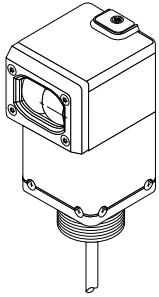


Datasheet

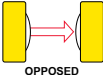
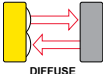


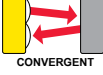
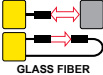

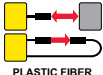
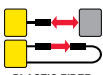


- SPDT electromechanical relay output for economy and high switching capacity
- Operate from 24 to 250 V ac (50/60 Hz) or from 24 to 36 V dc; all sensing modes available
- Modular design with interchangeable components, optional Pulse or Delay timing logic modules
- Sense and Load output indicator LEDs
- Choice of pre-wired cable or SO-type quick-disconnect cable fitting
- Cross-hole design for front, back, or side mounting, plus 30mm threaded base mounting hub; standard limit switch mounting hole spacing



WARNING: Not To Be Used for Personnel Protection

Never use this device as a sensing device for personnel **protection**. Doing so could lead to serious injury or death. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

Model	Sensing Mode	Range	Response Time	Repeatability	Beam
OSEE (Emitter) and OSER (Receiver)	 OPPOSED	45 m (150 ft)	20 ms ON/OFF	0.4 ms	Infrared, 880 nm
OSD	 DIFFUSE	450 mm (18 in)	20 ms ON/OFF	1 ms	Infrared, 880 nm
OSDX		2 m (6 ft)	20 ms ON/OFF	1 ms	
OSELV	 RETRO	0.15 to 9 m (6 in to 30 ft)	20 ms ON/OFF	1 ms	Visible red, 650 nm
OSELVAG	 POLAR RETRO	0.3 m to 4.5 m (12 in to 15 ft)	20 ms ON/OFF	1 ms	
OSECV	 CONVERGENT	Focus at 38 mm (1.5 in)	20 ms ON/OFF	1 ms	
OSEFX	 GLASS FIBER Opposed Mode	See Excess Gain curves	20 ms ON/OFF	1 ms	Infrared, 880 nm
	 GLASS FIBER Diffuse Mode				
OSEFP	 PLASTIC FIBER Opposed Mode	See Excess Gain curves	20 ms ON/OFF	1 ms	Visible red, 650 nm
	 PLASTIC FIBER Diffuse Mode				



Power Block Models	For Use With	Cable or Connector
OPEJ5	All but emitters	Prewired 6-foot PVC-jacketed 5-conductor cable.
OPEJ5QD		Integral minifast™ 5-conductor quick-disconnect cable fitting. Requires cable model MBCC-512, sold separately.
OPEJE	Emitters only, no output circuitry	Prewired 6-foot PVC-jacketed 2-conductor cable
OPEJEQD		Integral minifast™ 5-conductor quick-disconnect cable fitting. Requires cable model MBCC-512, sold separately.

Overview

Banner E-Series OMNI-BEAM™ sensors are a line of modular, self-contained, photoelectric sensors designed for applications where economy and performance are important. E-Series OMNI-BEAMS have SPDT (single-pole double-throw, form "C") electromechanical relay output and employ a power block that operates from either 24 to 250 V ac or 24 to 36 V dc. Sensing ranges of E-Series OMNI-BEAMS are, in most cases, identical to those of standard model OMNI-BEAMS.

E-Series OMNI-BEAM sensors have two major modules: a sensor head and a power block. (NOTE: sensor heads are interchangeable and are ordered individually.) Light (LO) or dark operate (DO) output is selected via an easily-accessible internal switch.

LED indicators for Sense and Load are located atop the sensor head beneath a transparent, gasketed acrylic cover. Optional logic module boards slip easily into the sensor head and provide adjustable delay or adjustable pulse timer logic.

The Sense indicator lights when an object is sensed. The LOAD indicator lights when the sensor's output relay is energized. This indicator is especially useful when a timing logic module is used and SENSE and LOAD conditions are not concurrent.

Their cross-hole mounting design with standard limit-switch hole spacing enables OMNI-BEAM E-Series sensors to be mounted from the front, either side, or the back, making them ideal for conveyor and other production line applications. E-Series OMNI-BEAMS may also be mounted using their 30 mm threaded base mounting hub. A versatile 2-axis stainless steel accessory mounting bracket (model SMB30MM) and a PBT swivel-mount bracket (model SMB30SM) are available.

