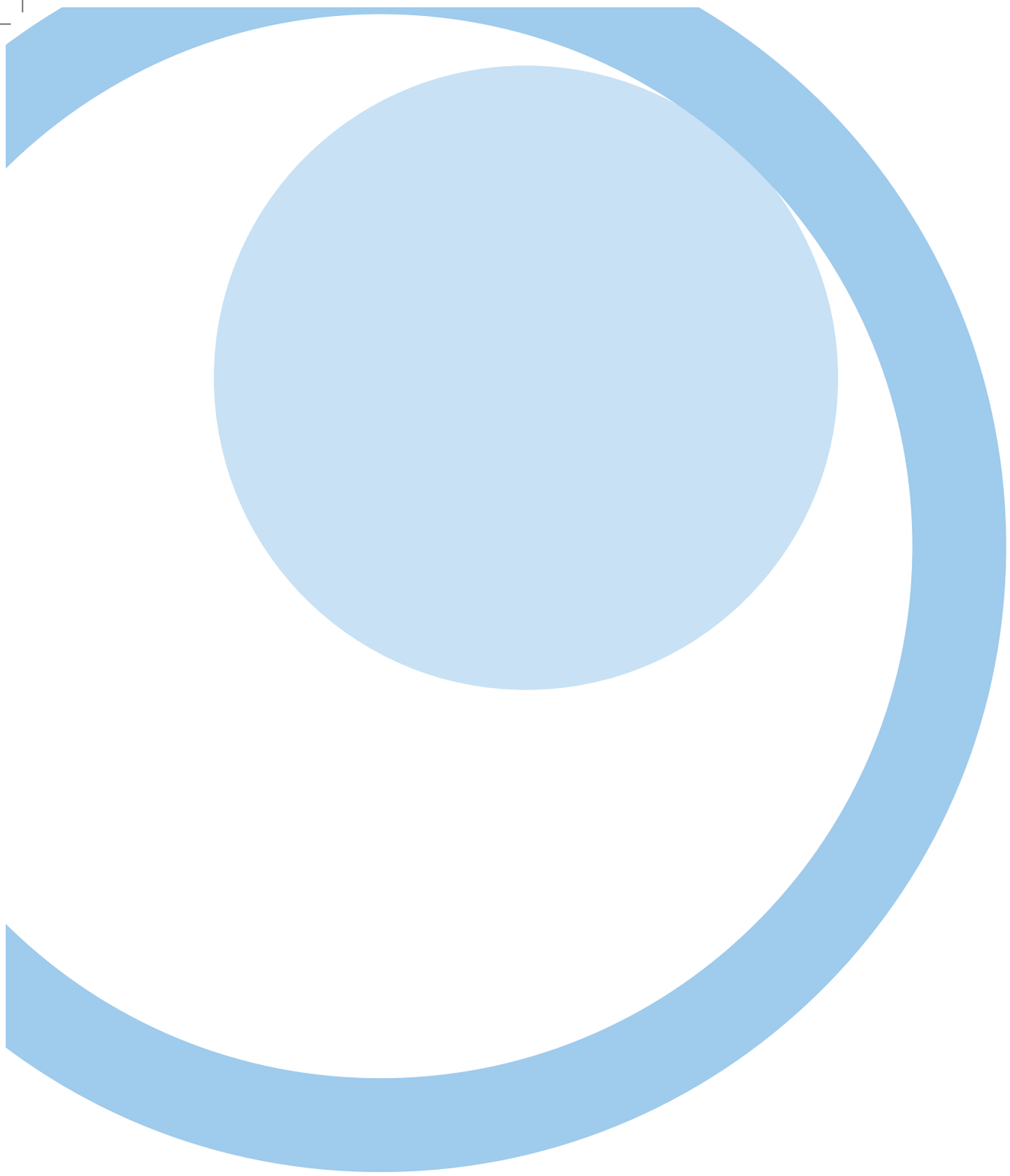
Cylindrical Photoelectric Sensor



H8 series

M8 high frequency DC
H8 series

features

- **Very small dimensions: M8 housing**
- **High switching frequency: 50 kHz**
- **Completely amplified**
- **IP67 protection degree**
- **Strong stainless steel housing**
- **Approvals: CE**

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

code description

H8 E / 1

series	H8	M8 miniaturized through-beam
function	E	Emitter
	R	Receiver
version	1	Standard version

available models

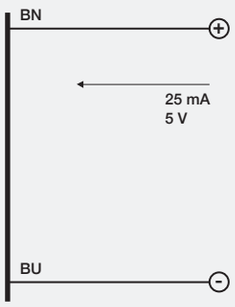
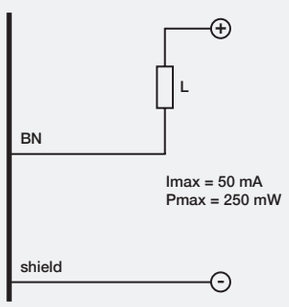
model	housing	distance (mm)	exit	note	model
emitter	stainless steel	80	cable	5 Vdc - 25 mA	H8E/1
receiver				Imax = 50 mA Pmax = 250 mW	H8R/1

technical specification

through-beam models

	H8
	
nominal sensing distance	80 mm
emission	infrared (880 nm)
minimum detectable object	-
repeatability	-
supply voltage	5 Vdc (E1), 30 Vdc max R1
ripple	≤ 1 %
no-load supply current	25 mA (E1)
load current (nominal)	≥ 2,5 mA
load current (maximum)	≤ 50 mA, 250 mW
leakage current	-
voltage drop	≤ 0.2 V @ 2.5 mA
output type	open collector
switching frequency	50 kHz
power on delay	-
power supply protections	-
EMC	in conformity with the EMC Directive according to EN 60947-5-2
output protection	-
operating temperature range	- 25°C...+ 70°C (without freeze)
external light interference	150 lux (incandescent lamp)
protection degree	IP67 (EN60529)
LEDs	-
housing materials	stainless steel
optic materials	plastic
weight	63 g

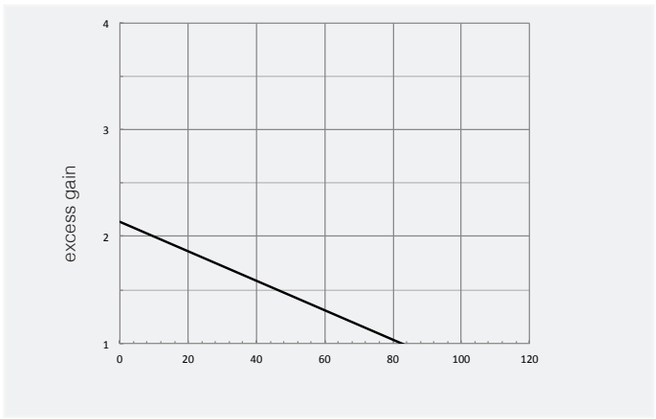
electrical diagrams of the connections

H8E/1 emitter	H8R/1 receiver
	

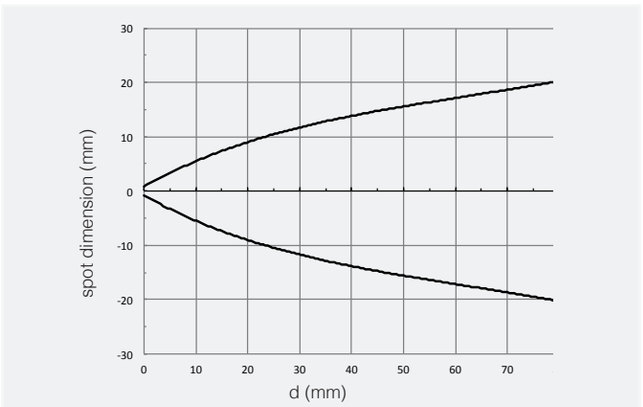
BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

response diagram

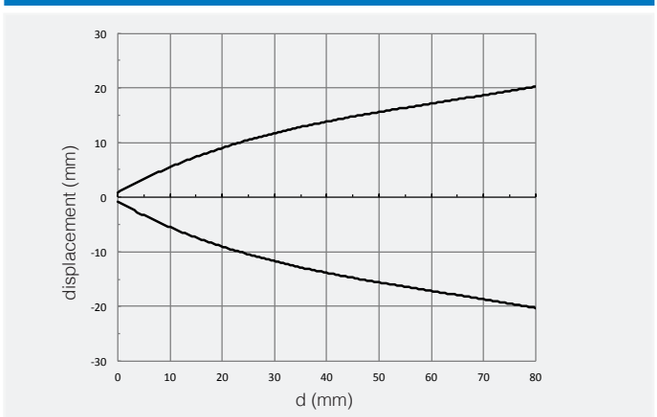
H8E/1, H8R/1 excess gain



H8E/1, H8R/1 spot dimension

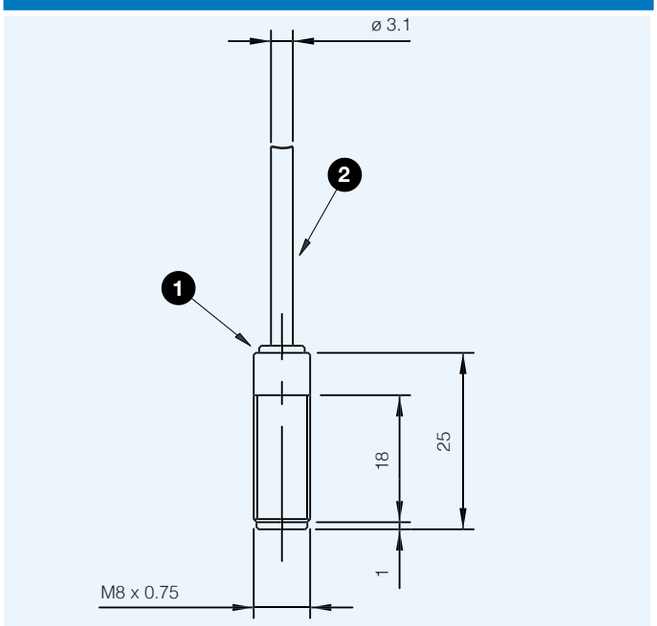


H8E/1, H8R/1 parallel displacement



dimensions (mm)

H8*/**

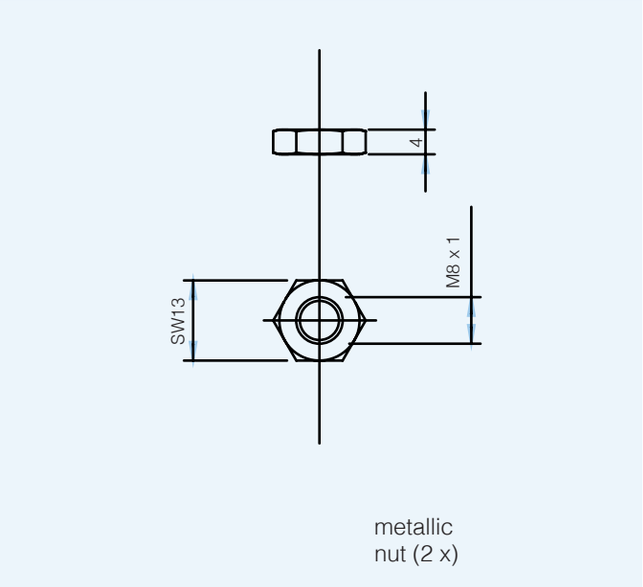


1 axial cable exit

2 Ø 3.1 mm, PVC, 2 m

dimensions (mm)

accessories included in all metallic models



notes

HE series

M8 miniaturized through-beam sensors DC HE series

features

- **M8 through beam models with high switching frequency**
- **LED status indicator for all models**
- **Complete protection against electrical damages**
- **IP67 protection degree**
- **Stainless steel housing**
- **Supply voltage 10...30 Vdc**
- **Approvals: CE**

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

code description

HE E / 0 0 - 3 A

series	HE	M8 high switching frequency through beam sensors
output	E	Emitter
	R	Receiver
output state	0	Emitter
	A	NO output receiver
	C	NC output receiver
output logic	0	Emitter
	P	PNP receiver
	N	NPN receiver
distance	3	Models with 10 kHz, 1 m sensing distance
	4	Models with 1 kHz, 2 m sensing distance
connect.	A	Cable exit 2 m
	F	M8 plug cable exit

available models

model	distance (m)	switching frequency (kHz)	exit	PNP NO	NPN NO	PNP NC	NPN NC
emitter	1	10	cable	HEE/00-3A			
			M8	HEE/00-3F			
receiver			cable	HER/AP-3A	HER/AN-3A	HER/CP-3A	HER/CN-3A
			M8	HER/AP-3F	HER/AN-3F	HER/CP-3F	HER/CN-3F
emitter	2	1	cable	HEE/00-4A			
			M8	HEE/00-4F			
receiver			cable	HER/AP-4A	HER/AN-4A	HER/CP-4A	HER/CN-4A
			M8	HER/AP-4F	HER/AN-4F	HER/CP-4F	HER/CN-4F

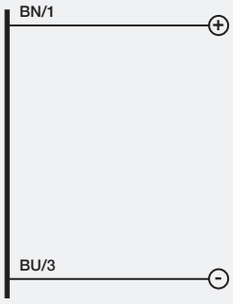
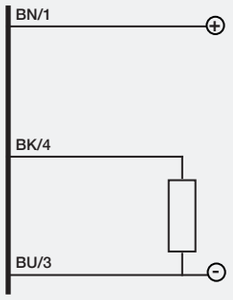
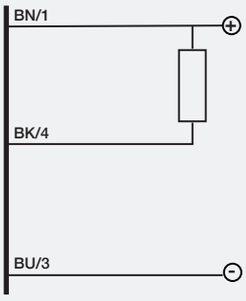
technical specification

through-beam models

	HEE/**-3*	HER/**-3*	HEE/**-4*	HER/**-4*
				
nominal sensing distance Sn	1 m (EG = 2)		2 m (EG = 2)	
emission	infrared (880 nm)	-	infrared (880 nm)	-
hysteresis	≤ 10 %			
repeatability	10 %			
operating voltage	10...30 Vdc, 30 Vdc max			
ripple	≤ 10 %			
no-load supply current	≤ 45 mA			
load current	≤ 100 mA			
leakage current	10 µA			
output voltage drop	≤ 2 V			
output type	-	NPN or PNP NO or NC	-	NPN or PNP NO or NC
switching frequency	10 kHz		1 kHz	
power on delay	-	≤ 100 ms	-	≤ 100 ms
power supply protections	polarity reversal, impulsive overvoltages			
EMC	in conformity with the EMC Directive according to EN 60947-5-2			
output protection	short circuit (autoreset)			
temperature range	- 25°C...+ 50°C			
temperature drift	≤ 10 %			
external light interference	3,000 lux (incandescent lamp), 5,000 lux (sunlight)			
protection degree	IP67 (EN60529) [1]			
LEDs	yellow (supply)	yellow (output active)	yellow (supply)	yellow (output active)
housing material	stainless steel			
optic material	plastic			
weight	15 g connector / 40 g cable			

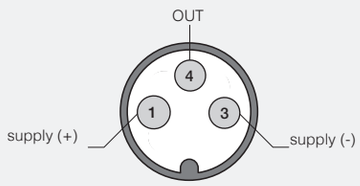
[1] Protection guaranteed only with plug cable well mounted

electrical diagrams of the connections

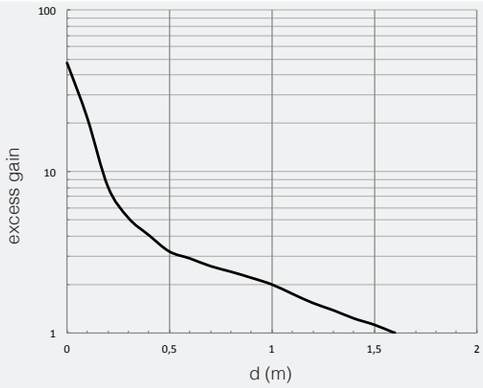
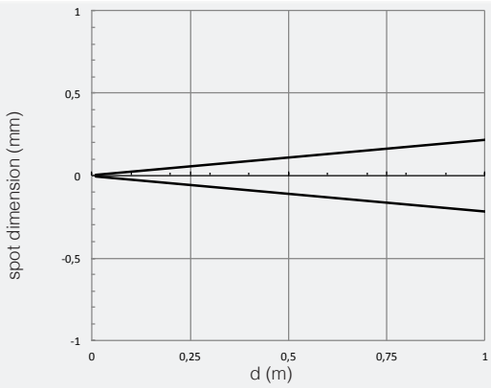
HER/00-**	HER/*P-**	HER/*N-**
		

BN	brown
BU	blue
BK	balck
WH	white
PK	pink
GY	gray

plug

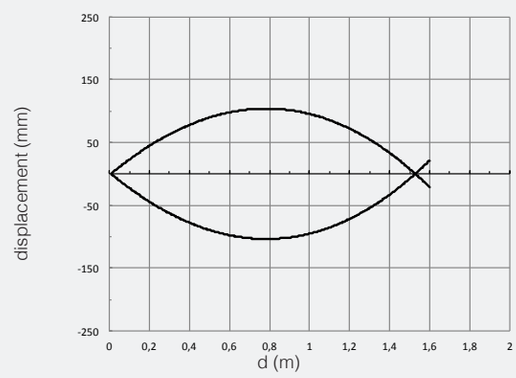
M8


response diagram

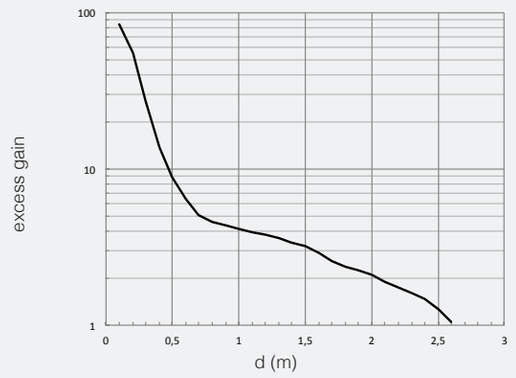
HE*/**-3 excess gain	HE*/**-3 spot dimension
	

response diagram

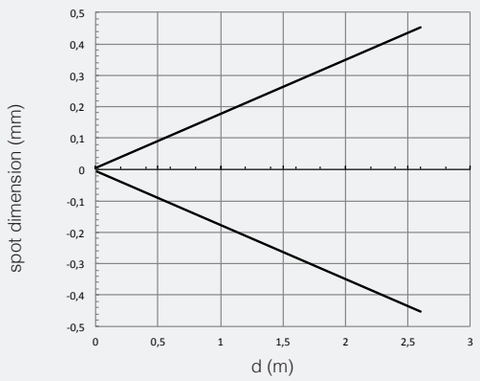
HE*/**-3 mutual interference



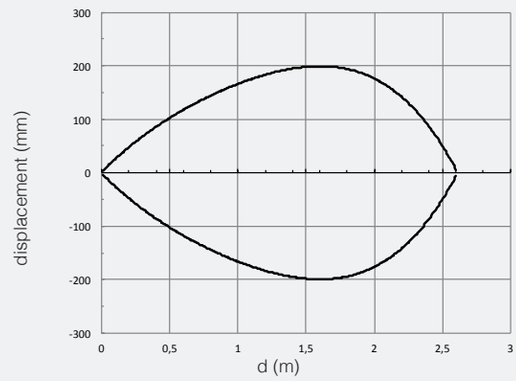
HE*/**-4 excess gain



HE*/**-4 spot dimension

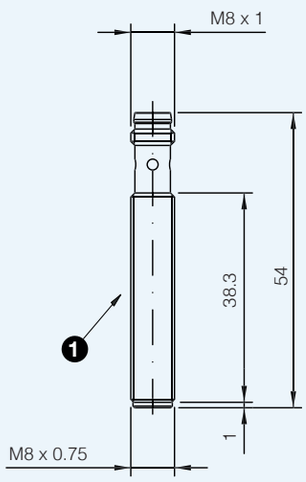


HE*/**-4 parallel displacement

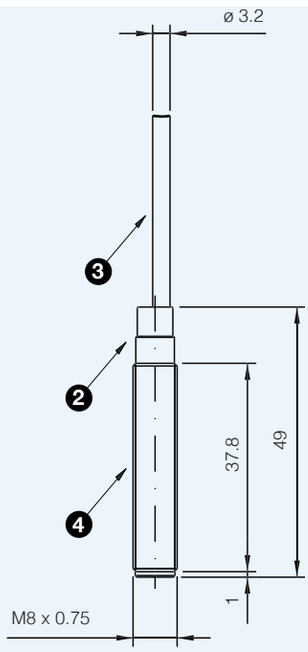


dimensions (mm)

HE*/**-*F



HE*/**-*A



1 cylindrical threaded housing exit F

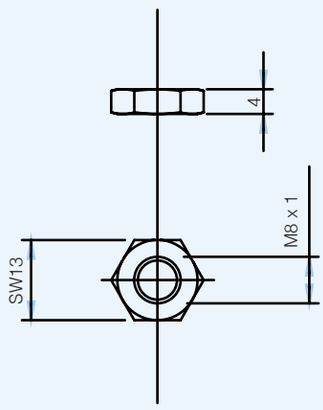
2 plastic cable exit

3 cable Ø 3,1

4 cylindrical threaded housing exit A

dimensions (mm)

accessories included



metallic
nut (2 x)

DG series

Ø 10 mm miniaturized through-beam sensors DG series

features

- **Ø 10 mm plastic housing 41 mm length**
- **Ø 13 mm hole irreversibile spring latch fixing**
- **LED status indicator receiver only**
- **Complete protection against electrical damages**
- **IP67 protection degree**
- **Nominal sensing distance (Sn): 2 m ExG. = 4**
- **Supply voltage 15...37 Vdc (10...30 Vdc for EA version)**
- **Approvals: CE**

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

code description

DG E / L N - 3 A

series	DG	Miniaturized photoelectric sensor DG series
emitter / receiver	E	Emitter
	R	Receiver
emitter / receiver output	1	Emitter
	L	Receiver Light ON
	D	Receiver Dark ON
function	1	Emitter
	N	NPN logic receiver
	P	PNP logic receiver
housing	3	Housing Ø 10 mm with spring latch fixing for Ø 13 mm hole
cable	A	5 m cable length
	D	7 m cable length
version	EA	Special version with 10...30 Vdc supply voltage
		Standard version

available models

model	distance (m)	supply voltage	cable (m)	PNP NO	NPN NO	PNP NC	NPN NC
emitter	-	15...37 Vdc	5	DGE/11-3A			
			7	DGE/11-3D			
		10...30 Vdc	5	DGE/11-3AEA			
			7	DGE/11-3DEA			
receiver	2	15...37 Vdc	5	DGR/DP-3A	DGR/LP-3A	DGR/DN-3A	DGR/LN-3A
			7	DGR/DP-3D	DGR/LP-3D	DGR/DN-3D	DGR/LN-3D
		10...30 Vdc	5	DGR/DP-3AEA	-	-	-
			7	DGR/DP-3DEA	-	-	-

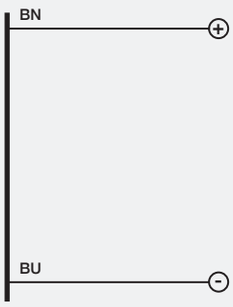
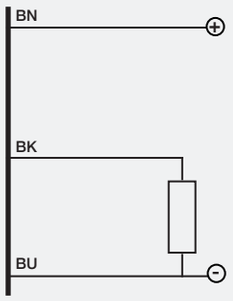
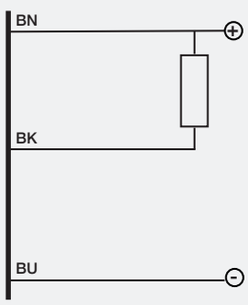
technical specification

through-beam models

	DGE/11-**	DGR/**-**	DG*/**-**EA
			
nominal sensing distance	2 m (EG = 4)		
emission	infrared (880 nm)	-	-
supply operating voltage	15...37 Vdc		10...30 Vdc
ripple	10 %		
no-load supply current	≤ 10 mA		
load output current	-	30 mA	
leakage current	-	10 µA	
output voltage drop	-	2 V with = 30 mA	
output type	-	NPN or PNP LO or DO	
switching frequency	-	40 Hz	
power on delay	-	100 ms	
power supply protections	polarity reversal, pulse overvoltage		
EMC	in conformity with the EMC Directive according to EN 60947-5-2		
output protection	-	short circuit	
operating temperature range	- 25°C...+ 70°C		
temperature drift	≤ 10 %		
protection degree	IP67 (EN60529) [1]		
external light interference	-	20,000 lux	
LEDs	supply	output status	
housing material	PC		

[1] Protection guaranteed only with plug cable well mounted

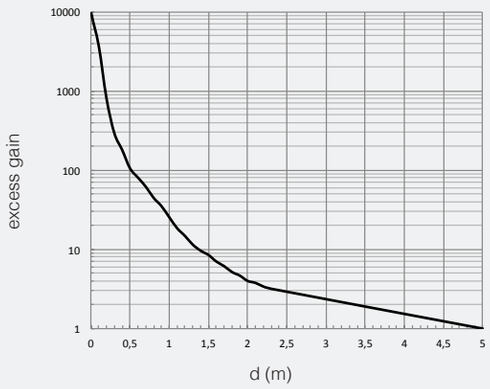
electrical diagrams of the connections

emitter	receiver PNP	receiver NPN
		

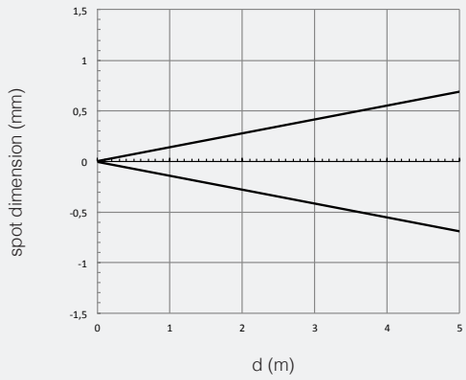
BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

response diagram

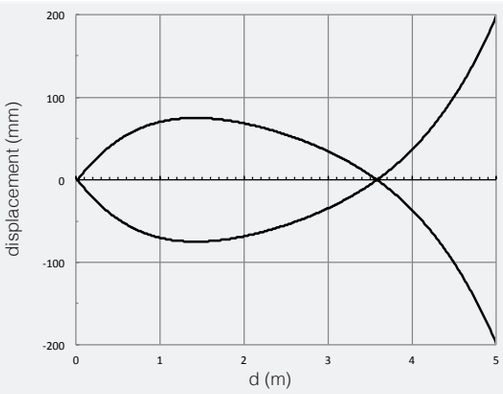
DGE/**-**, DGR/**-** excess gain



DGE/**-**, DGR/**-** spot dimension

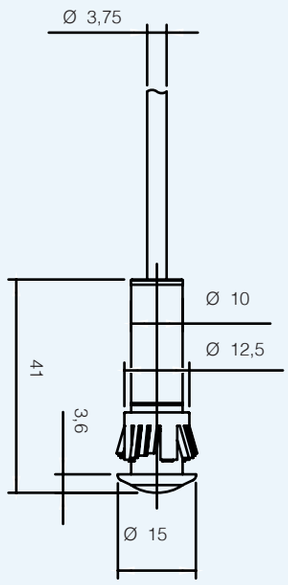


DGE/**-**, DGR/**-** parallel displacement



dimensions (mm)

DG*/-***



DM series

M12 cylindrical photoelectric sensors

features

- **Models diffuse reflection, polarized and through-beam**
- **Local and remote teach-in function**
- **Light-on / Dark-on selectable outputs**
- **IP67 protection degree**
- **Multifunction LED status indicator**
- **Complete protection against electrical damages**
- **Approvals: CE and cULus listed**

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

code description (*)

DM 2 / 0 N - 1 A

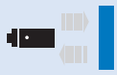
series	DM	M12 cylindrical photoelectric sensor
type	2	Diffuse reflection 100 mm without sensitivity adjustment
	3	Diffuse reflection 100 mm with sensitivity adjustment
	7	Diffuse reflection 300 mm with sensitivity adjustment
	P	Polarized 2 m with sensitivity adjustment
	E	Emitter 4 m with power emission adjustment
	R	Receiver 4 m
emitter / receiver	0	Emitter without check - Receiver LO/DO selectable
	X	Emitter with check
function	0	Emitter
	N	NPN output
	P	PNP output
housing	1	Metal housing
cable	A	Axial cable exit
	H	M12 plug cable exit
version	25	DMP and DME without sensitivity adjustment
		Standard version

(*) ATEX models available, contact our Sales Dept. for further information.

available models

model	distance	adjustment	4 wires LO / DO NPN		4 wires LO / DO PNP	
			cable	plug	cable	plug
direct diffuse	100 mm	-	DM2/0N -1A	DM2/0N -1H	DM2/0P -1A	DM2/0P -1H
	100 mm	●	DM3/0N -1A	DM3/0N -1H	DM3/0P -1A	DM3/0P -1H
	300 mm		DM7/0N -1A	DM7/0N -1H	DM7/0P -1A	DM7/0P -1H
polarized	2 m		DMP/0N -1A	DMP/0N -1H	DMP/0P -1A	DMP/0P -1H
emitter	4 m		DME/00 -1A	DME/00 -1H	DME/00 -1A	DME/00 -1H
receiver		-	DMR/0N -1A	DMR/0N -1H	DMR/0P -1A	DMR/0P -1H

technical specification

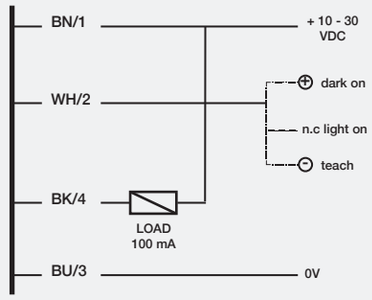
	diffuse reflection			polarized	through-beam	
	DM2/0*-1*	DM3/0*-1*	DM7/0*-1*	DMP/0*-1*	DMR/0*-1*	DME/0*-1*
						
nominal sensing distance	100 mm (1)		300 mm (2)	2.5 m (3)	4 m	
emission	infrared (880 nm)			red (660 nm)	infrared (880 nm)	
tolerance	+ 15 % / - 5 %					
hysteresis	≤ 10 %				≤ 20 %	
repeatability	5 %					
operating voltage	10...30 Vdc					
ripple	≤ 10 %					
no-load current	≤ 30 mA					
load current	100 mA					
leakage current	≤ 10 µA					
output voltage drop	2 V max. IL = 100 mA					
output type	NPN o PNP - LO / DO selectable					
switching frequency	400 Hz				250 Hz	
response time	1.1 ms				2 ms	
power on delay	150 ms					
power supply protections	polarity reversal, transient					
EMC	in conformity with the EMC Directive according to EN 60947-5-2					
output protection	short circuit (autoreset)					
temperature range	- 25°C...+ 70°C					
temperature drift	10 % Sr					
protection degree	IP67 (EN60529) (4)					
check input	-				decoupled input supply 10..30 Vdc	
external light interference	3000 lux (incandescent lamp), 10000 lux (sunlight)					
LEDs	yellow					
sensitivity adjustment	-	●			-	●
housing material	nickel-plated brass					
optic material	plastic					
tightening torque	10 Nm					
weight (approximate)	28 g connector / 60 g cable					

(1) With 100x100 mm white paper (2) With 200x200 mm white paper (3) With RL 110 reflector (4) Protection guaranteed only with plug cable well mounted

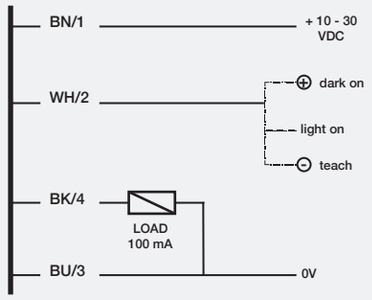
DM SERIES.

electrical diagrams of the connections

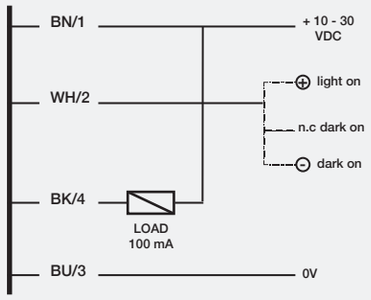
DM2/0N-** DM3/0N-** DM7/0N-**



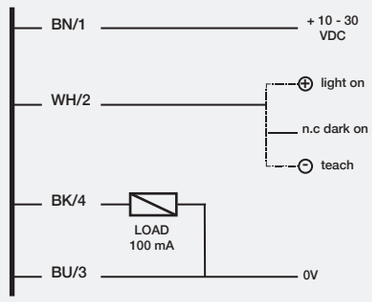
DM2/0P-** DM3/0P-** DM7/0P-**



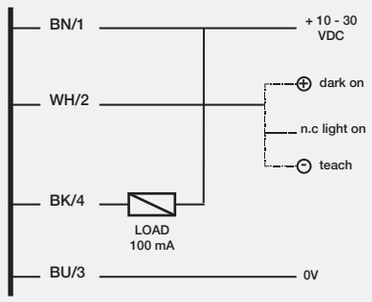
DMP/0N-**



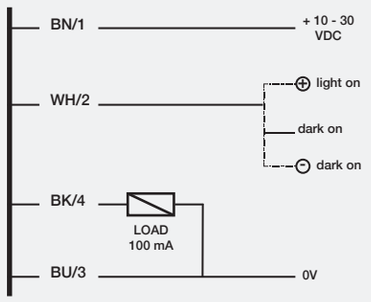
DMP/0P-**



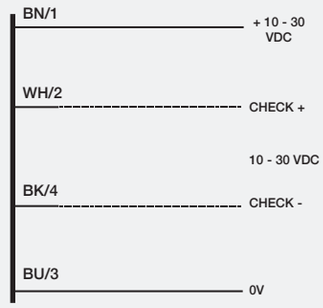
DMR/0N-1*



DMR/0P-1*



DME/X0-1*



BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

Notes:

Models DM2/0N-** and DM2/0P-** without sensitivity adjustment.

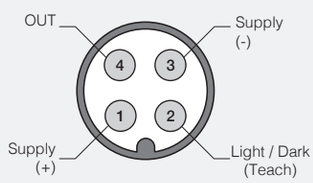
Models DMP/0N-**25 and DMP/0P-**25 without sensitivity adjustment.

Models DME/00-** without check.

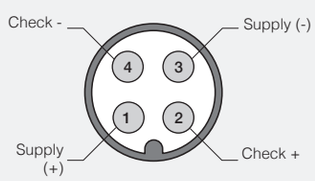
In case of combined load, resistive and capacitive, the maximum admissible capacity (C) is 0,1 µF for maximum output voltage and current.

plug

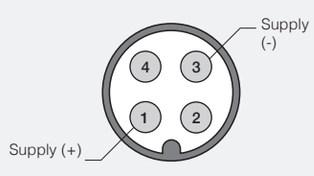
M12 diffuse reflection polarized receiver



M12 emitter with check



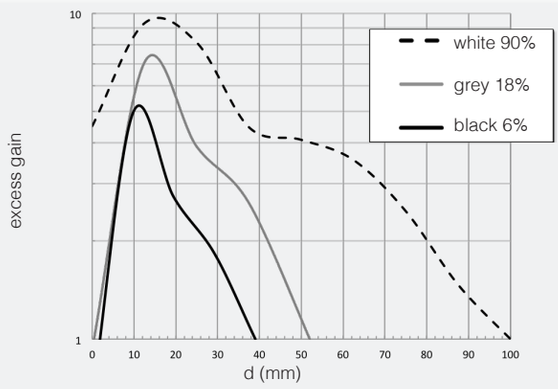
M12 emitter without check



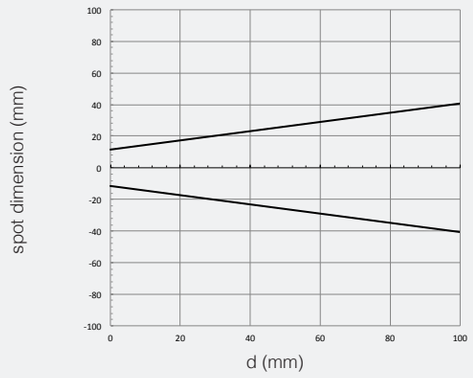
response diagrams

direct reflection models

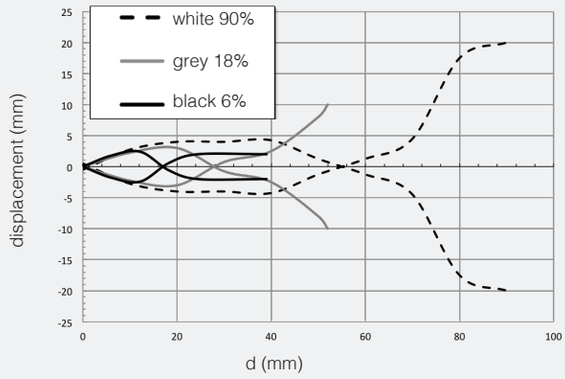
DM2/**-** excess gain



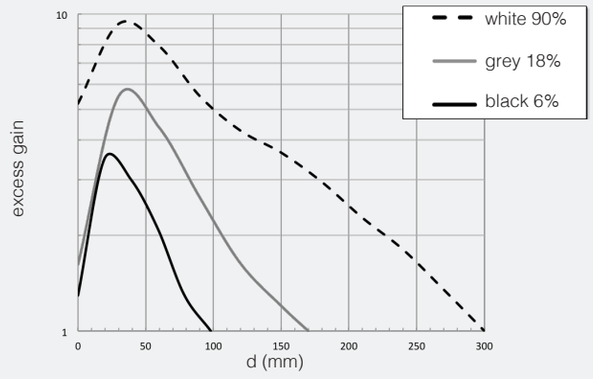
DM2/**-** spot dimension



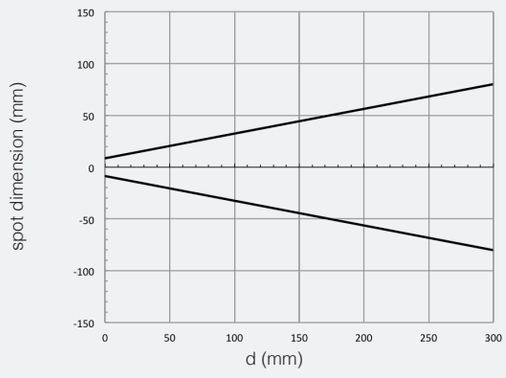
DM2/**-** parallel displacement



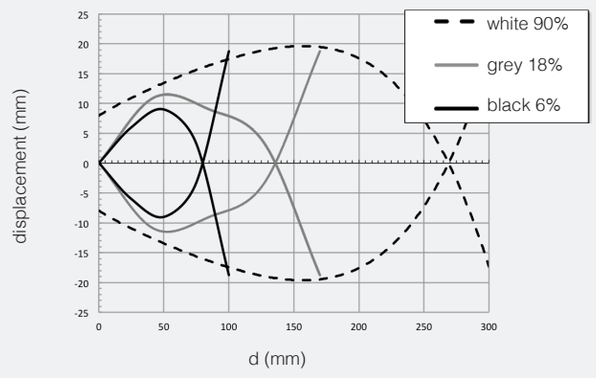
DM5/**-** excess gain



DM5/**-** spot dimension



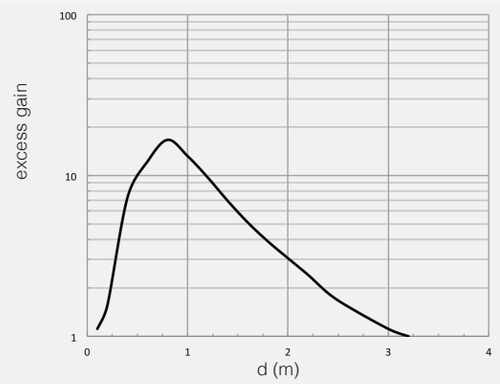
DM5/**-** parallel displacement



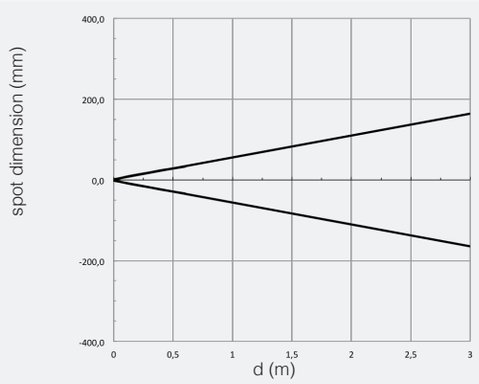
response diagrams

polarized models (diagrams calculated with RL110)

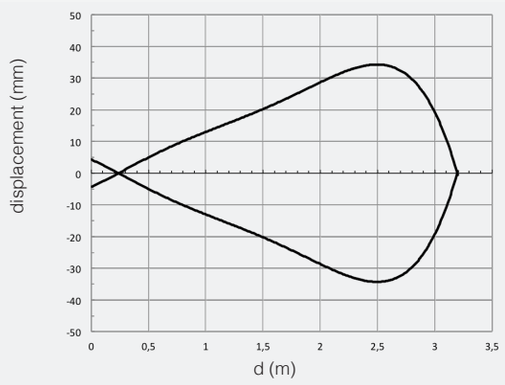
DM7/**-** excess gain



DM7/**-** spot dimension



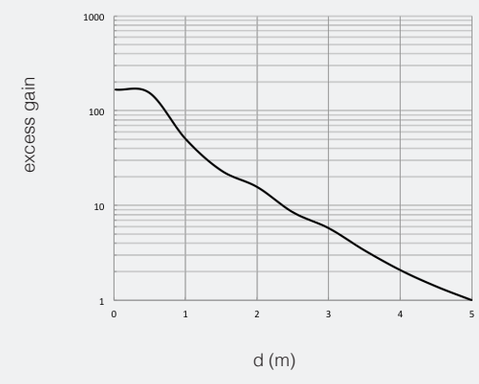
DM7/**-** parallel displacement



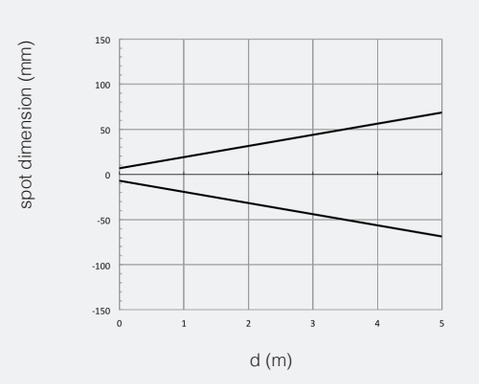
response diagrams

through-beam models

DMP/**-** excess gain



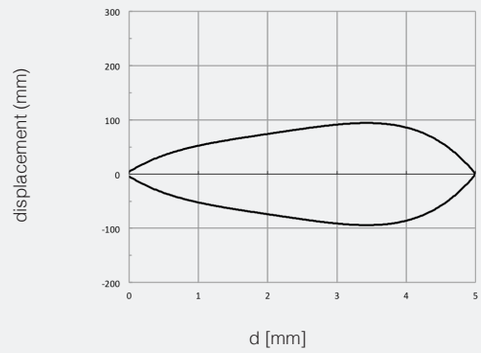
DMP/**-** spot dimension



response diagrams

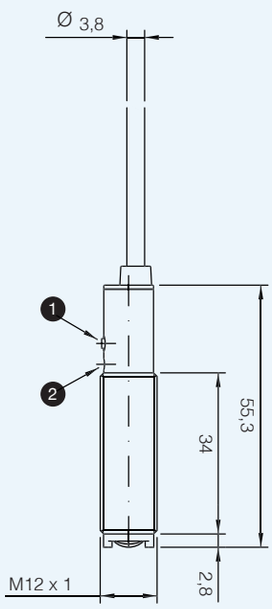
through-beam models

DMP/-** parallel displacement**

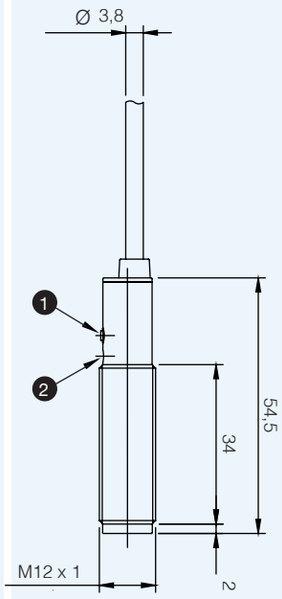


dimensions (mm)

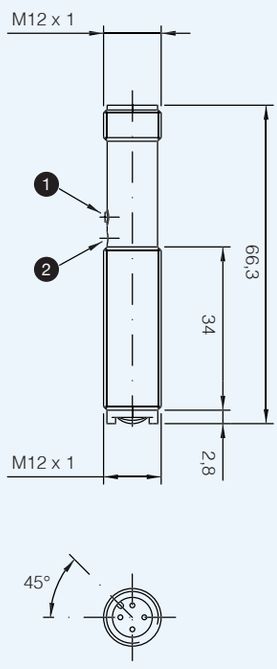
DMP/-1A**



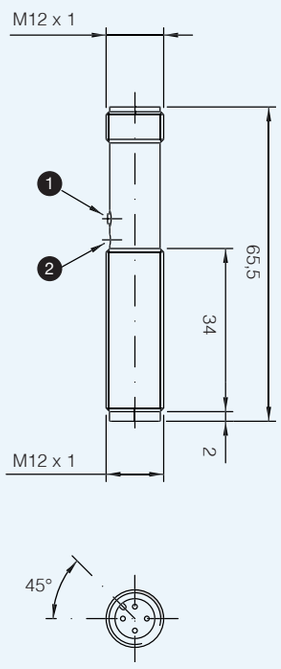
DM*/-1A**



DMP/-1H**



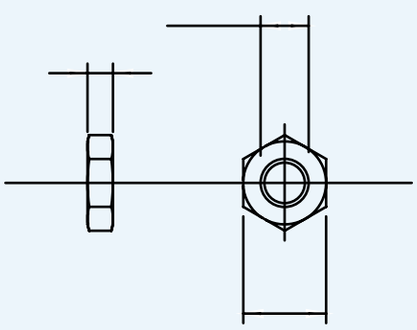
DM*/-1H**



1 Teach-In button 2 LED

dimensions (mm)

accessories included



metallic
nut (2 x)

FA series
M18 photoelectric sensors DC

features

Complete range of M18 sensors with 10...30 Vdc power supply
Axial and radial optic with flat surface
Retro-reflective models for transparent objects detection, with red emission
IP67 protection degree
Metallic or plastic housing
Sensitivity adjustment available for all models
Total protection against any type of electric damages
Approvals: CE and cULus listed

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

code description (*)

FA I C / B P - 0 A

series	FA	M18 sensor with 4 DC wires
emission	I	Infrared invisible led emission
	R	Red visible led emission
type	2	100 mm Direct reflection without adjustment
	3	100 mm Direct reflection with adjustment
	4	200 mm Direct reflection with adjustment
	5	200 mm Direct reflection without adjustment
	6	400 mm Direct reflection without adjustment
	7	400 mm Direct reflection with adjustment
	8	Direct reflection: 1000 mm axial, 800 mm radial with adjustment
	C	Reflex without adjustment
	P	Reflex polarized without adjustment
	N	Reflex polarized with adjustment
	M	Reflex with adjustment
	L	Reflex with adj. for transparent objects detection
	H	Emitter
	D	Receiver with sensitivity adjustment
	Z	Receiver without sensitivity adjustment
emitter	0	Emitter
	X	Emitter with check
	B	4 wires output complementary NO and NC
output	0	Emitter
	P	PNP output
	N	NPN output
housing	0	Plastic housing, axial optic
	1	Metal housing, axial optic
	2	Plastic housing, radial optic
	3	Metal housing, radial optic
plug / cable output	A	Axial cable output
	E	Axial M12 plastic connector output

