



# More Precision

**optoNCDT ILR** // Laser-optical distance sensors



# Compact and reliable laser distance sensor optoNCDT ILR104x

-  Measuring ranges without reflector: 10 m  
With reflector: 60 m and 150 m
-  Ideal for series applications in the automation industry
-  Laser class 1
-  Robust design IP67 / IP69 / IP69K
-  Fast response time
-  Compact & lightweight design



**NEW** Now with 150 m measuring range

## Compact and reliable sensor

The optoNCDT ILR104x laser distance sensors are designed for industrial distance measurements. These sensors achieve measuring ranges up to 10 meters without reflector film, 60 and 150 meters with reflector film. They feature a high protection class and resistance to ambient light. Due to their rotatable cable outlet and their compact design, these sensors can also be installed in difficult-to-access and narrow places.

The optoNCDT ILR104x sensors can be put into operation quickly and easily via the IO-Link interface. Operation of the sensor is supported by keys and LEDs.

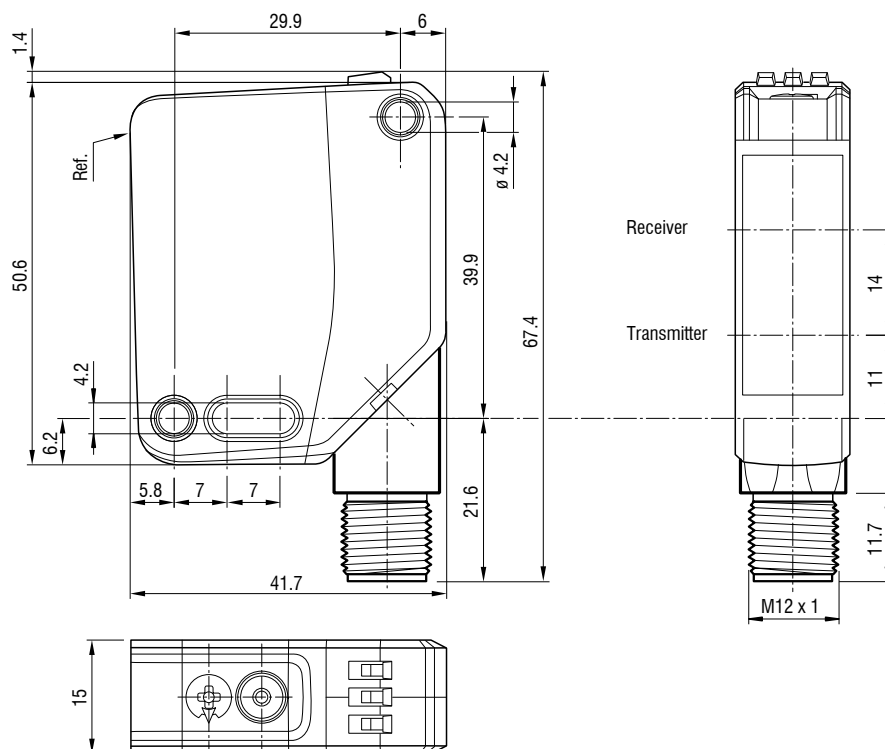
## Time-of-flight principle

The ILR104x distance sensors use the time-of-flight measuring principle for accurate, reliable, clear and reproducible results. They achieve precise measurement results regardless of surface texture, dark object colors or ambient light. The ILR104x series sensors use a class 1 laser.

## Versatile use

The compact sensors are designed for automation and are used for presence detection and collision monitoring, for example. Their robust plastic housing with IP69K protection class, the 50,000 lx ambient light resistance and a wide temperature range of -30 to +60 °C make these sensors the ideal choice for numerous applications.

