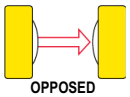
T18
DC-Operated Self-Contained Sensors

Completely epoxy-encapsulated barrel-mount sensors operate on dc supply voltage and withstand harsh sensing environments.

- Design rated NEMA 6P, IP67
- Wide operating range from -40° C to +70° C
- Advanced diagnostics warn of marginal sensing conditions or output overload
- Available in opposed, retroreflective, diffuse and fixed-field modes
- Cordsets and brackets see page 164

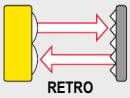
Opposed T18, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 OPPOSED	20 m	2 m	T186E Emitter	
		4-pin Euro QD	T186EQ Emitter	
		2 m	T18SN6R	T18SP6R
		4-pin Euro QD	T18SN6RQ	T18SP6RQ

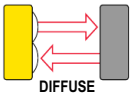
Retro & Polar Retro T18, 10-30 V DC

Infrared LED Visible Red LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 RETRO	2 m†	2 m	T18SN6L	T18SP6L
		4-pin Euro QD	T18SN6LQ	T18SP6LQ
 POLAR RETRO	2 m†	2 m	T18SN6LP	T18SP6LP
		4-pin Euro QD	T18SN6LPQ	T18SP6LPQ

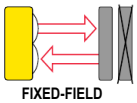
Diffuse T18, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 DIFFUSE	500 mm	2 m	T18SN6D	T18SP6D
		4-pin Euro QD	T18SN6DQ	T18SP6DQ

Fixed-Field T18, 10-30 V DC

Infrared LED

Sensing Mode	Range	Connection	Models NPN	Models PNP
 FIXED-FIELD	0 - 25 mm Cutoff	2 m	T18SN6FF25	T18SP6FF25
		4-pin Euro QD	T18SN6FF25Q	T18SP6FF25Q
	0 - 50 mm Cutoff	2 m	T18SN6FF50	T18SP6FF50
		4-pin Euro QD	T18SN6FF50Q	T18SP6FF50Q
	0 - 100 mm Cutoff	2 m	T18SN6FF100	T18SP6FF100
		4-pin Euro QD	T18SN6FF100Q	T18SP6FF100Q

For more specifications see page 166.

Connection options: A model with a QD requires a mating cordset (see page 164).

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **T18SN6L W/30**).

† Retroreflective range is specified using one model BRT-3 retroreflector. Actual sensing range may differ, depending on the efficiency and reflective area of theretroreflector used. See Accessories section for more information.

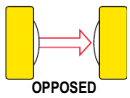
T18 AC
AC-Operated Self-Contained Sensors

Completely epoxy-encapsulated barrel-mount sensors operate on ac supply voltage and withstand harsh sensing environments.

- Design rated NEMA 6P, IP67
- Quick disconnect models rated to IP69K
- Wide operating range from -40° C to +70° C
- Available in opposed, retroreflective, diffuse and fixed-field modes
- Cordsets and brackets see page 164

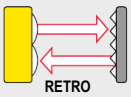
Opposed T18, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 OPPOSED	20 m	2 m	T183E Emitter	
		4-pin Micro QD	T183EQ1 Emitter	
		2 m	T18AW3R	T18RW3R
		4-pin Micro QD	T18AW3RQ1	T18RW3RQ1

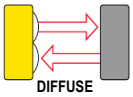
Retro & Polar Retro T18, 20-250 V AC

Infrared LED Visible Red LED

Sensing Mode	Range	Connection	Models LO	Models DO
 RETRO	2 m†	2 m	T18AW3L	T18RW3L
		4-pin Micro QD	T18AW3LQ1	T18RW3LQ1
 POLAR RETRO	2 m†	2 m	T18AW3LP	T18RW3LP
		4-pin Micro QD	T18AW3LPQ1	T18RW3LPQ1

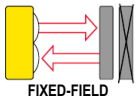
Diffuse T18, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 DIFFUSE	300 mm	2 m	T18AW3D	T18RW3D
		4-pin Micro QD	T18AW3DQ1	T18RW3DQ1

T18, 20-250 V AC

Infrared LED

Sensing Mode	Range	Connection	Models LO	Models DO
 FIXED-FIELD	0 - 25 mm Cutoff	2 m	T18AW3FF25	T18RW3FF25
		4-pin Micro QD	T18AW3FF25Q1	T18RW3FF25Q1
	0 - 50 mm Cutoff	2 m	T18AW3FF50	T18RW3FF50
		4-pin Micro QD	T18AW3FF50Q1	T18RW3FF50Q1
	0 - 100 mm Cutoff	2 m	T18AW3FF100	T18RW3FF100
		4-pin Micro QD	T18AW3FF100Q1	T18RW3FF100Q1

For more specifications see page 167.

Connection options: A model with a QD requires a mating cordset (see page 164).

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **T18SN6L W/30**).

