FFRS SERIES

INSTALLATION MANUAL

CAT8EFF1143901

Micro Detectors

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Declaration of conformity M.D. Micro Detectors S.p.A. con Unico Socio
Declare under our sole responsibility that these products are in conformity with the following EEC directive: 2004/108/EC and subsequent amendments.

CODE STRUCTURE

FF R S / B P - 1 E

M18 photoelectric sensor 3 / 4 wires, DC	FF		Standard version
LED visible Red emission	R	V5	Smooth M18 housing
Background Suppression	S	AN	With ATEX certified
4 wires, LOn / DOn selectable	0	77	Special model for reflective material
3 wires, LOn pulse	L	E	M12 axial plastic plug cable exit
3 wires, DOn pulse	D	1	Metallic housing axial optic
4 wires, LOn/DOn complementary output	B	P	PNP output
		N	NPN output

Model FFRS
II 3G Ex nA IIC T4
II 3D Ex tD A22 IP67 T 110°C
Certificate number : 0909019X

SUPPLIED MATERIAL

- Installation manual
- Safety instructions for dangerous areas
- Declaration of Conformity CE
- Label ATEX marked

FEATURES

- New series of BGS cylindrical photoelectric sensors suitable for the food industry
- Body and nuts in Stainless Steel AISI316L
- Protection degree IP68/IP69K
- Light – On / Dark – On selectable output or complementary (Q/Qnot) output
- Complete protection against electrical damages
- Microcontroller based
- Multifunction LED indicator
- New sensitive adjustment: on object (short teach) on background (long teach)
- Special model with reduced spot dimension and good performance on reflective material
- Switching frequency: 1 KHz (standard model), 400Hz (special model 77)
- Scanning range (Sd): 30mm – 130 mm (standard model); 60mm -100mm (special model 77)
- ATEX certified

TEACH-IN OPTION

Two different way to teach the sensor are possible in standard model :

- short teach: teach-in on object
- long teach: teach-in on background

Tech-in on object is the best solution if the background is not present into the sensing area, or the background colour don't influence the correct behaviour of the sensor.

Teach-in on the background could be useful if a background is present into the sensing area or if the background colour make difficult the detection of the target.

If the background is out of the sensing area (further than 130mm), teach-in on the object is the correct solution.

In special model "77", only tech on object is possible

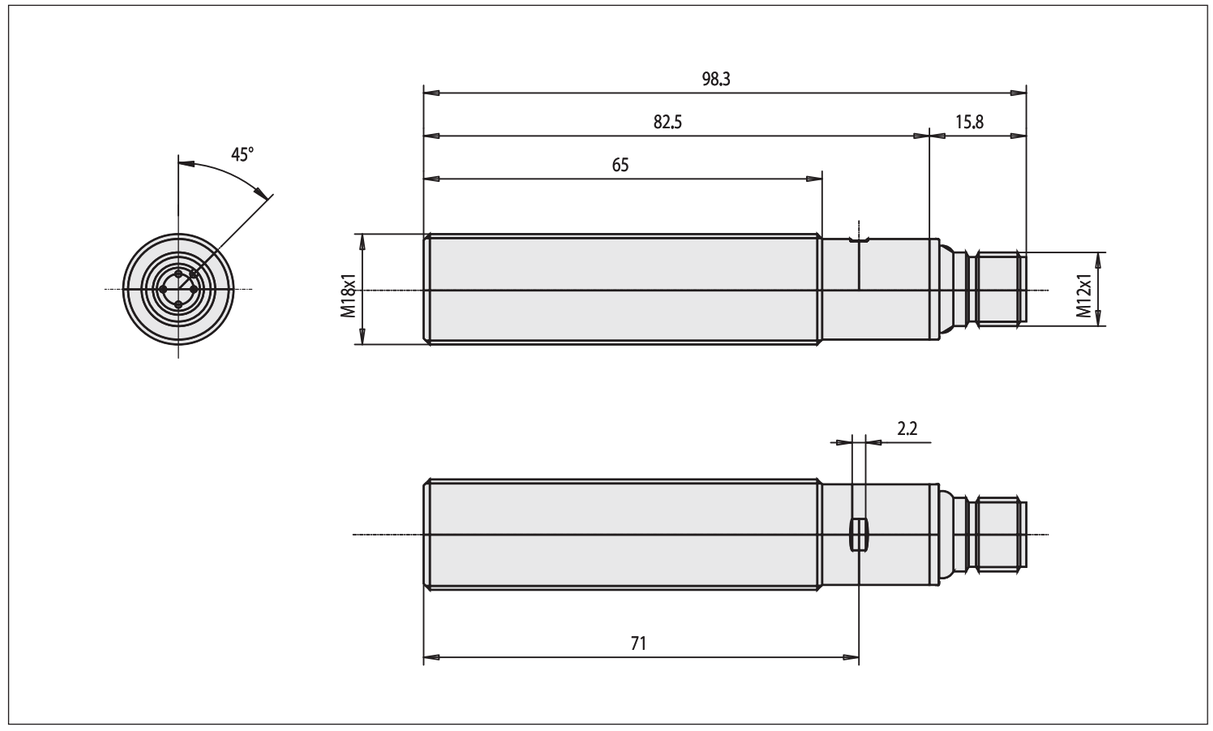
For ATEX models read carefully safety instruction before installation

