



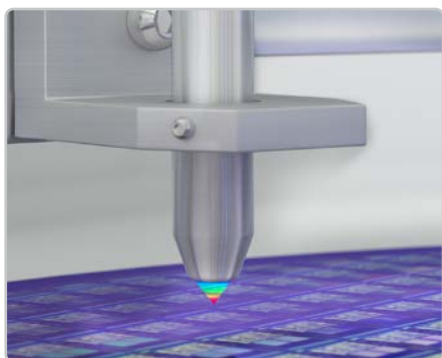
# More Precision.







**confocalDT** // Confocal chromatic sensor system

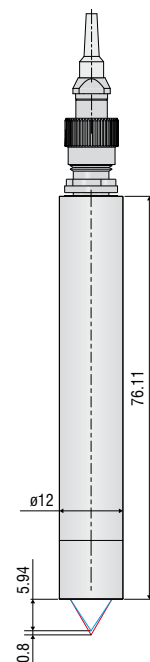
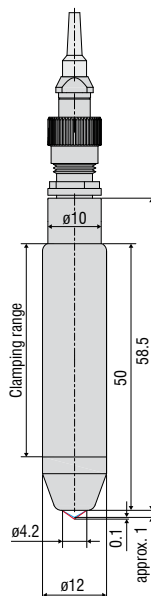


# High precision sensors for displacement and thickness measurements

## confocalDT IFS2407



-  Compact sensors from  $\varnothing 12$  mm
-  Submicron resolution
-  For one-sided thickness measurements
-  For precise distance measurements
-  Very small light spot
-  Large tilt angle



Dimensions in mm, not to scale.

Model	IFS2407-0,1	IFS2407-0,1(001)	IFS2407-0,8
Measuring range	0.1 mm	0.1 mm	0.8 mm
Start of measuring range	approx. 1 mm	1 mm	5.9 mm
Resolution	static <sup>1)</sup>	3 nm	24 nm
	dynamic <sup>2)</sup>	6 nm	75 nm
Linearity <sup>3)</sup>	Displacement and distance	< $\pm 0.05 \mu\text{m}$	< $\pm 0.2 \mu\text{m}$
	Thickness	< $\pm 0.1 \mu\text{m}$	< $\pm 0.4 \mu\text{m}$
Light spot diameter	3 $\mu\text{m}$	4 $\mu\text{m}$	6 $\mu\text{m}$
Max. measuring angle <sup>4)</sup>	$\pm 48^\circ$	$\pm 48^\circ$	$\pm 30^\circ$
Numerical aperture (NA)	0.80	0.70	0.50
Min. target thickness <sup>5)</sup>	0.005 mm	0.005 mm	0.04 mm
Connector	pluggable optical fiber via FC socket, standard length 3 m; extension up to 50 m; bending radius: static 30 mm; dynamic 40 mm		
Mounting	Clamping, mounting adapter (see accessories)		
Temperature range	Storage	-20 ... +70 °C	
	Operation	+5 ... +70 °C	
Shock (DIN EN 60068-2-27)	15 g / 6 ms in XY axis, 1000 shocks each		
Vibration (DIN EN 60068-2-6)	2 g / 20 ... 500 Hz in XY axis, 10 cycles each		
Protection class (DIN EN 60529)	IP65 (front)		
Material	Stainless steel housing, glass lenses		
Weight <sup>6)</sup>	approx. 36 g	approx. 36 g	approx. 40 g
Special features	Sensor with high numerical aperture	Light-intensive sensor	-

<sup>1)</sup> Average from 512 values at 1 kHz, near to the mid of the measuring range onto optical flat

