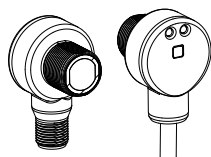


# EZ-BEAM® TM18 Series Sensors



## Installation Guide

View or download additional Information on this product, including excess gain curves, beam patterns, and accessories, at [www.bannerengineering.com/155853](http://www.bannerengineering.com/155853).



### 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                   |                   |                                         |                   |                              |                   |
|--------------------------|-------------------|-----------------------------------------|-------------------|------------------------------|-------------------|
| Opposed Mode: 20 m Range |                   | Polarized: 5.5 m * Range                |                   | Diffuse: 500 mm Range        |                   |
| Model Number             | Output            | Model Number                            | Output            | Model Number                 | Output            |
| TM186E                   | None              | TM18AP6LP                               | PNP, LO 3-wire    | TM18AP6DV                    | PNP, LO 3-wire    |
| TM18AP6R                 | PNP, LO 3-wire    | TM18RP6LP                               | PNP, DO 3-wire    | TM18RP6DV                    | PNP, DO 3-wire    |
| TM18RP6R                 | PNP, DO 3-wire    | TM18VP6LP                               | PNP, LO/DO 4-wire | TM18VP6DV                    | PNP, LO/DO 4-wire |
| TM18VP6R                 | PNP, LO/DO 4-wire | TM18AN6LP                               | NPN, LO 3-wire    | TM18AN6DV                    | NPN, LO 3-wire    |
| TM18AN6R                 | NPN, LO 3-wire    | TM18RN6LP                               | NPN, DO 3-wire    | TM18RN6DV                    | NPN, DO 3-wire    |
| TM18RN6R                 | NPN, DO 3-wire    | TM18VN6LP                               | NPN, LO/DO 4-wire | TM18VN6DV                    | NPN, LO/DO 4-wire |
| TM18VN6R                 | NPN, LO/DO 4-wire | * Range specified with BRT-84 reflector |                   | QD Models are also available |                   |

| Fixed Field: 25 mm Range |                   | Fixed Field: 50 mm Range |                   | Fixed Field: 100 mm Range |                   |
|--------------------------|-------------------|--------------------------|-------------------|---------------------------|-------------------|
| Model Number             | Output            | Model Number             | Output            | Model Number              | Output            |
| TM18AP6FF25              | PNP, LO 3-wire    | TM18AP6FF50              | PNP, LO 3-wire    | TM18AP6FF100              | PNP, LO 3-wire    |
| TM18VP6FF25              | PNP, LO/DO 4-wire | TM18VP6FF50              | PNP, LO/DO 4-wire | TM18VP6FF100              | PNP, LO/DO 4-wire |
| TM18AN6FF25              | NPN, LO 3-wire    | TM18AN6FF50              | NPN, LO 3-wire    | TM18AN6FF100              | NPN, LO 3-wire    |
| TM18VN6FF25              | NPN, LO/DO 4-wire | TM18VN6FF50              | NPN, LO/DO 4-wire | TM18VN6FF100              | NPN, LO/DO 4-wire |

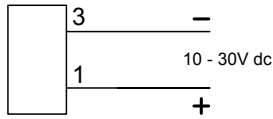
| Fixed Field: 25 mm Range |                   | Fixed Field: 50 mm Range |                   | Fixed Field: 100 mm Range |                   |
|--------------------------|-------------------|--------------------------|-------------------|---------------------------|-------------------|
| Model Number             | Output            | Model Number             | Output            | Model Number              | Output            |
| TM18AP6FF25IR            | PNP, LO 3-wire    | TM18AP6FF50IR            | PNP, LO 3-wire    | TM18AP6FF100IR            | PNP, LO 3-wire    |
| TM18VP6FF25IR            | PNP, LO/DO 4-wire | TM18VP6FF50IR            | PNP, LO/DO 4-wire | TM18VP6FF100IR            | PNP, LO/DO 4-wire |
| TM18AN6FF25IR            | NPN, LO 3-wire    | TM18AN6FF50IR            | NPN, LO 3-wire    | TM18AN6FF100IR            | NPN, LO 3-wire    |
| TM18VN6FF25IR            | NPN, LO/DO 4-wire | TM18VN6FF50IR            | NPN, LO/DO 4-wire | TM18VN6FF100IR            | NPN, LO/DO 4-wire |

To order the 9 m (30 ft) cable models, add the suffix "W/30" to the cabled model number. For example, "TM186E W/30". To order the 4-pin Euro M12 integral QD models, add suffix Q8 (for example, TM186EQ8). To order the 4-pin Euro M12 pigtail QD models: add suffix Q5 (for example, TM186EQ5).



