



# FA series

## M18 photoelectric sensors DC



## features

Complete range of M18 sensors with 10...30 Vdc power supply

Axial and radial optic with flat surface

Retro-reflective models for transparent objects detection, with red emission

IP67 protection degree

Metallic or plastic housing

Sensitivity adjustment available for all models

Total protection against any type of electric damages

Approvals: CE and cULus listed



## web contents



- Application notes
- Photos
- Catalogue / Manuals



## code description (\*)

	FA	I	C	/	B	P	-	0	A
series	FA								
emission	I								
	R								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
type	C								
	P								
	N								
	M								
	L								
	H								
	D								
	Z								
emitter	0								
	X								
	B								
output	0								
	P								
	N								
housing	0								
	1								
	2								
	3								
plug / cable output	A								
	E								

201601\_MD\_Product Catalogue

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



## available models

cable exit photoelectric sensors

M18 cylindrical DC

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

## available models

plug cable exit photoelectric sensors



M18 cylindrical DC

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

# technical specification

direct reflection models

M18 cylindrical DC

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

<sup>(1)</sup> White target kodak 90% reflection 100 x 100 mm

<sup>(2)</sup> Protection guaranteed only with plug cable well mounted

# technical specification

direct reflection models



M18 cylindrical DC

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

<sup>(1)</sup> White target kodak 90% reflection 100 x 100 mm <sup>(2)</sup> White target kodak 90% reflection 200 x 200 mm <sup>(3)</sup> White target kodak 90% reflection 400 x 400 mm

<sup>(4)</sup> Protection guaranteed only with plug cable well mounted

# technical specification

reflex and polarized models

M18 cylindrical DC

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

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

# technical specification

through beam models



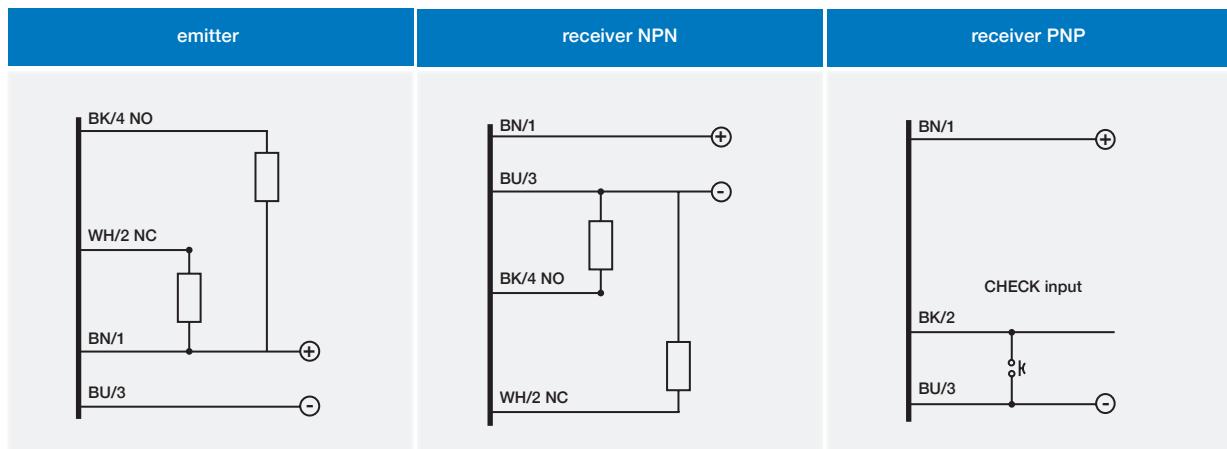
M18 cylindrical DC

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

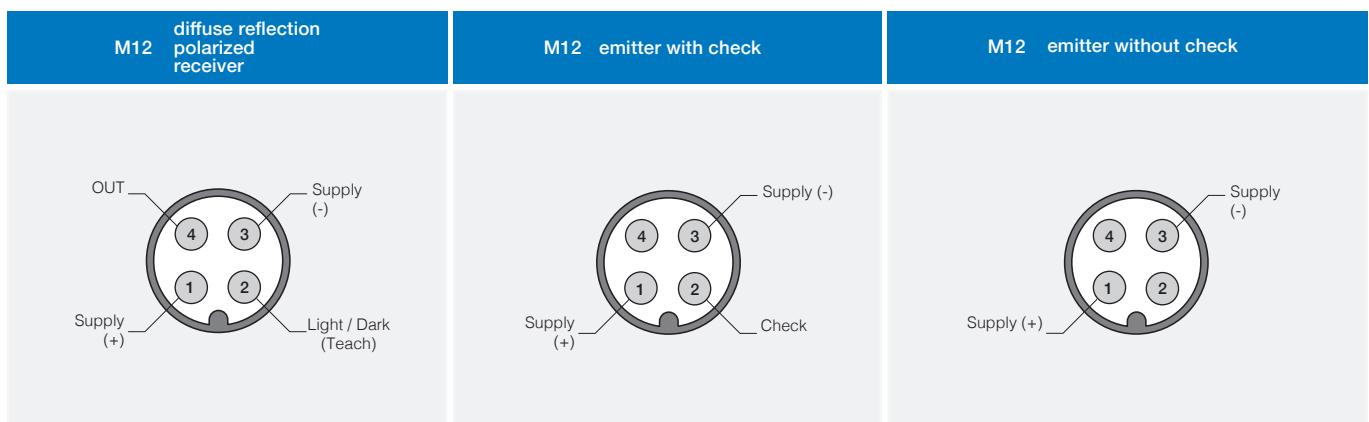
<sup>(1)</sup> Protection guaranteed only with plug cable well mounted



