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				Visible red 625 nm	None
TM18AP6R		Opposed	20 m	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

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Model Number*	Mode		Range	LED	Output
TM18AP6LP		Polarized Retro- flective	5.5 m **	Visible red 680 nm	PNP, LO 3-wire
TM18RP6LP					PNP, DO 3-wire
TM18VP6LP					PNP, LO/DO 4-wire
TM18AN6LP	LASER POLAR RETRO				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	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 - Class 2

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 recives its own (or the emitter's) modulated light

Dark Operate: Output conducts when sensor does not receive it 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 Flash- ing*	Output is overloaded		
Yellow ON Steady	N.O. Output is con- ducting		
Yellow Flash- ing*	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 Flash- ing	N.A.		
Yellow ON Steady	Output is conducting		
Yellow Flash- ing	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

Class 2 supply Required; CE

Performance Curves



40 mm 60 mm

0

1 m

2 m

3 m

DISTANCE

4 m

5 m

6 m

1

0.01 m

.033'

0.1 m

.33'

DISTANCE

10 m

33'

1 m

3.3'

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Dimensions



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

**Lockwasher and M18 Nut included

Wiring

Emitter <u>3 –</u> <u>1 ^{10-30V dc}</u> +	NPN L.O. 3-Wire	NPN D.O. 3-Wire	NPN L.O./D.O. 4-Wire		
	PNP L.O. 3-Wire $ \begin{array}{c} 1 \\ 3 \\ 10 \\ -300 \\ 4 \\ -300 \\ -30$	PNP D.O. 3-Wire	PNP L.O./D.O. 4-Wire		
QD and cabled emitter wiring functionality is identical; black and white wires have no connection when not shown. Wiring Key					
1=Brown 2=White 3=Blue 4=Black					

Quick Disconnect (QD) Cordsets



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 aper- tures of 0.5, 1.0, and 2.5 mm di- ameter	3	AP18SRN*		T18, TM18
* Kits include Teflon® FEP® lens, o housing	o-ring ar	nd thread-on		
Kit with glass lens to protect plas- tic sensor lens from chemical envi- ronments	1	APG18S	000	S18, M18, T18, TM18

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