## Wiring

### Emitter

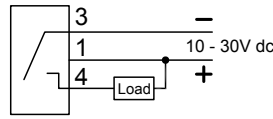


#### Wiring Key

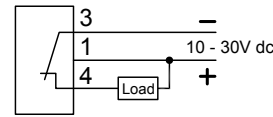
- 1 = Brown
- 2 = White
- 3 = Blue
- 4 = Black

QD and cabled emitter wiring functionality is identical; black and white wires have no connection when not shown.

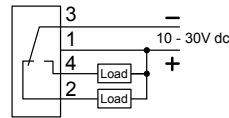
### NPN L.O. 3-Wire



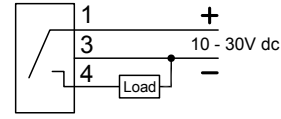
### NPN D.O. 3-Wire



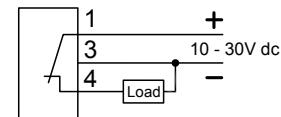
### NPN L.O./D.O. 4-Wire



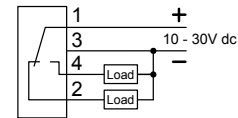
### PNP L.O. 3-Wire



### PNP D.O. 3-Wire



### PNP L.O./D.O. 4-Wire



## Specifications

#### Supply Voltage and Current - Class 2

10 to 30 V dc (10% max. ripple within specified limits); supply current (exclusive of load current):

Emitters: 25 mA

Receivers: 20 mA

Polarized Retroreflective: 20 mA

Diffuse and Fixed-Field: 35 mA

#### Supply Protection Circuitry

Protected against reverse polarity and transient voltages

#### Effective Beam

13 mm for opposed mode sensors

#### Output Configuration

NPN (current sinking) or PNP (current sourcing), depending on model  
Light Operate: Output conducts when sensor receives its own (or the emitter's) modulated light

Dark Operate: Output conducts when sensor does not receive its own (or the emitter's) modulated light

#### Connections

2 m (6.5 ft) or 9 m (30 ft) PVC attached cable

Integral 4-pin M12/Euro-style quick disconnect

4-pin M12/Euro-style PVC pigtail quick disconnect

#### Construction

Housing: Zinc die cast with nickel plating

Lens: PMMA or PC (opposed mode only)

Black Cover: PBT polyester housing

#### Output Protection Circuitry

Protected against false pulse on power-up and continuous overload or short circuit of outputs

#### Output Rating

150 mA maximum each output at 25 °C, derated to 100 mA at 70 °C (derate about 1 mA per °C)

OFF-state leakage current: < 1 microamp at 30 V dc

ON-state saturation voltage: < 1 V at 10 mA dc; < 1.5 V at 150 mA dc

#### Adjustments

Diffuse models only: single turn rear panel sensitivity control

#### Indicators

Two LEDs (green and amber)

| Complementary (4-Wire) Models |                                  |
|-------------------------------|----------------------------------|
| Indicator                     | Description                      |
| Green ON                      | Power ON                         |
| Green Flashing*               | Output is overloaded             |
| Amber ON                      | N.O. Output is conducting        |
| Amber Flashing*               | Marginal excess gain (1 to 1.5x) |

\* Not valid for Diffuse or Fixed Field Models.

| Single Output (3-Wire) Models |                      |
|-------------------------------|----------------------|
| Indicator                     | Description          |
| Green ON                      | Power ON             |
| Green Flashing                | N.A.                 |
| Amber ON                      | Output is conducting |
| Amber Flashing                | N.A.                 |

#### Output Response Time (TM18)

Opposed mode: 1.5 ms ON, 0.75 ms OFF

Retro: 3 ms ON and OFF

Diffuse and Fixed Field: 3 ms ON, 1.5 ms OFF

Note: 100 ms delay on power-up; outputs do not conduct during this time.

