Baumer
Passion for Sensors

Photoelectric sensors.

Reliable object detection and distance measurement even on challenging surfaces

Partnership.
Precise.
Pioneering.

Visibly better: Baumer sensors.

The Baumer Group is leading at international level in the development and production of sensors, shaft encoders, measuring instruments as well as components for automatic image processing. As an owner-managed family business, we employ about 2600 workers worldwide in 38 subsidiaries and 19 countries. With marked customer orientation, consistently high quality and vast innovation capability, Baumer develops specific solutions for many industries and applications worldwide.

Our standards – your benefits.

- Passion coupled with expertise – both have made us a sensor pioneer and technology leader
- Our range of services is hard to beat – we have the right product, developed by our own team, for every task
- Inspiring through innovation – a challenge Baumer employees take on every day
- Reliability, precision and quality – our customers' requirements are what drives us
- Partnership from the start – together with our customers we develop suitable solutions
- Always a step ahead – thanks to our production depth, our flexibility and our delivery reliability
- Available worldwide – Baumer is Baumer everywhere

Optical sensors – keeping a sharp eye on your plant automation

Not all light barriers and laser distance sensors are the same. With its comprehensive knowledge of the market and extremely high levels of technological expertise in the field of optoelectronic sensors, Baumer stands for products that offer more:

- Exceptional performance in extremely compact designs.
- Detection with high repeat accuracy even for difficult surfaces, colors or lighting conditions
- Robust products for every environmental condition
- Digital intelligence for optimum application solutions, reduced control complexity, smooth data transfer and more efficient plant maintenance.

Optical sensors from Baumer at a glance

- The right light source - LED, infrared, Baumer PinPoint and excellent laser sensors
- All functional principles - from through beam sensors to *SmartReflect*® light barriers with no reflectors
- The most reliable object detection and extremely precise distance measurement
- Sector-specific factory automation for robotics, assembly and handling, or packaging
- Ranges of up to 60 meters
- Plastic or stainless steel housing in washdown and hygienic designs
- Simple and adaptable setting, programming and installation for your application

Learn more.
Downloadable data sheets as well as further information about our products is available at:
www.baumer.com/photoelectric

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Smart profile sensors *PosCon*®

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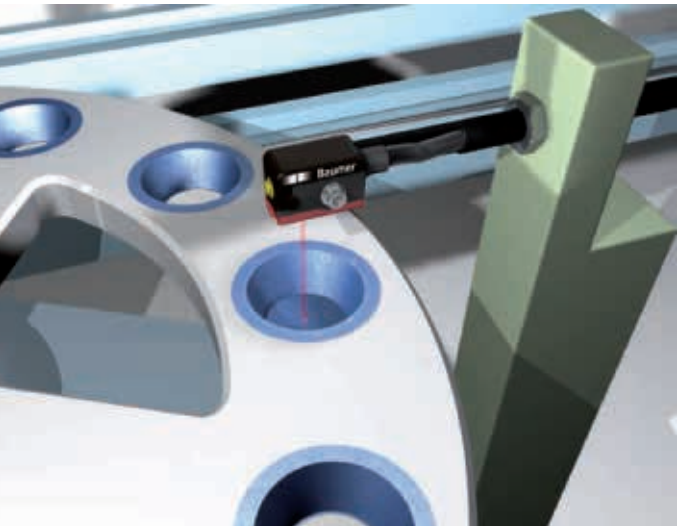
Smart & Small –
High performance, extremely compact designs

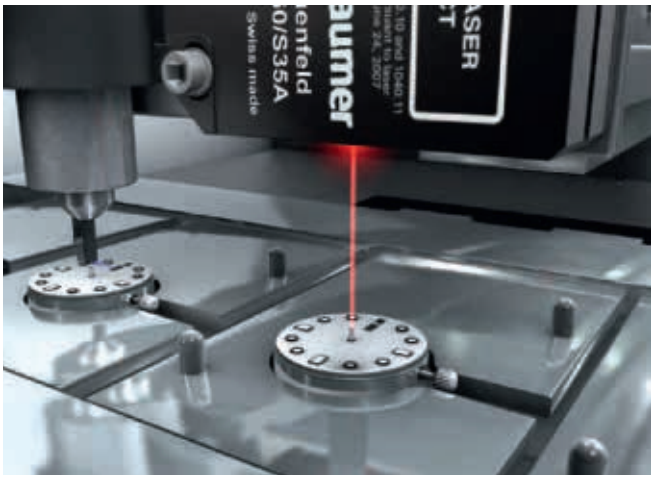
Optical miniature sensors

- Extensive miniature sensor portfolio for applications where space is at an absolute premium
- High performance in extremely cramped spaces from 4 mm with integral evaluation electronics with a range of up to 8 m
- All sensors, even the smallest, can be easily and accurately adjusted to the specific application requirements
- Sensors with beam diameters of up to 0.1 mm can detect the smallest objects or identify parts with the utmost precision regardless of color or objects in the background



Leading the global market

- FHDK 04: smallest sensor on the market with real background suppression
- FNxK 07: Smallest line of sensors with an adjustable switching distance
- OHDK 10: laser sensors with background suppression and adjustable sensing distance
- FxDM 08: Miniature sensors for profiled guideways



Distance measuring miniature sensors

- Extremely small laser triangulation distance sensor with integral electronics
- Teachable measuring range of up to 550 mm
- Point laser for extremely small objects or line laser for coarse surfaces
- Highspeed measurements thanks to high measurement rates of 1 kHz

Fiber optic sensors and fiber optics

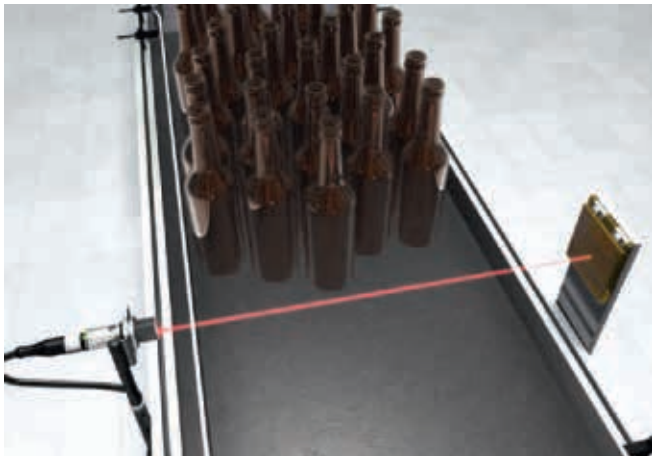
- Detect extremely small objects in narrow and highly inaccessible spaces
- Very small, lightweight sensors for robotics
- Broad range of plastic or glass fiber optics in cubical or cylindrical designs
- Fiber optic sensors in a range of designs and sizes for greater flexibility, wherever they are mounted

Precise control of fast processes and detection of very small objects

Laser light barriers and light sensors

O300 miniature laser sensors with added value

- Precision triggering due to very low jitter of <22 us
- Safe laser class 1
- Reliable detection of irregular or small objects due to line or point beam geometry
- High repeat accuracy
- IO-Link – Industrie 4.0 and IIoT ready



Cylindrical M18 laser sensors

- Rugged M18 metal housing
- Range of up to 55 m

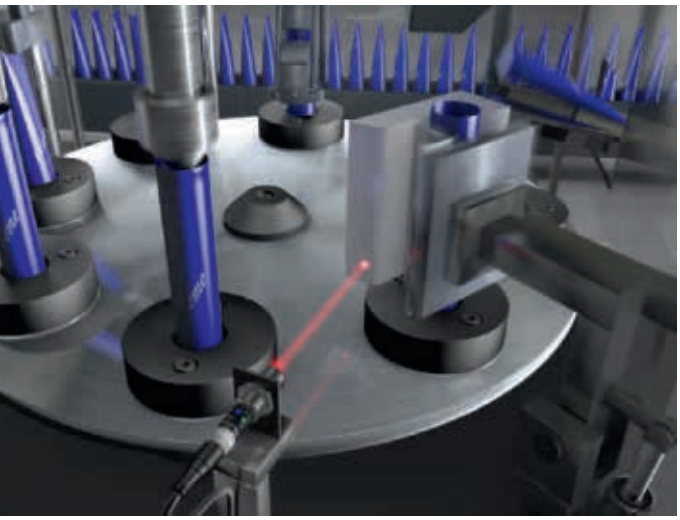
- Extremely high system performance due to very short response times of < 0.1 ms provides rapid, high-precision processing. 0.1 mm laser beam detects extremely small components and differences in position
- Increased product and process quality due to precise detection of small objects from a safe distance and irrespective of their exact position, e.g. on the conveyor belt
- Complete design freedom due to availability in every configuration

Laser differential sensors

- Detect extremely small objects < 0.2 mm
- Tolerance analysis
- Comparison of object sizes and positions
- Stage and edge detection
- High insensitivity to color

Light barriers without reflectors

SmartReflect®



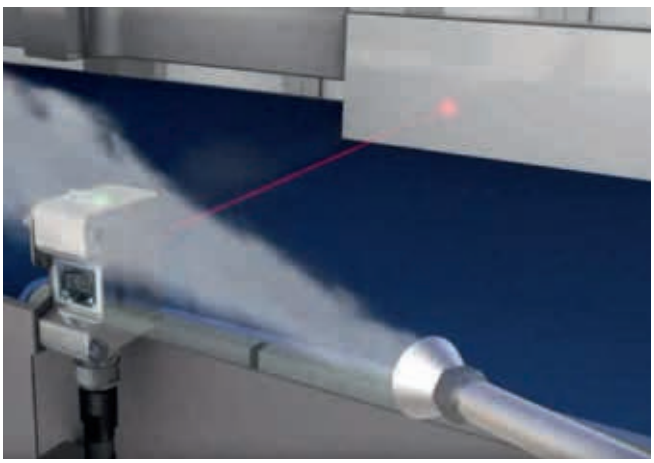
Cylindrical M18 sensors

- Rugged M18 metal housing
- Baumer PinPoint LED
- Easy, uncomplicated setup with qTeach
- Range of up to 300 mm

- Extremely high plant availability and process security: Highly reliable object detection thanks to the barrier principle and removal of the reflector as a potential source of errors
- Reduced operating costs: Quick installation as no reflector to fit No need to replace reflectors due to wear
- Increased productivity due to range of up to 1.9 m or 1 m for transparent objects, and short response times of <0.25 ms Quick format change, easy sensor replacement and access to additional information via IO-Link

Transparent detection without reflectors

- Reliable detection of bowls, PET bottles and foils
- Short response time of < 0.25 ms
- IO link – Industrie 4.0 and IIoT ready
- Range of up to 1000 mm



Stainless steel sensors for demanding environments

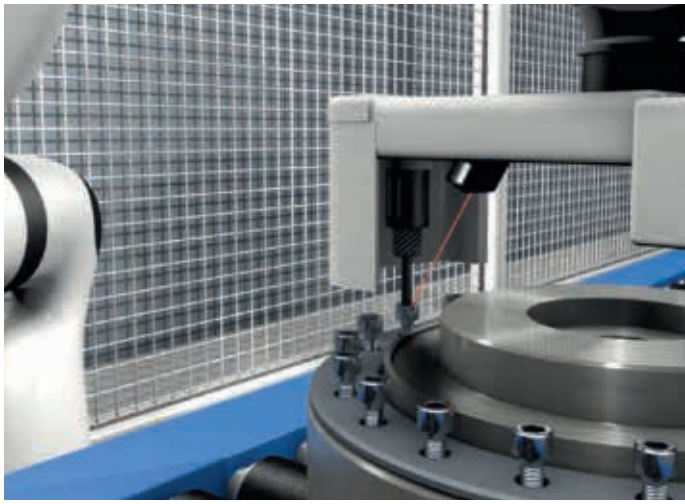
- Robust stainless steel housing
- EHEDG-certified, FDA-compliant, Ecolab-tested
- IP 69K and Ecolab-tested
- Long-term seal thanks to proTect+
- Range of up to 1000 mm

Measure distance, spacing and position even on challenging surfaces

Optical distance sensors

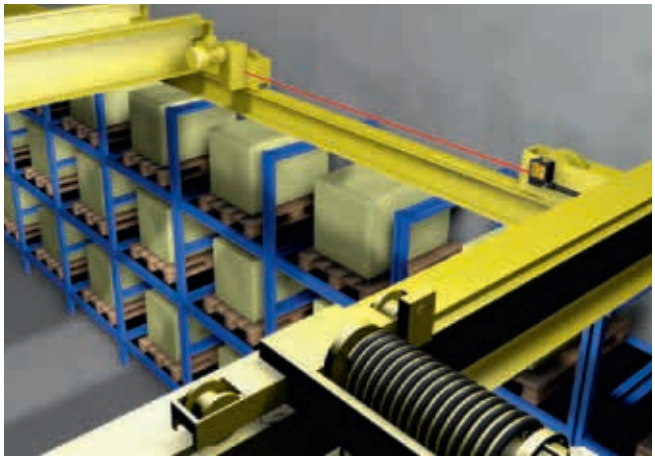
Miniature sensors

- Extremely small housing with integral microcontroller
- Teachable measuring range of up to 550 mm
- Point laser for extremely small objects or line laser for coarse surfaces
- Safety due to laser class 1 sensors



High Performance

- Rugged M18 metal housing
- Baumer PinPoint LED
- Easy, uncomplicated setup with qTeach
- Range of up to 300 mm



Long ranges

- Robust stainless steel housing
- EHEDG-certified, FDA-compliant, Ecolab-tested
- IP 69K and Ecolab-tested
- Long-term seal thanks to proTect+
- Range of up to 1000 mm

- Reliable and efficient processes thanks to a range of beam shapes, accurate measurement to the sub-micrometer scale and long ranges
- Durable, robust solutions thanks to rugged housings made of stainless steel, metal and plastic for different applications
- Simple operation and integration Fast, economical initial start-up thanks to Plug & Play
- Factory-calibrated sensors with measuring values displayed in millimeters

One function – one sensor

Smart profile sensors – *PosCon*®

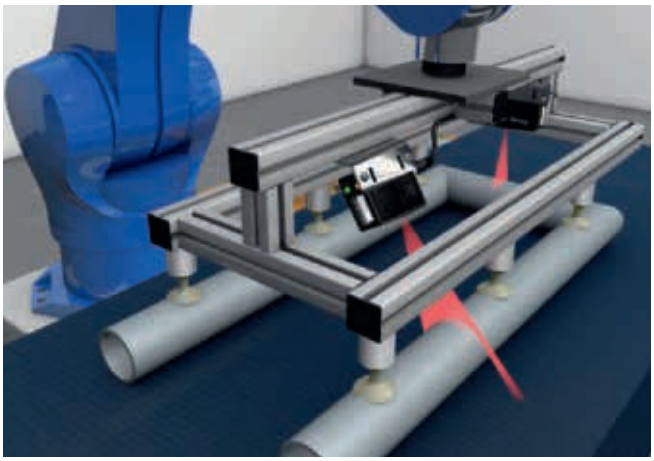
- Compact measuring devices with pre-configured functions for efficient object measurement
- Smart measurement of object heights, edge positions and diameters
- Quick installation with no reflectors
- Easy initial start-up with no external software (plug & measure)
- High accuracy and ambient light immunity

Easy width measurement – *PosCon* OXE7

- Measurement of object edges, widths and gaps irrespective of out-of-roundness
- Resolution up to 20 µm and measurement rates up to 550
- Reliable measurement even with out-of-round objects
- Adaptable sensor mounting up to ± 30°

Clever height measurement – *PosCon* OXH7

- Calibrated height measurement, even in rapid processes without precise positioning of the target objects
- High measuring accuracy up to 2 µm even with varying ambient light conditions
- Simple solution for critical check-&-sort applications



Measuring round objects – *PosCon* OXC7

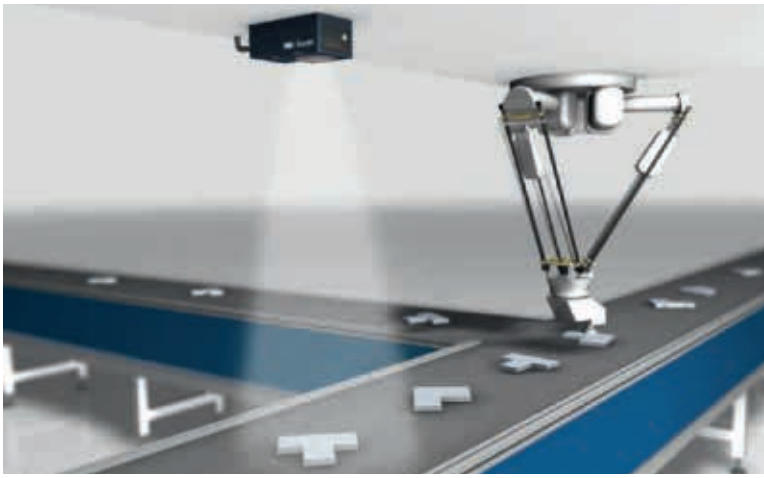
- Smart measurement of circle centers, diameters, top and external positions
- Reliable measurement for accurate positioning tasks and as reference points for inspection tasks
- Simple, adaptable mounting up to ± 30° with no reflectors

Keeping an eye on your quality

Vision sensors for automation technology – *VeriSens*®

Highlights:

- Simultaneous, image-based quality control of multiple features with a single sensor
- Easy configuration in a few minutes
- Versatile connection options including industrial Ethernet, digital I/Os
- Configurable web interface with *MultiViewer* function
- High process security due to contour-based image processing
- Image-based reading and evaluation



XC series: Maximum functionality and versatility

- Check all features (up to 22) with one device, including reading code and text
- Automatic part alignment with FEXLoc®
- C-mount connection for interchangeable lens, lens protection due to modular Tube System (IP 67)
- Fully-integrated VeriFlash® flash controller

XF series: Extended functionality for complex inspection tasks

- Check all available features (up to 22) with one device, including reading code and text
- Automatic part alignment with FEXLoc®
- Integral lighting and lens
- Variants with IP 69K stainless steel housing in washdown design

ID series: Code reader and text reader

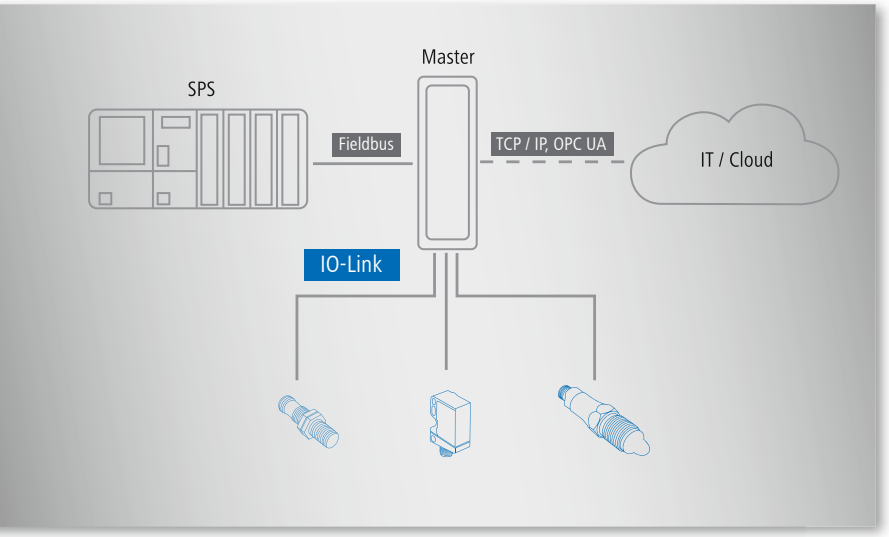
- Image-based checking of 1D/2D codes and plain text (OCR/OCV)
- Simple setup (no font training)
- Integral illumination and lens
- Check static and variable information

Digitalization starts with the sensor

IO-Link

Sensors accurately capture all sorts of measured values. Valuable additional information is produced by processing the measured values in the sensor. These can be processed through standardized digital communications interfaces such as IO-Link to make significant improvements in business processes.

Simple integration and maximum flexibility with IO-Link



IO-Link is an international standardized IO technology in accordance with IEC 61131-9. It allows digital, bidirectional point-to-point communication irrespective of the manufacturer. Sensors are connected to the IO-Link Master using standard 3-core plug-in cables. IO-Link is available for a wide range of sensor technologies and can also be integrated into small miniature sensors.

The IO-Link Master bundles several sensors together and provides connection to the control via the relevant fieldbus system. An Ethernet-based connection (using OPC UA) from the master unit also provides direct communication between the sensor and IT systems. The maximum cable length between the sensor and the master unit is 20 m. However, significantly longer connections between the sensor and the control can be achieved by connecting to a fieldbus system via a fieldmaster system. This provides maximum flexibility for the connection solution.

Additional data thanks to digital sensor connections

Data are the fundamental building blocks of process and product optimization. Access can be gained to valuable, extra data by using IO-Link.

Cyclical data are transmitted in real time. They service the process control in the automation system and can also be transmitted to other IT systems via IO-Link.

Non-cyclical data allow sensors (IO devices) to be configure d; analytical and identification data can also be read as required.

IO-Link

Process data
Measuring distances or switching conditions can be digitally processed and analyzed

Cyclical data

Analytical data
Data such as signal quality are recorded

Non-cyclical data

Identification
Data for identifying the sensor such as type of sensor, serial number, application

Cyclical data

Parameterization
Data for sensor parameterization can be stored and thus quickly multiplied

Non-cyclical data

The benefits of digitized connections

Cost-effective & secure connection

- Connection between the sensor and the IO-Link master unit via 3-core standard cabling
- International communications standard, irrespective of manufacturer
- Digital signals are transmitted to the control without losses or conversion costs

Simple & secure usability

- Intuitive sensor setting and functional monitoring via smart phone, tablet or PC
- Direct integration into engineering tools
- Local parameterization lock option

Extended setting options

- IO-Link offers additional functionalities and settings such as free selection of switching points, adjustable measuring ranges and filter functions, and much more. This allows the sensor to be configured accurately and reliably to suit the application.

Quick sensor replacement

- Automatic parameter transfer when replacing sensors

Increased flexibility

- Simple reparameterization when changing format or recipe during continuous production provides high flexibility with extremely high machine utilization

Additional data

- Transparency thanks to process data which can also be easily analyzed in IT systems
- Analytical data for monitoring the plant and sensor conditions, e.g. for preventative maintenance
- Identification and parameter data can also be digitally analyzed directly

OPC UA, Modbus TCP and integral webserver

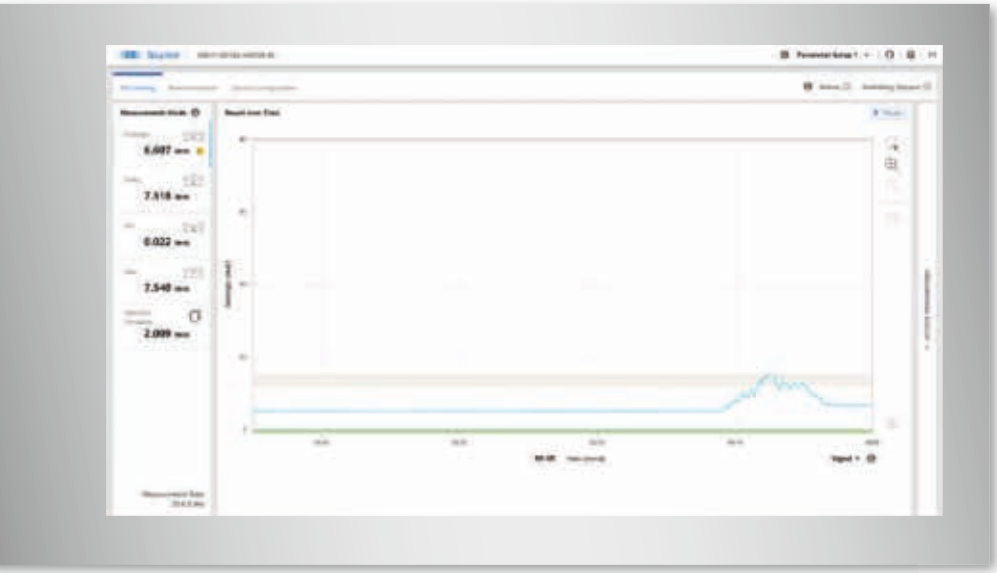
Simple integration into existing network structures - Ethernet interface, Modbus TCP IP and OPC UA

Baumer uses Ethernet and other technology in its optical measuring systems for data transfer and network connectivity. This provides quick, simple and, thanks to standard components, economical integration of sensors into existing industrial networks. Rapid, complete and error-free transmission of measured data is a further benefit. The measured data themselves and other additional data can be read and analyzed irrespective of their location. The communication protocols which are currently available are Modbus TCP/IP and OPC UA.

The MODBUS protocol is a very lean protocol which allows process data to be exchanged openly and supports rapid and efficient communication in industrial networks.

OPC UA (Open Platform Communication Unified Architecture) is a modern communications standard for use by any manufacturer which allows sensor data to be exchanged beyond the automation system. This facilitates, for example, the use of information from different systems without significant programming effort and thus optimization of processes.

Tailor-made measurement solutions - The Baumer web interface for simple configuration and operation



Simple solutions even for complex measuring tasks
Both simple and complex measuring tasks can be configured and validated quickly and easily via the intuitive Baumer web interface. For complex measurement tasks, extended functionalities, such as the output of the height profile and the camera image, are available for assessing the measurement. The measurements can be recorded and analyzed over time.

Storage of parameter sets
Up to three parameter settings can be stored in the sensor. The settings can be displayed quickly and easily.

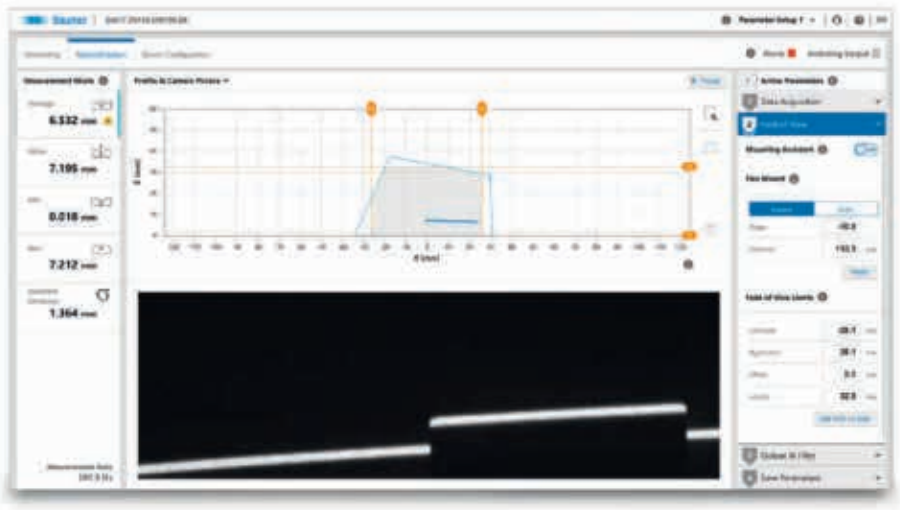
Process optimization by live visualization and in-depth diagnosis of measured values

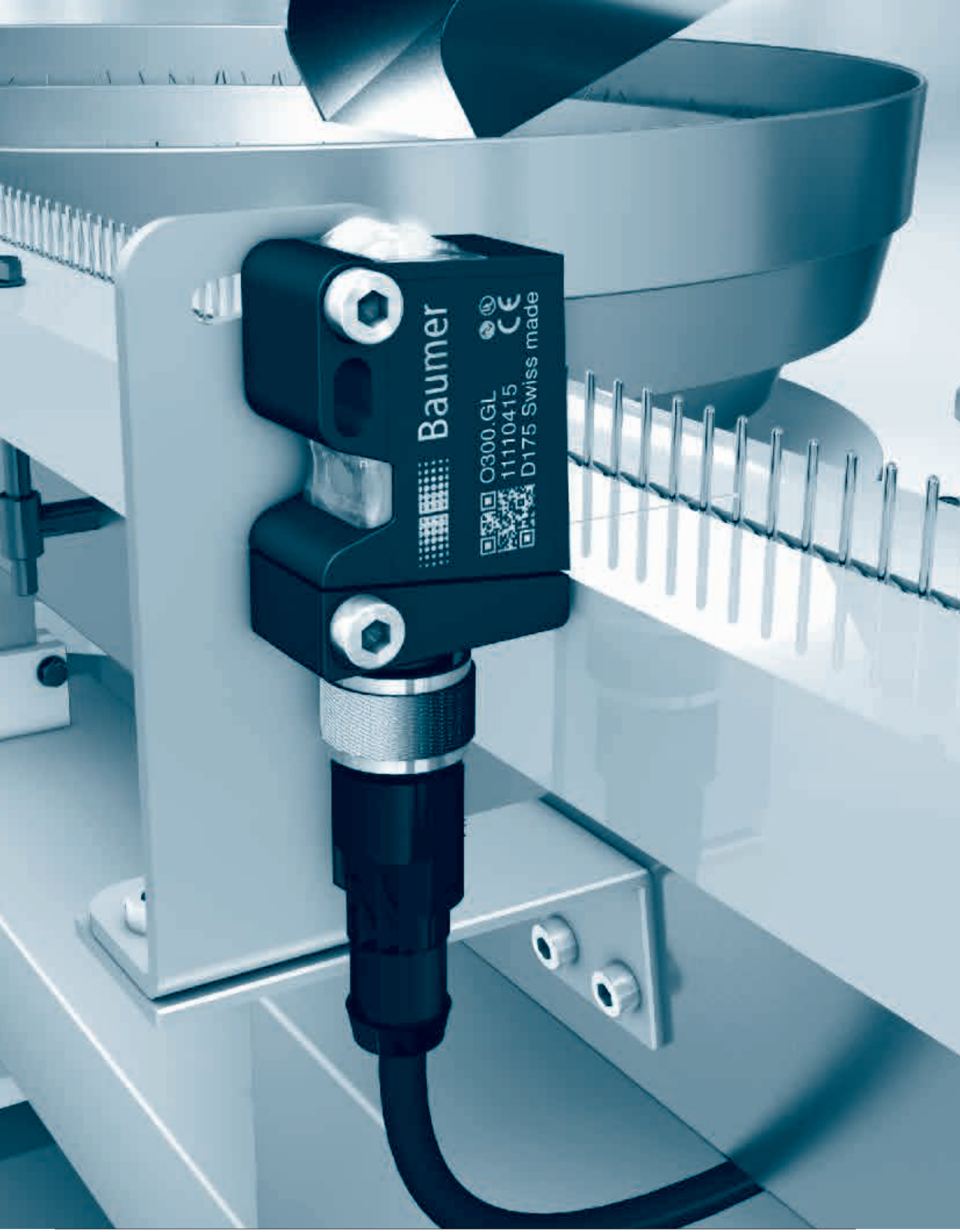
Live visualization and analysis of measured values

The delivered measured values for the selected mode can be monitored and controlled via the web interface. Invalid measured values are displayed immediately. The measured values can be frozen or exported for a more detailed analysis.

In-depth diagnosis

The unfiltered camera image from the sensor can also be used for a more precise diagnosis of the measuring situation. For example, unwanted reflections can be detected and the alignment can be optimized. The camera image can also be sent directly as a screenshot to Baumer, where expert advice is quickly available.




Baumer
O300.GL
11110415
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Light barriers and light sensors

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red light LED version

product family	FNCK 07	FNDK 07	O300.SP	O300.SP	FNDK 14	FNDK 14	O500.SP
	MINOS	*MINOS*					
	subminiature	subminiature	miniature	miniature	standard	standard	standard
version			standard object detection	line beam	standard object detection	standard object detection	standard object detection
width / diameter	8 mm	8 mm	12,9 mm	12,9 mm	14,8 mm	14,8 mm	18 mm
response time / release time	< 0,5 ms	< 0,5 ms	< 0,49 ms	< 1,5 ms	< 0,5 ms	< 1,8 ms	< 0,49 ms
light source	pulsed red LED	pulsed red LED	pulsed PinPoint LED	pulsed PinPoint LED	pulsed red LED	pulsed red LED	pulsed PinPoint LED
sensing distance adjustment	Teach-in	Teach-in	qTeach / external Teach-in and IO-Link qTeach qTeach / 1-Step Teach-in	Teach-in and IO-Link	Teach-in	Teach-in and IO-Link	qTeach / external Teach-in and IO-Link qTeach qTeach / 1-Step Teach-in
output circuit	NPN PNP	NPN PNP	push-pull NPN PNP	push-pull	PNP	push-pull	push-pull NPN PNP
connection types	cable flylead connector	cable flylead connector	cable connector flylead connector	cable connector	connector	cable connector	cable connector flylead connector
housing material	plastic	plastic	plastic	plastic	plastic	plastic	plastic
			IO-Link	IO-Link		IO-Link	IO-Link
protection class	IP 65	IP 65	IP 67	IP 67	IP 67	IP 67	IP 67
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OR18.SP
standard
standard object detection
18 mm
< 0,49 ms
pulsed PinPoint LED
qTeach / external qTeach
push-pull NPN PNP
connector
metal
IP 67
44

laser version

product family	O300.SL	O300.SL	O300W.SL	O300H.SL	ONDK 25
	miniature	miniature	miniature	miniature	standard
version	standard object detection	line beam	standard object detection	standard object detection	standard object detection
width / diameter	12,9 mm	12,9 mm	16,5 mm	16,5 mm	23,4 mm
response time / release time	< 0,25 ms	< 1,5 ms	< 0,25 ms	< 0,25 ms	< 10 ms
light source	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
sensing distance adjustment	Teach-in and IO-Link qTeach	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in
output circuit	push-pull NPN PNP	push-pull	push-pull	push-pull	push-pull
connection types	cable connector	cable connector	connector	cable flylead connector	cable connector
housing material	plastic	plastic	metal	metal	plastic
	IO-Link	IO-Link	IO-Link	IO-Link	
protection class	IP 67	IP 67	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 67
page	**46**	**48**	**50**	**52**	**54**

transparency detection

product family	O300.SP.T	O300W.SP.T	O300H.SP.T	FNDK 14	FNDR 14	FNDH 14	O500.SP.T
version	transparency object detection	transparency object detection	transparency object detection	Tray and bottle detection Foil detection	Tray and bottle detection Foil detection	Tray and bottle detection Foil detection	transparency object detection
width / diameter	12,9 mm	16,5 mm	16,5 mm	14,8 mm	19,6 mm	19,6 mm	18 mm
response time / release time	< 0,25 ms	< 0,25 ms	< 0,25 ms	< 1,8 ms	< 1,8 ms	< 1,8 ms	< 0,25 ms
sensing distance adjustment	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in Teach-in and IO-Link	Teach-in Teach-in and IO-Link	Teach-in and IO-Link
output circuit	push-pull	push-pull	push-pull	push-pull	push-pull	push-pull	push-pull
connection types	cable connector	connector	cable flylead connector	cable connector	connector	cable flylead connector	cable connector
housing material	plastic	metal	metal	plastic	metal	metal	plastic
	IO-Link	IO-Link	IO-Link	IO-Link	IO-Link	IO-Link	IO-Link
protection class	IP 67	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 67	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 67
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O500W.SP.T	O500H.SP.T
transparency object detection	transparency object detection
20,2 mm	20,2 mm
< 0,25 ms	< 0,25 ms
Teach-in and IO-Link	Teach-in and IO-Link
push-pull	push-pull
connector	cable flylead connector
metal	metal
IO-Link	IO-Link
IP 68/69K & proTect+	IP 68/69K & proTect+
70	72

stainless steel sensors in washdown or hygienic design

product family	O300W.SP	O300H.SP	FNDR 14	FNDH 14	O500W.SP	O500W.SP (Retro Serie 14)	O500H.SP
	miniature	miniature	standard	standard	standard	standard	standard
version	standard object detection	standard object detection	standard object detection	standard object detection	standard object detection	standard object detection	standard object detection
width / diameter	16,5 mm	16,5 mm	19,6 mm	19,6 mm	20,2 mm	20,2 mm	20,2 mm
response time / release time	< 0,49 ms	< 0,49 ms	< 1,8 ms	< 1,8 ms	< 0,49 ms	< 0,49 ms	< 0,49 ms
light source	pulsed PinPoint LED	pulsed PinPoint LED	pulsed point source LED	pulsed point source LED	pulsed PinPoint LED	pulsed PinPoint LED	pulsed PinPoint LED
sensing distance adjustment	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in Teach-in and IO-Link	Teach-in Teach-in and IO-Link	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in and IO-Link
output circuit	push-pull	push-pull	push-pull	push-pull	push-pull	push-pull	push-pull
connection types	connector	cable flylead connector	connector	cable flylead connector	connector	connector	cable flylead connector
housing material	metal	metal	metal	metal	metal	metal	metal
	IO-Link	IO-Link	IO-Link	IO-Link	IO-Link	IO-Link	IO-Link
protection class	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+
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General information

With SmartReflect®, Baumer has reinvented the optical light barrier: The reflector as the weak point has been eliminated, and highly reliable object detection is still guaranteed. This reduces your costs tremendously. Since every interruption of the light beam by any object is detected thanks to the SmartReflect® principle, the SmartReflect® light barrier can reliably detect objects irrespective of their shape, color or surface finish.

Applications

- Presence check of object in processes irrespective of the precise position of the object
- Extremely rapid and precise position detection, even for extremely small objects
- Application in robotics and electronic components
- Automated and configurable object detection, e.g. in format adjustments
- Capture objects, even at large distances
- Reliable counting of objects, even at extremely small distances
- Extremely accurate referencing of movements
- Recognition of different object materials, surfaces and colors, even on transparent, uneven, pitted or rough surfaces
- Monitoring of gradual changes in production processes and automated testing

Characteristics and advantages

Extremely high unit availability and process security

- Highly reliable object detection thanks to the sensor principle
- Elimination of the reflector as a potential source of error
- No function impairment from dirt accumulation
- Available in robust washdown or hygienic design

Reduction of operating costs

- Quick installation as no reflector to fit
- No need to replace reflectors due to wear
- Expensive reflector cleaning not required

Increase in productivity

- Range up to 1.9 m or 1 m for transparent objects
- High machine performance thanks to short response times of < 0.25 ms
- Quick change of format, easy sensor replacement and access to additional information via IO link

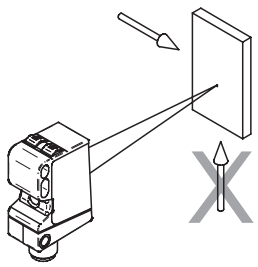
Technology and operation

Contrary to diffuse or through beam sensors, SmartReflect light barriers feature a closed light beam which is set up between the sensor and machine. The sensor switches when an object interrupts the light beam. The only requirement is the presence of a defined background, e.g. a machine part, within the sensing range of the sensor, which closes the light beam.

Mounting and adjustment

The SmartReflect light barrier has to be aligned with a machine part within its sensing range. This machine part is then set using the teach-in.

It should be noted that there is a dead band directly in front of the machine part that is set automatically during teach-in. The dead band is determined by the specification of the sensing range (Sa) as a percentage (%)of the background position (Sde).



It should be noted that an object to be detected must approach the active range of the sensor from the side in order to avoid switching errors.

Sde = 10 ... 45 mm

- compact housing with cable rear side
- sensing distance adjustable via Teach-in
- suppression of mutual interference

general data	
type	light barrier
light source	pulsed red LED
background position Sde	17 ... 45 mm
scanning range Sa	82% Sde
light indicator	LED green
output indicator	LED yellow
sensing distance adjustment	Teach-in
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	8 mm
height / length	16,2 mm
depth	10,8 mm
type	rectangular
housing material	plastic (PMMA, MABS, PA)
front (optics)	PMMA
ambient conditions	
operating temperature	-20 ... +50 °C
protection class	IP 65

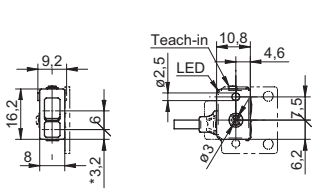
connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

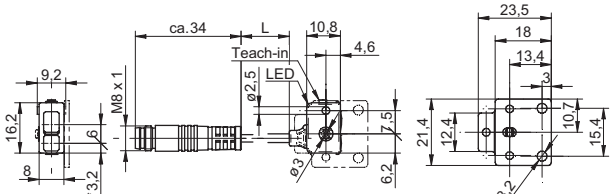
Accessories	
10150844	Minofix mounting 07
for details: see accessories section	

order reference	connection types	output circuit
FNCK 07N6910	cable rear side, 2 m	NPN
FNCK 07N6910/KS35A	flylead connector M8 4 pin, L=200 mm	NPN
FNCK 07P6910	cable rear side, 2 m	PNP
FNCK 07P6910/KS35A	flylead connector M8 4 pin, L=200 mm	PNP

dimension drawings



* emitter axis



* emitter axis cable length L = 200 mm

Sde = 10 ... 45 mm

- compact housing with cable bottom side
- sensing distance adjustable via Teach-in
- suppression of mutual interference

general data	
type	light barrier
light source	pulsed red LED
background position Sde	17 ... 45 mm
scanning range Sa	82% Sde
light indicator	LED green
output indicator	LED yellow
sensing distance adjustment	Teach-in
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	8 mm
height / length	16,2 mm
depth	10,8 mm
type	rectangular
housing material	plastic (PMMA, MABS, PA)
front (optics)	PMMA
ambient conditions	
operating temperature	-20 ... +50 °C
protection class	IP 65

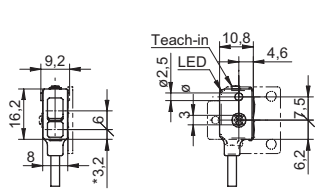
connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

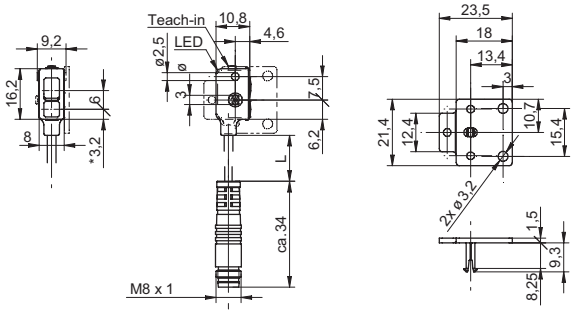
Accessories	
10150844	Minofix mounting 07
for details: see accessories section	

order reference	connection types	output circuit
FNDK 07N6910	cable bottom side, 2 m	NPN
FNDK 07N6910/KS35A	flylead connector M8 4 pin, L=200 mm	NPN
FNDK 07P6910	cable bottom side, 2 m	PNP
FNDK 07P6910/KS35A	flylead connector M8 4 pin, L=200 mm	PNP

dimension drawings



* emitter axis



* emitter axis cable length L = 200 mm

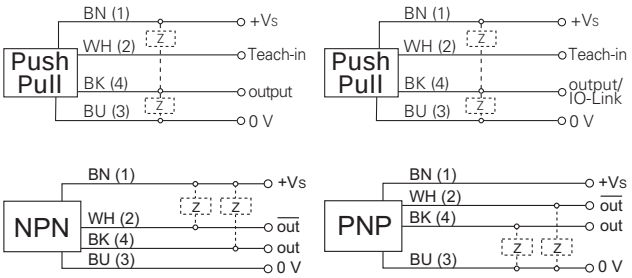
Sde = 30 ... 300 mm

IO-Link

- One inch class
- PinPoint LED
- IO-Link

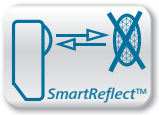
general data	
type	light barrier
version	standard object detection
light source	pulsed PinPoint LED
background position Sde	30 ... 300 mm
scanning range Sa	90% ... 85% Sde
power on indication	LED green
light indicator	LED yellow
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

connection diagrams



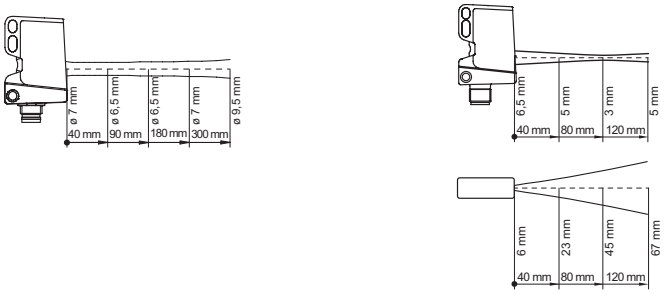
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

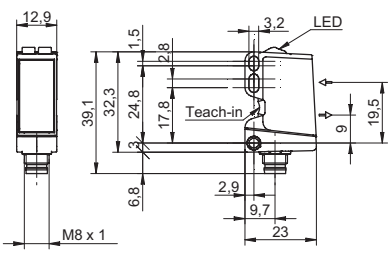


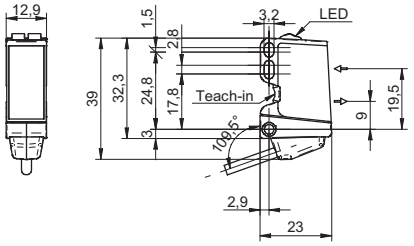
order reference	connection types	output circuit	sensing distance adjustment
O300.SP-11120122	cable 4 pin, 2 m	push-pull	qTeach / external
O300.SP-11110450	connector M8 4 pin	push-pull	qTeach / external
O300.SP-11140097	flylead connector M8, L=200 mm	push-pull	qTeach / external
O300.SP-11139109	flylead connector M12, L=200 mm	push-pull	qTeach / external
O300.SP-11125077	cable 4 pin, 2 m	push-pull	Teach-in and IO-Link
O300.SP-11125057	connector M8 4 pin	push-pull	Teach-in and IO-Link
O300.SP-11120126	cable 4 pin, 2 m	NPN complementary	qTeach
O300.SP-11135851	cable 4 pin, 2 m	NPN complementary	qTeach / 1-Step Teach-in
O300.SP-11135852	connector M8 4 pin	NPN complementary	qTeach / 1-Step Teach-in
O300.SP-11110453	connector M8 4 pin	NPN complementary	qTeach
O300.SP-11120123	cable 4 pin, 2 m	PNP complementary	qTeach
O300.SP-11135854	cable 4 pin, 2 m	PNP complementary	qTeach / 1-Step Teach-in
O300.SP-11135855	connector M8 4 pin	PNP complementary	qTeach / 1-Step Teach-in
O300.SP-11110451	connector M8 4 pin	PNP complementary	qTeach

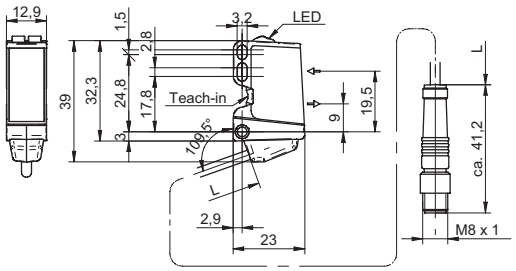
beam characteristics (typically)

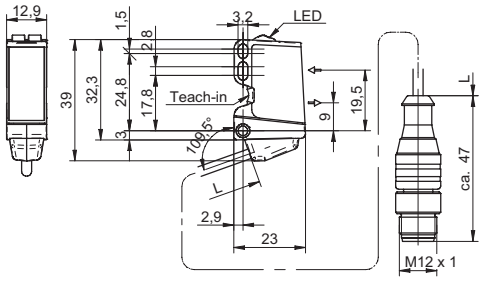


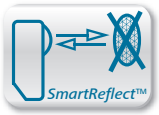
dimension drawings










SmartReflect™

Sde = 30 ... 120 mm

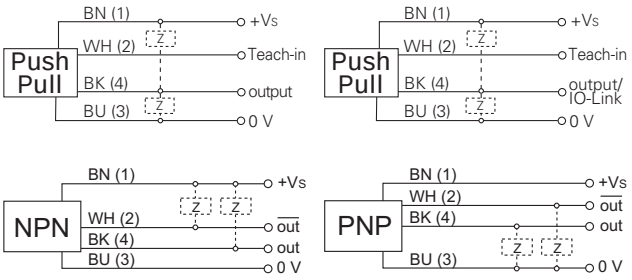
IO-Link

- One inch class
- PinPoint LED
- line 5 x 67 mm

general data	
type	light barrier
version	line beam
light source	pulsed PinPoint LED
background position Sde	30 ... 120 mm
scanning range Sa	90% ... 85% Sde
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
beam type	line
alignment optical axis	< 2°
electrical data	
response time / release time	< 1,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

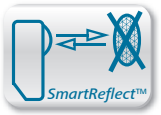
order reference	connection types
O300.SP-11199073	cable 4 pin, 2 m
O300.SP-11199086	connector M8 4 pin

connection diagrams

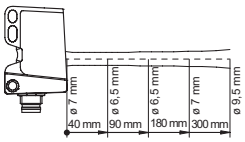


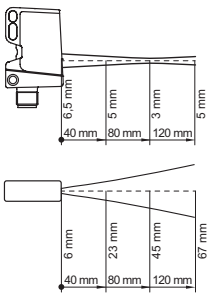
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

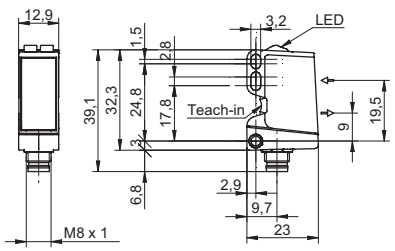


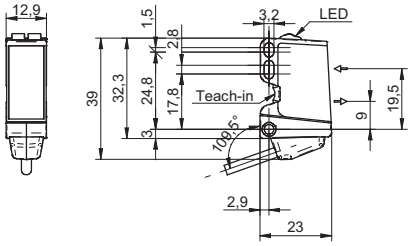
beam characteristics (typically)

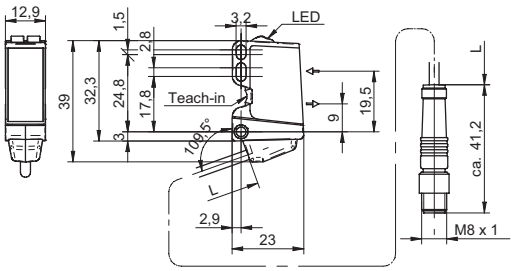


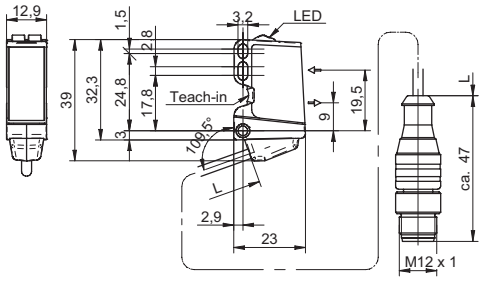


dimension drawings









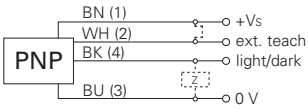
Sde = 55 ... 200 mm

- short response time
- sensing distance adjustable via Teach-in

general data	
type	light barrier
version	standard object detection
light source	pulsed red LED
background position Sde	60 ... 200 mm
scanning range Sa	90% Sde
light indicator	LED green
output indicator	LED yellow
sensing distance adjustment	Teach-in
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	35 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output circuit	PNP
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

order reference	connection types
FNDK 14P6910/S14	connector M12 4 pin
FNDK 14P6910/S35A	connector M8 4 pin

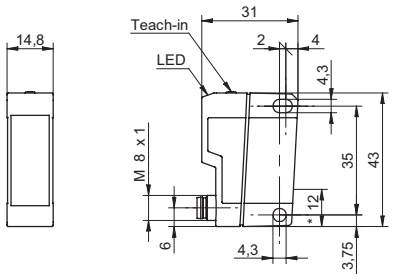
connection diagram



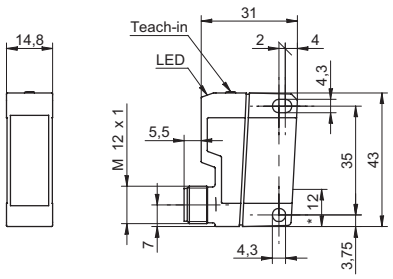
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
for details: see accessories section	

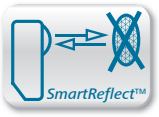
dimension drawings



* emitter axis



* emitter axis



Sde = 50 ... 800 mm

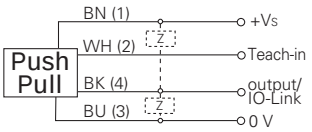
IO-Link

- short response time
- sensing distance adjustable via Teach-in
- IO-Link

general data	
type	light barrier
version	standard object detection
light source	pulsed red LED
background position Sde	50 ... 800 mm on V4A
scanning range Sa	96% Sde
alignment / soiled lens indicator	flashing light indicator
power on indication	LED green
output indicator	LED red
sensing distance adjustment	Teach-in and IO-Link
wave length	660 nm
electrical data	
response time / release time	< 1,8 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	30 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-30 ... +60 °C
protection class	IP 67

order reference	connection types
FNDK 14G6904/IO	cable 4 pin, 2 m
FNDK 14G6904/S14/IO	connector M12 4 pin
FNDK 14G6904/S35A/IO	connector M8 4 pin

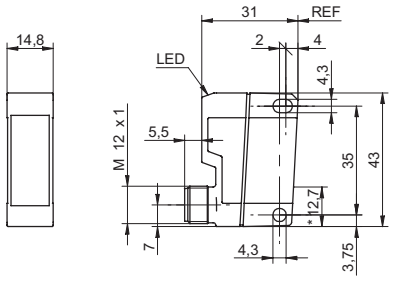
connection diagram



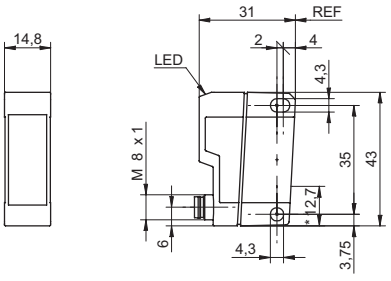
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
for details: see accessories section	

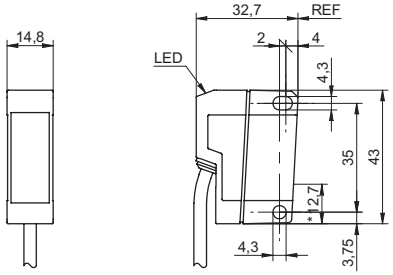
dimension drawings



* emitter axis



* emitter axis



* emitter axis

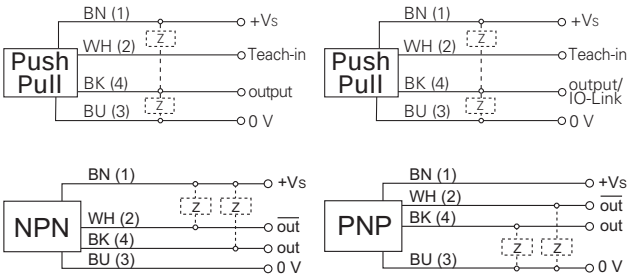
Sde = 60 ... 600 mm

IO-Link

- PinPoint LED
- IO-Link
- qTeach

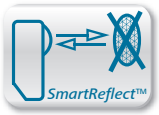
general data	
type	light barrier
version	standard object detection
light source	pulsed PinPoint LED
background position Sde	60 ... 600 mm
scanning range Sa	90% ... 85% Sde
power on indication	LED green
light indicator	LED yellow
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	45 mm
depth	32 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

connection diagrams



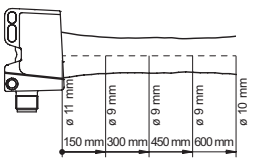
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11099942	Sensofix O500/U500
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
for details: see accessories section	

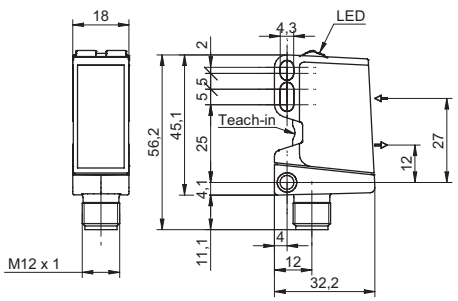


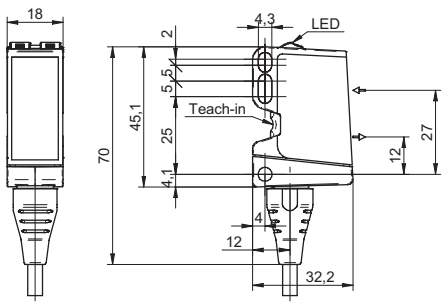
order reference	connection types	output circuit	sensing distance adjustment
O500.SP-11096085	cable 4 pin, 2 m	push-pull	qTeach / external
O500.SP-11096080	connector M12 4 pin	push-pull	qTeach / external
O500.SP-11139106	flylead connector M12, L=200 mm	push-pull	qTeach / external
O500.SP-11125089	cable 4 pin, 2 m	push-pull	Teach-in and IO-Link
O500.SP-11125082	connector M12 4 pin	push-pull	Teach-in and IO-Link
O500.SP-11096088	cable 4 pin, 2 m	NPN complementary	qTeach
O500.SP-11135865	cable 4 pin, 2 m	NPN complementary	qTeach / 1-Step Teach-in
O500.SP-11135866	connector M12 4 pin	NPN complementary	qTeach / 1-Step Teach-in
O500.SP-11096083	connector M12 4 pin	NPN complementary	qTeach
O500.SP-11096086	cable 4 pin, 2 m	PNP complementary	qTeach
O500.SP-11135867	cable 4 pin, 2 m	PNP complementary	qTeach / 1-Step Teach-in
O500.SP-11135869	connector M12 4 pin	PNP complementary	qTeach / 1-Step Teach-in
O500.SP-11096081	connector M12 4 pin	PNP complementary	qTeach

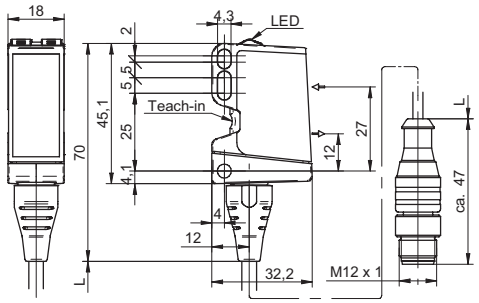
beam characteristic (typically)

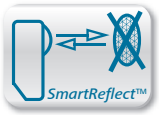


dimension drawings







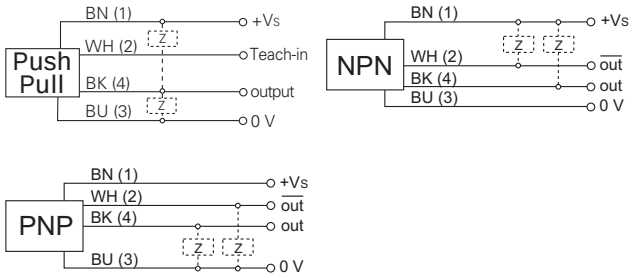

SmartReflect™

Sde = 55 ... 300 mm

- PinPoint LED
- qTeach
- short response time

general data	
type	light barrier
version	standard object detection
light source	pulsed PinPoint LED
background position Sde	55 ... 300 mm
scanning range Sa	90% ... 85% Sde
light indicator	LED green
output indicator	LED yellow
wave length	630 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	65 mm
type	cylindrical threaded
housing material	brass nickel plated
front (optics)	PA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

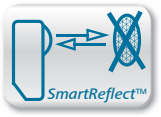
connection diagrams



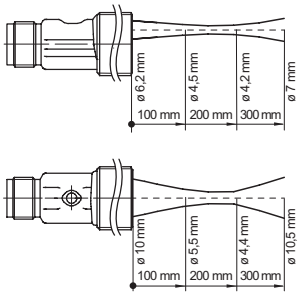
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
for details: see accessories section	

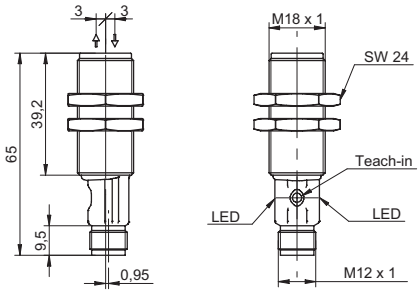
order reference	output circuit	sensing distance adjustment
OR18.SP-11128095	push-pull	qTeach / external
OR18.SP-11129342	NPN complementary	qTeach
OR18.SP-11129340	PNP complementary	qTeach



beam characteristic (typically)



dimension drawing



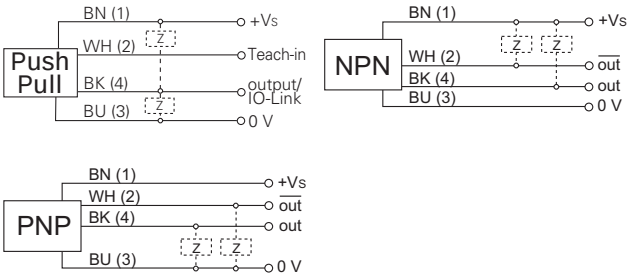
Sde = 30 ... 250 mm

IO-Link

- One inch class
- laser diode
- very small beam diameter

general data	
type	light barrier
version	standard object detection
light source	pulsed red laser diode
background position Sde	30 ... 250 mm
scanning range Sa	90% ... 85% Sde
repeat accuracy	< 0,1 mm at 100 mm
power on indication	LED green
light indicator	LED yellow
laser class	1
distance to focus	400 mm
wave length	656 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,5 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67

connection diagrams



connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

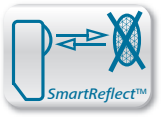
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

laser warning

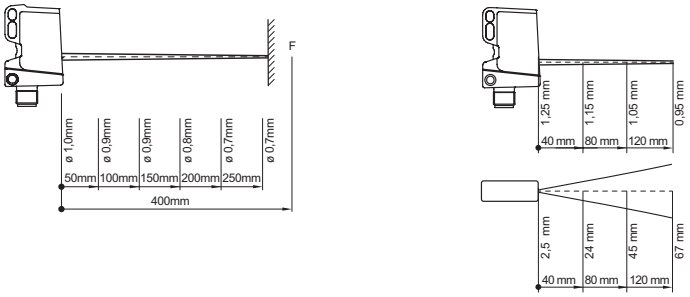
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference	connection types	output circuit	sensing distance adjustment
O300.SL-11176826	cable 4 pin, 2 m	push-pull	Teach-in and IO-Link
O300.SL-11176827	connector M8 4 pin	push-pull	Teach-in and IO-Link
O300.SL-11179003	cable 4 pin, 2 m	NPN complementary	qTeach
O300.SL-11179004	connector M8 4 pin	NPN complementary	qTeach
O300.SL-11179005	cable 4 pin, 2 m	PNP complementary	qTeach
O300.SL-11179006	connector M8 4 pin	PNP complementary	qTeach



beam characteristics (typically)



dimension drawings

Tw = 30 ... 120 mm

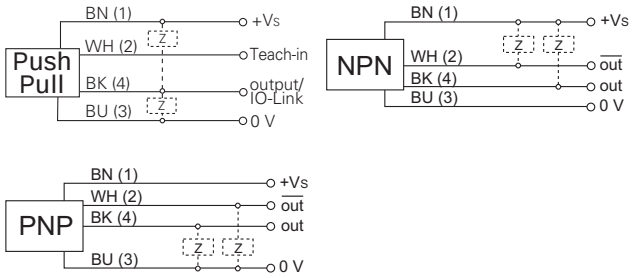
IO-Link

- One inch class
- laser diode
- line 0,95 x 67 mm

general data	
type	light barrier
version	line beam
light source	pulsed red laser diode
background position Sde	30 ... 120 mm
scanning range Sa	90% ... 85% Sde
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
laser class	1
distance to focus	400 mm
wave length	656 nm
suppression of reciprocal influence	yes
beam type	line
alignment optical axis	< 2°
electrical data	
response time / release time	< 1,5 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,5 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67

order reference	connection types
O300.SL-11199074	cable 4 pin, 2 m
O300.SL-11199075	connector M8 4 pin

connection diagrams



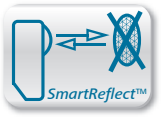
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

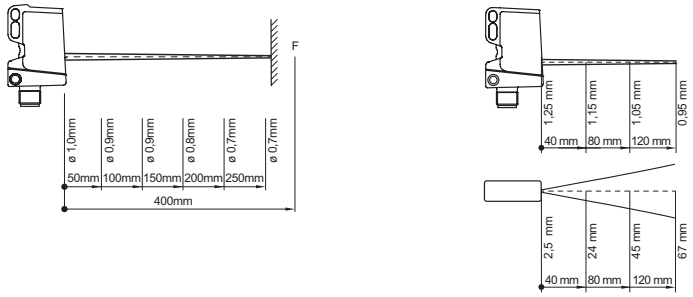
laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007



beam characteristics (typically)



dimension drawings

Sde = 30 ... 250 mm

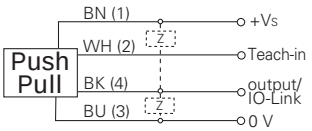
IO-Link

- One inch class
- washdown design
- laser diode

general data	
type	light barrier
special type	Washdown design
version	standard object detection
light source	pulsed red laser diode
background position Sde	30 ... 250 mm
scanning range Sa	90% ... 85% Sde
repeat accuracy	< 0,1 mm at 100 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
laser class	1
distance to focus	400 mm
wave length	656 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,5 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,7 mm
depth	28,2 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 68/69K & proTect+

order reference
O300W.SL-11179009

connection diagram



connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

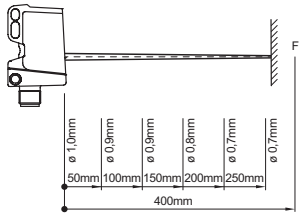
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

laser warning

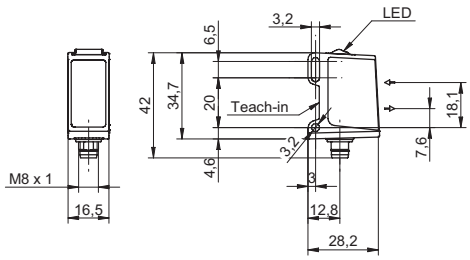
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

beam characteristic (typically)



dimension drawing



Sde = 30 ... 250 mm

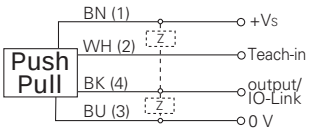
IO-Link

- One inch class
- hygienic design
- laser diode

general data	
type	light barrier
special type	hygienic design
version	standard object detection
light source	pulsed red laser diode
background position Sde	30 ... 250 mm
scanning range Sa	90% ... 85% Sde
repeat accuracy	< 0,1 mm at 100 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
laser class	1
distance to focus	400 mm
wave length	656 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,5 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,6 mm
depth	28,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 68/69K & proTect+

order reference	connection types
O300H.SL-11179007	cable 4 pin, 2 m
O300H.SL-11179008	flylead connector M8, L=200 mm

connection diagram



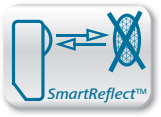
connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI11-1H	Mounting for sensors in hygienic design Ø 11 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

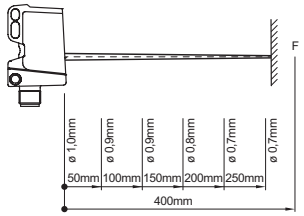
laser warning

CLASS 1 LASER PRODUCT

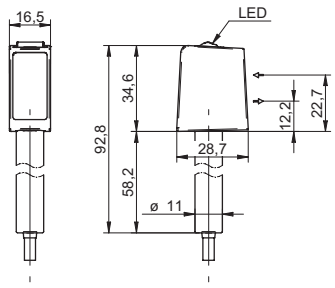
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

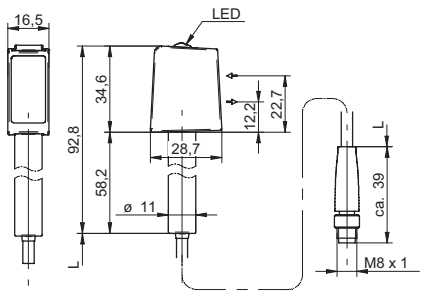


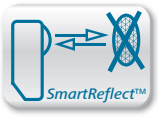
beam characteristic (typically)



dimension drawings







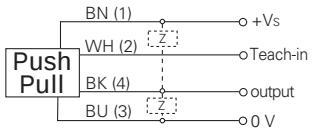
Sde = 100 ... 1900 mm

- long sensing range
- qTeach

general data	
type	light barrier
version	standard object detection
light source	pulsed red laser diode
background position Sde	100 ... 1900 mm
scanning range Sa	97% ... 83% Sde
alignment / soiled lens indicator	flashing light indicator
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in
laser class	1
wave length	656 nm
beam diameter	3,7 ... 22 mm
electrical data	
response time / release time	< 10 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	80 mA
voltage drop Vd	< 3,5 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	23,4 mm
height / length	63 mm
depth	45 mm
type	rectangular
housing material	plastic (SAN LURAN 378P)
front (optics)	PMMA
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67
storage temperature	-10 ... +70 °C

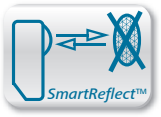
order reference	connection types
ONDK 25G6911	cable, 2 m
ONDK 25G6911/S14	connector M12 5 pin

connection diagram

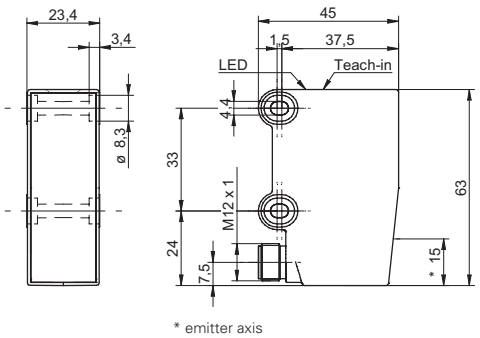


connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11077517	Mounting bracket for sensors series 25 (L design)
for details: see accessories section	



dimension drawing



* emitter axis

Sde = 30 ... 300 mm

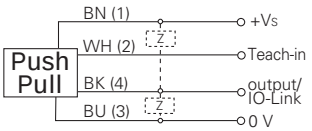
IO-Link

- One inch class
- PinPoint LED
- designed for detection of transparent objects

general data	
type	light barrier
version	transparency object detection
light source	pulsed PinPoint LED
background position Sde	30 ... 300 mm
scanning range Sa	100% ... 85% Sde
minimal signal attenuation	10 % / 20 % / 30 %
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

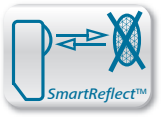
order reference	connection types
O300.SP.T-11136905	cable 4 pin, 2 m
O300.SP.T-11136906	connector M8 4 pin

connection diagram

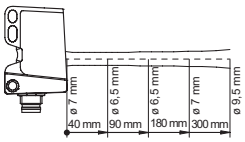


connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

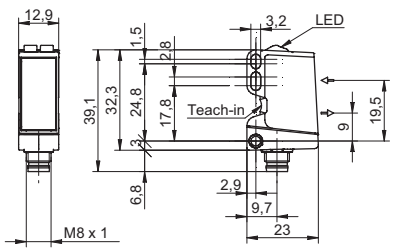
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

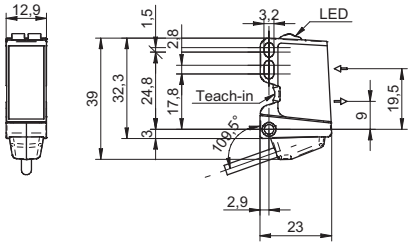


beam characteristic (typically)



dimension drawings





Sde = 30 ... 300 mm

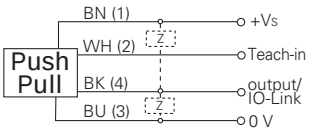
IO-Link

- One inch class
- washdown design
- PinPoint LED

general data	
type	light barrier
special type	Washdown design
version	transparency object detection
light source	pulsed PinPoint LED
background position Sde	30 ... 300 mm
scanning range Sa	100% ... 85% Sde
minimal signal attenuation	10 % / 20 % / 30 %
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,7 mm
depth	28,2 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

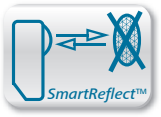
order reference
O300W.SP.T-11136922

connection diagram

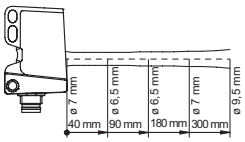


connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

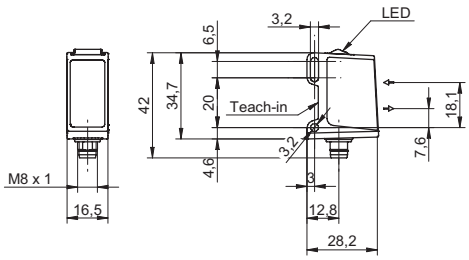
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	



beam characteristic (typically)



dimension drawing



Sde = 30 ... 300 mm

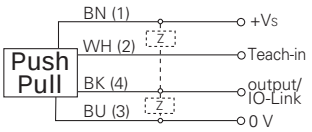
IO-Link

- One inch class
- hygienic design
- PinPoint LED

general data	
type	light barrier
special type	hygienic design
version	transparency object detection
light source	pulsed PinPoint LED
background position Sde	30 ... 300 mm
scanning range Sa	100% ... 85% Sde
minimal signal attenuation	10 % / 20 % / 30 %
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,6 mm
depth	28,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

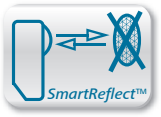
order reference	connection types
O300H.SP.T-11136925	cable 4 pin, 2 m
O300H.SP.T-11136926	flylead connector M8, L=200 mm

connection diagram

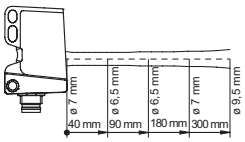


connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

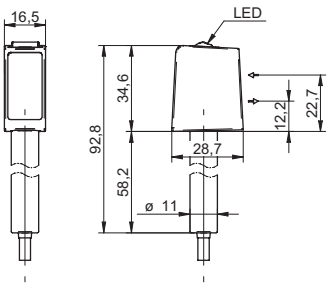
Accessories	
HI11-1H	Mounting for sensors in hygienic design Ø 11 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

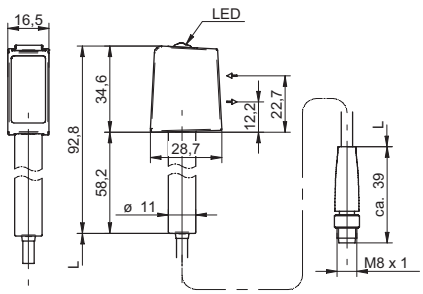


beam characteristic (typically)



dimension drawings





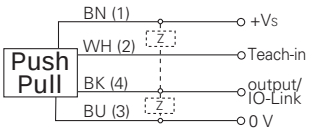
Sde = 200 ... 800 mm

IO-Link

- short response time
- sensing distance adjustable via Teach-in
- IO-Link

general data	
type	light barrier
light source	pulsed red LED
background position Sde	200 ... 800 mm on V4A
alignment / soiled lens indicator	flashing light indicator
power on indication	LED green
output indicator	LED red
sensing distance adjustment	Teach-in and IO-Link
wave length	660 nm
electrical data	
response time / release time	< 1,8 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	30 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-30 ... +60 °C
protection class	IP 67

connection diagram

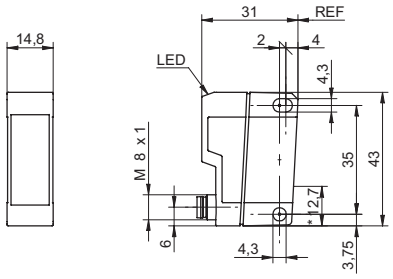


connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

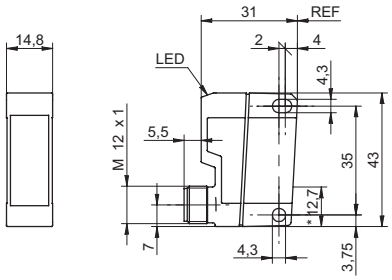
Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
for details: see accessories section	

order reference	version	connection types	reverse polarity protection	minimal signal attenuation
FNDK 14G6902/IO	Tray and bottle detection	cable 4 pin, 2 m	yes, Vs to GND	30 %
FNDK 14G6902/S14/IO	Tray and bottle detection	connector M12 4 pin	yes, Vs to GND	30 %
FNDK 14G6902/S35A/IO	Tray and bottle detection	connector M8 4 pin	yes, Vs to GND	30 %
FNDK 14G6903/IO	Foil detection	cable 4 pin, 2 m	yes	12 %
FNDK 14G6903/S14/IO	Foil detection	connector M12 4 pin	yes	12 %
FNDK 14G6903/S35A/IO	Foil detection	connector M8 4 pin	yes	12 %

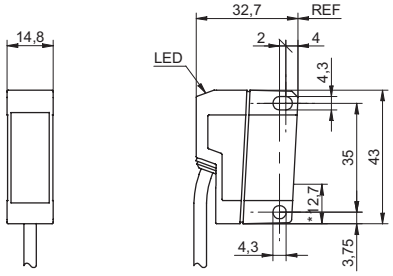
dimension drawings



* emitter axis



* emitter axis



* emitter axis

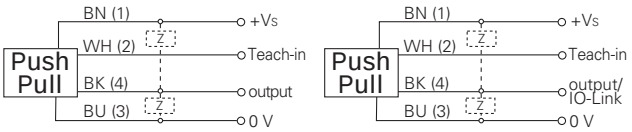
Sde = 200 ... 800 mm

IO-Link

- washdown design
- IO-Link
- remote Teach-in

general data	
type	light barrier
special type	Washdown design
light source	pulsed point source LED
background position Sde	200 ... 800 mm on V4A
alignment / soiled lens indicator	flashing light indicator
power on indication	LED green
output indicator	LED red
wave length	660 nm
approvals/certificates	Ecolab
electrical data	
response time / release time	< 1,8 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	35 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
mechanical data	
width / diameter	19,6 mm
height / length	51 mm
depth	34,3 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12
ambient conditions	
operating temperature	-30 ... +60 °C
protection class	IP 68/69K & proTect+
storage temperature	-30 ... +70 °C

connection diagrams



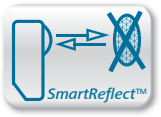
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11046278	Mounting bracket series 14 washdown
11046279	Sensofix series 14 washdown
for details: see accessories section	

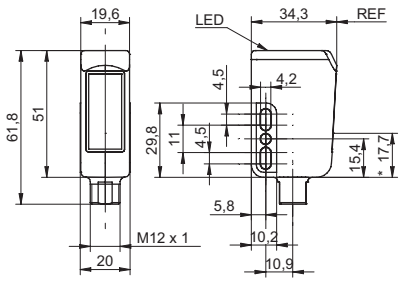
remarks

Sensor FDA compliant and Ecolab approved
IO-Link: output signal, service status, object presence
sensitivity adjustable: via Teach-in wire input
LSR = Liquid Silicon Rubber

order reference	version	sensing distance adjustment	reverse polarity protection	minimal signal attenuation
FNDR 14G6902/S14	Tray and bottle detection	Teach-in	yes, Vs to GND	30 %
FNDR 14G6902/S14/IO	Tray and bottle detection	Teach-in and IO-Link	yes, Vs to GND	30 %
FNDR 14G6903/S14	Foil detection	Teach-in	yes	12 %
FNDR 14G6903/S14/IO	Foil detection	Teach-in and IO-Link	yes	12 %



dimension drawing



* emitter axis

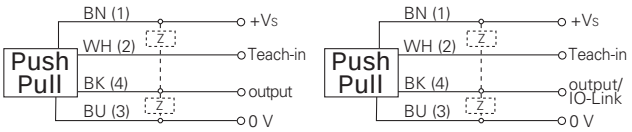
Sde = 200 ... 800 mm

IO-Link

- hygienic design
- IO-Link
- remote Teach-in

general data	
type	light barrier
special type	hygienic design
light source	pulsed point source LED
background position Sde	200 ... 800 mm on V4A
alignment / soiled lens indicator	flashing light indicator
power on indication	LED green
output indicator	LED red
wave length	660 nm
approvals/certificates	Ecolab EHEDG
electrical data	
response time / release time	< 1,8 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	35 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
mechanical data	
width / diameter	19,6 mm
height / length	52,2 mm
depth	34,3 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-30 ... +60 °C
protection class	IP 68/69K & proTect+
storage temperature	-30 ... +70 °C

connection diagrams



connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

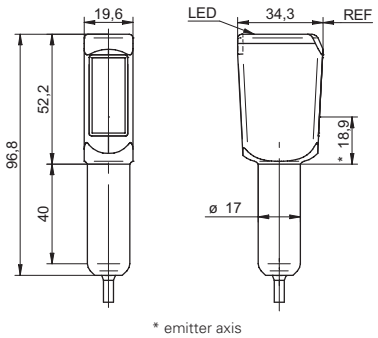
Accessories	
HI17-1H	Mounting for sensors in hygienic design Ø 17 mm
for details: see accessories section	

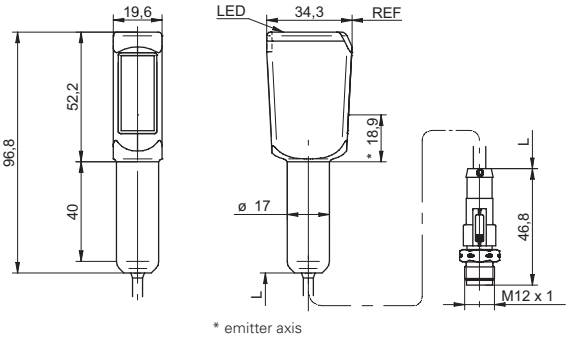
remarks

Sensor FDA compliant, EHEDG certified and Ecolab approved
IO-Link: output signal, service status, object presence
sensitivity adjustable: via Teach-in wire input
LSR = Liquid Silicon Rubber

order reference	version	connection types	sensing distance adjustment	reverse polarity protection	minimal signal attenuation
FNDH 14G6902	Tray and bottle detection	cable 4 pin, 2 m	Teach-in	yes, Vs to GND	30 %
FNDH 14G6902/IO	Tray and bottle detection	cable 4 pin, 2 m	Teach-in and IO-Link	yes, Vs to GND	30 %
FNDH 14G6902/KS34A	Tray and bottle detection	flylead connector M12, L=300 mm	Teach-in	yes, Vs to GND	30 %
FNDH 14G6902/KS34A/IO	Tray and bottle detection	flylead connector M12, L=300 mm	Teach-in and IO-Link	yes, Vs to GND	30 %
FNDH 14G6903	Foil detection	cable 4 pin, 2 m	Teach-in	yes	12 %
FNDH 14G6903/IO	Foil detection	cable 4 pin, 2 m	Teach-in and IO-Link	yes	12 %
FNDH 14G6903/KS34A	Foil detection	flylead connector M12, L=300 mm	Teach-in	yes	12 %
FNDH 14G6903/KS34A/IO	Foil detection	flylead connector M12, L=300 mm	Teach-in and IO-Link	yes	12 %

dimension drawings





Sde = 60 ... 1000 mm

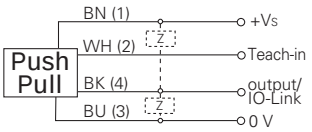
IO-Link

- PinPoint LED
- designed for detection of transparent objects
- IO-Link

general data	
type	light barrier
version	transparency object detection
light source	pulsed PinPoint LED
background position Sde	60 ... 1000 mm
scanning range Sa	100% ... 85% Sde
minimal signal attenuation	10 % / 20 % / 30 %
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	45 mm
depth	32 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

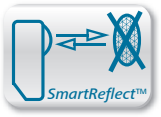
order reference	connection types
O500.SP.T-11136920	cable 4 pin, 2 m
O500.SP.T-11136921	connector M12 4 pin

connection diagram

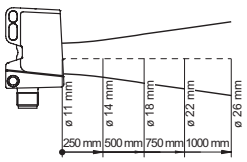


connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

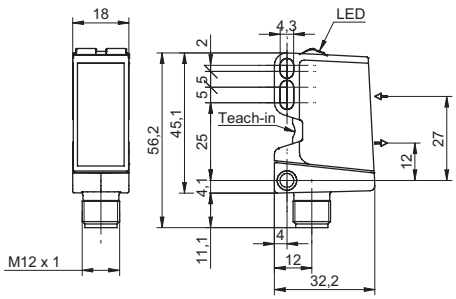
Accessories	
11099942	Sensofix O500/U500
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
for details: see accessories section	

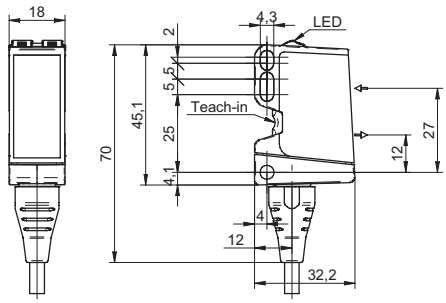


beam characteristic (typically)



dimension drawings





Sde = 60 ... 1000 mm

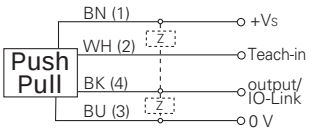
IO-Link

- washdown design
- PinPoint LED
- designed for detection of transparent objects

general data	
type	light barrier
special type	Washdown design
version	transparency object detection
light source	pulsed PinPoint LED
background position Sde	60 ... 1000 mm
scanning range Sa	100% ... 85% Sde
minimal signal attenuation	10 % / 20 % / 30 %
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,2 mm
depth	37,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

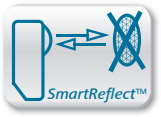
order reference
O500W.SP.T-11136924

connection diagram

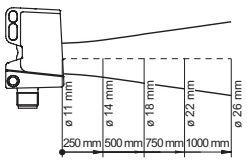


connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

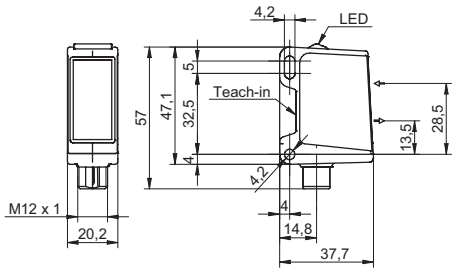
Accessories	
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
11099942	Sensofix O500/U500
for details: see accessories section	



beam characteristic (typically)



dimension drawing



Sde = 60 ... 1000 mm

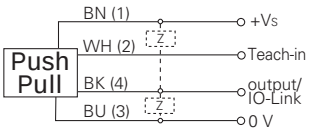
IO-Link

- hygienic design
- PinPoint LED
- designed for detection of transparent objects

general data	
type	light barrier
special type	hygienic design
version	transparency object detection
light source	pulsed PinPoint LED
background position Sde	60 ... 1000 mm
scanning range Sa	100% ... 85% Sde
minimal signal attenuation	10 % / 20 % / 30 %
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,7 mm
depth	36,4 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

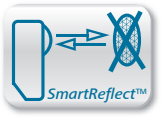
order reference	connection types
O500H.SP.T-11136929	cable 4 pin, 2 m
O500H.SP.T-11136930	flylead connector M12, L=300 mm

connection diagram

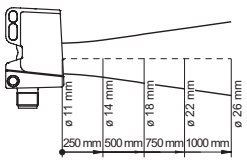


connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

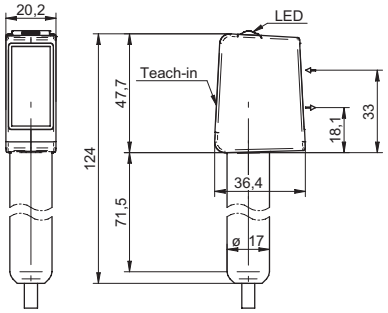
Accessories	
HI17-1H	Mounting for sensors in hygienic design Ø 17 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

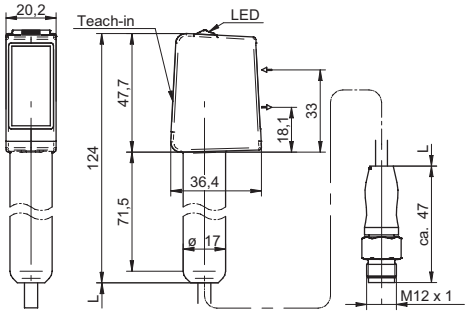


beam characteristic (typically)



dimension drawings





Sde = 30 ... 300 mm

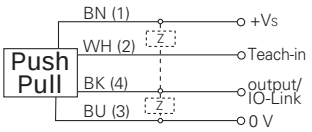
IO-Link

- One inch class
- washdown design
- PinPoint LED

general data	
type	light barrier
special type	Washdown design
version	standard object detection
light source	pulsed PinPoint LED
background position Sde	30 ... 300 mm
scanning range Sa	90% ... 85% Sde
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,7 mm
depth	28,2 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

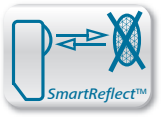
order reference
O300W.SP-11127758

connection diagram

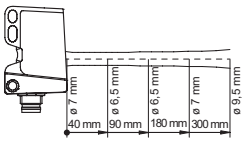


connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

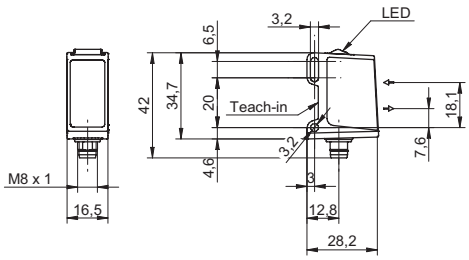
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	



beam characteristic (typically)



dimension drawing



Sde = 30 ... 300 mm

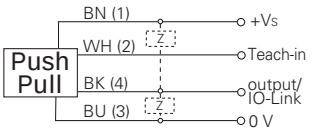
IO-Link

- One inch class
- hygienic design
- PinPoint LED

general data	
type	light barrier
special type	hygienic design
version	standard object detection
light source	pulsed PinPoint LED
background position Sde	30 ... 300 mm
scanning range Sa	90% ... 85% Sde
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,6 mm
depth	28,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

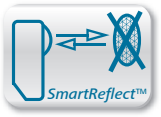
order reference	connection types
O300H.SP-11127754	cable 4 pin, 2 m
O300H.SP-11136904	flylead connector M8, L=200 mm

connection diagram

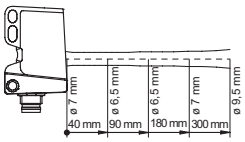


connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

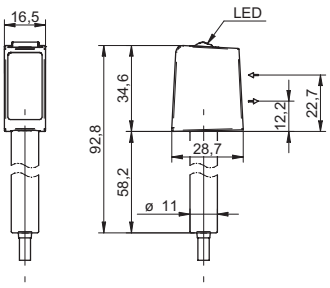
Accessories	
HI11-1H	Mounting for sensors in hygienic design Ø 11 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

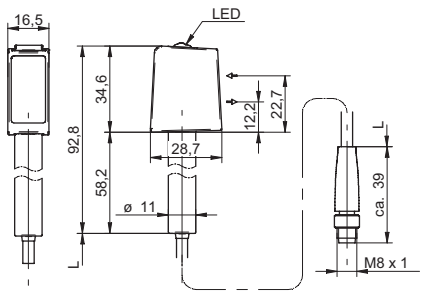


beam characteristic (typically)



dimension drawings





Sde = 50 ... 800 mm

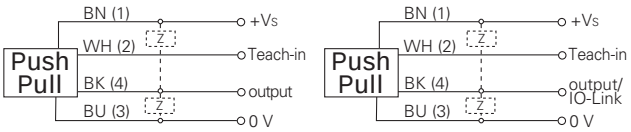
IO-Link

- washdown design
- IO-Link
- remote Teach-in

general data	
type	light barrier
special type	Washdown design
version	standard object detection
light source	pulsed point source LED
background position Sde	50 ... 800 mm on V4A
scanning range Sa	96% Sde
alignment / soiled lens indicator	flashing light indicator
power on indication	LED green
output indicator	LED red
wave length	660 nm
approvals/certificates	Ecolab
electrical data	
response time / release time	< 1,8 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	35 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	19,6 mm
height / length	51 mm
depth	34,3 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12
ambient conditions	
operating temperature	-30 ... +60 °C
protection class	IP 68/69K & proTect+
storage temperature	-30 ... +70 °C

order reference	sensing distance adjustment
FNDR 14G6901/S14	Teach-in
FNDR 14G6901/S14/IO	Teach-in and IO-Link

connection diagrams



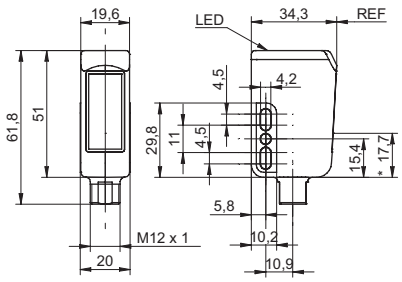
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11046278	Mounting bracket series 14 washdown
11046279	Sensofix series 14 washdown
for details: see accessories section	

remarks

Sensor FDA compliant and Ecolab approved
IO-Link: output signal, service status, object presence
sensitivity adjustable: via Teach-in wire input
LSR = Liquid Silicon Rubber

dimension drawing



* emitter axis

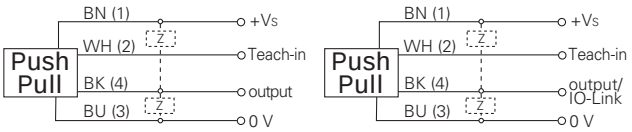
Sde = 50 ... 800 mm

IO-Link

- hygienic design
- IO-Link
- remote Teach-in

general data	
type	light barrier
special type	hygienic design
version	standard object detection
light source	pulsed point source LED
background position Sde	50 ... 800 mm on V4A
scanning range Sa	96% Sde
alignment / soiled lens indicator	flashing light indicator
power on indication	LED green
output indicator	LED red
wave length	660 nm
approvals/certificates	Ecolab EHEDG
electrical data	
response time / release time	< 1,8 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	35 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	19,6 mm
height / length	52,2 mm
depth	34,3 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-30 ... +60 °C
protection class	IP 68/69K & proTect+
storage temperature	-30 ... +70 °C

connection diagrams



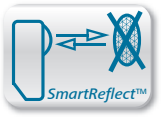
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI17-1H	Mounting for sensors in hygienic design Ø 17 mm
for details: see accessories section	

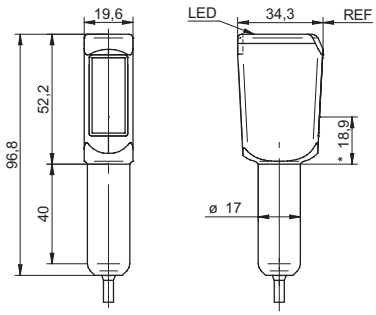
remarks

Sensor FDA compliant, EHEDG certified and Ecolab approved
IO-Link: output signal, service status, object presence
sensitivity adjustable: via Teach-in wire input
LSR = Liquid Silicon Rubber

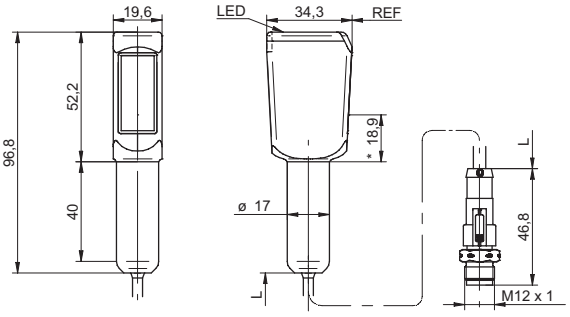
order reference	connection types	sensing distance adjustment
FNDH 14G6901	cable 4 pin, 2 m	Teach-in
FNDH 14G6901/IO	cable 4 pin, 2 m	Teach-in and IO-Link
FNDH 14G6901/KS34A	flylead connector M12, L=300 mm	Teach-in
FNDH 14G6901/KS34A/IO	flylead connector M12, L=300 mm	Teach-in and IO-Link



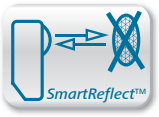
dimension drawings



* emitter axis



* emitter axis



Sde = 60 ... 600 mm

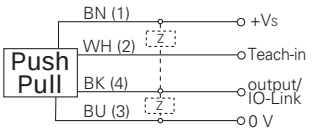
IO-Link

- washdown design
- PinPoint LED
- IO-Link

general data	
type	light barrier
special type	Washdown design
version	standard object detection
light source	pulsed PinPoint LED
background position Sde	60 ... 600 mm
scanning range Sa	90% ... 85% Sde
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,2 mm
depth	37,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

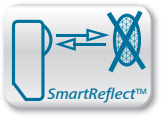
order reference
O500W.SP-11125098

connection diagram

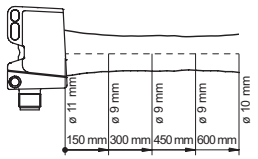


connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

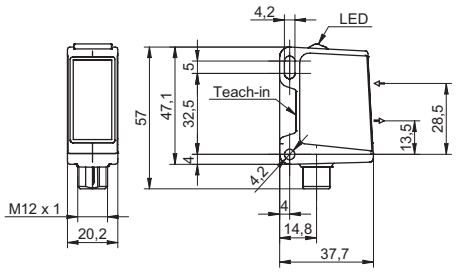
Accessories	
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
11099942	Sensofix O500/U500
for details: see accessories section	



beam characteristic (typically)



dimension drawing



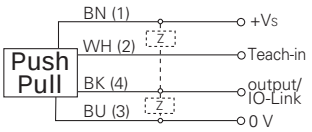
Sde = 60 ... 600 mm

IO-Link

- washdown design
- PinPoint LED
- IO-Link

general data	
type	light barrier
special type	Washdown design
version	standard object detection
light source	pulsed PinPoint LED
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,9 mm
depth	37,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

connection diagram

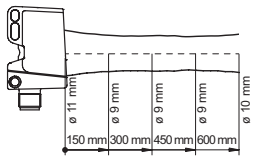


connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

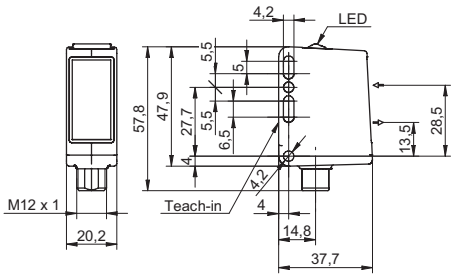
Accessories	
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
11099942	Sensofix O500/U500
10134964	Mounting bracket series 14 (L design)
10149011	Sensofix series 14
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

order reference	background position Sde	scanning range Sa
O500W.SP-11137002	60 ... 600 mm	90% ... 85% Sde
O500W.SP-11137003	60 ... 800 mm	90% ... 80% Sde

beam characteristic (typically)



dimension drawing



Sde = 60 ... 600 mm

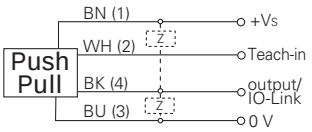
IO-Link

- hygienic design
- PinPoint LED
- IO-Link

general data	
type	light barrier
special type	hygienic design
version	standard object detection
light source	pulsed PinPoint LED
background position Sde	60 ... 600 mm
scanning range Sa	90% ... 85% Sde
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,7 mm
depth	36,4 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

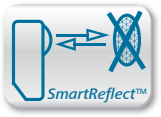
order reference	connection types
O500H.SP-11125106	cable 4 pin, 2 m
O500H.SP-11125107	flylead connector M12, L=300 mm

connection diagram

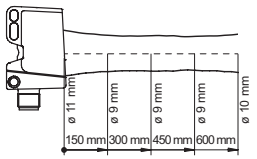


connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

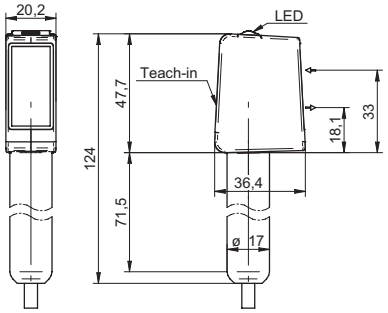
Accessories	
HI17-1H	Mounting for sensors in hygienic design Ø 17 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

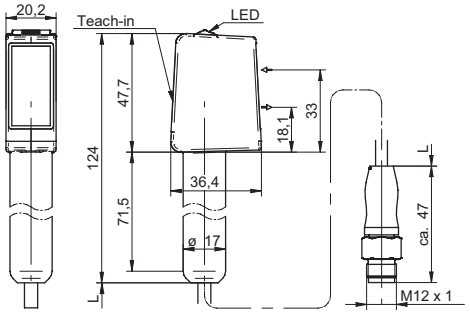


beam characteristic (typically)



dimension drawings





red light LED version

product family	FPCK 07	FPDK 07	FPDK 10	FPDM 12	O300.RP	O300.RR	FPDK 14
	subminiature	subminiature	miniature	miniature	miniature	miniature	standard
version							single lens optics
width / diameter	8 mm	8 mm	10,4 mm	12,4 mm	12,9 mm	12,9 mm	14,8 mm
actual range Sb	0,6 m	0,6 m	3,5 m	5 m	5 m	4 m	3,2 m 7 m
response time / release time	< 0,5 ms	< 0,5 ms	< 0,5 ms	< 1 ms	< 0,49 ms	< 0,49 ms	< 1 ms
light source	pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED	pulsed PinPoint LED	pulsed red LED	pulsed red LED
sensitivity adjustment	Teach-in	Teach-in	potentiometer, 240°	no	qTeach / remote qTeach	no	no
output circuit	NPN PNP	NPN PNP	NPN PNP	NPN PNP	push-pull NPN PNP	push-pull	NPN PNP
connection types	cable flylead connector	cable flylead connector	cable connector	cable connector	cable connector flylead connector	cable connector	cable connector
housing material	plastic	plastic	plastic	metal	plastic	plastic	plastic
protection class	IP 65	IP 65	IP 65 IP 67	IP 67	IP 67	IP 67	IP 67
page	**98**	**100**	**102**	**104**	**106**	**110**	**112**

O500.RP	O500.RR	FPDM 16	FPDK 20	FPAM 18	OR18.RR
standard	standard	standard	standard	standard	standard
18 mm	18 mm	15,4 mm	20 mm	18 mm	18 mm
7,5 m	7,5 m	7,3 m	5,5 m	3,2 m	3,5 m
< 0,49 ms	< 0,49 ms	< 1 ms	< 0,5 ms	< 1 ms	< 1 ms
pulsed PinPoint LED	pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED
qTeach / remote qTeach	no	potentiometer, 10 turn	potentiometer, 270°	no	potentiometer, 270°
push-pull NPN PNP	push-pull	NPN PNP	NPN PNP	NPN PNP	NPN PNP
cable connector	cable connector	cable connector	connector	cable connector	connector cable flylead connector
plastic	plastic	metal	plastic	metal	plastic
IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
114	**116**	**118**	**120**	**122**	**124**

laser version

product family	OPDM 12	O300.RL	O300H.RL	O300W.RL	OPDK 14	OPDM 16	OR18.RL
	miniature	miniature	miniature	miniature	standard	standard	standard
version	single lens optics				single lens optics		
width / diameter	12,4 mm	12,9 mm	16,5 mm	16,5 mm	14,8 mm	15,4 mm	18 mm
actual range Sb	4,5 m 7 m	5 m	5 m	5 m	10 m	7,5 m 11 m	15 m
response time / release time	< 0,05 ms < 0,1 ms	< 0,1 ms	< 0,1 ms	< 0,1 ms	< 0,25 ms	< 0,1 ms	< 0,34 ms
light source	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
sensitivity adjustment	no	Teach-in and IO-Link qTeach	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in	potentiometer, 270°	potentiometer, 270°
output circuit	NPN PNP	push-pull NPN PNP	push-pull	push-pull	PNP	PNP	NPN PNP
connection types	connector cable	cable connector	cable flylead connector	connector	cable connector	cable connector	cable connector
housing material	metal	plastic	metal	metal	plastic	metal	metal
protection class	IP 67	IP 67	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 67	IP 67	IP 67
page	**126**	**128**	**130**	**132**	**134**	**136**	**138**

transparency detection

product family	O300.RP.T	O300W.RP.T	O300H.RP.T	FRDK 14	OPDK 14	FPDM 16	O500.RP.T
version	transparency object detection	transparency object detection	transparency object detection	for transparent objects	for transparent objects single lens optics	for transparent objects	transparency object detection
width / diameter	12,9 mm	16,5 mm	16,5 mm	14,8 mm	14,8 mm	15,4 mm	18 mm
actual range Sb	3,5 m	3,5 m	3,5 m	7 m	4,5 m	6 m	5,5 m
response time / release time	< 0,25 ms	< 0,25 ms	< 0,25 ms	< 0,1 ms	< 0,25 ms	< 2,5 ms	< 0,25 ms
sensitivity adjustment	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in	Teach-in	Teach-in	Teach-in and IO-Link
output circuit	push-pull	push-pull	push-pull	NPN PNP	PNP	PNP	push-pull
connection types	cable connector	connector	cable flylead connector	cable connector	cable connector	connector	cable connector
housing material	plastic	metal	metal	plastic	plastic	metal	plastic
protection class	IP 67	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 67	IP 67	IP 67	IP 67
page	**140**	**142**	**144**	**146**	**148**	**150**	**152**

O500W.RP.T	O500H.RP.T	OR18.RR.T	OR18W.RR.T
transparency object detection	transparency object detection	transparency object detection	transparency object detection
20,2 mm	20,2 mm	18 mm	18 mm
5,5 m	5,5 m	0,5 m	0,5 m
< 0,25 ms	< 0,25 ms	< 1 ms	< 1 ms
Teach-in and IO-Link	Teach-in and IO-Link	potentiometer, 270°	potentiometer, 270°
push-pull	push-pull	NPN PNP	NPN PNP
connector	cable flylead connector	connector	connector
metal	metal	plastic	metal
IP 68/69K & proTect+	IP 68/69K & proTect+	IP 67	IP 67/69K
154	**156**	**158**	**160**

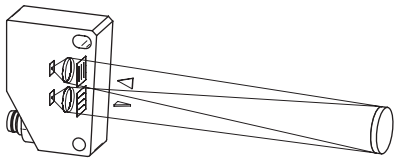
stainless steel sensors in washdown or hygienic design

product family	O300W.RP	O300H.RP	FPDR 14	FPDH 14	O500W.RP	O500W.RP	O500H.RP
	miniature	miniature	standard	standard	standard	standard	standard
width / diameter	16,5 mm	16,5 mm	19,6 mm	19,6 mm	20,2 mm	20,2 mm	20,2 mm
actual range Sb	5 m	5 m	3 m	3 m	7,5 m	7,5 m	7,5 m
response time / release time	< 0,49 ms	< 0,49 ms	< 1 ms	< 1 ms	< 0,49 ms	< 0,49 ms	< 0,49 ms
light source	pulsed PinPoint LED	pulsed PinPoint LED	pulsed red LED	pulsed red LED	pulsed PinPoint LED	pulsed PinPoint LED	pulsed PinPoint LED
sensitivity adjustment	qTeach / remote	Teach-in: remote	no	no	qTeach / remote	Teach-in: remote	Teach-in: remote
output circuit	push-pull	push-pull	NPN PNP	NPN PNP	push-pull	push-pull	push-pull
connection types	connector	cable flylead connector	connector	cable flylead connector	connector	connector	cable flylead connector
housing material	metal	metal	metal	metal	metal	metal	metal
protection class	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+
page	**162**	**164**	**166**	**168**	**170**	**172**	**174**

OR18W.RR
standard
18 mm
3,5 m
< 1 ms
pulsed red LED
potentiometer, 270°
NPN PNP
connector
metal
IP 67/69K
176

General information

The emitter and receiver are installed in the same housing. The emitted infrared, red or laser light is returned by a triple reflector or a reflective film to the receiver. The output changes its state when the object breaks the light beam (sensor receives no light).



Applications

- Stack height monitoring
- Detection of objects located at any position on a conveyor belt
- Detection of transparent objects
- Detection of glossy objects on a conveyor belt
- Retro-reflective laser sensors with single-lens optics allow the precise detection of objects through small openings and the smallest distances between the sensor and the reflector.

Characteristics and advantages

Polarizing filter
This filter allows objects to be detected regardless of the texture and color of the surface. Glossy and reflective objects are also reliably detected.

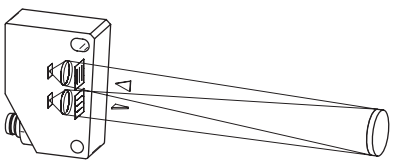
Single-lens optics
Because the emitted and received beams are on the same axis, the direction of approach of the object is irrelevant, and it is possible to look through small openings. Reflectors can also be used in close-range without signal breakdown.

Transparent objects
Special versions of retro-reflective sensors can also reliably detect transparent objects such as packaging films, PET bottles and glassware.

Short response times
Retro-reflective laser sensors with response times of 0,05 ms and focused laser beams correctly detect the smallest, fast-moving objects (0,1 mm in diameter).

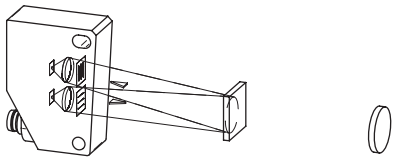
Technology and operation

The polarizing filter permits the emitted light to pass in only one polarization plane.
The triple reflector depolarizes the light on reflection. A part of the light reflected back to the receiver passes the second polarization filter, offset by 90°, and is detected by the receiver.



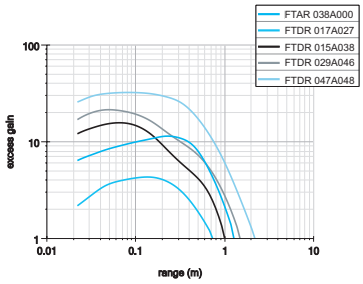
Technology and operation

A glossy object in the light beam reflects the light without changing its polarization direction.
This light cannot pass through the polarization filter in front of the receive.
A glossy object therefore also breaks the light beam.

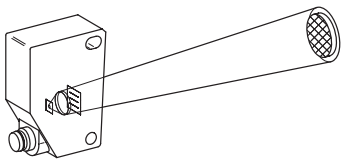


Mounting and adjustment

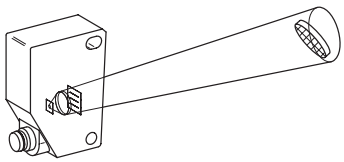
Each sensor has a separate excess gain curve. As the operating reliability depends heavily on the ambient conditions, it must be ensured that the sensor operates with the highest possible excess signal gain.



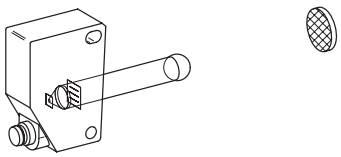
With narrow light beams as used in laser sensors, the size of the light spot on the reflector in relation to the triple structure is crucial factor when it comes to choosing the reflector or the reflective type. A special reflective type or reflector for laser sensors should be used for spot diameters of up to 1,5mm, while the use of reflectors with microstructures is recommended for spot diameters of up to 3 mm. It should also be ensured that the reflective type or reflector is not placed close to the focus.



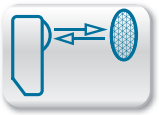
The reflector is aligned and centered.



The reflector may not be tilted by more than 15°.



For a correct function, the object must cover the reflector or at least have the size of the beam diameter on the distance.



Sb = 0,6 m

- compact housing
- sensing range adjustable via Teach-in
- suppression of mutual interference

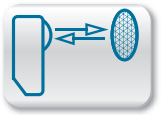
general data	
type	retro-reflective sensor
light source	pulsed red LED
actual range Sb	0,6 m
nominal range Sn	0,8 m
polarization filter	yes
alignment / soiled lens indicator	flashing light indicator
light indicator	LED green
output indicator	LED yellow
sensitivity adjustment	Teach-in
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	8 mm
height / length	17,8 mm
depth	12,6 mm
type	rectangular
housing material	plastic (PMMA, MABS, PA)
front (optics)	PMMA
ambient conditions	
operating temperature	-20 ... +50 °C
protection class	IP 65

connection diagrams

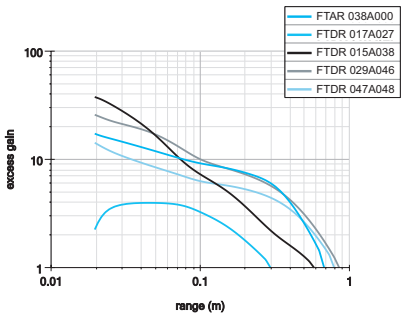
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

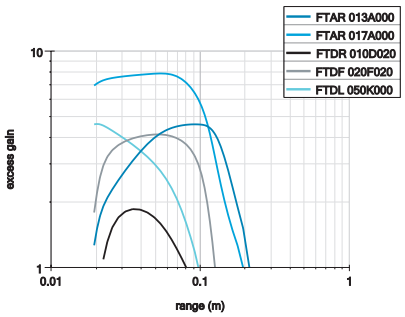
Accessories	
10150844	Minofix mounting 07
for details: see accessories section	

order reference	connection types	output circuit
FPCK 07N6901	cable rear side, 2 m	NPN
FPCK 07N6901/KS35A	flylead connector M8 4 pin, L=200 mm	NPN
FPCK 07P6901	cable rear side, 2 m	PNP
FPCK 07P6901/KS35A	flylead connector M8 4 pin, L=200 mm	PNP



excess gain curves

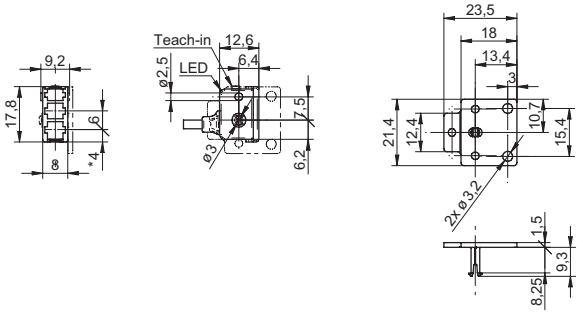




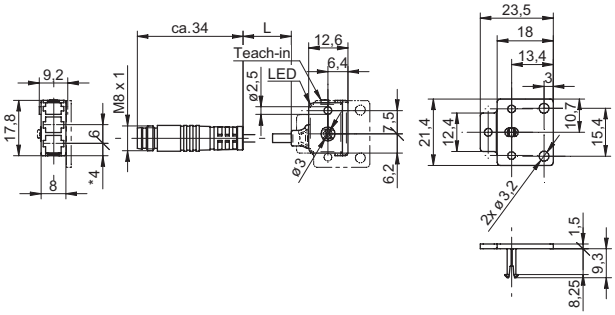
reflectors

FTAR 013A000	ø 15 mm	Sn = 210 mm
FTAR 017A000	ø 20,7 mm	Sn = 190 mm
FTAR 036A000	ø 46 mm	Sn = 680 mm
FTDR 010D020	15 x 25 mm	Sn = 80 mm
FTDR 017A027	20 x 42 mm	Sn = 290 mm
FTDR 015A038	18 x 40 mm	Sn = 570 mm
FTDR 029A046	32,5 x 48 mm	Sn = 830 mm
FTDR 047A048	54 x 75 mm	Sn = 790 mm
FTDF 020F020	20 x 20 mm	Sn = 120 mm
FTDL 050K000/... m	tape 50 x ... mm	Sn = 97 mm

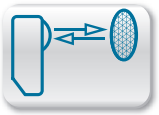
dimension drawings



* emitter axis



* emitter axis cable length L = 200 mm



Sb = 0,6 m

- compact housing
- sensing range adjustable via Teach-in
- suppression of mutual interference

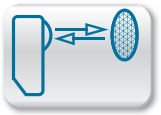
general data	
type	retro-reflective sensor
light source	pulsed red LED
actual range Sb	0,6 m
nominal range Sn	0,8 m
polarization filter	yes
alignment / soiled lens indicator	flashing light indicator
light indicator	LED green
output indicator	LED yellow
sensitivity adjustment	Teach-in
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	8 mm
height / length	17,8 mm
depth	12,6 mm
type	rectangular
housing material	plastic (PMMA, MABS, PA)
front (optics)	PMMA
ambient conditions	
operating temperature	-20 ... +50 °C
protection class	IP 65

connection diagrams

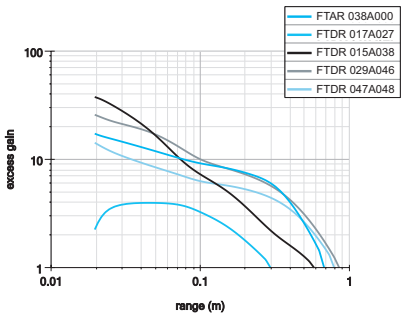
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

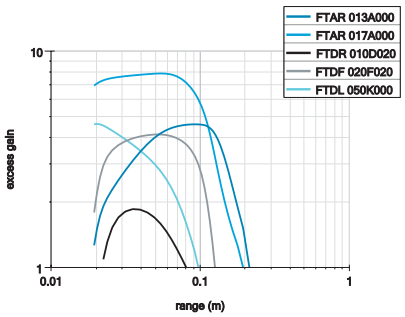
Accessories	
10150844	Minofix mounting 07
for details: see accessories section	

order reference	connection types	output circuit
FPDK 07N6901	cable bottom side, 2 m	NPN
FPDK 07N6901/KS35A	flylead connector M8 4 pin, L=200 mm	NPN
FPDK 07P6901	cable bottom side, 2 m	PNP
FPDK 07P6901/KS35A	flylead connector M8 4 pin, L=200 mm	PNP



excess gain curves

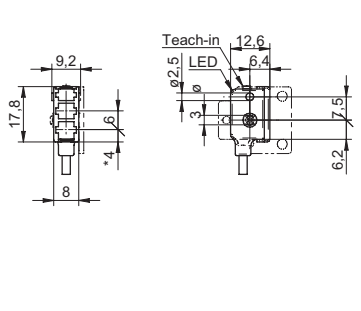




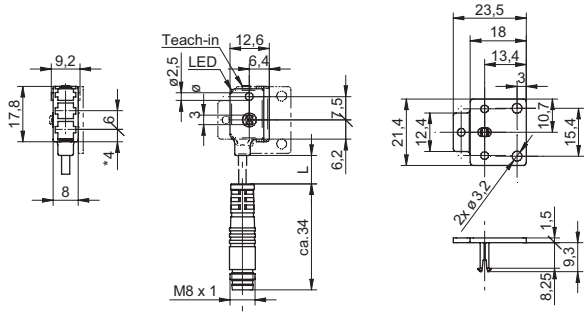
reflectors

FTAR 013A000	ø 15 mm	Sn = 210 mm
FTAR 017A000	ø 20,7 mm	Sn = 190 mm
FTAR 036A000	ø 46 mm	Sn = 680 mm
FTDR 010D020	15 x 25 mm	Sn = 80 mm
FTDR 017A027	20 x 42 mm	Sn = 290 mm
FTDR 015A038	18 x 40 mm	Sn = 570 mm
FTDR 029A046	32,5 x 48 mm	Sn = 830 mm
FTDR 047A048	54 x 75 mm	Sn = 790 mm
FTDF 020F020	20 x 20 mm	Sn = 120 mm
FTDL 050K000/... m	tape 50 x ... mm	Sn = 97 mm

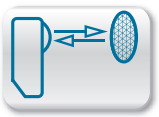
dimension drawings



* emitter axis



* emitter axis cable length L = 200 mm



Sb = 3,5 m

- compact housing
- polarization filter to detect shiny objects
- suppression of mutual interference

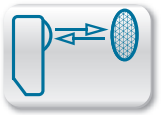
general data	
type	retro-reflective sensor
light source	pulsed red LED
actual range Sb	3,5 m
nominal range Sn	4 m
polarization filter	yes
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	16,3 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C

connection diagrams

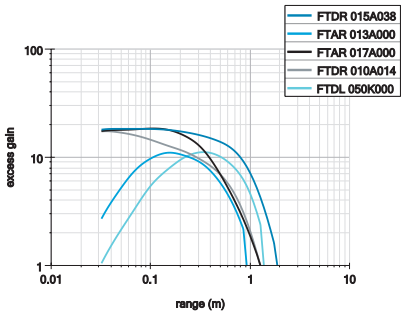
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

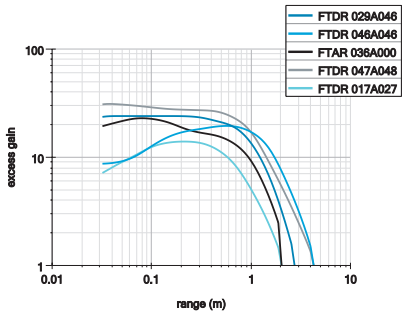
Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
10162083	Mounting panel for sensors series 10
10118798	Mounting bracket series 10
for details: see accessories section	

order reference	connection types	output circuit	sensitivity adjustment	protection class
FPDK 10N5130	cable 4 pin, 2 m	NPN	no	IP 65
FPDK 10N5130/S35A	connector M8 4 pin	NPN	no	IP 67
FPDK 10N5135	cable 4 pin, 2 m	NPN	potentiometer, 240°	IP 65
FPDK 10N5135/S35A	connector M8 4 pin	NPN	potentiometer, 240°	IP 67
FPDK 10P5130	cable 4 pin, 2 m	PNP	no	IP 65
FPDK 10P5130/S35A	connector M8 4 pin	PNP	no	IP 67
FPDK 10P5135	cable 4 pin, 2 m	PNP	potentiometer, 240°	IP 65
FPDK 10P5135/S35A	connector M8 4 pin	PNP	potentiometer, 240°	IP 67



excess gain curves

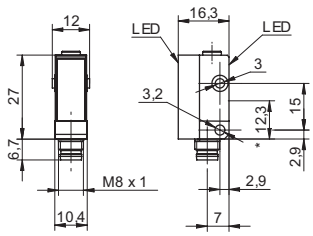




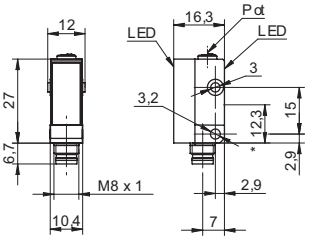
reflectors

FTAR 013A000	ø 15 mm	Sn = 0,9 m
FTAR 017A000	ø 20,7 mm	Sn = 1,2 m
FTAR 036A000	ø 46 mm	Sn = 2 m
FTDR 010D014	12,8 x 16,8 mm	Sn = 1,2 m
FTDR 017A027	20 x 42 mm	Sn = 2 m
FTDR 015A038	18 x 40 mm	Sn = 1,8 m
FTDR 029A046	32,5 x 48 mm	Sn = 2,7 m
FTDR 047A048	54 x 75 mm	Sn = 4 m
FTDL 050K000/... m	tape 50 x ... mm	Sn = 1,3 m

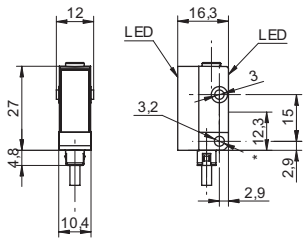
dimension drawings



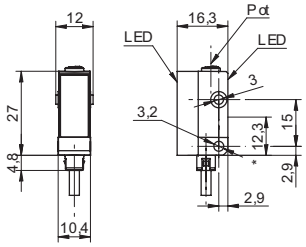
* emitter axis



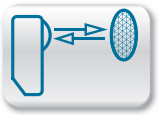
* emitter axis



* emitter axis



* emitter axis

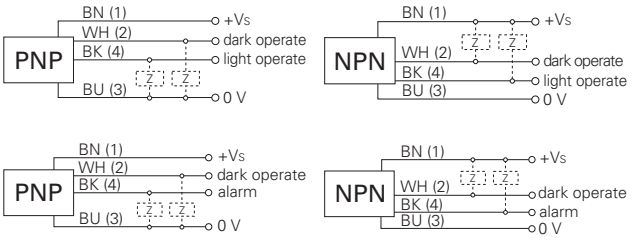


Sb = 5 m

- rugged miniature metal housing
- polarization filter to detect shiny objects
- available with alarm output

general data	
type	retro-reflective sensor
light source	pulsed red LED
actual range Sb	5 m
nominal range Sn	5,2 m
polarization filter	yes
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	no
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	25 mA
voltage drop Vd	< 1,8 VDC
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,4 mm
height / length	35 mm
depth	35 mm
type	rectangular
housing material	die-cast zinc
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

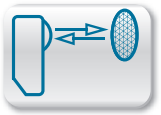
connection diagrams



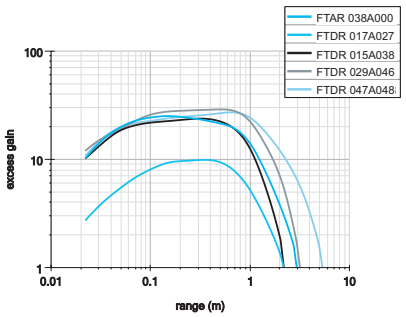
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

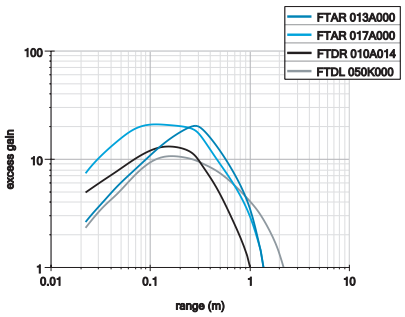
Accessories	
10150328	Sensofix series 12
10113873	Mounting bracket series 12 (L design)
for details: see accessories section	

order reference	connection types	output circuit	output function
FPDM 12N3401	cable 4 pin, 2 m	NPN	alarm output dark
FPDM 12N3401/S35A	connector M8 4 pin	NPN	alarm output dark
FPDM 12N5101	cable 4 pin, 2 m	NPN	light / dark operate
FPDM 12N5101/S35A	connector M8 4 pin	NPN	light / dark operate
FPDM 12P3401	cable 4 pin, 2 m	PNP	alarm output dark
FPDM 12P3401/S35A	connector M8 4 pin	PNP	alarm output dark
FPDM 12P5101	cable 4 pin, 2 m	PNP	light / dark operate
FPDM 12P5101/S35A	connector M8 4 pin	PNP	light / dark operate



excess gain curves

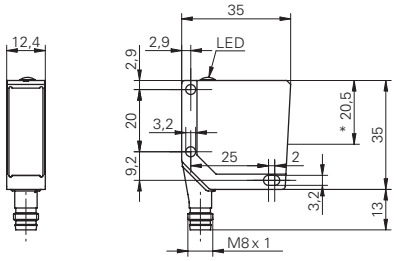




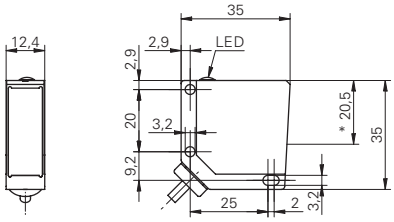
reflectors

FTAR 013A000	ø 15 mm	Sn = 1,2 m
FTAR 017A000	ø 20,7 mm	Sn = 1,2 m
FTAR 036A000	ø 46 mm	Sn = 2,9 m
FTDR 010D014	12,8 x 16,8 mm	Sn = 1 m
FTDR 017A027	20 x 42 mm	Sn = 2,1 m
FTDR 015A038	18 x 40 mm	Sn = 2,1 m
FTDR 029A046	32,5 x 48 mm	Sn = 3,1 m
FTDR 047A048	54 x 75 mm	Sn = 5,2 m
FTDL 050K000/... m	tape 50 x ... mm	Sn = 2,1 m

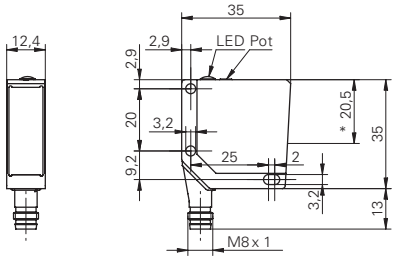
dimension drawings



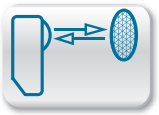
* emitter axis



* emitter axis



* emitter axis

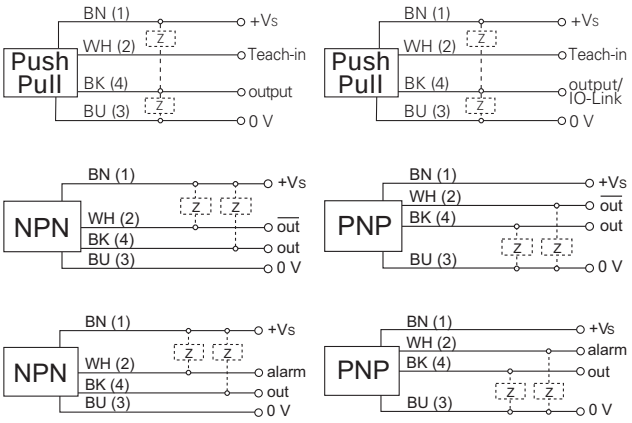


Sb = 5 m

- One inch class
- PinPoint LED
- polarization filter to detect shiny objects

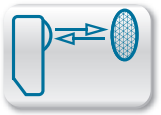
general data	
type	retro-reflective sensor
light source	pulsed PinPoint LED
actual range Sb	5 m
nominal range Sn	6 m
polarization filter	yes
light indicator	LED yellow
power on indication	LED green
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	25 mA
voltage drop Vd	< 3 VDC
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

connection diagrams

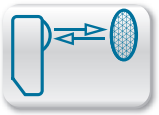


connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

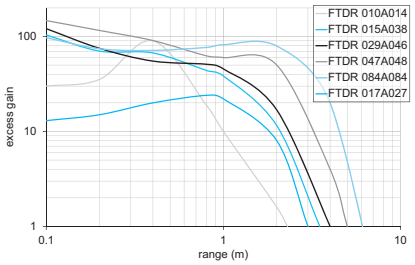
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

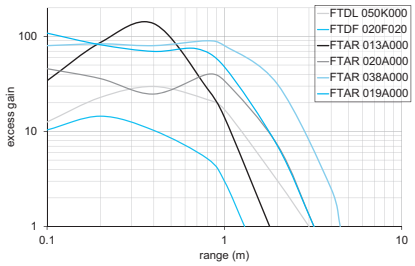


order reference	connection types	output circuit	output function	sensitivity adjustment
O300.RP-11120107	cable 4 pin, 2 m	push-pull	light / dark operate	qTeach / remote
O300.RP-11110449	connector M8 4 pin	push-pull	light / dark operate	qTeach / remote
O300.RP-11143019	flylead connector M8, L=200 mm	push-pull	light / dark operate	qTeach / remote
O300.RP-11120129	flylead connector M12, L=200 mm	push-pull	light / dark operate	qTeach / remote
O300.RP-11120110	cable 4 pin, 2 m	NPN complementary	light / dark operate	qTeach
O300.RP-11110447	connector M8 4 pin	NPN complementary	light / dark operate	qTeach
O300.RP-11120112	cable 4 pin, 2 m	NPN	light / dark operate, alarm	qTeach
O300.RP-11110448	connector M8 4 pin	NPN	light / dark operate, alarm	qTeach
O300.RP-11120120	cable 4 pin, 2 m	PNP complementary	light / dark operate	qTeach
O300.RP-11110445	connector M8 4 pin	PNP complementary	light / dark operate	qTeach
O300.RP-11120121	cable 4 pin, 2 m	PNP	light / dark operate, alarm	qTeach
O300.RP-11110446	connector M8 4 pin	PNP	light / dark operate, alarm	qTeach

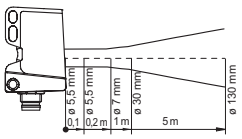


excess gain curves

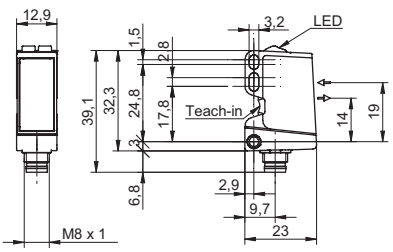


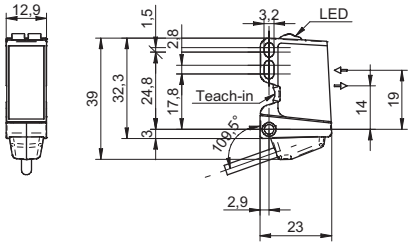


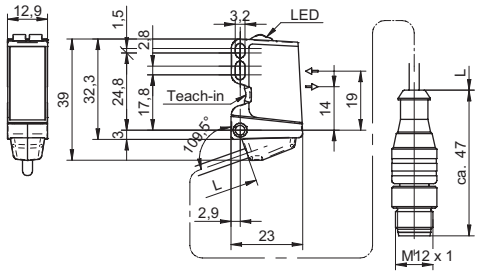
beam characteristic (typically)

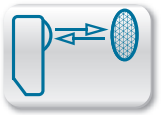


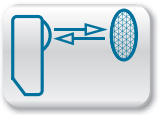
dimension drawings











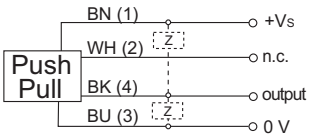
Sb = 4 m

- One inch class
- polarization filter to detect shiny objects

general data	
type	retro-reflective sensor
light source	pulsed red LED
actual range Sb	4 m
nominal range Sn	5 m
polarization filter	yes
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	no
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

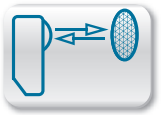
order reference	connection types	output function
O300.RR-11120118	cable 4 pin, 2 m	dark operate
O300.RR-11110444	connector M8 4 pin	dark operate
O300.RR-11120114	cable 4 pin, 2 m	light operate
O300.RR-11110443	connector M8 4 pin	light operate

connection diagram

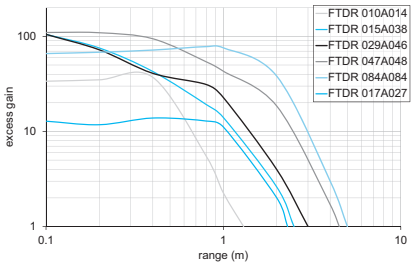


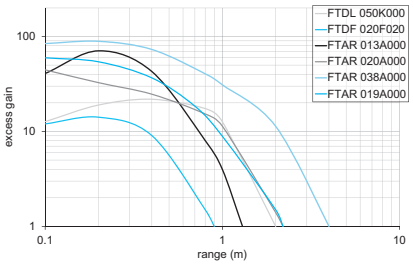
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

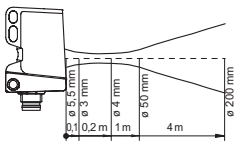


excess gain curves

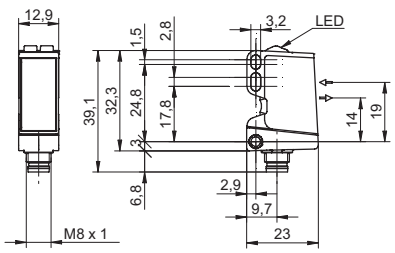


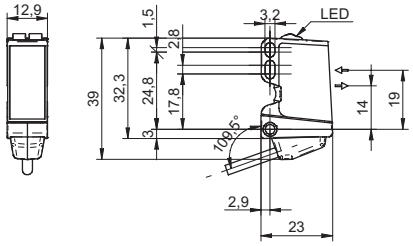


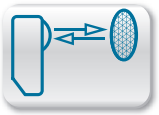
beam characteristic (typically)



dimension drawings







Sb = 7 m

- polarization filter to detect shiny objects
- single lens optics (FPDK 14x5111/S35A)
- suppression of mutual interference

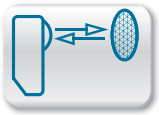
general data	
type	retro-reflective sensor
light source	pulsed red LED
polarization filter	yes
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	no
wave length	660 nm
suppression of reciprocal influence	yes
actual range Sb = 3,2 m	
version	single lens optics
nominal range Sn	3,8 m
actual range Sb = 7 m	
nominal range Sn	7,2 m
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

connection diagrams

connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

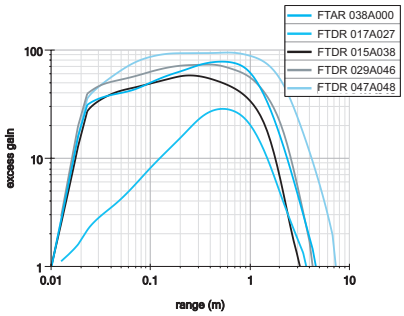
Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
for details: see accessories section	

order reference	actual range Sb	connection types	output circuit
FPDK 14N5101	7 m	cable 4 pin, 2 m	NPN
FPDK 14N5101/S14	7 m	connector M12 4 pin	NPN
FPDK 14N5101/S35A	7 m	connector M8 4 pin	NPN
FPDK 14N5111	3,2 m	cable 4 pin, 2 m	NPN
FPDK 14N5111/S14	3,2 m	connector M12 4 pin	NPN
FPDK 14N5111/S35A	3,2 m	connector M8 4 pin	NPN
FPDK 14P5101	7 m	cable 4 pin, 2 m	PNP
FPDK 14P5101/S14	7 m	connector M12 4 pin	PNP
FPDK 14P5101/S35A	7 m	connector M8 4 pin	PNP
FPDK 14P5111	3,2 m	cable 4 pin, 2 m	PNP
FPDK 14P5111/S14	3,2 m	connector M12 4 pin	PNP
FPDK 14P5111/S35A	3,2 m	connector M8 4 pin	PNP

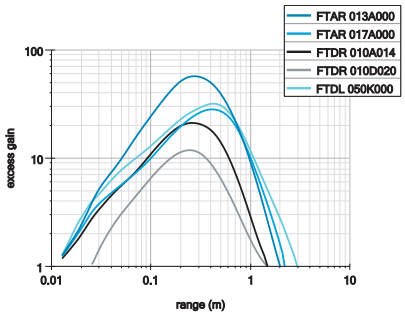


excess gain curves

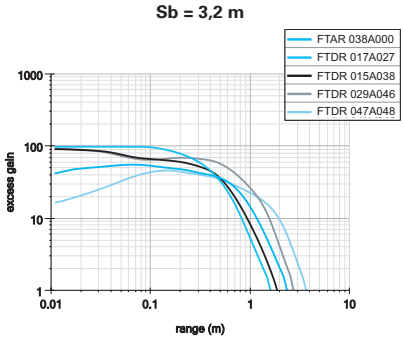
Sb = 7 m



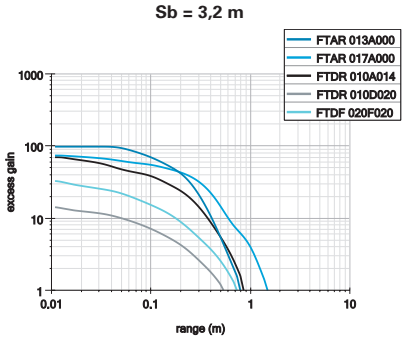
Sb = 7 m



Sb = 3,2 m



Sb = 3,2 m

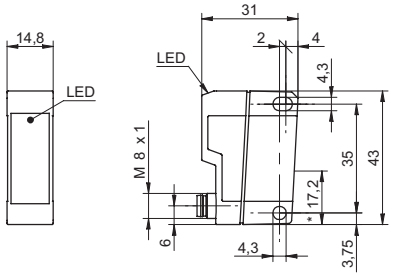


reflectors

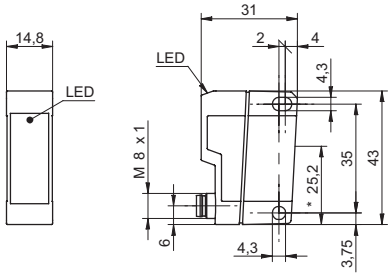
FTAR 013A000	ø 15 mm	Sn = 2 m
FTAR 017A000	ø 20,7 mm	Sn = 2,1 m
FTAR 036A000	ø 46 mm	Sn = 4,5 m
FTDR 010D14	12,8 x 16,8 mm	Sn = 1,4 m
FTDR 010D020	15 x 25 mm	Sn = 1,4 m
FTDR 017A027	20 x 42 mm	Sn = 3,6 m
FTDR 015A038	18 x 40 mm	Sn = 3,1 m
FTDR 029A046	32,5 x 48 mm	Sn = 4,2 m
FTDR 047A048	54 x 75 mm	Sn = 7,2 m
FTDL 050K000/... m	tape 50 x ... mm	Sn = 2,9 m

FTAR 013A000	ø 15 mm	Sn = 0,8 m
FTAR 017A000	ø 20,7 mm	Sn = 1,4 m
FTAR 036A000	ø 46 mm	Sn = 2,2 m
FTDR 010D14	12,8 x 16,8 mm	Sn = 0,8 m
FTDR 010D020	15 x 25 mm	Sn = 0,5 m
FTDR 017A027	20 x 42 mm	Sn = 1,5 m
FTDR 015A038	18 x 40 mm	Sn = 1,8 m
FTDR 029A046	32,5 x 48 mm	Sn = 2,8 m
FTDR 047A048	54 x 75 mm	Sn = 3,8 m
FTDF 020F020	20 x 20 mm	Sn = 0,7 m

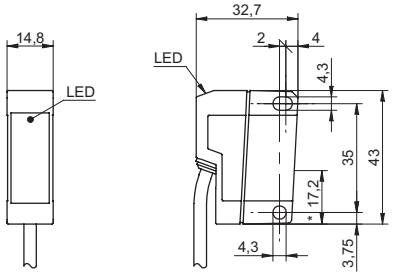
dimension drawings



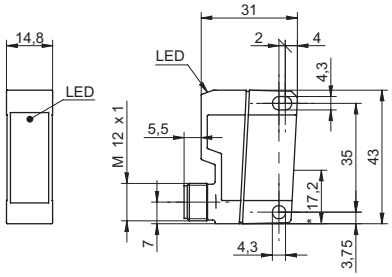
* emitter axis FPDK 14x5101/S35A



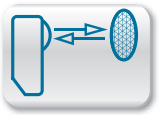
* emitter and receiver axis FPDK 14x5111... single lens optics



* emitter axis FPDK 14x5101



* emitter axis FPDK 14x5101/S14

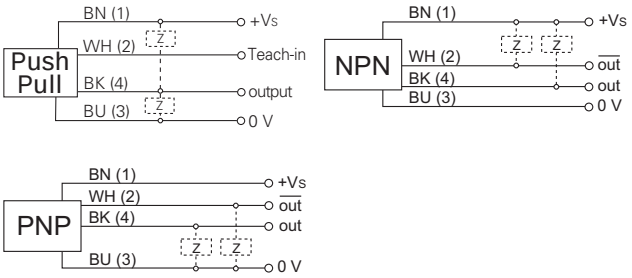


Sb = 7,5 m

- PinPoint LED
- polarization filter to detect shiny objects
- small beam diameter

general data	
type	retro-reflective sensor
light source	pulsed PinPoint LED
actual range Sb	7,5 m
nominal range Sn	8 m
polarization filter	yes
light indicator	LED yellow
power on indication	LED green
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	45 mm
depth	32 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

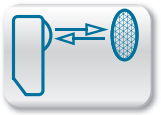
connection diagrams



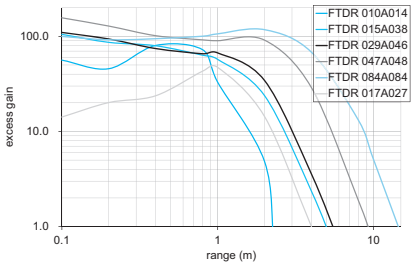
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

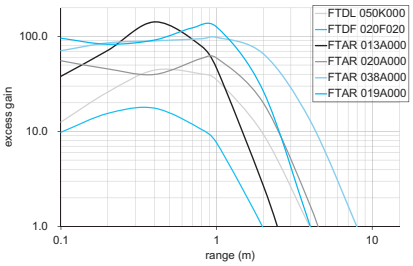
Accessories	
11099942	Sensofix O500/U500
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
for details: see accessories section	

order reference	connection types	output circuit	sensitivity adjustment
O500.RP-11096103	cable 4 pin, 2 m	push-pull	qTeach / remote
O500.RP-11096098	connector M12 4 pin	push-pull	qTeach / remote
O500.RP-11096101	cable 4 pin, 2 m	NPN complementary	qTeach
O500.RP-11096096	connector M12 4 pin	NPN complementary	qTeach
O500.RP-11096099	cable 4 pin, 2 m	PNP complementary	qTeach
O500.RP-11096094	connector M12 4 pin	PNP complementary	qTeach

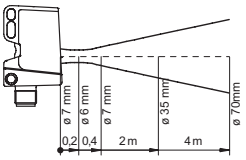


excess gain curves

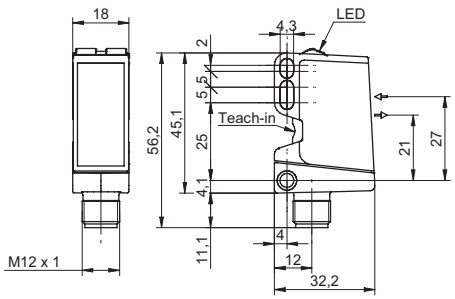


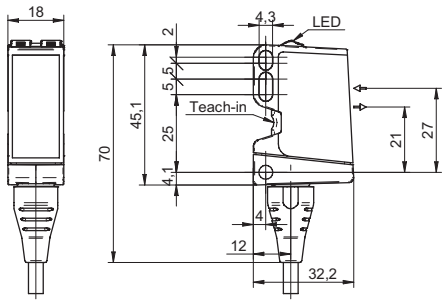


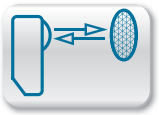
beam characteristic (typically)



dimension drawings





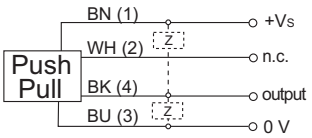


Sb = 7,5 m

- polarization filter to detect shiny objects

general data	
type	retro-reflective sensor
light source	pulsed red LED
actual range Sb	7,5 m
nominal range Sn	8 m
polarization filter	yes
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	no
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	45 mm
depth	32 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

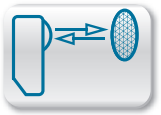
connection diagram



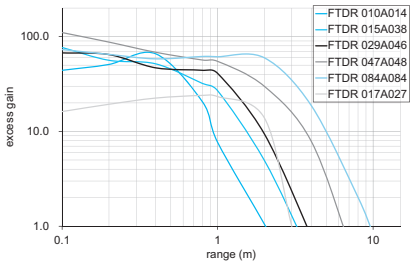
connectors and mating connectors	
ESG 34SH0200	Connector M12, 3 pin, straight, 2 m
ESW 33SH0200	Connector M12, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

