More Precision

confocalDT // Confocal chromatic measuring system

Compact sensor design ø12 mm

Submicrometer resolution

One-sided thickness measurement

Distance measurement

Extremely small spot size
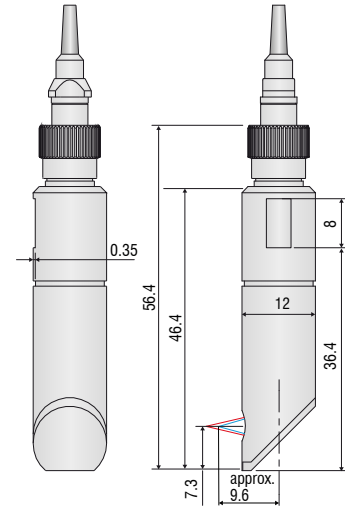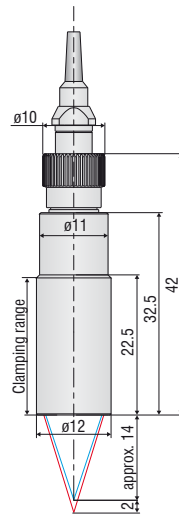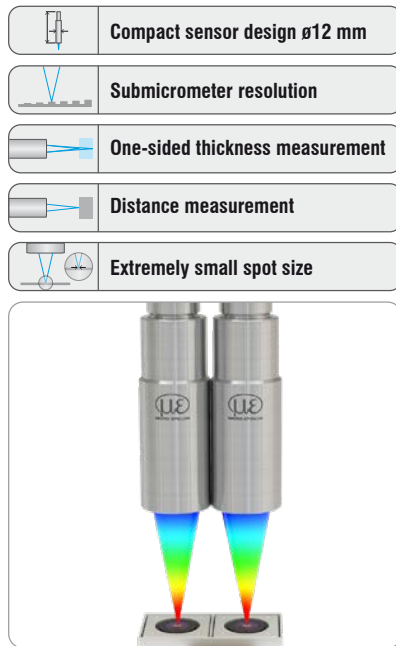
Dimensions in mm, not to scale

Model	IFS2404-2	IFS2404/90-2
Measuring range	2 mm	2 mm
Start of measuring range approx.	14 mm	9.6 mm [1]
Resolution static [2]	40 nm	40 nm
Resolution dynamic [3]	125 nm	125 nm
Linearity [4] Displacement and distance	$< \pm 1\,\mu m$	$< \pm 1\,\mu m$
Linearity [4] Thickness	$< \pm 2\,\mu m$	$< \pm 2\,\mu m$
Light spot diameter	$10\,\mu m$	$10\,\mu m$
Max. tilt angle [5]	$\pm 12°$	$\pm 12°$
Numerical aperture (NA)	0.25	0.25
Min. target thickness [6]	0.1 mm	0.1 mm
Connection	pluggable optical fiber via FC socket, type C2404-x; standard length 2 m; extension up to 50 m; bending radius: static 30 mm, dynamic 40 mm	
Installation	Clamping; mounting adapter (see accessories)	
Temperature range Storage	-20 … +70 °C	
Temperature range 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	approx. 20 g	approx. 30 g