#### Repeatability (TM18)

Opposed mode: 190 µs

Retro: 585 µs

Diffuse and Fixed Field: 185 µs

**Environmental Rating**

IEC IP67; quick disconnect models are IEC IP69K when mated with a washdown rated (IEC IP69K) cordset

**Operating Conditions**

-40 °C to +70 °C (-40 °F to +158 °F)

90% at +50 °C maximum relative humidity (non-condensing)

**Vibration and Mechanical Shock**

All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06 in acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)

**Certifications**

Class 2 supply Required;



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.

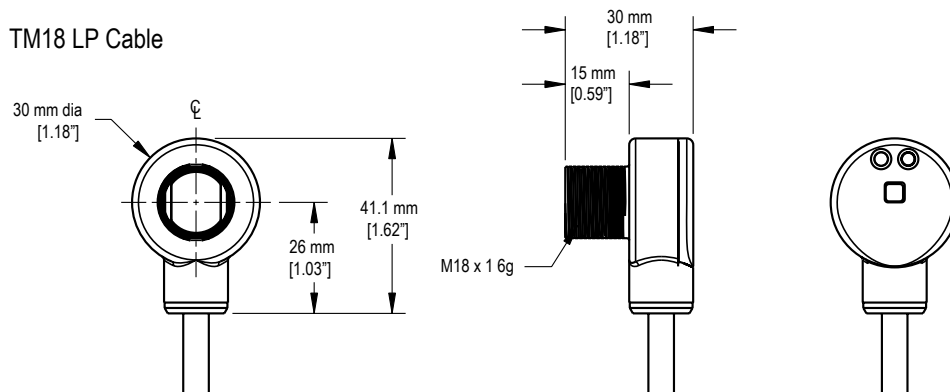
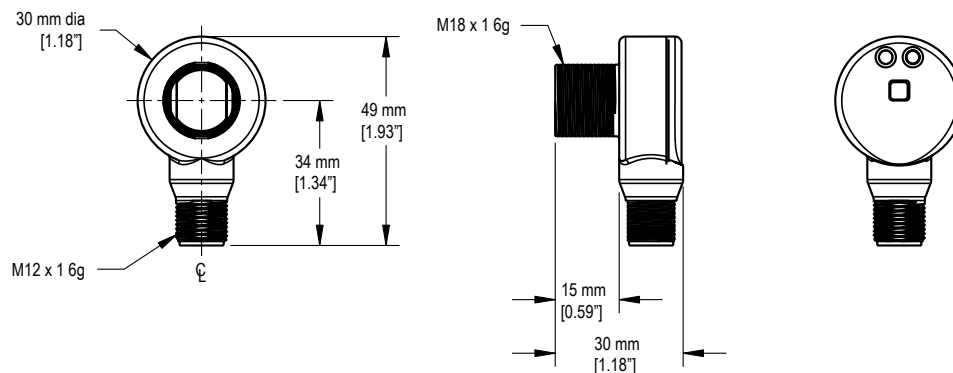
Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.

Supply wiring leads < 24 AWG shall not be spliced.

For additional product support, go to <http://www.bannerengineering.com>.

| Supply Wiring | Required Overcurrent Protection |
|---------------|---------------------------------|
| 20            | 5.0 Amps                        |
| 22            | 3.0 Amps                        |
| 24            | 2.0 Amps                        |
| 26            | 1.0 Amps                        |
| 28            | 0.8 Amps                        |
| 30            | 0.5 Amps                        |

## Dimensions

**TM18 LP Cable****TM18 LP QD**

Maximum Torque specification: 5.6 nm or 50 in-lbs. Lockwasher and M18 nut included.

## Banner Engineering Corp Limited Warranty

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