## Dimensions:



(dimensions in mm, not to scale)

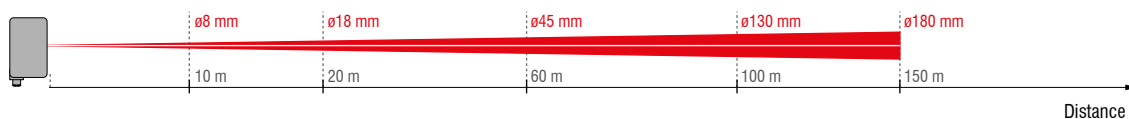
| Model                           |                                                        | ILR1040-10-IO-I                                                                                                                    | ILR1040-10-IO-U           | ILR1041-60-IO-I            | ILR1041-60-IO-U           | ILR1041-150-IO-I           | ILR1041-150-IO-U          |
|---------------------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|
| Measuring range <sup>[1]</sup>  | Start of measuring range                               | 0.03 m                                                                                                                             | 0.03 m                    | -                          | -                         | -                          | -                         |
|                                 | End of measuring range                                 | 10 m                                                                                                                               | 10 m                      | -                          | -                         | -                          | -                         |
|                                 | Start of measuring range with reflector film ILR-RF250 | -                                                                                                                                  | -                         | 0.2 m                      | 0.2 m                     | 0.2 m                      | 0.2 m                     |
|                                 | End of measuring range with reflector film ILR-RF250   | -                                                                                                                                  | -                         | 60 m                       | 60 m                      | 150 m                      | 150 m                     |
| Measuring rate                  |                                                        | adjustable up to 333 Hz                                                                                                            |                           |                            |                           |                            |                           |
| Max. travel speed               |                                                        | 10 m/s                                                                                                                             |                           |                            |                           |                            |                           |
| Resolution                      |                                                        | 1 mm                                                                                                                               |                           |                            |                           |                            |                           |
| Linearity <sup>[2]</sup>        |                                                        | typ. ± 20 mm                                                                                                                       |                           |                            |                           |                            |                           |
| Repeatability <sup>[3]</sup>    |                                                        | < 3 mm                                                                                                                             |                           |                            |                           | < 6 mm                     |                           |
| Light source                    |                                                        | Semiconductor laser < 1 mW, 660 nm (red) 2mrad 4ns                                                                                 |                           |                            |                           |                            |                           |
| Laser class                     |                                                        | Class 1 in accordance with DIN EN 60825-1:2014                                                                                     |                           |                            |                           |                            |                           |
| Typ. service life               |                                                        | 85.000 h                                                                                                                           |                           |                            |                           |                            |                           |
| Permissible ambient light       |                                                        | 50,000 lx @ 2.5 m standard white 90 %, 10,000 lx @ 2.5 m black 6 %                                                                 |                           |                            |                           |                            |                           |
| Supply voltage                  |                                                        | 18 ... 30 VDC                                                                                                                      |                           |                            |                           |                            |                           |
| Power consumption               |                                                        | 25 mA                                                                                                                              |                           |                            |                           |                            |                           |
| Digital interface               |                                                        | IO-Link 1.1 (via C/Q pin 4)                                                                                                        |                           |                            |                           |                            |                           |
| Analog output                   |                                                        | 4 ... 20 mA<br>(12-bit DA)                                                                                                         | 0 ... 10 V<br>(12-bit DA) | 4 ... 20 mA<br>(12-bit DA) | 0 ... 10 V<br>(12-bit DA) | 4 ... 20 mA<br>(16-bit DA) | 0 ... 10 V<br>(16-bit DA) |
| Switching output                |                                                        | Q1 (max 100 mA) push-pull output (configurable) reverse polarity protected, overvoltage-proof                                      |                           |                            |                           |                            |                           |
| Connection                      |                                                        | Supply & signal: M12 x1 , 4-pin                                                                                                    |                           |                            |                           |                            |                           |
| Mounting                        |                                                        | Through bores                                                                                                                      |                           |                            |                           |                            |                           |
| Temperature range               | Storage                                                | -40 ... +70 °C                                                                                                                     |                           |                            |                           |                            |                           |
|                                 | Operation                                              | -30 ... +60 °C                                                                                                                     |                           |                            |                           |                            |                           |
| Protection class (DIN EN 60529) |                                                        | IP67 / IP69 / IP69K                                                                                                                |                           |                            |                           |                            |                           |
| Material                        |                                                        | PC (polycarbonate)                                                                                                                 |                           |                            |                           |                            |                           |
| Weight                          |                                                        | 37 g                                                                                                                               |                           |                            |                           |                            |                           |
| Control and indicator elements  |                                                        | 3x LED for power, switching status and teach-in;<br>5-position rotary switch for selecting the operating modes;<br>teach-in button |                           |                            |                           |                            |                           |
| Special features                |                                                        | Operating mode: single measurement, external triggering, distance tracking, continuous measurement                                 |                           |                            |                           |                            |                           |