[1] Start of measuring range measured from sensor axis.
[2] Average from 512 values at 1 kHz, near to the midrange onto optical flat
[3] RMS noise relates to mid of measuring range (1 kHz)
[4] All data at constant ambient temperature (25 ±1 °C) against optical flat; specifications can change when measuring different objects.
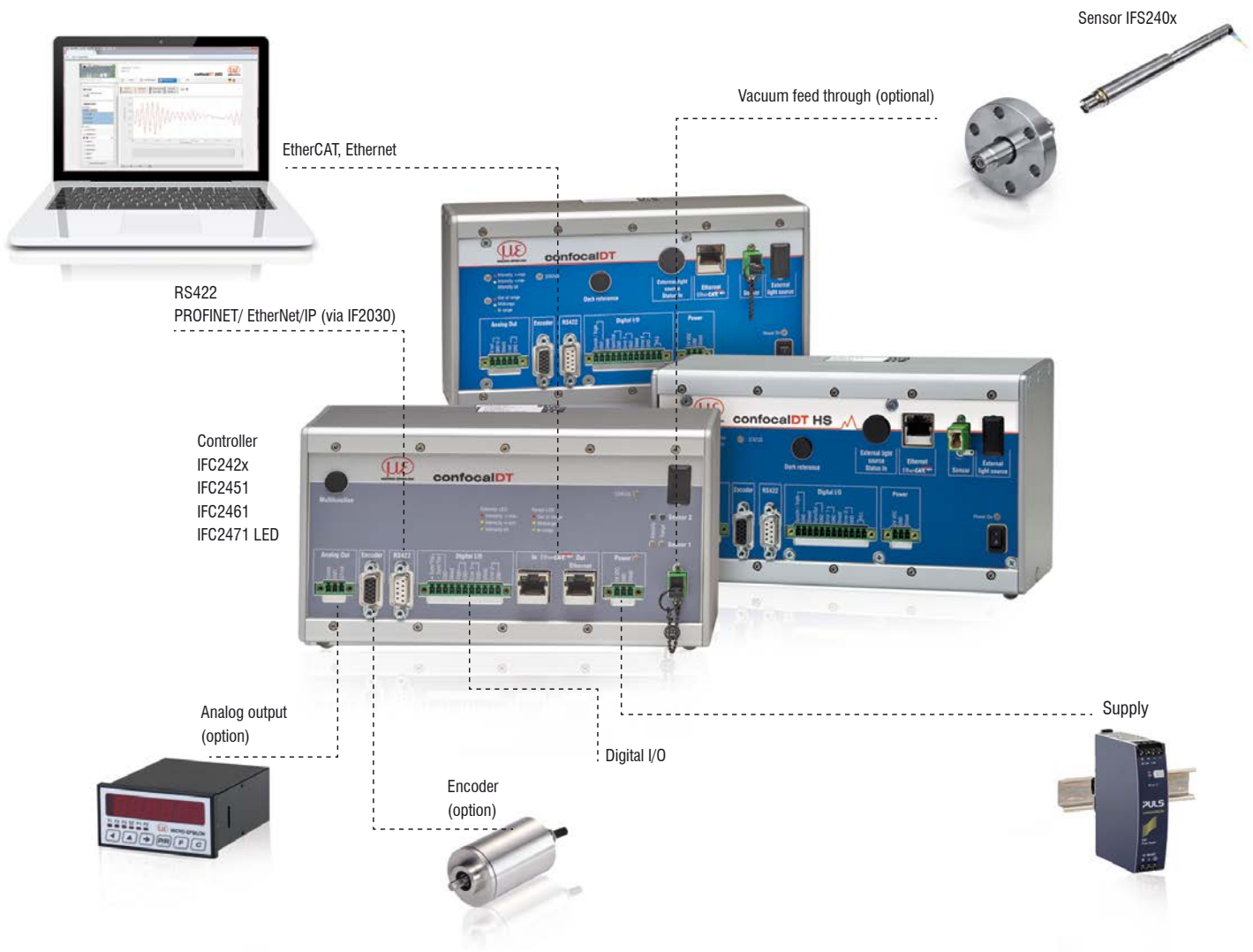[5] Maximum sensor tilt angle that produces a usable signal on reflecting surfaces. The accuracy decreases when approaching the limit values.
[6] Glass sheet with refractive index n = 1.5 throughout the entire measuring range. In the mid of the measuring range, also thinner layers can be measured.

