

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
- Intelligent models with background suppression
- Metal and plastic housings
- Models with or without sensitivity adjustment
- IP67 protection
- UL and CUL approved



Note: The feasibility of a code number does not mean the effective availability of a product

FA	I	A	/	B	P	-	O	A	
Infrared emission	I							A	Axial cable exit
Visible red LED emission	R							E	M12 plastic axial plug exit
Red laser diode emission	L							C	90° cable exit
								K	M12 plastic 90° plug exit
Diffuse 50mm without sensitivity adjustment		A						0	Plastic housing, axial optics
Diffuse 50mm with sensitivity adjustment		B						1	Metal housing, axial optics
Diffuse 100mm without sensitivity adjustment		2						2	Plastic housing, 90° optics
Diffuse 100mm with sensitivity adjustment		3						3	Metal housing, 90° optics
Diffuse 200mm with sensitivity adjustment, 300mm Laser model		4						P	PNP logic output
Diffuse 200mm without sensitivity adjustment		5						N	NPN logic output
Diffuse 400mm without sensitivity adjustment		6						O	Emitter
Diffuse 400mm with sensitivity adjustment		7						0	Emitter or 4 wire, LOn/DOn selectable
Diffuse 1000mm axial 800mm 90° optics, with sensitivity adj.		8						X	Emitter with check
Diffuse 1000mm axial 800mm 90° optics, without sensitivity adj.		9						L	3 wire, LOn
Emitter		H						D	3 wire, DOn
Receiver with sens. adj. 20m axial 15m 90° optics, (50m Laser)		D						B	4 wire, complementary NO and NC output
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							
Diffuse Background Suppression, 30mm to 130mm		S							
Diffuse Background Suppression, 35mm to 300mm		W							

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Specification

Common to all models

Operating voltage	10-30VDC
Ripple	≤10%
Repeat accuracy 5%	5%, 10% (Background Suppression)
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	25nm (metal body), 1nm (plastic body)
Time delay before availability	200ms (not with receiver/Laser emitter combination)
Storage temperature	-55° to 90°C
Protection	IP67 (EN60529)
Cable material	PVC

Background Suppression Models

Function	Distance	Housing	4 wires NO + NC PNP		4 wires NO + NC NPN	
			Cable	Plug	Cable	Plug
Background suppression	30...130 mm	Axial plastic	FARS/BP-0A	FARS/BP-0E	FARS/BN-0A	FARS/BN-0E
		Axial metallic	FARS/BP-1A	FARS/BP-1E	FARS/BN-1A	FARS/BN-1E
	60...100	Metallic	-	FARS/BP-1E7712	-	FARS/BN-1E7712
	35...300 mm	Axial plastic	FARW/BP-0A	FARW/BP-0E	FARW/BN-0A	FARW/BN-0E
Axial metallic		FARW/BP-1A	FARW/BP-1E	FARW/BN-1A	FARW/BN-1E	

Infrared LED Emission

Model	Infrared Emitter		Receiver	
	FAIH/X0-**	FAIH/O0-**	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/X0-**	FAID/**-**
Nominal sensing distance	50m	
Emission	Red LASER 650nm (Class 1 in accordance to ICE60825-1)	
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)	

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Diffuse Red LASER Emission

Red LASER Emitter	
Model	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/DO _n 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

Red LASER Emitter	
Model	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/DO _n 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

Diffuse visible red and infrared LED Emission

Model	Red LED Emitter				Infrared Emitter					
	FARA/**_**	FARB/**_**	FAR2/**_**	FAR3/**_**	FA14/**_**	FA15/**_**	FA16/**_**	FA17/**_**	FA18/**_**	FA19/**_**
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/DO _n selectable on special models)									
Switching frequency	250Hz									
Sensitivity adjustment	No	Yes	No	Yes	No	Yes	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)									

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

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

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

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

	Infrared	Red	Red		(for transparent objects)
Model	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)				

