

High Resolution Area Sensor BX80



- Ultra compact rectangular strong housing
- Controlled area 70mm
- Operating distance of up to 2m
- Small object detection as low as 5mm in diameter
- Options with analogue output 4-20mA
- Protection Degree up to IP67
- Metal body option for heavy duty and high temperature use.
- Complete protection against electrical damage



Options and ordering codes

BX80		A	/	2	N	-	0	H
Emitter without sensitivity adjustment	E							H M12 plug exit
Emitter with sensitivity adjustment	S							A 5m cable
Receiver with limited crossed beams, Logic output	A							
Receiver with extended crossed beams, Logic + 4-20mA output	B							
Receiver with Logic + 4-20mA analogue output	D							
2m Range, 5-6mm Ø resolution, 10ms				1			0 PBT+PC	
1.5m Range, 5-6mm Ø resolution, 10ms				2			1 PBT+PC + air vented AL enclosure	
1m Range, 5-6mm Ø resolution, 3ms				3			2 PBT+glass optic	
0.6m Range, 3-6mm Ø resolution, 2ms				4	P PNP logic output			
0.25m Range, 2mm Ø resolution, 2ms				5	N NPN logic output			
					0 Emitter			

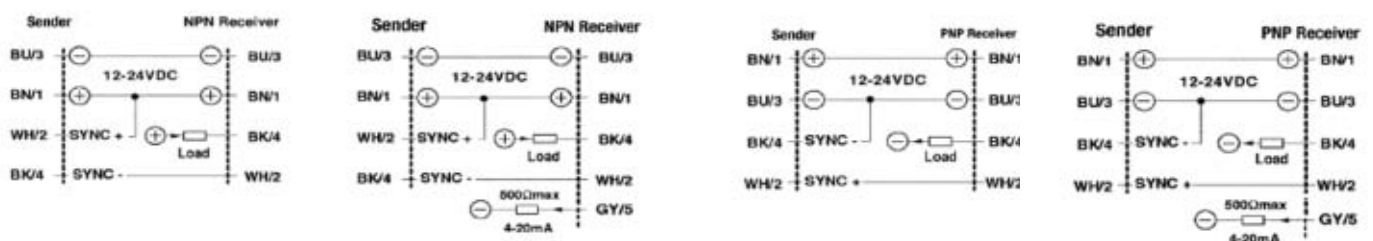
General Specification

Specification	BX80*/1*_*_*	BX80*/2*_*_*	BX80*/3*_*_*	BX80*/4*_*_*	BX80*/5*_*_*
Nominal sensing distance	2m	1.5m	1m	0.6m	0.25m
Response time	10ms Max.		3ms Max.	2ms Max.	
Controlled area height	70mm				
Number of beams	12				
Beam pitch	6mm				
BX80A/	Min. object size	Ø6mm			Ø2mm
	Min. op. distance	0		30mm	90mm
BX80B/	Min. op. distance	Ø5mm		Ø3mm	Ø3mm
	Min. op. distance	300mm	500mm	550mm	
BX80D/	Min. op. distance	+/-6mm			
	Min. op. distance	8mm			
Differential travel	15% Maximum				
Repeat Accuracy	0/20% of the nominal sensing distance Sn				
Operating voltage	12-24VDC				
Ripple	50mA Receivers, 100mA emitters				
No-load supply current	100mA Maximum				
Leakage current	10µA				
Voltage drop	1.2V Maximum				
Output type	NPN/PNP or NO/NC Selectable				
Angular displacement	3 degree emitter, 6 degree receiver at nominal sensing distance Sn				
Emission	Infra red 880nm				
Time delay before availability	500ms				
Output protections	Reverse polarity and voltage transien				
Storage temperature	-40 to +80 degree C				
Interference by external light	Incandescent light 1500 Lux maximum, sun light 4500 Lux maximum				
Protection degree	IP67 (EN60529)				
Emitter LED indicators	Green (supply), Red (alarm sync.) and Yellow (area status)				
Receiver LED indicators	Green (supply), Red (alignment) and Yellow (output state)				
Housing material	PBT + 30% FV (Valox) UL94V0				
Lens material	PC				
Tightening torque	25Nm maximum				
Weight (approx)	Plug type 0.26 to 0.30 kg and cabled type 0.80 to 0.82kg				

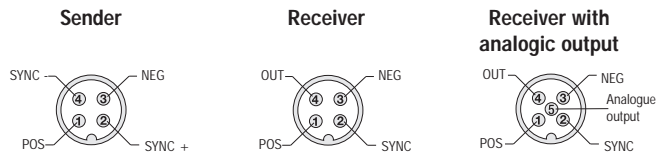
Standard types

Emitters	Limited cross-beams	Extended cross-beams	Analogue output
BX80S/10-0H	BX80A/1P-0H	BX80B/1P-0H	BX80D/2P-0H
BX80S/20-0H	BX80A/2P-0H	BX80B/2P-0H	BX80D/4P-0H
BX80S/30-0H	BX80A/3P-0H	BX80B/3P-0H	
BX80S/40-0H	BX80A/4P-0H	BX80B/1N-0H	
BX80S/50-0H	BX80A/5P-0H	BX80B/2N-0H	
	BX80A/1N-0H		
	BX80A/2N-0H		

Wiring Diagrams



Connectors M12

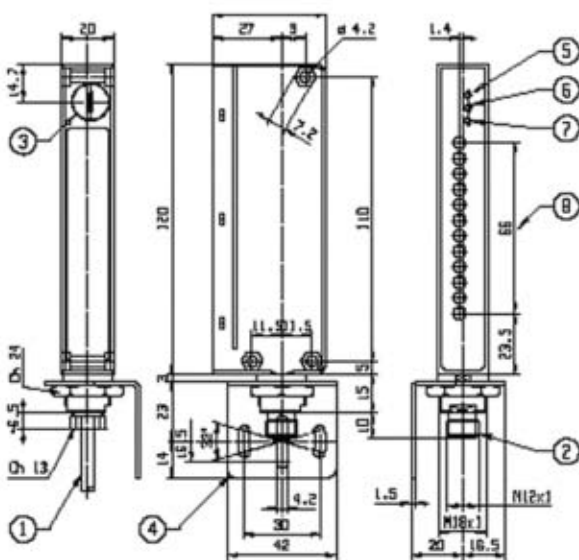


Applications

- Detection of object presence by different and irregular shapes
- Counting of objects
- Operating distance of up to 2m
- Control of envelopes released from conveyors
- Options with analogue output 4-20mA
- Position control
- Presence detection and height control of objects on conveyors

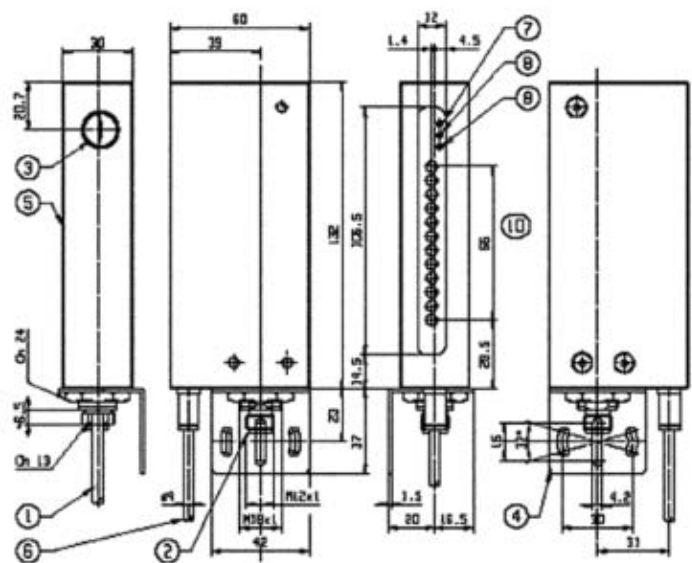
Dimensions (mm)

Standard version



1. Axial cable exit
2. M12 metal plug cable exit
3. Bottle top covering sensitivity adjustment (sender), NO/NC (receiver)
4. Mounting bracket ST 18-C
5. Green LED
6. Red LED
7. Yellow LED
8. Sensitivity area

...with aluminium protection cover



1. Axial cable exit
2. M12 metal plug cable exit
3. Bottle top covering sensitivity adjustment (sender), NO/NC (receiver)
4. Mounting bracket ST 18-C
5. Aluminium protection cover
6. Air blowing tube $\varnothing 4 \div \varnothing 2$
7. Green LED
8. Red LED
9. Yellow LED
10. Sensitivity area

Plastic Fibre Optic CF



- Many models
- Diffuse and Through-beam plastic fibres
- Suitable for use with FS1, FX2 FX3 and FX4 range and industry standard amplifiers
- IP67

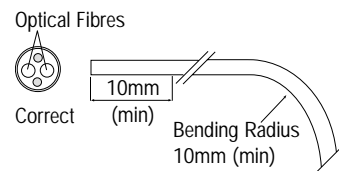
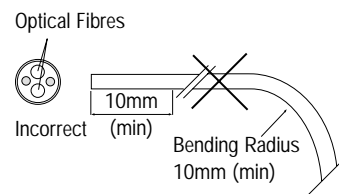
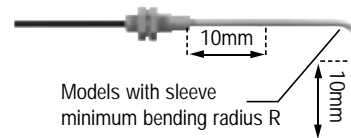


Options and ordering codes

CF / CA2 - 20

Diffuse with cylinder field of view	CA1	05	0.5 meter fibre length
Diffuse	CA2	10	1 meter fibre length
Diffuse with pliable head	CA4	20	2 meter fibre length
Diffuse	CB1		
Diffuse with pliable head	CB3		
Diffuse with spiral fibre	CC1		
Through-beam with pliable head	RA4		
Through-beam	RA7		
Through-beam	RB3		
Through-beam with pliable head	RB4		
Through-beam	RB6		
Through-beam with lens	RB9		
Through-beam with lens	RBA		
Through-beam with spiral fibre	RC6		
Through-beam lens with spiral fibre	RC9		
Through-beam lens with spiral fibre	RCA		

Please contact IMO technical for confirmation of length availability for model type.
Other lengths may be possible



Specification

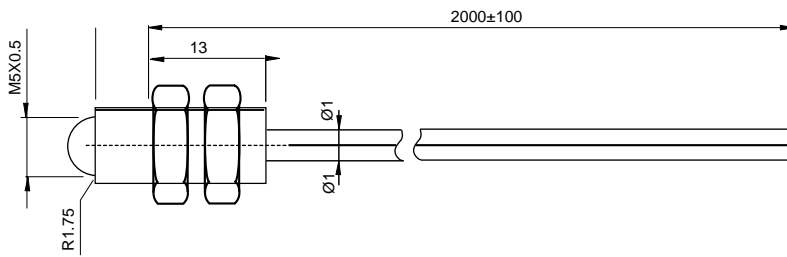
Model	Type	Sensing distance			Fibre Core Ø	Free-Cut	Lens	Head Type	Fibre & Sleeve bending radius R _{min}	Temperature Range	Head material
		FS1	FX3	FX4							
CF/CA1	Diffuse	60mm	140mm	140mm	0.5mm	Yes	No	M5	15 mm-N/A	-25 to +70 °C	V2A INOX/ Stainless steel
CF/CA2	Diffuse	15mm	70mm	110mm	0.5mm	No	No	M4	5mm-N/A	-40 to +70 °C	CuZn Ni plated
CF/CA4	Diffuse	15mm	60mm	80mm	0.5mm	No	No	M4 + sleeve	5mm-5mm	-40 to +55 °C	CuZn Ni plated
CF/CB1	Diffuse	50mm	200mm	300mm	1mm	Yes	No	M6	10mm-N/A	-40 to +70 °C	CuZn Ni plated
CF/CB3	Diffuse	50mm	200mm	300mm	1mm	Yes	No	M6 + sleeve	10mm-10mm	-40 to +55 °C	CuZn Ni plated
CF/CC1	Diffuse	15mm	70mm	100mm	1mm	No	Yes	M6	10mm-N/A	-40 to +70 °C	CuZn Ni plated
CF/RA4	Through-beam	30mm	150mm	250mm	0.5mm	No	No	M4 + sleeve	10mm-10mm	-40 to +55 °C	CuZn Ni plated
CF/RA7	Through-beam	30mm	150mm	250mm	0.5mm	No	No	M3	5mm-N/A	-40 to +70 °C	CuZn Ni plated
CF/RB3	Through-beam	120mm	700mm	700mm	1mm	Yes	Yes	M4 + M2.6	25mm-N/A	-25 to +70 °C	CuZn Ni plated
CF/RB4	Through-beam	120mm	600mm	900mm	1mm	Yes	No	M4 + sleeve	10mm-10mm	-40 to +55 °C	CuZn Ni plated
CF/RB6	Through-beam	120mm	600mm	900mm	1mm	Yes	No	M4	10mm-N/A	-40 to +70 °C	CuZn Ni plated
CF/RB9	Through-beam	1.2m	8m	10m	1mm	Yes	Yes	Ø 6mm	10mm-N/A	-40 to +70 °C	CuZn Ni plated
CF/RBA	Through-beam	1.2m	8m	10m	1mm	Yes	Yes	M7	10mm-N/A	-40 to +70 °C	CuZn Ni plated
CF/RC6	Through-beam	100mm	500mm	500mm	1mm	No	No	M4	10mm-N/A	-40 to +70 °C	CuZn Ni plated
CF/RC9	Through-beam	1m	6m	8m	1mm	No	Yes	Ø6mm	10mm-N/A	-40 to +70 °C	CuZn Ni plated
CF/RCA	Through-beam	1m	6m	8m	1mm	No	Yes	M7	10mm-N/A	-40 to +70 °C	CuZn Ni plated

Plastic Fibre Optic CF continued

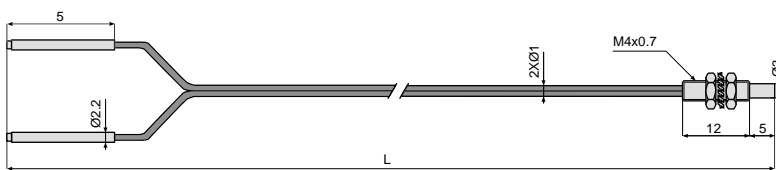


Outline dimensions (mm)

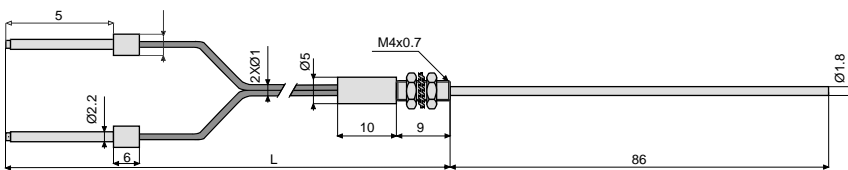
CF/CA1-**



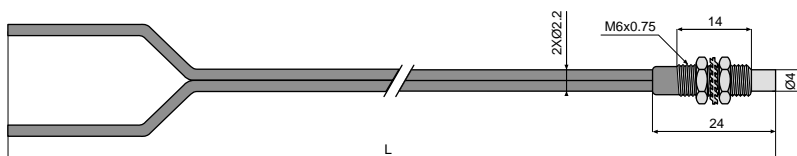
CF/CA2-**



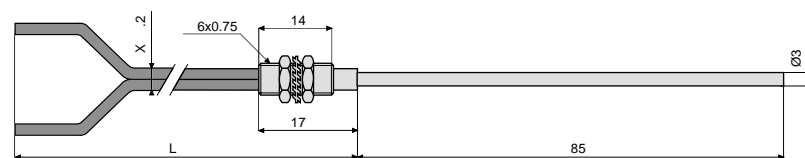
CF/CA4-**



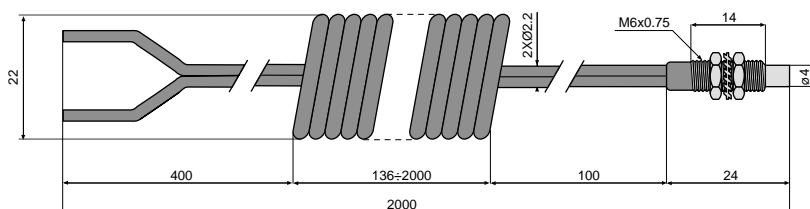
CF/CB1-**



CF/CB3-**



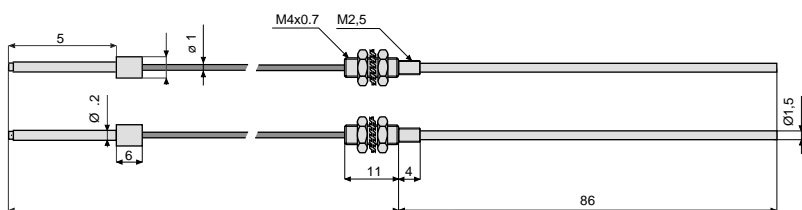
CF/CC1-**



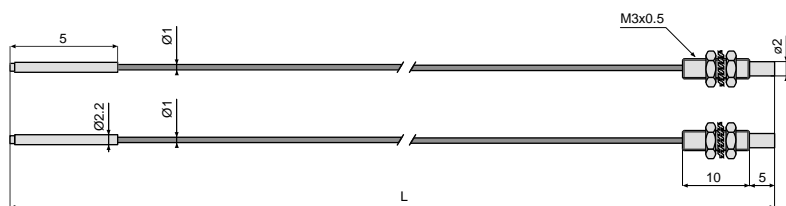
Plastic Fibre Optic CF continued

Outline dimensions (mm)

