wenglor
the innovative family

Photoelectronic sensors
of laser class 1

Photoelectronic sensors of laser class 1

Photoelectronic sensors of laser class 1 are highly versatile and solve numerous applications in a reliable and straightforward way. One of their great advantages is that their light is not harmful to the human eye and that therefore no protective measures need to be implemented.

This catalog contains all photoelectronic sensors of laser class 1 by wenglor – for products of other categories refer to the wenglor general catalog or www.wenglor.com.

High-performance distance sensors are the most powerful sensors for distance measurement,
They are particularly fast and precise, and demonstrate their high efficiency over large working ranges. They are ideally suited for demanding applications. Even black and shiny objects are reliably detected. Ethernet technology is integrated into selected sensors.

Reflex sensors with background suppression analyze the light reflected from objects. Color, shape and surface characteristics of the object have almost no influence on the detection range. Even dark objects can be reliably detected against a bright background.

Retro-reflex sensors detect shiny, chromed or reflective surfaces reliably thanks to the integrated polarization filter.

Through-beam sensors detect even the smallest parts reliably thanks to their fine laser beam.

Content

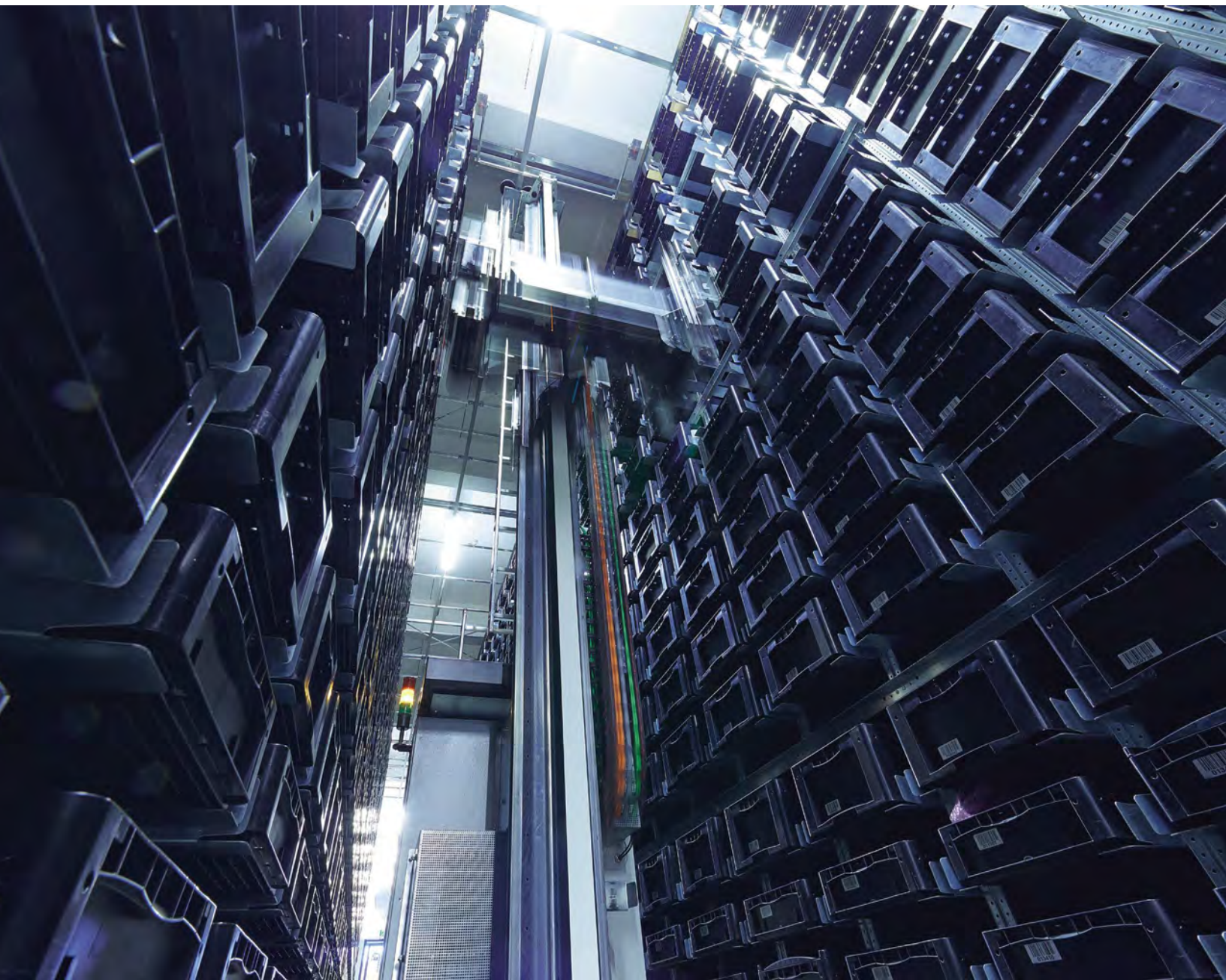
L

Laser Class 1:

Laser Class	Class 1
Danger Classification	Safe under reasonably foreseeable conditions
Use of a plug connector for remote controlled safety interlocks	Not required
Key switch	Not required
Beam stop or beam attenuator	Not required
Additional warning signs at entrances, safety covers etc.	Not required
Identification of the beam emission aperture	Not required
Bundle of rays terminated at its end	*
Bundle of rays as short as possible, and enclosed if feasible (e.g. in pipe)	Not required
Eye protection	Not required
Laser safety inspector	Not required, but advisable for applications with non-encapsulated laser beam.
Avoid inadvertent specular reflection	Not required
Protective clothing	Not required
User training	Not required

* Termination of the bundle of rays is not required by the standard, but is nevertheless advisable. Open beam paths should be positioned above or below eye-level, in as far as this is practical. The table is intended to provide an overview only. The currently valid laser equipment safety standard is binding.

Laser Light:
Monochrome light with in-phase wave arrangement. Laser diodes have a small emitting surface. It is thus possible to focus light accurately with a lens. Slightly divergent light beams with highly concentrated energy can be generated.
Pp: maximum radiant power within one pulse
Po: medium radiant power
PRF: Impulse Repetition Frequency



High-Performance Distance Sensors

This group brings together the most powerful sensors for distance measurement, which work in reflex mode according to different principles. High performance distance sensors are particularly fast and precise, and demonstrate their high efficiency over large working ranges. They are ideally suited for demanding applications. Even black and shiny objects are reliably detected. Ethernet technology is integrated into selected sensors.

High-performance distance sensors which use the principle of angle measurement determine the distance between the sensor and the object. These sensors have small working ranges (under 1 m) and recognize objects with high precision. Some sensors use a high-resolution CMOS line array and DSP signal processing. The color, shape and texture of the objects to be recognized does not affect the sensors' measurements. Even dark objects can be reliably detected against a bright background. They can be operated with very high speeds or very high resolutions. The measured value can be output as an analog value or via the interfaces. Furthermore, Teach-In, filter functions for adjusting a switching output, and an error output are available. The measuring range can be selected individually within the working range. The new sensors from wenglor's PNBC range expand the product portfolio at the high-end with resolution of down to 0.06 μm (16-bit), maximum linearity deviation of 0.05% and an output rate of up to 30,000 Hz.

High-performance distance sensors which use the principle of transit time measurement determine the distance between the sensor and the object according to the principle of transit time measurement. These sensors have a large working range and are therefore able to detect objects over large distances.
Selected sensors are distinguished by WinTec (wenglor interference free technology). This technology allows black or shiny surfaces to be reliably detected even in extremely inclined positions. It is possible to mount several sensors next to or across from each other without them influencing each other.

Application examples:

- High-precision positioning
- Static and dynamic differential measurement
- Contour measurement
- Recording extremely small parts
- Edge detection
- Counting objects
- Shelf full message in intra-logistics

High-Performance Distance Sensor

55 mm LASER

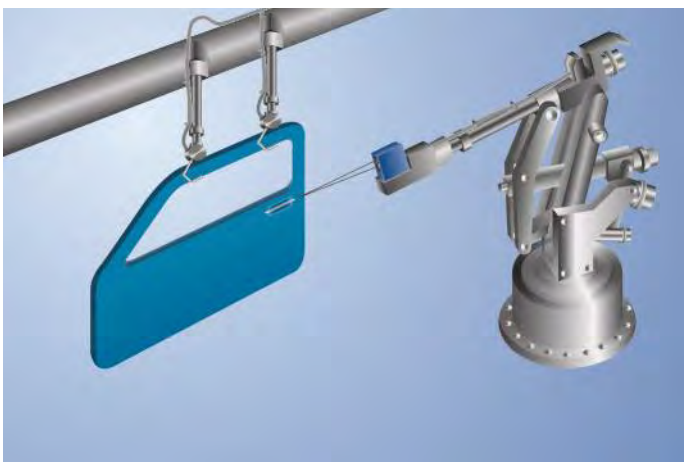
Range

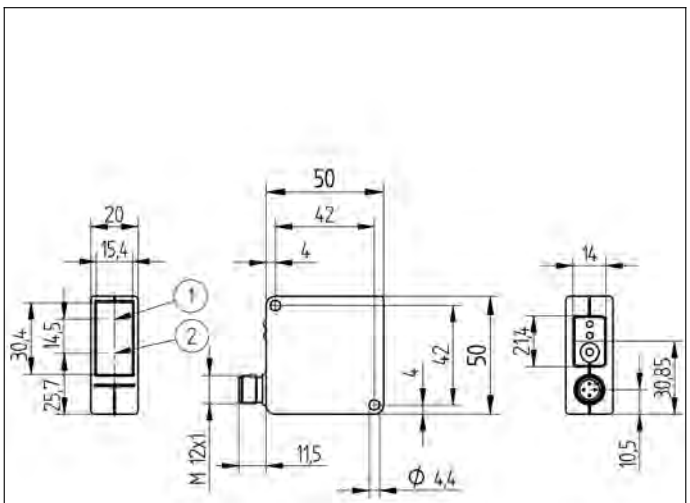
- **Smallest recognizable distance difference: 100 µm**
- **Spot diameter: 0,3 mm**

Technical Data

Optical Data	
Range	55 mm
Adjustable Range	45...55 mm
Switching Hysteresis	< 100 µm
Light Source	Laser (red)
Wave Length	660 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	< 0,3 mm
Focus Distance	75 mm
Electrical Data	
Supply Voltage	10...30 V DC
Current Consumption (Ub = 24 V)	< 30 mA
Switching Frequency	800 Hz
Response Time	650 µs
Temperature Drift	< 5 µm/K
Temperature Range	-25...60 °C
Switching Output Voltage Drop	< 2,5 V
PNP Switching Output/Switching Current	200 mA
PNP Contamination Output/Switching Current	50 mA
Short Circuit Protection	yes
Reverse Polarity Protection	yes
Overload Protection	yes
Protection Class	III
FDA Accession Number	1120738-000
Mechanical Data	
Setting Method	Potentiometer
Housing Material	Plastic
Full Encapsulation	yes
Degree of Protection	IP67
Connection	M12 × 1; 4-pin

These sensors detect distance by measuring angles. They are particularly good at recognizing objects in front of any background. The color, shape and surface characteristics of the object have practically no influence on sensor switching performance.





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 1 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version
Part Number	OHP551B0003
Contamination Output	●
PNP NO	●
Connection Diagram No.	103
Control Panel No.	P2
Suitable Connection Technology No.	2
Suitable Mounting Technology No.	380

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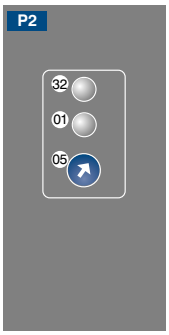
Complementary Products

PNP-NPN Converter BG2V1P-N-2M
Protection Housing Set ZSP-NN-02
Protection Housing ZSV-0x-01

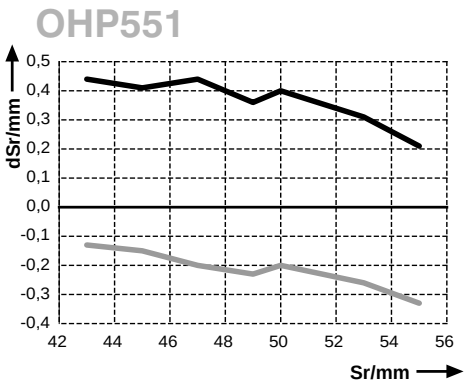
Ctrl. Panel



01 = Switching Status Indicator
05 = Switching Distance Adjuster
32 = Contamination Warning/Error Warning

Switching Distance Deviation

Typical characteristic curve based on Kodak white (90 % remission)



Sr = Switching Distance
dSr = Switching Distance Change
black 6 % remission
grey 18 % remission

High-Performance Distance Sensor

30...80 mm LASER

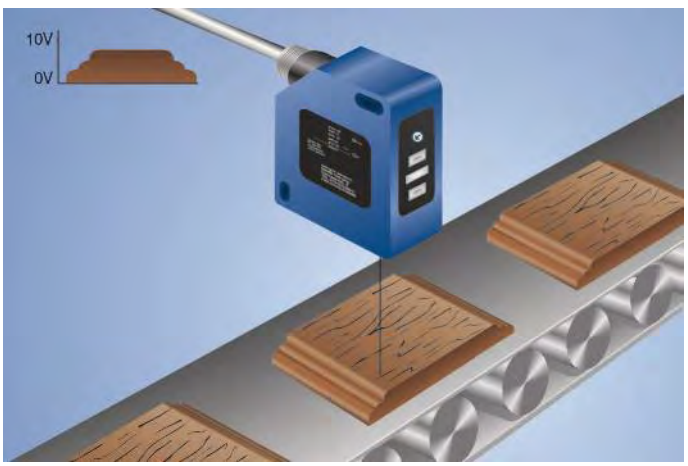
Range

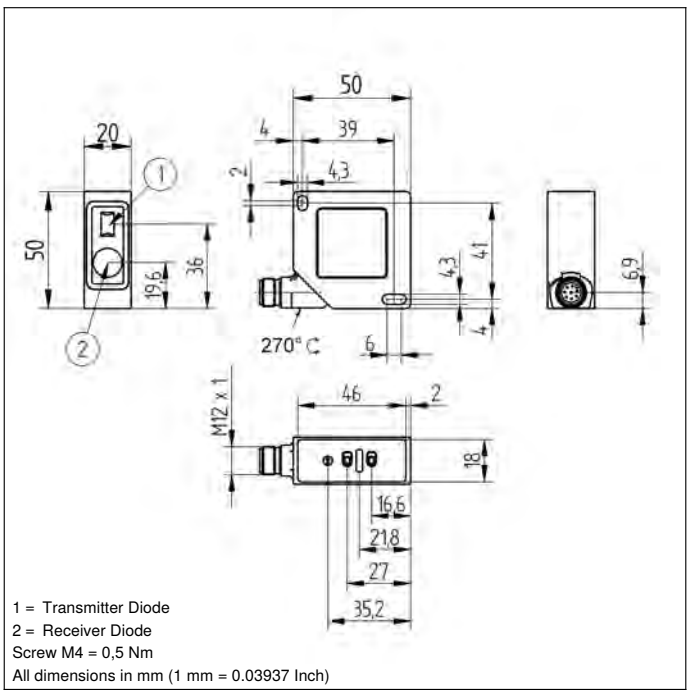
- **High resolution: 8 µm (resolution-mode)**
- **Linearity: 0,1 % (resolution-mode)**
- **Measured value independent of material, color and brightness**
- **Zoom function**

Technical Data

Optical Data	
Working Range	30...80 mm
Measuring Range	50 mm
Resolution	8 µm
Resolution (Speed-Mode)	12 µm
Linearity	0,1 %
Linearity (Speed-Mode)	0,2 %
Light Source	Laser (red)
Wave Length	660 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	18...30 V DC
Current Consumption (Ub = 24 V)	< 80 mA
Measuring Rate	1000 /s
Measuring Rate (Resolution-Mode)	500 /s
Response Time	< 1000 µs
Response Time (Resolution Mode)	< 2000 µs
Temperature Drift	< 5 µm/K
Temperature Range	-25...50 °C
Analog Output	0...10 V/4...20 mA
Current Load Voltage Output	< 1 mA
Current Output Load Resistance	< 500 Ohm
Interface	RS-232
Baud Rate	38400 Bd
Protection Class	III
FDA Accession Number	1120734-000
Mechanical Data	
Setting Method	Teach-In
Housing Material	Plastic
Degree of Protection	IP67
Connection	M12 × 1; 8-pin

These sensors work with a high-resolution CMOS line and DSP technology and determine distance using angular measurement. As a result, material, color and brightness related measurement differences are virtually eliminated.
Integrated analogue output can be configured for voltage 0...10 V (10...0 V) or current 4...20 mA (20...4 mA).





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version
Part Number	OCP801H0180
Error Output	●
Analog Output	●
RS-232 Interface	●
Connection Diagram No.	529
Control Panel No.	P7
Suitable Connection Technology No.	80
Suitable Mounting Technology No.	380

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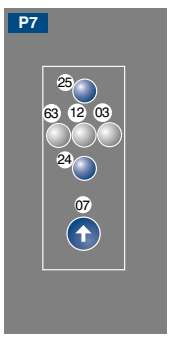
Complementary Products

- Analog Evaluation Unit AW02
- Feldbus Gateways ZAGxxxN01, EPGG001
- Interface Cable S232W3
- Protection Housing Set ZSP-NN-02
- Protection Housing ZSV-0x-01
- wTeach2 software DNNF005

Ctrl. Panel

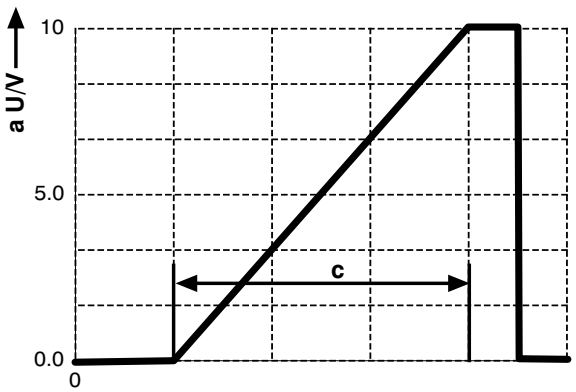


03 = Error Indicator
07 = Selector Switch
12 = Analog Output Indicator
24 = Plus Button
25 = Minus Button
63 = Analog Output Current Indicator

Table 1

Working Distance	30 mm	80 mm
Spot Size	0,4 × 0,8 mm	0,7 × 1,4 mm

Output Graph



c = Measuring Range
a = Analog Voltage Output

High-Performance Distance Sensor

80 mm LASER

Range

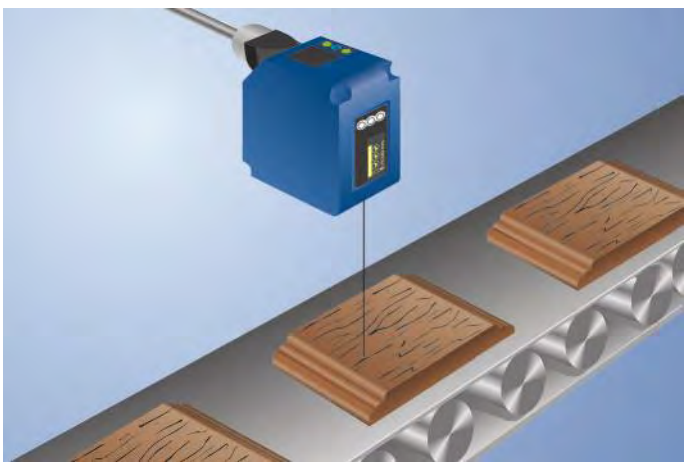
IndustrialEthernet

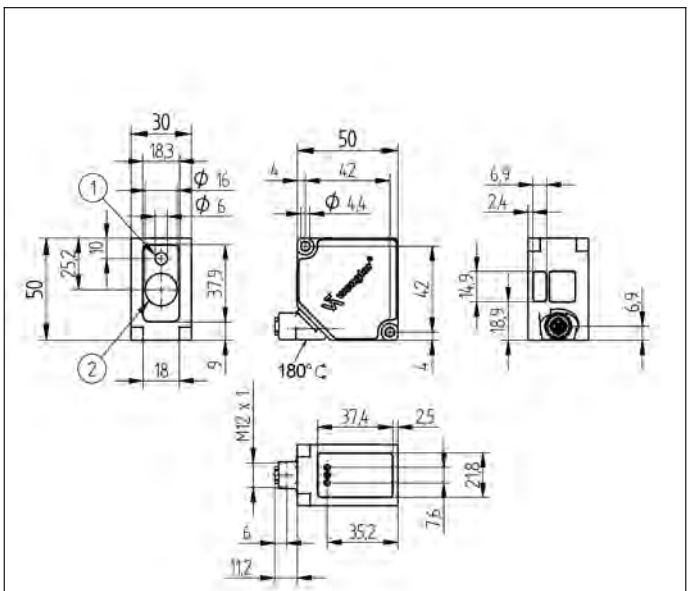
- **CMOS line array**
- **Industrial Ethernet**
- **Measured value independent of material, color and brightness**
- **Web server and graphic display for simple operation**

Technical Data

Optical Data	
Working Range	30...80 mm
Measuring Range	50 mm
Reproducibility maximum	15...50 µm
Linearity Deviation	50...100 µm
Light Source	Laser (red)
Wave Length	655 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	3,6 × 0,9 mm
Electrical Data	
Port Type	100BASE-TX
PoE Class	1
Output rate	330 /s
Temperature Drift	< 5 µm/K
Temperature Range	-25...50 °C
Reverse Polarity Protection	yes
Protection Class	III
Mechanical Data	
Setting Method	Menu (OLED)
Housing Material	Metal
Degree of Protection	IP68
Connection	M12 × 1; 8-pin, X-cod.
Safety-relevant Data	
MTTFd (EN ISO 13849-1)	350,69 a

These sensors work with a high-resolution CMOS line and DSP technology and determine distance using angular measurement.
Sensors with Industrial Ethernet make the analog and digital input cards at control units unnecessary, as all service and measurement data is read, analyzed and processed in the control unit in real time, without the need for conversion. Power over Ethernet connects data transfer and power supply in one cable and thus reduces the wiring effort.





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 1 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

Display brightness may decrease with age. This does not result in any impairment of the sensor function.

