



Quick Manual interfero**METER**

IMS5420-TH
IMS5420MP-TH
IMS5420IP67-TH
IMS5420IP67MP-TH

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You can find further information about the measurement system in the operating instructions. They are available at:



<https://www.micro-epsilon.com/download-file/man--interferometer-5420--en.pdf>



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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. |
|  | Indicates hardware or a software button/menu. |

Warnings

- | | |
|---|--|
|  | <p>Avoid unnecessary laser radiation to be exposed to the human body.</p> <ul style="list-style-type: none"> Switch off the controller for cleaning and maintenance. Switch off the controller for system maintenance and repair if the controller is integrated into a system. <p>Caution - use of controls or adjustments or performance of procedures other than those specified may cause harm.</p> <p>Connect the power supply and the display/output device according to the safety regulations for electrical equipment.</p> <ul style="list-style-type: none">> Risk of injury, damage to or destruction of the controller |
|  | <p>The supply voltage must not exceed the specified limits.</p> <ul style="list-style-type: none">> Damage to or destruction of the controller |

NOTICE

Avoid shocks and impacts to the sensor and the controller.

> Damage to or destruction of the components

Never kink optical fibers or bend them in tight radii.

> Damage to or destruction of the optical fibers; failure of measurement device

Protect the ends of the optical fibers against contamination

> Failure of the measuring device

Protect the cable against damage.

> Failure of the measuring device

Intended Use

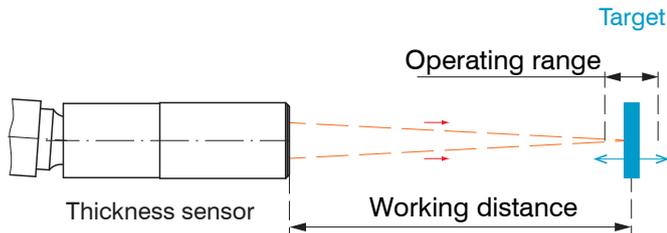
- The interferoMETER measuring system is designed for use in an industrial environments and domestic areas. It is used for measuring thickness and surface inspection, monitoring quality and checking dimensions.
- The measuring system must only be operated within the limits specified in the technical data, see operating instructions chap. 3.
- The measuring system must be used in such a way that no persons are endangered or machines and other material goods are damaged in the event of malfunction or total failure of the controller.
- Take additional precautions for safety and damage prevention in case of safety-related applications.

Proper Environment

| Model | | IMS5420-TH | IMS5420MP-TH | IMS5420IP67-TH | IMS5420IP67MP-TH |
|-------------------|----------------------|--|--------------|--|------------------|
| Protection class | Sensor | IP65 (optional IP67) | | | |
| | Controller | IP 40 | | IP 67 | |
| Temperature range | Storage | -20 ... +70 °C (-4 ... +158 °F) | | | |
| | Operation Sensor | +10 ... +50 °C (+50 ... +122 °F), front side | | +10 ... +60 °C (+50 ... +140 °F), front side | |
| | Operation Controller | +10 ... +50 °C (+50 ... +122 °F) | | | |
| Humidity | | 5 – 95 % (non-condensing) | | | |

Ambient pressure Atmospheric pressure
 EMC According to EN 61000-6-3 / EN 61326-1
 (Class B) and EN 61 000-6-2 / EN 61326-1

Glossary



You can find further information about the sensors in the operating instructions, chapter Technical Data.

Laser Safety

The following apply to the interfeROMETER IMS5420, IMS5420MP, IMS5420IP67 and IMS5420IP67MP measuring systems:

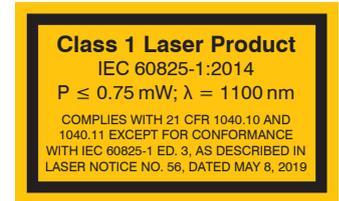
The measuring system works with a measuring laser of a wavelength of 1100 nm with a max. power of <0.75 mW.

The measuring system falls within laser class 1.

The accessible radiation is harmless under predictable conditions.

For class 1 laser devices, impairment of color vision and disturbances, e.g., from a glare effect, cannot be excluded.

An LED signalizes by illumination that laser radiation emits from the optical opening of the light source SLED.



Laser label measuring laser

The following apply to the interfeROMETER IMS5420 and IMS5420MP measuring systems:

The measuring system works with a pilot laser of a wavelength of 635 nm (visible red) offering max. power of <0.2 mW.

The measuring system falls within laser class 1.



Laser label pilot laser

The accessible radiation is harmless under predictable conditions. For class 1 laser devices, impairment of color vision and disturbances, e.g., from a glare effect, cannot be excluded.

An LED signalizes by illumination that laser radiation emits from the optical opening of the light source P_{lot} .

Operating Modes

The interferoMETER measuring system provides highly accurate measurements of thicknesses for transparent layer materials, e.g. silicon wafers, at a wavelength of 1100 nm.

| | |
|---------|-------------------------------|
| Silicon | 0.05 ... 1.05 mm ¹ |
| Air | 0.2 ... 4 mm ² |

