FF series

M18 IP69K photoelectric sensors
for harsh environments

features

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



web contents

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

M18 IP69K
for harsh environments

code description(*)

FF R 3 / B P - 1 E

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

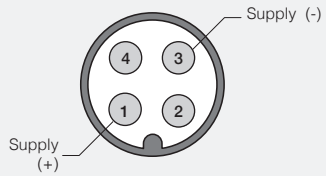
(*) ATEX models available, contact our Sales Dept. for further information.

available models

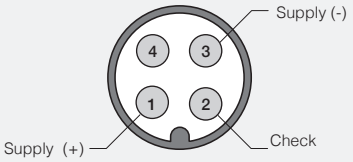
model	housing	adjustment	distance	4 wires			
				NPN NO + NC	PNP NO + NC	NPN NO + NC	PNP NO + NC
direct diffuse	AISI 316L (DIN 1.4404)	Teach-In	100 mm	FFR3/0N-1E	FFR3/0P-1E	FFR3/BN-1E	FFR3/BP-1E
			400 mm	FFI7/0N-1E	FFI7/0P-1E	FFI7/BN-1E	FFI7/BP-1E
			800 mm	FFI8/0N-1E	FFI8/0P-1E	FFI8/BN-1E	FFI8/BP-1E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

plug

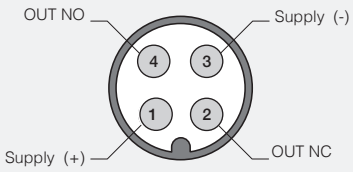
M12 emitter without check



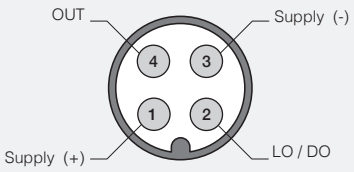
M12 emitter with check



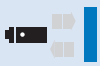
M12 diffuse reflection polarized receiver



M12 diffuse reflection polarized receiver



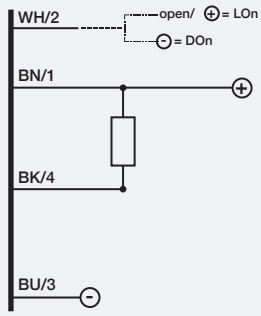
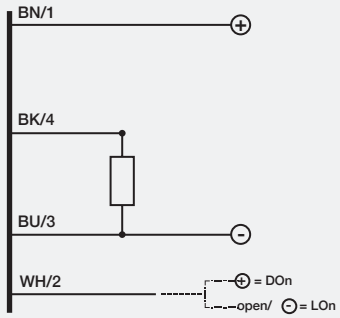
technical specification

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

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

electrical diagrams of the connections

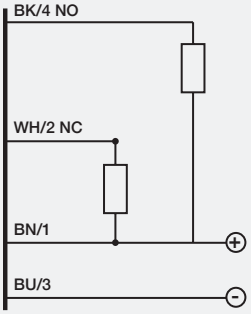
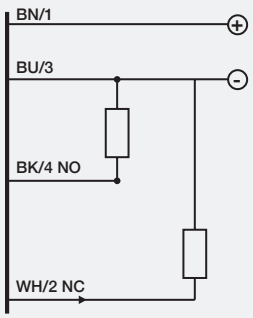
LO/DO selectable output

