S70

ADVANCED FIBER OPTIC AMPLIFIERS FOR HIGH SPEED AND LOW CONTRAST APPLICATIONS

- DIN rail mountable models with dual digital displays
- High speed models: 200 µs...5 ms
- Super high speed models: 10 µs...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

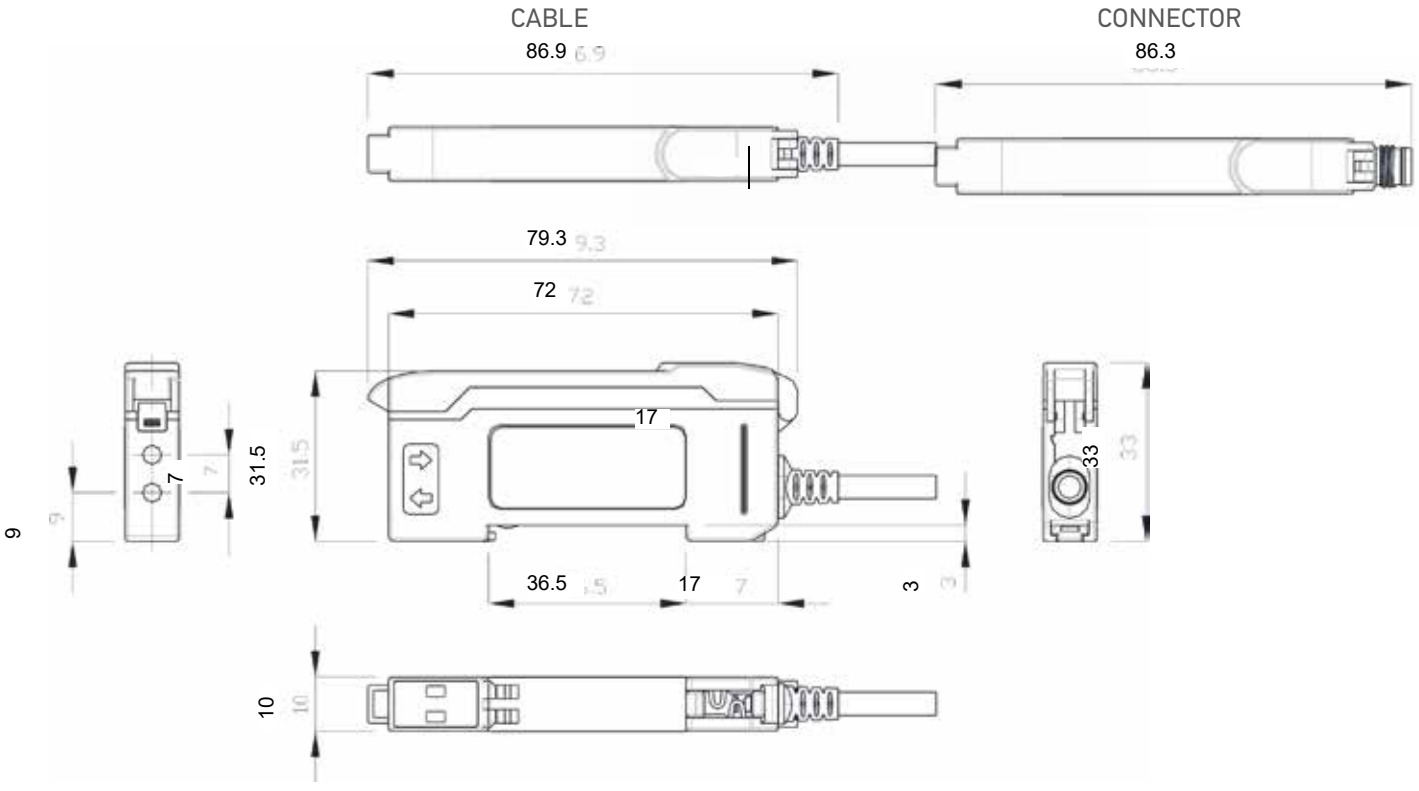
- Processing and Packaging machinery
- Electronics assembling
- Pharmaceutical industry
- Cosmetic and bottling industries

S70		
Response time		Super high speed: 10 µs (S70...E2) High speed: 200 µs (S70...E1), 15 µs (S70...E2), 250 µs (S70...E3) Fast: 50 µs (S70...E2), 500 µs (S70...E3) Standard: 500 µs (S70...E1), 250 µs (S70...E2), 1 ms (S70...E3) Medium range: 500 µs (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 µs (S70...E2) High speed: 66 µs (S70...E1), 5 µs (S70...E2), 100 µs (S70...E3) Fast: 12 µs (S70...E2), 150 µs (S70...E3) Standard: 100 µs (S70...E1), 50 µs (S70...E2), 180 µs (S70...E3) Medium range: 80 µs (S70...E2) Long range: 100 µs (S70...E1), 165 µs (S70...E2), 180 µs (S70...E3) Extra long range: 100 µs (S70...E1), 180 µs (S70...E3)
Power supply	Vdc	10...30 V (current output models and digital output models) 12...30 (voltage output models)
	Vac	
	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

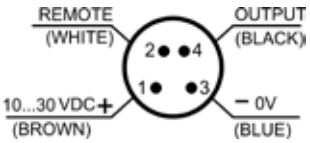
Power supply	10...30 V (current output models and digital output models) 12...30 (voltage output models)
Ripple	10% max.
Consumption (output current excluded)	40 mA max. (standard display mode), 30 mA max. (ECO display mode)
Light emission	red 660 nm (mod. S70...E1, S70...E3) red 635 nm (mod. S70...E2)
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	Super high speed: 10 µs (S70...E2) High speed: 200 µs (S70...E1), 15 µs (S70...E2), 250 µs (S70...E3) Fast: 50 µs (S70...E2), 500 µs (S70...E3) Standard: 500 µs (S70...E1), 250 µs (S70...E2), 1 ms (S70...E3) Medium range: 500 µs (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)
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), 250Hz (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

M8 CONNECTOR



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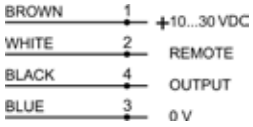
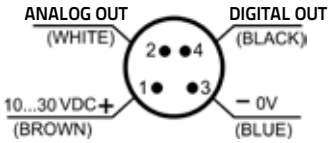
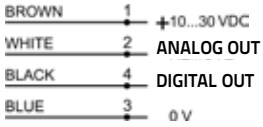