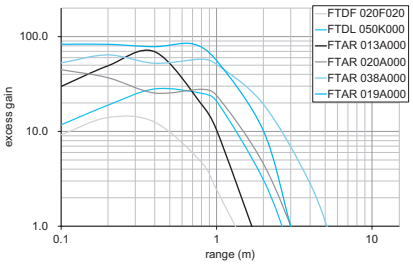
Accessories	
11099942	Sensofix O500/U500
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
for details: see accessories section	

order reference	connection types	output function
O500.RR-11096093	cable 3 pin, 2 m	dark operate
O500.RR-11096091	connector M12 3 pin	dark operate
O500.RR-11096092	cable 3 pin, 2 m	light operate
O500.RR-11096090	connector M12 3 pin	light operate

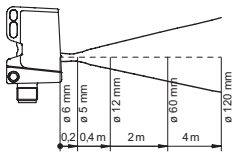


excess gain curves

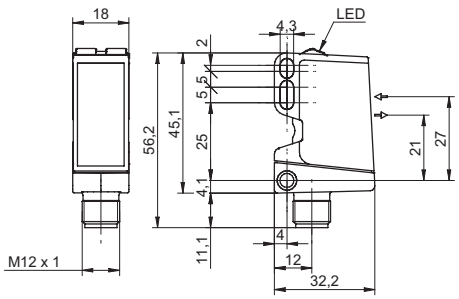


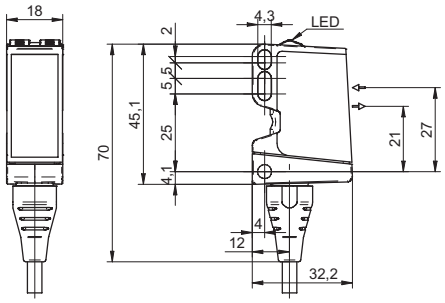


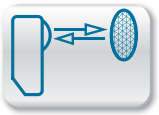
beam characteristic (typically)



dimension drawings







Sb = 7,3 m

- rugged metal housing
- sensing range adjustable via potentiometer
- polarization filter to detect shiny objects

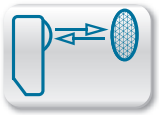
general data	
type	retro-reflective sensor
light source	pulsed red LED
actual range Sb	7,3 m
nominal range Sn	8,5 m
polarization filter	yes
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	36 mA
current consumption typ.	26 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	15,4 mm
height / length	50 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

connection diagrams

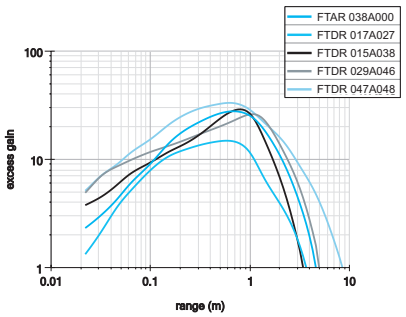
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

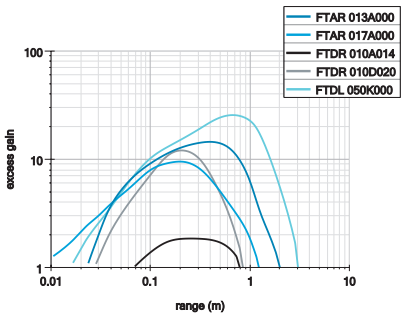
Accessories	
10151721	Sensofix series 16
10113917	Mounting bracket series 16 (L design)
10116407	Lens cleaning air nozzle bracket
for details: see accessories section	

order reference	connection types	output circuit	sensitivity adjustment
FPDM 16N5101	cable 4 pin, 2 m	NPN	no
FPDM 16N5101/S14	connector M12 4 pin	NPN	no
FPDM 16P5101	cable 4 pin, 2 m	PNP	no
FPDM 16P5101/S14	connector M12 4 pin	PNP	no
FPDM 16P5105	cable 4 pin, 2 m	PNP	potentiometer, 10 turn
FPDM 16P5105/S14	connector M12 4 pin	PNP	potentiometer, 10 turn



excess gain curves

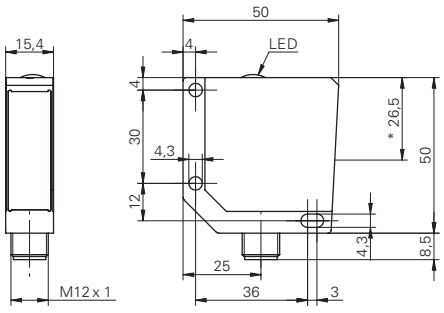




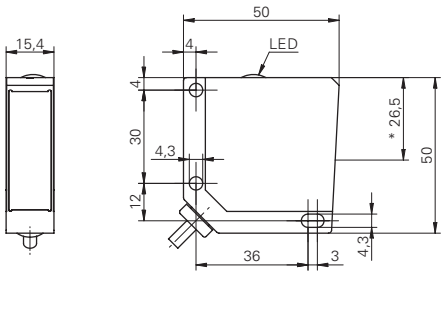
reflectors

FTAR 013A000	ø 15 mm	Sn = 2 m
FTAR 017A000	ø 20,7 mm	Sn = 1,1 m
FTAR 036A000	ø 46 mm	Sn = 4,5 m
FTDR 010D014	12,8 x 16,8 mm	Sn = 0,8 m
FTDR 010D020	15 x 25 mm	Sn = 0,8 m
FTDR 017A027	20 x 42 mm	Sn = 3,6 m
FTDR 015A038	18 x 40 mm	Sn = 3,2 m
FTDR 029A046	32,5 x 48 mm	Sn = 5 m
FTDR 047A048	54 x 75 mm	Sn = 8,5 m
FTDL 050K000/... m	tape 50 x ... mm	Sn = 3 m

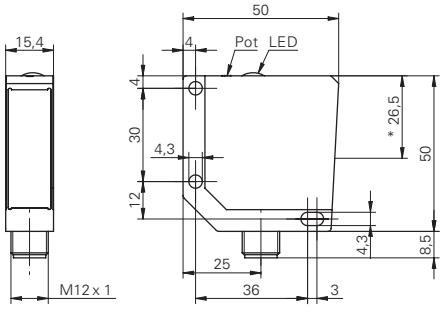
dimension drawings



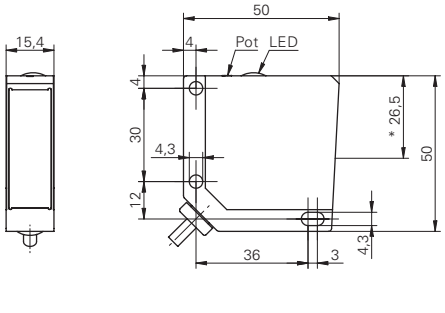
* emitter axis



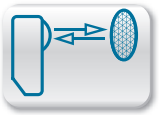
* emitter axis



* emitter axis



* emitter axis



Sb = 5,5 m

- cross-technology housing concept
- polarization filter to detect shiny objects
- small mounting depth

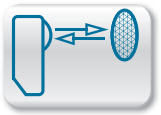
general data	
type	retro-reflective sensor
light source	pulsed red LED
actual range Sb	5,5 m
nominal range Sn	6,8 m
polarization filter	yes
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	potentiometer, 270°
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	22 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20 mm
height / length	42 mm
depth	15 mm
type	rectangular
housing material	plastic (PBT-ASA)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

order reference	output circuit
FPDK 20N5101/S35A	NPN
FPDK 20P5101/S35A	PNP

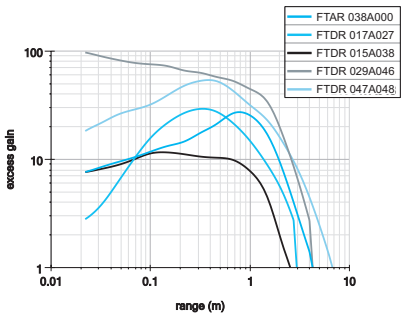
connection diagrams

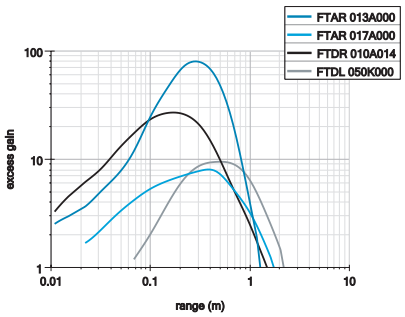
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10150326	Sensofix series 10 / series 20
for details: see accessories section	



excess gain curves

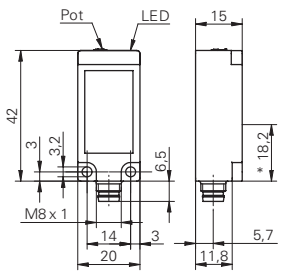




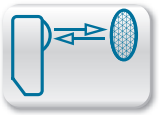
reflectors

FTAR 013A000	ø 15 mm	Sn = 1,2 m
FTAR 017A000	ø 20,7 mm	Sn = 1,8 m
FTAR 036A000	ø 46 mm	Sn = 4,2 m
FTDR 010D014	12,8 x 16,8 mm	Sn = 1,3 m
FTDR 017A027	20 x 42 mm	Sn = 3 m
FTDR 015A038	18 x 40 mm	Sn = 2,4 m
FTDR 029A046	32,5 x 48 mm	Sn = 4,2 m
FTDR 047A048	54 x 75 mm	Sn = 6,8 m
FTDL 050K000/... m	tape 50 x ... mm	Sn = 2,1 m

dimension drawing



* emitter axis

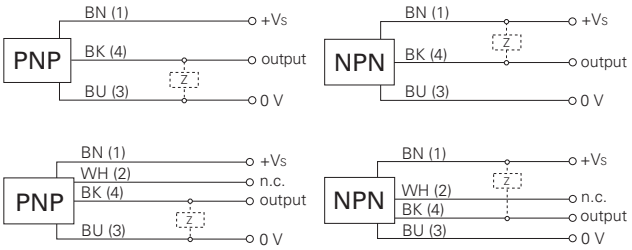


Sb = 3,2 m

- rugged metal housing
- polarization filter to detect shiny objects

general data	
type	retro-reflective sensor
light source	pulsed red LED
actual range Sb	3,2 m
nominal range Sn	4 m
polarization filter	yes
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	no
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	22 mA
voltage drop Vd	< 1,8 VDC
output function	dark operate
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
type	cylindrical threaded
housing material	brass nickel plated / PC
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67

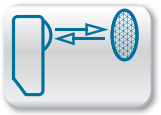
connection diagrams



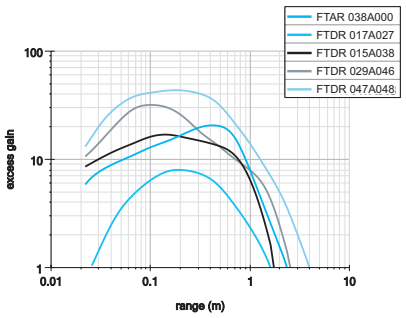
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

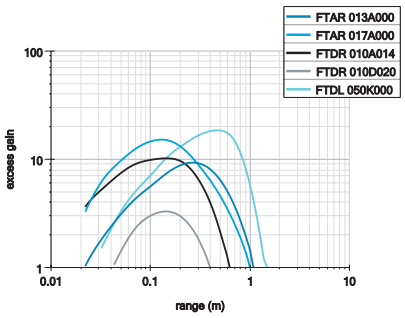
Accessories	
10151658	Sensofix series 18
10103068	Glass cover series 18
10107250	Doubling lens series 18 FZAM 18
10115913	Cap nut glass cover and doubling lens for sensors series 18
for details: see accessories section	

order reference	connection types	height / length	output circuit
FPAM 18N3151	cable 3 pin, 2 m	57 mm	NPN
FPAM 18N3151/S14	connector M12 4 pin	67 mm	NPN
FPAM 18P3151	cable 3 pin, 2 m	57 mm	PNP
FPAM 18P3151/S14	connector M12 4 pin	67 mm	PNP



excess gain curves

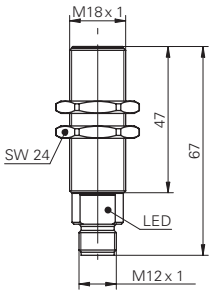


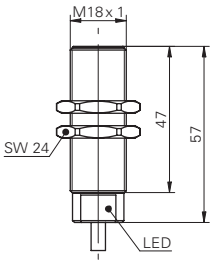


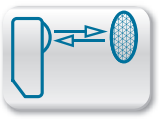
reflectors

FTAR 013A000	ø 15 mm	Sn = 1,1 m
FTAR 017A000	ø 20,7 mm	Sn = 1 m
FTAR 036A000	ø 46 mm	Sn = 2,2 m
FTDR 010D014	12,8 x 16,8 mm	Sn = 0,6 m
FTDR 010D020	15 x 25 mm	Sn = 0,4 m
FTDR 017A027	20 x 42 mm	Sn = 1,6 m
FTDR 015A038	18 x 40 mm	Sn = 1,7 m
FTDR 029A046	32,5 x 48 mm	Sn = 2,3 m
FTDR 047A048	54 x 75 mm	Sn = 4 m
FTDL 050K000/... m	tape 50 x ... mm	Sn = 1,4 m

dimension drawings





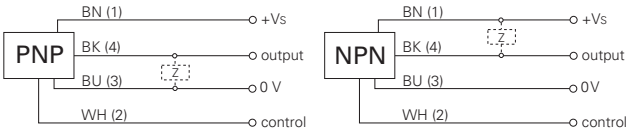


Sb = 3,5 m

- polarization filter to detect shiny objects
- sensitivity adjustable via potentiometer
- suppression of mutual interference

general data	
type	retro-reflective sensor
light source	pulsed red LED
actual range Sb	3,5 m
nominal range Sn	4,5 m
polarization filter	yes
alignment / soiled lens indicator	LED green
output indicator	LED yellow
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
type	cylindrical threaded
housing material	plastic (ABS TERLURAN)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67

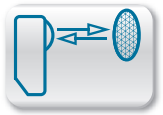
connection diagrams



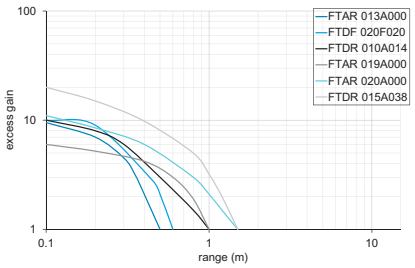
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

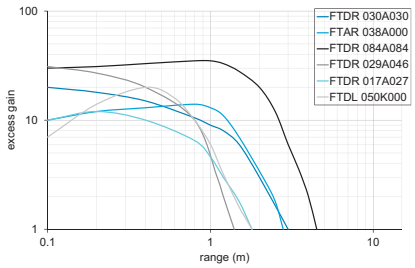
Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
ZPART-M18.NUT	Clamping nut for sensors Ø 18 mm
for details: see accessories section	

order reference	connection types	height / length	output circuit	sensitivity adjustment
OR18.RR-11157781	connector M12 4 pin	67,2 mm	NPN	potentiometer, 270°
OR18.RR-11157782	cable 4 pin, 2 m	44,8 mm	NPN	no
OR18.RR-11157783	flylead connector M12 4 pin, L=100 mm	44,8 mm	NPN	no
OR18.RR-11157680	connector M12 4 pin	67,2 mm	PNP	potentiometer, 270°
OR18.RR-11157768	cable 4 pin, 2 m	44,8 mm	PNP	no
OR18.RR-11157780	flylead connector M12 4 pin, L=100 mm	44,8 mm	PNP	no

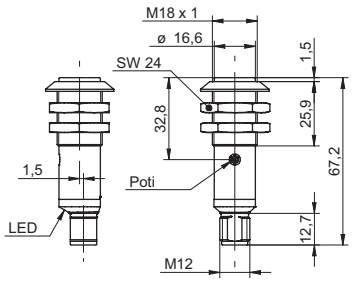


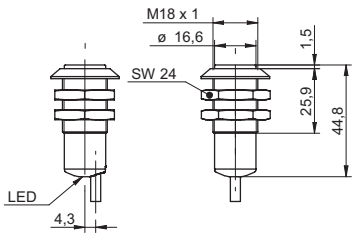
excess gain curves

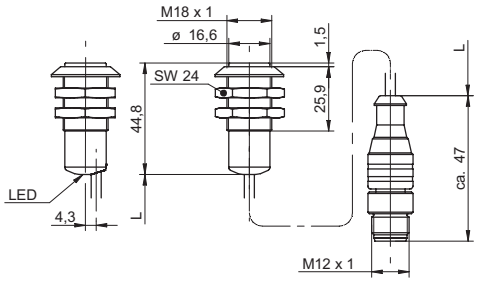


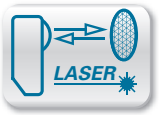


dimension drawings









Sb = 7 m

- rugged miniature metal housing
- single lens optics
- short response time

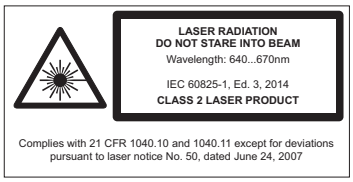
general data	
type	retro-reflective laser sensor
version	single lens optics
light source	pulsed red laser diode
repeat accuracy	< 0,1 mm at laser focus
polarization filter	yes
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	no
laser class	2
wave length	650 nm
actual range Sb = 4,5 m	
nominal range Sn	5 m
actual range Sb = 7 m	
nominal range Sn	8 m
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	50 mA
current consumption typ.	40 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,4 mm
height / length	35 mm
depth	35 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67

connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10150328	Sensofix series 12
10113873	Mounting bracket series 12 (L design)
for details: see accessories section	

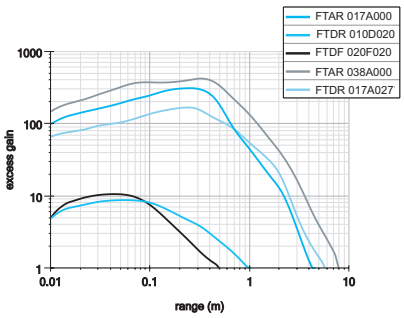
laser warning



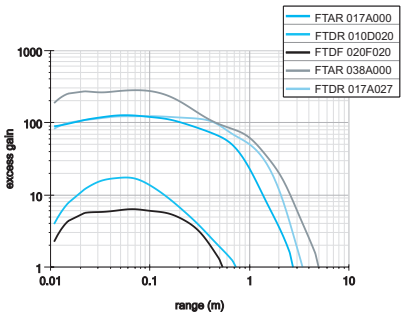
order reference	actual range Sb	connection types	output circuit	response time / release time	distance to focus
OPDM 12N5101/S35A	7 m	connector M8 4 pin	NPN	< 0,1 ms	400 mm
OPDM 12P5101	7 m	cable 4 pin, 2 m	PNP	< 0,1 ms	400 mm
OPDM 12P5101/S35A	7 m	connector M8 4 pin	PNP	< 0,1 ms	400 mm
OPDM 12P5102/S35A	4,5 m	connector M8 4 pin	PNP	< 0,1 ms	100 mm
OPDM 12P5103/S35A	7 m	connector M8 4 pin	PNP	< 0,1 ms	parallel beam
OPDM 12P5104/S35A	4,5 m	connector M8 4 pin	PNP	< 0,05 ms	100 mm

excess gain curves

Sb = 7 m



Sb = 4,5 m



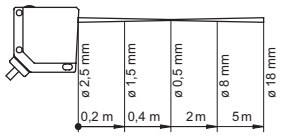
reflectors

FTAR 017A000	ø 20,7 mm	Sn = 4,1 m
FTAR 036A000	ø 46 mm	Sn = 8 m
FTDR 010D020	15 x 25 mm	Sn = 0,95 m
FTDR 017A027	20 x 42 mm	Sn = 5,7 m
FTDF 020F020	20 x 20 mm	Sn = 0,5 m

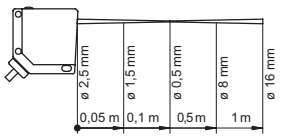
FTAR 017A000	ø 20,7 mm	Sn = 2,7 m
FTAR 036A000	ø 46 mm	Sn = 5 m
FTDR 010D020	15 x 25 mm	Sn = 0,71 m
FTDR 017A027	20 x 42 mm	Sn = 3,2 m
FTDF 020F020	20 x 20 mm	Sn = 0,5 m

beam characteristics (typically)

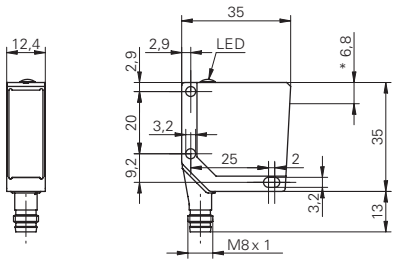
Sb = 7 m



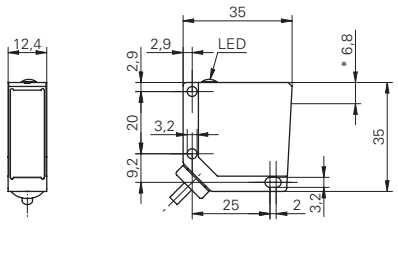
Sb = 4,5 m



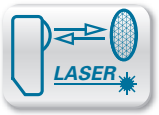
dimension drawings



* emitter and receiver axis



* emitter and receiver axis

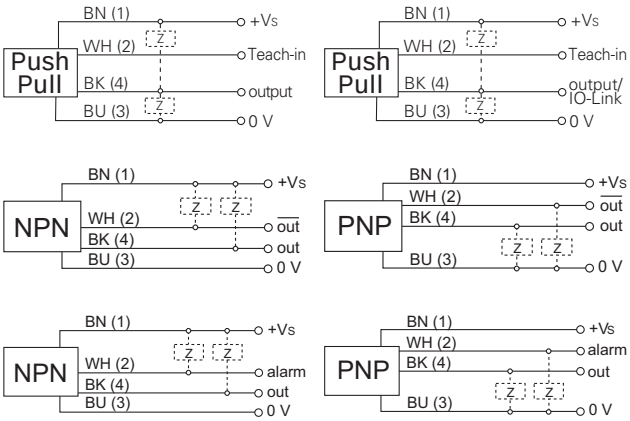


Sb = 5 m

- One inch class
- laser diode
- polarization filter to detect shiny objects

general data	
type	retro-reflective sensor
light source	pulsed red laser diode
actual range Sb	5 m
nominal range Sn	6 m
repeat accuracy	< 0,2 mm at 500 mm
polarization filter	yes
light indicator	LED yellow
power on indication	LED green
laser class	1
distance to focus	parallel beam
wave length	656 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
electrical data	
response time / release time	< 0,1 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,5 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67

connection diagrams



connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

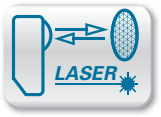
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

laser warning

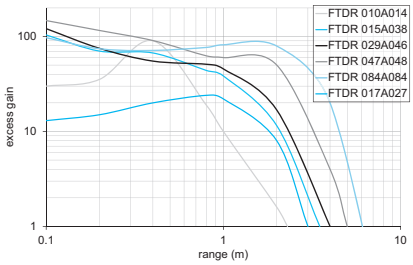
CLASS 1 LASER PRODUCT

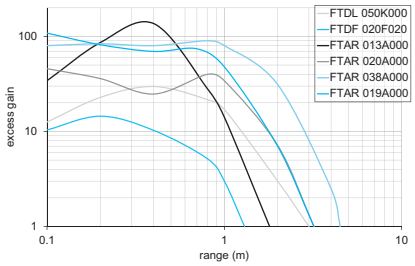
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference	connection types	output circuit	sensitivity adjustment
O300.RL-11172767	cable 4 pin, 2 m	push-pull	Teach-in and IO-Link
O300.RL-11172769	connector M8 4 pin	push-pull	Teach-in and IO-Link
O300.RL-11172800	cable 4 pin, 2 m	NPN complementary	qTeach
O300.RL-11172801	connector M8 4 pin	NPN complementary	qTeach
O300.RL-11172802	cable 4 pin, 2 m	PNP complementary	qTeach
O300.RL-11172803	connector M8 4 pin	PNP complementary	qTeach

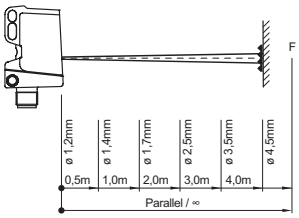


excess gain curves

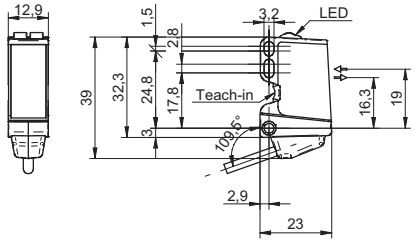


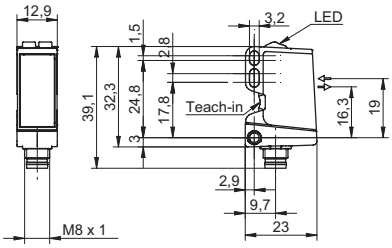


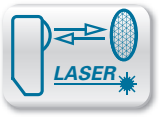
beam characteristic (typically)



dimension drawings







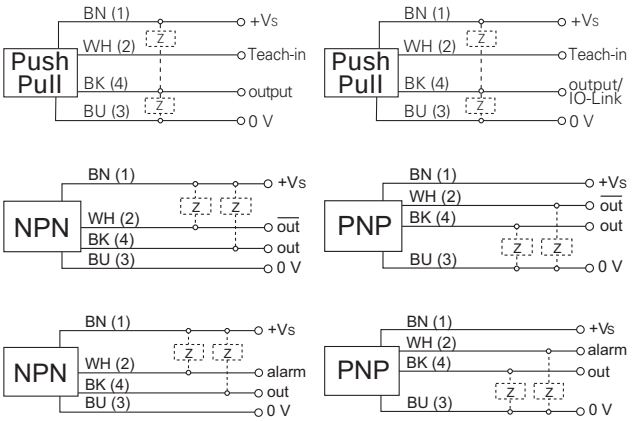
Sb = 5 m

- One inch class
- hygienic design
- laser diode

general data	
type	retro-reflective sensor
special type	hygienic design
light source	pulsed red laser diode
actual range Sb	5 m
nominal range Sn	6 m
repeat accuracy	< 0,2 mm at 500 mm
polarization filter	yes
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	Teach-in and IO-Link
laser class	1
distance to focus	parallel beam
wave length	656 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,1 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,5 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,6 mm
depth	28,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 68/69K & proTect+

order reference	connection types
O300H.RL-11172813	cable 4 pin, 2 m
O300H.RL-11172814	flylead connector M8, L=200 mm

connection diagrams



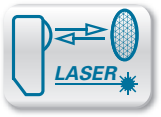
connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI11-1H	Mounting for sensors in hygienic design Ø 11 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

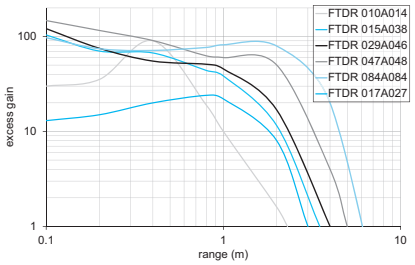
laser warning

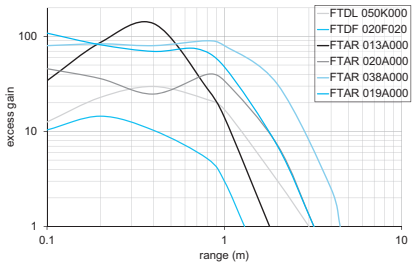
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

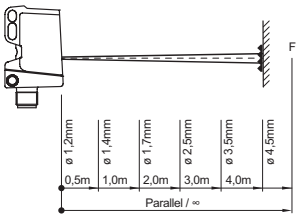


excess gain curves

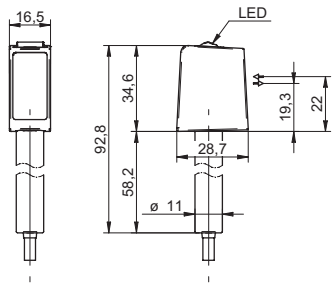


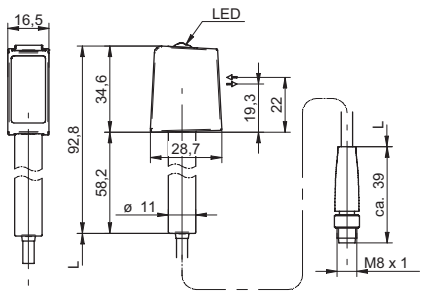


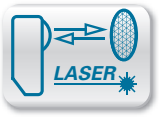
beam characteristic (typically)



dimension drawings







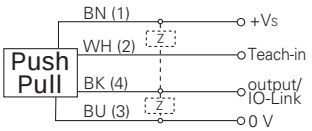
Sb = 5 m

- One inch class
- washdown design
- laser diode

general data	
type	retro-reflective sensor
special type	Washdown design
light source	pulsed red laser diode
actual range Sb	5 m
nominal range Sn	6 m
repeat accuracy	< 0,2 mm at 500 mm
polarization filter	yes
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	Teach-in and IO-Link
laser class	1
distance to focus	parallel beam
wave length	656 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,1 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,5 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,7 mm
depth	28,2 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 68/69K & proTect+

order reference
O300W.RL-11172815

connection diagram



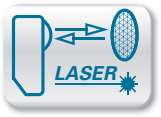
connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

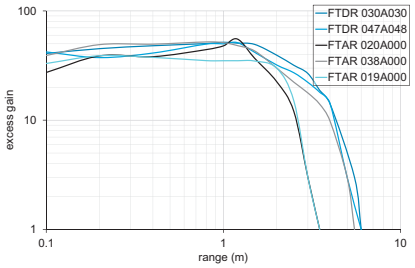
laser warning

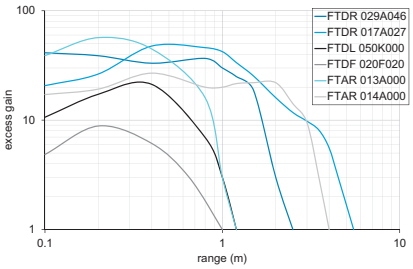
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11
except for deviations pursuant to laser
notice No. 50, dated June 24, 2007

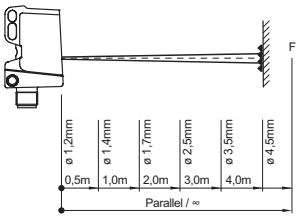


excess gain curves

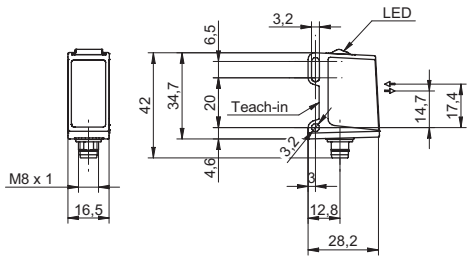


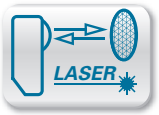


beam characteristic (typically)



dimension drawing





Sb = 10 m

- single lens optics
- long sensing range
- short response time

general data	
type	retro-reflective laser sensor
version	single lens optics
light source	pulsed red laser diode
actual range Sb	10 m
nominal range Sn	11 m
repeat accuracy	< 0,1 mm at laser focus
polarization filter	yes
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	Teach-in
laser class	1
distance to focus	400 mm
wave length	650 nm
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,2 VDC
output function	light / dark operate
output circuit	PNP
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67

order reference	connection types
OPDK 14P5901	cable 4 pin, 2 m
OPDK 14P5901/S14	connector M12 4 pin
OPDK 14P5901/S35A	connector M8 4 pin

connection diagrams

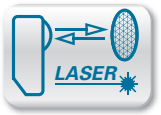
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
for details: see accessories section	

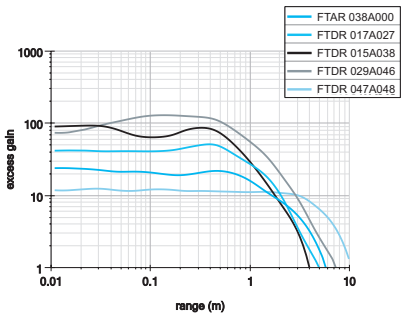
laser warning

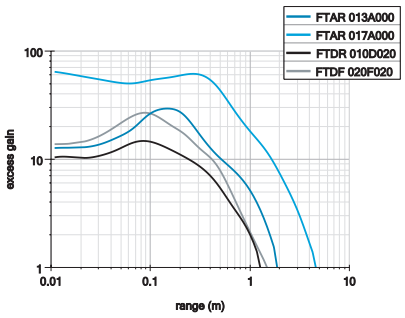
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007



excess gain curves

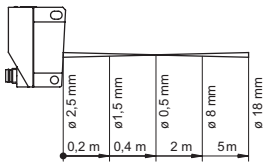




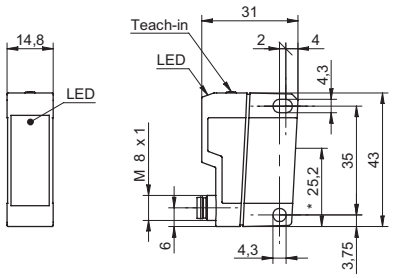
reflectors

FTAR 013A000	ø 15 mm	Sn = 1,9 m
FTAR 017A000	ø 20,7 mm	Sn = 4,4 m
FTAR 036A000	ø 46 mm	Sn = 5,8 m
FTDR 010D020	15 x 25 mm	Sn = 1,1 m
FTDR 017A027	20 x 42 mm	Sn = 5 m
FTDR 015A038	18 x 40 mm	Sn = 4 m
FTDR 029A046	32,5 x 48 mm	Sn = 7,2 m
FTDR 047A048	54 x 75 mm	Sn = 11 m
FTDF 020F020	20 x 20 mm	Sn = 1,2 m

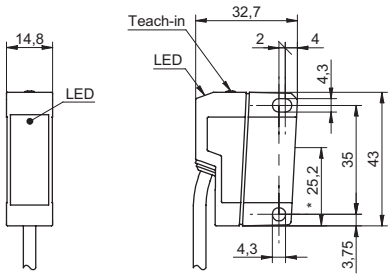
beam characteristic (typically)



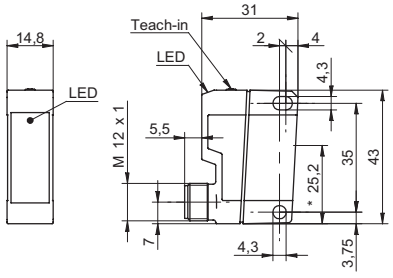
dimension drawings



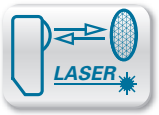
* emitter and receiver axis



* emitter and receiver axis



* emitter and receiver axis



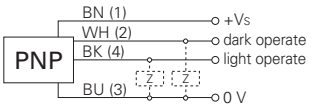
Sb = 11 m

- rugged metal housing
- high repeatability
- short response time

general data	
type	retro-reflective laser sensor
light source	pulsed red laser diode
polarization filter	yes
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
laser class	1
wave length	650 nm
actual range Sb = 7,5 m	
nominal range Sn	8,3 m
repeat accuracy	< 0,1 mm at laser focus
sensitivity adjustment	potentiometer, 270°
distance to focus	80 mm
actual range Sb = 11 m	
nominal range Sn	12 m
repeat accuracy	< 1,5 mm at 0 ... 0,5 m
sensitivity adjustment	no
distance to focus	400 mm
electrical data	
response time / release time	< 0,1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	70 mA
current consumption typ.	60 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output circuit	PNP
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	15,4 mm
height / length	50 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67

order reference	actual range Sb	connection types
OPDM 16P5102	11 m	cable 4 pin, 2 m
OPDM 16P5102/S14	11 m	connector M12 4 pin
OPDM 16P5103/S14	7,5 m	connector M12 4 pin

connection diagram



connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151721	Sensofix series 16
10113917	Mounting bracket series 16 (L design)
10116407	Lens cleaning air nozzle bracket
for details: see accessories section	

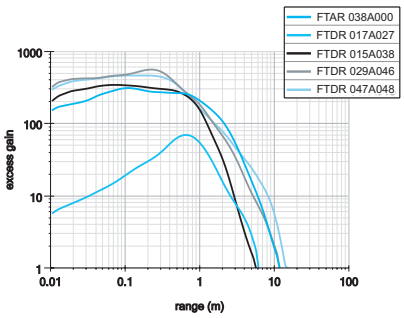
laser warning

CLASS 1 LASER PRODUCT

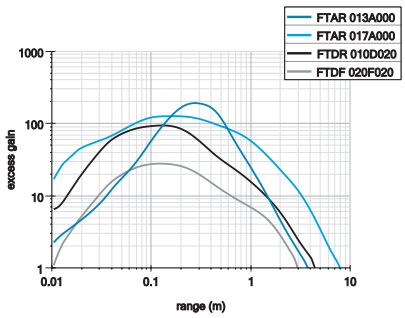
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

excess gain curves

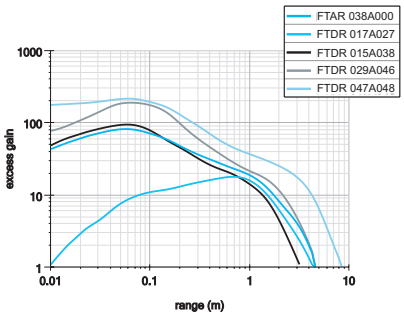
Sb = 11 m



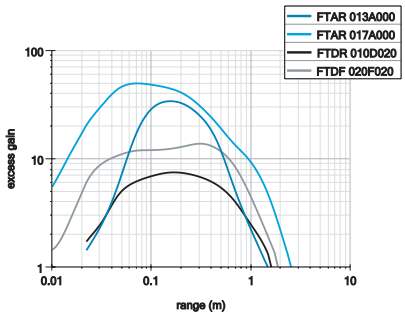
Sb = 11 m



Sb = 7,5 m



Sb = 7,5 m



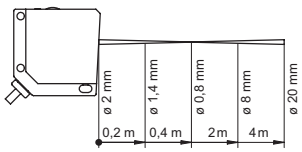
reflectors

FTAR 013A000	ø 15 mm	Sn = 1,3 m
FTAR 017A000	ø 20,7 mm	Sn = 2,4 m
FTAR 036A000	ø 46 mm	Sn = 4,4 m
FTDR 010D020	15 x 25 mm	Sn = 1,4 m
FTDR 017A027	20 x 42 mm	Sn = 4,4 m
FTDR 015A038	18 x 40 mm	Sn = 3,1 m
FTDR 029A046	32,5 x 48 mm	Sn = 4,4 m
FTDR 047A048	54 x 75 mm	Sn = 8,3 m
FTDF 020F020	20 x 20 mm	Sn = 1,8 m

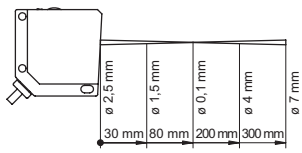
FTAR 013A000	ø 15 mm	Sn = 3,8 m
FTAR 017A000	ø 20,7 mm	Sn = 8 m
FTAR 036A000	ø 46 mm	Sn = 11 m
FTDR 010D020	15 x 25 mm	Sn = 4,2 m
FTDR 017A027	20 x 42 mm	Sn = 6 m
FTDR 015A038	18 x 40 mm	Sn = 5,5 m
FTDR 029A046	32,5 x 48 mm	Sn = 11 m
FTDR 047A048	54 x 75 mm	Sn = 12 m
FTDF 020F020	20 x 20 mm	Sn = 3 m

beam characteristics (typically)

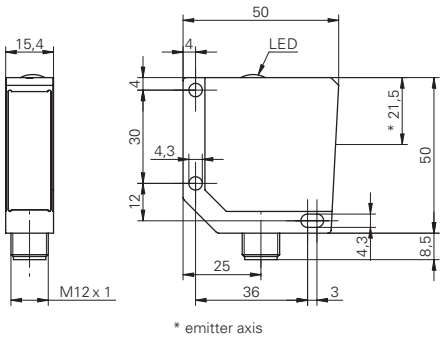
Sb = 11 m



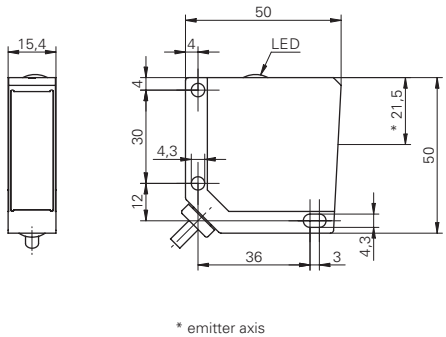
Sb = 7,5 m



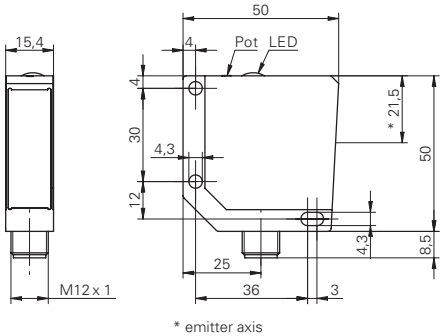
dimension drawings



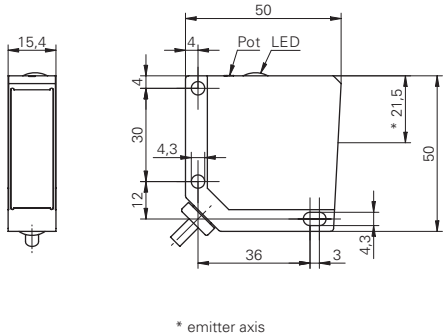
* emitter axis



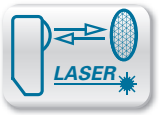
* emitter axis



* emitter axis



* emitter axis



Sb = 15 m

- short response time
- long range
- polarization filter to detect shiny objects

general data	
type	retro-reflective sensor
light source	pulsed red laser diode
actual range Sb	15 m
nominal range Sn	16 m
polarization filter	yes
output indicator	LED yellow
power on indication	LED green
sensitivity adjustment	potentiometer, 270°
laser class	1
distance to focus	parallel beam
wave length	630 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,34 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	35 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
type	cylindrical threaded
housing material	brass nickel plated
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +55 °C
protection class	IP 67

connection diagrams

connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

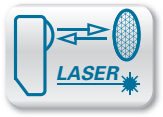
Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
for details: see accessories section	

laser warning

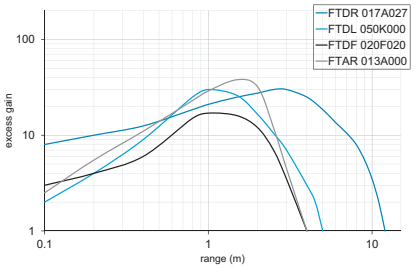
CLASS 1 LASER PRODUCT

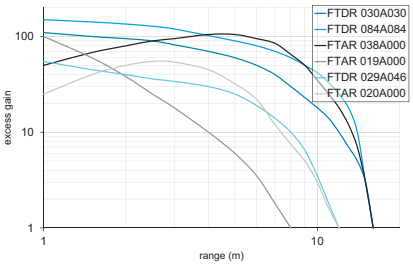
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference	connection types	height / length	output circuit
OR18.RL-11157787	cable 4 pin, 2 m	77 mm	NPN complementary
OR18.RL-11157786	connector M12 4 pin	81,5 mm	NPN complementary
OR18.RL-11157785	cable 4 pin, 2 m	77 mm	PNP complementary
OR18.RL-11157784	connector M12 4 pin	81,5 mm	PNP complementary

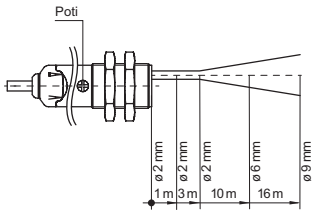


excess gain curves

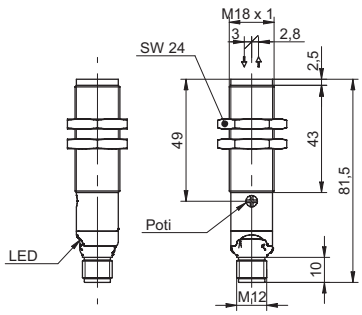


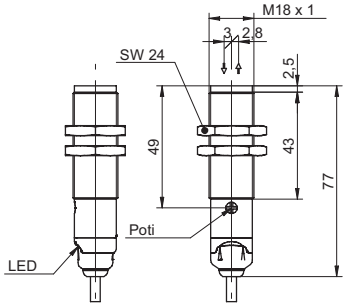


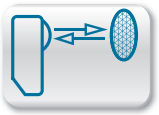
beam characteristic (typically)



dimension drawings







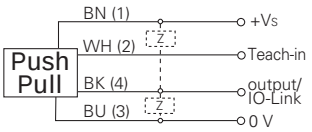
Sb = 3,5 m

- One inch class
- PinPoint LED
- designed for detection of transparent objects

general data	
type	retro-reflective sensor
version	transparency object detection
light source	pulsed PinPoint LED
actual range Sb	3,5 m
nominal range Sn	4 m
polarization filter	yes
minimal signal attenuation	10 % / 20 % / 30 %
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

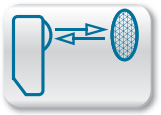
order reference	connection types
O300.RP.T-11157331	cable 4 pin, 2 m
O300.RP.T-11157334	connector M8 4 pin

connection diagram

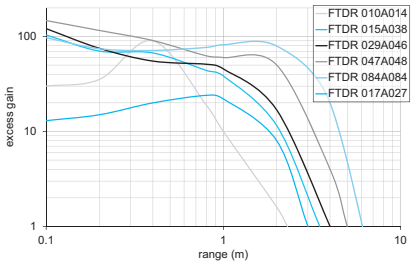


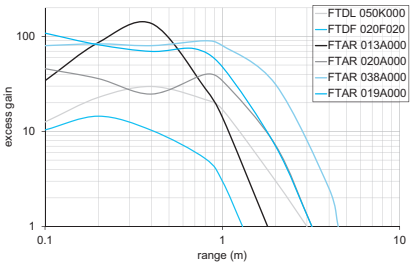
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

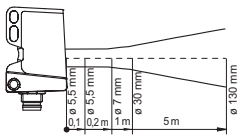


excess gain curves

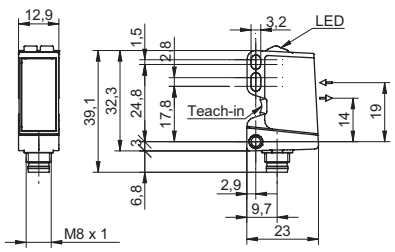


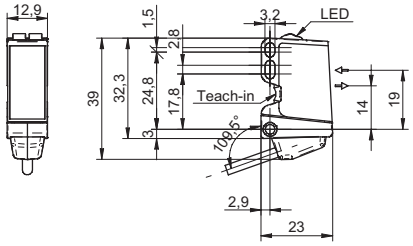


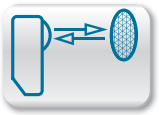
beam characteristic (typically)



dimension drawings







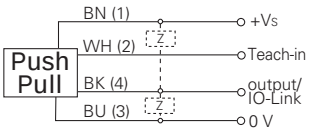
Sb = 3,5 m

- One inch class
- washdown design
- designed for detection of transparent objects

general data	
type	retro-reflective sensor
special type	Washdown design
version	transparency object detection
light source	pulsed PinPoint LED
actual range Sb	3,5 m
nominal range Sn	4 m
polarization filter	yes
minimal signal attenuation	10 % / 20 % / 30 %
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,7 mm
depth	28,2 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

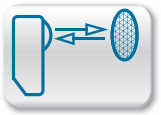
order reference
O300W.RP.T-11157338

connection diagram

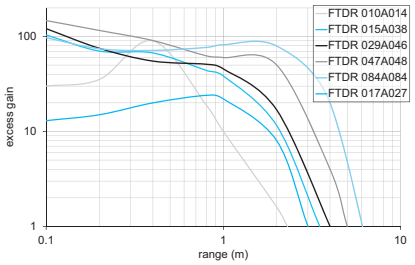


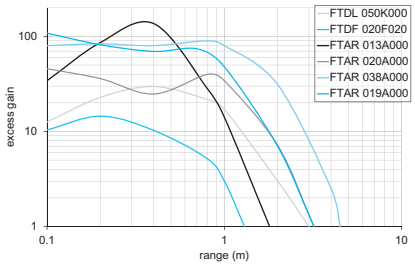
connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

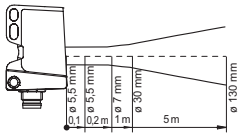


excess gain curves

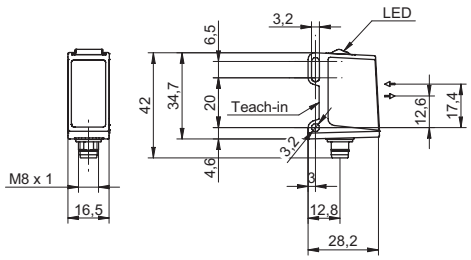


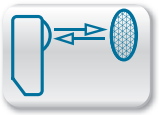


beam characteristic (typically)



dimension drawing





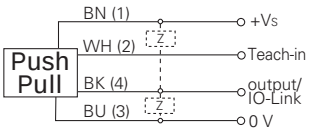
Sb = 3,5 m

- One inch class
- hygienic design
- designed for detection of transparent objects

general data	
type	retro-reflective sensor
special type	hygienic design
version	transparency object detection
light source	pulsed PinPoint LED
actual range Sb	3,5 m
nominal range Sn	4 m
polarization filter	yes
minimal signal attenuation	10 % / 20 % / 30 %
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,6 mm
depth	28,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

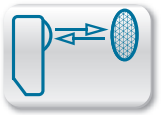
order reference	connection types
O300H.RP.T-11157335	cable 4 pin, 2 m
O300H.RP.T-11157337	flylead connector M8, L=200 mm

connection diagram

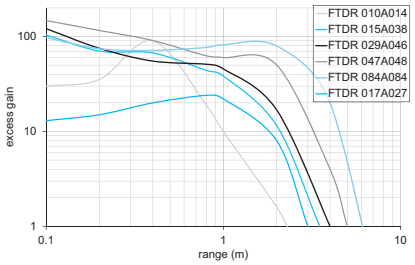


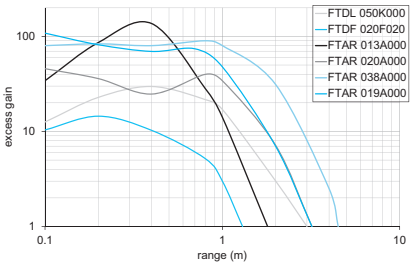
connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI11-1H	Mounting for sensors in hygienic design Ø 11 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

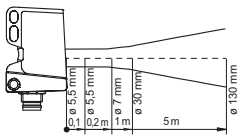


excess gain curves

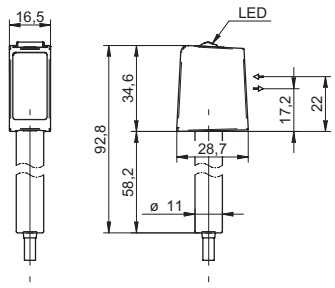


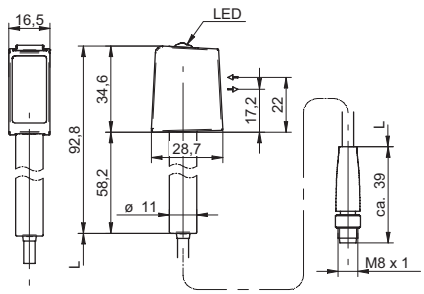


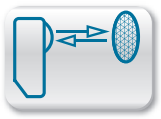
beam characteristic (typically)



dimension drawings







Sb = 7 m

- designed for detection of transparent objects
- sensitivity adjustable via Teach-in
- short response time

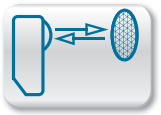
general data	
type	retro-reflective sensor
version	for transparent objects
light source	pulsed red LED
actual range Sb	7 m
nominal range Sn	8 m
polarization filter	no
light indicator	LED yellow
sensitivity adjustment	Teach-in
wave length	660 nm
electrical data	
response time / release time	< 0,1 ms
teach-in signal time	> 500 µs
adaption time	< 20 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	35 mA
voltage drop Vd	< 2,2 VDC
output function	light / dark operate switchable
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

connection diagrams

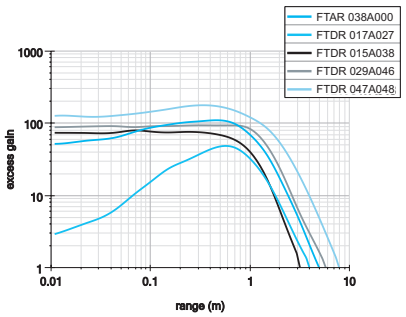
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

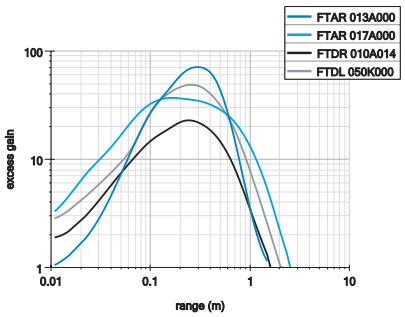
Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
for details: see accessories section	

order reference	connection types	output circuit
FRDK 14N6901	cable 4 pin, 2 m	NPN
FRDK 14N6901/S14	connector M12 4 pin	NPN
FRDK 14N6901/S35A	connector M8 4 pin	NPN
FRDK 14P6901	cable 4 pin, 2 m	PNP
FRDK 14P6901/S14	connector M12 4 pin	PNP
FRDK 14P6901/S35A	connector M8 4 pin	PNP



excess gain curves

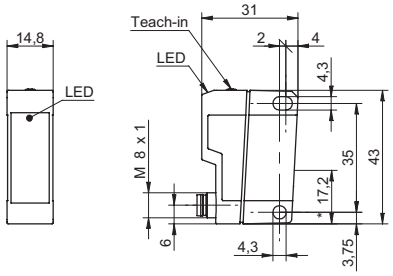




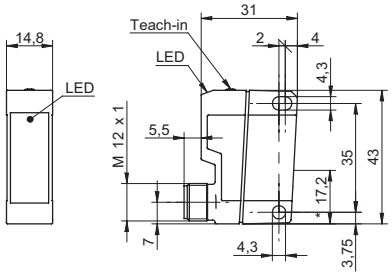
reflectors

FTAR 013A000	ø 15 mm	Sn = 1,7 m
FTAR 017A000	ø 20,7 mm	Sn = 2,4 m
FTAR 036A000	ø 46 mm	Sn = 5 m
FTDR 010A014	12,8 x 16,8 mm	Sn = 1,7 m
FTDR 017A027	20 x 42 mm	Sn = 4 m
FTDR 015A038	18 x 40 mm	Sn = 2,1 m
FTDR 029A046	32,5 x 48 mm	Sn = 5,8 m
FTDR 047A048	54 x 75 mm	Sn = 8 m
FTDL 050K000/... m	tape 50 x ... mm	Sn = 2 m

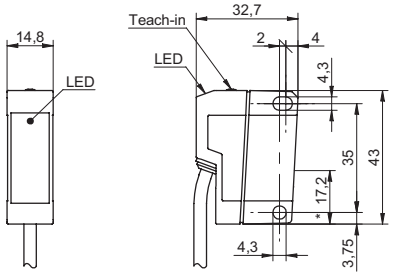
dimension drawings



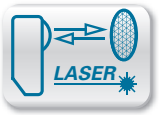
* emitter axis



* emitter axis



* emitter axis



Sb = 4,5 m

- designed for detection of transparent objects
- single lens optics
- short response time

general data	
type	retro-reflective laser sensor
version	for transparent objects single lens optics
light source	pulsed red laser diode
actual range Sb	4,5 m
nominal range Sn	5,2 m
repeat accuracy	< 0,1 mm at laser focus
polarization filter	yes
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	Teach-in
laser class	1
distance to focus	100 mm
wave length	650 nm
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,2 VDC
output circuit	PNP
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67

connection diagrams

connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

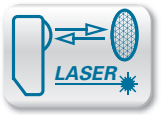
Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
for details: see accessories section	

laser warning

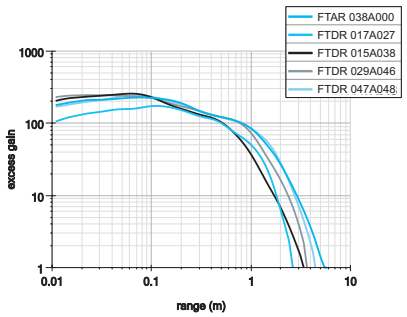
CLASS 1 LASER PRODUCT

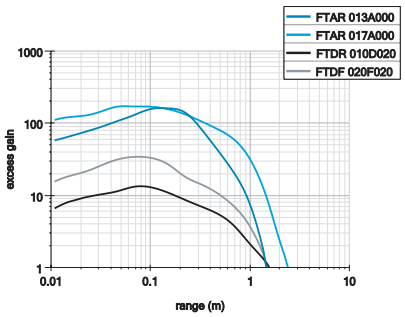
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference	connection types	output function	teach value stored after power-off
OPDK 14P1902	cable 4 pin, 2 m	light operate	volatile
OPDK 14P1902/S14	connector M12 4 pin	light operate	volatile
OPDK 14P1902/S35A	connector M8 4 pin	light operate	volatile
OPDK 14P1903	cable 4 pin, 2 m	light operate	non volatile
OPDK 14P1903/S14	connector M12 4 pin	light operate	non volatile
OPDK 14P1903/S35A	connector M8 4 pin	light operate	non volatile
OPDK 14P3902	cable 4 pin, 2 m	dark operate	volatile
OPDK 14P3902/S14	connector M12 4 pin	dark operate	volatile
OPDK 14P3902/S35A	connector M8 4 pin	dark operate	volatile
OPDK 14P3903	cable 4 pin, 2 m	dark operate	non volatile
OPDK 14P3903/S14	connector M12 4 pin	dark operate	non volatile
OPDK 14P3903/S35A	connector M8 4 pin	dark operate	non volatile



excess gain curves

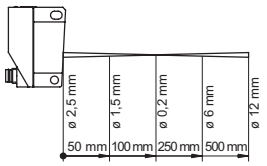




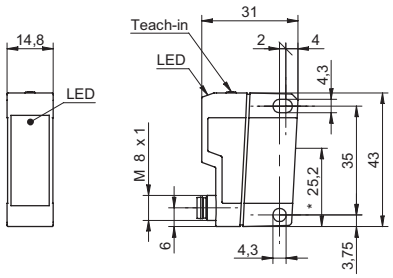
reflectors

FTAR 013A000	ø 15 mm	Sn = 1,4 m
FTAR 017A000	ø 20,7 mm	Sn = 2,2 m
FTAR 036A000	ø 46 mm	Sn = 4,2 m
FTDR 010D020	15 x 25 mm	Sn = 1,4 m
FTDR 017A027	20 x 42 mm	Sn = 2,6 m
FTDR 015A038	18 x 40 mm	Sn = 3,2 m
FTDR 029A046	32,5 x 48 mm	Sn = 3,6 m
FTDR 047A048	54 x 75 mm	Sn = 5,2 m
FTDF 020F020	20 x 20 mm	Sn = 1,4 m

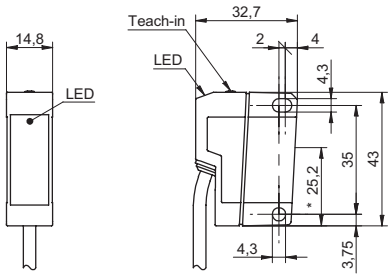
beam characteristic (typically)



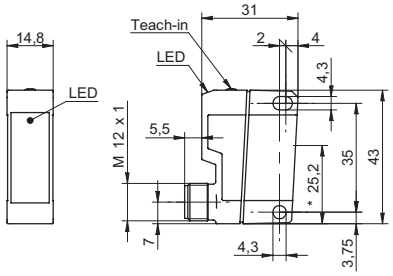
dimension drawings



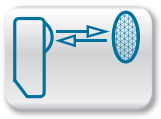
* emitter and receiver axis



* emitter and receiver axis



* emitter and receiver axis



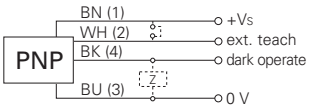
Sb = 6 m

- rugged metal housing
- designed for detection of transparent objects
- sensitivity adjustable via Teach-in

general data	
type	retro-reflective sensor
version	for transparent objects
light source	pulsed red LED
actual range Sb	6 m
nominal range Sn	7,2 m
polarization filter	yes
light indicator	LED yellow
sensitivity adjustment	Teach-in
wave length	660 nm
electrical data	
response time / release time	< 2,5 ms
adaption time	< 25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	50 mA
current consumption typ.	40 mA
voltage drop Vd	< 1,8 VDC
output function	dark operate
output circuit	PNP
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	15,4 mm
height / length	50 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

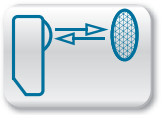
order reference
FPDM 16P3921/S14

connection diagram

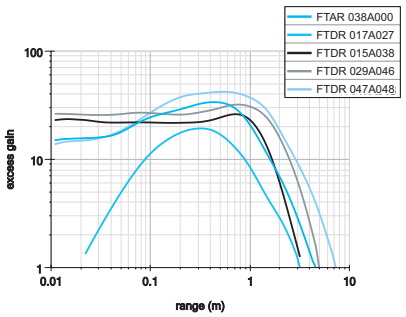


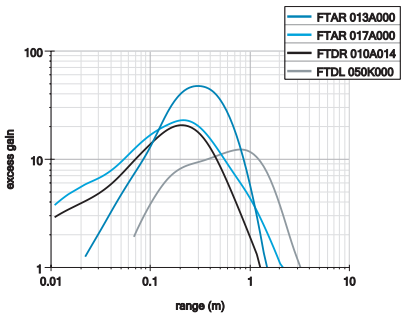
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151721	Sensofix series 16
10113917	Mounting bracket series 16 (L design)
10116407	Lens cleaning air nozzle bracket
for details: see accessories section	



excess gain curves

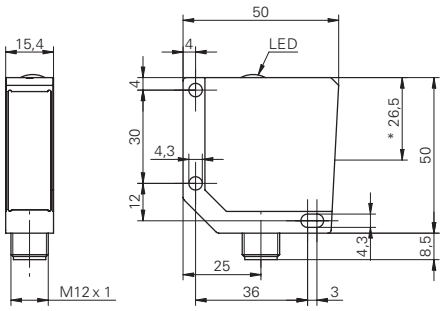




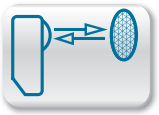
reflectors

FTAR 013A000	ø 15 mm	Sn = 1,5 m
FTAR 017A000	ø 20,7 mm	Sn = 2,1 m
FTAR 036A000	ø 46 mm	Sn = 4,6 m
FTDR 010D014	12,8 x 16,8 mm	Sn = 1,3 m
FTDR 017A027	20 x 42 mm	Sn = 3,1 m
FTDR 015A038	18 x 40 mm	Sn = 3,2 m
FTDR 029A046	32,5 x 48 mm	Sn = 5 m
FTDR 047A048	54 x 75 mm	Sn = 7,2 m
FTDL 050K000/... m	tape 50 x ... mm	Sn = 3 m

dimension drawing



* emitter axis



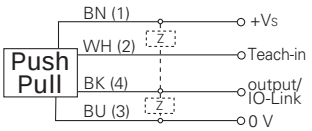
Sb = 5,5 m

- PinPoint LED
- designed for detection of transparent objects
- polarization filter to detect shiny objects

general data	
type	retro-reflective sensor
version	transparency object detection
light source	pulsed PinPoint LED
actual range Sb	5,5 m
nominal range Sn	6 m
polarization filter	yes
minimal signal attenuation	10 % / 20 % / 30 %
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	45 mm
depth	32 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

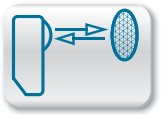
order reference	connection types
O500.RP.T-11157339	cable 4 pin, 2 m
O500.RP.T-11157351	connector M12 4 pin

connection diagram

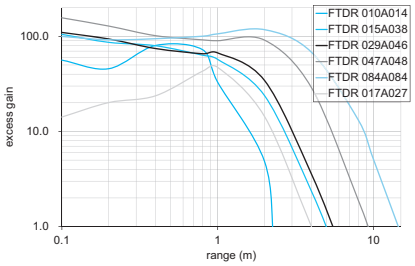


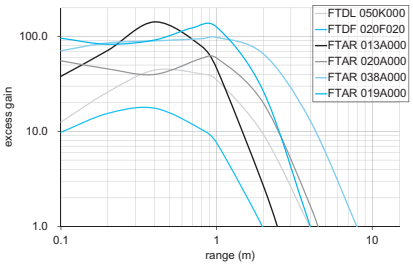
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11099942	Sensofix O500/U500
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
for details: see accessories section	

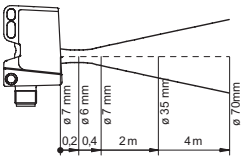


excess gain curves

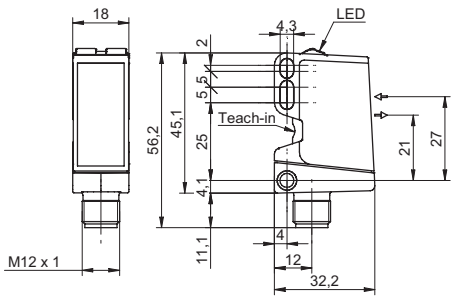


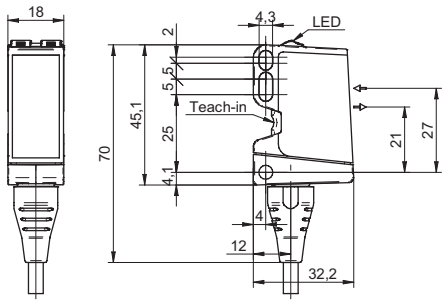


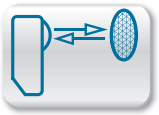
beam characteristic (typically)



dimension drawings







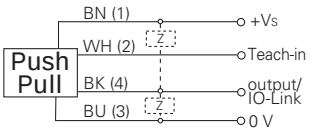
Sb = 5,5 m

- washdown design
- PinPoint LED
- designed for detection of transparent objects

general data	
type	retro-reflective sensor
special type	Washdown design
version	transparency object detection
light source	pulsed PinPoint LED
actual range Sb	5,5 m
nominal range Sn	6 m
polarization filter	yes
minimal signal attenuation	10 % / 20 % / 30 %
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,2 mm
depth	37,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

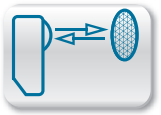
order reference
O500W.RP.T-11157357

connection diagram

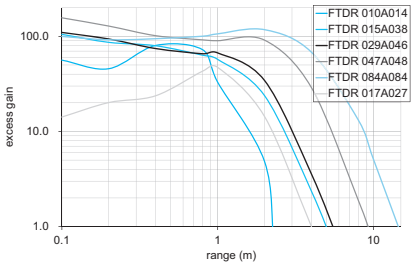


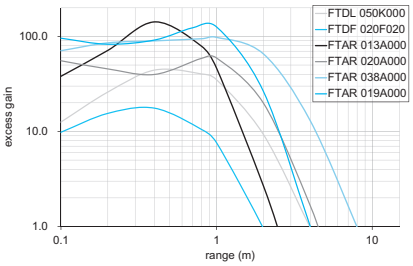
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
11099942	Sensofix O500/U500
for details: see accessories section	

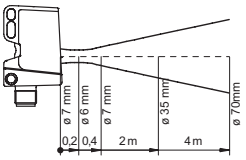


excess gain curves

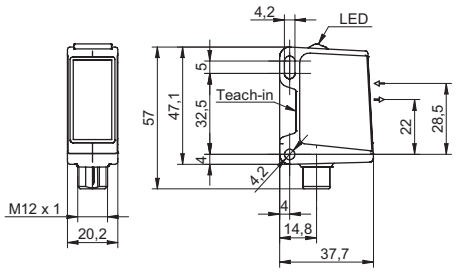


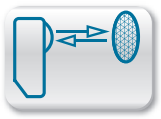


beam characteristic (typically)



dimension drawing





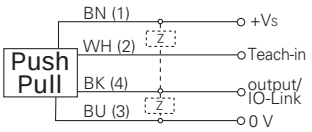
Sb = 5,5 m

- hygienic design
- PinPoint LED
- designed for detection of transparent objects

general data	
type	retro-reflective sensor
special type	hygienic design
version	transparency object detection
light source	pulsed PinPoint LED
actual range Sb	5,5 m
nominal range Sn	6 m
polarization filter	yes
minimal signal attenuation	10 % / 20 % / 30 %
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,7 mm
depth	36,4 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

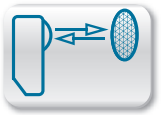
order reference	connection types
O500H.RP.T-11157354	cable 4 pin, 2 m
O500H.RP.T-11157356	flylead connector M12, L=300 mm

connection diagram

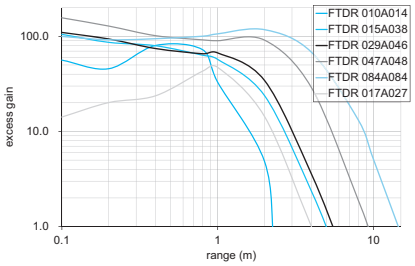


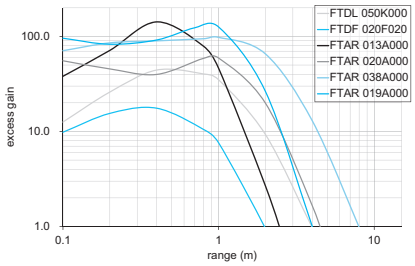
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI17-1H	Mounting for sensors in hygienic design Ø 17 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

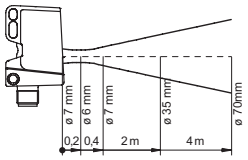


excess gain curves

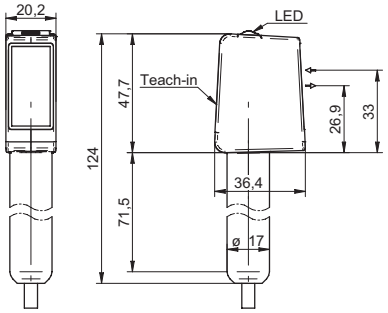


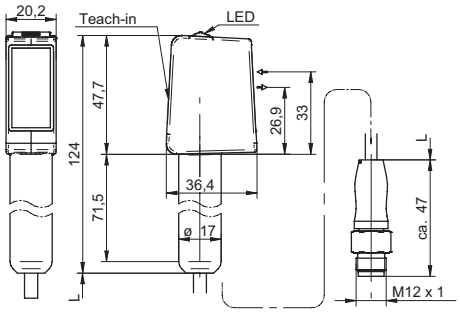


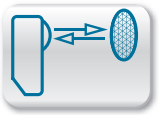
beam characteristic (typically)



dimension drawings







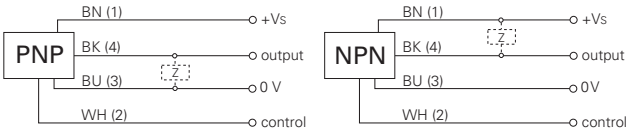
Sb = 0.5 m

- designed for detection of transparent objects
- polarization filter to detect shiny objects
- sensitivity adjustable via potentiometer

general data	
type	retro-reflective sensor
version	transparency object detection
light source	pulsed red LED
actual range Sb	0,5 m
nominal range Sn	0,8 m
polarization filter	yes
output indicator	LED yellow
sensitivity adjustment	potentiometer, 270°
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	67,2 mm
type	cylindrical threaded
housing material	plastic (ABS TERLURAN)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67

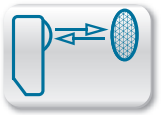
order reference	output circuit
OR18.RR.T-11157789	NPN
OR18.RR.T-11157788	PNP

connection diagrams

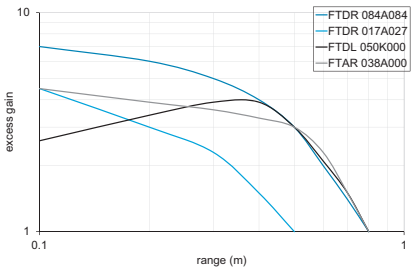


connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

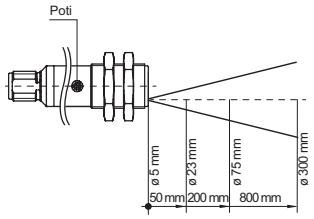
Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
ZPART-M18.NUT	Clamping nut for sensors Ø 18 mm
for details: see accessories section	



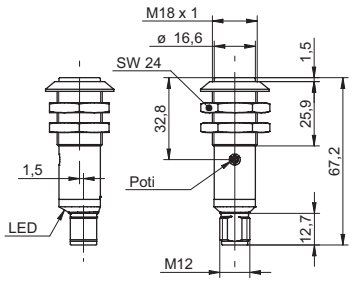
excess gain curve

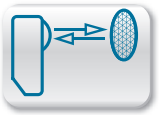


beam characteristic (typically)



dimension drawing





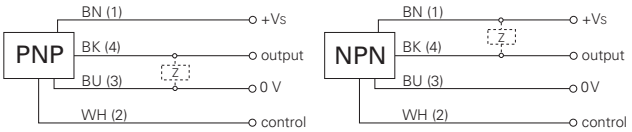
Sb = 4 m

- washdown design
- designed for detection of transparent objects
- polarization filter to detect shiny objects

general data	
type	retro-reflective sensor
special type	Washdown design
version	transparency object detection
light source	pulsed red LED
actual range Sb	0,5 m
nominal range Sn	0,8 m
polarization filter	yes
output indicator	LED yellow
sensitivity adjustment	potentiometer, 270°
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	67,2 mm
type	cylindrical threaded
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67/69K

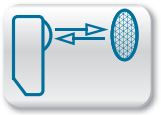
order reference	output circuit
OR18W.RR.T-11157846	NPN
OR18W.RR.T-11157845	PNP

connection diagrams

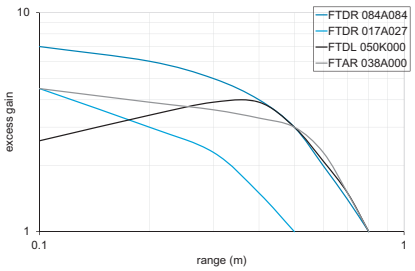


connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

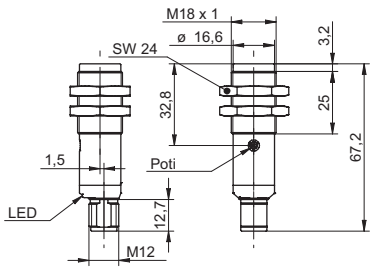
Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
for details: see accessories section	

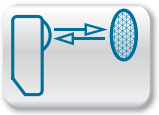


excess gain curve



dimension drawing





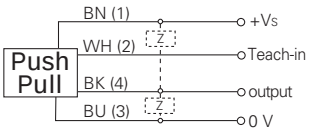
Sb = 5 m

- One inch class
- washdown design
- PinPoint LED

general data	
type	retro-reflective sensor
special type	Washdown design
light source	pulsed PinPoint LED
actual range Sb	5 m
nominal range Sn	6 m
polarization filter	yes
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	qTeach / remote
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	25 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,7 mm
depth	28,2 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

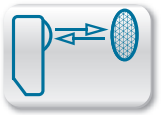
order reference
O300W.RP-11127720

connection diagram

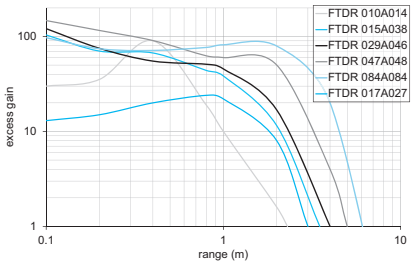


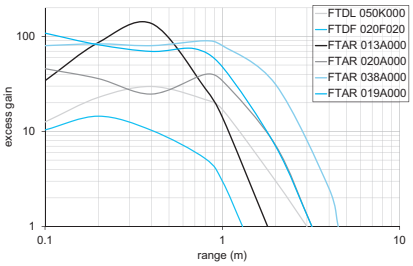
connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

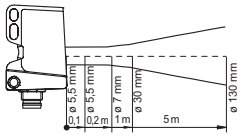


excess gain curves

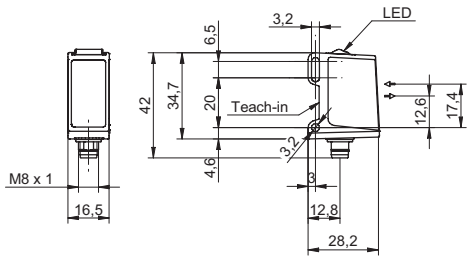


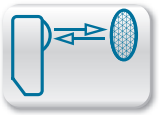


beam characteristic (typically)



dimension drawing





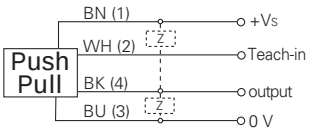
Sb = 5 m

- One inch class
- hygienic design
- PinPoint LED

general data	
type	retro-reflective sensor
special type	hygienic design
light source	pulsed PinPoint LED
actual range Sb	5 m
nominal range Sn	6 m
polarization filter	yes
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	Teach-in: remote
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	25 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,6 mm
depth	28,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

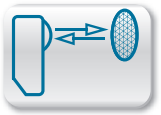
order reference	connection types
O300H.RP-11127716	cable 4 pin, 2 m
O300H.RP-11157327	flylead connector M8, L=200 mm

connection diagram

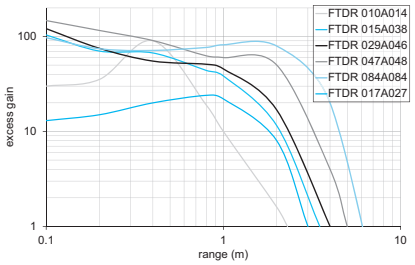


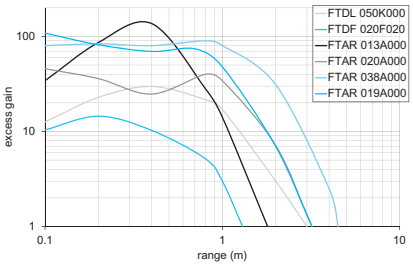
connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI11-1H	Mounting for sensors in hygienic design Ø 11 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

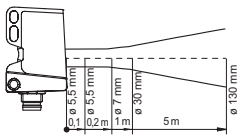


excess gain curves

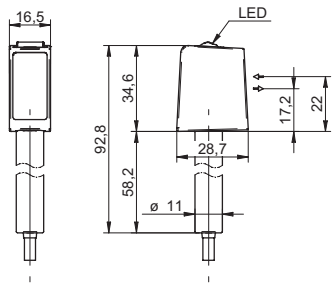


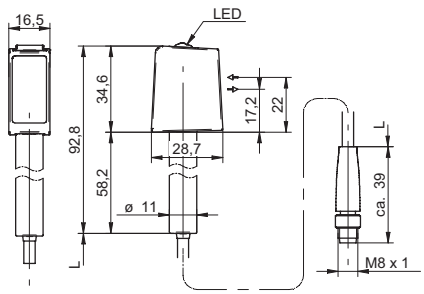


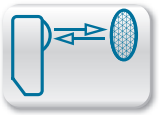
beam characteristic (typically)



dimension drawings







Sb = 3 m

- washdown design
- Ecolab approved

general data	
type	retro-reflective sensor
special type	Washdown design
light source	pulsed red LED
actual range Sb	3 m
nominal range Sn	3,5 m
polarization filter	yes
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	no
wave length	660 nm
suppression of reciprocal influence	yes
approvals/certificates	Ecolab
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	19,6 mm
height / length	51 mm
depth	34,3 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12
ambient conditions	
operating temperature	-30 ... +60 °C
protection class	IP 68/69K & proTect+
storage temperature	-30 ... +70 °C

order reference	output circuit
FPDR 14N5101/S14	NPN
FPDR 14P5101/S14	PNP

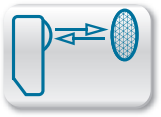
connection diagrams

connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

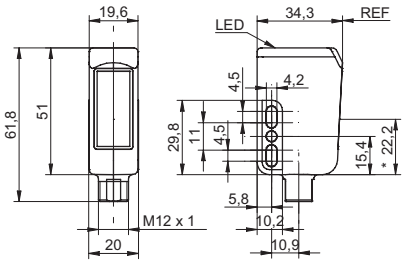
Accessories	
11046278	Mounting bracket series 14 washdown
11046279	Sensofix series 14 washdown
for details: see accessories section	

remarks

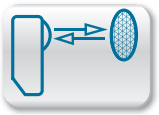
Sensor FDA compliant and Ecolab approved
LSR = Liquid Silicon Rubber



dimension drawing



* emitter axis



Sb = 3 m

- hygienic design
- EHEDG certified

general data	
type	retro-reflective sensor
special type	hygienic design
light source	pulsed red LED
actual range Sb	3 m
nominal range Sn	3,5 m
polarization filter	yes
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	no
wave length	660 nm
suppression of reciprocal influence	yes
approvals/certificates	Ecolab EHEDG
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	19,6 mm
height / length	52,2 mm
depth	34,3 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-30 ... +60 °C
protection class	IP 68/69K & proTect+
storage temperature	-30 ... +70 °C

connection diagrams

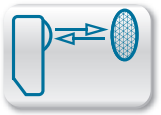
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI17-1H	Mounting for sensors in hygienic design Ø 17 mm
for details: see accessories section	

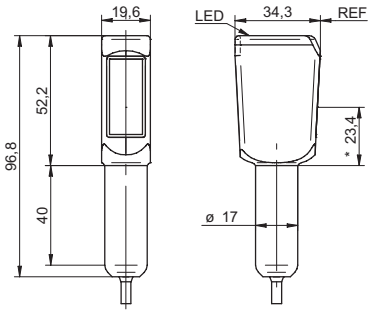
remarks

Sensor FDA compliant, EHEDG certified and Ecolab approved
LSR = Liquid Silicon Rubber

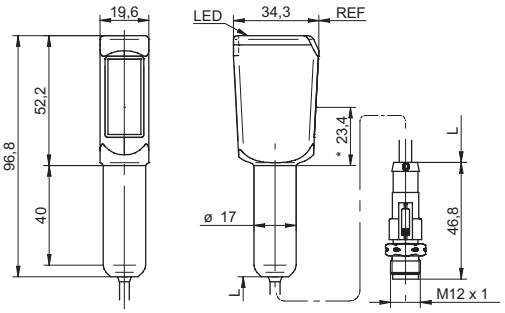
order reference	connection types	output circuit
FPDH 14N5101	cable 4 pin, 2 m	NPN
FPDH 14N5101/KS34A	flylead connector M12, L=300 mm	NPN
FPDH 14P5101	cable 4 pin, 2 m	PNP
FPDH 14P5101/KS34A	flylead connector M12, L=300 mm	PNP



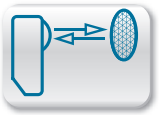
dimension drawings



* emitter axis



* emitter axis



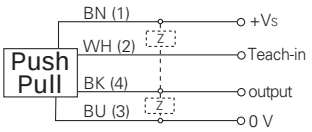
Sb = 7,5 m

- washdown design
- PinPoint LED
- polarization filter to detect shiny objects

general data	
type	retro-reflective sensor
special type	Washdown design
light source	pulsed PinPoint LED
actual range Sb	7,5 m
nominal range Sn	8 m
polarization filter	yes
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	qTeach / remote
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,2 mm
depth	37,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

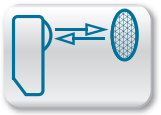
order reference
O500W.RP-11107745

connection diagram

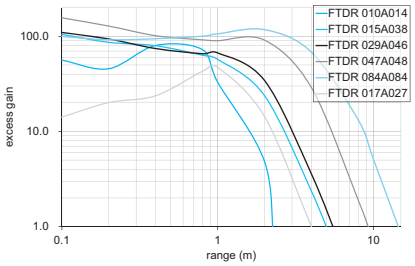


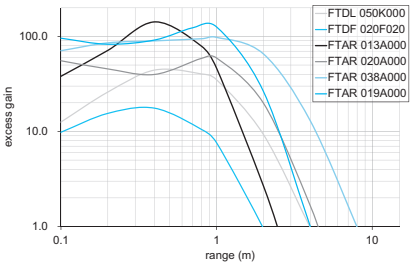
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
11099942	Sensofix O500/U500
for details: see accessories section	

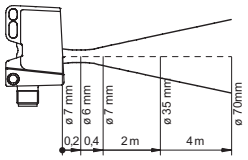


excess gain curves

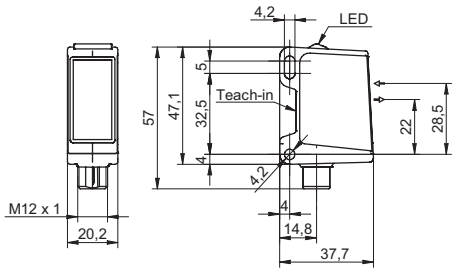


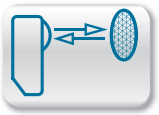


beam characteristic (typically)



dimension drawing





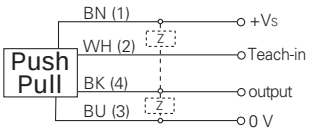
Sb = 7,5 m

- washdown design
- PinPoint LED
- polarization filter to detect shiny objects

general data	
type	retro-reflective sensor
special type	Washdown design
light source	pulsed PinPoint LED
actual range Sb	7,5 m
nominal range Sn	8 m
polarization filter	yes
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	Teach-in: remote
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,2 mm
depth	37,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

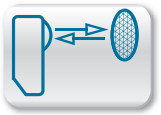
order reference
O500W.RP-11125066

connection diagram

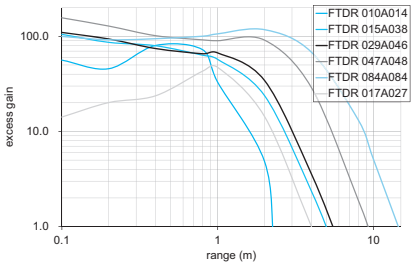


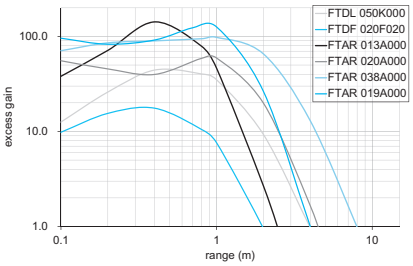
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
11099942	Sensofix O500/U500
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

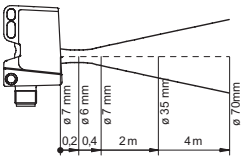


excess gain curves

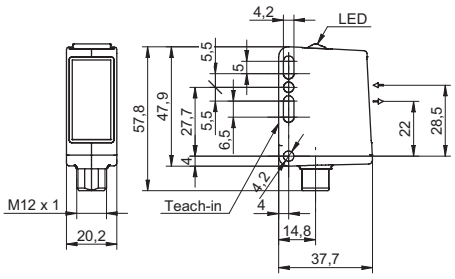


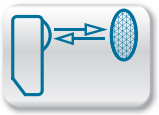


beam characteristic (typically)



dimension drawing





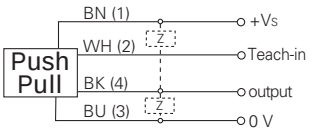
Sb = 7,5 m

- hygienic design
- PinPoint LED
- polarization filter to detect shiny objects

general data	
type	retro-reflective sensor
special type	hygienic design
light source	pulsed PinPoint LED
actual range Sb	7,5 m
nominal range Sn	8 m
polarization filter	yes
light indicator	LED yellow
power on indication	LED green
sensitivity adjustment	Teach-in: remote
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,7 mm
depth	36,4 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

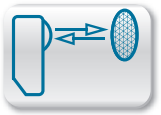
order reference	connection types
O500H.RP-11107831	cable 4 pin, 2 m
O500H.RP-11107832	flylead connector M12, L=300 mm

connection diagram

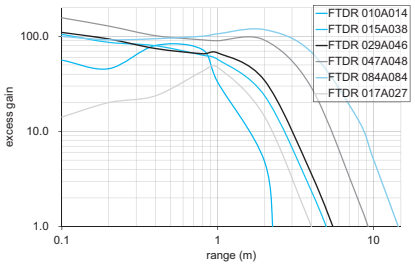


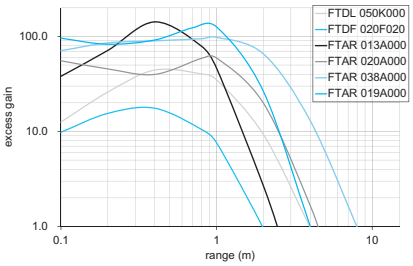
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI17-1H	Mounting for sensors in hygienic design Ø 17 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

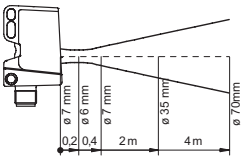


excess gain curves

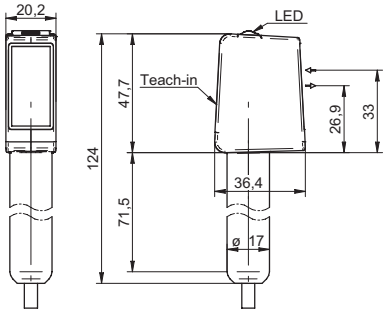


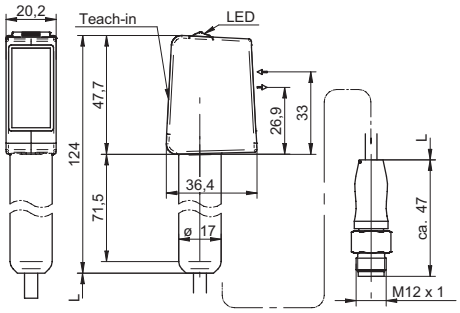


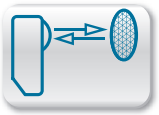
beam characteristic (typically)



dimension drawings







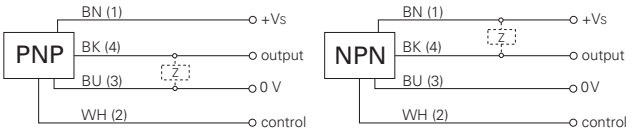
Sb = 3,5 m

- washdown design
- polarization filter to detect shiny objects
- sensitivity adjustable via potentiometer

general data	
type	retro-reflective sensor
special type	Washdown design
light source	pulsed red LED
actual range Sb	3,5 m
nominal range Sn	4,5 m
polarization filter	yes
alignment / soiled lens indicator	LED green
output indicator	LED yellow
sensitivity adjustment	potentiometer, 270°
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	67,2 mm
type	cylindrical threaded
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67/69K

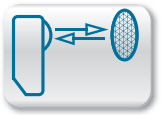
order reference	output circuit
OR18W.RR-11157844	NPN
OR18W.RR-11157843	PNP

connection diagrams

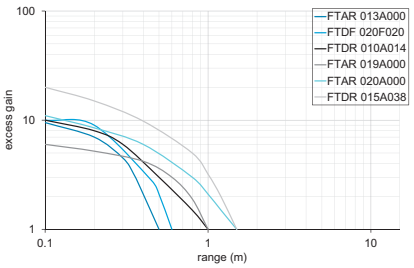


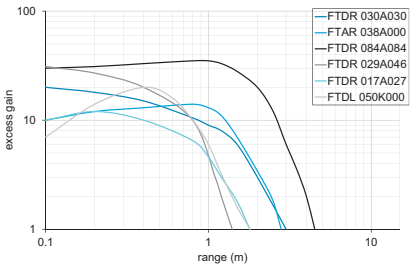
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
for details: see accessories section	

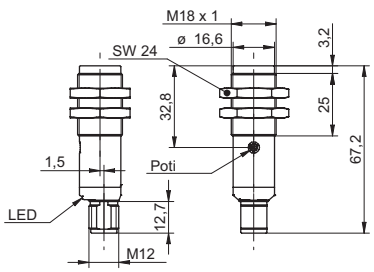


excess gain curves





dimension drawing



red light LED version

product family	FSCK 07 / FECK 07	FSDK 07 / FEDK 07	FSDM 08 / FEDM 08	FSDM 08 / FEDM 08	FSAM 08 / FEAM 08	FSDK 10 / FEDK 10	FSDM 12 / FEDM 12
width / diameter	8 mm	8 mm	8 mm	8 mm	8 mm	10,4 mm	12,4 mm
actual range Sb	2 m	2 m	0,7 m	2,5 m	2,5 m	5 m	6 m
response time / release time	< 0,5 ms	< 0,5 ms	< 2,5 ms	< 2,5 ms	< 2,5 ms	< 1,4 ms	< 1 ms
light source	pulsed red LED	pulsed red LED	pulsed infrared diode	pulsed infrared diode	pulsed infrared diode	pulsed red LED	pulsed red LED
sensitivity adjustment	Teach-in	Teach-in	no	no	no	potentiometer, 270°	no
output circuit	NPN PNP	NPN PNP	PNP	PNP	PNP	NPN PNP	PNP
connection types	cable flylead connector	cable flylead connector	cable connector	cable connector	cable connector	cable connector flylead connector	cable connector
housing material	plastic	plastic	metal	metal	metal	plastic	metal
protection class	IP 65	IP 65	IP 65	IP 65	IP 65	IP 65 IP 67	IP 67
page	**184**	**186**	**188**	**190**	**192**	**194**	**196**

laser version

product family	OSDK 10 / OEDK 10	O300.EL / O300.TL	O300W.EL / O300W.TL	O300H.EL / O300H.TL	OSDK 14 / OEDK 14	OR18.EL / OR18.TL
width / diameter	10,4 mm	12,9 mm	16,5 mm	16,5 mm	14,8 mm	18 mm
actual range Sb	8 m	40 m	40 m	40 m	8 m	55 m
response time / release time	< 0,2 ms	< 0,49 ms	< 0,49 ms	< 0,49 ms	< 0,5 ms	< 0,34 ms
light source	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
sensitivity adjustment	potentiometer, 270°	qTeach / remote qTeach	qTeach / remote	Teach-in: remote	no	potentiometer, 270°
output circuit	NPN PNP	push-pull NPN PNP	push-pull	push-pull	PNP	NPN PNP
connection types	cable connector	cable connector	connector	cable flylead connector	cable connector	cable connector
housing material	plastic	plastic	metal	metal	plastic	metal
protection class	IP 65 IP 67	IP 67	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 67	IP 67
page	**206**	**208**	**212**	**216**	**220**	**222**

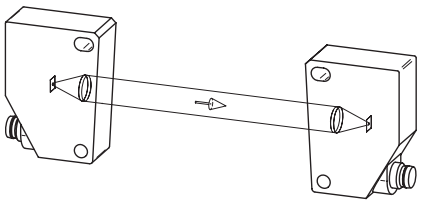
O300.ER / O300.TR	FSDK 14 / FEDK 14	O500.ER / O500.TR	OR18.EI / OR18.TI
12,9 mm	14,8 mm	18 mm	18 mm
10 m	12 m	25 m	13 m
< 0,49 ms	< 1,2 ms	< 0,49 ms	< 2 ms
pulsed red LED	pulsed red LED	pulsed red LED	pulsed infrared diode
qTeach / remote qTeach	no	qTeach / remote qTeach	potentiometer, 270°
push-pull NPN PNP	NPN PNP	push-pull NPN PNP	NPN PNP
cable connector	cable connector	cable connector	connector cable flylead connector
plastic	plastic	plastic	plastic
IP 67	IP 67	IP 67	IP 67
198	**200**	**202**	**204**

stainless steel sensors in washdown or hygienic design

product family	O300W.ER / O300W.TR	O300H.ER / O300H.TR	O500W.ER / O500W.TR	O500H.ER / O500H.TR	OR18W.EI / OR18W.TI
width / diameter	16,5 mm	16,5 mm	20,2 mm	20,2 mm	18 mm
actual range Sb	10 m	10 m	25 m	25 m	13 m
response time / release time	< 0,49 ms	< 0,49 ms	< 0,49 ms	< 0,49 ms	< 2 ms
light source	pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED	pulsed infrared diode
sensitivity adjustment	qTeach / remote	Teach-in: remote	qTeach / remote	Teach-in: remote	potentiometer, 270°
output circuit	push-pull	push-pull	push-pull	push-pull	NPN PNP
connection types	connector	cable flylead connector	connector	cable flylead connector	connector
housing material	metal	metal	metal	metal	metal
protection class	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 67/69K
page	**224**	**226**	**228**	**230**	**232**

General information

An emitter in a separate housing transmits the light to a separate receiver. The object is detected when it breaks the emitted beam.



Applications

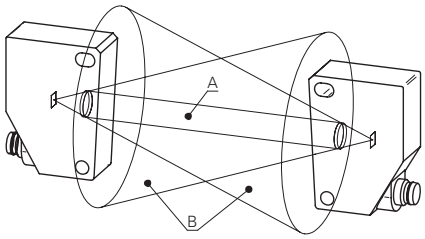
- Detection of objects at a great distance – through beam sensors have the longest ranges.
- Monitoring of doors and entrances
- Due to the good repeatability throughout the entire range, positioning of objects
- Reliable detection of high-gloss objects such as mirrors, wafers or chrome-plated surfaces

Characteristics and advantages

- Due to the separated configuration, long ranges with large signal excess gain can be achieved in comparison with equivalent retro-reflective systems. Through beam sensors are therefore most suitable for operation in unfavorable ambient conditions such as dirt, dust and moisture.
- The clearly defined, consistent active zone permits highly constant repeatability throughout the entire sensing distance.
- The switching point is independent of the surface properties of the object.

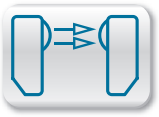
Technology and operation

The active area (A) of a through beam sensor is equal to the diameter of the lens of the receiver or emitter. The acceptance zone (B) of the emitter and receiver is larger. However, this is only important for adjustment and for operation close to glossy surfaces. With focused through beam laser sensors, the active area is the diameter of the laser beam if this is smaller than the receiver lens or the front opening at the receiver end.



Mounting and adjustment

The emitter and receiver must be aimed at each other. The narrower the angle of radiation and reception, the more accurately this must be conducted.

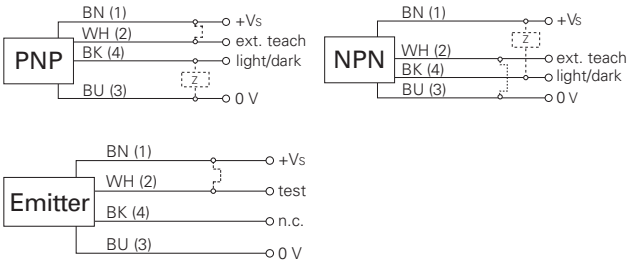


Sb = 2 m

- compact housing
- sensing range adjustable via Teach-in
- test input

general data	
type	through beam sensor
actual range Sb	2 m
nominal range Sn	2,5 m
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED green
output indicator	LED yellow
sensitivity adjustment	Teach-in
emitter	
light source	pulsed red LED
wave length	660 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	20 mA
reverse polarity protection	yes
receiver	
response time / release time	< 0,5 ms
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
emitter	
current consumption typ.	12 mA
mechanical data	
width / diameter	8 mm
height / length	16,2 mm
depth	10,8 mm
type	rectangular
housing material	plastic (PMMA, MABS, PA)
front (optics)	PMMA
ambient conditions	
operating temperature	-20 ... +50 °C
protection class	IP 65

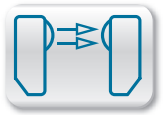
connection diagrams



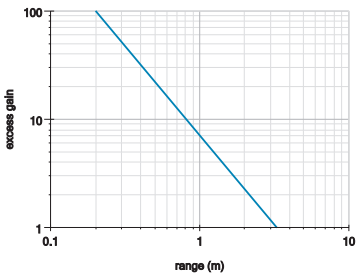
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10150844	Minofix mounting 07
for details: see accessories section	

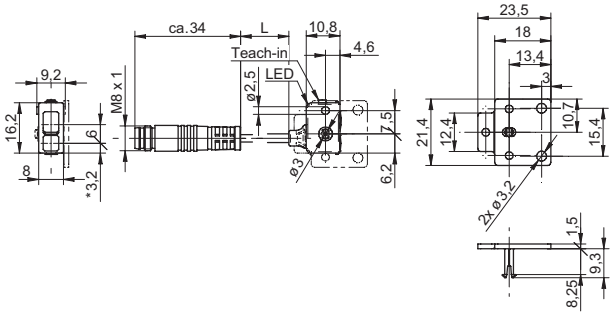
order reference	emitter / receiver	connection types	output circuit
FECK 07N6901	receiver	cable rear side, 2 m	NPN
FECK 07N6901/KS35A	receiver	flylead connector M8 4 pin, L=200 mm	NPN
FECK 07P6901	receiver	cable rear side, 2 m	PNP
FECK 07P6901/KS35A	receiver	flylead connector M8 4 pin, L=200 mm	PNP
FSCK 07D9601	emitter	cable rear side, 2 m	-
FSCK 07D9601/KS35A	emitter	flylead connector M8 4 pin, L=200 mm	-



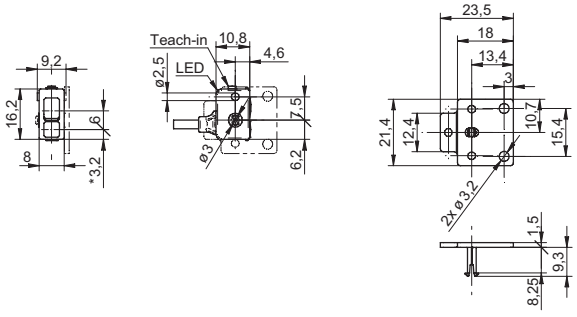
excess gain curve



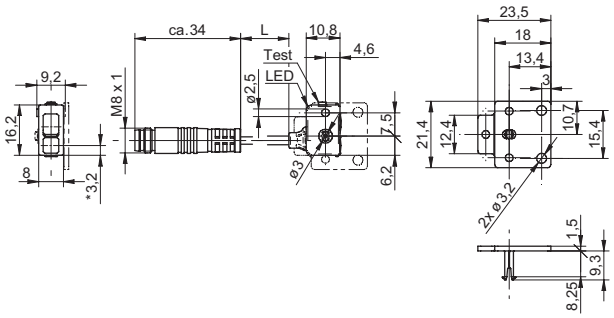
dimension drawings



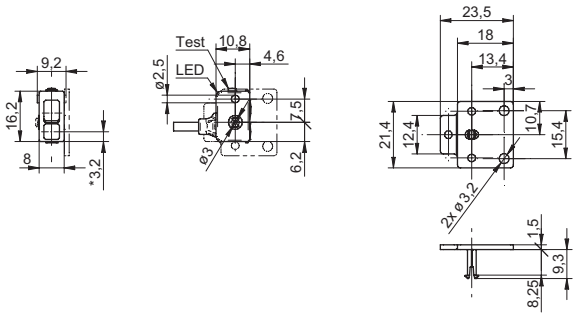
* receiver axis cable length L = 200 mm



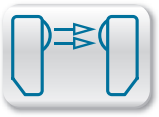
* receiver axis



* emitter axis cable length L = 200 mm



* emitter axis

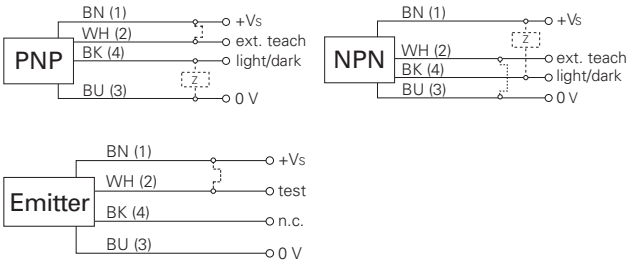


Sb = 2 m

- compact housing
- sensitivity adjustment via Teach-in
- test input

general data	
type	through beam sensor
actual range Sb	2 m
nominal range Sn	2,5 m
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED green
output indicator	LED yellow
sensitivity adjustment	Teach-in
emitter	
light source	pulsed red LED
wave length	660 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	20 mA
reverse polarity protection	yes
receiver	
response time / release time	< 0,5 ms
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
emitter	
current consumption typ.	12 mA
mechanical data	
width / diameter	8 mm
height / length	16,2 mm
depth	10,8 mm
type	rectangular
housing material	plastic (PMMA, MABS, PA)
front (optics)	PMMA
ambient conditions	
operating temperature	-20 ... +50 °C
protection class	IP 65

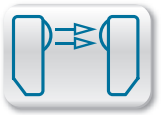
connection diagrams



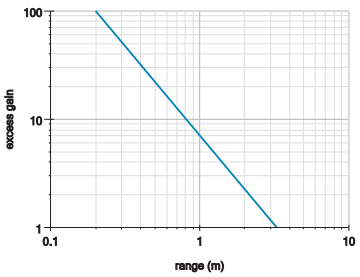
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10150844	Minofix mounting 07
for details: see accessories section	

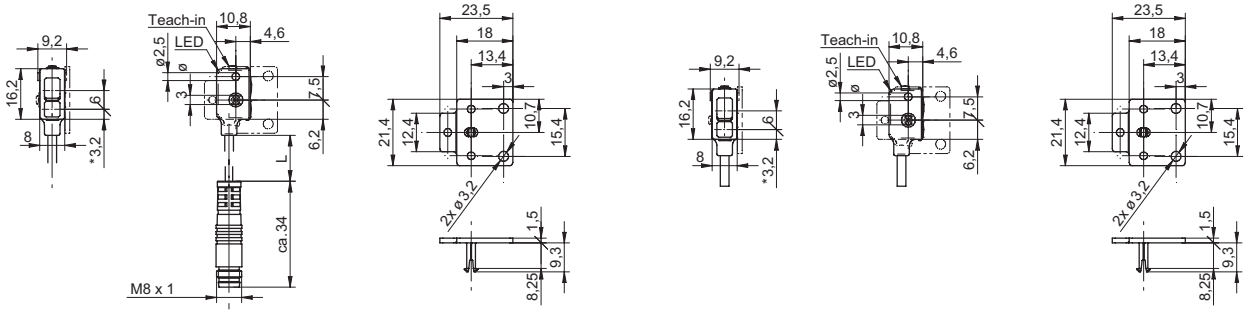
order reference	emitter / receiver	connection types	output circuit
FEDK 07N6901	receiver	cable bottom side, 2 m	NPN
FEDK 07N6901/KS35A	receiver	flylead connector M8 4 pin, L=200 mm	NPN
FEDK 07P6901	receiver	cable bottom side, 2 m	PNP
FEDK 07P6901/KS35A	receiver	flylead connector M8 4 pin, L=200 mm	PNP
FSDK 07D9601	emitter	cable bottom side, 2 m	-
FSDK 07D9601/KS35A	emitter	flylead connector M8 4 pin, L=200 mm	-



excess gain curve

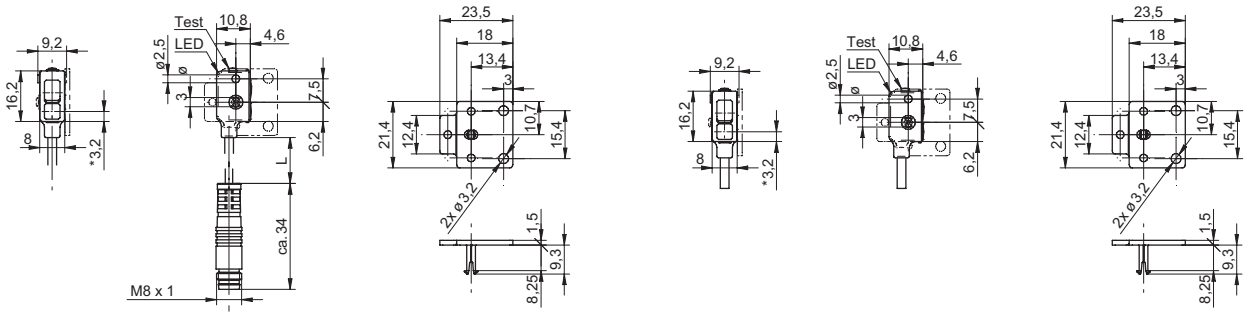


dimension drawings



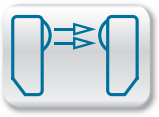
* receiver axis cable length L = 200 mm

* receiver axis



* emitter axis cable length L = 200 mm

* emitter axis

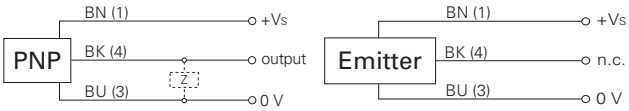


Sb = 0,7 m

- subminiature metal housing
- small rectangular design

general data	
type	through beam sensor
actual range Sb	0,7 m
nominal range Sn	1 m
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED red
sensitivity adjustment	no
emitter	
light source	pulsed infrared diode
wave length	880 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
reverse polarity protection	yes
receiver	
response time / release time	< 2,5 ms
current consumption max. (no load)	24 mA
current consumption typ.	24 mA
voltage drop Vd	< 2 VDC
output circuit	PNP
output current	< 100 mA
short circuit protection	yes
emitter	
current consumption max. (no load)	48 mA
current consumption typ.	17 mA
mechanical data	
width / diameter	8 mm
height / length	58 mm
depth	12 mm
type	rectangular
housing material	aluminum anodized
front (optics)	PC
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 65

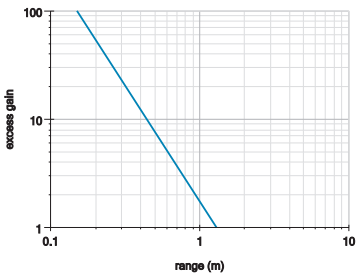
connection diagrams



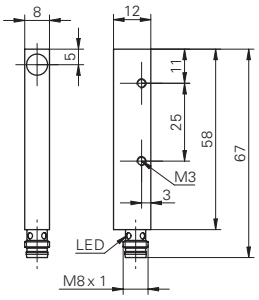
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

order reference	emitter / receiver	connection types	output function
FEDM 08P1001	receiver	cable 3 pin, 2 m	light operate
FEDM 08P1001/S35L	receiver	connector M8, 3 pin	light operate
FEDM 08P3001	receiver	cable 3 pin, 2 m	dark operate
FEDM 08P3001/S35L	receiver	connector M8, 3 pin	dark operate
FSDM 08D9001	emitter	cable 3 pin, 2 m	-
FSDM 08D9001/S35	emitter	connector M8, 3 pin	-

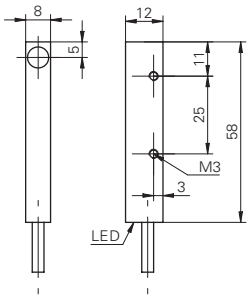
excess gain curve



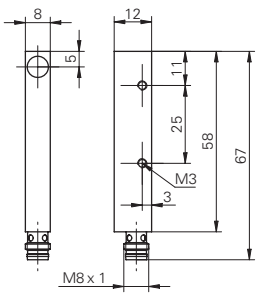
dimension drawings



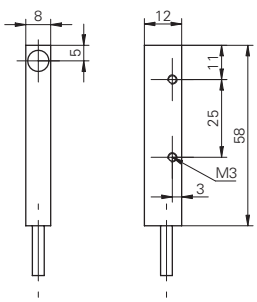
receiver



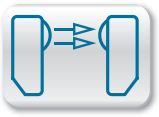
receiver



emitter



emitter

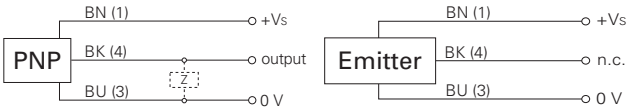


Sb = 2,5 m

- subminiature metal housing
- small rectangular design

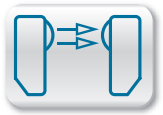
general data	
type	through beam sensor
actual range Sb	2,5 m
nominal range Sn	3 m
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED red
sensitivity adjustment	no
emitter	
light source	pulsed infrared diode
wave length	880 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
reverse polarity protection	yes
receiver	
response time / release time	< 2,5 ms
current consumption max. (no load)	24 mA
current consumption typ.	24 mA
voltage drop Vd	< 2 VDC
output circuit	PNP
output current	< 100 mA
short circuit protection	yes
emitter	
current consumption max. (no load)	48 mA
current consumption typ.	17 mA
mechanical data	
width / diameter	8 mm
height / length	58 mm
depth	15 mm
type	rectangular
housing material	aluminum anodized
front (optics)	PC
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 65

connection diagrams

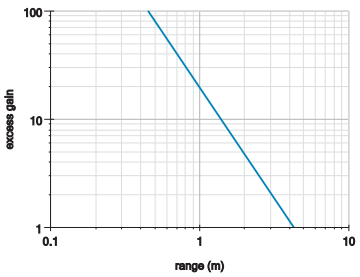


connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

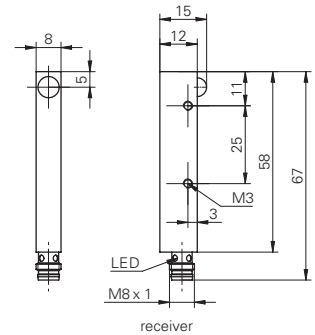
order reference	emitter / receiver	connection types	output function
FEDM 08P1002	receiver	cable 3 pin, 2 m	light operate
FEDM 08P1002/S35L	receiver	connector M8, 3 pin	light operate
FEDM 08P3002	receiver	cable 3 pin, 2 m	dark operate
FEDM 08P3002/S35L	receiver	connector M8, 3 pin	dark operate
FSDM 08D9002	emitter	cable 3 pin, 2 m	-
FSDM 08D9002/S35	emitter	connector M8, 3 pin	-



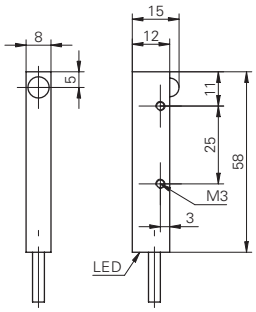
excess gain curve



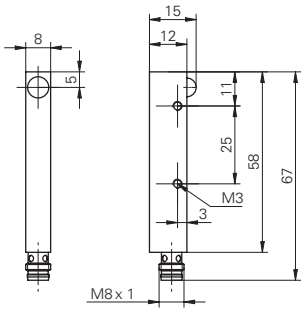
dimension drawings



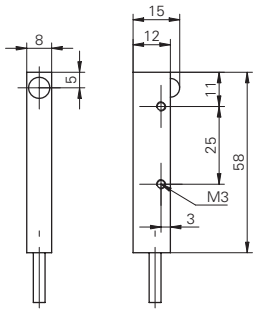
receiver



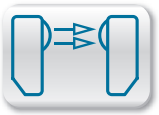
receiver



emitter



emitter

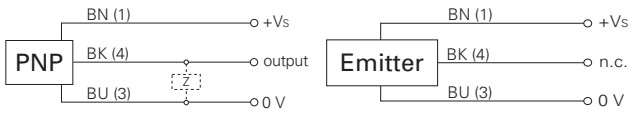


Sb = 2,5 m

- subminiature metal housing
- cylindrical design

general data	
type	through beam sensor
actual range Sb	2,5 m
nominal range Sn	3 m
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED red
sensitivity adjustment	no
emitter	
light source	pulsed infrared diode
wave length	880 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
reverse polarity protection	yes
receiver	
response time / release time	< 2,5 ms
current consumption max. (no load)	24 mA
current consumption typ.	24 mA
voltage drop Vd	< 2 VDC
output circuit	PNP
output current	< 100 mA
short circuit protection	yes
emitter	
current consumption max. (no load)	48 mA
current consumption typ.	17 mA
mechanical data	
width / diameter	8 mm
type	cylindrical threaded
housing material	brass nickel plated
front (optics)	PC
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 65

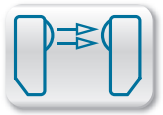
connection diagrams



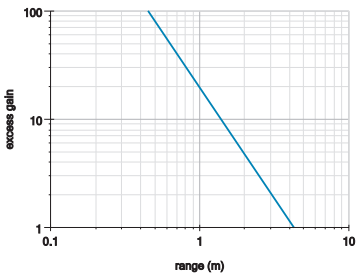
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151719	Sensofix series 08 round
for details: see accessories section	

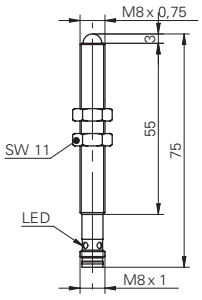
order reference	emitter / receiver	connection types	height / length	output function
FEAM 08P1002	receiver	cable 3 pin, 2 m	59 mm	light operate
FEAM 08P1002/S35L	receiver	connector M8, 3 pin	75,5 mm	light operate
FEAM 08P3002	receiver	cable 3 pin, 2 m	59 mm	dark operate
FEAM 08P3002/S35L	receiver	connector M8, 3 pin	75,5 mm	dark operate
FSAM 08D9002	emitter	cable 3 pin, 2 m	59 mm	-
FSAM 08D9002/S35	emitter	connector M8, 3 pin	75,5 mm	-



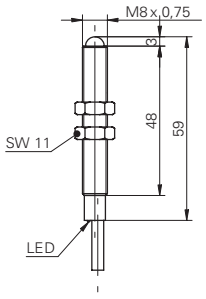
excess gain curve



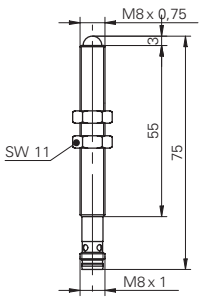
dimension drawings



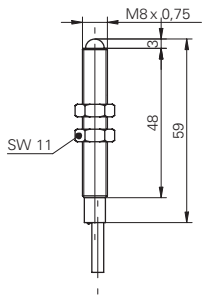
receiver



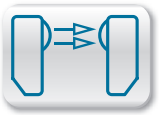
receiver



emitter



emitter

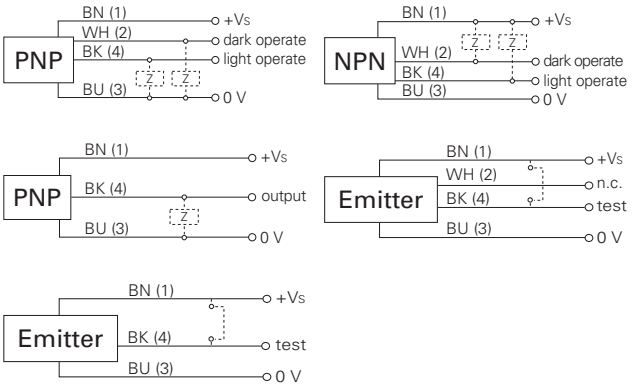


Sb = 5 m

- compact housing
- sensitivity adjustment via potentiometer
- test input

general data	
type	through beam sensor
actual range Sb	5 m
nominal range Sn	6 m
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	potentiometer, 270°
emitter	
light source	pulsed red LED
wave length	660 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
reverse polarity protection	yes
receiver	
response time / release time	< 1,4 ms
current consumption max. (no load)	16 mA
current consumption typ.	16 mA
voltage drop Vd	< 1,8 VDC
output current	< 100 mA
short circuit protection	yes
emitter	
current consumption max. (no load)	23 mA
current consumption typ.	15 mA
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	14 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C

connection diagrams

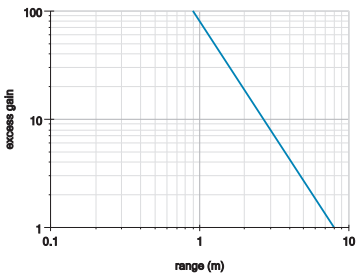


connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

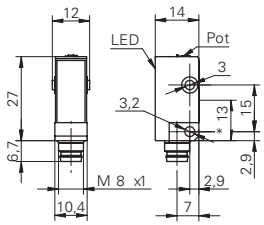
Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
for details: see accessories section	

order reference	emitter / receiver	connection types	output circuit	output function	protection class
FEDK 10N5101	receiver	cable 4 pin, 2 m	NPN	light / dark operate	IP 65
FEDK 10N5101/S35A	receiver	connector M8 4 pin	NPN	light / dark operate	IP 67
FEDK 10P1101/KS35	receiver	flylead connector M8 3 pin	PNP	light operate	IP 65
FEDK 10P3101/KS35	receiver	flylead connector M8 3 pin	PNP	dark operate	IP 65
FEDK 10P5101	receiver	cable 4 pin, 2 m	PNP	light / dark operate	IP 65
FEDK 10P5101/S35A	receiver	connector M8 4 pin	PNP	light / dark operate	IP 67
FSDK 10D9001/KS35	emitter	flylead connector M8 3 pin	-	-	IP 65
FSDK 10D9601	emitter	cable 4 pin, 2 m	-	-	IP 65
FSDK 10D9601/S35A	emitter	connector M8 4 pin	-	-	IP 67

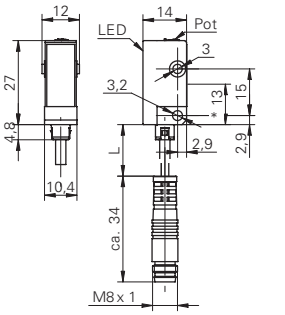
excess gain curve



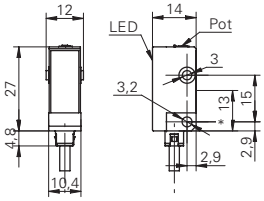
dimension drawings



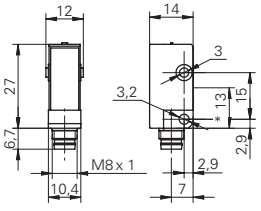
* receiver axis



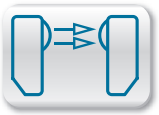
* receiver axis cable length L = 200 mm



* receiver axis



* emitter axis



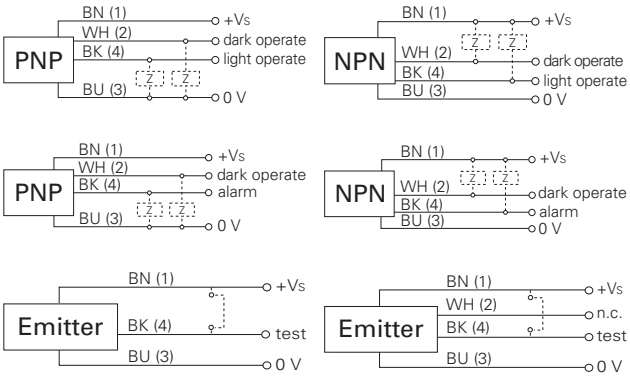
Sb = 6 m

- rugged miniature metal housing
- test input

general data	
type	through beam sensor
actual range Sb	6 m
nominal range Sn	7,5 m
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	no
emitter	
light source	pulsed red LED
wave length	660 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
reverse polarity protection	yes
receiver	
response time / release time	< 1 ms
current consumption max. (no load)	17 mA
current consumption typ.	17 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output circuit	PNP
output current	< 100 mA
short circuit protection	yes
emitter	
current consumption max. (no load)	30 mA
current consumption typ.	18 mA
mechanical data	
width / diameter	12,4 mm
height / length	35 mm
depth	35 mm
type	rectangular
housing material	die-cast zinc
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

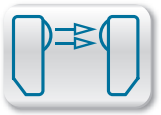
order reference	emitter / receiver	connection types
FEDM 12P5101	receiver	cable 4 pin, 2 m
FEDM 12P5101/S35A	receiver	connector M8 4 pin
FSDM 12D9601	emitter	cable 3 pin, 2 m
FSDM 12D9601/S35A	emitter	connector M8 4 pin

connection diagrams

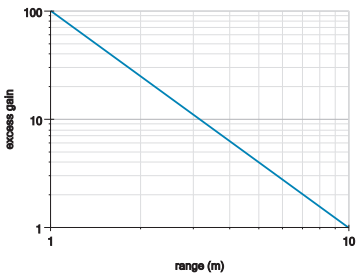


connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

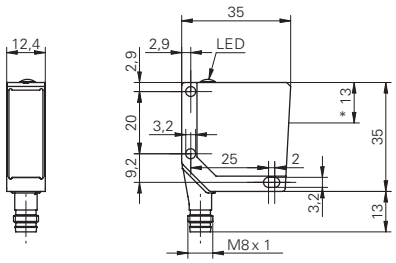
Accessories	
10150328	Sensofix series 12
10113873	Mounting bracket series 12 (L design)
for details: see accessories section	



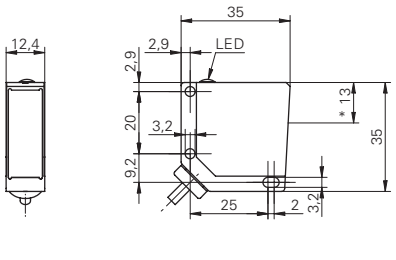
excess gain curve



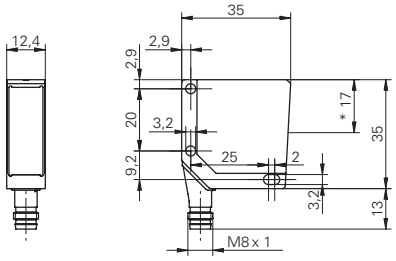
dimension drawings



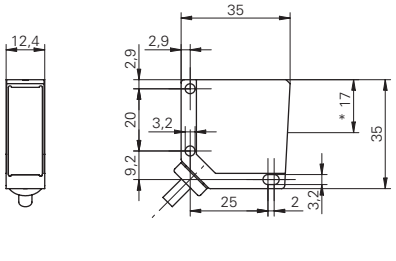
* receiver axis



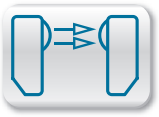
* receiver axis



* emitter axis



* emitter axis

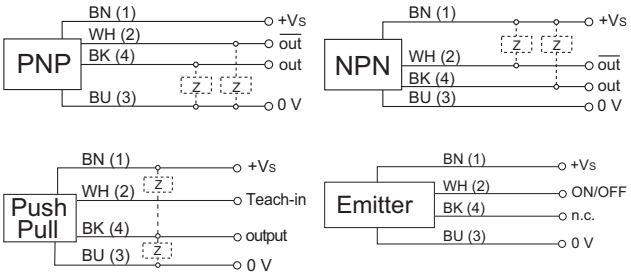


Sb = 10 m

- One inch class
- sensitivity adjustment via Teach-in
- test input

general data	
type	through beam sensor
actual range Sb	10 m
nominal range Sn	15 m
power on indication	LED green
alignment optical axis	< 2°
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
emitter	
light source	pulsed red LED
wave length	645 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
reverse polarity protection	yes
receiver	
response time / release time	< 0,49 ms
voltage drop Vd	< 3 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

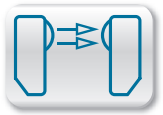
connection diagrams



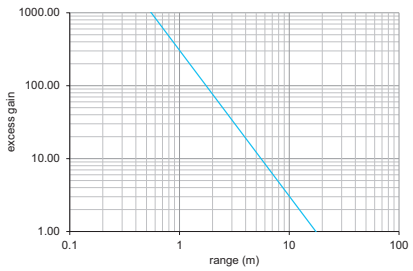
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

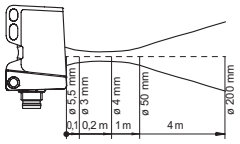
order reference	emitter / receiver	connection types	output circuit	sensitivity adjustment
O300.ER-11167265	receiver	cable 4 pin, 2 m	push-pull	qTeach / remote
O300.ER-11128044	receiver	connector M8 4 pin	push-pull	qTeach / remote
O300.ER-11167266	receiver	cable 4 pin, 2 m	NPN complementary	qTeach
O300.ER-11128055	receiver	connector M8 4 pin	NPN complementary	qTeach
O300.ER-11167267	receiver	cable 4 pin, 2 m	PNP complementary	qTeach
O300.ER-11128047	receiver	connector M8 4 pin	PNP complementary	qTeach
O300.TR-11167264	emitter	cable 4 pin, 2 m	-	-
O300.TR-11128022	emitter	connector M8 4 pin	-	-



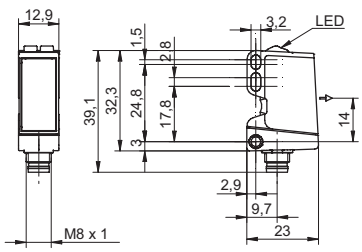
excess gain curve

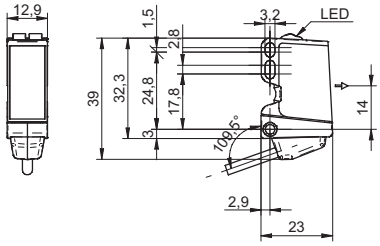


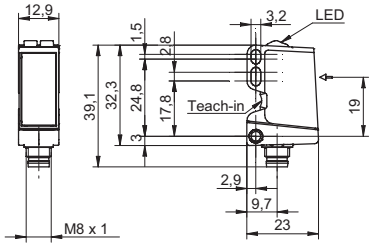
beam characteristic (typically)

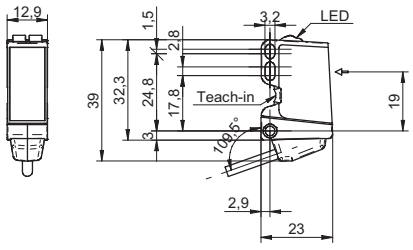


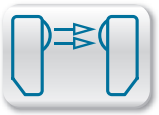
dimension drawings









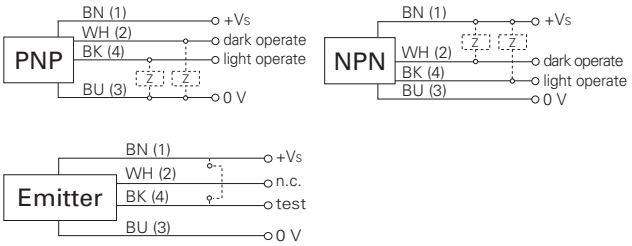


Sb = 12 m

- long range
- test input

general data	
type	through beam sensor
actual range Sb	12 m
nominal range Sn	15 m
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	no
emitter	
light source	pulsed red LED
wave length	660 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	20 mA
reverse polarity protection	yes
receiver	
response time / release time	< 1,2 ms
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
emitter	
current consumption typ.	12 mA
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

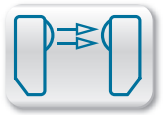
connection diagrams



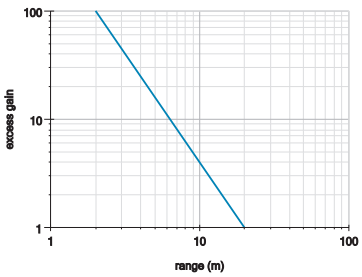
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
10144075	Slot aperture stickers series 14
for details: see accessories section	

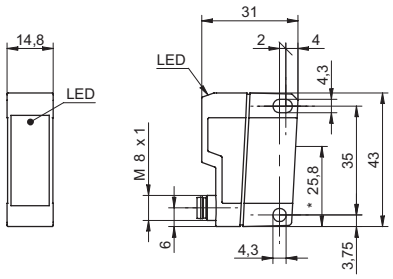
order reference	emitter / receiver	connection types	output circuit
FEDK 14N5101	receiver	cable 4 pin, 2 m	NPN
FEDK 14N5101/S14	receiver	connector M12 4 pin	NPN
FEDK 14N5101/S35A	receiver	connector M8 4 pin	NPN
FEDK 14P5101	receiver	cable 4 pin, 2 m	PNP
FEDK 14P5101/S14	receiver	connector M12 4 pin	PNP
FEDK 14P5101/S35A	receiver	connector M8 4 pin	PNP
FSDK 14D9601	emitter	cable 4 pin, 2 m	-
FSDK 14D9601/S14	emitter	connector M12 4 pin	-
FSDK 14D9601/S35A	emitter	connector M8 4 pin	-



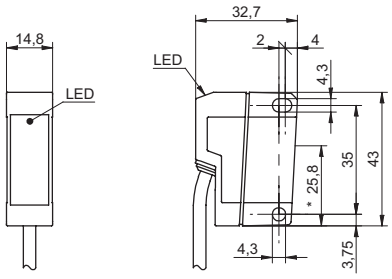
excess gain curve



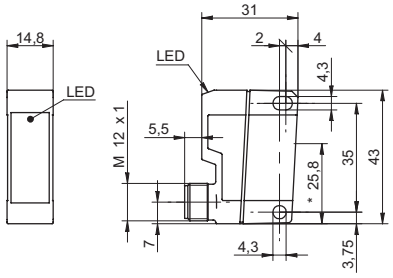
dimension drawings



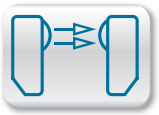
* emitter and receiver axis



* emitter and receiver axis



* emitter and receiver axis

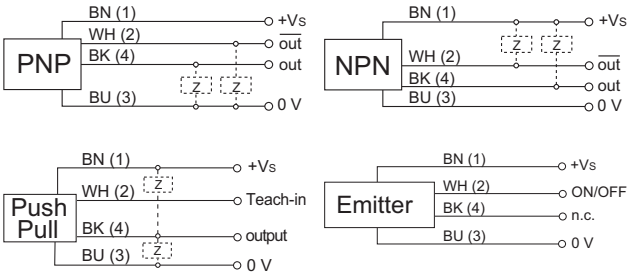


Sb = 25 m

- long range
- sensitivity adjustment via Teach-in
- test input

general data	
type	through beam sensor
actual range Sb	25 m
nominal range Sn	40 m
power on indication	LED green
alignment optical axis	< 1°
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
emitter	
light source	pulsed red LED
wave length	645 nm
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
reverse polarity protection	yes
receiver	
voltage drop Vd	< 3 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
mechanical data	
width / diameter	18 mm
height / length	45 mm
depth	32 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

connection diagrams

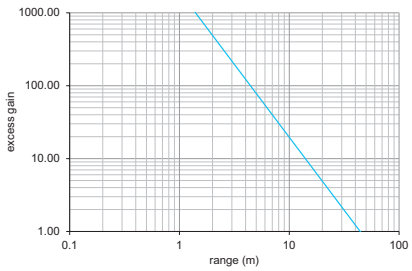


connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

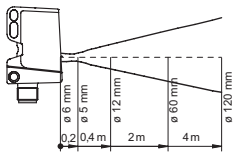
Accessories	
11099942	Sensofix O500/U500
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
for details: see accessories section	

order reference	emitter / receiver	connection types	output circuit	sensitivity adjustment
O500.ER-11167280	receiver	cable 4 pin, 2 m	push-pull	qTeach / remote
O500.ER-11128072	receiver	connector M12 4 pin	push-pull	qTeach / remote
O500.ER-11167281	receiver	cable 4 pin, 2 m	NPN complementary	qTeach
O500.ER-11128078	receiver	connector M12 4 pin	NPN complementary	qTeach
O500.ER-11167282	receiver	cable 4 pin, 2 m	PNP complementary	qTeach
O500.ER-11128075	receiver	connector M12 4 pin	PNP complementary	qTeach
O500.TR-11167269	emitter	cable 4 pin, 2 m	-	-
O500.TR-11128041	emitter	connector M12 4 pin	-	-

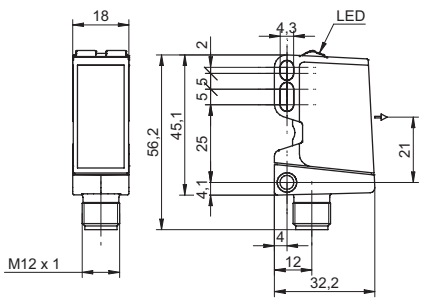
excess gain curve

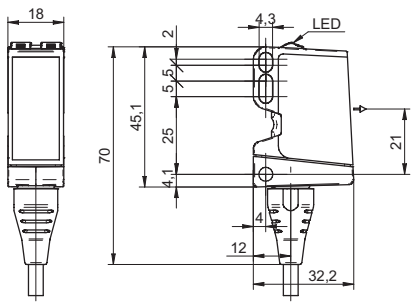


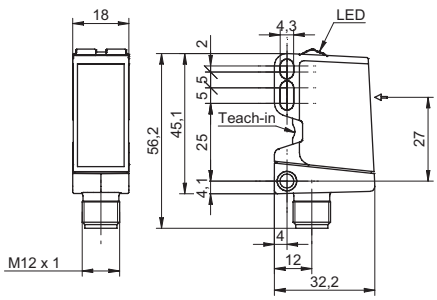
beam characteristic (typically)

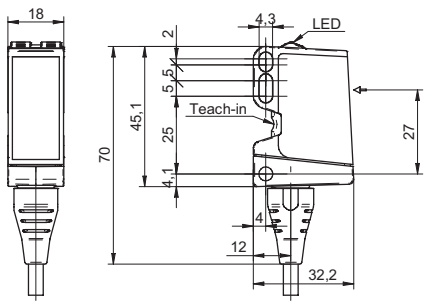


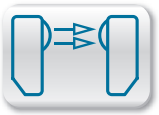
dimension drawings









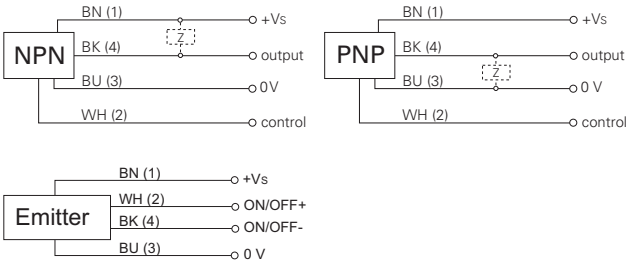


Sb = 13 m

- sensitivity adjustment via potentiometer
- test input

general data	
type	through beam sensor
actual range Sb	13 m
nominal range Sn	20 m
receiver	
alignment / soiled lens indicator	LED green
output indicator	LED yellow
emitter	
light source	pulsed infrared diode
power on indication	LED green
wave length	880 nm
electrical data	
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
reverse polarity protection	yes
receiver	
response time / release time	< 2 ms
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
mechanical data	
width / diameter	18 mm
type	cylindrical threaded
housing material	plastic (ABS TERLURAN)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67

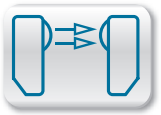
connection diagrams



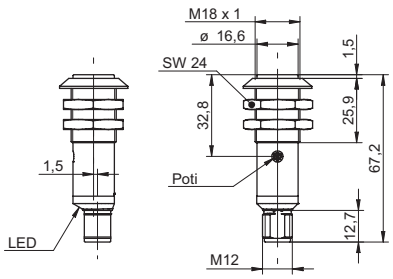
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

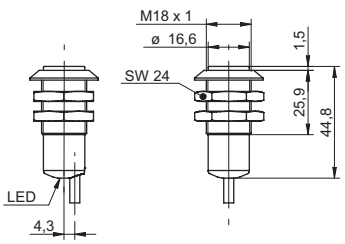
Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
ZPART-M18.NUT	Clamping nut for sensors Ø 18 mm
for details: see accessories section	

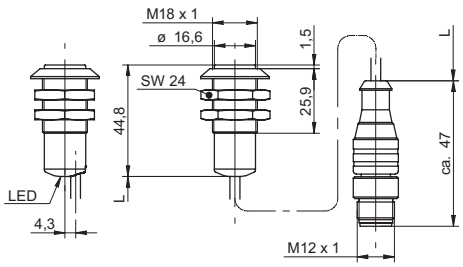
order reference	emitter / receiver	connection types	height / length	output circuit	sensitivity adjustment	emission power adjustment
OR18.EI-11157814	receiver	connector M12 4 pin	67,2 mm	NPN	potentiometer, 270°	-
OR18.EI-11157815	receiver	cable 4 pin, 2 m	44,8 mm	NPN	no	-
OR18.EI-11157816	receiver	flylead connector M12 4 pin, L=100 mm	44,8 mm	NPN	no	-
OR18.EI-11157811	receiver	connector M12 4 pin	67,2 mm	PNP	potentiometer, 270°	-
OR18.EI-11157812	receiver	cable 4 pin, 2 m	44,8 mm	PNP	no	-
OR18.EI-11157813	receiver	flylead connector M12 4 pin, L=100 mm	44,8 mm	PNP	no	-
OR18.TI-11157821	emitter	connector M12 4 pin	67,2 mm	-	-	potentiometer, 270°
OR18.TI-11157823	emitter	cable 4 pin, 2 m	44,8 mm	-	-	no
OR18.TI-11157825	emitter	flylead connector M12 4 pin, L=100 mm	44,8 mm	-	-	no

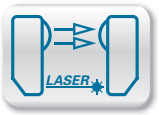


dimension drawings







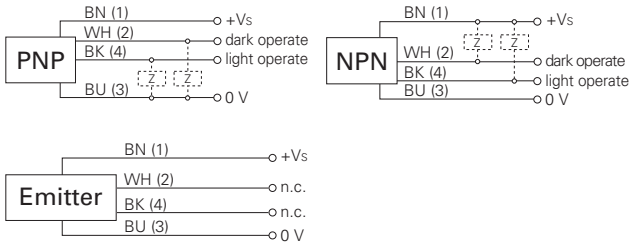


Sb = 8 m

- long range
- short response time

general data	
type	through beam laser sensor
actual range Sb	8 m
nominal range Sn	10 m
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	potentiometer, 270°
emitter	
light source	pulsed red laser diode
laser class	1
distance to focus	parallel beam
wave length	650 nm
electrical data	
voltage supply range +Vs	11 ... 30 VDC
reverse polarity protection	yes
receiver	
response time / release time	< 0,2 ms
current consumption max. (no load)	16 mA
current consumption typ.	16 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
emitter	
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
receiver	
depth	14 mm
emitter	
depth	16,3 mm
ambient conditions	
operating temperature	-10 ... +50 °C

connection diagrams



connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

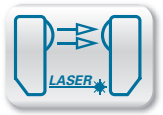
Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
for details: see accessories section	

laser warning

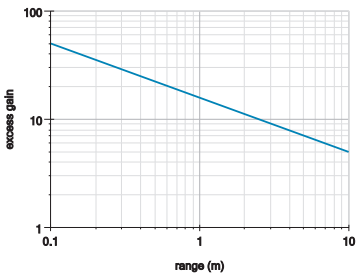
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

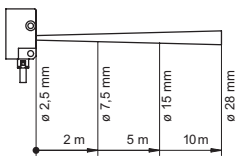
order reference	emitter / receiver	connection types	output circuit	protection class
OEDK 10N5105	receiver	cable 4 pin, 2 m	NPN	IP 65
OEDK 10N5105/S35A	receiver	connector M8 4 pin	NPN	IP 67
OEDK 10P5105	receiver	cable 4 pin, 2 m	PNP	IP 65
OEDK 10P5105/S35A	receiver	connector M8 4 pin	PNP	IP 67
OSDK 10D9005	emitter	cable 4 pin, 2 m	-	IP 65
OSDK 10D9005/S35A	emitter	connector M8 4 pin	-	IP 67



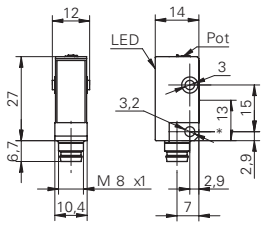
excess gain curve



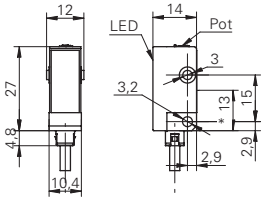
beam characteristic (typically)



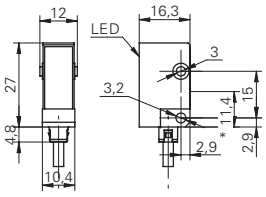
dimension drawings



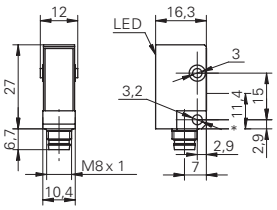
* receiver axis



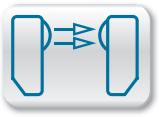
* receiver axis



* emitter axis



* emitter axis

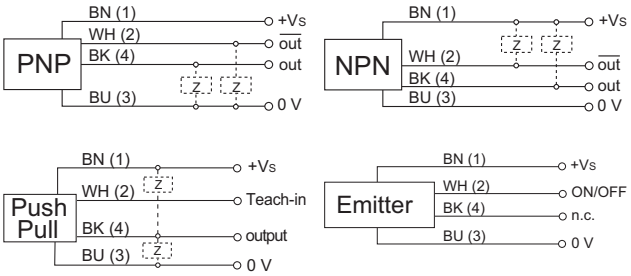


Sb = 40 m

- One inch class
- long range
- short response time

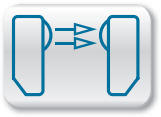
general data	
type	through beam sensor
actual range Sb	40 m
nominal range Sn	75 m
power on indication	LED green
alignment optical axis	< 2°
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
emitter	
light source	pulsed red laser diode
laser class	1
distance to focus	parallel beam
wave length	656 nm
electrical data	
reverse polarity protection	yes
receiver	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
emitter	
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
protection class	IP 67
receiver	
operating temperature	-25 ... +60 °C
emitter	
operating temperature	-10 ... +60 °C

connection diagrams

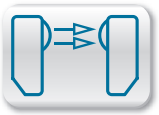


connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

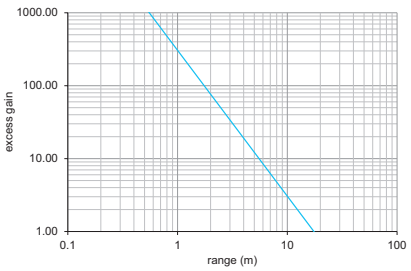
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	



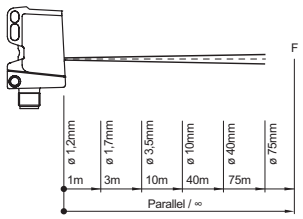
order reference	emitter / receiver	connection types	output circuit	sensitivity adjustment
O300.EL-11176842	receiver	cable 4 pin, 2 m	push-pull	qTeach / remote
O300.EL-11176843	receiver	connector M8 4 pin	push-pull	qTeach / remote
O300.EL-11181069	receiver	cable 4 pin, 2 m	NPN complementary	qTeach
O300.EL-11181080	receiver	connector M8 4 pin	NPN complementary	qTeach
O300.EL-11181081	receiver	cable 4 pin, 2 m	PNP complementary	qTeach
O300.EL-11181082	receiver	connector M8 4 pin	PNP complementary	qTeach
O300.TL-11176844	emitter	cable 4 pin, 2 m	-	-
O300.TL-11176845	emitter	connector M8 4 pin	-	-



