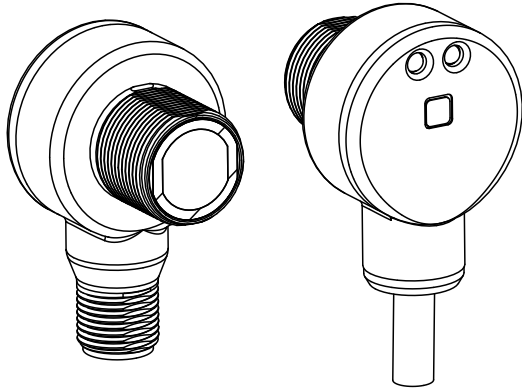


TM18 Series Sensors

Compact Metal Self-Contained DC-Operated Sensors



- Heavy duty metal housing with 18 mm threaded barrel mount and integral metal QD prevents sensor damage during machine assembly, transport, maintenance, and operation
- Right angle "T" mounting fits in tight places, prevents sensor damage, and avoids personnel catch points
- Models with dedicated 3-wire output NPN or PNP for OEM machine builders — designed to work with I/O block splitters for reduced wiring costs
- Models with 4-wire complementary NPN or PNP outputs available
- Featuring EZ-BEAM technology provides reliable sensing without adjustments
- Visible red LED models available in opposed, polarized retroreflective, diffuse, and fixed-field (background suppression) modes
- Completely epoxy encapsulated electronics to provide superior durability, especially in harsh sensing environments
- Sensors rated IP69K for resistance to intermittent high pressure washdown
- Innovative dual indicator systems takes the guess work out of sensor performance monitoring
- Enhanced immunity to fluorescent lights on fixed field and diffuse sensors
- Cross talk avoidance allows two sensors to be used in close proximity on polarized retro, diffuse, and fixed field sensors


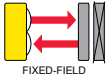
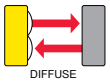


WARNING: Not To Be Used for Personnel Protection

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.

Models

Model Number*	Mode		Range	LED	Output
TM186E		Opposed	20 m	Visible red 625 nm	None
TM18AP6R				None	PNP, LO 3-wire
TM18RP6R					PNP, DO 3-wire
TM18VP6R					PNP, LO/DO 4-wire
TM18AN6R					NPN, LO 3-wire
TM18RN6R					NPN, DO 3-wire
TM18VN6R					NPN, LO/DO 4-wire

Model Number*	Mode		Range	LED	Output
TM18AP6LP		Polarized Retro-reflective	5.5 m **	Visible red 680 nm	PNP, LO 3-wire
TM18RP6LP					PNP, DO 3-wire
TM18VP6LP					PNP, LO/DO 4-wire
TM18AN6LP					NPN, LO 3-wire
TM18RN6LP					NPN, DO 3-wire
TM18VN6LP					NPN, LO/DO 4-wire
TM18AP6FF25		Fixed Field Background Suppression	25 mm	Visible red 660 nm	PNP, LO 3-wire
TM18VP6FF25					PNP, LO/DO 4-wire
TM18AN6FF25					NPN, LO 3-wire
TM18VN6FF25					NPN, LO/DO 4-wire
TM18AP6FF50			50 mm		PNP, LO 3-wire
TM18VP6FF50					PNP, LO/DO 4-wire
TM18AN6FF50					NPN, LO 3-wire
TM18VN6FF50					NPN, LO/DO 4-wire
TM18AP6FF100			100 mm		PNP, LO 3-wire
TM18VP6FF100					PNP, LO/DO 4-wire
TM18AN6FF100					NPN, LO 3-wire
TM18VN6FF100					NPN, LO/DO 4-wire
TM18AP6DV		Diffuse Visible Mode	500 mm	Visible red 660 nm	PNP, LO 3-wire
TM18RP6DV					PNP, DO 3-wire
TM18VP6DV					PNP, LO/DO 4-wire
TM18AN6DV					NPN, LO 3-wire
TM18RN6DV					NPN, DO 3-wire
TM18VN6DV					NPN, LO/DO 4-wire

*6.5 ft. (2 m) PVC cable models listed.

