Baumer
Passion for Sensors

Sensors for object detection and distance measurement

Product overview

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 2700 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

Object dectection

Inductive proximity switches
Cylindrical housings 6
Rectangular housings 8
Application-specific inductive sensors 10

Capactive sensors
Capacitive proximity sensors in metal housings 16
Capacitive proximity sensors in plastic housings 17

Light barriers and light sensors
Subminiature and miniature sensors 18
Standard sensors – Rectangular and cylindrical 22
Sensors with extra power – O300/O500 24
Laser sensors 26
Light barriers without reflector – *SmartReflect*® 30
Transparent detection 34
Washdown design 38
Hygenic design 39
Fork and angle sensors 40
Differential, contrast and color sensors 42

Fiber optic sensors and fiber optic cables
Plastic fiber optic sensors and fiber optic cables 44
Glass fiber optic sensors and fiber optic cables 46

Ultrasonic sensors – the most versatile object detection
Miniaturized ultrasonic sensors 49
Robust ultrasonic sensors with flexilbe parameterization 49
Ultrasonic sensors with Teach button 50
High-speed sensors / Chemically robust sensors 52
Sensors with sonic nozzles / Large sensing distances 53

Magnetic and cylinder sensors
Magnetic proximity sensors 54
Cylinder sensors 55
Analog magnetic rotary encoders 57
Hall / speedsensors 58

Edge measurement and detection
Edge measurement 60
Copy counters *SCATEC*® 62

Precision mechanical switches *My-Com*®
Cylindrical and rectangular housings 64

Distance measurement

Optical distance sensors
Minature sensors 68
High performance sensors 69
Sensors for long measuring range and standard sensors 70
Sensors in hygienic and washdown design 72

Radar sensors
Radar sensors 74

Ultrasonic distance sensors
Minature sensors 76
Robust distance sensors with flexible parameterization 77
Ultrasonic sensors with Teach button 78
Chemically robust sensors / for off-highway machinery 80
With sonic nozzles / long ranges 81

Inductive distance sensors – *AlphaProx*®
Cylindrical housings 82
Rectangular housings 84
Linearized characteristic curve 86
Sensors with reduction factor 1 87
High-precision and high-sensitivity sensors 88
Robust sensors / Designed for Reliability 89
Sensors with IO-Link interface 90

Linear magnetisc encoders
Dimension 92

Measuring wheel encoders
Measuring wheels 94
Incremental encoders 95

Cable transducers
Absolute cable transducers 96

Accessories

Cables & adapters, mounting accessories 98
Testing and parameterization, network components 99
Reflectors & beam columnators 100
Magnets 101

Inductive proximity switches

Cylindrical inductive proximity switches for factory automation

The proven solution for safe, non-contact detection of metal objects

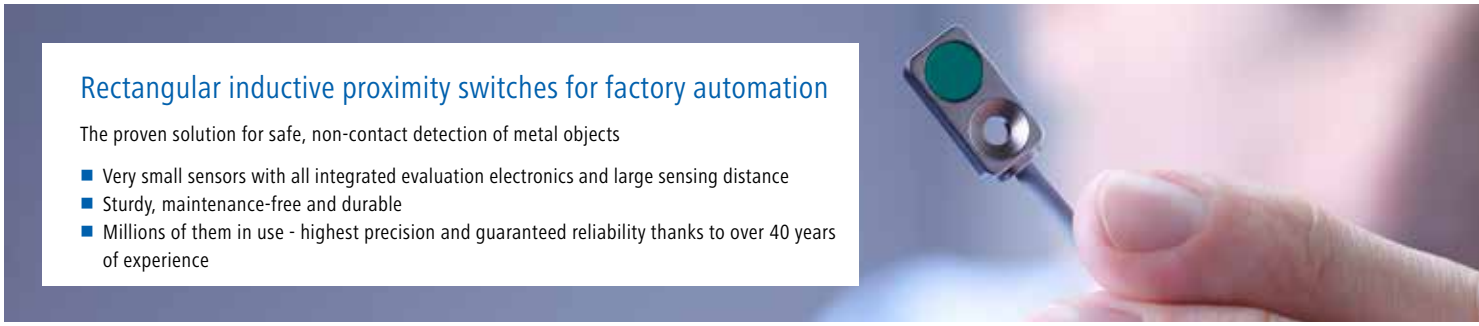
- Very small sensors with all integrated evaluation electronics and large sensing distance
- Sturdy, maintenance-free and durable
- Always the right sensor thanks to a wide variety of variants

	IFRM 03 external electronics	IFRM 03	IFRM 04 Thread	IFRM 04	IFRM 05
category	Subminiatur	Subminiatur	Subminiatur	Subminiatur	Subminiatur
dimensions	ø 3 mm	ø 3 mm	M4	ø 4 mm	M5
housing length	12 mm	from 12 mm	from 22 mm	from 15 mm	from 15 mm
nominal sensing distance Sn	0,8 mm	0,8 ... 1 mm	0,8 mm	1 ... 1,6 mm	1 ... 1,6 mm
switching frequency	3 kHz	to 4 kHz	3 kHz	to 5 kHz	to 5 kHz
output signal	PNP NPN	PNP NPN	PNP NPN	PNP NPN	PNP NPN
connection types	flylead connector M8 (electronics in connector)	cable 2 m flylead connector M8 wires	cable 2 m flylead connector M8	connector M5 connector M8 cable 2 m flylead connector M8 wires	connector M5 connector M8 cable 2 m flylead connector M8 wires
housing material	stainless steel	stainless steel	stainless steel	stainless steel	stainless steel
operating temperature	–25 ... +75 °C	–25 ... +75 °C –10 ... +70 °C	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C
protection class	IP 67	IP 67	IP 67	IP 67	IP 67
specific features					

Cylindrical inductive proximity switches for factory automation

IFRM 06 IR06.PxxS	IFRM 08 IR08.PxxS	IFRM 12 IR12.PxxS	IFRM 18 IR18.PxxS	IFRM 30 IR30.PxxS
Sub-/Miniatur	**Sub-/Miniatur**	**Compact**	**Compact**	**Compact**
ø 6,5 mm	M8	M12	M18	M30
from 22 mm	from 18 mm	from 30 mm	from 35 mm	from 35 mm
2 ... 6 mm	2 ... 6 mm	4 ... 10 mm	8 ... 15 mm	10 ... 24 mm
to 5 kHz	to 5 kHz	to 2 kHz	to 500 Hz	to 500 Hz
PNP NPN	PNP NPN	PNP NPN	PNP NPN	PNP NPN
connector M8 cable 2 m flylead connector M8	connector M8 connector M12 cable 2 m flylead connector M8	connector M8 connector M12 cable 2 m	connector M8 connector M12 cable 2 m	connector M12 cable 2 m
stainless steel	stainless steel	brass nickel plated	brass nickel plated	brass nickel plated
–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C 0 ... +65 °C	–25 ... +75 °C
IP 67	IP 67	IP 67	IP 67	IP 67
		■ variants with antivalent output (NO & NC)	■ variants with antivalent output (NO & NC)	■ variants with antivalent output (NO & NC)

Inductive proximity switches



Rectangular inductive proximity switches for factory automation

The proven solution for safe, non-contact detection of metal objects

- Very small sensors with all integrated evaluation electronics and large sensing distance
- Sturdy, maintenance-free and durable
- Millions of them in use - highest precision and guaranteed reliability thanks to over 40 years of experience

	IFFM 08	IFFM 04	IFFM 06	IFFM 08
category	Subminiatur	Subminiatur	Miniatur	Miniatur
dimensions (B × T × L)	8 × 4,7 × 16 mm	4 × 4 × 22 mm	6 × 6 × 20 ... 30 mm	8 × 8 × 20 ... 60 mm
nominal sensing distance Sn	2 mm	0,8 mm	1 mm	2 mm
switching frequency	5 kHz	3 kHz	5 kHz	5 kHz
output signal	PNP NPN	PNP NPN	PNP NPN	PNP NPN
connection types	cable 2 m flylead connector M8	cable 2 m	connector M5 cable 2 m	connector M8 cable 2 m flylead connector M8
housing material	die-cast zinc nickel plated	stainless steel	brass nickel plated	brass nickel plated die-cast zinc nickel plated
operating temperature	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C
protection class	IP 67	IP 67	IP 67	IP 67
specific features	■ extra flat design (4.7 mm)			

Rectangular inductive proximity switches for factory automation

IFFM 12	IFFM 20
Compact	Compact
12 × 8 × 28 mm	20 × 10 × 41 mm
4 mm	5 ... 8 mm
2 kHz	to 1 kHz
PNP NPN	PNP NPN
connector M5	connector M8
brass nickel plated	brass nickel plated
–25 ... +75 °C	–25 ... +75 °C
IP 67	IP 67

Inductive proximity switches

Application-specific inductive sensors – Outdoor / high temperature

- Rugged Outdoor and Washdown sensors
- High shock and vibration resistance
- Sensors with extended temperature range up to 180 °C

Outdoor / Washdown	**IFRM 12 / 18** **Outdoor**	**IFRR 08 / 12 / 18** **Washdown**
features	■ Rugged stainless steel (V4A) or all-metal housing ■ IP 69K long-term seal – *proTect+* ■ High signal quality in an extended temperature range	
dimensions	M12 / M18	M8 / M12 / M18
nominal sensing distance Sn	6 ... 12 mm	3 ... 12 mm
switching frequency	0,4 ... 2 kHz	0,5 ... 3 kHz
housing material	brass nickel plated	stainless steel 1.4404 (V4A)
operating temperature	–40 ... +80 °C	–40 ... +80 °C
protection class	IP 67	IP 68/69K & *proTect+*
specific features		■ Ecolab-tested ■ FDA-compliant ■ Vibration resistance EN 61373: 2010 (category 3) ■ Shock resistance EN 61373: 2010 (category 3)

High temperature up to +180 °C	**IFRM 06 / 08 / 12** **High temperature up to +100 °C**	**IFRD 06 / 08 / 12 / 18** **High temperature up to +100 °C** **Full metal housing (*DuroProx*)**	**IFRH 06 / 08 / 12** **High temperature up to +180 °C** **with separated electronics**
features	■ Sensors with extended temperature range up to 180 °C ■ Versions with integrated and separate evaluation electronics ■ High switching frequencies		
dimensions	ø 6,5 mm / M8 / M12	ø 6,5 mm / M8 / M12 / M18	M8 / M12 / M18
nominal sensing distance Sn	2 ... 4 mm	2 ... 6 mm	1,5 ... 5 mm
switching frequency	2 ... 5 KHz	100 ... 150 Hz	1 ... 4 kHz
housing material	stainless steel brass nickel plated	stainless steel 1.4404 (V4A)	stainless steel brass nickel plated
operating temperature	–25 ... +100 °C	–25 ... +100 °C	–25 ... +180 °C
protection class	IP 67	IP 68 / IP 69K	IP 67

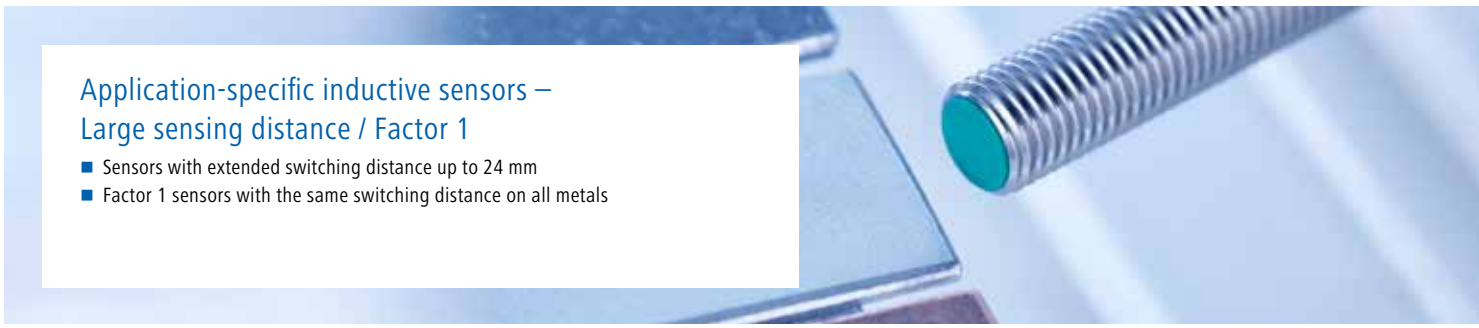
Application-specific inductive sensors – High pressure / magnetic field

- Pressure resistant up to 500 bar
- Immune to welding and magnetic fields up to 90 mT

High pressure resistant sensors	IFRP 12	IFRP 16	IFRP 18
features	■ Pressure resistant up to 500 bar ■ Sensor surface made of zirconium oxide (ZrO2/ceramics) ■ High switching frequencies		
dimensions	M12	M16	M18
nominal sensing distance Sn	2 mm	2 mm	2 mm
switching frequency	5 kHz	3 kHz	3 kHz
housing material	stainless steel	stainless steel	stainless steel
sensing face	ZrO2 / ceramic	ZrO2 / ceramic	ZrO2 / ceramic
operating temperature	–25 ... +80 °C	–25 ... +80 °C	–25 ... +80 °C
protection class	IP 68/67	IP 68/67	IP 68/67

Sensors immune to welding and magnetic fields	IFRW 12	IFRW 18
features	■ For magnetic fields up to 90 mT ■ PTFE-coated front ■ Chrome-plated brass housing ■ Resistant to welding sparks	
dimensions	M12	M18
nominal sensing distance Sn	2 mm	5 mm
switching frequency	1 kHz	500 Hz
housing material	brass chromium plated	brass chromium plated
sensing face	PTFE-coated	PTFE-coated
operating temperature	–25 ... +75 °C	–25 ... +75 °C
protection class	IP 67	IP 67

Inductive proximity switches

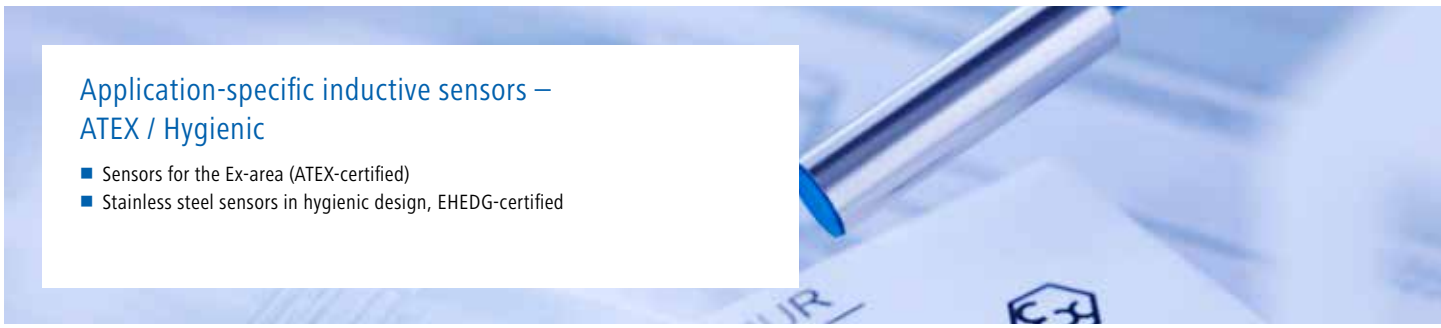


Application-specific inductive sensors – Large sensing distance / Factor 1

- Sensors with extended switching distance up to 24 mm
- Factor 1 sensors with the same switching distance on all metals

Large sensing distance	IR06.P03S IR06.P06S	IR08.P03S IR08.P06S	IR12.P06S IR12.P10S	IR18.P12S IR18.P15S	IR30.P18S IR30.P24S
category	Miniatur	Miniatur	Compact	Compact	Compact
features	■ Large installation tolerances ■ Enhanced protection against mechanical damage ■ Cylindrical designs from Ø6.5 mm to M30 ■ Flush and non-flush variants				
dimensions	ø 6,5 mm	M8	M12	M18	M30
nominal sensing distance Sn	3 / 6 mm	3 / 6 mm	6 / 10 mm	15 / 18 mm	18 / 24 mm
switching frequency	2 kHz	2 kHz	1 kHz	400 Hz	500 Hz
housing material	stainless steel	stainless steel	brass nickel plated	brass nickel plated	brass nickel plated
operating temperature	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C 0 ... +65 °C	–25 ... +75 °C
protection class	IP 67	IP 67	IP 67	IP 67	IP 67

Factor 1	IR06.P02F	IR08.P02F	IR12.P04F	IR18.P06F IR18.P08F
category	Miniatur	Miniatur	Compact	Compact
features	■ Detection of stainless steel, aluminum and non-ferrous metals with the same sensing distance ■ High switching frequencies up to 3 kHz			
dimensions	ø 6,5 mm	M8	M12	M18
housing length	40 / 46 mm	40 / 46 mm	40 / 50 mm	50 / 60 mm
nominal sensing distance Sn	2 mm	2 mm	4 mm	6 / 8 mm
switching frequency	3 kHz	3 kHz	2 kHz	500 Hz
housing material	stainless steel	stainless steel	brass nickel plated	brass nickel plated
operating temperature	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C
protection class	IP 67	IP 67	IP 67	IP 67



Application-specific inductive sensors – ATEX / Hygienic

- Sensors for the Ex-area (ATEX-certified)
- Stainless steel sensors in hygienic design, EHEDG-certified

ATEX	IFR10.82	IFRM 06X IFRM 08X	IFRM 12	IFRM 12X IFRM 18X
category	Sub-Miniatur Circuit board mountable	Miniatur	Compact	Compact
features	■ For environments with flammable gas or dust ■ ATEX certified ■ High repeat accuracy < 0.01 mm ■ Compact design			
dimensions	10 mm	ø 6,5 mm / M8	M12	M12 / M18
nominal sensing distance Sn	2 mm	1,5 mm	4 mm	2 ... 8 mm
switching frequency	2 kHz	5 kHz	2 kHz	to 2 kHz
output circuit	NAMUR	NAMUR	PNP / NPN	NAMUR
operating temperature	–25 ... +75 °C	–20 ... +60 °C	–25 ... +65 °C	–20 ... +60 °C
protection class	IP 67	IP 67	IP 67	IP 67
approvals/certificates	ATEX 3G	ATEX 1G	ATEX 3D	ATEX 1G

Hygienic design	IFBR 06	IFBR 11	IFBR 17
category	Miniatur	Compact	Compact
features	■ FDA compliant materials – EHEDG certified ■ High chemical resistance – Ecolab tested and LCP front cap ■ IP 68K long-term seal – *proTect+* ■ Flush and non-flush housings		
dimensions	ø 6,5 mm	ø 11 mm	ø 17 mm
nominal sensing distance Sn	3 mm	4 mm (flush) 6 mm (non-flush)	8 mm (flush) 12 mm (non-flush)
switching frequency	3 kHz	1 kHz	500 Hz
housing material	stainless steel 1.4404 (V4A)	stainless steel 1.4404 (V4A)	stainless steel 1.4404 (V4A)
operating temperature	–40 ... +80 °C, cleaning temperature to +100 °C	–40 ... +80 °C, cleaning temperature to +100 °C	–40 ... +80 °C, cleaning temperature to +100 °C
protection class	IP 68/69K & *proTect+*	IP 68/69K & *proTect+*	IP 68/69K & *proTect+*

Inductive proximity switches

Application-specific inductive sensors – Marine / for off-highway-machinery

- Inductive proximity switches for off-highway machinery – designed for reliability
- DNV-GL certified marine sensors

For off-highway-machines	IR12V.04S	IR18V.08S
category	**compact**	**compact**
features	■ Designed for Reliability ■ Versions with flylead connector German ■ EN 13309, EN ISO 14982:2009, ISO 13766:2006	
dimensions	M12	M18
nominal sensing distance Sn	4 mm	8 mm
switching frequency	2 kHz	450 kHz
housing material	brass nickel plated	brass nickel plated
operating temperature	–40 ... +85 °C	–40 ... +85 °C
protection class	IP 68 / IP 69K (face)	IP 68 / IP 69K (face)

Marine	IR12.P04S	IR18.P10S
category	**compact**	**compact**
features	■ Versions with diagnostic input ■ Marine type approval (according to DNVGL-CG-0339)	
dimensions	M12	M18
nominal sensing distance Sn	4 mm	10 mm
switching frequency	1 kHz	800 kHz
housing material	stainless steel 1.4404 (V4A)	brass nickel plated, chromium plated
operating temperature	–40 ... +75 °C	–40 ... +75 °C
protection class	IP 67	IP 67
specific features		■ Ecolab-tested ■ FDA-compliant ■ Vibration resistance EN 61373: 2010 (category 3) ■ Shock resistance EN 61373: 2010 (category 3)

Application-specific inductive sensors

Capacitive sensors

Capacitive proximity sensors

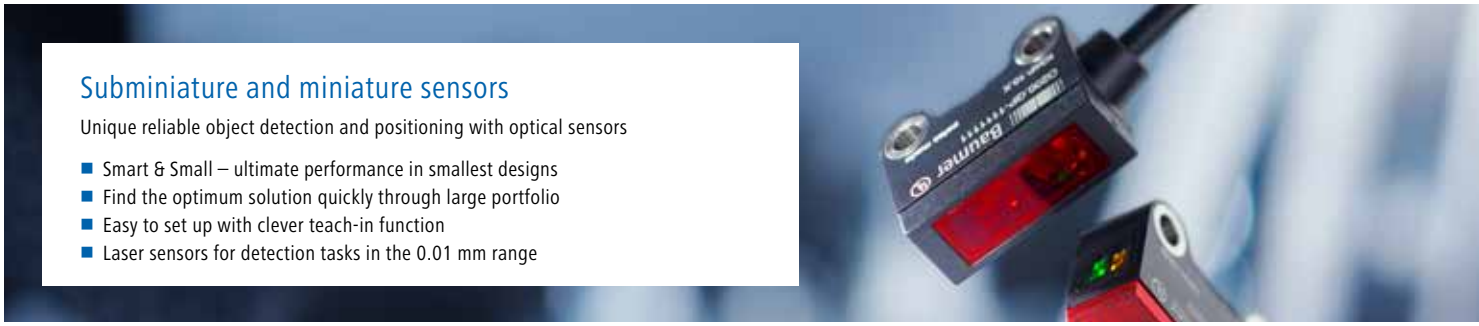
For level detection of liquids or granules as well as non-conductive objects.

