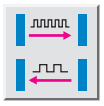
Distance sensors

Distance sensors

- Non-contact, precise distance measurement with red or laser light
- Large operational ranges
- High resolution
- Easy to use thanks to programmable parameters or Teach-in
- Serial interfaces, also SSI for further external processing
- Can be connected to Profibus, Interbus-S, DeviceNet bus
- Used for positioning cranes, automated guided vehicle systems, rack serving units as well as for monitoring filling levels, loop control and detecting minute parts to µm tolerances



IR data transmission photoelectric sensors

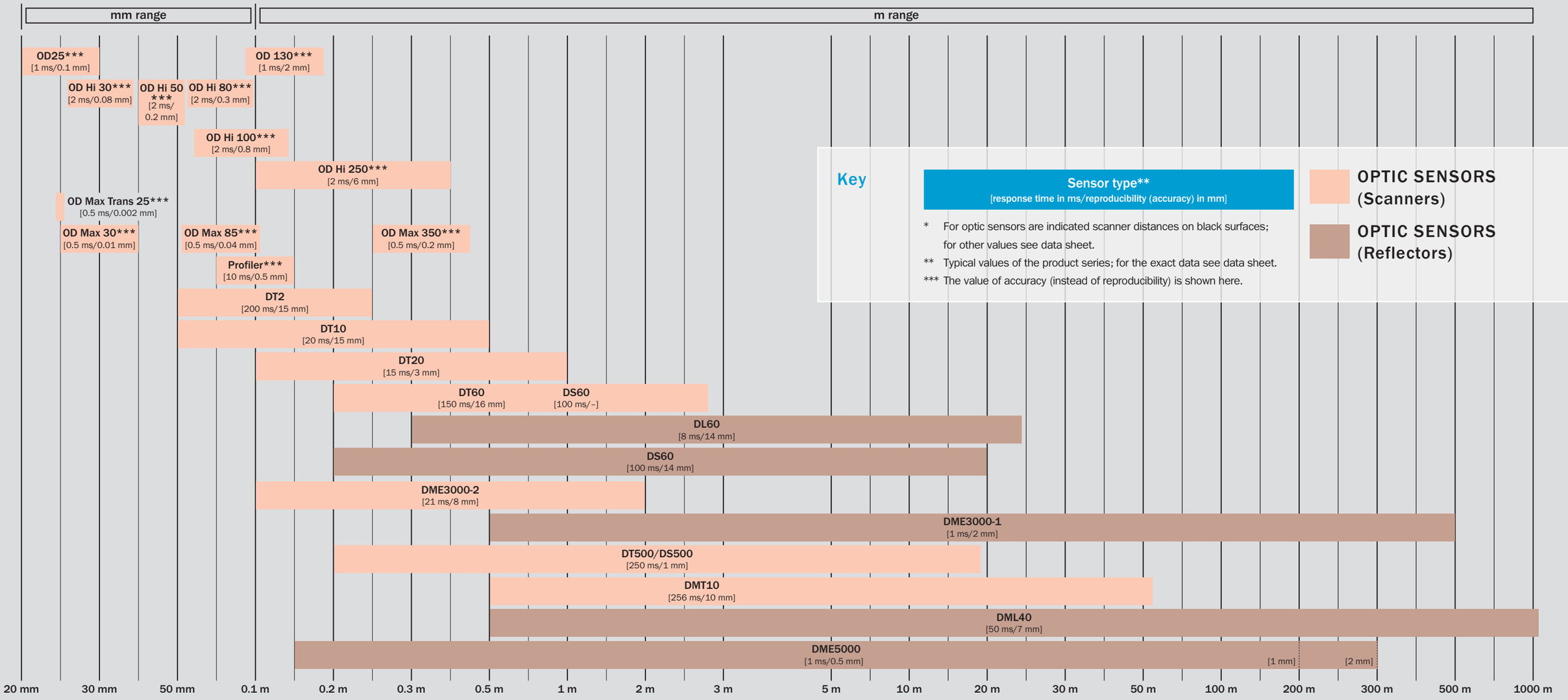
- Cableless transmission of data
- Bidirectional communication between sender and receiver
- Low cable installation and maintenance costs
- High degree of immunity against ambient light
- Large operational ranges
- Compatible with Profibus, Interbus and SSI

Contents

Distance sensors →

Measuring accurately can be so easy.

Sometimes it is not so easy to measure distances precisely. But you can master these tasks as easy as child's play with the sensors from SICK. There are different sensors for an extremely wide range of applications. Which system fits best technologically and economically to your tasks depends on which distances should be measured and how precise the measurements need to be.



Key

Sensor type**
[response time in ms/reproducibility (accuracy) in mm]

* For optic sensors are indicated scanner distances on black surfaces; for other values see data sheet.

** Typical values of the product series; for the exact data see data sheet.

*** The value of accuracy (instead of reproducibility) is shown here.

OPTIC SENSORS (Scanners)

OPTIC SENSORS (Reflectors)

The measurement ranges*: From millimeters to kilometers

Measure distances in harsh ambient conditions with a high resolution – highly accurate all the way to "µ" and with less installation work for large measurement distances.

OUR SENSICK DISTANCE SENSORS

OD, OD Hi | OD Max | Profiler | DT2 | DT10 | DT20 | DS60/DT60, DL60, DS60 | DME3000 | DT/DS500 | DMT, DML | DME5000

Displacement sensor

Displacement Sensors: Highly precise distance measurement

The OD series of displacement sensors are easy-to-operate optical distance sensors based on the triangulation measurement principle. They are mainly used to measure objects in production processes. In addition to measuring objects, their high reliability means that displacement sensors are often used for simple detection of very small objects.

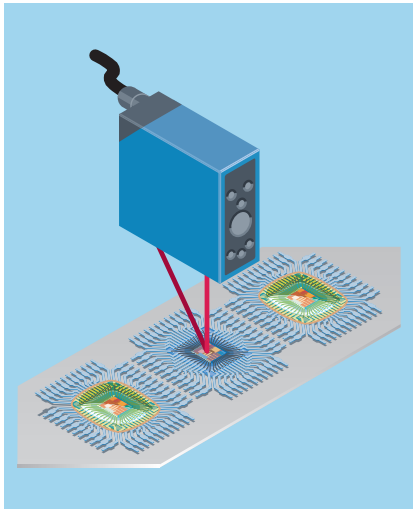
In almost all areas of production, there are components which have to meet strictest requirements in terms of precision and optics. Displacement sensors immediately detect the smallest deviation, depression or unevenness – even to sub mm precision. For this reason, displacement sensors are widely used in industries where quality is of great importance, for example in the automotive and electronic industries or in robotics.

Displacement sensors are used in production processes in these industries, especially for:

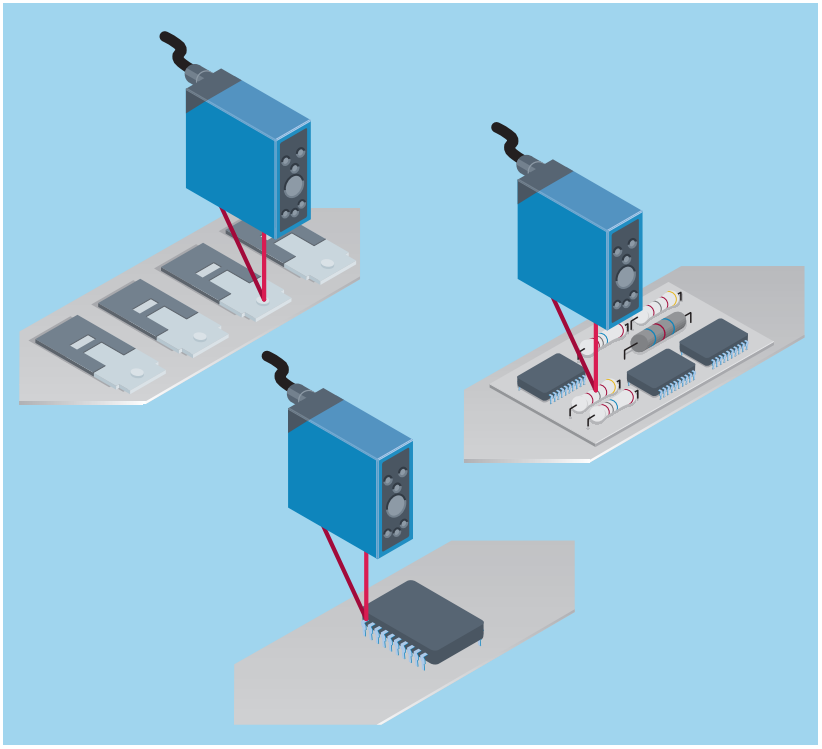
- Quality control,
- Classifying and sorting measurement objects,
- Process control (e.g. positioning).

Due to the wide product range, a suitable sensor can be found for any customer requirement.

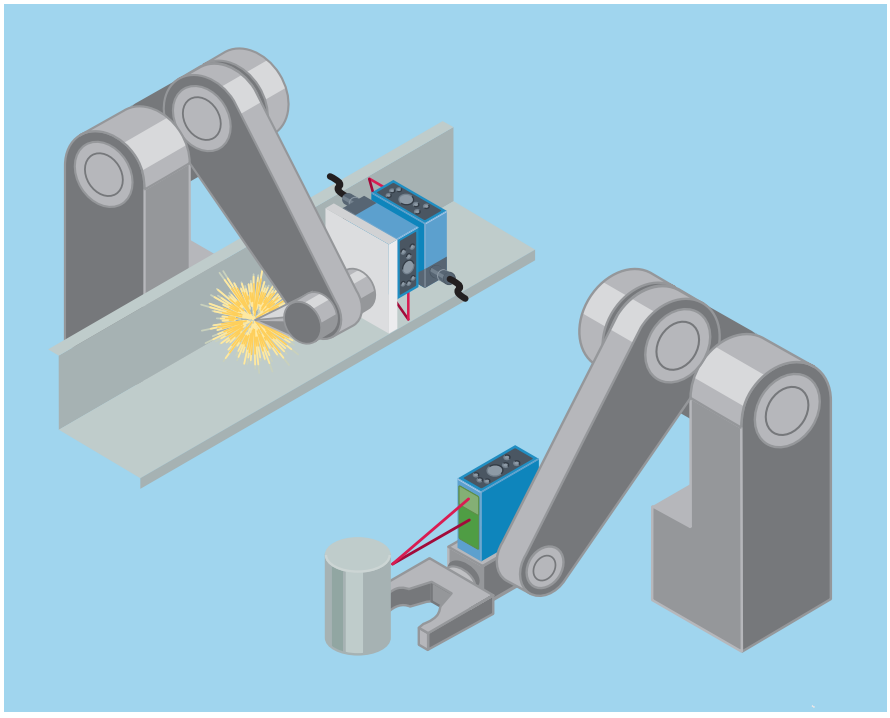
▼ **Semiconductor industry:** Measuring the epoxy resin deposit in IC manufacturing with the OD displacement sensor.

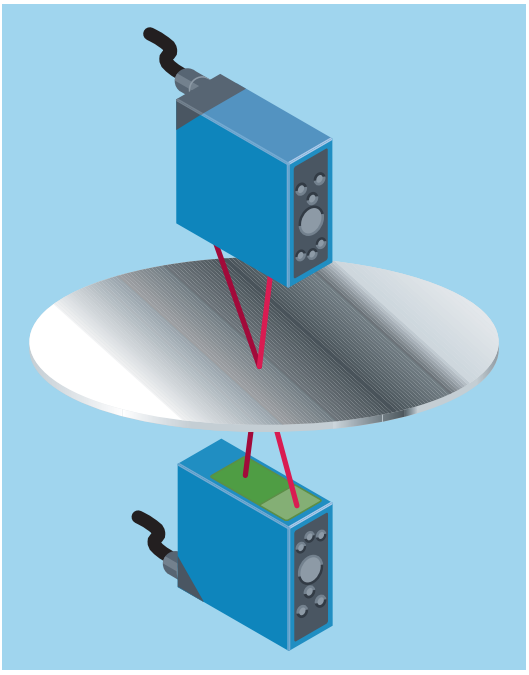


▼ **Robotics:** Alignment and targeted control of robot arms and control of welding robots in special purpose engineering or in mass production with an OD displacement sensor.

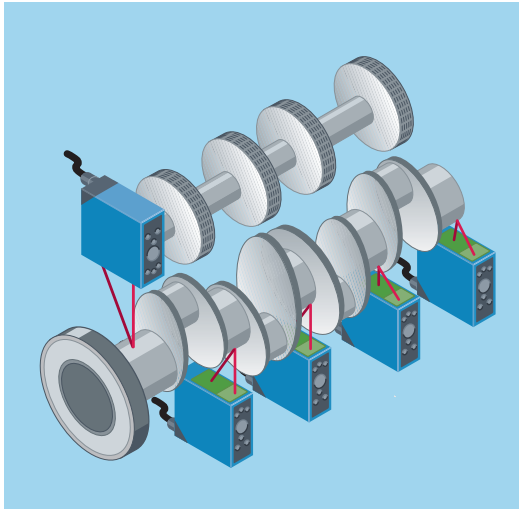


◄ **Electronics industry:** Checking the IC contacts before assembling boards. Making sure whether electrical components are present.

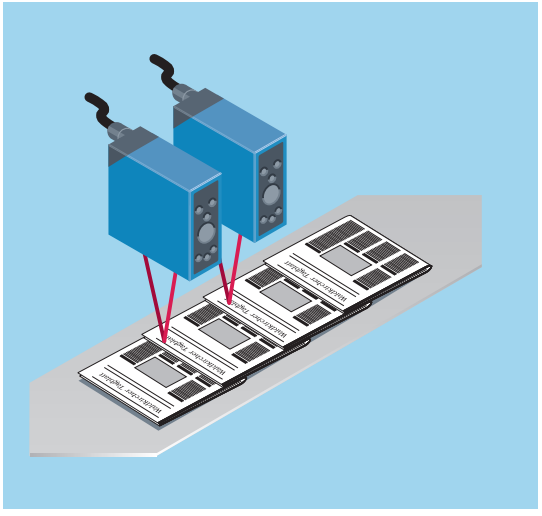




▲ Thickness check of different materials.



► **Automobile industry:** Tolerance checks of cams and crankshaft bearings with two or more OD displacement sensors in an engine factory.



◄ **Paper and packaging industry:** Checking and counting newspaper or (thin) brochures after the folding process.

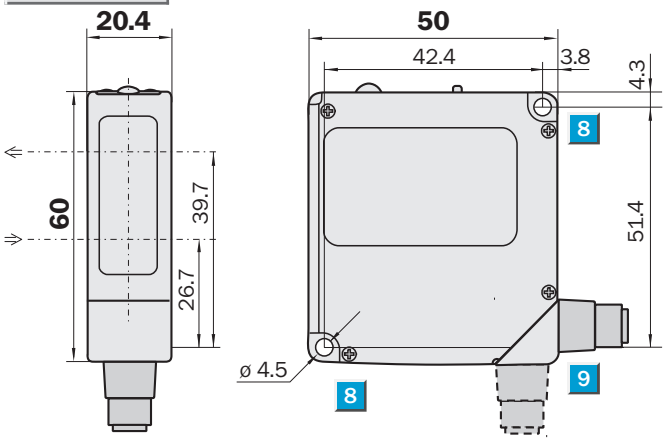
Measuring range
25 ± 5 mm

Displacement sensor

- LED technology:
  Averaging via the light spot =
  Measurement of rough surfaces
- PSD technology:
  Measurement of diffusely reflective surfaces

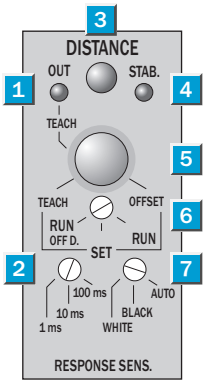
Dimensional drawing

OD 25



Adjustments possible

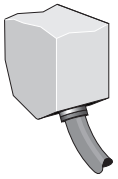
OD 25-05P132
OD 25-05P830
OD 25-05N132
OD 25-05N830



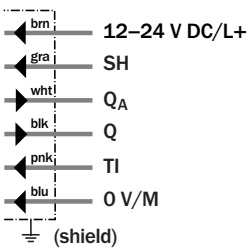
1 Teach-in indicator/output indicator
2 Response time selector
3 Distance indicator
4 Stable indicator
5 Teach-in button
6 Mode selector
7 Sensitivity selector
8 Mounting hole, ø 4.5 mm
9 Connecting cable 2 m (optional 5 m) or M12 plug; 90° rotatable

Connection type

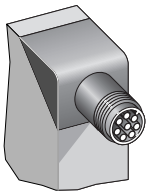
OD 25-05P132
OD 25-05N132



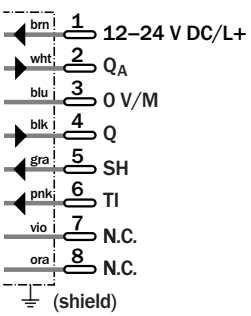
6 x 0.2 mm²



OD 25-05P830
OD 25-05N830



8-pin, M12

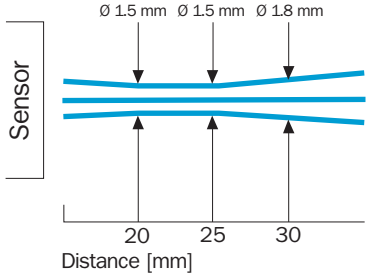


See chapter Accessories
Cables and connectors

Technical data	OD	25-05 P132	25-05 N132	25-05 P830	25-05 N830
Light source	LED, red light [1]	■	■	■	■
Measuring range	25 ± 5 mm	■	■	■	■
Resolution [2]	30 µm at 1 ms	■	■	■	■
	10 µm at 10 ms	■	■	■	■
	3 µm at 100 ms	■	■	■	■
Reproducibility [3]	90 µm at 1 ms	■	■	■	■
	30 µm at 10 ms	■	■	■	■
	9 µm at 100 ms	■	■	■	■
Accuracy [4]	± 100 µm	■	■	■	■
Effect of air temperature	±0.01 % FS [5]/°C	■	■	■	■
Response time [6]	100/10/1 ms	■	■	■	■
Measuring frequency/Output rate	5 kHz	■	■	■	■
In- and outputs	PNP	■		■	
	NPN		■		■
Output					
1 Analogue current output	4 ... 20 mA [7]	■	■	■	■
1 Control output	Max. 100 mA/DC 30 V	■	■	■	■
Input					
1 Sample and Hold input	Synchronisation of the sensor	■	■	■	■
1 Teach input	To reference the measurement	■	■	■	■
Supply voltage U_S	12 ... 24 V DC, –5 %, +10 %	■	■	■	■
Power consumption [8]	≤ 2.88 W	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
VDE protection class	III	■	■	■	■
Ambient temperature	Operation –10 °C ... +40 °C [9]	■	■	■	■
	Storage –20 °C ... +60 °C	■	■	■	■
Sensitivity to ambient light	Max. 3.000 lx (artificial light)	■	■	■	■
	Max. 10.000 lx (sun)	■	■	■	■
Vibration resistance	10/s ... 55/s [10]	■	■	■	■
Shock resistance	50 G (500 m/s²)	■	■	■	■
Weight	150 g (plug), 250 g (cable)	■	■	■	■
Material	Housing: PBT	■	■	■	■
Connection type	2 m connecting cable (optional 5 m)	■	■		
	Plug M12, 8-pin [11]			■	■

1) Wavelength 650 nm
2) Dependent on the selected response time with 6 ... 90% remission
3) Dependent on the selected response time with 6 ... 90% remission and constant framework conditions
4) For 18 ... 90 % remission; equivalent ± 0.1 % of Full Scale (accuracy for 6 % remission = ± 4 % of Full Scale)
5) Full Scale = Measuring range: OD25-05 ... = 10 mm
6) Dependent on the selected response time
7) Load impedance max. 300 Ω
8) Including analogue current output
9) Non-condensing; do not bend below 0 °C
10) Amplitude 1.5 mm; 2 h for axes XYZ
11) 2 m cable: 6020663
5 m cable: 6020664

Light spot diameter OD 25-05 (LED)



Order information

Type	Order no.
OD25-05P132	6020643
OD25-05P830	6020647
OD25-05N132	6020642
OD25-05N830	6020646

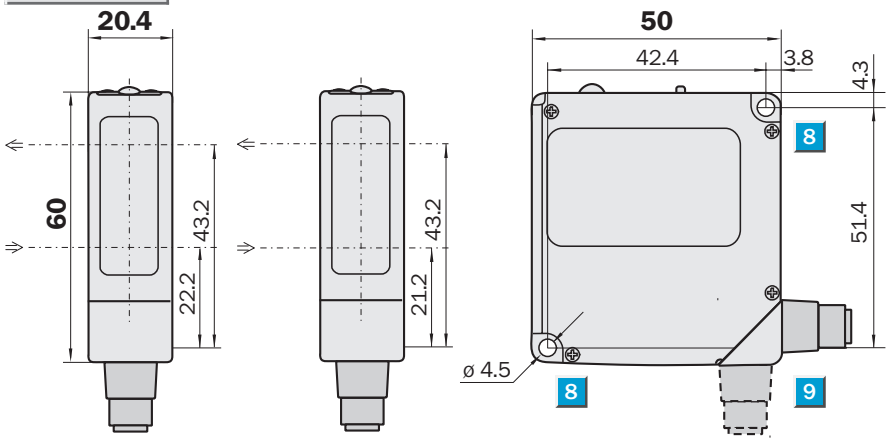
Measuring ranges 30 ± 4
50 ± 10 mm/100 ± 35
130 ± 50/250 ± 150 mm

Displacement sensor

- **Laser technology:**
  Measurement or detection of very small objects
- **PSD technology:**
  Measurement of diffusely reflective surfaces

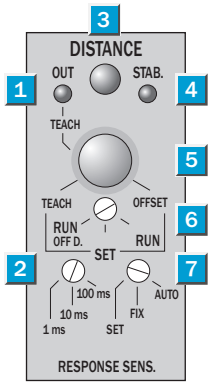
Dimensional drawing

OD 30	OD 50
OD 100	
OD 130	
OD 250	



Adjustments possible

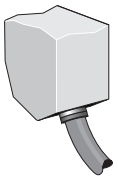
All types



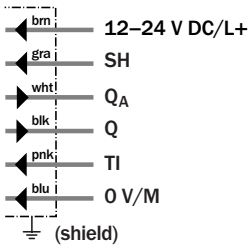
1 Teach-in indicator/output indicator
2 Response time selector
3 Distance indicator
4 Stable indicator
5 Teach-in button
6 Mode selector
7 Sensitivity selector
8 Mounting hole, ø 4.5 mm
9 Connecting cable 2 m (optional 5 m) or M12 plug; 90° rotatable

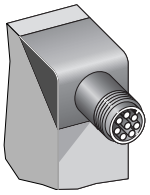
Connection type

OD 30-04P142	OD 50-10N142	OD 30-04P840	OD 50-10P840
OD 30-04N142	OD 100-35P142	OD 30-04N840	OD 50-10N840
OD 50-10P142	OD 100-35N142		

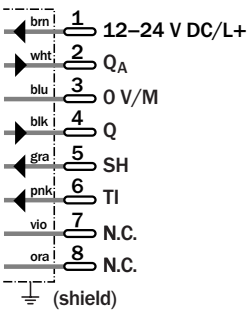


6 x 0.2 mm²





8-pin, M12

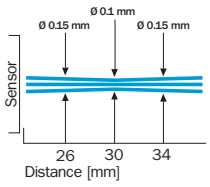


See chapter Accessories
Cables and connectors

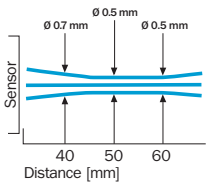
Technical data	OD	30-04 P142	30-04 N142	30-04 P840	30-04 N840	50-10 P142	50-10 N142	50-10 P840	50-10 N840	100-35 P142	100-35 N142
Light source	Red laser diode 2 (II) [1]	■	■	■	■	■	■	■	■	■	■
Measuring range	30 ± 4 mm	■	■	■	■						
	50 ± 10 mm					■	■	■	■		
	100 ± 35 mm									■	■
Resolution [2]	1 µm	■	■	■	■						
	3 µm					■	■	■	■		
	15 µm									■	■
Reproducibility [3]	3 µm	■	■	■	■						
	9 µm					■	■	■	■		
	45 µm									■	■
Accuracy [4]	± 160 µm	■	■	■	■						
	± 400 µm					■	■	■	■		
	± 1.4 mm									■	■
Effect of air temperature	±0.01 % FS [5]/°C	■	■	■	■	■	■	■	■	■	■
Response time [6]	100/10/1 ms	■	■	■	■	■	■	■	■	■	■
Measuring frequency/Output rate	5 kHz	■	■	■	■	■	■	■	■	■	■
In- and outputs	PNP	■		■		■		■		■	
	NPN		■		■		■		■		■
Outputs											
1 Analogue current output	4 ... 20 mA [7]	■	■	■	■	■	■	■	■	■	■
1 Control output	Max. 100 mA/30 V DC	■	■	■	■	■	■	■	■	■	■
Inputs											
1 Sample and Hold input	Synchronisation of the sensor	■	■	■	■	■	■	■	■	■	■
1 Teach input	To reference the measurement	■	■	■	■	■	■	■	■	■	■
Supply voltage V_S	12 ... 24 V DC, –5 %, +10 %	■	■	■	■	■	■	■	■	■	■
Power consumption [8]	≤ 1.8 W	■	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■	■	■
VDE protection class	III	■	■	■	■	■	■	■	■	■	■
Ambient temperature	Operation –10 °C ... +40 °C [9]	■	■	■	■	■	■	■	■	■	■
	Storage –20 °C ... +60 °C	■	■	■	■	■	■	■	■	■	■
Sensitivity to ambient light	Max. 3.000 lx (artivicial light)	■	■	■	■	■	■	■	■	■	■
	Max. 10.000 lx (sun)	■	■	■	■	■	■	■	■	■	■
Vibration resistance	10/s ... 55/s [10]	■	■	■	■	■	■	■	■	■	■
Shock resistance	50 G (500 m/s²)	■	■	■	■	■	■	■	■	■	■
Weight	200 g (plug), 300 g (cable)	■	■	■	■	■	■	■	■	■	■
Material	Housing: Zinc	■	■	■	■	■	■	■	■	■	■
Connection type	2 m connecting cable (optional 5 m)	■	■			■	■			■	■
	Plug M12, 8-pin [11]			■	■			■	■		

1) Wavelength 650 nm, max. output 1 mW
2) At a selected response time of 100 ms with 90 % remission
3) At a selected response time of 100 ms with 90 % remission and constant conditions
4) For 18 ... 90 % remission; equivalent ± 2 % of Full Scale
5) Full Scale = Measuring range:
OD30-04 ... = 8 mm
OD50-10 ... = 20 mm
OD100-35 ... = 70 mm
6) Dependent on the selected response time
7) Load impedance max. 300 Ω
8) Including analogue current output
9) Non-condensing; do not bend below 0 °C
10) Amplitude 1.5 mm; 2 h for axes XYZ
11) 2 m cable: 6020663
5 m cable: 6020664

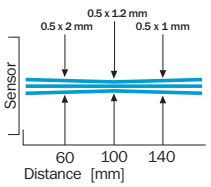
OD 30-04: Light spot diameter



OD 50-10: Light spot diameter



OD 100-35: Light spot diameter



Order information

Type	Order no.
OD30-04N142	6021840
OD30-04P142	6021839
OD30-04N840	6021842
OD30-04P840	6021841
OD50-10N142	6020636
OD50-10P142	6020637
OD50-10N840	6020640
OD50-10P840	6020641
OD100-35N142	6022477
OD100-35P142	6022476

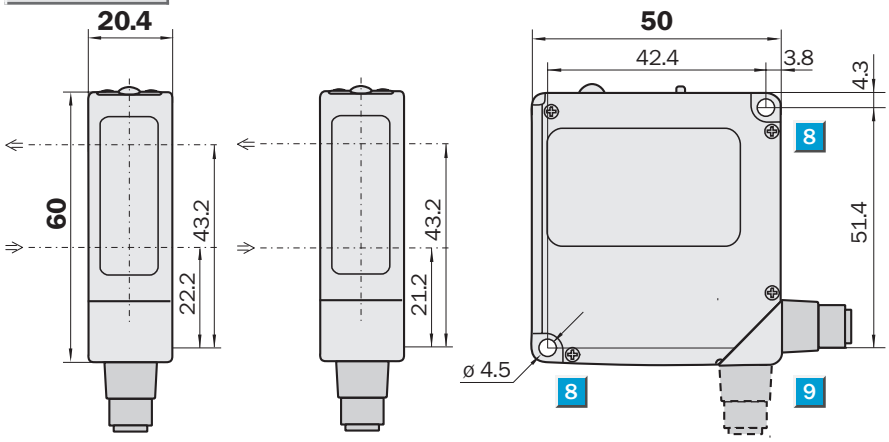
Measuring ranges 30 ± 4
50 ± 10 mm/100 ± 35
130 ± 50/250 ± 150 mm

Displacement sensor

- **Laser technology:**
  Measurement or detection of very small objects
- **PSD technology:**
  Measurement of diffusely reflective surfaces

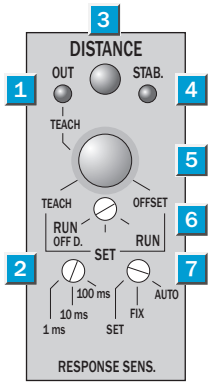
Dimensional drawing

OD 30 | OD 50 | OD 100 | OD 130 | OD 250



Adjustments possible

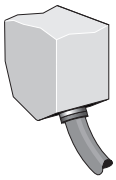
All types



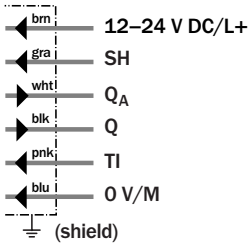
1 Teach-in indicator/output indicator
2 Response time selector
3 Distance indicator
4 Stable indicator
5 Teach-in button
6 Mode selector
7 Sensitivity selector
8 Mounting hole, ø 4.5 mm
9 Connecting cable 2 m (optional 5 m) or M12 plug; 90° rotatable

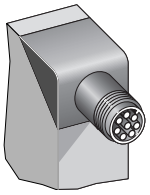
Connection type

OD 130-50P142	OD 250-150P142	OD 100-35P840	OD 130-50N840
OD 130-50N142	OD 250-150N142	OD 100-35N840	OD 250-150P840
		OD 130-50P840	OD 250-150N840

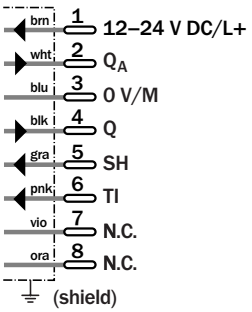


6 x 0.2 mm²





8-pin, M12

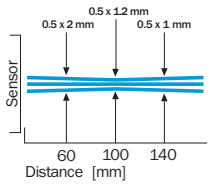


See chapter Accessories
Cables and connectors

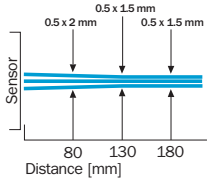
Technical data	OD	100-35 P840	100-35 N840	130-50 P142	130-50 N142	130-50 P840	130-50 N840	250-150 P142	250-150 N142	250-150 P840	250-150 N840
Light source	Red laser diode 2 (II) [1]	■	■	■	■	■	■	■	■	■	■
Measuring range	100 ± 35 mm	■	■								
	130 ± 50 mm			■	■	■	■				
	250 ± 150 mm							■	■	■	■
Resolution [2]	15 µm	■	■								
	20 µm			■	■	■	■				
	150 µm							■	■	■	■
Reproducibility [3]	45 µm	■	■								
	60 µm			■	■	■	■				
	450 µm							■	■	■	■
Accuracy [4]	± 1.4 mm	■	■								
	± 2 mm			■	■	■	■				
	± 9 mm							■	■	■	■
Effect of air temperature	±0.01 % FS [5]/°C	■	■	■	■	■	■	■	■	■	■
Response time [6]	100/10/1 ms	■	■	■	■	■	■	■	■	■	■
Measuring frequency/Output rate	5 kHz	■	■	■	■	■	■	■	■	■	■
In- and outputs	PNP	■		■		■		■		■	
	NPN		■		■		■		■		■
Output											
1 Analogue current output	4 ... 20 mA [7]	■	■	■	■	■	■	■	■	■	■
1 Control output	max. 100 mA/DC 30 V	■	■	■	■	■	■	■	■	■	■
Inputs											
1 Sample and Hold input	Synchronisation of the sensor	■	■	■	■	■	■	■	■	■	■
1 Teach input	To reference the measurement	■	■	■	■	■	■	■	■	■	■
Supply voltage V_S	12 ... 24 V DC, –5 %, +10 %	■	■	■	■	■	■	■	■	■	■
Power consumption [8]	≤ 1.8 W	■	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■	■	■
VDE protection class	III	■	■	■	■	■	■	■	■	■	■
Ambient temperature	Operation –10 °C ... +40 °C [9]	■	■	■	■	■	■	■	■	■	■
	Storage –20 °C ... +60 °C	■	■	■	■	■	■	■	■	■	■
Sensitivity to ambient light	Max. 3.000 lx (artificial light)	■	■	■	■	■	■	■	■	■	■
	Max. 10.000 lx (sun)	■	■	■	■	■	■	■	■	■	■
Vibration resistance	10/s ... 55/s [10]	■	■	■	■	■	■	■	■	■	■
Shock resistance	50 G (500 m/s²)	■	■	■	■	■	■	■	■	■	■
Weight	200 g (plug), 300 g (cable)	■	■	■	■	■	■	■	■	■	■
Material	Housing: Zinc	■	■	■	■	■	■	■	■	■	■
Connection type	2 m connecting cable (optional 5 m)			■	■			■	■		
	Plug M12, 8-pin[11]	■	■			■	■			■	■

1) Wavelength 650 nm, max. output 1 mW
2) At a selected response time of 100 ms with 90 % remission
3) At a selected response time of 100 ms with 90 % remission and constant conditions
4) For 6 ... 90 % (OD250-150, 16 ... 90 %) Remission; equivalent ± 2 % of Full Scale (bei OD250-150 ± 3 %)
5) Full Scale = Measuring range:
OD100-35 ... = 70 mm
OD130-50 ... = 100 mm
OD250-150 ... = 300 mm
6) Dependent on the selected response time
7) Load impedance max. 300 Ω
8) Including analogue current output
9) Non-condensing; do not bend below 0 °C
10) Amplitude 1.5 mm; 2 h for axes XYZ
11) 2 m cable: 6020663
5 m cable: 6020664

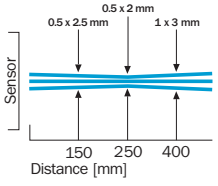
OD 100-35: Light spot diameter



OD 130-50: Light spot diameter



OD 250-150: Light spot diameter



Order information

Type	Order no.
OD100-35N840	6022479
OD100-35P840	6022478
OD130-50N142	6021848
OD130-50P142	6021847
OD130-50N840	6021850
OD130-50P840	6021849
OD250-150N142	6021852
OD250-150P142	6021851
OD250-150N840	6021854
OD250-150P840	6021853

Measurement ranges
30 ± 4/50 ± 10/80 ± 15/ 100 ± 40/250 ± 150 mm

Displacement sensor

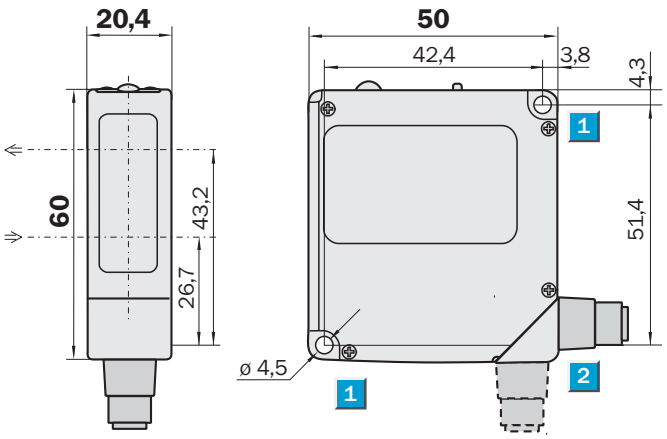
- Laser Technology
- CMOS Technology:
  - object independent measuring: shiny, dark
- Stand-alone Device:
  - no additional outlay caused by external controller necessary
- Setting and display on the device – quick, fast and easy set up

CE

See chapter Accessories
Cables and connectors

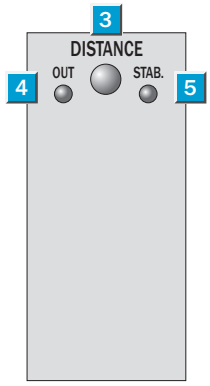
Dimensional drawing

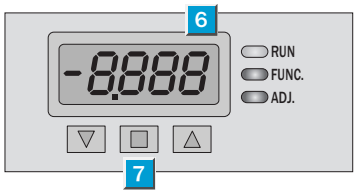
OD 30 | OD 50 | OD 80 | OD 100 | OD 250



Adjustments possible

All types

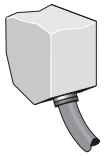




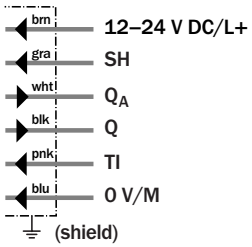
1 Mounting hole, ø 4.5 mm
2 2 m cable (5 m optional) or M12 plug; 90° rotatable
3 Distance indicator
4 Output indicator (OUT)
5 Stability indicator
6 Display
7 Mode buttons

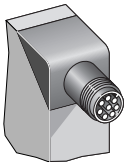
Connection type

OD 30-04P152	OD 30-04N152	OD 30-04P850	OD 30-04N850
OD 50-10P152	OD 50-10N152	OD 50-10P850	OD 50-10N850
OD 80-15P152	OD 80-15N152		

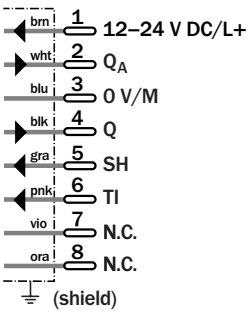


6 x 0.2 mm²





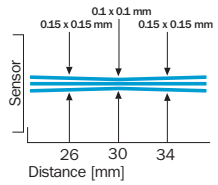
8-pin, M12



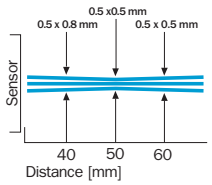
Technical data	OD	30-04 P152	30-04 N152	30-04 P850	30-04 N850	50-10 P152	50-10 N152	50-10 P850	50-10 N850	80-15 P152	80-15 N152
Light source	Red laser diode 2 (II) [1]	■	■	■	■	■	■	■	■	■	■
Measuring range	30 ± 4 mm	■	■	■	■						
	50 ± 10 mm					■	■	■	■		
	80 ± 15 mm									■	■
Resolution [2]	4 µm	■	■	■	■						
	10 µm					■	■	■	■		
	15 µm									■	■
Reproducibility [3]	12 µm	■	■	■	■						
	30 µm					■	■	■	■		
	45 µm									■	■
Accuracy [4]	± 80 µm	■	■	■	■						
	± 200 µm					■	■	■	■		
	± 300 µm									■	■
Effect of air temperature	±0.08 % FS [5]/°C	■	■	■	■	■	■	■	■	■	■
Response time [6]	2 ms	■	■	■	■	■	■	■	■	■	■
Measuring frequency/Output rate	1 kHz	■	■	■	■	■	■	■	■	■	■
In- and outputs	PNP	■		■		■		■		■	
	NPN		■		■		■		■		■
Output											
1 Analogue current output	4 ... 20 mA [7]	■	■	■	■	■	■	■	■	■	■
1 Control output	max. 100 mA/30 V DC	■	■	■	■	■	■	■	■	■	■
Inputs											
1 Sample and Hold input	Synchronisation of the sensor	■	■	■	■	■	■	■	■	■	■
1 Teach input	To reference the measurement	■	■	■	■	■	■	■	■	■	■
Display type	Alphanumeric display, 4-digit	■	■	■	■	■	■	■	■	■	■
Additional features	Averaging functions	■	■	■	■	■	■	■	■	■	■
	Autom./manual sensitivity setting	■	■	■	■	■	■	■	■	■	■
	Timer functions	■	■	■	■	■	■	■	■	■	■
	3 Memory banks	■	■	■	■	■	■	■	■	■	■
Supply voltage V_S	12 ... 24 V DC, –5 %, +10 %	■	■	■	■	■	■	■	■	■	■
Power consumption [8]	≤ 2.88 W	■	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■	■	■
VDE protection class	III	■	■	■	■	■	■	■	■	■	■
Ambient temperature	Operation –10 °C ... +40 °C [9]	■	■	■	■	■	■	■	■	■	■
	Storage –20 °C ... +60 °C	■	■	■	■	■	■	■	■	■	■
Sensitivity to ambient light	Max. 3.000 lx (artificial light)	■	■	■	■	■	■	■	■	■	■
	Max. 10.000 lx (sun)	■	■	■	■	■	■	■	■	■	■
Vibration resistance	10/s ... 55/s [10]	■	■	■	■	■	■	■	■	■	■
Shock resistance	50 G (500 m/s²)	■	■	■	■	■	■	■	■	■	■
Weight	200 g (plug), 300 g (cable)	■	■	■	■	■	■	■	■	■	■
Material	Housing: Zinc	■	■	■	■	■	■	■	■	■	■
Connection type	2 m connecting cable (optional 5 m)	■	■			■	■			■	■
	Plug M12, 8-pin[11]			■	■			■	■		