(*) ATEX models available, contact our Sales Dept. for further information.

available models

cable exit photoeletric sensors

model	distance	housing	adjustment	4 wires (axial optic)		4 wires (right angle optic)	
				NPN NO + NC	PNP NO + NC	NPN NO + NC	PNP NO + NC
diffuse reflection	100 mm	plastic	-	FAR2/BN-0A	FAR2/BP-0A	FAR2/BN-2A	FAR2/BP-2A
			●	FAR3/BN-0A	FAR3/BP-0A	FAR3/BN-2A	FAR3/BP-2A
		metallic	-	FAR2/BN-1A	FAR2/BP-1A	FAR2/BN-3A	FAR2/BP-3A
			●	FAR3/BN-1A	FAR3/BP-1A	FAR3/BN-3A	FAR3/BP-3A
	200 mm	plastic		FAI4/BN-0A	FAI4/BP-0A	FAI4/BN-2A	FAI4/BP-2A
			-	FAI5/BN-0A	FAI5/BP-0A	FAI5/BN-2A	FAI5/BP-2A
		metallic	●	FAI4/BN-1A	FAI4/BP-1A	FAI4/BN-3A	FAI4/BP-3A
			-	FAI5/BN-1A	FAI5/BP-1A	FAI5/BN-3A	FAI5/BP-3A
	400 mm	plastic		FAI6/BN-0A	FAI6/BP-0A	FAI6/BN-2A	FAI6/BP-2A
			●	FAI7/BN-0A	FAI7/BP-0A	FAI7/BN-2A	FAI7/BP-2A
		metallic	-	FAI6/BN-1A	FAI6/BP-1A	FAI6/BN-3A	FAI6/BP-3A
			●	FAI7/BN-1A	FAI7/BP-1A	FAI7/BN-3A	FAI7/BP-3A
	1,000 mm (axial)	plastic		FAI8/BN-0A	FAI8/BP-0A	FAI8/BN-2A	FAI8/BP-2A
	800 mm (90°)	metallic		FAI8/BN-1A	FAI8/BP-1A	FAI8/BN-3A	FAI8/BP-3A
retroreflective	5 m (axial) 4 m (90°)	plastic	-	FAIC/BN-0A	FAIC/BP-0A	FAIC/BN-2A	FAIC/BP-2A
			●	FAIM/BN-0A	FAIM/BP-0A	FAIM/BN-2A	FAIM/BP-2A
		metallic	-	FAIC/BN-1A	FAIC/BP-1A	FAIC/BN-3A	FAIC/BP-3A
			●	FAIM/BN-1A	FAIM/BP-1A	FAIM/BN-3A	FAIM/BP-3A
polarized	4 m (axial) 2.5 m (90°)	plastic	-	FARP/BN-0A	FARP/BP-0A	FARP/BN-2A	FARP/BP-2A
			●	FARN/BN-0A	FARN/BP-0A	FARN/BN-2A	FARN/BP-2A
		metallic	-	FARP/BN-1A	FARP/BP-1A	FARP/BN-3A	FARP/BP-3A
			●	FARN/BN-1A	FARN/BP-1A	FARN/BN-3A	FARN/BP-3A
trasparents	0.1...1.5 m	plastic		FARL/BN-0A	FARL/BP-0A	FARL/BN-2A	FARL/BP-2A
		metallic		FARL/BN-1A	FARL/BP-1A	FARL/BN-3A	FARL/BP-3A
through-beam	20 m (axial) 15 m (90°)	plastic	emitter	FAIH/00-0A		FAIH/00-2A	
			emitt. + check	FAIH/X0-0A		FAIH/X0-2A	
			receiver	FAIZ/BN-0A	FAIZ/BP-0A	FAIZ/BN-2A	FAIZ/BP-2A
			adj. receiver	FAID/BN-0A	FAID/BP-0A	FAID/BN-2A	FAID/BP-2A
		metallic	emitter	FAIH/00-1A		FAIH/00-3A	
			emitt. + check	FAIH/X0-1A		FAIH/X0-3A	
			receiver	FAIZ/BN-0A	FAIZ/BP-0A	FAIZ/BN-2A	FAIZ/BP-2A
			adj. receiver	FAID/BN-1A	FAID/BP-1A	FAID/BN-3A	FAID/BP-3A

available models

plug cable exit photoeletric sensors

model	distance	housing	adjustment	4 wires (axial optic)		4 wires (right angle optic)	
				NPN NO + NC	PNP NO + NC	NPN NO + NC	PNP NO + NC
diffuse reflection	100 mm	plastic	-	FAR2/BN-0E	FAR2/BP-0E	FAR2/BN-2E	FAR2/BP-2E
			●	FAR3/BN-0E	FAR3/BP-0E	FAR3/BN-2E	FAR3/BP-2E
		metallic	-	FAR2/BN-1E	FAR2/BP-1E	FAR2/BN-3E	FAR2/BP-3E
			●	FAR3/BN-1E	FAR3/BP-1E	FAR3/BN-3E	FAR3/BP-3E
	200 mm	plastic		FAI4/BN-0E	FAI4/BP-0E	FAI4/BN-2E	FAI4/BP-2E
			-	FAI5/BN-0E	FAI5/BP-0E	FAI5/BN-2E	FAI5/BP-2E
		metallic	●	FAI4/BN-1E	FAI4/BP-1E	FAI4/BN-3E	FAI4/BP-3E
			-	FAI5/BN-0E	FAI5/BP-0E	FAI5/BN-2E	FAI5/BP-2E
	400 mm	plastic		FAI6/BN-0E	FAI6/BP-0E	FAI6/BN-2E	FAI6/BP-2E
			●	FAI7/BN-0E	FAI7/BP-0E	FAI7/BN-2E	FAI7/BP-2E
		metallic	-	FAI6/BN-1E	FAI6/BP-1E	FAI6/BN-3E	FAI6/BP-3E
			●	FAI7/BN-1E	FAI7/BP-1E	FAI7/BN-3E	FAI7/BP-3E
	1.000 mm (axial)	plastic		FAI8/BN-0E	FAI8/BP-0E	FAI8/BN-2E	FAI8/BP-2E
	800 mm (90°)	metallic		FAI8/BN-1E	FAI8/BP-1E	FAI8/BN-3E	FAI8/BP-3E
retroreflective	5 m (axial) 4 m (90°)	plastic	-	FAIC/BN-0E	FAIC/BP-0E	FAIC/BN-2E	FAIC/BP-2E
			●	FAIM/BN-0E	FAIM/BP-0E	FAIM/BN-2E	FAIM/BP-2E
		metallic	-	FAIC/BN-1E	FAIC/BP-1E	FAIC/BN-3E	FAIC/BP-3E
			●	FAIM/BN-1E	FAIM/BP-1E	FAIM/BN-3E	FAIM/BP-3E
polarized	4 m (axial) 2.5 m (90°)	plastic	-	FARP/BN-0E	FARP/BP-0E	FARP/BN-2E	FARP/BP-2E
			●	FARN/BN-0E	FARN/BP-0E	FARN/BN-2E	FARN/BP-2E
		metallic	-	FARP/BN-1E	FARP/BP-1E	FARP/BN-3E	FARP/BP-3E
			●	FARN/BN-1E	FARN/BP-1E	FARN/BN-3E	FARN/BP-3E
trasparents	0,1...1.5 m	plastic	●	FARL/BN-0E	FARL/BP-0E	FARL/BN-2E	FARL/BP-2E
		metallic		FARL/BN-1E	FARL/BP-1E	FARL/BN-3E	FARL/BP-3E
through-beam	20 m (axial) 15 m (90°)	plastic	emitter	FAIH/00-0E		FAIH/00-2E	
			emitt. + check	FAIH/X0-0E		FAIH/X0-2E	
			receiver	FAIZ/BN-0E	FAIZ/BP-0E	FAIZ/BN-2E	FAIZ/BP-2E
			adj. receiver	FAID/BN-0E	FAID/BP-0E	FAID/BN-2E	FAID/BP-2E
		metallic	emitter	FAIH/00-1E		FAIH/00-3E	
			emitt. + check	FAIH/X0-1E		FAIH/X0-3E	
			receiver	FAIZ/BN-0E	FAIZ/BP-0E	FAIZ/BN-2E	FAIZ/BP-2E
			adj. receiver	FAID/BN-1E	FAID/BP-1E	FAID/BN-3E	FAID/BP-3E

technical specification

direct reflection models

	red LED emission	
	FAR2/B*-**	FAR3/B*-**
		
nominal sensing distance	100 mm [1]	
emission	red (660 nm)	
hysteresis	≤ 10 %	
repeatability	5 %	
operating voltage	10...30 Vcc	
ripple	≤ 10 %	
no-load supply current	30 mA	
load current	100 mA	
leakage current	10 µA	
output voltage drop	2 V max. IL = 100 mA	
output type	NPN or PNP NO + NC	
switching frequency	250 Hz	
power on delay	200 ms	
power supply protections	polarity reversal, impulsive overvoltage	
output protection	Short circuit (autoreset) Overvoltage	
sensitivity adjustment	-	●
operating temperature range	- 25°C...+ 70°C (without freeze)	
temperature drift	10 % Sr	
protection degree	IP67 (EN60529) [4]	
EMC	in conformity with the EMC Directive according to EN 60947-5-2	
external light interference	3,000 lux (incandescence lamp), 10,000 lux (sunlight)	
LEDs	Yellow (Light status) or (output status in the LO/DO special versions)	
housing material	PBT (plastic) / nicked plated brass (metallic) / PC (cable exit)	
optic material	PC	
tightening torque	1 Nm (plastic), 25 Nm (metallic)	
weight (approximate)	plastic version: 30 g connector / 50 g cable metallic version: 100 g connector / 130 g cable	

[1] White target kodak 90% reflection 100 x 100 mm
[2] Protection guaranteed only with plug cable well mounted

technical specification

direct reflection models

	infrared LED emission				
	FAI4/B*-**	FAI5/B*-**	FAI6/B*-**	FAI7/B*-**	FAI8/B*-**
nominal sensing distance	200 mm (1)		400 mm (2)		1,000 mm (3) (axial) 800 mm (3) (90°)
emission	infrared (880 nm)				
hysteresis	≤ 10 %				
repeatability	5 %				
operating voltage	10...30 Vcc				
ripple	≤ 10 %				
no-load supply current	30 mA				
load current	100 mA				
leakage current	10 µA				
output voltage drop	2 V max. IL = 100 mA				
output type	NPN or PNP NO + NC				
switching frequency	250 Hz				
power on delay	200 ms				
power supply protections	polarity reversal, impulsive overvoltage				
output protection	Short circuit (autoreset) Overvoltage				
sensitivity adjustment	●	-		●	
operating temperature range	- 25°C...+ 70°C (without freeze)				
temperature drift	10 % Sr				
protection degree	IP67 (EN60529) (4)				
EMC	in conformity with the EMC Directive according to EN 60947-5-2				
external light interference	3,000 lux (incandescence lamp), 10,000 lux (sunlight)				
LEDs	Yellow (Light status) or (output status in the LO/DO special versions)				
housing material	PBT (plastic) / nicked plated brass (metallic) / PC (cable exit)				
optic material	PC				
tightening torque	1 Nm (plastic), 25 Nm (metallic)				
weight (approximate)	plastic version: 30 g plug / 50 g cable metallic version: 100 g plug / 130 g cable				

(1) White target kodak 90% reflection 100 x 100 mm (2) White target kodak 90% reflection 200 x 200 mm (3) White target kodak 90% reflection 400 x 400 mm
(4) Protection guaranteed only with plug cable well mounted

technical specification

reflex and polarized models

	retroreflective		polarized		transparent objects detection
	FAIC/B*-** [1]	FAIM/B*-** [1]	FARP/B*-** [1]	FARN/B*-** [1]	FARL/B*-** [2]
					
nominal sensing distance	5 m (axial), 4 m (radial)		4 m (axial), 2.5 m (radial)		1.5 m
emission	infrared (880 nm)		red (660 nm)		
hysteresis	≤ 10 %				
repeatability	5 %				
operating voltage	10...30 Vdc				
ripple	≤ 10 %				
no-load supply current	30 mA				
load current	100 mA				
leakage current	≤ 10 µA				
output voltage drop	2 V max. IL = 100 mA				
output type	NPN or PNP NO + NC				
switching frequency	250 Hz				
power on delay	200 ms				
power supply protections	polarity reversal, impulsive overvoltage				
output protection	Short circuit (autoreset) Overvoltage				
sensitivity adjustment	-	●	-	●	
operating temperature range	- 25°C...+ 70°C (without freeze)				
temperature drift	10 % Sr				
protection degree	IP67 (EN60529) [3]				
EMC	in conformity with the EMC Directive according to EN 60947-5-2				
external light interference	5000 lux (incandescence lamp), 10.000 lux (sunlight)				
LEDs	Yellow (Light status) or (output status in the LO/DO special versions)				
housing material	PBT (plastic) / nicked plated brass (metallic) / PC (cable exit)				
optic material	PC		plastic		PC
tightening torque	1 Nm (plastic), 25 Nm (metallic)				
weight (approximate)	plastic version: 30 g plug / 50 g cable metallic version: 100 g plug / 130 g cable				

[1] With RL 110 reflector [2] With RL 113G or RL 116 reflector [3] Protection guaranteed only with plug cable well mounted

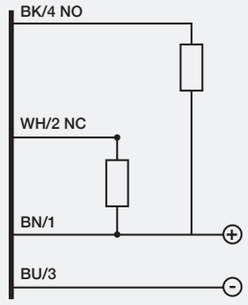
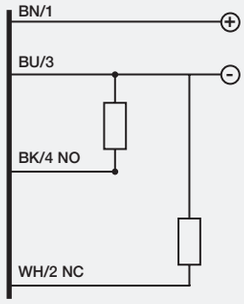
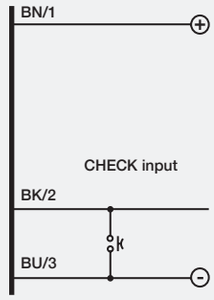
technical specification

throug beam models

	emitter		receiver	
	FAIH/X0-**	FAIH/00-**	FAIZ/B*-**	FAID/B*-**
				
nominal sensing distance	20 m axial model / 15 m right angle model			
emission	infrared (880 nm)			
hysteresis	≤ 10 %			
repeatability	5 %			
operating voltage	10...30 Vdc			
ripple	≤ 10 %			
no-load supply current	25 mA			
load current	-		100 mA	
leakage current	-		10 µA	
output voltage drop	-		2 V max. IL = 100 mA	
output type	-		NPN or PNP NO + NC	
switching frequency	-		250 Hz	
power on delay	-		200 ms	
power supply protections	impulsive overvoltage polarity reversal			
output protection	-		Short circuit (autoreset) - Overvoltage	
sensitivity adjustment	-		-	●
operating temperature range	- 25°C...+ 70°C (without freeze)			
temperature drift	10 % Sr			
check input	BK/2 connected to 0 V switches off the emission	-		
EMC	in conformity with the EMC Directive according to EN 60947-5-2			
protection degree	IP67 (EN60529) (1)			
external light interference	5,000 lux (incandescence lamp), 10,000 lux (sunlight)			
LEDs	green (power ON)		Yellow (light state or output status in the special LO/DO versions)	
housing material	PBT (plastic) / nicked plated brass (metallic) / PC (cable exit)			
optic material	PC			
tightening torque	1 Nm (plastic), 25 Nm (metallic)			
weight (approximate)	plastic version: 30 g connector / 50 g cable metallic version: 100 g connector / 130 g cable			

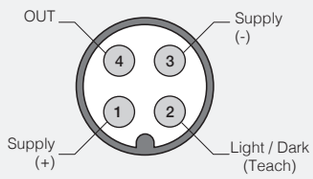
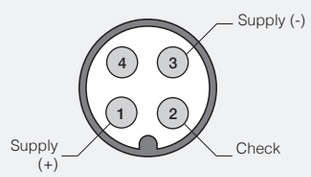
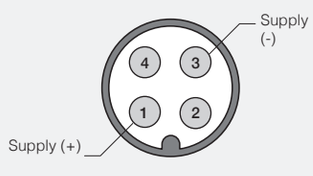
(1) Protection guaranteed only with plug cable well mounted

electrical diagrams of the connections

emitter	receiver NPN	receiver PNP
		

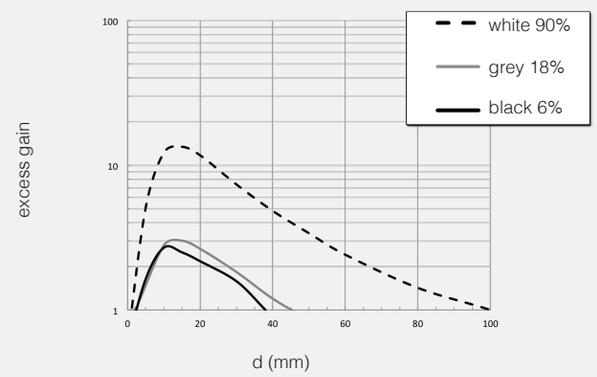
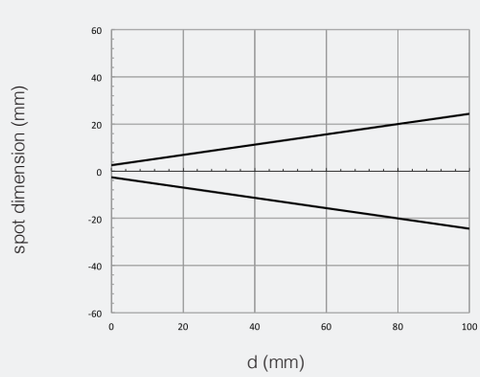
BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

plug

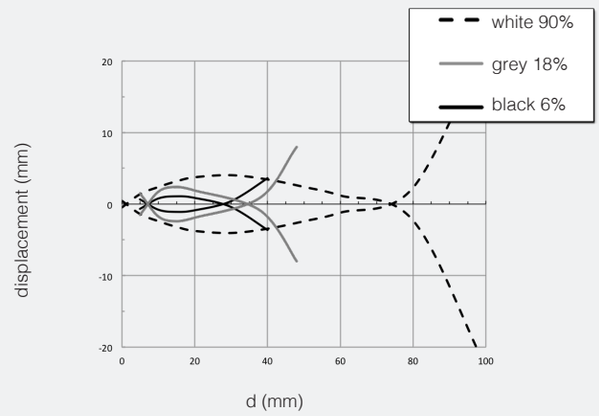
M12 diffuse reflection polarized receiver	M12 emitter with check	M12 emitter without check
		

response diagram

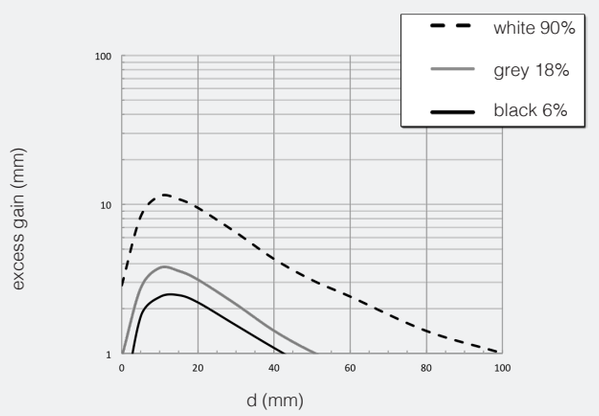
direct diffuse models

FAR2,FAR3/**-(0,1)* excess gain	FAR2,FAR3/**-(0,1)* spot dimension
	

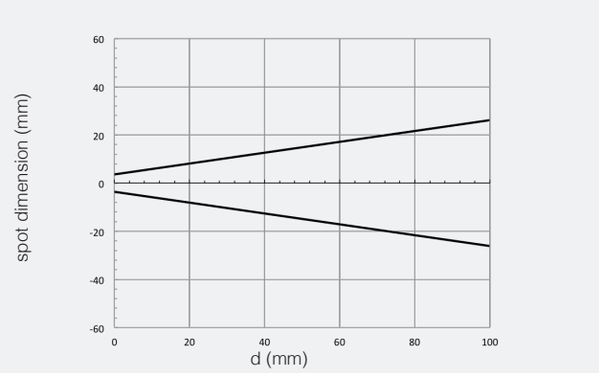
FAR2,FAR3/**-(0,1)* parallel displacement



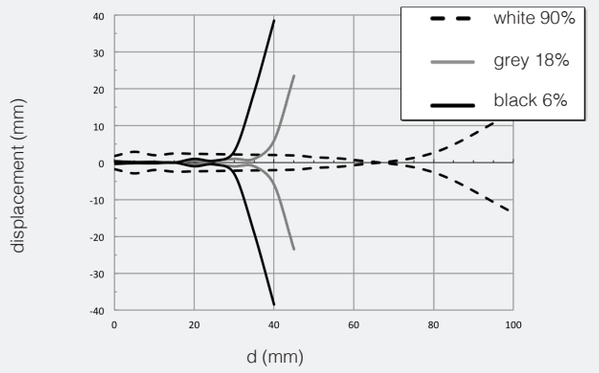
FAR2,FAR3/**-(2,3)* excess gain



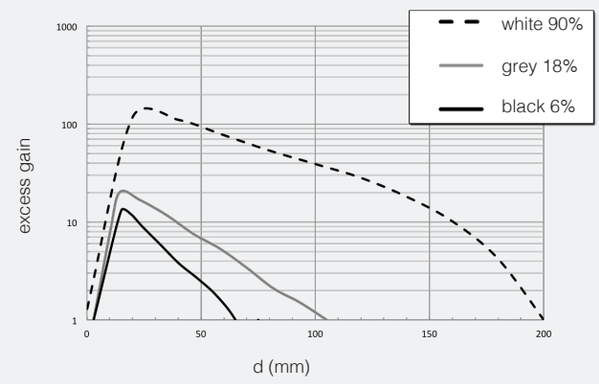
FAR2,FAR3/**-(2,3)* spot dimension



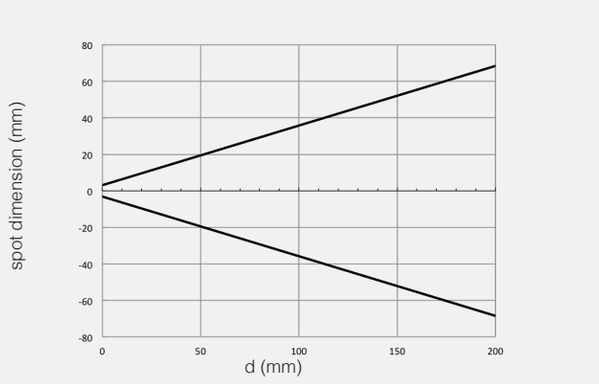
FAR2,FAR3/**-(2,3)* parallel displacement



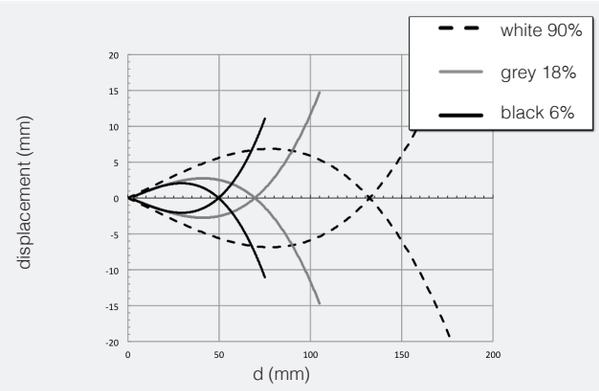
FAI4, FAI5/**-(0,1)* excess gain



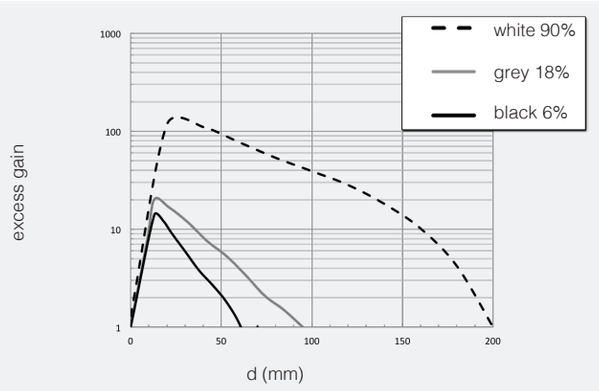
FAI4, FAI5/**-(0,1)* spot dimension



FAI4, FAI5/**-(0,1)* parallel displacement



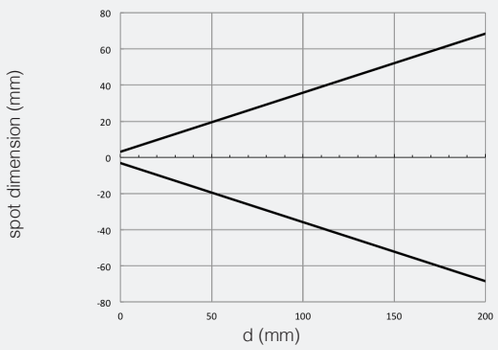
FAI4, FAI5/**-(2,3)* excess gain



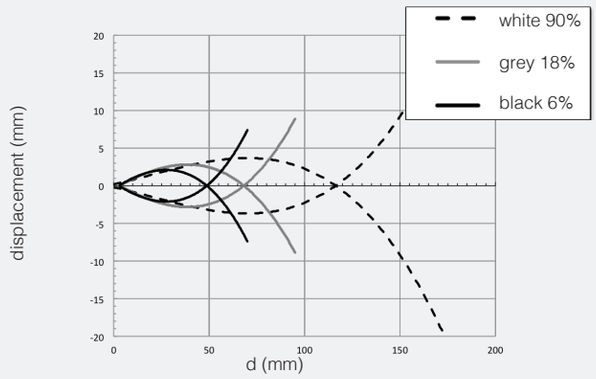
response diagrams

direct diffuse models

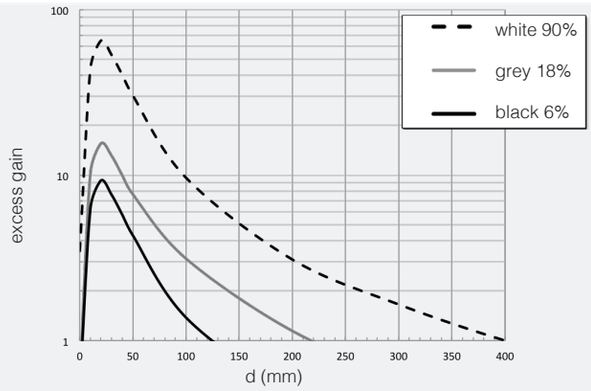
FAI4, FAI5/**-(2,3)* spot dimension



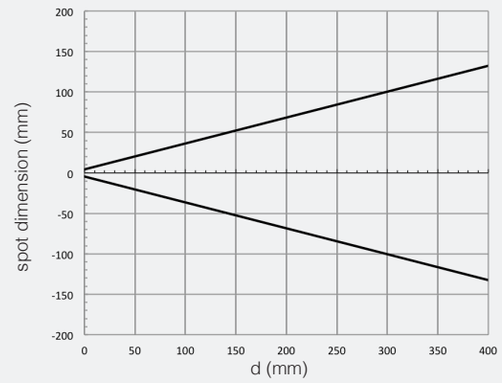
FAI4, FAI5/**-(2,3)* parallel displacement



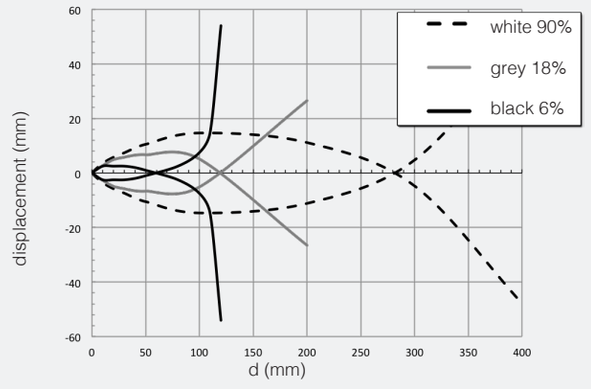
FAI6,FAI7/**-(0,1)* excess gain



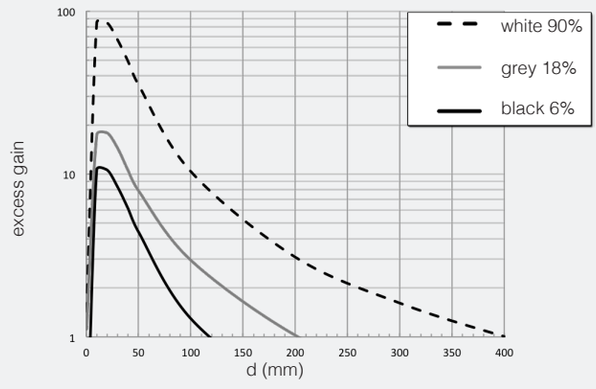
FAI6,FAI7/**-(0,1)* spot dimension



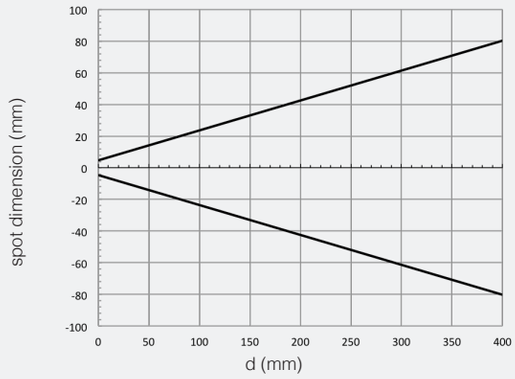
FAI6,FAI7/**-(0,1)*parallel displacement



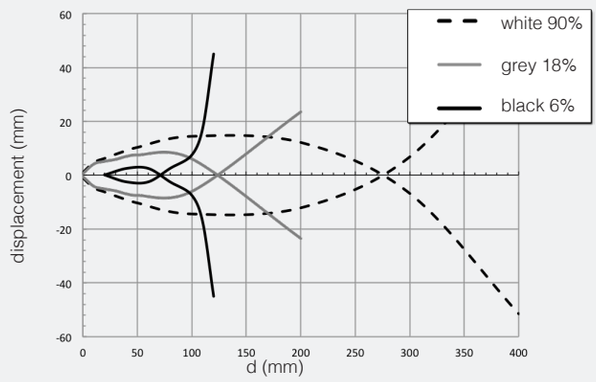
FAI6,FAI7/**-(2,3)* excess gain



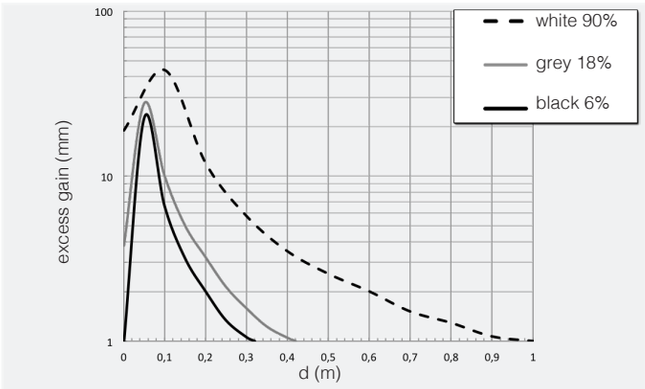
FAI6,FAI7/**-(2,3)* spot dimension



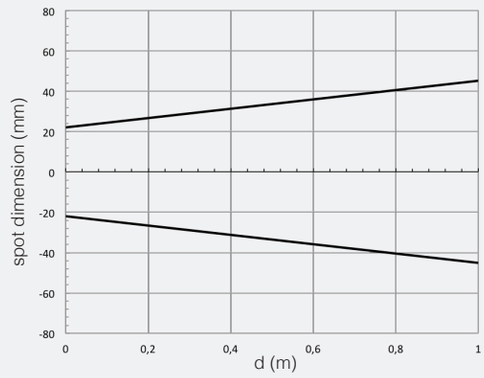
FAI6,FAI7/**-(2,3)* parallel displacement



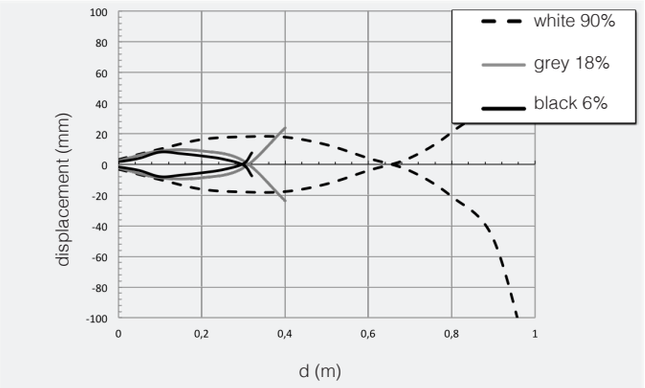
FAI8/**-(0,1)* excess gain



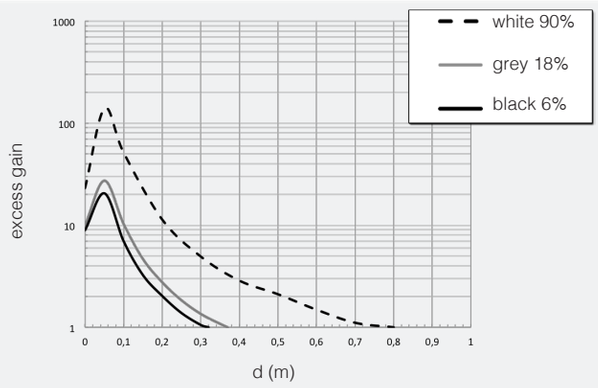
FAI8/**-(0,1)* spot dimension



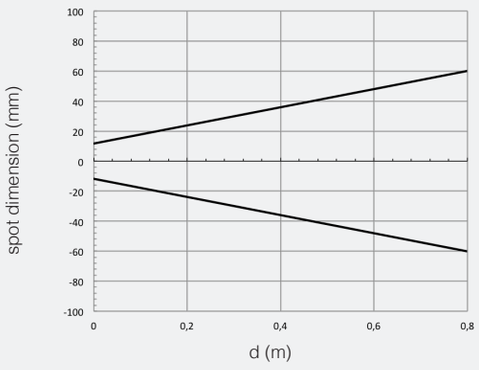
FAI8/**-(0,1)* parallel displacement



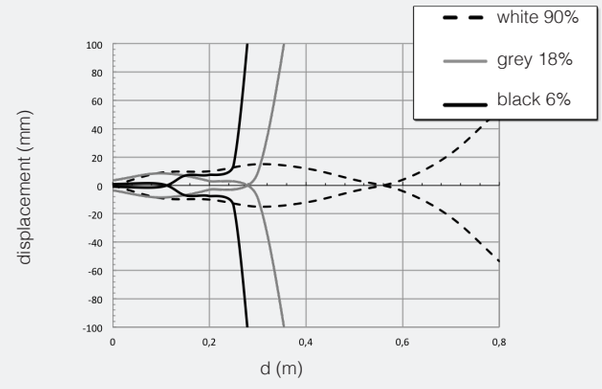
FAI8/**-(2,3)* excess gain



FAI8/**-(2,3)* spot dimension



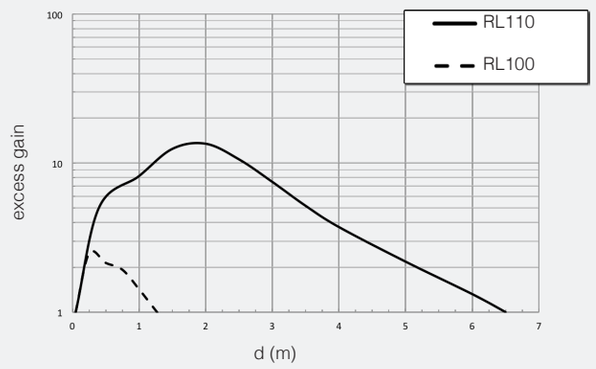
FAI8/**-(2,3)* parallel displacement



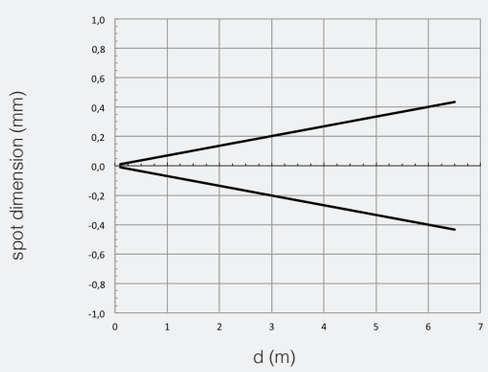
response diagrams

retro-reflective models

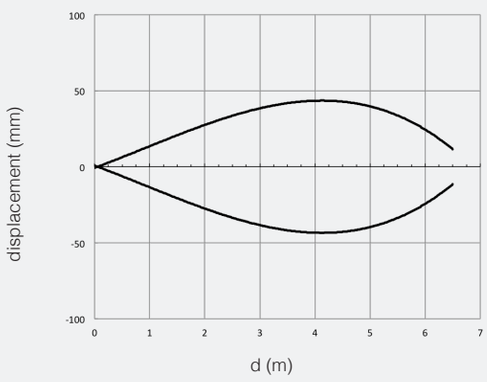
FAIC,FAIM/**-(0,1)* excess gain



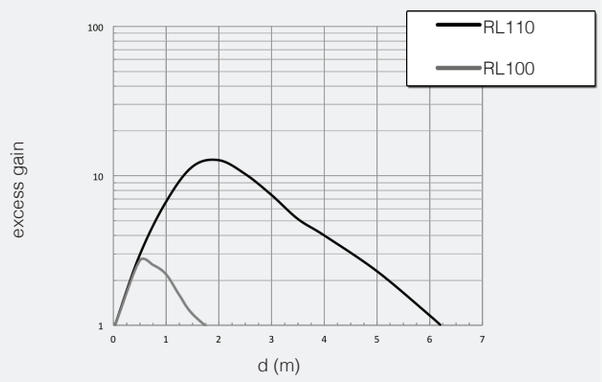
FAIC,FAIM/**-(0,1)* spot dimension



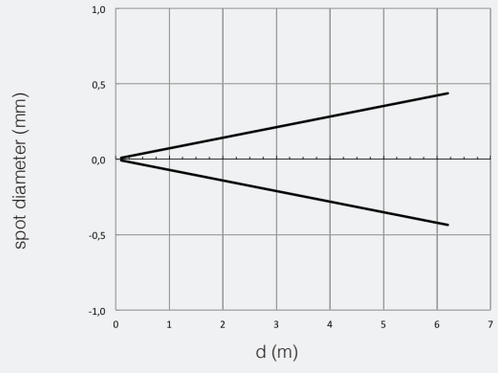
FAIC,FAIM/**-(0,1)* parallel displacement



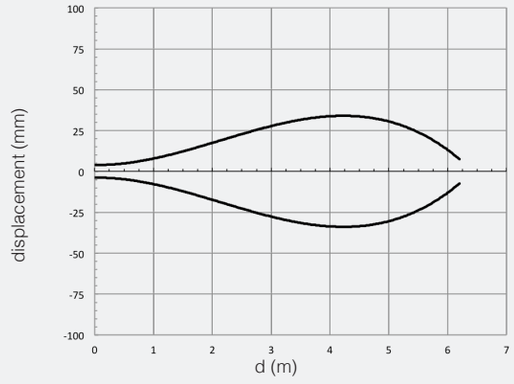
FAIC,FAIM/**-(2,3)* excess gain



FAIC,FAIM/**-(2,3)* dispot diameter



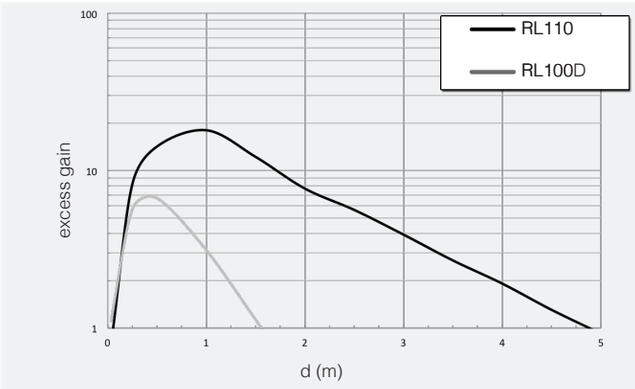
FAIC,FAIM/**-(2,3)* parallel displacement



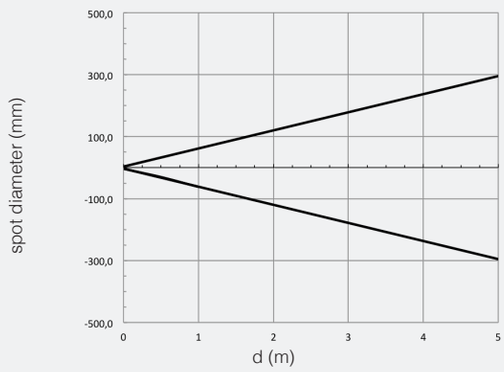
response diagrams

polarized models

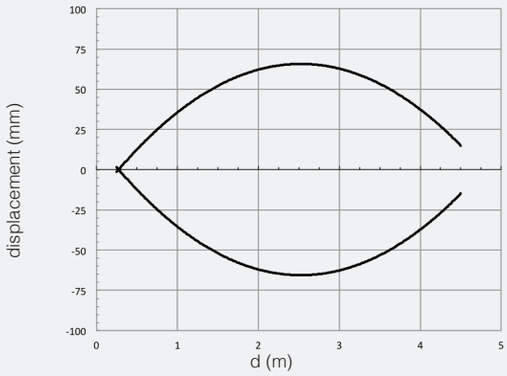
FARP,FARN/**-(0,1)* excess gain



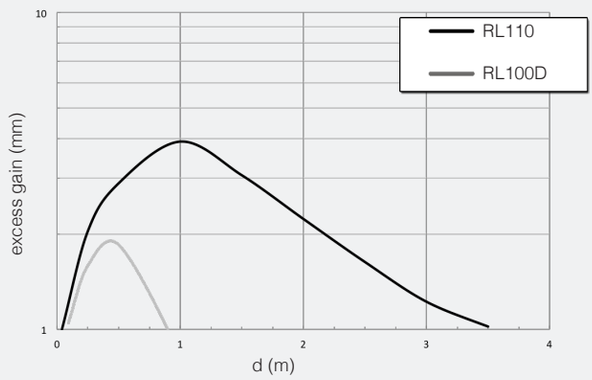
FARP,FARN/**-(0,1)* spot diameter



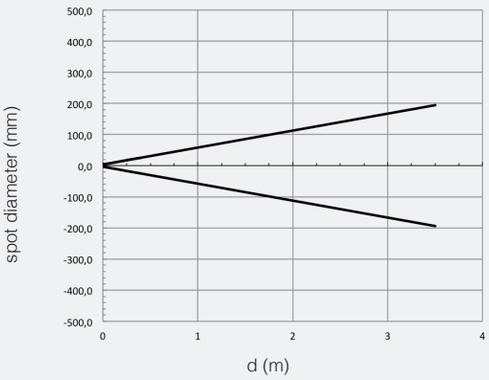
FARP,FARN/**-(0,1)* parallel displacement



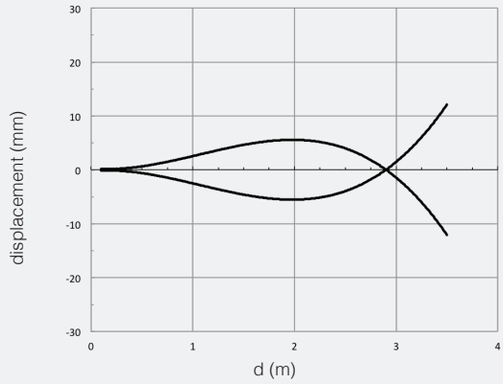
FARP,FARN/**-(2,3)* excess gain



FARP,FARN/**-(2,3)* spot diameter



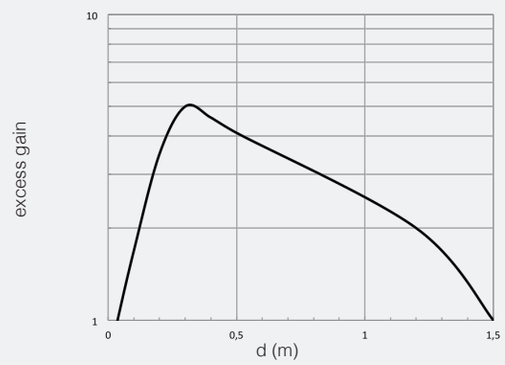
FARP,FARN/**-(2,3)* parallel displacement



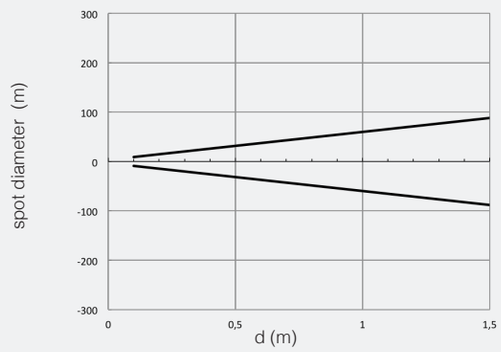
response diagrams

polarized models for transparent objects (diagrams calculated with RL110)

FARL/**-* excess gain



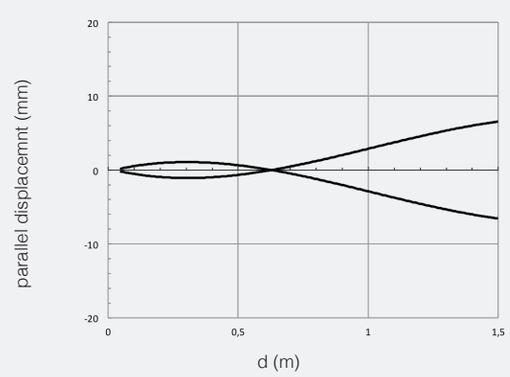
FARL/**-* spot diameter



response diagrams

polarized models for transparent objects

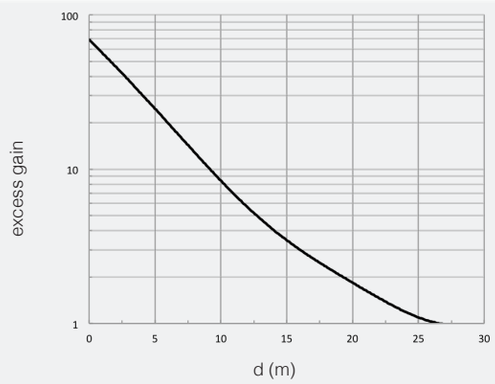
FARL/**-* parallel displacement



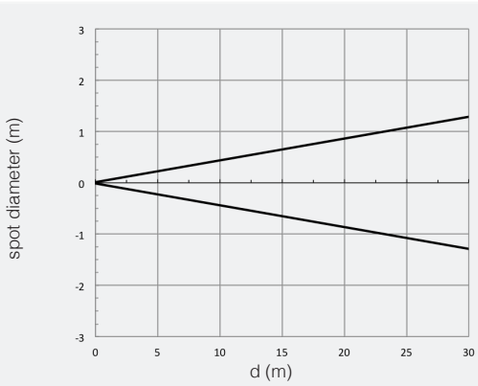
response diagrams

through beam models

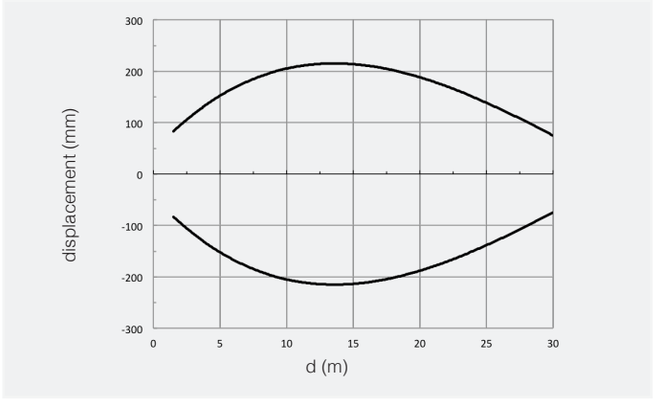
FAIH/**-(0,1)* FAID/**-(0,1)*, excess gain