E-Series opposed mode emitters use an emitter power block, either model OPEJE or OPEJEQD. All other E-Series sensors use either model OPEJ5 or OPEJ5QD¹. Models OPEJE and OPEJ5 have a 1/2-in NPS integral internal conduit thread and are supplied with a 6-foot PVC-covered cable. Models OPEJEQD and OPEJ5QD ("QD" models) have NEMA 4-rated quick-disconnect Mini-style connectors. All models are housed in tough, molded PBT housings. The power block electronics are epoxy-encapsulated. When assembled, all parts of E Series OMNI-BEAMS are fully gasketed.

Diffuse Mode

Diffuse (proximity) mode sensors detect objects by sensing their own emitted light reflected from the object. They are ideal for use when the reflectivity and profile of the detected object is sufficient to return a large percentage of emitted light back to the sensor. Model OSEDX is the first choice for diffuse (proximity) mode applications when there are no background objects to falsely return light.

Retroreflective

The visible red sensing beam of retroreflective sensors makes them very easy to align. The anti-glare model (suffix "AG") polarizes the emitted light and filters out unwanted reflections, making sensing possible in otherwise unsuitable applications. Use "AG" models only in very clean environments and use with the model BRT-3 3" reflector. For detailed information on retroreflective targets, see the Banner product catalog.

Fiber Optic

Model OSEFX is an excellent choice for glass fiber optic applications compatible with the use of an infrared sensing beam and where faster sensor response is not required. Excess gain is very high; as a result, opposed individual fibers operate reliably in many hostile environments. Also, special miniature bifurcated fiber optic assemblies with bundle sizes as small as 0.5 mm (0.020 in) in diameter may be used successfully for diffuse mode sensing. The excess gain curves and beam patterns illustrate response with standard 1.5 mm (0.060 in) diameter and 3 mm (0.12 in) diameter bundles. Response for smaller or larger bundle sizes may be interpolated.

Plastic fiber optics are lower in cost than glass fiber optics and are ideal for use in situations where the environmental conditions allow. They are easily cut to length in the field and are available in a variety of sensing end styles. For further information, refer to the Banner product catalog.

Chemical resistance of plastic fiber optic assemblies: contact with acids, strong bases (alkalis), and solvents will damage the monofilament optical fiber acrylic core. The polyethylene jacket protects the optical fiber from most chemical environments; however, materials may migrate through the jacket with long-term exposure. Samples of plastic fiber optic material are available from Banner for testing and evaluation.

Power Blocks with SPDT Form "C" Electromechanical Relay Output

OMNI-BEAM E Series power blocks provide regulated low voltage dc power to the sensor head and logic module (if one is used), with input of 24 to 36 V dc or 24 to 250 V ac (50/60 Hz). All power blocks, except those designed only to power emitters, have an internal electromechanical form "C" SPDT relay output.

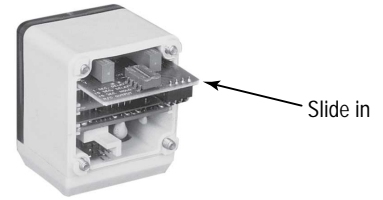
¹ E Series sensor heads may also be used with Standard OMNI-BEAM power blocks with solid-state output relay.

Power blocks are epoxy-encapsulated and rated for 0 °C to +50 °C (+32 °F to +122 °F). They feature limit switch style cross-hole design for front, back, or side mounting, plus a 30 mm threaded hub for swivel bracket or through-hole mounting. Models include prewired cable or quick-disconnect (QD) fitting. Assembled sensors are rated NEMA 1, 2, 3, 3S, 4, 12, and 13.

OMNI-BEAM Logic Modules

E Series OMNI-BEAM sensors easily accept the addition of timing logic when needed. Three multiple-function logic modules are available. Model OLM5 is programmable for ON-delay, OFF-delay, or ON/OFF-delay timing logic. Models OLM8 and OLM8M1 offer either one-short or delayed one-shot functions. Programming of the logic function, the timing range, and the output state is done via a set of four switches located on the logic module.

Both logic modules feature 15-turn clutched potentiometers for accurate timing adjustments. The logic module simply slides into the sensor head housing and interconnects without wires. Timing adjustments are easily accessible at the top of the sensor head and are protected by the sensor head's transparent, gasketed polycarbonate cover. Assembled sensors are rated NEMA 1, 2, 3, 3S, 4, 12, and 13.