<sup>[1]</sup> The specified data apply at a constant room temperature of 20 °C with continuous sensor operation.  
Measurements were taken on a white, diffusely reflective surface (reference ceramic). Reflector film RF250

<sup>[2]</sup> Statistical spread  $2\sigma$

<sup>[3]</sup> Incl. thermal influence

## Light spot diameter



The ILR104x sensors use a semiconductor laser of class 1.  
Devices in this laser class require no special safety precautions.  
They work with a semiconductor laser with a wavelength of 660 nm (visible/red)  
Laser power is <1 mW.

# Connection possibilities optoNCDT ILR



ILR104x



ILR3800-IO



ILR3800  
ILR3800-H



Power supply unit PS2020  
(Optional for DIN rail mounting)



ILR1171

## Supply and output cables

|          |              |                               |
|----------|--------------|-------------------------------|
| 29011586 | PC1040-10    | Supply and output cable, 10 m |
| 29011587 | PC1040-2     | Supply and output cable, 2 m  |
| 29011588 | PC1040/90-2  | Supply and output cable, 2 m  |
| 29011589 | PC1040-5     | Supply and output cable, 5 m  |
| 29011590 | PC1040/90-5  | Supply and output cable, 5 m  |
| 29011590 | PC1040-10    | Supply and output cable, 10 m |
| 29011591 | PC1040/90-10 | Supply and output cable, 10 m |
| 29011592 | PC1040-20    | Supply and output cable, 20 m |
| 29011593 | PC1040/90-20 | Supply and output cable, 20 m |

## Supply and output cables

|          |                   |                               |
|----------|-------------------|-------------------------------|
| 29011669 | PC3800-5 IO-Link  | Supply and output cable, 5 m  |
| 29011670 | PC3800-10 IO-Link | Supply and output cable, 10 m |
| 29011671 | PC3800-15 IO-Link | Supply and output cable, 15 m |
| 29011672 | PC3800-20 IO-Link | Supply and output cable, 20 m |

## Supply and output cables

|          |                        |                                                                                                             |
|----------|------------------------|-------------------------------------------------------------------------------------------------------------|
| 29011609 | PCF3800-30/IF2004      | Supply and output cable, 30 m                                                                               |
| 29011682 | PCF3800-100/IF2004     | Supply and output cable, 10 m<br>(to connect 4 ILRs to the IF2004, the IF2008-Y adapter cable is required.) |
| 2901528  | IF2008-Y adapter cable |                                                                                                             |

## Connection cables

|          |                      |                          |
|----------|----------------------|--------------------------|
| 29011624 | PCE3800-20/IF2008ETH | Connection cable, 20 m   |
| 29011623 | PCE3800-10/IF2008ETH | Y-connection cable, 10 m |
| 29011622 | PCE3800-10/IF2008ETH | Connection cable, 10 m   |
| 29011621 | PCE3800-5/IF2008ETH  | Connection cable, 5 m    |
| 29011620 | PCE3800-2/IF2008ETH  | Connection cable, 2 m    |

