More Precision

confocalDT // Confocal chromatic measuring system
Confocal sensors with high precision

Confocal DT IFS2405

<table>
<thead>
<tr>
<th>Sensor model</th>
<th>IFS2405-0.3</th>
<th>IFS2405-1</th>
<th>IFS2405-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>0.3 mm</td>
<td>1 mm</td>
<td>3 mm</td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>approx. 6 mm</td>
<td>10 mm</td>
<td>20 mm</td>
</tr>
<tr>
<td>Numerical aperture</td>
<td>0.60</td>
<td>0.55</td>
<td>0.45</td>
</tr>
<tr>
<td>Light spot diameter</td>
<td>6 µm</td>
<td>8 µm</td>
<td>9 µm</td>
</tr>
<tr>
<td>Linearity (displacement and distance measurement)</td>
<td>≤ ± 0.15 µm</td>
<td>≤ ± 0.25 µm</td>
<td>≤ ± 0.75 µm</td>
</tr>
<tr>
<td>Linearity (thickness measurement)</td>
<td>≤ ± 0.3 µm</td>
<td>≤ ± 0.5 µm</td>
<td>≤ ± 1.5 µm</td>
</tr>
<tr>
<td>Resolution</td>
<td>10 nm</td>
<td>28 nm</td>
<td>36 nm</td>
</tr>
<tr>
<td>Weight</td>
<td>140 g</td>
<td>125 g</td>
<td>225 g</td>
</tr>
<tr>
<td>Max. tilt</td>
<td>± 34°</td>
<td>± 30°</td>
<td>± 24°</td>
</tr>
</tbody>
</table>

**Protection class**: IP65, front operated

**Temperature range**: Operation + 5 ... + 70 °C, Storage -20 ... + 70 °C

**Connection**: pluggable sensor cable via FC socket, standard length 3 m; extension up to 50 m; bending radius: static 30 mm; dynamic 40 mm

**Shock**: 15 g, 6 ms

**Vibration**: 2g / 10 Hz ... 500 Hz

FSO = Full Scale Output

All data at constant ambient temperature (25 ± 2 °C) against optical flat; specifications can change when measuring different materials.

1 Average from 512 values at 1 kHz, near to the midrange

2 Maximum sensor tilt angle that produces a usable signal on a reflecting surface, near to the midrange
<table>
<thead>
<tr>
<th>Sensor model</th>
<th>IFS 2405-10</th>
<th>IFS 2405-28</th>
<th>IFS 2405-30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>10 mm</td>
<td>28 mm</td>
<td>30 mm</td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>approx. 50 mm</td>
<td>220 mm</td>
<td>100 mm</td>
</tr>
<tr>
<td>Numerical aperture</td>
<td>0.30</td>
<td>0.10</td>
<td>0.20</td>
</tr>
<tr>
<td>Light spot diameter</td>
<td>16 µm</td>
<td>60 µm</td>
<td>50 µm</td>
</tr>
<tr>
<td>Linearity (displacement and distance measurement)</td>
<td>≤ ± 2.5 µm</td>
<td>≤ ± 7 µm</td>
<td>≤ ± 7.5 µm</td>
</tr>
<tr>
<td>Linearity (thickness measurement)</td>
<td>≤ ± 5 µm</td>
<td>≤ ± 14 µm</td>
<td>≤ ± 15 µm</td>
</tr>
<tr>
<td>Resolution</td>
<td>60 nm</td>
<td>250 nm</td>
<td>180 nm</td>
</tr>
<tr>
<td>Weight</td>
<td>500 g</td>
<td>750 g</td>
<td>730 g</td>
</tr>
<tr>
<td>Max. tilt</td>
<td>± 17°</td>
<td>± 5°</td>
<td>± 9°</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65, front operated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>Operation</td>
<td>+5 °C ... +70 °C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Storage</td>
<td>-20 °C ... +70 °C</td>
<td></td>
</tr>
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FSO = Full Scale Output

All data at constant ambient temperature (25 ± 2 °C) against optical flat; specifications can change when measuring different materials.

1) Average from 512 values at 1 kHz, near to the midrange

2) Maximum sensor tilt angle that produces a usable signal on a reflecting surface, near to the midrange
System design

The confocalDT system consists of:
- Sensor IFS240x
- Controller IFC24xx
- Fiber-optic cable
Customer-specific modifications

Application examples are often found where the standard versions of the sensors and the controller 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 until UHV
- Specific lengths
- Customer-specific mounting options
- Optical filter for ambient light compensation
- Housing material
- Measuring range / offset distance

Vacuum setup

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

Controller IFC24xx
Accessories: mounting adapter
MA2402 for sensors 2402

Accessories: mounting adapter
MA2403 for sensors 2403

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

Mounting block

Mounting ring
Accessories

Software
IFD24n1-Tool  Free demo software tool included

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

Cables for IFS2402/IFS2403 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 Optical fiber with protection tube for mechanical stress (3 m, 10 m, customer-specific length up to 50 m)

Cables for IFS2405/IFS2406 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 sensors
C2404-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-IF2008, 3 m, 10 m, 20 m
PS2020 Power supply 24 V / 2.5 A
EC2471-3/OE Encoder cable, 3 m

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

![Optical fiber diagram](image.png)

- Multimode core 50 µm / 26 µm
- Cladding 125 µm
- Acrylate <250 µm
- Coating/buffer
- PVC: polyvinyl chloride
- Strain relief
- PVDF: polyvinylidene fluoride

![E2000/APC standard connector](image.png)

![FC/APC standard connector](image.png)

![DIN connector](image.png)
High performance sensors made by Micro-Epsilon

- Sensors and systems for displacement and position
- Sensors and measurement devices for non-contact temperature measurement
- 2D/3D profile sensors (laser scanner)
- Optical micrometers, fiber optic sensors and fiber optics
- Color recognition sensors, LED analyzers and color inline spectrometer
- Measurement and inspection systems