1) Wavelength 650 nm, max. output 1 mW
2) Averaging: 64 measurements
Object: 6 ... 90 % remission
3) With constant environmental conditions;
Averaging: 64 measurements
4) For 18 ... 90 % remission; equivalent ± 1 % of Full Scale
5) Full Scale = Measuring range:
OD30-04 ... = 8 mm
OD50-10 ... = 20 mm
OD80-15 ... = 30 mm
6) Without averaging and manually selected sensitivity
7) Load impedance max. 300 Ω
8) Including analogue current output
9) Non-condensing; do not bend below 0 °C
10) Amplitude 1.5 mm; 2 h for axes XYZ
11) 2 m cable: 6020663
5 m cable: 6020664

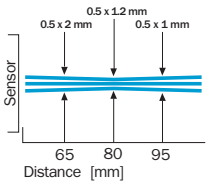
OD30-04: Light spot diameter



OD50-10: Light spot diameter



OD80-15: Light spot diameter



Order information

Type	Order no.
OD30-04N152	6025033
OD30-04P152	6025031
OD30-04N850	6025034
OD30-04P850	6025032
OD50-10N152	6025037
OD50-10P152	6025035
OD50-10N850	6025038
OD50-10P850	6025036
OD80-15N152	6025041
OD80-15P152	6025039

Measurement ranges
30 ± 4/50 ± 10/80 ± 15/ 100 ± 40/250 ± 150 mm

Displacement sensor

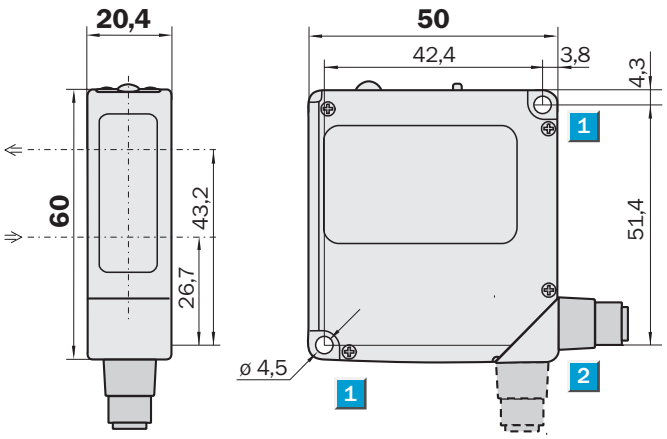
- Laser Technology
- CMOS Technology:
  - object independent measuring: shiny, dark
- Stand-alone Device:
  - no additional outlay caused by external controller necessary
- Setting and display on the device – quick, fast and easy set up

CE

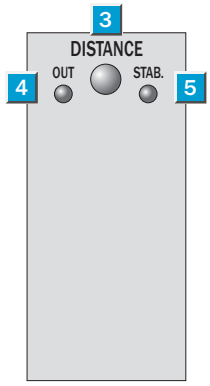
See chapter Accessories
Cables and connectors

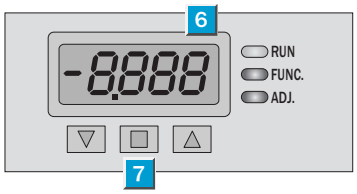
Dimensional drawing

OD 30	OD 50	OD 80	OD 100	OD 250



Adjustments possible
All types

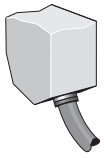




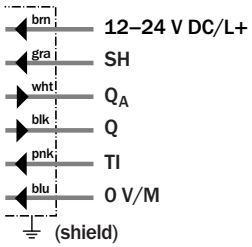
1 Mounting hole, ø 4.5 mm
2 2 m cable (5 m optional) or M12 plug; 90° rotatable
3 Distance indicator
4 Output indicator (OUT)
5 Stability indicator
6 Display
7 Mode buttons

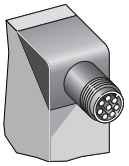
Connection type

OD100-40P152	OD100-40N152	OD 80-15P850	OD 80-15N850
OD250-150P152	OD250-150N152	OD 100-40P850	OD 100-40N850
		OD 250-150P850	OD 250-150N850

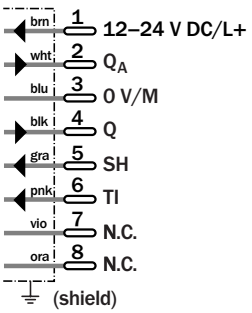


6 x 0.2 mm²





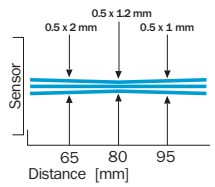
8-pin, M12



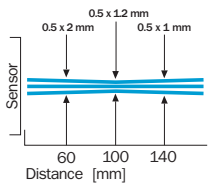
Technical data	OD	80-15 P850	80-15 N850	100-40 P152	100-40 N152	100-40 P850	100-40 N850	250-150 P152	250-150 N152	250-150 P850	250-150 N850
Light source	Red laser diode 2 (II) [1]	■	■	■	■	■	■	■	■	■	■
Measuring range	80 ± 15 mm	■	■								
	100 ± 40 mm			■	■	■	■				
	250 ± 150 mm							■	■	■	■
Resolution [2]	15 µm	■	■								
	35 µm			■	■	■	■				
	75 µm							■	■	■	■
Reproducibility [3]	45 µm	■	■								
	105 µm			■	■	■	■				
	225 µm							■	■	■	■
Accuracy [4]	± 300 µm	■	■								
	± 800 µm			■	■	■	■				
	± 6 mm							■	■	■	■
Effect of air temperature	±0.08 % FS [5]/°C	■	■	■	■	■	■	■	■	■	■
Response time [6]	2 ms	■	■	■	■	■	■	■	■	■	■
Measuring frequency/Output rate	1 kHz	■	■	■	■	■	■	■	■	■	■
In- and outputs	PNP	■		■		■		■		■	
	NPN		■		■		■		■		■
Output											
1 Analogue current output	4 ... 20 mA [7]	■	■	■	■	■	■	■	■	■	■
1 Control output	max. 100 mA/DC 30 V	■	■	■	■	■	■	■	■	■	■
Inputs											
1 Sample and Hold input	Synchronisation of the sensor	■	■	■	■	■	■	■	■	■	■
1 Teach input	To reference the measurement	■	■	■	■	■	■	■	■	■	■
Display type	Alphanumeric display, 4-digit	■	■	■	■	■	■	■	■	■	■
Additional features	Averaging functions	■	■	■	■	■	■	■	■	■	■
	Autom./manual sensitivity setting	■	■	■	■	■	■	■	■	■	■
	Timer functions	■	■	■	■	■	■	■	■	■	■
	3 Memory banks	■	■	■	■	■	■	■	■	■	■
Supply voltage V_S	12 ... 24 V DC, –5 %, +10 %	■	■	■	■	■	■	■	■	■	■
Power consumption [8]	≤ 2.88 W	■	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■	■	■
VDE protection class	III	■	■	■	■	■	■	■	■	■	■
Ambient temperature	Operation –10 °C ... +40 °C [9]	■	■	■	■	■	■	■	■	■	■
	Storage –20 °C ... +60 °C	■	■	■	■	■	■	■	■	■	■
Sensitivity to ambient light	max. 3.000 lx (artificial light)	■	■	■	■	■	■	■	■	■	■
	max. 10.000 lx (sun)	■	■	■	■	■	■	■	■	■	■
Vibration resistance	10/s ... 55/s [10]	■	■	■	■	■	■	■	■	■	■
Shock resistance	50 G (500 m/s²)	■	■	■	■	■	■	■	■	■	■
Weight	200 g (plug), 300 g (cable)	■	■	■	■	■	■	■	■	■	■
Material	Housing: Zinc	■	■	■	■	■	■	■	■	■	■
Connection type	2 m connecting cable (optional 5 m)			■	■			■	■		
	Plug M12, 8-pin[11]	■	■			■	■			■	■

1) Wavelength 650 nm, max. output 1 mW
2) Averaging: 64 measurements
Object: 6 ... 90 % remission
3) With constant environmental conditions;
Averaging: 64 measurements
4) For 18 ... 90 % remission; equivalent ± 1 % of Full Scale (for OD250-150 ± 2 %)
5) Full Scale = Measuring range:
OD80-15 ... = 30 mm
OD100-40 ... = 80 mm
OD250-150 ... = 300 mm
6) Without averaging and manually selected sensitivity
7) Load impedance max. 300 Ω
8) Including analogue current output
9) Non-condensing; do not bend below 0 °C
10) Amplitude 1.5 mm;
2 h for axes XYZ
11) 2 m cable: 6020663
5 m cable: 6020664

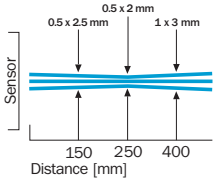
OD80-15: Light spot diameter



OD100-40: Light spot diameter



OD250-150: Light spot diameter



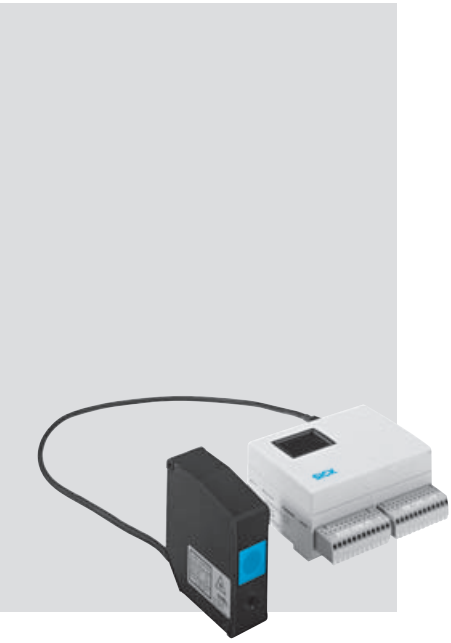
Order information

Type	Order no.
OD80-15N850	6025042
OD80-15P850	6025040
OD100-40N152	6025045
OD100-40P152	6025043
OD100-40N850	6025046
OD100-40P850	6025044
OD250-150N152	6028095
OD250-150P152	6028094
OD250-150N850	6028097
OD250-150P850	6028096

Measurement range
30 ± 5/85 ± 20/
350 ± 100 mm

Displacement Sensor

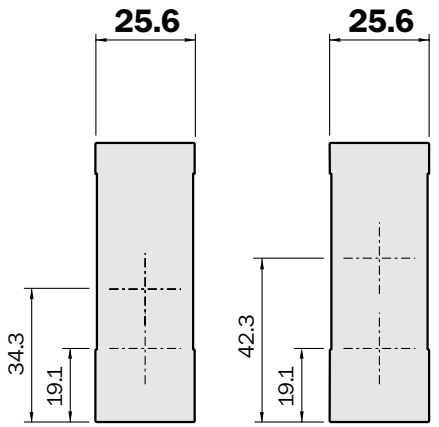
- Laser Technology
- CMOS Technology: object independent measuring from shiny to dark
- High measurement accuracy
- High-End-System: 1 or 2 sensor heads per amplifier unit
- 4 analogue outputs and 5 switching outputs
- RS 232C interface



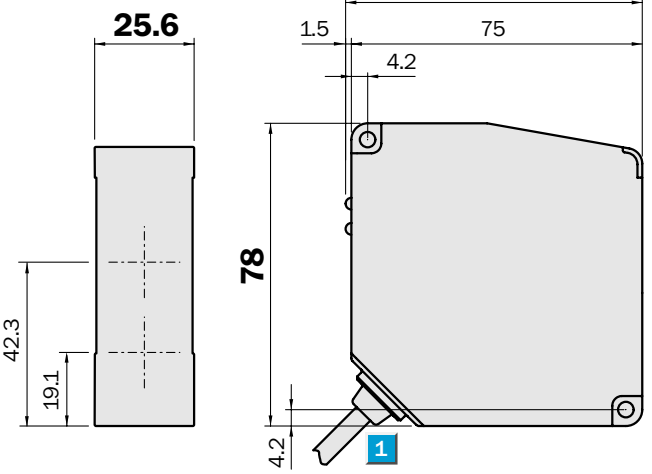
See chapter Accessories
Cables and connectors

Dimensional drawing

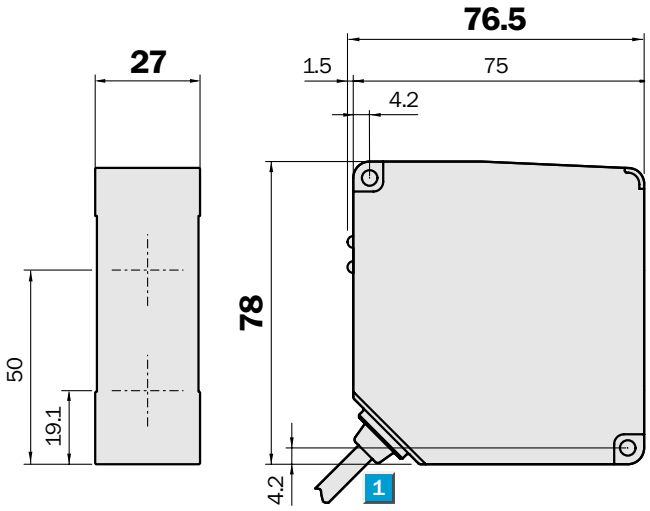
0D30-05T1



0D85-20T1



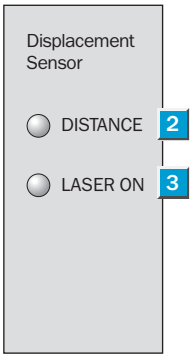
0D350-100T1



1 Cable Ø 5 mm/0.5 m with 10-pin connector
2 Distance indicator LED
3 Laser on LED

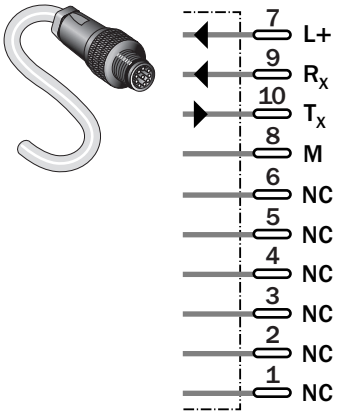
Adjustments possible

All types



Connection types

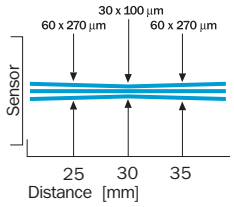
All types | 10-pin



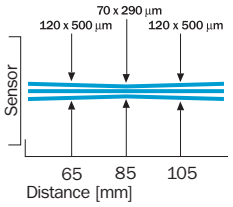
Technical Data		OD	30-05T1	85-20T1	350-100T1
Light source	Red laser diode 2 (II) [1]		■	■	■
Measuring range	30 ± 5 mm		■		
	85 ± 20 mm			■	
	350 ± 100 mm				■
Measuring frequency	10 kHz		■	■	■
Resolution [2]	1 µm		■		
	5 µm			■	
	50 µm				■
Reproducibility [3]	3 µm		■		
	15 µm			■	
	150 µm				■
Accuracy [4]	± 10 µm		■		
	± 40 µm			■	
	± 200 µm				■
Supply voltage V_S	Supplied from the amplifier unit		■	■	■
Temperature drift	±0.01 % FS [5]/°C		■	■	■
Enclosure rating	IP 67		■	■	■
VDE protection class	III		■	■	■
Ambient temperature T_A	Operation –10 °C ... +45 °C [6]		■	■	■
	Storage –20 °C ... +60 °C		■	■	■
Ambient light limit	max. 3.000 lx (fluorescent light)		■	■	■
	max. 10.000 lx (sun light)		■	■	■
Vibration resistance	10/s ... 55/s [7]		■	■	■
Shock resistance	50 G (500 m/s²)		■	■	■
Weight	250 g (including 50 cm cable)		■	■	■
Material Sensor head housing	Diecast aluminium		■	■	■
Cable extension	0.5 m pig tail with connector [8]		■	■	■

1) Wavelength 650 nm, max. output 1 mW
2) Averaging: 256 measurement; Object: 90% remission; Distance: middle distance
3) With constant environmental conditions; Averaging: 256 measurements; Object: 90% remission
4) Equivalent ± 0.1 % of Full Scale for 6 ... 90 % remission
5) Full Scale: OD30-05T1 = 10 mm OD85-20T1 = 40 mm OD350-100T1 = 200 mm
6) Non-condensing
7) Double amplitude 1.5 mm, 2 h for XYZ axes
8) Extendable by cable to max. 10 m

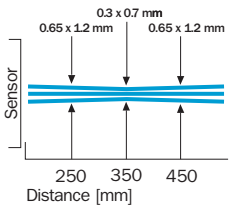
OD30-05T1: Lightspot diameter



OD85-20T1: Lightspot diameter



OD350-100T1: Lightspot diameter



Order information

Type	Order no.
OD30-05T1	6028959
OD85-20T1	6028958
OD350-100T1	6028957

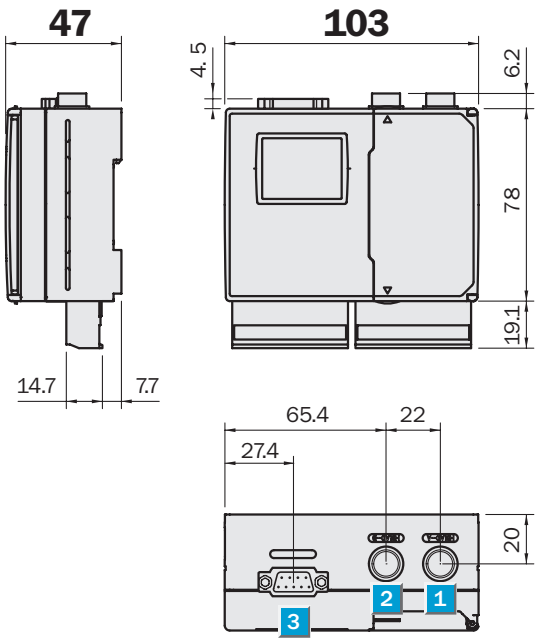
Measurement range
30 ± 5/85 ± 20/
350 ± 100 mm

Displacement Sensor

- Laser Technology
- CMOS Technology: object independent measuring from shiny to dark
- High measurement accuracy
- High-End-System: 1 or 2 sensor heads and amplifier unit
- 4 analogue outputs and 5 switching outputs
- RS 232C interface

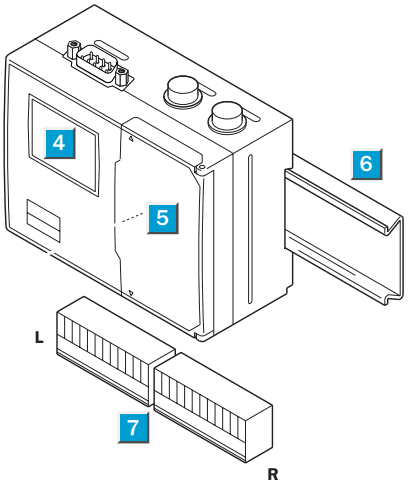
See chapter Accessories
Cables and connectors

Dimensional drawing



Adjustments possible

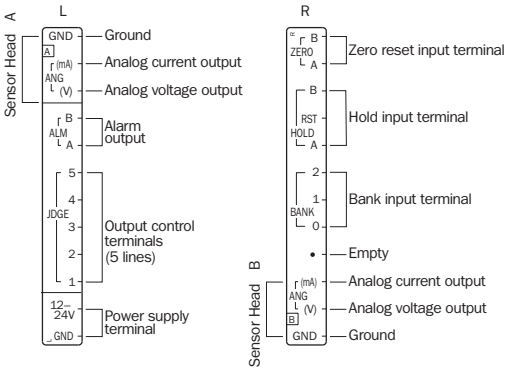
AOD-P1
AOD-N1



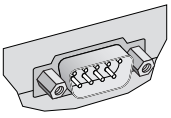
1 Sensor head A connection port
2 Sensor head B connection port
3 RS 232C interface
4 LCD display
5 Operation panel
6 DIN rail
7 Terminal board (detachable)

Connection terminal board

AOD-P1
AOD-N1



Connector pinning RS 232C



Female connector, 9-pin

1 DCD – Data Carrier Detect
2 RXD – Receive Data
3 TXD – Transmit Data
4 DTR – Data Terminal Ready
5 SG – Signal Ground
6 DSR – Data Set Ready
7 RTS – Request to Send
8 CTS – Clear to Send
9 RI – (Ring Indicator)

Technical Data		AOD-	P1	N1
In- and outputs		PNP	■	
		NPN		■
Response time [1]		0.5 ms	■	■
Output rate		10 kHz	■	■
Supply voltage V_S		12 ... 24 V DC ± 10 %	■	■
Power consumption [2]		6 W	■	■
Outputs				
2 Analogue voltage outputs [3]		–5 ... + 5 V [4]	■	■
2 Analogue current outputs [3]		4 ... 20 mA [5]	■	■
5 Switching outputs [6]		Max. 100 mA/24 V DC [7]	■	■
2 Alarm outputs		To indicate failed measurements	■	■
Data interface		RS 232C (male)	■	■
Inputs				
3 Bank inputs		External memory bank selection	■	■
3 Hold inputs		Holding the measurement/Laser off	■	■
2 Zero reset inputs		To reference the measurement	■	■
Additional features		Arithmetical calculations	■	■
		Averaging functions	■	■
		Frequency filters	■	■
		Autom./manual sensitivity setting	■	■
		Timer functions	■	■
		8 Memory banks	■	■
		Hold functions	■	■
Display type		LCD colour display	■	■
Enclosure rating		IP 20	■	■
VDE protection class		III	■	■
Ambient temperature T_A		Operation –10 °C ... +45 °C [8]	■	■
		Storage –20 °C ... +60 °C	■	■
Vibration resistance		10/s ... 55/s [9]	■	■
Shock resistance		20 G (196 m/s²)	■	■
Weight		240 g (including terminal board)	■	■
Material	Housing	Polycarbonate	■	■
	Terminal board	Nylon 66	■	■
Connection type		Terminal board	■	■

1) Without averaging and manually selected sensitivity
2) 1 for each sensor head, or 1 for the calculation result.
3) Output impendance max. 1 kΩ, Resolution 1 mV
4) Output impendance max. 300, Resolution 1.5 µA
5) For the calculation result
6) Residual voltage max. 1.8 V
7) When connected with 2 sensor heads. Including analogue current output.
8) Non condensing
9) Double amplitude 1.5 mm, 2 h for XYZ axes

Order information	
OD Max™ Amplifier unit	
Type	**Order no.**
AOD-P1	6028960
AOD-N1	6028961

Accessories, extension cable		
Type	**Order no.**	**Cable length**
DSL-1210-G02M	6028943	2 m
DSL-1210-G05M	6028944	5 m

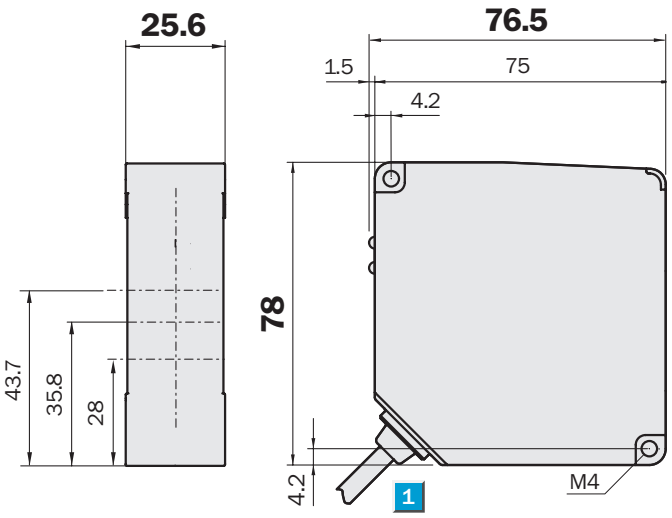
Measuring range
25 ± 1 mm

Displacement sensor

- Laser Technology
- Measurement of transparent materials
- High measurement accuracy
- High-End-System: 1 or 2 sensor heads per amplifier unit
- 4 analogue outputs and 5 switching outputs
- RS 232C interface

Dimensional drawing

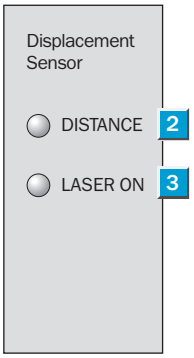
OD25-01T1



1 Cable Ø 5 mm/0.5 m with 10-pin connector
2 Distance indicator LED
3 Laser on LED

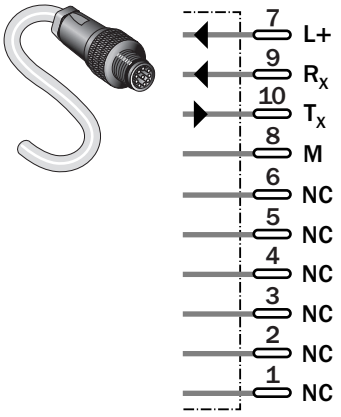
Adjustments possible

All types



Connection types

All types | 10-pin

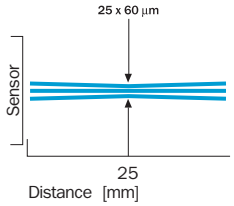


See chapter Accessories
Cables and connectors

Technical data	OD	25-01T1
Light source	Red laser diode 2 (II) [1]	
Measuring range	25 ± 1 mm	
Resolution [2]	0.1 µm	
Reproducibility [3]	0.3 µm	
Accuracy [4]	± 2 µm	
Effect of air temperature	±0.05 % FS [5]/°C	
Measuring frequency	10 kHz	
Supply voltage V_S	Supplied from the amplifier unit	
Enclosure rating	IP 67	
VDE protection class	III	
Ambient temperature	Operation –10 °C ... +45 °C [6]	
	Storage –20 °C ... +60 °C	
Sensitivity to ambient light	max. 3,000 lx (artificial light)	
	max. 10,000 lx (sun)	
Vibration resistance	10/s ... 55/s [7]	
Shock resistance	50 G (500 m/s²)	
Weight	250 g (incl. 50 cm cable)	
Material Sensor-Housing	Diecast aluminium	
Connection type	0.5 m pig tail with connector [8]	

1) Wavelength 650 nm, max. output 390 µW
2) Averaging: 256 measurement; Object: 90% remission; Distance: middle distance
3) With constant environmental conditions; Averaging: 256 measurements; Object: 90% remission
4) On Glass; Parallel alignment of the active sensor surface to the object surface; Equivalent ± 0.1 % of Full Scale
5) Full Scale = Measuring range: OD25-01T1 = 2 mm
6) Non-condensing
7) Double amplitude 1.5 mm, 2 h for XYZ axes
8) Extendable by cable to max. 10 m

Light spot diameter OD25-01T1



Order information

Type	Order no.
OD25-01T1	6030977

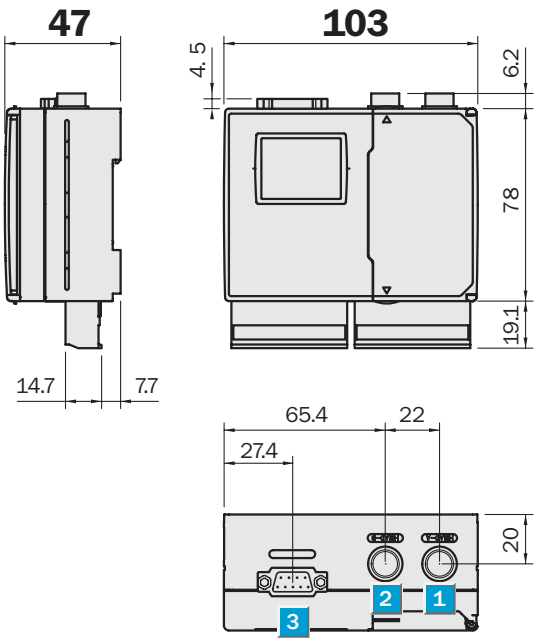
Measuring range
25 ± 1 mm

Displacement sensor

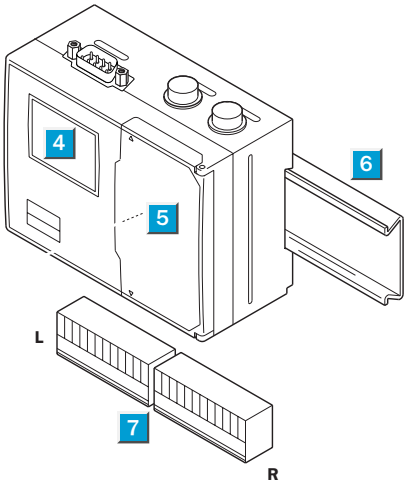
- Laser Technology
- Measurement of transparent materials
- High measurement accuracy
- High-End-System: 1 or 2 sensor heads and amplifier unit
- 4 analogue outputs and 5 switching outputs
- RS 232C interface

See chapter Accessories
Cables and connectors

Dimensional drawing



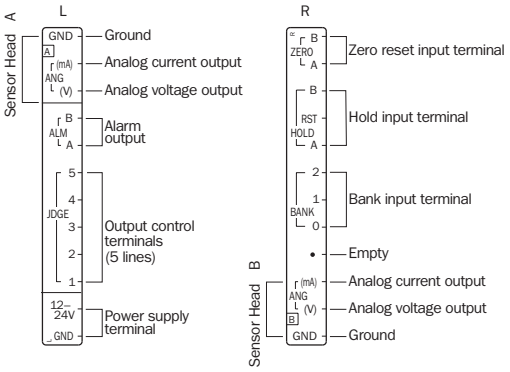
Adjustments possible
AODG-P1
AODG-N1



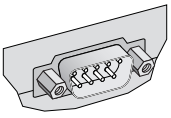
1 Sensor head A connection port
2 Sensor head B connection port
3 RS 232C interface
4 LCD display
5 Operation panel
6 DIN rail
7 Terminal board (detachable)

Connection terminal board

AODG-P1
AODG-N1



Connector pinning RS 232C



Female connector, 9-pin

1 DCD – Data Carrier Detect
2 RXD – Receive Data
3 TXD – Transmit Data
4 DTR – Data Terminal Ready
5 SG – Signal Ground
6 DSR – Data Set Ready
7 RTS – Request to Send
8 CTS – Clear to Send
9 RI – (Ring Indicator)

Technical data		AODG-	P1	N1
Response time [1]		0.5 ms		
Output rate		10 kHz		
In- and outputs		PNP		
		NPN		
Outputs				
2 Analogue voltage outputs [3]		–5 ... + 5 V [4]		
2 Analogue current outputs [3]		4 ... 20 mA [5]		
5 Switching outputs [6]		Max. 100 mA/30 V DC [7]		
2 Alarm outputs		To indicate failed measurements		
Data interface		RS 232C (male)		
Inputs				
3 Bank inputs		External memory bank selection		
3 Hold inputs		Holding the measurement/Laser off		
2 Zero reset inputs		To reference the measurement		
Display type		LCD colour display		
Additional features		Arithmetical calculations		
		Averaging functions		
		Frequency filters		
		Autom./manual sensitivity setting		
		Timer functions		
		8 Memory banks		
		Hold functions		
Supply voltage V_S		12 ... 24 V DC -5%, + 10%		
Power consumption [7]		6 W		
Enclosure rating		IP 20		
VDE protection class		III		
Ambient temperature		Operation –10 °C ... +45 °C [8]		
		Storage –20 °C ... +60 °C		
Vibration resistance		10/s ... 55/s [9]		
Shock resistance		20 G (196 m/s²)		
Weight		240 g (including terminal board)		
Material	Housing	Polycarbonate		
	Terminal board	Nylon 66		
Connection type		Terminal board		

1) Without averaging and manually selected sensitivity
2) 1 for each sensor head, or 1 for the calculation result.
3) Load impedance max. 1 kΩ, resolution 1 mV
4) Load impedance max. 300, resolution 1,5 µA
5) For the calculation result
6) Residual voltage max. 1.8 V
7) When connected with 2 sensor heads. Including analogue current output.
8) Non-condensing
9) Double amplitude 1.5 mm, 2 h for XYZ axes

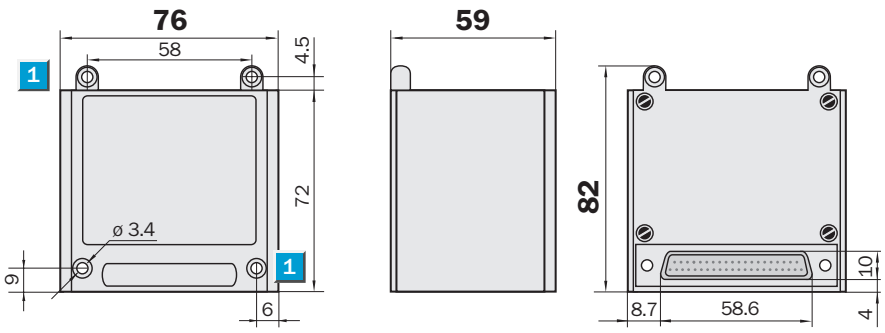
Order information	
OD Max™ Amplifier unit	
Type	**Order no.**
AODG-P1	6030978
AODG-N1	6030979

Accessories, extension cable		
Type	**Order no.**	**Cable length**
DSL-1210-G02M	6028943	2 m
DSL-1210-G05M	6028944	5 m

Displacement sensor

- Measuring value processing for difficult applications
- RS 232 and Profibus

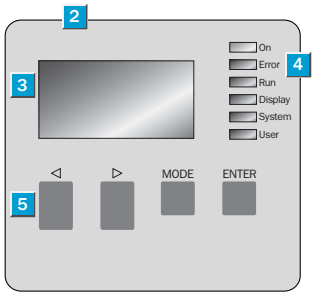
Dimensional drawing



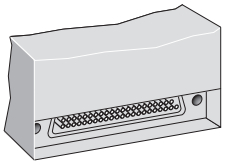
Adjustments possible

ODC 100-P120

1 Mounting hole, ø 3.4 mm
2 Electronics module
3 LC Display
4 Status LEDs
5 Film keyboard



Connection type Plug 37-pin, Sub D connector



1	+24 V/L+
2	PE
3	In-Sig. 2 – (GND)
4	In-Sig. 2 + (Q_A)
5	Shield 2
6	Q 2
7	Autozero
8	Teach-Sen. 2 (TI)
9	Hold-Sen. 2 (SH)
10	H
11	L
12	Error

13	RTS
14	TxD
15	+24 V/L+
16	PE
17	PE
18	+5 V
19	PB +
20	GND/M
21	PE
22	In-Sig. 1 – (GND)
23	In-Sig. 1 + (Q_A)
24	Shield 1

25	Q 1
26	Sync
27	Teach sen. 1 (TI)
28	Hold sen. 1 (SH)
29	HH
30	LL
31	Go
32	CTS
33	RxD
34	GND/M
35	PE
36	GND/M
37	PB –

Technical data	ODC 100	-P120
Accuracy	± 0.05 % (FS) [1]	
Response time Eingang	1 ms	
Measuring frequency	Max. 2 kHz	
In- and outputs	PNP	
Output		
5 Switching outputs	Max. 100 mA/30 V DC	
1 Alarm output	Output for invalid input signal	
2 Alarm outputs	Referencing of the sensors attached	
Data interface	RS 232	
	Profibus DB	
Inputs		
2 Analogue inputs	4 ... 20 mA	
1 Sample and Hold input	Synchronising/holding the	
	calculation result	
1 Zero reset input	Referencing the calculation result	
Display type	Alphanumeric display, 8-digit	
Additional features	Arithmetical calculations	
	Averaging functions	
	Frequency filters	
	Timer functions	
	Measuring/Hold function	
	Scaling the analogue inputs	
Supply voltage V_S	24 V DC ± 10 %	
Power consumption [2]	≤ 7.2 W	
Enclosure rating	IP 20 (IP 65 on request)	
VDE protection class	III	
Ambient temperature	Operation: 0 ... +50 °C	
	Storage: –30 ... +60 °C	
Vibration resistance	10 ... 55/s [3]	
Shock resistance	50 G (500 m/s²)	
Weight	800 g	
Housing material	Zinc	
Connection type	Plug 37-pin	

[1] FS = full scale = measurement range of the sensor, processed via the analogue input

[2] Excl. load

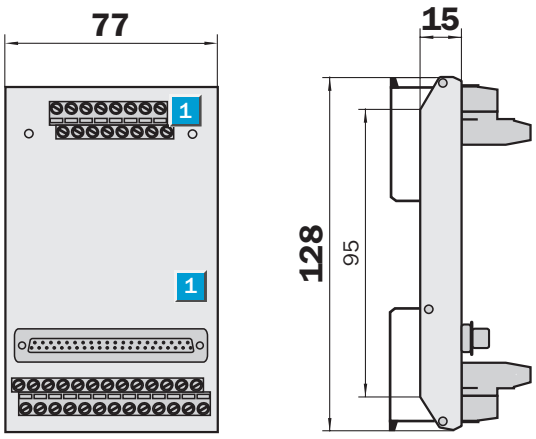
[3] Amplitude 1.5 mm, 2 h for XYZ axes

Order information	
Type	**Order no.**
ODC 100-P120	6022480

Mounting socket ODC-SOC

- ODC-SOC: Mounting socket for tophat profile rail mounting

Dimensional drawing mounting socket ODC-SOC

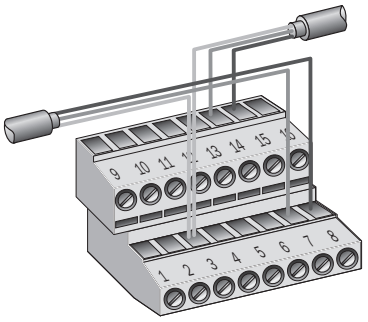


Connection option

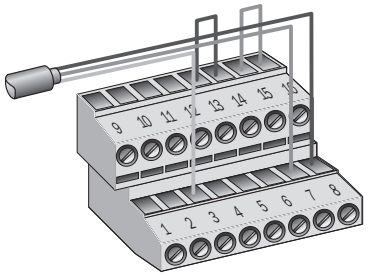
1 Taphole for screwing the ODC evaluation unit, M3

Terminal assignment X1

X1, Module not connected to the end of the field bus cable



X1, Module connected to the end of the field bus cable

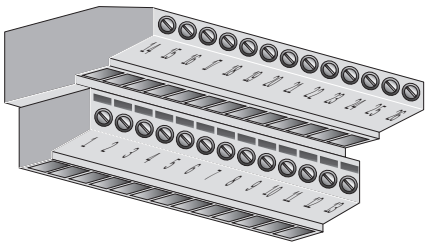


1	GND/M
2	GND/M
3	PE
4	GND/M
5	TxD
6	RxD
7	PB +
8	PB –
9	+24 V/L+
10	+24 V/L+
11	RTS
12	CTS
13	+5 V
14	PB +
15	PB –
16	GND/M

Order information

Type	Order no.
ODC-SOC	6 020 985

Terminal assignment X2



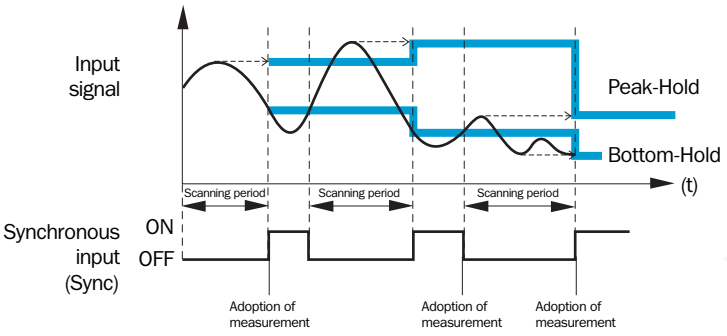
1	+24 V/L+	14	+24 V/L+
2	GND/M (0 V)	15	GND/M (0 V)
3	In-Sig. 1 – (GND)	16	In-Sig. 2 – (GND)
4	In-Sig. 1 + (Q_A)	17	In-Sig. 2 + (Q_A)
5	Shield 1	18	Shield 2
6	Q 1	19	Q 2
7	Sync	20	Autozero
8	Teach sen. 1 (TI)	21	Teach sen. 1 (TI)
9	Hold sen. 1 (SH)	22	Hold sen. 1 (SH)
10	HH	23	H
11	LL	24	L
12	Go	25	Error
13	GND/M	26	+24 V/L+

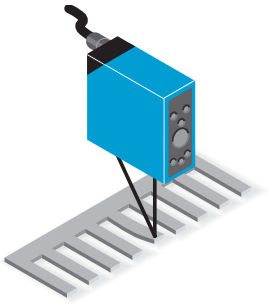
Time behavior graphs

Measuring/Hold function (ODC/OD Max)

Peak-Bottom-Hold

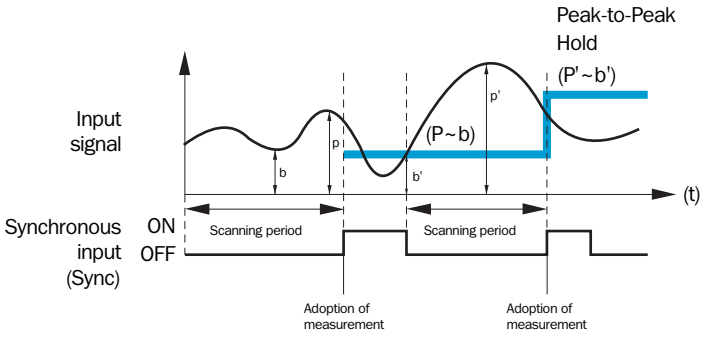
The “Peak-(Bottom-)Hold” function is used for measuring the highest (lowest) value during a specific time period.

