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

Technical Glossary

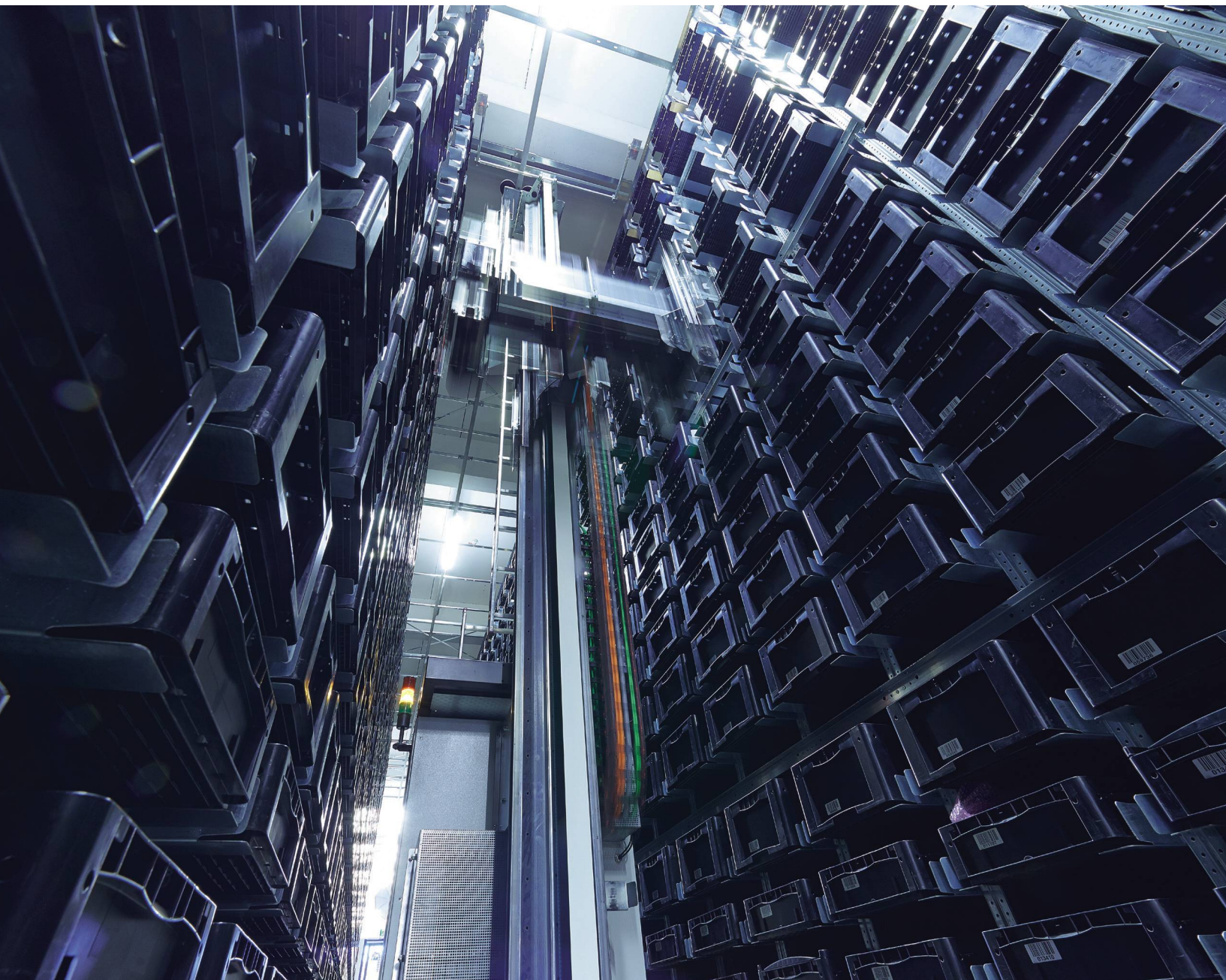
L

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. The Laser sensors are classified after EN60825-1:2007.
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.

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

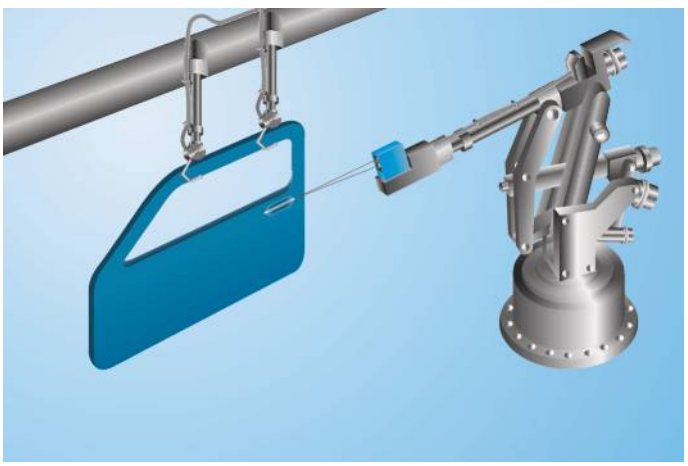
Range

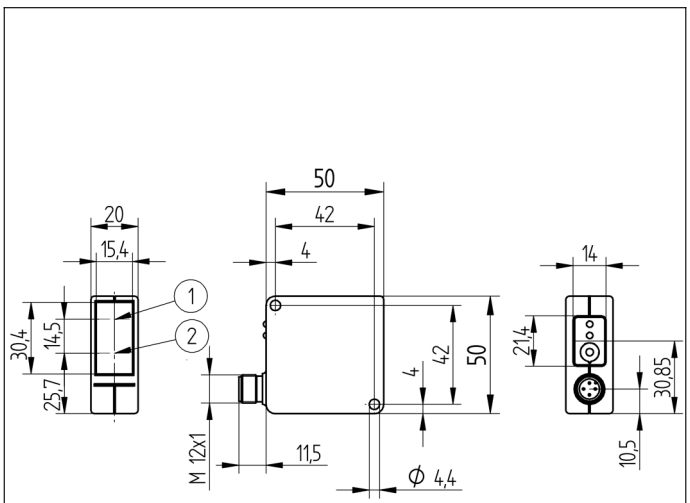
- **Smallest recognizable distance difference: 100 µm**
- **Spot diameter: 0,3 mm**

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
Light 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
Mechanical Data	
Adjustment	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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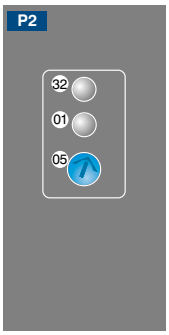
Complementary Products

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

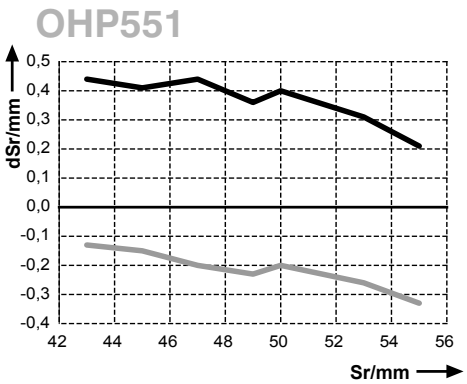
Ctrl. Panel



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

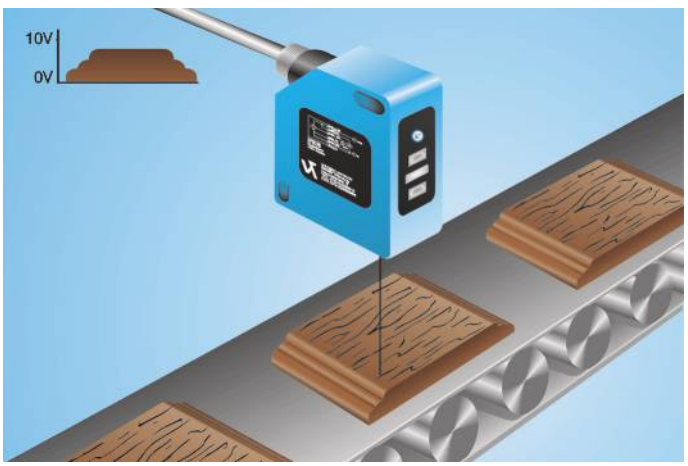
Range

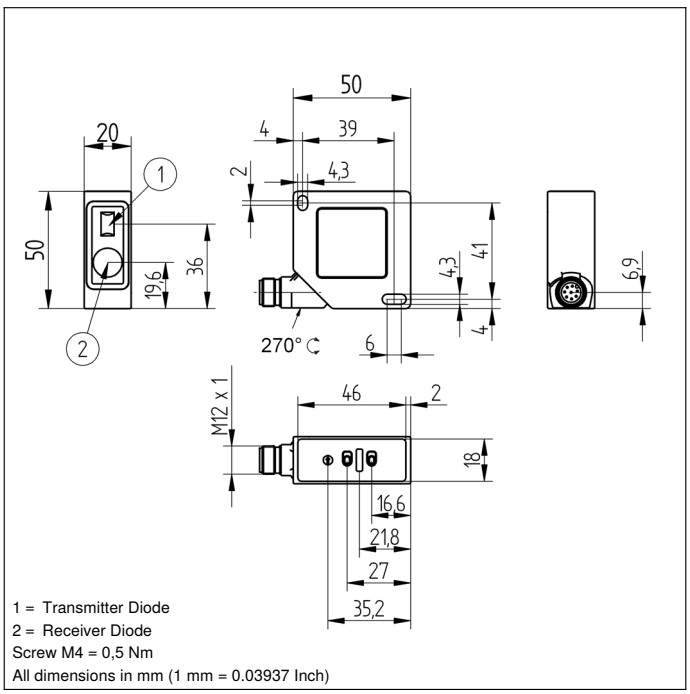
- **High resolution: 8 µm (resolution-mode)**
- **Linearity: 0,1 % (resolution-mode)**
- **Measured value independent of material, color and brightness**
- **Zoom function**