FAIH/**-(0,1)* FAID/**-(0,1)*, spot diameter



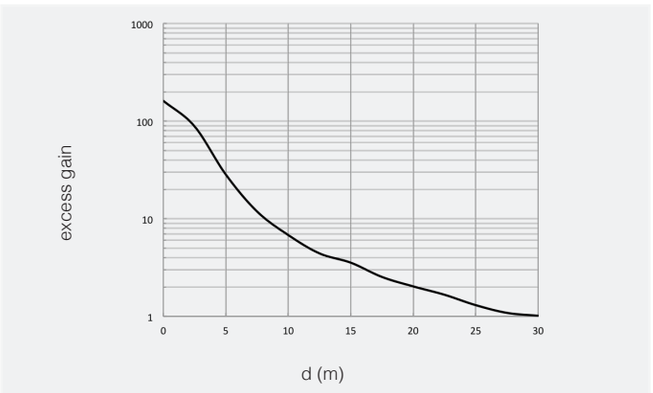
FAIH/**-(0,1)* FAID/**-(0,1)*, parallel displacement



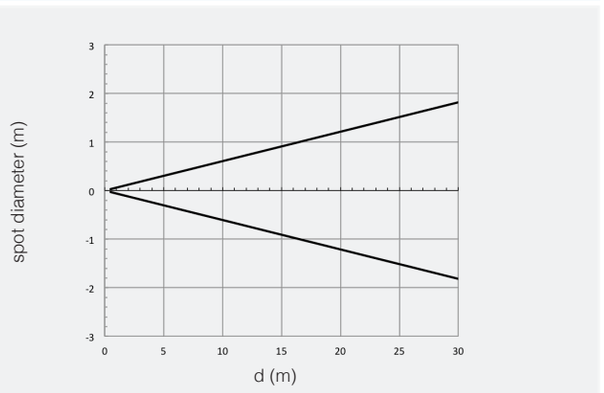
response diagrams

through beam models

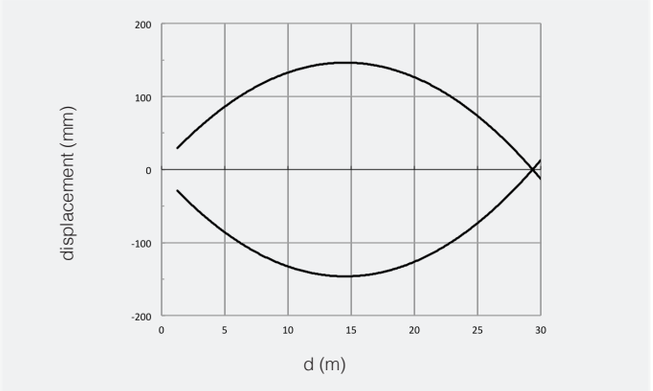
FAIH/**-(2,3)* FAID/**-(2,3)*, excess gain



FAIH/**-(2,3)* FAID/**-(2,3)*, spot diameter

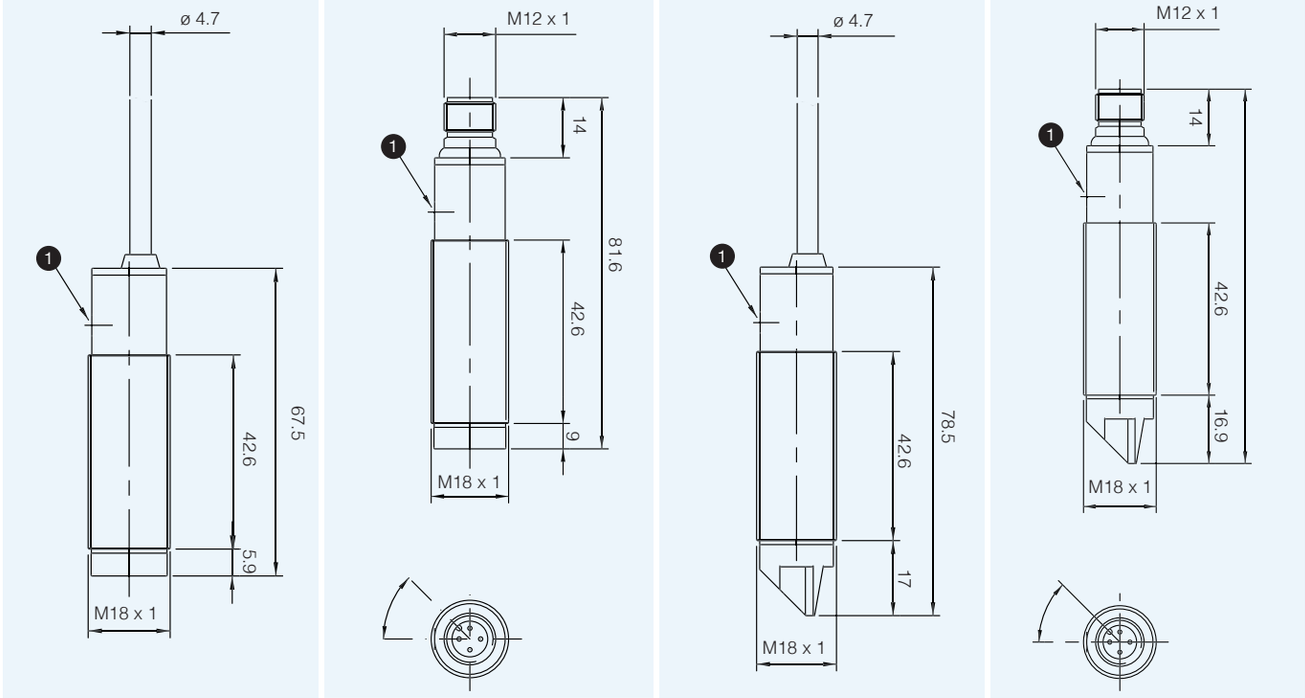


FAIH/**-(2,3)* FAID/**-(2,3)*, parallel displacement



dimensions (mm)

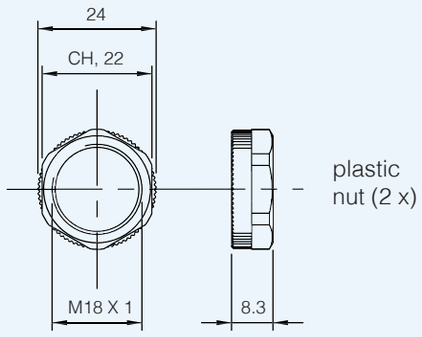
FA**/**-0A; FA**-**1A	FA**/**-0E; FA**-**1E	FA**/**-2A; FA**-**3A	FA**/**-2E; FA**-**3E



1 Trimmer for sensibility regulation

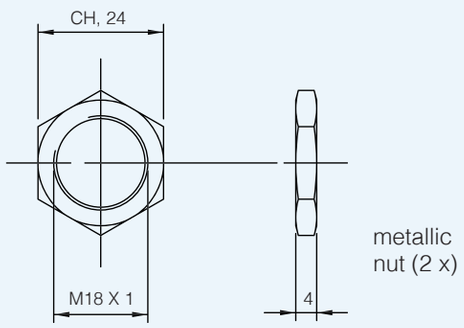
dimensions (mm)

accessories included in all plastic models



dimensions (mm)

accessories included in all metallic models



FARS series

M18 direct diffuse with adjustable background suppression

features

- **30...130 mm adjustable max reading distance**
- **Cable or M12 plastic plug versions**
- **Supply voltage 10...30 Vdc, output current 100 mA**
- **LED light status indicator**
- **IP67 protection degree**
- **Complete protection against electrical damages**
- **ATEX models, cat.3, available on request**
- **Approvals: CE and cULus Listed**

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

code description(*)

FARS / B P - 0 A

series	FARS	M18 photoelectric sensor with adjustable 30...130 mm
NO/NC	B	4 wires output complementary NO and NC
output	P	PNP output
	N	NPN output
housing	0	Plastic housing axial optic
	1	Metal housing axial optic
cable/ plug	A	Axial cable output 2 m
	E	Axial M12 plastic plug output

(*) ATEX models available, contact our Sales Dept. for further information.

available models

function	distance	housing	4 wires NO + NC PNP		4 wires NO + NC NPN	
			cable	plug	cable	plug
background suppression	30...130 mm	axial plastic	FARS/BP-0A	FARS/BP-0E	FARS/BN-0A	FARS/BN-0E
		axial metallic metallic	FARS/BP-1A	FARS/BP-1E	FARS/BN-1A	FARS/BN-1E
	60...100		-	FARS/BP-1E7712	-	FARS/BN-1E7712

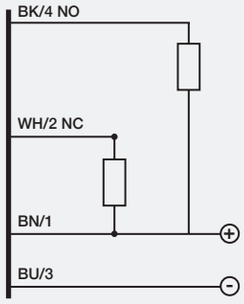
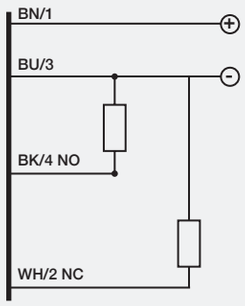
technical specification

background suppression

	FARS/**-**
	
nominal sensing distance	30...130 mm
scanning adjustable range Sd	30...130 mm (white paper)
emission	red light (660 nm)
hysteresis	≤ 10 %
repeatability	10 %
operating voltage	10...30 Vcc
ripple	≤ 10 %
no-load supply current	25 mA
load current	100 mA
leakage current	≤ 10 µA (@ 30 Vcc)
output voltage drop	2 V max. IL = 100 mA
output type	NPN o PNP; NO + NC or LO/DO selectable
switching frequency	1 kHz
power on delay	200 ms
power supply protections	short circuit (auto reset)
operating temperature range	- 25°C...+ 70°C (without freeze)
temperature drift	≤ 10 % Sd (≤ 3 % Sd per Sd 60...110 mm)
distance adjustment	potentiometer
protection degree	IP67 (EN60529) [1]
EMC	in conformity with the EMC Directive according to EN 60947-5-2
external light interference	5,000 lux (incandescence lamp), 10,000 lux (sunlight)
LEDs	yellow / light status / short circuit / internal error
cable exit	PVC 4x0, 34 mmq; Ø 4,7 mm; 2m
plug exit	M12 4 pins, male
housing material	PBT (plastic) / nicked plated brass (metallic) / PC (cable exit and plug)
optic material	plastic
tightening torque	25 Nm (metallic)
weight (approximate)	plastic version: 30 g connector / 50 g cable metallic version: 100 g connector / 130 g cable
yellow LED status	sensor status
ON	light status
OFF	dark status
flashing slowly	output short circuit detected
flashing 3 of 10	internal error

[1] Protection guaranteed only with plug cable well mounted

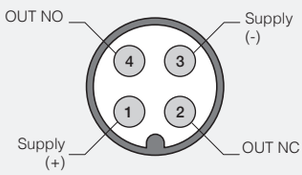
electrical diagrams of the connections

NPN	PNP
	

BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

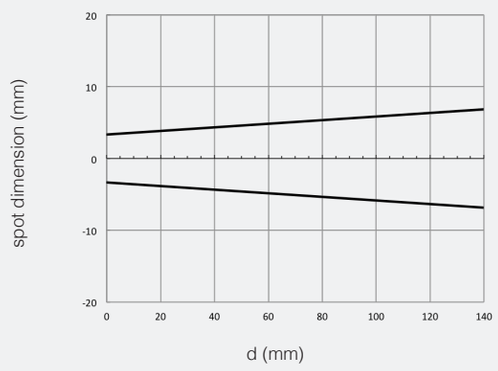
plug

M12 4 wires output complementary NO and NC

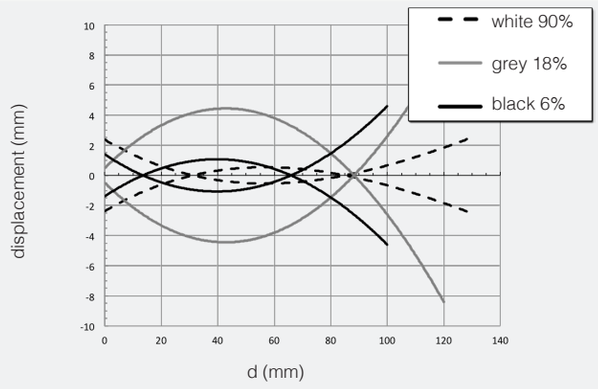


response diagram

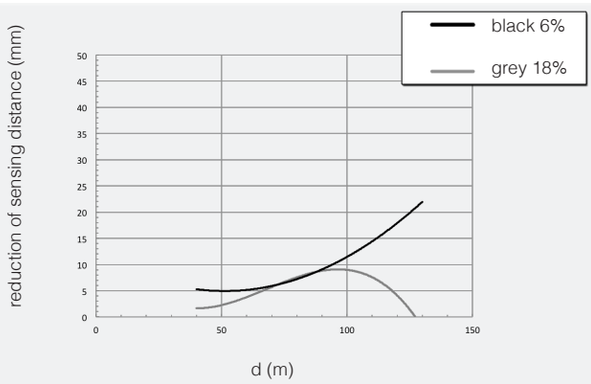
FARS/**-** spot dimension



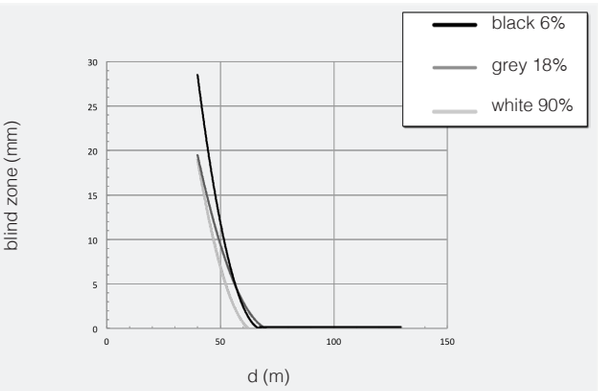
FARS/**-** parallel displacement



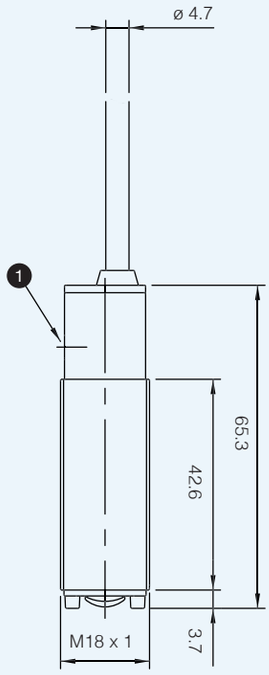
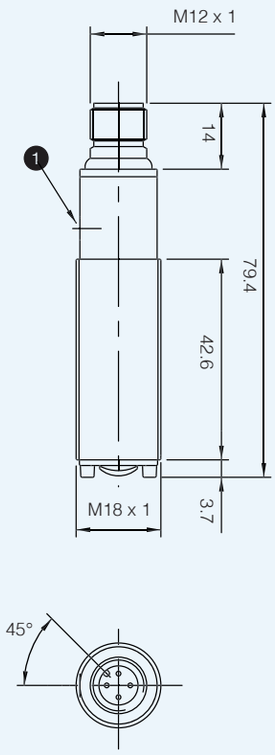
FARS/**-** reduction of sensing distance



FARS/**-** blind zone



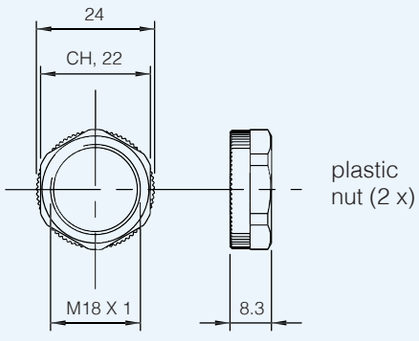
dimensions (mm)

FARS/**-*A	FARS/**-*E
	

1 potentiometer for sensitivity adjustment

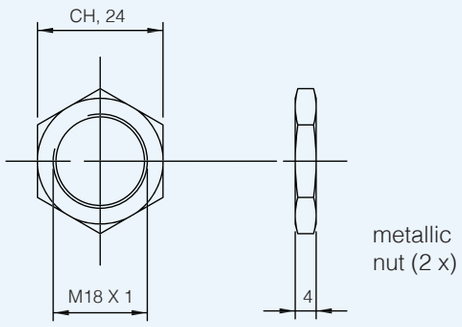
dimensions (mm)

accessories included in all plastic models



dimensions (mm)

accessories included in all metallic models



FA LASER series

M18 photoelectric sensors
DC LASER emission

features

- **Complete range of M18 sensors with 10...30 Vdc power supply**
- **Axial and radial optic with flat surface**
- **Visible red laser emission models**
- **IP67 protection degree**
- **Metallic or plastic housing**
- **Sensitivity adjustment available for all models**
- **Total protection against any type of electric damages**
- **Approvals: CE and cULus listed**

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

code description

FA L N / B P - 0 A

series	FA	M18 sensor with 3/4 DC wires
emission	L	Red laser diode emission
tiype	4	300 mm direct reflection with adjustment
	N	Polarized with adjustment
	H	Emitter
	D	Receiver with sensitivity adjustment
emitter	0	LO/DO selectable output, 4 wires - Emitter
	X	Emitter with check
	B	4 wires output Complementary NO + NC
output	0	Emitter
	P	PNP output
	N	NPN output
housing	0	Plastic housing axial optic
	1	Metal housing axial optic
	2	Plastic housing radial optic
	3	Metal housing radial optic
cable / plug output	A	Axial cable output
	E	Axial M12 plastic connector output

(*) ATEX models available, contact our Sales Dept. for further information.

available models

model	distance	housing	4 wires NPN NO + NC		4 wires PNP NO + NC	
			cable	plug	cable	plug
direct diffuse	300 mm	axial plastic	FAL4/BN-0A	FAL4/BN-0E	FAL4/BP-0A	FAL4/BP-0E
		axial metal	FAL4/BN-1A	FAL4/BN-1E	FAL4/BP-1A	FAL4/BP-1E
	200 mm	90° plastic	FAL4/BN-2A	FAL4/BN-2E	FAL4/BP-2A	FAL4/BP-2E
		90° metal	FAL4/BN-3A	FAL4/BN-3E	FAL4/BP-3A	FAL4/BP-3E
polarized	20 m (RL 110) 30 m (RL 201)	axial plastic	FALN/BN-0A	FALN/BN-0E	FALN/BP-0A	FALN/BP-0E
		axial metal	FALN/BN-1A	FALN/BN-1E	FALN/BP-1A	FALN/BP-1E
		90° plastic	FALN/BN-2A	FALN/BN-2E	FALN/BP-2A	FALN/BP-2E
		90° metal	FALN/BN-3A	FALN/BN-3E	FALN/BP-3A	FALN/BP-3E
emitter	50 m	axial plastic	-	FALH/X0-0E	-	-
		axial metal	-	FALH/X0-1E	FALH/X0-1A	-
		90° plastic	-	FALH/X0-2E	FALH/X0-2A	-
		90° metal	-	FALH/X0-3E	FALH/X0-3A	FALH/X0-3E
receiver	50 m	axial plastic	FALD/BN-1A	FALD/BN-0E	FALD/BP-0A	FALD/BP-0E
		axial metal	FALD/BN-2A	FALD/BN-1E	FALD/BP-1A	FALD/BP-1E
		90° plastic	FALD/BN-3A	FALD/BN-2E	FALD/BP-2A	FALD/BP-2E
		90° metal	FALD/BN-4A	FALD/BN-3E	FALD/BP-3A	FALD/BP-3E

technical specification

direct reflection models

	FAL4/**-**
	
nominal sensing distance	300 mm (axial optic focused 100 mm) [1] 200 mm (radial optic focused 100 mm) [1]
emission	red laser diode (650 nm) class 1 laser (IEC60825-1)
minimum detectable object	0.1 mm
hysteresis	≤ 10 %
repeatability	5 %
operating voltage	10...30 Vdc
ripple	≤ 10 %
no-load supply current	≤ 30 mA
load current	100 mA
leakage current	≤ 10 µA a V max
output voltage drop	2 V max. IL = 100 mA
output type	NPN or PNP; NO + NC or LO/DO selectable
switching frequency	800 Hz
power on delay	200 ms
power supply protections	polarity reversal, transient
output protection	short circuit (autoreset) Overvoltage
sensitivity adjustment	yes / Teach-In function
operating temperature range	- 15°C...+ 55°C (without freeze)
temperature drift	10 % Sr
protection degree	IP67 (EN60529) [2]
EMC	in conformity with the EMC Directive according to EN 60947-5-2
external light interference	3,000 lux (incandescent lamp) 10,000 lux (sunlight)
LEDs	green power supply / yellow (ON-Light state EG ≥ 2) / yellow (Flashing-Light state 1 < EG < 2) / yellow (OFF-Dark state)
housing material	PBT (plastic) / nicked plated brass (metallic) / PC (cable exit)
optic material	PC / glass
tightening torque	1 Nm (plastic), 25 Nm (metallic)
weight (approximate)	plastic version: 30 g connector / 50 g cable metallic version: 100 g connector / 130 g cable

[1] White target kodak 90% reflection 100 x 100 mm
[2] Protection guaranteed only with plug cable well mounted

technical specification

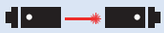
polarized models

	FALN/**-**
	
nominal sensing distance	20 m with RL 110 30 m with RL 201; 5 m with RL 100D
emission	red laser diode (650 nm)
emitter	class 1 Laser (IEC 825-1)
minimum detectable object	0.7 mm - 1 m 24 mm - 25 m
spot dimension	see diagram
hysteresis	≤ 10 %
repeatability	5 %
operating voltage	10...30 Vdc
ripple	≤ 10 %
no-load supply current	≤ 30 mA
load current	100 mA
leakage current	≤ 10 µA a V max
output voltage drop	2 V max. IL = 100 mA
output type	NPN or PNP; NO + NC or LO/DO selectable
switching frequency	800 Hz
power on delay	200 ms
power supply protections	polarity reversal, transient
output protection	short circuit (autoreset) overvoltage
sensitivity adjustment	Yes / Teach-In function
operating temperature range	- 15°C...+ 55°C (without freeze)
temperature drift	10 % Sr
protection degree	IP67 (EN60529) (1)
EMC	in conformity with the EMC Directive according to EN 60947-5-2
external light interference	3,000 lux (incandescent lamp) 10,000 lux (sunlight)
LEDs	green power supply / yellow (EG ≥ 2) / yellow (Flashing-Light state 1 < EG < 2) / yellow (OFF-Dark state)
housing material	PBT (plastic) / nicked plated brass (metallic) / PC (cable exit)
optic material	PC / glass
tightening torque	1 Nm (plastic), 25 Nm (metallic)
weight (approximate)	plastic version: 30 g connector / 50 g cable metallic version: 100 g connector / 130 g cable

(1) Protection guaranteed only with plug cable well mounted

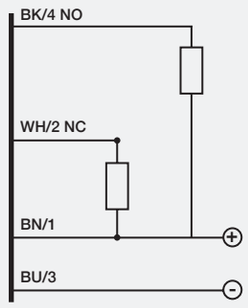
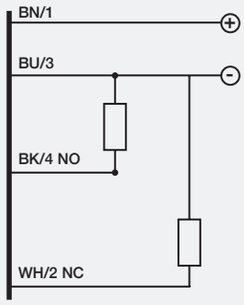
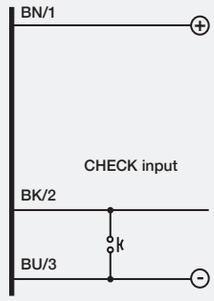
technical specification

through beam models

	emitter	receiver
	FALH/X0-**	FALD/**-**
		
nominal sensing distance	50 m	
emission	red laser diode (650 nm)	
emitter	class 1 Laser (IEC 60825-1)	
minimum detectable object	10 mm	
spot dimension	see diagram	
hysteresis	≤ 10 %	
repeatability	5 %	
operating voltage	10...30 Vdc	
ripple	≤ 10 %	
no-load supply current	≤ 25 mA	
load current		100 mA
leakage current		≤ 10 µA a Vmax
output voltage drop		2 V max. IL = 100 mA
output type		NPN or PNP
switching frequency		1 kHz
power on delay		200 ms
power supply protections	polarity reversal, transient	
output protection		short circuit (autoreset) overvoltage
sensitivity adjustment		trimmer
operating temperature range	- 15°C...+ 55°C (without freeze)	
temperature drift	10 % Sr	
check input	BK/2 connected to 0 switches off the emission	-
EMC	in conformity with the EMC Directive according to EN 60947-5-2	
protection degree	IP67 (EN60529) [1]	
external light interference	-	
LEDs	green (power supply) yellow (on) yellow (off)	green (power supply) yellow (light status or output status in the special LO/DO version)
housing material	PBT (plastic) / nicked plated brass (metallic) / PC (cable exit)	
optic material	PC / glass	
tightening torque	1 Nm (plastic), 25 Nm (metallic)	
weight (approximate)	plastic version: 30 g connector / 50 g cable metallic version: 100 g connector / 130 g cable	

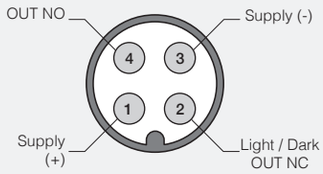
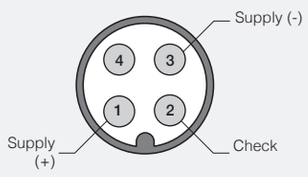
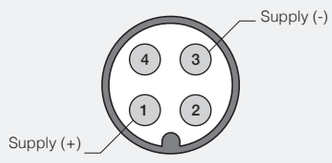
[1] Protection guaranteed only with plug cable well mounted

electrical diagrams of the connections

emitter	receiver NPN	receiver PNP
		

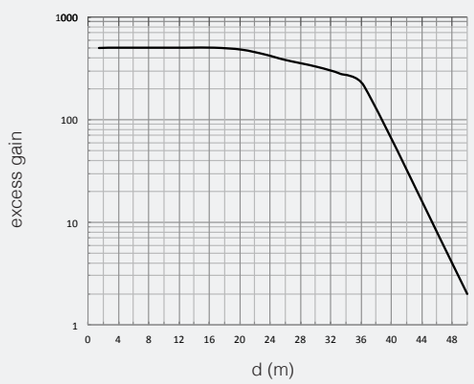
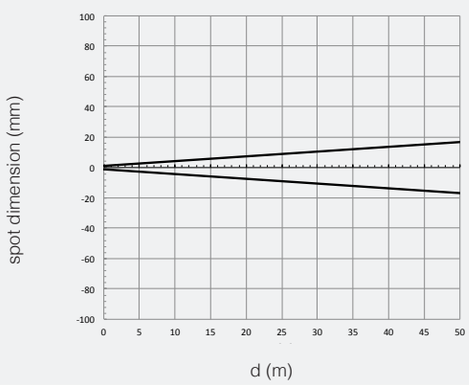
BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

plug

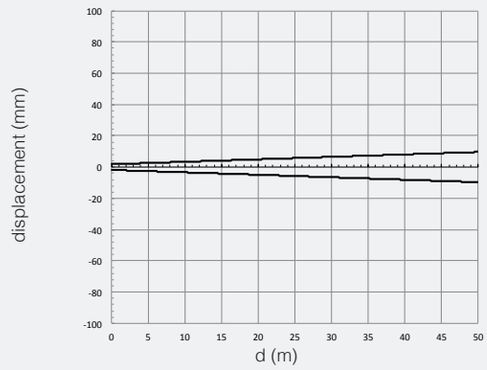
M12 diffuse reflection polarized receiver	M12 emitter with check	M12 emitter without check
		

response diagram

through beam models

FALH/**-0*, FALD/**- 0* excess gain	FALH/**- 0*, FALD/**- 0* spot dimension
	

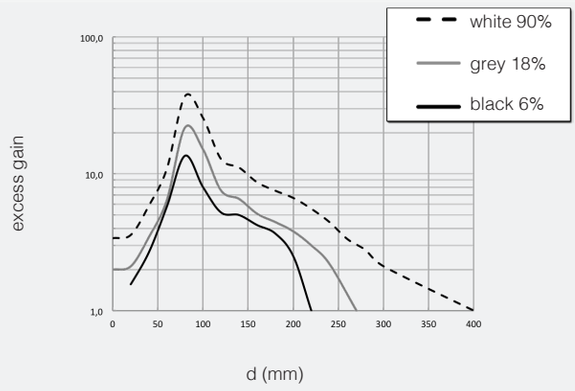
FALH/**- 0*, FALD/**- 0* parallel displacement



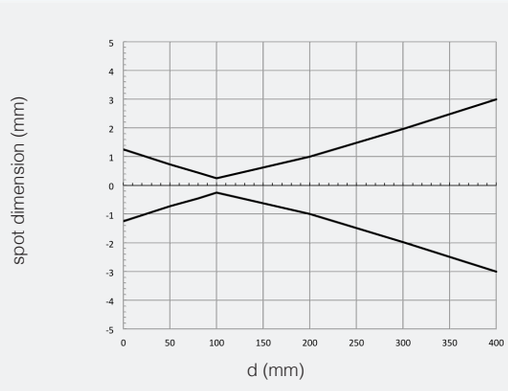
response diagram

direct diffuse models

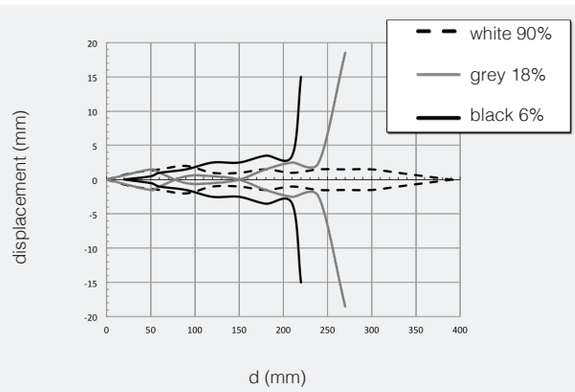
FAL4/B*-0,1* excess gain



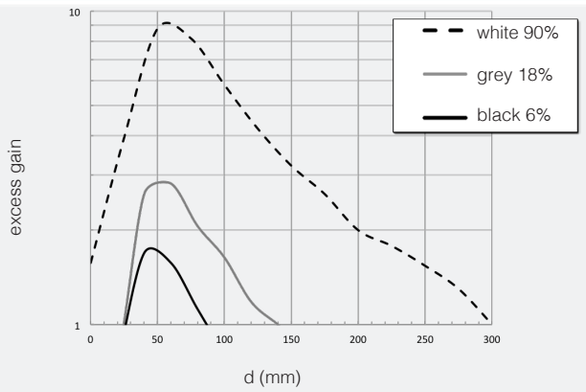
FAL4/B*-0,1* spot dimension



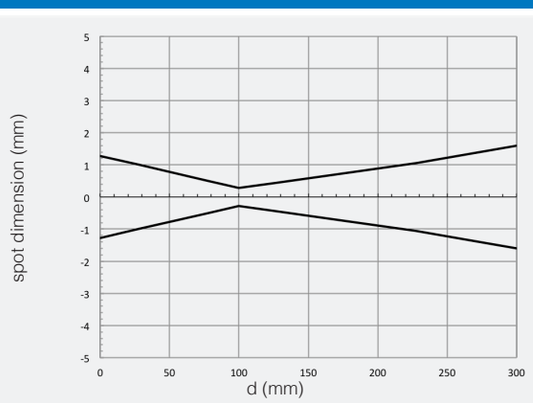
FAL4/B*-0,1* parallel displacement



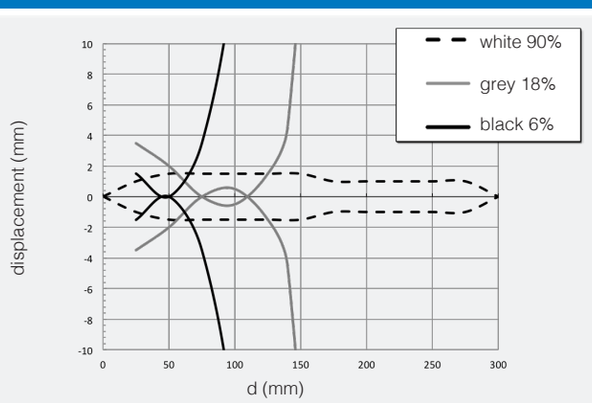
FAL4/B*-2,3* excess gain



FAL4/B*-2,3* spot dimension



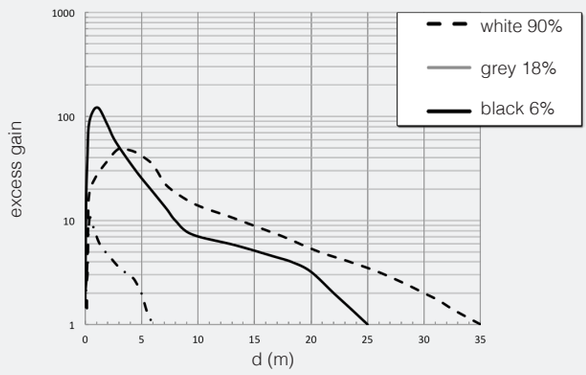
FAL4/B*- 2,3* parallel displacement



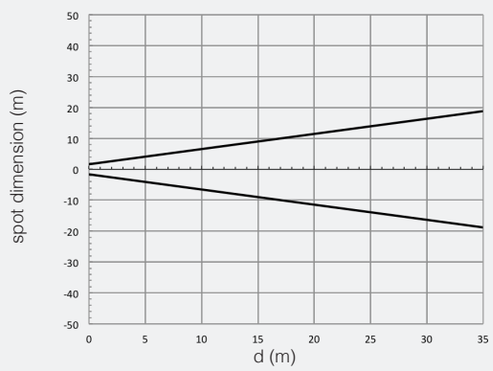
response diagram

polarized models

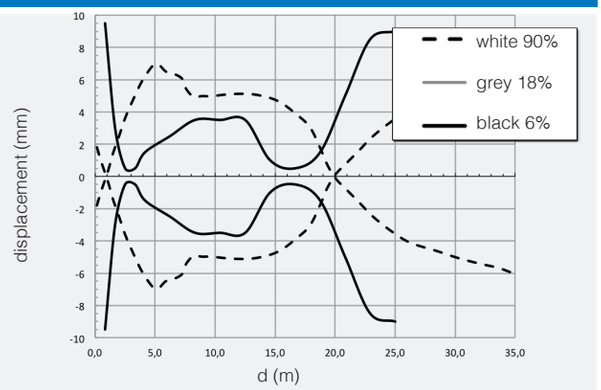
FALN/**-** excess gain



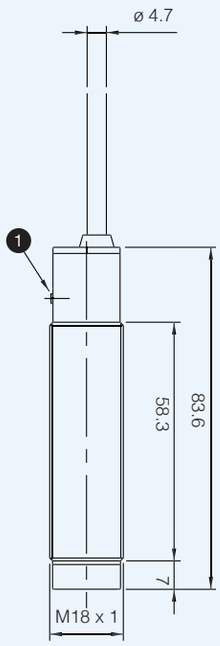
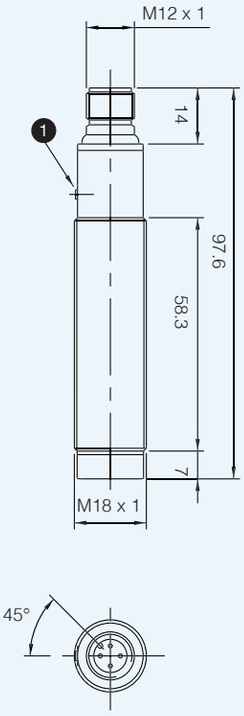
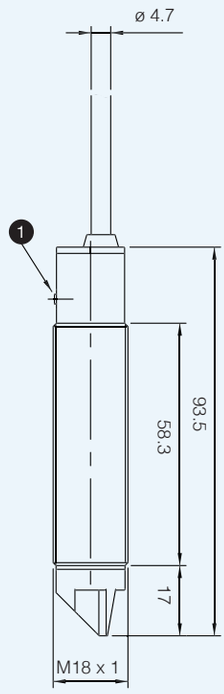
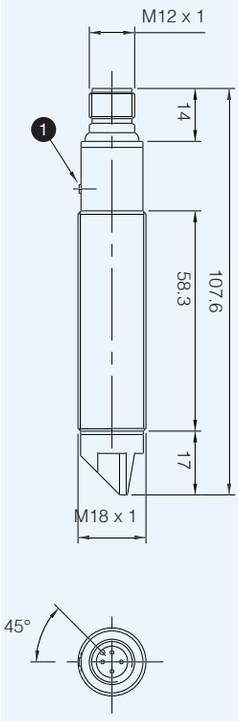
FALN/**-** spot dimension



FALN/**-** parallel displacement



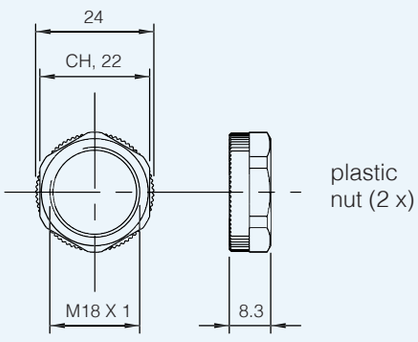
dimensions (mm)

FAL*/**-0A; FAL*/**-1A	FAL*/**-0E; FAL*/**-1E	FAL*/**-2A; FAL*/**-3A	FAL*/**-2E; FAL*/**-3E
			

1 Button for sensitivity adjustment

dimensions (mm)

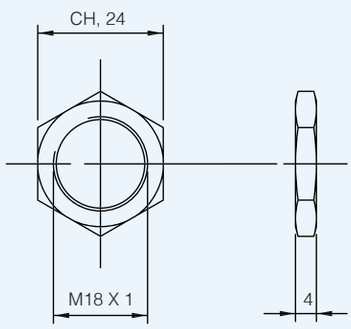
accessories included in all plastic models



plastic
nut (2 x)

dimensions (mm)

accessories included in all metallic models



metallic
nut (2 x)

notes

FAL BGS series

M18 LASER with adjustable background suppression

features

- **M18 Photoelectric sensor Background Suppression with Laser emission**
- **Models in Class I and Class II Laser emission power**
- **Axial and Right angle optic materials**
- **Sensing distance adjustment by trimmer**
- **Collimated Light spot**
- **Complete protection against electrical damages**
- **Nichel brass housing**

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

code description

FA L W / B P - 1 E 77

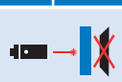
series	FA	M18 Cilindrical photelectric sensor
emission	L	Laser emission
background suppression	S	Background Suppression (Laser Class 1)
	W	Background Suppression (Laser Class 2)
output	0	Lo/Do selectable output
	B	Complementary output (NO+NC)
NPN / PNP output	N	NPN output
	P	PNP output
housing	1	Axial version Metallic housing
	3	Right Angle (90°) version Metallic housing
plug	E	Connector M12 4 pins
version	77	Special version (Anti Reflex)

available models

model	distance (mm)	laser class	optical	output selectable (LO/DO)		complementary output (NO+NC)	
				NPN	PNP	NPN	PNP
background suppression	30...100	1	axial	FALS/0N-1E	FALS/0P-1E	FALS/BN-1E	FALS/BP-1E
	30...80		right angle	FALS/0N-3E	FALS/0P-3E	FALS/BN-3E	FALS/BP-3E
	30...150	2	axial	FALW/0N-1E	FALW/0P-1E	FALW/BN-1E	FALW/BP-1E
	30...130		right angle	FALW/0N-3E	FALW/0P-3E	FALW/BN-3E	FALW/BP-3E
	30...120		axial	-	-	FALW/BN-1E77	FALW/BP-1E77
	30...100		right angle	-	-	FALW/BN-3E77	FALW/BP-3E77

technical specification

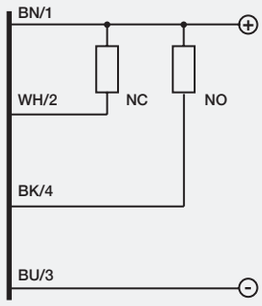
according to IEC EN 60947-5-2

	axial	radial	axial	radial
	FALS/**-**	FALS/**-**	FALW/**-**	FALW/**-**
				
nominal sensing distance	25...100 mm	25...80 mm	25...150 mm	25...130 mm
sensing range (Sd)	30...100 mm	30...80 mm	30...150 mm	30...130 mm
emission	red laser diode (650 nm)			
Laser Protection Class EN60852-1	1		2	
adjustment	trimmer (270°)			
hysteresis	10 %			
repeatability	10 %			
operating voltage	10...30 Vdc			
ripple	≤ 10 %			
no-load current	≤ 40 mA			
output current	100 mA			
leakage current	≤ 10 µA (Vdc max)			
output voltage drop	2 V max. IL = 100 mA			
output type	NPN or PNP; NO + NC or LO/DO selectable			
switching frequency	1.5 kHz			
power on delay	250 ms			
power supply protections	polarity reversal, transient			
output protection	short cirrcuit (auto reset), over voltage pulses			
temperature range	- 10°C...+ 50°C			
temperature drift	10 % Sn			
max. Capacitive Load	500 nF			
protection degree	IP67 (EN60529)[1]			
external light interference	15,000 lux (incandescent lamp)			
EMC	in conformity with the EMC Directive according to EN 60947-5-2			
LED indicator	yellow (output sate)			
housing material	nickel plated brass			
optic materials	PMMA ABS	glass ABS	PMMA ABS	glass ABS
exit plug	grilamid (PA 12)			
tightening torque	40 Nm (metallic)			
weight	60 g			

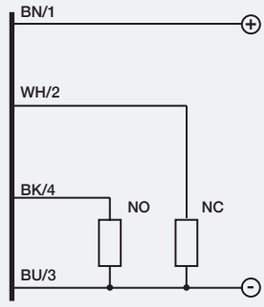
[1] Protection guaranteed only with plug cable well mounted

electric diagrams of the connections

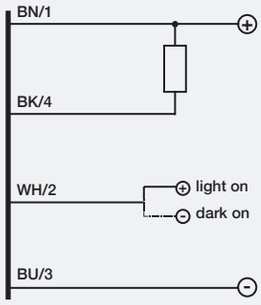
NPN NO + NC



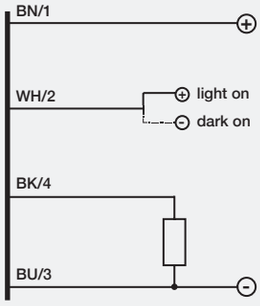
PNP NO + NC



NPN LO/DO



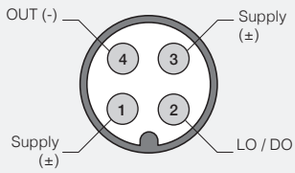
PNP LO/DO



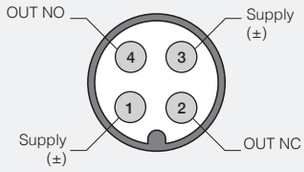
BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

plug

M12 FAL*/0*-**

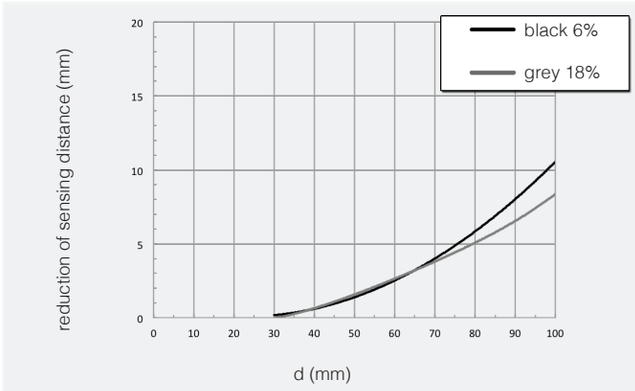


M12 FAL*/B*-**

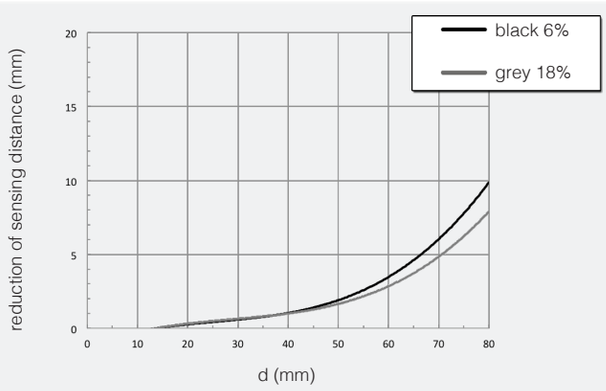


response diagram

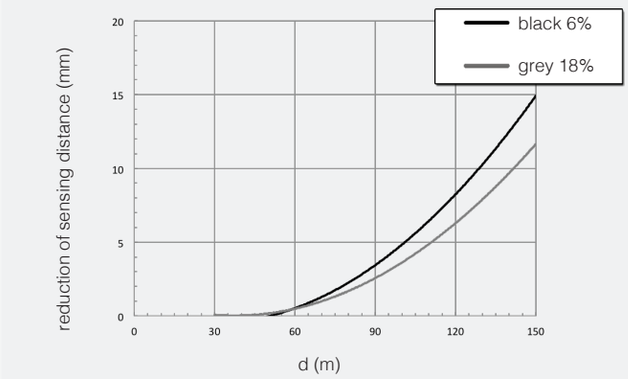
FALS/**-1E reduction of sensing distance



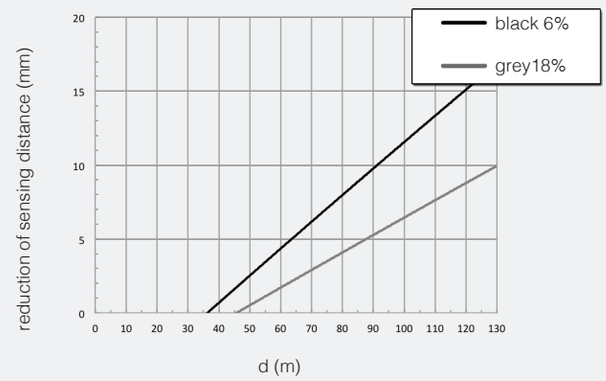
FALS/**-3E reduction of sensing distance



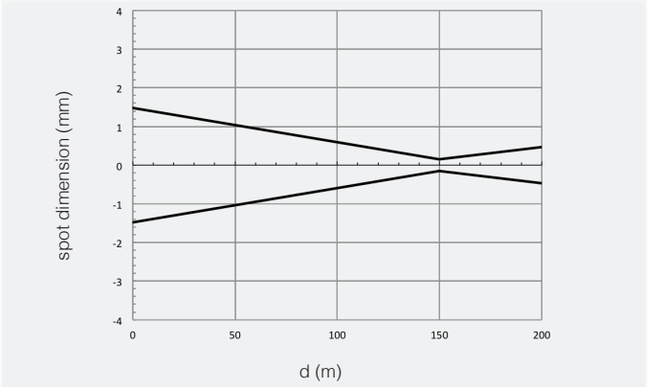
FALW/**-1E reduction of sensing distance



FALW/**-3E reduction of sensing distance

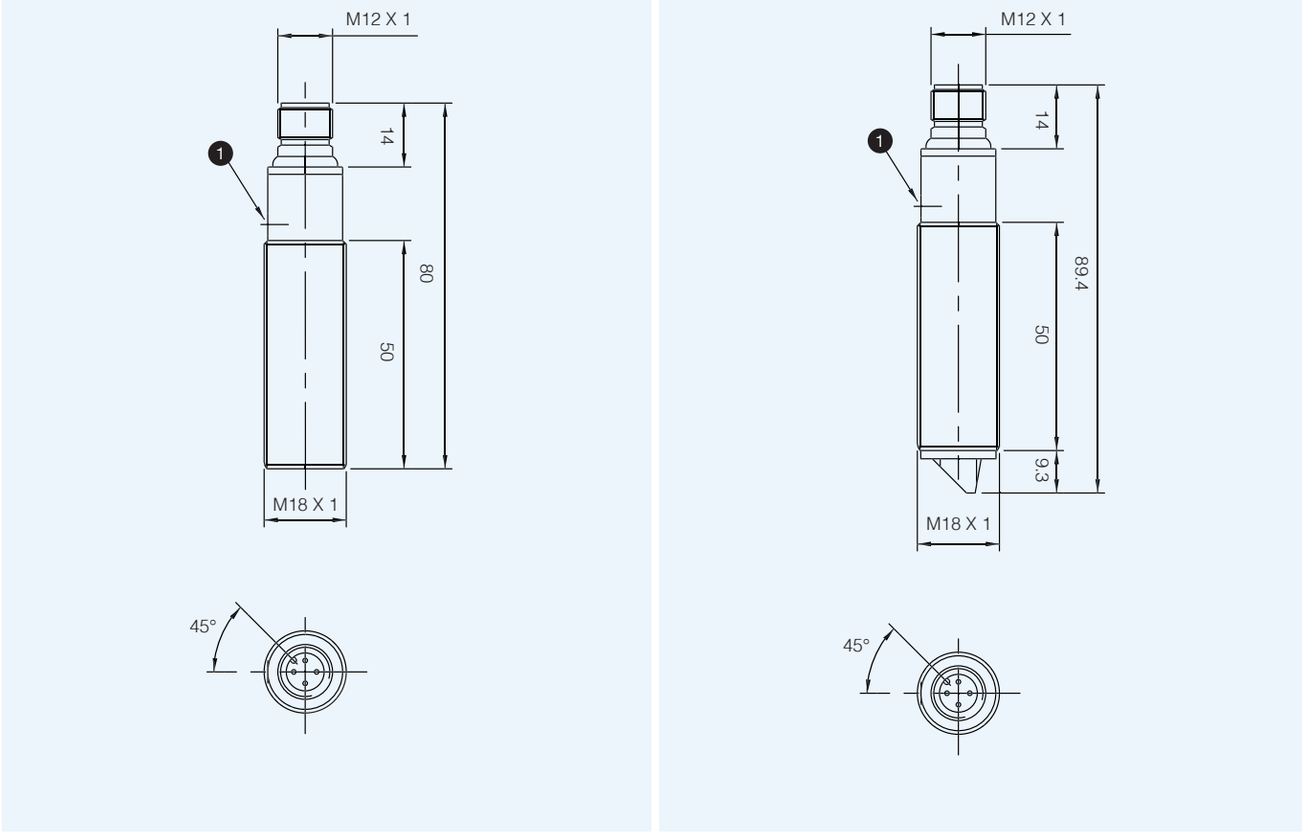


FALS/**-** spot dimension



dimensions (mm)

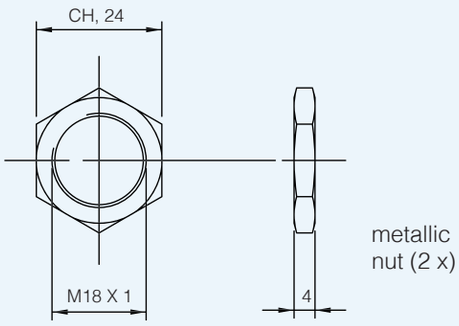
FALS/**-1E; FALW/**-1E	FALS/**-3E; FALW/**-3E



1 Trimmer

dimensions (mm)

accessories included in all models



metallic
nut (2 x)

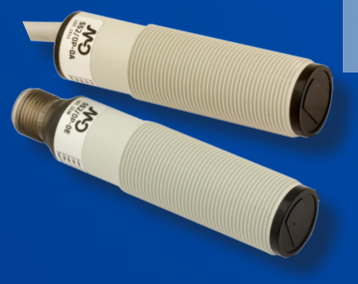
notes

SS - SP series

M18 DC with lateral adjustment

features

- **Models with side sens. adjustment on axial and right angle optic**
- **LO/DO selectable output**
- **ATEX models, cat. 3, available on request**
- **LED status indicator for all versions**
- **Complete protection against electrical damages**
- **IP67 protection degree for all models**
- **Approvals: CE and cULus listed**



web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

code description (*)

background suppression

SS 0 / 0 N - 0 A

series	SS	M18 photoelectric sensors with axial optic
type	0	50 mm background suppr. without sens. adjust.
	1	100 mm background suppr. without sens. adjust.
	T	Focalizer background suppr. 12 mm (with focalizer STF-12) - 25 mm (with focalizer STF-25)
output	0	LO/DO selectable output
	L	3 wires – light on
	D	3 wires – dark on
NPN / PNP output	N	NPN output
	P	PNP output
housing material	0	Plastic housing
	1	Metallic housing
cable / plug exit	A	Axial cable exit 2 m
	E	M12 plug cable exit

(*) ATEX models available, contact our Sales Dept. for further information.

code description

diffuse reflection and retro-reflective

SS 2 / 0 N - 0 A

series	SS	M18 photoelectric sensors with axial optic
	SP	M18 photoelectric sensors with right angle optic
type	2	100 mm diffuse reflection without sens. adjust.
	3	100 mm diffuse reflection with sens. adjust.
	7	400 mm diffuse reflection with sens. adjust.
	8	800 mm diffuse reflection with sens. adjust.
	C	5 m retro-reflective without sens. adjust. (1)
	P	4 m polarized retro-reflective without sens. adjust. (1)
output	0	LO/DO selectable output
	L	3 wires - light on
	D	3 wires - dark on
NPN / PNP output	N	NPN output
	P	PNP output
housing material	0	Plastic housing
	1	Metallic housing
cable / plug oitput	A	Axial cable exit
	E	M12 plug cable exit
		Standard version
	3X	Retro-reflective and polarized with sens. adjust.