- High switching distance up to 15 mm even through non-metallic walls
- Absolutely reliable even when interfered by ambient conditions, e.g. ambient light or dirt
- Reliable detection even of wafers, PCBs and paper stacks

	CFAM 12	CFAM 18	CFAM 30	CFBM 20
category	cylindrical	cylindrical	cylindrical	rectangular
function				
detection of non-conductive media	■	■	■	■
liquids in direct contact				
fill level detection through container	■	■	■	■
object detection / buld goods	■	■	■	■
dimensions / height	M12	M18	M30	20 × 35 × 12 mm
housing length	60 mm with cable 76 mm with connector	64 mm with cable 78,4 mm with connector	71 mm with cable 82 mm with connector	35 mm
nominal sensing distance Sn	4 mm	8 mm	15 mm	5 mm
switching frequency	50 Hz	50 Hz	50 Hz	50 Hz
output signal	PNP NPN	PNP NPN	PNP NPN	PNP NPN
connection types	cable 2 m connector M12	cable 2 m connector M12	cable 2 m connector M12	connector M8
housing material	brass nickel plated	brass nickel plated	brass nickel plated	brass nickel plated
operating temperature	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C
protection class	IP 65	IP 65	IP 65	IP 65
specific features	■ potentiometer	■ potentiometer	■ potentiometer ■ flush installation	■ fixed switching distance ■ flush installation

CFAK 12 with cap	CFAK 12	CFAK 18	CFDK 30	CFDK 25
cylindrical	cylindrical	cylindrical	rectangular	rectangular flat design
		■	■	
		■	■	■
■	■	■		
		■	■	
M12	M12	M18	30 × 65 × 18,5 mm	25 × 52,4 × 6 mm
39,5 mm	39 mm	63,5 mm		
0,1 mm	0,5 mm	2 ... 15 mm	4 ... 15 mm	2 ... 15 mm
15 Hz	15 Hz	50 Hz	50 Hz	35 Hz
PNP NPN	PNP NPN	PNP NPN	PNP NPN	push-pull
cable 2 m flylead connector M8	cable 2 m	cable 2 m	cable 2 m connector M12	cable 2 m flylead connector M8
POM EPDM50	PBT	PBT	PBT	PA 12
0 ... +50 °C	0 ... +70 °C	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C
IP 67	IP 67	IP 67 / IP 65	IP 65	IP 65
■ level sensor for contaminated media		■ potentiometer	■ potentiometer	■ switching distance fix by default ■ mounting flexibility thanks to innovative mounting frame

Light barriers and light sensors



Subminiature and miniature sensors

Unique reliable object detection and positioning with optical sensors

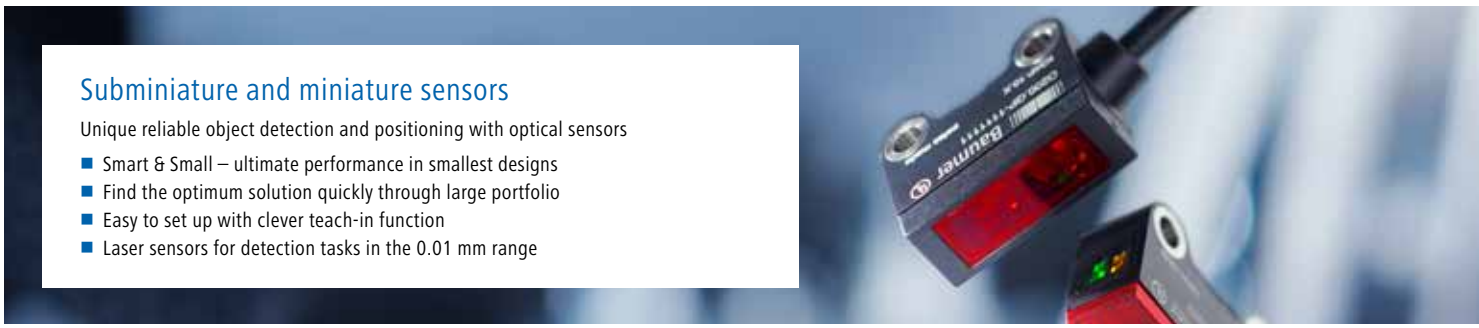
- Smart & Small – ultimate performance in smallest designs
- Find the optimum solution quickly through large portfolio
- Easy to set up with clever teach-in function
- Laser sensors for detection tasks in the 0.01 mm range

x = function principle y = light source	FHDK 04	FxDK 07 FxCK 07	FxDM 08	FxAM 08
features	■ Mounting in rails ■ Fix sensing distance	■ World's smallest adjustable sensor family	■ Fix sensing distance ■ Robust metal housing	■ Fix sensing distance
dimensions (B × H × T)	4 × 44,8 × 6,2 mm	8 × 16,2 × 10,8 mm	8 × 58 × 12 mm	M8 × 56 mm
function principle (x) / ranges				
diffuse sensors with background suppression	**30 mm / 50 mm** (FHDK 14)	**10 ... 60 mm** (FHDK 07 / FHCK 07)		
diffuse sensor with background suppression		**20 ... 150 mm** (FZDK 07 / FZCK 07)	**40 mm / 80 mm** (FZDM 08)	**40 mm / 80 mm** (FZAM 08)
SmartReflect® light barriers without reflector		**17 ... 45 mm** (FNCK 07)		
SmartReflect® transparent				
retro-reflective sensors		**800 mm** (FPDK 07 / FPCK 07)		
transparent detection without reflector				
through beam sensors		**2,5 m** (FSDK 07 / FSCK 07) (FEDK 07 / FECK 07)	**1 m / 3 m** (FSDM 08 / FEDM 08)	**3 m** (FSAM 08 / FEAM 08)
light source (y)				
standard LED (R)	■	■		
pinPoint LED (P)				
infrarot (I)			■	■
laser (L)				
response time	< 0,5 ms	< 0,5 ms	< 1 ms	< 2,5 ms
output	push-pull	PNP NPN	PNP	PNP
connection types	cable 2 m flylead connector M8	cable 2 m flylead connector M8	cable 2 m connector M8	cable 2 m connector M8
housing material	plastic	plastic	aluminium	brass nickel plated
operating temperature	–10 ... +50 °C	–20 ... +50 °C	–25 ... +65 °C	–25 ... +65 °C
protection class	IP 65	IP 65	IP 65	IP 65

IO-Link

O200.xy	FxDK 10 OxDK 10 (laser)	FxDM 12 OxDM 12 (laser)	FxAM 12
■ V-optics for shiny objects and High-Power-Mode for very dark objects	■ Different beam cones optimized for the application	■ Sensing distance adjustable ■ Sensors with single lens optics	■ Sensitivity adjustable with potentiometer
8 × 21 × 14,1 mm	10,4 × 27 × 14 mm	12,4 × 35 × 35 mm	M12 × 70,5 mm
10 ... 120 mm	**10 ... 130 mm** (FHDK 10 / OHDK 10)	**15 ... 300 mm** (FHDM 12 / OHDM 12)	
	3 ... 200 mm (FZDK 10 / OZDK 10)		**30 ... 200 mm** (FZAM 12)
25 ... 180 mm			
4 m	**4 m** (FPDK 10)	**8 m** (FPDM 12 / OPDM 12)	
6 m	**10 m** (FSDK 10 / FEDK 10) (OSDK 10 / OEDK 10)	**7,5 m** (FSDM 12 / FEDM 12)	
■	■	■	
■			
			■
	■	■	
< 0,25 ms	< 0,5 ms < 0,05 ms (Laser)	< 1 ms < 0,05 ms (laser)	< 1 ms
push-pull PNP NPN	push-pull PNP NPN	PNP NPN	PNP
cable 2 m connector M8	cable 2 m connector M8 flylead connector M8	cable 2 m connector M8	cable 2 m connector M12
plastic	plastic	die-cast zinc	brass nickel plated
–25 ... +50 °C	–25 ... +65 °C –10 ... +50 °C (laser)	–25 ... +65 °C –20 ... +50 °C (laser)	–25 ... +65 °C
IP 67	IP 65 / IP 67	IP 67	IP 65

Light barriers and light sensors



Subminiature and miniature sensors

Unique reliable object detection and positioning with optical sensors

- Smart & Small – ultimate performance in smallest designs
- Find the optimum solution quickly through large portfolio
- Easy to set up with clever teach-in function
- Laser sensors for detection tasks in the 0.01 mm range

IO-Link

IO-Link

x = function principle y = light source	O300.xy	O300.xy Line	OHDM 13 (laser)
features	■ Setting via wear-free *qTeach*® or IO-Link	■ Up to 100 mm long time	■ Sensing distance adjustable
dimensions (B × H × T)	12,9 × 32,3 × 23 mm	12,9 × 32,3 × 23 mm	13,4 × 48,2 × 40 mm
function principle (x) / ranges			
diffuse sensors with background suppression	**30 ... 300 mm** (O300.Gy)	**30 ... 180 mm** (O300.Gy)	**50 ... 550 mm** (OHDM 13)
diffuse sensor with background suppression	**10 ... 400 mm** (O300.Zy)		
SmartReflect® light barriers without reflector	**30 ... 300 mm** (O300.Sy)	**30 ... 120 mm** (O300.Sy)	
SmartReflect® transparent	**30 ... 300 mm** (O300.SP.T)		
retro-reflective sensors	**6 m** (O300.Ry)		
transparent detection without reflector	**4 m** (O300.RP.T)		
through beam sensors	**15 m** (O300.Ty / O300.Ey)		
light source (y)			
standard LED (R)	■	■	
pinPoint LED (P)	■	■	
infrarot (I)	■		
laser (L)	■	■	■
response time	< 0,25 ms < 0,1 ms (laser)	< 1,5 ms	< 5 ms
output	push-pull PNP NPN	push-pull	PNP NPN
connection types	cable 2 m connector M8 flylead connector	cable 2 m connector M8	connector M8
housing material	plastic	plastic	aluminum
operating temperature	–25 ... +60 °C –10 ... +60 °C (laser)	–25 ... +60 °C –10 ... +60 °C (laser)	0 ... +50 °C
protection class	IP 67	IP 67	IP 67

Light barriers and light sensors

Standard sensors – rectangular and cylindrical

Unique reliable object detection and positioning with optical sensors

- Find the optimum solution quickly through large portfolio
- Easy to set up with clever teach-in function
- Extremely accurate object positioning with 0.01 mm precision

x = function principle y = light source	FxDK 14 OxDK 14 (laser)	FxDM 16 OxDM 16 (laser)	OR18.xy	OR18.GR.F
features	■ Sensors for transparent objects	■ Laser sensors for wafer detection	■ Setting via potentiometer, teach-in or *qTeach*	■ Fixed Focus
dimensions (B × H × T)	14,8 × 43 × 31 mm	15,4 × 50 × 50 mm	M18	M18 × 48,3 mm
function principle (x) / ranges				
diffuse sensors with background suppression	**20 ... 500 mm** (FHDK 14 / OHDK 14)	**20 ... 600 mm** (FHDM 16 / OHDM 16)	**40 ... 200 mm** (OR18.Gy)	**50 mm** (OR18.GR.F)
diffuse sensors with intensity difference	**5 ... 600 mm** (FZDK 14 / OZDK 14)	**0 ... 400 mm** (FZDM 16 / OZDM 16)	**0 ... 800 mm** (OR18.ZI)	
SmartReflect® light barriers without reflector	**50 ... 800 mm** (FNDK 14)		**55 ... 300 mm** (OR18.SP)	
SmartReflect® transparent				
retro-reflective sensors	**11 m** (FRDK / FPDK / OPDK 14)	**12 m** (FPDM 16 / OPDM 16)	**16 m** (OR18.RR)	
transparent detection without reflector			**800 mm** (OR18.RR.T)	
through beam sensors	**15 m** (FSDK 14 / FEDK 14) (OSDK 14 / OEDK 14)		**60 m** (OR18.TI / OR18.EI)	
light source (y)				
standard LED (R)	■	■	■	■
pinPoint LED (P)			■	
infrarot (I)			■	
laser (L)	■	■	■	
response time	< 0,5 ms < 0,25 ms (laser)	< 1 ms < 0,05 ms (laser)	< 0,5 ms < 0,1 ms (laser)	< 0,5 ms
output	push-pull PNP NPN	PNP NPN 4 ... 20 mA	PNP NPN	PNP NPN
connection types	cable 2 m connector M8 flylead connector M12	cable 2 m connector M12	cable 2 m connector M12 flylead connector M12	cable 2 m connector M12
housing material	plastic	die-cast zinc	plastic brass nickel plated	plastic
operating temperature	–25 ... +65 °C –10 ... +50 °C (laser)	–25 ... +65 °C –10 ... +50 °C (laser)	–25 ... +55 °C –10 ... +55 °C (laser)	–25 ... +55 °C
protection class	IP 67	IP 67	IP 67	IP 65 / IP 67

Light barriers and light sensors – rectangular and cylindrical

FxAM 18	O500.xy	OHDM 20 (Laser)	OxDK 25 (Laser)
■ Compatible with glass fibre optics	■ Setting via wear-free *qTeach*® or IO-Link	■ Light / dark operate switchable	■ Sensors with 2 output ■ *qTeach*®
M18	18 × 45 × 32 mm	20,6 × 65 × 50 mm	23,4 × 63 × 45 mm
	60 ... 550 mm (O500.Gy)	**210 ... 1500 mm** (OHDM 20)	**100 ... 1750 mm** (OHDK 25)
60 ... 430 mm (FZAM 18)	**20 ... 600 mm** (O500.Zy)		
	60 ... 600 mm (O500.SP)		**1900 mm** (ONDK 25)
	60 ... 1000 mm (O500.Sy.T)		
4 m (FPAM 18)	**8 m** (O500.Ry)		
	6 m (O500.RP.T)		
	40 m (O500.TR / O500.ER)		
■	■		
	■		
■	■		
		■	■
< 1 ms	< 0,25 ms	< 6 ms	10 ms
PNP NPN	push-pull PNP NPN	PNP	push-pull
cable 2 m connector M12	cable 2 m connector M12	connector M12	cable 2 m connector M12
brass nickel plated	plastic	die-cast zinc	plastic
–25 ... +55 °C	–25 ... +60 °C	0 ... +50 °C	0 ... +50 °C
IP 67	IP 67	IP 67	IP 67

Light barriers and light sensors

Standard with extra power – O300/O500

Unique portfolio with extra performance for your application

- Beam shape as line or point allows for the optimum application-specific solution
- Enhanced processor performance for maximum detection reliability
- Easy implementation and operation, IoT-ready

IO-Link

IO-Link

IO-Link

O300.xy x = function principle y = light source	**O300.xy**	**O300W.xy**	**O300H.xy**
features	■ Setting via wear-free *qTeach*® or IO-Link	■ Stainless steel housing in washdown design ■ Safe setting via wear-free *qTeach*® or IO-Link	■ Stainless steel housing in hygienic design ■ Safe setting via wear-free magnetic *qTeach*® or IO-Link
dimensions (B × H × T)	12,9 × 32,3 × 23 mm	16,5 × 34,7 × 28,2 mm	16,5 × 34,6 × 28,7 mm
function principle (x) / ranges			
diffuse sensors background suppression (G)	**30 ... 300 mm** (O300.Gy)	**30 ... 250 mm** (O300W.Gy)	**30 ... 250 mm** (O300H.Gy)
diffuse sensors with intensity difference (Z)	**10 ... 400 mm** (O300.Zy)		
SmartReflect® light barriers without a reflector (S)	**30 ... 300 mm** (O300.Sy)	**30 ... 300 mm** (O300W.Sy)	**30 ... 300 mm** (O300H.Sy)
SmartReflect® transparent (Sy.T)	**30 ... 300 mm** (O300.SP.T)	**30 ... 300 mm** (O300W.SP.T)	**30 ... 300 mm** (O300H.SP.T)
diffuse sensors (R)	**6 m** (O300.Ry)	**6 m** (O300W.Ry)	**6 m** (O300H.Ry)
retro-reflective sensors (Ry. T)	**4 m** (O300.RP.T)	**4 m** (O300W.RP.T)	**4 m** (O300H.Ry.T)
through beam sensors (T / E)	**15 ... 75 m** (O300.Ty / O300.Ey)	**15 ... 75 m** (O300W.Ty / O300W.Ey)	**15 ... 75 m** (O300H.Ty / O300H.Ey)
light source (y)			
standard LED (R)	■	■	■
pinPoint LED (P)	■	■	■
infrarot (I)	■		
laser (L)	■	■	■
response time	< 0,25 ms < 0,1 ms (laser)	< 0,25 ms < 0,1 ms (laser)	< 0,25 ms < 0,1 ms (laser)
output	push-pull PNP NPN	push-pull	push-pull
connection types	cable 2 m connector M8 flylead connector M8	connector M8	connector 2 m flylead connector M8
housing material	plastic	stainless steel, Ecolab-certified, FDA-compliant	stainless steel, Ecolab-certified, EHEDG-compliant, FDA-compliant
operating temperature	–25 ... +60 °C –10 ... +60 °C (laser)	–25 ... +60 °C –10 ... +60 °C (laser)	–25 ... +60 °C –10 ... +60 °C (laser)
protection class	IP 67	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*

	IO-Link	IO-Link	IO-Link
O500.xy x = function principle y = light source	**O500.xy**	**O500W.xy**	**O500H.xy**
features	■ Setting via wear-free *qTeach*® or IO-Link	■ Stainless steel housing in washdown design ■ Safe setting via wear-free *qTeach*® or IO-Link	■ Stainless steel housing in hygienic design ■ Safe setting via wear-free magnetic *qTeach*® or IO-Link
dimensions (B × H × T)	18 × 45 × 32 mm	20,2 × 47,2 × 37,2 mm	20,2 × 47,7 × 36,4 mm
function principle (x) / ranges			
diffuse sensors background suppression (G)	**60 ... 550 mm** (O500.Gy)	**60 ... 400 mm** (O500W.Gy)	**60 ... 400 mm** (O500H.Gy)
diffuse sensors with intensity difference (Z)	**20 ... 600 mm** (O500.Zy)		
SmartReflect® light barriers without a reflector (S)	**60 ... 600 mm** (O500.SP)	**60 ... 600 mm** (O500W.SP)	**60 ... 600 mm** (O500H.SP)
SmartReflect® transparent (Sy.T)	**60 ... 1000 mm** (O500.SP.T)	**60 ... 1000 mm** (O500W.SP.T)	**60 ... 1000 mm** (O500H.SP.T)
diffuse sensors (R)	**8 m** (O500.Ry)	**8 m** (O500W.Ry)	**8 m** (O500H.Ry)
retro-reflective sensors (Ry. T)	**6 m** (O500.RP.T)	**6 m** (O500W.RP.T)	**6 m** (O500H.RP.T)
through beam sensors (T / E)	**40 m** (O500.TR / O500.ER)	**40 m** (O500W.TR / O500W.ER)	**40 m** (O500H.TR / O500H.ER)
light source (y)			
standard LED (R)	■	■	■
pinPoint LED (P)	■	■	■
infrarot (I)	■		
laser (L)			
response time	< 0,25 ms	< 0,25 ms	< 0,25 ms
output	push-pull PNP NPN	push-pull	push-pull
connection types	cable 2 m connector M12	connector M12	cable 2 m connector M12
housing material	plastic	stainless steel, Ecolab-certified, FDA-compliant	stainless steel, Ecolab-certified, EHEDG-compliant, FDA-compliant
operating temperature	–25 ... +60 °C	–25 ... +60 °C	–25 ... +60 °C
protection class	IP 67	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*

