



## S70

*Advanced fiber optic amplifiers for high speed and low contrast applications*

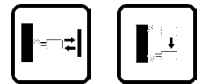
- DIN rail mountable models with dual digital displays
- High speed models: 200  $\mu$ s...5 ms
- Super high speed models: 10  $\mu$ s...1ms
- Analog output models
- Teach-in setting via +/SET/- push-button/switch, remote input or IO-Link
- Standard 2 m cable or M8 4-pole connection

### APPLICATIONS

- Processing and Packaging machinery
- Electronics assembling
- Pharmaceutical industry
- Cosmetic and bottling industries



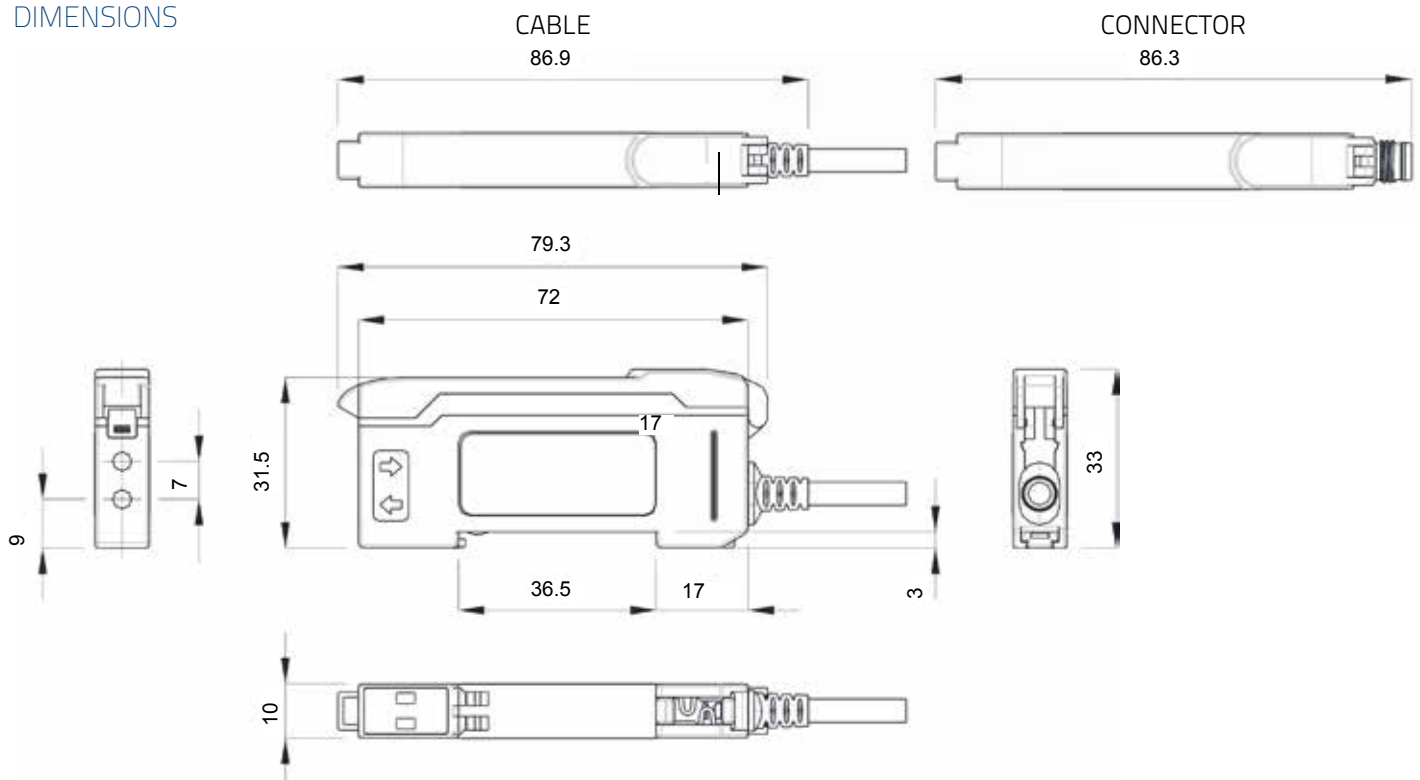
SENSORS



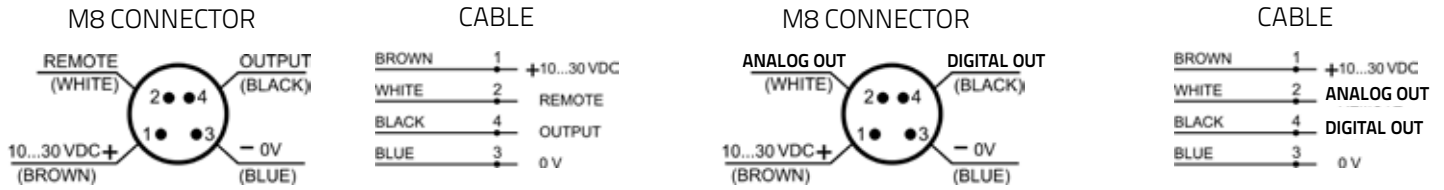
S70		
Response time		Super high speed: 10 $\mu$ s (S70...E2) High speed: 200 $\mu$ s (S70...E1), 15 $\mu$ s (S70...E2), 250 $\mu$ s (S70...E3) Fast: 50 $\mu$ s (S70...E2), 500 $\mu$ s (S70...E3) Standard: 500 $\mu$ s (S70...E1), 250 $\mu$ s (S70...E2), 1 ms (S70...E3) Medium range: 500 $\mu$ s (S70...E2) Long range: 2 ms (S70...E1), 1 ms (S70...E2), 4 ms (S70...E3) Extra long range: 5 ms (S70...E1), 12 ms (S70...E3)
Repeatability		Super high speed: 5 $\mu$ s (S70...E2) High speed: 66 $\mu$ s (S70...E1), 5 $\mu$ s (S70...E2), 100 $\mu$ s (S70...E3) Fast: 12 $\mu$ s (S70...E2), 150 $\mu$ s (S70...E3) Standard: 100 $\mu$ s (S70...E1), 50 $\mu$ s (S70...E2), 180 $\mu$ s (S70...E3) Medium range: 80 $\mu$ s (S70...E2) Long range: 100 $\mu$ s (S70...E1), 165 $\mu$ s (S70...E2), 180 $\mu$ s (S70...E3) Extra long range: 100 $\mu$ s (S70...E1), 180 $\mu$ s (S70...E3)
Power supply	Vdc	10...30 V (current output models and digital output models)
	Vac	12...30 (voltage output models)
	Vac/dc	
Output	PNP	▪
	NPN	▪
	NPN/PNP	
	relay	
	other	Analog out 4...20mA; Analog out 0...10V; Analog out 0...5V
Connection	cable	▪
	connector	▪
	pig-tail	
Approximate dimensions (mm)		10x79x31.5
Housing material		ABS and polycarbonate
Mechanical protection		IP50, NEMA 1

TECHNICAL DATA	
Power supply	10...30 V (current output models and digital output models) 12...30 (voltage output models)
Ripple	10% max.
Consumption (output current excluded)	40 mA max. (standard display mode), 30 mA max. (ECO display mode)
Light emission	red 660 nm (mod. S70...E1, S70...E3) red 635 nm (mod. S70...E2)
Setting	+ / SET / - push-button, LIGHT / DARK switch, RUN / PRG / ADJ mode switch
Indicators	yellow OUTPUT LED red SIGNAL LEVEL 4-digit display green THRESHOLD 4-digit display
Output	PNP or NPN PNP and push-pull (IO-Link mod. S70...PZ)
Output current	100 mA max.
Saturation voltage	1,5 V max. (mod. S70...N) 2 V max. (mod. S70...P/PZ)
Response time	<b>Super high speed:</b> 10 µs (S70...E2) <b>High speed:</b> 200 µs (S70...E1), 15 µs (S70...E2), 250 µs (S70...E3) <b>Fast:</b> 50 µs (S70...E2), 500 µs (S70...E3) <b>Standard:</b> 500 µs (S70...E1), 250 µs (S70...E2), 1 ms (S70...E3) <b>Medium range:</b> 500 µs (S70...E2) <b>Long range:</b> 2 ms (S70...E1), 1 ms (S70...E2), 4 ms (S70...E3) <b>Extra long range:</b> 5 ms (S70...E1), 12 ms (S70...E3)
Switching frequency	S70...E1: 2.5 kHz (High Speed), 1 kHz (Standard), 250 Hz (Long Range), 100 Hz (Extra Long Range) S70...E2: 50 kHz (Super High Speed), 33 kHz (High Speed), 10 kHz (Fast), 2 kHz (Standard), 1 kHz (Medium Range), 500 Hz (Long Range) S70...E3: 1 kHz (High Speed), 500 Hz (Fast), 250 Hz (Standard), 62.5 Hz (Long Range), 20 Hz (Extra Long Range)
IO-Link interface	baud rate: 38400 bps (COM2) process data width: 16 bits IODD files: provide all programming options of top panel interface, plus additional functionality
Connection	2 m cable, M8 4-pole connector
Dielectric strength	500 Vac, 1 min between electronics and housing
Insulating resistance	>20 MΩ, 500 Vdc between electronics and housing
Electrical protection	class 2
Mechanical protection	IP50, NEMA 1
Ambient light rejection	according to EN 60947-5-2
Vibrations	0,5 mm amplitude, 10 ... 55 Hz frequency, for every axis (EN60068-2-6)
Shock resistance	11 ms (30 G) 6 shock for every axis (EN60068-2-27)
Housing material	ABS and polycarbonate
Operating temperature	-10 ... 55 °C
Storage temperature	-25 ... 85 °C
Weight	69 g max. cable vers., 21 g max. conn. vers.

