Technical Description

When there is no space for traditional sensors, there is only one answer: miniaturization. The diffuse **BOS S3** with its small dimensions (13 × 26 × 52 mm) can be used in locations with shallow installation depth (right angle version) or narrow openings (straight version).

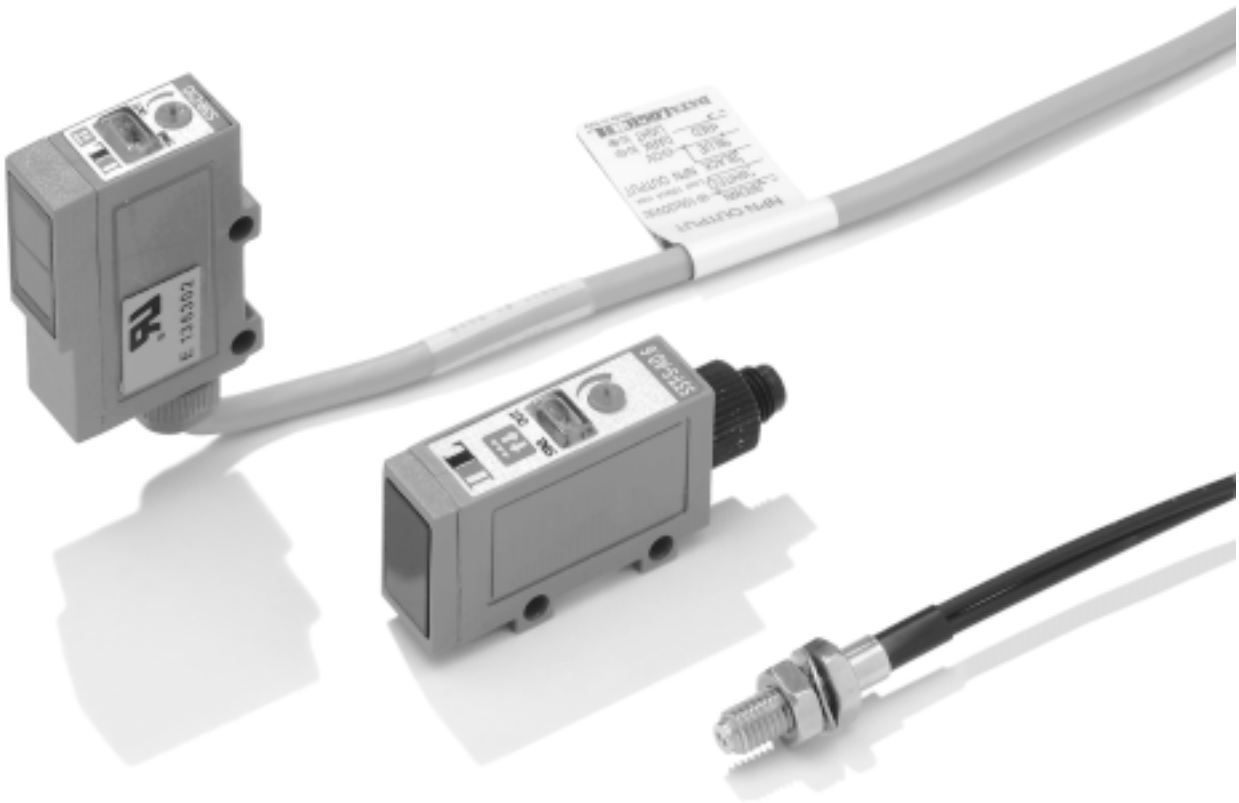
The series consists of:
- Diffuse with 100 mm and 500 mm sensing distance
- Diffuse with focused beam and 12 mm sensing distance, optimal for precise sensing and small parts detection
- Retroreflective with polarizing filter for errorless detection of highly light reflecting objects (i.e. packaging with shiny surfaces)
- Thru-Beam with 5 m range, test input and alarm output
- Use the diagnostic function to check for proper function
- Models with plastic fiber optics permit sensing of miniature objects, checking of individual product markings, and operation in extremely tight locations.