## electrical diagrams of the connections

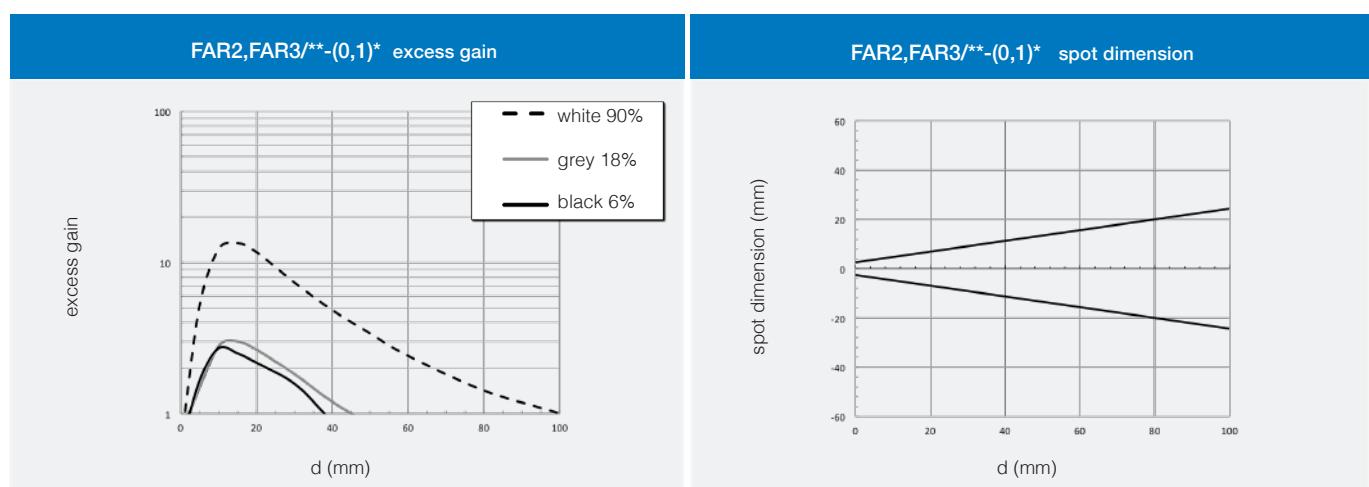


## plug



## response diagram

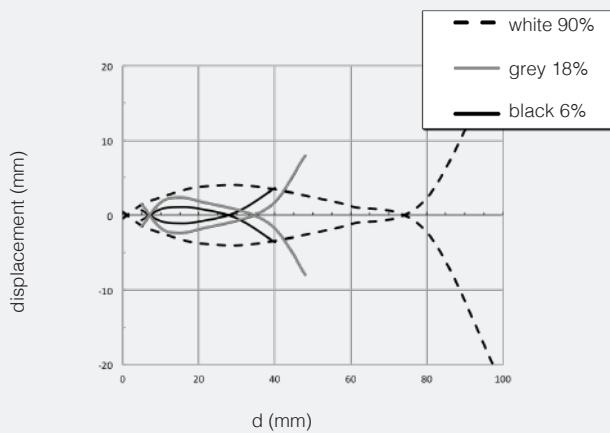
direct diffuse models



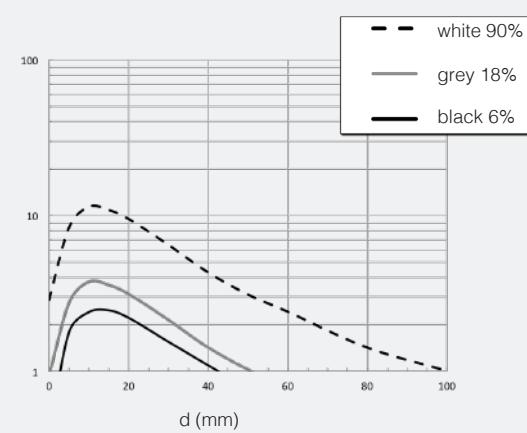


M18 cylindrical DC

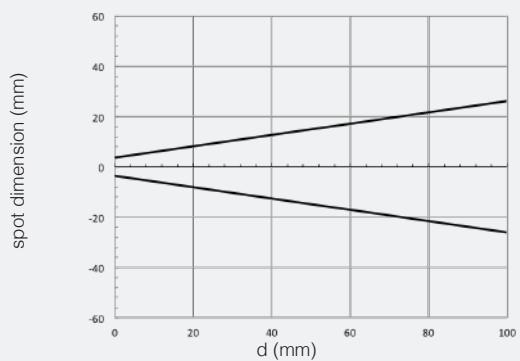
FAR2,FAR3/\*\*-(0,1)\* parallel displacement