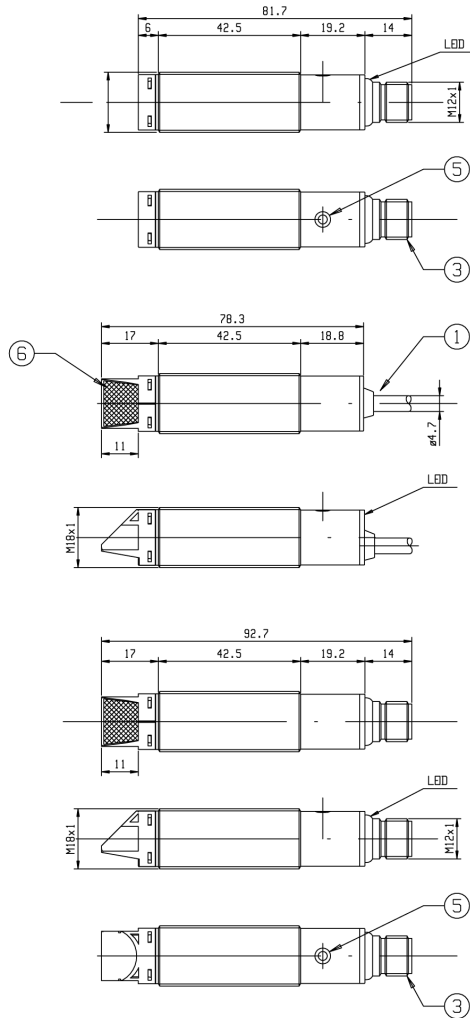
(4) With RL110 reflector. Please refer to IMO data sheet for reflectors.

Background Suppression

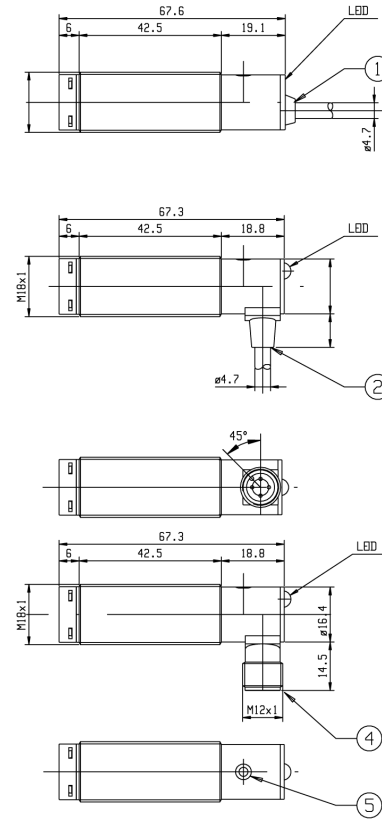
Part Number	FARS/B*_**	FARW/B*_**
Nominal sensing distance	30... 130mm	35... 300mm
Scanning adjustable range SD	30... 130mm (white paper)	35... 300mm (white paper)
Emission	Red light (660nm)	Pin point red light (660nm)
No-load supply current	25 mA	
Output voltage drop	2 V max. I _L = 100 mA	
Output type	NPN / PNP; NO + NC	
Switching frequency	1 kHz	
Operating temperature range	- 25°C...+ 70°C (without freeze)	
Distance adjustment	Yes	
External light interference	5,000 lux (incandescence lamp), 10,000 lux (sunlight)	
Optic material	Plastic	
Weight (approximate)	Plastic version: 30 g connector / 50 g cable Metallic version: 100 g connector / 130 g cable	
Yellow LED status	Sensor status	
ON	Light status	
OFF	Dark status	
Flashing slowly	Output short circuit detected	
Flashing 3 of 10	Internal error	

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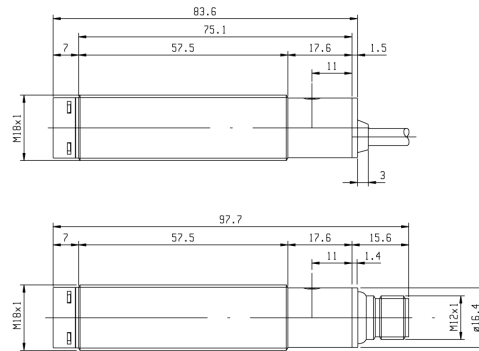
Dimensions (mm)



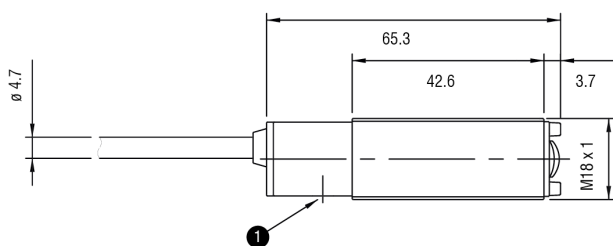
1. Axial cable exit with tang
2. Right angle cable exit with tang
3. M12 plug cable exit
4. Right angle M12 plug cable exit
5. Sensitivity adjustment trimmer