	Plug Version		
Part Number	OCP801P0150P	OCP801P0150C	OCP801P0150E
Web server	yes	yes	yes
EoE (Ethernet over EtherCAT)		yes	
PROFINET IO, CC-B	●		
EtherCAT		●	
EtherNet/IP™			●
Interface	PROFINET	EtherCAT	EtherNet/IP™
Connection Diagram No.	001	001	001
Control Panel No.	X2 T12	X2 T15	X2 T13
Suitable Connection Technology No.	50	50	50
Suitable Mounting Technology No.	380	380	380

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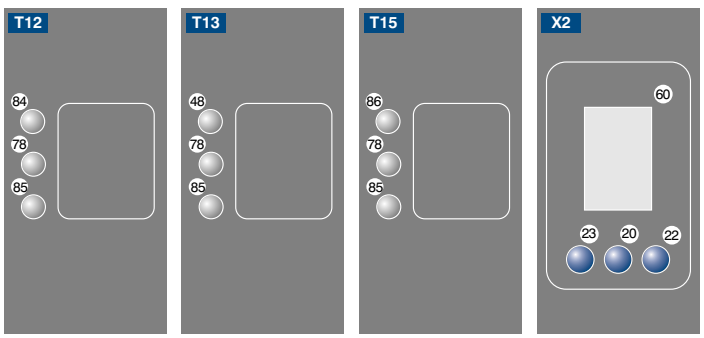
Complementary Products

- Midspan Adapter Z0029
- Protection Housing ZNNS001, ZNNS002
- Switch/Junction with PoE ZAC50xN0x

Ctrl. Panel



20 = Enter Button
22 = UP Button
23 = Down Button
48 = Network Status
60 = Display
78 = Module status
84 = Communication Status
85 = Link/Act LED
86 = STATUS

High-Performance Distance Sensor

100 mm LASER

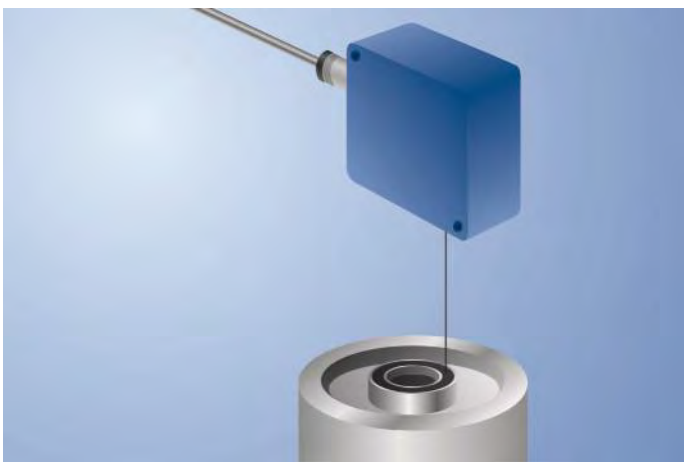
Range

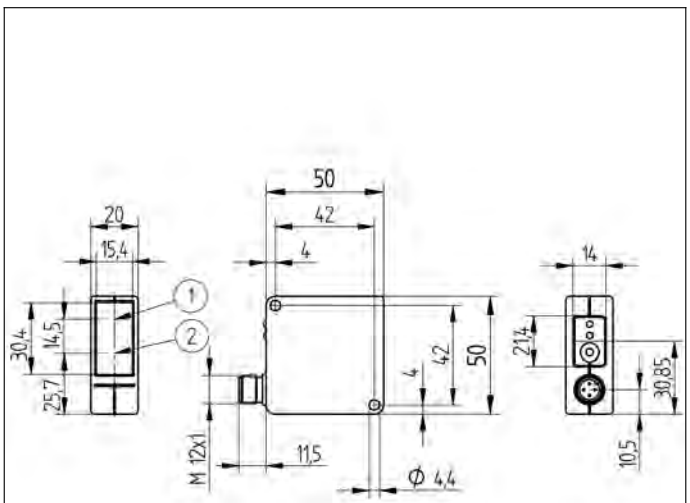
- **Smallest recognizable distance difference: 400 µm**
- **Spot diameter: 0,6 mm**

Technical Data

Optical Data	
Range	100 mm
Adjustable Range	60...100 mm
Switching Hysteresis	< 400 µm
Light Source	Laser (red)
Wave Length	660 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	< 0,6 mm
Focus Distance	110 mm
Electrical Data	
Supply Voltage	10...30 V DC
Current Consumption (Ub = 24 V)	< 30 mA
Switching Frequency	800 Hz
Response Time	650 µs
Temperature Drift	< 15 µm/K
Temperature Range	-25...60 °C
Switching Output Voltage Drop	< 2,5 V
PNP Switching Output/Switching Current	200 mA
PNP Contamination Output/Switching Current	50 mA
Short Circuit Protection	yes
Reverse Polarity Protection	yes
Overload Protection	yes
Protection Class	III
FDA Accession Number	1120737-000
Mechanical Data	
Setting Method	Potentiometer
Housing Material	Plastic
Full Encapsulation	yes
Degree of Protection	IP67
Connection	M12 × 1; 4-pin

These sensors detect distance by measuring angles. They are particularly good at recognizing objects in front of any background. The color, shape and surface characteristics of the object have practically no influence on sensor switching performance.





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 1 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version
Part Number	OHP102B0003
Contamination Output	●
PNP NO	●
Connection Diagram No.	103
Control Panel No.	P2
Suitable Connection Technology No.	2
Suitable Mounting Technology No.	380

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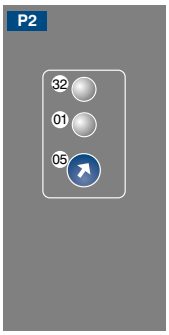
Complementary Products

PNP-NPN Converter BG2V1P-N-2M
Protection Housing Set ZSP-NN-02
Protection Housing ZSV-0x-01

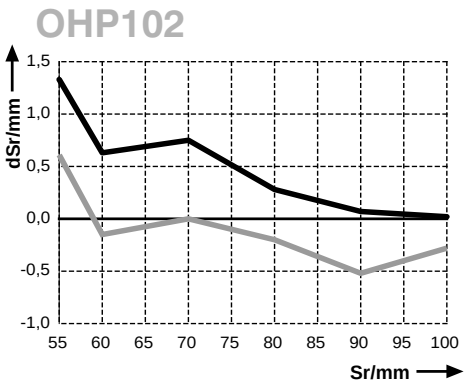
Ctrl. Panel



01 = Switching Status Indicator
05 = Switching Distance Adjuster
32 = Contamination Warning/Error Warning

Switching Distance Deviation

Typical characteristic curve based on Kodak white (90 % remission)



Sr = Switching Distance
dSr = Switching Distance Change
black 6 % remission
grey 18 % remission

High-Performance Distance Sensor

40...160 mm LASER

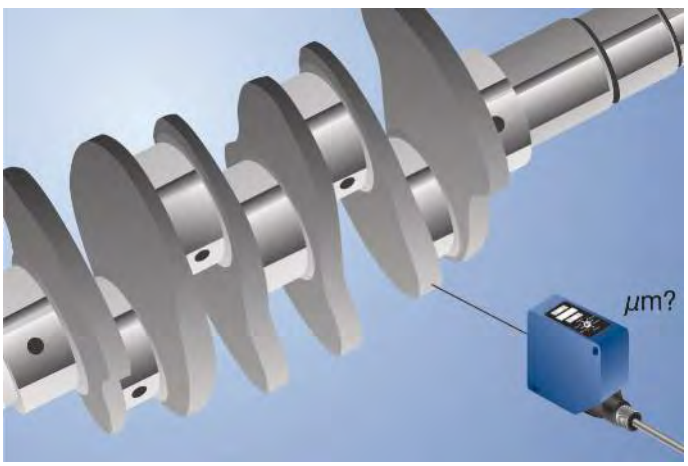
Range

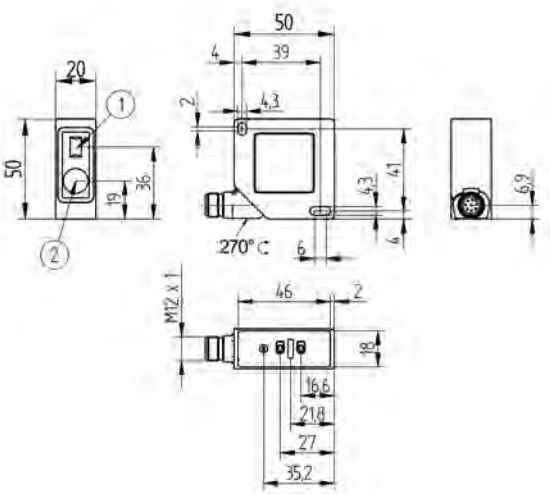
- **High resolution: 20 µm (resolution-mode)**
- **Linearity: 0,1 % (resolution-mode)**
- **Measured value independent of material, color and brightness**
- **Zoom function**

Technical Data

Optical Data	
Working Range	40...160 mm
Measuring Range	120 mm
Resolution	20 µm
Resolution (Speed-Mode)	30 µm
Linearity	0,1 %
Linearity (Speed-Mode)	0,2 %
Light Source	Laser (red)
Wave Length	660 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	18...30 V DC
Current Consumption (Ub = 24 V)	< 80 mA
Measuring Rate	1000 /s
Measuring Rate (Resolution-Mode)	500 /s
Response Time	< 1000 µs
Response Time (Resolution Mode)	< 2000 µs
Temperature Drift	< 10 µm/K
Temperature Range	-25...50 °C
Analog Output	0...10 V/4...20 mA
Current Load Voltage Output	< 1 mA
Current Output Load Resistance	< 500 Ohm
Interface	RS-232
Baud Rate	38400 Bd
Protection Class	III
FDA Accession Number	1120717-000
Mechanical Data	
Setting Method	Teach-In
Housing Material	Plastic
Degree of Protection	IP67
Connection	M12 × 1; 8-pin

These sensors work with a high-resolution CMOS line and DSP technology and determine distance using angular measurement. As a result, material, color and brightness related measurement differences are virtually eliminated.
Integrated analogue output can be configured for voltage 0...10 V (10...0 V) or current 4...20 mA (20...4 mA).





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version
Part Number	OCP162H0180
Error Output	●
Analog Output	●
RS-232 Interface	●
Connection Diagram No.	529
Control Panel No.	P7
Suitable Connection Technology No.	80
Suitable Mounting Technology No.	380

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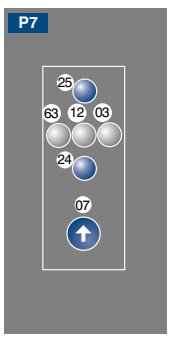
Complementary Products

- Analog Evaluation Unit AW02
- Feldbus Gateways ZAGxxxN01, EPGG001
- Interface Cable S232W3
- Protection Housing Set ZSP-NN-02
- Protection Housing ZSV-0x-01
- wTeach2 software DNNF005

Ctrl. Panel

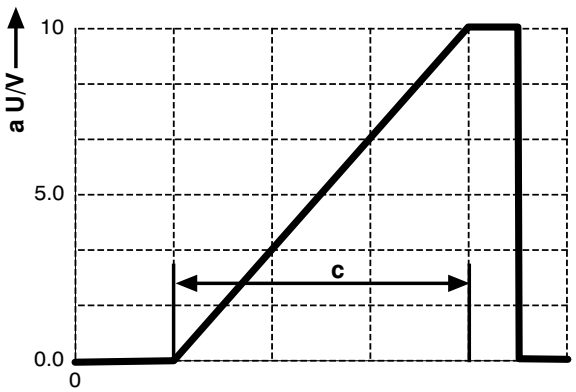


03 = Error Indicator
07 = Selector Switch
12 = Analog Output Indicator
24 = Plus Button
25 = Minus Button
63 = Analog Output Current Indicator

Table 1

Working Distance	40 mm	160 mm
Spot Size	0,4 × 0,9 mm	0,9 × 1,8 mm

Output Graph



c = Measuring Range
a = Analog Voltage Output

High-Performance Distance Sensor

160 mm LASER

Range

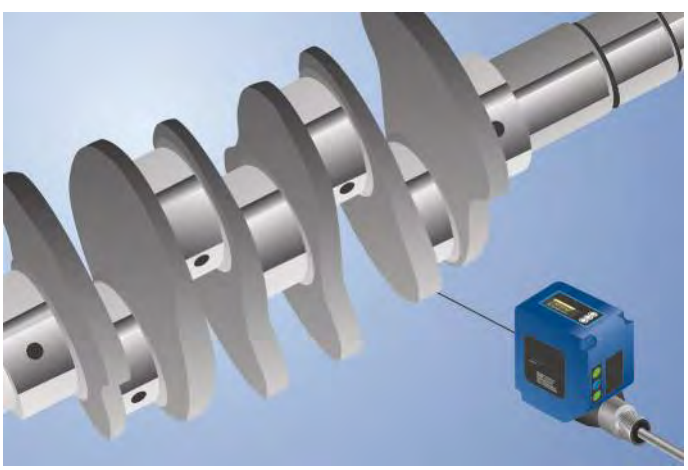
IndustrialEthernet

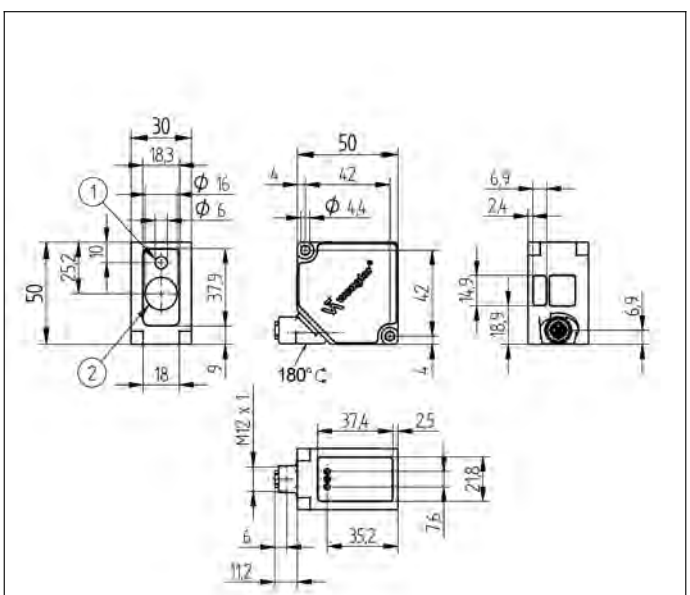
- **CMOS line array**
- **Industrial Ethernet**
- **Measured value independent of material, color and brightness**
- **Web server and graphic display for simple operation**

Technical Data

Optical Data	
Working Range	40...160 mm
Measuring Range	120 mm
Reproducibility maximum	20...70 µm
Linearity Deviation	50...160 µm
Light Source	Laser (red)
Wave Length	655 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	3,6 × 0,9 mm
Electrical Data	
Port Type	100BASE-TX
PoE Class	1
Output rate	330 /s
Temperature Drift	< 10 µm/K
Temperature Range	-25...50 °C
Reverse Polarity Protection	yes
Protection Class	III
Mechanical Data	
Setting Method	Menu (OLED)
Housing Material	Metal
Degree of Protection	IP68
Connection	M12 × 1; 8-pin, X-cod.
Safety-relevant Data	
MTTFd (EN ISO 13849-1)	350,69 a

These sensors work with a high-resolution CMOS line and DSP technology and determine distance using angular measurement.
Sensors with Industrial Ethernet make the analog and digital input cards at control units unnecessary, as all service and measurement data is read, analyzed and processed in the control unit in real time, without the need for conversion. Power over Ethernet connects data transfer and power supply in one cable and thus reduces the wiring effort.





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 1 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

Display brightness may decrease with age. This does not result in any impairment of the sensor function.

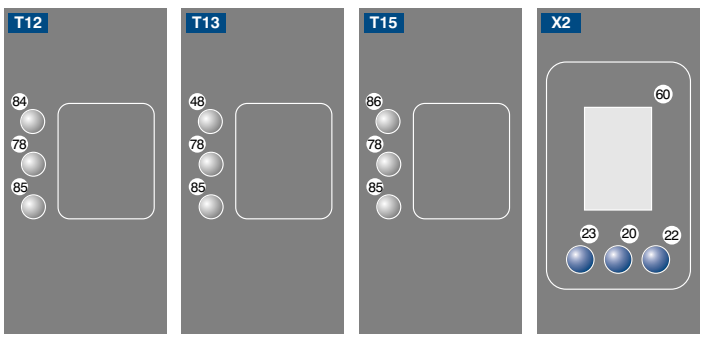
	Plug Version		
Part Number	OCP162P0150P	OCP162P0150C	OCP162P0150E
Web server	yes	yes	yes
EoE (Ethernet over EtherCAT)		yes	
PROFINET IO, CC-B	●		
EtherCAT		●	
EtherNet/IP™			●
Interface	PROFINET	EtherCAT	EtherNet/IP™
Connection Diagram No.	001	001	001
Control Panel No.	X2 T12	X2 T15	X2 T13
Suitable Connection Technology No.	50	50	50
Suitable Mounting Technology No.	380	380	380

Connection Diagrams page 78

Complementary Products

- Midspan Adapter Z0029
- Protection Housing ZNNS001, ZNNS002
- Switch/Junction with PoE ZAC50xN0x

Ctrl. Panel



20 = Enter Button
22 = UP Button
23 = Down Button
48 = Network Status
60 = Display
78 = Module status
84 = Communication Status
85 = Link/Act LED
86 = STATUS

High-Performance Distance Sensor

240 mm LASER

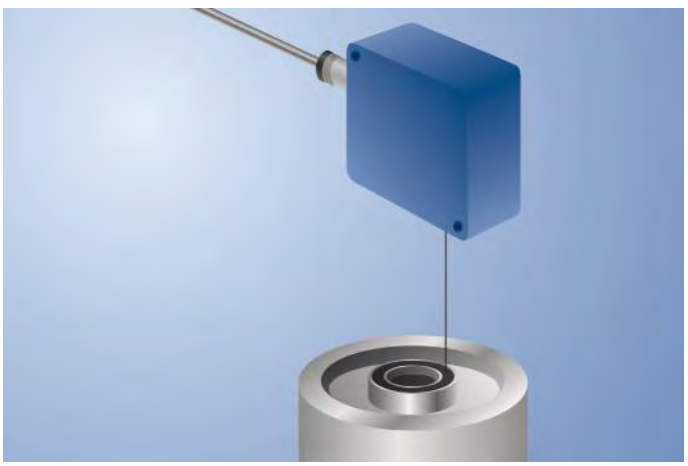
Range

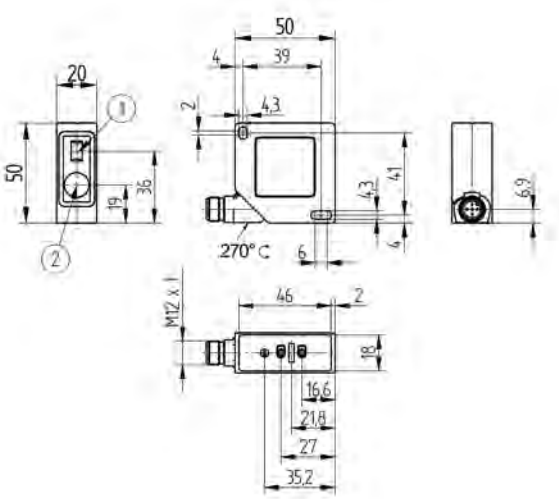
- **CMOS line array**
- **Highly accurate switching distance**
- **Minimal switching hysteresis**
- **Switching point independent of material, color and brightness**

Technical Data

Optical Data	
Range	240 mm
Adjustable Range	40...240 mm
Switching Hysteresis	< 0,5 %
Light Source	Laser (red)
Wave Length	655 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	10...30 V DC
Current Consumption (Ub = 24 V)	< 50 mA
Switching Frequency	300 Hz
Response Time	< 1,7 ms
On-/Off-Delay (RS-232)	0...1 s
Temperature Drift	< 15 µm/K
Temperature Range	-25...60 °C
Switching Outputs	2
Switching Output Voltage Drop	< 1,5 V
Switching Output/Switching Current	200 mA
Short Circuit Protection	yes
Reverse Polarity Protection	yes
Teach Mode	HT, VT, FT, TP
Baud Rate	9600 Bd
Protection Class	III
FDA Accession Number	1120718-000
Mechanical Data	
Setting Method	Teach-In
Housing Material	Plastic
Degree of Protection	IP67
Connection	M12 × 1; 4/5-pin

These sensors work with a high-resolution CMOS line and DSP technology and determine distance using angular measurement. As a result, material, color and brightness related switching point differences are virtually eliminated. Two independent switching outputs are available, at which two switching thresholds and one on or off-delay time (in 10 ms steps) can be configured. Sensor functions can be activated, and scanning results can be acquired via the RS-232 interface.





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

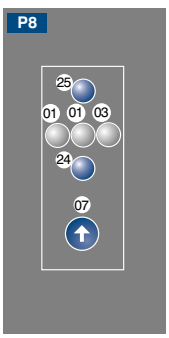
	Plug Version
Part Number	OCP242X0135
Error Output	●
Configurable as PNP/NPN/Push-Pull	●
Switchable to NC/NO	●
RS-232 with Adapterbox	●
External teach-in input	●
Connection Diagram No.	779
Control Panel No.	P8
Suitable Connection Technology No.	2 35
Suitable Mounting Technology No.	380

Connection Diagrams page 78

Complementary Products

Adapterbox A232
Protection Housing Set ZSP-NN-02
Protection Housing ZSV-0x-01
wTeach2 software DNNF005

Ctrl. Panel



01 = Switching Status Indicator 25 = Minus Button
03 = Error Indicator
07 = Selector Switch
24 = Plus Button

Table 1

Detection Range	40 mm	240 mm
Spot Size	0,4 × 0,9 mm	1,1 × 2,3 mm

High-Performance Distance Sensor

50...350 mm LASER

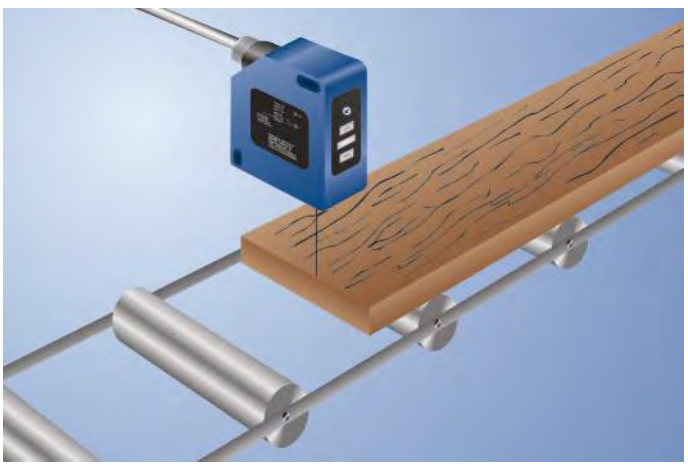
Range

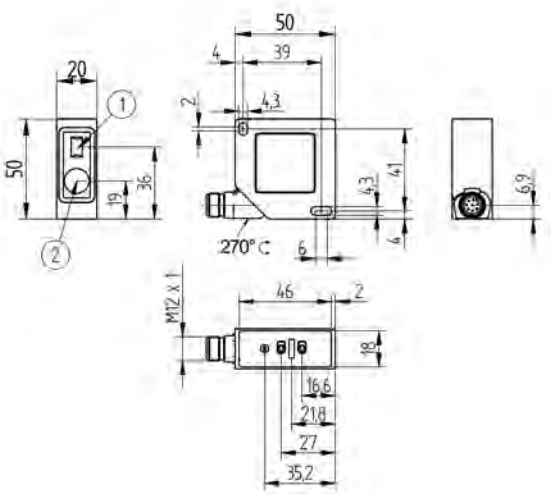
- **High resolution: 50 µm (resolution-mode)**
- **Linearity: 0,15 % (resolution-mode)**
- **Measured value independent of material, color and brightness**
- **Zoom function**

Technical Data

Optical Data	
Working Range	50...350 mm
Measuring Range	300 mm
Resolution	50 µm
Resolution (Speed-Mode)	80 µm
Linearity	0,15 %
Linearity (Speed-Mode)	0,2 %
Light Source	Laser (red)
Wave Length	660 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	18...30 V DC
Current Consumption (Ub = 24 V)	< 80 mA
Measuring Rate	500 /s
Measuring Rate (Resolution-Mode)	250 /s
Response Time	< 2000 µs
Response Time (Resolution Mode)	< 4000 µs
Temperature Drift	< 25 µm/K
Temperature Range	-25...50 °C
Analog Output	0...10 V/4...20 mA
Current Load Voltage Output	< 1 mA
Current Output Load Resistance	< 500 Ohm
Interface	RS-232
Baud Rate	38400 Bd
Protection Class	III
FDA Accession Number	1120723-000
Mechanical Data	
Setting Method	Teach-In
Housing Material	Plastic
Degree of Protection	IP67
Connection	M12 × 1; 8-pin

These sensors work with a high-resolution CMOS line and DSP technology and determine distance using angular measurement. As a result, material, color and brightness related measurement differences are virtually eliminated.
Integrated analogue output can be configured for voltage 0...10 V (10...0 V) or current 4...20 mA (20...4 mA).