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
Light Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	18...30 V DC
Current Consumption (Ub = 24 V)	< 80 mA
Measurement Rate	1000 /s
Measurement 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
Mechanical Data	
Adjustment	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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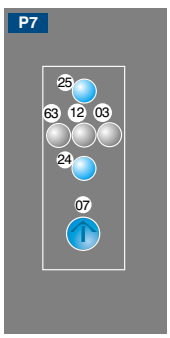
Complementary Products

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

Ctrl. Panel

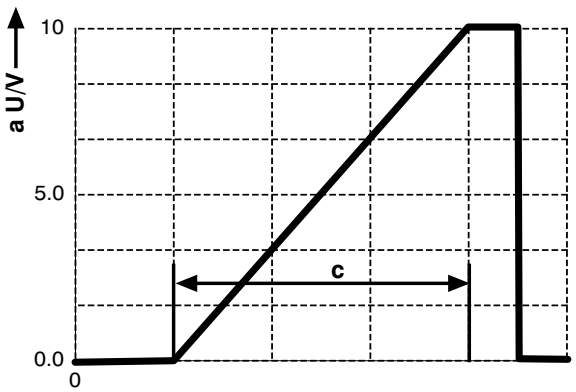


03 = Error Indicator
07 = Selector Switch
12 = Analog Output Indicator
24 = Plus Button
25 = Minus Button
63 = Analog Output Current Indicator

Table 1

Working Distance	30 mm	80 mm
Light 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

100 mm LASER

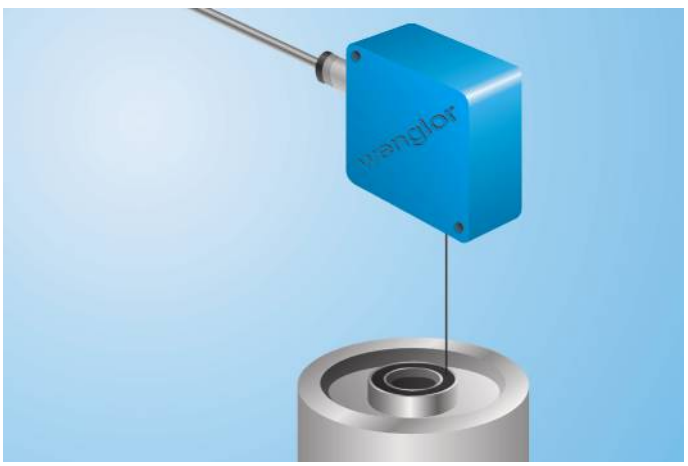
Range

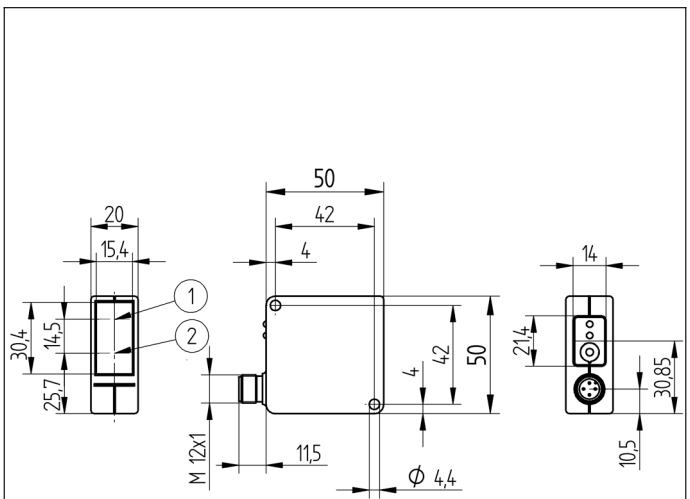
- **Smallest recognizable distance difference: 400 µm**
- **Spot diameter: 0,6 mm**

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
Light 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
Mechanical Data	
Adjustment	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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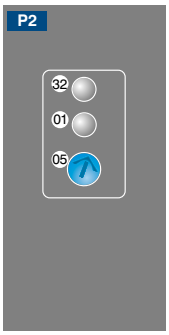
Complementary Products

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

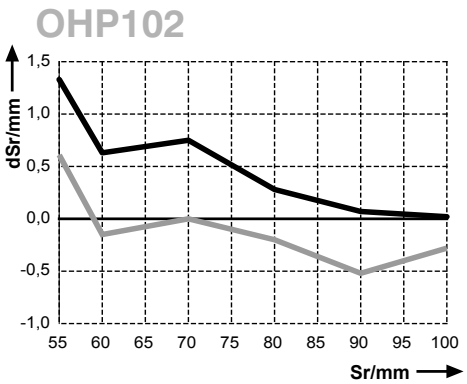
Ctrl. Panel



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

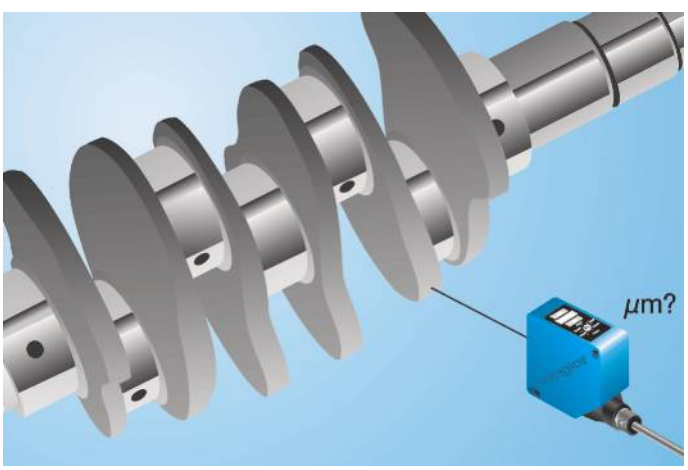
Range

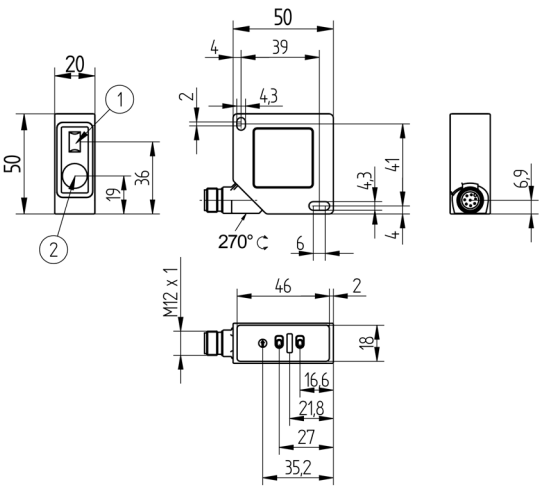
- **High resolution: 20 µm (resolution-mode)**
- **Linearity: 0,1 % (resolution-mode)**
- **Measured value independent of material, color and brightness**
- **Zoom function**

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
Light Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	18...30 V DC
Current Consumption (Ub = 24 V)	< 80 mA
Measurement Rate	1000 /s
Measurement 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
Mechanical Data	
Adjustment	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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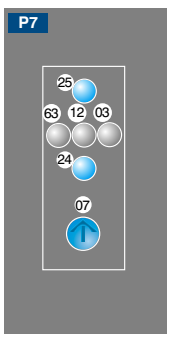
Complementary Products

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

Ctrl. Panel

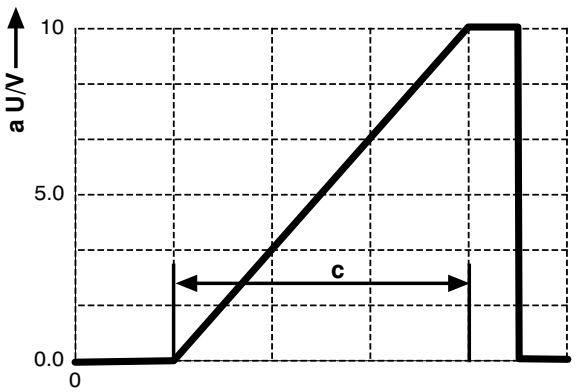


03 = Error Indicator
07 = Selector Switch
12 = Analog Output Indicator
24 = Plus Button
25 = Minus Button
63 = Analog Output Current Indicator

Table 1

Working Distance	40 mm	160 mm
Light 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

