More Precision

confocalDT // Confocal chromatic measuring system

Compact sensor design ø12 mm

Submicrometer resolution

One-sided thickness measurement

Distance measurement

Extremely small spot size

ø10

ø11

42

32.5

22.5

ø12

approx. 14

2
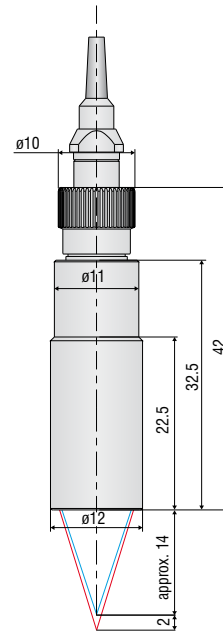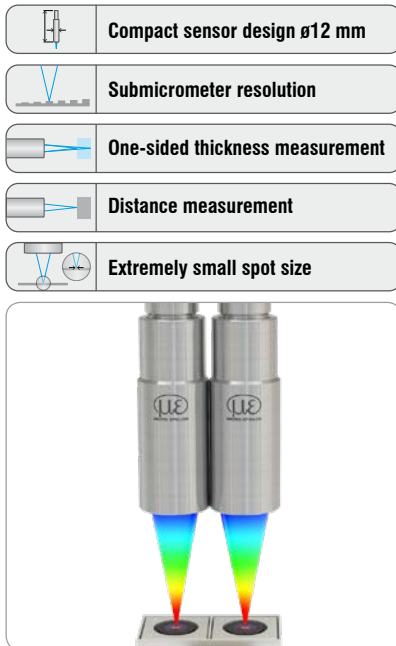
Dimensions in mm, not to scale

Model	IFS2404-2
Measuring range	2 mm
Start of measuring range approx.	14 mm
Resolution [1]	40 nm
Linearity [2] Displacement and distance	$< \pm 1\,\mu$m
Thickness	$< \pm 2\,\mu$m
Light spot diameter	$10\,\mu$m
Max. tilt angle [3]	$\pm 12°$
Numerical aperture	0.25
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
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 axes / 1000 shocks per axis
Vibration (DIN-EN 60068-2-6)	2 g / 20 Hz … 500 Hz in XY axes / 10 cycles per axis
Protection class (DIN-EN 60529)	IP65, front operated
Material	stainless steel housing, glass lenses
Weight	20 g