## DIMENSIONS



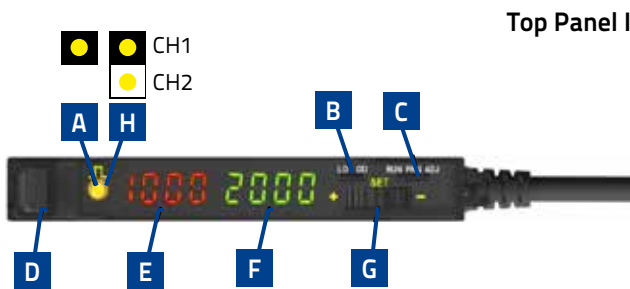
## CONNECTIONS



## INDICATOR AND SETTINGS

The **RUN/PRG/ADJ Mode Switch** puts the sensor in RUN, PRG (Program), or ADJ (Adjust) mode. RUN mode allows the sensor to operate normally and prevents unintentional programming changes via the **+ /SET/ - button**. PRG mode allows the sensor to be programmed through the display driven programming menu. ADJ mode allows the user to perform TEACH and SET methods and Manual Adjust.

The **LO/DO Switch** is used to select Light Operate or Dark Operate mode.



Top Panel Interface

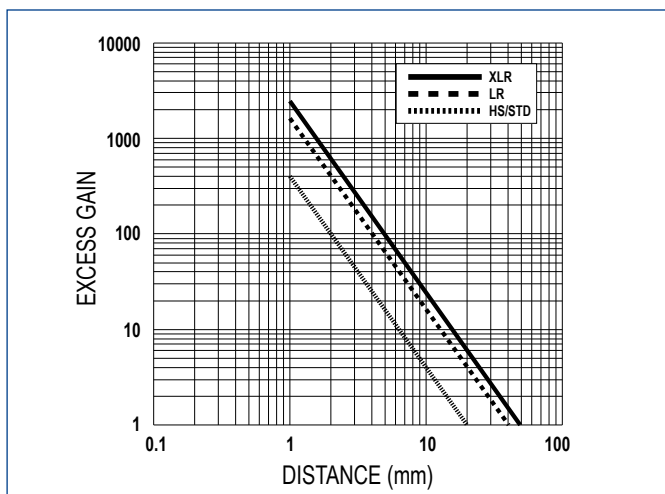
- A Output LED
- B LO/DO Switch
- C RUN/PRG/ADJ
- D Lever Action Fiber Clamp
- E Red Signal Level
- F Green Threshold
- G +/SET/- Rocker Button
- H CH1 Analog out, CH2 Discrete out (only S70...E3)

As an alternative the sensor can be programmed remotely and the remote input may be used to perform TEACH and SET methods (not available on IO-Link models).

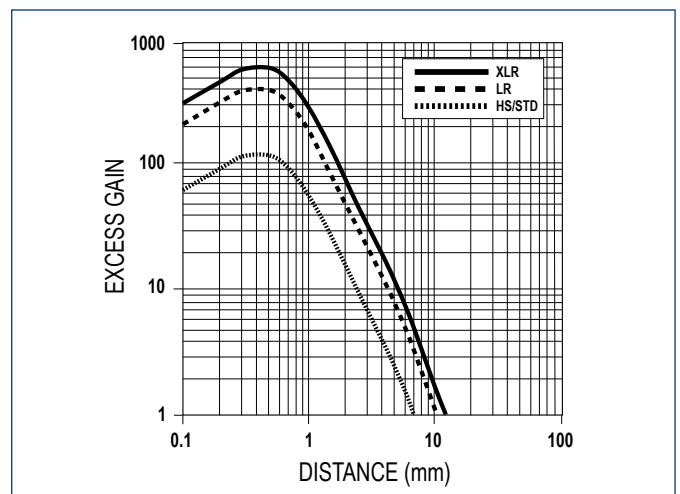
## DETECTION DIAGRAMS

	S70-E1			
	HIGH SPEED	STANDARD	LONG RANGE	EXTRA LONG RANGE
Response Time	200 $\mu$ s	500 $\mu$ s	2 ms	5 ms
Repeatability	66 $\mu$ s	100 $\mu$ s	100 $\mu$ s	100 $\mu$ s