WARNING These products are NOT safety sensors and are NOT suitable for use in personal safety application

SPECIFICATIONS

Model	FFRS/**-**	FFRS/**-**77
Type	Background suppression	
Nominal sensing distance Sn	30 – 130mm	60 – 100mm
Scanning range (Sd)	30 -130 mm (white paper)	60 -100mm (white paper)
Emission	Red (660 nm)	
Tolerance	+15/-5%	
Differential travel	≤ 10 % (white paper)	≤ 15 % (white paper)
Repeat accuracy	10 %	
Operating voltage	10 – 30 Vdc	
Ripple	≤ 10 %	
No-load current	50 mA (Val=30V)	
Output current	100 mA	
Leakage current	≤ 10 mA (VDC max)	
Output voltage drop	2 V max. (II=100mA)	
Output type	NPN or PNP Lon/Don selectable or Q/Qnot output	
Switching frequency	1 KHz	400 Hz
Time delay before availability	200 ms	
Supply electrical protections	Polarity reversal, transient	
Output electrical protections	Short circuit (autoreset)	
Temperature range	-25°…+85° (without freeze); short exposure 15min to 100°C	
protection degree	IP67; IP68 (1m , 7 days); IP69K (according to DIN 40050 part 9)	
Interference to external light	5000lux (incandescent lamp); 10000lux (sunlight)	
LED indicators	Green on: tech function available off: teach function blocked lamping slowly: teach in progress Yellow Output state / (0 model) Light State / B model)	
Housing material	Stainless steel AISI316L	
Exit Connector	Grilamid	
Optic material	Flat plane PMMA, FDA certified	
Aprovals	CE, cULus, IP68, IP69K, ECOLAB	
Weight (approx)	200gr / 240gr	