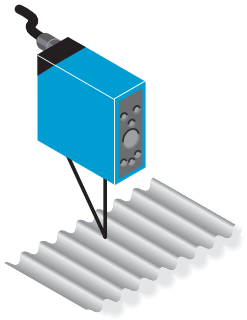




Peak-to-Peak-Hold

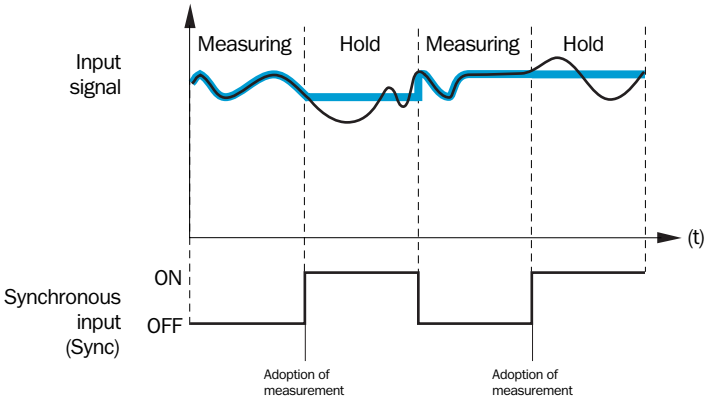
The “Peak-to-Peak” function is used for measuring the difference between the highest and lowest values during the preset time period.

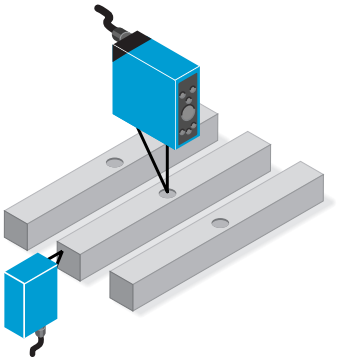




Sample/Hold

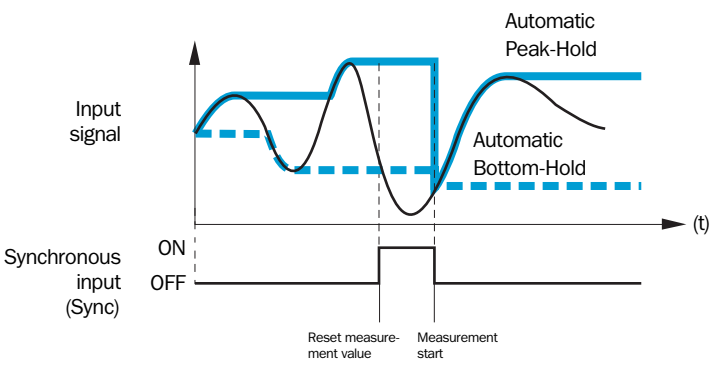
The “Sample-and-Hold” function is used for measuring the value during a specific time period.

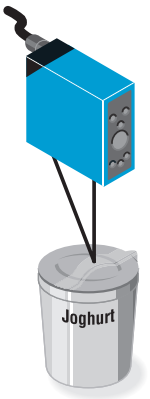




Automatic Peak-Bottom-Hold

The “Automatic Peak- and Bottom-Hold” function is used for measuring the highest (lowest) value from the beginning of the measurement.





Displacement sensor

Displacement Sensor Profiler: Line sensor for profile measurement

The PRO100 Profiler is a compact split-beam sensor based on the measurement principle of optical triangulation. The surface structure of the measured object is captured based on the reflections of the laser line mapped on the receiver element. Due to the selectable measurement modes, different information about the surface can be determined.

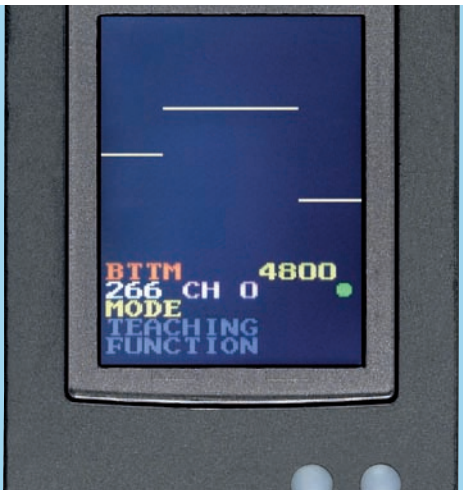
The Profiler is used in a range of industries, but especially:

- Quality control,
- Classifying and sorting of measured objects,
- Process control (e.g. positioning).

Highest point:
25.53 mm

◄ PEAK-Mode:
Measuring the distance to the highest point of the measured object

Lowest point:
48.00 mm

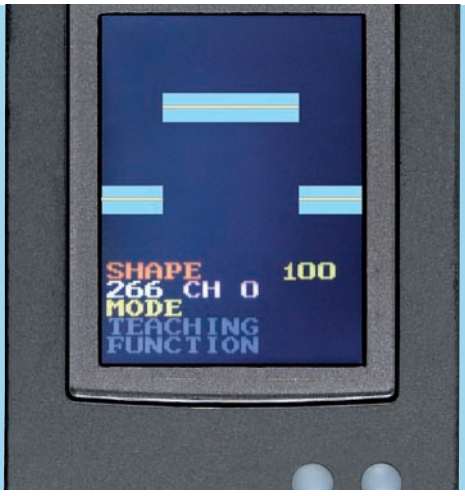


► BOTTOM-Mode:
Measuring the distance to the lowest point of the measured object

Distance between the highest and the lowest point:
22.47 mm

◄ PEAK-PEAK-Mode:
Measuring the height difference between the highest and the lowest point of the object

permitted deviation:
(light blue)



► SHAPE-Mode:
Comparing the matching of the measured object to a nominal shape

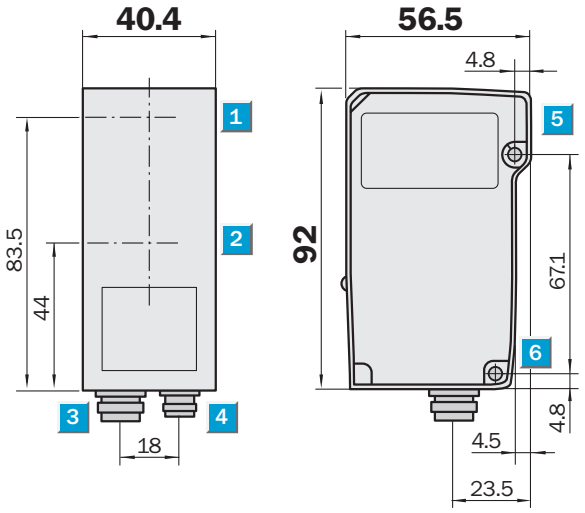
Scanning distance
100 ± 25 mm

Displacement sensor

- Profile measurement with line sensor
- 32 mm laser line
- Stand-alone device
- Easy and fast setup through:
  - Integrated display
  - Teach-in function
- 3 switching outputs and 1 analogue output

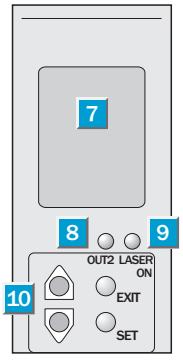
See chapter Accessories
Cables and connectors
Mounting systems

Dimensional drawing



Adjustments possible

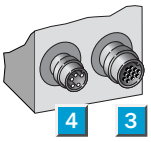
All types



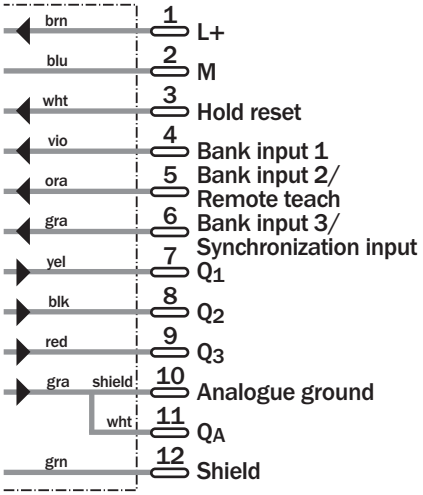
1 Optical axis, sender
2 Optical axis, receiver
3 Main connector, 12-pin (HRS HR30)
4 Display connector 6-pin (HRS HR30) (see Accessories)
5 Reference surface for measurements
6 Mounting holes, ø 4.2 mm
7 LCD-Display
8 Indicator switching output 2 (orange)
9 LED “Laser on” (green)
10 Operating keys

Connection types

All types



Connection via cable 12-pin



Technical data		PRO100-	25L2P	25L2N								
Scanning distance		100 ± 25 mm										
Light source, Light spot size		Laser diode [1], red light, 0.3 x 32 mm² [2]										
Laser Class		2M (EN 60825:2001)										
Supply voltage V_S [3]		DC 12 ... 24 V										
Current consumption max. [4]		120 mA/24 V; 180 mA/12 V										
Linearity [5]	**in z direction**	**± 0.25 mm** [2]										
	in x direction	± 0.8 % of FS in x [6]										
Accuracy [5]	**in z direction**	**± 0.5 mm** [2]										
	in x direction	± 1.5 % of FS in x [6]										
Resolution [7]	**in z direction**	**50 µm**										
	in x direction	80 µm										
Max. response time		10 ... 99 ms [8]										
3 switching outputs [9]		PNP Open collector										
		NPN Open collector										
Analogue output		4 ... 20 mA [10]										
Load dependant		± 0.05 % FS										
Temperature drift		± 0.05 % FS/°C										
Warm-up time max.		5 min.										
Indicator	Switching output2	LED, orange										
	Laser active	LED, green										
Ambient light	Sunlight	10.000 lx										
	HF lamp	3.000 lx										
Ambient temperature T_A		Operation –10 °C ... +40 °C [11]										
		Storage –20 °C ... +60 °C										
8 memory banks		switchable										
Vibration resistance		10/s ... 55/s										
Shock resistance		50 G (500 m/s²)										
VDE protection class		III										
Enclosure rating		IP 66										
Material	Housing	Zinc die-casting/PC										
	Window	Glas										
Weight [12]		Approx. 250 g										

1) Wavelength = 650 nm; Max. output 1 mW (into an aperture of 7 mm)
2) For Full scale in z direction = 100 mm ± 25 mm
3) –5 %, +10 %
4) Incl. analogue output current
5) Measured object: white ceramic, with factory settings
6) FS in x = full scale in x direction: depends on the distance, according to the field of vision. Eg.: at 100 mm = 22 mm
7) Measured object: white ceramics at medium scanning distance, with factory settings
8) Dependent on the chosen settings; synchronised: 6 ... 50.5 ms
9) 30 V/100 mA max. (residual voltage: max. 1.8 V)
10) 24 mA for out of range
11) Non-condensing
12) Excluding connection cable

Order information

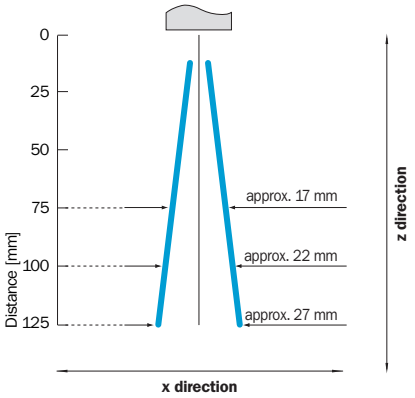
Profiler™

Type	Order no.
PRO100-25L2P, Profiler PNP-Version	6030859
PRO100-25L2N, Profiler NPN-Version	6030860

Accessories

Type	Order no.
PROM-1, external control unit, incl. LCD, 3 m pigtail, 6-pin (HRS HR30)	6029185
DOL-SH12-G02M, 2 m main connection cable (included in supply)	6029083
DOL-SH12-G05M, 5 m main connection cable	6029084
DOL-DH06-G02M, 2 m data transfer cable 6-pin (HRS HR30 + RS232)	6029801

Field of vision



DT2/DT10/DT20/DT60: Analogue distance sensors to satisfy all customer requirements

With the four distance sensors DT2, DT10, DT20 and DT60, there are several sensors for applications in very different industrial areas. The sensors feature various measurement ranges:
DT2: 300 mm max.
DT10: 500 mm max.
DT20: 1000 mm max. and
DT60/DL: 5300 mm max.

An analogue output plus an additional switching output can communicate information about a continuous object movement, to the controller.

Depending on the application and requirements, the sensor configurations can be used for level control, loop control and even object measurements. These products are very robust and suited to harsh industrial environmental conditions, featuring insensitivity to ambient light. Particular importance has been placed on fast and intuitive commissioning: all sensors are Plug&Play sensors, an added value immediately reflected in shorter machine downtimes.

Innovative technologies such as OES3 and time-of-flight measurement enable resolutions to 1 mm, as well as high-precision and reproducible measurements.
A particular highlight is the type-oriented ordering procedure for the DT20 and DT60 sensors, with any measurement range capable of being supplied preset ex works.

► High accuracies are required when determining the diameter of paper rolls

▼ Analogue distance sensors – essential for measuring and classifying objects

◄ ▲ Analogue distance sensors checking levels

Measurement range
50 ... 300 mm

Photoelectric proximity switch

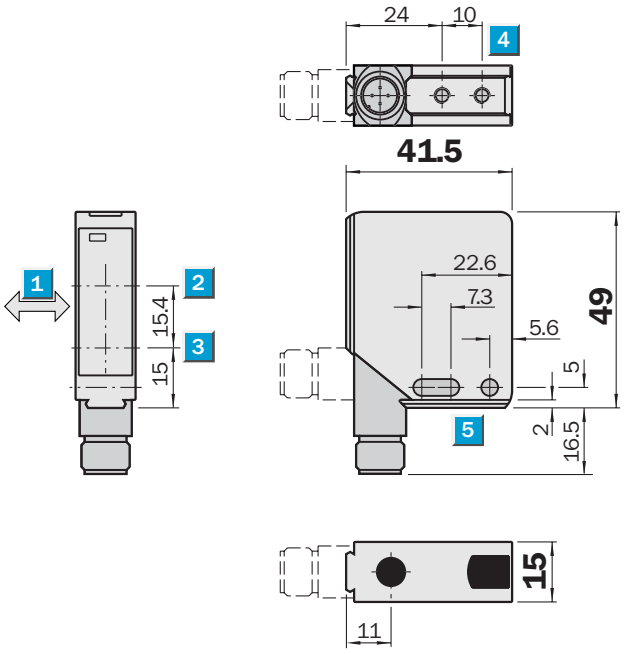
- Analogue output
- 90° rotatable M12 plug
- Infrared light
- 1 mm resolution

See chapter Accessories

Cables and connectors

Mounting systems

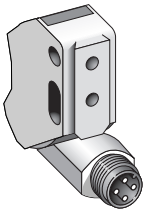
Dimensional drawing



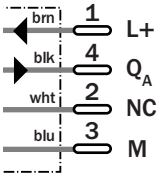
1 Standard direction of the material being scanned
2 Optical axis, receiver
3 Optical axis, sender
4 M4 threaded mounting hole – 4 mm deep
5 Through borehole Ø 4.2 mm

Connection type

DT2-410



4-pin, M12



Technical data	DT2-	410
Measurement range [1]	90 % remission: 50 ... 300 mm	
	6 % remission: 50 ... 250 mm	
Accuracy		
Object with 90 % remission	±8 % to current value	
Reproducibility		
Object with 90 % remission	3 % to 200 mm	
	5 % to 300 mm to current value	
Light source [2], **light type**	Infrared, 880 nm	
Light spot diameter	80 mm at 300 mm	
Supply voltage V_S	18 ... 30 V DC [3]	
Residual ripple [4]	< 5 V_{PP}	
Current consumption [5]	< 100 mA	
Analogue output	4–20 mA	
Response time	200 ms	
Resolution	1 mm	
Connection type	Plug, M12, 4-pin	
VDE protection class [6]	III	
Enclosure rating	IP 67	
Ambient temperature T_A	Operation –10 °C ... +45 °C	
	Storage –25 °C ... +75 °C	

1) Falling below of the measurement range results in ambiguous values
Exceeding the measurement range results in values = 20.3 mA

2) Average service life 100,000 h at T_A = + 25 °C

3) Limit values, reverse-polarity protected

4) May not exceed or fall short of V_S tolerances

5) Without load

6) Reference voltage DC 30 V

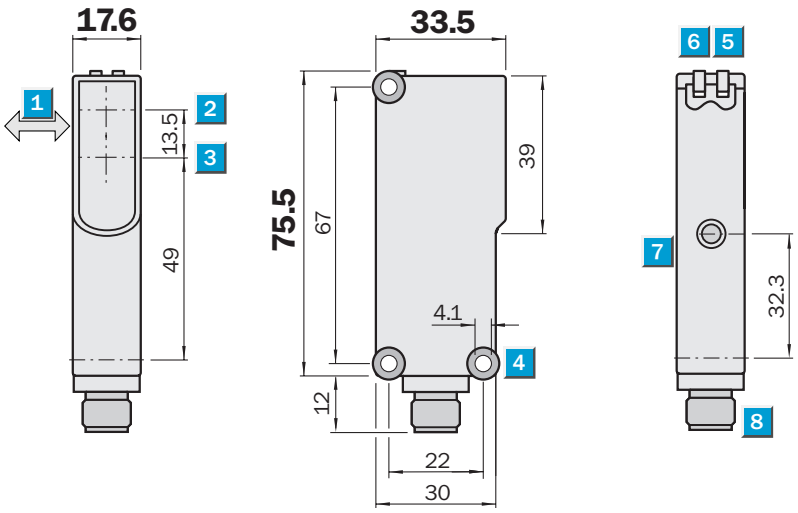
Order information	
Type	**Order no.**
DT2-410	1 024 093

Measurement range
50 ... 500 mm

Distance Sensor

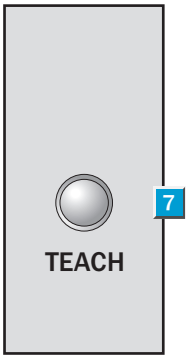
- Analogue output 4 ... 20 mA
- High measuring accuracy
- Visible red light
- Power-On LED
- Insensitive to external light sources (HF lamps)

Dimensional drawing



Adjustments possible

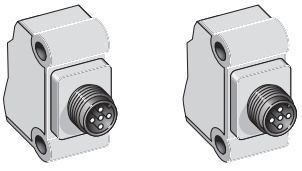
All types



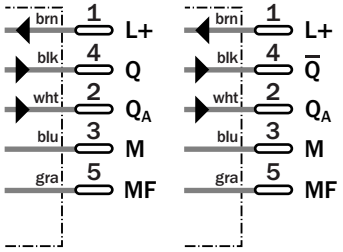
1 Standard direction of the material being detected
2 Optical axis, sender
3 Optical axis, receiver
4 Mounting hole Ø 4.1 mm
5 LED indicator, yellow; switching output status active
6 LED indicator, green; power on
7 Teach button
8 M12 plug, 5-pin

Connection type

DT10-P10B5	DT10-P10D5
DT10-N10B5	DT10-N10D5



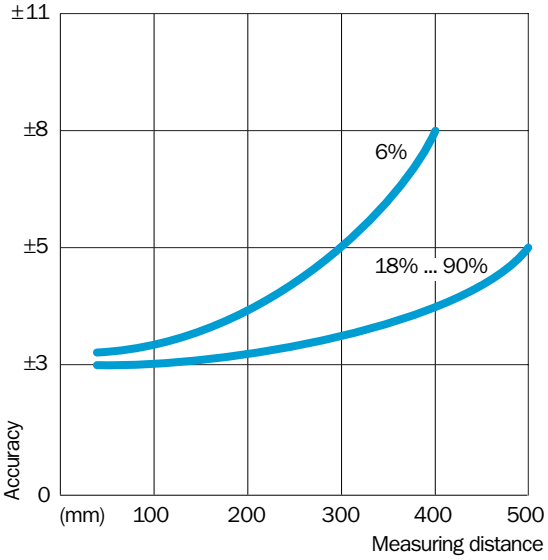
5-pin, M12	5-pin, M12



See chapter Accessories
Cables and connectors
Mounting systems

Technical data	DT10-	P10B5	P10D5	N10B5	N10D5
Measuring range					
Object with 6% remission	50 mm ... 400 mm	■	■	■	■
Object with 18 % ... 90 % remission	50 mm ... 500 mm	■	■	■	■
Light source [1]	LED, red light	■	■	■	■
Light spot diameter	20 mm at 400 mm	■	■	■	■
Supply voltage V_S [2]	10 ... 30 V DC	■	■	■	■
Current consumption [3]	< 1.2 W	■	■	■	■
Residual ripple [4]	≤ 5 V_{PP}	■	■	■	■
Analogue output [5]	4 ... 20 mA	■	■	■	■
Accuracy [6]	± 3 ... 8 mm	■	■	■	■
Reproducibility [7]	3 mm	■	■	■	■
Resolution	< 1.5 mm	■	■	■	■
Response time [8]	20 ms	■	■	■	■
Output rate [9]	1 ms	■	■	■	■
Temperature drift	1.0 mm/K	■	■	■	■
Switching outputs	Q	■		■	
	$\overline{Q}$		■		■
DT10-P: PNP	HIGH = V_S – (< 1 V)/LOW ≤ 1 V	■	■		
DT10-N: NPN	HIGH = V_S – (< 1 V)/LOW ≤ 1 V			■	■
Multifunction MF	External Teach	■	■	■	■
Output current I_A [10]	100 mA	■	■	■	■
Connection type	M12 plug, 5-pin	■	■	■	■
VDE protection class [11]	⧈	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation –25 ... +50 °C	■	■	■	■
	Storage –40 ... +75 °C	■	■	■	■
Warm-up time	30 min.	■	■	■	■
Initialisation period	650 ms	■	■	■	■
Weight	Approx. 40 g	■	■	■	■

1) Average service life 100,000 h at T_A = +25 °C
2) Limit values, reverse-polarity protected Operation in short-circuit protected network max. 8 A
3) Without load
4) May not exceed or fall short of V_S tolerances
5) R_L < 200 Ω, V_P ≥ 10 V
R_L < 500 Ω, V_P ≥ 16 V
6) At room temperature
7) Same ambient conditions
8) Lateral introduction of object into the measurement range
9) Object in measurement range
10) Output Q short-circuit protected
11) Reference voltage 50 V DC



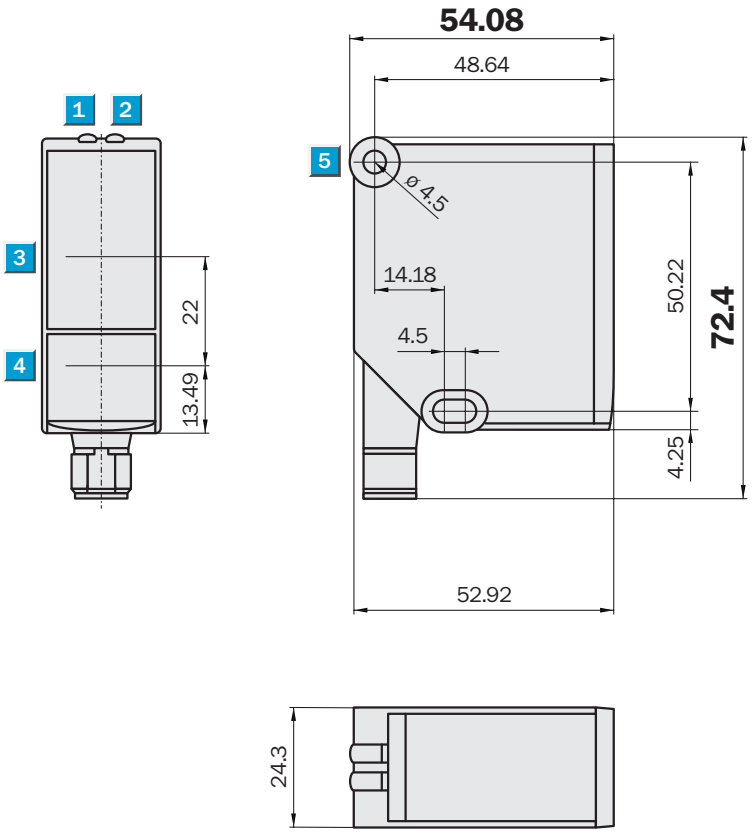
Order information	
Type	**Order no.**
DT10-P10B5	1 027 325
DT10-P10D5	1 027 326
DT10-N10B5	1 027 327
DT10-N10D5	1 027 328

Measurement range
90 ... 600 mm
100 ... 1000 mm

Distance Sensor, Proximity mode

- Analogue output 4 ... 20 mA
- High measurement accuracy
- Power-On LED
- Plug & Play Sensor
- Insensitive to external light sources

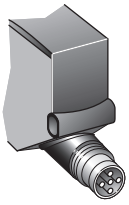
Dimensional drawing



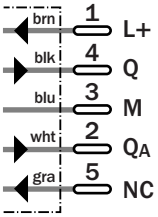
1 Power
2 Function indicator
3 Optical axis, receiver
4 Optical axis, sender
5 Mounting hole
6 Plug, M12, 5-pin

Connection type

DT20



5-pin, M12



See chapter Accessories
Cables and connectors
Mounting systems

Technical data	DT20										
Measurement range [1]		■									
Object with 6% remission	90 ... 600 mm	■									
	100 ... 820 mm		■								
Object with 18% remission	90 ... 600 mm	■									
	100 ... 1,000 mm		■								
Object with 90% remission	90 ... 600 mm	■									
	100 ... 1,000 mm		■								
Light source [2]	LED, infrared light	■	■								
Light spot diameter	35 mm at 1 m	■	■								
Supply voltage V_S [3]	10 ... 30 V DC	■	■								
Current consumption [4]	1.5 W	■	■								
Residual ripple [5]	≤ 5 V_{PP}	■	■								
Analogue output	4 ... 20 mA	■	■								
Reproducibility	± 1.5 mm	■									
	± 3 mm		■								
Resolution	1 mm	■									
	2 mm		■								
Response time	10 ms	■									
	15 ms		■								
Output rate	1 ms	■	■								
Temperature drift	0.25 mm/K	■	■								
Switching outputs	PNP o. NPN, Q	■	■								
Signal voltage PNP	HIGH = U_V – (< 2 V)/LOW = 0 V	■	■								
Signal voltage NPN	HIGH = U_V/LOW ≤ 2 V	■	■								
Connection type	M12 plug, 5-pin	■	■								
VDE protection class	□	■	■								
Enclosure rating	IP 66/IP 67	■	■								
Ambient temperature T_A	Operation –25 ... +55 °C	■	■								
	Storage –40 ... +75 °C	■	■								
Weight	135 g	■	■								
Housing material	Metal	■	■								

1) For types with max. measurement range:
> 600 mm for min. measurement range = 100 mm
≤ 600 mm for min. measurement range = 90 mm

Various measurement ranges are possible (see type-based order information below)

2) Average service life 100,000 h at T_A = +25 °C

3) Limit values, reverse-polarity protected

4) Without load

5) May not exceed or fall short of V_S tolerances

Plug & Play: measurement range freely selectable, measurement range bb to ee ; 4 mA ... 20 mA	
DT20-P/N130Bbbee	
bb: min. measurement range [6]	ee: max. measurement range [6]
09 [7]	00 [7]

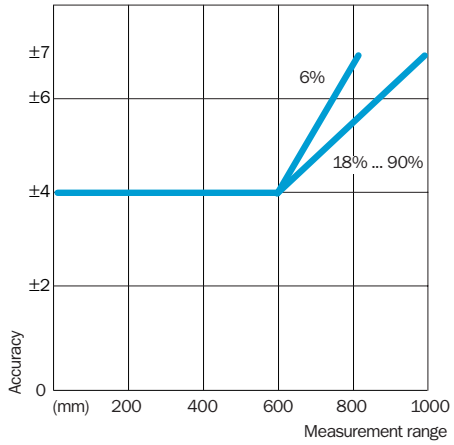
6) Minimum range between bb and ee must be 10 units (05 ≙ 5 cm; 10 ≙ 10 cm)

7) 09 ≙ 9 cm; 00 ≙ 100 cm

1th example: measurement range 100 mm ... 1000 mm	
DT20-P130B1000	
4 mA ≙ 10 cm	20 mA ≙ 100 cm

2nd example: measurement range 600 mm ... 90 mm (Inverse diagram)	
DT20-P130B6009	
4 mA ≙ 60 cm	20 mA ≙ 9 cm

Accuracy



Basic types:
Order information

Type	Order no.	Measurement range
DT20-P130B0960	1029273	90 ... 600 mm
DT20-P130B1000	1028800	100 ... 1000 mm
DT20-P130B1050	1027831	100 ... 500 mm
DT20-P130B1080	1028720	100 ... 800 mm
DT20-P130B2535	1028721	250 ... 350 mm
DT20-P130B2545	1028724	250 ... 450 mm
DT20-P130B2560	1028723	250 ... 600 mm
DT20-P130B4000	1028722	400 ... 1000 mm
DT20-N130B0960	1029274	90 ... 600 mm
DT20-N130B1000	1029275	100 ... 1000 mm

Measurement range
200 ... 5300 mm

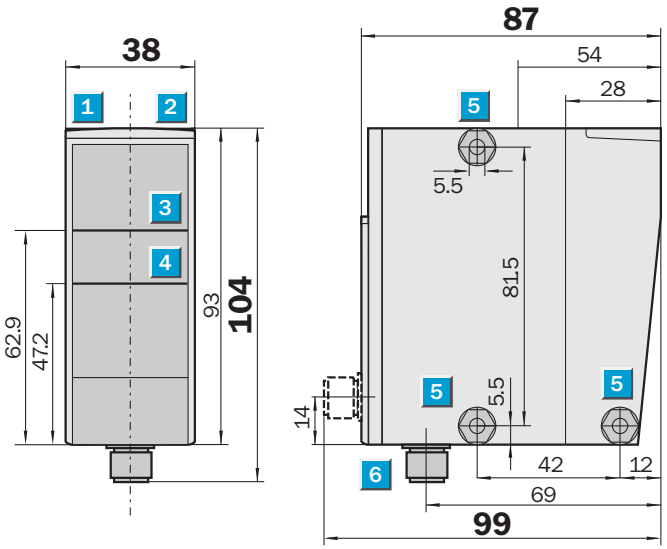
Distance sensor

- Analogue output 4 ... 20 mA
- Teach-in and Plug & Play version
- High measuring accuracy
- Visible red light laser
- Power-On LED
- Acknowledgement after Teach-in

c UL us

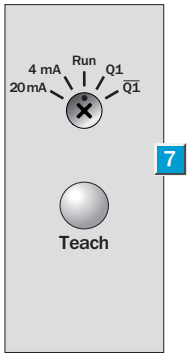
See chapter Accessories
Cables and connectors
Mounting systems

Dimensional drawing



Adjustments possible

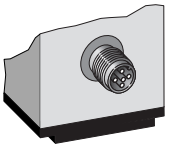
DT60-P111B
DT60-N111B



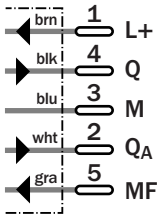
1 Power
2 Function indicator
3 Optical axis, sender
4 Optical axis, receiver
5 Mounting hole
6 M12 plug, 5-pin
7 Operating panel Teach-in version

Connection type

All types



5-pin, M12



Technical data	DT60-	P111B	N111B	P111B bbee	N111B bbee						
Teach-in version		■	■								
Plug & Play version	Measuring range freely selectable			■	■						
Measuring range											
(min. ... max. measuring distance)	200 mm ... 5300 mm	■	■	■	■						
Object with 3% remission	200 mm ... 2000 mm	■	■	■	■						
Object with 6% remission	200 mm ... 2800 mm	■	■	■	■						
Object with 18% remission	200 mm ... 5000 mm	■	■	■	■						
Object with 90% remission	200 mm ... 5300 mm	■	■	■	■						
Light source [1]	Laser diode, red light	■	■	■	■						
Light spot at 2 m distance	Ø 10 mm	■	■	■	■						
Supply voltage V_S [2]	11 ... 30 V DC	■	■	■	■						
Power consumption [3]	< 3 W	■	■	■	■						
Ripple [4]	≤ 5 V_{SS}	■	■	■	■						
Analogue output (invertable)	4 ... 20 mA	■	■	■	■						
Accuracy [5]	± 10 mm	■	■	■	■						
Reproducibility	± 8 mm typ.	■	■	■	■						
Resolution	1.5 mm	■	■	■	■						
Response time	50 ms ... 250 ms [6]	■	■	■	■						
Cycle time	< 55 ms	■	■	■	■						
Output rate	< 15 ms	■	■	■	■						
Temperature drift	0.5 mm/K (0.4 mm/K typ.)	■	■	■	■						
Switching outputs (invertable)	Q	■	■	■	■						
	$\overline{Q}$	■	■								
DL60-P: PNP	HIGH = U_V – (< 2 V)/LOW = 0 V	■		■							
DL60-N: NPN	HIGH = U_V/LOW ≤ 2 V		■		■						
Output current I_A [7]	100 mA	■	■	■	■						
Multifunction MF	Laser off	■	■	■	■						
Connection type	M12 plug, 5-pin	■	■	■	■						
VDE protection class [8]	II	■	■	■	■						
Laser protection class	2 (EN 60 825-1)	■	■	■	■						
Enclosure rating	IP 67	■	■	■	■						
Ambient temperature	Operation –25 ... +55 °C	■	■	■	■						
	Storage –25 ... +75 °C	■	■	■	■						
Weight	202 g	■	■	■	■						

1) Average service life 50,000 h at T_A = +25 °C
2) Limit values, reverse-polarity protected
3) Without load
4) May not exceed or fall short of V_S tolerances
5) After 30 minutes on-time
6) Adaptive, depending on degree of reflectance
7) Output Q short-circuit protected
8) Reference voltage 50 V DC

Plug & Play version: measuring range freely selectable, measuring range bb to ee ≙ 4 mA ... 20 mA	
DT60-P/N111Bbbee	
bb: min. measuring distance [9]	ee: max. measuring distance [9]
02 [10]	53 [11]

9) Minimum distance between bb and ee must be 03 units (03 ≙ 300 mm)
10) 02 ≙ 200 mm; 53 ≙ 5300 mm
11) 90% remission

1st example: measuring range 1200 mm ... 3400 mm	
DT60-P/N111B1234	
4 mA ≙ 1200 mm	20 mA ≙ 3400 mm

2nd example: measuring range 4200 mm ... 3800 mm (Inverted characteristic curve)	
DT60-P/N111B4238	
4 mA ≙ 4200 mm	20 mA ≙ 3800 mm

Order information	
Type	**Order no.**
DT60-P111B	1 025 843
DT60-N111B	1 025 844
DT60-P111B0520	1 025 847
DT60-P111B0253	1 026 063
DT60-N111B0253	1 026 160
DT60-P111Bbbee*)	X XXX XXX

*) Measuring range freely selectable

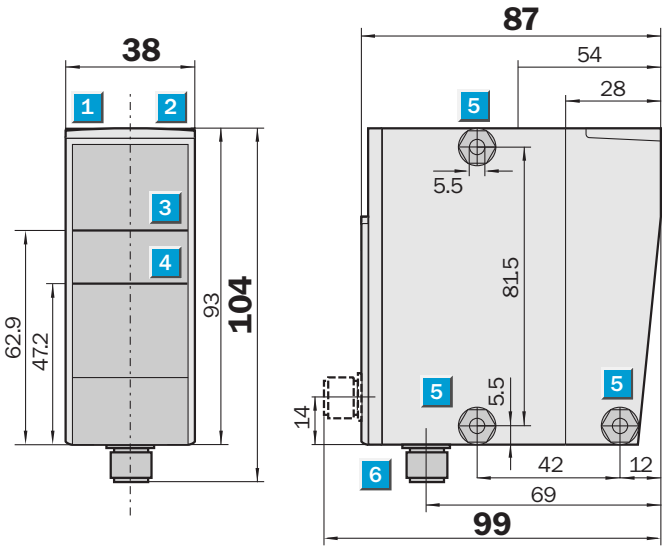
Measurement range
200 ... 5300 mm

Distance sensor

- Analogue output 4 ... 20 mA
- Teach-in and Plug & Play version
- High measuring accuracy
- Visible red light laser
- Power-On LED
- Acknowledgement after Teach-in

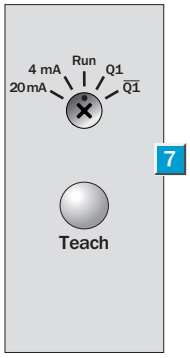
c UL us

Dimensional drawing



Adjustments possible

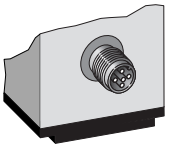
DT60-P211B
DT60-N211B



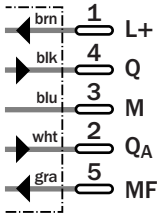
1 Power
2 Function indicator
3 Optical axis, sender
4 Optical axis, receiver
5 Mounting hole
6 M12 plug, 5-pin
7 Operating panel Teach-in version

Connection type

All types



5-pin, M12



See chapter Accessories
Cables and connectors
Mounting systems

Technical data	DT60-	P211B	N211B	P211B bbee	N211B bbee
Teach-in version		■	■		
Plug & Play version	Measuring range freely selectable			■	■
Measuring range					
(min. ... max. measuring distance)	200 mm ... 5300 mm	■	■	■	■
Object with 3% remission	200 mm ... 1000 mm (A)/1400 mm (B)	■	■	■	■
Object with 6% remission	200 mm ... 1400 mm (A)/2000 mm (B)	■	■	■	■
Object with 18% remission	200 mm ... 2400 mm (A)/3600 mm (B)	■	■	■	■
Object with 90% remission	200 mm ... 5000 mm (A)/5300 mm (B)	■	■	■	■
Light source [1]	Laser diode, red light	■	■	■	■
Light spot at 2 m distance	Ø 10 mm	■	■	■	■
Supply voltage V_S [2]	11 ... 30 V DC	■	■	■	■
Power consumption [3]	< 3 W	■	■	■	■
Ripple [4]	≤ 5 V_{SS}	■	■	■	■
Analogue output (invertable)	4 ... 20 mA	■	■	■	■
Accuracy [5]	± 13 mm	■	■	■	■
Reproducibility	± 10 mm	■	■	■	■
Resolution	1.5 mm	■	■	■	■
Response time	A = 30 ms/B = 50 ms	■	■	■	■
Output rate	1.2 ms (A)/3.6 ms (B)	■	■	■	■
Temperature drift	0.5 mm/K (0.4 mm/K typ.)	■	■	■	■
Switching outputs (invertable)	Q	■	■	■	■
	$\overline{Q}$	■	■		
DT60-P: PNP	HIGH = U_V – (< 2 V)/LOW = 0 V	■		■	
DT60-N: NPN	HIGH = U_V/LOW ≤ 2 V		■		■
Output current I_A [6]	100 mA	■	■	■	■
Multifunction MF	Laser off	■	■	■	■
Connection type	M12 plug, 5-pin	■	■	■	■
VDE protection class [7]	II	■	■	■	■
Laser protection class	2 (EN 60 825-1)	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature	Operation –25 ... +55 °C	■	■	■	■
	Storage –25 ... +75 °C	■	■	■	■
Weight	202 g	■	■	■	■