[1] Average from 512 values at 1 kHz, near to the midrange onto optical flat
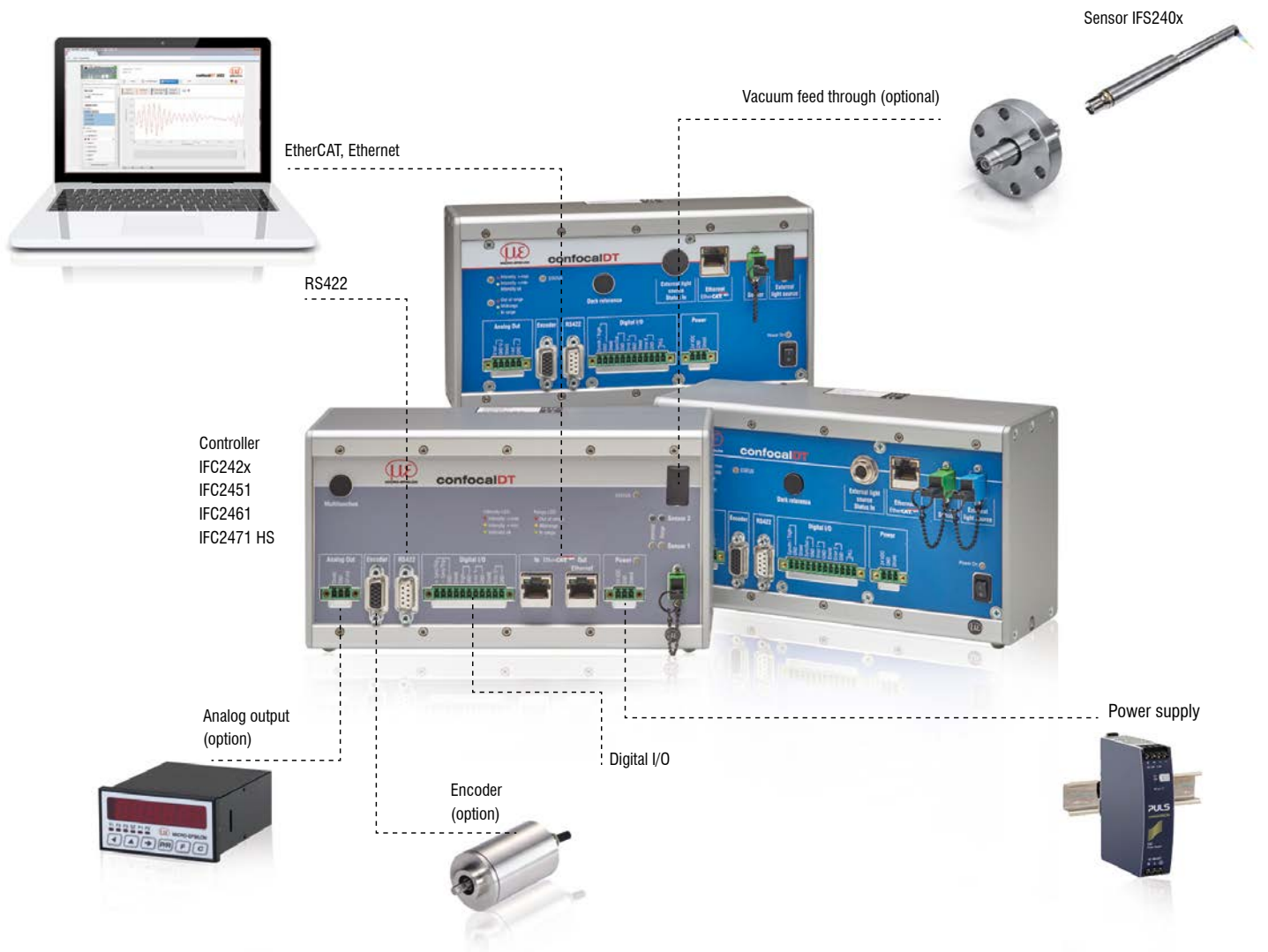[2] All data at constant ambient temperature (25±1 °C) against optical flat; specifications can change when measuring different materials.
[3] Maximum sensor tilt angle that produces a usable signal on reflecting surfaces. The accuracy decreases when approaching the limit values.

System design

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

Sensor IFS240x

Vacuum feed through (optional)

EtherCAT, Ethernet

RS422

Controller
IFC242x
IFC2451
IFC2461
IFC2471 HS

Analog output
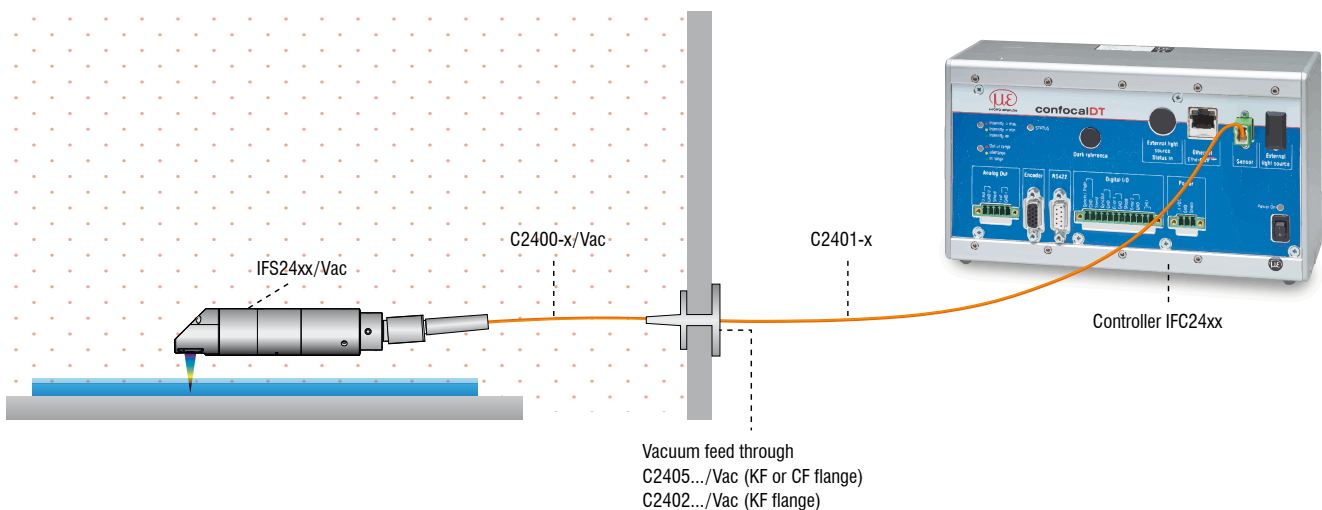(option)