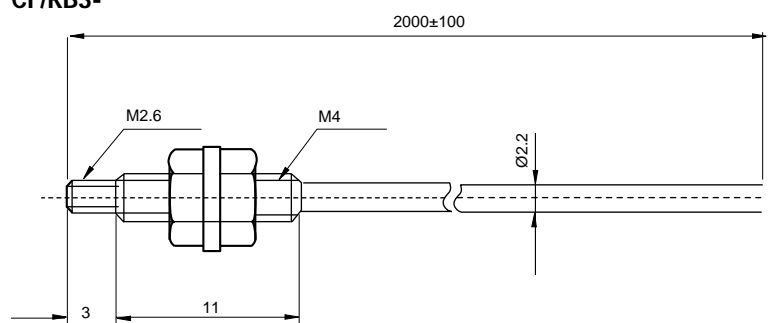
CF/RA4-**



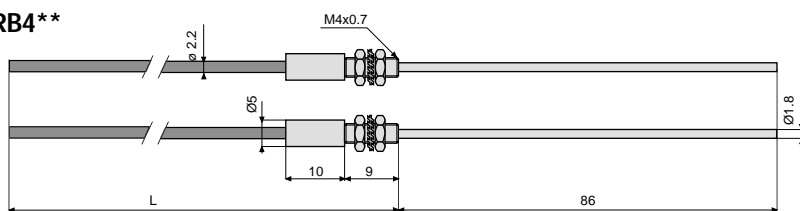
CF/RA7-**



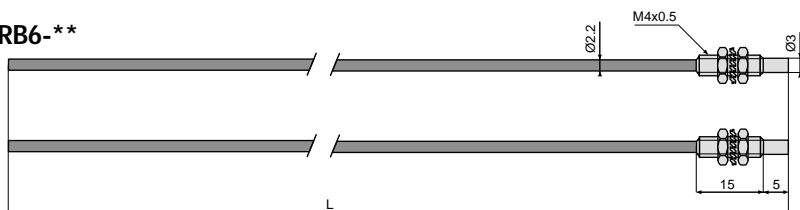
CF/RB3-**



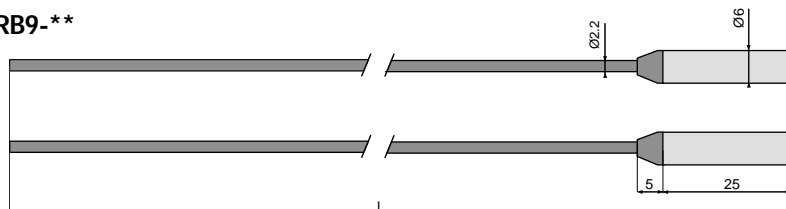
CF/RB4**



CF/RB6-**



CF/RB9-**

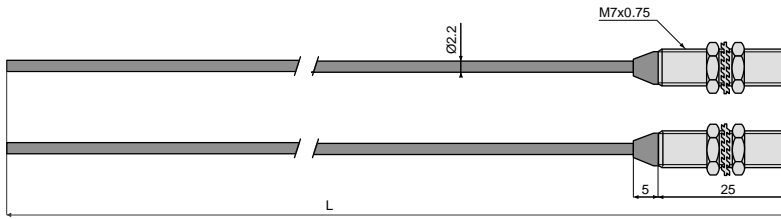


Plastic Fibre Optic CF continued

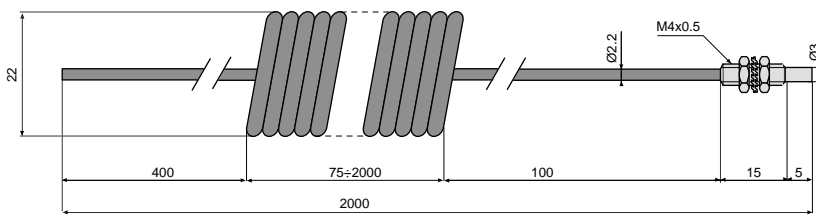


Outline dimensions (mm)

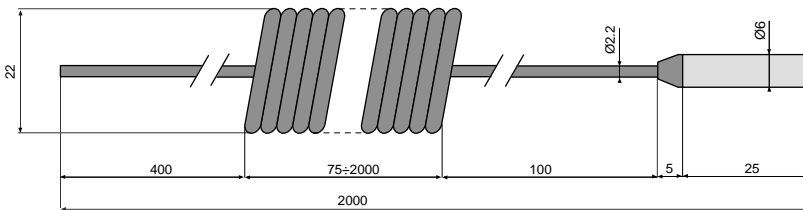
CF/RBA-**



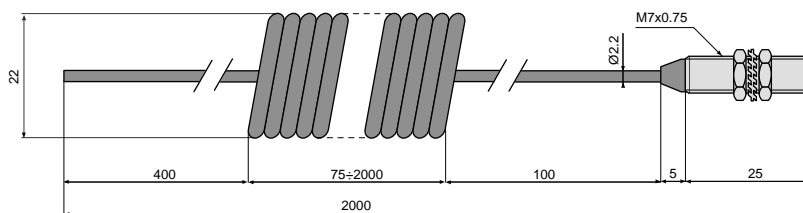
CF/RC6-**



CF/RC9-**



CF/RCA**



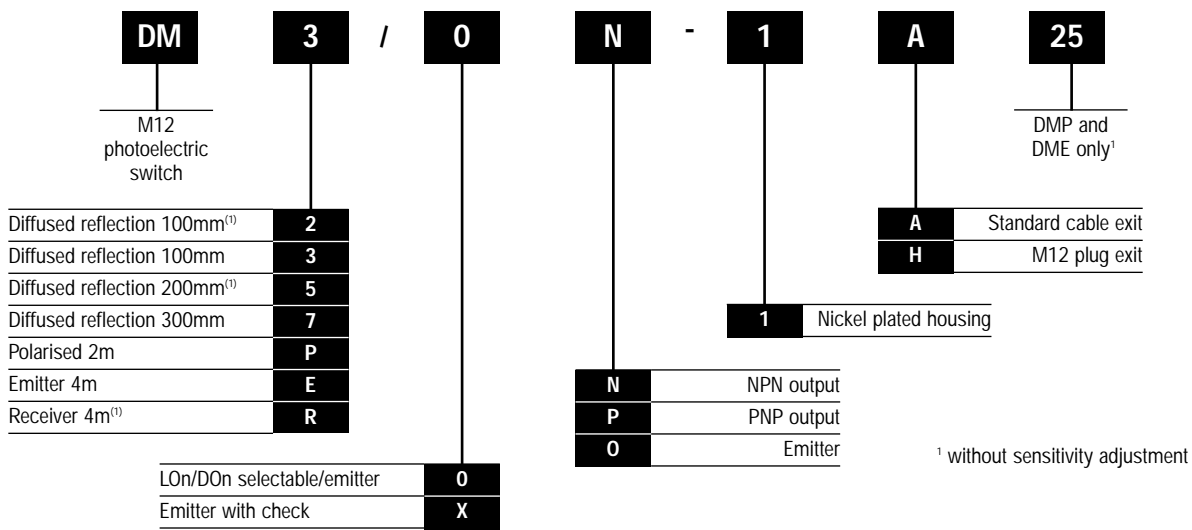
M12 Miniature Photoelectric Switches DM



- Diffused, polarised retro-reflective and through-beam
- Nickel-plated housing with IP67 protection
- Multifunction LED status indicator
- Pre-cabled or M12 plug connector
- NO/NC selectable
- Local and remote teach-in function



Options and ordering codes



Specification

Model	DM2/0*-1*	DM3/0*-1*	DM5/0*-1*	DM7/0*-1*	DMP/0*-1*	DMR/0*-1*	DME/*0-1*
	Diffuse reflection				Polarised	Through-beam	
Nominal sensing distance	100mm ^a		200mm ^a	300mm ^b	2m ^c	4m	
Emission	Infrared (880nm)				Red (660nm)	Infrared (880nm)	
Tolerance	+ 15%/-5%						
Differential travel	10% maximum					20% maximum	
Repeat accuracy	5%						
Operating voltage	10-30VDC						
Ripple	10% maximum						
Load current	100mA						
No-load current	20mA						
Leakage current	10µA maximum (VDC maximum)						
Output voltage drop	2V maximum I _L =100mA						
Output type	NPN/PNP – Light On/Dark On selectable						
Switching frequency	400Hz					250Hz	
Time delay before availability	150ms						
Supply electrical protection	Polarity reversal and transient						
Output electrical protection	Short circuit (auto-reset)						
Operating temperature	-25 to +70 °C						
Interference by sunlight	10000 lux						
Protection degree	IEC IP67						
Sensitivity adjustment	N/A	Teach-in	N/A	Teach-in	N/A	Trimmer	
Tightening torque	10 Nm						

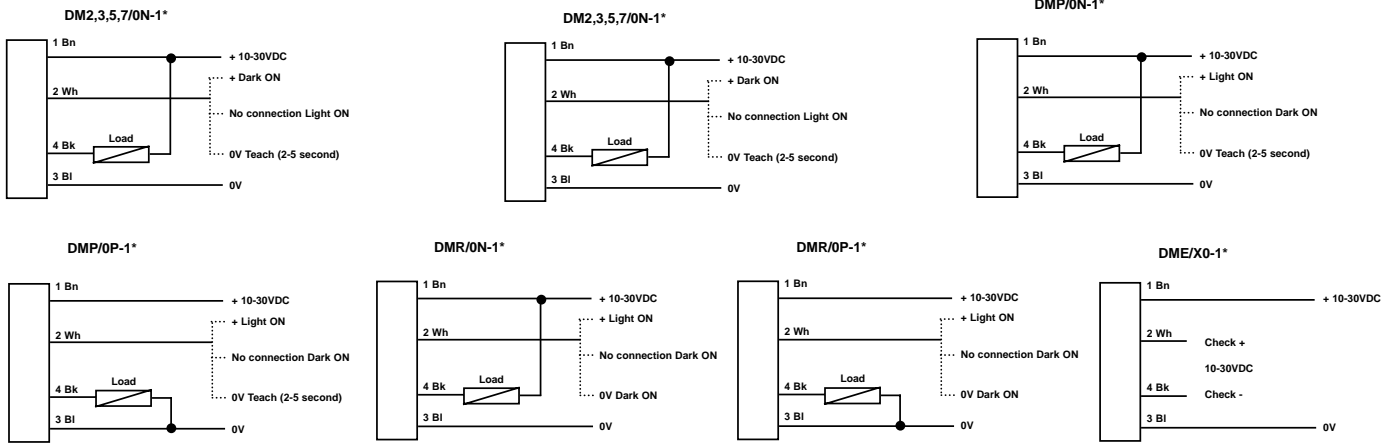
^a Test target 100x100mm white paper ^b Test target 200x200mm white paper ^c Reflector RL110

M12 Miniature Photoelectric Switches

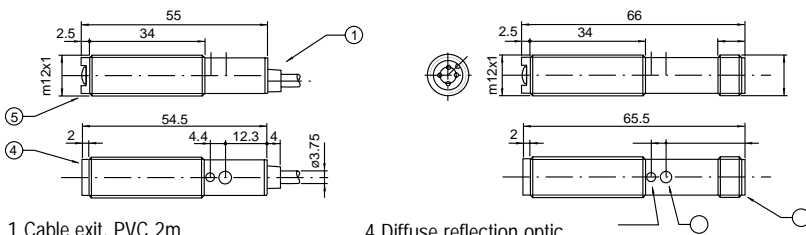
DM continued



Wiring diagrams



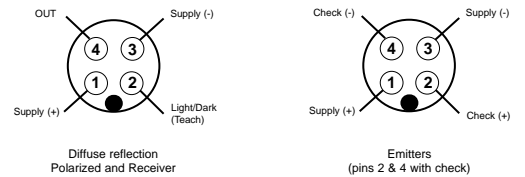
Dimensions (mm)



- 1 Cable exit, PVC 2m
- 2 M12 meta plug connector
- 3 Teach-in Button

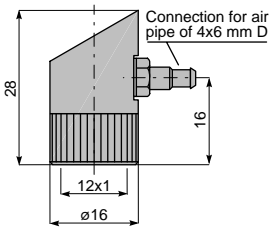
- 4 Diffuse reflection optic
- 5 Retro-reflective

Connector connections (M12)



Accessories

Antidust front ø12mm ST36



material: anodised aluminium

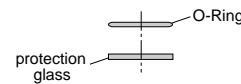
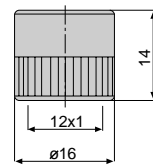
This is used to prevent dust or other deposits on the lenses of photoelectric switches ø12mm*, thus ensuring constant detection is maintained. It consists of a threaded body with a side air inlet pipe.

The sensitivity loss is approx. 20-30%.



*not suitable for diffuse models.

Protection front ø12mm ST60



material: anodised aluminium - glass

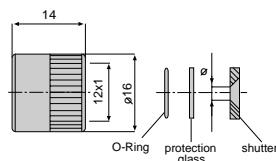
For the protection of the lenses of photoelectric switches ø12mm*. It allows use of the sensor even in particularly aggressive conditions (presence of chemical solvents etc.)

The system consists of a threaded metal body, an O-ring and a protection glass.

The sensitivity loss is approx. 20-25%.

*not suitable for diffuse models.

Shutter ø12mm STOM_L

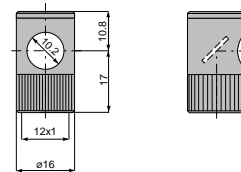


material: anodised aluminium - glass

This accessory, available for through-beam photoelectric switches ø12mm, reduces the emitted beam allowing the detection of small targets (down to 1mm). The shutter consists of a threaded ring nut, a protection glass, an O-ring and an aperture to be screwed on the optical head of both transmitter and receiver.

The attained sensing ranges refer to the minimum detectable target as indicated in the table below

Right angle beam adaptor ø12mm ST37



material: anodised aluminium

For directing the photoelectric detection through 90° to the photoelectric switch optical axes for ø12mm* sensors.

This accessory consists of an internal threaded body to be screwed on the optical head of the photoelectric switch.

The mirror inside the body is set at 45° to the optical axes of the sensor allowing detection at 90°.

The sensitivity loss is approx. 20-30%.

*not suitable for diffuse models.

Shutter code	STOM1	STOM2	STOM3	STOM4	STOM5	STOM6
MM series	1	2	3	4	5	6
Ø minimum target (mm)	1	2	3	4	5	6
sensing range (m)	0.05	0.20	0.40	0.60	1.40	2.00

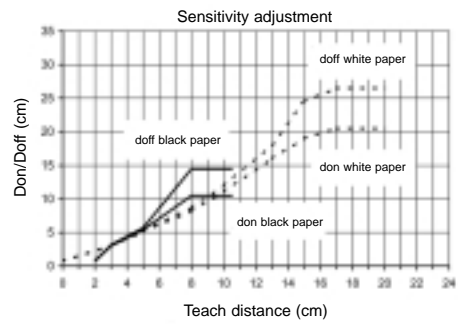
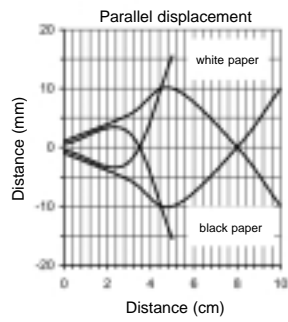
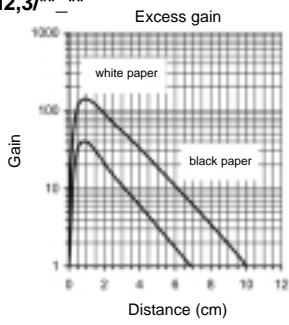
M12 Miniature Photoelectric Switches

DM continued

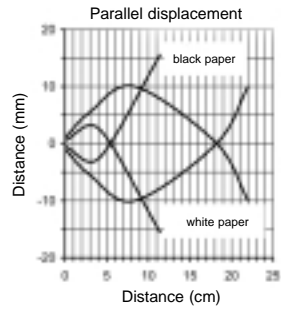
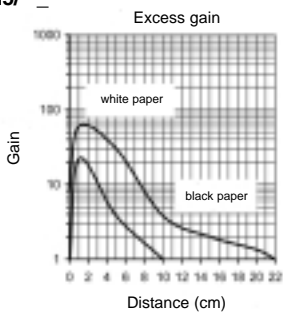


Characteristic curves

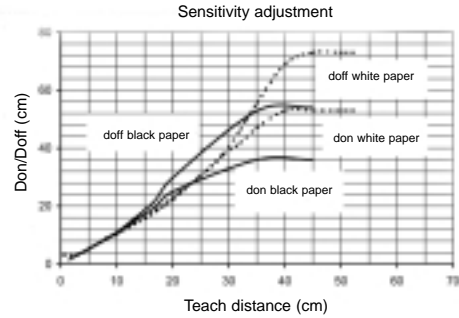
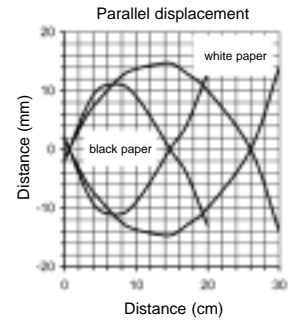
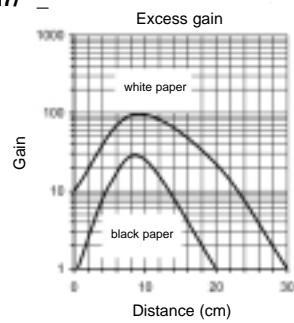
DM2,3/** **



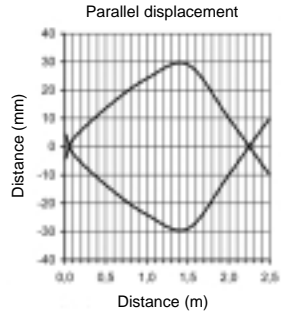
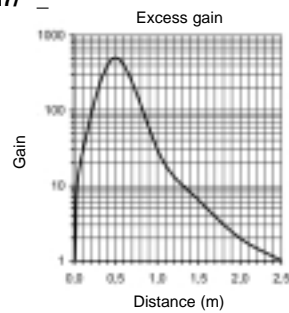
DM5/** **



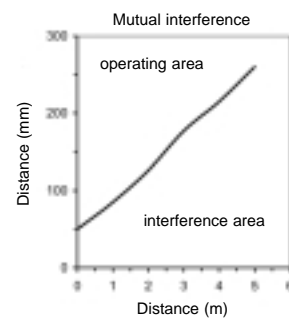
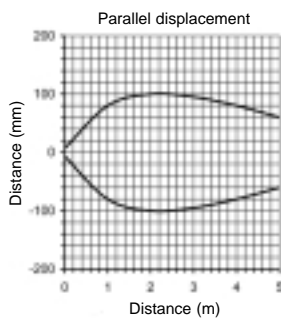
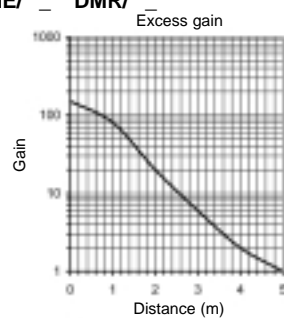
DM7/** **



DM7/** **



DME/** ** DMR/** **



M18 DC Photoelectric Switches FA



Compact M18 barrel type photoelectric switches for DC operation.