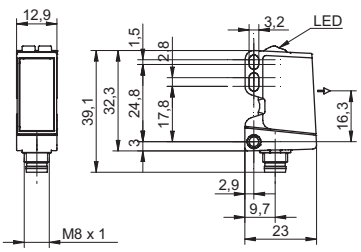
excess gain curve

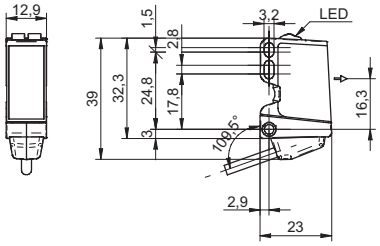


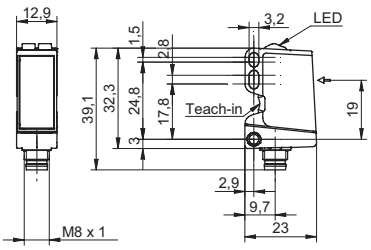
beam characteristic (typically)

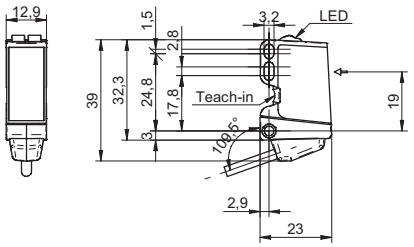


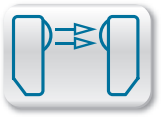
dimension drawings

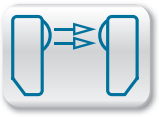










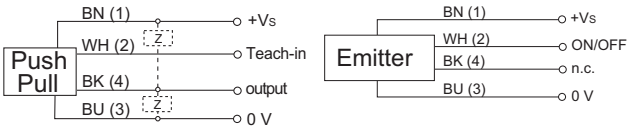


Sb = 40 m

- washdown design
- long range
- short response time

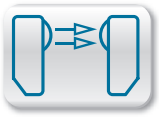
general data	
type	through beam sensor
special type	Washdown design
actual range Sb	40 m
nominal range Sn	75 m
power on indication	LED green
alignment optical axis	< 2°
approvals/certificates	Ecolab
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	qTeach / remote
emitter	
light source	pulsed red laser diode
laser class	1
distance to focus	parallel beam
wave length	656 nm
electrical data	
reverse polarity protection	yes
receiver	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
emitter	
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
mechanical data	
width / diameter	16,5 mm
height / length	34,7 mm
depth	28,2 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
protection class	IP 68/69K & proTect+
receiver	
operating temperature	-25 ... +60 °C
emitter	
operating temperature	-10 ... +60 °C

connection diagrams

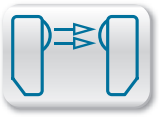


connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

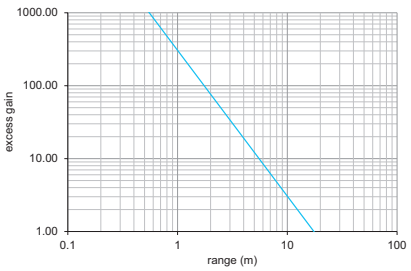
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	



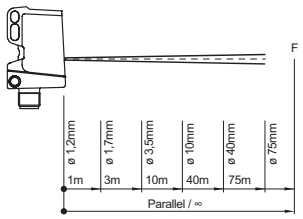
order reference	emitter / receiver
O300W.EL-11181085	receiver
O300W.TL-11181228	emitter



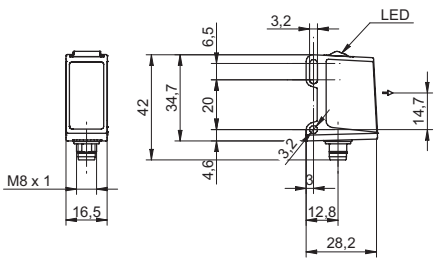
excess gain curve

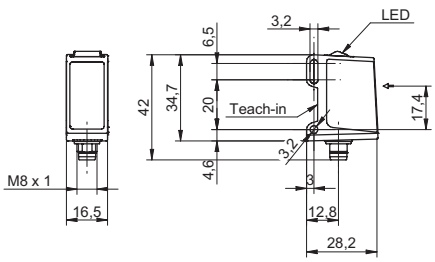


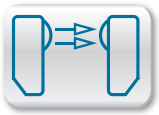
beam characteristic (typically)

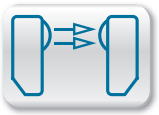


dimension drawings







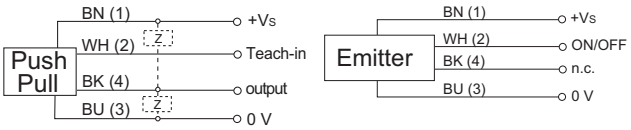


Sb = 40 m

- hygienic design
- long range
- short response time

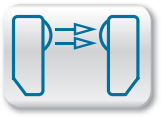
general data	
type	through beam sensor
special type	hygienic design
actual range Sb	40 m
nominal range Sn	75 m
power on indication	LED green
alignment optical axis	< 2°
approvals/certificates	Ecolab
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	Teach-in: remote
emitter	
light source	pulsed red laser diode
laser class	1
distance to focus	parallel beam
wave length	656 nm
electrical data	
reverse polarity protection	yes
receiver	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
emitter	
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
mechanical data	
width / diameter	16,5 mm
height / length	34,6 mm
depth	28,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
protection class	IP 68/69K & proTect+
receiver	
operating temperature	-25 ... +60 °C
emitter	
operating temperature	-10 ... +60 °C

connection diagrams

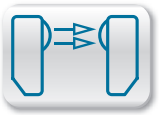


connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

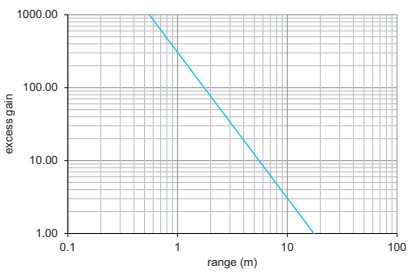
Accessories	
HI11-1H	Mounting for sensors in hygienic design Ø 11 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	



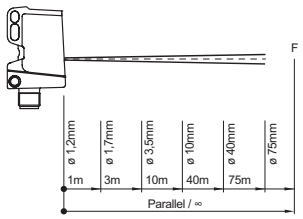
order reference	emitter / receiver	connection types
O300H.EL-11181083	receiver	cable 4 pin, 2 m
O300H.EL-11181084	receiver	flylead connector M8, L=200 mm
O300H.TL-11181225	emitter	cable 4 pin, 2 m
O300H.TL-11181227	emitter	flylead connector M8, L=200 mm



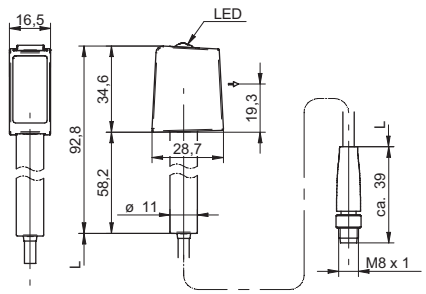
excess gain curve

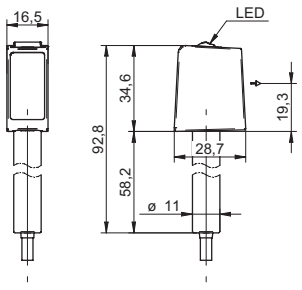


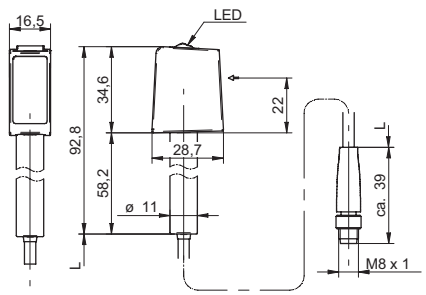
beam characteristic (typically)

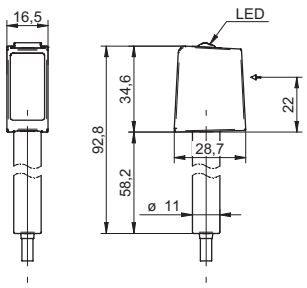


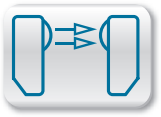
dimension drawings

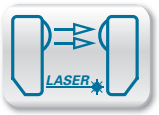












Sb = 8 m

- long range
- short response time

general data	
type	through beam laser sensor
actual range Sb	8 m
nominal range Sn	10 m
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	no
emitter	
light source	pulsed red laser diode
power on indication	LED green
laser class	1
distance to focus	parallel beam
wave length	650 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
reverse polarity protection	yes
receiver	
response time / release time	< 0,5 ms
current consumption max. (no load)	20 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output circuit	PNP
output current	< 100 mA
short circuit protection	yes
emitter	
current consumption max. (no load)	35 mA
current consumption typ.	25 mA
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
protection class	IP 67
receiver	
operating temperature	-25 ... +65 °C
emitter	
operating temperature	10 ... +50 °C

order reference	emitter / receiver	connection types
OEDK 14P5101	receiver	cable 4 pin, 2 m
OEDK 14P5101/S14	receiver	connector M12 4 pin
OEDK 14P5101/S35A	receiver	connector M8 4 pin
OSDK 14D9001	emitter	cable 4 pin, 2 m
OSDK 14D9001/S14	emitter	connector M12 4 pin
OSDK 14D9001/S35A	emitter	connector M8 4 pin

connection diagrams

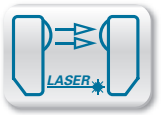
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
for details: see accessories section	

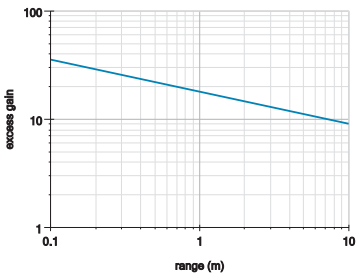
laser warning

CLASS 1 LASER PRODUCT

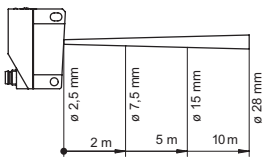
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007



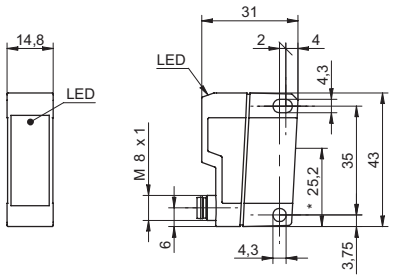
excess gain curve



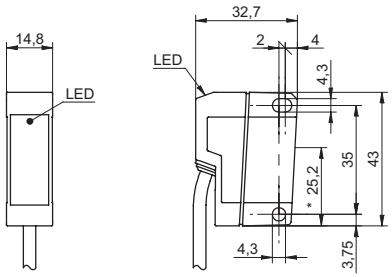
beam characteristic (typically)



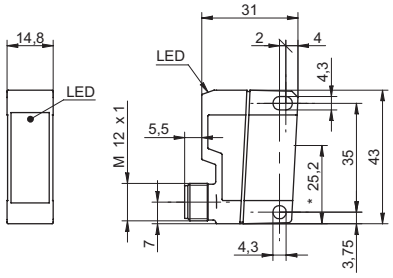
dimension drawings



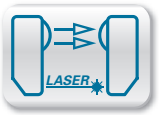
* emitter and receiver axis



* emitter and receiver axis



* emitter and receiver axis

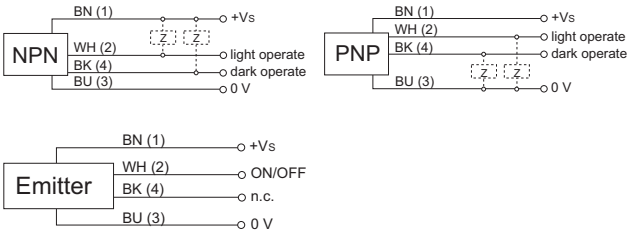


Sb = 55 m

- long range
- short response time
- test input

general data	
type	through beam sensor
actual range Sb	55 m
nominal range Sn	60 m
power on indication	LED green
receiver	
output indicator	LED yellow
sensitivity adjustment	potentiometer, 270°
emitter	
light source	pulsed red laser diode
emission power adjustment	no
laser class	1
distance to focus	parallel beam
wave length	630 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	35 mA
reverse polarity protection	yes
receiver	
response time / release time	< 0,34 ms
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
mechanical data	
width / diameter	18 mm
type	cylindrical threaded
housing material	brass nickel plated
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +55 °C
protection class	IP 67

connection diagrams



connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

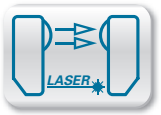
Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
for details: see accessories section	

laser warning

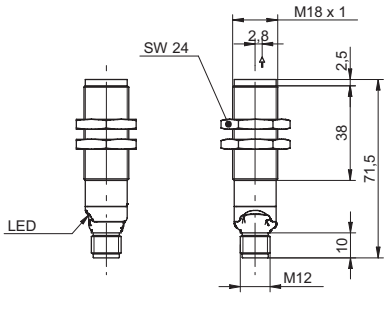
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

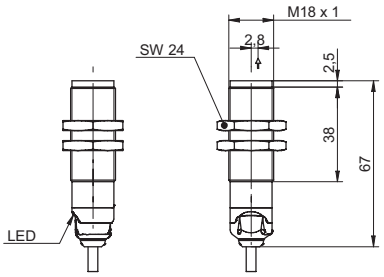
order reference	emitter / receiver	connection types	height / length	output circuit
OR18.EL-11157820	receiver	cable 4 pin, 2 m	77 mm	NPN complementary
OR18.EL-11157819	receiver	connector M12 4 pin	81,5 mm	NPN complementary
OR18.EL-11157818	receiver	cable 4 pin, 2 m	77 mm	PNP complementary
OR18.EL-11157817	receiver	connector M12 4 pin	81,5 mm	PNP complementary
OR18.TL-11157840	emitter	cable 4 pin, 2 m	67 mm	-
OR18.TL-11157829	emitter	connector M12 4 pin	71,5 mm	-



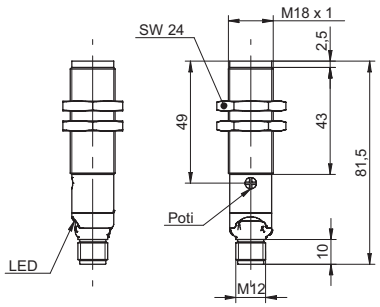
dimension drawings



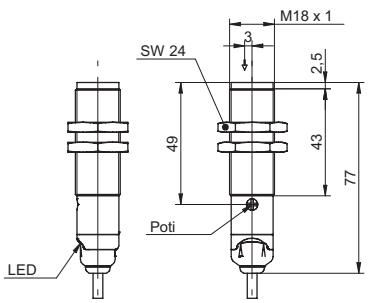
emitter



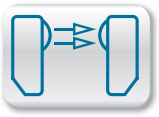
emitter



receiver



receiver



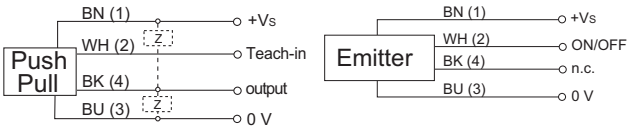
Sb = 10 m

- washdown design
- short response time
- test input

general data	
type	through beam sensor
special type	Washdown design
actual range Sb	10 m
nominal range Sn	15 m
power on indication	LED green
alignment optical axis	< 2°
approvals/certificates	Ecolab
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	qTeach / remote
emitter	
light source	pulsed red LED
wave length	645 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
reverse polarity protection	yes
receiver	
response time / release time	< 0,49 ms
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,7 mm
depth	28,2 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

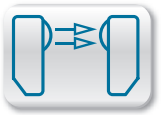
order reference	emitter / receiver
O300W.ER-11167301	receiver
O300W.TR-11167300	emitter

connection diagrams

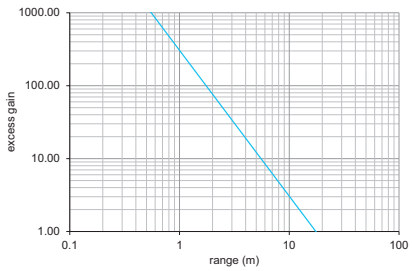


connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

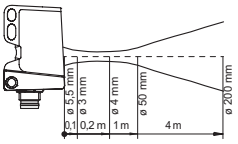
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	



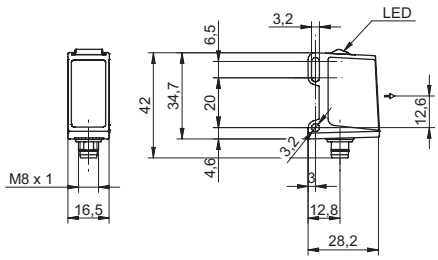
excess gain curve

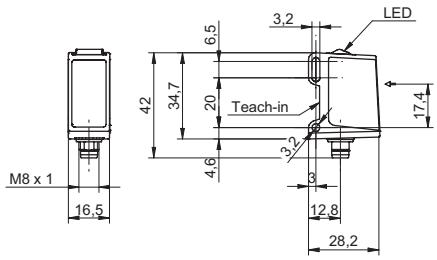


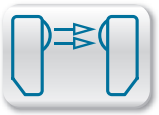
beam characteristic (typically)



dimension drawings





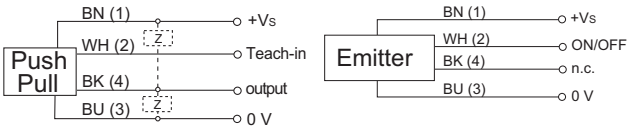


Sb = 10 m

- hygienic design
- short response time
- test input

general data	
type	through beam sensor
special type	hygienic design
actual range Sb	10 m
nominal range Sn	15 m
power on indication	LED green
alignment optical axis	< 2°
approvals/certificates	Ecolab
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	Teach-in: remote
emitter	
light source	pulsed red LED
wave length	645 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
reverse polarity protection	yes
receiver	
response time / release time	< 0,49 ms
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,6 mm
depth	28,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

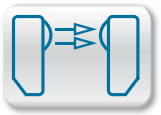
connection diagrams



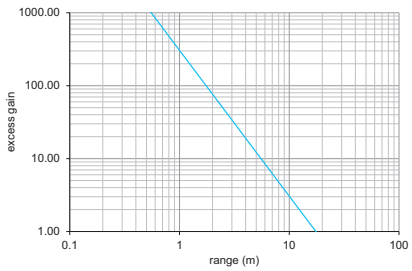
connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI11-1H	Mounting for sensors in hygienic design Ø 11 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

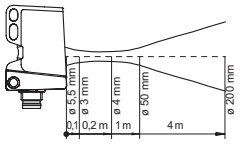
order reference	emitter / receiver	connection types
O300H.ER-11167293	receiver	cable 4 pin, 2 m
O300H.ER-11167294	receiver	flylead connector M8, L=200 mm
O300H.TR-11167291	emitter	cable 4 pin, 2 m
O300H.TR-11167292	emitter	flylead connector M8, L=200 mm



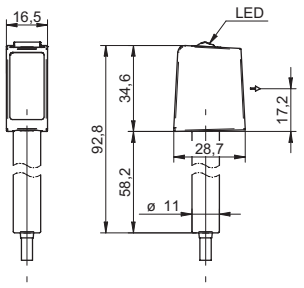
excess gain curve

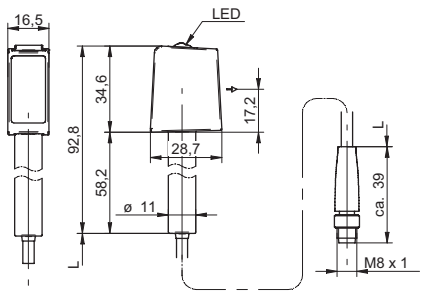


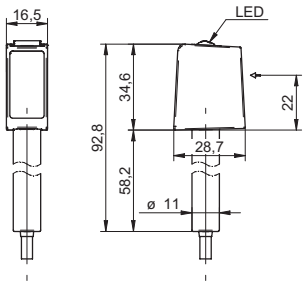
beam characteristic (typically)

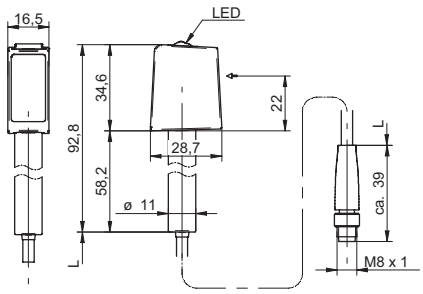


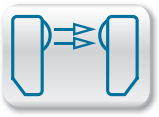
dimension drawings











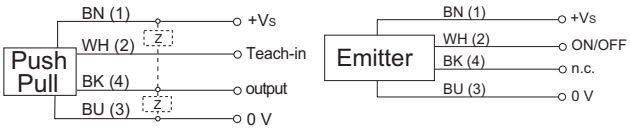
Sb = 25 m

- washdown design
- long range
- short response time

general data	
type	through beam sensor
special type	Washdown design
actual range Sb	25 m
nominal range Sn	40 m
power on indication	LED green
alignment optical axis	< 1°
approvals/certificates	Ecolab
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	qTeach / remote
emitter	
light source	pulsed red LED
wave length	645 nm
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
reverse polarity protection	yes
receiver	
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,2 mm
depth	37,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

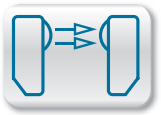
order reference	emitter / receiver
O500W.ER-11167303	receiver
O500W.TR-11167302	emitter

connection diagrams

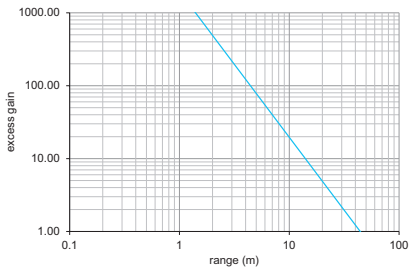


connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

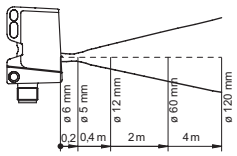
Accessories	
11099942	Sensofix O500/U500
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
for details: see accessories section	



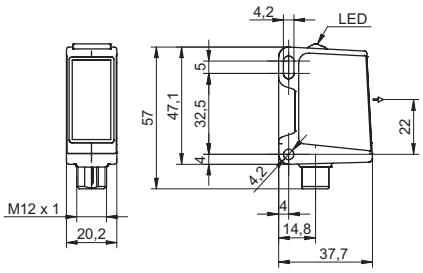
excess gain curve

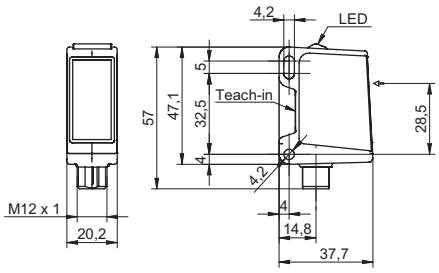


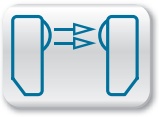
beam characteristic (typically)



dimension drawings





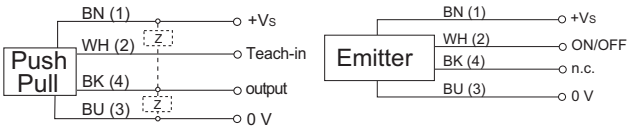


Sb = 25 m

- hygienic design
- long range
- short response time

general data	
type	through beam sensor
special type	hygienic design
actual range Sb	25 m
nominal range Sn	40 m
power on indication	LED green
alignment optical axis	< 1°
approvals/certificates	Ecolab
receiver	
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	Teach-in: remote
emitter	
light source	pulsed red LED
wave length	645 nm
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
reverse polarity protection	yes
receiver	
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,7 mm
depth	36,4 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

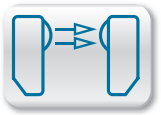
connection diagrams



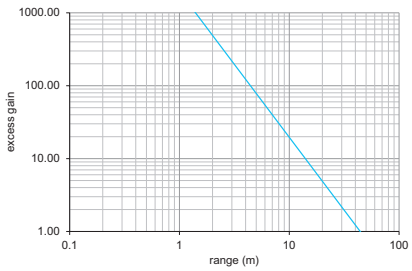
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI17-1H	Mounting for sensors in hygienic design Ø 17 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

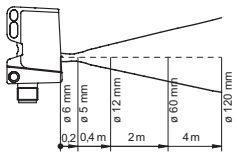
order reference	emitter / receiver	connection types
O500H.ER-11167297	receiver	cable 4 pin, 2 m
O500H.ER-11167299	receiver	flylead connector M12, L=200 mm
O500H.TR-11167295	emitter	cable 4 pin, 2 m
O500H.TR-11167296	emitter	flylead connector M12, L=200 mm



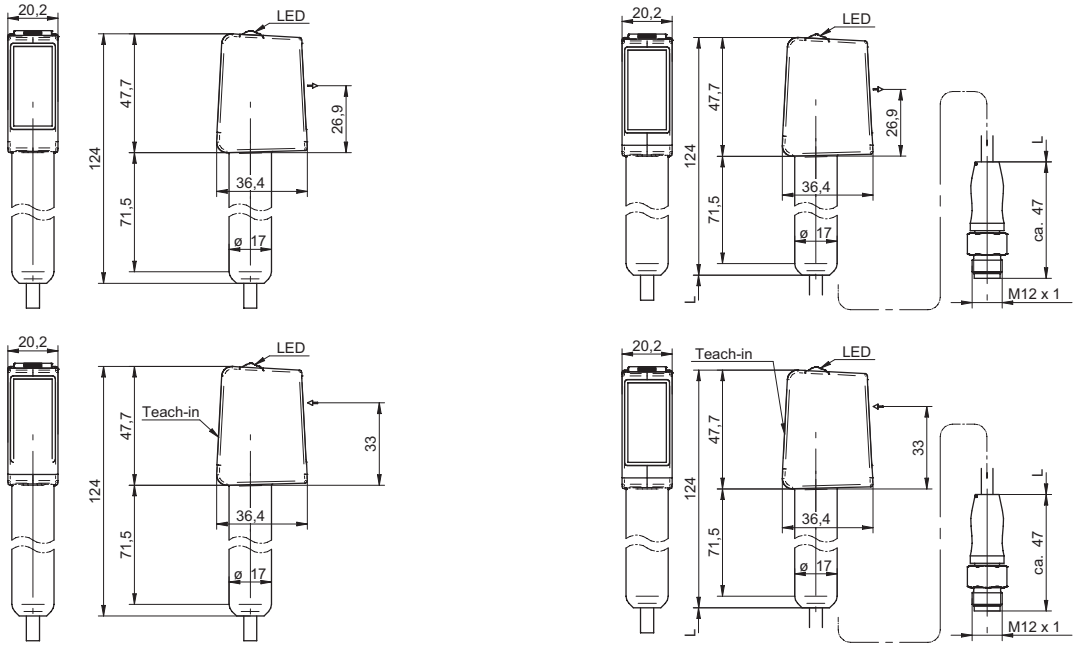
excess gain curve

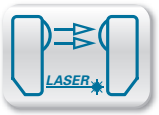


beam characteristic (typically)



dimension drawings



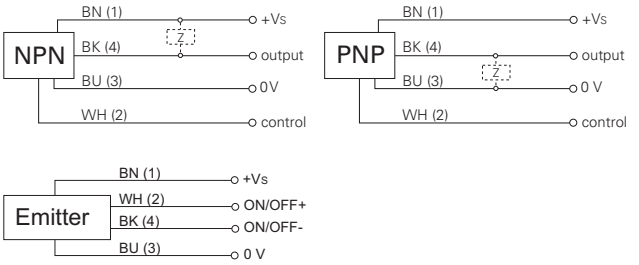


Sb = 13 m

- washdown design
- sensitivity adjustment via potentiometer

general data	
type	through beam sensor
special type	Washdown design
actual range Sb	13 m
nominal range Sn	20 m
receiver	
alignment / soiled lens indicator	LED green
output indicator	LED yellow
sensitivity adjustment	potentiometer, 270°
emitter	
light source	pulsed infrared diode
power on indication	LED green
emission power adjustment	potentiometer, 270°
wave length	880 nm
electrical data	
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
reverse polarity protection	yes
receiver	
response time / release time	< 2 ms
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
mechanical data	
width / diameter	18 mm
height / length	67,2 mm
type	cylindrical threaded
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67/69K

connection diagrams



connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

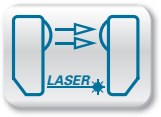
Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
for details: see accessories section	

laser warning

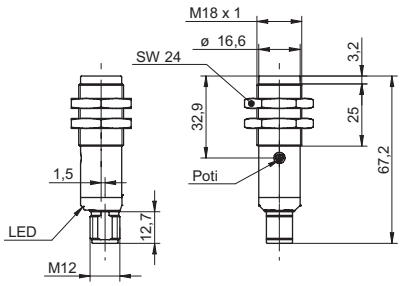
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference	emitter / receiver	output circuit
OR18W.EI-11157854	receiver	NPN
OR18W.EI-11157851	receiver	PNP
OR18W.TI-11157855	emitter	-



dimension drawing



red light LED version

product family	FGUM 020	FGUM 030	FGUM 030	FGUM 050	FGUM 050	FGUM 080	FGUM 080
width / diameter	40 mm	50 mm	50 mm	70 mm	70 mm	100 mm	100 mm
fork width Sb	20 mm	30 mm	30 mm	50 mm	50 mm	80 mm	80 mm
response time / release time	< 0,125 ms	< 0,125 ms	< 0,166 ms	< 0,125 ms	< 0,166 ms	< 0,125 ms	< 0,166 ms
light source	pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED
sensitivity adjustment	potentiometer, 270°	potentiometer, 270°	Teach-in: button / remote	potentiometer, 270°	Teach-in: button / remote	potentiometer, 270°	Teach-in: button / remote
output circuit	PNP	PNP	PNP	PNP	PNP	PNP	PNP
connection types	connector	connector	connector	connector	connector	connector	connector
housing material	metal	metal	metal	metal	metal	metal	metal
protection class	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
page	**239**	**240**	**241**	**242**	**243**	**244**	**245**

laser version

product family	OGUM 030 Basic	OGUM 030 Performance	OGUM 050 Basic	OGUM 050 Performance	OGUM 080 Basic	OGUM 080 Performance	OGUM 120 Basic
width / diameter	50 mm	60 mm	70 mm	80 mm	100 mm	110 mm	144 mm
fork width Sb	30 mm	30 mm	50 mm	50 mm	80 mm	80 mm	120 mm
response time / release time	< 0,166 ms	< 0,166 ms	< 0,166 ms	< 0,166 ms	< 0,166 ms	< 0,166 ms	< 0,166 ms
light source	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
sensitivity adjustment	potentiometer, 270°	potentiometer, 270°	potentiometer, 270°	potentiometer, 270°	potentiometer, 270°	potentiometer, 270°	potentiometer, 270°
output circuit	PNP	PNP	PNP	PNP	PNP	PNP	PNP
connection types	connector	connector	connector	connector	connector	connector	connector
housing material	metal	metal	metal	metal	metal	metal	metal
protection class	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
page	**250**	**251**	**252**	**253**	**254**	**255**	**256**

FGUM 120	FGLM 050	FGLM 080	FGLM 120
144 mm	75 mm	105 mm	150 mm
120 mm	60 mm	100 mm	158 mm
< 0,25 ms	< 0,125 ms	< 0,125 ms	< 0,25 ms
pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED
potentiometer, 270°	potentiometer, 270°	potentiometer, 270°	potentiometer, 270°
PNP	PNP	PNP	PNP
connector	connector	connector	connector
metal	metal	metal	metal
IP 67	IP 67	IP 67	IP 67
246	**247**	**248**	**249**

OGUM 120 Performance
150 mm
120 mm
< 0,166 ms
pulsed red laser diode
potentiometer, 270°
PNP
connector
metal
IP 67
257

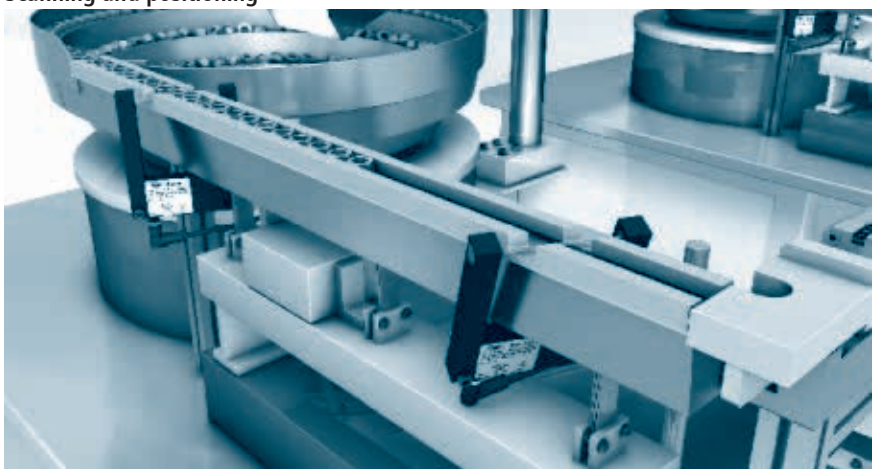
Introduction

Fork and angle sensors comprise an emitter and a receiver optimally aligned to one another and installed in a torsionally rigid metal housing. This enables highly accurate scanning and positioning of objects, as is required in automatic feeders, vibration conveyors and other applications, while high repeatability is ensured by precise collimator optics. Equipped with a laser light source, fork sensors can even position the very smallest of parts in the micron range. Time-consuming alignment and adjustment usually required for through beam sensors is unnecessary. Compared to through beam sensors, the electric wiring features just one cable connection.

Typical applications

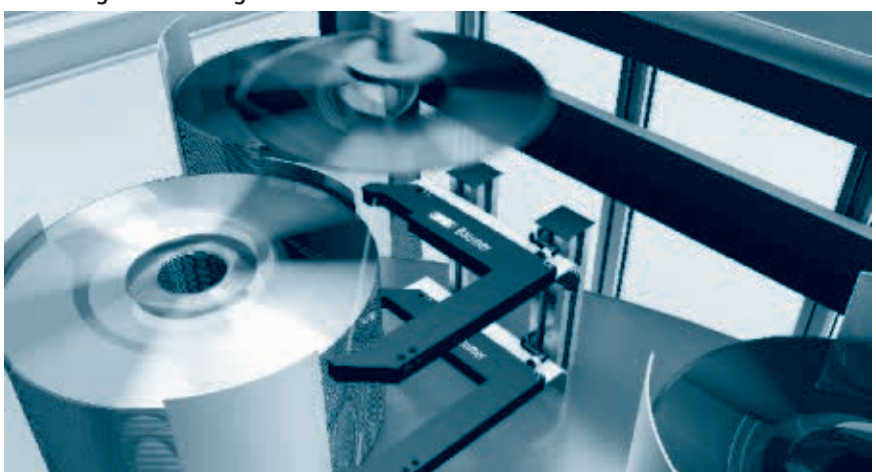
Thanks to their simple handling and optimally aligned optics, fork and angle sensors are extremely versatile. To enable optimum installation, different fork widths as well as U- and L-shaped versions are available.

Scanning and positioning



Scanning very small objects down to 50 µm in an automatic feeder

Stack height monitoring



Monitoring CD sheet stack heights

Features and benefits

Easy installation and adjustment
The emitter and receiver are already optimally aligned to one another in a torsionally rigid metal housing.

Innovative shapes
The special L-shape of the angle sensor enables optimum approach towards the optical axis.

Fast processes
Switching frequencies of up to 50 kHz allow rotational speed measurements.

Rugged
Use possible even in harsh ambient conditions thanks to metal housing and protection class IP 67.

Technology and function

Fork and angle sensors as well as through beam sensors are founded on the same basic principle.

The scratch-resistant, mineral glass collimator optics used in the fork and angle sensors FGUM/FGLM and OGUM produces a homogeneous, very narrow light beam. This feature gives the sensor its high detection accuracy, which is guaranteed over the entire beam range from all sides.

The largest laser fork sensor can reliably and repeatedly detect a 50 µm object over the entire 120 mm range.

The virtually parallel light beam and the small beam angle of the receiver optics make it possible to install the fork and angle sensors side by side without affecting each other and even produce, for example, small light barriers.

Sensitivity adjustment features a choice of two different adjustment methods – easy manual adjustment of sensitivity using a potentiometer or variable adjustment options by automatic teach-in.

Potentiometer
Easy sensitivity adjustment thanks to mechanical 270° potentiometer directly on the fork sensor.

Teach-in
The teach-in function enables rapid and easy commissioning in the field. The teach-in operation can be performed using the integrated teach-in button or the external teach-in cable.

Mounting and adjustment

The almost parallel light beam and the small beam angle of the receiver optics make it possible to install the sensors side by side without affecting each other and even construct, for example, small light barriers.

Attach the fork and angle sensors so that the object can pass freely through the scanning range. The receiver side should be protected from direct exposure to external light sources.

Potentiometer adjustment
Sensitivity is highest when the potentiometer is turned fully counterclockwise, enabling the smallest possible parts to be scanned with minimal power of the beam.

When the potentiometer is turned fully clockwise, sensitivity is lowest, so only larger parts are scanned. The power of the beam is highest and the fork/angle sensor has high excess gain to combat dirt.

Teach-in adjustment
The dynamic teach-in facility enables the sensor to calculate the optimum sensitivity level during operation, resulting in new potential applications.

For example, the smallest objects can be taught in without precise positioning simply by passing the light beam.

To initiate the dynamic teach-in procedure, the yellow teach-in button must be held down for 2 seconds. At least two objects should pass the light beam of the fork sensor during the following 2-4 seconds of the active teach-in phase. The LED indicates the active teach-in phase by flashing rapidly. If the teach-in procedure was completed successfully, this is clearly and visibly indicated by two flashes of the LED.

The active teach-in phase can be defined individually using an external teach-in facility. The longer a pulse is applied to the external teach-in cable, the longer the sensor teaches in its surrounding. When the external teach-in facility is employed, the teach-in button can also be automatically disabled.

Adjustment of light/dark switching
The output functions NO (dark-switching) and NC (light-switching) can be adjusted using a rotary switch. The required switch position is indicated on the type plate.
To prevent accidental switching, the rotary switch is covered by a rubber cap.

Important: always set the switch for the output function fully clockwise or counterclockwise. Intermediate positions lead to undefined output states.

Sb = 20 mm

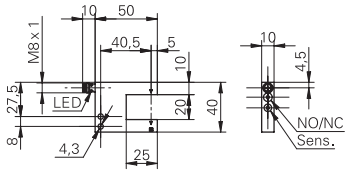
- sensitivity adjustable via potentiometer
- fork width 20 mm
- rugged metal housing

general data	
type	through beam sensor
object size	> 0,4 mm
repeat accuracy	< 0,02 mm
hysteresis	< 0,1 mm
ambient light immunity	< 50 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red LED
wave length	660 nm
light indicator	LED yellow
electrical data	
response time / release time	< 0,125 ms
switching frequency	< 4 kHz
voltage supply range +Vs	10 ... 35 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	40 mm
fork width Sb	20 mm
height / length	50 mm
penetration depth	25 mm
depth	10 mm
type	U profile
housing material	die-cast zinc
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

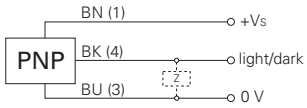
order reference

FGUM 020P8001/S35L

dimension drawing



connection diagram

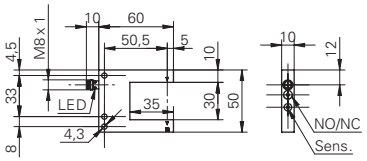


Sb = 30 mm

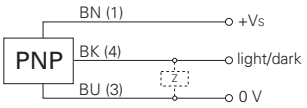
- sensitivity adjustable via potentiometer
- fork width 30 mm
- rugged metal housing

general data	
type	through beam sensor
object size	> 0,5 mm
repeat accuracy	< 0,02 mm
hysteresis	< 0,25 mm
ambient light immunity	< 140 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red LED
wave length	660 nm
light indicator	LED yellow
electrical data	
response time / release time	< 0,125 ms
switching frequency	< 4 kHz
voltage supply range +Vs	10 ... 35 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	50 mm
fork width Sb	30 mm
height / length	60 mm
penetration depth	35 mm
depth	10 mm
type	U profile
housing material	die-cast zinc
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

dimension drawing



connection diagram



order reference

FGUM 030P8001/S35L

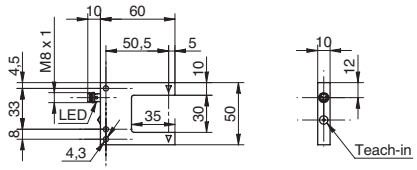
Sb = 30 mm

- sensitivity adjustable via Teach-in
- smallest detectable object 0,3 mm
- rugged metal housing

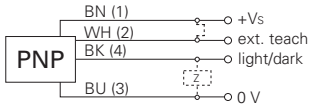
general data	
type	through beam sensor
object size	> 0,3 mm
repeat accuracy	< 0,03 mm
hysteresis	< 0,1 mm
ambient light immunity	< 20 kLux
sensitivity adjustment	Teach-in: button / remote
light source	pulsed red LED
wave length	660 nm
light indicator	LED yellow
electrical data	
response time / release time	< 0,166 ms
switching frequency	< 3 kHz
voltage supply range +Vs	10 ... 35 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	50 mm
fork width Sb	30 mm
height / length	60 mm
penetration depth	35 mm
depth	10 mm
type	U profile
housing material	die-cast zinc
connection types	connector M8
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

order reference
FGUM 030P6901/S35A

dimension drawing



connection diagram

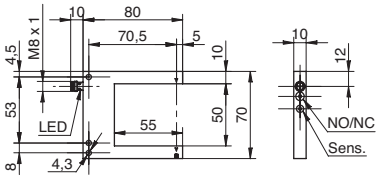


Sb = 50 mm

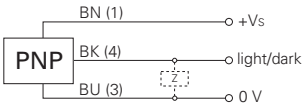
- sensitivity adjustable via potentiometer
- fork width 50 mm
- rugged metal housing

general data	
type	through beam sensor
object size	> 0,5 mm
repeat accuracy	< 0,04 mm
hysteresis	< 0,25 mm
ambient light immunity	< 80 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red LED
wave length	660 nm
light indicator	LED yellow
electrical data	
response time / release time	< 0,125 ms
switching frequency	< 4 kHz
voltage supply range +Vs	10 ... 35 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	70 mm
fork width Sb	50 mm
height / length	80 mm
penetration depth	55 mm
depth	10 mm
type	U profile
housing material	die-cast zinc
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

dimension drawing



connection diagram



order reference

FGUM 050P8001/S35L

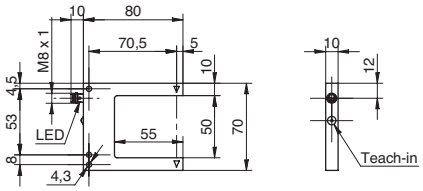
Sb = 50 mm

- sensitivity adjustable via Teach-in
- smallest detectable object 0,3 mm
- rugged metal housing

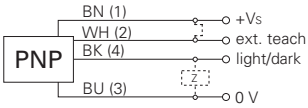
general data	
type	through beam sensor
object size	> 0,3 mm
repeat accuracy	< 0,03 mm
hysteresis	< 0,1 mm
ambient light immunity	< 20 kLux
sensitivity adjustment	Teach-in: button / remote
light source	pulsed red LED
wave length	660 nm
light indicator	LED yellow
electrical data	
response time / release time	< 0,166 ms
switching frequency	< 3 kHz
voltage supply range +Vs	10 ... 35 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	70 mm
fork width Sb	50 mm
height / length	80 mm
penetration depth	55 mm
depth	10 mm
type	U profile
housing material	die-cast zinc
connection types	connector M8
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

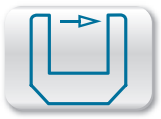
order reference
FGUM 050P6901/S35A

dimension drawing



connection diagram



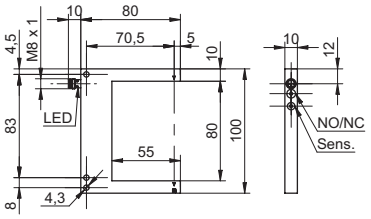


Sb = 80 mm

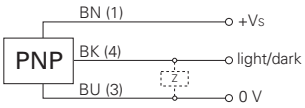
- sensitivity adjustable via potentiometer
- fork width 80 mm
- rugged metal housing

general data	
type	through beam sensor
object size	> 0,5 mm
repeat accuracy	< 0,06 mm
hysteresis	< 0,25 mm
ambient light immunity	< 80 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red LED
wave length	660 nm
light indicator	LED yellow
electrical data	
response time / release time	< 0,125 ms
switching frequency	< 4 kHz
voltage supply range +Vs	10 ... 35 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	100 mm
fork width Sb	80 mm
height / length	80 mm
penetration depth	55 mm
depth	10 mm
type	U profile
housing material	die-cast zinc
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

dimension drawing



connection diagram



order reference

FGUM 080P8001/S35L

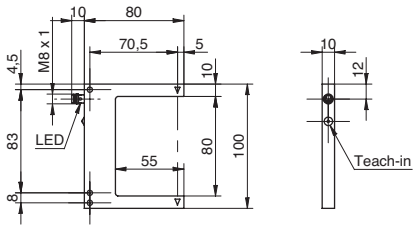
Sb = 80 mm

- sensitivity adjustable via Teach-in
- smallest detectable object 0,3 mm
- rugged metal housing

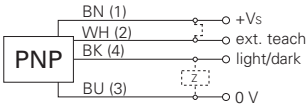
general data	
type	through beam sensor
object size	> 0,3 mm
repeat accuracy	< 0,03 mm
hysteresis	< 0,1 mm
ambient light immunity	< 20 kLux
sensitivity adjustment	Teach-in: button / remote
light source	pulsed red LED
wave length	660 nm
light indicator	LED yellow
electrical data	
response time / release time	< 0,166 ms
switching frequency	< 3 kHz
voltage supply range +Vs	10 ... 35 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	100 mm
fork width Sb	80 mm
height / length	80 mm
penetration depth	55 mm
depth	10 mm
type	U profile
housing material	die-cast zinc
connection types	connector M8
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

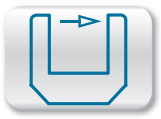
order reference
FGUM 080P6901/S35A

dimension drawing



connection diagram



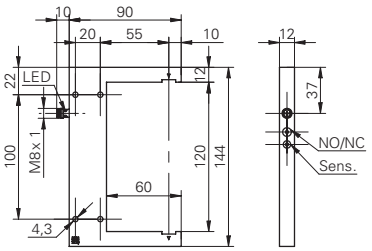


Sb = 120 mm

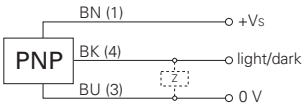
- sensitivity adjustable via potentiometer
- fork width 120 mm
- rugged metal housing

general data	
type	through beam sensor
object size	> 0,8 mm
repeat accuracy	< 0,06 mm
hysteresis	< 0,25 mm
ambient light immunity	< 50 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red LED
wave length	660 nm
light indicator	LED yellow
electrical data	
response time / release time	< 0,25 ms
switching frequency	< 2 kHz
voltage supply range +Vs	10 ... 35 VDC
current consumption max. (no load)	40 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	144 mm
fork width Sb	120 mm
height / length	90 mm
penetration depth	60 mm
depth	12 mm
type	U profile
housing material	die-cast zinc
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

dimension drawing



connection diagram



order reference

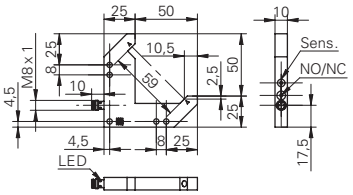
FGUM 120P8001/S35L

Sb = 60 mm

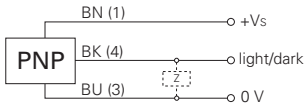
- optical axis approachable in x-, y- and z-direction
- smallest detectable object 0,5 mm
- rugged metal housing

general data	
type	through beam sensor
object size	> 0,5 mm
repeat accuracy	< 0,06 mm
hysteresis	< 0,25 mm
ambient light immunity	< 80 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red LED
wave length	660 nm
light indicator	LED yellow
electrical data	
response time / release time	< 0,125 ms
switching frequency	< 4 kHz
voltage supply range +Vs	10 ... 35 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	75 mm
fork width Sb	60 mm
height / length	75 mm
penetration depth	50 mm
depth	10 mm
type	L profile
housing material	die-cast zinc
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

dimension drawing



connection diagram



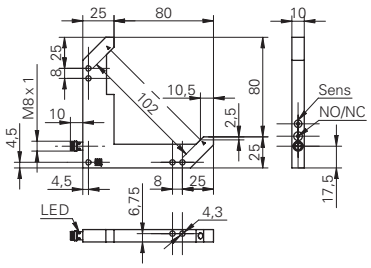
order reference
FGLM 050P8001/S35L

Sb = 100 mm

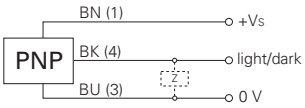
- optical axis approachable in x-, y- and z-direction
- smallest detectable object 0,7 mm
- rugged metal housing

general data	
type	through beam sensor
object size	> 0,7 mm
repeat accuracy	< 0,06 mm
hysteresis	< 0,25 mm
ambient light immunity	< 70 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red LED
wave length	660 nm
light indicator	LED yellow
electrical data	
response time / release time	< 0,125 ms
switching frequency	< 4 kHz
voltage supply range +Vs	10 ... 35 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	105 mm
fork width Sb	100 mm
height / length	105 mm
penetration depth	80 mm
depth	10 mm
type	L profile
housing material	die-cast zinc
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

dimension drawing



connection diagram



order reference

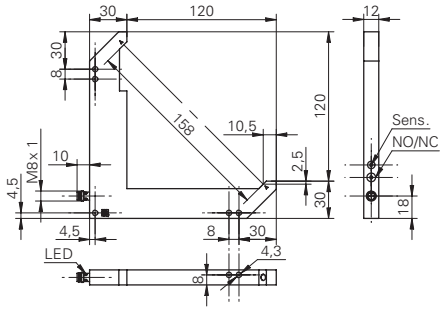
FGLM 080P8001/S35L

Sb = 158 mm

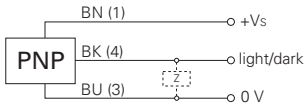
- optical axis approachable in x-, y- and z-direction
- smallest detectable object 1 mm
- rugged metal housing

general data	
type	through beam sensor
object size	> 1 mm
repeat accuracy	< 0,06 mm
hysteresis	< 0,25 mm
ambient light immunity	< 50 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red LED
wave length	660 nm
light indicator	LED yellow
electrical data	
response time / release time	< 0,25 ms
switching frequency	< 2 kHz
voltage supply range +Vs	10 ... 35 VDC
current consumption max. (no load)	40 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	150 mm
fork width Sb	158 mm
height / length	150 mm
penetration depth	120 mm
depth	12 mm
type	L profile
housing material	die-cast zinc
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

dimension drawing



connection diagram



order reference

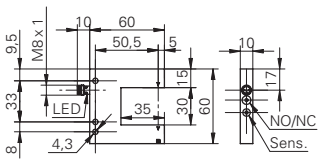
FGLM 120P8001/S35L

Sb = 30 mm

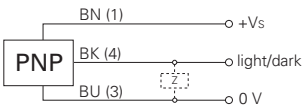
- laser fork sensor in rugged metal housing
- smallest detectable object 0,1 mm
- high repeatability of 0,02 mm

general data	
type	through beam sensor
object size	> 0,1 mm
repeat accuracy	< 0,02 mm
hysteresis	< 0,05 mm
ambient light immunity	< 5 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red laser diode
wave length	670 nm
laser class	1
light indicator	LED yellow
electrical data	
response time / release time	< 0,166 ms
switching frequency	< 3 kHz
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	50 mm
fork width Sb	30 mm
height / length	60 mm
penetration depth	35 mm
depth	10 mm
type	U profile
housing material	die-cast zinc
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	5 ... +45 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10161959	Converter PNP/NPN - M8 x 1
11163236	Adapter for pulse stretching M8
for details: see accessories section	

dimension drawing



connection diagram



laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference

OGUM 030P8002/S35L

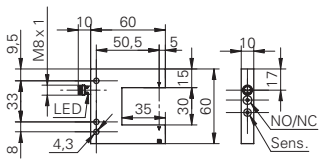
Sb = 30 mm

- precise laser fork sensor in rugged metal housing
- smallest detectable object 0,05 mm
- very high repeatability of 0,01 mm

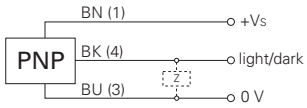
general data	
type	through beam sensor
object size	> 0,05 mm
repeat accuracy	< 0,01 mm
hysteresis	< 0,02 mm
ambient light immunity	< 100 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red laser diode
wave length	670 nm
laser class	1
light indicator	LED yellow
electrical data	
response time / release time	< 0,166 ms
switching frequency	< 3 kHz
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	60 mm
fork width Sb	30 mm
height / length	60 mm
penetration depth	35 mm
depth	10 mm
type	U profile
housing material	aluminum anodized
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	5 ... +45 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

order reference
OGUM 030P8001/S35L

dimension drawing



connection diagram



laser warning

CLASS 1 LASER PRODUCT

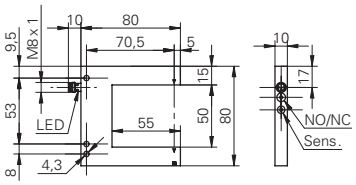
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

Sb = 50 mm

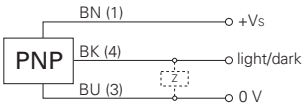
- laser fork sensor in rugged metal housing
- smallest detectable object 0,1 mm
- high repeatability of 0,02 mm

general data	
type	through beam sensor
object size	> 0,1 mm
repeat accuracy	< 0,02 mm
hysteresis	< 0,05 mm
ambient light immunity	< 5 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red laser diode
wave length	670 nm
laser class	1
light indicator	LED yellow
electrical data	
response time / release time	< 0,166 ms
switching frequency	< 3 kHz
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	70 mm
fork width Sb	50 mm
height / length	80 mm
penetration depth	55 mm
depth	10 mm
type	U profile
housing material	die-cast zinc
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	5 ... +45 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10161959	Converter PNP/NPN - M8 x 1
11163236	Adapter for pulse stretching M8
for details: see accessories section	

dimension drawing



connection diagram



laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference

OGUM 050P8002/S35L

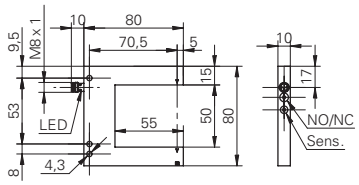
Sb = 50 mm

- precise laser fork sensor in rugged metal housing
- smallest detectable object 0,05 mm
- very high repeatability of 0,01 mm

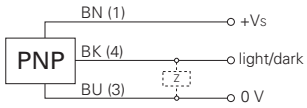
general data	
type	through beam sensor
object size	> 0,05 mm
repeat accuracy	< 0,01 mm
hysteresis	< 0,02 mm
ambient light immunity	< 100 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red laser diode
wave length	670 nm
laser class	1
light indicator	LED yellow
electrical data	
response time / release time	< 0,166 ms
switching frequency	< 3 kHz
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	80 mm
fork width Sb	50 mm
height / length	80 mm
penetration depth	55 mm
depth	10 mm
type	U profile
housing material	aluminum anodized
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	5 ... +45 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

order reference
OGUM 050P8001/S35L

dimension drawing



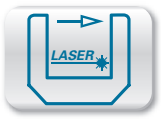
connection diagram



laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

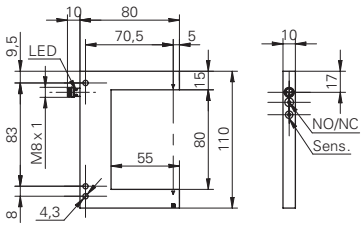


Sb = 80 mm

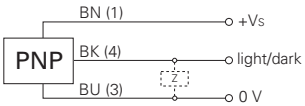
- laser fork sensor in rugged metal housing
- smallest detectable object 0,1 mm
- repeatability of 0,02 mm

general data	
type	through beam sensor
object size	> 0,2 mm
repeat accuracy	< 0,02 mm
hysteresis	< 0,05 mm
ambient light immunity	< 5 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red laser diode
wave length	670 nm
laser class	1
light indicator	LED yellow
electrical data	
response time / release time	< 0,166 ms
switching frequency	< 3 kHz
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	100 mm
fork width Sb	80 mm
height / length	80 mm
penetration depth	55 mm
depth	10 mm
type	U profile
housing material	die-cast zinc
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	5 ... +45 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10161959	Converter PNP/NPN - M8 x 1
11163236	Adapter for pulse stretching M8
for details: see accessories section	

dimension drawing



connection diagram



laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference

OGUM 080P8002/S35L

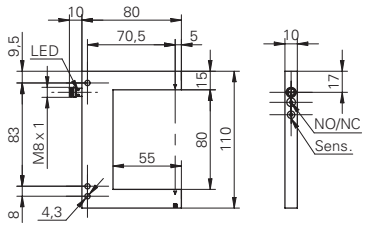
Sb = 80 mm

- precise laser fork sensor in rugged metal housing
- smallest detectable object 0,05 mm
- very high repeatability of 0,01 mm

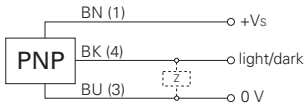
general data	
type	through beam sensor
object size	> 0,05 mm
repeat accuracy	< 0,01 mm
hysteresis	< 0,02 mm
ambient light immunity	< 100 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red laser diode
wave length	670 nm
laser class	1
light indicator	LED yellow
electrical data	
response time / release time	< 0,166 ms
switching frequency	< 3 kHz
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	110 mm
fork width Sb	80 mm
height / length	80 mm
penetration depth	55 mm
depth	10 mm
type	U profile
housing material	aluminum anodized
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	5 ... +45 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

order reference
OGUM 080P8001/S35L

dimension drawing



connection diagram



laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

Sb = 120 mm

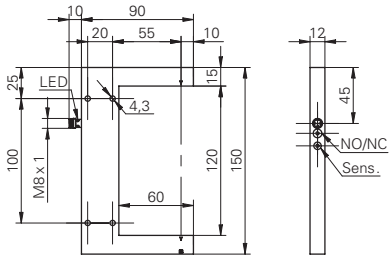
- laser fork sensor in rugged metal housing
- smallest detectable object 0,1 mm
- repeatability of 0,02 mm

general data	
type	through beam sensor
object size	> 0,2 mm
repeat accuracy	< 0,02 mm
hysteresis	< 0,05 mm
ambient light immunity	< 5 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red laser diode
wave length	670 nm
laser class	1
light indicator	LED yellow
electrical data	
response time / release time	< 0,166 ms
switching frequency	< 3 kHz
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	144 mm
fork width Sb	120 mm
height / length	90 mm
penetration depth	60 mm
depth	12 mm
type	U profile
housing material	die-cast zinc
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	5 ... +45 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10161959	Converter PNP/NPN - M8 x 1
11163236	Adapter for pulse stretching M8
for details: see accessories section	

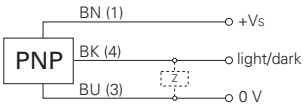
order reference

OGUM 120P8002/S35L

dimension drawing



connection diagram



laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

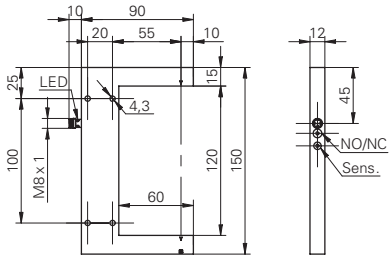
Sb = 120 mm

- precise laser fork sensor in rugged metal housing
- smallest detectable object 0,05 mm
- very high repeatability of 0,01 mm

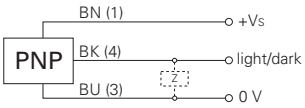
general data	
type	through beam sensor
object size	> 0,05 mm
repeat accuracy	< 0,01 mm
hysteresis	< 0,02 mm
ambient light immunity	< 100 kLux
sensitivity adjustment	potentiometer, 270°
light source	pulsed red laser diode
wave length	670 nm
laser class	1
light indicator	LED yellow
electrical data	
response time / release time	< 0,166 ms
switching frequency	< 3 kHz
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
output function	light / dark operate switchable
output circuit	PNP
voltage drop Vd	< 2,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	150 mm
fork width Sb	120 mm
height / length	90 mm
penetration depth	60 mm
depth	12 mm
type	U profile
housing material	aluminum anodized
connection types	connector M8, 3 pin
ambient conditions	
operating temperature	5 ... +45 °C
protection class	IP 67
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

order reference
OGUM 120P8001/S35L

dimension drawing



connection diagram



laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

red light LED version

product family	FHDK 04	FHCK 07	FHDK 07	FHDK 10	FHDK 10	FHDK 10	FHDK 10
		MINOS	*MINOS*				
	subminiature	subminiature	subminiature	miniature	miniature	miniature	miniature
version						point source LED	line beam
width / diameter	4 mm	8 mm	8 mm	10,4 mm	10,4 mm	10,4 mm	10,4 mm
sensing distance Tw	30 mm ±2 mm 50 mm ±3 mm	10 ... 60 mm	10 ... 60 mm	30 mm ±2 mm 50 mm ±3 mm 80 mm ±8 mm	20 ... 120 mm	25 ... 120 mm	20 ... 80 mm
response time / release time	< 0,5 ms	< 0,5 ms	< 0,5 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms
light source	pulsed point source LED	pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED	pulsed point source LED	pulsed red LED
sensing distance adjustment		Teach-in	Teach-in		mechanical, 5 turn	mechanical, 5 turn	mechanical, 5 turn
output circuit	push-pull	NPN PNP	NPN PNP	push-pull	NPN PNP	NPN PNP	NPN PNP
connection types	cable flylead connector	cable flylead connector	cable flylead connector	cable connector	flylead connector cable connector	cable connector	cable connector
housing material	plastic	plastic	plastic	plastic	plastic	plastic	plastic
protection class	IP 65	IP 65	IP 65	IP 65 IP 67	IP 65 IP 67	IP 65 IP 67	IP 65 IP 67
page	**270**	**272**	**274**	**276**	**278**	**280**	**282**

FHDK 10	FHDM 12	O300.GP	O300.GP	O300.GR	O300.GR	O300.GI	FHDK 14	FHDK 14
miniature	miniature	miniature	miniature	miniature	miniature	miniature	standard	standard
for glass detection			line beam		line beam			
10,4 mm	12,4 mm	12,9 mm	12,9 mm	12,9 mm	12,9 mm	12,9 mm	14,8 mm	14,8 mm
10 ... 30 mm	15 ... 300 mm	30 ... 200 mm	30 ... 120 mm	30 ... 300 mm	30 ... 180 mm	30 ... 300 mm	20 ... 350 mm 30 ... 500 mm	40 ... 200 mm
< 1 ms	< 1 ms	< 0,49 ms	< 1,5 ms	< 1 ms	< 1,5 ms	< 0,49 ms	< 1 ms < 5 ms	< 0,5 ms
pulsed red LED	pulsed red LED	pulsed PinPoint LED	pulsed PinPoint LED	pulsed red LED	pulsed red LED	pulsed infrared diode	pulsed red LED	pulsed red LED
mechanical, 5 turn	mechanical, 5 turn	qTeach / external Teach-in and IO-Link qTeach qTeach / 1-Step Teach-in	Teach-in and IO-Link	qTeach qTeach / 1-Step Teach-in	qTeach	qTeach / external	mechanical, 10 turn	Teach-in
NPN PNP	NPN PNP	push-pull NPN PNP	push-pull	push-pull NPN PNP	push-pull	push-pull	NPN PNP	NPN PNP
connector	cable connector	cable connector flylead connector	cable connector	cable connector	cable connector	cable connector	cable connector	cable connector
plastic	metal	plastic	plastic	plastic	plastic	plastic	plastic	plastic
		IO-Link	IO-Link					
IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
344	**284**	**286**	**288**	**290**	**292**	**294**	**296**	**298**

red light LED version

product family	FHDM 16	O500.GP	O500.GR	O500.GI	FHDK 20	OR18.GP	OR18.GR
	standard	standard	standard	standard	standard	standard	standard
version							
width / diameter	15,4 mm	18 mm	18 mm	18 mm	20 mm	18 mm	18 mm
sensing distance Tw	20 ... 450 mm 20 ... 600 mm	60 ... 400 mm	60 ... 550 mm	60 ... 550 mm	30 ... 200 mm	45 ... 200 mm	40 ... 120 mm
response time / release time	< 1 ms < 5 ms	< 0,49 ms	< 1 ms	< 0,49 ms	< 0,5 ms	< 0,49 ms	< 1 ms
light source	pulsed red LED	pulsed PinPoint LED	pulsed red LED	pulsed infrared diode	pulsed red LED	pulsed PinPoint LED	pulsed red LED
sensing distance adjustment	mechanical, 5 turn	qTeach / external Teach-in and IO-Link qTeach qTeach / 1-Step Teach-in	qTeach qTeach / 1-Step Teach-in	qTeach / external	Teach-in	qTeach / external qTeach	mechanical, 4 turn
output circuit	NPN PNP	push-pull NPN PNP	push-pull NPN PNP	push-pull	NPN PNP	push-pull NPN PNP	NPN PNP
connection types	cable connector	cable connector	cable connector	cable connector	connector	connector	connector
housing material	metal	plastic	plastic	plastic	plastic	metal	plastic
		IO-Link					
protection class	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
page	**300**	**302**	**304**	**306**	**308**	**310**	**312**

OR18.GR.F
standard
fixed focus
18 mm
50 mm
< 0,5 ms
pulsed red LED
no
NPN PNP
cable flylead connector
plastic
IP 67
314

laser version

product family	OHDK 10	OHDK 10	OHDM 12	O300.GL	O300.GL	O300H.GL	O300W.GL
	miniature	miniature	miniature	miniature	miniature	miniature	miniature
version		line beam			line beam		
width / diameter	10,4 mm	10,4 mm	12,4 mm	12,9 mm	12,9 mm	16,5 mm	16,5 mm
sensing distance Tw	22 ... 130 mm	22 ... 130 mm	17 ... 120 mm	30 ... 250 mm	30 ... 120 mm	30 ... 250 mm	30 ... 250 mm
response time / release time	< 0,25 ms	< 0,25 ms		< 0,25 ms	< 1,5 ms	< 0,25 ms	< 0,25 ms
response time			< 1 ms				
release time			< 2,7 ms				
light source	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
sensing distance adjustment	mechanical, 5 turn	mechanical, 5 turn	Teach-in	Teach-in and IO-Link qTeach	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in and IO-Link
output circuit	NPN PNP	NPN PNP	NPN PNP	push-pull NPN PNP	push-pull	push-pull	push-pull
connection types	cable connector	connector	connector	cable connector	cable connector	cable flylead connector	connector
housing material	plastic	plastic	metal	plastic	plastic	metal	metal
				IO-Link	IO-Link	IO-Link	IO-Link
protection class	IP 65 IP 67	IP 67	IP 67	IP 67	IP 67	IP 68/69K & proTect+	IP 68/69K & proTect+
page	**316**	**318**	**320**	**322**	**324**	**326**	**328**

OHDM 13	OHDK 14	OHDM 16	OHDM 16	OHDM 20	OHDK 25	OHDK 25
miniature	standard	standard	standard	standard	standard	standard
			wafer mapping sensor			
13,4 mm	14,8 mm	15,4 mm	15,4 mm	20,6 mm	23,4 mm	23,4 mm
50 ... 550 mm	20 ... 350 mm	25 ... 300 mm	123 ... 143 mm	210 ... 1500 mm	100 ... 900 mm	100 ... 1750 mm
	< 0,5 ms	< 0,1 ms < 0,6 ms	< 5 ms		< 10 ms	< 10 ms
< 5 ms				< 6 ms		
< 15 ms				< 18 ms		
pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
Teach-in	mechanical, 9 turn	mechanical, 8 turn	no	Teach-in	Teach-in	Teach-in
NPN PNP	NPN PNP	NPN PNP	NPN PNP	PNP	push-pull	push-pull
connector	cable connector	cable connector	cable	connector	cable connector	cable connector
metal	plastic	metal	metal	metal	plastic	plastic
IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
330	**332**	**334**	**336**	**338**	**340**	**342**

transparency detection

product family	FHDK 10
version	for glass detection
width / diameter	10,4 mm
sensing distance Tw	10 ... 30 mm
response time / release time	< 1 ms
sensing distance adjustment	mechanical, 5 turn
output circuit	NPN PNP
connection types	connector
housing material	plastic
protection class	IP 67
page	**344**

stainless steel sensors in washdown or hygienic design

product family	O300W.GP	O300H.GP	FHDR 14	FHDH 14	O500H.GP	O500W.GP	O500W.GP (Retro)
	miniature	miniature	standard	standard	standard	standard	standard
width / diameter	16,5 mm	16,5 mm	19,6 mm	19,6 mm	20,2 mm	20,2 mm	20,2 mm
sensing distance Tw	30 ... 200 mm	30 ... 200 mm	50 ... 400 mm	50 ... 400 mm	60 ... 400 mm	60 ... 400 mm	60 ... 400 mm
response time / release time	< 0,49 ms	< 0,49 ms	< 1,8 ms	< 1,8 ms	< 0,49 ms	< 0,49 ms	< 0,49 ms
light source	pulsed PinPoint LED	pulsed PinPoint LED	pulsed red LED	pulsed red LED	pulsed PinPoint LED	pulsed PinPoint LED	pulsed PinPoint LED
sensitivity adjustment			IO-Link	IO-Link			
sensing distance adjustment	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in	Teach-in	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in and IO-Link
output circuit	push-pull	push-pull	push-pull	push-pull	push-pull	push-pull	push-pull
connection types	connector	cable flylead connector	connector	cable flylead connector	cable flylead connector	connector	connector
housing material	metal	metal	metal	metal	metal	metal	metal
	IO-Link	IO-Link	IO-Link	IO-Link	IO-Link	IO-Link	IO-Link
protection class	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+	IP 68/69K & proTect+
page	**346**	**348**	**350**	**352**	**354**	**356**	**358**

OR18W.GR
standard
18 mm
40 ... 120 mm
< 1 ms
pulsed red LED
mechanical, 4 turn
NPN PNP
connector
metal
IP 67/69K
360

General information

By using the triangulation principle, diffuse sensors with background suppression not only measure the light intensity reflected by the target, but also determine the distance of the object from the sensor. In this way, objects with the minimum size of the light beam located within the adjustable sensing distance can be detected regardless of their color and surface.

The diffuse sensors with background suppression and laser light source were developed specifically for applications in which exact positioning is important. With the precisely focused beam, even very small objects such as the wires of a resistor or threads can be clearly detected or counted.

Applications

- Detection of boxes, metal and plastic parts lying on a base such as a conveyor belt, table or transport trolley from above
- Detection of bulk materials or other non-transparent materials in a container
- Counting of different-colored objects such as plastic bottles or printed packages
- Reliable presence monitoring of assembly parts, even with objects moving in the background

Characteristics and advantages

Adjustable sensing distance
The switching point can be adjusted accurately between the object and the interfering background using a set screw or Teach-in method

Largely independent of color
The sensing distance remains constant even if the color of the objects changes. Readjustment is therefore unnecessary. Objects changing in the background also have no effect.

Small spot size
Laser sensors can detect objects with a size of just 0,1 mm. Sensors with pinpoint diodes have a spot of only 2 mm diameter at the focus.

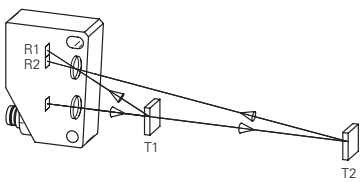
Red light emitters
Visible red light permits simple adjustment of the sensor to small objects by eye.

Short response time
Small, quickly moving objects are reliably detected due to the short response time.

Technology and operation

The sensors are based on the triangulation principle. Only the angle of the light reflected back from the object determines the distance at which the sensor responds. The amount of reflected light is far less important.

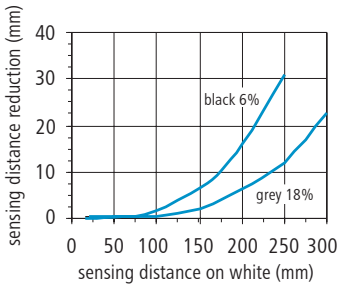
The schematic sketch below shows that receiver R1 receives the light reflected back from the object T1 (acute angle of incidence) and receiver R2 the light reflected back from the background (shallow angle of incidence). The transition from R1 to R2 determines the sensing distance.

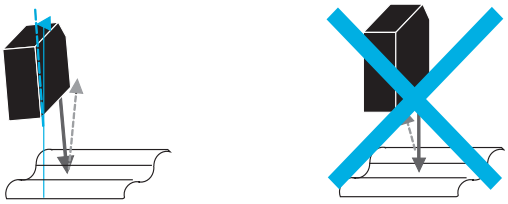


Mounting and adjustment

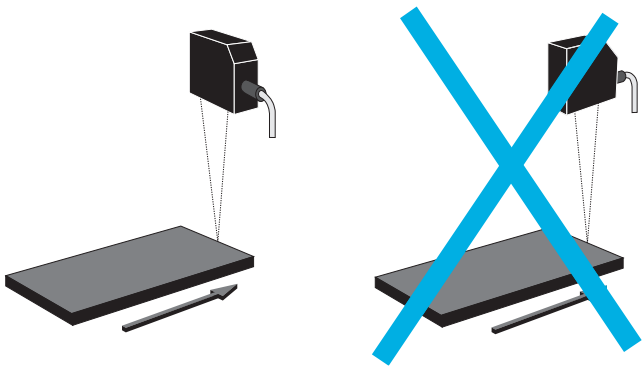
The diffuse sensor must be aimed at the object. The sensing distance must be set to a distance between the target and the background. The background must be located behind the adjusted sensing distance by at least the distance of the sensing distance reduction of the sensor to black.

For diffuse sensors with background suppression, the sensing range diagram is specified for the optimum adjustment. This indicates the sensing range reduction as a function of the sensing range to white for different degrees of remission. This means the distance by which the sensing distance to black or gray is reduced in comparison with white. When the adjusted sensing range to white is entered on the X axis of the diagram, the reduction of the sensing distance to black or gray can be read off on the Y axis. The sensing distance reduction also indicates the minimum distance a black or gray object must be separated from a white background.

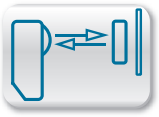




The direct reflection from glossy or reflective objects must not impinge on the receiver. This can be avoided by slightly tilting the sensor.



It should be ensured that the object to be detected approaches the active area of the sensor from the side, which avoids malfunctions caused by deflection of the light beam at edges.

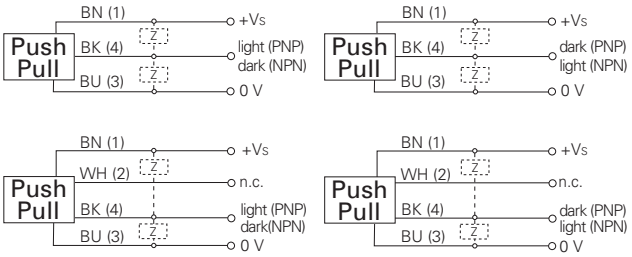


Tw = 50 mm

- compact housing
- small beam diameter
- push-pull output

general data	
type	background suppression
light source	pulsed point source LED
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
wave length	660 nm
beam diameter	2 mm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	20 mA
voltage drop Vd	< 2 VDC
output circuit	push-pull
output current	< 50 mA
short circuit protection	yes
reverse polarity protection	yes, supply only
mechanical data	
width / diameter	4 mm
height / length	44,8 mm
depth	6,2 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 65

connection diagrams

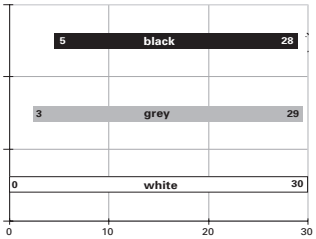


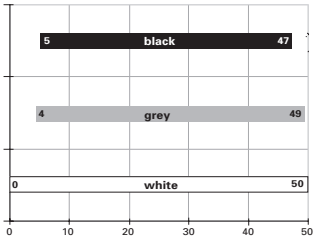
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10163196	Mounting brad FHDK 04
10163299	Bracket for profiles FHDK 04
for details: see accessories section	

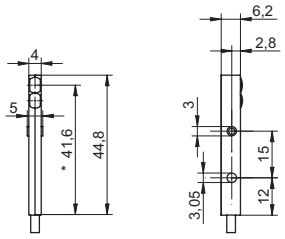
order reference	sensing distance Tw	connection types	output function
FHDK 04G6101	30 mm ±2 mm	cable 3 pin, 2 m	light operate
FHDK 04G6101/KS35A	30 mm ±2 mm	flylead connector M8 4 pin, L=200 mm	light operate
FHDK 04G6102	50 mm ±3 mm	cable 3 pin, 2 m	light operate
FHDK 04G6102/KS35A	50 mm ±3 mm	flylead connector M8 4 pin, L=200 mm	light operate
FHDK 04G6111	30 mm ±2 mm	cable 3 pin, 2 m	dark operate
FHDK 04G6111/KS35A	30 mm ±2 mm	flylead connector M8 4 pin, L=200 mm	dark operate
FHDK 04G6112	50 mm ±3 mm	cable 3 pin, 2 m	dark operate
FHDK 04G6112/KS35A	50 mm ±3 mm	flylead connector M8 4 pin, L=200 mm	dark operate

sensing distance diagrams

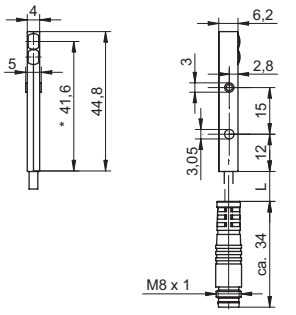




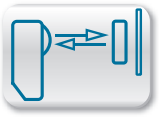
dimension drawings



* emitter axis



* emitter axis cable length L = 200 mm



Tw = 10 ... 60 mm

- compact housing
- sensing distance adjustable via Teach-in
- suppression of mutual optical interference

general data	
type	background suppression
light source	pulsed red LED
sensing distance Tw	10 ... 60 mm
sensing range Tb (at Tw max.)	2 ... 60 mm
sensing range Tb (at Tw min.)	5 ... 10 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED green
output indicator	LED yellow
sensing distance adjustment	Teach-in
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	8 mm
height / length	16,2 mm
depth	10,8 mm
type	rectangular
housing material	plastic (PMMA, MABS, PA)
front (optics)	PMMA
ambient conditions	
operating temperature	-20 ... +50 °C
protection class	IP 65

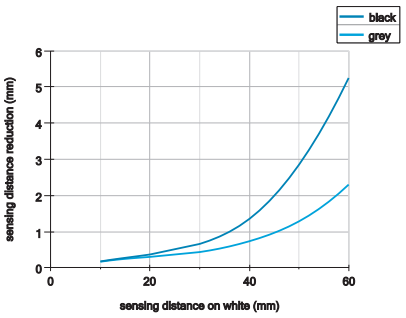
connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

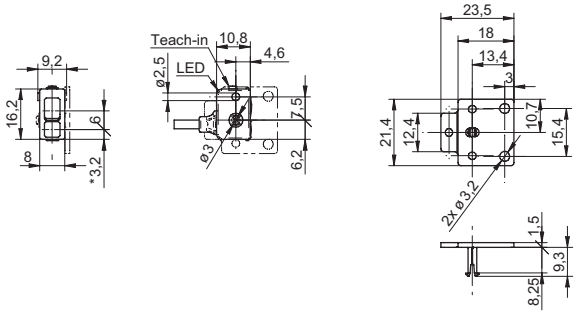
Accessories	
10150844	Minofix mounting 07
for details: see accessories section	

order reference	connection types	output circuit
FHCK 07N6901	cable rear side, 2 m	NPN
FHCK 07N6901/KS35A	flylead connector M8 4 pin, L=200 mm	NPN
FHCK 07P6901	cable rear side, 2 m	PNP
FHCK 07P6901/KS35A	flylead connector M8 4 pin, L=200 mm	PNP

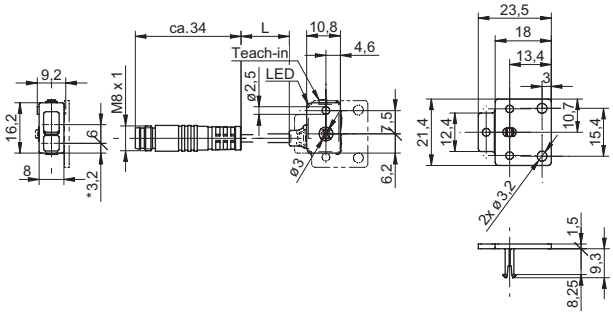
sensing distance diagram



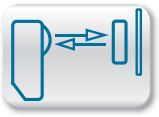
dimension drawings



* emitter axis



* emitter axis cable length L = 200 mm



Tw = 10 ... 60 mm

- compact housing
- sensing distance adjustable via Teach-in
- suppression of mutual optical interference

general data	
type	background suppression
light source	pulsed red LED
sensing distance Tw	10 ... 60 mm
sensing range Tb (at Tw max.)	2 ... 60 mm
sensing range Tb (at Tw min.)	5 ... 10 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED green
output indicator	LED yellow
sensing distance adjustment	Teach-in
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	8 mm
height / length	16,2 mm
depth	10,8 mm
type	rectangular
housing material	plastic (PMMA, MABS, PA)
front (optics)	PMMA
ambient conditions	
operating temperature	-20 ... +50 °C
protection class	IP 65

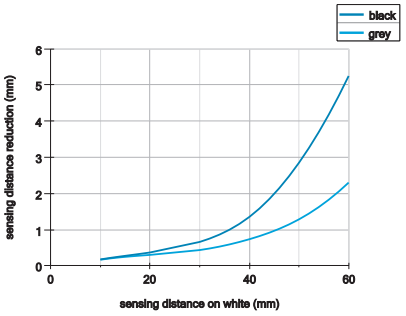
connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

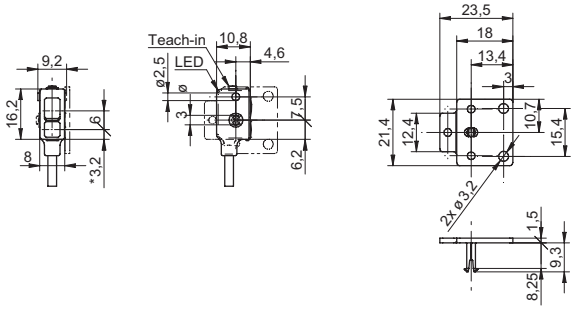
Accessories	
10150844	Minofix mounting 07
for details: see accessories section	

order reference	connection types	output circuit
FHDK 07N6901	cable bottom side, 2 m	NPN
FHDK 07N6901/KS35A	flylead connector M8 4 pin, L=200 mm	NPN
FHDK 07P6901	cable bottom side, 2 m	PNP
FHDK 07P6901/KS35A	flylead connector M8 4 pin, L=200 mm	PNP

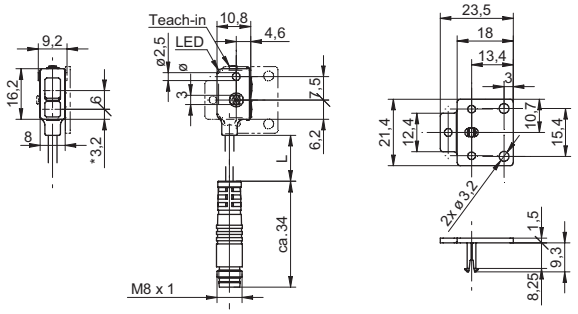
sensing distance diagram



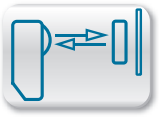
dimension drawings



* emitter axis



* emitter axis cable length L = 200 mm

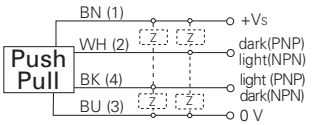


Tw = 80 mm

- compact housing
- fixed sensing distance
- push-pull output

general data	
type	background suppression
light source	pulsed red LED
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	18 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 50 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	14,7 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C

connection diagram

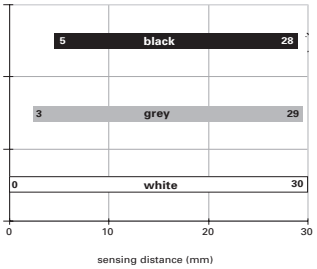


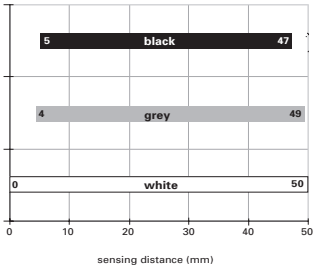
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

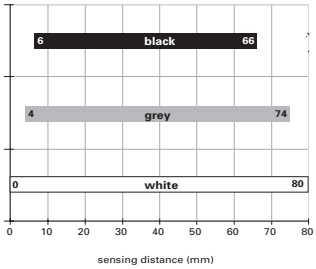
Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
10162083	Mounting panel for sensors series 10
10118798	Mounting bracket series 10
for details: see accessories section	

order reference	sensing distance Tw	connection types	protection class
FHDK 10G5120	30 mm ±2 mm	cable 4 pin, 2 m	IP 65
FHDK 10G5120/S35A	30 mm ±2 mm	connector M8 4 pin	IP 67
FHDK 10G5121	50 mm ±3 mm	cable 4 pin, 2 m	IP 65
FHDK 10G5121/S35A	50 mm ±3 mm	connector M8 4 pin	IP 67
FHDK 10G5122	80 mm ±8 mm	cable 4 pin, 2 m	IP 65
FHDK 10G5122/S35A	80 mm ±8 mm	connector M8 4 pin	IP 67

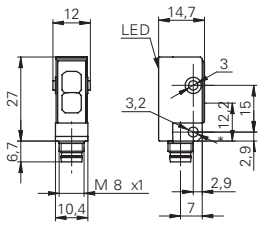
sensing distance diagrams



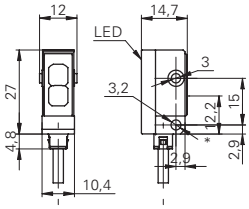




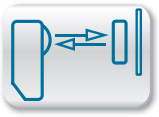
dimension drawings



* emitter axis



* emitter axis

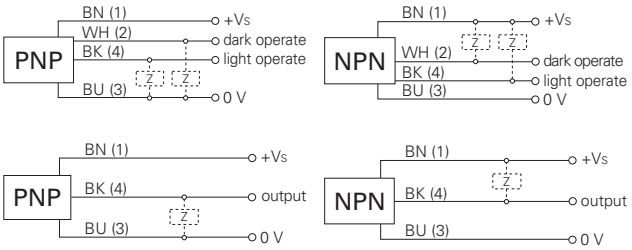


Tw = 20 ... 120 mm

- compact housing
- large sensing range
- sensing distance adjustable via potentiometer

general data	
type	background suppression
light source	pulsed red LED
sensing distance Tw	20 ... 120 mm
sensing range Tb (at Tw max.)	5 ... 120 mm
sensing range Tb (at Tw min.)	5 ... 20 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensing distance adjustment	mechanical, 5 turn
distance to focus	35 ... 45 mm
wave length	660 nm
beam diameter	4 mm at focus
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	14 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C

connection diagrams

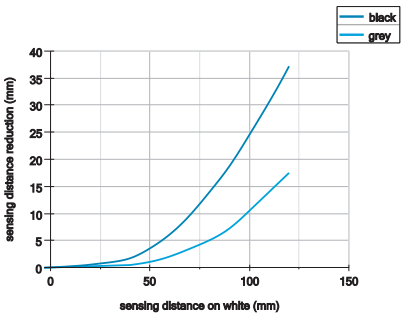


connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

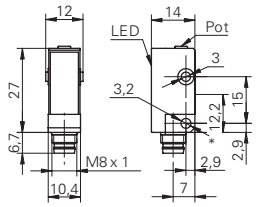
Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
10162083	Mounting panel for sensors series 10
10118798	Mounting bracket series 10
for details: see accessories section	

order reference	connection types	output circuit	output function	protection class
FHDK 10N1101/KS35	flylead connector M8 3 pin	NPN	light operate	IP 65
FHDK 10N5101	cable 4 pin, 2 m	NPN	light / dark operate	IP 65
FHDK 10N5101/S35A	connector M8 4 pin	NPN	light / dark operate	IP 67
FHDK 10P1101/KS35	flylead connector M8 3 pin	PNP	light operate	IP 65
FHDK 10P5101	cable 4 pin, 2 m	PNP	light / dark operate	IP 65
FHDK 10P5101/S35A	connector M8 4 pin	PNP	light / dark operate	IP 67

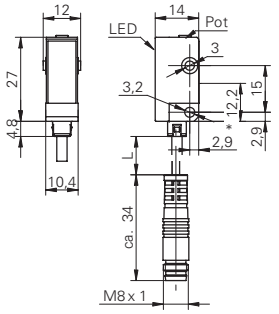
sensing distance diagram



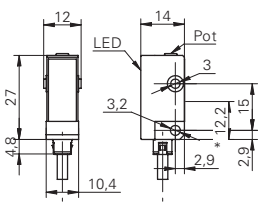
dimension drawings



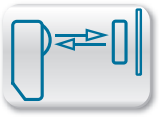
* emitter axis



* emitter axis cable length L = 200 mm



* emitter axis



Tw = 20 ... 120 mm

- compact housing
- small beam diameter
- sensing distance adjustable via potentiometer

general data	
type	background suppression
version	point source LED
light source	pulsed point source LED
sensing distance Tw	25 ... 120 mm
sensing range Tb (at Tw max.)	5 ... 120 mm
sensing range Tb (at Tw min.)	5 ... 25 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensing distance adjustment	mechanical, 5 turn
distance to focus	35 ... 45 mm
wave length	660 nm
beam diameter	2 mm at focus
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	14 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C

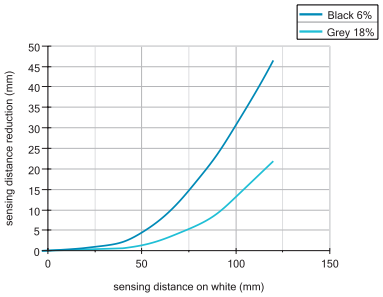
connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

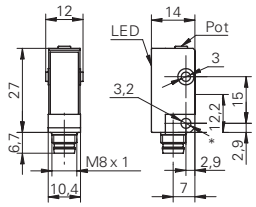
Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
10162083	Mounting panel for sensors series 10
10118798	Mounting bracket series 10
for details: see accessories section	

order reference	connection types	output circuit	protection class
FHDK 10N5110	cable 4 pin, 2 m	NPN	IP 65
FHDK 10N5110/S35A	connector M8 4 pin	NPN	IP 67
FHDK 10P5110	cable 4 pin, 2 m	PNP	IP 65
FHDK 10P5110/S35A	connector M8 4 pin	PNP	IP 67

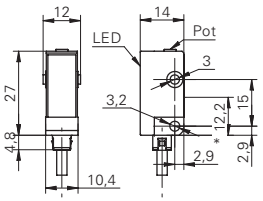
sensing distance diagram



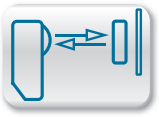
dimension drawings



* emitter axis



* emitter axis cable length L = 200 mm



Tw = 20 ... 80 mm

- compact housing
- with line beam
- sensing distance adjustable via potentiometer

general data	
type	background suppression
version	line beam
light source	pulsed red LED
sensing distance Tw	20 ... 80 mm
sensing range Tb (at Tw max.)	5 ... 80 mm
sensing range Tb (at Tw min.)	5 ... 20 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensing distance adjustment	mechanical, 5 turn
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	14 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C

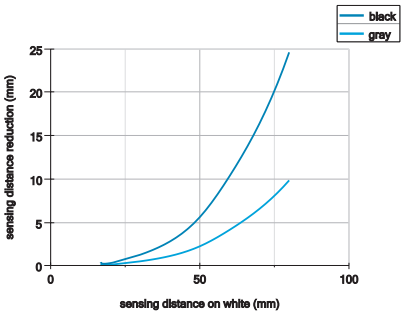
connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

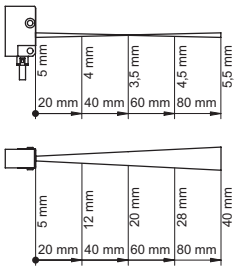
Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
10162083	Mounting panel for sensors series 10
10118798	Mounting bracket series 10
for details: see accessories section	

order reference	connection types	output circuit	protection class
FHDK 10N5150	cable 4 pin, 2 m	NPN	IP 65
FHDK 10N5150/S35A	connector M8 4 pin	NPN	IP 67
FHDK 10P5150	cable 4 pin, 2 m	PNP	IP 65
FHDK 10P5150/S35A	connector M8 4 pin	PNP	IP 67

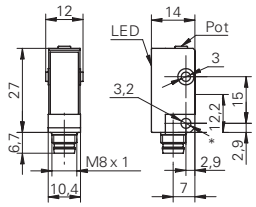
sensing distance diagram



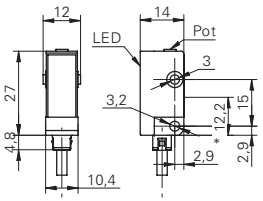
beam characteristic (typically)



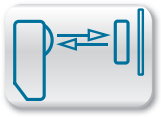
dimension drawings



* emitter axis



* emitter axis



Tw = 15 ... 300 mm

- rugged miniature metal housing
- sensing distance adjustable via potentiometer
- suppression of mutual optical interference

general data	
type	background suppression
light source	pulsed red LED
sensing distance Tw	15 ... 300 mm
sensing range Tb (at Tw max.)	15 ... 300 mm
sensing range Tb (at Tw min.)	5 ... 15 mm
light indicator	LED yellow
sensing distance adjustment	mechanical, 5 turn
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	25 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,4 mm
height / length	35 mm
depth	35 mm
type	rectangular
housing material	die-cast zinc
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

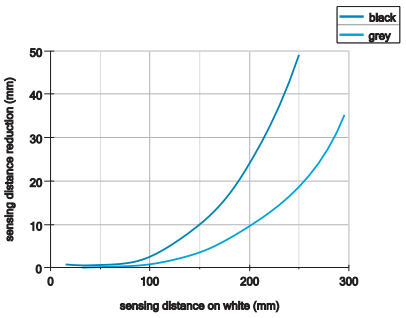
order reference	connection types	output circuit
FHDM 12N5001	cable 4 pin, 2 m	NPN
FHDM 12N5001/S35A	connector M8 4 pin	NPN
FHDM 12P5001	cable 4 pin, 2 m	PNP
FHDM 12P5001/S35A	connector M8 4 pin	PNP

connection diagrams

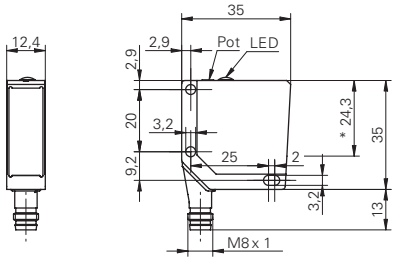
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10150328	Sensofix series 12
10113873	Mounting bracket series 12 (L design)
for details: see accessories section	

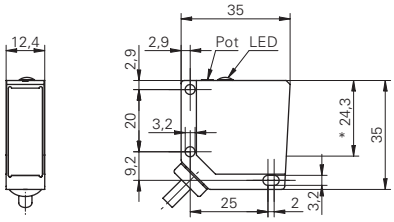
sensing distance diagram



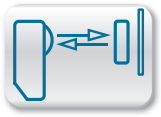
dimension drawings



* emitter axis



* emitter axis



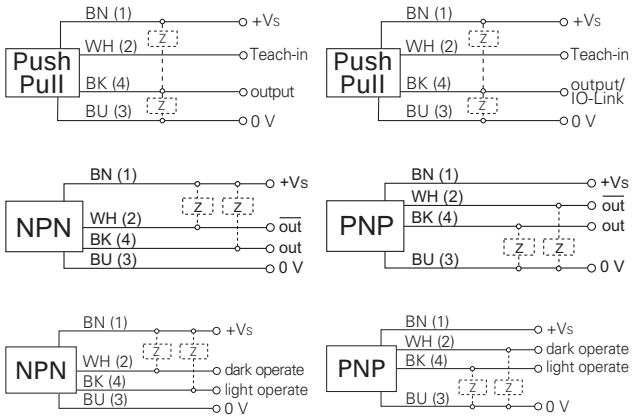
Tw = 200 mm

IO-Link

- One inch class
- PinPoint LED
- small beam diameter

general data	
type	background suppression
light source	pulsed PinPoint LED
sensing distance Tw	30 ... 200 mm
sensing range Tb	15 ... 200 mm
power on indication	LED green
light indicator	LED yellow
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

connection diagrams

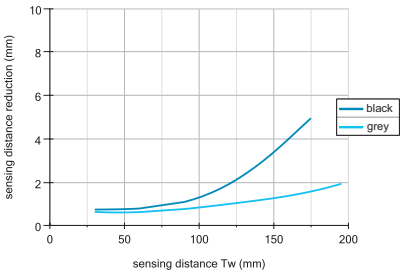


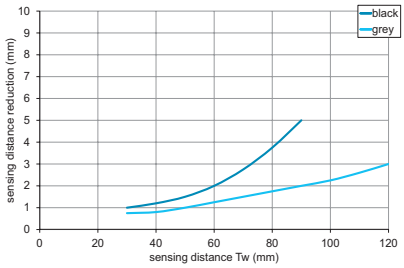
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

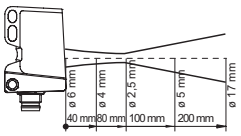
order reference	connection types	output circuit	sensing distance adjustment
O300.GP-11120101	cable 4 pin, 2 m	push-pull	qTeach / external
O300.GP-11110415	connector M8 4 pin	push-pull	qTeach / external
O300.GP-11143644	flylead connector M8, L=200 mm	push-pull	qTeach / external
O300.GP-11125058	cable 4 pin, 2 m	push-pull	Teach-in and IO-Link
O300.GP-11125023	connector M8 4 pin	push-pull	Teach-in and IO-Link
O300.GP-11120103	cable 4 pin, 2 m	NPN complementary	qTeach
O300.GP-11135827	cable 4 pin, 2 m	NPN complementary	qTeach / 1-Step Teach-in
O300.GP-11135828	connector M8 4 pin	NPN complementary	qTeach / 1-Step Teach-in
O300.GP-11110442	connector M8 4 pin	NPN complementary	qTeach
O300.GP-11120104	cable 4 pin, 2 m	PNP complementary	qTeach
O300.GP-11135829	cable 4 pin, 2 m	PNP complementary	qTeach / 1-Step Teach-in
O300.GP-11135850	connector M8 4 pin	PNP complementary	qTeach / 1-Step Teach-in
O300.GP-11110441	connector M8 4 pin	PNP complementary	qTeach
O300.GP-11147416	flylead connector M12, L=200 mm	PNP complementary	qTeach

sensing distance diagrams

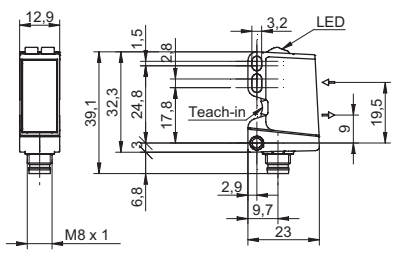


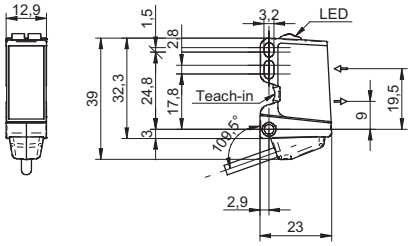


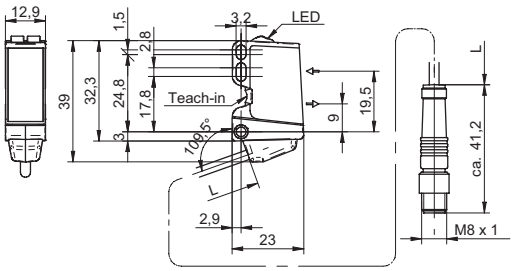
beam characteristic (typically)

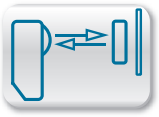


dimension drawings









Tw = 120 mm

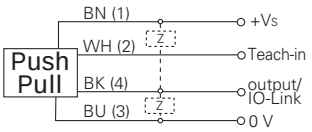
IO-Link

- One inch class
- PinPoint LED
- line 5 x 67 mm

general data	
type	background suppression
version	line beam
light source	pulsed PinPoint LED
sensing distance Tw	30 ... 120 mm
sensing range Tb	15 ... 120 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
beam type	line
alignment optical axis	< 2°
electrical data	
response time / release time	< 1,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

order reference	connection types
O300.GP-11199038	cable 4 pin, 2 m
O300.GP-11199039	connector M8 4 pin

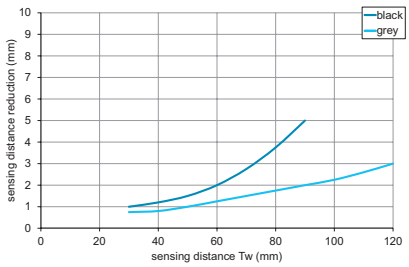
connection diagram



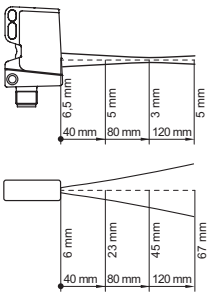
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

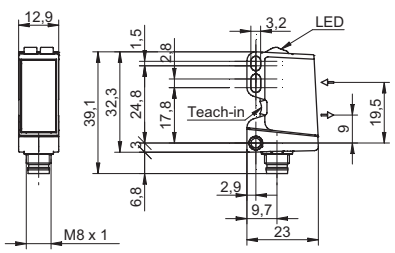
sensing distance diagram

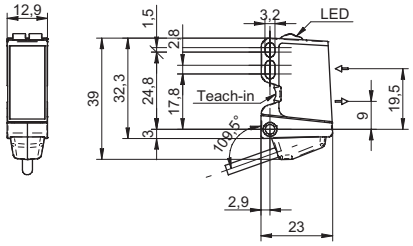


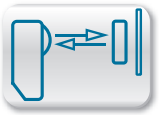
beam characteristic (typically)



dimension drawings





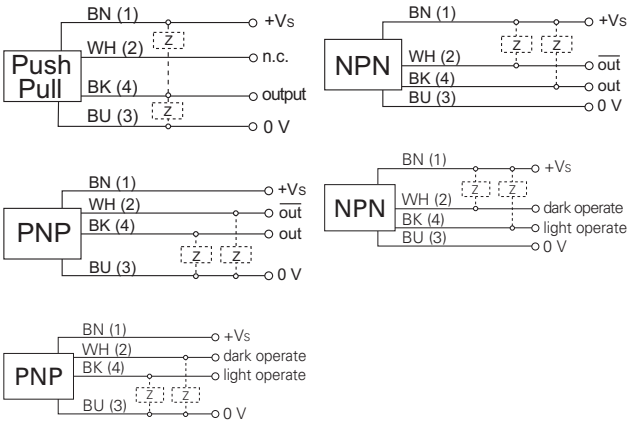


Tw = 300 mm

- One inch class
- qTeach

general data	
type	background suppression
light source	pulsed red LED
sensing distance Tw	30 ... 300 mm
sensing range Tb	15 ... 300 mm
power on indication	LED green
light indicator	LED yellow
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

connection diagrams

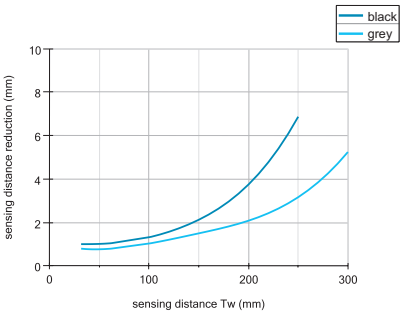


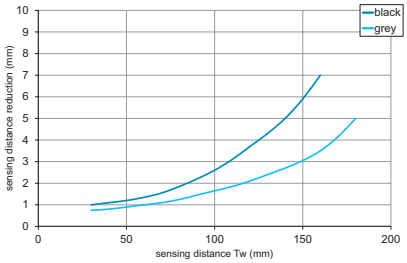
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

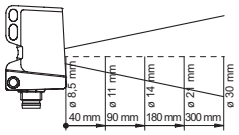
order reference	connection types	output circuit	sensing distance adjustment
O300.GR-11120106	cable 4 pin, 2 m	push-pull	qTeach
O300.GR-11110414	connector M8 4 pin	push-pull	qTeach
O300.GR-11135876	cable 4 pin, 2 m	NPN complementary	qTeach
O300.GR-11135882	cable 4 pin, 2 m	NPN complementary	qTeach / 1-Step Teach-in
O300.GR-11128552	connector M8 4 pin	NPN complementary	qTeach / 1-Step Teach-in
O300.GR-11135879	connector M8 4 pin	NPN complementary	qTeach
O300.GR-11135880	cable 4 pin, 2 m	PNP complementary	qTeach
O300.GR-11135883	cable 4 pin, 2 m	PNP complementary	qTeach / 1-Step Teach-in
O300.GR-11135885	connector M8 4 pin	PNP complementary	qTeach / 1-Step Teach-in
O300.GR-11135881	connector M8 4 pin	PNP complementary	qTeach

sensing distance diagrams

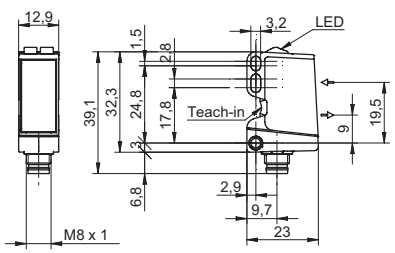


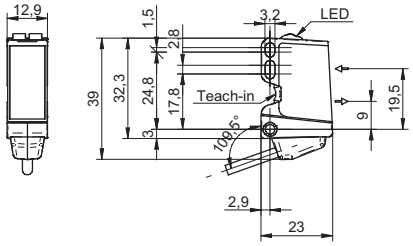


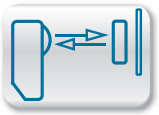
beam characteristic (typically)



dimension drawings







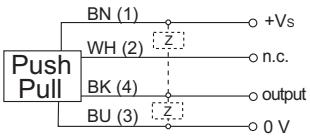
Tw = 180 mm

- One inch class
- red light LED
- line 21 x 100 mm

general data	
type	background suppression
version	line beam
light source	pulsed red LED
sensing distance Tw	30 ... 180 mm
sensing range Tb	15 ... 180 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	qTeach
wave length	630 nm
suppression of reciprocal influence	yes
beam type	line
alignment optical axis	< 2°
electrical data	
response time / release time	< 1,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

order reference	connection types
O300.GR-11199071	cable 4 pin, 2 m
O300.GR-11199072	connector M8 4 pin

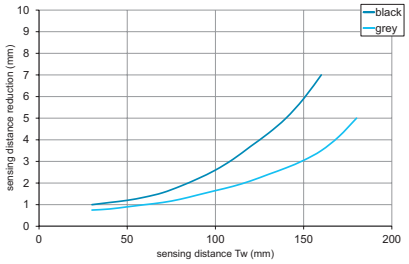
connection diagram



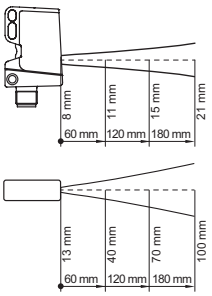
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

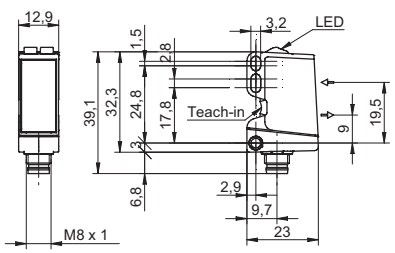
sensing distance diagram

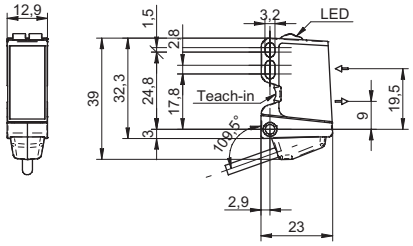


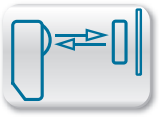
beam characteristic (typically)



dimension drawings







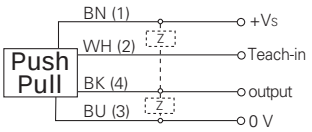
Tw = 300 mm

- One inch class
- infrared LED
- short response time

general data	
type	background suppression
light source	pulsed infrared diode
sensing distance Tw	30 ... 300 mm
sensing range Tb	15 ... 300 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	qTeach / external
wave length	860 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

order reference	connection types
O300.GI-11128081	cable 4 pin, 2 m
O300.GI-11121712	connector M8 4 pin

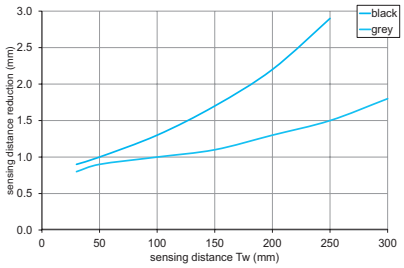
connection diagram



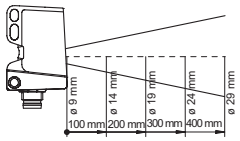
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

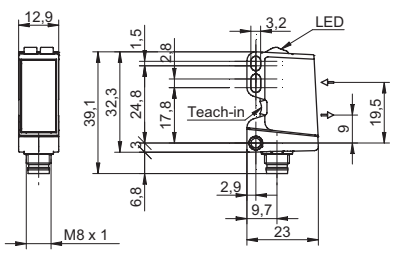
sensing distance diagram

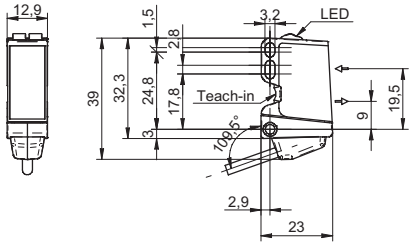


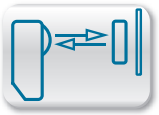
beam characteristic (typically)



dimension drawings







Tw = 20 ... 500 mm

- long range
- sensing distance adjustable via potentiometer
- suppression of mutual optical interference

general data	
type	background suppression
light source	pulsed red LED
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensing distance adjustment	mechanical, 10 turn
wave length	660 nm
suppression of reciprocal influence	yes
sensing distance Tw = 20 ... 350 mm	
sensing range Tb (at Tw max.)	20 ... 350 mm
sensing range Tb (at Tw min.)	5 ... 20 mm
sensing distance Tw = 30 ... 500 mm	
sensing range Tb (at Tw max.)	30 ... 500 mm
sensing range Tb (at Tw min.)	5 ... 30 mm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

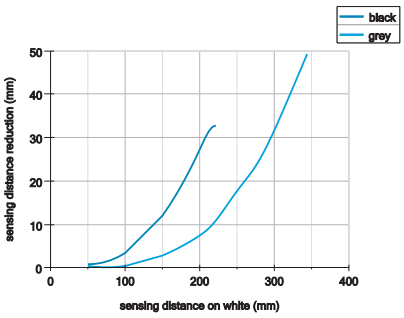
connection diagrams

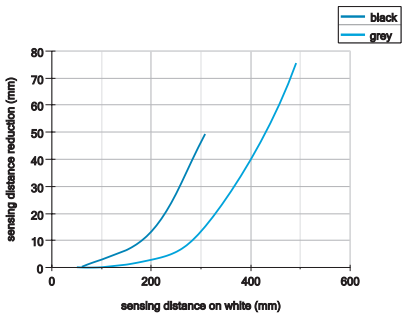
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
for details: see accessories section	

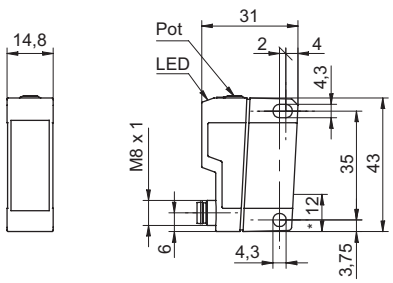
order reference	sensing distance Tw	connection types	output circuit	response time / release time	depth
FHDK 14N5101	20 ... 350 mm	cable 4 pin, 2 m	NPN	< 1 ms	32,7 mm
FHDK 14N5101/S14	20 ... 350 mm	connector M12 4 pin	NPN	< 1 ms	31 mm
FHDK 14N5101/S35A	20 ... 350 mm	connector M8 4 pin	NPN	< 1 ms	31 mm
FHDK 14N5104	30 ... 500 mm	cable 4 pin, 2 m	NPN	< 5 ms	32,7 mm
FHDK 14N5104/S14	30 ... 500 mm	connector M12 4 pin	NPN	< 5 ms	31 mm
FHDK 14N5104/S35A	30 ... 500 mm	connector M8 4 pin	NPN	< 5 ms	31 mm
FHDK 14P5101	20 ... 350 mm	cable 4 pin, 2 m	PNP	< 1 ms	32,7 mm
FHDK 14P5101/S14	20 ... 350 mm	connector M12 4 pin	PNP	< 1 ms	31 mm
FHDK 14P5101/S35A	20 ... 350 mm	connector M8 4 pin	PNP	< 1 ms	31 mm
FHDK 14P5104	30 ... 500 mm	cable 4 pin, 2 m	PNP	< 5 ms	32,7 mm
FHDK 14P5104/S14	30 ... 500 mm	connector M12 4 pin	PNP	< 5 ms	31 mm
FHDK 14P5104/S35A	30 ... 500 mm	connector M8 4 pin	PNP	< 5 ms	31 mm

sensing distance diagrams

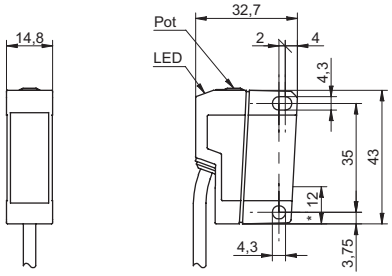




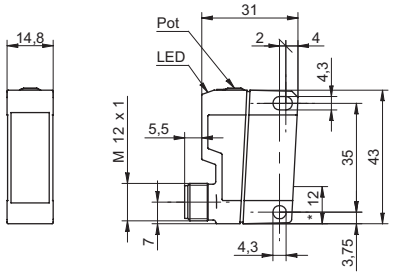
dimension drawings



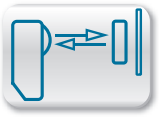
* emitter axis



* emitter axis



* emitter axis



Tw = 40 ... 200 mm

- short response time
- sensing distance adjustable via Teach-in
- suppression of mutual optical interference

general data	
type	background suppression
light source	pulsed red LED
sensing distance Tw	40 ... 200 mm
sensing range Tb (at Tw max.)	20 ... 200 mm
sensing range Tb (at Tw min.)	12 ... 40 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED green
output indicator	LED yellow
sensing distance adjustment	Teach-in
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	35 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

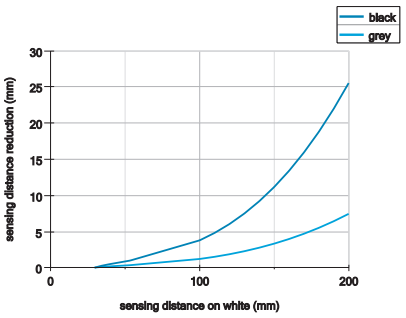
connection diagrams

connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

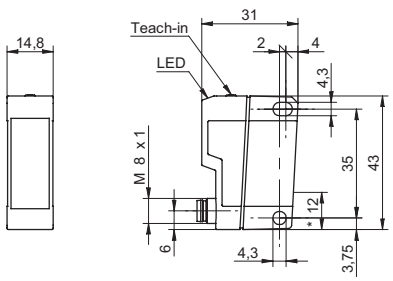
Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
for details: see accessories section	

order reference	connection types	output circuit	depth
FHDK 14N6901	cable 4 pin, 2 m	NPN	32,7 mm
FHDK 14N6901/S14	connector M12 4 pin	NPN	31 mm
FHDK 14N6901/S35A	connector M8 4 pin	NPN	31 mm
FHDK 14P6901	cable 4 pin, 2 m	PNP	32,7 mm
FHDK 14P6901/S14	connector M12 4 pin	PNP	31 mm
FHDK 14P6901/S35A	connector M8 4 pin	PNP	31 mm

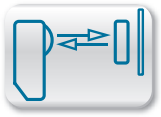
sensing distance diagram



dimension drawing



* emitter axis



Tw = 20 ... 600 mm

- rugged metal housing
- sensing distance adjustable via potentiometer
- suppression of mutual optical interference

general data	
type	background suppression
light source	pulsed red LED
sensing range Tb (at Tw min.)	5 ... 20 mm
light indicator	LED yellow
sensing distance adjustment	mechanical, 5 turn
wave length	660 nm
suppression of reciprocal influence	yes
sensing distance Tw = 20 ... 450 mm	
sensing range Tb (at Tw max.)	20 ... 450 mm
sensing distance Tw = 20 ... 600 mm	
sensing range Tb (at Tw max.)	20 ... 600 mm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	41 mA
current consumption typ.	29 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	15,4 mm
height / length	50 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

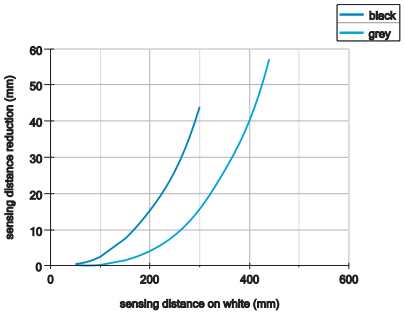
connection diagrams

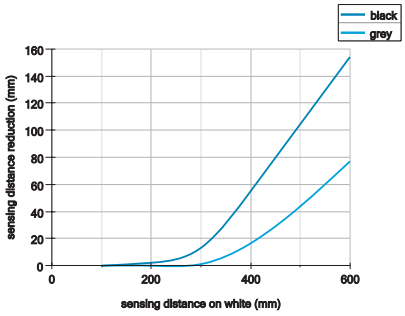
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151721	Sensofix series 16
10113917	Mounting bracket series 16 (L design)
10116407	Lens cleaning air nozzle bracket
for details: see accessories section	

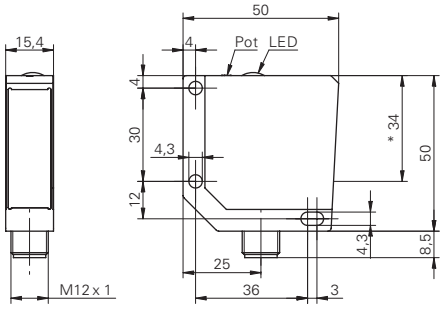
order reference	sensing distance Tw	connection types	output circuit	response time / release time
FHDM 16N5001	20 ... 450 mm	cable 4 pin, 2 m	NPN	< 1 ms
FHDM 16N5001/S14	20 ... 450 mm	connector M12 4 pin	NPN	< 1 ms
FHDM 16N5004	20 ... 600 mm	cable 4 pin, 2 m	NPN	< 5 ms
FHDM 16N5004/S14	20 ... 600 mm	connector M12 4 pin	NPN	< 5 ms
FHDM 16P5001	20 ... 450 mm	cable 4 pin, 2 m	PNP	< 1 ms
FHDM 16P5001/S14	20 ... 450 mm	connector M12 4 pin	PNP	< 1 ms
FHDM 16P5004	20 ... 600 mm	cable 4 pin, 2 m	PNP	< 5 ms
FHDM 16P5004/S14	20 ... 600 mm	connector M12 4 pin	PNP	< 5 ms

sensing distance diagrams

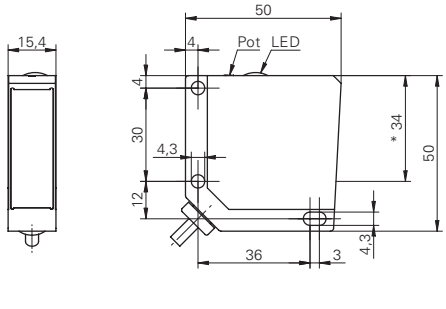




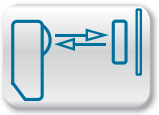
dimension drawings



* emitter axis



* emitter axis



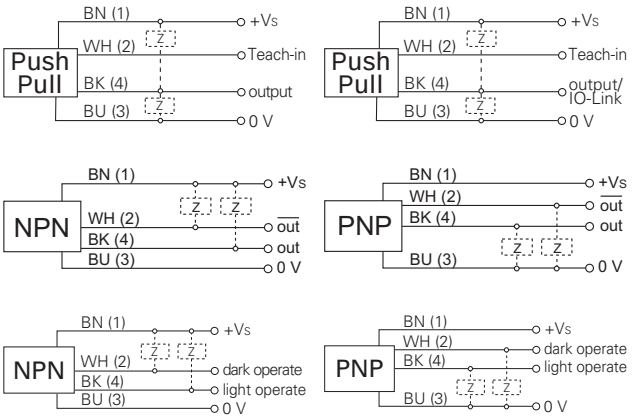
Tw = 400 mm

IO-Link

- PinPoint LED
- small beam diameter
- short response time

general data	
type	background suppression
light source	pulsed PinPoint LED
sensing distance Tw	60 ... 400 mm
sensing range Tb	30 ... 400 mm
power on indication	LED green
light indicator	LED yellow
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	45 mm
depth	32 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

connection diagrams

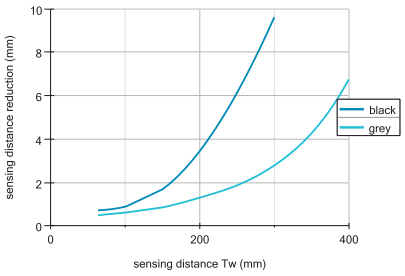


connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

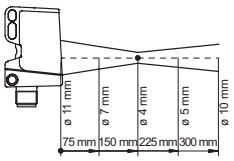
Accessories	
11099942	Sensofix O500/U500
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
for details: see accessories section	

order reference	connection types	output circuit	sensing distance adjustment
O500.GP-11096067	cable 4 pin, 2 m	push-pull	qTeach / external
O500.GP-11096064	connector M12 4 pin	push-pull	qTeach / external
O500.GP-11125084	cable 4 pin, 2 m	push-pull	Teach-in and IO-Link
O500.GP-11125079	connector M12 4 pin	push-pull	Teach-in and IO-Link
O500.GP-11096069	cable 4 pin, 2 m	NPN complementary	qTeach
O500.GP-11135857	cable 4 pin, 2 m	NPN complementary	qTeach / 1-Step Teach-in
O500.GP-11135859	connector M12 4 pin	NPN complementary	qTeach / 1-Step Teach-in
O500.GP-11096066	connector M12 4 pin	NPN complementary	qTeach
O500.GP-11096068	cable 4 pin, 2 m	PNP complementary	qTeach
O500.GP-11135861	cable 4 pin, 2 m	PNP complementary	qTeach / 1-Step Teach-in
O500.GP-11135862	connector M12 4 pin	PNP complementary	qTeach / 1-Step Teach-in
O500.GP-11096065	connector M12 4 pin	PNP complementary	qTeach

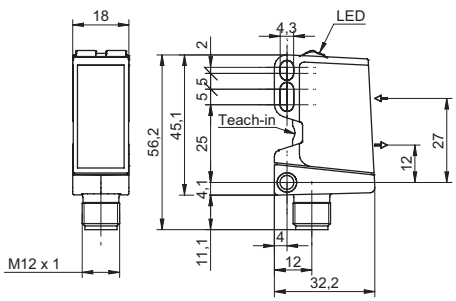
sensing distance diagram

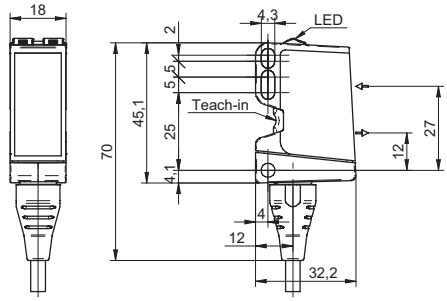


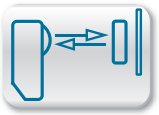
beam characteristic (typically)



dimension drawings





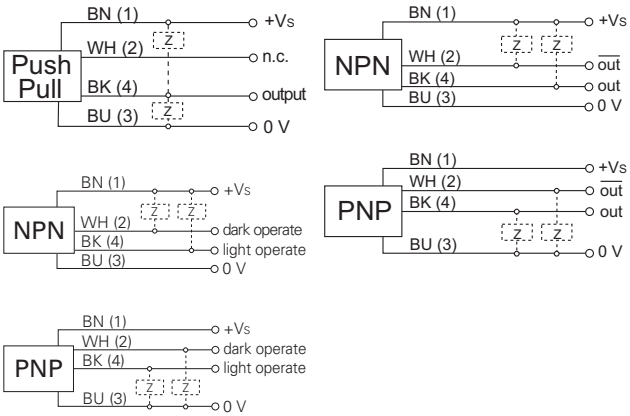


Tw = 600 mm

- qTeach

general data	
type	background suppression
light source	pulsed red LED
sensing distance Tw	60 ... 550 mm
sensing range Tb	30 ... 600 mm
power on indication	LED green
light indicator	LED yellow
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	45 mm
depth	32 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

connection diagrams

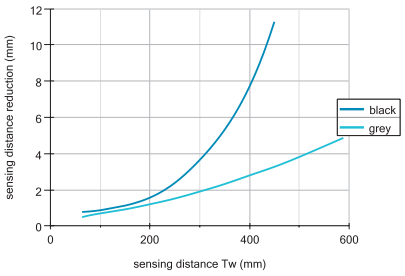


connectors and mating connectors	
ESG 34SH0200	Connector M12, 3 pin, straight, 2 m
ESW 33SH0200	Connector M12, 3 pin, angular, 2 m
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

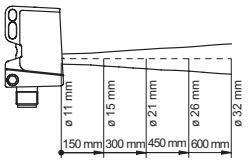
Accessories	
11099942	Sensofix O500/U500
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
for details: see accessories section	

order reference	connection types	output circuit	sensing distance adjustment
O500.GR-11096063	cable 3 pin, 2 m	push-pull	qTeach
O500.GR-11096062	connector M12 3 pin	push-pull	qTeach
O500.GR-11135886	cable 4 pin, 2 m	NPN complementary	qTeach
O500.GR-11135889	cable 4 pin, 2 m	NPN complementary	qTeach / 1-Step Teach-in
O500.GR-11135863	connector M12 4 pin	NPN complementary	qTeach / 1-Step Teach-in
O500.GR-11123121	connector M12 4 pin	NPN complementary	qTeach
O500.GR-11135888	cable 4 pin, 2 m	PNP complementary	qTeach
O500.GR-11135891	cable 4 pin, 2 m	PNP complementary	qTeach / 1-Step Teach-in
O500.GR-11135864	connector M12 4 pin	PNP complementary	qTeach / 1-Step Teach-in
O500.GR-11123131	connector M12 4 pin	PNP complementary	qTeach

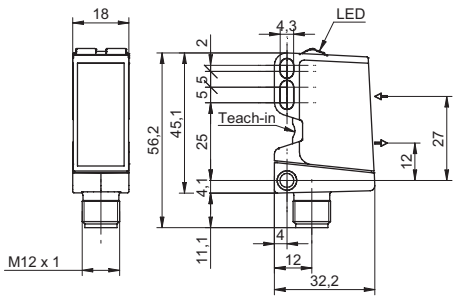
sensing distance diagram

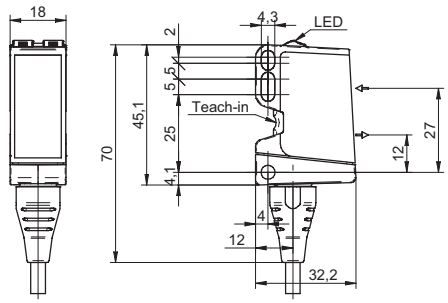


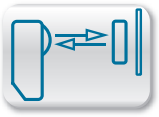
beam characteristic (typically)



dimension drawings







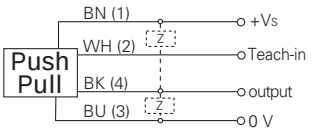
Tw = 600 mm

- infrared LED
- short response time
- qTeach

general data	
type	background suppression
light source	pulsed infrared diode
sensing distance Tw	60 ... 550 mm
sensing range Tb	30 ... 600 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	qTeach / external
wave length	860 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	45 mm
depth	32 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

order reference	connection types
O500.GI-11128082	cable 4 pin, 2 m
O500.GI-11120203	connector M12 4 pin

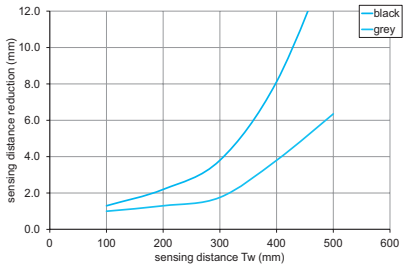
connection diagram



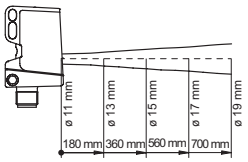
connectors and mating connectors	
ESG 34SH0200	Connector M12, 3 pin, straight, 2 m
ESW 33SH0200	Connector M12, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11099942	Sensofix O500/U500
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
for details: see accessories section	

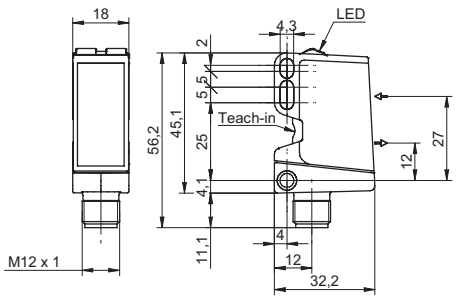
sensing distance diagram

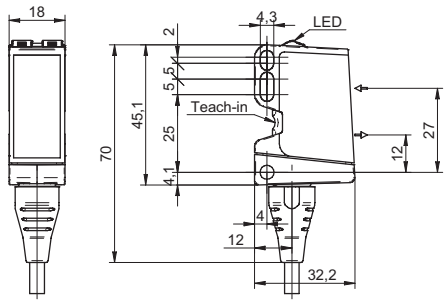


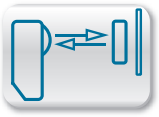
beam characteristic (typically)



dimension drawings







Tw = 30 ... 200 mm

- cross-technology housing concept
- sensing distance adjustable via Teach-in
- small mounting depth

general data	
type	background suppression
light source	pulsed red LED
sensing distance Tw	30 ... 200 mm
sensing range Tb (at Tw max.)	2 ... 200 mm
sensing range Tb (at Tw min.)	12 ... 30 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED green
output indicator	LED yellow
sensing distance adjustment	Teach-in
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	48 mA
current consumption typ.	28 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20 mm
height / length	42 mm
depth	15 mm
type	rectangular
housing material	plastic (PBT-ASA)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

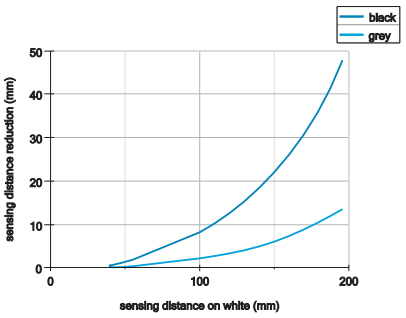
order reference	output circuit
FHDK 20N6901/S35A	NPN
FHDK 20P6901/S35A	PNP

connection diagrams

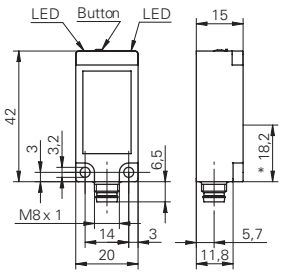
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10150326	Sensofix series 10 / series 20
for details: see accessories section	

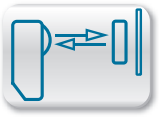
sensing distance diagram



dimension drawing



* emitter axis

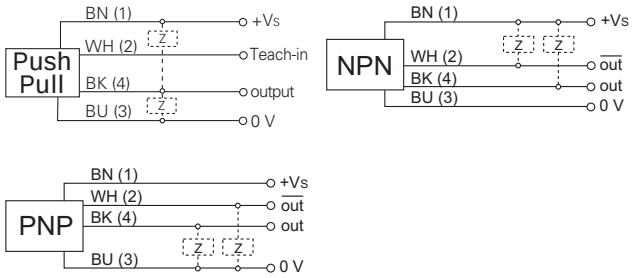


Tw = 200 mm

- PinPoint LED
- small beam diameter
- short response time

general data	
type	background suppression
light source	pulsed PinPoint LED
sensing distance Tw	45 ... 200 mm
sensing range Tb	20 ... 200 mm
power on indication	LED green
light indicator	LED yellow
wave length	630 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	65 mm
type	cylindrical threaded
housing material	brass nickel plated
front (optics)	PA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

connection diagrams

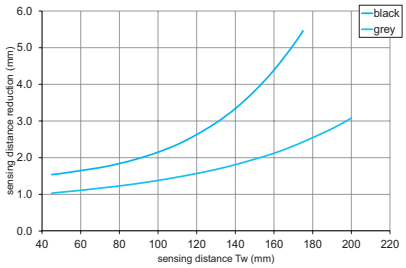


connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

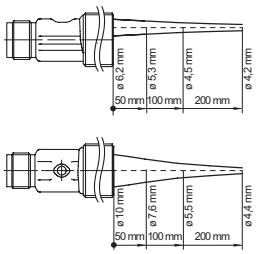
Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
for details: see accessories section	

order reference	output circuit	sensing distance adjustment
OR18.GP-11128094	push-pull	qTeach / external
OR18.GP-11129327	NPN complementary	qTeach
OR18.GP-11129323	PNP complementary	qTeach

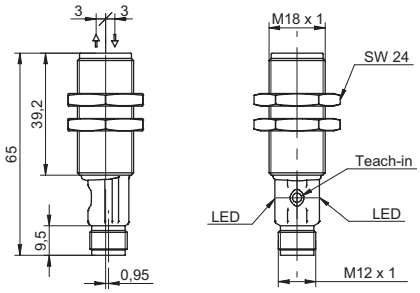
sensing distance diagram

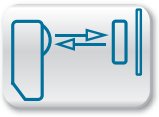


beam characteristic (typically)



dimension drawing





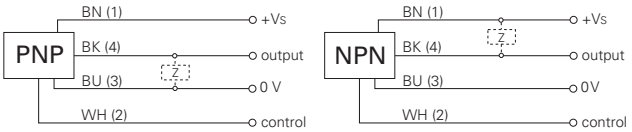
Tw = 120 mm

- sensing distance adjustable via potentiometer

general data	
type	background suppression
light source	pulsed red LED
sensing distance Tw	40 ... 120 mm
sensing range Tb	5 ... 120 mm
power on indication	LED green
output indicator	LED yellow
sensing distance adjustment	mechanical, 4 turn
wave length	660 nm
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	71,9 mm
type	cylindrical threaded
housing material	plastic (ABS TERLURAN)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67

order reference	output circuit
OR18.GR-11157842	NPN
OR18.GR-11157841	PNP

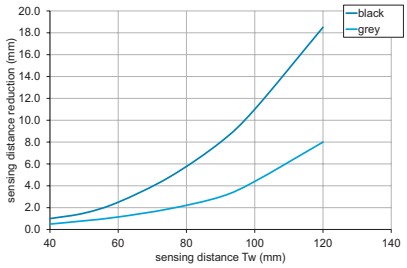
connection diagrams



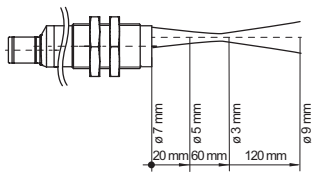
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
ZPART-M18.NUT	Clamping nut for sensors Ø 18 mm
for details: see accessories section	

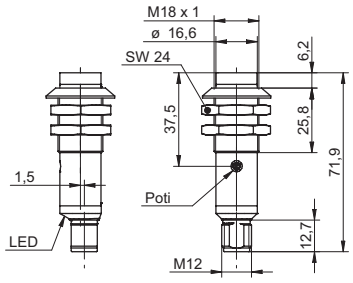
sensing distance diagram

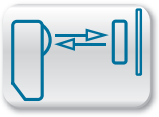


beam characteristic (typically)



dimension drawing



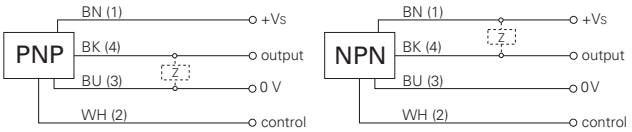


Tw = 120 mm

- fixed sensing distance
- small beam diameter

general data	
type	background suppression
version	fixed focus
light source	pulsed red LED
sensing distance Tw	50 mm
sensing range Tb	10 ... 50 mm
output indicator	LED yellow
sensing distance adjustment	no
wave length	660 nm
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	48,3 mm
type	cylindrical threaded
housing material	plastic (ABS TERLURAN)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67

connection diagrams

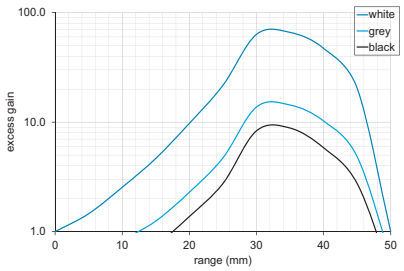


connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

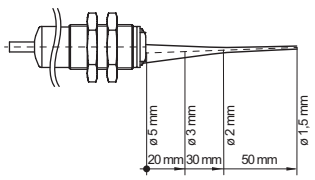
Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
ZPART-M18.NUT	Clamping nut for sensors Ø 18 mm
for details: see accessories section	

order reference	connection types	output circuit
OR18.GR.F-11157809	cable 4 pin, 2 m	NPN
OR18.GR.F-11157810	flylead connector M12 4 pin, L=100 mm	NPN
OR18.GR.F-11157807	cable 4 pin, 2 m	PNP
OR18.GR.F-11157808	flylead connector M12 4 pin, L=100 mm	PNP

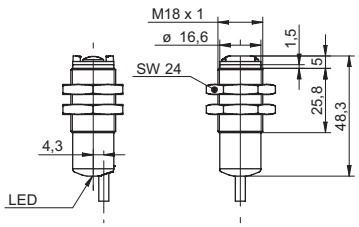
sensing distance diagram

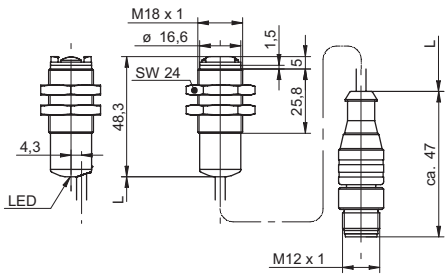


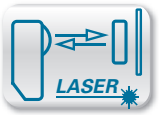
beam characteristic (typically)



dimension drawings







Tw = 22 ... 130 mm

- compact housing
- high repeatability
- sensing distance adjustable via potentiometer

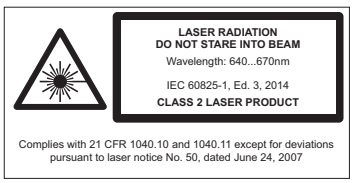
general data	
type	background suppression
light source	pulsed red laser diode
sensing distance Tw	22 ... 130 mm
sensing range Tb (at Tw max.)	3 ... 130 mm
sensing range Tb (at Tw min.)	3 ... 22 mm
repeat accuracy	< 0,2 mm at laser focus
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	mechanical, 5 turn
laser class	2
distance to focus	40 mm
wave length	650 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
short circuit protection	yes
reverse polarity protection	yes, supply only
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	16,3 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +50 °C

connection diagrams

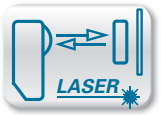
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
10162083	Mounting panel for sensors series 10
10118798	Mounting bracket series 10
for details: see accessories section	

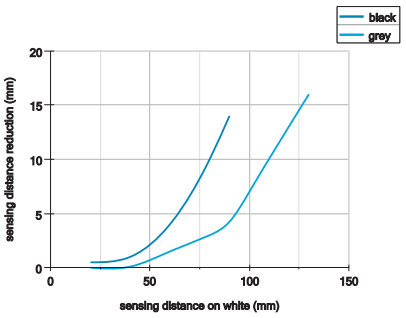
laser warning



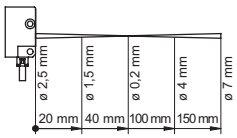
order reference	connection types	output circuit	protection class	output current
OHDK 10N5101	cable 4 pin, 2 m	NPN	IP 65	< 70 mA
OHDK 10N5101/S35A	connector M8 4 pin	NPN	IP 67	< 70 mA
OHDK 10P5101	cable 4 pin, 2 m	PNP	IP 65	< 100 mA
OHDK 10P5101/S35A	connector M8 4 pin	PNP	IP 67	< 100 mA



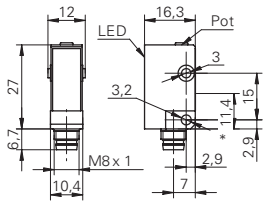
sensing distance diagram



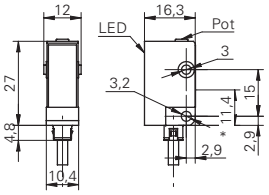
beam characteristic (typically)



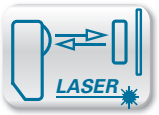
dimension drawings



* emitter axis



* emitter axis



Tw = 22 ... 130 mm

- compact housing
- line beam
- sensing distance adjustable via potentiometer

general data	
type	background suppression
version	line beam
light source	pulsed red laser diode
sensing distance Tw	22 ... 130 mm
sensing range Tb (at Tw max.)	3 ... 130 mm
sensing range Tb (at Tw min.)	3 ... 22 mm
repeat accuracy	< 0,2 mm at laser focus
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	mechanical, 5 turn
laser class	1
distance to focus	40 mm
wave length	650 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
short circuit protection	yes
reverse polarity protection	yes, supply only
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	16,3 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67

order reference	output circuit	output current
OHDK 10N5150/S35A	NPN	< 70 mA
OHDK 10P5150/S35A	PNP	< 100 mA

connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

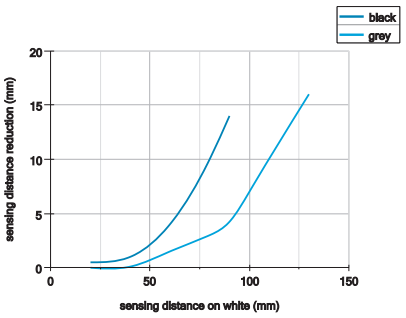
Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
10162083	Mounting panel for sensors series 10
10118798	Mounting bracket series 10
for details: see accessories section	

laser warning

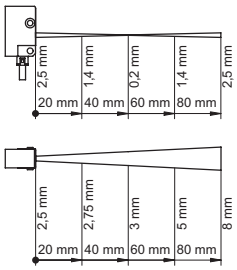
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

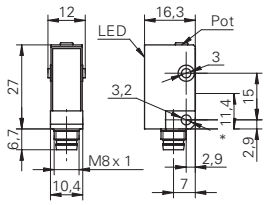
sensing distance diagram



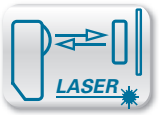
beam characteristic (typically)



dimension drawing



* emitter axis



Tw = 17 ... 120 mm

- rugged miniature metal housing
- negligible black/white difference
- teachable sensing distance

general data	
type	background suppression
light source	pulsed red laser diode
sensing distance Tw	17 ... 120 mm
sensing range Tb (at Tw max.)	16 ... 120 mm
sensing range Tb (at Tw min.)	16 ... 17 mm
power on indication	LED green
light indicator	LED red
sensing distance adjustment	Teach-in
laser class	2
wave length	675 nm
beam diameter	0,9 ... 0,5 mm
electrical data	
response time	< 1 ms
release time	< 2,7 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	80 mA
current consumption typ.	40 mA
voltage drop Vd	< 2,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	12,4 mm
height / length	37 mm
depth	34,5 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67

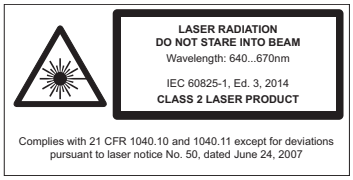
order reference	output circuit
OHDM 12N6901/S35A	NPN
OHDM 12P6901/S35A	PNP

connection diagrams

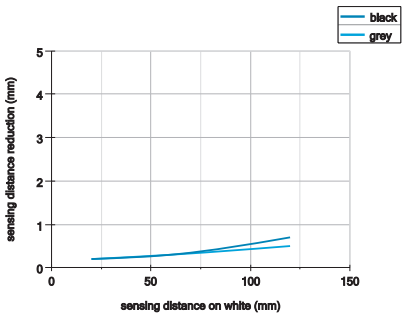
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10150328	Sensofix series 12
10113873	Mounting bracket series 12 (L design)
for details: see accessories section	

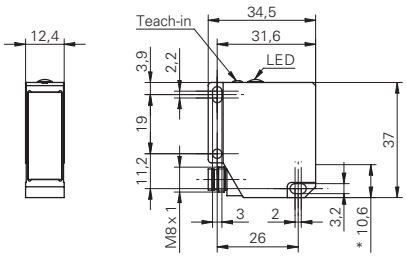
laser warning



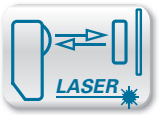
sensing distance diagram



dimension drawing



* emitter axis



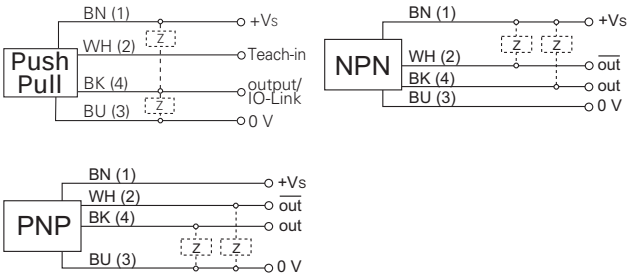
Tw = 250 mm

IO-Link

- One inch class
- laser diode
- very small beam diameter

general data	
type	background suppression
light source	pulsed red laser diode
sensing distance Tw	30 ... 250 mm
sensing range Tb	15 ... 250 mm
repeat accuracy	< 0,1 mm at laser focus
power on indication	LED green
light indicator	LED yellow
laser class	1
distance to focus	80 mm
wave length	656 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,5 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67

connection diagrams



connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

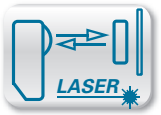
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

laser warning

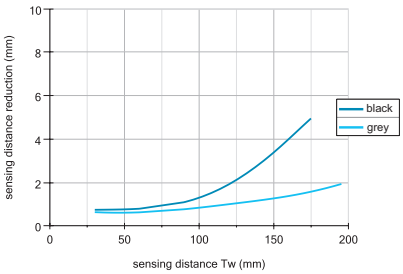
CLASS 1 LASER PRODUCT

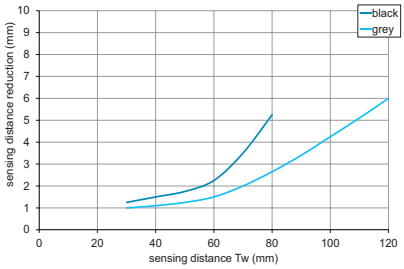
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference	connection types	output circuit	sensing distance adjustment
O300.GL-11171740	cable 4 pin, 2 m	push-pull	Teach-in and IO-Link
O300.GL-11171741	connector M8 4 pin	push-pull	Teach-in and IO-Link
O300.GL-11171745	cable 4 pin, 2 m	NPN complementary	qTeach
O300.GL-11171742	connector M8 4 pin	NPN complementary	qTeach
O300.GL-11171747	cable 4 pin, 2 m	PNP complementary	qTeach
O300.GL-11171748	connector M8 4 pin	PNP complementary	qTeach