Features

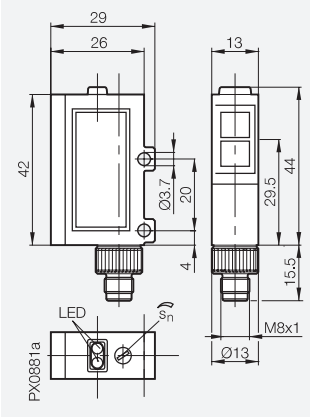
- Supply voltage 10...30 V DC, reverse polarity protected
- Output short circuit protected
- Light-On/Dark-On selectable
- Sensitivity adjustment with potentiometer
- Setup aid and stability display with green LED
- IP 66
- Flat window discourages dust accumulation
- Can be DIN rail mounted (fiber optic version)

Applications

- Direct object sensing
- Object detection using fiber optics
- Parts counting in machine design and conveying, packaging machinery, and assembly lines



Series		BOS S3 Right angle
Diffuse	Sensing range	12 mm/100 mm/500 mm
Retroreflective	Sensing range	2 m
Thru-Beam	Sensing range	5 m

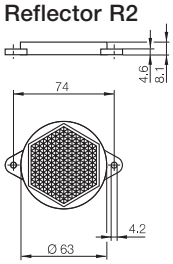


Diffuse					
PNP/NPN*, PNP	O/●	100	mm		BOS S3T-R-C10-PNP
PNP/NPN*, PNP	O/●	500	mm		BOS S3T-R-C50-PNP
Diffuse, Fixed Focus					
PNP/NPN*, PNP	O/●	12	mm	Red light, focussed	BOS S3T-R-D12-PNP
Polarized Retroreflective					
PNP/NPN*, PNP	O/●	2	m	Red light	BOS S3T-R-B2-PNP
Retroreflective					
PNP/NPN*, PNP	O/●	0.6	m	Clear Object	BOS S3T-R-A0.6
PNP/NPN*, PNP	O/●	2.5	m		BOS S3T-R-A2.5
Thru-Beam					
PNP/NPN*, PNP	O/●	5	m	Receiver	BLE S3T-R-F5-PNP
		5	m	Emitter	BLS S3T-R-G5-PNP

Slit Apertures

Slit width	0.5 mm	1 mm	2 mm
Range	0.5 m	1.0 m	2.0 m
Object size	>0.5 mm	>1mm	>2mm

Reflector R2



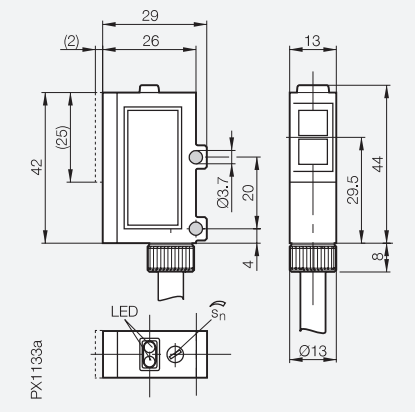
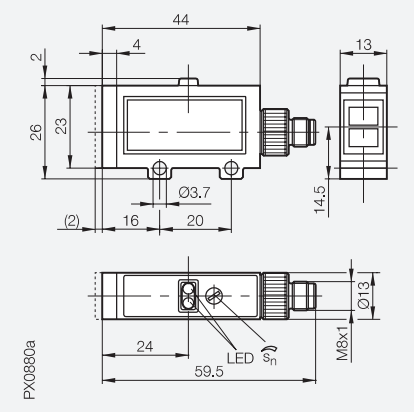
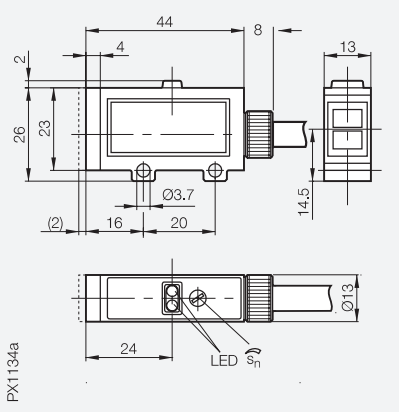
Note: Mounting bracket, R2 reflector for retroreflective model, and slit apertures for emitter/receiver are included. See other reflectors in accessories section.