## Excess gain

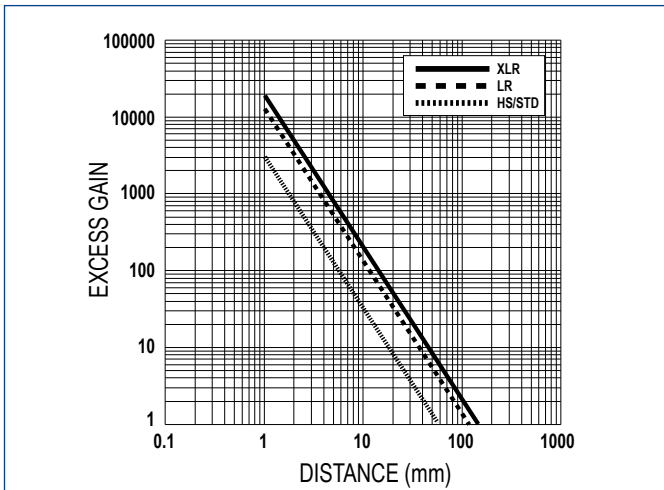


Through beam with 0.2 mm internal fiber optic diameter

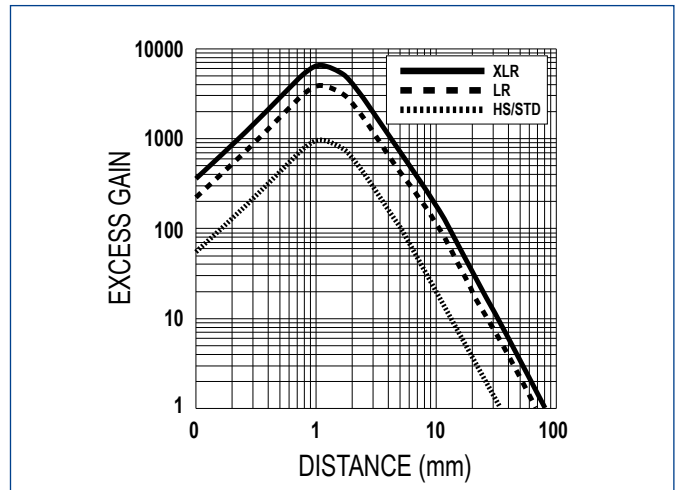


Diffuse proximity with 0.2 mm internal fiber optic diameter

## Excess gain

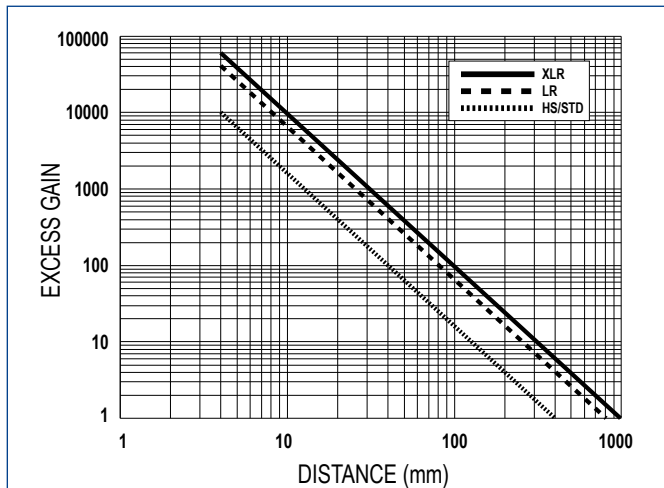


Through beam with 0.5 mm internal fiber optic diameter

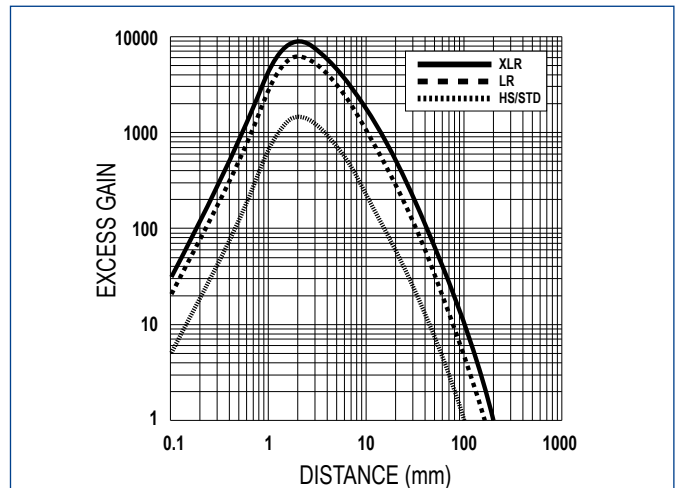


Diffuse proximity with 0.5 mm internal fiber optic diameter

## Excess gain

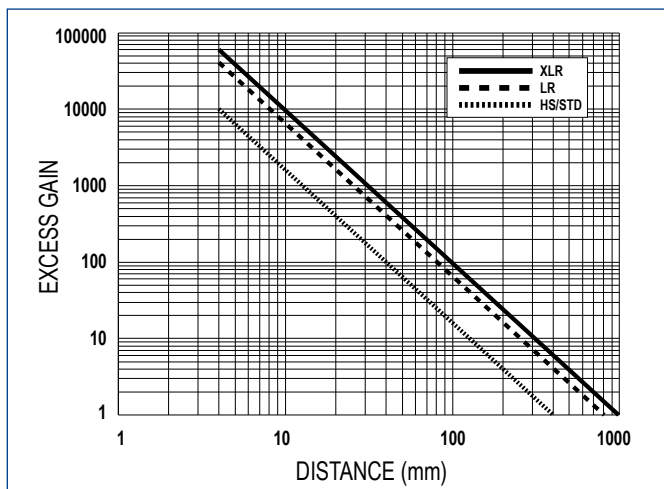


Through beam with 1 mm internal fiber optic diameter

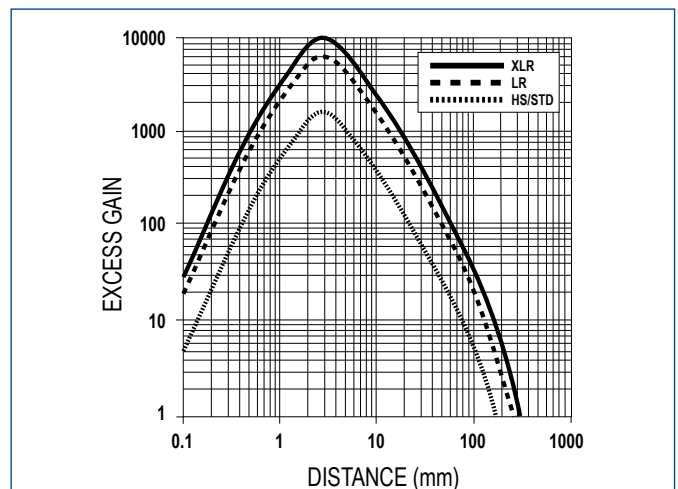


Diffuse proximity with 1 mm internal fiber optic diameter

## Excess gain



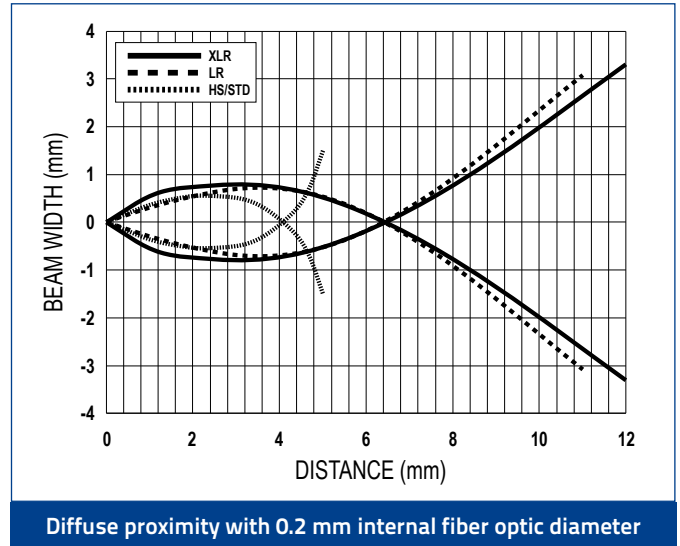
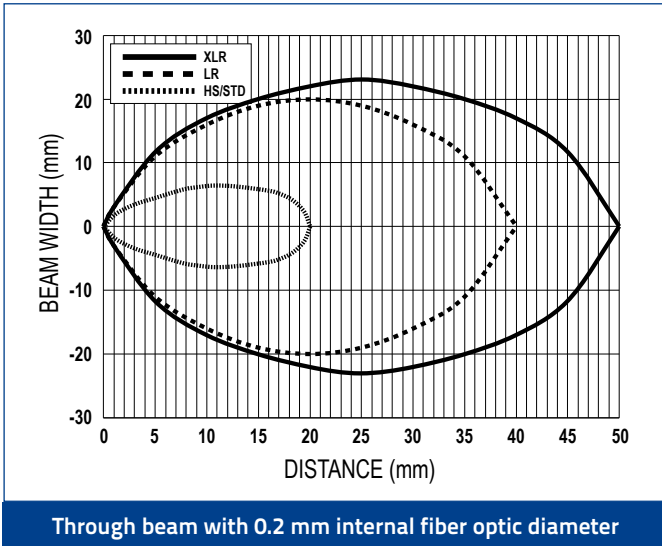
Through beam with 1.5 mm internal fiber optic diameter



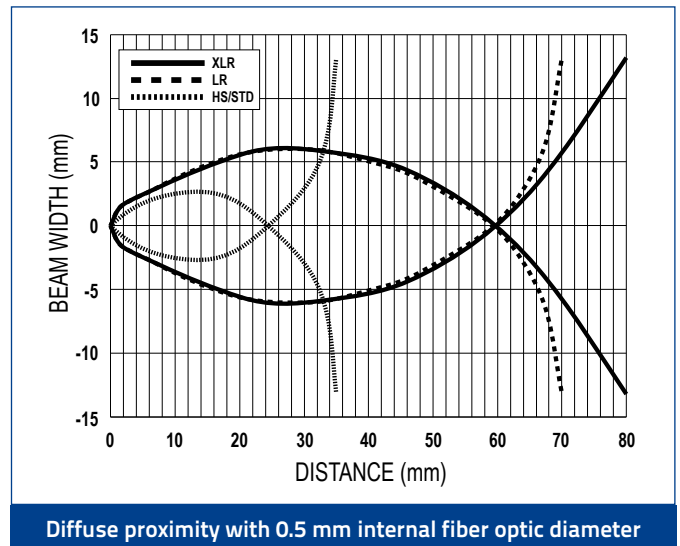
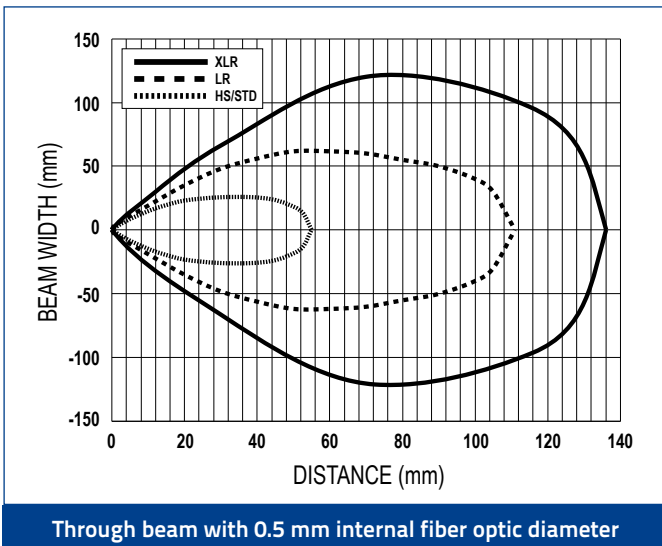
Diffuse proximity with 1.5 mm internal fiber optic diameter

S70-E1				
	HIGH SPEED	STANDARD	LONG RANGE	EXTRA LONG RANGE
Response Time	200 $\mu$ s	500 $\mu$ s	2 ms	5 ms
Repeatability	66 $\mu$ s	100 $\mu$ s	100 $\mu$ s	100 $\mu$ s

### Detection area

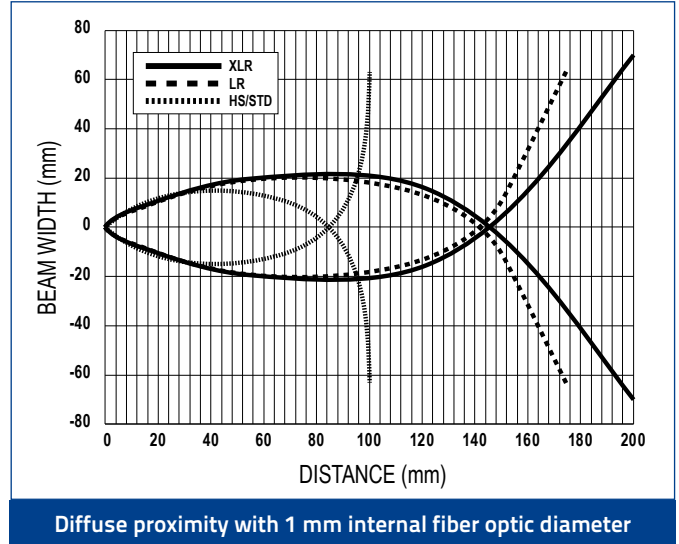
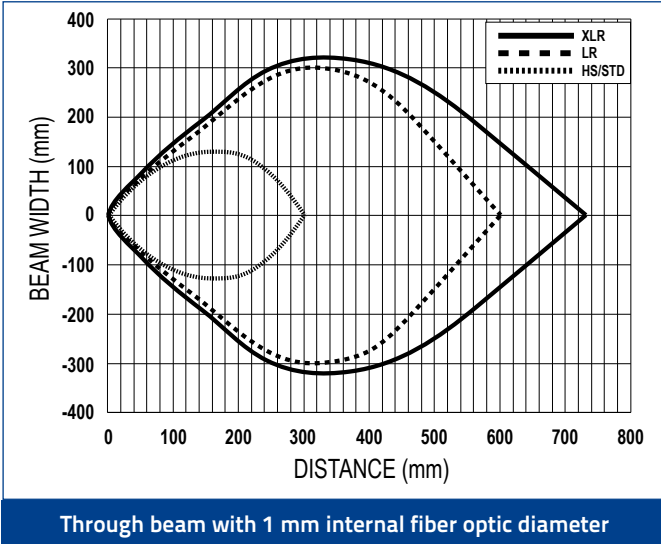