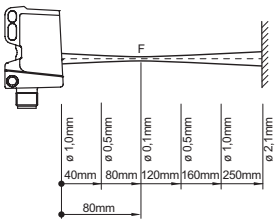


sensing distance diagrams

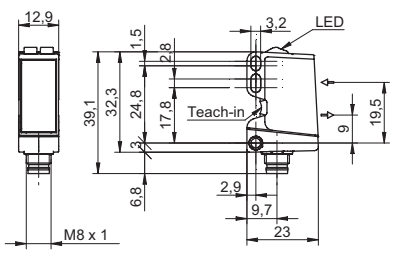


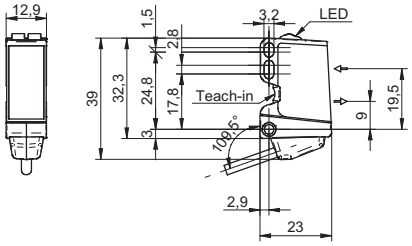


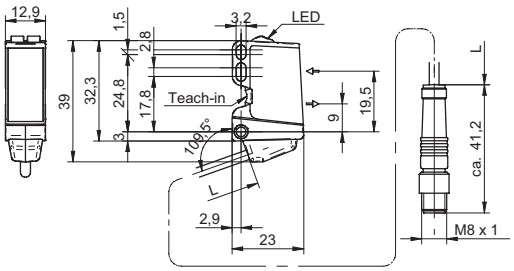
beam characteristic (typically)

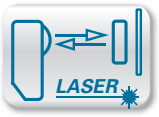


dimension drawings









Tw = 120 mm

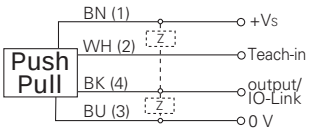
IO-Link

- One inch class
- laser diode
- line 0,75 x 67 mm

general data	
type	background suppression
version	line beam
light source	pulsed red laser diode
sensing distance Tw	30 ... 120 mm
sensing range Tb	15 ... 120 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
laser class	1
distance to focus	80 mm
wave length	656 nm
suppression of reciprocal influence	yes
beam type	line
alignment optical axis	< 2°
electrical data	
response time / release time	< 1,5 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,5 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67

order reference	connection types
O300.GL-11199070	cable 4 pin, 2 m
O300.GL-11196492	connector M8 4 pin

connection diagram



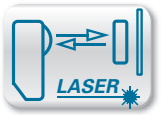
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

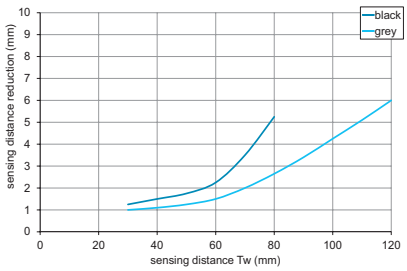
laser warning

CLASS 1 LASER PRODUCT

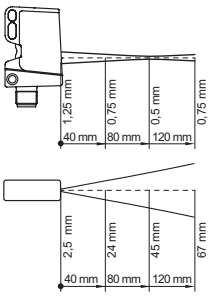
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007



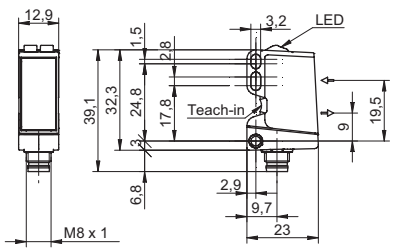
sensing distance diagram

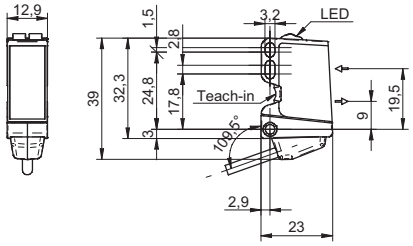


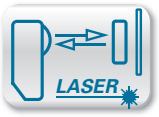
beam characteristic (typically)



dimension drawings







Tw = 250 mm

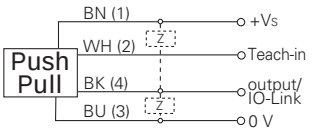
IO-Link

- One inch class
- hygienic design
- laser diode

general data	
type	background suppression
special type	hygienic design
light source	pulsed red laser diode
sensing distance Tw	30 ... 250 mm
sensing range Tb	15 ... 250 mm
repeat accuracy	< 0,1 mm at laser focus
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
laser class	1
distance to focus	80 mm
wave length	656 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,5 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,6 mm
depth	28,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 68/69K & proTect+

order reference	connection types
O300H.GL-11171768	cable 4 pin, 2 m
O300H.GL-11171769	flylead connector M8, L=200 mm

connection diagram



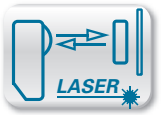
connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI11-1H	Mounting for sensors in hygienic design Ø 11 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

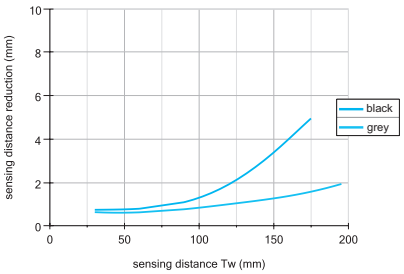
laser warning

CLASS 1 LASER PRODUCT

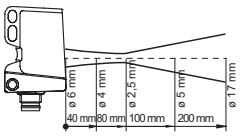
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007



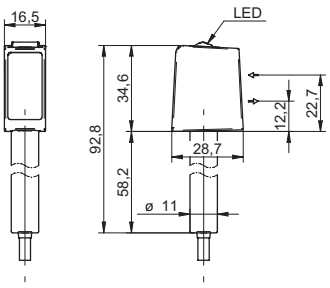
sensing distance diagram

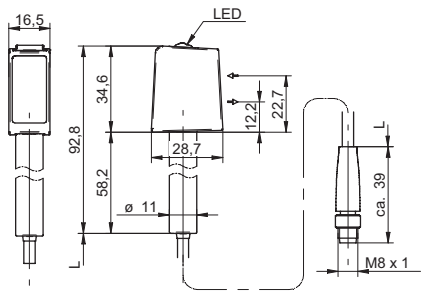


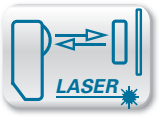
beam characteristic (typically)



dimension drawings







Tw = 250 mm

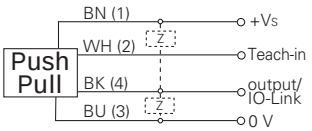
IO-Link

- One inch class
- washdown design
- laser diode

general data	
type	background suppression
special type	Washdown design
light source	pulsed red laser diode
sensing distance Tw	30 ... 250 mm
sensing range Tb	15 ... 250 mm
repeat accuracy	< 0,1 mm at laser focus
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
laser class	1
distance to focus	80 mm
wave length	656 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,5 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,7 mm
depth	28,2 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 68/69K & proTect+

order reference
O300W.GL-11171770

connection diagram



connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

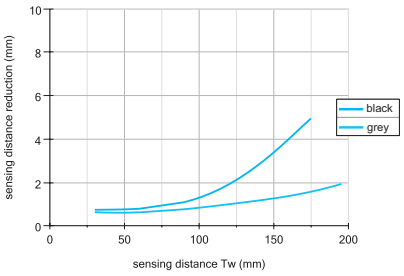
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

laser warning

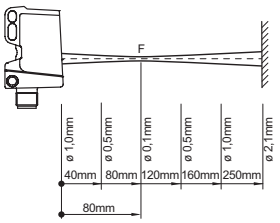
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

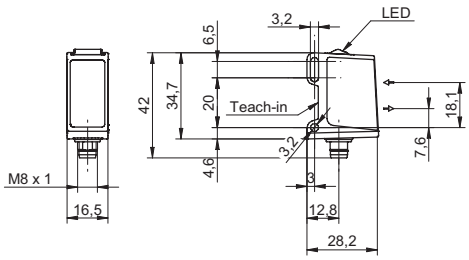
sensing distance diagram

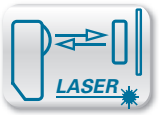


beam characteristic (typically)



dimension drawing





Tw = 50 ... 550 mm

- rugged metal housing
- negligible black/white difference
- teachable sensing distance

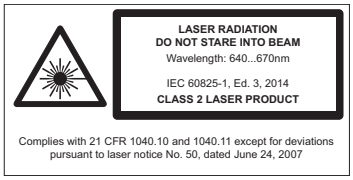
general data	
type	background suppression
light source	pulsed red laser diode
sensing distance Tw	50 ... 550 mm
sensing range Tb (at Tw max.)	50 ... 550 mm
sensing range Tb (at Tw min.)	16 ... 17 mm
power on indication	LED green
light indicator	LED red
sensing distance adjustment	Teach-in
laser class	2
electrical data	
response time	< 5 ms
release time	< 15 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	80 mA
current consumption typ.	40 mA
voltage drop Vd	< 2,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	13,4 mm
height / length	48,2 mm
depth	40 mm
type	rectangular
housing material	aluminum
front (optics)	glass
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67

connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

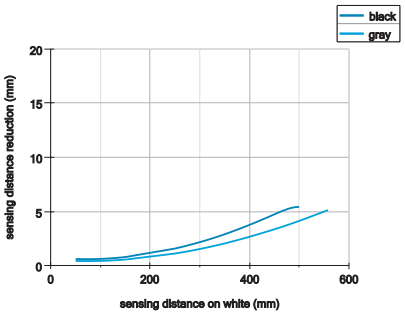
Accessories	
10161829	Sensofix series 13
10161695	Mounting bracket for sensors series 13 (L design)
for details: see accessories section	

laser warning

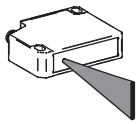


order reference	output circuit	wave length	beam type	beam width	beam height	beam diameter
OHDM 13N6901/S35A	NPN	675 nm	point	-	-	1 mm
OHDM 13P6901/S35A	PNP	675 nm	point	-	-	1 mm
OHDM 13P6951/S35A	PNP	650 nm	line	2 mm	4 ... 13 mm	-

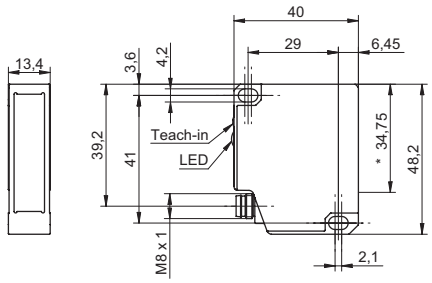
sensing distance diagram



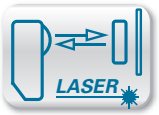
beam characteristic (typically)



dimension drawing



* emitter axis



Tw = 20 ... 350 mm

- short response time
- high repeatability
- sensing distance adjustable via potentiometer

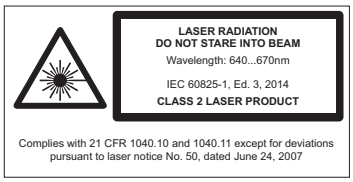
general data	
type	background suppression
light source	pulsed red laser diode
sensing distance Tw	20 ... 350 mm
sensing range Tb (at Tw max.)	20 ... 350 mm
sensing range Tb (at Tw min.)	5 ... 20 mm
repeat accuracy	< 0,2 mm at laser focus
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	mechanical, 9 turn
laser class	2
distance to focus	115 mm
wave length	650 nm
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67

connection diagrams

connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

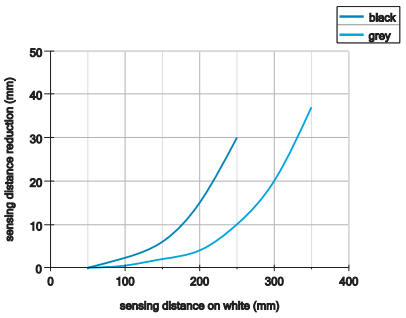
Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
for details: see accessories section	

laser warning

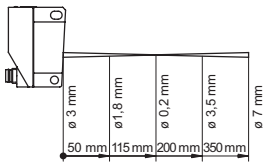


order reference	connection types	output circuit	depth
OHDK 14N5101	cable 4 pin, 2 m	NPN	32,7 mm
OHDK 14N5101/S14	connector M12 4 pin	NPN	31 mm
OHDK 14N5101/S35A	connector M8 4 pin	NPN	31 mm
OHDK 14P5101	cable 4 pin, 2 m	PNP	32,7 mm
OHDK 14P5101/S14	connector M12 4 pin	PNP	31 mm
OHDK 14P5101/S35A	connector M8 4 pin	PNP	31 mm

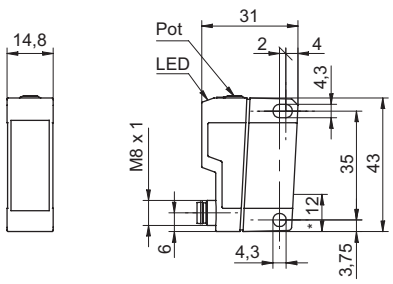
sensing distance diagram



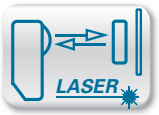
beam characteristic (typically)



dimension drawing



* emitter axis



Tw = 25 ... 300 mm

- rugged metal housing
- long range
- high repeatability

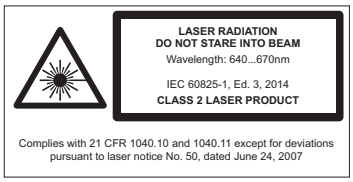
general data	
type	background suppression
light source	pulsed red laser diode
sensing distance Tw	25 ... 300 mm
sensing range Tb (at Tw max.)	40 ... 300 mm
sensing range Tb (at Tw min.)	5 ... 25 mm
repeat accuracy	< 0,1 mm at laser focus
output indicator	LED yellow
sensing distance adjustment	mechanical, 8 turn
laser class	2
wave length	650 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	25 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	15,4 mm
height / length	50 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67

connection diagrams

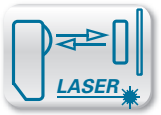
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151721	Sensofix series 16
10113917	Mounting bracket series 16 (L design)
10116407	Lens cleaning air nozzle bracket
for details: see accessories section	

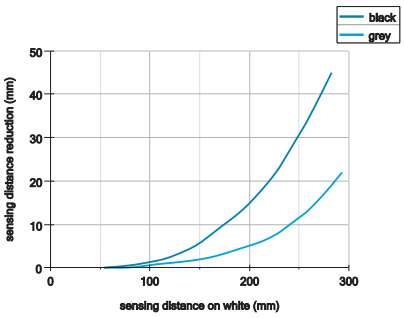
laser warning



order reference	connection types	output circuit	response time / release time	distance to focus	suppression of reciprocal influence
OHDM 16N5001	cable 4 pin, 2 m	NPN	< 0,6 ms	80 mm	yes
OHDM 16N5001/S14	connector M12 4 pin	NPN	< 0,6 ms	80 mm	yes
OHDM 16P5001	cable 4 pin, 2 m	PNP	< 0,6 ms	80 mm	yes
OHDM 16P5001/S14	connector M12 4 pin	PNP	< 0,6 ms	80 mm	yes
OHDM 16P5002/S14	connector M12 4 pin	PNP	< 0,6 ms	40 mm	yes
OHDM 16P5012	cable 4 pin, 2 m	PNP	< 0,1 ms	60 mm	-
OHDM 16P5012/S14	connector M12 4 pin	PNP	< 0,1 ms	60 mm	-

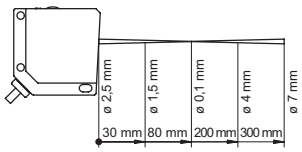


sensing distance diagram

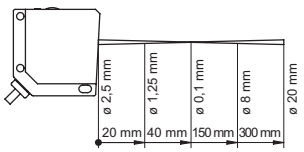


beam characteristics (typically)

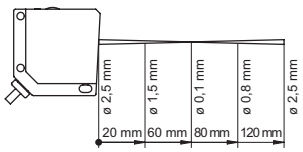
distance to laser focus = 80 mm



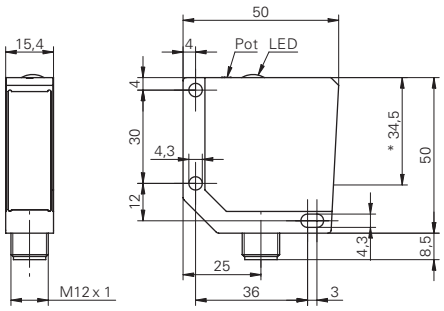
distance to laser focus = 40 mm



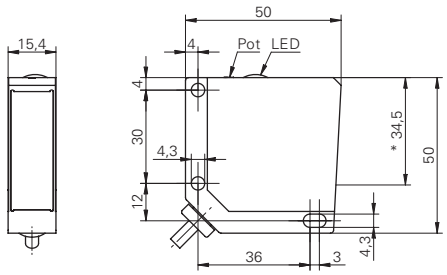
distance to laser focus = 60 mm



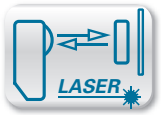
dimension drawings



* emitter axis



* emitter axis



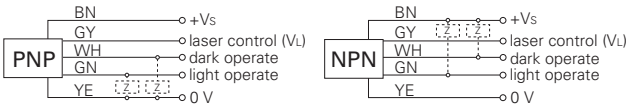
Tw = 133 mm

- for lateral detection of wafer edges
- very long range
- laser sensor in rugged metal housing

general data	
type	background suppression
version	wafer mapping sensor
light source	pulsed red laser diode
sensing distance Tw	123 ... 143 mm
repeat accuracy	< 0,1 mm at laser focus
power on indication	LED green
output indicator	LED yellow
sensing distance adjustment	no
laser class	2
wave length	650 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	25 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	15,4 mm
height / length	50 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	cable 5 pin, 2 m
ambient conditions	
operating temperature	-5 ... +50 °C
protection class	IP 67

order reference	output circuit
OHDM 16N5651	NPN
OHDM 16P5651	PNP

connection diagrams



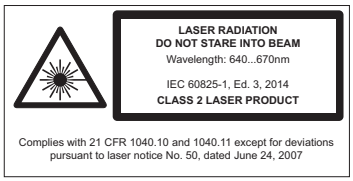
Accessories	
10151721	Sensofix series 16
10113917	Mounting bracket series 16 (L design)
10116407	Lens cleaning air nozzle bracket
for details: see accessories section	

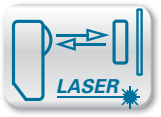
remarks

Function laser control - input:

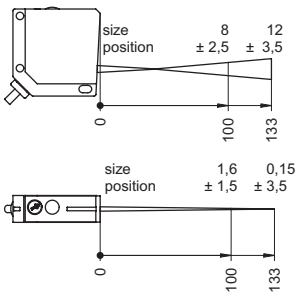
- Laser diode on VL < 1 V
- Laser diode off VL > Vs - 4 V or open

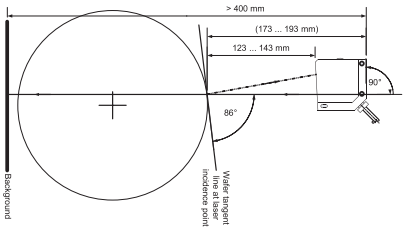
laser warning



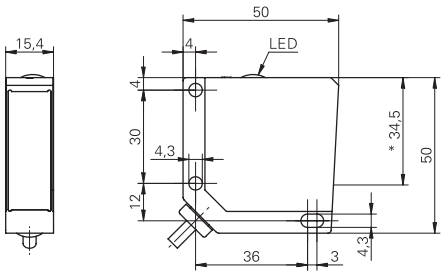


beam characteristics (typically)

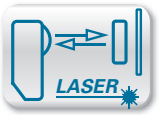




dimension drawing



* emitter axis



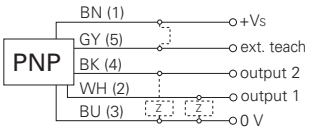
Tw = 210 ... 1500 mm

- long range
- negligible black/white difference
- two teachable sensing distances

general data	
type	background suppression
light source	pulsed red laser diode
sensing distance Tw	210 ... 1500 mm
sensing range Tb (at Tw max.)	200 ... 1500 mm
sensing range Tb (at Tw min.)	200 ... 210 mm
power on indication	LED green
light indicator	LED red
sensing distance adjustment	Teach-in
laser class	2
wave length	650 nm
beam diameter	2 mm
electrical data	
response time	< 6 ms
release time	< 18 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
voltage drop Vd	< 5 VDC
output function	light / dark operate
output circuit	PNP
output current	< 20 mA
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	20,6 mm
height / length	65 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M12 5 pin
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67

order reference
OHDM 20P6990/S14C

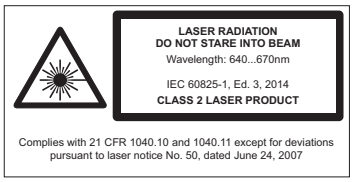
connection diagram



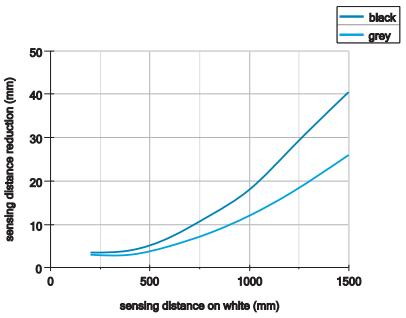
connectors and mating connectors	
ESG 34CH0200	Connector M12, 5 pin, straight, 2 m
ESW 33CH0200	Connector M12, 5 pin, angular, 2 m
ESW 33CH0500	Connector M12, 5 pin, angular, 5 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11010227	Mounting bracket OxDM 20
10156878	Protector cap OxDM 20
for details: see accessories section	

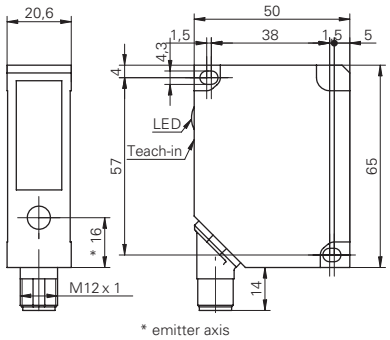
laser warning

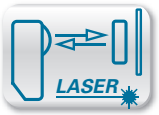


sensing distance diagram



dimension drawing





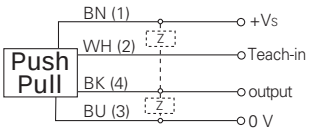
Tw = 100 ...900 mm

- qTeach
- no black/white difference

general data	
type	background suppression
light source	pulsed red laser diode
sensing distance Tw	100 ... 900 mm
sensing range Tb	100 ... 900 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in
laser class	1
wave length	656 nm
beam diameter	3,7 ... 13 mm
black/white shift	0%
electrical data	
response time / release time	< 10 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	80 mA
voltage drop Vd	< 3,5 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	23,4 mm
height / length	63 mm
depth	45 mm
type	rectangular
housing material	plastic (SAN LURAN 378P)
front (optics)	PMMA
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67
storage temperature	-10 ... +70 °C

order reference	connection types
OHDK 25G6921	cable, 2 m
OHDK 25G6921/S14	connector M12 5 pin

connection diagram



connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

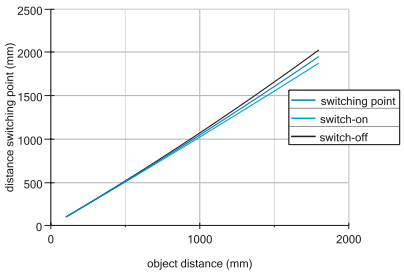
Accessories	
11077517	Mounting bracket for sensors series 25 (L design)
for details: see accessories section	

laser warning

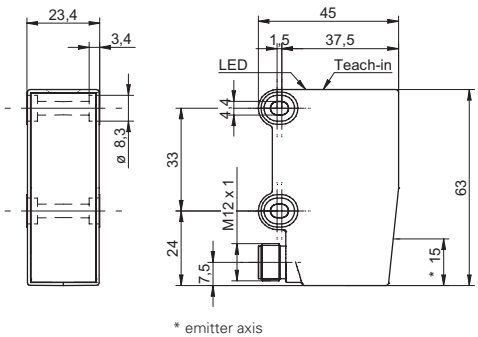
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

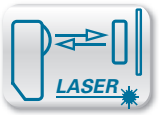
sensing distance diagram



dimension drawing



* emitter axis



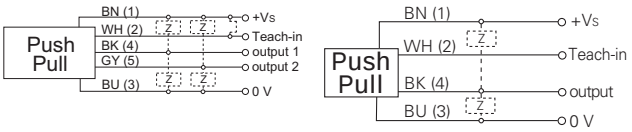
Tw = 100 ...1750 mm

- qTeach
- no black/white difference
- 1 or 2 switching outputs

general data	
type	background suppression
light source	pulsed red laser diode
sensing distance Tw	100 ... 1750 mm
sensing range Tb	100 ... 1750 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in
laser class	1
wave length	656 nm
beam diameter	3,7 ... 22 mm
black/white shift	0%
electrical data	
response time / release time	< 10 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	80 mA
voltage drop Vd	< 3,5 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	23,4 mm
height / length	63 mm
depth	45 mm
type	rectangular
housing material	plastic (SAN LURAN 378P)
front (optics)	PMMA
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67
storage temperature	-10 ... +70 °C

order reference	connection types	number of outputs
OHDK 25G6911	cable, 2 m	1
OHDK 25G6911/S14	connector M12 5 pin	1
OHDK 25G6912	cable, 2 m	2
OHDK 25G6912/S14C	connector M12 5 pin	2

connection diagrams



connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 34CH0200	Connector M12, 5 pin, straight, 2 m
ESW 33CH0200	Connector M12, 5 pin, angular, 2 m
ESW 33CH0500	Connector M12, 5 pin, angular, 5 m
additional cable connectors and field wireable connectors: see accessories	

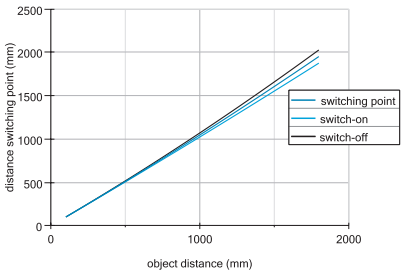
Accessories	
11077517	Mounting bracket for sensors series 25 (L design)
for details: see accessories section	

laser warning

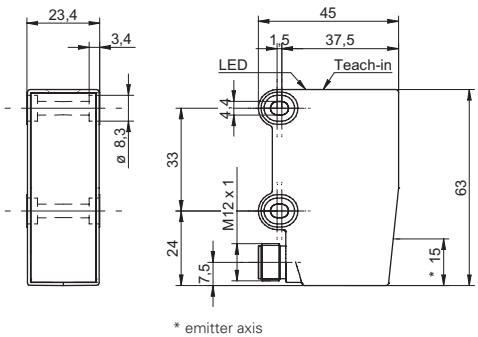
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

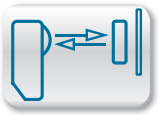
sensing distance diagram



dimension drawing



* emitter axis



Tw = 10 ... 30 mm

- compact housing
- optimized for glass detection
- sensing distance adjustable via potentiometer

general data	
type	background suppression
version	for glass detection
light source	pulsed red LED
sensing distance Tw	10 ... 30 mm
sensing range Tb (at Tw max.)	3 ... 30 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensing distance adjustment	mechanical, 5 turn
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	14 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

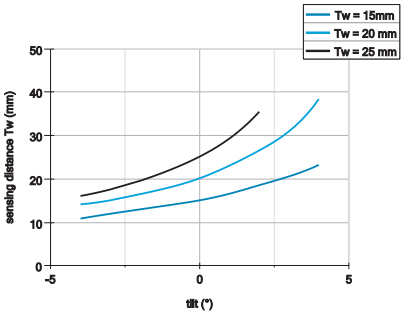
order reference	output circuit
FHDK 10N5160/S35A	NPN
FHDK 10P5160/S35A	PNP

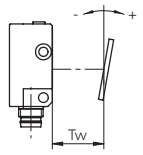
connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
10162083	Mounting panel for sensors series 10
10118798	Mounting bracket series 10
for details: see accessories section	

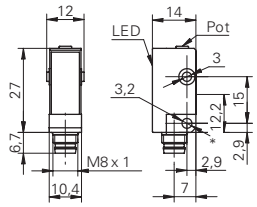
sensing distance diagrams



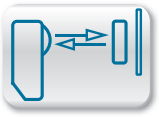


sensor object (mirror)

dimension drawing



* emitter axis



Tw = 200 mm

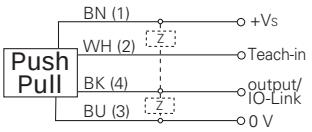
IO-Link

- One inch class
- washdown design
- PinPoint LED

general data	
type	background suppression
special type	Washdown design
light source	pulsed PinPoint LED
sensing distance Tw	30 ... 200 mm
sensing range Tb	15 ... 200 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,7 mm
depth	28,2 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

order reference
O300W.GP-11127755

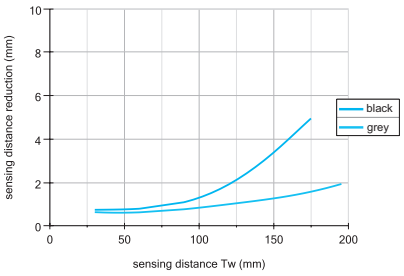
connection diagram



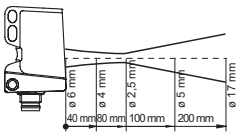
connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

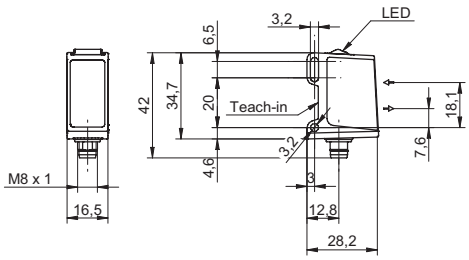
sensing distance diagram

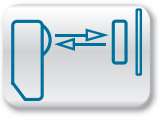


beam characteristic (typically)



dimension drawing





Tw = 200 mm

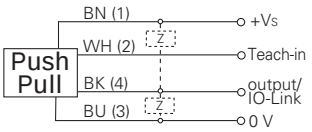
IO-Link

- One inch class
- hygienic design
- PinPoint LED

general data	
type	background suppression
special type	hygienic design
light source	pulsed PinPoint LED
sensing distance Tw	30 ... 200 mm
sensing range Tb	15 ... 200 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16,5 mm
height / length	34,6 mm
depth	28,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

order reference	connection types
O300H.GP-11127745	cable 4 pin, 2 m
O300H.GP-11157157	flylead connector M8, L=200 mm

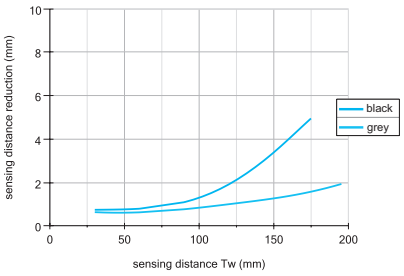
connection diagram



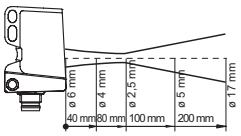
connectors and mating connectors	
ESG 32AY0200	Connector M8, 4 pin, straight, 2 m, V4A-PP
ESW 31AY0200	Connector M8, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI11-1H	Mounting for sensors in hygienic design Ø 11 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

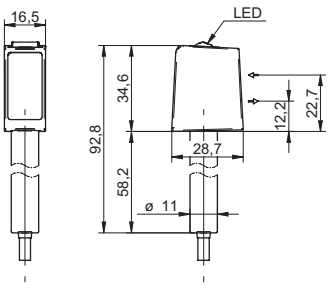
sensing distance diagram

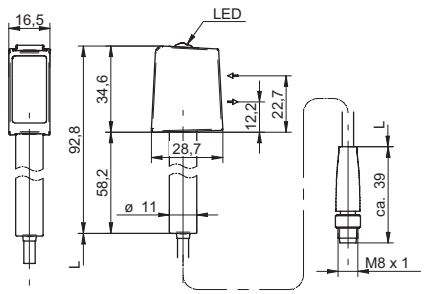


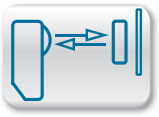
beam characteristic (typically)



dimension drawings







Tw = 50 ... 400 mm

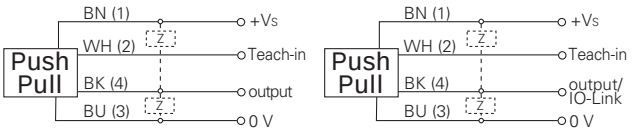
IO-Link

- washdown design
- IO-Link
- Remote Teach-in

general data	
type	background suppression
special type	Washdown design
light source	pulsed red LED
sensing distance Tw	50 ... 400 mm
sensing range Tb (at Tw max.)	20 ... 400 mm
sensing range Tb (at Tw min.)	20 ... 50 mm
power on indication	LED green
output indicator	LED red
sensing distance adjustment	Teach-in
wave length	660 nm
approvals/certificates	Ecolab
electrical data	
response time / release time	< 1,8 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	35 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	19,6 mm
height / length	51 mm
depth	34,3 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12
ambient conditions	
operating temperature	-30 ... +60 °C
protection class	IP 68/69K & proTect+
storage temperature	-30 ... +70 °C

order reference	sensitivity adjustment
FHDR 14G6901/S14	-
FHDR 14G6901/S14/IO	IO-Link

connection diagrams



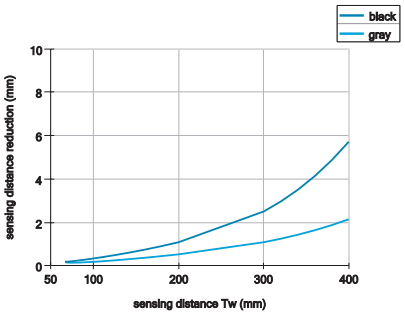
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11046278	Mounting bracket series 14 washdown
11046279	Sensofix series 14 washdown
for details: see accessories section	

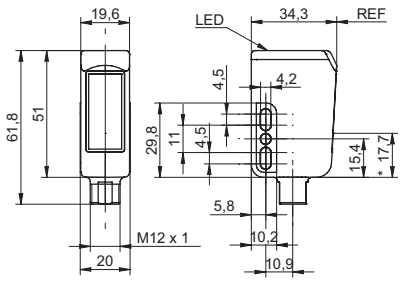
remarks

Sensor FDA compliant and Ecolab approved
IO-Link: output signal, service status, object presence
sensitivity adjustable: via Teach-in wire input
LSR = Liquid Silicon Rubber

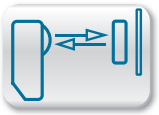
sensing distance diagram



dimension drawing



* emitter axis



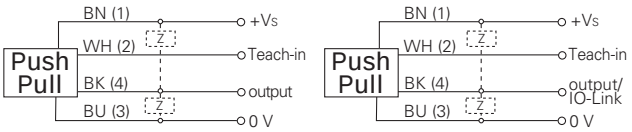
Tw = 50 ... 400 mm

IO-Link

- hygienic design
- remote Teach-in

general data	
type	background suppression
special type	hygienic design
light source	pulsed red LED
sensing distance Tw	50 ... 400 mm
sensing range Tb (at Tw max.)	20 ... 400 mm
sensing range Tb (at Tw min.)	20 ... 50 mm
power on indication	LED green
output indicator	LED red
sensing distance adjustment	Teach-in
wave length	660 nm
approvals/certificates	Ecolab EHEDG
electrical data	
response time / release time	< 1,8 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	35 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	19,6 mm
height / length	52,2 mm
depth	34,3 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-30 ... +60 °C
protection class	IP 68/69K & proTect+
storage temperature	-30 ... +70 °C

connection diagrams



connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

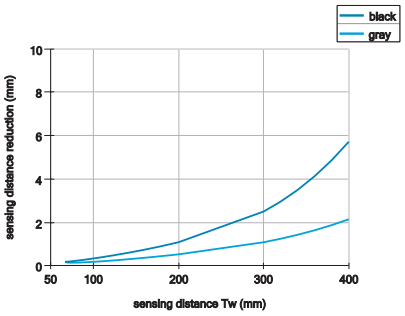
Accessories	
HI17-1H	Mounting for sensors in hygienic design Ø 17 mm
for details: see accessories section	

remarks

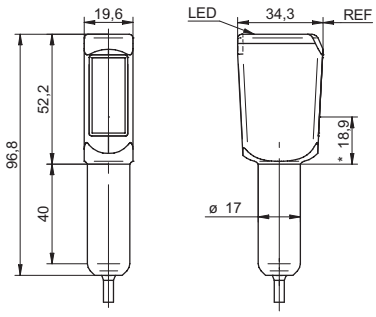
Sensor FDA compliant, EHEDG certified and Ecolab approved
IO-Link: output signal, service status, object presence
sensitivity adjustable: via Teach-in wire input
LSR = Liquid Silicon Rubber

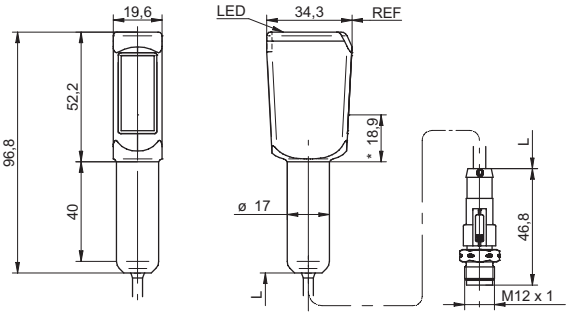
order reference	connection types	sensitivity adjustment
FHDH 14G6901	cable 4 pin, 2 m	-
FHDH 14G6901/IO	cable 4 pin, 2 m	IO-Link
FHDH 14G6901/KS34A	flylead connector M12, L=300 mm	-
FHDH 14G6901/KS34A/IO	flylead connector M12, L=300 mm	IO-Link

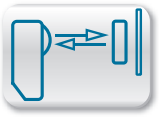
sensing distance diagram



dimension drawings







Tw = 400 mm

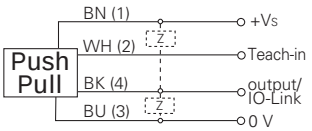
IO-Link

- hygienic design
- PinPoint LED
- small beam diameter

general data	
type	background suppression
special type	hygienic design
light source	pulsed PinPoint LED
sensing distance Tw	60 ... 400 mm
sensing range Tb	30 ... 400 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,7 mm
depth	36,4 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

order reference	connection types
O500H.GP-11125101	cable 4 pin, 2 m
O500H.GP-11125102	flylead connector M12, L=300 mm

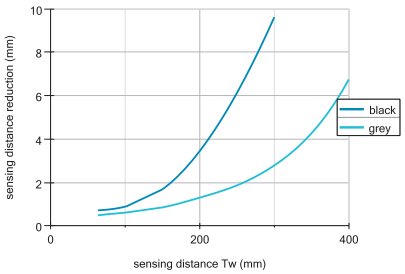
connection diagram



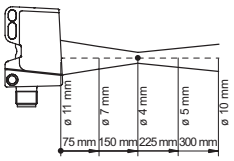
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI17-1H	Mounting for sensors in hygienic design Ø 17 mm
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

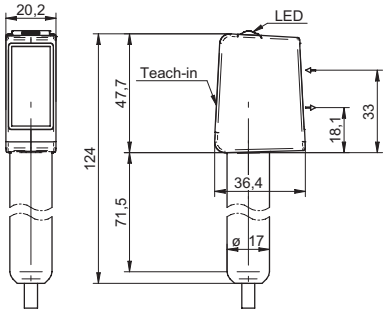
sensing distance diagram

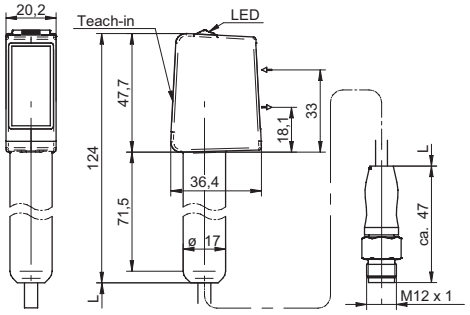


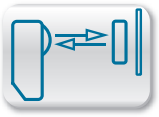
beam characteristic (typically)



dimension drawings







Tw = 400 mm

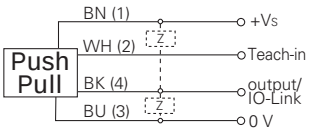
IO-Link

- washdown design
- PinPoint LED
- small beam diameter

general data	
type	background suppression
special type	Washdown design
light source	pulsed PinPoint LED
sensing distance Tw	60 ... 400 mm
sensing range Tb	30 ... 400 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,2 mm
depth	37,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

order reference
O500W.GP-11125092

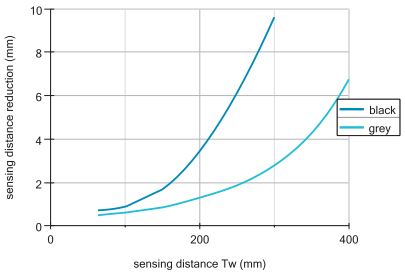
connection diagram



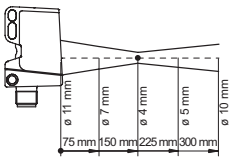
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
11099942	Sensofix O500/U500
for details: see accessories section	

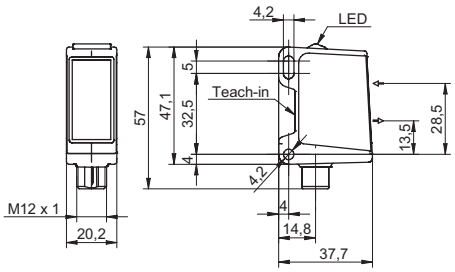
sensing distance diagram

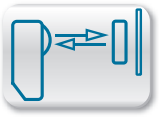


beam characteristic (typically)



dimension drawing





Tw = 400 mm

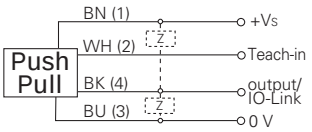
IO-Link

- washdown design
- PinPoint LED
- small beam diameter

general data	
type	background suppression
special type	Washdown design
light source	pulsed PinPoint LED
sensing distance Tw	60 ... 400 mm
sensing range Tb	30 ... 400 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	Teach-in and IO-Link
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20,2 mm
height / length	47,9 mm
depth	37,7 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

order reference
O500W.GP-11137000

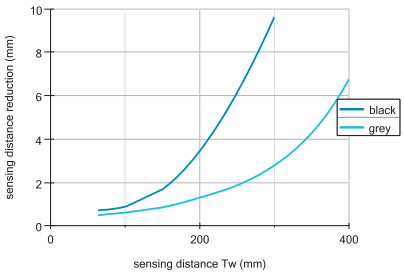
connection diagram



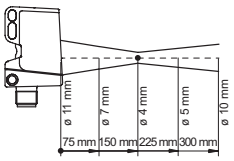
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
11099942	Sensofix O500/U500
10134964	Mounting bracket series 14 (L design)
10149011	Sensofix series 14
11137318	Teach Pen for sensors in metal housing
11141124	Teach Pen for sensors in metal housing (USA, CAN, JP)
for details: see accessories section	

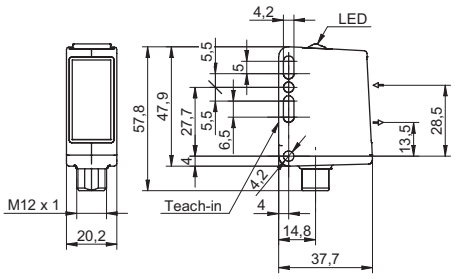
sensing distance diagram

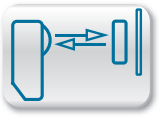


beam characteristic (typically)



dimension drawing





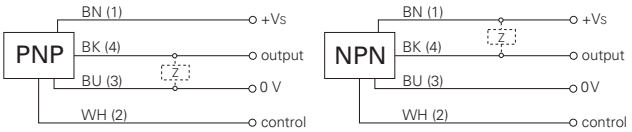
Tw = 120 mm

- washdown design
- sensing distance adjustable via potentiometer

general data	
type	background suppression
special type	Washdown design
light source	pulsed red LED
sensing distance Tw	40 ... 120 mm
sensing range Tb	5 ... 120 mm
power on indication	LED green
output indicator	LED yellow
sensing distance adjustment	mechanical, 4 turn
wave length	660 nm
suppression of reciprocal influence	no
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	71,9 mm
type	cylindrical threaded
housing material	stainless steel 1.4404 (V4A), plastic (ABS TERLURAN)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67/69K

order reference	output circuit
OR18W.GR-11157857	NPN
OR18W.GR-11157856	PNP

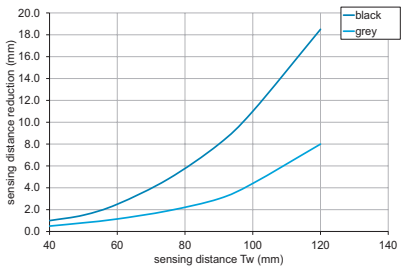
connection diagrams



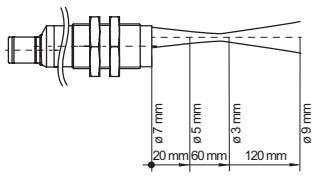
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
for details: see accessories section	

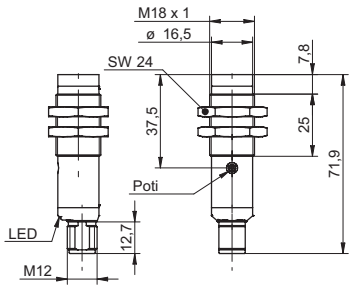
sensing distance diagram



beam characteristic (typically)



dimension drawing



red light LED version

product family	FZCK 07	FZDK 07	FZDM 08	FZDK 10	FZDK 14	FZDM 16	FZDK 20
	MINOS	*MINOS*					
	subminiature	subminiature	subminiature	miniature	standard	standard	standard
width / diameter	8 mm	8 mm	8 mm	10,4 mm	14,8 mm	15,4 mm	20 mm
sensing distance Tw	20 ... 150 mm	20 ... 150 mm	< 40 mm < 80 mm	5 ... 200 mm	5 ... 600 mm	0 ... 400 mm	5 ... 500 mm
response time / release time	< 0,5 ms	< 0,5 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 0,5 ms
light source	pulsed red LED	pulsed red LED	pulsed infrared diode	pulsed red LED	pulsed red LED	pulsed infrared diode	pulsed red LED
sensitivity adjustment	Teach-in	Teach-in	no	potentiometer, 270°	potentiometer, 270°	potentiometer, 270°	potentiometer, 270°
sensing distance adjustment							
output circuit	NPN PNP	NPN PNP	PNP	NPN PNP	NPN PNP	NPN PNP	NPN PNP
connection types	cable flylead connector	cable flylead connector	cable connector	flylead connector cable connector	cable connector	cable connector	connector
housing material	plastic	plastic	metal	plastic	plastic	metal	plastic
protection class	IP 65	IP 65	IP 65	IP 65 IP 67	IP 67	IP 67	IP 67
page	**370**	**372**	**374**	**376**	**378**	**380**	**382**

O300.ZR	O500.ZR	FZAM 08	FZAM 12	OR18.ZI	FZAM 18	FZAM 18	FZAM 18	FZAM 30
miniature	standard	subminiature	miniature	standard	standard	standard	standard	standard
12,9 mm	18 mm	8 mm	12 mm	18 mm	18 mm	18 mm	18 mm	30 mm
10 ... 400 mm	20 ... 600 mm	< 40 mm < 80 mm	30 ... 200 mm	0 ... 80 mm 0 ... 300 mm 0 ... 800 mm	60 ... 430 mm	20 ... 150 mm	60 ... 430 mm	100 ... 700 mm 300 ... 1500 mm
< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 0,5 ms	< 1 ms	< 0,25 ms < 2,5 ms
pulsed red LED	pulsed red LED	pulsed infrared diode	pulsed infrared diode	pulsed infrared diode	pulsed infrared diode	pulsed infrared diode	pulsed infrared diode	pulsed infrared diode
		no	potentiometer, 270°		Teach-in	potentiometer, 15 turn	potentiometer, 270°	potentiometer, 15 turn
qTeach	qTeach			potentiometer, 270°				
push-pull	push-pull	PNP	NPN PNP	NPN PNP	NPN PNP	NPN PNP	NPN PNP	NPN PNP
cable connector	cable connector	cable connector	connector cable	connector cable flylead connector	cable connector	cable	cable connector	cable
plastic	plastic	metal	metal	plastic	metal	metal	metal	metal
IP 67	IP 67	IP 65	IP 65	IP 67	IP 67	IP 65	IP 67	IP 65
384	**386**	**388**	**390**	**392**	**394**	**396**	**398**	**400**

red light LED version

product family	OR18W.ZI

	standard
width / diameter	18 mm
sensing distance Tw	0 ... 300 mm 0 ... 800 mm
response time / release time	< 1 ms
light source	pulsed infrared diode
sensing distance adjustment	potentiometer, 270°
output circuit	NPN PNP
connection types	connector
housing material	metal
protection class	IP 67/69K

page	402

laser version

product family	OZDK 10	OZDK 10	O300.ZL	OZDK 14	OZDM 16	OZDM 16	OR18.ZL
	miniature	miniature	miniature	standard	standard	standard	standard
version		line beam					
width / diameter	10,4 mm	10,4 mm	12,9 mm	14,8 mm	15,4 mm	15,4 mm	18 mm
sensing distance Tw	3 ... 150 mm	3 ... 150 mm	10 ... 250 mm	20 ... 300 mm	0 ... 250 mm	0 ... 250 mm	10 ... 300 mm
response time / release time	< 0,05 ms	< 0,05 ms	< 0,1 ms	< 0,15 ms	< 0,05 ms	< 0,1 ms	< 0,34 ms
light source	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
sensitivity adjustment	potentiometer, 5 turn	potentiometer, 5 turn		Teach-in	potentiometer, 14 turn	potentiometer, 14 turn	
sensing distance adjustment			Teach-in and IO-Link qTeach				potentiometer, 270°
output circuit	NPN PNP	NPN PNP	push-pull NPN PNP	NPN PNP	NPN PNP	PNP	NPN PNP
connection types	cable connector	cable connector	cable connector	connector cable	cable connector	cable connector	cable connector
housing material	plastic	plastic	plastic	plastic	metal	metal	metal
			IO-Link				
protection class	IP 65 IP 67	IP 65 IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
page	**404**	**406**	**408**	**410**	**412**	**414**	**416**

Diffuse sensors with intensity difference

General information

The emitter and receiver are in the same housing. The emitted infrared, red or laser light is reflected directly by the target back to the sensor. If the target reflects sufficiently well, the received light causes the sensor to switch.

Applications

- Differentiation and sorting of objects, e.g. by size, degree of reflection etc.
- Counting of objects
- Presence check, e.g. of a paper stack.

Characteristics and advantages

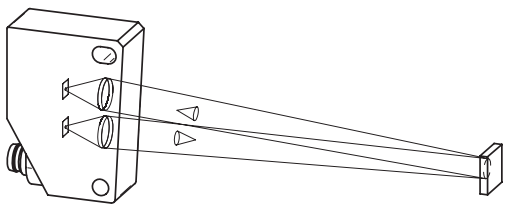
- Exploitation of the refection from the target
- Suitable to discern black from white
- Relatively large active range
- Simple installation (only one sensor)
- Short response time

- The sensing distance depends largely on the reflective properties of the object surface.
- Positioning and monitoring with just one sensor.

Technology and operation

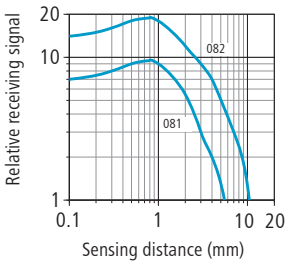
The light shining on the target is largely diffused and reflected back in all directions.
A very small part of this remitted light is observed by the receiver. If the target reflects sufficiently well, the received light causes the sensor to switch.

As the sensor operates with the reflection from the materials, the surface properties, color and gloss have a great influence on the switching distance.



Mounting and adjustment

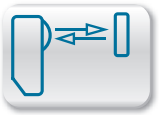
With diffuse sensors operating by the intensity difference principle, the relative receiving signal is specified. This represents the signal level received from a white object as a function of the distance. Using this diagram, the sensing range can be determined for an object which is not white. The correction factor of the respective material is required for this purpose.



Correction factor

The material and surface properties of the object (representing the reflectivity) influence the switching distance of a diffuse sensor with intensity difference. To determine the corrected switching distance, the following values must therefore be applied to the relative receiving signal (KFs) or in approximation to the distance (KFd).

Material	KFs	KFd
Kodak test card	100 %	100 %
Pale, planed wood	80 %	90 %
Rough wood	20 %	45 %
Drawn aluminum	25 %	50 %
Cardboard, matte black	7 %	26 %



Tw = 20 ... 150 mm

- compact housing
- sensitivity adjustable via Teach-in
- suppression of mutual optical interference

general data	
type	intensity difference
light source	pulsed red LED
sensing distance Tw	20 ... 150 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED green
output indicator	LED yellow
sensitivity adjustment	Teach-in
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	8 mm
height / length	16,2 mm
depth	10,8 mm
type	rectangular
housing material	plastic (PMMA, MABS, PA)
front (optics)	PMMA
ambient conditions	
operating temperature	-20 ... +50 °C
protection class	IP 65

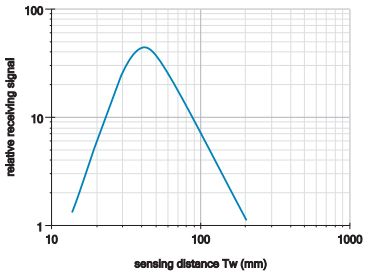
connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

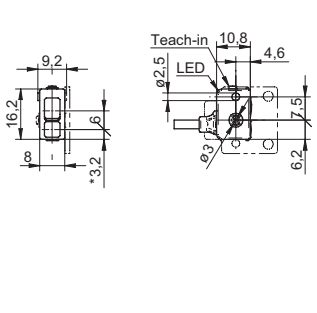
Accessories	
10150844	Minofix mounting 07
for details: see accessories section	

order reference	connection types	output circuit
FZCK 07N6901	cable rear side, 2 m	NPN
FZCK 07N6901/KS35A	flylead connector M8 4 pin, L=200 mm	NPN
FZCK 07P6901	cable rear side, 2 m	PNP
FZCK 07P6901/KS35A	flylead connector M8 4 pin, L=200 mm	PNP

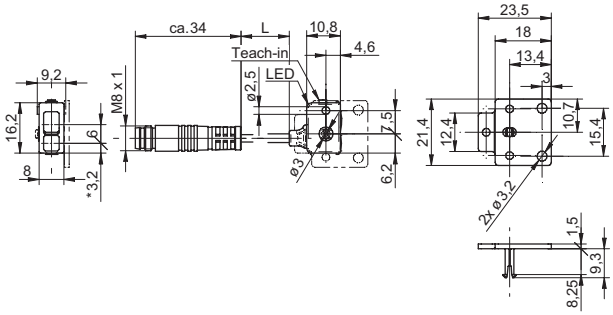
relative receiving signal



dimension drawings



* emitter axis



* emitter axis cable length L = 200 mm

Tw = 20 ... 150 mm

- compact housing
- sensitivity adjustable via Teach-in
- suppression of mutual optical interference

general data	
type	intensity difference
light source	pulsed red LED
sensing distance Tw	20 ... 150 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED green
output indicator	LED yellow
sensitivity adjustment	Teach-in
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	8 mm
height / length	16,2 mm
depth	10,8 mm
type	rectangular
housing material	plastic (PMMA, MABS, PA)
front (optics)	PMMA
ambient conditions	
operating temperature	-20 ... +50 °C
protection class	IP 65

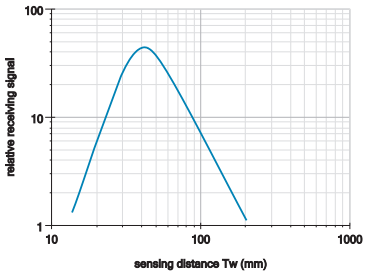
connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

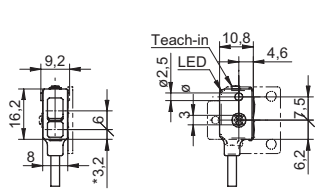
Accessories	
10150844	Minofix mounting 07
for details: see accessories section	

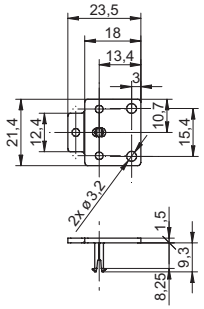
order reference	connection types	output circuit
FZDK 07N6901	cable bottom side, 2 m	NPN
FZDK 07N6901/KS35A	flylead connector M8 4 pin, L=200 mm	NPN
FZDK 07P6901	cable bottom side, 2 m	PNP
FZDK 07P6901/KS35A	flylead connector M8 4 pin, L=200 mm	PNP

relative receiving signal

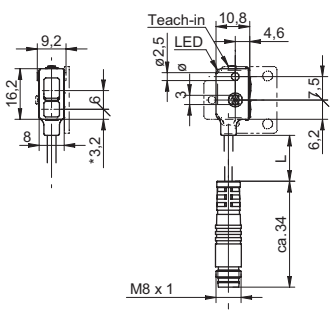


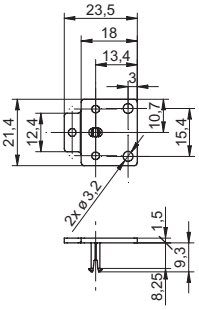
dimension drawings



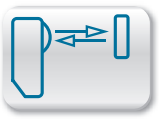


* emitter axis





* emitter axis cable length L = 200 mm

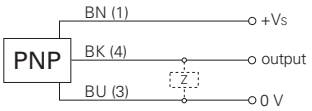


Tw = 80 mm

- subminiature metal housing
- fixed sensing distance

general data	
type	intensity difference
light source	pulsed infrared diode
alignment / soiled lens indicator	flashing light indicator
light indicator	LED red
sensitivity adjustment	no
wave length	880 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	42 mA
current consumption typ.	20 mA
voltage drop Vd	< 2 VDC
output circuit	PNP
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	8 mm
height / length	58 mm
depth	12 mm
type	rectangular
housing material	aluminum anodized
front (optics)	PC
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 65

connection diagram

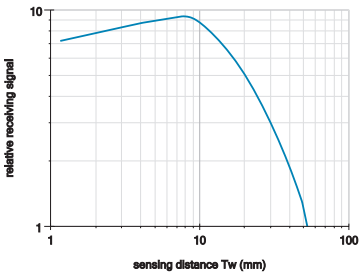


connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

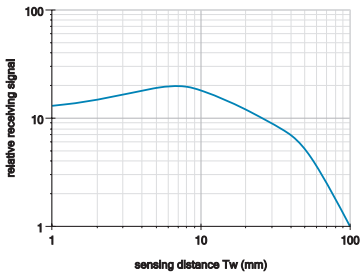
order reference	sensing distance Tw	connection types	output function
FZDM 08P1001	< 40 mm	cable 3 pin, 2 m	light operate
FZDM 08P1001/S35L	< 40 mm	connector M8, 3 pin	light operate
FZDM 08P1002	< 80 mm	cable 3 pin, 2 m	light operate
FZDM 08P1002/S35L	< 80 mm	connector M8, 3 pin	light operate
FZDM 08P3001	< 40 mm	cable 3 pin, 2 m	dark operate
FZDM 08P3001/S35L	< 40 mm	connector M8, 3 pin	dark operate
FZDM 08P3002	< 80 mm	cable 3 pin, 2 m	dark operate
FZDM 08P3002/S35L	< 80 mm	connector M8, 3 pin	dark operate

relative receiving signals

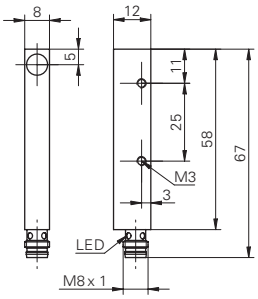
Tw < 40 mm

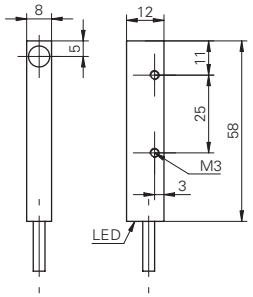


Tw < 80 mm



dimension drawings



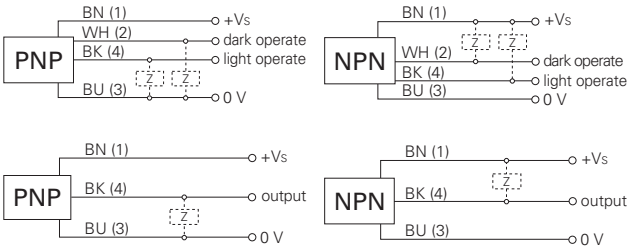


Tw = 5 ... 200 mm

- compact housing
- sensing distance adjustable via potentiometer

general data	
type	intensity difference
light source	pulsed red LED
sensing distance Tw	5 ... 200 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	potentiometer, 270°
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	14 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C

connection diagrams

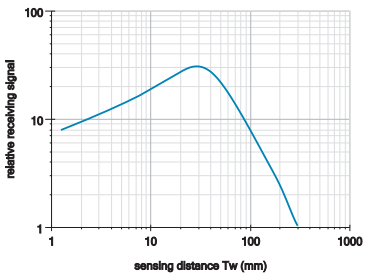


connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

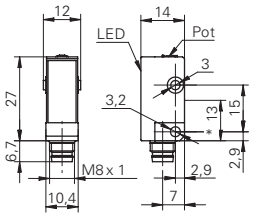
Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
10162083	Mounting panel for sensors series 10
10118798	Mounting bracket series 10
for details: see accessories section	

order reference	connection types	output circuit	output function	protection class
FZDK 10N1101/KS35	flylead connector M8 3 pin	NPN	light operate	IP 65
FZDK 10N5101	cable 4 pin, 2 m	NPN	light / dark operate	IP 65
FZDK 10N5101/S35A	connector M8 4 pin	NPN	light / dark operate	IP 67
FZDK 10P1101/KS35	flylead connector M8 3 pin	PNP	light operate	IP 65
FZDK 10P5101	cable 4 pin, 2 m	PNP	light / dark operate	IP 65
FZDK 10P5101/S35A	connector M8 4 pin	PNP	light / dark operate	IP 67

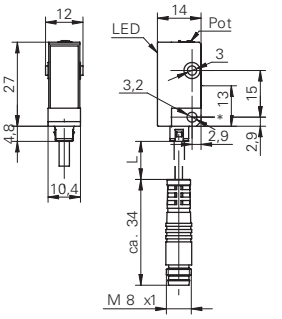
relative receiving signal



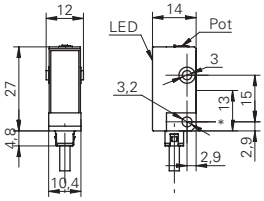
dimension drawings



* emitter axis



* emitter axis cable length L = 200 mm



* emitter axis

Tw = 5 ... 600 mm

- long range
- sensing distance adjustable via potentiometer
- suppression of mutual optical interference

general data	
type	intensity difference
light source	pulsed red LED
sensing distance Tw	5 ... 600 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	potentiometer, 270°
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

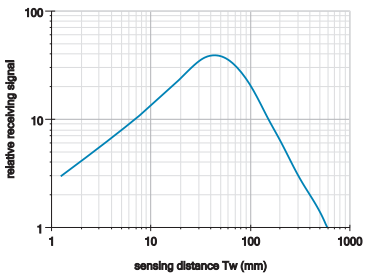
connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

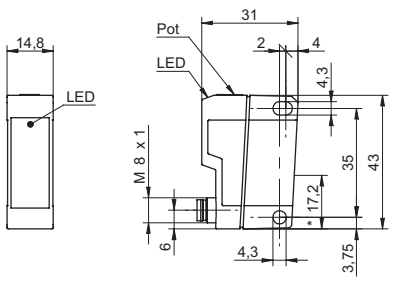
Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
for details: see accessories section	

order reference	connection types	output circuit
FZDK 14N5101	cable 4 pin, 2 m	NPN
FZDK 14N5101/S35A	connector M8 4 pin	NPN
FZDK 14P5101	cable 4 pin, 2 m	PNP
FZDK 14P5101/S14	connector M12 4 pin	PNP
FZDK 14P5101/S35A	connector M8 4 pin	PNP

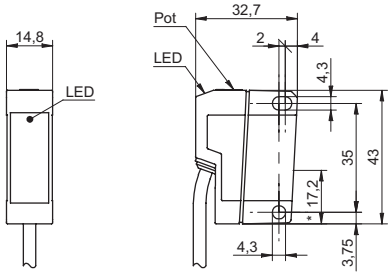
relative receiving signal



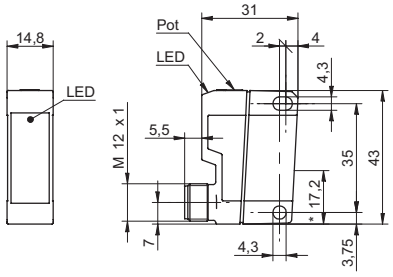
dimension drawings



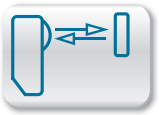
* emitter axis



* emitter axis



* emitter axis



Tw = 0 ... 400 mm

- rugged metal housing
- sensing distance adjustable via potentiometer

general data	
type	intensity difference
light source	pulsed infrared diode
sensing distance Tw	0 ... 400 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	potentiometer, 270°
wave length	880 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	41 mA
current consumption typ.	29 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	15,4 mm
height / length	50 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

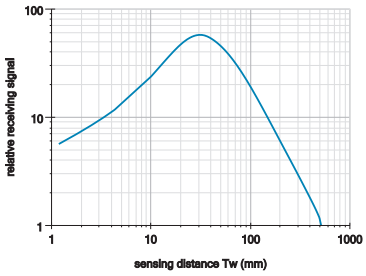
order reference	connection types	output circuit
FZDM 16N5101	cable 4 pin, 2 m	NPN
FZDM 16N5101/S14	connector M12 4 pin	NPN
FZDM 16P5101	cable 4 pin, 2 m	PNP
FZDM 16P5101/S14	connector M12 4 pin	PNP

connection diagrams

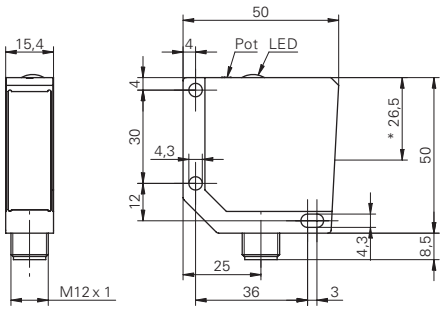
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151721	Sensofix series 16
10113917	Mounting bracket series 16 (L design)
10116407	Lens cleaning air nozzle bracket
for details: see accessories section	

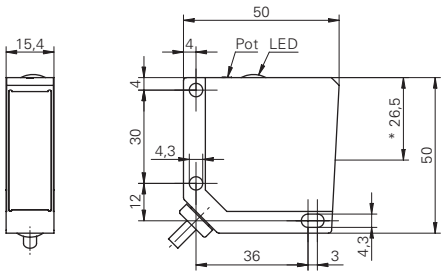
relative receiving signal



dimension drawings



* emitter axis



* emitter axis

Tw = 5 ... 500 mm

- cross-technology housing concept
- sensing distance adjustable via potentiometer
- small mounting depth

general data	
type	intensity difference
light source	pulsed red LED
sensing distance Tw	5 ... 500 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	potentiometer, 270°
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	25 mA
current consumption typ.	22 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	20 mm
height / length	42 mm
depth	15 mm
type	rectangular
housing material	plastic (PBT-ASA)
front (optics)	PMMA
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

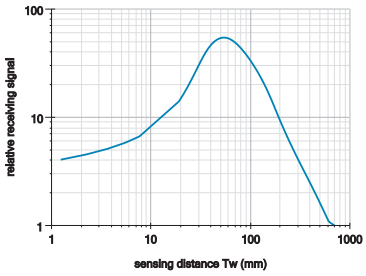
order reference	output circuit
FZDK 20N5101/S35A	NPN
FZDK 20P5101/S35A	PNP

connection diagrams

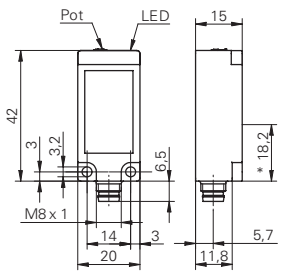
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10150326	Sensofix series 10 / series 20
for details: see accessories section	

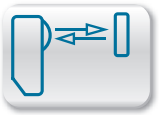
relative receiving signal



dimension drawing



* emitter axis



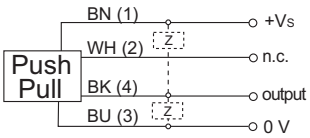
Tw = 400 mm

- One inch class
- qTeach

general data	
type	intensity difference
light source	pulsed red LED
sensing distance Tw	10 ... 400 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	qTeach
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

order reference	connection types
O300.ZR-11128017	cable 4 pin, 2 m
O300.ZR-11128014	connector M8 4 pin

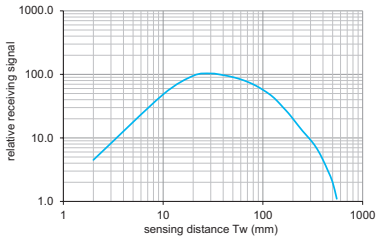
connection diagram



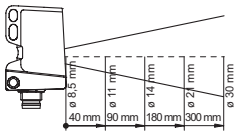
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

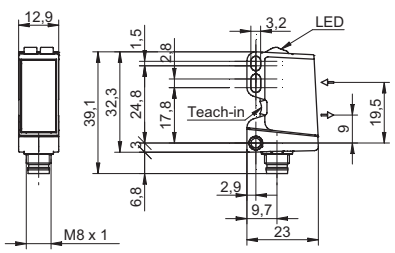
relative receiving signal

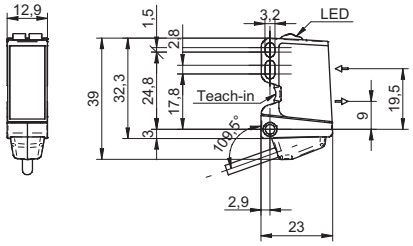


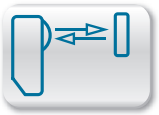
beam characteristic (typically)



dimension drawings







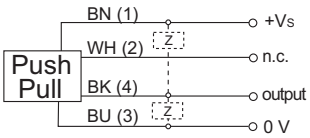
Tw = 600 mm

- qTeach

general data	
type	intensity difference
light source	pulsed red LED
sensing distance Tw	20 ... 600 mm
power on indication	LED green
light indicator	LED yellow
sensing distance adjustment	qTeach
wave length	630 nm
suppression of reciprocal influence	yes
alignment optical axis	< 1°
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	45 mm
depth	32 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

order reference	connection types
O500.ZR-11128020	cable 3 pin, 2 m
O500.ZR-11128018	connector M12 3 pin

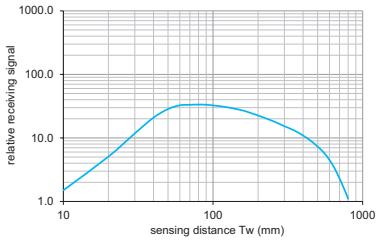
connection diagram



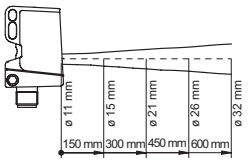
connectors and mating connectors	
ESG 34SH0200	Connector M12, 3 pin, straight, 2 m
ESW 33SH0200	Connector M12, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11099942	Sensofix O500/U500
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
for details: see accessories section	

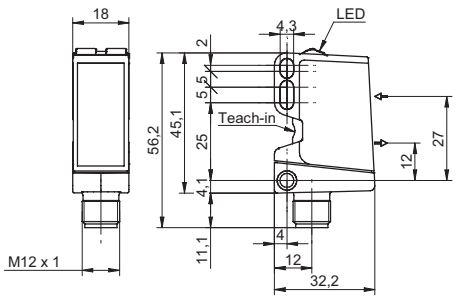
relative receiving signal

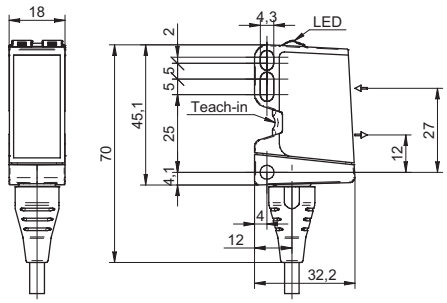


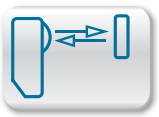
beam characteristic (typically)



dimension drawings





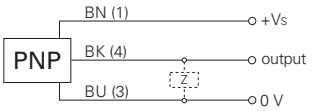


Tw = 80 mm

- subminiature metal housing
- fixed sensing distance

general data	
type	intensity difference
light source	pulsed infrared diode
alignment / soiled lens indicator	flashing light indicator
light indicator	LED red
sensitivity adjustment	no
wave length	880 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	42 mA
current consumption typ.	20 mA
voltage drop Vd	< 2 VDC
output circuit	PNP
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	8 mm
type	cylindrical threaded
housing material	brass nickel plated
front (optics)	PC
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 65

connection diagram



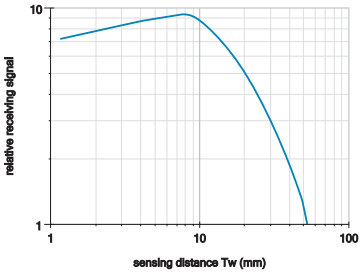
connectors and mating connectors	
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151719	Sensofix series 08 round
for details: see accessories section	

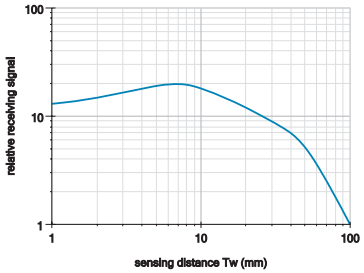
order reference	sensing distance Tw	height / length	connection types	output function
FZAM 08P1001	< 40 mm	56 mm	cable 3 pin, 2 m	light operate
FZAM 08P1001/S35L	< 40 mm	73 mm	connector M8, 3 pin	light operate
FZAM 08P1002	< 80 mm	56 mm	cable 3 pin, 2 m	light operate
FZAM 08P1002/S35L	< 80 mm	73 mm	connector M8, 3 pin	light operate
FZAM 08P3001	< 40 mm	56 mm	cable 3 pin, 2 m	dark operate
FZAM 08P3001/S35L	< 40 mm	73 mm	connector M8, 3 pin	dark operate
FZAM 08P3002	< 80 mm	56 mm	cable 3 pin, 2 m	dark operate
FZAM 08P3002/S35L	< 80 mm	73 mm	connector M8, 3 pin	dark operate

relative receiving signals

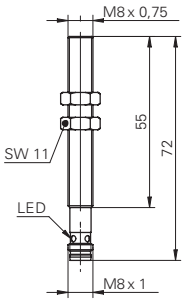
Tw < 40 mm

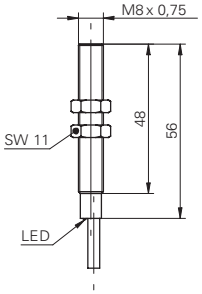


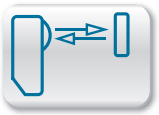
Tw < 80 mm



dimension drawings





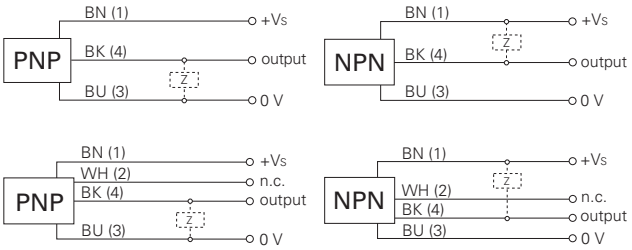


Tw = 30 ... 200 mm

- rugged metal housing
- sensing distance adjustable via potentiometer
- suppression of mutual optical interference

general data	
type	intensity difference
light source	pulsed infrared diode
sensing distance Tw	30 ... 200 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	potentiometer, 270°
wave length	880 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	42 mA
current consumption typ.	24 mA
voltage drop Vd	< 1,8 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12 mm
type	cylindrical threaded
housing material	brass nickel plated
front (optics)	PC
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 65

connection diagrams

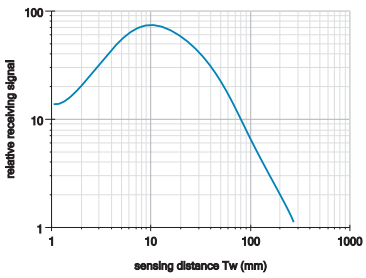


connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

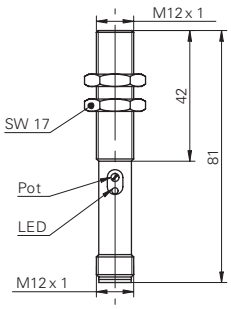
Accessories	
10151720	Sensofix series 12 round
for details: see accessories section	

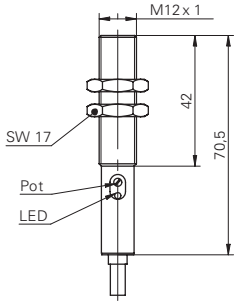
order reference	height / length	connection types	output circuit	output function
FZAM 12N1104/S14	80 mm	connector M12 4 pin	NPN	light operate
FZAM 12N3104	70 mm	cable 3 pin, 2 m	NPN	dark operate
FZAM 12N3104/S14	80 mm	connector M12 4 pin	NPN	dark operate
FZAM 12P1104	70 mm	cable 3 pin, 2 m	PNP	light operate
FZAM 12P1104/S14	80 mm	connector M12 4 pin	PNP	light operate
FZAM 12P3104	70 mm	cable 3 pin, 2 m	PNP	dark operate
FZAM 12P3104/S14	80 mm	connector M12 4 pin	PNP	dark operate

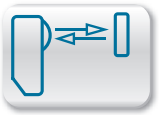
relative receiving signal



dimension drawings





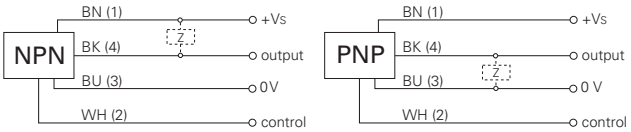


Tw = 800 mm

- infrared LED
- long range
- sensing distance adjustable via potentiometer

general data	
type	intensity difference
light source	pulsed infrared diode
alignment / soiled lens indicator	LED green
output indicator	LED yellow
wave length	880 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
type	cylindrical threaded
housing material	plastic (ABS TERLURAN)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67

connection diagrams



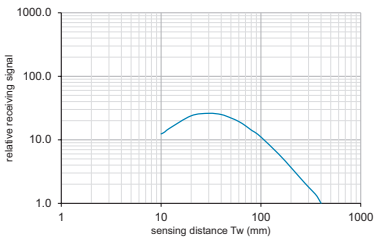
connectors and mating connectors	
ESG 34SH0200	Connector M12, 3 pin, straight, 2 m
ESW 33SH0200	Connector M12, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
ZPART-M18.NUT	Clamping nut for sensors Ø 18 mm
for details: see accessories section	

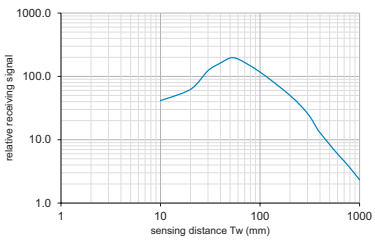
order reference	sensing distance Tw	height / length	connection types	output circuit	sensing distance adjustment
OR18.ZI-11157801	0 ... 800 mm	67,2 mm	connector M12 4 pin	NPN	potentiometer, 270°
OR18.ZI-11157797	0 ... 300 mm	67,2 mm	connector M12 4 pin	NPN	potentiometer, 270°
OR18.ZI-11157792	0 ... 80 mm	44,8 mm	cable 4 pin, 2 m	NPN	no
OR18.ZI-11157798	0 ... 300 mm	44,8 mm	cable 4 pin, 2 m	NPN	no
OR18.ZI-11157793	0 ... 80 mm	44,8 mm	flylead connector M12 4 pin, L=100 mm	NPN	no
OR18.ZI-11157799	0 ... 300 mm	44,8 mm	flylead connector M12 4 pin, L=100 mm	NPN	no
OR18.ZI-11157800	0 ... 800 mm	67,2 mm	connector M12 4 pin	PNP	potentiometer, 270°
OR18.ZI-11157794	0 ... 300 mm	67,2 mm	connector M12 4 pin	PNP	potentiometer, 270°
OR18.ZI-11157790	0 ... 80 mm	44,8 mm	cable 4 pin, 2 m	PNP	no
OR18.ZI-11157795	0 ... 300 mm	44,8 mm	cable 4 pin, 2 m	PNP	no
OR18.ZI-11157791	0 ... 80 mm	44,8 mm	flylead connector M12 4 pin, L=100 mm	PNP	no
OR18.ZI-11157796	0 ... 300 mm	44,8 mm	flylead connector M12 4 pin, L=100 mm	PNP	no

relative receiving signals

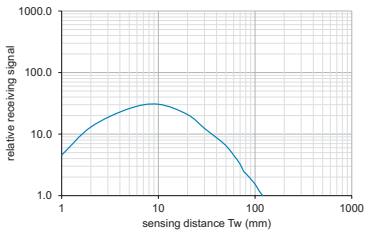
Tw = 0 ... 300 mm



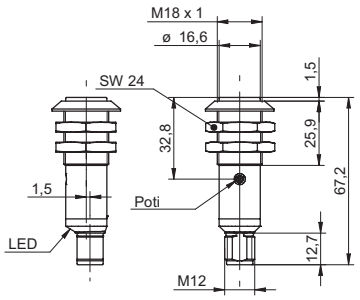
Tw = 0 ... 800 mm

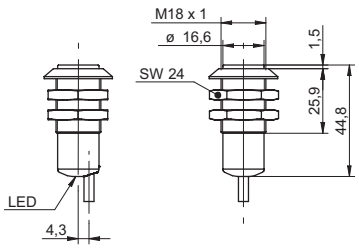


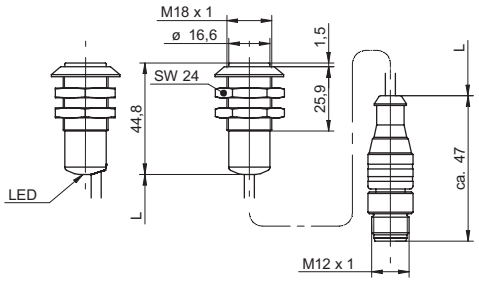
Tw = 0 ... 80 mm



dimension drawings







Tw = 60 ... 430 mm

- with alarm output
- sensing distance adjustable via Teach-in
- extended sensing distance with lens

general data	
type	intensity difference
light source	pulsed infrared diode
sensing distance Tw	60 ... 430 mm
sensing distance Tw (with doubling lense)	80 ... 800 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED green
output indicator	LED yellow
sensitivity adjustment	Teach-in
wave length	880 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	55 mA
current consumption typ.	40 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate, alarm
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
type	cylindrical threaded
housing material	brass nickel plated / PC
front (optics)	PC
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67

connection diagrams

connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

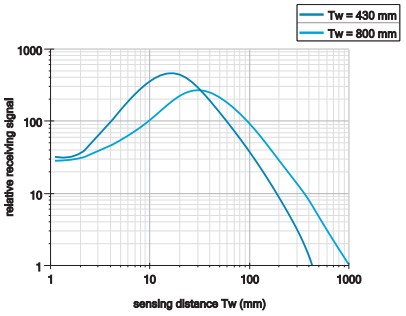
Accessories	
10151658	Sensofix series 18
10103068	Glass cover series 18
10107250	Doubling lens series 18 FZAM 18
10115913	Cap nut glass cover and doubling lens for sensors series 18
for details: see accessories section	

remarks

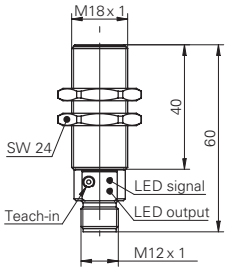
With doubling lens / cap nut, the sensing distance can be doubled.

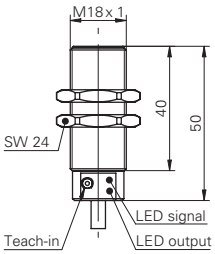
order reference	height / length	connection types	output circuit
FZAM 18N6460	50 mm	cable 4 pin, 2 m	NPN
FZAM 18N6460/S14	60 mm	connector M12 4 pin	NPN
FZAM 18P6460	50 mm	cable 4 pin, 2 m	PNP
FZAM 18P6460/S14	60 mm	connector M12 4 pin	PNP

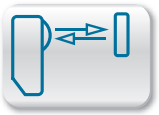
relative receiving signal



dimension drawings







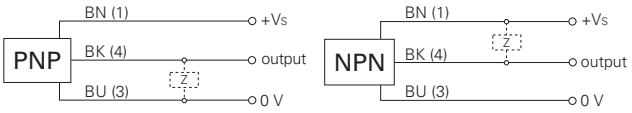
Tw = 20 ... 150 mm

- rugged metal housing
- sensing distance adjustable with potentiometer (axial)
- extended sensing distance with lens

general data	
type	intensity difference
light source	pulsed infrared diode
sensing distance Tw	20 ... 150 mm
sensing distance Tw (with doubling lense)	30 ... 280 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	potentiometer, 15 turn
wave length	880 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 1,8 VDC
output function	light operate
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	50 mm
type	cylindrical threaded
housing material	brass nickel plated / PC
front (optics)	PC
connection types	cable 3 pin, 2 m
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 65

order reference	output circuit
FZAM 18N1155	NPN
FZAM 18P1155	PNP

connection diagrams

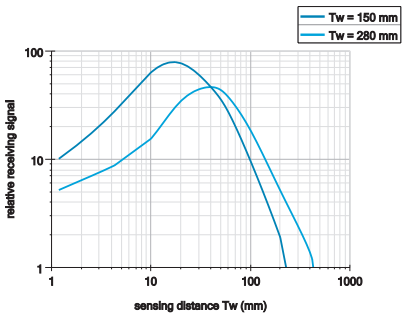


Accessories	
10151658	Sensofix series 18
10103068	Glass cover series 18
10107250	Doubling lens series 18 FZAM 18
10115913	Cap nut glass cover and doubling lens for sensors series 18
for details: see accessories section	

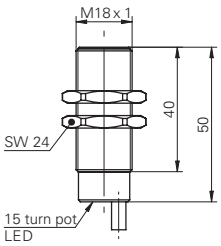
remarks

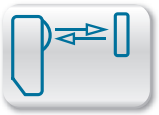
With doubling lens / cap nut, the sensing distance can be doubled.

relative receiving signal



dimension drawing



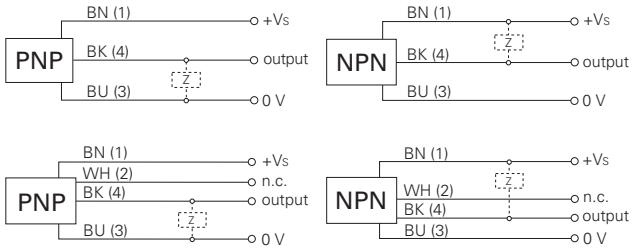


Tw = 60 ... 430 mm

- rugged metal housing
- sensing distance adjustable with radially mounted potentiometer
- extended sensing distance with lens

general data	
type	intensity difference
light source	pulsed infrared diode
sensing distance Tw	60 ... 430 mm
sensing distance Tw (with doubling lense)	80 ... 800 mm
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	potentiometer, 270°
wave length	880 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 1,8 VDC
output function	light operate
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
type	cylindrical threaded
housing material	brass nickel plated / PC
front (optics)	PC
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67

connection diagrams



connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

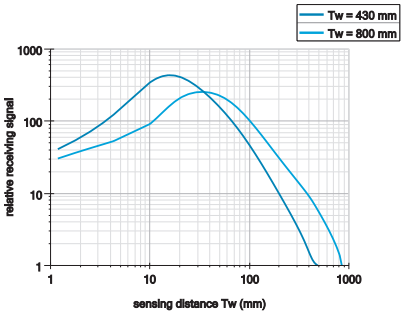
Accessories	
10151658	Sensofix series 18
10103068	Glass cover series 18
10107250	Doubling lens series 18 FZAM 18
10115913	Cap nut glass cover and doubling lens for sensors series 18
for details: see accessories section	

remarks

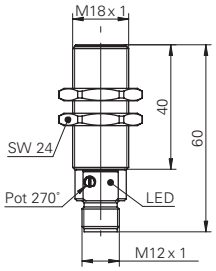
With doubling lens / cap nut, the sensing distance can be doubled.

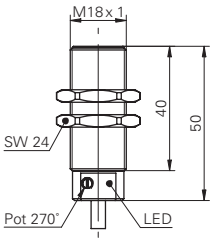
order reference	height / length	connection types	output circuit
FZAM 18N1150	50 mm	cable 3 pin, 2 m	NPN
FZAM 18N1150/S14	60 mm	connector M12 4 pin	NPN
FZAM 18P1150	50 mm	cable 3 pin, 2 m	PNP
FZAM 18P1150/S14	60 mm	connector M12 4 pin	PNP

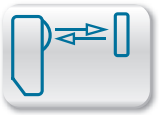
relative receiving signal



dimension drawings







Tw = 100 ... 1500 mm

- rugged metal housing
- long sensing range

general data	
type	intensity difference
light source	pulsed infrared diode
alignment / soiled lens indicator	flashing light indicator
light indicator	LED yellow
sensitivity adjustment	potentiometer, 15 turn
wave length	880 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	60 mA
current consumption typ.	50 mA
voltage drop Vd	< 2,5 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	30 mm
height / length	66 mm
type	cylindrical threaded
housing material	brass nickel plated
front (optics)	PC
connection types	cable 4 pin, 2 m
ambient conditions	
operating temperature	0 ... +65 °C
protection class	IP 65

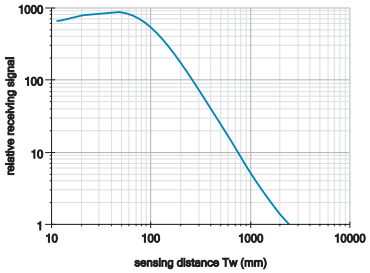
connection diagrams

Accessories	
11200030	Sensofix series 30
ZADAP-M30.STANDARD	Mounting bracket series 30
ZADAP-M30.LONG	Mounting bracket long series 30 (L design)
10103226	Glass cover series 30
10107408	Doubling lens series 30 FZAM 30
10102801	Cap nut glass cover for sensors series 30
for details: see accessories section	

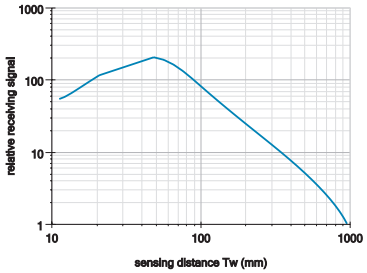
order reference	sensing distance Tw	output circuit	response time / release time
FZAM 30N5002	300 ... 1500 mm	NPN	< 2,5 ms
FZAM 30P5002	300 ... 1500 mm	PNP	< 2,5 ms
FZAM 30P5003	100 ... 700 mm	PNP	< 0,25 ms

relative receiving signals

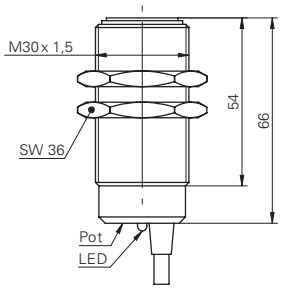
Tw = 300 ... 1500 mm

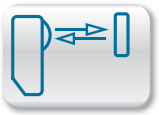


Tw = 100 ... 700 mm



dimension drawing



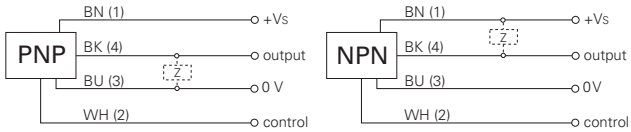


Tw = 1000 mm

- washdown design
- infrared LED
- long range

general data	
type	intensity difference
special type	Washdown design
light source	pulsed infrared diode
alignment / soiled lens indicator	LED green
output indicator	LED yellow
sensing distance adjustment	potentiometer, 270°
wave length	880 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	40 mA
current consumption typ.	30 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	67,2 mm
type	cylindrical threaded
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12 4 pin
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67/69K

connection diagrams



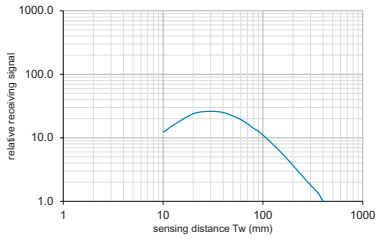
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
for details: see accessories section	

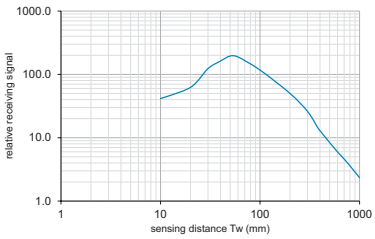
order reference	sensing distance Tw	output circuit
OR18W.ZI-11157850	0 ... 800 mm	NPN
OR18W.ZI-11157848	0 ... 300 mm	NPN
OR18W.ZI-11157849	0 ... 800 mm	PNP
OR18W.ZI-11157847	0 ... 300 mm	PNP

relative receiving signals

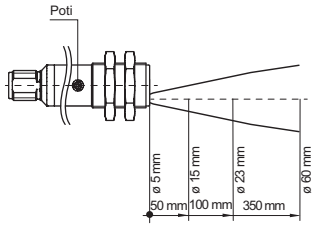
Tw = 0 ... 300 mm



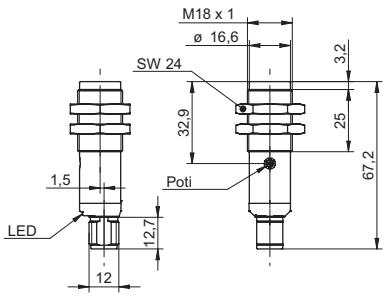
Tw = 0 ... 800 mm

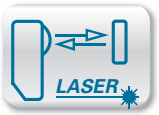


beam characteristic (typically)



dimension drawing





Tw = 3 ... 150 mm

- compact housing
- high repeatability
- very short response time

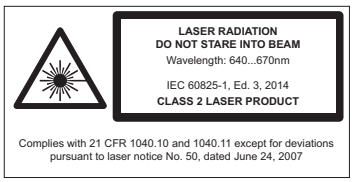
general data	
type	intensity difference
light source	pulsed red laser diode
sensing distance Tw	3 ... 150 mm
optimum operating distance	20 ... 40 mm
detectable remission difference (on grey)	> 8 %
repeat accuracy	< 0,2 mm at laser focus
power on indication	LED green
light indicator	LED yellow
sensitivity adjustment	potentiometer, 5 turn
laser class	2
distance to focus	40 mm
wave length	650 nm
electrical data	
response time / release time	< 0,05 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	50 mA
current consumption typ.	40 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	16,3 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +50 °C

connection diagrams

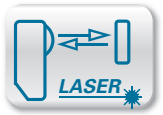
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
10162083	Mounting panel for sensors series 10
10118798	Mounting bracket series 10
for details: see accessories section	

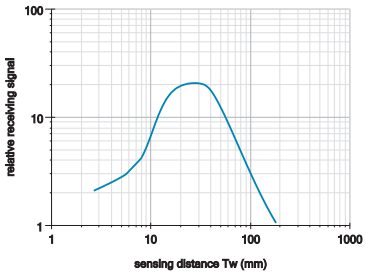
laser warning



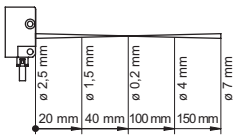
order reference	connection types	output circuit	protection class
OZDK 10N5101	cable 4 pin, 2 m	NPN	IP 65
OZDK 10N5101/S35A	connector M8 4 pin	NPN	IP 67
OZDK 10P5101	cable 4 pin, 2 m	PNP	IP 65
OZDK 10P5101/S35A	connector M8 4 pin	PNP	IP 67



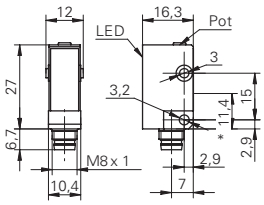
relative receiving signal



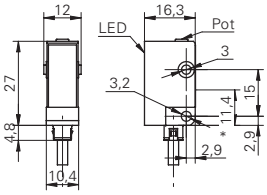
beam characteristic (typically)



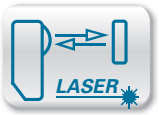
dimension drawings



* emitter axis



* emitter axis



Tw = 3 ... 150 mm

- compact housing
- line beam
- very short response time

general data	
type	intensity difference
version	line beam
light source	pulsed red laser diode
sensing distance Tw	3 ... 150 mm
optimum operating distance	35 ... 45 mm
repeat accuracy	< 0,2 mm at laser focus
power on indication	LED green
light indicator	LED yellow
sensitivity adjustment	potentiometer, 5 turn
laser class	1
distance to focus	40 mm
wave length	650 nm
electrical data	
response time / release time	< 0,05 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	50 mA
current consumption typ.	40 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	16,3 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +50 °C

connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

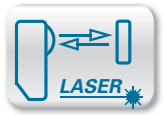
Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
10162083	Mounting panel for sensors series 10
10118798	Mounting bracket series 10
for details: see accessories section	

laser warning

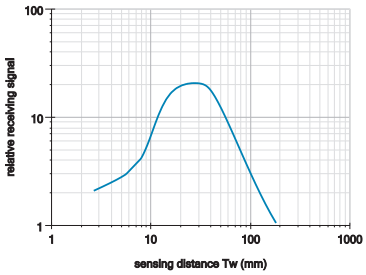
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

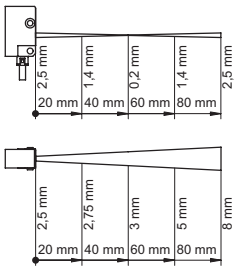
order reference	connection types	output circuit	protection class
OZDK 10N5150	cable 4 pin, 2 m	NPN	IP 65
OZDK 10N5150/S35A	connector M8 4 pin	NPN	IP 67
OZDK 10P5150	cable 4 pin, 2 m	PNP	IP 65
OZDK 10P5150/S35A	connector M8 4 pin	PNP	IP 67



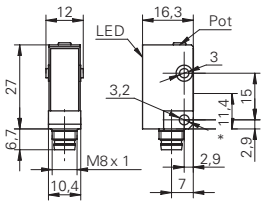
relative receiving signal



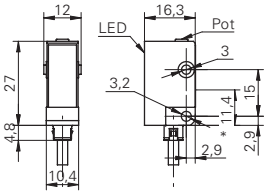
beam characteristic (typically)



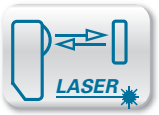
dimension drawings



* emitter axis



* emitter axis

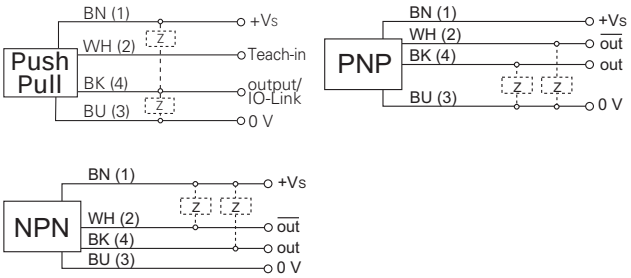


Tw = 250 mm

- One inch class
- laser diode
- short response time

general data	
type	intensity difference
light source	pulsed red laser diode
sensing distance Tw	10 ... 250 mm
repeat accuracy	< 0,1 mm at laser focus
power on indication	LED green
light indicator	LED yellow
laser class	1
distance to focus	80 mm
wave length	656 nm
suppression of reciprocal influence	yes
alignment optical axis	< 2°
electrical data	
response time / release time	< 0,1 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,5 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67

connection diagrams



connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

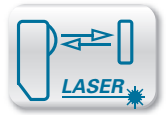
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

laser warning

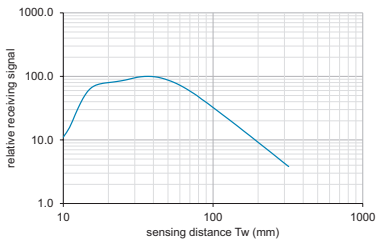
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

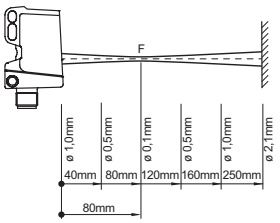
order reference	connection types	output circuit	sensing distance adjustment
O300.ZL-11176829	cable 4 pin, 2 m	push-pull	Teach-in and IO-Link
O300.ZL-11176840	connector M8 4 pin	push-pull	Teach-in and IO-Link
O300.ZL-11181086	cable 4 pin, 2 m	NPN complementary	qTeach
O300.ZL-11181087	connector M8 4 pin	NPN complementary	qTeach
O300.ZL-11181088	cable 4 pin, 2 m	PNP complementary	qTeach
O300.ZL-11181089	connector M8 4 pin	PNP complementary	qTeach



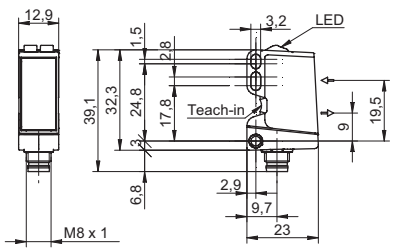
relative receiving signal

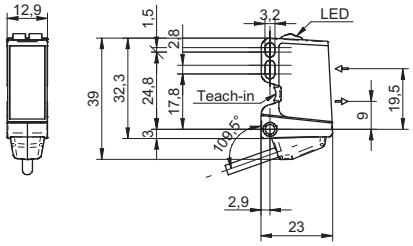


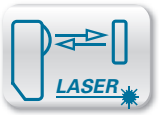
beam characteristic (typically)



dimension drawings







Tw = 20 ... 300 mm

- very short response time
- high repeatability
- sensing distance adjustable via Teach-in

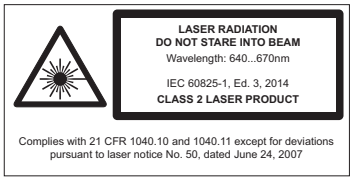
general data	
type	intensity difference
light source	pulsed red laser diode
sensing distance Tw	20 ... 300 mm
repeat accuracy	< 0,2 mm at laser focus
alignment / soiled lens indicator	flashing light indicator
power on indication	LED green
light indicator	LED yellow
sensitivity adjustment	Teach-in
laser class	2
distance to focus	115 mm
wave length	650 nm
electrical data	
response time / release time	< 0,15 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,2 VDC
output function	light operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67

connection diagrams

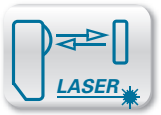
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
for details: see accessories section	

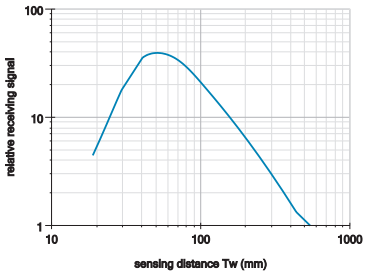
laser warning



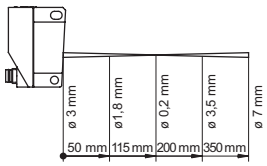
order reference	connection types	output circuit
OZDK 14N1901/S14	connector M12 4 pin	NPN
OZDK 14P1901	cable 4 pin, 2 m	PNP
OZDK 14P1901/S14	connector M12 4 pin	PNP
OZDK 14P1901/S35A	connector M8 4 pin	PNP



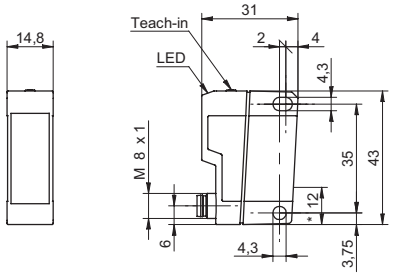
relative receiving signal



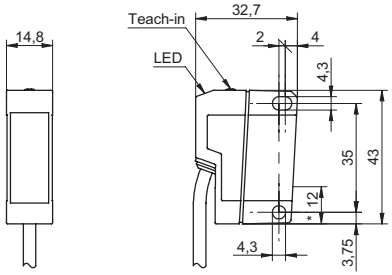
beam characteristic (typically)



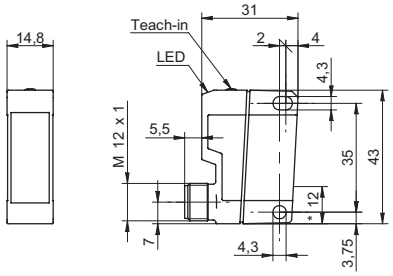
dimension drawings



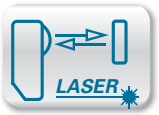
* emitter axis



* emitter axis



* emitter axis

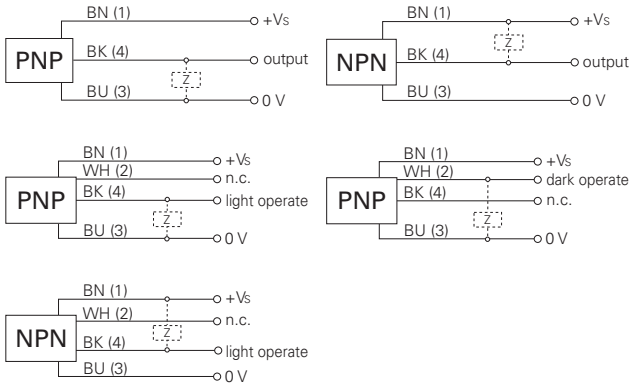


Tw = 0 ... 250 mm

- rugged metal housing
- high repeatability
- very short response time

general data	
type	intensity difference
light source	pulsed red laser diode
sensing distance Tw	0 ... 250 mm
optimum operating distance	40 ... 80 mm
detectable remission difference (on grey)	> 8 %
repeat accuracy	< 0,1 mm at laser focus
output indicator	LED yellow
sensitivity adjustment	potentiometer, 14 turn
laser class	1
distance to focus	80 mm
wave length	675 nm
electrical data	
response time / release time	< 0,05 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	65 mA
current consumption typ.	60 mA
voltage drop Vd	< 2 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	15,4 mm
height / length	50 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67

connection diagrams



connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151721	Sensofix series 16
10113917	Mounting bracket series 16 (L design)
10116407	Lens cleaning air nozzle bracket
for details: see accessories section	

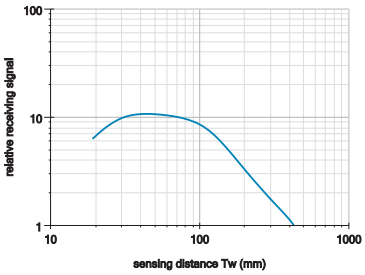
laser warning

CLASS 1 LASER PRODUCT

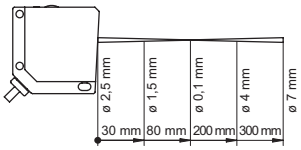
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference	connection types	output circuit	output function
OZDM 16N1001	cable 3 pin, 2 m	NPN	light operate
OZDM 16N1001/S14	connector M12 4 pin	NPN	light operate
OZDM 16P1001	cable 3 pin, 2 m	PNP	light operate
OZDM 16P1001/S14	connector M12 4 pin	PNP	light operate
OZDM 16P3001	cable 3 pin, 2 m	PNP	dark operate
OZDM 16P3001/S14	connector M12 4 pin	PNP	dark operate

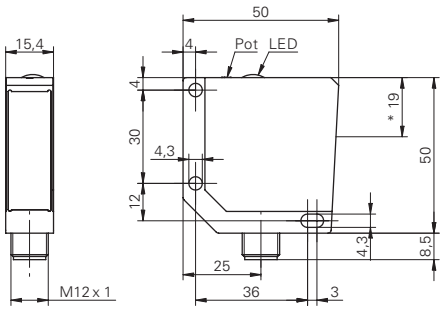
relative receiving signal



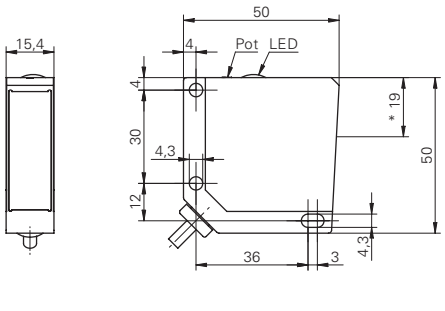
beam characteristic (typically)



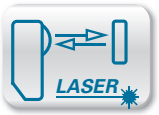
dimension drawings



* emitter axis



* emitter axis



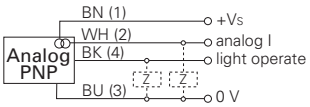
Tw = 0 ... 250 mm

- with analog output
- high repeatability
- very short response time

general data	
type	intensity difference
light source	pulsed red laser diode
sensing distance Tw	0 ... 250 mm
optimum operating distance	40 ... 80 mm
detectable remission difference (on grey)	> 8 %
repeat accuracy	< 0,1 mm at laser focus
output indicator	LED yellow
sensitivity adjustment	potentiometer, 14 turn
laser class	1
distance to focus	80 mm
wave length	675 nm
electrical data	
response time / release time	< 0,1 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	65 mA
current consumption typ.	60 mA
voltage drop Vd	< 2 VDC
output function	light operate
output circuit	PNP / analog 4 ... 20 mA
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	15,4 mm
height / length	50 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67

order reference	connection types
OZDM 16P1901	cable 4 pin, 2 m
OZDM 16P1901/S14	connector M12 4 pin

connection diagram



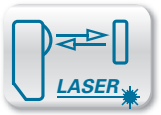
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151721	Sensofix series 16
10113917	Mounting bracket series 16 (L design)
10116407	Lens cleaning air nozzle bracket
for details: see accessories section	

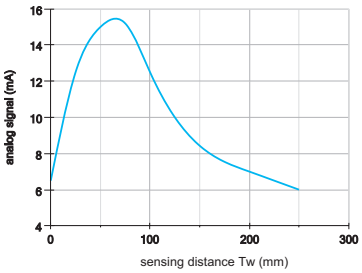
laser warning

CLASS 1 LASER PRODUCT

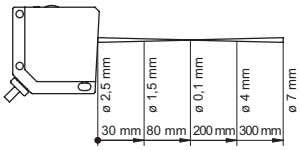
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007



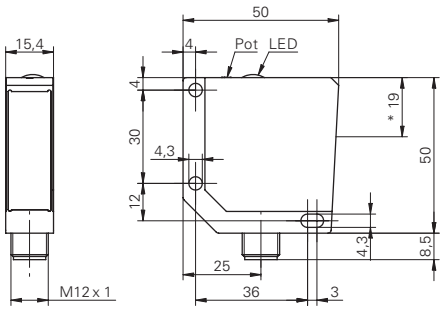
signal progression



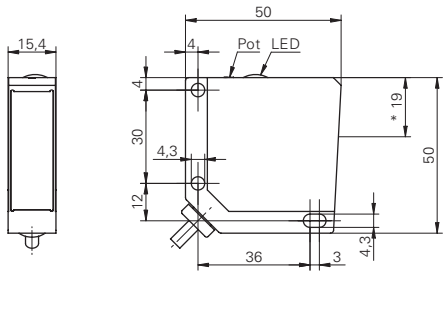
beam characteristic (typically)



dimension drawings



* emitter axis



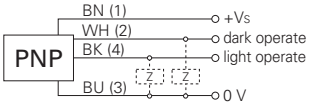
* emitter axis

Tw = 300 mm

- short response time
- sensing distance adjustable via potentiometer
- suppression of mutual optical interference

general data	
type	intensity difference
light source	pulsed red laser diode
sensing distance Tw	10 ... 300 mm
power on indication	LED green
output indicator	LED yellow
sensing distance adjustment	potentiometer, 270°
laser class	1
distance to focus	100 mm
wave length	630 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,34 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	35 mA
voltage drop Vd	< 2 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
type	cylindrical threaded
housing material	brass nickel plated
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +55 °C
protection class	IP 67

connection diagram



connectors and mating connectors	
ESG 34SH0200	Connector M12, 3 pin, straight, 2 m
ESW 33SH0200	Connector M12, 3 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151658	Sensofix series 18
ZADAP-M18.STANDARD	Mounting bracket series 18
ZADAP-M18.SHORT	Mounting bracket short series 18 (L design)
ZADAP-M18.LONG	Mounting bracket long series 18 (L design)
ZADAP-M18.SWING	Mounting bracket for adjustment for sensors series 18
ZADAP-M18.MICRO	Mounting bracket for adjustment for sensors series 18
for details: see accessories section	

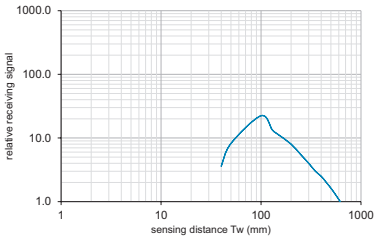
laser warning

CLASS 1 LASER PRODUCT

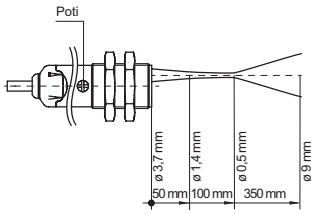
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference	height / length	connection types	output circuit
OR18.ZL-11157806	77 mm	cable 4 pin, 2 m	NPN complementary
OR18.ZL-11157805	81,5 mm	connector M12 4 pin	NPN complementary
OR18.ZL-11157803	77 mm	cable 4 pin, 2 m	PNP complementary
OR18.ZL-11157802	81,5 mm	connector M12 4 pin	PNP complementary

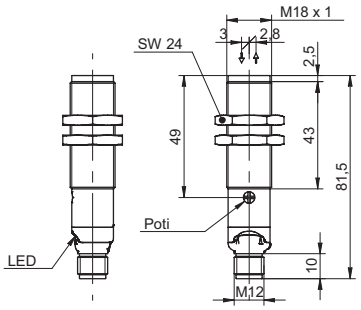
relative receiving signal

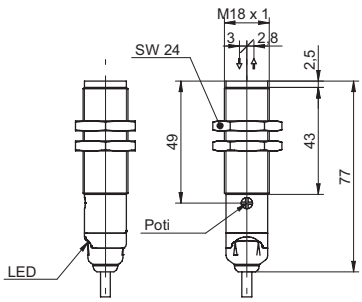


beam characteristic (typically)



dimension drawings





product family	**FKDM 22**	**FKDM 22**	**FKDM 22**
	LOGIPAL	*LOGIPAL*	*LOGIPAL*
sensing distance Tw	40 mm	40 mm	25 mm
sensor channels	4 (teachable)	2 (teachable)	4 (teachable)
size of measuring spot	3 mm x 5 mm	3 mm x 5 mm	0,7 mm x 1,3 mm
response time / release time	< 0,34 ms	< 0,34 ms	< 0,34 ms
light source	LED red / green / blue	LED red / green / blue	LED red / green / blue
output circuit	NPN PNP	NPN PNP	PNP
device plug	connector M12, 8 pin, rotatable	connector M12, 8 pin, rotatable	connector M12, 8 pin, rotatable
page	**420**	**421**	**422**

General information

With the ***LOGIPAL*** color detection sensor, you can now use the color as a solution for sorting, quality monitoring and automation in your processes.

Applications

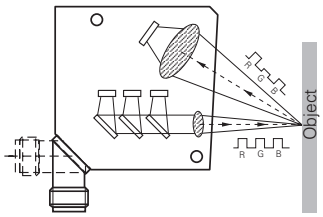
- Objects can be monitored and sorted by colored marks.
- The correct color of objects can be inspected or the objects can be sorted by their color.

Characteristics and advantages

- **Simple operation:**
  Four different colors can be programmed with just three buttons.
- **Finest color graduation:**
  One of five tolerance stages can be chosen for each color.
- **Short response time:**
  With a response time of only 0,34 ms, high detection rates can be achieved.
- **Synchronization input:**
  Allows controlled measurement of the color.
- **External Teach-in input:**
  Allows complete remote control of all Teach-in functions by serial data transfer. An RS 232 interface transducer with galvanic isolation is available as an accessory.

Technology and operation

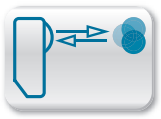
The sensor operates by the three-stage principle, meaning that it emits the three colors red, green and blue and then measures the color proportions of the three colors reflected by the object.
The color of an object is programmed in the Teach-in procedure. If the sensor recognizes this color again during operation, it activates the corresponding output. Optional tolerances permit it to detect large or small differences in color.



Mounting and adjustment

The use of the color sensor is as simple as for a diffuse sensor. Only the points below must be observed.

- For glossy objects, tilt the sensor to the side by approve. 15 °.
- If you wish to detect very fine differences in color, the sensing distance of 40 mm ha to be adhered.

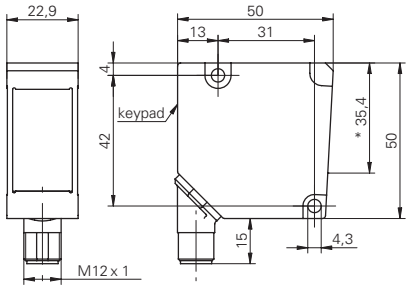


Tw = 40 mm

- up to 4 colors can be distinguished properly
- spot size 3 x 5 mm
- rugged metal housing

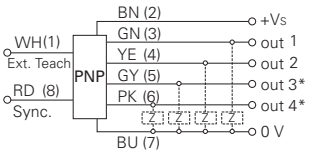
general data	
sensing distance Tw	40 mm
sensor channels	4 (teachable)
tolerance ranges	5-step teachable (LEDs)
size of measuring spot	3 mm x 5 mm
light source	LED red / green / blue
signal display (Teach)	LED orange
channel status display	LED yellow per channel
power on indication	LED green
electrical data	
response time / release time	< 0,34 ms
voltage supply range +Vs	10 ... 30 VDC
power consumption	< 2 W
output function	light operate
voltage drop Vd	< 1,8 VDC
output current (per channel)	< 100 mA
remote Teach-In input	protocol with return signal through channel 1-output
level (sync., teach)	high: 2/3 Vs...Vs low: 0 V...1/3 Vs
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	22,9 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
device plug	connector M12, 8 pin, rotatable
ambient conditions	
operating temperature	-10 ... +55 °C
protection class	IP 67
connectors and mating connectors	
ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10126220	Mounting bracket series 22 L design
for details: see accessories section	
remarks	
Complete remote control of the sensor is possible using the "Ext. Teach" input. The converter RS 232 is neccessary.	

dimension drawing

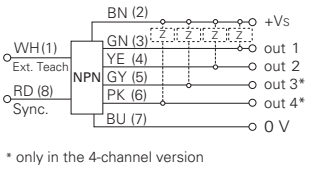


* emitter axis

connection diagrams

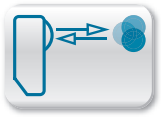


* only in the 4-channel version



* only in the 4-channel version

order reference	output circuit	sync. input
FKDM 22N1901/S14F	NPN	high active
FKDM 22P1901/S14F	PNP	low active

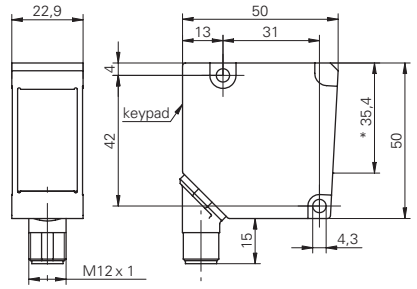


Tw = 40 mm

- up to 2 colors can be distinguished properly
- spot size 3 x 5 mm
- rugged metal housing

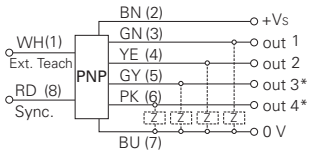
general data	
sensing distance Tw	40 mm
sensor channels	2 (teachable)
tolerance ranges	5-step teachable (LEDs)
size of measuring spot	3 mm x 5 mm
light source	LED red / green / blue
signal display (Teach)	LED orange
channel status display	LED yellow per channel
power on indication	LED green
electrical data	
response time / release time	< 0,34 ms
voltage supply range +Vs	10 ... 30 VDC
power consumption	< 2 W
voltage drop Vd	< 1,8 VDC
output current (per channel)	< 100 mA
remote Teach-In input	protocol with return signal through channel 1-output
level (sync., teach)	high: 2/3 Vs...Vs low: 0 V...1/3 Vs
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	22,9 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
device plug	connector M12, 8 pin, rotatable
ambient conditions	
operating temperature	-10 ... +55 °C
protection class	IP 67
connectors and mating connectors	
ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10126220	Mounting bracket series 22 L design
for details: see accessories section	
remarks	
Complete remote control of the sensor is possible using the "Ext. Teach" input. The converter RS 232 is neccessary.	

dimension drawing

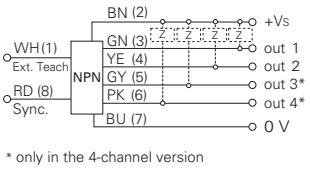


* emitter axis

connection diagrams

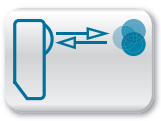


* only in the 4-channel version



* only in the 4-channel version

order reference	output circuit	output function	sync. input
FKDM 22N1902/S14F	NPN	light operate	high active
FKDM 22P1902/S14F	PNP	light operate	low active
FKDM 22P3902/S14F	PNP	dark operate	low active

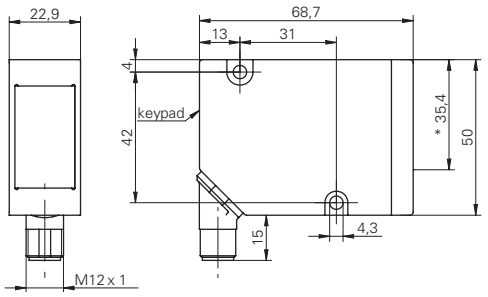


Tw = 25 mm

- up to 4 colors can be distinguished properly
- spot size 0,7 x 1,3 mm
- rugged metal housing

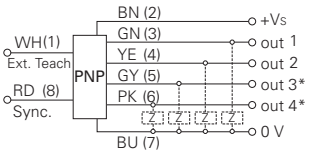
general data	
sensing distance Tw	25 mm
sensor channels	4 (teachable)
tolerance ranges	5-step teachable (LEDs)
size of measuring spot	0,7 mm x 1,3 mm
light source	LED red / green / blue
signal display (Teach)	LED orange
channel status display	LED yellow per channel
power on indication	LED green
electrical data	
response time / release time	< 0,34 ms
voltage supply range +Vs	10 ... 30 VDC
power consumption	< 2 W
output circuit	PNP
output function	light operate
voltage drop Vd	< 1,8 VDC
output current (per channel)	< 100 mA
remote Teach-In input	protocol with return signal through channel 1-output
sync. input	low active
level (sync., teach)	high: 2/3 Vs...Vs low: 0 V...1/3 Vs
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	22,9 mm
type	rectangular
housing material	aluminum anodized
front (optics)	glass
device plug	connector M12, 8 pin, rotatable
ambient conditions	
operating temperature	-10 ... +55 °C
protection class	IP 67
connectors and mating connectors	
ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10126220	Mounting bracket series 22 L design
for details: see accessories section	
remarks	
Complete remote control of the sensor is possible using the "Ext. Teach" input. The converter RS 232 is neccessary.	

dimension drawing

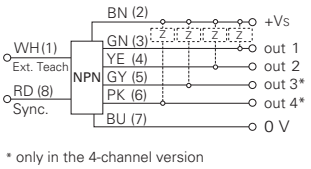


* emitter axis

connection diagrams



* only in the 4-channel version



* only in the 4-channel version

order reference
FKDM 22P1911/S14F

white light version

product family	FKDH 14	FKDK 14	FKDR 14
type	diffuse contrast sensor	diffuse contrast sensor	diffuse contrast sensor
width / diameter	19,6 mm	14,8 mm	19,6 mm
sensing distance Tw	12,5 mm ±2 mm	12,5 mm ±2 mm	12,5 mm ±2 mm
response time / release time	< 0,05 ms	< 0,05 ms	< 0,05 ms
light source	white LED	white LED	white LED
sensitivity adjustment	Teach-in	Teach-in	Teach-in
output circuit	push-pull	push-pull	push-pull
connection types	cable flylead connector	cable connector	connector
housing material	metal	plastic	metal
page	**426**	**428**	**430**

laser version

product family	OZDK 10	OZDK 10	OZDK 14	OZDM 16	OZDM 16
type	diffuse contrast sensor	diffuse contrast sensor	diffuse contrast sensor	diffuse contrast sensor	diffuse contrast sensor
width / diameter	10,4 mm	10,4 mm	14,8 mm	15,4 mm	15,4 mm
sensing distance Tw	3 ... 150 mm	3 ... 150 mm	20 ... 300 mm	0 ... 250 mm	0 ... 250 mm
response time / release time	< 0,05 ms	< 0,05 ms	< 0,15 ms	< 0,1 ms	< 0,05 ms
light source	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
sensitivity adjustment	potentiometer, 5 turn	potentiometer, 5 turn	Teach-in	potentiometer, 14 turn	potentiometer, 14 turn
output circuit	NPN PNP	NPN PNP	NPN PNP	PNP	NPN PNP
connection types	cable connector	cable connector	connector cable	cable connector	cable connector
housing material	plastic	plastic	plastic	metal	metal
page	**432**	**434**	**436**	**438**	**440**

General information

Diffuse contrast sensors can detect finest differences in contrast. Contrasts arise when surfaces bear bright and dark areas (e.g. a dark color mark on a bright primary color), or by structures on a surface (e.g. a weld seam).

Applications

- Recognize print marks (FKDK 14)
  Print marks (or color marks) are usually dark-colored marks on a light background. The marks differ from the background in brightness and often in color.
- Detect edges, seams, grooves (laser sensors)
  If a surface is observed from an oblique angle, the reflection behavior changes at an indentation, which to the sensor is equivalent to a contrast difference.

Characteristics and advantages

- White light sensor
  The narrow white light line allows precise detection of color marks

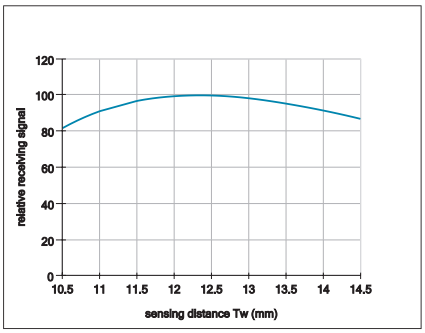
- Laser sensors
  Thanks to the focused beam, even the slightest edge up to 0.1 mm in height can be detected.

- Fast response time
  Very short response times up to 50 µs allow "real time" recording of marks and thus increase the process accuracy.

- Sensor with analog signal
  Allows to import desired nominal values and to detect deviations thereof.

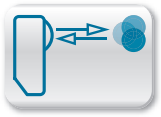
Technology and operation

Diffuse contrast sensors are based on the intensity difference principle with a clearly defined small light spot. At the ideal operating distance the sensor is optimized so that the finest contrast differences are detected almost independent of small changes in distance.
The graph "Relative signal reception" was measured on white paper.



Mounting and adjustment

The sensor should usually be mounted inclined by 5° to 20° to the object surface, especially when shiny material is scanned. When scanning edges, grooves or indentations, the sensor must be aligned so that the direct reflection is detected when the indentation, groove, or edge enters the light beam.



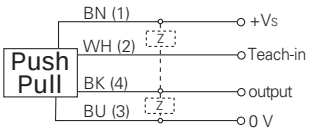
Tw = 12.5 mm

- hygiene design
- very short response time
- White light

general data	
type	diffuse contrast sensor
special type	hygienic design
light source	white LED
sensing distance Tw	12,5 mm ±2 mm
light indicator	LED green
output indicator	LED yellow
sensitivity adjustment	Teach-in
distance to focus	12,5 mm
beam height	3 mm
beam width	1 mm
approvals/certificates	Ecolab EHEDG
electrical data	
response time / release time	< 0,05 ms
voltage supply range +Vs	18 ... 30 VDC
current consumption max. (no load)	50 mA
current consumption typ.	40 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	19,6 mm
height / length	52,2 mm
depth	34,3 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

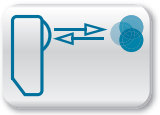
order reference	connection types
FKDH 14G6901	cable 4 pin, 2 m
FKDH 14G6901/KS34A	flylead connector M12, L=300 mm

connection diagram

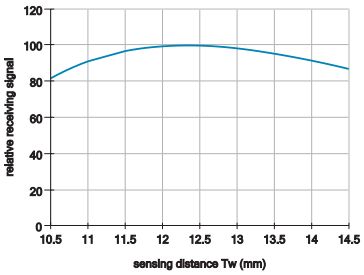


connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

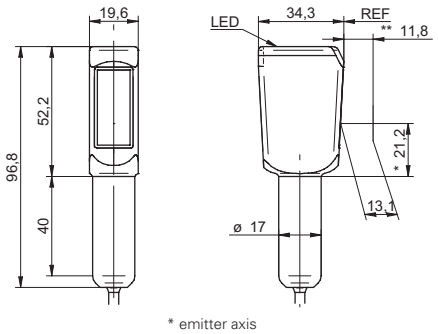
Accessories	
HI17-1H	Mounting for sensors in hygienic design Ø 17 mm
for details: see accessories section	

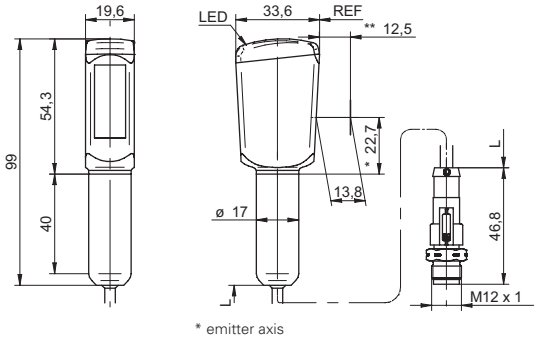


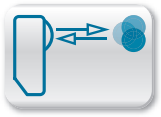
relative receiving signal



dimension drawings







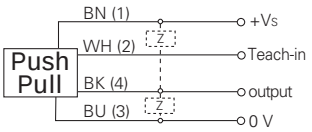
Tw = 12.5 mm

- very short response time
- white light

general data	
type	diffuse contrast sensor
light source	white LED
sensing distance Tw	12,5 mm ±2 mm
light indicator	LED green
output indicator	LED yellow
sensitivity adjustment	Teach-in
distance to focus	12,5 mm
beam height	3 mm
beam width	1 mm
electrical data	
response time / release time	< 0,05 ms
voltage supply range +Vs	18 ... 30 VDC
current consumption max. (no load)	50 mA
current consumption typ.	40 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 67

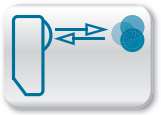
order reference	connection types
FKDK 14G6901	cable 4 pin, 2 m
FKDK 14G6901/S14	connector M12 4 pin
FKDK 14G6901/S35A	connector M8 4 pin

connection diagram

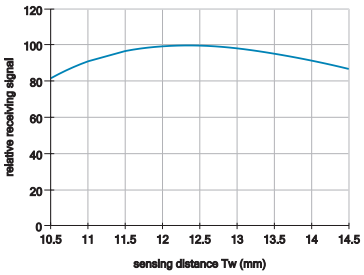


connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

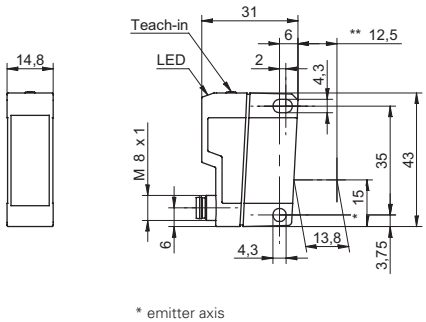
Accessories	
10134964	Mounting bracket series 14 (L design)
10149011	Sensofix series 14
for details: see accessories section	



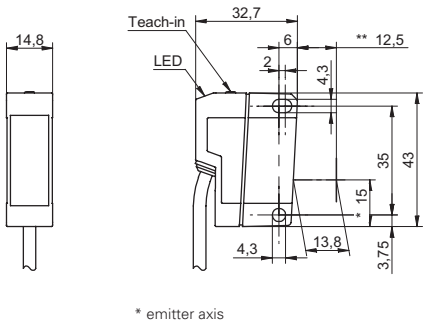
relative receiving signal



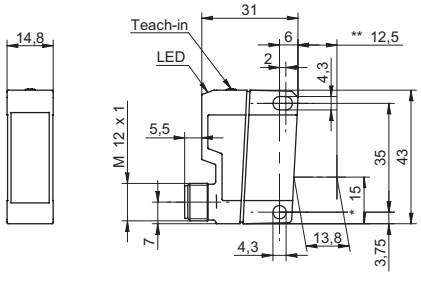
dimension drawings



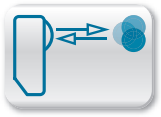
* emitter axis



* emitter axis



* emitter axis



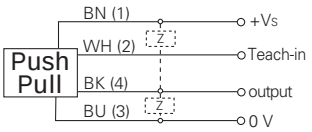
Tw = 12.5 mm

- washdown design
- very short response time
- White light

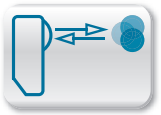
general data	
type	diffuse contrast sensor
special type	Washdown design
light source	white LED
sensing distance Tw	12,5 mm ±2 mm
light indicator	LED green
output indicator	LED yellow
sensitivity adjustment	Teach-in
distance to focus	12,5 mm
beam height	3 mm
beam width	1 mm
approvals/certificates	Ecolab
electrical data	
response time / release time	< 0,05 ms
voltage supply range +Vs	18 ... 30 VDC
current consumption max. (no load)	50 mA
current consumption typ.	40 mA
voltage drop Vd	< 3 VDC
output function	light / dark operate
output circuit	push-pull
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	19,6 mm
height / length	51 mm
depth	34,3 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 68/69K & proTect+

order reference
FKDR 14G6901/S14

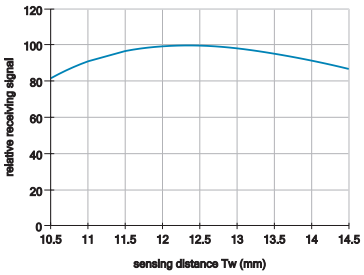
connection diagram



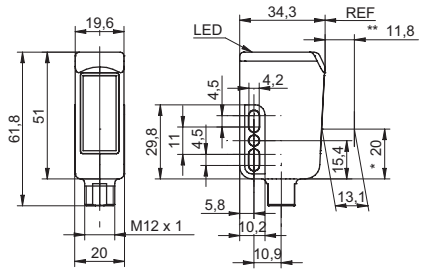
Accessories	
10134964	Mounting bracket series 14 (L design)
10149011	Sensofix series 14
for details: see accessories section	



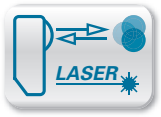
relative receiving signal



dimension drawing



* emitter axis



Tw = 3 ... 150 mm

- compact housing
- high repeatability
- very short response time

general data	
type	diffuse contrast sensor
version	line beam
light source	pulsed red laser diode
sensing distance Tw	3 ... 150 mm
optimum operating distance	35 ... 45 mm
repeat accuracy	< 0,2 mm at laser focus
power on indication	LED green
light indicator	LED yellow
sensitivity adjustment	potentiometer, 5 turn
laser class	1
distance to focus	40 mm
wave length	650 nm
electrical data	
response time / release time	< 0,05 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	50 mA
current consumption typ.	40 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	16,3 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +50 °C

connection diagrams

connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

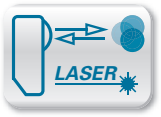
Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
10162083	Mounting panel for sensors series 10
10118798	Mounting bracket series 10
for details: see accessories section	

laser warning

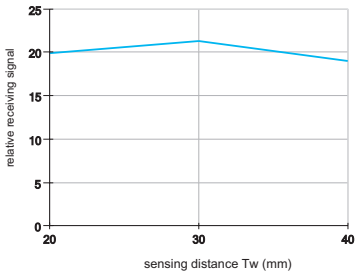
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

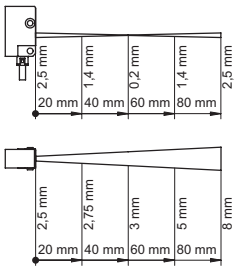
order reference	connection types	output circuit	protection class
OZDK 10N5150	cable 4 pin, 2 m	NPN	IP 65
OZDK 10N5150/S35A	connector M8 4 pin	NPN	IP 67
OZDK 10P5150	cable 4 pin, 2 m	PNP	IP 65
OZDK 10P5150/S35A	connector M8 4 pin	PNP	IP 67



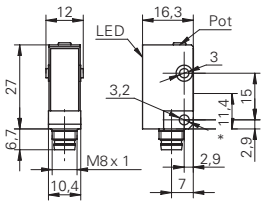
relative receiving signal



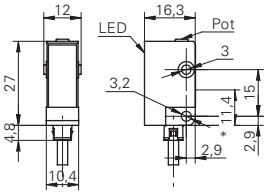
beam characteristic (typically)



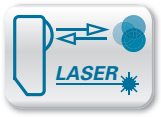
dimension drawings



* emitter axis



* emitter axis



Tw = 3 ... 150 mm

- compact housing
- high repeatability
- very short response time

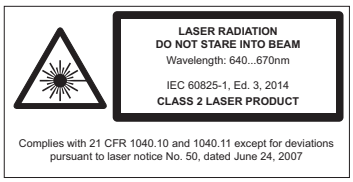
general data	
type	diffuse contrast sensor
light source	pulsed red laser diode
sensing distance Tw	3 ... 150 mm
optimum operating distance	20 ... 40 mm
detectable remission difference (on grey)	> 8 %
repeat accuracy	< 0,2 mm at laser focus
power on indication	LED green
light indicator	LED yellow
sensitivity adjustment	potentiometer, 5 turn
laser class	2
distance to focus	40 mm
wave length	650 nm
electrical data	
response time / release time	< 0,05 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	50 mA
current consumption typ.	40 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	16,3 mm
type	rectangular
housing material	plastic (ASA)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +50 °C

connection diagrams

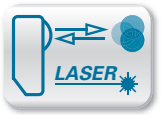
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
10162083	Mounting panel for sensors series 10
10118798	Mounting bracket series 10
for details: see accessories section	

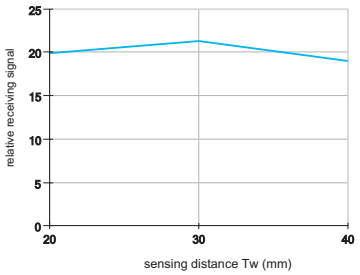
laser warning



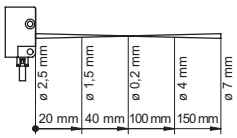
order reference	connection types	output circuit	protection class
OZDK 10N5101	cable 4 pin, 2 m	NPN	IP 65
OZDK 10N5101/S35A	connector M8 4 pin	NPN	IP 67
OZDK 10P5101	cable 4 pin, 2 m	PNP	IP 65
OZDK 10P5101/S35A	connector M8 4 pin	PNP	IP 67



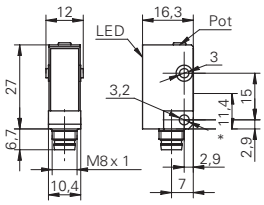
relative receiving signal



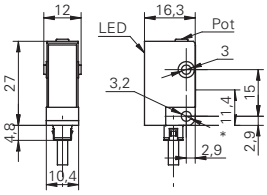
beam characteristic (typically)



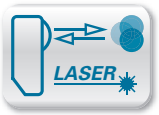
dimension drawings



* emitter axis



* emitter axis



Tw = 20 ... 300 mm

- very short response time
- high repeatability
- sensing distance adjustable via Teach-in

general data	
type	diffuse contrast sensor
light source	pulsed red laser diode
sensing distance Tw	20 ... 300 mm
optimum operating distance	40 ... 60 mm
repeat accuracy	< 0,2 mm at laser focus
alignment / soiled lens indicator	flashing light indicator
power on indication	LED green
light indicator	LED yellow
sensitivity adjustment	Teach-in
laser class	2
distance to focus	115 mm
wave length	650 nm
electrical data	
response time / release time	< 0,15 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
current consumption typ.	25 mA
voltage drop Vd	< 2,2 VDC
output function	light operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67

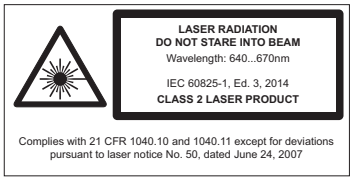
order reference	connection types	output circuit
OZDK 14N1901/S14	connector M12 4 pin	NPN
OZDK 14P1901	cable 4 pin, 2 m	PNP
OZDK 14P1901/S14	connector M12 4 pin	PNP
OZDK 14P1901/S35A	connector M8 4 pin	PNP

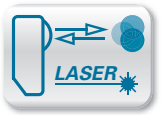
connection diagrams

connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

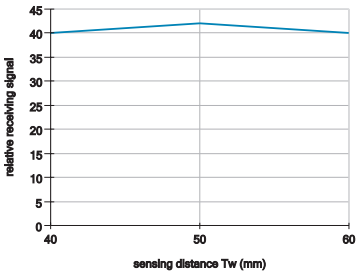
Accessories	
10149011	Sensofix series 14
10134964	Mounting bracket series 14 (L design)
for details: see accessories section	

laser warning

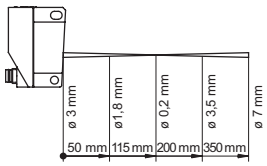




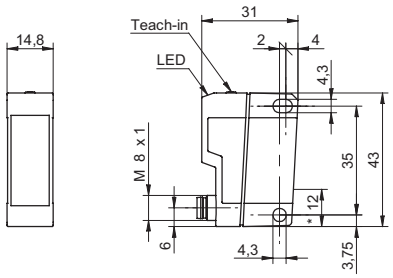
relative receiving signal



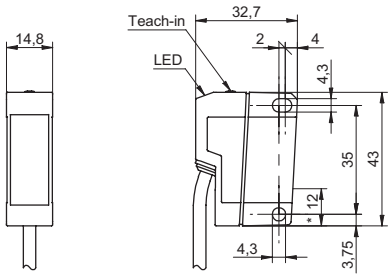
beam characteristic (typically)



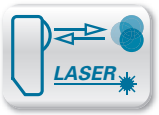
dimension drawings



* emitter axis



* emitter axis



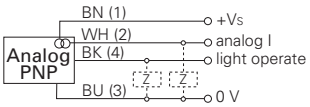
Tw = 0 ... 250 mm

- with analog output
- high repeatability
- very short response time

general data	
type	diffuse contrast sensor
light source	pulsed red laser diode
sensing distance Tw	0 ... 250 mm
optimum operating distance	40 ... 80 mm
detectable remission difference (on grey)	> 8 %
repeat accuracy	< 0,1 mm at laser focus
output indicator	LED yellow
sensitivity adjustment	potentiometer, 14 turn
laser class	1
distance to focus	80 mm
wave length	650 nm
electrical data	
response time / release time	< 0,1 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	65 mA
current consumption typ.	60 mA
voltage drop Vd	< 2 VDC
output function	light operate
output circuit	PNP / analog 4 ... 20 mA
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	15,4 mm
height / length	50 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67

order reference	connection types
OZDM 16P1901	cable 4 pin, 2 m
OZDM 16P1901/S14	connector M12 4 pin

connection diagram



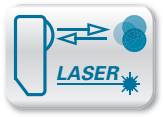
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10151721	Sensofix series 16
10113917	Mounting bracket series 16 (L design)
for details: see accessories section	

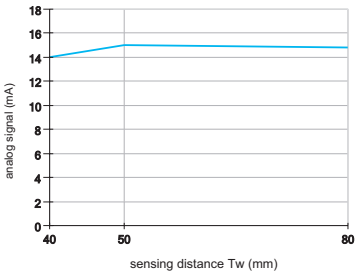
laser warning

CLASS 1 LASER PRODUCT

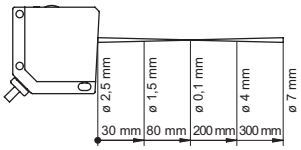
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007



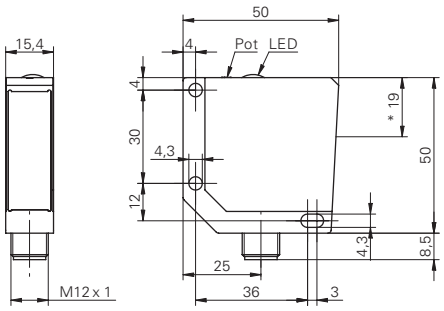
signal progression



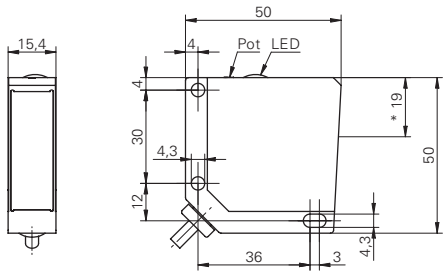
beam characteristic (typically)



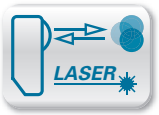
dimension drawings



* emitter axis



* emitter axis

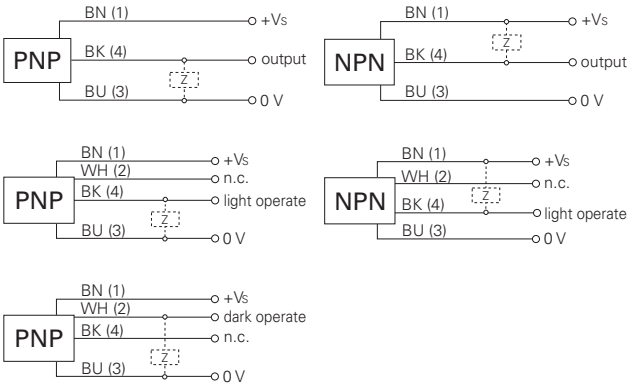


Tw = 0 ... 250 mm

- rugged metal housing
- high repeatability
- very short response time

general data	
type	diffuse contrast sensor
light source	pulsed red laser diode
sensing distance Tw	0 ... 250 mm
optimum operating distance	40 ... 80 mm
detectable remission difference (on grey)	> 8 %
repeat accuracy	< 0,1 mm at laser focus
output indicator	LED yellow
sensitivity adjustment	potentiometer, 14 turn
laser class	1
distance to focus	80 mm
wave length	650 nm
electrical data	
response time / release time	< 0,05 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	65 mA
current consumption typ.	60 mA
voltage drop Vd	< 2 VDC
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	15,4 mm
height / length	50 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67

connection diagrams



connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

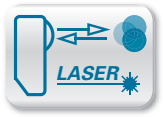
Accessories	
10151721	Sensofix series 16
10113917	Mounting bracket series 16 (L design)
for details: see accessories section	

laser warning

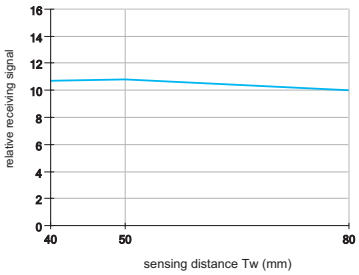
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

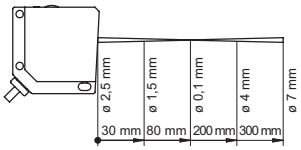
order reference	connection types	output circuit	output function
OZDM 16N1001	cable 3 pin, 2 m	NPN	light operate
OZDM 16N1001/S14	connector M12 4 pin	NPN	light operate
OZDM 16P1001	cable 3 pin, 2 m	PNP	light operate
OZDM 16P1001/S14	connector M12 4 pin	PNP	light operate
OZDM 16P3001	cable 3 pin, 2 m	PNP	dark operate
OZDM 16P3001/S14	connector M12 4 pin	PNP	dark operate



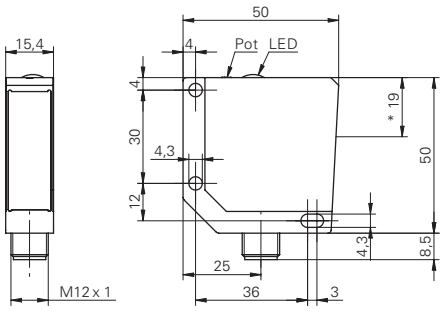
relative receiving signal



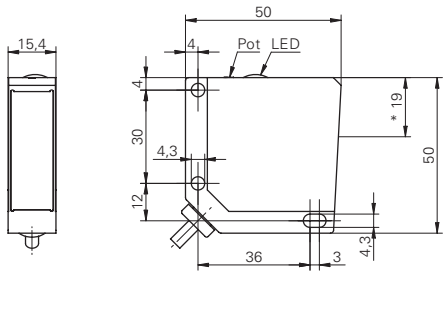
beam characteristic (typically)



dimension drawings



* emitter axis



* emitter axis

product family	OBDM 12	OBDM 12	OBDM 12	OBDM 12	OBDM 12
type	step analysis	min./max. analysis	tolerance analysis	window analysis	2-point comparison
width / diameter	12,4 mm	12,4 mm	12,4 mm	12,4 mm	12,4 mm
sensing distance Tw	16 ... 120 mm	16 ... 120 mm	16 ... 120 mm	16 ... 120 mm	16 ... 120 mm
response time	< 5 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms
light source	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
output circuit	NPN PNP	NPN PNP	NPN PNP	NPN PNP	NPN PNP
connection types	connector	connector	connector	connector	connector
housing material	metal	metal	metal	metal	metal
page	**448**	**449**	**450**	**451**	**452**

Difference sensors

General information

The range of difference sensors opens new perspectives in the field of sensing. The patented functions provide the user with new, innovative solutions in the detection of objects, monitoring of tolerances or the comparison of object sizes and object positions. With the fine laser beam and the high insensitivity of the sensor to colors, objects are accurately detected. Five different sensors with different functions are available according to the application.