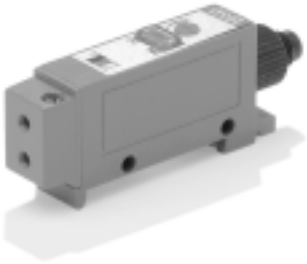
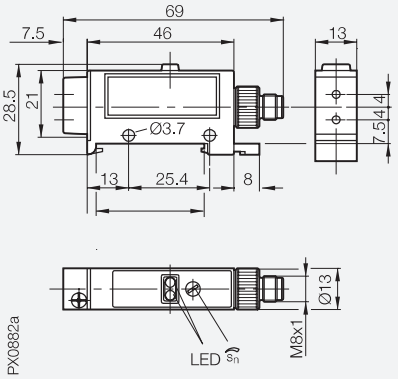
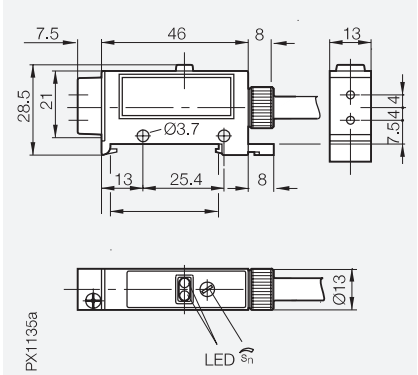
Diffuse values referenced to Kodak white card with 90 % reflection. Retroreflective values referenced to R1 reflector.

Supply voltage U_B	10...30 V DC
Voltage drop U_d at I_e	≤ 1.5 V
Rated isolation voltage U_i	75 V DC
Rated operational current I_e	≤ 100 mA
No-load supply current I_0	≤ 30 mA
Short circuit protected	yes
Permissible capacitance	0.5 µF
On/Off delay	≤ 1 ms/≤ 2 ms
Frequency of operating cycles	500 Hz/250 Hz
Utilization category	DC 13
Output	PNP/NPN
Output function	O/● selectable
Permissible ambient light	3000 Lux
Sensitivity adjustment	Potentiometer 0...270°
Output function indication	yes
Stability indication	yes
Ambient temperature range T_a	–15...+55 °C
Degree of protection per IEC 529	IP 66
Insulation class	
Housing material	ABS
Material of sensing face	PMMA
Connection	Connector
No. of wires × conductor cross section	
Weight	30 g
Recommended connector	BKS-S 75/S74

O/● = Light-On/Dark-On

* Selectable PNP/NPN with cable version

BOS S3 Right angle 12 mm/100 mm/500 mm 2 m 5 m	BOS S3 straight 12 mm/100 mm/500 mm 2 m 5 m	BOS S3 straight 12 mm/100 mm/500 mm 2 m 5 m
		
BOS S3-R-C10 BOS S3-R-C50	BOS S3T-S-C10-PNP BOS S3T-S-C50-PNP	BOS S3-S-C10 BOS S3-S-C50
BOS S3-R-D12	BOS S3T-S-D12-PNP	BOS S3-S-D12
BOS S3-R-B2	BOS S3T-S-B2-PNP	BOS S3-S-B2
BOS S3-R-A0.6 BOS S3-R-A2.5	BOS S3T-S-A0.6-PNP BOS S3T-S-A2.5-PNP	BOS S3-S-A0.6 BOS S3-S-A2.5
BLE S3-R-F5 BLS S3-R-G5	BLE S3T-S-F5-PNP BLS S3T-S-G5-PNP	BLE S3-S-F5 BLS S3-S-G5
10...30 V DC	10...30 V DC	10...30 V DC
≤ 1.5 V	≤ 1.5 V	≤ 1.5 V
75 V DC	75 V DC	75 V DC
≤ 100 mA	≤ 100 mA	≤ 100 mA
≤ 30 mA	≤ 30 mA	≤ 30 mA
yes	yes	yes
0.5 µF	0.5 µF	0.5 µF
≤ 1 ms/≤ 2 ms	≤ 1 ms/≤ 2 ms	≤ 1 ms/≤ 2 ms
500 Hz/250 Hz	500 Hz/250 Hz	500 Hz/250 Hz
DC 13	DC 13	DC 13
PNP/NPN selectable	PNP/NPN	PNP/NPN selectable
O/● selectable	O/● selectable	O/● selectable
3000 Lux	3000 Lux	3000 Lux
Potentiometer 0...270°	Potentiometer 0...270°	Potentiometer 0...270°
yes	yes	yes
yes	yes	yes
–15...+55 °C	–15...+55 °C	–15...+55 °C
IP 66	IP 66	IP 66
ABS	ABS	ABS
PMMA	PMMA	PMMA
2 m Cable	Connector	2 m Cable
4 × 22AWG		4 × 22AWG
85 g	30 g	85 g
	BKS-S 75/S74	

Series	**BOS S3T straight for plastic fiber optic cable with ∅ 2.2 mm**	**BOS S3 straight for plastic fiber optic cable with ∅ 2.2 mm**
		
