



More Precision

confocalDT IFC241x

Compact confocal controllers for precise distance and thickness measurements



Compact confocal chromatic controllers for industrial series applications

confocalDT IFC2411 / IFC2412

-  Most compact confocal controller on the market
-  Nanometer resolution for precise distance and thickness measurements
-  **INTERFACE** Flexible integration via Ethernet, RS422 or analog output (U/I)
-  Direct PLC connection due to Industrial Ethernet
-  **IP40** Robust aluminum housing (IP40)
-  **Preis Leistung** Excellent price-performance ratio



EtherCAT  **PROFINET**  **EtherNet/IP** 

Precision meets compactness – powerful confocal chromatic controllers

The IFC2411 and IFC2412 controllers set new standards in non-contact distance and thickness measurements. The most compact confocal chromatic controllers currently available deliver impressive results with high-precision measurements at high speeds. Their unique design makes these controllers ideal for easy integration into existing plants and systems. They can be quickly mounted on a DIN rail and fit into even the smallest control cabinets.

One controller – two channels with full performance

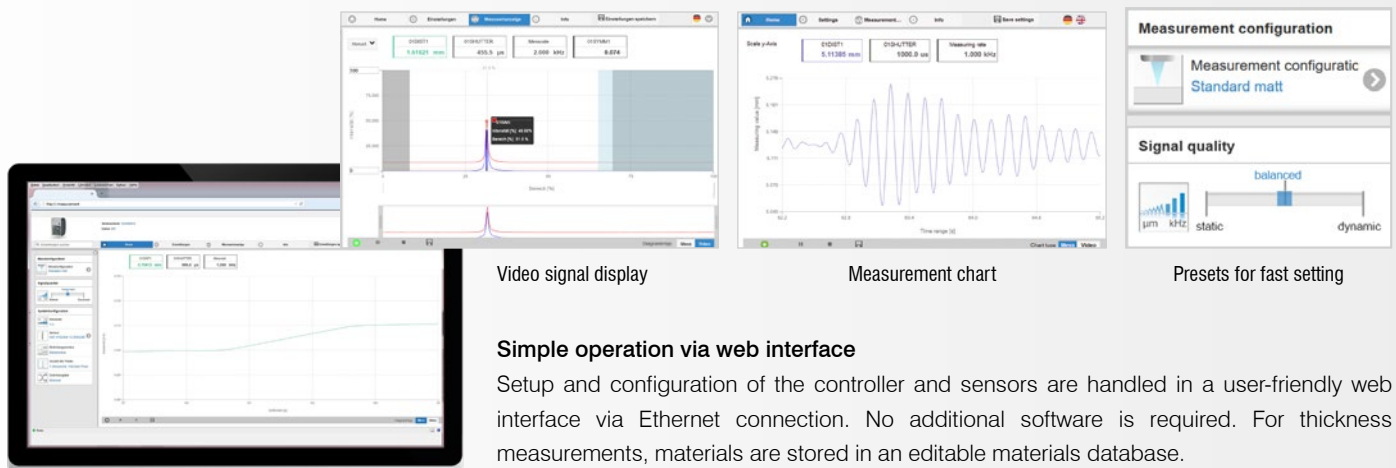
With the dual-channel version confocalDT IFC2412, integrated calculation functions enable the data combination of both channels, for example for thickness measurements of battery film. The measured values are recorded synchronously and at full measuring rate for both channels.

Largest sensor portfolio & numerous application possibilities

The flexible connection of various sensors enables measurements on almost all surfaces as well as one-sided thickness measurements on transparent objects. Micro-Epsilon's extensive sensor portfolio covers measuring ranges from 0.1 mm to 30 mm. In addition, the sensors are available for use in high-temperature environments and in a vacuum.

Developed for industry, OEM & automation

Diverse interfaces enable flexible integration into machines and systems. The robust IP40 aluminum housing provides reliable protection in industrial environments for maximum precision and signal stability. These systems impress in series and OEM applications with their outstanding performance and excellent price-performance ratio.