Difference sensors with:

- Step analysis
- Window analysis
- Tolerance analysis
- Min./max. analysis
- 2-point comparisons

Characteristics and advantages

Difference evaluation
Distance measuring sensors with integrated logic for distance difference evaluation. Complex evaluation by the connected controller is no longer necessary, saving time and costs.

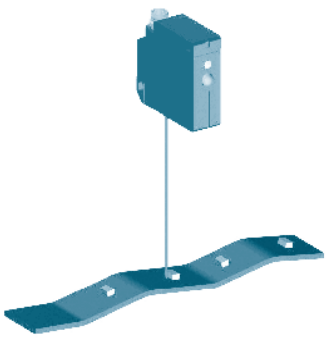
Nominal difference teachable
With the standardized Teach-in process of Baumer, the nominal difference can be quickly and easily programmed.

Switching output
The comparison of the actual and nominal difference is made internally by the sensors and is issued at the switching output as a simply assessed pass/fail signal.

Applications and functions

Difference sensors with step analysis
In step analysis, objects are detected by their height difference (stage) and reported in the form of a digital output signal.

The sensor evaluates the positive or negative height difference within a specified time window of max. 5 ms. If the height difference is greater than 50 % of the taught-in value, an impulse of at least 10 ms is issued at the output. When the value is less than 50 %, the sensor switches back to the OFF state. If height differences are smaller than 50 % of the taught value within the time window (e.g. fluctuation of the conveyor belt), the sensor remains in the OFF state.



- The stage / edge from which the objects are detected can be adjusted (minimum object height 0,2 mm)
- Defined output impulse of 10 ms (can also be read by a normal PLC)

- Detection of objects on a fluctuating conveyor belt
- Detection of stages or edges
- Positioning of objects by an edge, regardless of the distance

Applications and functions

Difference sensors with min./max. analysis

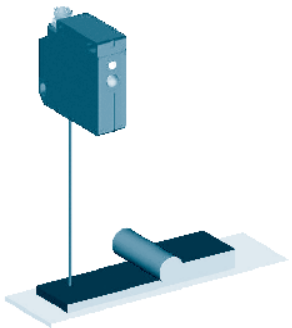
With min./max. analysis, objects can be inspected and monitored according to their scanned contour or shape. The scanning of the objects is activated by an external control signal. At the end of a detection sequence, the measured values are evaluated and the difference between the minimum and maximum values is determined. If the difference exceeds a nominal difference previously taught into the sensor, this is reported in the form of an ON signal. This signal remains active until a new detection sequence is started. When this starts, the output returns to the OFF state. If the difference is smaller than the nominal difference, the output remains in the OFF state.

- Difference is detected regardless of the distance
- Start and stop of the measuring cycle can be determined independently
- Easily evaluated pass/fail signal

- Round true running or knock of wheels / discs can be checked regardless of the distance
- Deformation of plastic parts after cooling can be checked

Difference sensors with tolerance analysis

The dimensional tolerance of objects can be determined by tolerance analysis. In the continuous detection of object distances, all measured values are checked to determine if it is between the specified maximum and minimum tolerances. In the case of if being between, an ON signal is issued at the output. If the distance remains within the tolerance range, the sensor remains in the OFF state.



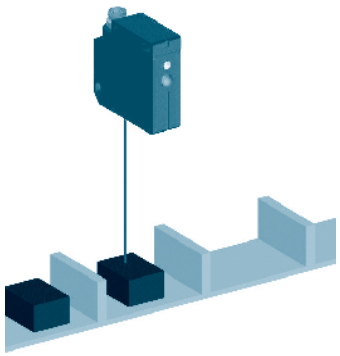
- Sensor form of a caliper gauge
- Simple monitoring of a distance with a tolerance range (pass/fail information)
- Tolerance range and nominal distance can be taught in separately

- Material thickness checking after a roller mill
- Material thickness checking for extruders

Applications and functions

Difference sensors with window analysis
With window analysis, objects can be classified by a specified switching window.

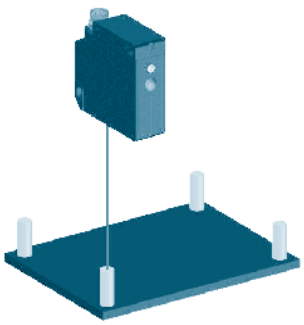
For this purpose, the switching window is specified in a simple Teach-in procedure with upper and lower limits. If an object is outside the defined limits, this is reported at the switching output.



- Foreground and background suppression in a single sensor
- Positions can be taught in separately
- Smallest window 0,45 mm
- Interfering objects in the foreground and background can be suppressed
- Objects can be detected on a segmented conveyor belt

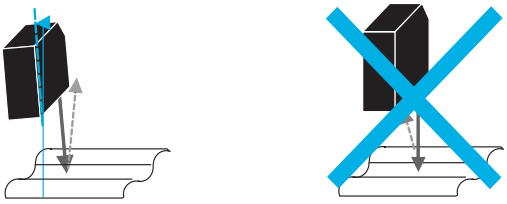
Difference sensors with 2-point comparison
In a 2-point comparison, two distances detected at two specifically chosen times are measured and compared.

The choice of the time is made using a sync signal. The first distance is measured at the rising flank of the signal and the second distance at the falling flank of the signal. After the second distance was measured, the sensor evaluates the difference between the two distances and compares this with a previously taught-in maximum permissible deviation. If this difference is exceeded, the output switches to the ON state.

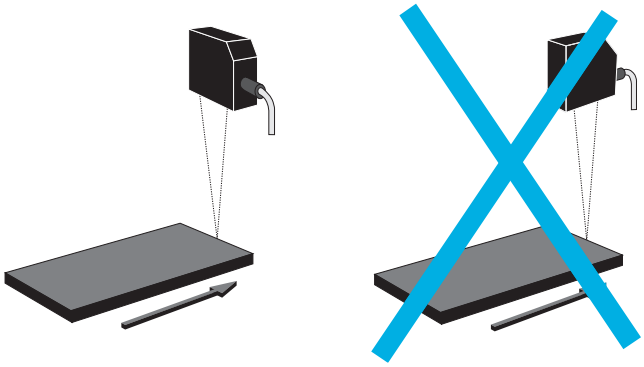


- Object heights can be compared regardless of the distance
- Deviation can be taught in (min. 0,3 mm)
- Measuring time can be determined separately by an external signal
- Checking the pressing depth of pins
- Comparison of the distances/heights of objects with a reference value

Mounting and adjustment



The direct reflection from glossy or reflective objects must not impinge on the receiver. This can be avoided by slightly tilting the sensor.



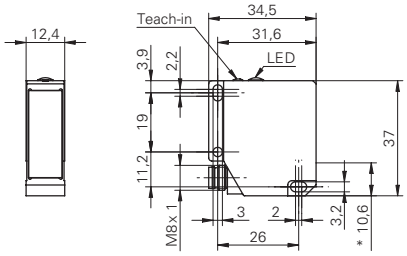
For optimum measurement results, the sensor must be installed at right angles to the movement of the object.

Tw = 16 ... 120 mm

- detection of edges
- reference steps adjustable
- min. output pulse 10 ms

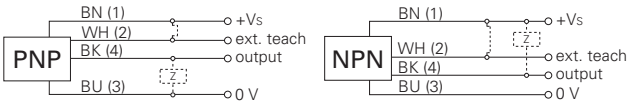
general data	
type	step analysis
sensing distance Tw	16 ... 120 mm
Teach-in range min.	> 0,2 mm
adjustment	Teach-in
power on indication	LED green
output indicator	LED red
light source	pulsed red laser diode
laser class	2
wave length	650 nm
beam diameter	0,5 ... 0,2 mm
electrical data	
response time	< 5 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	80 mA
current consumption typ.	40 mA
output current	< 100 mA
output pulse length	10 ms
voltage drop Vd	< 2,8 VDC
reverse polarity protection	yes, Vs to GND
short circuit protection	yes
mechanical data	
width / diameter	12,4 mm
height / length	37 mm
depth	34,5 mm
type	rectangular
front (optics)	glass
housing material	die-cast zinc
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10150328	Sensofix series 12
10113873	Mounting bracket series 12 (L design)
for details: see accessories section	

dimension drawing

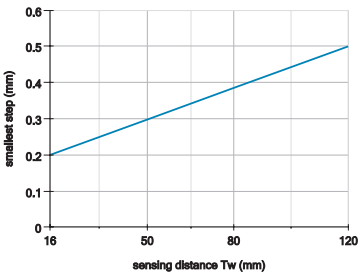


* emitter axis

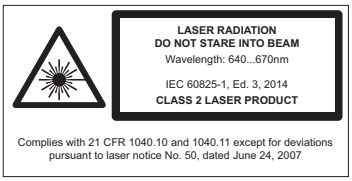
connection diagrams



min. detectable difference



laser warning



order reference	output circuit
OBDM 12N6910/S35A	NPN
OBDM 12P6910/S35A	PNP

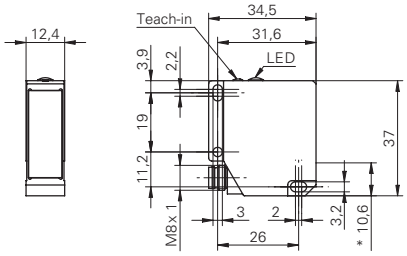
Tw = 16 ... 120 mm

- analysis of distance differences (min./max.)
- max. difference tolerance adjustable
- measuring time selectable

general data	
type	min./max. analysis
sensing distance Tw	16 ... 120 mm
Teach-in range min.	> 0,3 mm
adjustment	Teach-in
power on indication	LED green
output indicator	LED red
light source	pulsed red laser diode
laser class	2
wave length	650 nm
beam diameter	0,5 ... 0,2 mm
electrical data	
response time	< 1 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	80 mA
current consumption typ.	40 mA
output current	< 100 mA
voltage drop Vd	< 2,8 VDC
reverse polarity protection	yes, Vs to GND
short circuit protection	yes
mechanical data	
width / diameter	12,4 mm
height / length	37 mm
depth	34,5 mm
type	rectangular
front (optics)	glass
housing material	die-cast zinc
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10150328	Sensofix series 12
10113873	Mounting bracket series 12 (L design)
for details: see accessories section	

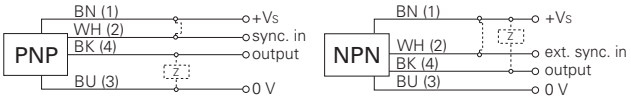
order reference	output circuit
OBDM 12N6920/S35A	NPN
OBDM 12P6920/S35A	PNP

dimension drawing

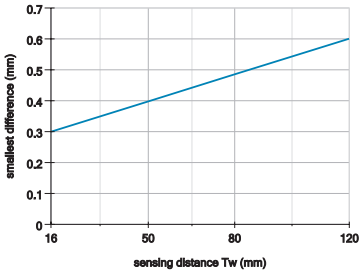


* emitter axis

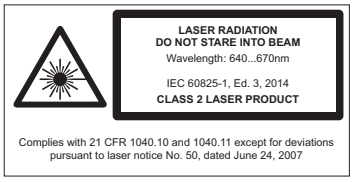
connection diagrams



min. detectable difference



laser warning

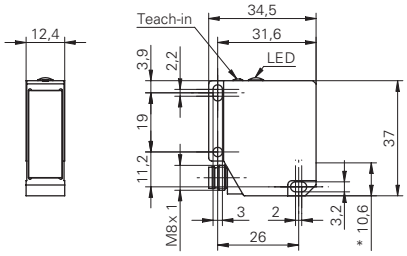


Tw = 16 ... 120 mm

- distance monitoring within a tolerance band
- nominal distance
- adjustable tolerance band

general data	
type	tolerance analysis
sensing distance Tw	16 ... 120 mm
Teach-in range min.	> 0,4 mm
adjustment	Teach-in
power on indication	LED green
output indicator	LED red
light source	pulsed red laser diode
laser class	2
wave length	650 nm
beam diameter	0,5 ... 0,2 mm
electrical data	
response time	< 1 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	80 mA
current consumption typ.	40 mA
output current	< 100 mA
voltage drop Vd	< 2,8 VDC
reverse polarity protection	yes, Vs to GND
short circuit protection	yes
mechanical data	
width / diameter	12,4 mm
height / length	37 mm
depth	34,5 mm
type	rectangular
front (optics)	glass
housing material	die-cast zinc
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10150328	Sensofix series 12
10113873	Mounting bracket series 12 (L design)
for details: see accessories section	

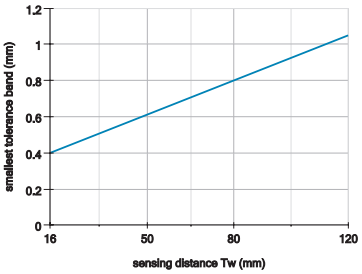
dimension drawing



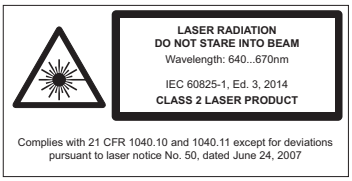
* emitter axis

connection diagrams

min. detectable difference



laser warning



order reference	output circuit
OBDM 12N6930/S35A	NPN
OBDM 12P6930/S35A	PNP

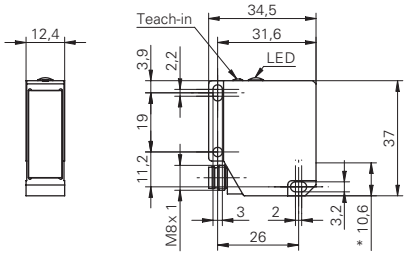
Tw = 16 ... 120 mm

- range switch (foreground / background suppression)
- adjustable window

general data	
type	window analysis
sensing distance Tw	16 ... 120 mm
Teach-in range min.	> 0,4 mm
adjustment	Teach-in
power on indication	LED green
output indicator	LED red
light source	pulsed red laser diode
laser class	2
wave length	650 nm
beam diameter	0,5 ... 0,2 mm
electrical data	
response time	< 1 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	80 mA
current consumption typ.	40 mA
output current	< 100 mA
voltage drop Vd	< 2,8 VDC
reverse polarity protection	yes, Vs to GND
short circuit protection	yes
mechanical data	
width / diameter	12,4 mm
height / length	37 mm
depth	34,5 mm
type	rectangular
front (optics)	glass
housing material	die-cast zinc
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10150328	Sensofix series 12
10113873	Mounting bracket series 12 (L design)
for details: see accessories section	

order reference	output circuit
OBDM 12N6940/S35A	NPN
OBDM 12P6940/S35A	PNP

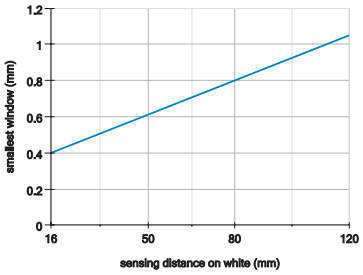
dimension drawing



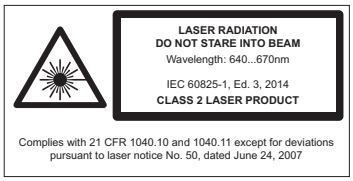
* emitter axis

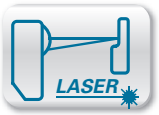
connection diagrams

min. detectable difference



laser warning



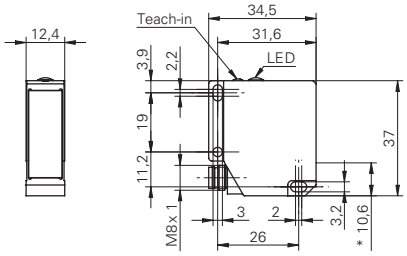


Tw = 16 ... 120 mm

- comparison of two distances
- max. tolerance adjustable
- specific measuring moment selectable

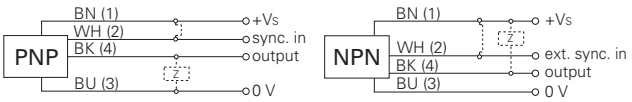
general data	
type	2-point comparison
sensing distance Tw	16 ... 120 mm
Teach-in range min.	> 0,3 mm
adjustment	Teach-in
power on indication	LED green
output indicator	LED red
light source	pulsed red laser diode
laser class	2
wave length	650 nm
beam diameter	0,5 ... 0,2 mm
electrical data	
response time	< 1 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	80 mA
current consumption typ.	40 mA
output current	< 100 mA
voltage drop Vd	< 2,8 VDC
reverse polarity protection	yes, Vs to GND
short circuit protection	yes
mechanical data	
width / diameter	12,4 mm
height / length	37 mm
depth	34,5 mm
type	rectangular
front (optics)	glass
housing material	die-cast zinc
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10150328	Sensofix series 12
10113873	Mounting bracket series 12 (L design)
for details: see accessories section	

dimension drawing

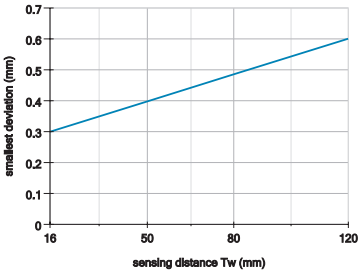


* emitter axis

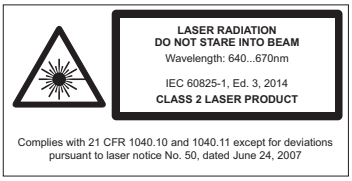
connection diagrams



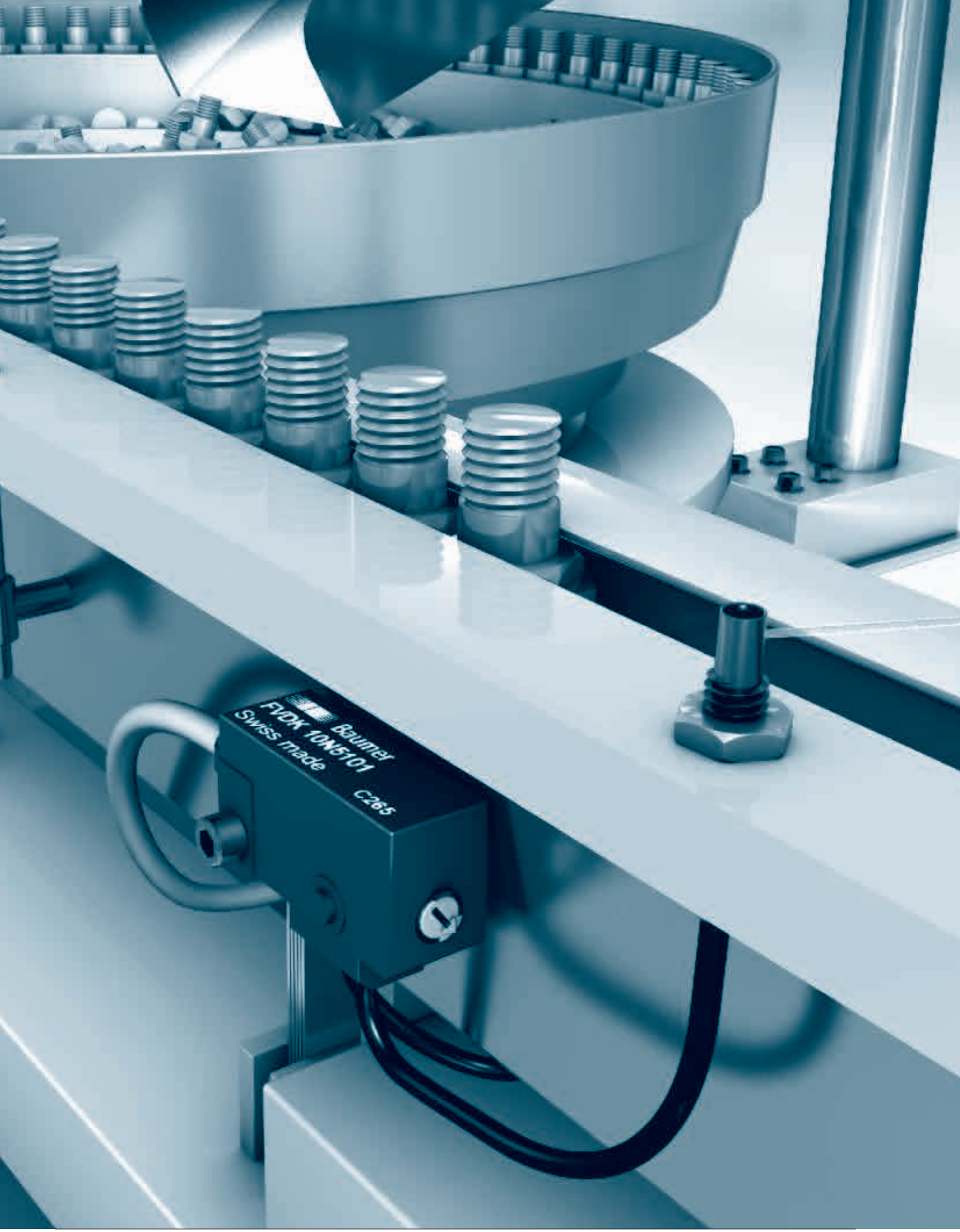
min. detectable difference



laser warning



order reference	output circuit
OBDM 12N6950/S35A	NPN
OBDM 12P6950/S35A	PNP


Baumer
FVDK 10N5101
Swiss made
C265

Fiber optics and fiber optic sensors

Plastic fiber optic sensors	Page 456
Plastic fiber optics / Diffuse types	Page 473
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Glass fiber optics / Through beam types	Page 542

product family	FVDK 10	FVDK 12	FVDK 12	FVDK 22	FVDK 66	FVDK 66	FVDK 67
version		integrated alarm output	fast version	integrated alarm output	master slave		2 outputs
width / diameter	10,4 mm	12 mm	12 mm	22 mm	10 mm	10 mm	10 mm
actual range Sb (FSE 200C1002)	160 mm	320 mm	140 mm	320 mm	340 mm	340 mm	1200 mm
sensing distance Tw (FUE 200C1003)	45 mm	90 mm	40 mm	90 mm	130 mm	130 mm	300 mm
response time / release time	< 1 ms	< 1 ms	< 0,05 ms	< 1 ms	0,25 ... 1 ms	0,25 ... 1 ms	0,14 ... 5 ms
light source	pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED
output circuit	NPN PNP	PNP	PNP	PNP	NPN PNP	NPN PNP	NPN PNP
connection types	cable connector	cable connector	connector	cable connector	cable	cable connector	cable connector
housing material	plastic	plastic	plastic	plastic	plastic	plastic	plastic
page	**462**	**463**	**464**	**465**	**466**	**467**	**468**

product family	FVDK 67	FVDK 67	FVDK 80	FWDK 84
version	master slave		small hysteresis high sensitivity	
width / diameter	10 mm	10 mm	10 mm	10 mm
actual range Sb (FSE 200C1002)	1200 mm	1200 mm	240 mm 440 mm	90 mm
sensing distance Tw (FUE 200C1003)	300 mm	300 mm	70 mm 120 mm	25 mm
response time / release time	0,05 ... 5 ms 0,058 ... 5 ms	0,05 ... 5 ms 0,058 ... 5 ms	< 0,5 ms	1 ... 50 ms
light source	pulsed red LED	pulsed red LED	pulsed red LED	pulsed red LED
output circuit	NPN PNP	NPN PNP	NPN PNP	analog 1 ... 5 VDC
connection types	cable	cable connector flylead connector	cable flylead connector	cable
housing material	plastic	plastic	plastic	plastic
page	**469**	**470**	**471**	**472**

Plastic fiber optic sensors

General information

Fiber optics are the extended vision of conventional sensors and, due to their miniature construction, can be installed directly in the most difficult ambient conditions. As only light is conveyed, fiber optics are intrinsically safe, which adds to their range of applications.

Plastic fiber optics are characterized primarily by the properties of the employed raw material – the plastic. Advances in the manufacture of plastics permit bending radii of just 1 mm for the optical fibers, which is completely impossible for glass fibers. Fiber materials are now available which are extremely tolerant to bending and thereby make their use in drag chains possible.

Typical applications

Due to their versatility, optical fibers can be used in the most diverse applications. The small, space-saving sensing heads are very suitable for use in very constricted conditions. It is also possible to monitor whole areas or execute precise positioning by the different arrangements of the fibers.

- Due to the light weight and space-saving construction, optical fibers can be integrated directly in pick & place tools
- Detection, differentiation and positioning of the most diverse objects
- Monitoring of whole areas with fiber optic arrays with linear fiber arrangement
- Use at high, low or constantly fluctuating ambient temperatures
- Detection of levels or leaks, including hazardous liquids
- Detection of transparent media such as glass, wafers or films with focused fiber optic reflective types

Characteristics and advantages

Independent of the environment
As only light is conveyed, electromagnetic fields, high or low temperatures have no effect on the functional reliability.

Space-saving
The smallest sensing heads have a diameter of 1,5 mm and are only 10 mm long. With bending radii of just 1 mm, it is possible to integrate the eye of the sensor even in the most constricted places.

Precise light spots
Fiber cross-sections of only 0,25 mm generate a fine core beam in fiber optic through beam types, whereas doubling lenses in fiber optic reflective types permit precise light spots of 0,1 mm.

Application-specific fiber arrangement
The coaxial fiber arrangement permits optimum light distribution over the receiver fibers and thereby makes precise positioning of objects possible. Also, fiber optic arrays with a linear fiber arrangement allow a whole area to be monitored or the detection of randomly conveyed objects.

Application feedback
Multi-digit displays integrated in the fiber optic sensors permit the stability of the application to be assessed and make fault analyses possible.

Fast processes
Fiber optic sensors with response times of only 50 microseconds allow the detection of objects even in very fast processes.

Technology and operation

The technology is based on intensity differences. The fiber optic through beam types detect an object breaking the light beam between the emitter and receiver. The fiber optic reflective types evaluate the amount of light reflected back from an object. The high-resolution analog/digital conversion in the fiber optic sensors permits very slight changes to be evaluated. This is important where the detection of small objects or differentiation of the finest contrasts is demanded.

Fundamentally, the fiber optics form a unit with the corresponding processing units, and the type of fiber optic head is mainly decisive for the detection of objects. The table below is intended to provide aid in understanding the large range of different sensing heads:

Version/type	Properties	Field of application	Example types
Standard	Large selection of different shapes. Economical	Standard applications, simple object detection	FUE 200C1003 FUE 200C1004
Coaxial	Homogenous light distribution over all receiver fibers. Lens adaptation possible	Optimally suited for positioning tasks. Highly accurate in combination with focusing lenses	FCE 200C1Y00 FCE 200D1Y00
Side light exit	90° light exit Reduced beam angle More installation space	Constricted conditions	FUE 200C4Y00 FSE 200C4002
Array	Linear arrangement of the fibers. Line lengths of 5,25 ... 21 mm. Reflective or through beam types	Detection of objects which cannot be precisely conveyed. Measurement of object sizes or edge positions	FUE 200C6Y00 FSE 200C6Y00
Longer range Parallel beam	Integrated lens Small beam angle Long range	Object detection and positioning over a long distance. No influencing by interfering objects close to the optical fiber	FLE 200C1Y00 FPE 200C1Y00
Highly flexible	Min. bending radius down to 1 mm Suitable for flexible installation	Constricted conditions	FUE 200E1Y00 FSE 200F6Y00
Bendable	Extremely bendable, designed for bending more than 1 million times.	For use in drag chains or on moving parts	FSE 200D1Y50
Small light spot	In combination with focusing lenses, a light spot of only 0,1mm can be produced.	Detection of very small objects Highly accurate edge positioning	FCE 050C1Y10 with lens 134544
Level detection	Special sensing tip to avoid liquid residues. Version for pipe/hose fitting	Detection of levels in different liquids, in or out of contact	FUL 200D2Y00 FSL 500C6Y00 FOC 500C6Y00
Spezial versions	Heat and cold resistent Chemical and oil resistent	For extreme environmental. Conditions such as chemical or aggressive surroundings or temperatures from -60 ... +350 °C	FUG 500C1Y00 FUC 200C2Y00

Fiber optic sensors of the ranges FVDK 66 and FVDK 67 – versatile and multifunctional

The generation of multifunction fiber optic sensors is particularly suitable for handling processes, where very fast movements as well as exact positioning or the detection of very small objects are important. A single sensor undertakes the tasks which were formerly performed by many different sensors. The user can choose from 3 to 8 different operating modes from very short response time to high sensitivity to adapt the sensor optimally to his application. Despite the all-in-one concept, the requirement for simple operation is also fulfilled.

	FVDK 67	FVDK 66
Sensing range (FSE 200C1002)	1200 mm	340 mm
Sensing distance (FUE 200C1003)	300 mm	130 mm
Min. response time	50 µsec	250 µsec
Speed / sensing modes	5 levels	3 levels
Adjustment	Automatically via teach-in manually with +/- button	Automatically via teach-in manually with +/- button
Suppression of reciprocal influences	8 sensors	2 sensors
Long-term stability	yes	yes
Timer	On- or Off-Delay On- and Off-Delay One-Shot One-Shot and On-Delay	On- or Off-Delay
Available versions	Standard With external teach-in Master/Slave 2 switching outputs	Standard With external teach-in Master/Slave
Additional functions	Factory setup Rotate display Delay / freeze display Keylock Chemical and oil resistant	Factory setup Rotate display

Reduced wiring

With the master/slave version up to 16 sensors can be connected together to one unit (consisting of one master and the appropriate number of slaves). Only the power of the master has to be wired. The slaves are supplied through the side plug. For maximum flexibility in the wiring of the individual sensor signals each slave has a single-core cable. Series 66 and 67 can be combined in any order.

Application feedback

The application feedback is particularly important during commissioning if consistent detection is to be ensured. The switching point and the relative received signal are indicated simultaneously on the 2x4 digit display of the FVDK 67 range. With this information it can be determined at a glance whether the switching point has been optimally adjusted.

Long-term stability

In both sensor series measures have been taken to ensure the long-term stability of the switching function. This is done either by compensating the aging of the emitting LED or by repositioning the switching threshold.

Teach-in or potentiometer? Just simple operation

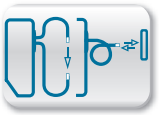
The fiber optic sensors of the FVDK 12, 22 and 60 ranges are characterized particularly by their simple handling. The sensitivity can be adjusted either with a potentiometer or a Teach-in button. Differently colored LEDs or simple displays provide the adjustment feedback. The sensor ranges differ primarily in their speed, sensitivity, hysteresis functions and supplementary functions such as timers, external Teach-in or logical output gates. However, all have the same thing in common: regardless of where the sensor is installed, the adjustment can be made practically without the need for operating instructions.

Type FVDK 12
- Integrated, dynamic Teach-in allows the most reliable detection of moving objects or small parts for which it is difficult to find an exact Teach-in position
- High-speed version with a response time of only 50 µs
- Integrated alarm output warns in advance of excessive soiling
- Protection class IP 65

Type FVDK 22
- Two sensors in one housing reduces the necessary wiring
- The two integrated sensors do not interfere with each other
- It is possible to link the two outputs logically
- Version with external Teach-in from the controller

Teach-in or potentiometer? Just simple operation

Type FVDK 10
- Smallest fiber optic sensor
- Easy and quick sensitivity adjustment with potentio-meter
- Protection against optical interference between up to 3 optical fibers

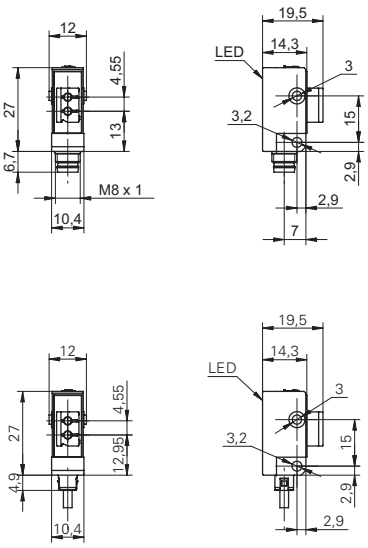


Sb = 160 mm
Tw = 45 mm

- sensitivity adjustable via potentiometer
- suppression of mutual optical interference

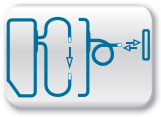
general data	
actual range Sb (FSE 200C1002)	160 mm
sensing distance Tw (FUE 200C1003)	45 mm
light source	pulsed red LED
light indicator	LED yellow
alignment / soiled lens indicator	flashing light indicator
adjustment	potentiometer, 270°
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	30 mA
current consumption typ.	20 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10,4 mm
height / length	27 mm
depth	14 mm
type	rectangular
housing material	plastic (ASA)
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 40
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10150326	Sensofix series 10 / series 20
10114501	Mounting bracket series 10 (U design)
10133792	Mounting bracket series 10 (L design)
10162083	Mounting panel for sensors series 10
10118798	Mounting bracket series 10
for details: see accessories section	

dimension drawings



connection diagrams

order reference	output circuit	connection types
FVDK 10N5101	NPN	cable, 2 m
FVDK 10N5101/S35A	NPN	connector M8
FVDK 10P5101	PNP	cable, 2 m
FVDK 10P5101/S35A	PNP	connector M8

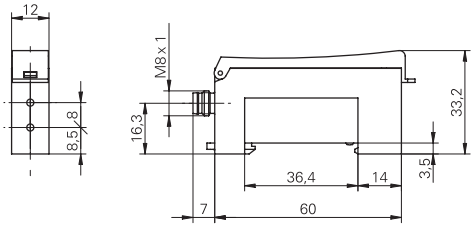


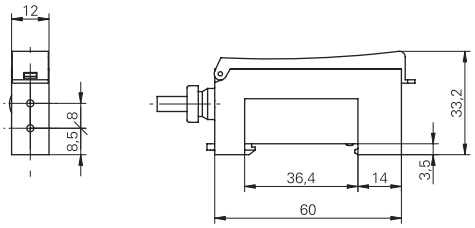
Sb = 320 mm
Tw = 90 mm

- sensitivity adjustable via Teach-in
- integrated alarm output
- protection class IP 65

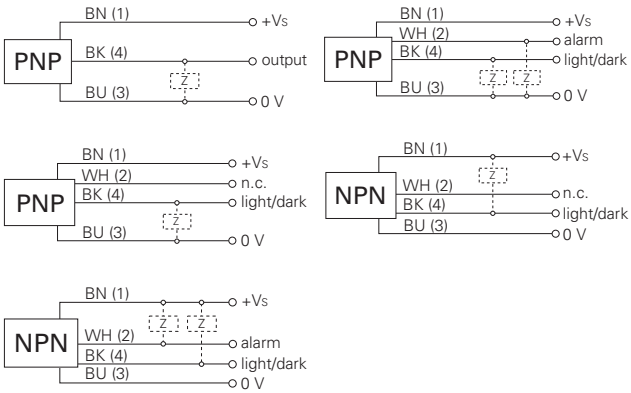
general data	
actual range Sb (FSE 200C1002)	320 mm
sensing distance Tw (FUE 200C1003)	90 mm
light source	pulsed red LED
light indicator	LED green
alignment / soiled lens indicator	LED green, flashing
output indicator	LED yellow
adjustment	Teach-in
wave length	660 nm
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	46 mA
current consumption typ.	36 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate switchable
output circuit	PNP
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12 mm
height / length	33,2 mm
depth	60 mm
type	rectangular
housing material	PBT / PC
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 65
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10145702	Mounting bracket for fiber optic sensors series 12
for details: see accessories section	

dimension drawings

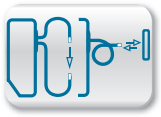




connection diagrams



order reference	min. output pulse length	connection types	version
FVDK 12P6101	-	cable, 2 m	-
FVDK 12P6101/S35A	-	connector M8 4 pin	-
FVDK 12P6401	-	cable, 2 m	integrated alarm output
FVDK 12P6401/S35A	-	connector M8 4 pin	integrated alarm output
FVDK 12P6501/S35A	40 ms	connector M8 4 pin	integrated alarm output

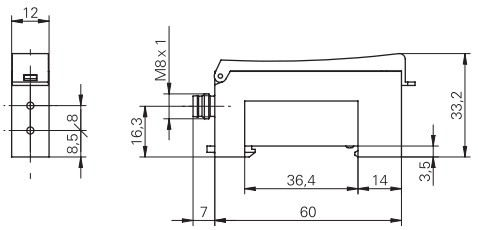


Sb = 140 mm

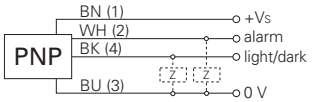
- short response time 50 µs
- fast version < 0,05 ms
- integrated alarm output

general data	
version	fast version
actual range Sb (FSE 200C1002)	140 mm
sensing distance Tw (FUE 200C1003)	40 mm
light source	pulsed red LED
light indicator	LED green
alignment / soiled lens indicator	LED green, flashing
output indicator	LED yellow
adjustment	Teach-in
wave length	660 nm
electrical data	
response time / release time	< 0,05 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	40 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate switchable
output circuit	PNP
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	12 mm
height / length	33,2 mm
depth	60 mm
type	rectangular
housing material	PBT / PC
connection types	connector M8 4 pin
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 65
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10145702	Mounting bracket for fiber optic sensors series 12
for details: see accessories section	

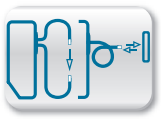
dimension drawing



connection diagram



order reference
FVDK 12P6410/S35A

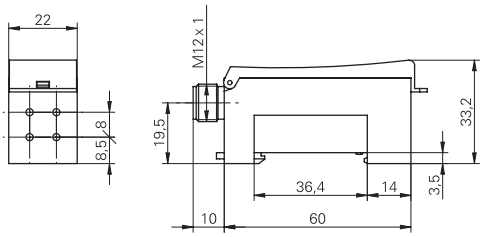


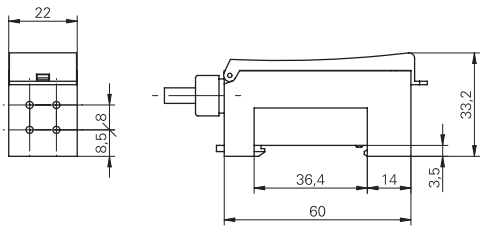
Sb = 320 mm
Tw = 90 mm

- 2 sensors in one housing
- sensitivity adjustable via Teach-in
- optional logical output operation

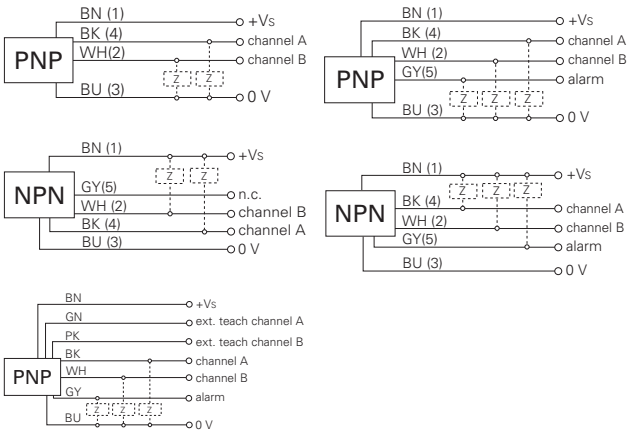
general data	
actual range Sb (FSE 200C1002)	320 mm
sensing distance Tw (FUE 200C1003)	90 mm
light source	pulsed red LED
light indicator	LED green
alignment / soiled lens indicator	LED green, flashing
output indicator	LED yellow
adjustment	Teach-in
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	68 mA
current consumption typ.	50 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate switchable
output circuit	PNP
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	22 mm
height / length	33,2 mm
depth	60 mm
type	rectangular
housing material	PBT / PC
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 65
connectors and mating connectors	
ESG 34CH0200	Connector M12, 5 pin, straight, 2 m
ESW 33CH0200	Connector M12, 5 pin, angular, 2 m
ESW 33CH0500	Connector M12, 5 pin, angular, 5 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10125534	Mounting bracket for fiber optic sensors series 22
for details: see accessories section	

dimension drawings

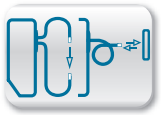




connection diagrams



order reference	min. output pulse length	connection types	version
FVDK 22P6101	-	cable, 2 m	-
FVDK 22P6101/S14C	-	connector M12 5 pin	-
FVDK 22P6401	-	cable, 2 m	integrated alarm output
FVDK 22P6401/S14C	-	connector M12 5 pin	integrated alarm output
FVDK 22P6501/S14C	40 ms	connector M12 5 pin	integrated alarm output

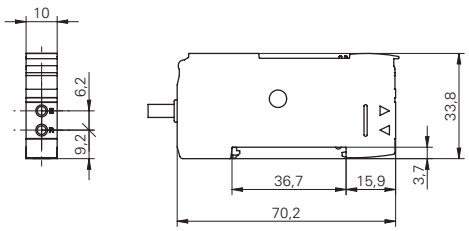


Sb = 340 mm
Tw = 130 mm

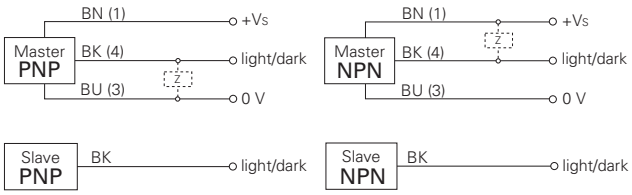
- master/slave system with up to 15 extension units
- 2x4 digit display

general data	
actual range Sb (FSE 200C1002)	340 mm
sensing distance Tw (FUE 200C1003)	130 mm
light source	pulsed red LED
light indicator	2 x 4-digit display
output indicator	LED yellow
adjustment	Teach-in
wave length	645 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	0,25 ... 1 ms (adjustable)
voltage supply range +Vs	10,8 ... 26,4 VDC
current consumption max. (no load)	30 mA
voltage drop Vd	< 2,1 VDC
output function	light / dark operate switchable
on / off delay	1 ... 5000 ms
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10 mm
height / length	33,8 mm
depth	70,2 mm
type	rectangular
housing material	polycarbonate/ABS
connection types	cable, 2 m
ambient conditions	
operating temperature	-20 ... +55 °C
protection class	IP 40
Accessories	
10159806	Mounting bracket for fiber optic sensors series 60, 66, 67, 80
for details: see accessories section	

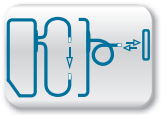
dimension drawing



connection diagrams



order reference	output circuit	version
FVDK 10N66YM	NPN	master
FVDK 10N66YS	NPN	slave
FVDK 10P66YM	PNP	master
FVDK 10P66YS	PNP	slave

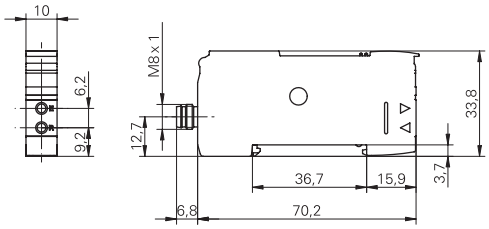


Sb = 340 mm
Tw = 130 mm

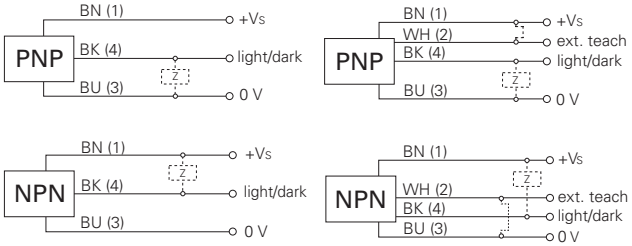
- 2x4 digit display indicates the switching point and receiving light level
- easy operation

general data	
actual range Sb (FSE 200C1002)	340 mm
sensing distance Tw (FUE 200C1003)	130 mm
light source	pulsed red LED
light indicator	2 x 4-digit display
output indicator	LED yellow
wave length	645 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	0,25 ... 1 ms (adjustable)
voltage supply range +Vs	10,8 ... 26,4 VDC
current consumption max. (no load)	30 mA
voltage drop Vd	< 2,1 VDC
output function	light / dark operate switchable
on / off delay	1 ... 5000 ms
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10 mm
height / length	33,8 mm
depth	70,2 mm
type	rectangular
housing material	polycarbonate/ABS
ambient conditions	
operating temperature	-20 ... +55 °C
protection class	IP 40
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10159806	Mounting bracket for fiber optic sensors series 60, 66, 67, 80
for details: see accessories section	

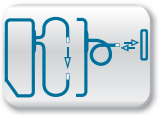
dimension drawing



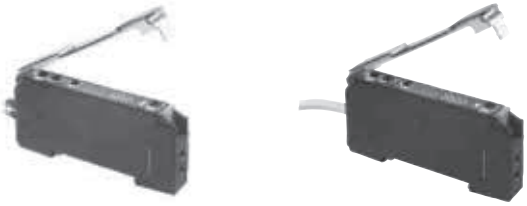
connection diagrams



order reference	adjustment	output circuit	connection types
FVDK 10N66Y0	Teach-in	NPN	cable, 2 m
FVDK 10N66Y0/S35A	Teach-in	NPN	connector M8 4 pin
FVDK 10N66YR	Teach-in: button / external	NPN	cable, 2 m
FVDK 10P66Y0	Teach-in	PNP	cable, 2 m
FVDK 10P66Y0/S35A	Teach-in	PNP	connector M8 4 pin
FVDK 10P66YR	Teach-in: button / external	PNP	cable, 2 m



Sb = 1200 mm
Tw = 300 mm

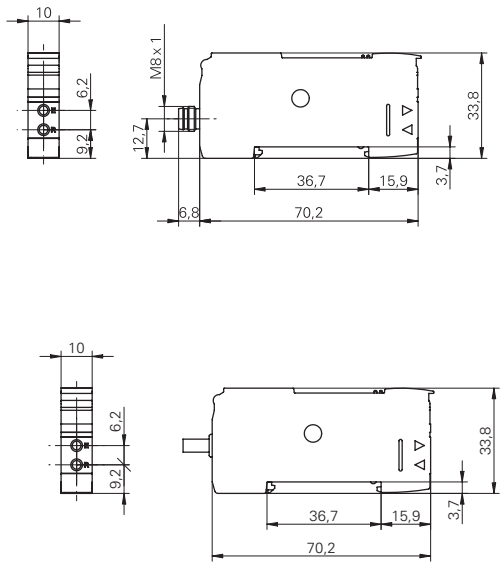


- 2 independently adjustable outputs
- suppression of mutual optical interference
- 2x4 digit display

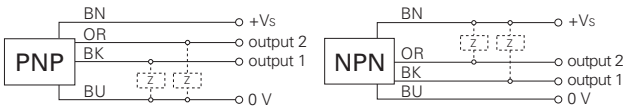
general data	
version	2 outputs
actual range Sb (FSE 200C1002)	1200 mm
sensing distance Tw (FUE 200C1003)	300 mm
light source	pulsed red LED
light indicator	2 x 4-digit display
output indicator	LED orange
adjustment	Teach-in
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	0,14 ... 5 ms (adjustable)
voltage supply range +Vs	10,8 ... 26,4 VDC
current consumption max. (no load)	30 mA
voltage drop Vd	< 2,1 VDC
output function	light / dark operate switchable
on / off delay	0,25 ... 20000 ms
min. output pulse length	0,25 ... 20000 ms
output current	< 30 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10 mm
height / length	33,8 mm
depth	70,2 mm
type	rectangular
housing material	polycarbonate/ABS
ambient conditions	
operating temperature	-20 ... +55 °C
protection class	IP 40
Accessories	
10159806	Mounting bracket for fiber optic sensors series 60, 66, 67, 80
for details: see accessories section	

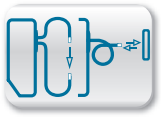
order reference	output circuit	connection types
FVDK 10N67Y2	NPN	cable, 2 m
FVDK 10P67Y2/S35A	PNP	connector M8 4 pin

dimension drawings



connection diagrams



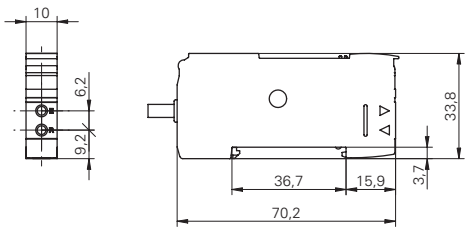


Sb = 1200 mm
Tw = 300 mm

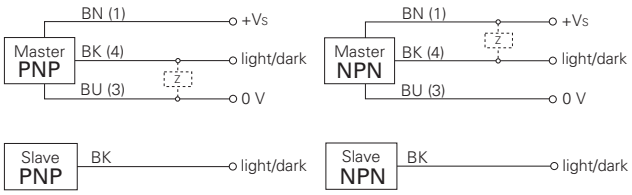
- master/slave system with up to 16 extension units
- integrated dynamic auto-teach-in function
- 2x4 digit display

general data	
actual range Sb (FSE 200C1002)	1200 mm
sensing distance Tw (FUE 200C1003)	300 mm
light source	pulsed red LED
light indicator	2 x 4-digit display
output indicator	LED orange
adjustment	Teach-in
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
voltage supply range +Vs	10,8 ... 26,4 VDC
current consumption max. (no load)	30 mA
voltage drop Vd	< 2,1 VDC
output function	light / dark operate switchable
on / off delay	0,25 ... 20000 ms
min. output pulse length	0,25 ... 20000 ms
output current	< 50 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10 mm
height / length	33,8 mm
depth	70,2 mm
type	rectangular
housing material	polycarbonate/ABS
ambient conditions	
operating temperature	-20 ... +55 °C
protection class	IP 40
Accessories	
10159806	Mounting bracket for fiber optic sensors series 60, 66, 67, 80
for details: see accessories section	

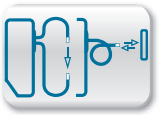
dimension drawing



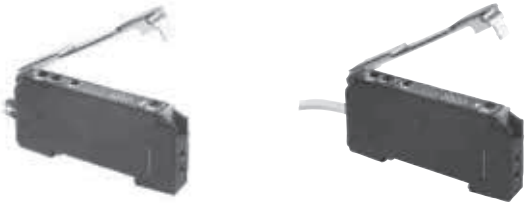
connection diagrams



order reference	response time / release time	output circuit	connection types	version
FVDK 10N67YM	0,05 ... 5 ms (adjustable)	NPN	cable, 2 m	master
FVDK 10N67YS	0,05 ... 5 ms (adjustable)	NPN	cable (output only), 2 m	slave
FVDK 10P67YM	0,058 ... 5 ms (adjustable)	PNP	cable, 2 m	master
FVDK 10P67YS	0,058 ... 5 ms (adjustable)	PNP	cable (output only), 2 m	slave



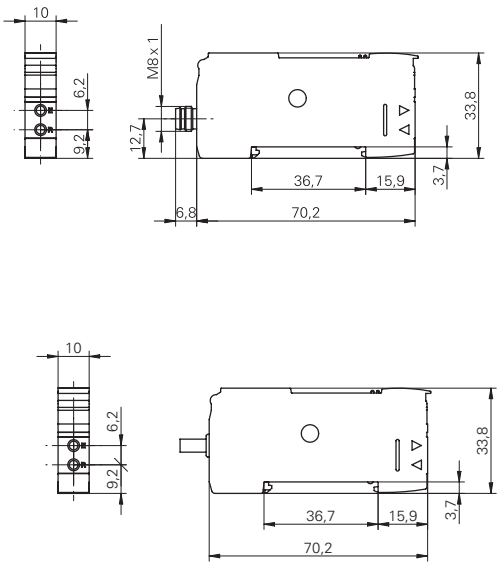
Sb = 1200 mm
Tw = 300 mm



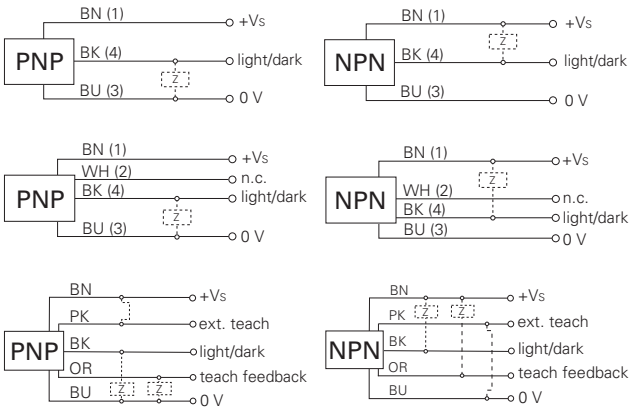
- 2x4 digit display indicates the switching point and receiving light level
- versatile applicable due to 8 integrated operating

general data	
actual range Sb (FSE 200C1002)	1200 mm
sensing distance Tw (FUE 200C1003)	300 mm
light source	pulsed red LED
light indicator	2 x 4-digit display
output indicator	LED orange
wave length	660 nm
suppression of reciprocal influence	yes
electrical data	
voltage supply range +Vs	10,8 ... 26,4 VDC
current consumption max. (no load)	30 mA
voltage drop Vd	< 2,1 VDC
output function	light / dark operate switchable
on / off delay	0,25 ... 20000 ms
min. output pulse length	0,25 ... 20000 ms
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10 mm
height / length	33,8 mm
depth	70,2 mm
type	rectangular
housing material	polycarbonate/ABS
ambient conditions	
operating temperature	-20 ... +55 °C
protection class	IP 40
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10159806	Mounting bracket for fiber optic sensors series 60, 66, 67, 80
for details: see accessories section	

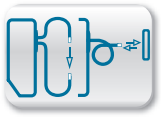
dimension drawings



connection diagrams



order reference	adjustment	response time / release time	output circuit	output current	connection types
FVDK 10N67Y0	Teach-in	0,05 ... 5 ms (adjustable)	NPN	< 100 mA	cable, 2 m
FVDK 10N67Y0/S35A	Teach-in	0,05 ... 5 ms (adjustable)	NPN	< 100 mA	connector M8 4 pin
FVDK 10N67YR	Teach-in: button / external	0,05 ... 5 ms (adjustable)	NPN	< 50 mA	cable, 2 m
FVDK 10P67Y0	Teach-in	0,058 ... 5 ms (adjustable)	PNP	< 100 mA	cable, 2 m
FVDK 10P67Y0/KS35A	Teach-in	0,058 ... 5 ms (adjustable)	PNP	< 100 mA	flylead connector M8 4 pin, L=200 mm
FVDK 10P67Y0/S35A	Teach-in	0,058 ... 5 ms (adjustable)	PNP	< 100 mA	connector M8 4 pin
FVDK 10P67YR	Teach-in: button / external	0,058 ... 5 ms (adjustable)	PNP	< 50 mA	cable, 2 m

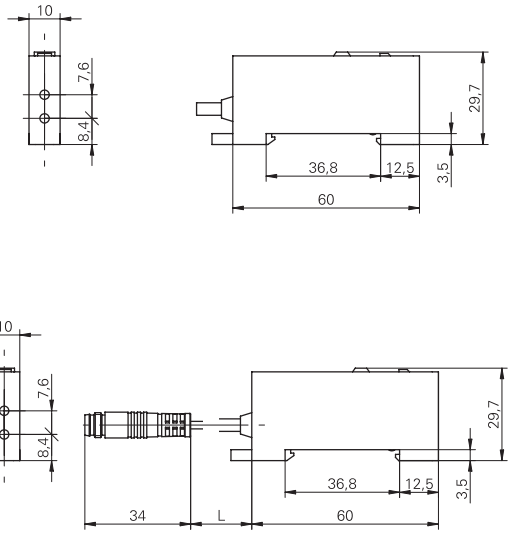


Sb = 440 mm
Tw = 120 mm

- sensitivity adjustable via potentiometer
- fast and high sensitivity version available
- integrated alarm output

general data	
light source	pulsed red LED
light indicator	LED green
alignment / soiled lens indicator	LED green, flashing
output indicator	LED red
adjustment	potentiometer
wave length	680 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	35 mA
voltage drop Vd	< 1 VDC
output function	light / dark operate switchable
off delay	40 ms
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10 mm
height / length	29,7 mm
depth	60 mm
type	rectangular
housing material	polycarbonate/ABS
ambient conditions	
operating temperature	-20 ... +60 °C
protection class	IP 40
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

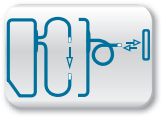
dimension drawings



cable length L = 200 mm

connection diagrams

order reference	actual range Sb (FSE 200C1002)	sensing distance Tw (FUE 200C1003)	output circuit	connection types	version
FVDK 10N81Y0	240 mm	70 mm	NPN	cable, 2 m	small hysteresis
FVDK 10N83Y0	440 mm	120 mm	NPN	cable, 2 m	high sensitivity
FVDK 10P81Y0	240 mm	70 mm	PNP	cable, 2 m	small hysteresis
FVDK 10P81Y0/KS35A	240 mm	70 mm	PNP	flylead connector M8 4 pin, L=200 mm	small hysteresis
FVDK 10P83Y0	440 mm	120 mm	PNP	cable, 2 m	high sensitivity
FVDK 10P83Y0/KS35A	440 mm	120 mm	PNP	flylead connector M8 4 pin, L=200 mm	high sensitivity



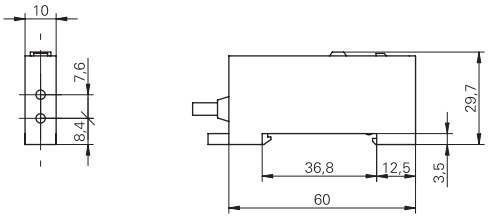
Sb = 90 mm
Tw = 25 mm

- analog output 1 ... 5 VDC
- adjustable resolution

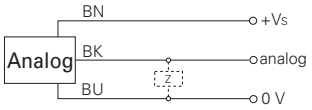
general data	
actual range Sb (FSE 200C1002)	90 mm
sensing distance Tw (FUE 200C1003)	25 mm
light source	pulsed red LED
alignment / soiled lens indicator	LED red
output indicator	LED green
adjustment	potentiometer
resolution	0,3 ... 6 % (Full Scale)
wave length	680 nm
electrical data	
response time / release time	1 ... 50 ms (adjustable)
voltage supply range +Vs	10,8 ... 26,4 VDC
current consumption max. (no load)	40 mA
output circuit	analog 1 ... 5 VDC
load resistance	> 10 kOhm
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	10 mm
height / length	29,7 mm
depth	60 mm
type	rectangular
housing material	polycarbonate/ABS
connection types	cable, 2 m
ambient conditions	
operating temperature	-20 ... +60 °C
protection class	IP 40

order reference
FWDK 10U84Y0

dimension drawing



connection diagram



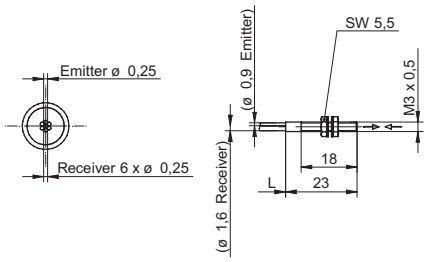
Tw = 1 ... 60 mm

- with thread
- coaxial

general data	
particular characteristics	coaxial
type	Diffuse sensors
sensing distance Tw	1 ... 60 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	3 mm
height / length (head)	23 mm
material (head)	stainless steel
bending radius	15 mm
cable jacket diameter	1,6 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	500 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
10134544	Focusing lens M3 ø 0,1 mm
10134543	Focusing lens M3 ø 0,4 m
10134542	Focusing lens M3 ø 2 mm
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 9 mm (HS)	-	1 ... 45 mm (nL)	1 ... 60 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 9 mm (HS)	-	1 ... 45 mm (nL)	1 ... 60 mm (HP)
FVDK 67 (master/slave)	1 ... 9 mm (HS)	-	1 ... 45 mm (nL)	1 ... 60 mm (HP)
FVDK 66 (standard version)	-	1 ... 15 mm (FT)	1 ... 25 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 15 mm (FT)	1 ... 25 mm (nL)	-
FVDK 22	-	-	1 ... 20 mm (nL)	-
FVDK 12	-	-	1 ... 20 mm (nL)	-
FVDK 12 (fast version)	1 ... 19 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 10 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 5 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FCE 050C1Y10

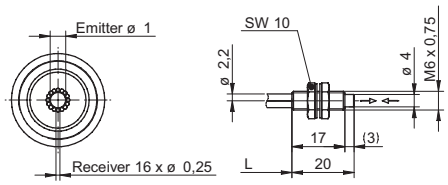
Tw = 1 ... 400 mm

- with thread
- coaxial

general data	
particular characteristics	coaxial
type	Diffuse sensors
sensing distance Tw	1 ... 400 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	6 mm
height / length (head)	20 mm
material (head)	stainless steel
bending radius	20 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 65 mm (HS)	-	1 ... 300 mm (nL)	1 ... 400 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 65 mm (HS)	-	1 ... 300 mm (nL)	1 ... 400 mm (HP)
FVDK 67 (master/slave)	1 ... 65 mm (HS)	-	1 ... 300 mm (nL)	1 ... 400 mm (HP)
FVDK 66 (standard version)	-	1 ... 90 mm (FT)	1 ... 150 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 90 mm (FT)	1 ... 150 mm (nL)	-
FVDK 22	-	-	1 ... 90 mm (nL)	-
FVDK 12	-	-	1 ... 90 mm (nL)	-
FVDK 12 (fast version)	1 ... 85 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 45 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 25 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FCE 200C1Y00

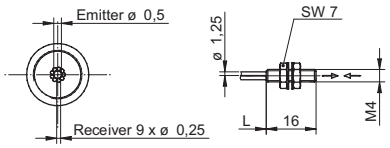
Tw = 1 ... 110 mm

- with thread
- coaxial

general data	
particular characteristics	coaxial
type	Diffuse sensors
sensing distance Tw	1 ... 110 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	4 mm
height / length (head)	16 mm
material (head)	stainless steel
bending radius	15 mm
cable jacket diameter	1,25 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 12 mm (HS)	-	1 ... 80 mm (nL)	1 ... 110 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 12 mm (HS)	-	1 ... 80 mm (nL)	1 ... 110 mm (HP)
FVDK 67 (master/slave)	1 ... 12 mm (HS)	-	1 ... 80 mm (nL)	1 ... 110 mm (HP)
FVDK 66 (standard version)	-	1 ... 20 mm (FT)	1 ... 35 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 20 mm (FT)	1 ... 35 mm (nL)	-
FVDK 22	-	-	1 ... 8 mm (nL)	-
FVDK 12	-	-	1 ... 8 mm (nL)	-
FVDK 12 (fast version)	1 ... 7 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 16 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 25 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FCE 200C1Y01

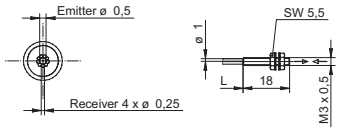
Tw = 1 ... 86 mm

- with thread
- coaxial

general data	
particular characteristics	coaxial
type	Diffuse sensors
sensing distance Tw	1 ... 86 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	3 mm
height / length (head)	18 mm
material (head)	stainless steel
bending radius	15 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
10134544	Focusing lens M3 ø 0,1 mm
10134543	Focusing lens M3 ø 0,4 m
10134542	Focusing lens M3 ø 2 mm
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 14 mm (HS)	-	1 ... 65 mm (nL)	1 ... 86 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 14 mm (HS)	-	1 ... 65 mm (nL)	1 ... 86 mm (HP)
FVDK 67 (master/slave)	1 ... 14 mm (HS)	-	1 ... 65 mm (nL)	1 ... 86 mm (HP)
FVDK 66 (standard version)	-	1 ... 21 mm (FT)	1 ... 35 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 21 mm (FT)	1 ... 35 mm (nL)	-
FVDK 22	-	-	1 ... 20 mm (nL)	-
FVDK 12	-	-	1 ... 20 mm (nL)	-
FVDK 12 (fast version)	1 ... 18 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 10 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 5 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FCE 200D1Y00

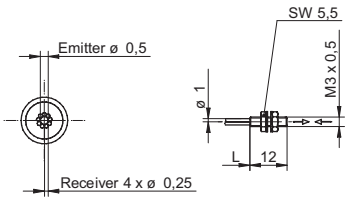
Tw = 1 ... 95 mm

- with thread
- coaxial

general data	
particular characteristics	coaxial
type	Diffuse sensors
sensing distance Tw	1 ... 95 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	3 mm
height / length (head)	12 mm
material (head)	stainless steel
bending radius	15 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
10134544	Focusing lens M3 ø 0,1 mm
10134543	Focusing lens M3 ø 0,4 m
10134542	Focusing lens M3 ø 2 mm
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 8 mm (HS)	-	1 ... 65 mm (nL)	1 ... 95 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 8 mm (HS)	-	1 ... 65 mm (nL)	1 ... 95 mm (HP)
FVDK 67 (master/slave)	1 ... 8 mm (HS)	-	1 ... 65 mm (nL)	1 ... 95 mm (HP)
FVDK 66 (standard version)	-	1 ... 16 mm (FT)	1 ... 28 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 16 mm (FT)	1 ... 28 mm (nL)	-
FVDK 22	-	-	1 ... 20 mm (nL)	-
FVDK 12	-	-	1 ... 20 mm (nL)	-
FVDK 12 (fast version)	1 ... 18 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 10 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 5 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FCE 200D1Y01

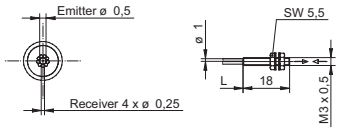
Tw = 1 ... 46 mm

- with thread
- coaxial

general data	
particular characteristics	ultra flexible coaxial
type	Diffuse sensors
sensing distance Tw	1 ... 46 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	3 mm
height / length (head)	18 mm
material (head)	stainless steel
bending radius	4 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
10134544	Focusing lens M3 ø 0,1 mm
10134543	Focusing lens M3 ø 0,4 m
10134542	Focusing lens M3 ø 2 mm
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 7 mm (HS)	-	1 ... 35 mm (nL)	1 ... 46 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 7 mm (HS)	-	1 ... 35 mm (nL)	1 ... 46 mm (HP)
FVDK 67 (master/slave)	1 ... 7 mm (HS)	-	1 ... 35 mm (nL)	1 ... 46 mm (HP)
FVDK 66 (standard version)	-	1 ... 10 mm (FT)	1 ... 18 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 10 mm (FT)	1 ... 18 mm (nL)	-
FVDK 22	-	-	1 ... 18 mm (nL)	-
FVDK 12	-	-	1 ... 18 mm (nL)	-
FVDK 12 (fast version)	1 ... 16 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 8 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 4 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FCE 200E1Y00

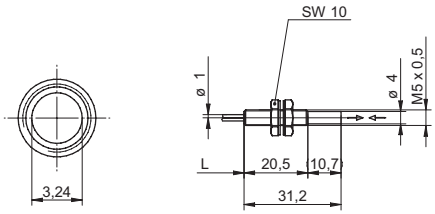
Tw = 1 ... 70 mm

- with thread
- coaxial

general data	
particular characteristics	parallel beam
type	Diffuse sensors
sensing distance Tw	1 ... 70 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	5 mm
height / length (head)	31,2 mm
material (head)	stainless steel
bending radius	15 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 8 mm (HS)	-	1 ... 60 mm (nL)	1 ... 70 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 8 mm (HS)	-	1 ... 60 mm (nL)	1 ... 70 mm (HP)
FVDK 67 (master/slave)	1 ... 8 mm (HS)	-	1 ... 60 mm (nL)	1 ... 70 mm (HP)
FVDK 66 (standard version)	-	1 ... 16 mm (FT)	1 ... 20 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 16 mm (FT)	1 ... 20 mm (nL)	-
FVDK 22	-	-	1 ... 20 mm (nL)	-
FVDK 12	-	-	1 ... 20 mm (nL)	-
FVDK 12 (fast version)	1 ... 18 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 10 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 5 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FKE 200D1Y00

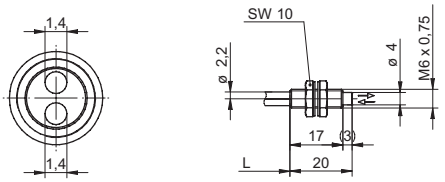
Tw = 1 ... 530 mm

- with thread
- long distance

general data	
particular characteristics	long distance
type	Diffuse sensors
sensing distance Tw	1 ... 530 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	6 mm
height / length (head)	20 mm
material (head)	stainless steel
bending radius	20 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 85 mm (HS)	-	1 ... 400 mm (nL)	1 ... 530 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 85 mm (HS)	-	1 ... 400 mm (nL)	1 ... 530 mm (HP)
FVDK 67 (master/slave)	1 ... 85 mm (HS)	-	1 ... 400 mm (nL)	1 ... 530 mm (HP)
FVDK 66 (standard version)	-	1 ... 120 mm (FT)	1 ... 210 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 120 mm (FT)	1 ... 210 mm (nL)	-
FVDK 22	-	-	1 ... 160 mm (nL)	-
FVDK 12	-	-	1 ... 160 mm (nL)	-
FVDK 12 (fast version)	1 ... 150 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 70 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 45 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FLE 200C1Y00

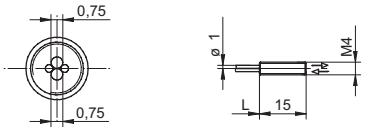
Tw = 1 ... 200 mm

- with thread
- long distance

general data	
particular characteristics	long distance
type	Diffuse sensors
sensing distance Tw	1 ... 200 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	4 mm
height / length (head)	15 mm
material (head)	stainless steel
bending radius	15 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 32 mm (HS)	-	1 ... 150 mm (nL)	1 ... 200 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 32 mm (HS)	-	1 ... 150 mm (nL)	1 ... 200 mm (HP)
FVDK 67 (master/slave)	1 ... 32 mm (HS)	-	1 ... 150 mm (nL)	1 ... 200 mm (HP)
FVDK 66 (standard version)	-	1 ... 46 mm (FT)	1 ... 75 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 46 mm (FT)	1 ... 75 mm (nL)	-
FVDK 22	-	-	1 ... 70 mm (nL)	-
FVDK 12	-	-	1 ... 70 mm (nL)	-
FVDK 12 (fast version)	1 ... 66 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 40 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 18 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FLE 200D1Y00

- leakage monitoring

general data	
type	Diffuse sensors (Leakage sensor)
measurement type	contact with medium
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	13 mm
height / length (head)	30,9 mm
depth (head)	9,9 mm
material (head)	PFA
bending radius	20 mm
cable jacket diameter	2,2 mm
material cable jacket	PFA (chemically resistant)
material (fiber optic cable)	plastic
length (fiber optic cable)	5000 mm
operating temperature	-30 ... +70 °C

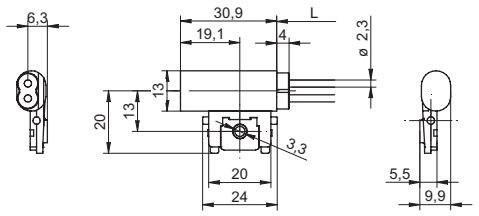
Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

fitting fiber optic sensors
FVDK 67 (standard version)
FVDK 67 (2 adjustable outputs)
FVDK 67 (master/slave)
FVDK 66 (standard version)
FVDK 66 (master/slave)
FVDK 22
FVDK 12
FVDK 12 (fast version)
FVDK 10

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FOC 500C6Y00

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

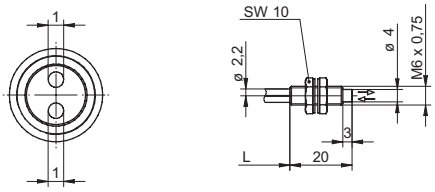
Tw = 1 ... 200 mm

- Heat resistant
- with thread

general data	
particular characteristics	heat resistant
type	Diffuse sensors
sensing distance Tw	1 ... 200 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	6 mm
height / length (head)	20 mm
material (head)	stainless steel
bending radius	25 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +105 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 43 mm (HS)	-	1 ... 190 mm (nL)	1 ... 200 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 43 mm (HS)	-	1 ... 190 mm (nL)	1 ... 200 mm (HP)
FVDK 67 (master/slave)	1 ... 43 mm (HS)	-	1 ... 190 mm (nL)	1 ... 200 mm (HP)
FVDK 66 (standard version)	-	1 ... 55 mm (FT)	1 ... 100 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 55 mm (FT)	1 ... 100 mm (nL)	-
FVDK 22	-	-	1 ... 70 mm (nL)	-
FVDK 12	-	-	1 ... 70 mm (nL)	-
FVDK 12 (fast version)	1 ... 66 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 40 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 18 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FUA 200C1Y00

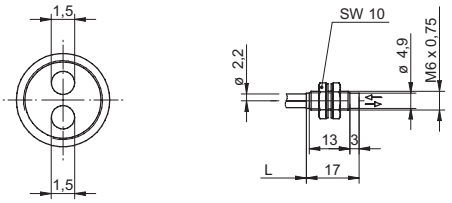
Tw = 1 ... 400 mm

- Heat and cold resistant
- with thread

general data	
particular characteristics	heat resistant
type	Diffuse sensors
sensing distance Tw	1 ... 400 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	6 mm
height / length (head)	17 mm
material (head)	stainless steel
bending radius	35 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-60 ... +150 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 65 mm (HS)	-	1 ... 300 mm (nL)	1 ... 400 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 65 mm (HS)	-	1 ... 300 mm (nL)	1 ... 400 mm (HP)
FVDK 67 (master/slave)	1 ... 42 mm (HS)	-	1 ... 300 mm (nL)	1 ... 400 mm (HP)
FVDK 66 (standard version)	-	1 ... 90 mm (FT)	1 ... 150 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 90 mm (FT)	1 ... 150 mm (nL)	-
FVDK 22	-	-	1 ... 110 mm (nL)	-
FVDK 12	-	-	1 ... 110 mm (nL)	-
FVDK 12 (fast version)	1 ... 103 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 45 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 28 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FUB 200C1Y00

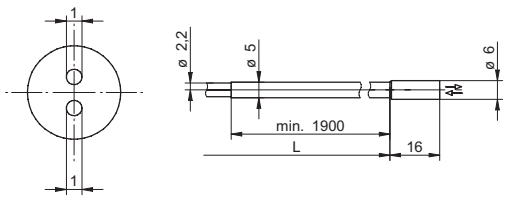
Tw = 1 ... 170 mm

- Chemically resistant
- Smooth sensing head

general data	
particular characteristics	chemically resistant
type	Diffuse sensors
sensing distance Tw	1 ... 170 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	6 mm
height / length (head)	16 mm
material (head)	stainless steel
bending radius	80 mm
cable jacket diameter	2,2 mm
material cable jacket	PFA (chemically resistant)
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 28 mm (HS)	-	1 ... 130 mm (nL)	1 ... 170 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 28 mm (HS)	-	1 ... 130 mm (nL)	1 ... 170 mm (HP)
FVDK 67 (master/slave)	1 ... 28 mm (HS)	-	1 ... 130 mm (nL)	1 ... 170 mm (HP)
FVDK 66 (standard version)	-	1 ... 42 mm (FT)	1 ... 70 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 42 mm (FT)	1 ... 70 mm (nL)	-
FVDK 22	-	-	1 ... 50 mm (nL)	-
FVDK 12	-	-	1 ... 50 mm (nL)	-
FVDK 12 (fast version)	1 ... 47 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 35 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 12 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FUC 200C2Y00

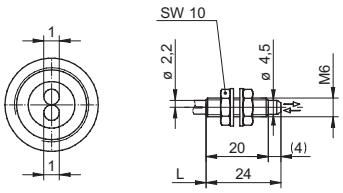
Tw = 1 ... 300 mm

- with thread

general data	
particular characteristics	standard
type	Diffuse sensors
sensing distance Tw	1 ... 300 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	6 mm
height / length (head)	24 mm
material (head)	brass
bending radius	15 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 33 mm (HS)	-	1 ... 260 mm (nL)	1 ... 300 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 33 mm (HS)	-	1 ... 260 mm (nL)	1 ... 300 mm (HP)
FVDK 67 (master/slave)	1 ... 33 mm (HS)	-	1 ... 260 mm (nL)	1 ... 300 mm (HP)
FVDK 66 (standard version)	-	1 ... 65 mm (FT)	1 ... 110 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 65 mm (FT)	1 ... 110 mm (nL)	-
FVDK 22	-	-	1 ... 90 mm (nL)	-
FVDK 12	-	-	1 ... 90 mm (nL)	-
FVDK 12 (fast version)	1 ... 84 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 45 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 25 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FUE 200C1003

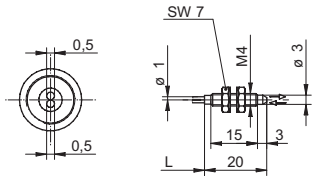
Tw = 1 ... 120 mm

- with thread

general data	
particular characteristics	standard
type	Diffuse sensors
sensing distance Tw	1 ... 120 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	4 mm
height / length (head)	20 mm
material (head)	brass
bending radius	8 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 12 mm (HS)	-	1 ... 100 mm (nL)	1 ... 120 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 12 mm (HS)	-	1 ... 100 mm (nL)	1 ... 120 mm (HP)
FVDK 67 (master/slave)	1 ... 12 mm (HS)	-	1 ... 100 mm (nL)	1 ... 120 mm (HP)
FVDK 66 (standard version)	-	1 ... 26 mm (FT)	1 ... 45 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 26 mm (FT)	1 ... 45 mm (nL)	-
FVDK 22	-	-	1 ... 35 mm (nL)	-
FVDK 12	-	-	1 ... 35 mm (nL)	-
FVDK 12 (fast version)	1 ... 33 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 18 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 10 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

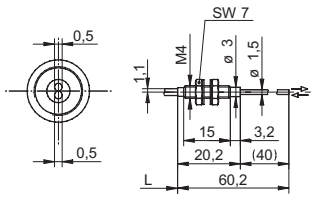
order reference
FUE 200C1004

Tw = 1 ... 120 mm

- with thread
- small sensing head

general data	
particular characteristics	small sensing head sensing head can be bent once
type	Diffuse sensors
sensing distance Tw	1 ... 120 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	4 mm
height / length (head)	60,2 mm
material (head)	stainless steel / brass
bending radius	8 mm
cable jacket diameter	1,1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
for details: see accessories section	

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 12 mm (HS)	-	1 ... 100 mm (nL)	1 ... 120 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 12 mm (HS)	-	1 ... 100 mm (nL)	1 ... 120 mm (HP)
FVDK 67 (master/slave)	1 ... 12 mm (HS)	-	1 ... 100 mm (nL)	1 ... 120 mm (HP)
FVDK 66 (standard version)	-	1 ... 26 mm (FT)	1 ... 45 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 26 mm (FT)	1 ... 45 mm (nL)	-
FVDK 22	-	-	1 ... 35 mm (nL)	-
FVDK 12	-	-	1 ... 35 mm (nL)	-
FVDK 12 (fast version)	1 ... 33 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 18 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 10 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FUE 200C1012

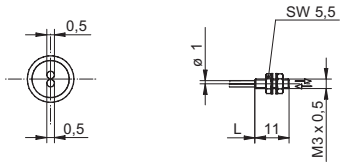
Tw = 1 ... 105 mm

- with thread

general data	
particular characteristics	standard
type	Diffuse sensors
sensing distance Tw	1 ... 105 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	3 mm
height / length (head)	11 mm
material (head)	stainless steel
bending radius	15 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 12 mm (HS)	-	1 ... 80 mm (nL)	1 ... 105 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 12 mm (HS)	-	1 ... 80 mm (nL)	1 ... 105 mm (HP)
FVDK 67 (master/slave)	1 ... 12 mm (HS)	-	1 ... 80 mm (nL)	1 ... 105 mm (HP)
FVDK 66 (standard version)	-	1 ... 25 mm (FT)	1 ... 43 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 25 mm (FT)	1 ... 43 mm (nL)	-
FVDK 22	-	-	1 ... 35 mm (nL)	-
FVDK 12	-	-	1 ... 35 mm (nL)	-
FVDK 12 (fast version)	1 ... 33 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 18 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 10 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FUE 200D1Y00

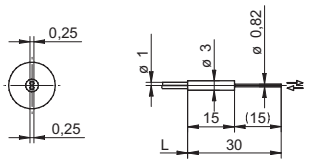
Tw = 1 ... 20 mm

- Smooth sensing head

general data	
particular characteristics	small sensing head
type	Diffuse sensors
sensing distance Tw	1 ... 20 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	3 mm
height / length (head)	30 mm
material (head)	stainless steel
bending radius	15 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	500 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 2 mm (HS)	-	1 ... 16 mm (nL)	1 ... 20 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 2 mm (HS)	-	1 ... 16 mm (nL)	1 ... 20 mm (HP)
FVDK 67 (master/slave)	1 ... 2 mm (HS)	-	1 ... 16 mm (nL)	1 ... 20 mm (HP)
FVDK 66 (standard version)	-	1 ... 2 mm (FT)	1 ... 4 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 2 mm (FT)	1 ... 4 mm (nL)	-
FVDK 22	-	-	1 ... 8 mm (nL)	-
FVDK 12	-	-	1 ... 8 mm (nL)	-
FVDK 12 (fast version)	1 ... 7 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 3 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 2 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FUE 050C2Y10

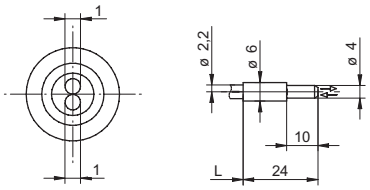
Tw = 1 ... 300 mm

- Smooth sensing head

general data	
particular characteristics	standard smooth sensing head without thread
type	Diffuse sensors
sensing distance Tw	1 ... 300 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	6 mm
height / length (head)	24 mm
material (head)	aluminum
bending radius	15 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 33 mm (HS)	-	1 ... 260 mm (nL)	1 ... 300 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 33 mm (HS)	-	1 ... 260 mm (nL)	1 ... 300 mm (HP)
FVDK 67 (master/slave)	1 ... 33 mm (HS)	-	1 ... 260 mm (nL)	1 ... 300 mm (HP)
FVDK 66 (standard version)	-	1 ... 65 mm (FT)	1 ... 110 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 65 mm (FT)	1 ... 110 mm (nL)	-
FVDK 22	-	-	1 ... 90 mm (nL)	-
FVDK 12	-	-	1 ... 90 mm (nL)	-
FVDK 12 (fast version)	1 ... 84 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 45 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 25 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FUE 200C2003

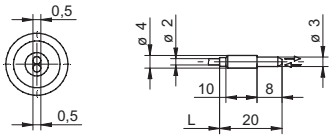
Tw = 1 ... 120 mm

- Smooth sensing head

general data	
particular characteristics	standard smooth sensing head without thread
type	Diffuse sensors
sensing distance Tw	1 ... 120 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	4 mm
height / length (head)	20 mm
material (head)	aluminum
bending radius	8 mm
cable jacket diameter	2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 12 mm (HS)	-	1 ... 100 mm (nL)	1 ... 120 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 12 mm (HS)	-	1 ... 100 mm (nL)	1 ... 120 mm (HP)
FVDK 67 (master/slave)	1 ... 12 mm (HS)	-	1 ... 100 mm (nL)	1 ... 120 mm (HP)
FVDK 66 (standard version)	-	1 ... 26 mm (FT)	1 ... 45 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 26 mm (FT)	1 ... 45 mm (nL)	-
FVDK 22	-	-	1 ... 35 mm (nL)	-
FVDK 12	-	-	1 ... 35 mm (nL)	-
FVDK 12 (fast version)	1 ... 33 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 18 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 10 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FUE 200C2004

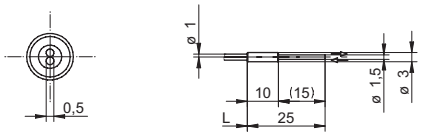
Tw = 1 ... 86 mm

- Smooth sensing head
- small sensing head

general data	
particular characteristics	small sensing head
type	Diffuse sensors
sensing distance Tw	1 ... 86 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	3 mm
height / length (head)	25 mm
material (head)	stainless steel
bending radius	15 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 14 mm (HS)	-	1 ... 65 mm (nL)	1 ... 86 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 14 mm (HS)	-	1 ... 65 mm (nL)	1 ... 86 mm (HP)
FVDK 67 (master/slave)	1 ... 14 mm (HS)	-	1 ... 65 mm (nL)	1 ... 86 mm (HP)
FVDK 66 (standard version)	-	1 ... 21 mm (FT)	1 ... 35 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 21 mm (FT)	1 ... 35 mm (nL)	-
FVDK 22	-	-	1 ... 35 mm (nL)	-
FVDK 12	-	-	1 ... 35 mm (nL)	-
FVDK 12 (fast version)	1 ... 33 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 18 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 9 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FUE 200C2Y00

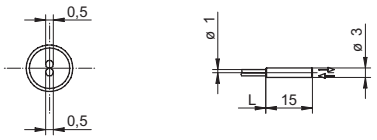
Tw = 1 ... 105 mm

- Smooth sensing head

general data	
particular characteristics	standard smooth sensing head without thread
type	Diffuse sensors
sensing distance Tw	1 ... 105 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	3 mm
height / length (head)	15 mm
material (head)	stainless steel
bending radius	15 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 17 mm (HS)	-	1 ... 80 mm (nL)	1 ... 105 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 17 mm (HS)	-	1 ... 80 mm (nL)	1 ... 105 mm (HP)
FVDK 67 (master/slave)	1 ... 17 mm (HS)	-	1 ... 80 mm (nL)	1 ... 105 mm (HP)
FVDK 66 (standard version)	-	1 ... 25 mm (FT)	1 ... 43 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 25 mm (FT)	1 ... 43 mm (nL)	-
FVDK 22	-	-	1 ... 35 mm (nL)	-
FVDK 12	-	-	1 ... 35 mm (nL)	-
FVDK 12 (fast version)	1 ... 33 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 18 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FUE 200D2Y00

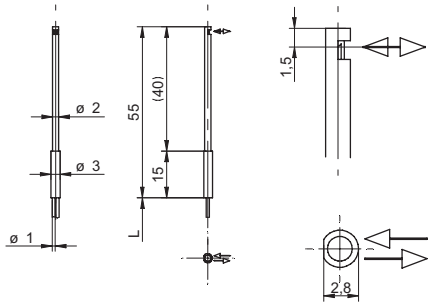
Tw = 1 ... 40 mm

- Smooth sensing head
- side view

general data	
particular characteristics	side view
type	Diffuse sensors
sensing distance Tw	1 ... 40 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (radial)
width / diameter (head)	3 mm
height / length (head)	55 mm
material (head)	brass nickel plated
bending radius	4 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 6 mm (HS)	-	1 ... 30 mm (nL)	1 ... 40 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 6 mm (HS)	-	1 ... 30 mm (nL)	1 ... 40 mm (HP)
FVDK 67 (master/slave)	1 ... 6 mm (HS)	-	1 ... 30 mm (nL)	1 ... 40 mm (HP)
FVDK 66 (standard version)	-	1 ... 10 mm (FT)	1 ... 17 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 10 mm (FT)	1 ... 17 mm (nL)	-
FVDK 22	-	-	1 ... 10 mm (nL)	-
FVDK 12	-	-	1 ... 10 mm (nL)	-
FVDK 12 (fast version)	1 ... 9 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 5 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 4 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FUE 200C4Y00

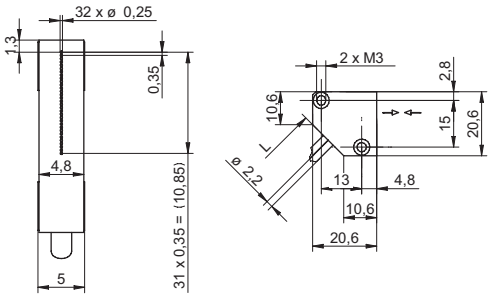
Tw = 1 ... 265 mm

- Array
- Line length = Number of holes x hole spacing

general data	
particular characteristics	side view
type	Diffuse sensors
sensing distance Tw	1 ... 265 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	rectangular, side view
width / diameter (head)	20,6 mm
height / length (head)	20,6 mm
depth (head)	5 mm
material (head)	stainless steel
bending radius	15 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 43 mm (HS)	-	1 ... 200 mm (nL)	1 ... 265 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 43 mm (HS)	-	1 ... 200 mm (nL)	1 ... 265 mm (HP)
FVDK 67 (master/slave)	1 ... 43 mm (HS)	-	1 ... 200 mm (nL)	1 ... 265 mm (HP)
FVDK 66 (standard version)	-	1 ... 60 mm (FT)	1 ... 100 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 60 mm (FT)	1 ... 100 mm (nL)	-
FVDK 22	-	-	1 ... 80 mm (nL)	-
FVDK 12	-	-	1 ... 80 mm (nL)	-
FVDK 12 (fast version)	1 ... 75 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 45 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 20 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FUE 200C6Y00

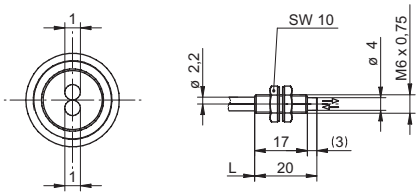
Tw = 1 ... 210 mm

- with thread
- ultra flexible

general data	
particular characteristics	ultra flexible
type	Diffuse sensors
sensing distance Tw	1 ... 210 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	6 mm
height / length (head)	20 mm
material (head)	stainless steel
bending radius	2 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 34 mm (HS)	-	1 ... 160 mm (nL)	1 ... 210 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 34 mm (HS)	-	1 ... 160 mm (nL)	1 ... 210 mm (HP)
FVDK 67 (master/slave)	1 ... 34 mm (HS)	-	1 ... 160 mm (nL)	1 ... 210 mm (HP)
FVDK 66 (standard version)	-	1 ... 50 mm (FT)	1 ... 85 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 50 mm (FT)	1 ... 85 mm (nL)	-
FVDK 22	-	-	1 ... 80 mm (nL)	-
FVDK 12	-	-	1 ... 60 mm (nL)	-
FVDK 12 (fast version)	1 ... 56 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 38 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 16 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FUE 200E1Y00

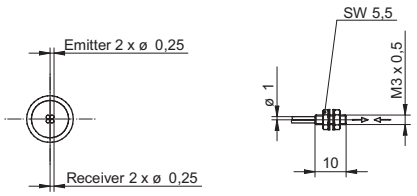
Tw = 1 ... 20 mm

- with thread
- ultra flexible

general data	
particular characteristics	ultra flexible
type	Diffuse sensors
sensing distance Tw	1 ... 20 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	3 mm
height / length (head)	10 mm
material (head)	stainless steel
bending radius	4 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	1 ... 3 mm (HS)	-	1 ... 15 mm (nL)	1 ... 20 mm (HP)
FVDK 67 (2 adjustable outputs)	1 ... 3 mm (HS)	-	1 ... 15 mm (nL)	1 ... 20 mm (HP)
FVDK 67 (master/slave)	1 ... 3 mm (HS)	-	1 ... 15 mm (nL)	1 ... 20 mm (HP)
FVDK 66 (standard version)	-	1 ... 5 mm (FT)	1 ... 8 mm (nL)	-
FVDK 66 (master/slave)	-	1 ... 5 mm (FT)	1 ... 8 mm (nL)	-
FVDK 22	-	-	1 ... 18 mm (nL)	-
FVDK 12	-	-	1 ... 15 mm (nL)	-
FVDK 12 (fast version)	1 ... 14 mm (HS)	-	-	-
FVDK 10	-	-	1 ... 6 mm (nL)	-
FWDK 84 (analog output)	-	-	1 ... 2 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

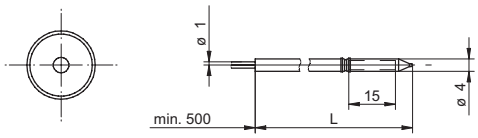
order reference
FUE 200F1Y00

- Fill level detection
- Smooth sensing head

general data	
type	Diffuse sensors (liquid level sensor)
measurement type	contact with medium
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	4 mm
height / length (head)	15 mm
material (head)	PFA
bending radius	15 mm
cable jacket diameter	1 mm
material cable jacket	PFA (chemically resistant)
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +105 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	-	-	-	-
FVDK 67 (2 adjustable outputs)	-	-	-	-
FVDK 67 (master/slave)	-	-	-	-
FVDK 66 (standard version)	-	-	-	-
FVDK 66 (master/slave)	-	-	-	-
FVDK 22	-	-	-	-
FVDK 12	-	-	-	-
FVDK 12 (fast version)	-	-	-	-
FVDK 10	-	-	-	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

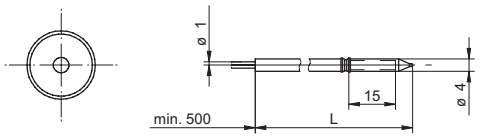
order reference
FUL 200D2Y00

- Fill level detection
- Smooth sensing head

general data	
type	Diffuse sensors (liquid level sensor)
measurement type	contact with medium
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	4 mm
height / length (head)	15 mm
material (head)	PFA
bending radius	15 mm
cable jacket diameter	1 mm
material cable jacket	PFA (chemically resistant)
material (fiber optic cable)	plastic
length (fiber optic cable)	5000 mm
operating temperature	-30 ... +105 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	sensing distance Tw (0,05 ms)	sensing distance Tw (0,25 ms)	sensing distance Tw (1 ms)	sensing distance Tw (5 ms)
FVDK 67 (standard version)	-	-	-	-
FVDK 67 (2 adjustable outputs)	-	-	-	-
FVDK 67 (master/slave)	-	-	-	-
FVDK 66 (standard version)	-	-	-	-
FVDK 66 (master/slave)	-	-	-	-
FVDK 22	-	-	-	-
FVDK 12	-	-	-	-
FVDK 12 (fast version)	-	-	-	-
FVDK 10	-	-	-	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

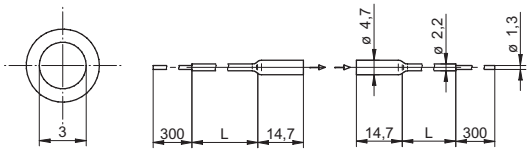
order reference
FUL 500D2Y00

Sb = 4500 mm

- Chemical and oil proof
- Smooth sensing head

general data	
type	through beam sensor
actual range Sb	4500 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	5 mm
height / length (head)	14,7 mm
material (head)	stainless steel
bending radius	20 mm
cable jacket diameter	2,2 mm
material cable jacket	PFA (chemically resistant)
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C
exit angle	± 2°

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
for details: see accessories section	

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	750 mm (HS)	-	3000 mm (nL)	4500 mm (HP)
FVDK 67 (2 adjustable outputs)	750 mm (HS)	-	3000 mm (nL)	4500 mm (HP)
FVDK 67 (master/slave)	750 mm (HS)	-	3000 mm (nL)	4500 mm (HP)
FVDK 66 (standard version)	-	880 mm (FT)	1500 mm (nL)	-
FVDK 66 (master/slave)	-	880 mm (FT)	1500 mm (nL)	-
FVDK 22	-	-	1100 mm (nL)	-
FVDK 12	-	-	1100 mm (nL)	-
FVDK 12 (fast version)	1050 mm (HS)	-	-	-
FVDK 10	-	-	500 mm (nL)	-
FWDK 84 (analog output)	-	-	300 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FLC 200D2Y00

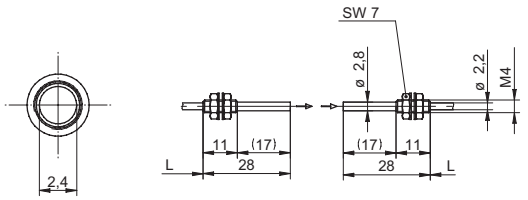
Sb = 4140 mm

- with thread
- parallel beam

general data	
particular characteristics	parallel beam
type	through beam sensor
actual range Sb	4140 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	4 mm
height / length (head)	28 mm
material (head)	stainless steel
bending radius	20 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C
exit angle	± 2°

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	690 mm (HS)	-	2760 mm (nL)	4140 mm (HP)
FVDK 67 (2 adjustable outputs)	690 mm (HS)	-	2760 mm (nL)	4140 mm (HP)
FVDK 67 (master/slave)	690 mm (HS)	-	2760 mm (nL)	4140 mm (HP)
FVDK 66 (standard version)	-	840 mm (FT)	1400 mm (nL)	-
FVDK 66 (master/slave)	-	840 mm (FT)	1400 mm (nL)	-
FVDK 22	-	-	1400 mm (nL)	-
FVDK 12	-	-	1400 mm (nL)	-
FVDK 12 (fast version)	1320 mm (HS)	-	-	-
FVDK 10	-	-	600 mm (nL)	-
FWDK 84 (analog output)	-	-	390 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FPE 200C1Y00

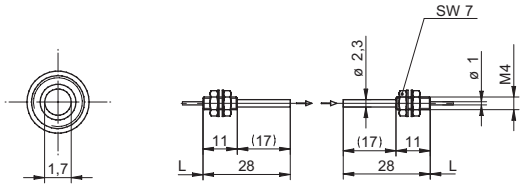
Sb = 3600 mm

- with thread
- parallel beam

general data	
particular characteristics	parallel beam
type	through beam sensor
actual range Sb	3600 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	4 mm
height / length (head)	28 mm
material (head)	stainless steel
bending radius	15 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C
exit angle	± 1°

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119912	Mounting bracket Ø 1,1 mm
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	600 mm (HS)	-	2400 mm (nL)	3600 mm (HP)
FVDK 67 (2 adjustable outputs)	600 mm (HS)	-	2400 mm (nL)	3600 mm (HP)
FVDK 67 (master/slave)	600 mm (HS)	-	2400 mm (nL)	3600 mm (HP)
FVDK 66 (standard version)	-	730 mm (FT)	1200 mm (nL)	-
FVDK 66 (master/slave)	-	730 mm (FT)	1200 mm (nL)	-
FVDK 22	-	-	800 mm (nL)	-
FVDK 12	-	-	800 mm (nL)	-
FVDK 12 (fast version)	755 mm (HS)	-	-	-
FVDK 10	-	-	320 mm (nL)	-
FWDK 84 (analog output)	-	-	200 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FPE 200D1Y00

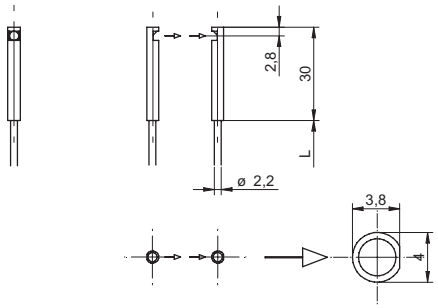
Sb = 4500 mm

- Smooth sensing head
- parallel beam

general data	
particular characteristics	parallel beam
type	through beam sensor
actual range Sb	4500 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (radial)
width / diameter (head)	4 mm
height / length (head)	30 mm
material (head)	stainless steel
bending radius	30 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C
exit angle	± 2°

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	750 mm (HS)	-	3000 mm (nL)	4500 mm (HP)
FVDK 67 (2 adjustable outputs)	750 mm (HS)	-	3000 mm (nL)	4500 mm (HP)
FVDK 67 (master/slave)	750 mm (HS)	-	3000 mm (nL)	4500 mm (HP)
FVDK 66 (standard version)	-	920 mm (FT)	1500 mm (nL)	-
FVDK 66 (master/slave)	-	920 mm (FT)	1500 mm (nL)	-
FVDK 22	-	-	1000 mm (nL)	-
FVDK 12	-	-	1000 mm (nL)	-
FVDK 12 (fast version)	945 mm (HS)	-	-	-
FVDK 10	-	-	400 mm (nL)	-
FWDK 84 (analog output)	-	-	200 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FPE 200C4Y00

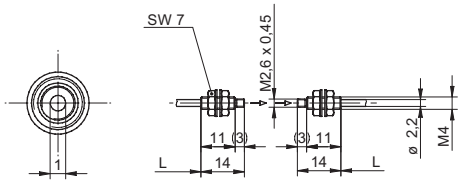
Sb = 690 mm

- Heat resistant
- with thread

general data	
particular characteristics	heat resistant
type	through beam sensor
actual range Sb	690 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	4 mm
height / length (head)	14 mm
material (head)	stainless steel
bending radius	25 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +105 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
10134541	Doubling lens increases the actual range (paires)
10134540	Doubling lens increases the actual range (paires)
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	115 mm (HS)	-	460 mm (nL)	690 mm (HP)
FVDK 67 (2 adjustable outputs)	115 mm (HS)	-	460 mm (nL)	690 mm (HP)
FVDK 67 (master/slave)	115 mm (HS)	-	60 mm (nL)	690 mm (HP)
FVDK 66 (standard version)	-	140 mm (FT)	240 mm (nL)	-
FVDK 66 (master/slave)	-	140 mm (FT)	240 mm (nL)	-
FVDK 22	-	-	210 mm (nL)	-
FVDK 12	-	-	210 mm (nL)	-
FVDK 12 (fast version)	198 mm (HS)	-	-	-
FVDK 10	-	-	100 mm (nL)	-
FWDK 84 (analog output)	-	-	60 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSA 200C1Y00

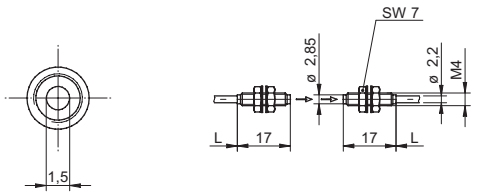
Sb = 1200 mm

- Heat resistant
- with thread

general data	
particular characteristics	heat resistant
type	through beam sensor
actual range Sb	1200 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	4 mm
height / length (head)	17 mm
material (head)	stainless steel
bending radius	35 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-60 ... +150 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	200 mm (HS)	-	800 mm (nL)	1200 mm (HP)
FVDK 67 (2 adjustable outputs)	200 mm (HS)	-	800 mm (nL)	1200 mm (HP)
FVDK 67 (master/slave)	200 mm (HS)	-	800 mm (nL)	1200 mm (HP)
FVDK 66 (standard version)	-	240 mm (FT)	410 mm (nL)	-
FVDK 66 (master/slave)	-	240 mm (FT)	10 mm (nL)	-
FVDK 22	-	-	310 mm (nL)	-
FVDK 12	-	-	310 mm (nL)	-
FVDK 12 (fast version)	292 mm (HS)	-	-	-
FVDK 10	-	-	160 mm (nL)	-
FWDK 84 (analog output)	-	-	85 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

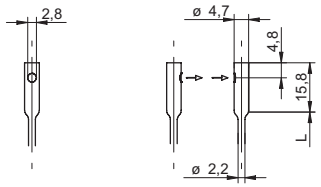
order reference
FSB 200C1Y00

Sb = 1030 mm

- side view

general data	
particular characteristics	side view
type	through beam sensor
actual range Sb	1030 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (radial)
width / diameter (head)	4,7 mm
height / length (head)	15,8 mm
material (head)	stainless steel
bending radius	20 mm
cable jacket diameter	2,2 mm
material cable jacket	PFA (chemically resistant)
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
for details: see accessories section	

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	170 mm (HS)	-	690 mm (nL)	1030 mm (HP)
FVDK 67 (2 adjustable outputs)	170 mm (HS)	-	690 mm (nL)	1030 mm (HP)
FVDK 67 (master/slave)	170 mm (HS)	-	690 mm (nL)	1030 mm (HP)
FVDK 66 (standard version)	-	210 mm (FT)	350 mm (nL)	-
FVDK 66 (master/slave)	-	210 mm (FT)	350 mm (nL)	-
FVDK 22	-	-	270 mm (nL)	-
FVDK 12	-	-	270 mm (nL)	-
FVDK 12 (fast version)	254 mm (HS)	-	-	-
FVDK 10	-	-	120 mm (nL)	-
FWDK 84 (analog output)	-	-	75 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSC 200C4Y00

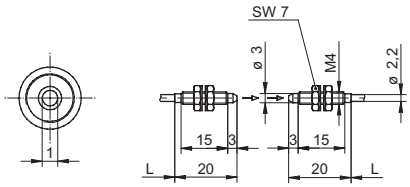
Sb = 1200 mm

- with thread

general data	
particular characteristics	standard
type	through beam sensor
actual range Sb	1200 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	4 mm
height / length (head)	20 mm
material (head)	brass
bending radius	15 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
10119909	Doubling lens M4 increases the actual range (paires)
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	130 mm (HS)	-	900 mm (nL)	1200 mm (HP)
FVDK 67 (2 adjustable outputs)	130 mm (HS)	-	900 mm (nL)	1200 mm (HP)
FVDK 67 (master/slave)	130 mm (HS)	-	900 mm (nL)	1200 mm (HP)
FVDK 66 (standard version)	-	220 mm (FT)	390 mm (nL)	-
FVDK 66 (master/slave)	-	220 mm (FT)	390 mm (nL)	-
FVDK 22	-	-	320 mm (nL)	-
FVDK 12	-	-	320 mm (nL)	-
FVDK 12 (fast version)	300 mm (HS)	-	-	-
FVDK 10	-	-	160 mm (nL)	-
FWDK 84 (analog output)	-	-	90 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200C1002

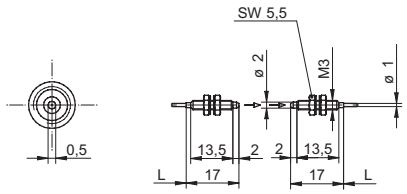
Sb = 340 mm

- with thread

general data	
particular characteristics	standard
type	through beam sensor
actual range Sb	340 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	3 mm
height / length (head)	17 mm
material (head)	brass
bending radius	8 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119912	Mounting bracket Ø 1,1 mm
10140260	Reduction tube
10119910	Doubling lens M3 increases the actual range (paires)
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	40 mm (HS)	-	290 mm (nL)	340 mm (HP)
FVDK 67 (2 adjustable outputs)	40 mm (HS)	-	290 mm (nL)	340 mm (HP)
FVDK 67 (master/slave)	40 mm (HS)	-	290 mm (nL)	340 mm (HP)
FVDK 66 (standard version)	-	70 mm (FT)	125 mm (nL)	-
FVDK 66 (master/slave)	-	70 mm (FT)	125 mm (nL)	-
FVDK 22	-	-	100 mm (nL)	-
FVDK 12	-	-	100 mm (nL)	-
FVDK 12 (fast version)	94 mm (HS)	-	-	-
FVDK 10	-	-	50 mm (nL)	-
FWDK 84 (analog output)	-	-	28 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

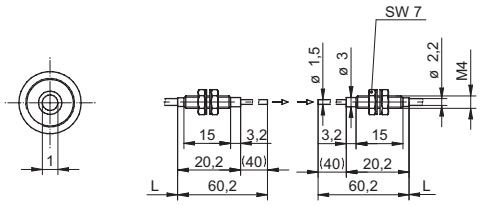
order reference
FSE 200C1004

Sb = 340 mm

- with thread
- small sensing head

general data	
particular characteristics	small sensing head sensing head can be bent once
type	through beam sensor
actual range Sb	340 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	4 mm
height / length (head)	60,2 mm
material (head)	stainless steel / brass
bending radius	8 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

dimension drawing



Accessories

10114652	Cutting tool for plastic fiber optics
for details: see accessories section	

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	40 mm (HS)	-	290 mm (nL)	340 mm (HP)
FVDK 67 (2 adjustable outputs)	40 mm (HS)	-	290 mm (nL)	340 mm (HP)
FVDK 67 (master/slave)	40 mm (HS)	-	290 mm (nL)	340 mm (HP)
FVDK 66 (standard version)	-	70 mm (FT)	125 mm (nL)	-
FVDK 66 (master/slave)	-	70 mm (FT)	125 mm (nL)	-
FVDK 22	-	-	100 mm (nL)	-
FVDK 12	-	-	100 mm (nL)	-
FVDK 12 (fast version)	94 mm (HS)	-	-	-
FVDK 10	-	-	50 mm (nL)	-
FWDK 84 (analog output)	-	-	28 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200C1013

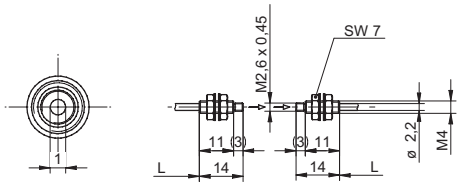
Sb = 1200 mm

- with thread
- small sensing head

general data	
particular characteristics	standard short sensing head
type	through beam sensor
actual range Sb	1200 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	4 mm
height / length (head)	14 mm
material (head)	stainless steel
bending radius	20 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
10134541	Doubling lens increases the actual range (paires)
10134540	Doubling lens increases the actual range (paires)
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	200 mm (HS)	-	800 mm (nL)	1200 mm (HP)
FVDK 67 (2 adjustable outputs)	200 mm (HS)	-	800 mm (nL)	1200 mm (HP)
FVDK 67 (master/slave)	200 mm (HS)	-	800 mm (nL)	1200 mm (HP)
FVDK 66 (standard version)	-	240 mm (FT)	410 mm (nL)	-
FVDK 66 (master/slave)	-	240 mm (FT)	390 mm (nL)	-
FVDK 22	-	-	320 mm (nL)	-
FVDK 12	-	-	320 mm (nL)	-
FVDK 12 (fast version)	300 mm (HS)	-	-	-
FVDK 10	-	-	160 mm (nL)	-
FWDK 84 (analog output)	-	-	90 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200C1Y00

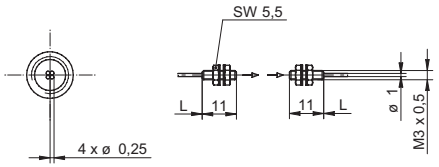
Sb = 180 mm

- with thread
- suitable for flexible cable carriers

general data	
particular characteristics	suitable for flexible cable carriers
type	through beam sensor
actual range Sb	180 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	3 mm
height / length (head)	11 mm
material (head)	stainless steel
bending radius	4 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119912	Mounting bracket Ø 1,1 mm
10140260	Reduction tube
10119910	Doubling lens M3 increases the actual range (paires)
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	30 mm (HS)	-	120 mm (nL)	180 mm (HP)
FVDK 67 (2 adjustable outputs)	30 mm (HS)	-	120 mm (nL)	180 mm (HP)
FVDK 67 (master/slave)	30 mm (HS)	-	120 mm (nL)	180 mm (HP)
FVDK 66 (standard version)	-	38 mm (FT)	60 mm (nL)	-
FVDK 66 (master/slave)	-	38 mm (FT)	60 mm (nL)	-
FVDK 22	-	-	45 mm (nL)	-
FVDK 12	-	-	45 mm (nL)	-
FVDK 12 (fast version)	42 mm (HS)	-	-	-
FVDK 10	-	-	20 mm (nL)	-
FWDK 84 (analog output)	-	-	20 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200D1Y50

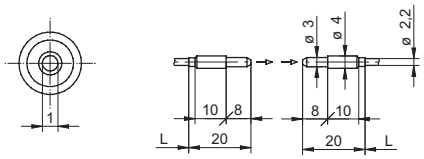
Sb = 1200 mm

- Smooth sensing head

general data	
particular characteristics	standard
type	through beam sensor
actual range Sb	1200 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	4 mm
height / length (head)	20 mm
material (head)	aluminum
bending radius	15 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	130 mm (HS)	-	900 mm (nL)	1200 mm (HP)
FVDK 67 (2 adjustable outputs)	130 mm (HS)	-	900 mm (nL)	1200 mm (HP)
FVDK 67 (master/slave)	130 mm (HS)	-	900 mm (nL)	1200 mm (HP)
FVDK 66 (standard version)	-	220 mm (FT)	390 mm (nL)	-
FVDK 66 (master/slave)	-	220 mm (FT)	390 mm (nL)	-
FVDK 22	-	-	320 mm (nL)	-
FVDK 12	-	-	320 mm (nL)	-
FVDK 12 (fast version)	300 mm (HS)	-	-	-
FVDK 10	-	-	160 mm (nL)	-
FWDK 84 (analog output)	-	-	90 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200C2002

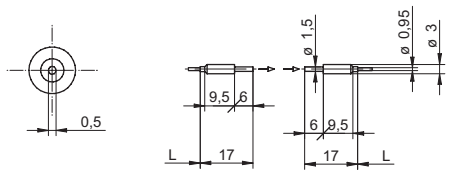
Sb = 340 mm

- Smooth sensing head

general data	
particular characteristics	standard
type	through beam sensor
actual range Sb	340 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	3 mm
height / length (head)	17 mm
material (head)	aluminum
bending radius	8 mm
cable jacket diameter	0,95 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119912	Mounting bracket Ø 1,1 mm
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	40 mm (HS)	-	290 mm (nL)	340 mm (HP)
FVDK 67 (2 adjustable outputs)	40 mm (HS)	-	290 mm (nL)	340 mm (HP)
FVDK 67 (master/slave)	40 mm (HS)	-	290 mm (nL)	340 mm (HP)
FVDK 66 (standard version)	-	70 mm (FT)	125 mm (nL)	-
FVDK 66 (master/slave)	-	70 mm (FT)	125 mm (nL)	-
FVDK 22	-	-	100 mm (nL)	-
FVDK 12	-	-	100 mm (nL)	-
FVDK 12 (fast version)	94 mm (HS)	-	-	-
FVDK 10	-	-	50 mm (nL)	-
FWDK 84 (analog output)	-	-	28 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200C2004

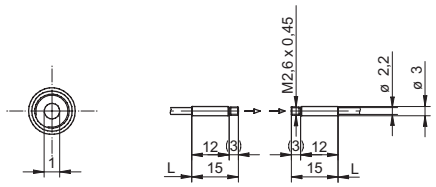
Sb = 1200 mm

- Smooth sensing head
- short sensing head

general data	
particular characteristics	standard short sensing head
type	through beam sensor
actual range Sb	1200 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	3 mm
height / length (head)	15 mm
material (head)	stainless steel
bending radius	20 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
10134541	Doubling lens increases the actual range (paires)
10134540	Doubling lens increases the actual range (paires)
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	200 mm (HS)	-	800 mm (nL)	1200 mm (HP)
FVDK 67 (2 adjustable outputs)	200 mm (HS)	-	800 mm (nL)	1200 mm (HP)
FVDK 67 (master/slave)	200 mm (HS)	-	800 mm (nL)	1200 mm (HP)
FVDK 66 (standard version)	-	240 mm (FT)	410 mm (nL)	-
FVDK 66 (master/slave)	-	240 mm (FT)	410 mm (nL)	-
FVDK 22	-	-	100 mm (nL)	-
FVDK 12	-	-	100 mm (nL)	-
FVDK 12 (fast version)	94 mm (HS)	-	-	-
FVDK 10	-	-	160 mm (nL)	-
FWDK 84 (analog output)	-	-	90 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200C2Y00

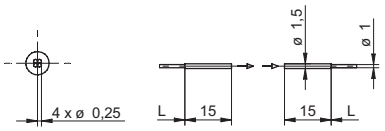
Sb = 180 mm

- Smooth sensing head

general data	
particular characteristics	standard
type	through beam sensor
actual range Sb	180 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	1,5 mm
height / length (head)	15 mm
material (head)	stainless steel
bending radius	4 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119912	Mounting bracket Ø 1,1 mm
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	30 mm (HS)	-	120 mm (nL)	180 mm (HP)
FVDK 67 (2 adjustable outputs)	30 mm (HS)	-	120 mm (nL)	180 mm (HP)
FVDK 67 (master/slave)	30 mm (HS)	-	120 mm (nL)	180 mm (HP)
FVDK 66 (standard version)	-	38 mm (FT)	60 mm (nL)	-
FVDK 66 (master/slave)	-	38 mm (FT)	60 mm (nL)	-
FVDK 22	-	-	45 mm (nL)	-
FVDK 12	-	-	45 mm (nL)	-
FVDK 12 (fast version)	42 mm (HS)	-	-	-
FVDK 10	-	-	20 mm (nL)	-
FWDK 84 (analog output)	-	-	20 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200D2Y00

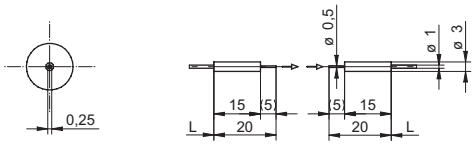
Sb = 37 mm

- Smooth sensing head
- small sensing head

general data	
particular characteristics	small sensing head
type	through beam sensor
actual range Sb	37 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	3 mm
height / length (head)	20 mm
material (head)	stainless steel
bending radius	15 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119912	Mounting bracket Ø 1,1 mm
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	6 mm (HS)	-	25 mm (nL)	37 mm (HP)
FVDK 67 (2 adjustable outputs)	6 mm (HS)	-	25 mm (nL)	37 mm (HP)
FVDK 67 (master/slave)	6 mm (HS)	-	25 mm (nL)	37 mm (HP)
FVDK 66 (standard version)	-	7 mm (FT)	12 mm (nL)	-
FVDK 66 (master/slave)	-	7 mm (FT)	12 mm (nL)	-
FVDK 22	-	-	15 mm (nL)	-
FVDK 12	-	-	15 mm (nL)	-
FVDK 12 (fast version)	14 mm (HS)	-	-	-
FVDK 10	-	-	8 mm (nL)	-
FWDK 84 (analog output)	-	-	4 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200D2Y50

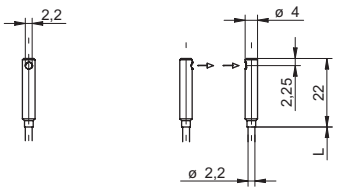
Sb = 750 mm

- Smooth sensing head
- side view

general data	
particular characteristics	side view smooth sensing head without thread
type	through beam sensor
actual range Sb	750 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (radial)
width / diameter (head)	4 mm
height / length (head)	22 mm
material (head)	aluminum
bending radius	15 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	80 mm (HS)	-	600 mm (nL)	750 mm (HP)
FVDK 67 (2 adjustable outputs)	80 mm (HS)	-	600 mm (nL)	750 mm (HP)
FVDK 67 (master/slave)	80 mm (HS)	-	600 mm (nL)	750 mm (HP)
FVDK 66 (standard version)	-	150 mm (FT)	260 mm (nL)	-
FVDK 66 (master/slave)	-	150 mm (FT)	260 mm (nL)	-
FVDK 22	-	-	200 mm (nL)	-
FVDK 12	-	-	200 mm (nL)	-
FVDK 12 (fast version)	188 mm (HS)	-	-	-
FVDK 10	-	-	100 mm (nL)	-
FWDK 84 (analog output)	-	-	55 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200C4001

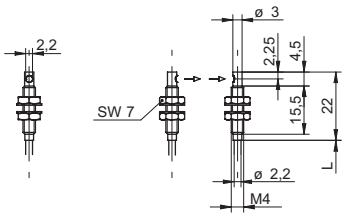
Sb = 750 mm

- with thread
- side view

general data	
particular characteristics	side view
type	through beam sensor
actual range Sb	750 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (radial)
width / diameter (head)	4 mm
height / length (head)	22 mm
material (head)	brass
bending radius	15 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	80 mm (HS)	-	600 mm (nL)	750 mm (HP)
FVDK 67 (2 adjustable outputs)	80 mm (HS)	-	600 mm (nL)	750 mm (HP)
FVDK 67 (master/slave)	80 mm (HS)	-	600 mm (nL)	750 mm (HP)
FVDK 66 (standard version)	-	150 mm (FT)	260 mm (nL)	-
FVDK 66 (master/slave)	-	150 mm (FT)	260 mm (nL)	-
FVDK 22	-	-	200 mm (nL)	-
FVDK 12	-	-	200 mm (nL)	-
FVDK 12 (fast version)	188 mm (HS)	-	-	-
FVDK 10	-	-	100 mm (nL)	-
FWDK 84 (analog output)	-	-	55 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200C4002

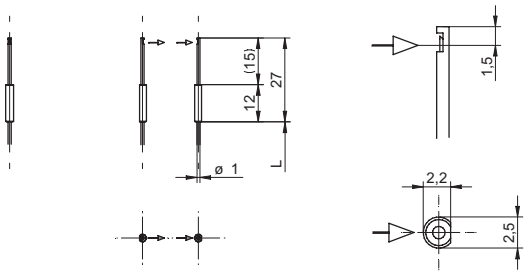
Sb = 165 mm

- Smooth sensing head
- side view

general data	
particular characteristics	side view small sensing head smooth sensing head without thread
type	through beam sensor
actual range Sb	165 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (radial)
width / diameter (head)	2,5 mm
height / length (head)	27 mm
material (head)	stainless steel
bending radius	15 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119912	Mounting bracket Ø 1,1 mm
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	27 mm (HS)	-	110 mm (nL)	165 mm (HP)
FVDK 67 (2 adjustable outputs)	27 mm (HS)	-	110 mm (nL)	165 mm (HP)
FVDK 67 (master/slave)	27 mm (HS)	-	110 mm (nL)	165 mm (HP)
FVDK 66 (standard version)	-	33 mm (FT)	55 mm (nL)	-
FVDK 66 (master/slave)	-	33 mm (FT)	55 mm (nL)	-
FVDK 22	-	-	50 mm (nL)	-
FVDK 12	-	-	50 mm (nL)	-
FVDK 12 (fast version)	47 mm (HS)	-	-	-
FVDK 10	-	-	18 mm (nL)	-
FWDK 84 (analog output)	-	-	14 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200D4Y00

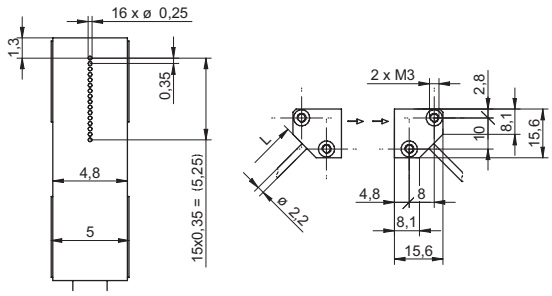
Sb = 780 mm

- Array
- Line length = Number of holes x hole spacing

general data	
particular characteristics	array (fine light barrier)
type	through beam sensor
actual range Sb	780 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	rectangular
width / diameter (head)	15,6 mm
height / length (head)	15,6 mm
depth (head)	5 mm
material (head)	POM
bending radius	4 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	130 mm (HS)	-	520 mm (nL)	780 mm (HP)
FVDK 67 (2 adjustable outputs)	130 mm (HS)	-	520 mm (nL)	780 mm (HP)
FVDK 67 (master/slave)	130 mm (HS)	-	520 mm (nL)	780 mm (HP)
FVDK 66 (standard version)	-	150 mm (FT)	270 mm (nL)	-
FVDK 66 (master/slave)	-	150 mm (FT)	270 mm (nL)	-
FVDK 22	-	-	200 mm (nL)	-
FVDK 12	-	-	200 mm (nL)	-
FVDK 12 (fast version)	188 mm (HS)	-	-	-
FVDK 10	-	-	100 mm (nL)	-
FWDK 84 (analog output)	-	-	55 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200C6Y00

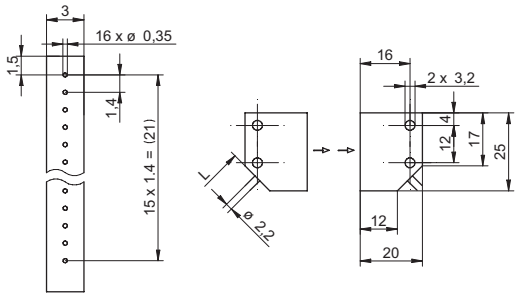
Sb = 790 mm

- Array
- Line length = Number of holes x hole spacing

general data	
particular characteristics	array (fine light barrier)
type	through beam sensor
actual range Sb	790 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	rectangular
width / diameter (head)	20 mm
height / length (head)	25 mm
depth (head)	3 mm
material (head)	aluminum
bending radius	4 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	85 mm (HS)	-	600 mm (nL)	790 mm (HP)
FVDK 67 (2 adjustable outputs)	85 mm (HS)	-	600 mm (nL)	790 mm (HP)
FVDK 67 (master/slave)	85 mm (HS)	-	600 mm (nL)	790 mm (HP)
FVDK 66 (standard version)	-	150 mm (FT)	260 mm (nL)	-
FVDK 66 (master/slave)	-	150 mm (FT)	260 mm (nL)	-
FVDK 22	-	-	200 mm (nL)	-
FVDK 12	-	-	200 mm (nL)	-
FVDK 12 (fast version)	188 mm (HS)	-	-	-
FVDK 10	-	-	100 mm (nL)	-
FWDK 84 (analog output)	-	-	55 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200C6Y02

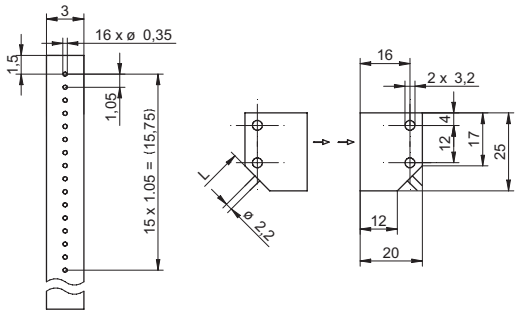
Sb = 790 mm

- Array
- Line length = Number of holes x hole spacing

general data	
particular characteristics	array (fine light barrier)
type	through beam sensor
actual range Sb	790 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	rectangular
width / diameter (head)	20 mm
height / length (head)	25 mm
depth (head)	3 mm
material (head)	aluminum
bending radius	4 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	85 mm (HS)	-	600 mm (nL)	790 mm (HP)
FVDK 67 (2 adjustable outputs)	85 mm (HS)	-	600 mm (nL)	790 mm (HP)
FVDK 67 (master/slave)	85 mm (HS)	-	600 mm (nL)	790 mm (HP)
FVDK 66 (standard version)	-	150 mm (FT)	260 mm (nL)	-
FVDK 66 (master/slave)	-	150 mm (FT)	260 mm (nL)	-
FVDK 22	-	-	200 mm (nL)	-
FVDK 12	-	-	200 mm (nL)	-
FVDK 12 (fast version)	188 mm (HS)	-	-	-
FVDK 10	-	-	100 mm (nL)	-
FWDK 84 (analog output)	-	-	55 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200C6Y15

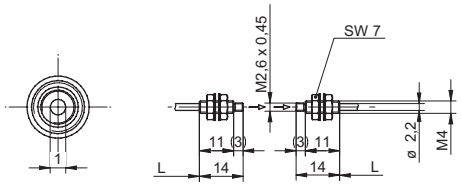
Sb = 900 mm

- with thread
- ultra flexible

general data	
particular characteristics	ultra flexible
type	through beam sensor
actual range Sb	900 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	4 mm
height / length (head)	14 mm
material (head)	stainless steel
bending radius	2 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
10134541	Doubling lens increases the actual range (paires)
10134540	Doubling lens increases the actual range (paires)
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	150 mm (HS)	-	600 mm (nL)	900 mm (HP)
FVDK 67 (2 adjustable outputs)	150 mm (HS)	-	600 mm (nL)	900 mm (HP)
FVDK 67 (master/slave)	150 mm (HS)	-	600 mm (nL)	900 mm (HP)
FVDK 66 (standard version)	-	180 mm (FT)	310 mm (nL)	-
FVDK 66 (master/slave)	-	180 mm (FT)	310 mm (nL)	-
FVDK 22	-	-	270 mm (nL)	-
FVDK 12	-	-	270 mm (nL)	-
FVDK 12 (fast version)	255 mm (HS)	-	-	-
FVDK 10	-	-	120 mm (nL)	-
FWDK 84 (analog output)	-	-	75 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200E1Y00

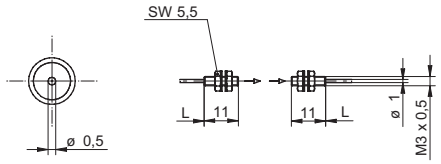
Sb = 140 mm

- with thread
- ultra flexible

general data	
particular characteristics	ultra flexible
type	through beam sensor
actual range Sb	140 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	3 mm
height / length (head)	11 mm
material (head)	stainless steel
bending radius	1 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119912	Mounting bracket Ø 1,1 mm
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	23 mm (HS)	-	95 mm (nL)	140 mm (HP)
FVDK 67 (2 adjustable outputs)	23 mm (HS)	-	95 mm (nL)	140 mm (HP)
FVDK 67 (master/slave)	23 mm (HS)	-	95 mm (nL)	140 mm (HP)
FVDK 66 (standard version)	-	29 mm (FT)	50 mm (nL)	-
FVDK 66 (master/slave)	-	29 mm (FT)	50 mm (nL)	-
FVDK 22	-	-	30 mm (nL)	-
FVDK 12	-	-	30 mm (nL)	-
FVDK 12 (fast version)	28 mm (HS)	-	-	-
FVDK 10	-	-	12 mm (nL)	-
FWDK 84 (analog output)	-	-	8 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200F1Y00

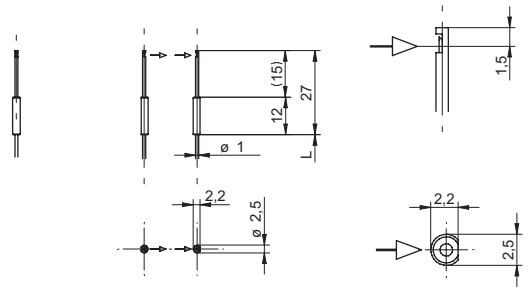
Sb = 52 mm

- smooth sensing head
- side view

general data	
particular characteristics	side view small sensing head
type	through beam sensor
actual range Sb	52 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (radial)
width / diameter (head)	2,5 mm
height / length (head)	27 mm
material (head)	stainless steel
bending radius	1 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119912	Mounting bracket Ø 1,1 mm
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	8 mm (HS)	-	35 mm (nL)	52 mm (HP)
FVDK 67 (2 adjustable outputs)	8 mm (HS)	-	35 mm (nL)	52 mm (HP)
FVDK 67 (master/slave)	8 mm (HS)	-	35 mm (nL)	52 mm (HP)
FVDK 66 (standard version)	-	11 mm (FT)	20 mm (nL)	-
FVDK 66 (master/slave)	-	11 mm (FT)	20 mm (nL)	-
FVDK 22	-	-	15 mm (nL)	-
FVDK 12	-	-	15 mm (nL)	-
FVDK 12 (fast version)	14 mm (HS)	-	-	-
FVDK 10	-	-	8 mm (nL)	-
FWDK 84 (analog output)	-	-	4 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200F4Y00

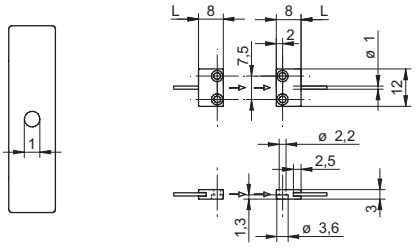
Sb = 140 mm

- rectangular
- plastic

general data	
type	through beam sensor
actual range Sb	140 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	rectangular
width / diameter (head)	12 mm
height / length (head)	8 mm
depth (head)	3 mm
material (head)	POM
bending radius	1 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119912	Mounting bracket Ø 1,1 mm
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	17 mm (HS)	-	110 mm (nL)	140 mm (HP)
FVDK 67 (2 adjustable outputs)	17 mm (HS)	-	110 mm (nL)	140 mm (HP)
FVDK 67 (master/slave)	17 mm (HS)	-	110 mm (nL)	140 mm (HP)
FVDK 66 (standard version)	-	23 mm (FT)	40 mm (nL)	-
FVDK 66 (master/slave)	-	23 mm (FT)	40 mm (nL)	-
FVDK 22	-	-	40 mm (nL)	-
FVDK 12	-	-	40 mm (nL)	-
FVDK 12 (fast version)	37 mm (HS)	-	-	-
FVDK 10	-	-	15 mm (nL)	-
FWDK 84 (analog output)	-	-	11 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 100F6Y01

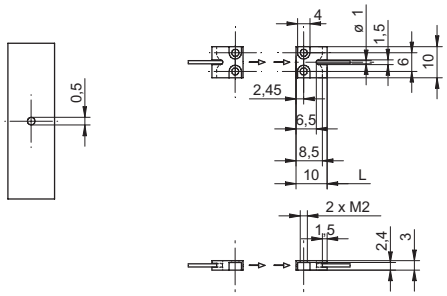
Sb = 140 mm

- rectangular
- brass nickel plated sensor head

general data	
type	through beam sensor
actual range Sb	140 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	rectangular
width / diameter (head)	10 mm
height / length (head)	10 mm
depth (head)	3 mm
material (head)	brass nickel plated
bending radius	1 mm
cable jacket diameter	1 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119912	Mounting bracket Ø 1,1 mm
10140260	Reduction tube
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	23 mm (HS)	-	95 mm (nL)	140 mm (HP)
FVDK 67 (2 adjustable outputs)	23 mm (HS)	-	95 mm (nL)	140 mm (HP)
FVDK 67 (master/slave)	23 mm (HS)	-	95 mm (nL)	140 mm (HP)
FVDK 66 (standard version)	-	29 mm (FT)	50 mm (nL)	-
FVDK 66 (master/slave)	-	29 mm (FT)	50 mm (nL)	-
FVDK 22	-	-	40 mm (nL)	-
FVDK 12	-	-	40 mm (nL)	-
FVDK 12 (fast version)	37 mm (HS)	-	-	-
FVDK 10	-	-	15 mm (nL)	-
FWDK 84 (analog output)	-	-	11 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FSE 200F6Y00

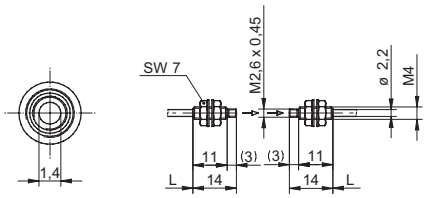
Sb = 2175 mm

- with thread

general data	
type	through beam sensor
actual range Sb	2175 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical threaded (axial)
width / diameter (head)	3 mm
height / length (head)	14 mm
material (head)	stainless steel
bending radius	20 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below “fitting fiber optic sensors”.

dimension drawing



Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	360 mm (HS)	-	1450 mm (nL)	2175 mm (HP)
FVDK 67 (2 adjustable outputs)	360 mm (HS)	-	1450 mm (nL)	2175 mm (HP)
FVDK 67 (master/slave)	360 mm (HS)	-	1450 mm (nL)	2175 mm (HP)
FVDK 66 (standard version)	-	450 mm (FT)	770 mm (nL)	-
FVDK 66 (master/slave)	-	450 mm (FT)	770 mm (nL)	-
FVDK 22	-	-	680 mm (nL)	-
FVDK 12	-	-	680 mm (nL)	-
FVDK 12 (fast version)	640 mm (HS)	-	-	-
FVDK 10	-	-	300 mm (nL)	-
FWDK 84 (analog output)	-	-	190 mm (nL)	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FWE 200C1Y00

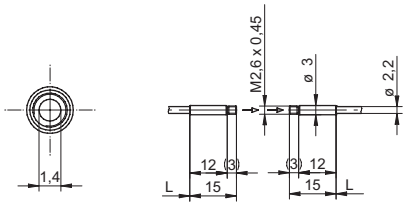
Sb = 2350 mm

- Smooth sensing head

general data	
type	through beam sensor
actual range Sb	2350 mm
response time / release time	0,05 ... 5 ms
type of head (fiber optic cable)	cylindrical smooth (axial)
width / diameter (head)	3 mm
height / length (head)	15 mm
material (head)	stainless steel
bending radius	20 mm
cable jacket diameter	2,2 mm
material cable jacket	PE
material (fiber optic cable)	plastic
length (fiber optic cable)	2000 mm
operating temperature	-30 ... +70 °C

Sensing distance/response time:
For the definitive sensing distance/response time please see table below "fitting fiber optic sensors".

dimension drawing

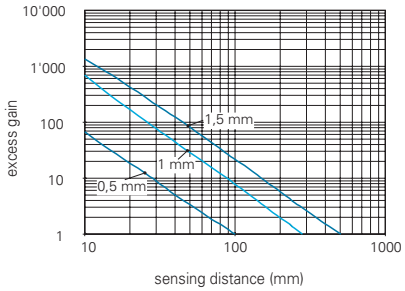
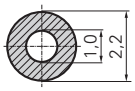
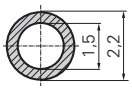


Accessories	
10114652	Cutting tool for plastic fiber optics
10119911	Mounting bracket Ø 2,2 mm
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m
10145523	Fiber optic cable extension 5 m hochflexibel
for details: see accessories section	

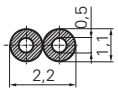
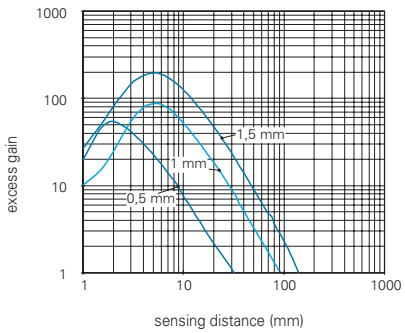
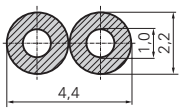
fitting fiber optic sensors	actual range Sb (0,05 ms)	actual range Sb (0,25 ms)	actual range Sb (1 ms)	actual range Sb (5 ms)
FVDK 67 (standard version)	360 mm (HS)	-	1450 mm (nL)	2350 mm (HP)
FVDK 67 (2 adjustable outputs)	360 mm (HS)	-	1450 mm (nL)	2350 mm (HP)
FVDK 67 (master/slave)	360 mm (HS)	-	1450 mm (nL)	2350 mm (HP)
FVDK 66 (standard version)	-	450 mm (FT)	770 mm (nL)	-
FVDK 66 (master/slave)	-	450 mm (FT)	770 mm (nL)	-
FVDK 22	-	-	680 mm (nL)	-
FVDK 12	-	-	680 mm (nL)	-
FVDK 12 (fast version)	642 mm (HS)	-	-	-
FVDK 10	-	-	300 mm (nL)	-
FWDK 84 (analog output)	-	-	-	-

operating modes
HS High Speed
FT fast
nL Standard
HP High Sensitivity

order reference
FWE 200C2Y00

through-beam types	fiber ø	fiber mm²	min. bending radius	part nr. [1]	excess gain curve (2 m cut fiber)
	0,5 mm	≈ 0,2 mm²	8 mm	10114158	 reduction of sensing distance: 4 % per meter (valid up to 10 m)
	1 mm	≈ 0,8 mm²	15 mm	10114157	
	1,5 mm	≈ 1,8 mm²	25 mm	10123729	

Highly flexible version on demand.

reflective types	fiber ø	fiber mm²	min. bending radius	part nr. [1]	excess gain curve (2 m cut fiber)
	2 x 0,5 mm	≈ 2 x 0,2 mm²	8 mm	10114594	 reduction of sensing distance: 4 % per meter (valid up to 10 m)
	2 x 1 mm	≈ 2 x 0,8 mm²	15 mm	10114595	

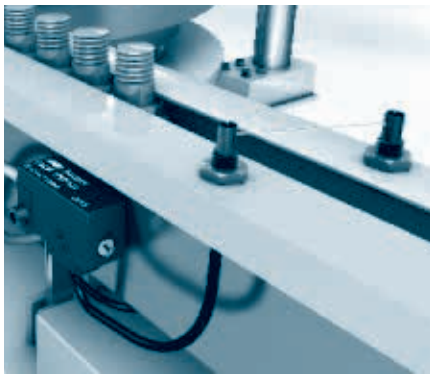
Highly flexible version on demand.

[1] order designation in meters

product family	FZAM 18	FVDM 15	FZAM 18	FZAM 18	FZAM 30
width / diameter	18 mm	15 mm	18 mm	18 mm	30 mm
actual range Sb	310 mm	1200 mm	800 mm	800 mm	600 mm 1400 mm
sensing distance Tw	60 mm	240 mm	150 mm	150 mm	110 mm 230 mm
response time / release time	< 0,5 ms	< 0,1 ms < 1 ms	< 1 ms	< 1 ms	< 0,25 ms < 2,5 ms
light source	pulsed infrared diode	pulsed infrared diode	pulsed infrared diode	pulsed infrared diode	pulsed infrared diode
adjustment	potentiometer, 15 turn	potentiometer, 20 turn	potentiometer, 270°	Teach-in	potentiometer, 20 turn
output circuit	NPN PNP	NPN PNP	NPN PNP	NPN PNP	NPN PNP
connection types	cable	cable connector	cable connector	cable connector	cable
housing material	metal	metal	metal	metal	metal
page	**536**	**544**	**537**	**538**	**539**

General information

In contrast to plastic fiber optics, glass fiber optics contain hundreds of individual fibers. Each one conveys a part of the emitted light. Depending on the arrangement of the individual fibers, a homogenous light spot or a line can be produced. Also, glass is a high-quality, durable material, which guarantees a long and constant service life. This is only one of the reasons that glass optical fibers are used in the telecommunications industry. The high heat resistance also allows fields of application which are difficult or completely impossible with other sensors.



Typical applications

The wide range of sheath materials and sensing heads make it possible for you to adapt the sensors optimally to your machine concept. A way can always be found to fasten the small fiber optic heads. Due to the different available lengths, the fiber optic sensor can be placed individually at an optimum point.

- Metal-sheathed optical fibers can also be used under harsh conditions
- Detection, differentiation and positioning of different objects
- Monitoring of areas using fiber optic arrays with linear fiber arrangement
- Use at high, low or constantly fluctuating ambient temperatures
- Ranges of up to 1,4 m with fiber optic through beam types

Characteristics and advantages

Independent of the environment
As only light is conveyed, electromagnetic fields or high/low temperatures have no effect on the functional reliability.

(plastic-sheathed: -25 ... +70 °C)
(metal-sheathed: -25 ... +250 °C)

Rugged
Metal-sheathed optical fibers are protected against mechanical effects (chips etc).
All fiber optic sensors are fitted with a rugged metal housing.

Stable operation
High-quality glass fibers ensure stable operation for a long period. All fiber optic sensors are equipped with high-power infrared light sources, which provide sufficient excess gain even with a certain degree of soiling.

Area monitoring
Fiber optic arrays with a linear fiber arrangement permit an area to be monitored or the detection of objects which are not precisely conveyed.

Optimum installation
Apart from the common threaded types, fiber optic sensors with smooth sleeves or side light exit are available.

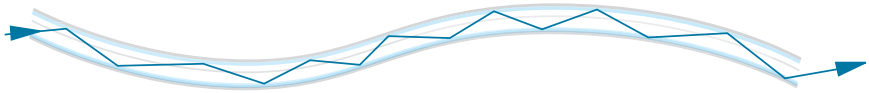
Fast processes
Fiber optic sensors with response times of only 50 microseconds permit the detection of objects even in very fast processes.