OMNI-BEAM Logic Module Specifications

Operating Temperature

-40 °C to +70 °C (-40 °F to +158 °F)

Timing Adjustments

Two 15-turn clutched potentiometers with brass elements, accessible from outside at top of sensor block, beneath gasketed cover.

Timing Repeatability

Plus or minus 2% of timing range (maximum). Assumes conditions of constant temperature and power supply.

Useful Time Range

Useful range is from maximum time down to 10% of maximum, all models. When timing potentiometer is set fully counterclockwise, time will be approximately 1% of maximum for models OLM5 and OLM8, and 2% of maximum for model OLM8M1.

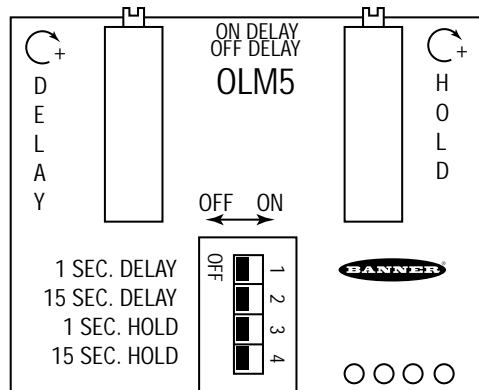
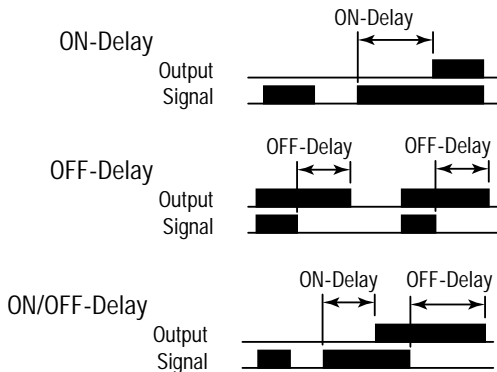
Response Time

A disabled timing function adds no measurable sensing response time.

OLM5 Delay Timer Logic Module

Model OLM5 is programmable for ON-DELAY or OFF-DELAY or ON/OFF DELAY timing functions. Each delay function may be independently adjusted and separately programmed for either a long or short adjustment range.

- If both ranges of either delay function are selected (i.e., if both 1 second and 15 second switches are "on"), the delay time range becomes 16 seconds, maximum.
- With switches #1 and #2 "off" (no ON-DELAY programmed), ON-DELAY is adjustable from "negligible" up to 100 milliseconds, maximum.
- With switches #3 and #4 "off" (no OFF-DELAY programmed), OFF-DELAY is adjustable from "negligible" up to 100 milliseconds, maximum.



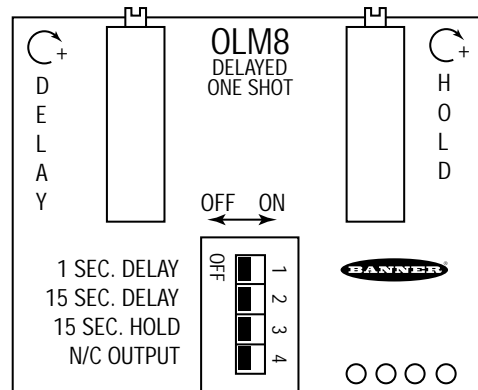
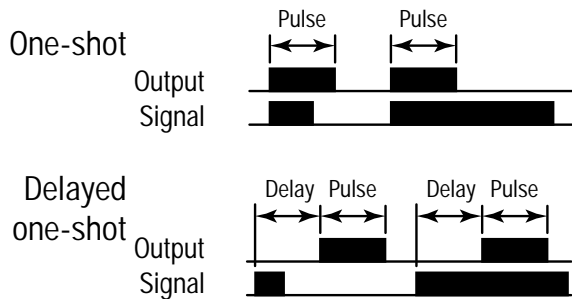
Timing Logic Function and Timing Range		Switch Positions			
		1	2	3	4
ON-DELAY	1 second maximum	ON	OFF	OFF	OFF
ON-DELAY	15 seconds maximum	OFF	ON	OFF	OFF
OFF-DELAY	1 second maximum	OFF	OFF	ON	OFF

