









More Precision

interferoMETER // High precision absolute interferometers



Stable thickness measurement with submicrometer resolution

interferoMETER 5400-TH

-  Nanometer-accurate thickness measurement, even with varying distances
-  Stable measurement from a long distance
-  Precise thickness measurement of up to 5 layers
-  Measuring rate up to 6 kHz for high speed measurements
-  Ethernet / EtherCAT / RS422 / PROFINET / EtherNet/IP
-  Flexible industrial integration



Stable thickness measurement with varying distances

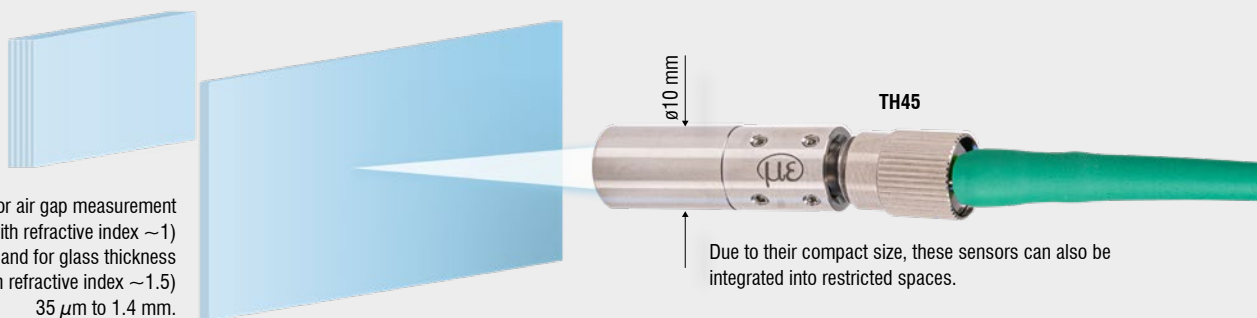
The IMS5400-TH absolute interferometer opens up new perspectives in industrial thickness measurements. The interferometer is used for highly accurate thickness measurements from a relatively large distance. The large thickness measuring range allows the measurement of thin layers, flat glass and films. As the absolute interferometer works with an SLED in the near-infrared range, it is possible to measure the thickness of optically non-dense objects such as anti-reflective coated glass.

Reliable even with vibrating materials

A decisive advantage is the distance-independent measurement, where a stable nanometer-accurate thickness value is achieved. This is how the target can move within the measuring range without influencing the accuracy.

With the multi-layer thickness measurement (IMS5400.../MP) up to 5 layers can be measured

The measuring range for air gap measurement (with refractive index ~ 1) is 50 μm to 2.1 mm and for glass thickness measurement (with refractive index ~ 1.5) 35 μm to 1.4 mm.



Due to their compact size, these sensors can also be integrated into restricted spaces.

Controller

| Model | | IMS5400-TH | IMS5400MP-TH |
|---------------------------------|------------|---|----------------|
| Resolution ^[1] | | < 1 nm | |
| Measuring rate | | continuously adjustable from 100 Hz to 6 kHz | |
| Linearity ^[2] | | < ±100 nm ^[3] / < ±200 nm ^[4] | |
| Temperature stability | | temperature compensated, stability < 10 ppm between +15 ... +35 °C | |
| Multi-peak measurement | | 1 layer | up to 5 layers |
| Light source | | NIR-SLED, narrow wavelength band at approx. 840 nm; pilot laser: laser LED, wavelength 635 nm | |
| Laser class | | Class 1 according to DIN EN 60825-1: 2015-07; Pilot laser: Class 1, power (< 0.2 mW) | |
| Supply voltage | | 24 VDC ±15 % | |
| Power consumption | | approx. 10 W (24 V) | |
| Signal input | | Sync in, trigger in, 2x encoders (A+, A-, B+, B-, index) | |
| Digital interface | | Ethernet / EtherCAT / RS422 / PROFINET ^[5] / EtherNet/IP ^[5] | |
| Analog output | | 4 ... 20 mA / 0 ... 10 V (16 bit D/A converter) | |
| Switching output | | Error1-Out, Error2-Out | |
| Digital output | | sync out | |
| Connection | Optical | Pluggable fiber optic cable via E2000 socket (controller); see accessories for cable lengths; bending radius: static 30 mm, dynamic 40 mm | |
| | Electrical | 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) | |
| Mounting | | Free-standing, DIN rail mounting | |
| Temperature range | Storage | -20 ... +70 °C | |
| | Operation | +15 ... +35 °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) | | IP40 | |
| Material | | Aluminum housing, passive cooling | |
| Control and indicator elements | | Multifunction button: two adjustable functions and reset to factory settings after 10 s; web interface for setup: selectable presets, freely selectable averaging, data reduction, setup management; 6 x color LEDs for intensity, range, SLED, pilot laser, status and power; pilot laser: can be switched on for sensor alignment | |