- 4-pin Euro M12 integral QD models: add suffix Q8 (for example, TM186EQ8)
- 30 ft. (9 m) PVC cable models: add suffix "W/30" (for example, TM186EW/30)
- 4-pin Euro M12 pigtail QD models: add suffix Q5 (for example, TM186EQ5)

** Range specified with BRT-84 reflector.

Specifications

Supply Voltage and Current

10 to 30V 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

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

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 @ 30V dc

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

Output Protection Circuitry

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

Output Response Time

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

Opposed mode: 190 µs

Retro: 585 µs

Diffuse and Fixed Field: 185 µs

Effective Beam

13 mm for opposed mode sensors

Adjustments

Diffuse models only: single turn rear panel sensitivity control

Construction

Housing: Zinc die cast with nickel plating

Lens: PMMA or PC (opposed mode only)

Black Cover: PBT polyester housing

Indicators

Two LEDs (Green and Yellow)

Complementary (4-Wire) Models	
Indicator	Description
Green ON Steady	Power ON
Green Flashing*	Output is overloaded
Yellow ON Steady	N.O. Output is conducting
Yellow 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 Steady	Power ON
Green Flashing	N.A.
Yellow ON Steady	Output is conducting
Yellow Flashing	N.A.

Environmental Rating

Leakproof design rated IP67, IP69K QD Models and cable models when PVC jacket is protected

Operating Conditions

Temperature: -40° to +70° C (-40° to +158° F)

Relative humidity: 90% at 50° C (non-condensing)