Light barriers and light sensors

Laser sensors

Precise control of fast processes and detection of very small objects

- Very precise object positioning to within 0.01 mm
- Detection of very small objects thanks to focused 0.1 mm laser spot
- Detection of fast objects thanks to short response times of < 0.1 ms

x = function principle	OxDK 10	OxDM 12	OBDM 12 Difference sensors	OHDM 13
features	■ Different application-optimized beam shapes	■ Adjustable ranges ■ Sensors with single lens optics	■ 5 functions (e.g. window teach)	■ Adjustable ranges
dimensions (B × H × T)	10,4 × 27 × 14 mm	12,4 × 35 × 35 mm	12,4 × 37 × 34,5 mm	13,4 × 48,2 × 40 mm
function principle (x) / ranges				
diffuse sensors background suppression	**20 .. 130 mm** (OHDK 10)	**17 ... 120 mm** (OHDM 12)		**50 ... 550 mm** (OHDM 13)
diffuse sensors with intensity difference	**3 ... 150 mm** (OZDK 10)			
SmartReflect® light barriers without a reflector				
retro-reflective sensors		**8 m** (OPDM 12)		
retro-reflective sensors for transparent detection				
through beam sensors	**10 m** (OSDK / OEDK 10)			
differential sensors			**16 ... 120 mm** (OBDM 12)	
laser class	1 & 2	2	2	2
response time up	< 0,05 ms	< 0,05 ms	< 1 ms	< 5 ms
output	PNP NPN	PNP NPN	PNP NPN	PNP NPN
housing material	plastic	die-cast zinc	die-cast zinc	aluminum
operating temperature	–10 ... +50 °C	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C
protection class	IP 65 / IP 67	IP 67	IP 67	IP 67

IO-Link

IO-Link

IO-Link

OxDK 14	O300.xL	O300W.xL	O300H.xL
■ Mechanical sensing distance adjustment	■ Setting via wear-free magnetic *qTeach*® or IO-Link	■ Setting via wear-free *qTeach*® or IO-Link	■ Setting via wear-free magnetic *qTeach*® or IO-Link
14,8 × 43 × 31 mm	12,9 × 32,3 × 23 mm	16,5 × 34,7 × 28,2 mm	16,5 × 34,6 × 28,7 mm
20 ... 350 mm (OHDK 14)	**30 ... 300 mm** (O300.GL)	**30 ... 250 mm** (O300W.GL)	**30 ... 250 mm** (O300H.GL)
	10 ... 400 mm (O300.ZL)		
	30 ... 300 mm (O300.SL)	**30 ... 300 mm** (O300W.SL)	**30 ... 300 mm** (O300H.SL)
11 m (OPDK 14)	**6 m** (O300.RL)	**6 m** (O300W.RL)	**6 m** (O300H.RL)
5,2 m (OPDK 14)			
	75 m (O300.TL / O300.EL)	**75 m** (O300W.TL / O300W.EL)	**75 m** (O300H.TL / O300H.EL)
2	1	1	1
< 0,15 ms	< 0,1 ms	< 0,1 ms	< 0,1 ms
PNP NPN	PNP NPN push-pull	push-pull	push-pull
plastic	plastic	stainless steel	stainless steel
–10 ... +50 °C	–25 ... +60 °C	–25 ... +60 °C	–25 ... +60 °C
IP 67	IP 67 IP 68 / IP 69K *proTect+*	IP 67 IP 68 / IP 69K *proTect+*	IP 67 IP 68 / IP 69K *proTect+*

Light barriers and light sensors

Laser sensors

Precise control of fast processes and detection of very small objects

- Very precise object positioning to within 0.01 mm
- Detection of very small objects thanks to focused 0.1 mm laser spot
- Detection of fast objects thanks to short response times of < 0.1 ms

x = function principle	OxDM 16	OHDM 20	OxDK 25	OR18.EL/TL
features	■ Sensors for wafer detection	■ Large range	■ Sensors with two outputs	■ Short response time ■ Large range
dimensions (B × H × T)	15,4 × 50 × 50 mm	20,6 × 65 × 50 mm	23,4 × 63 × 45 mm	M18
function principle (x) / ranges				
diffuse sensors background suppression	**25 ... 300 mm** (OHDM 16)	**210 ... 1500 mm**	**100 ... 1750 mm** (OHDK 25)	
diffuse sensors with intensity difference	**0 ... 250 mm** (OZDM 16)			**10 ... 300 mm** (OR18.ZL)
SmartReflect® light barriers without a reflector			**100 ... 1900 mm** (ONDK 25)	
retro-reflective sensors	**12 m** (OPDM 16)			**16 m** (OR18.RL)
retro-reflective sensors for transparent detection				
through beam sensors				**60 m** (OR18.EL/TL)
differential sensors				
laser class	2	2	1	1
response time up	< 0,1 ms	< 6 ms	< 10 ms	< 0,34 ms
output	PNP NPN	PNP	push-pull	PNP NPN
housing material	die-cast zinc	die-cast zinc	plastic	brass nickel plated
operating temperature	–10 ... +50 °C	–10 ... +50 °C	–10 ... +50 °C	–10 ... +55 °C
protection class	IP 67	IP 67	IP 67	IP 67

Light barriers and light sensors

Light barriers without reflector – *SmartReflect®*

Less is more – reduced operating costs with increased functional reliability

- Reliable barrier principle between the sensor and the machine part
- Suitable for objects of different color, surface or transparency
- Robust with dirt deposit in plastic, stainless steel or hygiene design

IO-Link

IO-Link

y = light source	FNDK 07 FNCK 07	O200.Sy	O300.Sy O300.Sy.T	O500.Sy O500.Sy.T
features	■ Miniature sensor ■ Sensing distance adjustable	■ Miniature sensor ■ Sensing distance adjustable	■ Miniature sensor ■ Transparent detection versions	■ Transparent detection versions
dimensions (B × H × T)	8 × 16,2 × 10,8 mm	8 × 21 × 15,8 mm	12,9 × 32,2 × 23 mm	18 × 45 × 32 mm
light source (y)				
standard LED (R)	**17 ... 45 mm**	**30 ... 180 mm**		
pinPoint LED (P)			**30 ... 300 mm** (O300.SP / O300.SP.T)	**60 ... 600 mm** (O500.SP) **30 ... 1000 mm** (O500.SP.T)
infrarot (I)				
laser (L)			**30 ... 250 mm** (O300.SL)	
response time	< 0,5 ms	< 0,25 ms	< 0,25 ms	< 0,25 ms
output	PNP NPN	push-pull PNP NPN	push-pull PNP NPN	push-pull PNP NPN
connection types	cable 2 m flylead connector M8	cable 2 m flylead connector M8	cable 2 m connector M8 flylead connector M8	cable 2 m connector M12
housing material	plastic	plastic	plastic	plastic
operating temperature	–20 ... +50 °C	–25 ... +50 °C	–25 ... +60 °C	–25 ... +60 °C
protection class	IP 65	IP 67	IP 67	IP 67

Light barriers without reflector – *SmartReflect®*

IO-Link

FNDK 14

- Transparent detection versions

14,8 × 43 × 31 mm

50 ... 800 mm

< 1,8 ms

push-pull

cable 2 m
connector M8
flylead connector M12

plastic

–30 ... +65 °C

IP 67

ONDK 25

- Standard

23,4 × 63 × 45 mm

1900 mm

< 10 ms

push-pull

cable 2 m
connector M12

plastic

0 ... +50 °C

IP 67

OR18.SP

- Standard sensor M18

M18 × 65 mm

55 ... 300 mm

< 0,49 ms

push-pull
PNP
NPN

connector M12

brass nickel plated

–25 ... +60 °C

IP 67

IO-Link

O300W.Sy
O300W.Sy.T

- Washdown design
- Transparent detection versions

16,5 × 34,7 × 28,2 mm

30 ... 300 mm
(O300W.SP / O300W.SP.T)

30 ... 250 mm
(O300W.SL)

< 0,25 ms

push-pull

connector M8

stainless steel, Ecolab-certified, FDA-compliant

–25 ... +60 °C

IP 68 / IP 69K
proTect+

IO-Link

O500W.Sy
O500W.Sy.T

- Washdown design
- Transparent detection versions

20,2 × 47,2 × 37,7 mm

60 ... 600 mm
(O500W.SP)
30 ... 1000 mm
(O500W.SP.T)

< 0,25 ms

push-pull

connector M12

stainless steel, Ecolab-certified, FDA-compliant

–25 ... +60 °C

IP 68 / IP 69K
proTect+

Light barriers and light sensors

Light barriers without reflector – *SmartReflect®*

Less is more – reduced operating costs with increased functional reliability

- Reliable barrier principle between the sensor and the machine part
- Suitable for objects of different color, surface or transparency
- Robust with dirt deposit in plastic, stainless steel or hygiene design

	IO-Link	IO-Link	IO-Link	IO-Link
y = light source	FNDR 14	O300H.Sy O300H.Sy.T	O500H.Sy O500H.Sy.T	FNDH 14
features	■ Washdown design	■ Hygienic design ■ Version for transparency object detection	■ Hygienic design ■ Version for transparency object detection	■ Hygienic design ■ Version for transparency object detection
dimensions (B × H × T)	19,6 × 51 × 34,3 mm	16,5 × 34,6 × 28,7 mm	20,2 × 47,7 × 36,4 mm	19,6 × 52,2 × 34,3 mm
light source (y)				
standard LED (R)				
pinPoint LED (P)	**50 ... 800 mm**	**30 ... 300 mm** (O300H.SP / O300H.SP.T)	**60 ... 600 mm** (O500H.SP) **60 ... 1000 mm** (O500H.SP.T)	**50 ... 800 mm**
laser (L)		**30 ... 250 mm** (O300H.SL)		
response time	< 1,8 ms	< 0,25 ms	< 0,25 ms	< 1,8 ms
output	push-pull	push-pull	push-pull	push-pull
connection types	connector M12	cable 2 m flylead connector M8	cable 2 m flylead connector M12	cable 2 m flylead connector M12
housing material	stainless steel, Ecolab-certified, EHEDG-compliant, FDA-compliant	stainless steel, Ecolab-certified, EHEDG-compliant, FDA-compliant	stainless steel, Ecolab-certified, EHEDG-compliant, FDA-compliant	stainless steel, Ecolab-certified, EHEDG-compliant, FDA-compliant
operating temperature	–30 ... +60 °C	–25 ... +60 °C	–25 ... +60 °C	–30 ... +60 °C
protection class	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*

SmartReflect® – the light barrier without reflector

With *SmartReflect*® Baumer has reinvented the optical light barrier: The reflector as the weak point is eliminated and highly reliable object detection is still guaranteed even for transparent objects. That reduces your costs tremendously.

Your benefits

- Maximum system uptime and process safety
  - Very reliable object detection thanks to barrier principle
  - Elimination of the reflector as a potential source of error
  - No function impairment through dirt accumulation
  - Available in robust washdown or hygiene design

- Reduction of operating costs
  - No reflector means time saving installation
  - No need for a reflector eliminates exchange and wear
  - No need for a reflector eliminates cleaning effort

- Raising productivity
  - Sensing range up to 1.9 m or 1 m for transparent objects
  - High machine performance thanks to short response times of < 0.25 ms
  - Fast format changes, easy sensor exchange and additional usage data via IO-Link

Light barriers and light sensors

Transparent detection

The sensor solutions for the detection of bowls, bottles and foils

- Extremely safe and fast with a response time < 0.25 ms
- Unique range without reflector up to 1 m
- Up to 7 m range with retro-reflective light barriers

IO-Link

IO-Link

IO-Link

y = light source	O300.SP.T	O300.RP.T	FNDK 14	FRDK 14
features	■ *SmartReflect*®	■ Retro-reflective sensors	■ *SmartReflect*®	■ Retro-reflective sensors
dimensions (B × H × T)	12,9 × 32,3 × 23 mm	12,9 × 32,3 × 23 mm	14,8 × 43 × 31 mm	14,8 × 43 × 31 mm
light source (y)				
standard LED (R)				
pinPoint LED (P)	**30 ... 300 mm**	**4 m**	**200 ... 800 mm**	**7 m**
infrarot (I)				
laser (L)				
response time	< 0,25 ms	< 0,25 ms	< 1,8 ms	< 0,25 ms
output	push-pull	push-pull	push-pull	push-pull
connection types	cable 2 m connector M8	cable 2 m connector M8	cable 2 m connector M8 connector M12	cable 2 m connector M8
housing material	plastic	plastic	plastic	plastic
operating temperature	–25 ... +60 °C	–25 ... +60 °C	–30 ... +60 °C	–25 ... +60 °C
protection class	IP 67	IP 67	IP 67	IP 68 / IP 69K *proTect+*

IO-Link

IO-Link

OPDK 14	FPDM 16	O500.SP.T	O500.RP.T
■ Retro-reflective laser sensor	■ Retro-reflective sensors	■ *SmartReflect*®	■ Retro-reflective sensors
14,8 × 43 × 31 mm	15,4 × 50 × 50 mm	18 × 45 × 32 mm	18 × 45 × 32 mm
	7,2 m		
		60 ... 1000 mm	6 m
5,2 m			
< 0,25 ms	< 2,5 ms	< 0,25 ms	< 0,25 ms
PNP NPN	PNP	push-pull	push-pull
cable 2 m connector M8 connector M12	connector M12	cable 2 m connector M12	cable 2 m connector M12
plastic	die-cast zinc	plastic	plastic
–10 ... +50 °C	–25 ... +65 °C	–25 ... +60 °C	–25 ... +60 °C
IP 67	IP 67	IP 67	IP 67

Light barriers and light sensors

Transparent detection in demanding enviroments

Robust stainless steel sensors for the detection of bowls, bottles and foils

- Extremely safe and fast with a response time < 0.25 ms
- Unique range without reflector up to 1 m
- Up to 7 m range with retro-reflective light barriers

IO-Link

IO-Link

IO-Link

IO-Link

y = light source	O300W.SP.T O300H.SP.T	O300W.RP.T O300W.RP.T	FNDR 14 FNDH 14	O500W.SP.T O500H.SP.T
features	■ *SmartReflect*® ■ Stainless steel housing in washdown- (W) or hygienic design (H)	■ Retro-reflective sensors ■ Stainless steel housing in washdown- (W) or hygienic design (H)	■ *SmartReflect*® ■ Stainless steel housing in washdown- (W) or hygienic design (H)	■ *SmartReflect*® ■ Stainless steel housing in washdown- (W) or hygienic design (H)
dimensions (B × H × T)	16,5 × 34,7 × 28,2 mm	16,5 × 34,7 × 28,2 mm	16,5 × 51 × 34,3 mm	20,2 × 124 × 36,4 mm
light source (y)				
standard LED (R)				
pinPoint LED (P)	**30 ... 300 mm**	**4 m**	**20 ... 800 mm**	**60 ... 1000 mm**
infrarot (I)				
laser (L)				
response time	< 0,25 ms	< 0,25 ms	< 0,25 ms	< 0,25 ms
output	push-pull	push-pull	push-pull	push-pull
connection types	cable 2 m connector M8	cable 2 m connector M8	cable 2 m connector M8 connector M12	cable 2 m connector M12
housing material	stainless steel, Ecolab-certified, EHEDG-compliant (hygienic), FDA-compliant	stainless steel, Ecolab-certified, EHEDG-compliant (hygienic), FDA-compliant	stainless steel, Ecolab-certified, EHEDG-compliant (hygienic), FDA-compliant	stainless steel, Ecolab-certified, EHEDG-compliant (hygienic), FDA-compliant
operating temperature	–25 ... +60 °C	–25 ... +60 °C	–30 ... +60 °C	–25 ... +60 °C
protection class	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*

Transparent detection in demanding enviroments

IO-Link

O500W.RP.T O500H.RP.T	OR18.W.RR.T
■ Retro-reflective sensors ■ Stainless steel housing in washdown- (W) or hygienic design (H)	■ Retro-reflective sensors ■ Stainless steel housing in washdown- (W)
20,2 × 124 × 36,4 mm	M18 × 67,2 mm
	800 mm
6 m	
< 0,25 ms	< 1 ms
push-pull	PNP NPN
cable 2 m connector M12	connector M12
stainless steel, Ecolab-certified, EHEDG-compliant (hygienic), FDA-compliant	stainless steel
–25 ... +60 °C	–25 ... +55 °C
IP 68 / IP 69K *proTect+*	IP 67/69K

proTect+

The *proTect+* impermeability concept by Baumer ensures absolute dependability even under most adverse conditions. Thanks to the specifically conceived construction and the use of high-quality materials, sensors with *proTect+* provide IP 69K protection and ensure absolute stability even after countless temperature cycles. In order to achieve this, the sensors have been shock-tested over the entire temperature range. The *proTect+* concept ensures enhanced reliability and extended sensor service life.
More information at www.baumer.com/protect+

Light barriers and light sensors

Washdown design

- Robust stainless steel housing
- Long-term sealing thanks to *proTect+*
- IP 69K and Ecolab tested
- Different sizes and sensor principles

IO-Link

IO-Link

IO-Link

IO-Link

x = function principle y = light source	FxDR 14	O300W.xy	O500W.xy	OR18W.xy
dimensions (B × H × T)	19,6 × 62,4 × 34,3 mm	16,5 × 34,7 × 28,2 mm	20,2 × 47,2 × 37,7 mm	M18
function principle (x) / ranges				
diffuse sensors with background suppression	**50 ... 400 mm** (FHDR 14)	**30 ... 250 mm** (O300W.GP / O300W.GL)	**60 ... 400 mm** (O500W.GP)	**40 ... 120 mm** (OR18W.GR)
diffuse sensors with intensity difference				**0 ... 800 mm** (OR18W.ZI)
SmartReflect® light barriers without reflector	**50 ... 800 mm** (FNDR 14)	**30 ... 300 mm** (O300W.SP / O300W.SL)	**60 ... 600 mm** (O500W.SP)	
SmartReflect® transparent	**200 ... 800 mm** (FNDR 14)	**30 ... 300 mm** (O300W.SP.T)	**60 ... 1000 mm** (O500W.SP.T)	
retro-reflective sensors	**3 m** (FPDR 14)	**6 m** (O300W.RP / O300W.RL)	**8 m** (O500W.RP)	**4,5 m** (OR18W.RR)
transparent detection without reflector		**4 m** (O300W.RP.T)	**6 m** (O500W.RP.T)	**800 mm** (OR18W.RR.T)
through beam sensors		**15 m** (O300W.TR / .TL) (O300W.ER / .EL)	**40 m** (O500W.TR / .TL) (O500W.ER / .EL)	**20 m** (OR18W.TI) (OR18W.EI)
contrast sensor	**12,5 mm ±2 mm** (FKDR 14)			
light source (y)				
standard LED (R)	■	■	■	■
pinPoint LED (P)	■	■	■	
infrarot (I)				■
laser (L)		■		
response time	< 1 ms <0,05 ms (contrast)	< 0,25 ms < 0,1 ms (laser)	< 0,25 ms	< 1 ms
output	push-pull	push-pull	push-pull	PNP NPN
connection types	connector M12	connector M8	connector M12	connector M12
housing material	stainless steel, Ecolab-certified, FDA-compliant	stainless steel, Ecolab-certified, FDA-compliant	stainless steel, Ecolab-certified, FDA-compliant	stainless steel, Ecolab-certified, FDA-compliant
operating temperature	–25 ... +60 °C	–25 ... +60 °C	–25 ... +60 °C	–25 ... +55 °C
protection class	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*	IP 67 / IP 69K