Model		IFC2411	IFC2411/IE
Resolution	Ethernet	2 nm	-
	Industrial Ethernet	-	2 nm
	RS422	18 bit	
	Analog	16 bits (teachable)	
Measuring rate		Continuously adjustable from 100 Hz to 8 kHz	
Linearity ^[1]		typ. < ±0.02 % FSO (depends on sensor)	
Multi-peak measurement		1 layer	
Light source		Internal white LED	
No. of characteristic curves		up to 10 characteristic curves for different sensors per channel, selection via table in the menu	
Permissible ambient light ^[2]		30.000 lx	
Synchronization		yes	
Supply voltage		24 VDC ±10 %	
Power consumption		< 7 W (24V)	
Signal input		sync-in / trig-in; 2 encoders (A+, A-, B+, B-, index) 3 encoders (A+, A-, B+, B-)	sync-in / trig-in; 1x encoder (A+, A-, B+, B-, index)
Digital interface ^[3]		Ethernet / RS422	EtherCAT / PROFINET / Ethernet/IP / RS422
Analog output		Current: 4 ... 20 mA; voltage: 0 ... 5V & 0 ... 10 V (16 bit D/A converter)	
Digital output		Sync-out	
Connection	Optical	pluggable optical fiber via E2000 socket, length 2 m ... 50 m, min. bending radius 30 mm	
	Electrical	3-pin supply terminal block; 6-pin I/O terminal block (max. cable length 30 m); 17-pin M12 connector for RS422, analog and encoder; RJ45 connector for Ethernet) (max. cable length 100 m)	3-pin supply terminal block; 5-pin I/O terminal block (max. cable length 30 m); 17-pin M12 connector for RS422, analog and encoder; RJ45 connector for Industrial Ethernet (max. cable length 100 m)
Mounting		free-standing, DIN rail mounting	
Temperature range	Storage	-20 ... +70 °C	
	Operation	+5 ... +50 °C	
Shock (DIN EN 60068-2-27)		15 g/6 ms on XYZ axis, 1000 shocks each	
Vibration (DIN EN 60068-2-6)		2 g / 20 ... 500 Hz in XYZ axis, 10 cycles each	
Protection class (DIN EN 60529)		IP40	
Material		Aluminum	
Weight		approx. 335 g	
Compatibility		compatible with all confocalDT sensors	
No. of measurement channels		1	
Control and indicator elements		Web interface for setup and settings; Multifunction button: interface selection, two adjustable functions and reset to factory settings after 10 s; 4x color LEDs for intensity, range, link and data	Web interface for setup and settings; Multifunction button: interface selection, two adjustable functions and reset to factory settings after 10 s; 4x color LEDs for Intensity, Range, RUN and ERR

