D11 Series

BANNER®
more sensors, more solutions

Datasheet

Low cost self-contained sensors for use with plastic fiber optics

- Low-cost, 10 V dc to 30 V dc, self-contained sensors for use with all Banner plastic fiber optics
- Compact 11 mm-wide housing designed for DIN rail mounting; also mounts to other surfaces using the supplied mounting bracket
- Choice of NPN (sinking) or PNP (sourcing) complementary outputs—one normally open and one normally closed; 150 mA output load rating
- Normally-closed output may be wired as a diagnostic alarm to alert personnel to marginal sensing conditions[1]
- Fast, 500 microsecond (0.5 millisecond) output response
- LED status indications for power ON, output overload, fiber alignment, and marginal gain conditions
- Choose models with integral 2 m (6.5 ft) cable or pico-style quick disconnect (QD) connector; 9 m (30 ft) cables are also available
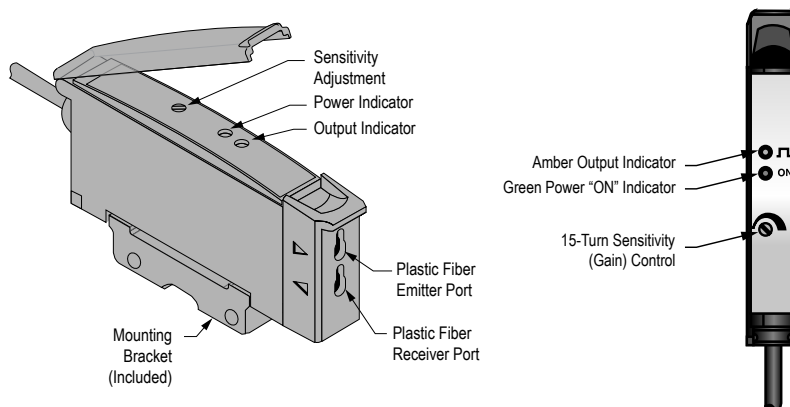
⚠ WARNING: Not To Be Used for Personnel **Protection**

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.

Models

Models	Range	Connection[2]	Supply Voltage	Output Type
D11SN6FP	Range varies by sensing mode and fiber optics used	2 m (6.5 ft)	10 V dc to 30 V dc	Complementary NPN (sinking)
D11SN6FPQ		4-pin Pico QD		
D11SP6FP		2 m (6.5 ft)		Complementary PNP (sourcing)
D11SP6FPQ		4-pin Pico QD		

Features

Sensitivity Adjustment
Power Indicator
Output Indicator
Plastic Fiber Emitter Port
Plastic Fiber Receiver Port
Mounting Bracket (Included)

Amber Output Indicator
Green Power "ON" Indicator
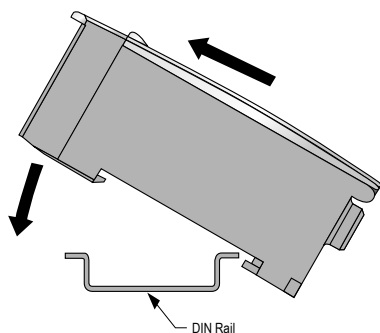15-Turn Sensitivity (Gain) Control

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[1] U.S. Patent #5087838
[2] To order the 9 m (30 ft) PVC cable model, add the suffix "W/30" to the cabled model number. For example, D11SN6FP W/30. Models with a quick disconnect require a mating cordset.
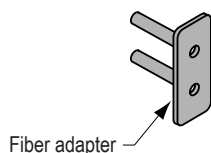
Installation

Mount the D11 on a DIN rail or the included bracket.

DIN Rail

Installing **Plastic** Fibers

1. Cut the fiber ends according to the instructions included with the fibers.
2. Slide the fiber gripper up (open).
3. If you are using 0.254 mm or 0.508 mm (0 .010 inch or 0.020 inch) diameter fibers: Insert the adaptor into the ports as far as it will go.
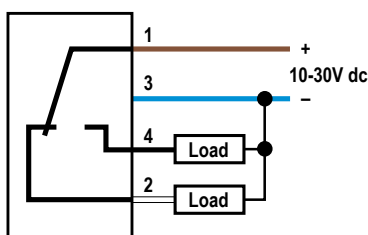

Fiber adapter

4. For all fiber diameters: Insert the prepared plastic fiber sensor ends gently into the ports as far as they will go.
5. Slide the fiber gripper back down to lock it.