Hygienic design

- EHEDG certified, FDA-compliant, Ecolab tested
- Long-term sealing thanks to *proTect+*
- Different sizes and sensor principles
- Benefits through *SmartReflect*® light barrier without reflector

IO-Link

IO-Link

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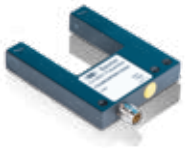
x = function principle y = light source	FxDH 14	O300H.xy	O500H.xy
dimensions (B × H × T)	19,6 × 52,2 × 34,3 mm	16,5 × 34,6 × 28,7 mm	20,2 × 47,7 × 36,4 mm
function principle (x) / ranges			
diffuse sensors with background suppression	**50 ... 400 mm** (FHDH 14)	**30 ... 250 mm** (O300H.Gy)	**60 ... 400 mm** (O500H.Gy)
diffuse sensors with intensity difference			
SmartReflect® light barriers without reflector	**50 ... 800 mm** (FNDH 14)	**30 ... 300 mm** (O300H.Sy)	**60 ... 600 mm** (O500H.Sy)
SmartReflect® transparent	**200 ... 800 mm** (FNDH 14)	**30 ... 300 mm** (O300H.SP.T)	**60 ... 1000 mm** (O500H.SP.T)
retro-reflective sensors	**3,5 m** (FPDH 14)	**6 m** (O300H.Ry)	**8 m** (O500H.Ry)
transparent detection without reflector		**4 m** (O300H.RP.T)	**6 m** (O500H.RP.T)
through beam sensors		**15 m** (O300H.Ty) (O300H.Ey)	**40 m** (O500H.Ty) (O500H.Ey)
contrast sensor	**12,5 m ±2 mm** (FKDH 14)		
light source (y)			
standard LED (R)	■	■	■
pinPoint LED (P)	■	■	■
infrarot (I)			
laser (L)		■	
response time	< 1 ms <0,05 ms (contrast)	< 0,25 ms <0,1 ms (laser)	< 0,25 ms
output	push-pull	push-pull	push-pull
connection types	connector 2 m flylead connector M12	connector 2 m flylead connector M8	connector 2 m flylead connector M12
housing material	stainless steel, Ecolab-certified, EHEDG-compliant, FDA-compliant	stainless steel, Ecolab-certified, EHEDG-compliant, FDA-compliant	stainless steel, Ecolab-certified, EHEDG-compliant, FDA-compliant
operating temperature	–30 ... +60 °C	–25 ... +60 °C –10 ... +60 °C (Laser)	–25 ... +60 °C
protection class	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*

Light barriers and light sensors

Fork and angle sensors

- Through-beam photoelectric sensor integrated in a single device
- No alignment of transmitter and receiver
- No misalignment caused by vibration
- Laser variants for miniature parts and positioning within 1/100 mm range



	FGUM	OGUM basic	OGUM	FGLM
category	**Pulsed red LED Fork sensors**	**Laser Fork sensors**	**Laser Fork sensors**	**Angle sensors L profile**
features	■ Potentiometer or Teach-in version ■ Narrow, virtually parallel light beam ■ Sensors can be mounted side-by-side	■ High resolution ■ Short response time ■ Sensors can be mounted side-by-side	■ Very high resolution ■ Extremely narrow laser light beam ■ Sensors can be mounted side-by-side ■ High repeat accuracy	■ Special L-type ■ Narrow, virtually parallel light beam ■ Sensors can be mounted side-by-side
type	U profile	U profile	U profile	L profile
fork widths	20 mm 30 mm 50 mm 80 mm 120 mm 170 mm	30 mm 50 mm 80 mm 120 mm	30 mm 50 mm 80 mm 120 mm	60 mm 100 mm 158 mm
object size	> 0,4 mm	> 0,1 mm	> 0,05 mm	> 0,5 mm
repeat accuracy	< 0,02 mm	< 0,02 mm	< 0,01 mm	< 0,06 mm
response / release time	< 0,125 ms	< 0,166 ms	< 0,166 ms	< 0,125 ms
connection types	connector M8	connector M8	connector M8	connector M8
housing material	die-cast zinc	aluminum	aluminum	die-cast zinc
operating temperature	–10 ... +60 °C	+5 ... +45 °C	+5 ... +45 °C	–10 ... +60 °C
protection class	IP 67	IP 67	IP 67	IP 67
specific features		■ laser class 1	■ laser class 1	

Fork and angle sensors

Light barriers and light sensors

Differential, contrast and color sensors

- Differential sensors to monitor position tolerances
- Rapid print mark recognition
- Capturing even slightest contrast or shades of color
- Small dimensions, starting at 10 mm

	OBDM 12	OZDK 10	OZDM 16
features	■ Difference sensors	■ Diffuse sensors with intensity difference - miniature	■ Diffuse sensors with intensity difference with analog output - standard
dimensions (B × H × T)	12,4 × 37 × 34,5 mm	10,4 × 27 × 16,3 mm	15,4 × 50 × 50 mm
light source	laser	laser	laser
sensing distance Tw	16 ... 120 mm	3 ... 150 mm	0 ... 250 mm
response time	< 1 ms	< 0,05 ms	< 0,1 ms
output	PNP NPN	PNP NPN	PNP 4 ... 20 mA
connection types	connector M8	cable 2 m connector M8	cable 2 m connector M8
housing material	die-cast zinc	plastic	die-cast zinc
operating temperature	0 ... +50 °C	0 ... +50 °C	–10 ... +50 °C
protection class	IP 67	IP 67	IP 67
function	■ monitoring of position tolerances ■ object detection on fluctuating conveyor belts ■ detection of minimum and maximum deviations in the process ■ variant for step / edge detection	■ detection of gradual changes, e. g. when polishing surfaces ■ fast and economical print mark recognition	■ detection of gradual changes, e. g. when polishing surfaces ■ fast and economical print mark recognition

Differential, contrast and color sensors

FKDK 14	FKDR 14	FKDH 14	FKDM 22
■ White LED diffuse contrast sensors	■ White LED diffuse contrast sensors ■ Washdown design	■ White LED diffuse contrast sensors ■ Hygienic design	■ Color sensors
14,8 × 43 × 31 mm	19,6 × 51 × 34,3 mm	19,6 × 52,2 × 34,3 mm	22,9 × 50 × 68,7 mm
white LED	white LED	white LED	RGB
12,5 mm ±2 mm	12,5 mm ±2 mm	12,5 mm ±2 mm	25 mm / 40 mm
< 0,05 ms	< 0,05 ms	< 0,05 ms	< 0,34 ms
push-pull	push-pull	push-pull	PNP NPN
cable 2 m connector M8 connector M12	connector M12	cable 2 m flylead connector M12	connector M12
plastic	stainless steel	stainless steel	aluminum
–25 ... +65 °C	–25 ... +65 °C	–25 ... +60 °C	–10 ... +55 °C
IP 67	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*	IP 67
■ detection of gradual changes, e. g. when polishing surfaces ■ fast and economical print mark recognition	■ detection of gradual changes, e. g. when polishing surfaces ■ fast and economical print mark recognition	■ detection of gradual changes, e. g. when polishing surfaces ■ fast and economical print mark recognition	■ 4 color channels ■ Adjustable color tolerance ■ Quick response time of 0,34 ms

Fiber optic sensors

Plastic fiber optic sensors and fiber optic cables

Always close to the action – detecting tiny objects in cramped or inaccessible places

- Detection reliability in high-dynamic processes
- Quick and easy configuration by teach-in feature or potentiometer

	Plastic fiber optic	FVDK 10 (FVDK 10N51/ FVDK 10P51)	FVDK 66 (FVDK 10N66/ FVDK 10P66)	FVDK 66 High Sensitivity (FVDK 10N66Y/ FVDK 10P66Y)
features	■ Extremely varied beam geometries: spot, coaxial, focused, line ■ Fiber optics resistant to chemicals ■ High temperature fiber ■ Lateral beam emission	■ Smallest fiber optic sensor ■ Sensitivity adjustable with potentiometer	■ Sensitivity adjustable with Teach-in ■ Minimized installation effort (master slave) ■ Logical output linking available (Duplex version) ■ Timer functions	■ Sensitivity adjustable with Teach-in ■ Increased sensitivity ■ High power mode ■ Timer functions
dimensions		10,4 × 27 × 19,5 mm	10 × 33,8 × 70,2 mm	10 × 33,8 × 70,2 mm
ranges (optical fiber dependent)				
with through beam (max.)		**600 mm**	**1500 mm**	**3500 mm**
with reflective (max.)		**70 mm**	**130 mm**	**470 mm**
response time		< 1 ms	0,25 ... 1 ms	0,25 ... 5 ms
output		NPN PNP	NPN PNP	NPN PNP
connection types		cable 2 m flylead connector M8	cable 2 m connector M8	cable 2 m connector M8
housing material		plastic (ASA)	polycarbonate / ABS	polycarbonate / ABS
operating temperature		–25 ... +55 °C	–20 ... +55 °C	20 ... +55 °C
protection class		IP 40	IP 40	IP 40
additional functions			■ External Teach-in	■ External Teach-in
specific features			■ master slave	

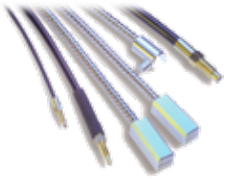
Plastic fiber optics sensors and fiber optic cables

Fiber optic sensors

Glass fiber optic sensors and fiber optic cables

Always close to the action – detecting tiny objects in cramped or inaccessible places

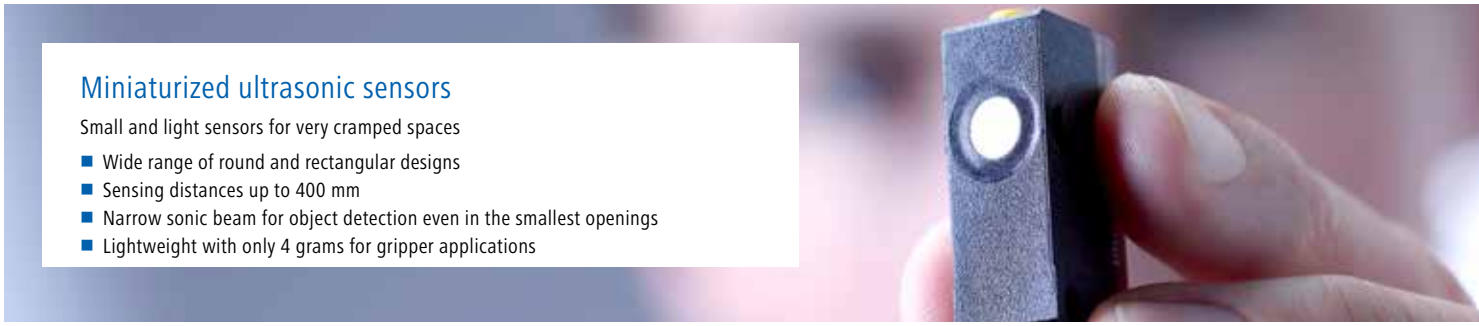
- Robust metal housing
- Sensitivity configurable using potentiometer and Teach-in feature
- Specialized variants for long-range detection, high sensitivity and fast moving objects



	Glass fiber optic	FZAM 18	FZAM 30	FVDM 15
features	■ Different beam geometries: spot, line ■ Fiber optics with robust metal sheath ■ High temperature fiber ■ Lateral beam emission	■ Sensitivity adjustable with Teach-in or potentiometer ■ Robust metal housing	■ Sensitivity adjustable with Teach-in or potentiometer ■ Robust metal housing ■ For large ranges	■ Sensitivity adjustable with potentiometer ■ Robust metal housing ■ Quick response and release times
dimensions		M18 × 50 mm	M30 × 50 mm	15 × 60 × 45 mm
ranges (optical fiber dependent)				
with through beam (max.)		800 mm	1400 mm	500 mm
with reflective (max.)		150 mm	230 mm	240 mm
response time		< 0,5 ms / < 1 ms	< 0,25 ms / <2,5 ms	< 0,1 ms / <1 ms
output		NPN PNP	NPN PNP	NPN PNP
connection types		cable 2 m connector M12	cable 2 m	cable 2 m connector M12
housing material		brass nickel plated / PC	brass nickel plated	die-cast aluminum
operating temperature		–25 ... +55 °C	0 ... +65 °C	–25 ... +55 °C
protection class		IP 67	IP 65	IP 65
specific features		■ infrared	■ fast version ■ infrared	■ fast version ■ infrared

Glass fiber optics sensors and fiber optic cables

Ultrasonic sensors



Miniaturized ultrasonic sensors

Small and light sensors for very cramped spaces

- Wide range of round and rectangular designs
- Sensing distances up to 400 mm
- Narrow sonic beam for object detection even in the smallest openings
- Lightweight with only 4 grams for gripper applications

	UNAM 12 URAM 12	UNCK / UNDK 09 URCK / URDK 09	UNDK 10 / URDK 10
features	■ Narrow and wide sonic beam angles ■ Highspeed versions ■ Versions with beam columnator	■ Versions with beam columnator ■ Very flat housing ■ Lateral approach accuracy <1, 5 mm	■ The world's smallest sensor ■ Weights only 4 grams ■ Narrow sonic beam angles
dimensions	M12	8,6 × 82 × 24,5 mm	10,4 × 27 × 14 mm
sensing range Sd / sensor principle			
proximity switch (UNxx / xx.PAO)	5 ... 400 mm	3 ... 200 mm	10 ... 200 mm
2 point proximity switch (UZxx)			
retro-reflective sensors (URxx / xx.RAO)	0 ... 70 mm	0 ... 200 mm	0 ... 200 mm
through beam sensors (UExx)			
response time	< 1,5 mm	< 0,5 mm < 1,5 mm	< 0,5 mm < 1,5 mm
output	NPN PNP	push-pull NPN PNP	NPN PNP
connection types	connector M12	cable 2 m connector M8	cable 2 m connector M8
housing material	brass nickel plated	plastic	plastic
operating temperature	–10 ... +60 °C	0 ... +60 °C	–10 ... +60 °C
protection class	IP 67	IP 67	IP 67

UNxx / xx.PAO = proximity switch
URxx / xx.RAO = retro-reflective sensors
UZxx = 2 point proximity switch
UExx = through beam sensors

Robust ultrasonic sensors with flexible parameterization

Extremely robust – U500 and UR18

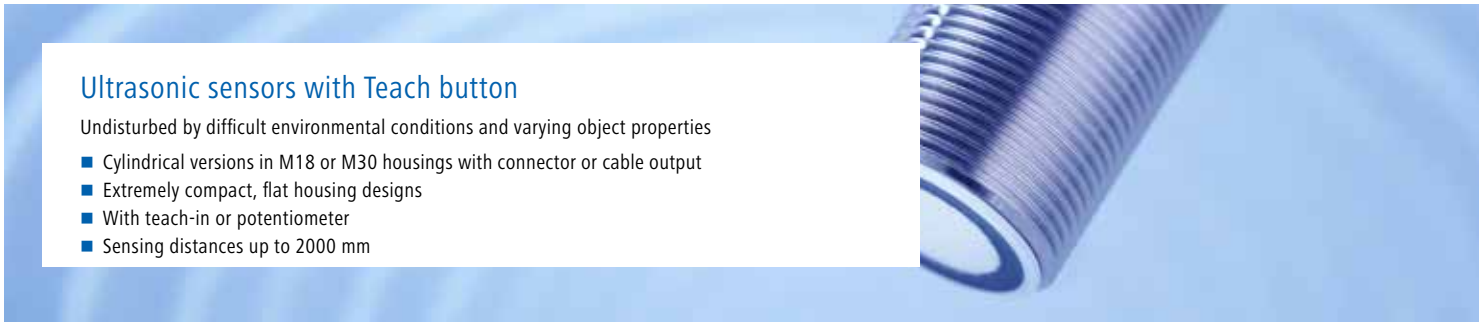
- Highest process reliability due to hermetically sealed sensor element
- IO-Link functionality for flexible parameterization
- Short blind range of 70 mm with a sensing distance up to 1000 mm
- Superb quality with an affordable price tag

IO-Link

IO-Link

	UR18	U500
features	■ Sensor element hermetical sealed ■ Ideal for level application ■ Very small blind range ■ Ecolab certification	■ Proven slim design ■ Sensor element hermetical sealed ■ Very small blind range
dimensions	M18	15 × 45,1 × 32,2 mm
sensing range Sd / sensor principle		
proximity switch (Uxxx / xx.PAO)	70 ... 1000 mm	70 ... 1000 mm
2 point proximity switch (Uxxx)	70 ... 1000 mm	70 ... 1000 mm
retro-reflective sensors (Uxxx / xx.RAO)	0 ... 1000 mm	0 ... 1000 mm
through beam sensors (Uxxx)	0 ... 2000 mm	0 ... 2000 mm
response time	< 0,5 mm	< 0,5 mm
output	1 × push-pull 2 × push-pull	1 × push-pull 2 × push-pull
adjustable parameters	Switching points or switching windows for distance or counter, measuring range, sound beam, averaging, temperature compensation, output logic, switching hysteresis, input/ output logic, switch-off delay, output circuit, SSC / output assignment, LED behavior, teaching facilities	
process data	MDC: Distance, counter SSC: Distance, counter	
diagnostic data	Switching cycles, operating time, boot cycles, histograms of process data values and the operating voltage and device temperature	
connection types	connector M12, 5 pin	connector M12, 5 pin
housing material	stainless steel V2A	plastic ASA
operating temperature	–25 ... +65 °C	–25 ... +65 °C
protection class	IP 69 (from front) IP 67 (from rear)	IP 67

Ultrasonic sensors



Ultrasonic sensors with Teach button

Undisturbed by difficult environmental conditions and varying object properties

- Cylindrical versions in M18 or M30 housings with connector or cable output
- Extremely compact, flat housing designs
- With teach-in or potentiometer
- Sensing distances up to 2000 mm

	UNAM 18	UNAM 30 UZAM 30	UNDK 20 URDK 20 UEDK 20
features	■ Standardised installation due to M18 housing ■ Internal and external Teach-in ■ Cable and connector versions	■ Internal and external Teach-in ■ Cable and connector versions ■ Potentiometer versions	■ Flat type ■ Internal and external Teach-in ■ Narrow and wide sonic beam angles ■ M8 connector
dimensions	M18	M30	20 × 42 × 15 mm
sensing range Sd / sensor principle			
proximity switch (UNxx / xx.PAO)	100 ... 1000 mm	200 ... 1500 mm	10 ... 1000 mm
2 point proximity switch (UZxx)		100 ... 1000 mm	
retro-reflective sensors (URxx / xx.RAO)			0 ... 1000 mm
through beam sensors (UExx)			0 ... 1000 mm
response time	< 0,5 mm	< 0,5 mm	< 0,5 mm
output	NPN PNP	NPN PNP	NPN PNP
connection types	cable 2 m connector M12	cable 2 m connector M12	connector M8
housing material	brass nickel plated stainless steel	brass nickel plated	plastic
operating temperature	–10 ... +60 °C	–25 ... +60 °C –10 ... +60 °C	–10 ... +60 °C
protection class	IP 67	IP 67	IP 67

UNxx / xx.PAO = proximity switch
URxx / xx.RAO = retro-reflective sensors
UZxx = 2 point proximity switch
UExx = through beam sensors

Ultrasonic sensors with Teach button

UNDK 30 / URDK 30 UZDK 30 / UEDK 30
■ Compact type ■ Large sensing range ■ Teach-in on the sensor ■ Potentiometer version ■ Narrow and wide sonic beam angles
30 × 65 × 31 mm
30 ... 1000 mm
30 ... 2000 mm
0 ... 2000 mm
0 ... 700 mm
< 0,5 mm
NPN PNP
cable 2 m connector M12
plastic / die-cast zinc
–10 ... +60 °C
IP 67

Ultrasonic sensors

Application-specific ultrasonic sensors – High-speed / Chemically robust

- Highspeed sensors with only 1.3 ms response time
- Chemical robust **stainless steel sensors with patented parylene coating**

