



Quick Manual  
**confocalDT IFC2411**  
**PROFINET**

IFC2411

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You can find more information about the measuring system in the operating instructions. They are available online at:

<https://www.micro-epsilon.com/fileadmin/download/manuals/man--confocalDT-2410-2411-2415-PROFINET-en.pdf>



## General

### Symbols used

The following symbols are used in this document:



Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.



Indicates a situation that may result in property damage if not avoided.



Indicates a user action.



Indicates a tip for users.

Measurement

Indicates hardware or a software button/menu.

### Warnings



Connect the power supply and the display/output device according to the safety regulations for electrical equipment.

> Risk of injury, damage to or destruction of the sensor

When all interfaces are used, the sensor surface heats up to more than 50 °C.

> Risk of injury



Avoid shocks and impacts to the sensor.

> Damage to or destruction of the sensor

The supply voltage must not exceed the specified limits.

> Damage to or destruction of the sensor

Protect the cables against damage.

> Failure of the measuring device

## Intended use

- The measuring system is designed for use in an industrial environment. It is used for
    - measuring displacement, distance and thickness
    - measuring the position of parts or machine components
  - The measuring system must only be operated within the limits specified in the technical data.
- ➔ The measuring system must only be used in such a way that no persons are endangered or machines are damaged in the event of malfunction or total failure of the sensor.
- ➔ Take additional precautions for safety and damage prevention in case of safety-related applications.

## Proper environment

	Sensor	Controller
Protection class	IP64, front side	IP40
Temperature range (operation)	+5 ... +70 °C (+41 ... +158 °F)	+5 ... +50 °C (+41 ... +122 °F)
Temperature range (storage)	-20 ... +70 °C (-4 ... +158 °F)	
Humidity	5 ... 95 % (non-condensing)	
Ambient pressure	Atmospheric pressure	
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	

## Glossary

SMR Start of measuring range

MMR Mid of measuring range

MR Measuring range

EMR End of measuring range

Minimum target thickness see Technical Data, Operating Instructions

Maximum target thickness Sensor measuring range x Refractive index of target

## Mechanical fastening

### Sensor

The optical sensors operate in the nanometer range. Observe the maximum tilt angle between sensor and target.

- **i** Ensure careful handling during installation and operation!

The dimensional drawings for the IFS240x series sensors, their mounting, and the MA240x series mounting adapters are summarized in a separate document. You can find these online at:

<https://www.micro-epsilon.com/download-file/set--confocalDT-Sensoren--en.pdf>



Fasten the sensors with a circumferential clamp. This type of sensor mounting ensures the highest level of reliability because the sensor's cylindrical housing is clamped over a relatively large area. This is absolutely necessary in difficult installation situations, such as on machines, production lines, etc.