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

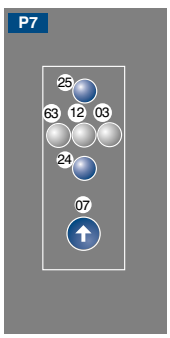
	Plug Version
Part Number	OCP352H0180
Error Output	●
Analog Output	●
RS-232 Interface	●
Connection Diagram No.	529
Control Panel No.	P7
Suitable Connection Technology No.	80
Suitable Mounting Technology No.	380

Connection Diagrams page 78

Complementary Products

- Analog Evaluation Unit AW02
- Feldbus Gateways ZAGxxxN01, EPGG001
- Interface Cable S232W3
- Protection Housing Set ZSP-NN-02
- Protection Housing ZSV-0x-01
- wTeach2 software DNNF005

Ctrl. Panel

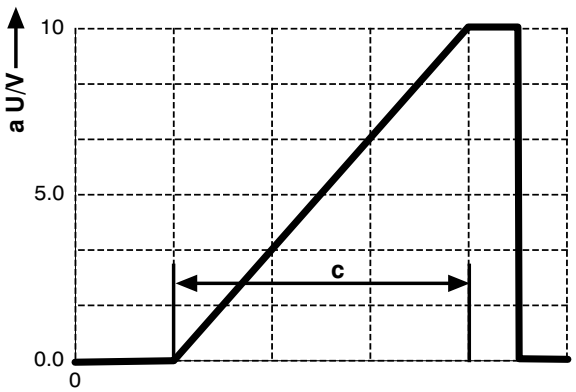


03 = Error Indicator
07 = Selector Switch
12 = Analog Output Indicator
24 = Plus Button
25 = Minus Button
63 = Analog Output Current Indicator

Table 1

Working Distance	50 mm	350 mm
Spot Size	0,4 × 1 mm	1,4 × 3,1 mm

Output Graph



c = Measuring Range
a = Analog Voltage Output

High-Performance Distance Sensor

350 mm LASER

Range

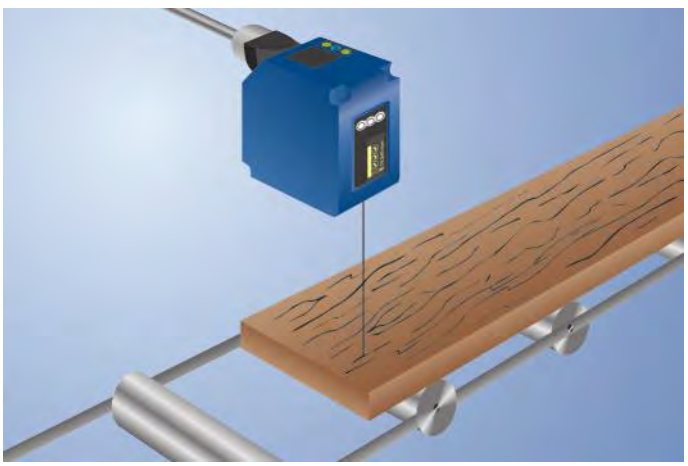
IndustrialEthernet

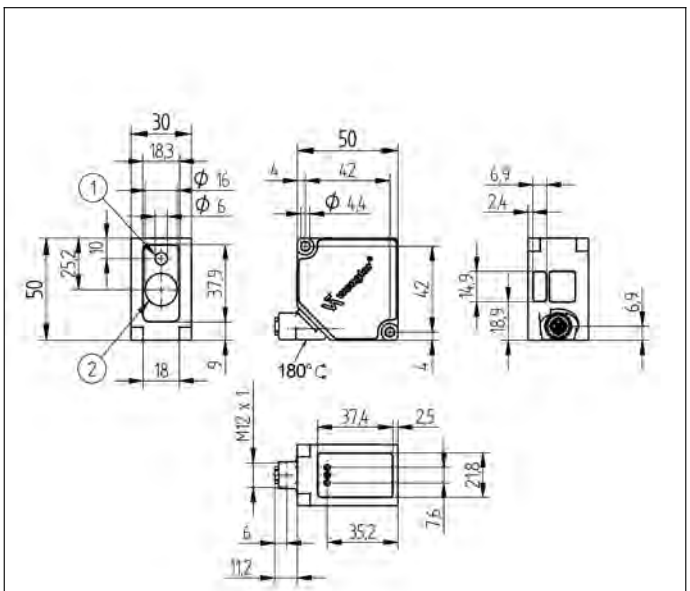
- **CMOS line array**
- **Industrial Ethernet**
- **Measured value independent of material, color and brightness**
- **Web server and graphic display for simple operation**

Technical Data

Optical Data	
Working Range	50...350 mm
Measuring Range	300 mm
Reproducibility maximum	20...150 µm
Linearity Deviation	100...500 µm
Light Source	Laser (red)
Wave Length	655 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	3,6 × 0,9 mm
Electrical Data	
Port Type	100BASE-TX
PoE Class	1
Output rate	330 /s
Temperature Drift	< 20 µm/K
Temperature Range	-25...50 °C
Reverse Polarity Protection	yes
Protection Class	III
Mechanical Data	
Setting Method	Menu (OLED)
Housing Material	Metal
Degree of Protection	IP68
Connection	M12 × 1; 8-pin, X-cod.
Safety-relevant Data	
MTTFd (EN ISO 13849-1)	350,69 a

These sensors work with a high-resolution CMOS line and DSP technology and determine distance using angular measurement.
Sensors with Industrial Ethernet make the analog and digital input cards at control units unnecessary, as all service and measurement data is read, analyzed and processed in the control unit in real time, without the need for conversion. Power over Ethernet connects data transfer and power supply in one cable and thus reduces the wiring effort.





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 1 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

Display brightness may decrease with age. This does not result in any impairment of the sensor function.

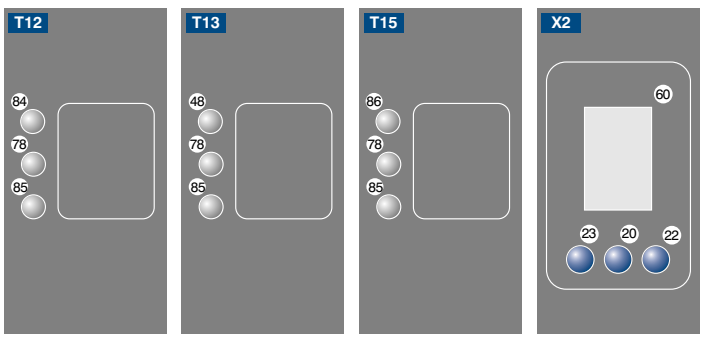
	Plug Version		
Part Number	OCP352P0150P	OCP352P0150C	OCP352P0150E
Web server	yes	yes	yes
EoE (Ethernet over EtherCAT)		yes	
PROFINET IO, CC-B	●		
EtherCAT		●	
EtherNet/IP™			●
Interface	PROFINET	EtherCAT	EtherNet/IP™
Connection Diagram No.	001	001	001
Control Panel No.	X2 T12	X2 T15	X2 T13
Suitable Connection Technology No.	50	50	50
Suitable Mounting Technology No.	380	380	380

Connection Diagrams page 78

Complementary Products

- Midspan Adapter Z0029
- Protection Housing ZNNS001, ZNNS002
- Switch/Junction with PoE ZAC50xN0x

Ctrl. Panel



20 = Enter Button
22 = UP Button
23 = Down Button
48 = Network Status
60 = Display
78 = Module status
84 = Communication Status
85 = Link/Act LED
86 = STATUS

High-Performance Distance Sensor

660 mm LASER

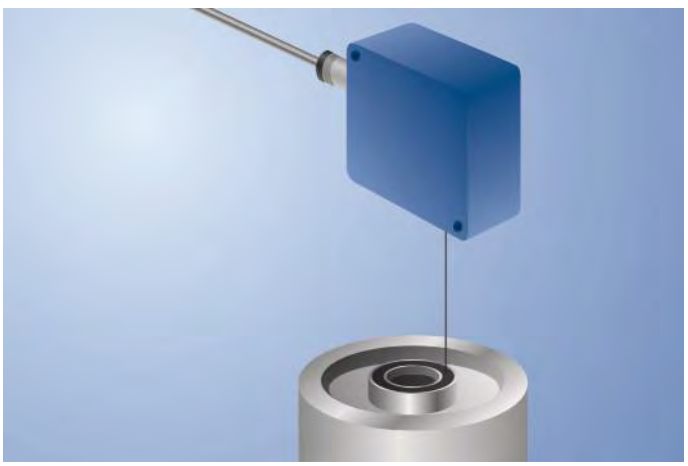
Range

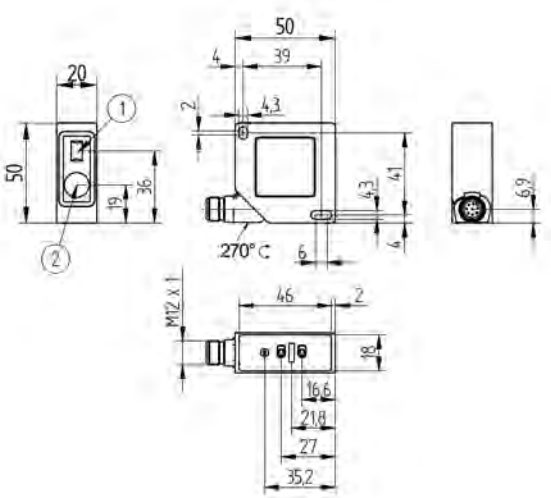
- **CMOS line array**
- **Highly accurate switching distance**
- **Minimal switching hysteresis**
- **Special coated optics**
- **Switching point independent of material, color and brightness**

Technical Data

Optical Data	
Range	660 mm
Adjustable Range	60...660 mm
Switching Hysteresis	< 1 %
Light Source	Laser (red)
Wave Length	655 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	10...30 V DC
Current Consumption (Ub = 24 V)	< 50 mA
Switching Frequency	100 Hz
Response Time	< 5 ms
On-/Off-Delay (RS-232)	0...1 s
Temperature Drift	< 50 µm/K
Temperature Range	-25...60 °C
Switching Outputs	2
Switching Output Voltage Drop	< 1,5 V
Switching Output/Switching Current	200 mA
Short Circuit Protection	yes
Reverse Polarity Protection	yes
Protection Class	III
FDA Accession Number	1120728-000
Mechanical Data	
Setting Method	Teach-In
Housing Material	Plastic
Degree of Protection	IP67

These sensors work with a high-resolution CMOS line and DSP technology and determine distance using angular measurement. As a result, material, color and brightness related switching point differences are virtually eliminated. Two independent switching outputs are available, at which two switching thresholds and one on or off-delay time (in 10 ms steps) can be configured. Sensor functions can be activated, and scanning results can be acquired via the RS-232 interface.





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

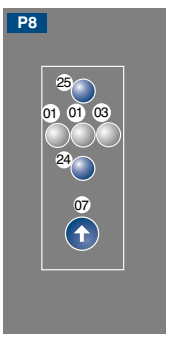
	Plug Version	
Part Number	OCP662X0080	OCP662X0135
Error Output	●	●
Configurable as PNP/NPN/Push-Pull	●	●
Switchable to NC/NO	●	●
RS-232 Interface	●	
RS-232 with Adapterbox		●
External teach-in input		●
Teach Mode	HT, VT, TP	HT, VT, FT, TP
Baud Rate	38400 Bd	9600 Bd
Coated Optics	yes	
Connection	M12 × 1; 8-pin	M12 × 1; 4/5-pin
Connection Diagram No.	737	779
Control Panel No.	P8	P8
Suitable Connection Technology No.	80	2 35
Suitable Mounting Technology No.	380	380

Connection Diagrams page 78

Complementary Products

Adapterbox A232
Interface Cable S232W3
Protection Housing Set ZSP-NN-02
Protection Housing ZSV-0x-01
wTeach2 software DNNF005

Ctrl. Panel



01 = Switching Status Indicator
03 = Error Indicator
07 = Selector Switch
24 = Plus Button
25 = Minus Button

Table 1

Detection Range	60 mm	660 mm
Spot Size	0,5 × 1,2 mm	2 × 5,5 mm

High-Performance Distance Sensor

660 mm LASER

Range

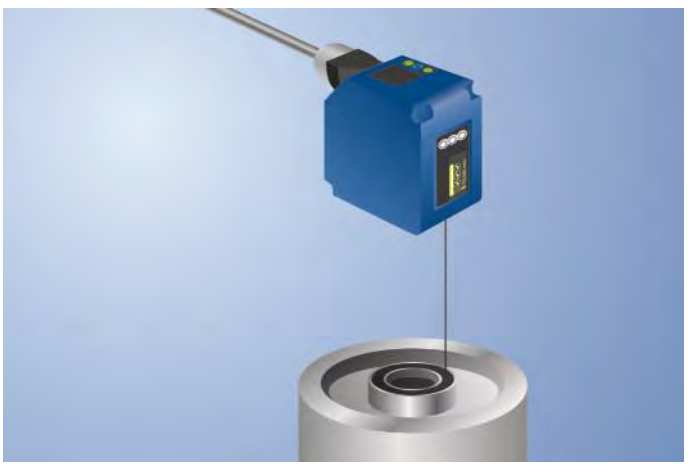
IndustrialEthernet

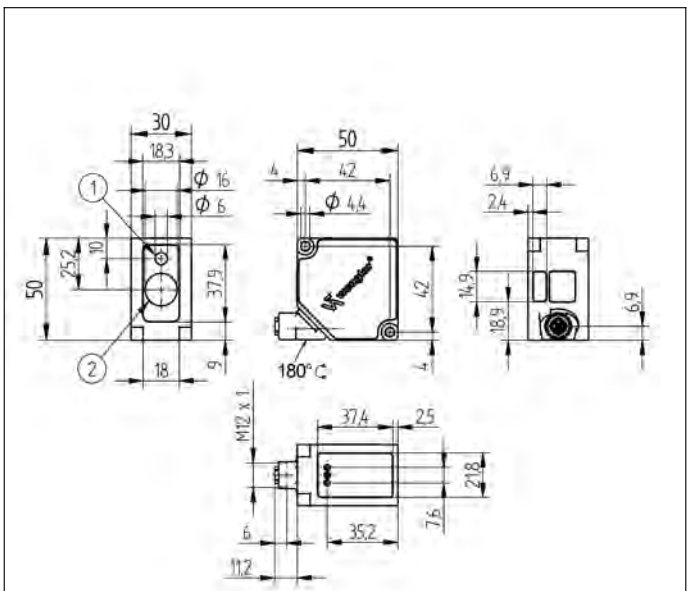
- **CMOS line array**
- **Industrial Ethernet**
- **Measured value independent of material, color and brightness**
- **Web server and graphic display for simple operation**

Technical Data

Optical Data	
Working Range	60...660 mm
Measuring Range	600 mm
Reproducibility maximum	70...1000 µm
Linearity Deviation	100...1000 µm
Light Source	Laser (red)
Wave Length	655 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	3,6 × 0,9 mm
Electrical Data	
Port Type	100BASE-TX
PoE Class	1
Output rate	330 /s
Temperature Drift	< 50 µm/K
Temperature Range	-25...50 °C
Reverse Polarity Protection	yes
Protection Class	III
Mechanical Data	
Setting Method	Menu (OLED)
Housing Material	Metal
Degree of Protection	IP68
Connection	M12 × 1; 8-pin, X-cod.
Safety-relevant Data	
MTTFd (EN ISO 13849-1)	350,69 a

These sensors work with a high-resolution CMOS line and DSP technology and determine distance using angular measurement.
Sensors with Industrial Ethernet make the analog and digital input cards at control units unnecessary, as all service and measurement data is read, analyzed and processed in the control unit in real time, without the need for conversion. Power over Ethernet connects data transfer and power supply in one cable and thus reduces the wiring effort.





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 1 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

Display brightness may decrease with age. This does not result in any impairment of the sensor function.

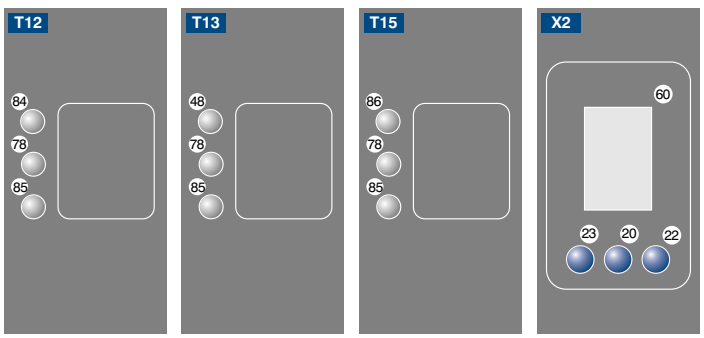
	Plug Version		
Part Number	OCP662P0150P	OCP662P0150C	OCP662P0150E
Web server	yes	yes	yes
EoE (Ethernet over EtherCAT)		yes	
PROFINET IO, CC-B	●		
EtherCAT		●	
EtherNet/IP™			●
Interface	PROFINET	EtherCAT	EtherNet/IP™
Connection Diagram No.	001	001	001
Control Panel No.	X2 T12	X2 T15	X2 T13
Suitable Connection Technology No.	50	50	50
Suitable Mounting Technology No.	380	380	380

Connection Diagrams page 78

Complementary Products

Midspan Adapter Z0029
Protection Housing ZNNS001, ZNNS002
Switch/Junction with PoE ZAC50xN0x

Ctrl. Panel



20 = Enter Button
22 = UP Button
23 = Down Button
48 = Network Status
60 = Display
78 = Module status
84 = Communication Status
85 = Link/Act LED
86 = STATUS

High-Performance Distance Sensor

0...1000 mm LASER

Range

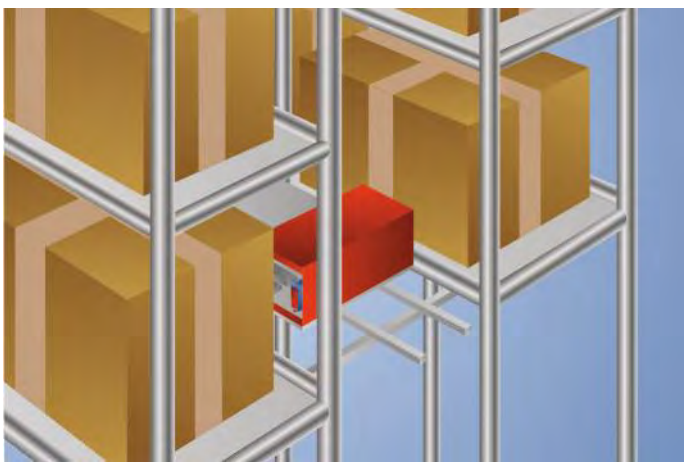
WinTec

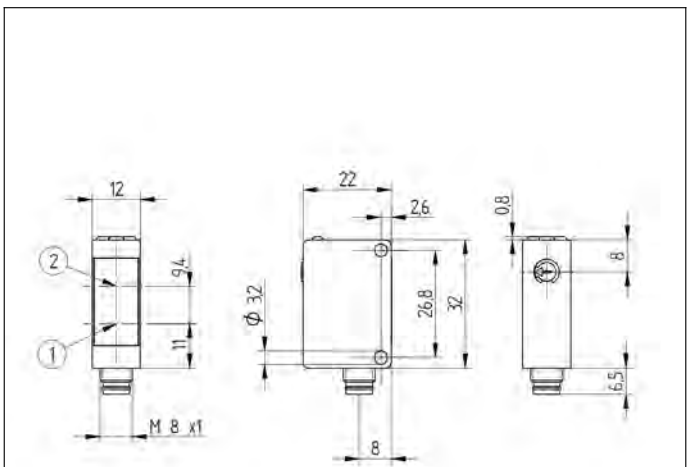
- **Interference-free towards gloss in the background with WinTec**
- **Miniature design**
- **No mutual interference with WinTec**
- **Reliable in case of glossy objects with WinTec**
- **Secure detection of black objects also in extremely inclined positions with WinTec**

Technical Data

Optical Data	
Working Range	0...1000 mm
Adjustable Range	100...1000 mm
Switching Hysteresis	< 20 mm
Light Source	Laser (red)
Wave Length	680 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Beam Divergence	< 16 mrad
Max. Ambient Light	10000 Lux
Spot Diameter	see Table 1
Triple Dot Laser	yes
Electrical Data	
Supply Voltage	10...30 V DC
Current Consumption (Ub = 24 V)	< 30 mA
Switching Frequency	1000 Hz
Response Time	0,5 ms
Temperature Drift	< 2,5 %
Temperature Range	-40...50 °C
Switching Outputs	2
Switching Output Voltage Drop	< 2,5 V
PNP Switching Output/Switching Current	100 mA
Short Circuit Protection	yes
Reverse Polarity Protection	yes
Overload Protection	yes
Protection Class	III
FDA Accession Number	1620293-000
Mechanical Data	
Setting Method	Potentiometer
Housing Material	Plastic
Optic Cover	PMMA
Degree of Protection	IP67
Safety-relevant Data	
MTTFd (EN ISO 13849-1)	996,97 a

These miniature sensors determine distance between the sensor and the object by means of transit time measurement.
wenglor's interference-free technology (WinTec) is revolutionizing sensor technology: it prevents numerous sensors arranged directly opposite or next to each other from interfering with one another. The sensors reach a very high switching frequency and use laser class 1, which is safe for the human eye.