240 mm LASER

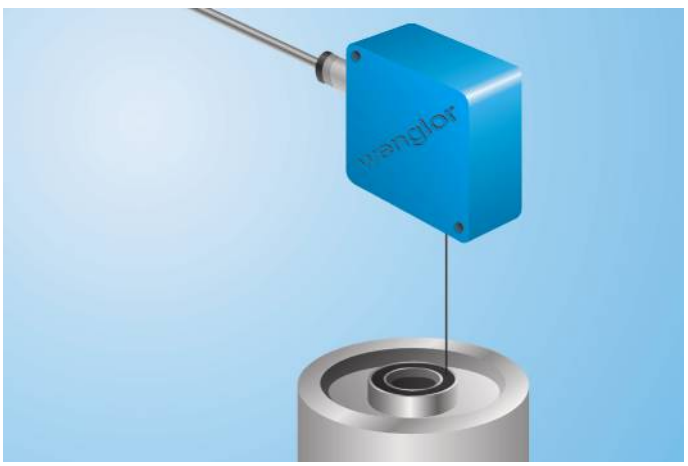
Range

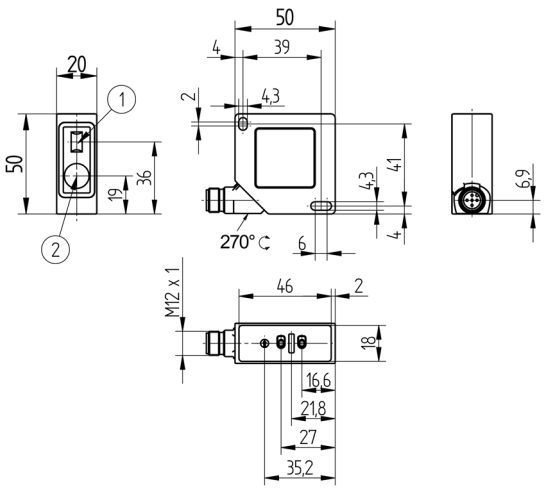
- **CMOS line array**
- **Highly accurate switching distance**
- **Minimal switching hysteresis**
- **Switching point independent of material, color and brightness**

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
Light 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
Mechanical Data	
Adjustment	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	●
NO/NC switchable	●
RS-232 with Adapterbox	●
External Teach Input	●
Connection Diagram No.	779
Control Panel No.	P8
Suitable Connection Technology No.	2 35
Suitable Mounting Technology No.	380

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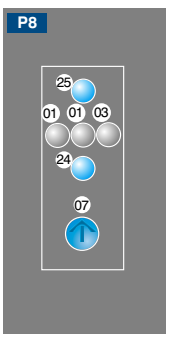
Complementary Products

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

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
Light Spot Size	0,4 × 0,9 mm	1,1 × 2,3 mm

High-Performance Distance Sensor

50...350 mm LASER

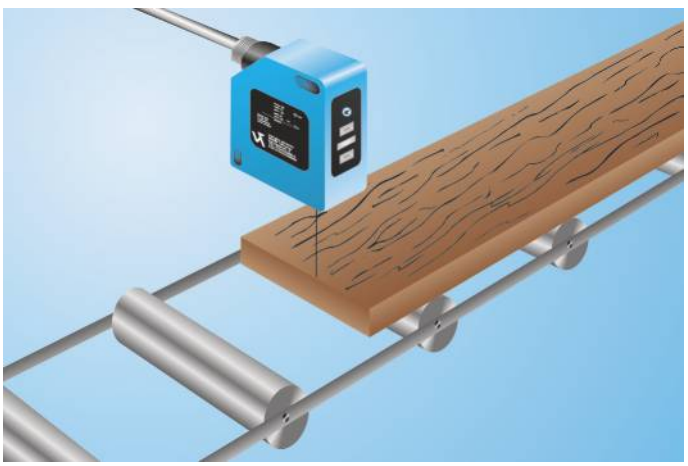
Range

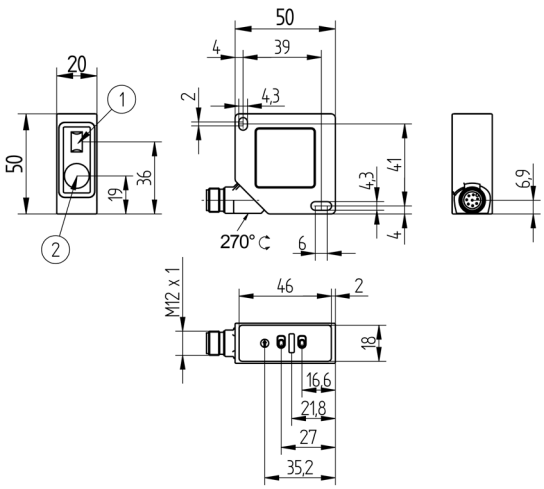
- **High resolution: 50 µm (resolution-mode)**
- **Linearity: 0,15 % (resolution-mode)**
- **Measured value independent of material, color and brightness**
- **Zoom function**

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
Light Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	18...30 V DC
Current Consumption (Ub = 24 V)	< 80 mA
Measurement Rate	500 /s
Measurement 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
Mechanical Data	
Adjustment	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

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Complementary Products

Analog Evaluation Unit AW02
Feldbus Gateways ZAGxxxN01
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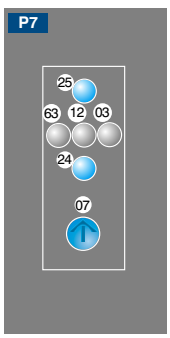
Protection Housing Set ZSP-NN-02
Protection Housing ZSV-0x-01

Ctrl. Panel

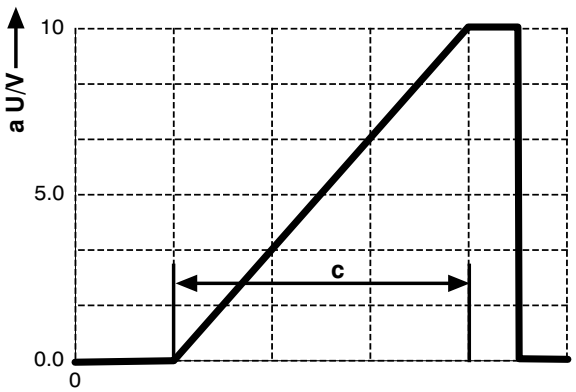


03 = Error Indicator
07 = Selector Switch
12 = Analog Output Indicator
24 = Plus Button
25 = Minus Button
63 = Analog Output Current Indicator

Table 1

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

Output Graph



c = Measuring Range
a = Analog Voltage Output

High-Performance Distance Sensor

660 mm LASER

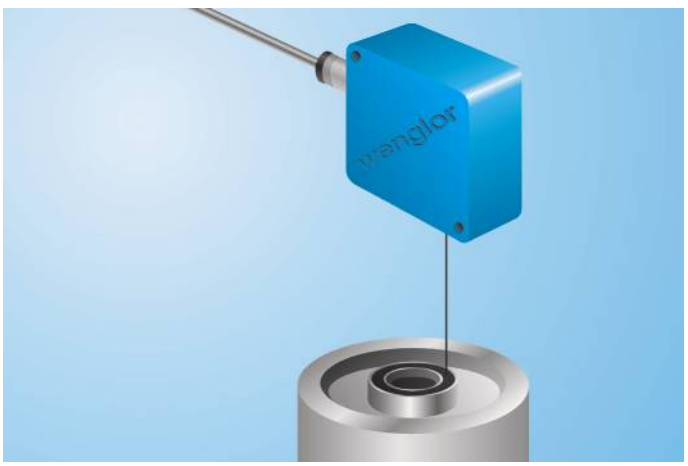
Range

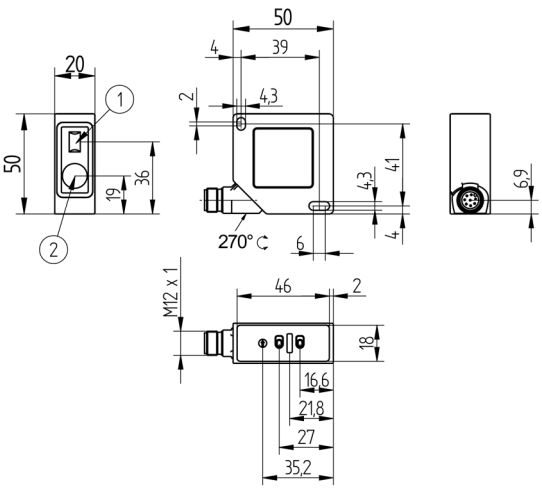
- **CMOS line array**
- **Highly accurate switching distance**
- **Minimal switching hysteresis**
- **Special coated optic**
- **Switching point independent of material, color and brightness**

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
Light 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
Mechanical Data	
Adjustment	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	●	●
NO/NC switchable	●	●
RS-232 Interface	●	
RS-232 with Adapterbox		●
External Teach Input		●
Teach Mode	HT, VT, TP	HT, VT, FT, TP
Baud Rate	38400 Bd	9600 Bd
Coated Optic	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 54