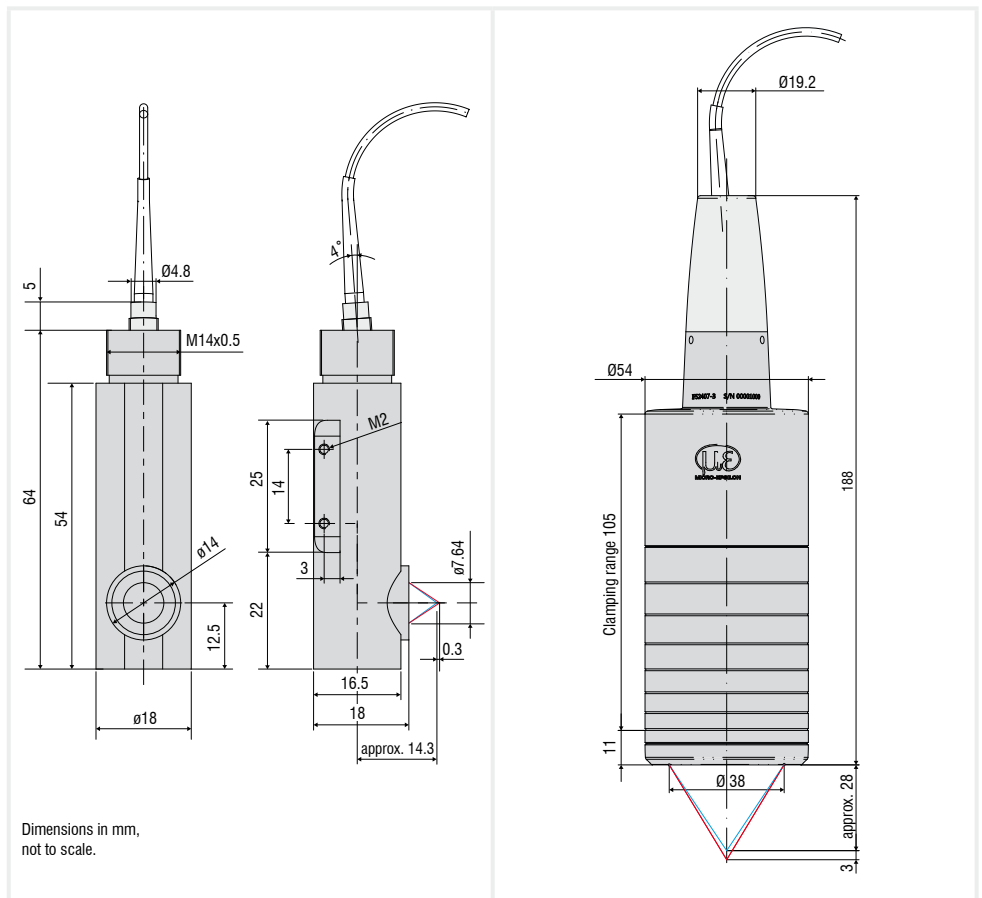
<sup>2)</sup> RMS noise relates to mid of measuring range (1 kHz)

<sup>3)</sup> All data at constant ambient temperature (25  $\pm$  1 °C) against optical flat; specifications can change when measuring different objects.

<sup>4)</sup> Maximum measuring angle of the sensor that produces a usable signal on reflecting surfaces. The accuracy decreases when approaching the limit values.

<sup>5)</sup> Glass sheet with refractive index  $n = 1.5$  throughout the entire measuring range. In the mid of the measuring range, also thinner layers can be measured.

