

S70



ADVANCED FIBER OPTIC AMPLIFIERS FOR HIGH SPEED AND LOW CONTRAST APPLICATIONS

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

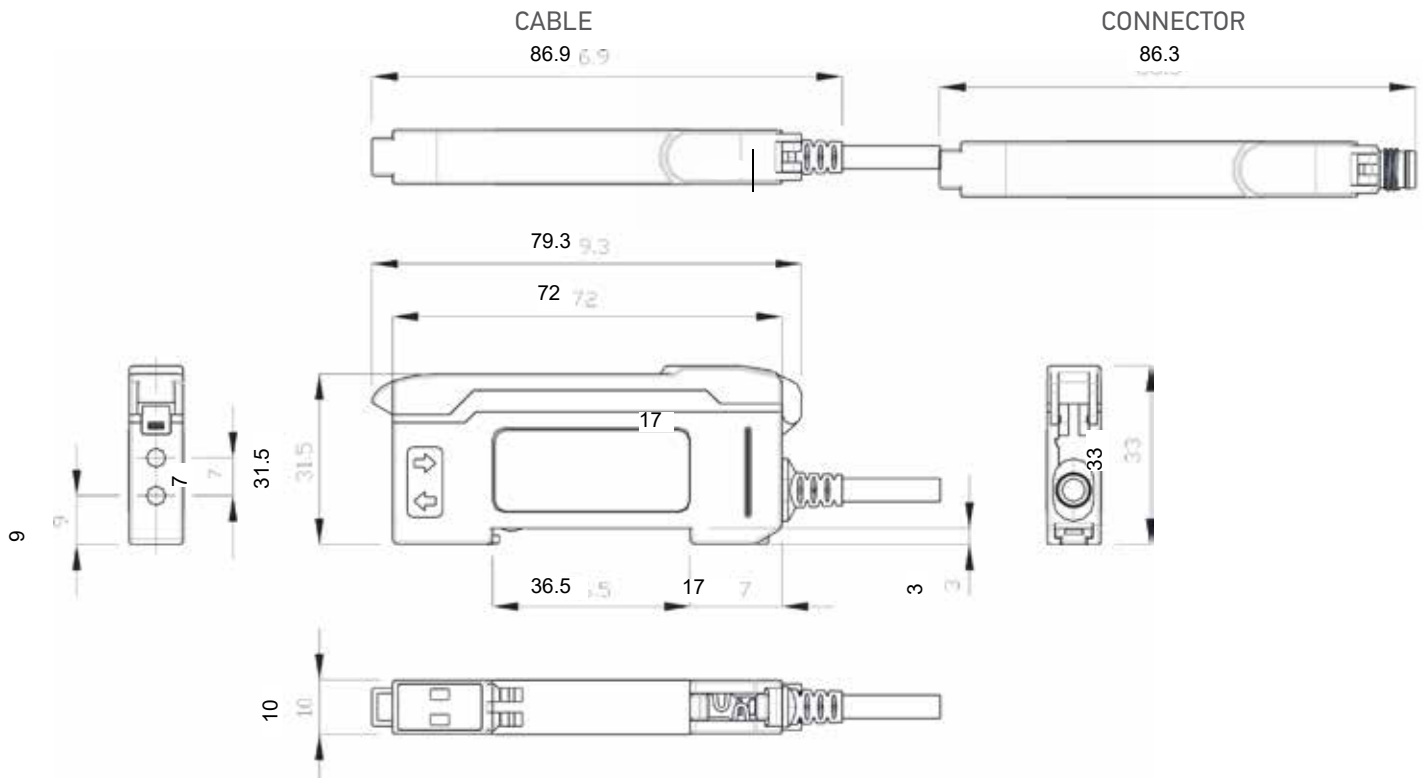


| S70 | | |
|------------------------------------|--|--|
| Response time | Super high speed: 10 μ s (S70...E2) High speed: 200 μ s (S70...E1), 15 μ s (S70...E2), 250 μ s (S70...E3) Fast: 50 μ s (S70...E2), 500 μ s (S70...E3) Standard: 500 μ s (S70...E1), 250 μ s (S70...E2), 1 ms (S70...E3) Medium range: 500 μ 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) | |
| | Super high speed: 5 μ s (S70...E2) High speed: 66 μ s (S70...E1), 5 μ s (S70...E2), 100 μ s (S70...E3) Fast: 12 μ s (S70...E2), 150 μ s (S70...E3) Standard: 100 μ s (S70...E1), 50 μ s (S70...E2), 180 μ s (S70...E3) Medium range: 80 μ s (S70...E2) Long range: 100 μ s (S70...E1), 165 μ s (S70...E2), 180 μ s (S70...E3) Extra long range: 100 μ s (S70...E1), 180 μ s (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 |

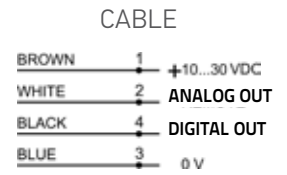
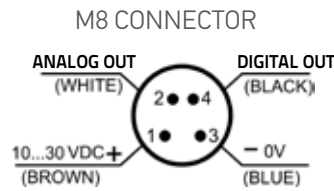
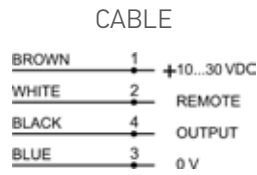
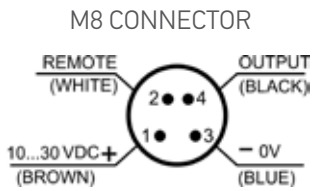
TECHNICAL DATA

| | |
|--|---|
| 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 |
| Output current | PNP and push-pull (IO-Link mod. S70...PZ) 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), 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



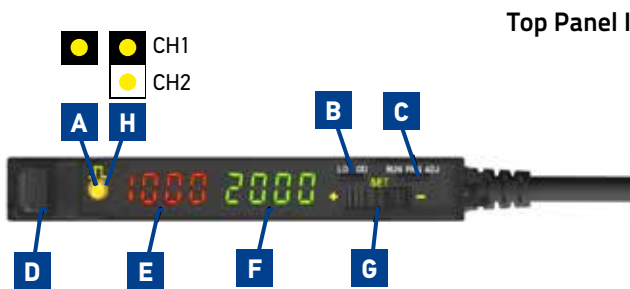
CONNECTIONS



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.



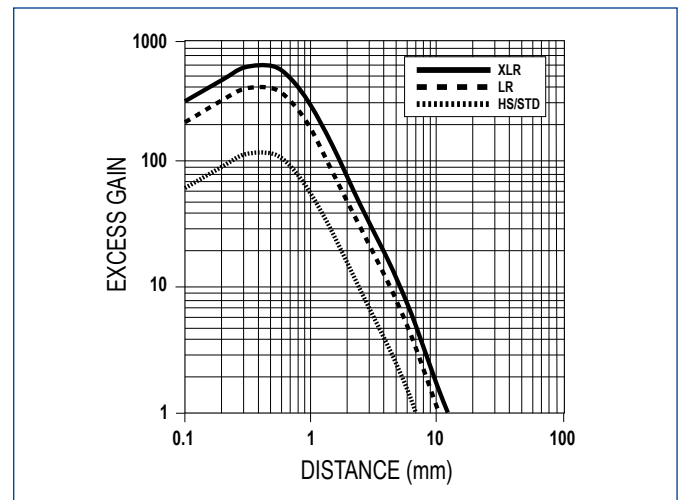
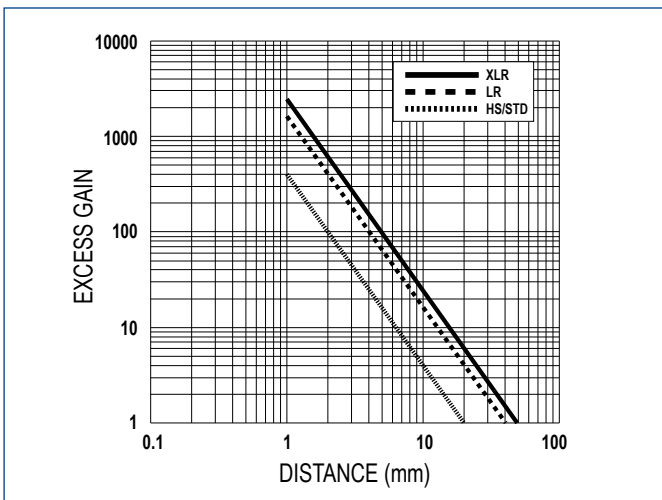
- A Output LED
- B LO/DO Switch
- C RUN/PRG/ADJ
- D Lever Action Fiber Clamp
- E Red Signal Level
- F Green Threshold
- G +/SET/- Rocker Button
- H CH1 Analog out, CH2 Discrete out (only S70...E3)

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).

