**MICRO-EPSILON**

More Precision.

confocalDT // Confocal chromatic sensor system

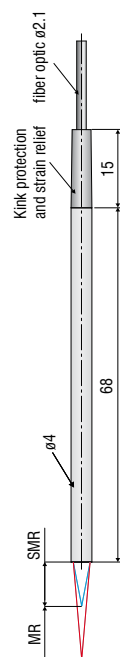# Confocal chromatic miniature sensors
confocalDT IFS2402

Miniature sensors Ø4 mm with axial or radial beam path

Submicron resolution

For precise distance measurements

Small light spot

MR = Measuring range
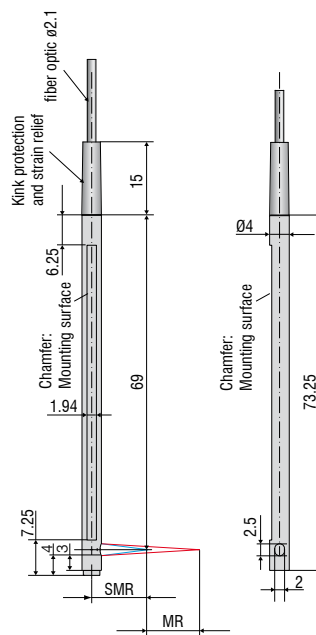SMR = Start of measuring range
Dimensions in mm, not to scale

Model	IFS2402-0,5	IFS2402-1,5	IFS2402-4
Measuring range	0.5 mm	1.5 mm	3.5 mm
Start of measuring range	approx.	1.7 mm	0.9 mm	1.9 mm
Resolution	static [1]	16 nm	60 nm	100 nm
	dynamic [2]	48 nm	192 nm	480 nm
Linearity [3]	Displacement and distance	< ±0.2 μm	< ±1.2 μm	< ±3 μm
Light spot diameter	10 μm	20 μm	20 μm
Max. measuring angle [4]	±18°	±5°	±3°
Numerical aperture (NA)	0.40	0.20	0.10
Connector	integrated optical fiber 2 m with E2000/APC connector; 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)	IP64, front operated		
Material	Stainless steel housing, glass lenses		
Weight	approx. 186 g (incl. optical fiber)		

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

fiber optic ø2.1

Kink protection and strain relief

15

Chamfer: Mounting surface

6.25

69

1.94

7.25

4

3

SMR

MR

Ø4

Chamfer: Mounting surface

73.25

2.5

2

MR = Measuring range
SMR = Start of measuring range
Dimensions in mm, not to scale

Model	IFS2402/90-1,5	IFS2402/90-4
Measuring range	1.5 mm	2.5 mm
Start of measuring range approx.	2.5 mm [1]	2.5 mm [1]
Resolution static [2]	60 nm	100 nm
dynamic [3]	192 nm	480 nm
Linearity [4] Displacement and distance	< ±1.2 μm	< ±3 μm
Light spot diameter	20 μm	20 μm
Max. measuring angle [5]	±5°	±3°
Numerical aperture	0.20	0.10
Connector	integrated optical fiber 2 m with E2000/APC connector; 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)	IP40	
Material	Stainless steel housing, glass lenses	
Weight	approx. 186 g (incl. optical fiber)	