1 = Transmitter Diode
2 = Receiver Diode
Screw M3 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version			Prewired Version
Part Number	P1KY001	P1KY002	P1KY003	P1KY004
PNP NO/NC antivalent	●	●	●	●
Connection	M8 × 1; 4-pin	M12 × 1; 4-pin	M8 × 1; 4-pin	Cable, 4-wire, 2 m
Cable Length		200 mm	200 mm	
Connection Diagram No.	101	101	101	201
Control Panel No.	1K1	1K1	1K1	1K1
Suitable Connection Technology No.	7	2	7	
Suitable Mounting Technology No.	400	400	400	400

Connection Diagrams page 78

Table 1

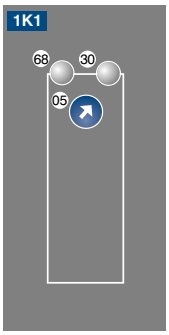
Working Distance	100 mm	500 mm	1000 mm
Spot Diameter	4 mm	7 mm	15 mm

Complementary Products

PNP-NPN Converter BG2V1P-N-2M

PNP-NPN Converter BG7V1P-N-2M

Ctrl. Panel

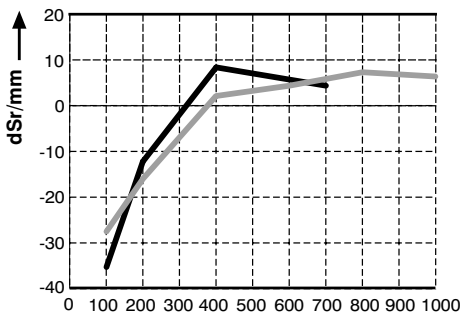


05 = Switching Distance Adjuster
30 = Switching Status/Contamination Warning
68 = Supply Voltage Indicator

Switching Distance Deviation

Typical characteristic curve based on Kodak white (90 % remission)

P1KY0



Sr = Switching Distance
dSr = Switching Distance Change
black 6 % remission
grey 18 % remission

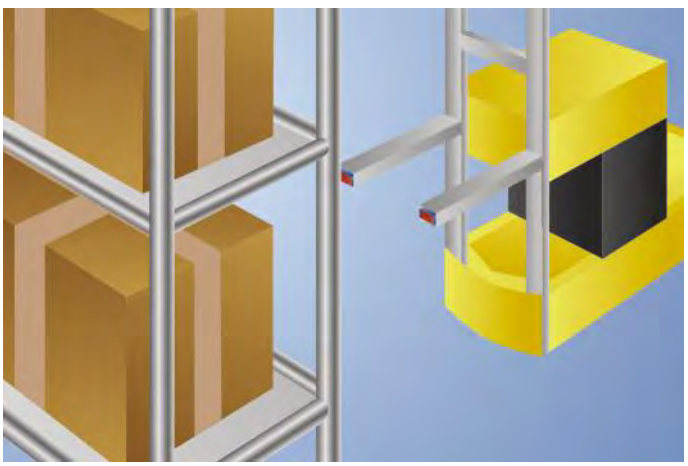
High-Performance Distance Sensor

0...1500 mm LASER

Range

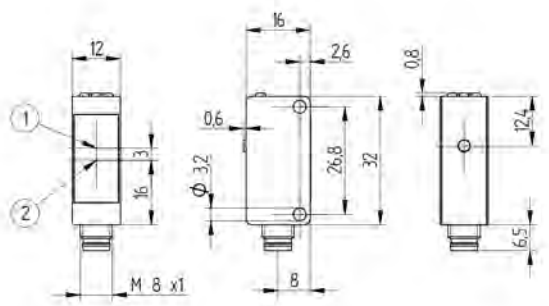
- **2 mutually independent switching outputs**
- **IO-Link interface**
- **Large working range**
- **Miniature design**

The high-performance distance sensor with compact format accurately determines distance between the sensor and the object on the basis of transit time measurement. Two mutually independent switching outputs and the intelligent IO-Link interface permit multifunctional use for precisely ascertaining distance to an object, or for detecting the object at any two switching points. A large working range of 0 to 1500 mm ensures top performance with a miniature format and flexibility where range is concerned. Thanks to laser class 1, the sensor's laser beam is harmless for the human eye.



Technical Data

Optical Data	
Working Range	0...1500 mm
Adjustable Range	50...1500 mm
Switching Hysteresis	< 30 mm
Light Source	Laser (infrared)
Wave Length	940 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	10...30 V DC
Supply Voltage with IO-Link	18...30 V DC
Current Consumption (Ub = 24 V)	< 15 mA
Switching Frequency	10 Hz
Response Time	< 36 ms
Temperature Drift	< 2,5 %
Temperature Range	-30...50 °C
Switching Outputs	2
Switching Output Voltage Drop	< 2,5 V
Switching Output/Switching Current	100 mA
Residual Current Switching Output	< 50 µA
Short Circuit Protection	yes
Reverse Polarity Protection	yes
Overload Protection	yes
Lockable	yes
Interface	IO-Link V1.1
Protection Class	III
FDA Accession Number	1720547-000
Mechanical Data	
Setting Method	Teach-In
Housing Material	Plastic
Optic Cover	PMMA
Degree of Protection	IP67/IP68
Safety-relevant Data	
MTTFd (EN ISO 13849-1)	2266,52 a



1 = Receiver Diode
2 = Transmitter Diode
Screw M3 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version	
Part Number	P1KY101	P1KY102
PNP NO/NC antivalent	●	●
IO-Link	●	●
Connection	M8 × 1; 4-pin	M12 × 1; 4-pin
Cable Length		200 mm
Connection Diagram No.	223	223
Control Panel No.	A23	A23
Suitable Connection Technology No.	7	2
Suitable Mounting Technology No.	400	400

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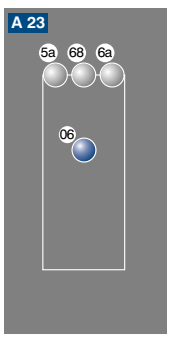
Table 1

Working Distance	350 mm	700 mm	1500 mm
Spot Diameter	14 mm	25 mm	42 mm

Complementary Products

IO-Link Master

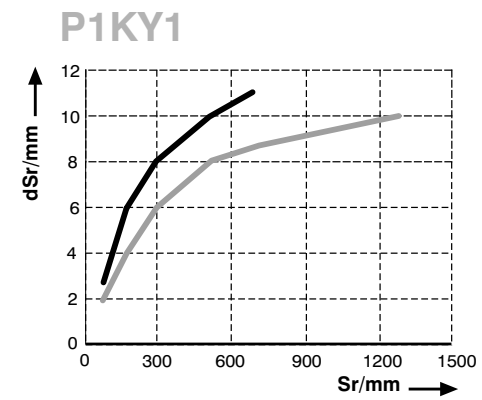
Ctrl. Panel



06 = Teach Button
5a = Switching Status Display, O1
68 = Supply Voltage Indicator
6a = Switching Status Display, O2

Switching Distance Deviation

Typical characteristic curve based on Kodak white (90 % remission)



Sr = Switching Distance
dSr = Switching Distance Change
black 6 % remission
grey 18 % remission

High-Performance Distance Sensor

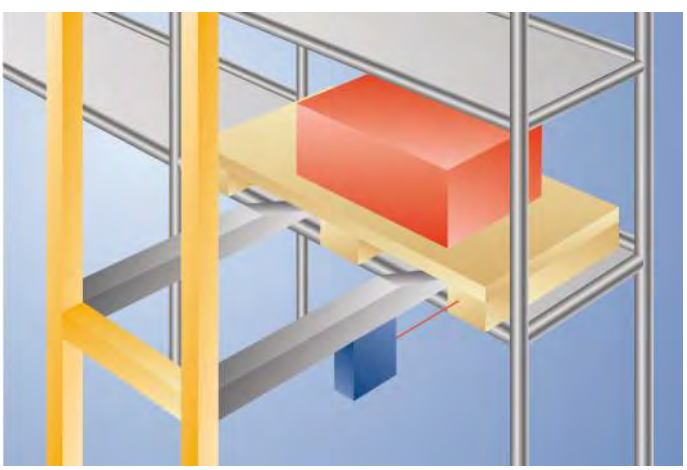
0...3 m LASER

Range

WinTec

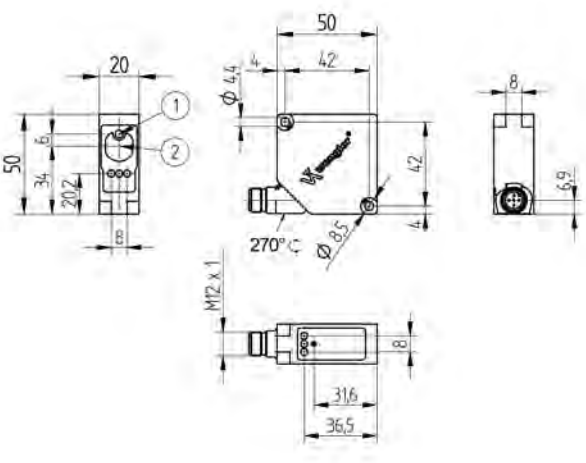
- **Interference-free towards gloss in the background with WinTec**
- **No mutual interference with WinTec**
- **Reliable in case of glossy objects with WinTec**
- **Secure detection of black objects also in extremely inclined positions with WinTec**

These sensors have scratch-resistant optics and the emitted light can be switched off. They use the transit time measurement principle to measure the distance between the sensor and the object.
wenglor interference-free technology (WinTec) has revolutionized sensor technology:
It makes it possible to mount several sensors directly next to, or opposite each other without the sensors influencing each other. The sensors reach a very high switching frequency and use laser class 1, which is safe for the human eye.



Technical Data

Optical Data	
Working Range	0...3000 mm
Adjustable Range	200...3000 mm
Switching Hysteresis	< 15 mm
Light Source	Laser (red)
Wave Length	660 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Beam Divergence	< 2 mrad
Max. Ambient Light	10000 Lux
Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	10...30 V DC
Current Consumption (Ub = 24 V)	< 50 mA
Switching Frequency	1000 Hz
Response Time	0,5 ms
Temperature Drift (-10 °C < Tu < 50 °C)	< 1 %
Temperature Drift (Tu < -10 °C, Tu > 50 °C)	< 2,5 %
Temperature Range	-40...60 °C
Switching Outputs	2
Switching Output Voltage Drop	< 2,5 V
PNP Switching Output/Switching Current	200 mA
Short Circuit Protection	yes
Reverse Polarity Protection	yes
Overload Protection	yes
Protection Class	III
FDA Accession Number	0710891-003
Mechanical Data	
Setting Method	Teach-In
Housing Material	Plastic
Optic Cover	PMMA
Degree of Protection	IP68
Connection	M12 × 1; 4/5-pin
Safety-relevant Data	
MTTFd (EN ISO 13849-1)	771,39 a



1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

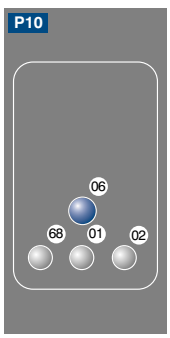
	Plug Version
Part Number	OY2P303A0135
PNP NO/NC antivalent	●
Connection Diagram No.	780
Control Panel No.	P10
Suitable Connection Technology No.	2 35
Suitable Mounting Technology No.	380

Connection Diagrams page 78

Complementary Products

- PNP-NPN Converter BG2V1P-N-2M
- Protection Housing Set ZSP-NN-02
- Protection Housing ZSV-0x-01

Ctrl. Panel



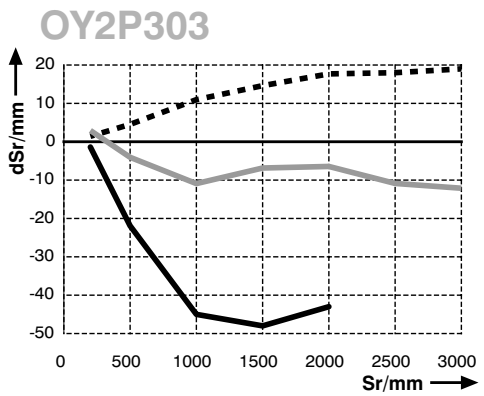
01 = Switching Status Indicator
02 = Contamination Warning
06 = Teach Button
68 = Supply Voltage Indicator

Table 1

Working Distance	0 m	3 m
Spot Diameter	5 mm	9 mm

Switching Distance Deviation

Typical characteristic curve based on Kodak white (90 % remission)



Sr = Switching Distance
dSr = Switching Distance Change

black 6 % remission
grey 18 % remission
Aluminum

High-Performance Distance Sensor

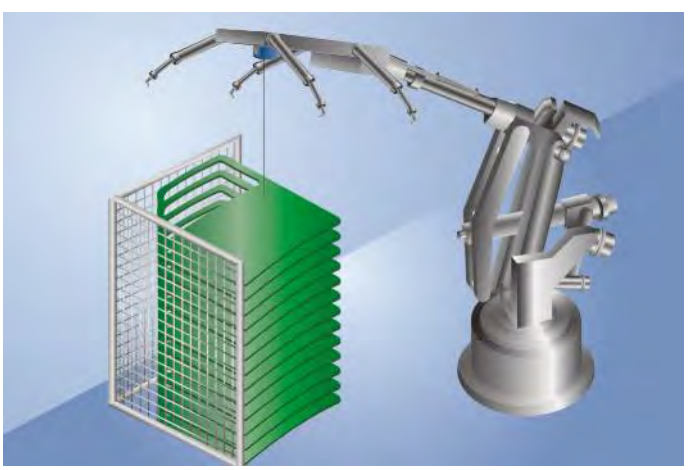
0,05...3,05 m LASER

Range

WinTec

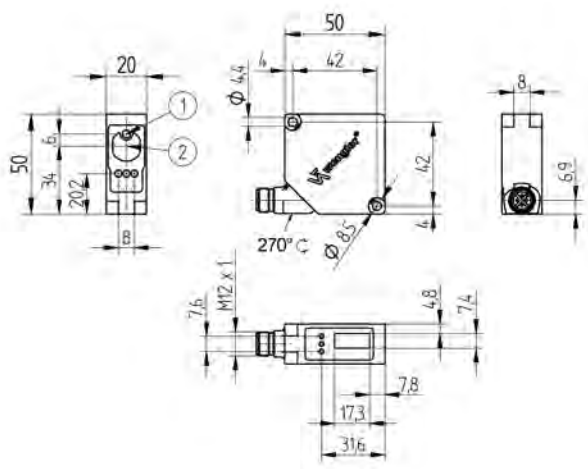
- **2 mutually independent switching outputs**
- **Analog output (0...10 V/4...20 mA)**
- **Graphical display for easy operation**
- **Reliable in case of glossy objects with WinTec**
- **Secure detection of black objects also in extremely inclined positions with WinTec**

These sensors have scratch-resistant optics and the emitted light can be switched off. They use the transit time measurement principle to measure the distance between the sensor and the object.
wenglor interference-free technology (WinTec) has revolutionized sensor technology:
It makes it possible to mount several sensors directly next to, or opposite each other without the sensors influencing each other. The sensors reach a very high switching frequency and use laser class 1, which is safe for the human eye.



Technical Data

Optical Data	
Working Range	50...3050 mm
Measuring Range	3000 mm
Reproducibility maximum	1 mm
Linearity Deviation (200...3050 mm)	7 mm
Linearity Deviation (50...200 mm)	15 mm
Switching Hysteresis	3...20 mm
Light Source	Laser (red)
Wave Length	660 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Beam Divergence	< 2 mrad
Electrical Data	
Supply Voltage	18...30 V DC
Current Consumption (Ub = 24 V)	< 70 mA
Switching Frequency	250 Hz
Measuring Rate	1...500 /s
On-/Off-Delay	0...10000 ms
Temperature Drift	< 0,4 mm/K
Temperature Range	-40...50 °C
Switching Outputs	2
Switching Output Voltage Drop	< 2,5 V
Switching Output/Switching Current	100 mA
Analog Output	0...10 V/4...20 mA
Short Circuit Protection	yes
Reverse Polarity and Overload Protection	yes
Teach Mode	HT, VT, FT, TP
Protection Class	III
Mechanical Data	
Setting Method	Menu (OLED)
Housing Material	Plastic
Optic Cover	PMMA
Degree of Protection	IP68



1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

Display brightness may decrease with age. This does not result in any impairment of the sensor function.

	Plug Version	
Part Number	OY1P303P0102	OY1P303P0189
Error Output	●	●
Contamination Output	●	●
Configurable as PNP/NPN/Push-Pull	●	●
Analog Output	●	●
RS-232 Interface		●
IO-Link	●	
Interface	IO-Link V1.1	RS-232
Connection	M12 × 1; 4-pin	M12 × 1; 8-pin
MTTFd (EN ISO 13849-1)	349,73 a	344,3 a
Connection Diagram No.	782	531
Control Panel No.	X2	X2
Suitable Connection Technology No.	21	89
Suitable Mounting Technology No.	380	380

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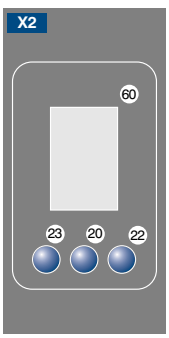
Complementary Products

Analog Evaluation Unit AW02
Feldbus Gateways ZAGxxxN01, EPGG001
Interface Cable S232W3
IO-Link Master
Protection Housing Set ZSP-NN-02
Protection Housing ZSV-0x-01
wTeach2 software DNNF005

Ctrl. Panel



20 = Enter Button
22 = UP Button
23 = Down Button
60 = Display

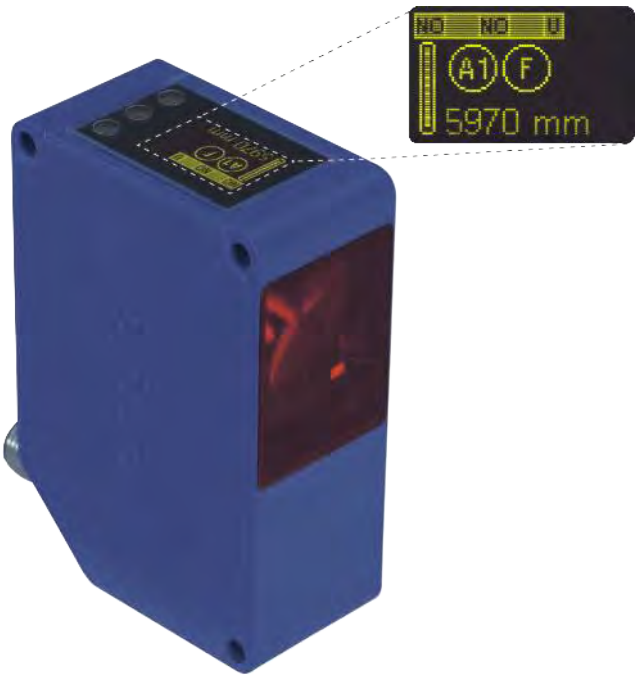
Table 1

Working Distance	0 m	3 m
Spot Diameter	5 mm	9 mm

High-Performance Distance Sensor

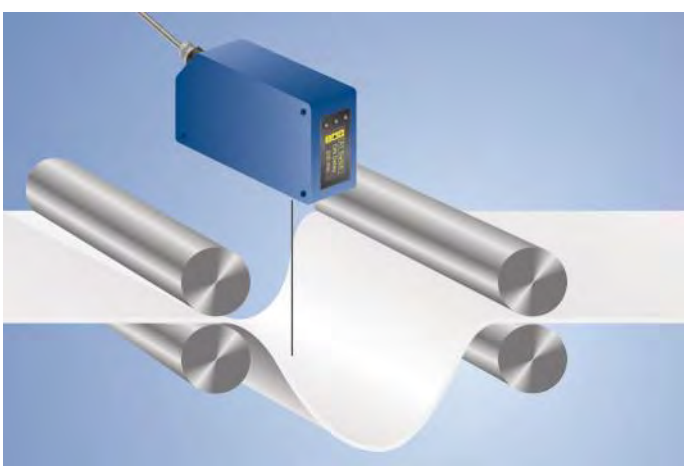
0,2...6,2 m LASER

Range



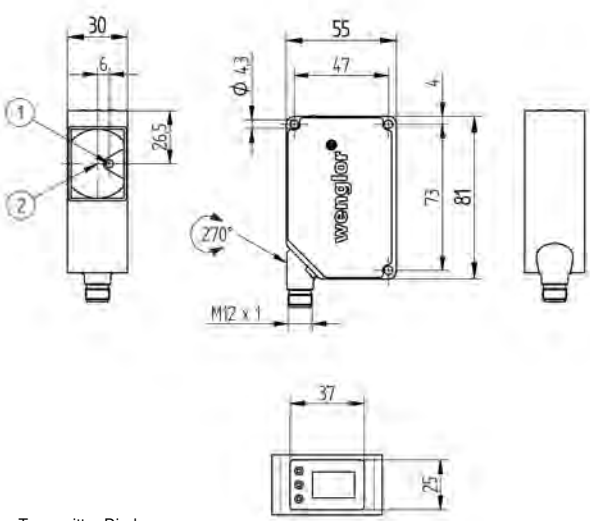
- **2 mutually independent switching outputs**
- **Graphical display for easy operation**
- **Switching output A1 as analog output switchable (0...10 V/4...20 mA)**
- **Temperature drift eliminable**

These sensors have scratch-resistant optics and the emitted light can be switched off. They use the transit time measurement principle to measure the distance between the sensor and the object. For this reason, the object's color, shape and surface characteristics have practically no influence on measurement results. Even dark objects can be reliably recognized.



Technical Data

Optical Data	
Working Range	0,2...6,2 m
Measuring Range	6 m
Resolution	1...12 mm
Linearity	0,5 %
Switching Hysteresis	3...20 mm
Light Source	Laser (red)
Wave Length	660 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Beam Divergence	< 2 mrad
Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	18...30 V DC
Current Consumption (Ub = 24 V)	< 100 mA
Switching Frequency	50 Hz
Measuring Rate	1...100 /s
Response Time	10...200 ms
On-/Off-Delay	0...10000 ms
Temperature Drift (-10 °C < Tu < 50 °C)	< 0,2 mm/K
Temperature Drift (Tu < -10 °C, Tu > 50 °C)	< 0,4 mm/K
Temperature Range	-25...60 °C
Switching Outputs	2
Switching Output Voltage Drop	< 2,5 V
Switching Output/Switching Current	200 mA
Analog Output	0...10 V/4...20 mA
Short Circuit Protection	yes
Reverse Polarity and Overload Protection	yes
Protection Class	III
FDA Accession Number	0920381-000
Mechanical Data	
Setting Method	Menu (OLED)
Housing Material	Plastic
Degree of Protection	IP68
Connection	M12 × 1; 4-pin
Safety-relevant Data	
MTTFd (EN ISO 13849-1)	346,68 a



1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

Display brightness may decrease with age. This does not result in any impairment of the sensor function.

	Plug Version
Part Number	OY1TA603P0003
Configurable as PNP/NPN/Push-Pull	●
Analog Output	●
Connection Diagram No.	755
Control Panel No.	TA1
Suitable Connection Technology No.	21
Suitable Mounting Technology No.	340

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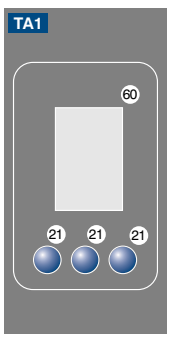
Complementary Products

Analog Evaluation Unit AW02

Protection Housing Set ZST-NN-02

Ctrl. Panel



21 = Mode Button
60 = Display

Table 1

Working Distance	0 m	6 m
Spot Diameter	5 mm	< 12 mm

High-Performance Distance Sensor

0,1...10,1 m LASER

Range

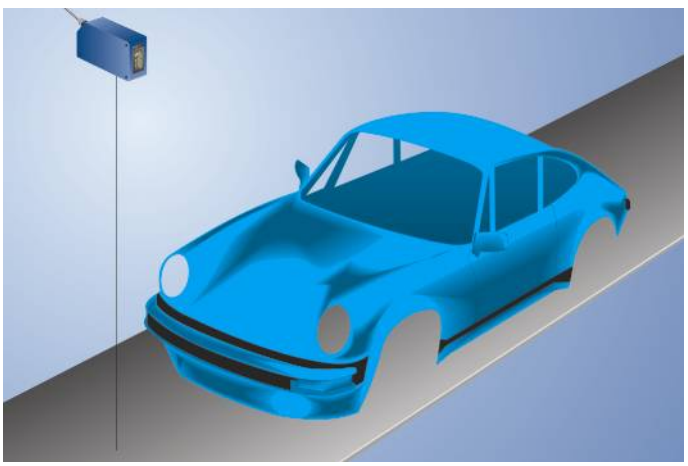
IndustrialEthernet WinTec

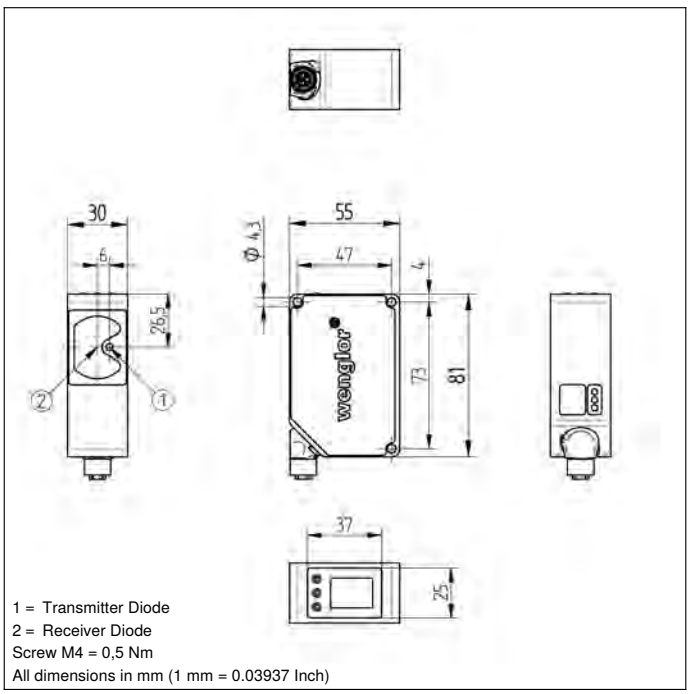
- **Industrial Ethernet**
- **Reliable in case of glossy objects with WinTec**
- **Secure detection of black objects also in extremely inclined positions with WinTec**
- **Web server and graphic display for simple operation**

Technical Data

Optical Data	
Working Range	0,1...10,1 m
Reproducibility maximum	7 mm
Linearity Deviation	20 mm
Light Source	Laser (red)
Wave Length	660 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Beam Divergence	< 2 mrad
Max. Ambient Light	5000 Lux
Spot Diameter	see Table 1
Electrical Data	
Port Type	100BASE-TX
PoE Class	1
Response Time	10 ms
Temperature Range	-25...50 °C
Reverse Polarity Protection	yes
Protection Class	III
Mechanical Data	
Setting Method	Menu (OLED)
Housing Material	Plastic
Degree of Protection	IP68
Connection	M12 × 1; 8-pin, X-cod.