Timing Logic Function and Timing Range		Switch Positions			
		1	2	3	4
OFF-DELAY	15 seconds maximum	OFF	OFF	OFF	ON
ON-DELAY	1 second maximum	ON	OFF	ON	OFF
OFF-DELAY					
ON-DELAY	1 second maximum	ON	OFF	OFF	ON
OFF-DELAY	15 second maximum				
ON-DELAY	15 second maximum	OFF	ON	ON	OFF
OFF-DELAY	1 second maximum				
ON-DELAY	15 second maximum	OFF	ON	OFF	ON
OFF-DELAY					

OLM8 Pulse Timer Logic Module

Models OLM8 and OLM8M1 are programmable for either a one-shot ("single-shot") pulse timer or a delayed one-shot logic timer. Delay and Pulse times may be independently adjusted and separately configured for either a long or short adjustment range. OLM8M1 maximum times are 1/10 those of the OLM8.

- DELAY is non-retriggerable.
- PULSE is retriggerable if the DELAY time is less than the ONE-SHOT pulse time.
- If both ranges of the delay function are selected (i.e., if both 1 second and 15 second switches are "on"), the delay time range becomes 16 (1.6*) seconds, maximum.
- With switches #1 and #2 "off" (no DELAY programmed), DELAY is adjustable from "negligible" up to 10 (4.5*) milliseconds, maximum.



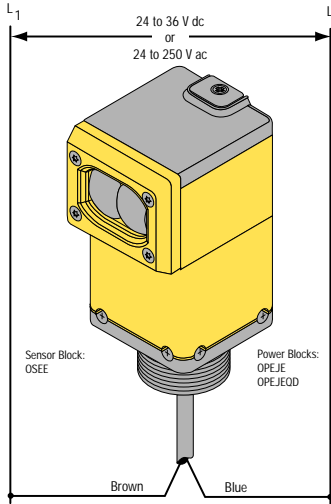
Logic Function and Timing Ranges			Switch Positions			
	OLM8	OLM8M1	1	2	3	4
ONE-SHOT	1 second maximum pulse	0.1 second maximum pulse	OFF	OFF	OFF	--
ONE-SHOT	15 seconds maximum pulse	1.5 seconds maximum pulse	OFF	OFF	ON	--
DELAYED	1 second maximum delay	0.1 second maximum delay	ON	OFF	OFF	--
ONE-SHOT	1 second maximum pulse	0.1 second maximum pulse				
DELAYED	15 seconds maximum delay	1.5 seconds maximum delay	OFF	ON	OFF	--
ONE-SHOT	1 second maximum pulse	0.1 second maximum pulse				
DELAYED	1 second maximum delay	0.1 second maximum delay	ON	OFF	ON	--
ONE-SHOT	15 seconds maximum pulse	1.5 seconds maximum pulse				
DELAYED	15 seconds maximum delay	1.5 seconds maximum delay	OFF	ON	ON	--
ONE-SHOT	15 seconds maximum pulse	1.5 seconds maximum pulse				

For normally open outputs (outputs conduct during pulse time) _____ OFF

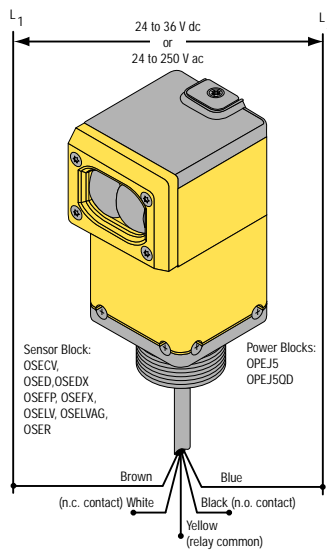
For normally closed outputs (outputs open during pulse time) _____ ON

Wiring

Emitter Hookup to OPEJE and OPEJEQD Power Blocks



Emitter Hookup to OPEJ5 and OPEJ5QD Power Blocks



DC wiring is without regard to power supply polarity.