^[1] All data at constant ambient temperature (24 ±2 °C). Measuring rate 0.5 kHz, moving average over 64 values, measured differentially between the front and back of a thin glass plate in the mid of the measuring range (2 sigma)

^[2] Maximum deviation from reference system over the entire measuring range, measured on front surface of ND filter

^[3] applies to the IMP TH45 and IMP MP-TH45 sensor models

^[4] applies to the IMP TH70 and IMP MP-TH70 sensor models

^[5] Optional connection via interface module (see accessories)

Sensors for thickness measurements

interferoMETER 5400-TH



Sensors for the IMS5400 controller for thickness measurements

| Model | | IMP TH45 | IMP TH70 |
|------------------------------------|--------------------------|--|---------------|
| Working distance | | 45 mm ±3.5 mm | 70 mm ±2.1 mm |
| Measuring range | Thickness ^[1] | 0.035 ... 1.4 mm ^[2] | |
| Temperature stability | | Linearity valid for the entire temperature range | |
| Light spot diameter ^[3] | | 10 µm | 5 µm |
| Measuring angle ^[4] | | ±2° | ±4° |
| Connection | Optical | Pluggable fiber optic cable via FC socket (sensor); see accessories for cable lengths; 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 | |
| Dimensions | Diameter | Ø10 | Ø20 |
| | Length | 30 mm | approx. 75 mm |
| Protection class (DIN EN 60529) | | IP65 / IP40 (option / VAC) | IP65 |
| Vacuum | | UHV (cable and sensor) | - |
| Material | | Stainless steel | |

^[1] Values also for MP measurement

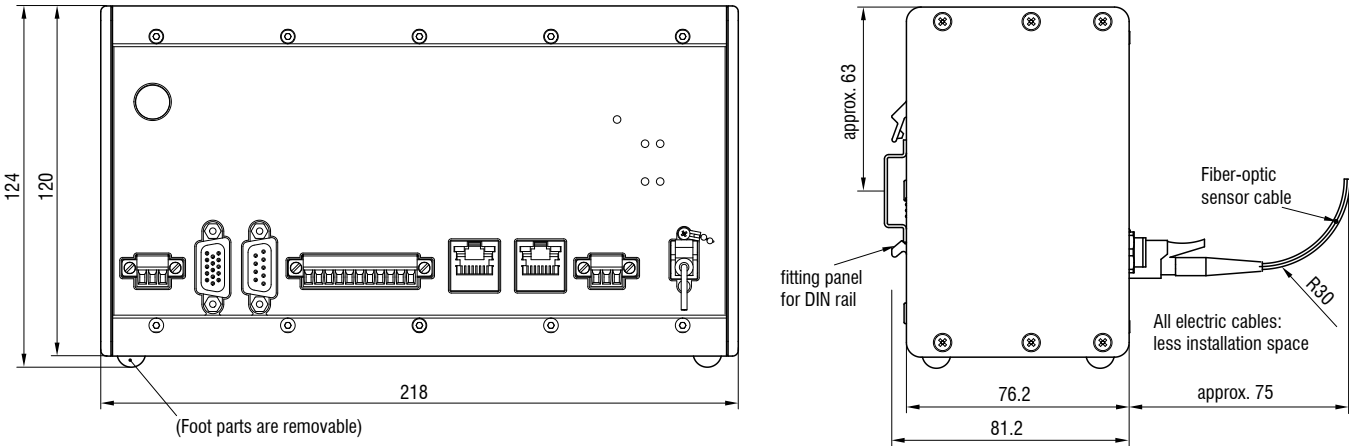
^[2] All data at constant ambient temperature (24 ±2 °C). Measuring range with n=1.5; for air gap measurement between two glass plates (n~1) the measuring range is 0.05 ... 2.1 mm. The measuring object must be within the working distance.