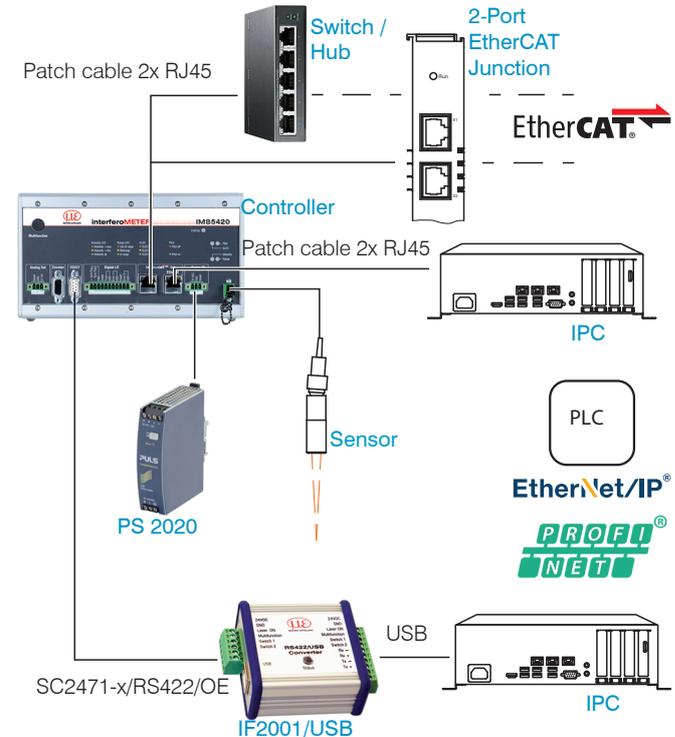
Measuring ranges for thickness measurements

The possible resolution here is in the nanometer range. To get started quickly, it is recommended to use saved configurations (presets) for various target surfaces and applications, see instruction manual Chap. 6.6.

- 1) Measuring range at $n=3.82$ (silicon); measurable thickness depends on doping
- 2) For air gap measurement between two glass plates ($n \sim 1$) the measuring range is 0.2 ... 4 mm. The measuring object must be within the working distance.

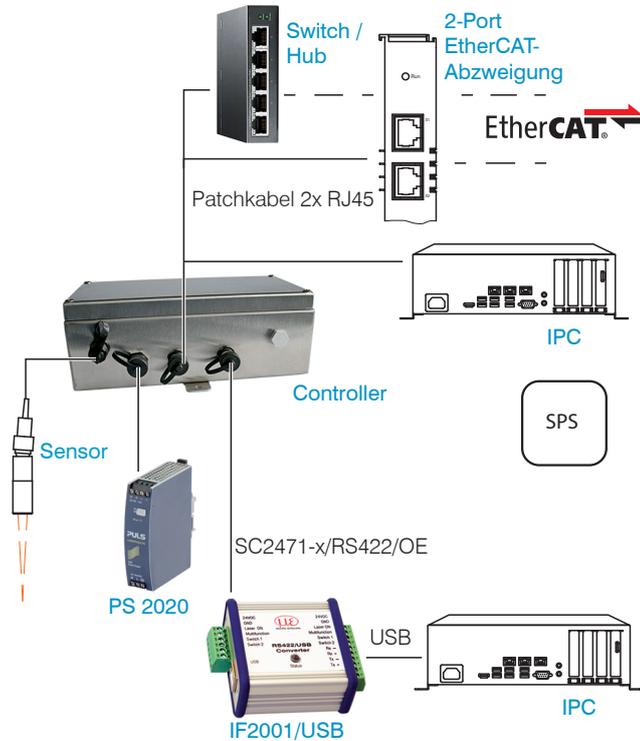
Setup, Connection Options

➡ Connect the components together and mount the sensors into the clamps.



Connection examples on IMS5420, IMS5420MP

A more detailed description of the connection options is available in the operating instructions.

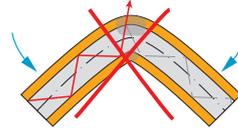


Connection examples on IMS5420IP67, IMS5420IP67MP

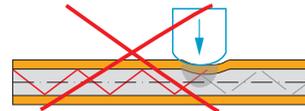
Sensor Cable

Sensor and controller are connected through an optical fiber.

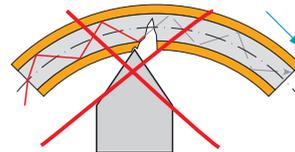
- Do not shorten or extend the optical fiber.
- Do not pull or hold the sensor on the optical fiber.



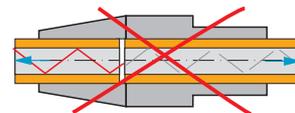
Do not kink the optical fiber.



Do not crush the optical fiber, do not fasten it using cable ties.



Please do not grind the optical fiber over sharp corners.



Do not pull the optical fiber.

Cleaning of the connectors requires the corresponding know-how.

General Rules

As a matter of principle, avoid:

- any contamination of the connector, e.g., dust or finger prints
- unnecessary mating cycles.
- any mechanical stress of the optical fiber (bending, crushing, pulling, twisting, knotting etc.).
- tight curvature of the optical fiber because the glass fiber is damaged in the process and this causes permanent damage.

Never bend the cable more tightly than the permissible bending radius.



Fixed:
R = 30 mm or more

Flexible:
R = 40 mm or more

Mounting, Mounting Adapter

The sensors use an optical measuring principle that allows for measurements in the nm range.

• Ensure careful handling during installation and operation.

➡ Mount the sensors with an outer clamp. Use the MA5400-10 mounting adapter from the optional accessories.

This type of sensor installation ensures the highest level of reliability because the sensor's cylindrical cover is clamped over a relatively large area.

IMS5420-TH / IMS5420MP-TH / IMS5420IP67-TH / IMS5420IP67MP-TH

Electrical Connectors, IMS5420IP67

Supply Voltage

| Pin | Color | Comment |
|-----|-------|---|
| 1 | Brown | $+U_B$ 24 VDC \pm 15 %, $I_{max} < 1$ A |
| 3 | Blue | GND |



4-pin M12 connector

Optional accessory: PC5420/IP67-x

Ethernet

5-pin M12 female connector
with D coding

Optional accessory:
shielded SC5420IP67-IE-x-RJ45
Ethernet cable



RS422

| Pin | Color | Name |
|-----|--------|--------|
| 1 | Yellow | RX - |
| 2 | Green | RX + |
| 3 | Grey | GND422 |
| 4 | Pink | TX + |
| 5 | Brown | TX - |

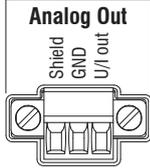
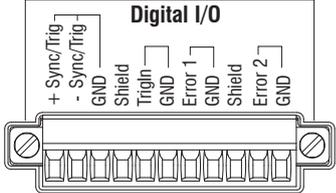
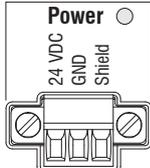


5-pol M12 Buchse

Optional accessory: SC5420IP67-OE-x

Wire colours correspond to the optional accessory cables.