- Complete series of M18 photoelectric sensors, 10-30VDC
- Models with axial and 90 degree optics
- Models with IR, red light and red light laser emission
- Red light emission for transparent object detection
- Metal and plastic housings
- Models with or without sensitivity adjustment
- IP67 protection
- UL and CUL approved



Options and ordering codes

	FA	I	A	/	B	P	-	O	A
Infrared emission		I							
Visible red LED emission		R							
Red laser diode emission		L							
Diffuse 50mm without sensitivity adjustment			A						
Diffuse 50mm with sensitivity adjustment			B						
Diffuse 100mm without sensitivity adjustment			2						
Diffuse 100mm with sensitivity adjustment			3						
Diffuse 200mm with sensitivity adjustment, 300mm Laser model			4						
Diffuse 200mm without sensitivity adjustment			5						
Diffuse 400mm without sensitivity adjustment			6						
Diffuse 400mm with sensitivity adjustment			7						
Diffuse 1000mm axial 800mm 90° optics, with sensitivity adj.			8						
Diffuse 1000mm axial 800mm 90° optics, without sensitivity adj.			9						
Emitter			H						
Receiver with sens. adj. 20m axial 15m 90° optics, (50m Laser)			D						
Receiver without sensitivity adjustment 20m axial 15m 90° optics			Z						
Retro-reflective without sensitivity adjustment, 4m			C						
Polarised retro-reflective without sens. adj. 3m axial 2m 90° optics			P						
Polarised retro with sens. adj. 3m axial 2m 90° optics (35m Laser)			N						
Retroreflective with sensitivity adjustment 4m			M						
Polarised retro-reflective with sens. adj. For transparent objects 1m			L						
					O				
					X				
					L				
					D				
					B				
						P			
						N			
						O			
							0		
							1		
							2		
							3		
								A	
								E	
								C	
								K	

A	Axial cable exit
E	M12 plastic axial plug exit
C	90° cable exit
K	M12 plastic 90° plug exit
0	Plastic housing, axial optics
1	Metal housing, axial optics
2	Plastic housing, 90° optics
3	Metal housing, 90° optics
P	PNP logic output
N	NPN logic output
O	Emitter
O	Emitter or 4 wire, LOn/DOn selectable
X	Emitter with check
L	3 wire, LOn
D	3 wire, DOn
B	4 wire, complementary NO and NC output

M18 DC Photoelectric Switches FA



continued

Specification common to all models

Operating voltage	10-30VDC
Ripple	≤10%
Repeat accuracy	5%
Load current	100mA (not emitters)
Leakage current	≤10μA at Vmax (not emitters)
Supply electrical protection	Polarity reversal and transient
Output electrical protection	Short circuit (auto-reset) and over-voltage
EMC immunity	In accordance to EN50082-2;1995/EN60947-5-2;1999
Radiation	In accordance to EN50081-1;1993
Housing material	PBT (Plastic body) or Nickel plated brass (Metal body), PC (cable exit)
Tightening torque	40Nm
Time delay before availability	200ms (not with receiver/Laser emitter combination)
Storage temperature	-55° to 90°C
Protection	IP67 (EN60529)
Cable material	PVC

Infrared LED Emission

Model	Infrared Emitter		Receiver	
	FAIH/XO-**	FAIH/OO-**	FAIZ/**_**	FAID/**_**
Nominal sensing distance	20m with axial optics, 15m with 90 degree optics			
Emission	Infrared (880nm)		-	
No load supply current	25mA			
Output voltage drop	-	1.2Vmax. I _L = 100mA		
Output type	-	NPN or PNP, Q/Q _{not} or (LOn/DOn selectable on special models)		
Switching frequency	-	250Hz		
Sensitivity adjustment	No		Yes	
Check input	BK/2 to 0V test enable	-		
Interference external light	5000 lux (incandescent lamp)		10000 lux (sunlight)	
LED indicators	Green (Power ON)		Yellow (light state)	
Optics material	PC			
Weight (approximate)	200g (plastic body type)		240g (metal body type)	

Visible Red LASER Emission

Model	Red LASER Emitter	Receiver
	FALH/XO-**	FAID/**_**
Nominal sensing distance	50m	
Emission	Red LASER 650nm (Class 1 in accordance to IEC60825-1)	
No load supply current	25mA	
Output voltage drop	-	1.8Vmax. I _L = 100mA
Spot dimension	40mm at 60m	
Output type	-	NPN or PNP, Q/Q _{not}
Switching frequency	1kHz	-
Sensitivity adjustment	Yes	-
Check input	BK/2 to 0V test enable	
Operating temperature	-15° to 55°C	
Interference external light	3000 lux (incandescent lamp) 10000 lux (sunlight)	
LED indicators	Green (Power ON)	Yellow (light state)
Optics material	PC/Glass	
Weight (approximate)	200g (plastic body type) 240g (metal body type)	

Diffuse Red LASER Emission

Model	Red LASER Emitter
	FAL4/**_**
Nominal sensing distance	300mm ⁽¹⁾
Emission	Red LASER 650nm (Class 1 in accordance to IEC60825-1)
No load supply current	30mA
Output voltage drop	1.2Vmax. I _L = 100mA
Minimum object	0.1mm
Output type	NPN or PNP, Q/Q _{not} or (LOn/DOn selectable on special models)
Switching frequency	800Hz
Sensitivity adjustment	Yes, Teach function
Operating temperature	-15° to 55°C
Interference external light	3000 lux (incandescent lamp) 10000 lux (sunlight)
LED indicators	Yellow (Q/Q _{not} models indicates light status, when blinking, detection level is over threshold but under twice the threshold)
Optics material	PC/Glass
Weight (approximate)	200g

(1) White target Kodak paper (100mm²) 90% reflection

Polarized retro-reflective Red LASER Emission

Model	Red LASER Emitter
	FALN/**_**
Nominal sensing distance	25m with RL110
Emission	Red LASER 650nm (Class 1 in accordance to IEC60825-1)
No load supply current	≤ 20mA
Output voltage drop	1.2Vmax. I _L = 100mA
Minimum object	0.7mm at 1m, 24mm at 25m
Spot dimension	25mm at 25m
Output type	NPN or PNP, Q/Q _{not} or (LOn/DOn selectable on special models)
Switching frequency	800Hz
Sensitivity adjustment	Yes, Teach function
Operating temperature	-15° to 55°C
Interference external light	3000 lux (incandescent lamp) 10000 lux (sunlight)
LED indicators	Yellow (Q/Q _{not} models indicates light status, when blinking, detection level is over threshold but under twice the threshold)
Optics material	PC/Glass
Weight (approximate)	200g

M18 DC Photoelectric Switches FA



continued

Diffuse visible red and infrared LED Emission

Model	Red LED Emitter				Infrared Emitter					
	FARA/**_**	FARB/**_**	FAR2/**_**	FAR3/**_**	FAI4/**_**	FAI5/**_**	FAI6/**_**	FAI7/**_**	FAI8/**_**	FAI9/**_**
Nominal sensing distance	50mm ⁽¹⁾		100mm ⁽¹⁾		200mm ⁽²⁾		400mm ⁽²⁾		1m ⁽³⁾	
Emission	Red (660nm)				Infrared (880nm)					
No load supply current	30mA									
Output voltage drop	1.2Vmax. I _L =100mA									
Output type	NPN or PNP, Q/Q _{not} or (LOn/DOn selectable on special models)									
Switching frequency	250Hz									
Sensitivity adjustment	No	Yes	No	Yes	No		Yes		No	
Operating temperature	-25 to 70°C									
Interference external light	5000 lux (incandescent lamp) 10000 lux (sunlight)									
LED indicators	Yellow (light state)									
Optics material	PC									
Weight (approximate)	100g (plastic body type) 120g (metal body type)									

(1) White target Kodak paper (100mm²) 90% reflection

(2) White target Kodak paper (200mm²) 90% reflection

(3) White target Kodak paper (400mm²) 90% reflection

Polarized retro-reflective, retro-reflective models with visible red, LASER and infrared LED Emission

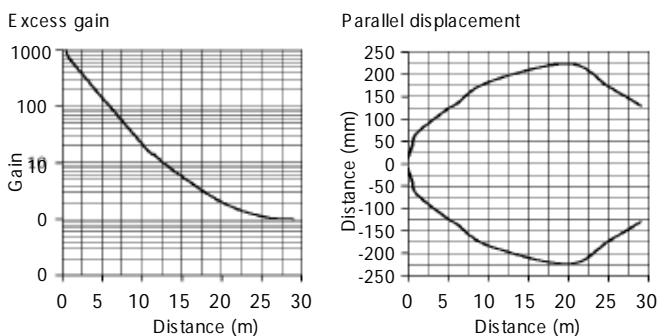
Model	Infrared	Red	Red		(for transparent objects)
	FAIC/**_**	FAIM/**_**	FAIP/**_**	FAIN/**_**	FAIL/**_**
Nominal sensing distance	4m ⁽⁴⁾		3m ⁽⁴⁾ axial optics 2m ⁽⁴⁾ 90 degree optics		1m ⁽⁴⁾
Emission	Infrared (880nm)		Red (660nm)		
No load supply current	30mA				
Output voltage drop	1.2Vmax. I _L =100mA				
Output type	NPN or PNP, Q/Q _{not} or (LOn/DOn selectable on special models)				
Switching frequency	250Hz				
Sensitivity adjustment	No	Yes	No		Yes
Operating temperature	-25 to 70°C				
Interference external light	5000 lux (incandescent lamp) 10000 lux (sunlight)				
LED indicators	Yellow (light state)				
Optics material	PC				
Weight (approximate)	100g (plastic body type) 120g (metal body type)				

(4) With RL110 reflector. Please refer to IMO data sheet for reflectors.

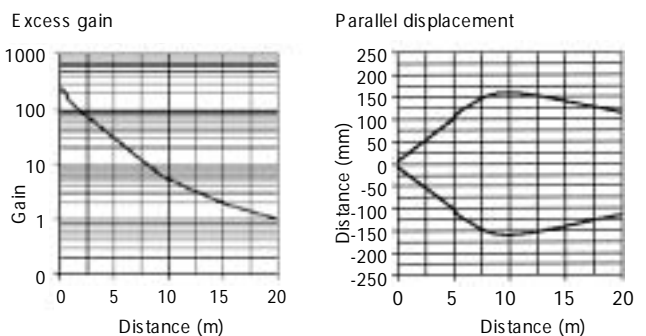
Characteristic curves

Through beam

FAIH/**_** FAID/**_** FAIZ/**_** axial optic



FAIH/**_** FAID/**_** FAIZ/**_** 90 degree optics



M18 DC Photoelectric Switches FA

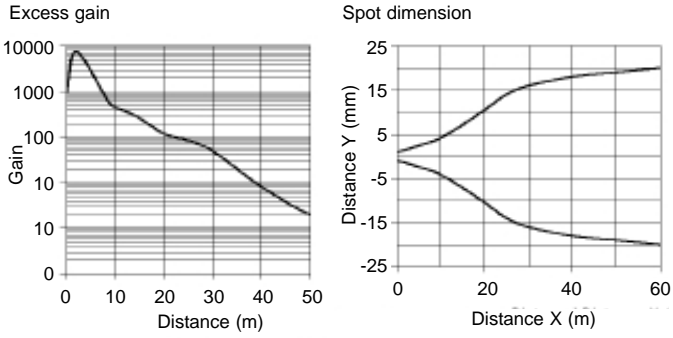


continued

Characteristic curves continued

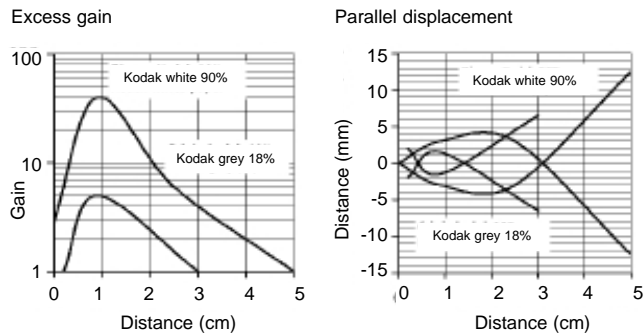
Through beam continued

FALH/XO-** FALD/**-**

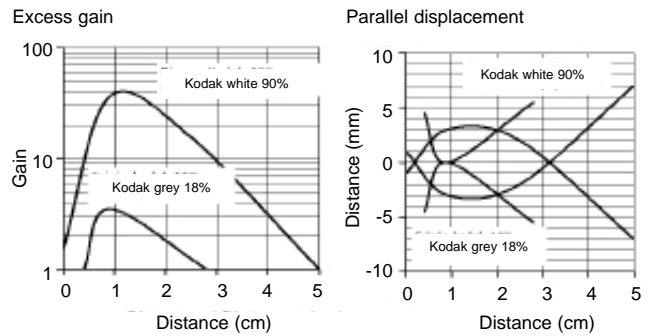


Diffuse reflection

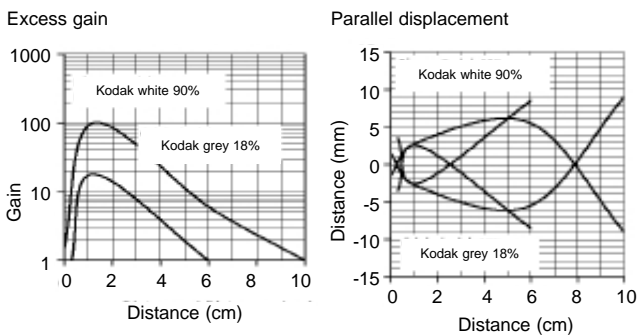
FARA/**-** FARB/**-** axial optic



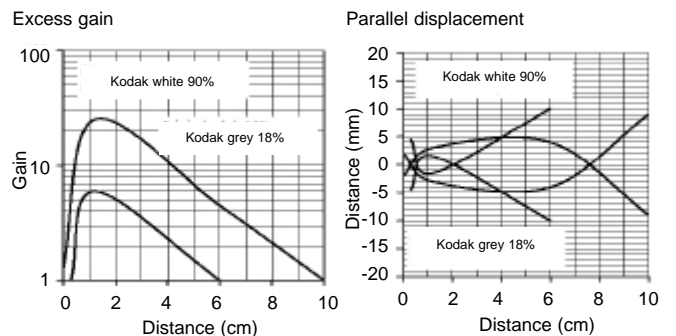
FARA/**-** FARB/**-** 90 degree optics



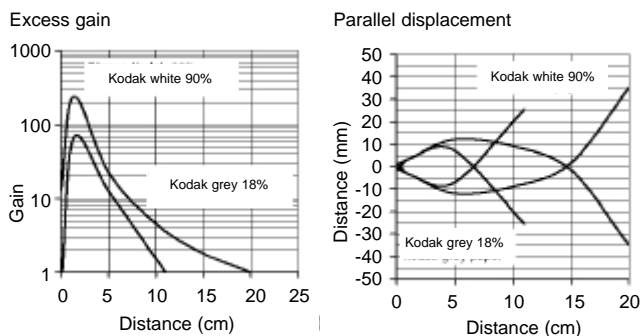
FAR2/**-** FAR3/**-** axial optic



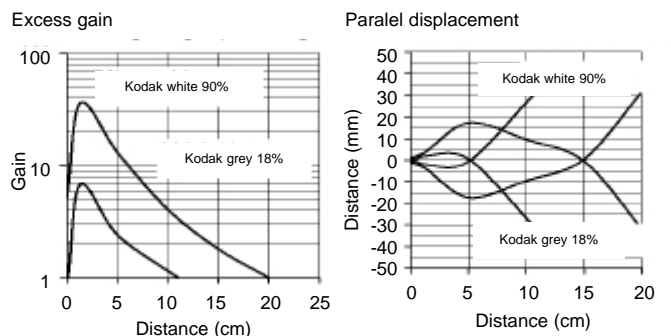
FAR2/**-** FAR3/**-** 90 degree optics



FAI4/**-** FAI5/**-** axial



FAI4/**-** FAI5/**-** 90 degree optics



M18 DC Photoelectric Switches FA

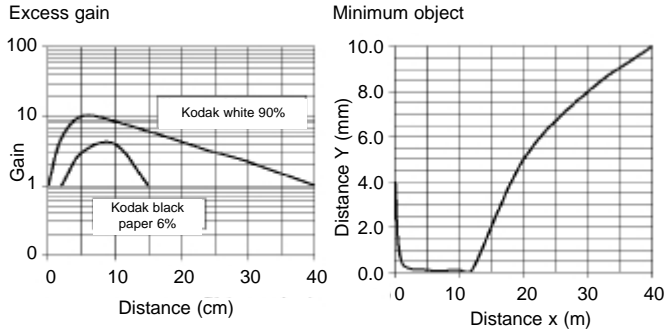


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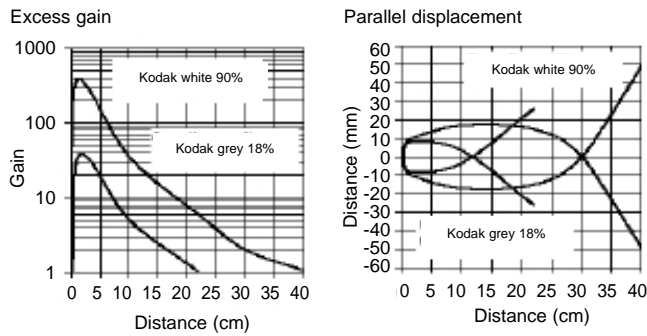
Characteristic curves continued