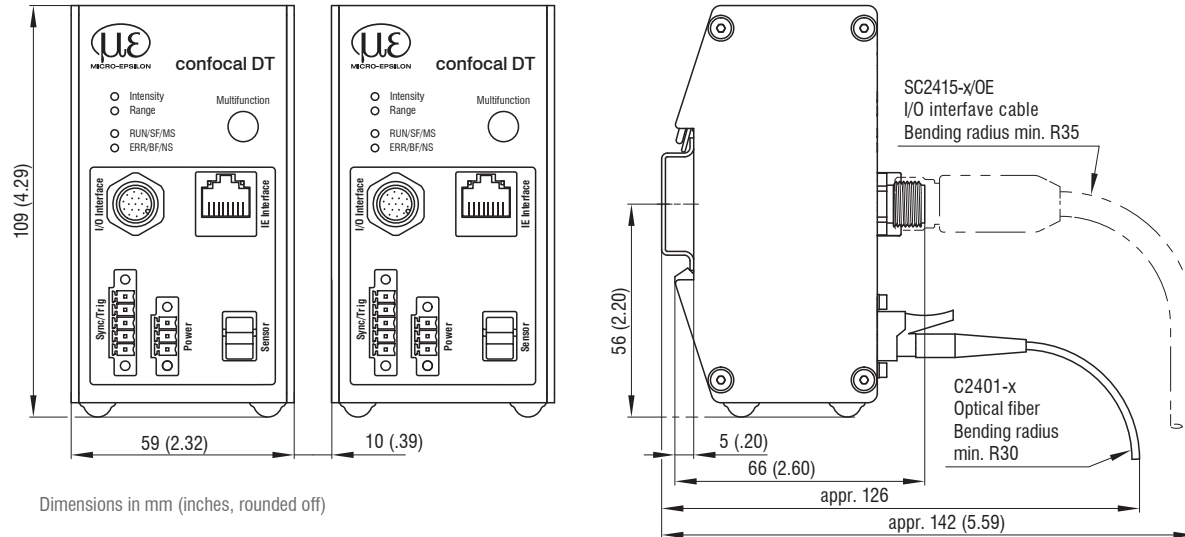


*Circumferential clamping with MA2400-27 mounting adapter*

## Controller

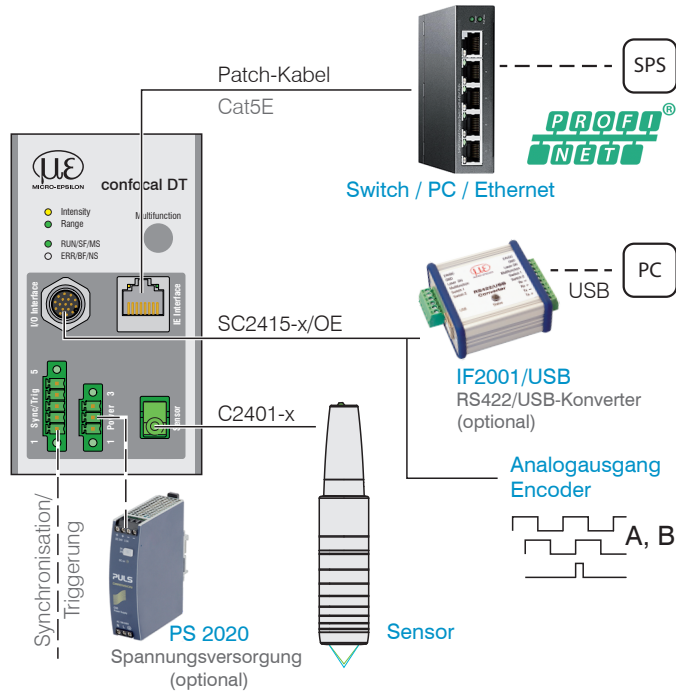
The IFC2411 controller can be mounted, e.g., in a control cabinet using a top-hat rail TH 35 according to DIN EN 60715.

- When attaching the controller, ensure that no connections, operating or display elements are covered. The minimum distance between adjacent controllers is 10 mm.



Dimensional drawing IFC2411

## Electrical connections



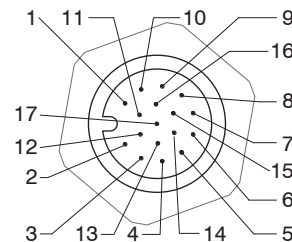
Characteristics SC2415-x/OE signal line:

- Analog output
- RS422
- Encoder

The SC2415-x/OE cable is not included in delivery.

Controller, 17-pin connector		SC2415-x/OE
Signal	Pin	Wire color
Analog Output	1	White, internal
Analog GND	2	Black <sup>1</sup>
Data Tx-	3	Black
Data Tx+	13	Purple
n.c.	5	Red
n.c.	14	Blue
Encoder 1B+	8	Grey
Encoder 1B-	15	Pink
Encoder 1Ref+	9	Green
Encoder 1Ref-	16	Yellow
Data Rx+	10	Brown
Data Rx-	11	White
Encoder 1A-	12	Red/blue
Encoder 1A+	17	Grey/pink

Pin assignment SC2415-x/OEY



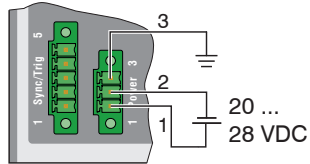
The GND connections are not electrically separated.

17-pin controller male connector, pin side

1) Analog output in shielded cable area

## Supply voltage

Nominal value: 24 V DC (20 ... 28 V,  $P < 7$  W).



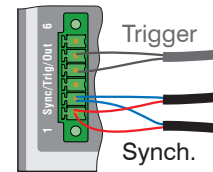
Controller	Power supply
3-pin pluggable screw terminal	
1	$V_+$
2	GND
3	Screen

Voltage supply only for measuring devices, not to be used for drives or similar sources of impulse interference at the same time. Micro-Epsilon recommends using the optionally available PS2020 power supply unit for the sensor.

- Only turn on the power supply after wiring has been completed.
- Connect the inputs Pin 1 and Pin 2 at the sensor with a 24V power supply.

## Synchronization, trigger

- Interconnect all GND, if the controllers are not supplied from a common power supply.



Controller	Signal	Level
5-pin pluggable screw terminal		
1	Sync +	RS422
2	Sync -	RS422
3	Cable shield	
4	Trig	TTL
5	GND	

### Star- or Cascaded synchronization

- Connect Pins 1 and 2 of controller 1 (master) with the correct polarity to Pins 1 and 2 of controller 2 (slave) to controller n, in order to synchronize two or more controllers.

### Triggering

- Connect the pins 4 and 5 with a trigger source (master).

## Ethernet, PROFINET

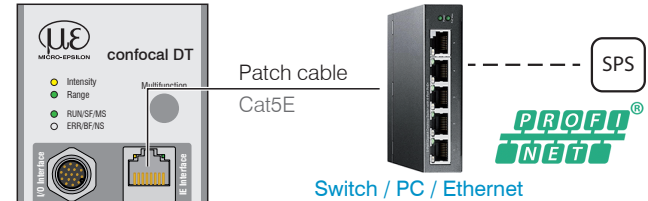
### Connection

- with an Ethernet network (PC) or
- with the PROFINET bus system (IN port).

Connect the controller and network with a shielded Ethernet cable (Cat5E, 2 m patch cable from the scope of delivery, total cable length shorter than 100 m).