Electrical Connectors, IMS5420

| Pin | Description | Comments | |
|--------------------------|---|--|---|
| U/I out | Voltage output | 0 ... 5 V; 0 ... 10 V; R_i appr. 50 Ohm 5.5 V / 10.9 V with error, outside measuring range |  <p>Analog Out</p> <p>Shield GND U/I out</p> |
| | Current output | 4 ... 20 mA; $R_L \leq 500$ Ohm 23.7 mA with error, outside measuring range | |
| GND | Ground analog output | Galvanically connected with supply | |
| +Sync/Trig -Sync/Trig | Synchronization input/output, trigger input | RS422 level (EIA422) |  <p>Digital I/O</p> <p>+ Sync/Trig - Sync/Trig GND Shield TrigIn GND Error 1 GND Shield Error 2 GND</p> |
| TrigIn | Trigger input | TTL or HTL level TTL: Low ≤ 0.8 V, High ≥ 2 V HTL: Low ≤ 3 V, High ≥ 8 V | |
| Error 1 / 2 | Switch outputs | NPN, PNP or Push-Pull $I_{max} = 100$ mA, $U_{Hmax} = 30$ V | |
| GND | Ground potentials | All GND conductors are interconnected with one another and to supply voltage ground. | |
| 24 VDC | Supply voltage | $\pm 15\%$, $I_{max} < 1$ A | |
| GND | Supply voltage ground | GND is galvanically connected to GND of switching outputs, synchronization, analog and encoder input |  <p>Power</p> <p>24 VDC GND Shield</p> |
| Shield | Shields to respective output/input, connector housing | | |

The plug-in screw terminals are designed for a conductor cross-section of 0.14 mm² up to 1.5 mm².

LEDs Controller

| | | |
|--|---|--|
| Power on | Green | Supply voltage available |
| Status | Off | No error |
| | If EtherCAT is active, meaning of the LED is conform with the Ether-CAT guidelines. | |
| Intensity LED Intensity > max Intensity < min Intensity ok | Red | Signal in saturation |
| | Yellow | Signal too low |
| | Green | Signal ok |
| SLED SLED off SLED init SLED on | Red | SLED of |
| | Yellow | SLED warms up |
| | Green | SLED ready for operation |
| | Yellow flashing | SLED current outside the optimal value range ¹ |
| Pilot Pilot off Pilot on | Red | Pilot laser off |
| | Green | Pilot laser on |
| | Green | Pilot laser is alternately turned on and off, if no target object or outside the measuring range |
| Range LED Out of range Midrange In range | Red | No target object, or target object outside the operating range. The expected number of peaks was not found or it was not possible to assign a thickness. |
| | Yellow | Target close to mid of working distance |
| | Green | Target within operating range The expected number of peaks was found. A valid thickness could be found for each peak. |

LED IMS5420IP67

| | |
|----------|-------|
| Power on | Green |
|----------|-------|

Supply voltage available

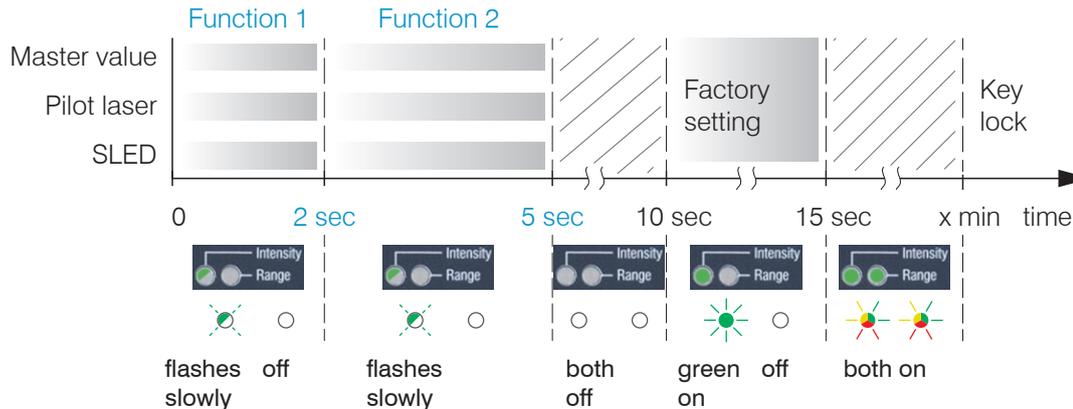
1) When measuring outside the optimum current value of the SLED, the controller will measure, but the measurement accuracy may not be as specified.

Button Multifunction, IMS5420

The Multifunction button of the controller has multiple functions. It enables, e.g., to operate the light source. The button is factory-set to the Pilotlaser on/off feature.

| | | | |
|---|-----------------------|-----------------------------|---|
|  | Key function 1 / 2 | Set / reset master value | <i>Starts or stops the master measurement of the selected signals</i> |
| | | Pilot laser | <i>Turns on/off the pilot laser</i> |
| | | SLED | <i>Turns the light source on/off for the sensor</i> |
| | | Inactive | <i>Key has no function</i> |

There are two defined time intervals for pressing the button; each of these can be assigned a function. All time intervals are indicated by the LEDs flashing/lighting up.