Technology and operation

By exploiting the so-called total reflection, it is possible to convey light in a medium such as glass without great loss.

Explanation of total reflection

When light waves reflect on a barrier layer between two media with different optical densities, they do not simply carry on in a straight line. When they penetrate from an optically denser medium (e.g. glass fiber core) into an optically thinner medium (e.g. glass sheath), there is a smaller angle, the critical angle, under which total reflection occurs. The light wave is reflected back and remains in the optically denser medium.



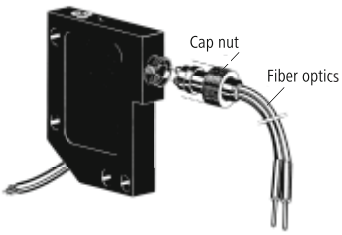
The glass sheath couting the core fiber is decisive for the transmission of light waves almost completely without loss. This ensures an optically consistent density of the sheath and the core and thereby permits a practically constant number of total reflections. This also occurs when the optical fiber is slightly bent. If there would be no core sheath, it would be highly decisive for the total reflection whether the optical fiber is used in an air medium or, for example, water. The critical angle would then change decisively, which could permit an undesired escape of light under certain circumstances.

In the sensing principle, fiber optic solutions are based on intensity differences. With fiber optic through beam types, an object breaking the light beam between the emitter and receiver is detected. With the fiber optic reflective types, the amount of light reflected by an object is evaluated.

For more information, see the section on plastic fiber optics in this chapter.

Mounting and adjustment

Fiber optics series 15



The cap nut to fasten the fiber optics is supplied with every order.

If damaged or lost, the cap nut can be ordered under the following number:

Cap nut	10103230

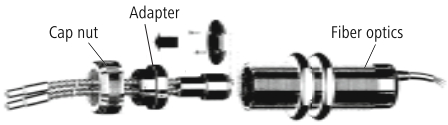
Fiber optics series 18

The adjusting plate and cap nut are supplied with every order.

If damaged or lost, they can be ordered under the following part numbers:

Adjusting plate	10101958
Cap nut	10101480

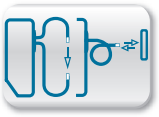
Fiber optics series 30



The adapter and the cap nut must be ordered as accessories with every order.

Adapter	10102757
Cap nut	10102801

For installation of the fiber optics, the cover must be removed.

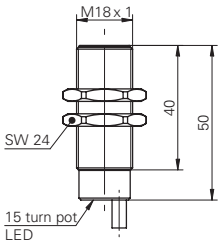


Sb = 310 mm
Tw = 60 mm

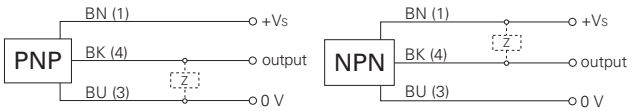
- sensitivity adjustable via potentiometer (axial)
- rugged metal housing
- infrared light source

general data	
actual range Sb	310 mm
sensing distance Tw	60 mm
light source	pulsed infrared diode
light indicator	LED yellow
alignment / soiled lens indicator	LED, flashing
adjustment	potentiometer, 15 turn
wave length	880 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 0,5 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 1,8 VDC
output function	light operate
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
height / length	50 mm
type	cylindrical threaded
housing material	brass nickel plated / PC
connection types	cable 3 pin, 2 m
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 65
Accessories	
10151658	Sensofix series 18
10101958	Adjusting plate series 18
10101480	Cap nut (replace) for fiber optics series 18
for details: see accessories section	
remarks	
cap nut and adjusting plate are included with fibre	

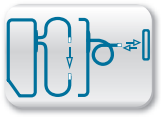
dimension drawing



connection diagrams



order reference	output circuit
FZAM 18N1155	NPN
FZAM 18P1155	PNP

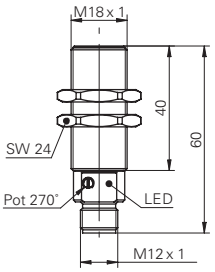


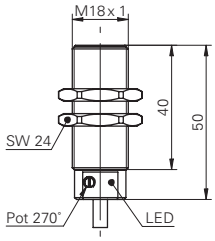
Sb = 800 mm
Tw = 150 mm

- sensitivity adjustable via potentiometer (radial)
- rugged metal housing
- infrared light source

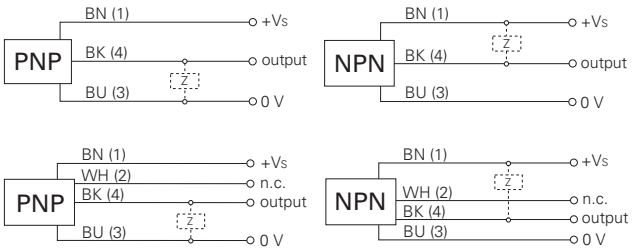
general data	
actual range Sb	800 mm
sensing distance Tw	150 mm
light source	pulsed infrared diode
light indicator	LED yellow
alignment / soiled lens indicator	LED, flashing
adjustment	potentiometer, 270°
wave length	880 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
current consumption typ.	30 mA
voltage drop Vd	< 1,8 VDC
output function	light operate
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
type	cylindrical threaded
housing material	brass nickel plated / PC
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10151658	Sensofix series 18
10101958	Adjusting plate series 18
10101480	Cap nut (replace) for fiber optics series 18
for details: see accessories section	
remarks	
cap nut and adjusting plate are included with fibre	

dimension drawings

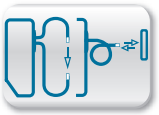




connection diagrams



order reference	height / length	output circuit	connection types
FZAM 18N1150	50 mm	NPN	cable 3 pin, 2 m
FZAM 18N1150/S14	60 mm	NPN	connector M12 4 pin
FZAM 18P1150	50 mm	PNP	cable 3 pin, 2 m
FZAM 18P1150/S14	60 mm	PNP	connector M12 4 pin

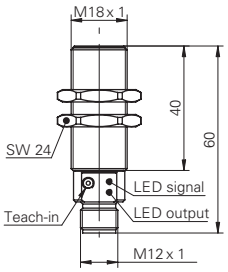


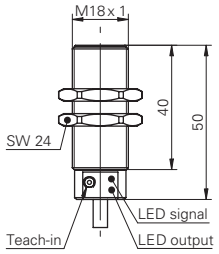
Sb = 800 mm
Tw = 150 mm

- sensitivity adjustable via Teach-in
- light / dark operation programmable
- rugged metal housing

general data	
actual range Sb	800 mm
sensing distance Tw	150 mm
light source	pulsed infrared diode
light indicator	LED green
alignment / soiled lens indicator	LED green, flashing
output indicator	LED yellow
adjustment	Teach-in
wave length	880 nm
suppression of reciprocal influence	yes
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	55 mA
current consumption typ.	40 mA
voltage drop Vd	< 1,8 VDC
output function	light / dark operate switchable
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	18 mm
type	cylindrical threaded
housing material	brass nickel plated / PC
ambient conditions	
operating temperature	-25 ... +55 °C
protection class	IP 67
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10151658	Sensofix series 18
10101958	Adjusting plate series 18
10101480	Cap nut (replace) for fiber optics series 18
for details: see accessories section	
remarks	
cap nut and adjusting plate are included with fibre	

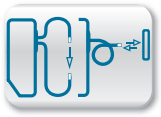
dimension drawings





connection diagrams

order reference	height / length	output circuit	connection types
FZAM 18N6460	50 mm	NPN	cable 4 pin, 2 m
FZAM 18N6460/S14	60 mm	NPN	connector M12 4 pin
FZAM 18P6460	50 mm	PNP	cable 4 pin, 2 m
FZAM 18P6460/S14	60 mm	PNP	connector M12 4 pin

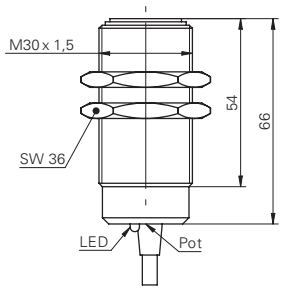


Sb = 1400 mm
Tw = 230 mm

- extended sensing distance
- fast version available
- rugged metal housing

general data	
light source	pulsed infrared diode
light indicator	LED yellow
alignment / soiled lens indicator	LED, flashing
adjustment	potentiometer, 20 turn
wave length	880 nm
electrical data	
voltage supply range +Vs	10 ... 30 VDC
voltage drop Vd	< 2,5 VDC
output function	light / dark operate
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	30 mm
height / length	66 mm
type	cylindrical threaded
housing material	brass nickel plated
connection types	cable 4 pin, 2 m
ambient conditions	
operating temperature	0 ... +65 °C
protection class	IP 65
Accessories	
11200030	Sensofix series 30
ZADAP-M30.STANDARD	Mounting bracket series 30
ZADAP-M30.LONG	Mounting bracket long series 30 (L design)
10102757	Adapter series 30
10106042	Adapter series 30 (angeled fiber optics)
10102801	Cap nut glass cover for sensors series 30
for details: see accessories section	
remarks	
cap nut and adapter has to be ordered separatly	

dimension drawing



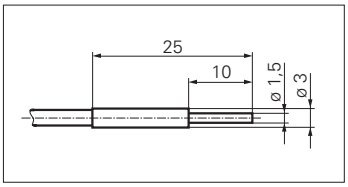
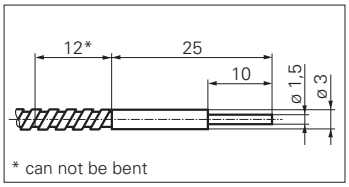
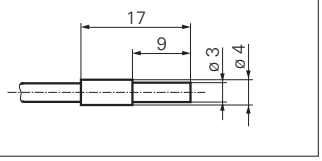
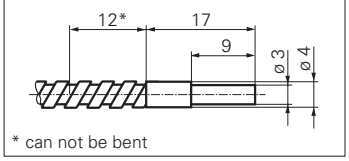
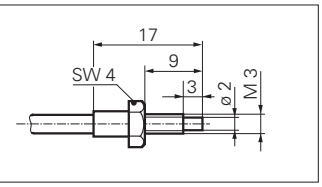
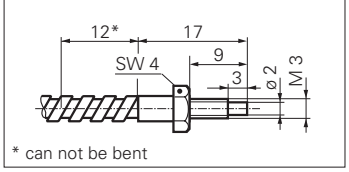
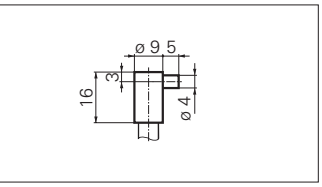
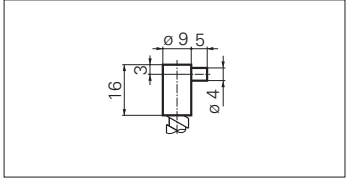
connection diagrams

order reference	actual range Sb	sensing distance Tw	response time / release time	current consumption max. (no load)	current consumption typ.	output circuit
FZAM 30N5004	1400 mm	230 mm	< 2,5 ms	50 mA	33 mA	NPN
FZAM 30P5001	600 mm	110 mm	< 0,25 ms	40 mA	30 mA	PNP
FZAM 30P5004	1400 mm	230 mm	< 2,5 ms	50 mA	33 mA	PNP

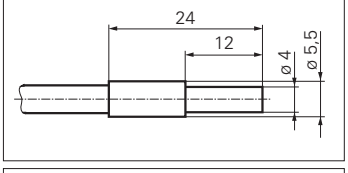
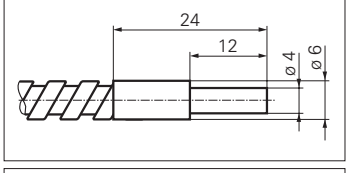
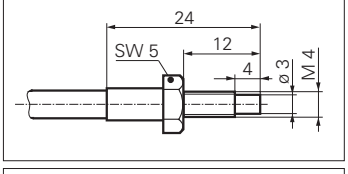
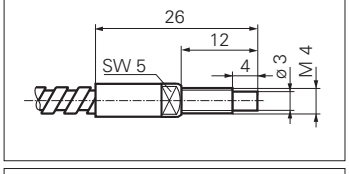
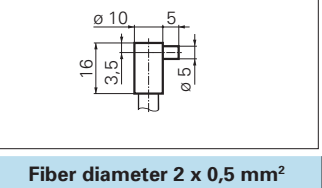
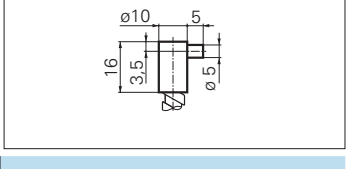
Glass fiber optics for Series 18, 30
Reflective types

Series 18 20-turn pot. | Series 18 Side mounted pot. Teach-in | Series 30 Fast version | Series 30 Extended Tw

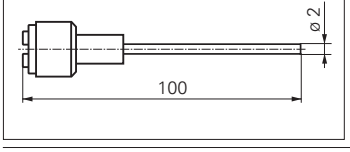
Fiber diameter 2 x 0,5 mm²

Sheath material: PVC ø 2,5 mm (FUE ...)	Sheath material: brass chromium plated ø 4 mm (FUF ...)	Part number	Tw = sensing distance [mm]
	 * can not be bent	**FUE 050A2004** **FUF 050A2004** (length 50 cm)	10 20 15 35
		FUE 100A2004 **FUF 100A2004** (length 100 cm)	5 20 15 30
	 * can not be bent	**FUE 050A2003** **FUF 050A2005** (length 50 cm)	10 20 15 35
		FUE 100A2003 **FUF 100A2005** (length 100 cm)	5 20 15 30
	 * can not be bent	**FUE 050A1003** **FUF 050A1005** (length 50 cm)	10 20 15 35
		FUE 100A1003 **FUF 100A1005** (length 100 cm)	5 20 15 30
		**FUE 050A4004** **FUF 050A4004** (length 50 cm)	10 20 15 35
		FUE 100A4004 **FUF 100A4004** (length 100 cm)	5 20 15 30

Fiber diameter 2 x 1 mm²

Sheath material: PUR ø 4,5 mm (FUE ...)	Sheath material: brass chromium plated ø 5 mm (FUF ...)	Part number	Tw = sensing distance [mm]
		**FUE 050A2002** **FUF 050A2007** (length 50 cm)	15 40 30 70
		FUE 100A2002 **FUF 100A2007** (length 100 cm)	15 40 30 60
		**FUE 050A1002** **FUF 050A1007** (length 50 cm)	15 40 30 70
		FUE 100A1002 **FUF 100A1007** (length 100 cm)	15 40 30 60
		**FUE 050A4005** **FUF 050A4005** (length 50 cm)	15 40 30 70
		FUE 100A4005 **FUF 100A4005** (length 100 cm)	15 40 30 60

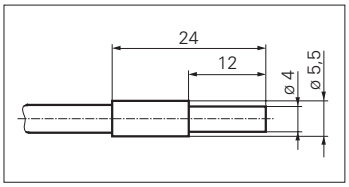
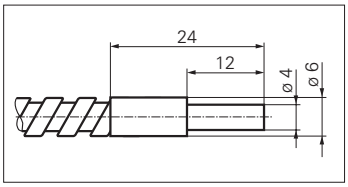
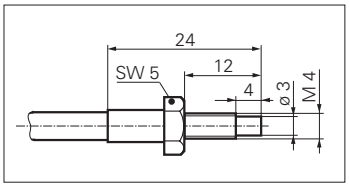
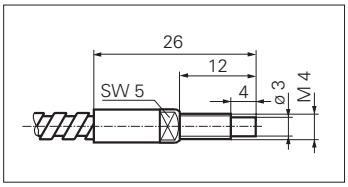
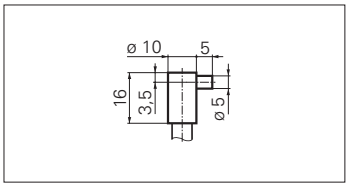
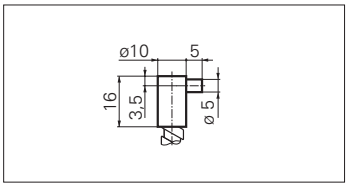
Fiber diameter 2 x 0,5 mm²

Sheath material: Chrome-nickel-steel ø 2 mm FUH 010A2002		Part number	Tw = sensing distance [mm]
		**FUH 010A2002** (length 10 cm)	10 20 15 35

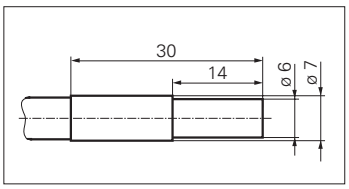
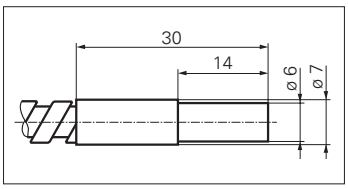
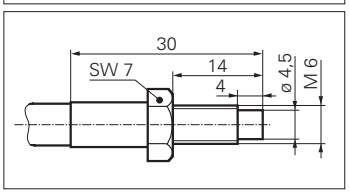
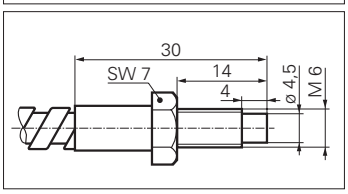
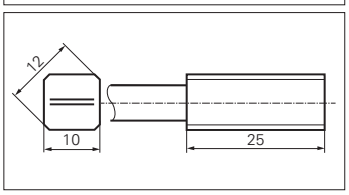
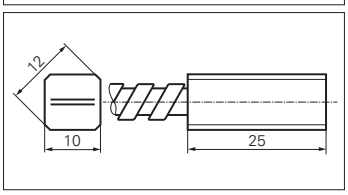
Glass fiber optics for Series 18, 30
Reflective types

Series 18 20-turn pot. | Series 18 Side mounted pot. Teach-in | Series 30 Fast version | Series 30 Extended Tw

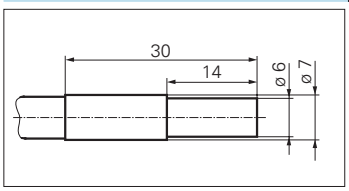
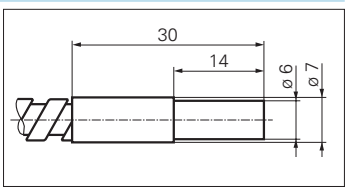
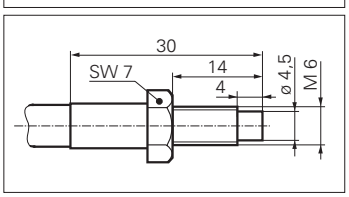
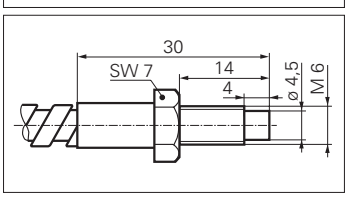
Fiber diameter 2 x 2 mm²

Sheath material: PUR ø 4,5 mm (FUE ...)	Sheath material: brass chromium plated ø 5 mm (FUF ...)	Part number	Tw = sensing distance [mm]
		**FUE 050A2011** **FUF 050A2011** (length 50 cm)	35 80 60 115
		FUE 100A2011 **FUF 100A2011** (length 100 cm)	35 80 60 115
		**FUE 050A1011** **FUF 050A1011** (length 50 cm)	35 80 60 115
		FUE 100A1011 **FUF 100A1011** (length 100 cm)	35 80 60 115
		**FUE 050A4003** **FUF 050A4002** (length 50 cm)	35 80 60 115
		FUE 100A4003 **FUF 100A4002** (length 100 cm)	35 80 60 115

Fiber diameter 2 x 3 mm²

Sheath material: PUR ø 6 mm (FUE ...)	Sheath material: brass chromium plated ø 6 mm (FUF ...)	Part number	Tw = sensing distance [mm]
		**FUE 050A2008** **FUF 050A2003** (length 50 cm)	60 150 100 210
		FUE 100A2008 **FUF 100A2003** (length 100 cm)	55 150 100 200
		**FUE 050A1008** **FUF 050A1003** (length 50 cm)	60 150 100 210
		FUE 100A1008 **FUF 100A1003** (length 100 cm)	55 150 100 200
		**FUE 050A3001** **FUF 050A3001** (length 50 cm)	60 150 100 210
		FUE 100A3001 **FUF 100A3001** (length 100 cm)	55 150 100 200

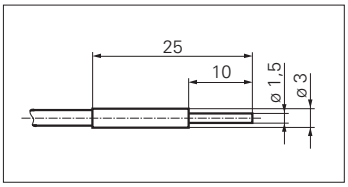
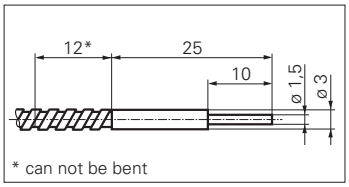
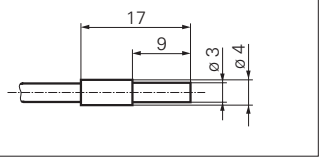
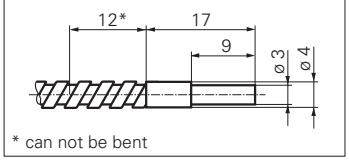
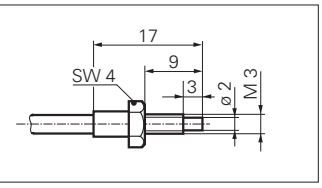
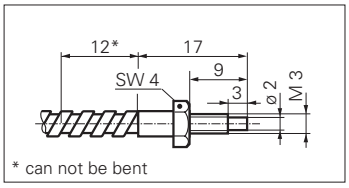
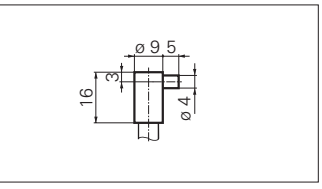
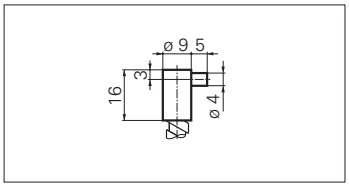
Fiber diameter 2 x 4 mm²

Sheath material: PUR ø 6 mm (FUE ...)	Sheath material: brass chromium plated ø 6 mm (FUF ...)	Part number	Tw = sensing distance [mm]
		**FUE 050A2001** **FUF 050A2001** (length 50 cm)	60 150 110 230
		FUE 100A2001 **FUF 100A2001** (length 100 cm)	60 150 100 220
		**FUE 050A1001** **FUF 050A1001** (length 50 cm)	60 150 110 230
		FUE 100A1001 **FUF 100A1001** (length 100 cm)	60 150 100 220

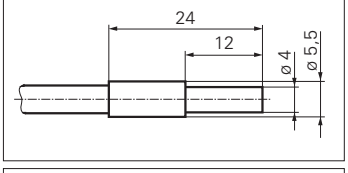
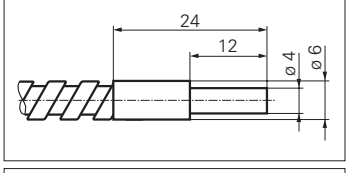
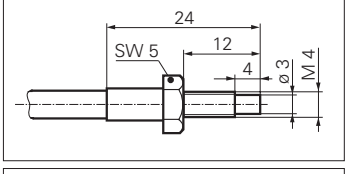
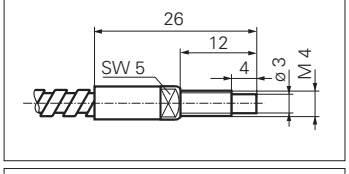
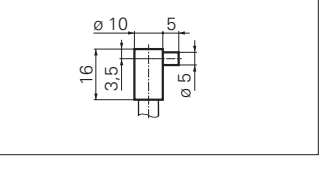
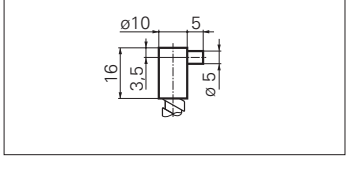
Glass fiber optics for Series 18, 30
Through beam types

Series 18 20-turn pot. | Series 18 Side mounted pot. Teach-in | Series 30 Fast version | Series 30 Extended Sb

Fiber diameter 2 x 1 mm²

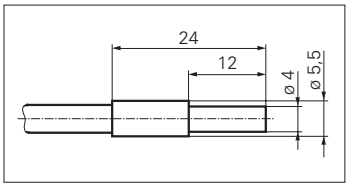
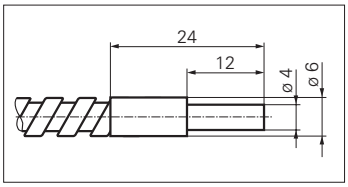
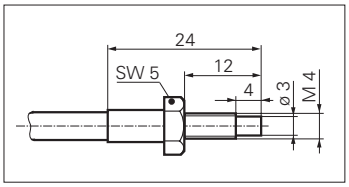
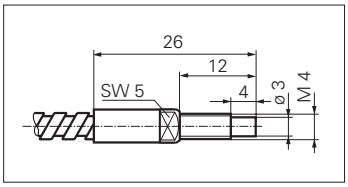
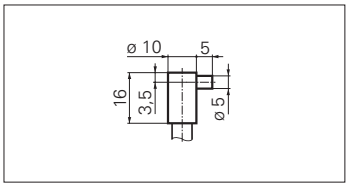
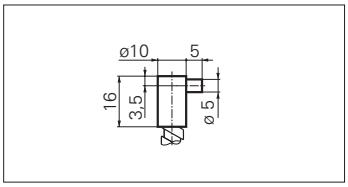
Sheath material: PVC ø 2,5 mm (FSE ...)	Sheath material: brass chromium plated ø 4 mm (FSF ...)	Part number	Sb = actual range [mm]
	 * can not be bent	**FSE 050A2002** **FSF 050A2004** (length 50 cm)	90 270 200 450
		FSE 100A2002 **FSF 100A2004** (length 100 cm)	90 250 190 500
	 * can not be bent	**FSE 050A2001** **FSF 050A2005** (length 50 cm)	90 270 200 450
		FSE 100A2001 **FSF 100A2005** (length 100 cm)	90 250 190 500
	 * can not be bent	**FSE 050A1001** **FSF 050A1005** (length 50 cm)	90 270 200 450
		FSE 100A1001 **FSF 100A1005** (length 100 cm)	90 250 190 500
		**FSE 050A4003** **FSF 050A4003** (length 50 cm)	90 270 200 450
		FSE 100A4003 **FSF 100A4003** (length 100 cm)	90 250 190 500

Fiber diameter 2 x 2 mm²

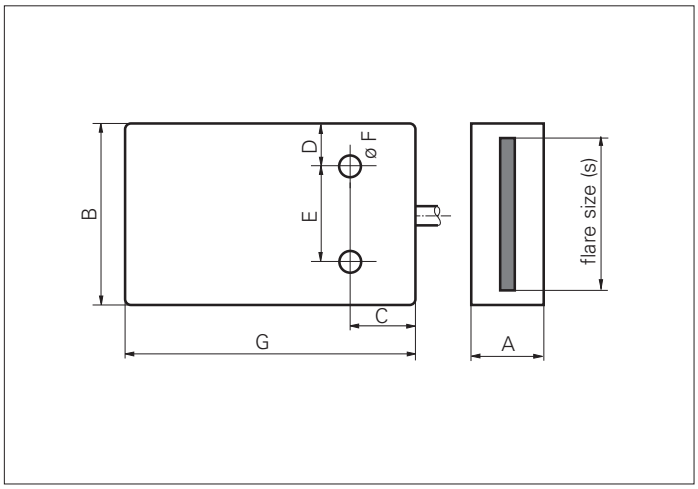
Sheath material: PUR ø 4,5 mm (FSE ...)	Sheath material: brass chromium plated ø 5 mm (FSF ...)	Part number	Sb = actual range [mm]
		**FSE 050A2006** **FSF 050A2002** (length 50 cm)	180 450 380 450
		FSE 100A2006 **FSF 100A2002** (length 100 cm)	170 500 370 860
		**FSE 050A1006** **FSF 050A1002** (length 50 cm)	180 450 380 450
		FSE 100A1006 **FSF 100A1002** (length 100 cm)	170 500 370 860
		**FSE 050A4006** **FSF 050A4002** (length 50 cm)	180 450 380 450
		FSE 100A4006 **FSF 100A4002** (length 100 cm)	170 500 370 860

Glass fiber optics for Series 18, 30
Through beam types

Series 18 20-turn pot. | Series 18 Side mounted pot. Teach-in | Series 30 Fast version | Series 30 Extended Sb

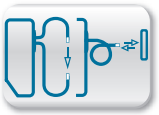
Fiber diameter 2 x 4 mm²		Part number	Sb = actual range [mm]
Sheath material: PVC ø 4 mm (FSE ...)	Sheath material: brass chromium plated ø 5 mm (FSF ...)		
		**FSE 050A2003** **FSF 050A2001** (length 50 cm)	310 500 500 500
		FSE 100A2003 **FSF 100A2001** (length 100 cm)	300 800 600 1400
		**FSE 050A1003** **FSF 050A1001** (length 50 cm)	310 500 500 500
		FSE 100A1003 **FSF 100A1001** (length 100 cm)	300 800 600 1400
		**FSE 050A4004** **FSF 050A4004** (length 50 cm)	310 500 500 500
		FSE 100A4004 **FSF 100A4004** (length 100 cm)	300 800 600 1400

Arrays (for Series 18 only)



Part number	Sb = actual range [mm]
FSF 050A3020 **FSE 050A3020** (length 50 cm)	310 500
FSF 100A3020 **FSE 100A3020** (length 100 cm)	310 800
FSF 050A3021 **FSF 050A3022** (length 50 cm)	350 500
FSF 100A3021 **FSF 100A3022** (length 100 cm)	350 900

flare size	dimensions mm							part number
s	A	B	C	D	E	F	G	
8 mm	10	10	-	-	-	-	25	FSF 050A3020 FSF 100A3020
8 mm	10	10	-	-	-	-	25	FSE 050A3020 FSE 100A3020
20 mm	10	25	9	6.5	12	3,2	40	FSF 050A3021 FSF 100A3021
35 mm	12	40	12	7.5	25	4,2	50	FSF 050A3022 FSF 100A3022
metal sheath (FSF...)								length 50 cm length 100 cm
plastic sheath (FSE...) (PUR)								length 50 cm length 100 cm

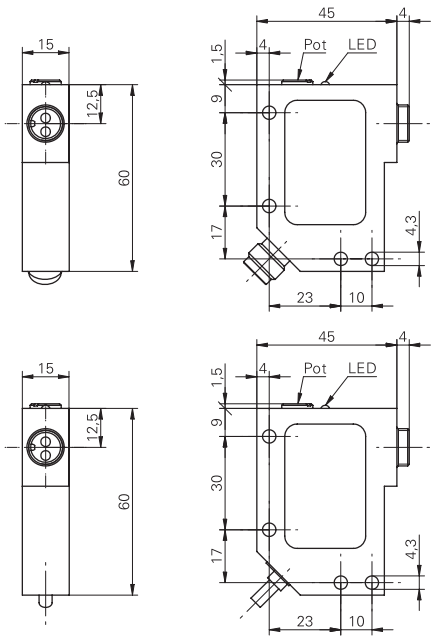


Sb = 1200 mm
Tw = 240 mm

- sensitivity adjustable via potentiometer
- fast version available
- rugged metal housing

general data	
actual range Sb	1200 mm
sensing distance Tw	240 mm
light source	pulsed infrared diode
light indicator	LED yellow
alignment / soiled lens indicator	LED, flashing
adjustment	potentiometer, 20 turn
wave length	880 nm
suppression of reciprocal influence	yes
electrical data	
voltage supply range +Vs	10 ... 30 VDC
voltage drop Vd	< 1,8 VDC
output function	light / dark operate
output current	< 200 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	15 mm
height / length	60 mm
depth	45 mm
type	rectangular
housing material	die-cast aluminum
ambient conditions	
operating temperature	-25 ... +65 °C
protection class	IP 65
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10103415	Mounting bracket series 15 (L design)
10103230	Cap nut (replace) for fiber optics series 15
for details: see accessories section	

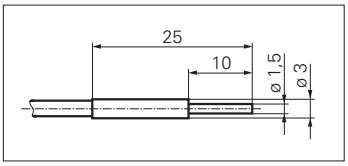
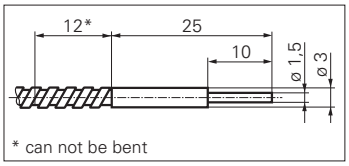
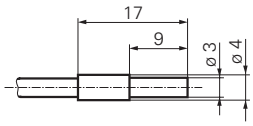
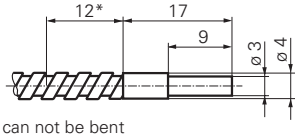
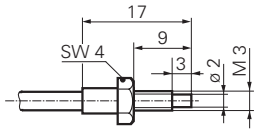
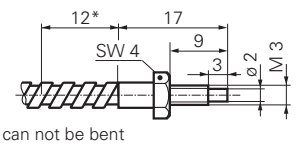
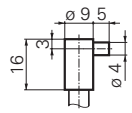
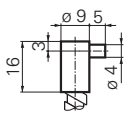
dimension drawings

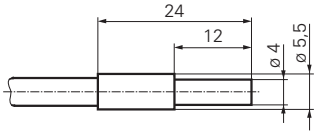
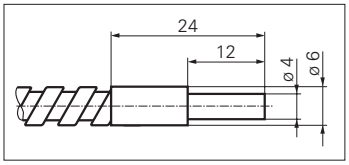
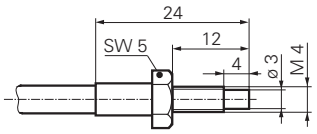
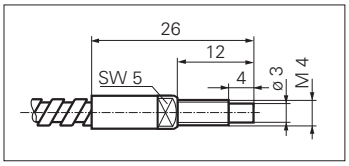
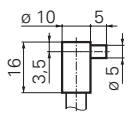
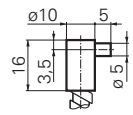


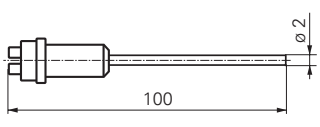
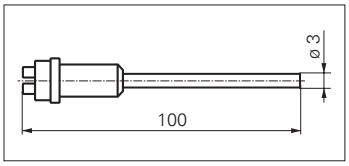
connection diagrams

order reference	response time / release time	current consumption max. (no load)	current consumption typ.	output circuit	connection types
FVDM 15N5103	< 1 ms	46 mA	30 mA	NPN	cable 4 pin, 2 m
FVDM 15N5103/S14	< 1 ms	46 mA	30 mA	NPN	connector M12 4 pin
FVDM 15P5103	< 1 ms	46 mA	30 mA	PNP	cable 4 pin, 2 m
FVDM 15P5103/S14	< 1 ms	46 mA	30 mA	PNP	connector M12 4 pin
FVDM 15P5130	< 0,1 ms	60 mA	50 mA	PNP	cable 4 pin, 2 m
FVDM 15P5130/S14	< 0,1 ms	60 mA	50 mA	PNP	connector M12 4 pin

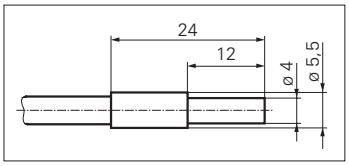
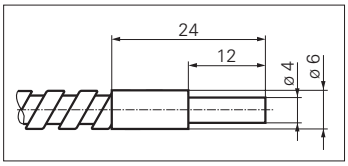
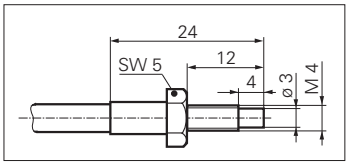
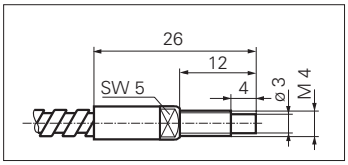
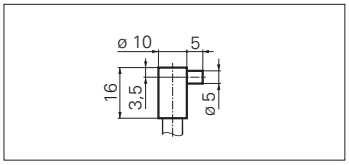
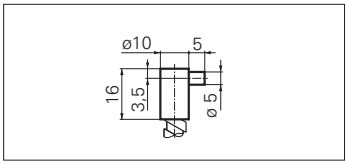
Glass fiber optics for Series 15
Reflective types

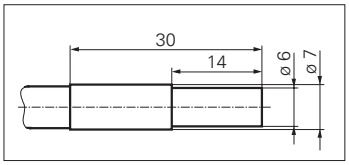
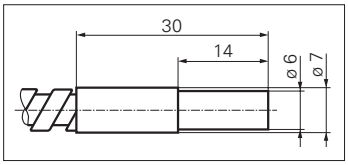
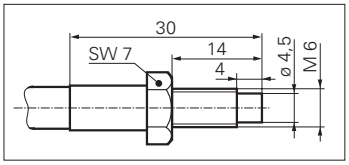
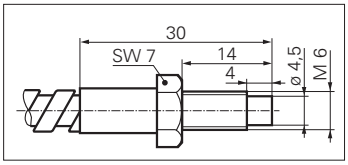
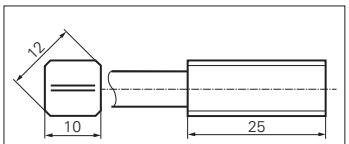
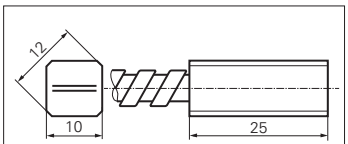
Fiber diameter 2 x 0,5 mm²		Part number	Tw = sensing distance [mm]
Sheath material: PVC ø 2,5 mm (FUE ...)	Sheath material: brass chromium plated ø 4 mm (FUF ...)		
	 * can not be bent	**FUE 025B2004** **FUF 025B2004** (length 25 cm)	25
		FUE 050B2004 **FUF 050B2004** (length 50 cm)	25
	 * can not be bent	**FUE 025B2003** **FUF 025B2003** (length 25 cm)	25
		FUE 050B2003 **FUF 050B2003** (length 50 cm)	25
	 * can not be bent	**FUE 025B1003** **FUF 025B1003** (length 25 cm)	25
		FUE 050B1003 **FUF 050B1003** (length 50 cm)	25
		**FUE 025B4003** **FUF 025B4006** (length 25 cm)	25
		FUE 050B4003 **FUF 050B4006** (length 50 cm)	25

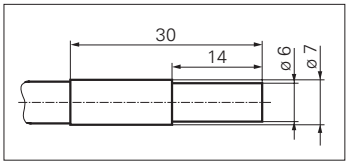
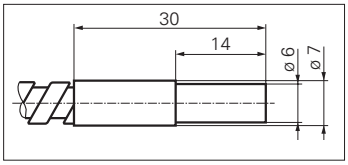
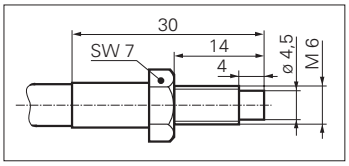
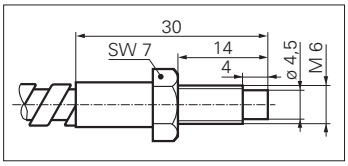
Fiber diameter 2 x 1 mm²		Part number	Tw = sensing distance [mm]
Sheath material: PUR ø 4,5 mm (FUE ...)	Sheath material: brass chromium plated ø 5 mm (FUF ...)		
		**FUE 025B2002** **FUF 025B2005** (length 25 cm)	60
		FUE 050B2002 **FUF 050B2005** (length 50 cm)	60
		**FUE 025B1002** **FUF 025B1005** (length 25 cm)	60
		FUE 050B1002 **FUF 050B1005** (length 50 cm)	60
		**FUE 025B4005** **FUF 025B4008** (length 25 cm)	60
		FUE 050B4005 **FUF 050B4008** (length 50 cm)	60

Fiber diameter 2 x 0,5 mm²	Fiber diameter 2 x 1 mm²	Part number	Tw = sensing distance [mm]
Sheath material: Chrome-nickel-steel ø 2 mm FUH 010B2002	Sheath material: Chrome-nickel-steel ø 3 mm FUH 010B2001		
		**FUH 010B2002** (length 10 cm)	25
		FUH 010B2001 (length 10cm)	60

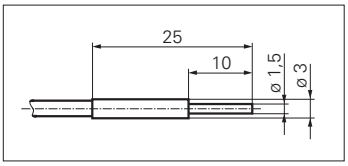
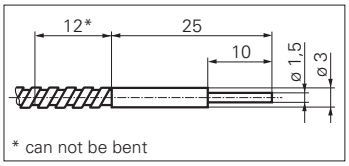
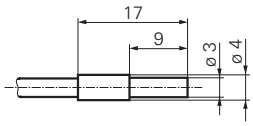
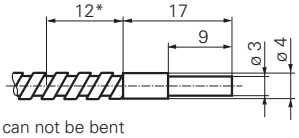
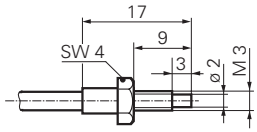
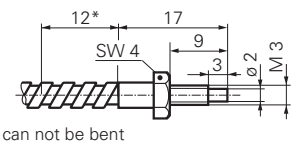
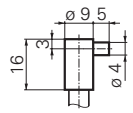
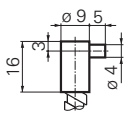
Glass fiber optics for Series 15
Reflective types

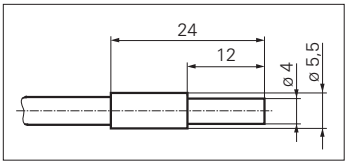
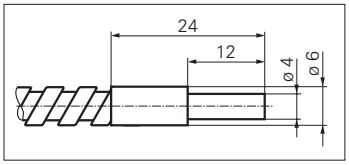
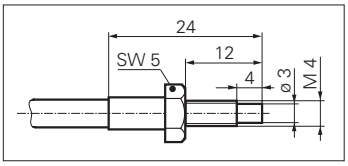
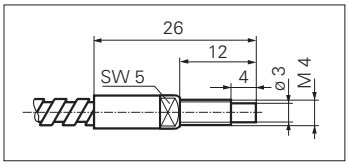
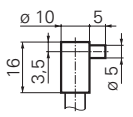
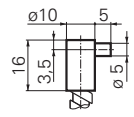
Fiber diameter 2 x 2 mm²			
Sheath material: PUR ø 4,5 mm (FUE ...)	Sheath material: brass chromium plated ø 5 mm (FUF ...)	Part number	Tw = sensing distance [mm]
		**FUE 025B2011** **FUF 025B2011** (length 25 cm)	110
		FUE 050B2011 **FUF 050B2011** (length 50 cm)	100
		**FUE 025B1011** **FUF 025B1011** (length 25 cm)	110
		FUE 050B1011 **FUF 050B1011** (length 50 cm)	100
		**FUE 025B4004** **FUF 025B4002** (length 25 cm)	110
		FUE 050B4004 **FUF 050B4002** (length 50 cm)	100

Fiber diameter 2 x 3 mm²			
Sheath material: PUR ø 6 mm (FUE ...)	Sheath material: brass chromium plated ø 6 mm (FUF ...)	Part number	Tw = sensing distance [mm]
		**FUE 025B2008** **FUF 025B2002** (length 25 cm)	210
		FUE 050B2008 **FUF 050B2002** (length 50 cm)	200
		**FUE 025B1008** **FUF 025B1002** (length 25 cm)	210
		FUE 050B1008 **FUF 050B1002** (length 50 cm)	200
		**FUE 025B3001** **FUF 025B3001** (length 25 cm)	210
		FUE 050B3001 **FUF 050B3001** (length 50 cm)	200

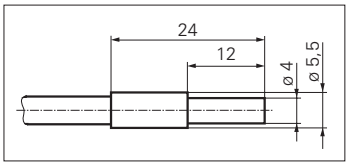
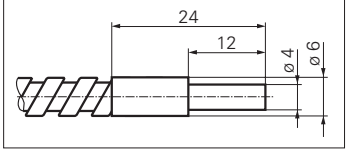
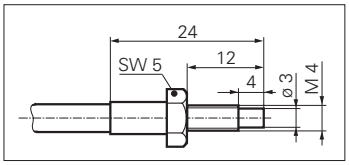
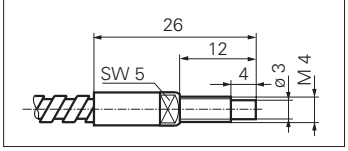
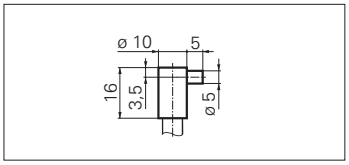
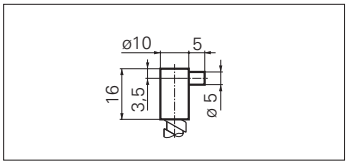
Fiber diameter 2 x 4 mm²			
Sheath material: PUR ø 6 mm (FUE ...)	Sheath material: brass chromium plated ø 6 mm (FUF ...)	Part number	Tw = sensing distance [mm]
		**FUE 025B2001** **FUF 025B2001** (length 25 cm)	240
		FUE 050B2001 **FUF 050B2001** (length 50 cm)	230
		**FUE 025B1001** **FUF 025B1001** (length 25 cm)	240
		FUE 050B1001 **FUF 050B1001** (length 50 cm)	230

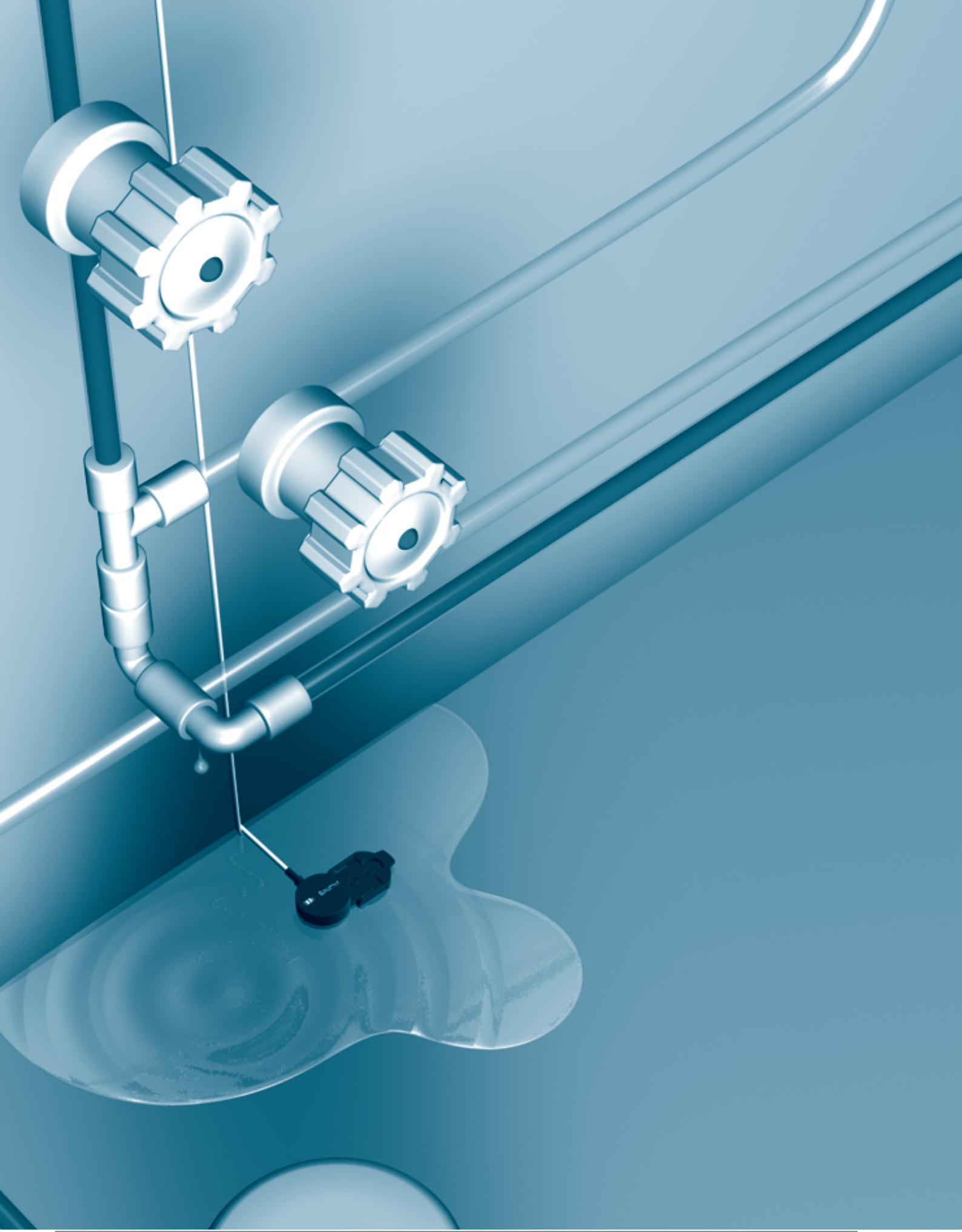
Glass fiber optics for Series 15
Through beam types

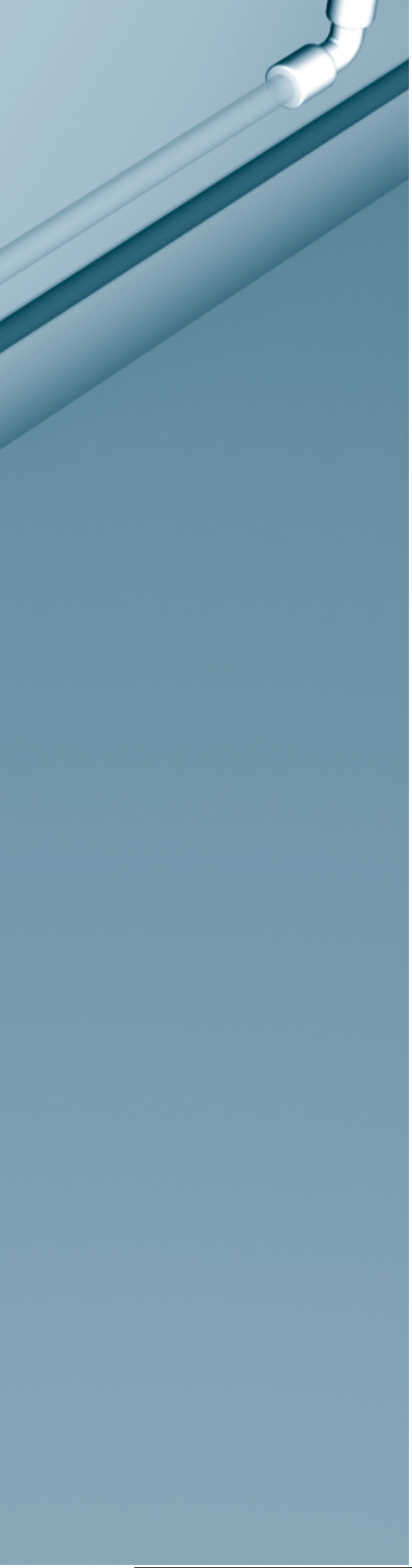
Fiber diameter 2 x 1 mm²			
Sheath material: PVC ø 2,5 mm (FSE ...)	Sheath material: brass chromium plated ø 4 mm (FSF ...)	Part number	**Sb** = actual range [mm]
	 * can not be bent	**FSE 025B2002** **FSF 025B2002** (length 25 cm)	140
		FSE 050B2002 **FSF 050B2002** (length 50 cm)	320
	 * can not be bent	**FSE 025B2001** **FSF 025B2005** (length 25 cm)	140
		FSE 050B2001 **FSF 050B2005** (length 50 cm)	320
	 * can not be bent	**FSE 025B1001** **FSF 025B1005** (length 25 cm)	140
		FSE 050B1001 **FSF 050B1005** (length 50 cm)	320
		**FSE 025B4003** **FSF 025B4003** (length 25 cm)	140
		FSE 050B4003 **FSF 050B4003** (length 50 cm)	320

Fiber diameter 2 x 2 mm²			
Sheath material: PUR ø 4,5 mm (FSE ...)	Sheath material: brass chromium plated ø 5 mm (FSF ...)	Part number	**Sb** = actual range [mm]
		**FSE 025B2006** **FSF 025B2006** (length 25 cm)	160
		FSE 050B2006 **FSF 050B2006** (length 50 cm)	450
		**FSE 025B1007** **FSF 025B1007** (length 25 cm)	160
		FSE 050B1007 **FSF 050B1007** (length 50 cm)	450
		**FSE 025B4006** **FSF 025B4002** (length 25 cm)	160
		FSE 050B4006 **FSF 050B4002** (length 50 cm)	450

Glass fiber optics for Series 15
Through beam types

Fiber diameter 2 x 4 mm²		Part number	Sb = actual range [mm]
Sheath material: PVC ø 4 mm (FSE ...)	Sheath material: brass chromium plated ø 5 mm (FSF ...)		
		**FSE 025B2003** **FSF 025B2001** (length 25 cm)	160
		FSE 050B2003 **FSF 050B2001** (length 50 cm)	500
		**FSE 025B1003** **FSF 025B1001** (length 25 cm)	160
		FSE 050B1003 **FSF 050B1001** (length 50 cm)	500
		**FSE 025B4004** **FSF 025B4004** (length 25 cm)	160
		FSE 050B4004 **FSF 050B4004** (length 50 cm)	500





Level monitoring and leak detecting sensors

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Level monitoring sensors	Page 557
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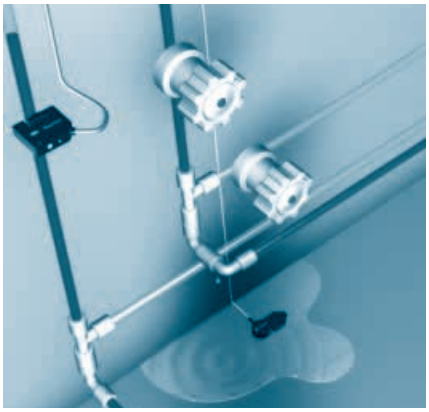
Diverse	Page 564

product family	FFAK 17	FFAK 17	FFAK 16	FFAM 17	FFAM 16	FFDK 16	FODK 23
type	liquid level sensor	liquid level sensor	liquid level sensor	liquid level sensor	liquid level sensor	liquid level sensor	Leakage sensor
width / diameter	30 mm	30 mm	30 mm	30 mm	30 mm	16 mm	23 mm
response time / release time						< 2 ms	< 1 ms
light source	pulsed infrared diode	pulsed infrared diode	pulsed infrared diode	pulsed infrared diode	pulsed infrared diode	pulsed infrared diode	pulsed red LED
sensitivity adjustment	no	potentiometer, 15 turn	no	potentiometer, 15 turn	potentiometer, 15 turn	no	no
output circuit	NPN PNP	NPN PNP	NPN PNP	PNP	PNP	PNP	PNP
connection types	cable	cable	cable	cable	cable	cable	cable
thread	G 3/8"	G 3/8"	M16x1 mm	G 3/8"	M16x1 mm		
housing material	plastic	plastic	plastic	metal	metal	plastic	plastic
page	**557**	**558**	**559**	**560**	**561**	**562**	**563**

General information

With photoelectric level monitoring and leak sensors, liquids can be easily and reliably detected without the need of an electrical connection or mechanical movement between the liquid and the sensor. There are two possible principles of detection: the sensor is in direct contact with the liquid or it is fastened to a hose or stand pipe to detect the level without contact. The available fiber optic versions permit level and leak control in constricted surroundings and even in hazardous zones.



Typical applications

The chemical resistance of the sensors permits versatile applications:

- Level monitoring of liquids such as
  - acetone
  - alkalis
  - milk
  - acids, e.g. hydrochloric, sulfuric or battery acid
  - mineral oil
  - all non-conductive liquids
- Contact free level detection in (semi) transparent hoses and stand pipes
- Detection of the minimum and maximum levels in trays and tanks
- Leak monitoring of oil trays or lubricant tanks
- Monitoring of leaked liquids in dispensers and other liquid handling systems

Characteristics and advantages of level monitoring sensors

Chemical resistance
The sensor housings are made of polysulfonide or stainless steel and are resistant to certain liquids.

Detectable media
As optical light is used to detect the liquid, various and non-conductive liquids can be detected.

Simple commissioning
It is unnecessary to adjust sensors with integrated electronics. With fiber optics, the adjustment is made via a fiber optic sensor.

Hazardous environments
The intrinsically safe fiber optic version with PFA coating can also be used in hazardous environments.

Characteristics and advantages of leak sensors

Detectable media
As optical light is used to detect the liquid, various and non-conductive liquids can be detected. Typically, 1ml of leaked liquid is sufficient to initiate an alarm.

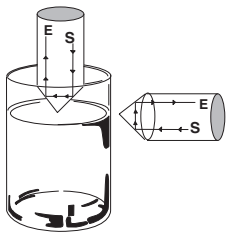
Failsafe facility
The integrated failsafe facility triggers an alarm on leaks, cable rupture, detachment from the fastening or if the sensor is defective.

Hazardous environments
The intrinsically safe fiber optic version with PFA coating can also be used in hazardous environments.

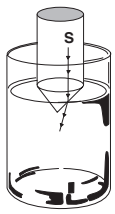
Technology and operation

Level monitoring and leak sensors in contact with the liquid

The operating principles of both types of sensor are shown in the sketch below. The critical angle for total reflection changes depending on whether the sensor tip is surrounded by water or air. If the sensor tip is surrounded by a liquid, the light beam is refracted by the liquid and the sensor output changes its state. The liquid medium may be electrically conductive, turbid or clear. The same operating principle is employed for the leak sensors. Only the volume of the liquid is different. Typically, as little as 1ml of a liquid can be detected.



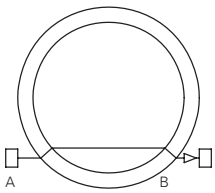
Level not reached



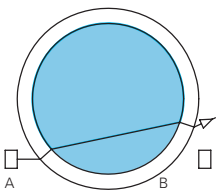
Level reached

Level monitoring sensors without contact with the liquid

The level monitoring sensors for hose or stand pipe mounting operate by a similar principle. For example, the FFDK 16 also exploits the refractive properties of liquids. In a state without the liquid, the emitted light (A) impinges directly on the receiver (B). If the liquid enters the detection range, a part of the emitted light is refracted, so that less light impinges on the receiver. This change in the light can be assessed by the sensor.

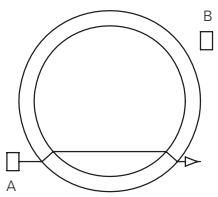


Level not reached

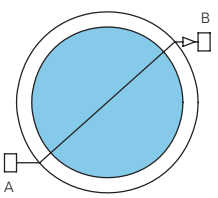


Level reached

With the fiber optic version FSL 500C6Y00, the principle is exactly the opposite. In a state without the liquid, no light impinges on the receiver (B). It is only when liquid enters the detection range of the array that a part of the emitted light (A) is diverted to the receiver (B). This change in the light can be assessed by the receiver. The advantage of the array configuration with a monitoring range of approx. 5 mm is that interference caused by foam and small air bubbles can be suppressed by a powerful fiber optic sensor.



Level not reached

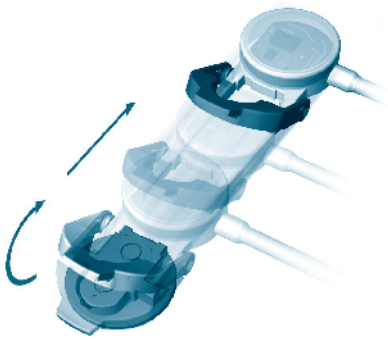


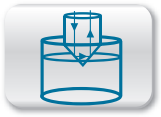
Level reached

Mounting and adjustment

Level monitoring sensors for hose/stand pipe mounting:
The sensors can very easily be attached to a hose or stand pipe with cable ties.
A separate bracket or other holder is unnecessary. No adjustments must be made to the FFDK 16 with integrated electronics. It is only necessary to choose between light and dark switching.
With the fiber optic version FSL, the adjustment is made via a fiber optic sensor.

Leak sensors:
The leak sensors can be screwed directly to the floor or on a base. No adjustments must be made to the sensor FODK 23. With the fiber optic version FOC, the adjustment is made via a fiber optic sensor. The sensors can be very easily released from their holders for cleaning purposes move to beginning of sentence.



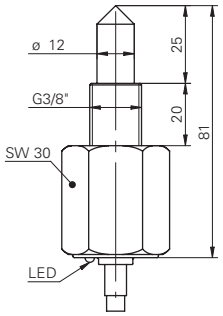


- chemical resistance
- up to 10 bar nominal pressure

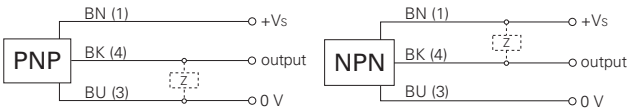
general data	
type	liquid level sensor
light source	pulsed infrared diode
nominal pressure (probe tip)	10 bar
output indicator	LED yellow
sensitivity adjustment	no
wave length	880 nm
measurement type	contact with medium
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	15 mA
voltage drop Vd	< 2 VDC
output function	normally open (NO)
output current	< 200 mA
short circuit protection	no
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	30 mm
height / length	81 mm
thread	G 3/8"
type	cylindrical
material (sensing device)	polysulphone
housing material	polysulphone
connection types	cable 3 pin, 2 m
ambient conditions	
operating temperature	0 ... +65 °C
protection class	IP 67

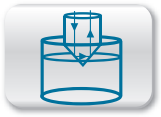
order reference	output circuit
FFAK 17NTD1001/L	NPN
FFAK 17PTD1001/L	PNP

dimension drawing



connection diagrams

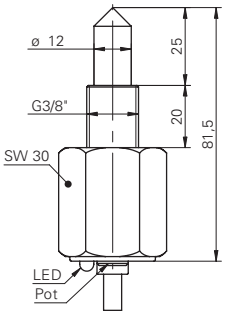




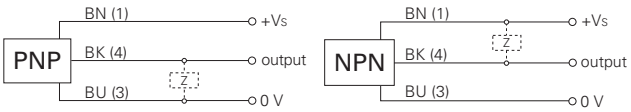
- sensitivity adjustable
- chemical resistance
- up to 10 bar nominal pressure

general data	
type	liquid level sensor
light source	pulsed infrared diode
nominal pressure (probe tip)	10 bar
output indicator	LED yellow
sensitivity adjustment	potentiometer, 15 turn
wave length	880 nm
measurement type	contact with medium
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	15 mA
voltage drop Vd	< 2 VDC
output function	normally open (NO)
output current	< 200 mA
short circuit protection	no
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	30 mm
height / length	81,5 mm
thread	G 3/8"
type	cylindrical
material (sensing device)	polysulphone
housing material	polysulphone
connection types	cable 3 pin, 2 m
ambient conditions	
operating temperature	0 ... +65 °C
protection class	IP 67

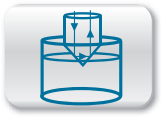
dimension drawing



connection diagrams



order reference	output circuit
FFAK 17NTD1002/L	NPN
FFAK 17PTD1002/L	PNP

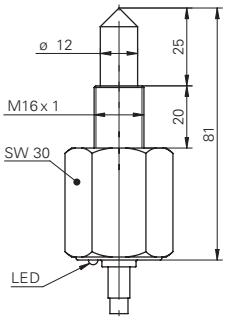


- with thread M16x1
- chemical resistance
- up to 10 bar nominal pressure

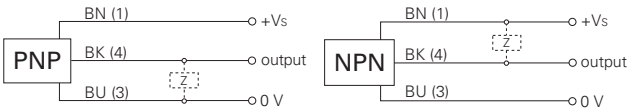
general data	
type	liquid level sensor
light source	pulsed infrared diode
nominal pressure (probe tip)	10 bar
output indicator	LED yellow
sensitivity adjustment	no
wave length	880 nm
measurement type	contact with medium
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	15 mA
voltage drop Vd	< 2 VDC
output function	normally open (NO)
output current	< 200 mA
short circuit protection	no
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	30 mm
height / length	81 mm
thread	M16x1 mm
type	cylindrical
material (sensing device)	polysulphone
housing material	polysulphone
connection types	cable 3 pin, 2 m
ambient conditions	
operating temperature	0 ... +65 °C
protection class	IP 67

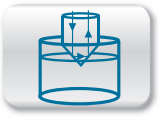
order reference	output circuit
FFAK 16NTD1001/L	NPN
FFAK 16PTD1001/L	PNP

dimension drawing



connection diagrams

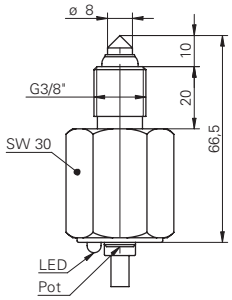




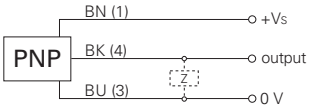
- rugged metal housing
- chemical resistance
- up to 40 bar nominal pressure

general data	
type	liquid level sensor
light source	pulsed infrared diode
nominal pressure (probe tip)	40 bar
output indicator	LED yellow
sensitivity adjustment	potentiometer, 15 turn
wave length	880 nm
measurement type	contact with medium
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	15 mA
voltage drop Vd	< 2 VDC
output function	normally open (NO)
output circuit	PNP
output current	< 200 mA
short circuit protection	no
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	30 mm
height / length	66,5 mm
thread	G 3/8"
type	cylindrical
material (sensing device)	glass (borosilicate)
housing material	stainless steel DIN 1.4305/AISI 303
connection types	cable 3 pin, 2 m
ambient conditions	
operating temperature	0 ... +65 °C
protection class	IP 67

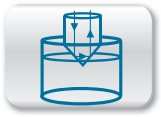
dimension drawing



connection diagram



order reference
FFAM 17PTD1002/L

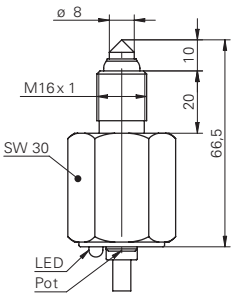


- with thread M16x1
- rugged metal housing
- up to 40 bar nominal pressure

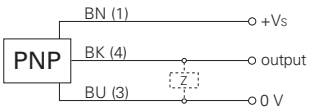
general data	
type	liquid level sensor
light source	pulsed infrared diode
nominal pressure (probe tip)	40 bar
output indicator	LED yellow
sensitivity adjustment	potentiometer, 15 turn
wave length	880 nm
measurement type	contact with medium
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	15 mA
voltage drop Vd	< 2 VDC
output function	normally open (NO)
output circuit	PNP
output current	< 200 mA
short circuit protection	no
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	30 mm
height / length	66,5 mm
thread	M16x1 mm
type	cylindrical
material (sensing device)	glass (borosilicate)
housing material	stainless steel DIN 1.4305/AISI 303
connection types	cable 3 pin, 2 m
ambient conditions	
operating temperature	0 ... +65 °C
protection class	IP 67

order reference
FFAM 16PTD1002/L

dimension drawing



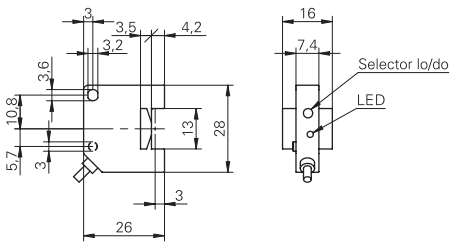
connection diagram



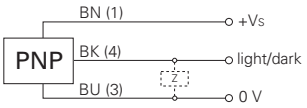
- liquid level sensor for pipe mounting
- pipe diameter from 3 ... 13 mm
- easy setup - no adjustment necessary

general data	
type	liquid level sensor
light source	pulsed infrared diode
output indicator	LED red
sensitivity adjustment	no
wave length	950 nm
max. thickness of the pipe / tube	1 mm
electrical data	
response time / release time	< 2 ms
current consumption max. (no load)	25 mA
voltage drop Vd	< 1 VDC
output function	light / dark operate switchable
output circuit	PNP
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	16 mm
height / length	28 mm
depth	26 mm
type	rectangular
housing material	PC
connection types	cable 3 pin, 2 m
ambient conditions	
operating temperature	-10 ... +55 °C
protection class	IP 50

dimension drawing



connection diagram



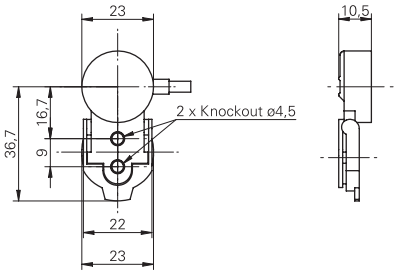
order reference	voltage supply range +Vs	max. outer diameter of the pipe / tube
FFDK 16P50Y0	9 ... 30,8 VDC	8 ... 13 mm
FFDK 16P50Y5	10 ... 30 VDC	3 ... 7 mm

- leakage sensor with integrated electronics
- detects liquid amounts of approx. 1 ml
- chemical resistance thanks to PFA sheath

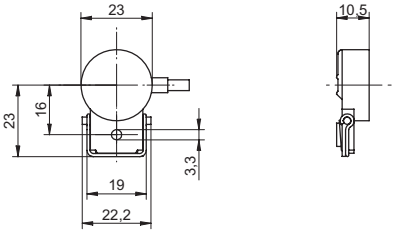
general data	
type	Leakage sensor
light source	pulsed red LED
output indicator	LED orange
light indicator	LED green
sensitivity adjustment	no
wave length	875 nm
measurement type	contact with medium
electrical data	
response time / release time	< 1 ms
voltage supply range +Vs	12 ... 24 VDC
current consumption max. (no load)	30 mA
voltage drop Vd	< 1 VDC
output function	normally closed (NC)
output circuit	PNP
output current	< 50 mA
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	23 mm
height / length	10,5 mm
depth	37,2 mm
type	rectangular
material (sensing device)	PFA
ambient conditions	
operating temperature	-25 ... +50 °C
protection class	IP 67

order reference	housing material	connection types
FODK 23P90Y0	PFA / PVC	cable 3 pin, 2 m
FODK 23P90Y0/0500	PFA / PVC	cable 3 pin, 5 m
FODK 23P90Y5	PFA	cable 3 pin, 2 m

dimension drawings

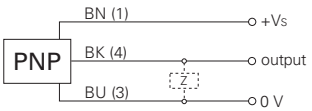


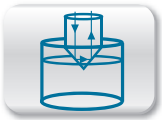
FODK 23P90Y0...



FODK 23P90Y5

connection diagram



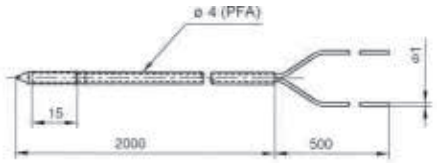


Fiber optic level sensor FUL

- the special sensor tip prevents drop formation
- high chemical resistance

general data	
type	liquid level sensor
optical fiber length	2 m / 5 m
mechanical data	
min. bending radius	30 mm
tensile strength	5 N
optical fiber material	PFA
ambient conditions	
operating temperature	-30 … +105 °C
order reference	
FUL 200D2Y00	(use with fiber optic sensor FVDK 66 / FVDK 67)
FUL 500D2Y00	(use with fiber optic sensor FVDK 66 / FVDK 67)

dimension drawing



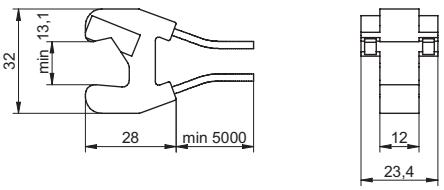
R = 15 mm / 30 mm tip to 40 mm length

Fiber optic level sensor for stand pipe mounting FSL

- fine light curtain suppresses foam/air bubbles
- diameter of the pipe/tube 3 ... 13 mm

general data	
type	liquid level sensor
optical fiber length	5 m
max. outer diameter of the pipe/tube	3 ... 13 mm
max. thickness of the pipe/tube	1 mm
mechanical data	
min. bending radius	4 mm
tensile strength	20 N
optical fiber material	PMMA, PFA coated
housing material	PEI / PC
ambient conditions	
operating temperature	-30 … +70 °C
order reference	
FSL 500C6Y00	(use with fiber optic sensor FVDK 66 / FVDK 67)

dimension drawing

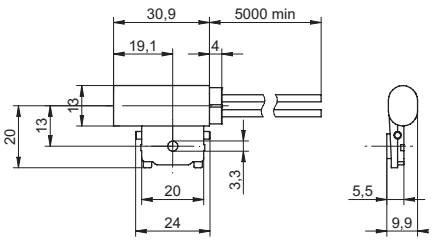


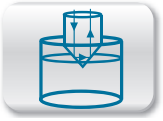
Fiber optic leak sensor FOC

- detects typical liquid volumes of 1 ml
- high chemical resistance

general data	
type	leakage sensor
optical fiber length	5 m
mechanical data	
min. bending radius	20 mm
tensile strength	10 N
optical fiber material	PE, PFA coated
housing material	PFA
ambient conditions	
operating temperature	-30 … +70 °C
order reference	
FOC 500C6Y00	(use with fiber optic sensor FVDK 66 / FVDK 67)

dimension drawing





Baumer
CH-8501 Frauenfeld
FLDK 110G1006/S14
SCATEC -2
CAUTION
SWISS CHOCOLATE
8 Stück
Schokoküsse

Edge measurement and detection

Web edge measurement independent of radial and axial runout Page 572
Edge detection with wide measuring field Page 576
Edge measurement by parallel light beam Page 584
Copy counters *SCATEC* Page 590

product family	OXE7	ZADM 023	ZADM 023	ZADM 034
	PosCon			*ParCon*
type	measuring mode: edges, center, width, gap	measuring mode: edges, center, width	measuring mode: edges, center, width	measuring mode: edges, width
measuring field size		30 mm 150 mm 350 mm		24 mm
measuring field size (dep. on measuring dist.)			400 ... 875 mm	
measuring distance (to object)		50 mm 200 mm 500 mm	640 ... 1400 mm	0 ... 40 mm
measuring range towards object				
measuring frequency	90 ... 250 Hz 111 ... 370 Hz 125 ... 500 Hz 159 ... 625 Hz	500 Hz	500 Hz	1800 Hz 2000 Hz
interface		analog and RS 485	analog and RS 485	
output signal	4 ... 20 mA / 0 ... 10 VDC	4 ... 20 mA	4 ... 20 mA	4 ... 20 mA
output circuit	analog and RS 485			analog
connection types	connector	connector	connector	connector
page	**574**	**578**	**582**	**584**

ZADM 034	ZADM 034
ParCon	*ParCon*
measuring mode: edges, width measuring mode: sum of all dark areas, edges	switchable
22 mm	24 mm
	0 ... 40 mm
0 ... 200 mm	
1100 Hz	4000 Hz
4 ... 20 mA	
analog	PNP
connector	connector
586	**588**

product family	FLDM 170	FLDM 170	FLDK 110	FLDK 110
	SCATEC-15	*SCATEC-10*	*SCATEC-2*	*SCATEC-2*
measuring distance Sd	0 ... 120 mm	0 ... 90 mm	0 ... 60 mm 0 ... 120 mm	0 ... 60 mm 0 ... 120 mm
optimum operating distance	100 mm	70 mm	40 mm 100 mm	40 mm 100 mm
counting rate	< 3000000 copies/h	< 3000000 copies/h	< 600000 copies/h	< 600000 copies/h
output pulse length	0,3 ... 100 ms selectable	0,3 ... 100 ms selectable	5 / 10 / 15 / 20 ms selectable	5 / 10 ms selectable
sensitivity	single sheet/edge thickness 0,15 mm	single sheet/edge thickness 0,1 mm	single sheet/edge thickness 0,2 mm single sheet/edge thickness 0,25 mm	single sheet/edge thickness 0,25 mm single sheet/edge thickness 0,2 mm
false pulse suppression	4 program options	4 program options	on/off switchable	on/off switchable
sensitivity adjustment	4 preset levels or level set by customer	4 preset levels or level set by customer	high/low switchable	
direct gap detection	yes	yes		
interface	serial for ScaDiag software	serial for ScaDiag software		
light source	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
output circuit	opto isolated push-pull	opto isolated push-pull	opto isolated push-pull	push-pull
page	**594**	**596**	**598**	**602**

FLDK 110

SCATEC-J

0 ... 55 mm

40 mm

< 280000 copies/h

10 ms

single sheet/edge thickness 1,5 mm

no

pulsed red laser diode

push-pull

604

General information

PosCon sensors are based on the principle of 3D light sectioning in which the projected laser line is reflected by the surface and projected onto a two-dimensional optical receiver in a triangulation process. The specially developed multiple lens system ensures the required optical mapping quality.
Different specific figures are thus reliably calculated with the help of clever algorithms and powerful coordinate transformation functions. In the measurement mode in question, the measured result can be compared with configurable limit values, and is available in binary form at the switching output. Or the measured value can be output directly in millimeters on the display or at the interface.

Applications

Integrated coordinate transformation
PosCon sensors can be positioned laterally at an angle of ± 30°above the object. This allows avoidance of disruptive installation obstacles, greatly extending the range of applications. Integrated coordinate transformation corrects the angle error in the sensor. So no additional, time-consuming programming effort is necessary in the control system.

qTarget® – optical axis aligned by design
qTarget® enables the optical axis of the *PosCon* sensors to be aligned by design to defined reference points of the housing. This allows correct sensor positioning directly in CAD, making subsequent sensor mounting in the application free of further aiming effort.

Measurement independent of object positions
An appropriate object can move within the measuring field without having any impact on the measurement. This absence of sensitivity makes a significant contribution to the reliable functioning of the sensor in the application.

Characteristics and advantages

More freedom in machine construction and easy installation
- Optimum design thanks to optically aligned axis (qTarget)
- Fast sensor alignment thanks to visible laser line and LED indicators
- Any inclined installation position within ±30°
- Sensor operation without a reflector

Minimized programming effort for fast implementation
- Predefined measuring functions to measure edge and center positions, gaps and object width
- Only few parameters to optimize your measuring task
- No external software required
- Measured value output in millimeters thanks to calibrated sensor

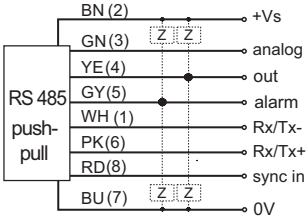
Process safety ensured by reliable measuring results even under demanding conditions
- Accurate measurements even on very dark objects
- High measuring rates with fast-moving objects
- Immune to ambient light impacts

Sd = 150 ... 250 mm

- 0-10 VDC / 4-20 mA (adaptive)
- measuring mode: edges, center, width, gap
- RS 485 interface

general data	
type	measuring mode: edges, center, width, gap
repeat accuracy	± 10 µm
power on indication	LED green
output indicator	LED yellow / LED red
light source	pulsed red laser diode
wave length	656 nm
laser class	1
adjustment	Touch Display, RS485
electrical data	
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	150 mA
output circuit	analog and RS 485
output signal	4 ... 20 mA / 0 ... 10 VDC
switching output	push-pull
output function	Out 1 / Alarm
output current	< 100 mA
baud rate	115200, adjustable
reverse polarity protection	yes, Vs to GND
short circuit protection	yes
mechanical data	
width / diameter	26 mm
height / length	74 mm
depth	55 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin
weight	130 g
ambient conditions	
operating temperature	-20 ... +50 °C
protection class	IP 67
storage temperature	-25 ... +75 °C
vibration (sinusoidal)	IEC 60068-2-6:2008 1.5 mm p-p at f = 10 - 57 Hz, 10 cycles per axis 10 g at f = 58 - 2000 Hz, 10 cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-27:2009 50 g / 11 ms resp. 100 g / 6 ms, 10 jolts per axis and direction 100 g / 2 ms, 5000 jolts per axis and direction

connection diagram



connectors and mating connectors	
ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11120705	Mounting bracket X7 90° for PosCon and OM70, incl. accessories
11126836	Mounting bracket X7 30° horizontal for PosCon and OM70, incl. accessories
11126837	Mounting bracket X7 30° vertical for PosCon and OM70, incl. accessories
for details: see accessories section	

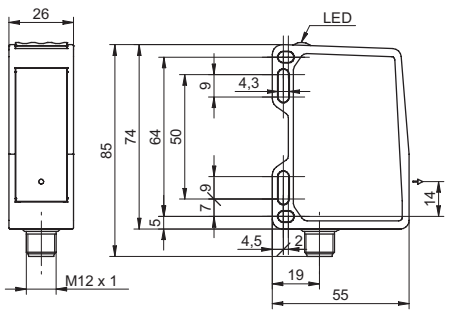
laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference	measuring range (width)	measuring range (distance)	version	measuring frequency	resolution	linearity error	temperature drift
OXE7.E15T-11177353	48 ... 72 mm	100 ... 150 mm	PosCon OXE7 - for very precise measurements and dark objects	111 ... 370 Hz	20 µm	± 50 ... ± 75 µm	< 0,03 % measured value/K
OXE7.E15T-11148276	48 ... 72 mm	100 ... 150 mm	PosCon OXE7 - for very precise measurements	159 ... 625 Hz	20 µm	± 50 ... ± 75 µm	< 0,03 % measured value/K
OXE7.E25T-11174280	75 ... 125 mm	150 ... 250 mm	PosCon OXE7 - for very dark objects	90 ... 250 Hz	30 ... 50 µm	± 80 ... ± 120 µm	< 0,05 % measured value/K
OXE7.E25T-11111452	75 ... 125 mm	150 ... 250 mm	PosCon OXE7	125 ... 500 Hz	30 ... 50 µm	± 80 ... ± 120 µm	< 0,05 % measured value/K

dimension drawing

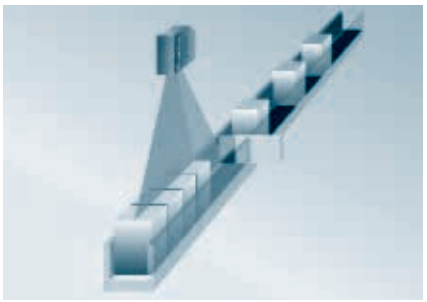


General information

Line sensors are used to detect object widths and object positions. The position / width is issued as an analog value with high accuracy proportional to the overall measuring area. Although smaller than a deck of playing cards, the sensors contain not only the complete signal conditioning, but also a long-life illumination unit.

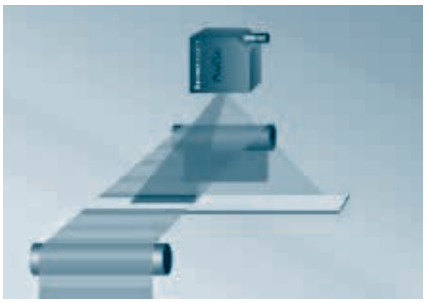
The simple switching version of the ***ParCon*** also allows the detection of small objects within the measuring area.

Applications



Edge detection (ZADM 023, *ParCon*)

- Control of textile, plastic or paper edges
- Positioning of objects by the edge
- Level measurement

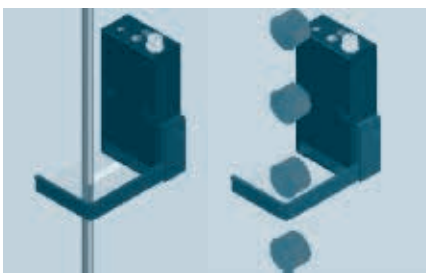


Width measurement (ZADM 023, *ParCon*)

- Width inspection during the production of fabric and rubber bands

Center position (ZADM 023)

- Position measurement by the object center, by which bands or objects of different width can be aligned centrally to each other



Counting and detecting objects (*ParCon*), switching output

- Detection and counting of small objects falling through the measurement area
- Wire and belt break monitoring

Characteristics and advantages

ParCon line sensor

- The two measuring modes (edge, width, center) can be set by a push of a button.
- Due to the parallel light beams, the vertical movement of fabric webs does not affect the measurement signal.
- The high measuring frequency of 1000 Hz in the analog sensor also allows rapid movements to be detected.
- Due to the high measuring frequency of 4 kHz, even small, rapidly moving parts are reliably detected.

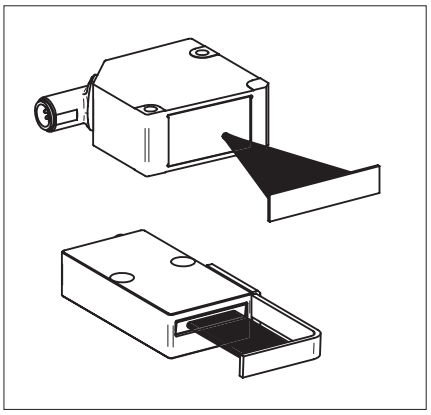
ZADM 023 line sensor

- The measuring area can be restricted by a simple Teach-in process to suppress interfering objects and areas.
- The three different measuring modes (width, edge, center) can be set simply by a push of a button.
- Two threshold values can be programmed with the Teach-in button and serve as tolerance limits for the switching output.
- All functions available with the buttons can also be operated via an RS 485 interface.
- The position and other information can be read via the interface.
- Measurement is possible on transparent objects and films.

Technology and operation

With the line sensors, the light of the integrated illumination is reflected by a reflective film (special film) installed opposite the sensor and is received by the diode line. The length of the diode line and the optics determine the measuring area. Due to the narrow diode line, the measuring area is also only a narrow band. If an object obstructs a part of the light, no light falls on the corresponding part of the diode line. The integrated microcontroller processes the shaded areas and the transitions from dark to light and calculates the corresponding analog value according to the measuring mode.

The optics of the ZADM 023 and the *ParCon* are constructed differently. The ZADM 023 has a diverging measuring field. This makes large measuring areas of up to 800 mm possible.
The specified measuring area is achieved at the nominal distance. It becomes larger or smaller proportionally with the distance. This causes an object to appear larger or smaller according to the distance.
The *ParCon* has a parallel measuring field, making an object appear equal in size in the entire measuring area.



Mounting and adjustment

The reflective tape specified in the documentation must be used for the ZADM 023 and *ParCon*.

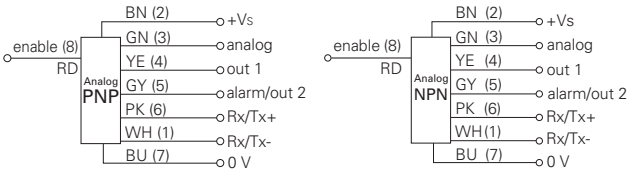
If the reflective tape is protected against abrasion by a Plexiglas or glass sheet, this must be tilted 7° to the sensor to ensure that the direct reflection does not reflect to the receiver. The reflective tape for the *ParCon* is covered by a protective film.
If highly reflective objects are measured, it is conceivable that a direct reflection will occur just as strong as the light from the reflective film. In this case, measuring errors can occur. This can be prevented by tilting the sensor away from the object.

measuring field size = 350 mm

- Teach-in measuring range
- measuring mode: edges, center, width
- RS 485 interface

general data	
type	measuring mode: edges, center, width
version	with filter for transparent objects
measuring frequency	500 Hz
linearity error relative	< 0,3 %
light source	pulsed infrared diode
wave length	880 nm
adjustment	Teach-in
measuring field size = 30 mm	
measuring distance (to object)	50 mm
resolution	< 0,03 mm
smallest object recognizable	0,3 mm
measuring field size = 150 mm	
measuring distance (to object)	200 mm
resolution	< 0,15 mm
smallest object recognizable	1,2 mm
measuring field size = 350 mm	
measuring distance (to object)	500 mm
resolution	< 0,35 mm
smallest object recognizable	4 mm
electrical data	
response time	< 2 ms
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	150 mA
output signal	4 ... 20 mA
output current	< 100 mA
interface	analog and RS 485
baud rate	19200, adjustable
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	23 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M12 8 pin, rotatable
ambient conditions	
operating temperature	0 ... +55 °C
protection class	IP 67

connection diagrams



connectors and mating connectors

ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded

additional cable connectors and field wireable connectors: see accessories

Accessories

10126220	Mounting bracket series 22 L design

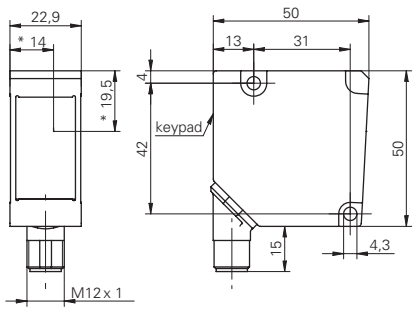
for details: see accessories section

order reference	measuring field size	output function	switching output
ZADM 023H151.0001	150 mm	Out 1 / Alarm	PNP
ZADM 023H151.0002	150 mm	Out 1 / Alarm	NPN
ZADM 023H151.0011	150 mm	Out 1 / Out 2	PNP
ZADM 023H151.0012	150 mm	Out 1 / Out 2	NPN
ZADM 023H300.0001	30 mm	Out 1 / Alarm	PNP
ZADM 023H300.0002	30 mm	Out 1 / Alarm	NPN
ZADM 023H300.0011	30 mm	Out 1 / Out 2	PNP
ZADM 023H300.0012	30 mm	Out 1 / Out 2	NPN
ZADM 023H351.0001	350 mm	Out 1 / Alarm	PNP
ZADM 023H351.0002	350 mm	Out 1 / Alarm	NPN
ZADM 023H351.0011	350 mm	Out 1 / Out 2	PNP
ZADM 023H351.0012	350 mm	Out 1 / Out 2	NPN

reflectors

		reflector	reflector tape on reel		reflective tape	
measuring range	30 mm	FTDR 005I040	FTDL 005I000/... m	width 5 mm	FTDF 005I040	5 x 40 mm
measuring range	150 mm	FTDR 020I175	FTDL 020I000/... m	width 20 mm	FTDF 020I175	20 x 175 mm
measuring range	350 mm	FTDR 035I395	FTDL 035I000/... m	width 35 mm	FTDF 035I395	35 x 395 mm
			FTDL 610I000/... m	width 610 mm		

dimension drawing



* receiver axis

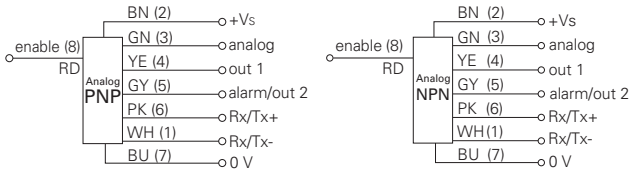
measuring field size = 875 mm

- Teach-in measuring range
- measuring mode: edges, center, width
- RS 485 interface

general data	
type	measuring mode: edges, center, width
version	without filter, therefore not for transparent objects
measuring field size (dep. on measuring dist.)	400 ... 875 mm
measuring distance (to object)	640 ... 1400 mm
measuring frequency	500 Hz
resolution	0,5 ... 1 mm
smallest object recognizable	8,5 ... 18 mm
linearity error relative	< 0,3 %
light source	pulsed infrared diode
wave length	880 nm
adjustment	Teach-in
electrical data	
response time	< 2 ms
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	150 mA
output signal	4 ... 20 mA
output current	< 100 mA
interface	analog and RS 485
baud rate	19200, adjustable
reverse polarity protection	yes, Vs to GND
short circuit protection	yes
mechanical data	
width / diameter	23 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M12 8 pin, rotatable
ambient conditions	
operating temperature	0 ... +55 °C
protection class	IP 67

order reference	output function	switching output
ZADM 023H871.0001	Out 1 / Alarm	PNP
ZADM 023H871.0002	Out 1 / Alarm	NPN
ZADM 023H871.0011	Out 1 / Out 2	PNP

connection diagrams



connectors and mating connectors	
ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10126220	Mounting bracket series 22 L design
for details: see accessories section	

reflectors

FTDL 050l000/... m	on reel, width 35 mm
FTDL 610l000/... m	on reel, width 610 mm

conversion factors

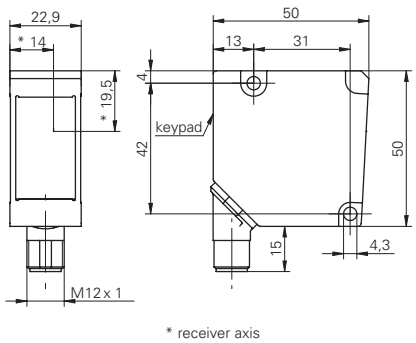
measuring distance (mm)	measuring field size (mm)
640	400
1400	875
meas. distance : meas. field size	**= 1,6**

measuring distance (mm)	resolution (mm)
640	0,5
1400	1
meas. distance : resolution	**= 1300**

measuring distance (mm)	smallest object (mm)
640	8,5
1400	18
meas. distance : smallest object	**= 75**

example	desired measuring field size	= **650 mm**
meas. distance	650 mm x 1,6	= 1040 mm
resolution	1040 mm : 1300	= 0,8 mm
smallest object	1040 mm : 75	= 13,9 mm

dimension drawing



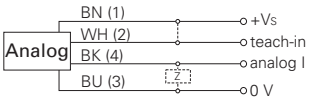
* receiver axis

measuring field size = 24 mm

- measuring of edge position and object width
- parallel, uniform light beam
- high measuring frequency

general data	
type	measuring mode: edges, width
measuring field size	24 mm
measuring distance (to object)	0 ... 40 mm
resolution	< 0,05 mm
repeat accuracy	< 0,05 mm
smallest object recognizable	1 mm
linearity error	± 0,4 mm (S = 0...40 mm) ± 0,2 mm (S = 20...40 mm)
power on indication	LED green
output indicator	LED yellow
light source	pulsed infrared diode
wave length	880 nm
electrical data	
response time	< 0,5 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	120 mA
output circuit	analog
output signal	4 ... 20 mA
reverse polarity protection	yes, Vs to GND
short circuit protection	yes
mechanical data	
width / diameter	34 mm
housing material	aluminum
front (optics)	glass
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +55 °C
protection class	IP 67
remarks	
reflector bracket can be replaced with a reflective tape.	

connection diagram



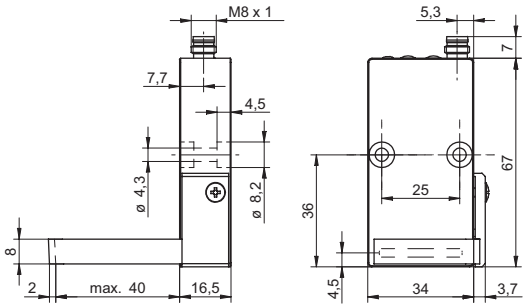
connectors and mating connectors	
ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

order reference	type	measuring frequency
ZADM 034I240.0001	rectangular, side view	1800 Hz
ZADM 034I240.0021	rectangular, front view	2000 Hz

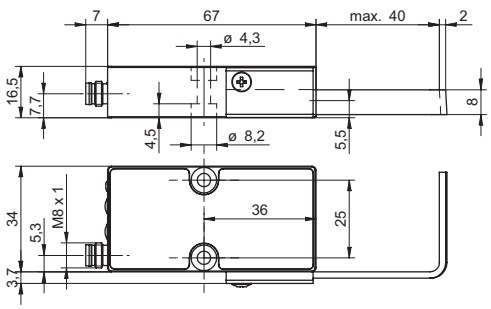
reflectors	
FTDF 012M050	tape 12 x 50 mm (included)
FTDR 008M030/01	bracket for ZADM 034x240.xx01 (included)
FTDR 008M030/21	bracket for ZADM 034x240.xx21 (included)

optional	
FTDF 050M234	tape 50 x 234 mm

dimension drawings



type: side view



type: front view

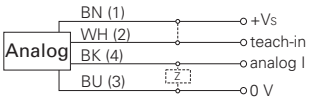
measuring field size = 22 mm

- measuring of edge position and object width
- parallel, uniform light beam
- high measuring frequency

general data	
measuring field size	22 mm
measuring range towards object	0 ... 200 mm
measuring frequency	1100 Hz
resolution	< 0,1 mm (S = 0 ... 150 mm) < 0,2 mm (S = 150 ... 200 mm)
repeat accuracy	< 0,1 mm (S = 0 ... 150 mm) < 0,2 mm (S = 150 ... 200 mm)
smallest object recognizable	3 mm
linearity error	± 1,75 mm (S = 0 ... 200 mm) ± 1 mm (S = 50 ... 150 mm)
power on indication	LED green
output indicator	LED yellow
light source	pulsed infrared diode
wave length	880 nm
electrical data	
response time	< 0,9 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	120 mA
output circuit	analog
output signal	4 ... 20 mA
reverse polarity protection	yes, Vs to GND
short circuit protection	yes
mechanical data	
width / diameter	34 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +55 °C
protection class	IP 67
remarks	
reflector bracket can be replaced with a reflective tape.	

order reference	type
ZADM 034I220.0021	measuring mode: edges, width
ZADM 034I220.0022	measuring mode: sum of all dark areas, edges

connection diagram



connectors and mating connectors	
ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

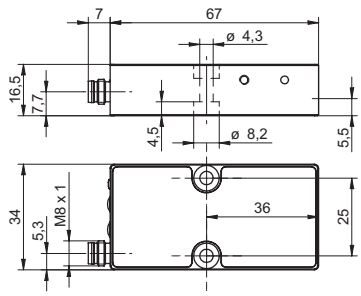
reflectors

FTDF 035M050	tape 12 x 50 mm (included)

optional

FTDF 050M234	tape 50 x 234 mm

dimension drawing



type: front view

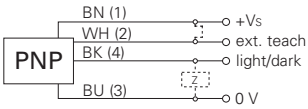
measuring field size = 24 mm

- detection of small objects
- measuring area 24 x 40 mm
- high measuring frequency

general data	
type	switchable
measuring field size	24 mm
measuring distance (to object)	0 ... 40 mm
measuring frequency	4000 Hz
resolution	< 0,1 mm
smallest object recognizable	0,5 mm
hysteresis	0,4 mm
power on indication	LED green
light source	pulsed infrared diode
wave length	880 nm
adjustment	Teach-in
electrical data	
response time	< 0,25 ms
output pulse length	10 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	120 mA
output circuit	PNP
output function	light / dark operate
output current	< 100 mA
voltage drop Vd	< 2,2 VDC
reverse polarity protection	yes, Vs to GND
short circuit protection	yes
mechanical data	
width / diameter	34 mm
housing material	aluminum
front (optics)	glass
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +55 °C
protection class	IP 67
remarks	
reflector bracket can be replaced with a reflective tape.	

order reference	type
ZADM 034P240.6901	rectangular, side view
ZADM 034P240.6921	rectangular, front view

connection diagram

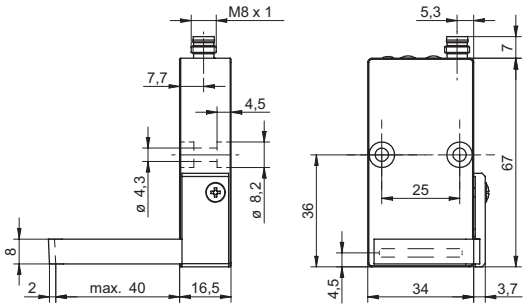


connectors and mating connectors	
ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

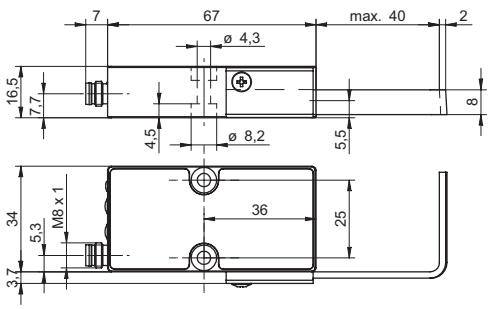
reflectors	
FTDF 012M050	tape 12 x 50 mm (included)
FTDR 008M030/01	bracket for ZADM 034x240.xx01 (included)
FTDR 008M030/21	bracket for ZADM 034x240.xx21 (included)

optional	
FTDF 050M234	tape 50 x 234 mm

dimension drawings



type: side view



type: front view

General information

The sensors in the ***SCATEC*** range were developed specifically for non-contact counting of overlapped paper sheets and newspapers. Other flat objects conveyed in a lap stream or individually can also be counted. If such an object moves through the laser beam, the sensor replies with an electrical impulse with a fixed time period. The patented optical principle permits objects to be detected regardless of their color and surface; matte black objects are counted just as accurately as white glossy ones.

Characteristics and advantages

- **Counts regardless of the motion of product direction**
  The copies are counted when an edge facing the laser beam moves through the beam, whether the direction of product motion is forwards or backwards
- **Visible laser beam**
  The red laser line is easily visible on the object and permits simple alignment.
- **Color insensitivity**
  The integrated laser controller makes the ***SCATEC*** extremely insensitive to different surfaces of the object.
- **No blind region**
  Large counted objects can even touch the sensor without causing counting errors.
- **Sensitivity adjustment**
  Depending on the model, the sensitivity can be adjusted with a DIP switch, on the control panel or via the interface.
- **Edge indicator**
  Yellow LED: light ist on as long as an edge is in the laser beam.

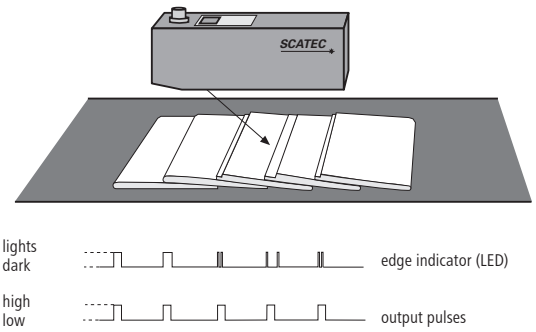
Characteristics and advantages

Multiple pulse suppression
Particularly with thick copies (newspapers, folded cardboard boxes etc.) or with a small prefold, multiple pulses which can occur at the edge can be suppressed by this function. Error pulse suppression operates by preventing further pulses from being emitted when an output pulse is active or during an idle time. The following programs guarantee optimum adjustment to all counting problems:

Fixed idle time: adjustable in milliseconds

Dynamic dead time: the microcontroller constantly monitors the pulse sequence and eliminates multiple pulses even if the conveying speed varies by dynamically adjusting the dead time to the pulse sequence.

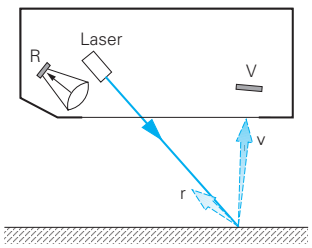
Synchronization to the machine cycle: the ***SCATEC*** can be synchronized to the machine cycle (e.g. by an encoder) via a synchronization input. The dead time then corresponds to a defined distance which is absolutely independent of the conveying speed.

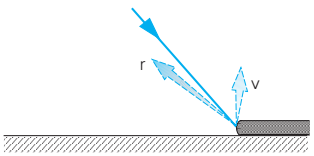


- **No counting errors when the lap stream is interrupted**
  The ***SCATEC*** detects only the leading edge of an object. It does not detect trailing edges which become visible when the lap stream is interrupted. Projecting trailing edges can be suppressed by direct gap detection or by delaying the output pulse (***SCATEC-10*** or ***SCATEC-15***). An integrated retro-reflective sensor allows accurate detection of gaps in the lap stream. This can additionally increase the counting accuracy.
- **Programming and diagnostic software**
  With the programming software ***ScaDiag***, all functions and parameters can be simply adjusted on a PC. Furthermore, measurement sequences can be recorded and stored for diagnosis and troubleshooting.

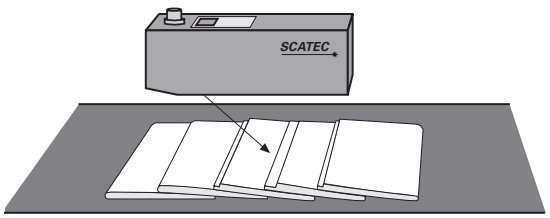
Technology and operation

Stated simply, the ***SCATEC*** consists of a laser light source and two photodetectors. The beam is aimed diagonally at the objects to be detected.
The photodetector **R** is located close to the laser light source and photodetector **V** is a little further away. The sensor determines the ratio between signal **v** (light diffused forwards) and signal **r** (light diffused backwards).
The ration **v/r** differs widely depending on whether the beam strikes a flat surface or an edge. If an edge moves into the laser beam, the direct view from detector **V** to the laser strike point is obstructed, reducing signal **v**, and also the edge increases the backwards diffusion, which causes signal **r** to rise. Both effects make the ratio **v/r** much smaller at an edge than on a flat surface. If the ratio **v/r** falls below a specific threshold, this is interpreted by the sensor as an edge.
Due to the well-focused laser beam, the ***SCATEC*** detects even the smallest edges. There is no blind region directly beneath the sensor. Large counted objects may even touch the sensor without causing counting errors.

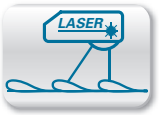




Mounting and adjustment



- The objects to be counted must have an edge facing the beam.
- The sensor must be installed parallel above the working plane.
- The laser beam should be blocked by a beam stop mounted parallel and just below the bearing surface. We recommend a light, matte object for this purpose (white paper, light and matte metal surface).



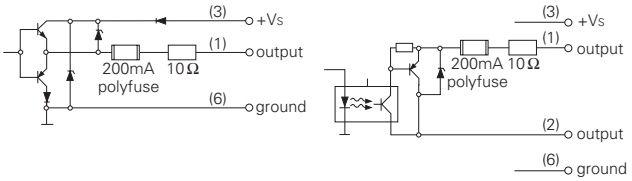
Sd = 0 ... 120 mm

- up to 3 million copies/hour
- Sensitivity ≥ 0,15 mm
- display and integrated counter

general data	
measuring distance Sd	0 ... 120 mm
optimum operating distance	100 mm
counting rate	< 3000000 copies/h
object speed	< 5 m/sec
object cycle distance	> 1 mm
sensitivity	single sheet/edge thickness 0,15 mm
sync. input	yes
measuring point	visible red laser line 8 mm
light source	pulsed red laser diode
wave length	670 nm
laser class	2
edge indicator	LED yellow
power on indication	LED green
false pulse suppression	4 program options
direct gap detection	yes
sensitivity adjustment	4 preset levels or level set by customer
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	230 mA
output pulse length	0,3 ... 100 ms selectable
short circuit protection	yes
reverse polarity protection	yes
interface	serial for ScaDiag software
mechanical data	
width / diameter	30 mm
type	rectangular
housing material	die-cast zinc
connector base (main connector)	DIN 45322, 6 pin
connector base (interface)	DIN 45326, 8 pin
front (optics)	glass
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 54
Accessories	
10157472	Mounting panel for sensors SCATEC
for details: see accessories section	

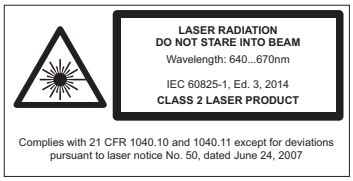
order reference	output circuit
FLDM 170C1030/S42	opto isolated
FLDM 170G1030/S42	push-pull

connection diagrams

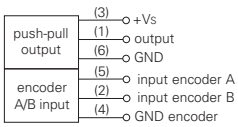


accessories	
ScaDiag kit diagnostic program includes interface converter and manual	10156491
mounting plate for mounting on round rod	10157472
for details, see accessories section	

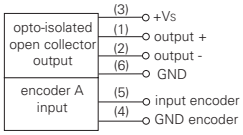
laser warning



pin assignments

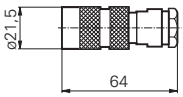


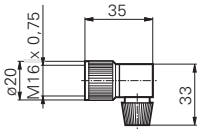
main connector push-pull



main connector open collector

connectors





10104236	6 pin	(included)
10153202	8 pin	(optional)

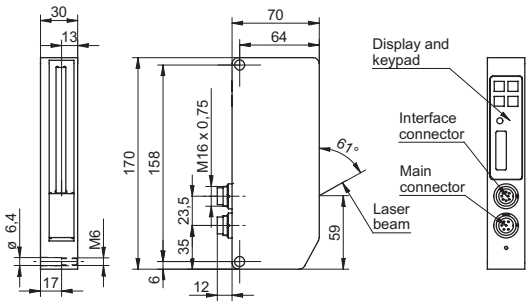
10153094	6 pin	(optional)
10153095	8 pin	(optional)

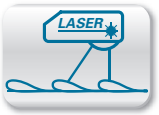
connector	
ESG 16DP1000G	main cable, length = 10 m, shielded, 6 pin

reflectors

FTDF 025F025	tape 25 x 25 mm
(included)	

dimension drawing





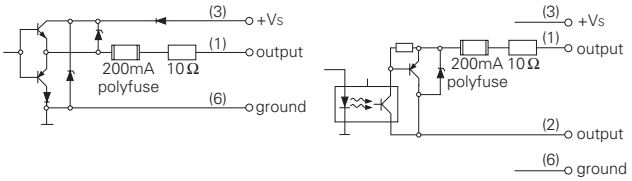
Sd = 0 ... 90 mm

- up to 3 million copies/hour
- Sensitivity ≥ 0,1 mm
- display and integrated counter

general data	
measuring distance Sd	0 ... 90 mm
optimum operating distance	70 mm
counting rate	< 3000000 copies/h
object speed	< 5 m/sec
object cycle distance	> 1 mm
sensitivity	single sheet/edge thickness 0,1 mm
sync. input	yes
measuring point	visible red laser line 6 mm
light source	pulsed red laser diode
wave length	670 nm
laser class	2
edge indicator	LED yellow
power on indication	LED green
false pulse suppression	4 program options
direct gap detection	yes
sensitivity adjustment	4 preset levels or level set by customer
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	230 mA
output pulse length	0,3 ... 100 ms selectable
short circuit protection	yes
reverse polarity protection	yes
interface	serial for ScaDiag software
mechanical data	
width / diameter	30 mm
type	rectangular
housing material	die-cast zinc
connector base (main connector)	DIN 45322, 6 pin
connector base (interface)	DIN 45326, 8 pin
front (optics)	glass
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 54
Accessories	
10157472	Mounting panel for sensors SCATEC
for details: see accessories section	

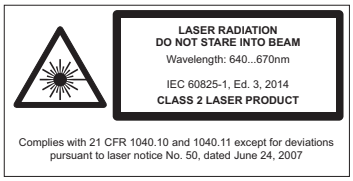
order reference	output circuit
FLDM 170C1011/S42	opto isolated
FLDM 170G1011/S42	push-pull

connection diagrams

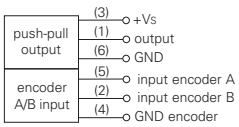


accessories	
ScaDiag kit diagnostic program includes interface converter and manual	10156490
mounting plate for mounting on round rod	10157472
for details, see accessories section	

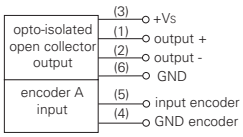
laser warning



pin assignments

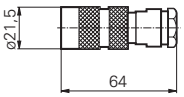


main connector push-pull

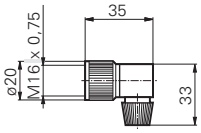


main connector open collector

connectors



10104236	6 pin	(included)



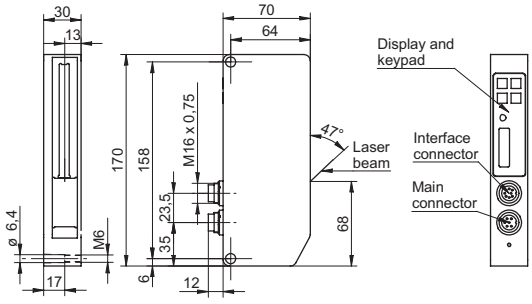
10153094	6 pin	(optional)

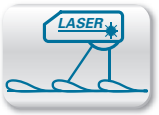
connector	
ESG 16DP1000G	main cable, length = 10 m, shielded, 6 pin

reflectors

FTDF 025F025	tape 25 x 25 mm
(included)	

dimension drawing



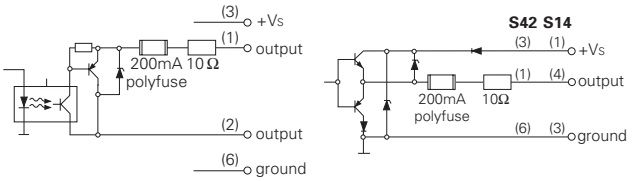


Sd = 0 ... 120 mm

- Smallest laser copy counter on the market
- counting of up to 600'000 copies/hour
- Sensitivity ≥ 0,2 mm

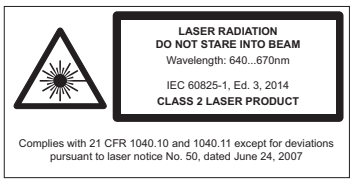
general data	
counting rate	< 600000 copies/h
object speed	< 5 m/sec
object cycle distance	> 1 mm
sync. input	no
light source	pulsed red laser diode
wave length	670 nm
laser class	2
edge indicator	LED yellow
power on indication	LED green
false pulse suppression	on/off switchable
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	180 mA
output pulse length	5 / 10 / 15 / 20 ms selectable
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	30 mm
type	rectangular
housing material	PA 6
front (optics)	glass
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 54
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10157472	Mounting panel for sensors SCATEC
for details: see accessories section	

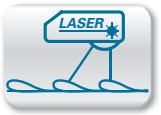
connection diagrams



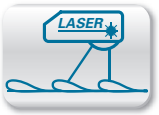
accessories	
ScaDiag kit (S14) diagnostic program includes interface converter and manual	10156479
ScaDiag kit (S42) diagnostic program includes interface converter and manual	10156489
mounting plate for mounting on round rod	10157472
for details, see accessories section	

laser warning

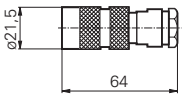




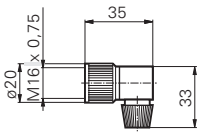
order reference	measuring distance Sd	sensitivity	output circuit	optimum operating distance	connector base (main connector)	measuring point	sensitivity adjustment
FLDK 110C1003/S42	0 ... 60 mm	single sheet/edge thickness 0,2 mm	opto isolated	40 mm	DIN 45322, 6 pin	visible red laser line 2 mm	high/low switchable
FLDK 110C1005/S42	0 ... 120 mm	single sheet/edge thickness 0,25 mm	opto isolated	100 mm	DIN 45322, 6 pin	visible red laser line 3 mm	high/low switchable
FLDK 110G1003/S14	0 ... 60 mm	single sheet/edge thickness 0,2 mm	push-pull	40 mm	M12 x 1, 5 pin	visible red laser line 2 mm	high/low switchable
FLDK 110G1003/S42	0 ... 60 mm	single sheet/edge thickness 0,2 mm	push-pull	40 mm	DIN 45322, 6 pin	visible red laser line 2 mm	high/low switchable
FLDK 110G1005/S14	0 ... 120 mm	single sheet/edge thickness 0,25 mm	push-pull	100 mm	M12 x 1, 5 pin	visible red laser line 3 mm	-



connectors



10104236	6 pin	DIN 45322
(included)		

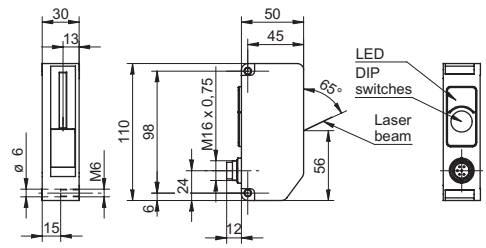


10153094	6 pin	DIN 45322
(optional)		

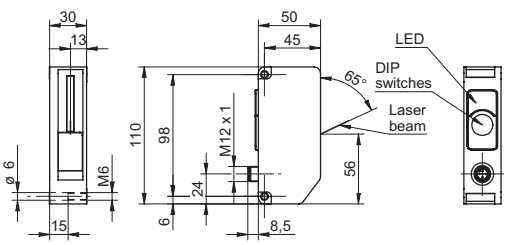
connectors M12 x 1		
ESG 34AH0200	4 pin	2 m, straight
ESG 34AH0500	4 pin	5 m, straight
ESG 34AH1000	4 pin	10 m, straight

connectors M12 x 1		
ESW 33AH0200	4 pin	2 m, angular
ESW 33AH0500	4 pin	5 m, angular
ESW 33AH1000	4 pin	10 m, angular

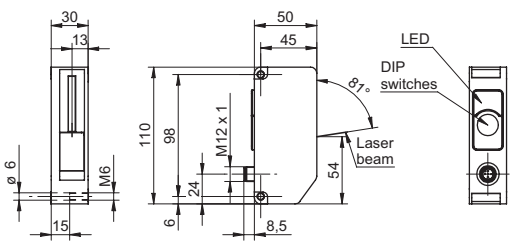
dimension drawings



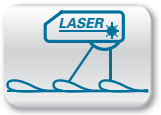
FLDK 110x1003/S42

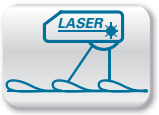


FLDK 110x1003/S14



FLDK 110G1005/S14


LASER

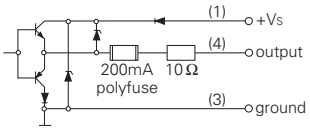


Sd = 0 ... 120 mm

- Laser copy counter / edge detector
- Individual package detection with seamless product detection

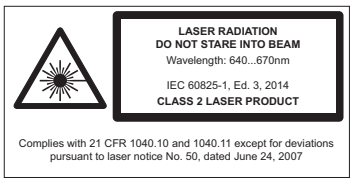
general data	
counting rate	< 600000 copies/h
object speed	< 5 m/sec
sync. input	no
light source	pulsed red laser diode
wave length	670 nm
laser class	2
edge indicator	LED yellow
power on indication	LED green
false pulse suppression	on/off switchable
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	180 mA
output circuit	push-pull
output pulse length	5 / 10 ms selectable
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	30 mm
type	rectangular
housing material	PA 6
connector base (main connector)	M12 x 1, 5 pin
front (optics)	glass
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 54
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10157472	Mounting panel for sensors SCATEC
for details: see accessories section	

connection diagram

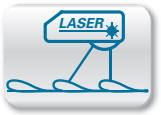


accessories	
mounting plate for mounting on round rod	10157472
ScaDiag kit diagnostic program includes interface converter and manual	10156479
for details, see accessories section	

laser warning



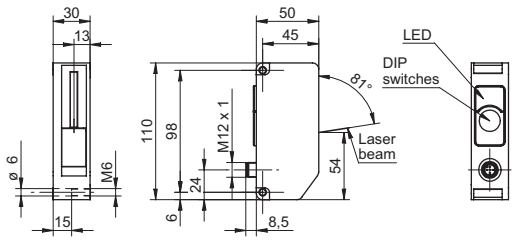
order reference	measuring distance Sd	sensitivity	optimum operating distance	measuring point
FLDK 110G1006/S14	0 ... 120 mm	single sheet/edge thickness 0,25 mm	100 mm	visible red laser line 3 mm
FLDK 110G1303/S14	0 ... 60 mm	single sheet/edge thickness 0,2 mm	40 mm	visible red laser line 2 mm

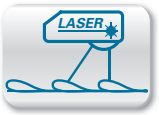


connectors

connectors M12 x 1			connectors M12 x 1		
ESG 34AH0200	4 pin	2 m, straight	ESW 33AH0200	4 pin	2 m, angular
ESG 34AH0500	4 pin	5 m, straight	ESW 33AH0500	4 pin	5 m, angular
ESG 34AH1000	4 pin	10 m, straight	ESW 33AH1000	4 pin	10 m, angular

dimension drawing





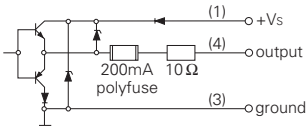
Sd = 0 ... 55 mm

- Smallest laser copy counter on the market
- counting of up to 280'000 copies/hour
- Sensitivity ≥ 1,5 mm

general data	
measuring distance Sd	0 ... 55 mm
optimum operating distance	40 mm
counting rate	< 280000 copies/h
object speed	< 2 m/sec
object cycle distance	> 13 mm
sensitivity	single sheet/edge thickness 1,5 mm
sync. input	no
measuring point	visible red point
light source	pulsed red laser diode
wave length	670 nm
laser class	2
edge indicator	LED yellow
power on indication	LED green
sensitivity adjustment	no
electrical data	
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	180 mA
output circuit	push-pull
output pulse length	10 ms
short circuit protection	yes
reverse polarity protection	yes
mechanical data	
width / diameter	30 mm
type	rectangular
housing material	PA 6
connector base (main connector)	M12 x 1, 5 pin
front (optics)	glass
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 54
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	
Accessories	
10157472	Mounting panel for sensors SCATEC
for details: see accessories section	

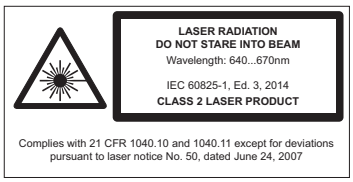
order reference
FLDK 110G1010/S14

connection diagram



accessories	
mounting plate for mounting on round rod	10157472
ScaDiag kit diagnostic program includes interface converter and manual	11051709
for details, see accessories section	

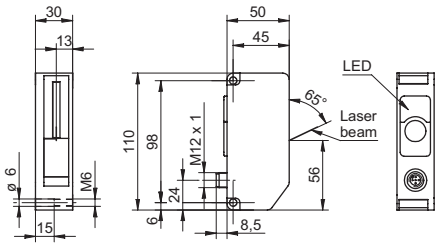
laser warning

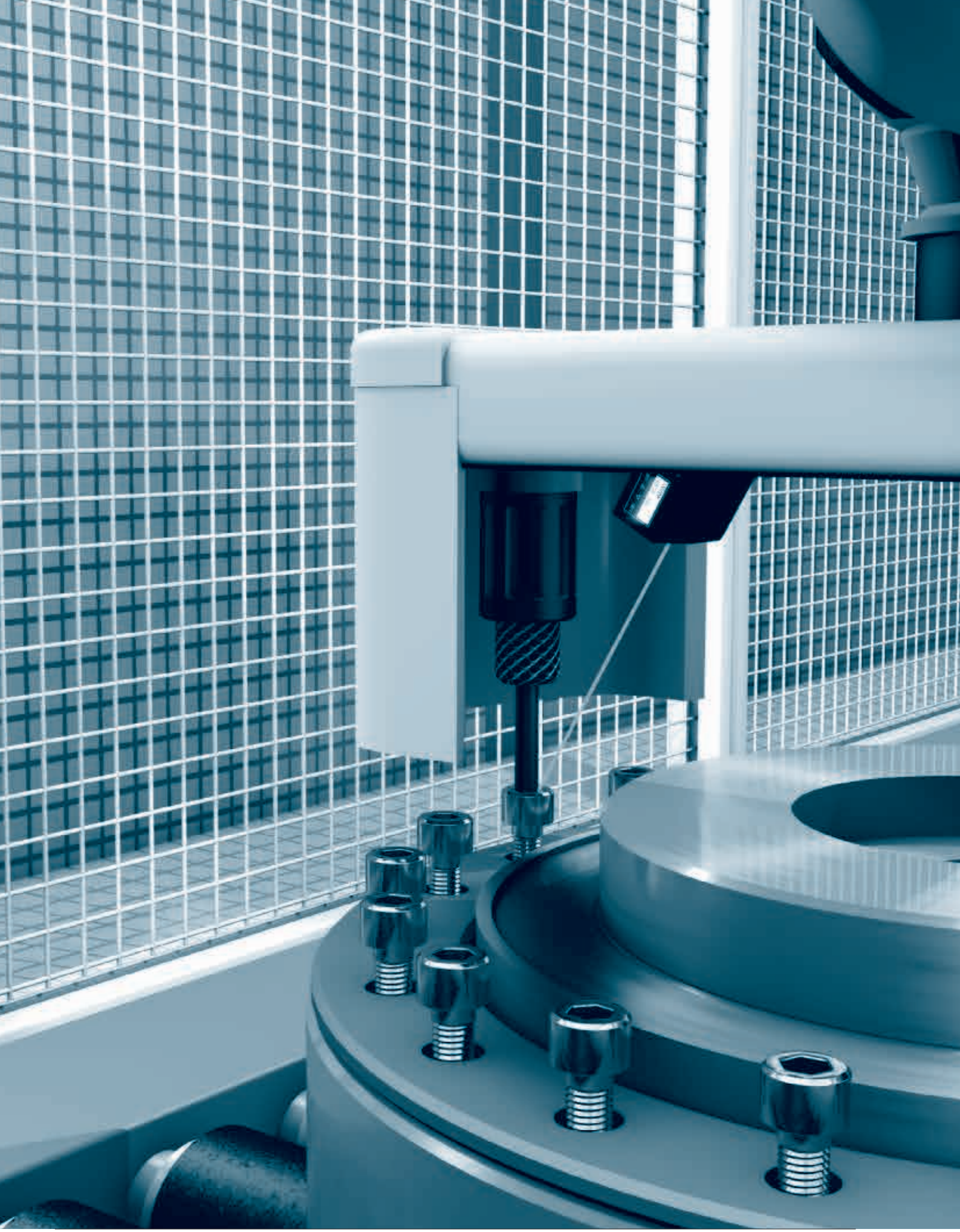


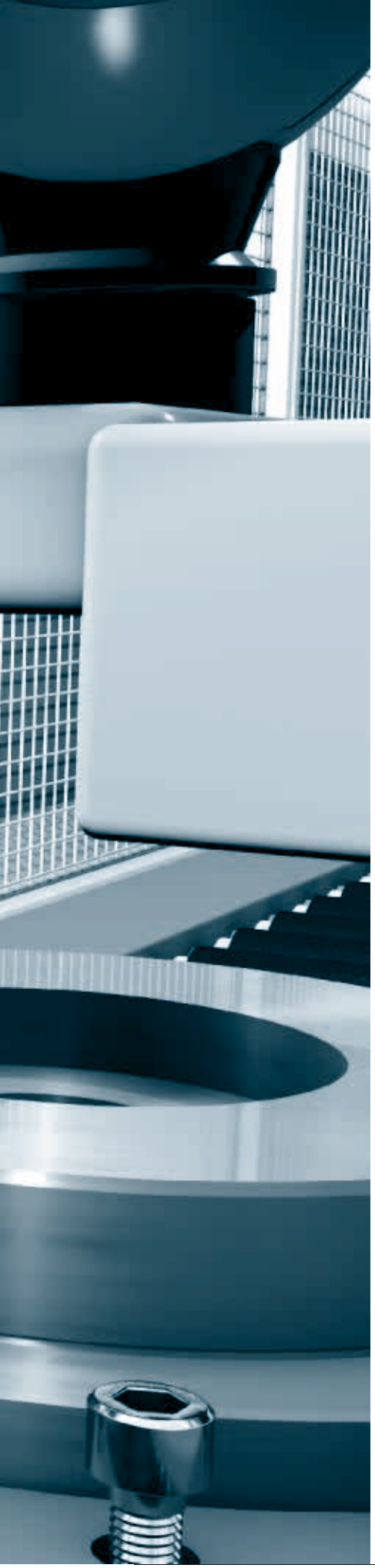
connectors

connectors M12 x 1			connectors M12 x 1		
ESG 34AH0200	4 pin	2 m, straight	ESW 33AH0200	4 pin	2 m, angular
ESG 34AH0500	4 pin	5 m, straight	ESW 33AH0500	4 pin	5 m, angular
ESG 34AH1000	4 pin	10 m, straight	ESW 33AH1000	4 pin	10 m, angular

dimension drawing







Distance sensors

Miniature sensors	Page 624
Performance sensors for the fabric automation	Page 646
High-Performance sensors	Page 664
Long range sensors	Page 682
Standard distance sensors	Page 686

laser distance sensors

product family	OADM 12	OADM 12	OADM 12	OADM 13	OADM 13
width / diameter	12,4 mm	12,4 mm	12,4 mm	13,4 mm	13,4 mm
measuring distance Sd	16 ... 26 mm 16 ... 120 mm	16 ... 26 mm 16 ... 120 mm	16 ... 26 mm 30 ... 50 mm 16 ... 120 mm	50 ... 350 mm 50 ... 550 mm	50 ... 350 mm 50 ... 550 mm
resolution	0,002 ... 0,005 mm 0,002 ... 0,12 mm	0,002 ... 0,005 mm 0,002 ... 0,12 mm	0,004 ... 0,008 mm 0,01 ... 0,026 mm 0,012 ... 0,12 mm	0,01 ... 0,4 mm 0,01 ... 1,15 mm	0,01 ... 0,4 mm 0,01 ... 1,15 mm
linearity error	± 0,006 ... ± 0,015 mm ± 0,015 ... ± 0,35 mm	± 0,013 ... ± 0,025 mm ± 0,015 ... ± 0,35 mm	± 0,013 ... ± 0,025 mm ± 0,032 ... ± 0,078 mm ± 0,026 ... ± 0,35 mm	± 0,05 ... ± 1,2 mm ± 0,08 ... ± 3,5 mm	± 0,05 ... ± 1,2 mm ± 0,08 ... ± 3,5 mm
response time / release time	< 0,9 ms	2 ... 3 ms	< 1,8 ms < 3 ms	< 0,9 ms < 2 ms	< 0,9 ms < 2 ms
light source	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
adjustment	Teach-in: button / external	Teach-in: button / external	RS 485	Teach-in: button / external	Teach-in: button / external
output circuit	analog	analog	RS 485	analog	analog
output signal	4 ... 20 mA 0 ... 10 VDC	4 ... 20 mA 0 ... 10 VDC		4 ... 20 mA	0 ... 10 VDC
connection types	connector	connector	connector	connector	connector
housing material	metal	metal	metal	metal	metal
page	**624**	**626**	**628**	**630**	**632**

OADM 13	OADM 13	OADM 13	OADM 13	OADM 20	OADM 20
13,4 mm	13,4 mm	13,4 mm	13,4 mm	20,6 mm	20,6 mm
50 ... 350 mm 50 ... 550 mm	50 ... 350 mm 50 ... 550 mm	50 ... 60 mm 60 ... 100 mm 100 ... 200 mm	50 ... 60 mm 60 ... 100 mm 100 ... 200 mm	30 ... 70 mm 30 ... 130 mm	50 ... 300 mm 100 ... 600 mm
0,05 ... 0,4 mm 0,09 ... 1,15 mm	0,05 ... 0,4 mm 0,09 ... 1,15 mm	< 0,015 mm 0,015 ... 0,038 mm 0,039 ... 0,15 mm	< 0,015 mm 0,015 ... 0,038 mm 0,039 ... 0,15 mm	0,004 ... 0,02 mm 0,005 ... 0,06 mm	0,01 ... 0,33 mm 0,015 ... 0,67 mm
± 0,18 ... ± 1,2 mm ± 0,3 ... ± 3,5 mm	± 0,18 ... ± 1,2 mm ± 0,3 ... ± 3,5 mm	< 0,045 mm ± 0,047 ... ± 0,118 mm ± 0,123 ... ± 0,457 mm	< 0,045 mm ± 0,047 ... ± 0,118 mm ± 0,123 ... ± 0,457 mm	± 0,012 ... ± 0,06 mm ± 0,015 ... ± 0,2 mm	± 0,03 ... ± 1 mm ± 0,05 ... ± 2 mm
< 0,9 ms < 2 ms	< 0,9 ms < 2 ms	< 2 ms	< 2 ms	< 0,9 ms	< 0,9 ms
pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
RS 232	RS 485	Teach-in: button / external	Teach-in: button / external	Teach-in: button / external	Teach-in: button / external
RS 232	RS 485	analog	analog	analog	analog
		4 ... 20 mA	0 ... 10 VDC	4 ... 20 mA 0 ... 10 VDC	4 ... 20 mA 0 ... 10 VDC
connector	connector	connector	connector	connector	connector
metal	metal	metal	metal	metal	metal
634	**636**	**638**	**642**	**646**	**648**

laser distance sensors

product family	OADM 20	OADM 20	OADM 20	OADR 20	OADM 21
width / diameter	20,6 mm	20,6 mm	20,6 mm	20,3 mm	20,4 mm
measuring distance Sd	30 ... 70 mm 30 ... 130 mm 50 ... 300 mm	100 ... 600 mm 200 ... 1000 mm	50 ... 300 mm 100 ... 600 mm 200 ... 1000 mm	30 ... 130 mm 50 ... 300 mm 100 ... 600 mm	100 ... 600 mm 200 ... 1000 mm
resolution	0,004 ... 0,02 mm 0,005 ... 0,06 mm 0,01 ... 0,33 mm	0,015 ... 0,67 mm 0,12 ... 2,5 mm	0,01 ... 0,4 mm 0,015 ... 0,8 mm 0,12 ... 3 mm	0,005 ... 0,06 mm 0,01 ... 0,33 mm 0,015 ... 0,67 mm	0,01 ... 0,25 mm 0,02 ... 0,4 mm
linearity error	± 0,012 ... ± 0,06 mm ± 0,015 ... ± 0,2 mm ± 0,03 ... ± 1 mm	± 0,05 ... ± 2 mm ± 0,48 ... ± 10 mm	± 0,2 ... ± 1,5 mm ± 0,5 ... ± 3,4 mm ± 0,36 ... ± 9 mm	± 0,015 ... ± 0,2 mm ± 0,03 ... ± 1 mm ± 0,05 ... ± 2 mm	± 0,07 ... ± 1 mm ± 0,11 ... ± 1,65 mm
response time / release time	< 0,9 ms	< 0,9 ms	< 2 ms < 2,5 ms < 3,5 ms	< 0,9 ms	< 4 ms
light source	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
adjustment	Teach-in: button / external	Teach-in: button / external	Teach-in: button / external	external	Teach-in: button / external
output circuit	analog	analog		analog	analog
output signal	4 ... 20 mA / 0 ... 10 VDC	4 ... 20 mA / 0 ... 10 VDC	4 ... 20 mA / 0 ... 10 VDC	4 ... 20 mA / 0 ... 10 VDC	4 ... 20 mA / 0 ... 10 VDC
connection types	connector	connector	cable	connector	connector
housing material	metal	metal	metal	metal	metal
page	**650**	**654**	**656**	**658**	**662**

OM70-L	OM70-L	OM70-L	OM70-P	OM70-P	OM70-P
26 mm	26 mm	26 mm	26 mm	26 mm	26 mm
30 ... 70 mm 40 ... 140 mm 50 ... 250 mm	100 ... 600 mm 100 ... 1000 mm 150 ... 1500 mm	100 ... 600 mm 100 ... 1000 mm 150 ... 1500 mm	30 ... 70 mm 40 ... 140 mm 50 ... 250 mm	100 ... 600 mm 100 ... 1000 mm 150 ... 1500 mm	100 ... 600 mm 100 ... 1000 mm 150 ... 1500 mm
0,7 ... 1 µm 1) 2) 3) 1,2 ... 2,5 µm 1) 2) 3) 1,4 ... 6,3 µm 1) 2) 3)	3 ... 24 µm 1) 2) 3) 3 ... 63 µm 1) 2) 3) 13 ... 125 µm 1) 2) 3)	3 ... 24 µm 1) 2) 3) 3 ... 63 µm 1) 2) 3) 13 ... 125 µm 1) 2) 3)	0,7 ... 1 µm 1) 2) 3) 1,2 ... 2,5 µm 1) 2) 3) 1,4 ... 6,3 µm 1) 2) 3)	3 ... 24 µm 1) 2) 3) 3 ... 63 µm 1) 2) 3) 13 ... 125 µm 1) 2) 3)	3 ... 24 µm 1) 2) 3) 3 ... 63 µm 1) 2) 3) 13 ... 125 µm 1) 2) 3)
± 0,06 % Mr 1) 2) ± 0,07 % Mr 1) 2) ± 0,09 % Mr 1) 2)	± 0,12 % Mr 1) 2) ± 0,19 % Mr 1) 2) ± 0,32 % Mr 1) 2)	± 0,12 % Mr 1) 2) ± 0,19 % Mr 1) 2) ± 0,32 % Mr 1) 2)	± 0,06 % Mr 1) 2) ± 0,07 % Mr 1) 2) ± 0,09 % Mr 1) 2)	± 0,12 % Mr 1) 2) ± 0,19 % Mr 1) 2) ± 0,32 % Mr 1) 2)	± 0,12 % Mr 1) 2) ± 0,19 % Mr 1) 2) ± 0,32 % Mr 1) 2)
0,8 ms 2)	0,8 ms 2)	0,8 ms 2)	0,8 ms 2)	0,8 ms 2)	0,8 ms 2)
pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
Touch Display, RS485	Touch Display, RS485	Touch Display, RS485	Touch Display, RS485	Touch Display, RS485	Touch Display, RS485
analog and RS 485	analog and RS 485	analog and RS 485	analog and RS 485	analog and RS 485	analog and RS 485
4 ... 20 mA / 0 ... 10 VDC	4 ... 20 mA / 0 ... 10 VDC	4 ... 20 mA / 0 ... 10 VDC	4 ... 20 mA / 0 ... 10 VDC	4 ... 20 mA / 0 ... 10 VDC	4 ... 20 mA / 0 ... 10 VDC
connector	connector	connector	connector	connector	connector
metal	metal	metal	metal	metal	metal
664	**666**	**668**	**670**	**672**	**674**

laser distance sensors

product family	OM70-X	OM70-X	OM70-X	OADM 250	OADM 260
width / diameter	26 mm	26 mm	26 mm	25,4 mm	25,4 mm
measuring distance Sd	100 ... 150 mm	100 ... 500 mm	100 ... 150 mm	200 ... 4000 mm	200 ... 13000 mm
resolution	2 ... 4 µm 1) 2) 4) 5)	4 ... 25 µm 1) 2) 4) 5)	2 ... 4 µm 1) 2) 4) 5)	1,3 mm	5 mm
linearity error	± 30 ... ± 90 µm 1) 2) 4)	± 100 µm 1) 2) 4) 6)	± 30 ... ± 90 µm 1) 2) 4)		
response time / release time	3,5 ms 2) 3)	1,3 ms 2) 3)	3,5 ms 2) 3)		
light source	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
adjustment	Touch Display, RS485	Touch Display, RS485	Webserver, Ethernet TCP/IP	Teach-in: button / external	Teach-in: button / external
output circuit	analog and RS 485	analog and RS 485		analog	analog
output signal	4 ... 20 mA / 0 ... 10 VDC	4 ... 20 mA / 0 ... 10 VDC		4 ... 20 mA 0 ... 10 VDC	4 ... 20 mA
connection types	connector	connector	connector	connector	connector
housing material	metal	metal	metal	metal	metal
page	**676**	**678**	**680**	**682**	**684**

photoelectric sensors with analog output

product family	O300.DI	O300.DL	O300.DP	O500.DI	O500.DP
width / diameter	12,9 mm	12,9 mm	12,9 mm	18 mm	18 mm
measuring distance Sd	30 ... 300 mm	30 ... 250 mm	30 ... 300 mm	60 ... 550 mm	60 ... 400 mm
resolution	0,5 ... 5 mm	0,5 ... 10 mm	0,5 ... 5 mm	0,5 ... 5 mm	0,5 ... 3 mm
linearity error	± 1,5 ... ± 15 mm	± 1,5 ... ± 12,5 mm	± 1,5 ... ± 15 mm	± 3 ... ± 27,5 mm	± 3 ... ± 20 mm
response time / release time	< 0,49 ms	< 0,25 ms	< 0,49 ms	< 0,49 ms	< 0,49 ms
light source	pulsed infrared diode	pulsed red laser diode	pulsed PinPoint LED	pulsed infrared diode	pulsed PinPoint LED
adjustment	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in and IO-Link	Teach-in and IO-Link
output circuit	push-pull	push-pull	push-pull	push-pull	push-pull
output signal					
connection types	cable connector	cable connector	cable connector	cable connector	cable connector
housing material	plastic	plastic	plastic	plastic	plastic
page	**686**	**688**	**690**	**692**	**694**

product family	OADK 25
width / diameter	23,4 mm
measuring distance Sd	100 ... 1000 mm
resolution	0,3 ... 4 mm
linearity error	± 1,1 ... ± 15 mm
response time / release time	< 12,8 ms
light source	pulsed red laser diode
adjustment	Teach-in
output circuit	analog
output signal	0 ... 10 VDC 4 ... 20 mA
connection types	cable connector
housing material	plastic
page	**708**

FADK 14	FADK 14	FADR 14	FADR 14	FADH 14	FADH 14
14,8 mm	14,8 mm	19,6 mm	19,6 mm	19,6 mm	19,6 mm
50 ... 400 mm	50 ... 400 mm	50 ... 400 mm	50 ... 400 mm	50 ... 400 mm	50 ... 400 mm
0,1 ... 1 mm	0,1 ... 1 mm	0,1 ... 1 mm	0,1 ... 1 mm	0,1 ... 1 mm	0,1 ... 1 mm
± 1,5 ... ± 4 mm	± 1,5 ... ± 4 mm	± 1,5 ... ± 4 mm	± 1,5 ... ± 4 mm	± 1,5 ... ± 4 mm	± 1,5 ... ± 4 mm
< 3 ms	< 3 ms	< 3 ms	< 3 ms	< 3 ms	< 3 ms
pulsed point source LED	pulsed point source LED	pulsed point source LED	pulsed point source LED	pulsed point source LED	pulsed point source LED
IO-Link	IO-Link	IO-Link	IO-Link	IO-Link	IO-Link
analog	analog	analog	analog	analog	analog
4 ... 20 mA	0 ... 10 VDC	4 ... 20 mA	0 ... 10 VDC	4 ... 20 mA	0 ... 10 VDC
cable connector	cable connector	connector	connector	cable flylead connector	cable flylead connector
plastic	plastic	metal	metal	metal	metal
696	**698**	**700**	**702**	**704**	**706**

General information

Optical distance sensors by Baumer measure accurately to the micrometer and deliver reliable results even on demanding surfaces. The extremely compact sensors with fully integrated electronics are ready to use quickly and with little effort.

Typical applications

Reliable and efficient processes

- Laser point, laser line or multi-spot beam shapes for reliable measurement in the sub-micrometer range for demanding surfaces
- Measurements with high repeat accuracy even in the sub-micrometer range
- Precise positioning of objects with a linearity error of ±0.06%
- Smart signal processing in the sensor
- Fast measurements thanks to short measuring cycles

Long-lasting, robust solutions

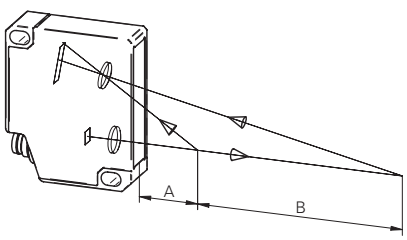
- Robust housings made of stainless steel, metal and plastic for different applications
- High ambient light immunity
- Sensors resistant to vibration and sensors in IP 69K washdown design
- Low temperature drift during fluctuations in ambient temperatures

Simple operation and integration

- Fast, economical initial start-up thanks to Plug & Play
- Fast and simple adjustment of the measuring range using the teach-in button
- Innovative touch display with a simple operating concept
- Factory-calibrated sensors with measuring values displayed in millimeters

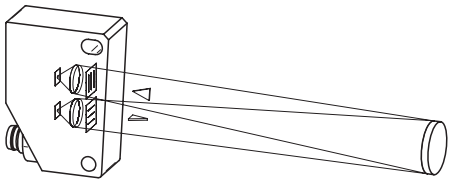
Technology and operation
Triangulation

The light beam arrives at the object as a small spot. The sensor's receiver (photodiode array) detects the position of this spot. Depending on the distance, the angle of incidence changes and thus so does the position of the light spot on the receiver. The photodiode array is read by an integral microcontroller. The controller accurately calculates the angle from the light distribution on the photodiode array and then calculates the distance to the object from this. This distance is either transmitted to the serial port or converted into an output current proportional to the distance. The microcontroller guarantees a high degree of linearity and measuring accuracy. The combination of a photodiode array and a microcontroller allows interference from reflections to be suppressed, thus providing reliable data from critical surfaces. The sensor adapts to different colors by adjusting its internal sensitivity, making it almost independent of the color of the object. A digital output is activated if there is no object within the measuring range or if insufficient light is received to detect the object correctly, e.g. if the sensor is dirty. The possible resolution and the accuracy change with the distance. The same distance Δd which causes a significant change in the angle 1 close to the sensor produces a much smaller change in the angle 2 at a greater distance (see drawing). This non-linear behavior is corrected by the microcontroller, so that the output signal retains a linear relationship with the distance.



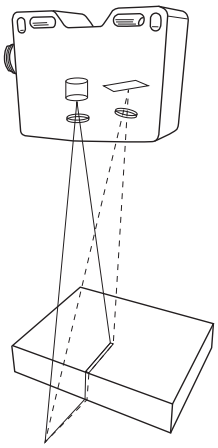
Time of flight (propagation time measurement)

The propagation time measurement is a process for indirect distance measurement by measuring the amount of time that a signal requires to cover the measuring distance. In practice this means that an emitter sends a signal package which is reflected by the object and by the receiver. In the sensor, the propagation time and/or phase shift is evaluated and converted into a distance. Using this propagation time technology, objects can be detected exactly and reliably at great distances.



Light section method

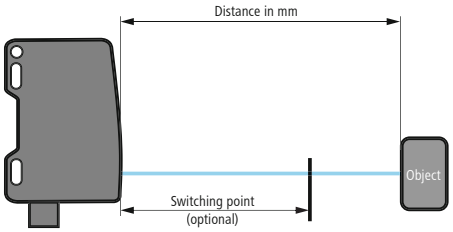
The innovative Baumer multi-spot measuring principle is based on the light section method. On the basis of the triangulation principle, the laser beam, which is up to 62 mm wide, is projected onto a receiver matrix, and up to 600 items of distance information are determined. The intelligent evaluation of this distance information takes place directly in the sensor, which then calculates the resulting distance. Thanks to its resolution of up to 2 µm at a measuring frequency of 500 Hz, the sensor provides exceptionally stable and precise measurement results.



Measurement functions

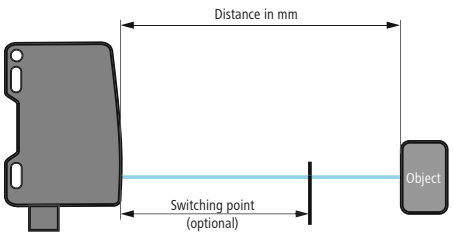
Distance measurements

In the case of distance measurement, the sensor is ready to use immediately and gives the distance from the sensor to the object. The measured value can, for example, be used for the precise positioning of objects or for controlling a system. A digital output can also be parameterized as an option.