<sup>6)</sup> Sensor weight without optical fiber



Model	IFS2407/90-0,3		IFS2407-3	
Measuring range	0.3 mm		3 mm	
Start of measuring range	approx.	5.3 mm	28 mm	
Resolution	static <sup>1)</sup>	6 nm	13 nm	
	dynamic <sup>2)</sup>	20 nm	63 nm	
Linearity <sup>3)</sup>	Displacement and distance	< ±0.15 μm	< ±0.5 μm	
	Thickness	< ±0.3 μm	< ±1 μm	
Light spot diameter	6 μm		9 μm	
Max. measuring angle <sup>4)</sup>	±27°		±30°	
Numerical aperture (NA)	0.50		0.53	
Min. target thickness <sup>5)</sup>	0.015 mm		0.15 mm	
Connector	pluggable optical fiber via FC socket, type C2407-x; standard length 3 m; extension up to 50 m; bending radius: static 30 mm, dynamic 40 mm		pluggable optical fiber via FC socket, standard length 3 m; extension up to 50 m; bending radius: static 30 mm, dynamic 40 mm	
Mounting	Mounting holes (2x M2)		Clamping, mounting adapter (see accessories)	
Temperature range	Storage	-20 ... +70 °C		
	Operation	+5 ... +70 °C		
Shock (DIN EN 60068-2-27)	15 g / 6 ms in XY axis, 1000 shocks each			
Vibration (DIN EN 60068-2-6)	2 g / 20 ... 500 Hz in XY axis, 10 cycles each			
Protection class (DIN EN 60529)	IP65 (front)			
Material	Stainless steel housing, glass lenses		Aluminum housing, glass lenses	
Weight <sup>6)</sup>	approx. 30 g		approx. 550 g	

<sup>1)</sup> Average from 512 values at 1 kHz, near to the mid of the measuring range onto optical flat

<sup>2)</sup> RMS noise relates to mid of measuring range (1 kHz)

<sup>3)</sup> All data at constant ambient temperature (25 ± 1 °C) against optical flat; specifications can change when measuring different objects.

<sup>4)</sup> Maximum measuring angle of the sensor that produces a usable signal on reflecting surfaces. The accuracy decreases when approaching the limit values.

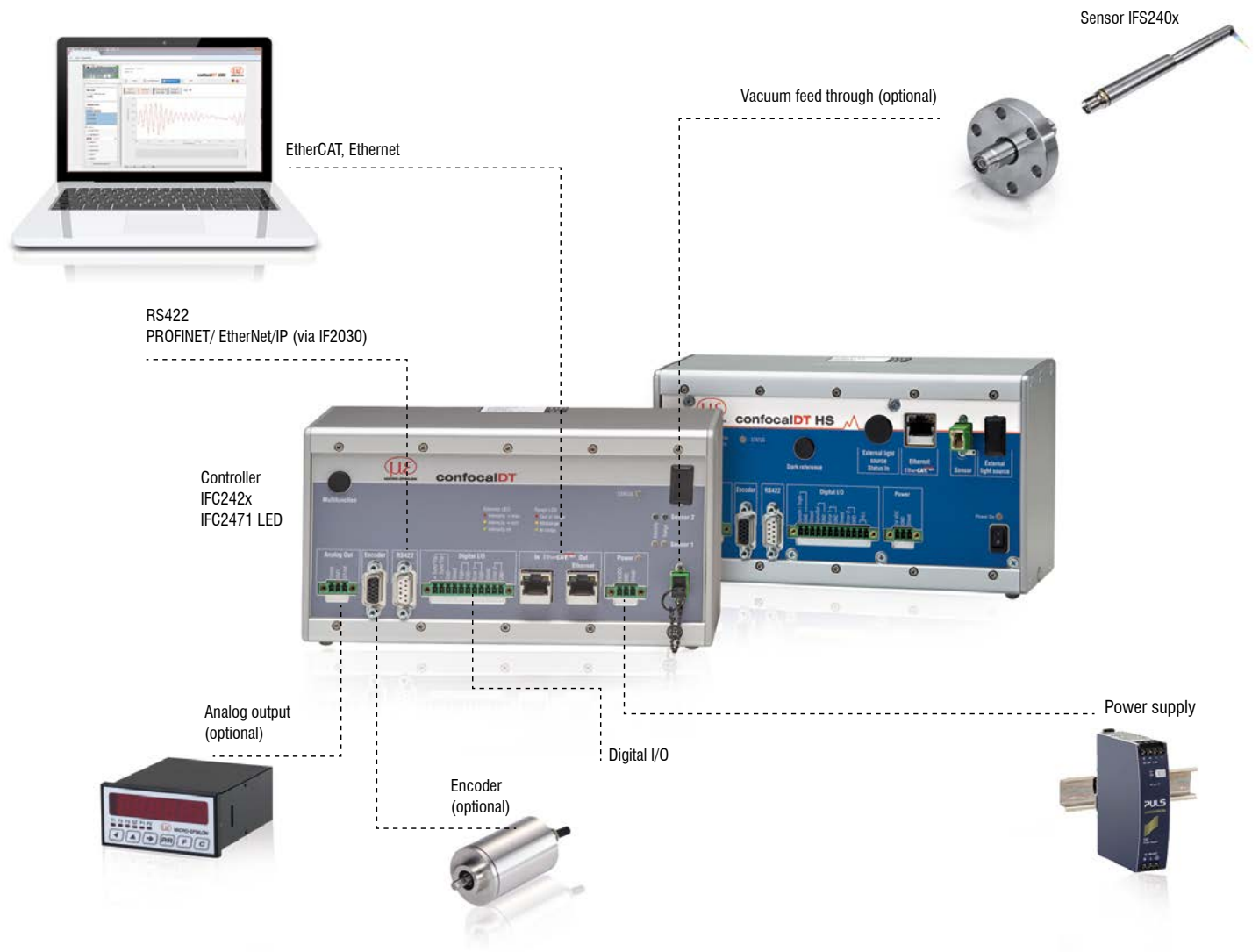
<sup>5)</sup> Glass sheet with refractive index n = 1.5 throughout the entire measuring range. In the mid of the measuring range, also thinner layers can be measured.

