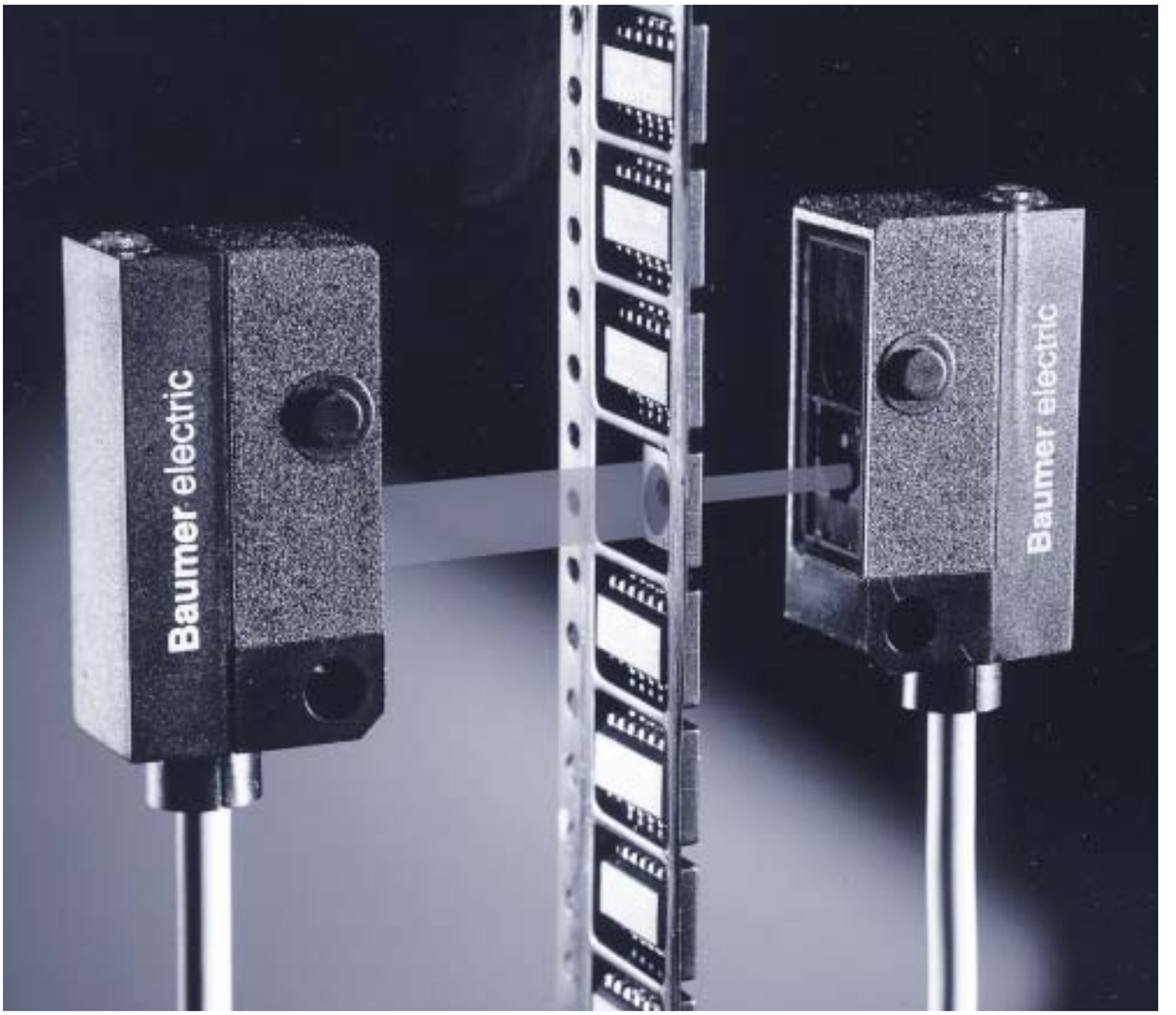
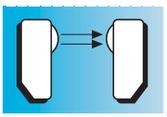
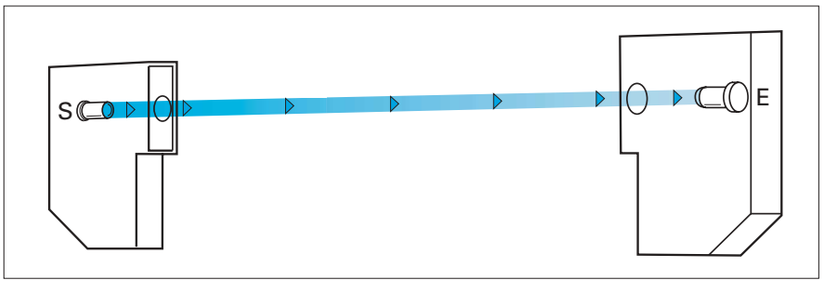
Applications
Through beam sensors



Function

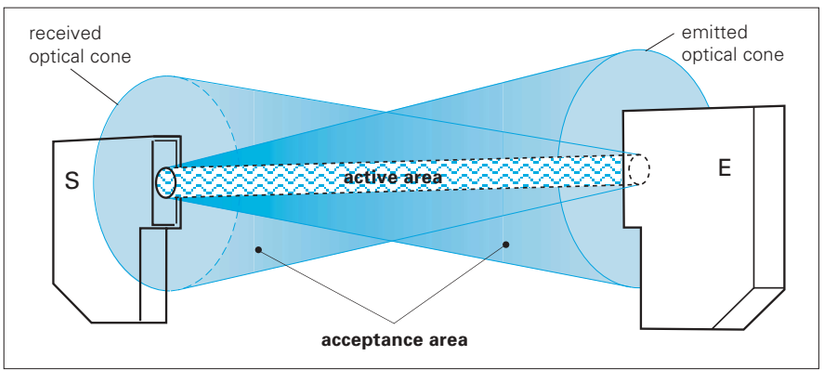


Through beam sensors



A separate emitter (S) sends a light beam to a separate receiver (E). The sensor switches when the light beam is interrupted. Since light is only travelling in one direction, much larger sensing ranges are possible when compared with equivalent sized retro-reflective sensors. Through beam sensors are therefore preferred for installations in areas with more bad ambient conditions such as dirt, moisture or dust.

Active area



The active area of a through beam sensor is equivalent to the lens size of the emitter or receiver. The acceptance cone is larger. This is important when considering alignment and operation near shiny surfaces.

Excess gain

Every photoelectric sensor has its own excess gain curve, which represents a factor of the minimum amount of light required to operate, plotted against distance.

