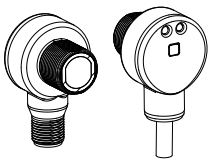
EZ-BEAM® TM18 Series Sensors

Installation Guide

View or download additional Information on this product, including excess gain curves, beam patterns, and accessories, at *www.bannerengineering.com/155853*.



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).

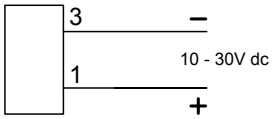
Original Document
151948 Rev. F

1 July 2015

151948

Wiring

Emitter

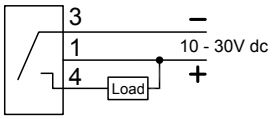


Wiring Key

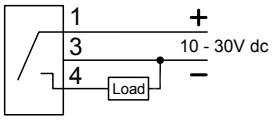
1 = Brown
2 = White
3 = Blue
4 = Black

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

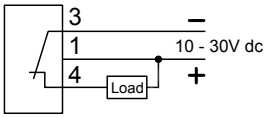
NPN L.O. 3-Wire



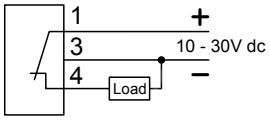
PNP L.O. 3-Wire



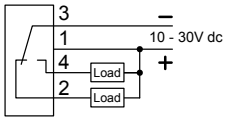
NPN D.O. 3-Wire



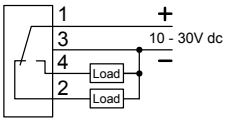
PNP D.O. 3-Wire



NPN L.O./D.O. 4-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 it own (or the emitter fts) 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

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 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

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

c UL us LISTED Class 2 supply Required; CE

Required Overcurrent Protection

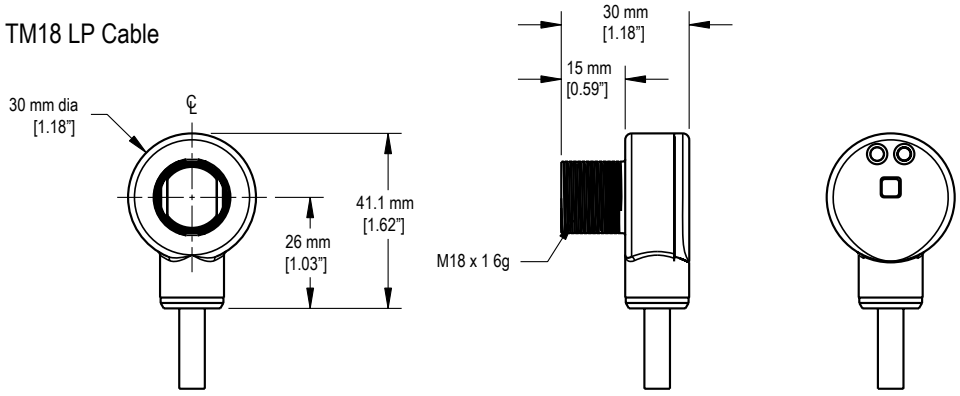
WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

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*.

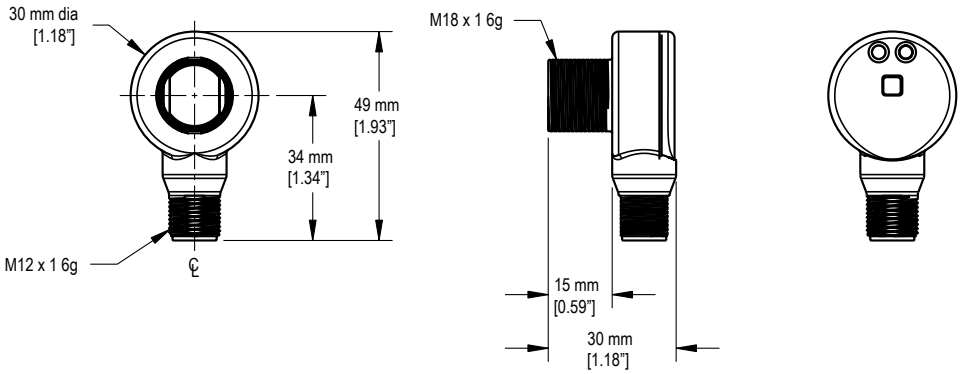
Supply Wiring	Required Overcurrent Protection
20	5.0 Amps
22	3.0 Amps
24	2.0 Amps
26	1.0 Amps
28	0.8 Amps
30	0.5 Amps

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

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.

THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.

This Warranty is exclusive and limited to repair or, at the discretion of Banner Engineering Corp., replacement. IN NO EVENT SHALL BANNER ENGINEERING CORP. BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR ANY EXTRA COSTS, EXPENSES, LOSSES, LOSS OF PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT OR FROM THE USE OR INABILITY TO USE THE PRODUCT, WHETHER ARISING IN CONTRACT OR WARRANTY, STATUTE, TORT, STRICT LIABILITY, NEGLIGENCE, OR OTHERWISE.

Banner Engineering Corp. reserves the right to change, modify or improve the design of the product without assuming any obligations or liabilities relating to any product previously manufactured by Banner Engineering Corp.