	UNAM 12 High-speed	URAM 12 High-speed	UNAR 12 URAR 12	UNAR 18 URAR 18
category	**High-speed sensors**		**Chemically robust stainless steel sensors with parylene coating**	
features	■ Fastest ultrasonic sensor ■ External Teach-in	■ Fastest ultrasonic sensor ■ External Teach-in ■ Sensors with sonic nozzle for small openings	■ Miniature sensor for narrow designs ■ Patented all-round protection ■ FDA-compliant materials ■ Very short response time ■ Ecolab certification	■ M18 standard housing ■ FDA-compliant materials ■ Internal and external Teach-in ■ Ecolab certification
dimensions	M12	M12	M12	M18
sensing range Sd / sensor principle				
proximity switch (UNxx / xx.PAO)	0 ... 40 mm 10 ... 70 mm		30 ... 200 mm	60 ... 1000 mm
2 point proximity switch (UZxx)				
retro-reflective sensors (URxx / xx.RAO)		0 ... 40 mm 0 ... 70 mm	0 ... 200 mm	0 ... 400 mm
repeat accuracy	< 0,5 mm	< 1,5 mm	< 0,5 mm	< 0,5 mm
output	NPN PNP	NPN PNP	NPN PNP	NPN PNP
connection types	connector M12	connector M12	connector M12	connector M12
housing material	brass nickel plated	brass nickel plated	stainless steel	brass nickel plated stainless steel
operating temperature	–10 ... +60 °C	–10 ... +60 °C	0 ... +60 °C	–10 ... +60 °C
protection class	IP 67	IP 67	IP 67	IP 67

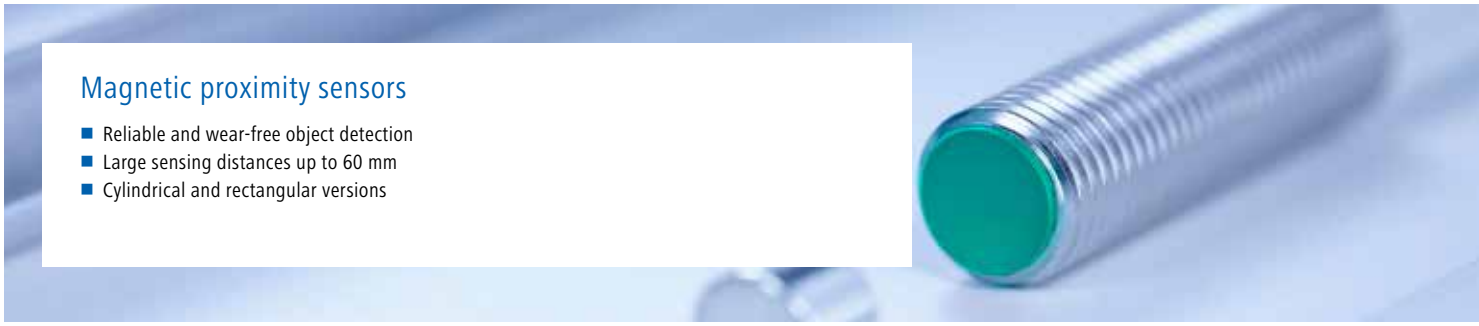
UNxx / xx.PAO = proximity switch
URxx / xx.RAO = retro-reflective sensors
UZxx = 2 point proximity switch
UExx = through beam sensors

Application-specific ultrasonic sensors – Sonic nozzles / Sensing distances

- Sensors with sonic nozzle for passages up to ø 3 mm
- Sensors with long-range detection up to 6000 mm

	UNDK 09	UNAM / URAM 12	UNAM 50 URAM 50 UZAM 50	UNAM 70
category	**with sonic nozzles**		**with large sensing distances**	
features	■ High resolution ■ Minimal blind region ■ RS 232 ■ Various mounting options ■ Flat housing ■ Narrow sonic beam angle for detection in openings of up to 3 mm	■ Sonic nozzle for very narrow sonic beams ■ External Teach-in ■ Connector M12	■ Internal and external Teach-in ■ Cable and connector versions ■ Potentiometer versions	■ Internal and external Teach-in ■ Connector M12
dimensions	8,6 × 82 × 24,5 mm	M12	M30	M30
sensing range Sd / sensor principle				
proximity switch (UNxx / xx.PAO)	3 ... 200 mm	5 ... 400 mm	350 ... 2500 mm	
2 point proximity switch (UZxx)			350 ... 2500 mm	60 ... 6000 mm
retro-reflective sensors (URxx / xx.RAO)	0 ... 200 mm	0 ... 70 mm	0 ... 3000 mm	
response time	< 0,5 mm	< 0,5 mm	< 1 mm < 3 mm	< 3 mm
output	push-pull RS 232	NPN PNP	NPN PNP	NPN PNP
connection types	cable 2 m flylead connector M8	connector M12	cable 2 m connector M12	connector M12
housing material	plastic	brass nickel plated	brass nickel plated	brass nickel plated
operating temperature	0 ... +60 °C	–10 ... +60 °C	–25 ... +60 °C	–25 ... +60 °C
protection class	IP 67	IP 67	IP 67	IP 67

Magnetic and cylinder sensors



Magnetic proximity sensors

- Reliable and wear-free object detection
- Large sensing distances up to 60 mm
- Cylindrical and rectangular versions

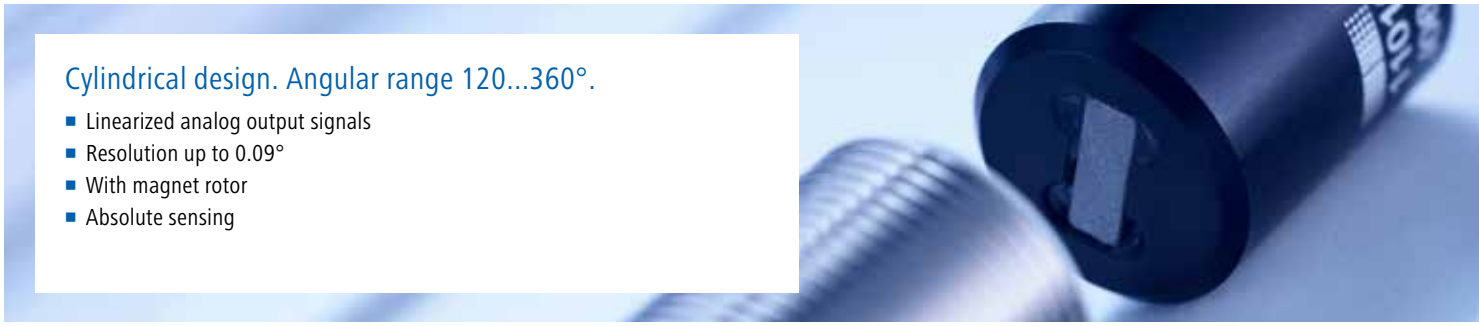
	MFFM 08	MFRM 08	MFVM 08
features	■ Acquisition of magnet location ■ Large sensing range ■ Object detection through container walls possible	■ Acquisition of magnet location ■ Large sensing range ■ Object detection through container walls possible	■ Full metall sensor ■ Sensing distance to 60 mm
dimensions	8 × 30 × 8 mm	M8	8 × 12 × 30 mm
nominal switching distance Sn typ.	to 60 mm	60 mm	60 mm
switching frequency	5 kHz	5 kHz	5 kHz
voltage supply range +Vs	10 ... 30 VDC	10 ... 30 VDC	10 ... 30 VDC
output circuit	PNP NPN	PNP NPN	PNP NPN
connection types	cable 2 m	cable 2 m	cable 2 m
housing material	brass nickel plated	stainless steel	aluminum
operating temperature	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C
protection class	IP 67	IP 67	IP 67

Cylinder sensors

- Detecting stop positions of pistons in every standard cylinder with C- or T-slots
- Different versions and versatile installation accessories for maximum flexibility
- Non-contact sensing and absolutely wear-free

	MZCK 03x1011 MZCK 03x1012	MZTK 06x1011 MZTK 06x1012 MZTK 06x1013
features	■ For C slot cylinders ■ Oil- and salt water climate resistant	■ For T slot cylinders ■ Oil- and salt water climate resistant
dimensions	3,7 × 23 × 4,6 mm 3,7 × 11 × 19,5 mm	6,2 × 31 × 4,3 mm 6,5 × 21 × 9,4 mm 6,2 × 31,5 × 4,5 mm
nominal operation point / assured sensing distance Sa max.	4 mT	4 mT 2 mT (MZTK 06x1012)
switching frequency	200 kHz	200 kHz
voltage supply range +Vs	6 ... 30 VDC	6 ... 30 VDC
output circuit	PNP NPN	PNP NPN
connection types	cable 2,5 m flylead connector M8	cable 2,5 m flylead connector M8
housing material	PA 66	PA 66
operating temperature	–40 ... +70 °C	–40 ... +70 °C
protection class	IP 67	IP 67

Magnetic and cylinder sensors



Cylindrical design. Angular range 120...360°.

- Linearized analog output signals
- Resolution up to 0.09°
- With magnet rotor
- Absolute sensing

	MDRM 18	MDRM 18	MDRM 18	MDRM 18	MDRM 18	MDRM 18
features	■ Linear angular range 120° ■ Output signal 4...20 mA	■ Linear angular range 270° ■ Output signal 4...20 mA		■ Linear angular range 160° ■ Output signal 0.5...4.5 VDC / 1...9 VDC	■ Linear angular range 360° ■ Output signal 0...4.3 VDC / 0...5 VDC	
dimensions (sensor head)	M18 x 1 (cyclindrical threaded)					
angular range	120° linear	270° linear		160° linear	360° linear	
resolution	0.09°	0.09°	1.41°	0.09°	0.09°	1.41°
working distance max.	5 mm (with magnet rotor MSFS)	5 mm (with magnet rotor MSFS)	4 mm (with magnet rotor MSFS)	5 mm (with magnet rotor MSFS)	5 mm (with magnet rotor MSFS)	4 mm (with magnet rotor MSFS)
output circuit	current output			voltage output		
output signal	4...20 mA			0.5...4.5 VDC 1...9 VDC	0...4.3 VDC	0...5 VDC
response time	<2 ms					
connection	cable 2 m mating connector M12	cable 2 m connector M12		cable 2 m mating connector M8	cable 2 m connector M12	
voltage supply	15...30 VDC			5 VDC 12...28 VDC	4.7...7.5 VDC	4.75...5.25 VDC
operating temperature	-40...+85 °C					
protection	IP 67					

Functional principle

The heart of a magnetic magnetic angle sensor sensor is the integrated dual differential Hall element which builds an electrical parameter related to the flux direction of an exterior magnetic field. This magnetic field rotating about the element's center axis generates two sinusoids shifted by 90° which are utilized to detect the rotation angle for output as an absolute value. The integrated electronics evaluates the sinusoids into a linear voltage or current signal. The absolute dection principle ensures output of the correct rotation angle even after power failure.

Rectangular design. Angular range 270...360°.

- Linearized analog output signals
- Resolution up to 0.09°
- With magnet rotor
- Absolute sensing

	MDFM 20	MDFM 20	MDFM 20	MDFM 20
features	■ Linear angular range 270° ■ Output signal 4...20 mA ■ Resolution 0.09°	■ Linear angular range 270° ■ Output signal 4...20 mA ■ Resolution 1.41°	■ Linear angular range 360° ■ Output signal 0...4.3 VDC ■ Resolution 0.09°	■ Linear angular range 360° ■ Output signal 0...5 VDC ■ Resolution 1.41°
dimensions (sensor head)	20 × 30 × 8 mm (rectangular)			
angular range	270° linear		360° linear	
resolution	0.09°	1.41°	0.09°	1.41°
working distance max.	5 mm (with magnet rotor MSFS)	4 mm (with magnet rotor MSFS)	5 mm (with magnet rotor MSFS)	4 mm (with magnet rotor MSFS)
output circuit	current output		voltage output	
output signal	4...20 mA		0...4.3 VDC	0...5 VDC
response time	<4 ms			
connection	cable 2 m mating connector M8			
voltage supply	15...30 VDC		4.7...7.5 VDC	4.75...5.25 VDC
operating temperature	-40...+85 °C			
protection	IP 67			

Hall / speed sensors

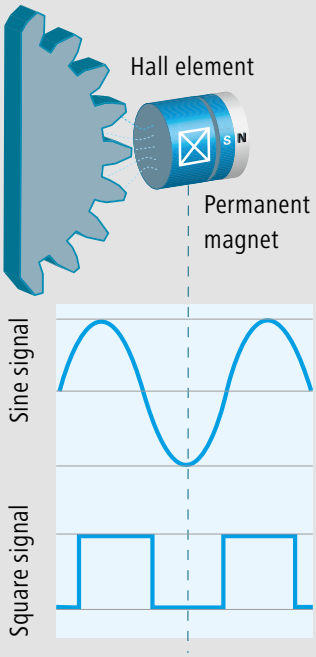
Size up to 18 mm. Incremental.

- Scanning of gear wheels from module 1
- High switching frequency up to 20 kHz
- For dirty, humid and oily environments
- Wide temperature range up to +120 °C

	MHRM 12 - 1 channel	MHRM 12 - 2 channels	IHRM 12 - 1 channel	MHRM 18 - 1 channel
features	■ Cylindrical design M12 ■ 1-channel push-pull output ■ High switching frequency ■ Large temperature range	■ Cylindrical design M12 ■ 2-channel push-pull output ■ Detection of speed and rotational direction ■ High protection class and pressure resistance ■ Wide temperature range up to +120 °C	■ Cylindrical design M12 ■ 1-channel PNP output ■ High degree of protection and pressure resistance ■ Wide temperature range up to +120 °C	■ Cylindrical design M18 ■ 1-channel PNP output ■ Wide temperature range up to +120 °C
dimensions (sensor head)	M12 x 1 (cyclindrical threaded)			M18 x 1 (cyclindrical threaded)
housing length	50 mm, 60 mm	60 mm		
switching frequency	0...15 kHz		1...20 kHz	
gear size	from modul 1			
gear width	>6 mm			
working distance max	0.7 mm (module 1) 2.4 mm (module 3)		1 mm (module 1) 2.5 mm (module 3)	0.7 mm (module 1) 1.8 mm (module 2)
output signal A	push-pull	push-pull	PNP	PNP
output signal B	–	push-pull	–	–
connection	cable, connector	cable	cable, mating connector M12	Cable
housing material	brass nickel plated	chrome-nickel steel		
operating temperature	–40...+85 °C	–40...+120 °C	–40...+120 °C (–25...+75 °C)	–40...+120 °C
protection (sensing face)	IP 67	IP 68		
protection (sensor)	IP 67	IP 67		

Robust speed measurement

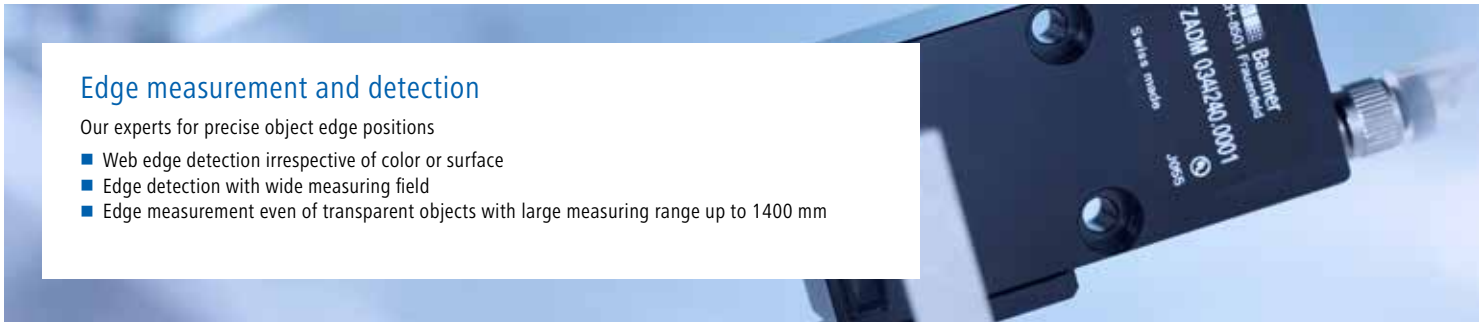
Hall sensors operate on non-contact sensing of ferromagnetic objects. Thanks to very high switching frequencies they are even capable of detecting the teeth at fast rotating gears. Space-saving and extremely robust, they provide eased speed feedback.



Functional principle

Hall sensors operate on a current-carrying semiconductor which is biased by a permanent magnet installed behind. This magnetic field being penetrated by a ferromagnetic object causes the semiconductor to change voltage, which is transformed by the integrated electronics into an amplified square signal.

Edge measurement and detection



Edge measurement and detection

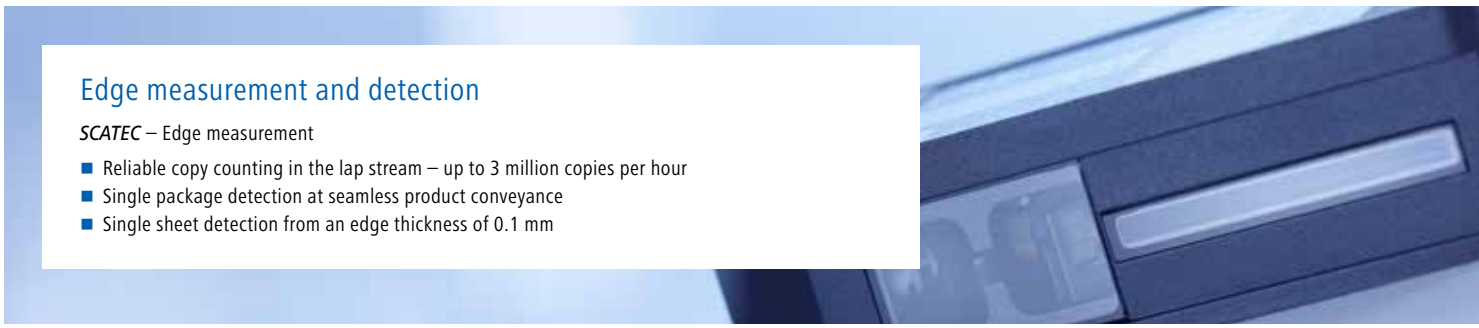
Our experts for precise object edge positions

- Web edge detection irrespective of color or surface
- Edge detection with wide measuring field
- Edge measurement even of transparent objects with large measuring range up to 1400 mm

	ZADM 023	ZADM 023	*ParCon* ZADM 034	*ParCon* ZADM 034
category	**edge detection with wide measuring field**	**edge detection with wide measuring field**	**measurements of edge positions and object widths**	**measurements of edge positions and object widths**
features	■ Control of textile, plastic or paper edges ■ Capable of detecting transparent objects and foils	■ Control of textile, plastic or paper edges ■ Extremely large measuring field up to 875 mm in width ■ Capable of detecting transparent objects and foils	■ Measuring mode: edges, width ■ Broad and parallel light beam ■ High measuring frequency	■ Measuring mode: edges, width, sum of all dark areas ■ Broad and parallel light beam ■ High measuring frequency
dimensions	23 × 50 × 50 mm	23 × 50 × 50 mm	34 × 67 × 16,5 mm	34 × 67 × 16,5 mm
sensor principle	Line sensor	Line sensor	Line sensor	Line sensor
light source	pulsed infrared diode			
measuring range Sd	50 mm 200 mm 500 mm	60 ... 1400 mm	0 ... 40 mm	0 ... 200 mm
measuring field size	30 mm 150 mm 350 mm	400 ... 875 mm	24 mm	22 mm
resolution	< 0,15 mm	< 2 mm	< 0,05 mm	< 0,1 mm (S = 0 ... 150 mm) < 0,2 mm (S = 150 ... 200 mm)
output circuit	PNP NPN	RS 485 PNP NPN	analog	analog
output signal	4 ... 20 mA	4 ... 20 mA	4 ... 20 mA	4 ... 20 mA
measuring frequency	> 500 Hz	> 500 Hz	> 1600 Hz	> 1100 Hz
connection types	connector M12 8 pin rotatable	connector M12 8 pin rotatable	connector M8 4 pin	connector M8 4 pin
housing material	die-cast zinc	die-cast zinc	aluminum	aluminum
operating temperature	0 ... +55 °C	0 ... +55 °C	0 ... +55 °C	0 ... +55 °C
protection class	IP 67	IP 67	IP 67	IP 67