^[3] With a working distance of 45 mm (TH-45) or 70 mm (TH-70)

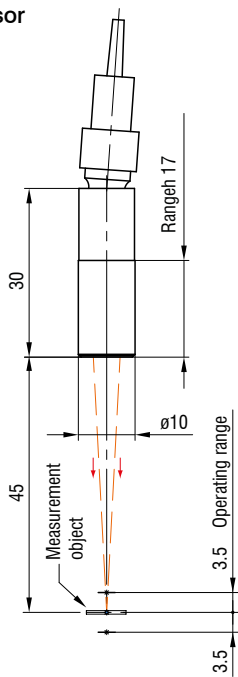
^[4] Maximum sensor tilt angle that produces a usable signal on an approx. 0.6 mm thick BK7 optical flat in the mid of the measuring range. The accuracy decreases when approaching the limit values.

Dimensions

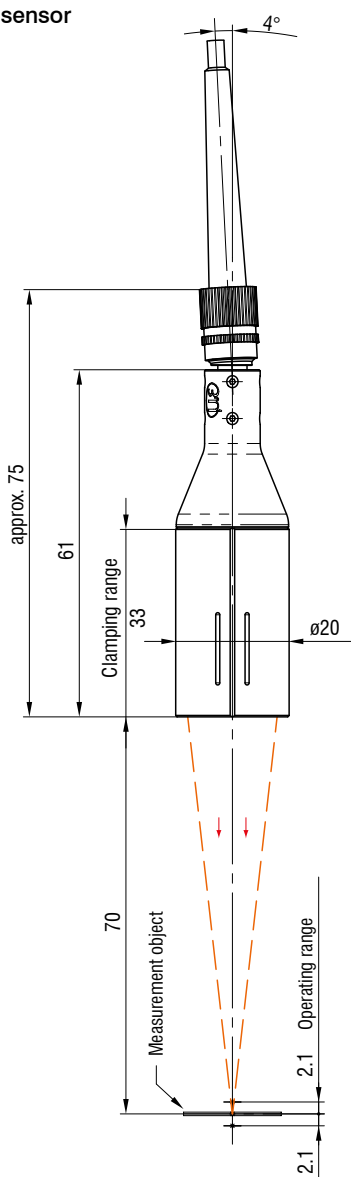
IMS5400-TH controller



Thickness sensor
IMP TH45