^[1] FSO = Full Scale Output

^[2] Illuminant: light bulb

^[3] The controller can also be parameterized via Ethernet

Compact confocal chromatic controllers for industrial series applications

confocalDT IFC2411 / IFC2412

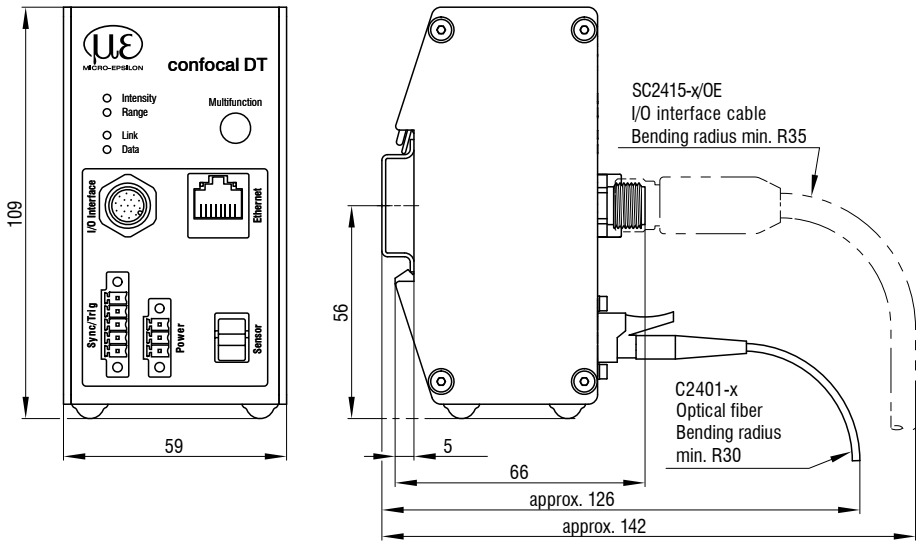
Model		IFC2412	IFC2412/IE
Resolution	Ethernet	2 nm	-
	Industrial Ethernet	-	2 nm
	RS422	18 bit	18 bit
	Analog	16 bits (teachable)	16 bits (teachable)
Measuring rate		Continuously adjustable from 100 Hz to 8 kHz	
Linearity ^[1]		typ. < ±0.02 % FSO (depends on sensor)	
Multi-peak measurement		1 layer	
Light source		Internal white LED	
No. of characteristic curves		up to 10 characteristic curves for different sensors per channel, selection via table in the menu	
Permissible ambient light ^[2]		30.000 lx	
Synchronization		yes	
Supply voltage		24 VDC ±10 %	
Power consumption		< 7 W (24V)	
Signal input		sync-in / trig-in; 2 (3) x encoders (A+, A-, B+, B-, index)	
Digital interface		Ethernet / RS422	EtherCAT / RS422
Analog output		Current: 4 ... 20 mA; voltage: 0 ... 5V & 0 ... 10 V (16 bit D/A converter)	
Digital output		Sync-out	
Connection	Optical	pluggable optical fiber via E2000 socket, length 2 m ... 50 m, min. bending radius 30 mm	
	Electrical	3-pin supply terminal block; 5-pin terminal for Out/Trig; 6-pin I/O terminal block (max. cable length 30 m); 17-pin M12 connector for RS422, analog and encoder; RJ45 connector for Ethernet) (max. cable length 100 m)	
Mounting		free-standing, DIN rail mounting	
Temperature range	Storage	-20 ... +70 °C	
	Operation	+5 ... +50 °C	
Shock (DIN EN 60068-2-27)		15 g/6 ms on XYZ axis, 1000 shocks each	
Vibration (DIN EN 60068-2-6)		2 g / 20 ... 500 Hz in XYZ axis, 10 cycles each	
Protection class (DIN EN 60529)		IP40	
Material		Aluminum	
Weight		670 g	670 g
Compatibility		compatible with all confocalDT sensors	
No. of measurement channels		2	2
Control and indicator elements		Web interface for setup and settings; Multifunction button: interface selection, two adjustable functions and reset to factory settings after 10 s; 4x color LEDs for intensity, range, link and data	Web interface for setup and settings; Multifunction button: interface selection, two adjustable functions and reset to factory settings after 10 s; 4x color LEDs for Intensity, Range, RUN and ERR

^[1] FSO = Full Scale Output

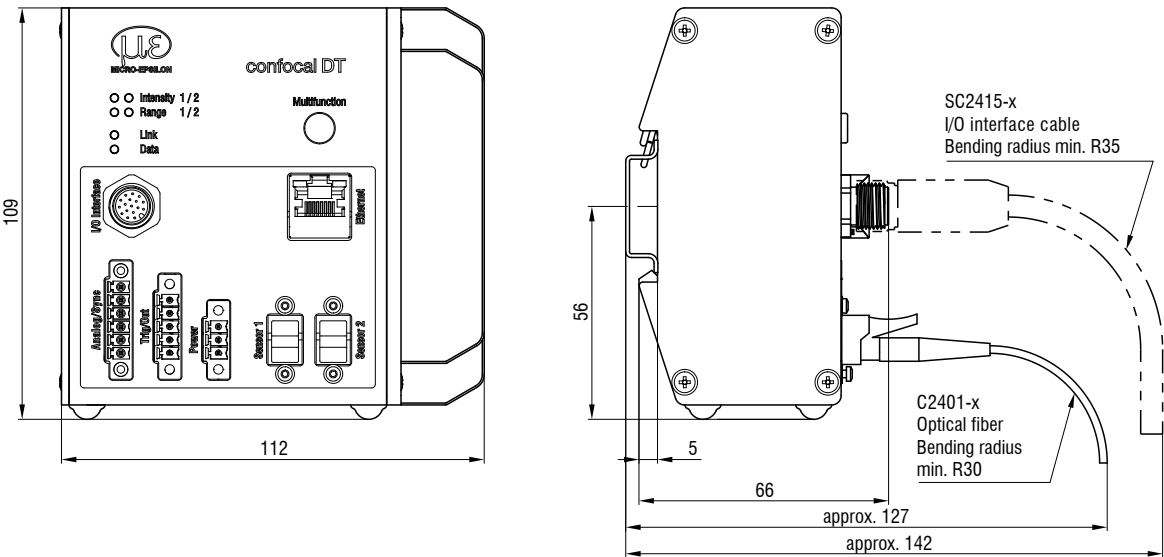
^[2] Illuminant: light bulb

Dimensions

confocalDT IFC2411



confocalDT IFC2412



Powerful confocal controllers for precise and fast inline processes

confocalDT IFC2416 / IFC2417

-  Nanometer resolution for highest precision
-  Ideal for extremely fast distance and thickness measurements up to 25 kHz
-  Multi-peak: up to 5 layers with one measurement
-  Best signal quality and stability due to high light intensity
-  **INTER FACE** Flexible integration via Ethernet, RS422 or analog output
-  **IP40** Compact design and robust IP40 aluminum housing



Compact housing – maximum speed & precision

The confocal chromatic controllers IFC2416 and IFC2417 feature a high measuring rate of 25 kHz and enormous light intensity. This enables stable and precise measurements at high speed on various materials and surfaces.