Diffuse reflective continued

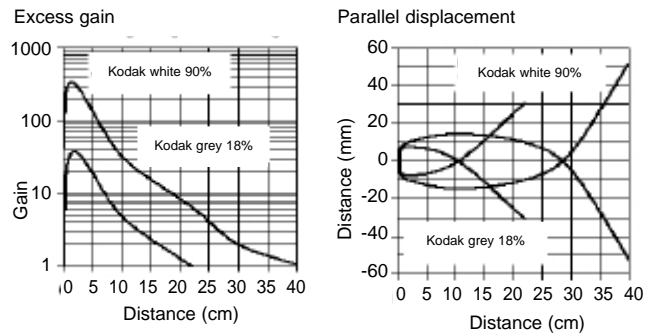
FAL4/**_**



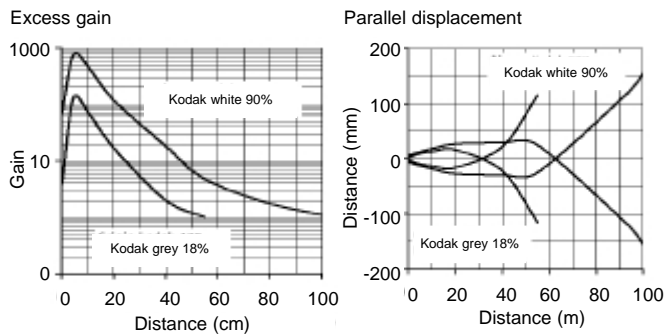
FAI6/**_** FAI6/**_** axial optics



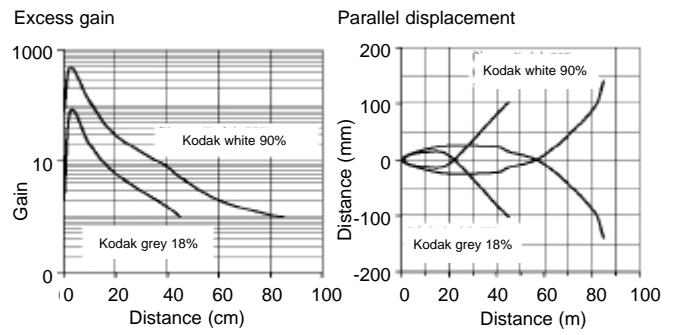
FAI6/**_** FAI6/**_** 90 degree optics



FAI8/**_** FAI9/**_** axial optics

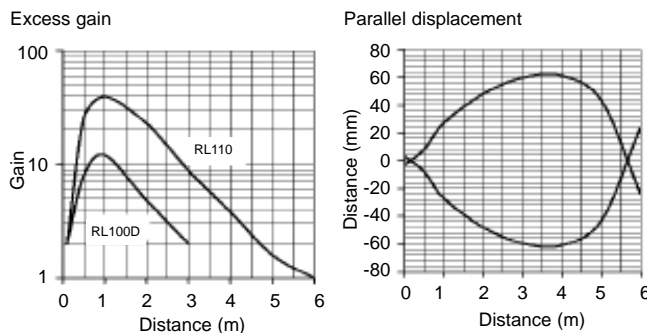


FAI8/**_** FAI9/**_** 90 degree optics

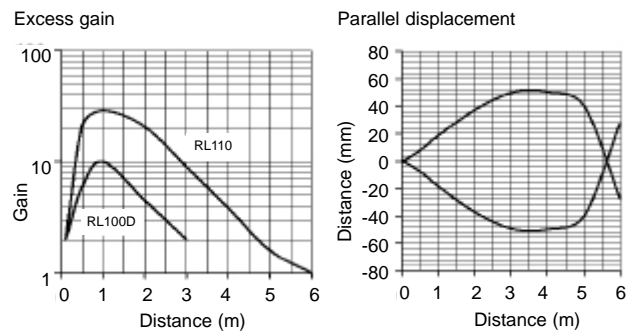


Retro-reflective

FAIC/**_** FAIM/**_** axial optics



FAIC/**_** FAIM/**_** 90 degree optics



M18 DC Photoelectric Switches FA



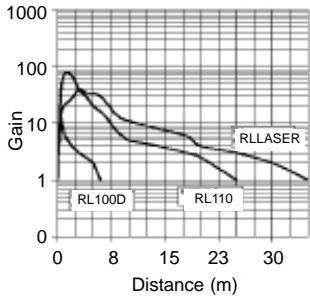
continued

Characteristic curves continued

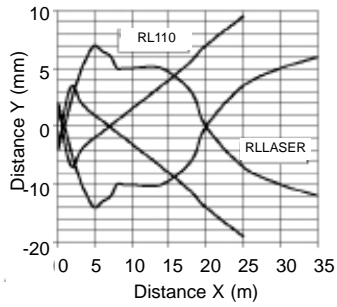
Retro-reflective continued

FALM/**-**

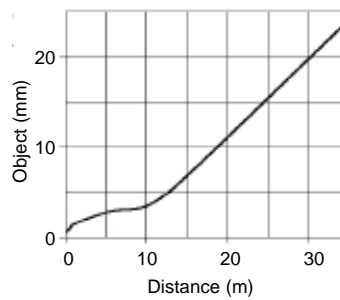
Excess gain



Parallel displacement

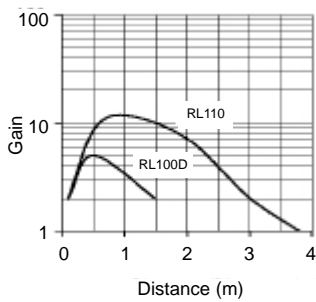


Minimum object

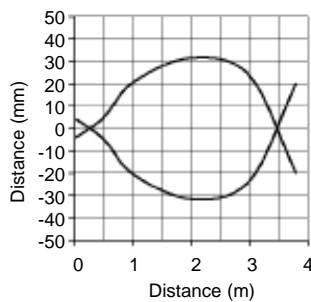


FARP/**-** FARN/**-** axial optics

Excess gain

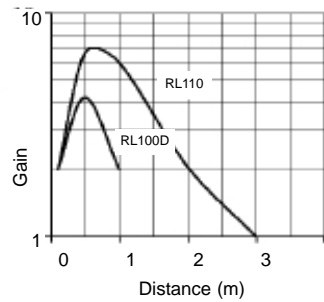


Parallel displacement

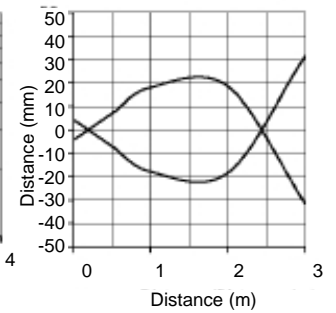


FARP/**-** FARN/**-** 90 degree optics

Excess gain

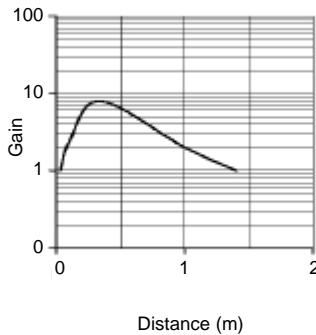


Parallel displacement

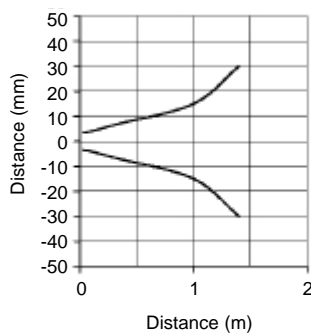


FARL/**-**

Excess gain



Parallel displacement

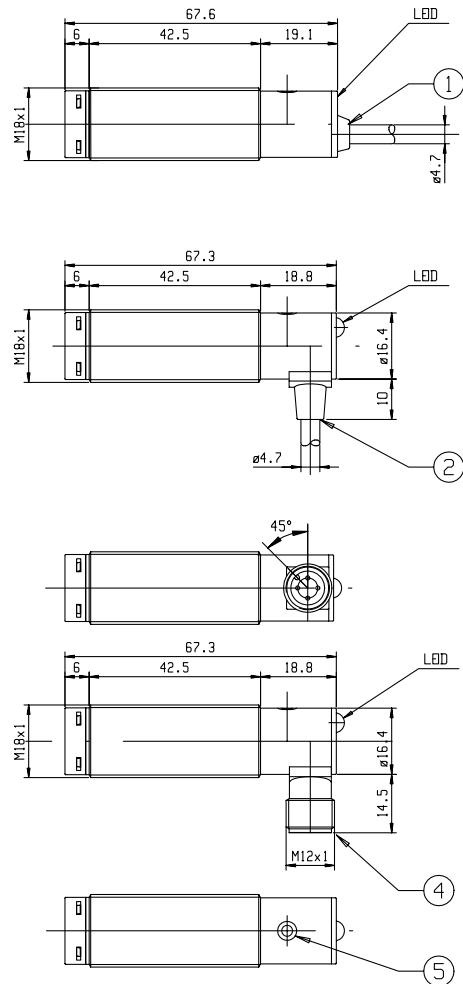
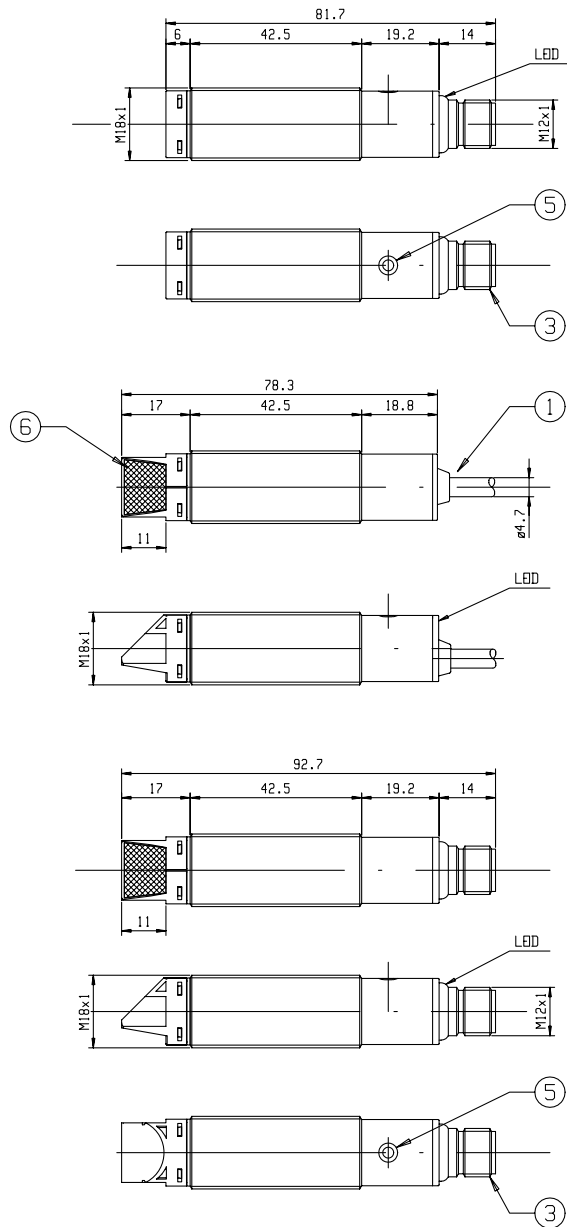


M18 DC Photoelectric Switches FA



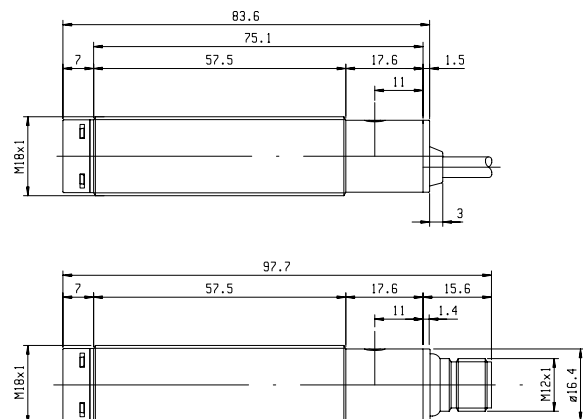
continued

Dimensions (mm)



1. Axial cable exit with tang
2. Right angle cable exit with tang
3. M12 plug cable exit
4. Right angle M12 plug cable exit
5. Sensitivity adjustment trimmer

FAL models (laser)



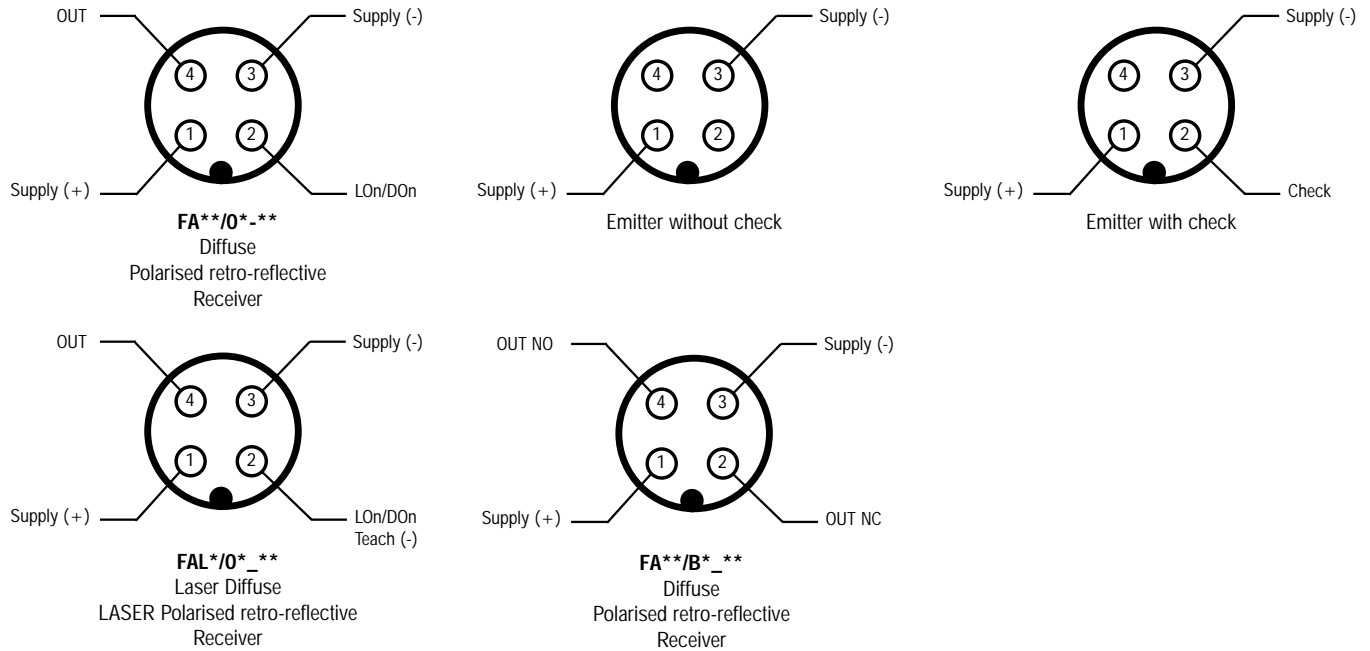
M18 DC Photoelectric Switches FA



continued

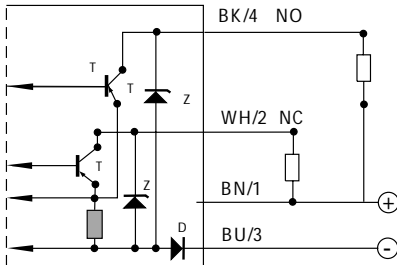
Wiring connections and outputs

M12 plug connector

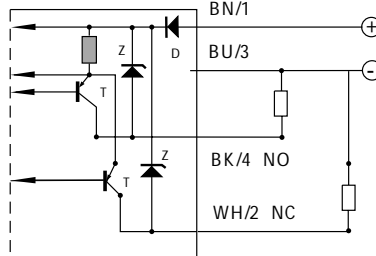


Complementary Q/Q_{not} output

NPN

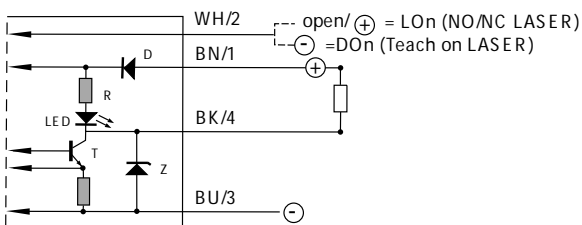


PNP

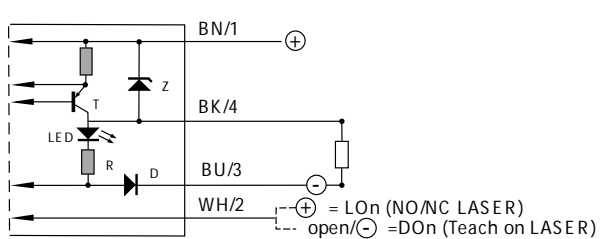


LOn/DOn selectable output

NPN

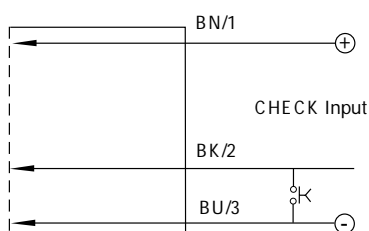


PNP

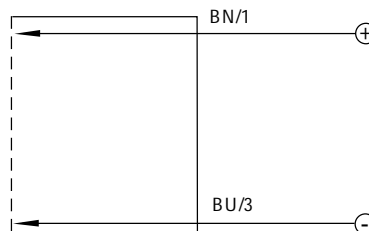


Complementary Q/Q_{not} output

Emitter with check



Emitter without check



Fibre Optic Sensor FX

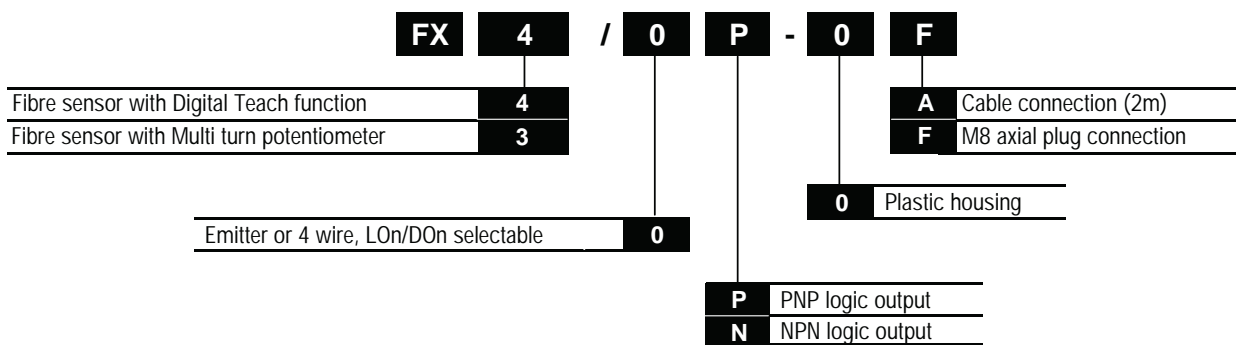


DIN Rail mounting Fibre Optic sensor / amplifier

- Digital "Teach In" sensitivity adjustment (FX4)
- Multi turn potentiometer adjustment (FX3)
- High speed output response
- Ultra thin 10mm housing
- 20mm to 200mm range
- Pulse stretcher
- UL and CUL approved