### Detection area

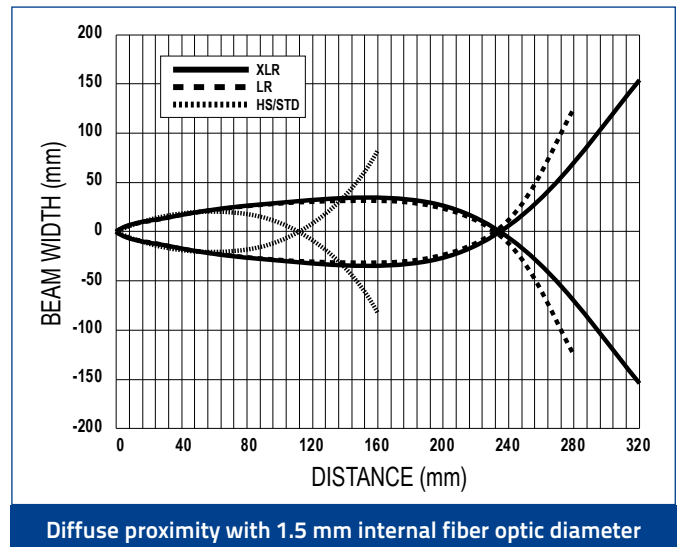
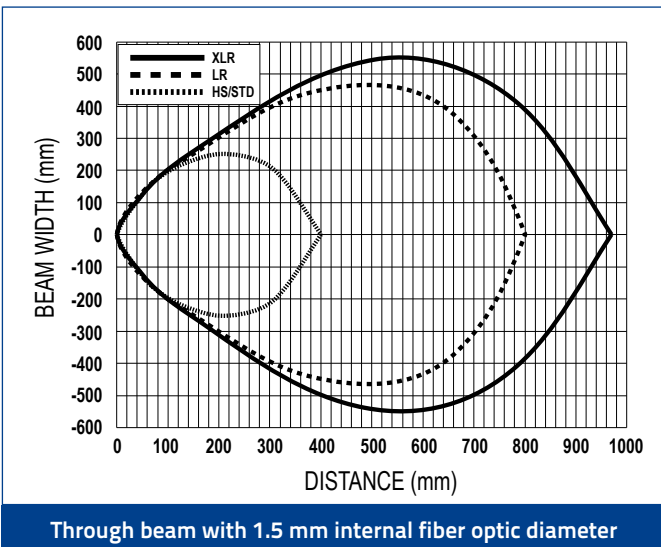


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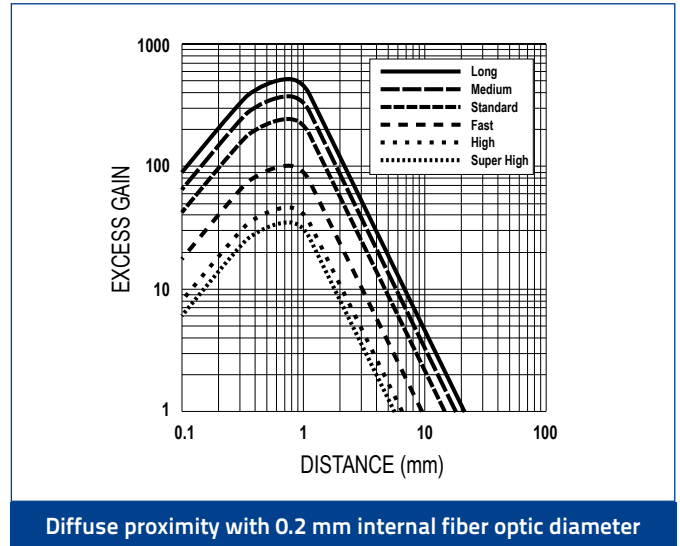
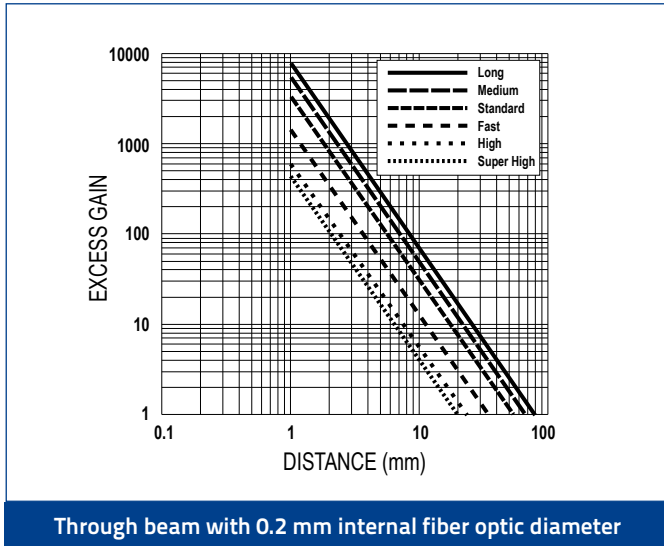


## Detection area

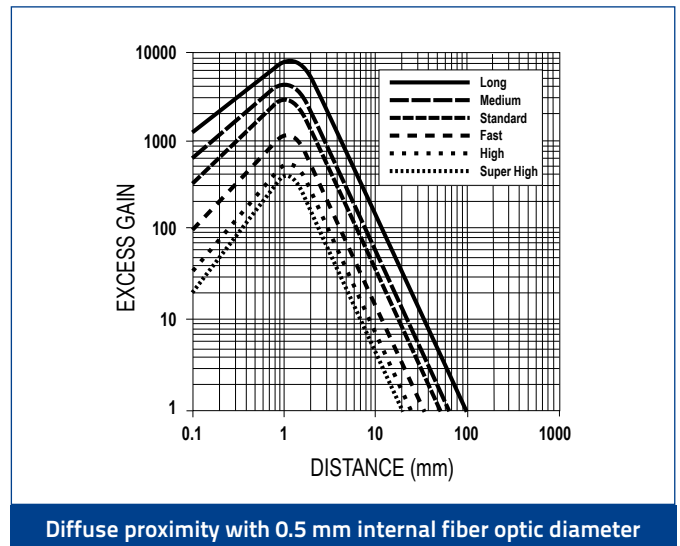
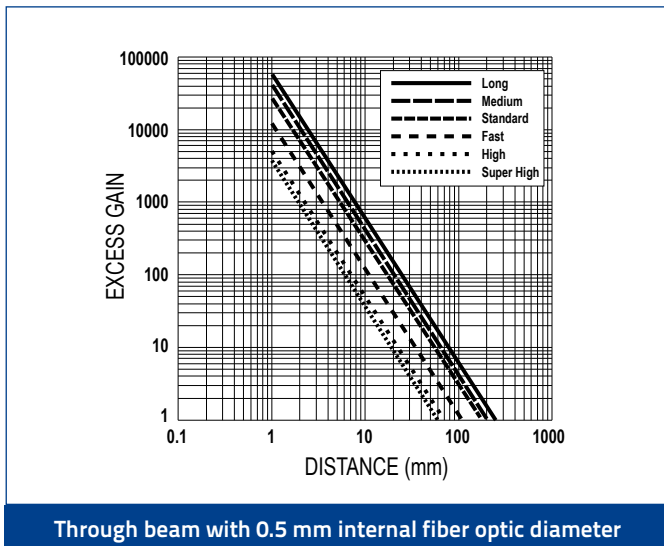


S70-E2						
	SUPER HIGH SPEED	HIGH SPEED	FAST	STANDARD	MEDIUM RANGE	LONG RANGE
Response Time	10 $\mu$ s	15 $\mu$ s	50 $\mu$ s	250 $\mu$ s	500 $\mu$ s	1 ms
Repeatability	5 $\mu$ s	5 $\mu$ s	12 $\mu$ s	50 $\mu$ s	80 $\mu$ s	165 $\mu$ s