These compact controllers are used for high-resolution distance and thickness measurements in all areas of industry. Thanks to the multi-peak option, multi-layer measurements of transparent objects with up to 5 layers are possible.

One controller – two channels with full performance

With the dual-channel version confocalDT IFC2417, integrated calculation functions enable the data combination of both channels, for example for thickness measurements of battery film. The measured values are recorded synchronously and at full measuring rate for both channels.

Flexible choice of sensor for a wide range of applications

The flexible connection of various sensors enables measurements on almost all surfaces as well as one-sided thickness measurements on transparent objects. Micro-Epsilon's extensive sensor portfolio covers measuring ranges from 0.1 mm to 30 mm. In addition, sensors are available for use in high-temperature environments and in a vacuum.

Robustness and ease of integration

The powerful controllers are optimally protected in a compact IP40 aluminum housing for easy integration into machines and production lines. Several interfaces are available for integration purposes. In addition to Ethernet and RS422, analog signals can be output as current or voltage values. Last but not least, encoder inputs as well as a synchronization and switching output support optimal process control.

- Largest sensor portfolio**
Flexible selection of
- Measuring range & offset distance
 - Field of application: vacuum, industry, temperature
 - Light spot & measuring angle
 - Design & beam path (straight/lateral)

Extremely high light intensity
Stable and fast measurements on all materials and surfaces



Model		IFC2416
Resolution	Ethernet	2 nm
	RS422	18 bit
	Analog	16 bits (teachable)
Measuring rate	Continuously adjustable from 100 Hz to 25 kHz	
Linearity ^[1]	typ. < ±0.02 % FSO (depends on sensor)	
Multi-peak measurement	5 layers	
Light source	Internal white LED	
No. of characteristic curves	up to 10 characteristic curves for different sensors per channel, selection via table in the menu	
Permissible ambient light ^[2]	30.000 lx	
Synchronization	yes	
Supply voltage	24 VDC ±10 %	
Power consumption	< 8.5 W (24V)	
Synchronization	sync-in / trig-in; 2 (3) x encoders (A+, A-, B+, B-, index)	
Digital interface	Ethernet / RS422	
Analog output	Current: 4 ... 20 mA; voltage: 0 ... 5V & 0 ... 10 V (16 bit D/A converter)	
Digital output	Sync-out; error-out	
Connection	Optical	pluggable optical fiber via E2000 socket, length 2 m ... 50 m, min. bending radius 30 mm
	Electrical	3-pin supply terminal block; 6-pin I/O terminal block (max. cable length 30 m); 17-pin M12 connector for RS422, analog and encoder; RJ45 connector for Ethernet) (max. cable length 100 m)
Mounting	free-standing, DIN rail mounting	
Temperature range	Storage	-20 ... +70 °C
	Operation	+5 ... +50 °C
Shock (DIN EN 60068-2-27)	15 g/6 ms on XYZ axis, 1000 shocks each	
Vibration (DIN EN 60068-2-6)	2 g / 20 ... 500 Hz in XYZ axis, 10 cycles each	
Protection class (DIN EN 60529)	IP40	
Material	Aluminum	
Weight	approx. 460 g	
Compatibility	compatible with all confocalDT sensors	
No. of measurement channels	1	
Control and indicator elements	Web interface for setup and settings; Multifunction button: interface selection, two adjustable functions and reset to factory settings after 10 s; 4x color LEDs for intensity, range, link and data	