These sensors have scratch-resistant optics and the emitted light can be switched off. They use the transit time measurement principle to measure the distance between the sensor and the object.
Sensors with Industrial Ethernet make the analog and digital input cards at control units unnecessary, as all service and measurement data is read, analyzed and processed in the control unit in real time, without the need for conversion. Power over Ethernet connects data transfer and power supply in one cable and thus reduces the wiring effort.





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

Display brightness may decrease with age. This does not result in any impairment of the sensor function.

Part Number	OY2TA104P0150P	OY2TA104P0150C	OY2TA104P0150E
	Plug Version		
Web server	yes	yes	yes
EoE (Ethernet over EtherCAT)		yes	
PROFINET IO, CC-B	●		
EtherCAT		●	
EtherNet/IP™			●
Interface	PROFINET	EtherCAT	EtherNet/IP™
Connection Diagram No.	001	001	001
Control Panel No.	X2 T10	X2 T14	X2 T11
Suitable Connection Technology No.	50	50	50
Suitable Mounting Technology No.	340	340	340

Connection Diagrams page 78

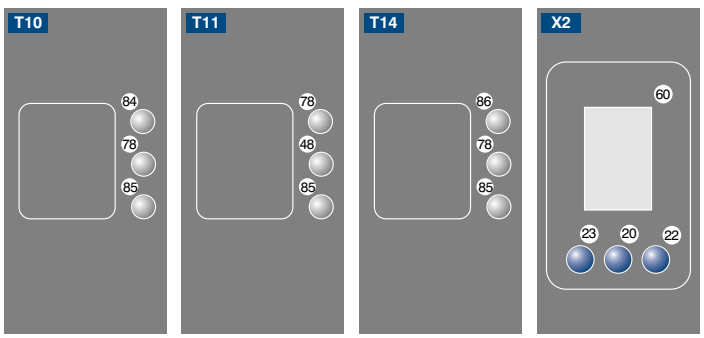
Complementary Products

- Midspan Adapter Z0029
- Protection Housing Set ZST-NN-02
- Switch/Junction with PoE ZAC50xN0x

Table 1

Working Distance	0 m	10 m
Spot Diameter	5 mm	< 20 mm

Ctrl. Panel

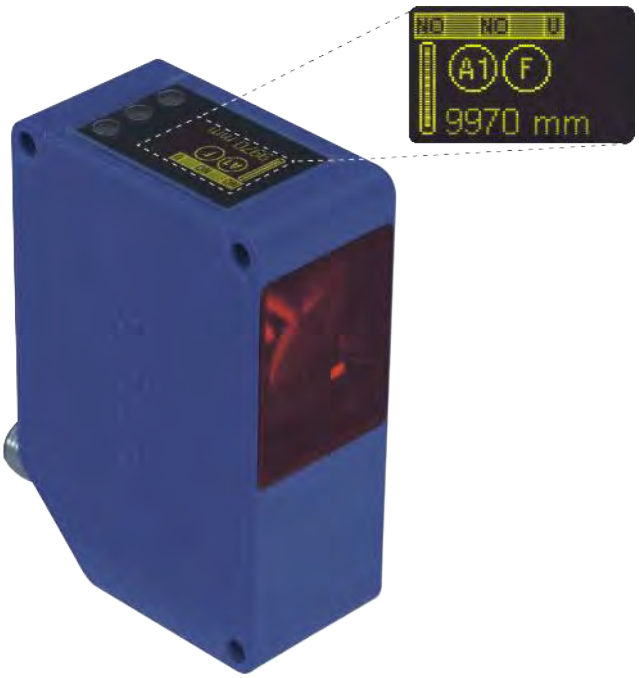


20 = Enter Button
22 = UP Button
23 = Down Button
48 = Network Status
60 = Display
78 = Module status
84 = Communication Status
85 = Link/Act LED
86 = STATUS

High-Performance Distance Sensor

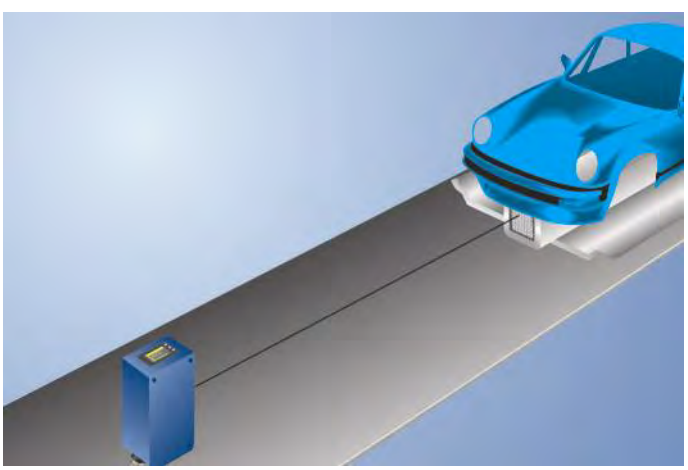
0,1...10,2 m LASER

Range



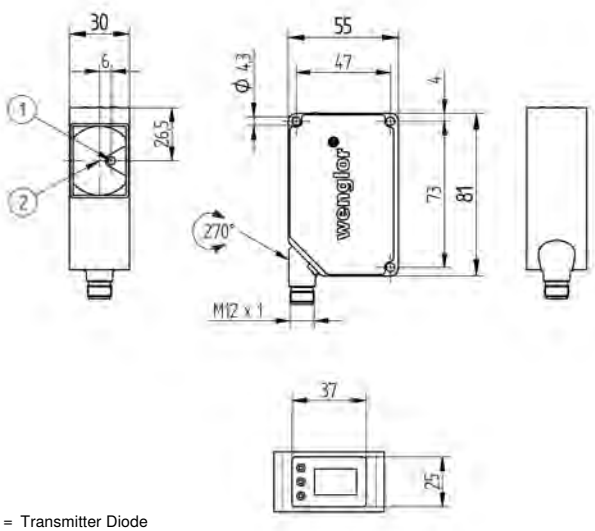
- **Emitted light disengageable**
- **Graphical display for easy operation**
- **Switching output A1 as analog output switchable (0...10 V/4...20 mA)**
- **Temperature drift eliminable**

These sensors have scratch-resistant optics and the emitted light can be switched off. They use the transit time measurement principle to measure the distance between the sensor and the object. Using a suitable reflector at the object, a highly accurate position measurement at large distances is also possible.
The configurations are selected using a menu and can be protected by a password.



Technical Data

Optical Data	
Working Range	0,1...10,2 m
Analog Working Range	0,2...10,2 m
Measuring Range	10 m
Reference Reflector/Reflex Foil	RF508
Resolution	2...6 mm
Linearity	0,5 %
Switching Hysteresis	3...20 mm
Light Source	Laser (red)
Wave Length	660 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Beam Divergence	< 2 mrad
Reflector required	yes
Electrical Data	
Supply Voltage	18...30 V DC
Current Consumption (Ub = 24 V)	< 100 mA
Switching Frequency	50 Hz
Measuring Rate	1...100 /s
Response Time	10...200 ms
On-/Off-Delay	0...10000 ms
Temperature Drift (-10 °C < Tu < 50 °C)	< 0,2 mm/K
Temperature Drift (Tu < -10 °C, Tu > 50 °C)	< 0,4 mm/K
Temperature Range	-25...60 °C
Switching Outputs	2
Switching Output Voltage Drop	< 2,5 V
Switching Output/Switching Current	200 mA
Analog Output	0...10 V/4...20 mA
Short Circuit Protection	yes
Reverse Polarity and Overload Protection	yes
Protection Class	III
FDA Accession Number	0920382-000
Mechanical Data	
Setting Method	Menu (OLED)
Housing Material	Plastic
Degree of Protection	IP68
Connection	M12 × 1; 4-pin



1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

Display brightness may decrease with age. This does not result in any impairment of the sensor function.

	Plug Version
Part Number	X1TA100QXT3
Error Output	●
Configurable as PNP/NPN/Push-Pull	●
Analog Output	●
Connection Diagram No.	755
Control Panel No.	TA1
Suitable Connection Technology No.	21
Suitable Mounting Technology No.	340

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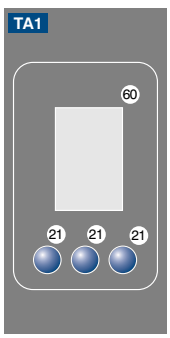
Complementary Products

- Analog Evaluation Unit AW02
- Protection Housing Set ZST-NN-02
- Reflector, Reflex Foil

Ctrl. Panel



21 = Mode Button
60 = Display

Table 1

Working Distance	0 m	10 m
Spot Diameter	5 mm	< 20 mm

Feasible reflector distance

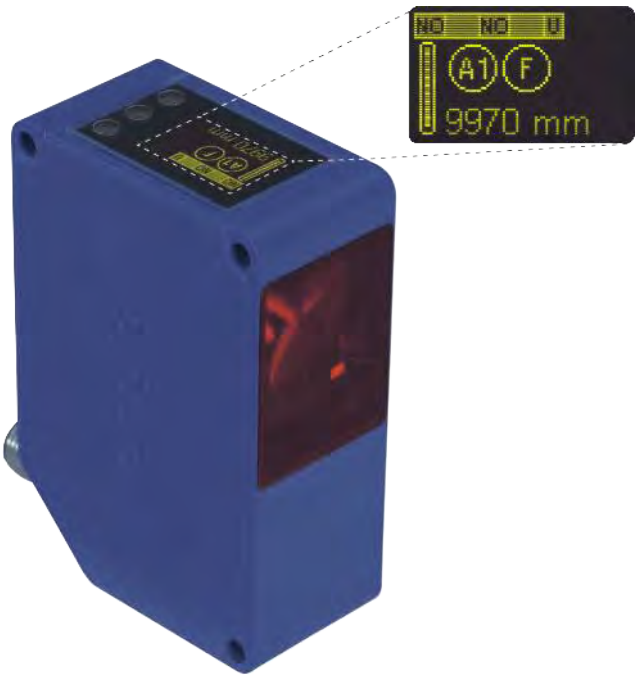
Reflector type, mounting distance

RF505	0,1...10 m	**ZRAF07K01**	0,1...10 m
RF508	0,1...10 m	**ZRAF08K01**	0,1...10 m
RF258	0,1...10 m	**ZRDF__K01**	0...10 m

High-Performance Distance Sensor

0,2...100,2 m LASER

Range

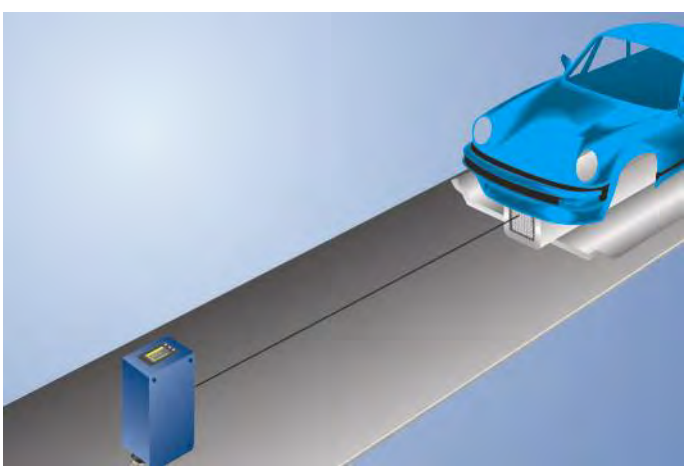


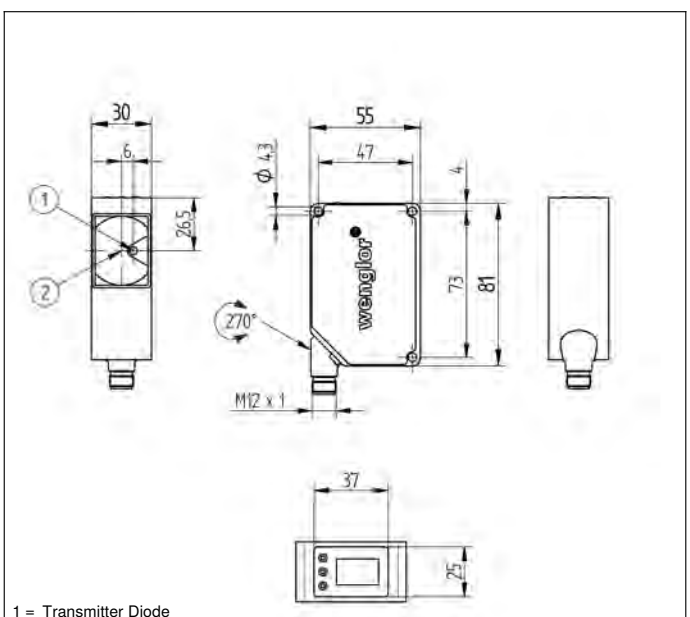
- **Analog output (0...10 V/4...20 mA)**
- **Emitted light disengageable**
- **Graphical display for easy operation**
- **Temperature drift eliminable**

Technical Data

Optical Data	
Working Range	0,2...100,2 m
Measuring Range	100 m
Reference Reflector/Reflex Foil	4 × RQ100BA
Resolution	4...20 mm
Linearity	0,05 %
Switching Hysteresis	13...50 mm
Light Source	Laser (red)
Wave Length	660 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Beam Divergence	< 2 mrad
Spot Diameter	see Table 1
Reflector required	yes
Electrical Data	
Supply Voltage	18...30 V DC
Current Consumption (Ub = 24 V)	< 100 mA
Switching Frequency	50 Hz
Measuring Rate	1...100 /s
On-/Off-Delay	0...10000 ms
Temperature Drift	0,5 mm/K
Temperature Range	-25...60 °C
Switching Output Voltage Drop	< 2,5 V
Switching Output/Switching Current	200 mA
Analog Output	0...10 V/4...20 mA
Short Circuit Protection	yes
Reverse Polarity and Overload Protection	yes
Protection Class	III
FDA Accession Number	0920382-000
Mechanical Data	
Setting Method	Menu (OLED)
Housing Material	Plastic
Degree of Protection	IP68
Connection	M12 × 1; 8-pin
Safety-relevant Data	
MTTFd (EN ISO 13849-1)	345,65 a

These sensors have scratch-resistant optics and the emitted light can be switched off. They use the transit time measurement principle to measure the distance between the sensor and the object. Using a suitable reflector at the object, a highly accurate position measurement at large distances is also possible.
The configurations are selected using a menu and can be protected by a password.





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

Display brightness may decrease with age. This does not result in any impairment of the sensor function.

Part Number	Plug Version	
	X1TA101MHT88	X1TA101MHV80
Error Output	●	●
Configurable as PNP/NPN/Push-Pull	●	●
Analog Output	●	●
RS-232 Interface	●	
Switching Outputs	1	2
Interface	RS-232	
Connection Diagram No.	516	514
Control Panel No.	TA1	TA1
Suitable Connection Technology No.	88	80
Suitable Mounting Technology No.	340	340

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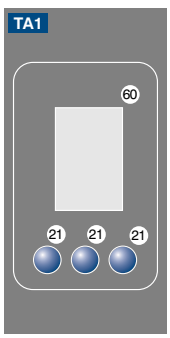
Complementary Products

Analog Evaluation Unit AW02
Feldbus Gateways ZAGxxxN01, EPGG001
Interface Cable S232W3
Protection Housing Set ZST-NN-02
Reflector, Reflex Foil
wTeach2 software DNNF005

Ctrl. Panel



21 = Mode Button
60 = Display

Table 1

Working Distance	0 m	40 m	100 m
Spot Diameter	5 mm	80 mm	< 200 mm

Feasible reflector distance

Reflector type, mounting distance

RQ100BA	5...100 m	**ZRAF07K01**	0,2...40 m
RF505	0,2...40 m	**ZRAF08K01**	0,2...40 m
RF508	0,2...40 m	**ZRDF03K01**	0,2...40 m
RF258	0,2...40 m	**ZRDF10K01**	0,2...100 m

Reflex Sensors with Background Suppression

Reflex sensors with background suppression analyze the light reflected from objects. As these sensors work according to the principle of angular measurement, the color, shape and surface characteristics of the object have almost no influence on the detection range. Even dark objects can be reliably detected against a bright background. The output is switched as soon as an object passes the selected range.

Application examples:

- Edge detection
- Detecting minimal differences in height
- Object recognition against any background
- Detecting packaging
- Monitoring of filling levels and stacking heights

Reflex Sensor
with Background Suppression

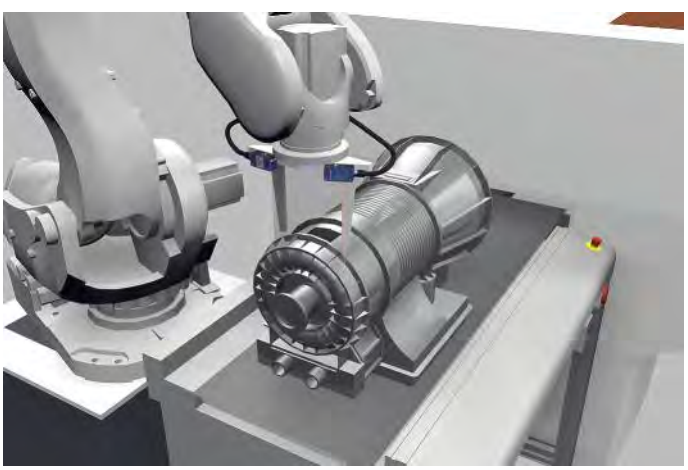
120 mm LASER
Range

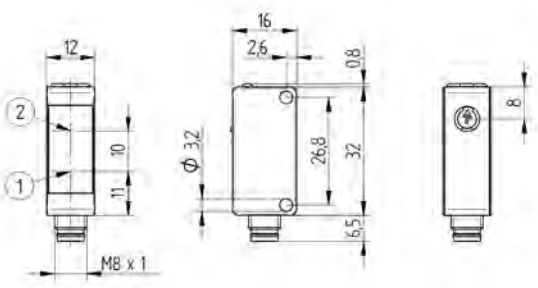
- **Condition monitoring**
- **Detect extremely small parts starting at 0.1 mm**
- **High switching frequency**
- **IO-Link 1.1**
- **Laser class 1**

Technical Data

Optical Data	
Range	120 mm
Adjustable Range	30...120 mm
Switching Hysteresis	< 10 %
Light Source	Laser (red)
Wave Length	655 nm
Service Life (T = +25 °C)	100000 h
Max. Ambient Light	10000 Lux
Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	10...30 V DC
Supply Voltage with IO-Link	18...30 V DC
Current Consumption (Ub = 24 V)	< 15 mA
Temperature Drift	< 5 %
Temperature Range	-40...60 °C
Switching Output Voltage Drop	< 2 V
Switching Output/Switching Current	100 mA
Residual Current Switching Output	< 50 µA
Short Circuit and Overload Protection	yes
Reverse Polarity Protection	yes
Lockable	yes
Interface	IO-Link V1.1
Protection Class	III
Mechanical Data	
Setting Method	Potentiometer
Housing Material	Plastic
Degree of Protection	IP67/IP68
Optic Cover	PMMA

The reflex sensor with background suppression works with laser light according to the angle measurement principle and is designed to detect objects against any background. The sensor always has the same switching distance, regardless of the color, shape and surface of the objects. The fine laser beam means that even the smallest parts, starting at 0.1 mm in size, can be reliably detected. The IO-Link interface can be used to configure the reflex sensors (PNP/NPN, NC/NO, switching distance), as well as for reading out switching statuses and distance values.