Options and ordering codes



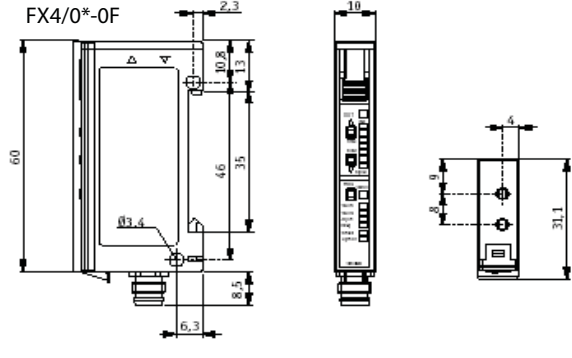
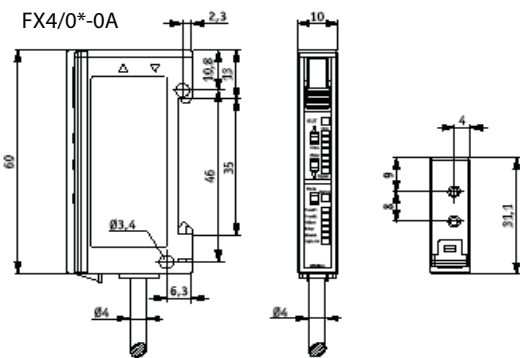
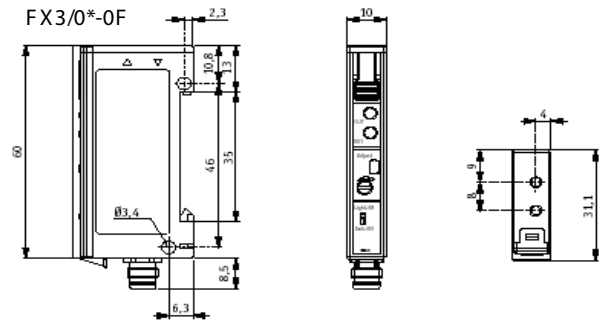
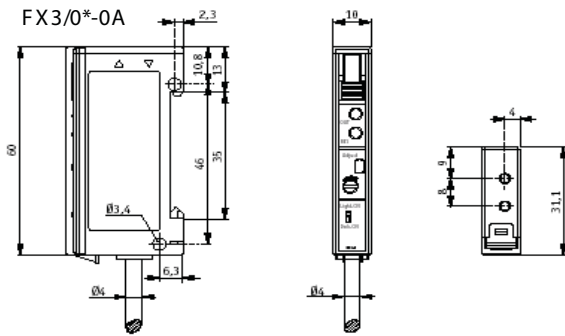
Specifications common to all models

	FX4/0*-0*	FX3/0*-0*
Operating voltage	10-30Vdc	
Output current	200mA	
Leakage current	0.1 mA	
Output Volt Drop	2v @ 200 mA	
No Load Supply Current	25mA typ. @ 24V	15mA typ. @24V
Red Light Emission	680 Nm, Pulsed	
Modulation Frequency	15kHz	
Switching Frequency	1.5kHz	
Power up delay	80mS	300mS
Indicators	Bar LED	Yellow LED (output) Green LED (alarm)
Adjustments	Push Button Teach	12 Turn Potentiometer
Pulse Timer	10mS - 150mS	
Output electrical protection	Short circuit (auto-reset) and over-voltage	
Protection (housing)	IP64 (EN60529)	
Protection (shock / vibration)	IEC 60947-5-2 / 7.4	
Housing material	ABS	
Storage temperature	-25° to 80°C	
Operating temperature	-25° to 55°C	
Weight	69g (approx)	

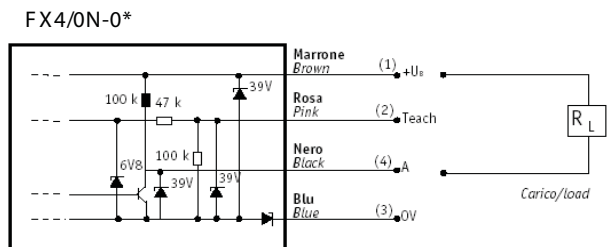
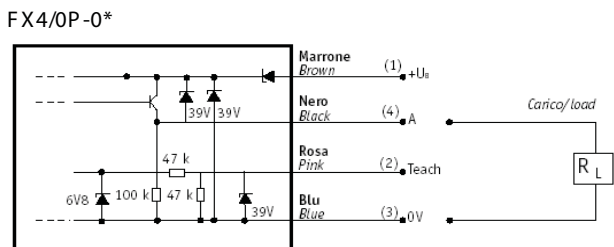
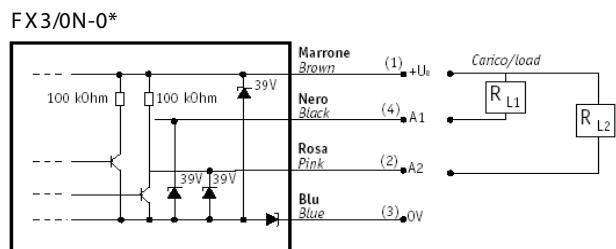
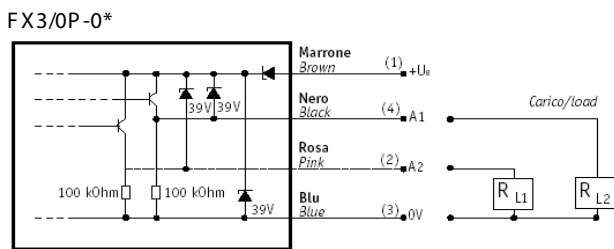
Fibre Optic Sensor FX



Dimensions



Connections



M18 DC DECOUT® Photoelectric Switches MS



DECOUT® NPN-PNP-NO-NC multi-function isolated output barrel type photoelectric switches

- Diffuse, retro-reflective, polarised, through-beam optical fibre models and background suppression
- 16m and 32m through-beam types
- Diagnostic CHECK function available on through-beam models
- IP67 protected nickel-plated or plastic housing
- Plug-in models
- Rear mounted LED operation indicator
- Short-circuit protection
- UL and CUL approved



Options and ordering codes

MS / **2** / **0** **0** - **0** **A**

DECOUT® Photoelectric switches ø18mm	MS
DECOUT® Photoelectric switches ø18mm with 90° lens	MP

A	Standard cable exit
E	M12 plastic plug

0 Plastic housing

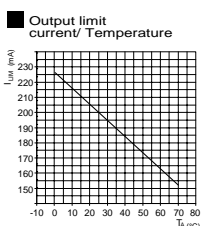
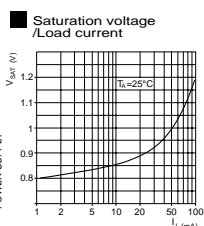
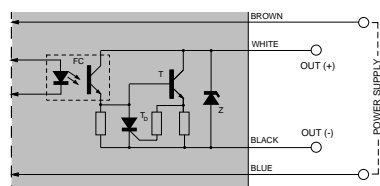
10cm diffuse	2
20cm diffuse	4
40cm diffuse	6
50mm sensing background suppression	0
100mm sensing background suppression	1
4m retro-reflective	C
3m polarised retro-reflective	P
Standard transmitter	E
16m standard receiver	R
32m long distance receiver	D
Optical fibre	F

X	Transmitter with CHECK
0	All other models

Add suffix 'UR' for UL approved models

Output circuit

DECOUT output range
MS*/00-** model

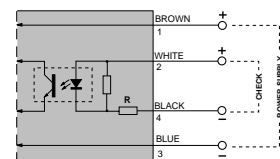


Note: in case of combined load i.e. resistive and capacitive, the maximum admissible capacity is 0.1µF for maximum output voltage and output current.

CHECK

MSE/X Transmitter

- operating voltage: 6-30VDC
- R value: 4.7KOhm
- max. isolation voltage
- CHECK/supply: 1000VAC



The CHECK function is incorporated in the MSE/X transmitter. If 6-30 V DC is applied between the white and black wires; the presence of a target is simulated; forcing the receiver output to switch. As the input is internally decoupled, the CHECK function can be performed by either NPN or PNP configurations.

M18 DC DECOUT® Photoelectric Switches MS continued



Specification

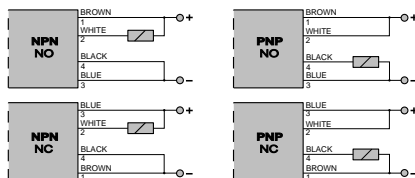
Type	diffuse		b/supp	retro-reflective	polarised	through-beam		optical fibre		
Models	MS2	MS4	MS6	MS0	MS1	MSC	MSP	MSE-MSR	MSE-MSD	MSF
Sensing range	10cm ⁽¹⁾	20cm ⁽¹⁾	40cm ⁽²⁾	50mm	100mm	4m ⁽³⁾	3m ⁽³⁾	16m ⁽⁴⁾	32m ⁽⁴⁾	20-400mm
Emission	infra-red					red	infrared		red	
Hysteresis	10%									
Repeatability	5%									
Tolerance	+ 15% - 10% of the sensing range									
Supply voltage	10 - 30 DC									
Ripple	10% max.									
Max consumption	30mA	30mA	30mA	30mA		trans 15mA (w. CHECK 35mA) receiver 25mA		25mA		
Response time	6ms	6ms	6ms	6ms		16ms		1ms		
Output type	DECOUT® (NPN,PNP,NO,NC selectable on the single unit)									
Load current	100 mA									
Residual output voltage	1.2V max. IL = 100 mA									
Leakage current	< 10 µA									
Output current limit	200 mA (see graph, overleaf)									
Electric protections	against short circuit (discount power to reset) - polarity reversal - inductive loads									
Time before switch operation	200 ms									
LED status indicator	yes (at the rear)									
Insulation resistance	> 1000M Ohm to 1000VDC									
Dielectric strength	2000VAC 50Hz for 1 Minute									
Noise immunity	1000V (IEC 801-4, II) plastic housing, 500V (IEC801-4, I) metal housing									
Protection degree	IEC IP67									
Materials	housing: plastic body - polyamide (nylon), metal body - nickel-plated brass, lenses: acrylic, cable exit: polycarbonate									
Operating temperature	-25° + 70° C (without freeze)									
Interference by external light	3000 lux (artificial light), 10000 lux (sunlight)									
Tightening torque	INm (10kgcm), (plastic housing); 40Nm (408 kgcm), (metal housing)									
Ambient humidity	35-85% r.h.									
Weight (approx.)	125g (plastic) 150g (metal)					210g (plastic) 250g (metal)			125g	

⁽¹⁾ referred to 100x100mm white matt paper; ⁽²⁾ referred to 200x200mm white matt paper; ⁽³⁾ with ø80mm reflector (RL110 supplied separately); ⁽⁴⁾ minimum detectable target ø7.5mm

Wiring connections

DECOUT output

MS*/00-** model



PARALLEL connection

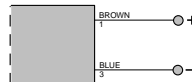
Since the value for leakage current is very low (10µA max.) there are no practical restrictions in the parallel connection of several sensors, provided the load current is of a few mA.

SERIES connection

In the series connection of several sensors it is necessary to account for the voltage drop value V_{sat} (between 0.8V and 1.2V typical) according to the available supply voltage.

TRANSMITTER

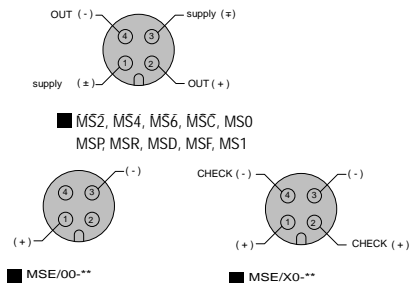
MSE/00-** model



Plug-pin connections

M12 plug

Cable exit option E or H



Optical fibre

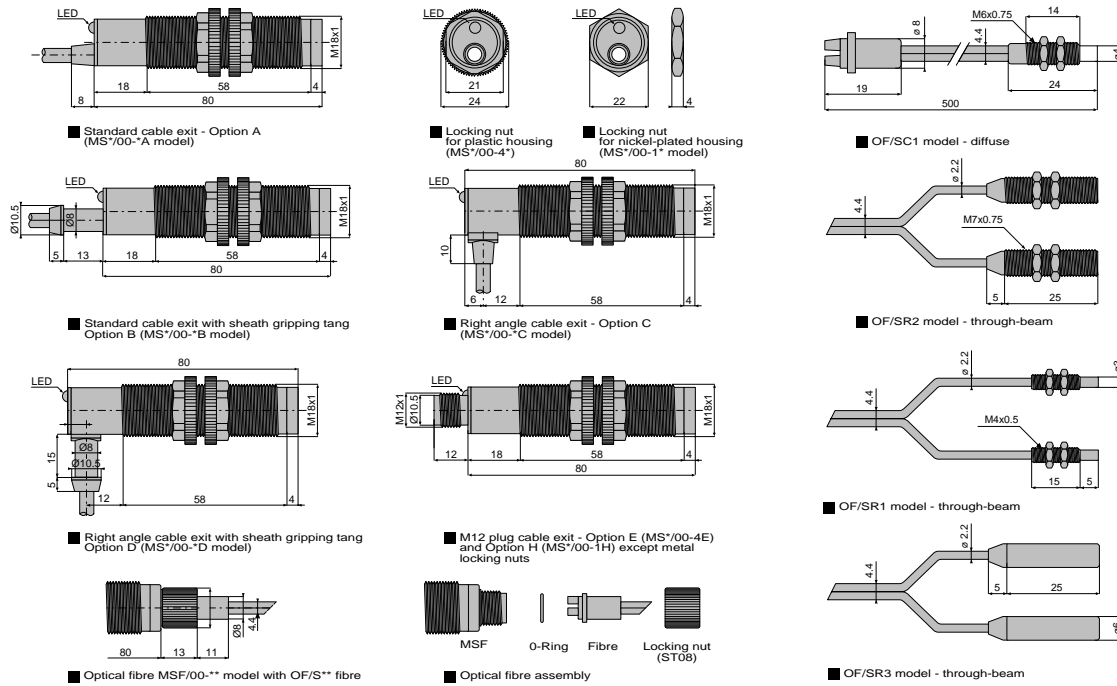
type	diffuse ⁽²⁾	through-beam	through-beam	through-beam
models	OF/SC1	OF/SR1	OF/SR2	OF/SR3
sensing range ⁽¹⁾	20mm	40mm	400mm	400mm
fibre head	M6x0.75	M4x0.5	M7x0.75	Ø6mm unthreaded
fibre	500mm standard fibre length - Ø 1mm active fibre			
operating temperature	- 10°+70 °C			
materials	fibre: methacrylate - sheath: polyethylene - fibre head: aluminium			

⁽¹⁾referred to MSF photoelectric switch - ⁽²⁾can be used in retro-reflective version

M18 DC DECOUT® Photoelectric Switches MS continued



Dimensions (mm)



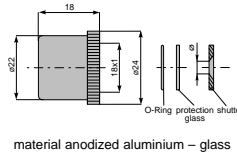
Red LED showing the output state; MSE models equipped with LED showing the presence of supply voltage.
 Cable: $\varnothing 4.7\text{mm}$, 2m length, 0.34mm² conductor section, PVC material

Each model is also available with fibre length of 1m (OF/S*-1 model) and 2m (OF/S*-2 model)

Accessories

Type	Code
Swing mount bracket	ST02
Axial mount bracket	ST18-A
Right-angle mount bracket	ST18-C
Antidust front	ST30
Right angle beam adapter	ST03
Shutter	ST0S*
Protective front	ST50
Reflectors	see RL leaflet
Right angle beam adapter for OF/SR2 fibre	ST28

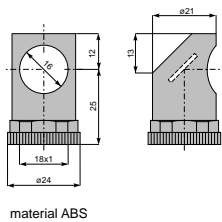
Shutter $\varnothing 18\text{mm}$



This accessory, available for through-beam photoelectric switches $\varnothing 18\text{mm}$, reduces the emitted beam allowing the detection of small targets (down to 1mm). The shutter consists of a threaded ring nut, a protection glass, an O-ring and an aperture to be screwed on the optical head of both transmitter and receiver.

Shutter code	ST0S2	ST0S3	ST0S4	ST0S6	ST0S8
\varnothing shutter aperture (mm)	2	3	4	6	8
MSE/MSR sensing range (m)	0.8	1.8	3.2	6.5	N/A
\varnothing min. detectable object (mm)	1	1.5	2	3	N/A
MSE/MSD sensing range (m)	1.5	3.5	6.5	15	26
\varnothing min. detectable object (mm)	1	1.5	2	3	4

Right angle beam adapter $\varnothing 18\text{mm}$



For directing the photoelectric detection at 90° to the photoelectric switch optical axes for $\varnothing 18\text{mm}^*$ sensors.

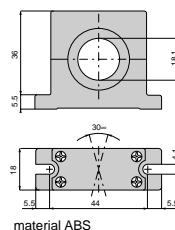
This accessory consists of an internal threaded body to be screwed on the optical head of the photoelectric switch.

The mirror inside the body is set at 45° to the optical axes of the sensor allowing detection at 90°.

The sensitivity loss is approx. 20-30%.

*Not for diffuse types.