1) Average service life 50,000 h at T_A = +25 °C
2) Limit values, reverse-polarity protected
3) Without load
4) May not exceed or fall short of V_S tolerances
5) After 30 minutes on-time
6) Output Q short-circuit protected
7) Reference voltage 50 V DC

Plug & Play version: measuring range freely selectable, measuring range bb to ee ≙ 4 mA ... 20 mA	
DT60-P/N111Bbbee	
bb: min. measuring distance [8]	ee: max. measuring distance [8]
02 [11]	53 [12]

8) Minimum distance between bb and ee must be 03 units (03 ≙ 300 mm)
9) 02 ≙ 200 mm; 53 ≙ 5300 mm
10) 90% remission

1st example: measuring range 1200 mm ... 3400 mm	
DT60-P/N111B1234	
4 mA ≙ 1200 mm	20 mA ≙ 3400 mm

2nd example: measuring range 4200 mm ... 3800 mm (Inverted characteristic curve)	
DT60-P/N111B4238	
4 mA ≙ 4200 mm	20 mA ≙ 3800 mm

Order information	
Type	**Order no.**
DT60-P211B	1 025 845
DT60-N211B	1 025 846
DT60-P211B0520	1 026 444
DT60-P211B0253	1 026 445
DT60-N211B0253	1 026 446
DT60-P211Bbbee*)	X XXX XXX
DT60-N211Bbbee*)	X XXX XXX

*) Measuring range freely selectable

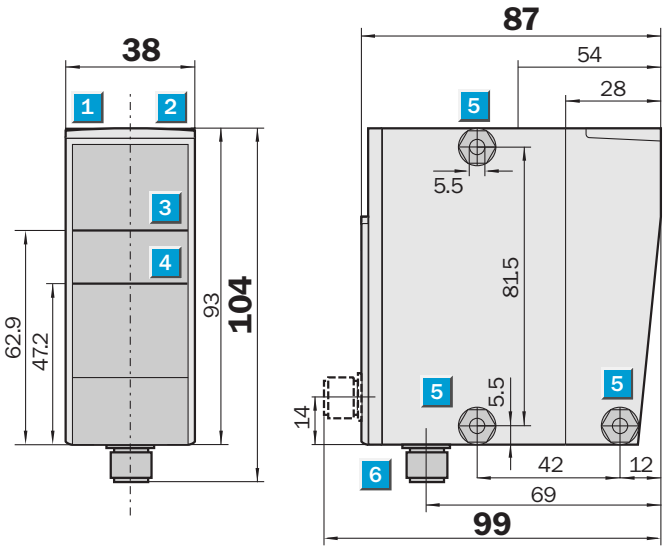
Measurement range
300 mm ... 24 m

Distance sensor

- Analogue output 4 ... 20 mA
- Teach-in and Plug & Play version
- High measuring accuracy
- Visible red light laser
- Power-On LED
- Acknowledgement after Teach-in

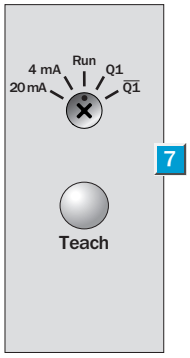
c UL us

Dimensional drawing



Adjustments possible

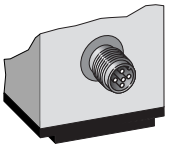
DL60-P111B
DL60-N111B



1 Power
2 Function indicator
3 Optical axis, sender
4 Optical axis, receiver
5 Mounting hole
6 M12 plug, 5-pin
7 Operating panel Teach-in version

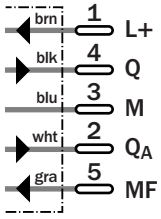
Connection type

DL60-P111B	DL60-P111Bbbee
DL60-N111B	DL60-N111Bbbee



See chapter Accessories
Cables and connectors
Mounting systems

5-pin, M12



Technical data	DL60-	P111B	N111B	P111B bbee	N111B bbee						
Teach-in version		■	■								
Plug & Play version	Measuring range freely selectable			■	■						
Measuring range											
(min. ... max. measuring distance)											
Reflective Tape: REF-5870-K2	300 mm... 24000 mm [1]	■	■	■	■						
Light source [2]	Laser diode, red light	■	■	■	■						
Light spot at 2 m distance	Ø 20 mm	■	■	■	■						
Supply voltage V_S [3]	11 ... 30 V DC	■	■	■	■						
Power consumption [4]	< 3 W	■	■	■	■						
Residual ripple [5]	≤ 5 V_{PP}	■	■	■	■						
Analogue output (invertable)	4 ... 20 mA	■	■	■	■						
Accuracy [6]	± 15 mm	■	■	■	■						
Reproducibility	± 7 mm	■	■	■	■						
Resolution	12 Bit [7]	■	■	■	■						
Response time	130 ms	■	■	■	■						
Output rate	< 8 ms	■	■	■	■						
Temperature drift	0.4 mm/K typ.	■	■	■	■						
Switching outputs (invertable)	Q	■	■	■	■						
	$\overline{Q}$	■	■								
DL60-P: PNP	HIGH = U_V – (< 2 V)/LOW = 0 V	■		■							
DL60-N: NPN	HIGH = U_V/LOW ≤ 2 V		■		■						
Output current I_A [8]	100 mA	■	■	■	■						
Multifunction MF	Laser off	■	■	■	■						
Connection type	M12 plug, 5-pin	■	■	■	■						
VDE protection class [9]	II	■	■	■	■						
Laser protection class	2 (EN 60 825-1)	■	■	■	■						
Enclosure rating	IP 67	■	■	■	■						
Ambient temperature	Operation –25 ... +55 °C	■	■	■	■						
	Storage –25 ... +75 °C	■	■	■	■						
Initialisation time	550 ms	■	■	■	■						
Weight	202 g	■	■	■	■						

1) 40 m on request
2) Average service life 50,000 h at T_A = +25 °C
3) Limit values, reverse-polarity protected
4) Without load
5) May not exceed or fall short of V_S tolerances
6) After 30 minutes on-time
7) At 24 m measuring distance = 7 mm
8) Output Q short-circuit protected
9) Reference voltage 50 V DC

Plug & Play version: measuring range freely selectable, measuring range bb to ee ≙ 4 mA ... 20 mA	
DL60-P/N111Bbbee	
bb: min. measuring distance [10]	ee: max. measuring distance [10]
00 [11]	24 [11]

10) Minimum distance between bb and ee must be 01 units (01 ≙ 1 m)
11) 00 ≙ 300 mm; 24 ≙ 24 m

1st example: measuring range 300 mm ... 24 m	
DL60-P/N111B0024	
4 mA ≙ 300 mm	20 mA ≙ 24 m

2nd example: measuring range 2 m ... 10 m	
DL60-P/N111B0210	
4 mA ≙ 2 m	20 mA ≙ 10 m

Order information	
Type	**Order no.**
DL60-P111B	1 025 848
DL60-N111B	1 026 360
DL60-P111B0024	1 026 361
DL60-P111B0210	1 026 362
DL60-N111B0024	1 026 363
DL60-P111Bbbee*)	X XXX XXX
DL60-N111Bbbee*)	X XXX XXX

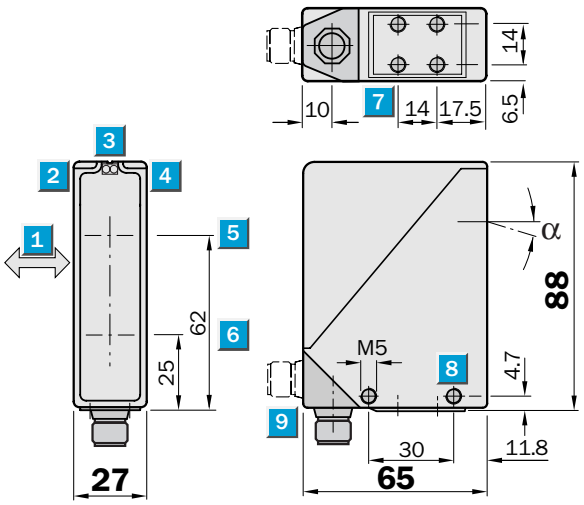
*) Measuring range freely selectable

Scanning distance
100 ... 3000 mm

Photoelectric proximity switches

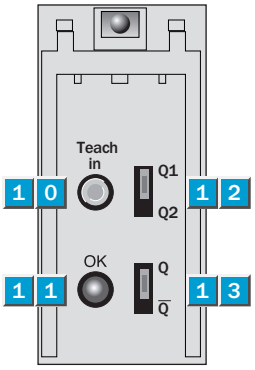
- Analogue + digital output
- High resolution
- Switching outputs adjustable using simple teach-in
- Compact housing
- Insensitive to ambient light

Dimensional drawing



Adjustments possible

All types



1	Standard direction of object being scanned
2	Output Q_2 function indicator
3	Alignment sight
4	Output Q_1 function indicator
5	Centre of transmitter's optical axis
6	Centre of receiver's optical axis
7	M5 threaded mounting hole, 6 mm deep
8	M5 threaded mounting hole
9	Rotatable plug
10	"Teach-in" programming switch
11	"Teach-in" function indicator
12	"Q_1/Q_2" program switch
13	"Q/Q" program switch

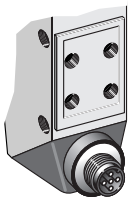
Adjustment instructions

Programming the switching outputs:

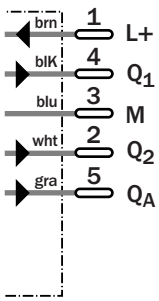
1. Move "Q_1/Q_2" switch to the switching output to be programmed. Move "$Q/\overline{Q}$" switch to the desired switching mode.
2. Place object at the required switching distance.
3. Press "Teach-in" key. "OK" indicator illuminates when the switching limit has been saved to the memory.
4. Repeat steps 1/2/3 for the second switching output.
5. The device is ready for operation.

Connection type

All types



5-pin, M12



See chapter Accessories

Cables and connectors

Mounting systems

Special accessories

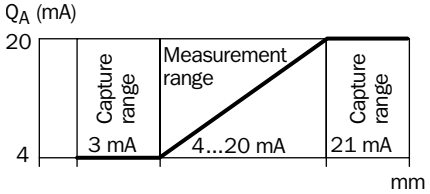
Technical data	WTA24-P	5201	5401	5501	5201 S 04
Light source[1], light type	LED, infrared light	■	■	■	■
Supply voltage V_S	12…30 V DC[2]	■	■	■	■
Residual ripple	< 5 V_{PP}[3]	■	■	■	■
Current consumption	< 100 mA[4]	■	■	■	■
Switching outputs					
Q_1, Q_2	PNP, reversible	■	■	■	■
Output voltage	HIGH = V_S – < 2 V/LOW = < 2 V	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■
Response time[5]	5 ms	■	■		
Max. switching frequency[6]	100 Hz	■	■		
Response time[5]	50 ms			■	
Max. switching frequency[6]	10 Hz			■	
Response time[5]	100 ms				■
Max. switching frequency[6]	5 Hz				■
Analogue output[7] [8]	4…20 mA	■	■	■	■
Connection type	Plug	■	■	■	■
VDE protection class[9]	⧈	■	■	■	■
Circuit protection[10]	A, B, C	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature T_A	Operation – 10 °C…+ 55 °C	■	■	■	■
	Storage – 25 °C…+ 75 °C	■	■	■	■
Shock load	To IEC 68	■	■	■	■
Temperature drift	0.2 %/K	■	■	■	■
(relative to measured value)					

1) Average service life 100,000 h at T_A = + 25 °C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) Object 50:50
7) In capture range 3 or 21 mA
8) R = 0…500 Ω
9) Reference voltage 50 V DC
10) A = V_S connections reverse-polarity protected
B = Inputs Q_1 and Q_2 short-circuit protected
C = Interference pulse suppression

Measurement range, reproducibility and accuracy

WTA24-	P 5201		P 5401		P 5501		P 5201 S04	
Measurement range	250…350 mm		600…1200 mm		1000…3000 mm		100…500 mm	
Capture range	200…250 mm		400…600 mm		500…1000 mm		80…100 mm	
Light spot diameter (90 % core light)	4…8 mm		15…30 mm		20…50 mm		8…12 mm	
Angle of dispersion α	7°		2°		0.5°		7°	
Reproducibility	White (90 %)	1.0 %	White (90 %)	1.5 %	White (90 %)	4.0 %	White (90 %)	1.0 %
(relative to measured value,	Grey (18 %)	1.0 %	Grey (18 %)	2.5 %	Grey (18 %)	8.0 %	Black (6 %)	2.0 %
object 100 x 100 mm,	Black (6 %)	1.5 %	Black (6 %)[1]	4.0 %	Black (6 %)[2]	10.0 %		
ambient surroundings remain constant)								
Accuracy	blanc (90 %)	1.5 %	blanc (90 %)	3.0 %	blanc (90 %)	5.5 %	White (90 %)	6.5 %
(relative to measured value,	Grey (18 %)	2.0 %	Grey (18 %)	5.0 %	Grey (18 %)	10.0 %	Grey (18 %)	10.5 %
object 100 x 100 mm,	Black (6 %)	4.0 %	Black (6 %)[1]	8.0 %	Black (6 %)[2]	13.0 %	Black (6 %)	11.5 %
ambient surroundings remain constant)								

1) up to 1000 mm
2) up to 2000 mm

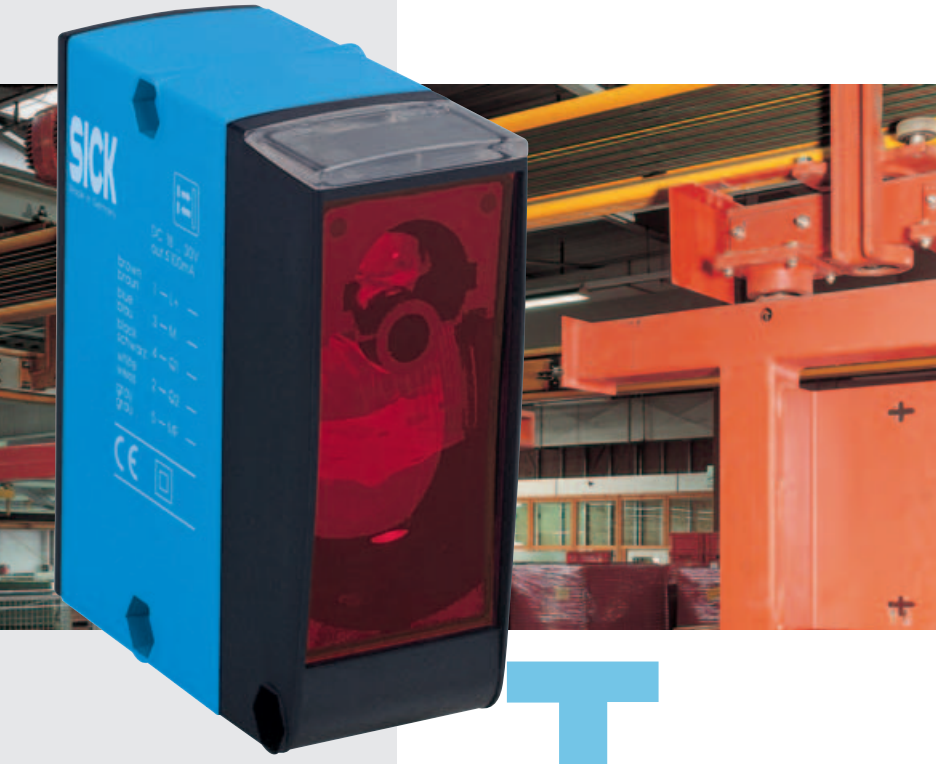


Order information	
Type	**Order no.**
WTA24-P 5201	1 011 504
WTA24-P 5401	1 011 505
WTA24-P 5501	1 011 515
WTA24-P 5201 S04	1 015 804

Distance sensors
Proximity mode

Distance sensors
Reflector mode

DS60: The solution for large scanning distances

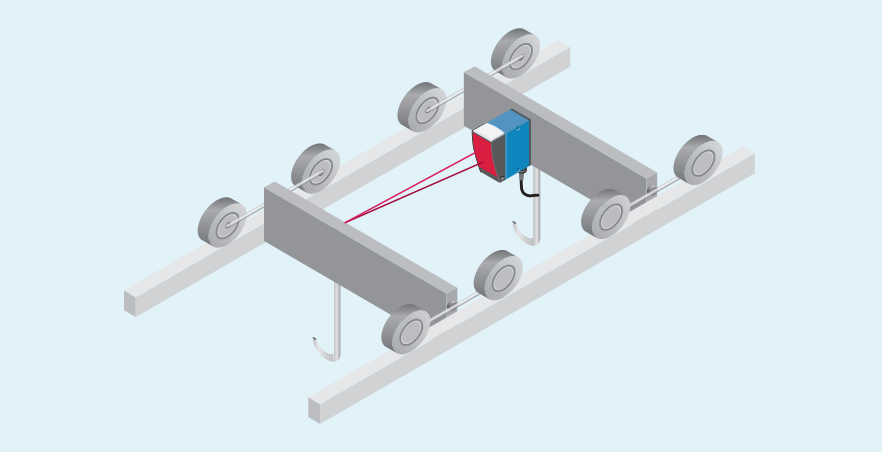


The prevention of collisions for cranes and vehicles or checking whether storage bays in warehousing systems are occupied are typical examples of applications in which compact triangulation scanners reach their technological limits and laser distance measuring systems become too expensive. The DS60 fills this gap. Even under difficult ambient conditions and with a variety of target objects, the compact, optoelectronic distance sensor can detect them reliably and consistently at distances between 100 mm and 6,000 mm.

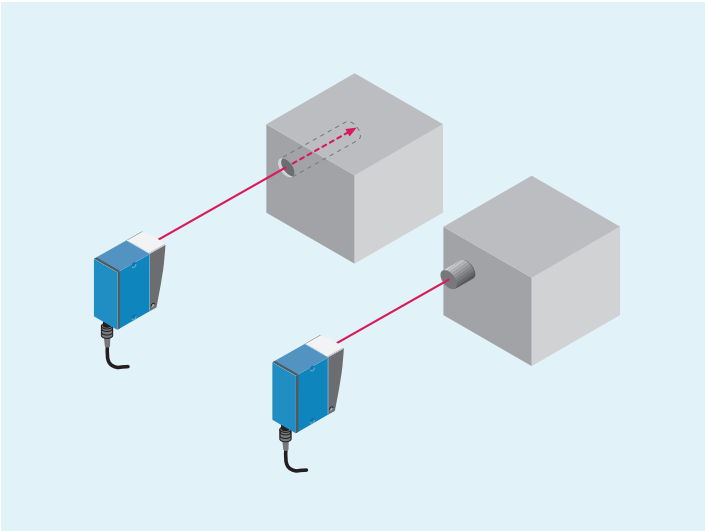
During development of the DS60, emphasis was placed on satisfying user requirements such as, compact design, two invertable switching outputs, simple operation and adjustment as well as low maintenance requirements with a long service life.

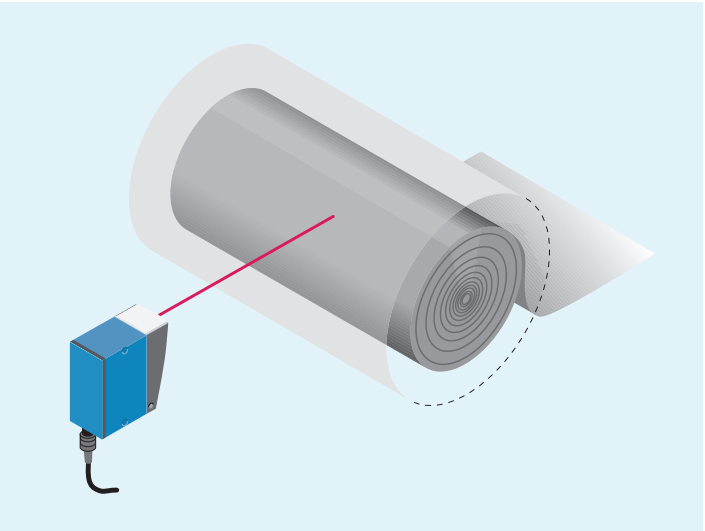
The DS60 is able to do much more than prevent collisions and check whether storage bays are full. By linking the two binary outputs, min./max. control operations in level gauging systems (bulk materials) can be implemented as combined protection against dry-running and overfilling. Another typical application would be two-point sag regulation in the paper and plastics industries. Further possible applications for distance measurement using two binary outputs are, for example, high/low speed regulation for overhead conveyors or assisting ground conveyors in docking manoeuvres.

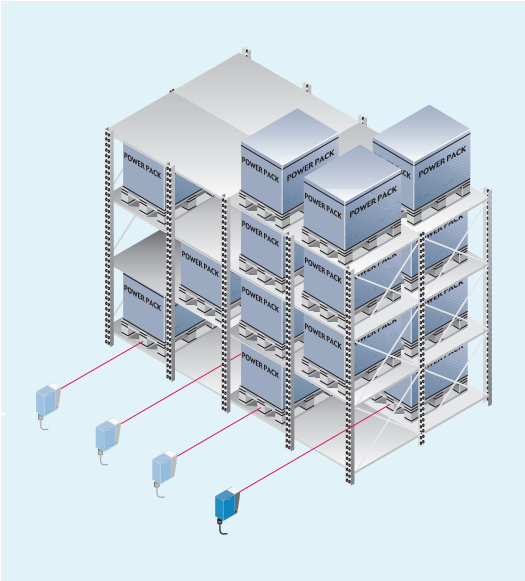
▶ Ensuring everything runs smoothly in warehousing/handling systems: The DS60 distance sensor is used to make sure that a safe distance is maintained between overhead conveyors.



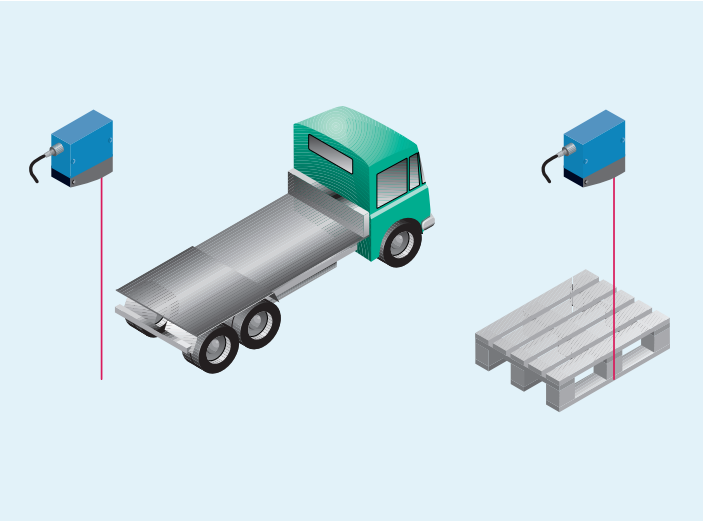
▼ Detection of bolts or recesses in work-pieces – another speciality of the DS60.







▲ Two storage bays can be monitored with just one sensor.



▲ A variant of the sensor, used to detect objects between the sensor and a fixed background.

▲ Positioning and checking the diameters of rolled materials. The object can move closer to the DS60 during positioning. The switching output is activated as soon as the taught-in distance is undershot.

Application Field

The DS60 distance sensors operate according to the principle of time of flight measurement. The compact sensor makes large and adjustable scanning distances possible with very precise distance detection.

Almost any objects, including tilted ones, are detected dependably in front of a shiny background (e.g., zinc-coated steel sheets or window panes) within the scanning range.

A connectable pilot light simplifies precise alignment on the scanning object.

One sensor model with a red light laser and a small light spot makes the detection of even the smallest objects at large distances possible. Precise alignment is made using a visible, red laser beam.

Another sensor model operates using Diamond Grade reflective tape. This switches when the reflective tape falls short of the previously set distance (not comparable to a photoelectric switch during light path interruption).

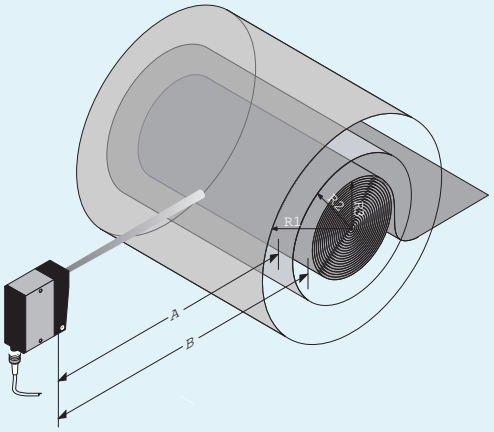
Two switching outputs signal whether the set distances are reached.

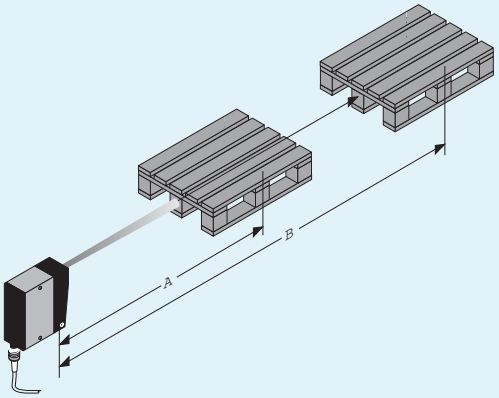
DS60 DtO IR Distance to Object, Infrared Light

Variant DtO IR – Application field

Detecting the distance between sensor and object.
The object can move toward the sensor during positioning.
Falling short of the previously set distance triggers the switching outputs.

▶ Task:
Determining the diameter of a (shining) aluminum or (dark) steel coil.
The distances A (switching output Q_1) and B (switching output Q_2) are taught in.
Radius R1 = switching distance A: switching output Q_1 is actuated,
Radius R2 = switching distance B: switching output Q_2 is actuated.





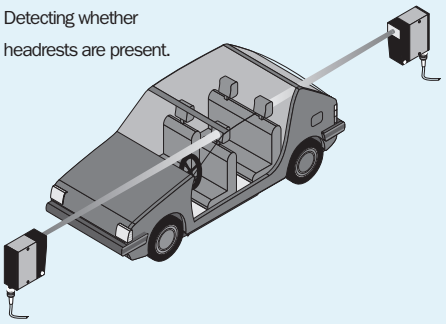
◀ Task:
Detecting whether a compartment is vacant or contains one or two Euro-pallets.
The sensor model with a 12 mm light spot measurement is especially suitable for precise detection of a pallet foot at a great distance. Problem-free alignment of the sensor using the pilot light.

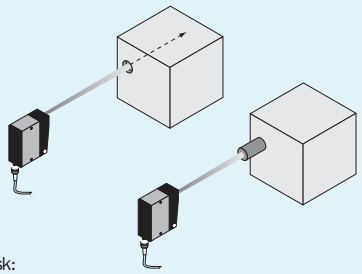
DS60 DtO R Distance to Object, Red Light

Variant DtO R – Application field

Detecting smaller objects and cavities or holes.
The object can move toward the sensor during positioning. Falling short of the previously set distance triggers the switching output.

▼ Task:
Detecting whether headrests are present.



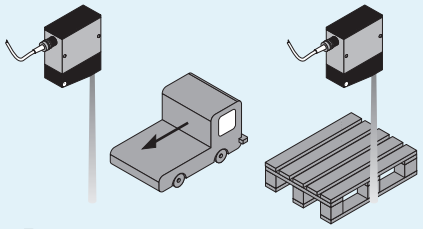


▲ Task:
Detecting whether bolts or cavities/holes are present.

DS60 ObSB IR Object between Sensor and Background, Infrared Light

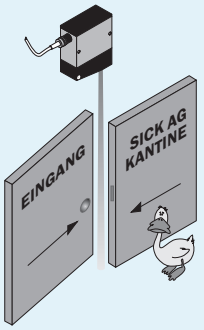
Variant ObSB IR – Application field

Similar to a photoelectric reflex switch only that no reflector is required, but instead a stationary background (e.g., a floor).
The distance to the background is set, not the distance to the object. The switching output is triggered when an object is between the background and the sensor.



▲ Task:
Detecting and/or counting vehicles.
Detecting whether pallets are present.

▶ Task:
Monitoring closing edges of doors.

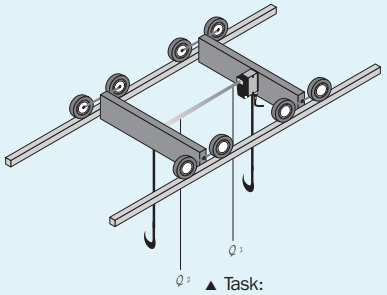


DS60 DtR IR Distance to Diamond Grade Reflective Tape, Infrared Light

Variant DtR IR – Application field

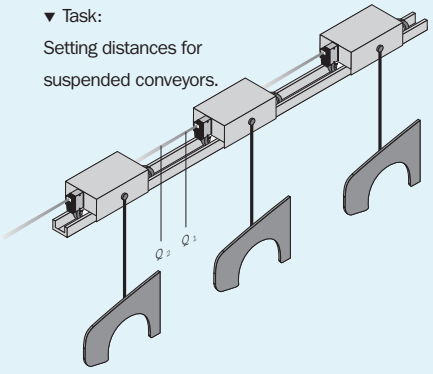
Setting distances from cranes, suspended conveyors and conveyors on the ground. The sensor function can be checked via a test input. A distance of up to 20 m can be separated into three sectors on the Diamond Grade reflective tape:

- Distance to tape greater than the taught-in distances Q_1 and Q_2
- Distance to tape between Q_1 and Q_2
- Distance to tape shorter than Q_1



▲ Task:
Setting distances to gantry cranes.

▼ Task:
Setting distances for suspended conveyors.

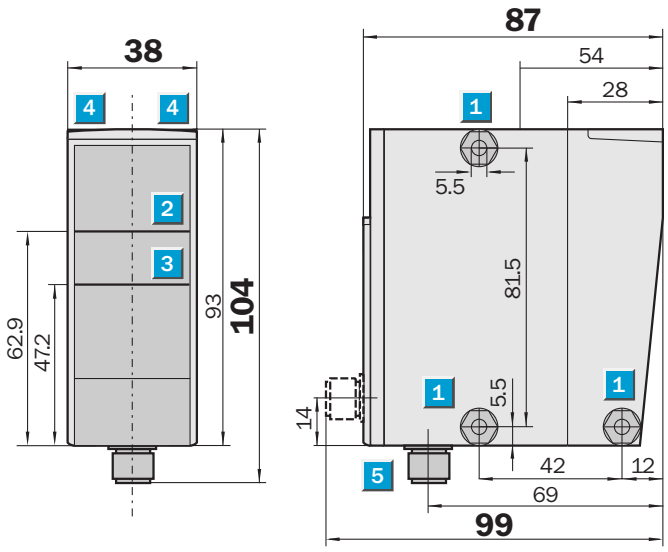


Scanning distance
200 ... 6000 mm

Distance Sensor

- Background suppression up to 100 m
- High target dynamic: black … extremely shiny
- Two function LED
- Red Pilot Light
- Teach-in

Dimensional drawing



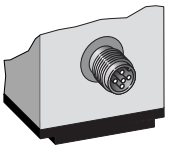
Adjustments possible

- DS60-P/-N21111
- DS60-P/-N21311
- DS60-P/-N41111
- DS60-P/-N41311
- DS60-P41111-S03

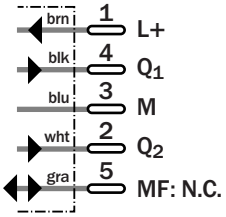
1 Mounting hole Ø 5.2 mm
2 Optical axis – sender
3 Optical axis – receiver
4 Status indicator
5 M12 plug, 5-pin
6 Control panel

Connection type

DS60-P/-N21111 | DS60-P/-N41111 | DS60-P41111-S03
DS60-P/-N21311 | DS60-P/-N41311



5-pin, M12



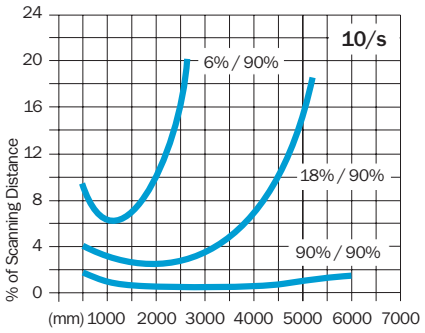
See chapter Accessories

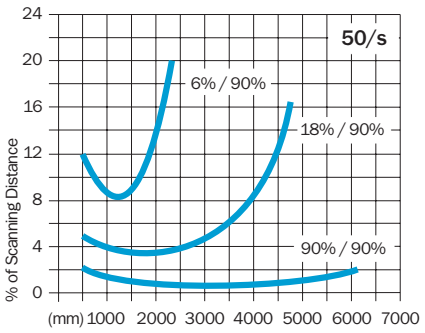
- Cables and connectors
- Mounting systems
- Special accessories

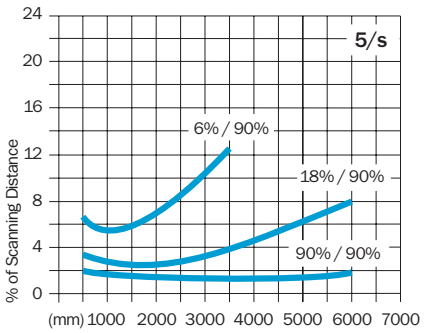
Technical data	DS60	-P 21111	-N 21111	-P 21311	-N 21311	-P 41111	-N 41111	-P 41311	-N 41311	-P 41111-S03
Type of connection	M12 plug, 5-pin	■	■	■	■	■	■	■	■	■
Scanning distance, adjustable	200 mm to 6000 mm	■	■	■	■	■	■	■	■	■
Object with 3 % remission	80 mm to 1400 mm	■	■	■	■					
	80 mm to 1600 mm					■	■	■	■	
	80 mm to 1750 mm									■
Object with 6 % remission	80 mm to 2400 mm	■	■	■	■					
	80 mm to 2600 mm					■	■	■	■	
	80 mm to 3000 mm									■
Object with 18 % remission	80 mm to 4600 mm	■	■	■	■					
	80 mm to 5000 mm					■	■	■	■	
	80 mm to 5650 mm									■
Object with 90 % remission [1]	80 mm to 6000 mm	■	■	■	■	■	■	■	■	■
Light source [2]	Laser diode, infrared	■	■	■	■	■	■	■	■	■
Light spot at 6 m distance	Ø 60 mm	■	■			■	■			
	Ø 12 mm			■	■			■	■	■
Supply voltage V_S [3]	18 to 30 V DC	■	■	■	■	■	■	■	■	■
Power consumption [4]	< 3 W	■	■	■	■	■	■	■	■	■
Ripple [5]	≤ 5 V_{PP}	■	■	■	■	■	■	■	■	■
Switching outputs (invertable)	Q_1, Q_2	■	■	■	■	■	■	■	■	■
DS60-P: PNP	HIGH = V_S – (< 2 V)/LOW = 0 V	■		■		■		■		■
DS60-N: NPN	HIGH = V_S/LOW ≤ 2 V		■		■		■		■	
Output current [6]	100 mA	■	■	■	■	■	■	■	■	■
Switching frequency	50/s	■	■	■	■					
	10/s					■	■	■	■	
	5/s									■
Switching limit Q_1/Q_2	adjustable (Teach-in)	■	■	■	■	■	■	■	■	■
Time delay	on request	■	■	■	■	■	■	■	■	■
Multifunction MF	N.C./External Teach on request	■	■	■	■	■	■	■	■	■
VDE protection class [7]	II	■	■	■	■	■	■	■	■	■
Laser protection class	1 (EN 60 825-1)	■	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■	■
Ambient temperature[8]	Operation – 25 to + 50 °C	■	■	■	■	■	■	■	■	■
	Storage – 25 to + 75 °C	■	■	■	■	■	■	■	■	■
Weight	202 g	■	■	■	■	■	■	■	■	■

1) Also shiny
2) Average service life 100 000 h, at room temperature = + 25 °C
3) Limit values, reverse polarity protected
4) Without load
5) Must be within V_S tolerances
6) Outputs Q_1 and Q_2 short-circuit protected
7) Withstand voltage 50 V DC
8) Do not distort cable below 0 °C

Scanning distance







Order information

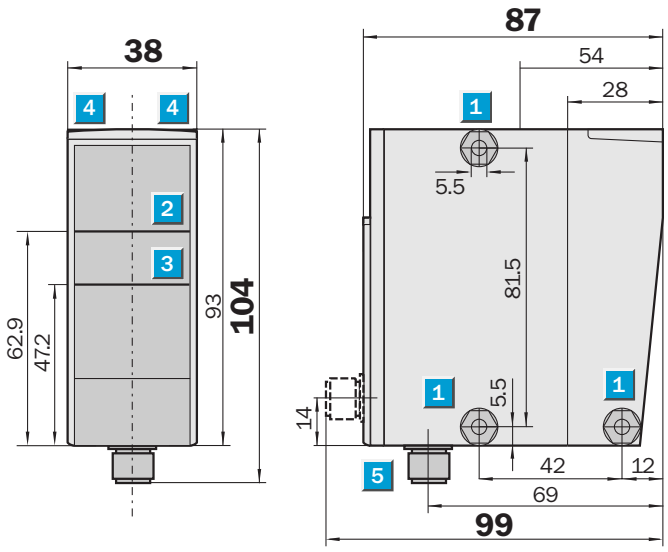
Type	Order no.
DS60-P21111	1 016 361
DS60-P21311	1 016 393
DS60-P41111	1 016 687
DS60-P41311	1 016 689
DS60-N21111	1 016 394
DS60-N21311	1 016 686
DS60-N41111	1 016 688
DS60-N41311	1 016 690
DS60-P41111-S03	1 023 745

Scanning distance
200 ... 6000 mm

Distance Sensor

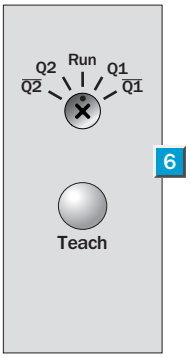
- Background suppression up to 100 m
- High target dynamic: black … extremely shiny
- Two function LED
- Precise alignment by red laser light
- Teach-in

Dimensional drawing



Adjustments possible

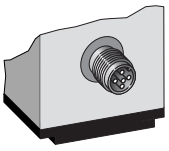
DS60-P/-N21211
DS60-P/-N41211



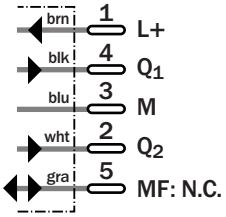
1 Mounting hole Ø 5.2 mm
2 Optical axis – sender
3 Optical axis – receiver
4 Status indicator
5 M12 plug, 5-pin
6 Control panel

Connection type

DS60-P/-N21211
DS60-P/-N41211



5-pin, M12

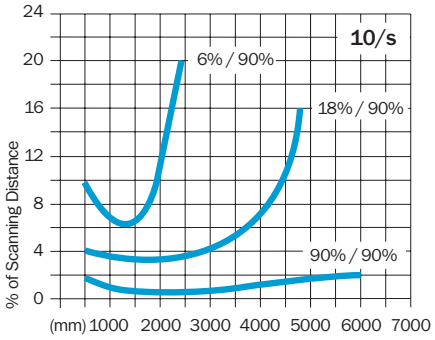


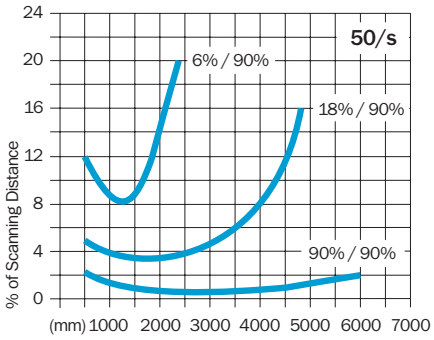
See chapter Accessories
Cables and connectors
Mounting systems
Special accessories