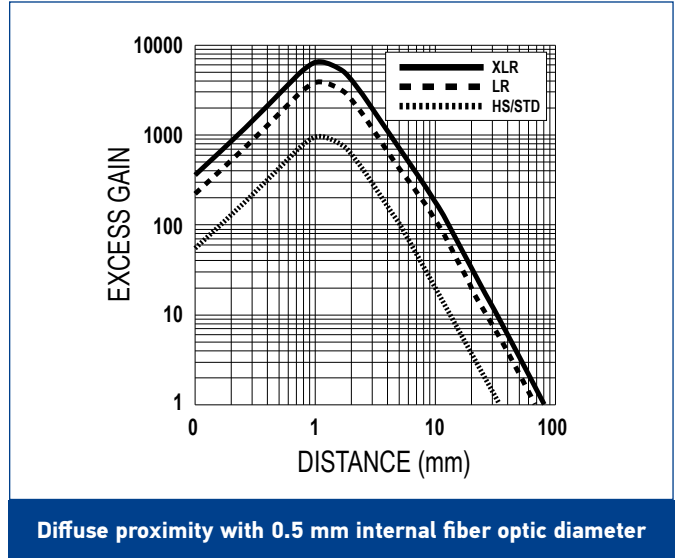
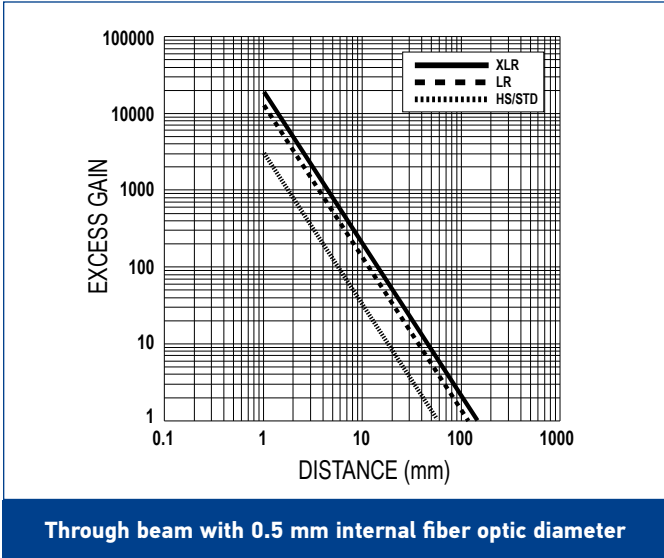
DETECTION DIAGRAMS

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

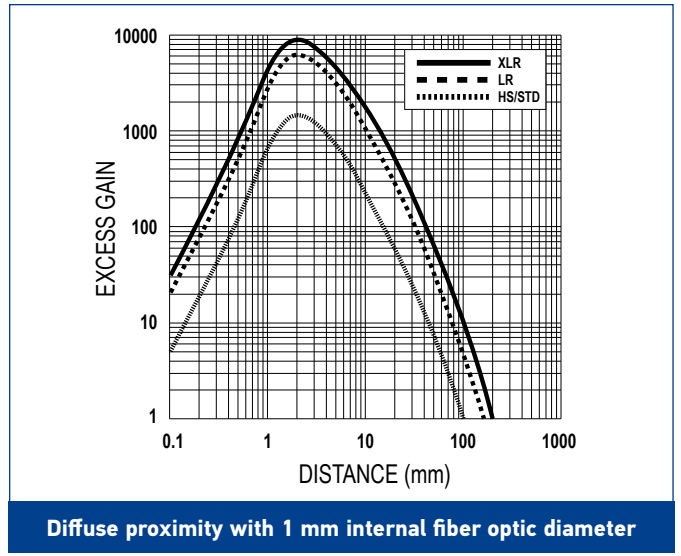
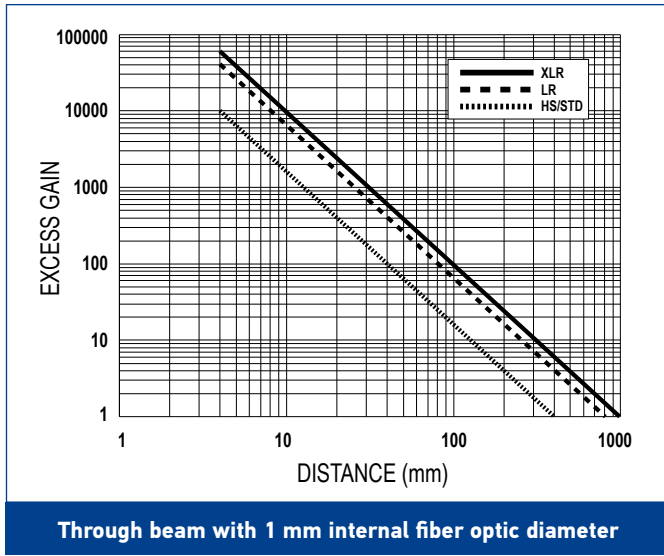
EXCESS GAIN



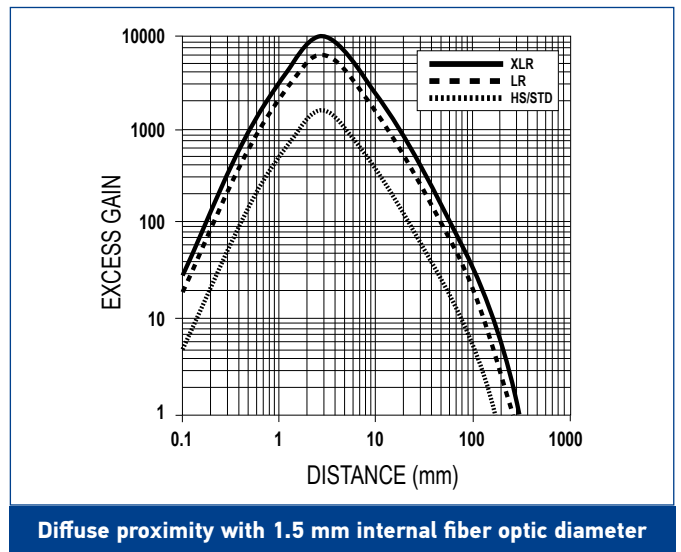
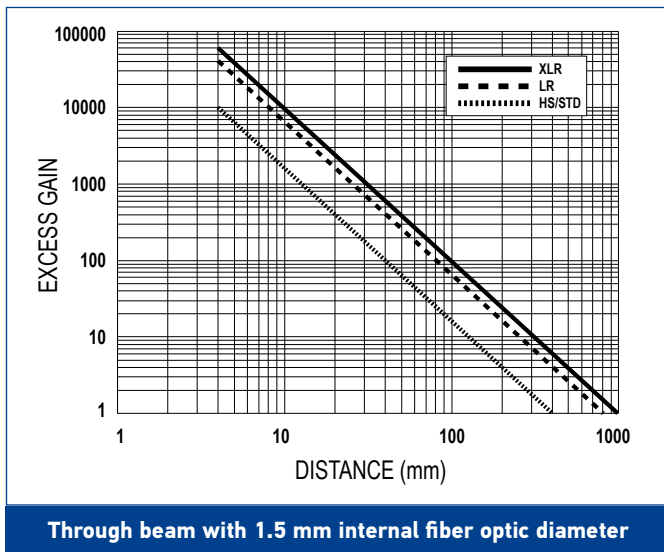
EXCESS GAIN



EXCESS GAIN



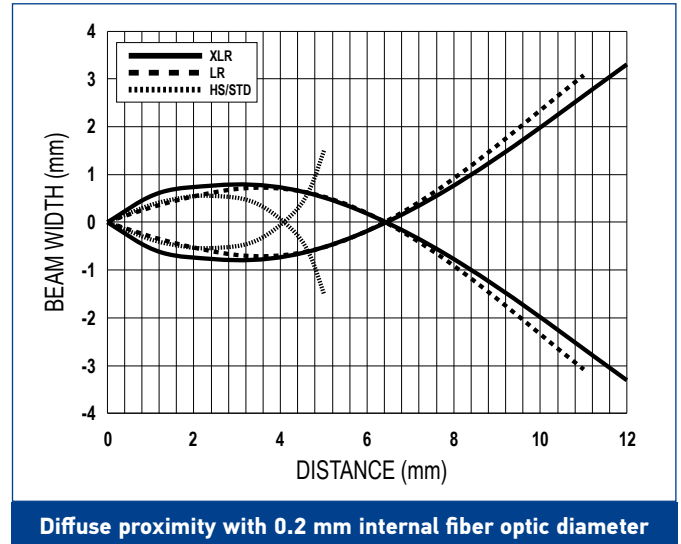
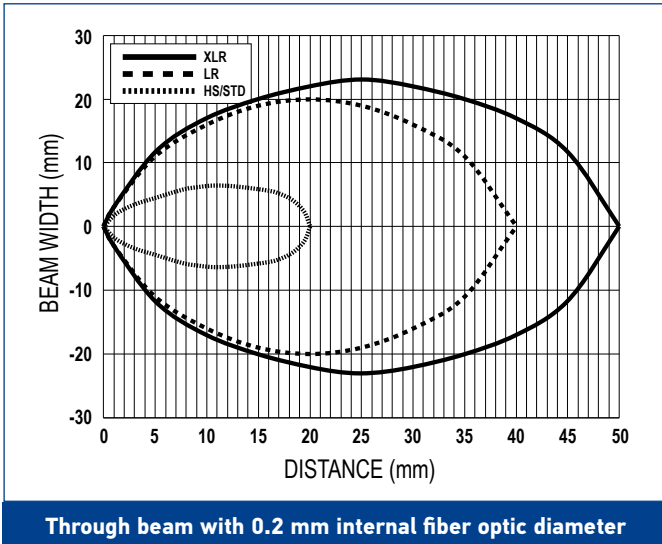
EXCESS GAIN



