

FI22FP Series

Low-Profile, Inline Plastic Fiber Optic Sensor



Features

- Low-profile fiber optic sensors are designed for inconspicuous surface mounting
- 8-segment LED light bar indicates relative received signal strength, sensing contrast, programming status, and diagnostic warnings
- Easy-to-set automatic *Expert*-style TEACH options including static, dynamic, and single-point programming plus manual adjustment for fine-tuning
- Smart power-control algorithms to maximize sensing contrast
- Fast 500-microsecond sensing response
- Programmable 30-millisecond pulse stretcher (OFF delay)
- Extreme programming flexibility via two push buttons or a remote input wire
- Output may be programmed for either light or dark operate
- Bipolar discrete outputs: one current sourcing (PNP) and one current sinking (NPN)
- Visible red (660 nm) light source
- Easy-to-read TEACH and signal strength readout, plus indicators for a continuous readout of operating status

Models

Model	Cable*	Supply Voltage	Output Type	Maximum Range**
FI22FP	2 m (6.5') 5-wire integral cable	10V dc to 30V dc	Bipolar NPN/ PNP	<p>Range varies depending on sensing mode and fiber optic(s) used; see below and page 2 for typical values.</p> <p>Opposed Mode PIT26U Fiber: 60 mm (2.36") PIT46U Fiber: 260 mm (10.24") PIT66U Fiber: 540 mm (21.26")</p> <p>Diffuse Mode PBT26U Fiber: 15 mm (0.59") PBT46U Fiber: 65 mm (2.56") PBT66U Fiber: 115 mm (4.53")</p>
FI22FPQ	Integral 6-pin Pico-style QD			

*9 m (30') cables are available by adding suffix "W/30" to the model number of any cabled sensor (e.g., **FI22FP W/30**). A model with a QD connector requires a mating cable (see page 9).

**See page 2 for beam patterns and excess gain curves.



WARNING . . . Not To Be Used for Personnel Protection

Never use this product as a sensing device for personnel protection. Doing so could lead to serious injury or death.

This product 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. Consult your current Banner Safety Products catalog for safety products which meet OSHA, ANSI and IEC standards for personnel protection.

FI22FP Low-Profile Inline Plastic Fiber Optic Sensor

Two-Point Static TEACH (Switch Point)

- Sets a single switching threshold
- Threshold position is adjustable using “+” and “-” buttons (Manual Adjust)

Two-Point TEACH is the traditional setup method, used when two conditions can be presented by the user. The sensor locates a single sensing threshold (the switch point) midway between the two taught conditions, with the Output ON condition on one side, and the Output OFF condition on the other (see Figure 2).

The first condition taught is the ON condition. The Output ON and OFF conditions can be reversed by changing Light/Dark Operate status in SETUP mode.

Two-Point TEACH and Manual Adjust

Using Manual Adjust with Two-Point TEACH moves the switching threshold. The lighted LED on the bargraph will move to exhibit the relative amount of received signal.

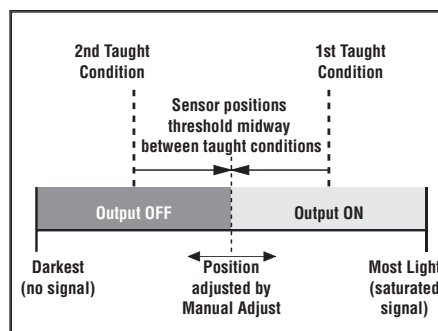


Figure 2. Two-Point TEACH (Light Operate shown)

Bargraph LED Following TEACH	Relative Signal Difference/ Recommendation
6 to 8	Excellent: Very stable operation.
4 to 5	Good: Minor sensing variables will not affect sensing reliability.
2 to 3	Low: Minor sensing variables may affect sensing reliability.
1	Unreliable: Consider an alternate sensing scheme.

	Push Button	Remote Line $0.04 \text{ seconds} \leq T \leq 0.8 \text{ seconds}$	Display Shows
Access TEACH Mode	<ul style="list-style-type: none"> • Press and Hold > 2 seconds 	No action required; sensor is ready for 1st TEACH condition.	Power LED: OFF Output LED: ON Status LEDs: #2 & 3 Alternately flashing
Learn Output ON Condition	<ul style="list-style-type: none"> • Present Output ON condition • Single-pulse remote line 	<ul style="list-style-type: none"> • Present Output ON condition • Single-pulse remote line 	Power LED: OFF Output LED: OFF Status LEDs: #2 & 3 Alternately flashing
Learn Output OFF Condition	<ul style="list-style-type: none"> • Present Output OFF condition • Click (T) 	<ul style="list-style-type: none"> • Present Output OFF condition • Single-pulse remote line 	Teach Accepted Power LED: ON Bargraph: One LED flashes to show relative contrast (good signal difference shown; see table above) Sensor returns to Run mode
			Teach Unacceptable Power LED: OFF Bargraph: #1, 3, 5, 7 Alternately flash to show failure Sensor returns to “Learn Output ON” condition