Connections

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



4-pin M12 Euro style integral QD

4-pin M12 Euro style PVC pigtail QD

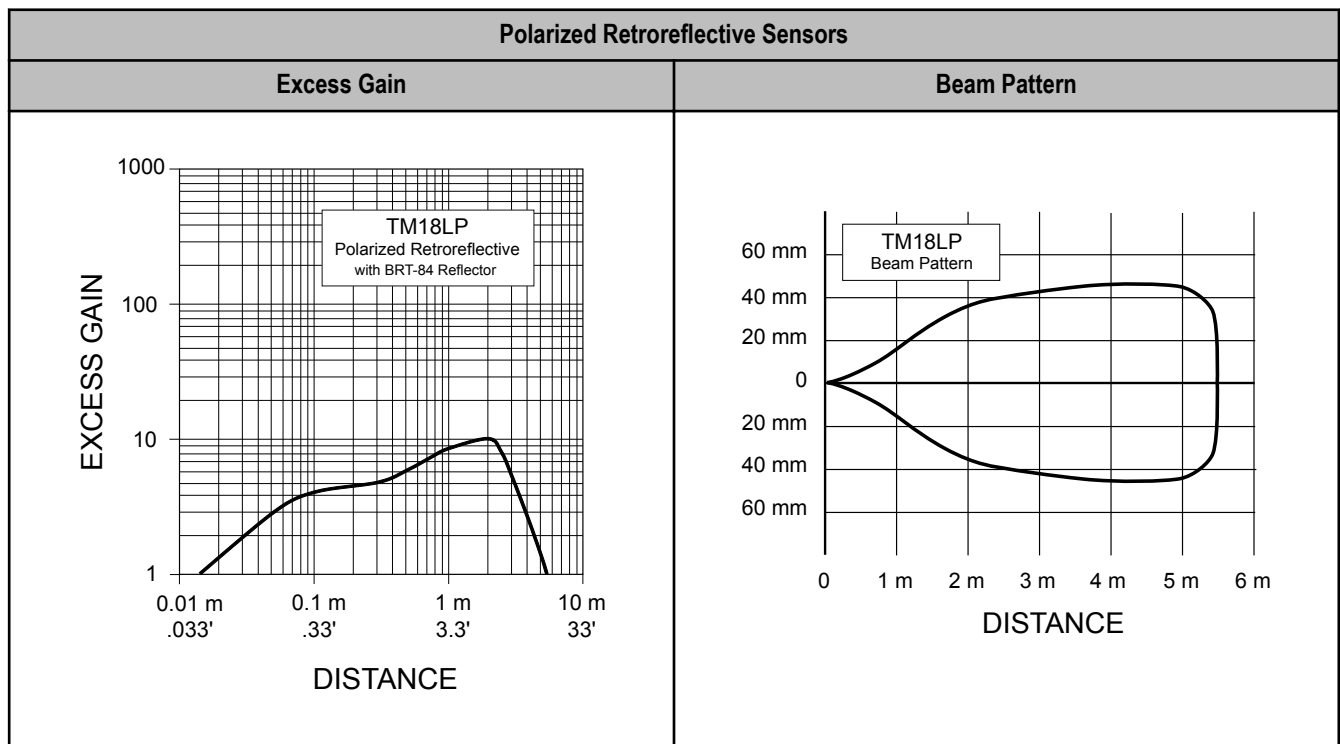
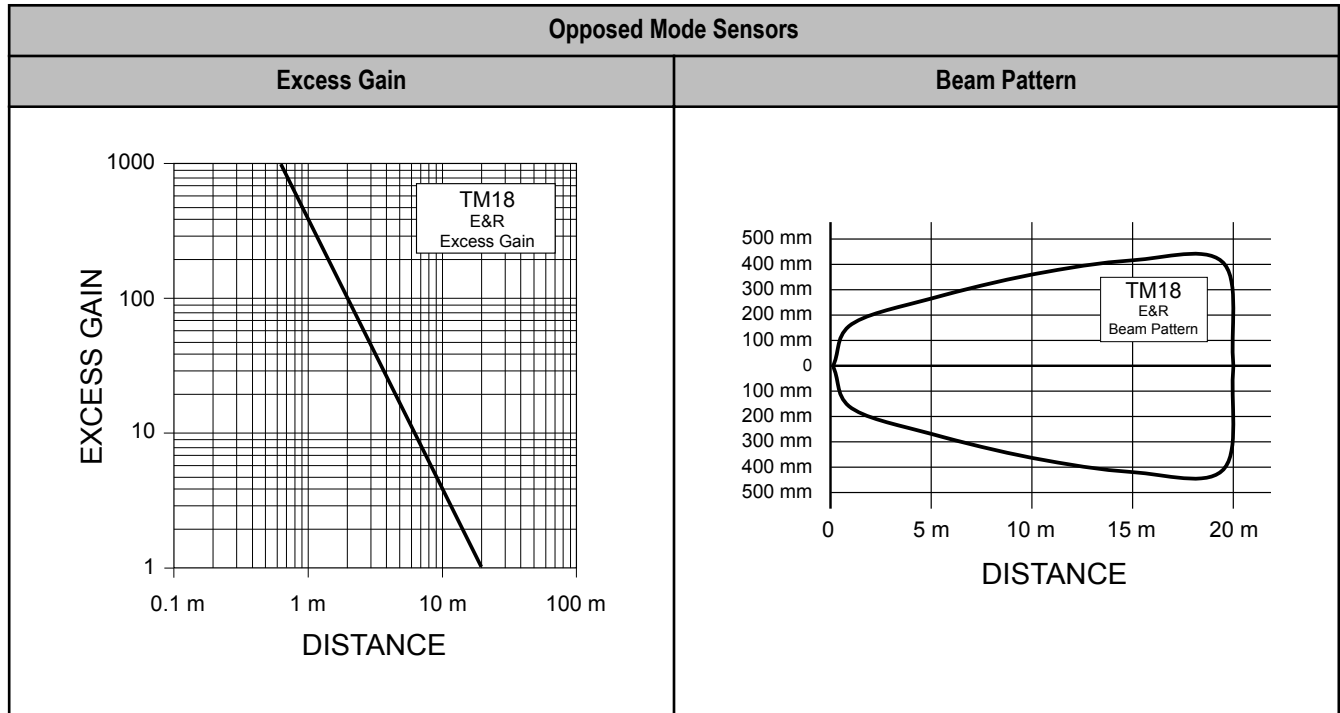
Vibration and Mechanical Shock