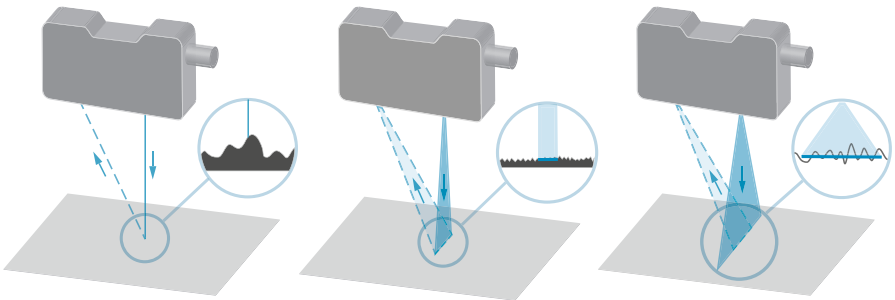
Tolerance measurements

If, for example, the dimensional accuracy of objects is to be checked, a direct tolerance measurement can be made by teaching-in a reference, thus allowing the deviation from the nominal dimension to be determined directly. Here too, a digital output can be parameterized according-



Beam shapes

Besides different dimensions and ranges, the beam shape plays a particularly important role. Thanks to continuous further development, Baumer can now offer three different beam forms in its portfolio with the new «multi-spot» measuring principle:



Laser point

Accurate measurement of small objects thanks to focused laser spot < 0.4 mm

Laser line

Stable measurements on rough surfaces and textured color surfaces thanks to a fine laser line < 10 mm

Multi-spot

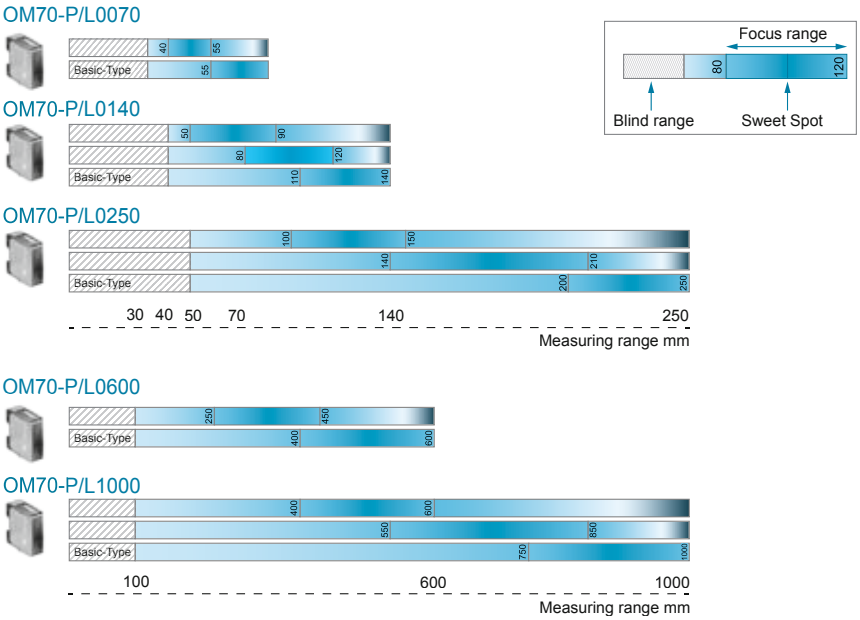
Stable measurements on inhomogeneously shiny and very rough surfaces from over 600 measurements with an extra-wide laser line < 72 mm

Optimal focus ranges for OM70 sensors

Reliable and reproducible measurements

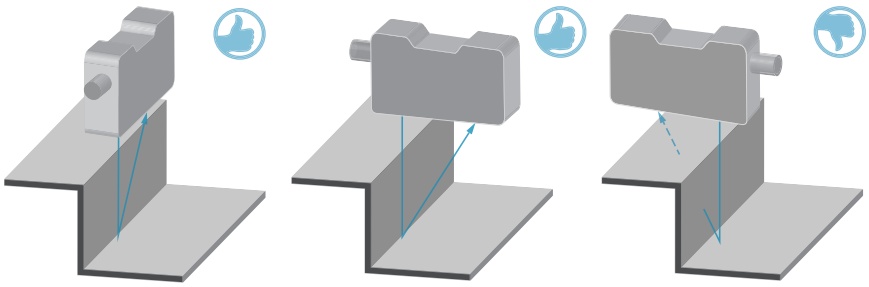
In practice, object surfaces are rarely ideal for optical distance measurement. This often leads to unreliable, unstable measurements. Being the only laser distance sensors on the market, the OM70 sensors therefore offer different focus ranges for the measuring ranges 70, 140, 250, 600 and 1000 mm. This ensures maximum reliability exactly where it is needed in the application.

You are not sure where you want to set the focus range or need the whole measuring range? Then we recommend the basic-type.

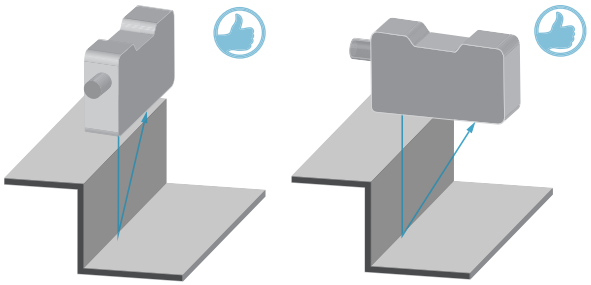


Mounting and adjustment

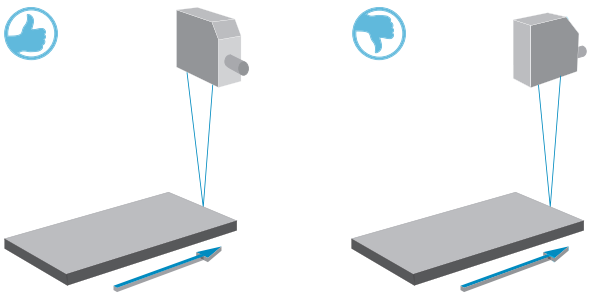
In all distance-measuring sensors, care must be taken to ensure that the laser spot can be directly picked up by the optical system of the receiver and that there are no obstacles in front of the receiver.



With shiny or reflective, surfaces, the reflection may not strike the receiver directly. This can be avoided by tilting the sensor slightly. For optimum measurement results, the sensor must be installed perpendicular to the movement of the object.



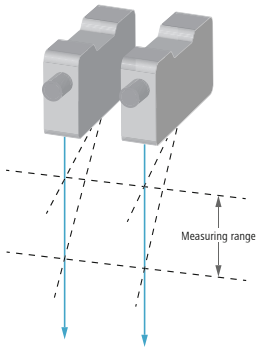
A simple rule applies for triangulation sensors that the distance between the sensor and the object should be kept as small as possible in each application. The shorter the range, the better (more than proportional) the resolution and accuracy.



Note on electromagnetic compatibility: Earth the sensor and use a shielded connecting cable.

Mounting and adjustment

In many applications, several sensors have to be mounted close together. Baumer distance sensors can be arranged side by side without interfering with one another. If mutual interference caused by the installation cannot be avoided, then the sensors can be operated asynchronously using the synchronized input.



Parameterization

Baumer's optical distance sensors have not only analog but also digital interfaces, through which the sensors are parameterized and directly integrated into the existing production environment.

Teach-Button / *qTeach*®

Depending on the application, optical distance sensors which only have one analog output can be restricted in their range and thus re-taught or taught in. This may result in greater accuracy, and thus increased process safety can also be achieved. This is done either using a teach-in button or by means of the contactless *qTeach*® function.

Parameterization by means of the display

An innovative touch display offers the option of setting functions and parameters directly on the display. Depending on the arrangement, this ensures a quick and easy start-up.

- Type of measurement
- Light / dark object
- Filter values
- Analog / digital output

RS 485

The RS 485 serial interface as a bidirectional bus system allows up to 31 sensors to be connected or parameterized. RS 485 also provides fast data transfer of up to 3 Mbit/s, even over longer distances; measured rates of up to 2.5 kHz can be supported in the application.

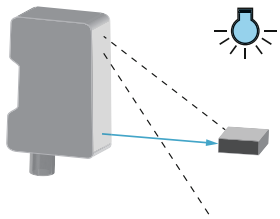
IO-Link

IO-Link allows simple and cost-effective parameterization of optical distance sensors by the PLC. The connection is established by means of a conventional 3-pole M12 cable. Thanks to the standardized interface, IO-Link offers an efficient way to integrate the distance sensors quickly by means of a master at field bus level.

Special features

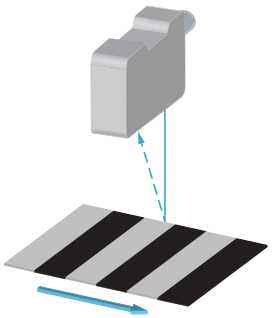
High ambient light immunity

Powerful algorithms integrated in the sensor make laser distance sensors very insensitive to external light sources. This guarantees reliable, robust operation.



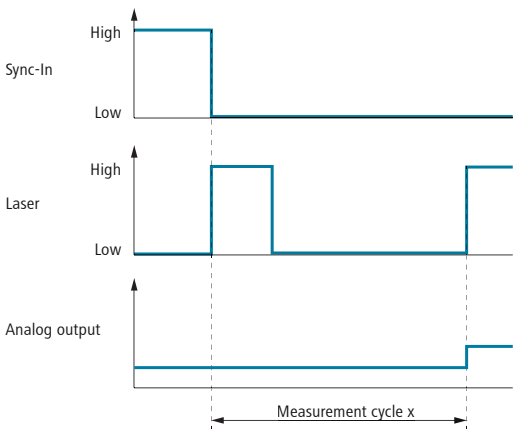
Automatic exposure control

Optical distance sensors by Baumer automatically adapt to different object colors and brightness levels by varying their transmission intensity and optimizing their exposure time. This they are not affected by the reflectivity of an object. It is also possible to measure objects with a reflectivity of up to 2%.



Sync-in / triggering

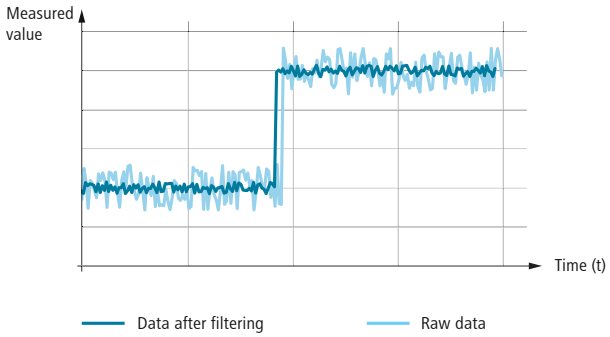
The measurements of several sensors can be synchronized through the sync-in input. For thickness measurements, two sensors can be triggered simultaneously in synchronous mode through the sync input. In asynchronous mode, on the other hand, several sensors that interfere with each other in an application can deliberately be operated one after the other.



Special features

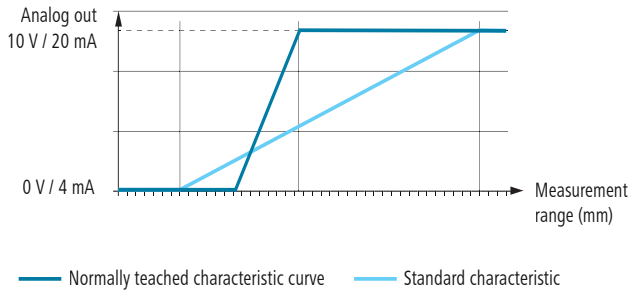
Programmable filter functions

The noise of the output signal can be reduced by activating filtering, thus increasing the resolution. The filter is used to suppress measurement errors. The output changes only after a defined number of measured values. The measuring frequency is not affected by this filter, but the response time is. The filter function can be parameterized through the selection of predefined precision modes.



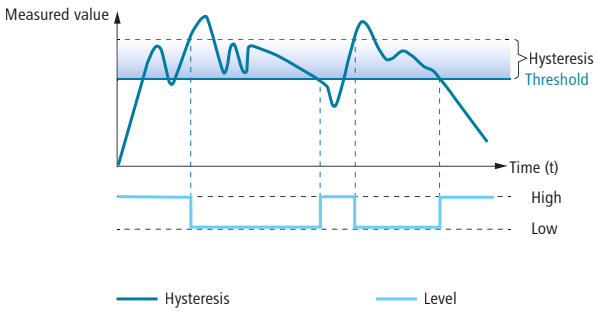
Programmable measuring ranges

The measuring range can be adjusted by the user within the maximum measuring range with the teach-in button, the teach-in line or through the display. The analog output has its full stroke within this taught-in area and thus higher measuring accuracy. The factory setting is the maximum measuring range.



Configurable switched output

A switched output should switch as soon as a defined measured value exceeds or falls below the set level. For a reliable switching signal, the hysteresis (difference between the switching point and the return switching point) can be parameterized in millimeters in absolute terms. The safe operation of your system is guaranteed, regardless of the position of the object in the field of view.

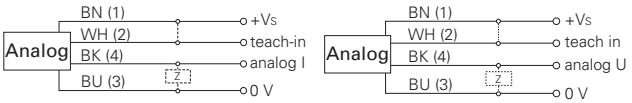


Sd = 16 ... 120 mm

- smallest distance measuring sensor
- teachable measuring range Sr > 1 mm
- resolution up to 2 µm

general data	
adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2
beam type	point
interference suppression	< 30 ms
measuring distance Sd = 16 ... 26 mm	
Teach-in range min.	> 1 mm
resolution	0,002 ... 0,005 mm
linearity error	± 0,006 ... ± 0,015 mm
beam diameter	0,5 ... 0,2 mm
temperature drift	< 0,04 % Sde/K
measuring distance Sd = 16 ... 120 mm	
Teach-in range min.	> 2 mm
resolution	0,002 ... 0,12 mm
linearity error	± 0,015 ... ± 0,35 mm
beam diameter	0,9 ... 0,5 mm
temperature drift	< 0,06 % Sde/K
electrical data	
response time / release time	< 0,9 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	analog
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	12,4 mm
height / length	37 mm
depth	34,5 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67

connection diagrams



connectors and mating connectors

ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

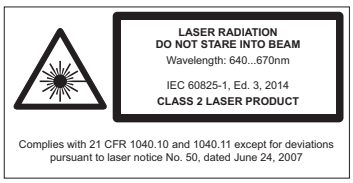
Accessories

10150328	Sensofix series 12
10113873	Mounting bracket series 12 (L design)
for details: see accessories section	

remarks

For objects with a reflectivity < 4 %, the response time / release time is increased automatically up to max. 1,5 ms.
Missed measurement up to 30 cycles (30 ms) will be suppressed. During this time the analog output stays on hold.

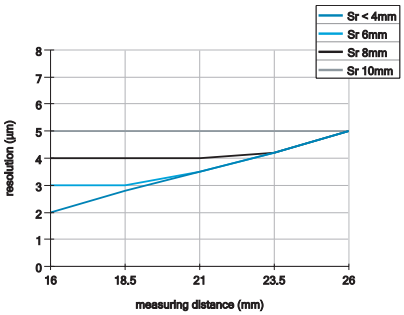
laser warning



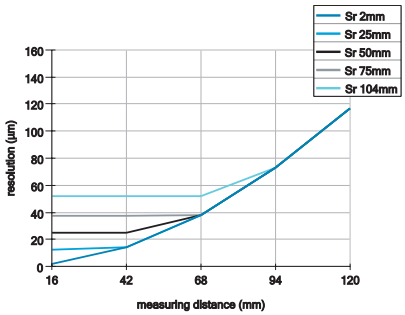
order reference	measuring distance Sd	output signal	load resistance	ambient light immunity
OADM 12I6430/S35A	16 ... 26 mm	4 ... 20 mA	< (+Vs - 6 V) / 0,02 A	< 100 kLux
OADM 12I6460/S35A	16 ... 120 mm	4 ... 20 mA	< (+Vs - 6 V) / 0,02 A	< 30 kLux
OADM 12U6430/S35A	16 ... 26 mm	0 ... 10 VDC	> 100 kOhm	< 100 kLux
OADM 12U6460/S35A	16 ... 120 mm	0 ... 10 VDC	> 100 kOhm	< 30 kLux

resolution

Sd = 16 ... 26 mm

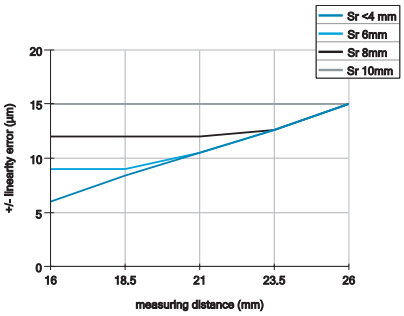


Sd = 16 ... 120 mm

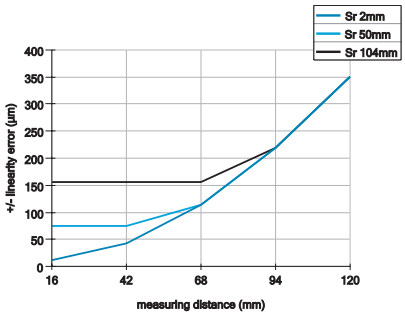


linearity errors

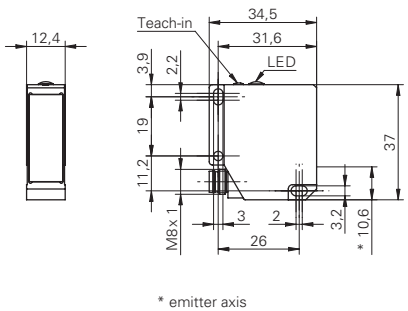
Sd = 16 ... 26 mm



Sd = 16 ... 120 mm



dimension drawing



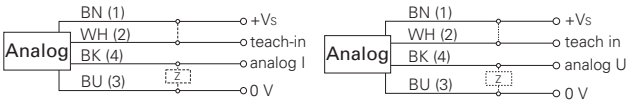
* emitter axis

Sd = 16 ... 120 mm

- smallest distance measuring sensor
- teachable measuring range Sr > 1 mm
- resolution up to 2 µm

general data	
adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	1
beam type	point
interference suppression	< 30 ms
measuring distance Sd = 16 ... 26 mm	
Teach-in range min.	> 1 mm
resolution	0,002 ... 0,005 mm
linearity error	± 0,013 ... ± 0,025 mm
beam diameter	0,5 ... 0,2 mm
temperature drift	< 0,04 % Sde/K
measuring distance Sd = 16 ... 120 mm	
Teach-in range min.	> 2 mm
resolution	0,002 ... 0,12 mm
linearity error	± 0,015 ... ± 0,35 mm
beam diameter	0,9 ... 0,5 mm
temperature drift	< 0,06 % Sde/K
electrical data	
response time / release time	2 ... 3 ms
voltage supply range +Vs	12 ... 28 VDC
output circuit	analog
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	12,4 mm
height / length	37 mm
depth	34,5 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M8 4 pin
ambient conditions	
ambient light immunity	< 50 kLux
operating temperature	0 ... +50 °C
protection class	IP 67

connection diagrams



connectors and mating connectors	
ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10150328	Sensofix series 12
10113873	Mounting bracket series 12 (L design)
for details: see accessories section	

laser warning

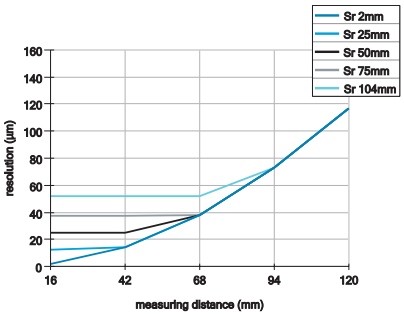
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

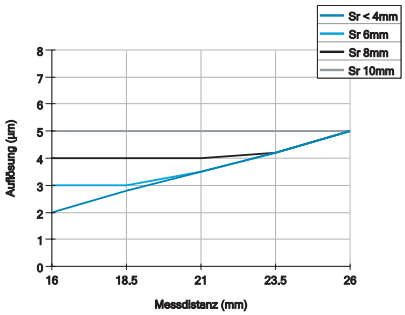
order reference	measuring distance Sd	output signal	current consumption max. (no load)	load resistance
OADM 12I7430/S35A	16 ... 26 mm	4 ... 20 mA	100 mA	< (+Vs - 6 V) / 0,02 A
OADM 12I7460/S35A	16 ... 120 mm	4 ... 20 mA	100 mA	< (+Vs - 6 V) / 0,02 A
OADM 12U7430/S35A	16 ... 26 mm	0 ... 10 VDC	80 mA	> 100 kOhm
OADM 12U7460/S35A	16 ... 120 mm	0 ... 10 VDC	80 mA	> 100 kOhm

resolution

Sd = 16 ... 120 mm

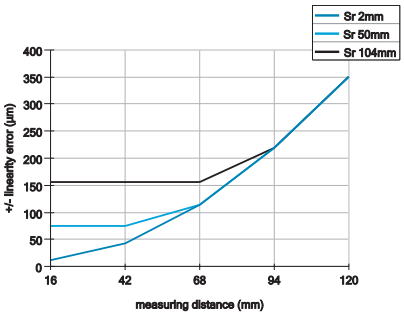


Sd = 16 ... 26 mm

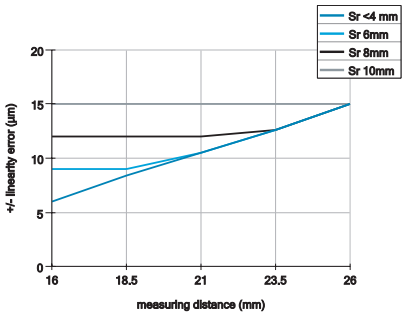


linearity errors

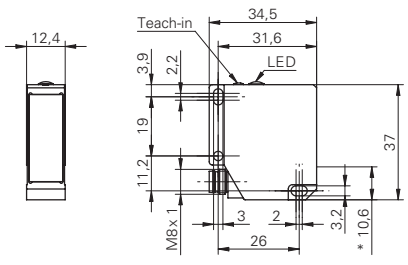
Sd = 16 ... 120 mm



Sd = 16 ... 26 mm



dimension drawing



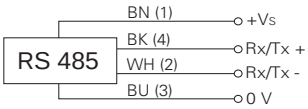
* emitter axis

Sd = 16 ... 120 mm

- smallest distance measuring sensor
- serial interface RS 485
- resolution up to 4 µm

general data	
adjustment	RS 485
power on indication	LED green
light source	pulsed red laser diode
wave length	650 nm
laser class	1
beam type	point
interference suppression	< 30 ms
alarm indicator	LED red
measuring distance Sd = 16 ... 26 mm	
resolution	0,004 ... 0,008 mm
linearity error	± 0,013 ... ± 0,025 mm
beam diameter	0,5 ... 0,2 mm
temperature drift	< 0,04 % Sde/K
measuring distance Sd = 30 ... 50 mm	
resolution	0,01 ... 0,026 mm
linearity error	± 0,032 ... ± 0,078 mm
beam diameter	0,7 ... 0,4 mm
temperature drift	< 0,06 % Sde/K
measuring distance Sd = 16 ... 120 mm	
resolution	0,012 ... 0,12 mm
linearity error	± 0,026 ... ± 0,35 mm
beam diameter	0,9 ... 0,5 mm
temperature drift	< 0,06 % Sde/K
electrical data	
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	80 mA
output circuit	RS 485
baud rate	38400, adjustable
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	12,4 mm
height / length	37 mm
depth	34,5 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M8 4 pin
ambient conditions	
ambient light immunity	< 50 kLux
operating temperature	0 ... +50 °C
protection class	IP 67

connection diagram



connectors and mating connectors	
ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10150328	Sensofix series 12
10113873	Mounting bracket series 12 (L design)
for details: see accessories section	

laser warning

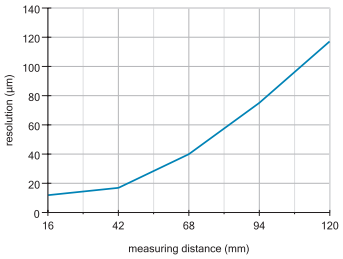
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

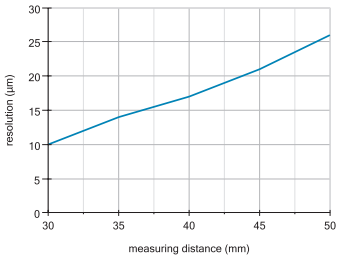
order reference	measuring distance Sd	response time / release time
OADM 12S7430/S35A	16 ... 26 mm	< 1,8 ms
OADM 12S7440/S35A	30 ... 50 mm	< 1,8 ms
OADM 12S7460/S35A	16 ... 120 mm	< 3 ms

resolution

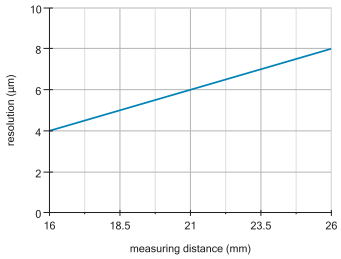
Sd = 16 ... 120 mm



Sd = 30 ... 50 mm

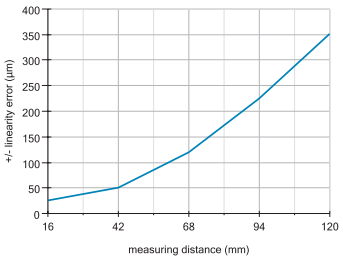


Sd = 16 ... 28 mm

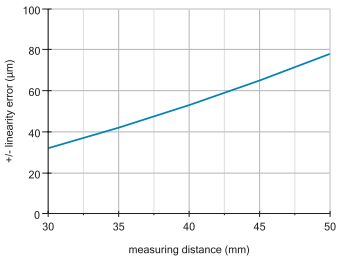


linearity errors

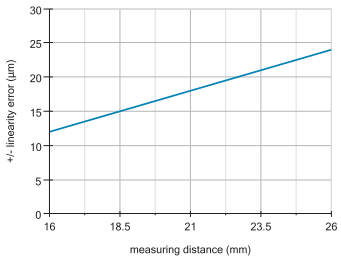
Sd = 16 ... 120 mm



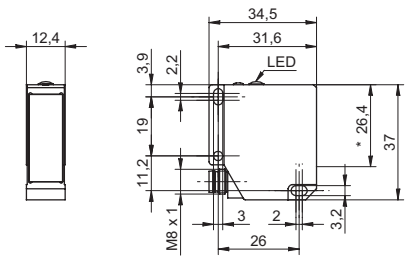
Sd = 30 ... 50 mm



Sd = 16 ... 28 mm



dimension drawing



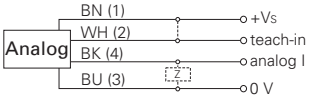
* emitter axis

Sd = 50 ... 550 mm

- compact housing, current output
- teachable measuring range Sr > 5 mm
- resolution up to 10 µm

general data	
adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2
interference suppression	< 30 ms
measuring distance Sd = 50 ... 350 mm	
Teach-in range min.	> 5 mm
resolution	0,01 ... 0,4 mm
linearity error	± 0,05 ... ± 1,2 mm
temperature drift	< 0,04 % Sde/K
measuring distance Sd = 50 ... 550 mm	
Teach-in range min.	> 10 mm
resolution	0,01 ... 1,15 mm
linearity error	± 0,08 ... ± 3,5 mm
temperature drift	< 0,07 % Sde/K
electrical data	
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	analog
output signal	4 ... 20 mA
load resistance	< (+Vs - 6 V) / 0,02 A
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	13,4 mm
height / length	48,2 mm
depth	40 mm
type	rectangular
housing material	aluminum
front (optics)	glass
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67

connection diagram



connectors and mating connectors

ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

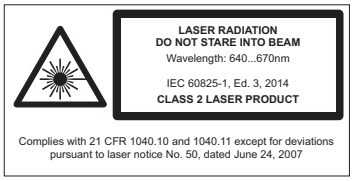
Accessories

10161829	Sensofix series 13
10161695	Mounting bracket for sensors series 13 (L design)
for details: see accessories section	

remarks

For objects with a reflectivity < 6 %, the response time / release time is increased automatically up to max. 3 ms (OADM 13x6x75/S35A) resp. 5 ms (OADM 13x7x80/S35A).
Missed measurement up to 30 cycles (30 ms) will be suppressed. During this time the analog output stays on hold.

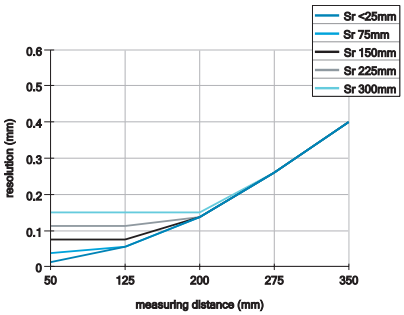
laser warning



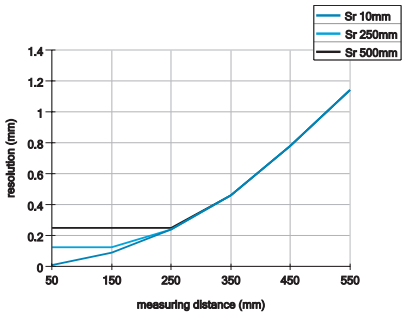
order reference	measuring distance Sd	response time / release time	beam type	beam width	beam height	beam diameter	ambient light immunity
OADM 13I6475/S35A	50 ... 350 mm	< 0,9 ms	point	-	-	1 mm	< 20 kLux
OADM 13I6575/S35A	50 ... 350 mm	< 0,9 ms	line	2 mm	4 ... 9 mm	-	< 30 kLux
OADM 13I7480/S35A	50 ... 550 mm	< 2 ms	point	-	-	1 mm	< 40 kLux
OADM 13I7580/S35A	50 ... 550 mm	< 2 ms	line	2 ... 1 mm	4 ... 11 mm	-	< 40 kLux

resolution

Sd = 50 ... 350 mm

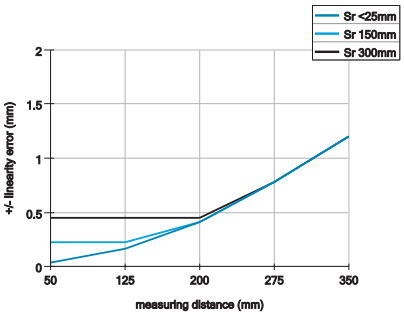


Sd = 50 ... 550 mm

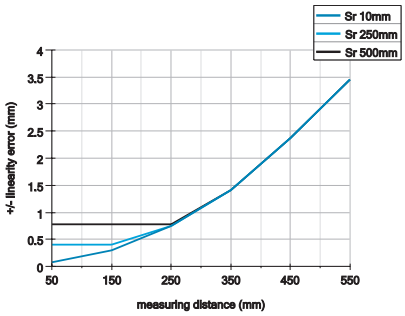


linearity errors

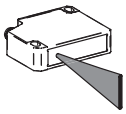
Sd = 50 ... 350 mm



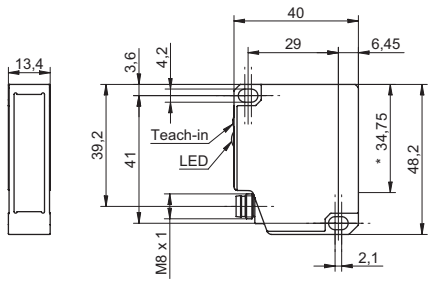
Sd = 50 ... 550 mm



beam alignment (line)



dimension drawing



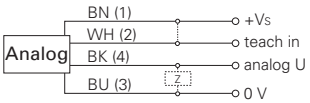
* emitter axis

Sd = 50 ... 550 mm

- compact housing, voltage output
- teachable measuring range Sr > 5 mm
- resolution up to 10 µm

general data	
adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2
interference suppression	< 30 ms
measuring distance Sd = 50 ... 350 mm	
Teach-in range min.	> 5 mm
resolution	0,01 ... 0,4 mm
linearity error	± 0,05 ... ± 1,2 mm
temperature drift	< 0,04 % Sde/K
measuring distance Sd = 50 ... 550 mm	
Teach-in range min.	> 10 mm
resolution	0,01 ... 1,15 mm
linearity error	± 0,08 ... ± 3,5 mm
temperature drift	< 0,07 % Sde/K
electrical data	
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	80 mA
output circuit	analog
output signal	0 ... 10 VDC
load resistance	> 100 kOhm
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	13,4 mm
height / length	48,2 mm
depth	40 mm
type	rectangular
housing material	aluminum
front (optics)	glass
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67

connection diagram



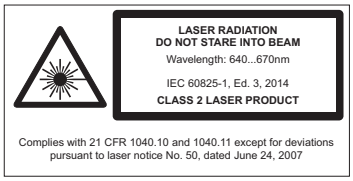
connectors and mating connectors	
ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10161829	Sensofix series 13
10161695	Mounting bracket for sensors series 13 (L design)
for details: see accessories section	

remarks

For objects with a reflectivity < 6 %, the response time / release time is increased automatically up to max. 3 ms (OADM 13x6x75/S35A) resp. 5 ms (OADM 13x7x80/S35A).
Missed measurement up to 30 cycles (30 ms) will be suppressed. During this time the analog output stays on hold.

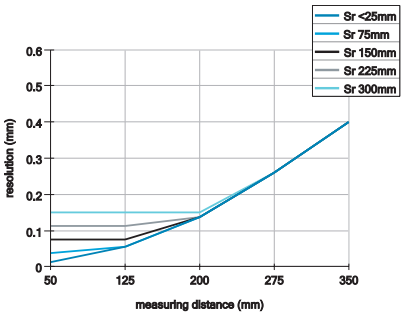
laser warning



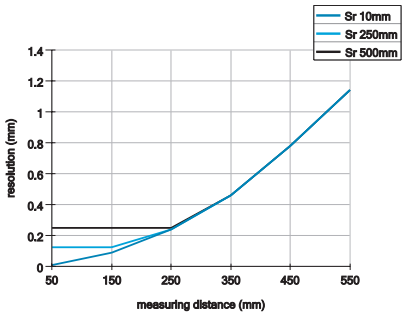
order reference	measuring distance Sd	response time / release time	beam type	beam width	beam height	beam diameter	ambient light immunity
OADM 13U6475/S35A	50 ... 350 mm	< 0,9 ms	point	-	-	1 mm	< 20 kLux
OADM 13U6575/S35A	50 ... 350 mm	< 0,9 ms	line	2 mm	4 ... 9 mm	-	< 30 kLux
OADM 13U7480/S35A	50 ... 550 mm	< 2 ms	point	-	-	1 mm	< 40 kLux
OADM 13U7580/S35A	50 ... 550 mm	< 2 ms	line	2 ... 1 mm	4 ... 11 mm	-	< 40 kLux

resolution

Sd = 50 ... 350 mm

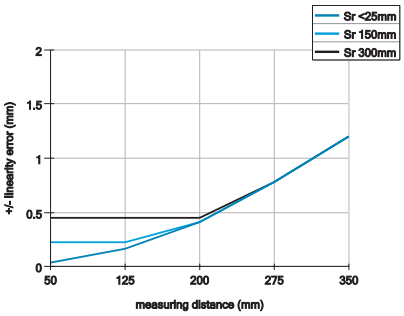


Sd = 50 ... 550 mm

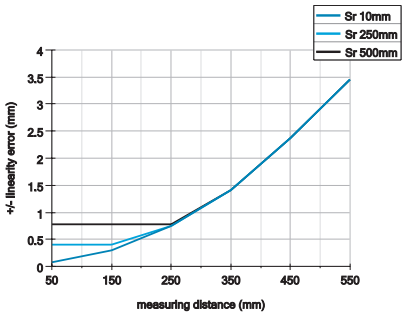


linearity errors

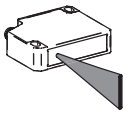
Sd = 50 ... 350 mm



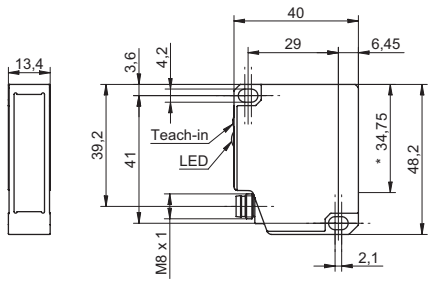
Sd = 50 ... 550 mm



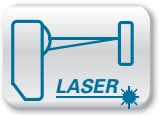
beam alignment (line)



dimension drawing



* emitter axis

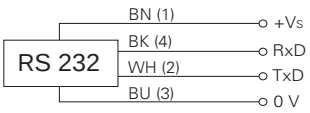


Sd = 50 ... 550 mm

- serial interface RS 232
- resolution up to 50 µm
- also with laser line for rough surfaces

general data	
adjustment	RS 232
power on indication	LED green
light source	pulsed red laser diode
wave length	650 nm
laser class	2
alarm indicator	LED red
measuring distance Sd = 50 ... 350 mm	
resolution	0,05 ... 0,4 mm
linearity error	± 0,18 ... ± 1,2 mm
temperature drift	< 0,04 % Sde/K
measuring distance Sd = 50 ... 550 mm	
resolution	0,09 ... 1,15 mm
linearity error	± 0,3 ... ± 3,5 mm
temperature drift	< 0,07 % Sde/K
electrical data	
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	80 mA
output circuit	RS 232
baud rate	38400, adjustable
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	13,4 mm
height / length	48,2 mm
depth	40 mm
type	rectangular
housing material	aluminum
front (optics)	glass
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67

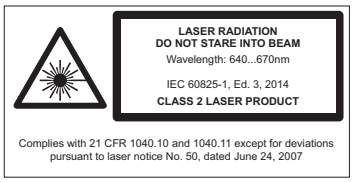
connection diagram



connectors and mating connectors	
ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10161829	Sensofix series 13
10161695	Mounting bracket for sensors series 13 (L design)
for details: see accessories section	

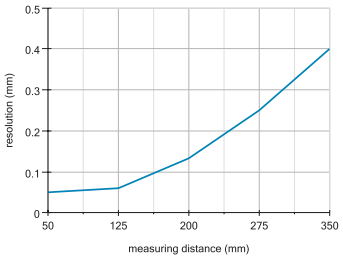
laser warning



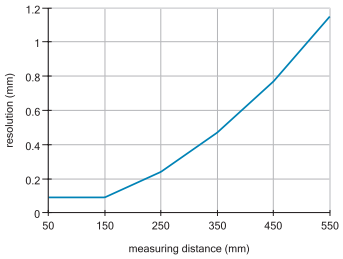
order reference	measuring distance Sd	response time / release time	beam type	beam width	beam height	beam diameter	ambient light immunity
OADM 13T6475/S35A	50 ... 350 mm	< 0,9 ms	point	-	-	1 mm	< 20 kLux
OADM 13T6575/S35A	50 ... 350 mm	< 0,9 ms	line	2 mm	4 ... 9 mm	-	< 30 kLux
OADM 13T7480/S35A	50 ... 550 mm	< 2 ms	point	-	-	1 mm	< 100 kLux
OADM 13T7580/S35A	50 ... 550 mm	< 2 ms	line	2 mm	4 ... 13 mm	-	< 100 kLux

resolution

Sd = 50 ... 350 mm

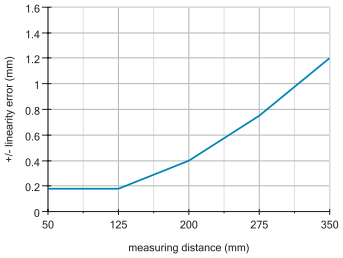


Sd = 50 ... 550 mm

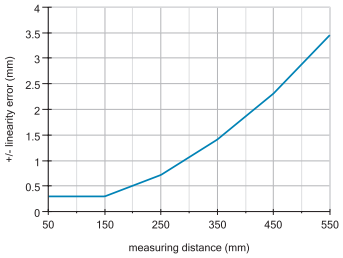


linearity errors

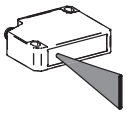
Sd = 50 ... 350 mm



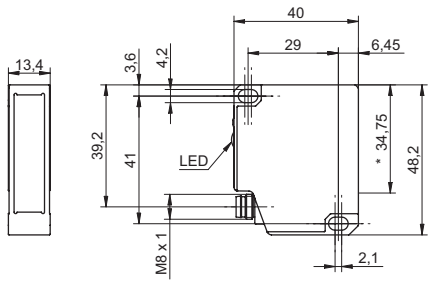
Sd = 50 ... 550 mm



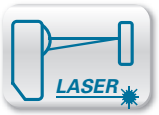
beam alignment (line)



dimension drawing



* emitter axis

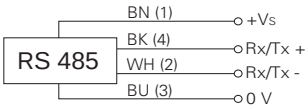


Sd = 50 ... 550 mm

- serial interface RS 485
- resolution up to 50 µm
- also with laser line for rough surfaces

general data	
adjustment	RS 485
power on indication	LED green
light source	pulsed red laser diode
wave length	650 nm
laser class	2
alarm indicator	LED red
measuring distance Sd = 50 ... 350 mm	
resolution	0,05 ... 0,4 mm
linearity error	± 0,18 ... ± 1,2 mm
temperature drift	< 0,04 % Sde/K
measuring distance Sd = 50 ... 550 mm	
resolution	0,09 ... 1,15 mm
linearity error	± 0,3 ... ± 3,5 mm
temperature drift	< 0,07 % Sde/K
electrical data	
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	80 mA
output circuit	RS 485
baud rate	38400, adjustable
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	13,4 mm
height / length	48,2 mm
depth	40 mm
type	rectangular
housing material	aluminum
front (optics)	glass
connection types	connector M8 4 pin
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67

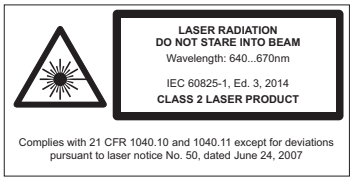
connection diagram



connectors and mating connectors	
ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10161829	Sensofix series 13
10161695	Mounting bracket for sensors series 13 (L design)
for details: see accessories section	

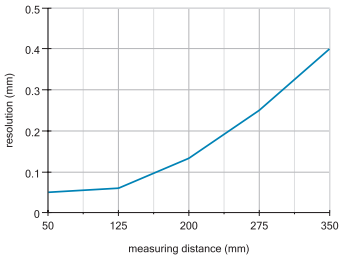
laser warning



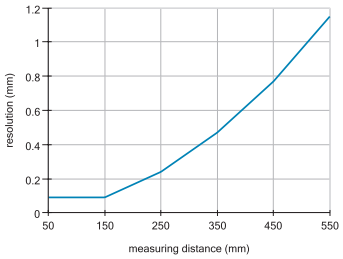
order reference	measuring distance Sd	response time / release time	beam type	beam width	beam height	beam diameter	ambient light immunity
OADM 13S6475/S35A	50 ... 350 mm	< 0,9 ms	point	-	-	1 mm	< 20 kLux
OADM 13S6575/S35A	50 ... 350 mm	< 0,9 ms	line	2 mm	4 ... 9 mm	-	< 30 kLux
OADM 13S7480/S35A	50 ... 550 mm	< 2 ms	point	-	-	1 mm	< 100 kLux
OADM 13S7580/S35A	50 ... 550 mm	< 2 ms	line	2 mm	4 ... 13 mm	-	< 100 kLux

resolution

Sd = 50 ... 350 mm

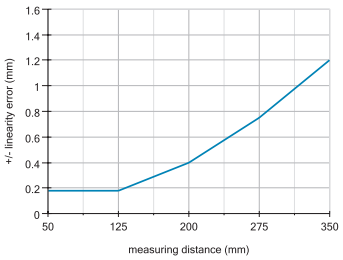


Sd = 50 ... 550 mm

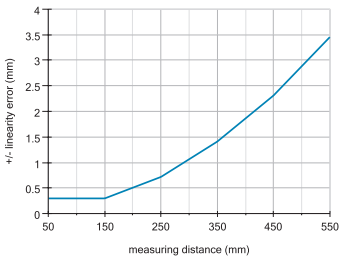


linearity errors

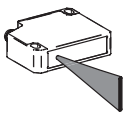
Sd = 50 ... 350 mm



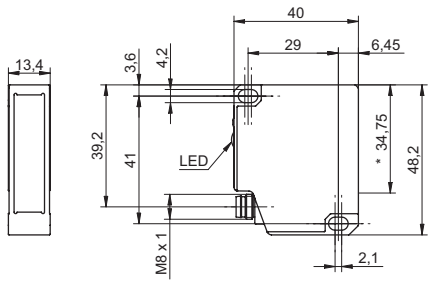
Sd = 50 ... 550 mm



beam alignment (line)



dimension drawing



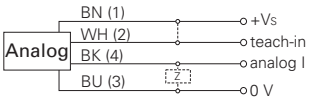
* emitter axis

Sd = 50 ... 200 mm

- compact housing, current output
- high sensitivity
- fine laser line

general data	
adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	1
beam type	line
interference suppression	< 30 ms
temperature drift	< 0,07 % Sde/K
measuring distance Sd = 50 ... 60 mm	
Teach-in range min.	> 1 mm
resolution	< 0,015 mm
linearity error	< 0,045 mm
object reflectivity	> 0,5 %
measuring distance Sd = 60 ... 100 mm	
Teach-in range min.	> 4 mm
resolution	0,015 ... 0,038 mm
linearity error	± 0,047 ... ± 0,118 mm
object reflectivity	> 0,8 %
measuring distance Sd = 100 ... 200 mm	
Teach-in range min.	> 5 mm
resolution	0,039 ... 0,15 mm
linearity error	± 0,123 ... ± 0,457 mm
object reflectivity	> 2 %
electrical data	
response time / release time	< 2 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	analog
output signal	4 ... 20 mA
load resistance	< (+Vs - 6 V) / 0,02 A
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	13,4 mm
height / length	48,2 mm
depth	40 mm
type	rectangular
housing material	aluminum
front (optics)	glass
connection types	connector M8 4 pin
ambient conditions	
ambient light immunity	< 100 kLux
operating temperature	0 ... +50 °C
protection class	IP 67

connection diagram



connectors and mating connectors

ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded

additional cable connectors and field wireable connectors: see accessories

Accessories

10161829	Sensofix series 13
10161695	Mounting bracket for sensors series 13 (L design)

for details: see accessories section

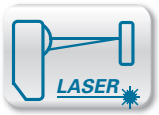
remarks

Missed measurement up to 15 cycles (30 ms) will be suppressed. During this time the analog output stays on hold.

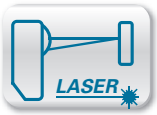
laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

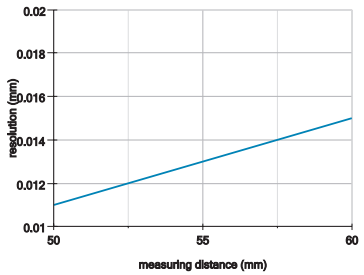


order reference	measuring distance Sd
OADM 13I7730/S35A	50 ... 60 mm
OADM 13I7745/S35A	60 ... 100 mm
OADM 13I7760/S35A	100 ... 200 mm

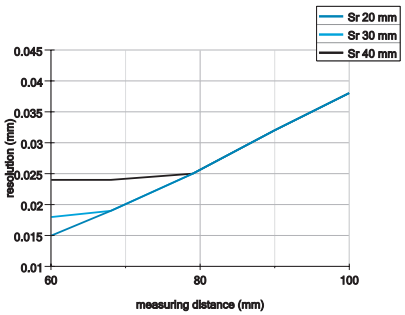


resolution

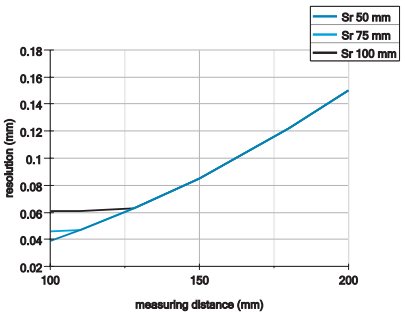
Sd = 50 ... 60 mm



Sd = 60 ... 100 mm

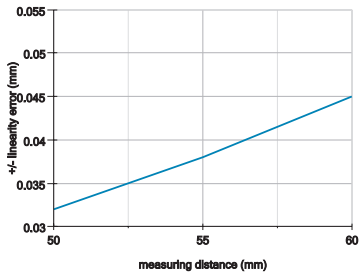


Sd = 100 ... 200 mm

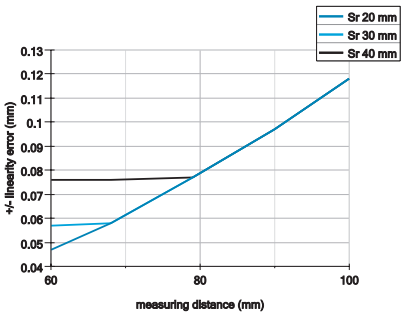


linearity errors

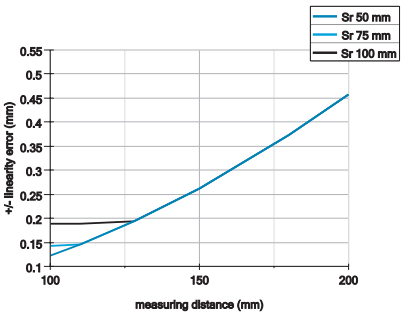
Sd = 50 ... 60 mm



Sd = 60 ... 100 mm

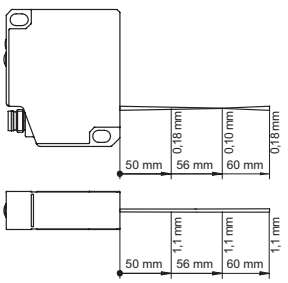


Sd = 100 ... 200 mm

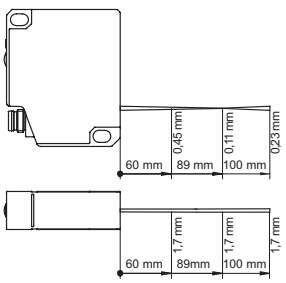


beam alignment (line)

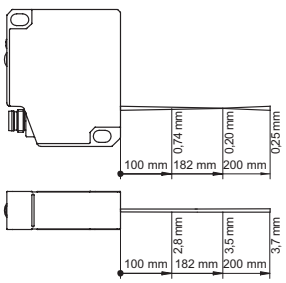
Sd = 50 ... 60 mm



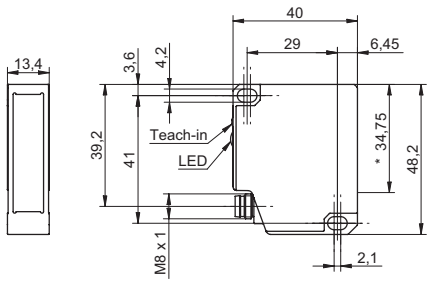
Sd = 60 ... 100 mm



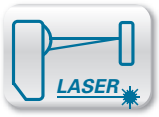
Sd = 100 ... 200 mm

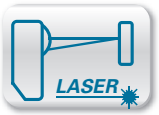


dimension drawing



* emitter axis


LASER

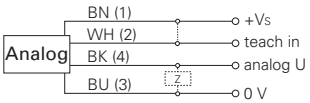


Sd = 50 ... 200 mm

- compact housing, voltage output
- high sensitivity
- fine laser line

general data	
adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	1
beam type	line
interference suppression	< 30 ms
temperature drift	< 0,07 % Sde/K
measuring distance Sd = 50 ... 60 mm	
Teach-in range min.	> 1 mm
resolution	< 0,015 mm
linearity error	< 0,045 mm
object reflectivity	> 0,5 %
measuring distance Sd = 60 ... 100 mm	
Teach-in range min.	> 4 mm
resolution	0,015 ... 0,038 mm
linearity error	± 0,047 ... ± 0,118 mm
object reflectivity	> 0,8 %
measuring distance Sd = 100 ... 200 mm	
Teach-in range min.	> 5 mm
resolution	0,039 ... 0,15 mm
linearity error	± 0,123 ... ± 0,457 mm
object reflectivity	> 2 %
electrical data	
response time / release time	< 2 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	80 mA
output circuit	analog
output signal	0 ... 10 VDC
load resistance	> 100 kOhm
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	13,4 mm
height / length	48,2 mm
depth	40 mm
type	rectangular
housing material	aluminum
front (optics)	glass
connection types	connector M8 4 pin
ambient conditions	
ambient light immunity	< 100 kLux
operating temperature	0 ... +50 °C
protection class	IP 67

connection diagram



connectors and mating connectors

ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories

10161829	Sensofix series 13
10161695	Mounting bracket for sensors series 13 (L design)
for details: see accessories section	

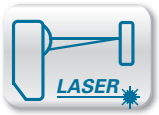
remarks

Missed measurement up to 15 cycles (30 ms) will be suppressed. During this time the analog output stays on hold.

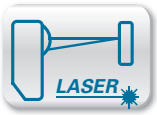
laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

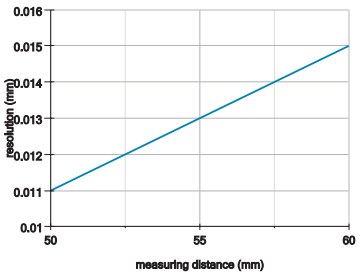


order reference	measuring distance Sd
OADM 13U7730/S35A	50 ... 60 mm
OADM 13U7745/S35A	60 ... 100 mm
OADM 13U7760/S35A	100 ... 200 mm

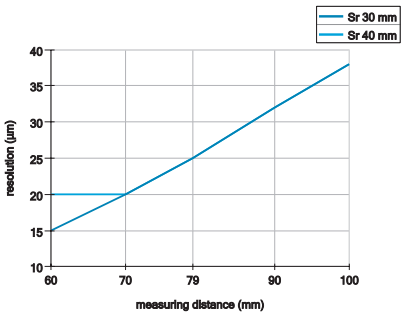


resolution

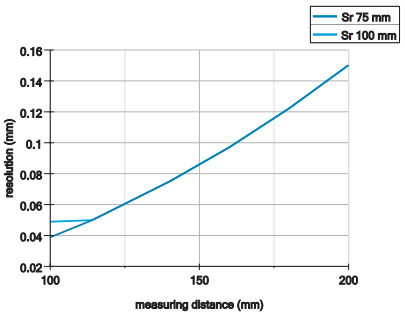
Sd = 50 ... 60 mm



Sd = 60 ... 100 mm

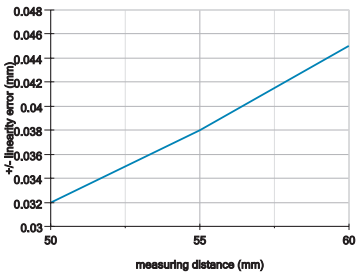


Sd = 100 ... 200 mm

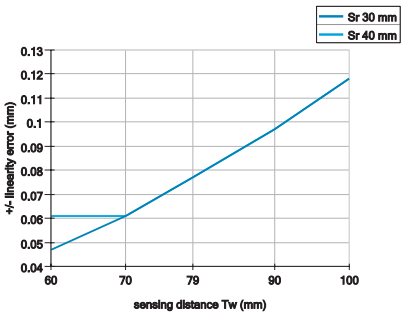


linearity errors

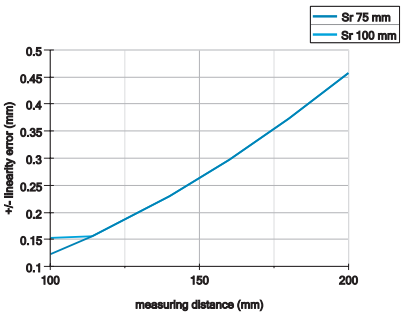
Sd = 50 ... 60 mm



Sd = 60 ... 100 mm

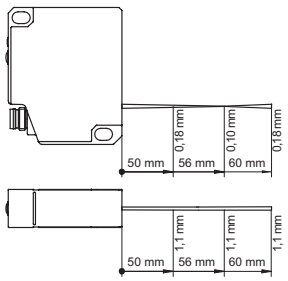


Sd = 100 ... 200 mm

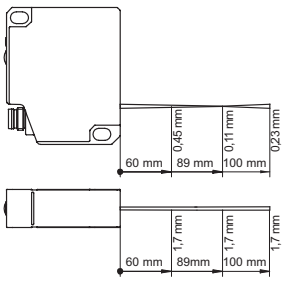


beam alignment (line)

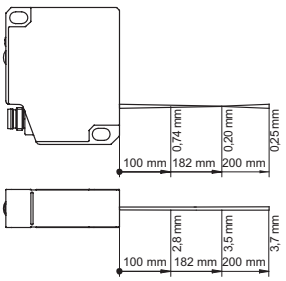
Sd = 50 ... 60 mm



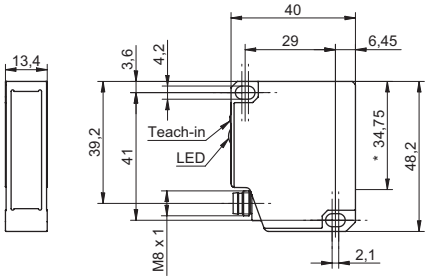
Sd = 60 ... 100 mm



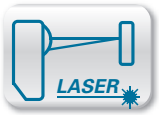
Sd = 100 ... 200 mm



dimension drawing



* emitter axis

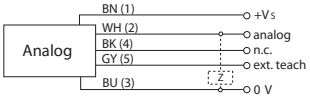

LASER

Sd = 30 ... 130 mm

- response time < 0,9 ms
- teachable measuring range Sr >2 mm

general data	
adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2
beam type	point
measuring distance Sd = 30 ... 70 mm	
Teach-in range min.	> 2 mm
resolution	0,004 ... 0,02 mm
linearity error	± 0,012 ... ± 0,06 mm
beam diameter	1 ... 0,2 mm
measuring distance Sd = 30 ... 130 mm	
Teach-in range min.	> 3 mm
resolution	0,005 ... 0,06 mm
linearity error	± 0,015 ... ± 0,2 mm
beam diameter	2 ... 1 mm
electrical data	
response time / release time	< 0,9 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	analog
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	20,6 mm
height / length	65 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M12 5 pin, rotatable
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67

connection diagram



connectors and mating connectors

ESG 34CH0200G	Connector M12, 5 pin, straight, 2 m, shielded

additional cable connectors and field wireable connectors: see accessories

Accessories

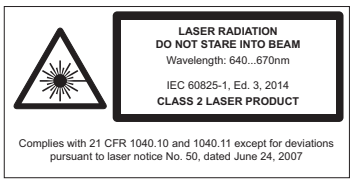
11010227	Mounting bracket OxDM 20
10156878	Protector cap OxDM 20

for details: see accessories section

remarks

Missed measurements up to 30 cycles will be suppressed. During this time the analog output stays on hold.

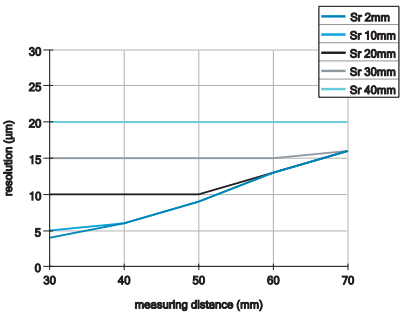
laser warning



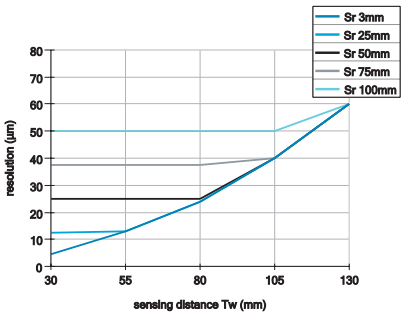
order reference	measuring distance Sd	output signal	load resistance (analog U)	load resistance (analog I)
OADM 20I2441/S14C	30 ... 70 mm	4 ... 20 mA	-	< (+Vs - 6 V) / 0,02 A
OADM 20I2460/S14C	30 ... 130 mm	4 ... 20 mA	-	< (+Vs - 6 V) / 0,02 A
OADM 20U2441/S14C	30 ... 70 mm	0 ... 10 VDC	> 100 kOhm	-
OADM 20U2460/S14C	30 ... 130 mm	0 ... 10 VDC	> 100 kOhm	-

resolution

Sd = 30 ... 70 mm

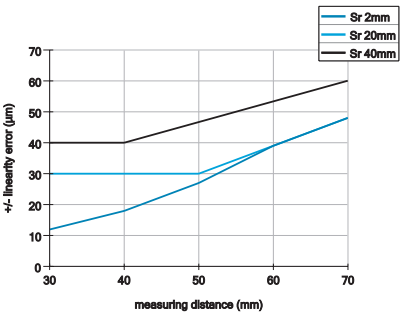


Sd = 30 ... 130 mm

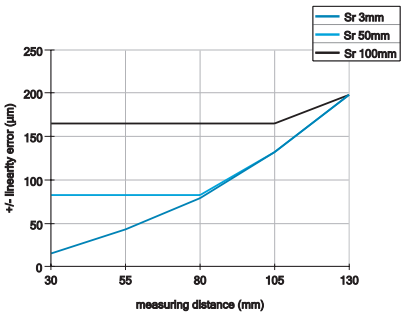


linearity errors

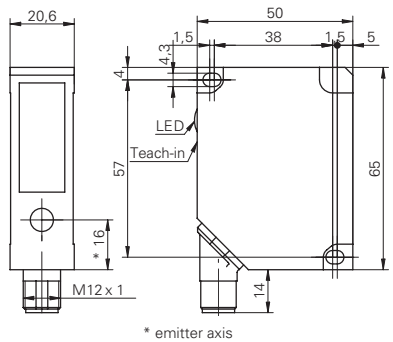
Sd = 30 ... 70 mm



Sd = 30 ... 130 mm



dimension drawing

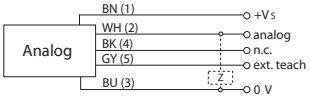


Sd = 50 ... 600 mm

- response time < 0,9 ms
- teachable measuring range Sr > 5 mm

general data	
adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2
beam type	point
beam diameter	2 mm
measuring distance Sd = 50 ... 300 mm	
Teach-in range min.	> 5 mm
resolution	0,01 ... 0,33 mm
linearity error	± 0,03 ... ± 1 mm
measuring distance Sd = 100 ... 600 mm	
Teach-in range min.	> 10 mm
resolution	0,015 ... 0,67 mm
linearity error	± 0,05 ... ± 2 mm
electrical data	
response time / release time	< 0,9 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	analog
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	20,6 mm
height / length	65 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M12 5 pin, rotatable
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67

connection diagram



connectors and mating connectors

ESG 34CH0200G	Connector M12, 5 pin, straight, 2 m, shielded

additional cable connectors and field wireable connectors: see accessories

Accessories

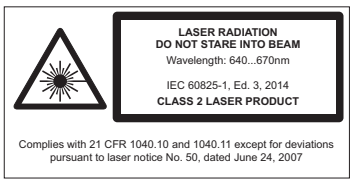
11010227	Mounting bracket OxDM 20
10156878	Protector cap OxDM 20

for details: see accessories section

remarks

For objects with a reflectivity < 7% (OADM 20x2480/S14C), the response / release time is increased automatically up to max. 2,8 ms. Missed measurements up to 30 cycles will be suppressed. During this time the analog output stays on hold.

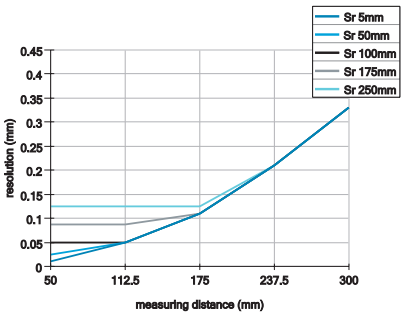
laser warning



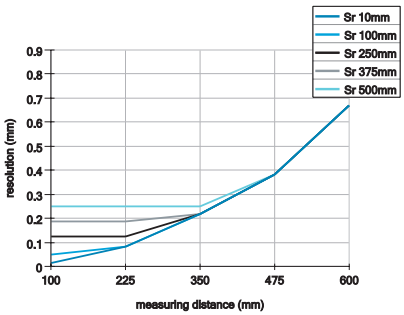
order reference	measuring distance Sd	output signal	load resistance (analog U)	load resistance (analog I)
OADM 20I2472/S14C	50 ... 300 mm	4 ... 20 mA	-	< (+Vs - 6 V) / 0,02 A
OADM 20I2480/S14C	100 ... 600 mm	4 ... 20 mA	-	< (+Vs - 6 V) / 0,02 A
OADM 20U2472/S14C	50 ... 300 mm	0 ... 10 VDC	> 100 kOhm	-
OADM 20U2480/S14C	100 ... 600 mm	0 ... 10 VDC	> 100 kOhm	-

resolution

Sd = 50 ... 300 mm

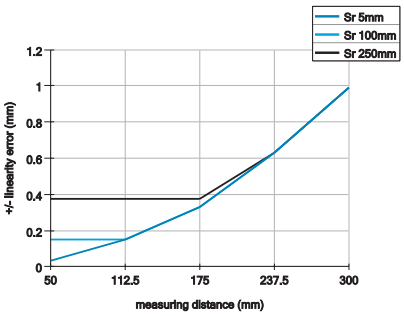


Sd = 100 ... 600 mm

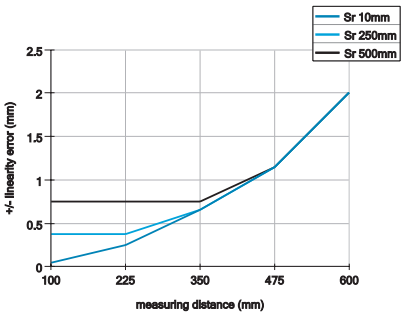


linearity errors

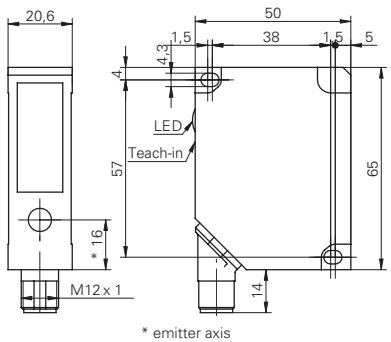
Sd = 50 ... 300 mm



Sd = 100 ... 600 mm



dimension drawing

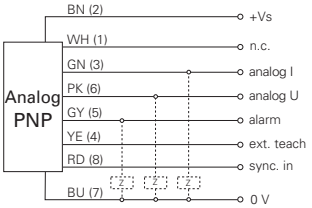


Sd = 30 ... 300 mm

- response time < 0,9 ms
- teachable measuring range Sr > 2 mm
- resolution up to 4 µm

general data	
adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2
measuring distance Sd = 30 ... 70 mm	
Teach-in range min.	> 2 mm
resolution	0,004 ... 0,02 mm
linearity error	± 0,012 ... ± 0,06 mm
temperature drift	< 0,015 % Sde/K
measuring distance Sd = 30 ... 130 mm	
Teach-in range min.	> 3 mm
resolution	0,005 ... 0,06 mm
linearity error	± 0,015 ... ± 0,2 mm
temperature drift	< 0,03 % Sde/K
measuring distance Sd = 50 ... 300 mm	
Teach-in range min.	> 5 mm
resolution	0,01 ... 0,33 mm
linearity error	± 0,03 ... ± 1 mm
temperature drift	< 0,03 % Sde/K
electrical data	
response time / release time	< 0,9 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	analog
output signal	4 ... 20 mA / 0 ... 10 VDC
load resistance (analog I)	< (+Vs - 6 V) / 0,02 A
load resistance (analog U)	> 100 kOhm
output current	< 100 mA
alarm output	PNP
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	20,6 mm
height / length	65 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M12 8 pin, rotatable
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67

connection diagram



connectors and mating connectors

ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded

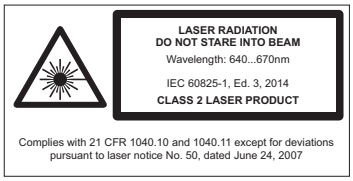
additional cable connectors and field wireable connectors: see accessories

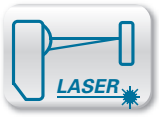
Accessories

11010227	Mounting bracket OxDM 20
10156878	Protector cap OxDM 20

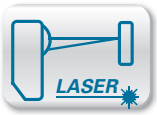
for details: see accessories section

laser warning



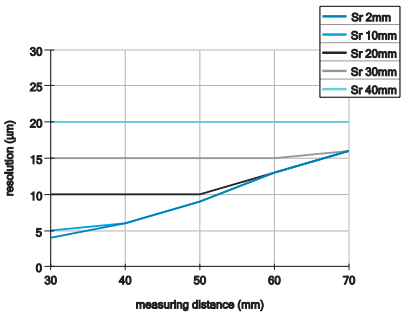


order reference	measuring distance Sd	beam type	beam width	beam height	beam diameter	ambient light immunity
OADM 20I6441/S14F	30 ... 70 mm	point	-	-	1 ... 0,2 mm	< 50 kLux
OADM 20I6460/S14F	30 ... 130 mm	point	-	-	2 ... 1 mm	< 40 kLux
OADM 20I6472/S14F	50 ... 300 mm	point	-	-	2 mm	< 8 kLux
OADM 20I6541/S14F	30 ... 70 mm	line	1 ... 0,2 mm	2 mm	-	< 50 kLux
OADM 20I6560/S14F	30 ... 130 mm	line	2 ... 1 mm	3 ... 5 mm	-	< 40 kLux
OADM 20I6572/S14F	50 ... 300 mm	line	2,5 mm	4 ... 12 mm	-	< 8 kLux

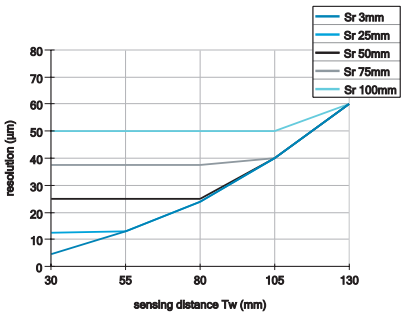


resolution

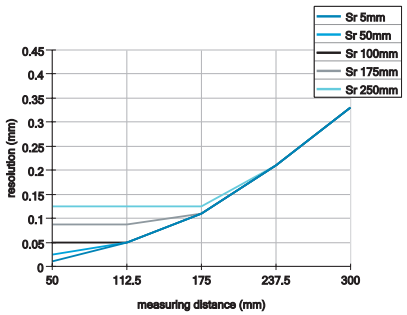
Sd = 30 ... 70 mm



Sd = 30 ... 130 mm

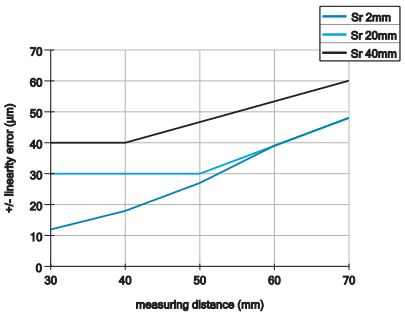


Sd = 50 ... 300 mm

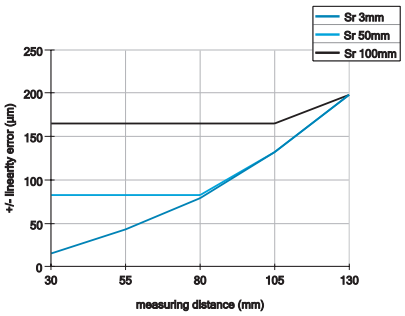


linearity errors

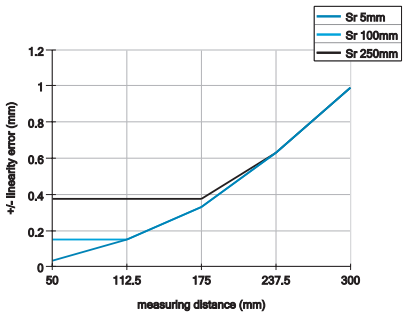
Sd = 30 ... 70 mm



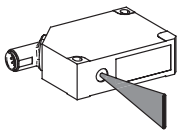
Sd = 30 ... 130 mm



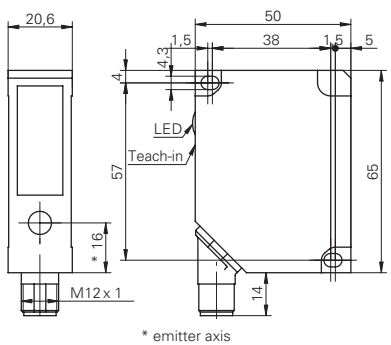
Sd = 50 ... 300 mm

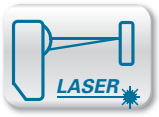


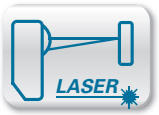
beam alignment (line)



dimension drawing




LASER

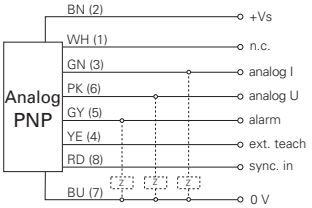


Sd = 100 ... 1000 mm

- response time < 0,9 ms
- teachable measuring range Sr > 10 mm
- resolution up to 15 µm

general data	
adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2
measuring distance Sd = 100 ... 600 mm	
Teach-in range min.	> 10 mm
resolution	0,015 ... 0,67 mm
linearity error	± 0,05 ... ± 2 mm
temperature drift	< 0,03 % Sde/K
measuring distance Sd = 200 ... 1000 mm	
Teach-in range min.	> 20 mm
resolution	0,12 ... 2,5 mm
linearity error	± 0,48 ... ± 10 mm
temperature drift	< 0,06 % Sde/K
electrical data	
response time / release time	< 0,9 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	analog
output signal	4 ... 20 mA / 0 ... 10 VDC
load resistance (analog I)	< (+Vs - 6 V) / 0,02 A
load resistance (analog U)	> 100 kOhm
output current	< 100 mA
alarm output	PNP
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	20,6 mm
height / length	65 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	connector M12 8 pin, rotatable
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67

connection diagram



connectors and mating connectors

ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

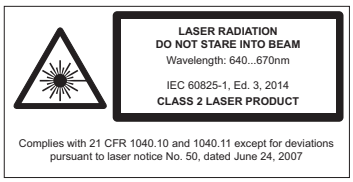
Accessories

11010227	Mounting bracket OxDM 20
10156878	Protector cap OxDM 20
for details: see accessories section	

remarks

For objects with a reflectivity < 7 % (OADM 20I6x80/S14F) or < 15 % (OADM 20I6x81/S14F) the response time/release time is increased automatically up to 2,8 ms.

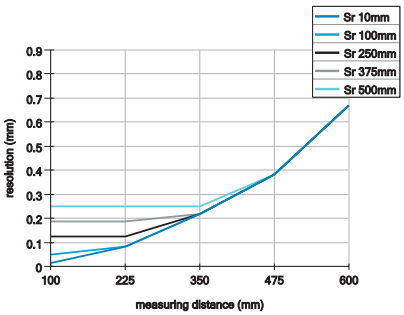
laser warning



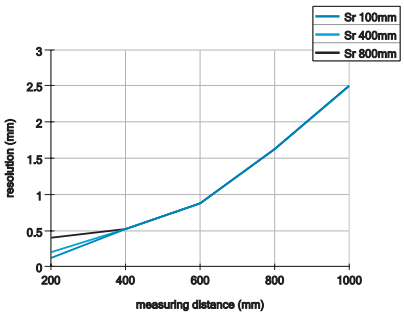
order reference	measuring distance Sd	beam type	beam width	beam height	beam diameter	ambient light immunity
OADM 20I6480/S14F	100 ... 600 mm	point	-	-	2 mm	< 10 kLux
OADM 20I6481/S14F	200 ... 1000 mm	point	-	-	2 mm	< 5 kLux
OADM 20I6580/S14F	100 ... 600 mm	line	2,5 mm	5,5 ... 21 mm	-	< 10 kLux
OADM 20I6581/S14F	200 ... 1000 mm	line	2,5 mm	8,5 ... 35 mm	-	< 5 kLux

resolution

Sd = 100 ... 600 mm

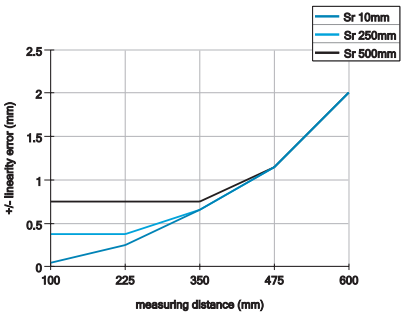


Sd = 200 ... 1000 mm

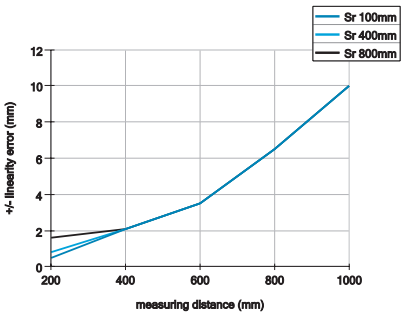


linearity errors

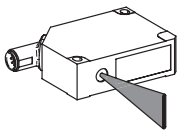
Sd = 100 ... 600 mm



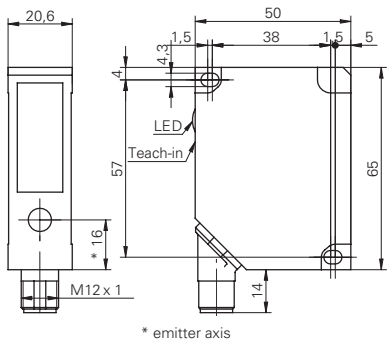
Sd = 200 ... 1000 mm



beam alignment (line)



dimension drawing



Sd = 50 ... 1000 mm

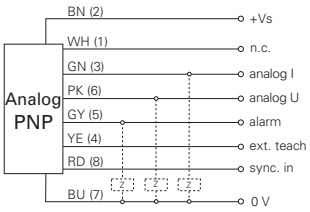
- for demanding applications
- very high ambient light immunity
- extremely vibration resistant

general data	
adjustment	Teach-in: button / external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2
beam type	line
temperature drift	< 0,04 % Sde/K
measuring distance Sd = 50 ... 300 mm	
Teach-in range min.	> 5 mm
resolution	0,01 ... 0,4 mm
linearity error	± 0,2 ... ± 1,5 mm
beam width	2 mm
beam height	6 ... 11 mm
measuring distance Sd = 100 ... 600 mm	
Teach-in range min.	> 10 mm
resolution	0,015 ... 0,8 mm
linearity error	± 0,5 ... ± 3,4 mm
beam width	2 mm
beam height	7 ... 17 mm
measuring distance Sd = 200 ... 1000 mm	
Teach-in range min.	> 20 mm
resolution	0,12 ... 3 mm
linearity error	± 0,36 ... ± 9 mm
beam width	3 ... 1 mm
beam height	8 ... 25 mm

electrical data	
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output signal	4 ... 20 mA / 0 ... 10 VDC
load resistance (analog I)	< (+Vs - 6 V) / 0,02 A
load resistance (analog U)	> 100 kOhm
output current	< 100 mA
alarm output	PNP
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	20,6 mm
height / length	65 mm
depth	50 mm
type	rectangular
housing material	die-cast zinc
front (optics)	glass
connection types	cable 8 pin, 2 m
ambient conditions	
operating temperature	-20 ... +60 °C
protection class	IP 67
vibration (sinusoidal)	IEC 60068-2-6:2008 30 g at f = 10 - 2000 Hz, cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-29:2009 75 g / 6 ms, 4000 jolts per axis and direction

order reference	measuring distance Sd	response time / release time	short circuit protection	ambient light immunity
OADM 20I6591	50 ... 300 mm	< 2 ms	yes	< 100 kLux
OADM 20I6592	100 ... 600 mm	< 2,5 ms	yes	< 100 kLux
OADM 20I6593	200 ... 1000 mm	< 3,5 ms	-	< 60 kLux

connection diagram



Accessories

11010227	Mounting bracket OxDM 20
10156878	Protector cap OxDM 20

for details: see accessories section

remarks

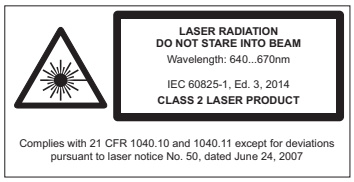
Fault suppression
If the laser beam is interrupted or if measurement faults occur, the analog outputs and the alarm output remain at their most recent valid value for a max. of 300 ms. Every valid value is immediately passed on to the outputs. If no valid value appears within 300 ms, the analog outputs switch to 4 mA / 0 V and the alarm output goes to HIGH.

Vibration stability:
- IEC 60068-2-6 (30 g, 10-2000 Hz, per axis)

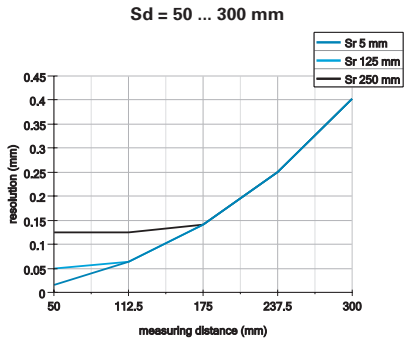
Random stability:
- IEC 60068-2-64 (0,4 g2/Hz, 20-1000 Hz, per axis)

Bump stability:
- IEC 60068-2-29 (75 g, 6 ms, 4000 pulses per axis and direction)

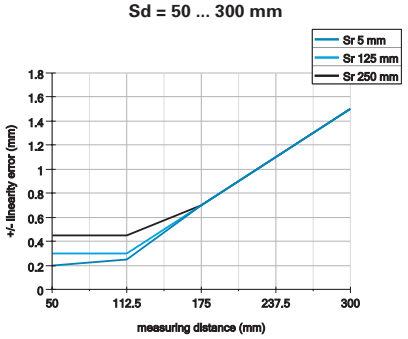
laser warning



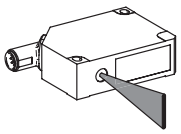
resolution



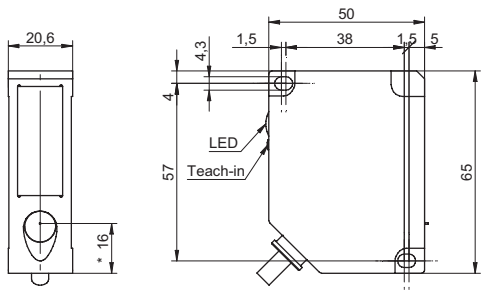
linearity errors



beam alignment (line)



dimension drawing



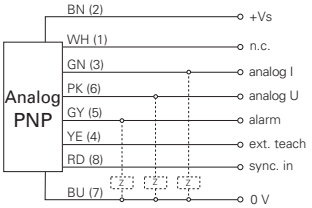
* emitter axis

Sd = 30 ... 600 mm

- washdown design
- Ecolab approved
- front screen PMMA

general data	
special type	Washdown design
adjustment	external
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2
temperature drift	< 0,03 % Sde/K
approvals/certificates	Ecolab
measuring distance Sd = 30 ... 130 mm	
Teach-in range min.	> 3 mm
resolution	0,005 ... 0,06 mm
linearity error	± 0,015 ... ± 0,2 mm
measuring distance Sd = 50 ... 300 mm	
Teach-in range min.	> 5 mm
resolution	0,01 ... 0,33 mm
linearity error	± 0,03 ... ± 1 mm
measuring distance Sd = 100 ... 600 mm	
Teach-in range min.	> 10 mm
resolution	0,015 ... 0,67 mm
linearity error	± 0,05 ... ± 2 mm
electrical data	
response time / release time	< 0,9 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	analog
output signal	4 ... 20 mA / 0 ... 10 VDC
load resistance (analog I)	< (+Vs - 6 V) / 0,02 A
load resistance (analog U)	> 100 kOhm
output current	< 100 mA
alarm output	PNP
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	20,3 mm
height / length	65 mm
depth	51 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
connection types	connector M12 8 pin
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 69K & proTect+

connection diagram



connectors and mating connectors

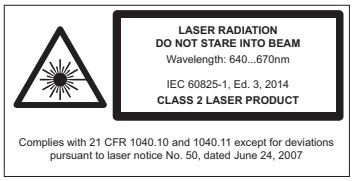
ESG 34FF0500G	Connector M12, 8 pin, straight, 5 m, Niro, shielded

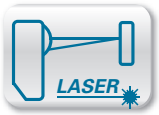
additional cable connectors and field wireable connectors: see accessories

remarks

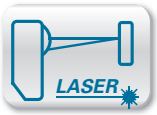
For objects with a reflectivity < 7 % (OADR 20I6x85/S14F) the response time/release time is increased automatically up to 2.8 ms.

laser warning



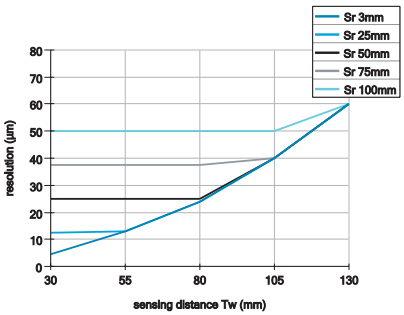


order reference	measuring distance Sd	beam type	beam width	beam height	beam diameter	ambient light immunity
OADR 20I6465/S14F	30 ... 130 mm	point	-	-	2 ... 1 mm	< 40 kLux
OADR 20I6475/S14F	50 ... 300 mm	point	-	-	2 mm	< 8 kLux
OADR 20I6485/S14F	100 ... 600 mm	point	-	-	2 mm	< 10 kLux
OADR 20I6565/S14F	30 ... 130 mm	line	2 ... 1 mm	3 ... 5 mm	-	< 40 kLux
OADR 20I6575/S14F	50 ... 300 mm	line	2,5 mm	4 ... 12 mm	-	< 8 kLux
OADR 20I6585/S14F	100 ... 600 mm	line	2,5 mm	5,5 ... 21 mm	-	< 10 kLux

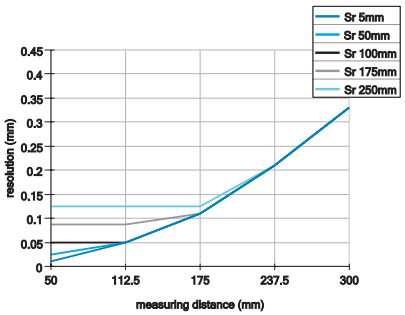


resolution

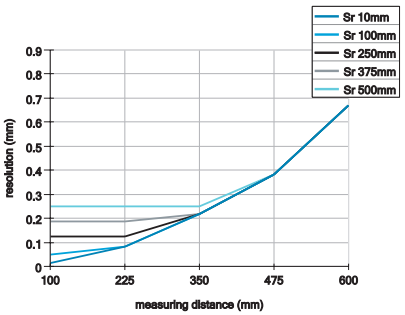
Sd = 30 ... 130 mm



Sd = 50 ... 300 mm

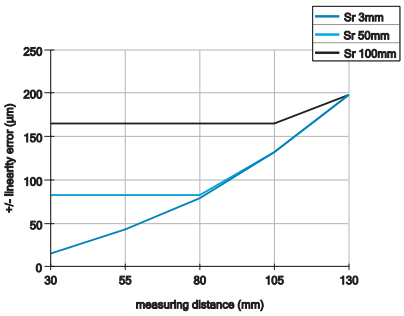


Sd = 100 ... 600 mm

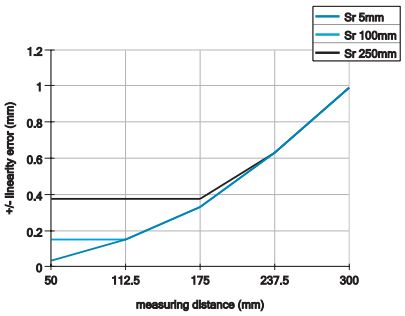


linearity errors

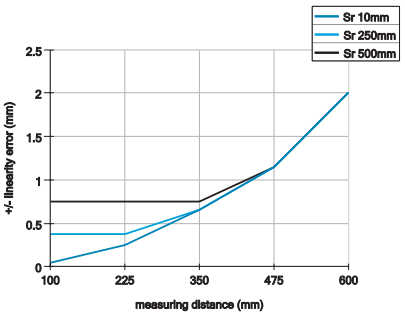
Sd = 30 ... 130 mm



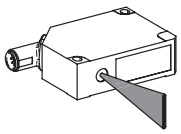
Sd = 50 ... 300 mm



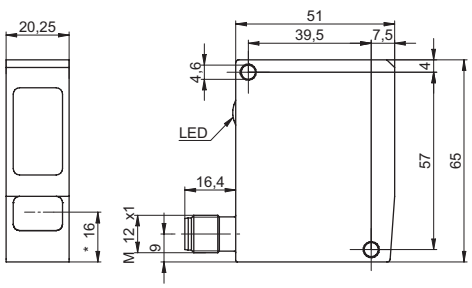
Sd = 100 ... 600 mm



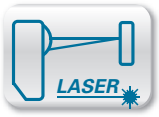
beam alignment (line)



dimension drawing



* emitter axis

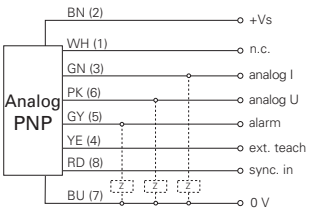

LASER

Sd = 100 ... 1000 mm

- teachable measuring range Sr > 10 mm
- resolution up to 10 µm
- synchronization input

general data	
adjustment	Teach-in: button / external
Teach-in range min.	> 10 mm
power on indication	LED green
soiled lens indicator	LED red
light source	pulsed red laser diode
wave length	650 nm
laser class	2
measuring distance Sd = 100 ... 600 mm	
resolution	0,01 ... 0,25 mm
linearity error	± 0,07 ... ± 1 mm
temperature drift	< 0,012 % Sde/K
measuring distance Sd = 200 ... 1000 mm	
resolution	0,02 ... 0,4 mm
linearity error	± 0,11 ... ± 1,65 mm
temperature drift	< 0,02 % Sde/K
electrical data	
response time / release time	< 4 ms
voltage supply range +Vs	12 ... 28 VDC
current consumption max. (no load)	100 mA
output circuit	analog
output signal	4 ... 20 mA / 0 ... 10 VDC
load resistance (analog I)	< (+Vs - 6 V) / 0,02 A
load resistance (analog U)	> 100 kOhm
output current	< 100 mA
alarm output	PNP
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	20,4 mm
height / length	135 mm
depth	45 mm
type	rectangular
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin, rotatable
ambient conditions	
ambient light immunity	< 10 kLux
operating temperature	0 ... +50 °C
protection class	IP 67

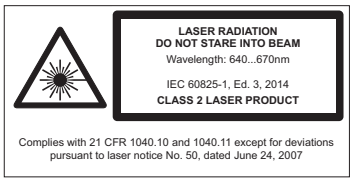
connection diagram



connectors and mating connectors

ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

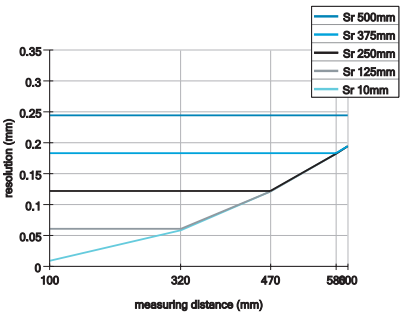
laser warning



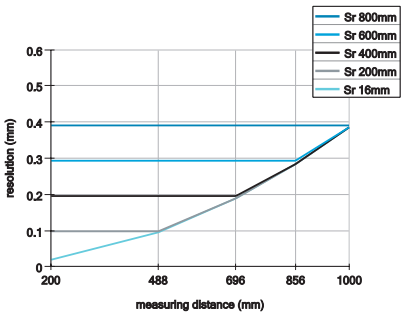
order reference	measuring distance Sd	beam type	beam width	beam height	beam diameter
OADM 21I6480/S14F	100 ... 600 mm	point	-	-	2 mm
OADM 21I6481/S14F	200 ... 1000 mm	point	-	-	2 mm
OADM 21I6580/S14F	100 ... 600 mm	line	2 mm	4 ... 13 mm	-
OADM 21I6581/S14F	200 ... 1000 mm	line	2,5 mm	6 ... 20 mm	-

resolution

Sd = 100 ... 600 mm

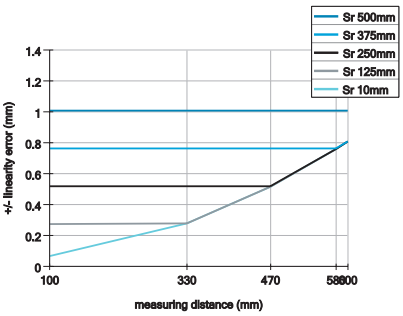


Sd = 200 ... 1000 mm

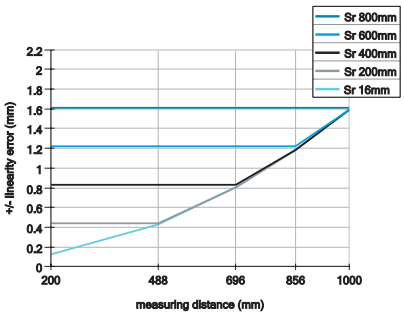


linearity errors

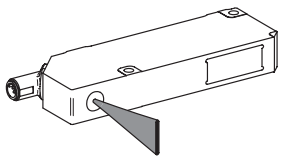
Sd = 100 ... 600 mm



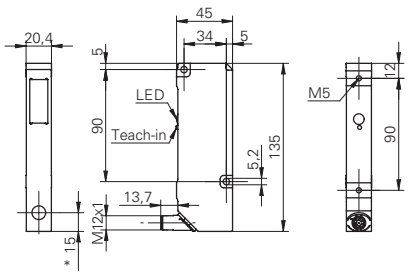
Sd = 200 ... 1000 mm



beam alignment (line)



dimension drawing



* emitter axis

Sd = 30 ... 250 mm

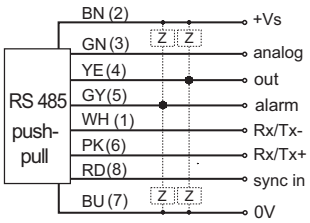
- Distance or tolerance function
- Very high resolution up to 0,7 µm
- Output in mm

general data	
adjustment	Touch Display, RS485
power on indication	LED green
output indicator	LED yellow / LED red
light source	pulsed red laser diode
wave length	660 nm
laser class	1
beam type	line
hysteresis digital output	adjustable
measuring distance Sd = 30 ... 70 mm	
measuring range Mr	40 mm
resolution	0,7 ... 1 µm 1) 2) 3)
repeat accuracy	0,1 ... 0,3 µm 1) 2) 3)
linearity error	± 0,06 % Mr 1) 2)
temperature drift	0,01 % Sde/K 1) 2)
measuring distance Sd = 40 ... 140 mm	
measuring range Mr	100 mm
resolution	1,2 ... 2,5 µm 1) 2) 3)
repeat accuracy	0,3 ... 0,7 µm 1) 2) 3)
linearity error	± 0,07 % Mr 1) 2)
temperature drift	0,015 % Sde/K 1) 2)
measuring distance Sd = 50 ... 250 mm	
measuring range Mr	200 mm
resolution	1,4 ... 6,3 µm 1) 2) 3)
repeat accuracy	0,3 ... 2 µm 1) 2) 3)
linearity error	± 0,09 % Mr 1) 2)
temperature drift	0,025 % Sde/K 1) 2)

electrical data	
response time / release time	0,8 ms 2)
measuring frequency	2500 Hz 2)
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	75 mA
output circuit	analog and RS 485
baud rate	115200, adjustable
output signal	4 ... 20 mA / 0 ... 10 VDC
output current	< 100 mA
switching output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	26 mm
height / length	74 mm
depth	55 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin
weight	130 g
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67
vibration (sinusoidal)	IEC 60068-2-6:2008 ± 0.75 mm p-p at f = 10 - 58 Hz, 10 cycles per axis 10 g at f = 58 - 2000 Hz, 10 cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-27:2009 50 g / 11 ms resp. 100 g / 6 ms, 10 jolts per axis and direction 100 g / 2 ms, 5000 jolts per axis and direction

order reference	measuring distance Sd	type	ambient light immunity	focal range	sweet spot	version
OM70-11200058	30 ... 70 mm	distance measuring	< 28 kLux	40 ... 55 mm	48 mm	OM70 laser line
OM70-11112017	30 ... 70 mm	distance measuring	< 28 kLux	55 ... 70 mm	65 mm	OM70 laser line basic
OM70-11200062	40 ... 140 mm	distance measuring	< 35 kLux	50 ... 90 mm	70 mm	OM70 laser line
OM70-11200064	40 ... 140 mm	distance measuring	< 35 kLux	80 ... 120 mm	100 mm	OM70 laser line
OM70-11112019	40 ... 140 mm	distance measuring	< 35 kLux	110 ... 140 mm	130 mm	OM70 laser line basic
OM70-11200066	50 ... 250 mm	distance measuring	< 170 kLux	100 ... 150 mm	130 mm	OM70 laser line
OM70-11200068	50 ... 250 mm	distance measuring	< 170 kLux	140 ... 210 mm	180 mm	OM70 laser line
OM70-11112061	50 ... 250 mm	distance measuring	< 170 kLux	200 ... 250 mm	240 mm	OM70 laser line basic
OM70T-11175113	30 ... 70 mm	tolerance measuring	< 28 kLux	55 ... 70 mm	65 mm	OM70 laser line basic
OM70T-11175110	40 ... 140 mm	tolerance measuring	< 35 kLux	110 ... 140 mm	130 mm	OM70 laser line basic
OM70T-11175097	50 ... 250 mm	tolerance measuring	< 170 kLux	200 ... 250 mm	240 mm	OM70 laser line basic

connection diagram



connectors and mating connectors

ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories

11120705	Mounting bracket X7 90° for PosCon and OM70, incl. accessories
for details: see accessories section	

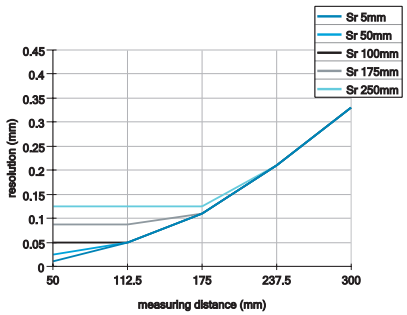
laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

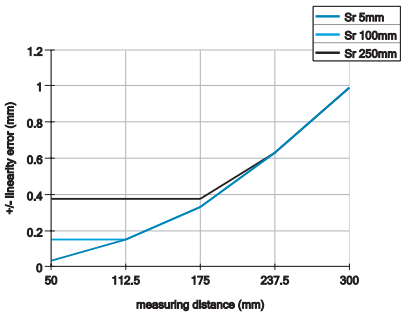
resolution

Sd = 50 ... 300 mm

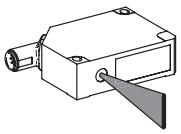


linearity error

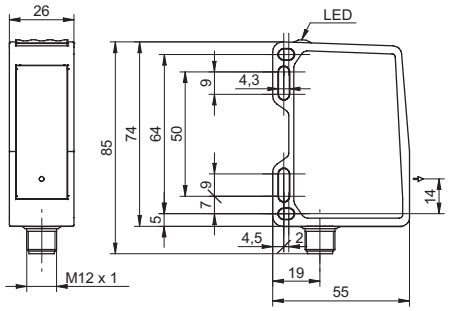
Sd = 50 ... 300 mm



beam alignment (line)



dimension drawing



Sd = 100 ... 1500 mm

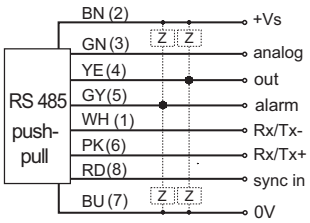
- Distance or tolerance function
- Very high resolution up to 0,7 µm
- Output in mm

general data	
type	distance measuring
version	OM70 laser line basic
adjustment	Touch Display, RS485
power on indication	LED green
output indicator	LED yellow / LED red
light source	pulsed red laser diode
wave length	660 nm
laser class	1
beam type	line
hysteresis digital output	adjustable
measuring distance Sd = 100 ... 600 mm	
measuring range Mr	500 mm
focal range	400 ... 600 mm
sweet spot	500 mm
resolution	3 ... 24 µm 1) 2) 3)
repeat accuracy	1 ... 9 µm 1) 2) 3)
linearity error	± 0,12 % Mr 1) 2)
temperature drift	0,04 % Sde/K 1) 2)
measuring distance Sd = 100 ... 1000 mm	
measuring range Mr	900 mm
focal range	750 ... 1000 mm
sweet spot	1000 mm
resolution	3 ... 63 µm 1) 2) 3)
repeat accuracy	1 ... 32 µm 1) 2) 3)
linearity error	± 0,19 % Mr 1) 2)
temperature drift	0,065 % Sde/K 1) 2)
measuring distance Sd = 150 ... 1500 mm	
measuring range Mr	1350 mm
focal range	1000 ... 1500 mm
sweet spot	1500 mm
resolution	13 ... 125 µm 1) 2) 3)
repeat accuracy	3 ... 63 µm 1) 2) 3)
linearity error	± 0,32 % Mr 1) 2)
temperature drift	0,100 % Sde/K 1) 2)

electrical data	
response time / release time	0,8 ms 2)
measuring frequency	2500 Hz 2)
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	75 mA
output circuit	analog and RS 485
baud rate	115200, adjustable
output signal	4 ... 20 mA / 0 ... 10 VDC
output current	< 100 mA
switching output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	26 mm
height / length	74 mm
depth	55 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin
weight	130 g
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67
vibration (sinusoidal)	IEC 60068-2-6:2008 ± 0.75 mm p-p at f = 10 - 58 Hz, 10 cycles per axis 10 g at f = 58 - 2000 Hz, 10 cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-27:2009 50 g / 11 ms resp. 100 g / 6 ms, 10 jolts per axis and direction 100 g / 2 ms, 5000 jolts per axis and direction

order reference	measuring distance Sd	ambient light immunity
OM70-11112065	100 ... 600 mm	< 170 kLux
OM70-11195788	100 ... 1000 mm	< 100 kLux
OM70-11112012	150 ... 1500 mm	< 35 kLux

connection diagram



connectors and mating connectors

ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories

11120705	Mounting bracket X7 90° for PosCon and OM70, incl. accessories
for details: see accessories section	

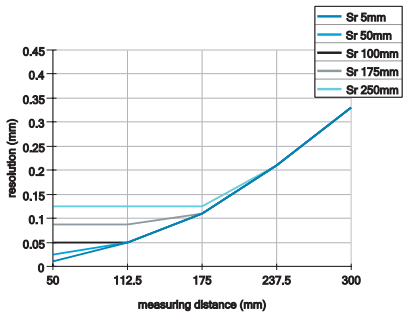
laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

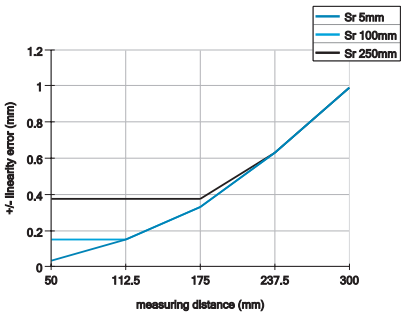
resolution

Sd = 50 ... 300 mm

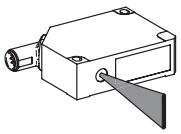


linearity error

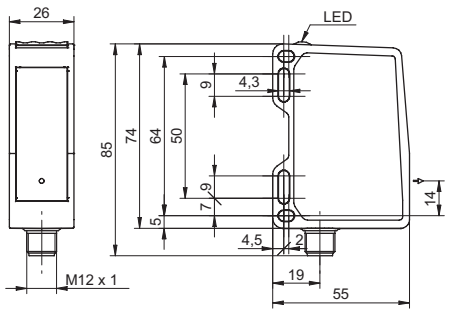
Sd = 50 ... 300 mm



beam alignment (line)



dimension drawing



Sd = 100 ... 1500 mm

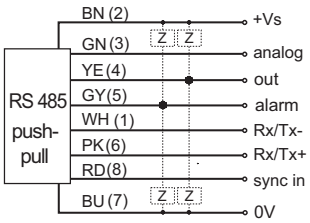
- Distance function
- Very high resolution up to 8 µm
- Output in mm

general data	
type	distance measuring
adjustment	Touch Display, RS485
power on indication	LED green
output indicator	LED yellow / LED red
light source	pulsed red laser diode
wave length	660 nm
laser class	2
beam type	line
hysteresis digital output	adjustable
measuring distance Sd = 100 ... 600 mm	
measuring range Mr	500 mm
resolution	3 ... 24 µm 1) 2) 3)
repeat accuracy	1 ... 9 µm 1) 2) 3)
linearity error	± 0,12 % Mr 1) 2)
temperature drift	0,04 % Sde/K 1) 2)
measuring distance Sd = 100 ... 1000 mm	
measuring range Mr	900 mm
resolution	3 ... 63 µm 1) 2) 3)
repeat accuracy	1 ... 32 µm 1) 2) 3)
linearity error	± 0,19 % Mr 1) 2)
temperature drift	0,065 % Sde/K 1) 2)
measuring distance Sd = 150 ... 1500 mm	
measuring range Mr	1350 mm
resolution	13 ... 125 µm 1) 2) 3)
repeat accuracy	3 ... 63 µm 1) 2) 3)
linearity error	± 0,32 % Mr 1) 2)
temperature drift	0,100 % Sde/K 1) 2)

electrical data	
response time / release time	0,8 ms 2)
measuring frequency	2500 Hz 2)
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	75 mA
output circuit	analog and RS 485
baud rate	115200, adjustable
output signal	4 ... 20 mA / 0 ... 10 VDC
output current	< 100 mA
switching output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	26 mm
height / length	74 mm
depth	55 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin
weight	130 g
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67
vibration (sinusoidal)	IEC 60068-2-6:2008 ± 0.75 mm p-p at f = 10 - 58 Hz, 10 cycles per axis 10 g at f = 58 - 2000 Hz, 10 cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-27:2009 50 g / 11 ms resp. 100 g / 6 ms, 10 jolts per axis and direction 100 g / 2 ms, 5000 jolts per axis and direction

order reference	measuring distance Sd	ambient light immunity	focal range	sweet spot	version
OM70-11200090	100 ... 600 mm	< 170 kLux	250 ... 450 mm	350 mm	OM70 laser line
OM70-11112067	100 ... 600 mm	< 170 kLux	400 ... 600 mm	500 mm	OM70 laser line basic
OM70-11199109	100 ... 1000 mm	< 100 kLux	400 ... 600 mm	500 mm	OM70 laser line
OM70-11200095	100 ... 1000 mm	< 100 kLux	550 ... 850 mm	700 mm	OM70 laser line
OM70-11199100	100 ... 1000 mm	< 100 kLux	750 ... 1000 mm	1000 mm	OM70 laser line basic
OM70-11112015	150 ... 1500 mm	< 35 kLux	1000 ... 1500 mm	1500 mm	OM70 laser line basic

connection diagram



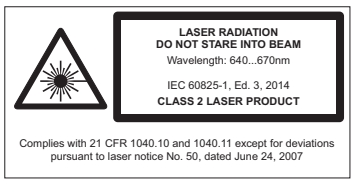
connectors and mating connectors

ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	

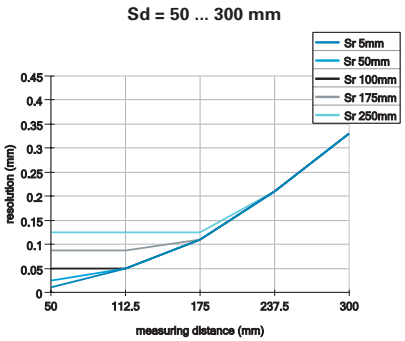
Accessories

11120705	Mounting bracket X7 90° for PosCon and OM70, incl. accessories
for details: see accessories section	

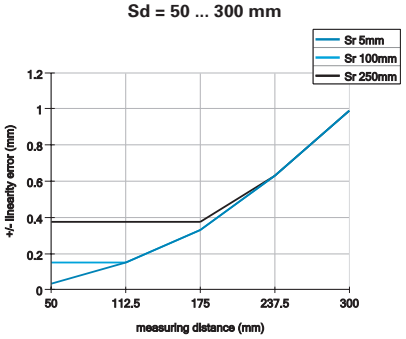
laser warning



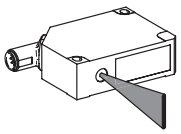
resolution



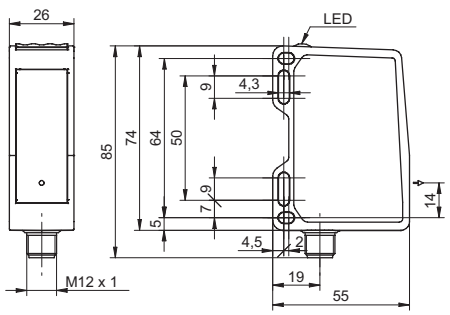
linearity error



beam alignment (line)



dimension drawing



Sd = 30 ... 250 mm

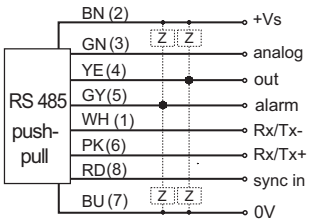
- Distance or tolerance function
- Very high resolution up to 1,2 µm
- Output in mm

general data	
adjustment	Touch Display, RS485
power on indication	LED green
output indicator	LED yellow / LED red
light source	pulsed red laser diode
wave length	660 nm
laser class	1
beam type	point
hysteresis digital output	adjustable
measuring distance Sd = 30 ... 70 mm	
measuring range Mr	40 mm
resolution	0,7 ... 1 µm 1) 2) 3)
repeat accuracy	0,1 ... 0,3 µm 1) 2) 3)
linearity error	± 0,06 % Mr 1) 2)
temperature drift	0,01 % Sde/K 1) 2)
measuring distance Sd = 40 ... 140 mm	
measuring range Mr	100 mm
resolution	1,2 ... 2,5 µm 1) 2) 3)
repeat accuracy	0,3 ... 0,7 µm 1) 2) 3)
linearity error	± 0,07 % Mr 1) 2)
temperature drift	0,015 % Sde/K 1) 2)
measuring distance Sd = 50 ... 250 mm	
measuring range Mr	200 mm
resolution	1,4 ... 6,3 µm 1) 2) 3)
repeat accuracy	0,3 ... 2 µm 1) 2) 3)
linearity error	± 0,09 % Mr 1) 2)
temperature drift	0,025 % Sde/K 1) 2)

electrical data	
response time / release time	0,8 ms 2)
measuring frequency	2500 Hz 2)
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	75 mA
output circuit	analog and RS 485
baud rate	115200, adjustable
output signal	4 ... 20 mA / 0 ... 10 VDC
output current	< 100 mA
switching output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	26 mm
height / length	74 mm
depth	55 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin
weight	130 g
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67
vibration (sinusoidal)	IEC 60068-2-6:2008 ± 0.75 mm p-p at f = 10 - 58 Hz, 10 cycles per axis 10 g at f = 58 - 2000 Hz, 10 cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-27:2009 50 g / 11 ms resp. 100 g / 6 ms, 10 jolts per axis and direction 100 g / 2 ms, 5000 jolts per axis and direction

order reference	measuring distance Sd	type	ambient light immunity	focal range	sweet spot	version
OM70-11200060	30 ... 70 mm	distance measuring	< 28 kLux	40 ... 55 mm	48 mm	OM70 laser point
OM70-11195785	30 ... 70 mm	distance measuring	< 28 kLux	55 ... 70 mm	65 mm	OM70 laser point basic
OM70-11200061	40 ... 140 mm	distance measuring	< 38 kLux	50 ... 90 mm	70 mm	OM70 laser point
OM70-11200063	40 ... 140 mm	distance measuring	< 38 kLux	80 ... 120 mm	100 mm	OM70 laser point
OM70-11112018	40 ... 140 mm	distance measuring	< 38 kLux	110 ... 140 mm	130 mm	OM70 laser point basic
OM70-11200065	50 ... 250 mm	distance measuring	< 175 kLux	100 ... 150 mm	130 mm	OM70 laser point
OM70-11200067	50 ... 250 mm	distance measuring	< 175 kLux	140 ... 210 mm	180 mm	OM70 laser point
OM70-11112060	50 ... 250 mm	distance measuring	< 175 kLux	200 ... 250 mm	240 mm	OM70 laser point basic
OM70T-11195786	30 ... 70 mm	tolerance measuring	< 28 kLux	55 ... 70 mm	65 mm	OM70 laser point basic
OM70T-11175099	40 ... 140 mm	tolerance measuring	< 38 kLux	110 ... 140 mm	130 mm	OM70 laser point basic
OM70T-11175094	50 ... 250 mm	tolerance measuring	< 175 kLux	200 ... 250 mm	240 mm	OM70 laser point basic

connection diagram



connectors and mating connectors

ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories

11120705	Mounting bracket X7 90° for PosCon and OM70, incl. accessories
for details: see accessories section	

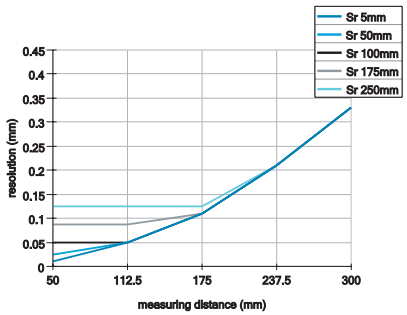
laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

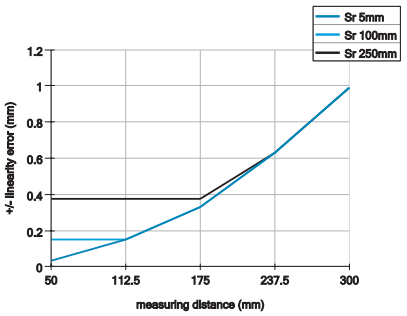
resolution

Sd = 50 ... 300 mm

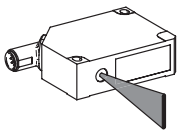


linearity error

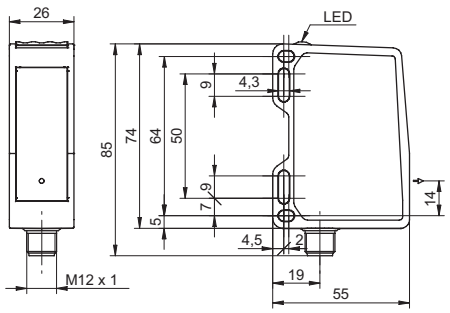
Sd = 50 ... 300 mm



beam alignment (line)



dimension drawing



Sd = 100 ... 1500 mm

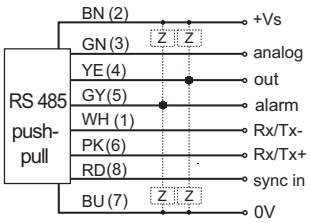
- Distance or tolerance function
- Very high resolution up to 1,2 µm
- Output in mm

general data	
type	distance measuring
version	OM70 laser point basic
adjustment	Touch Display, RS485
power on indication	LED green
output indicator	LED yellow / LED red
light source	pulsed red laser diode
wave length	660 nm
laser class	1
beam type	point
hysteresis digital output	adjustable
measuring distance Sd = 100 ... 600 mm	
measuring range Mr	500 mm
focal range	400 ... 600 mm
sweet spot	500 mm
resolution	3 ... 24 µm 1) 2) 3)
repeat accuracy	1 ... 9 µm 1) 2) 3)
linearity error	± 0,12 % Mr 1) 2)
temperature drift	0,04 % Sde/K 1) 2)
measuring distance Sd = 100 ... 1000 mm	
measuring range Mr	900 mm
focal range	750 ... 1000 mm
sweet spot	1000 mm
resolution	3 ... 63 µm 1) 2) 3)
repeat accuracy	1 ... 32 µm 1) 2) 3)
linearity error	± 0,19 % Mr 1) 2)
temperature drift	0,065 % Sde/K 1) 2)
measuring distance Sd = 150 ... 1500 mm	
measuring range Mr	1350 mm
focal range	1000 ... 1500 mm
sweet spot	1500 mm
resolution	13 ... 125 µm 1) 2) 3)
repeat accuracy	3 ... 63 µm 1) 2) 3)
linearity error	± 0,32 % Mr 1) 2)
temperature drift	0,100 % Sde/K 1) 2)

electrical data	
response time / release time	0,8 ms 2)
measuring frequency	2500 Hz 2)
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	75 mA
output circuit	analog and RS 485
baud rate	115200, adjustable
output signal	4 ... 20 mA / 0 ... 10 VDC
output current	< 100 mA
switching output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	26 mm
height / length	74 mm
depth	55 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin
weight	130 g
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67
vibration (sinusoidal)	IEC 60068-2-6:2008 ± 0.75 mm p-p at f = 10 - 58 Hz, 10 cycles per axis 10 g at f = 58 - 2000 Hz, 10 cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-27:2009 50 g / 11 ms resp. 100 g / 6 ms, 10 jolts per axis and direction 100 g / 2 ms, 5000 jolts per axis and direction

order reference	measuring distance Sd	ambient light immunity
OM70-11112064	100 ... 600 mm	< 300 kLux
OM70-11195787	100 ... 1000 mm	< 100 kLux
OM70-11111994	150 ... 1500 mm	< 35 kLux

connection diagram



connectors and mating connectors

ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories

11120705	Mounting bracket X7 90° for PosCon and OM70, incl. accessories
for details: see accessories section	

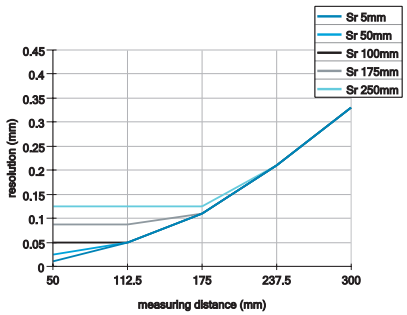
laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

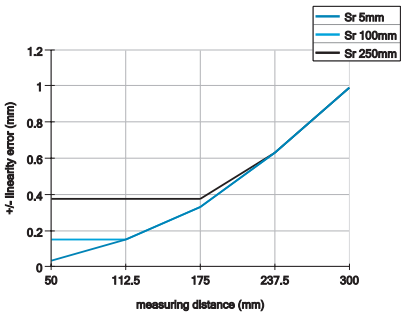
resolution

Sd = 50 ... 300 mm

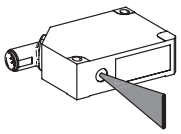


linearity error

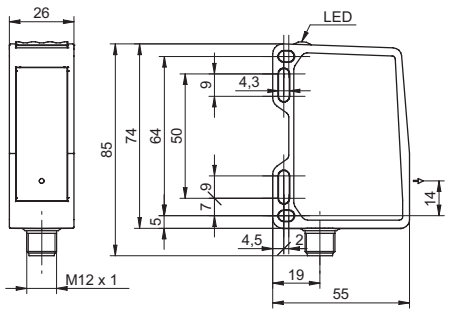
Sd = 50 ... 300 mm



beam alignment (line)



dimension drawing



Sd = 100 ... 1500 mm

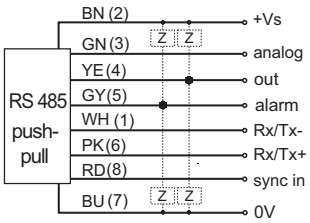
- Distance function
- Very high resolution up to 13 µm
- Output in mm

general data	
type	distance measuring
adjustment	Touch Display, RS485
power on indication	LED green
output indicator	LED yellow / LED red
light source	pulsed red laser diode
wave length	660 nm
laser class	2
beam type	point
hysteresis digital output	adjustable
measuring distance Sd = 100 ... 600 mm	
measuring range Mr	500 mm
resolution	3 ... 24 µm 1) 2) 3)
repeat accuracy	1 ... 9 µm 1) 2) 3)
linearity error	± 0,12 % Mr 1) 2)
temperature drift	0,04 % Sde/K 1) 2)
measuring distance Sd = 100 ... 1000 mm	
measuring range Mr	900 mm
resolution	3 ... 63 µm 1) 2) 3)
repeat accuracy	1 ... 32 µm 1) 2) 3)
linearity error	± 0,19 % Mr 1) 2)
temperature drift	0,065 % Sde/K 1) 2)
measuring distance Sd = 150 ... 1500 mm	
measuring range Mr	1350 mm
resolution	13 ... 125 µm 1) 2) 3)
repeat accuracy	3 ... 63 µm 1) 2) 3)
linearity error	± 0,32 % Mr 1) 2)
temperature drift	0,100 % Sde/K 1) 2)

electrical data	
response time / release time	0,8 ms 2)
measuring frequency	2500 Hz 2)
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	75 mA
output circuit	analog and RS 485
baud rate	115200, adjustable
output signal	4 ... 20 mA / 0 ... 10 VDC
output current	< 100 mA
switching output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	26 mm
height / length	74 mm
depth	55 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin
weight	130 g
ambient conditions	
operating temperature	-10 ... +50 °C
protection class	IP 67
vibration (sinusoidal)	IEC 60068-2-6:2008 ± 0.75 mm p-p at f = 10 - 58 Hz, 10 cycles per axis 10 g at f = 58 - 2000 Hz, 10 cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-27:2009 50 g / 11 ms resp. 100 g / 6 ms, 10 jolts per axis and direction 100 g / 2 ms, 5000 jolts per axis and direction

order reference	measuring distance Sd	ambient light immunity	focal range	sweet spot	version
OM70-11200069	100 ... 600 mm	< 300 kLux	250 ... 450 mm	350 mm	OM70 laser point
OM70-11112066	100 ... 600 mm	< 300 kLux	400 ... 600 mm	500 mm	OM70 laser point basic
OM70-11199108	100 ... 1000 mm	< 100 kLux	400 ... 600 mm	500 mm	OM70 laser point
OM70-11200091	100 ... 1000 mm	< 100 kLux	550 ... 850 mm	700 mm	OM70 laser point
OM70-11199089	100 ... 1000 mm	< 100 kLux	750 ... 1000 mm	1000 mm	OM70 laser point basic
OM70-11112013	150 ... 1500 mm	< 35 kLux	1000 ... 1500 mm	1500 mm	OM70 laser point basic

connection diagram



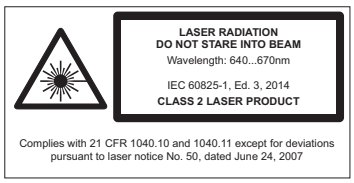
connectors and mating connectors

ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	

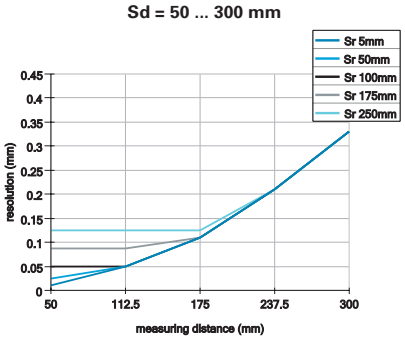
Accessories

11120705	Mounting bracket X7 90° for PosCon and OM70, incl. accessories
for details: see accessories section	

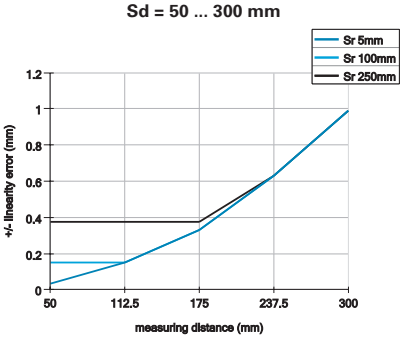
laser warning



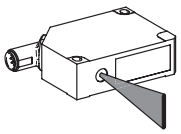
resolution



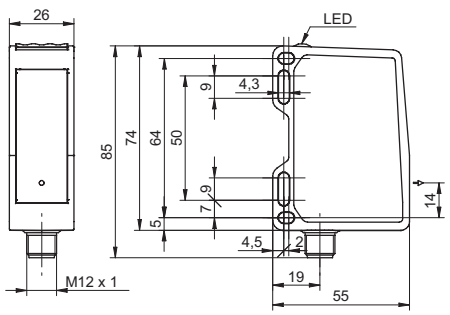
linearity error



beam alignment (line)



dimension drawing



Sd = 100 ... 150 mm

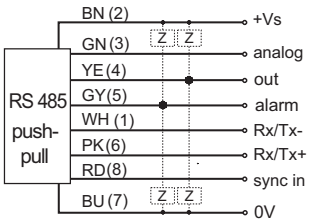
- Stable measurement values even on coarse and shiny surfaces
- Very high resolution up to 2 µm
- Output in mm

general data	
version	OM70 multi-spot
measuring distance Sd	100 ... 150 mm
measuring range (width)	48 ... 72 mm
adjustment	Touch Display, RS485
power on indication	LED green
resolution	2 ... 4 µm 1) 2) 4) 5)
linearity error	± 30 ... ± 90 µm 1) 2) 4)
light source	pulsed red laser diode
wave length	656 nm
laser class	1
beam type	multi-spot
temperature drift	± 0,04 % Sde/K 1) 2) 4)

electrical data	
response time / release time	3,5 ms 2) 3)
measuring frequency	570 Hz 2) 3)
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	120 mA
output circuit	analog and RS 485
baud rate	115200, adjustable
output signal	4 ... 20 mA / 0 ... 10 VDC
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	26 mm
height / length	74 mm
depth	55 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin
ambient conditions	
ambient light immunity	< 35 kLux
operating temperature	-10 ... +50 °C
protection class	IP 67
storage temperature	-25 ... +75 °C
vibration (sinusoidal)	IEC 60068-2-6:2008 1.5 mm p-p at f = 10 - 57 Hz, 10 cycles per axis 10 g at f = 58 - 2000 Hz, 10 cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-27:2009 50 g / 11 ms resp. 100 g / 6 ms, 10 jolts per axis and direction 100 g / 2 ms, 5000 jolts per axis and direction

order reference
OM70-11155463

connection diagram



connectors and mating connectors

ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories

11120705	Mounting bracket X7 90° for PosCon and OM70, incl. accessories
for details: see accessories section	

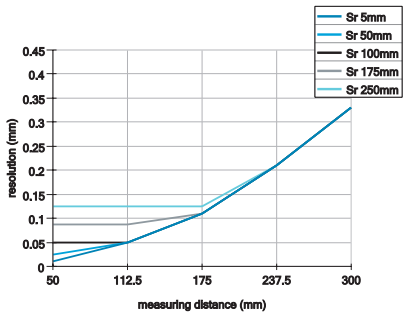
laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

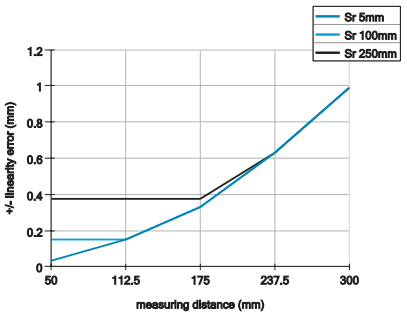
resolution

Sd = 50 ... 300 mm

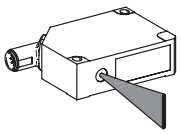


linearity error

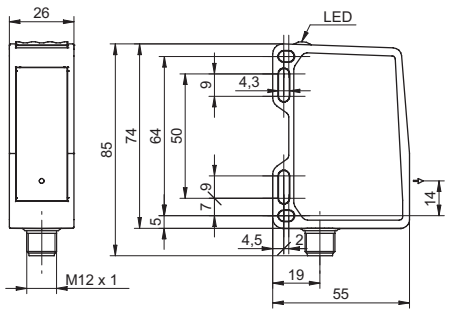
Sd = 50 ... 300 mm



beam alignment (line)



dimension drawing



Sd = 100 ... 500 mm

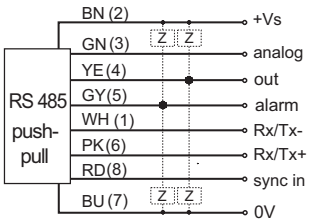
- Stable measurement values even on coarse and shiny surfaces
- Very high resolution up to 4 µm
- Output in mm

general data	
version	OM70 multi-spot
measuring distance Sd	100 ... 500 mm
measuring range (width)	13 ... 66 mm
adjustment	Touch Display, RS485
power on indication	LED green
resolution	4 ... 25 µm 1) 2) 4) 5)
repeat accuracy	4 ... 20 µm 1) 2) 4) 5)
linearity error	± 100 µm 1) 2) 4) 6)
light source	pulsed red laser diode
wave length	660 nm
laser class	2
beam type	multi-spot
temperature drift	± 0,04 % Sde/K 1) 2) 4)

electrical data	
response time / release time	1,3 ms 2) 3)
measuring frequency	1540 Hz 2) 3)
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	120 mA
output circuit	analog and RS 485
baud rate	115200, adjustable
output signal	4 ... 20 mA / 0 ... 10 VDC
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	26 mm
height / length	74 mm
depth	55 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin
ambient conditions	
ambient light immunity	< 35 kLux
operating temperature	-10 ... +50 °C
protection class	IP 67
storage temperature	-25 ... +75 °C
vibration (sinusoidal)	IEC 60068-2-6:2008 1.5 mm p-p at f = 10 - 57 Hz, 10 cycles per axis 10 g at f = 58 - 2000 Hz, 10 cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-27:2009 50 g / 11 ms resp. 100 g / 6 ms, 10 jolts per axis and direction 100 g / 2 ms, 5000 jolts per axis and direction

order reference
OM70-11112069

connection diagram



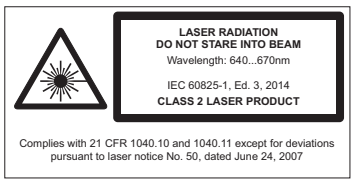
connectors and mating connectors

ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	

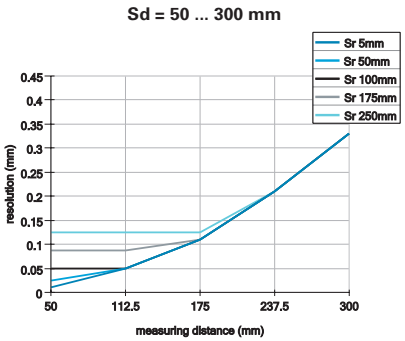
Accessories

11120705	Mounting bracket X7 90° for PosCon and OM70, incl. accessories
for details: see accessories section	

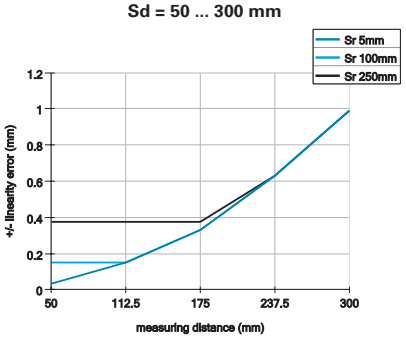
laser warning



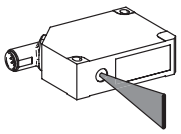
resolution



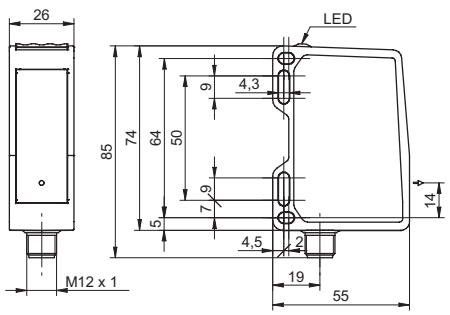
linearity error



beam alignment (line)



dimension drawing



Sd = 100 ... 1500 mm

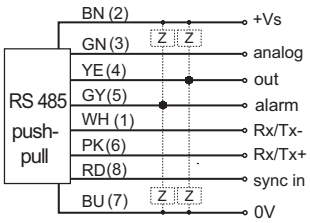
- Stable measurement values even on coarse and shiny surfaces
- Very high resolution up to 2 µm
- Output in mm

general data	
type	distance measuring
version	OM70 multi-spot
measuring distance Sd	100 ... 150 mm
measuring range (width)	48 ... 72 mm
adjustment	Webserver, Ethernet TCP/IP
power on indication	LED green
output indicator	LED yellow / LED red
ethernet link indication	LED blue
resolution	2 ... 4 µm 1) 2) 4) 5)
linearity error	± 30 ... ± 90 µm 1) 2) 4)
light source	pulsed red laser diode
wave length	656 nm
laser class	1
beam type	multi-spot
temperature drift	± 0,04 % Sde/K 1) 2) 4)

electrical data	
response time / release time	3,5 ms 2) 3)
measuring frequency	570 Hz 2) 3)
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	150 mA
output current	< 100 mA
switching output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
interface	Ethernet TCP/IP
protocol	Modbus TCP, OPC UA
webserver	yes
mechanical data	
width / diameter	26 mm
height / length	74 mm
depth	55 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin & M12 4 pin
weight	135 g
ambient conditions	
ambient light immunity	< 35 kLux
operating temperature	-10 ... +50 °C
protection class	IP 67
storage temperature	-20 ... +60
vibration (sinusoidal)	IEC 60068-2-6:2008 1.5 mm p-p at f = 10 - 57 Hz, 10 cycles per axis 10 g at f = 58 - 2000 Hz, 10 cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-27:2009 30 g / 11 ms, 6 jolts per axis and direction

order reference
OM70-11185168

connection diagram



connectors and mating connectors

ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
KSG 34A/KSG45AP0200G/E	Ethernet cable; connector M12, straight to RJ45 mating connector, 4-pin, 2 m, shielded
KSG 34A/KSG45AP0500G/E	Ethernet cable; connector M12, straight to RJ45 mating connector, 4-pin, 5 m, shielded
KSG 34A/KSG45AP1000G/E	Ethernet cable; connector M12, straight to RJ45 mating connector, 4-pin, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories

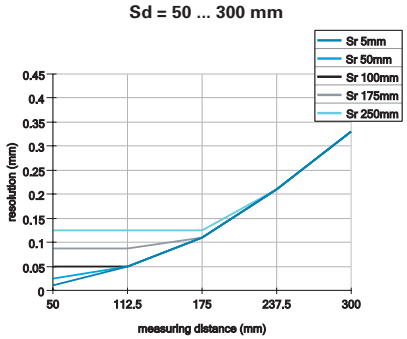
11120705	Mounting bracket X7 90° for PosCon and OM70, incl. accessories
for details: see accessories section	

laser warning

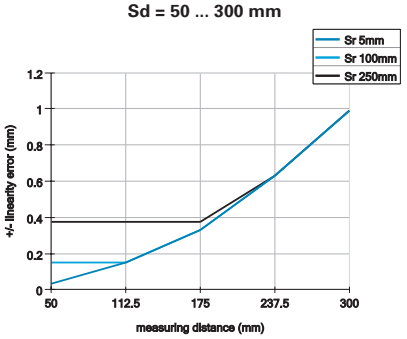
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

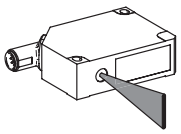
resolution



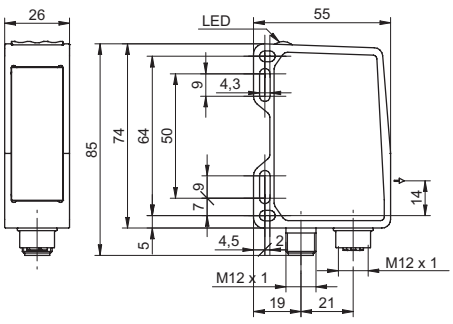
linearity error



beam alignment (line)



dimension drawing

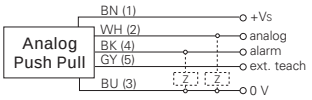


Sd = 0,2 ... 4 m

- measuring independent of colors up to 4 m
- extremely compact housing
- teachable measuring range

general data	
measuring distance Sd	200 ... 4000 mm
measuring distance Sd (white 90%)	200 ... 4000 mm
measuring distance Sd (grey 18%)	200 ... 4000 mm
measuring distance Sd (black 6%)	200 ... 4000 mm
adjustment	Teach-in: button / external
Teach-in range min.	> 100 mm
power on indication	LED green
soiled lens indicator	LED red
resolution	1,3 mm
repeatability	± 5 mm (with 40 kLux ambient light)
linearity	± 15 mm
light source	pulsed red laser diode
wave length	660 nm
laser class	2
beam type	point
beam diameter	5 ... 20 mm
electrical data	
measuring rate	10 ms
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	250 mA (typ. 110 mA @ 24V)
output circuit	analog
output current	< 100 mA
alarm output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	25,4 mm
height / length	66 mm
depth	51 mm
type	rectangular
housing material	aluminum
front (optics)	glass
connection types	connector M12 5 pin, rotatable
ambient conditions	
ambient light immunity	< 40 kLux
operating temperature	-25 ... +50 °C
protection class	IP 67
typ. temp. coefficient	0,2 mm /°C

connection diagram

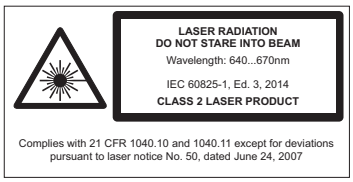


connectors and mating connectors

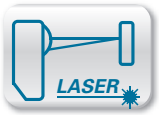
ESG 34CH0200G Connector M12, 5 pin, straight, 2 m, shielded

additional cable connectors and field wireable connectors: see accessories

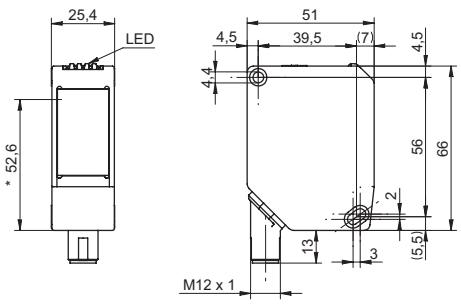
laser warning



order reference	output signal	load resistance (analog U)	load resistance (analog I)
OADM 250I1101/S14C	4 ... 20 mA	-	< (+Vs - 6 V) / 0,02 A
OADM 250U1101/S14C	0 ... 10 VDC	> 10 kOhm	-



dimension drawing



* emitter axis

Sd = 0,2 ... 13 m

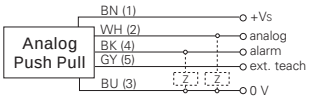
- measuring up to 13 m
- extremely compact housing
- teachable measuring range

general data	
measuring distance Sd	200 ... 13000 mm
measuring distance Sd (white 90%)	200 ... 13000 mm
measuring distance Sd (grey 18%)	200 ... 9000 mm
measuring distance Sd (black 6%)	200 ... 4000 mm
adjustment	Teach-in: button / external
Teach-in range min.	> 100 mm
power on indication	LED green
soiled lens indicator	LED red
resolution	5 mm
repeatability	± 15 mm (with 40 kLux ambient light)
linearity	± 15 mm
light source	pulsed red laser diode
wave length	660 nm
laser class	2
beam type	point
beam diameter	5 ... 50 mm
electrical data	
measuring rate	10 ms
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	250 mA (typ. 110 mA @ 24V)
output circuit	analog
output signal	4 ... 20 mA
load resistance (analog I)	< (+Vs - 6 V) / 0,02 A
output current	< 100 mA
alarm output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	25,4 mm
height / length	66 mm
depth	51 mm
type	rectangular
housing material	aluminum
front (optics)	glass
connection types	connector M12 5 pin, rotatable
ambient conditions	
ambient light immunity	< 40 kLux
operating temperature	-25 ... +50 °C
protection class	IP 67
typ. temp. coefficient	0,4 mm /°C

order reference

OADM 260I1101/S14C

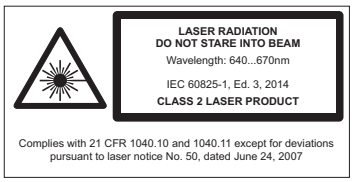
connection diagram

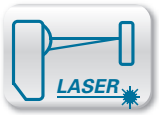


connectors and mating connectors

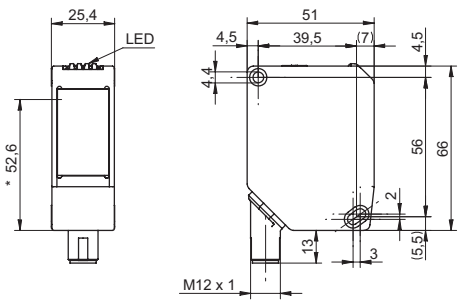
ESG 34CH0200G	Connector M12, 5 pin, straight, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

laser warning

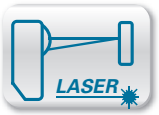




dimension drawing



* emitter axis



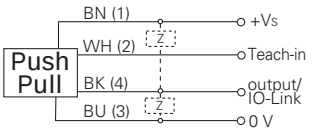
Sd = 30 ... 300 mm

- One inch class
- infrared LED
- distance value via IO-Link

general data	
type	distance measuring
version	IO-Link measuring
measuring distance Sd	30 ... 300 mm
adjustment	Teach-in and IO-Link
power on indication	LED green
light indicator	LED yellow
resolution	0,5 ... 5 mm
linearity error	± 1,5 ... ± 15 mm
light source	pulsed infrared diode
wave length	860 nm
beam type	point
suppression of reciprocal influence	yes
alignment optical axis	< 2°
temperature drift	< 0,2 % Sde/K
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
voltage drop Vd	< 3 VDC
output circuit	push-pull
baud rate	38,4 kBaud (COM 2)
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
interface	IO-Link V1.1
cycle time	≥ 2,7 ms
process data length	3 Byte
process data structure	Bit 0 = BDC1 Bit 2 = quality Bit 3 = alarm Bit 8-23 = 16 Bit measurement
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

order reference	connection types
O300.DI-11199080	cable 4 pin, 2 m
O300.DI-11199081	connector M8 4 pin

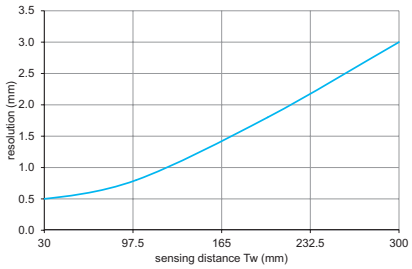
connection diagram



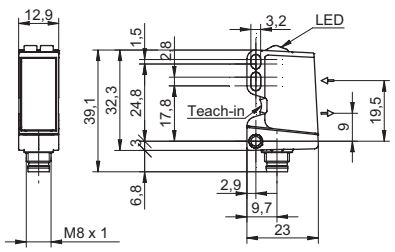
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

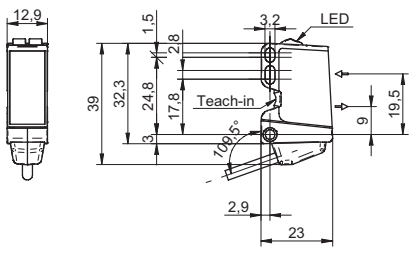
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

resolution



dimension drawings





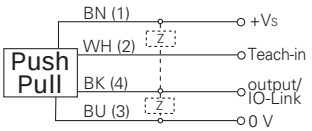
Sd = 30 ... 250 mm

- One inch class
- laser diode
- distance value via IO-Link

general data	
type	distance measuring
version	IO-Link measuring
measuring distance Sd	30 ... 250 mm
focal distance	400 mm
adjustment	Teach-in and IO-Link
power on indication	LED green
light indicator	LED yellow
resolution	0,5 ... 10 mm
linearity error	± 1,5 ... ± 12,5 mm
light source	pulsed red laser diode
wave length	656 nm
laser class	1
beam type	point
suppression of reciprocal influence	yes
alignment optical axis	< 2°
temperature drift	< 0,2 % Sde/K
electrical data	
response time / release time	< 0,25 ms
voltage supply range +Vs	11 ... 30 VDC
current consumption max. (no load)	30 mA
voltage drop Vd	< 2,5 VDC
output circuit	push-pull
baud rate	230,4 kBaud (COM 3)
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
interface	IO-Link V1.1
cycle time	≥ 0,6 ms
process data length	3 Byte
process data structure	Bit 0 = BDC1 Bit 2 = quality Bit 3 = alarm Bit 8-23 = 16 Bit measurement
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-10 ... +60 °C
protection class	IP 67

order reference	connection types
O300.DL-11199078	cable 4 pin, 2 m
O300.DL-11199079	connector M8 4 pin

connection diagram



connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

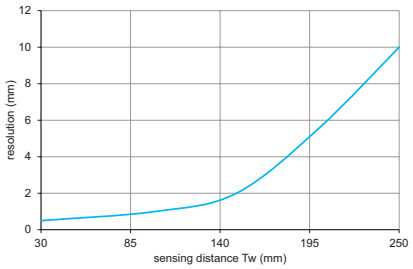
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

laser warning

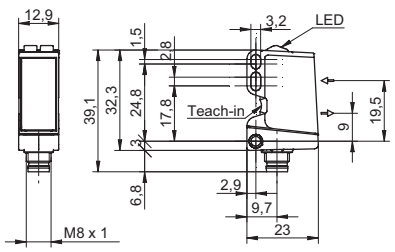
CLASS 1 LASER PRODUCT

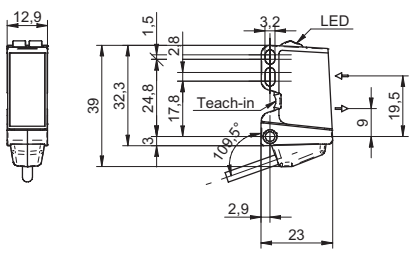
IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

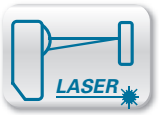
resolution



dimension drawings







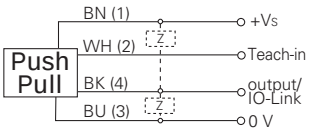
Sd = 30 ... 300 mm

- One inch class
- PinPoint LED
- distance value via IO-Link

general data	
type	distance measuring
version	IO-Link measuring
measuring distance Sd	30 ... 300 mm
adjustment	Teach-in and IO-Link
power on indication	LED green
light indicator	LED yellow
resolution	0,5 ... 5 mm
linearity error	± 1,5 ... ± 15 mm
light source	pulsed PinPoint LED
wave length	630 nm
beam type	point
suppression of reciprocal influence	yes
alignment optical axis	< 2°
temperature drift	< 0,2 % Sde/K
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	45 mA
voltage drop Vd	< 3 VDC
output circuit	push-pull
baud rate	38,4 kBaud (COM 2)
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
interface	IO-Link V1.1
cycle time	≥ 2,7 ms
process data length	3 Byte
process data structure	Bit 0 = BDC1 Bit 2 = quality Bit 3 = alarm Bit 8-23 = 16 Bit measurement
mechanical data	
width / diameter	12,9 mm
height / length	32,3 mm
depth	23 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

order reference	connection types
O300.DP-11199076	cable 4 pin, 2 m
O300.DP-11199077	connector M8 4 pin

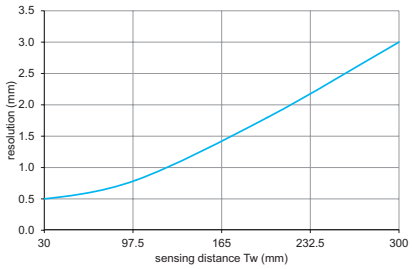
connection diagram



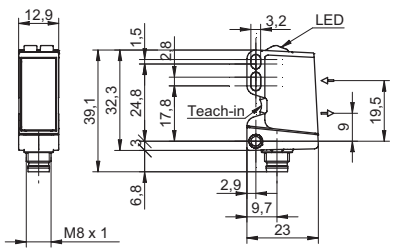
connectors and mating connectors	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