M8 CONNECTOR



CABLE

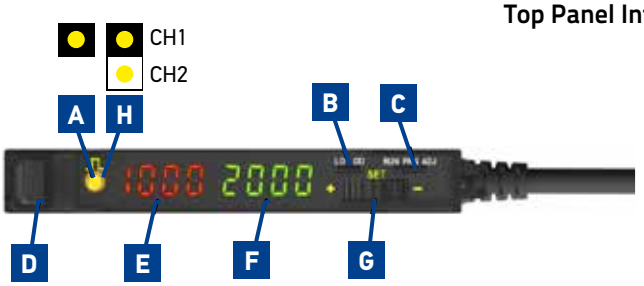


INDICATOR AND SETTINGS

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



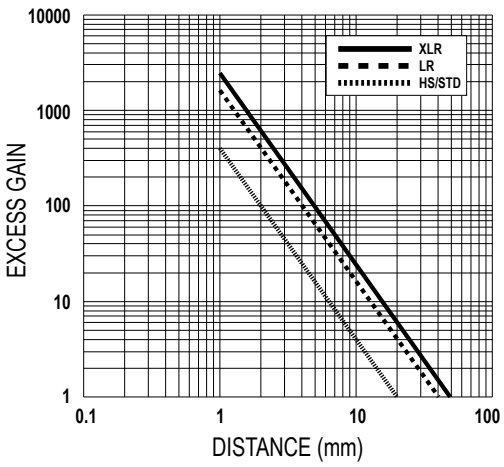
- A Output LED
- B LO/DO Switch
- C RUN/PRG/ADJ
- D Lever Action Fiber Clamp
- E Red Signal Level
- F Green Threshold
- G +/SET/- Rocker Button
- H CH1 Analog out, CH2 Discrete out (only S70...E3)

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).

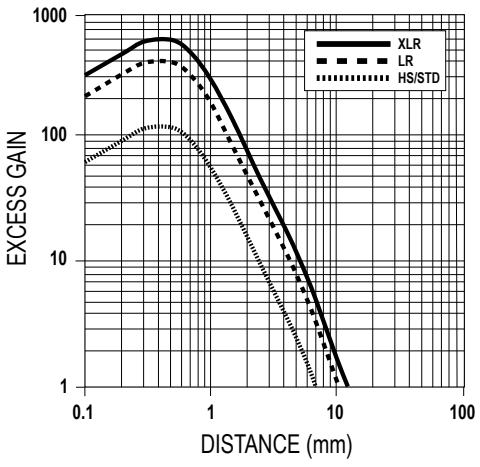
DETECTION DIAGRAMS

S70-E1				
	HIGH SPEED	STANDARD	LONG RANGE	EXTRA LONG RANGE
Response Time	200 µs	500 µs	2 ms	5 ms
Repeatability	66 µs	100 µs	100 µs	100 µs