## Supply and output cables

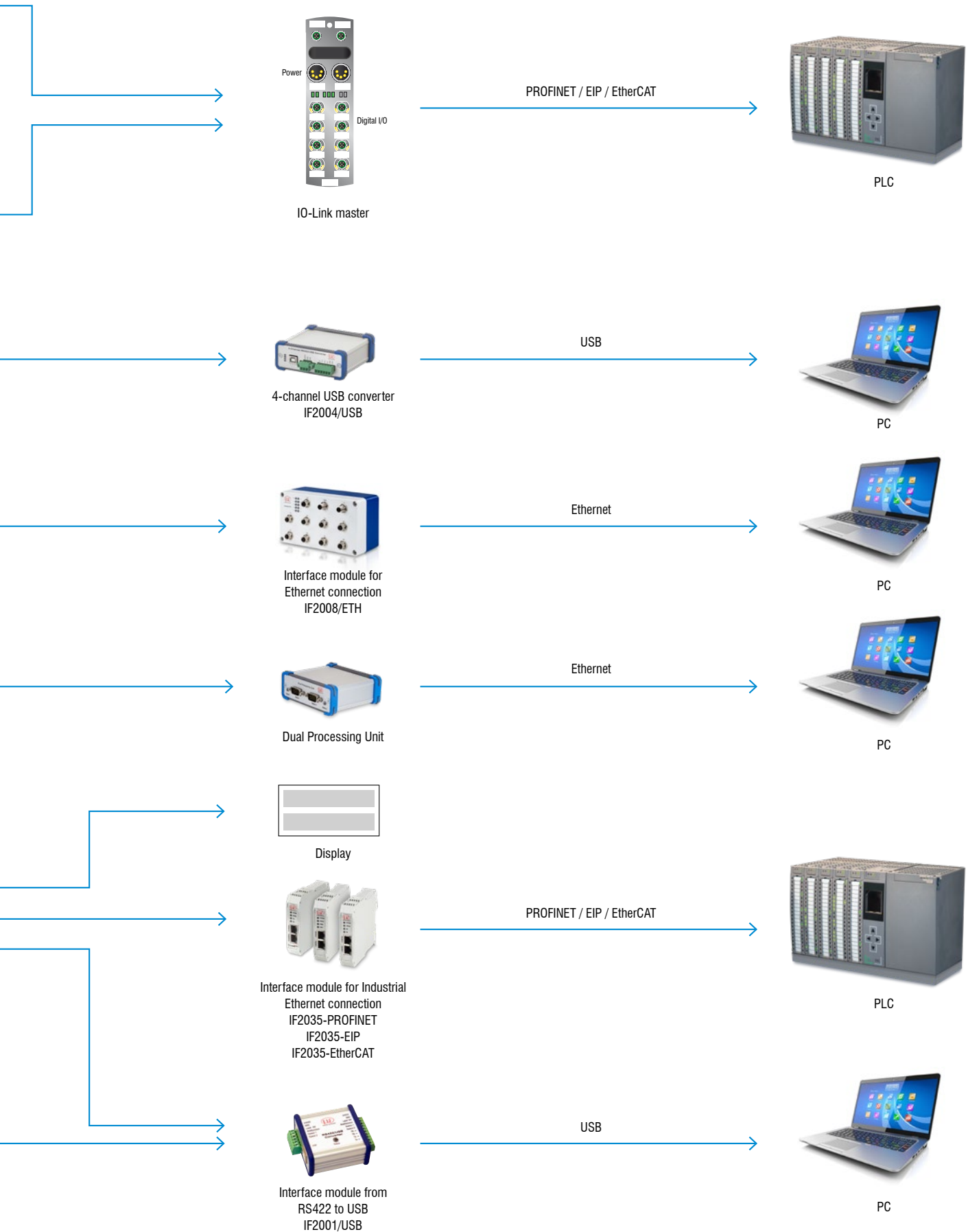
|          |               |                               |
|----------|---------------|-------------------------------|
| 29011737 | PC3800-2/DPU  | Supply and output cable, 2 m  |
| 29011738 | PC3800-5/DPU  | Supply and output cable, 5 m  |
| 29011739 | PC3800-10/DPU | Supply and output cable, 10 m |

## Supply and output cables

|          |              |                               |
|----------|--------------|-------------------------------|
| 29011513 | PC3800-2     | Supply and output cable, 2 m  |
| 29011514 | PC3800/90-2  | Supply and output cable, 2 m  |
| 29011515 | PC3800-5     | Supply and output cable, 5 m  |
| 29011516 | PC3800/90-5  | Supply and output cable, 5 m  |
| 29011517 | PC3800-10    | Supply and output cable, 10 m |
| 29011518 | PC3800/90-10 | Supply and output cable, 10 m |
| 29011519 | PC3800-20    | Supply and output cable, 20 m |
| 29011520 | PC3800/90-20 | Supply and output cable, 20 m |
| 29011521 | PC3800-30    | Supply and output cable, 30 m |
| 29011522 | PC3800/90-30 | Supply and output cable, 30 m |

## Supply and output cables

|          |           |                               |
|----------|-----------|-------------------------------|
| 29011401 | PC1171-2  | Supply and output cable, 2 m  |
| 29011402 | PC1171-5  | Supply and output cable, 5 m  |
| 29011403 | PC1171-10 | Supply and output cable, 10 m |



# Optional accessories

## optoNCDT ILR

### Reflector film and target plate

The sensor measures the distance to moving and stationary objects.  
The reflector film is used to extend the measuring range.

