More Precision

interferoMETER IMS5400-DS // White light interferometer for high precision distance measurements
Due to their compact size, these sensors can also be integrated into restricted spaces.

**Absolute distance measurement with nanometer resolution**
The IMS5400-DS white light interferometer opens up new perspectives in industrial distance measurement. The controller has an intelligent evaluation feature and enables absolute measurements with nanometer accuracy at a relatively large offset distance. Compared to other absolute measuring optical systems, the IMS5400-DS offers an unsurpassed combination of accuracy, measuring range and offset distance.

**Small light spot for the smallest of details and structures**
The sensors generate a constantly small light spot over the entire measuring range. The light spot diameter is only 10 µm and allows the detection of small details such as structures on semiconductors and miniaturized electronic components.

**Various interfaces for advanced automation**
Integrated interfaces such as Ethernet, EtherCAT and RS422 as well as encoder connections, analog outputs, synchronization inputs and digital I/Os enable the connection to modern control systems and production programs.

**Absolute measurement of step profiles**
Unlike conventional interferometers, the IMS5400-DS also enables the measurement of step profiles. Thanks to the absolute measurement, the scanning is performed with high signal stability and precision. When measuring on moving objects, the differences in height of heels, steps and depressions can thus be reliably detected.

**Integration in industrial environments**
Robust sensors and a controller in a metal housing make the IMS5400-DS ideally suitable for integration into production lines. These compact sensors are extremely space-saving and can also be integrated in confined spaces. The controller is installed in the control cabinet via DIN rail mounting and provides very stable measurement results due to active temperature compensation and passive cooling. Highly flexible fiber optic cables are available in lengths up to 20 m and allow a spatial separation of sensor and controller. Unlike other conventional interferometers, initial operations and parameter set up are easy and user-friendly via a web interface. No software installation is required.
<table>
<thead>
<tr>
<th><strong>Model</strong></th>
<th><strong>IMSS400-DS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>2.1 mm</td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>approx. 19 mm</td>
</tr>
<tr>
<td>Resolution</td>
<td>$&lt; 1$ nm</td>
</tr>
<tr>
<td>Measuring rate</td>
<td>continuously adjustable from 100 Hz to 6 kHz</td>
</tr>
<tr>
<td>Linearity</td>
<td>$&lt; 0.50$ nm</td>
</tr>
<tr>
<td>Temperature stability</td>
<td>Linearity typ. 0.1 nm / K (without offset displacement) temperature-compensated, stability $&lt; 10$ ppm between $+15 \ldots +35$ °C</td>
</tr>
<tr>
<td>Light source</td>
<td>NIR-SLED, wavelength 840 nm</td>
</tr>
<tr>
<td>Laser safety class</td>
<td>Class 1 in accordance with DIN EN 60825-1 : 2015-07</td>
</tr>
<tr>
<td>Light spot diameter</td>
<td>10 µm</td>
</tr>
<tr>
<td>Max. tilt angle</td>
<td>$\pm 2^\circ$</td>
</tr>
<tr>
<td>Target material</td>
<td>Glass, reflecting or diffuse surfaces</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>24 VDC $\pm 15$ %</td>
</tr>
<tr>
<td>Power consumption</td>
<td>approx. 10 W (24 V)</td>
</tr>
<tr>
<td>Signal input</td>
<td>Sync in, Trigger in, 2 x encoders (A+, A-, B+, B-, index)</td>
</tr>
<tr>
<td>Digital interface</td>
<td>Ethernet / EtherCAT / RS422</td>
</tr>
<tr>
<td>Analog output</td>
<td>4 ... 20 mA / 0 ... 10 V (16 bit D/A converter)</td>
</tr>
<tr>
<td>Switching output</td>
<td>Error1-Out, Error2-Out</td>
</tr>
<tr>
<td>Digital output</td>
<td>Sync out</td>
</tr>
</tbody>
</table>

### Connection

**Optical**
- pluggable optical fiber via E2000 socket (controller) and FC socket (sensor);
- standard length 3 m, 5 m and 10 m; other cable lengths on request;
- 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)

### Installation
- Sensor: Clamping, mounting adapter (see accessories)
- Controller: free-standing, DIN rail mounting

### Temperature range
- Sensor: $+5 \ldots +70$ °C;
- Controller: $+15 \ldots +35$ °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 (controller and sensor)

### Material
- Sensor: Stainless steel
- Controller: Aluminum housing, passive cooling

### Control and display elements
- multifunction button: two adjustable functions and reset to factory setting after 10 s;
- web interface for setup: selectable presets, freely selectable averaging possibilities, data reduction, setup management;
- 6 x color LEDs for intensity, range, SLED, pilot laser, status and power;
- switchable pilot laser for sensor alignment (laser LED 635 nm, laser class 1, performance $< 0.2$ mW)

All data at constant ambient temperature ($24 \pm 2$ °C)

1) Measuring rate 0.5 kHz, moving averaging over 64 values, measured at the front of a 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) In the mid of the measuring range
4) Maximum sensor tilt angle that produces a usable signal on polished glass ($n = 1.5$) in the mid of the measuring range. The accuracy decreases when approaching the limit values.
5) Non-transparent materials require an optically dense surface with a wavelength of 840 nm
Dimensions

Sensor

Controller

Accessories: Sensor mounting adapter

(dimensions in mm, not to scale)