The two LEDs *SF* and *BF* indicate that the connection was successful and is active.

The measuring device can be configured via Records (PROFINET), the web interface or by ASCII commands at command level (e.g. Telnet).



## RS422 connection with USB converter IF2001/USB

In addition to Industrial Ethernet, the controller also supports serial communication via RS422. Serial communication is possible with SC2415-x/OE cables. The SC2415-x/OE cable and the IF2001/USB RS422-to-USB converter are an optional accessory.


Characteristics: Differential signals according to EIA-422, galvanically connected to the supply voltage.


- ➡ Use a shielded cable with twisted wires.  
Cable length must be less than 30 m.
- ➡ Connect the ground connections.

Controller 17-pin connector	Signal	SC2415-x/OE	IF2001/USB
3	Tx -	Black	Rx -
13	Tx +	Purple	Rx +
10	Rx +	Brown	Tx +
11	Rx -	White	Tx -
Housing	Shield	Cable shield	---

## Sensor LEDs

LED	Color	Status	Meaning
Intensity	Red	flashes	Dark signal acquisition in progress
	Red	lights up	Signal saturated
	Yellow	lights up	Signal too low
	Green	lights up	Signal OK
Range	Red	flashes	Dark signal acquisition in progress
	Red	lights up	No target present, outside of measuring range
	Yellow	lights up	Target close to mid of measuring range
	Green	lights up	Measuring object within the measuring range
SF		off	No error
	Red	flashing, approx. 1 Hz	DCP signal service is triggered by the bus
	Red	illuminated	Watchdog time-out; channel, generic or extended diagnosis exist; system error
BF		off	No error
	Red	flashing, approx. 2 Hz	No data exchange
	Red	illuminated	No configuration; or slow physical connection or no physical connection at all

 Intensity

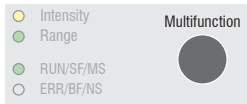
 Range

 RUN/SF/MS

 ERR/BF/NS

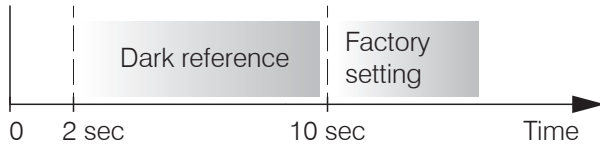
## Multifunction button

The Multifunction button is assigned multiple functions. The button is assigned the Dark correction function at the factory.



Function	Dark reference	<i>Starts dark referencing</i>
	Factory settings	Reset the device and measurement settings to factory settings.

The selected function is indicated by the flashing/illuminated Range and Intensity LEDs.



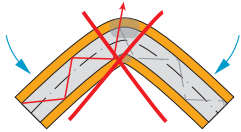
The Multifunction button is not assigned a keylock in the factory. You can optionally deactivate or lock the key to prevent incorrect operation.

*Actuation time of Multifunction button*

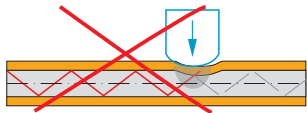
## Sensor cable, optical fiber

Sensor and controller are connected through an optical fiber.

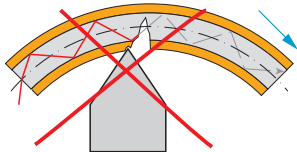
- Do not shorten or lengthen the optical fibers.
- Do not pull or hold the sensor on the optical fiber.



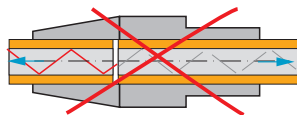
Do not kink the sensor cable.



Please do neither squeeze the sensor cable nor fix it by using cable ties.



Please do not grind the sensor cable over sharp corners.



Do not pull the sensor cable.

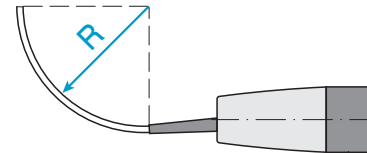
Cleaning of the connectors requires the corresponding know-how.

### Basic Rules

Avoid

- any contamination of the connector, e. g. dust
- any mechanical stress of the fiber
- strong bending of the fiber

Please never underrun the allowed bending radius.

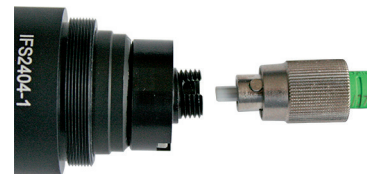


Fixed:

$R = 30 \text{ mm}$  or more

Flexible:

$R = 40 \text{ mm}$  or more



Socket groove on the sensor (left) and guiding peg of an FC sensor plug (right)

Fiber optic and sensor

- i** Note the orientation of the socket and the guiding peg.

## Commissioning

The measuring system is ready for operation approx. 3 s after applying the supply voltage. To ensure precise measurements, let the measuring system warm up for approx. 50 minutes. The sensors start with the last stored operating mode. PROFINET is set by default.

- The measuring system has no IP address by default. The IP address and the device name are assigned via the PROFINET Discovery Protocol. The IP address and the device name can be assigned, e.g., via the TIA Portal.