Wiring Diagrams

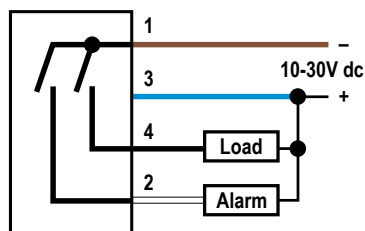NPN Outputs—Standard Wiring
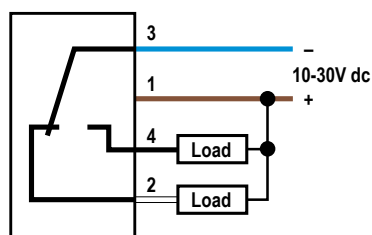
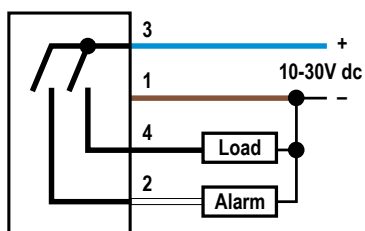PNP Outputs—Standard Wiring

Key
1 = Brown
2 = White
3 = Blue
4 = Black

NPN Outputs—Alarm Wiring

PNP Outputs—Alarm Wiring

Quick disconnect (QD) wiring diagrams are functionally identical.

Specifications

Required Fiber **Optic** Cable
PI or PB Series plastic fibers

Sensing Beam
Visible red, 680 nm

Supply Voltage and Current
10 V dc to 30 V dc at 25 mA (exclusive of load current)

Supply **Protection** Circuitry
Protected against reverse polarity and transient voltages

Output **Configuration**
Complementary: one normally open (N.O.) and the other normally closed (N.C.); N.C. output may be wired as diagnostic alarm output by reversing power supply connections[3] (see Wiring Diagrams); Outputs are NPN (Sinking) or PNP (Sourcing), depending on model
Diagnostic alarm output energizes whenever excess gain falls to between 1× and 1.5× in the light condition; this output corresponds to flashing amber indicator LED

Output **Rating**
150 mA maximum (each output); the total load may not exceed 150 mA
Off-state leakage current: < 5 microamps at 30 V dc
On-state saturation voltage: < 1 V at 10 mA dc; < 1.5 V at 150 mA dc

Output **Protection** Circuitry
Protected against false pulse on power-up (false pulse protection circuit causes a 0.1 second delay on power-up); short-circuit protected

Output Response Time
500 microseconds "on" and "off"

Repeatability
160 microseconds; response time and repeatability are independent of signal strength

Adjustments
The sensitivity control is located on top of the module; it is a 15-turn slotted brass screw, clutched at both ends of travel

Indicators
Two LEDs: Green and Amber
Green steady = power to sensor is "on"
Green flashing = output is overloaded
Amber steady = normally open output is conducting
Amber flashing = marginal excess gain (1× to 1.5×) in light condition = alarm output "on"

Construction
Black ABS flame retardant housing with acrylic cover; Stainless steel M3 × 0.5 hardware for use with ABS mounting bracket (supplied)

Environmental **Rating**
IEC IP54; NEMA 2

Connections
2 m (6-1/2 ft) or 9 m (30 ft) attached cable, or 4-pin pico-style quick disconnect fitting; Cables for QD models are purchased separately

Operating Conditions
−20 °C to +55 °C (−4 °F to +131°F)
90% at +50 °C maximum relative humidity (non-condensing)

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
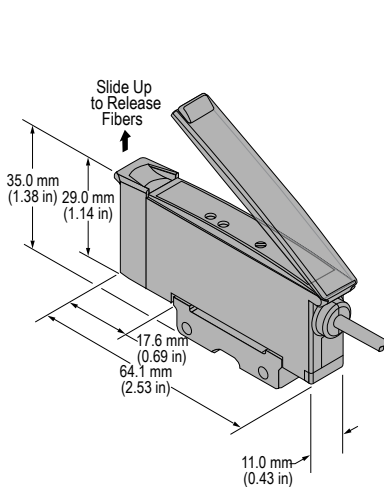
CE cᴿᵁˡUS