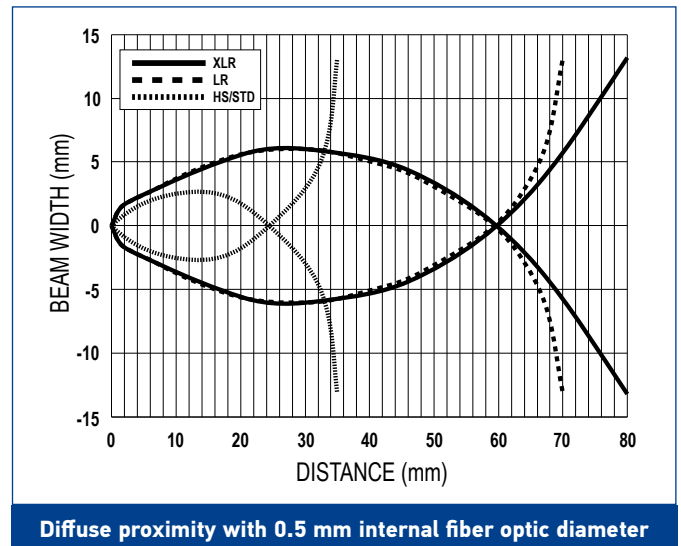
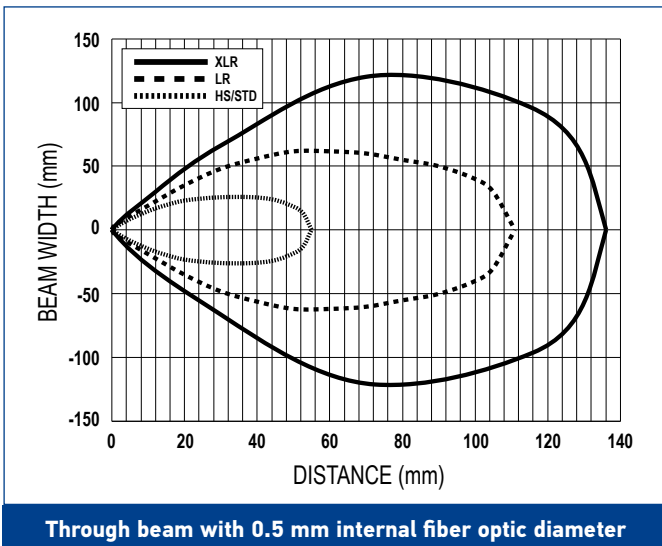
S70-E1

| | HIGH SPEED | STANDARD | LONG RANGE | EXTRA LONG RANGE |
|---------------|-------------|-------------|-------------|------------------|
| Response Time | 200 μ s | 500 μ s | 2 ms | 5 ms |
| Repeatability | 66 μ s | 100 μ s | 100 μ s | 100 μ s |

DETECTION AREA



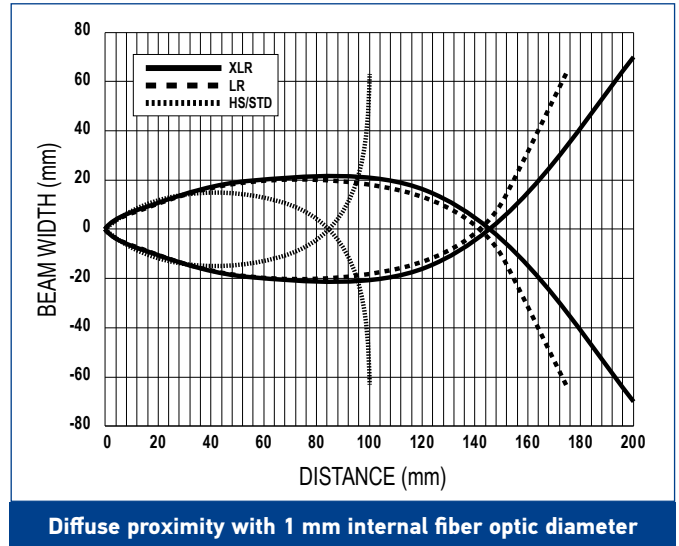
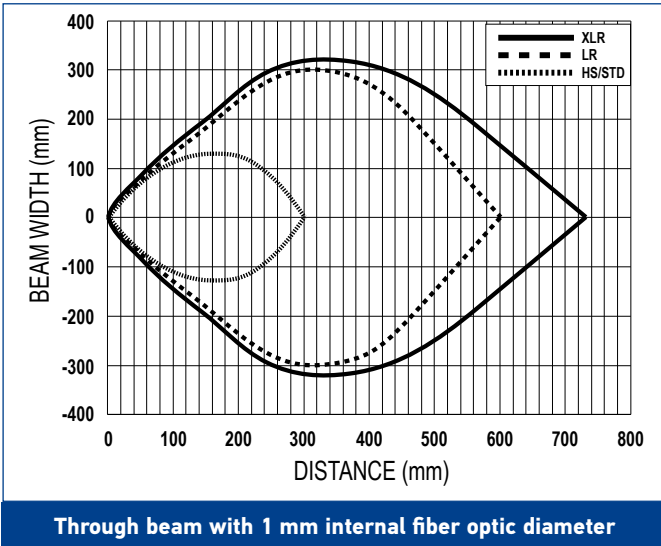
DETECTION AREA



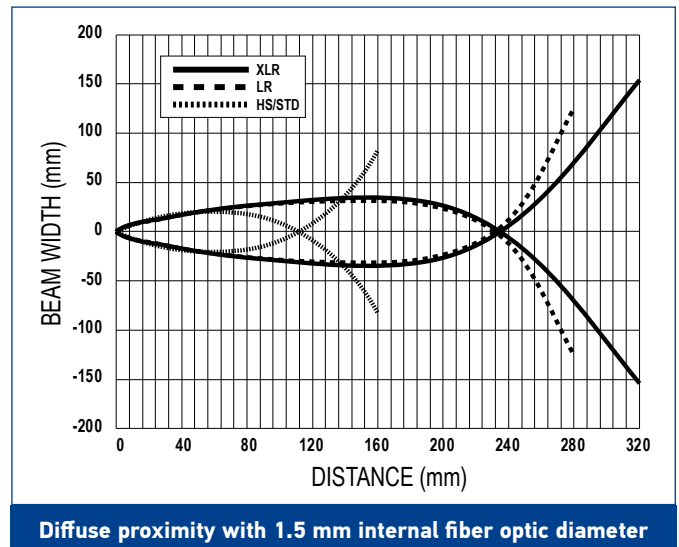
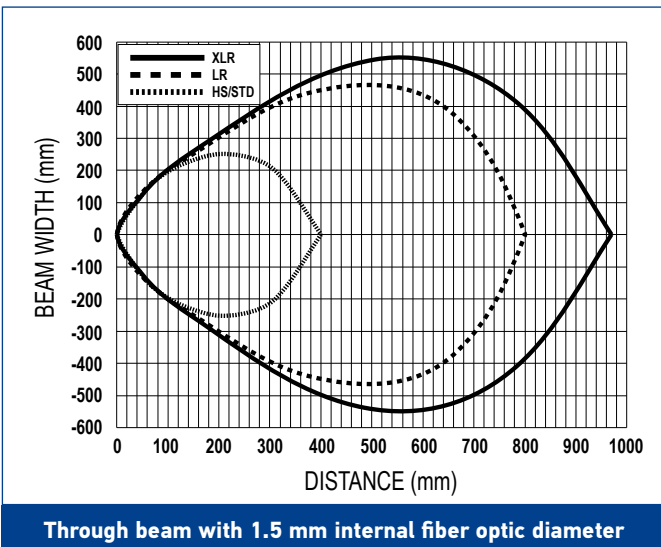
S70-E1

| | HIGH SPEED | STANDARD | LONG RANGE | EXTRA LONG RANGE |
|---------------|-------------|-------------|-------------|------------------|
| Response Time | 200 μ s | 500 μ s | 2 ms | 5 ms |
| Repeatability | 66 μ s | 100 μ s | 100 μ s | 100 μ s |