		
Basic unit for plastic fiber optic cable		
PNP/NPN*, PNP	BOS S3T-S-E1-PNP	BOS S3-S-E1
Supply voltage U_B	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e	≤ 1.5 V	≤ 1.5 V
Rated isolation voltage U_i	75 V DC	75 V DC
Rated operational current I_e	≤ 100 mA	≤ 100 mA
No-load supply current I_0	≤ 30 mA	≤ 30 mA
Short circuit protected	yes	yes
Permissible capacitance	0.5 µF	0.5 µF
On/Off delay	≤ 1 ms/≤ 2 ms	≤ 1 ms/≤ 2 ms
Frequency of operating cycles	500 Hz/250 Hz	500 Hz/250 Hz
Utilization category	DC 13	DC 13
Output	PNP	PNP/NPN selectable
Output function	O/● selectable	O/● selectable
Permissible ambient light	3000 Lux	3000 Lux
Sensitivity adjustment	Potentiometer 0...270°	Potentiometer 0...270°
Output function indication	yes	yes
Stability indication	yes	yes
Ambient temperature range T_a	–15...+55 °C	–15...+55 °C
Degree of protection per IEC 529	IP 66	IP 66
Insulation class		
Housing material	ABS	ABS
Material of sensing face	PMMA	PMMA
Connection	Connector	2 m cable
No. of wires × conductor cross section		4 × 0.34 mm²
Weight	30 g	85 g
Recommended connector	BKS-S 74	

O/● = Light-On/Dark-On

*Selectable NPN/PNP for cable version

Note: Use universal plastic fiber optics. See fiber optics section.

Thru-Beam

Alarm Output in Receiver

(PNP open collector – 30 mA) cable version
The receiver is equipped with an alarm output. It acts as a warning signal when the function is affected by contamination or mechanical alignment. The alarm output is activated when the receiver signal is in the alarm range for at least 3 seconds.

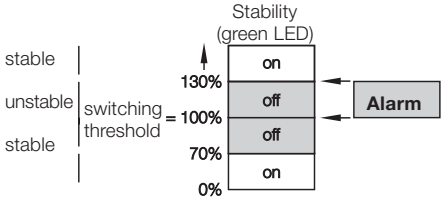
Test Input on Emitter

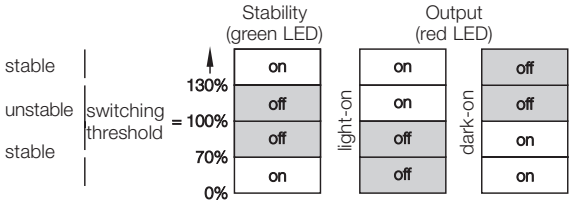
The test input interrupts the light pulses from the emitter and allows the function of the emitter and receiver to be checked (when using Test+, Test– must be at 0 V, when using Test–, Test+ must be at 10...30 V). The receiver output must switch each time when a voltage of 10...30 V DC (Test+) or 0 V (Test–) is present on the test input. Contamination or alignment on the optical axis can cause the emitter signal to reach the receiver only weakly, if at all. Therefore the output will not switch even though the test input is activated. The test function provides a remote check of the thru beam type and serves as a preventative measure.

Green Stability Display

The green stability display illuminates in the “safe“ range, where the input energy is at least 30 % over or under the “threshold energy“.
The “threshold energy“ at which a signal change is effected, is defined as 100 %. The “safe“ range is therefore reached when:

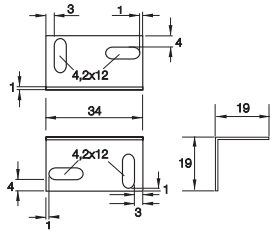
– the input signal is at 130 % or more of the threshold energy.
– the input signal is at 70 % or less than the threshold energy.



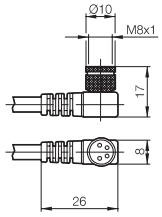


2

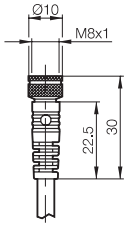
Mounting Bracket



BKS-S 75-3-_ _

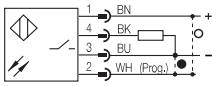


BKS-S 74-3-_ _

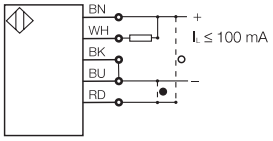


Wiring diagrams

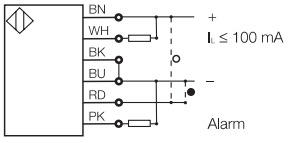
Diffuse, Retroreflective
Thru-Beam (Receiver) and basic unit