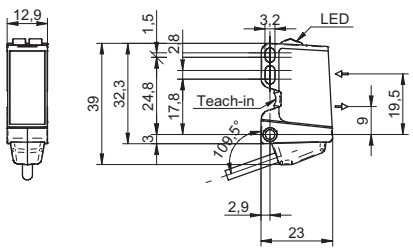
Accessories	
11104963	Sensofix O300
11102423	Mounting bracket O300 (L design)
11124807	Mounting bracket O300 - Retrofit for sensors series 20
for details: see accessories section	

resolution



dimension drawings





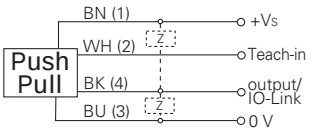
Sd = 60 ... 550 mm

- infrared LED
- distance value via IO-Link
- resolution up to 0,5 mm

general data	
type	distance measuring
version	IO-Link measuring
measuring distance Sd	60 ... 550 mm
adjustment	Teach-in and IO-Link
power on indication	LED green
light indicator	LED yellow
resolution	0,5 ... 5 mm
linearity error	± 3 ... ± 27,5 mm
light source	pulsed infrared diode
wave length	860 nm
beam type	point
suppression of reciprocal influence	yes
alignment optical axis	< 1°
temperature drift	< 0,2 % Sde/K
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
voltage drop Vd	< 3 VDC
output circuit	push-pull
baud rate	38,4 kBaud (COM 2)
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
interface	IO-Link V1.1
cycle time	≥ 2,7 ms
process data length	3 Byte
process data structure	Bit 0 = BDC1 Bit 2 = quality Bit 3 = alarm Bit 8-23 = 16 Bit measurement
mechanical data	
width / diameter	18 mm
height / length	45 mm
depth	32 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

order reference	connection types
O500.DI-11199084	cable 4 pin, 2 m
O500.DI-11199085	connector M12 4 pin

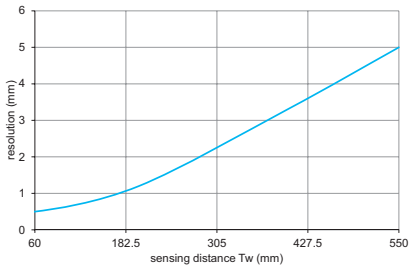
connection diagram



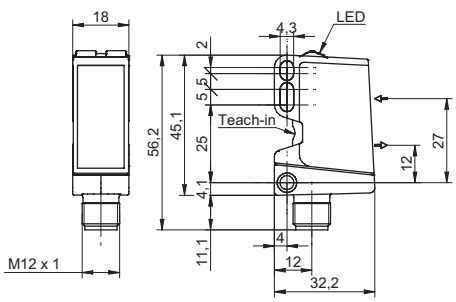
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

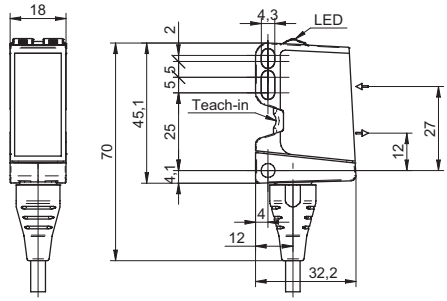
Accessories	
11099942	Sensofix O500/U500
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
for details: see accessories section	

resolution



dimension drawings





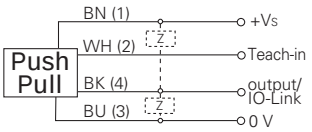
Sd = 60 ... 400 mm

- PinPoint LED
- distance value via IO-Link
- resolution up to 0,5 mm

general data	
type	distance measuring
version	IO-Link measuring
measuring distance Sd	60 ... 400 mm
adjustment	Teach-in and IO-Link
power on indication	LED green
light indicator	LED yellow
resolution	0,5 ... 3 mm
linearity error	± 3 ... ± 20 mm
light source	pulsed PinPoint LED
wave length	630 nm
beam type	point
suppression of reciprocal influence	yes
alignment optical axis	< 1°
temperature drift	< 0,2 % Sde/K
electrical data	
response time / release time	< 0,49 ms
voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	40 mA
voltage drop Vd	< 3 VDC
output circuit	push-pull
baud rate	38,4 kBaud (COM 2)
output current	< 100 mA
short circuit protection	yes
reverse polarity protection	yes
interface	IO-Link V1.1
cycle time	≥ 2,7 ms
process data length	3 Byte
process data structure	Bit 0 = BDC1 Bit 2 = quality Bit 3 = alarm Bit 8-23 = 16 Bit measurement
mechanical data	
width / diameter	18 mm
height / length	45 mm
depth	32 mm
type	rectangular
housing material	plastic (ASA, PMMA)
front (optics)	PMMA
ambient conditions	
operating temperature	-25 ... +60 °C
protection class	IP 67

order reference	connection types
O500.DP-11199082	cable 4 pin, 2 m
O500.DP-11199083	connector M12 4 pin

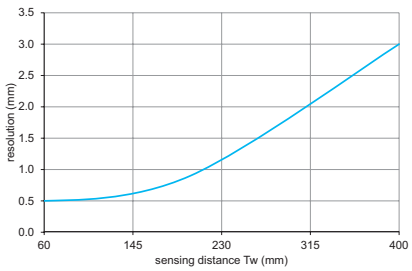
connection diagram



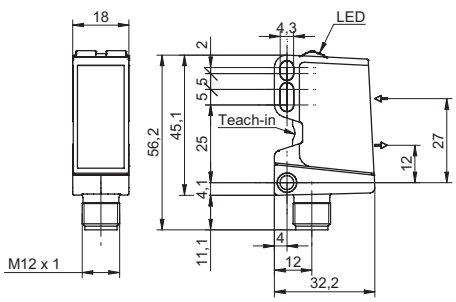
connectors and mating connectors	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
additional cable connectors and field wireable connectors: see accessories	

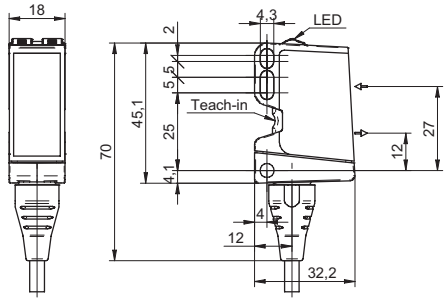
Accessories	
11099942	Sensofix O500/U500
11092246	Mounting bracket O500/U500 (L design)
11111164	Mounting bracket O500/U500 - Retrofit for sensors series 30
for details: see accessories section	

resolution



dimension drawings





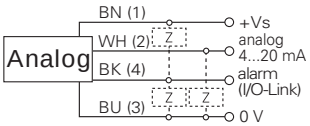
Sd = 50 ... 400 mm

- compact design
- measuring distance Sd 50 ... 400 mm
- resolution up to 0,1 mm

general data	
measuring distance Sd	50 ... 400 mm
adjustment	IO-Link
Teach-in range min.	> 20 mm
power on indication	LED green
soiled lens indicator	LED red
resolution	0,1 ... 1 mm
linearity error	± 1,5 ... ± 4 mm
light source	pulsed point source LED
wave length	660 nm
beam type	point
beam diameter	8 mm
temperature drift	< 0,1 % Sde/K
electrical data	
response time / release time	< 3 ms
voltage supply range +Vs	12 ... 26 VDC
current consumption max. (no load)	80 mA
output circuit	analog
output signal	4 ... 20 mA
load resistance (analog I)	< (+Vs - 10 V) / 0,02 A
output current	< 100 mA
alarm output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67

order reference	connection types
FADK 14I4470/IO	cable 4 pin, 2 m
FADK 14I4470/S14/IO	connector M12 4 pin
FADK 14I4470/S35A/IO	connector M8 4 pin

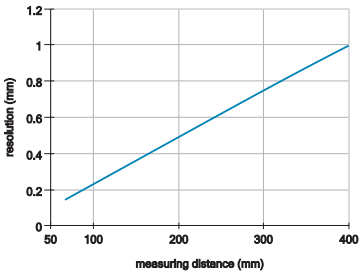
connection diagram



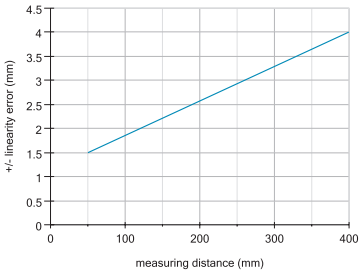
connectors and mating connectors	
ESW 33AH0200G	Connector M12, 4 pin, angular, 2 m, shielded
ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10134964	Mounting bracket series 14 (L design)
10149011	Sensofix series 14
for details: see accessories section	

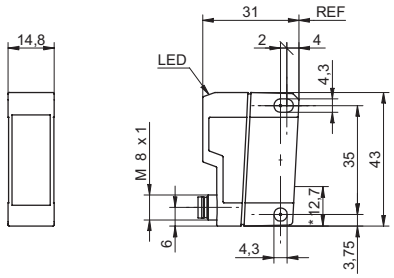
resolution



linearity error



dimension drawing



* emitter axis

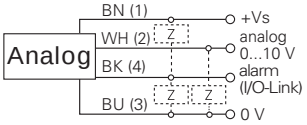
Sd = 50 ... 400 mm

- compact design
- measuring distance Sd 50 ... 400 mm
- resolution up to 0,1 mm

general data	
measuring distance Sd	50 ... 400 mm
adjustment	IO-Link
Teach-in range min.	> 20 mm
power on indication	LED green
soiled lens indicator	LED red
resolution	0,1 ... 1 mm
linearity error	± 1,5 ... ± 4 mm
light source	pulsed point source LED
wave length	660 nm
beam type	point
beam diameter	8 mm
temperature drift	< 0,1 % Sde/K
electrical data	
response time / release time	< 3 ms
voltage supply range +Vs	14 ... 26 VDC
current consumption max. (no load)	80 mA
output circuit	analog
output signal	0 ... 10 VDC
load resistance (analog U)	> 100 kOhm
output current	< 100 mA
alarm output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	14,8 mm
height / length	43 mm
depth	31 mm
type	rectangular
housing material	plastic (ASA, MABS)
front (optics)	PMMA
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 67

order reference	connection types
FADK 14U4470/IO	cable 4 pin, 2 m
FADK 14U4470/S14/IO	connector M12 4 pin
FADK 14U4470/S35A/IO	connector M8 4 pin

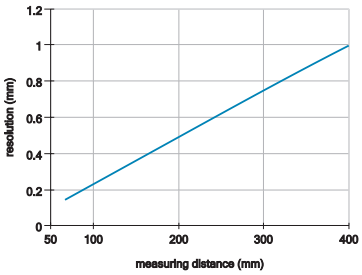
connection diagram



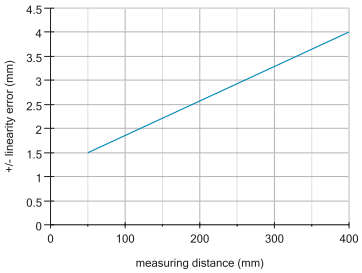
connectors and mating connectors	
ESW 33AH0200G	Connector M12, 4 pin, angular, 2 m, shielded
ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10134964	Mounting bracket series 14 (L design)
10149011	Sensofix series 14
for details: see accessories section	

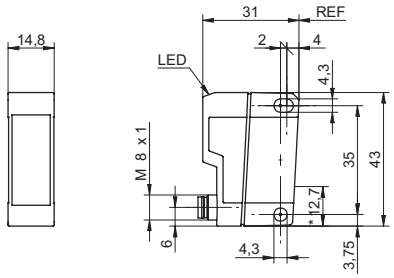
resolution



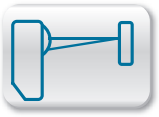
linearity error



dimension drawing



* emitter axis



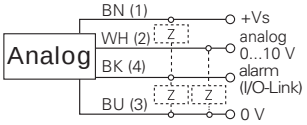
Sd = 50 ... 400 mm

- washdown design
- compact design
- measuring distance Sd 50 ... 400 mm

general data	
measuring distance Sd	50 ... 400 mm
special type	Washdown design
adjustment	IO-Link
Teach-in range min.	> 20 mm
power on indication	LED green
soiled lens indicator	LED red
resolution	0,1 ... 1 mm
linearity error	± 1,5 ... ± 4 mm
light source	pulsed point source LED
wave length	660 nm
beam type	point
beam diameter	8 mm
temperature drift	< 0,1 % Sde/K
approvals/certificates	Ecolab
electrical data	
response time / release time	< 3 ms
voltage supply range +Vs	12 ... 26 VDC
current consumption max. (no load)	80 mA
output circuit	analog
output signal	4 ... 20 mA
load resistance (analog I)	< (+Vs - 10 V) / 0,02 A
output current	< 100 mA
alarm output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	19,6 mm
height / length	51 mm
depth	34,3 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A); LSR
front (optics)	PMMA
connection types	connector M12
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 68/69K & proTect+

order reference
FADR 14I4470/S14/IO

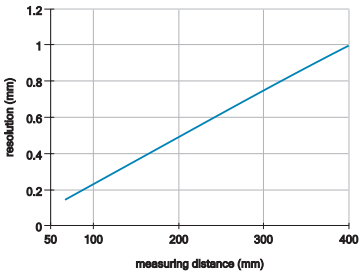
connection diagram



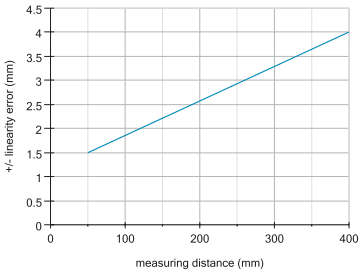
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10134964	Mounting bracket series 14 (L design)
10149011	Sensofix series 14
for details: see accessories section	

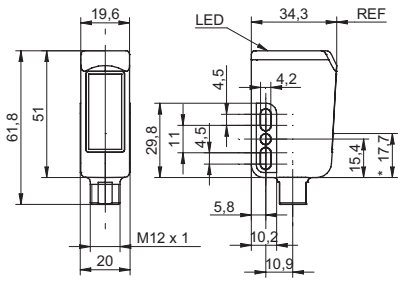
resolution



linearity error



dimension drawing



* emitter axis

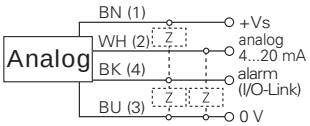
Sd = 50 ... 400 mm

- washdown design
- compact design
- measuring distance Sd 50 ... 400 mm

general data	
measuring distance Sd	50 ... 400 mm
special type	Washdown design
adjustment	IO-Link
Teach-in range min.	> 20 mm
power on indication	LED green
soiled lens indicator	LED red
resolution	0,1 ... 1 mm
linearity error	± 1,5 ... ± 4 mm
light source	pulsed point source LED
wave length	660 nm
beam type	point
beam diameter	8 mm
temperature drift	< 0,1 % Sde/K
approvals/certificates	Ecolab
electrical data	
response time / release time	< 3 ms
voltage supply range +Vs	14 ... 26 VDC
current consumption max. (no load)	80 mA
output circuit	analog
output signal	0 ... 10 VDC
load resistance (analog U)	> 100 kOhm
output current	< 100 mA
alarm output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	19,6 mm
height / length	51 mm
depth	34,3 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A); LSR
front (optics)	PMMA
connection types	connector M12
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 68/69K & proTect+

order reference
FADR 14U4470/S14/IO

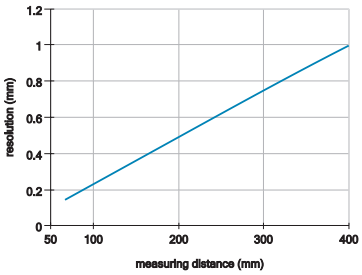
connection diagram



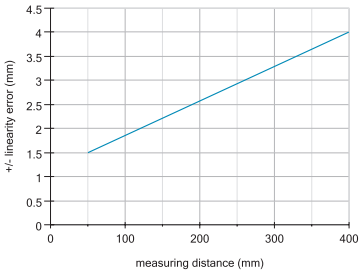
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
10134964	Mounting bracket series 14 (L design)
10149011	Sensofix series 14
for details: see accessories section	

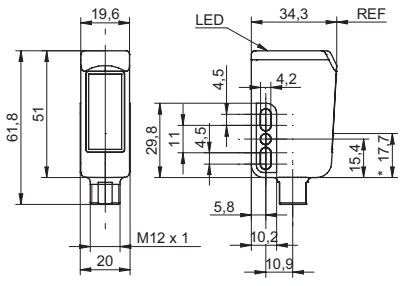
resolution



linearity error



dimension drawing



* emitter axis

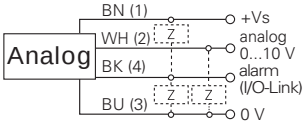
Sd = 50 ... 400 mm

- hygienic design
- compact design
- measuring distance Sd 50 ... 400 mm

general data	
measuring distance Sd	50 ... 400 mm
special type	hygienic design
adjustment	IO-Link
Teach-in range min.	> 20 mm
power on indication	LED green
soiled lens indicator	LED red
resolution	0,1 ... 1 mm
linearity error	± 1,5 ... ± 4 mm
light source	pulsed point source LED
wave length	660 nm
beam type	point
beam diameter	8 mm
temperature drift	< 0,1 % Sde/K
approvals/certificates	Ecolab EHEDG
electrical data	
response time / release time	< 3 ms
voltage supply range +Vs	12 ... 26 VDC
current consumption max. (no load)	80 mA
output circuit	analog
output signal	4 ... 20 mA
load resistance (analog I)	< (+Vs - 10 V) / 0,02 A
output current	< 100 mA
alarm output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	19,6 mm
height / length	52,2 mm
depth	34,3 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 68/69K & proTect+

order reference	connection types
FADH 14I4470/IO	cable 4 pin, 2 m
FADH 14I4470/KS34A/IO	flylead connector M12, L=300 mm

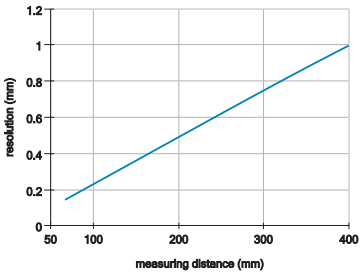
connection diagram



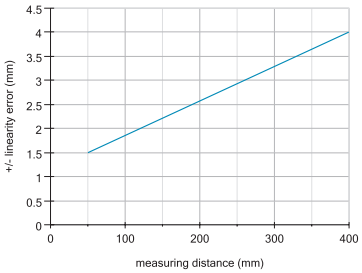
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI17-1H	Mounting for sensors in hygienic design Ø 17 mm
for details: see accessories section	

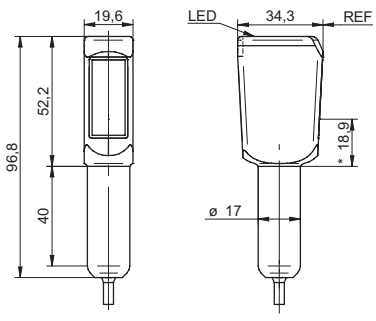
resolution



linearity error



dimension drawing



* emitter axis

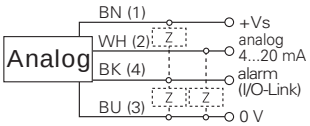
Sd = 50 ... 400 mm

- hygienic design
- compact design
- measuring distance Sd 50 ... 400 mm

general data	
measuring distance Sd	50 ... 400 mm
special type	hygienic design
adjustment	IO-Link
Teach-in range min.	> 20 mm
power on indication	LED green
soiled lens indicator	LED red
resolution	0,1 ... 1 mm
linearity error	± 1,5 ... ± 4 mm
light source	pulsed point source LED
wave length	660 nm
beam type	point
beam diameter	8 mm
temperature drift	< 0,1 % Sde/K
approvals/certificates	Ecolab EHEDG
electrical data	
response time / release time	< 3 ms
voltage supply range +Vs	14 ... 26 VDC
current consumption max. (no load)	80 mA
output circuit	analog
output signal	0 ... 10 VDC
load resistance (analog U)	> 100 kOhm
output current	< 100 mA
alarm output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	19,6 mm
height / length	52,2 mm
depth	34,3 mm
type	rectangular
housing material	stainless steel 1.4404 (V4A)
front (optics)	PMMA
ambient conditions	
operating temperature	0 ... +50 °C
protection class	IP 68/69K & proTect+

order reference	connection types
FADH 14U4470/IO	cable 4 pin, 2 m
FADH 14U4470/KS34A/IO	flylead connector M12, L=300 mm

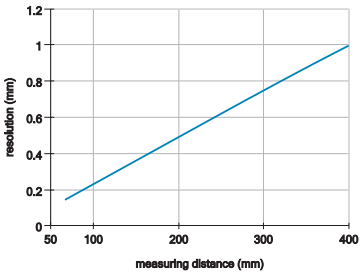
connection diagram



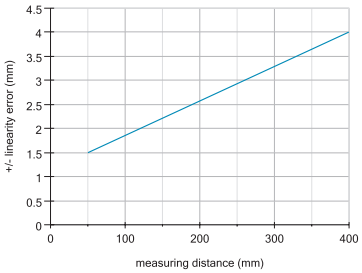
connectors and mating connectors	
ESG 34AY0200	Connector M12, 4 pin, straight, 2 m, V4A-PP
ESW 33AY0200	Connector M12, 4 pin, angular, 2 m, V4A-PP
additional cable connectors and field wireable connectors: see accessories	

Accessories	
HI17-1H	Mounting for sensors in hygienic design Ø 17 mm
for details: see accessories section	

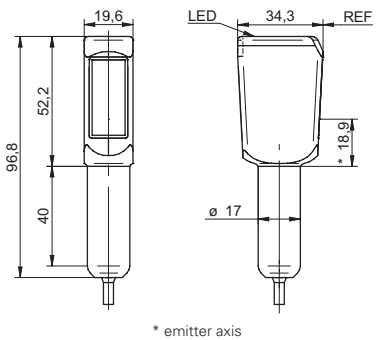
resolution



linearity error



dimension drawing



* emitter axis

Sd = 100 ... 1000 mm

- qTeach
- alarm output

general data	
measuring distance Sd	100 ... 1000 mm
adjustment	Teach-in
Teach-in range min.	> 50 mm
power on indication	LED green
soiled lens indicator	LED red
resolution	0,3 ... 4 mm
linearity error	± 1,1 ... ± 15 mm
light source	pulsed red laser diode
wave length	656 nm
laser class	1
beam type	point
beam diameter	3,7 ... 13 mm
interference suppression	< 32 ms
electrical data	
response time / release time	< 12,8 ms
voltage supply range +Vs	12 ... 30 VDC
current consumption max. (no load)	80 mA
output circuit	analog
output current	< 100 mA
alarm output	push-pull
short circuit protection	yes
reverse polarity protection	yes, Vs to GND
mechanical data	
width / diameter	23,4 mm
height / length	63 mm
depth	45 mm
type	rectangular
housing material	plastic (SAN LURAN 378P)
front (optics)	PMMA
ambient conditions	
ambient light immunity	< 20 kLux
operating temperature	0 ... +50 °C
protection class	IP 67

connection diagrams

connectors and mating connectors

ESG 34CH0200G	Connector M12, 5 pin, straight, 2 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories

11077517	Mounting bracket for sensors series 25 (L design)
for details: see accessories section	

laser warning

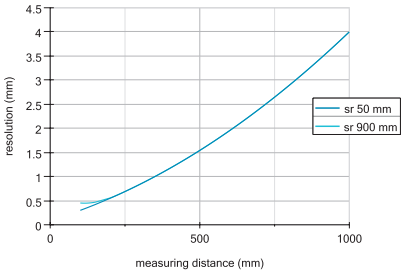
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference	output signal	connection types	load resistance (analog U)	load resistance (analog I)
OADK 25I7480	4 ... 20 mA	cable, 2 m	-	< (+Vs - 6 V) / 0,02 A
OADK 25I7480/S14C	4 ... 20 mA	connector M12 5 pin	-	< (+Vs - 6 V) / 0,02 A
OADK 25U7480	0 ... 10 VDC	cable, 2 m	> 100 kOhm	-
OADK 25U7480/S14C	0 ... 10 VDC	connector M12 5 pin	> 100 kOhm	-

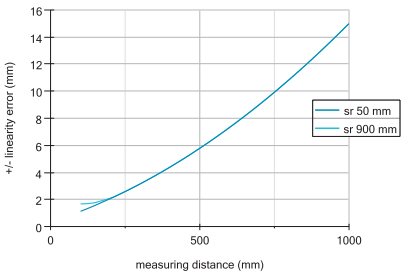
resolution

Sd = 100 ... 1000 mm

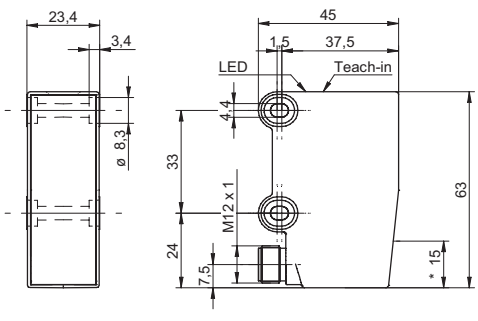


linearity error

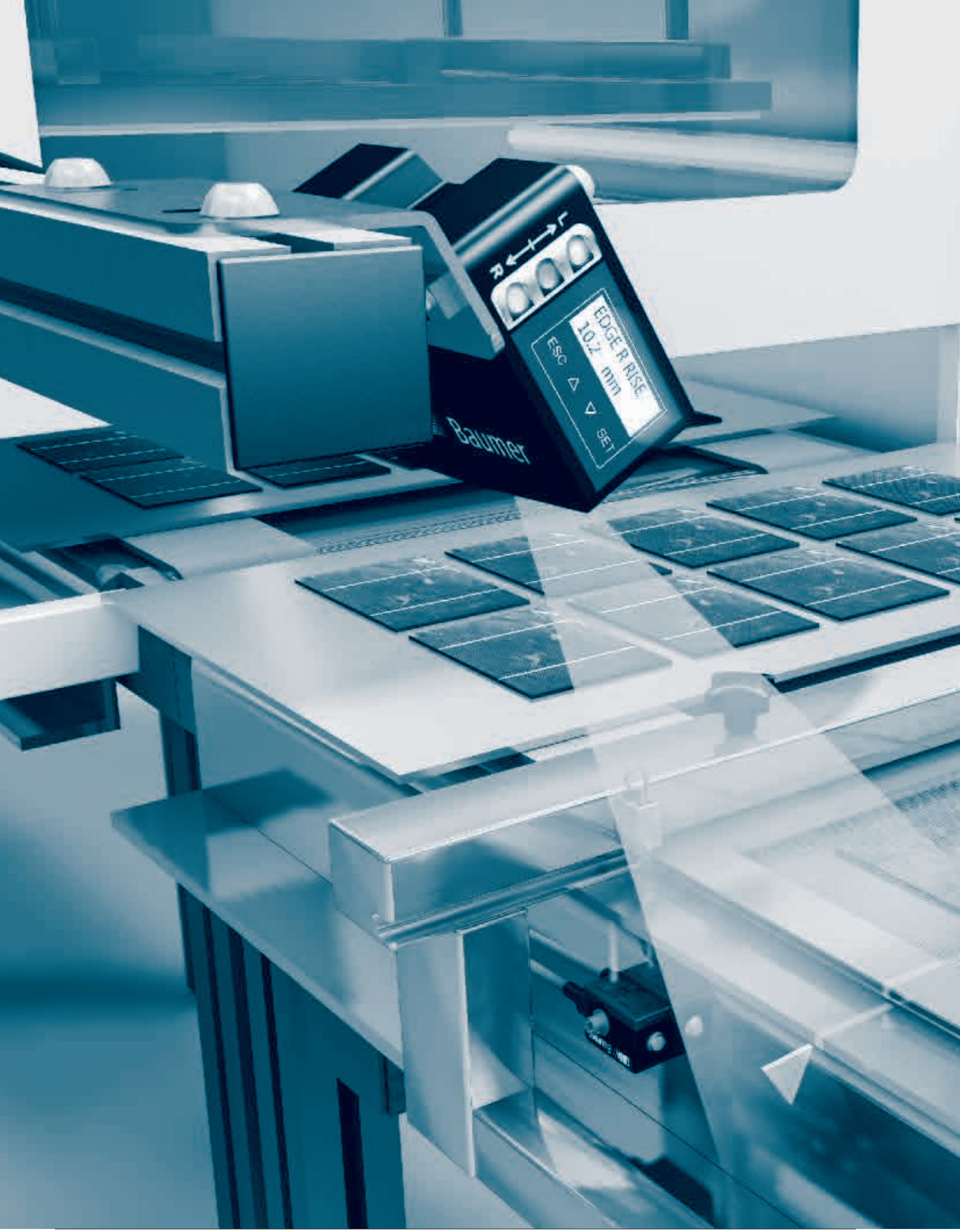
Sd = 100 ... 1000 mm

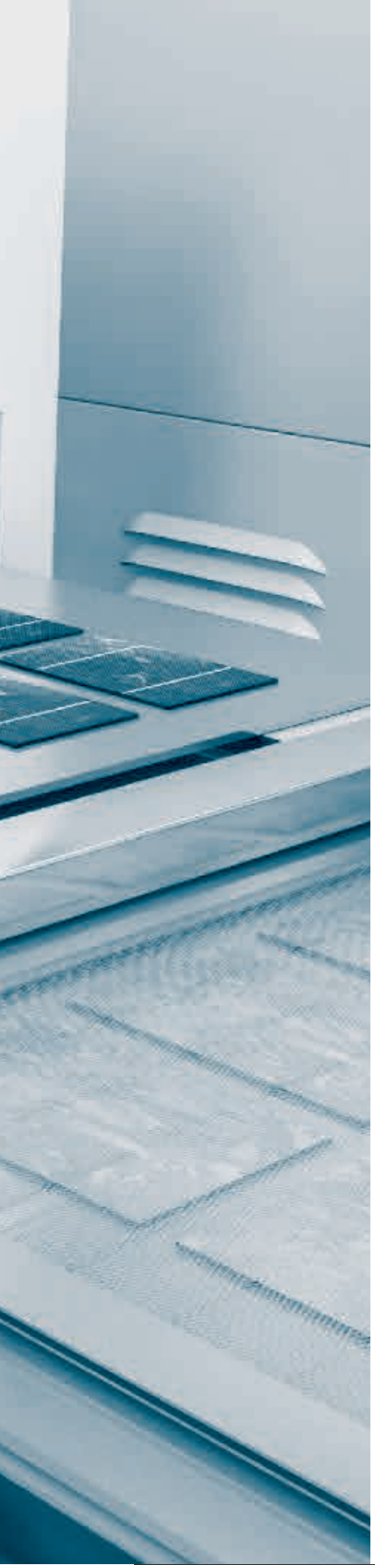


dimension drawing



* emitter axis


EDGE R RISE
10.2 mm
ESC
SET
Baumer



Smart profile sensors *PosCon*®

Overview	Page 712
Width measurement OXE7	Page 714
Height measurement OXH7	Page 716
Measurement of round objects OXC7	Page 720

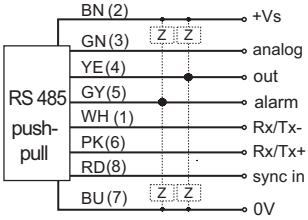
product family	OXE7	OXH7	OXH7	OXC7
	PosCon	*PosCon*	*PosCon*	*PosCon*
	edges, width, gap	height measurement	height measurement	round objects
laser class	1	2	1	1
resolution	20 µm 30 ... 50 µm	4 ... 25 µm	2 ... 4 µm	10 ... 40 µm
linearity error	± 50 ... ± 75 µm ± 80 ... ± 120 µm	± 100 µm	± 30 ... ± 90 µm	± 35 ... ± 60 µm
measuring frequency	90 ... 250 Hz 111 ... 370 Hz 125 ... 500 Hz 159 ... 625 Hz	1540 Hz	570 Hz	450 Hz
ambient light immunity	< 25 kLux < 35 kLux	< 35 kLux	< 35 kLux	< 25 kLux
output circuit	analog and RS 485	analog and RS 485	analog and RS 485	analog and RS 485
output signal	4 ... 20 mA / 0 ... 10 VDC	4 ... 20 mA / 0 ... 10 VDC	4 ... 20 mA / 0 ... 10 VDC	4 ... 20 mA / 0 ... 10 VDC
page	**714**	**716**	**718**	**720**

Sd = 150 ... 250 mm

- 0-10 VDC / 4-20 mA (adaptive)
- measuring mode: edges, center, width, gap
- RS 485 interface

general data	
type	measuring mode: edges, center, width, gap
repeat accuracy	± 10 µm
power on indication	LED green
output indicator	LED yellow / LED red
light source	pulsed red laser diode
wave length	656 nm
laser class	1
adjustment	Touch Display, RS485
electrical data	
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	150 mA
output circuit	analog and RS 485
output signal	4 ... 20 mA / 0 ... 10 VDC
switching output	push-pull
output function	Out 1 / Alarm
output current	< 100 mA
baud rate	115200, adjustable
reverse polarity protection	yes, Vs to GND
short circuit protection	yes
mechanical data	
width / diameter	26 mm
height / length	74 mm
depth	55 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin
weight	130 g
ambient conditions	
operating temperature	-20 ... +50 °C
protection class	IP 67
storage temperature	-25 ... +75 °C
vibration (sinusoidal)	IEC 60068-2-6:2008 1.5 mm p-p at f = 10 - 57 Hz, 10 cycles per axis 10 g at f = 58 - 2000 Hz, 10 cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-27:2009 50 g / 11 ms resp. 100 g / 6 ms, 10 jolts per axis and direction 100 g / 2 ms, 5000 jolts per axis and direction

connection diagram



connectors and mating connectors	
ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11120705	Mounting bracket X7 90° for PosCon and OM70, incl. accessories
11126836	Mounting bracket X7 30° horizontal for PosCon and OM70, incl. accessories
11126837	Mounting bracket X7 30° vertical for PosCon and OM70, incl. accessories
for details: see accessories section	

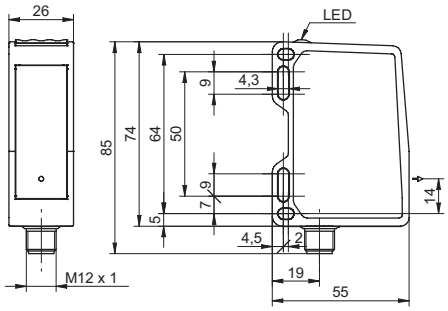
laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference	measuring range (width)	measuring range (distance)	version	measuring frequency	resolution	linearity error	temperature drift
OXE7.E15T-11177353	48 ... 72 mm	100 ... 150 mm	PosCon OXE7 - for very precise measurements and dark objects	111 ... 370 Hz	20 µm	± 50 ... ± 75 µm	< 0,03 % measured value/K
OXE7.E15T-11148276	48 ... 72 mm	100 ... 150 mm	PosCon OXE7 - for very precise measurements	159 ... 625 Hz	20 µm	± 50 ... ± 75 µm	< 0,03 % measured value/K
OXE7.E25T-11174280	75 ... 125 mm	150 ... 250 mm	PosCon OXE7 - for very dark objects	90 ... 250 Hz	30 ... 50 µm	± 80 ... ± 120 µm	< 0,05 % measured value/K
OXE7.E25T-11111452	75 ... 125 mm	150 ... 250 mm	PosCon OXE7	125 ... 500 Hz	30 ... 50 µm	± 80 ... ± 120 µm	< 0,05 % measured value/K

dimension drawing

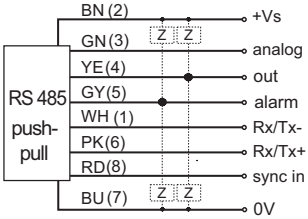


Sd = 100 ... 500 mm

- Position-independent height measurements
- Very high resolution up to 4 µm
- Output in mm
- Touch display for parameterization

general data	
type	height
version	PosCon OXH7
measuring range (width)	13 ... 66 mm
measuring range (distance)	100 ... 500 mm
measuring frequency	1540 Hz
resolution	4 ... 25 µm
repeat accuracy	4 ... 20 µm
linearity error	± 100 µm
temperature drift	± 0,04 % Sde/K
power on indication	LED green
light source	pulsed red laser diode
wave length	660 nm
laser class	2
optical peak power max.	6 mW
adjustment	Touch Display, RS485
electrical data	
response time / release time	1,3 ms
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	120 mA
output circuit	analog and RS 485
output signal	4 ... 20 mA / 0 ... 10 VDC
switching output	push-pull
output function	Out 1 / Alarm
output current	< 100 mA
baud rate	115200, adjustable
reverse polarity protection	yes, Vs to GND
short circuit protection	yes
mechanical data	
width / diameter	26 mm
height / length	74 mm
depth	55 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin
weight	130 g

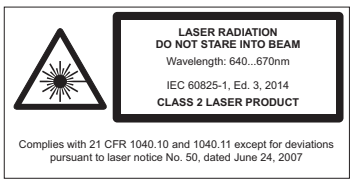
connection diagram



connectors and mating connectors	
ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11120705	Mounting bracket X7 90° for PosCon and OM70, incl. accessories
11126836	Mounting bracket X7 30° horizontal for PosCon and OM70, incl. accessories
11126837	Mounting bracket X7 30° vertical for PosCon and OM70, incl. accessories
for details: see accessories section	

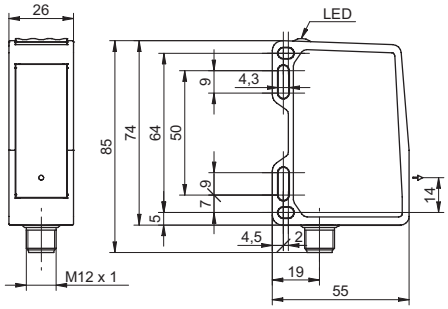
laser warning



ambient conditions	
ambient light immunity	< 35 kLux
operating temperature	-10 ... +50 °C
protection class	IP 67
storage temperature	-25 ... +75 °C
vibration (sinusoidal)	IEC 60068-2-6:2008 1.5 mm p-p at f = 10 - 57 Hz, 10 cycles per axis 10 g at f = 58 - 2000 Hz, 10 cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-27:2009 50 g / 11 ms resp. 100 g / 6 ms, 10 jolts per axis and direction 100 g / 2 ms, 5000 jolts per axis and direction

order reference
OXH7-11161809

dimension drawing

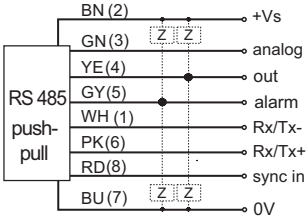


Sd = 100 ... 150 mm

- Position-independent height measurements
- Very high resolution up to 2 µm
- Output in mm

general data	
type	height
version	PosCon OXH7
measuring range (width)	48 ... 72 mm
measuring range (distance)	100 ... 150 mm
measuring frequency	570 Hz
resolution	2 ... 4 µm
linearity error	± 30 ... ± 90 µm
temperature drift	± 0,04 % Sde/K
power on indication	LED green
light source	pulsed red laser diode
wave length	656 nm
laser class	1
optical peak power max.	2,4 mW
adjustment	Touch Display, RS485
electrical data	
response time / release time	3,5 ms
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	120 mA
output circuit	analog and RS 485
output signal	4 ... 20 mA / 0 ... 10 VDC
switching output	push-pull
output function	Out 1 / Alarm
output current	< 100 mA
baud rate	115200, adjustable
reverse polarity protection	yes, Vs to GND
short circuit protection	yes
mechanical data	
width / diameter	26 mm
height / length	74 mm
depth	55 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin
weight	130 g
ambient conditions	
ambient light immunity	< 35 kLux
operating temperature	-10 ... +50 °C
protection class	IP 67
storage temperature	-25 ... +75 °C
vibration (sinusoidal)	IEC 60068-2-6:2008 1.5 mm p-p at f = 10 - 57 Hz, 10 cycles per axis 10 g at f = 58 - 2000 Hz, 10 cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-27:2009 50 g / 11 ms resp. 100 g / 6 ms, 10 jolts per axis and direction 100 g / 2 ms, 5000 jolts per axis and direction

connection diagram



connectors and mating connectors	
ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11120705	Mounting bracket X7 90° for PosCon and OM70, incl. accessories
11126836	Mounting bracket X7 30° horizontal for PosCon and OM70, incl. accessories
11126837	Mounting bracket X7 30° vertical for PosCon and OM70, incl. accessories
for details: see accessories section	

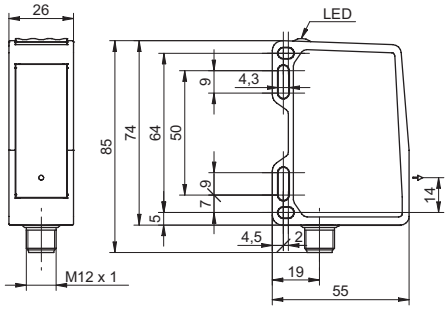
laser warning

CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference
OXH7-11159406

dimension drawing

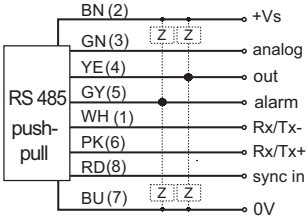


Sd = 150 ... 250 mm

- Measurement of center positions, diameters, and outer positions of round objects
- Suitable for outer diameters up to 130 mm
- Output in mm

general data	
type	measuring mode: center, diameter, limits left, right and top for round objects
version	PosCon OXC7
measuring range (width)	75 ... 125 mm
measuring range (distance)	150 ... 250 mm
measuring frequency	450 Hz
resolution	10 ... 40 µm
repeat accuracy	10 ... 20 µm
linearity error	± 35 ... ± 60 µm
temperature drift	± 0,05 % Sde/K
power on indication	LED green
output indicator	LED yellow / LED red
light source	pulsed red laser diode
wave length	656 nm
laser class	1
optical peak power max.	3 mW
adjustment	Touch Display, RS485
object type	round
object diameter min.	30 mm
object diameter max.	130 mm
electrical data	
response time / release time	7 ms
voltage supply range +Vs	15 ... 28 VDC
current consumption max. (no load)	120 mA
output circuit	analog and RS 485
output signal	4 ... 20 mA / 0 ... 10 VDC
switching output	push-pull
output function	Out 1 / Alarm
output current	< 100 mA
baud rate	115200, adjustable
reverse polarity protection	yes, Vs to GND
short circuit protection	yes
mechanical data	
width / diameter	26 mm
height / length	74 mm
depth	55 mm
type	rectangular, front view
housing material	aluminum
front (optics)	glass
connection types	connector M12 8 pin
weight	130 g

connection diagram



connectors and mating connectors	
ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded
additional cable connectors and field wireable connectors: see accessories	

Accessories	
11120705	Mounting bracket X7 90° for PosCon and OM70, incl. accessories
11126836	Mounting bracket X7 30° horizontal for PosCon and OM70, incl. accessories
11126837	Mounting bracket X7 30° vertical for PosCon and OM70, incl. accessories
for details: see accessories section	

laser warning

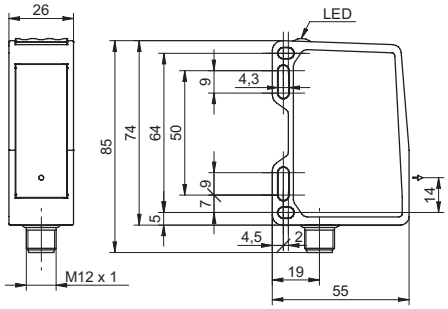
CLASS 1 LASER PRODUCT

IEC 60825-1/2014
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

ambient conditions	
ambient light immunity	< 25 kLux
operating temperature	-10 ... +50 °C
protection class	IP 67
storage temperature	-25 ... +75 °C
vibration (sinusoidal)	IEC 60068-2-6:2008 1.5 mm p-p at f = 10 - 57 Hz, 10 cycles per axis 10 g at f = 58 - 2000 Hz, 10 cycles per axis
shock (semi-sinusoidal)	IEC 60068-2-27:2009 50 g / 11 ms resp. 100 g / 6 ms, 10 jolts per axis and direction 100 g / 2 ms, 5000 jolts per axis and direction

order reference
OXC7-11170024

dimension drawing



POWER
LINK / ACT
NET RUN
FAIL
PASS
Baumer
Baumer

Vision sensors *VeriSens*®

Overview	Page 726
VeriSens® CS / ID / XF	Page 728
VeriSens® XC	Page 730
VeriSens® XF (IP 69K)	Page 732

Vision sensors *VeriSens*®

Applications

- Presence and completeness check
- Acqisition of part location and correct position
- Reading of numbers and characters
- Reading of barcodes and matrix codes

Integration – easy and flexible

- Each 5 freely definable digital inputs / outputs
- Encoder interface
- Siemens SIMATIC® S7 function modules
- Process interface
- Visualization of live and defect images
- Backup & Restore function
- Industrial Ethernet integrated (PROFINET / EtherNet/IP™)
- NAT support

Fields of application

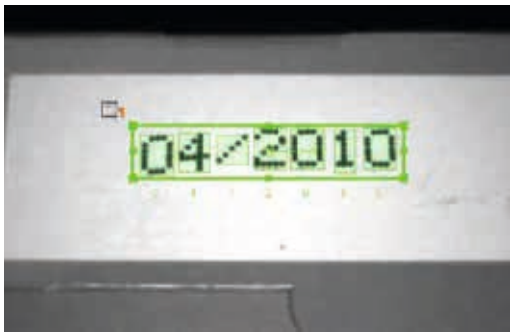
- Quality control
- Food & beverage
- Assembly/Handling
- Packaging industry
- Electronics industry
- Pharmaceutical industry

The image-processing *VeriSens*® vision sensors provide extensive capabilities for a variety of inspection tasks in automation technology. LED lighting, precision optics, a CCD or CMOS camera, processing electronics, and interfaces are integrated in the industrial-suited and compact metal housing (IP 67, IP 69K).

The unified user interface allows intuitive configuration of the vision sensors, even for non-experts in image processing. Visualization or a quick job switching when changing products are also available via a configurable web interface.

Vision sensor *VeriSens*® for checking and sorting of products

- Completeness and presence control of food packaging



VeriSens® **ID series**

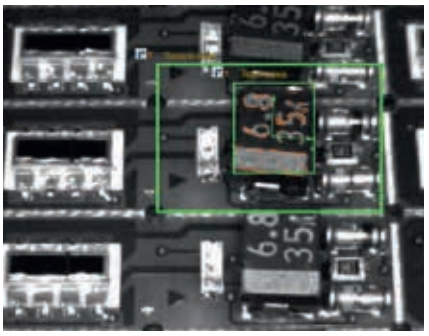
Reading of text and 1D / 2D codes

- Multi Reader for text and codes (incl. GS1)
- Reading of text without font training
- Various codes are read simultaneously

VeriSens® **CS series**

Checking and sorting of products

- Presence and completeness check
- Part recognition and part sorting
- Checking of part geometry



VeriSens® **XF / XC series**

Powerful for complex inspection tasks

- Largest set of *VeriSens*® feature checks
- Coordinate conversion for Pick & Place
- Result output via process interface

product family	VS CS100M03	VS ID100M03	VS ID510M03	VS XF700M03
	VeriSens® CS100	*VeriSens*® ID100	*VeriSens*® ID510	*VeriSens*® XF700
resolution (format)	752 × 480 px (1/3″)	752 × 480 px (1/3″)	752 × 480 px (1/3″)	752 × 480 px (1/3″)
sensor	CMOS	CMOS	CMOS	CMOS
optics	10 / 16 mm	10 / 16 mm	12 mm	12 / 16 mm
min. object distance	50 / 70 mm	50 / 70 mm	50 mm	50 / 100 mm
illumination LED white	■	■	■	■
ilumination LED infrared	■	■	■	■
VeriFlash® integrated flash controller				
communication	setup Ethernet (10 Base-T / 100 Base-TX)	setup Ethernet (10 Base-T / 100 Base-TX) process interface TCP/IP | RS 485	setup Ethernet (10 Base-T / 100 Base-TX) process interface PROFINET (CC-A) / EtherNet/IP™, TCP/UDP	setup Ethernet (10 Base-T / 100 Base-TX) process interface PROFINET (CC-A) / EtherNet/IP™, TCP/UDP
material: housing cover glass	Aluminum PMMA	Aluminium PMMA	Aluminum PMMA	Aluminum PMMA
identification functions code / text		■ / –	■ / ■	
ColorFEX® 3D color assistent				■
distortion correction (monochrome only)				■
configurable web interface with *MultiViewer*	■	■	■	■
page	**728**	**728**	**728**	**728**

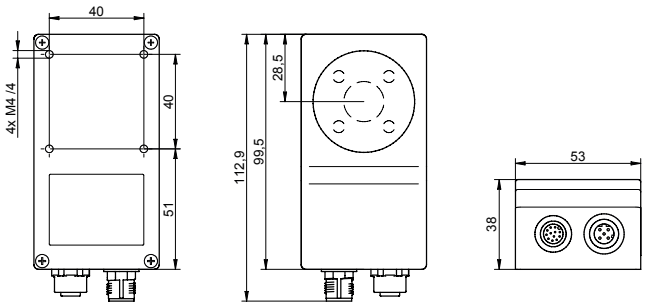
VS XF800M03	VS XC700M	VS XC800M	VS XF105M03	VS XF205M03
VeriSens® XF800	*VeriSens®* XC700	*VeriSens®* XC800	*VeriSens®* XF105	*VeriSens®* XF205
752 × 480 px (1/3″)	A) 640 × 480 px (1/4″) B) 1280 × 960 px (1/3″) C) 1600 × 1200 px (1/1.8″)	A) 640 × 480 px (1/4″) B) 1280 × 960 px (1/3″) C) 1600 × 1200 px (1/1.8″)	752 × 480 px (1/3″)	752 × 480 px (1/3″)
CMOS	CCD	CCD	CMOS	CMOS
12 / 16 mm	C-mount	C-mount	10 / 16 mm	10 / 16 mm
50 / 100 mm	changeable lens (C-mount)	changeable lens (C-mount)	50 / 70 mm	50 / 70 mm
■			■	■
■			■	■
	■	■		
setup Ethernet (10 Base-T / 100 Base-TX) process interface PROFINET (CC-A)/ EtherNet/IP™, TCP/UDP	setup Ethernet (10 Base-T / 100 Base-TX) process interface PROFINET (CC-A)/ EtherNet/IP™, TCP/UDP	setup Ethernet (10 Base-T / 100 Base-TX) process interface PROFINET (CC-A)/ EtherNet/IP™, TCP/UDP	setup Ethernet (10 Base-T / 100 Base-TX) process interface TCP/IP	setup Ethernet (10 Base-T / 100 Base-TX) process interface TCP/IP
Aluminum PMMA	Aluminum PMMA	Aluminum PMMA	stainless steel 1.4404 PMMA	stainless steel 1.4404 PMMA
■ / ■		■ / ■		■ / ■
■	■ resolution: A, B	■ resolution: A, B		
■	■	■		
■	■	■	■	■
728	**730**	**730**	**732**	**732**

focal distance = 10 / 12 / 16 mm

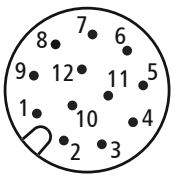
- Image-based quality control with one single sensor
- Easy configuration within a few minutes
- Interfaces: Industrial Ethernet, digital I/Os

general data			
sensor	CMOS		
resolution (format)	752 × 480 px (1/3")		
type	monochrome, color		
illumination	white, infrared		
speed High-resolution mode: High-speed mode:	max. inspections/s (monochrome) 50 100 (XF series only)		
objectiv (focal distance)	10 mm	12 mm	16 mm
object distance min.	50 mm	50 mm	70/100 mm
number of jobs (products)	up to 255 on the device		
features per job	32		
inputs	8 ... 30 V		
outputs	PNP 100 mA		
digital input	Trigger, Job selection, External teach-in, Encoders (CH-A, CH-B) 500 kHz		
digital output	Pass / Fail 1-5, Flash Sync, Alarm, Camera Ready, Output Enable		
communication initial setup: process interface: (device dependent)	 Ethernet (10 BASE-T / 100 BASE-TX) PROFINET (CC-A) / EtherNet/IP™, TCP/UDP (Ethernet), RS485		
electrical data			
voltage supply range +Vs	⎓ 18 ... 30 V		
power consumption max.	typ. 8 W (I_{max} = 1 A at 24 V)		
mechanical data			
width / diameter	53 mm		
height / length	99.5 mm		
depth	38 mm		
type	rectangular		
housing material	Aluminum and PMMA		
weight	250 g		
ambient conditions			
operating temperature	+5 ... +50 °C @ measurement point		
storage temperature	-20 ... +70 °C		
humidity	0 ... 90 % (non-condensing)		
protection class	IP 67		
vibration load	IEC 60068-2-6, IEC 60068-2-64		
mechanical shock resistance	EN 60068-2-27		
accessories			
VeriSens® mounting adapter	11177010		
VeriSens® Application Suite CD	included in delivery		
additional information see accessories			

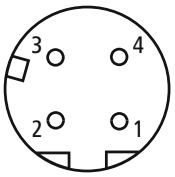
dimension drawing



Electrical connection	**Type M12 / 12-pin, A-coded**
1: Power +18…30 V DC	
2: Ground	
3: IN1 (Trigger)	
4: OUT1	
5: IN2	
6: OUT2	
7: OUT3	
8: IN3	
9: OUT4 | RS485+	
10: IN4	
11: IN5	
12: OUT5 | RS485–	



Electrical connection	**Type M12 / 4-pin**
1: TD+	
2: RD+	
3: TD–	
4: RD–	



connectors		
ESG 34JP0200G	12-pin	2 m straight (shielded)
ESG 34JP0500G	12-pin	5 m straight (shielded)
KSG 34A/ KSG45AP0200G/E	4-pin	2 m straight (shielded)
KSG 34A/ KSG45AP0500G/E	4-pin	5 m straight (shielded)
additional cable connectors and field wireable connectors, see accessories		

order reference	lens	illumination
VS CS100M03W10EP	10 mm	white
VS CS100M03W16EP	16 mm	white
VS CS100M03I10EP	10 mm	infrared
VS CS100M03I16EP	16 mm	infrared

functions
Part location: Part location on contours **Geometry:** Distance, Circle **Feature comparison:** Count contour points, Contour comparison, Brightness

order reference	lens	illumination
VS ID100M03W10RP	10 mm	white
VS ID100M03W16RP	16 mm	white
VS ID510M03W12IP	12 mm	white
VS ID510M03I12IP	12 mm	infrared

Funktionen
Identification: Barcode, Matrix code
Identification: Barcode, Matrix code, Text

order reference	lens	illumination
VS XF700M03W12IP	12 mm	white
VS XF700C03W12IP (color)		
VS XF700M03W16IP	16 mm	white
VS XF700C03W16IP (color)		
VS XF700M03I12IP	12 mm	infrared
VS XF700M03I16IP	16 mm	infrared

functions (*VS XF700C03WxxIP only)
Part location: Part location on contours, Part location on edges, Part location on circle, Part location on text line **Geometry:** Distance, Circle, Angle, Count edges, Point position, Edge characteristics **Feature comparison:** Count contour points, Contour comparison, Area size, Count areas, Pattern comparison, Find object positions, Brightness, Contrast, Color identification*, Color positioning*

order reference	lens	illumination
VS XF800M03W12IP	12 mm	white
VS XF800C03W12IP (color)		
VS XF800M03W16IP	16 mm	white
VS XF800C03W16IP (color)		
VS XF800M03I12IP	12 mm	infrared
VS XF800M03I16IP	16 mm	infrared

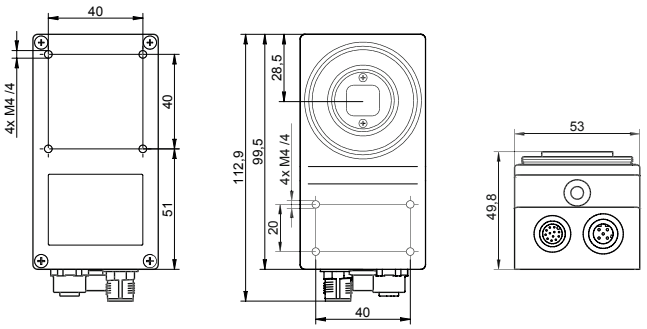
functions (*VS XF800C03WxxIP only)
Part location: Part location on contours, Part location on edges, Part location on circle, Part location on text line **Geometry:** Distance, Circle, Angle, Count edges, Point position, Edge characteristics **Feature comparison:** Count contour points, Contour comparison, Area size, Count areas, Pattern comparison, Find object positions, Brightness, Contrast, Color identification*, Color positioning* **Identification:** Barcode, Matrix code, Text

focal distance = 10 / 16 mm

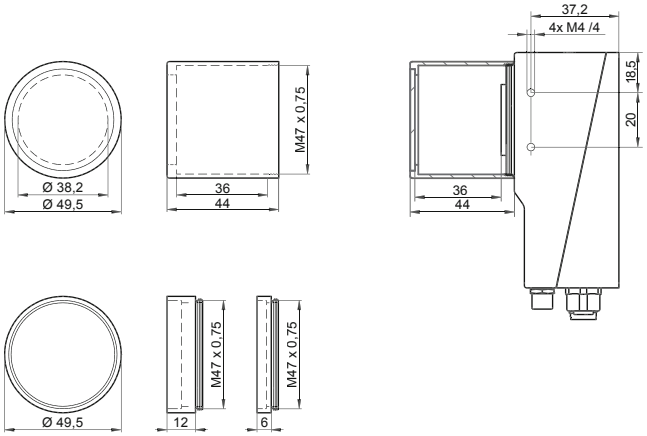
- Image-based quality control with one single sensor
- Easy configuration within a few minutes
- Interfaces: Industrial Ethernet, digital I/Os

general data	
sensor	CMOS
resolution (format)	640 × 480 px (1/4") [1] 1280 × 960 px (1/3") [2] 1600 × 1200 px (1/1.8") [3]
type	monochrome [1, 2, 3] // color [1, 2]
speed High-resolution mode: High-speed mode:	max. inspections/s (monochrome) 118 // 116 [1] | 32 // 31 [2] | 21 [3] 144 [1] | 54 [2] | 35 [3]
number of jobs (products)	up to 255 on the device
features per job	32
inputs	8 ... 30 V
outputs	PNP 100 mA
digital input	Trigger, Job selection, External teach-in, Encoders (CH-A, CH-B) 500 kHz
digital output	Pass / Fail 1-5, Flash Sync, Alarm, Camera Ready, Output Enable
communication initial setup: process interface:	 Ethernet (10 BASE-T / 100 BASE-TX) PROFINET (CC-A) / EtherNet/IP™, TCP/UDP (Ethernet)
electrical data	
voltage supply range +Vs	⎓ 18 ... 30 V
power consumption max.	typ. 5 W (I_{max} = 1,5 A at 24 V)
integrated flash controller	
Voltage (permanent)	⎓ 12 V or ⎓ 24 V
Voltage (pulsed)	⎍ 24 V or ⎍ 48 V
Current (permanent)	I_{max} = 800 mA at ⎓ 24 V (±10 %, at least ±100 mA, at 25 °C)
Current (pulsed)	I_{max} = 4 A at ⎍ 48 V (+10/-20 %, at least ±100 mA, at 25 °C)
Flash time	max. 1 ms (Duty Cycle max. 1:10)
Mechanische Daten	
width / diameter	53 mm
height / length	99.5 mm
depth	49.8 mm (without lens / tube)
type	rectangular
housing material	Aluminum and PMMA
weight	300 g (without lens / tube)
ambient conditions	
operating temperature	+5 ... +50 °C @ measurement point
storage temperature	-20 ... +70 °C
humidity	0 ... 90 % (non-condensing)
protection class	IP 67 (with tube)
vibration load	IEC 60068-2-6, IEC 60068-2-64
mechanical shock resistance	EN 60068-2-27

dimension drawing: device

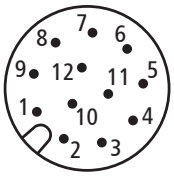


dimension drawing: tube / tube module



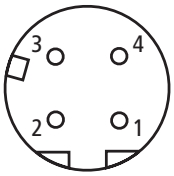
accessories	
XC Tube, M47, length 44 mm	11088325 (included in delivery)
XC Tube Module, M47, 6 mm	11115649
XC Tube Module, M47, 12 mm	11089149
VeriSens® mounting adapter	11177010
VeriSens® Application Suite CD	included in delivery
additional information see accessories	

electrical connection	type M12 / 12-pin, A-coded
1: Power +18…30 V DC	
2: Ground	
3: IN1 (Trigger)	
4: OUT1	
5: IN2	
6: OUT2	
7: OUT3	
8: IN3	
9: OUT4	
10: IN4	
11: IN5	
12: OUT5	

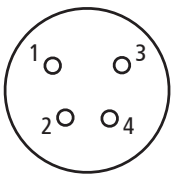


connectors		
ESG 34JP0200G	M12 / 12-pin	2 m straight (shielded)
ESG 34JP0500G	M12 / 12-pin	5 m straight (shielded)
KSG 34A/ KSG45AP0200G/E	M12 / 4-pin	2 m straight (shielded)
KSG 34A/ KSG45AP0500G/E	M12 / 4-pin	5 m straight (shielded)
ESG32A/JSTBV0030	M8 / 4-pin	30 cm straight (shielded), to JST 3-pin
ESG32A/JSTSV0030	M8 / 4-pin	30 cm straight (shielded), to JST 2-pin
additional cable connectors and field wireable connectors, see accessories		

electrical connection	type M12 / 4-pin
1: TD+	
2: RD+	
3: TD–	
4: RD–	



electr. connection illumination*	type M8 / 4-pin
1: +24 V bzw. +48 V Flash	
2: +12 V bzw. +24 V Flash	
3: Ground	
4: Flash Sync PNP 100 mA	
* voltage outputs configurable by software	



order reference		resolution (sensor)
VS XC700M03X00IP		640 × 480 px (1/4″)
VS XC700C03X00IP	(color)	
VS XC700M12X00IP		1280 × 960 px (1/3″)
VS XC700C12X00IP	(color)	
VS XC700M20X00IP		1600 × 1200 px (1/1.8″)

functions (*VS XC700CxxX00IP only)

Part location: Part location on contours, Part location on edges, Part location on circle, Part location on text line
Geometry: Distance, Circle, Angle, Count edges, Point position, Edge characteristics
Feature comparison: Count contour points, Contour comparison, Area size, Count areas, Pattern comparison, Find object positions, Brightness, Contrast, Color identification*, Color positioning*

order reference		resolution (sensor)
VS XC800M03X00IP		640 × 480 px (1/4″)
VS XC800C03X00IP	(color)	
VS XC800M12X00IP		1280 × 960 px (1/3″)
VS XC800C12X00IP	(color)	
VS XC800M20X00IP		1600 × 1200 px (1/1.8″)

functions (*VS XC800CxxX00IP only)

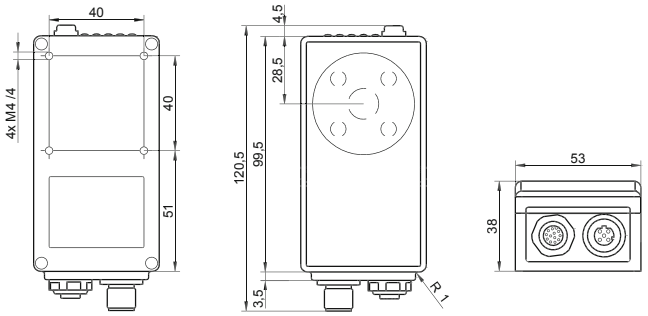
Part location: Part location on contours, Part location on edges, Part location on circle, Part location on text line
Geometry: Distance, Circle, Angle, Count edges, Point position, Edge characteristics
Feature comparison: Count contour points, Contour comparison, Area size, Count areas, Pattern comparison, Find object positions, Brightness, Contrast, Color identification*, Color positioning*
Identification: Barcode, Matrix code, Text

focal distance = 10 / 16 mm

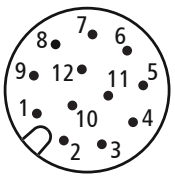
- Image-based quality control with one single sensor
- Easy configuration within a few minutes
- Interfaces: PROFINET/EtherNet/IP™ via gateway, digital I/Os

general data	
sensor	CMOS
resolution (format)	752 × 480 px (1/3")
type	monochrome
illumination	white, infrared
speed High-resolution mode: High-speed mode:	max. inspections/s (monochrome) 50 100
objectiv (focal distance)	10 mm 16 mm
object distance min.	50 mm 70 mm
number of jobs (products)	up to 255 on the device
features per job	32
inputs	8 ... 30 V
outputs	PNP 100 mA
digital input	Trigger, Job selection, External teach-in, Encoders (CH-A, CH-B) 500 kHz
digital output	Pass / Fail 1-5, Flash Sync, Alarm, Camera Ready, Output Enable
communication initial setup: process interface:	 Ethernet (10 BASE-T / 100 BASE-TX) TCP/UDP (Ethernet), PROFINET/EtherNet/IP™ (gateway)
electrical data	
voltage supply range +Vs	⎓ 18 ... 30 V
power consumption max.	typ. 8 W (I_{max} = 1 A at 24 V)
mechanical data	
width / diameter	53 mm
height / length	107,5 mm
depth	38 mm
type	rectangular
housing material	stainless steel 1.4404 and PMMA
weight	700 g
ambient conditions	
operating temperature	+5 ... +50 °C @ measurement point
storage temperature	-20 ... +70 °C
humidity	0 ... 90 % (non-condensing)
protection class	IP 69 K
vibration load	IEC 60068-2-6, IEC 60068-2-64
mechanical shock resistance	EN 60068-2-27
accessories	
VeriSens® mounting adapter	11177010
VeriSens® Application Suite CD	included in delivery
additional information see accessories	

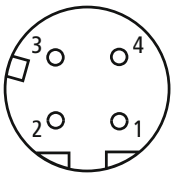
dimension drawing



Electrical connection	Type M12 / 12-pin, A-coded
1: Power +18…30 V DC	
2: Ground	
3: IN1 (Trigger)	
4: OUT1	
5: IN2	
6: OUT2	
7: OUT3	
8: IN3	
9: OUT4	
10: IN4	
11: IN5	
12: OUT5	



Electrical connection	Type M12 / 4-pin
1: TD+	
2: RD+	
3: TD–	
4: RD–	



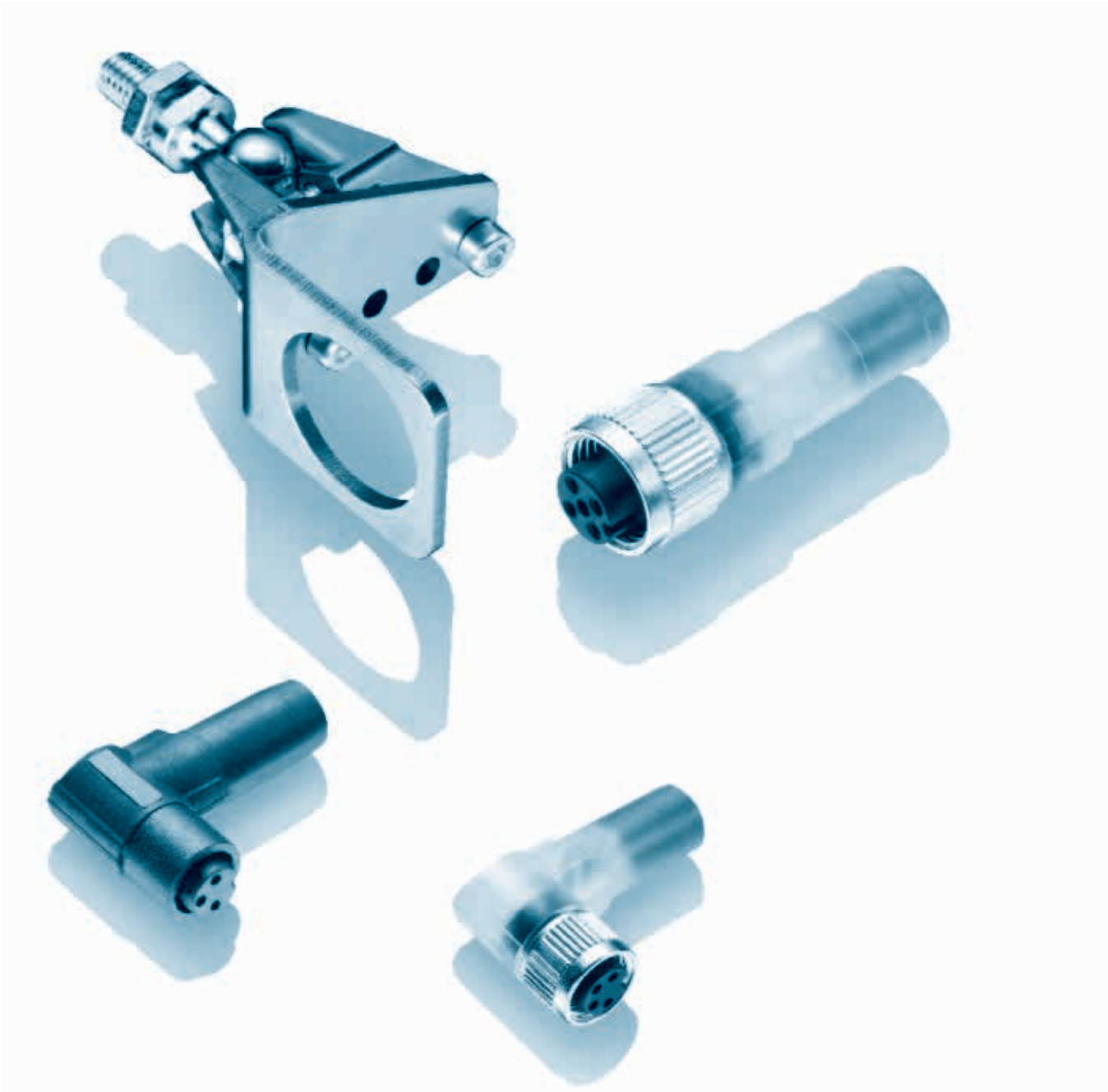
connectors		
ESG 34JP0200G	12-pin	2 m straight (shielded)
ESG 34JP0500G	12-pin	5 m straight (shielded)
KSG 34A/ KSG45AP0200G/E	4-pin	2 m straight (shielded)
KSG 34A/ KSG45AP0500G/E	4-pin	5 m straight (shielded)
additional cable connectors and field wireable connectors, see accessories		

order reference	lens	illumination
VS XF105M03W10EP	10 mm	white
VS XF105M03I10EP	10 mm	infrared
VS XF105M03I16EP	16 mm	infrared

functions
Part location: Part location on contours, Part location on edges, Part location on circle, Part location on text line **Geometry:** Distance, Circle, Angle, Count edges, Point position, Edge characteristics **Feature comparison:** Count contour points, Contour comparison, Area size, Count areas, Pattern comparison, Find object positions, Brightness, Contrast

order reference	lens	illumination
VS XF205M03W10EP	10 mm	white
VS XF205M03W16EP	16 mm	white
VS XF205M03I10EP	10 mm	infrared

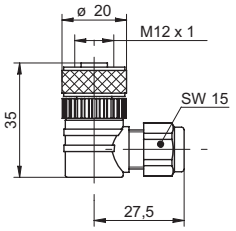
functions
Part location: Part location on contours, Part location on edges, Part location on circle, Part location on text line **Geometry:** Distance, Circle, Angle, Count edges, Point position, Edge characteristics **Feature comparison:** Count contour points, Contour comparison, Area size, Count areas, Pattern comparison, Find object positions, Brightness, Contrast **Identification:** Barcode, Matrix code, Text



Accessories

Connectors and mating connectors	Page 736
Connectors / Pin assignment	Page 741
Reflectors	Page 742
Divers	Page 748
Mountings	Page 750
Mounting kits *Sensofix*	Page 754
Hygienic and washdown	Page 756
Fiber optics	Page 758

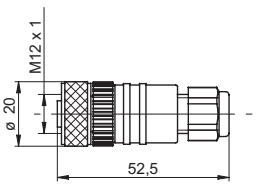
ES 14 - Cable socket M12 angular, not pre-assembled



order reference	
ES 14A PG7	Connector M12, 4 pin, angular
ES 14C PG7	Connector M12, 5 pin, angular

- Connector female unshielded
- Connector only, no cable supplied
- 4 and 5 pin versions

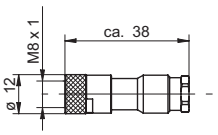
ES 18 - Cable socket M12 straight, not pre-assembled



order reference	
ES 18A PG7	Connector M12, 4 pin, straight
ES 18C PG7	Connector M12, 5 pin, straight

- Connector female unshielded
- Connector only, no cable supplied
- 4 and 5 pin versions

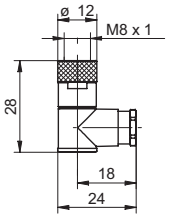
ES 21 - Cable socket M8 straight, not pre-assembled



order reference	
ES 21	Connector M8, 3 pin, straight
ES 21A	Connector M8, 4 pin, straight

- Connector female unshielded
- Connector only, no cable supplied
- 3 and 4 pin version

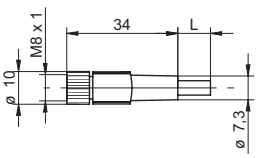
ES 22 - Cable socket M8 angular, not pre-assembled



order reference	
ES 22	Connector M8, 3 pin, angular
ES 22A	Connector M8, 4 pin, angular

- Connector female unshielded
- Connector only, no cable supplied
- 3 and 4 pin versions

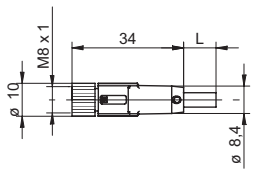
ESG 32 - Connector M8 straight



order reference	
ESG 32AH0200	Connector M8, 4 pin, straight, 2 m
ESG 32AH0500	Connector M8, 4 pin, straight, 5 m
ESG 32AH1000	Connector M8, 4 pin, straight, 10 m
ESG 32SH0200	Connector M8, 3 pin, straight, 2 m
ESG 32SH0500	Connector M8, 3 pin, straight, 5 m
ESG 32SH1000	Connector M8, 3 pin, straight, 10 m

- Connector unshielded
- 3 and 4 pin versions
- Cable coating PUR
- Halogen-free
- Suitable for flexible cable carriers
- UL listed, number E315836
- Meet EN 60079-25 requirements for intrinsically safe ATEX applications

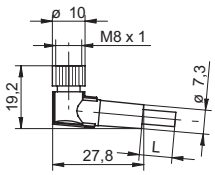
ESG 32G - Connector M8 straight, shielded



order reference	
ESG 32AH0200G	Connector M8, 4 pin, straight, 2 m, shielded
ESG 32AH0500G	Connector M8, 4 pin, straight, 5 m, shielded
ESG 32AH1000G	Connector M8, 4 pin, straight, 10 m, shielded
ESG 32SH0500G	Connector M8, 3 pin, straight, 5 m, shielded
ESG 32SH1000G/T	Connector M8, 3 pin, straight, 10 m, shielded

- Connector shielded, screen connected with cap nut
- 3 and 4 pin versions
- Cable coating PUR
- Halogen-free
- Suitable for flexible cable carriers
- UL listed, number E315836

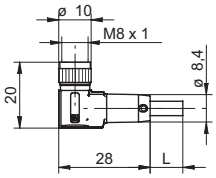
ESW 31 - Connector M8 angular



order reference	
ESW 31AH0200	Connector M8, 4 pin, angular, 2 m
ESW 31AH0500	Connector M8, 4 pin, angular, 5 m
ESW 31AH1000	Connector M8, 4 pin, angular, 10 m
ESW 31SH0200	Connector M8, 3 pin, angular, 2 m
ESW 31SH0500	Connector M8, 3 pin, angular, 5 m
ESW 31SH1000	Connector M8, 3 pin, angular, 10 m

- Connector unshielded
- 3 and 4 pin versions
- Cable coating PUR
- Halogen-free
- Suitable for flexible cable carriers
- UL listed, number E315836
- Meet EN 60079-25 requirements for intrinsically safe ATEX applications

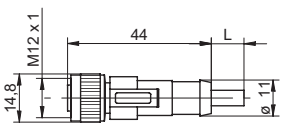
ESW 31G - Connector M8 angular, shielded



order reference	
ESW 31AH0200G	Connector M8, 4 pin, angular, 2 m, shielded
ESW 31AH0500G	Connector M8, 4 pin, angular, 5 m, shielded
ESW 31AH1000G	Connector M8, 4 pin, angular, 10 m, shielded
ESW 31SH0200G	Connector M8, 3 pin, angular, 2 m, shielded
ESW 31SH0500G	Connector M8, 3 pin, angular, 5 m, shielded

- Connector shielded, screen connected with cap nut
- 3 and 4 pin versions
- Cable coating PUR
- Halogen-free
- Suitable for flexible cable carriers
- UL listed, number E315836

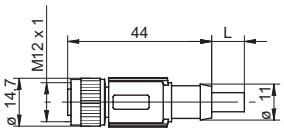
ESG 34 - Connector M12 straight



order reference	
ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESG 34AH0500	Connector M12, 4 pin, straight, 5 m
ESG 34AH1000	Connector M12, 4 pin, straight, 10 m
ESG 34CH0200	Connector M12, 5 pin, straight, 2 m
ESG 34CH0500	Connector M12, 5 pin, straight, 5 m
ESG 34SH0200	Connector M12, 3 pin, straight, 2 m
ESG 34SH0500	Connector M12, 3 pin, straight, 5 m
ESG 34SH1000	Connector M12, 3 pin, straight, 10 m

- Connector unshielded
- 3, 4 and 5 pin versions
- Cable coating PUR
- Halogen-free
- Suitable for flexible cable carriers
- UL listed, number E315836

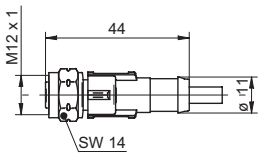
ESG 34G - Connector M12 straight, shielded



order reference	
ESG 34AH0200G	Connector M12, 4 pin, straight, 2 m, shielded
ESG 34AH0500G	Connector M12, 4 pin, straight, 5 m, shielded
ESG 34AH1000G	Connector M12, 4 pin, straight, 10 m, shielded
ESG 34CH0200G	Connector M12, 5 pin, straight, 2 m, shielded
ESG 34CH0500G	Connector M12, 5 pin, straight, 5 m, shielded
ESG 34CH1000G	Connector M12, 5 pin, straight, 10 m, shielded
ESG 34FH0200G	Connector M12, 8 pin, straight, 2 m, shielded
ESG 34FH0500G	Connector M12, 8 pin, straight, 5 m, shielded
ESG 34FH1000G	Connector M12, 8 pin, straight, 10 m, shielded

- Connector shielded, screen connected with cap nut
- 4, 5 and 8 pin versions
- Cable coating PUR
- Halogen-free
- Suitable for flexible cable carriers
- UL listed, number E315836

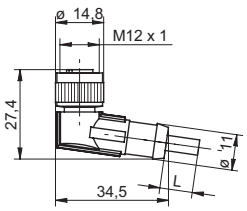
ESG 34F - Connector M12 straight, PVC/V4A



order reference	
ESG 34AF0500	Connector M12, 4 pin, straight, 5 m, V4A-PVC
ESG 34AF1000	Connector M12, 4 pin, straight, 10 m, V4A-PVC

- Connector unshielded
- 4 pin version
- Cable coating PVC
- Cap nut material in stainless steel V4A
- Ecolab certified and FDA conform
- UL listed, number E315836

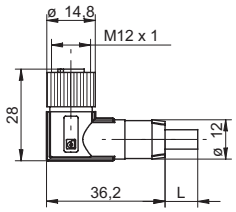
ESW 33 - Connector M12 angular



order reference	
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m
ESW 33AH0500	Connector M12, 4 pin, angular, 5 m
ESW 33AH1000	Connector M12, 4 pin, angular, 10 m
ESW 33CH0200	Connector M12, 5 pin, angular, 2 m
ESW 33CH0500	Connector M12, 5 pin, angular, 5 m
ESW 33SH0200	Connector M12, 3 pin, angular, 2 m
ESW 33SH0500	Connector M12, 3 pin, angular, 5 m
ESW 33SH1000	Connector M12, 3 pin, angular, 10 m

- Connector unshielded
- 3, 4 and 5 pin versions
- Cable coating PUR
- Halogen-free
- Suitable for flexible cable carriers
- UL listed, number E315836

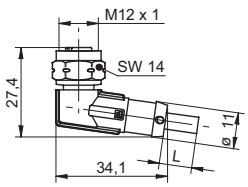
ESW 33G - Connector M12 angular, shielded



order reference	
ESW 33AH0200G	Connector M12, 4 pin, angular, 2 m, shielded
ESW 33AH0500G	Connector M12, 4 pin, angular, 5 m, shielded
ESW 33AH1000G	Connector M12, 4 pin, angular, 10 m, shielded
ESW 33CH0500G	Connector M12, 5 pin, angular, 5 m, shielded
ESW 33FH0200G	Connector M12, 8 pin, angular, 2 m, shielded
ESW 33FH0500G	Connector M12, 8 pin, angular, 5 m, shielded
ESW 33FH1000G	Connector M12, 8 pin, angular, 10 m, shielded

- Connector shielded, screen connected with cap nut
- 4, 5 and 8 pin versions
- Cable coating PUR
- Halogen-free
- Suitable for flexible cable carriers
- UL listed, number E315836

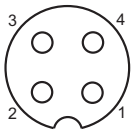
ESW 33F - Connector M12 angular, PVC/V4A



order reference	
ESW 33AF0200	Connector M12, 4 pin, angular, 2 m, V4A-PVC
ESW 33AF0500	Connector M12, 4 pin, angular, 5 m, V4A-PVC
ESW 33AF1000	Connector M12, 4 pin, angular, 10 m, V4A-PVC
ESW 33AF2500	Connector M12, 4 pin, angular, 25 m, V4A-PVC

- Connector unshielded
- 4 pin version
- Cable coating PVC
- Cap nut material in stainless steel V4A
- Ecolab certified and FDA conform
- UL listed, number E315836

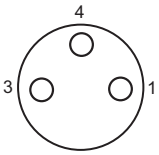
3 pin



1 = BN
2 = n.c.
3 = BU
4 = BK

ESG 34
ESW 33

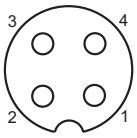
3 pin



1 = BN
3 = BU
4 = BK

ES 21
ES 22
ESG 32
ESG 32G
ESW 31
ESW 31G

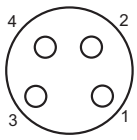
4 pin



1 = BN (+Vs)
2 = WH (output)
3 = BU (0V)
4 = BK (output)

ES 14
ES 18
ESG 34
ESG 34F
ESG 34G
ESW 33
ESW 33F
ESW 33G

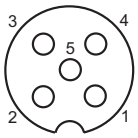
4 pin



1 = BN
2 = WH
3 = BU
4 = BK

ES 21A
ES 22A
ESG 32
ESG 32G
ESW 31
ESW 31G

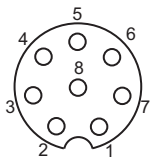
5 pin



1 = BN
2 = WH
3 = BU
4 = BK
5 = GY

ES 14C
ES 18C
ESG 34
ESG 34G
ESW 33
ESW 33G

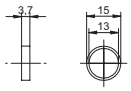
8 pin



1 = WH
2 = BN
3 = GN
4 = YE
5 = GY
6 = PK
7 = BU
8 = RD

ESG 34G
ESW 33G

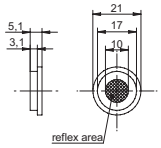
FTAR 013



- Fastening method self-adhesive
- Micro structure
- For Retro-reflective sensors

order reference	
FTAR 013A000	Reflector round Ø 15 mm

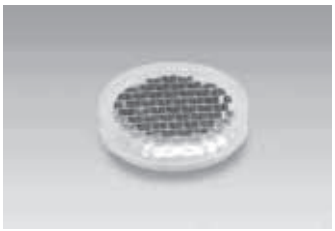
FTAR 014

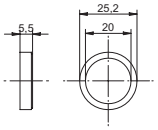


- Fastening method self-adhesive
- For Retro-reflective sensors

order reference	
FTAR 014A000	Reflector round Ø 21 mm

FTAR 020

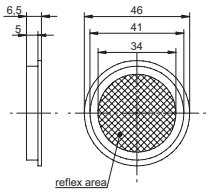




- Fastening method self-adhesive
- Micro structure
- For Retro-reflective sensors

order reference	
FTAR 020A000	Reflector round Ø 25,2 mm

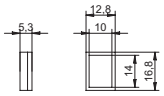
FTAR 038



- Fastening method self-adhesive
- For Retro-reflective sensors

order reference	
FTAR 038A000	Reflector round Ø 46 mm

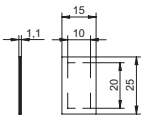
FTDR 010A



- Fastening method self-adhesive
- For Retro-reflective sensors

order reference	
FTDR010A014	Reflector rectangular 16,8 x 12,8 mm

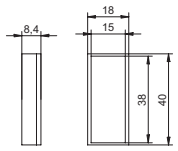
FTDR 010D



- Fastening method self-adhesive
- For laser light sensors

order reference	
FTDR 010D020	Reflector rectangular 15 x 25 mm

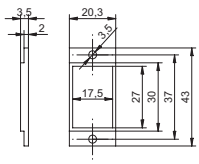
FTDR 015



- Fastening method self-adhesive
- For Retro-reflective sensors

order reference	
FTDR 015A038	Reflector rectangular 40 x 18 mm

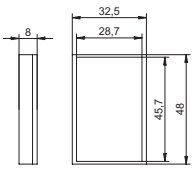
FTDR 017



- Fastening method screw mounting
- Micro structure
- For Retro-reflective sensors

order reference	
FTDR 017A027	Reflector rectangular 43 x 20,3 mm

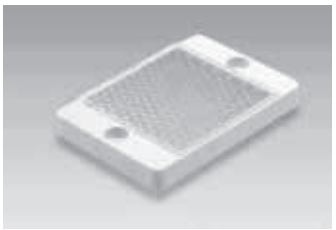
FTDR 029

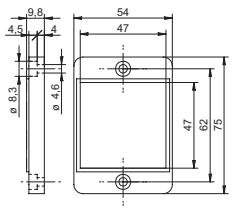


- Fastening method self-adhesive
- For Retro-reflective sensors

order reference	
FTDR 029A046	Reflector rectangular 48 x 32,5 mm

FTDR 047

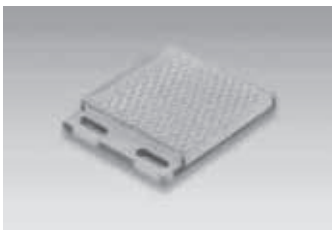


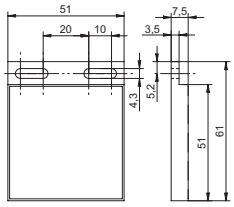


- Fastening method screw mounting
- For Retro-reflective sensors

order reference	
FTDR 047A048	Reflector rectangular 75 x 54 mm

FTDR 051

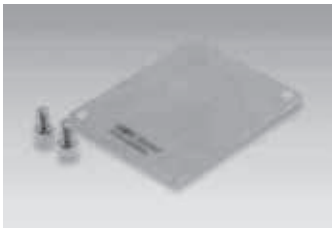


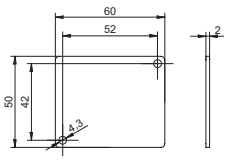


- Detergent resistant reflector
- Ecolab approved
- For Retro-reflective sensors

order reference	
FTDR 051E051	Ecolab approved reflector

FTDR 050

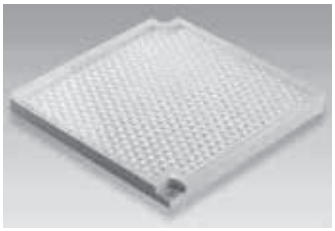


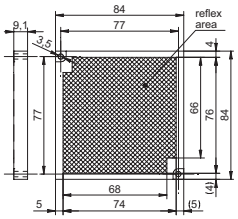


- Stainless steel reflector for SmartReflect in washdown design
- Material: Stainless steel V4A

order reference	
FTDR 050R060	Stainless steel reflector for SmartReflect in washdown design

FTDR 084

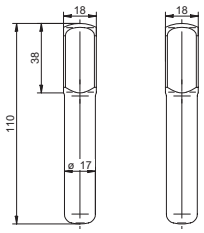




- Fastening method screw mounting
- For Retro-reflective sensors

order reference	
FTDR 084A084	Reflector rectangular 84 x 84 mm

FTDR 017W



- Stainless steel reflector for SmartReflect in hygiene design
- EHEDG-certified

Accessorie: "mounitng for sensors in hygienic design Ø17", order reference HI17-1H

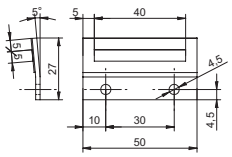
order reference	
FTDR 017W035	Stainless steel reflector for SmartReflect in hygiene design

FTDF 020F

- Fastening method self-adhesive
- For laser light sensors

order reference	
FTDF 020F020	Reflective tape rectangular 20 x 20 mm

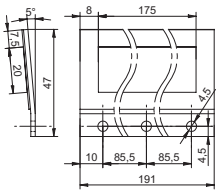
FTDR 005



- Fastening method screw mounting
- For pocket-size edge sensor *PosCon*

order reference	
FTDR 005I040	Reflector rectangular 50 x 27 mm

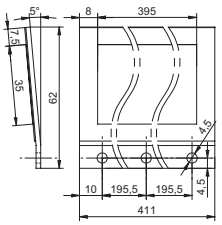
FTDR 020



- Fastening method screw mounting
- For pocket-size edge sensor *PosCon*

order reference	
FTDR 020I175	Reflector rectangular 191 x 47 mm

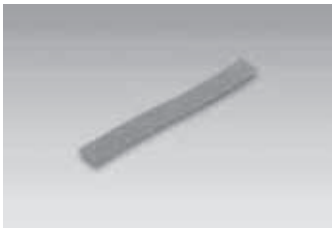
FTDR 035

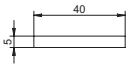


- Fastening method screw mounting
- For pocket-size edge sensor *PosCon*

order reference	
FTDR 035I395	Reflector rectangular 411 x 62 mm

FTDF 005

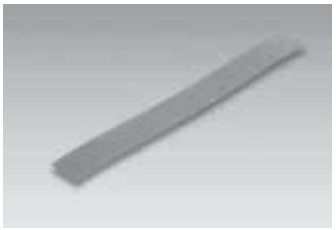


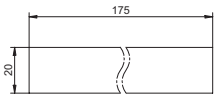


- Fastening method self-adhesive
- For pocket-size edge sensor *PosCon*

order reference	
FTDF 005I040	Reflective tape rectangular 5 x 40 mm

FTDF 020

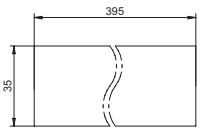




- Fastening method self-adhesive
- For pocket-size edge sensor *PosCon*

order reference	
FTDF 020I175	Reflective tape rectangular 20 x 175 mm

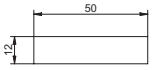
FTDF 035I



- Fastening method self-adhesive
- For pocket-size edge sensor *PosCon*

order reference	
FTDF 035I395	Reflective tape rectangular 35 x 395 mm

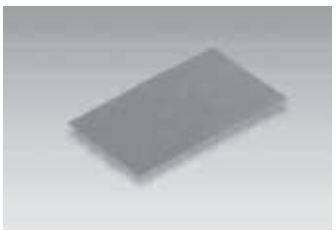
FTDF 012

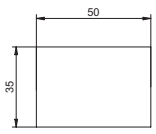


- Fastening method self-adhesive
- For pocket-size edge sensor *ParCon*

order reference	
FTDF 012M050	Reflective tape rectangular 12 x 50 mm

FTDF 035

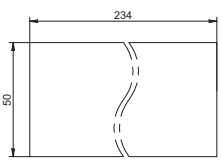




- Fastening method self-adhesive
- For pocket-size edge sensor *ParCon*

order reference	
FTDF 035M050	Reflective tape rectangular 35 x 50 mm

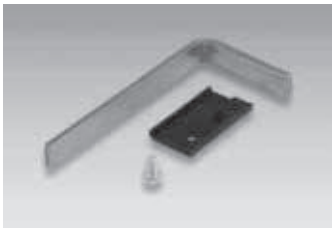
FTDF 050

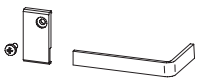


- Fastening method self-adhesive
- For pocket-size edge sensor *ParCon*

order reference	
FTDF 050M234	Reflective tape rectangular 50 x 234 mm

FTDR 008/01

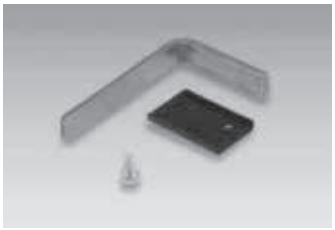




- Bracket with reflective tape
- For pocket-size edge sensor *ParCon*

order reference	
FTDR 008M030/01	Reflector bracket high

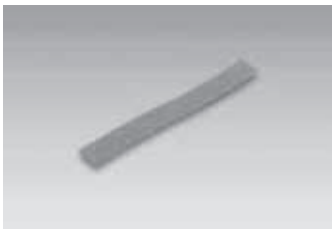
FTDR 008/21

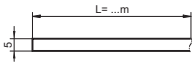


- Bracket with reflective tape
- For pocket-size edge sensor *ParCon*

order reference	
FTDR 008M030/21	Reflector bracket lateral

Z-FTDF 005

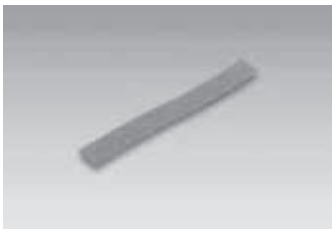


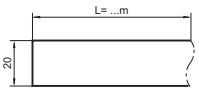


- Fastening method self-adhesive
- For pocket-size edge sensor *PosCon*

order reference	
Z-FTDF 005I0100	Reflective tape rectangular 5 x 100 mm
Z-FTDF 005I0500	Reflective tape rectangular 5 x 500 mm
Z-FTDF 005I1000	Reflective tape rectangular 5 x 1000 mm
Z-FTDF 005I1600	Reflective tape rectangular 5 x 1600 mm

Z-FTDF 020

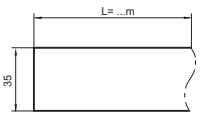




- Fastening method self-adhesive
- For pocket-size edge sensor *PosCon*

order reference	
Z-FTDF 020I0100	Reflective tape rectangular 20 x 100 mm
Z-FTDF 020I0180	Reflective tape rectangular 20 x 180 mm
Z-FTDF 020I0500	Reflective tape rectangular 20 x 500 mm
Z-FTDF 020I1000	Reflective tape rectangular 20 x 1000 mm
Z-FTDF 020I1600	Reflective tape rectangular 20 x 1600 mm

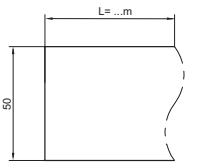
Z-FTDF 035



- Fastening method self-adhesive
- For pocket-size edge sensor *PosCon*

order reference	
Z-FTDF 035I0100	Reflective tape rectangular 35 x 100 mm
Z-FTDF 035I0500	Reflective tape rectangular 35 x 500 mm
Z-FTDF 035I1000	Reflective tape rectangular 35 x 1000 mm
Z-FTDF 035I1600	Reflective tape rectangular 35 x 1600 mm

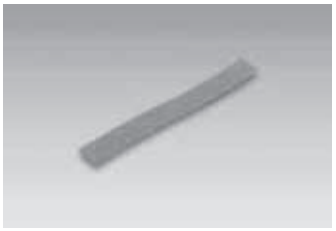
Z-FTDF 050

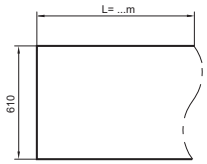


- Fastening method self-adhesive
- For pocket-size edge sensor *PosCon*

order reference	
Z-FTDF 050I0100	Reflective tape rectangular 50 x 100 mm
Z-FTDF 050I0500	Reflective tape rectangular 50 x 500 mm
Z-FTDF 050I1000	Reflective tape rectangular 50 x 1000 mm
Z-FTDF 050I1600	Reflective tape rectangular 50 x 1600 mm

Z-FTDF 610

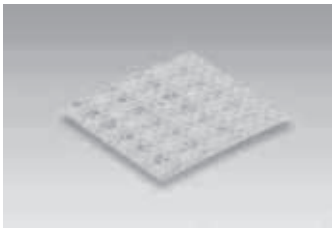


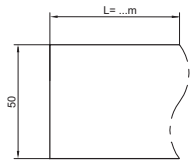


- Fastening method self-adhesive
- For pocket-size edge sensor *PosCon*

order reference	
Z-FTDF 610I0100	Reflective tape rectangular 610 x 100 mm
Z-FTDF 610I0500	Reflective tape rectangular 610 x 500 mm
Z-FTDF 610I1000	Reflective tape rectangular 610 x 1000 mm
Z-FTDF 610I1600	Reflective tape rectangular 610 x 1600 mm

Z-FTDF 050K

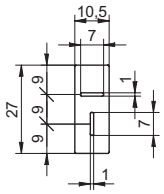




- Fastening method self-adhesive
- For Retro-reflective sensors

order reference	
Z-FTDF 050K0100	Reflective type rectangular 50 x 100 mm
Z-FTDF 050K0500	Reflective type rectangular 50 x 500 mm
Z-FTDF 050K1000	Reflective type rectangular 50 x 1000 mm
Z-FTDF 050K9999	Reflective type rectangular 50 x 10000 mm

Slot aperture stickers series 14

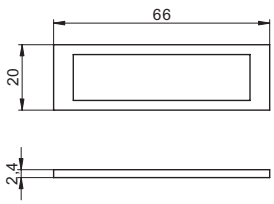


- Material: Polyester foil
- Contents: 2 pieces
- self-adhesive

For use with FSDK 14 / FEDK 14

order reference	
10144075	Slot aperture stickers series 14

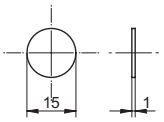
Protector cap for OxDM 20



- Material: PMMA
- Self-adhesive

order reference	
10156878	Protector cap OxDM 20

Glass cover for sensors series 18

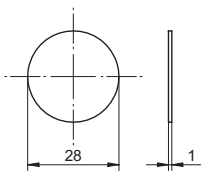


- Material: glass

For use with cap nut series 18

order reference	
10103068	Glass cover series 18

Glass cover for sensors series 30

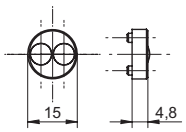


- Material: glass

For use with cap nut series 30

order reference	
10103226	Glass cover series 30

Doubling lens for sensors serie 18

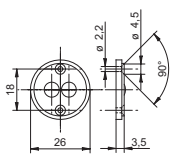


- Material: PBTP / glass
- For double the sensing distance FZAM 18

For use with FZAM 18

order reference	
10107250	Doubling lens series 18 FZAM 18

Doubling lens for sensors serie 30

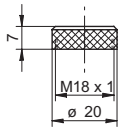


- Material: PC / glass
- For double the sensing distance FZAM 30

For use with FZAM 30

order reference	
10107408	Doubling lens series 30 FZAM 30

Cap nut for photoelectric sensors series 18

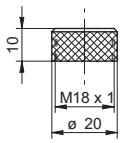


- Material: Nickel-plated brass

For use with FZAM 18 (with glass cover)

order reference	
10103067	Cap nut glass cover for sensors series 18

Cap nut for photoelectric sensors series 18

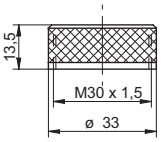


- Material: Nickel-plated brass

For use with FZAM 18 (with doubling lens)

order reference	
10115913	Cap nut glass cover and doubling lens for sensors series 18

Cap nut for photoelectric sensors series 30

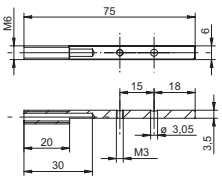


- Material: Nickel-plated brass

For use with FZAM 30 (with glass cover)

order reference	
10102801	Cap nut glass cover for sensors series 30

Mounting brad FHDK 04

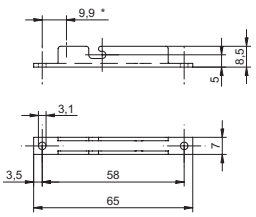


- Material: Nickel-plated steel

For use with FHDK 04

order reference	
10163196	Mounting brad FHDK 04

Bracket for profiles sensor series 04

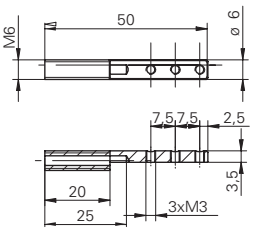


- Material: Aluminum

For use with FHDK 04

order reference	
10163299	Bracket for profiles FHDK 04

Minofix-Mounting kit for MINOS

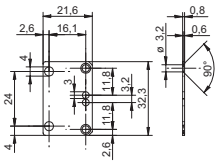


- Material: brass nickel-plated

For use with FxxK 07 (MINOS)

order reference	
10150844	Minofix mounting 07

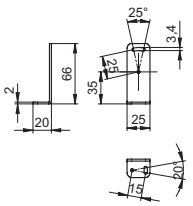
Mounting panel for sensors series 10



For use with UxDK 10, FxDK 10, OxDK 10

order reference	
10162083	Mounting panel for sensors series 10

Mounting bracket for sensors O300 (L design)

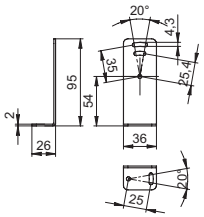


- Material: Steel

For use with O300

order reference	
11102423	Mounting bracket O300 (L design)

Mounting bracket for sensors O500/U500 (L design)

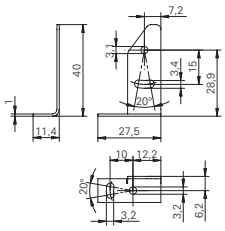


- Material: Steel

For use with O500

order reference	
11092246	Mounting bracket O500/U500 (L design)

Mounting bracket for sensors series 10

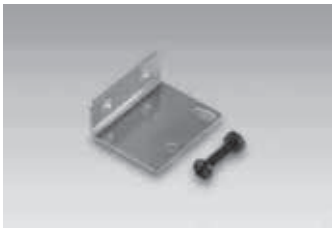


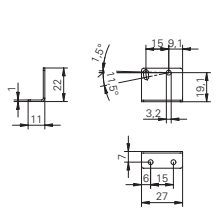
- Material: Steel

For use with UxDK 10, FxDK 10, OxDK 10

order reference	
10118798	Mounting bracket series 10

Mounting bracket for sensors series 10 (L design)



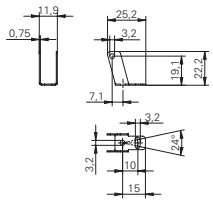


- Material: Steel

For use with UxDK 10, FxDK 10, OxDK 10

order reference	
10133792	Mounting bracket series 10 (L design)

Mounting bracket for sensors series 10 (U design)

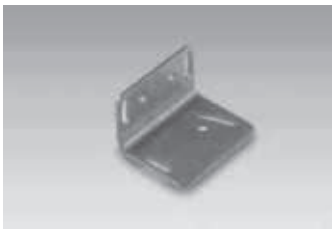


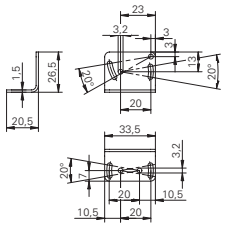
- Material: Steel

For use with UxDK 10, FxDK 10, OxDK 10 (only cabel versions)

order reference	
10114501	Mounting bracket series 10 (U design)

Mounting bracket for sensors series 12



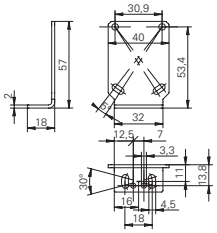


- Material: Steel

For use with FxDM 12, OxDM 12

order reference	
10113873	Mounting bracket series 12 (L design)

Mounting bracket for sensors series 13

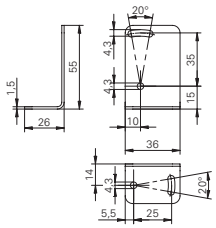


- Material: Steel

For use with OxDM 13

order reference	
10161695	Mounting bracket for sensors series 13 (L design)

Mounting bracket for sensors series 14

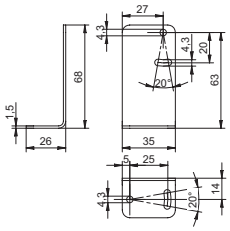


- Material: Steel

For use with FxDK 14, OxDK 14

order reference	
10134964	Mounting bracket series 14 (L design)

Mounting bracket for washdown sensors series 14

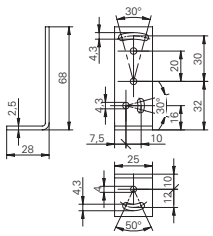


- Material: Stainless Steel

For use with FxDR 14

order reference	
11046278	Mounting bracket series 14 washdown

Mounting bracket for sensors series 15

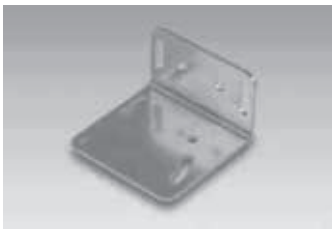


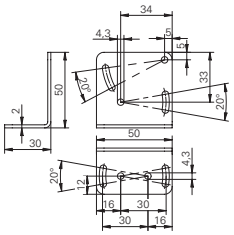
- Material: Steel

For use with FxDM 15

order reference	
10103415	Mounting bracket series 15 (L design)

Mounting bracket for sensors series 16



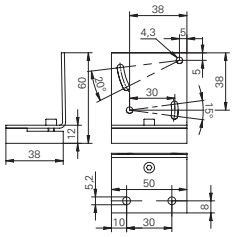


- Material: Steel

For use with FxDM 16, OxDM 16

order reference	
10113917	Mounting bracket series 16 (L design)

Mounting bracket for fine adjustment series 16

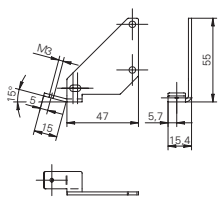


- Material: Steel

Simplifies the alignment of the laser sensors series OSDM 16 / OEDM 16

order reference	
10119373	Mounting bracket for fine adjustment series 16

Lens cleaning air nozzle bracket

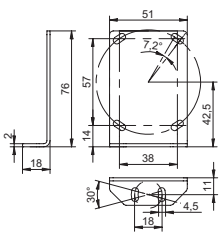


- Material: Steel

For use with FxDM 16, OxDM 16

order reference	
10116407	Lens cleaning air nozzle bracket

Mounting bracket for sensor OxDM 20

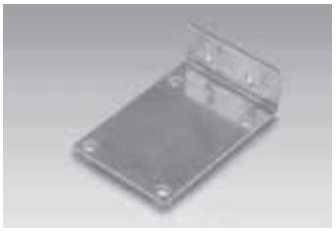


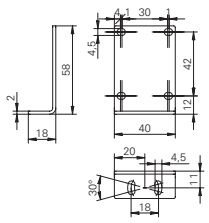
- Material: Steel

For use with OADM 20, OADM 250

order reference	
11010227	Mounting bracket OxDM 20

Mounting bracket for Logipal/PosCon



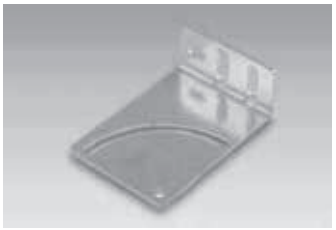


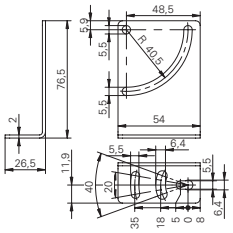
- Material: Steel

For use with ZADM 023, FKDM 22

order reference	
10126220	Mounting bracket series 22 L design

Mounting bracket for sensors series 26



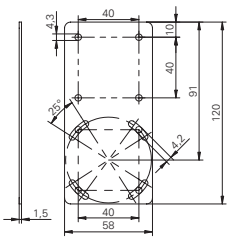


- Material: Steel

For use with FxDK 26

order reference	
10112477	Mounting bracket series 26 (L design)

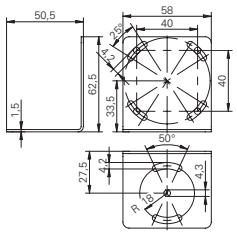
Mounting bracket for Verisens



- Material: Steel

order reference	
10159905	Mounting bracket for Verisens

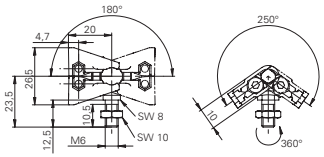
Mounting bracket for Verisens (L design)



- Material: Steel

order reference	
10159906	Mounting bracket for Verisens (L design)

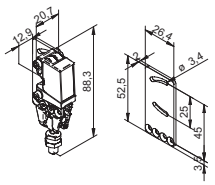
Sensofix-Base module



- Clamps made of stainless steel
- Ball pivots made of galvanized steel

order reference	
10149010	Sensofix-Base module

Sensofix-Mounting kit for sensors O300

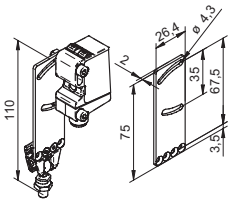


- Clamps made of stainless steel
- Ball pivots made of galvanized steel
- Mounting panel made of stainless steel

For use with photoelectric sensors O300

order reference	
11104963	Sensofix O300

Sensofix-Mounting kit for sensors O500/U500

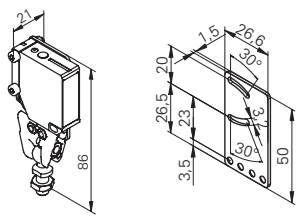


- Clamps made of stainless steel
- Ball pivots made of galvanized steel
- Mounting panel made of stainless steel

For use with photoelectric sensors O500

order reference	
11099942	Sensofix O500/U500

Sensofix-Mounting kit for sensors series 12

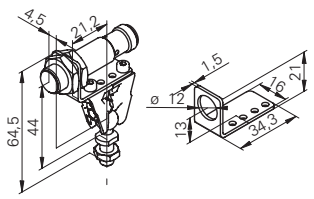


- Clamps made of stainless steel
- Ball pivots made of galvanized steel
- Mounting panel made of stainless steel

For use with FxDM 12, OxDM 12

order reference	
10150328	Sensofix series 12

Sensofix-Mounting kit for sensors series 12 round

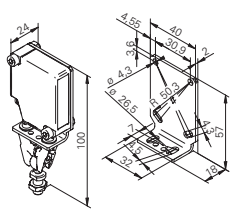


- Clamps made of stainless steel
- Ball pivots made of galvanized steel
- Mounting panel made of stainless steel

For use with all sensors in M12 housing

order reference	
10151720	Sensofix series 12 round

Sensofix-Mounting kit for sensors series 13

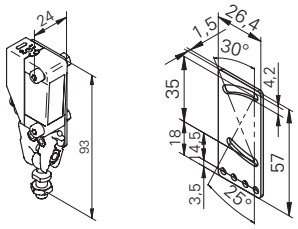


- Clamps made of stainless steel
- Ball pivots made of galvanized steel
- Mounting panel made of stainless steel

For use with OADM 13

order reference	
10161829	Sensofix series 13

Sensofix-Mounting kit for sensors series 14

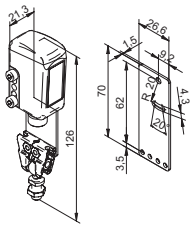


- Clamps made of stainless steel
- Ball pivots made of galvanized steel
- Mounting panel made of stainless steel

For use with FxDK 14, OxDK 14

order reference	
10149011	Sensofix series 14

Sensofix-Mounting kit for washdown sensors series 14

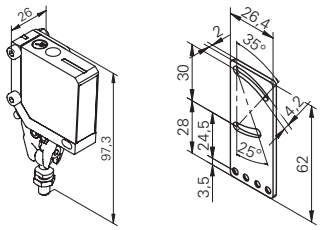


- Clamps made of stainless steel
- Ball pivots made of galvanized steel
- Mounting panel made of stainless steel

For use with FxDR 14

order reference	
11046279	Sensofix series 14 washdown

Sensofix-Mounting kit for sensors series 16

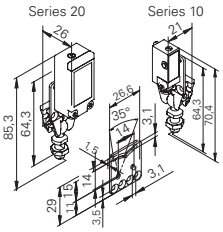


- Mounting panel made of stainless steel
- Clamps made of stainless steel
- Ball pivots made of galvanized steel

For use with FxDM 16, OxDM 16

order reference	
10151721	Sensofix series 16

Sensofix-Mounting kit for sensors series 10/20

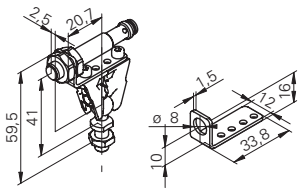


- Clamps made of stainless steel
- Ball pivots made of galvanized steel
- Mounting panel made of stainless steel

For use with photoelectric and ultrasonic sensors series 10, series 20

order reference	
10150326	Sensofix series 10 / series 20

Sensofix-Mounting kit for sensors series 08 round

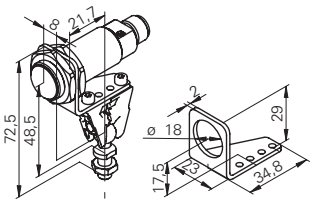


- Clamps made of stainless steel
- Ball pivots made of galvanized steel
- Mounting panel made of stainless steel

For use with all sensors in M8 housing

order reference	
10151719	Sensofix series 08 round

Sensofix-Mounting kit for sensors series 18 round

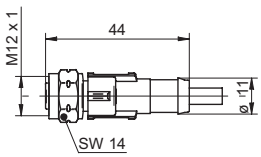


- Clamps made of stainless steel
- Ball pivots made of galvanized steel
- Mounting panel made of stainless steel

For use with all sensors in M18 housing

order reference	
10151658	Sensofix series 18

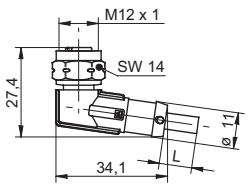
ESG 34F - Connector M12 straight, PVC/V4A



order reference	
ESG 34AF0500	Connector M12, 4 pin, straight, 5 m, V4A-PVC
ESG 34AF1000	Connector M12, 4 pin, straight, 10 m, V4A-PVC

- Connector unshielded
- 4 pin version
- Cable coating PVC
- Cap nut material in stainless steel V4A
- Ecolab certified and FDA conform
- UL listed, number E315836

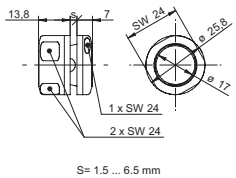
ESW 33F - Connector M12 angular, PVC/V4A



order reference	
ESW 33AF0200	Connector M12, 4 pin, angular, 2 m, V4A-PVC
ESW 33AF0500	Connector M12, 4 pin, angular, 5 m, V4A-PVC
ESW 33AF1000	Connector M12, 4 pin, angular, 10 m, V4A-PVC
ESW 33AF2500	Connector M12, 4 pin, angular, 25 m, V4A-PVC

- Connector unshielded
- 4 pin version
- Cable coating PVC
- Cap nut material in stainless steel V4A
- Ecolab certified and FDA conform
- UL listed, number E315836

Mounting HI17-1H for sensors in hygienic design Ø 17 mm



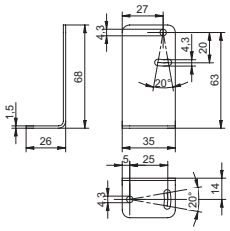
S= 1.5 ... 6.5 mm

- Material: Stainless steel V4A
- EHEDG-certified

For use with inductive sensors 17 mm and photoelectric sensors in hygienic design

order reference	
HI17-1H	Mounting for sensors in hygienic design Ø 17 mm

Mounting bracket for washdown sensors series 14

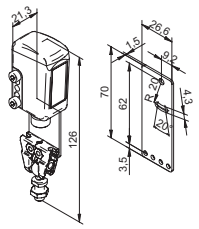


- Material: Stainless Steel

For use with FxDR 14

order reference	
11046278	Mounting bracket series 14 washdown

Sensofix-Mounting kit for washdown sensors series 14

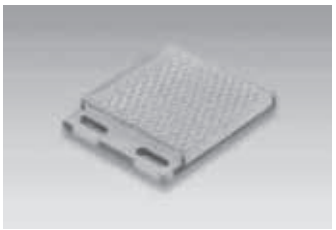


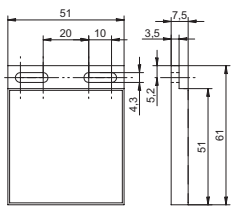
- Clamps made of stainless steel
- Ball pivots made of galvanized steel
- Mounting panel made of stainless steel

For use with FxDR 14

order reference	
11046279	Sensofix series 14 washdown

FTDR 051

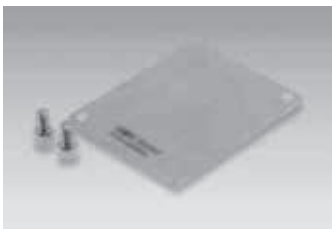


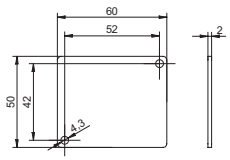


- Detergent resistant reflector
- Ecolab approved
- For Retro-reflective sensors

order reference	
FTDR 051E051	Ecolab approved reflector

FTDR 050

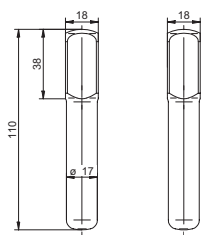




- Stainless steel reflector for SmartReflect in washdown design
- Material: Stainless steel V4A

order reference	
FTDR 050R060	Stainless steel reflector for SmartReflect in washdown design

FTDR 017W

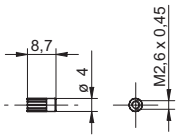


- Stainless steel reflector for SmartReflect in hygiene design
- EHEDG-certified

Accessorie: "mounitng for sensors in hygienic design Ø17", order reference HI17-1H

order reference	
FTDR 017W035	Stainless steel reflector for SmartReflect in hygiene design

Doubling lens M2,6

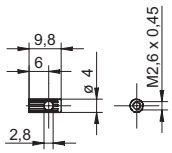


- Increases the actual range Sb by a factor of 6
- Contents: 2 pieces

For fiber optic: FSE 200C1Y00 / FSE 200C2Y00, FSA 200C1Y00, FSG 200C1Y00, FSE 200E1Y00

order reference	
10134541	Doubling lens increases the actual range (paires)

Doubling lens M2,6 (side view version)

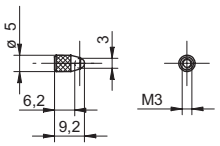


- Side view version
- Increases the actual range Sb by a factor of 6
- Contents: 2 pieces

For fiber optic: FSE 200C1Y00 / FSE 200C2Y00, FSA 200C1Y00, FSG 200C1Y00, FSE 200E1Y00

order reference	
10134540	Doubling lens increases the actual range (paires)

Doubling lens M3

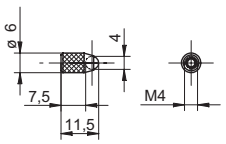


- Material: brass / glass
- Increases the actual range Sb by a factor of 6
- Contents: 2 pieces

For fiber optic: FSE 200C1004

order reference	
10119910	Doubling lens M3 increases the actual range (paires)

Doubling lens M4

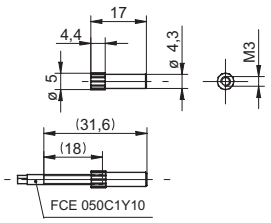


- Material: brass / glass
- Increases the actual range Sb by a factor of 6
- Contents: 2 pieces

For fiber optic: FSE 200C1004

order reference	
10119909	Doubling lens M4 increases the actual range (paires)

Focusing lens M3 ø 0,1 mm

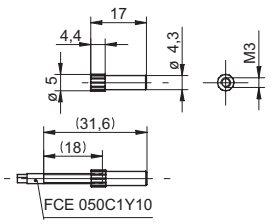


- Light spot Ø 0,1 mm at a distance of 4,6 mm

For fiber optic: FCE 050C1Y10 (empfohlen), FCE 200D1Y00, FCE 200D1Y01, FCE 200E1Y00

order reference	
10134544	Focusing lens M3 ø 0,1 mm

Focusing lens M3 ø 0,4 m

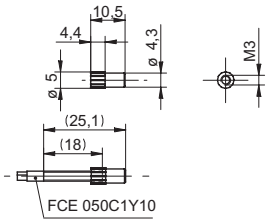


- Light spot Ø 0,4 mm at a distance of 7 mm

For fiber optic: FCE 050C1Y10 (empfohlen), FCE 200D1Y00, FCE 200D1Y01, FCE 200E1Y00

order reference	
10134543	Focusing lens M3 ø 0,4 m

Focusing lens M3 ø 2 mm

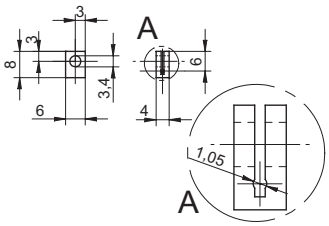


- Light spot Ø 2 mm at a distance of 19 mm

For fiber optic: FCE 050C1Y10 (empfohlen), FCE 200D1Y00, FCE 200D1Y01, FCE 200E1Y00

order reference	
10134542	Focusing lens M3 ø 2 mm

Mounting bracket 1,1 mm

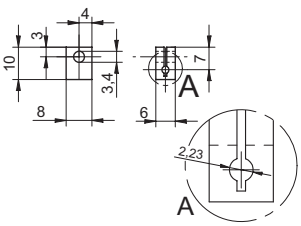


- Material: Aluminum

For fiber optic through beam type with 1,1 mm sheath diameters

order reference	
10119912	Mounting bracket Ø 1,1 mm

Mounting bracket 2,2 mm

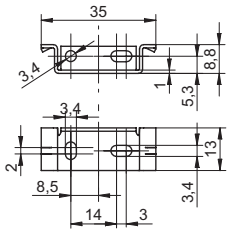


- Material: Aluminum

For fiber optic through beam type with 2,2 mm sheath diameters

order reference	
10119911	Mounting bracket Ø 2,2 mm

Mounting bracket for fiber optic sensors series 12

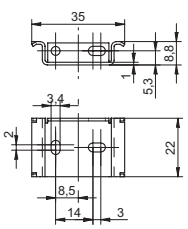


- Material: Steel
- Delivered with every plastic fiber optic sensor series 12

For use with FVDK 12

order reference	
10145702	Mounting bracket for fiber optic sensors series 12

Mounting bracket for fiber optic sensors series 22

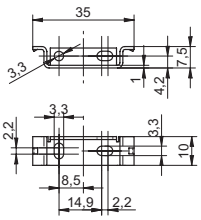


- Material: Steel
- Delivered with every plastic fiber optic sensor series 22

For use with FVDK 22

order reference	
10125534	Mounting bracket for fiber optic sensors series 22

Mounting bracket for fiber optic sensors series 60

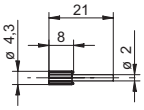


- Material: Steel
- Must be ordered separately for series 66 and series 67sensors

For use with FVDK 66, FVDK 67

order reference	
10159806	Mounting bracket for fiber optic sensors series 60, 66, 67, 80

Reduction tube



- Set of 2
- Delivered with every 1 mm diameter plastic fiber optic

order reference	
10140260	Reduction tube

Fiber optic cable extension

- Reduction in range due to fiber optic extension: 2 m = approx. 25%
- Reduction in range due to fiber optic extension: 5 m = approx. 60%

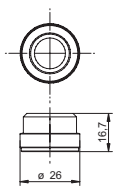
order reference	
10145523	Fiber optic cable extension 5 m hochflexibel
10156738	Fiber optic cable extension 2 m
10158142	Fiber optic cable extension 5 m

Cutting tool

- Delivered with every plastic fiber optic

order reference	
10114652	Cutting tool for plastic fiber optics

Adapter for glass fiber optic sensors 30

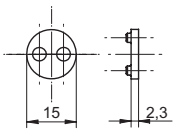


- Material: POM

For use with fiber optic amplifier FZAM 30

order reference	
10102757	Adapter series 30
10106042	Adapter series 30 (angeled fiber optics)

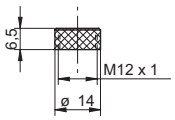
Adjusting plate for glass fiber optic sensors 18 (replace)



- Material: PETP
- For re-orders when lost
- Enclosed with every glass fiber optic of type A

order reference	
10101958	Adjusting plate series 18

Cap nut for glass fiber optic sensors 15 (replace)

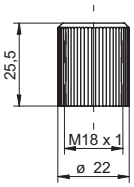


- Material: Nickel-plated brass
- For re-orders when lost
- Enclosed with every glass fiber optic of type B

For use with FVDM 15

order reference	
10103230	Cap nut (replace) for fiber optics series 15

Cap nut for glass fiber optic sensors 18 (replace)



- Material: POM
- For re-orders when lost
- Enclosed with every glass fiber optic of type A

For use with FZAM 18

order reference	
10101480	Cap nut (replace) for fiber optics series 18

IP65
PinPoin
Teach-in
Analog
NPN
qTarg

Glossary

Active zone

The zone in which an object can be detected in front of the sensor. With diffuse sensors, this is approximately equivalent to the zone within the maximum sensing distance where the emitted beam and the reception angle intersect. With retro-reflective sensors, this is the zone from the emitted beam exit plane to the reflector and from there back to the receiver entrance plane. With through beam sensors, this is the zone from the emitted beam exit plane to the receiver entrance plane.

Actual range Sb

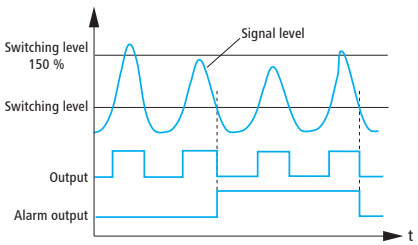
Like the nominal range Sn, but including an excess gain of 50% excess gain, i.e. the maximum distance at which reliable operation of the sensor is possible

Adjustment aid

See «Output indicator»

Alarm output

Output function which indicates an inadequate signal level. The alarm output usually has a «dynamic» function which indicates whether the excess gain of 150% of the switching threshold was exceeded or not during the last light switching operation. It is also usually available as a «static» function: in this case, the alarm output indicates whether the current value of the signal is within the «critical range» between 100% and 150% of the switching threshold.



Ambient light immunity

Maximum permissible light intensity of the ambient light measured with a non-pulsed light source to IEC60947-5-2 and directed together with the receiver at a white reference paper which clearly covers the received beam. The light intensity is measured on the reference paper. In almost all sensor ranges, direct exposure of the white object to sunlight has no effect on the measurement. However, direct exposure of the received beam to sunlight almost certainly causes measuring errors.

Analog output

In contrast to the binary output with two possible output states, the analog output allows one continuous value such as a voltage or current to be emitted, resulting in a higher resolution of the measured values (see «Resolution»). Usually available as a voltage output 0 … 10 V and current output 0 … 20 mA or 4 ... 20 mA. The analog value can also be transmitted via a digital interface like RS 485.

Background suppression

Diffuse sensors usually operate by the triangulation principle. Thanks to this accurate distance measurement, a background may be located close behind the adjusted switching point without interfering with the measurement. The background is «suppressed».

Beam alignment, squint

Due to the addition of the production tolerances of the optical and mechanical components which cannot be compensated by adjustment during manufacture, a squint between the emitter and receiver beams of up to several degrees can occur. From a light distance of more than approx. 40 cm, retro-reflective sensors must usually be aligned. (Exception: OAxx/OBxx range is factory-adjusted.)

Beam-interrupting

Sensor class in which the presence of an object is detected by interruption of the light beam between an emitter (and possibly a reflector) and an associated receiver.

Binary output

Output which can assume two states, i.e. a switching output

Black-white (gray-white) offset

For diffuse sensors with foreground and background suppression, there is a reduction in the sensing distance on gray or black reference paper in comparison with white reference paper (foreground suppression: increased sensing distance). This is also known as the black-white and gray-white offset. The sensing distance diagram shows the reduction in the sensing distance to gray or black as a function of the adjusted sensing distance.

Blind region

Because the emitter and receiver axes are usually offset to each other, it is possible at very close distances to the object that no light emitted by the emitted beam is within the detected angle of the receiver. In this situation, the sensor is dark-switched, or «blind».

CE conformity

Designates compliance of the products with European Union directives. The CE marking of the products is conditional on metrological proof of their electromagnetic compatibility (EMC) according to IEC 61000-4-x standards. Please also note the information on the safety concept.

Closing delay

Output function which extends the dark-switched state of a binary sensor by a specific time. This causes a delay in the switching of a light-switching output and the dark-switching output switches later.

Color sensor *LOGIPAL*

A color sensor determines the magnitude of deviation of the color components between a taught-in color and the color reflected by the object. The switching output indicates whether at least one color component is outside the specified tolerance bands.

Color-based

Sensor class which detects a specific composition of the reflected light spectrum, meaning colors or gray scales (=contrasts). The distance and received light intensity are secondary.

Complementary output

Depending on the wiring the output can be used as a light-switching or dark-switching output. Both output versions are available simultaneously.

Correction factor

The material and the surface texture of the object affect the switching distance of a diffuse sensor with intensity difference. To determine the corrected switching distance, the following values must therefore be applied to the relative receiving signal (KFs) and as an approximation to the distance (KFd).

Material	KFs	KFd
Kodak test card	100%	100%
Light, planed wood 80%	90%	
Rough wood	20%	45%
Drawn aluminum	25%	50%
Cardboard, matt black	7%	26%

Current consumption

Because photoelectric sensors usually operate with pulsed light, their operating current is not constant, but assumes a saw-tooth shape due to the internal smoothing of the current. An average value and a maximum value can be specified from this. Usually this is the maximum value.

Glossary

Degree of remission	The degree of remission designates the diffuse proportion of the reflected light, i.e. without the reflective proportion.
Diffuse sensor	Diffuse sensors detect the presence of an object by illuminating it with emitted light, which is then reflected by the object to the receiver in a diffused form (remitted).
Direction of approach	With triangulation sensors, the approach of an object edge in the direction from the emitter lens to the receiver lens or the reverse can lead to incorrect results. The directions of approach from the front or the side cause no errors.
Distance-based	Sensor class in which the distance to the object is primarily assessed as the measured value. The intensity of the received signal, colors or gray scales are secondary.
ECOLAB approved	The sensors are resistant to many common cleaning agents.
EHEDG (Hygienic Design)	Sensors and mounting accessories meet the design criteria for hygienic applications. These sensors can be used in close proximity to foodstuff and facilitate the certification of the machine.
EMC	All sensors undergo type testing with regard to their electromagnetic compatibility (EMC) according to the standards IEC61000-4-2, -3, -4.
Error correction	Photoelectric sensors usually operate by measuring pulsed light reflected by the object to the receiver. Because a measurement of this kind can be interfered with by various effects from the surroundings, e.g. rapid changes in the ambient light (switching fluorescent lighting on and off, welding sparks etc.), not all received light pulses appear in their correct magnitude, which could lead to switching errors. Fault correction evaluates the received pulses and only changes the switching state when a significant majority of pulses received within a time window indicate the need to change the switching state.
Excess gain	Because signal losses can occur in applications with optical sensors due to soiling of the optics and ageing of the light source, an excess gain must be allowed in the design of the application by presuming a shorter distance to the object than that indicated by the switching point. For reliable operation, an excess gain of at least 150% of the switching threshold is required. This distance correction can either be read off from the excess gain diagram or by exploiting the point at which the output indicator stops flashing. There are corresponding correction factors for diffuse sensors with intensity difference.
External teach-in input	See «Teach-in»
FDA compliant	Consistent use of food compliant materials only.
Fiber optic sensor	An intensity-based sensor in which the emitter and receiver optics are replaced by an optical fiber connection.

Glossary

Focusing	Particularly for sensors operating by the triangulation principle, it is ideal when the size of the light spot is as small as possible. However, according to the laws of optics, it is only possible to bundle the light rays at one point of the light path, the so-called point of focus. For this reason, light sources are focused at a specific distance. This distance is optimum for the detection of very small objects.
Infrared light	Light in a long-wave range which is invisible to the human eye. In comparison with red light LEDs, IR LEDs can supply a higher radiated power. Unsuitable for use with plastic optical fibers, but suitable for glass optical fibers.
Intensity-based	Sensor class in which the light intensity impinging on the receiver is processed as a measured value (which is only an indirect measure of the distance to the object). The distance, colors or gray scales (= contrast) are secondary.
Inverted output	Depending on the wiring the output can be used as a light-switching or dark-switching output. Both output variants exist at the same time.
IO-Link	This is a communication standard for point-to-point connections between a master (connecting module) and a slave (sensor/actor). Non-screened standard sensor cables can be used as the transmission medium. Process data (analog/binary) and service data (parameters/diagnostics) can be transmitted by serial communication. IO-Link compatible sensors can be connected to existing I/O modules (without using serial communication). The advantage of IO-Link is the reduction in project planning and installation costs by a uniform interface and convenient parameter adjustment and management.
Laser diode	Light source featuring an exit zone of the light that is very small and can therefore be focused by downstream optics to form a very small measuring point (light spot). Another feature is that the light intensity is regulated by a monitor function and therefore remains practically unchanged during the service life of the laser diode.
Laser protection class	Lasers are subdivided into different protection classes according to their danger to the human eye: 1: Harmless 1M: Harmless as long as not further bundled by optical measures 2: Laser radiation exists only in the visible spectral range (400 … 700 nm). Harmless for short periods of irradiation (max. 0.25s, as normally given by the natural protective reflex of the eyelid) 2M: Like 2 as long as not further bundled by optical measures
Light/dark operation	Light operation: the output switches when the receiver receives light. Dark operation: the output switches when the receiver receives no light.
Linearity deviation	Deviation from a proportional linear function (straight line). This is specified as an absolute value in mm or as a relative value as a percentage of the far limit of the measuring rage.

Glossary

Linking capability of outputs	**Parallel connection of the outputs (OR function)** Sensors with identical output stages (NPN or PNP) can be connected in parallel if they are connected to the same power supply unit. The number of sensors which can be connected in parallel depends on the respective load current and the currents flowing through the internal pull-up and pull-down resistors (typically 3 mA). The sum of all load currents plus the sum of all internal currents must not exceed the specified maximum switching current of a single sensor. **Series connection of sensors (AND function)** Relay outputs may be connected in series. For sensors with electronic outputs, it is not permissible to switch on the supply of one sensor via the output of a preceding sensor and implement an AND function in this way. Because a sensor represents a high capacitive load, this would activate the short circuit protection.
Measuring range	The sensor supplies a valid measurement result within this range. The measuring range and the limits of the measuring range are adjustable in some sensors.
Minimum pulse length	Output function which forces a minimum length, e.g. 4 ms, for the two output states of a binary sensor, so that even a slow controller can detect such a state without difficulty. In contrast to release/response delay, an output state longer than the minimum impulse length is not extended.
Mounting distance	Distance between sensors (in diffuse sensors between the emitted light spots on the object) to prevent optical interference. Sensors with measures to reduce optical interference are not affected by this, but if the number of 3 is exceeded, the specified mounting distance for the next sensor but one is applicable.
Mounting instructions (MAL)	Some sensors are supplied with mounting instructions (MAL) which contain detailed notes on the connection and operation of the sensor
Nominal range Sn	The guaranteed maximum switching distance of retro-reflective sensors under ideal conditions (at +25° C, not soiled, sensors adjusted to each other).
NPN output	Binary open collector switching output with NPN transistor switching to 0 V. Consequently the load current flows from the switching output through the load resistance to +Vs. A suppressor diode is integrated and also an internal load resistor of approx. 10 … 50 kOhm for measurement purposes.
Off delay	Output function which extends the light-switched state of a binary sensor by a specific time. As a result, the light-switched output drops out later and the dark-switched output is switched after a delay.
On delay	Output function which extends the dark-switched state of a binary sensor by a specific time. As a result the light-switching output switches after a delay and the dark-switching output will drop out later.
OneBox Design	*OneBox Design* stands for a new Baumer housing design. Baumer *NextGen* sensors feature the same dimensions, through holes and control elements for all sensor principles and technologies within the series.
One Inch Class	Compact sensor for one-inch mounting hole spacing is ideally suited for systems with extremely tight spaces..

Optical fiber

Cable made of glass or plastic fibers which conveys the light of a photoelectric sensor and enables the detection of an object at a constrained point due to its small size.

Optical interference

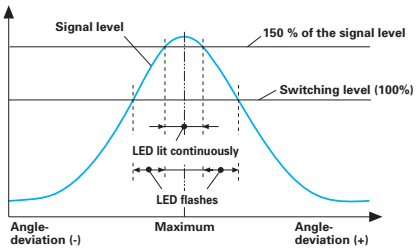
Without countermeasures, pulsed light sources which illuminate the same point on an object can overlap, which can cause switching errors. Sensors which are insensitive to optical interference use methods by which the pulses can evade each other and minimize situations in which switching errors are possible. These methods allow operation of up to 3 sensors in the same operating range, i.e. each sensor may «see» 2 interfering neighbors. The method becomes more reliable the better the neighboring sensors can be «seen», enabling the evasion algorithms to be suitably adjusted.

Output current

Maximum permissible current load at the outputs. Because the short-circuit protection secures all outputs together in sensors with several outputs and therefore monitors the sum of all output currents, it must be observed that the output current specification refers to this sum.

Output indicator

Visual display on the sensor, usually a yellow LED which indicates the status of the sensor receiver. LED off: receiving signal < switching threshold, LED flashing: receiving signal between 100 … 150% of the switching threshold, LED steady on: receiving signal >150% of the switching threshold.



Overvoltage protection

Protection against brief voltage surges in accordance with the standard IEC 61000-4

ParCon/PosCon **line sensor**

The line sensor is able to detect edges, widths and positions of objects without additional illumination. The measured value is issued with high accuracy as an analog value or via a serial interface.

PNP output

Binary open collector switching output with PNP transistor switching to +Vs. Consequently the load current flows from the switching output through the load resistance to 0 V. A suppressor diode is integrated and also an internal load resistor of approx. 10 … 50 kOhm for measurement purposes.

Point source LED

Form of LED in which, in contrast to conventional LEDs, the light exit is not diffuse and distributed around the entire chip, but exits from the front in a circular and therefore clearly defined shape. A very small light spot can be created in this way (ideal for diffuse sensors with background suppression), similar to a laser, but at the expense of the total light intensity.

Polarization filter

Polarization filters only allow light to pass which is polarized in a specific plane. Retro-reflective sensors with polarization filters have polarization planes at the emitter and receiver twisted towards one another by 90°, so they only detect light which is reflected by a retro-reflector and depolarized in this way. For this reason, the light beam itself is always reliably interrupted by reflective objects (which leave the polarization plane unchanged).

Glossary

proTect⊕	Unique impermeability concept – it guarantees that the sensors comply with protection class IP 68/IP 69K standards even after many temperature cycles and therefore have a long service life and high reliability.
Protection class (to IEC 60529)	**IP 65**: Protection against the penetration of dust and full protection against electrical contact. Protection against a water jet from any direction. **IP 67**: Protection against the penetration of dust and full protection against electrical contact. Protection against water when the housing is immersed in water under specific pressure and time conditions.
Pulsed light	The sensitivity of a photoelectric sensor to ambient light can substantially be reduced by using pulsed light. On the one hand, the emitter LEDs can emit a higher peak power in pulsed operation, on the other, this makes differential measurement possible during which the difference in the received light with the light source switched on or off can be evaluated and non-pulsed light can be effectively compensated.
Push-pull output	Compared to the open collector output variants PNP (= load virtually 0V) and NPN (= load virtually +Vs), the push-pull output enables random switching of the load within the limits of the supply voltage. However, compared to the above named open collector output variants, it is not admissible to connect outputs in parallel.
qTarget™	The Baumer design aligns the sensor's light beam to the fixing holes. This will not only compensate tolerances between individual components but ensures consistent alignment accuracy within the complete sensor series.
qTeach™	With *qTeach* we are introducing a new, convenient and wear-free teach procedure. Teaching of O500 sensors is just by a touch with any ferromagnetic tool. A blue LED light provides clear optical feedback. To prevent user errors, *qTeach* locks autonomously after 5 minutes.
Range sensor	Diffuse sensor with a switching output where two switching points can be set. This makes it possible to detect the presence of an object within a specified distance range.
Red light	Standard light color in the visible range, also suitable for use with plastic optical fibers. Advantage: due to its visibility, this improves the adjustment and monitoring of the application.
Reflection foil	See «(Retro-) reflector»
Relative receiving signal	The relative receiving signal is specified in diffuse sensors operating by the intensity difference principle. This signal represents the signal level received from a white object as a function of the distance. With the aid of this diagram, it is possible to determine the sensing distance for an object which is not white. The correction factor of the respective material is required for this purpose.
Release delay	Output function which extends the light-switched state of a binary sensor by a specific time. The light-switched output thereby opens later and the dark-switched output is switched after a delay.

Glossary

Release time	The minimum time required for an object to have left the scanning range to cause a change in the output state. This change in state is immediate, unless a signal processing time is also specified by which this change in state is further delayed. Compliance with this release time is conditional on the switching threshold falling by max. 50%. If it is necessary for the sensor to take measures to reduce interference with other sensors, this time may be extended by up to 50 µs.
Reproducibility (Repeat accuracy)	Max. deviation between two measurements under identical conditions (object position, soiling, temperature, duty cycle)
Residual ripple	Maximum proportion of alternating current which may be superimposed on the DC voltage supply with the momentary values remaining within the specified voltage supply range. Specified as a percentage of the mean value of +Vs.
Resolution	The smallest possible change in the measured value to cause a discernible change in the output signal.
Response time	The minimum time required for an object to be within the sensing distance to cause a change in the output state. This change in state is immediate, unless a signal processing time is also specified by which this change in state is further delayed. Compliance with this response time is conditional on an excess gain of at least 50% (the output indicator does not flash). If it is necessary for the sensor to take measures to reduce interference with other sensors, this time may be extended by up to 50 µs.
(Retro-) reflector	Reflector that casts light back in the direction of incidence and as a result, in contrast to a mirror, requires no exact alignment. They are available in the form of a triple reflector or reflective film.
Reverse polarity protection	Protection against reverse polarity is generally ensured between any connections of the sensor unless otherwise specified (e.g. only supply connections).
Safety concept	The safety concept defines the technical, instructional and legal measures which ensure the user (machine manufacturer, owner, user) a high degree of safety when handling our components. The safety concept also serves as the basis for the CE marking of our products and can be obtained in German, English or French.
Sensing range Tb	The sensing range Tb ranges between the adjusted sensing distance and the blind region. The blind region defines the range immediately in front of the sensor where an object cannot be reliably detected. The sensing distance is therefore the distance where an object (Kodak white) is reliably detected.
Sensing distance Tw	The sensing distance Tw is the maximum achievable distance of a diffuse sensor measured at +25° C on white paper (Kodak Card No. 1 527 795) size 200 x 200 mm. At a maximum sensing distance of under 400 mm, the reference paper size is 100 x 100 mm. The excess gain necessary for reliable operation under ideal conditions (50%) is already included. Sensors with adjusting aids indicate this point by a continuously lit reception indicator.
Sensitivity adjustment	Sensors operating with intensity difference or as retro-reflective sensors may have adjustable sensitivity. The sensitivity can then be adjusted to the application using a potentiometer or by teach-in.

Glossary

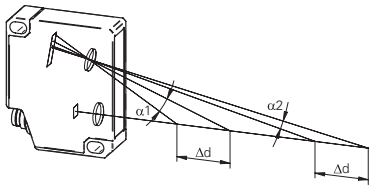
Sensor standard	The sensor standard IEC60947-5-2 forms the basis for all type tests on photoelectric sensors.
Shape-based	Sensor class which detects specific features of shape, e.g. edges, the height of newspaper copies, etc. The distance, received light intensity, colors or gray scales are secondary.
Short circuit protection	In optical sensors, short circuit protection is clocked (switches the output off for approx. 20 ms), self-resetting (attempts to switch the output again after the shut-off time has elapsed) and start-delayed (to handle capacitive loads of up to 50 nF occurring with longer cables).
Signal processing time	Delay between the detection of the future output state and its transmission to the output caused by signal processing. This has no effect on the maximum measurement frequency!
Smallest object	If the optical prerequisites for the detection of small objects are fulfilled, i.e. a sufficient signal difference exists, the following generally applies to the detection of moving objects with diffuse sensors: time in the scanning range > response time. For retro-reflective sensors: time in the scanning range > release time. The time in the scanning range te can be calculated by: te = distance in the scanning range/object speed
SmartReflect light barriers	Light barriers without reflectors. See section on SmartReflect light barriers.
Soiled lens indicator	See «Output indicator»
Start pulse suppression	Start pulse suppression suppresses undefined states during the starting phase by disabling all outputs during the first 20 ms after the voltage supply was switched on.
Switching hysteresis	Switching hysteresis is employed to prevent the normal fluctuations of the measured value close to the switching points of binary outputs from producing uncertain switching states (oscillating) at the output. A higher switching threshold to switch on the sensor is adjusted than to switch it off, resulting in a difference between the distances for switching on and off.
Teach-in	Electronic teaching of an operating parameter (e.g. sensitivity adjustment) by pressing a button or via an external teach-in input. The «static teach-in» function is available as a standard feature. During teach-in the on position and off position are taught in and the sensor calculates the optimum switching point from this. The on position is always used as a normally open function and the off position always as a normally closed function. There is also a «dynamic teach-in» function, during which the maximum and minimum values of the results measured over a desired time are analyzed and an optimum switching threshold for this situation is automatically adjusted afterwards.
Teach-input external	See «Teach-in».
Temperature drift	In photoelectric sensors, the emitter light sources (apart from laser diodes), receiver elements and amplifiers are subject to certain thermal effects. This dependency of the measured values on the temperature is specified by the designation «temperature drift».

Test input

Some sensors provide a means of switching off the emitter for a function test by activating an input. If the sensor was previously switched to light, the output of the sensor must consequentially change to the dark switching state

Triangulation principle

Measuring principle used in diffuse sensors with background suppression and in distance-measuring sensors. The emitter, the object and the receiver form a triangular arrangement. The receiver is designed to enable measurement of the angle between the beams from the emitter to the object and from the object to the receiver. This angle depends on the distance to the object, which is determined by the position at which the received beam strikes the receiver element.



UL test mark

The UL mark on a product indicates that samples of the complete product were tested by UL according to nationally acknowledged safety standards, that they are free from unacceptable, foreseeable risks such as fire, electric shocks and similar hazards and that the product was manufactured under UL supervision. Most products from Baumer electric are UL-listed. The file with the listed products can be viewed at HYPERLINK "http://www.ul.com/database.

Voltage supply range

The voltage supply must be within a specified voltage supply range at all times to ensure the correct function of the sensor.

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