Digital I/O

Encoder
(option)

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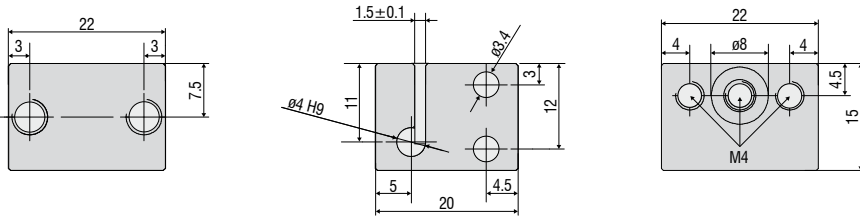
Possible modifications
- Sensors with connector
- Cable length
- Vacuum suitability up to UHV
- Specific lengths
- Customer-specific mounting options
- Optical filter for ambient light compensation
- Housing material
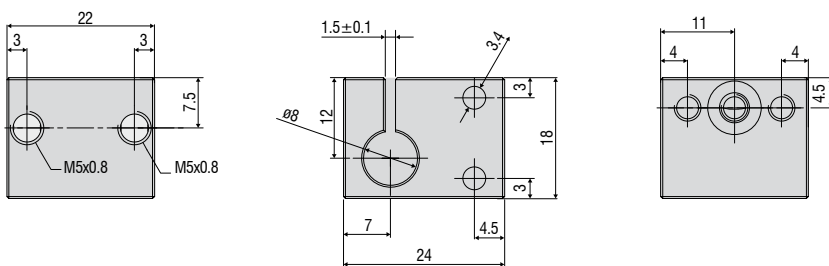- Measuring range / Offset distance

Vacuum setup

IFS24xx/Vac

C2400-x/Vac

C2401-x

Controller IFC24xx

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

Accessories: mounting adapter
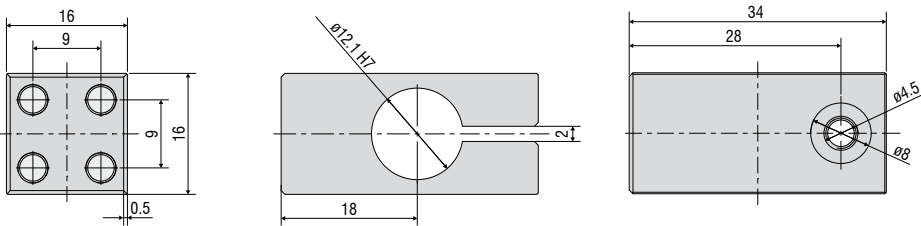MA2402 for sensors 2402

Accessories: mounting adapter
MA2403 for sensors 2403
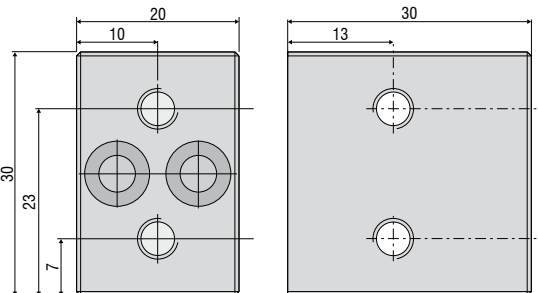