† Retroreflective range is specified using one model BRT-3 retroreflector. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories section for more information.

Cordsets

Euro QD (for ..Q8 or ..Q5 models)

See page 919

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA

Additional cordset information available.
See page 902.

Micro QD (for Q1 models)

See page 919

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQAC-406	MQAC-406RA
4.57 m	MQAC-415	MQAC-415RA
9.14 m	MQAC-430	MQAC-430RA

Brackets

T18

See page 866	See page 859	See page 860	See page 864
SMB1815SF	SMB18A	SMB18FM	SMBAMS18P

Additional brackets and information available.
See page 846.

Other Accessories

Reflectors	Apertures
See page 940	See page 966

DC Sensors (all models)

AC Sensors (all models)

T18 DC Specifications

Supply Voltage and Current	10 to 30 V dc (10% max. ripple); Supply current (exclusive of load current): **Opposed Emitters:** 25 mA **Opposed Receivers:** 20 mA **Polarized Retroreflective:** 30 mA **Non-polarized Retroreflective:** 25 mA **Diffuse:** 25 mA **Fixed-Field:** 35 mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state complementary dc switch; NPN (current sinking) or PNP (current sourcing), depending on model. The Dark Operate (DO) output may be wired as a normally open marginal signal alarm output, depending upon hookup to the power supply.
Output Rating	150 mA max. (each) in standard hookup. When wired for alarm output, the total load may not exceed 150 mA. **OFF-state leakage current:** less than 1 µA at 30 V dc **ON-state saturation voltage:** less than 1 V at 10 mA dc; less than 1.5 V at 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:** 3 milliseconds ON, 1.5 milliseconds OFF **Polarized Retroreflective, Non-polarized Retroreflective, Fixed-Field and Diffuse:** 3 milliseconds ON/OFF
Delay at Power-up	100 milliseconds; outputs are non-conducting during this time
Adjustments	T18 Series infrared non-polarized retroreflective and diffuse mode models (only) have a single-turn SENSITIVITY control for adjustment of system gain
Repeatability	**Opposed:** 375 microseconds **Polarized Retroreflective, Non-polarized Retroreflective, Fixed-Field and Diffuse:** 750 microseconds Repeatability and response are independent of signal strength
Indicators	**Two LEDs: Solid Green:** Power ON **Flashing Green**: output overloaded **Solid Yellow:** Light Operate (LO) output energized **Flashing Yellow:** marginal excess gain
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; one jam nut included.
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9
Connections	2 m or 9 m attached cable, or 4-pin Euro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 164.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (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-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	CE, CSA®, UL LISTED **ECOLAB®** chemical compatibility pending on some models; contact Banner Engineering for details

T18 AC Specifications

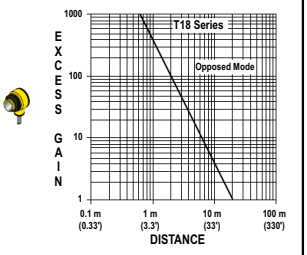
Supply Voltage and Current	20 to 250 V ac (50/60 Hz) **Average current:** 20 mA **Peak current:** 200 mA at 20 V ac, 500 mA at 120 V ac, 750 mA at 250 V ac
Supply Protection Circuitry	Protected against transient voltages
Output Configuration	Solid-state ac switch; three-wire hookup; Light Operate (LO) or Dark Operate (DO), depending on model **Light Operate:** Output conducts when the sensor sees its own (or the emitter's) modulated light **Dark Operate:** Output conducts when sensor sees dark
Output Rating	300 mA max. (continuous) **Fixed-Field:** derate 5 mA/° C above +50° C **Inrush capability:** 1 amp for 20 milliseconds, non-repetitive **OFF-state leakage current:** less than 100 µA **ON-state voltage drop:** 3 V at 300 mA ac; 2 V at 15 mA ac
Output Protection Circuitry	Protected against false pulse on power-up
Output Response Time	**Opposed:** 16 milliseconds ON, 8 milliseconds OFF **Polarized Retroreflective, Non-polarized Retroreflective, Fixed-Field and Diffuse:** 16 milliseconds ON/OFF
Delay at Power-up	100 milliseconds
Repeatability	**Opposed:** 2 milliseconds **Polarized Retroreflective, Non-polarized Retroreflective, Fixed-Field and Diffuse:** 4 milliseconds Repeatability and response are independent of signal strength.
Adjustments	T18 Series infrared non-polarized retroreflective and diffuse mode models (only) have a single-turn SENSITIVITY control for adjustment of system gain
Indicators	**Two LEDs: Solid Green:** Power ON **Solid Yellow:** Light sensed **Flashing Yellow:** marginal excess gain
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; one jam nut included.
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4 pin Micro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 164.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (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-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	LISTED **ECOLAB®** chemical compatibility pending on some models; contact Banner Engineering for details