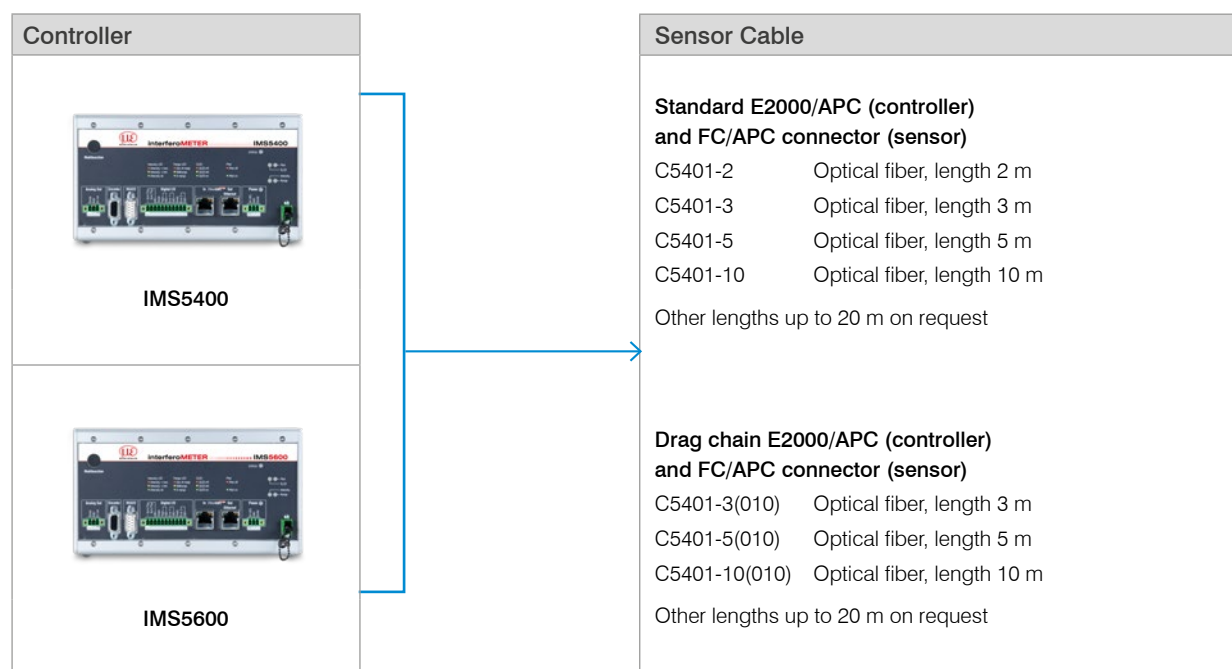
Thickness sensor
IMP TH70



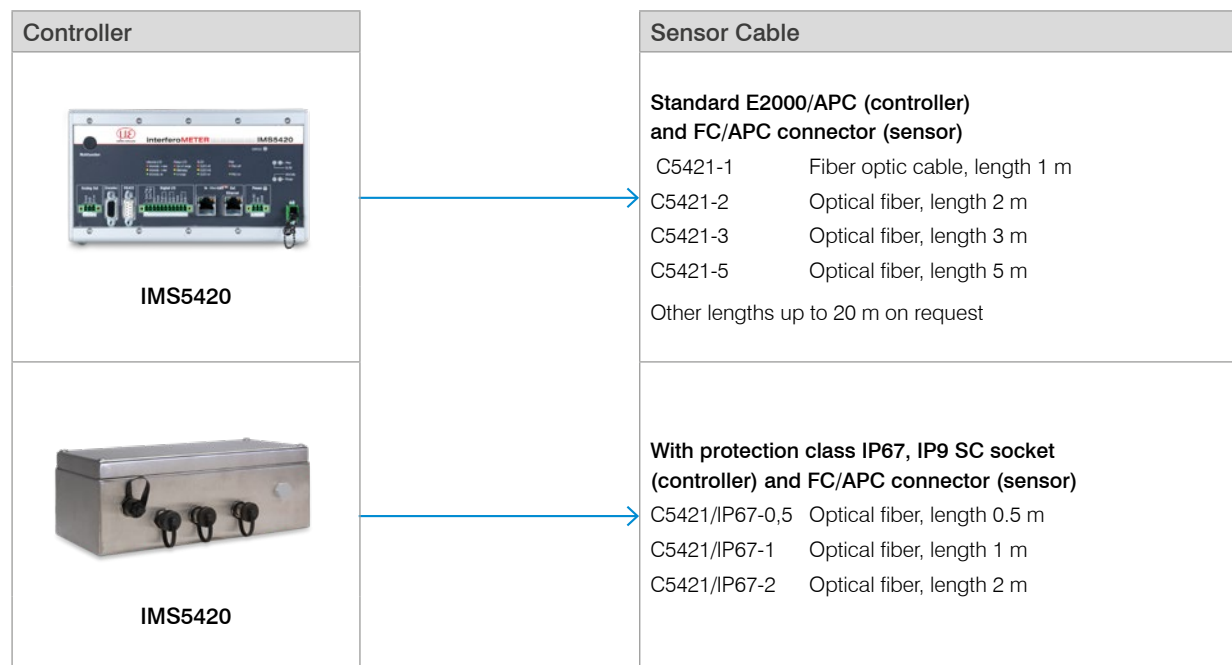
Connection possibilities

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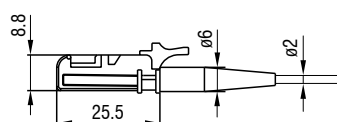
Connection options for the IMS5400 and IMS5600 controllers



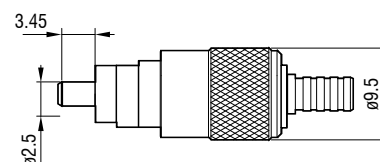
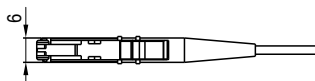
Connection options for the IMS5420 controller