DETECTION AREA



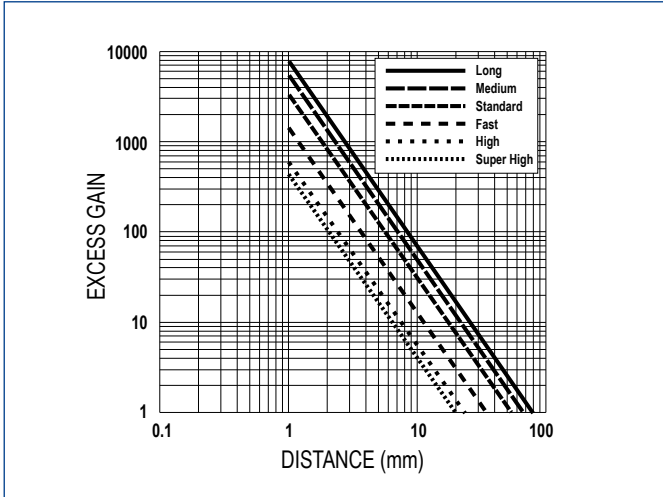
DETECTION AREA



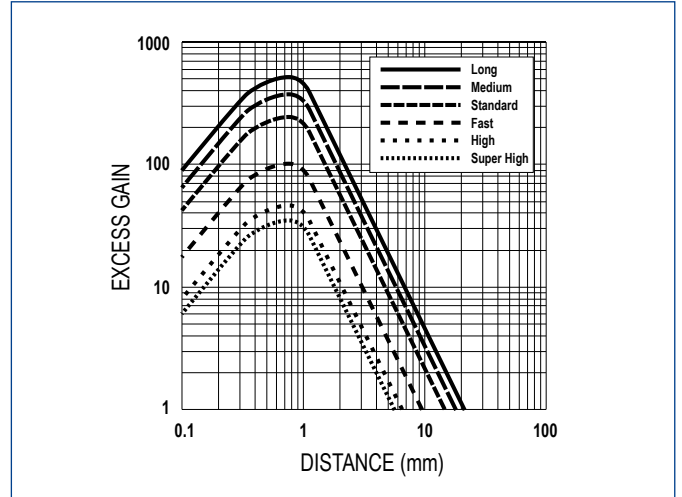
S70-E2

| | SUPER HIGH SPEED | HIGH SPEED | FAST | STANDARD | MEDIUM RANGE | LONG RANGE |
|---------------|-------------------------|-------------------|-------------|-----------------|---------------------|-------------------|
| Response Time | 10 μ s | 15 μ s | 50 μ s | 250 μ s | 500 μ s | 1 ms |
| Repeatability | 5 μ s | 5 μ s | 12 μ s | 50 μ s | 80 μ s | 165 μ s |

EXCESS GAIN

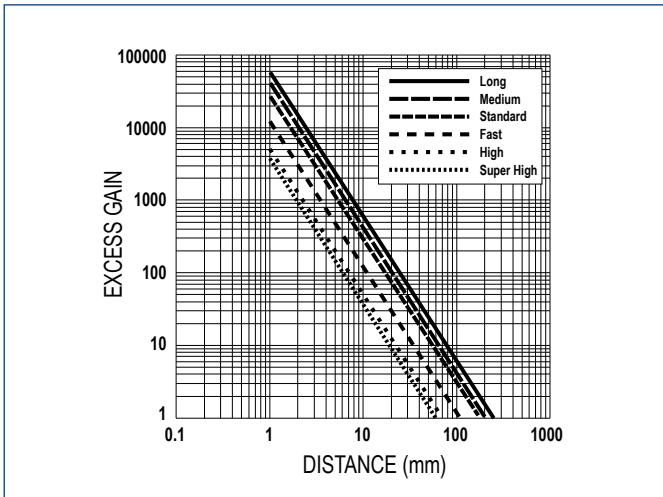


Through beam with 0.2 mm internal fiber optic diameter

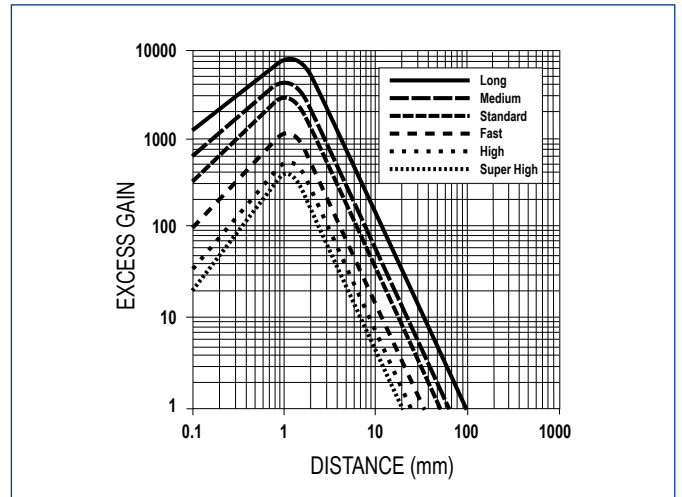


Diffuse proximity with 0.2 mm internal fiber optic diameter

EXCESS GAIN



Through beam with 0.5 mm internal fiber optic diameter

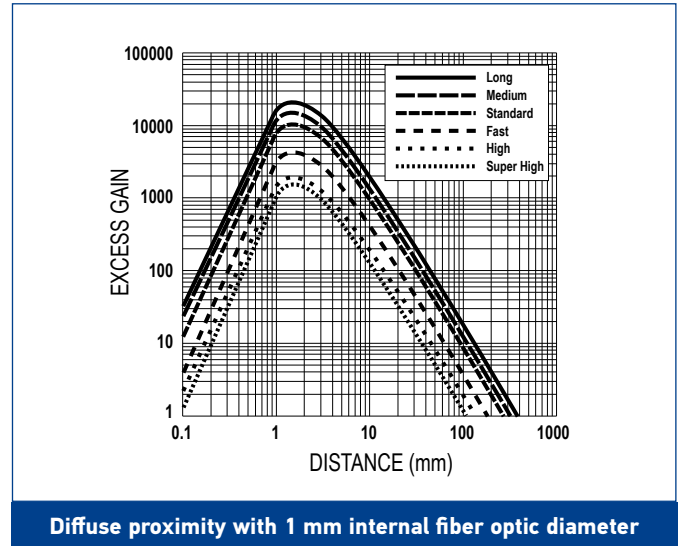
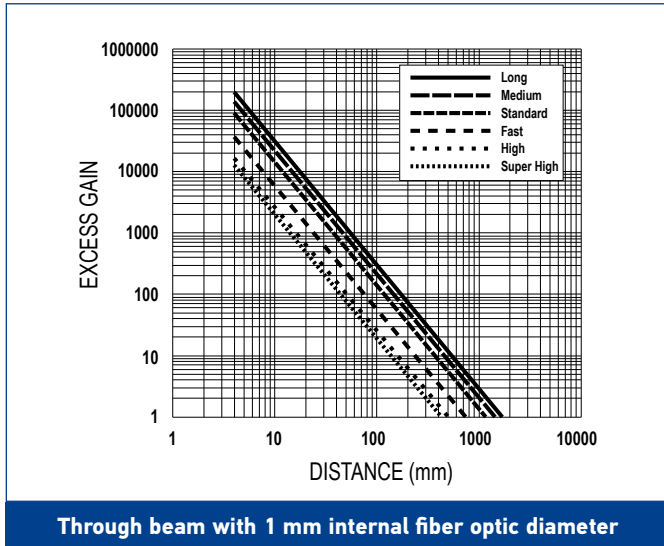