(1) Special version with sens. adjust, 3X variant

code description

through beam

SS H / 0 0 - 0 A

series	SS	M18 photoelectric sensors with axial optic
	SP	M18 photoelectric sensors with right angle optic
type	H	14 m emitter without sens. adjust.
	Z	14 m receiver without sens. adjust.
	D	14 m receiver with sens. sdjust.
	U	Emitter with reduced visible beam
	G	8 m receiver for small object
	V	3 m receiver for ultra small object
features	0	Emitter without check - LO/DO selectable
	X	Emitter with check
	L	3 wires – light on - S*D and S*Z only
	D	3 wires–dark on - S*D and S*Z only
	A	3 wires – light on - S*G and S*V only
	C	3 wires–dark on - S*G and S*V only
NPN / PNP output	0	Emitter
	N	NPN output
	P	PNP output
housing material	0	Plastic housing
	1	Metallic housing
cable / plug exit	A	Axial cable exit
	E	M12 plug cable exit - S*H, S*D and S*Z" versions only
	H	M12 plug cable exit - S*U, S*G and S*V versions only

available models

plug exit photoelectric sensors axial optic

function	distance	housing	adjustment	3 wires LO NPN	3 wires LO PNP	3 wires DO NPN	3 wires DO PNP	3 wires NPN LO / DO	3 wires PNP LO / DO
background suppression	50 mm	plastic	-	-	SS0/LP-0E	-	-	SS0/0N-0E	SS0/0P-0E
		metallic		-	SS0/LP-1E	-	-	SS0/0N-1E	SS0/0P-1E
	100 mm	plastic		-	SS1/LP-0E	-	-	SS1/0N-0E	SS1/0P-0E
		metallic		-	SS1/LP-1E	-	-	SS1/0N-1E	SS1/0P-1E
	focalized	plastic		-	-	-	-	SST/0N-0E	SST/0P-0E
		metallic		-	-	-	-	SST/0N-1E	SST/0P-1E
diffuse reflection	100 m	plastic		SS2/LN-0E	SS2/LP-0E	-	-	SS2/0N-0E	SS2/0P-0E
			●	-	-	-	-	-	-
		metallic	-	SS2/LN-1E	SS2/LP-1E	-	-	SS2/0N-1E	SS2/0P-1E
				-	-	-	-	-	SS3/0P-1E
	400 mm	plastic		-	SS7/LP-0E	-	-	SS7/0N-0E	SS7/0P-0E
		metallic	●	-	SS7/LP-1E	-	-	SS7/0N-1E	SS7/0P-1E
	800 mm	plastic		-	-	-	-	-	SS8/0P-0E
		metallic		-	-	-	-	-	SS8/0P-1E
retro-reflective	4 m	plastic	-	SSC/LN-0E	SSC/LP-0E	SSC/DN-0E	SSC/DP-0E	SSC/0N-0E	SSC/0P-0E
			●	-	-	-	-	SSC/0N-0E3X	SSC/0P-0E3X
		metallic	-	SSC/LN-1E	SSC/LP-1E	SSC/DN-1E	SSC/DP-1E	SSC/0N-1E	SSC/0P-1E
			●	-	-	-		SSC/0N-1E3X	SSC/0P-1E3X
polarized	3 m	plastic	-	SSP/LN-0E	SSP/LP-0E	SSP/DN-0E	SSP/DP-0E	SSP/0N-1E	SSP/0P-1E
			●	-	-	-	-	SSP/0N-1E3X	SSP/0P-1E3X
		metallic	-	SSP/LN-1E	SSP/LP-1E	SSP/DN-1E	SSP/DP-1E	SSP/0N-1E	SSP/0P-1E
			●	-	-	-	-	SSP/0N-1E3X	SSP/0P-1E3X
through-beam	14 m	plastic	emitter	SSH/00-0E					
			em. with check	SSH/X0-0E					
			receiver	SSZ/LN-0E	SSZ/LP-0E	SSZ/DN-0E	SSZ/DP-0E	SSZ/0N-0E	SSZ/0P-0E
			receiver adj.	SSD/LN-0E	SSD/LP-0E	SSD/DN-0E	SSD/DP-0E	SSD/0N-0E	SSD/0P-0E
		metallic	emitter	SSH/00-1E					
			em. with check	SSH/X0-1E					
			receiver	SSZ/LN-1E	SSZ/LP-1E	SSZ/DN-1E	SSZ/DP-1E	SSZ/0N-1E	SSZ/0P-1E
			receiver adj.	SSD/LN-1E	SSD/LP-1E	SSD/DN-1E	SSD/DP-1E	SSD/0N-1E	SSD/0P-1E
	8 m	plastic	emitter	SSU/00-0E					
			receiver	SSG/AN-0E	SSG/AP-0E	SSG/CN-0E	SSG/CP-0E	-	-
		metallic	emitter	SSU/00-1H					
			receiver	SSG/AN-1H	SSG/AP-1H	SSG/CN-1E	SSG/CP-1H	-	-
	3 m	plastic	emitter	SSU/00-0E					
			receiver	SSV/AN-0E	SSV/AP-0E	SSV/CN-0E	SSV/CP-0E	-	-
		metallic	emitter	SSU/00-1H					
			receiver	-					

available models

cable exit photoelectric sensors axial optic

function	distance	housing	adjustment	3 wires LO NPN	3 wires LO PNP	3 wires DO NPN	3 wires DO PNP	4 wires NPN LO / DO	4 wires PNP LO / DO
background suppression	50 mm	plastic	-	-	-	-	-	SS0/0N-0A	SS0/0P-0A
		metallic		-	-	-	-	SS0/0N-1A	SS0/0P-1A
	100 mm	plastic		-	-	-	-	SS1/0N-0A	SS1/0P-0A
		metallic		-	-	-	-	SS1/0N-1A	SS1/0P-1A
	focalizzata	plastic		-	-	-	-	SST/0N-0A	SST/0P-0A
		metallic		-	-	-	-	SST/0N-1A	SST/0P-1A
diffuse reflection	100 m	plastic		SS2/LN-0A	SS2/LP-0A	-	SS2/DP-0A	SS2/0N-0A	SS2/0P-0A
			●	-	-	-	-	SS3/0N-0A	SS3/0P-0A
		metallic	-	SS2/LN-1A	SS2/LP-1A	SS2/DN-1A	SS2/DP-1A	SS2/0N-1A	SS2/0P-1A
				-	-	-	-	SS3/0N-1A	SS3/0P-1A
	400 mm	plastic		-	-	-	-	SS7/0N-0A	SS7/0P-0A
		metallic	●	-	-	-	-	SS7/0N-1A	SS7/0P-1A
	800 mm	plastic		-	-	-	-	SS8/0N-0A	SS8/0P-0A
		metallic		-	-	-	-	SS8/0N-1A	SS8/0P-1A
retro-reflective	5 m	plastic	-	-	-	-	-	SSC/0N-0A	SSC/0P-0A
			●	-	-	-	-	SSC/0N-0A3X	SSC/0P-0A3X
		metallic	-	-	-	-	-	SSC/0N-1A	SSC/0P-1A
			●	-	-	-	-	SSC/0N-1A3X	SSC/0P-1A3X
polarized	4 m	plastic	-	-	-	-	SSP/DP-0A	SSP/0N-1A	SSP/0P-1A
			●	-	-	-	-	SSP/0N-1A3X	SSP/0P-1A3X
		metallic	-	-	-	-	SSP/DP-1A	SSP/0N-1A	SSP/0P-1A
			●	-	-	-	-	SSP/0N-1A3X	SSP/0P-1A3X
through-beam	14 m	plastic	emitter	SSH/00-0A					
			em. with check	SSH/X0-0A					
			receiver	SSZ/LN-0A	SSZ/LP-0A	SSZ/DN-0A	SSZ/DP-0A	SSZ/0N-0A	SSZ/0P-0A
			receiver adj.	-	-	-	-	SSD/0N-0A	SSD/0P-0A
		metallic	emitter	SSH/00-1A					
			em. with check	SSH/X0-1A					
			receiver	-	-	-	-	SSZ/0N-1E	SSZ/0P-1E
			receiver adj.	-	-	-	-	SSD/0N-1E	SSD/0P-1E
	8 m	plastic	emitter	SSU/00-0A					
			receiver	SSG/AN-0A	SSG/AP-0A	SSG/CN-0A	SSG/CP-0A	-	-
		metallic	emitter	SSU/00-1A					
			em. with check	SSU/X0-1A					
			receiver	SSG/AN-1A	SSG/AP-1A	SSG/CN-1A	SSG/CP-1A	-	-
	3 m	plastic	emitter	SSU/00-0A					
			em. with check	SSU/X0-0A					
			receiver	-	SSV/AP-0A	-	-	-	-
		metallic	emitter	SSU/00-1A					
			receiver	-	SSV/AP-1A	-	-	-	-

available models

plug exit photoelectric sensors radial optic

function	distance	housing	adjustment	3 wires LO NPN	3 wires LO PNP	3 wires DO NPN	3 wires DO PNP	4 wires NPN LO/DO	4 wires PNP LO/DO
diffuse reflection	100 mm	plasticc	-	SP2/LN-0E	SP2/LP-0E	-	-	SP2/0N-0E	SP2/0P-0E
			●	-	-	-	-	-	SP3/0P-0E
		metallic	-	SP2/LN-1E	SP2/LP-1E	-	-	SP2/0N-1E	SP2/0P-1E
			●	-	-	-	-	-	SP3/0P-1E
	400 mm	plastic		-	-	-	-	SP7/0N-0E	SP7/0P-0E
	800 mm			-	-	-	-	-	SP8/0P-0E
		metallic		-	-	-	-	-	SP8/0P-1E
through-beam	14 m	plastic	emitter	SPH/00-0E					
			receiver with check	-	-	-	-	SPZ/0N-0E	SPZ/0P-0E
		metallic	emitter	SPH/00-1E					
	8 m	plastic		SPU/00-0E					
	3 m	metallic		SPU/00-1E					

available models

cable exit photoelectric sensors radial optic

function	distance	housing	adjustment	3 wires LO NPN	3 wires LO PNP	3 wires DO NPN	3 wires DO PNP	3 wires NPN LO/DO	3 wires PNP LO/DO
diffuse reflection	100 mm	metallic	●	-	-	SP3/DN-1A	-	-	-
	400 mm	plastic		-	-	-	-	SP7/0N-0A	SP7/0P-0A
		metallic		-	-	-	-	SP7/0N-1A	SP7/0P-1A
through-beam	14 m	plastic	emitter	SPH/00-0A					
			em. with check	SPH/X0-0A					
			receiver	-	-	-	-	SPZ/0N-0A	SPZ/0P-0A
		metallic	emitter	SPH/00-1A					
			em. with check	SPH/X0-1A					
			receiver	-	-	-	-	SPZ/0N-1A	SPZ/0P-1A
	3 m		emitter	SPU/00-1A					

technical specification

background suppression models

	SS0/**-**	SS1/**-**	SST/**-**
			
nominal sensing distance	50 mm	100 mm	12/25 mm
emission	red (660 nm)		
spot diameter	see diagram		
minimum detectable object	1 mm	3.5 mm	0.1 mm with STF-12 0.25 mm with STF-25
dfferential travel	≤ 10 %		
repeatability	5 %		
operating voltage	10...30 Vdc		
ripple	≤ 10 %		
supply current	≤ 30 mA		
load current	100 mA		
leakage current	10 µA		
output voltage drop	1.2 V max. IL = 100 mA		
output type	NPN or PNP - LO/DO selectable		
switching frequency	1 kHz		
power on delay	200 ms		
power supply protections	polarity reversal, transient		
output protection	short circuit (autoreset)		
operating temperature range	- 25°C...+ 70°C (without freeze)		
temperature drift	10 % Sr		
protection degree	IP67 (EN60529) (1)		
EMC	in conformity with the EMC Directive according to EN 60947-5-2		
external light interference	3,000 lux (incandescence lamp) 10,000 lux (sunligh)		
LEDs	yellow		
housing material	PBT (plastic) / nicked plated brass (metallic) / PC (cable exit))		
optic material	plastic		
tightening torque	25 Nm (metallic housing), 1 Nm (plastic housing)		
weight (approx)	plastic version: 30 g connector / 70 g cable metallic version: 100 g connector / 130 g cable		

(1) Protection guaranteed only with plug cable well mounted

technical specification

diffuse reflection and retro-reflective models

	diffuse reflection				retro-reflective	polarized
	S*2/**-**	S*3/**-**	S*7/**-**	S*8/**-**	S*C/**-****	S*P/**-****
						
nominal sensing distance	with white target 100 x 100 mm		400 mm with white target 200 x 200 mm	800 mm with white target 400 x 400 mm	5 m with reflector RL 110	4 m with reflector RL 110
emission	infrared (880 nm)					red (660 nm)
dfferential travel	≤ 10 %					
repeatability	5 %					
operating voltage	10...30 Vdc					
ripple	≤ 10 %					
supply current	30 mA					
load current	100 mA					
leakage current	10 µA					
output voltage drop	1.2 V max. IL = 100 mA					
output type	NPN or PNP - LO/DO selectable					
switching frequency	250 Hz					
power on delay	200 ms					
power supply protections	polarity reversal, transient					
output protection	short circuit (autoreset)					
sensibility adjustment	-	●			-	●
operating temperature range	- 25°C...+ 70°C (without freeze)					
temperature drift	10 % Sr					
protection degree	IP67 (EN60529) [1]					
EMC	in conformity with the EMC Directive according to EN 60947-5-2					
external light interference	3,000 lux (incandescence lamp), 10.000 lux (sunligh)					
LEDs	yellow					
housing material	PBT (plastic) / nicked plated brass / PC (cable exit)					
optic material	plastic					
tightening torque	1 Nm (plastic housing), 25 Nm (metal housing)					
weight (approx)	plastic version: 30 g connector / 70 g cable metallic version: 100 g connector / 130 g cable					

[1] Protection guaranteed only with plug cable well mounted

technical specification

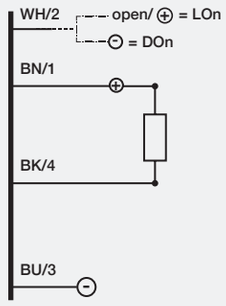
through beam models

	standard beam			barrier for small and ulta-small objects		
	emitter	receiver	receiver	emitter	receiver	receiver
	S*H/*0-**	S*Z/**-**	S*D/**-**	S*U/*0-**	S*G/**-**	S*V/**-**
nominal sensing distance	14 m			-	8 m	3 m
minimum detectable object	-				Ø 4 mm	Ø 1 mm
emission	red (660)					
tolerance	-			90% - 200% @ Eg = 1,5		
dfferential travel	≤ 10 %					
repeatability	5 %					
operating voltage	10...30 Vdc					
ripple	≤ 10 %					
supply current	40 mA	30 mA		25 mA	20 mA	
load current	100 mA					
leakage current	10 µA					
output voltage drop	2.5 V max. IL = 100 mA					
output type	NPN or PNP - LO/DO selectable			NPN or PNP - NO or NC		
switching frequency	250 Hz					
power on delay	200 ms					
power supply protections	polarity reversal, transient					
output protection	short circuit (autoreset)					
sensibility adjustment	-	●		-		
operating temperature range	- 25°C...+ 75°C (without freeze)					
temperature drift	10 % Sr			≤ 10 % Sr		
protection degree	IP67 (EN60529) [1]					
EMC	in conformity with the EMC Directive according to EN 60947-5-2					
external light interference	3,000 lux (incandescent lamp), 10,000 lux (sunlight)					
LEDs	yellow			red (activated output)		
housing material	PBT (plastic) / nicked plated brass / PC (cable exit)					
optic material	plastic					
tightening torque	1 Nm (plastic housing), 25 Nm (metallic housing)					
weight (approx)	plastic version: 30 g connector / 70 g cable metallic version: 100 g connector / 130 g cable					

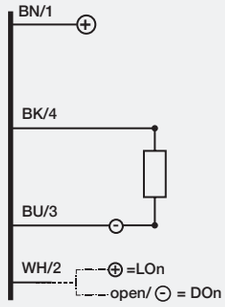
[1] Protection guaranteed only with plug cable well mounted

electrical diagrams of the connections

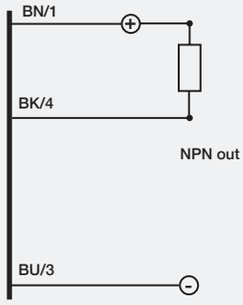
S/0N-****



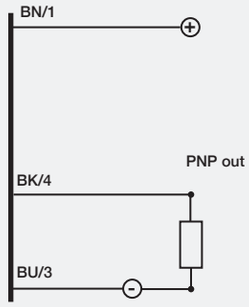
S/0P-****



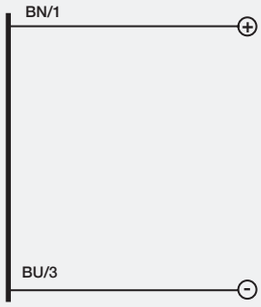
S/*N-**** (3 wires NPN)



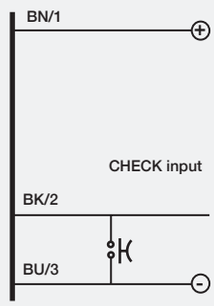
S/*P-**** (3 wires PNP)



S/00-****



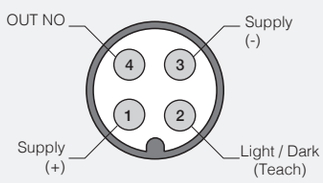
S*H/X0-**



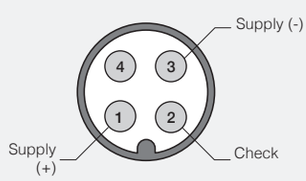
BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	grey

plug

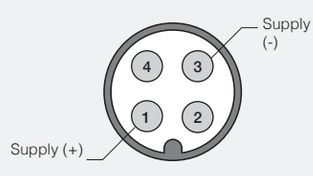
M12 diffuse reflection polarized receiver



M12 emitter with check



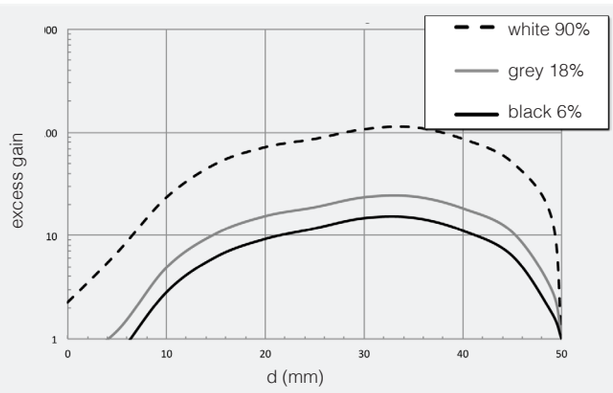
M12 emitter without check



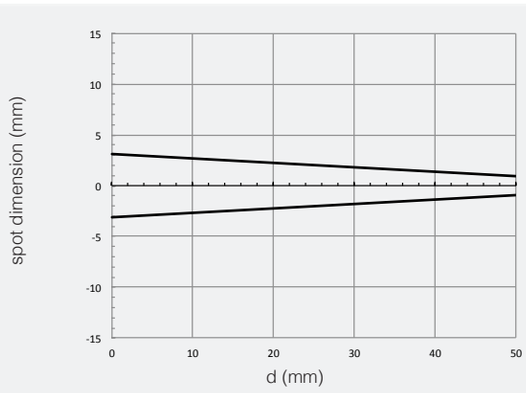
response diagrams

background suppression models

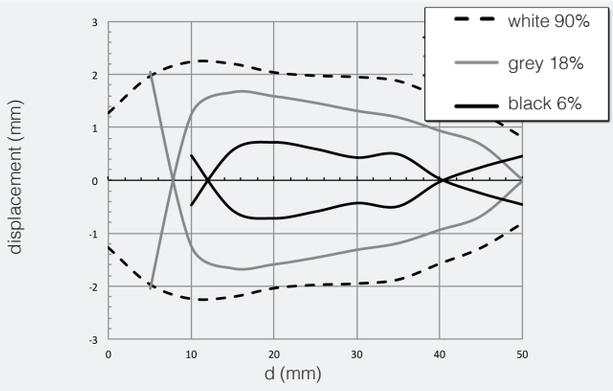
SS0/**-** excess gain



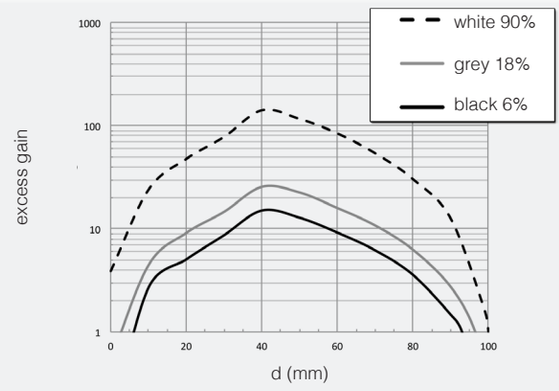
SS0/**-** spot dimension



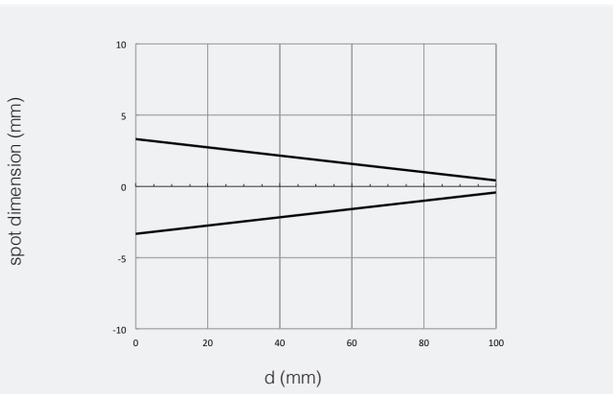
SS0/**-** parallel displacement



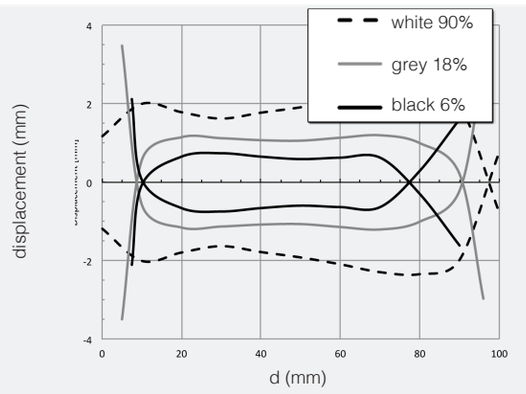
SS1/**-** excess gain



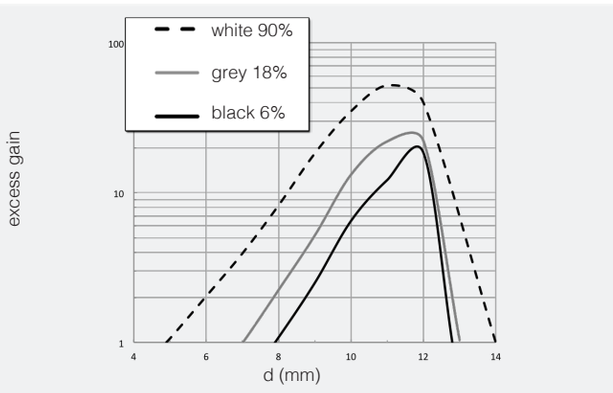
SS1/**-** spot dimension



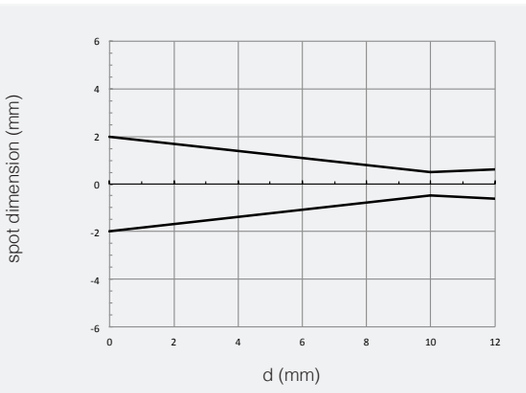
SS1/**-** parallel displacement



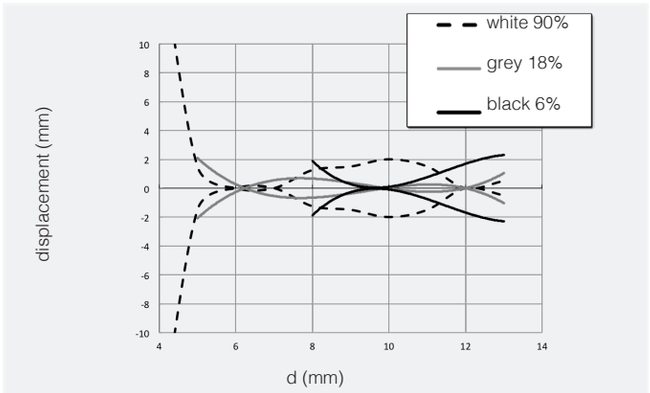
S*T/**-** + STF-12 excess gain



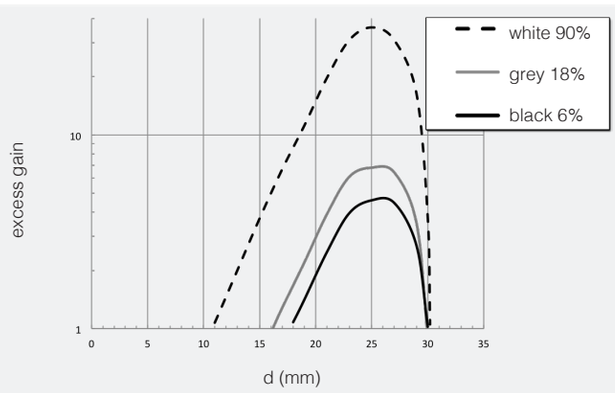
S*T/**-** + STF-12 spot dimension



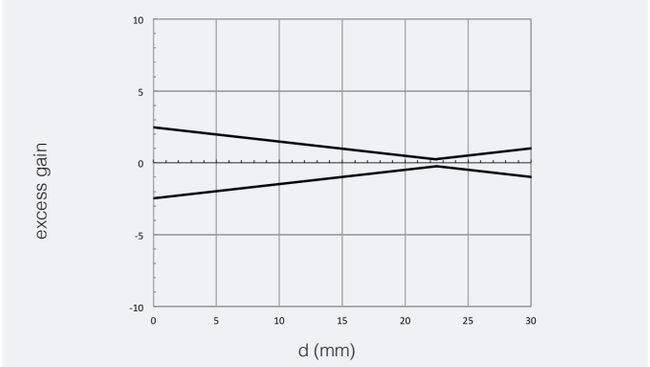
S*T/**-** + STF-12 parallel displacement



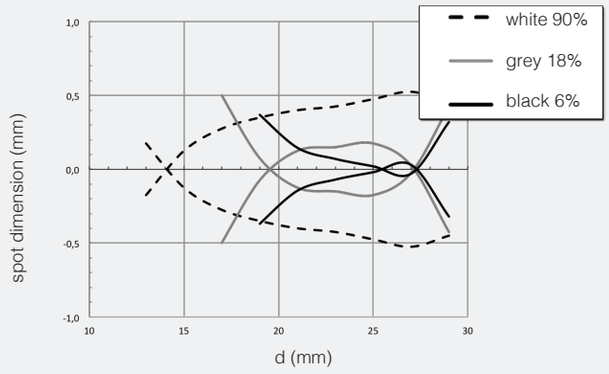
S*T/**-** + STF-25 excess gain



S*T/**-** + STF-25 spot dimension



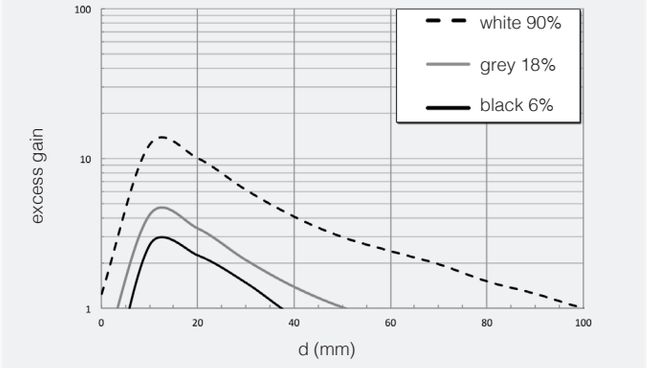
S*T/**-** + STF-25parallel displacementnt



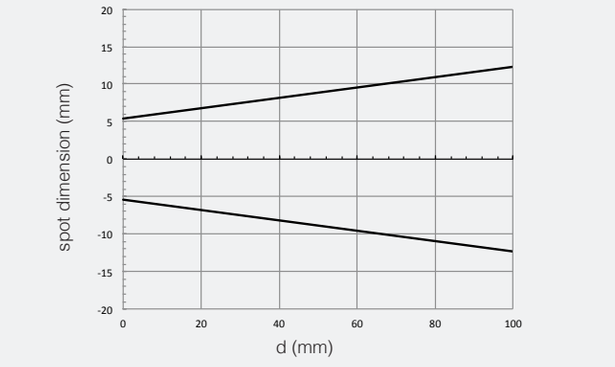
response diagrams

retro-reflective models

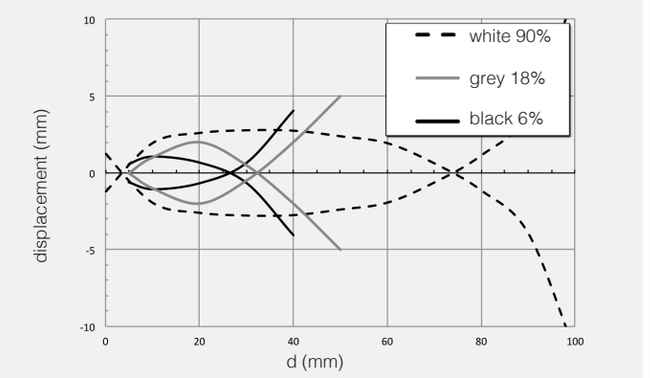
SS2,SS3/**-** excess gain



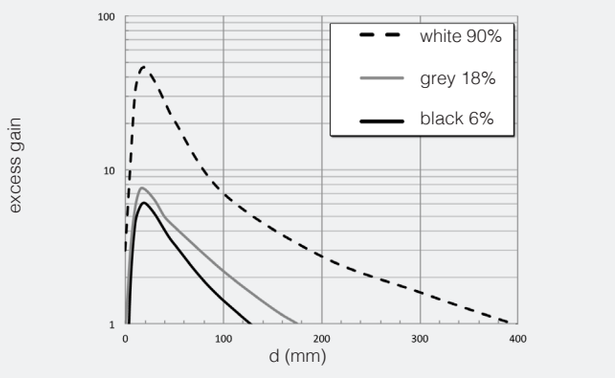
SS2,SS3//**-** spot dimension



SS2,SS3//**-** parallel displacement



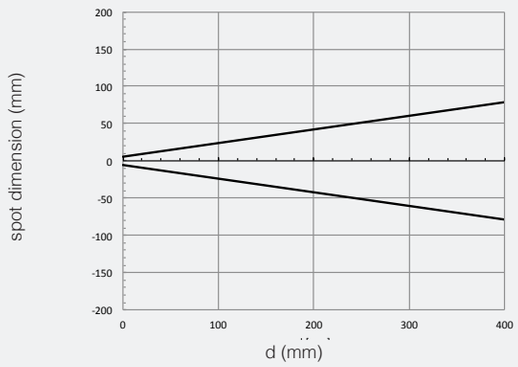
SS6,SS7/**-** excess gain



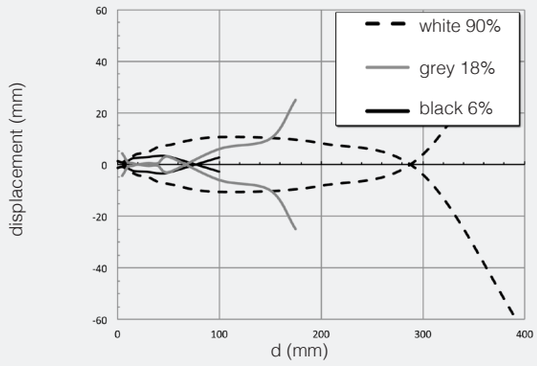
response diagrams

retro-reflective models

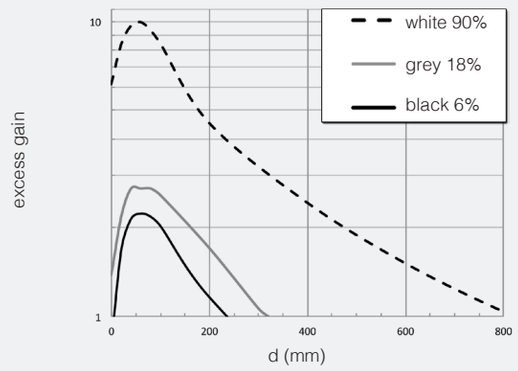
SS6/**-**,SS7/**-** spot dimension



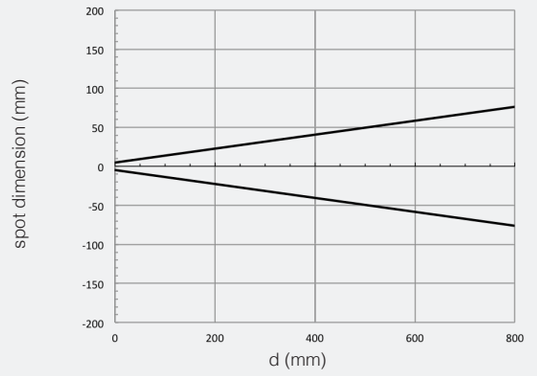
SS6/**-**,SS7/**-** parallel displacement



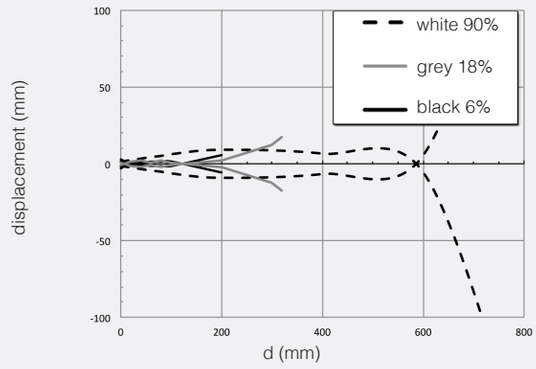
SS8/**-** excess gain



SS8/**-** spot dimension



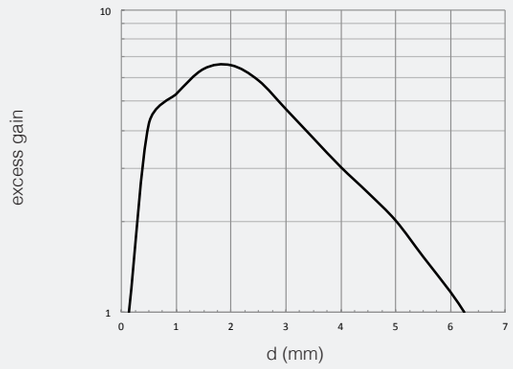
SS8/**-** parallel displacement



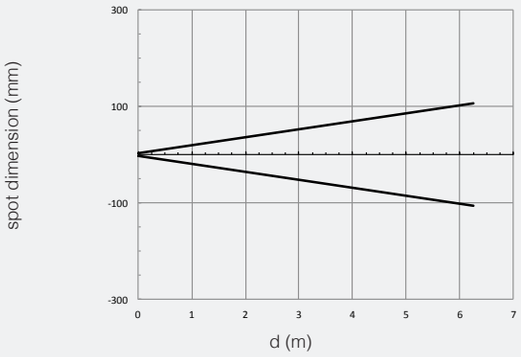
response diagrams

retro-reflective models (diagrams measured using RL100)

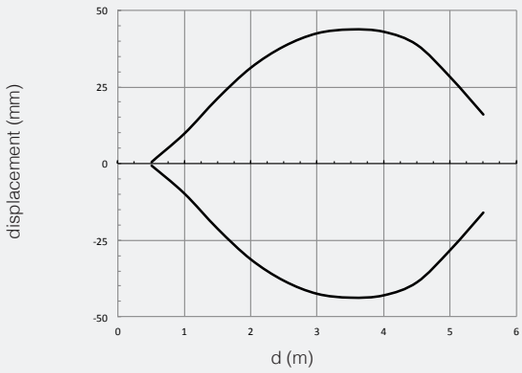
SSC/**-** excess gain



SSC/**-** spot dimension



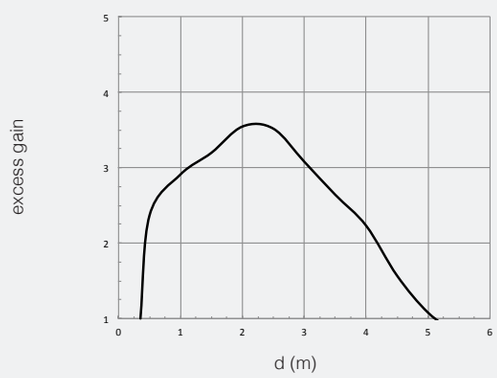
SSC/**-** parallel displacement



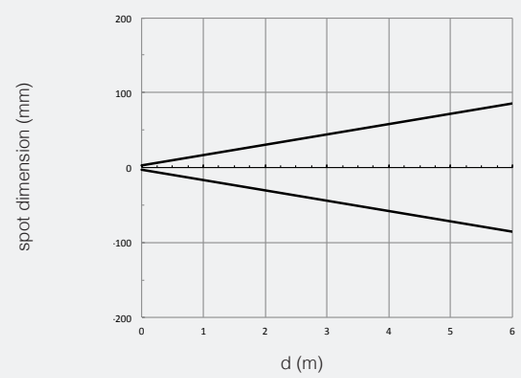
response diagrams

polarized models (diagrams measured using RL100)

S*P/**-** excess gain



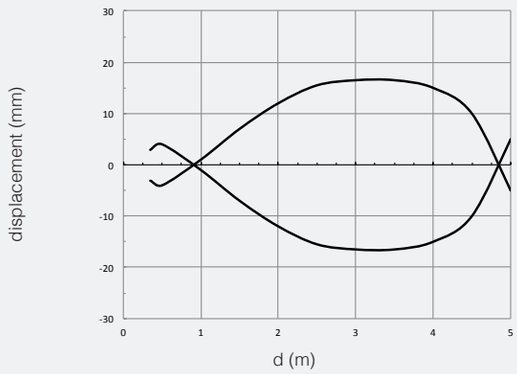
S*P/**-** spot dimension



response diagrams

polarized models (diagrams measured using RL100)

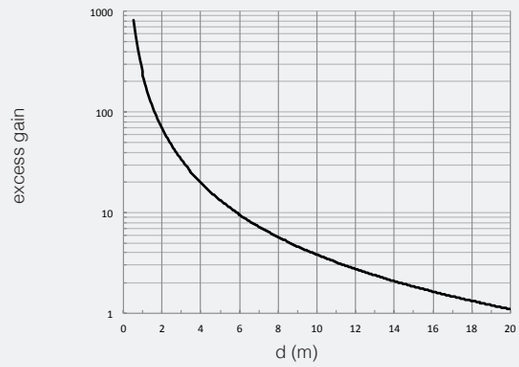
S*P/-** parallel displacement**



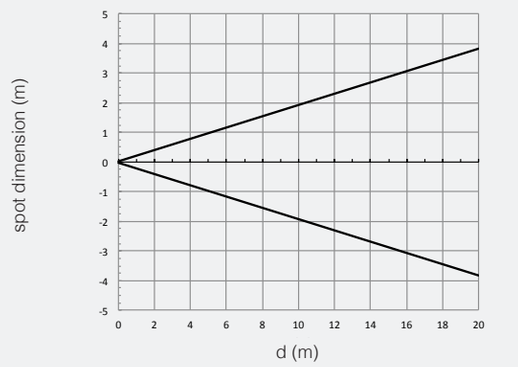
response diagrams

through beam models

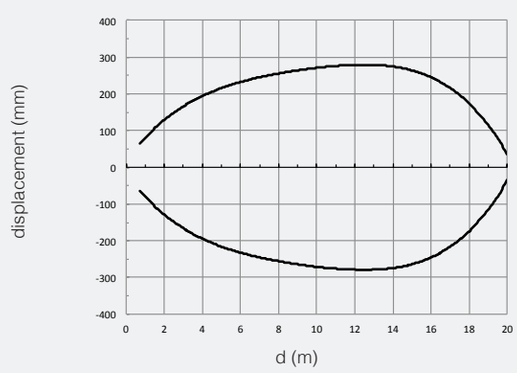
S*H/-(0,1)*, S*D/**-(0,1)* excess gain**



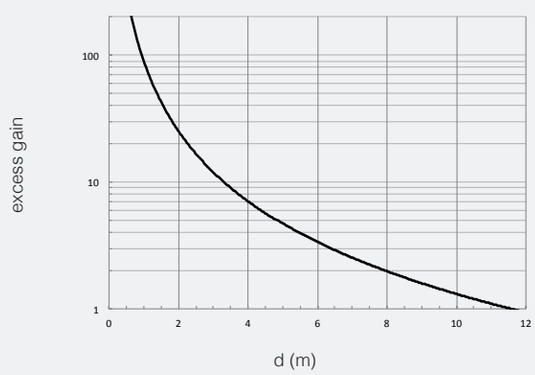
S*H/-(0,1)*, S*D/**-(0,1)* spot dimension**