<sup>6)</sup> Sensor weight without optical fiber

# System design confocalDT

The confocalDT system consists of:

- Sensor IFS240x
- Controller IFC24xx
- Fiber optic cable C24xx



### Customer-specific modifications

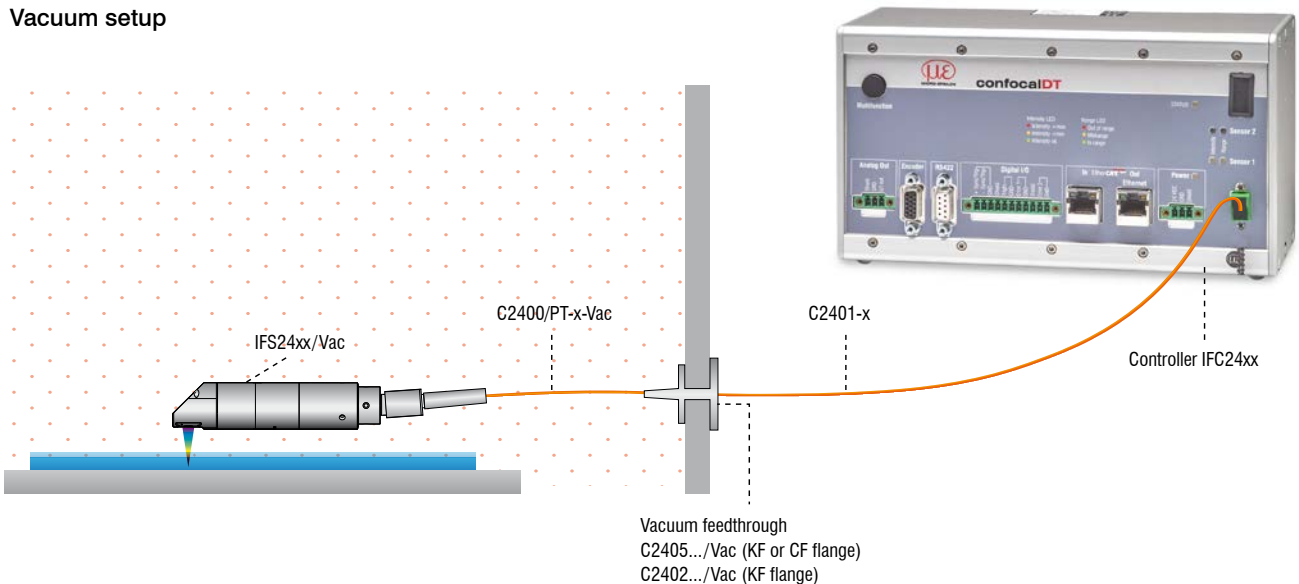
Application examples are often found where the standard versions of the sensors and the controllers are performing at their limits. To facilitate such special tasks, it is possible to customize the sensor design and to adjust the controller accordingly. Common requests for modifications include changes in design, mounting options, customized cable lengths and modified measuring ranges.



