TP200
Technical description		
<ul style="list-style-type: none">This component consists of a small module with a built-in touch-trigger probe.This 5-way probe is available in four versions providing a varying triggering force.	<ul style="list-style-type: none">Touch-trigger probe consisting of one mounting module and one probe body. Both parts are fitted together over a magnetic system.This 5-way probe is available in four versions providing a varying triggering force.	<ul style="list-style-type: none">Compact 6-way touch-trigger probe using innovative micro strain gauge technologyAllows for small trigger forces and offers advanced triggering accuracy as well as long reliable operation
Mounting		
M8 thread (probe body) M2 thread (styli)		
Available modules		
LF low force SF standard force MF medium force EF extended force	SF standard force LF low force	
Sense directions		
5-way: ± X, ± Y, + Z	6-way: ± X, ± Y, ± Z	
Repeatability 1D (10 mm stylus)		
0.35 µm (LF module) 0.35 µm (SF module) 0.50 µm (MF module) 0.65 µm (EF module)	0.40 µm (Trigger level 1) 0.50 µm (Trigger level 2)	
Repeatability 2D (10 mm stylus)		
± 0.60 µm (LF module) ± 0.80 µm (SF module) ± 1.00 µm (MF module) ± 2.00 µm (EF module)	± 0.80 µm (Trigger level 1) ± 0.90 µm (Trigger level 2)	
Triggering force		
0.055 N, L = 10 mm (LF module) 0.08 N, L = 10 mm (SF module) 0.10 N, L = 25 mm (MF module) 0.10 N, L = 50 mm (EF module)	X, Y: 0.02 N / Z: 0.07 N (all modules)	
Stylus module changing racks		
Standard: TESASTAR-pr with 4 slots Option: TESASTAR-pr with 2 or 6 slots	SCR200 with 6 slots	

Mutual measuring range Vision sensor \longleftrightarrow Touch-trigger probe in X direction = 230 mm (X offset = 70 mm)

Technical Data

Control system and safety regulations

- CNC controller:
 - » 3 axes microprocessor CNC with vector path control
- Safety equipment:
 - » Emergency-Stop circuit with Emergency-Stop button
 - » Scale signal monitoring
 - » Protective covers for the axes' drives
 - » Collision protection for touch-trigger probes
- Safety regulations:
 - » EN ISO 12100-1 and -2 (Safety of machinery)
 - » EN 60204-1 (Safety of machinery - Electrical equipment of machines)
 - » EN 61000-6-2 and -4 (Electromagnetic compatibility EMC)
 - » EN 61010-1 (Safety requirements for electrical equipment for measurement, control and laboratory use)
 - » EN 61326-1 (Electrical equipment for measurement, control and laboratory use - EMC requirements)

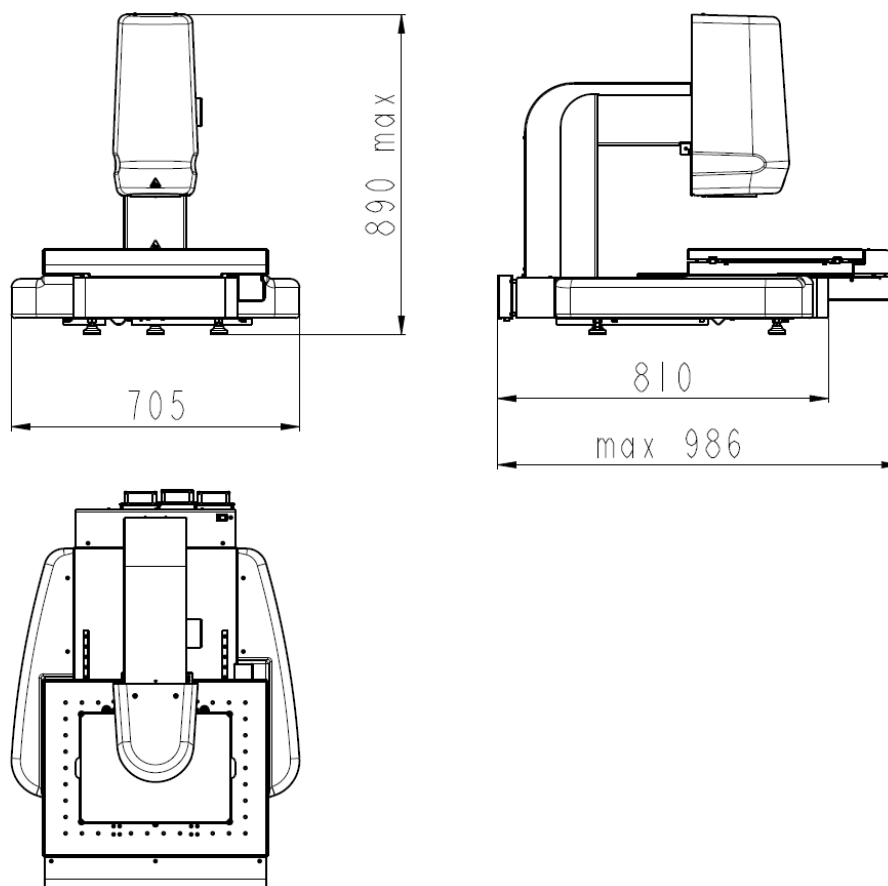
Supply data

- Input voltage power supply 110-240 V \pm 10%, frequency 50-60 Hz
- Input voltage machine 24 V, continuous
- Power consumption < 120 W (without PC)