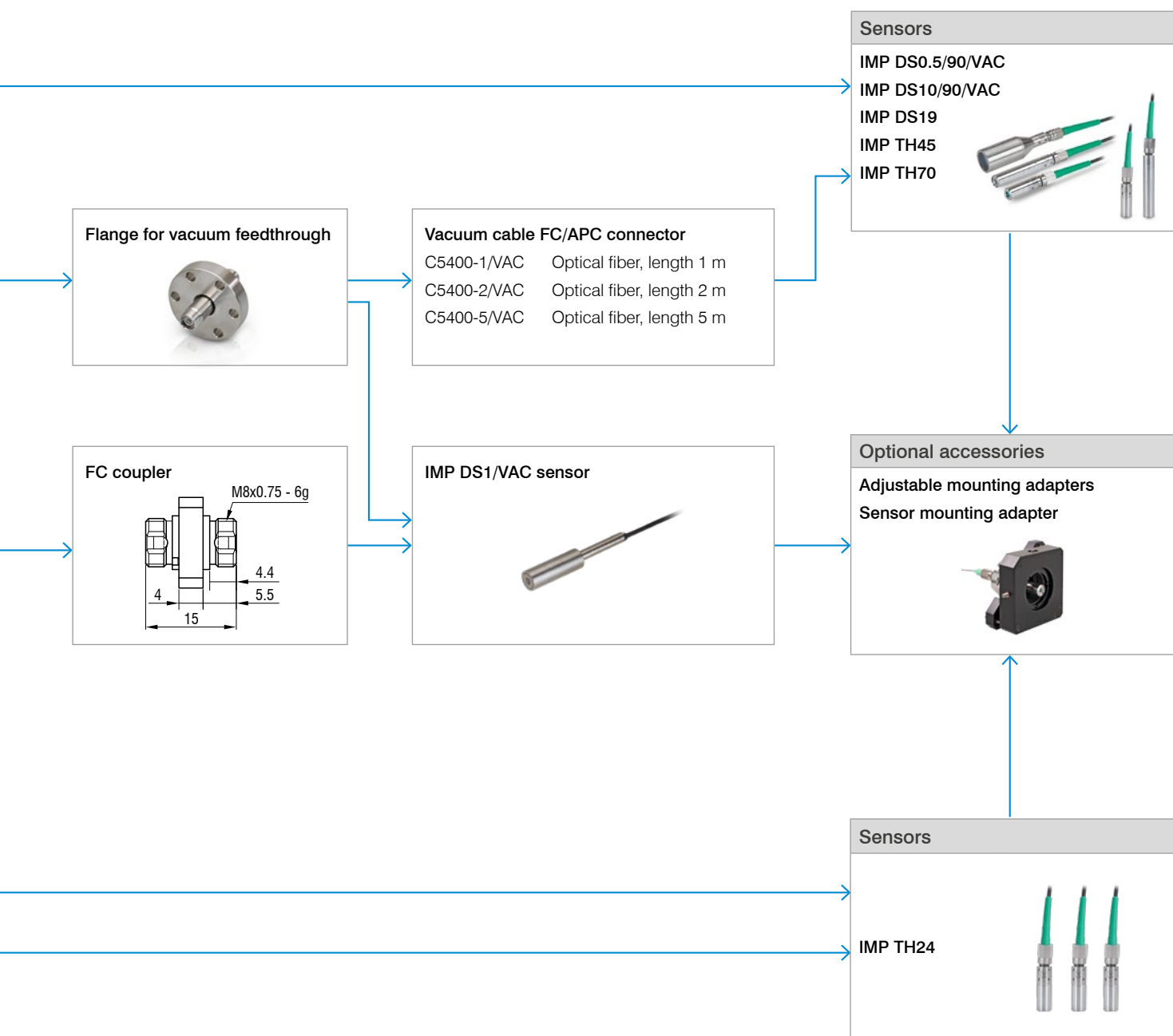
Connector



E2000/APC Standard connector



FC/APC Standard connector



Article designations

DS IMS5xxx-DSxx
distance measuring system
(e.g. IMS5600MP-DS19)

| IMS5xxx | -DSxx |
|-------------------------|-----------------------------|
| Controller model | Sensor model |
| IMS5400 | DS1/VAC |
| IMS5400MP | DS19 |
| IMS5600 | DS19/VAC |
| IMS5600MP | DS0.5/90/VAC DS10/90/VAC |

TH IMS5xxx-THxx
thickness measuring system
(e.g. IMS5400-TH45/VAC)

| IMS5xxx | -THxx |
|-------------------------|---------------------|
| Controller model | Sensor model |
| IMS5400 | TH45 |
| IMS5400MP | TH45/VAC TH70 |

TH IMS5420xx-THxx
wafer thickness measuring system
(e.g. IMS5420-TH24)

| IMS5xxx | -THxx |
|-------------------------|---------------------|
| Controller model | Sensor model |
| IMS5420 | TH24 |
| IMS5420MP | TH24(204) |
| IMS5420IP67 | |
| IMS5420IP67MP | |

Optional accessories

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Flange for vacuum feedthrough