## Excess gain

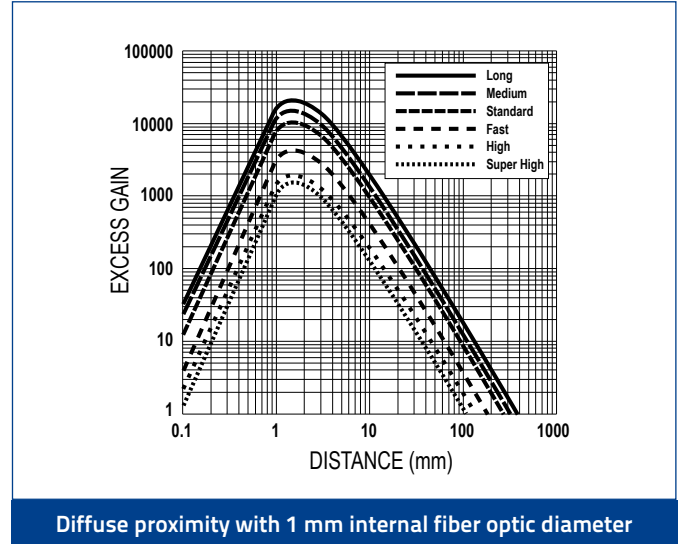
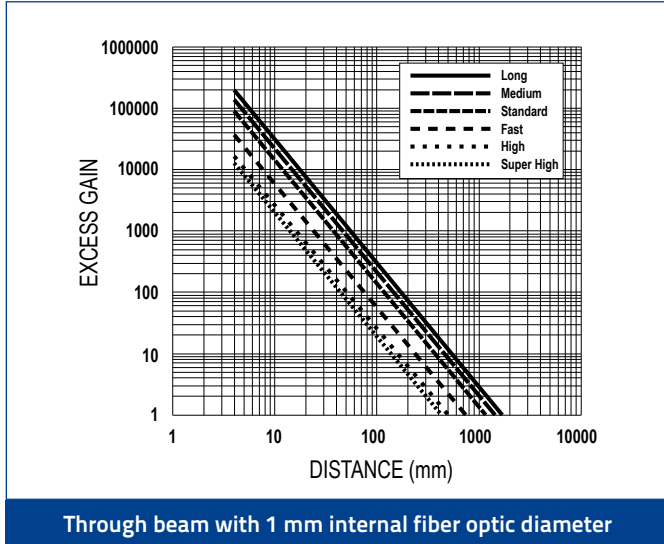


## Excess gain

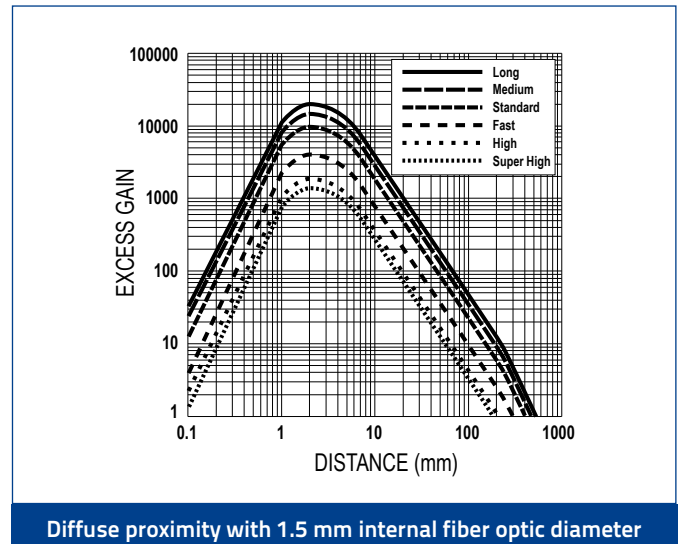
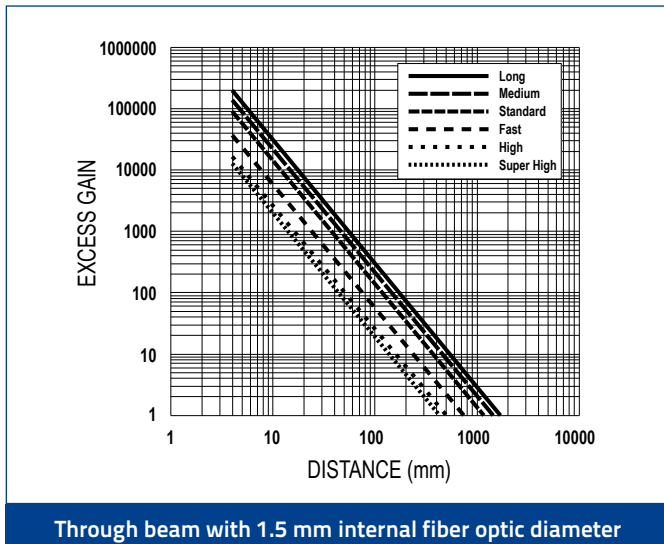


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## Excess gain



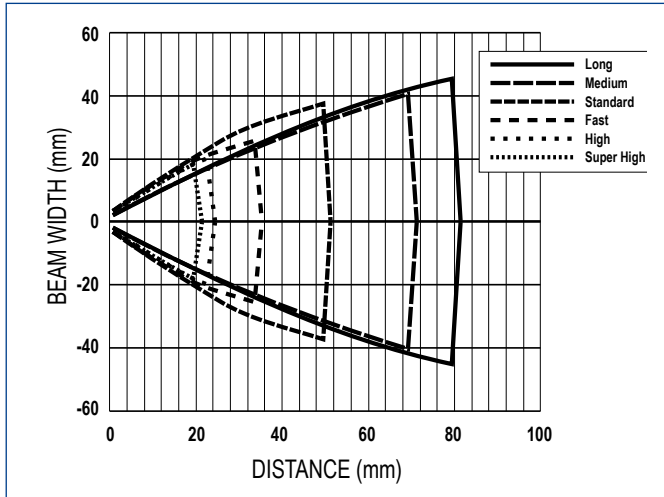
## Excess gain



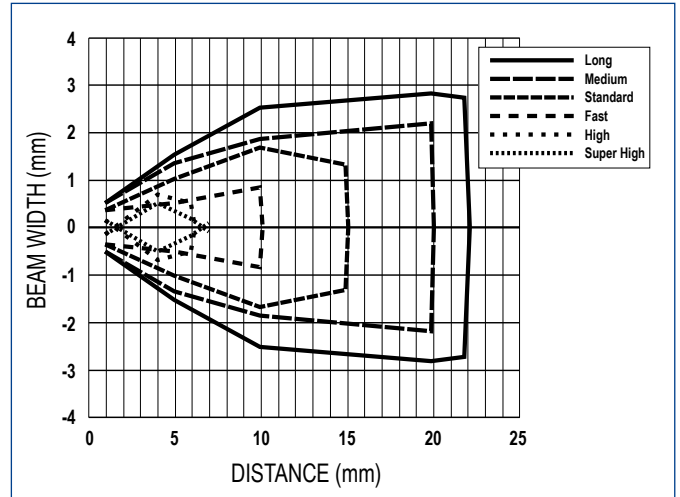


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## Detection area

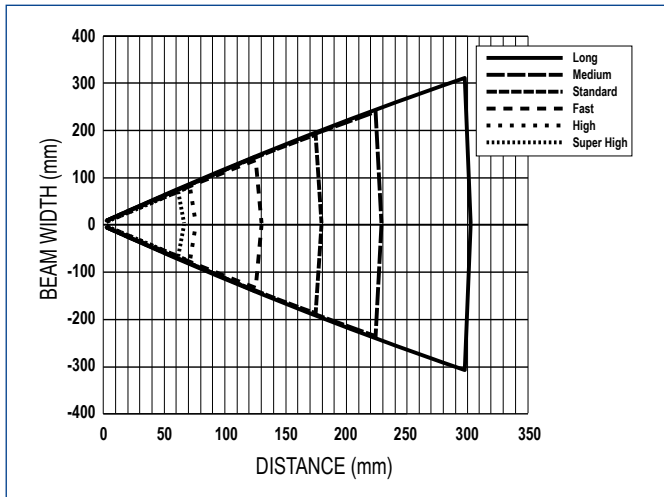


Through beam with 0.2 mm internal fiber optic diameter

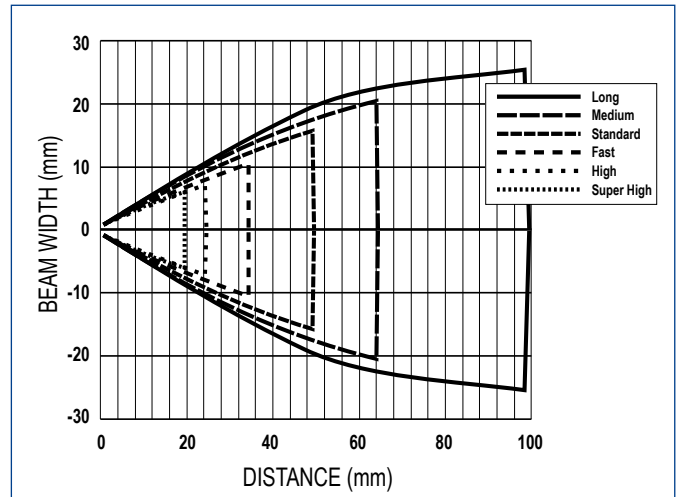


Diffuse proximity with 0.2 mm internal fiber optic diameter

## Detection area



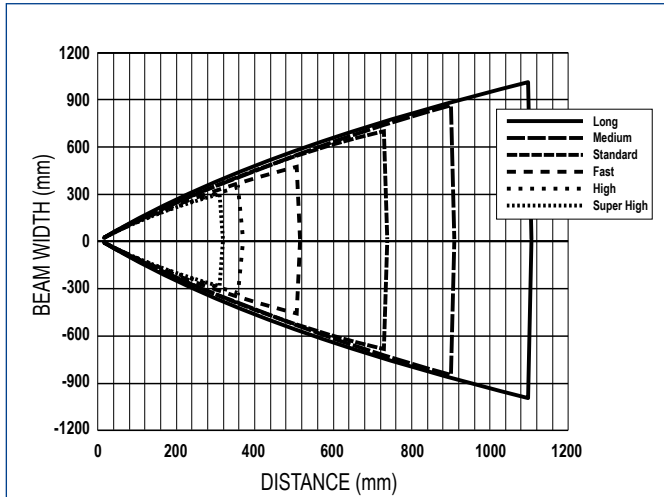
Through beam with 0.5 mm internal fiber optic diameter