NPN output	PNP output
	

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

electrical diagrams of the connections

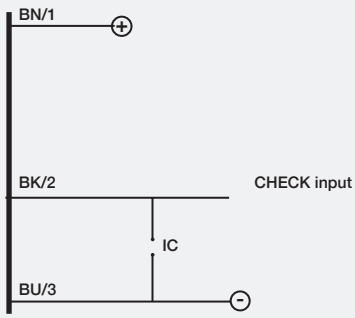
NO+NC complementary output

NPN output	PNP output
	

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

electrical diagrams of the connections

emitter with check

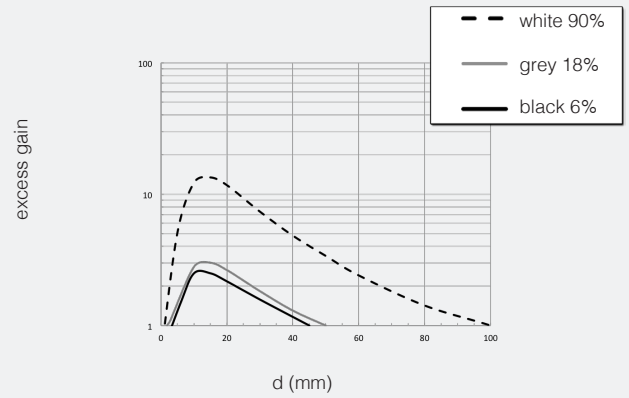


BN brown
BU blue
BK black
WH white
PK pink
GY gray

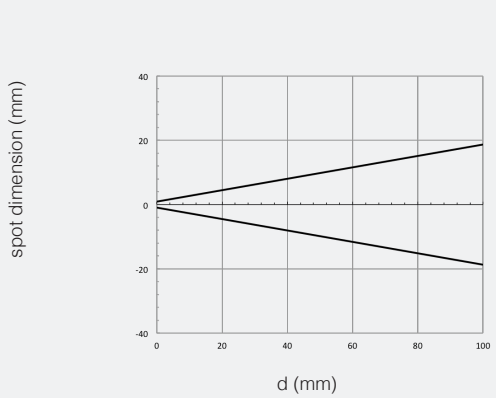
response diagrams

direct diffuse models

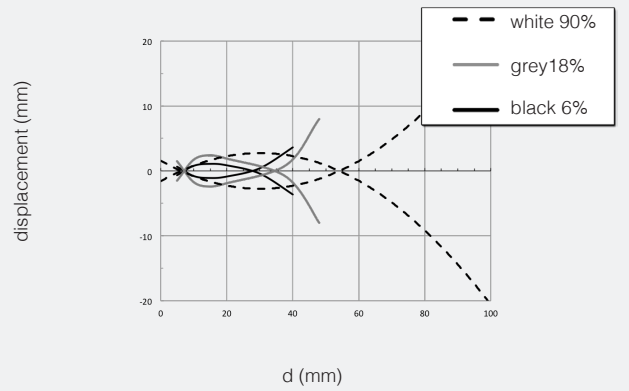
FFR3/**-1E excess gain



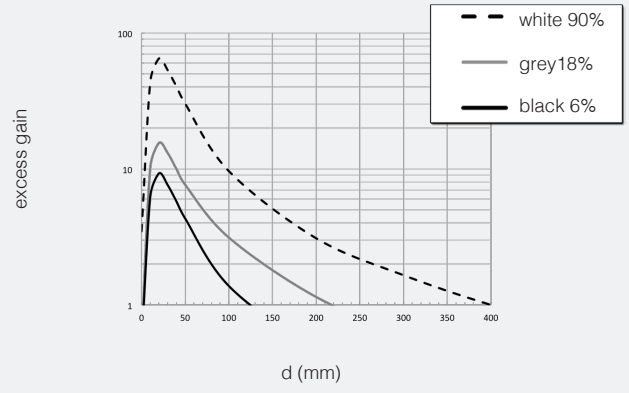
FFR3/**-1E spot dimension



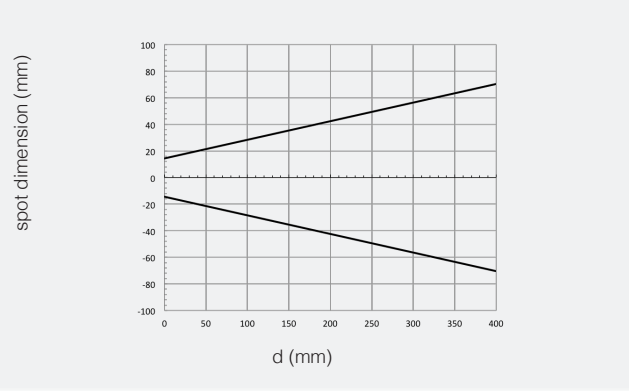
FFR3/**-1E parallel displacement