Excess Gain Curves

(Diffuse and Fixed-Field mode performance based on 90% reflectance white test card†)

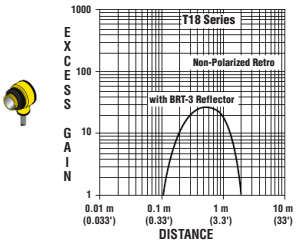
○ = Infrared LED P = Visible Red LED Polarized

Opposed Mode T18



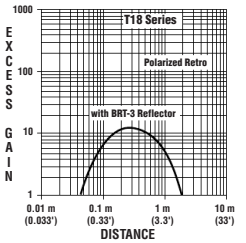
Range: 20 m | **LED:** ○

Retroreflective Mode T18



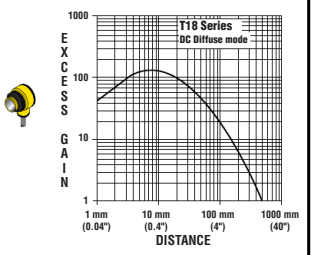
Range: 2 m | **LED:** ○

Polarized Retroreflective Mode T18



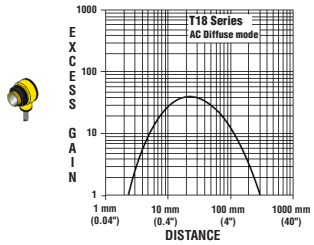
Range: 2 m | **LED:** P

Diffuse Mode T18



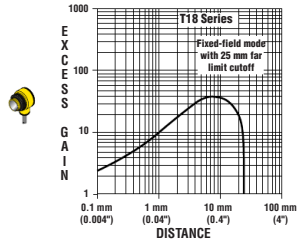
Range: 500 mm | **LED:** ○

Diffuse Mode T18



Range: 300 mm | **LED:** ○

Fixed-Field Mode T18

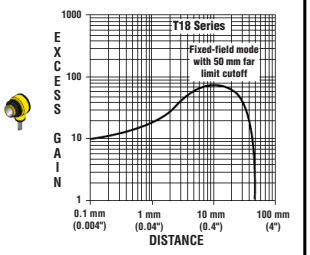


Ø 10 mm spot size @ 8 mm focus
Ø 10 mm spot size @ 25 mm cutoff

† Using 18% gray test card: Cutoff distance will be 95% of value shown.
† Using 6% black test card: Cutoff distance will be 90% of value shown.

Cutoff: 25 mm | **LED:** ○

Fixed-Field Mode T18

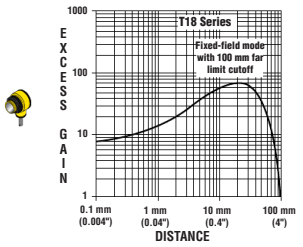


Ø 10 mm spot size @ 10 mm focus
Ø 10 mm spot size @ 50 mm cutoff

† Using 18% gray test card: Cutoff distance will be 90% of value shown.
† Using 6% black test card: Cutoff distance will be 85% of value shown.

Cutoff: 50 mm | **LED:** ○

Fixed-Field Mode T18



Ø 10 mm spot size @ 20 mm focus
Ø 10 mm spot size @ 100 mm cutoff

† 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.

Range: 100 mm | **LED:** ○

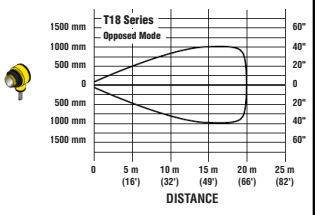
Beam Patterns

(Diffuse mode performance based on 90% reflectance white test card)

○ = Infrared LED P = Visible Red LED Polarized

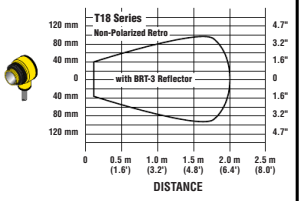
Opposed Mode T18

Effective Beam: 13 mm



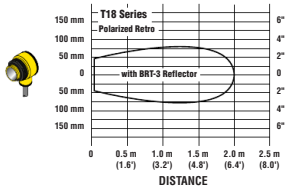
Range: 20 m | **LED:** ○

Retroreflective Mode T18



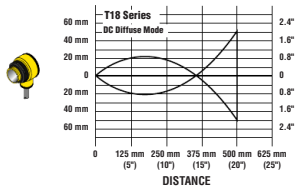
Range: 2 m | **LED:** ○

Polarized Retroreflective Mode T18



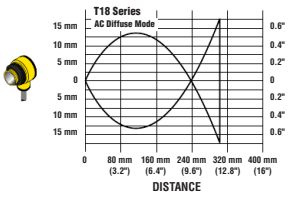
Range: 2 m | **LED:** P

Diffuse Mode T18



Range: 500 mm | **LED:** ○

Diffuse Mode T18



Range: 300 mm | **LED:** ○