➤ Choose between the following operation modes.

### PROFINET operation (standard)

➤ Assign an IP address and a device name to the sensor/controller.

You can find an example of this in the operating instructions, Chap. A5.

➤ Start your web browser and type the IP address of the sensor/controller into the address bar.

It is possible to update the firmware in PROFINET mode.

Alternative communication:

### Communication via RS422

For this mode, you will need to connect your controller to a PC/Notebook via RS422 and a command line, e.g. Telnet

You can find details on ASCII communication in the operating instructions.

### Ethernet-Setup-Mode

For this operating mode, you need to connect your sensor/controller to a PC/Notebook via Ethernet. Parameterization via web interface, no PROFINET.

➤ Switch to Ethernet setup mode using the `Multifunction` button.

➤ Start your web browser and type the IP address of the sensor/controller into the address bar.

Details on parameterization can be found in the operating instructions. Return to PROFINET after completing the settings:

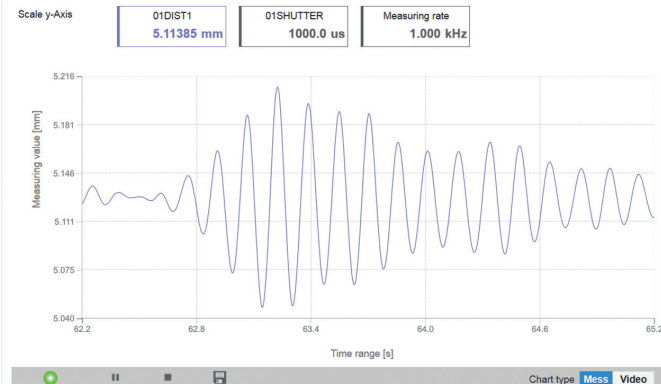
➤ Switch to the `Settings > System Settings > Boot Mode` menu.

➤ Select the Industrial Ethernet entry, restart the sensor/controller.

## Access via web interface

➔ Launch the web interface of the measuring system, see section Commissioning.

Interactive web pages for configuring the measuring system now appear in the web browser. The measuring system is active and provides measured values. Real-time measurement with the web interface is not guaranteed.



*First page after web interface has been accessed in Ethernet mode*

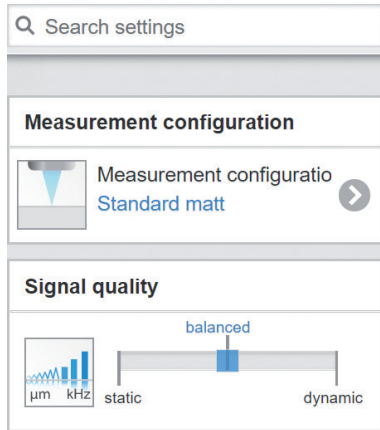
You can switch between the video signal and a display of the measured values over time for configuration. The appearance of the web sites can change depending on the functions. Dynamic help texts with excerpts from

the operating instructions assist you in configuring the measuring system.

• Depending on the selected measuring rate and the PC used, measured values may be reduced in the display. This means that not all measured values are sent to the web interface for display and saving.

The horizontal navigation contains the following functions:

- Home. The web interface automatically starts in this view with Measurement Chart, Measurement configuration and Signal quality.
- Settings. Configuration parameters, including triggering, measuring rate and zeroing/mastering.
- Measurement chart. Measurement chart or show video signal.
- Info. Contains information on the sensor, including measuring range, serial number and software version.

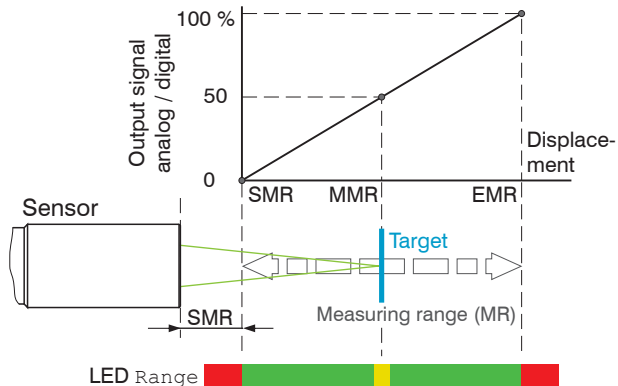


The vertical navigation is contextual to the selection in the horizontal navigation and contains the following functions for the Home menu:

- The `Search settings` function permits time-saving access to functions and parameters.
- `Measurement configuration`. Enables selection of predefined measurement settings.
- `Signal quality`. By mouse click it is possible to switch between three predefined basic settings for the measuring rate and the averaging.

### Positioning the target

➡ Position the target as centrally as possible within the measuring range.



- intensity
- range

LED Range	
Red	No target present or target outside of measuring range
Yellow	Target close to mid of measuring range
Green	Target within the measuring range

The **Range LED** on the front of the sensor indicates the position of the target relative to the sensor.

## Presets, setups, measurement configuration, signal quality

### Definition

- Preset: Manufacturer-specific program with settings for frequent measurement tasks; cannot be overwritten
- Setup: User-specific program with relevant settings for a measurement task
- Initial setup at boot (sensor start): a favorite can be selected from the setups, which is automatically activated at start. If no favorite is determined from the setups, the controller activates the Standard preset at startup.