^[1] FSO = Full Scale Output

^[2] Illuminant: light bulb

Powerful confocal controllers for precise and fast inline processes

confocalDT IFC2416 / IFC2417

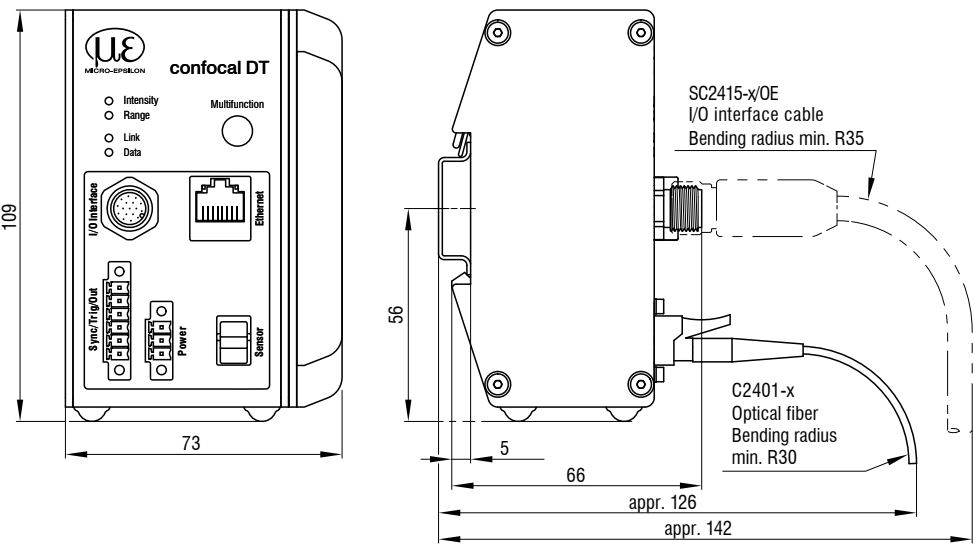
Model		IFC2417	IFC2417/IE
Resolution	Ethernet	2 nm	-
	Industrial Ethernet	-	2 nm
	RS422	18 bit	18 bit
	Analog	16 bits (teachable)	16 bits (teachable)
Measuring rate		Continuously adjustable from 100 Hz to 25 kHz	
Linearity ^[1]		typ. < ±0.02 % FSO (depends on sensor)	
Multi-peak measurement		5 layers	
Light source		Internal white LED	
No. of characteristic curves		up to 10 characteristic curves for different sensors per channel, selection via table in the menu	
Permissible ambient light ^[2]		30.000 lx	
Synchronization		yes	
Supply voltage		24 VDC ±10 %	
Power consumption		< 8.5 W (24V)	
Synchronization		yes	
Supply voltage		24 VDC ±10 %	
Power consumption		< 7 W (24V)	
Signal input		sync-in / trig-in; 2 (3) x encoders (A+, A-, B+, B-, index)	
Digital interface		Ethernet / RS422	EtherCAT / RS422
Analog output		Current: 4 ... 20 mA; voltage: 0 ... 5V & 0 ... 10 V (16 bit D/A converter)	
Digital output		Sync-out; error-out	
Connection	Optical	pluggable optical fiber via E2000 socket, length 2 m ... 50 m, min. bending radius 30 mm	
	Electrical	3-pin supply terminal block; 5-pin terminal for Out/Trig; 6-pin I/O terminal block (max. cable length 30 m); 17-pin M12 connector for RS422, analog and encoder; RJ45 connector for Ethernet (max. cable length 100 m)	
Mounting		free-standing, DIN rail mounting	
Temperature range	Storage	-20 ... +70 °C	
	Operation	+5 ... +50 °C	
Shock (DIN EN 60068-2-27)		15 g/6 ms on XYZ axis, 1000 shocks each	
Vibration (DIN EN 60068-2-6)		2 g / 20 ... 500 Hz in XYZ axis, 10 cycles each	
Protection class (DIN EN 60529)		IP40	
Material		Aluminum	
Weight		670 g	670 g
Compatibility		compatible with all confocalDT sensors	
No. of measurement channels		2	2
Control and indicator elements		Web interface for setup and settings; Multifunction button: interface selection, two adjustable functions and reset to factory settings after 10 s; 4x color LEDs for intensity, range, link and data	

