

Monitoring

Distances

Measuring



Distance measuring sensors



Inductive

- Tried and tested



Photoelectric

- Multifunctional



Ultrasonic

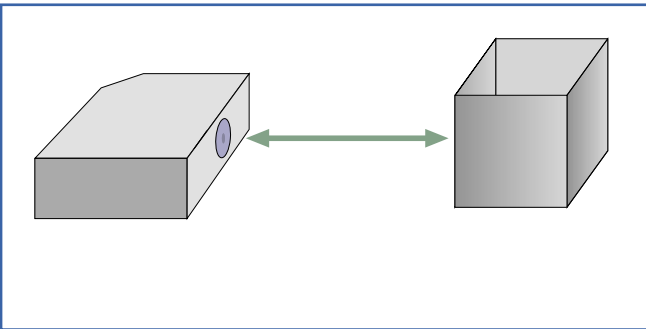
- Versatile

Measurably better – by far!

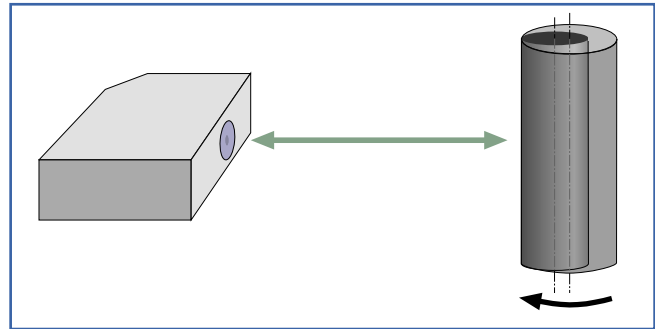
Efficient selection of suitable sensors for contactless distance measurement and position determination is becoming more and more important. Constantly rising requirements for machine performance and reduced budgets demand vast experience for a successful solution, particularly in the selection of the appropriate measurement method. To meet this challenge, we support you with the widest range of sensors for distance and position measurement. To achieve an optimum result, three physical measurement methods are available: inductive, photoelectric and ultrasonic.

Typical applications of measuring sensors

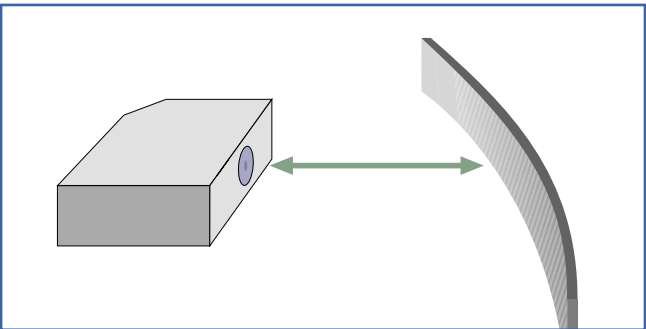
Travel / position / displacement



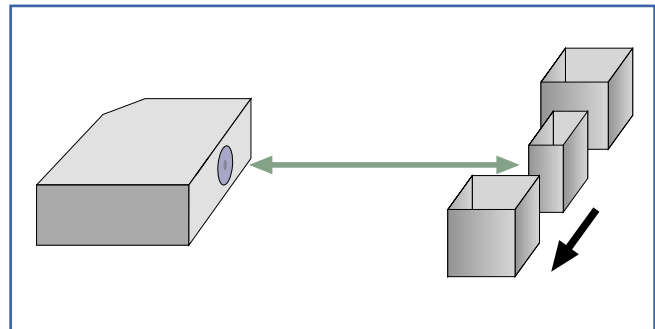
Diameter / eccentricity



Deflection / deformation

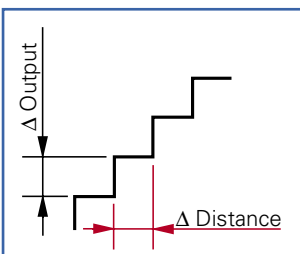


Size comparison / measurement tolerance



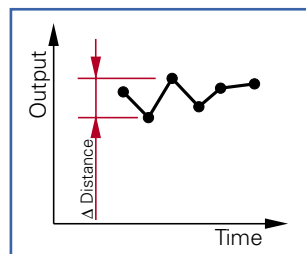
Technical definitions of measuring sensors

Resolution



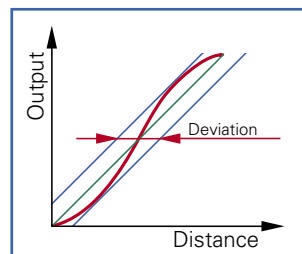
The resolution corresponds to the smallest possible distance change which causes a detectable change to the output signal.