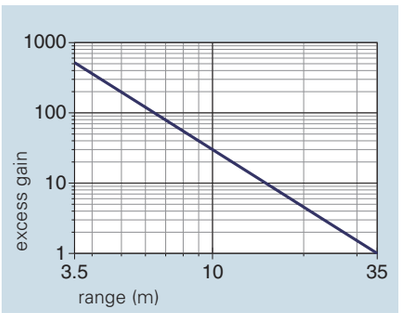
Measurement conditions

Clean environment and optics

Ambient temperature +25 °C

Sensors perfectly aligned with each other

excess gain curve

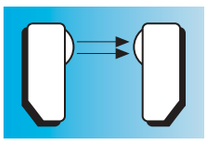


Through beam sensors Series 08

	Emitter	Receiver
	Sb 0,7 m	Sb 0,7 m

		cable	connector	cable	connector
Emitter		**FSDM 08D9001**	**FSDM 08D9001/S35**		
PNP	light operate			**FEDM 08P1001**	**FEDM 08P1001/S35L**
	dark operate			**FEDM 08P3001**	**FEDM 08P3001/S35L**

technical data		
nominal range Sn	1,0 m	1,0 m
actual range Sb	0,7 m	0,7 m
characteristics	-	excess gain curve Nr.081
output indicator	-	red LED
light source / wave length	pulsed infrared LED 880 nm	-
voltage supply range	12 - 30 VDC	12 - 30 VDC
max.supply current average value / peak value	17 mA / 48 mA	24 mA / 24 mA
max. switching current	-	100 mA
voltage drop	-	≤ 3 VDC
response time / release time	≤ 2,5 ms / ≤ 2,5 ms	≤ 2,5 ms / ≤ 2,5 ms
short circuit protection	-	yes
reverse polarity protection	yes	yes
temperature range	-25...+65 °C	-25...+65 °C
housing material	aluminum anodized	aluminum anodized
protection class	IP 65	IP 65



Series 08

- **Subminiature housing with side sensing optics**
- **Rugged design**

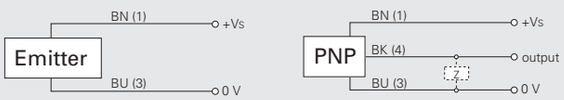
Range
Sb 700 mm

Rectangular design

Short circuit protection

Metal housing

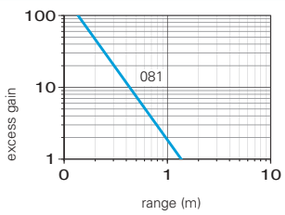
connection diagrams



output states

	object present	object not present
light operate	LED ⊗ PNP =LOW	LED ☼ PNP =HIGH
dark operate	LED ☼ PNP =HIGH	LED ⊗ PNP =LOW

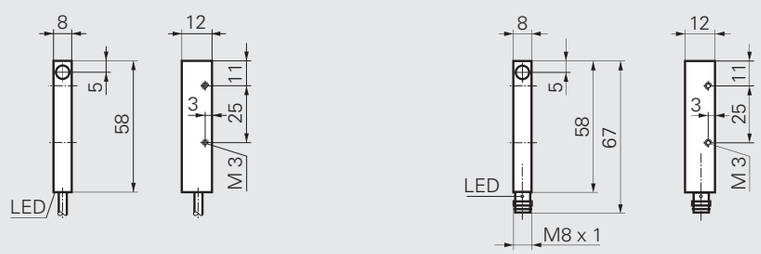
excess gain curve



connectors

ES 8.2P	3 pin	2 m PUR
ES 9.2P	3 pin	2 m PUR
ESW 31SH0200	3 pin	2 m PUR halogen-free
ESG 32SH0200	3 pin	2 m PUR halogen-free

for details see accessories section



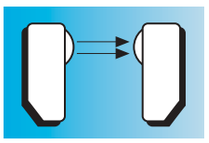
Emitter without LED

Through beam sensors Series 08

	Emitter	Receiver
	Sb 2,5 m	Sb 2,5 m

		cable	connector	cable	connector
Emitter		**FSDM 08D9002**	**FSDM 08D9002/S35**		
PNP	light operate			**FEDM 08P1002**	**FEDM 08P1002/S35L**
	dark operate			**FEDM 08P3002**	**FEDM 08P3002/S35L**

technical data		
nominal range Sn	3,0 m	3,0 m
actual range Sb	2,5 m	2,5 m
characteristics	-	excess gain curve Nr.082
output indicator	-	red LED
light source / wave length	pulsed infrared LED 880 nm	-
voltage supply range	12 - 30 VDC	12 - 30 VDC
max.supply current average value / peak value	17 mA / 48 mA	24 mA / 24 mA
max. switching current	-	100 mA
voltage drop	-	≤ 3 VDC
response time / release time	≤ 2,5 ms / ≤ 2,5 ms	≤ 2,5 ms / ≤ 2,5 ms
short circuit protection	-	yes
reverse polarity protection	yes	yes
temperature range	-25...+65 °C	-25...+65 °C
housing material	aluminum anodized	aluminum anodized
protection class	IP 65	IP 65



Series 08

- **Long sensing distance**
- **Subminiature housing with side sensing optics**
- **Rugged design**
- **Rectangular design**

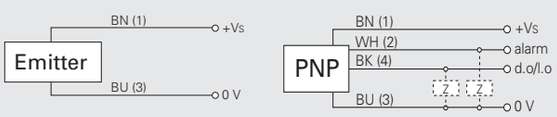
Range
Sb 2,5 m

Rectangular design

Short circuit protection

Metal housing

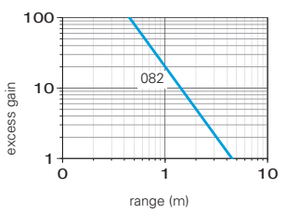
connection diagrams



output states

	object present	object not present
light operate	LED ⊗ PNP =LOW	LED ☼ PNP =HIGH
dark operate	LED ☼ PNP =HIGH	LED ⊗ PNP =LOW

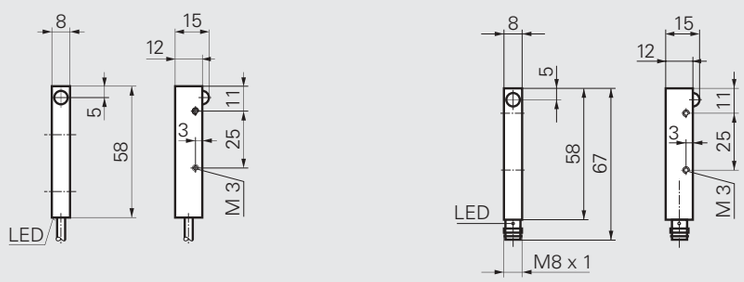
excess gain curve



connectors

ES 8.2P	3 pin	2 m PUR
ES 9.2P	3 pin	2 m PUR
ESW 31SH0200	3 pin	2 m PUR halogen-free
ESG 32SH0200	3 pin	2 m PUR halogen-free