System design

The confocalDT system consists of:
- Sensor IFS240x
- Controller IFC24xx
- Fiber optic cable C24xx

Sensor IFS240x

Vacuum feed through (optional)

EtherCAT, Ethernet

RS422
PROFINET/ EtherNet/IP (via IF2030)

Controller
IFC242x
IFC2451
IFC2461
IFC2471 LED

Analog output
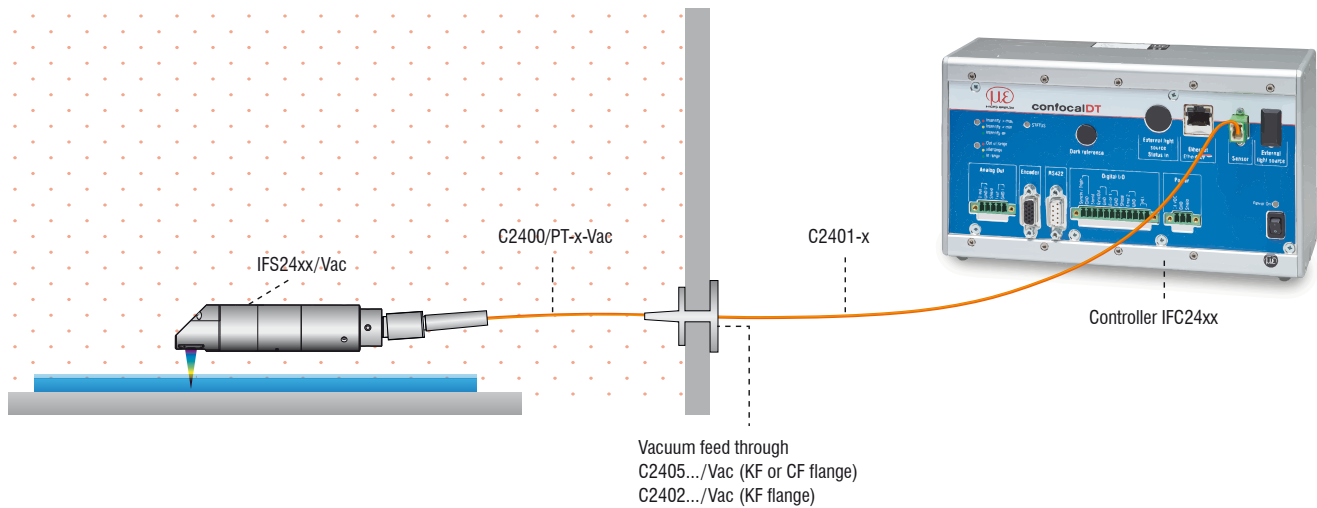(option)

Digital I/O

Encoder
(option)