The image displays two screenshots of the measurement configuration interface. The left screenshot shows the 'Measurement configuration' tab with 'Standard matt' selected. Below it is the 'Signal quality' section with a 'balanced' slider between 'static' and 'dynamic'. The 'System configuration' section includes 'Measuring rate' (1.0 kHz), 'Exposure mode' (MAN), and 'Number of peaks' (1 measurement values: High). The right screenshot shows the 'Measurement configuration' tab with a list of 'Presets' (Standard matt, Standard shiny, Multisurface, One-sided thickness measurement) and 'Setups' (F14\_8\_07, F2\_1\_34).

Upon delivery of the measuring system from the factory:

- the presets Standard matt, Standard shiny, Multisurface and One-sided thickness measurement are available
- no setup is available.

You can select a preset in the tab

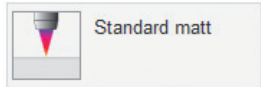
Home > Measurement configuration

You can select a setup in the tab

Home > Measurement configuration or  
Settings in the menu System settings >  
Load & Save

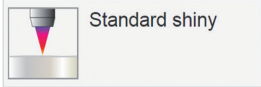
A setup can be permanently saved in the measuring system.

These presets enable quick startup of the respective measurement task. Basic features to suit the target surface, such as peak and material selection and the calculation functions are already set in the preset.



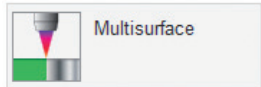
Standard matt

Distance measurement e.g. for ceramic material, non-transparent plastics. Highest peak, averaging, distance calculation.



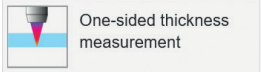
Standard shiny

Distance measurement e.g. for metal, polished surfaces. Highest peak, median over 5 values, distance calculation.



Multisurface

Distance measurement e.g. for PCBs, hybrid materials. Highest peak, median over 9 values, distance calculation.

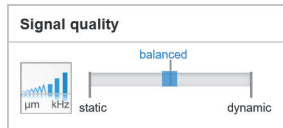


One-sided thickness measurement

One-sided thickness measurement, e.g., for glass, BK7 material. First and second peak, averaging, thickness calculation.

**i** After programming, save all settings permanently to a parameter set so that they will be available again the next time you switch on the controller. To do this, use the `Save settings` button.

For all presets, the measurement task can be individually adapted via the `Signal quality` slider. Reducing the measuring rate increases the exposure time for the line and thus improves the measurement quality.



Measuring rate <sup>1</sup>	Averaging <sup>1</sup>
0.2 kHz	Static Moving, 128 values
1 kHz	Balanced Moving, 16 values
5 kHz	Dynamic Moving, 4 values

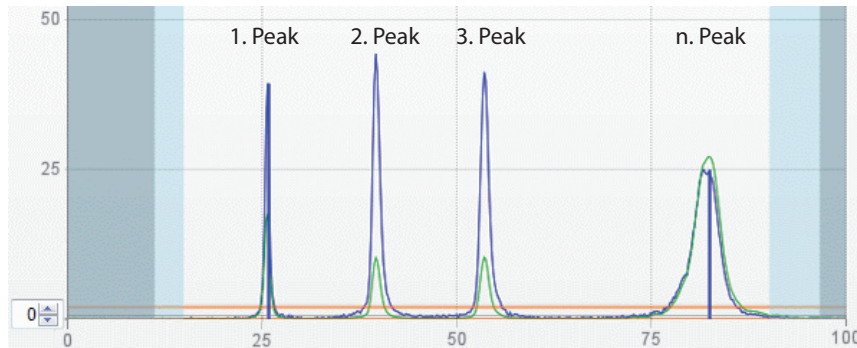
**Description**  
Three predefined basic settings (Static, Balanced and Dynamic); a change via mouse click is immediately visible in the diagram and the system configuration.  
**i** If the sensor starts up with a user-defined measurement setting (setup), the signal quality cannot be changed.

1) Values apply to the `Standard` and `One-sided thickness measurement` presets.

## Checking the video signal, peak selection

The video signal shows the determined reflections at the measuring object as a raw signal. The peaks are counted starting at the start of the measuring range toward the end of the measuring range. The corresponding measured value is marked by a vertical line (peak marking).

➡ Go to the `Measurement chart` menu. Display the video signal with `Video`. Adjust the settings for the exposure mode and measuring rate parameters.



The selection of peak/peaks dictates which regions in the signal are used for the distance or thickness measurement. For a measuring object consisting of several transparent layers, use the refractive index correction to compensate for the distance measurement errors caused by optical factors, see operating instructions.

*Video signal of transparent measuring object with four peaks (optical boundary areas) in the measuring range*

1 measurement value	First peak / highest peak / last peak
2 measurement values	First and second peak / first and last peak / second to last and last peak / highest and second highest peak

*Options for peak selection*

The `Standard`, `Standard shiny` and `Multisurface` presets use the highest peak.