ParCon ZADM 034
measurements of edge positions and object widths
■ Switching version ■ Detection of small objects ■ Measuring range up to 24 × 40 mm
34 × 67 × 16,5 mm
Line sensor
0 ... 40 mm
24 mm
< 0,1 mm
PNP
4 ... 20 mA
> 4000 Hz
connector M8 4 pin
aluminum
0 ... +55 °C
IP 67

Edge measurement and detection



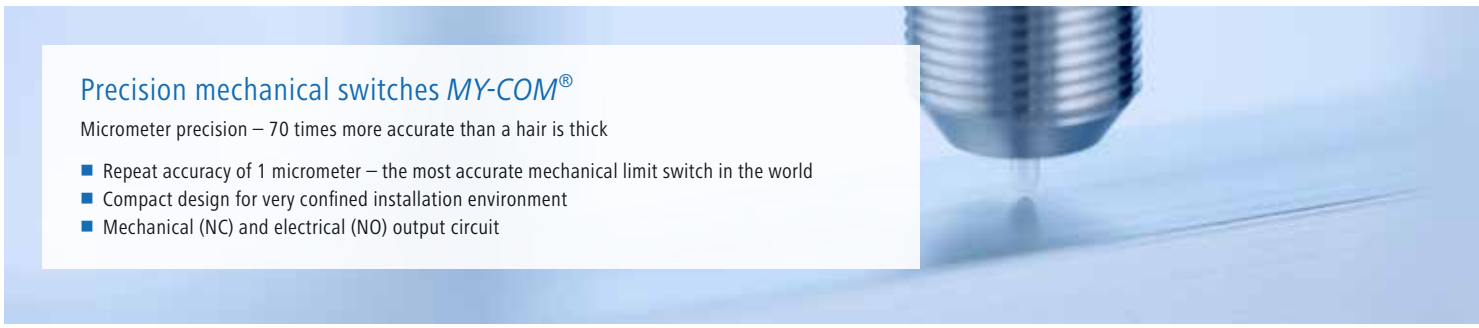
Edge measurement and detection

SCATEC – Edge measurement

- Reliable copy counting in the lap stream – up to 3 million copies per hour
- Single package detection at seamless product conveyance
- Single sheet detection from an edge thickness of 0.1 mm

	SCATEC-J	*SCATEC-2*	*SCATEC-10*	*SCATEC-15*
category	entry-level model edge thickness up 1,5 mm	standard edge thickness up 0,2 mm	precision class edge thickness up 0,1 mm	precision class edge thickness up 0,15 mm
dimensions	33 × 110 × 50 mm	33 × 110 × 50 mm	30 × 170 × 70 mm	30 × 170 × 70 mm
measuring distance	0 ... 55 mm	0 ... 120 mm	0 ... 90 mm	0 ... 120 mm
sensibility	single sheet/edge thickness 1,5 mm	single sheet/edge thickness 0,2 mm	single sheet/edge thickness 0,1 mm	single sheet/edge thickness 0,15 mm
counting rate	280'000 copies/h	600'000 copies/h	3'000'000 copies/h	3'000'000 copies/h
false pulse suppression		on/off switchable	4 program options	4 program options
connection types	connector M12	connector M12	DIN 45322 (main connector) DIN 45326 (interface)	DIN 45322 (main connector) DIN 45326 (interface)
housing material	PA 6	PA 6	die-cast zinc	die-cast zinc
operating temperature	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C
protection class	IP 54	IP 54	IP 54	IP 54
specific features		■ *SCATEC-2* Box for counting of individual packages (in transport clamps) ■ Counting of double copies		

Precision mechanical switches



Precision mechanical switches *MY-COM*®

Micrometer precision – 70 times more accurate than a hair is thick

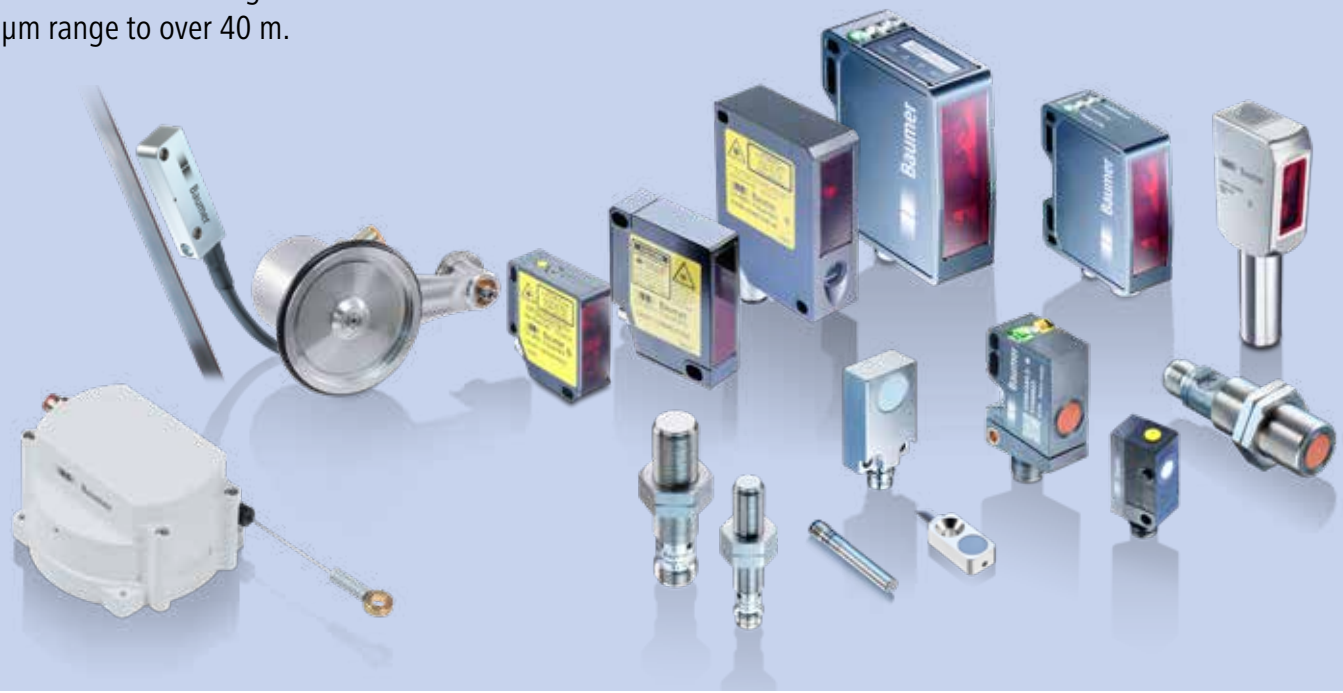
- Repeat accuracy of 1 micrometer – the most accurate mechanical limit switch in the world
- Compact design for very confined installation environment
- Mechanical (NC) and electrical (NO) output circuit

	MY-COM A	MY-COM B	MY-COM C	MY-COM D
features	■ Conical housing front ■ M8 fine pitch thread	■ Brass housing ■ Flat housing front ■ M8 fine pitch thread	■ Flat brass housing ■ 2-hole mounting	■ Robust burnished brass housing ■ Spherical metal tip ■ Protection class IP 67 ■ Lateral approach possible to 30°
all mechanical	■	■	■	
with amplifier				
for lateral approach				■
rugged IP 67				■
dimensions	M8 × 0,5	M8 × 0,5	8 × 12 × 30 mm	M16 × 0,5
repeat accuracy	< 1 µm	< 1 µm	< 1 µm	< 1 µm
output	NC (mechanical)	NC (mechanical)	NC (mechanical)	NC (mechanical) NO (PNP/NPN)
connection types	cable 0,8 m connector M8	cable 0,8 m connector S30	cable 0,8 m connector M8	cable 0,8 m connector M8
activating pin	zirconium oxide ZrO2	zirconium oxide ZrO2	zirconium oxide ZrO2	hardened steel
housing material	brass nickel plated	brass nickel plated	brass nickel plated	burnished brass
operating temperature	–20 ... +75 °C	–20 ... +75 °C	–20 ... +75 °C	–20 ... +75 °C
protection class	IP 50	IP 50	IP 50	IP 67

MY-COM E	MY-COM F MY-COM G	MY-COM H MY-COM L	MY-COM M
■ Brass housing ■ M6 fine pitch thread ■ Spherical hard metal tip ■ Lateral approach possible to 30°	■ Brass housing ■ Long M8 fine pitch thread	■ Brass housing ■ M8 fine pitch thread ■ Spherical ruby tip ■ Protection class IP 67	■ Brass housing ■ M8 fine pitch thread ■ Protection class IP 67
■	■	H	■
	G	L	■
■			
		■	■
M6 × 0,5	M8 × 0,5	M8 × 0,5	M8 × 0,5
< 1 µm	< 1 µm	< 1 µm	< 1 µm
NC (mechanical) NO (PNP/NPN)	NC (mechanical) NO (PNP/NPN)	NC (mechanical) NO (PNP/NPN)	NC (mechanical) NO (PNP/NPN)
cable 0,8 m	cable 0,8 m connector M8	cable 0,8 m connector M8	cable 0,8 m connector M8
hardened steel	zirconium oxide ZrO2	ruby	zirconium oxide ZrO2
brass nickel plated	brass nickel plated	brass nickel plated	brass nickel plated
–20 ... +75 °C	–20 ... +75 °C	–20 ... +75 °C	–20 ... +75 °C
IP 50	IP 50	IP 67	IP 67

Distance measurement

Sensors for detecting distances and distance information from the µm range to over 40 m.



Distance measurement

Optical distance sensors
Minature sensors 68
High performance sensors 69
Sensors for long measuring range and standard sensors 70
Sensors in hygienic and washdown design 72

Radar sensors
Radar sensors 74

Ultrasonic distance sensors
Minature sensors 76
Robust distance sensors with flexible parameterization 77
Ultrasonic sensors with Teach button 78
Chemically robust sensors / for off-highway machinery 80
With sonic nozzles / long ranges 81

Inductive distance sensors – *AlphaProx*®
Cylindrical housings 82
Rectangular housings 84
Linearized characteristic curve 86
Sensors with reduction factor 1 87
High-precision and high-sensitivity sensors 88
Robust sensors / Designed for Reliability 89
Sensors with IO-Link interface 90

Linear magnetisc encoders
Dimension 92

Measuring wheel encoders
Measuring wheels 94
Incremental encoders 95

Cable transducers
Absolute cable transducers 96

Accessories

Cables & adapters, mounting accessories 98
Testing and parameterization, network components 99
Reflectors & beam columnators 100
Magnets 101

Optical distance sensors

Optical distance sensors

Precise distance, spacing and position measurements even on challenging surfaces

- Fast and accuracy in the submicrometer range
- Reliably even on very rough, shiny or dark surfaces
- Very high ambient light immunity
- Large selection of performance classes, sizes and beam shapes

	OADM 12	OADM 13	OADM 20	OADM 20	OADM 21
category	miniature sensors		performance sensors		
features	■ Smallest laser distance sensor ■ Adjustable measuring range ■ High resolution ■ Also as laser class 1	■ Large measuring distance in a small housing ■ Adjustable measuring range ■ Also as laser class 1 & 2 ■ Point and Line	■ High vibration resistance ■ Different measuring ranges teachable ■ High measuring rates	■ Extremely high mechanical robustness ■ Increased ambient light immunity 100K lux ■ Suitable for outdoor applications	■ High resolution at large measuring distance ■ Adjustable measuring range
dimensions	12,4 × 37 × 34,5 mm	13,4 × 48,2 × 40 mm	20,6 × 65 × 50 mm	20,6 × 65 × 50 mm	20,4 × 135 × 45 mm
measuring distance	16 ... 120 mm	50 ... 550 mm	30 ... 1000 mm	50 ... 1000 mm	100 ... 1000 mm
resolution	≥ 2 µm	≥ 10 µm	≥ 4 µm	≥ 10 µm	≥ 10 µm
response time	< 0,9 ms	< 0,9 ms	< 0,9 ms	< 2,5 ms	< 5 ms
output	4 ... 20 mA 0 ... 10 V	4 ... 20 mA 0 ... 10 V RS 485 / RS 232	4 ... 20 mA 0 ... 10 V RS 485	4 ... 20 mA 0 ... 10 V	4 ... 20 mA 0 ... 10 V
connection types	connector M8	connector M8	connector M12	connector 2 m	connector M12
housing material	die-cast zinc	aluminum	die-cast zinc	die-cast zinc	aluminum
operating temperature	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C
protection class	IP 67	IP 67	IP 67	IP 67	IP 67
specific features	■ suppression of incorrect measuring operations, the last measured value is retained at the output for up to 30 ms	■ suppression of incorrect measuring operations, the last measured value is retained at the output for up to 30 ms	■ alarm output to signalize any incorrect measuring operation or out-of-range object ■ input for synchronizing measurements ■ laser diode can be switched on/off	■ missing measurement signals or incorrect measurements are suppressed	■ alarm output to signalize any incorrect measuring operation or out-of-range object ■ input for synchronizing measurements ■ laser diode can be switched on/off

OM70 Very high measuring accuracy	OM70 Large measuring distances	OM70 Tolerance measurement	OM70 Ethernet Very high measuring accuracy	OM70 Ethernet Large measuring distances
high performance sensors				
■ Selectable focus ranges ■ Resolutions up to 0,7 µm ■ Maximum measuring distances upt to 250 mm ■ Linearity deviations ±0,06 %	■ Selectable focus ranges ■ Resolutions up to 1,4 µm ■ Maximum measuring distances upt to 1500 mm	■ Selectable focus ranges ■ Resolutions up to 0,7 µm ■ Maximum measuring distances upt to 250 mm ■ Linearity deviations ±0,06 %	■ Configurable via web interface ■ Selectable focus ranges ■ Resolution up to 0.7 µm ■ Max. measuring distance up to 250 mm ■ Ethernet interface, OPC UA, Modbus TCP and Profinet	■ Configurable via web interface ■ Selectable focus ranges ■ Resolution up to 0.7 µm ■ Max. measuring distance up to 250 mm ■ Ethernet interface, OPC UA, Modbus TCP and Profinet
26 × 74 × 55 mm	26 × 74 × 55 mm	26 × 74 × 55 mm	26 × 74 × 55 mm	26 × 74 × 55 mm
30 ... 250 mm	100 ... 1500 mm	30 ... 250 mm	30 ... 250 mm	100 ... 1500 mm
≥ 0,7 µm	≥ 1,4 µm	≥ 0,7 µm	≥ 0,7 µm	≥ 1,4 µm
< 0,8 ms	< 0,8 ms	< 6 ms	< 0,8 ms	< 0,8 ms
4 ... 20 mA 0 ... 10 V RS 485	4 ... 20 mA 0 ... 10 V RS 485	4 ... 20 mA 0 ... 10 V RS 485	0 ... 5 mA 4 ... 20 mA 2 ... 10 V 0 ... 10 V Ethernet TCPI/P	0 ... 5 mA 4 ... 20 mA 2 ... 10 V 0 ... 10 V Ethernet TCPI/P
connector M12	connector M12	connector M12	connector M12 connector M8	connector M12 connector M8
aluminum	aluminum	aluminum	aluminum	aluminum
–10 ... +50 °C	–10 ... +50 °C	–10 ... +50 °C	–10 ... +50 °C	–10 ... +50 °C
IP 67	IP 67	IP 67	IP 67	IP 67
■ selectable filtering ■ configurable, digital switching output with adjustable hysteresis in millimeters ■ various trigger modes, touch display ■ changeover between current or voltage output 3 memory slots for parameter settings	■ selectable filtering ■ configurable, digital switching output with adjustable hysteresis in millimeters ■ various trigger modes, touch display ■ changeover between current or voltage output 3 memory slots for parameter settings	■ selectable filtering ■ configurable, digital switching output with adjustable hysteresis in millimeters ■ various trigger modes, touch display ■ changeover between current or voltage output 3 memory slots for parameter settings	■ Beyond the Standard: Connectivity ■ Easy system integration thanks to standardized interfaces ■ Flexible parameterizati-on via web interface ■ Precise measurement of structured and smallest objects thanks to line and spot beam shapes	■ Beyond the Standard: Connectivity ■ Easy system integration thanks to standardized interfaces ■ Flexible parameterizati-on via web interface ■ Precise measurement of structured and smallest objects thanks to line and spot beam shapes

Optical distance sensors

Large measuring range up to 13 meters

OADM 250 / OADM 260

- Resolutions up to 1.3 mm
- Time-of-Flight principle for up to 13 m measuring range
- Linearity errors down to ± 0,1 %
- Compact aluminum housing 20,4 x 135 x 45 mm

	OADM 250	OADM 260
category	**long range sensors**	
features	■ High resolution ■ Measurement up to 4 m independent of colors ■ Alarm output ■ Adjustable measuring range	■ Large measuring range up to 13 m ■ Alarm output ■ Adjustable measuring range
dimensions	25,4 × 66 × 51 mm	25,4 × 66 × 51 mm
measuring distance	0,5 ... 4 m	0,5 ... 13 m
resolution	≥ 1,3 mm	≥ 5 mm
response time	< 10 ms	< 10 ms
output signal	4 ... 20 mA 0 ... 10 V	4 ... 20 mA 0 ... 10 V
connection types	connector M12	connector M12
housing material	aluminum	aluminum
operating temperature	–25 ... +50 °C	–25 ... +50 °C
protection class	IP 67	IP 67
specific features	■ alarm output to signalize any incorrect measuring operation or out-of-range object	■ alarm output to signalize any incorrect measuring operation or out-of-range object

Standard distance sensors

- Resolution up to 0.1 mm
- Measuring range up to 1000 mm
- Red LED or laser class 1
- Washdown and hygienic design
- IO-Link

	O300.DI / DP / DL	FADK 14 LED distanz sensor	O500.DI / DP	OADK 25 Laser distanz sensor
category	standard sensors			
features	■ Distance measurement value via IO-Link in a miniature housing ■ Switching output ■ PinPoint LED, infrared LED or laser	■ Compact housing ■ Measuring distance 50 ... 400 mm ■ Resolution up to 0,1 mm	■ Distance measurement value via IO-Link ■ Switching output ■ Red light, infrared LED	■ *qTeach*® ■ Alarm output ■ Laser class 1
dimensions	12,9 × 32,3 × 23 mm	14,8 x 43 x 31 mm	18 × 45 × 32 mm	23,4 × 63 × 45 mm
measuring distance	30 ... 300 mm (Infrared, PinPoint) 30 ... 250 mm (Laser)	50 ... 400 mm	60 ... 550 mm	100 ... 1000 mm
resolution	0,5 ... 5 mm (Infrared, PinPoint) 0,5 ... 10 mm (Laser)	0,1 ... 1 mm	0,5 ... 5 mm	0,3 mm
response time	< 0,25 ms	< 3 ms	< 0,49 ms	< 12,8 ms
output signal	push-pull / IO-Link	4 ... 20 mA 0 ... 10 V	push-pull / IO-Link	4 ... 20 mA 0 ... 10 V
connection types	cable 2 m connector M8	cable 2 m connector M12	cable 2 m connector M12	cable 2 m connector M12
housing material	plastic (ASA, PMMA)	plastic (ASA, MABS)	plastic (ASA, PMMA)	plastic (SAN LURAN 378P)
operating temperature	–25 ... +60 °C –10 ... +60 °C (laser)	0 ... +50 °C	–25 ... +60 °C	0 ... +50 °C
protection class	IP 67	IP 67	IP 67	IP 67
specific features	■ cost-effective solution for simpler measuring tasks	■ cost-effective solution for simpler measuring tasks	■ cost-effective solution for simpler measuring tasks	■ cost-effective solution for simpler measuring tasks

Optical distance sensors

Robust stainless steel distance sensors

Sensors in hygienic and washdown design

- Stainless steel housing V4A
- *proTect+*® sealing concept
- Ecolab-tested and -certified
- EHEDG-compliant hygienic design resp. FDA-compliant washdown design