EXCESS GAIN

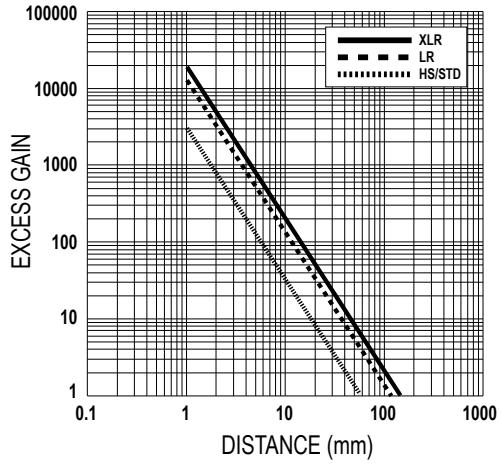


Through beam with 0.2 mm internal fiber optic diameter

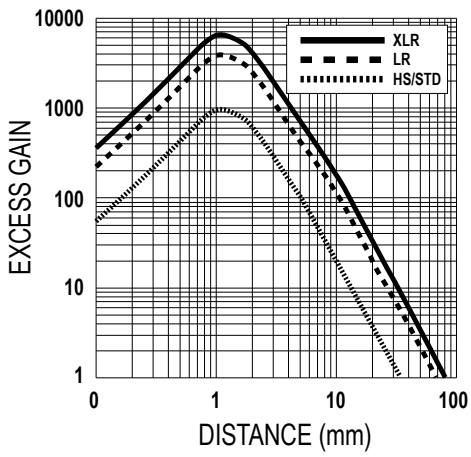


Diffuse proximity with 0.2 mm internal fiber optic diameter

EXCESS GAIN

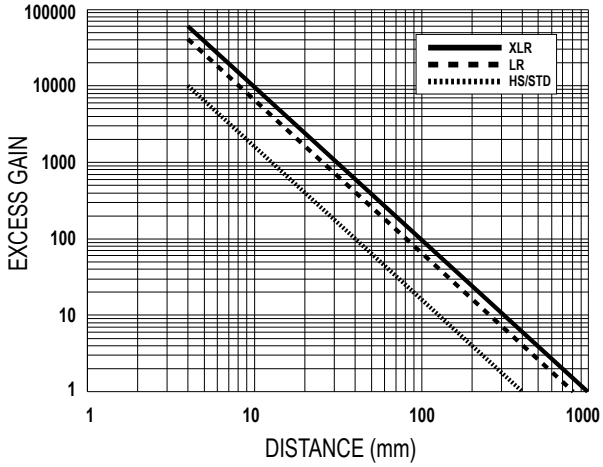


Through beam with 0.5 mm internal fiber optic diameter

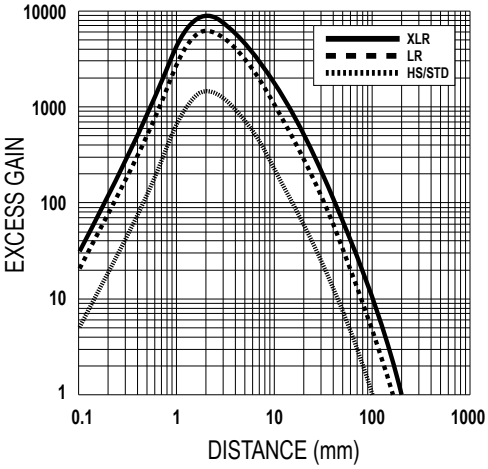


Diffuse proximity with 0.5 mm internal fiber optic diameter

EXCESS GAIN

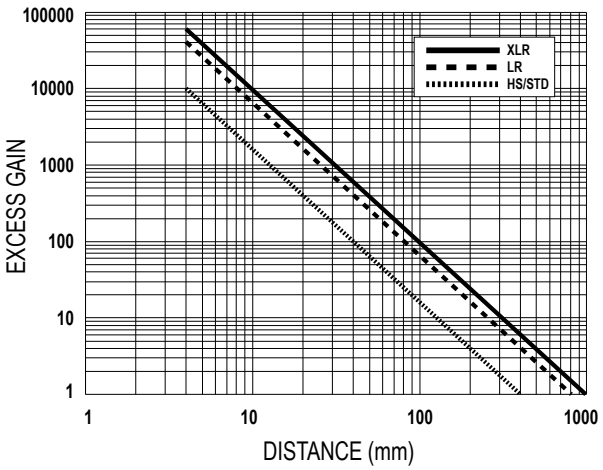


Through beam with 1 mm internal fiber optic diameter

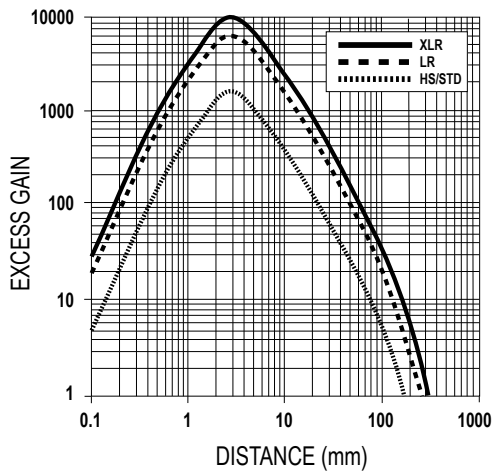


Diffuse proximity with 1 mm internal fiber optic diameter

EXCESS GAIN



Through beam with 1.5 mm internal fiber optic diameter



Diffuse proximity with 1.5 mm internal fiber optic diameter

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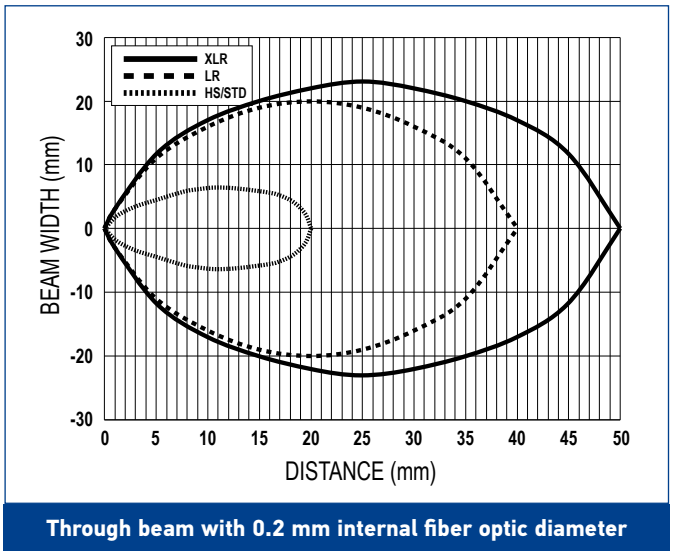
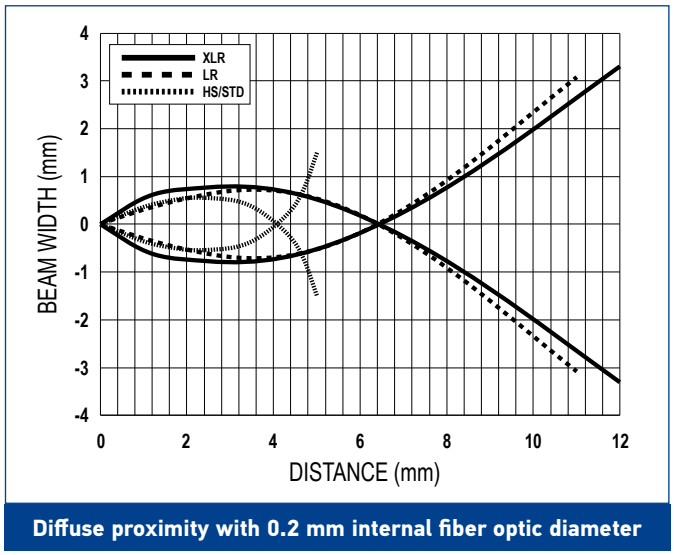
	HIGH SPEED	STANDARD	LONG RANGE	EXTRA LONG RANGE
Response Time	200 µs	500 µs	2 ms	5 ms
Repeatability	66 µs	100 µs	100 µs	100 µs