The preset `One-sided thickness measurement` uses the 1. and 2. peak for the calculation of the measured value.

➡ Go to the `Data Recording > Settings > Peak selection` menu to select a different peak.

## Distance measurement with website display

- ➡ Align the sensor perpendicularly to the object to be measured.
- ➡ Then gradually move the sensor (or the measuring object) closer from a distant position until the sensor's start of the measuring range is approximately reached.

As soon as the object is within the measuring field of the sensor, the sensor's Range LED lights up (green or yellow). Alternatively, you can watch the video signal.



Measurement (distance measurement) web page

1 The LED visualizes the state of measured value transmission.


- green: measured value transmission in progress
- yellow: waiting for data in trigger state
- gray: measured value transmission paused

The data query is controlled with the `Play/Pause/Stop/Save` buttons of the measured values that were transmitted. `Stop` stops the diagram; you can still continue to use the data selection and zoom functions.

`Pause` pauses the recording. `Save` opens a Windows selection dialog for the file name and storage location to save the last 10,000 values in a CSV file (separation using semicolon).

 Click on the  button (Start) to display the measurement results.

2 In the left-hand window, the signals to be displayed can be switched on or off during or after the measurement. Inactive curves are grayed out and can be added by clicking on the check mark. The changes become effective when you save the settings.

You can show or hide the individual signals using the eye symbols . The calculation continues in the background.

3 To scale the measurement value axis of the graph (y-axis), you can use `Auto` (= automatic scaling) or `Manual` (= manual scaling).

4 Quickly save to the last saved parameter set (setup). The button is accessible on every settings page.

5 Current values for distance, exposure time, current measuring rate and time stamp are shown in the text boxes above the graph. Errors are also displayed.

6 Mouseover function. When the chart has been stopped and you move the mouse over the graph, points on the curve are marked with a circle and the associated values are displayed in the text boxes above the graph. The intensity bars are also updated.

7 Peak intensity is displayed as a bar chart.

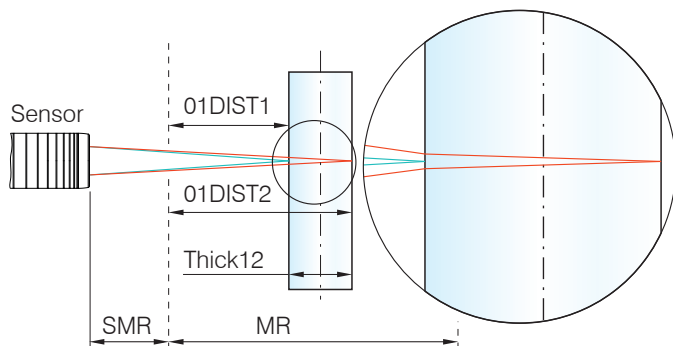
8 Scaling the x-axis: During an ongoing measurement, you can use the left-hand slider to enlarge the entire signal (zoom). The time range can also be defined using an input field under the time axis. When the chart has been stopped, the right-hand slider can also be used. You can also move the zoom window with the mouse in the center of the zoom window (four-sided arrow).

## One-sided thickness measurement, transparent target

To measure the thickness of a transparent object on one side, the controller evaluates two signals reflected from the surfaces. Based on these two signals, the controller calculates the distances from the surfaces and, from this, derives the thickness.

➤ Align the sensor perpendicularly to the object to be measured. Make sure that the target is approximately in the mid of the measuring range ( $SMR + 0.5 \times MR$ ).

**i** The light beam must strike the surface of the object at a perpendicular angle. Otherwise, measurements might be inaccurate.



*One-sided thickness measurement of transparent measuring object*

## Select preset

- Switch to the Home menu.
- Choose One-sided thickness measurement in the Measurement configuration menu.

This presetting prompts the sensor to use the first and second peak in the video signal for the thickness calculation.

## Material selection

Specifying the material is essential for calculating a correct thickness value. To compensate for the spectral change of the index of refraction, at least three refractive indices at different wavelengths or a refractive index and the Abbe number must be known.

- Switch to the Settings > Data recording > Material selection menu.
- Select the material of the measuring object for Layer 1.

## Video signal

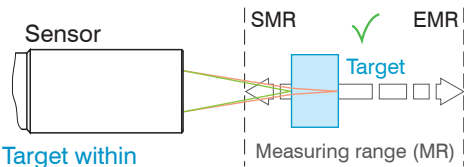
If a surface of the target lies outside the measuring range, the controller will send only one signal for the distance, intensity and center of gravity. This may also occur if a signal is below the detection threshold.

Two boundary surfaces are active when the thickness of a transparent material is measured. As a result, two peaks are visible in the video signal.

Even if the detection threshold is below the saddle between the two peaks, the controller can determine both distances and calculate the thickness from them.