Technical data	DS60	-P 21211	-N 21211	-P 41211	-N 41211
Type of connection	M12 plug, 5-pin	■	■	■	■
Scanning distance, adjustable	200 mm to 6000 mm	■	■	■	■
Object with 3 % remission	80 mm to 1400 mm	■	■		
	80 mm to 1600 mm			■	■
Object with 6 % remission	80 mm to 2400 mm	■	■		
	80 mm to 2600 mm			■	■
Object with 18 % remission	80 mm to 4600 mm	■	■		
	80 mm to 5000 mm			■	■
Object with 90 % remission [1]	80 mm to 6000 mm	■	■	■	■
Light source [2]	Laser diode, red	■	■	■	■
Light spot at 4.5 m distance	Ø 9 mm	■	■	■	■
Supply voltage V_S [3]	18 to 30 V DC	■	■	■	■
Power consumption [4]	< 3 W	■	■	■	■
Ripple [5]	≤ 5 V_{PP}	■	■	■	■
Switching outputs (invertable)	Q_1, Q_2	■	■	■	■
DS60-P: PNP	HIGH = V_S – (< 2 V)/LOW = 0 V	■		■	
DS60-N: NPN	HIGH = V_S/LOW ≤ 2 V		■		■
Output current [6]	100 mA	■	■	■	■
Switching frequency	50/s	■	■		
	10/s			■	■
Switching limit Q_1/Q_2	adjustable (Teach-in)	■	■	■	■
Time delay	on request	■	■	■	■
Multifunction MF	N.C./External Teach on request	■	■	■	■
VDE protection class [7]	II	■	■	■	■
Laser protection class	2 (EN 60 825-1)	■	■	■	■
Enclosure rating	IP 67	■	■	■	■
Ambient temperature[8]	Operation – 25 to + 50 °C	■	■	■	■
	Storage – 25 to + 75 °C	■	■	■	■
Weight	202 g	■	■	■	■

1) Also shiny
2) Average service life 50 000 h, at room temperature = + 25 °C
3) Limit values, reverse polarity protected
4) Without load
5) Must be within V_S tolerances
6) Outputs Q_1 and Q_2 short-circuit protected
7) Withstand voltage 50 V DC
8) Do not distort cable below 0 °C

Scanning distance





Order information

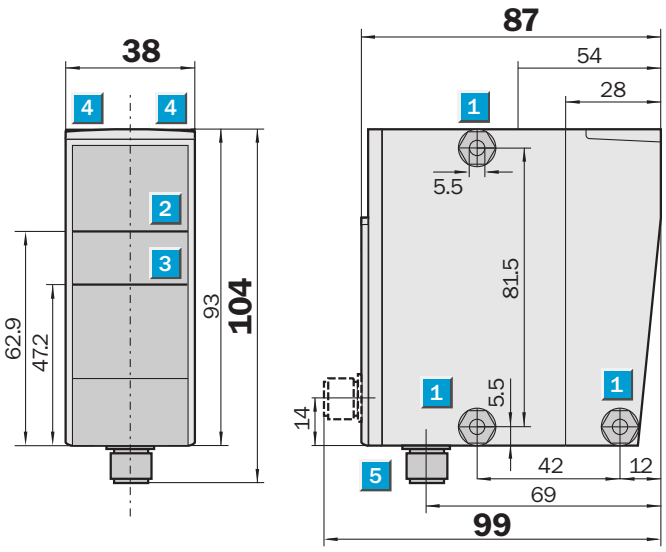
Type	Order no.
DS60-P21211	1 016 396
DS60-N21211	1 016 491
DS60-P41211	1 016 691
DS60-N41211	1 016 692

Scanning distance
200 ... 6000 mm

Distance Sensor

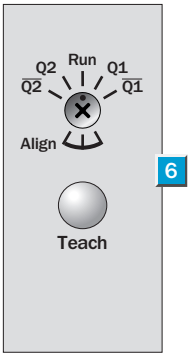
- Detection of extremely dark and shiny objects against a background
- High target dynamic: black … extremely shiny
- Two function LED
- Red Pilot Light
- Teach-in

Dimensional drawing



Adjustments possible

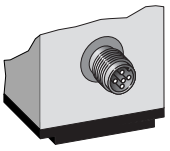
DS60-P/-N31111
DS60-P/-N31311
DS60-P/-N51111
DS60-P/-N51311



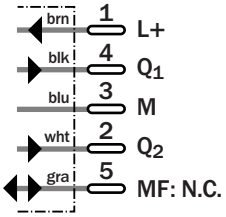
1 Mounting hole Ø 5.2 mm
2 Optical axis – sender
3 Optical axis – receiver
4 Status indicator
5 M12 plug, 5-pin
6 Control panel

Connection type

DS60-P/-N31111	DS60-P/-N51111
DS60-P/-N31311	DS60-P/-N51311



5-pin, M12



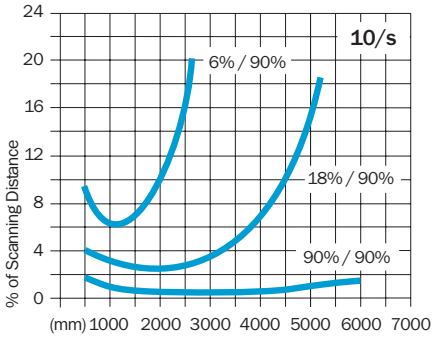
See chapter Accessories

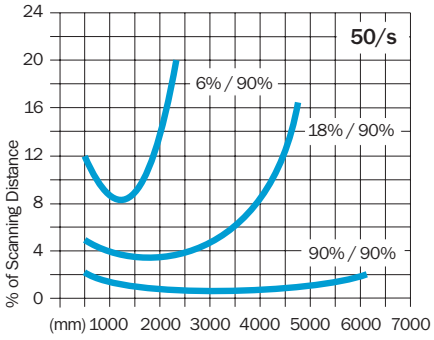
- Cables and connectors
- Mounting systems
- Special accessories

Technical data	DS60	-P 31111	-N 31111	-P 31311	-N 31311	-P 51111	-N 51111	-P 51311	-N 51311
Type of connection	M12 plug, 5-pin	■	■	■	■	■	■	■	■
Scanning distance, adjustable	200 mm to 6000 mm	■	■	■	■	■	■	■	■
Object with 3 % remission	80 mm to 1400 mm	■	■	■	■				
	80 mm to 1600 mm					■	■	■	■
Object with 6 % remission	80 mm to 2400 mm	■	■	■	■				
	80 mm to 2600 mm					■	■	■	■
Object with 18 % remission	80 mm to 4600 mm	■	■	■	■				
	80 mm to 5000 mm					■	■	■	■
Object with 90 % remission [1]	80 mm to 6000 mm	■	■	■	■	■	■	■	■
Light source [2]	Laser diode, infrared/	■	■	■	■	■	■	■	■
	Laser diode, red light on request	■	■	■	■	■	■	■	■
Light spot at 6 m distance	Ø 60 mm	■	■			■	■		
	Ø 12 mm			■	■			■	■
Supply voltage V_S [3]	18 to 30 V DC	■	■	■	■	■	■	■	■
Power consumption [4]	< 3 W	■	■	■	■	■	■	■	■
Ripple [5]	≤ 5 V_{PP}	■	■	■	■	■	■	■	■
Switching outputs (invertable)	Q_1, Q_2	■	■	■	■	■	■	■	■
DS60-P: PNP	HIGH = V_S – (< 2 V)/LOW = 0 V	■		■		■		■	
DS60-N: NPN	HIGH = V_S/LOW ≤ 2 V		■		■		■		■
Output current [6]	100 mA	■	■	■	■	■	■	■	■
Switching frequency	50/s	■	■	■	■				
	10/s					■	■	■	■
Switching limit Q_1/Q_2	adjustable (Teach-in)	■	■	■	■	■	■	■	■
Time delay	on request	■	■	■	■	■	■	■	■
Multifunction MF	N.C./External Teach on request	■	■	■	■	■	■	■	■
VDE protection class [7]	II	■	■	■	■	■	■	■	■
Laser protection class	1 (EN 60 825-1)	■	■	■	■	■	■	■	■
Enclosure rating	IP 67	■	■	■	■	■	■	■	■
Ambient temperature [8]	Operation – 25 to + 50 °C	■	■	■	■	■	■	■	■
	Storage – 25 to + 75 °C	■	■	■	■	■	■	■	■
Weight	202 g	■	■	■	■	■	■	■	■

1) Also shiny
2) Average service life 100 000 h, at room temperature = + 25 °C
3) Limit values, reverse polarity protected
4) Without load
5) Must be within V_S tolerances
6) Outputs Q_1 and Q_2 short-circuit protected
7) Withstand voltage 50 V DC
8) Do not distort cable below 0 °C

Scanning distance





Order information

Type	Order no.
DS60-P31111	1 016 493
DS60-P31311	1 016 693
DS60-P51111	1 016 695
DS60-P51311	1 016 697
DS60-N31111	1 016 494
DS60-N31311	1 016 694
DS60-N51111	1 016 696
DS60-N51311	1 016 698

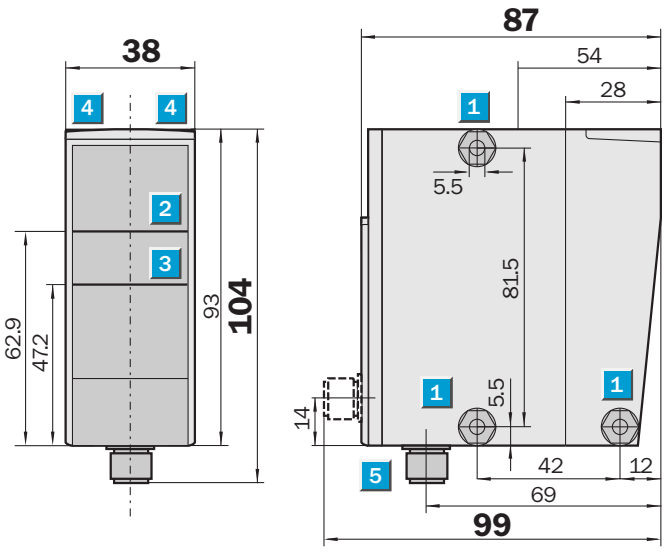
DS60 DtR IR Distance sensor: Time flight measurement distance to reflective tape, infrared light

Scanning range
200 ... 20000 mm

Distance Sensor

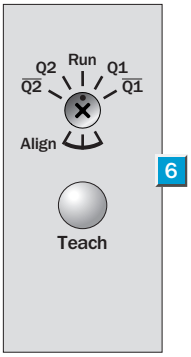
- Distance to reflective tape diamond grade
- Two switching outputs
- Two function LED
- Red Pilot Light
- Teach-in setup of switching outputs according to the distance of reflective tape

Dimensional drawing



Adjustments possible

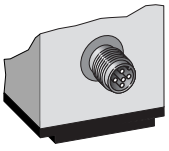
DS60-P/-N11121



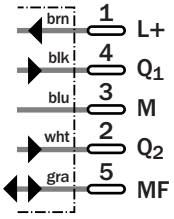
1 Mounting hole Ø 5.2 mm
2 Optical axis – sender
3 Optical axis – receiver
4 Status indicator
5 M12 plug, 5-pin
6 Control panel

Connection type

DS60-P/-N11121



5-pin, M12



See chapter Accessories
Cables and connectors
Mounting systems
Special accessories

Technical data	DS60	-P 11121	-N 11121
Type of connection	M12 plug, 5-pin	■	■
Scanning range, adjustable	200 mm to 20 000 mm	■	■
Reflective tape	Diamond Grade	■	■
Light source [1]	Laser diode, infrared	■	■
Light spot at 20 000 mm distance	Ø 200 mm	■	■
Supply voltage V_S [2]	18 to 30 V DC	■	■
Power consumption [3]	< 3 W	■	■
Ripple [4]	≤ 5 V_{PP}	■	■
Switching outputs (invertable)	Q_1, Q_2	■	■
DS60-P: PNP	HIGH = V_S – (< 2 V)/LOW = 0 V	■	
DS60-N: NPN	HIGH = V_S/LOW ≤ 2 V		■
Output current [5]	100 mA	■	■
Switching frequency	50/s	■	■
Switching limit Q_1/Q_2	adjustable (Teach-in)	■	■
Time delay	on request	■	■
Multifunction MF	Test-input/External Teach on request	■	■
Sender on	< 2 V or open-circuit	■	
	V_S – (< 2 V) or open-circuit		■
Sender off	> 12 V to < V_S	■	
	0 V to V_S – (> 12 V)		■
VDE protection class [6]	II	■	■
Laser protection class	1 (EN 60 825-1)	■	■
Enclosure rating	IP 67	■	■
Ambient temperature [7]	Operation – 25 to + 50 °C	■	■
	Storage – 25 to + 75 °C	■	■
Weight	202 g	■	■

1) Average service life 100 000 h, at room temperature = + 25 °C
2) Limit values, reverse polarity protected
3) Without load
4) Must be within V_S tolerances
5) Outputs Q_1 and Q_2 short-circuit protected
6) Withstand voltage 50 V DC
7) Do not distort cable below 0 °C

Order information	
Type	**Order no.**
DS60-P11121	1 016 397
DS60-N11121	1 016 492

Distance sensors
Proximity mode

DS 500/DT 500

Laser sensor measures distances to 18 m – on black material in proximity mode

DS 500 – distance sensor with two user taught switch outputs. Suitable for precise and reliable detection of objects – even with black surfaces – at a distance of up to 18 m. The high resolution of the sensor enables exact background suppression even in the presence of bright surfaces in the background.
Typical applications are:

- Anti-collision control,
- detection of small parts over a large scanning distance,
- part detection in material handling applications.

The sensors within the DS/DT 500 series are ideal for applications in rough environmental conditions due to their robust metal housing. Using the time of flight principle, a red laser detects the precise distance to the target object. The measurement laser is clearly visible on the target even at large distances, similar to a laser pointer. An integrated display on the housing of the sensor illustrates the current measurement value and enables easy set-up of switch positions. For outdoor applications, versions are available with integrated heating and a weather protection hood.

DT 500 – distance sensor with an analogue output or serial RS 422 data output. A universal sensor for distance measurement of black objects at a distance of up to 18 m. The user can teach the sensor the start and end of the sensors measuring. i.e. it can be adapted optimally to the task.
With a resolution of 1 mm and an accuracy of 3 mm, the DT 500 can be used for precise measurement tasks.
Typical applications are:

- Contour detection,
- diameter measurement,
- difference measurements,
- positioning of parts,
- stack height measurement/ classification.

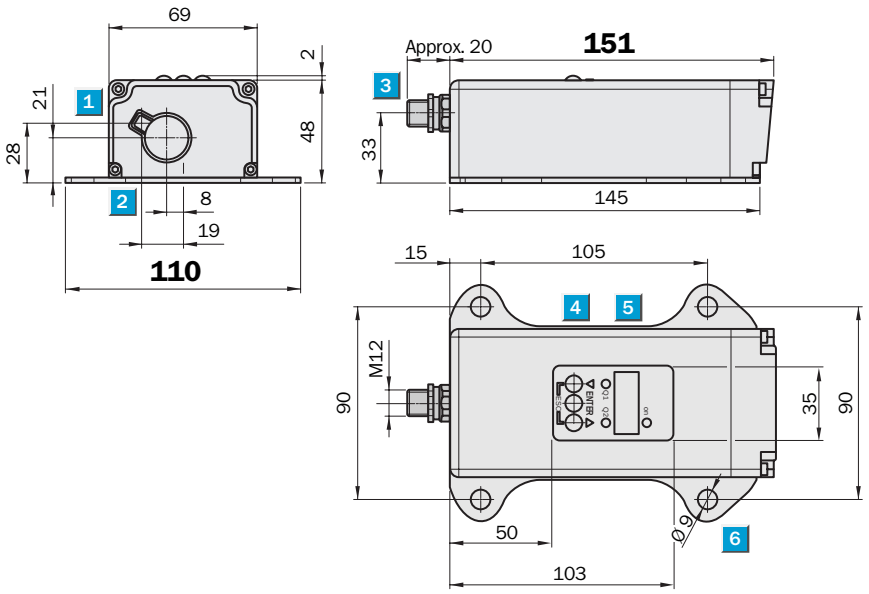
▲ A DT 500 laser sensor ensures the central positioning of mattresses and prepares them for bonding on the top layer of the mattress.

Scanning distance
0.2 … 18 m

Distance sensor

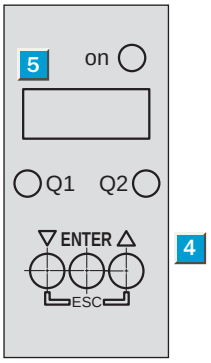
- High measurement accuracy thanks to time of flight measurement
- Simple alignment using red laser light
- Two distance switching outputs
- Metal housing with integral heating option
- Weather protection housing optional
- Alignment bracket optional

Dimensional drawing



Adjustments possible

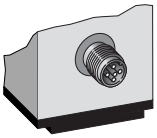
All types



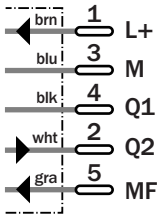
1 Optical axis – sender
2 Optical axis – receiver
3 M12 plug, 5-pin
4 Operating components
5 Indicator
6 Mounting hole

Connection type

All types



5-pin, M12



Teach-in	MF active	Model
Q1	100 ms	Current measurement value is used as switching threshold
$\bar{Q}1$	200 ms	
Q2	300 ms	
$\bar{Q}2$	400 ms	

See chapter Acccessories
Cables and connectors
Mounting systems
Special accessories

Technical data		DS500-	P111	P211	N111	N211
Scanning distance	0.2 ... 18 m (black), 6 % remission		■	■	■	■
	0.2 ... 30 m (white), 90 % remission		■	■	■	■
Light spot diameter	30 mm at 20 m		■	■	■	■
Light source [1], light type	Laser diode, red light		■	■	■	■
Laser class	2 (EN 60825/21 CFR 1040)		■	■	■	■
Supply voltage V_S [2]	10 ... 30 V DC [3]		■	■	■	■
Residual ripple [4]	5 V_{PP}		■	■	■	■
Power consumption typ. without heating	2 W		■		■	
with heating	22 W			■		■
Response time	250 ms		■	■	■	■
Switching accuracy	± 3 mm		■	■	■	■
Temperature drift	Typ. 0.05 mm/K		■	■	■	■
Switching outputs Q1, Q2	PNP		■	■		
	NPN				■	■
External Teach ET	Teach: > 12 V < V_S		■	■		
	Teach: < 2 V				■	■
	Free-running < 2 V or unswitched		■	■		
	Free-running > 12 V < V_S				■	■
VDE protection class [5]	⧈		■	■	■	■
Enclosure rating	IP 65		■	■	■	■
Ambient temperature without heating	Operation	–10 °C ... +50 °C	■		■	
with heating	Operation	–40 °C ... +50 °C [3]		■		■
	Storage	–25 °C ... +75 °C	■	■	■	■
Weight	Approx. 1000 g		■	■	■	■
Initialisation period	Typ. 500 ms		■	■	■	■
EMC	EN 61000-6-2, EN 55011		■	■	■	■
Mechanical load	Shock: EN 600 86-2-27/-2-29		■	■	■	■
	Sine: EN 600 68-2-6		■	■	■	■
	Noise: EN 600 68-2-64		■	■	■	■

1) Average service life 50,000 h at T_A = +25 °C
2) Reverse-polarity protected
3) V_S ≥ 24 V DC for DS500-P2xx with heating
4) May not exceed or fall short of V_S tolerances
5) Reference voltage 32 V DC

Error performance or no object in visibility field

Error: Measurement value output display: 0.000
Switching outputs: Switching stage ≙ measurement value 0 m

No object in visibility field:
Measurement value output display: 99.99
Switching outputs: Switching stage ≙ measurement value 99.99 m

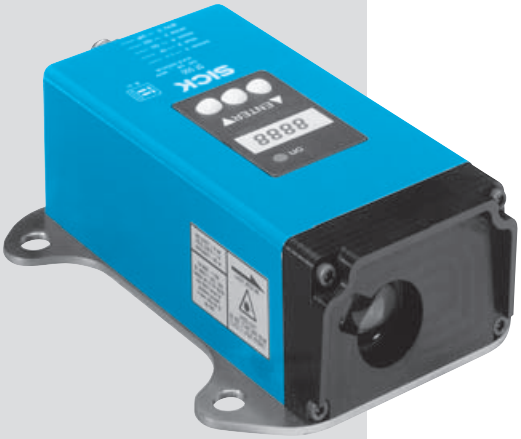
Order information

Type	Order no.
DS500-P111	1 026 519
DS500-P211	1 026 520
DS500-N111	1 026 512
DS500-N211	1 026 522

Measurement range
0.2 ... 18 m

Distance sensor

- High measurement accuracy thanks to time of flight measurement
- Simple alignment using red laser light
- Analogue current interface
- Serial RS 422 data output
- Metal housing with integral heating option
- Weather protection housing optional
- Alignment bracket optional



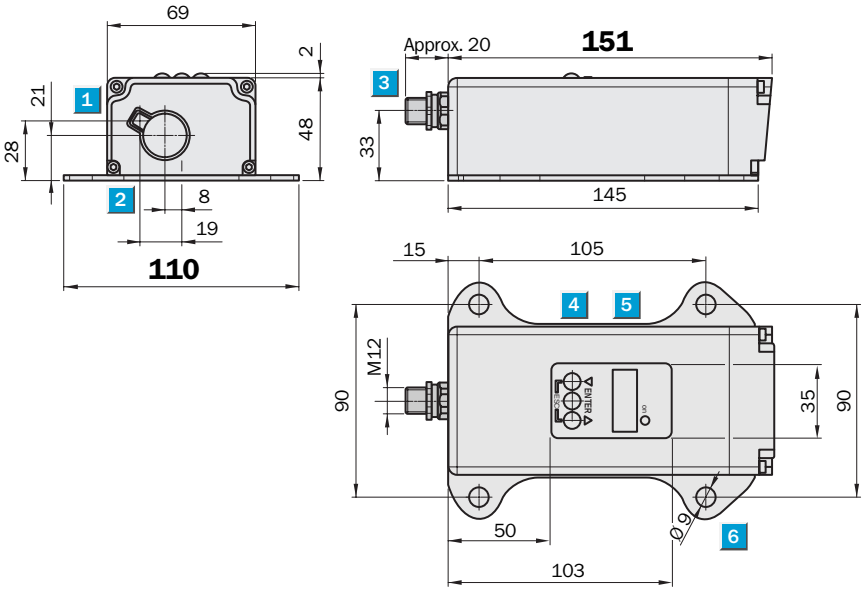
See chapter Acccessories

Cables and connectors

Mounting systems

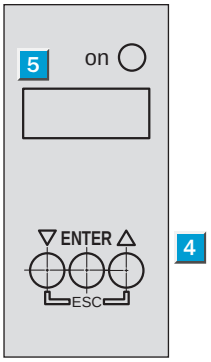
Special accessories

Dimensional drawing



Adjustments possible

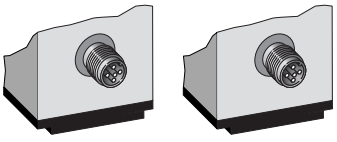
All types



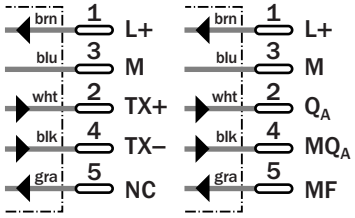
1 Optical axis – sender
2 Optical axis – receiver
3 M12 plug, 5-pin
4 Operating components
5 Indicator
6 Mounting hole

Connection type

Serial (-A .. 2) | Analogue (-A .. 1)



5-pin, M12 | 5-pin, M12



Technical data		DT500-	A111	A211	A112	A212
Measuring range	0.2 ... 18 m (black), 6 % remission		■	■	■	■
	0.2 ... 30 m (white), 90 % remission		■	■	■	■
Accuracy	±3 mm		■	■	■	■
Reproducibility [1]	1 mm		■	■	■	■
Measured value output	250 ms		■	■	■	■
Temperature drift	Typ. 0.05 mm/K		■	■	■	■
Light spot diameter	30 mm at 20 m		■	■	■	■
Resolution	1 mm		■	■	■	■
Light source [2], **light type**	Laser diode, red light		■	■	■	■
Laser class	2 (EN 60825/21 CFR 1040)		■	■	■	■
Supply voltage V_S [3]	10 ... 30 V DC [4]		■	■	■	■
Residual ripple [5]	5 V_{PP}		■	■	■	■
Power consumption typ. without heating	2 W		■		■	
with heating	22 W			■		■
Analogue output (adjustable)	0 ... 20 mA/4 ... 20 mA		■	■		
Serial interface	RS 422; 19,2 kBd; 8, n, 1				■	■
Measurement value display in mm [6]	20.000 CR LF				■	■
VDE protection class [7]	⧈		■	■	■	■
Enclosure rating	IP 65		■	■	■	■
Ambient temperature without heating	Operation	–10 °C ... +50 °C	■		■	
with heating	Operation	–40 °C ... +50 °C [4]		■		■
	Storage	–25 °C ... +75 °C	■	■	■	■
Weight	Approx. 1000 g		■	■	■	■
Initialisation period	Typ. 500 ms		■	■	■	■
EMC	EN 61000-6-2, EN 55011		■	■	■	■
Mechanical load	Shock: EN 600 86-2-27/-2-29		■	■	■	■
	Sine: EN 600 68-2-6		■	■	■	■
	Noise: EN 600 68-2-64		■	■	■	■

1) Statistical error 1 σ, environmental conditions constant
2) Average service life 50,000 h at T_A = +25 °C
3) Reverse-polarity protected
4) V_S ≥ 24 V DC for DT500-A2xx with heating
5) May not exceed or fall short of V_S tolerances
6) Without point, example output 20,000 mm
7) Reference voltage 32 V DC

Error performance or no object in visibility field

Error: Measurement value output display: 0.000
Analogue interface: 0/3.5 mA
Serial interface: 00000 CR LF

No object in visibility field:
Measurement value output display: 99.99
Analogue interface: 20.5 mA
Serial interface: 99999 CR LF

Order information

Type	Order no.
DT500-A111	1 026 515
DT500-A211	1 026 516
DT500-A112	1 026 517
DT500-A212	1 026 518

Distance sensors
Proximity mode

Distance sensors
Reflector mode

DME5000/DME3000/ DME2000: distance measurement in millisecond cycles

Distance measurement systems such as the DME5000 are used in automated storage technology for detecting the position of storage and retrieval devices. In order to do this, the sensor moves with the vehicle and constantly measures the time-of-flight of an emitted light impulse to the end of the shelf aisle and back. The electronics unit determines the position of the storage and retrieval unit from this time and passes it on to the vehicle control system.

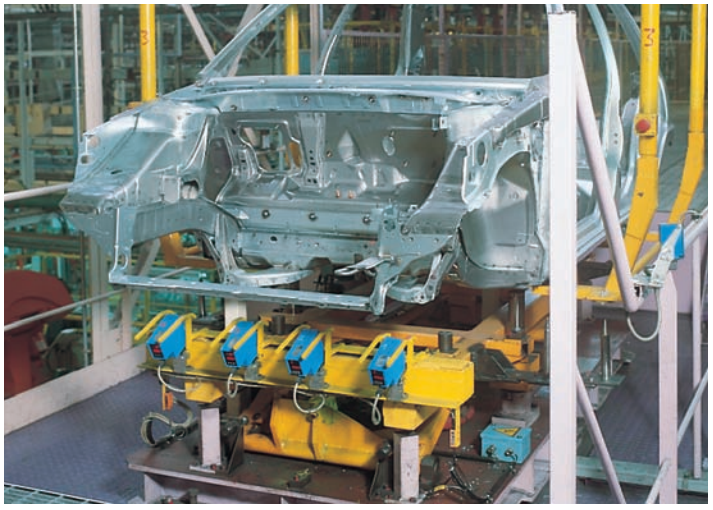
Highly dynamic and accurate measurement; multi-functional switching outputs and inputs for standby, preset and other system functions; a device display with all important information available at a glance; and a particularly user-friendly mounting and alignment concept are the most important advantages of the new DME5000 laser distance measurement system. The compact device is available in three versions that have been specially optimised for automatic small part stock, for pallets in high-bay warehouses or cranes. The DME5000's ambient temperature range has been designed for –10 °C to +55 °C. A variant with internal heating achieves –40 °C to +55 °C. Thus the distance measurement device is also suitable for use in deepfreeze storage systems. Warehouse type-specific versions for positioning processes at maximum speeds. Two warehouse types of differing sizes predominate: automatic small part stock for containers of varying dimensions, and structurally larger high-bay warehouses for Euro and, sometimes, system-specific pallets. The new DME5000 is suitable for approach speeds of up to 10 m/s and takes the differing requirements of the two types of warehouses into account with its two range-optimised versions for 70 m and 150 m.

Specially for cranes a 300 m version is available.

▼ Indexing car position – millimetre precision with the DME5000.

▲ DME process information: The weight of a coil can be determined from its diameter.

► Positioning high-bay stackers with the DME3000 distance measuring device.



▲ A DME distance measuring device used to detect drill holes as part of inspection/quality control.

Measurement range
0,15 ... 70/0,15 ... 150/
0,15 ... 300 m

Distance measuring device

- Short positioning processes: very fast measuring time
- High degree of system availability: highest accuracy and reproducibility
- Convenient operation startup: illuminated LCD display with diagnosis information
- Easy assembly and alignment concept: alignment bracket with spring/visible red light

SSI

CE

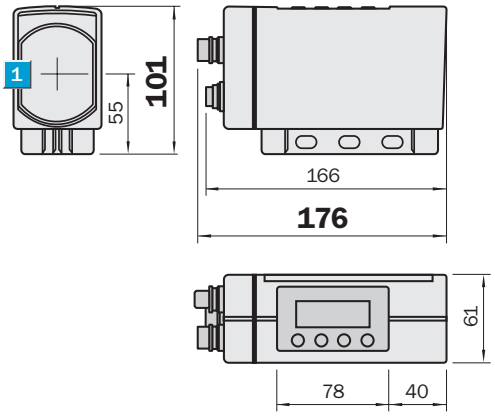
cULus LISTED

Laser class 2

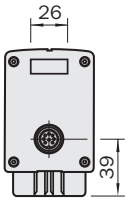
See chapter Accessories
Connectors
Mounting systems

Dimensional drawing

All types

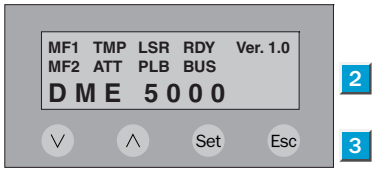


Back sight



Adjustments possible

All types

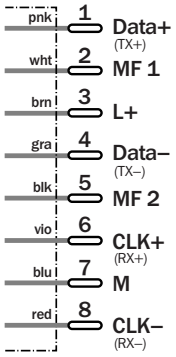


1 Centre of optical axis
2 LC display
3 Entry range

Connection type

Connections

8-pin, M16



Technical Data		DME5000-	111	121	211	221	311	321				
Measurement range [1]	0.15 ... 70 m		■	■								
	0.15 ... 150 m				■	■						
	0.15 ... 300 m						■	■				
Accuracy	±2 mm		■	■								
	±3 mm				■	■						
	±5 mm						■	■				
Reproducibility [2]	0.5 mm		■	■								
	1 mm				■	■						
	2 mm						■	■				
Light spot diameter	max. 130 mm at 70 m		■	■								
	max. 270 mm at 150 m				■	■						
	max. 550 mm at 300 m						■	■				
Resolution (adjustable)	0.05 ... 5 mm		■	■	■	■	■	■				
Light source [3], **light type**	Laser diode, red light		■	■	■	■	■	■				
Laser category	2 (IEC 60825-1/C.D.R.H.)		■	■	■	■	■	■				
Supply voltage V_S [4]	18 ... 30 V DC		■	■	■	■	■	■				
Residual ripple [5]	5 V_{PP}		■	■	■	■	■	■				
Current consumption	< 250 mA at 24 V DC		■		■		■					
with heating	< 1000 mA			■		■		■				
Switching outputs MF1, MF2	B (push/pull)		■	■	■	■	■	■				
Output (MF1/MF2)	HIGH: U_V < 3 V; LOW < 2 V		■	■	■	■	■	■				
Input (MF1) [6]	HIGH: > 12 V; LOW < 3 V		■	■	■	■	■	■				
Output current I_A max. [7]	100 mA (short-circuit/overload protected)		■	■	■	■	■	■				
Connection type	Plug		■	■	■	■	■	■				
VDE protection class [8]	⧈		■	■	■	■	■	■				
Enclosure rating	IP 65		■	■	■	■	■	■				
Ambient temperature	Operation	–10 °C ... +55 °C	■		■		■					
with heating	Operation	–40 °C ... +55 °C		■		■		■				
	Storage	–25 °C ... +75 °C	■	■	■	■	■	■				
Weight	approx. 1650 g		■	■	■	■	■	■				
Effect of air pressure	0.3 ppm/hPa		■	■	■	■	■	■				
Effect of air temperature	1 ppm/K		■	■	■	■	■	■				
Temperature drift	typ. 0.1 mm/K		■	■	■	■	■	■				
Measurement value output	1 ms		■	■								
	2 ms				■	■	■	■				
Initialisation period	500 ms		■	■	■	■						
	800 ms						■	■				
Max. running speed	5 m/s						■	■				
	10 m/s		■	■	■	■						
EMC	EN 61000-6-2, EN 55011: class B		■	■	■	■	■	■				
Mechanical load	Shock: EN 600 68-2-27/-2-29		■	■	■	■	■	■				
	Sine: EN 600 68-2-6		■	■	■	■	■	■				
	Noise: EN 600 68-2-64		■	■	■	■	■	■				

1) On reflective tape "Diamond Grade"
2) Statistical error 1 σ, environmental conditions constant, minimal warm-up time: 10 min.
3) Average service life 50,000 h at T_A = +25 °C
4) Limit values
5) May not exceed or fall short of V_S tolerances
6) Not reverse-polarity protected
7) Max. 100 nF/20 mH
8) Reference voltage 32 V DC

Order information	
Type	**Order no.**
DME5000-111	1022949
DME5000-121	1024083
DME5000-211	1024081
DME5000-221	1024085
DME5000-311	1025244
DME5000-321	1025246

Measurement range
0,15 ... 70/0,15 ... 150/
0,15 ... 300 m

Distance measuring device

- Short positioning processes: very fast measuring time
- High degree of system availability: highest accuracy and reproducibility
- Convenient operation startup: illuminated LCD display with diagnosis information
- Easy assembly and alignment concept: alignment bracket with spring/visible red light

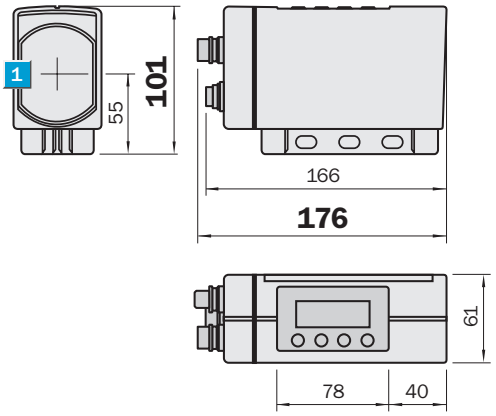
PROFIBUS

Laser class 2

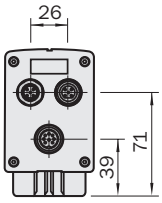
See chapter Accessories
Connectors
Mounting systems

Dimensional drawing

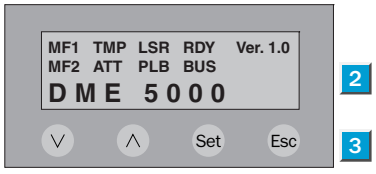
All types



Back sight

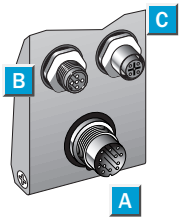


Adjustments possible



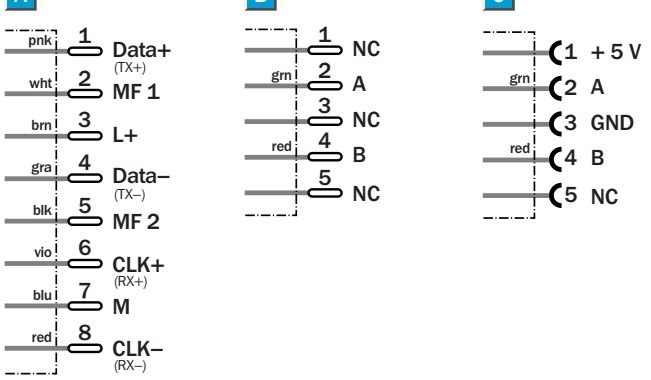
1 Centre of optical axis
2 LC display
3 Entry range

Connection type



Connections

8-pin, M16	5-pin, M12 Bus in	5-pin, M12 Bus out
A	B	C



Technical Data		DME5000-	112	122	212	222	312	322
Measurement range [1]	0.15 ... 70 m		■	■				
	0.15 ... 150 m				■	■		
	0.15 ... 300 m						■	■
Accuracy	±2 mm		■	■				
	±3 mm				■	■		
	±5 mm						■	■
Reproducibility [2]	0.5 mm		■	■				
	1 mm				■	■		
	2 mm						■	■
Light spot diameter	max. 130 mm at 70 m		■	■				
	max. 270 mm at 150 m				■	■		
	max. 550 mm at 300 m						■	■
Resolution (adjustable)	0.05 ... 5 mm		■	■	■	■	■	■
Light source [3], **light type**	Laser diode, red light		■	■	■	■	■	■
Laser category	2 (IEC 60825-1/C.D.R.H.)		■	■	■	■	■	■
Supply voltage V_S [4]	18 ... 30 V DC		■	■	■	■	■	■
Residual ripple [5]	5 V_{PP}		■	■	■	■	■	■
Current consumption	< 250 mA at 24 V DC		■		■		■	
with heating	< 1000 mA			■		■		■
Switching outputs MF1, MF2	B (push/pull)		■	■	■	■	■	■
Output (MF1/MF2)	HIGH: U_V < 3 V; LOW < 2 V		■	■	■	■	■	■
Input (MF1) [6]	HIGH: > 12 V; LOW < 3 V		■	■	■	■	■	■
Output current I_A max. [7]	100 mA (short-circuit/overload protected)		■	■	■	■	■	■
Connection type	Plug		■	■	■	■	■	■
VDE protection class [8]	⧈		■	■	■	■	■	■
Enclosure rating	IP 65		■	■	■	■	■	■
Ambient temperature	Operation	–10 °C ... +55 °C	■		■		■	
with heating	Operation	–40 °C ... +55 °C		■		■		■
	Storage	–25 °C ... +75 °C	■	■	■	■	■	■
Weight	approx. 1650 g		■	■	■	■	■	■
Effect of air pressure	0.3 ppm/hPa		■	■	■	■	■	■
Effect of air temperature	1 ppm/K		■	■	■	■	■	■
Temperature drift	typ. 0.1 mm/K		■	■	■	■	■	■
Measurement value output	2 ms		■	■	■	■	■	■
Initialisation period	500 ms		■	■	■	■		
	800 ms						■	■
Max. running speed	5 m/s						■	■
	10 m/s		■	■	■	■		
EMC	EN 61000-6-2, EN 55011: class B		■	■	■	■	■	■
Mechanical load	Shock: EN 600 68-2-27/-2-29		■	■	■	■	■	■
	Sine: EN 600 68-2-6		■	■	■	■	■	■
	Noise: EN 600 68-2-64		■	■	■	■	■	■

1) On reflective tape "Diamond Grade"
2) Statistical error 1 σ, environmental conditions constant, minimal warm-up time: 10 min.
3) Average service life 50,000 h at T_A = +25 °C
4) Limit values
5) May not exceed or fall short of V_S tolerances
6) Not reverse-polarity protected
7) Max. 100 nF/20 mH
8) Reference voltage 32 V DC

Order information	
Type	**Order no.**
DME5000-112	1023668
DME5000-122	1024084
DME5000-212	1024082
DME5000-222	1024086
DME5000-312	1025245
DME5000-322	1025247

Measurement range
0,15 ... 70/0,15 ... 150/
0,15 ... 300 m

Distance measuring device

- Short positioning processes: very fast measuring time
- High degree of system availability: highest accuracy and reproducibility
- Convenient operation startup: illuminated LCD display with diagnosis information
- Easy assembly and alignment concept: alignment bracket with spring/visible red light