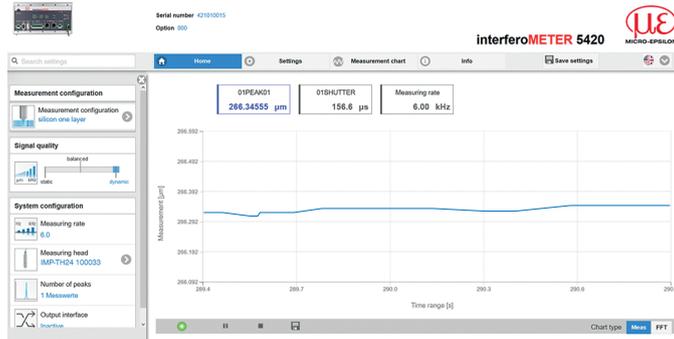
The Intensity and Range LEDs indicate the currently selected function.

Multifunction Button Actuation Time

Initial Operation

- Initializing starts after the voltage supply has been switched on. The measuring system is ready for use after approx. 10 seconds. To ensure precise measurements, let the measuring system warm up for approx. 60 minutes.

The controller is factory set to the static IP address 169.254.168.150. Use this address for a direct connection with a browser.



The start screen of the controller software is now displayed in the web browser.

You can check the IP address of the controller, that are connected to a PC / network, with the sensorTOOL.exe program. This program is available online at <https://www.micro-epsilon.com/download/software/sensorTOOL.exe>.

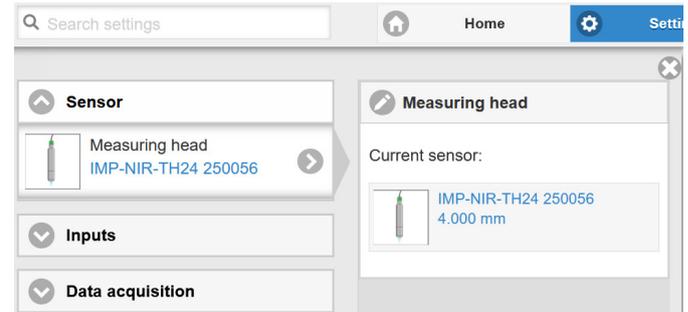
- Start the program sensorTOOL and click the button



- Click the Open Website button to connect the controller to your default browser.

Select a Sensor

- Change to the Settings > Sensor menu.
- Select a sensor from the list.



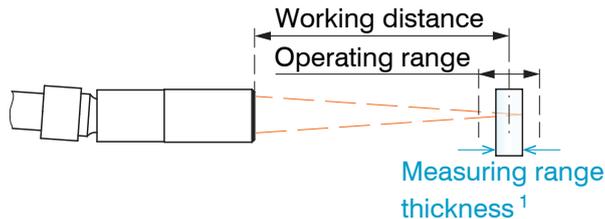
Positioning the Target, Thickness Measurement

The red-light pilot laser supports you in aligning the sensor to the target during commissioning.

Turn on or off the pilot laser in the menu `Settings > System settings`.

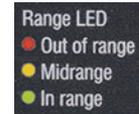
➡ Position the target (measurement object) as much as possible in the mid of the measuring range.

The peak positions remains stable in the FFT signal, even though the measurement target moves. The peak position depends on the target thickness.

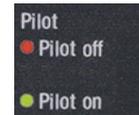


Basics thickness measurement

The LED Range on the controller front indicates the position of the target in relation to the sensor.



| | |
|--------|---|
| Red | No target or target outside the operating range |
| Yellow | Target close to the working distance |
| Green | Target within operating range |

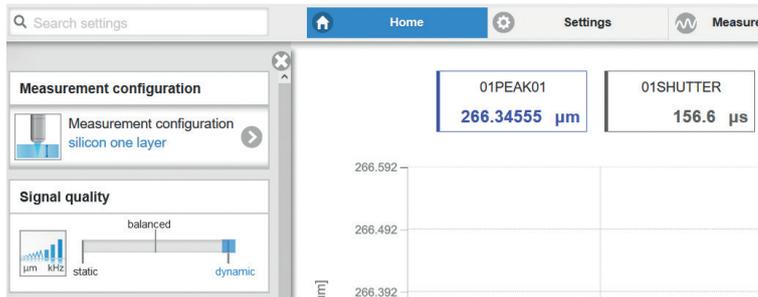


| | |
|-------|---|
| Green | Pilot laser is turned on and off alternately, if no target or outside the measuring range |
|-------|---|

- 1) The thickness measuring range is 0.05 ... 1.05 mm for $n=3.82$ (silicon); for air gap measurement between two glass plates ($n \sim 1$) the measuring range is 0.2 ... 4.0 mm.

Presets, Measurement Configuration

Common measurement configurations (presets) for various target surfaces are stored on the controller. This allows you to quickly start with your individual measurement task. In a preset the basic features like peak or material selection and calculation functions are already set.



The signal quality is set to **Balanced** at the factory.

➤ Go to the Home > Measurement configuration menu and start the Measurement configuration. Select a configuration.

Then, you can apply your own settings (setups).

When saving a modified preset, the web interface displays a dialog for entering a setup name. This prevents presets from being overwritten by accident. Data output only starts when the associated interface is activated.

| Preset | IMS5420 IMS5420IP67 | IMS5420MP IMS5420IP67MP |
|--|------------------------|----------------------------|
|  silicon one layer | ● | ● |
|  silicon p plus plus | ● | ● |
|  silicon two layers | | ● |

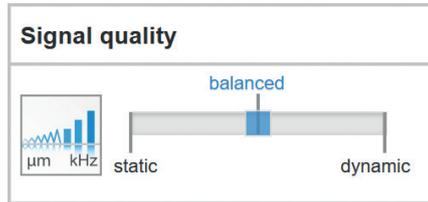
Overview possible presets

| Preset | IMS5420 IMS5420IP67 | IMS5420MP IMS5420IP67MP |
|--|------------------------|----------------------------|
|  multilayer silicon air | | ● |
|  multilayer paste silicon | | ● |

● possible preset

Signal Quality

Using the `Signal quality` function, you can influence the measuring rate and the respective averaging. Averaging with the `Median` function is specified by the preset. The subsequent moving averaging is specified by the `Signal quality` function.