Swing mount bracket $\varnothing 18\text{mm}$



For easy mounting and alignment of retro-reflective and through-beam photoelectric switches $\varnothing 18\text{mm}$:

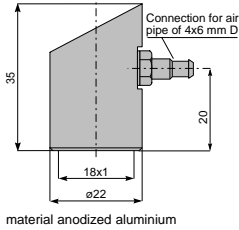
- fasten the mount bracket and tightly tighten the 4 self-tapping screws
 - direct the photoelectric switch to find the optimum position. The accessory allows rotation in all directions at an angle of 15° max.
 - clamp the 4 screws in the defined position
- 15°

M18 DC DECOUT® Photoelectric Switches MS continued



Accessories continued

Antidust front ø18mm (ST3Ø model)

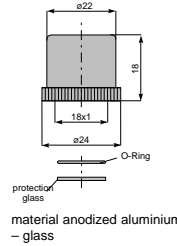


This is used to prevent dust or other deposits on the lenses of photoelectric switches ø18mm*, thus ensuring constant detection is maintained. It consists of a threaded body with a side air inlet pipe. The sensitivity loss is approx. 30%.



*not for diffuse types

Protective front ø18mm (ST5Ø model)

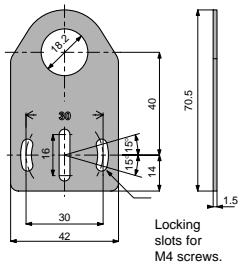


For the protection of the lenses of photoelectric switches ø18mm*. It allows use of the sensor even in particularly aggressive conditions (presence of chemical solvents etc.)

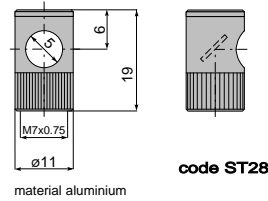
The system consists of a threaded metal body, an O-ring and a protection glass. The sensitivity loss is approx. 25%.

*not for diffuse types

Axial mount bracket (ST18-A model)



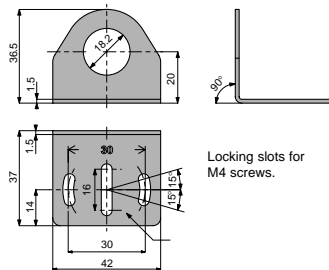
Right angle beam adapter for OF/SR2 fibre



The ST28 accessory is used for directing the photoelectric detection through 90° from the fibre optical axes. It consists of a threaded body to be screwed on the optical head of the sensor.

The mirror inside the body is set at 45° to the optical axes allowing detection at 90°. The sensitivity loss is approx. 20-30%.

Right angle mount bracket (ST18-C model)

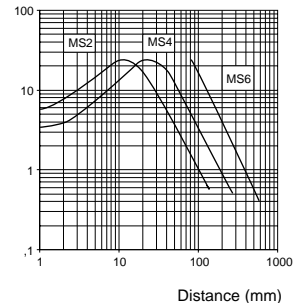


M18 DC DECOU[®] Photoelectric Switches MS continued

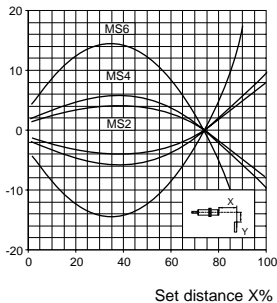


Characteristic curves

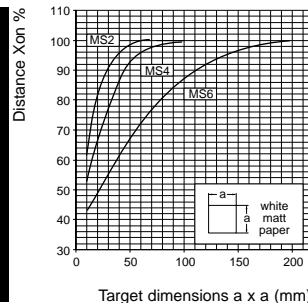
MS2-MS4-MS6 Excess gain



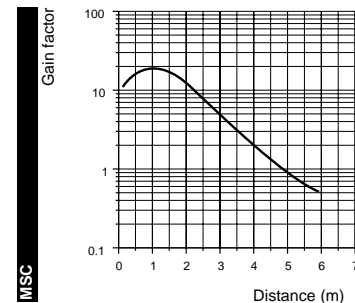
MS2-MS4-MS6 Parallel displacement



MS2-MS4-MS6 Distance/target size

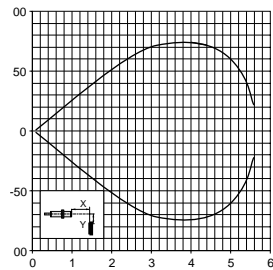


MSC Excess gain

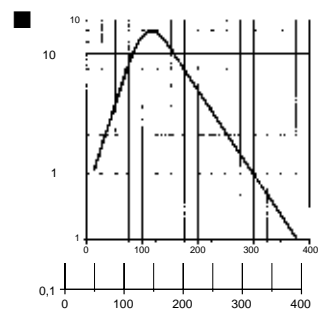


MSC Parallel displacement

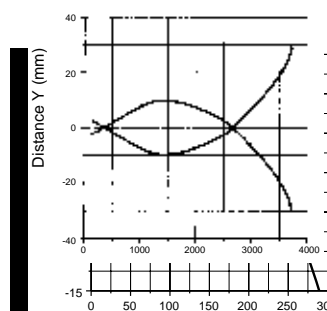
■ Parallel displacement



MSP Excess gain

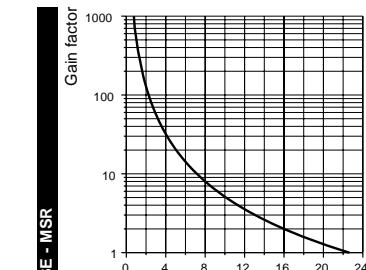


MSP Parallel displacement



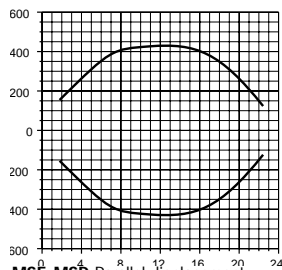
MSE-MSR Excess gain

■ Excess



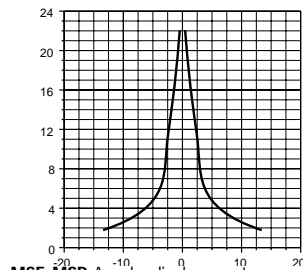
MSE-MSR Parallel displacement

■ Parallel displacement



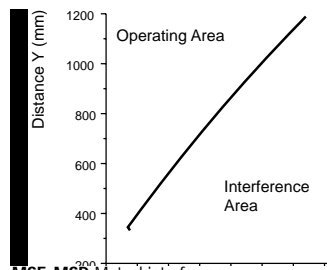
MSE-MSR Angular displacement

■ Angular displacement



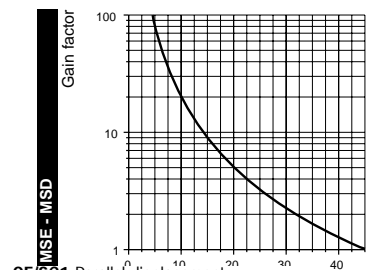
MSE-MSR Mutual interference

■ Mutual interference



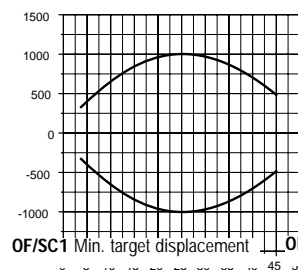
MSE-MSD Excess gain

■ Excess gain

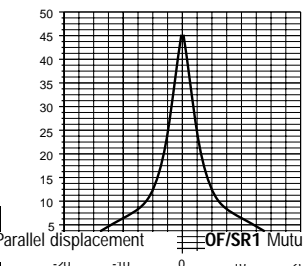


MSE-MSD Parallel displacement

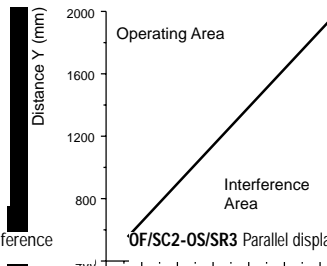
■ Parallel displacement



MSE-MSD Angular displacement

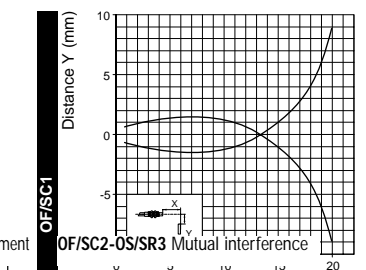


MSE-MSD Mutual interference



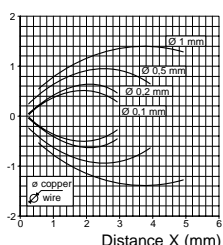
OF/SC1 Parallel displacement

■ Parallel displacement



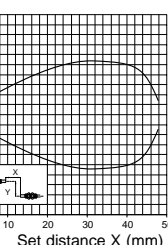
OF/SC1 Min. target displacement

■ Min. target



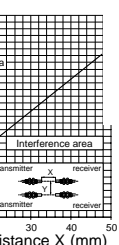
OF/RS1 Parallel displacement

■ Parallel



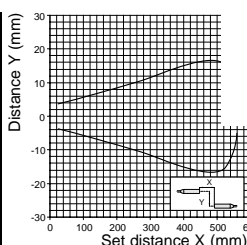
OF/RS1 Mutual interference

■ Mutual Interference



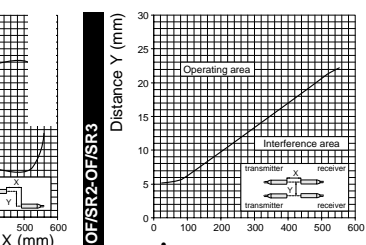
OF/SC2-OS/SR3 Parallel displacement

■ Parallel



OF/SC2-OS/SR3 Mutual interference

■ Mutual interference



M18 AC Photoelectric Switches MV



Compact ø18 x 80 mm barrel type photoelectric switches for AC operation

- Diffuse, retro-reflective, polarised, through-beam optical fibre models and background suppression
- 16m and 32m through-beam types
- Wide AC supply voltage 20-240VAC
- IP67 plastic housing
- Rear mounted LED operation indicator
- Low leakage triac output with transient protection
- Plug-in models for use with low voltage
- UL and CUL approved



Options and ordering codes

MV	2	/	A	0	-	0	A
AC multivoltage photoelectric switches ø18mm							
	2						A Standard cable exit
	4						E M12 plastic plug*
	6					0 Plastic housing	
10cm diffuse	2		A NO output state				
20cm diffuse	4		0 Transmitter				
40cm diffuse	6						
50mm sensing background suppression	0						
100mm sensing background suppression	1						
4m retro-reflective	C						
3m polarised retro-reflective	P						
Transmitter	E						
16m standard receiver	R						
32m long distance receiver	D						
Optical fibre	F						

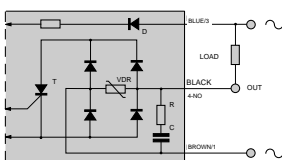
Please contact IMO for details of the many other options available, including the MQ range which gives right angle viewing with no loss of performance

Add suffix 'UR' for UL approved models
*Plug exit E for 24VAC supply only

Output circuit

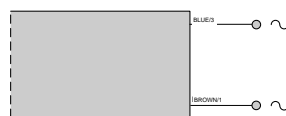
TRIAC output

MV*/0-** model



Transmitter

MVE/00-** model



PARALLEL connection

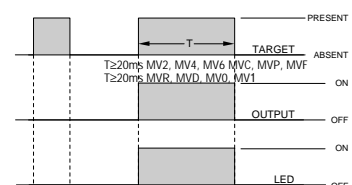
In the parallel connection of more outputs it is necessary to consider the maximum leakage current (1.5mA to 240 VAC) referred to load and supply values for computing the maximum number of sensors which may be connected.

Note: in order to ensure a long life of the output stage it is necessary to avoid short circuits. Further, the load current should never exceed the specifications value.

Timing chart

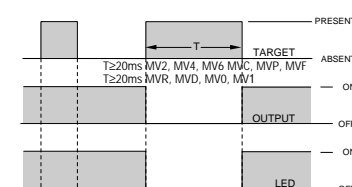
NO output (normally open)

MV*/A0-** model



NC output (normally closed)

MV*/C0-** model



M18 AC Photoelectric Switches MV



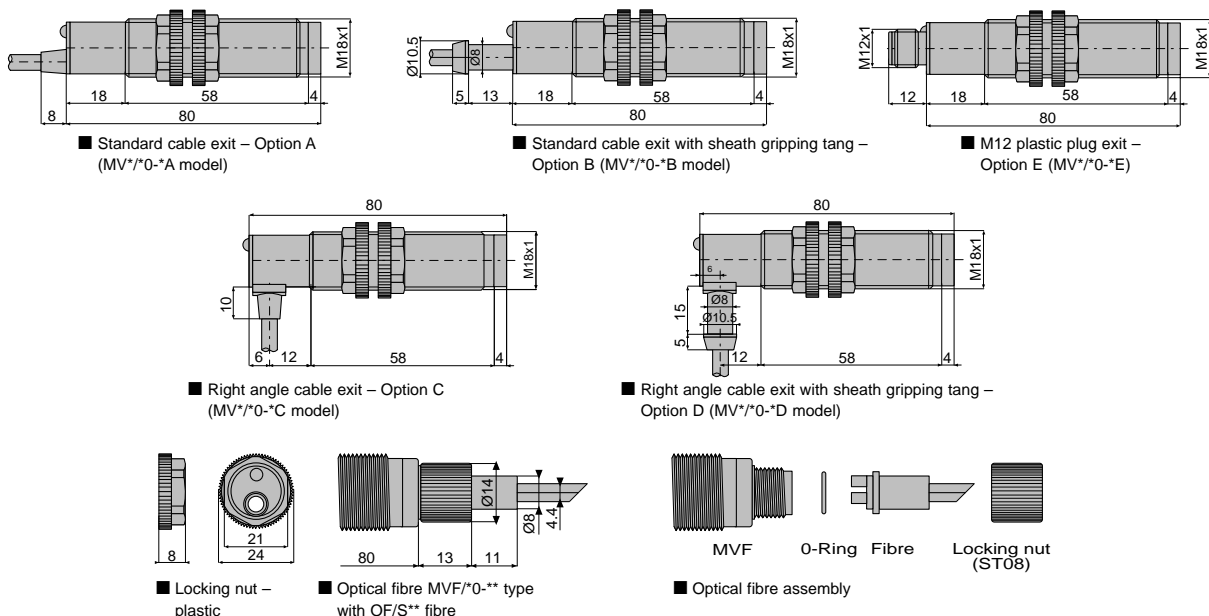
continued

Specification

Type	diffuse			b/supp		retro-reflective	polarised	through-beam		optical fibre
Models	MV2	MV4	MV6	MV0	MV1	MVC	MVP	MVE-MVR	MVE-MVD	MVF
Sensing range	10cm ⁽¹⁾	20cm ⁽¹⁾	40cm ⁽²⁾	50mm	100mm	4m ⁽³⁾	3m ⁽³⁾	16m ⁽⁴⁾	32m ⁽⁴⁾	20-400mm
Emission	infra-red					red	infrared		red	
Hysteresis	10%									
Repeatability	5%									
Tolerance	+ 15% - 5% of the sensing range									
Supply voltage	20 - 240 VAC									
Frequency	50 - 60 Hz									
Max consumption	MVR/MVD, 15mA rms Other models 30mA rms									
Response time	20ms	20ms	20ms	20ms	20ms	20ms	20ms	20ms	20ms	20ms
Output type	TRIAC - NO or NC									
Load current	300 mA RMS (at 50 °C)									
Residual output voltage	3V max. IL = 300 mA									
Leakage current	1.5 mA RMS max (V supply = 240VAC)									
Non-repeating current peak	6 A (Ton = 10ms)									
Minimum load current	5 mA RMS									
Time before switch operation	200 ms									
LED status indicator	yes (at the rear)									
Insulation resistance	> 1000M Ohm to 1000VDC									
Dielectric strength	2000VAC 50Hz for 1 Minute									
Noise immunity	1000V (IEC 801-4, II)									
Protection degree	IEC IP67									
Materials	housing: polyamide (nylon), lenses - acrylic, cable exit: polycarbonate									
Operating temperature	-25° + 70 °C (without freeze)									
Interference by external light	3000 lux (artificial light), 10000 lux (sunlight)									
Tightening torque	1 Nm (10kgcm), (plastic housing): 40Nm (408 kgcm), (metal housing)									
Ambient humidity	35-85% r.h.									
Weight (approx.)	90 gr.	90 gr.	90 gr.	90 gr.	90 gr.	90 gr.	175 gr.	175 gr.	175 gr.	90 gr.

⁽¹⁾ referred to 100x100mm white matt paper; ⁽²⁾ referred to 200x200mm white matt paper; ⁽³⁾ with ø80mm reflector (RL110 supplied separately); ⁽⁴⁾ minimum detectable target ø7.5mm

Dimensions (mm)



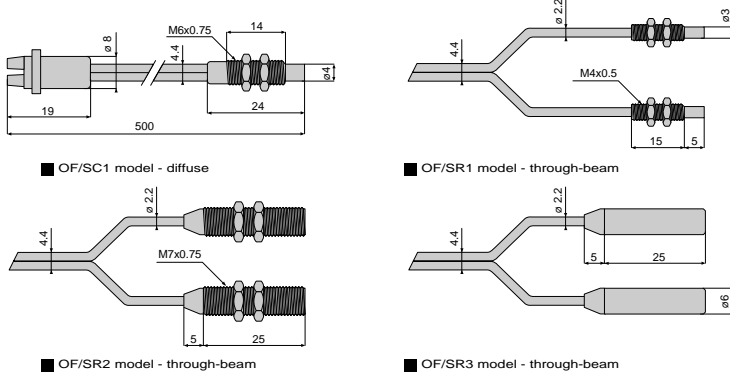
M18 AC Photoelectric Switches MV



continued

Dimensions (mm) continued

Red LED showing the output state on MV2, MV4, MV6, MVC, MVP, MVR, MVD, MVF models;
MVE model equipped with LED showing the presence of power supply.
Cable: $\varnothing 4.7\text{mm}$, 2m length, 0.34mm² conductor section PVC material



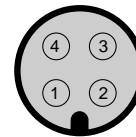
Each model is also available with fibre length of 1m (OF/S**-1 model) and 2m (OF/S**-2 model)

Optical fibre

type	diffuse ⁽²⁾	through-beam	through-beam	through-beam
models	OF/SC1	OF/SR1	OF/SR2	OF/SR3
sensing range ⁽¹⁾	20mm	40mm	400mm	400mm
fibre head	M6x0.75	M4x0.5	M7x0.75	$\varnothing 6\text{mm}$ unthreaded
fibre	500mm standard length - 1mm \varnothing active fibre			
operating temperature	-10° +70 °C			
materials	fibre: methacrylate - sheath: polyethylene - fibre head: aluminium			

Connectors

M12

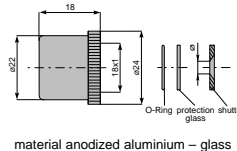


(1) referred to MVF photoelectric switch - (2) can be used in retro-reflective version also

Accessories

Type	Code
Swing mount bracket	ST02
Axial mount bracket	ST18-A
Right-angle mount bracket	ST18-C
Antidust front	ST30
Right angle beam adapter	ST03
Shutter	ST0S*
Protective front	ST50
Reflectors	see RL leaflet
Right angle beam adapter for OF/SR2 fibre	ST28

Shutter $\varnothing 18\text{mm}$

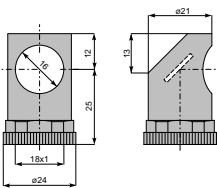


material anodized aluminium - glass

This accessory, available for through-beam photoelectric switches $\varnothing 18\text{mm}$, reduces the emitted beam allowing the detection of small targets (down to 1mm). The shutter consists of a threaded ring nut, a protection glass, an O-ring and an aperture to be screwed on the optical head of both transmitter and receiver.