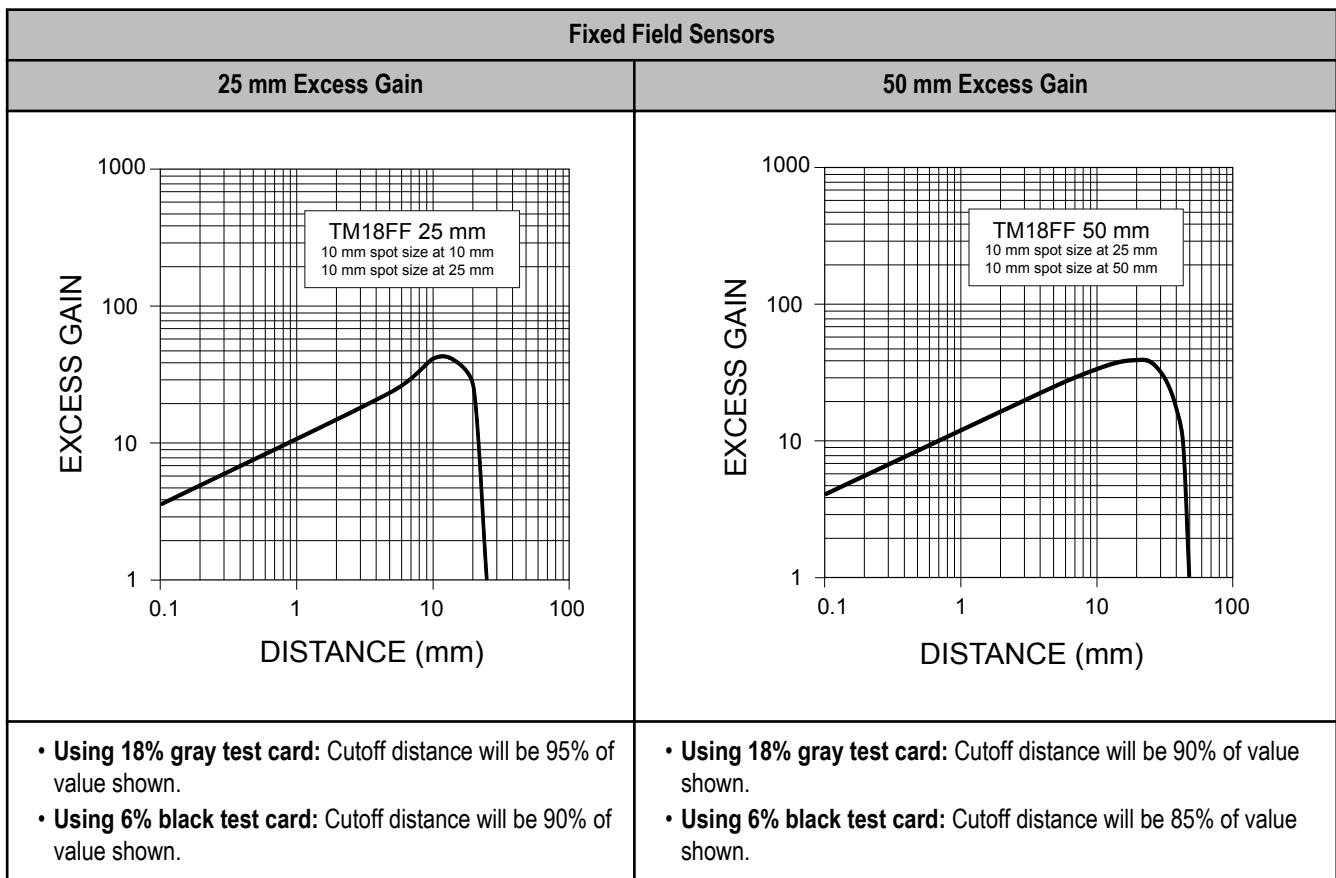
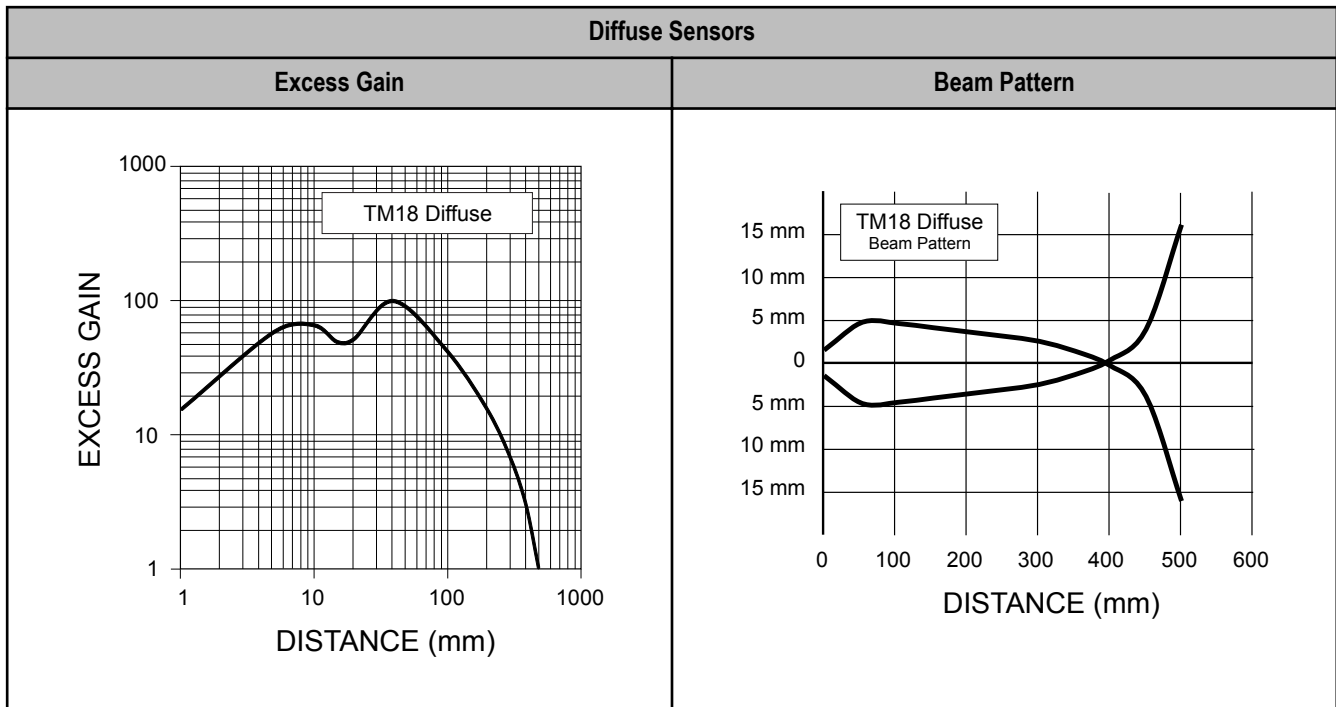
All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06" acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)