Diffuse proximity with 0.5 mm internal fiber optic diameter

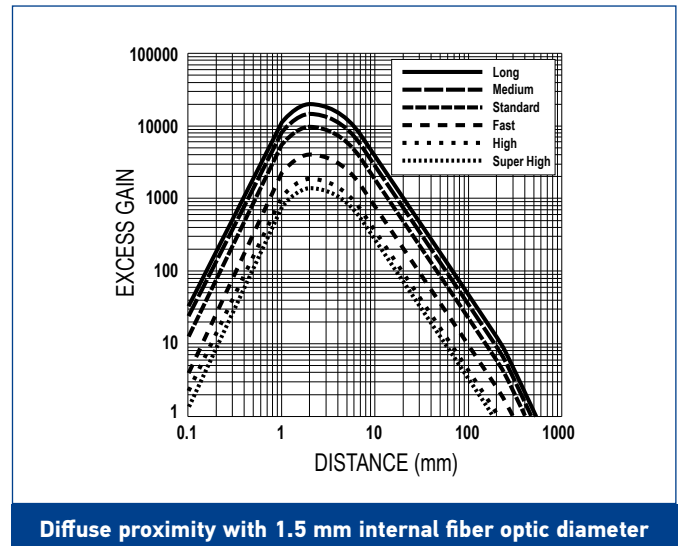
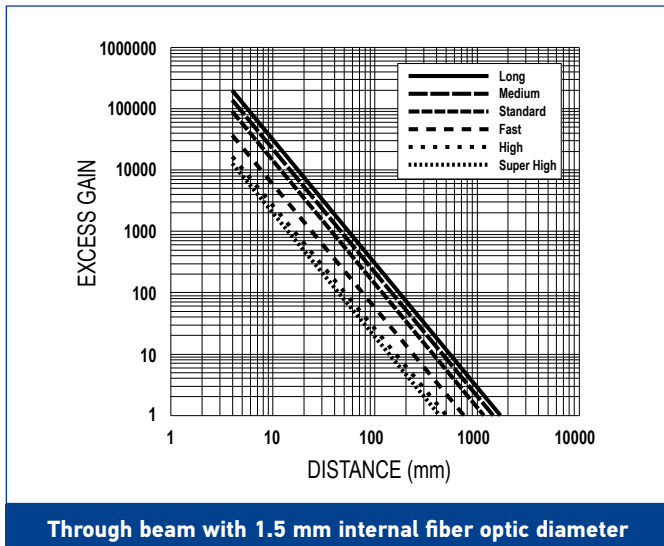
S70-E2

| | SUPER HIGH SPEED | HIGH SPEED | FAST | STANDARD | MEDIUM RANGE | LONG RANGE |
|---------------|------------------|------------|------------|-------------|--------------|-------------|
| Response Time | 10 μ s | 15 μ s | 50 μ s | 250 μ s | 500 μ s | 1 ms |
| Repeatability | 5 μ s | 5 μ s | 12 μ s | 50 μ s | 80 μ s | 165 μ s |

EXCESS GAIN



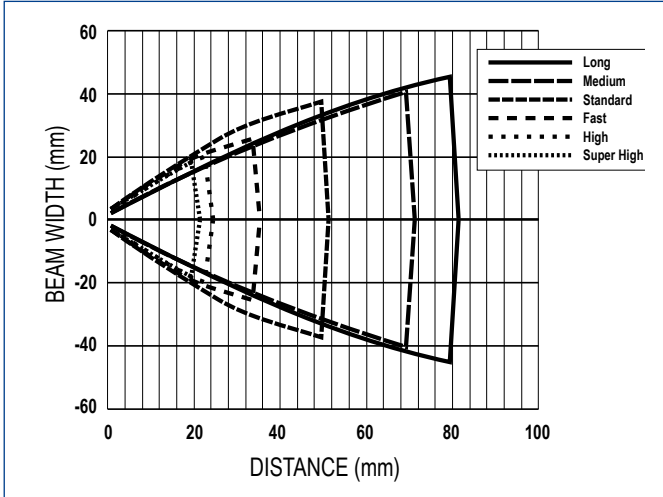
EXCESS GAIN



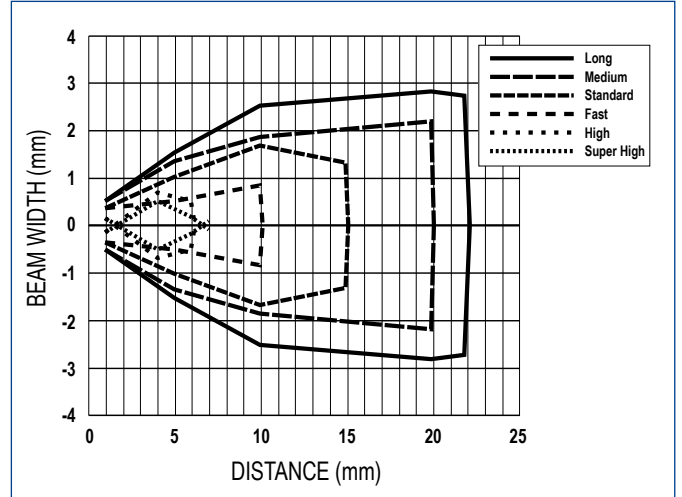
S70-E2

| | SUPER HIGH SPEED | HIGH SPEED | FAST | STANDARD | MEDIUM RANGE | LONG RANGE |
|---------------|-------------------------|-------------------|-------------|-----------------|---------------------|-------------------|
| Response Time | 10 μ s | 15 μ s | 50 μ s | 250 μ s | 500 μ s | 1 ms |
| Repeatability | 5 μ s | 5 μ s | 12 μ s | 50 μ s | 80 μ s | 165 μ s |