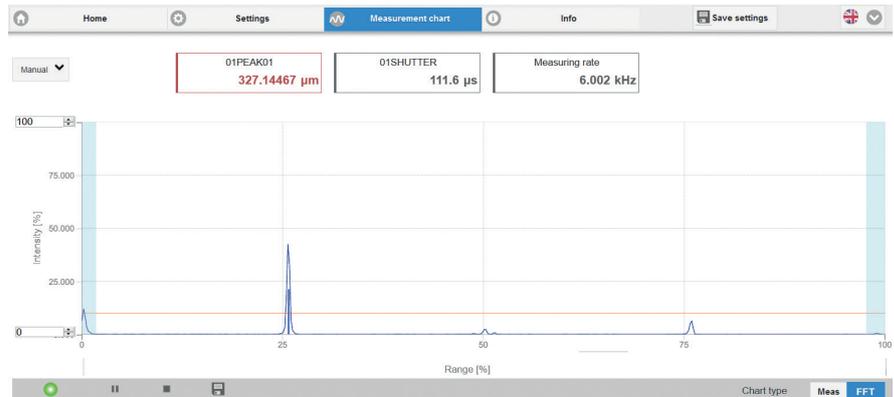
| Averaging | Description |
|--|---|
| Static, moving with 128 values, measuring rate 0.2 kHz | In the signal quality section, you can switch between three basic settings (static, balanced and dynamic). The reaction in the chart and system configuration is immediately visible. |
| Balanced, moving with 16 values, measuring rate 1 kHz | |
| Dynamic, moving with 4 values, measuring rate 6 kHz | |

i If the controller starts up with a user-defined measurement setting (setup), see Chap. 6.10, the signal quality cannot be changed.

Individual material selection is possible in the `Settings > Data recording > Material selection` menu.

FFT Signal Check

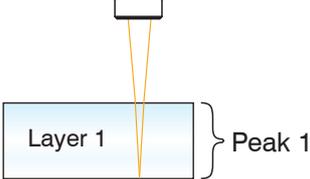
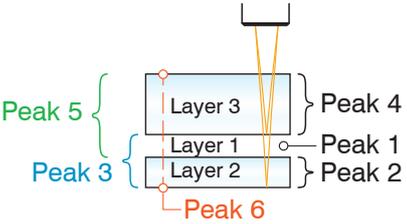
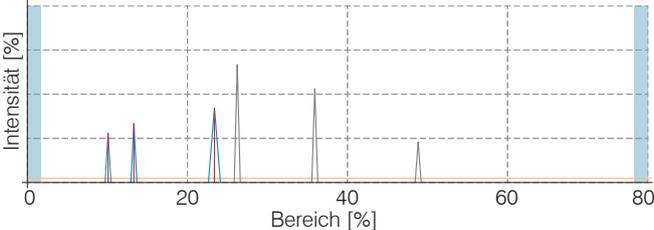
➡ Go to the `Measurement chart` menu. Show FFT signal display with `FFT`. The signal in the chart window shows the target thickness. Left 0 % (small thickness) and right 100 % (large thickness). The corresponding measured value is marked by a vertical line (peak marking). The diagram starts automatically when the website is called.



Measpeak Sorting

The selection of peak/peaks dictates which region in the signal is used for the thickness measurement.

- ▶ Switch to material selection by going to `Settings > Data recording`.
- ▶ Switch to the chart type `FFT`.
- ▶ Choose between `First peak` and `Highest peak`.

| IMS5420 and IMS5420IP67 | IMS5420MP and IMS5420IP67MP |
|---|--|
| <div style="text-align: center;">  </div> <p>The IMS5420 and IMS5420IP67 evaluates one layer. The peak in the FFT signal already corresponds to the thickness. It is not necessary to decide between the first and highest peak.</p> | <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <p><i>Evaluation starts with the first peak, e.g. 3 out of 4 peaks</i></p> <p>The IMS5420MP and IMS5420IP67MP evaluates up to five layers. Each peak represents a thickness value. The peaks are counted starting at the start of the measuring range (for the thinnest layer) toward the end of the measuring range (for the thickest layer). Combined thicknesses of adjacent layers are also evaluated.</p> |

In the case of a target consisting of several transparent layers, the material must be assigned for each layer. The material selection for a thickness measurement starts with the thinnest layer (layer 1) independent of the physical arrangement in the measuring object, see Chap. Material Selection.

The number of peaks of the FFT signal that are used for evaluation are to be determined separately, see Chap. Number of Peaks.

Number of Peaks

Number of peaks of the FFT signal used for evaluation in thickness measurement. The number of peaks can be selected in the `Settings > Data recording > Number of peaks`.

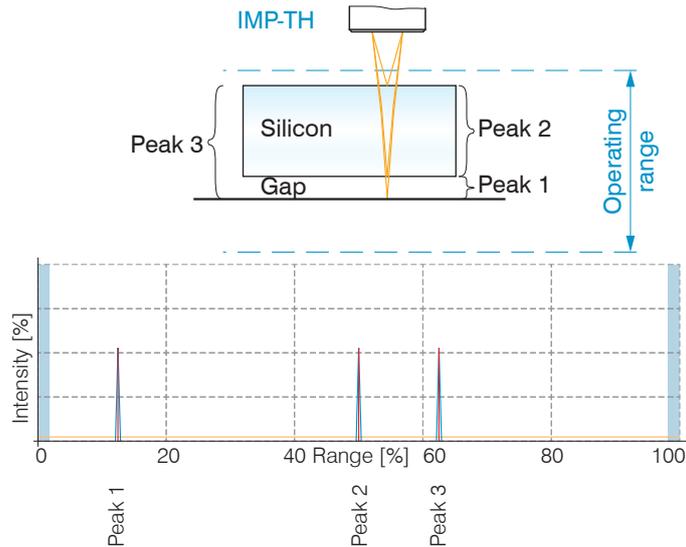
This function is possible for the following systems:

- IMS5420MP and IMS5420IP67MP: max. 5 layers

Make sure to count the peaks in the correct manner, see Chap. Measpeak Sorting.