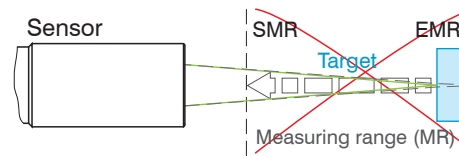
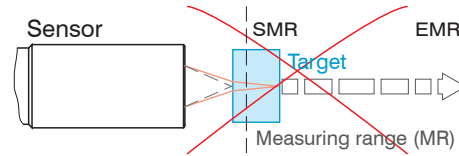


Video signal (*thickness measurement*) [web page](#)



Target within measuring range with two active boundary areas

Measurement arrangement for thickness measurement



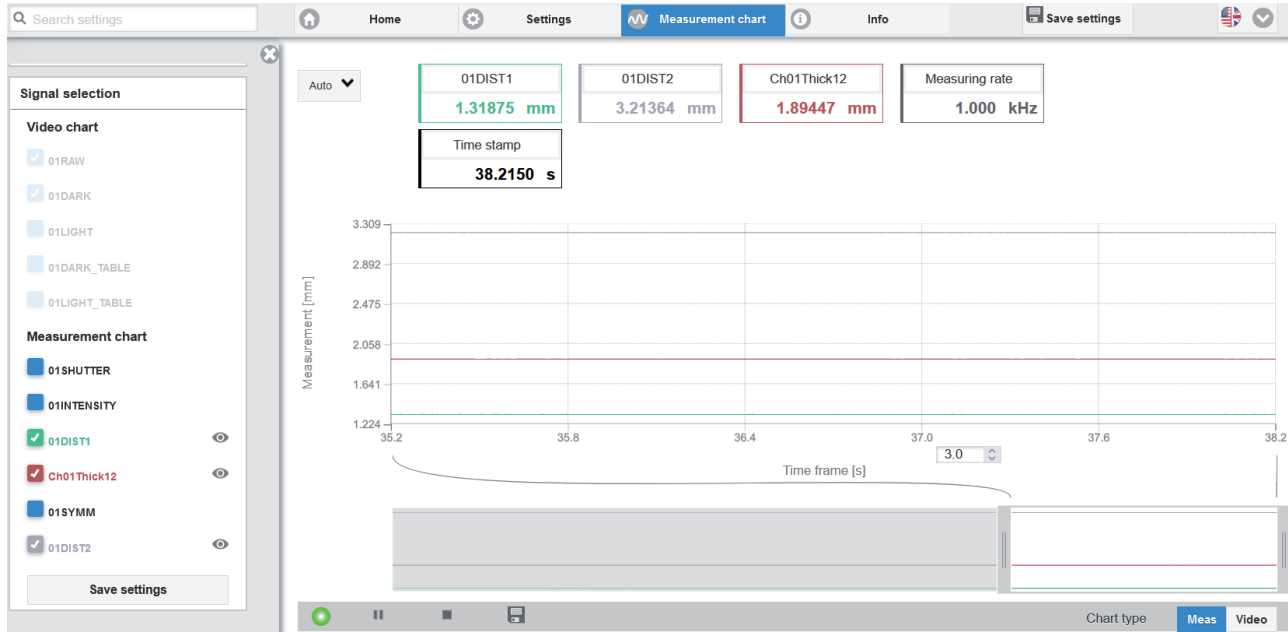
No thickness measurement possible

Measuring object only partially in the measuring range

## Measurement chart for thickness measurement

➡ Switch to the **Measurement chart** tab and select **Meas** as the chart type.

The web page shows the two distances and the thickness **Ch01Thick12** (difference between **01DIST2** and **01DIST1**) graphically and numerically. Optionally, the intensities of both peaks (**Peak 1 = near**, **Peak 2 = far**) can also be displayed.



## PROFINET documentation

The system starts with the last stored operating mode. PROFINET is set by default.

PROFINET operation enables easy parameter setting of a sensor/controller via web interface and Records.

The IFC241x is a PROFINET IO device that can exchange data cyclically and acyclically with a PROFINET IO controller. The IFC241x supports PROFINET with RT (Real-Time Communication).

PROFINET IRT (Isochronous Real-Time Communication) is currently not supported.

	IFC2411
Maximum measurement frequency (RT)	8 kHz (via oversampling)
Minimum bus cycle period (RT)	1 ms
Supported I&M records	0 to 3
Minimum cyclic process data size	4 bytes
Maximum cyclic process data size	704 bytes (max. 22 submodules * oversampling 8 * 4 bytes)
Number of input modules	8
Number of input submodules	176 (max. 22 submodules * oversampling 8)

In the delivery state, the IFC241x has no IP address and also no device name. These settings must be made once. The IP address and the device name are assigned via the PROFINET Discovery Protocol. The IP address and the device name can be assigned, e.g., via the `TIA Portal` software.

- **i** To use the IFC241x, you need the corresponding GSDML file. This is an XML file that you must include in your PLC environment
- **i** Define the modules in the device overview. Note the instructions and examples for acyclic reading and writing of records, see operating instructions, Chap. 8.5.

## Data format, little-endian

The IFC241x sends the cyclic process data in little-endian format. The acyclic demand data is also in little-endian format; records are read as little-endian and must also be written as little-endian. If the PLC uses the big-endian format, the byte order must be swapped.