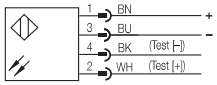
Diffuse, Retroreflective
NPN



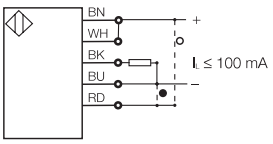
Receiver with Alarm Output
NPN



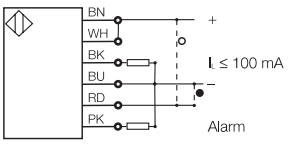
Thru-Beam (Emitter)

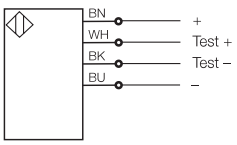


PNP

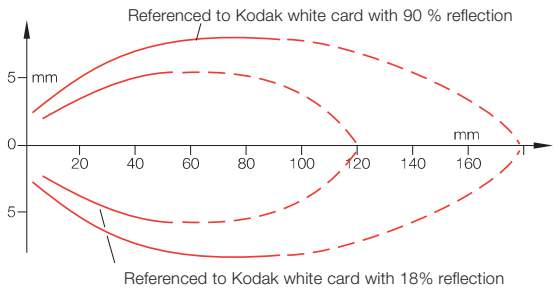


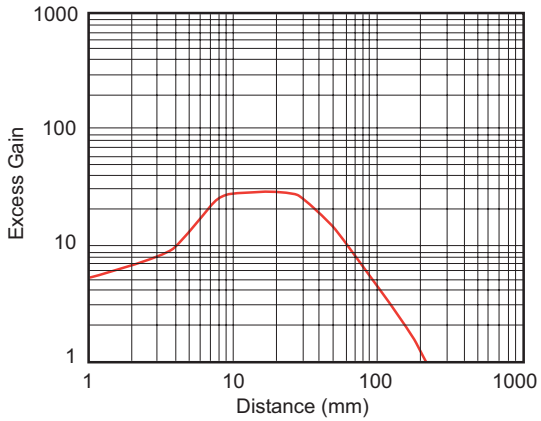
PNP



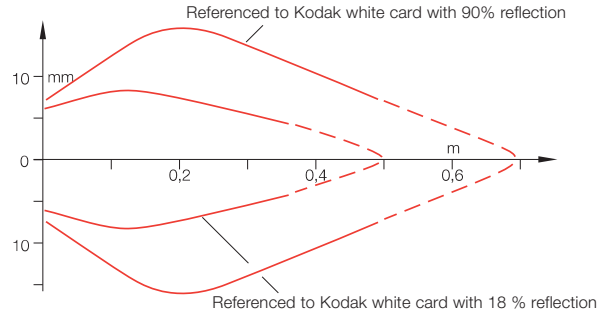


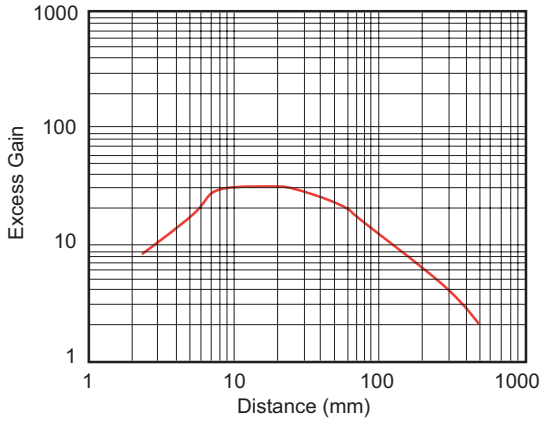
Diffuse (Short Range) S3...C10



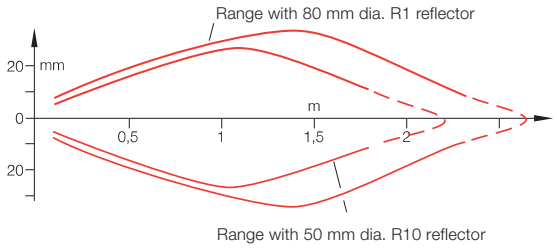


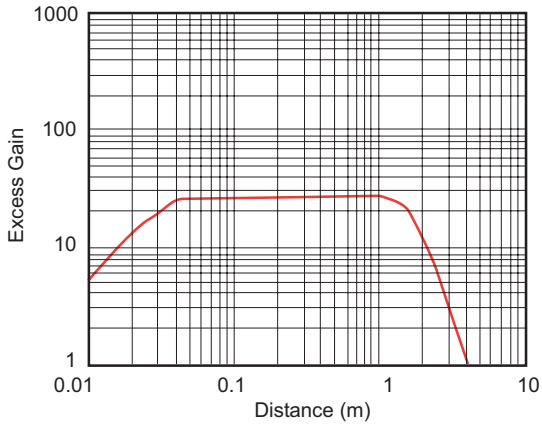