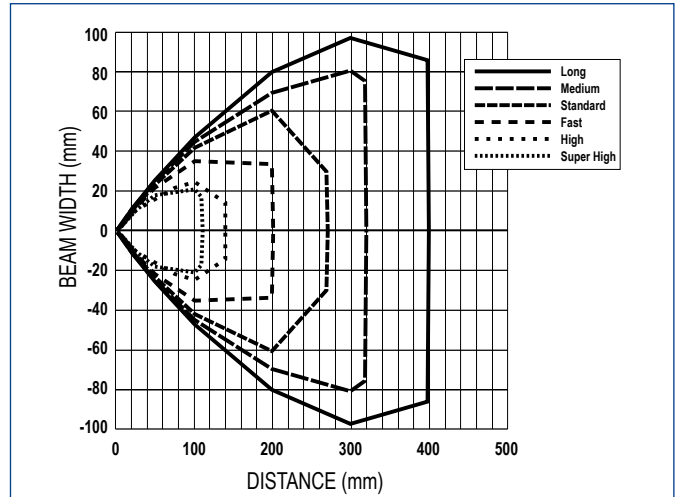
Diffuse proximity with 0.5 mm internal fiber optic diameter

S70-E2						
	SUPER HIGH SPEED	HIGH SPEED	FAST	STANDARD	MEDIUM RANGE	LONG RANGE
Response Time	10 $\mu$ s	15 $\mu$ s	50 $\mu$ s	250 $\mu$ s	500 $\mu$ s	1 ms
Repeatability	5 $\mu$ s	5 $\mu$ s	12 $\mu$ s	50 $\mu$ s	80 $\mu$ s	165 $\mu$ s

## Detection area

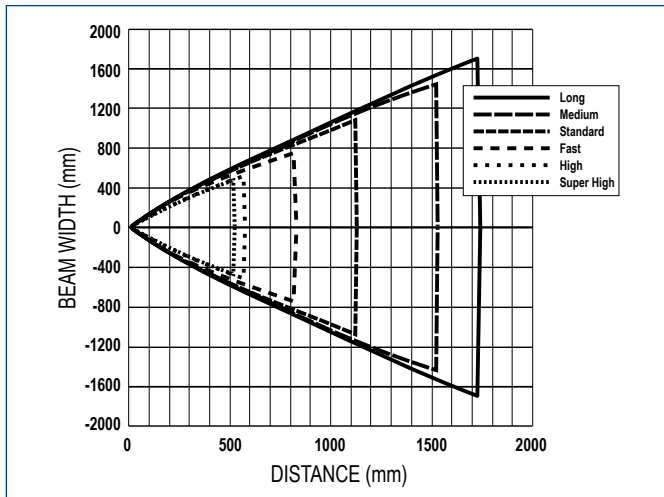


Through beam with 1 mm internal fiber optic diameter

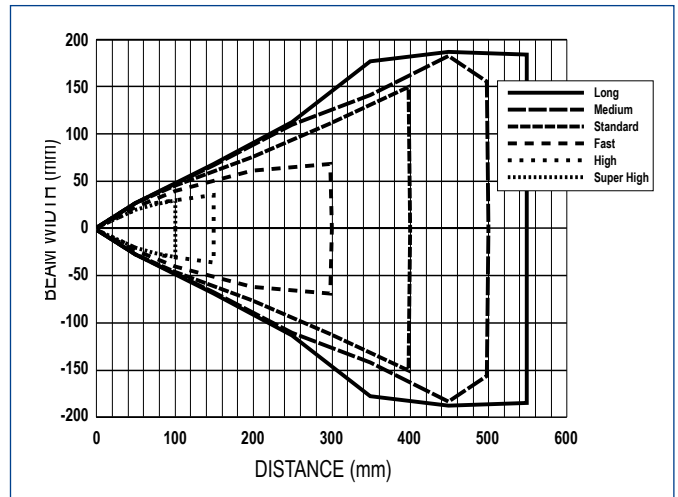


Diffuse proximity with 1 mm internal fiber optic diameter

## Detection area



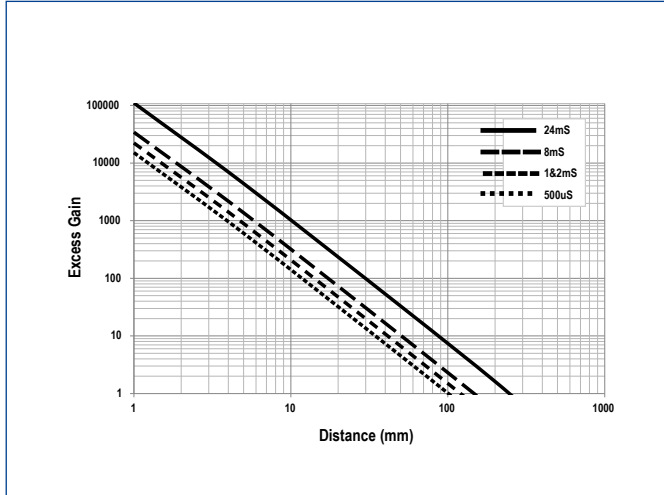
Through beam with 1.5 mm internal fiber optic diameter



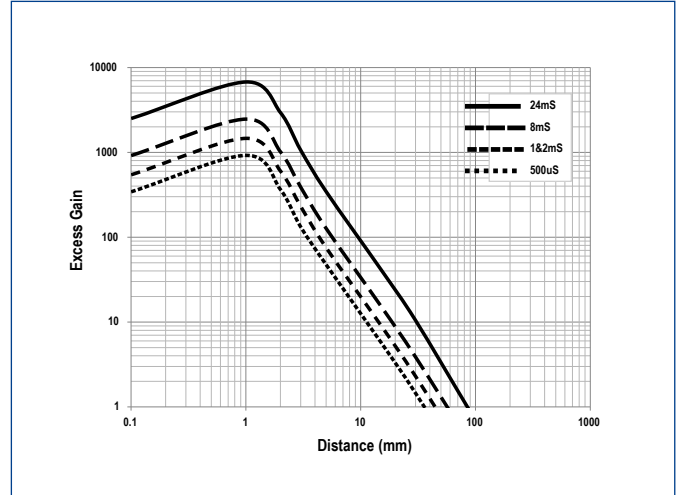
Diffuse proximity with 1.5 mm internal fiber optic diameter

S70-E3						
	SUPER HIGH SPEED	HIGH SPEED	FAST	STANDARD	LONG RANGE	EXTRA LONG RANGE
Response Time	-	250 $\mu$ s	500 $\mu$ s	1 ms	4 ms	12 ms
Repeatability	-	100 $\mu$ s	150 $\mu$ s	180 $\mu$ s	180 $\mu$ s	180 $\mu$ s