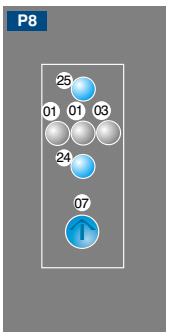
Complementary Products

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

Table 1

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

Ctrl. Panel



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

High-Performance Distance Sensor

0...3 m LASER

Range

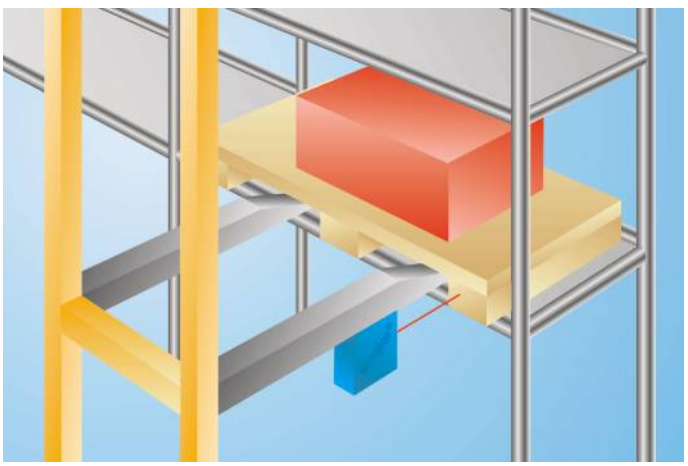
WinTec

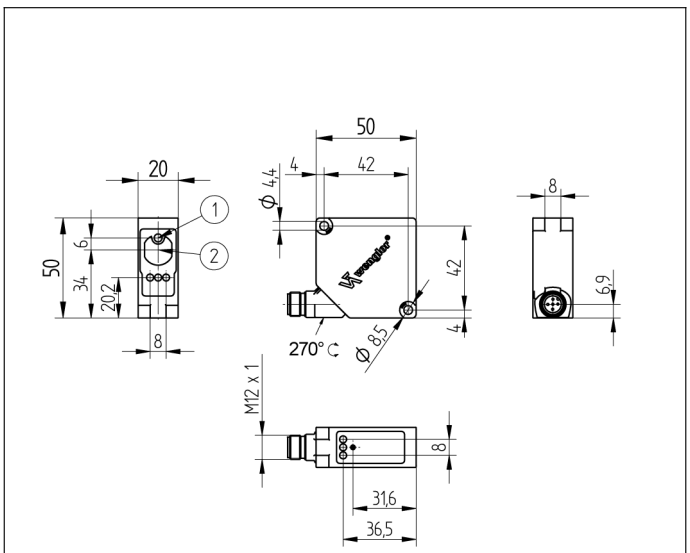
- **Interference-free towards gloss in the background with WinTec**
- **No mutual interference with WinTec**
- **Reliable in case of glossy objects with WinTec**
- **Secure detection of black objects also in extremely inclined positions with WinTec**

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
Light 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
Mechanical Data	
Adjustment	Teach-In
Housing Material	Plastic
Optic Cover	PMMA
Degree of Protection	IP68
Connection	M12 × 1; 4/5-pin

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.





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

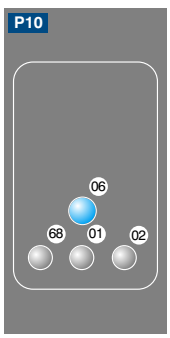
	Plug Version
Part Number	OY2P303A0135
PNP NO/NC antivalent	●
Connection Diagram No.	780
Control Panel No.	P10
Suitable Connection Technology No.	2 35
Suitable Mounting Technology No.	380

Connection Diagrams page 54

Complementary Products

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

Ctrl. Panel



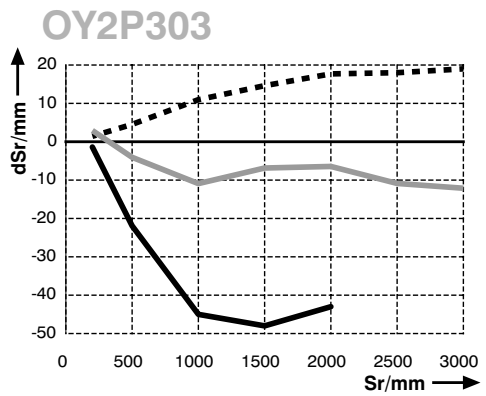
01 = Switching Status Indicator
02 = Contamination Warning
06 = Teach Button
68 = Supply Voltage Indicator

Table 1

Working Distance	0 m	3 m
Light 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

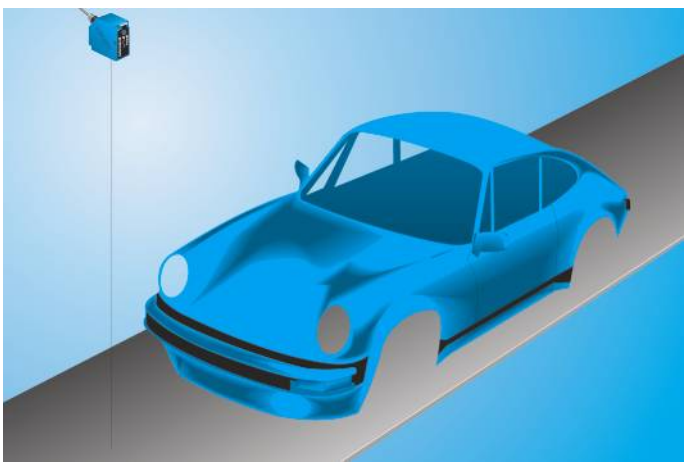
WinTec

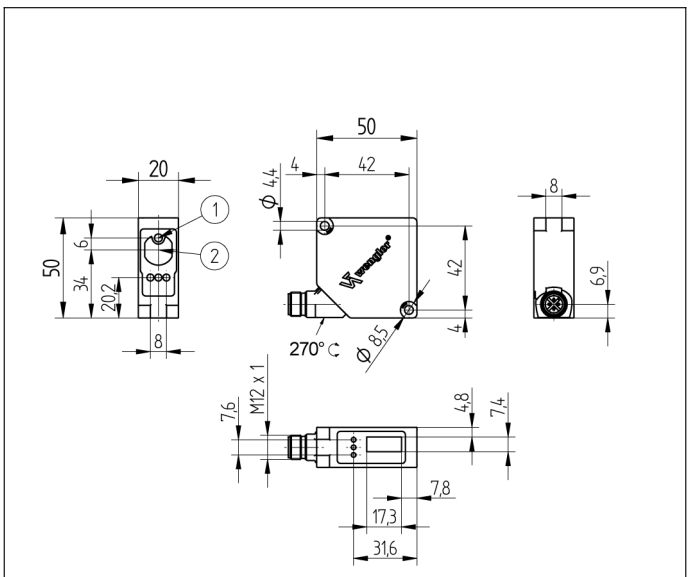
- **Analog output (0...10 V/4...20 mA)**
- **Graphical display for easy operation**
- **Reliable in case of glossy objects with WinTec**
- **Secure detection of black objects also in extremely inclined positions with WinTec**
- **Two mutually independent switching outputs**

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
Measurement 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	
Adjustment	Teach-In
Housing Material	Plastic
Optic Cover	PMMA
Degree of Protection	IP68

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.





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

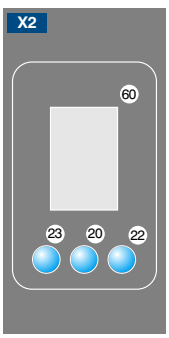
	Plug Version	
Part Number	OY1P303P0102	OY1P303P0189
Error Output	●	●
Contamination Output	●	●
Configurable as PNP/NPN/Push-Pull	●	●
Analog Output	●	●
RS-232 Interface		●
IO-Link	●	
Interface	IO-Link	RS-232
IO-Link Version	1.0	
Connection	M12 × 1; 4-pin	M12 × 1; 8-pin
Connection Diagram No.	782	531
Control Panel No.	X2	X2
Suitable Connection Technology No.	2	89
Suitable Mounting Technology No.	380	380

Connection Diagrams page 54

Complementary Products

- Feldbus Gateways ZAGxxxN01
- Interface Cable S232W3
- IO-Link Master
- Protection Housing Set ZSP-NN-02
- Protection Housing ZSV-0x-01

Ctrl. Panel



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

Table 1

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

High-Performance Distance Sensor

0,2...6,2 m LASER

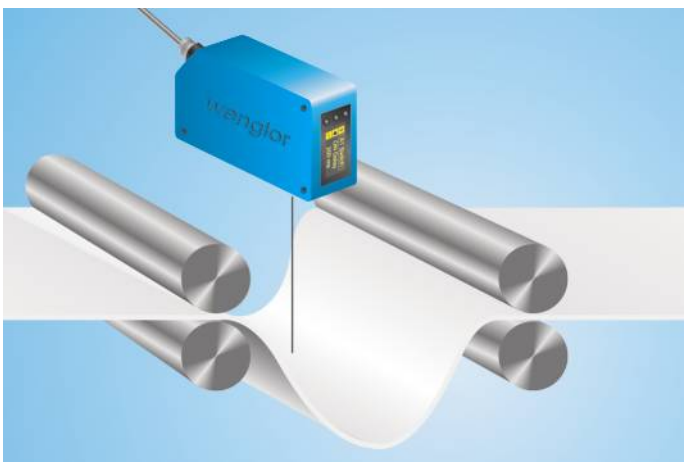
Range

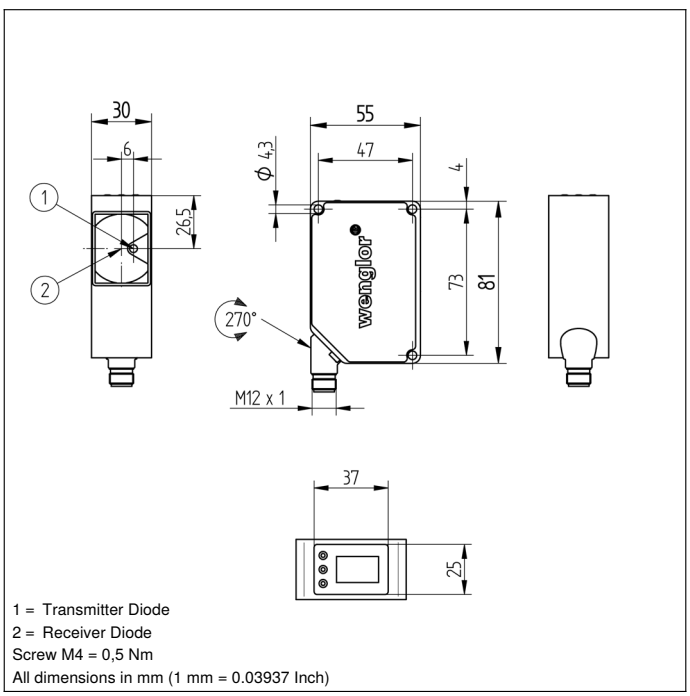
- **Graphical display for easy operation**
- **Switching output A1 as analog output switchable (0...10 V/4...20 mA)**
- **Temperature drift eliminable**
- **Two mutually independent switching outputs**

Technical Data

Optical Data	
Working Range	0,2...6,2 m
Measuring Range	6 m
Resolution	1...12 mm
Linearity	0,2 %
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
Beam Divergence	< 2 mrad
Light Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	18...30 V DC
Current Consumption (Ub = 24 V)	< 100 mA
Switching Frequency	50 Hz
Measurement 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
Mechanical Data	
Adjustment	Teach-In
Housing Material	Plastic
Degree of Protection	IP68
Connection	M12 × 1; 4-pin

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.