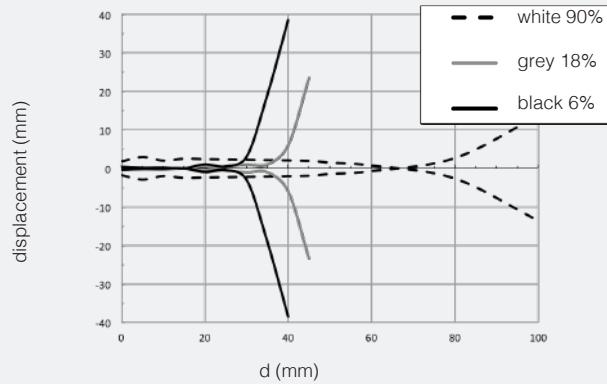
FAR2,FAR3/\*\*-(2,3)\* excess gain



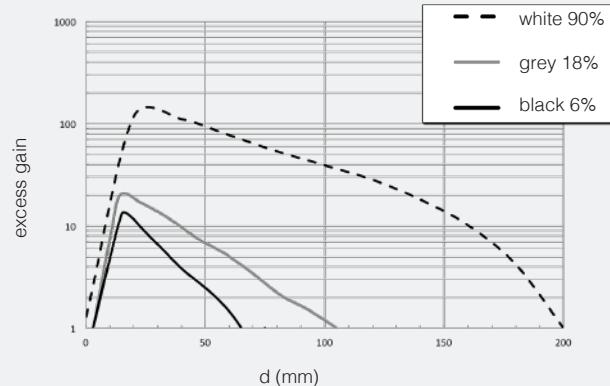
FAR2,FAR3/\*\*-(2,3)\* spot dimension



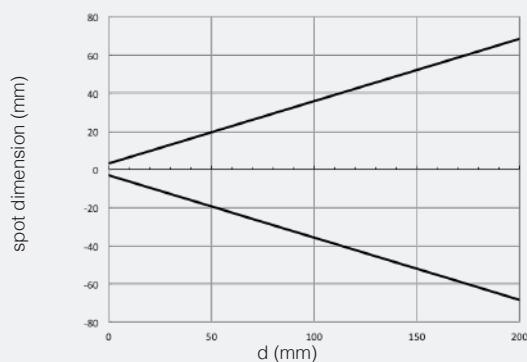
FAR2,FAR3/\*\*-(2,3)\* parallel displacement