Dimensions
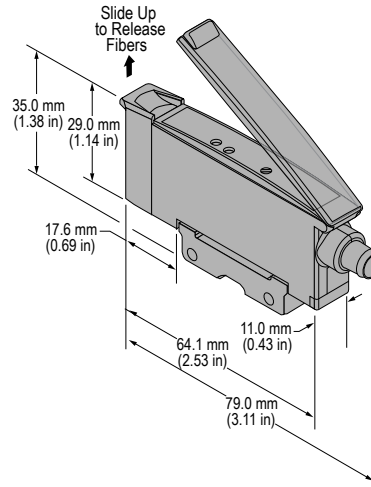

Figure 1. Cabled Models

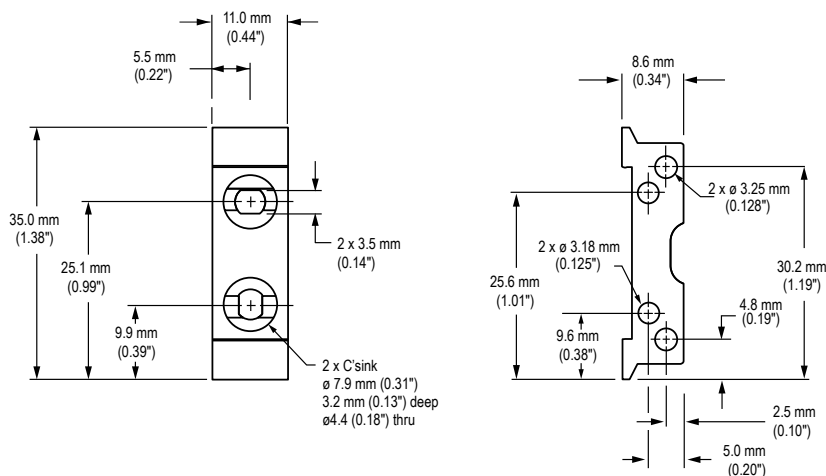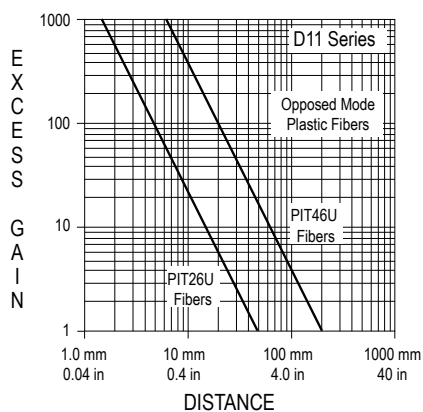*Figure 2. QD Models*

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[3] U.S. Patent #5087838
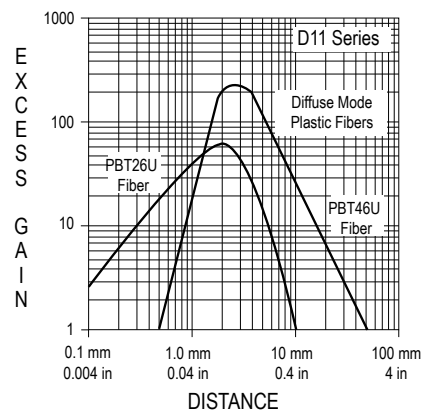
Figure 3. Mounting Bracket

Performance Curves

Diffuse mode performance based on 90% reflectance white test card.

Opposed Mode

Diffuse Mode

Accessories

4-Pin Snap-on M8/Pico-Style Cordsets				
Model	Length	Style	Dimensions	Pinout (Female)
PKG4-2	2 m (6.56 ft)	Straight	32 Typ. ø 9.0	4 2 3 1
PKW4Z-2	2 m (6.56 ft)	Right-Angle	29 Typ. 15 Typ. ø 10.9	1 = Brown 2 = White 3 = Blue 4 = Black

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