The material selection for a thickness measurement starts with the thinnest layer (layer 1) independent of the physical arrangement in the measuring object.

Example of a layer of silicon and gap, measpeak sorting: First, corresponding material selection



Material selection

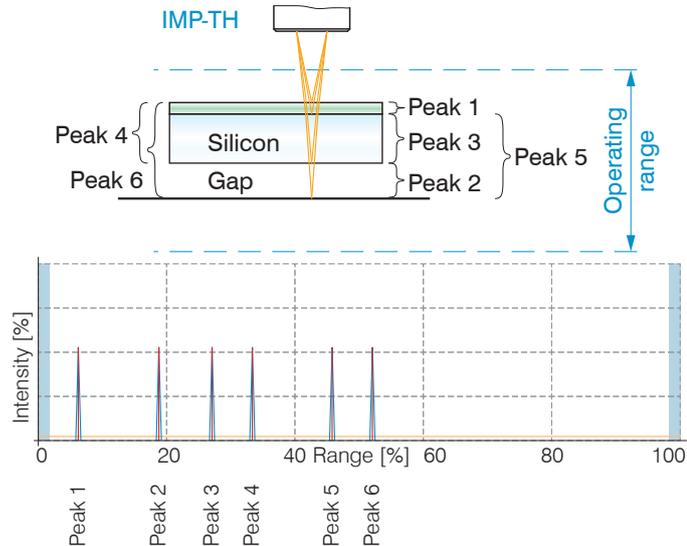
Material Infront:

Layer 1:

Layer 2:

Layer 3:

Example of silicon with paste and gap, measurement peak sorting: First, selected material



Material selection

Material Infront:

Layer 1:

Layer 2:

Layer 3:

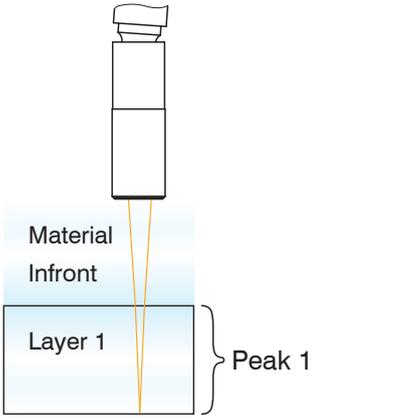
Layer 4:

The IMS5420MP and IMS5420IP67MP controllers can also measure the thickness of combined layers of the same material.

A material does not necessarily have to be selected for layer 4. Peak 4 stands for a combination layer of paste and silicon. The controller evaluates this layer; however, the result has no significance in the measurement.

Material Selection

The refractive index needs to be corrected in the controller for an exact thickness measurement. Only air may be present between the sensor face and the measuring object (`Material Infront`); other media such as water or alcohol are not permissible.

| | | |
|--|---|--|
|  | <ul style="list-style-type: none">➤ Switch to material selection by going to <code>Settings > Data recording</code>.➤ Assign the material according to the target used. | |
|--|---|--|

You can edit or add to the material table. For a new material, a phase index and group refractive index is required.

- Switch to the `Settings > Data recording > Link to material table` menu.
- Assign the material according to the target used.

Sensor

Inputs

Data acquisition

Measuring rate
0.1

Evaluation range (ROI)
1.76 - 97.51

Measpeak sorting
By height

Triggering (data recording)
Inactive

Material selection

Layer 1:

Silicon calibration

Link to material table

| material name | phase index | Group refractive index | phase shift | description |
|---------------------|-------------|------------------------|-------------|---|
| Air calibration | 1.000259 | 1.000262 | 0.000000 | Calibration material |
| Vacuum calibration | 1.000000 | 1.000000 | 0.000000 | Calibration material |
| Silicon calibration | 3.545000 | 3.820000 | 0.000000 | 1100 nm, laboratory conditions, Schinke et al. 2015 |
| Vacuum | 1.000000 | 1.000000 | 0.000000 | Perfect vacuum |
| Air | 1.000274 | 1.000276 | 0.000000 | 1100 nm, laboratory conditions, Ciddor et al. 1996 |
| Silicon | 3.545000 | 3.820000 | 0.000000 | 1100 nm, laboratory conditions, Schinke et al. 2015 |
| Water | 1.324000 | 1.340500 | 0.000000 | 1100 nm, 20degC, Daimon and Mesura et al. 2007 |

The surface area of the following material is also required for calculating the thicknesses.



Click the icon to change an existing entry.



Click the icon to add another material.



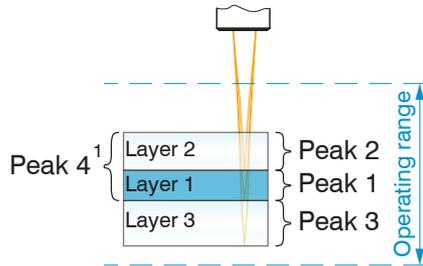
Click the icon to save another or changed material.



Click the icon to cancel the operation without saving.



Click the icon to delete the entry.



➤ Switch to material selection by going to **Settings > Data recording**.

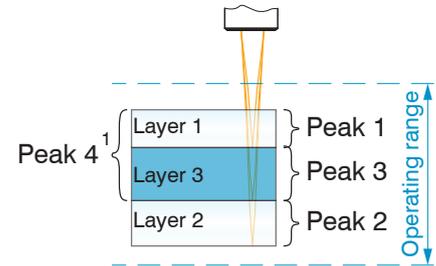
➤ Assign the materials to the individual layers according to the target used.