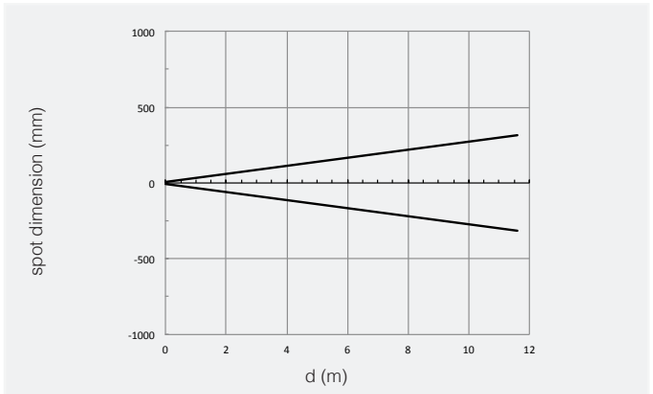
S*H/-(0,1)*, S*D/**-(0,1)* parallel displacement**



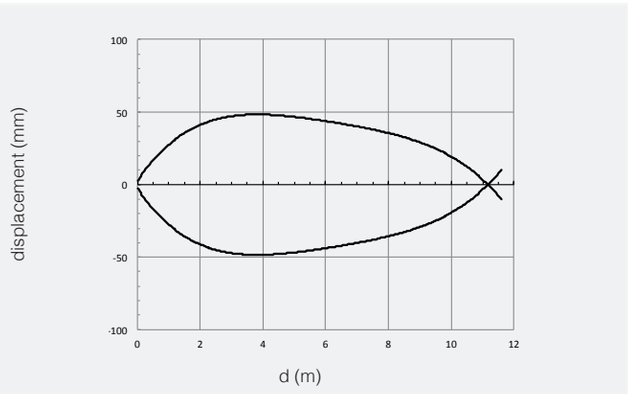
S*U/-**, S*G/**-** excess gain**



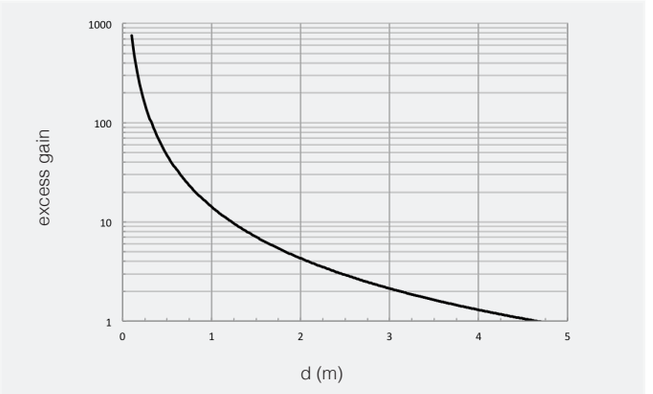
S*U/**-**, S*G/**-** spot dimension



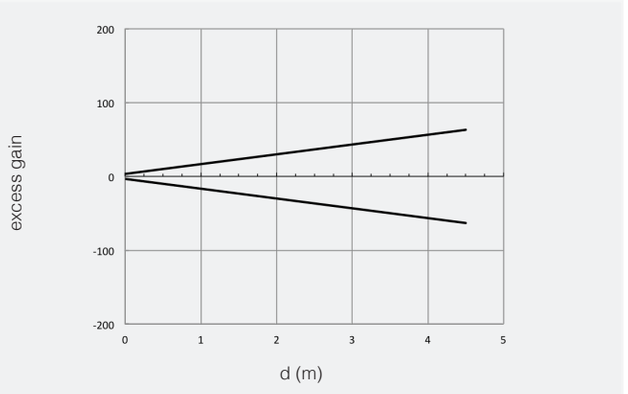
S*U/**-**, S*G/**-** parallel displacement



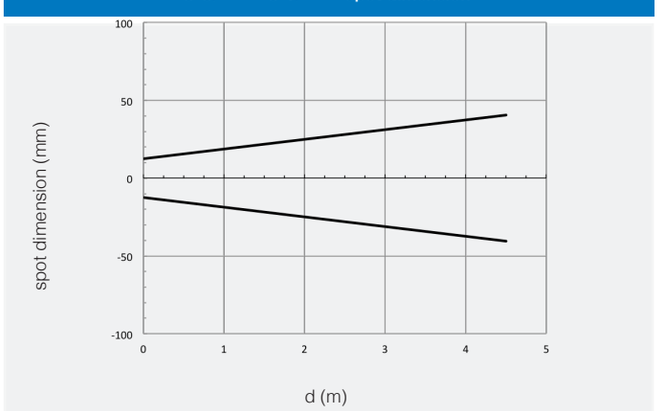
S*U/**-** S*V/**-** excess gain



S*U/**-** S*V/**-** excess gain

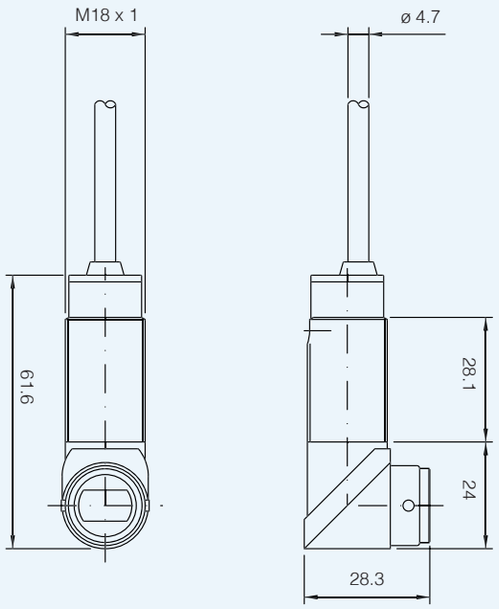


S*U/**-** S*V/**-** spot dimension

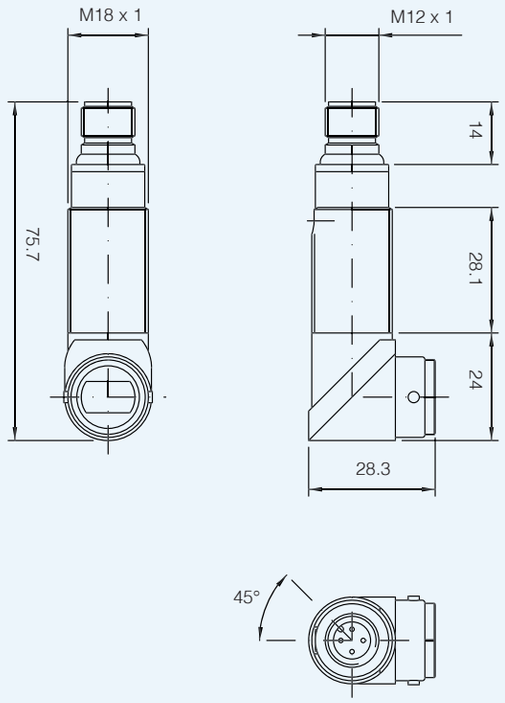


dimensions (mm)

SP*/-*A**

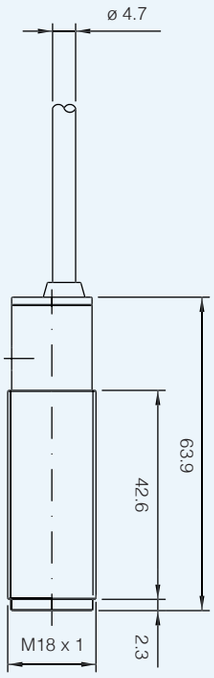


SP*/-*E**

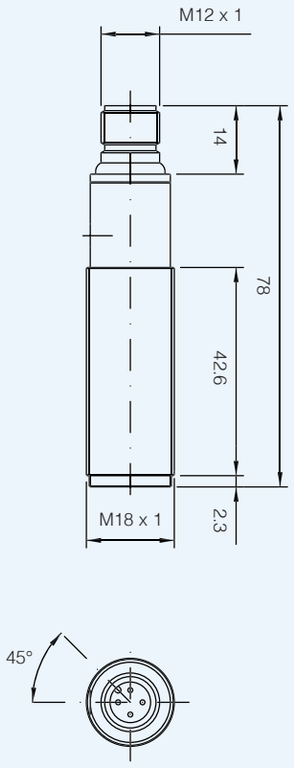


dimensions (mm)

SS*/-*A**

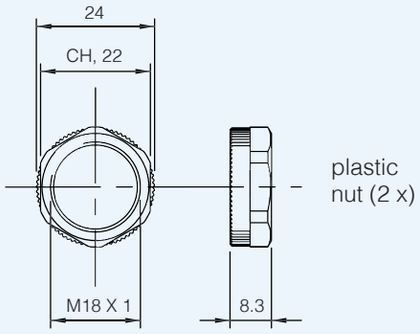


SS*/-*E**



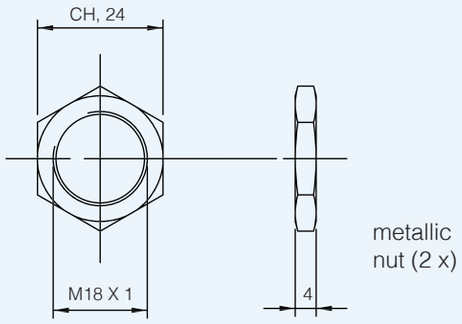
dimensions (mm)

accessories included in all plastic models



dimensions (mm)

accessories included in all metallic models



notes

MS - MP series
M18 DECOUT® DC output

features

- **Wide range of models: diffuse, retro-reflective, polarized, through-beam detection and background suppression**
- **Through-beam models with high sensing range**
- **Retro-reflective models with red visible polarized light**
- **Models with right angle optic (MP)**
- **Background suppression models with fixed distance**
- **Check function available for all through-beam models**
- **Complete protection against electrical damage**

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

code description

MS 0 / 0 0 - 0 A

series	MS	M18 DECOUT® photoelectric sensor
	MP	M18 photoelectric sensor with right angle optic and DECOUT® output
type	0	50 mm background suppression
	1	00 mm background suppression
	T	Focalized background suppr. 12 mm (focalizer STF-12), 25 mm (focalizer STF-25) (1)
	2	100 mm diffuse reflection
	3	100 mm diffuse reflection with regulation
	4	200 mm diffuse reflection
	6	400 mm diffuse reflection
	7	400 mm diffuse reflection with regulation
	C	4.5 m retro-reflective
	P	3.5 m polarized retro-reflective
	N	3.5 m polarized retro-reflective with regulation
	E	Standard emitter
	R	16 m standard receiver
	D	32 m long distance receiver
emitter type	0	Standard emitter - DECOUT® output
	X	Emitter with check
emitter	0	Standard emitter - DECOUT® output
housing material	0	Plastic housing
	1	Metal housing
cable / plug output	A	Axial cable output
	C	Right angle cable exit (1)
	E	M12 plug cable exit
	K	M12 right angle plug cable exit (1)

(1) Not available for MP models

available models

photoelectric sensors with axial optic

function	distance	axial cable exit 4 wires PNP/NPN - NO/NC		axial plug exit 4 wires PNP/NPN - NO/NC		radial cable exit 4 wires PNP/NPN - NO/NC		radial plug exit 4 wires PNP/NPN - NO/NC	
		plastic housing	metal housing	plastic housing	metal housing	plastic housing	metal housing	plastic housing	metal housing
background suppression	50 mm	MS0/00-0A	MS0/00-1A	MS0/00-0E	MS0/00-1E	-	-	MS0/00-0K	-
	100 mm	MS1/00-0A	MS1/00-1A	MS1/00-0E	MS1/00-1E	-	-	-	-
	focalized			MST/00-0E	MST/00-1E	-	-	-	-
direct diffuse	100 mm	MS2/00-0A	MS2/00-1A	MS2/00-0E	MS2/00-1E	-	-	-	-
		MS3/00-0A	MS3/00-1A	MS3/00-0E	MS3/00-1E	-	-	-	-
	200 mm	MS4/00-0A	MS4/00-1A	MS4/00-0E	MS4/00-1E	-	-	MS4/00-0K	-
	400 mm	MS6/00-0A	MS6/00-0A	MS6/00-0E	MS6/00-0E	-	-	MS6/00-0K	-
		MS7/00-0A	MS7/00-0A	MS7/00-0E	MS7/00-0E	-	-	MS7/00-0K	-
retro-reflective	4 m	MSC/00-0A	MSC/00-0A	MSC/00-0E	MSC/00-0E	MSC/00-0C	MSC/00-1C	MSC/00-0K	-
polarized	3.5 m	MSP/00-0A	MSP/00-1A	MSP/00-0E	MSP/00-1E	-	-	-	-
		MSN/00-0A	MSN/00-1A	MSN/00-0E	MSN/00-1E	-	-	MSE/00-0K	MSE/00-1K
through beam	emitter	MSE/00-0A	MSE/00-1A	MSE/00-0E	MSE/00-1E	-	-	-	-
	emitter with check	MSE/X0-0A	MSE/X0-1A	MSE/X0-0E	MSE/X0-1E	-	-	-	-
	receiver 16 m	MSR/00-0A	MSR/00-1A	MSR/00-0E	MSR/00-0E	-	-	MSR/00-0K	MSR/00-1K
	receiver 32 m	MSD/00-0A	MSD/00-1A	MSD/00-0E	MSD/00-1E	-	-	-	-

available models

photoelectric sensors with radial optic

function	distance	axial cable exit 4 wires PNP/NPN - NO/NC		axial plug exit 4 wires PNP/NPN - NO/NC		radial cable exit 4 wires PNP/NPN - NO/NC		radial plug exit 4 wires PNP/NPN - NO/NC	
		plastic housing	metal housing	plastic housing	metal housing	plastic housing	metal housing	plastic housing	metal housing
background suppression	50 mm	MP0/00-0A	MP0/00-1A	MP0/00-0E	MP0/00-1E	-	-	-	-
	100 mm	MP1/00-0A	MP1/00-1A	MP1/00-0E	MP1/00-1E	-	-	-	-
direct diffuse	200 mm	MP2/00-0A	-	MP2/00-0E	-	-	-	-	-
		MP4/00-0A	-	MP4/00-0E	-	-	-	-	-
	400 mm	-	-	MP6/00-0E	-	-	-	-	-
retro-reflective	4.5 m	MPC/00-0A	MPC/00-0A	MPC/00-0E	MPC/00-0E	-	-	-	-
polarized	3.5 m	-	-	-	-	-	-	-	-
through beam	emitter	MPE/00-0A	MPE/00-1A	MPE/00-0E	MPE/00-1E	-	-	-	-
	emitter with check	MPE/X0-0A	MPE/X0-1A	MPE/X0-0E	MPE/X0-1E	-	-	-	-
	receiver 16 m	MPR/00-0A	MPR/00-1A	MPR/00-0E	MPR/00-0E	-	-	-	-

technical specification

background suppression models

	M*0/00-*	M*1/00-**	MST/00-**
			
nominal sensing distance	50 mm (1)	100 mm (1)	12/25 mm
emission	infrared (880 nm)		red (660 mm)
regulation	-		
tolerance	0...+10 % Sn		
dfferential travel	≤ 5 %		≤ 10 %
repeatability	5 %		
operating voltage	10...30 Vdc		
ripple	≤ 10 %		
supply current	≤ 40 mA		≤ 30 mA
load current	≤ 100 mA		
leakage current	6 A (Ton = 10 ms)		
output voltage drop	1.2 V max. IL = 100 mA		
output type	DECOUT® (NPN/PNP, NO, NC)		
switching frequency	1 KHz		
power on delay	200 ms		
power supply protections	transient		
output protection	short circuit (with hold)		
operating temperature range	- 25°C...+ 70°C (without freeze)		
temperature drift	5 % Sr		10 % Sr
protection degree	IP67 (EN60529) (2)		
EMC	in conformity with the EMC Directive according to EN 60947-5-2		
external light interference	3,000 lux (incandescent lamp), 10,000 lux (sunlight)		
LEDs	red (output energized)		yellow
housing material	PBT (plastic) / nicked plated brass (metallic) / PC (cable exit)		
optic material	PMMA		plastic
tightening torque	1 Nm (plastic housing), 25 Nm (metallic housing)		
weight (approx)	plastic version: 30 g plug / 70 g cable metallic version: 100 g plug / 130 g cable		

(1) With 100x100 mm white matt paper (2) Protection guaranteed only with plug cable well mounted

technical specification

direct diffuse models

	M*2/00-**	M*3/00-**	M*4/00-**	M*6/00-0**	M*7/00-**
					
nominal sensing distance	100 mm (1)		200 mm (1)	400 mm (2)	
emission	infrared (880 nm)				
regulation	-	●	-		●
tolerance	-				+15...-10 % Sn
dfferential travel	≤ 5 %				≤ 10 %
repeatability	5%				
operating voltage	10...30 Vdc				
ripple	≤ 10 %				
supply current	≤ 40 mA				≤ 30 mA
load current	≤ 100 mA				
leakage current	6 A (Ton = 10 ms)				
output voltage drop	1,2 V max. IL = 100 mA				
output type	DECOUT® (NPN/PNP, NO NC)				
switching frequency	80 Hz				
power on delay	200 ms				
power supply protections	transient				
output protection	short circuit (with hold)				
operating temperature range	-25°C...+70°C (without freeze)				
temperature drift	5 % Sr				
protection degree	IP67 (EN60529)(3)				
EMC	in conformity with the EMC Directive according to EN 60947-5-2				
external light interference	3,000 lux (incandescent lamp), 10,000 lux (sunlight)				
LEDs	red (output energized)				
housing material	PBT (plastic) / nicked plated brass (metallic) / PC (cable exit)				
optic material	PMMA				
tightening torque	1 Nm (plastic housing), 25 Nm (metallic housing)				
weight (approx)	plastic version: 30 g plug / 70 g cable metallic version: 100 g plug / 130 g cable				

(1) With 100x100 mm white matt paper (2) With 200x200 mm white matt paper ((4) Protection guaranteed only with plug cable well mounted

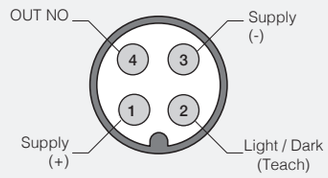
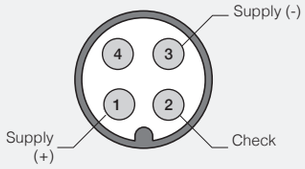
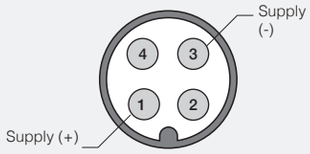
technical specification

retro-reflective and long distance models

	retro-reflective			through-beam	
	standard	polarized		standard	long distance
	M*C/00-*	M*P/00-**	MSN/00-**	M*E/**-** M*R/**-**	M*E/**-** M*D/**-**
					
nominal sensing distance	4,5 m [1]	3,5 m [1]		16 m	32 m
emission	infrared (880 nm)	red (660 mm)		infrared (880 nm)	
tolerance	+15...-10 % Sn			-	
dfferential travel	≤ 10 %				
repeatability	5 %				
operating voltage	10...30 Vdc				
ripple	≤ 10 %				
no-load supply current	≤ 30 mA			≤ 15 mA (emitter) ≤ 35 mA (emitter with check) ≤ 25 mA (receiver)	
load current	≤ 100 mA				
leakage current	≤ 10 µA				
output voltage drop	1,2 V max. IL = 100 mA				
output type	DECOUT® (NPN/PNP, NO/NC)				
switching frequency	80 Hz			30 Hz	
power on delay	200 ms				
power supply protections	transient				
output protection	short circuit (with hold)				
operating temperature range	- 25°C...+ 70°C (without freeze)				
temperature drift	≤ 10 % Sr				
protection degree	IP67 (EN60529) [2]				
EMC	in conformity with the EMC Directive according to EN 60947-5-2 60947-5-2				
external light interference	3,000 lux (incandescent lamp), 10,000 lux (sunlight)				
LEDs	red (output energized)				
housing material	PBT (plastic) / nickel-plated brass (metallic) / polycarbonate (cable exit)				
optic material	PMMA				
tightening torque	40 Nm (metallic housing)				
weight (approx)	plastic version: 30 g plug / 70 g cable metallic version: 100 g plug / 130 g cable				

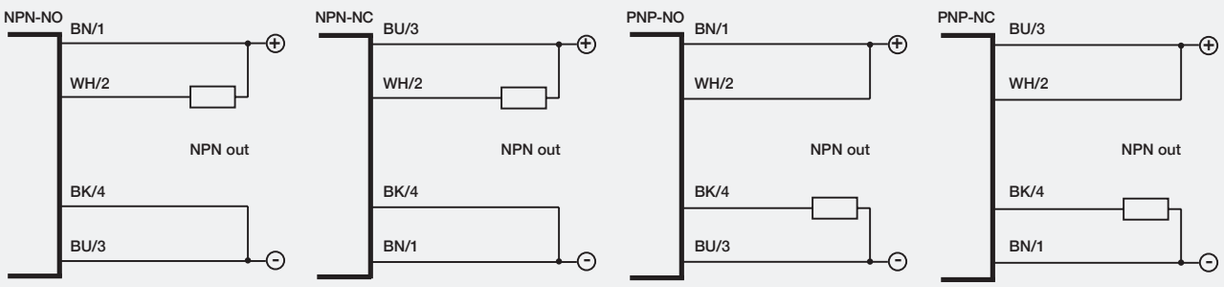
[1] With 100x100 mm white matt paper [4] Protection guaranteed only with plug cable well mounted

plug

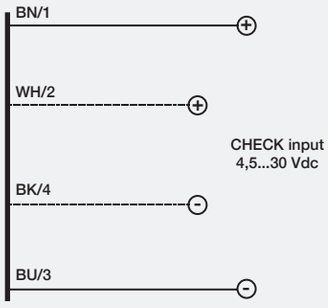
M12	M12 emitter with check	M12 emitter without check
		

electrical diagrams of the connections

DECOUT® output



emitter with check

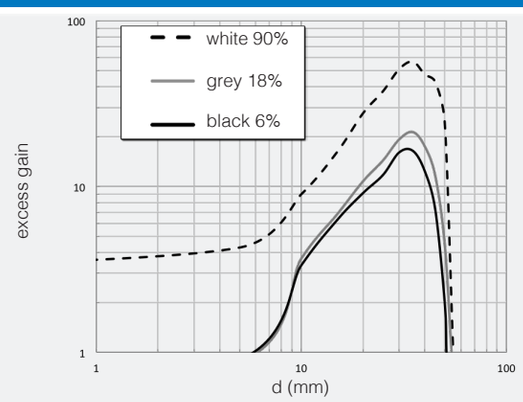


BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

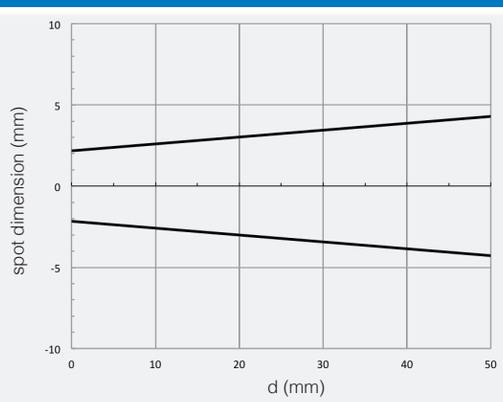
response diagrams

background suppression models

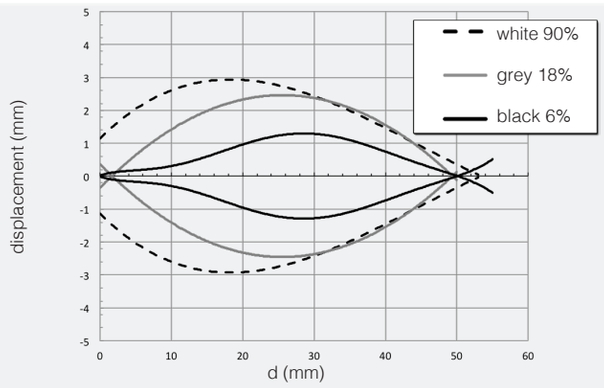
M*0/**-** excess gain



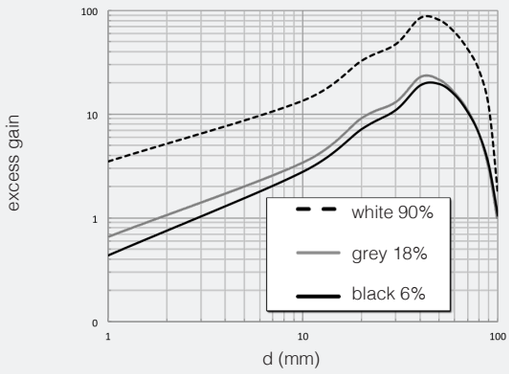
M*0/**-** spot dimension



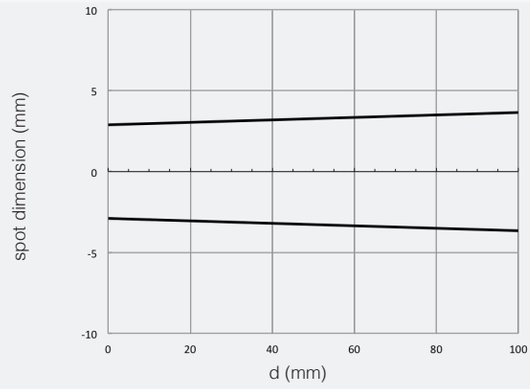
M*0/**-** parallel displacement



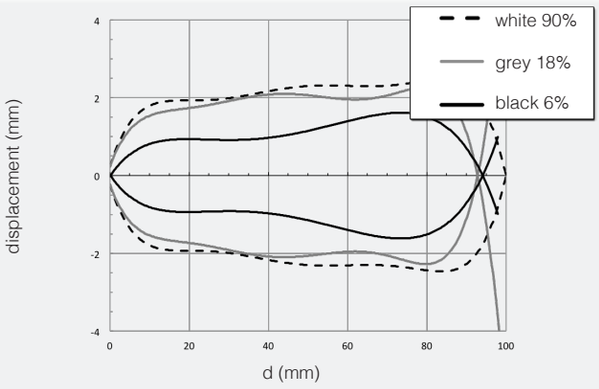
M*1/**-** excess gain



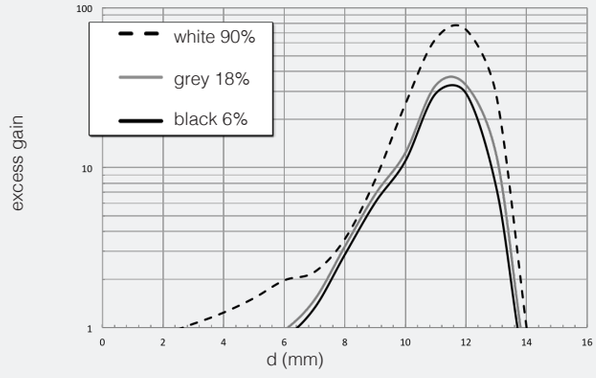
M*1/**-** spot dimension



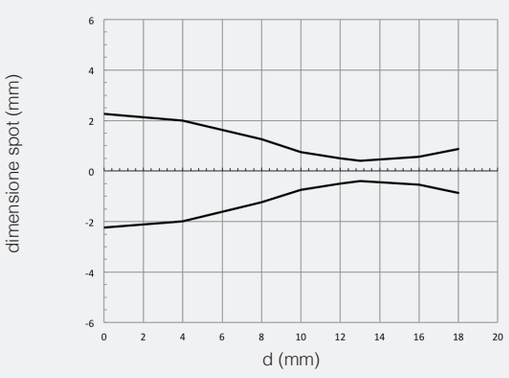
M*1/**-** parallel displacement



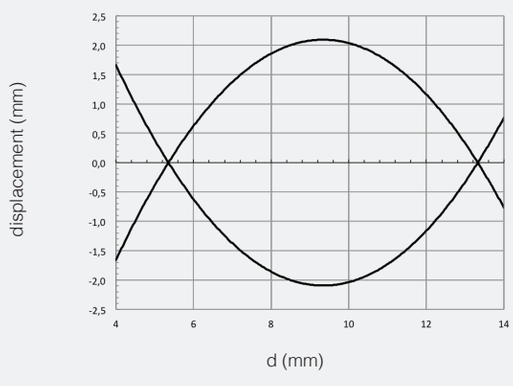
MST/00-** + STF12 excess gain



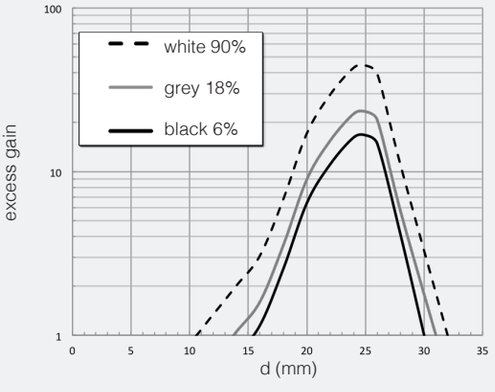
MST/00-** + STF12 spot dimension



MST/00-** + STF12 parallel displacement



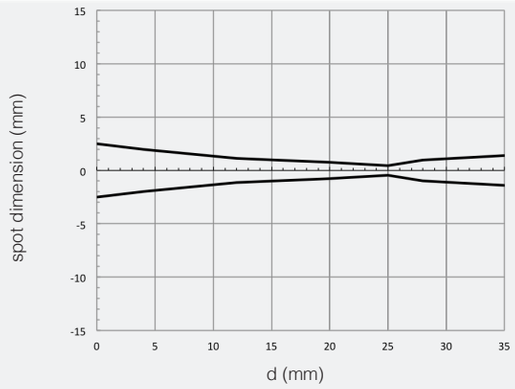
MST/00-** + STF25 excess gain



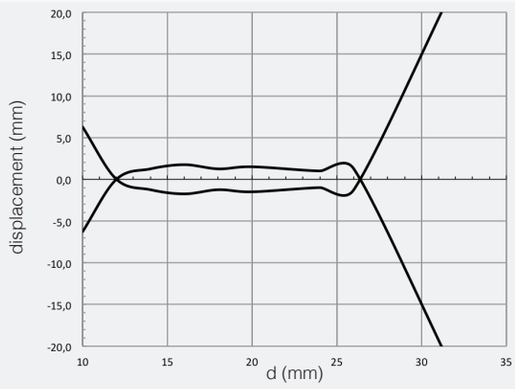
response diagrams

direct diffuse models

MST/00-** + STF25 spot dimension



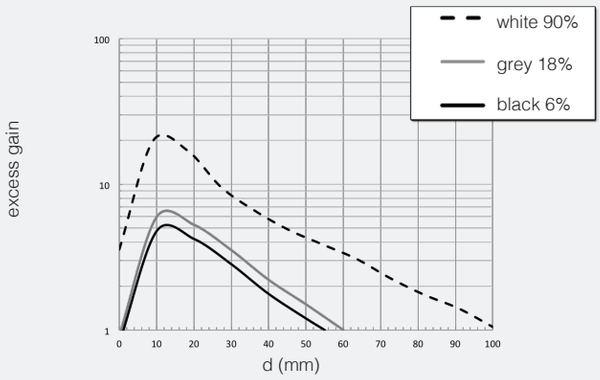
MST/00-** + STF25 parallel displacement



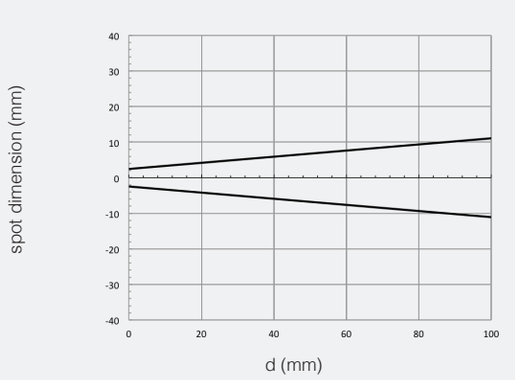
response diagrams

direct diffuse models

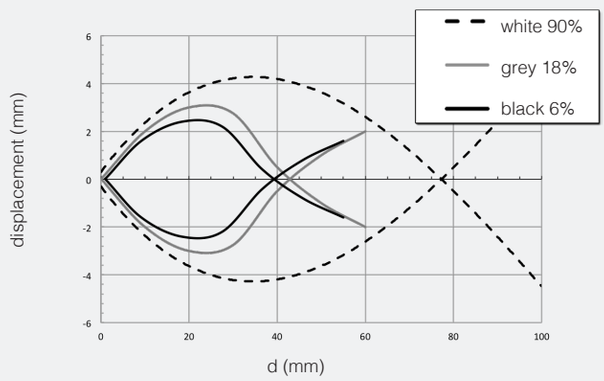
M*2, M*3/00-** excess gain



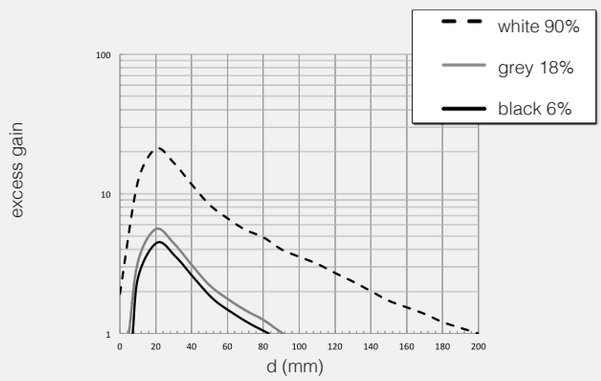
M*2, M*3/00-** spot dimension



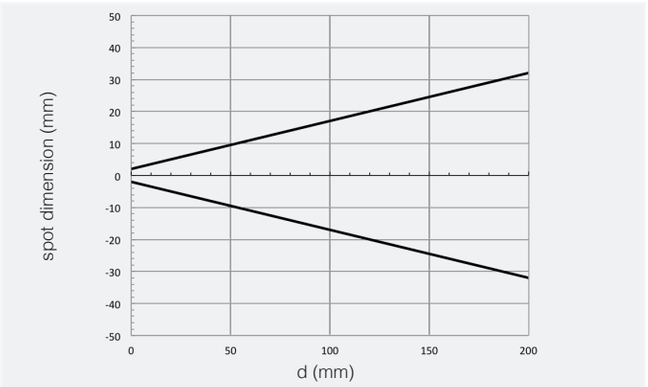
M*2, M*3/00-** parallel displacement



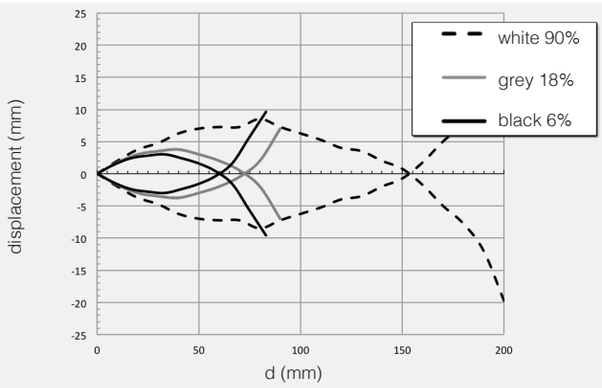
M*4/00-** excess gain



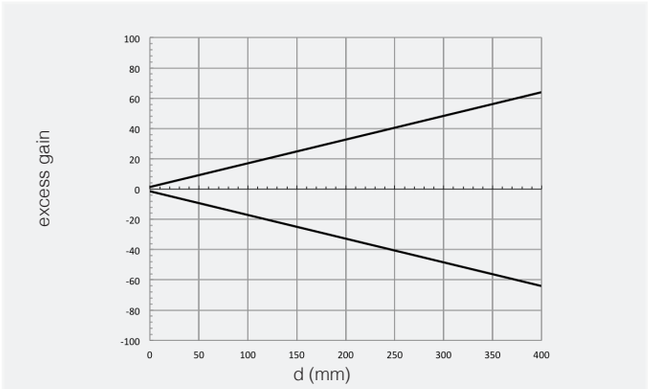
M*4/00-** dimensione spot



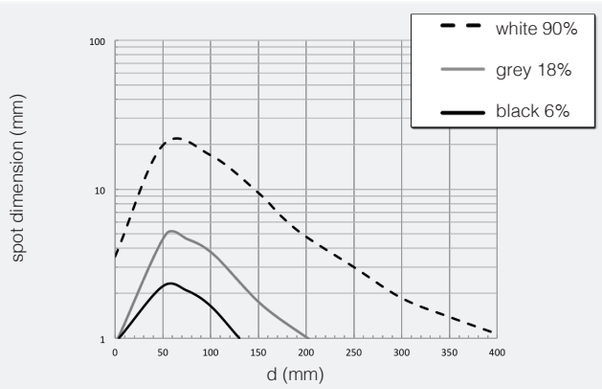
M*4/00-** parallel displacement



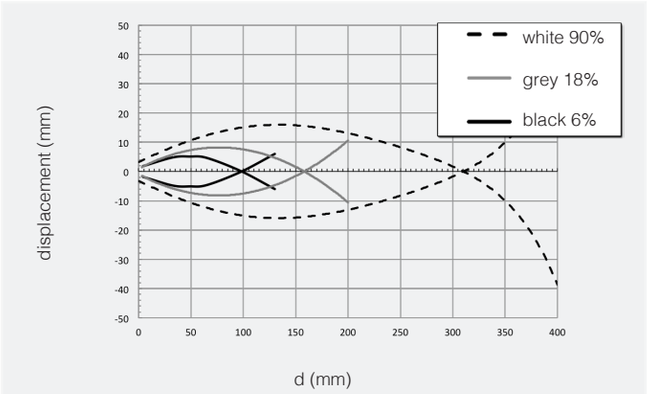
M*6, M*7**/00-** excess gain



M*6, M*7**/00-** spot dimension



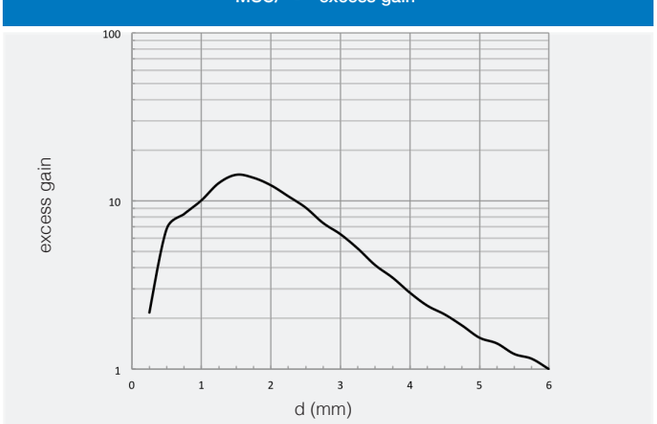
M*6, M*7**/00-** parallel displacement



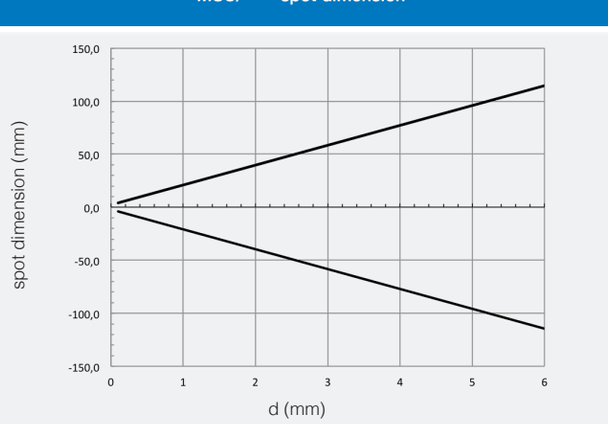
response diagrams

retro-reflective standard and polarized models

MSC/**-** excess gain



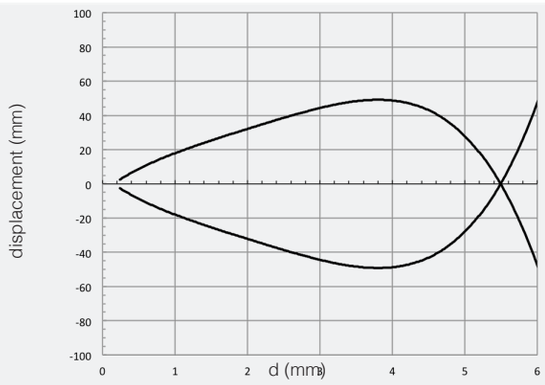
MSC/**-** spot dimension



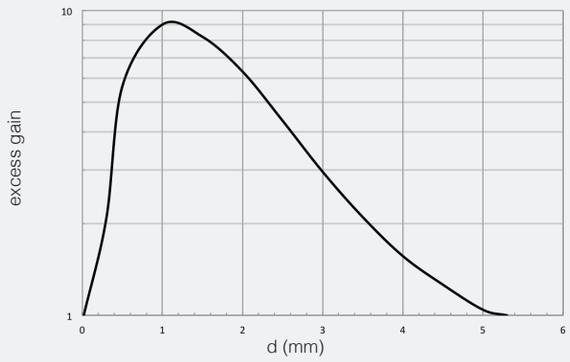
response diagrams

retro-reflective polarized models (diagrams measured using RL100)

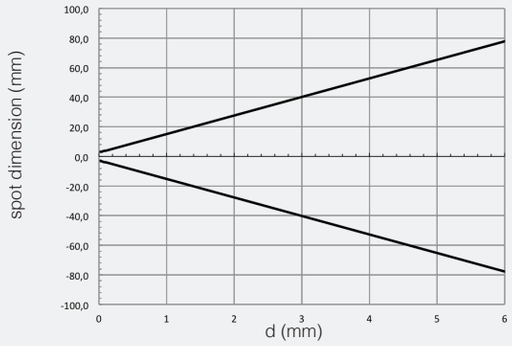
MSC/**-** parallel displacement



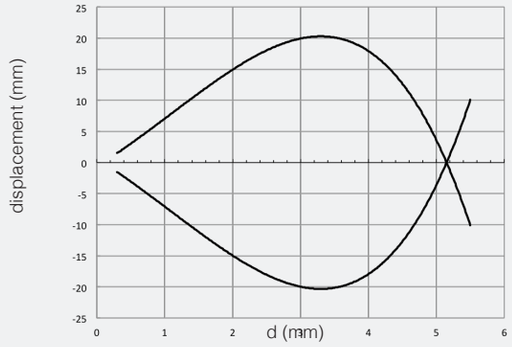
MSP, MSN/**-** excess gain



MSP, MSN/**-** spot dimension



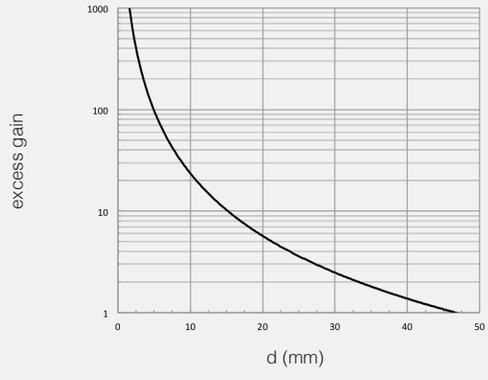
MSP, MSN/**-** parallel displacement



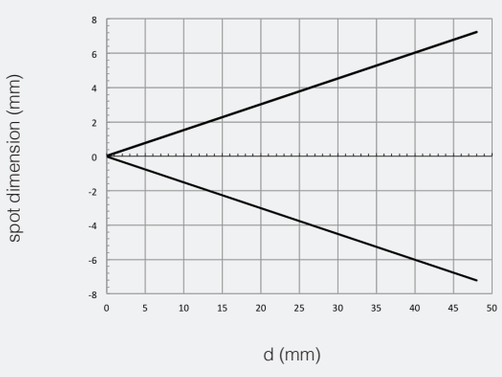
response diagrams

through-beam standard and long distance models

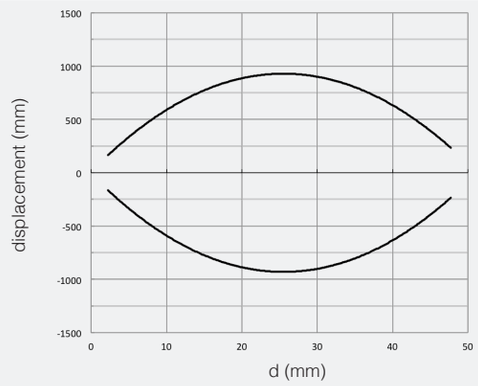
MSE/**-** - MSD/**-** excess gain



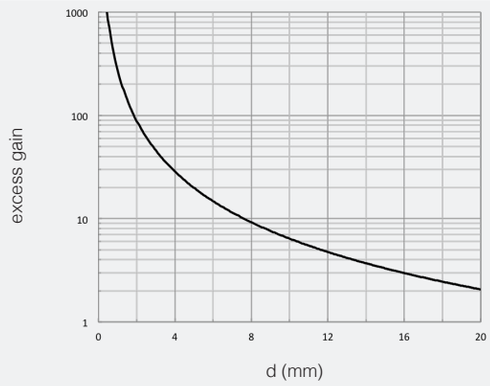
MSE/**-** - MSD/**-** spot dimension



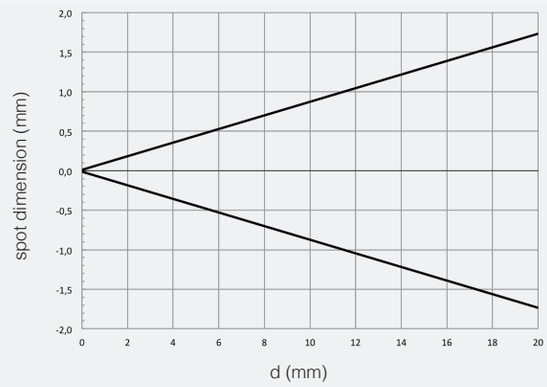
MSE/**-** - MSD/**-** parallel displacement



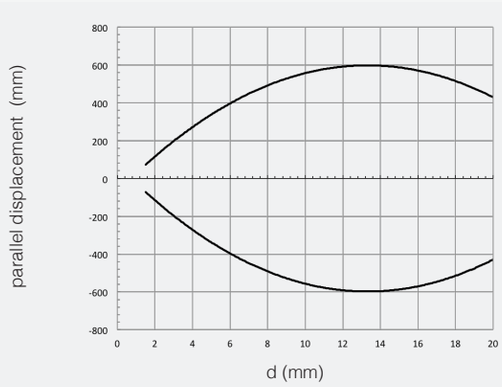
MSE/**-** - MSR/**-** excess gain



MSE/**-** - MSR/**-** spot dimension



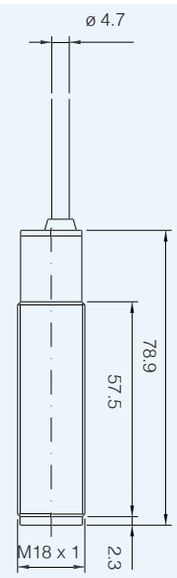
MSE/**-** - MSR/**-** parallel displacement