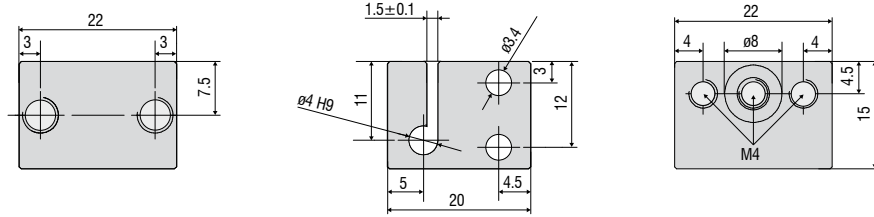
### Possible modifications

- Sensors with connector
- Cable length
- Vacuum suitability up to UHV
- Specific lengths
- Customer-specific mounting options
- Optical filter for ambient light compensation
- Housing material
- Measuring range / Offset distance

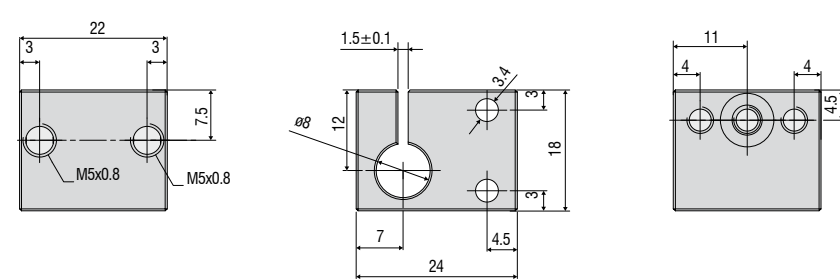
### Vacuum setup



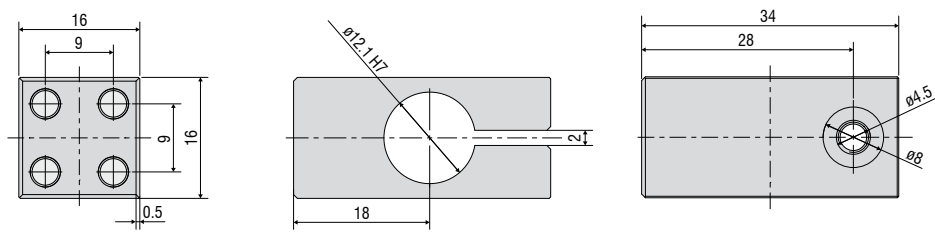
**Accessories: mounting adapter**  
MA2402 for sensors 2402