Diffuse (Long Range) S3...C50



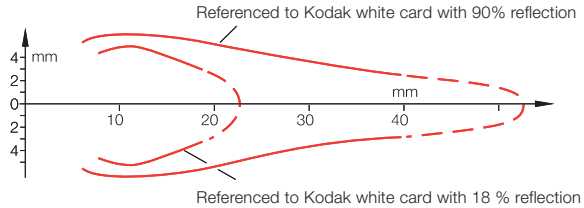


Polarized Retroreflective S3...B2



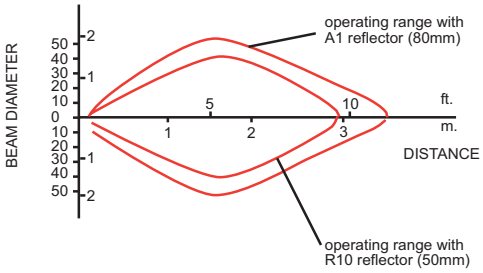


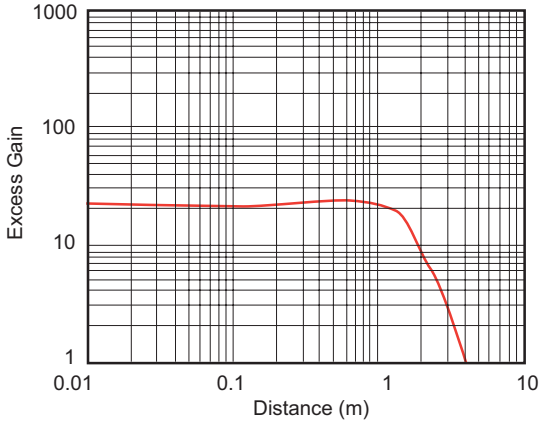
Fixed Focus S3...D12



Retroreflective S3...A2.5...

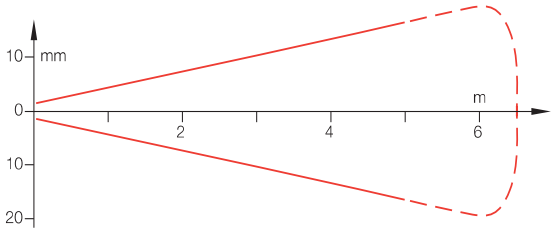
Retroreflective BOS S3-_-A2.5

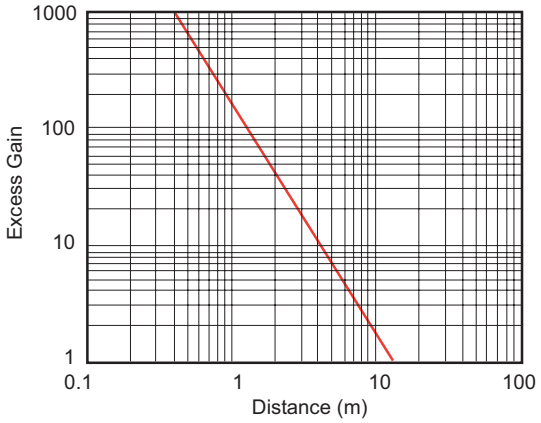




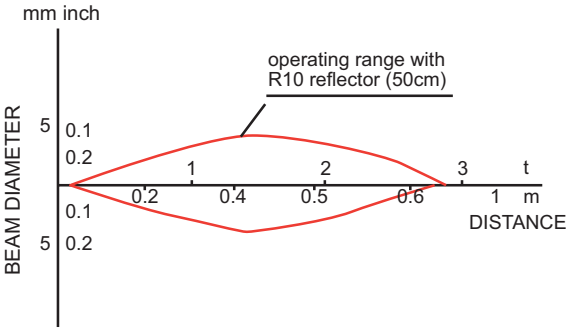
Thru-Beam S3...F/G5

Thru-Beam BLS S3.../BLE S3...





Retroreflective S3...A0.6...



Fiber Optic S3...E1...