Certifications

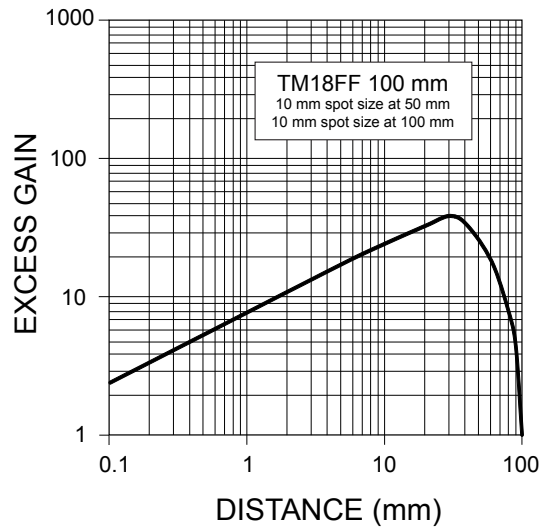
 US LISTED pending; 

Performance Curves





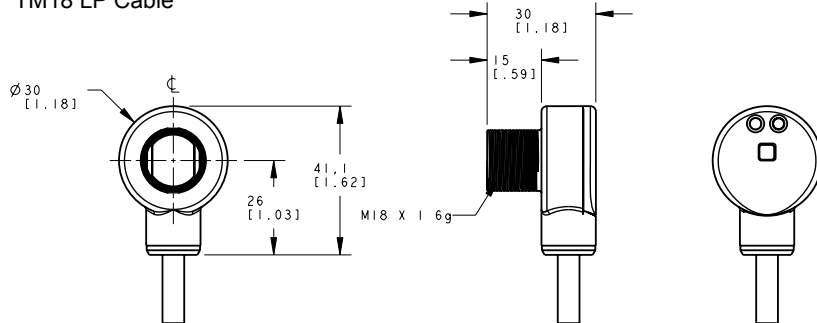
100 mm Excess Gain



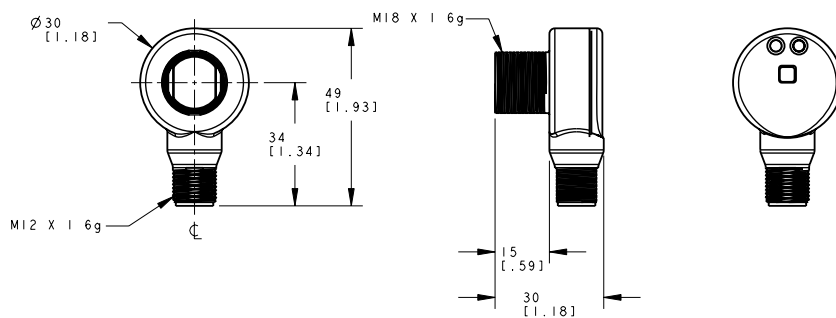
- Using 18% gray test card: Cutoff distance will be 85% of value shown.
- Using 6% black test card: Cutoff distance will be 75% of value shown.

Dimensions

TM18 LP Cable



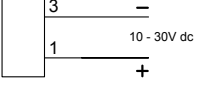
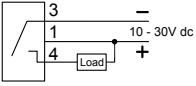
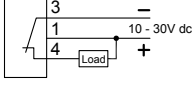
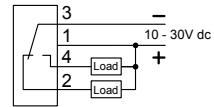
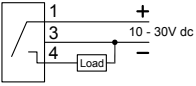
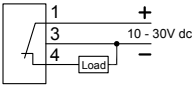
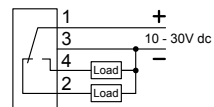
TM18 LP QD



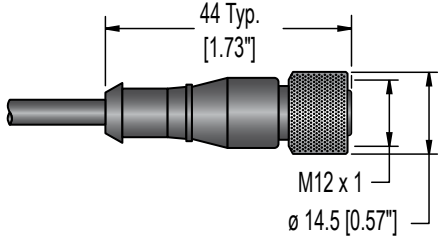
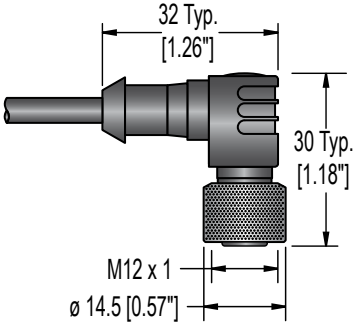
*Maximum Torque specification: 5.6 nm or 50 in-lbs

**Lockwasher and M18 Nut included




Wiring

<p>Emitter</p> 	<p>NPN L.O. 3-Wire</p> 	<p>NPN D.O. 3-Wire</p> 	<p>NPN L.O./D.O. 4-Wire</p> 
	<p>PNP L.O. 3-Wire</p> 	<p>PNP D.O. 3-Wire</p> 	<p>PNP L.O./D.O. 4-Wire</p> 
<p>QD and cabled emitter wiring functionality is identical; black and white wires have no connection when not shown.</p> <p>Wiring Key</p> <p>1=Brown 2=White 3=Blue 4=Black</p>			

Quick Disconnect (QD) Cordsets

4-Pin Euro-Style Cordsets — Single-Ended	
<p>4-Pin M12/Euro-Style Cordsets (straight connector)</p> <p>MQDC-406, 2 m (6.5')</p> <p>MQDC-415, 5 m (15')</p> <p>MQDC-430, 9 m (30')</p>	
<p>4-Pin M12/Euro-Style Cordsets (right-angle connector)</p> <p>MQDC-406RA, 2 m (6.5')</p> <p>MQDC-415RA, 5 m (15')</p> <p>MQDC-430RA, 9 m (30')</p>	

Apertures

Aperture Description	Units	Model	Product	Used With
Kit includes 3 round apertures of 0.5, 1.0, and 2.5 mm diameter	3	AP18SCN*		T18, TM18
Kit includes 3 rectangular apertures of 0.5, 1.0, and 2.5 mm diameter	3	AP18SRN*		T18, TM18
* Kits include Teflon® FEP® lens, o-ring and thread-on housing				
Kit with glass lens to protect plastic sensor lens from chemical environments	1	APG18S		S18, M18, T18, TM18



Warranty: Banner Engineering Corporation warrants its products to be free from defects for a period of one year. Banner Engineering Corporation will repair or replace, free of charge, any product of its manufacture found to be defective at the time it is returned to the factory during the warranty period. This warranty does not cover damage or liability for the improper application of Banner products. This warranty is in lieu of any other warranty either expressed or implied.