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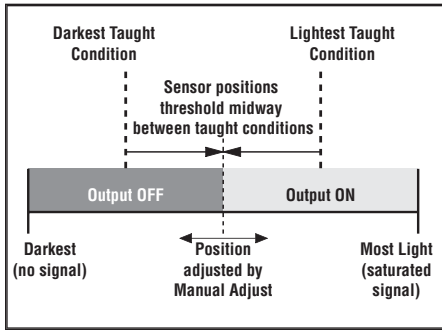


Figure 3. Two-Point Dynamic TEACH (Light Operate shown)

Bargraph LED Following TEACH	Relative Signal Difference/ Recommendation
6 to 8	Excellent: Very stable operation.
4 to 5	Good: Minor sensing variables will not affect sensing reliability.
2 to 3	Low: Minor sensing variables may affect sensing reliability.
1	Unreliable: Consider an alternate sensing scheme.

Dynamic TEACH and Adaptive Thresholds

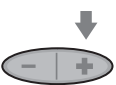

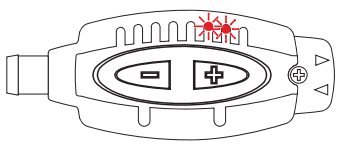
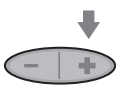

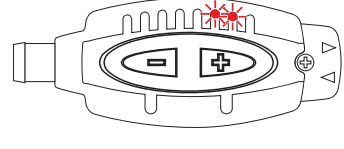
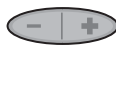
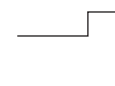
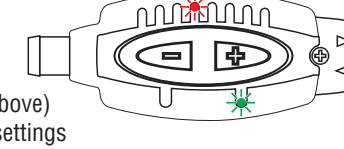
- Teach on-the-fly
- Sets a single switching threshold
- Threshold position is adjustable using “+” and “-” buttons (Manual Adjust)

Dynamic TEACH is best used when a machine or process may not be stopped for teaching. A variation of two-point TEACH, it programs the sensor during actual machine run conditions, taking multiple samples of the light and dark conditions and automatically setting the threshold at the optimum level (see Figure 3).

Dynamic TEACH activates the sensor’s adaptive threshold system, which continuously tracks minimum and maximum signal levels, and automatically maintains centering of the switch point between the light and dark conditions. The adaptive threshold system remains in effect during RUN mode. The adaptive routine saves to non-volatile memory at least once per hour.

When Dynamic TEACH mode is used, the output ON state (light or dark operate) will remain as it was last programmed. To change the output ON state, use SETUP mode (see page 7).

The sensing set point may be adjusted (fine-tuned) whenever the sensor is in RUN mode by clicking the “+” and “-” buttons. However, when a manual adjustment is made, the adaptive threshold system is disabled (cancelled).

	Push Button	Remote Line $0.04 \text{ seconds} \leq T \leq 0.8 \text{ seconds}$	Display Shows
Access TEACH Mode	<ul style="list-style-type: none"> • Press and Hold > 2 seconds 	<ul style="list-style-type: none"> • Hold remote line low (to ground) > 2 seconds 	Power LED: OFF Bargraph: #6 & 7 Alternately flashing 
Learn Output ON Condition	<ul style="list-style-type: none"> • Continue to hold • Present Output ON and OFF conditions 	<ul style="list-style-type: none"> • Present Output ON and OFF conditions • Continue to hold remote line low (to ground) 	Power LED: OFF Bargraph: #6 & 7 Alternately flashing 
Learn Output OFF Condition	<ul style="list-style-type: none"> • Release 	<ul style="list-style-type: none"> • Release remote line/switch 	Teach Accepted Power LED: ON Bargraph: One LED flashes to show relative contrast (good signal difference shown; see table above) Sensor returns to Run mode with new settings 
			Teach Unacceptable Power LED: OFF Bargraph: #1, 3, 5, 7 Alternately flash to show failure Sensor returns to Run mode without changing settings 