confocalDT // Confocal chromatic sensor system
The new confocal controller for industrial applications
confocalDT IFC242x

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 of the CCD line enables 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.

Two sensors can be directly connected to a confocal IFC2422 controller.
<table>
<thead>
<tr>
<th>Model</th>
<th>IFC2421</th>
<th>IFC2421MP</th>
<th>IFC2422</th>
<th>IFC2422MP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet/EtherCAT</td>
<td>1 nm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>RS422</td>
<td>18 bit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog</td>
<td></td>
<td></td>
<td></td>
<td>16 bits (teachable)</td>
</tr>
<tr>
<td>Measuring rate</td>
<td></td>
<td>continuously adjustable from 100 Hz to 10 kHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearity</td>
<td>typ. &lt; ±0.025 % FSO (depends on sensor)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-layer 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></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 ± 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 encoders (A+, A-, B+, B-, index) or 3x encoders (A+, A-, B+, B-)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital interface</td>
<td>Ethernet; EtherCAT; RS422; PROFINET; EtherNet/IP</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>Connector</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>Mounting</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></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operation: +5 … + 50 °C</td>
<td></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</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control and indicator 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) Full measuring range up to 8 kHz. Sensor-dependent up to 80% FSO between 9 and 10 kHz
2) Illuminant: light bulb
3) Connection via interface module (see accessories)
4) No loss of intensity and linearity due to two synchronous measurement channels

IFC2421 Controller

IFC2422 Controller
The confocalDT system consists of:
- Sensor IFS240x
- Controller IFC24xx
- Fiber optic cable C24xx
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
### Accessories: mounting adapter
MA2402 for sensors 2402

![Diagram of MA2402](image)

### Accessories: mounting adapter
MA2403 for sensors 2403

![Diagram of MA2403](image)

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

![Diagram of MA2404-12](image)

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

**Mounting block**

![Diagram of mounting block](image)

**Mounting ring**

![Diagram of mounting ring](image)
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 directly 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.

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

For M4x6 grub screw, 0441841
For M4x6 grub screw, 0441074
For M4x6 grub screw, 0441381
For M4x6 grub screw, 0441381

Screws for tilting adjustment
Screws for adjusting the position in the x, y axes
2 x 2 Threaded holes for M4 mounting screws

**Software**

IFD24xx-Tool  Software demo tool included

**Accessories light source**

IFL2422/LED  Lamp module for IFC2422 and IFC2466
IFL24x1/LED  Lamp module for IFC2421 and IFC2465

**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/ACP and E2000/ACP 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/ACP 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

E2000/APC Standard connector
FC/APC Standard connector
DIN Connector