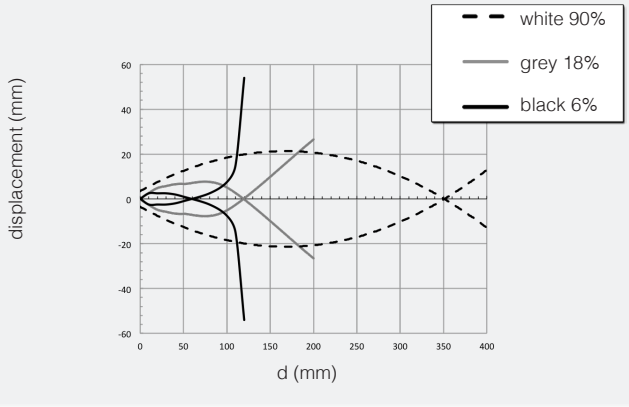
FFI7/**-** excess gain



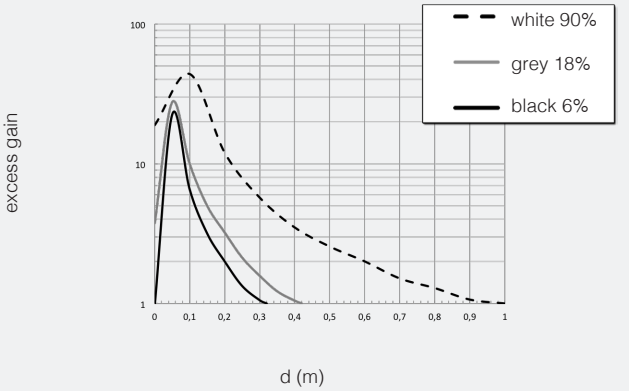
FFI7/**-** spot dimension



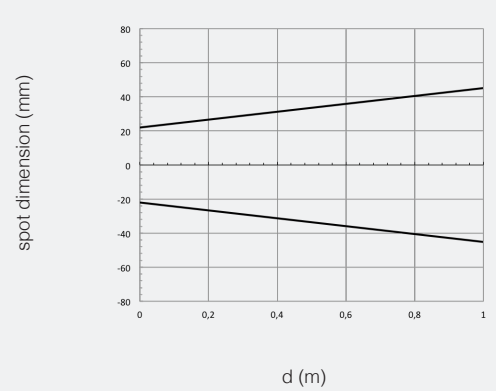
FFI7/**-** parallel displacement



FFI8/**-** excess gain



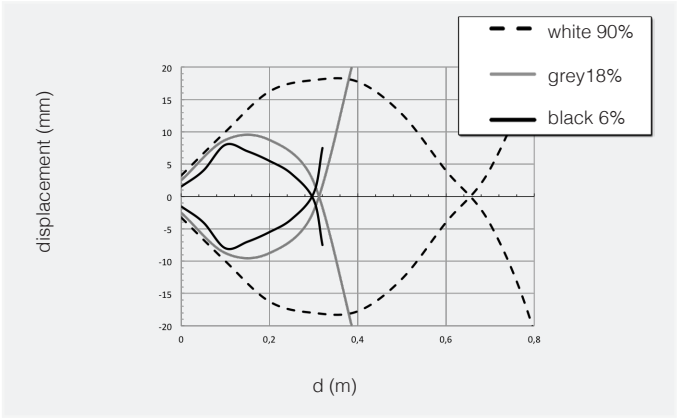
FFI8/**-** spot dimension



response diagrams

direct diffuse models

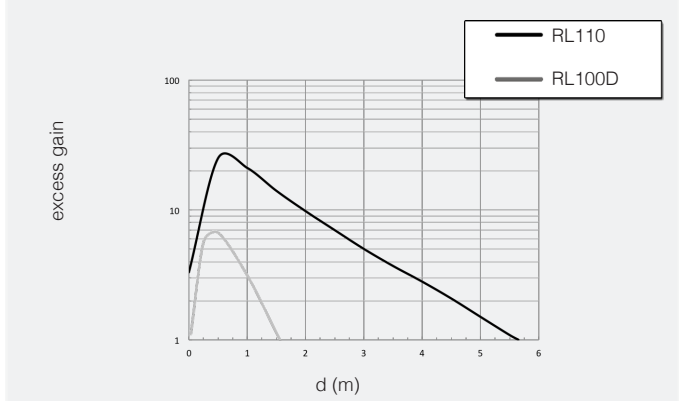
FFI8/-** parallel displacement**



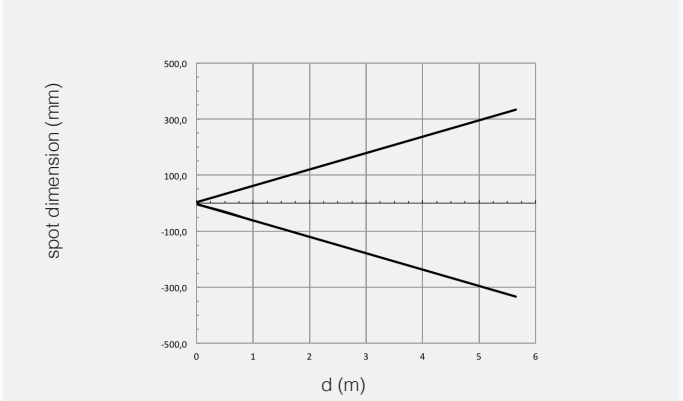
response diagrams

polarized models

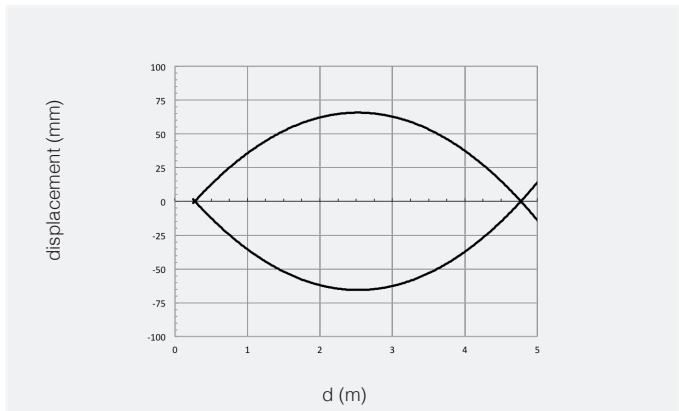
FFRN/- 1E - FFRP/**- 1E excess gain**



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



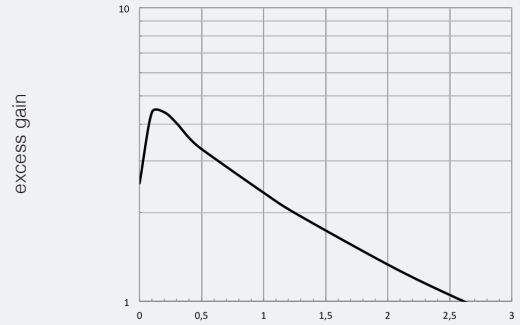
FFRN/- 1E - FFRP/**- 1E* parallel displacement**