C5405/VAC/1/CF16 CF flange

C5405/VAC/1/KF16 KF flange

Mounting adapter

MA5400- 10 Mounting adapter for IMP-DS19/ -TH45

MA5400- 20 Mounting adapter for IMP-TH70

MA2402-4 Mounting adapter for IMP-DS1

Other accessories

SC2471-x/IF2008 IMC5400/5600 connector cable+ IF2008/PCIE, length 3 m / 10 m

SC2471-x/RS422/OE IMC5400/5600 interface cable + IF2001/USB, length 3 m / 10 m

IF2001/USB RS422/USB converter

IF2008/PCIE Interface card

IF2035/PNET Interface module for PROFINET integration

IF2035-EIP Interface module for EtherNet/IP with DIN rail housing

PS2020 Power supply 24V / 2.5A

EC2471-3/OE Encoder cable, 3 m



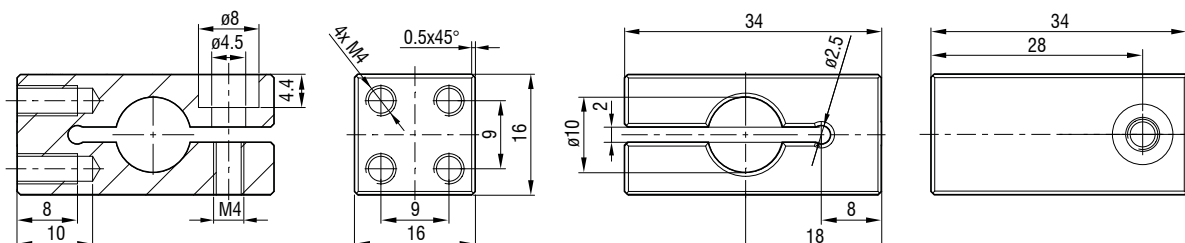
C5405/VAC/1/CF16
C5405/VAC/1/KF16

Sensor mounting adapter

MA5400-10

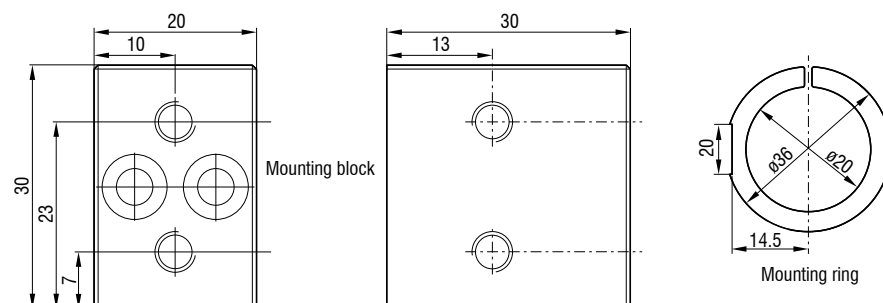
Sensor mounting adapter for all interferoMETER sensors:

(exception IMP-DS1, IMP-TH70)



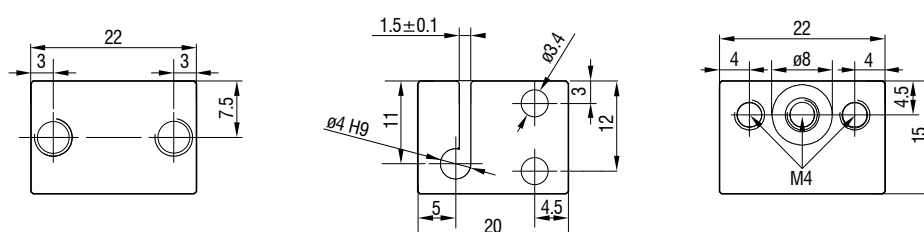
MA5400-20

Sensor mounting adapter for IMP-TH70 sensors:



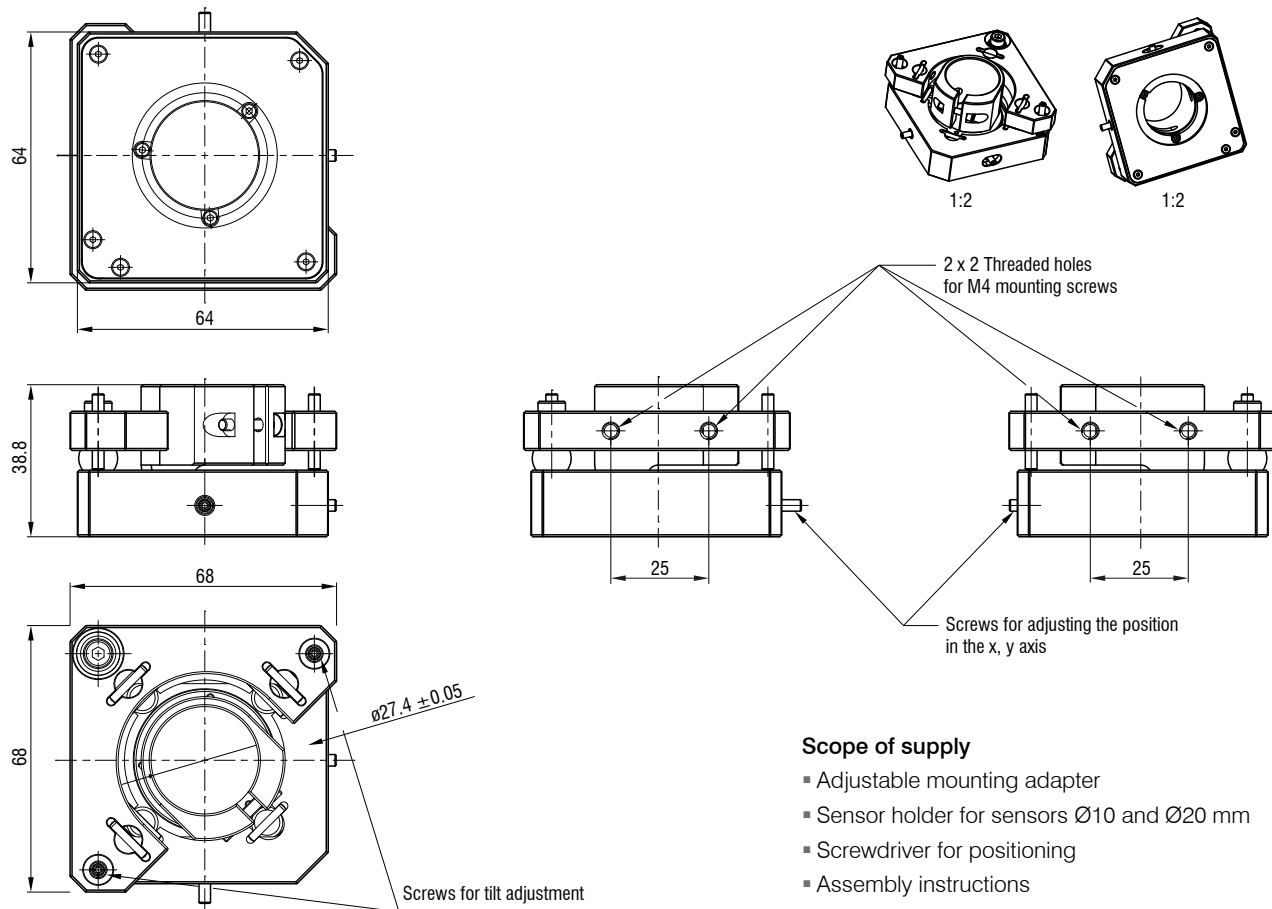
MA2402-4

Sensor mounting adapter for IMP-DS1 sensors



Adjustable mounting adapter

The adjustable JMA mounting adapter simplifies the alignment and fine adjustment of interferometric sensors. The sensors and adapters can be integrated into the machine and aligned 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.

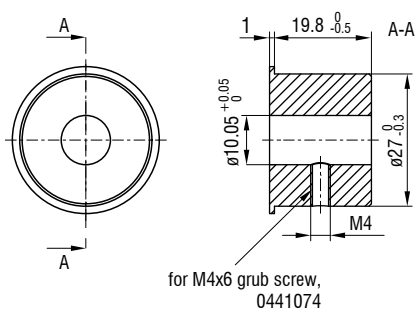


Scope of supply

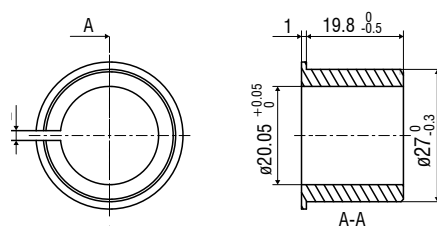
- Adjustable mounting adapter
- Sensor holder for sensors $\varnothing 10$ and $\varnothing 20$ mm
- Screwdriver for positioning
- Assembly instructions

Sensor holder

Sensor holder for JMA-10



Sensor holder for JMA-20



(dimensions in mm, not to scale)

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