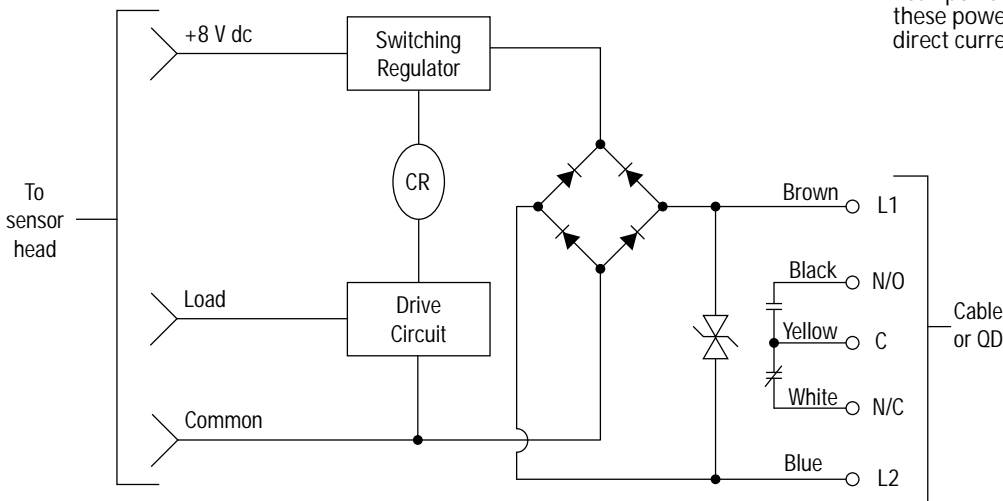
Cordset model MBCC-5.. is sold separately for use with powerblock model OPEJEQD. It has five wires. The white, black, and yellow wires have no connection.

E Series OMNI-BEAM sensor heads may also be used with standard OMNI-BEAM power blocks with solid-state output relay.

When E Series sensor heads are used with these power blocks, the power block Alarm output functions as a second load output that switches in parallel with the Load output (DPST). If the power block is a dc power block, neither output will have short-circuit or overload protection. E Series sensor heads do not have a D.A.T.A.™ display.

Application caution - Power block models OPEJ5(QD) and OPEJE(QD). Power block modules OPEJ5(QD) and OPEJE(QD) use "partial phase firing" power conversion to enable their wide range of ac input voltage (24 to 250 V ac). AC power is applied to the sensor for only a small portion of each ac half-cycle. The current demand during this period may be as high as 1 to 2 amps per sensor.

The collective current demand of several of these sensors on a common ac line is significant. If several sensors are wired directly to the ac mains, it is unlikely that any adverse effects will be noticed. However, problems may be noticed if several sensors are connected to a common circuit that is isolated from the ac mains by a transformer. The collective peak current demand may rob other components on the same circuit of enough power to function properly. In the worst case, a transformer with inadequate reserve current capacity may overheat. Barring a transformer failure, the sensors themselves will operate normally.



Peak power demand is not an issue when these power blocks are powered from direct current (24 to 36 V dc).

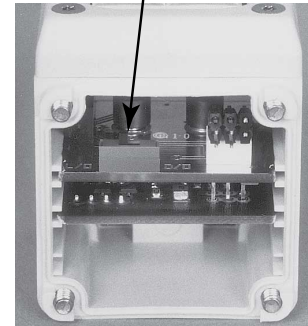
Configuration

Select between light- or dark-operate mode using a slide switch inside the bottom of the sensor head. In LIGHT operate, the output is energized when the sensor “sees” light. In DARK operate, the output is energized when the sensor “sees” dark.

To access the switch:

1. Remove the transparent cover from the top of the sensor head.
2. Unscrew the four captive assembly bolts that hold the sensor head to the power block.
3. The switch is easily operated with a small screwdriver. Move the switch to the LEFT for LIGHT operate, or to the RIGHT for DARK operate (switch position information is inscribed on the printed circuit board, next to the switch).

Light/Dark Operate Switch
LO ← DO



Specifications

Supply Voltage and Current

24 V ac to 250 V ac (50-60 Hz), or 24 V ac to 36 V dc at 45 mA dc maximum, exclusive of load
DC wiring is without regard to polarity

Output Configuration

One internal form “C” (single-pole double-throw) relay

Output Response Time

20 milliseconds ON and OFF; 100-millisecond delay on power-up (relay is de-energized during this period)

Adjustments

Multi-turn Gain control on top of sensor (beneath a transparent gasketed polycarbonate cover) allows precise sensitivity setting (turn clockwise to increase gain).

Internal switch selects LIGHT operate or DARK operate.

Optional logic module models OLM5, OLM8, and OLM8M1 have adjustable timing functions.

Connections

Sensors may be supplied either with 2-wire (for emitter models) and 5-wire (for all other models) 6 ft PVC-covered cable and 1/2-inch NPS integral internal conduit thread in the sensor base, or integral QD (quick disconnect) connector. QD models use 5-conductor cord sets MBCC-5.. (sold separately).