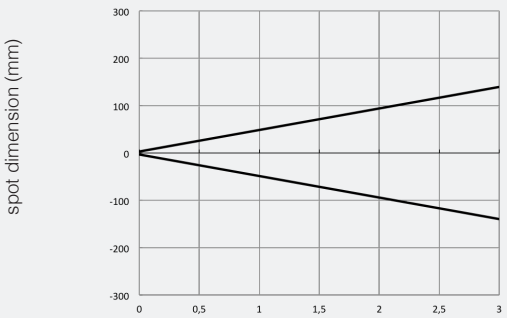
response diagrams

models for transparent objects

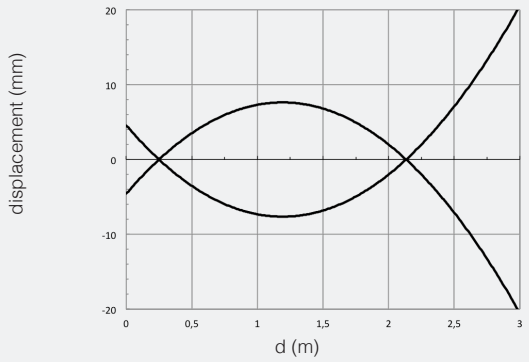
FFRL/**-1E excess gain



FFRL/**-1E spot dimension



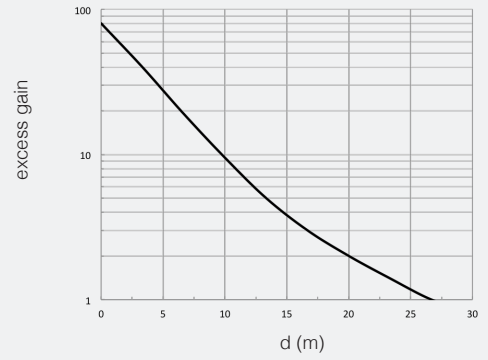
FFRL/**-1E parralel displacement



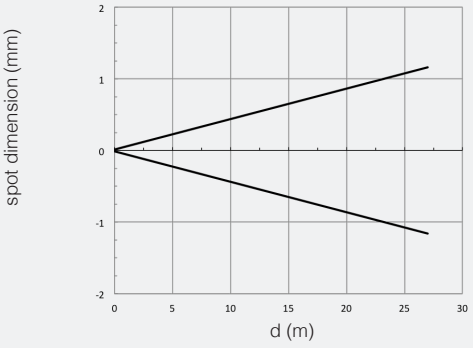
response diagrams

through beam models

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



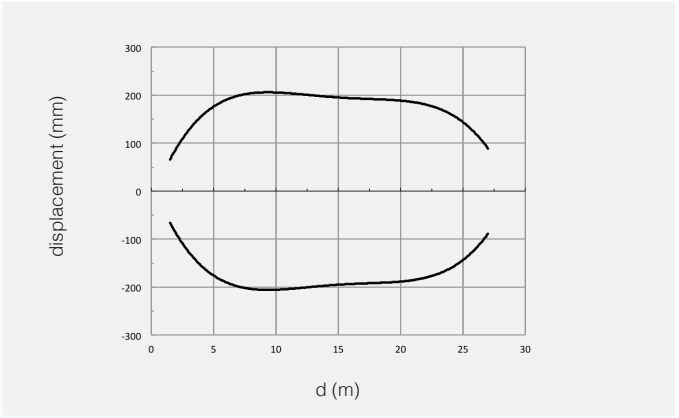