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

	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.	2
Suitable Mounting Technology No.	340

Connection Diagrams page 54

Table 1

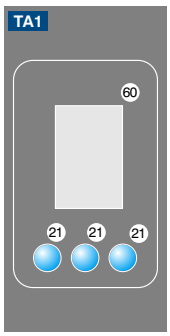
Working Distance	0 m	6 m
Light Spot Diameter	5 mm	< 12 mm

Complementary Products

Analog Evaluation Unit AW02

Protection Housing Set ZST-NN-02

Ctrl. Panel



21 = Mode Button
60 = Display

High-Performance Distance Sensor

0,1...10,2 m LASER

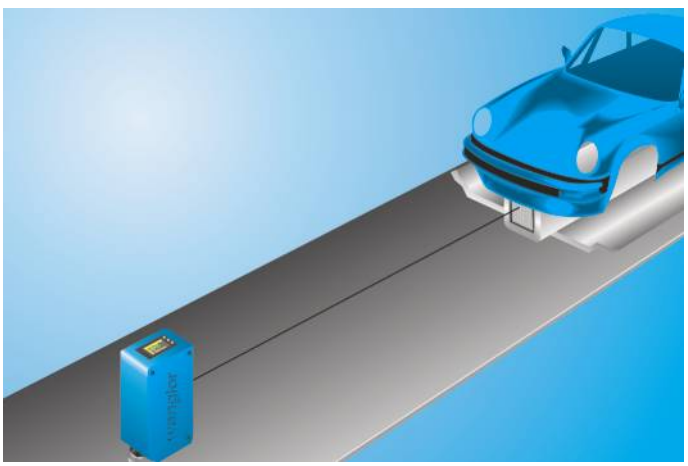
Range

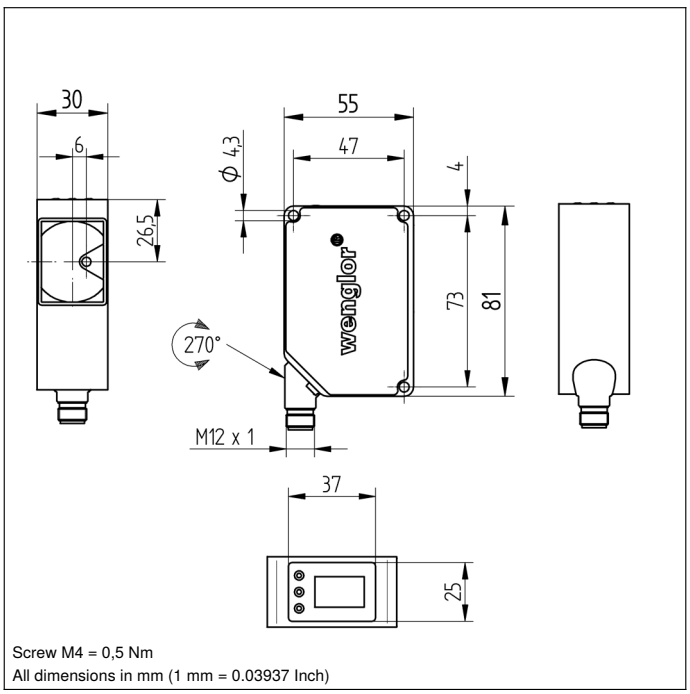
- **Emitted light disengageable**
- **Graphical display for easy operation**
- **Switching output A1 as analog output switchable (0...10 V/4...20 mA)**
- **Temperature drift eliminable**

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	0,2 %
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
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
Measurement 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
Mechanical Data	
Adjustment	Teach-In
Housing Material	Plastic
Degree of Protection	IP68
Connection	M12 × 1; 4-pin

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.





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

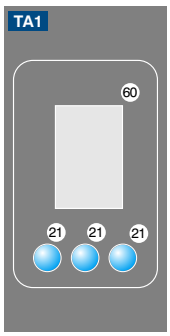
	Plug Version
Part Number	X1TA100QXT3
Error Output	●
Configurable as PNP/NPN/Push-Pull	●
Analog Output	●
Connection Diagram No.	755
Control Panel No.	TA1
Suitable Connection Technology No.	2
Suitable Mounting Technology No.	340

Connection Diagrams page 54

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
Light 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

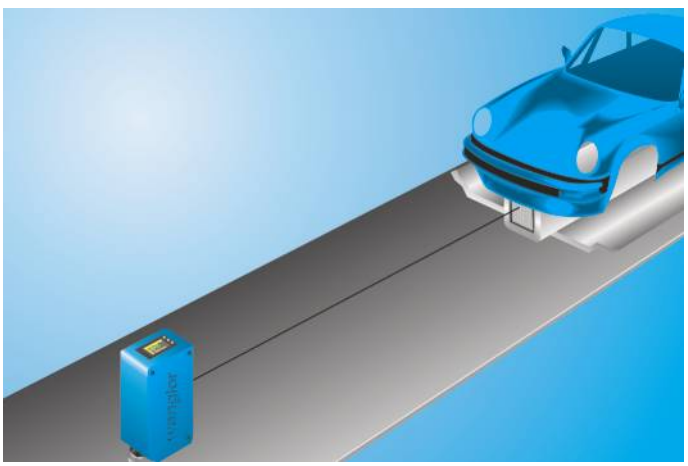
Range

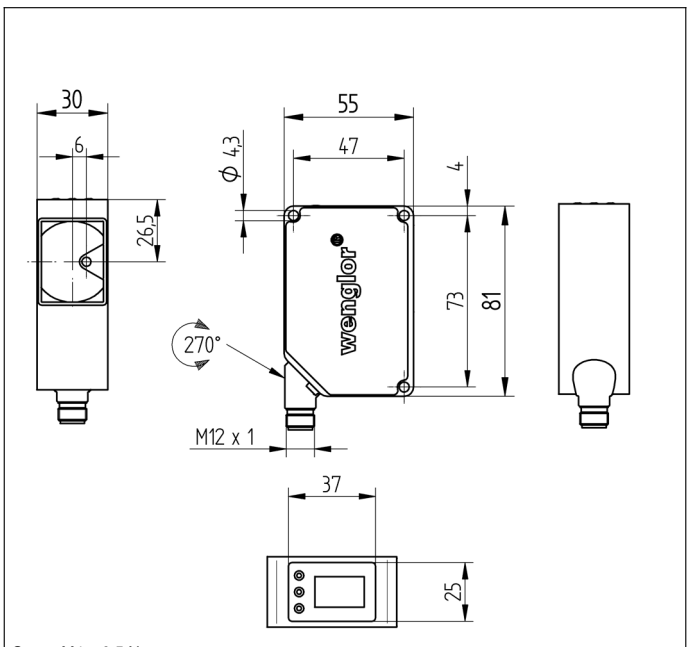
- **Analog output (0...10 V/4...20 mA)**
- **Emitted light disengageable**
- **Graphical display for easy operation**
- **Temperature drift eliminable**

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
Beam Divergence	< 2 mrad
Light 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
Measurement 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
Mechanical Data	
Adjustment	Teach-In
Housing Material	Plastic
Degree of Protection	IP68
Connection	M12 × 1; 8-pin

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.





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

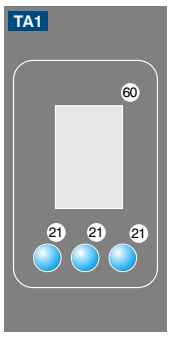
	Plug Version	
Part Number	X1TA101MHT88	X1TA101MHV80
Error Output	●	●
Configurable as PNP/NPN/Push-Pull	●	●
Analog Output	●	●
RS-232 Interface	●	
Switching Outputs	1	2
Interface	RS-232	
Connection Diagram No.	516	514
Control Panel No.	TA1	TA1
Suitable Connection Technology No.	88	80
Suitable Mounting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

Connection Diagrams page 54

Complementary Products

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

Ctrl. Panel



21 = Mode Button
60 = Display

Table 1

Working Distance	0 m	40 m	100 m
Light 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