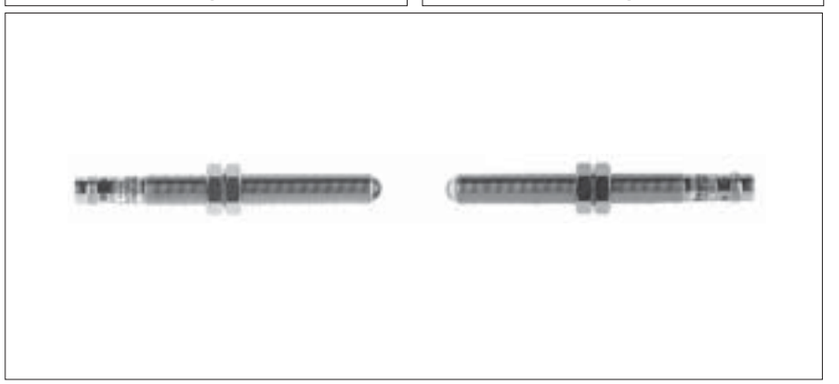
for details see accessories section



Emitter without LED

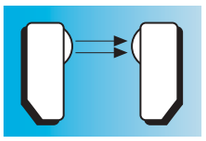
Through beam sensors Series 08

	Emitter	Receiver
	Sb 2,5 m	Sb 2,5 m



		cable	connector	cable	connector
Emitter		**FSAM 08D9002**	**FSAM 08D9002/S35**		
PNP	light operate			**FEAM 08P1002**	**FEAM 08P1002/S35L**
	dark operate			**FEAM 08P3002**	**FEAM 08P3002/S35L**

technical data		
nominal range Sn	3,0 m	3,0 m
actual range Sb	2,5 m	2,5 m
characteristics	-	excess gain curve
output indicator	-	red LED
light source / wave length	pulsed infrared LED / 880 nm	-
voltage supply range	12 - 30 VDC	12 - 30 VDC
max. supply current average value / peak value	17 mA / 48 mA	24 mA / 24 mA
max. switching current	-	100 mA
voltage drop	-	≤ 3 VDC
response time / release time	≤ 2,5 ms / ≤ 2,5 ms	≤ 2,5 ms / ≤ 2,5 ms
short circuit protection	-	yes
reverse polarity protection	yes	yes
temperature range	-25...+65 °C	-25...+65 °C
housing material	brass nickel plated	brass nickel plated
protection class	IP 65	IP 65



Series 08

- **Subminiature housing**
- **Rugged design**

Range
Sb 2,5 m

Tubular design

Short circuit protection

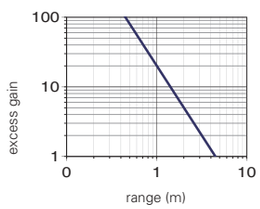
Metal housing

connection diagrams

output states

	object present	object not present
light operate	LED ⊗ PNP =LOW	LED ☼ PNP =HIGH
dark operate	LED ☼ PNP =HIGH	LED ⊗ PNP =LOW

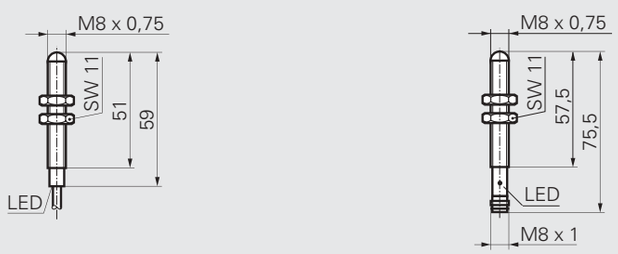
excess gain curve



connectors

ES 8.2P	3 pin	2 m PUR
ES 9.2P	3 pin	2 m PUR
ESW 31SH0200	3 pin	2 m PUR halogen-free
ESG 32SH0200	3 pin	2 m PUR halogen-free

for details see accessories section



Emitter without LED

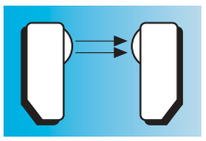
Through beam sensors Series 10

Emitter	Receiver
Sb 5,0 m	Sb 5,0 m

		cable	connector	cable	connector
Emitter		**FSDK 10D9601**	**FSDK 10D9601/S35A**		
PNP	light operate				
	dark operate				
	light/dark operate			**FEDK 10P5101**	**FEDK 10P5101/S35A**
NPN	light operate				
	dark operate				
	light/dark operate			**FEDK 10N5101**	**FEDK 10N5101/S35A**

technical data					
nominal range Sn		6,0 m		6,0 m	
actual range Sb		5,0 m		5,0 m	
characteristics		-		no. 102	
output indicator		-		yellow LED	
alignment aid / soiled lens indicator		-		flashing LED	
light source / wave length		pulsed red LED / 660 nm		-	
voltage supply range		10 - 30 VDC		10 - 30 VDC	
max. supply current average value / peak value		15 mA / 23 mA		16 mA / 16 mA	
max. switching current		-		100 mA	
voltage drop		-		≤ 1,8 VDC	
response time / release time		-		≤ 1 ms / ≤ 1 ms	
test input	emitter off	+Vs		-	
test input	emitter on	0 V or not connected		-	
sensitivity adjustment		-		270° pot	
short circuit protection		-		yes	
reverse polarity protection		yes		yes	
temperature range		-25...+65 °C		-25...+65 °C	
housing material		Acrylnitril / Styrol / Acrylester (ASA)		Acrylnitril / Styrol / Acrylester (ASA)	
protection class		IP 65	IP 67	IP 65	IP 67

Options			flylead connector version		flylead connector version	
		emitter	**FSDK 10D9001/KS35**			
	light operate	PNP			**FEDK 10P1101/KS35**	
	dark operate	PNP			**FEDK 10P3101/KS35**	



Series 10

- **Subminiature design**
- **Long sensing distance**
- **Alignment aid / soiled lens indicator (flashing LED)**
- **Flylead connector version (option)**
- **Test input**

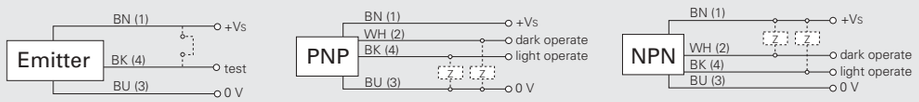
Range Sb 5,0 m

Alignment aid

Visible red light

Plastic housing

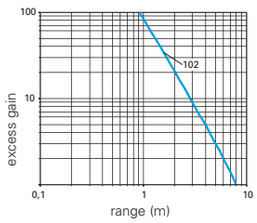
connection diagrams



output states

	object present	object not present
light operate	LED ⊗ PNP =LOW NPN=HIGH	LED ⊗ PNP =HIGH NPN=LOW
dark operate	LED ⊗ PNP =HIGH NPN=LOW	LED ⊗ PNP =LOW NPN=HIGH

excess gain curve



connectors

ES 8.2P	3 pin	2 m PUR
ESG 32SH0200	3 pin	2 m PUR [2]
ESG 32AH0200	4 pin	2 m PUR [2]
ESW 31AH0200	4 pin	2 m PUR [2]

suitable to type

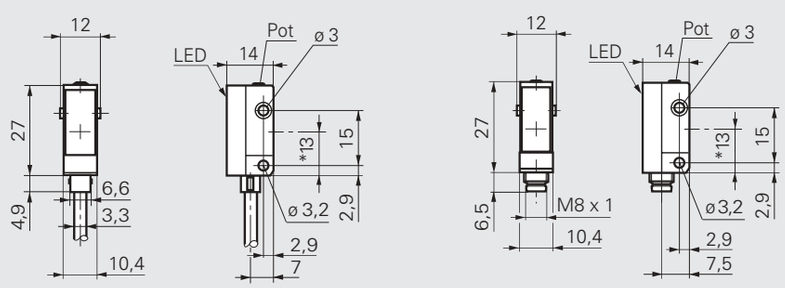
FxDK 10xx101/KS35
FxDK 10xx101/KS35
FxDK 10x5101/S35A
FxDK 10x5101/S35A