Compared to the example on the left, the thickness of the middle layer (blue) has increased and is greater than the top and bottom layers. The material selection must be adjusted for this case.

In the FFT signal, peak 1 up to peak 3 change places, see Chap. Measpeak Sorting.

The material selection for a thickness measurement starts with the thinnest layer (layer 1) independent of the physical arrangement in the measuring object.

1) The IMS5420MP and IMS5420IP67MP controllers also evaluate combined thicknesses of different layers. A material does not necessarily have to be selected for layer 4. Peak 4 stands for a combination layer of the two upper layers. The controller evaluates this layer; however, the result has no significance in the measurement.



Material selection

Material Infront:

Layer 1:

Layer 2:

Layer 3:

Layer 4:

Material selection

Material Infront:

Layer 1:

Layer 2:

Layer 3:

Layer 4:

Output Values

| Output value | Description | Min | Max | Scaling | Unit |
|----------------------|--------------------|-----------|------------|------------------------------------|---------------|
| 01ABS (2048 x 16Bit) | FFT signal | 0 | 2047 | value / 2048 * 100 | % |
| 01SHUTTER | Exposure time | 1 | 100000 | value / 10 | μ s |
| 01ENCODER1 | Encoder | 0 | UINT32_MAX | value | Encoder ticks |
| 01ENCODER2 | Encoder | 0 | UINT32_MAX | value | Encoder ticks |
| 01ENCODER3 | Encoder | 0 | UINT32_MAX | value | Encoder ticks |
| 01AMOUNT[01..16] | Intensity | 0 | UINT32_MAX | - (value & 0xffff) / 2048 * 100 | - % |
| MEASRATE | Sample rate | 1666 | 100000 | 10000 / value | kHz |
| TIMESTAMP | Time information | 0 | UINT32_MAX | value | μ s |
| COUNTER | Frame counter | 0 | UINT32_MAX | value | |
| STATE | State word | 0 | UINT32_MAX | see instruction manual for details | |
| 01PEAK[01..16] | Thickness value | INT32_MIN | see below | value * 10 | pm |
| USERNAMED VALUES | Calculation result | INT32_MIN | 0x7ffffeff | wie 01PEAK[01..16] | pm |

Output values with RS422 and Ethernet

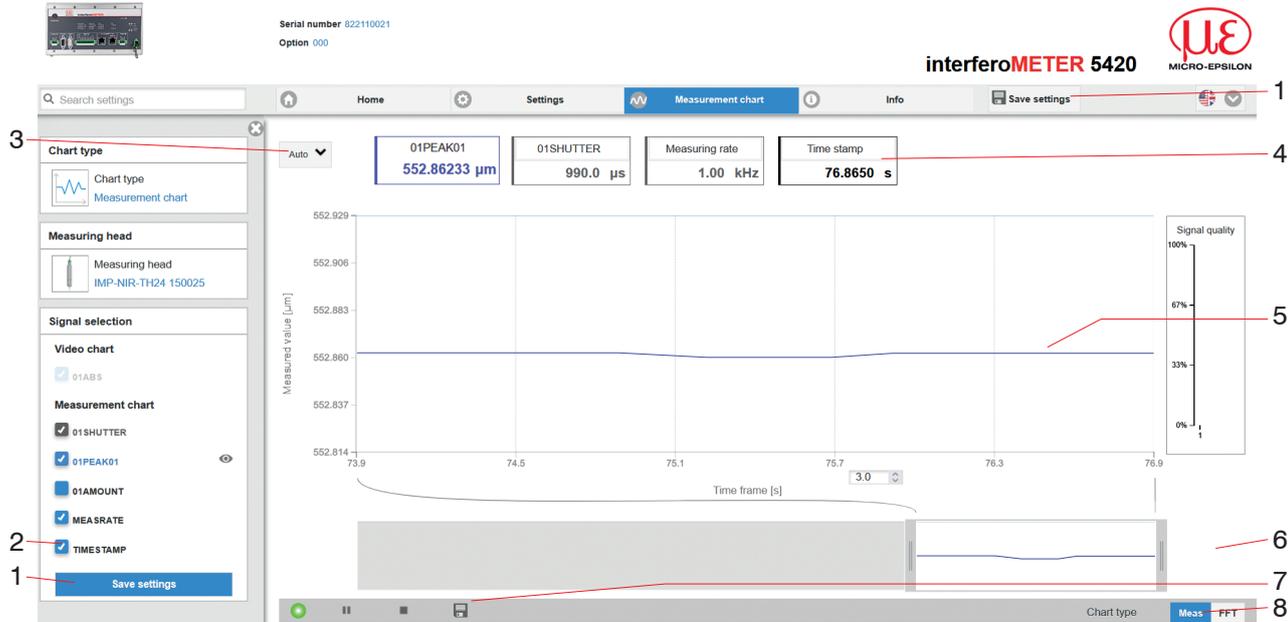
| | | |
|----------------|-----------|---|
| 01PEAK[01..16] | 0x7ffff04 | There is no peak present |
| | 0x7ffff05 | Peak is located in front of the operating range |
| | 0x7ffff06 | Peak is located behind of the operating range |
| | 0x7ffff07 | Measuring value cannot be calculated |
| | 0x7ffff08 | Measuring value cannot be evaluated |
| | 0x7ffff0E | Hardware error |

Thickness Measurement, Web Page Display

➡ Align the sensor vertically to the target object.

➡ Then, move the sensor (or the target) closer, until you more or less reach the working distance for your sensor.

Once the object is within the sensor's measuring range, the Range LED (green or yellow) on the front of the controller will light up. Or, observe the FFT signal.