[1] Start of measuring range measured from sensor axis
[2] Average from 512 values at 1 kHz, near to the mid of the measuring range 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.
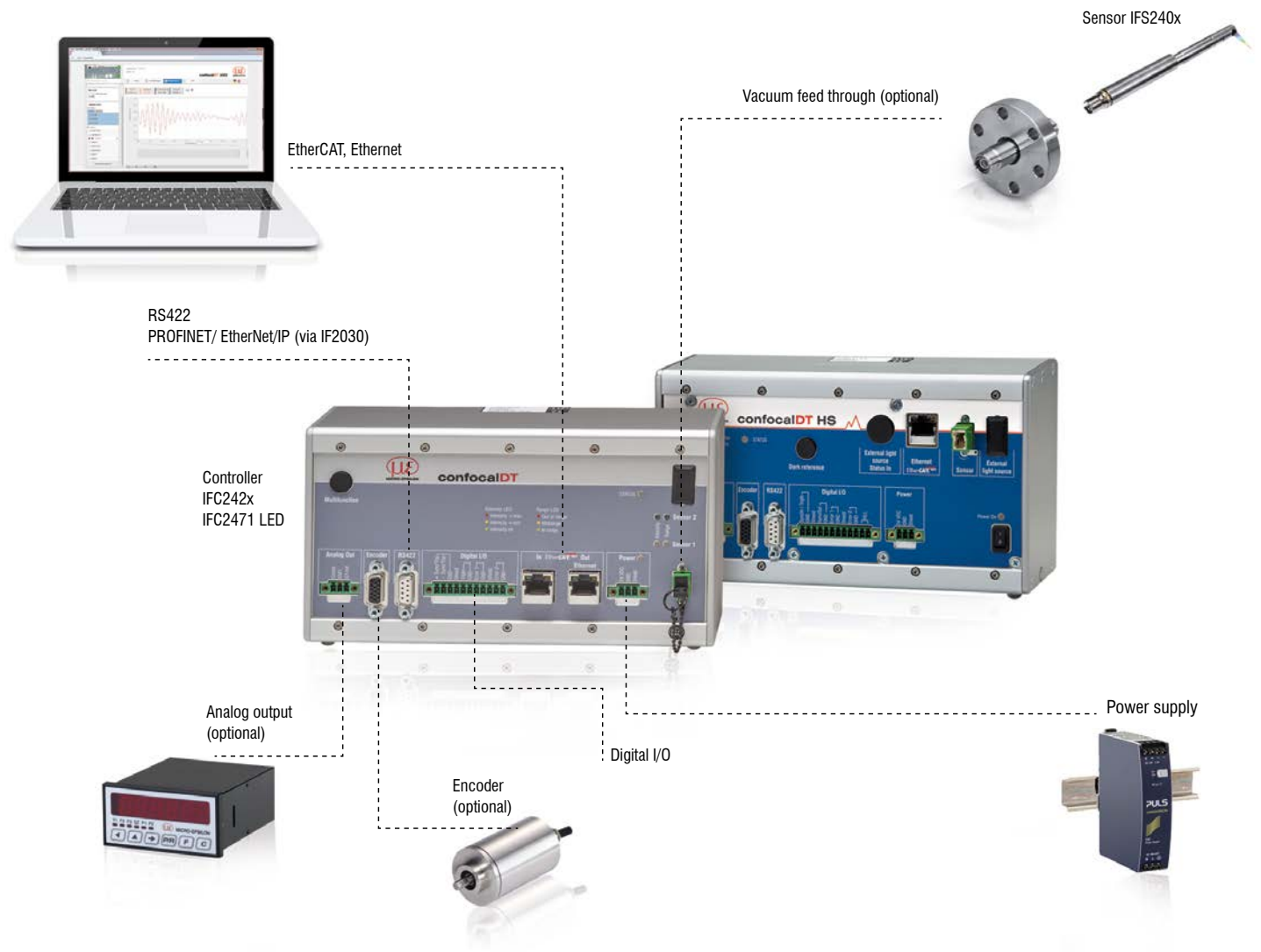[5] Maximum measuring angle of the sensor that produces a usable signal on reflecting surfaces. The accuracy decreases when approaching the limit values.

System design
confocalDT

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
IFC2471 LED

confocalDT

confocalDT HS

Analog output
(optional)

Digital I/O

Encoder
(optional)