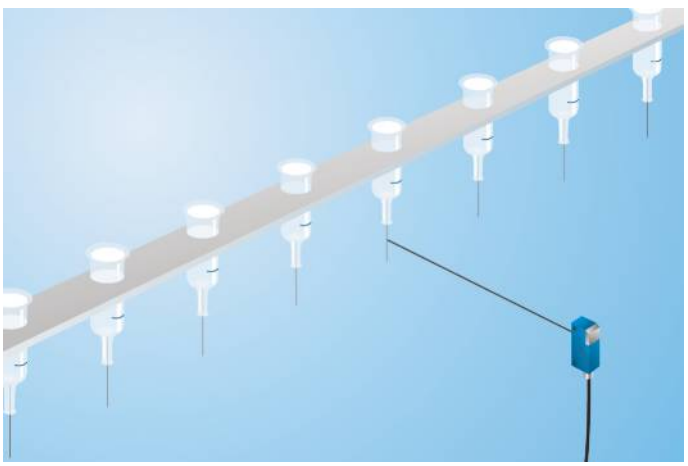
80 mm LASER
Range

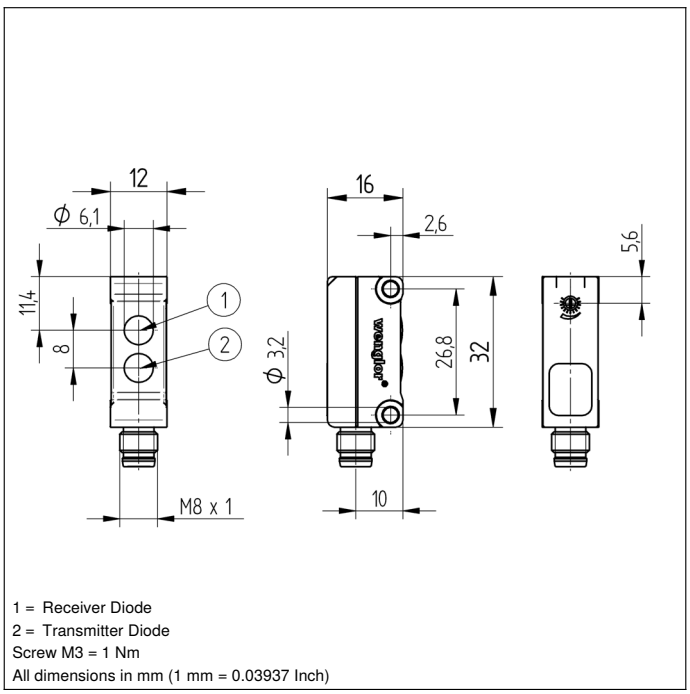
- **High switching frequency**
- **Laser light**
- **Low current consumption < 15 mA**
- **Miniature design**

Technical Data

Optical Data	
Range	80 mm
Adjustable Range	18...80 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
Light Spot Diameter	see Table 1
Electrical Data	
Supply Voltage	10...30 V DC
Current Consumption (Ub = 24 V)	< 15 mA
Switching Frequency	1900 Hz
Response Time	263 µs
Temperature Drift	< 5 %
Temperature Range	-25...60 °C
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
Mechanical Data	
Adjustment	Potentiometer
Housing Material	Plastic
Full Encapsulation	yes
Degree of Protection	IP67
Connection	M8 × 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 = Receiver Diode
2 = Transmitter Diode
Screw M3 = 1 Nm
All dimensions in mm (1 mm = 0.03937 Inch)

	Plug Version
Part Number	OYK801A0107
PNP NO/NC antivalent	●
Connection Diagram No.	101
Control Panel No.	K4
Suitable Connection Technology No.	7
Suitable Mounting Technology No.	400

Connection Diagrams page 54

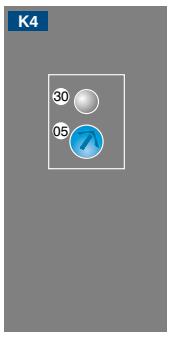
Table 1

Detection Range	40 mm	80 mm
Light Spot Diameter	1,5 mm	1 mm

Complementary Products

PNP-NPN Converter BG7V1P-N-2M

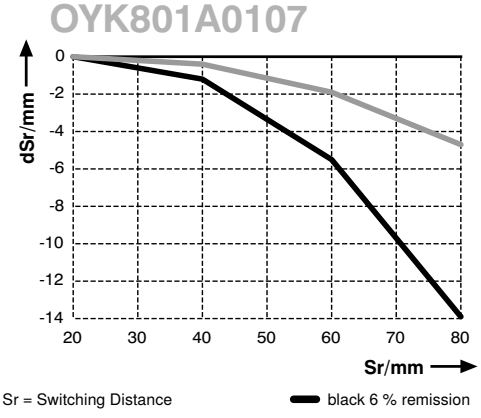
Ctrl. Panel



05 = Switching Distance Adjuster
30 = Switching Status/Contamination 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

Reflex Sensor
with Background Suppression

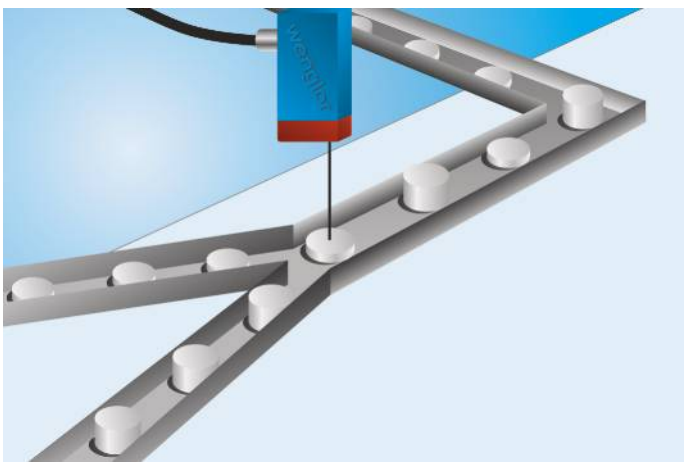
150 mm LASER
Range

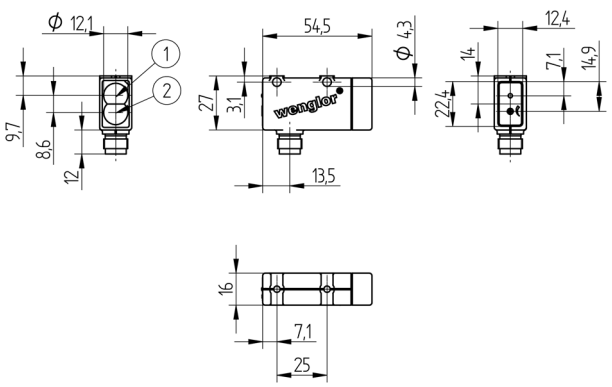
- **High switching frequency**
- **Special coated optic**

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
Light 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
Mechanical Data	
Adjustment	Potentiometer
Housing Material	Plastic
Coated Optic	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)

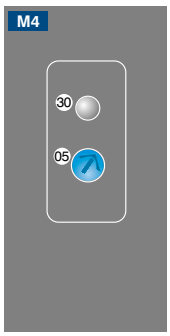
	Plug Version
Part Number	OHM152B0002
Contamination Output	●
PNP NO	●
Connection Diagram No.	103
Control Panel No.	M4
Suitable Connection Technology No.	2
Suitable Mounting Technology No.	360

Connection Diagrams page 54

Complementary Products

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

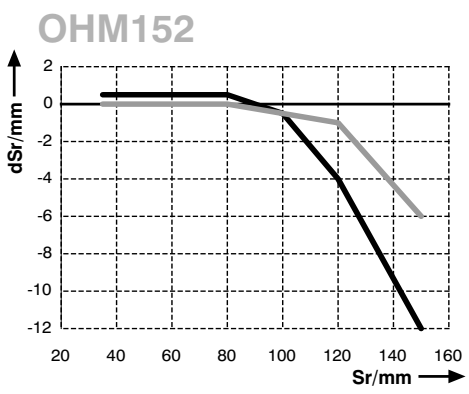
Ctrl. Panel



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

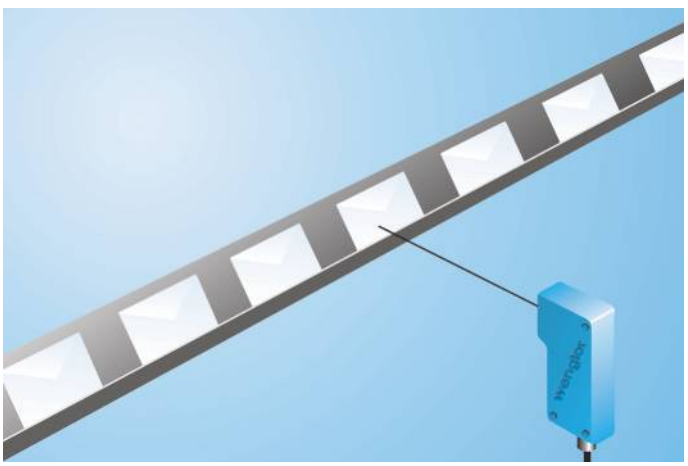
250 mm LASER
Range

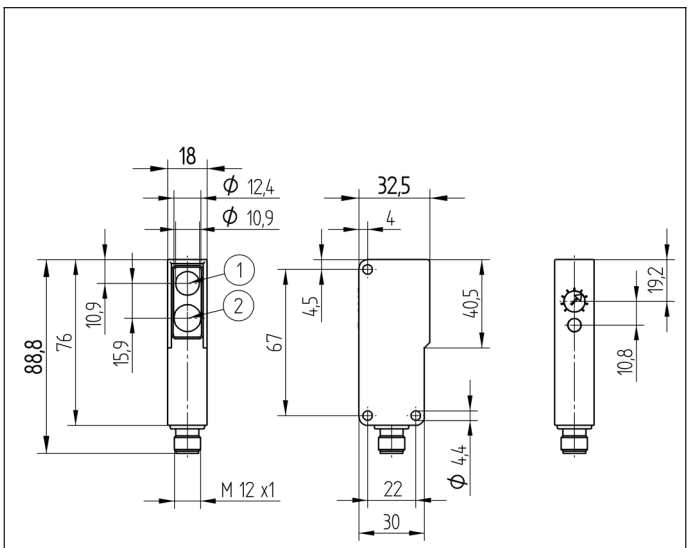
- **Special coated optic**
- **Stainless steel plug (V2A)**
- **Switching frequency: 600 Hz**