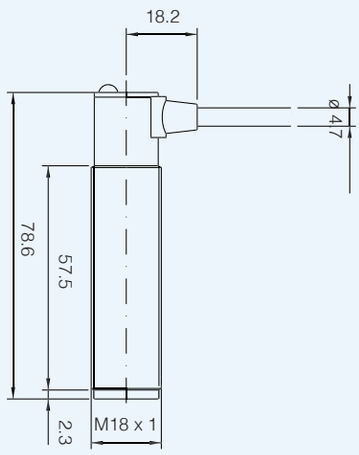
dimensions (mm)

axial models

MS*/00-*A



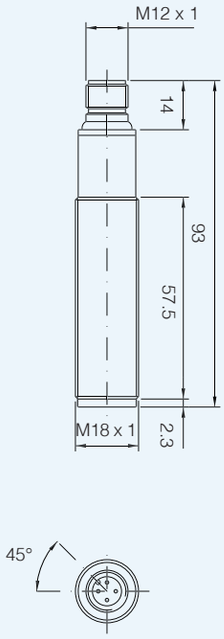
MS*/00-0C



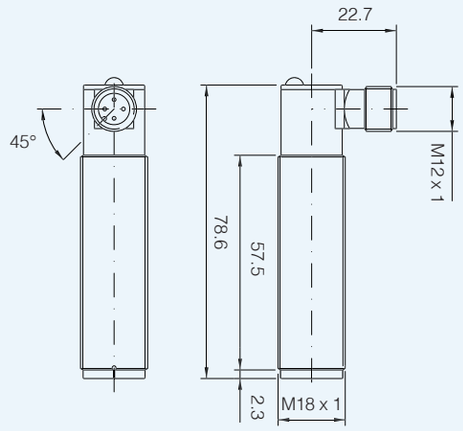
dimensions (mm)

axial models

MS*/00-*E



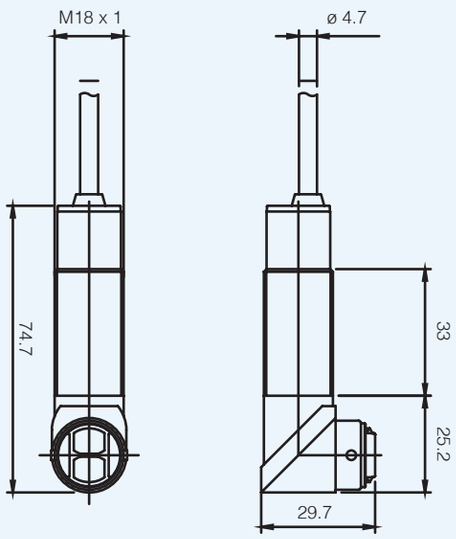
MS*/00-*K



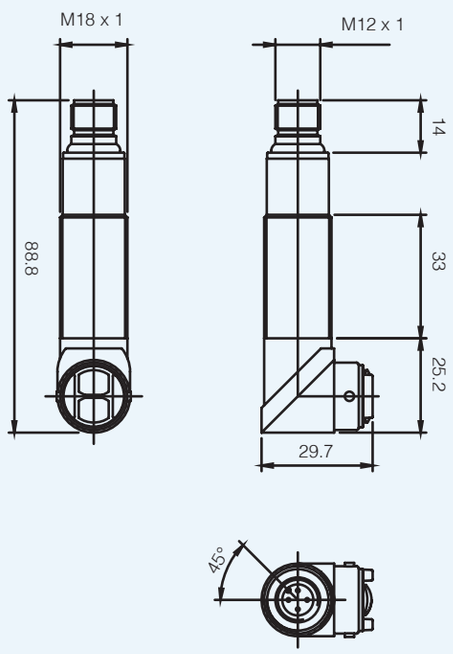
dimensions (mm)

background suppression radial models

MP0/00-*A; MP1/00-*A



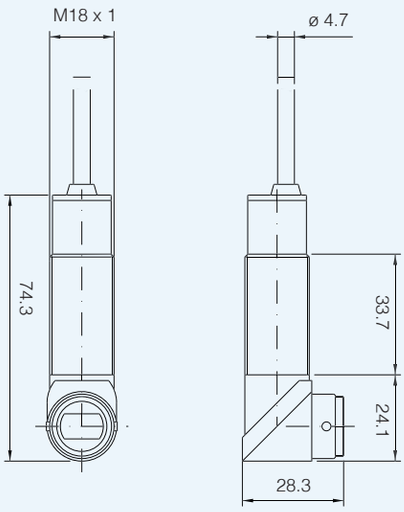
MP0/00-*E; MP1/00-*E



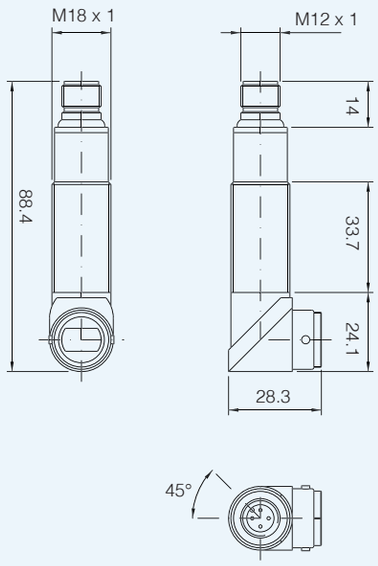
dimensions (mm)

diffuse reflection, retroreflective, polarized, through beam radial models

MP*/00-*A

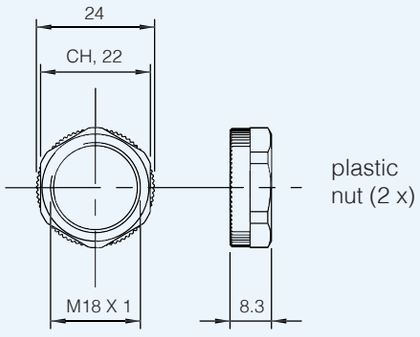


MP*/00-*E



dimensions (mm)

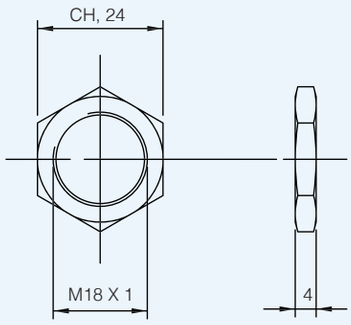
accessories included in all plastic models



plastic
nut (2 x)

dimensions (mm)

accessories included in all metallic models



metallic
nut (2 x)

notes

SA series

M18 DC high performances
with rear adjustment

features

- **Wide range of models: diffuse, retro-reflective, polarized and fixed-focus**
- **All models are available with sensitivity adjustment trimmer**
- **Double LED indicator (ON/OFF - supply)**
- **NO/NC selectable output**
- **IP65 protection degree**
- **Complete protection against electrical damage**
- **Wide range of plugs, accessories and reflectors available**
- **Approvals: CE**

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

M18 with high performances

code description

SA 2 / 0 N - 0 C

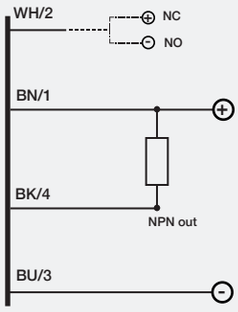
series	SA	M18 photoelectric sensor with high performance
	2	150 mm diffuse reflection
type	6	400 mm diffuse reflection
	8	1000 mm diffuse reflection
	C	6 m retro-reflective
	P	3.5 m polarized
	T	Diffuse reflection fixed-focus
NO / NC	0	NO/NC selectable
NPN / PNP output	N	NPN output logic
	P	PNP output logic
housing material	0	Plastic housing
	1	Metal housing
cable / plug exit	C	Right angle cable output 2 m
	K	M12 right angle plug cable exit

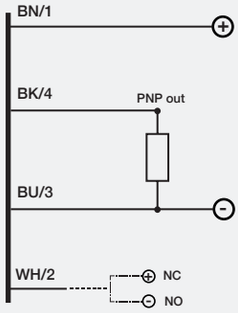
available models

output	function	distance	plastic models		metal models	
			PNP NO/NC	NPN NO/NC	PNP NO/NC	NPN NO/NC
right angle cable	diffuse reflection	150 mm	SA2/0P-0C	SA2/0N-0C	SA2/0P-1C	SA2/0N-1C
		400 mm	SA6/0P-0C	SA6/0N-0C	SA6/0P-1C	SA6/0N-1C
		1.000 mm	SA8/0P-0C	SA8/0N-0C	SA8/0P-1C	SA8/0N-1C
	retro-reflective	6 m	SAC/0P-0C	SAC/0N-0C	SAC/0P-1C	SAC/0N-1C
	polarized	3 m	SAP/0P-0C	SAP/0N-0C	SAP/0P-1C	SAP/0N-1C
	focalized with STF-12	12 mm	SAT/0P-0C	SAT/0N-0C	SAT/0P-1C	SAT/0N-1C
	focalized with STF-25	25 mm				
	focalized with STF-50	50 mm				
M12 right angle plug	diffuse reflection	150 mm	SA2/0P-0K	SA2/0N-0K	SA2/0P-1K	SA2/0N-1K
		400 mm	SA6/0P-0K	SA6/0N-0K	SA6/0P-1K	SA6/0N-1K
		1.000 mm	SA8/0P-0K	SA8/0N-0K	SA8/0P-1K	SA8/0N-1K
	retro-reflective	6 m	SAC/0P-0K	SAC/0N-0K	SAC/0P-1K	SAC/0N-1K
	polarized	3 m	SAP/0P-0K	SAP/0N-0K	SAP/0P-1K	SAP/0N-1K
	focalized with STF-12	12 mm	SAT/0P-0K	SAT/0N-0K	SAT/0P-1K	SAT/0N-1K
	focalized with STF-25	25 mm				
	focalized with STF-50	50 mm				

electrical diagrams of the connections

emitter NPN	receiver NPN





BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

In case of combined load, resistive and capacitive, the maximum admissible capacity C is 0,2µF, for maximum load voltage and current.

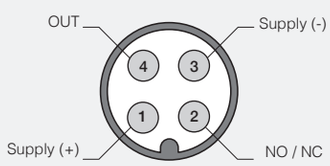
Indications NO and NC are referred to the diffuse reflection sensors (on target absence). For retro-reflective models the indication NO to be replaced by NC and NC becomes NO.

technical specification

	iffuse reflection			retro-reflective		fixed-focus		
	standard			standard	polarized	STF-12	STF-25	STF-50
	SA2/0*-**	SA6/0*-**	SA8/0*-**	SAC/0*-**	SAP/0*-**	SAT/0*-**		
								
nominal sensing distance	150 mm (1)	400 mm (1)	1.000 mm (2)	6 m (3)	3 m (3)	12 mm	25 mm	50 mm
emission	infrared (880 nm)				red (660 nm)			
tolerance	+15...-10 % Sn							
hysteresis	≤ 10 %							
repeatability	5 %							
operating voltage	10...30 Vdc							
ripple	≤ 10 %							
no-load supply current	≤ 30 mA	≤ 35 mA	≤ 30 mA	≤ 35 mA	≤ 30 mA			
load current	≤ 100 mA							
leakage current	≤ 10 µA							
output voltage drop	2 V max. IL = 100 mA							
output type	NPN or PNP, NO/NC selectable							
switching frequency	1 kHz max.							
power on delay	200 ms							
power supply protections	polarity reversal, transient							
output protection	short circuit (autoreset)							
operating temperature range	- 25°C...+ 70°C (without freeze)							
temperature drift	≤ 10 % Sr							
protection degree	IP67 (EN60529) (4)							
EMC	in conformity with the EMC Directive according to EN 60947-5-2							
external light interference	3,000 lux (incandescent lamp), 10,000 lux (sunlight)							
LEDs	yellow (output energized), green (supply), red (activated output)							
housing material	BT (plastic housing),nickel-plated brass (metal housing), nylon (cable exit)							
optic material	PMMA					glass (STF-**)		
tightening torque	1 Nm (plastic housing) / Nm (metal housing)							
weight (approximate)	plastic version: 40 g connector / 75 g cable metallic version: 100 g connector / 140 g cable							

(1) With 100x100 mm white matt paper (2) With 200x200 mm white matt paper (3) With standard reflector Ø 80 mm (RL110 supplied seperately) (4) Protection guaranteed only with plug cable well mounted.

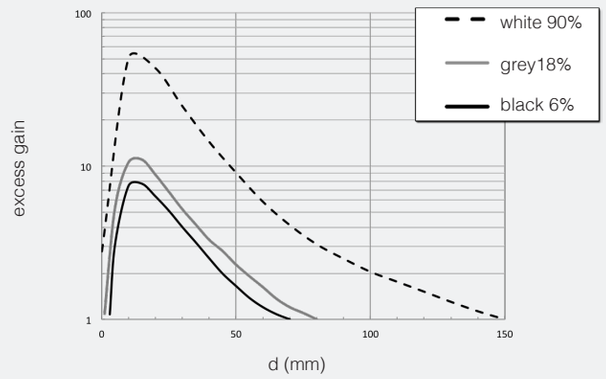
plug

M12


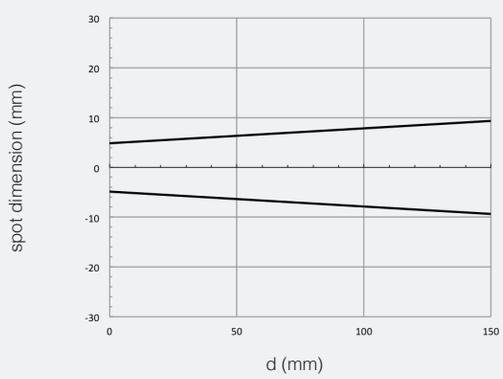
response diagrams

direct diffuse models

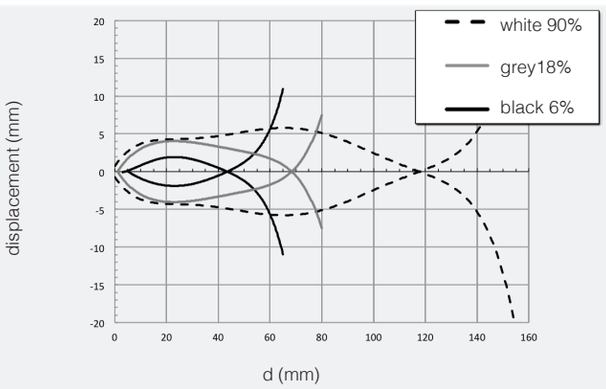
SA2/0*-** excess gain



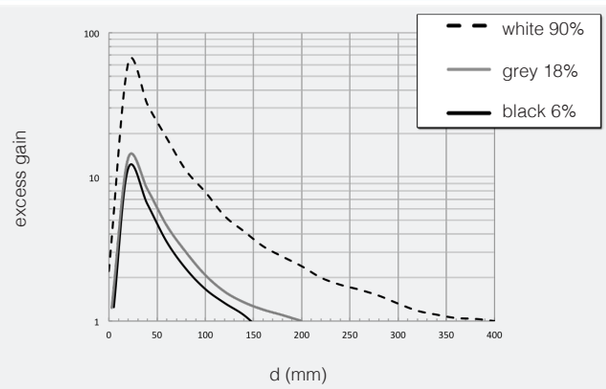
SA2/0*-** spot dimension



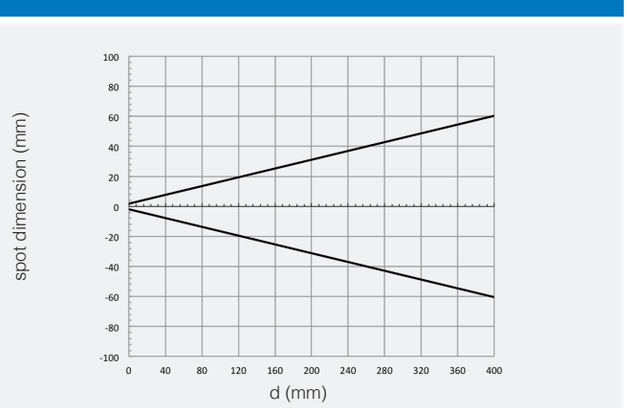
SA2/0*-** parallel displacement



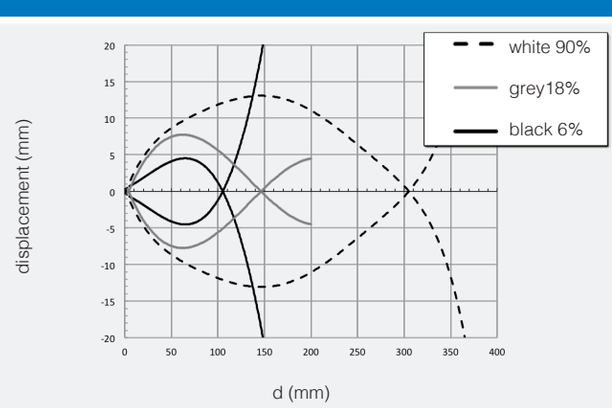
SA6/0*-** excess gain



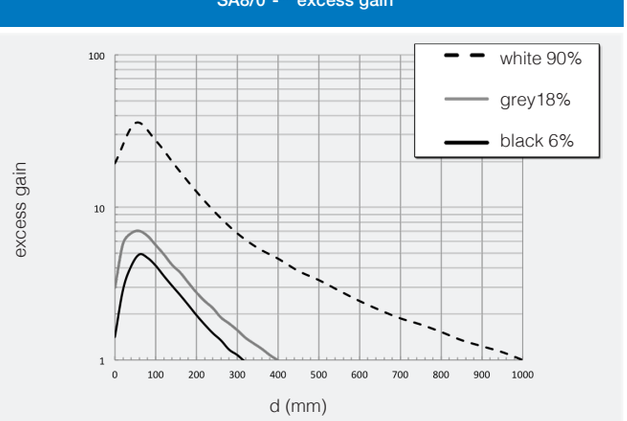
SA6/0*-** spot dimension



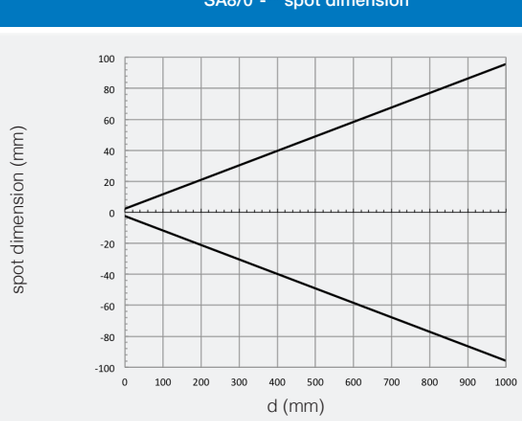
SA6/0*-** parallel displacement



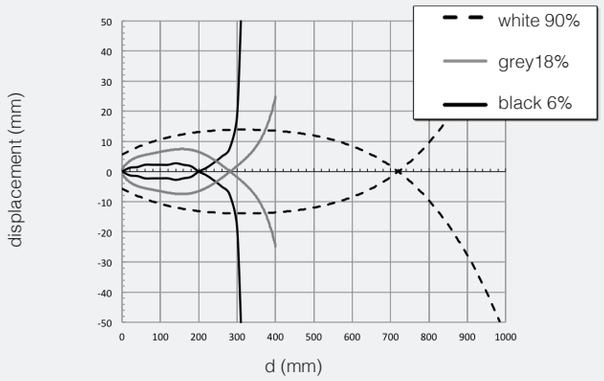
SA8/0*-** excess gain



SA8/0*-** spot dimension



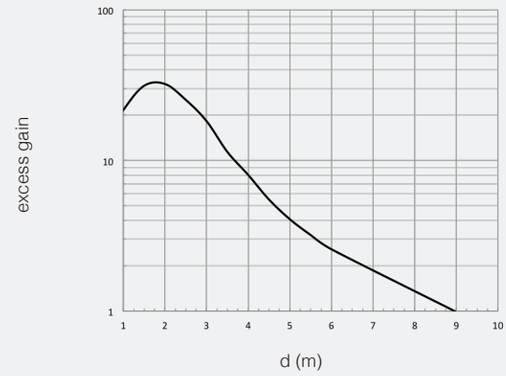
SA8/0*-** parallel displacement



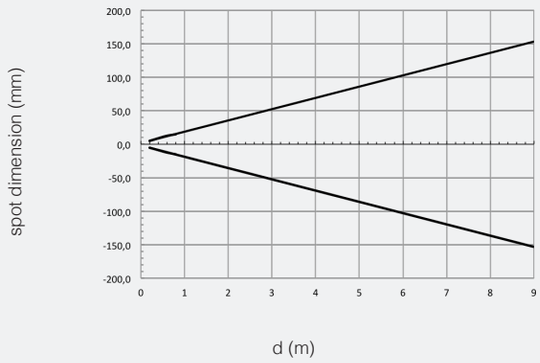
response diagrams

direct diffuse models

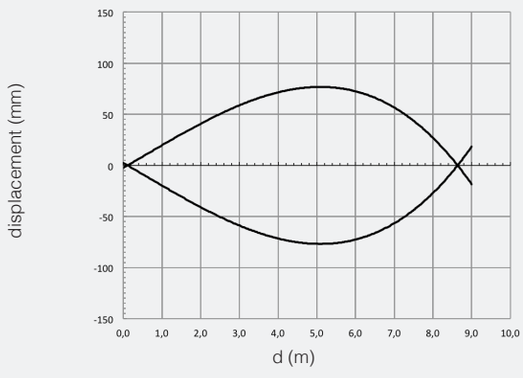
SAC/0*-** excess gain



SAC/0*-** spot dimension



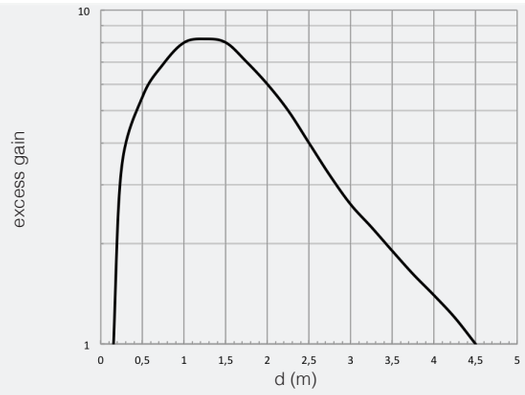
SAC/0*-** parallel displacement



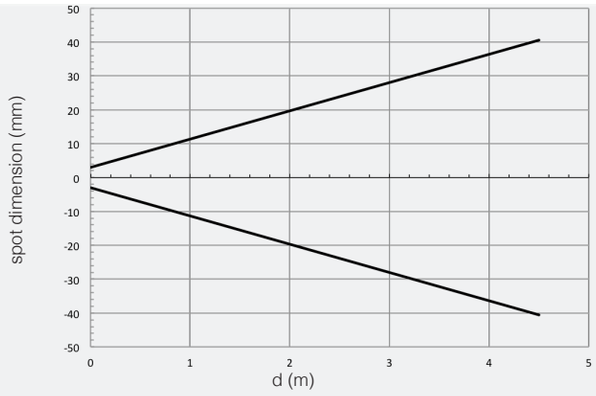
response diagrams

polarized models (diagrams detected with RL110)

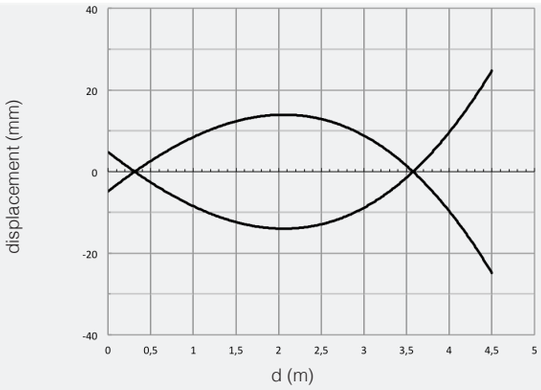
SAP/**-** excess gain



SAP/**-** spot dimension



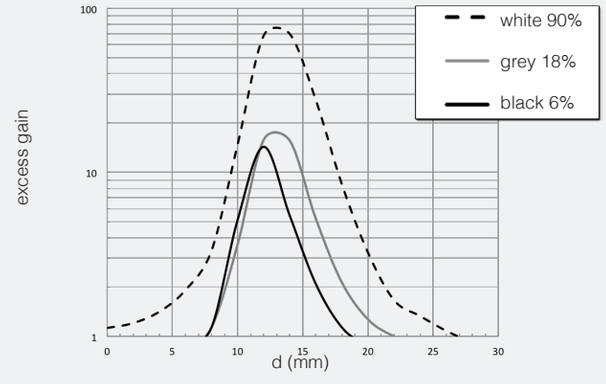
SAP/**-** parallel displacement



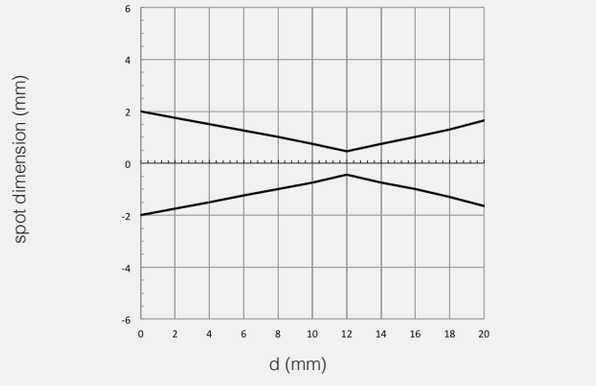
response diagrams

direct diffuse models

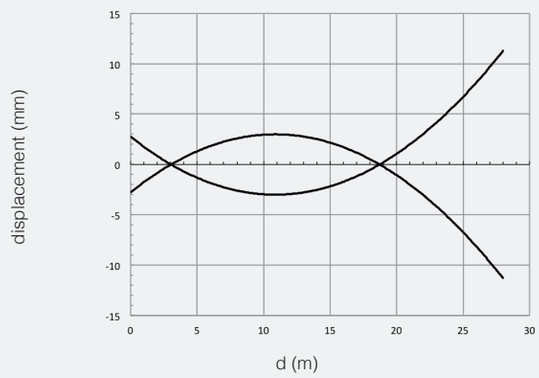
S*T/**-** + STF-50 excess gain



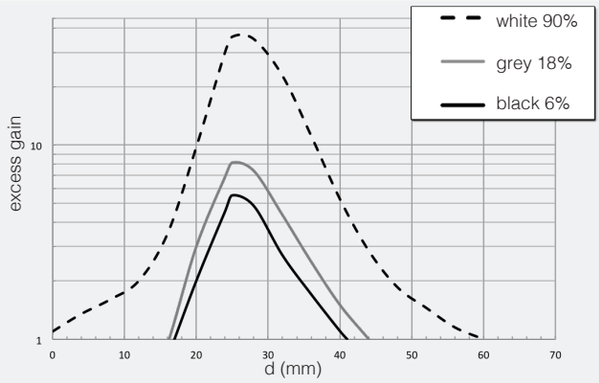
S*T/**-** + STF-50 spot dimension



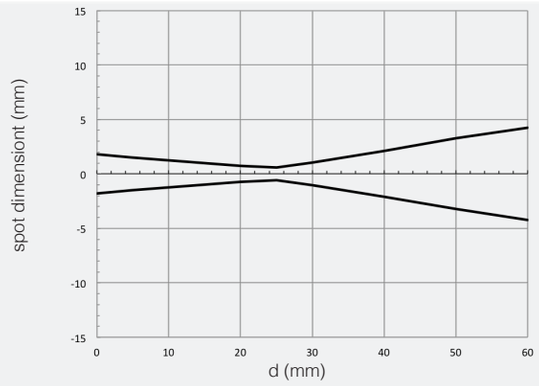
S*T/**-** + STF-50 parallel displacement



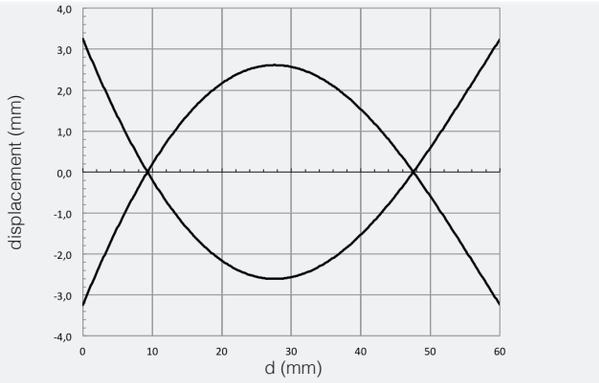
S*T/**-** + STF-50 excess gain



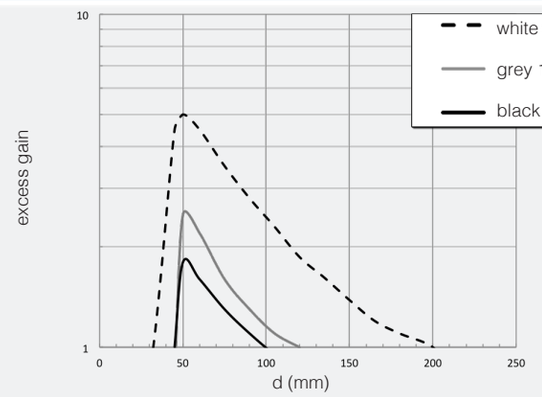
S*T/**-** + STF-50 spot dimension



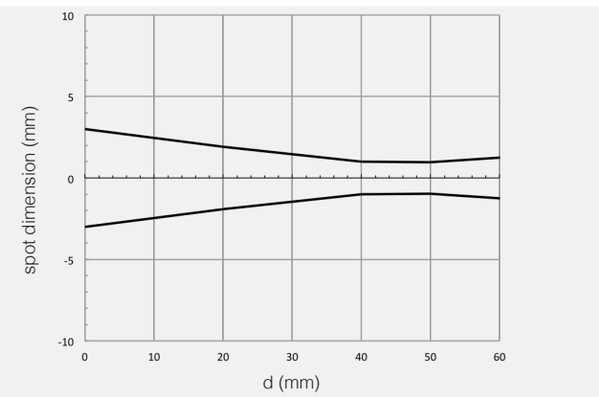
S*T/**-** + STF-50 parallel displacement



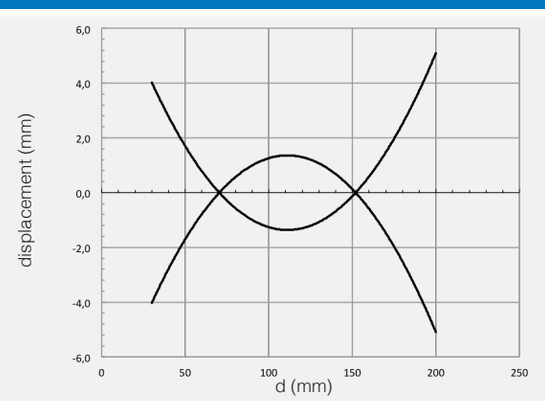
S*T/**-** + STF-50 excess gain



S*T/**-** + STF-50 spot dimension

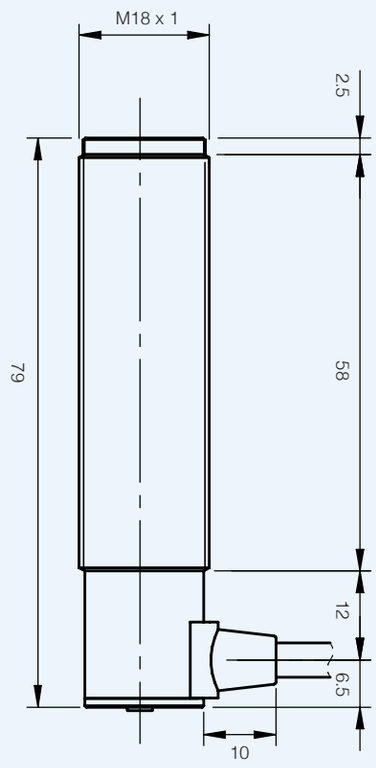


S*T/**-** + STF-50 parallel displacement

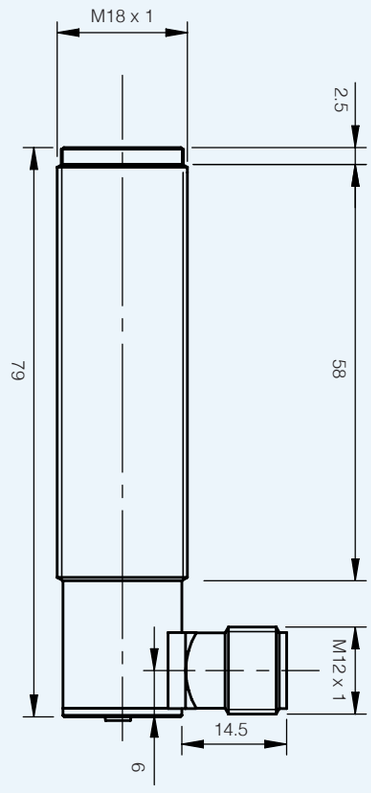


dimensions (mm)

SA*/0*-*C

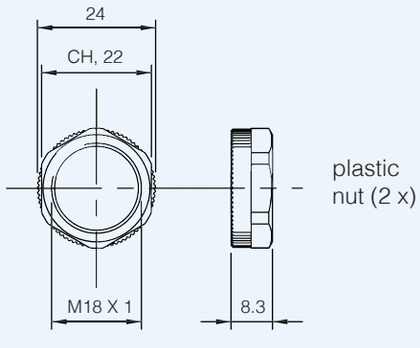


SA*/0*-*K



dimensions (mm)

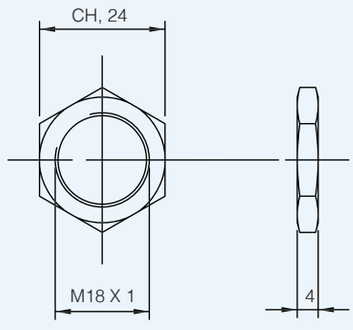
accessories included in all plastic models



plastic
nut (2 x)

dimensions (mm)

accessories included in all metallic models



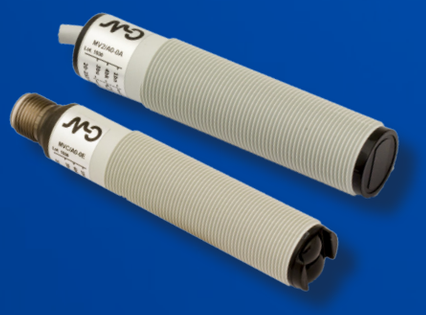
metallic
nut (2 x)

MV series

M18 AC multivoltage output photoelectric sensors

features

- **Wide range of models: diffuse, retro-reflective, polarized, through-beam**
- **Through-beam models with high sensing range**
- **Retro-reflective models with polarized light (with visible beam)**
- **M12 plug cable exit in axial or right angle shape**
- **Low leakage current and high output current**
- **IP67 protection degree**
- **Complete protection against electrical damage**



web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

code description

MV 2 / A 0 - 0 A

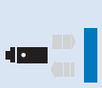
series	MV	M18 multivoltage photoelectric sensor
type	2	100 mm diffuse reflection
	4	200 mm diffuse reflection
	6	400 mm diffuse reflection
	C	4.5 m retro-reflective
	P	3.5 m polarized
	E	Emitter
	R	6 m standard receiver
	D	32 m high distance receiver
output	A	NO output state
	C	Uscita normalmente chiusa NC
	0	Emettitore
AC output	0	Uscita AC
NC output	0	NC output state
cable / plug output	A	Axial cable exit
	E	M12 plug cable exit

available models

M18 multitension photoelectric sensor

function	distance	housing	axial cable exit		M12 plug exit	
			3 wires N0	3 wires NC	3 wires N0	3 wires NC
diffuse reflection	100 mm	plastic	MV2/A0-0A	MV2/C0-0A	MV2/A0-0E	MV2/C0-0E
	200 mm		MV4/A0-0A	MV4/C0-0A	MV4/A0-0E	MV4/C0-0E
	400 mm		MV6/A0-0A	MV6/C0-0A	MV6/A0-0E	MV6/C0-0E
retro-reflective	4.5 m		MVC/A0-0A	MVC/C0-0A	MVC/A0-0E	MVC/C0-0E
polarized	3.5 m		MVP/A0-0A	MVP/C0-0A	MVP/A0-0E	MVP/C0-0E
through-beam	16 / 32 m		MVE/00-0A		MVE/00-0E	
	16 m		MVR/A0-0A	MVR/C0-0A	MVR/A0-0E	MVR/C0-0E
	32 m		MVD/A0-0A	MVD/C0-0A	MVD/A0-0E	MVD/C0-0E

technical specification

	diffuse reflection			retro-reflective	
	standard				polarized
	MV2/*0-0*	MV4/*0-0*	MV6/*0-0*	MVC/*0-0*	MVP/*0-0*
					
nominal sensing distance	100 mm (1)	200 mm (1)	400 mm (2)	4.5 m (3)	3.5 m (3)
emission	infrared (880 nm)				red (660 nm)
tollerance	+15...-5 % Sn				
hysteresis	≤ 10 %				
repeatability	5 %				
operating voltage	20...253 Vac / 50...60 Hz				
ripple	≤ 10 %				
no-load supply current	≤ 30 mA_{RMS}				
load current	5...300 mA_{RMS} (Ta = 50°C)				
inrush current	6 A (Ton = 10 ms)				
leakage current	1.5 mA_{RMS} max. (Voltaggio = 250 Vac)				
voltage drop	3 V max. IL = 300 mA				
output type	TRIAC				
switching frequency	25 Hz				
power on delay	200 ms				
temperature range	- 25°C...+ 70°C (without freeze)				- 25°C...+ 60°C
temperature drift	≤ 10 % Sr				
protection degree	IP67 (EN60529) (4)				
EMC	in conformity with the EMC Directive according to EN 60947-5-2				
external light interference	3,000 lux (incandescent lamp), 10,000 lux (sunlight)				
LEDs	red				
housing material	PBT (plastic housing) / polycarbonate (cable exit)				
lenses material	PMMA				
tightening torque	1 Nm				
weight (approximate)	30 g connector / 100 g cable				

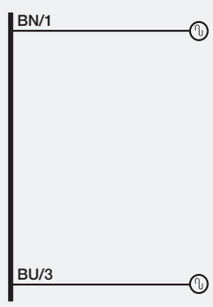
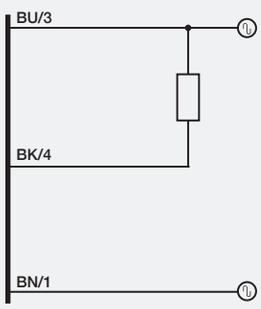
(1) With 100x100 mm white matt paper (2) With 200x200 mm white matt paper (3) With standard reflector Ø80 mm (RL110 supplied seperately) (4) Protection guaranteed only with plug cable well mounted

technical specification

	through-beam	
	standard	high distance
	M*E/00-0* + M*R/*0-0*	M*E/00-0* + M*D/*0-0*
nominal sensing distance	16 m	32 m
emission	infrared (880 nm)	
minimum detectable object	Ø 7,5 mm	
tollerance	see Sr (glossary)	
hysteresis	≤ 10 %	
repeatability	5 %	
operating voltage	20...253 Vac / 50...60 Hz	
no-load supply current	≤ 30 mA_{RMS} (emitter), 15 mA_{RMS} (receiver)	
load current	5...300 mA_{RMS} (Ta = 50°C)	
inrush current	6 A (Ton = 10 ms)	
leakage current	1,5 mA_{RMS} max. (Voltaggio = 250 Vac)	
voltage drop	3 V max. IL = 300 mA	
output type	TRIAC	
switching frequency	25 Hz	
power on delay	200 ms	
temperature range	- 25°C...+ 70°C (without freeze)	
temperature drift	≤ 10 % Sr	
protection degree	IP67 (EN60529) (1)	
EMC	in conformity with the EMC Directive according to EN 60947-5-2	
external light interference	3,000 lux (incandescent lamp), 10,000 lux (sunlight)	
LEDs	red (output energized)	
housing material	PBT (plastic) / polycarbonate (cable exit)	
lenses material	PMMA	
tightening torque	1 Nm	
weight (approximate)	30 g plug / 100 g cable	

(1) Protection guaranteed only with plug cable well mounted

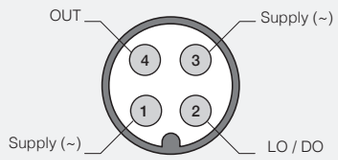
electrical diagrams of the connections

emitter	AC exit
	

BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

plug

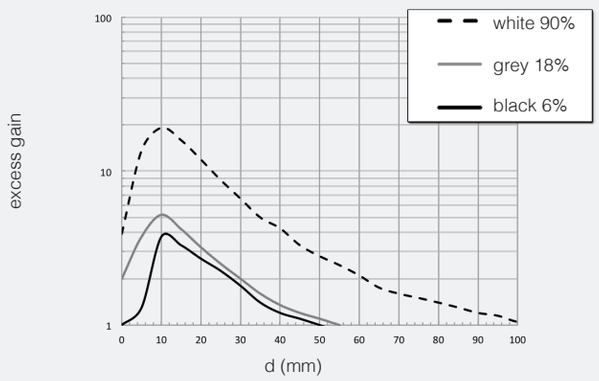
MQ background suppression



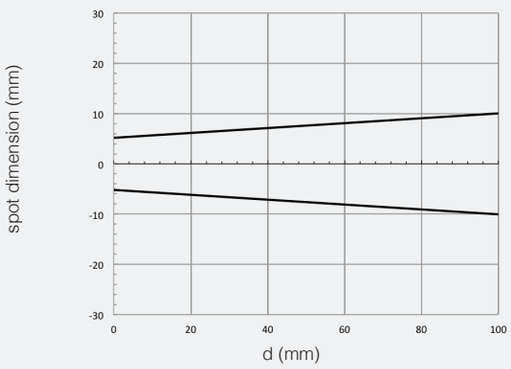
response diagrams

diffuse reflection models

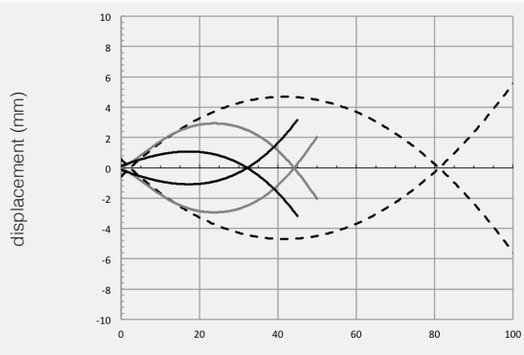
MV2/00-** excess gain



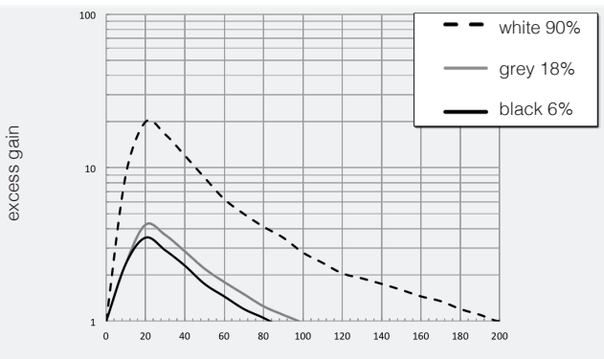
MV2/00-** spot dimension



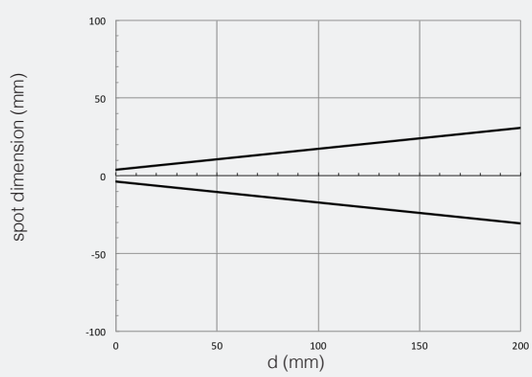
MV2/00-** parallel displacement



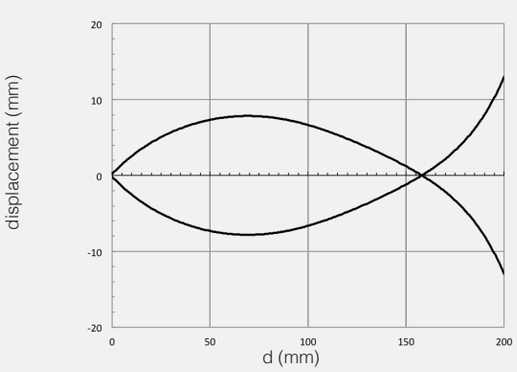
MV4/00-** excess gain



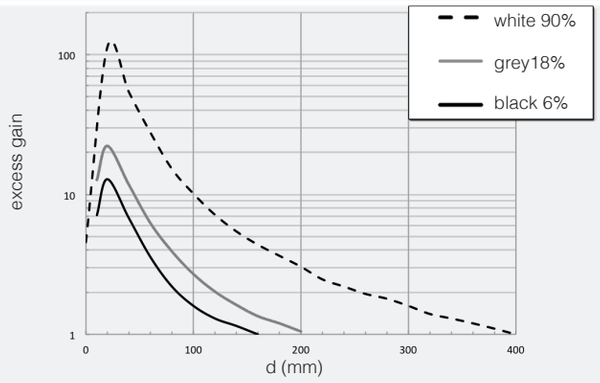
MV4/00-** spot dimension



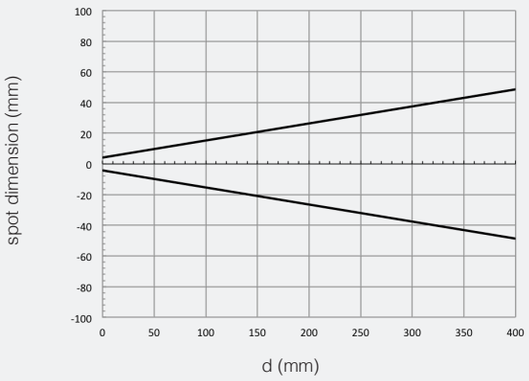
MV4/00-** parallel displacement



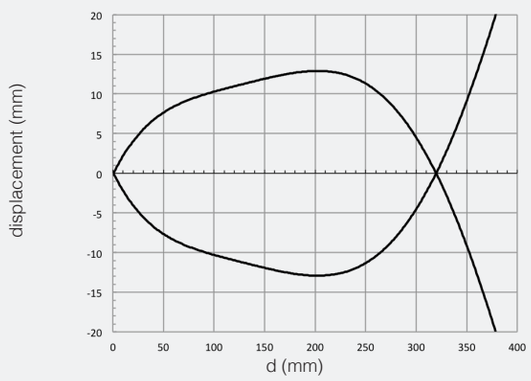
MV6/0*-** excess gain



MV6/0*-** spot dimension



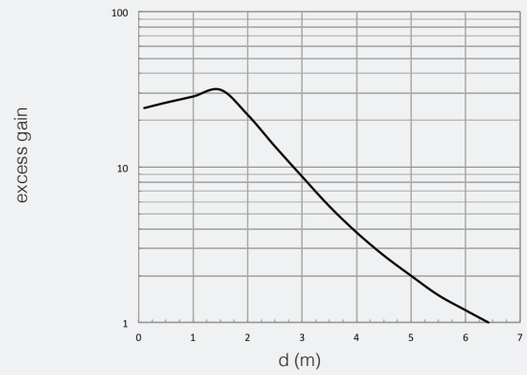
MV6/0*-** parallel displacement



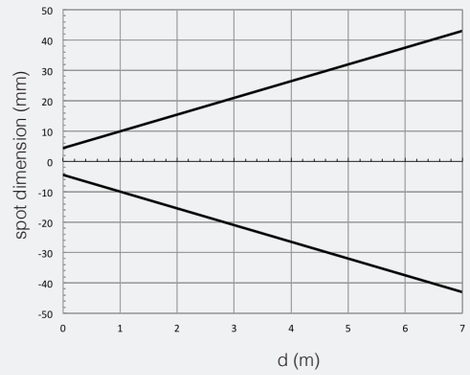
response diagrams

retro-reflective models (diagrams detected using RL110)