Operating Conditions

Temperature: 0 °C to +50 °C (+32 °F to +122 °F)

Temperature for Plastic Fiber Optics: -30 °C to +70 °C (-22 °F to +158 °F)

Indicators

Red LED indicators for Sense and Load on top of sensor (beneath a transparent gasketed polycarbonate cover).

Sense LED lights when an object is sensed. Load LED lights when the output relay is energized.

Construction

Molded thermoplastic polyester housing. Power block is totally encapsulated. Molded acrylic lenses, stainless steel hardware. When assembled, all parts are fully gasketed.

Assembled E Series OMNI-BEAM sensors are rated NEMA 1, 2, 3, 3S, 4, 12, and 13.

Output Rating

Maximum switching power (resistive load): 150 W, 600 VA
Maximum switching voltage (resistive load): 250 V ac or 30 V dc
Maximum switching current (resistive load): 5 A
Minimum voltage and current: 5 V dc, 0.1 A
Mechanical life of relay: 10,000,000 operations
Electrical life of relay at full resistive load: 100,000 operations

Timing Logic

Optional logic modules are available:

Timing logic module OLM5 (DELAY timing logic)

Timing logic module OLM8 or OLM8M1 (PULSE timing logic)

Required Overcurrent Protection



WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

Overcurrent protection is required to be provided by end product application per the supplied table.

Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.

Supply wiring leads < 24 AWG shall not be spliced.

For additional product support, go to www.bannerengineering.com.

Supply Wiring (AWG)	Required Overcurrent Protection (Amps)
20	5.0
22	3.0
24	2.0
26	1.0
28	0.8
30	0.5