AllenBradley	Big-endian	Omron	Big-endian
BECKHOFF	Big-endian	SIEMENS S7-300	Big-endian
Festo	Little-endian	SIEMENS S7-1200/150	Little-endian

- No further communication via the fieldbus is required. Each measurement value has a DWORD.  
 1 DWORD = 2 WORD = 4 BYTES = 32 bits.

Output value	Min	Max	Scaling	Unit	IFC2411
0xRAW (512 x 16 bits)	0	4095	value / 4096 * 100	%	X
0xSHUTTER	0	UINT32_MAX	Value / 36	$\mu$ s	X
0xENCODER1	0	UINT32_MAX	Value	Encoder ticks	X
0xENCODER2	0	UINT32_MAX	Value	Encoder ticks	X
0xENCODER3	0	UINT32_MAX	Value	Encoder ticks	X
0xINTENSITY[1..6]	0	0x3ffffff	(value & 0x7ff) / 1024 * 100	%	X
0xDIST[1..6]	INT32_MIN	0x7ffffeff	Value / 1000000	mm	X
MEASRATE	4500	360000	36000 / value	kHz	X
MEASRATE	1440	360000	36000 / value	kHz	-
TIMESTAMP	0	UINT32_MAX	Value	$\mu$ s	X
COUNTER	0	UINT32_MAX	Value		X
_MIN	INT32_MIN	0x7ffffeff	identical 0xDIST*	mm	X
_PEAK	INT32_MIN	0x7ffffeff	identical 0xDIST*	mm	X
_MAX	INT32_MIN	0x7ffffeff	identical 0xDIST*	mm	X

*Extract of output values with Industrial Ethernet*

## Service, repair

If the measuring system is defective:

- Switch to the web interface of the controller. Details can be found in the `Commissioning > Access via Web Interface` section
- Save your current measurement and device settings in the sensor/controller to a parameter set. Then save this parameter set to your PC/Notebook. Details can be found in the `Setting Sensor Parameters > System Settings > Import & Export` section, see operating instructions.
- Please send us the affected parts for repair or exchange.

If the cause of a fault cannot be clearly identified, please send the entire measuring system to:

MICRO-EPSILON MESSTECHNIK  
GmbH & Co. KG  
Königbacher Straße 15  
94496 Ortenburg / Germany  
Tel. +49 (0) 8542 / 168-0  
Fax +49 (0) 8542 / 168-90  
info@micro-epsilon.com  
[www.micro-epsilon.com](http://www.micro-epsilon.com)

## Disclaimer

All components of the device have been checked and tested for functionality in the factory. However, should any defects occur despite careful quality control, these shall be reported immediately to Micro-Epsilon or to your distributor / retailer.

Micro-Epsilon undertakes no liability whatsoever for damage, loss or costs caused by or related in any way to the product, in particular consequential damage, e.g., due to

- non-observance of these instructions/this manual,
- improper use or improper handling (in particular due to improper installation, commissioning, operation and maintenance) of the product, repairs or modifications by third parties,
- the use of force or other handling by unqualified persons.

This limitation of liability also applies to defects resulting from normal wear and tear (e.g., to wearing parts) and in the event of non-compliance with the specified maintenance intervals (if applicable). Micro-Epsilon is exclusively responsible for repairs. It is not permitted to make unauthorized structural and / or technical modifications or alterations to the product. In the interest of further development, Micro-Epsilon reserves the right to modify the design or the firmware.

In addition, the General Terms of Business of Micro-Epsilon shall apply, which can be accessed under Legal details | Micro-Epsilon <https://www.micro-epsilon.com/legal-details>.

## Decommissioning, disposal

In order to avoid the release of environmentally harmful substances and to ensure the reuse of valuable raw materials, we draw your attention to the following regulations and obligations:

- Remove all cables from the sensor and/or controller.
- Dispose of the sensor and/or the controller, its components and accessories, as well as the packaging materials in compliance with the applicable country-specific waste treatment and disposal regulations of the region of use.
- You are obliged to comply with all relevant national laws and regulations.

For Germany / the EU, the following (disposal) instructions apply in particular:

- Waste equipment marked with a crossed garbage can must not be disposed of with normal industrial waste (e.g. residual waste can or the yellow recycling bin) and must be disposed of separately. This avoids hazards to the environment due to incorrect disposal and ensures proper recycling of the old appliances. 
- A list of national laws and contacts in the EU member states can be found at [https://ec.europa.eu/environment/topics/waste-and-recycling/waste-electrical-and-electronic-equipment-weee\\_en](https://ec.europa.eu/environment/topics/waste-and-recycling/waste-electrical-and-electronic-equipment-weee_en). Here you can inform yourself about the respective national collection and return points.
- Old devices can also be returned for disposal to Micro-Epsilon at the address given in the legal details at <https://www.micro-epsilon.com/legal-details/>.
- We would like to point out that you are responsible for deleting the measurement-specific and personal data on the old devices to be disposed of.
- Under the registration number WEEE Registration No. DE28605721, we are registered at the foundation Elektro-Altgeräte Register, Nordostpark 72, 90411 Nuremberg, as a manufacturer of electrical and/or electronic equipment.



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X9691458.02-A012066MSC

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