DETECTION AREA

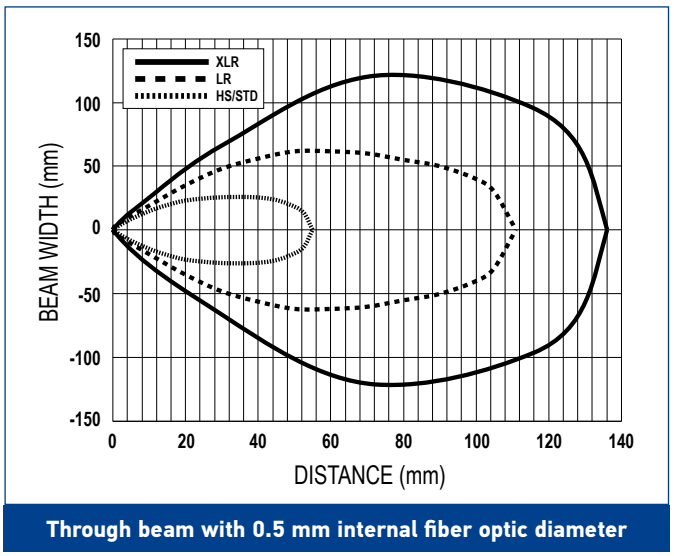


Through beam with 0.2 mm internal fiber optic diameter

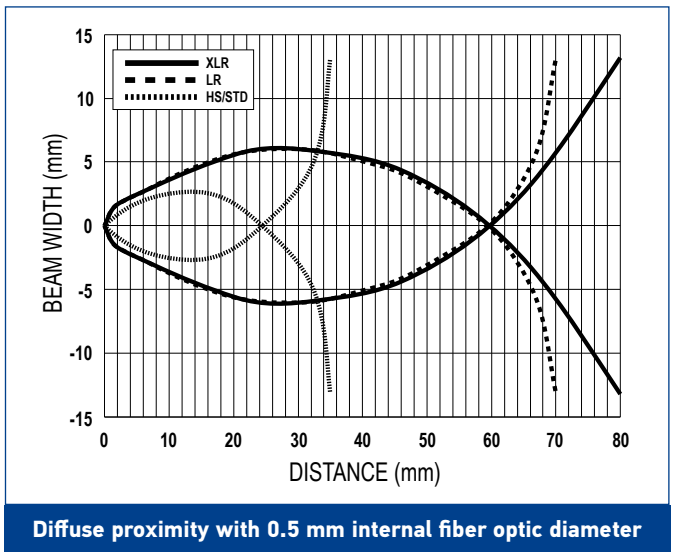


Diffuse proximity with 0.2 mm internal fiber optic diameter

DETECTION AREA



Through beam with 0.5 mm internal fiber optic diameter



Diffuse proximity with 0.5 mm internal fiber optic diameter

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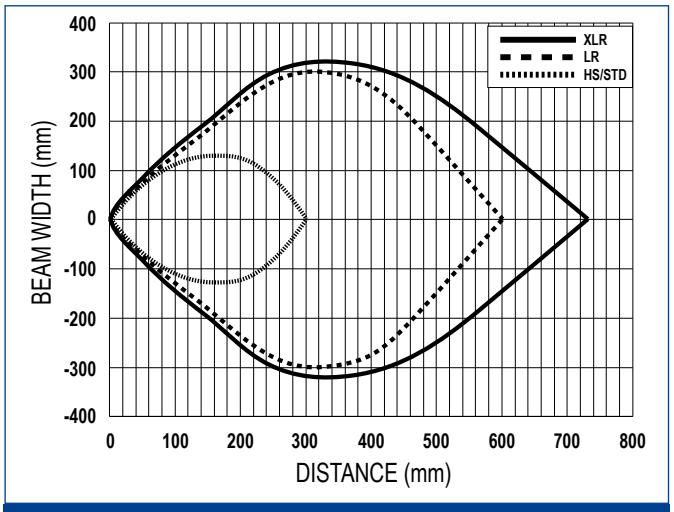
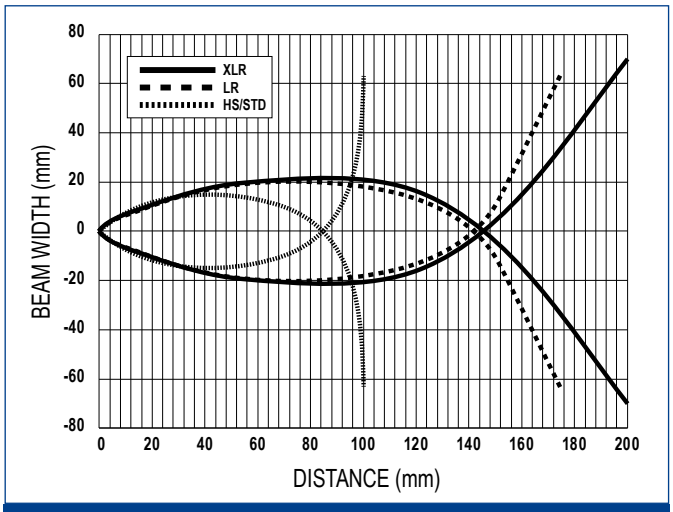
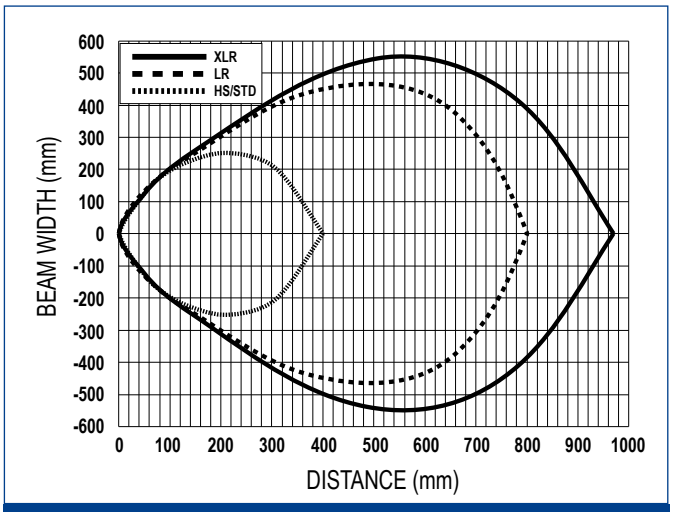


Through beam with 1 mm internal fiber optic diameter

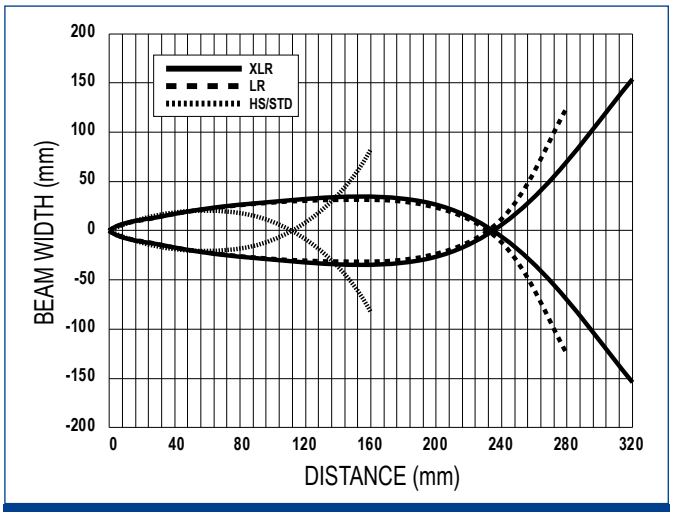


Diffuse proximity with 1 mm internal fiber optic diameter

DETECTION AREA



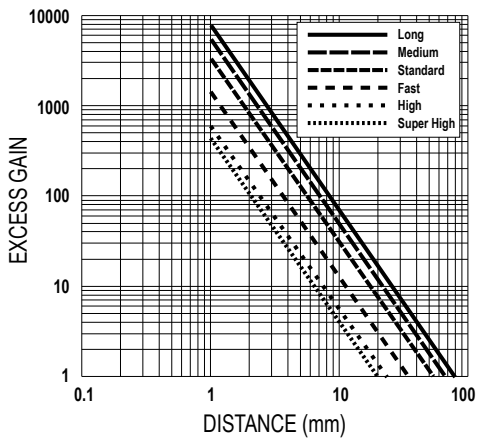
Through beam with 1.5 mm internal fiber optic diameter



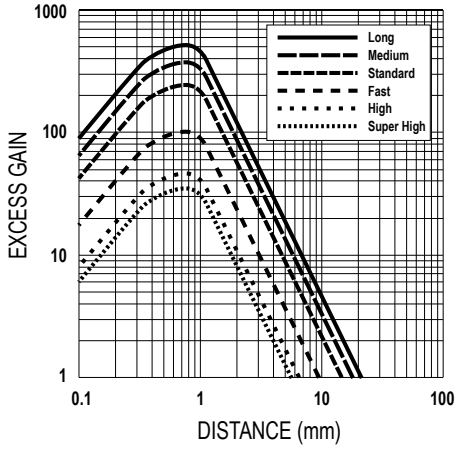
Diffuse proximity with 1.5 mm internal fiber optic diameter