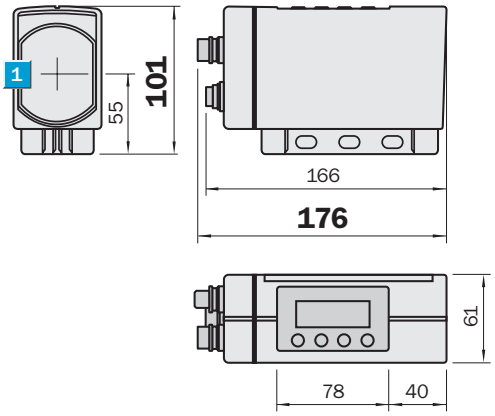
RS 422

Laser class 2

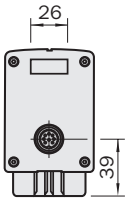
See chapter Accessories
Connectors
Mounting systems

Dimensional drawing

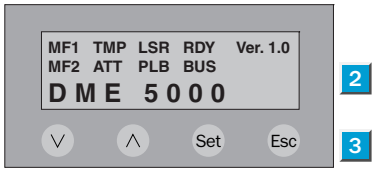
All types



Back sight



Adjustments possible

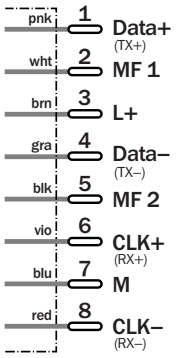


1 Centre of optical axis
2 LC display
3 Entry range

Connection type

Connections

8-pin, M16



Technical Data		DME5000-	113	123	213	223	313	323
Measurement range [1]	0.15 ... 70 m		■	■				
	0.15 ... 150 m				■	■		
	0.15 ... 300 m						■	■
Accuracy	±2 mm		■	■				
	±3 mm				■	■		
	±5 mm						■	■
Reproducibility [2]	0.5 mm		■	■				
	1 mm				■	■		
	2 mm						■	■
Light spot diameter	max. 130 mm at 70 m		■	■				
	max. 270 mm at 150 m				■	■		
	max. 550 mm at 300 m						■	■
Resolution (adjustable)	0.05 ... 5 mm		■	■	■	■	■	■
Light source [3], **light type**	Laser diode, red light		■	■	■	■	■	■
Laser category	2 (IEC 60825-1/C.D.R.H.)		■	■	■	■	■	■
Supply voltage V_S [4]	18 ... 30 V DC		■	■	■	■	■	■
Residual ripple [5]	5 V_{PP}		■	■	■	■	■	■
Current consumption	< 250 mA at 24 V DC		■		■		■	
with heating	< 1000 mA			■		■		■
Switching outputs MF1, MF2	B (push/pull)		■	■	■	■	■	■
Output (MF1/MF2)	HIGH: U_V < 3 V; LOW < 2 V		■	■	■	■	■	■
Input (MF1) [6]	HIGH: > 12 V; LOW < 3 V		■	■	■	■	■	■
Output current I_A max. [7]	100 mA (short-circuit/overload protected)		■	■	■	■	■	■
Connection type	Plug		■	■	■	■	■	■
VDE protection class [8]	⧈		■	■	■	■	■	■
Enclosure rating	IP 65		■	■	■	■	■	■
Ambient temperature	Operation	–10 °C ... +55 °C	■		■		■	
with heating	Operation	–40 °C ... +55 °C		■		■		■
	Storage	–25 °C ... +75 °C	■	■	■	■	■	■
Weight	approx. 1650 g		■	■	■	■	■	■
Effect of air pressure	0.3 ppm/hPa		■	■	■	■	■	■
Effect of air temperature	1 ppm/K		■	■	■	■	■	■
Temperature drift	typ. 0.1 mm/K		■	■	■	■	■	■
Measurement value output	2 ms		■	■	■	■	■	■
Initialisation period	500 ms		■	■	■	■		
	800 ms						■	■
Max. running speed	5 m/s						■	■
	10 m/s		■	■	■	■		
EMC	EN 61000-6-2, EN 55011: class B		■	■	■	■	■	■
Mechanical load	Shock: EN 600 68-2-27/-2-29		■	■	■	■	■	■
	Sine: EN 600 68-2-6		■	■	■	■	■	■
	Noise: EN 600 68-2-64		■	■	■	■	■	■

1) On reflective tape "Diamond Grade"
2) Statistical error 1 σ, environmental conditions constant, minimal warm-up time: 10 min.
3) Average service life 50,000 h at T_A = +25 °C
4) Limit values
5) May not exceed or fall short of V_S tolerances
6) Not reverse-polarity protected
7) Max. 100 nF/20 mH
8) Reference voltage 32 V DC

Order information	
Type	**Order no.**
DME5000-113	1025048
DME5000-123	1025249
DME5000-213	1025050
DME5000-223	1025251
DME5000-313	1025252
DME5000-323	1025253

Measurement range
0,15 ... 70/0,15 ... 150/
0,15 ... 300 m

Distance measuring device

- Short positioning processes: very fast measuring time
- High degree of system availability: highest accuracy and reproducibility
- Convenient operation startup: illuminated LCD display with diagnosis information
- Easy assembly and alignment concept: alignment bracket with spring/visible red light

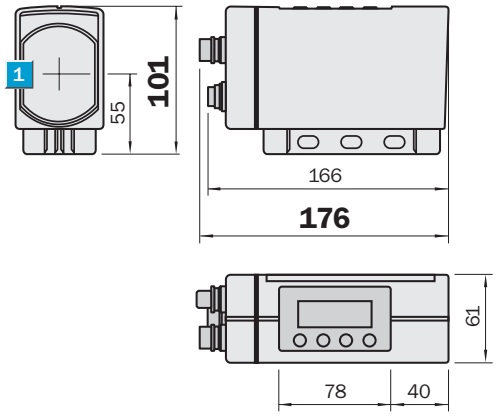
HIPERFACE® by SICK STEGMANN

Laser class 2

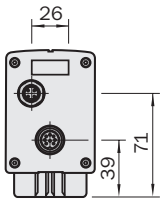
See chapter Accessories

Connectors
Mounting systems
Reflectors
Special accessories

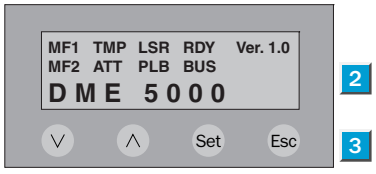
Dimensional drawing



Back sight

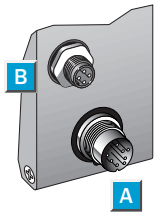


Adjustments possible



1 Centre of optical axis
2 LC display
3 Entry range

Connection type



Connections

8-pin, M12

A

wht	1	REF sin
brn	2	+ sin
grn	3	REF cos
yel	4	+ cos
gra	5	Data +
pnk	6	Data -
blu	7	GND
	8	NC

4-pin, M12

B

brn	1	L+
wht	2	MF2
blu	3	M
blk	4	MF1

Technical Data		DME5000-	117	127	217	227	317	327
Measurement range [1]	0.15 ... 70 m		■	■				
	0.15 ... 150 m				■	■		
	0.15 ... 300 m						■	■
Accuracy	±2 mm		■	■				
	±3 mm				■	■		
	±5 mm						■	■
Reproducibility [2]	0.5 mm		■	■				
	1 mm				■	■		
	2 mm						■	■
Light spot diameter	max. 130 mm at 70 m		■	■				
	max. 270 mm at 150 m				■	■		
	max. 550 mm at 300 m						■	■
Resolution (adjustable)	0.05 ... 5 mm		■	■	■	■	■	■
Light source [3], **light type**	Laser diode, red light		■	■	■	■	■	■
Laser category	2 (IEC 60825-1/C.D.R.H.)		■	■	■	■	■	■
Supply voltage V_S [4]	18 ... 30 V DC		■	■	■	■	■	■
Residual ripple [5]	5 V_{PP}		■	■	■	■	■	■
Current consumption	< 250 mA at 24 V DC		■		■		■	
with heating	< 1000 mA			■		■		■
Switching outputs MF1, MF2	B (push/pull)		■	■	■	■	■	■
Output (MF1/MF2)	HIGH: U_V < 3 V; LOW < 2 V		■	■	■	■	■	■
Input (MF1) [6]	HIGH: > 12 V; LOW < 3 V		■	■	■	■	■	■
Output current I_A max. [7]	100 mA (short-circuit/overload protected)		■	■	■	■	■	■
Connection type	Plug		■	■	■	■	■	■
VDE protection class [8]	⧈		■	■	■	■	■	■
Enclosure rating	IP 65		■	■	■	■	■	■
Ambient temperature	Operation	–10 °C ... +55 °C	■		■		■	
with heating	Operation	–40 °C ... +55 °C		■		■		■
	Storage	–25 °C ... +75 °C	■	■	■	■	■	■
Weight	approx. 1650 g		■	■	■	■	■	■
Effect of air pressure	0.3 ppm/hPa		■	■	■	■	■	■
Effect of air temperature	1 ppm/K		■	■	■	■	■	■
Temperature drift	typ. 0.1 mm/K		■	■	■	■	■	■
Measurement value output	2 ms		■	■	■	■	■	■
Initialisation period	900 ms		■	■	■	■	■	■
Max. running speed	5 m/s						■	■
	10 m/s		■	■	■	■		
EMC	EN 61000-6-2, EN 55011: class B		■	■	■	■	■	■
Mechanical load	Shock: EN 600 68-2-27/-2-29		■	■	■	■	■	■
	Sine: EN 600 68-2-6		■	■	■	■	■	■
	Noise: EN 600 68-2-64		■	■	■	■	■	■

1) On reflective tape "Diamond Grade"
2) Statistical error 1 σ, environmental conditions constant, minimal warm-up time: 10 min.
3) Average service life 50,000 h at T_A = +25 °C
4) Limit values
5) May not exceed or fall short of V_S tolerances
6) Not reverse-polarity protected
7) Max. 100 nF/20 mH
8) Reference voltage 32 V DC

Order information	
Type	**Order no.**
DME5000-117	1028243
DME5000-127	1028244
DME5000-217	1028245
DME5000-227	1028246
DME5000-317	1028247
DME5000-327	1028248

Measurement range
0,15 ... 70/0,15 ... 150/
0,15 ... 300 m

Distance measuring device

- Short positioning processes: very fast measuring time
- High degree of system availability: highest accuracy and reproducibility
- Convenient operation startup: illuminated LCD display with diagnosis information
- Easy assembly and alignment concept: alignment bracket with spring/visible red light

DeviceNet

CE

c UL us LISTED

Laser class 2

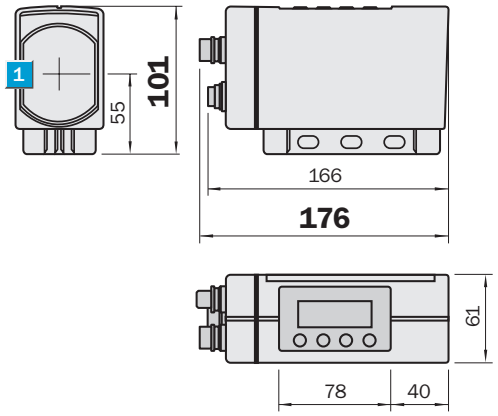
See chapter Accessories

Connectors

Mounting systems

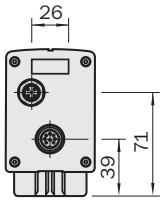
Special accessories

Dimensional drawing

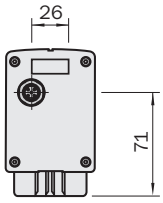


Back sight

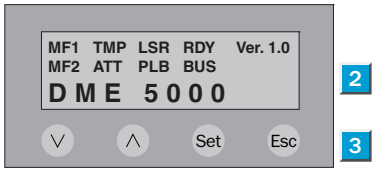
DME5000-xx4



DME5000-xx5



Adjustments possible



1 Centre of optical axis
2 LC display
3 Entry range

Connection type

DME5000-XX4

DME5000-XX5

Connections

8-pin, M16

A

pnk	1	Data+ (TX+)
wht	2	MF 1
brn	3	L+
gra	4	Data– (TX–)
blk	5	MF 2
vio	6	CLK+ (RX+)
blu	7	M
red	8	CLK– (RX–)

5-pin, M12

Bus in

D

grn	1	Shield
red	2	L+ (24 V/U_S)
blk	3	M (GND/COM)
wht	4	CAN_H
blu	5	CAN_L

Technical Data		DME5000-	114	115	124	214	215	224	314	315	324
Measurement range [1]	0.15 ... 70 m		■	■	■						
	0.15 ... 150 m					■	■	■			
	0.15 ... 300 m								■	■	■
Accuracy	±2 mm		■	■	■						
	±3 mm					■	■	■			
	±5 mm								■	■	■
Reproducibility [2]	0.5 mm		■	■	■						
	1 mm					■	■	■			
	2 mm								■	■	■
Light spot diameter	max. 130 mm at 70 m		■	■	■						
	max. 270 mm at 150 m					■	■	■			
	max. 550 mm at 300 m								■	■	■
Resolution (adjustable)	0.05 ... 5 mm		■	■	■	■	■	■	■	■	■
Light source [3], **light type**	Laser diode, red light		■	■	■	■	■	■	■	■	■
Laser category	2 (IEC 60825-1/C.D.R.H.)		■	■	■	■	■	■	■	■	■
Supply voltage V_S [4]	18 ... 30 V DC		■	■	■	■	■	■	■	■	■
Residual ripple [5]	5 V_{PP}		■	■	■	■	■	■	■	■	■
Current consumption	< 250 mA at 24 V DC		■	■		■	■		■	■	
with heating	< 1000 mA				■			■			■
Switching outputs MF1, MF2	B (push/pull)		■	■	■	■	■	■	■	■	■
Output (MF1/MF2)	HIGH: U_V < 3 V; LOW < 2 V		■	■	■	■	■	■	■	■	■
Input (MF1) [6]	HIGH: > 12 V; LOW < 3 V		■	■	■	■	■	■	■	■	■
Output current I_A max. [7]	100 mA (short-circuit/overload protected)		■	■	■	■	■	■	■	■	■
Connection type	Plug		■	■	■	■	■	■	■	■	■
VDE protection class[8]	⧈		■	■	■	■	■	■	■	■	■
Enclosure rating	IP 65		■	■	■	■	■	■	■	■	■
Ambient temperature	Operation	–10 °C ... +55 °C	■	■		■	■		■	■	
with heating	Operation	–40 °C ... +55 °C			■			■			■
	Storage	–25 °C ... +75 °C	■	■	■	■	■	■	■	■	■
Weight	approx. 1650 g		■	■	■	■	■	■	■	■	■
Effect of air pressure	0.3 ppm/hPa		■	■	■	■	■	■	■	■	■
Effect of air temperature	1 ppm/K		■	■	■	■	■	■	■	■	■
Temperature drift	typ. 0.1 mm/K		■	■	■	■	■	■	■	■	■
Measurement value output	2 ms		■	■	■	■	■	■	■	■	■
Initialisation period	500 ms		■	■	■	■	■	■			
	800 ms								■	■	■
Max. running speed	5 m/s								■	■	■
	10 m/s		■	■	■	■	■	■			
EMC	EN 61000-6-2, EN 55011: class B		■	■	■	■	■	■	■	■	■
Mechanical load	Shock: EN 600 68-2-27/-2-29		■	■	■	■	■	■	■	■	■
	Sine: EN 600 68-2-6		■	■	■	■	■	■	■	■	■
	Noise: EN 600 68-2-64		■	■	■	■	■	■	■	■	■

1) On reflective tape "Diamond Grade"
2) Statistical error 1 σ, environmental conditions constant, minimal warm-up time: 10 min.
3) Average service life 50,000 h at T_A = +25 °C
4) Limit values
5) May not exceed or fall short of V_S tolerances
6) Not reverse-polarity protected
7) Max. 100 nF/20 mH
8) Reference voltage 32 V DC

Order information	
Type	**Order no.**
DME5000-114	1025832
DME5000-115	1025833
DME5000-124	1025836
DME5000-214	1025834
DME5000-215	1025835
DME5000-224	1025837
DME5000-314	1026002
DME5000-315	1026003
DME5000-324	1026004

Measurement range up to 500 m

Distance measuring device

- Excellent measurement accuracy and reproducibility thanks to time-of-flight measurement
- Simple adjustment using visible red light
- Easy handling due to integrated display
  - 2 switching outputs
  - pre-failure signalling output
  - plausibility control
- Gateway to Interbus, DeviceNet

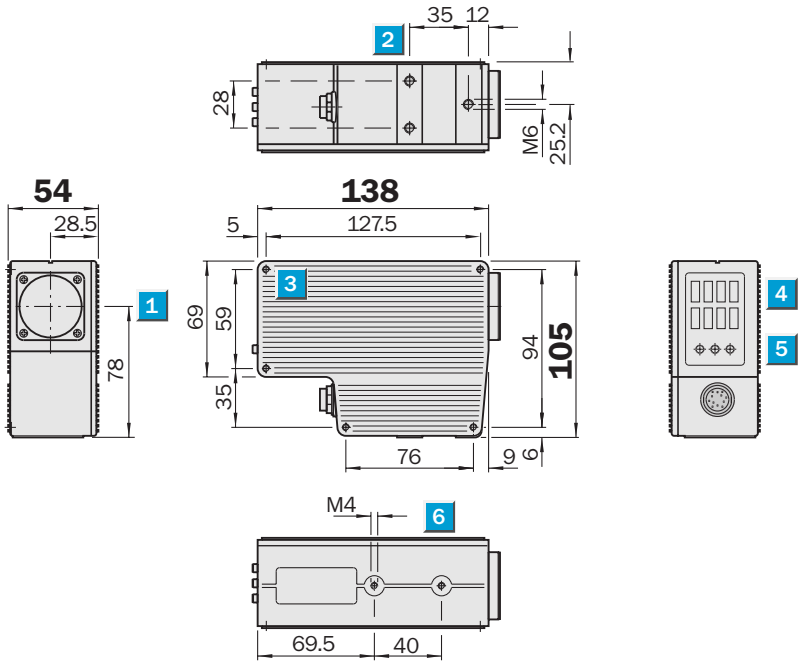
RS 422

Laser class 2

See chapter Accessories

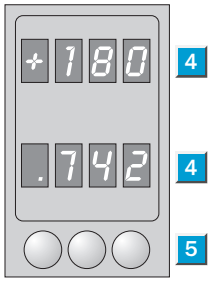
- Cables and connectors
- Mounting systems
- Reflectors
- Special accessories

Dimensional drawing



Adjustments possible

All types

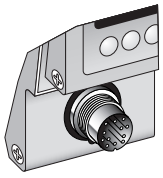


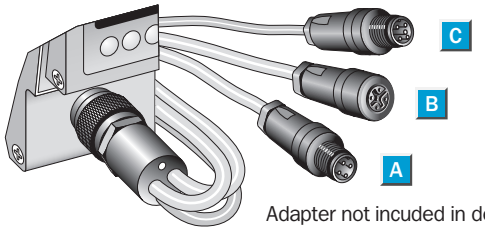
1 Centre of optical axis
2 M6 threaded mounting hole, 10 mm deep
3 M4 threaded mounting hole, 14 mm deep (this side only)
4 8-digit alphanumeric indicator
5 Programming switches
6 M4 threaded mounting hole, 6 mm deep

Connection type

DME3000-111
DME3000-111S01
DME3000-311

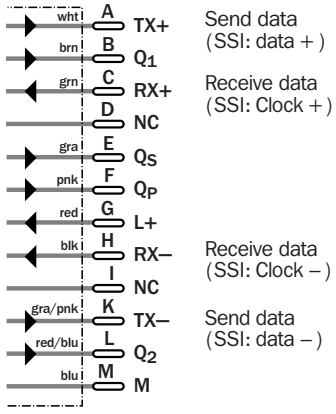
DME3000-111P
DME3000-111P01
DME3000-311P
DME3000-311P03



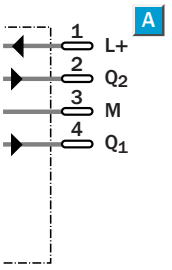


Adapter not incuded in delivery

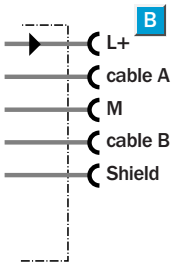
12-pin, M16



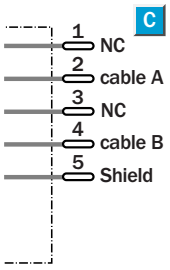
4-pin, M12



5-pin, M12



5-pin, M12



Technical data	DME3000-	111	111 S01	311	111P	111 P01	311P	311 P03
Measurement range	0.1…500 m[1], dep. on reflector, s. b.	■	■	■	■	■	■	■
Accuracy[2) 3)]	±5 mm (measurement distance>200 mm)	■	■	■	■	■	■	■
Reproducibility[4)]	Depending on measurement range, see below	■	■	■	■	■	■	■
Light spot diameter	1 m (measurement distance 500 m)	■	■	■	■	■	■	■
Resolution	0.125 mm	■	■	■	■	■	■	■
Light source[5)]**, light type**	Laser diode, red light	■	■	■	■	■	■	■
Laser category	2 (IEC 825-1/EN 60825-1)	■	■	■	■	■	■	■
	CDRH		■			■		■
Supply voltage V_S	18…30 V DC[6)]	■	■	■	■	■	■	■
Ripple	< 5 V_{SS}[7)]	■	■	■	■	■	■	■
Power consumption	≤ 6 W[8)]	■	■	■	■	■	■	■
Switching outputs	PNP/NPN	■	■	■	■	■	■	■
Q_1, Q_2, Q_P, Q_S	HIGH = V_S – < 2 V/LOW = < 2 V	■	■	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■	■
Q_1 and Q_2 switching outputs	Reversible Q/$\overline{Q}$	■	■	■	■	■	■	■
Switching limit/switching hysteresis	Adjustable	■	■	■	■	■	■	■
Q_P plausibility output	HIGH: measurement correct/	■	■	■	■	■	■	■
	LOW: measurement error							
Q_S service output	HIGH: OK / LOW: pre-failure signalling	■	■	■	■	■	■	■
	output							
Connection type	Plug	■	■	■	■	■	■	■
VDE protection class[9)]	⧈	■	■	■	■	■	■	■
Circuit protection[10)]	A, B, C	■	■	■	■	■	■	■
Enclosure rating	IP 65	■	■	■	■	■	■	■
Ambient temperature T_A	Operation – 10 °C…+ 45 °C	■	■	■	■	■	■	■
	Storage – 25 °C…+ 75 °C	■	■	■	■	■	■	■
Weight	Approx. 980 g	■	■	■	■	■	■	■
Interfaces	SSI: GRAY/BINARY adjust., 24 or 25 bits	■	■	■				
Serial interface	RS 422: 4.8/9.6/19.2/38.4 kBaud	■	■	■				
Profibus	Max. 12 MBaud				■	■	■	■
Effect of air pressure	0.3 ppm/hPa	■	■	■	■	■	■	■
Effect of air temperature	1 ppm/K	■	■	■	■	■	■	■
Temperature drift	Typical 0.3 mm/K	■	■		■	■		
	Typical 0.2 mm/K			■			■	■
Meas. value output SSI	1 ms	■	■	■				
Profibus	1.5 ms				■	■	■	■
RS 422, 38.4 kBaud	5 ms	■	■	■				
Initialisation period	4 s	■	■	■	■	■	■	■
Max. running speed	10 m/s	■	■	■	■	■	■	■

1) Relative to front edge of object
2) 23 °C air temperature, 977 hPa, min. switching period 30 min
3) Re-calibration recommended after 25,000 h
4) Environmental conditions constant, min. switching period 30 min.
5) Average service life 50,000 h at T_A = +25 °C
6) Limit values
7) May not exceed or fall short of V_S tolerances
8) Without load
9) Reference voltage 32 V DC
10) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
C = Interference pulse suppression

Measurement range		
Reproducibility	**0.5 mm**	**2 mm**
Statistical error 1 σ (switching period min. 30 min, environmental conditions constant)		
Measurement range with reflector		
Reflective tape 3290	0.1 m…20 m	0.1 m…40 m
Reflective tape 7610	**0.1 m…40 m**	**0.1 m…90 m**
Reflective tape "Diamond Grade"	**3.0 m…90 m**	**0.5 m…250 m**
Multi-reflector PL240F	0.1 m…250 m	0.1 m…300 m
Multi-reflector PL560F	0.1 m…270 m	0.1 m…350 m
Multi-reflector PL880F	10 m…300 m	8.0 m…500 m

Order information	
Type	**Order no.**
DME3000-111	1013110
DME3000-111S01	1015921
DME3000-311	1016283
DME3000-111P	1018063
DME3000-111P01	1018575
DME3000-311P	1018542
DME3000-311P03	1019305

Measurement range up to 10 m

Distance measuring device

- Excellent measurement accuracy and reproducibility thanks to time-of-flight measurement
- Simple adjustment using visible red light
- Easy handling due to programmable parameters
  - 2 switching outputs
  - pre-failure signalling output
  - plausibility control
- RS 422 serial interface and SSI interface
- Profibus
- Gateway to Interbus, DeviceNet

Laser class 2, 3 B

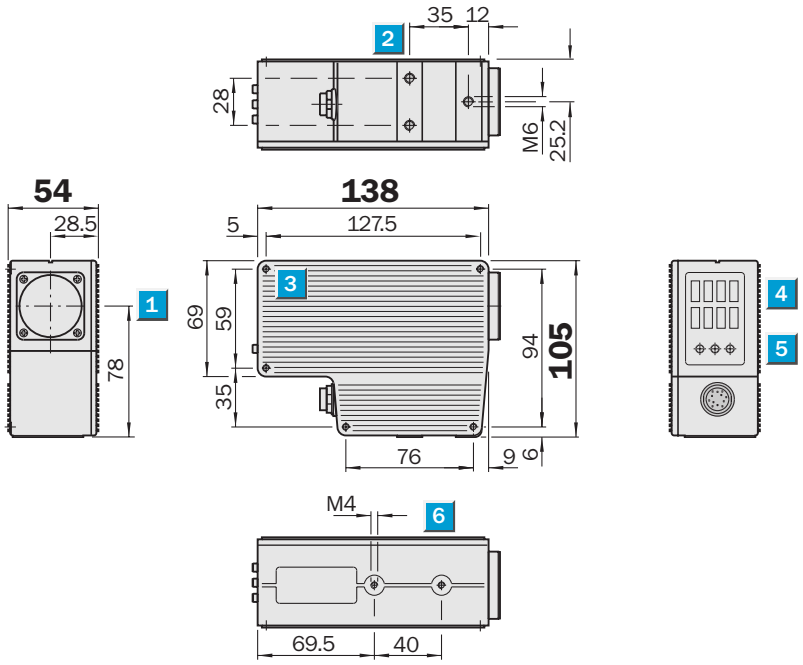
See chapter Accessories

Cables and connectors

Mounting systems

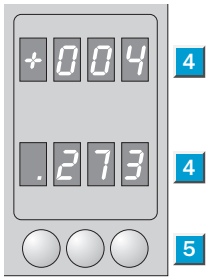
Special accessories

Dimensional drawing



Adjustments possible

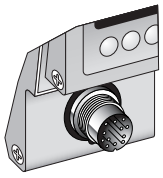
All types



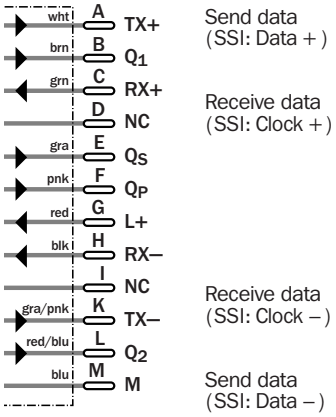
1 Centre of optical axis
2 M6 threaded mounting hole, 10 mm deep
3 M4 threaded mounting hole, 14 mm deep (this side only)
4 8-digit alphanumeric indicator
5 Programming switches
6 M4 threaded mounting hole, 6 mm deep

Connection type

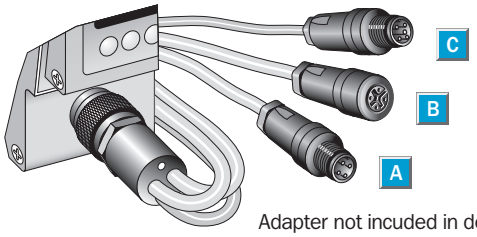
DME3000-211
DME3000-212
DME3000-232



12-pin, M16

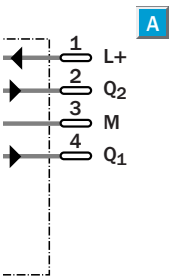


DME3000-211P
DME3000-411P
DME3000-212P04
DME3000-232P

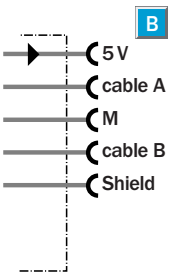


Adapter not incuded in delivery

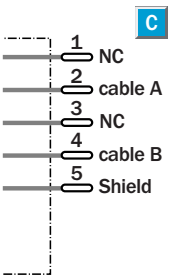
4-pin, M12



5-pin, M12



5-pin, M12



Technical data	DME 3000-	211	212	232	211P	411P	212P04	232P
Measurement range	100…8,000 mm	■	■		■	■	■	
	100…10,000 mm			■				■
Light spot diameter	5 mm (measurement distance 8 m)	■	■	■	■	■	■	■
Resolution	0.125 mm	■	■	■	■	■	■	■
Light source[2], **light type**	Diode laser, red light	■	■	■	■	■	■	■
Laser category	2 (IEC 825-1/EN 60825-1)	■	■		■	■	■	
Laser category	3 B (IEC 825-1/EN 60825-1)			■				■
Service life (at 25 °C)	MTTF 50,000 h	■	■	■	■	■	■	■
NIR blocking filter			■	■			■	■
Supply voltage V_S	18…30 V DC[3]	■	■	■	■	■	■	■
Ripple	< 5 V_{SS}[4]	■	■	■	■	■	■	■
Power consumption	≤ 6 W[5]	■	■	■	■	■	■	■
Switching outputs	PNP/NPN	■	■	■	■	■	■	■
Q_1, Q_2, Q_P, Q_S	HIGH = U_V – ≤ 2 V/LOW = < 2 V	■	■	■	■	■	■	■
Output current I_A max.	100 mA	■	■	■	■	■	■	■
Q_1 and Q_2 switching outputs	Reversible Q/$\overline{Q}$	■	■	■	■	■	■	■
Switching limit/switching hysteresis	Adjustable	■	■	■	■	■	■	■
Q_P plausibility output	HIGH: measurement correct/	■	■	■	■	■	■	■
	LOW: measurement error	■	■	■	■	■	■	■
Q_S service output	HIGH: OK/LOW: pre-failure signalling	■	■	■	■	■	■	■
	output							
Connection type	Plug	■	■	■	■	■	■	■
VDE protection class[6]	⧈	■	■	■	■	■	■	■
Circuit protection[7]	A, B, C	■	■	■	■	■	■	■
Enclosure rating	IP 65	■	■	■	■	■	■	
	IP 68							■
Ambient temperature T_A	Operation – 10 °C…+ 45 °C	■	■	■	■	■	■	■
	Storage – 25 °C…+ 75 °C	■	■	■	■	■	■	■
Weight	Approx. 980 g	■	■	■	■	■	■	■
Interfaces	SSI: GRIS/BINARY adjust., 24 or 25 bits	■	■	■				
Serial interface	RS 422: 4.8/9.6/19.2/38.4 kBaud	■	■	■				
Profibus	Max. 12 MBaud				■	■	■	■
Temperature drift	typ. 0.2 mm/K					■		
	typ. 0.4 mm/K	■	■	■	■		■	■
	(compensation on request)							
Measured value output								
SSI/Profibus	21 ms	■	■	■	■	■	■	■
RS 422, 38.4 kBaud	21 ms	■	■	■				
Initialisation period	5 s	■	■	■	■	■	■	■

1) Relative to front edge of object
2) Average service life 50,000 h at T_A = + 25 °C
3) Limit values
4) May not exceed or fall short of V_S tolerances
5) Without load
6) Reference voltage 50 V DC
7) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
C = Interference pulse suppression
8) Environmental conditions constant, min. switching period 30 min.
9) 23 °C air temp, 977 hPA, min. switching period 30 min.
10) Re-calibration recommended after 25,000 h.

Reproducibility and accuracy as a function of measurement distance

	DME3000-									
	21..	232	21..	232	21..	232	21..	232	21..	232
Measurement distance	1 m		2 m		4 m		6 m		8 m	10 m
Reproducibility[8]										
White, 90 % remission	1 mm	0.5 mm	2 mm	1 mm	5 mm	2 mm	10 mm	5 mm	25 mm	20 mm
Grey, 18 % remission	2 mm	1 mm	5 mm	2.5 mm	25 mm	5 mm	–	25 mm	–	–
Black, 6 % remission	5 mm	2 mm	25 mm	8 mm	–	25 mm	–	–	–	–
Accuracy[9][10]										
White, 90 % remission	±5 mm	±5 mm	±5 mm	±5 mm	±10 mm	±5 mm	±20 mm	±5 mm	±30 mm	±20 mm
Grey, 18 % remission	±5 mm	±5 mm	±10 mm	±5 mm	±30 mm	±10 mm	–	±25 mm	–	–
Black, 6 % remission	±10 mm	±5 mm	±20 mm	±10 mm	–	±10 mm	–	–	–	–

Order information

Types	Order no.
DME3000-211	1013782
DME3000-212	1015906
DME3000-232	1015794
DME3000-211P	1018064
DME3000-411P	1019149
DME3000-212P04	1019697
DME3000-232P	1018958

Measurement range 100...2047 mm

Measurement range 0.1...130 mm

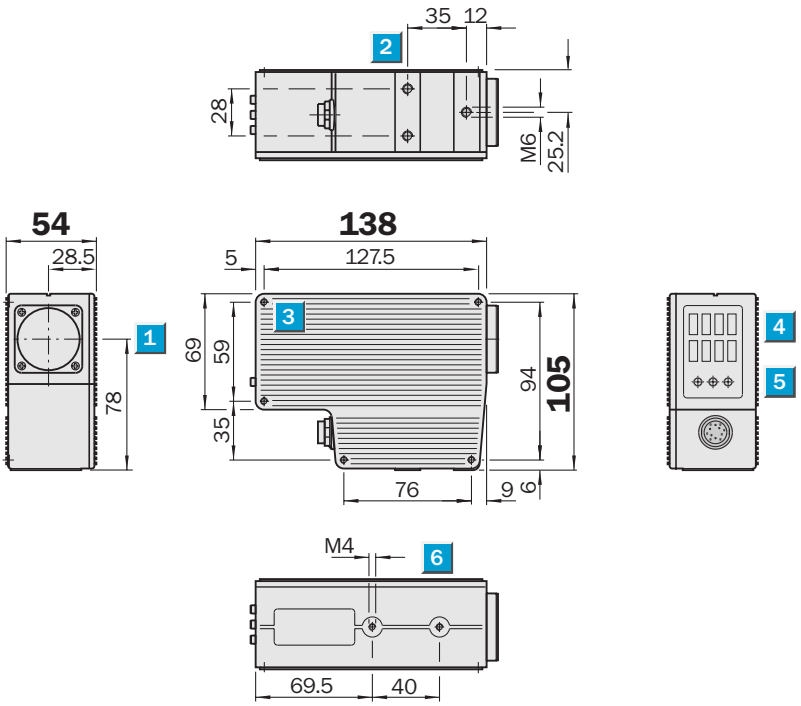
Distance measuring device

- Excellent measurement accuracy and reproducibility thanks to time-of-flight measurement
- Simple adjustment using visible red light
- Freely programmable parameters
  - 2 switching outputs
  - pre-failure signalling output
  - plausibility control
- RS 232 serial interface
- Analogue output

Laser class 2

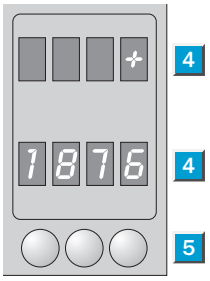
See chapter Accessories
Cables and connectors
Mounting systems
Special accessories

Dimensional drawing



Adjustments possible

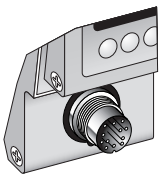
DME2000-000



1 Centre of optical axis
2 M6 threaded mounting hole, 10 mm deep
3 M4 threaded mounting hole, 14 mm deep (this side only)
4 8-digit alphanumeric indicator
5 Programming switches
6 M4 threaded mounting hole, 6 mm deep

Connection type

DME2000-000



12-pin, M16

wht	A	DTR	Data terminal ready (RS 232 output)
brn	B	Q_1	Q_1 switching output
grn	C	CTS	Clear to send (RS 232 input)
yel	D	Q_A	Q_A analogue output
gra	E	Q_S	Q_S service output
pnk	F	Q_P	Q_P plausibility output
red	G	L+	+ 18...30 V DC V_S
blk	H	RXD	R x D (receive data, RS 232 input)
vio	I	S&H	Blanking input
gra/pnk	K	TXD	T x D (send data, RS 232 output)
red/blu	L	Q_2	Q_2 switching output
blu	M	M	0 V (earth)

Technical data	DME2000-	000									
Light source[1], light type	Laser diode, red light										
Laser category	2 (IEC 825-1/EN 60825-1)										
Supply voltage V_S	18…30 V DC [2]										
Ripple	< 5 V_{SS}[3]										
Power consumption	< 6 W[4]										
Switching outputs											
Q_1, Q_2, Q_P, Q_S	PNP										
Output voltage	HIGH = V_S – ≤ 2 V/LOW = 2 V										
Output current I_A	100 mA										
Q_1 and Q_2 switching outputs	Reversible										
Switching limit	Adjustable in 1 mm increments										
Switching hysteresis	Adjustable in 2mm increments,										
	0…254 mm										
Q_P plausibility output	HIGH: measurement correct/										
	LOW: measurement error										
Q_S service output	HIGH: device has no faults/										
	LOW: pre-failure signalling output										
Blanking input S/H	HIGH: ≥ 10 V; ≤ V_S/										
	LOW: ≤ 2 V or unswitched;										
	HIGH: Measured value stored/										
	LOW: free-running										
Analogue output	0…20 mA or 4…20 mA										
Connection type	Plug										
VDE protection class[5]	⧈										
Circuit protection[6]	A, B, C										
Enclosure rating	IP 65 (IEC 529)										
Ambient temperature T_A	Operation – 10 °C…+ 45 °C										
	Storage – 25 °C…+ 75 °C										
Weight	Approx. 980 g										
Shock load	To IEC 68										
Serial interface	RS 232 (4.8/9.6, 19.2 kBaud)										
Temperature drift	Type 0.4 mm/K										

1) Average service life 50,000 h at T_A = +25 °C

2) Limit values

3) May not exceed or fall short of V_S tolerances

4) Without load

5) Reference voltage 50 V DC

6) A = V_S connections reverse-polarity protected
B = Output Q reverse-polarity protected
C = Interference pulse suppression

	Mode 1.1: Proximity mode	Mode 2.1: Reflector mode
Measurement range[7]	100…2047 mm	0.1…130 m
Resolution	1 mm	1 mm
Light spot dimensions	Approx. 3 mm/2 m	Approx. 250 mm/130 m
Effect of compressed air		0.3 ppm/mbar
Effect of air temperature		1 ppm/K
Measured value output cycle	29 ms	100 ms
Target remission	> 6…< 36000 %	Reflective tape
Max. running speed		3 m/s
Reproducibility[8]	1 mm (= 90 % remission)	2 mm
Statistical error 1 σ	3 mm (> 18 % remission)	3…130 m APM reflective tape
	25 mm (> 6 % remission)	3…100 m Diamond Grade
Statistical error 3 σ[9]	Typical 1 mm; max. 2 mm	0.1…90 m reflective tape 7610
		0.1…40 m reflective tape 3290
Accuracy[10]	± 5 mm (= 90 % remission)	+ 5/– 20 mm
	± 11 mm (> 18 % remission)	In range as below
	± 65 mm (> 6 % remission)	reproducibility stated

7) Relative to front edge of object

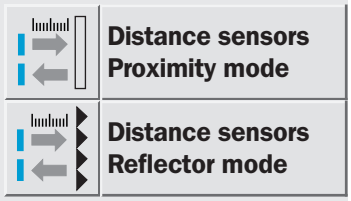
8) Environmental conditions constant at 30 min. minimum switching period

9) Measurement distance 1 m, 90 % remission

10) 20 °C ambient temperature, 1013 mbar, 30 min. switching period, re-calibration recommended after 25,000 h

Order information

Standard type	Order no.
DME2000-000	1010578



DMT/DML: Non-contact measurement of large distances

The devices in the DMT10-2 series use the time-of-flight method to measure the distance to naturally reflecting objects in a distance of up to 155 m. The DML variant even functions at distances of up to 1200 m with reflector.