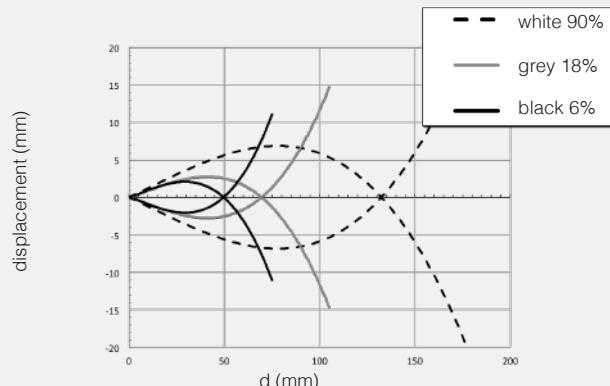
FAI4, FAI5/\*\*-(0,1)\* excess gain



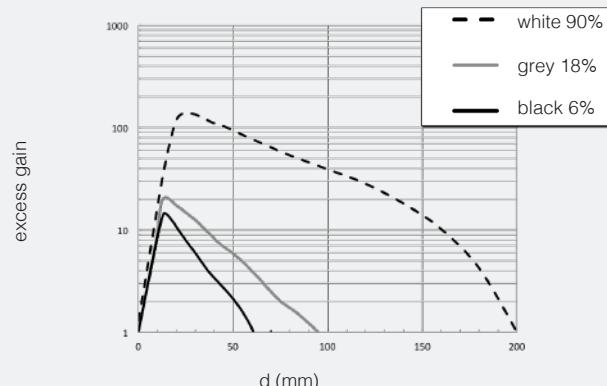
FAI4, FAI5/\*\*-(0,1)\* spot dimension



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



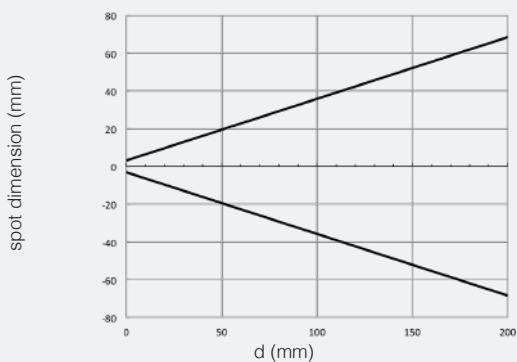
FAI4, FAI5/\*\*-(2,3)\* excess gain



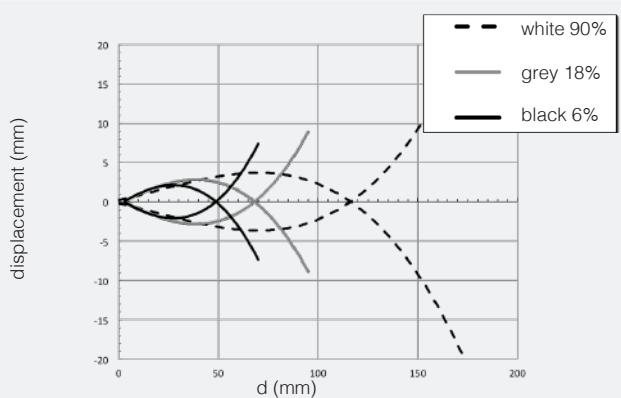
# response diagrams

direct diffuse models

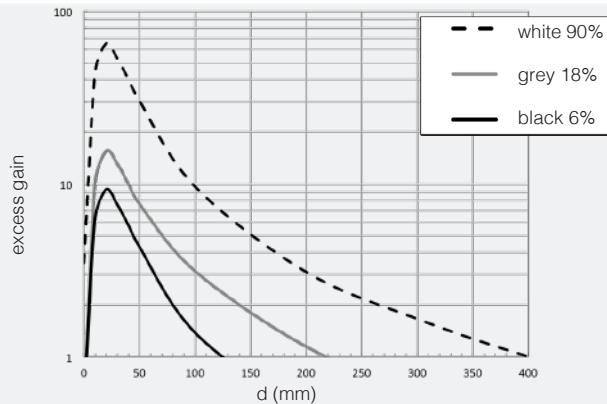
FAI4, FAI5/\*\*-(2,3)\* spot dimension



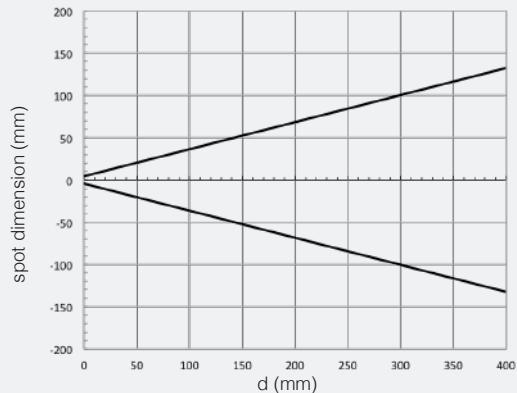
FAI4, FAI5/\*\*-(2,3)\* parallel displacement



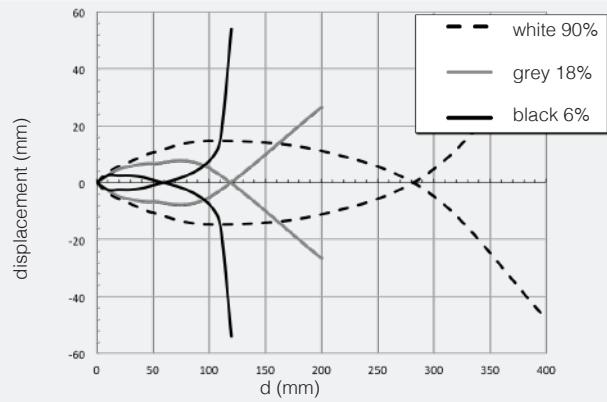
FAI6,FAI7/\*\*-(0,1)\* excess gain



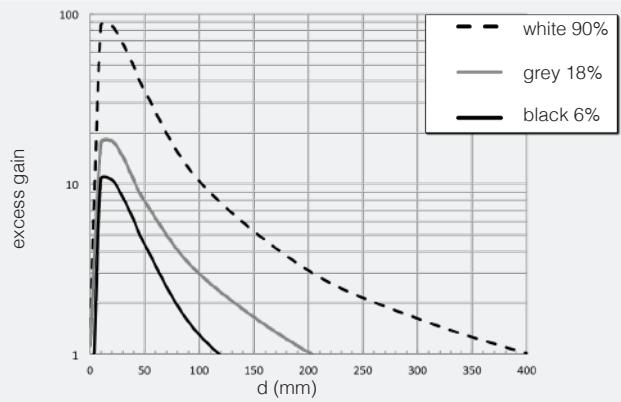
FAI6,FAI7/\*\*-(0,1)\* spot dimension



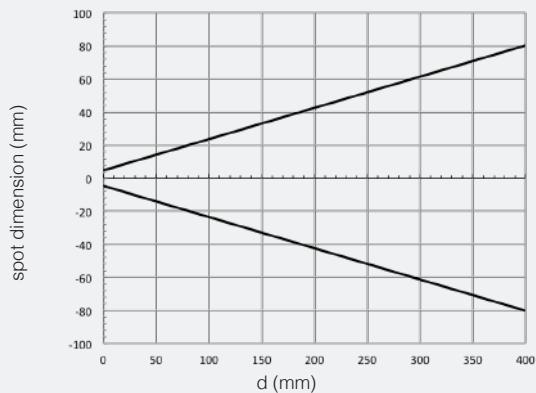
FAI6,FAI7/\*\*-(0,1)\*parallel displacement