1 = Transmitter Diode
2 = Receiver Diode
Screw M3 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version			
Part Number	P1KH006	P1KH008	P1KH009	P1KH007
PNP NO		●		
PNP NO/NC antivalent	●		●	●
IO-Link	●	●	●	●
Laser Class (EN 60825-1)	1	1	2	1
Switching Frequency	1000 Hz	1000 Hz	2000 Hz	1000 Hz
Switching Frequency (interference-free mode)	500 Hz	500 Hz	1000 Hz	500 Hz
Response Time	0,5 ms	0,5 ms	0,25 ms	0,5 ms
Response time (interference-free mode)	1 ms	1 ms	0,5 ms	1 ms
FDA Accession Number	1710976-001	1710976-001	1710987-000	1710976-001
Connection	M8 × 1; 4-pin	M8 × 1; 3-pin	M8 × 1; 4-pin	M12 × 1; 4-pin
Cable Length				20 cm
MTTFd (EN ISO 13849-1)	1641,23 a	1647,45 a	1641,23 a	1641,23 a
Connection Diagram No.	215	216	215	215
Control Panel No.	1K1	1K1	1K1	1K1
Suitable Connection Technology No.	7	8	7	2
Suitable Mounting Technology No.	400	400	400	400

Connection Diagrams page 78

Table 1

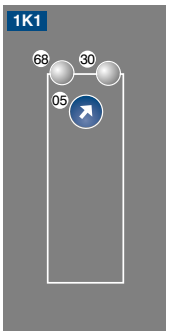
Detection Range	40 mm	80 mm	120 mm
Spot Diameter	2,5 mm	1,5 mm	1 mm

Complementary Products

IO-Link Master

wTeach2 software DNNF005

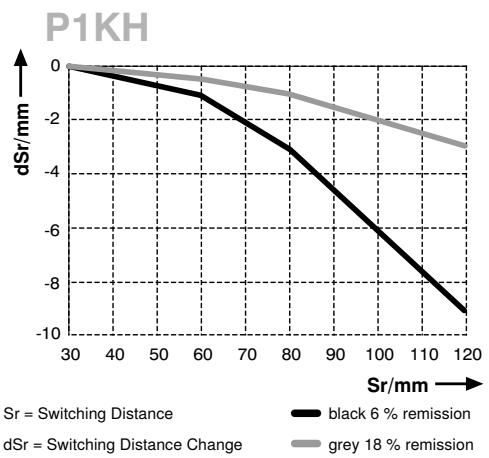
Ctrl. Panel



05 = Switching Distance Adjuster
30 = Switching Status/Contamination Warning
68 = Supply Voltage Indicator

Switching Distance Deviation

Typical characteristic curve based on Kodak white (90 % remission)



Sr = Switching Distance
dSr = Switching Distance Change
black 6 % remission
grey 18 % remission

Reflex Sensor
with Background Suppression

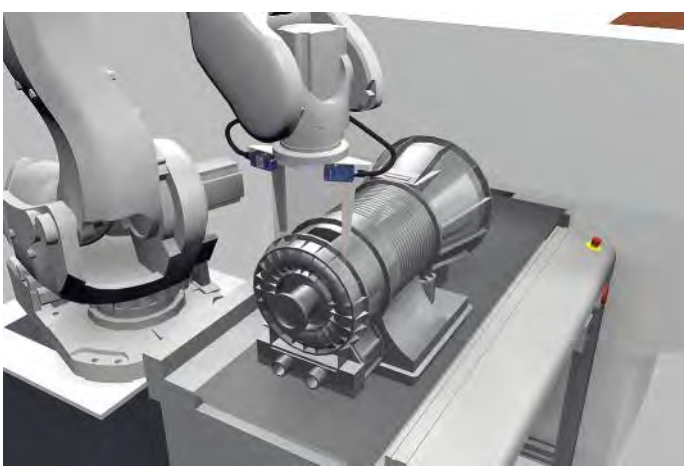
120 mm LASER
Range

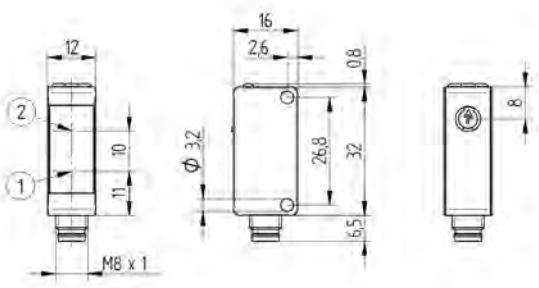
- **Condition monitoring**
- **Detect extremely small parts starting at 0.1 mm**
- **High switching frequency**
- **IO-Link 1.1**
- **Laser class 1**

Technical Data

Optical Data	
Range	120 mm
Adjustable Range	30...120 mm
Switching Hysteresis	< 10 %
Light Source	Laser (red)
Wave Length	655 nm
Service Life (T = +25 °C)	100000 h
Max. Ambient Light	10000 Lux
Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	10...30 V DC
Supply Voltage with IO-Link	18...30 V DC
Current Consumption (Ub = 24 V)	< 15 mA
Temperature Drift	< 5 %
Temperature Range	-40...60 °C
Switching Output Voltage Drop	< 2 V
Switching Output/Switching Current	100 mA
Residual Current Switching Output	< 50 µA
Short Circuit and Overload Protection	yes
Reverse Polarity Protection	yes
Lockable	yes
Interface	IO-Link V1.1
Protection Class	III
Mechanical Data	
Setting Method	Potentiometer
Housing Material	Plastic
Degree of Protection	IP67/IP68
Optic Cover	PMMA

The reflex sensor with background suppression works with laser light according to the angle measurement principle and is designed to detect objects against any background. The sensor always has the same switching distance, regardless of the color, shape and surface of the objects. The fine laser beam means that even the smallest parts, starting at 0.1 mm in size, can be reliably detected. The IO-Link interface can be used to configure the reflex sensors (PNP/NPN, NC/NO, switching distance), as well as for reading out switching statuses and distance values.





1 = Transmitter Diode
2 = Receiver Diode
Screw M3 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version			
Part Number	P1KH015	P1KH028	P1KH029	P1KH030
NPN NO			●	
NPN NO/NC antivalent	●	●		●
IO-Link	●	●	●	●
Laser Class (EN 60825-1)	1	1	1	2
Switching Frequency	1000 Hz	1000 Hz	1000 Hz	2000 Hz
Switching Frequency (interference-free mode)	500 Hz	500 Hz	500 Hz	1000 Hz
Response Time	0,5 ms	0,5 ms	0,5 ms	0,25 ms
Response time (interference-free mode)	1 ms	1 ms	1 ms	0,5 ms
FDA Accession Number	1710976-001	1710976-001	1710976-001	1710987-000
Connection	M8 × 1; 4-pin	M12 × 1; 4-pin	M8 × 1; 3-pin	M8 × 1; 4-pin
Cable Length		20 cm		
MTTFd (EN ISO 13849-1)	1641,23 a	1641,23 a	1647,45 a	1641,23 a
Connection Diagram No.	213	213	171	213
Control Panel No.	1K1	1K1	1K1	1K1
Suitable Connection Technology No.	7	2	8	7
Suitable Mounting Technology No.	400	400	400	400

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Table 1

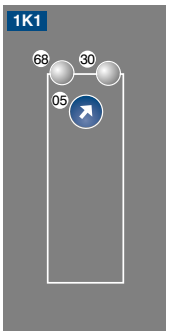
Detection Range	40 mm	80 mm	120 mm
Spot Diameter	2,5 mm	1,5 mm	1 mm

Complementary Products

IO-Link Master

wTeach2 software DNNF005

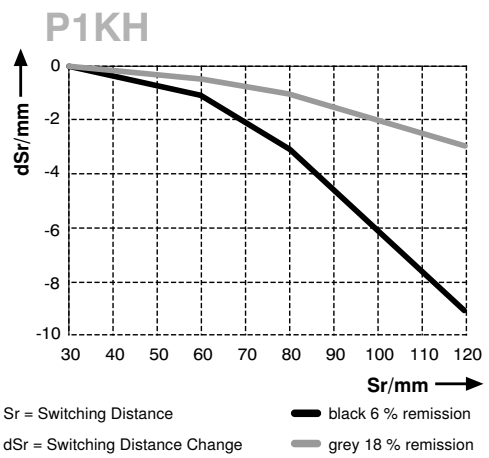
Ctrl. Panel



05 = Switching Distance Adjuster
30 = Switching Status/Contamination Warning
68 = Supply Voltage Indicator

Switching Distance Deviation

Typical characteristic curve based on Kodak white (90 % remission)



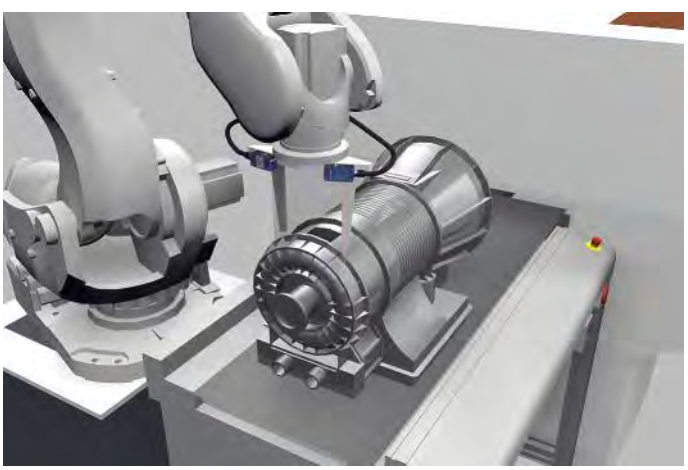
Sr = Switching Distance
dSr = Switching Distance Change
black 6 % remission
grey 18 % remission

Reflex Sensor
with Background Suppression

150 mm LASER
Range

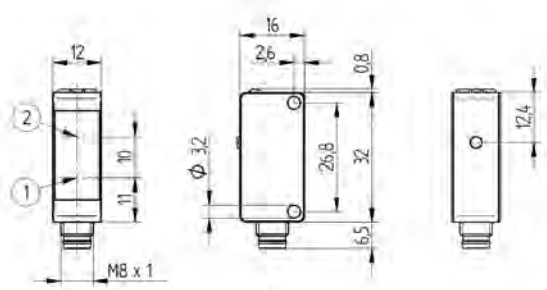
- **Condition monitoring**
- **Detect extremely small parts starting at 0.1 mm**
- **High-end**
- **IO-Link 1.1**
- **Laser class 1**

The reflex sensor with background suppression works with laser light according to the angle measurement principle. It has a IO-Link interface with a data storage function as well as additional configuration and diagnostic options. The interface can also be used to configure the sensors (PNP/NPN, NC/NO, switching distance, error output), as well as for reading out switching statuses and distance values. The teach-in function also provides another configuration option. Two independent switching outputs can be used, for instance, to monitor minimum and maximum values of distances or fill levels and stack heights.



Technical Data

Optical Data	
Range	120 mm
Adjustable Range	30...120 mm
Switching Hysteresis	< 10 %
Light Source	Laser (red)
Wave Length	655 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	15...30 V DC
Supply Voltage with IO-Link	18...30 V DC
Current Consumption (Ub = 24 V)	< 20 mA
Switching Frequency	100 Hz
Switching Frequency (1 Switching Output)	1000 Hz
Response Time	5 ms
Response time (1 switching output)	0,5 ms
Temperature Drift	< 5 %
Temperature Range	-40...60 °C
Switching Outputs	2
Switching Output Voltage Drop	< 2 V
Switching Output/Switching Current	100 mA
Residual Current Switching Output	< 50 µA
Short Circuit and Overload Protection	yes
Reverse Polarity Protection	yes
Lockable	yes
Interface	IO-Link V1.1
Data Storage	yes
Protection Class	III
FDA Accession Number	1710976-001
Mechanical Data	
Setting Method	Teach-In
Housing Material	Plastic
Degree of Protection	IP67/IP68
Connection	M8 × 1; 4-pin
Optic Cover	PMMA



1 = Transmitter Diode
2 = Receiver Diode
Screw M3 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version	
Part Number	P1KH017	P1KH031
PNP NO/NC antivalent	●	
NPN NO/NC antivalent		●
IO-Link	●	●
Connection Diagram No.	221	221
Control Panel No.	A23	A23
Suitable Connection Technology No.	7	7
Suitable Mounting Technology No.	400	400

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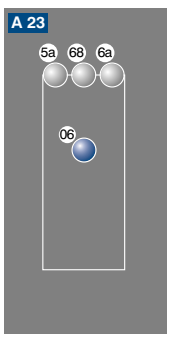
Complementary Products

IO-Link Master

Ctrl. Panel



06 = Teach Button
30 = Switching Status/Contamination Warning
5a = Switching Status Display, O1
68 = Supply Voltage Indicator
6a = Switching Status Display, O2

Table 1

Detection Range	40 mm	80 mm	120 mm
Spot Diameter	2,5 mm	1,5 mm	1 mm

Reflex Sensor
with Background Suppression

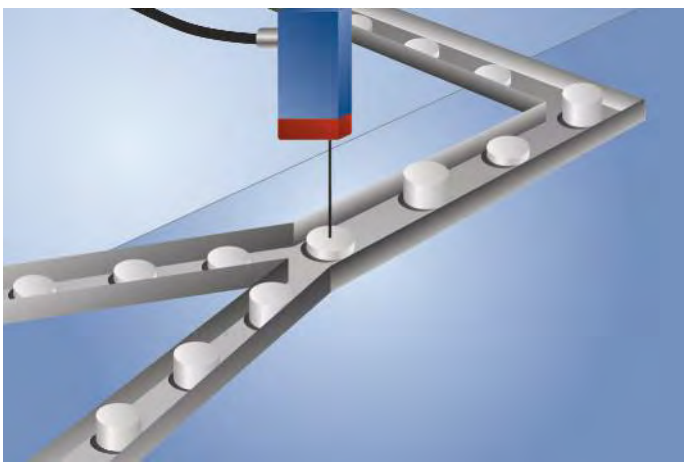
150 mm LASER
Range

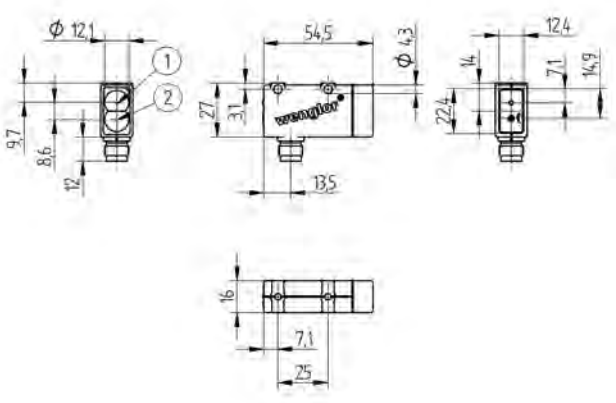
- **High switching frequency**
- **Special coated optics**

Technical Data

Optical Data	
Range	150 mm
Adjustable Range	35...150 mm
Switching Hysteresis	5 %
Light Source	Laser (red)
Wave Length	650 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	1 mm
at a Distance of	120 mm
Electrical Data	
Supply Voltage	10...30 V DC
Current Consumption (Ub = 24 V)	< 20 mA
Switching Frequency	1600 Hz
Response Time	313 µs
Temperature Drift	< 5 %
Temperature Range	-25...60 °C
Switching Output Voltage Drop	< 2,5 V
PNP Switching Output/Switching Current	200 mA
PNP Contamination Output/Switching Current	50 mA
Short Circuit Protection	yes
Reverse Polarity Protection	yes
Overload Protection	yes
Protection Class	III
FDA Accession Number	1120735-000
Mechanical Data	
Setting Method	Potentiometer
Housing Material	Plastic
Coated Optics	yes
Full Encapsulation	yes
Degree of Protection	IP67
Connection	M12 × 1; 4-pin

These sensors detect distance by measuring angles. They are particularly good at recognizing objects in front of any background. The color, shape and surface characteristics of the object have practically no influence on sensor switching performance.





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 1 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version
Part Number	OHM152B0002
Contamination Output	●
PNP NO	●
Connection Diagram No.	103
Control Panel No.	M4
Suitable Connection Technology No.	2
Suitable Mounting Technology No.	360

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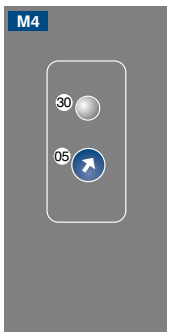
Complementary Products

- PNP-NPN Converter BG2V1P-N-2M
- Protection Housing Set ZSM-NN-02
- Protection Housing ZSV-0x-01

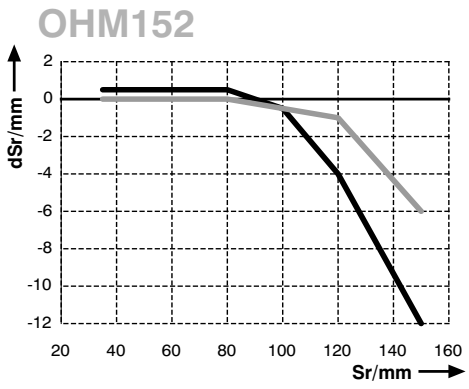
Ctrl. Panel



05 = Switching Distance Adjuster
30 = Switching Status/Contamination Warning

Sensing Range Diagram

Typical characteristic curve based on Kodak white (90 % remission)



Sr = Switching Distance
dSr = Switching Distance Change
black 6 % remission
grey 18 % remission

Reflex Sensor
with Background Suppression

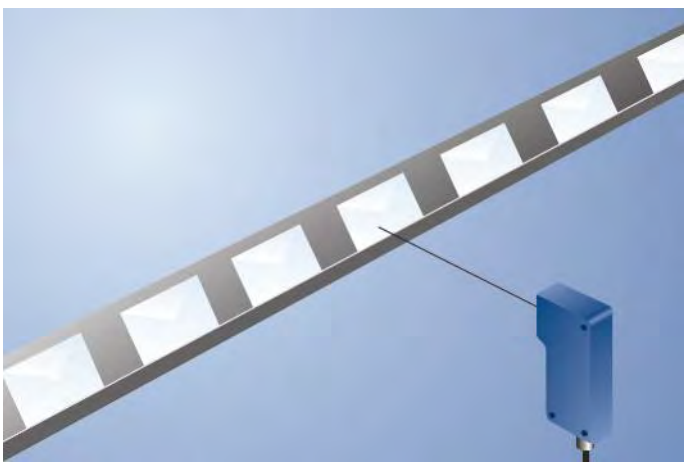
250 mm LASER
Range

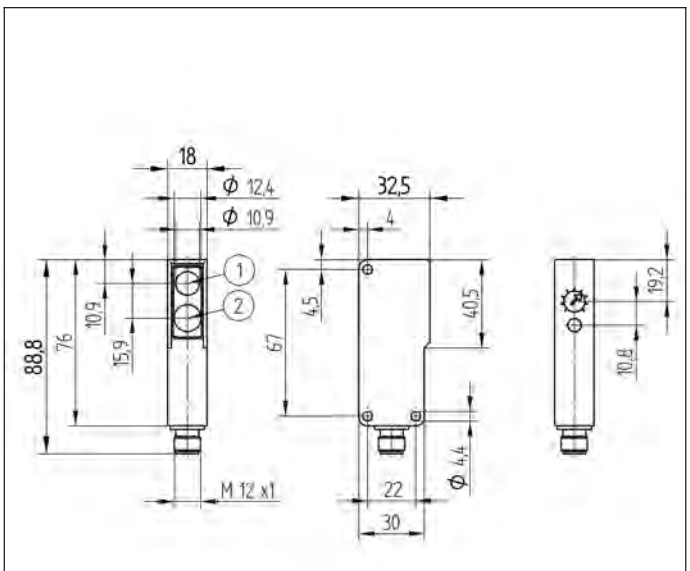
- **Special coated optics**
- **Stainless steel plug (V2A)**
- **Switching frequency: 600 Hz**

Technical Data

Optical Data	
Range	250 mm
Adjustable Range	65...250 mm
Switching Hysteresis	< 1 %
Light Source	Laser (red)
Wave Length	655 nm
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	10...30 V DC
Current Consumption (Ub = 24 V)	< 20 mA
Switching Frequency	600 Hz
Response Time	833 µs
Temperature Drift	< 2 %
Temperature Range	-25...60 °C
Switching Output Voltage Drop	< 2,5 V
PNP Switching Output/Switching Current	200 mA
Contamination Output Voltage Drop	< 2,5 V
PNP Contamination Output/Switching Current	50 mA
Short Circuit Protection	yes
Reverse Polarity Protection	yes
Overload Protection	yes
Protection Class	III
FDA Accession Number	1120736-000
Mechanical Data	
Setting Method	Potentiometer
Housing Material	Plastic
Coated Optics	yes
Degree of Protection	IP67
Connection	M12 × 1; 4-pin
Safety-relevant Data	
MTTFd (EN ISO 13849-1)	1932,89 a

These sensors detect distance by measuring angles. They are particularly good at recognizing objects in front of any background. The color, shape and surface characteristics of the object have practically no influence on sensor switching performance.





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 1 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version
Part Number	OHN252B0003
Contamination Output	●
PNP NO	●
Connection Diagram No.	103
Control Panel No.	N3
Suitable Connection Technology No.	2
Suitable Mounting Technology No.	350

Connection Diagrams page 78

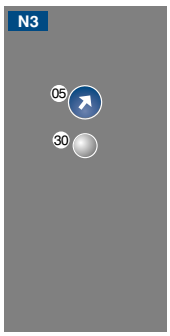
Table 1

Detection Range	60 mm	125 mm	250 mm
Spot Diameter	3 mm	2,5 mm	2,5 mm

Complementary Products

- Dust extraction tube STAUBTUBUS-03
- PNP-NPN Converter BG2V1P-N-2M
- Protection Housing Set ZSN-NN-02

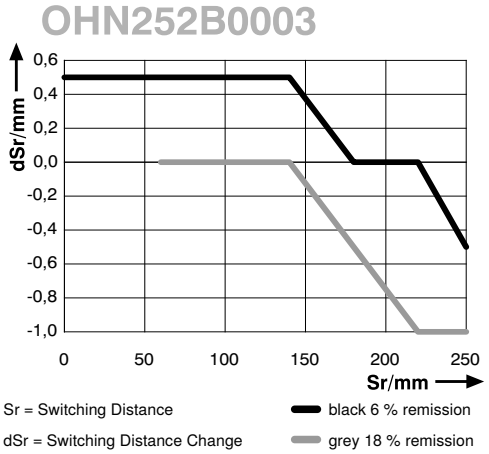
Ctrl. Panel



05 = Switching Distance Adjuster
30 = Switching Status/Contamination Warning

Switching Distance Deviation

Typical characteristic curve based on Kodak white (90 % remission)



Retro-Reflex Sensors

In retro-reflex sensors, the transmitter and receiver are located in a single housing.
They operate using red light, laser light and a reflector. The output switches if the light beam between the sensor and reflector is interrupted.
Even shiny, chromed or reflective surfaces can be reliably detected thanks to the integrated polarization filter.