The DMT/DML operates by emitting extremely short pulses of light and by measuring the travel time of these pulses to the object and back. It then uses the pulse travel time to calculate the distance to the object.

Once identified, the distance is indicated via a serial RS 232 or RS 422 interface. If required, the distance can also be transmitted via an analogue 4 ... 20 mA interface.

Two additional switching outputs with programmable parameters are also available: the operator can, for example, define certain work points as fixed distances which signal whenever the set value is exceeded or not met. The devices are also available with an Profibus interface. The system parameters are programmed via the RS 232 interface, using a laptop. DMT10-2-2xxx with electronic mask is specifically suited for dynamic procedures.

The large measuring range make these devices ideal for use in a wide range of branches for many different applications:

- level measurement in silos,
- goods profile measurement in connection with crane controls,
- determining the diameter of paper rolls in the printing and paper industry,
- level measurement of water, paper pulp or molten metal,
- measuring and regulating sag,
- measuring the dimensions of slabs,
- outdoor crane positioning.

▲ The human eye is incapable of crane positioning in external applications. Exact distance measurement using the distance measuring devices DMT and DML ensures the necessary accuracy is achieved.

▲ Hot surfaces are no problem for the DMT – up to 800 °C. A special high-temperature version measures molten metal with a surface temperature of up to 1200 °C.

▲ Occupied or free – distance measuring devices with long scanning ranges provide reliable information on object and stack profiles. They assist in quickly finding the right position, to ensure that everything moves as planned.

Measurement range up to 155 m

Distance measuring devices

- Excellent measurement accuracy thanks to time-of-flight measurement
- Simple adjustment using pilot light
- Freely programmable parameters – 2 switching outputs
- RS 422/RS 232 serial interface
- Analogue output

CE

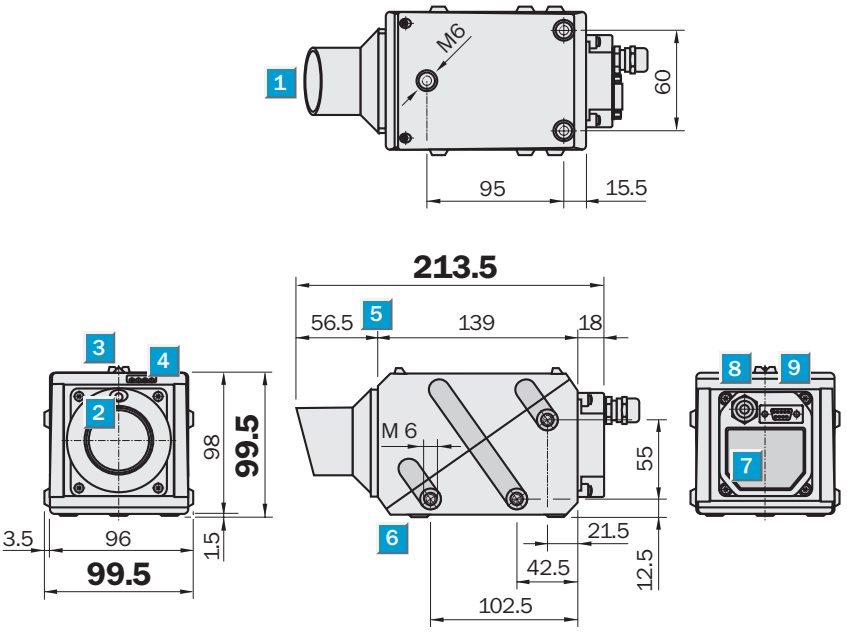
Laser class 1

See chapter Accessories

Cables and connectors

Mounting systems

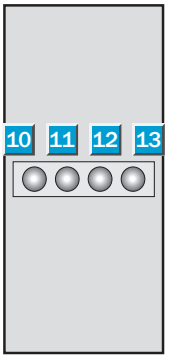
Dimensional drawing



Adjustments possible

DMT10-2-1111

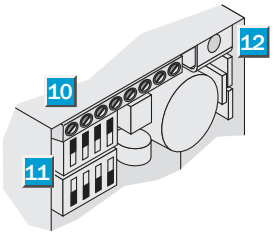
DMT10-2-1113



1	Dust protection tube
2	Laserpointer pilot light
3	Alignment sight
4	Function indicator
5	Zero level
6	Mounting hole M6 threaded – 6 mm deep
7	Plug cover
8	PG9
9	9-pin plug Sub D 9
10	Q_1 function indicator
11	Q_2 function indicator
12	Operating active, LED green
13	Plausibility (measurement error) LED red

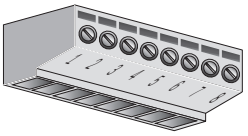
Connection type

all Types



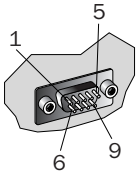
10	Terminals
11	DIP switch
	RS 232/RS 422 switch
12	Shield

PG9, terminal assignment



1	L+	5	$L+/Q, Q_A$
2	M	6	$M/Q, Q_A$
3	Q_1	7	Q_A
4	Q_2	8	NC

9-pin plug Sub D



RS 232		RS 422	
1	NC	5	GND
2	RxD	6	Tx +
3	TxD	7	Tx –
4	NC	8	Rx +
		9	Rx –

Technical data RS 232/RS 422	DMT10-2	1111	1113	2111
Measurement range	0.5 ... 155 m	■		■
	0.5 ... 20 m, max. object temp. 1200 °C		■	
Light spot diameter/distance	20 mm + (5 mm x distance in m)	■	■	■
Resolution	1 mm	■	■	■
Light source, light type	Laser diode, infrared light	■	■	■
Laser category	1 (EN 60825-1: Nov. 2001;	■	■	■
	IEC 60825-1:ÄM2:2001)	■	■	■
Supply voltage V_S	18 ... 30 V DC [1]	■	■	■
Residual ripple	< 5 V_{SS} [2]	■	■	■
Power consumption	≤ 6 W [3]	■	■	■
Switching outputs Q_1 , Q_2 , Q_A		■	■	■
Input L+/Q, Q_A [4] [5]	+5 V ... +30 V DC, supply outputs	■	■	■
Output current I_A max.	100 mA	■	■	■
Analogue output	4 ... 20 mA, scalable	■	■	■
Serial interface	RS 422/RS 232 switchable	■	■	■
Measured value output				
Mean value creation	1/16/64/256/1024 values	■	■	■
Output rate (min)	1 ms, 16 ms, 64 ms, 256 ms, 1024 ms	■	■	■
Response time				
	Max. 1024 ms	■	■	
	1 ms			■
Temperature drift				
0 °C ... +40 °C	Typ. 0.3 mm/K	■	■	
–10 °C ... 0 °C; +40 °C ... +55 °C	Typ. 0.6 mm/K	■	■	
–10 °C ... +55 °C	Typ. 3.0 mm/K			■
Initialisation period	6 s	■	■	■
VDE protection class [4]	III	■	■	■
Circuit protection [5]	A, B	■	■	■
Enclosure rating	IP 65	■	■	■
Ambient temperature T_A	Operation – 10 °C ... + 55 °C	■	■	■
	Storage – 25 °C ... + 70 °C	■	■	■
Weight	Approx. 1200 g	■	■	■

1) Limit values
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Reference voltage 50 V DC PELV- voltage (EN 50178)
5) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
6) Environmental conditions constant, minimal switching period 30 min
7) 23 °C air temperature, 977 hPa, minimal switching period 30 min
8) Accuracy may be reduced by factor 2.5 operating in +40 °C ... 55 °C

Reproducibility and accuracy as a function of measurement distance [6] [7] [8]	DMT10-2				
Measurement distance	1 m	15 m	40 m	65 m	155 m
Reproducibility [6]					
White, 90 % remission	7 mm	7 mm	7 mm	7 mm	10 mm
Grey, 18 % remission	7 mm	7 mm	7 mm	10 mm	–
Black, 6 % remission	7 mm	7 mm	10 mm	–	–
Accuracy [7]					
White, 90 % remission	±10 mm	±10 mm	±10 mm	±10 mm	±10 mm
Grey, 18 % remission	±10 mm	±10 mm	±10 mm	±10 mm	–
Black, 6 % remission	±10 mm	±10 mm	±10 mm	–	–

Accuracy of DMT10-2-2111 may be reduced by factor 4 compared with DMT10-2-111x.

Order information RS 232/RS 422	
Type	**Order no.**
DMT10-2-1111	1027603
DMT10-2-1113	1027605
DMT10-2-2111	1028540

Measurement range up to 155 m

Distance measuring devices

- Excellent measurement accuracy thanks to time-of-flight measurement
- Simple adjustment using pilot light
- Freely programmable parameters
- Profibus/RS 232 interface

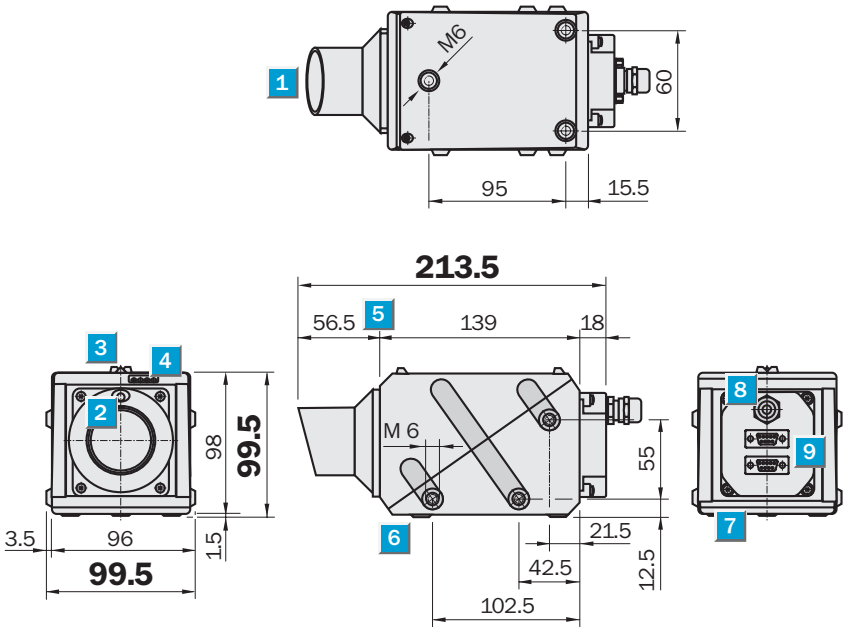
Laser class 1

See chapter Accessories

Cables and connectors

Mounting systems

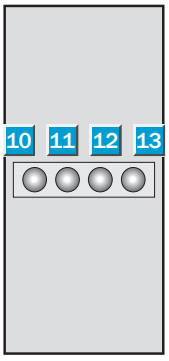
Dimensional drawing



Adjustments possible

DMT10-2-1211

DMT10-2-1213

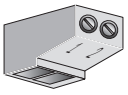


1	Dust protection tube
2	Laserpointer pilot light
3	Alignment sight
4	Function indicator
5	Zero level
6	Mounting hole M6 threaded – 6 mm deep
7	Plug cover
8	PG9
9	9-pin plug Sub D 9
10	Not in use
11	Data exchange
12	Operating active, LED green
13	Plausibility (measurement error) LED red

Connection scheme und data interface

all Types

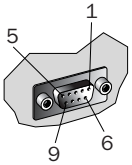
Terminal



1	L+
2	M

9-pin plug (bush) Sub D

Profibus

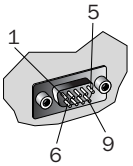


1	NC
2	NC
3	B
4	RTS

5	M
6	L+
7	NC
8	A
9	NC

9-pin plug Sub D

RS 232



1	nReset
2	RxD
3	TxD
4	NC

5	M
6	NC
7	NC
8	NC
9	NC

Technical data Profibus	DMT10-2	1211	1213	2211
Measurement range	0.5 ... 155 m	■		■
	0.5 ... 20 m, max. object temp. 1200 °C		■	
Light spot diameter	20 mm + (5 mm x distance in m)	■	■	■
Resolution	1 mm	■	■	■
Light source, light type	Laser diode, infrared light	■	■	■
Laser category	1 (EN 60825-1: Nov. 2001;	■	■	■
	IEC 60825-1:ÄM2:2001)	■	■	■
Supply voltage V_S	18 ... 30 V DC[1]	■	■	■
Residual ripple	< 5 V_{SS}[2]	■	■	■
Power consumption	≤ 6 W[3]	■	■	■
Serial interface	Profibus DP, max. 12 mBaud	■	■	■
Interface	RS 232	■	■	■
Measured value output				
Mean value creation	1/16/64/256/1024 values	■	■	■
Output rate (min)	1 ms, 16 ms, 64 ms, 256 ms, 1024 ms	■	■	■
Response time				
	max. 1024 ms	■	■	
	1 ms			■
Temperature drift				
0 °C ... +40 °C	Typ. 0.3 mm/K	■	■	
–10 °C ... 0 °C; +40 °C ... +55 °C	Typ. 0.6 mm/K	■	■	
–10 °C ... +55 °C	Typ. 3.0 mm/K			■
Initialisation period	6 s	■	■	■
VDE protection class[4]	III	■	■	■
Circuit protection[5]	A, B	■	■	■
Enclosure rating	IP 65	■	■	■
Ambient temperature T_A	Operation – 10 °C ... + 55 °C	■	■	■
	Storage – 25 °C ... + 70 °C	■	■	■
Weight	Approx. 1200 g	■	■	■

1) Limit values
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Reference voltage 50 V DC PELV- voltage (EN 50178)
5) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
6) Environmental conditions constant, minimal switching period 30 min
7) 23 °C air temperature, 977 hPa, minimal switching period 30 min
8) Accuracy may be reduced by factor 2.5 operating in +40 °C ... 55 °C

Reproducibility and accuracy as a function of measurement distance[6] [7] [8]					
	DMT10-2				
Measurement distance	1 m	15 m	40 m	65 m	155 m
Reproducibility[6]					
White, 90 % remission	7 mm	7 mm	7 mm	7 mm	10 mm
Grey, 18 % remission	7 mm	7 mm	7 mm	10 mm	–
Black, 6 % remission	7 mm	7 mm	10 mm	–	–
Accuracy[7]					
White, 90 % remission	±10 mm	±10 mm	±10 mm	±10 mm	±10 mm
Grey, 18 % remission	±10 mm	±10 mm	±10 mm	±10 mm	–
Black, 6 % remission	±10 mm	±10 mm	±10 mm	–	–

Accuracy of DMT10-2-2211 may be reduced by factor 4 compared with DMT10-2-121x.

Order information Profibus	
Type	**Order no.**
DMT10-2-1211	1027604
DMT10-2-1213	1027606
DMT10-2-2211	1028541

Measurement range up to 1200 m

Distance measuring devices

- Excellent measurement accuracy thanks to time-of-flight measurement
- Simple adjustment using pilot light
- Freely programmable parameters – 2 switching outputs
- RS 422/RS 232 serial interface
- Analogue output

CE

Laser class 1

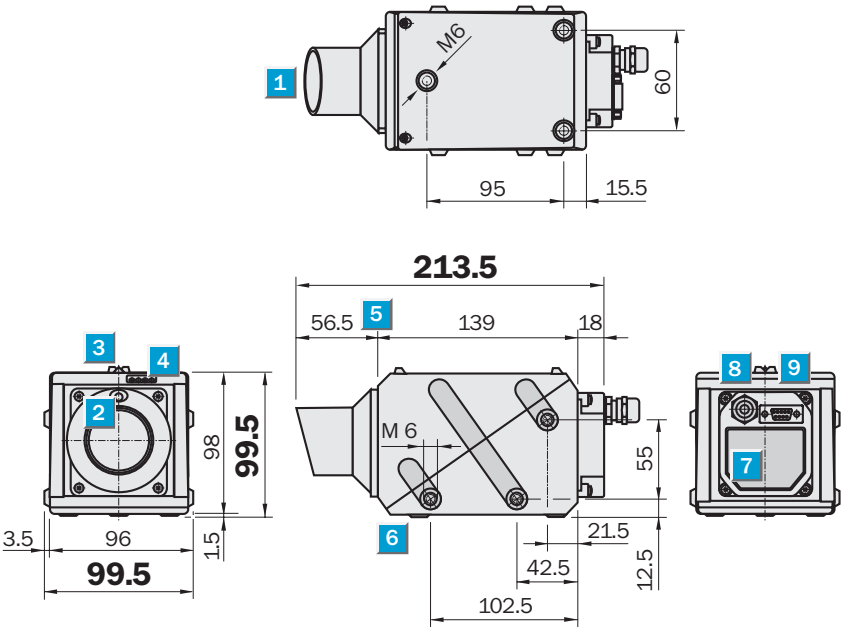
See chapter Accessories

Cables and connectors

Mounting systems

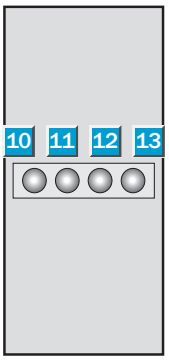
Reflectors

Dimensional drawing



Adjustments possible

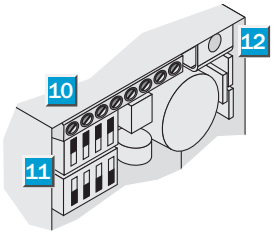
DML40-2-1111



1	Dust protection tube
2	Laserpointer pilot light
3	Alignment sight
4	Function indicator
5	Zero level
6	Mounting hole M6 threaded – 6 mm deep
7	Plug cover
8	PG9
9	9-pin plug Sub D 9
10	Q_1 function indicator
11	Q_2 function indicator
12	Operating active, LED green
13	Plausibility (measurement error) LED red

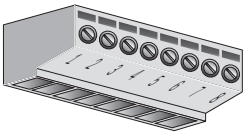
Connection type

DML40-2-1111



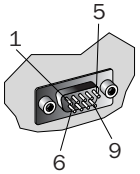
10	Terminals
11	DIP switch RS 232/RS 422 switch
12	Shield

PG9, terminal assignment



1	L+	5	L+/Q, Q_A
2	M	6	M/Q, Q_A
3	Q_1	7	Q_A
4	Q_2	8	NC

9-pin plug Sub D



RS 232		RS 422	
1	NC	5	GND
2	RxD	6	Tx +
3	TxD	7	Tx –
4	NC	8	Rx +
		9	Rx –

Technical data RS 232/RS 422	DML40-2	1111
Measurement range		
	0.5 ... 600 m on Diamond Grade	
	0.5 ... 800 m on reflector PL 880 FS01	
	0.5 ... 1200 m on reflector OP 55	
Light spot diameter	20 mm + (5 mm x distance in m)	
Resolution	1 mm	
Light source, light type	Laser diode, infrared light	
Laser category	1 (EN 60825-1: Nov. 2001;	
	IEC 60825-1:ÄM2:2001)	
Supply voltage V_S	18 ... 30 V DC[1]	
Residual ripple	< 5 V_{SS}[2]	
Power consumption	≤ 6 W[3]	
Outputs Q_1, Q_2, Q_A		
Input L+/Q, Q_A[4] [5]	DC +5 V ... +30 V, supply outputs	
Output current I_A max.	100 mA	
Analogue output	4 ... 20 mA, scalable	
Serial interface	RS 422/RS 232 switchable	
Measured value output		
Mean value creation	1/16/64/256/1024 values	
Output rate (min)	1 ms/3.2 ms/12.8 ms/50 ms/200 ms	
Temperature drift		
0 °C ... +40 °C	Typ. 0.3 mm/K	
–10 °C ... 0 °C; +40 °C ... +55 °C	Typ. 0.6 mm/K	
Initialisation period	6 s	
VDE protection class[6]	III	
Circuit protection[7]	A, B	
Enclosure rating	IP 65	
Ambient temperature T_A	Operation – 10 °C ... + 55 °C	
	Storage – 25 °C ... + 70 °C	
Weight	Approx. 1200 g	

1) Limit values
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Reference voltage 50 V DC PELV- voltage (EN 50178)
5) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
6) Environmental conditions constant, minimal switching period 30 min
7) 23 °C air temperature, 977 hPa, minimal switching period 30 min
8) Accuracy may be reduced by factor 2.5 operating in +40 °C ... 55 °C

Reproducibility and accuracy as a function of measurement distance[6] [7] [8]	
	DML40-2
Measurement distance	0.5 ... 1200 m
Reproducibility[6]	6 mm
Accuracy[7]	±10 mm

Order information RS 232/RS 422	
Type	**Order no.**
DML40-2-1111	1027607

Measurement range up to 1200 m

Distance measuring devices

- Excellent measurement accuracy thanks to time-of-flight measurement
- Simple adjustment using pilot light
- Freely programmable parameters
- Profibus/RS 232 interface

Laser class 1

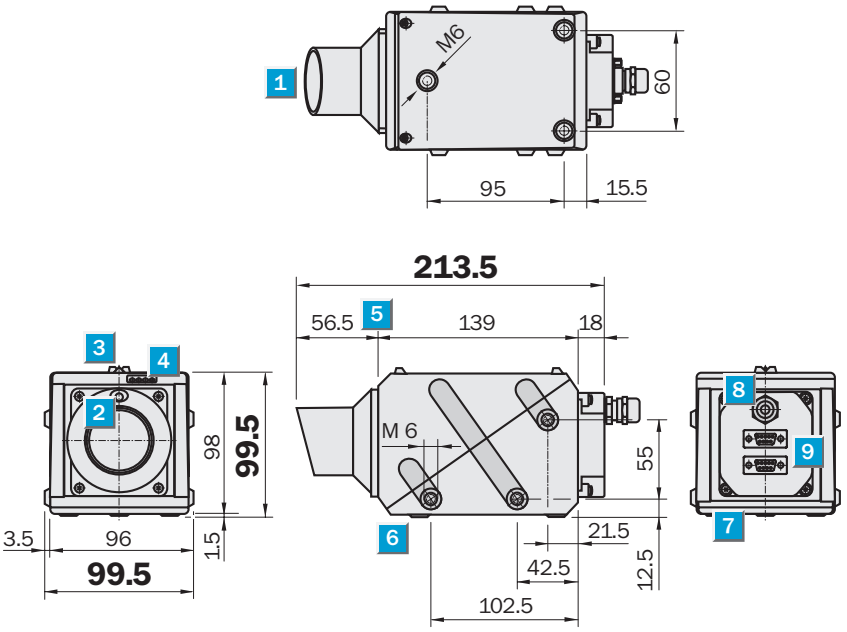
See chapter Accessories

Cables and connectors

Mounting systems

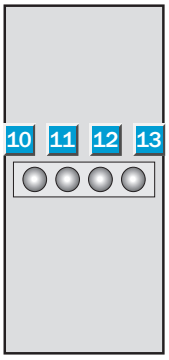
Reflectors

Dimensional drawing



Adjustments possible

DML40-2-1211

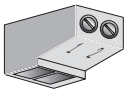


1	Dust protection tube
2	Laserpointer pilot light
3	Alignment sight
4	Function indicator
5	Zero level
6	Mounting hole M6 threaded – 6 mm deep
7	Plug cover
8	PG9
9	9-pin plug Sub D 9
10	Plausibility (measurement error) LED red
11	Operating active, LED green
12	Q_1 function indicator
13	Q_2 function indicator

Connection scheme and data interface

DML40-2-1211

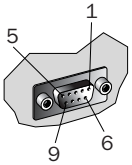
Terminal



1	L+
2	M

9-pin plug (bush) Sub D

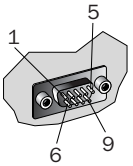
Profibus



1	NC	5	M
2	NC	6	L+
3	B	7	NC
4	RTS	8	A
		9	NC

9-pin plug Sub D

RS 232



1	nReset	5	M
2	RxD	6	NC
3	TxD	7	NC
4	NC	8	NC
		9	NC

Technical data Profibus	DML40-2	1211									

Measurement range		
	0.5 ... 600 m on Diamond Grade	
	0.5 ... 800 m on reflector PL 880 FS01	
	0.5 ... 1200 m on reflector OP 55	
Light spot diameter	20 mm + (5 mm x distance in m)	
Resolution	1 mm	
Light source, light type	Laser diode, infrared light	
Laser category	1 (EN 60825-1: Nov. 2001;	
	IEC 60825-1:ÄM2:2001)	
Supply voltage V_S	18 ... 30 V DC[1]	
Residual ripple	< 5 V_{SS}[2]	
Power consumption	≤ 6 W[3]	
Serial interface	Profibus DP, max. 12 mBaud	
Interface	RS 232	
Measured value output		
Mean value creation	1/16/64/256/1024 values	
Output rate (min)	1 ms/3.2 ms/12.8 ms/50 ms/200 ms	
Temperature drift		
0 °C ... +40 °C	Typ. 0.3 mm/K	
–10 °C ... 0 °C; +40 °C ... +55 °C	Typ. 0.6 mm/K	
Initialisation period	6 s	
VDE protection class[4]	III	
Circuit protection[5]	A, B	
Enclosure rating	IP 65	
Ambient temperature T_A	Operation – 10 °C ... + 55 °C	
	Storage – 25 °C ... + 70 °C	
Weight	Approx. 1200 g	

1) Limit values
2) May not exceed or fall short of V_S tolerances
3) Without load
4) Reference voltage 50 V DC PELV- voltage (EN 50178)
5) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
6) Environmental conditions constant, minimal switching period 30 min
7) 23 °C air temperature, 977 hPa, minimal switching period 30 min
8) Accuracy may be reduced by factor 2.5 operating in +40 °C ... 55 °C

Reproducibility and accuracy as a function of measurement distance[6] [7] [8]	
	DML40-2
Measurement distance	0.5 ... 1200 m
Reproducibility[6]	6 mm
Accuracy[7]	±10 mm

Order information Profibus	
Type	**Order no.**
DML40-2-1211	1027608

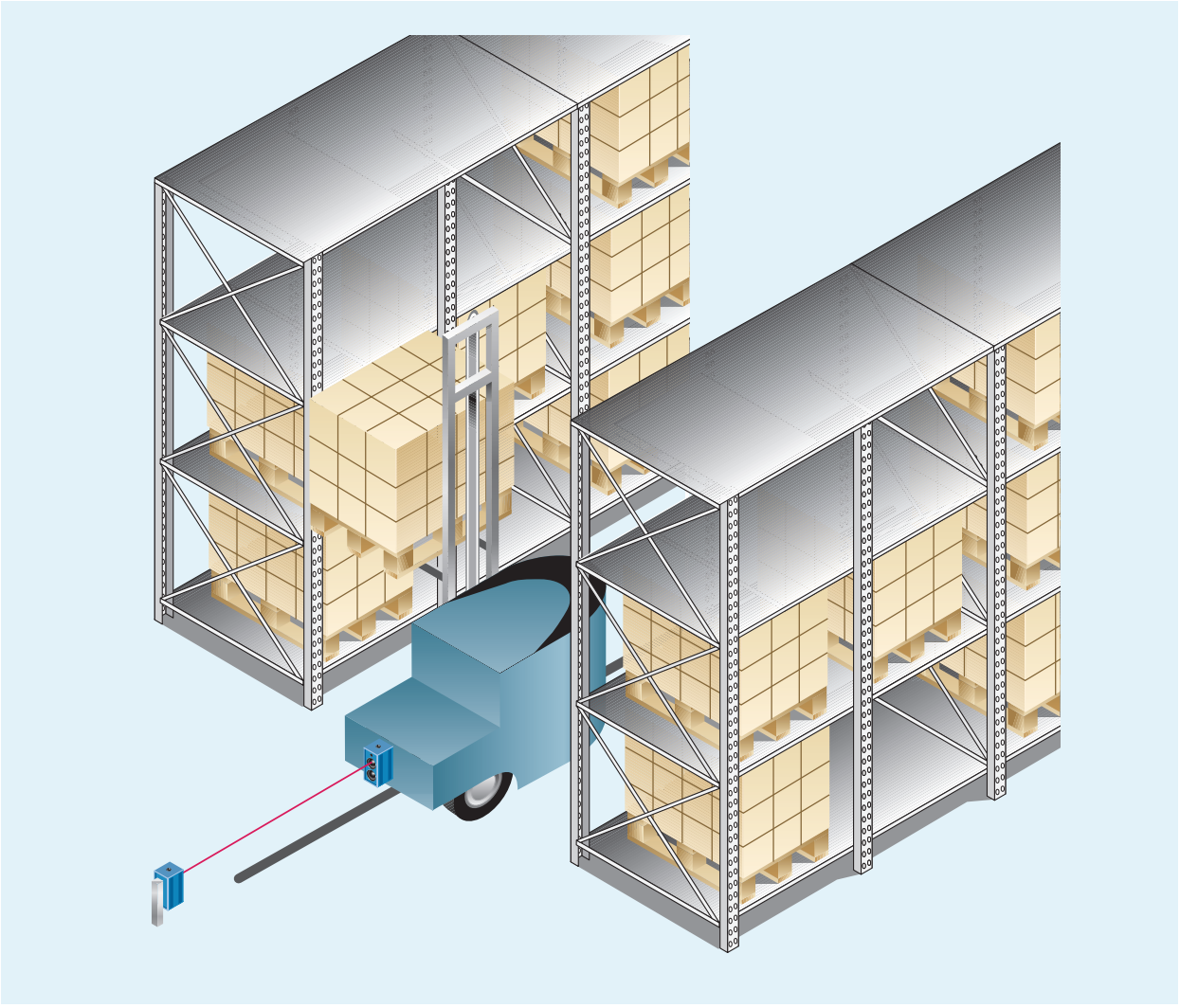
ISD: Optical infrared data transmission replaces cable connections

The ISD infrared data transmission system enables cable-free data transmission to rail-mounted vehicles along the light beam.
This system is a friction-free alternative to trailing cables, e.g. with high-bay stackers. The system consists of a device pair, i.e. optical data sender and receiver.
Both units can communicate in both directions over large distances. The point-to-point light beam is monitored during data transmissions. Interruption of the light beams is indicated both optically on the device and signalled via a special function interface.

The principal advantages of infrared data transmission are:

- Low cable installation and maintenance costs,
- fast installation using integrated optical alignment aid,
- high level immunity against electromagnetic interference,
- high insensitivity to ambient light thanks to integrated daylight filter and modulation,
- scanning ranges up to 200 m and transfer rates up to 2 Mbit/s,
- variety of interfaces: Profibus, Interbus, DH+, RIO, CANopen/DeviceNet, Ethernet.

▶ ISD infrared data transmission systems enable cable-free connection of high-bay stackers to the control components of, for example, Profibus DP. Trailing cables are no longer necessary.



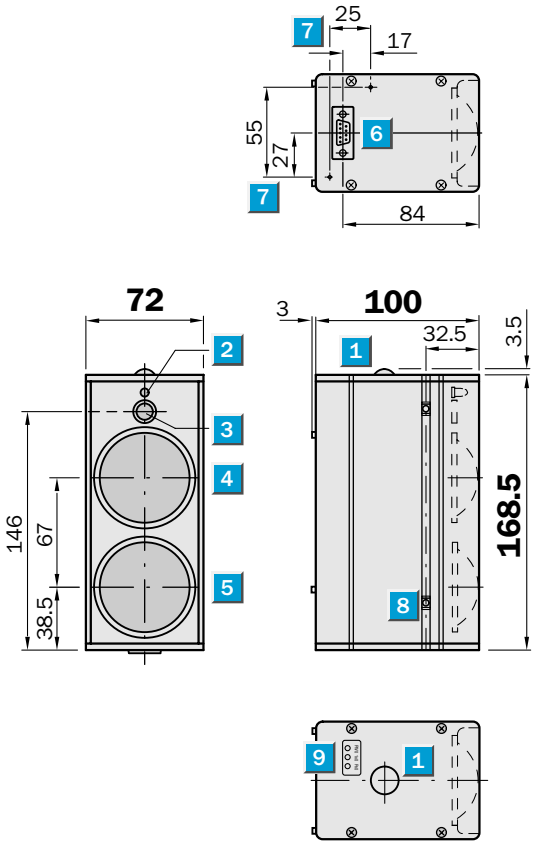
▲ The ISD data transmission system is ideal for use in, for example, aisles of high-bay warehouses. The system ensures high functionality, reliable transmission, simple installation and fast system alignment.

Scanning range
0.2 ... 200 m

Data transmission systems

- Duplex operation
- CL 20 mA, RS 232
- RS 422/485
- 38,400 bit/s

Dimensional drawing

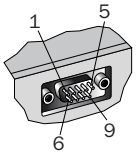


Settings

See Operating Instructions (order no. 8 008 207) for interface settings in the device.

1 View of optical adjustment aid (cross-line)
2 LED function indicator “interrupted light beam”
3 Light inlet for optical adjustment aid
4 Receiver lens
5 Sender lens
6 9-pin D-sub plug (all signals)
7 Mounting hole M3 threaded – 5 mm deep, for plug cover
8 M5 running nut (in groove), max. screwing depth 10 mm from housing surface
9 LED function indicators “Power on”, “RxD” and “TxD”

Connection diagram and data interfaces



9-pin plug

	Function interfaces	Data interfaces		
		CL 20 mA RS 422 RS 485 (4L)	RS 485 (2L)	RS 232
1	DC + 24 V			
2	Switching output [2], “pollution”			
3	Switching output [2], “light path free”			
4	Input, “sender off”			
5	GND/0 V	GND/0 V	GND/0 V	GND/0 V
6		R+[3]	R+/T+[3] or B[4]	R x D
7		R–[3]	R–/T–[3] or A[4]	–
8		T+	–	T x D
9		T–	–	–

[1] Wire cross-section on device with heating; min. 0.25 mm² with 5 m cable
[2] In PNP system
[3] With additional cable connection (cable termination)
[4] Symbols A and B apply to PROFIBUS and PROFIBUS-DP

See chapter Accessories
Cables and connectors
Mounting systems
Special accessories

Technical data	ISD 230-	2111	4111	5111	4121	5121
Scanning range	0.2…200 m	■	■	■	■	■
Light source	Infrared diode (λ = 860 nm)	■	■	■	■	■
Transmit/receive frequency	3 MHz ± 0.5 MHz	■	■	■	■	■
Transmit/receive angle	Approx. ± 0.4° / approx. ± 0.8°	■	■	■	■	■
Light spot diameter	Approx. 0.7 m at 50 m,	■	■	■	■	■
	Approx. 1.4 m at 100 m	■	■	■	■	■
Data transfer rate	Max. 38.4 kBd	■	■	■	■	■
Signal delay	Max. 10 µs	■	■	■	■	■
(over a light path)						
LED status indicator	4 status functions (“light beam inter-	■	■	■	■	■
	ruption”), “Power on”, “RxD”, “TxD”					
Data interface	CL 20 mA a/p	■	■		■	
	RS 232/RS 422/RS 485		■		■	
	Sinec L1 (for bus terminals BT 777)			■		■
Switching inputs	“Sender off”, PNP U_e = 24 V, I_e = 5 mA	■	■	■	■	■
Switching outputs	“Light path free”, PNP, U_a = 24 V,	■	■	■	■	■
	$I_{A\ max}$ = 20 mA					
	“Pollution”, PNP, U_a = 24 V,	■	■	■	■	■
	$I_{A\ max}$ = 20 mA					
Electrical connections	9-pin D-sub plug	■	■	■	■	■
Supply voltage V_S	With heating 24 V DC + 20 %/– 5 %				■	■
	24 V DC ± 20 %	■	■	■		
Current consumption	Max. 0.4 A	■	■	■		
	With heating max. 2.5 A				■	■
Enclosure rating	IP 54 (to DIN 40 050),	■	■	■	■	■
	With plug cover IP 65	■	■	■	■	■
Protection class	⧫ (toVDE 0106)	■	■	■	■	■
EMC vibration test	To IEC 801/IEC 68-2-6 Test FC	■	■	■	■	■
Mounting	Using 4 M5 running nuts,	■	■	■	■	■
	2 in nut per side					
Ambient temperature	Operation 0 … +55 °C	■	■	■		
	–38 … +55 °C (with heating)				■	■
	Storage – 20 … +70 °C	■	■	■	■	■
Max. relative humidity	90 %, uncondensed	■	■	■	■	■
Weight per unit	Approx. 1 kg (excluding accessories)	■	■	■	■	■
Housing material	Aluminium (treated), glass/plastic lens	■	■	■	■	■

Notes:

Two equivalent devices are required to create a data transfer section.
The data transfer frequencies are set through plug bridges (see Operating Instructions, order no. 8 008 207).

Order information

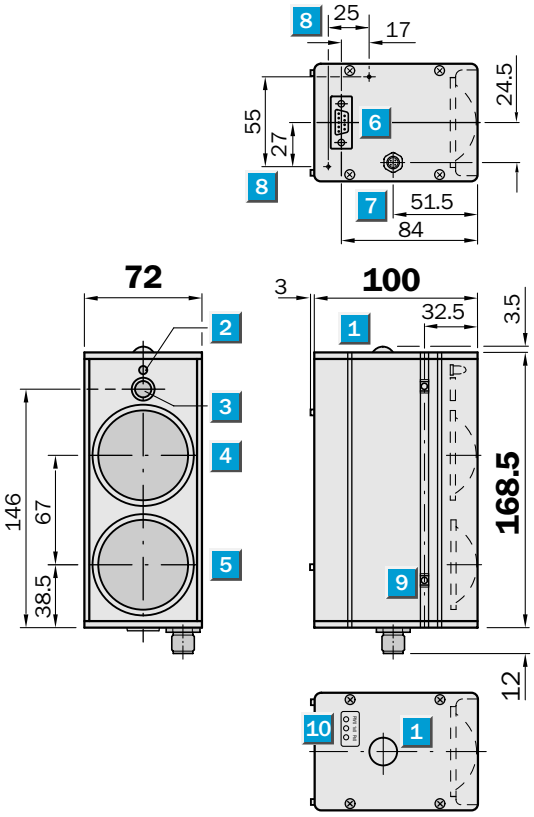
Type	Order no.
ISD 230-2111	1 017 388
ISD 230-4111	1 017 389
ISD 230-5111	1 017 390
ISD 230-4121	1 017 543
ISD 230-5121	1 017 544

Scanning range
0.2 ... 180 m

Data transmission systems

- Duplex operation
- RS 422/485
- Profibus
- Interbus-S
- SSI Interface

Dimensional drawing

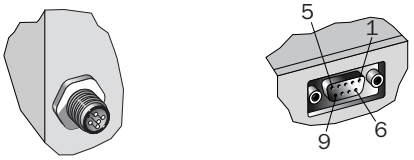


Settings

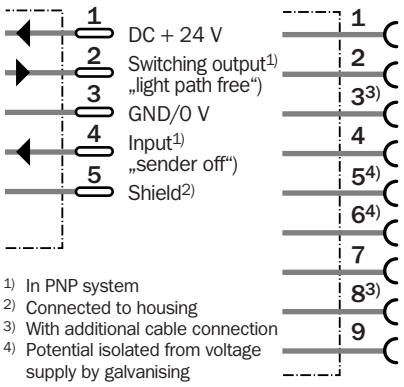
See Operating Instructions (order no. 8 008 207) for interface settings in the device.