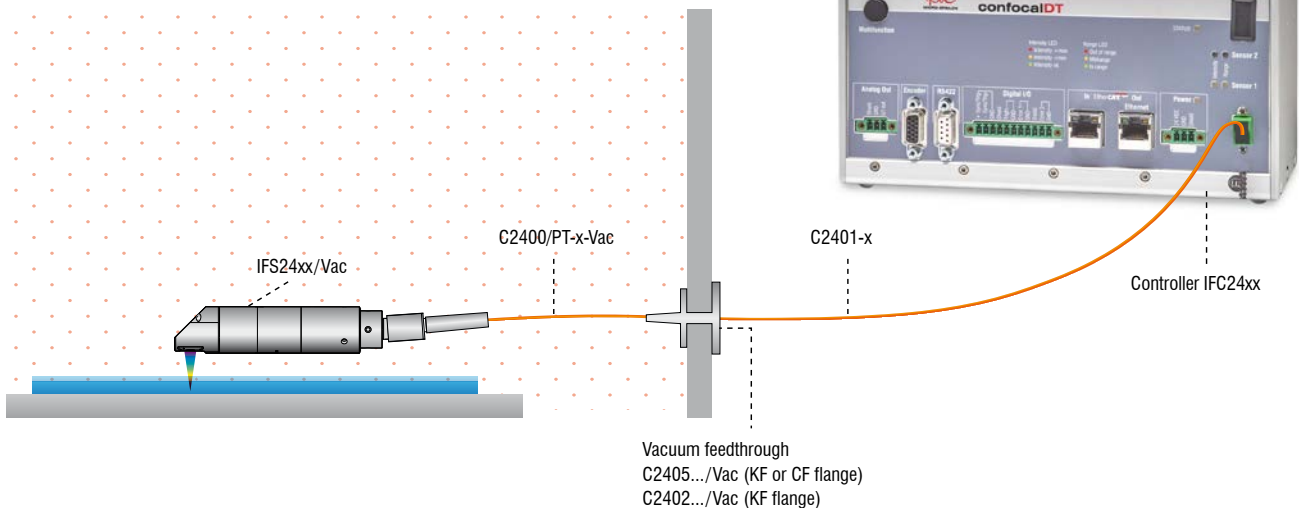Power supply

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.
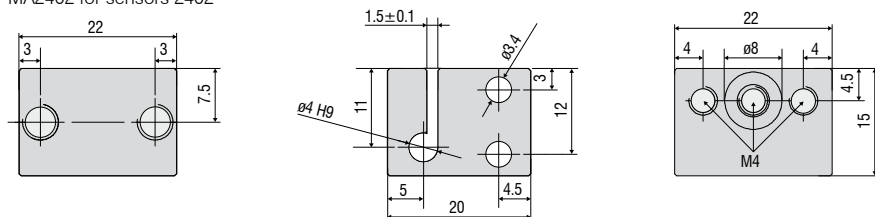
Possible modifications

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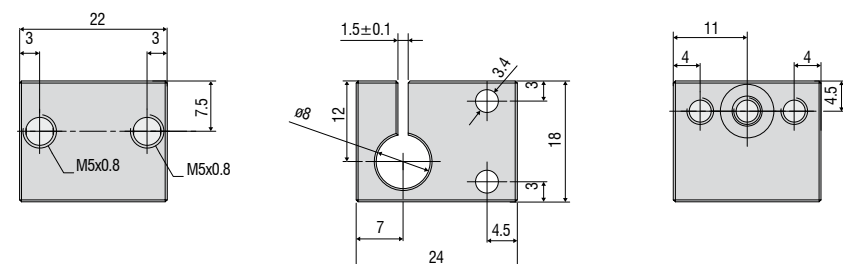- Measuring range / Offset distance

Vacuum setup

IFS24xx/Vac

C2400/PT-x-Vac

C2401-x

Controller IFC24xx

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

Accessories: mounting adapter
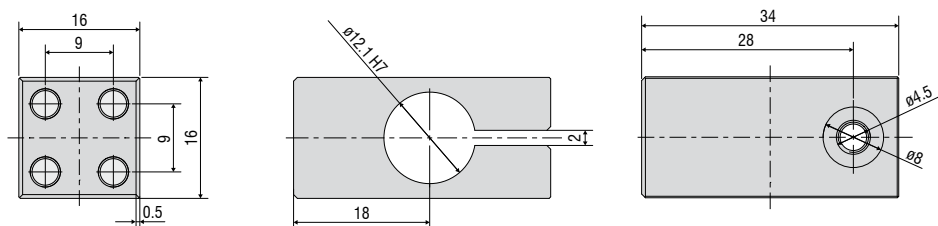MA2402 for sensors 2402

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
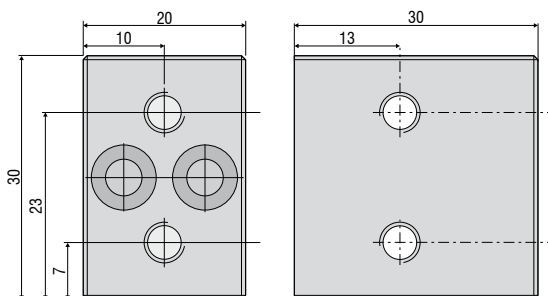
Adjustable mounting adapter