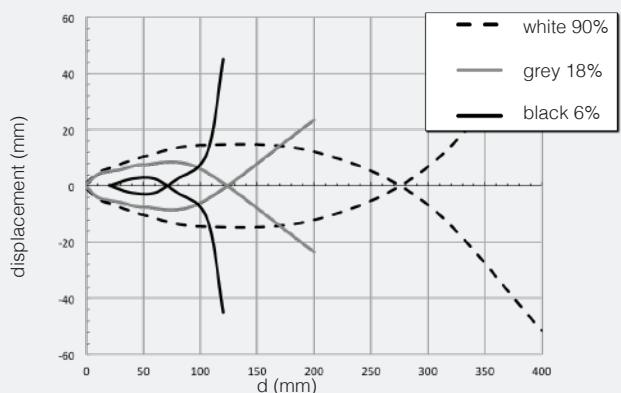
FAI6,FAI7/\*\*-(0,1)\* excess gain

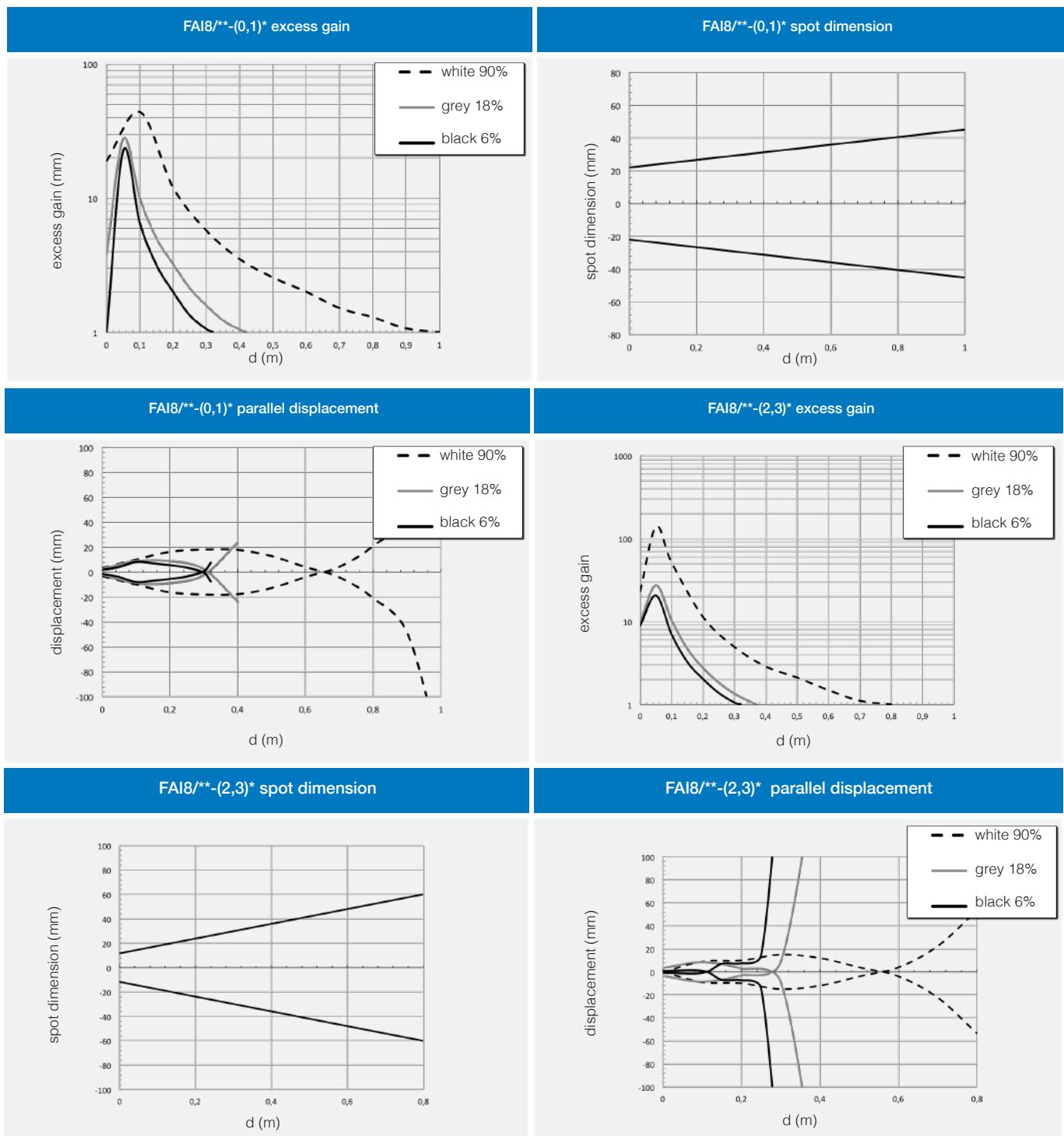


FAI6,FAI7/\*\*-(2,3)\* spot dimension



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

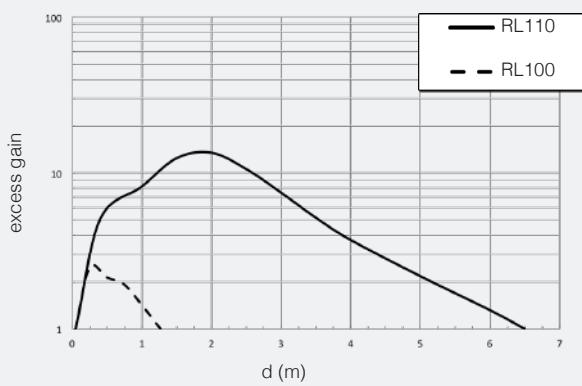




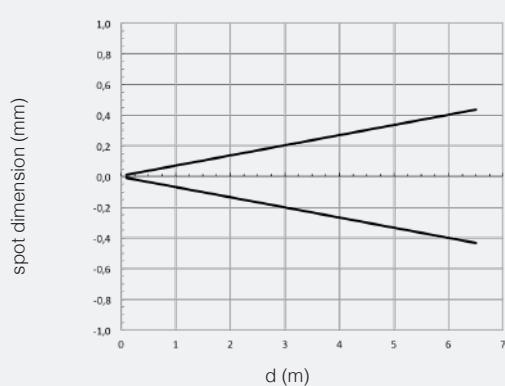
# response diagrams

retro-reflective models

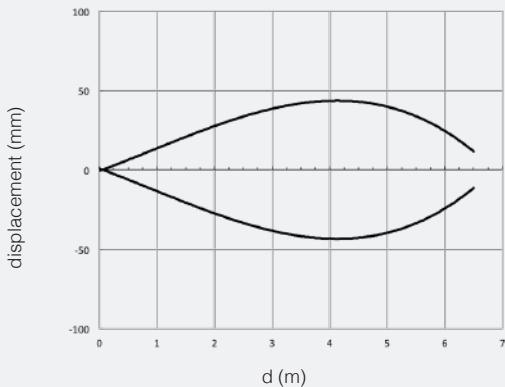
FAIC,FAIM/\*\*-(0,1)\* excess gain



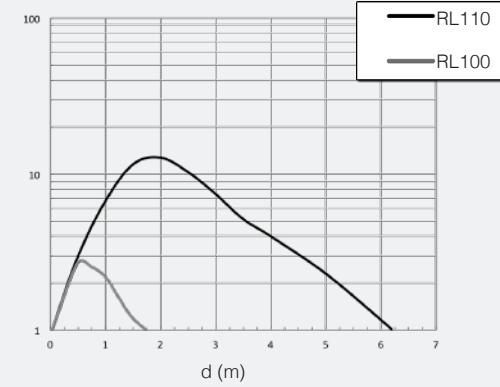
FAIC,FAIM/\*\*-(0,1)\* spot dimension



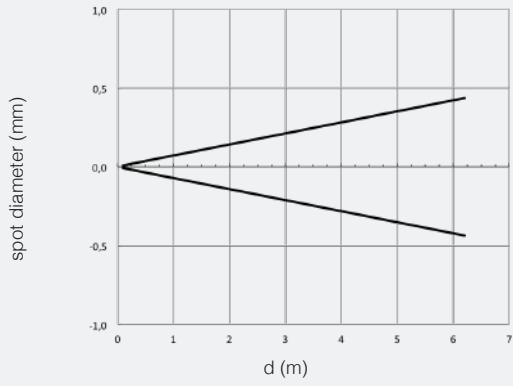
FAIC,FAIM/\*\*-(0,1)\* parallel displacement