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

EXCESS GAIN

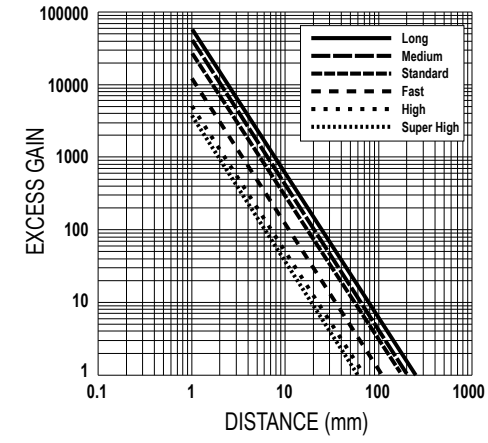


Through beam with 0.2 mm internal fiber optic diameter

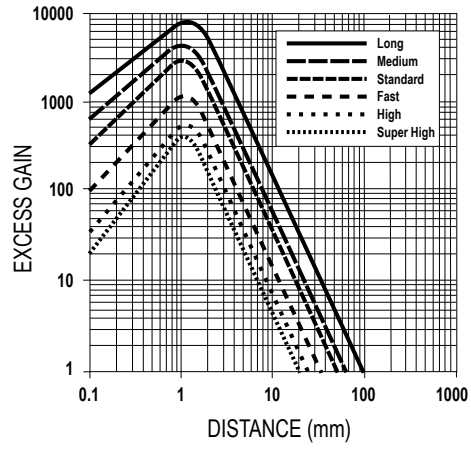


Diffuse proximity with 0.2 mm internal fiber optic diameter

EXCESS GAIN



Through beam with 0.5 mm internal fiber optic diameter



Diffuse proximity with 0.5 mm internal fiber optic diameter

S70-E2						
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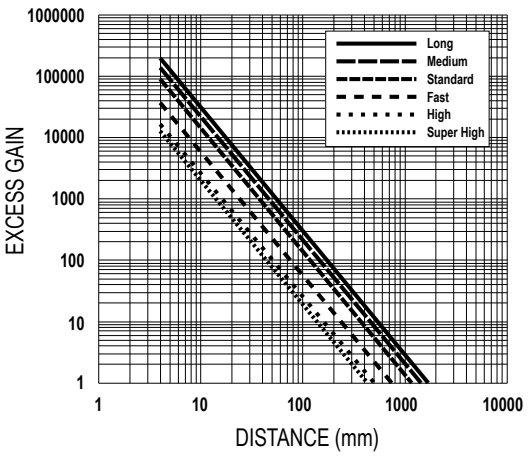
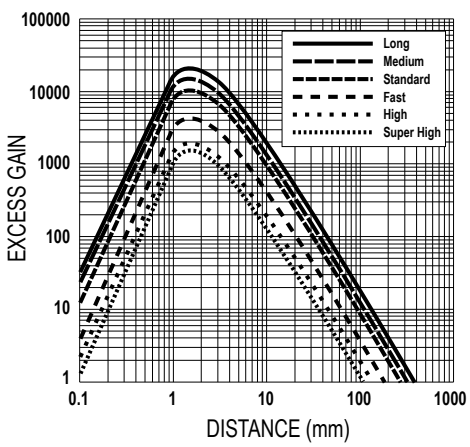
EXCESS GAIN

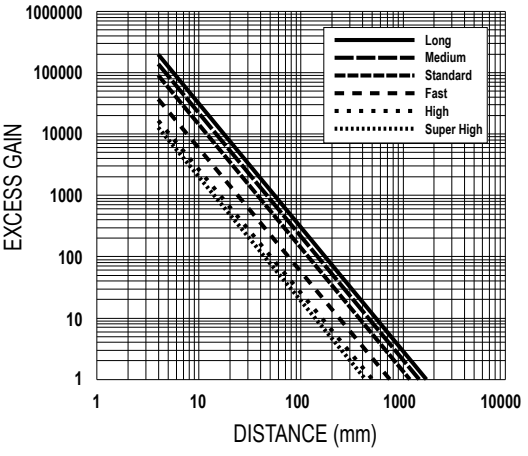


Through beam with 1 mm internal fiber optic diameter

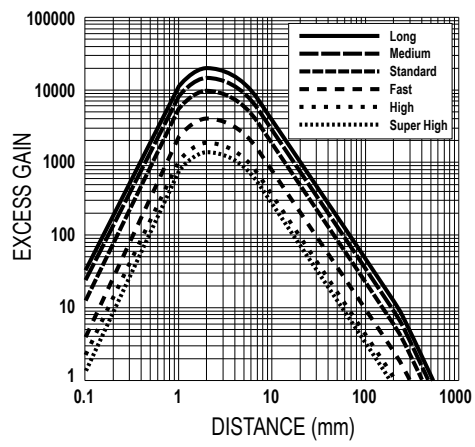


Diffuse proximity with 1 mm internal fiber optic diameter

EXCESS GAIN



Through beam with 1.5 mm internal fiber optic diameter



Diffuse proximity with 1.5 mm internal fiber optic diameter

S70-E2						
	SUPER HIGH SPEED	HIGH SPEED	FAST	STANDARD	MEDIUM RANGE	LONG RANGE
Response Time	10 µs	15 µs	50 µs	250 µs	500 µs	1 ms
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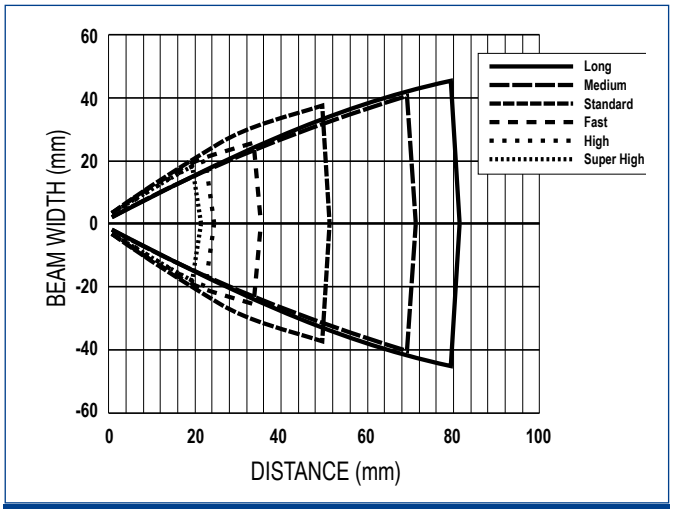
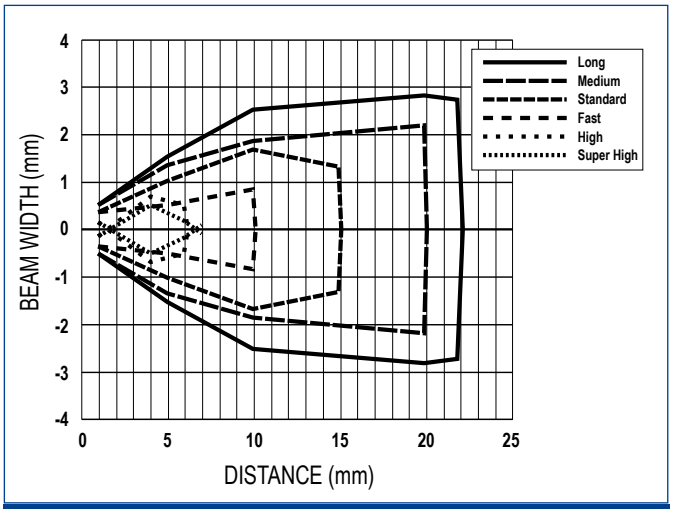
DETECTION AREA