## Excess gain

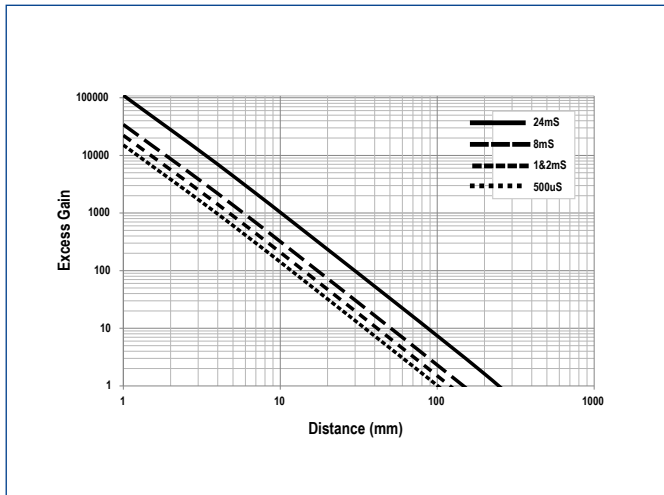


Through beam with 0.2 mm internal fiber optic diameter

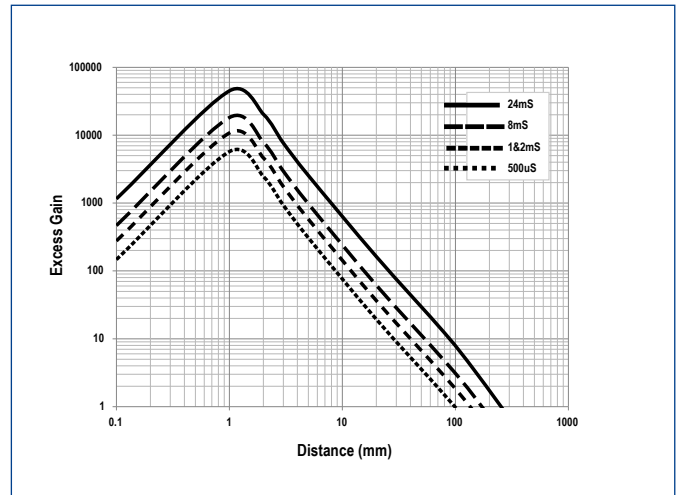


Diffuse proximity with 0.2 mm internal fiber optic diameter

## Excess gain



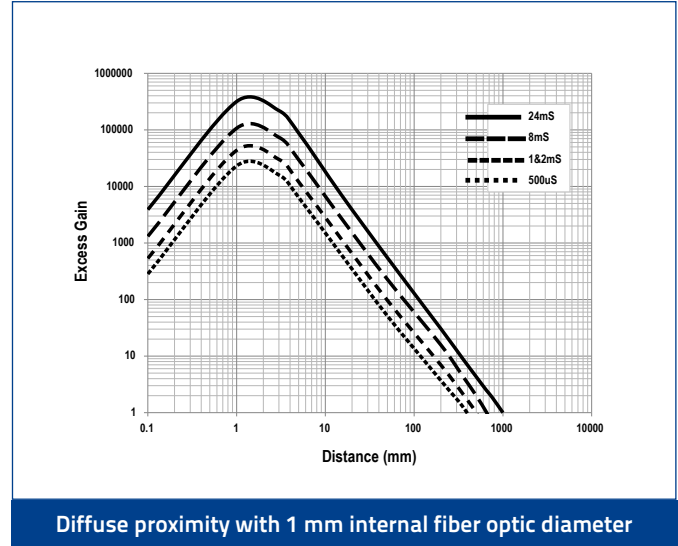
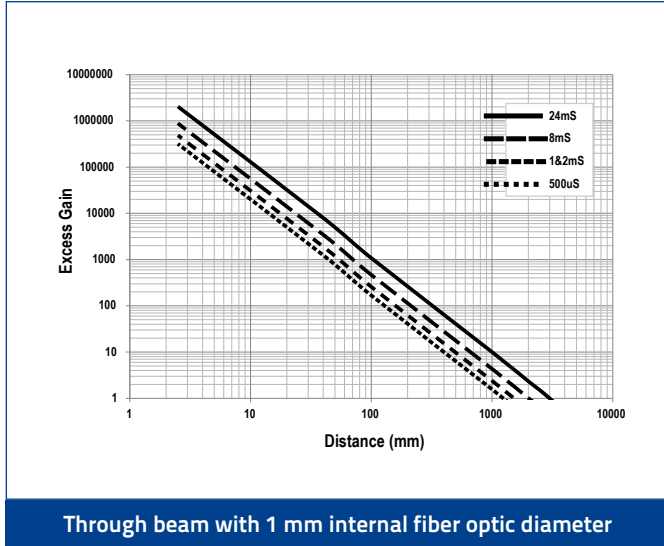
Through beam with 0.5 mm internal fiber optic diameter



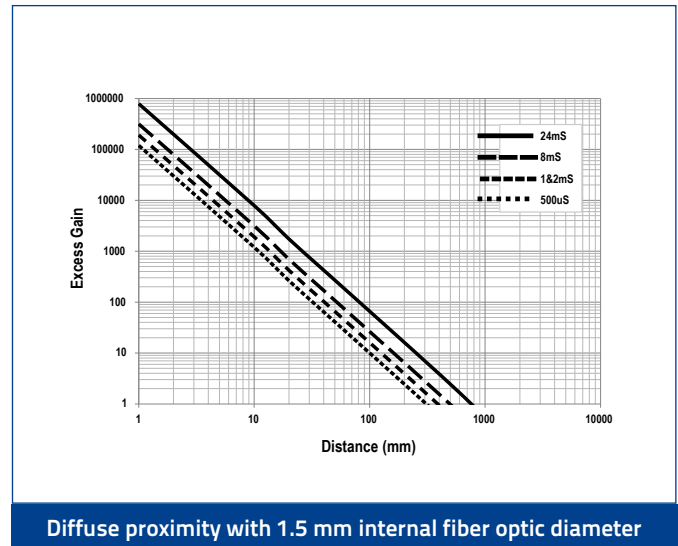
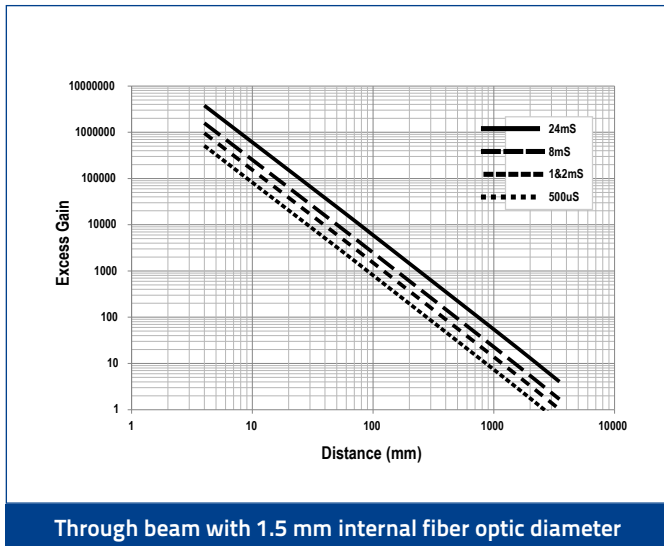
Diffuse proximity with 0.5 mm internal fiber optic diameter

S70-E3						
	SUPER HIGH SPEED	HIGH SPEED	FAST	STANDARD	LONG RANGE	EXTRA LONG RANGE
Response Time	-	250 $\mu$ s	500 $\mu$ s	1 ms	4 ms	12 ms
Repeatability	-	100 $\mu$ s	150 $\mu$ s	180 $\mu$ s	180 $\mu$ s	180 $\mu$ s

## Excess gain

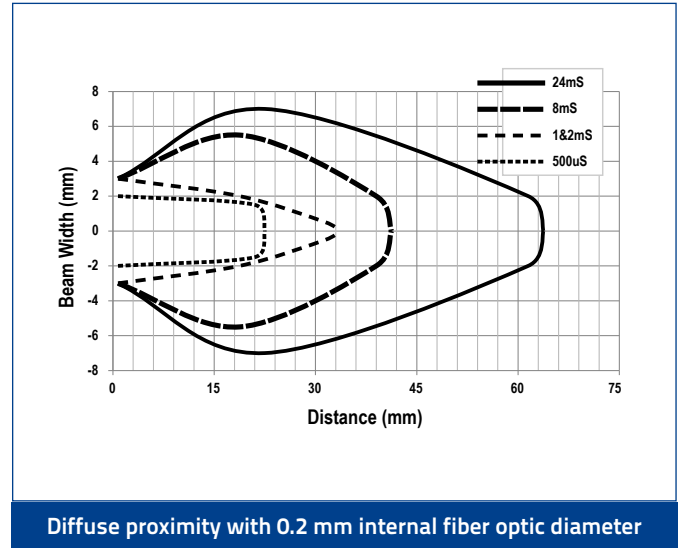
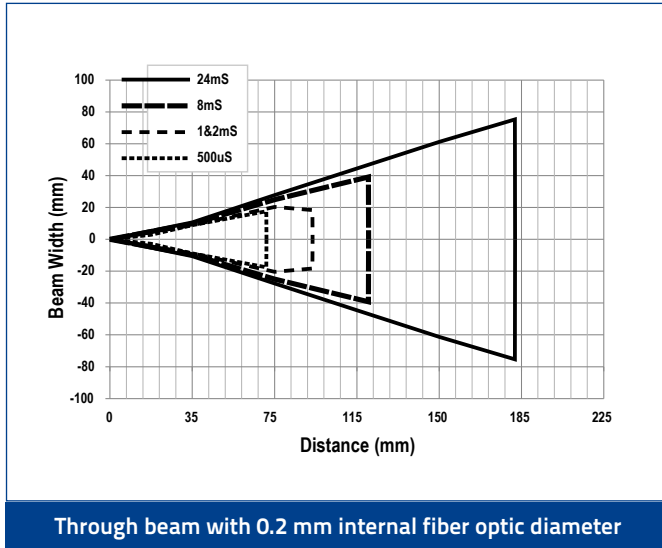


