More Precision

confocalDT // Confocal chromatic measuring system
The confocalDT 2421/22 controllers set the industrial standard in precise, confocal measurement technology.

Available as either a single- or a dual-channel version, these measuring systems are a low cost solution especially for serial applications. The active exposure regulation feature in the CCD line is for accurate, fast surface compensation on changing surfaces.

The controller can be operated with any IFS sensor and is available as a standard version for distance measurements or as a multi-peak version for multi-layer thickness measurements. Using a special calculation function, the confocalDT 2422 dual-channel version evaluates both channels. Measurement acquisition is synchronous and can be carried out while exploiting the full measuring rate for both channels.

Due to a user-friendly web interface, no additional software is necessary to configure the controller and the sensors. Data output is via Ethernet, EtherCAT, RS422 or analog output.

The new confocal controller for industrial applications confocalDT IFC242x

Measuring rate up to 6.5kHz
Fast surface compensation
Configuration via web interface
Submicrometer resolution
Multi-layer thickness measurement
Synchronous two-sided thickness measurement
Robust design with passive cooling

Two sensors can be directly connected to a confocal IFC2422 controller.

All settings are performed in the web interface. For thickness measurements, materials are stored in an expandable materials database.
<table>
<thead>
<tr>
<th>Model</th>
<th>IFC2421</th>
<th>IFC2421MP</th>
<th>IFC2422</th>
<th>IFC2422MP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>Ethernet/EtherCAT</td>
<td>1 nm</td>
<td>RS422</td>
<td>18 bit</td>
</tr>
<tr>
<td></td>
<td>analog</td>
<td></td>
<td></td>
<td>16 bits (teachable)</td>
</tr>
<tr>
<td>Measuring rate</td>
<td>continuously adjustable from 100 Hz to 6.5 kHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearity</td>
<td>typ. ( &lt; \pm 0.025 % ) FSO (depends on sensor)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi peak measurement</td>
<td>1 layer</td>
<td>5 layers</td>
<td>1 layer</td>
<td>5 layers</td>
</tr>
<tr>
<td>Light source</td>
<td>internal white LED</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of characteristic curves</td>
<td>up to 20 characteristic curves for different sensors per channel, selection via table in the menu</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible ambient light</td>
<td>30,000 lx</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synchronization</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply voltage</td>
<td>24 VDC ( \pm 15 % )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>approx. 10 W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal input</td>
<td>sync-in / trig-in; 2x encoder (A+, A-, B+, B- Index)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital interface</td>
<td>Ethernet; EtherCAT; RS422; PROFINET (^2); EtherNet/IP (^2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog output</td>
<td>Current: 4 … 20 mA; voltage: 0 … 10 V (16 bit D/A converter)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching output</td>
<td>Error1-Out, Error2-Out</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital output</td>
<td>sync-out</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection</td>
<td>optical</td>
<td>pluggable optical fiber via E2000 socket, length 2 m … 50 m, min. bending radius 30 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>electrical</td>
<td>3-pin supply terminal strip; encoder connection (15-pin, HD-sub socket, max. cable length 3 m, 30 m with external encoder supply); RS422 connection socket (9-pin, Sub-D, max. cable length 30 m); 3-pin output terminal strip (max. cable length 30 m); 11-pin I/O terminal strip (max. cable length 30 m); RJ45 socket for Ethernet (out) / EtherCAT (in/out) (max. cable length 100 m)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Installation</td>
<td>free-standing, DIN rail mounting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>Storage: -20 … +70 °C</td>
<td>Operation: +5 … +50 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock (DIN-EN 60068-2-27)</td>
<td>15 g / 6 ms in XYZ axis, 1000 shocks each</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration (DIN-EN 60068-2-6)</td>
<td>2 g / 20 … 500 Hz in XYZ axis, 10 cycles each</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class (DIN-EN 60529)</td>
<td>IP40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Aluminum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1.8 kg</td>
<td>approx. 2.25 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compatibility</td>
<td>compatible with all confocalDT sensors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of measurement channels (^3)</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control and display elements</td>
<td>multifunction button (two adjustable functions and reset to factory setting after 10 s); 5x LEDs for intensity, range, status and supply voltage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FSO = Full Scale Output
1) Illuminant: light bulb
2) Optional connection via interface module (see accessories)
3) No loss of intensity and linearity due to two synchronous measurement channels

![IFC2421 controller](image)

![IFC2422 controller](image)
The confocalDT system consists of:
- Sensor IFS240x
- Controller IFC24xx
- Fiber optic cable C24xx

- EtherCAT, Ethernet
- RS422
- PROFINET/EtherNet/IP (via IF2030)

Vacuum feed through (optional)

Analog output (option)

Encoder (option)

Digital I/O

Supply

Controller
IFC242x
IFC2451
IFC2461
IFC2471 LED
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 feed through

IFS24xx/Vac
C2400/PT-x-Vac
C2401-x
Controller IFC24xx

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

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 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
PVDF: polyvinylidene fluoride
Strain relief

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