Accessories: mounting adapter
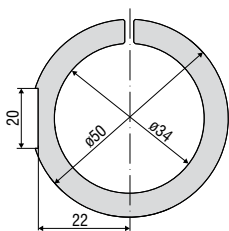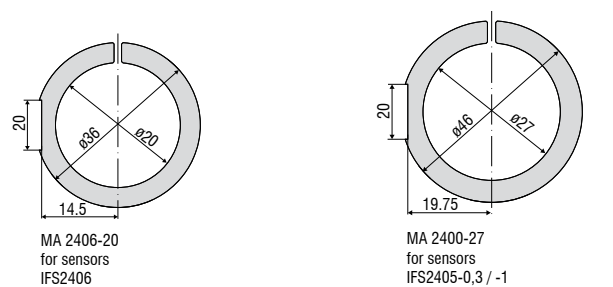MA2404-12 for sensors IFS2404-2

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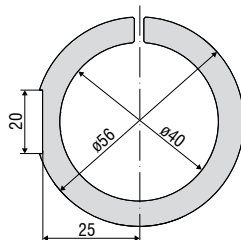MA2400 for sensors IFS2405/IFS2406 (consisting of a mounting block and a mounting ring)

Mounting block

Mounting ring

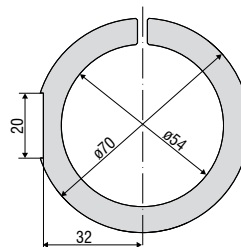MA 2406-20
for sensors
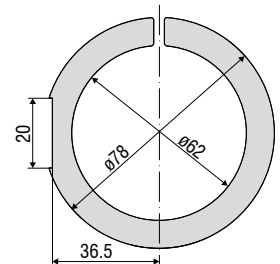IFS2406

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

MA 2405-34
for sensors
IFS2405-3

MA 2405-40
for sensors
IFS 2405-6

MA 2405-54
for sensors
IFS2405-10

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

Accessories

Software
IFD24n1-Tool   Free demo software 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 (01)   Optical 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)
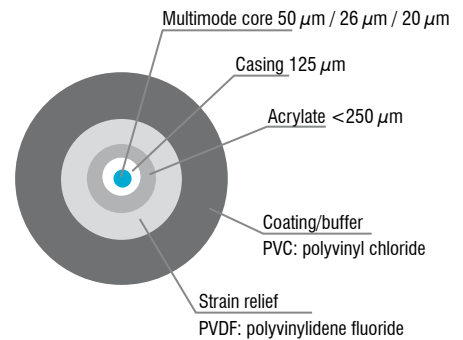
Vacuum feed through
C2402/Vac/KF16   Vacuum feed through with optical fiber, 1 channel, vacuum side FC/APC
      non-vacuum side E2000/APC, clamping flange KF 16
C2405/Vac/1/KF16   Vacuum feed through on both sides FC/APC socket, 1 channel,
      clamping flange type KF 16
C2405/Vac/1/CF16   Vacuum feed 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
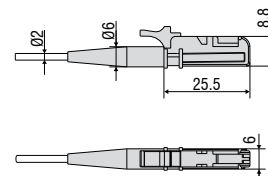
Other accessories
SC2471-x/USB/IND   Connector cable IFC2451/61/71, 3 m, 10 m, 20 m
SC2471-x/IF2008   Connector cable IFC2451/61/71-IF2008, 3 m, 10 m, 20 m
PS2020   Power supply 24V / 2.5A
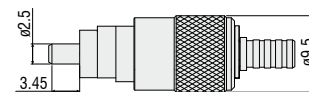EC2471-3/OE   Encoder cable, 3m

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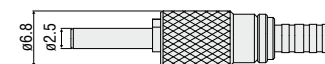Temperature range : -50°C to 90°C
Bending radius: 30/40 mm

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

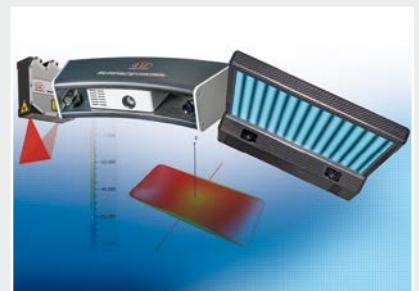Sensors and measurement devices for non-contact temperature measurement

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

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