Repeat accuracy



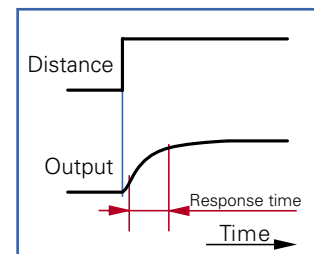
Repeat accuracy means the difference between the measured values of successive measurements within a period of 8 hours at an ambient temperature of $23\text{ °C} \pm 5\text{ °C}$.

Linearity



Linearity is the deviation from a proportional linear function (straight line). It is given as a percentage of the upper limit of the measuring range (full scale).

Response time



The time which the signal output of a sensor requires to rise from 10% to 90% of the maximum signal level is called the response time.

| Type | Inductive | | | | | | | |
|-----------------------------------|-----------|-------|-------|-------|--------|---------|---------|---------|
| Housing | ∅ 6,5 mm | M 8 | M 12 | M 18 | M 30 | 12 x 12 | 18 x 10 | 20 x 12 |
| Measuring distance ^{*1)} | 0...2 | 0...2 | 0...4 | 0...8 | 5...10 | 0...4 | 0...4 | 2...5 |
| Measuring ranges | 1 | 1 | 4 | 3 | 2 | 4 | 4 | 2 |

^{*1)} (mm)



| Type series | IWRM 06 | IWRM 08 | IPRM 12 IWRM 12 | IWRM 18 | IWRM 30 | IWFM 12 | IWFM 18 | IWFM 20 |
|------------------|-------------------------------|-----------------------|-------------------------------------|---------|-----------------------|----------------------|-------------------------------------|---------|
| Technical data | Resolution | 1 µm | 0,1 µm 1 µm | 10 µm | 10 µm | 1 µm | 1 µm | 10 µm |
| | Repeat accuracy | ± 10 µm | ± 5 µm | ± 10 µm | ± 10 µm | ± 5 µm | ± 5 µm | ± 10 µm |
| | Linearity (full scale) | ± 5% | ± 0,4% | ± 2% | ± 1,7% | ± 0,4% | ± 0,4% | ± 2% |
| | Response time | 0,70 ms ¹⁾ | 0,50 ms ¹⁾ | 0,35 ms | 0,35 ms ¹⁾ | 0,7 ms ¹⁾ | 0,35 ms ¹⁾ | 2 ms |
| Outputs | Analog 4 - 20 mA | 0 - 10 mA | ■ | ■ | ■ | ■ | ■ | ■ |
| | Analog 0 - 10 V | ■ | ■ | ■ | 1 - 9 V | ■ | ■ | 1 - 9 V |
| | PNP switching output | | ■ | | | | ■ | |
| | PNP alarm output | | | | | | | |
| | Digital RS 485 | | | | | | | |
| Special features | Teach-in ²⁾ | | ■ | | | | ■ | |
| | Measurement report on request | | ■ | | | ■ | ■ | |
| | | | Linearized With switching output | | | Linearized | Linearized With switching output | |

¹⁾ In the case of inductive sensors (without microcontroller), the response time is reduced in proportion to the measuring range which is used.

²⁾ Uniform teach-in method for defining the measuring range, inverting the characteristic curve and setting the thresholds of the switching output.