Application examples:

- Object recognition at great distances
- Presence control on conveyor belts
- Monitoring of stacking heights
- Mounting and supply control
- Gap control

Retro-Reflex Sensor

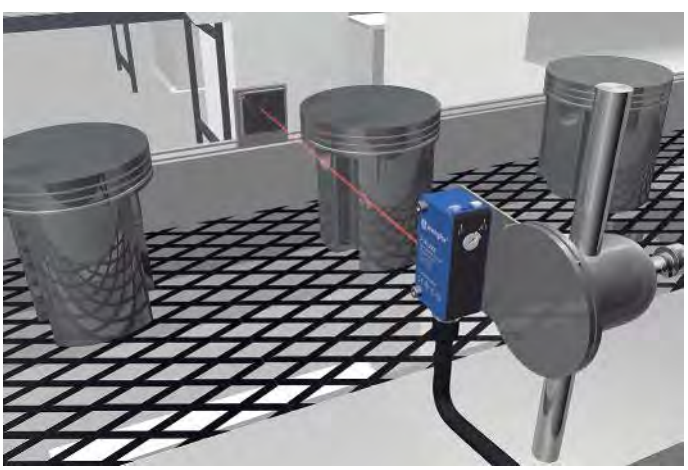
3000 mm LASER

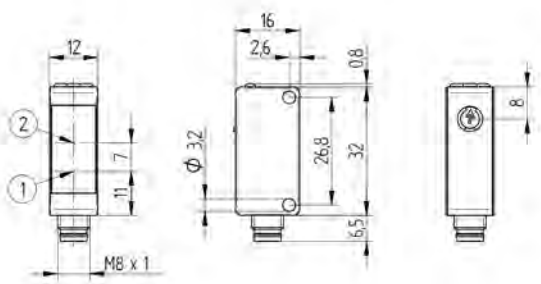
Range

- **Condition monitoring**
- **High switching frequency**
- **IO-Link 1.1**

Technical Data

Optical Data	
Range	3000 mm
Reference Reflector/Reflex Foil	RE6151BM
Smallest Recognizable Part	0,15 mm
Switching Hysteresis	< 15 %
Light Source	Laser (red)
Wave Length	655 nm
Polarization Filter	yes
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	0,5 mm
Focus Distance	180...220 mm
Two-Lens Optic	yes
Electrical Data	
Supply Voltage	10...30 V DC
Supply Voltage with IO-Link	18...30 V DC
Current Consumption (Ub = 24 V)	< 15 mA
Switching Frequency	2000 Hz
Switching frequency (speed mode)	4000 Hz
Response Time	0,25 ms
Response time (speed mode)	0,125 ms
Temperature Drift	< 10 %
Temperature Range	-40...60 °C
Switching Output Voltage Drop	< 2 V
Switching Output/Switching Current	100 mA
Residual Current Switching Output	< 50 µA
Short Circuit and Overload Protection	yes
Reverse Polarity Protection	yes
Lockable	yes
Interface	IO-Link V1.1
Protection Class	III
FDA Accession Number	1710976-001
Mechanical Data	
Setting Method	Potentiometer
Housing Material	Plastic
Degree of Protection	IP67/IP68
Connection	M8 × 1; 4-pin





1 = Transmitter Diode
2 = Receiver Diode
Screw M3 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

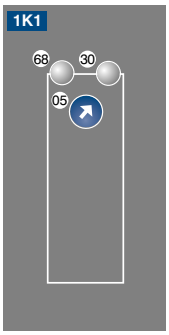
	Plug Version
Part Number	P1KL017
IO-Link	●
PNP NO/NC antivalent	●
Connection Diagram No.	215
Control Panel No.	1K1
Suitable Connection Technology No.	7
Suitable Mounting Technology No.	400

Connection Diagrams page 78

Complementary Products

IO-Link Master
Reflector, Reflex Foil
wTeach2 software DNNF005

Ctrl. Panel



05 = Switching Distance Adjuster
30 = Switching Status/Contamination Warning
68 = Supply Voltage Indicator

Table 1

Working Distance	0,1 m	1 m	3 m
Spot Diameter	1 mm	8 mm	28 mm

Retro-Reflex Sensor

10000 mm LASER

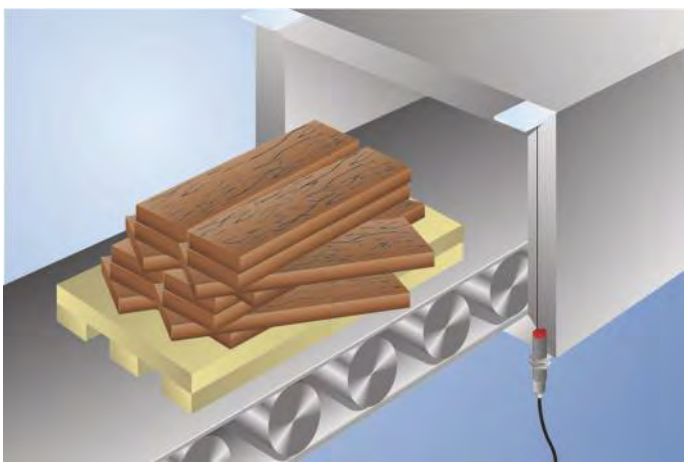
Range

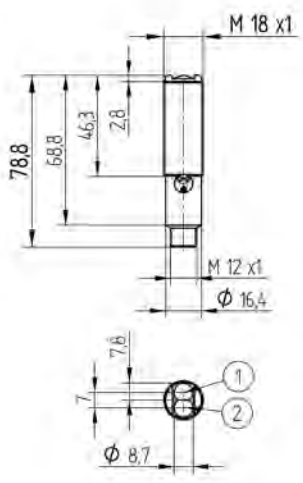
- **Smallest recognizable part: 0,1 mm**
- **Special coated optics**
- **Stainless steel housing**

Technical Data

Optical Data	
Range	10000 mm
Reference Reflector/Reflex Foil	RQ100BA
Smallest Recognizable Part	100 µm
Switching Hysteresis	< 15 %
Light Source	Laser (red)
Wave Length	655 nm
Polarization Filter	yes
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Opening Angle	1 °
Beam Divergence	< 15 mrad
Spot Diameter	see Table 1
Focus Distance	350 mm
Two-Lens Optic	yes
Electrical Data	
Supply Voltage	10...30 V DC
Current Consumption (Ub = 24 V)	< 30 mA
Switching Frequency	500 Hz
Response Time	1 ms
Temperature Drift	< 10 %
Temperature Range	-25...60 °C
Switching Output Voltage Drop	< 2,5 V
PNP Switching Output/Switching Current	200 mA
Short Circuit Protection	yes
Reverse Polarity Protection	yes
Overload Protection	yes
Protection Class	III
FDA Accession Number	1120739-000
Mechanical Data	
Setting Method	Potentiometer
Housing Material	Stainless Steel
Coated Optics	yes
Full Encapsulation	yes
Degree of Protection	IP67
Connection	M12 × 1; 4-pin

A reflector must be used in combination with these sensors. They can be installed in all kinds of industrial environments thanks to ample functional reserve. Even reflective objects can be reliably recognized through the use of polarized light.





1 = Receiver Diode
2 = Transmitter Diode
All dimensions in mm (1 mm = 0.03937 Inch)

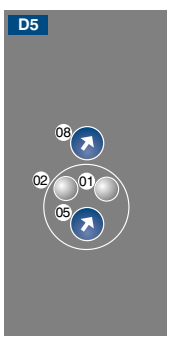
	Plug Version
Part Number	OLD104C0003
Contamination Output	●
PNP NO/NC switchable	●
Connection Diagram No.	105
Control Panel No.	D5
Suitable Connection Technology No.	2
Suitable Mounting Technology No.	150

Connection Diagrams page 78

Complementary Products

- Dust extraction tube STAUBTUBUS-01
- PNP-NPN Converter BG2V1P-N-2M
- Reflector, Reflex Foil

Ctrl. Panel



01 = Switching Status Indicator
02 = Contamination Warning
05 = Switching Distance Adjuster
08 = NO/NC Switch

Table 1

Working Distance	0,2 m	5 m	10 m
Spot Diameter	2 mm	42,5 mm	85 mm

Feasible reflector distance

Reflector type, mounting distance

RQ100BA	0,65...10 m	RR25KP	0,4...2 m
RE18040BA	0,65...6,5 m	RR21_M	0,5...2,3 m
RQ84BA	0,8...8,5 m	ZRAE02B01	0,8...4 m
RR84BA	0,7...9 m	ZRME01B01	0,5...1,5 m
RE9538BA	0,65...3,3 m	ZRME03B01	0,5...3,5 m
RE6151BM	0,55...8 m	ZRMR02K01	0,55...1,5 m
RR50_A	0,8...6,5 m	ZRMS02_01	0,85...2 m
RE6040BA	0,65...9 m	RF505	0,7...1,3 m
RE8222BA	0,75...4,5 m	RF508	0,55...1 m
RR34_M	0,65...4 m	RF258	0,55...1,5 m
RE3220BM	0,65...2,5 m	ZRAF07K01	0,7...1,3 m
RE6210BM	0,65...2,3 m	ZRAF08K01	0,7...1,3 m
RR25_M	0,5...3 m	ZRDF__K01	0,6...5 m

Retro-Reflex Sensor

10000 mm LASER

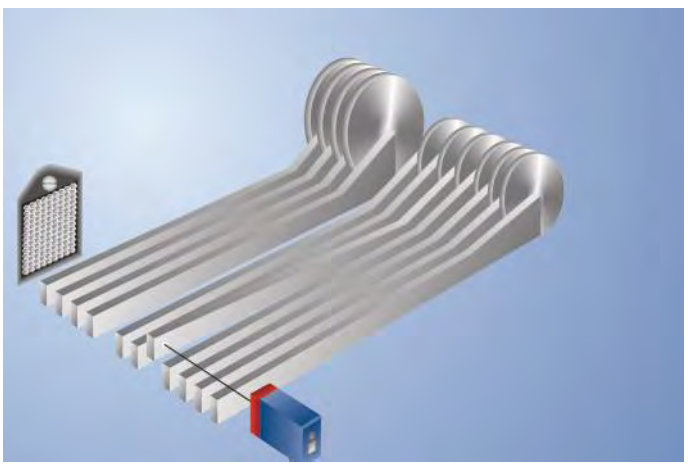
Range

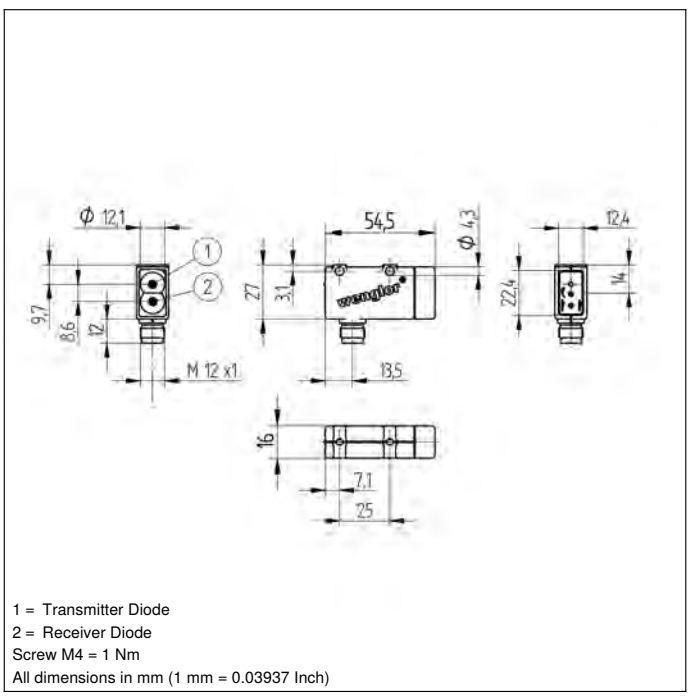
- **Smallest recognizable part: 2,5 mm**
- **Special coated optics**
- **Switching frequency: 500 Hz**
- **Time delay**

Technical Data

Optical Data	
Range	10000 mm
Reference Reflector/Reflex Foil	RQ100BA
Min. Distance to Reflector	100 mm
Smallest Recognizable Part	> 2500 µm
Switching Hysteresis	< 15 %
Light Source	Laser (red)
Wave Length	670 nm
Polarization Filter	yes
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Opening Angle	0,6 °
Spot Diameter	see Table 1
Two-Lens Optic	yes
Electrical Data	
Supply Voltage	10...30 V DC
Current Consumption (Ub = 24 V)	< 30 mA
Switching Frequency	500 Hz
Response Time	1 ms
Off-Delay	5 ms
Temperature Drift	< 10 %
Temperature Range	-10...60 °C
Switching Output Voltage Drop	< 2,5 V
PNP Switching Output/Switching Current	200 mA
Short Circuit Protection	yes
Reverse Polarity Protection	yes
Protection Class	III
FDA Accession Number	1120740-000
Mechanical Data	
Setting Method	Potentiometer
Housing Material	Plastic
Coated Optics	yes
Full Encapsulation	yes
Degree of Protection	IP67
Connection	M12 × 1; 4-pin

A reflector must be used in combination with these sensors. They can be installed in all kinds of industrial environments thanks to ample functional reserve. Even reflective objects can be reliably recognized through the use of polarized light.





1 = Transmitter Diode
2 = Receiver Diode
Screw M4 = 1 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

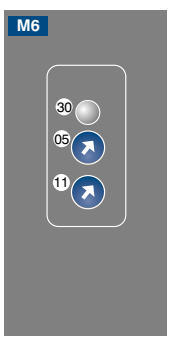
	Plug Version
Part Number	OLM104A0002
PNP NO/NC antivalent	●
Connection Diagram No.	101
Control Panel No.	M6
Suitable Connection Technology No.	2
Suitable Mounting Technology No.	360

Connection Diagrams page 78

Complementary Products

- PNP-NPN Converter BG2V1P-N-2M
- Protection Housing Set ZSM-NN-02
- Protection Housing ZSV-0x-01
- Reflector, Reflex Foil

Ctrl. Panel



05 = Switching Distance Adjuster
11 = ON-Delay/OFF-Delay Adjuster
30 = Switching Status/Contamination Warning

Table 1

Working Distance	0,2 m	5 m	10 m
Spot Diameter	5 mm	35 mm	70 mm

Feasible reflector distance

Reflector type, mounting distance

RQ100BA	0,1...10 m	RR25KP	0,15...2 m
RE18040BA	0,15...8 m	RR21_M	0,2...3 m
RQ84BA	0,1...9 m	ZRAE02B01	0,1...2,5 m
RR84BA	0,1...9 m	ZRME01B01	0,1...1,5 m
RE9538BA	0,1...4 m	ZRME03B01	0,15...5,5 m
RE6151BM	0,15...9 m	ZRMR02K01	0,15...2 m
RR50_A	0,1...9 m	ZRMS02_01	0,2...2,5 m
RE6040BA	0,1...10 m	RF505	0,2...1,7 m
RE8222BA	0,1...6 m	RF508	0,2...1,7 m
RR34_M	0,2...6 m	RF258	0,2...1,5 m
RE3220BM	0,2...4 m	ZRAF07K01	0,2...1,5 m
RE6210BM	0,25...3 m	ZRAF08K01	0,2...1,7 m
RR25_M	0,2...5 m	ZRDF__K01	0,15...8 m

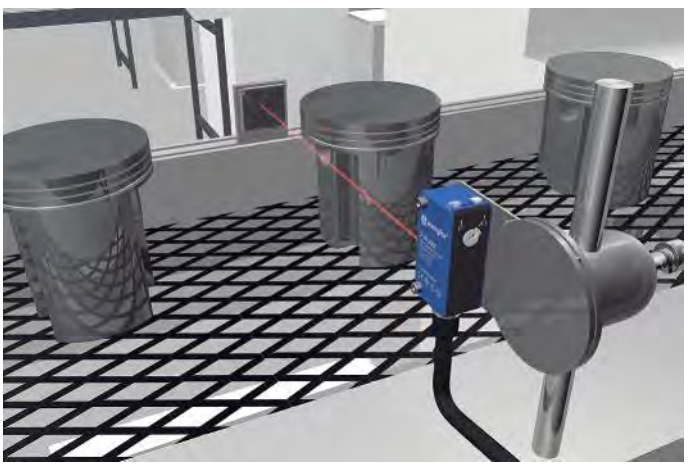
Retro-Reflex Sensor

12000 mm LASER

Range

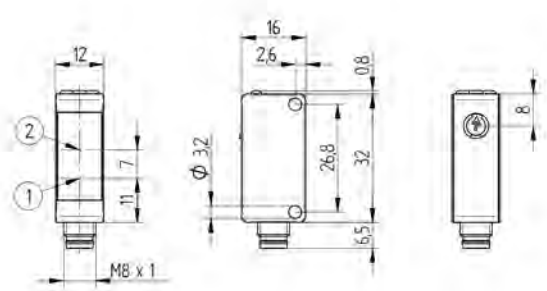
- **Condition monitoring**
- **Detect extremely small parts starting at 1 mm**
- **High switching frequency**
- **IO-Link 1.1**

The retro-reflex sensor works with a fine laser beam and a reflector. The collimated laser beam of laser class 1 detects objects, for instance, when conducting installation, feed or presence controls, starting at a size of one millimeter over the entire range. The IO-Link interface can be used to configure retro-reflective barriers (PNP/NPN, NC/NO, switching distance), as well as for reading out switching statuses and signal values.



Technical Data

Optical Data	
Range	12000 mm
Reference Reflector/Reflex Foil	RE6151BM
Smallest Recognizable Part	see Table 2
Switching Hysteresis	< 15 %
Light Source	Laser (red)
Wave Length	655 nm
Polarization Filter	yes
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Max. Ambient Light	10000 Lux
Spot Diameter	see Table 1
Two-Lens Optic	yes
Electrical Data	
Supply Voltage	10...30 V DC
Supply Voltage with IO-Link	18...30 V DC
Current Consumption (Ub = 24 V)	< 15 mA
Switching Frequency	2000 Hz
Switching frequency (speed mode)	4000 Hz
Response Time	0,25 ms
Response time (speed mode)	0,125 ms
Temperature Drift	< 10 %
Temperature Range	-40...60 °C
Switching Output Voltage Drop	< 2 V
Switching Output/Switching Current	100 mA
Residual Current Switching Output	< 50 µA
Short Circuit and Overload Protection	yes
Reverse Polarity Protection	yes
Lockable	yes
Interface	IO-Link V1.1
Protection Class	III
FDA Accession Number	1710976-001
Mechanical Data	
Setting Method	Potentiometer
Housing Material	Plastic
Degree of Protection	IP67/IP68
Optic Cover	PMMA



1 = Transmitter Diode
2 = Receiver Diode
Screw M3 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version					
Part Number	P1KL006	P1KL007	P1KL008	P1KL014	P1KL015	P1KL016
IO-Link	●	●	●	●	●	●
PNP NO		●				
PNP NC			●			
PNP NO/NC antivalent	●					
NPN NO					●	
NPN NC						●
NPN NO/NC antivalent				●		
Connection	M8 × 1; 4-pin	M8 × 1; 3-pin	M8 × 1; 3-pin	M8 × 1; 4-pin	M8 × 1; 3-pin	M8 × 1; 3-pin
MTTFd (EN ISO 13849-1)	2617,62 a	2633,47 a	2633,47 a	2617,62 a	2633,47 a	2633,47 a
Connection Diagram No.	215	216	217	213	171	218
Control Panel No.	1K1	1K1	1K1	1K1	1K1	1K1
Suitable Connection Technology No.	7	8	8	7	8	8
Suitable Mounting Technology No.	400	400	400	400	400	400

Connection Diagrams page 78

Table 1

Working Distance	0,1 m	5 m	12 m
Spot Diameter	4 mm	11 mm	22 mm

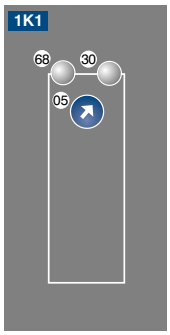
Table 2

Distance, Sensor to Reflector	2 m	4 m	12 m
Smallest Recognizable Part	1,5 mm	1 mm	2,5 mm

Complementary Products

- IO-Link Master
- Reflector, Reflex Foil
- wTeach2 software DNNF005

Ctrl. Panel



05 = Switching Distance Adjuster
30 = Switching Status/Contamination Warning
68 = Supply Voltage Indicator

Feasible reflector distance

Reflector type, mounting distance

RQ100BA	0,1...16 m	**RR25KP**	0,1...2,5 m
RE18040BA	0,1...12 m	**RR21_M**	0,1...7 m
RQ84BA	0,1...16 m	**ZRAE02B01**	0,1...7 m
RR84BA	0,1...16 m	**ZRME01B01**	0,1...3 m
RE9538BA	0,1...4,5 m	**ZRME03B01**	0,1...4,5 m
RE6151BM	0,1...12 m	**ZRMR02K01**	0,1...5 m
RR50_A	0,1...16 m	**ZRMS02_01**	0,1...7 m
RE6040BA	0,1...15 m	**RF505**	0,1...2 m
RE8222BA	0,1...10 m	**RF508**	0,1...2 m
RR34_M	0,1...2,5 m	**RF258**	0,1...2 m
RE3220BM	0,1...7 m	**ZRDF03K01**	0,1...4 m
RE6210BM	0,1...4,5 m	**ZRDF10K01**	0,1...4 m
RR25_M	0,1...7 m		


504

Through-Beam Sensors

The transmitter and receiver in through-beam sensors are integrated in separate housings. The output switches if the light beam is interrupted. The function of the transmitter and receiver can be tested with a test input.
Through-beam sensors are available with laser light, red light or infrared light. The fine laser beam creates a small spot of light, which can be used to reliably detect even the smallest parts. Their good visibility facilitates easy adjustment and commissioning, even at great distances. In the case of some laser through-beam sensors, the focus is adjustable.
Aligning through-beam sensors with red light is very easy thanks to the visible light spot.

Application examples:

- Detecting and counting extremely small parts
- Edge detection
- Pass monitoring
- Drill breakage control

Through-Beam Sensor

10000 mm LASER

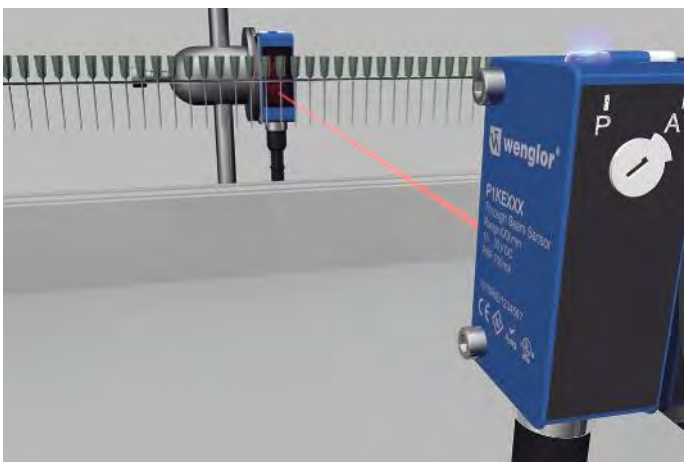
Range

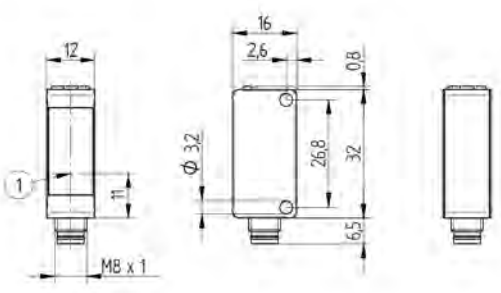
Technical Data

Optical Data	
Range	10000 mm
Light Source	Laser (red)
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Electrical Data	
Supply Voltage	10...30 V DC
Current Consumption (Ub = 24 V)	< 15 mA
Temperature Drift	< 10 %
Temperature Range	-40...60 °C
Reverse Polarity Protection	yes
Protection Class	III
Mechanical Data	
Housing Material	Plastic
Degree of Protection	IP67/IP68
Connection	M8 × 1; 3-pin
Optic Cover	PMMA

- **Detect smallest parts until 0,6 mm**
- **IO-Link 1.1**
- **Test input for high operational reliability**
- **Very high switching frequency**

The through-beam sensor works with a fine laser beam as well as a transmitter and a receiver. The collimated laser beam of laser class 1 detects objects, for instance, when conducting installation, feed or presence controls, starting at a size of just 0,6 millimeters. The transmitter can be deactivated using test input in order to test the functionality of the through-beam sensor. The IO-Link interface can be used to configure the sensor (PNP/NPN, NC/NO, switching distance), as well as for reading out switching statuses and signal values.