## Excess gain

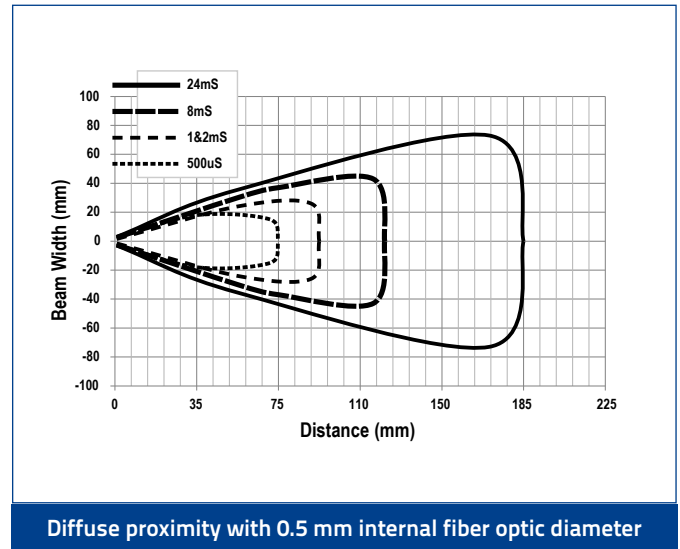
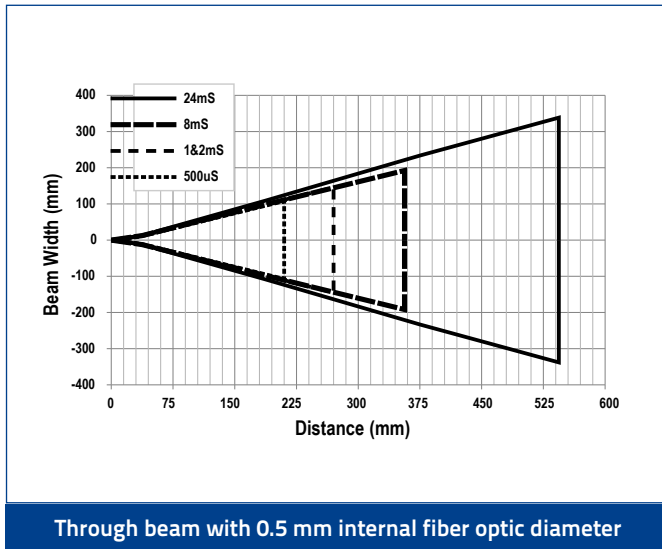


S70-E3						
	SUPER HIGH SPEED	HIGH SPEED	FAST	STANDARD	LONG RANGE	EXTRA LONG RANGE
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## Detection area

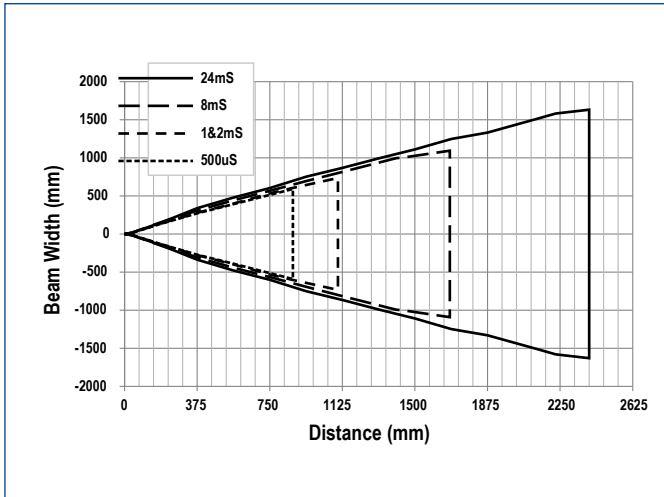


## Detection area

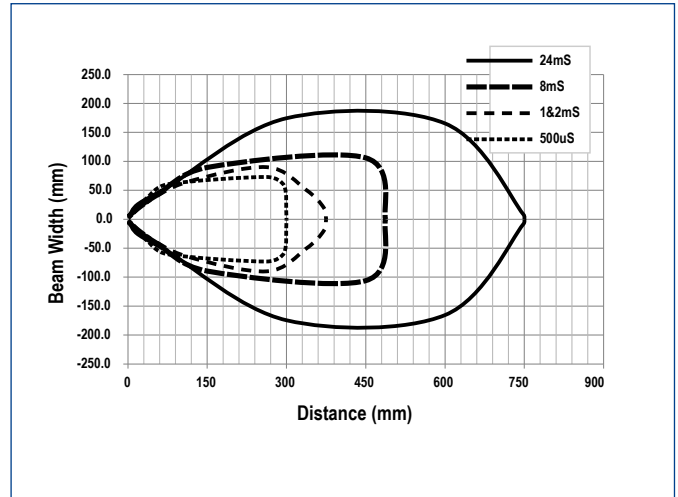


S70-E3						
	SUPER HIGH SPEED	HIGH SPEED	FAST	STANDARD	LONG RANGE	EXTRA LONG RANGE
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## Detection area

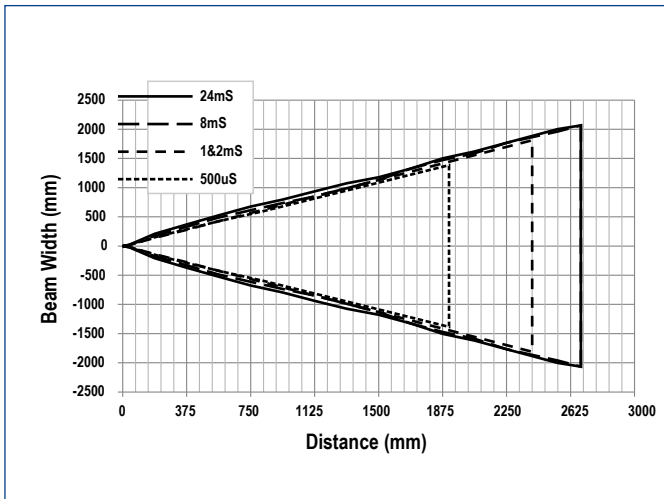


Through beam with 1 mm internal fiber optic diameter

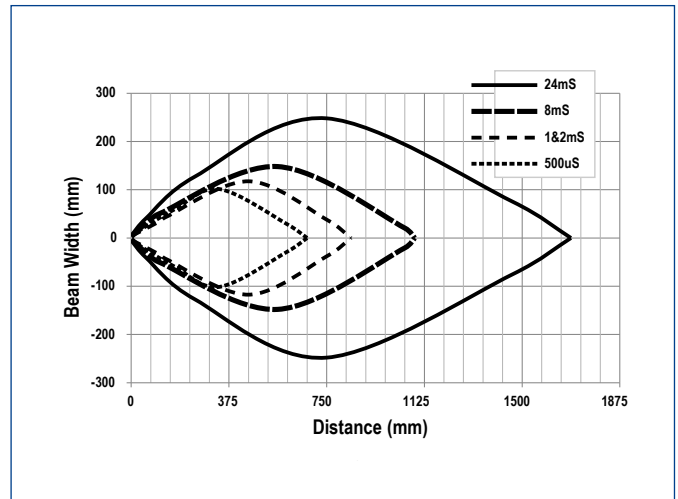


Diffuse proximity with 1 mm internal fiber optic diameter

## Detection area



Through beam with 1.5 mm internal fiber optic diameter

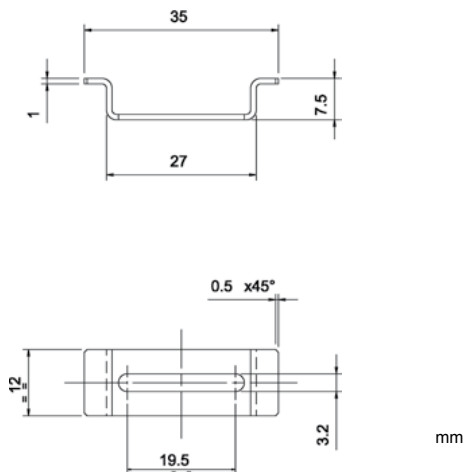


Diffuse proximity with 1.5 mm internal fiber optic diameter

## MODEL SELECTION AND ORDER INFORMATION

OPTIC FUNCTION	RESPONSE TIME	CONNECTION	OUTPUT	MODEL	ORDER No.	
Fiber Optic Amplifier	200 $\mu$ s ... 5 ms	2 m Cable	NPN	S70-2-E1-N	950561000	
			PNP	S70-2-E1-P	950561010	
		M8 Connector	NPN	S70-5-E1-N	950561060	
			PNP	S70-5-E1-P	950561020	
			PNP, push-pull IO-Link	S70-5-E1-PZ	950561030	
			NPN	S70-5-E2-N	950561040	
	10 $\mu$ s ... 1 ms	M8 Connector	PNP	S70-5-E2-P	950561050	
			4...20mA, NPN	S70-5-E3-NI	950561100	
		250us...12ms	M8 Connector	0...10V, NPN	S70-5-E3-NV	950561080
				4...20mA, PNP	S70-5-E3-PI	950561090
			M8 Connector	0...10V, PNP	S70-5-E3-PV	950561070

CRD-5000



MODEL	DESCRIPTION	ORDER No.
CRD-5000	DIN rail mounting bracket	95ACC2790

## CABLES

TYPE	DESCRIPTION	LENGTH	MODEL	ORDER No.
Axial M8 Connector	4-pole, grey, P.V.C.	3 m	CS-B1-02-G-03	95A251420
		5 m	CS-B1-02-G-05	95A251430
		7 m	CS-B1-02-G-07	95A251440
		10 m	CS-B1-02-G-10	95A251480
	4-pole, P.U.R.	2 m	CS-B1-02-R-02	95A251620
		5 m	CS-B1-02-R-05	95A251640
Radial M8 Connector	4-pole, grey, P.V.C.	3 m	CS-B2-02-G-03	95A251450
		5 m	CS-B2-02-G-05	95A251460
		7 m	CS-B2-02-G-07	95A251470
		10 m	CS-B2-02-G-10	95A251530
	4-pole, P.U.R.	2 m	CS-B2-02-R-02	95A251630
		5 m	CS-B2-02-R-05	95A251650