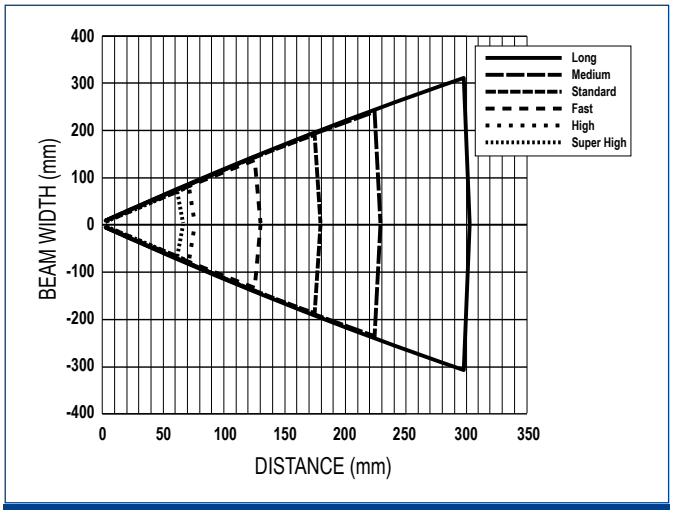


Through beam with 0.2 mm internal fiber optic diameter

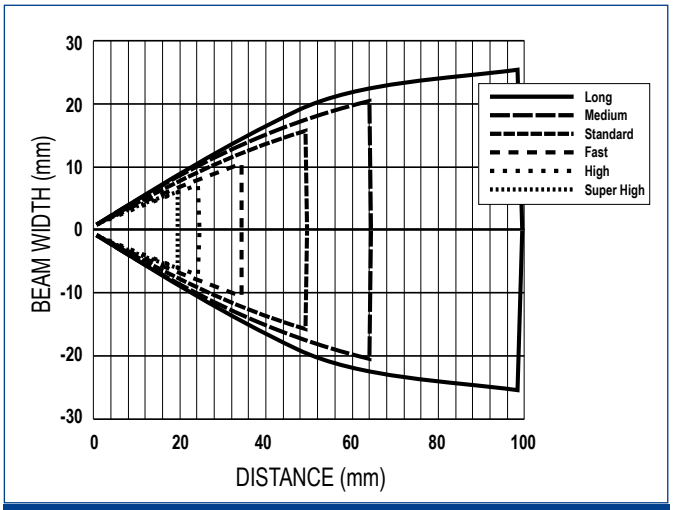


Diffuse proximity with 0.2 mm internal fiber optic diameter

DETECTION AREA



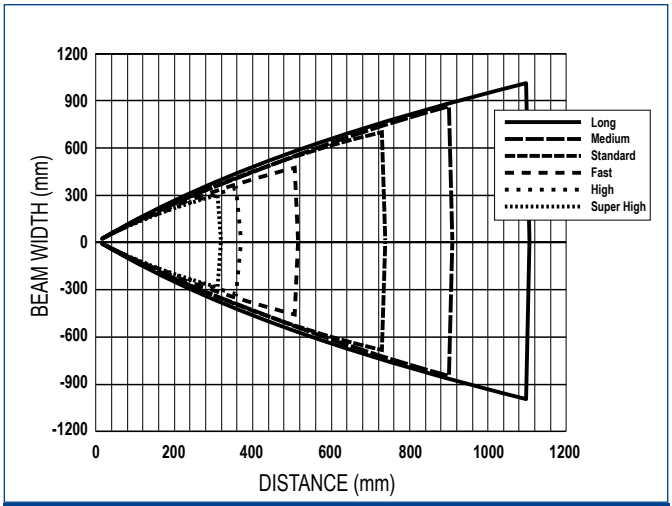
Through beam with 0.5 mm internal fiber optic diameter



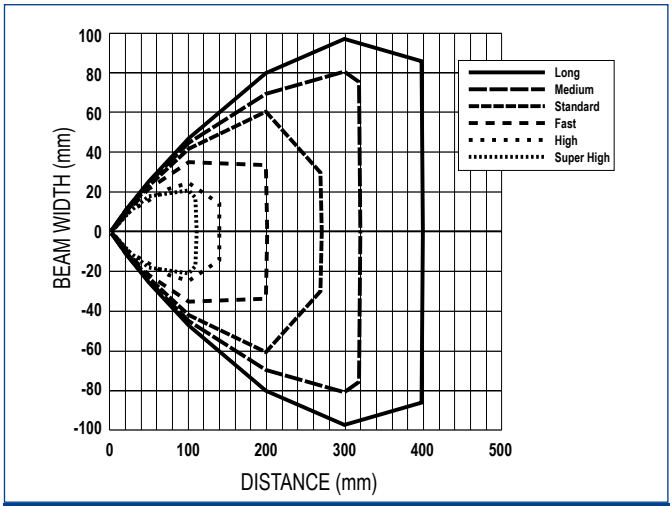
Diffuse proximity with 0.5 mm internal fiber optic diameter

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

DETECTION AREA

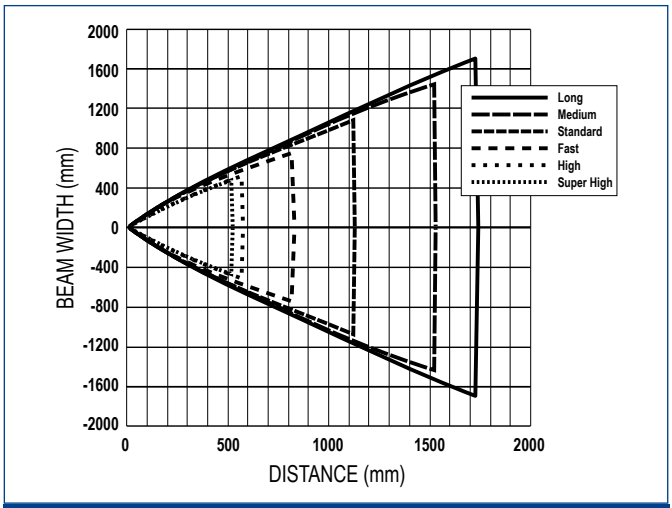


Through beam with 1 mm internal fiber optic diameter

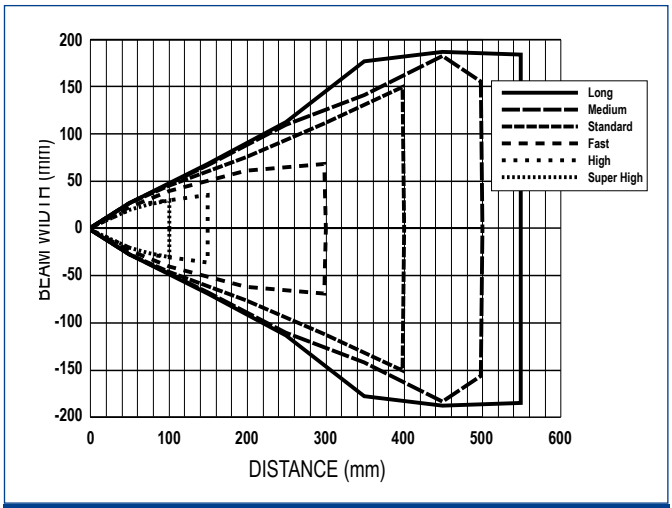


Diffuse proximity with 1 mm internal fiber optic diameter

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 µs	500 µs	1 ms	4 ms	12 ms
Repeatability	-	100 µs	150 µs	180 µs	180 µs	180 µs