^[1] FSO = Full Scale Output

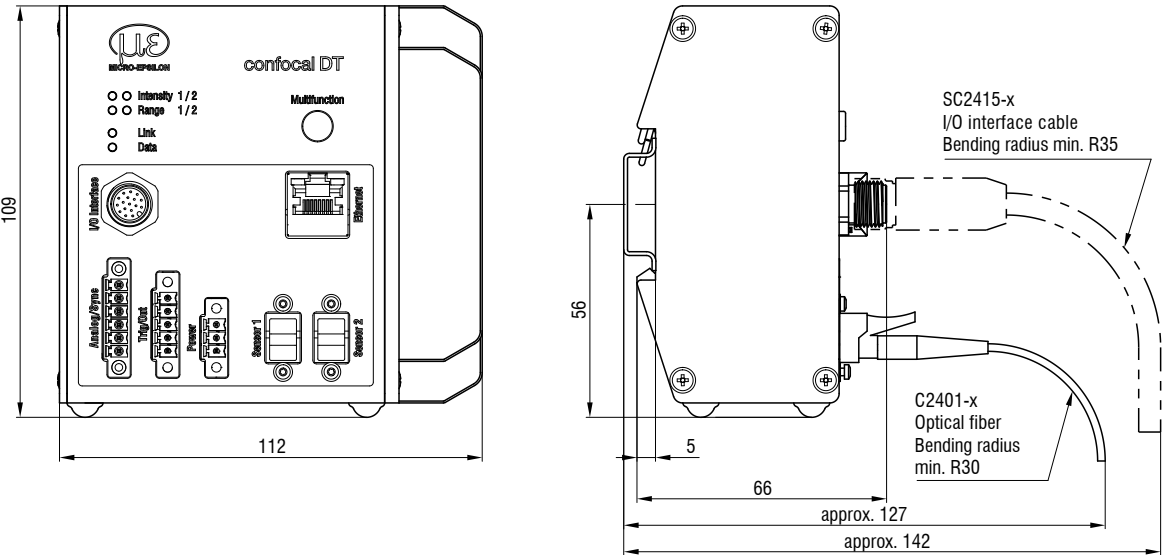
^[2] Illuminant: light bulb

Dimensions

confocalDT IFC2416

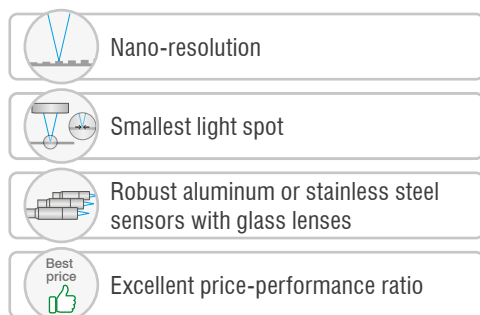


confocalDT IFC2417



Confocal chromatic sensors

confocalDT IFS2404



Model		IFS2404-1	IFS2404-2	IFS2404/90-2	IFS2404-3	IFS2404-6
Measuring range		1 mm	2 mm	2 mm	3 mm	6 mm
Start of measuring range	approx.	15 mm	14 mm	14 mm	25 mm	35 mm
Resolution	static ^[1]	< 12 nm	40 nm	40 nm	< 40 nm	< 80 nm
	dynamic ^[2]	< 50 nm	125 nm	125 nm	< 125 nm	< 250 nm
Linearity ^[3]	Displacement and distance	< ±0.3 μm	< ±0.6 μm	< ±0.6 μm	< ±0.9 μm	< ±1.8 μm
	Thickness	< ±0.6 μm	< ±1.2 μm	< ±1.2 μm	< ±1.8 μm	< ±3.6 μm
Light spot diameter		12 μm	10 μm	10 μm	18 μm	24 μm
Maximum measuring angle ^[4]		±25°	±12°	±12°	±19°	±10°
Numerical aperture (NA)		0.45	0.25	0.25	0.35	0.18
Min. target thickness ^[5]		0.05 mm	0.1 mm	0.1 mm	0.15 mm	0.3 mm
Target material		reflective, diffuse as well as transparent surfaces (e.g. glass)				
Connection		Pluggable optical fiber via FC socket; for cable type see accessories; standard length 2 m; extension up to 50 m; bending radius: static 30 mm, dynamic 40 mm				
Mounting		Radial 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				
Material		Aluminum housing, glass lenses				
Weight ^[6]		approx. 100 g	approx. 20 g	approx. 30 g	approx. 100 g	approx. 100 g

^[1] Average from 512 values at 1 kHz, in the mid of the measuring range

^[2] RMS noise related to the mid of the measuring range (1 kHz)

^[3] All data at constant ambient temperature (25 ± 1 °C). Measured on plane-parallel test glass. Acceptance report is enclosed with delivery