Supply

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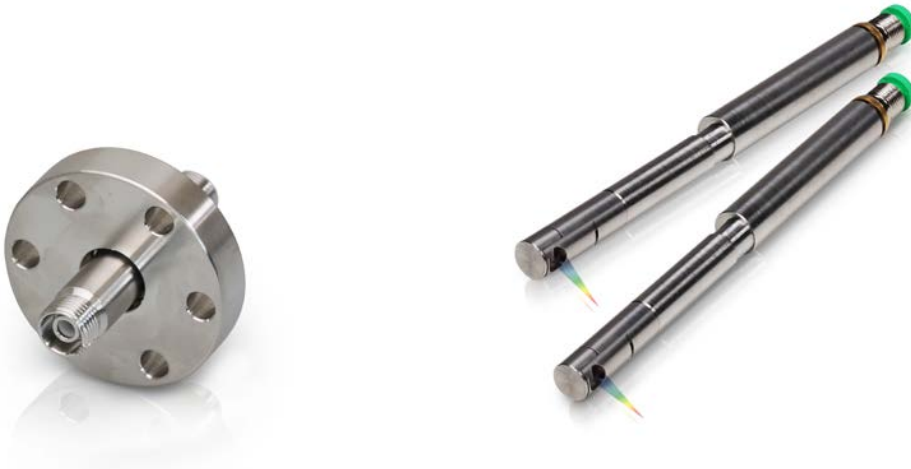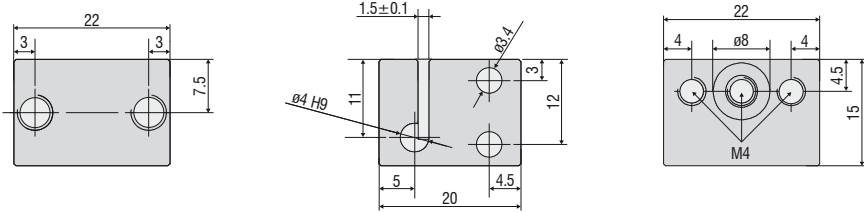
Possible modifications
- Sensors with connector
- Cable length
- Vacuum suitability up to UHV
- Specific lengths
- Customer-specific mounting options
- Optical filter for ambient light compensation
- Housing material
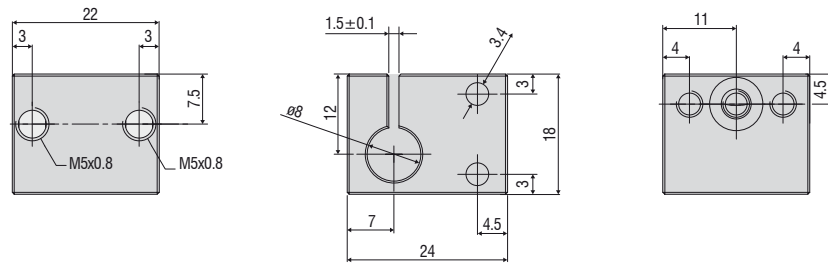- Measuring range / Offset distance

IFS24xx/Vac

C2400/PT-x-Vac

C2401-x

Controller IFC24xx

Vacuum feed through
C2405.../Vac (KF or CF flange)
C2402.../Vac (KF flange)

Accessories: mounting adapter
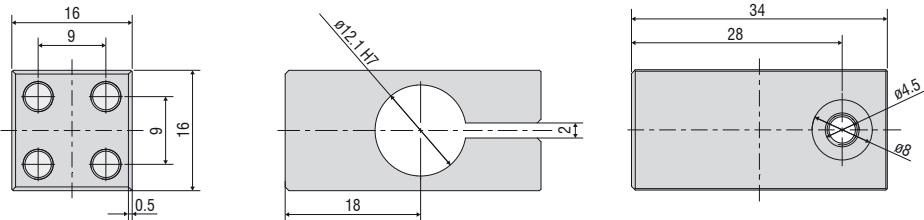MA2402 for sensors 2402

Accessories: mounting adapter
MA2403 for sensors 2403
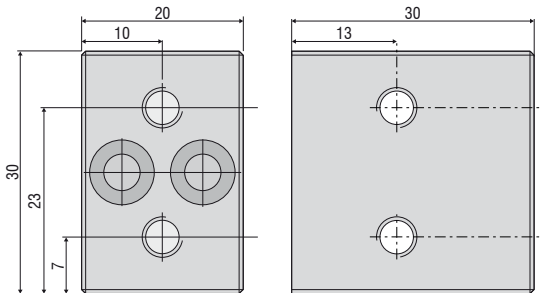
Accessories: mounting adapter
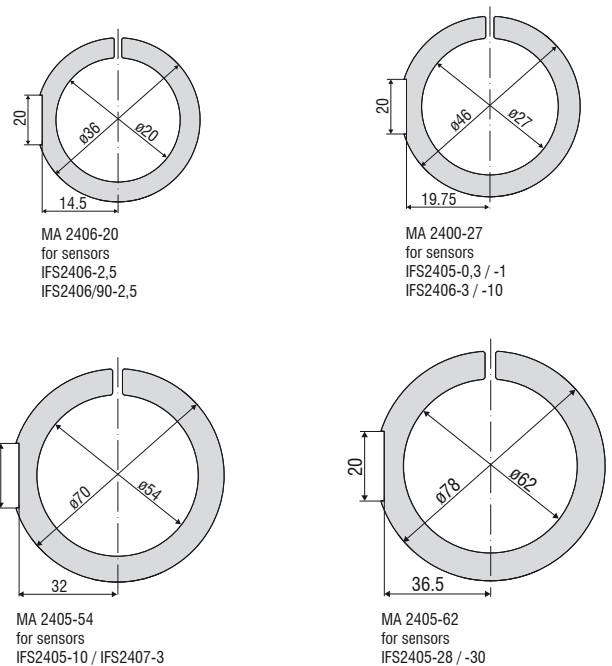MA2404-12 for sensors IFS2404-2 / IFS2404/90-2 / IFS2407-0,1