Certifications

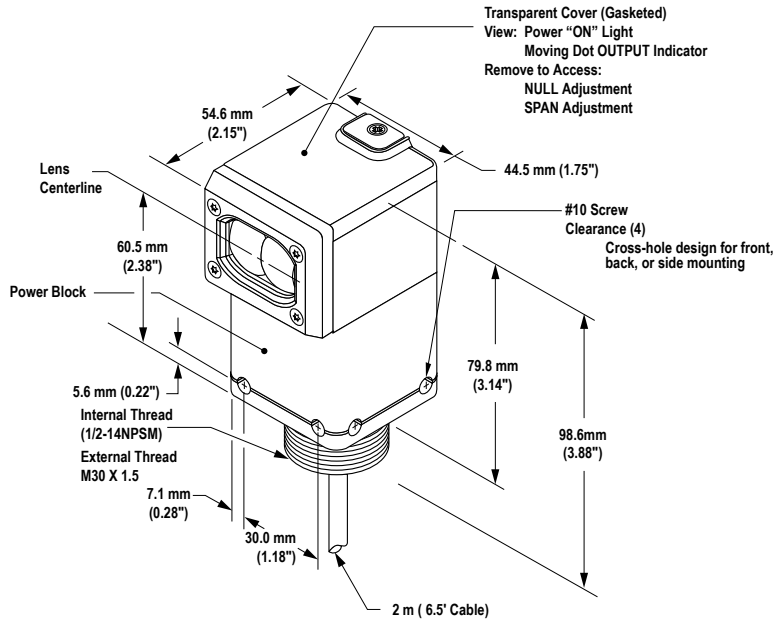


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E71083

Dimensions

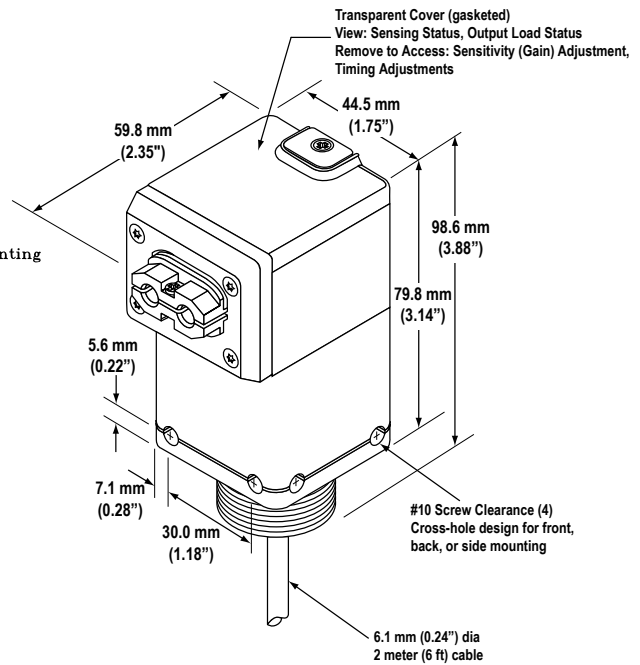
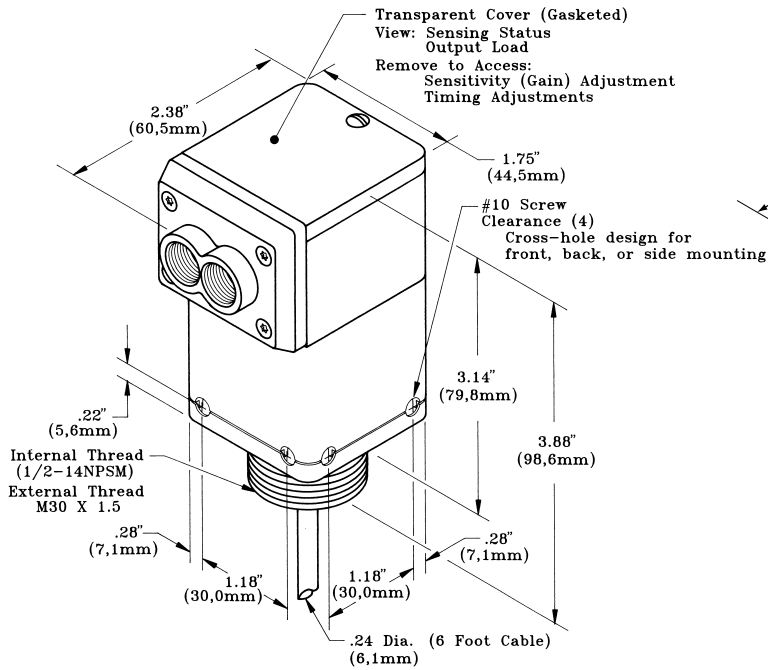
Models OSEE, OSER, OSED, OSEDX, OSELV, OSELVAG, OSECV



The depth of model OSELVAG is 57.7 mm (2.27 in). The depth of model OSECV is 62.0 mm (2.44 in).