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
Light 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
Mechanical Data	
Adjustment	Potentiometer
Housing Material	Plastic
Coated Optic	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	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 54

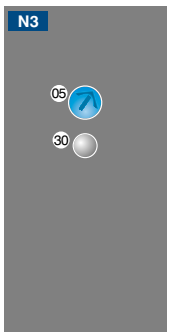
Table 1

Detection Range	60 mm	125 mm	250 mm
Light 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

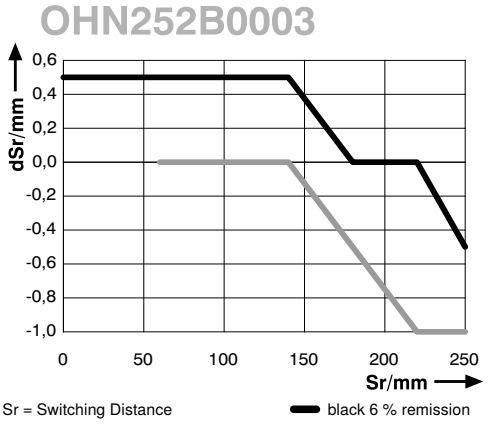
Ctrl. Panel



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

Switching Distance Deviation

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



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

10000 mm LASER

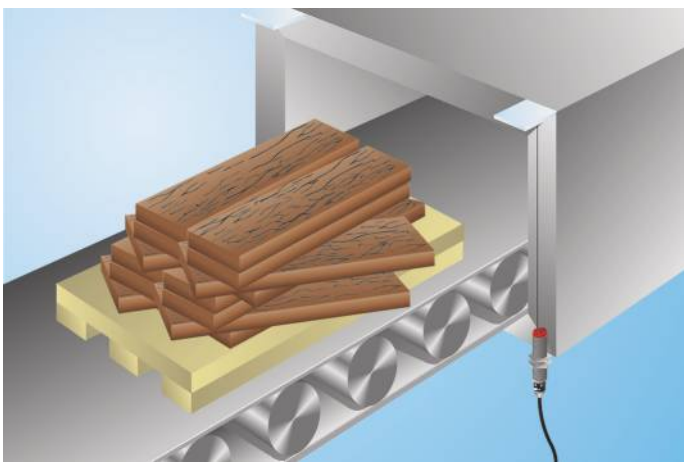
Range

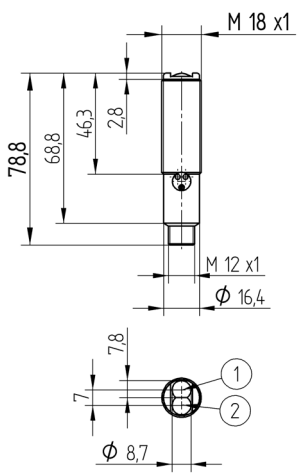
- **Smallest recognizable part: 0,1 mm**
- **Special coated optic**
- **Stainless steel housing**

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
Light 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
Mechanical Data	
Adjustment	Potentiometer
Housing Material	Stainless Steel
Coated Optic	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)

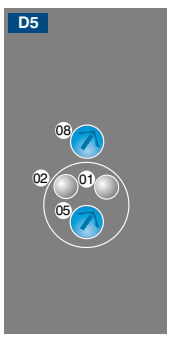
	Plug Version
Part Number	OLD104C0003
Contamination Output	●
PNP NO/NC switchable	●
Connection Diagram No.	105
Control Panel No.	D5
Suitable Connection Technology No.	2
Suitable Mounting Technology No.	150 160

Connection Diagrams page 54

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
Light 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

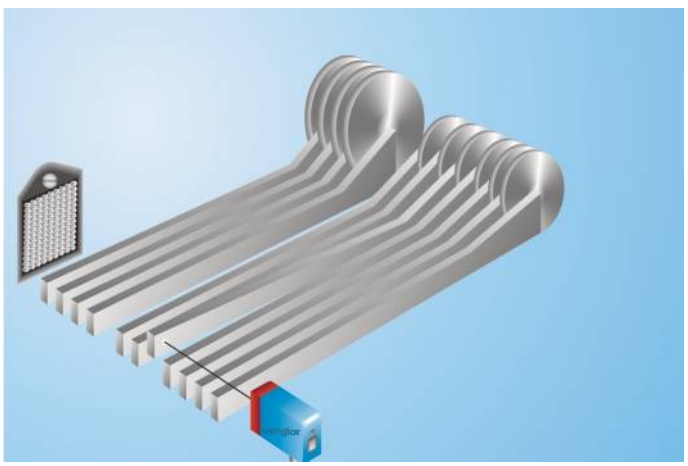
Range

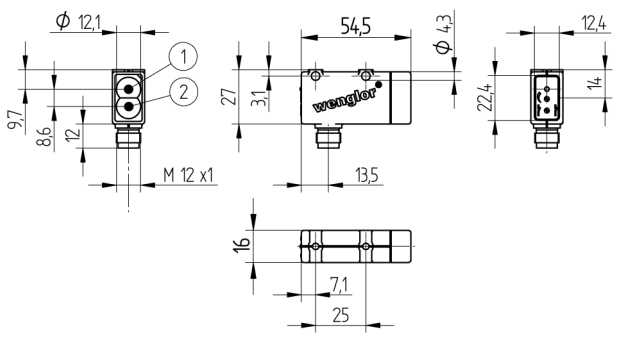
- **Smallest recognizable part: 2,5 mm**
- **Special coated optic**
- **Switching frequency: 500 Hz**
- **Time delay**

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 °
Light 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
Mechanical Data	
Adjustment	Potentiometer
Housing Material	Plastic
Coated Optic	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
All dimensions in mm (1 mm = 0.03937 Inch)

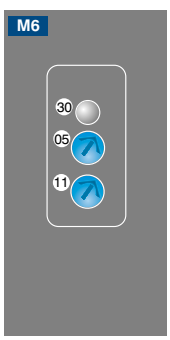
	Plug Version
Part Number	OLM104A0002
PNP NO/NC antivalent	●
Connection Diagram No.	101
Control Panel No.	M6
Suitable Connection Technology No.	2
Suitable Mounting Technology No.	360

Connection Diagrams page 54

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
Light 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


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

12000 mm LASER

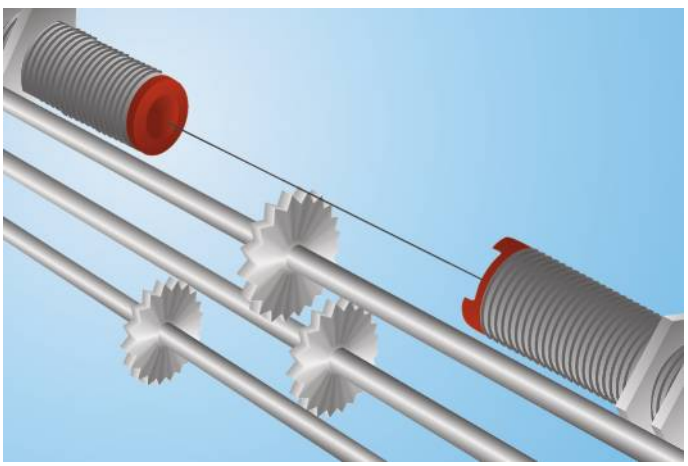
Range

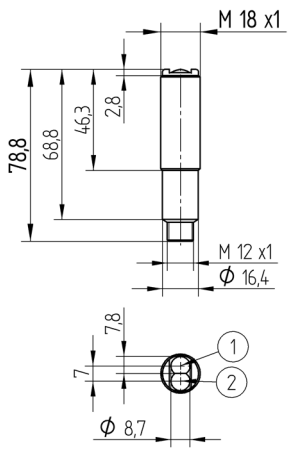
Technical Data

Optical Data	
Light Source	Laser (red)
Service Life (T = +25 °C)	100000 h
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 Optic	yes
Full Encapsulation	yes
Degree of Protection	IP67
Connection	M12 × 1; 4-pin

- **Smallest recognizable part: 0,25 mm**
- **Special coated optic**
- **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)

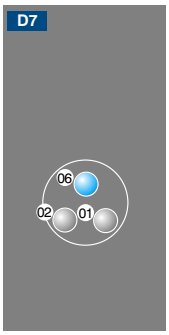
	Plug Version	
Part Number	OSD124Z0003	OED000C0003
Contamination Output		●
PNP NO/NC switchable		●
Range	12000 mm	
Smallest Recognizable Part		> 250 µm
Switching Hysteresis		< 15 %
Wave Length	655 nm	
Laser Class (EN 60825-1)	1	
Max. Ambient Light		10000 Lux
Opening Angle		12 °
Beam Divergence	10 mrad	
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
Adjustment		Teach-In
Connection Diagram No.	1018	154
Control Panel No.		D7
Suitable Connection Technology No.	2	2
Suitable Mounting Technology No.	150 160	150 160