DETECTION AREA

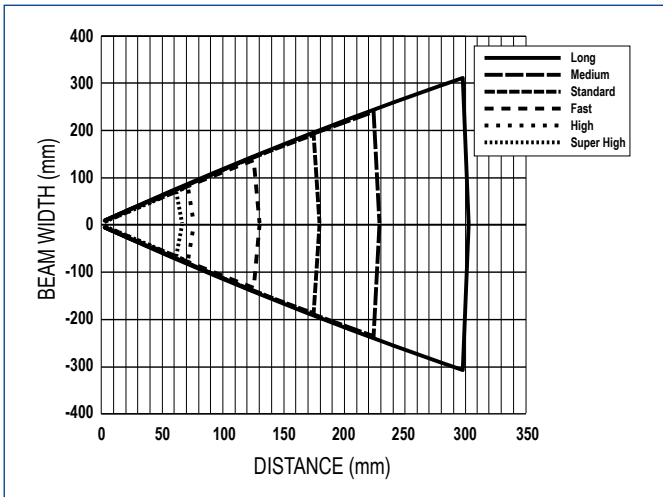


Through beam with 0.2 mm internal fiber optic diameter

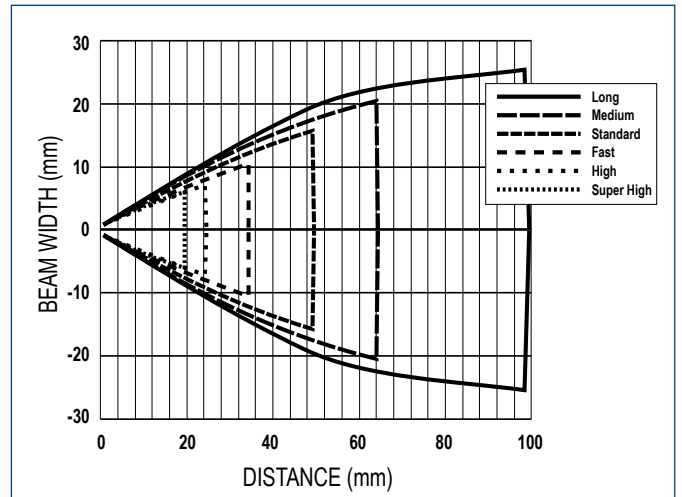


Diffuse proximity with 0.2 mm internal fiber optic diameter

DETECTION AREA



Through beam with 0.5 mm internal fiber optic diameter

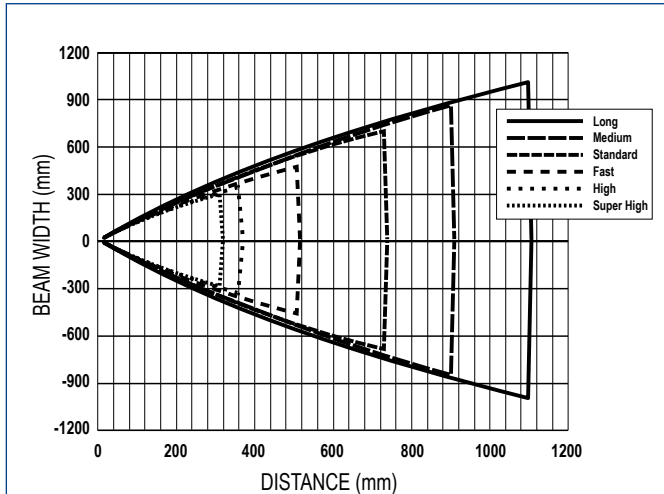


Diffuse proximity with 0.5 mm internal fiber optic diameter

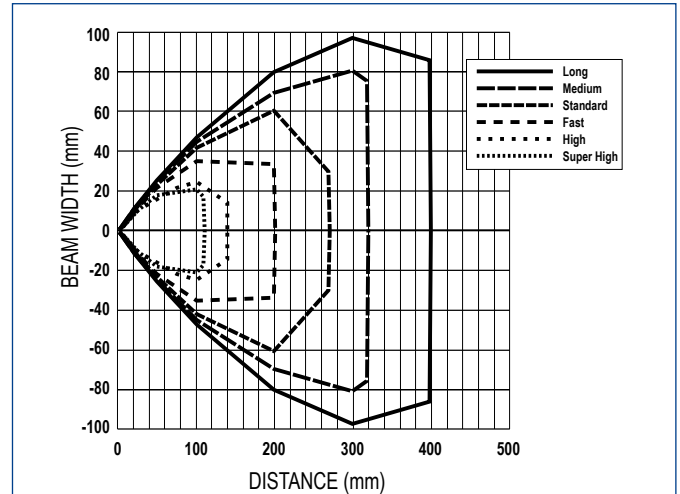
S70-E2

| | SUPER HIGH SPEED | HIGH SPEED | FAST | STANDARD | MEDIUM RANGE | LONG RANGE |
|---------------|------------------|------------|------------|-------------|--------------|-------------|
| Response Time | 10 μ s | 15 μ s | 50 μ s | 250 μ s | 500 μ s | 1 ms |
| Repeatability | 5 μ s | 5 μ s | 12 μ s | 50 μ s | 80 μ s | 165 μ s |

DETECTION AREA

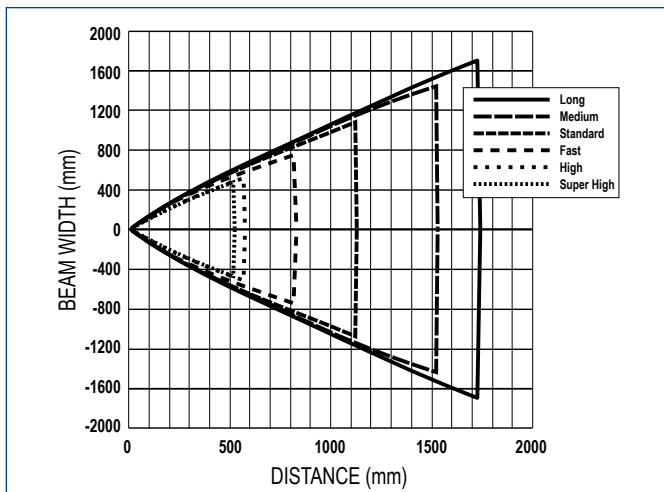


Through beam with 1 mm internal fiber optic diameter

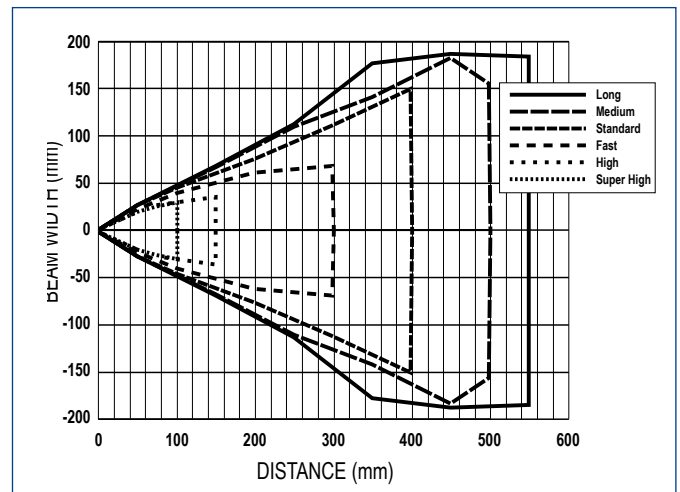


Diffuse proximity with 1 mm internal fiber optic diameter

DETECTION AREA



Through beam with 1.5 mm internal fiber optic diameter

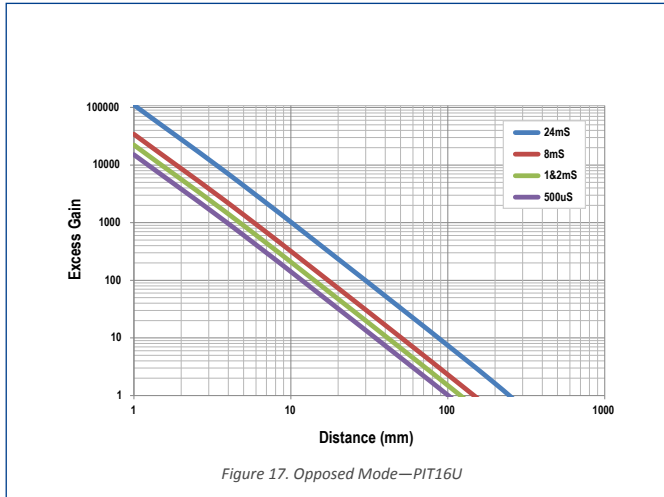


Diffuse proximity with 1.5 mm internal fiber optic diameter

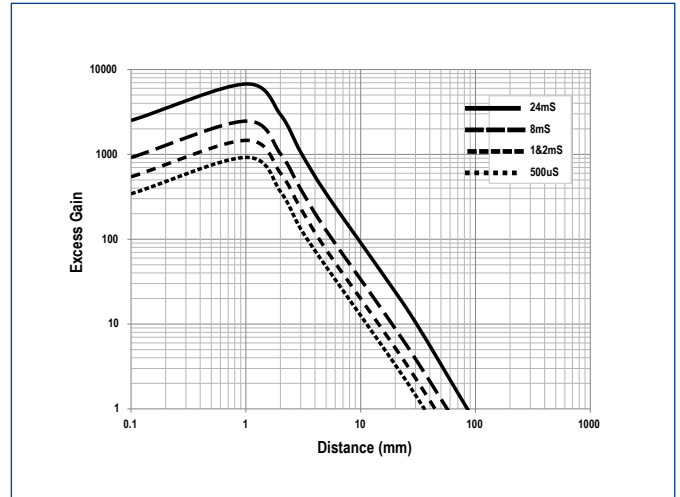
S70-E3

| | SUPER HIGH SPEED | HIGH SPEED | FAST | STANDARD | LONG RANGE | EXTRA LONG RANGE |
|---------------|------------------|-------------|-------------|-------------|-------------|------------------|
| Response Time | - | 250 μ s | 500 μ s | 1 ms | 4 ms | 12 ms |
| Repeatability | - | 100 μ s | 150 μ s | 180 μ s | 180 μ s | 180 μ s |