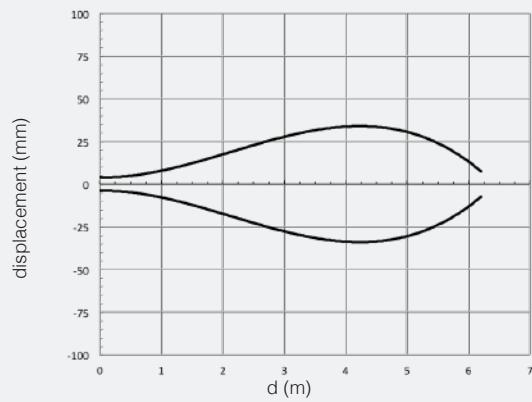
FAIC,FAIM/\*\*-(2,3)\* excess gain



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



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



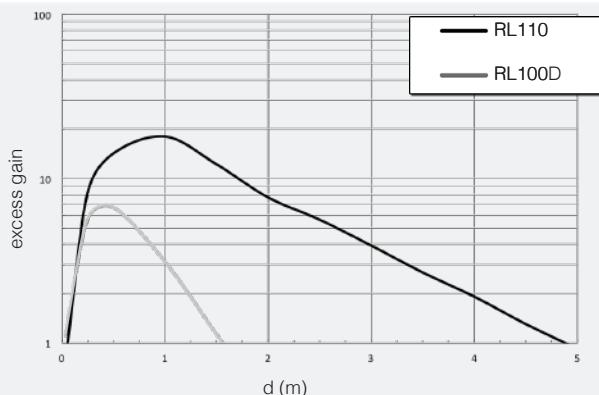
## response diagrams

polarized models

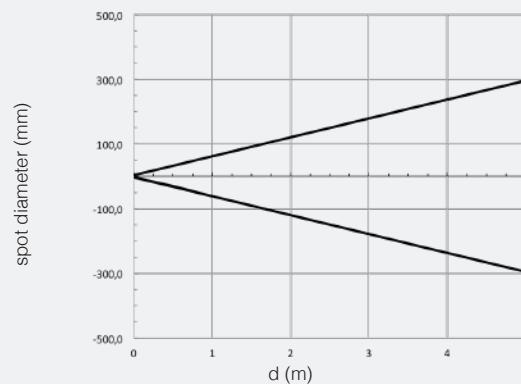


M18 cylindrical DC

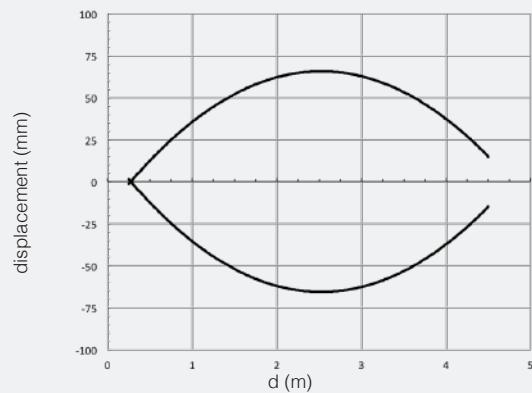
FARP,FARN/\*\*-(0,1)\* excess gain



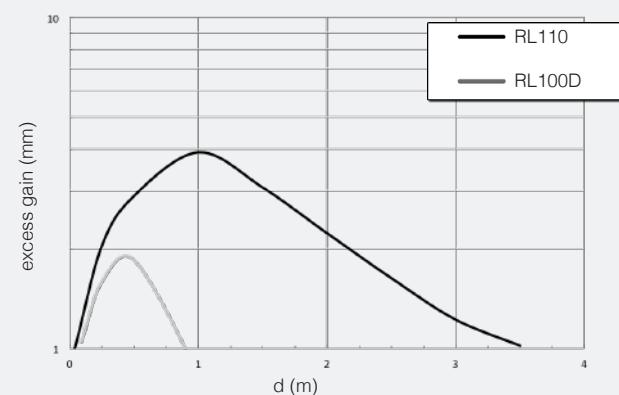
FARP,FARN/\*\*-(0,1)\* spot diameter



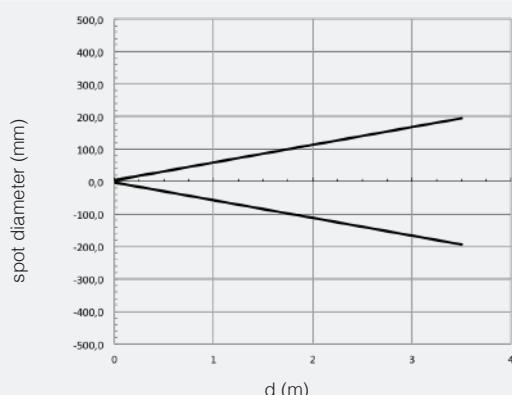
FARP,FARN/\*\*-(0,1)\* parallel displacement