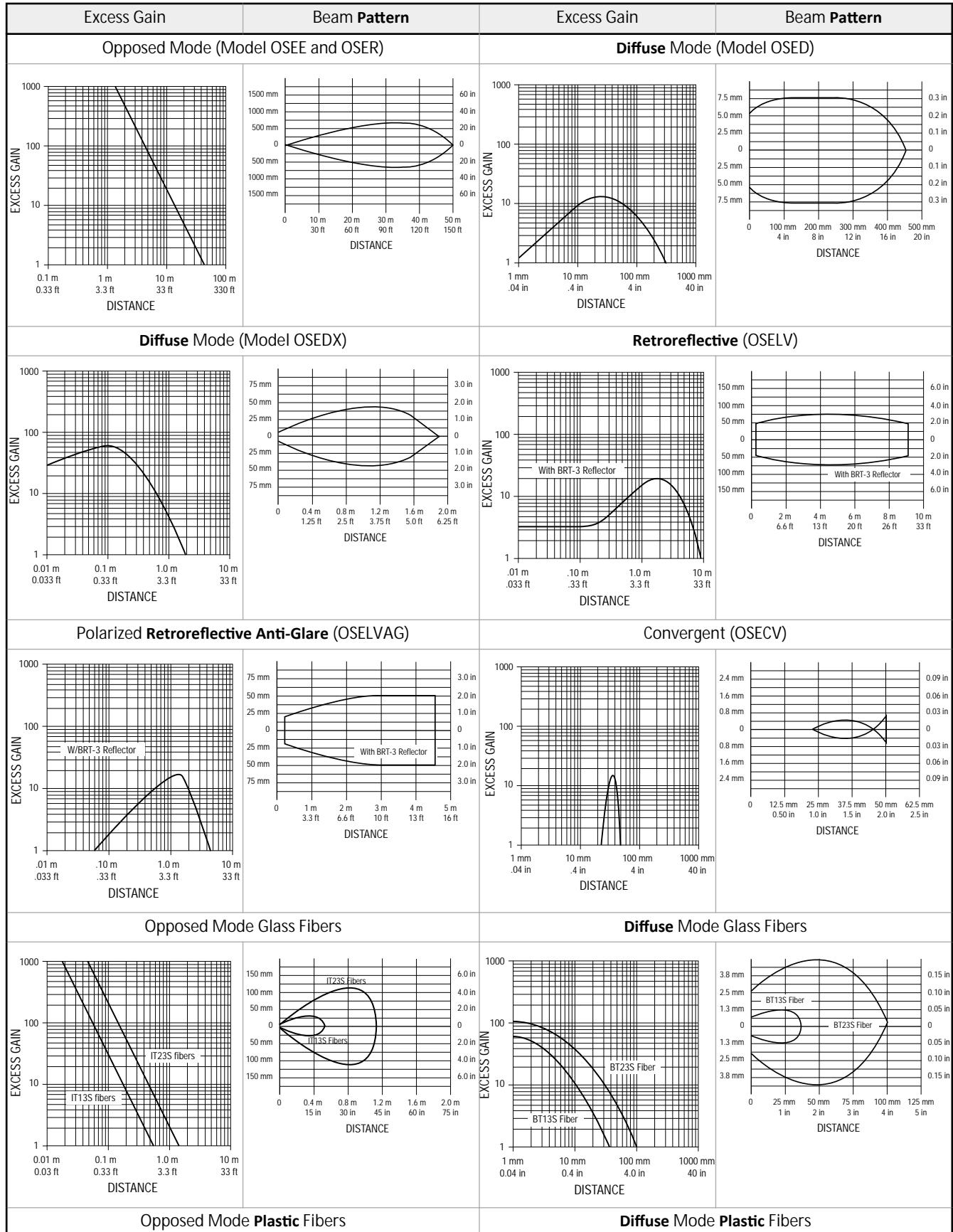
Model OSEFX

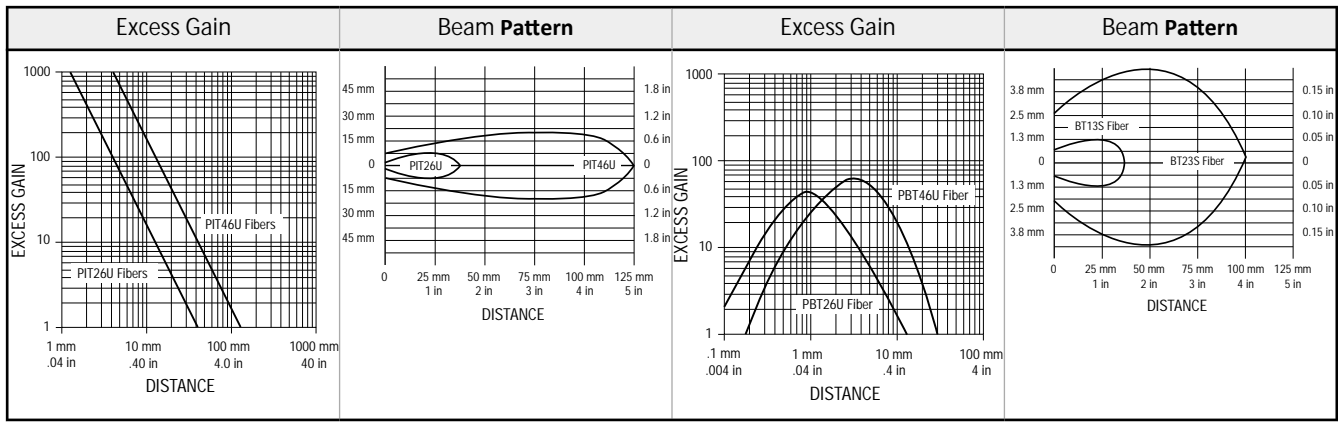
Model OSEFP



All measurements are listed in millimeters [inches], unless noted otherwise.

Performance Curves





Accessories

5-Pin Mini-Style Cordsets				
Model	Length	Style	Dimensions	Pinout (Female)
MBCC-506	1.83 m (6 ft)	Straight		<p>1 = Black 2 = Blue 3 = Yellow 4 = Brown 5 = White</p>
MBCC-512	3.66 m (12 ft)			
MBCC-530	9.14 m (30 ft)			

Banner Engineering Corp. Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

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