EXCESS GAIN

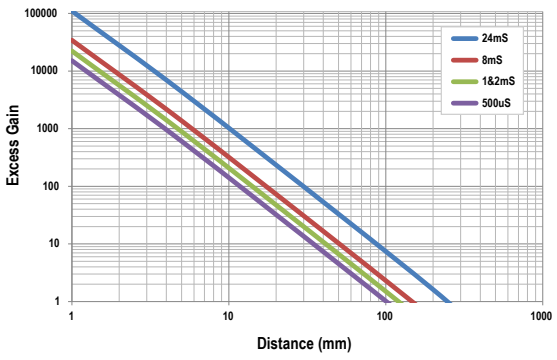
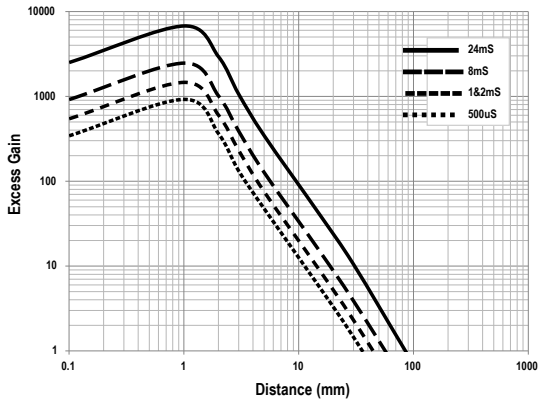


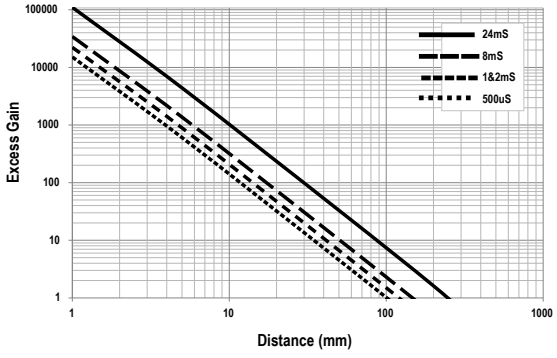
Figure 17. Opposed Mode—PIT16U

Through beam with 0.2 mm internal fiber optic diameter

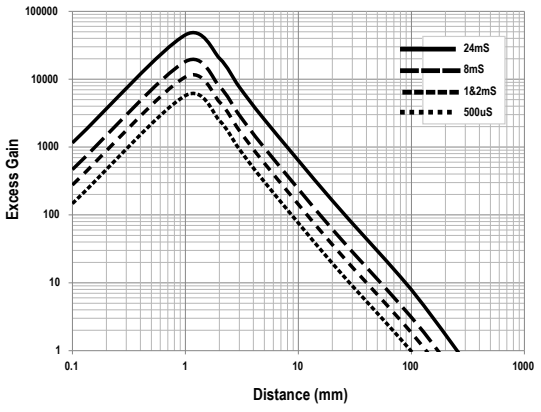


Diffuse proximity with 0.2 mm internal fiber optic diameter

EXCESS GAIN



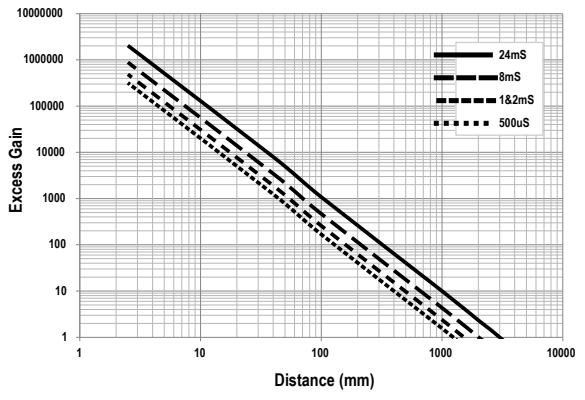
Through beam with 0.5 mm internal fiber optic diameter



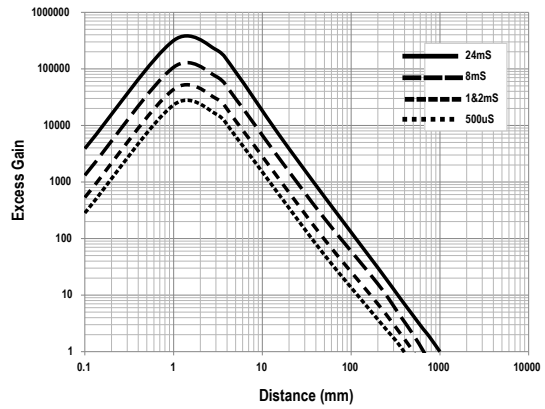
Diffuse proximity with 0.5 mm internal fiber optic diameter

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

EXCESS GAIN

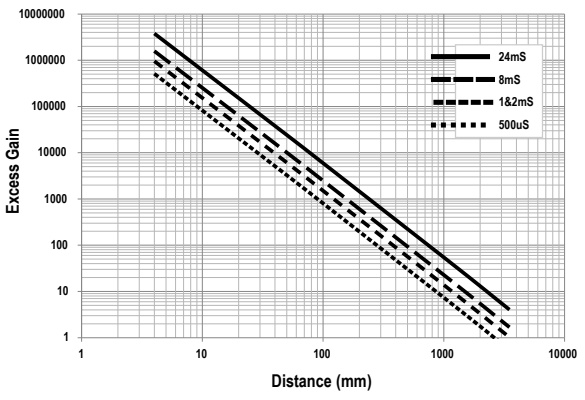


Through beam with 1 mm internal fiber optic diameter

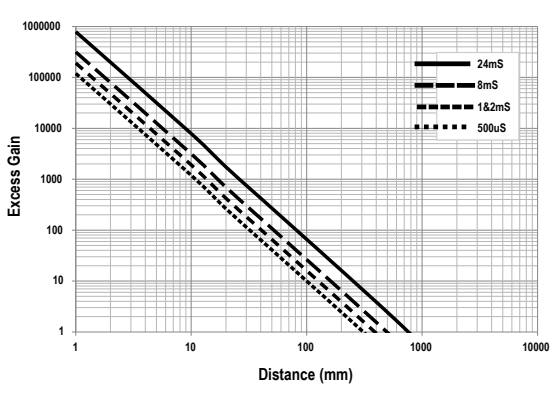


Diffuse proximity with 1 mm internal fiber optic diameter

EXCESS GAIN



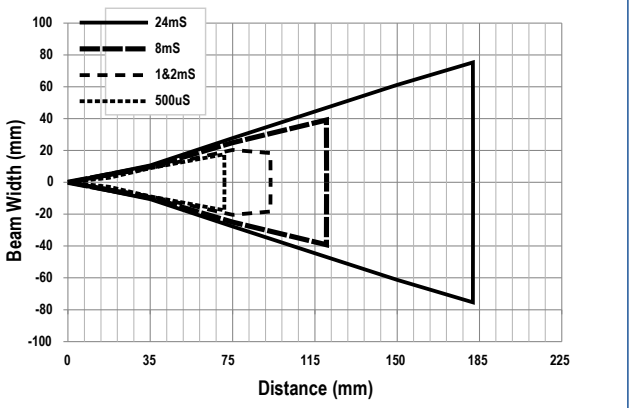
Through beam with 1.5 mm internal fiber optic diameter