accessories

mounting bracket (cable type)	114501
mounting bracket (connector type)	133792

[2] halogen-free

for details see accessories section



Emitter without LED and Pot

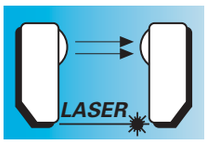
* emitter axis

Through beam laser sensors Series 10

	Emitter	Receiver
	Sb 8,0 m	Sb 8,0 m

		cable	connector	cable	connector
Emitter		**OSDK 10D9001**	**OSDK 10D9001/S35A**		
PNP	light operate				
	dark operate				
	light/dark operate			**OEDK 10P5101**	**OEDK 10P5101/S35A**
	light operate				
	dark operate				
	light/dark operate			**OEDK 10N5101**	**OEDK 10N5101/S35A**

technical data				
nominal range Sn	10,0 m		10,0 m	
actual range Sb	8,0 m		8,0 m	
curve	-		excess gain curve	
beam focal point	parallel beam		-	
power indicator	green LED		-	
output indicator	-		yellow LED	
Alignment aid/soiled lens indicator	-		green flashing LED	
light source	pulsed red laser diode		-	
wave length	675 nm		-	
laser class	2		-	
voltage supply range	10 - 30 VDC		10 - 30 VDC	
max. supply current average value / peak value	40 mA / 50 mA		15 mA / 16 mA	
max. switching current	-		100 mA	
voltage drop	-		≤ 1,8 VDC	
response time / release time	-		≤ 0,2 ms	
sensitivity adjustment	-		270° pot	
short circuit protection	-		yes	
reverse polarity protection	yes		yes	
temperature range	-10...+50 °C		-25...+65°C	
housing material	Acrylnitril / Styrol / Acrylester (ASA)		Acrylnitril / Styrol / Acrylester (ASA)	
protection class	IP 65	IP 67	IP 65	IP 67



Series 10

- **Wide range**
- **Sensitivity adjustable**
- **Alignment aid / soiled lens indicator**
- **Visible red light for alignment aid**

Range
Sb 8,0 m

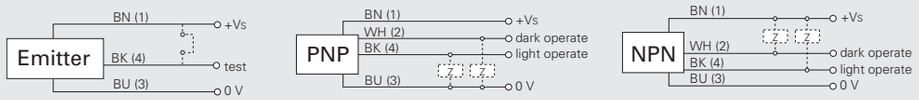
Sensitivity adjustment

Alignment aid

Visible red light

IEC 825-1/1996
21CFR 1040.10

connection diagram



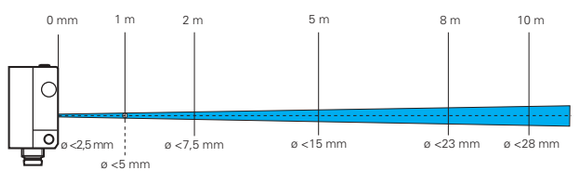
Version with alarm output:
light operate output is used as alarm output

d.o. dark operate
l.o. light operate

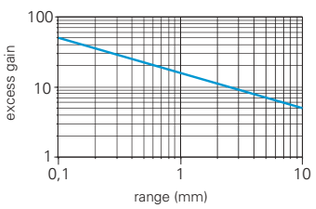
output state

	object present	object not present
light operate	LED ⊗ PNP =LOW NPN=HIGH	LED ☼ PNP =HIGH NPN=LOW
dark operate	LED ⊗ PNP =HIGH NPN=LOW	LED ☼ PNP =LOW NPN=HIGH

beam diameter chart OSDK 10D9001



excess gain curve



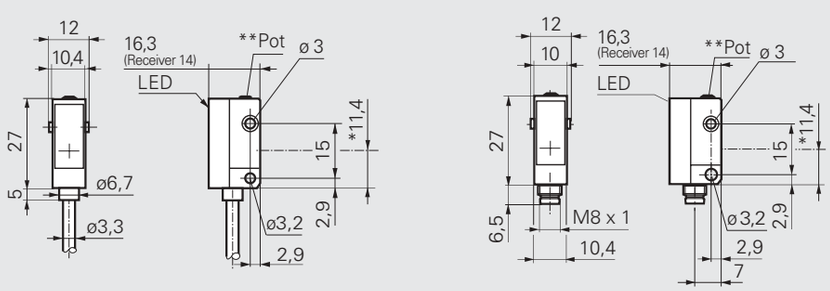
connectors

ESW 31AH0200	4 pin	2 m PUR halogen-free
ESG 32AH0200	4 pin	2 m PUR halogen-free

for details see accessories section

accessories

mounting bracket (cable type)	114501
mounting bracket (connector type)	133792



* emitter axis
** Pot only on receiver

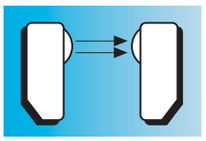
Through beam sensors Series 12

	Emitter	Receiver
	Sb 6,0 m	Sb 6,0 m
		

		cable	connector	cable	connector
Emitter		**FSDM 12D9601**	**FSDM 12D9601/S35A**		
PNP	light/dark operate			**FEDM 12P5101**	**FEDM 12P5101/S35A**
NPN	light/dark operate			**FEDM 12N5101**	**FEDM 12N5101/S35A**

technical data				
nominal range Sn		7,5 m		7,5 m
actual range Sb		6,0 m		6,0 m
characteristics		-		excess gain curve
output indicator		-		yellow LED
alignment aid / soiled lens indicator		-		flashing LED
light source / wave length		pulsed red LED / 660 nm		-
voltage supply range		10 - 30 VDC		10 - 30 VDC
max. supply current average value / peak value		18 mA / 30 mA		17 mA / 17 mA
max. switching current		-		100 mA
voltage drop		-		≤ 1,8 VDC
response time / release time		-		≤ 1 ms / ≤ 1 ms
test input	emitter off	+Vs		-
test input	emitter on	0 V or not connected		-
short circuit protection		-		yes
reverse polarity protection		yes		yes
temperature range		-25...+65 °C		-25...+65 °C
housing material		die-cast zinc		die-cast zinc
protection class		IP 67		IP 67

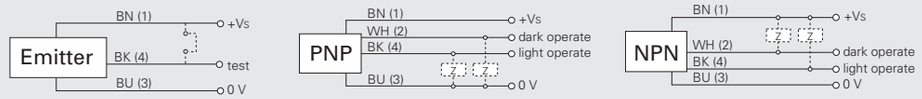
Options	alarm output dark	PNP			**FEDM 12P3401**	**FEDM 12P3401/S35A**
	alarm output dark	NPN			**FEDM 12N3401**	**FEDM 12N3401/S35A**