**Accessories: mounting adapter**  
MA2403 for sensors 2403

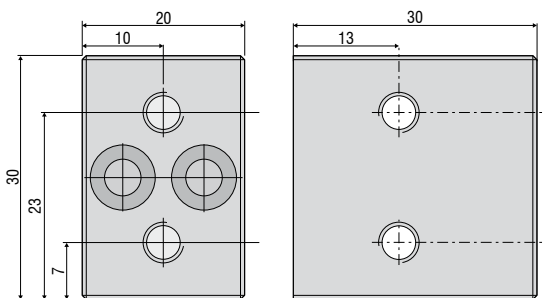


**Accessories: mounting adapter**  
MA2404-12 for sensors IFS2404-2 / IFS2404/90-2 / IFS2407-0,1

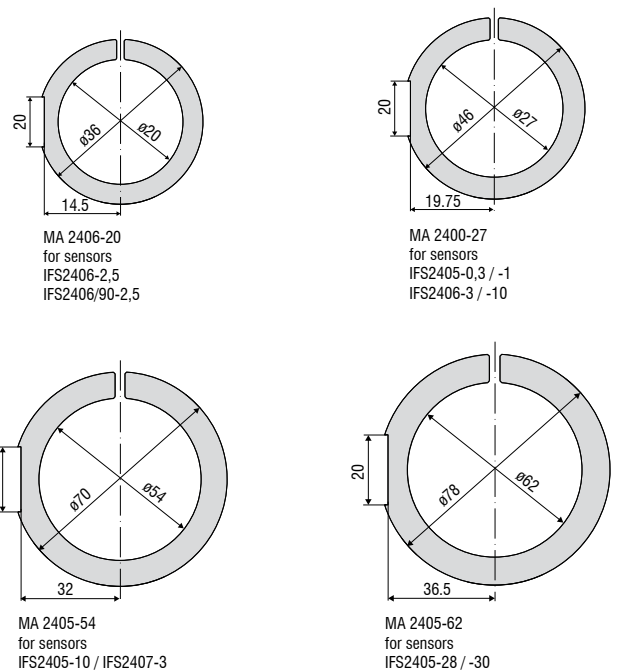


**Accessories: mounting adapter**  
MA2400 for sensors IFS2405 / IFS2406 / IFS2407 (consisting of a mounting block and a mounting ring)