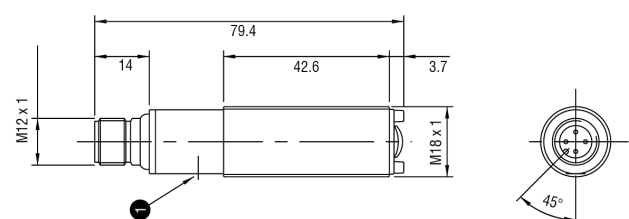
FAL models (laser)



FAR**/**-A



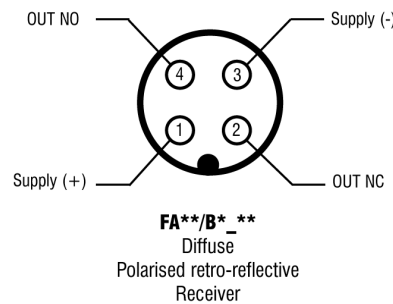
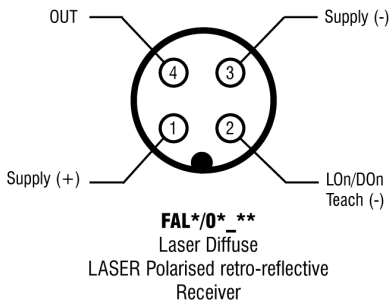
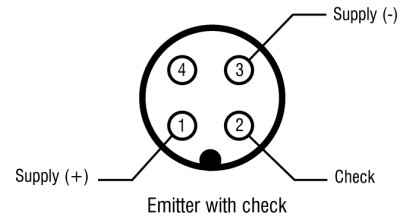
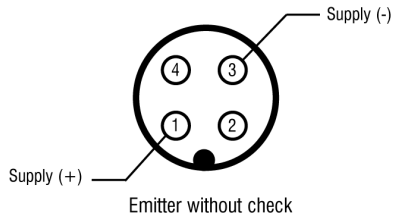
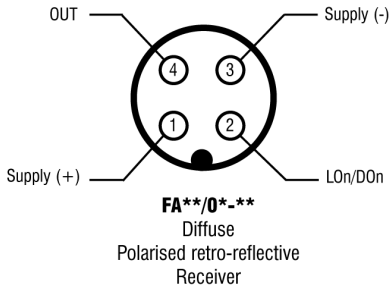
FAR**/**-E



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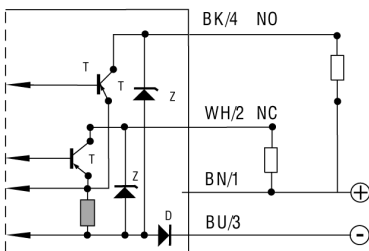
Wiring connections and outputs

M12 plug connector

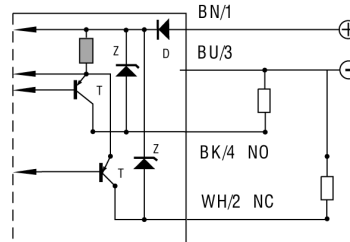


Complementary Q/Q_{not} output

NPN

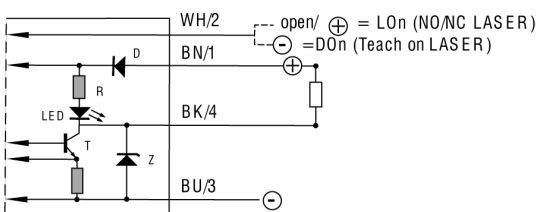


PNP

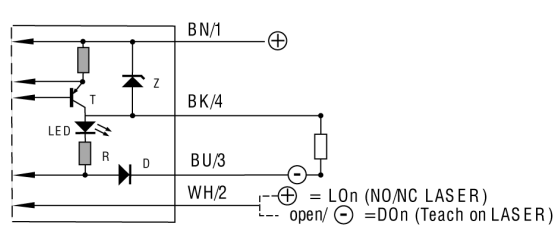


LOn/DO n selectable output

NPN

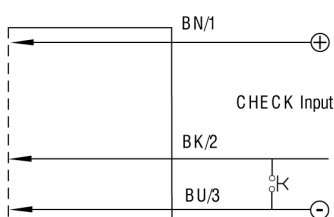


PNP



Complementary Q/Q_{not} output

Emitter with check



Emitter without check