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

Mounting block

Mounting ring

MA 2406-20
for sensors
IFS2406-2,5
IFS2406/90-2,5

MA 2400-27
for sensors
IFS2405-0,3 / -1
IFS2406-3 / -10

MA 2405-34
for sensors
IFS2405-3

MA 2405-40
for sensors
IFS 2405-6

MA 2405-54
for sensors
IFS2405-10 / IFS2407-3

MA 2405-62
for sensors
IFS2405-28 / -30

Accessories

Software
IFD24xx-Tool	Software demo tool included

Accessories light source
IFL2422/LE	Lamp module for IFC2422
IFL24x1/LED	Lamp module for IFC24x1
IFL2451/LED(003)	Lamp module for IFC2451(003)

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-x/PT	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 μm (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/PT-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 μm (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)

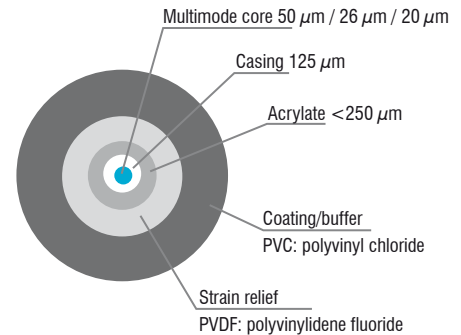### Vacuum feed through
C2402/Vac/KF16	Vacuum feed through with optical fiber, 1 channel, vacuum side FC/APC non-vacuum side E2000/APC, clamping flange KF 16
C2405/Vac/1/KF16	Vacuum feed through on both sides FC/APC socket, 1 channel, clamping flange type KF 16
C2405/Vac/1/CF16	Vacuum feed through on 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
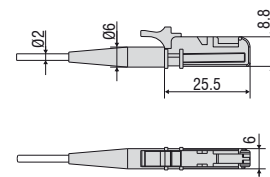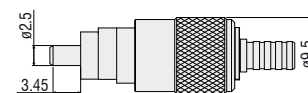|	
SC2471-x/USB/IND	Connector cable IFC2451/61/71, 3 m, 10 m, 20 m
SC2471-x/IF2008	Connector cable IFC2451/61/71-IF2008, 3 m, 10 m, 20 m
PS2020	Power supply 24V / 2.5A
EC2471-3/OE	Encoder cable, 3m
IF2030/PNET	Interface module for PROFINET connection
IF2030/ENETIP	Interface module for EtherNet/IP connection

Optical fiber
Temperature range : -50 °C to 90 °C

Bending radius: 30/40 mm

Multimode core 50 μm / 26 μm / 20 μm

Casing 125 μm

Acrylate <250 μm

Coating/buffer
PVC: polyvinyl chloride

Strain relief
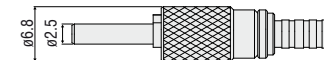PVDF: polyvinylidene fluoride

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
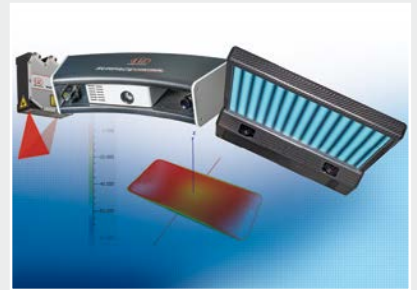
Measuring and inspection systems for metal strips, plastics and rubber

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