Series 12

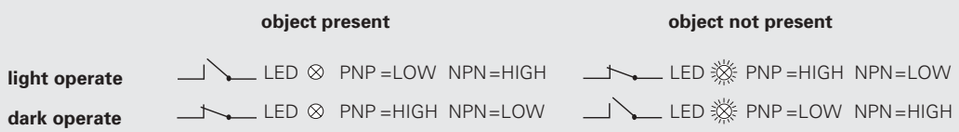
- **Miniature design**
- **Alignment aid / soiled lens indicator (flashing LED)**
- **Test input**
- **Alarm output**
- **Rugged metal housing**

connection diagrams

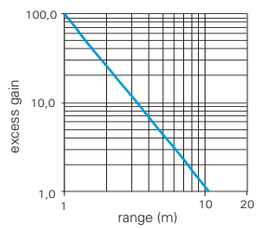


Version with alarm output must be ordered either dark operate or light operate

output states



excess gain curve



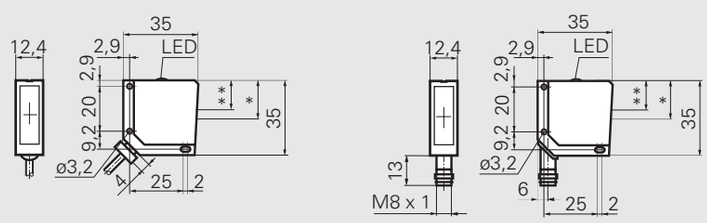
connectors

ES 8A	4 pin	2 m PVC
ES 9A	4 pin	2 m PVC
ESW 31AH0200	4 pin	2 m PUR halogen-free
ESG 32AH0200	4 pin	2 m PUR halogen-free

for details see accessories section

accessories

mounting bracket	113873



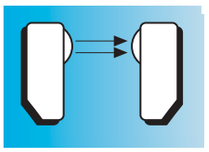
Emitter without LED

* emitter axis 17 mm
** receiver axis 13 mm

Through beam sensors Series 14

	Emitter	Receiver
	Sb 12,0 m	Sb 12,0 m
		

Emitter	FSDK 14D9601/S35A	FEDK 14P5101/S35A
PNP light/dark operate		
technical data		
nominal range Sn	15,0 m	15,0 m
actual range Sb	12,0 m	12,0 m
curve	-	excess gain curve
output indicator	-	yellow LED
alignment aid / soiled lens indicator	-	flashing LED
light source / wave length	pulsed red LED / 660 nm	-
voltage supply range	10 - 30 VDC	10 - 30 VDC
max. supply current average value / peak value	12 mA / 20 mA	20 mA / 20 mA
max. switching current	-	100 mA
voltage drop	< 1,8 VDC	< 1,8 VDC
response time	-	≤ 1ms
release time	-	≤ 1ms
test input emitter off	+ Vs	-
test input emitter on	0 V or not connected	-
short circuit protection	yes	yes
reverse polarity protection	yes	yes
temperature range	-25...+65 °C	-25...+65 °C
housing material	PBT-ASA	PBT-ASA
protection class	IP 65 snap-on connectors / IP 67 screw-on connectors	IP 65 snap-on connectors / IP 67 screw-on connectors



Series 14

- **Alignment aid / soiled lens indicator (flashing LED)**
- **Test input**
- **Plastic housing**

Range
Sb 12,0 m

Alignment aid

Test input

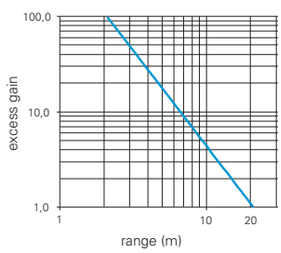
Plastic housing

connection diagrams

output state

	object present	object not present
light operate	LED ⊗ PNP =LOW	LED ⊗ PNP =HIGH
dark operate	LED ⊗ PNP =HIGH	LED ⊗ PNP =LOW

excess gain curve



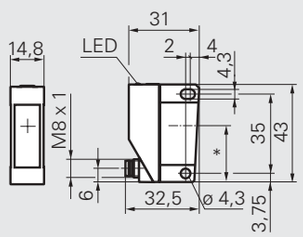
Connecteurs

ES 8A	4 pin	2 m PVC
ES 9A	4 pin	2 m PVC
ESW 31AH0200	4 pin	2 m PUR halogen-free
ESG 32AH0200	4 pin	2 m PUR halogen-free

for details see accessories section

accessories

mounting bracket	134964
slot aperture	144075



Emitter without LED

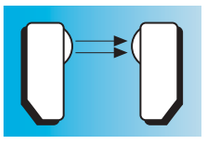
* emitter and receiver axis 25,8 mm

Through beam sensors Series 16

Emitter	Receiver
Sb 8,0 m	Sb 8,0 m

	cable	connector	cable	connector
Emitter	**FSDM 16D9601**	**FSDM 16D9601/S14**		
PNP light/dark operate			**FEDM 16P5101**	**FEDM 16P5101/S14**
NPN				

technical data			
nominal range Sn		10,0 m	10,0 m
actual range Sb		8,0 m	8,0 m
characteristics		-	excess gain curve
output indicator / power indicator		- / green LED	yellow LED/ -
alignment aid / soiled lens indicator		-	flashing LED
light source / wave length		pulsed red LED / 660 nm	-
voltage supply range		10 - 30 VDC	10 - 30 VDC
max. supply current average value / peak value		18 mA / 30 mA	17 mA / 17 mA
max. switching current		-	200 mA
voltage drop		-	≤ 1,8 VDC
response time / release time		-	≤ 1 ms / ≤ 1 ms
test input	emitter off	+Vs	-
test input	emitter on	0 V or not connected	-
sensitivity adjustment		-	-
short circuit protection		-	yes
reverse polarity protection		yes	yes
temperature range		-25...+65 °C	-25...+65 °C
housing material		die-cast zinc	die-cast zinc
protection class		IP 67	IP 67



Series 16

- **Alignment aid / soiled lens indicator (flashing LED)**
- **Test input**
- **Rugged metal housing**

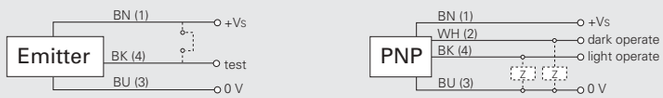
Range Sb 8,0 m

Alignment aid

Test input

Metal housing

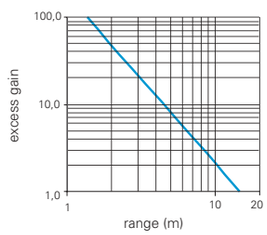
connection diagrams



output states

	object present	object not present
light operate	LED ⊗ PNP =LOW	LED ☼ PNP =HIGH
dark operate	LED ⊗ PNP =HIGH	LED ☼ PNP =LOW

excess gain curve



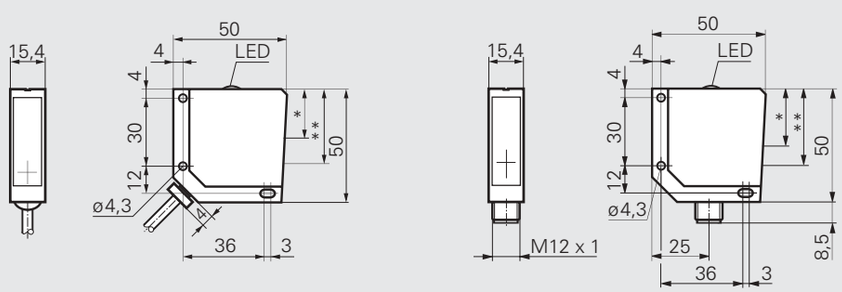
connectors

ES 14		2 m PVC
ES 24		2 m PVC
ESW 33AH0200	4 pin	2 m PUR halogen-free
ESG 34AH0200	4 pin	2 m PUR halogen-free