EXCESS GAIN

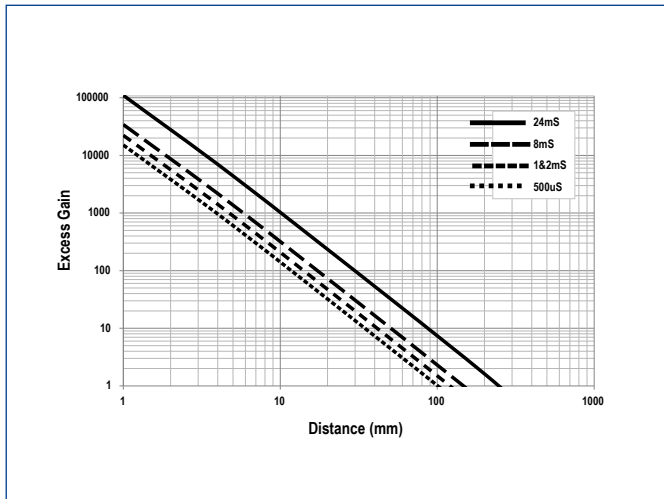


Through beam with 0.2 mm internal fiber optic diameter

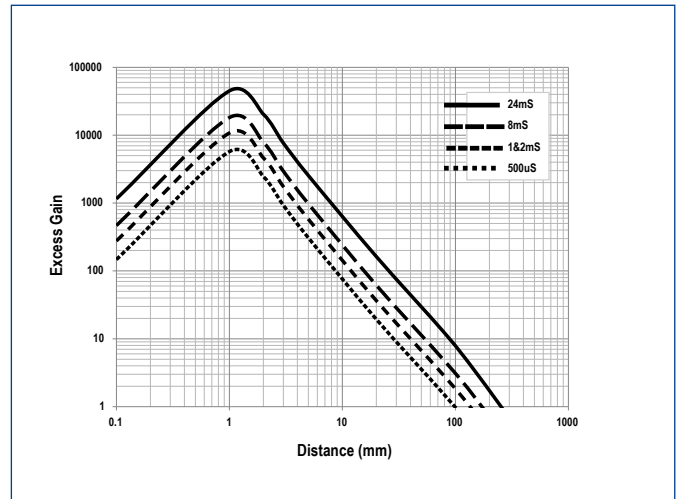


Diffuse proximity with 0.2 mm internal fiber optic diameter

EXCESS GAIN



Through beam with 0.5 mm internal fiber optic diameter

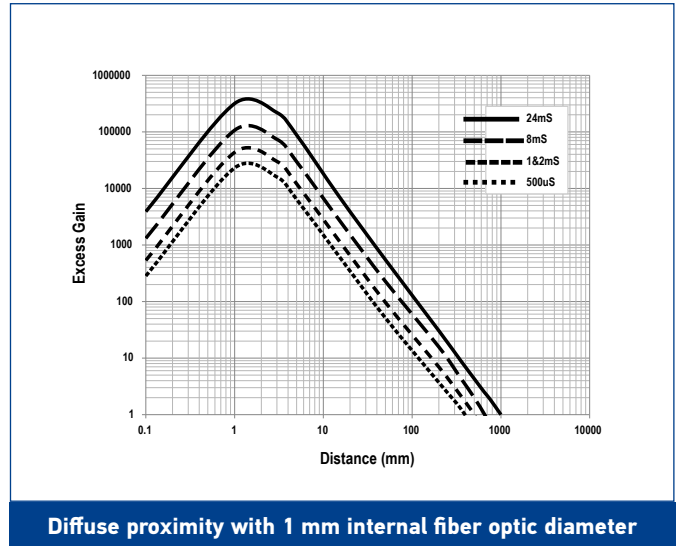
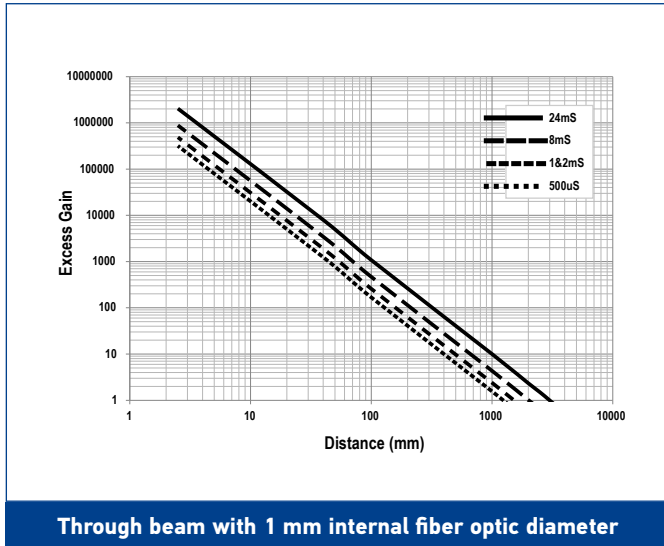


Diffuse proximity with 0.5 mm internal fiber optic diameter

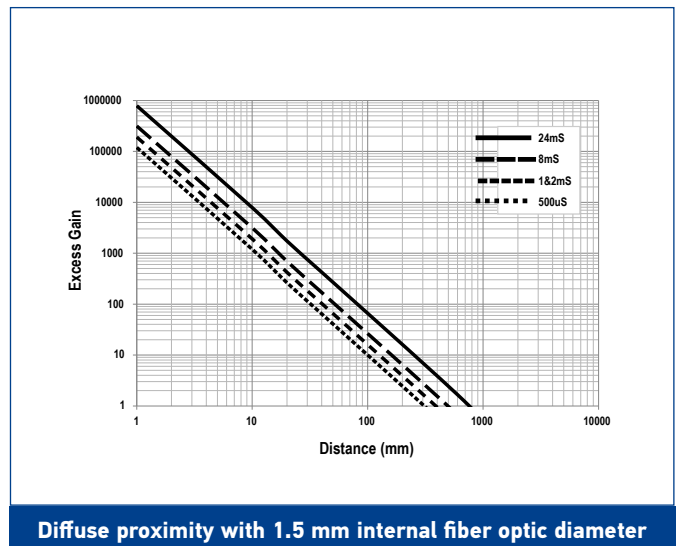
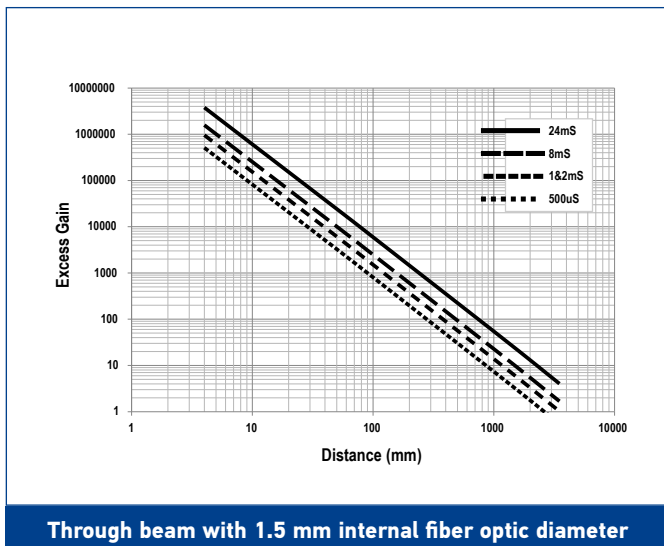
S70-E3

| | SUPER HIGH SPEED | HIGH SPEED | FAST | STANDARD | LONG RANGE | EXTRA LONG RANGE |
|---------------|------------------|-------------|-------------|-------------|-------------|------------------|
| Response Time | - | 250 μ s | 500 μ s | 1 ms | 4 ms | 12 ms |
| Repeatability | - | 100 μ s | 150 μ s | 180 μ s | 180 μ s | 180 μ s |

EXCESS GAIN



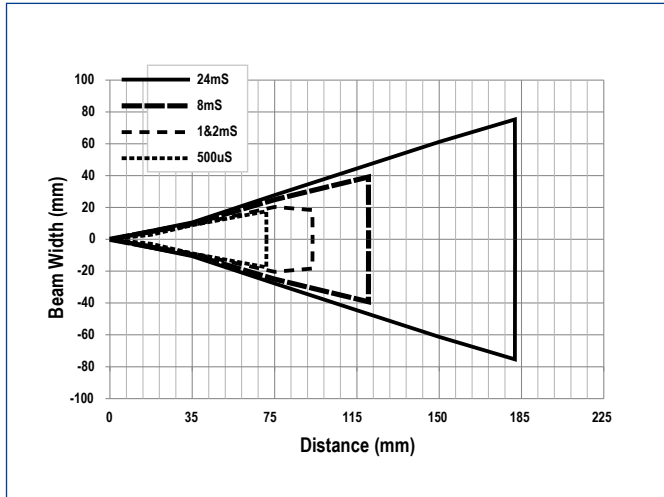
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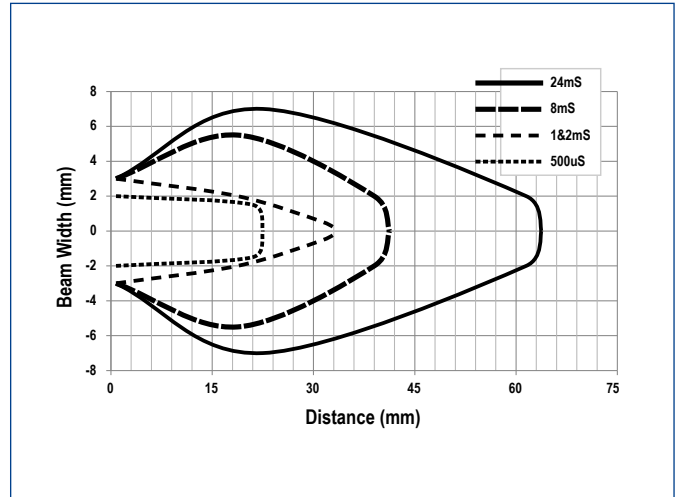
S70-E3

| | SUPER HIGH SPEED | HIGH SPEED | FAST | STANDARD | LONG RANGE | EXTRA LONG RANGE |
|---------------|------------------|-------------|-------------|-------------|-------------|------------------|
| Response Time | - | 250 μ s | 500 μ s | 1 ms | 4 ms | 12 ms |
| Repeatability | - | 100 μ s | 150 μ s | 180 μ s | 180 μ s | 180 μ s |