The following aspects should be considered:

- The minimum distance between sensor and reflector film must be observed.
- The laser spot must be centered on the reflector over the entire measuring path.
- The sensor and reflector may be tilted at a maximum angle of 5° to each other.

Reflective films work with targeted retroreflection, whereas a white target plate works with diffuse reflection. With a white target plate, the measuring range can be used up to 100 m – without restrictions in the close range.

Depending on the application, a reflective film or a white target plate can be used:

- optoNCDT ILR1041-x: Reflector film is absolutely necessary to use the measuring range. Measurement is not possible without reflector film.
- optoNCDT ILR1040-x: The use of a white target plate is recommended.

| Sensor           | Article                                        | Dimensions   |
|------------------|------------------------------------------------|--------------|
| optoNCDT ILR104x | Art. no.: 7966001 ILR-RF250 Reflector film     | 250 x 250 mm |
| optoNCDT ILR3800 | Art. no.: 7966058 ILR-RF210 Reflector film     | 210 x 297 mm |
| optoNCDT ILR1171 | Art. no.: 7966001 ILR-RF250 Reflector film     | 250 x 250 mm |
| optoNCDT ILR     | Art.-no.: 7966091 ILR-TB250 White target plate | 250 x 250 mm |



### Protective glass

The sensor can be protected from external influences by using a protective glass.

| Sensor           | Article                                       | Description                                                       |
|------------------|-----------------------------------------------|-------------------------------------------------------------------|
| optoNCDT ILR3800 | Art. no.: 7966080 ILR-PG3800 Protective glass | Optical glass, with anti-reflection coating and high transmission |



### Filter glass

Filter glasses enable measurement on highly reflective surfaces. However, this reduces the maximum laser power. Ask your regional sales contact before you use the filter glass.

| Sensor           | Article                                                                                                                                             | Description         |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| optoNCDT ILR3800 | Art.-no.: 7966081 ILR-NDF3800 Filter glass 0.75<br>Art. no.: 7966082 ILR-NDF3800 Filter glass 0.5<br>Art. no.: 7966083 ILR-NDF3800 Filter glass 0.9 | Optical gray filter |



### Compressed-air purge system

Particularly suitable for dusty and dirty environments to prevent deposits on the lens. Connection via a 6 mm hose. Recommended pressure: 3 bar.

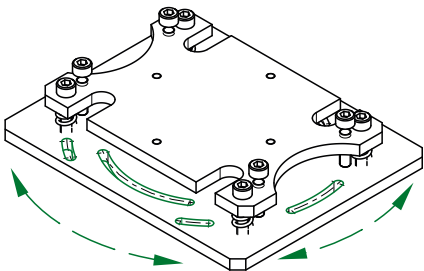
| Sensor           | Article                                                   | Description                                                 |
|------------------|-----------------------------------------------------------|-------------------------------------------------------------|
| optoNCDT ILR3800 | Art.-no.: 7966089 ILR-DLS3800 Compressed-air purge system | For cleaning or permanently keeping the optical path clear. |



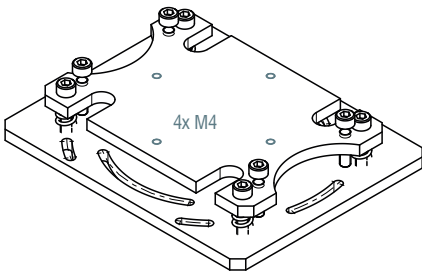
Mounting plate

The sensor can optionally be mounted using an aluminum plate. This ensures a secure hold and easy alignment of the sensor. Its robust design is suitable even for harsh industrial environments.