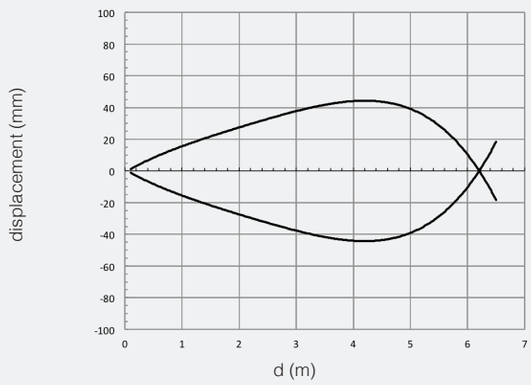
MVC/**-** excess gain



MVC/**-** spot dimension



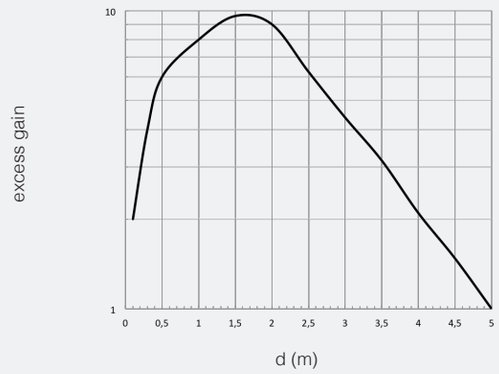
MVC/**-** parallel displacement



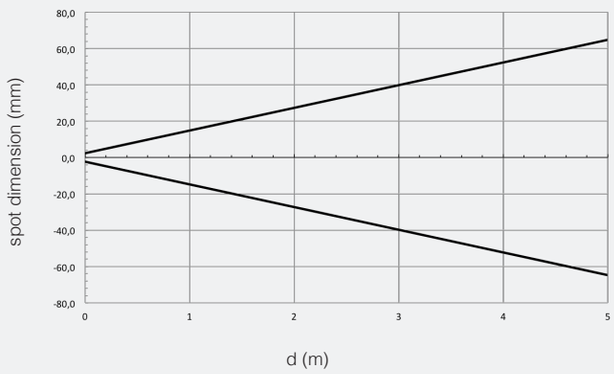
response diagrams

polarized models

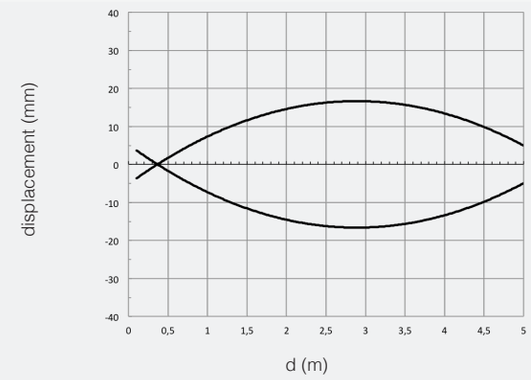
MVP/**-** excess gain



MVP/**-** spot dimension



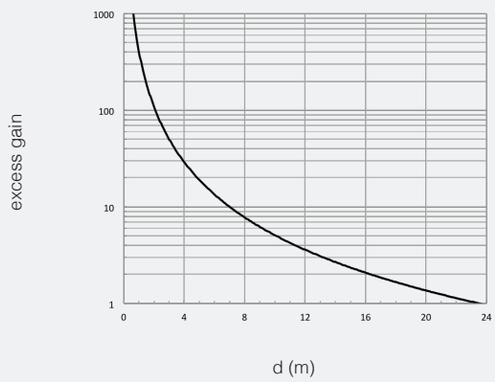
MVP/**-** parallel displacement



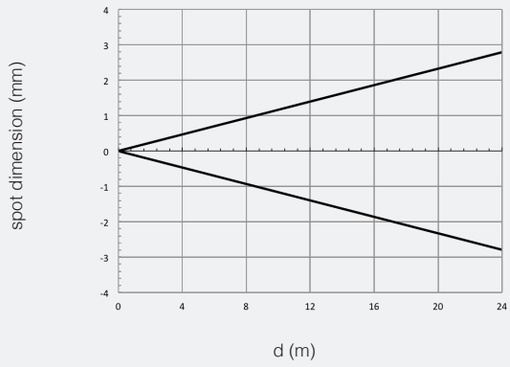
response diagrams

through-beam models

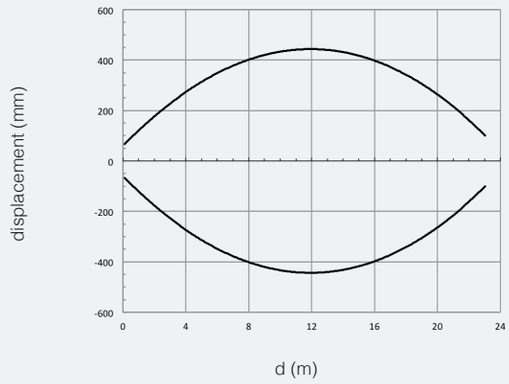
MVE/**-** - MVR/**-** excess gain



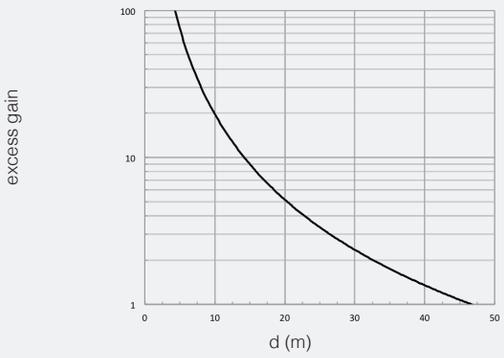
MVE/**-** - MVR/**-** spot dimension



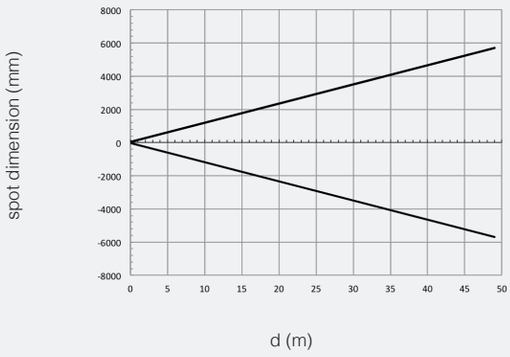
MVE/**-** - MVR/**-** parallel displacement



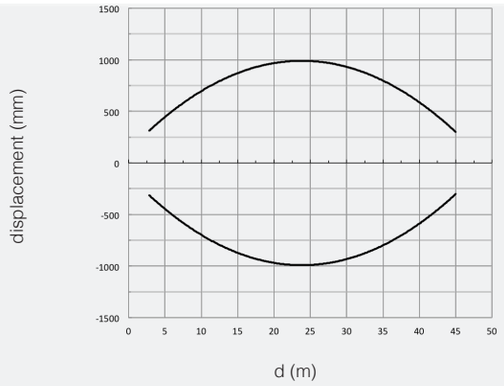
MVE/**-** - MVD/**-** excess gain



MVE/**-** - MVD/**-** spot dimension

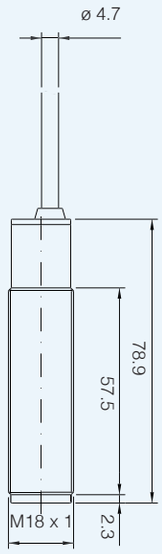
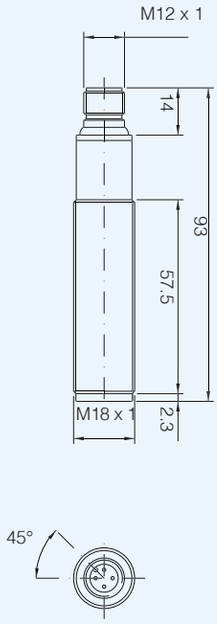


MVE/**-** - MVD/**-** parallel displacement



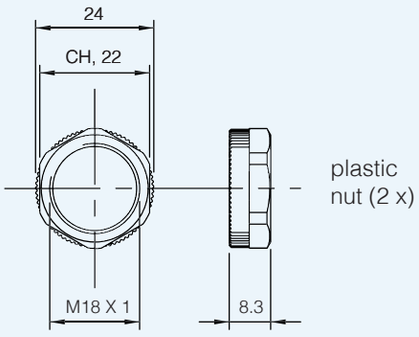
dimensions (mm)

axial models

MV*/*0-*A	MV*/*0-*E
	

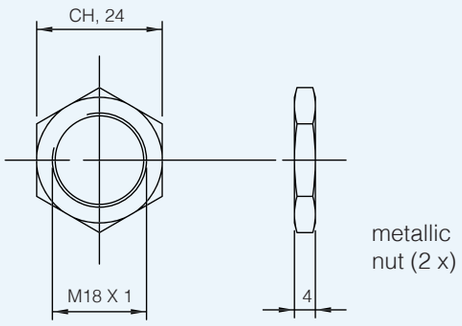
dimensions (mm)

accessories included in all plastic models



dimensions (mm)

accessories included in all metallic models



MQ0 / MQ1series

M18 with fixed distances background suppression and 90° optics

features

- **Models with 50 mm or 100 mm max reading distance**
- **M12 plug connection**
- **Plastic housing**
- **Supply voltage 20...253 Vac**
- **LED output status indicator**
- **IP67 protection degree**

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

code description

MQ 0 / 0 0 - 0 E

series	MQ	M18 photoelectric sensor AC with 90° optic
type	0	50 mm background suppression without sens. Ad just.
	1	100 mm background suppression without sens. Ad just.
4 wires	0	4 wires Light ON- Dark ON selectable
AC output	0	AC output
housing	0	Plastic housing
output	E	Axial M12 plastic connector output

available models

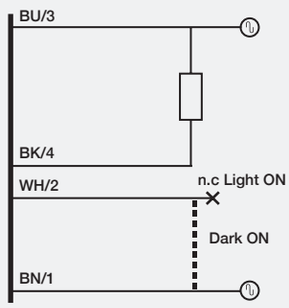
function	sensing distance (mm)	housing	cable axial exit
background suppression	50	plastic	MQ0/00-0E
	100		MQ1/00-0E

technical specifications

	MQ0/00-0E	MQ1/00-0E
		
nominal sensing distance	50 mm	100 mm
tolerance	+ 15 / 0 % di Sn	
emission	infrared (880 mm)	
hysteresis	≤ 1.5 % (white paper)	
repeatability	5 %	
supply voltage	20...253 Vac / 50 - 60 Hz	
no-load supply current	40 mA_{RMS}	
load current	5...300 mA_{RMS}	
inrush current	64 (Ton=10 ms)	
leakage current	≤ 1.5 mA_{RMS} (@ 250 Vca)	
output voltage drop	3 V max @ IL 300 mA	
output type	TRIAC	
switching frequency	25 Hz	
power on delay	200 ms	
power supply protections	impulsive over voltage	
operating temperature range	- 25°C...+ 70°C (without freeze)	
storage temperature	- 55°C...+80°C	
external light interference	3,000 lux (incandescence lamp), 10,000 lux (sunlight)	
temperature drift	≤ 10 % Sr	
EMC	according to EN50082-2; EN60947-5-2; EN50081-1	
LED indicator	yellow (light output status)	
protection degree	IP67 (EN60529)	
plug exit	M12 4 poli; Male	
housing material	PBT (barrel), PC (plug)	
optic material	PMMA	
tightening torque	1 Nm	
weight (approximate)	30 gr	

electrical diagrams of the connections

MQ background suppression

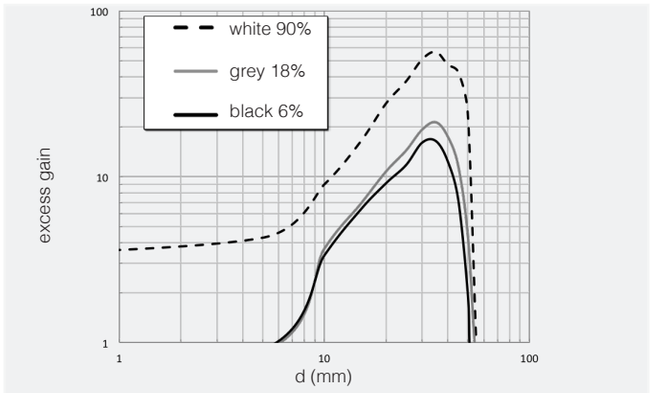


BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

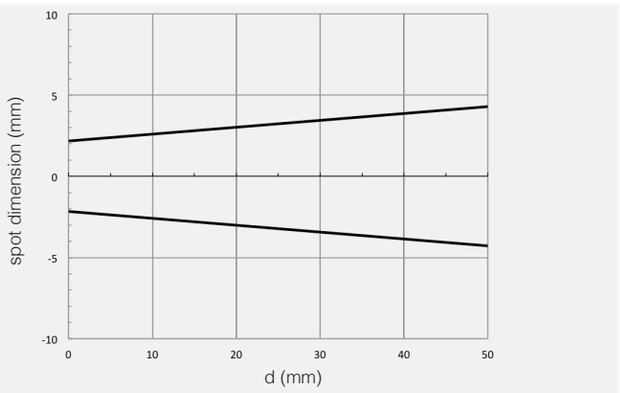
response diagrams

background suppression models

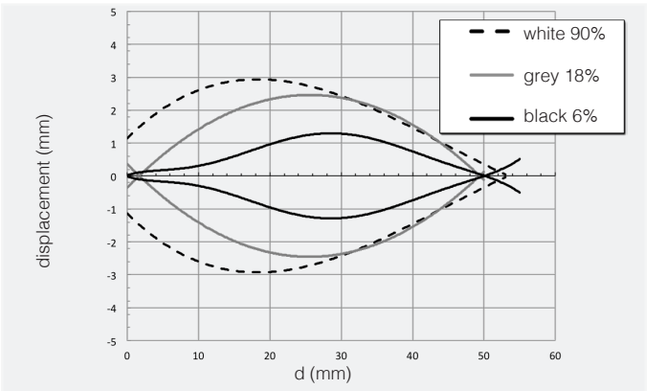
M*0/**-** excess gain



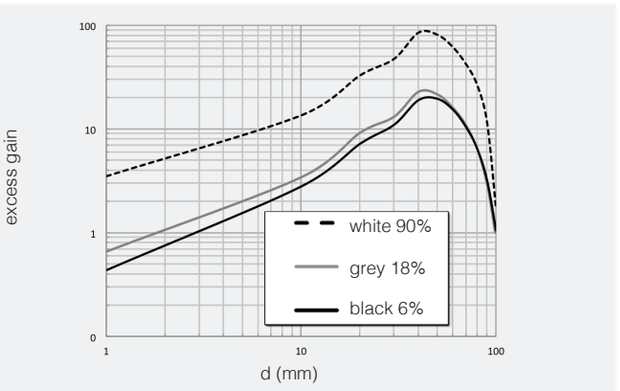
M*0/**-** spot dimension



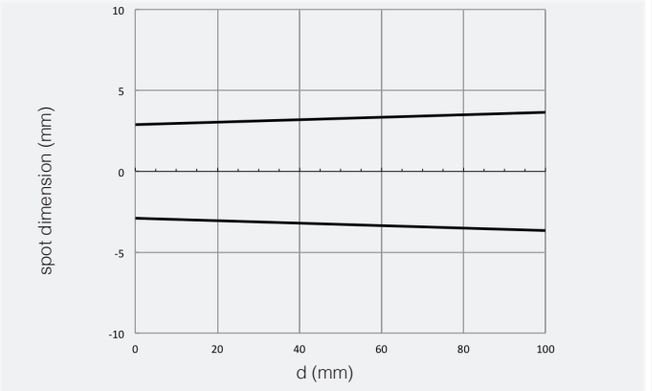
M*0/**-** parallel displacement



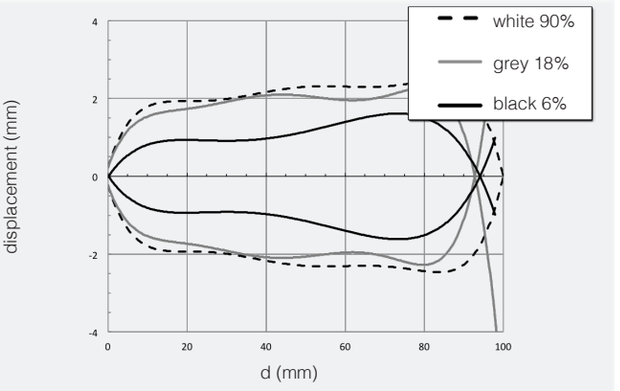
M*1/**-** excess gain



M*1/**-** spot dimension

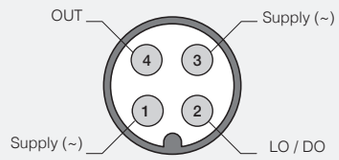


M*1/**-** parallel displacement



plug

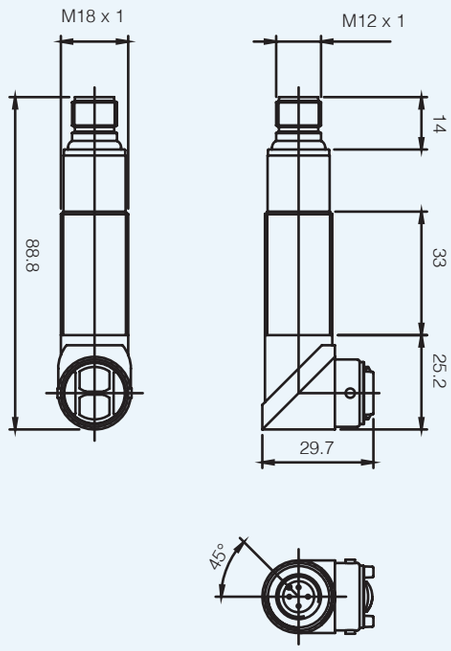
MQ background suppression



LO = Light ON
DO = Dark ON

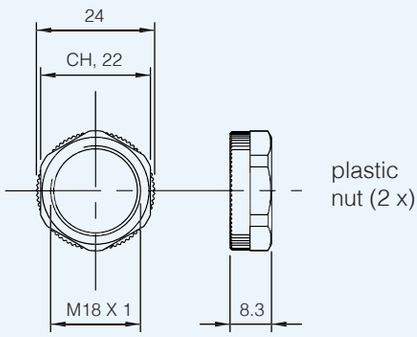
dimensions (mm)

MQ0/00-0E; MQ1/00-0E



dimensions (mm)

accessories included in all plastic models



FQ series

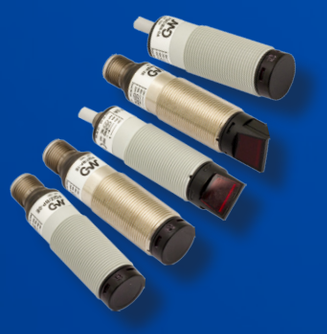
M18 photoelectric sensors
with short body

features

- **Wide range of models: direct diffuse, retro-reflective, polarized and fixed-focus**
- **Direct diffuse models with short and long sensing distance, polarized and through beam**
- **Nickel brass or plastic housing**
- **NO+NC complementary output**
- **P67 protection degree**
- **Complete protection against electrical damages**
- **Approvals: CE**

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**



code description

FQ I 7 / B P - 0 E

series	FQ	M18 photoelectric sensors with short body
emission	I	Infrared emission
	R	Visible red light emission
type	2	100 mm direct diffuse without sens. adj.
	3	100 mm direct diffuse with sens. adj.
	7	400 mm direct. diffuse with sens. adj.
	8	Direct reflection: 1200 mm (axial), 1000 mm (90°) with adj.
	C	6 m retro-reflective
	N	4.5 m retro-reflective with adj.
	L	Retroreflective for transparent objects 1.5 m
	H	Emitter without sens. adj.
	Z	20 m Receiver without sens. adj.
housing	0	Emitter without check
	B	Complementary output NO+NC
output logic	0	Emitter
	P	PNP output
	N	NPN output
housing material	0	Plastic housing, axial optic
	1	Metal housing, axial optic
	2	Plastic housing, right angle optic
	3	Metal housing, right angle optic
cable / plug output	E	M12 plastic plug cable exit
	A	2 m axial cable exit

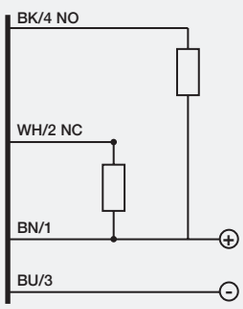
available models

function	distance	adjustment	output	housing	axial models		right angle models	
					PNP NO + NC	NPN NO + NC	PNP NO + NC	NPN NO + NC
direct diffuse	100 mm	•	cable	plastic	FQR2/BP-0A	-	-	-
			M12 plug		FQR3/BP-0E	-	-	-
	400 mm		cable		FQI7/BP-0E	-	-	-
			M12 plug		FQI7/BP-1A	-	-	-
			cable	metal	FQI7/BP-1E	-	-	-
			M12 plug		-	FQI7/BP-1A	-	-
	1,200 mm (A) 1,000 mm (R)		cable	plastic	-	FQI8/BN-0A	-	-
			M12 plug		FQI8/BP-0E	FQI8/BN-0E	FQI8/BP-2E	-
			cable	metal	FQI8/BP-1A	-	-	-
retro-reflective	6 m		cable	plastic	FQIC/BP-0A	FQIC/BN-0A	FQIC/BP-2A	FQIC/BN-2A
			M12 plug		FQIC/BP-0E	-	-	-
polarized	4.5 m		cable		FQRN/BP-0A	-	FQRN/BP-2A	-
			M12 plug		FQRN/BP-0E	-	FQRN/BP-2E	-
			M12 plug	metal	FQRN/BP-1E	-	FQRN/BP-3E	
for trasparent objects detection	1.5 m		cable	plastic	-	-	FQRL/BP-2A	-
			M12 plug		FQRL/BP-0E	-	FQRL/BP-2E	-
			M12 plug	metal	FQRL/BP-1E	-	-	-
emitter	20 m	-	cable	plastic	FQIH/00-0A	-	-	-
			M12 plug		FQIH/00-0E	-	FQIH/00-2E	-
			M12 plug	metal	FQIH/00-1E	-	-	-
receiver			cable	plastic	FQIZ/BP-0A	-	-	-
			M12 plug		FQIZ/BP-0E	-	FQIZ/BP-2E	
			M12 plug	metal	FQIZ/BP-1E	-	-	-

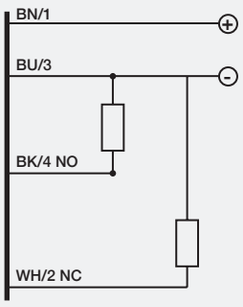
electric diagrams of the connections

NO + NC complementary exit

NPN



PNP



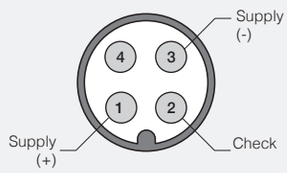
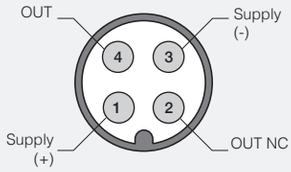
BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

tecnical specification

	direct diffuse				retroreflective	polarized	for transpa-rent objects	through beam	
	FQR2	FQR3	FQI7	FQI8	FQIC	FQRN	FQRL [2]	FQIZ	FQIH
nominal sensing distance	100 mm		400 mm	1,2 m 1 m (90°)	6 m 4 m (90°)	4.5 m 3 m (90°)	0.1...1.5 m	20 m 2 m (90°)	
emission	red (660 nm)		infrared (880 nm)			red (660 nm)		infrared (880 nm)	
diffential travel	≤ 10 %								
repeatability	≤ 5 %								
operating voltage	10...30 Vcc								
ripple	≤ 10 %								
no-load supply current	≤ 30 mA								
load current	≤ 50 mA								
leakage current	≤ 10 µA								
output voltage drop	2 V max. @ IL = 50 mA								
output type	NPN or PNP NO + NC								
switching frequency	250 Hz								
power on delay	≤ 200 ms								
operating temperature range	- 25°C...+ 70°C (without freeze)								
power supply protections	polarity reversal, impulsive overvoltage								
output electrical protection	short circuit (autoreset), overvoltage								
temperature drift	≤ 10 % Sr								
protection degree	IP67 (EN60529) [1]								
EMC	in conformity with the EMC Directive according to EN 60947-5-2								
interference by external light	5,000 lux (incandescent lamp), 10,000 lux (sunlight)								
LEDs	yellow (Light status)rosso (uscita attivata)								
housing material	PBT (plastic model) /nicked plated brass (metallic model) / PC (cable exit)								
optic material	PC/PMMA								
tightening torque	1 Nm (plastic), 35 Nm (metallic)								
weight (approx)	20 g plug (40 g metallic version) / 60 g cable								

[1] Protection guaranteed only with plug cable well mounted [2] With RL 113G or RL 116

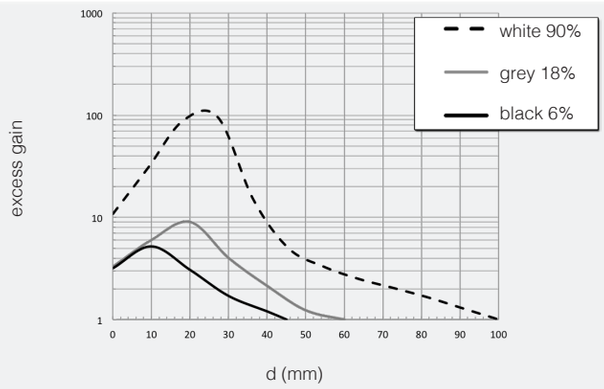
plug

emitter	complementary exit
	

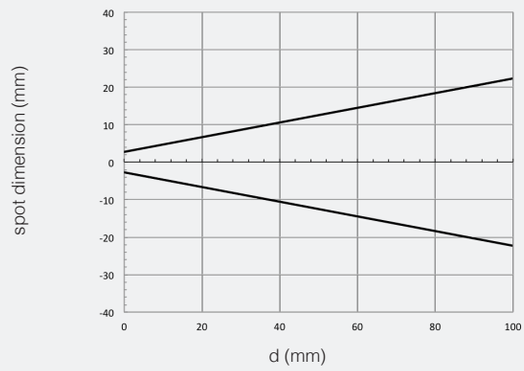
response diagrams

background suppression models

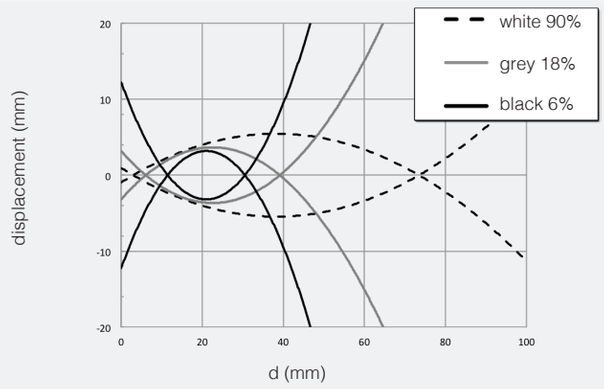
FQR2/FQR3 excess gain



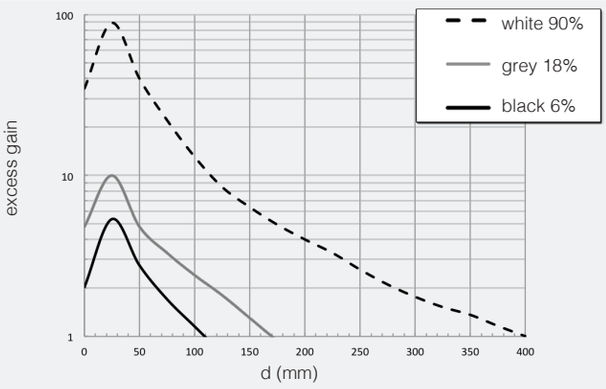
FQR2/FQR3 spot dimension



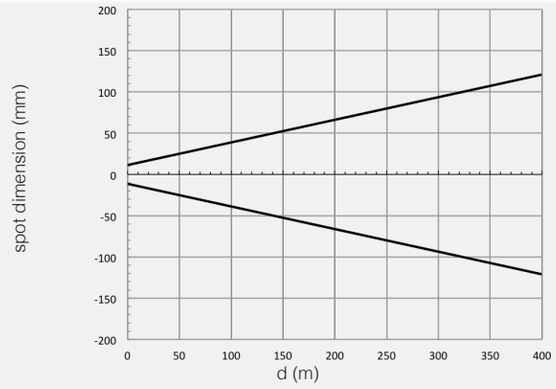
FQR2/FQR3 parallel displacement



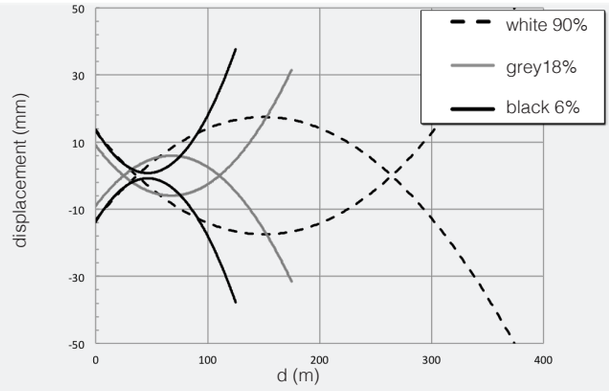
FQI7/B*-** excess gain



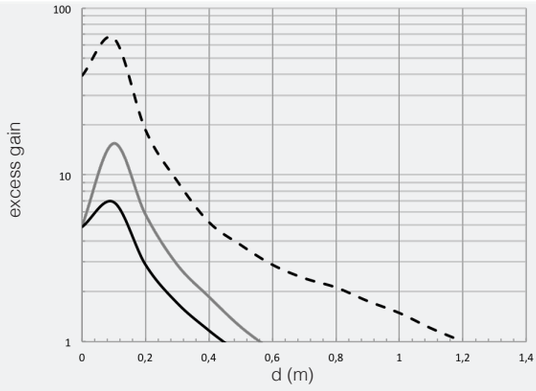
FQI7/B*-** spot dimension



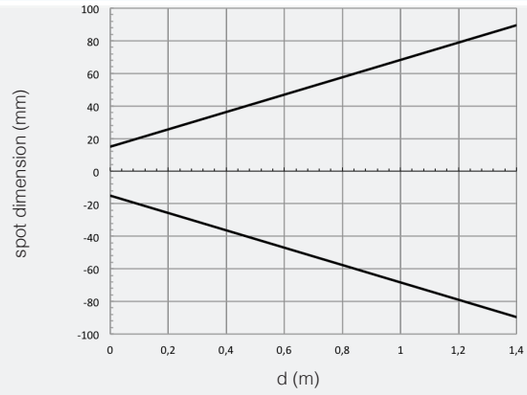
FQI7/B*-** parallel displacement



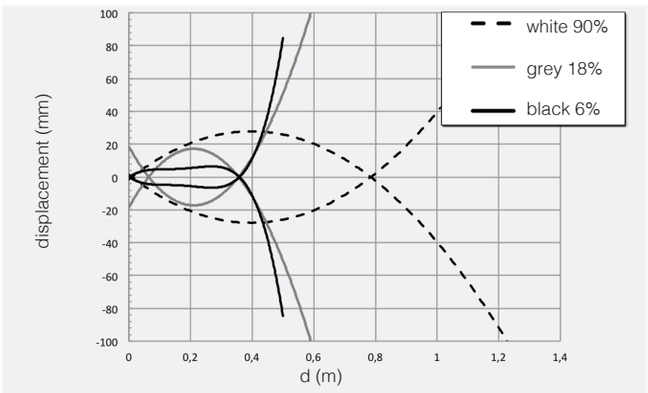
FQI8/B*-(0,1)* excess gain



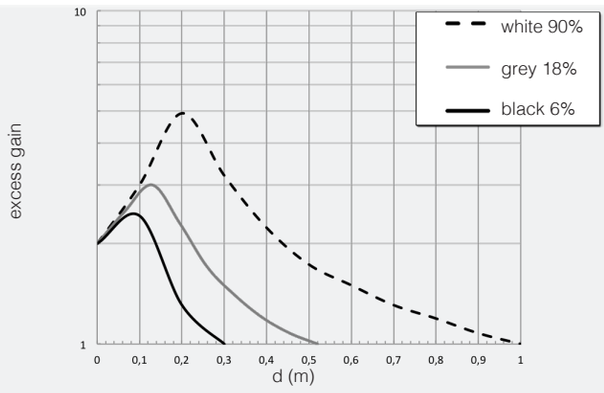
FQI8/B*-(0,1)* spot dimension



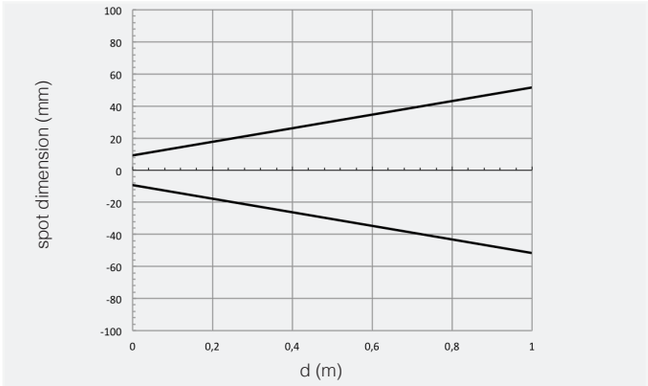
FQI8/B*-(0,1)* parallel displacement



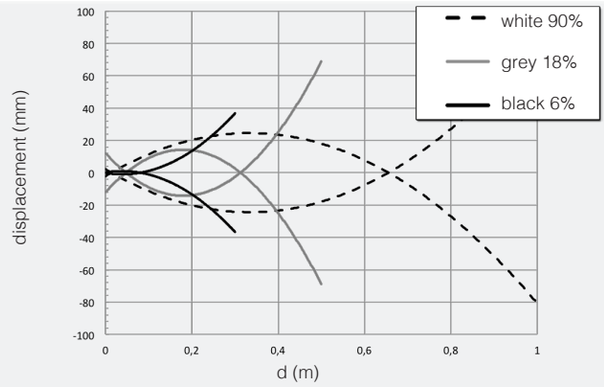
FQI8/B*-(2,3)* excess gain



FQI8/B*-(2,3)* spot dimension



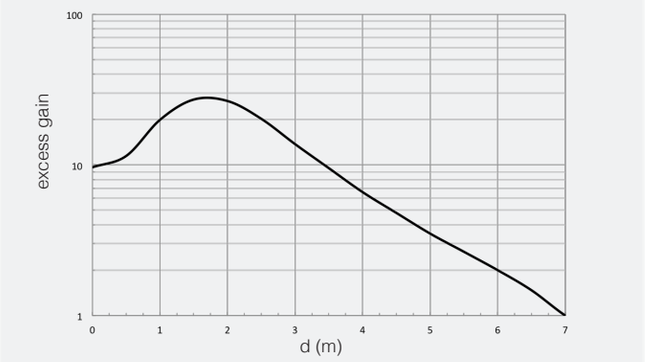
FQI8/B*-(2,3)* parallel displacement



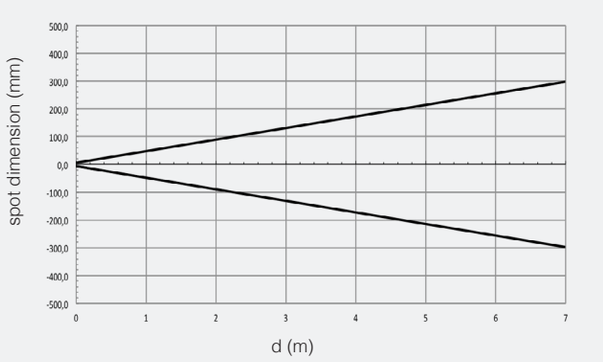
response diagrams

retro-reflective models (diagrams detected using RL110)

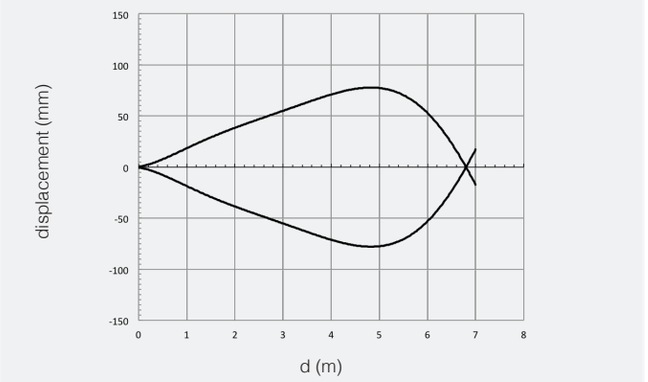
FQIC/B*-(0,1)* excess gain



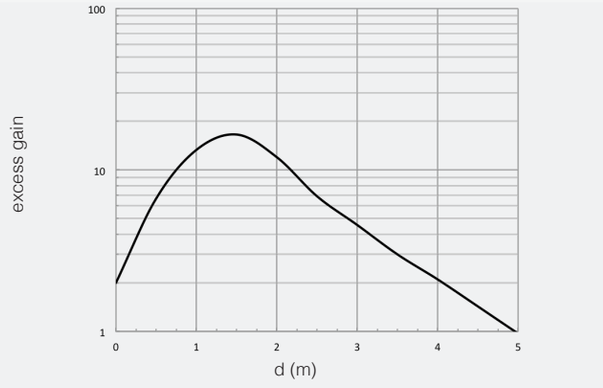
FQIC/B*-(0,1)* spot dimension



FQIC/B*-(0,1)* parallel displacement



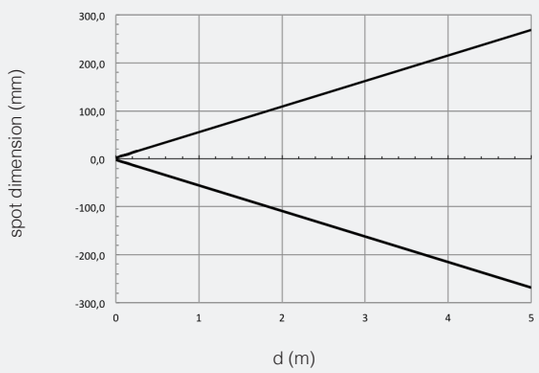
FQIC/B*-(2,3)* excess gain



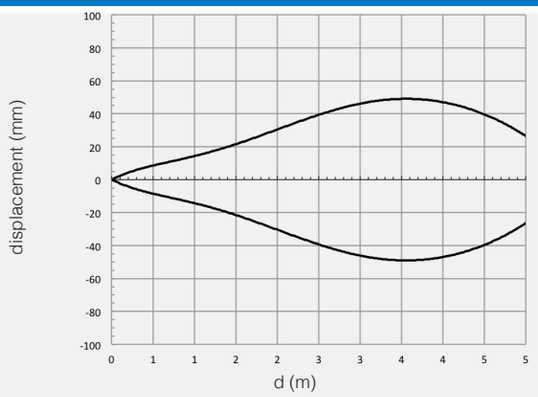
response diagrams

retro-reflective models

FQIC/B*-(2,3)* spot dimension



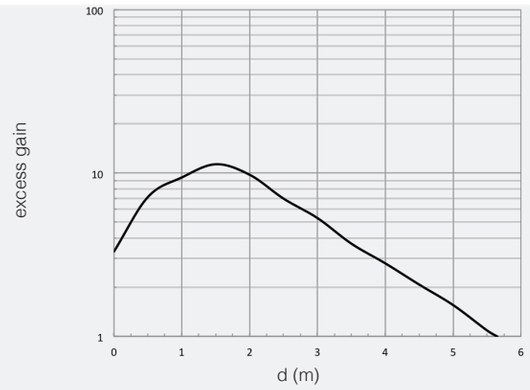
FQIC/B*-(2,3)* parallel displacement



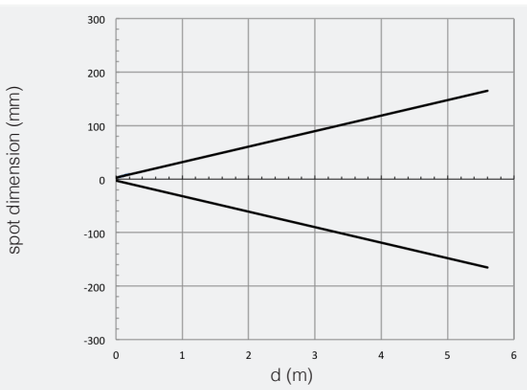
response diagrams

polarized models (diagrams detected using RL110)

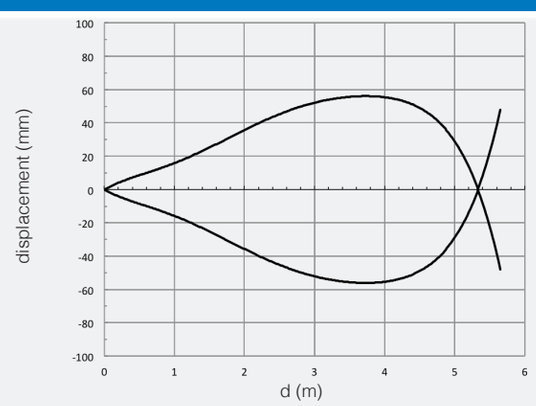
FQRN/B*-(0,1)* excess gain



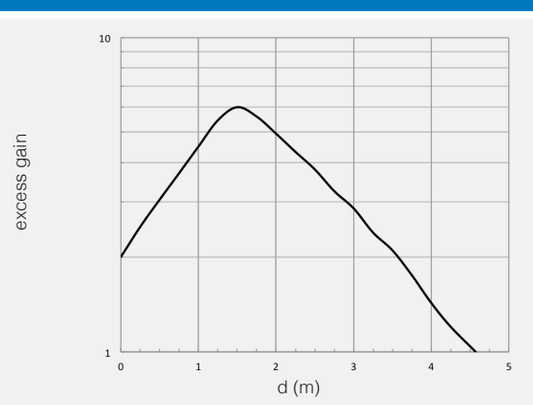
FQRN/B*-(0,1)* spot dimension



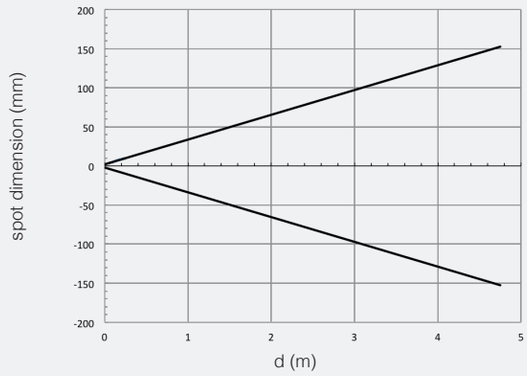
FQRN/B*-(0,1)* parallel displacement



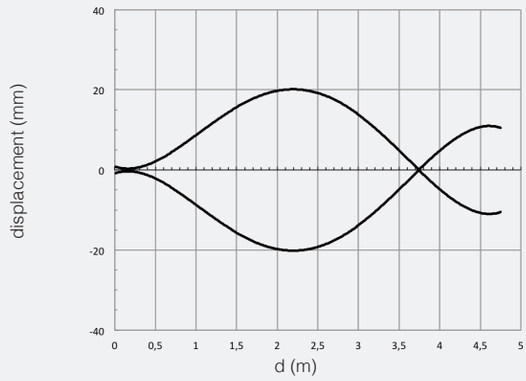
FQRN/B*-(2,3)* excess gain



FQRN/B*-(2,3)* spot dimension



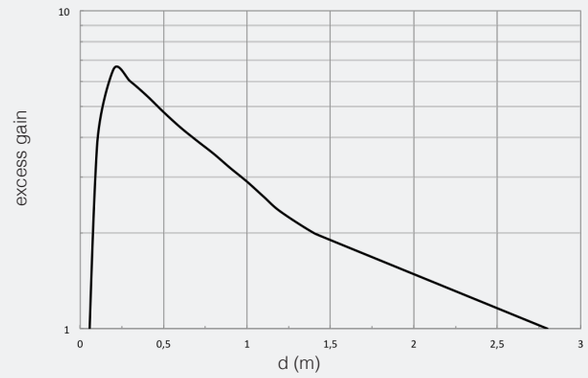
FQRN/B*-(2,3)* parallel displacement



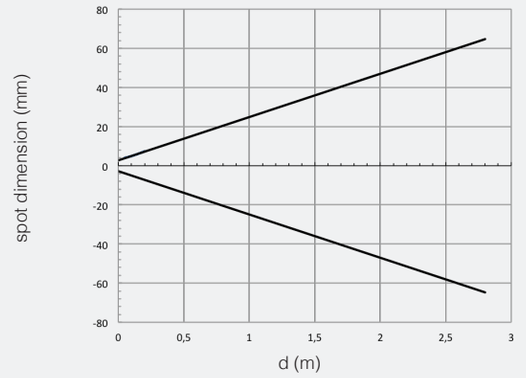
response diagrams

for transparent objects models (diagrams detected using RL110)

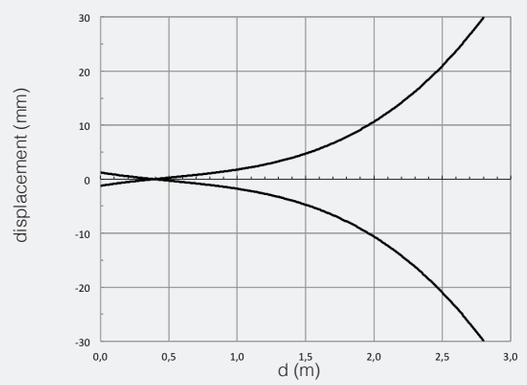
FQRL/B*-(0,1)* excess gain



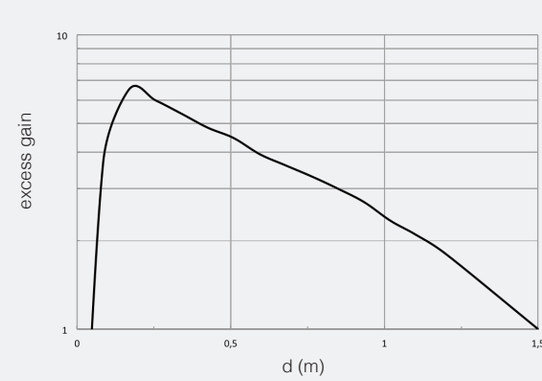
FQRL/B*-(0,1)* spot dimension



FQRL/B*-(0,1)* parallel displacement



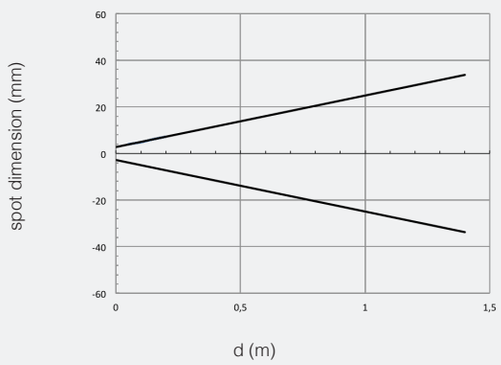
FQRL/B*-(2,3)* excess gain



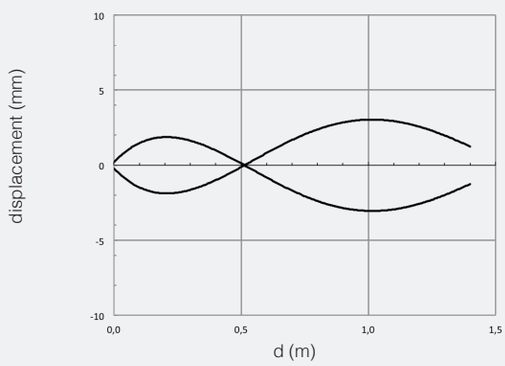
response diagrams

transparent models

FQRL/B*-(2,3)* spot dimension



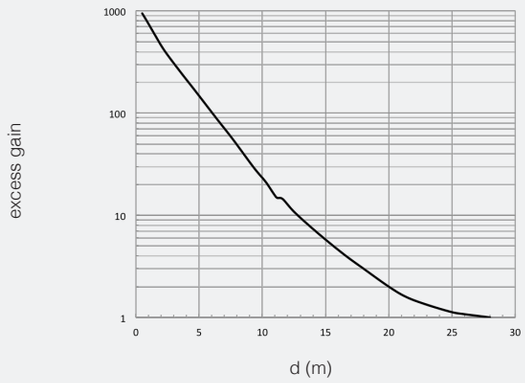
FQRL/B*-(2,3)* parallel displacement



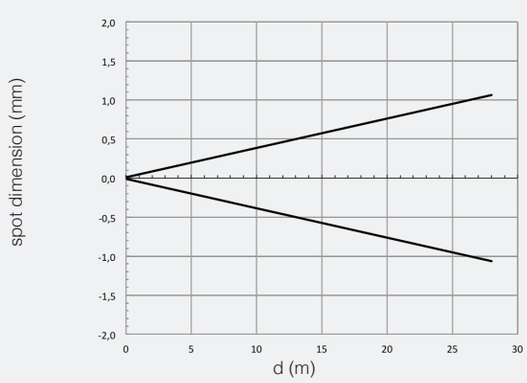
response diagrams

through-beam models

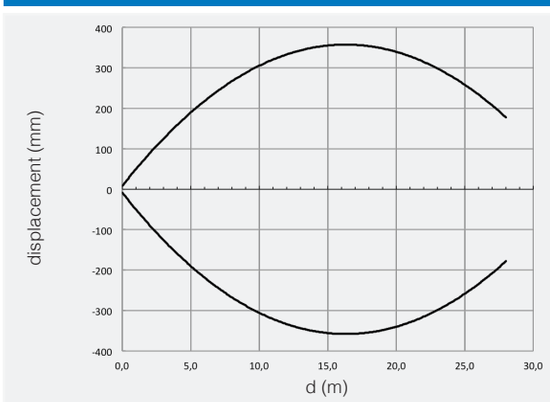
FQIH/00-*(0,1) - FQIZ/B*-*(0,1) excess gain



