



D10 Expert™ – with Discrete Output and Bargraph Display†

Advanced sensor for use with plastic fiber optics



Standard Model



Stack of Models with Bussable Power Feature

Features

- Easy-to-read 8-segment light bar indicator for teach and signal strength readout, plus indicators for continuous readout of operating status (user configuration)
- Easy-to-set automatic *Expert*-style configuration options include Static and Dynamic TEACH, and Window SET, plus manual adjustment for fine tuning
- Smart gain-control algorithm to maximize performance in low-contrast applications
- Fast 500-microsecond sensing response with improved crosstalk avoidance routine (for two sensors) in Normal mode
- Selectable high-speed (HS) mode option for 200-microsecond response
- Extreme configuration flexibility via push buttons or a remote input wire
- Easy selection of Light/Dark Operate (LO/DO), 30 ms pulse stretcher (OFF-delay), and response speed, via push buttons or a remote input wire
- Visible red (660 nm) or visible green (525 nm) sensing beam, depending on model
- Sleek, ultra-slim 10 mm housing, mounts to standard 35 mm DIN rail
- Models with bussable power provide simplified wiring of up to 16 sensors and feature improved temperature compensation for side-by-side mounting

† U.S. Patent(s) issued or pending

Models

Model		Description	Cable*	Outputs
Red Beam	Green Beam			
D10BFP	D10BFPG	Standard sensor	2 m (6.5') Cable	Bipolar NPN/PNP
D10BFPQ	D10BFPGQ		6-pin Pico-style QD	
Models with Bussable Power				
D10B5FP	—	Main unit	2 m (6.5') Cable	Bipolar NPN/PNP
D10B2PFP	—	Sub-unit	2 m (6.5') Cable	Single PNP
D10B2NFP	—		2 m (6.5') Cable	Single NPN

* 9 m (30') cables are available by adding suffix "W/30" to the model number of any cabled sensor (e.g., D10BFP W/30).

A model with a QD connector requires a mating cordset (see page 11).

NOTE: See page 9 for performance curves.



WARNING . . . Not To Be Used for Personnel Protection

Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death.

These sensors do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition. Consult your current Banner Safety Products catalog for safety products which meet OSHA, ANSI and IEC standards for personnel protection.

D10 Expert™ Discrete Output with Bargraph Display

Overview

The D10 *Expert* is an easy-to-use, DIN-rail-mountable fiber optic sensor. It provides high-performance sensing in low-contrast applications. Configuration options include SETUP mode plus Static and Dynamic TEACH, and Window SET options, in addition to manual fine adjustment, remote programming, and security push button lockout.

The sensor's compact housing has a large, easy-to-see bargraph display plus bright LEDs for easy programming and status monitoring during operation.

Standard models have bipolar outputs, one each NPN and PNP. Main units with bussable power have the same bipolar outputs; sub-units feature a single discrete output, either NPN or PNP.

Models with bussable power are designed for use in machines and other applications where multiple sensors will be grouped tightly. They feature increased temperature compensation compared with standard models and reduce the amount of wiring necessary for such applications. An accessory clamp is available to secure a bank of connected sensors together on a DIN rail (see page 11).

Sensor Configuration

Sensor configuration is accomplished via TEACH, SET, and SETUP modes. After the sensing parameters are defined (using either TEACH or SET mode), SETUP mode may be used to enable the delay, to change the light/dark operate status, or to select the high-speed response option (HS). Manual Adjust may be used to fine-tune the thresholds (see page 7). Two push buttons, Dynamic (+) and Static (-), or the remote wire, may be used to access and set the sensing parameters.

Sensor sensitivity may be configured using any of three methods. A single switching threshold may be achieved using either Dynamic (on-the-fly) or Static TEACH; or Window SET may be used to define a sensing window, centered on a single sensing condition.

Remote Configuration

The remote configuration function may be used to configure the sensor remotely or to disable the push buttons for security. Connect the gray wire of the sensor to ground (0V dc), with a remote programming switch connected between them. Pulse the remote line according to the diagrams in the configuration procedures. The duration of the individual pulses is equal to the value T:

$$0.04 \text{ seconds} \leq T \leq 0.8 \text{ seconds}$$

Returning to RUN Mode

Some TEACH, SET, and SETUP modes may be exited either after the 60-second time-out, or by exiting the process:

- In Static TEACH or Window SET mode, press and hold the Static (-) button (or hold the remote line) for 2 seconds. The sensor returns to RUN mode without saving any new settings.
- In SETUP mode, press and hold both the Static (-) and Dynamic (+) buttons (or hold the remote line) for 2 seconds. The sensor returns to RUN mode and saves the current setting.