DIMENSIONS



WIRING DIAGRAMS

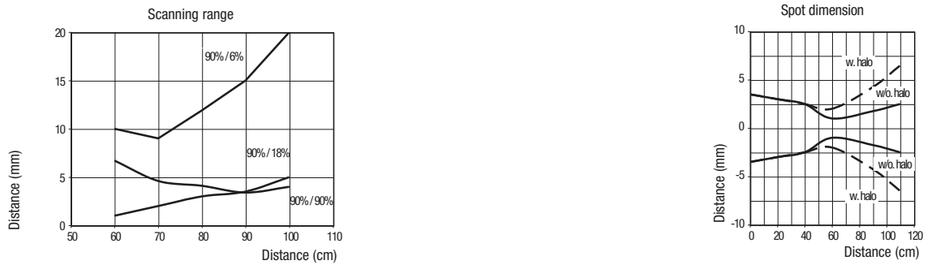
LO/DO Selectable output

NO+NC Complementary output

RESPONSE DIAGRAM

FFRS/**-** Standard Version

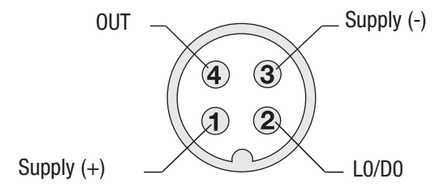
FFRS/**-**77 Special model for shiny object



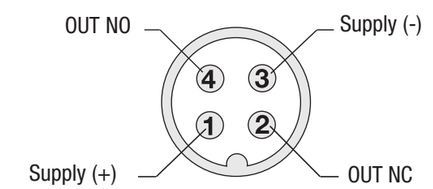
Key	
	BN V *brown*
	BK V *black*
	BU V *blue*
	WH V *white*

WIRING

Models FF**/0*-**



Models FF**/B*-**



NOTE

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

SENSITIVITY ADJUSTMENT

Two types of digital sensitivity adjustment are possible on the background suppression: teach-in on object and tech-in on background.

Tech-in on object is the best solution if the background is not present into the sensing area, or the background colour doesn't influence the correct behaviour of the sensor.

Teach-in on the background could be useful if a background is present into the sensing area or if the background colour makes difficult the detection of the target.

If the background is out of the sensing area (further than 130mm), teach-in on the object is the correct solution.

TEACH-IN ON THE OBJECT

Position light spot on object. Red light spot is visible on object. Sensor is in ON STATE. If it does not light up readjust photoelectric switch and / or check application condition.

Put the screwdriver on the notch for 2-8 secs. until the green LED switches back on constantly. Remove the screwdriver. The sensitive adjustment function starts and the green signal LED is blinking fast. At the end the green led switch ON constantly and the output is energized. Remove the object and check that the sensor switched off. Teach-in on object is the best solution when the background doesn't influence the detection of the target.

TEACH-IN ON THE BACKGROUND

Remove object. Red light spot is visible on background. Put the screwdriver on the notch for t > 8 secs. until the green signal LED starts flashing. Remove the screwdriver. The Teach-in on the background function starts and the green signal LED is blinking fast. At the and the green led switch ON constantly and the signal background was deleted. The sensor is in OFF STATE.
The detection distance is dependant both on the colour of background and target. The influence of the background was completely deleted.

LOCK / UNLOCK of Teach-in function: keeping the tool on the notch for t >13secs, green led is switched off. Removing the tool, the sensitivity adjusting function is locked. The green led is off and it is not possible to change the sensitivity set. The LOCK function is used to avoid tampering and interference with metal objects during working procedures. To unlock the sensor it is required to keep the tool on the notch for more than t >13secs. The green led switches on and the sensitivity adjusting function is again available.
If a ferrousmagnetic object remains on the notch for more of 13secs, the sensitivity function is locked and the green led is off. Until to the object is removed and the unlocking procedure is correctly performed, the sensor's sensitivity adjustment function is not available

CONNECTIONS

- Make sure that the operating voltage is correctly stabilized with a maximum ripple being within the specified figure as stated in the catalogue.
- In the event that the noise induced by the power lines is greater than that specified by the EC regulation (interference immunity), detach the sensor cables from the power and high voltage lines and insert the cable in an earthed metal conduit. Furthermore, it is advisable to connect the sensor directly to the supply source and not downstream of other devices
- To extend the supply and output cables, a cable with a minimum cross-section of 1mm^2 must be used. The length of such an extension is limit to a maximum of 100m (with respect to a minimum voltage and load current of 100mA).

The sensor will become active 200ms after supply voltage is applied.
During this time, the outputs will be OFF.
Don't use the signal output during this time.