Photoelectric





| Series 12 | Series 20 | Series 20 | Series 21 |
|-----------|-----------|-----------|------------|
| 15...120 | 30...1000 | 30...1000 | 200...1000 |
| 2 | 5 | 5 | 1 |



Ultrasonic

| ø 12 mm | ø 18 mm | Series 20 | Series 30 | ø 30 mm | ø 50 mm |
|----------|------------|-----------|-----------|-----------|------------|
| 20...200 | 100...1000 | 20...200 | 30...2000 | 100...700 | 400...2500 |
| 1 | 1 | 1 | 4 | 1 | 1 |



| OADM 12 | OADM 20 | OADM 20 Teach-in | OADM 21 | UNAM 12 | UNAM 18 | UNDK 20 | UNDK 30 | UNAM 30 | UNAM 50 |
|--|--|--|--|-------------------------|--------------------------|-------------------------|-------------------------|--------------------------|-------------------------|
| 2 µm | 10 µm | 4 µm | 30 µm | 300 µm | 300 µm | 300 µm | 300 µm | 300 µm | 300 µm |
| ± 2 µm | ± 10 µm | ± 4 µm | ± 30 µm | ± 500 µm | ± 500 µm | ± 500 µm | ± 500 µm | ± 500 µm | ± 1000 µm |
| ± 0,06% | ± 0,06% | ± 0,09% | ± 0,25% | ± 0,5% | ± 0,5% | ± 0,5% | ± 0,5% | ± 0,5% | ± 0,5% |
| 0,9 ms | 10 ms | 0,9 ms | 10 ms | 30 ms | 80 ms | 30 ms | 50 ms | 80 ms | 160 ms |
| ■ | ■ | ■ | ■ | 0 - 10 mA | ■ | ■ | ■ | ■ | ■ |
| | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | | | | | ■ | ■ | ■ | ■ | ■ |
| | ■ | ■ | ■ | | | | | | |
| | ■ | | | | | | | | |
| ■ | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| ■ | ■ | ■ | ■ | | | | | | |
| LASER  | LASER  Also with laser line | LASER  Hold function Synchronization input Also with laser line | LASER  Hold function Synchronization input Also with laser line | Sonic beam angle: 6° | Sonic beam angle: 10° | Sonic beam angle: 6° | Sonic beam angle: 8° | Sonic beam angle: 10° | Sonic beam angle: 8° |

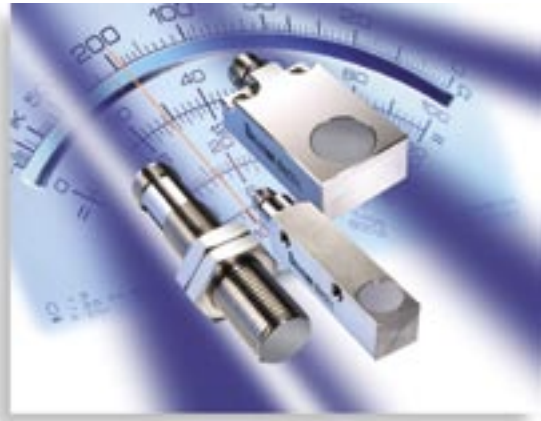
Inductive

Measuring distance
0...10 mm

Resolution
0,1 μm

Response time
0,35 ms

- *Extra flat housings*
- *Temperature-compensated*
- *Linearized characteristic curve*
- *With teach-in functions*



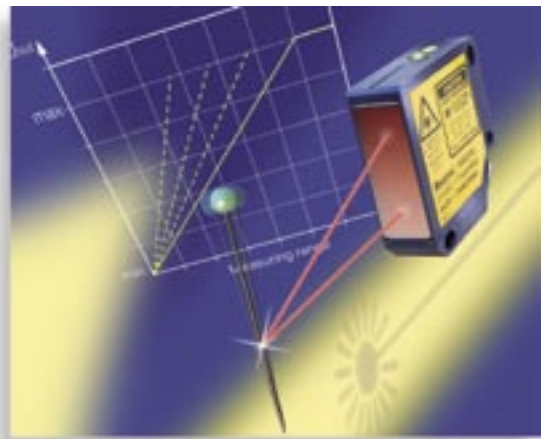
Photoelectric

Measuring distance
15... 1000 mm

Resolution
2 μm

Response time
0,9 ms

- *Smallest housing*
- *Short response time*
- *Extremely color-independent*
- *Configurable measuring range*



Ultrasonic

Measuring distance
20...2500 mm

Resolution
300 μm

Response time
30 ms

- *Compact square housing*
- *Short mounting depth*
- *Narrow sonic beam angle of only 6°*
- *Constant resolution*