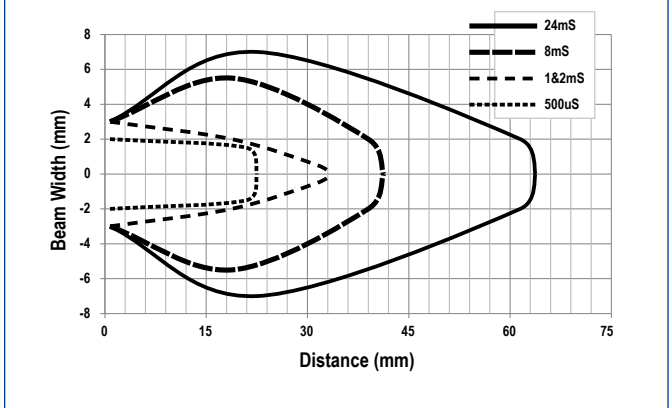
Diffuse proximity with 1.5 mm internal fiber optic diameter

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

DETECTION AREA



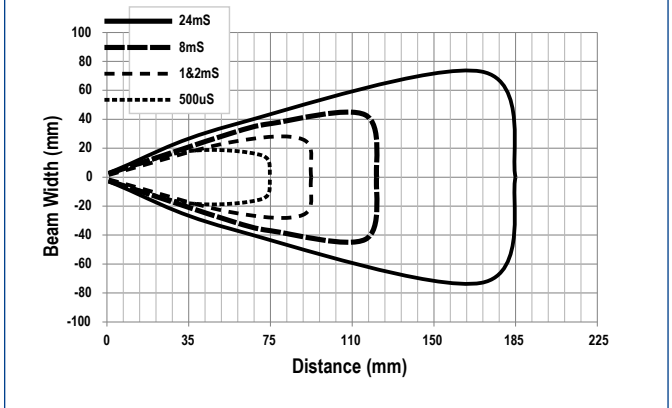
Through beam with 0.2 mm internal fiber optic diameter



Diffuse proximity with 0.2 mm internal fiber optic diameter

DETECTION AREA

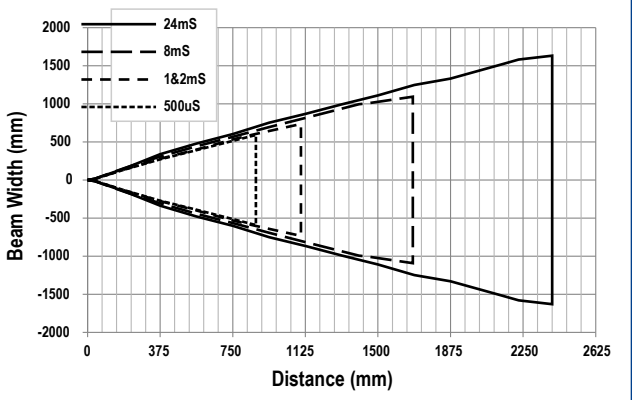
Through beam with 0.5 mm internal fiber optic diameter



Diffuse proximity with 0.5 mm internal fiber optic diameter

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

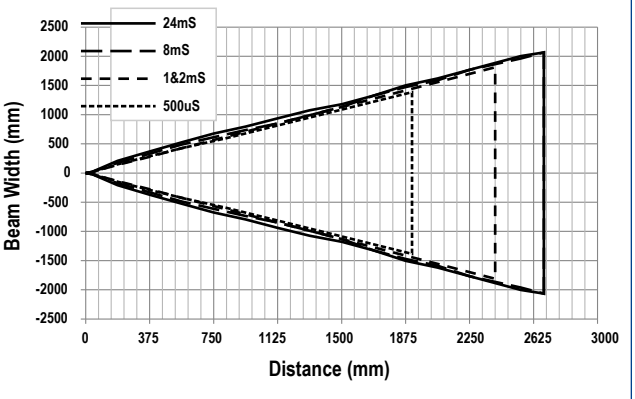
DETECTION AREA



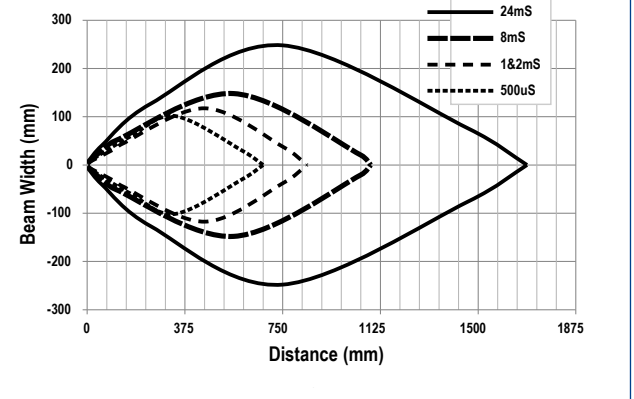
Through beam with 1 mm internal fiber optic diameter

Diffuse proximity with 1 mm internal fiber optic diameter

DETECTION AREA



Through beam with 1.5 mm internal fiber optic diameter

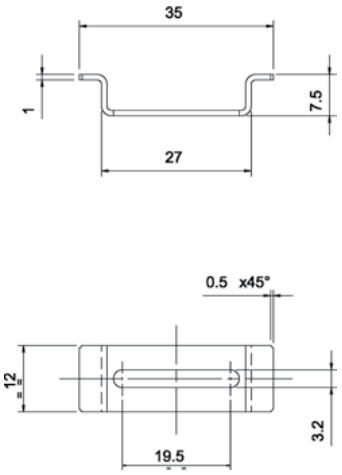


Diffuse proximity with 1.5 mm internal fiber optic diameter

MODEL SELECTION AND ORDER INFORMATION

OPTIC FUNCTION	RESPONSE TIME	CONNECTION	OUTPUT	MODEL	ORDER No.
Fiber Optic Amplifier	200 µs ... 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
	10 µs ... 1 ms		NPN	S70-5-E2-N	950561040
			PNP	S70-5-E2-P	950561050
	250us...12ms		4...20mA, NPN	S70-5-E3-NI	950561100
			0...10V, NPN	S70-5-E3-NV	950561080
			4...20mA, PNP	S70-5-E3-PI	950561090
			0...10V, PNP	S70-5-E3-PV	950561070

CRD-5000



mm

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
Radial M8 Connector	4-pole, P.U.R.	2 m	CS-B1-02-R-02	95A251620
		5 m	CS-B1-02-R-05	95A251640
	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
Axial M12 Connector	5-pole, L coded power cable	3 m	CS-M1-02-B-03	95ACC0007
Axial M12 F/M8 M Connector	4-pole, double headed	3 m	CS-H1-02-B-03	95ACC0008
Axial M12 F/M12 M Connector	4-pole, double headed	3 m	CS-I1-02-B-03	95ACC0009

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