1 = Transmitter Diode
Screw M3 = 0,5 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version		
Part Number	P1KS003	P1KE007	P1KE010
PNP NC		●	
NPN NC			●
IO-Link		●	●
Smallest Recognizable Part		see Table 1	see Table 1
Switching Hysteresis		< 15 %	< 15 %
Max. Ambient Light		10000 Lux	10000 Lux
Spot Diameter	see Table 1		
Sensor Type	Emitter	Receiver	Receiver
Supply Voltage with IO-Link		18...30 V DC	18...30 V DC
Switching Frequency		4500 Hz	4500 Hz
Switching Frequency (interference-free mode)		2000 Hz	2000 Hz
Response Time		0,11 ms	0,11 ms
Response time (interference-free mode)		0,25 ms	0,25 ms
Switching Output Voltage Drop		< 2 V	< 2 V
Switching Output/Switching Current		100 mA	100 mA
Residual Current Switching Output		< 50 µA	< 50 µA
Short Circuit and Overload Protection		yes	yes
Interface		IO-Link V1.1	IO-Link V1.1
Test input	yes		
FDA Accession Number	1710976-001		
Setting Method		Potentiometer	Potentiometer
MTTFd (EN ISO 13849-1)	3278,87 a	1945,13 a	1945,13 a
Connection Diagram No.	703	217	218
Control Panel No.	1K2	1K1	1K1
Suitable Connection Technology No.	8	8	8
Suitable Mounting Technology No.	400	400	400

Connection Diagrams page 78

Complementary Products

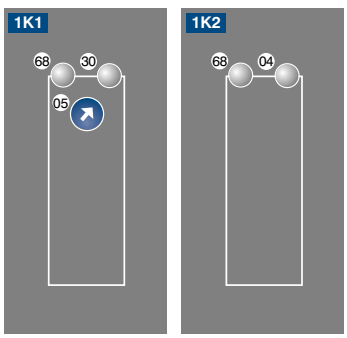
IO-Link Master

wTeach2 software DNNF005

Table 1

Working Distance	1 m	6 m	10 m
Spot Diameter	2,5 mm	25 mm	40 mm

Ctrl. Panel



04 = Function Indicator
05 = Switching Distance Adjuster
30 = Switching Status/Contamination Warning
68 = Supply Voltage Indicator

Through-Beam Sensor

12000 mm LASER

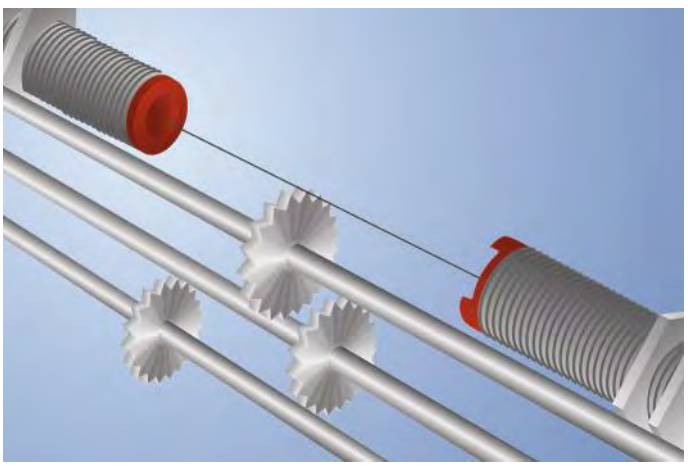
Range

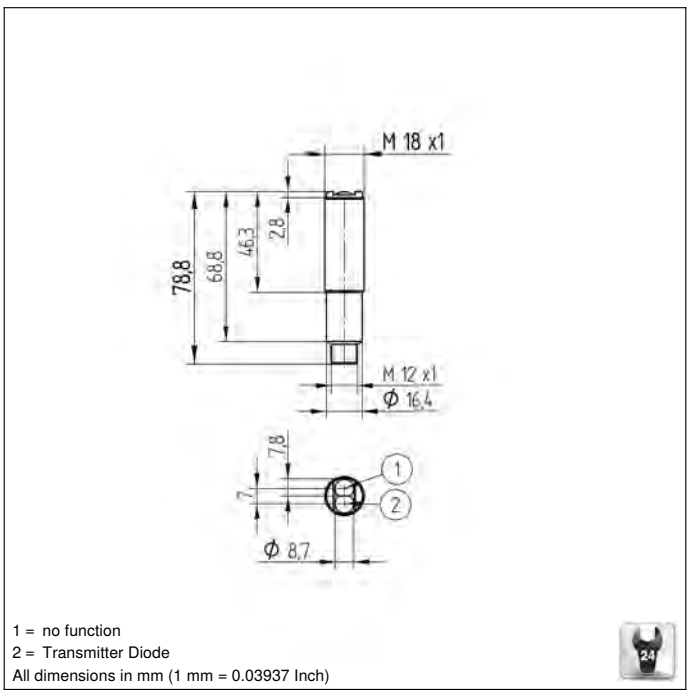
Technical Data

Optical Data	
Light Source	Laser (red)
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Electrical Data	
Supply Voltage	10...30 V DC
Current Consumption (Ub = 24 V)	< 15 mA
Temperature Drift	< 10 %
Temperature Range	-25...60 °C
Reverse Polarity Protection	yes
Protection Class	III
Mechanical Data	
Housing Material	Stainless Steel
Coated Optics	yes
Full Encapsulation	yes
Degree of Protection	IP67
Connection	M12 × 1; 4-pin

- **Smallest recognizable part: 0,25 mm**
- **Special coated optics**
- **Teach-in**
- **Time delay**

These through beam sensors are best suited for use in industrial environments. Thanks to their large working range, the devices demonstrate excellent functional reliability in highly contaminated environments. The sensors can be checked for correct functioning via the test input.





1 = no function
2 = Transmitter Diode
All dimensions in mm (1 mm = 0.03937 Inch)

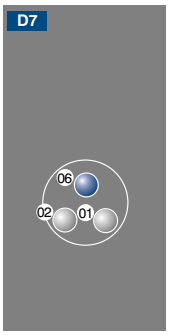
	Plug Version	
Part Number	OSD124Z0003	OED000C0003
Contamination Output		●
PNP NO/NC switchable		●
Range	12000 mm	
Smallest Recognizable Part		250 µm
Switching Hysteresis		< 15 %
Wave Length	655 nm	
Max. Ambient Light		10000 Lux
Opening Angle		12 °
Beam Divergence	10 mrad	
Sensor Type	Emitter	Receiver
Switching Frequency		3 kHz
Response Time		166 µs
Switching Output Voltage Drop		< 2,5 V
Switching Output/Switching Current		200 mA
Short Circuit and Overload Protection		yes
Teach Mode		NT, MT
FDA Accession Number	1120741-000	
Setting Method		Teach-In
MTTFd (EN ISO 13849-1)	3715,77 a	2409,91 a
Connection Diagram No.	1018	154
Control Panel No.		D7
Suitable Connection Technology No.	2	2
Suitable Mounting Technology No.	150	150

Connection Diagrams page 78

Complementary Products

- Dust extraction tube STAUBTUBUS-01
- Lens LA7
- PNP-NPN Converter BG2V1P-N-2M

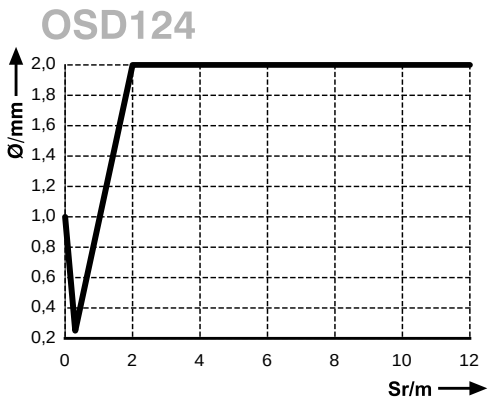
Ctrl. Panel



01 = Switching Status Indicator
02 = Contamination Warning
06 = Teach Button

Smallest Recognizable Part

Based on the Distance between Emitter and Receiver



Sr = Switching Distance

Ø = Diameter, Smallest Recognizable Part

Through-Beam Sensor

40000 mm LASER

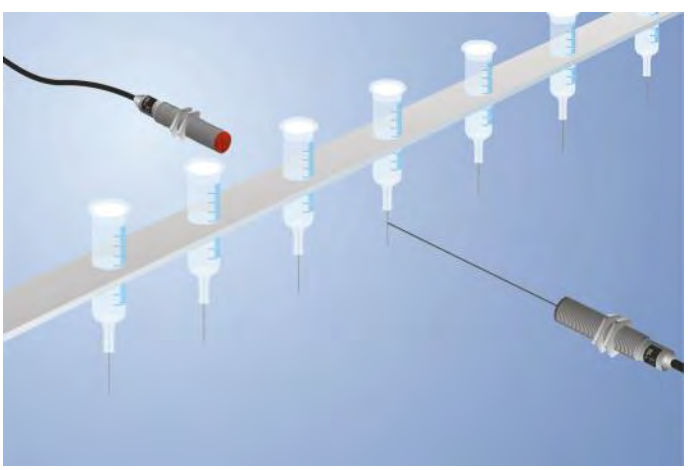
Range

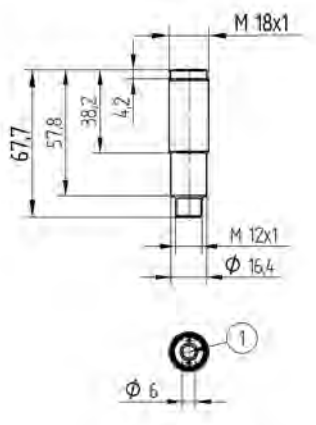
Technical Data

Optical Data	
Light Source	Laser (red)
Service Life (T = +25 °C)	100000 h
Laser Class (EN 60825-1)	1
Electrical Data	
Supply Voltage	10...30 V DC
Current Consumption (Ub = 24 V)	< 15 mA
Temperature Drift	< 10 %
Temperature Range	-25...60 °C
Reverse Polarity Protection	yes
Protection Class	III
Mechanical Data	
Housing Material	Stainless Steel
Full Encapsulation	yes
Degree of Protection	IP67
Connection	M12 × 1; 4-pin

- **Adjustable focus**
- **Range: 40 m**
- **Smallest recognizable part: 0,25 mm**
- **Special coated optics**
- **Teach-in**
- **Time delay**

These through beam sensors are best suited for use in industrial environments. Thanks to their large working range, the devices demonstrate excellent functional reliability in highly contaminated environments. The sensors can be checked for correct functioning via the test input.





1 = Transmitter Diode
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version	
Part Number	OSD404Z0003	OED000C0003
Contamination Output		●
PNP NO/NC switchable		●
Range	40000 mm	
Smallest Recognizable Part		250 µm
Switching Hysteresis		< 15 %
Wave Length	655 nm	
Max. Ambient Light		10000 Lux
Opening Angle		12 °
Beam Divergence	0,5 mrad	
Sensor Type	Emitter	Receiver
Switching Frequency		3 kHz
Response Time		166 µs
Switching Output Voltage Drop		< 2,5 V
Switching Output/Switching Current		200 mA
Short Circuit and Overload Protection		yes
Teach Mode		NT, MT
FDA Accession Number	1120742-000	
Setting Method		Teach-In
Coated Optics		yes
MTTFd (EN ISO 13849-1)	3715,77 a	2409,91 a
Connection Diagram No.	1018	154
Control Panel No.		D7
Suitable Connection Technology No.	2	2
Suitable Mounting Technology No.	150	150

Connection Diagrams page 78

Complementary Products

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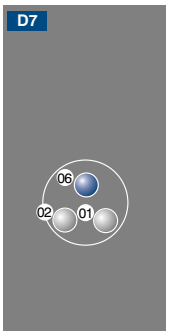
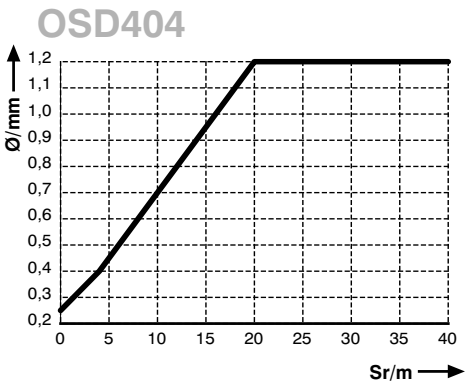
Ctrl. Panel



01 = Switching Status Indicator
02 = Contamination Warning
06 = Teach Button

Smallest Recognizable Part

Based on the Distance between Emitter and Receiver



Sr = Switching Distance

Ø = Diameter, Smallest Recognizable Part

Connection Diagrams

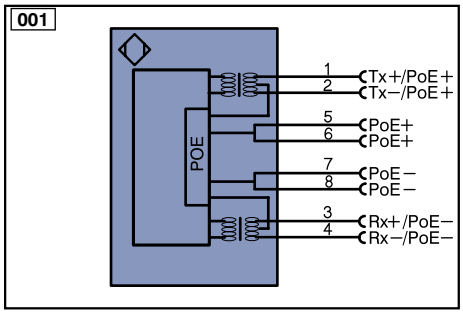
Legend

+	Supply Voltage +	
–	Supply Voltage 0 V	
~	Supply Voltage (AC Voltage)	
A	Switching Output	(NO)
Ā	Switching Output	(NC)
V	Contamination/Error Output	(NO)
V̄	Contamination/Error Output	(NC)
E	Input (analog or digital)	
T	Teach Input	
Z	Time Delay (activation)	
S	Shielding	
RxD	Interface Receive Path	
TxD	Interface Send Path	
RDY	Ready	
GND	Ground	
CL	Clock	
E/A	Output/Input programmable	
	IO-Link	
PoE	Power over Ethernet	
IN	Safety Input	
OSSD	Safety Output	
Signal	Signal Output	
BI_D+/-	Ethernet Gigabit bidirect. data line (A-D)	
EN0 RS422	Encoder 0-pulse 0-0̄ (TTL)	
PT	Platinum measuring resistor	
nc	not connected	
U	Test Input	
Ū	Test Input inverted	
W	Trigger Input	
O	Analog Output	
O–	Ground for the Analog Output	
BZ	Block Discharge	
AMV	Valve Output	
a	Valve Control Output +	
b	Valve Control Output 0 V	
SY	Synchronization	
E+	Receiver-Line	
S+	Emitter-Line	
⏚	Grounding	
SnR	Switching Distance Reduction	
Rx+/–	Ethernet Receive Path	
Tx+/–	Ethernet Send Path	
Bus	Interfaces-Bus A(+)/B(–)	
La	Emitted Light disengageable	
Mag	Magnet activation	
RES	Input confirmation	
EDM	Contactor Monitoring	
ENA RS422	Encoder A/Ā (TTL)	
ENB RS422	Encoder B/B̄ (TTL)	
ENA	Encoder A	
ENB	Encoder B	
AMIN	Digital output MIN	
AMAX	Digital output MAX	
AOK	Digital output OK	
SY In	Synchronization In	
SY OUT	Synchronization OUT	
OLT	Brightness output	
M	Maintenance	

Wire Colors according to DIN IEC 757

BK	Black
BN	Brown
RD	Red
OG	Orange
YE	Yellow
GN	Green
BU	Blue
VT	Violet
GY	Grey
WH	White
PK	Pink
GNYE	Green/Yellow

001



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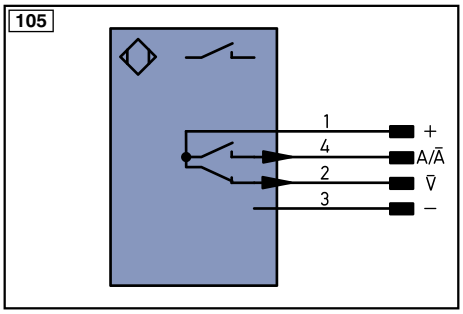

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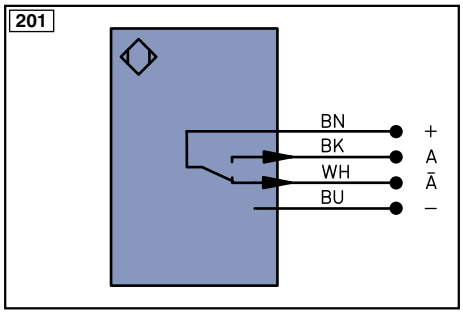

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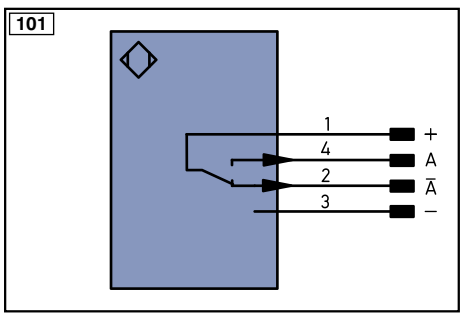

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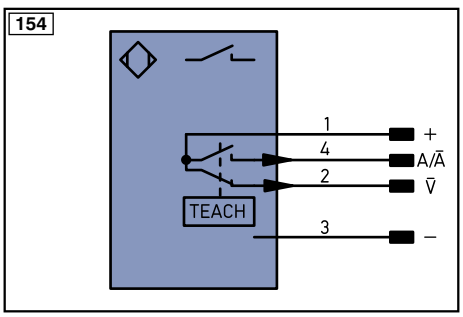

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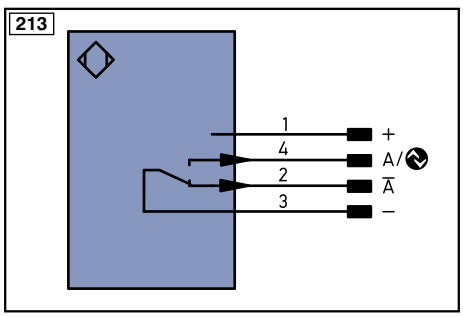

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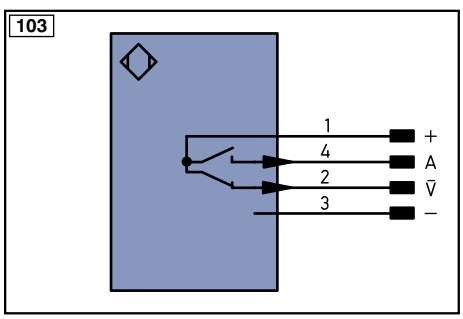

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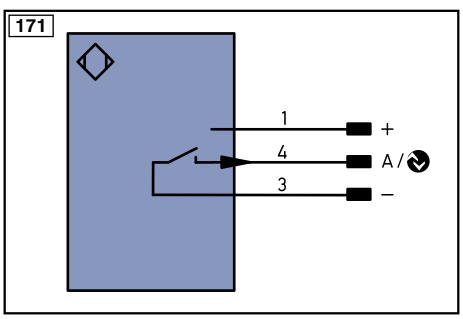

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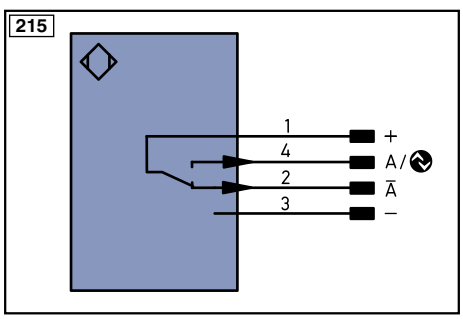

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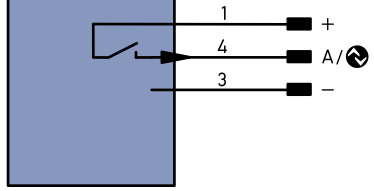

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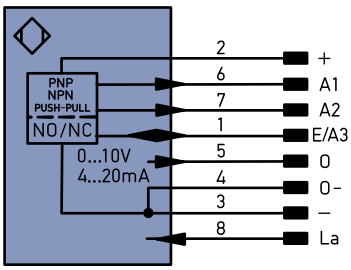

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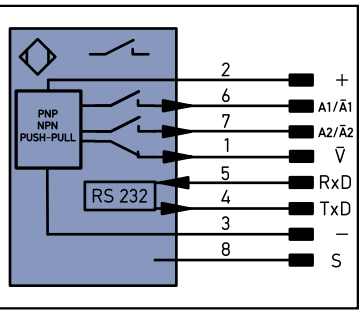

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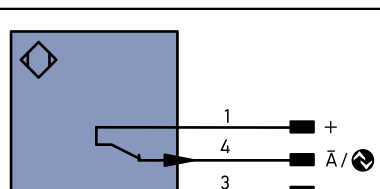

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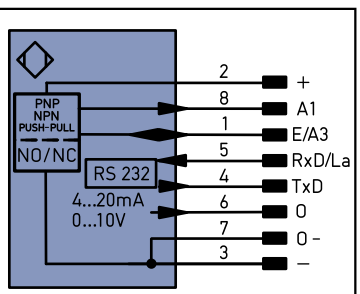

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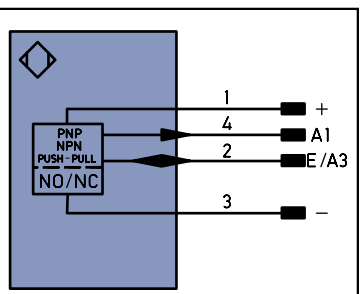

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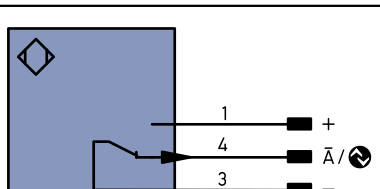

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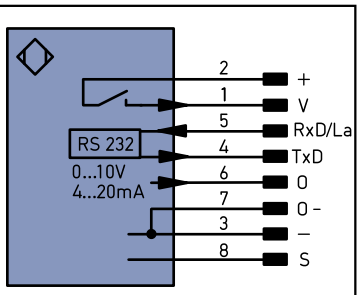

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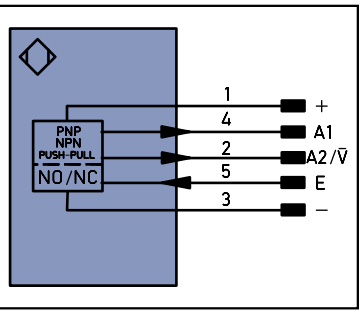

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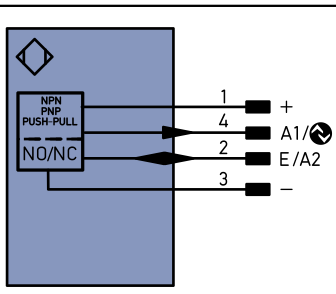

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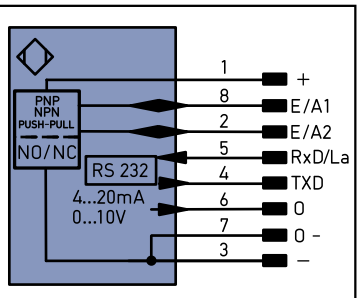

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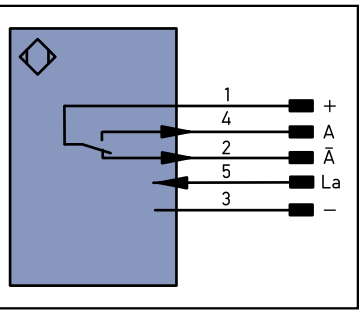

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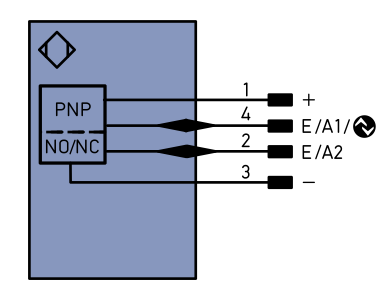

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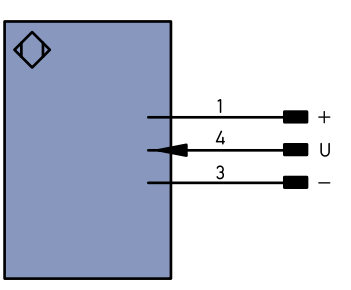

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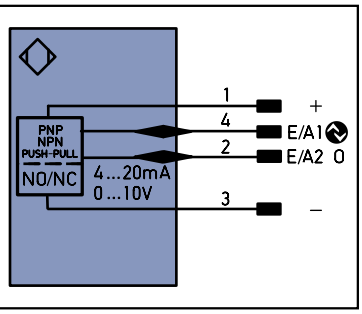

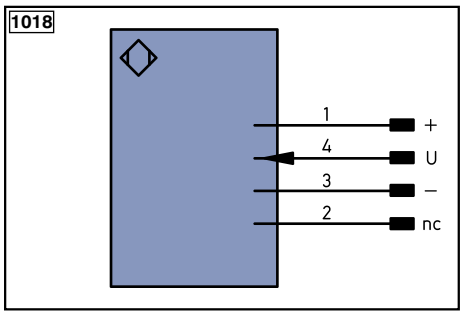
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