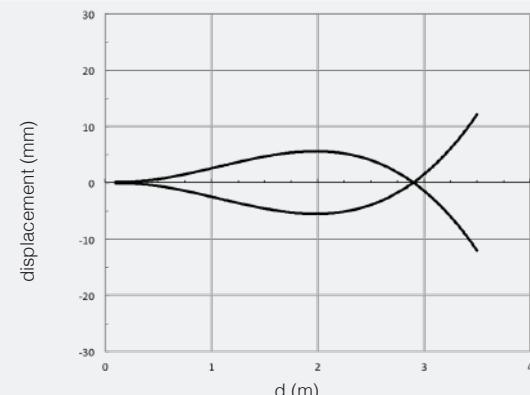
FARP,FARN/\*\*-(2,3)\* excess gain



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



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



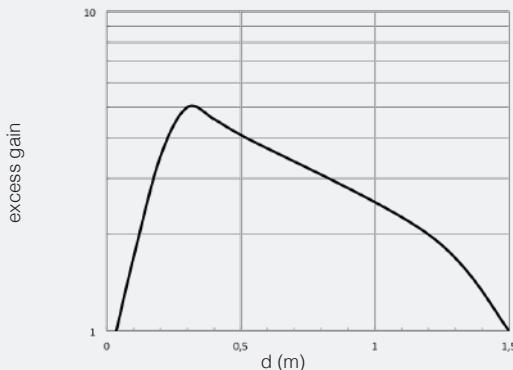


## response diagrams

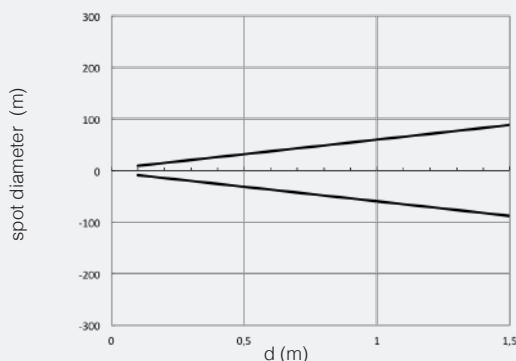
polarized models for transparent objects (diagrams calculated with RL110)

M18 cylindrical DC

FARL/\*\*-\* excess gain



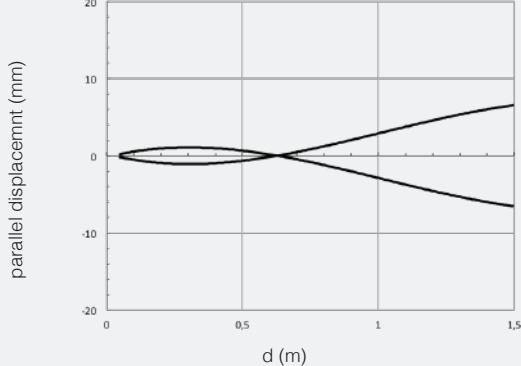
FARL/\*\*-\* spot diameter



## response diagrams

polarized models for transparent objects

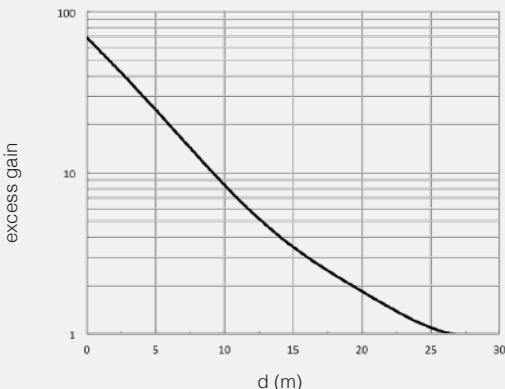
FARL/\*\*-\* parallel displacement



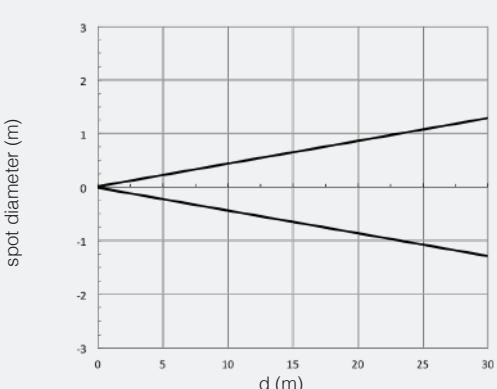
## response diagrams

through beam models

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



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

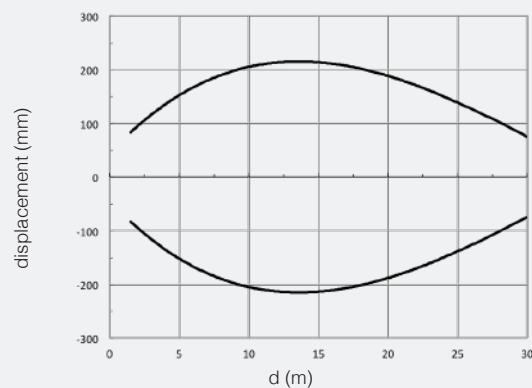


FA



M18 cylindrical DC

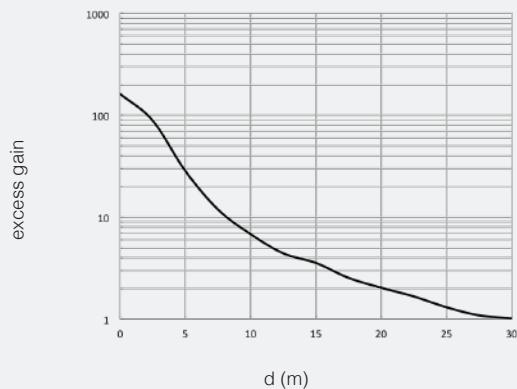
FAIH/\*\*-(0,1)\* FAID/\*\*-(0,1)\*, parallel displacement