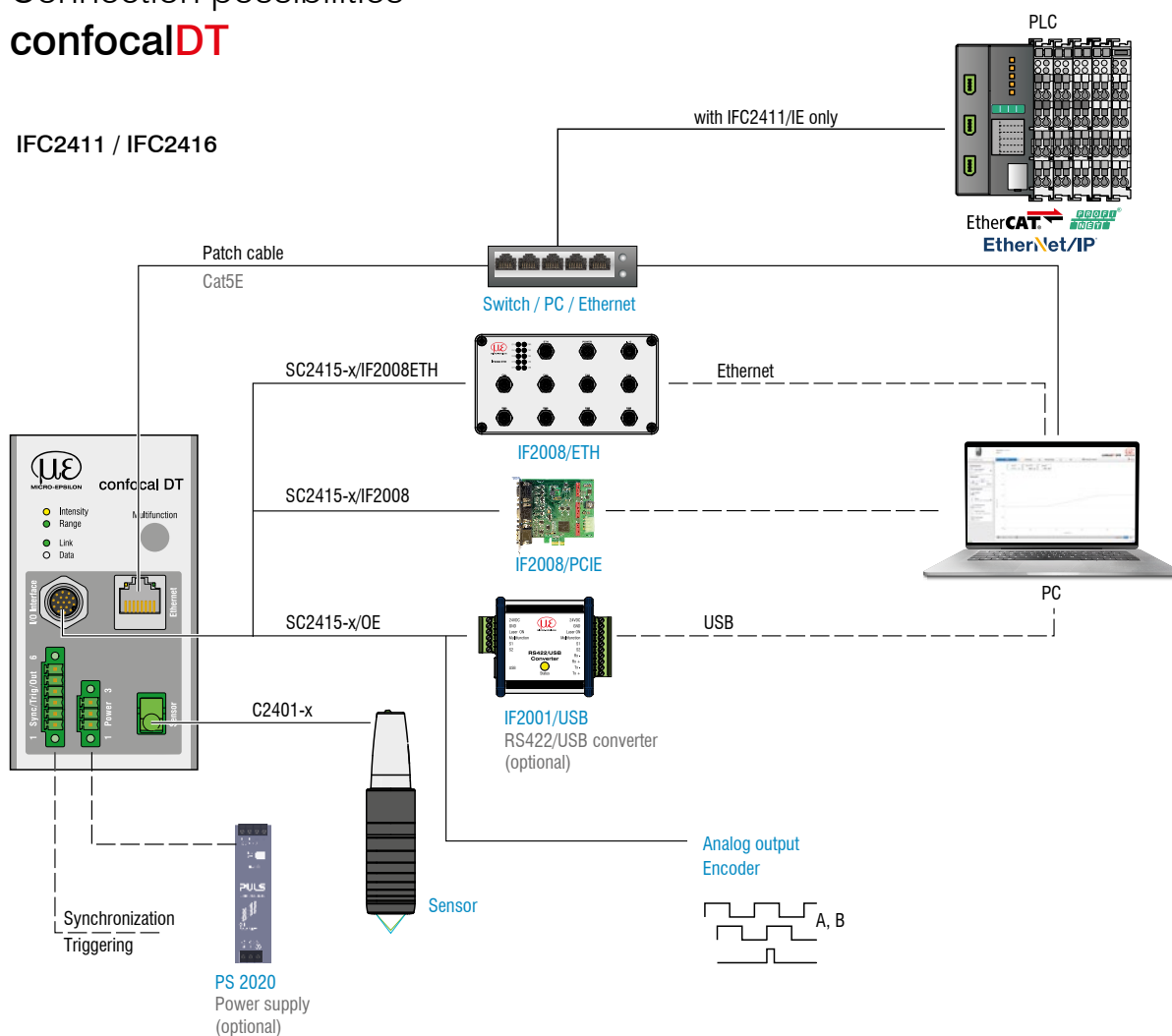
^[4] Maximum sensor measuring angle up to which a usable signal can be achieved on reflective surfaces, with accuracy decreasing toward the limit values

^[5] Glass sheet with refractive index n = 1.5 throughout the entire measuring range. In the mid of the measuring range, also thinner layers can be measured.