DETECTION AREA

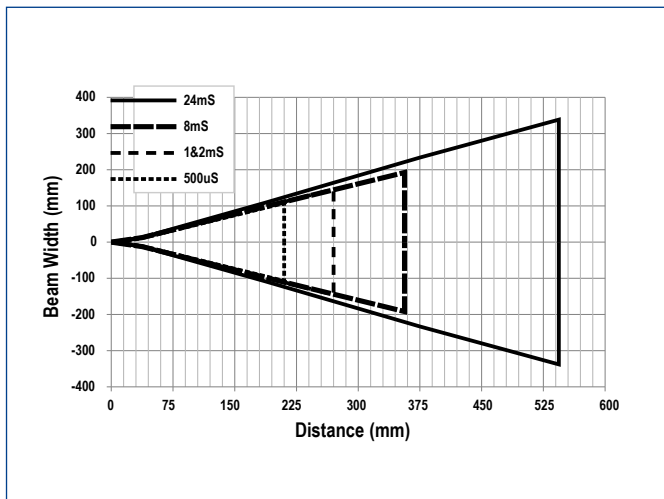


Through beam with 0.2 mm internal fiber optic diameter

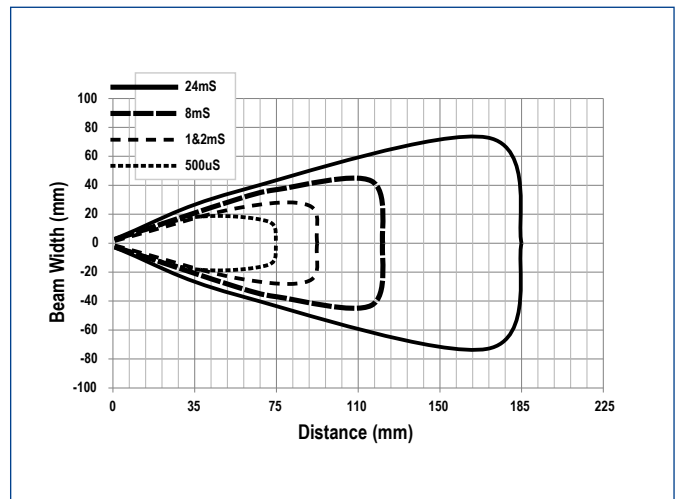


Diffuse proximity with 0.2 mm internal fiber optic diameter

DETECTION AREA



Through beam with 0.5 mm internal fiber optic diameter

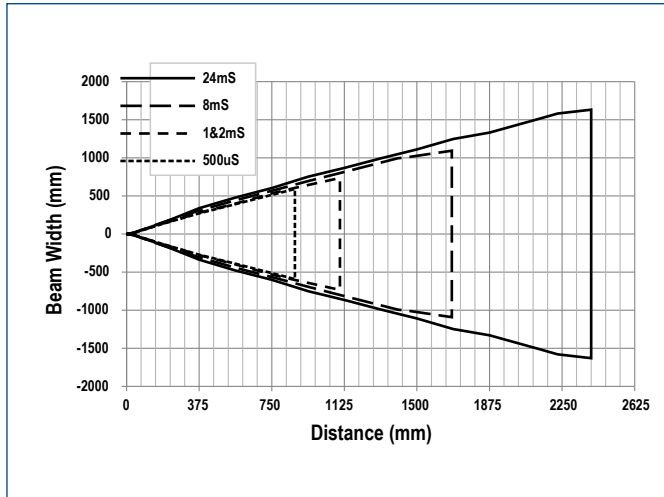


Diffuse proximity with 0.5 mm internal fiber optic diameter

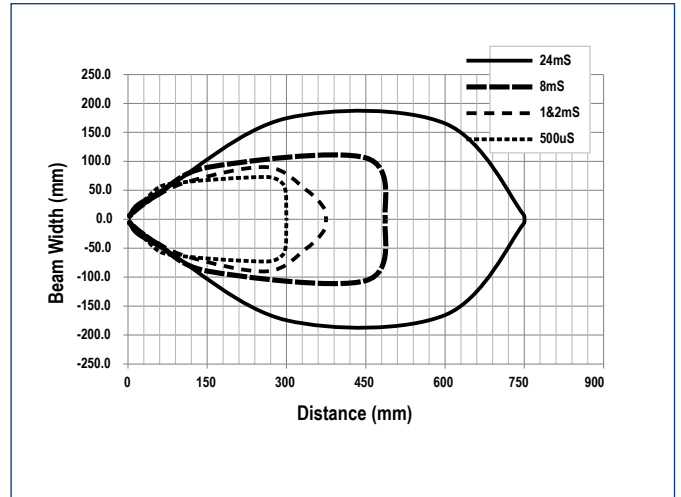
S70-E3

| | SUPER HIGH SPEED | HIGH SPEED | FAST | STANDARD | LONG RANGE | EXTRA LONG RANGE |
|---------------|------------------|-------------|-------------|-------------|-------------|------------------|
| Response Time | - | 250 μ s | 500 μ s | 1 ms | 4 ms | 12 ms |
| Repeatability | - | 100 μ s | 150 μ s | 180 μ s | 180 μ s | 180 μ s |

DETECTION AREA

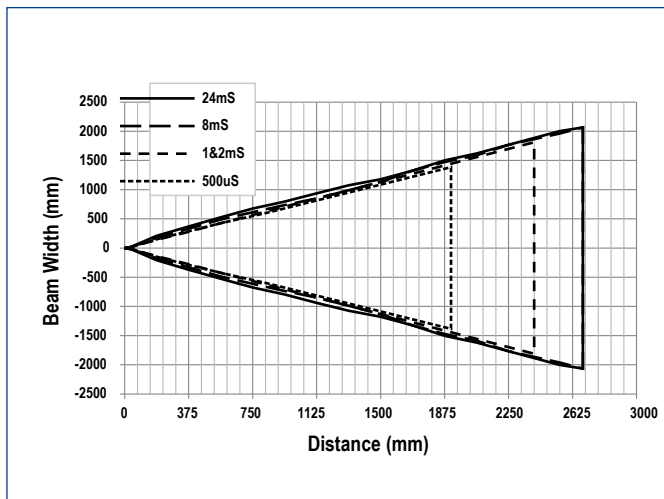


Through beam with 1 mm internal fiber optic diameter

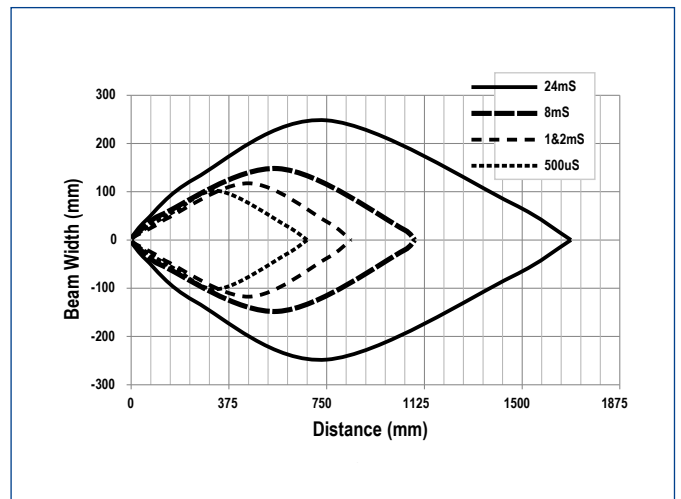


Diffuse proximity with 1 mm internal fiber optic diameter

DETECTION AREA



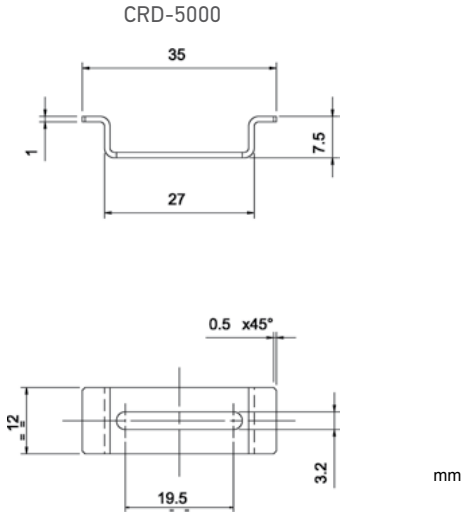
Through beam with 1.5 mm internal fiber optic diameter



Diffuse proximity with 1.5 mm internal fiber optic diameter

MODEL SELECTION AND ORDER INFORMATION

| OPTIC FUNCTION | RESPONSE TIME | CONNECTION | OUTPUT | MODEL | ORDER No. |
|-----------------------|----------------------|--------------------|------------------------|--------------|-------------|
| Fiber Optic Amplifier | 200 μ 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 μ s ... 1 ms | M8 Connector | PNP | S70-5-E2-P | 950561050 |
| | | | 4...20mA, NPN | S70-5-E3-NI | 950561100 |
| | | 250 μ s...12ms | M8 Connector | 0...10V, NPN | S70-5-E3-NV |
| | 4...20mA, PNP | | | S70-5-E3-PI | 950561090 |
| | 0...10V, PNP | | | S70-5-E3-PV | 950561070 |



| 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 |