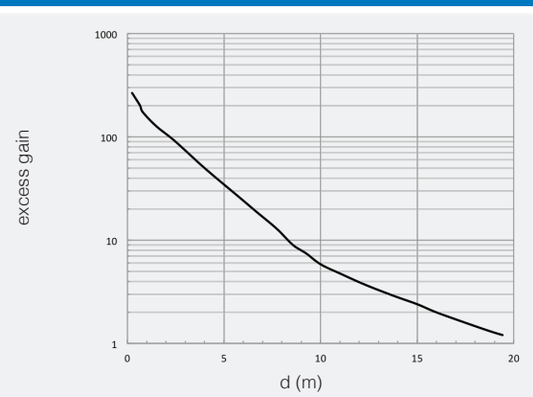
FQIH/00-*(0,1) - FQIZ/B*-*(0,1) dmensione spot



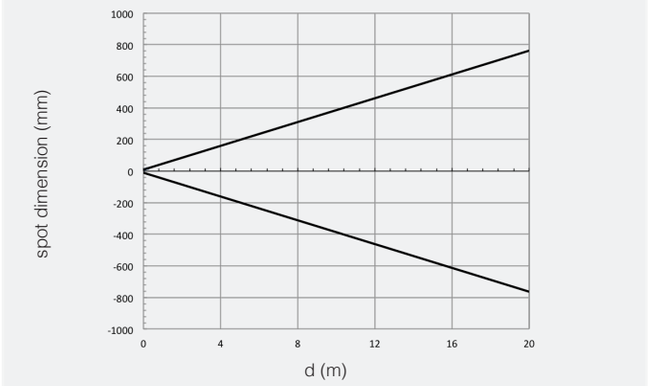
FQIH/00-*(0,1) - FQIZ/B*-*(0,1) parallel displacement



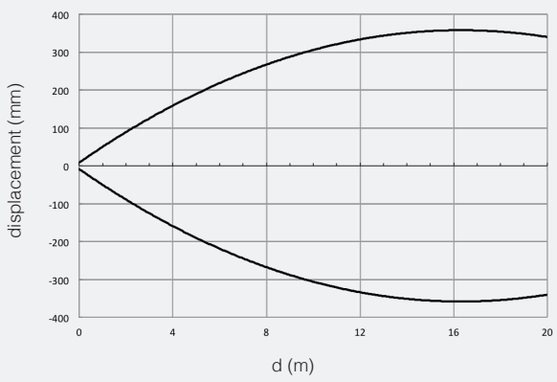
FQIH/00-(2,3)* - FQIZ/B*-(2,3)* excess gain



FQIH/00-*(0,1) - FQIZ/B*-*(0,1) spot dimension

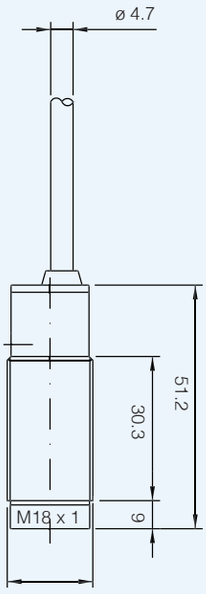


FQIH/00-*(0,1) - FQIZ/B*-*(0,1) parallel displacement

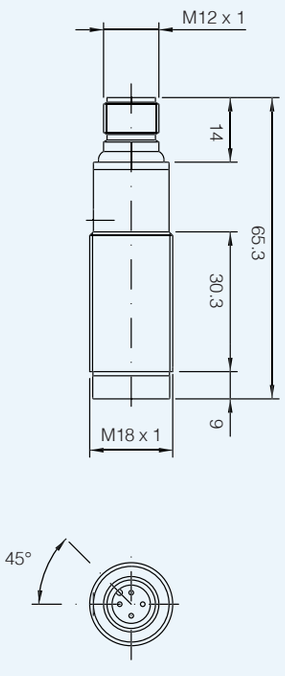


dimensions (mm)

FQ/**-0A; FQ**/**-1A**

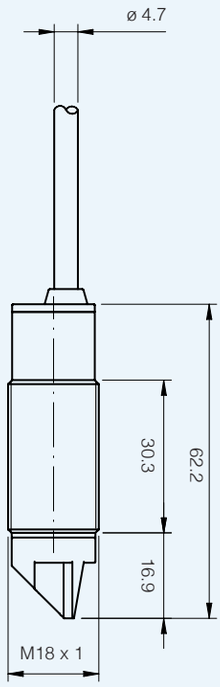


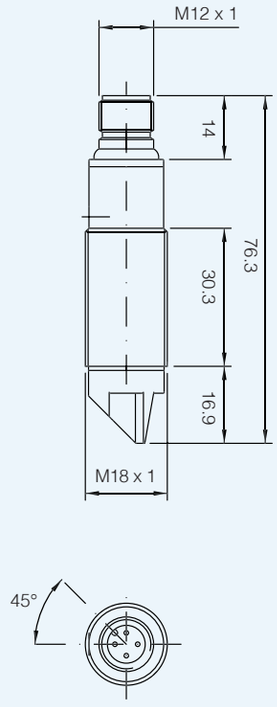
FQ/**-0E; FQ**/**-1E**



dimensions (mm)

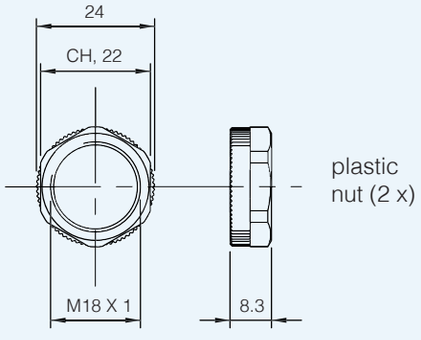
FQ**/**-2A; FQ**/**-3A	FQ**/**-2E; FQ**/**-3E





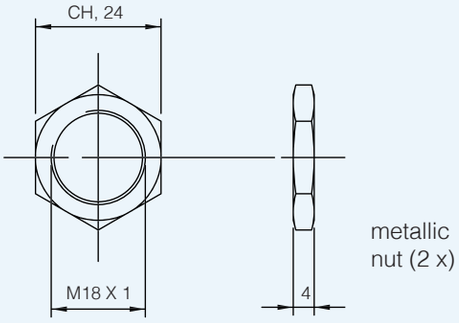
dimensions (mm)

accessories included in all plastic models



dimensions (mm)

accessories included in all metallic models



FF series

M18 IP69K photoelectric sensors for harsh environments

features

- **AISI 316L (DIN 1.4404) stainless steel housing**
- **LED status indicators: yellow (output), green (teach-in function)**
- **IP67 - IP68 - IP69K protection degree**
- **Complete protection against electrical damages**
- **ATEX models, cat. 3, available on request**
- **Direct diffuse, polarized, through beam models**
- **Innovative teach-in function through sensor's housing**
- **Approvals: CE and cULus Listed**

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

code description(*)

FF R 3 / B P - 1 E

series	FF	M18 photoelectric sensor for food + beverage applications
emission	R	Visible red LED emission
	I	Infrared LED emission
type	3	100 mm direct diffuse with sens. adjust.
	7	400 mm direct diffuse with sens. adjust.
	8	800 mm direct diffuse with sens. adjust.
	N	4.5 m polarized with sens. adjust.
	P	4.5 m polarized without sens. adjust.
	L	1 m retroref. for transp. objects with sens. adjust.
	H	Emitter
	Z	20 m receiver without sens. adjust.
output	B	NO+NC complementary output, 4 wires
	0	LO/DO selectable output, 4 wires - Emitter
	X	Emitter with Check
PNP / NPN	P	PNP output
	N	NPN output
	0	Emitter
housing	1	Stainless steel housing, axial optic
plug output	E	M12 plug exit
version		Standard version
	V5	Smooth housing

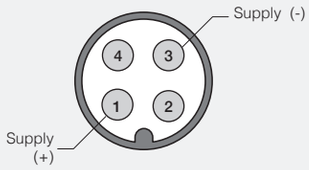
(*) ATEX models available, contact our Sales Dept. for further information.

available models

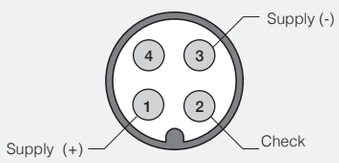
model	housing	adjustment	distance	4 wires			
				NPN NO + NC	PNP NO + NC	NPN NO + NC	PNP NO + NC
direct diffuse	AISI 316L (DIN 1.4404)	Teach-In	100 mm	FFR3/0N-1E	FFR3/0P-1E	FFR3/BN-1E	FFR3/BP-1E
			400 mm	FFI7/0N-1E	FFI7/0P-1E	FFI7/BN-1E	FFI7/BP-1E
			800 mm	FFI8/0N-1E	FFI8/0P-1E	FFI8/BN-1E	FFI8/BP-1E
polarized			4 m	FFRN/0N-1E	FFRN/0P-1E	FFRN/BN-1E	FFRN/BP-1E
		-		FFRP/0N-1E	FFRP/0P-1E	FFRP/BN-1E	FFRP/BP-1E
retroreflective for transparent objects		Teach-In	0.1...1.5 m	FFRL/0N-1E	FFRL/0P-1E	FFRL/BN-1E	FFRL/BP-1E
receiver		-	20 m	FFIZ/0N-1E	FFIZ/0P-1E	FFIZ/BN-1E	FFIZ/BP-1E
emitter with check				FFIH/X0-1E			
emitter without check				FFIH/00-1E			

plug

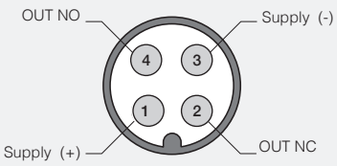
M12 emitter without check



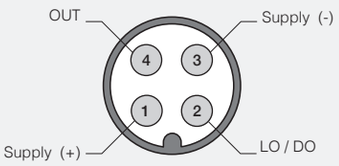
M12 emitter with check



M12 diffuse reflection polarized receiver



M12 diffuse reflection polarized receiver



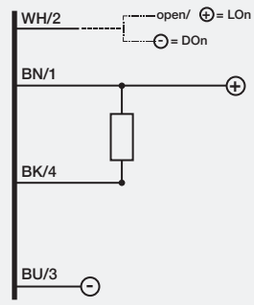
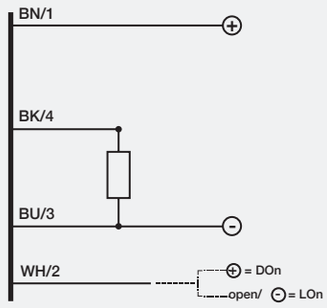
technical specification

	direct diffuse			polarized		for transparent objects	through beam	
	FFR3	FFI7	FFI8	FFRN	FFRP	FFRL	FFIZ	FFIH
								
nominal sensing distance	100 mm [1]	400 mm [2]	800 mm [3]	4.5 m [4]		0.1...1.5 m [5]	20 m	
emission	red (660 nm)	infrared (880 nm)		red (660 nm)			-	infrared (880 nm)
hysteresis	≤ 10 %							
repeatability	5 %							
tolerance	+ 15 / - 5 % Sn							
operating voltage	10...30 Vdc							
ripple	≤ 10 %							
no-load supply current	max 35 mA (at Val = 30 V)						25 mA	40 mA
load current	100 mA							
leakage current	≤ 10 µA @ Vmax							
output voltage drop	2 V max. IL = 100 mA							
output type	NPN o PNP selectable output LO / DO or complementary output NO + NC							
switching frequency	500 Hz						250 Hz	-
power on delay	200 ms							
temperature range	- 25°C...+ 80°C (without freeze)							
power supply protections	polarity reversal, transient							
output protection	short circuit (autoreset)							
sensitivity adjustment	Teach				-	Teach	-	-
temperature drift	10 % Sr							
protection degree	IP67; IP68 (1 m, 7 days); IP69K (according 40050 part 9) [6]							
EMC	in conformity with the EMC Directive according to EN 60947-5-2							
external light interference	5,000 lux (ncandescent lamp), 10,000 lux (sunlight))							
LEDs	Green: ON: teach function available OFF: teach function blocked Fast flashing: fine teach active Slow flashing: teach in progress Yellow: output state - excess gain (0 models) light State - excess gain (B models) [7]						Yellow: output state (0 models) light state (B models)	yellow (supply on)
housing material	stainless steel AISI316							
exit plug	PA12							
optic material	PA12							
tightening torque	50 Nm							
approvals	CE, cULus, IP69K, ECOLAB, Diversey							
weight (approximate)	60 gr							

[1] White target Kodak 90% reflection 100x100 mm [2] White target Kodak 90% reflection 200x200 mm [3] White target Kodak 90% reflection 400x400 mm [4] With RL110 reflector [5] With RL113G or RL116 reflector [6] Protection guaranteed only with plug cable well mounted [7] Yellow LED Fixed On: Excess Gain ≤ 2, Yellow LED flashing: Excess Gain <2

electrical diagrams of the connections

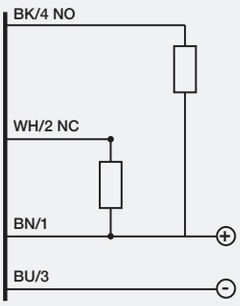
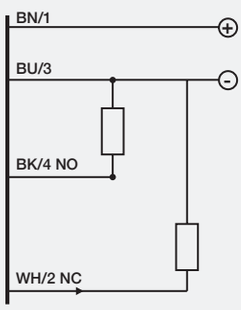
LO/DO selectable output

NPN output	PNP output
	

BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

electrical diagrams of the connections

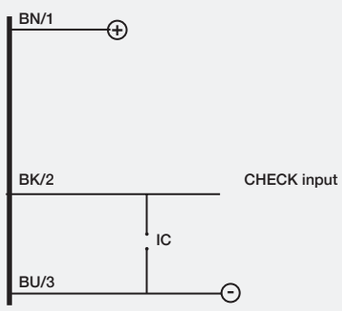
NO+NC complementary output

NPN output	PNP output
	

BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

electrical diagrams of the connections

emitter with check

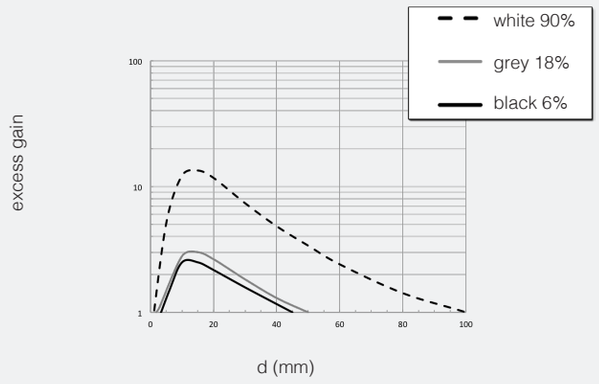


BN	brown
BU	blue
BK	black
WH	white
PK	pink
GY	gray

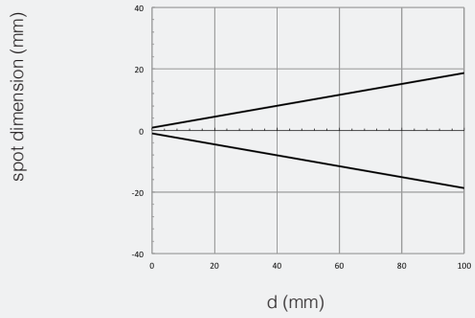
response diagrams

direct diffuse models

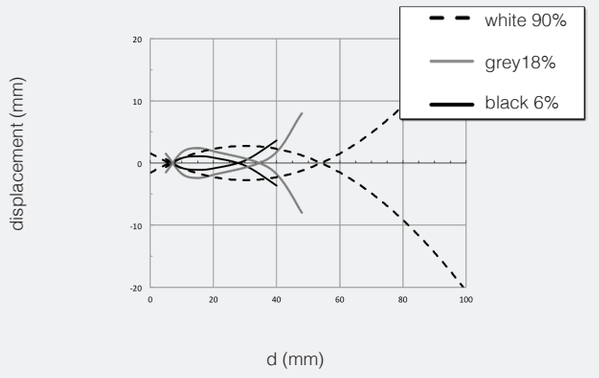
FFR3/**-1E excess gain



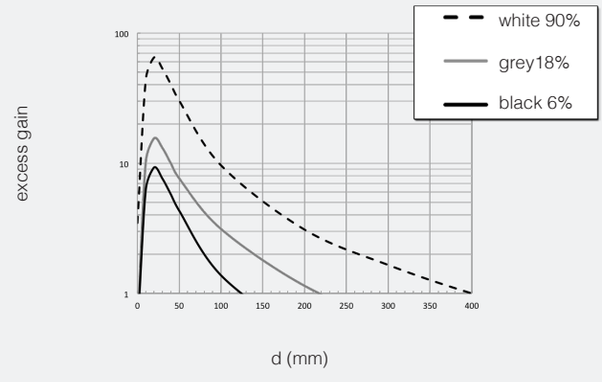
FFR3/**-1E spot dimension



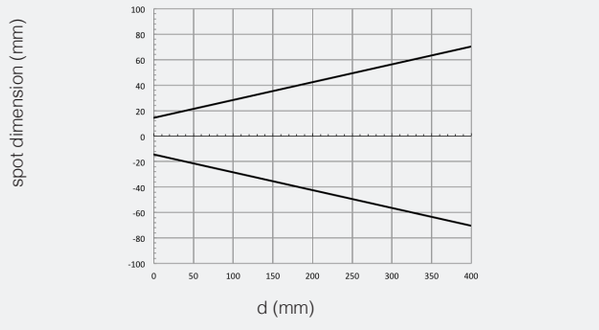
FFR3/**-1E parallel displacement



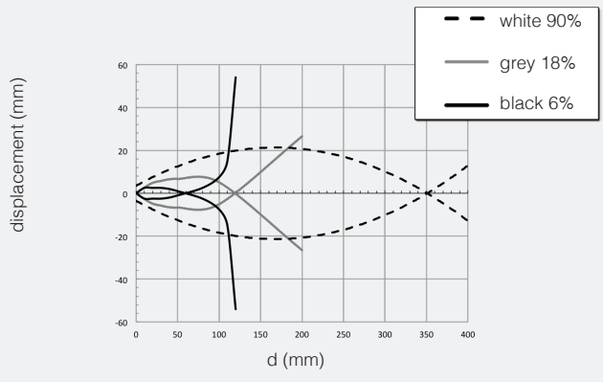
FFI7/**-** excess gain



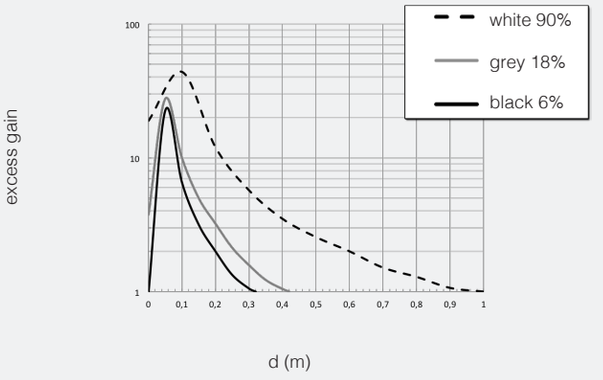
FFI7/**-** spot dimension



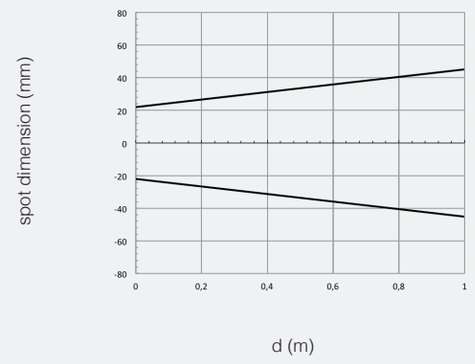
FFI7/**-** parallel displacement



FFI8/**-** excess gain



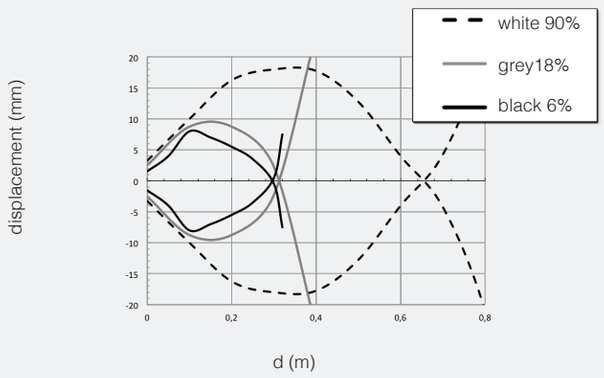
FFI8/**-** spot dimension



response diagrams

direct diffuse models

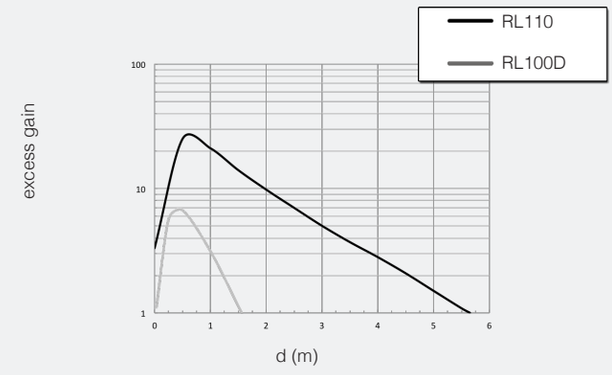
FFI8/**-** parallel displacement



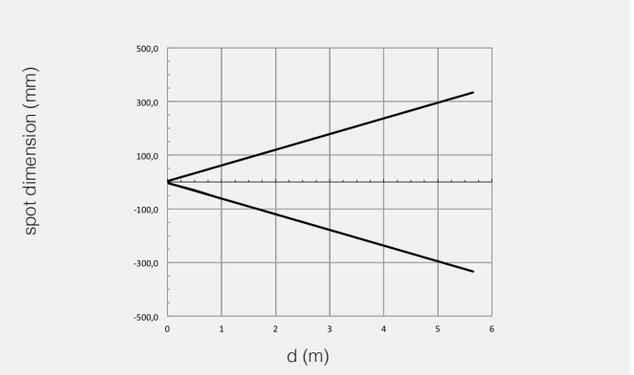
response diagrams

polarized models

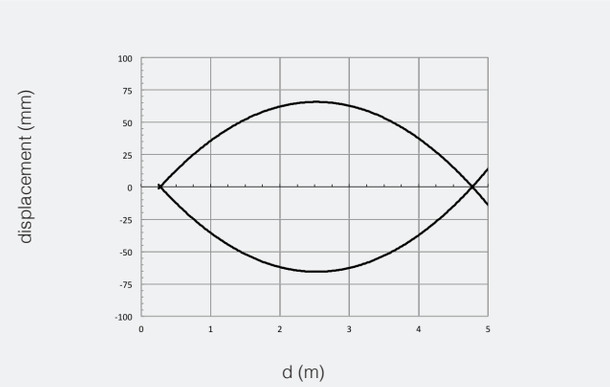
FFRN/**- 1E - FFRP/**- 1E excess gain



FFRN/**- 1E - FFRP/**- 1E spot dimension



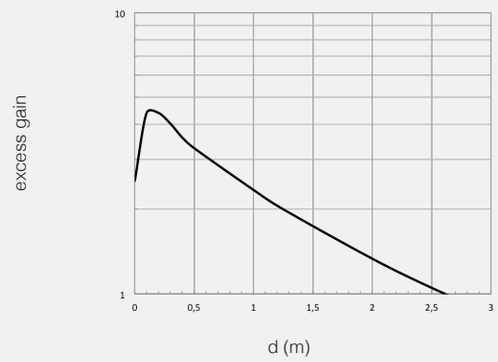
FFRN/**- 1E - FFRP/**- 1E* parallel displacement



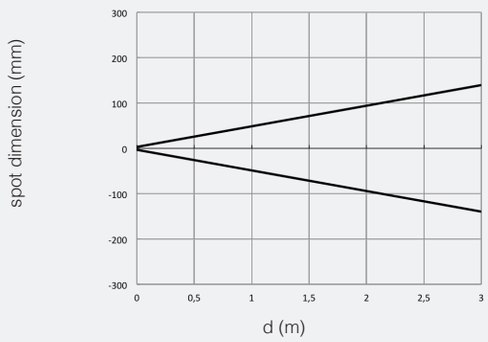
response diagrams

models for transparent objects

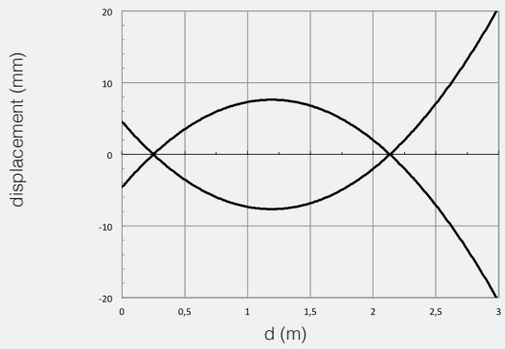
FFRL/**-1E excess gain



FFRL/**-1E spot dimension



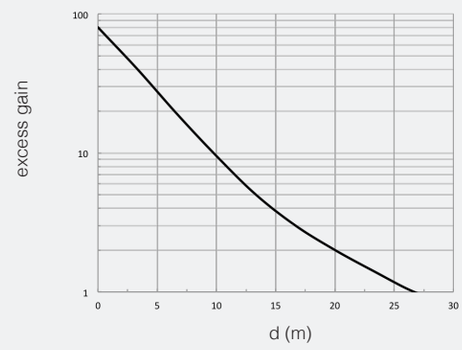
FFRL/**-1E parralel displacement



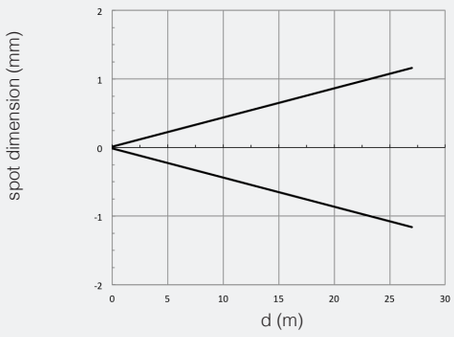
response diagrams

through beam models

FFIH/**-1E + FFIZ/**-1E excess gain



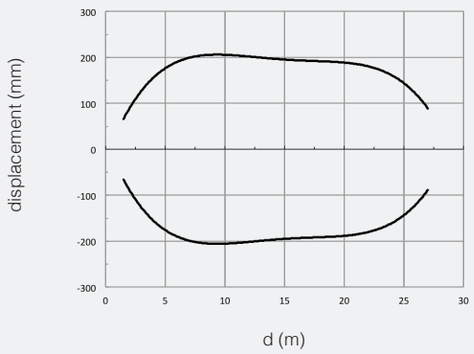
FFIH/**-1E + FFIZ/**-1E spot dimension



response diagrams

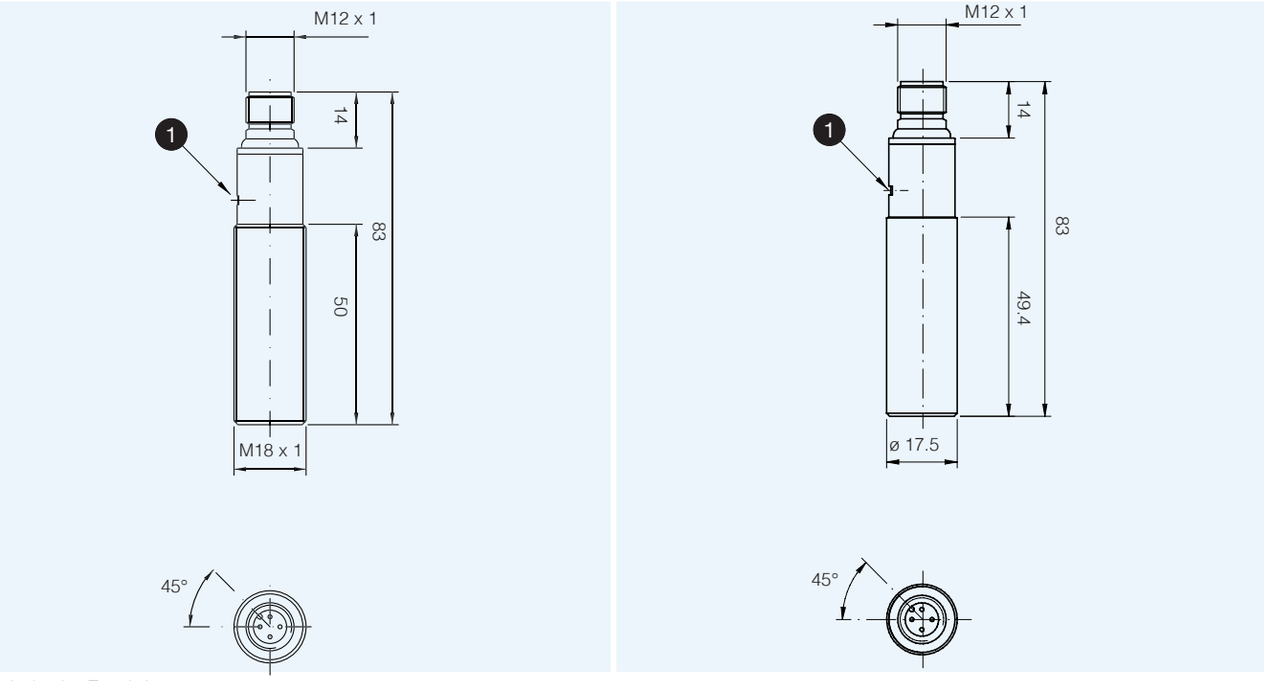
through beam models

FFIH/-1E + FFIZ/**-1E parallel displacement**



dimensions (mm)

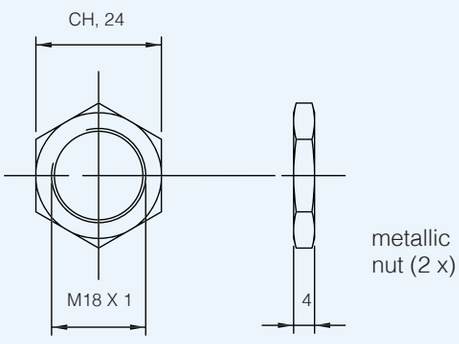
FF/**-**** | **FF**/**-1EV5**



1 Inductive Teach-In

dimensions (mm)

accessories included in all metallic models



metallic
nut (2 x)

FFRS series

M18 IP69K photoelectric sensors with background suppression for harsh environments

features

- **Stainless steel housing AISI316L (DIN 1.4404)**
- **protection degree: IP68-IP69K**
- **Complete protection against electrical damages**
- **New sensitive adjustment through sensor housing: on object or on background**
- **Special model with reduced spot dimension and good performance on reflective material**
- **Approvals: CE and cULus Listed**

web contents

- **Application notes**
- **Photos**
- **Catalogue / Manuals**

ECOLAB Diversey for a cleaner, healthier future

code description(*)

	FF	R	S	/	B	P	-	1	E	

series	FF	M18 photoelectric sensor with IP69K protection degree
emission	R	Visible red LED emission
function	S	Background suppression 30...130 mm
output	0	NO/NC selectable output, 4 wires
	B	NO+NC selectable output, 4 wires
PNP / NPN output	P	PNP output
	N	NPN output
housing	1	Stainless steel housing, axial optic
plug	E	M12 plug exit
version		Standard version
	V5	Smooth housing
	77	Special model for shiny object and 60...100 mm sensing distance
	V577	Special model with smooth housing for shiny object and 60...100 mm sensing distance

(*) ATEX models available, contact our Sales Dept. for further information.

available models

functions	housing	adjustment	distance (mm)	4 wires			
				NPN NO + NC	PNP NO + NC	NPN NO + NC	PNP NO + NC
background suppression	AISI 316L (DIN 1.4404) thread housing	Teach-In	30...130	FFRS/0N-1E	FFRS/0P-1E	FFRS/BN-1E	FFRS/BP-1E
	AISI 316L (DIN 1.4404) smooth housing			-	-	FFRS/BN-1EV5	FFRS/BP-1EV5
background suppression for shiny object	AISI 316L (DIN 1.4404) thread housing		60...100	FFRS/0N-1E77	FFRS/0P-1E77	FFRS/BN-1E77	FFRS/BP-1E77
	AISI 316L (DIN 1.4404) smooth housing			-	-	FFRS/BN-1EV577	FFRS/BP-1EV577

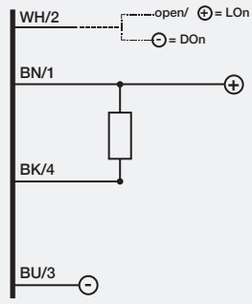
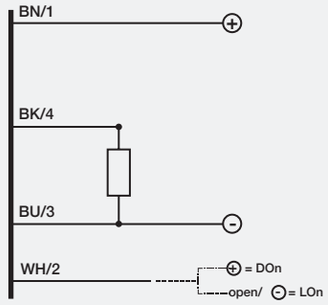
technical specification

	FFRS/**-**	FFRS/**-**77
		
nominal sensing distance	30...130 mm	60...100 mm
scanning range (Sd)	30...130 mm (white paper)	60...100 mm (white paper)
emission	red (660 nm)	
hysteresis	≤ 10 % (white paper)	≤ 15 % (white paper)
repeatability	10 %	
tolerance	+ 15 / - 5 % Sn	
supply voltage	10...30 Vdc	
ripple	≤ 10 %	
no-load supply current	50 mA (Val = 30 V)	
output current	100 mA	
leakage current	≤ 10 µA @ Vdc max	
output voltage drop	2 V max. IL = 100 mA	
output type	NPN or PNP selectable output LO/DO or complementary output NO + NC	
switching frequency	1kHz	400 Hz
power on delay	200 ms	
temperature range	- 25°C...+ 80°C (without freeze); short exposure with not working sensor 15 min to 100°C	
power supply protections	polarity reversal, transient	
output protection	short circuit (autoreset)	
protection degree	IP67; IP68 (1 m, 7 days); IP69K (according 40050 part 9) (1)	
EMC	in conformity with the EMC Directive according to EN 60947-5-2	
external light interference	5,000 lux (incandescent lamp), 10,000 lux (sunlight)	
LEDs	Green: ON: teach function available OFF: teach function blocked Fast flashing: teach in progress Yellow: output state (0 models) light State (B models)	
housing material	stainless steel	
exit plug	PA12	
optic material	PA12	
approvals	CE, cULus, IP68, IP69K, ECOLAB, Diversey	
weight (approximate)	60 gr	

(1) Protection guaranteed only with plug cable well mounted

response diagram

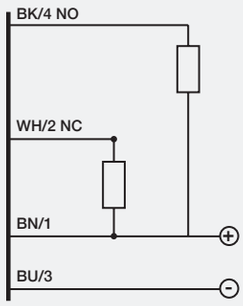
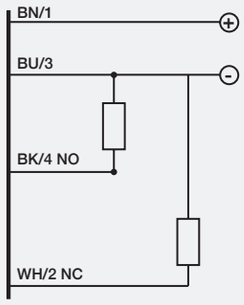
LO/DO selectable output

NPN output	PNP output
	

BN	brown
BU	blue
BK	black
WH	white

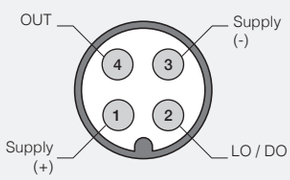
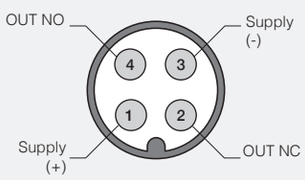
response diagram

NO+NC complementary output

NPN output	PNP output
	

BN	brown
BU	blue
BK	black
WH	white

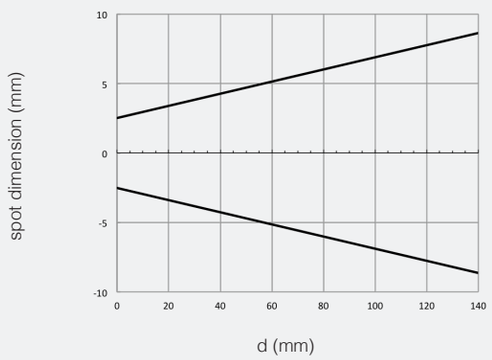
plug

M12 FF**/0*-**	M12 FF**/B*-**
	

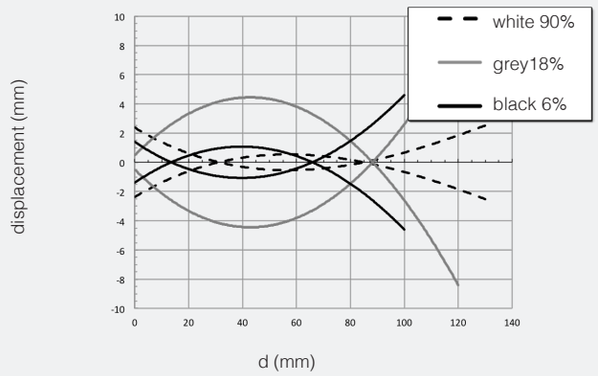
response diagrams

background suppression models

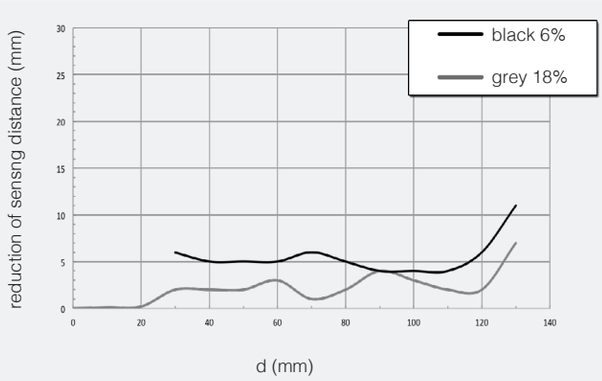
FFRS/**-** spot dimension



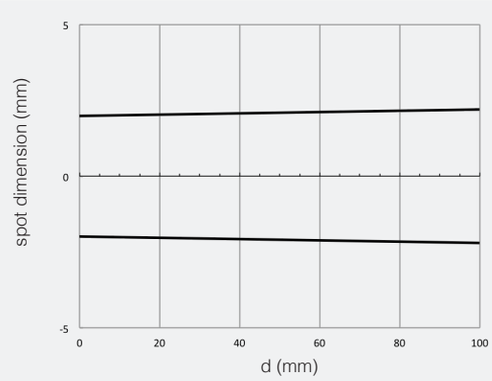
FFRS/**-** parallel displacement



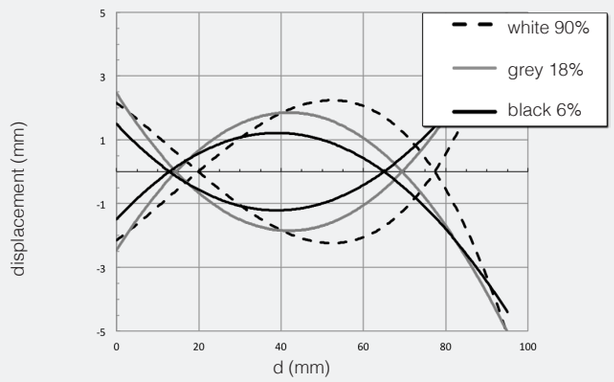
FFRS/**-** reduction of sensing distance



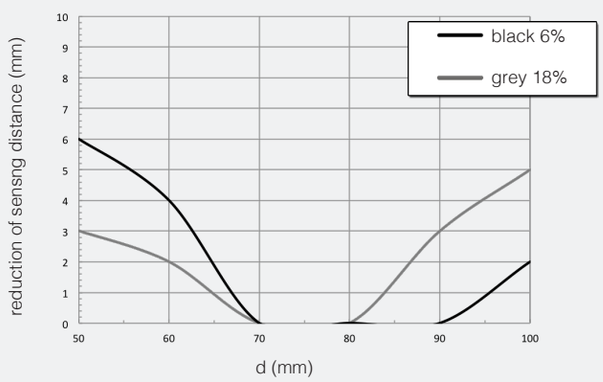
FFRS/**-**77 spot dimension



FFRS/**-**77 parallel displacement



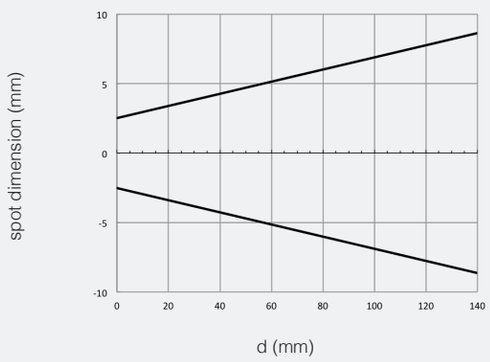
FFRS/**-**77 reduction of sensing distance



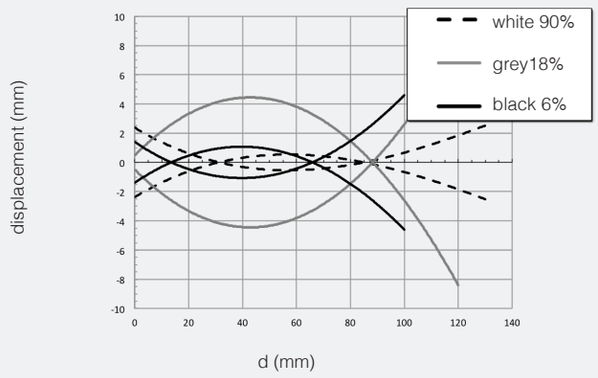
response diagrams

background suppression models

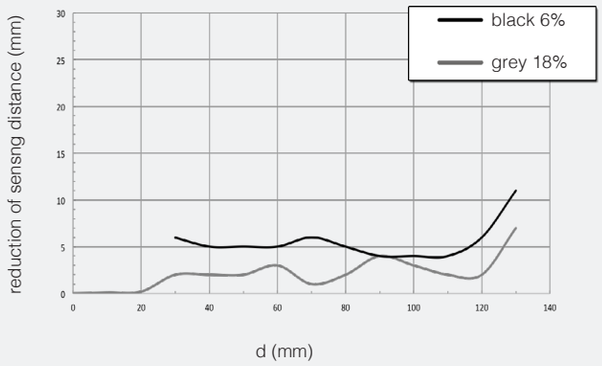
FFRS/**-** spot dimension



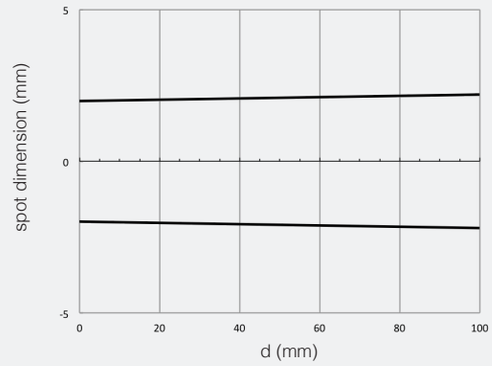
FFRS/**-** parallel displacement



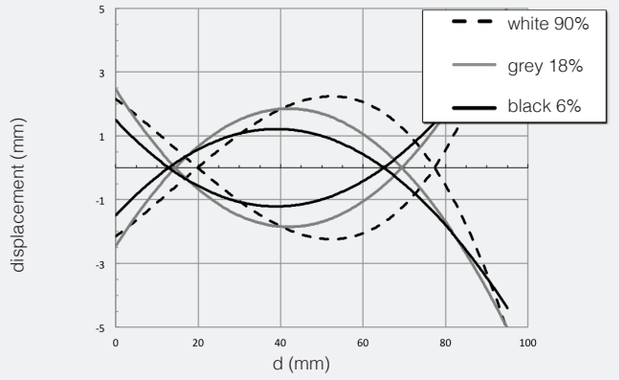
FFRS/**-** reduction of sensing distance



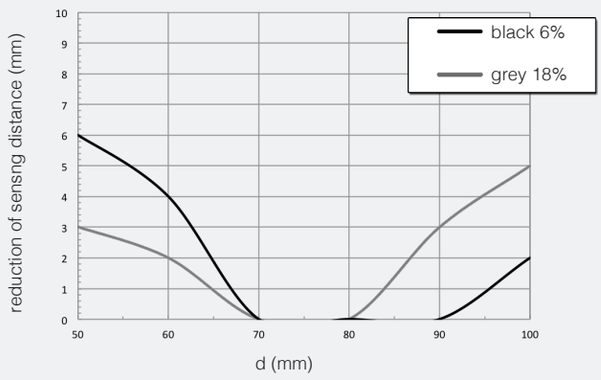
FFRS/**-**77 spot dimension



FFRS/**-**77 parallel displacement

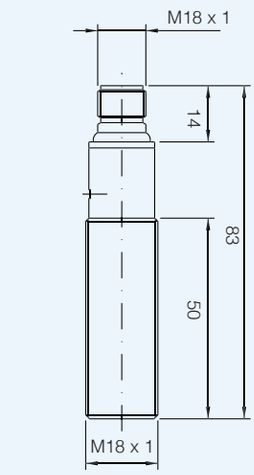


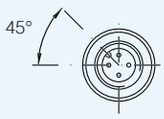
FFRS/**-**77 reduction of sensing distance

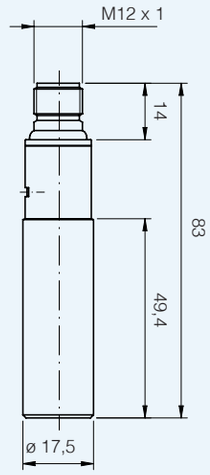


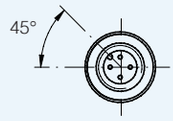
dimensions (mm)

FFRS/**-**	FFRS/**-V5



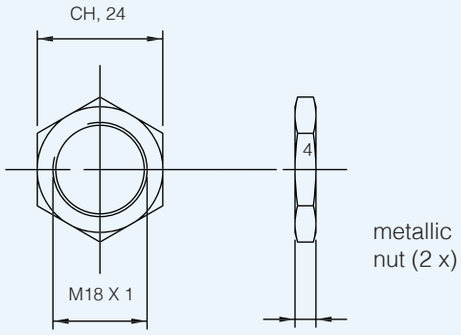






dimensions (mm)

accessories included in all metallic models



metallic
nut (2 x)