1 View of optical adjustment aid (cross-line)
2 LED function indicator “interrupted light beam”
3 Light inlet for optical adjustment aid
4 Receiver lens
5 Sender lens
6 9-pin D-sub plug (data interface)
7 5-pin M12 round plug (power supply and function interfaces)
8 Mounting hole M3 threaded – 5 mm deep, for plug cover
9 M5 running nut (in groove), max. screwing depth 10 mm from housing surface
10 LED function indicators “Power on”, “RxD” and “TxD”

Connection diagram und data interfaces



5-pin, M12 | 9-pin bush



1) In PNP system
2) Connected to housing
3) With additional cable connection
4) Potential isolated from voltage supply by galvanising

Data interface		
RS 422	RS 485 (2L)	Profibus
RS 485 (4L)		Profibus-DP
NC	NC	NC
NC	NC	NC
R+	R+/T+	B
T+	Reserved	Reserved
GND	GND	GND
+ 5 V	+ 5 V	+ 5 V
NC	NC	NC
R –	R –/T–	A
T–	Reserved	Reserved

See chapter Accessories

Cables and connectors
Mounting systems
Special accessories

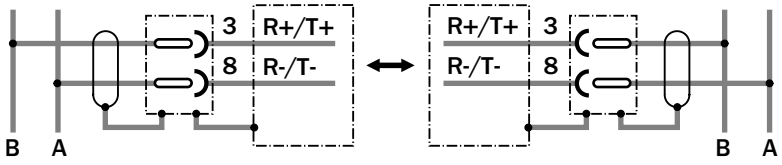
Technical data	ISD	260 -1111 -1112	260 -1121 -1122	280 -1111 -1112	280 -1121 -1122
Scanning range	0.2 ... 180 m	■	■		
	0.2 ... 150 m			■	■
Light source	Infrared diode (λ = 860 nm)	■	■	■	■
Transmit/receive frequency	4 MHz ± 0.5 MHz/11 MHz ± 0.75 MHz	■	■	■	■
Transmit/receive angle	Approx. ± 0.4° / approx. ± 0.8°	■	■	■	■
Light spot diameter	Approx. 0.7 m at 50 m	■	■	■	■
	Approx. 1.4 m at 100 m	■	■	■	■
Data transfer rate	Max. 0.5 MBd	■	■		
	Max. 1.5 MBd			■	■
Signal delay	Max. 2 µs	■	■	■	■
(over a light path)					
LED status indicator	4 status functions ("light beam inter-	■	■	■	■
	ruption"), "Power on", "RxD", "TxD"				
Data interfaces	RS 422 or RS 485 in 2- or	■	■	■	■
	4 tip configurations				
Switching inputs	"Sender off", PNP U_e = 24 V, I_e = 5 mA	■	■	■	■
Switching outputs	"Light path free", PNP, U_a = 24 V,				
	$I_{A\ max}$ = 20 mA	■	■	■	■
Electrical connections	9-pin D-sub bush	■	■	■	■
	5-pin round plug	■	■	■	■
Supply voltage V_S	With heating 24 V DC + 20 %/– 5 %		■		■
	24 V DC ± 20 %	■		■	
Current consumption	Max. 0.4 A/with heating max. 2.5 A	■	■	■	■
Enclosure rating	IP 54 (to DIN 40 050),	■	■	■	■
	With plug cover IP 65	■	■	■	■
Protection class	⧫ (to VDE 0106)	■	■	■	■
EMC vibration test	To IEC 801/IEC 68-2-6 Test FC	■	■	■	■
Mounting	Using 4 M 5 running nuts,	■	■	■	■
	2 in nut per side				
Ambient temperature	Operation 0 ... +40 °C	■		■	
	–38 ... +40 °C (with heating)		■		■
	Storage – 20 ... +70 °C	■	■	■	■
Max. relative humidity	90 %, uncondensed	■	■	■	■
Weight per unit	Approx. 1 kg (excluding accessories)	■	■	■	■
Housing material	Aluminium (treated), glass/plastic lens	■	■	■	■

Notes:

A pair of devices with numbers ending in 1 and 2 are required to create a data transfer section.

Data interface Profibus (L2 – DP)

(for other bus coupling, see Operating Instructions)



A and B in accordance with EN 50 170

The data cables for the bus can be connected directly to the device via the Siemens Profibus plug (9-pin, D-sub) (compatible configuration). The cable then terminates in the plug.

Order information

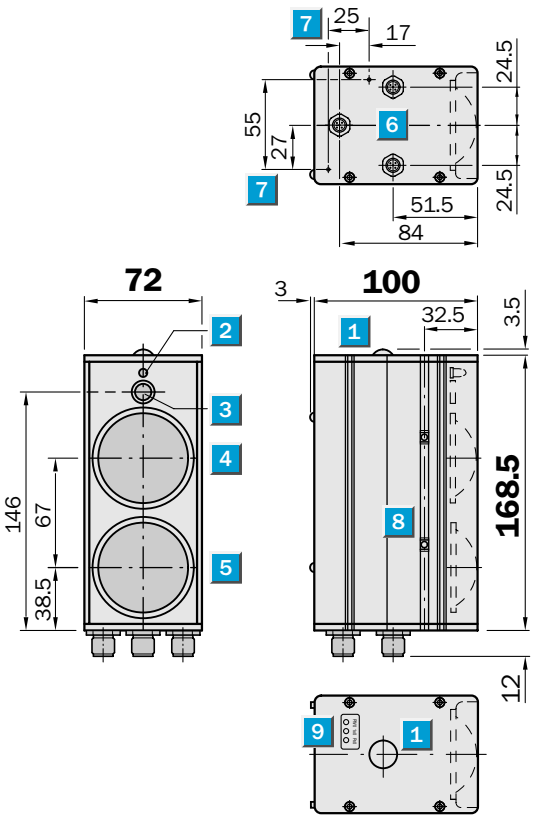
Type	Order no.
ISD 260-1111	1 017 379
ISD 260-1112	1 017 380
ISD 260-1121	1 017 381
ISD 260-1122	1 017 382
ISD 280-1111	1 017 046
ISD 280-1112	1 017 047
ISD 280-1121	1 017 375
ISD 280-1122	1 017 376

Scanning range
0.2 ... 150 m

Data transmission systems

- Profibus
- M12 interface, 5-pin

Dimensional drawing



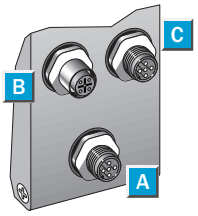
Settings

See Operating Instructions (order no. 8 008 207) for interface settings in the device.

1 View of optical adjustment aid (cross-line)
2 LED function indicator “interrupted light beam”
3 Light inlet for optical adjustment aid
4 Receiver lens
5 Sender lens
6 5-pin M12 round plug (3 x)
(power supply and function interfaces)
7 Mounting hole M3 threaded – 5 mm deep, for plug cover
8 M5 running nut (in groove), max. screwing depth 10 mm from housing surface
9 LED function indicators “Power on”, “RxD” and “TxD”

Connection diagram und data interfaces

All types



5-pin, M12 Bus in	5-pin, M12 Bus out	5-pin, M12
A	B	C
1 NC[1]	1 + 5 V	1 DC + 24 V
grn 2 A	grn 2 A	2 Switching output[2] (“light path free”)
3 NC[1]	3 GND	3 GND/0 V
red 4 B	red 4 B	4 Input[2] (“sender off”)
5 NC	5 NC	5 Shield[3]

[1] reserved: do not connect

[2] In PNP system
[3] Connected to housing

See chapter Accessories
Cables and connectors
Mounting systems
Special accessories

Technical data	ISD 280-	1111 S03	1112 S04	1121 S05	1122 S06
Scanning range	0.2 ... 150 m	■	■	■	■
Light source	Infrared diode (λ = 860 nm)	■	■	■	■
Transmit/receive frequency	4 MHz ± 0.5 MHz/11 MHz ± 0.75 MHz	■	■	■	■
Transmit/receive angle	Approx. ± 0.4° / approx. ± 0.8°	■	■	■	■
Light spot diameter	Approx. 0.7 m at 50 m	■	■	■	■
	Approx. 1.4 m at 100 m	■	■	■	■
Data transfer rate	Max. 1.5 MBd	■	■	■	■
Signal delay	Max. 2 µs	■	■	■	■
(over a light path)					
LED status indicator	4 status functions ("light beam inter-	■	■	■	■
	ruption", "Power on", "RxD", "TxD")				
Data interfaces	RS 422 or RS 485 in 2 or	■	■	■	■
	4 tip configurations				
Switching inputs	"Sender off", PNP U_e = 24 V, I_e = 5 mA	■	■	■	■
Switching outputs	"Light path free", PNP, U_a = 24 V,	■	■	■	■
	$I_{A\ max}$ = 20 mA				
Electrical connections	5-pin round plug	■	■	■	■
Supply voltage V_S	With heating 24 V DC + 20 %/– 5 %			■	■
	Without heating 24 V DC ± 20 %	■	■		
Current consumption	With heating max. 2.5 A			■	■
	Without heating max. 0.4 A	■	■		
Enclosure rating	IP 65	■	■	■	■
Protection class	⧫ (to VDE 0106)	■	■	■	■
EMC vibration test	To IEC 801/IEC 68-2-6 Test FC	■	■	■	■
Mounting	Using 4 M5 running nuts,	■	■	■	■
	2 in nut per side				
Ambient temperature T_A	Operation –38 °C ... +40 °C (with heat.)			■	■
	0 °C ... +40 °C (without heat.)	■	■		
	Storage –20 °C ... +70 °C	■	■	■	■
Max. relative humidity	90 %, uncondensed	■	■	■	■
Weight per unit	Approx. 1 kg (excluding accessories)	■	■	■	■
Housing material	Aluminium (treated), glass/plastic lens	■	■	■	■

Notes:

A pair of devices with numbers ending in 1 and 2 are required to create a data transfer section.

Order information

Type	Order no.
ISD280-1111S03	1 027 187
ISD280-1112S04	1 027 188
ISD280-1121S05	1 027 638
ISD280-1122S06	1 027 639

Scanning range
0.2 ... 120/0.2 ... 200/
0.2 ... 300 m

Data transmission systems

- Profibus interface
- Control panel front access
- Easy one-man-handling
- Up to 1.5 Mbit/s transfer rate
- Integrated 3-point bracket

CE

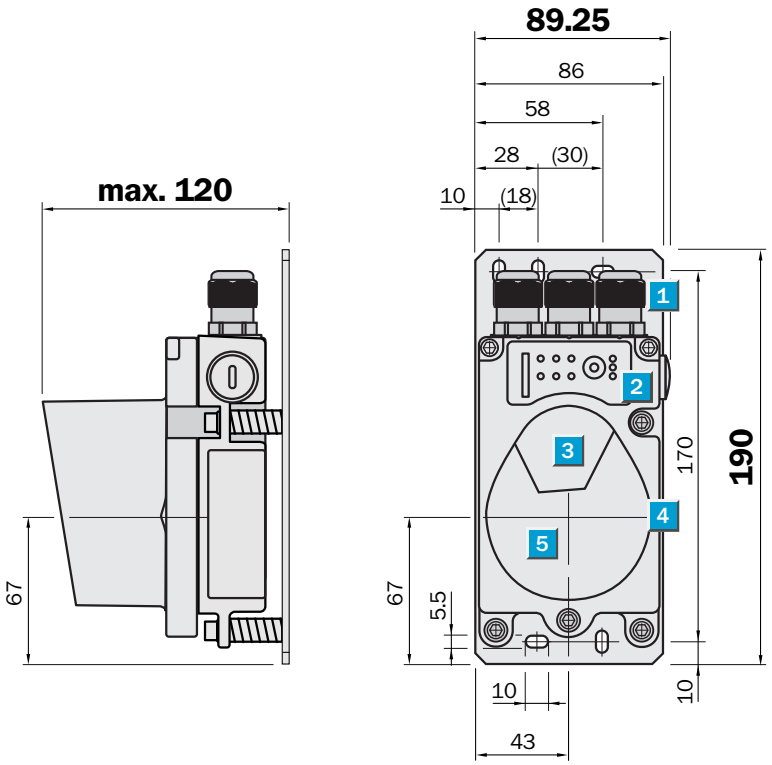
See chapter Accessories

Cables and connectors

Mounting systems

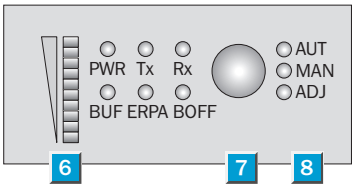
Special accessories

Dimensional drawing



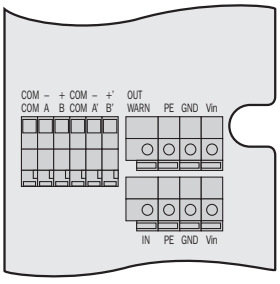
Adjustment possible

All types



1	M16
2	Control panel
3	Sender lens
4	Center of optical axis
5	Receiver lens
6	Display for signal level
7	Function button
8	LED operating indicator

Connection type and data interface



Terminals, general		Terminals, Profibus	
V_{in}	L+	A, –	A wire
GND	M	B, +	B wire
PE	Shield	COM	Pot. balance
OUT/WARN	Q	A', –'	A wire
IN	Switch. input	B', +'	B wire

Technical data		ISD	300 -1211 -1212	300 -1221 -1222	300 -1111 -1112	300 -1121 -1122	300 -1311 -1312
Scanning range	0.2 ... 120 m				■	■	
	0.2 ... 200 m		■	■			
	0.2 ... 300 m						■
Light source	Infrared light (λ = 880 nm)		■	■	■	■	■
Transmit/receive angle	± 0.5° for optical axis		■	■	■	■	■
Light spot diameter	0.9 m at 50 m/1.75 m at 100 m/		■	■	■	■	■
	3.5 m at 200 m		■	■	■	■	■
Data transfer rate	1.5 Mbit/s Profibus RS 485		■	■	■	■	■
Signal delay	1.5 µs + 1 Tbit		■	■	■	■	■
LED status indicator	Supply voltage, function mode		■	■	■	■	■
	data transfer, signal level		■	■	■	■	■
Data interface	Profibus/RS 485		■	■	■	■	■
Switching inputs	0 ... 2 V DC: "sender/receiver off"		■	■	■	■	■
	18 ... 30 V DC: "sender/receiver on"		■	■	■	■	■
Switching outputs	0 ... 2 V DC: normal operative		■	■	■	■	■
	V_{in}-2 V DC: reduced function reserve		■	■	■	■	■
Electrical connections	Terminals		■	■	■	■	■
Supply voltage V_S	18 ... 30 V DC		■	■	■	■	■
Current consumption	200 mA at 24 V DC (without heating)		■		■		■
	800 mA at 24 V DC (with heating)			■		■	
Enclosure rating	IP 65		■	■	■	■	■
Protection class	1		■	■	■	■	■
EMC vibration test	EN 61326 (1998) + A1 (1999)		■	■	■	■	■
Ambient temperature	Operation 5 ... +50 °C (without heating)		■		■		■
	– 30 ... +50 °C (with heating)			■		■	
	Storage – 30 ... +70 °C		■	■	■	■	■
Max. relative humidity	90 %, uncondensed		■	■	■	■	■
Weight per unit	1200 g		■	■	■	■	■
Housing material	Aluminium die-cast, front screen: glass		■	■	■	■	■

Notes:

A pair of devices with numbers ending in 1 and 2 are required to create a data transfer section.

Order information

Type	Order no.
ISD 300-1211	6 024 759
ISD 300-1212	6 024 760
ISD 300-1221	6 024 838
ISD 300-1222	6 024 839
ISD 300-1111	6 024 761
ISD 300-1112	6 024 837
ISD 300-1121	6 024 840
ISD 300-1122	6 024 841
ISD 300-1311	6 028 213
ISD 300-1312	6 028 214

Scanning range
0.2 ... 120 m/
0.2 ... 200 m

Data transmission systems

- Interbus interface
- Control panel front access
- Easy one-man-handling
- Up to 500 kbit/s transfer rate
- Integrated 3-point bracket

CE

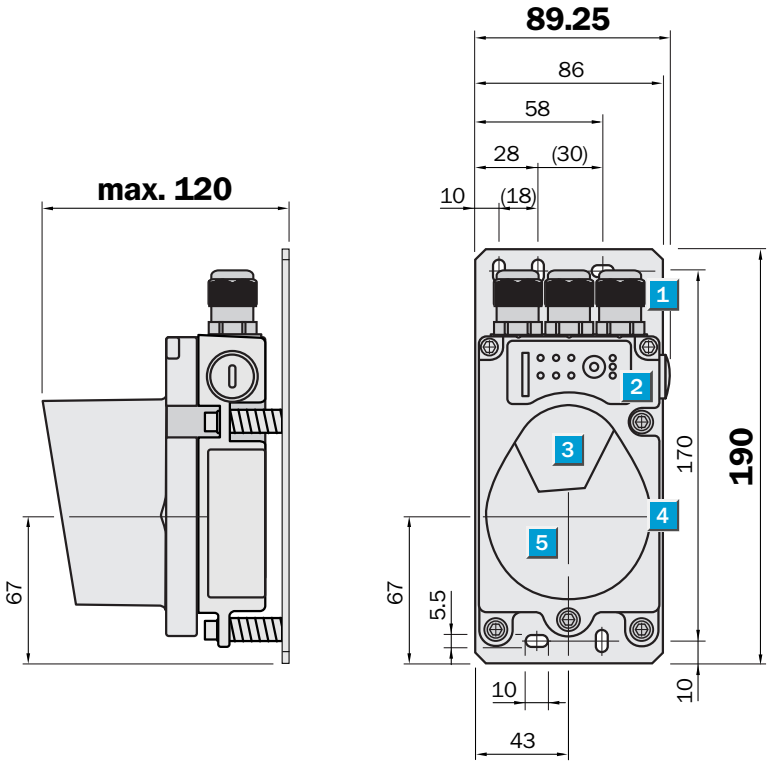
See chapter Accessories

Cables and connectors

Mounting systems

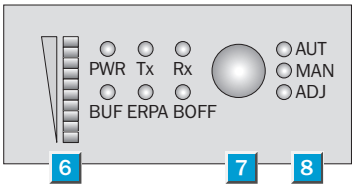
Special accessories

Dimensional drawing



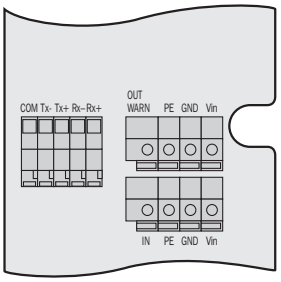
Adjustment possible

All types



1	M16
2	Control panel
3	Sender lens
4	Center of optical axis
5	Receiver lens
6	Display for signal level
7	Function button
8	LED operating indicator

Connection type and data interface



Terminals, general		Terminals, Interbus	
V_{in}	L+	DO1/DI2, Rx+	Receiver wire
GND	M	$\overline{DO1}$/$\overline{DI2}$, Rx–	Receiver wire
PE	Shield	DI1/DO2, Tx+	Send wire
OUT/WARN	Q	$\overline{DI1}$/$\overline{DO2}$, Tx–	Send wire
IN	Switch. input	COM	Pot. balance

Technical data	ISD	300 -2211 -2212	300 -2221 -2222	300 -2111 -2112	300 -2121 -2122
Scanning range	0.2 ... 120 m			■	■
	0.2 ... 200 m	■	■		
Light source	Infrared light (λ = 880 nm)	■	■	■	■
Transmit/receive angle	± 0.5° for optical axis	■	■	■	■
Light spot diameter	0.9 m at 50 m/1.75 m at 100 m/	■	■	■	■
	3.5 m at 200 m	■	■	■	■
Data transfer rate	500 kbit/s Interbus RS 422	■	■	■	■
Signal delay	1.5 µs	■	■	■	■
LED status indicator	Supply voltage, function mode,	■	■	■	■
	data transfer, signal level	■	■	■	■
Data interface	Interbus/RS 422	■	■	■	■
Switching inputs	0 ... 2 V DC: "sender/receiver off"	■	■	■	■
	18 ... 30 V DC: "sender/receiver on"	■	■	■	■
Switching outputs	DC 0 ... 2 V: normal operative	■	■	■	■
	DC V_{in}-2 V: reduced function reserve	■	■	■	■
Electrical connections	Terminals	■	■	■	■
Supply voltage V_S	18 ... 30 V DC	■	■	■	■
Current consumption	200 mA at 24 V DC (without heating)	■		■	
	800 mA at 24 V DC (with heating)		■		■
Enclosure rating	IP 65	■	■	■	■
Protection class	1	■	■	■	■
EMC vibration test	EN 61326 (1998) + A1 (1999)	■	■	■	■
Ambient temperature	Operation 5 ... +50 °C	■		■	
	(without heating)				
	– 30 ... +50 °C		■		■
	(with heating)				
	Storage – 30 ... +70 °C	■	■	■	■
Max. relative humidity	Max. 90 %, uncondensed	■	■	■	■
Weight per unit	1200 g	■	■	■	■
Housing material	Aluminium die-cast, front screen: glass	■	■	■	■

Notes:

A pair of devices with numbers ending in 1 and 2 are required to create a data transfer section.

Order information

Type	Order no.
ISD 300-2211	6 024 842
ISD 300-2212	6 024 843
ISD 300-2221	6 024 846
ISD 300-2222	6 024 847
ISD 300-2111	6 024 844
ISD 300-2112	6 024 845
ISD 300-2121	6 024 848
ISD 300-2122	6 024 849

Scanning range
0.2 ... 200 m

Data transmission systems

- Interbus interface
- Control panel front access
- Easy one-man-handling
- Up to 2 Mbit/s transfer rate
- Integrated 3-point bracket

CE

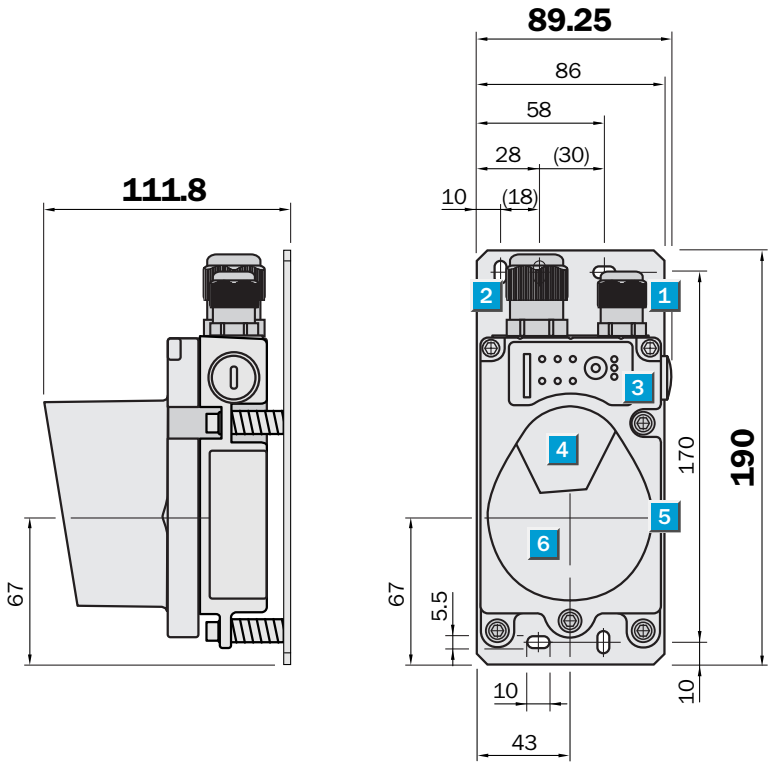
See chapter Accessories

Cables and connectors

Mounting systems

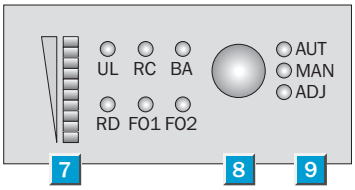
Special accessories

Dimensional drawing



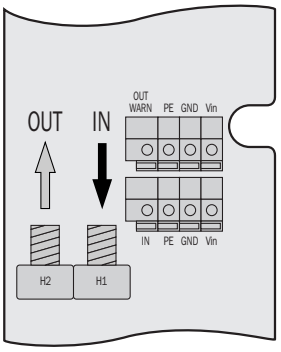
Adjustment possible

All types



1	M20
2	M16
3	Control panel
4	Sender lens
5	Center of optical axis
6	Receiver lens
7	Display for signal level
8	Function button
9	LED operating indicator

Connection type and data interface



Terminals, general		Fibre optic socket, Interbus	
V_{in}	L+	H1	Receiver
GND	M	H2	Sender
PE	Shield		
OUT/WARN	Q		
IN	Switch. input		

Technical data	ISD	300 -3211 -3212	300 -3221 -3222
Scanning range	0.2 ... 200 m		
Light source	Infrared light (λ = 880 nm)		
Transmit/receive angle	± 0.5° for optical axis		
Light spot diameter	0.9 m at 50 m/1.75 m at 100 m/		
	3.5 m at 200 m		
Data transfer rate	2 Mbit/s Interbus LWL		
Signal delay	2.5 µs		
LED status indicator	Supply voltage, function mode,		
	data transfer, signal level		
Data interface	Interbus/LWL		
Switching inputs	0 ... 2 V DC: "sender/receiver off"		
	18 ... 30 V DC: "sender/receiver on"		
Switching outputs	0 ... 2 V DC: normal operative		
	V_{in}-2 V DC: reduced function reserve		
Electrical connections	Terminals		
Supply voltage V_S	18 ... 30 V DC		
Current consumption	200 mA at 24 V DC (without heating)		
	800 mA at 24 V DC (with heating)		
Enclosure rating	IP 65		
Protection class	1		
EMC vibration test	EN 61326 (1998) + A1 (1999)		
Ambient temperature	Operation 5 ... +50 °C (without heating)		
	– 30 ... +50 °C (with heating)		
	Storage – 30 ... +70 °C		
Max. relative humidity	Max. 90 %, uncondensed		
Weight per unit	1200 g		
Housing material	Aluminium die-cast, front screen: glass		

Notes:

A pair of devices with numbers ending in 1 and 2 are required to create a data transfer section.

Order information

Type	Order no.
ISD 300-3211	6 024 850
ISD 300-3212	6 024 851
ISD 300-3221	6 024 852
ISD 300-3222	6 024 853

Scanning range
0.2 ... 200 m

Data transmission systems

- DH+/RIO interface
- Control panel front access
- Easy one-man-handling
- Up to 230.4 kbit/s transfer rate
- Integrated 3-point bracket

CE

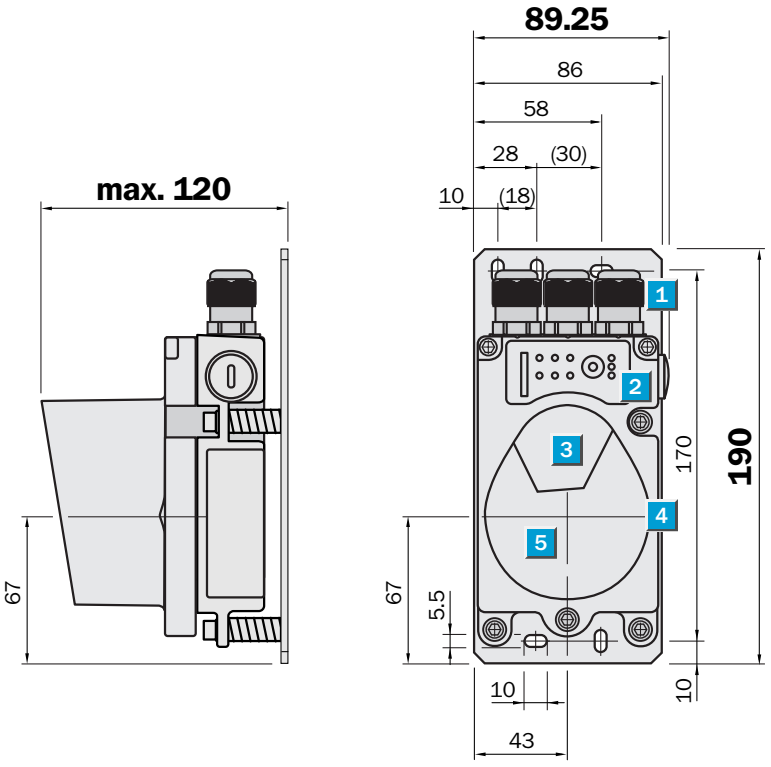
See chapter Accessories

Cables and connectors

Mounting systems

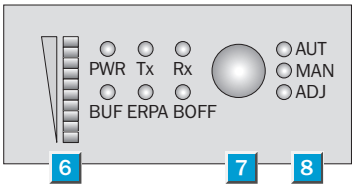
Special accessories

Dimensional drawing



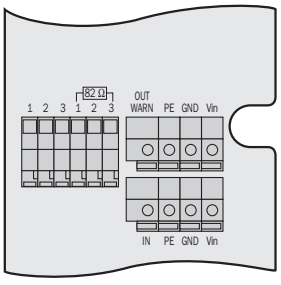
Adjustment possible

All types



1	M16
2	Control panel
3	Sender lens
4	Center of optical axis
5	Receiver lens
6	Display for signal level
7	Function button
8	LED operating indicator

Connection type and data interface



Terminals, general		Terminals, DH+/DH–	
V_{in}	L+	1	Clear/blue
GND	M	2	Shield
PE	Shield	3	Blue/clear
OUT/WARN	Q		
IN	Switch. input		

Technical data	ISD	300 -4211 -4212	300 -4221 -4222
Scanning range	0.2 ... 200 m		
Light source	Infrared light (λ = 880 nm)		
Transmit/receive angle	± 0.5° for optical axis		
Light spot diameter	0.9 m at 50 m/1.75 m at 100 m/		
	3.5 m at 200 m		
Data transfer rate	230.4 kbit/s DH+/RIO		
Signal delay	1.5 µs + 1.5 Tbit		
LED status indicator	Supply voltage, function mode,		
	data transfer, signal level		
Data interface	DH+/RIO		
Switching inputs	0 ... 2 V DC: "sender/receiver off"		
	18 ... 30 V DC: "sender/receiver on"		
Switching outputs	0 ... 2 V DC: normal operative		
	V_{in}-2 V DC: reduced function reserve		
Electrical connections	Terminals		
Supply voltage V_S	18 ... 30 V DC		
Current consumption	200 mA at 24 V DC (without heating)		
	800 mA at 24 V DC (with heating)		
Enclosure rating	IP 65		
Protection class	1		
EMC vibration test	EN 61326 (1998) + A1 (1999)		
Ambient temperature	Operation 5 ... +50 °C (without heating)		
	– 30 ... +50 °C (with heating)		
	Storage – 30 ... +70 °C		
Max. relative humidity	Max. 90 %, uncondensed		
Weight per unit	1200 g		
Housing material	Aluminium die-cast, front screen: glass		

Notes:

A pair of devices with numbers ending in 1 and 2 are required to create a data transfer section.

Order information

Type	Order no.
ISD 300-4211	6 024 854
ISD 300-4212	6 024 855
ISD 300-4221	6 024 856
ISD 300-4222	6 024 857

Scanning range
0.2 ... 200 m

Data transmission systems

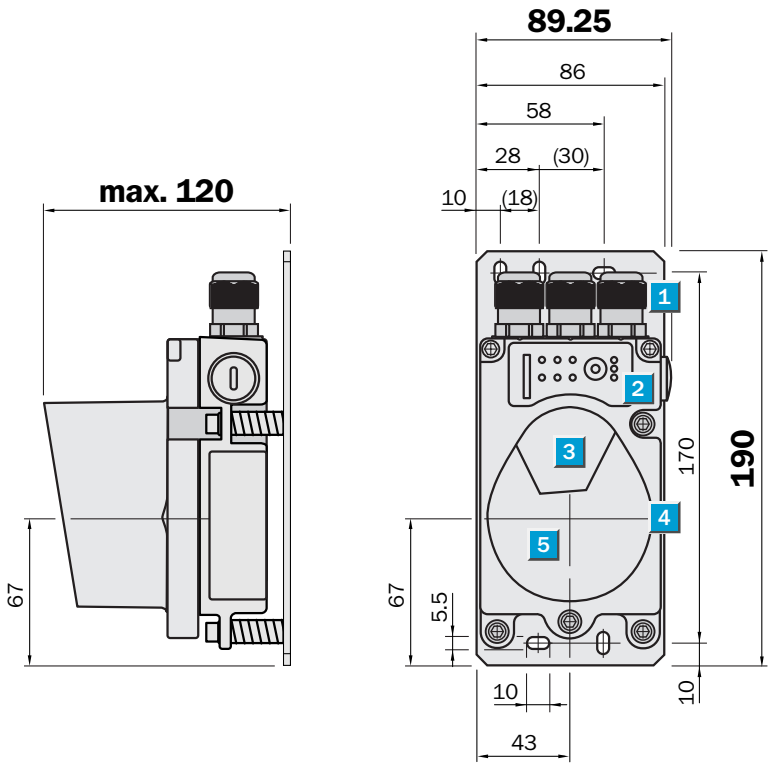
- CANopen/DeviceNet interface
- Control panel front access
- Easy one-man-handling
- Up to 1 MBit/s transfer rate
- Integrated 3-point bracket

CE

See chapter Accessories

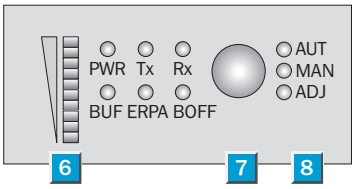
Cables and connectors
Mounting systems
Special accessories

Dimensional drawing



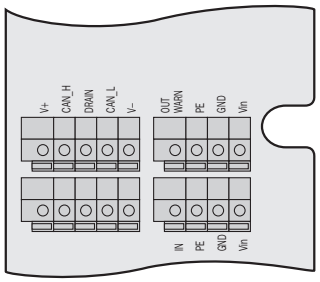
Adjustment possible

All types



1	M16
2	Control panel
3	Sender lens
4	Center of optical axis
5	Receiver lens
6	Display for signal level
7	Function button
8	LED operating indicator

Connection type and data interface



Terminals, general		Terminals, CANopen/DeviceNet	
V_{in}	L+	V–	Neg. supply (CAN reference ground)
GND	M	CAN_L	Bus signal (LOW)
PE	Shield	DRAIN	Shield
OUT/WARN	Q	CAN_H	Bus signal (HIGH)
IN	Switch. input	V+	Pos. supply

Technical data	ISD 300-	5211	5212								
Scanning range	0.2 ... 200 m										
Light source	Infrared light (λ = 880 nm)										
Transmit/receive angle	± 0.5° for optical axis										
Light spot diameter	0.9 m at 50 m/1.75 m at 100 m/										
	3.5 m at 200 m										
Data transfer rate	Max. 500 kBit/s DeviceNet										
	Max. 1 MBit/s CANopen										
LED status indicator	Supply voltage, function mode,										
	data transfer, signal level										
Data interface	CANopen/DeviceNet										
Switching inputs	0 ... 2 V DC: "sender/receiver off"										
	18 ... 30 V DC: "sender/receiver on"										
Switching outputs	0 ... 2 V DC: normal operative										
	V_{in}-2 V DC: reduced function reserve										
Electrical connections	Terminals										
Supply voltage V_S	18 ... 30 V DC										
Current consumption	200 mA at 24 V DC										
Enclosure rating	IP 65										
Protection class	1										
EMC vibration test	EN 61326 (1998) + A1 (1999)										
Ambient temperature	Operation –5 ... +50 °C										
	Storage –30 ... +70 °C										
Max. relative humidity	Max. 90 %, uncondensed										
Weight per unit	1200 g										
Housing material	Aluminium die-cast, front screen: glass										

Notes:

A pair of devices with numbers ending in 1 and 2 are required to create a data transfer section.

Order information

Type	Order no.
ISD 300-5211	6 027 231
ISD 300-5212	6 027 232

Scanning range
0.2 ... 200 m

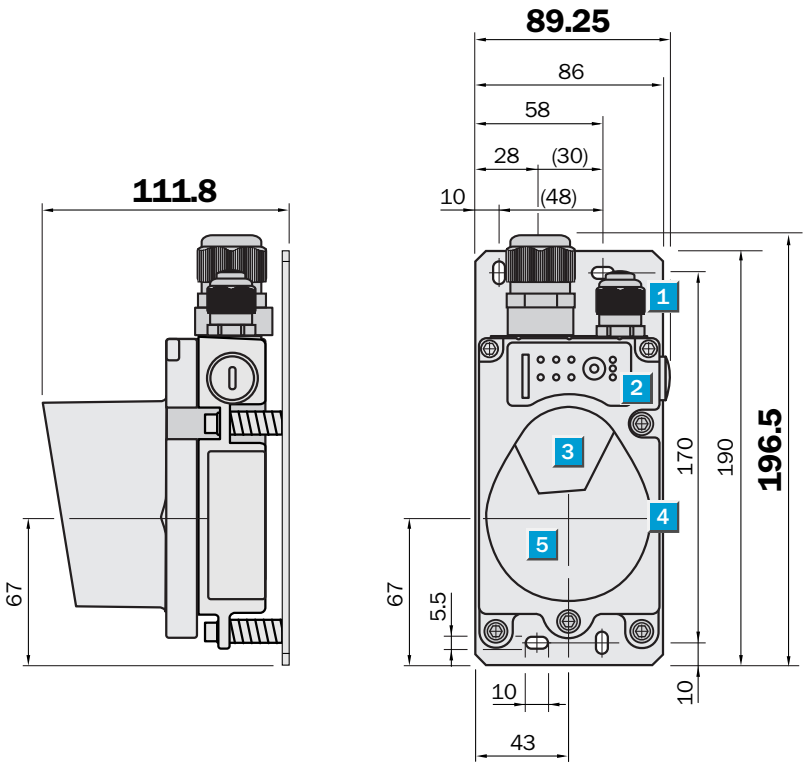
Data transmission systems

- Ethernet interface
- Control panel front access
- Easy one-man-handling
- Up to 2 MBit/s transfer rate
- Protocol-independent
- RJ 45 plug connection
- Integrated 3-point bracket

CE

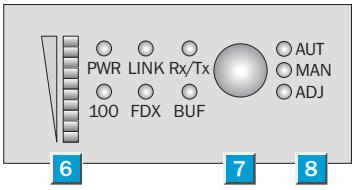
See chapter Accessories
Cables and connectors
Mounting systems
Special accessories

Dimensional drawing



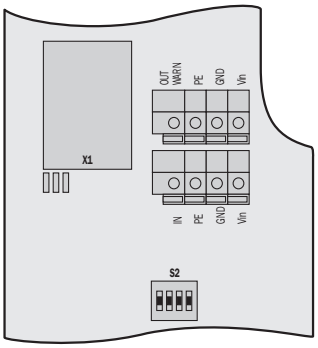
Adjustment possible

All types



1	M16
2	Control panel
3	Sender lens
4	Center of optical axis
5	Receiver lens
6	Display for signal level
7	Function button
8	LED operating indicator

Connection type and data interface



Terminals, general	
V_{in}	L+
GND	M
PE	Shield
OUT/WARN	Q
IN	Switch. input

Socket	Function	
X1	Socket for 10Base-T or 100Base-TX	
Switch	**Position**	**Function**
S2.1	**ON**	**Autonegotiation active (default)**
	OFF	Autonegotiation deactivated
S2.2	ON	100 MBit
	OFF	**10 MBit (default)**
S2.3	ON	Full duplex
	OFF	**Half duplex (default)**
S2.4	ON	Reserved
	OFF	**Reserved (default)**

Technical data	ISD 300-	6211	6212	6221	6222	6311	6312				
Scanning range	0.2 ... 200 m	■	■	■	■						
	... 300 m					■	■				
Light source	Infrared light (λ = 880 nm)	■	■	■	■	■	■				
Transmit/receive angle	± 0.5° for optical axis	■	■	■	■	■	■				
Light spot diameter	0.9 m at 50 m/1.75 m at 100 m/	■	■	■	■	■	■				
	3.5 m at 200 m	■	■	■	■	■	■				
Data transfer rate	Max. 2 MBit/s	■	■	■	■	■	■				
LED status indicator	Supply voltage, function mode,	■	■	■	■	■	■				
	data transfer, signal level										
Data interface	Ethernet	■	■	■	■	■	■				
Switching inputs	0 ... 2 V DC: "sender/receiver off"	■	■	■	■	■	■				
	18 ... 30 V DC: "sender/receiver on"	■	■	■	■	■	■				
Switching outputs	0 ... 2 V DC: normal operative	■	■	■	■	■	■				
	V_{in}-2 V DC: reduced function reserve	■	■	■	■	■	■				
Electrical connections	Terminals	■	■	■	■	■	■				
Supply voltage V_S	18 ... 30 V DC	■	■	■	■	■	■				
Current consumption	200 mA at DC 24 V (without heating)	■	■			■	■				
	800 mA at 24 DC V (with heating)			■	■						
Enclosure rating	IP 65	■	■	■	■	■	■				
Protection class	1	■	■	■	■	■	■				
EMC vibration test	EN 61326 (1998) + A1 (1999)	■	■	■	■	■	■				
Ambient temperature	Operation –5 °C ... +50 °C	■	■	■	■	■	■				
	Storage –30 °C ... +70 °C	■	■	■	■	■	■				
Max. relative humidity	Max. 90 %, uncondensed	■	■	■	■	■	■				
Weight per unit	1200 g	■	■	■	■	■	■				
Housing material	Aluminium die-cast, front screen: glass	■	■	■	■	■	■				

Notes:

A pair of devices with numbers ending in 1 and 2 are required to create a data transfer section.

Order information

Type	Order no.
ISD 300-6211	6 028 692
ISD 300-6212	6 028 693
ISD 300-6221	6 030 557
ISD 300-6222	6 030 558
ISD 300-6311	6 032 711
ISD 300-6312	6 032 712