for details see accessories section

accessories

mounting bracket	113917



* receiver axis 15 mm

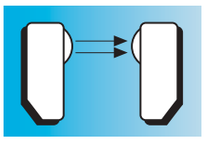
** emitter axis 26,5 mm

Through beam sensors Series 16 with sensitivity adjustment

Emitter	Receiver
Sb 3,0 m	Sb 3,0 m

	cable	connector	cable	connector
Emitter	**FSDM 16D9601**	**FSDM 16D9601/S14**		
PNP light/dark operate			**FEDM 16P5105**	**FEDM 16P5105/S14**
NPN				

technical data			
nominal range Sn		3,5 m	3,5 m
actual range Sb		3,0 m	3,0 m
characteristics		-	-
output indicator / power indicator		- / green LED	yellow LED / -
alignment aid / soiled lens indicator		-	flashing LED
light source / wave length		pulsed red LED / 660 nm	-
voltage supply range		10 - 30 VDC	10 - 30 VDC
max. supply current average value / peak value		18 mA / 30 mA	17 mA / 17 mA
max. switching current		-	200 mA
voltage drop		-	≤ 1,8 VDC
response time / release time		-	≤ 1 ms / ≤ 1 ms
test input	emitter off	+Vs	-
test input	emitter on	0 V or not connected	-
sensibility adjustment		-	10 turn pot
short circuit protection		-	yes
reverse polarity protection		yes	yes
temperature range		-25...+65 °C	-25...+65 °C
housing material		die-cast zinc	die-cast zinc
protection class		IP 67	IP 67



Series 16

- **Sensitivity adjustment**
- **Alignment aid / soiled lens indicator (flashing LED)**
- **Test input**
- **Rugged metal housing**

Range Sb 3,0 m

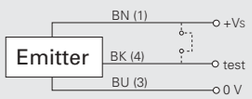
Sensitivity adjustment

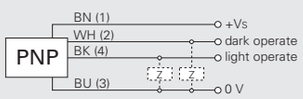
Alignment aid

Test input

Metal housing

connection diagrams

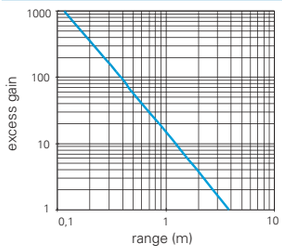




output states

	object present	object not present
light operate	LED ⊗ PNP = LOW NPN = HIGH	LED ⊛ PNP = HIGH NPN = LOW
dark operate	LED ⊗ PNP = HIGH NPN = LOW	LED ⊛ PNP = LOW NPN = HIGH

excess gain



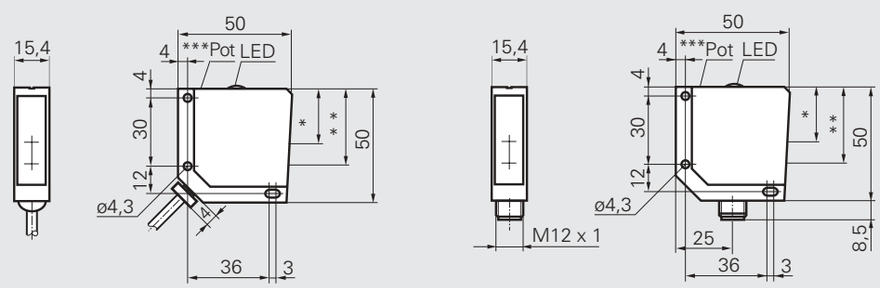
connectors

ES 14		2 m PVC
ES 24		2 m PVC
ESW 33AH0200	4 pin	2 m PUR halogen-free
ESG 34AH0200	4 pin	2 m PUR halogen-free

for details see accessories section

accessories

mounting bracket	113917



* receiver axis 15 mm

** emitter axis 26,5 mm

*** Pot only receiver

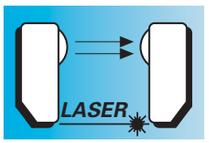
Through beam laser sensors Series 16

Emitter	Receiver
Sb 8,0 m	Sb 8,0 m

	cable	connector	cable	connector
Emitter	**OSDM 16D9601**	**OSDM 16D9601/S14**		
PNP light/dark operate			**OEDM 16P5101**	**OEDM 16P5101/S14**

technical data			
nominal range Sn		10,0 m	10,0 m
actual range Sb		8,0 m	8,0 m
beam focal point		0,4 m	-
repeatability at laser focus		≤ 0,1 mm[2], ≤ 0,4 mm[3]	-
repeatability within complete range		≤ 0,3 mm[2], ≤ 0,8 mm[3]	-
switching point accuracy[1]		≤ 0,5 mm[2], ≤ 1,0 mm within ±15 °C	-
power indicator		green LED	-
output indicator		-	yellow LED
indicator for optimized adjustment		-	green LED
light source		pulsed red laser diode	-
wave length		675 nm	-
laser class (IEC 825-1/1996) for Europe		1	-
laser class (21CFR 1040.1) for USA		2	-
voltage supply range		10 - 30 VDC	10 - 30 VDC
max. supply current average value / peak value		60 mA / 75 mA	30 mA / 30 mA
max. switching current		-	200 mA
voltage drop		-	≤ 1,8 VDC
response time / release time		-	≤ 0,1 ms
test input	emitter off	+Vs	-
test input	emitter on	0 V or not connected	-
sensitivity adjustment		-	270° pot
short circuit protection		-	yes
reverse polarity protection		yes	yes
temperature range		+10...50 °C	-25...+65°C
housing material		die-cast zinc	die-cast zinc
protection class		IP 67	IP 67
[1] for the complete range with reference to the optical axis		[2] at constant temperature [3] within temperature range	

Options alarm output dark PNP			**OEDM 16P3401**	**OEDM 16P3401/S14**



Series 16

- **Detects object sizes down to 1,6 mm at Sb 8,0 m**
- **Very wide range**
- **Sensitivity adjustable**
- **Two-color LED display for optimum setting**
- **Visible red light for alignment aid**

Sb 8,0 m

Alignment aid

Alarm output

Test input

Visible red light

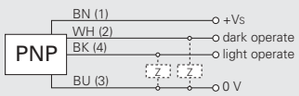
Class 1 LASER Product

IEC 825-1/1996

CAUTION
LASER RADIATION
DO NOT STARE INTO BEAM
LASERDIODE
Wavelength: 630 - 680 nm
Max. Output: < 1 mW
Class 2 LASER Product

21CFR 1040.10

connection diagram

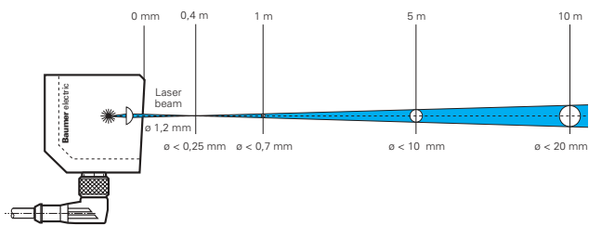


Version with alarm output:
light operate output is used as alarm output

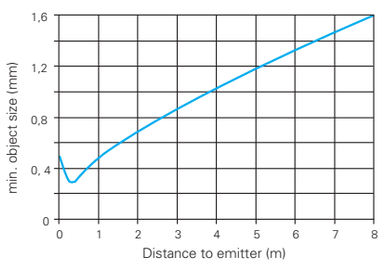
output state

	object present	object not present
light operate	LED ⊗ PNP =LOW	LED ☼ PNP =HIGH
dark operate	LED ⊗ PNP =HIGH	LED ☼ PNP =LOW