Shutter code	ST0S2	ST0S3	ST0S4	ST0S6	ST0S8
\varnothing shutter aperture (mm)	2	3	4	6	8
MVE/MVR sensing range (m)	0.8	1.8	3.2	6.5	N/A
\varnothing min. detectable object (mm)	1	1.5	2	3	N/A
MVR/MVD sensing range (m)	1.5	3.5	6.5	15	26
\varnothing min. detectable object (mm)	1	1.5	2	3	4

Right angle beam adapter $\varnothing 18\text{mm}$



material ABS

For directing the photoelectric detection at 90° to the photoelectric switch optical axes for $\varnothing 18\text{mm}^*$ sensors.

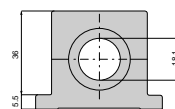
This accessory consists of an internal threaded body to be screwed on the optical head of the photoelectric switch.

The mirror inside the body is set at 45° to the optical axes of the sensor allowing detection at 90°.

The sensitivity loss is approx. 20-30%.

*Not for diffuse types.

Swing mount bracket $\varnothing 18\text{mm}$



material ABS

For easy mounting and alignment of retro-reflective and through-beam photoelectric switches $\varnothing 18\text{mm}$:

- fasten the mount bracket and tightly tighten the 4 self-tapping screws
- direct the photoelectric switch to find the optimum position. The accessory allows rotation in all directions at an angle of 15° max.
- clamp the 4 screws in the defined position

15°

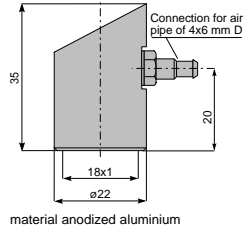
M18 AC Photoelectric Switches MV



continued

Accessories continued

Antidust front ø18mm (ST3Ø model)

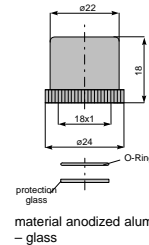


This is used to prevent dust or other deposits on the lenses of photoelectric switches ø18mm*, thus ensuring constant detection is maintained. It consists of a threaded body with a side air inlet pipe. The sensitivity loss is approx. 30%.



*not for diffuse types

Protective front ø18mm (ST5Ø model)

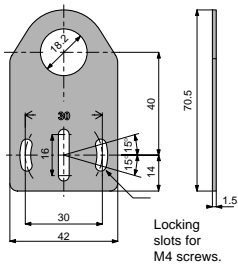


For the protection of the lenses of photoelectric switches ø18mm*. It allows use of the sensor even in particularly aggressive conditions (presence of chemical solvents etc.)

The system consists of a threaded metal body, an O-ring and a protection glass. The sensitivity loss is approx. 25%.

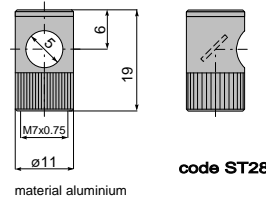
*not for diffuse types

Axial mount bracket (ST18-A model)



Locking slots for M4 screws.

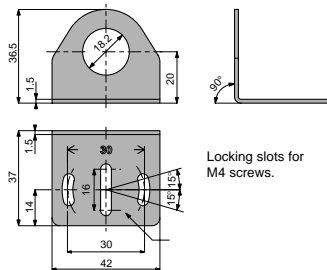
Right angle beam adapter for OF/SR2 fibre



The ST28 accessory is used for directing the photoelectric detection through 90° from the fibre optical axes. It consists of a threaded body to be screwed on the optical head of the sensor.

The mirror inside the body is set at 45° to the optical axes allowing detection at 90°. The sensitivity loss is approx. 20-30%.

Right angle mount bracket (ST18-C model)



Locking slots for M4 screws.

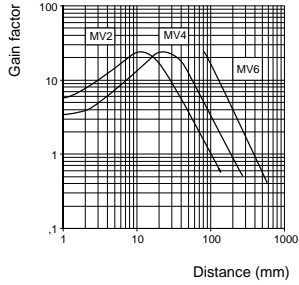
M18 AC Photoelectric Switches MV



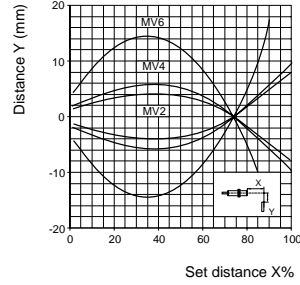
continued

Characteristic curves

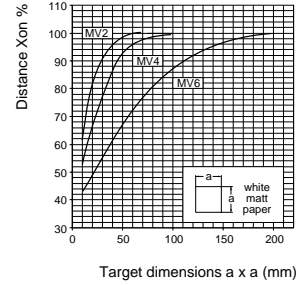
MV2-MV4-MV6 Excess gain



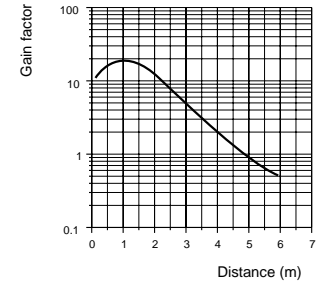
MV2-MV4-MV6 Parallel displacement



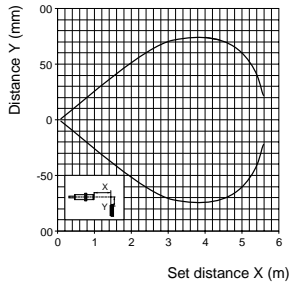
MV2-MV4-MV6 Distance/target size



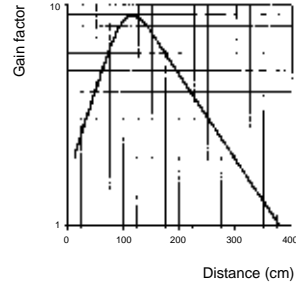
MVC Excess gain



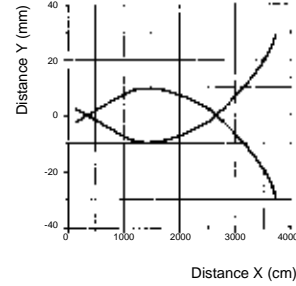
MVC Parallel displacement



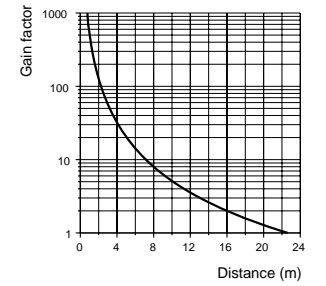
MVP Excess gain



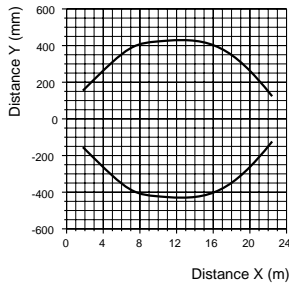
MVP Parallel displacement



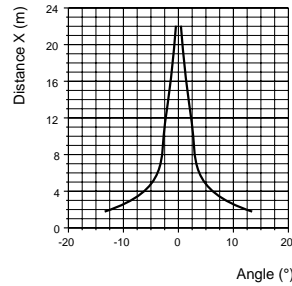
MVE-MVR Excess gain



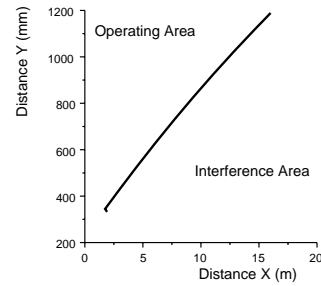
MVE-MVR Parallel displacement



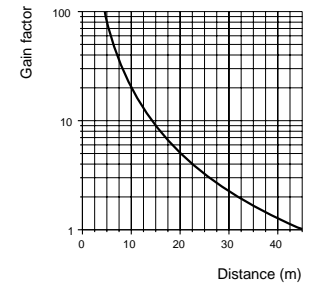
MVE-MVR Angular displacement



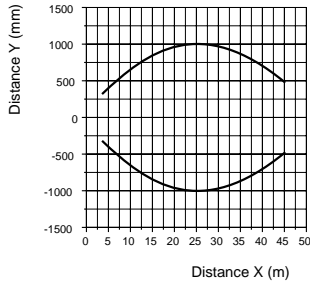
MVE-MVR Mutual interference



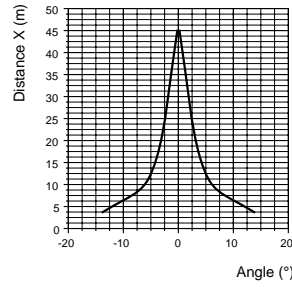
MVE-MVD Excess gain



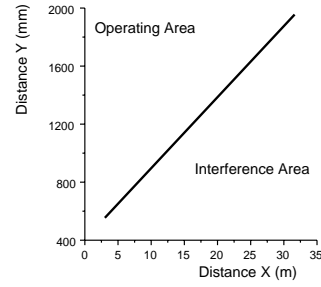
MVE-MVD Parallel displacement



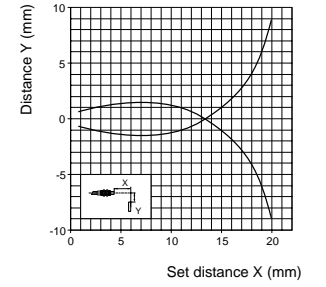
MVE-MVD Angular displacement



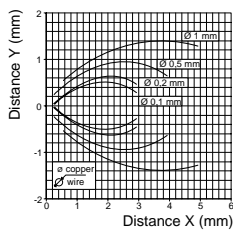
MVE-MVD Mutual interference



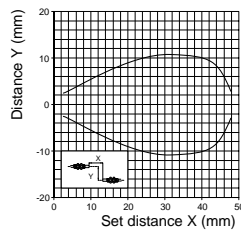
OF/SC1 Parallel displacement



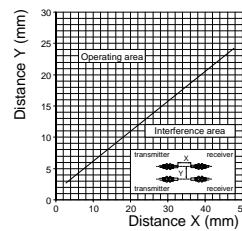
OF/SC1 Min. target displacement



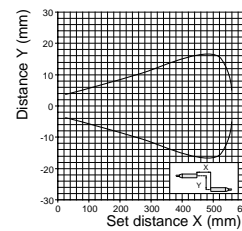
OF/SR1 Parallel displacement



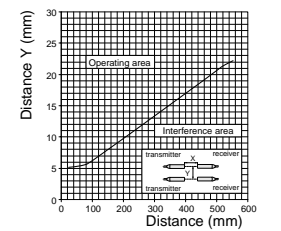
OF/SR1 Mutual interference



OF/SC2-OS/SR3 Parallel displacement



OF/SC2-OS/SR3 Mutual interference



Plug-in, Universal AC or DC Photoelectric Switches RX



Rugged, multi-purpose AC or DC photoelectric switches ideal for mechanical handling

- M12 plug-in for ease of maintenance
- Sensitivity adjustment on all models – not just diffuse
- Top-mounted LED alignment indicator with 360° visibility
- LED indications for output and stability
- Plastic lenses suitable for food industry use
- PLC compatible relay output types
- Light on/dark on (NO/NC) selector switch
- Multifunction DECOU[®] models (NPN/PNP/NO/NC)
- Multifunction timer: on-delay, off-delay, one-shot adjustable from 0.1 to 10 seconds
- Half-power switch on through-beam models for fine detection
- Choice of mounting method models
- IP65 protection
- UL and CUL approved



Options and ordering codes

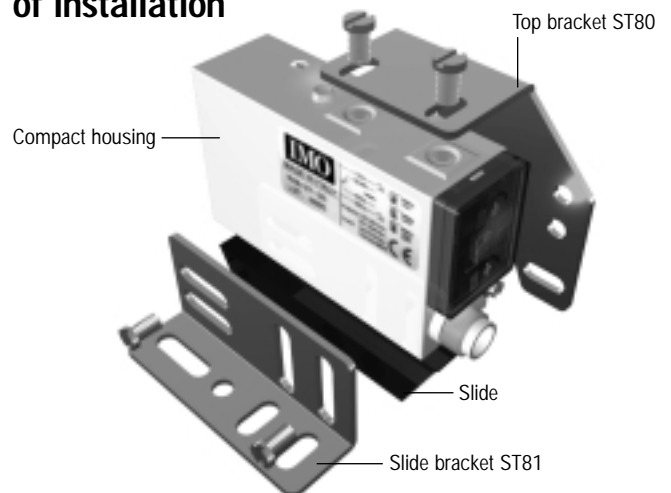
RX	6	/	0	0	-	1	A
Diffuse reflection 1000mm	6						A Without fixing slide
Diffuse reflection 2000mm	8						B With fixing slide
Retro-reflective 12m	C						
Polarized retro-reflective 6m	P					1 DECOU: 10-30VDC	
Background suppression 0.05 - 0.3m	S					3 Relay output: 20-60VDC/20-253VDC	
Background suppression 0.25 - 1m	L						
Emitter: 20-60VDC/20-253VAC	E						
Emitter with check: 10-30VDC	X						
Receiver	R					0 Without timer	
						T With timer	

For RXC and RXP models, select a reflector from the 'Reflectors' page
 For all models, select a 4-wire cable from the 'Sensor Connector Leads' page

Highly effective over long distances

0.3m and 1m background suppression, 1 and 2 metres diffuse reflection, 12 m with reflector (6 m with polarizing filter), 32m through beam; the highest distances in its category.

Maximum versatility of installation



Specifications

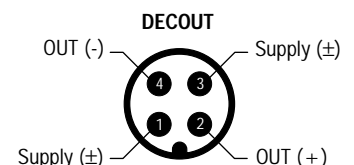
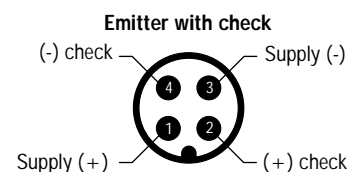
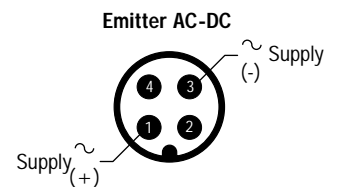
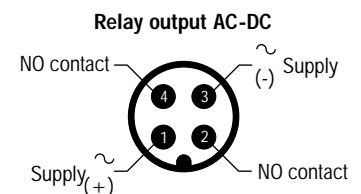
Model	DC						AC/DC					
	RX6/0*-1*	RX8/0*-1*	RXC/0*-1*	RXP/0*-1*	RXS/0*-1*	RXL/0*-1*	RX6/0*-3*	RX8/0*-3*	RXC/0*-3*	RXP/0*-3*	RXS/0*-3*	RXL/0*-3*
Type	diffuse reflection		retro-reflective		diffuse reflection		diffuse reflection		retro-reflective		diffuse reflection	
	-		standard	polarized	background suppr.		-		standard	polarized	background suppr.	
Nominal sensing distance(Sn)	1m ⁽¹⁾	2m ⁽¹⁾	12m ⁽²⁾	6m ⁽²⁾	0.05-0.3m ⁽¹⁾	0.25-1m ⁽¹⁾	1m ⁽¹⁾	2m ⁽¹⁾	12m ⁽²⁾	6m ⁽²⁾	0.05-0.3m ⁽¹⁾	0.25-1m ⁽¹⁾
Emission	infrared (880nm)			red(660nm)	infrared (880nm)				red (660nm)	infrared (880nm)		
Tolerance	-10/ +30%		EG 2 at Sr		0/ +10%		-10/ +30%		EG 2 at Sr		0/ +10%	
Differential travel	2/10% of the nominal sensing distance Sn											
Repeat accuracy	5%											
Operating voltage	10 - 30Vdc 2						0 - 253Vac / 20 - 60Vdc					
Ripple	≤ 10%						-					
No-load supply current	25mA			40mA			25mARMS			30mARMS		
Load current	≤ 100 mA						3A - 250Vac / 3A - 30Vdc (750VA/90W)					
Leakage current	≤ 10µA						-					
Voltage drop	1.2V max.						-					
Output type	static type (DECOUT®)						relay type					
Switching frequency	500Hz						25Hz					
Time delay before availability	100 ms											
Timing functions	from 0,1s to 10s, delay ON, delay OFF, one shot											
Supply electrical protections	polarity reversal, transient						transient (AC), over voltages (DC)					
Output electrical protections	short circuit (with hold)						-					
Temperature range	-25° to +70°C (without freeze)		-25° to +60°C		-25° to +70°C (without freeze)				-25° to +60°C		-25° to +70°C	
Temperature drift	± 10% Sr											
Interference to external light	≥ 5000 lux (incandescent lamp)		≥ 10000 lux (incandescent lamp)		≥ 5000 lux (incandescent lamp)				≥ 10000 lux (incandescent lamp)		≥ 5000 lux (incandescent lamp)	
Protection degree (DIN 40)	IEC IP65											
LED indicators	rear red (output state), top red (alignment), green (stable signal)											
Housing material	polycarbonate (glass fibre reinforced)											
Lenses material	PMMA 7N				glass		PMMA 7N				glass	
Weight (approx.)	75g (without slide) - 90g (with slide)						75g (without slide) - 90g (with slide)					

(1) with 100x100mm white matt paper and excess gain EG=1,5 ; (2) with standard reflector Ø80mm (RL110 supplied separately).