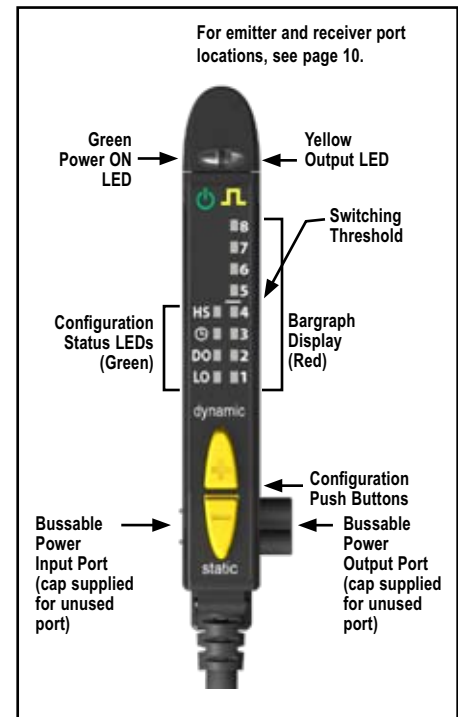



Figure 1. D10 Bargraph Model features

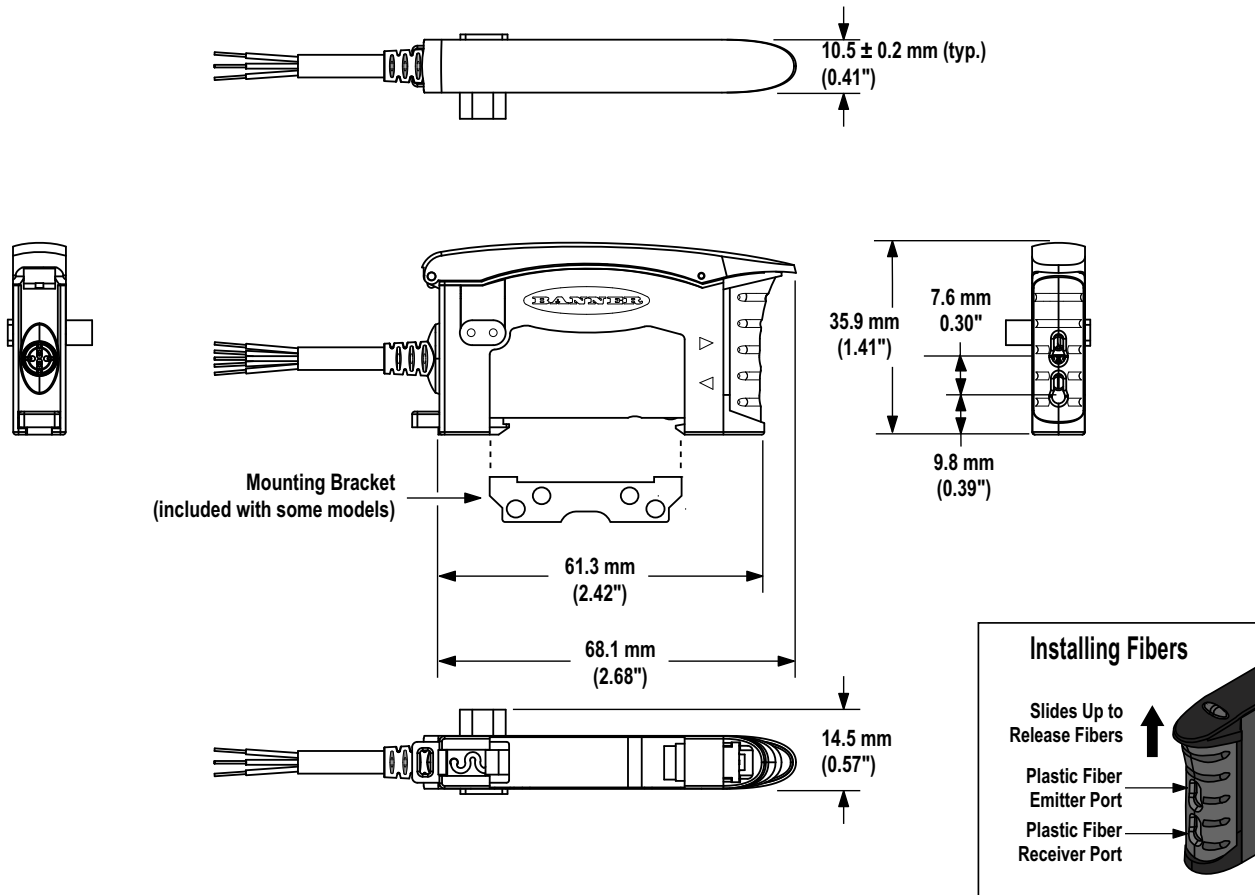
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Specifications