**Mounting block**

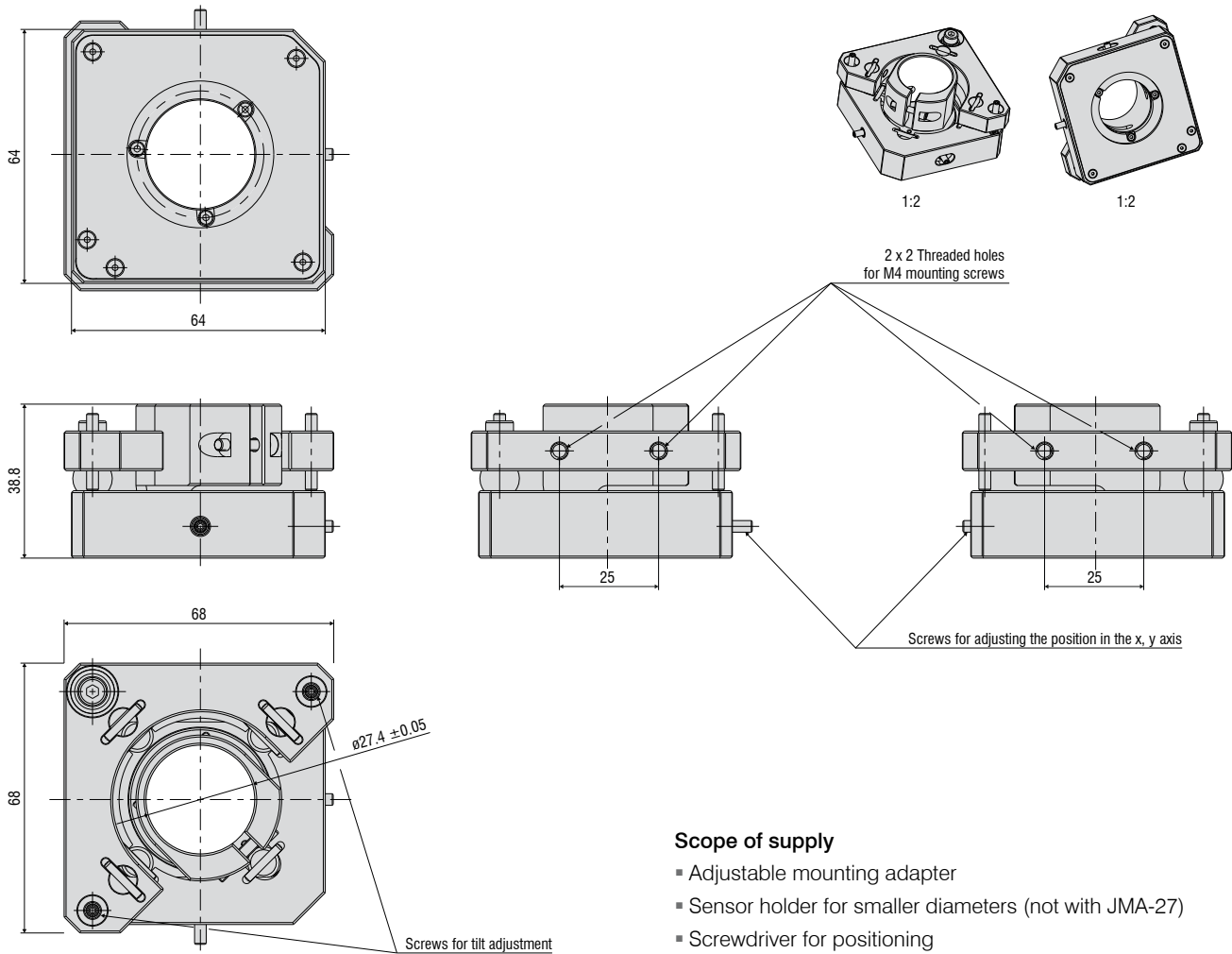


**Mounting ring**



### Adjustable mounting adapter

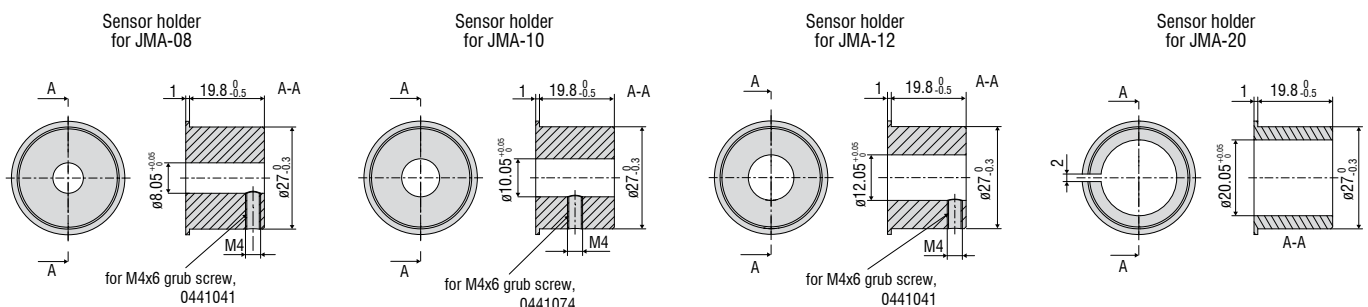
The adjustable JMA mounting adapter simplifies the alignment and fine adjustment of confocal sensors. You can integrate the sensors with the adapter directly into the machine and then align them directly on site. This corrects, e.g. minor deviations caused by mounting and compensates for tilted measuring objects. With two-sided thickness measurements, the mounting adapter supports the fine alignment of the two measuring points.



### Scope of supply

- Adjustable mounting adapter
- Sensor holder for smaller diameters (not with JMA-27)
- Screwdriver for positioning
- Assembly instructions

### Sensor holder for smaller diameters





### Software

IFD24xx-Tool      Software demo tool included

### Accessories light source

IFL2422/LED      Lamp module for IFC2422 and IFC2466  
IFL24x1/LED      Lamp module for IFC2421, IFC2465 and IFC2471

### Cable extension for sensors

CE2402 cable with 2x E2000/APC connectors  
CE2402-x      Extension for optical fiber (3 m, 10 m, 13 m, 30 m, 50 m)  
CE2402/PT3-x      Extension for optical fiber with protection tube for mechanical stress  
(3 m, 10 m, customer-specific length up to 50 m)