IO-Link

IO-Link

	FADR 14	FADH 14	OADR 20
features	■ Washdown design ■ Adjustable measuring range ■ Point source LED	■ Hygienic design ■ Adjustable measuring range ■ Point source LED	■ Washdown design ■ Adjustable measuring range ■ Laser beam ■ Laser Point / Laser line ■ Vibratio n-resistant
dimensions	19,6 × 62,4 × 33,8 mm	19,6 × 99,5 × 33,6 mm	20,3 × 65 × 50 mm
measuring distance	50 ... 400 mm	50 ... 400 mm	30 ... 600 mm
resolution	0,1 mm	0,1 mm	5 µm
response time	< 3 ms	< 3 ms	< 0,9 ms
output signal	4 ... 20 mA 0 ... 10 V	4 ... 20 mA 0 ... 10 V	4 ... 20 mA 0 ... 10 V
connection types	connector M12	cable 2 m flylead connector M12	connector M12
housing material	stainless steel 1.4404 (V4A)	stainless steel 1.4404 (V4A)	stainless steel 1.4404 (V4A)
operating temperature	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C
protection class	IP 68 / IP 69K & proTect+	IP 68 / IP 69K & proTect+	IP 68 / IP 69K & proTect+
specific features	■ alarm output to signalize any incorrect measuring operation or out-of-range object ■ service status indicator when soiled	■ alarm output to signalize any incorrect measuring operation or out-of-range object ■ service status indicator when soiled	■ alarm output to signalize any incorrect measuring operation or out-of-range object ■ input for synchronizing measurements ■ laser diode can be switched on/off

Radar sensors

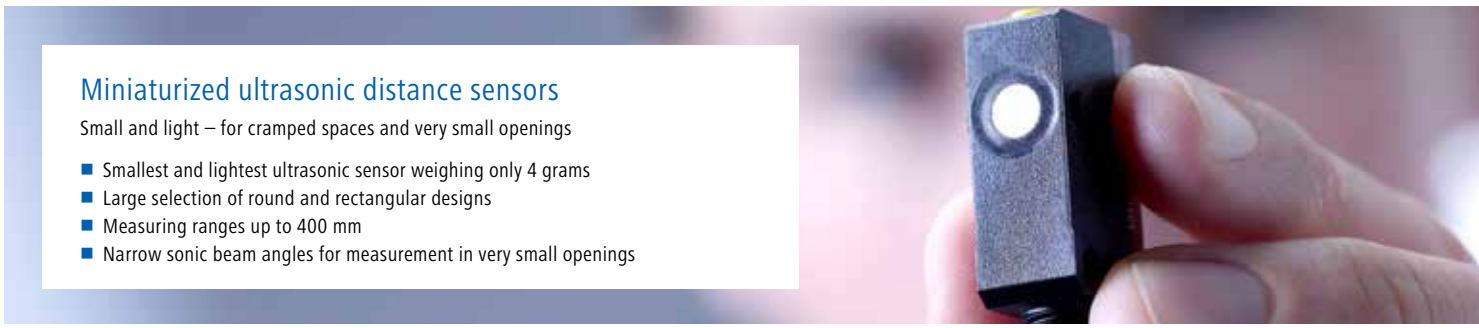
Radar distance measuring sensors

Precise measurements in the most extreme environments

- Smallest radar sensor with very narrow beam profile
- Reliable distance measurement up to 40 m even in harsh environments and when covered with dirt
- Available in Europe, USA and Canada

	RR30.DA (122 GHz)
	for flat or round objects to 40 m
features	■ Parallel analog and switching output ■ Narrow opening angle
dimensions	M30 × 107 mm
measuring distance	0,3 ... 40 m
response time	< 1 mm
output	4 ... 20 mA / 20 ... 4 mA + push-pull 0 ... 10 V / 10 ... 0 V + push-pull
adjustable parameters	Measuring distance, switching points via *qTeach*
connection types	connector M12 5 pin
housing material	stainless steel
operating temperature	–25 ... +65 °C
protection class	IP 68/IP 69K

Ultrasonic distance sensors



Miniaturized ultrasonic distance sensors

Small and light – for cramped spaces and very small openings

- Smallest and lightest ultrasonic sensor weighing only 4 grams
- Large selection of round and rectangular designs
- Measuring ranges up to 400 mm
- Narrow sonic beam angles for measurement in very small openings

IO-Link

	UNAM 12	UNDK 09 UNCK 09	UNDK 10
category	miniature	miniature	miniature
features	■ Narrow and wide sonic beam angles ■ External Teach-in ■ M12 connector	■ High resolution ■ Minimal blind region ■ RS 232 ■ Various mounting options ■ Flat housing ■ Narrow sonic beam angle for detection in openings of up to 3 mm	■ Smallest ultrasonic sensor ■ Internal and external Teach-in ■ Very low weight: 4 g ■ Narrow sonic beam angle ■ Cable and flylead connector versions
dimensions	M12	8,6 × 48,8 × 57,5 mm	10,4 × 27 × 14 mm
measuring distance	20 ... 400 mm	3 ... 200 mm	20 ... 200 mm
response time	< 10 ms	< 7 ms	< 15 ms
resolution	< 0,5 mm	< 0,1 mm	< 0,3 mm
repeat accuracy	< 0,5 mm	< 0,5 mm	< 0,5 mm
output	0 ... 10 mA / 10 ... 0 mA 0 ... 10 V / 10 ... 0 V	0 ... 10 V / 10 ... 0 V RS 232	0 ... 10 V / 10 ... 0 V
connection types	connector M12	cable 2 m flylead connector M8	cable 2 m connector M8 flylead connector M8
housing material	brass nickel plated	plastic	plastic
operating temperature	–10 ... +60 °C	0 ... +60 °C	–10 ... +60 °C
protection class	IP 67	IP 67	IP 67
specific features	■ with or w/o sonic nozzles	■ with or w/o sonic nozzles ■ cascadable in 9 mm grid	■ wide range of accessories and installation options

Robust ultrasonic distance sensors with flexible parameterization

Extremely resistant and flexible parameterization for any application

- Highest process reliability due to hermetically sealed sensor element
- IO-Link functionality for flexible parameterization
- Short blind range of 70 mm with a sensing distance up to 1000 mm
- Highest quality with high economic efficiency

IO-Link

IO-Link

	UR18	U500
features	■ IO-Link interface ■ Robust sensor element ■ Push-pull measurement signal due to IO-Link	
dimensions	M18	15 × 45,1 × 32,2 mm
measuring distance	70 ... 1000 mm	70 ... 1000 mm
response time	< 40 ms	< 40 ms
resolution	< 0,3 mm	< 0,3 mm
repeat accuracy	< 0,5 mm	< 0,5 mm
output	4 ... 20 mA / 20 ... 4 mA + push-pull 0 ... 10 V / 10 ... 0 V + push-pull	
adjustable parameters	Switching points or switching windows for distance or counter, measuring range, sound beam, averaging, temperature compensation, output logic, switching hysteresis, input/ output logic, switch-off delay, output circuit, SSC / output assignment, LED behavior, teaching facilities	
process data	MDC: Distance, counter SSC: Distance, counter	
diagnostic data	Switching cycles, operating time, boot cycles, histograms of process data values and the operating voltage and device temperature	
connection types	connector M12, 5 pin	connector M12, 5 pin
housing material	stainless steel V2A	plastic ASA
operating temperature	–25 ... +65 °C	–25 ... +65 °C
protection class	IP 69	IP 67

Ultrasonic distance sensors

Ultrasonic distance sensors with teach button

Unimpressed by difficult environmental conditions and varying object properties

- Cylindrical versions in M18 or M30 housings with connector or cable output
- Extremely compact, flat housing designs
- With teach-in or potentiometer
- Sensing distances up to 2000 mm

	UNAM 18	UNAM 30	UNDK 20	UNDK 30
category	**standard**	standard	standard	**standard**
features	■ Internal and external Teach-in ■ M12 connector	■ Internal and external Teach-in ■ Cable and connector versions ■ Potentiometer versions	■ Flat type ■ Internal and external Teach-in ■ Narrow and wide sonic beam angles ■ M8 connector	■ Compact design ■ Large sensing range ■ Internal Teach-in ■ Potentiometer version ■ Narrow and wide sonic beam angles ■ Cable and connector versions
dimensions	M18	M30	20 × 42 × 15 mm	30 × 65 × 31 mm
measuring distance	100 ... 1000 mm	100 ... 1000 mm	20 ... 1000 mm	30 ... 2000 mm
response time	< 10 ms	< 100 ms	< 10 ms	
resolution	< 0,3 mm	< 0,3 mm	< 0,3 mm	< 0,3 mm
response time	< 0,5 mm	< 0,5 mm	< 0,5 mm	< 1 mm
output	4 ... 20 mA / 20 ... 4 mA 0 ... 10 V / 10 ... 0 V	4 ... 20 mA / 20 ... 4 mA 0 ... 10 V / 10 ... 0 V	4 ... 20 mA / 20 ... 4 mA 0 ... 10 V / 10 ... 0 V	4 ... 20 mA / 20 ... 4 mA 0 ... 10 V / 10 ... 0 V
connection types	cable 2 m connector M12	connector M12 cable 2 m	connector M8	cable 2 m connector M12
housing material	stainless steel	brass nickel plated	plastic	plastic / die-cast zincs
operating temperature	–10 ... +60 °C	–10 ... +60 °C	–10 ... +60 °C	–10 ... +60 °C
protection class	IP 67	IP 67	IP 67	IP 67
specific features	■ optional sonic deflection bracket mounting			

Ultrasonic distance sensors with Teach button

Ultrasonic distance sensors

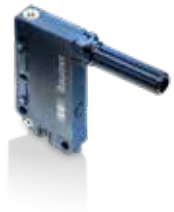
Application-specific ultrasonic distance sensors – Chemically robust / for off-highway-machinery

- Chemical robust **stainless steel sensors with patented parylene coating**
- Ultrasonic distance sensors for off-highway-machinery - designed for reliability

	UNAR 12	UNAR 18	U750
category	**Chemically robust stainless steel sensors with parylene coating**		**For off-highway-machinery**
features	■ Miniature sensor for narrow designs ■ Patented all-round protection ■ FDA-compliant materials ■ Very short response time	■ M18 standard housing ■ FDA-compliant materials ■ Internal and external Teach-in	■ Designed for relibility ■ Very small blinde range ■ For fill level application ■ 5 VDC power supply
dimensions	M12 × 70 mm	M18 × 91,5 mm	70 × 48 × 115 mm
measuring distance	20 ... 200 mm	60 ... 1000 mm	100 ... 2300 mm
response time	< 30 ms	< 80 ms	< 3000 ms
resolution	< 0,3 mm	< 0,3 mm	< 1 mm
repeat accuracy	< 0,5 mm	< 0,5 mm	< 5 mm
output	0 ... 10 mA / 10 ... 0 mA 0 ... 10 V / 10 ... 0 V	4 ... 20 mA / 20 ... 4 mA 0 ... 10 V / 10 ... 0 V	0,5 ... 4,5 VDC
connection types	connector M12	connector M12	German connector DT13-4P 4 pin
housing material	stainless steel	stainless steel	plastic (PA 10T/X)
operating temperature	0 ... +60 °C	0 ... +60 °C	–20 ... +70 °C
protection class	IP 67	IP 67	IP 67

Application-specific ultrasonic distance sensors – Sonic nozzles / measuring distance

- Sensors with sonic nozzle for tiny objects and very narrow passages
- Sensors with long-range detection up to 6000 mm



	UNAM 12	UNCK 09 UNDK 09	UNAM 50	UNAM 70
category	**sensors with sonic nozzles**		**long ranges**	
features	■ External Teach-in ■ M12 connector ■ Beam columnator for very narrow sonic cone profile	■ High resolution ■ Minimal blind region ■ RS 232 ■ Various mounting options ■ Flat housing ■ Narrow sonic beam angle for detection in openings of up to 3 mm	■ Large sensing range ■ Internal and external Teach-in ■ Cable and connector versions ■ Potentiometer versions	■ Large sensing range ■ Internal and external Teach-in ■ M12 connector
dimensions	M12	8,6 × 48,8 × 57,5 mm	M30	M30
measuring distance	20 ... 400 mm	23 ... 200 mm	400 ... 2500 mm	600 ... 6000 mm
resolution	< 0,3 mm	< 0,1 mm	< 0,3 mm	< 2 mm
repeat accuracy	< 0,5 mm	< 0,5 mm	< 1mm	< 1mm
output	0 ... 10 mA / 10 ... 0 mA 0 ... 10 V / 10 ... 0 V	0 ... 10 mA / 10 ... 0 mA RS 232	4 ... 20 mA / 20 ... 4 mA 0 ... 10 V / 10 ... 0 V	4 ... 20 mA / 20 ... 4 mA 0 ... 10 V / 10 ... 0 V
connection types	connector M12	connector M12 cable 2 m	connector M12 cable 2 m	connector M12
housing material	brass nickel plated	plastic	brass nickel plated	brass nickel plated
operating temperature	–10 ... +60 °C	0 ... +60 °C	–10 ... +60 °C	–25 ... +60 °C
protection class	IP 67	IP 67	IP 67	IP 67

Inductive distance sensors – *AlphaProx®*

Inductive distance sensors – cylindrical

- High resolution and repeatability
- Wide measuring ranges
- High measuring speed
- Extra-short designs

	IWRM 04	IR06.DxxS	IR08.DxxS	IR12.DxxS
category	**subminiature**	**sub-/miniature**	**sub-/miniature**	**compact**
features	■ Very high resolution ■ Quick response time ■ Fully integrated electronics ■ With M5 connector	■ Large measuring distance ■ Very high resolution ■ Quick response time ■ Fully integrated electronics ■ Short design	■ Large measuring distance ■ Very high resolution ■ Quick response time ■ Fully integrated electronics ■ Short design	■ Large measuring distance ■ Very high resolution ■ Quick response time ■ Linearized output calibration curves with Teach-in
dimensions	ø 4 mm	ø 6,5 mm	M8	M12
housing length	30 mm	up 22 mm	up 22 mm	up 40 mm
measuring distance Sd	0 ... 1 mm	0 ... 3 mm	0 ... 3 mm	0 ... 6 mm
resolution	1 µm	1 µm	1 µm	1 µm
repeat accuracy	5 µm	10 µm	10 µm	10 µm
response time	0,5 ms	0,5 ms	0,5 ms	1 ms
output signal	0 ... 10 V	0 ... 10 mA 0 ... 10 V	0 ... 10 mA 0 ... 10 V	4 ... 20 mA 0 ... 10 V
connection types	connector M5	cable 2 m connector M8	cable 2 m connector M8	cable 2 m connector M12
housing material	stainless steel	stainless steel	stainless steel	brass nickel plated
operating temperature	+10 ... +60 °C	–10 ... +70 °C	–10 ... +70 °C	–25 ... +75 °C
protection class	IP 67	IP 67	IP 67	IP 67

IR18.DxxS	IR30.DxxS
compact	**compact**
■ Large measuring distance ■ Very high resolution ■ Linearized output calibration curves with Teach-in	■ Large measuring distance ■ Very high resolution ■ Linearized output calibration curves with Teach-in ■ Flush and non-flush designs
M18	M30
up 50 mm	60 mm
0 ... 8 mm	0 ... 24 mm
2 µm	5 µm
15 µm	20 µm
2 ms	2 ms
4 ... 20 mA 0 ... 10 V	4 ... 20 mA 0 ... 10 V
cable 2 m connector M12	connector M12
brass nickel plated	brass nickel plated
–10 ... +70 °C	–25 ... +75 °C
IP 67	IP 67

Inductive distance sensors – *AlphaProx®*

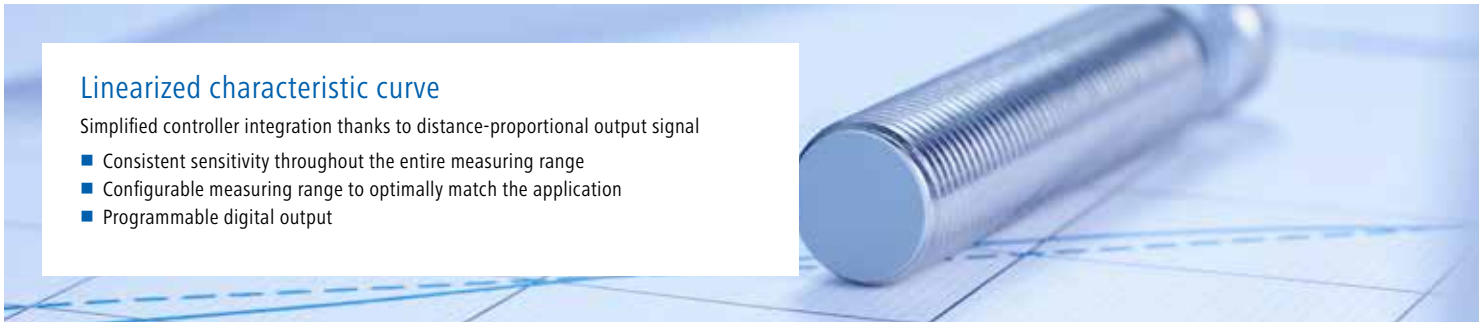
Inductive distance sensors – rectangular

- High repeat accuracy
- Large measuring range
- High measuring speed

	IWFM 05	IF08.D02S	IWFM 12	IWFM 18
category	**subminiature**	**subminiature**	**compact**	**compact**
features	■ Very high resolution ■ Quick response time ■ Fully integrated electronics ■ With M5 connector	■ Very high resolution ■ Compact model ■ Fully integrated electronics ■ Through-hole for M3 bolt	■ Integrated current and voltage output ■ Fully integrated electronics	■ Integrated current and voltage output ■ Fully integrated electronics
dimensions (B × T × L)	5 × 5 × 32 mm	8 × 4,7 × 16 mm	12 × 12 × 60 mm	18 × 10 × 30 mm
measuring distance Sd	0 ... 1 mm	0 ... 2 mm	0 ... 4 mm	0 ... 4 mm
resolution	1 µm	1 µm	1 µm	1 µm
repeat accuracy	10 µm	20 µm	5 µm	5 µm
response time	0,5 ms	1 ms	2 ms	2 ms
output signal	0 ... 10 V	0 ... 10 V	0 ... 10 V 4 ... 20 mA	0 ... 10 V 4 ... 20 mA
connection types	connector M5	cable 2 m flylead connector M8 flylead connector M5	cable 2 m connector M8	connector M8
housing material	brass nickel plated	die-cast zinc nickel plated	brass nickel plated	brass nickel plated
operating temperature	+10 ... +60 °C	+10 ... +60 °C	–10 ... +70 °C	–10 ... +70 °C
protection class	IP 67	IP 67	IP 67	IP 67
specific features	■ smallest inductive sensor with analog output	■ extremely low-profile version for front-side single-hole installation		

IWFM 20
compact
■ Integrated current and voltage output ■ Fully integrated electronics
20 × 12 × 35 mm
2 ... 5 mm
1 µm
10 µm
2 ms
0 ... 10 V 1 ... 9 V 4 ... 20 mA
connector M8 flylead connector M8
brass nickel plated
–10 ... +70 °C 0 ... +60 °C
IP 67

Inductive distance sensors – *AlphaProx®*



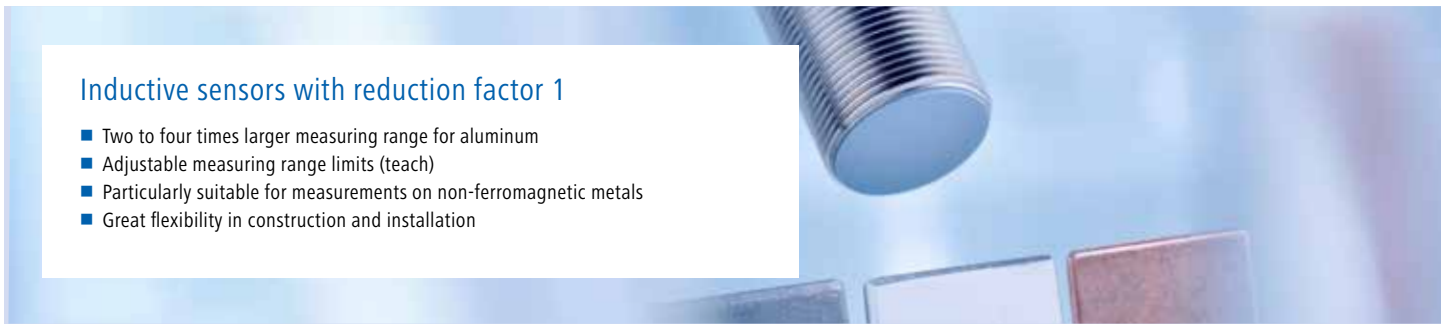
Linearized characteristic curve

Simplified controller integration thanks to distance-proportional output signal

- Consistent sensitivity throughout the entire measuring range
- Configurable measuring range to optimally match the application
- Programmable digital output

linearized characteristic curve	IR06.DxxL	IR08.DxxL	IR12.DxxL	IR18.DxxL	IR30.DxxL
category	miniatur	miniatur	compact	compact	compact
features	■ Adjustable measuring range ■ Linearized output calibration curves ■ External Teach-in	■ Adjustable measuring range ■ Linearized output calibration curves ■ External Teach-in	■ Adjustable measuring range ■ Linearized output calibration curves ■ External Teach-in	■ Adjustable measuring range ■ Linearized output calibration curves ■ External Teach-in	■ Adjustable measuring range ■ Linearized output calibration curves ■ External Teach-in
dimensions	ø 6,5 mm	M8	M12	M18	M30
housing length	up 40 mm	up 40 mm	60 mm	60 mm	60 mm
measuring distance Sd	0 ... 3 mm	0 ... 3 mm	0 ... 6 mm	0 ... 8 mm	0 ... 24 mm
resolution	3 µm	3 µm	3 µm	8 µm	5 µm
repeat accuracy	10 µm	10 µm	10 µm	15 µm	20 µm
response time	2 ms	2 ms	1 ms	1 ms	5 ms
output signal	0 ... 10 V	0 ... 10 V	4 ... 20 mA 0 ... 10 V	4 ... 20 mA 0 ... 10 V	4 ... 20 mA 0 ... 10 V
connection types	cable 2 m connector M8	cable 2 m connector M8	connector M12	connector M12	connector M12
housing material	stainless steel	stainless steel	brass nickel plated	brass nickel plated	brass nickel plated
operating temperature	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C
protection class	IP 67	IP 67	IP 67	IP 67	IP 67