	Standard Sensors	Models with Bussable Power
Sensing Beam	660 nm visible red or 525 nm visible green, depending on model	660 nm visible red
Supply Voltage	10 to 30V dc (10% max. ripple) @ less than 45 mA exclusive of load	12 to 30V dc (10% max. ripple) @ less than 45 mA exclusive of load
Supply Protection Circuitry	Protected against reverse polarity, over voltage, and transient voltages	
Delay at Power Up	200 milliseconds max.; outputs do not conduct during this time	850 milliseconds max.; outputs do not conduct during this time
Output Configuration	Bipolar; 1 current sourcing (PNP) and 1 current sinking (NPN)	Main units: Bipolar; 1 current sourcing (PNP) and 1 current sinking (NPN) Sub-units: 1 current sourcing (PNP) or 1 current sinking (NPN) output, depending on model
Output Rating	150 mA max. load @ 25° C (derate 1 mA per °C increase) OFF-state leakage current: < 5 µA at 30V dc ON-state saturation voltage: NPN: < 200 mV @ 10 mA; 1V @ 150 mA load PNP: < 1V @ 10 mA; 1.5V @ 150 mA load	100 mA max. load (derate 1 mA per °C above 30° C) OFF-state leakage current: < 5 µA at 30V dc ON-state saturation voltage: NPN: < 1.5V PNP: < 2V Supply 15V or more: up to 16 units with 100 mA outputs Less than 15V supply (9 m cable): up to 4 units with 100 mA outputs up to 8 units with 50 mA outputs
Output Protection	Protected against output short-circuit, continuous overload, transient over-voltages, and false pulse on power up	
Output Response Time	500 microseconds (normal mode) or 200 microseconds (high-speed mode)	
Repeatability	100 microseconds (normal mode) or 66 microseconds (high-speed mode)	
Adjustments	2 push buttons and remote wire <ul style="list-style-type: none"> • Expert-style configuration (Static and Dynamic TEACH, and Window SET) • Manually adjust (+/-) sensitivity (from push buttons only) • LO/DO, OFF-delay, and response speed configurable (from push buttons or remote wire) • Push button lockout (from remote wire only) Factory Default Settings: Light Operate, Normal Speed, No Delay	
Indicators	8-segment red bargraph: Light-to-dark signal difference relative to taught condition (Window SET) Sensing contrast (Static or Dynamic TEACH) Green Status Indicators: LO, DO, High Speed (HS), and OFF-Delay Green LED: Power ON Yellow LED: Output conducting	
Construction	Black ABS/polycarbonate alloy (UL94 V-0 rated) housing, clear polycarbonate cover	
Environmental Rating	IEC IP50, NEMA 1	
Connections	PVC-jacketed 2 m or 9 m (6.5' or 30') 6-wire integral cable or integral 6-pin Pico-style quick-disconnect	Main units: PVC-jacketed 2 m or 9 m (6.5' or 30') 5-wire integral cable Sub-units: PVC-jacketed 2 m or 9 m (6.5' or 30') 2-wire integral cable
Operating Conditions	Temperature: -10° to +55° C (+14° to 131° F) Storage: -20° to +85° C (-4° to +185° F) Relative Humidity: 90% @ 55° C (non-condensing)	
Certifications	 (CE approval is pending for models with bussable power)	

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Dimensions



Bracket Dimensions (Bracket included with Standard Sensor Models)