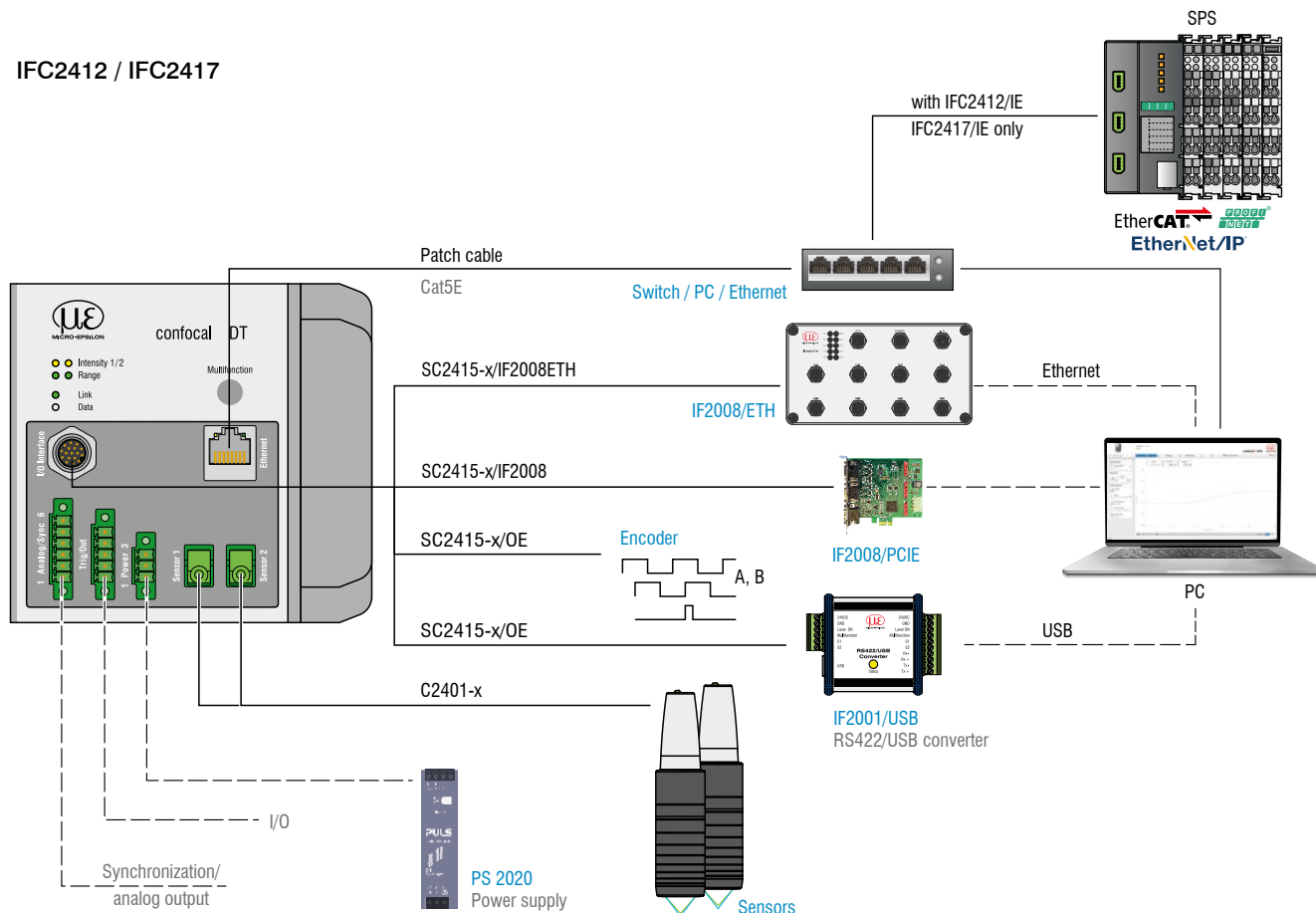
^[6] Sensor weight without optical fiber

Connection possibilities confocalDT

IFC2411 / IFC2416



IFC2412 / IFC2417



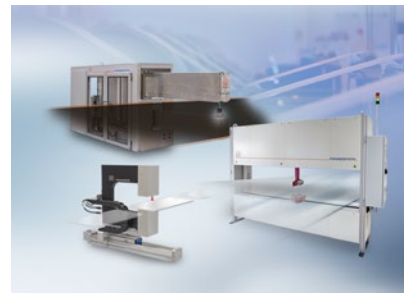
Sensors and Systems from Micro-Epsilon



Sensors and systems for displacement, distance and position



Sensors and measurement devices for non-contact temperature measurement



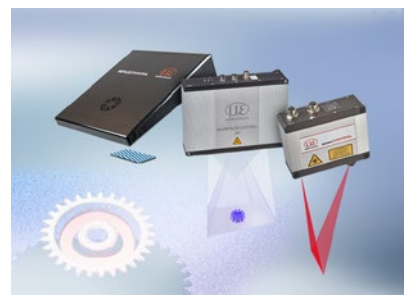
Measuring and inspection systems for metal strips, plastics and rubber



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