Optional equipment

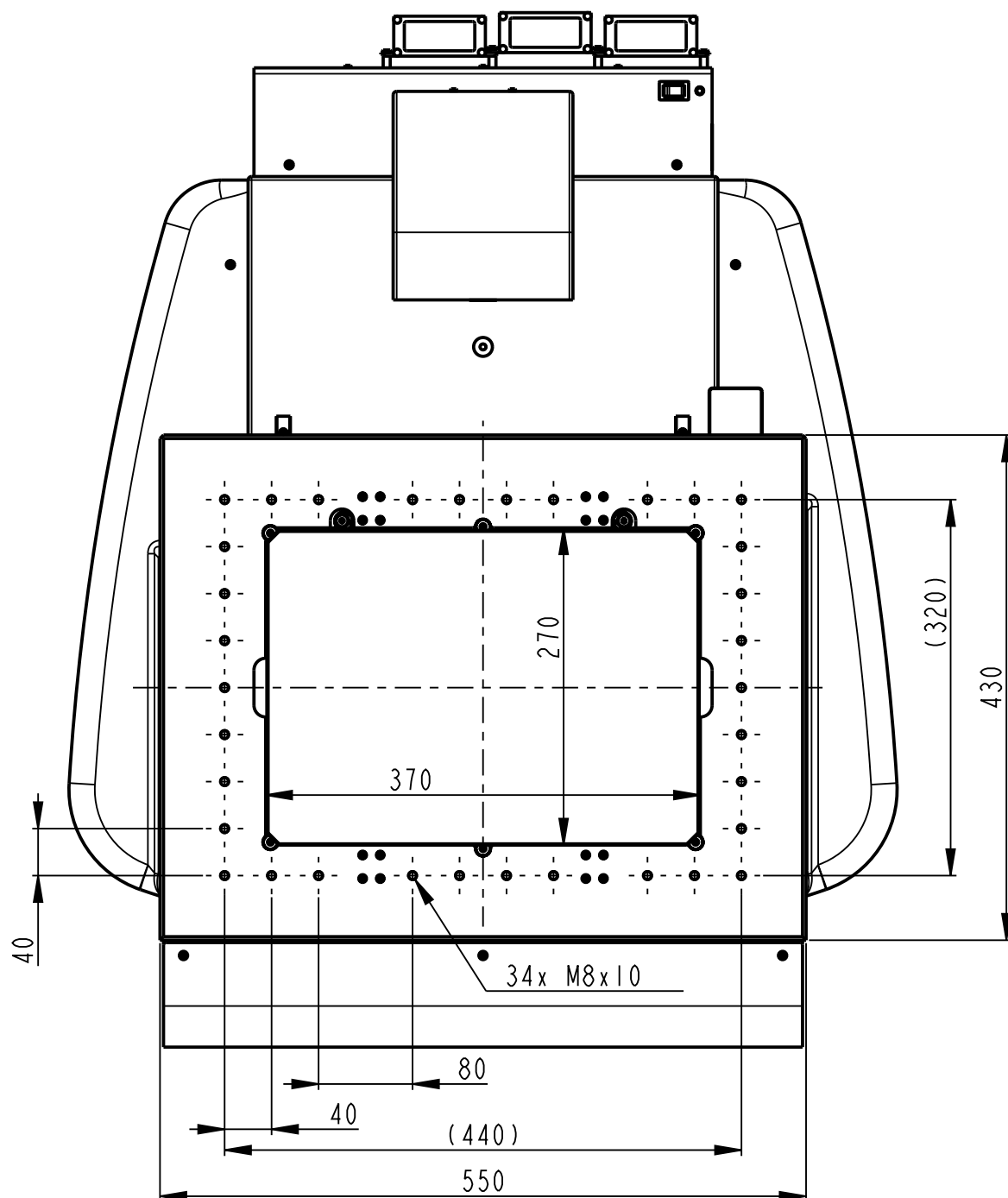
- Probe changer
- Periphery:
 - » Worktable
 - » Printers, monitors
 - » Uninterruptible power supply (UPS)

Machine layout



Maße in mm
Dimension in mm

Technische Änderungen vorbehalten.
Technical details subject to change without prior notice.



alle Gewinde M8 x 10
size of all threads M8 x 10



Optiv

Hexagon Metrology is the all-rounder in the world of metrology. With its new brand Optiv, the world's largest metrology group keeps this promise once again. Optiv stands for multisensor measuring machines of any kind. The portfolio ranges from benchtop measuring machines to high-accuracy multisensor measuring machines which achieve top performances even in the nano range. Multisensor measuring machines combine optical and tactile measuring techniques and thus, enable the user to measure all features of a workpiece in one measurement cycle. At the same time Optiv features both: flexibility and accuracy.

Optiv. Optical Performance Technology in Vision.

Hexagon Metrology

Hexagon Metrology is part of the Hexagon group and brings leading brands from the field of industrial metrology under one roof.

info.optiv@hexagonmetrology.com

www.optiv.net

www.hexagonmetrology.com

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