FFIH/**-1E + FFIZ/**-1E spot dimension



response diagrams

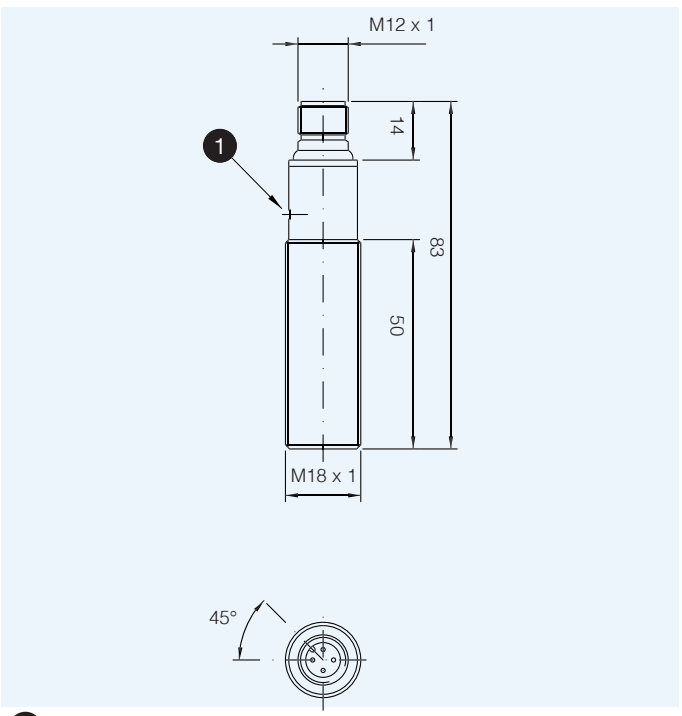
through beam models

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

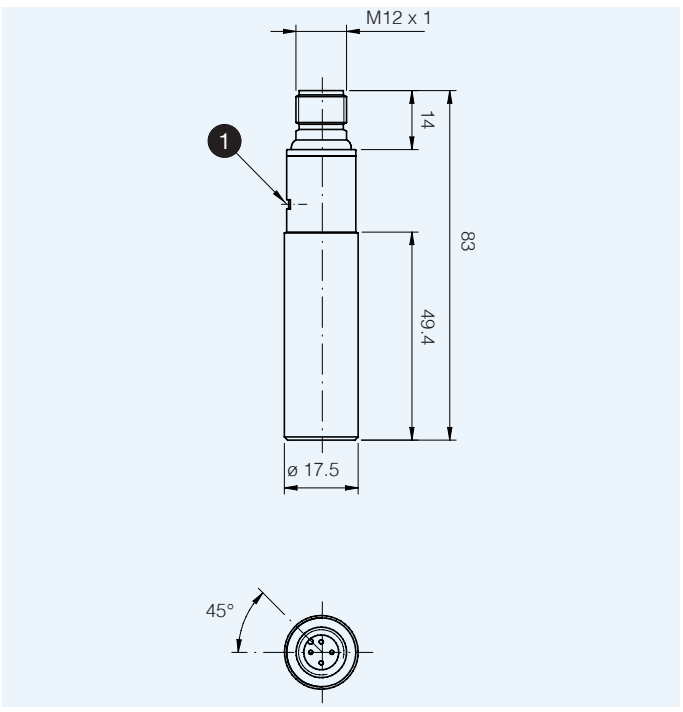


dimensions (mm)

FF/**-****



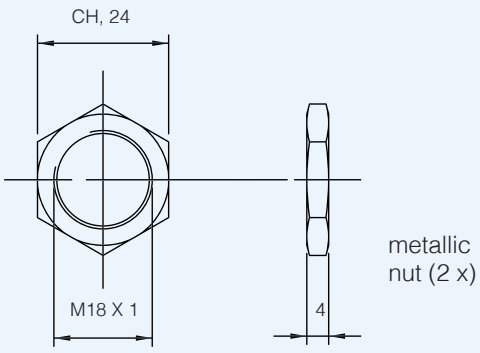
FF/**-1EV5**



1 Inductive Teach-In

dimensions (mm)

accessories included in all metallic models



metallic
nut (2 x)