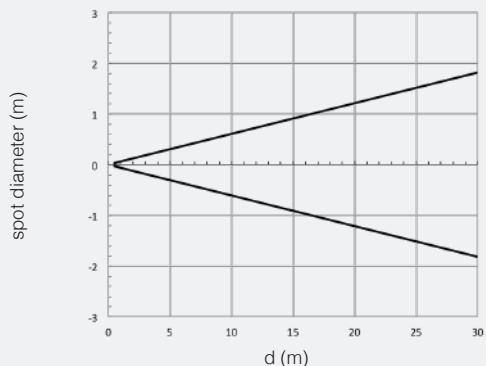
## response diagrams

through beam models

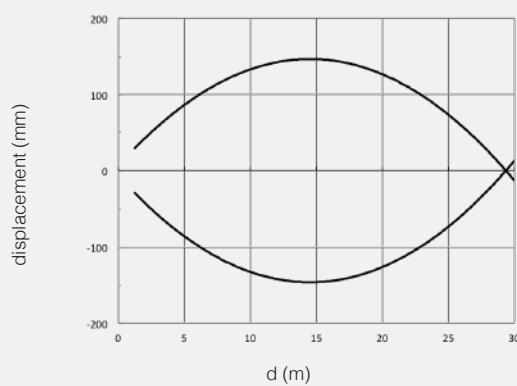
FAIH/\*\*-(2,3)\* FAID/\*\*-(2,3)\*, excess gain



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

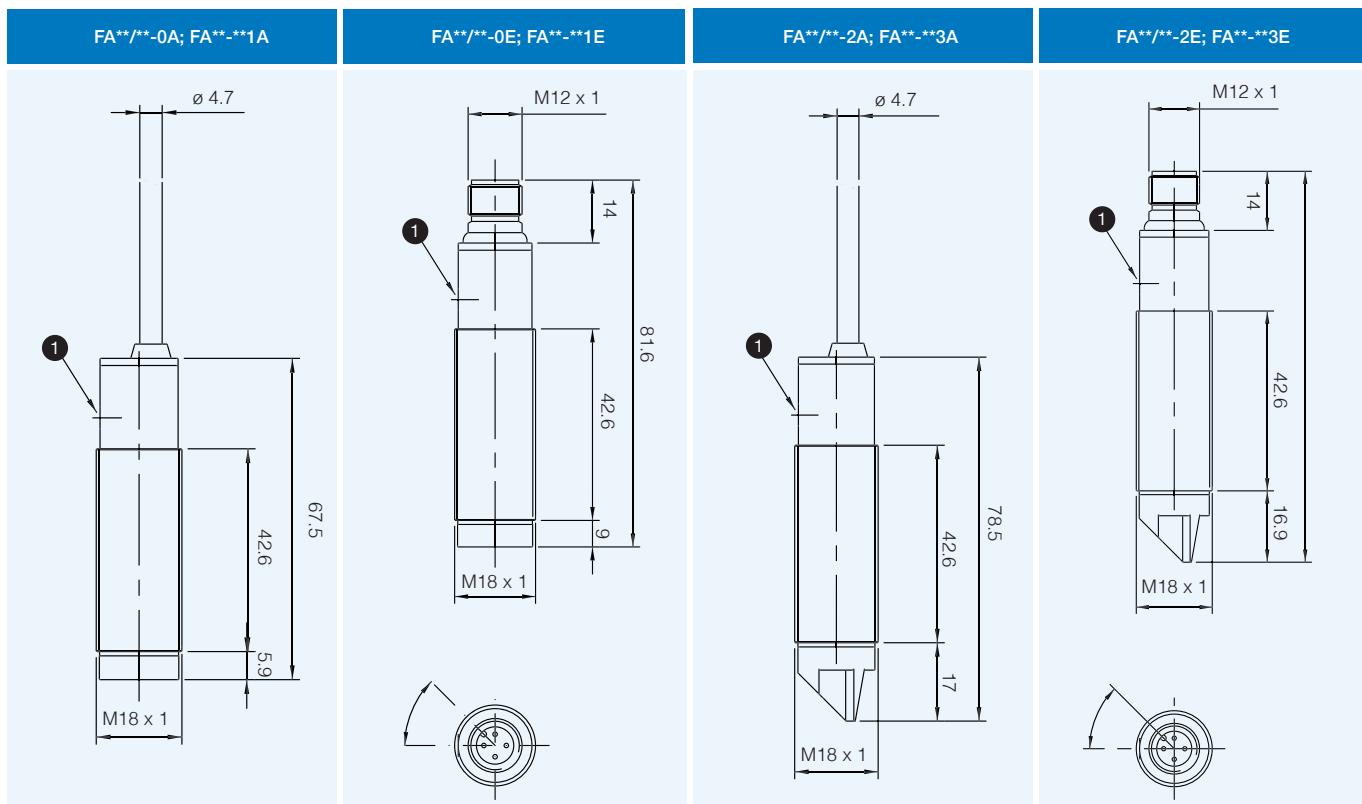


FAIH/\*\*-(2,3)\* FAID/\*\*-(2,3)\*, parallel displacement





## dimensions (mm)



1 Trimmer for sensibility regulation

## dimensions (mm)

accessories included in all plastic models