beam diameter chart OSDM 16D9601/S14



object size diagram



connectors

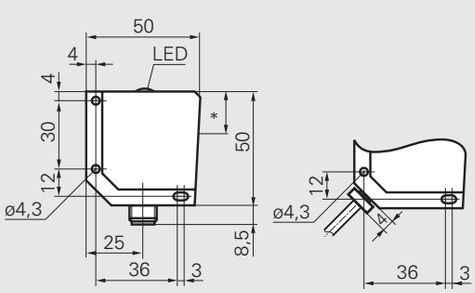
ES 14		
ES 24		
ESW 33AH0200	4 pin	2 m PUR halogen-free
ESG 34AH0200	4 pin	2 m PUR halogen-free

for details see accessories section

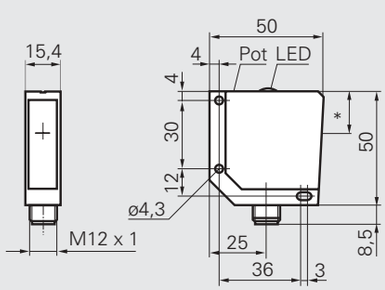
accessories

mounting bracket receiver	113917
mounting bracket emitter	119373

emitter



receiver

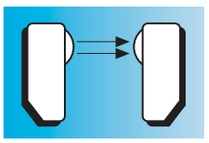


* emitter and receiver axis 21,5 mm

Through beam sensors Series 18

	Emitter	Receiver
	Sb 16,0 m	Sb 16,0 m
		
	cable / connector	cable / connector
Emitter	FSAM 18D9651 / FSAM 18D9651/S14	
PNP dark operate		FEAM 18P3150 / FEAM 18P3150/S14
NPN dark oparate		FEAM 18N3150 / FEAM 18N3150/S14

technical data			
nominal range Sn		20,0 m	20,0 m
actual range Sb		16,0 m	16,0 m
curve		-	excess gain curve
output indicator		-	yellow LED
adjustment button / soiled lens indicator		-	flashing LED
light source / wave length		pulsed infrared LED / 880 nm	-
voltage supply range		10 - 30 VDC	10 - 30 VDC
max. supply current average value / peak value		30 mA / 40 mA	20 mA / 20 mA
max. switching current		-	200 mA
voltage drop		-	≤ 1,8 VDC
test input	Emitter off	+Vs	-
test input	Emitter on	0 V or not connected	-
response time / release time		-	≤ 1 ms / ≤ 1 ms
sensitivity adjustment		-	by side mounted 270° pot
short circuit protection		-	yes
reverse polarity protection		yes	yes
temperature range		-25...+55 °C	-25...+55 °C
housing material		brass nickel plated / polycarbonate	brass nickel plated / polycarbonate
protection class		IP 67	IP 67



Series 18

- **Alignment aid / soiled lens indicator LED**
- **Side mounted 270° potentiometer**
- **Test input**

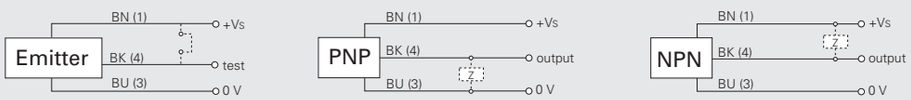
Range
Sb 16,0 m

Side mounted 270° potentio-meter

Test input

Alignment aid

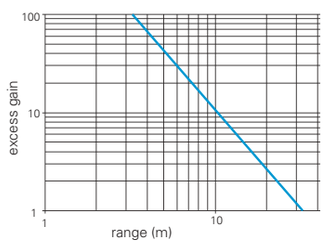
connection diagrams



output states

	object present	object not present
dark operate	LED ⊗ PNP =HIGH NPN=LOW	LED ☼ PNP =LOW NPN=HIGH

excess gain

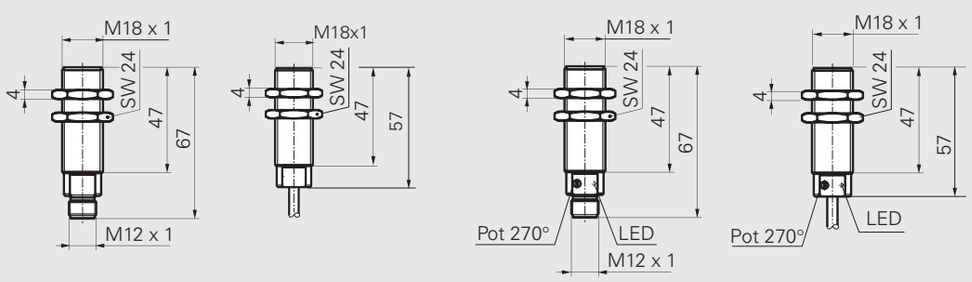


connectors

ES 14		2 m PVC
ES 24		2 m PVC
ESW 33AH0200	4 pin	2 m PUR halogen-free
ESG 34AH0200	4 pin	2 m PUR halogen-free

for details see accessories section

emitter **receiver**



Through beam sensors Series 26

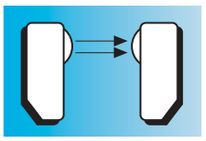
	Emitter	Receiver
	Sb 20,0 m	Sb 20,0 m
		

		cable	connector	cable	connector
Emitter			**FSDK 26D9003/S14**		
PNP					
	light /dark operate				**FEDK 26P5103/S14**

technical data				
nominal range Sn		25,0 m		25,0 m
actual range Sb		20,0 m		20,0 m
characteristics		-		excess gain curve
output indicator		-		yellow LED
alignment aid / soiled lens indicator		-		flashing LED
light source / wave length		pulsed infrared LED / 880 nm		-
voltage supply range		10 - 30 VDC		10 - 30 VDC
max. supply current average value / peak value		28 mA / 38 mA		20 mA / 20 mA
max. switching current		-		200 mA
voltage drop		-		≤ 1,8 VDC
response time / release time		-		≤ 1 ms / ≤ 1 ms
short circuit protection		-		yes
reverse polarity protection		yes		yes
temperature range		-25...+65 °C		-25...+65 °C
housing material		Acrylnitril / Styrol / Acrylester (ASA)		Acrylnitril / Styrol / Acrylester (ASA)
protection class		IP 67		IP 67

AC/DC	without time delay	**FSDK 26A9003**		**FEDK 26R7103**	
	with time delay			**FEDK 26R7303**	

technical data				
voltage supply range		20 - 264 V AC/DC		20 - 264 V AC/DC
supply current		≤ 50 mA		≤ 30 mA
switching output		-		relay contact (SPDT)
max. switching voltage		-		250 VAC / 100 VDC
max. switching current		-		3 A AC/DC
max. switching power		-		90 W / 720 VA
response time / release time		-		≤ 25 ms / ≤ 25 ms
time delay T_{on} / T_{off}				0,05 - 10 sec / 0,05 - 10 sec