Connection Diagrams page 54

Complementary Products

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

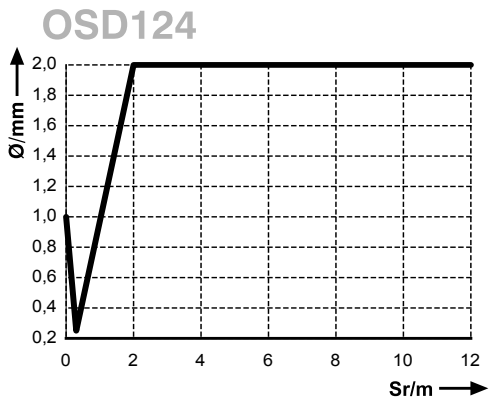
Ctrl. Panel



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

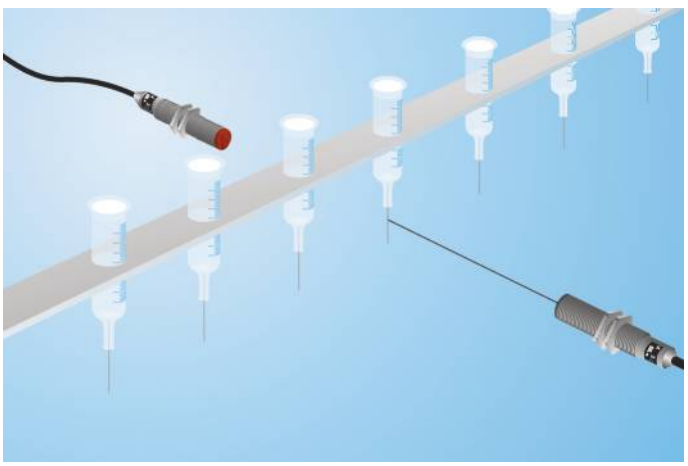
Range

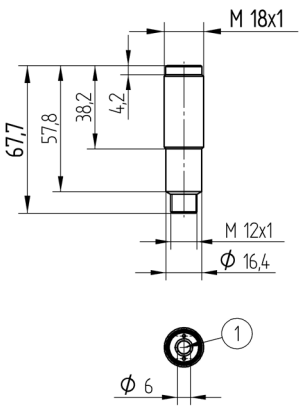
Technical Data

Optical Data	
Light Source	Laser (red)
Service Life (T = +25 °C)	100000 h
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 optic**
- **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	
Laser Class (EN 60825-1)	1	
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
Adjustment		Teach-In
Coated Optic		yes
Connection Diagram No.	1018	154
Control Panel No.		D7
Suitable Connection Technology No.	2	2
Suitable Mounting Technology No.	150 160	150 160

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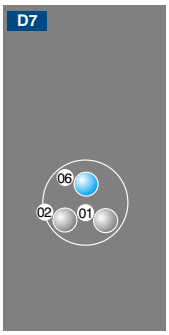
Complementary Products

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

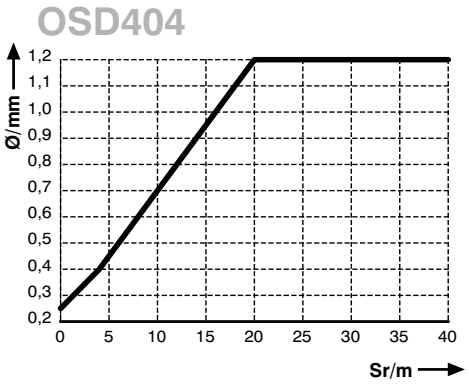
Ctrl. Panel



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

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	

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

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

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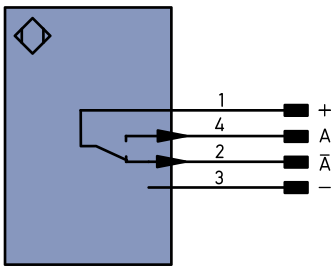

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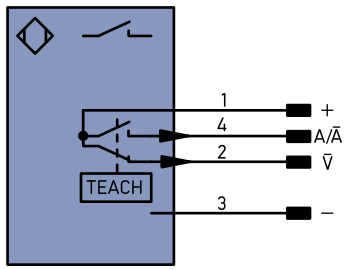

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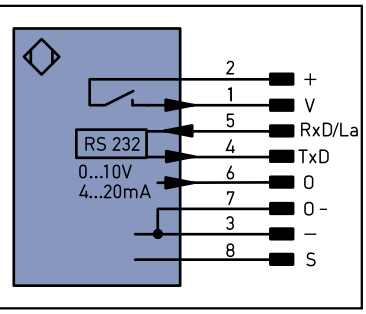

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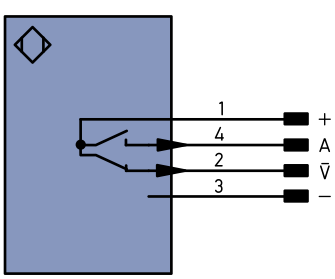

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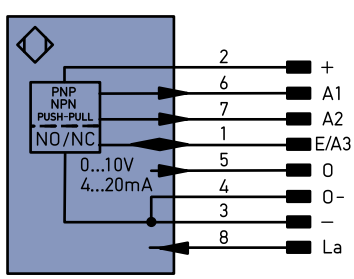

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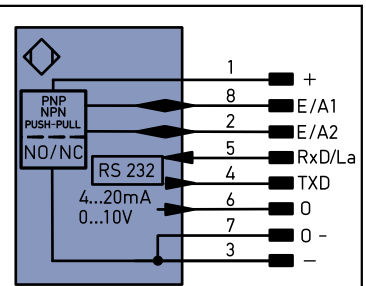

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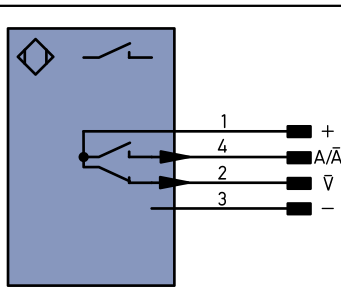

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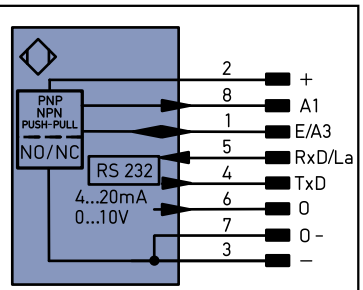

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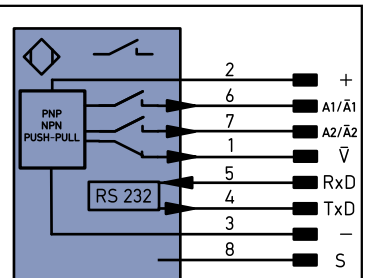
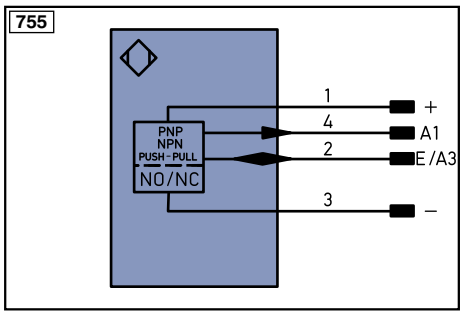
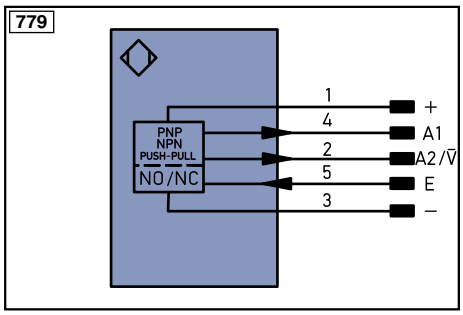
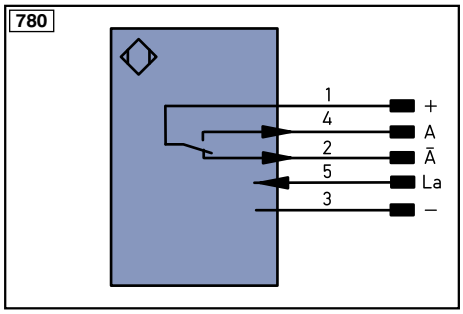
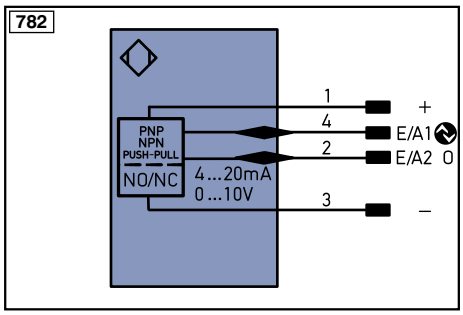
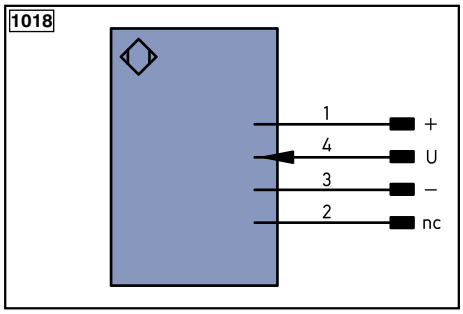



755
PNP
NPN
PUSH-PULL
NO/NC
1
4
2
3
+
A1
E/A3
–


779
PNP
NPN
PUSH-PULL
NO/NC
1
4
2
5
3
+
A1
A2/V̄
E
–


780
1
4
2
5
3
+
A
Ā
La
–


782
PNP
NPN
PUSH-PULL
NO/NC
4...20mA
0...10V
1
4
2
3
+
E/A1
E/A2
0
–


1018
1
4
3
2
+
U
–
nc

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alphabetical