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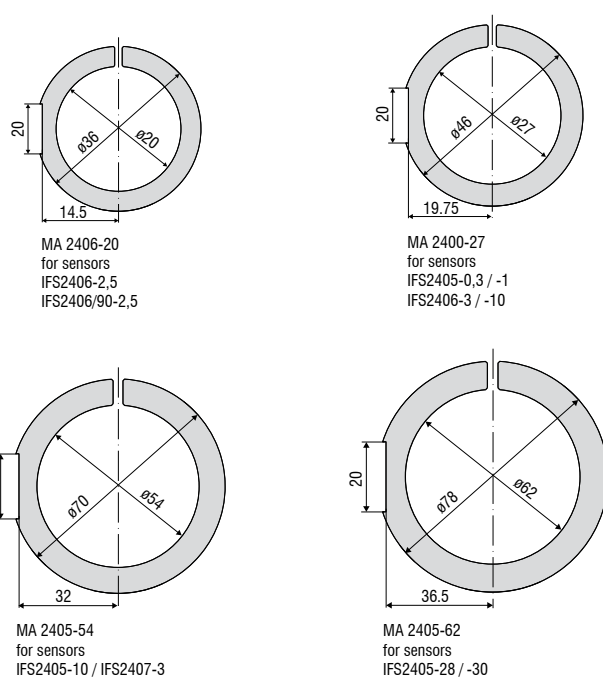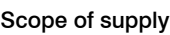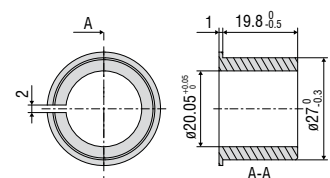ectly into the machine and then align them directly on site. This corrects, e.g, minor deviations caused by mounting and compensates for tilted measuring objects. With two-sided thickness measurements, the mounting adapter supports the fine alignment of the two measuring points.

1:2

1:2

2 x 2 Threaded holes
for M4 mounting screws

25

25

Screws for adjusting the position in the x, y axis

64

64

38.8

68

68

$\varnothing 27.4 \pm 0.05$

Screws for tilt adjustment

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

Sensor holder
for JMA-08

Sensor holder
for JMA-10

Sensor holder
for JMA-12

Sensor holder
for JMA-20

A
A
1   $19.8_{-0.5}^{0}$ A-A
$\varnothing 8.05_{0}^{+0.05}$
$\varnothing 27_{-0.3}^{0}$
M4
for M4x6 grub screw,
0441041

A
A
1   $19.8_{-0.5}^{0}$ A-A
$\varnothing 10.05_{0}^{+0.05}$
$\varnothing 27_{-0.3}^{0}$
M4
for M4x6 grub screw,
0441074

A
A
1   $19.8_{-0.5}^{0}$ A-A
$\varnothing 12.05_{0}^{+0.05}$
$\varnothing 27_{-0.3}^{0}$
M4
for M4x6 grub screw,
0441041

A
A
1   $19.8_{-0.5}^{0}$
2
$\varnothing 20.05_{0}^{+0.05}$
$\varnothing 27_{-0.3}^{0}$
A-A

Accessories
confocalDT

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 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/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 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 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
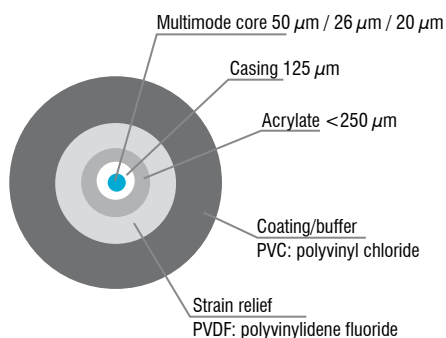EC2471-3/OE   Encoder cable, 3 m
IF2030/PNET   Interface module for PROFINET connection
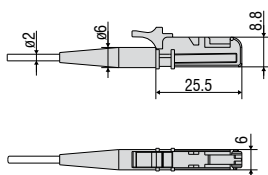IF2030/ENETIP   Interface module for EtherNet/IP connection
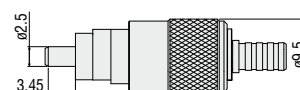
Optical fiber

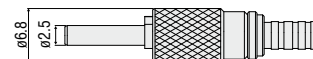Temperature range: -50 °C to 90 °C

Bending radius: 30/40 mm

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

ø2   ø6   8.8
25.5
6

FC/APC Standard connector

ø2.5   ø9.5
3.45

DIN Connector

ø6.8   ø2.5

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

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