Series 26

- **Alignment aid / soiled lens indicator (flashing LED)**
- **Large range**

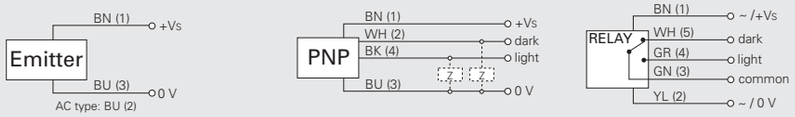
Range Sb 20,0 m

Alignment aid

Alarm output

3 A relay

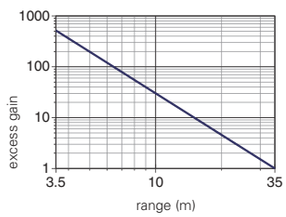
connection diagrams



output states

	object present	object not present
light operate	LED ⊗ PNP =LOW	LED ☼ PNP =HIGH
dark operate	LED ⊗ PNP =HIGH	LED ☼ PNP =LOW

excess gain curve



connectors

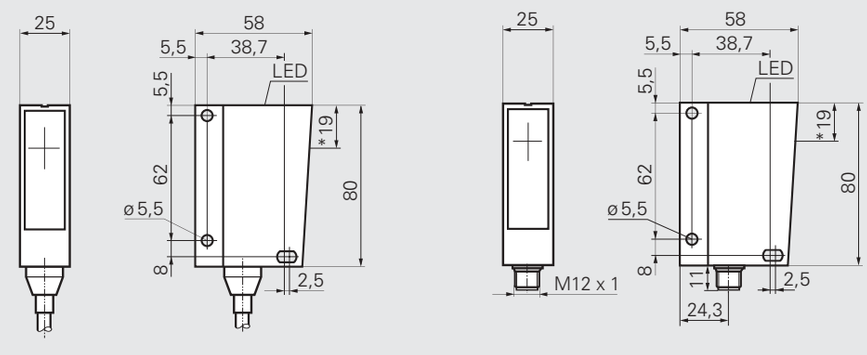
ES 14
ES 24

ESW 33AH0200	4 pin	2 m PUR halogen-free
ESG 34AH0200	4 pin	2 m PUR halogen-free

for details see accessories section

accessories

mounting bracket	112477



Emitter without LED

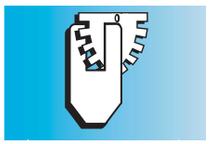
* emitter axis

Fork sensors Series 12/28

	Series 12	Series 28
	Gap width 3 mm	Gap width 2,7 mm
		
Type	**non-pulsed infrared light**	**non-pulsed infrared light**
PNP light operate	**FEG 12.24.45**	**FGDK 28P1001**
PNP dark operate	**FEG 12.24.35**	**FGDK 28P3001**
PNP light/dark operate		

technical data		
tooth / gap	0,8 mm	0,8 mm
scan depth	8 mm	5 mm
repeatability	< 0,01 mm	< 0,01 mm
hysteresis	< 0,1 mm	< 0,1 mm
switching frequency	< 50 KHz	< 50 KHz
output indicator	-	yellow LED
light source / wave length	infrared LED / 935 nm	infrared LED / 935 nm
voltage supply range	4,5 - 30 VDC	4,5 - 30 VDC
max. supply current average value / peak value	24 mA / 24 mA	PNP 25 mA / 25 mA NPN 30 mA / 30 mA
max. switching current	100 mA	100 mA
voltage drop	≤ 1 VDC	≤ 1 VDC
response time / release time	≤ 10 µs / ≤ 10 µs	≤ 10 µs / ≤ 10 µs
short circuit protection	no	no
reverse polarity protection	yes / +Vs	yes / +Vs
temperature range	-25...+65 °C	0...+65 °C
housing material	brass nickel plated	polyamide
protection class	IP 67	IP 67

Pulse disks	pulse rate	1	**IPS 70/1**	**IPS 70/1**
	pulse rate	60	**IPS 70/60**	**IPS 70/60**
	pulse rate	100	**IPS 70/100**	**IPS 70/100**



Series 12/28

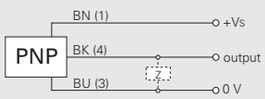
- **Very fast switching frequency up to 50 kHz**
- **Rectangular housing**
- **Small design**

Gap width 3 mm

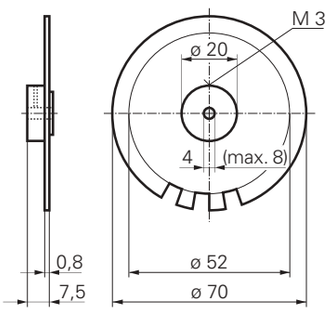
High switching frequency

Rugged design

connection diagram

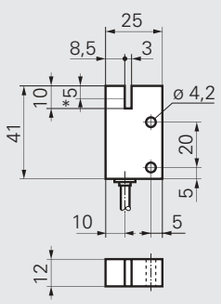


Pulse disk IPS

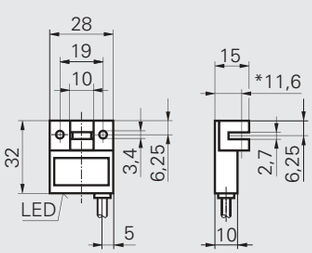


material: aluminum black
standard pulse rates: 1, 60, 100
part number see accessories section

series 12



series 28



* emitter axis

Fork sensors Series 14

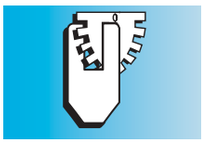
Series 14

Gap width 3 mm

Type		non-pulsed infrared light
PNP	light operate	
	dark operate	**FEG 14.24.35**
	light/dark operate	
NPN	light operate	
	dark operate	**FEG 14.24.15**
	light/dark operate	

technical data	
tooth / gap	0,8 mm
scan depth	8 mm
repeatability	< 0,01 mm
hysteresis	< 0,1 mm
switching frequency	< 50 KHz
light source / wave length	infrared LED / 935 nm
voltage supply range	4,5 - 30 VDC
max. supply current average value / peak value	24 mA / 24 mA
max. switching current	100 mA
voltage drop	≤ 1 VDC
response time / release time	≤ 10 µs / ≤ 10 µs
short circuit protection	no
reverse polarity protection	yes / +Vs
temperature range	-25...+65 °C
housing material	brass nickel plated
protection class	IP 67

Pulse disks		
	pulse rate 1	**IPS 70/1**
	pulse rate 60	**IPS 70/60**
	pulse rate 100	**IPS 70/100**



Series 14

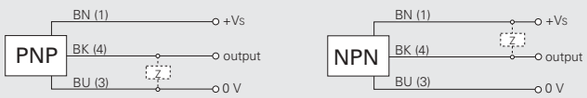
- **Tubular metal housing M14 x 1**
- **Very fast switching frequency up to 50 kHz**
- **Easy mounting**

Gap width 3 mm

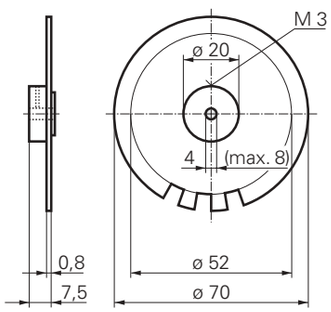
Rugged design

Metal housing

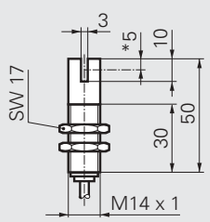
connection diagrams



Pulse disk IPS



material: aluminum black
standard pulse rates: 1, 60, 100
part number see accessories section



* emitter axis