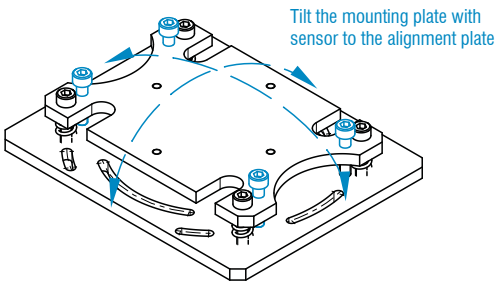
| Sensor           | Article                      | Description                                          |
|------------------|------------------------------|------------------------------------------------------|
| optoNCDT IIR3800 | Art. no.: 7966076 IIR-MP3800 | Mounting plate<br>Optional; for easy sensor mounting |



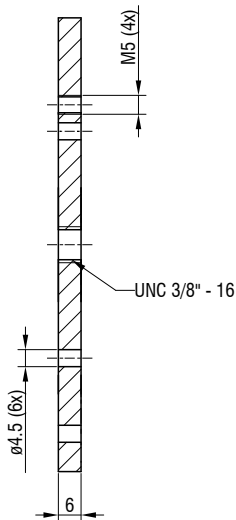
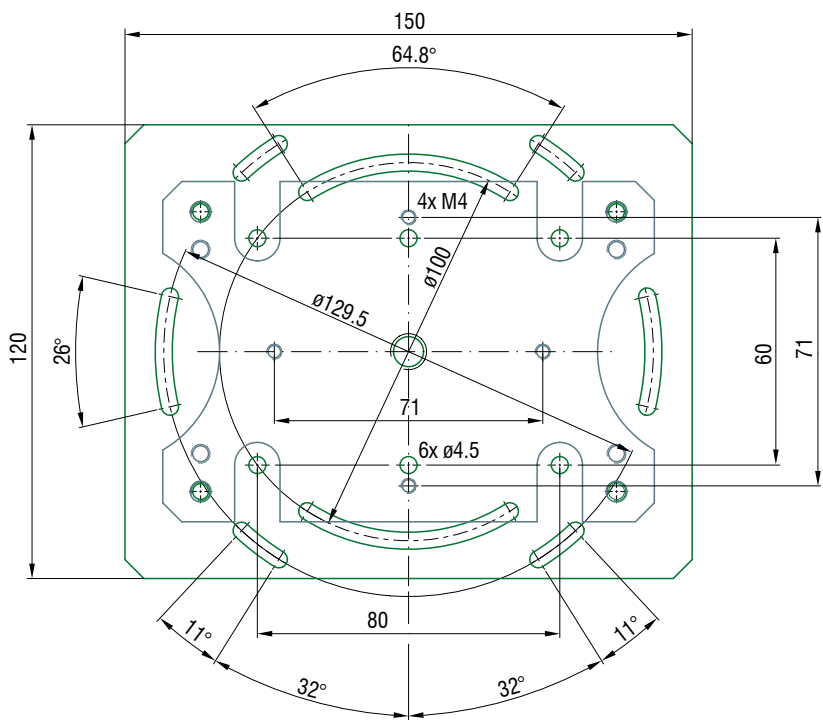
The sensor can optionally be mounted using a mounting plate.



4 mounting threads M4 for sensor mounting, optional: sensor rotated by 90°.



Tilt the mounting plate with sensor to the alignment plate



(dimensions in mm, not to scale)

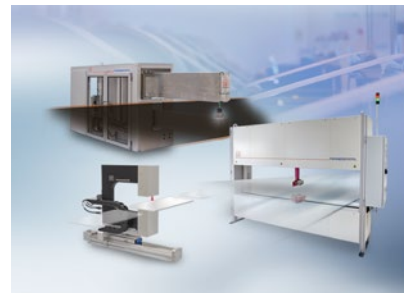
## Sensors and Systems from Micro-Epsilon



Sensors and systems for displacement, distance and position



Sensors and measurement devices for non-contact temperature measurement



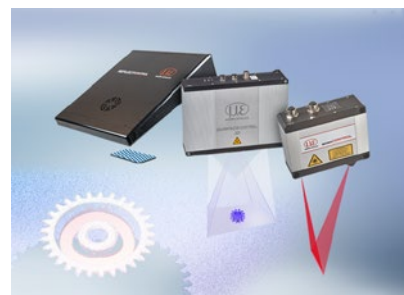
Measuring and inspection systems for metal strips, plastics and rubber



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