Measurement web page (thickness measurement)

- 1 Changes only take effect after clicking the Save settings button.

- 2 In the window on the left, the signals can be enabled or disabled both during and after the measurement. Inactive graphs are gray. Click on the check mark to add them. The changes take effect when saving the settings. Use the eye symbols  to show and hide the single signals. The calculation continues in the background.
 - 01PEAK01: Chronological sequence of displacement signal
- 3 `Auto` (= automatic scaling) or `Manual` (= manual setting) allow for scaling the measurement axis (Y axis) of the graphic.
- 4 The current values for distance, exposure time, current measuring rate and time stamp are displayed in the text boxes above the graphic. Errors are displayed as well.
- 5 Mouseover feature. When moving the mouse over the graph, curve points are highlighted with a circle symbol while the corresponding values are displayed in the text boxes above the graph.
- 6 X axis scaling: The total signal is zoomable with the slider on the left side during running measurement. The time range can be defined in the input field below the time axis. If the diagram is stopped, you can also use the right slider. The zoom window can also be moved with the mouse in the center of the zoom window (arrow cross).
- 7 The LED visualizes the status of the transmission of measured values:
 - green: transmission of measured values is running.
 - yellow: waiting for data in trigger mode
 - gray: transmission of measured values stopped

Data queries are controlled by using the `Play/Pause/Stop/Save` buttons of the measured values that were transmitted. `Stop` stops the diagram; data selection and zoom function are still possible. `Pause` interrupts recording. `Save` opens the Windows selection dialog for file name and storage location to save the FFT signals resp. measurement values in a CSV file (separation with semicolon).

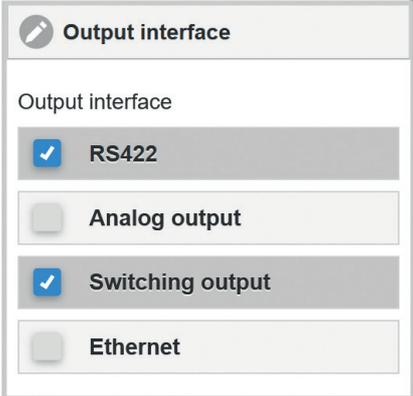
 Click the button  (Start), for starting the display of the measurement results.
- 8 The two buttons allow to switch between FFT signal and measurement representation.

Data Output, Interface Selection

The controller supports

- three digital interfaces that can be used in parallel for data output,
 - Ethernet: enables fast data transfer, but provides no real-time capabilities (packet-based data transfer). Both measurement and FFT data can be transferred. For measurement value detection without direct process control, for subsequent analysis. Parameterization is provided through the web interface or ASCII commands.
 - RS422: provides an interface capable of real-time output at a lower data rate.
 - Switching/limit value output
- Analog output: outputs either voltage or current values.

➤ Switch to the `Settings > Outputs > Output interface` menu and select the desired output channels.



| Output interface | |
|-------------------------------------|------------------|
| Output interface | |
| <input checked="" type="checkbox"/> | RS422 |
| <input type="checkbox"/> | Analog output |
| <input checked="" type="checkbox"/> | Switching output |
| <input type="checkbox"/> | Ethernet |

Selecting the required interfaces for data output

Ethernet

The controller transmits TCP/IP or UDP/IP packages with an Ethernet transfer rate of 10 Mbit/s or 100 Mbit/s. The transfer rate is selected automatically depending on the connected network or PC.

When transmitting measurement data to a measurement server, following successful connection (TCP or UDP), the sensor sends each measurement to the measurement server or to the connected client. No explicit request is necessary for this.

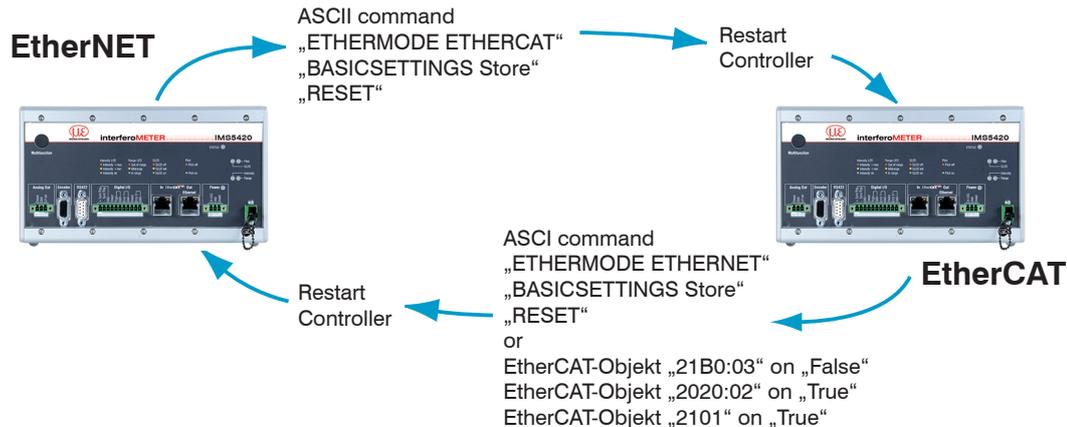
Thickness values are transmitted as 32 bit signed integer value with 10 pm resolution.

Set IP Address

- Change to the menu `Settings > Outputs > Ethernet Settings` and enter the new IP address.
- Click on `Apply settings` to confirm.
- Start the web interface with the new IP address.
- Save the new device settings. Click on `Save settings`.

Switching between Ethernet and EtherCAT

You can switch between Ethernet and EtherCAT using an ASCII command, the web interface or an EtherCAT object. Save the current settings before switching to EtherCAT. The switch becomes active only after the controller has been restarted.



The RS422 interface for sending an ASCII command is available both in Ethernet mode and in EtherCAT mode.

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.

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For translations into other languages, the German version shall prevail.



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