Linearized characteristic curve & factor 1



Inductive sensors with reduction factor 1

- Two to four times larger measuring range for aluminum
- Adjustable measuring range limits (teach)
- Particularly suitable for measurements on non-ferromagnetic metals
- Great flexibility in construction and installation

	IWFM 18	IWFK 20
	compact	**compact**
	■ Integrated current and voltage output ■ Fully integrated electronics	■ Adjustable measuring range ■ Teach-in button housing-integrated ■ Large measuring range ■ Plastic housing
	18 × 10 × 30 mm	20 × 15 × 42 mm
	0 ... 4 mm	0 ... 10 mm
	5 µm	10 µm
	10 µm	15 µm
	2,5 ms	3 ms
	0 ... 10 V	0 ... 10 VDC
	connector M8	connector M8
	brass nickel plated	plastic
	–10 ... +70 °C	–10 ... +70 °C
	IP 67	IP 67

factor 1	IR18.DxxF
category	**compact**
features	■ Very high measurement sensitivity ■ Linearized output calibration curves ■ External Teach-in
dimensions	M18
housing length	60 mm
measuring distance Sd	0 ... 8 mm
resolution	20 µm
repeat accuracy	30 µm
response time	15 ms
output signal	0 ... 10 V
connection types	connector M12
housing material	brass nickel plated
operating temperature	–25 ... +75 °C
protection class	IP 67

Inductive distance sensors – *AlphaProx®*

High-precision sensors

High-precision and high-sensitivity inductive sensors

- Large signal change for even the smallest position changes
- Solutions for high-end applications with a resolution of up to 4 nm
- Completely integrated in compact housing
- Easy teach option

high-precision and high-sensitivity inductive sensors	IPRM 12	IR12.DxxK IR18.DxxK
category	**High-precision sensors**	**High-sensitivity sensors**
dimensions	M12	M12 M18
housing length	90 mm	60 mm
measuring distance Sd	0 ... 3 mm	0,25 mm (Teach-in between 0 ... 3 mm)
resolution	0,004 µm	0,25 µm
sensitivity		40 V/mm 64 mA/mm
repeat accuracy	1 µm	1 µm
response time	2 ms	3 ms
output signal	4 ... 20 mA	4 ... 20 mA 0 ... 10 V
connection types	connector M12	cable 2 m connector M12
housing material	steel nickel plated	steel nickel plated
operating temperature	0 ... +60 °C	–10 ... +60 °C
protection class	IP 67	IP 67

Sturdy sensors

Precise measurements even in demanding applications

- Rugged stainless steel housing
- Outdoor- and Washdown design
- Inductive distance sensors for Off-highway-machines
- Easy teach option

sturdy sensors	IWRP 16	IWRM 18	IWRR 18
category	High-pressure resistant sensors	Outdoor design	Outdoor design Washdown design
dimensions	M16	M18	M18
housing length	61 mm	60 mm	60 mm
measuring distance Sd	0 ... 4 mm	0 ... 8 mm	0 ... 7 mm
resolution	5 µm	5 µm	5 µm
repeat accuracy	10 µm	15 µm	15 µm
response time	1 ms	2 ms	2 ms
output signal	4 ... 20 mA	4 ... 20 mA	4 ... 20 mA
connection types	connector M12	connector M12	connector M12
housing material	stainless steel	brass nickel plated	stainless steel 1.4404 (V4A)
operating temperature	–25 ... +75 °C	–40 ... +70 °C	–40 ... +70 °C
protection class	IP 68 (from front) IP 67	IP 67	IP 68/69K & *proTect+*
specific features	■ High-pressure resistant up to 300 bar ■ linearized characteristic output curve ■ External teach-in feature		■ Ecolab-tested ■ FDA-compliant

designed for reliability	IR18V.D08L
category	For Off-highway-machines
dimensions	M18
housing length	50 mm
measuring distance Sd	0 ... 8 mm
resolution	8 µm
repeat accuracy	16 µm
switching frequency	< 450 Hz
output signal	0,5 ... 4,5 VDC
connection types	cabel flylead connector German
housing material	brass nickel plated
operating temperature	–40 ... +85 °C
protection class	IP 69K (face) IP 68
approvals	EN 13309-2010 EN ISO 14982-2009 ISO 13766-2009

Inductive distance sensors – *AlphaProx®*

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linearized characteristic curve	IR06.DxxL	IR08.DxxL	IR12.DxxL	IR18.DxxL	IR30.DxxL
category	miniatur	miniatur	compact	compact	compact
features	■ Adjustable measuring range ■ Linearized output calibration curves	■ Adjustable measuring range ■ Linearized output calibration curves	■ Adjustable measuring range ■ Linearized output calibration curves	■ Adjustable measuring range ■ Linearized output calibration curves	■ Adjustable measuring range ■ Linearized output calibration curves
dimensions	ø 6,5 mm	M8	M12	M18	M30
housing length	46 mm	46 mm	50 mm	60 mm	60 mm
measuring distance Sd	0 ... 3 mm	0 ... 3 mm	0 ... 6 mm	0 ... 10 mm	0 ... 18 mm
resolution	5 µm	5 µm	3 µm	5 µm	10 µm
repeat accuracy	10 µm	10 µm	10 µm	15 µm	20 µm
min. cycle time	0,6 ms	0,6 ms	1 ms	1 ms	5 ms
output signal	Push-Pull / IO-Link				
adjustable parameters	Switching points or switching window for distance, frequency or counter, measuring range, output logic, switching hysteresis, input / output logic, switch-off delay, output circuit, measured value filter, SSC / output assignment, LED behaviour, teaching options				
process data	MDC: Distance, frequency or counter SSC1: Distance SSC2: Distance SSC3: Frequency SSC4: Counter				
diagnostic data	Switching cycles, operating time, booting cycles, histograms of process data, supply voltage and device temperature				
connection types	connector M8	connector M8	connector M12	connector M12	connector M12
housing material	stainless steel	stainless steel	brass nickel plated	brass nickel plated	brass nickel plated
operating temperature	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C	–25 ... +75 °C
protection class	IP 67	IP 67	IP 67	IP 67	IP 67

Inductive sensors with IO-Link interface

Linear bearingless encoders

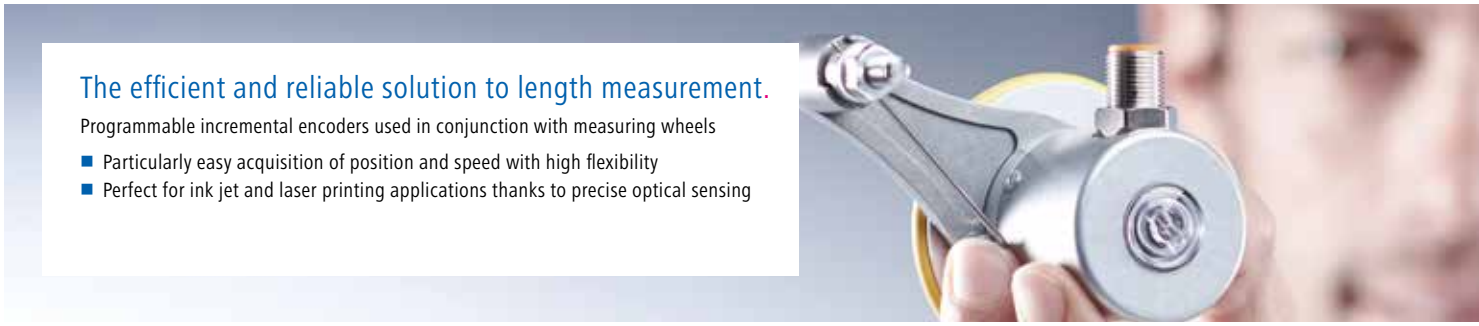
Non-contact length measuring operations, cost-efficient and precise

- Non-contact magnetic sensing technology free from wear
- Resistant to dirt and vibrations
- Long-life by virtue of robustness in extreme ambient conditions
- For maximum machine and system uptime

	MIL10
category	**Linear bearingless encoder**
features	■ Linear measuring system ■ Output signals A 90° B with index pulse ■ Output circuit push-pull or RS422
size (sensor head)	rectangular
dimensions (sensor head)	10 x 15 x 45,5 mm
sensing distance	0,1 ... 0,6 mm
interpolation	factor 20, 50, 100
movement speed	<5 m/s (resolution 5 µm) <10 m/s (resolution 10 µm) <25 m/s (resolution 25 µm)
output circuit	HTL/Push-pull TTL/RS422
output signal	A 90° B, R + inverted
total resolution	5 µm (factor 4 evaluation) 10 µm (factor 4 evaluation) 25 µm (factor 4 evaluation)
system-accuracy	±(0,02 mm +0,04 mm x magnetic belt length)
connection	cable 2 m cable 0,3 m with connector M12
voltage supply	10 ... 30 VDC, 5 VDC ±5 %
operating temperature	–40 ... +85 °C
protection class	IP 66, IP 67

Linear bearingless encoders

Measuring wheel encoders



The efficient and reliable solution to length measurement.

Programmable incremental encoders used in conjunction with measuring wheels

- Particularly easy acquisition of position and speed with high flexibility
- Perfect for ink jet and laser printing applications thanks to precise optical sensing

	MA20
category	**Compact, high-resolution measuring wheel system**
features	■ Measuring wheel encoder comprising encoder, tether arm and measuring wheel ■ Contact pressure fully adjustable
configurable parameters	16 pre-defined resolutions
configuration	HEX switch
sensing method	optical
dimensions	ø 40 mm (encoder)
voltage supply	4,75 ... 30 VDC
output stage	HTL/push-pull
output signals	A 90° B
shaft type	solid shaft ø 6 mm
connection types	flange connector M12, cable radial
pulses per revolution	100 ... 25 000
operating temperature	–20 ... +85 °C
protection class	IP 64
operating speed	≤ 3000 rpm
options	measuring wheels available with different rubber surface

	MR series
category	**Measuring wheels**
features	■ The perfect grip at any surface ■ Different surface profiles to match the application best ■ Circumference 200, 300 or 500 mm ■ For shaft diameter 4 ... 12 mm

	EIL580P-SC
category	Programming, incremental encoders combined with measuring wheel and programming device
features	■ Solid shaft with pressure or servo flange ■ Programming resolutions and signals
configurable parameters	Pulses per revolution, output stage HTL or TTL, zero pulse, signal sequence
configuration	PC software / hardware adapter, handheld programmer
sensing method	optical
dimensions (flange)	ø 58 mm
voltage supply	4,75 ... 30 VDC
output stage	TTL/RS422 HTL/push-pull
output signals	A 90° B, R + inverted
shaft type	solid shaft ø 10 mm or ø 6 mm
connection types	flange connector M12, M23, radial / axial cable, radial / axial / tangential
pulses per revolution	1 ... 65536
operating temperature	–40 ... +100 °C
protection class	IP 65, IP 67
operating speed	≤ 12 000 rpm (IP 65) ≤ 6000 rpm (IP 67)
max. shaft load	≤ 40 N axial, ≤ 80 N radial
options	isolated hollow shaft, flange variant, connector variant

	Z-PA-EI-H
category	Handheld programmer for encoder EIL580P
features	■ Simple and quick configuration ■ 4 user-assignable buttons ■ Intuitive menu navigation ■ Standard AA battery supply

Cable transducers

For robust outdoor use – measuring length up to 12 meter

- Absolute position detection integrated
- Redundant sensing and interface
- Analog and CANopen®
- Compact housing

	GCA3	GCA5	GCA8	GCA12
features	■ Measuring length up to 4.7 m ■ Non-contact magnetic sensing ■ Dirt skimmer ■ Three-chamber structure	■ Measuring length up to 7.8 m ■ Non-contact magnetic sensing ■ Dirt skimmer ■ Three-chamber structure	■ Measuring length up to 8 m ■ Absolute potentiometer sensing ■ Dirt skimmer ■ Three-chamber structure	■ Measuring length up to 12 m ■ Absolute potentiometer sensing ■ Dirt skimmer ■ Three-chamber structure
function	absolute			
interface				
- Analog / redundant	■ / ■	■ / ■	■ / ■	■ / ■
- CANopen® / redundant	■ / ■	■ / ■	■ / ■	■ / ■
sensing method	non-contact magnetic	non-contact magnetic	potentiometric	potentiometric
dimension	88 × 88 × 60,5 mm	88 × 88 × 65 mm	88 × 88 × 80,5 mm	126 × 126 × 98 mm
voltage supply	8 ... 30 VDC 12 ... 30 VDC (Analog)	8 ... 30 VDC 12 ... 30 VDC (Analog) 10 ... 30 VDC (CANopen®)		
connection				
- flange connector M12	radial			
- cable	radial			
measuring length	4,7 m	7,8 m	8 m	12 m
resolution	up to 14 bit			
linearity (interface-specific)	±0,5 %	±0,5 %	±0,3 %	±0,3 %
operating temperature	–40 ... +85 °C			
protection class	IP 67	IP 67	IP 65	IP 65
materials	housing: plastic cable: stainless steel with coating	housing: plastic cable: stainless steel with coating	housing: plastic/aluminum cable: stainless steel with coating	housing: plastic/aluminum cable: stainless steel with coating
options	■ integrated redundant inclination sensor	■ integrated redundant inclination sensor ■ Two-channel architecture ■ ISO13849 compliant firmware	■ integrated redundant inclination sensor	■ integrated redundant inclination sensor

Absolute cable transducers

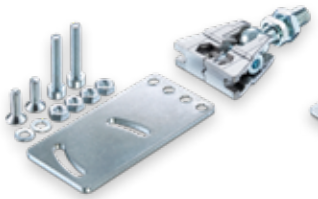
Modular system architecture – measuring range up to 50 Meter

- High combination flexibility of cable-transducer and basic encoder
- Every standard absolute interface
- High operational safety an long service life
- Precise metal housing

	GCA2	GCA4	GCA15	GCA50
features	■ Measuring length 2.4 m ■ Absolute encoder ■ Cable-pull housing: plastic	■ Measuring length 3 m ■ Absolute encoder ■ Cable-pull housing: aluminum	■ Measuring length 5...15 m ■ Absolute encoder ■ Cable-pull housing: aluminum	■ Measuring length 30...50 m ■ Absolute encoder ■ Cable-pull housing: aluminum
interface				
- SSI	■	■	■	■
- CANopen® / DeviceNet	■ / ■	■ / ■	■ / ■	■ / ■
- SAE J1939	■	■	■	■
- Profinet / Profibus-DP	■ / ■	■ / ■	■ / ■	■ / ■
- EtherCAT / EtherNet/IP	■ / ■	■ / ■	■ / ■	■ / ■
function principle	absolute			
sensing method	optical			
dimension	60 × 60 mm	96 × 96 × 56 mm	115 × 115 × 82,5 - 180,5 mm	200 × 200 × 268 - 333,5 mm
voltage supply	10 ... 30 VDC			
connection				
- flange connector M12, M23	radial, axial			
- cable	radial, axial			
- bus cover	radial			
measuring length	2,1 m	3 m	5 ... 15 m	30 ... 50 m
linearity	±0,01 %	±0,02 % (3 ... 7,5 m), ±0,01 % (10 ... 50 m)		
operating temperature	–20 ... +85 °C; options –40 ... +85 °C			
protection (encoder)	IP 50 (cable transducer), IP 65 (encoder)			
materials	cable-pull housing: plastic encoder: aluminium cable: stainless steel with coating	cable-pull housing: aluminum encoder: aluminium cable: stainless steel with coating		

Cables & adapters, mounting accessories

Cables & adapters	Cable socket unassembled	Cable socket	Male connector	Connecting cables
characteristics	■ M8 and M12 ■ Straight or angled ■ 3-, 4- and 5-pole versions	■ M5, M8, M9, M12 or 8 mm snap-in ■ 3- or 12-pole versions ■ Straight or angled ■ Screened or unscreened ■ Various sheath materials ■ Various lengths available up to 25 m	■ M8 ■ 3-pole versions ■ Straight ■ PUR sheath ■ Various lengths available up to 3 m	■ M8 or M12 ■ 3- or 4-pole versions ■ Straight or angled ■ PUR sheath ■ Various lengths available up to 10 m



Mounting accessories	Mounting kits	Mounting bracket	Mounting bracket	Bracket for profiles
characteristics	■ Sensofix Mounting sets ■ Robust metal version ■ Mounting sets for various sensor types ■ Easy, flexible alignment	■ Matching mounting brackets available for various sensor types ■ High quality metal ■ Compatible with flexible Sensofix	■ Easy, fast mounting of smooth and cylindrical sensors ■ Available from ø 6,5 mm to ø 20 mm	■ Mounting adapter for diverse sensor types ■ e.g. for mounting in profiles, slots, cylinders, etc.

Testing and parameterization, network components

Testing and parameterization	Sensor test equipment	Teach-in adapter
characteristics	■ Display (V or mA) or. LED (PNP/ NPN) reading ■ Sensor programming using integrated teach key ■ Connection option for plug-in power supply (available as accessory)	■ Sensor programming with teach-in pin ■ Teach-in using key ■ For sensors with M12 connection

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IO-Link

Network components	SensControl	IO-Link Master	USB-IO-Link Master
characteristics	■ Wireless IO-Link Master (WLAN and Bluetooth LE) with integrated battery ■ Visual indication of device status and data processing activity ■ Easy, standardized and reproducible configuration ■ Diagnostics and analysis ■ Apps for iOS and mobile Android devices	■ 8 Port-Link Master for use in the field and control cabinets ■ Data transmission to Master: parameters, identification, process and diagnostic information ■ User-convenient parameterization via web interface ■ EtherNET/IP or Profinet interface ■ Multiprotocol (Modbus TCP, OPC-UA-capable)	■ Parameterization of IO-Link sensors ■ Windows-based software IO-Link device tool included ■ Full set including power supply unit

Reflectors & beam columnators

Reflectors Lenses Apertures Glass	Reflectors	Reflective tapes	Apertures	Glass covers Filter Lens
characteristics	■ Self-adhesive or screw-mount reflectors ■ Circular or rectangular ■ All-metal reflectors ■ Ecolab certified types, resistant to cleaning agents	■ Self-adhesive tapes ■ Various widths and lengths	■ Apertures for various sensor types	■ For various sensor types

Beam columnators and deflector (Ultrasonic)	Beam columnators	Beam deflectors
characteristics	■ Replacement nozzles for sensors with sonic nozzles	■ Ideal for cramped spaces ■ Bends the sound 90°

Magnets

Magnets	Cylindrical magnets	Rectangular magnets and rotors
characteristics	■ For all magnetic proximity switches ■ Magnets in various sizes and strengths ■ Magnetization along the cylinder axis ■ For ambient temperatures up to +180 °C	■ For magnetic rotary encoders ■ Magnets available individually or integrated in the rotor ■ Magnetization throughout the depth ■ For ambient temperatures up to +180 °C

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