### Cable for IFS2404 sensors

C2404-x      Optical fiber with FC/APC and E2000/APC connectors  
Fiber core diameter 20  $\mu\text{m}$  (2 m)

### Cables for IFS2405/IFS2406/2407-0,1 sensors

C2401 cable with FC/APC and E2000/APC connectors  
C2401-x      Optical fiber (3 m, 5 m, 10 m, customer-specific length up to 50 m)  
C2401/PT3-x      Optical fiber with protection tube for mechanical stress  
(3 m, 5 m, 10 m, customer-specific length up to 50 m)  
C2401-x(01)      Optical fiber core diameter 26  $\mu\text{m}$  (3 m, 5 m, 15 m)  
C2401-x(10)      Drag-chain suitable optical fiber (3 m, 5 m, 10 m)

### C2400 cable with 2x FC/APC connectors

C2400-x      Optical fiber (3 m, 5 m, 10 m, customer-specific length up to 50 m)  
C2400/PT-x      Optical fiber with protection tube for mechanical stress  
(3 m, 5 m, 10 m, customer-specific length up to 50 m)  
C2400/PT-x-Vac      Optical fiber with protection tube suitable for use in vacuum  
(3 m, 5 m, 10 m, customer-specific length up to 50 m)



**Cable for IFS2407/90-0,3 sensors**

C2407-x Optical fiber with DIN connector and E2000/APC (2 m, 5 m)

**Vacuum feedthrough**

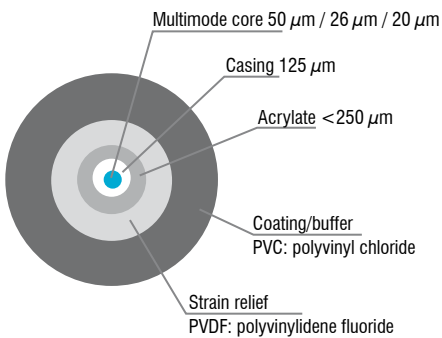
- C2402/Vac/KF16 Vacuum feed through with optical fiber, 1 channel, vacuum side FC/APC non-vacuum side E2000/APC, clamping flange KF 16
- C2405/Vac/1/KF16 Vacuum feed through on both sides FC/APC socket, 1 channel, clamping flange type KF 16
- C2405/Vac/1/CF16 Vacuum feed through on both sides FC/APC socket, 1 channel, flange type CF 16
- C2405/Vac/6/CF63 Vacuum feed through FC/APC socket, 6 channels, flange type CF 63

**Other accessories**

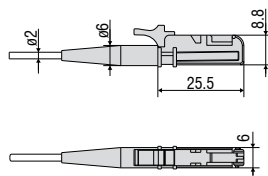
- SC2471-x/USB/IND Connector cable IFC2461/71, 3 m, 10 m, 20 m
- SC2471-x/IF2008 Connector cable IFC2461/71-IF2008, 3 m, 10 m, 20 m
- PS2020 Power supply 24 V / 2.5 A
- EC2471-3/OE Encoder cable, 3 m
- IF2030/PNET Interface module for PROFINET connection
- IF2030/ENETIP Interface module for EtherNet/IP connection

**Optical fiber**

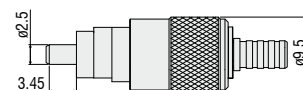
Temperature range: -50 °C to 90 °C  
 Bending radius: 30/40 mm



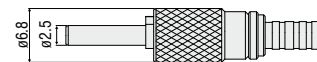
**E2000/APC Standard connector**



**FC/APC Standard connector**



**DIN Connector**



## Sensors and Systems from Micro-Epsilon



Sensors and systems for displacement, distance and position



Sensors and measurement devices for non-contact temperature measurement



Measuring and inspection systems for metal strips, plastics and rubber



Optical micrometers and fiber optics, measuring and test amplifiers



Color recognition sensors, LED analyzers and inline color spectrometers



3D measurement technology for dimensional testing and surface inspection