Model	DC		AC/DC	
	RXX/0*-1* and RXR/0*-1*		RXE/0*-3* and RXR/0*-3*	
Type	through-beam			
	with check		without check	
Nominal sensing distance(Sn)	16-32m selectable with switch ⁽¹⁾			
Emission	infrared (880nm)			
Tolerance	EG 2 at Sr			
Differential travel	10%			
Repeat accuracy	5%			
Operating voltage	10 - 30Vdc		20 - 253Vac / 20 - 60Vdc	
No-load supply current	35mA (emitter) - 25mA (receiver)		15mARMS (emitter) - 25mARMS (receiver)	
Load current	100 mA		3A - 250Vac / 3A - 30Vdc (750VA/90W)	
Leakage current	≤ 10µA		-	
Voltage drop	1,2V max.		-	
Output type	static type (DECOUT®)		relay type	
Switching frequency	250Hz		25Hz	
Time delay before availability	100 ms			
Timing functions	from 0,1s to 10s, delay ON, delay OFF, one shot			
Supply electrical protections	polarity reversal, transient		transient (AC), over voltages (DC)	
Output electrical protections	short circuit (with hold)		-	
Temperature range	-25° to +70°C (without freeze)			
Temperature drift	± 10% Sr			
Interference to external light	10000lux (incandescent lamp)			
Protection degree (DIN 40 050)	IEC IP65			
Emitter LED indicators	green (check off), red (distance x2)		green (supply), red (distance x2)	
Receiver LED indicators	rear red (output state), top red (alignment), green (stable signal)			
Housing material	polycarbonate (glass fiber reinforced)			
Lenses material	PMMA 7N			
Weight	(approx.) 75g (without slide) - 90g (with slide)			

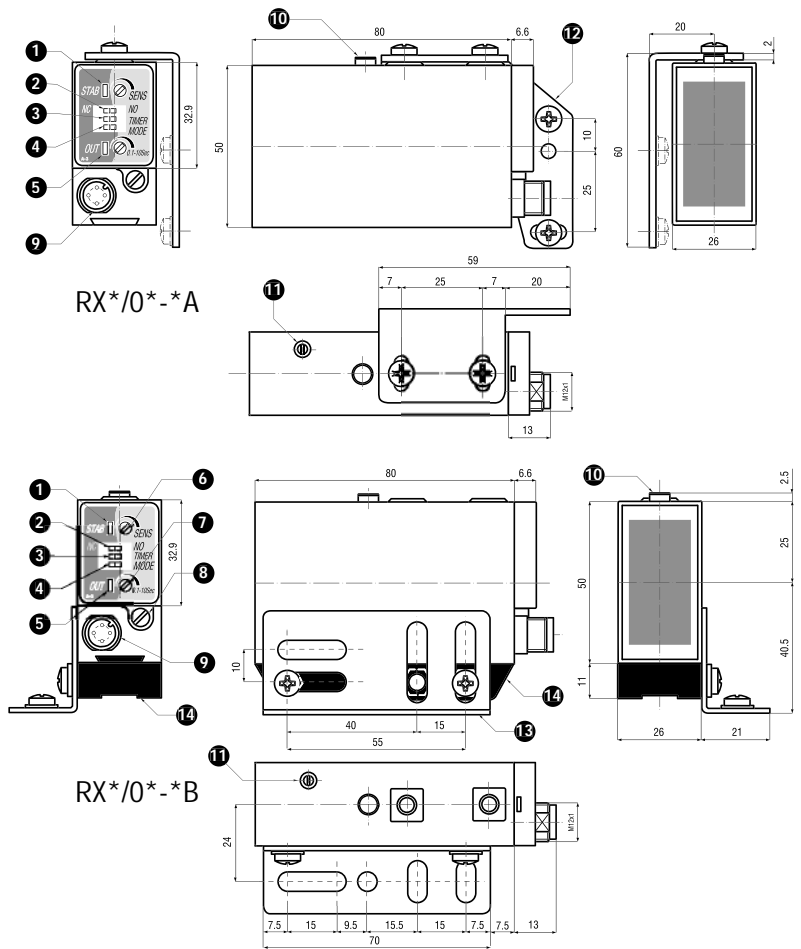
(1) with excess gain EG>2 at the nominal sensing distance Sn.

Connectors (M12)

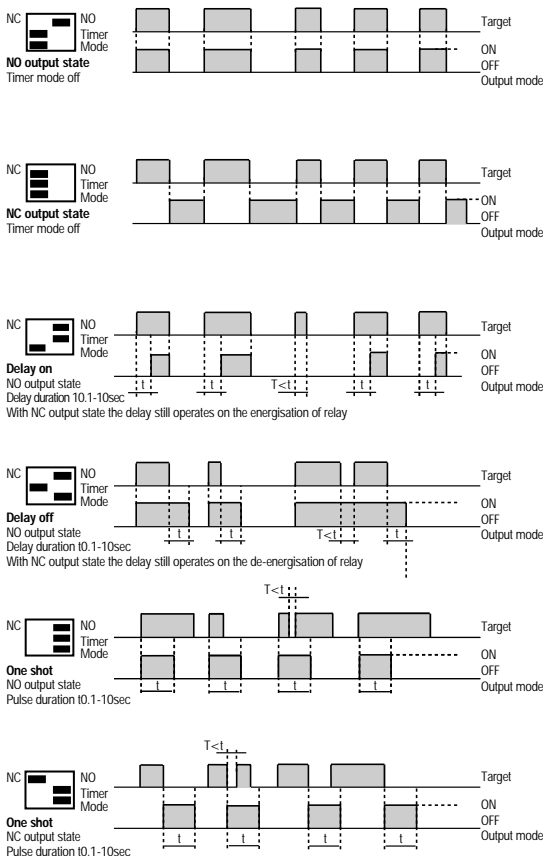


Dimensions mm

- 1 Green LED: stable signal (RX6-RX8-RSC-RXP-RXS-RXL-RXR) Green LED: check off (RXX) or supply voltage (RXE)
- 2 Switch of NO-NC selection (RX6-RX8-RSC-RXP-RXS-RXL-RXR) Switch selecting distance x1 – distance x2 (RXX-RXE)
- 3 Switch selecting timer function delay ON
- 4 Switch selecting timer function delay OFF
- 5 Red LED output state (RX6-RX8-RSC-RXP-RXS-RXL-RXR) Red LED distance x2 (RXX-RXE)
- 6 Trimmer for sensitivity adj. (not available for RXX and RXE)
- 7 Trimmer for timer function adjustment (0.1-10s)
- 8 Fixing screw for plastic protection of adjustments
- 9 M12 standard plug-in exit
- 10 LED for alignment (not available on RXX and RXE)
- 11 Screw for optic adjustment (available only for background suppression models RXS-RXL)
- 12 Fixing bracket (ST80) for sensor option A (supplied with option A)
- 13 Plastic base for sensor option B fixing
- 14 Fixing bracket (ST81) for sensor option B (supplied with option B)

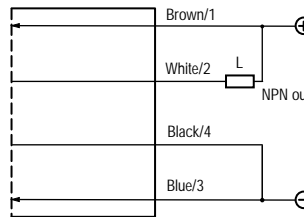


Timing diagrams RX*/OT-** models

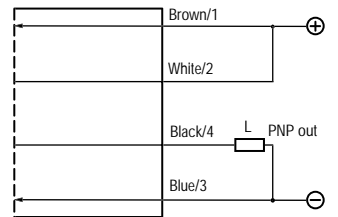


Wiring connections

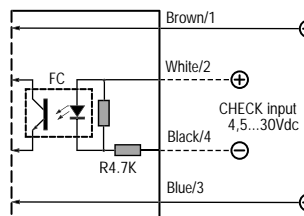
DECOUT® output



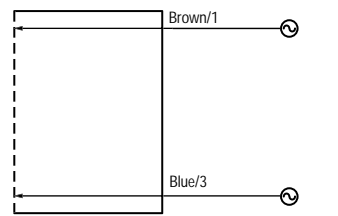
DECOUT® output



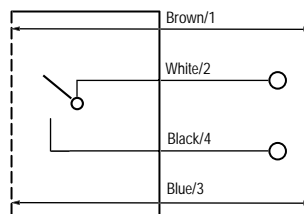
Emitters RXX (DC)



Emitters RXE (AC/DC)

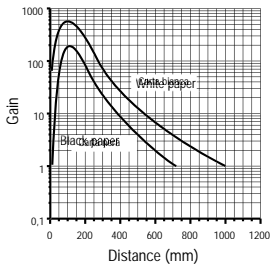


Relay output AC-DC

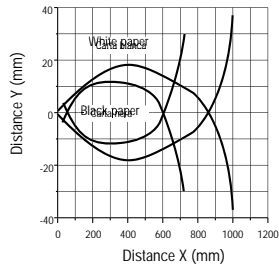


Characteristic curves

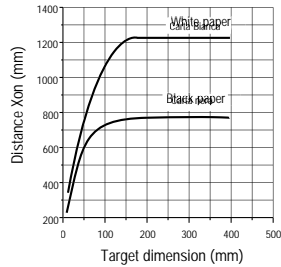
RX6 excess gain



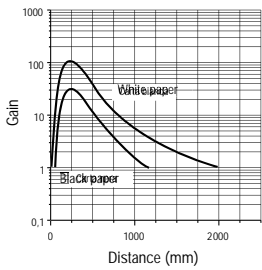
RX6 parallel displacement



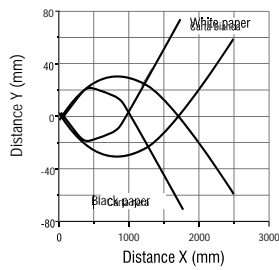
RX6 distance/target size



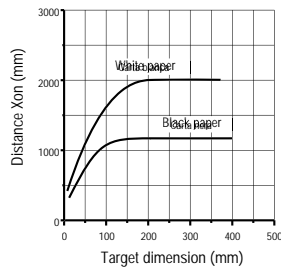
RX8 excess gain



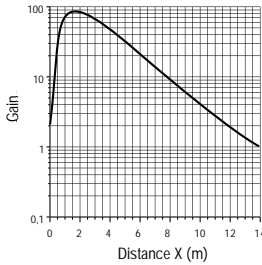
RX8 parallel displacement



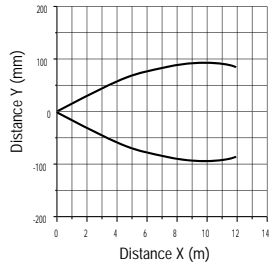
RX8 distance/target size



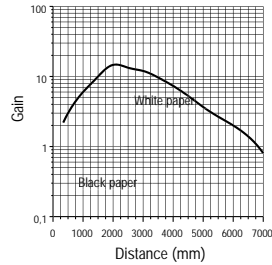
RXC excess gain



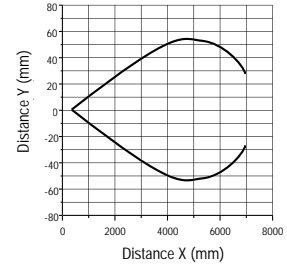
RXC parallel displacement



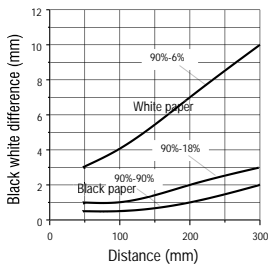
RXP excess gain



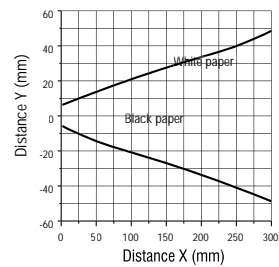
RXP parallel displacement



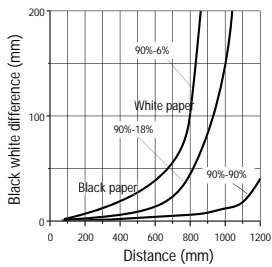
RXS background suppression



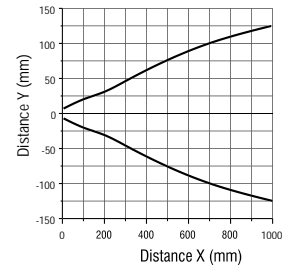
RXS parallel displacement



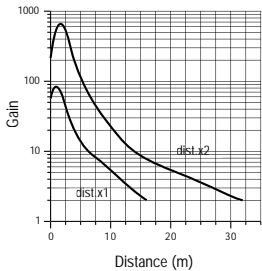
RXL background suppression



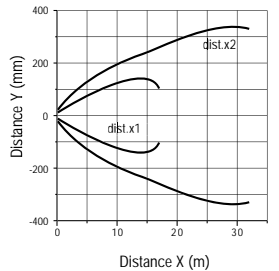
RXL parallel displacement



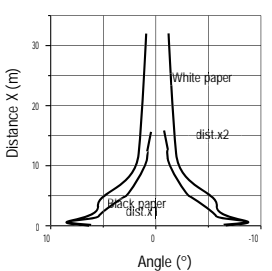
RX*-RXR excess gain



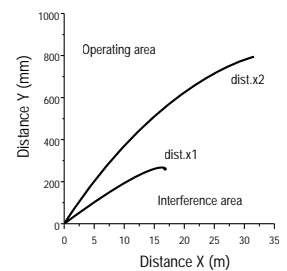
RX*-RXR parallel displacement



RX*-RXR angular displacement



RX*-RXR mutual interference



Multi-voltage Universal AC or DC Photoelectric Switches SQ



- Multi-voltage AC/DC
- Diffuse, Reflective and Through-beam
- Relay output SPDT
- Cable or M12 connector models
- Rotatable M12 connector
- Output and Power LED indicators
- Sensitivity adjustment (not all models)
- UL and cUL approved

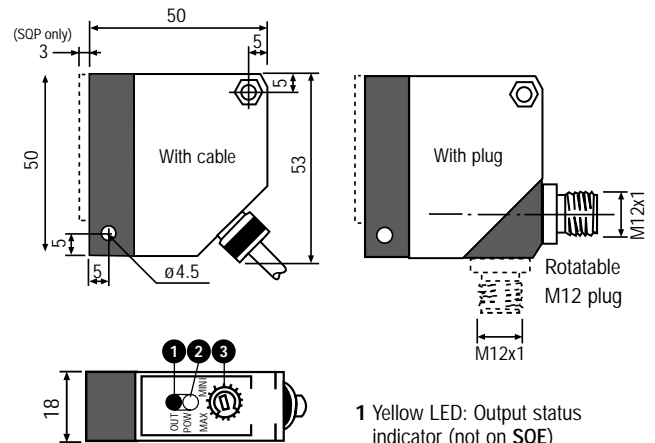


Options and ordering codes

Diffuse 1.8m range, pre-cable 2m, Relay normally OFF	SQD/A1.8-C
Diffuse 1.8m range, M12 connector, Relay normally OFF	SQD/A1.8-P
Reflective 13m range, pre-cabled 5m, Relay normally ON ⁽⁴⁾	SQC/C13-C5
Polarized reflective 6m range, pre-cabled 2m, Relay normally OFF	SQP/A6-C
Polarized reflective 6m range, M12 connector, Relay normally OFF	SQP/A6-P
Polarized reflective 6m range, pre-cabled 2m, Relay normally ON	SQP/C6-C
Polarized reflective 6m range, M12 connector, Relay normally ON	SQP/C6-P
Receiver 20m range, pre-cabled 2m, Relay normally OFF	SQR/A20-C
Receiver 20m range, M12 connector, Relay normally OFF	SQR/A20-P
Receiver 20m range, pre-cabled 2m, Relay normally ON	SQR/C20-C
Receiver 20m range, M12 connector, Relay normally ON	SQR/C20-P
Emitter 20m range, pre-cabled 2m	SQE/O20-C
Emitter 20m range, M12 connector	SQE/O20-P

Standard range shown, for other variants please contact IMO. Bracket and fixing screws are included unless specified

Outline dimensions (mm)



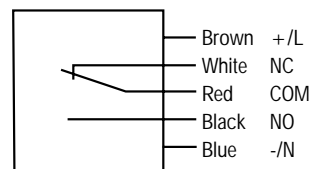
- 1 Yellow LED: Output status indicator (not on SQE)
- 2 Green LED: Power ON indicator
- 3 Potentiometer: To increase sensitivity turn towards MAX to decrease turn towards MIN

Specification

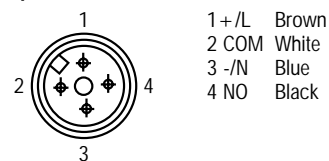
Type	Diffuse	Reflective		Through-beam	
		Standard	Polarized	Receiver	Emitter
Model	SQD	SQC	SQP	SQR	SQE
Supply voltage (50/60Hz)	12-253 V AC/DC			15-253 V AC/DC	
Nominal sensing (Sn)	0.2-1.8M ⁽¹⁾	13m ⁽²⁾	6m ⁽²⁾	20m	
Tolerance	± 10% Sn				
Hysteresis	10%				
Emission	IR 875nm	IR 875nm	Red 660nm	N/A	IR 875nm
Response time t_{on} t_{off}	100ms				
Switching frequency	10 Hz				
Sensitivity adjustment	1 turn pot	N/A	1 turn pot	N/A	
Output type	Relay				
Contacts	Pre-cabled SPDT, M12 plug connector NO				N/A
Max, output current	3A 30V AC - 1A 220V AC				N/A
Max, switching power	90W, 360 VA				N/A
Temperature range	-10 to +60 °C				
External light immunity	> 10,000 Lux ⁽³⁾				N/A
Protection degree	IP65				
Housing material	Housing ABS--Lenses: Methacrylate				

Wiring connections and outputs

Cable output: SQE Brown/Blue connections only



Plug output



- ⁽¹⁾ Determined with white mat paper 40000mm²
- ⁽²⁾ Determined with RL110 reflector (reflector not included)
- ⁽³⁾ Determined with halogen tungsten lamp (3000° K)
- ⁽⁴⁾ Do not include Bracket/fixing screws