# M18-3 Nickel-Plated Brass 18 mm Barrel Sensors



# Datasheet

Next Generation of Self-Contained DC-Operated Sensors



- Complete family of sensors, all housed in the popular 18 mm threaded metal barrel
- Economical photoelectric sensors for cost sensitive and high volume installations
- Powerful and bright visible red emitter beam for easy alignment and set-up
  - Highly visible output and dual-function power and stability indicators
- Advanced ASIC technology is resistant to optical and electrical noise source
- Wide operating temperature range: -40 °C to +70 °C (-40 °F to +158 °F)
- Robust 250° adjustment potentiometer on select models



#### 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

Emitter/Receiver Models 1					
Model Number	Output				
M18-3NAEL-2M		25 m (82 ft)			
M18-3NAEJ-2M	Emitter	25 m (82 ft) with beam inhibit	None		
M18-3NAES-2M		25 m (82 ft) with adjustment			
M18-3VNRL-2M		25 (02 ft)	Complementary NPN		
M18-3VPRL-2M		25 m (82 ft)	Complementary PNP		
M18-3VNRS-2M	– Receiver		Complementary NPN		
M18-3VPRS-2M		25 m (82 ft) with adjustment	Complementary PNP		

Polarized Retroreflective Models 1				
Model Number Range Output				
M18-3VNLP-2M	(m (10.7 ft) with DDT 04 reflector	Complementary NPN		
M18-3VPLP-2M	6 m (19.7 ft) with BRT-84 reflector	Complementary PNP		
M18-3VNLPC-2M	(m (10.7 ft) with DDT 04 reflector, with adjustment	Complementary NPN		
M18-3VPLPC-2M	6 m (19.7 ft) with BRT-84 reflector, with adjustment	Complementary PNP		

Retroreflective Models <sup>1</sup>				
Model Number Range Output				
M18-3VNLV-2M	7.5 m (24.6 ft) with BRT-84 reflector, with	Complementary NPN		
M18-3VPLV-2M	adjustment	Complementary PNP		

<sup>•</sup> To order the 150 mm (6 in) cable with a 4-pin M12/Euro-style quick disconnect model, add the suffix "Q5". For example, M18-3VNDL-Q5.



<sup>1</sup> Standard 2 m (6.5 ft) cable models are listed.

<sup>•</sup> To order the 4-pin M12/Euro-style integral quick disconnect model, add the suffix "Q8". For example, M18-3VNDL-Q8.

Diffuse Models <sup>1</sup>				
Model Number Range		Output		
M18-3VNDL-2M	750 mm (29.5 in) with adjustment	Complementary NPN		
M18-3VPDL-2M	750 mm (29.5 m) with adjustment	Complementary PNP		
M18-3VNDS-2M		Complementary NPN		
M18-3VPDS-2M	300 mm (11.8 in) with adjustment	Complementary PNP		

Fixed-Field Models <sup>1</sup>				
Model Number	Range	Output		
M18-3VNFF30-2M	20 mm (1.2 in)	Complementary NPN		
M18-3VPFF30-2M	- 30 mm (1.2 in)	Complementary PNP		
M18-3VNFF50-2M	E0 mm (1.0 in)	Complementary NPN		
M18-3VPFF50-2M	50 mm (1.9 in)	Complementary PNP		
M18-3VNFF75-2M	75 (0.01.)	Complementary NPN		
M18-3VPFF75-2M	- 75 mm (2.9 in)	Complementary PNP		
M18-3VNFF100-2M	100	Complementary NPN		
M18-3VPFF100-2M	100 mm (3.9 in)	Complementary PNP		
M18-3VNFF150-2M	150 mm (5.9 in)	Complementary NPN		
M18-3VPFF150-2M		Complementary PNP		
M18-3VNFF200-2M	200	Complementary NPN		
M18-3VPFF200-2M	- 200 mm (7.8 in)	Complementary PNP		

### Installing the M18-3 Sensor



Wiring Diagrams

Emitter



Emitter with Active High Beam Inhibit



#### Complementary Current Sinking (NPN)



NOTE: Open lead wires must be connected to a terminal block.

Complementary Current Sourcing (PNP)



## Specifications

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Supply Voltage 10 V to 30 V dc for ambient temperature ≤ 55 °C 10 V to 24 V dc for ambient temperature > 55 °C Supply Protection Circuitry Protected against reverse polarity and transient voltages	Supply Current (Exclusive of Load Current) Diffuse: 16 mA Opposed Mode Emitters: 17 mA Opposed Mode Receivers: 8 mA Retroreflective and Polarized Retroreflective: 16 mA Fixed-Field: 16 mA
Output Configuration Complementary PNP or NPN by model number Output Protection Circuitry Protected against false pulse on power-up and continuous short circuit of outputs. Short circuit protection at elevated temperature may require a power cycle to reset.	Output Rating ≤ 50 mA total current for ambient temperatures > 55 °C ≤ 100 mA total current through both outputs ≤ 55 °C OFF-State Leakage Current: < 50 µA at 30 V dc ON-State Saturation Voltage: < 1.5 V at 10 mA; < 3.0 V at 100 mA
Output Response Time Response is independent of signal strength Opposed mode: 1.5 milliseconds ON, 1.0 milliseconds OFF Retro, Polarized Retro, and Diffuse: 1.5 milliseconds ON, 0.75 milliseconds OFF Fixed-Field: 1.5 milliseconds ON, 1.0 milliseconds OFF Delay on Power-up: 100 milliseconds; outputs do not conduct during this time	Repeatability Repeatability is independent of signal strength Opposed mode: 170 microseconds Retro, Polarized Retro, and Diffuse modes: 100 microseconds Fixed-Field mode: 100 microseconds Emitter LED Visible red
Adjustments Diffuse (DL, DS), Emitter (ES), Receiver (RS), Polarized Retroreflective (LPC), Retroreflective (LV) models: Single turn sensitivity (gain) adjustment potentiometer Emitter Beam Inhibit (EJ) models: Tie black wire to 10 V to 30 V dc for beam inhibit Indicators Three LEDs (1 green, 2 amber) Green solid: indicates power applied and sensor ready Green flashing: indicates marginal sensing signal Amber solid: indicates Pin 4 (black wire) output conducting	Construction Housing: Nickel-plated brass Front window: PMMA Indicator windows: Clear Polysulfone (PSU) Indicator cover and gain pot driver: Black PSU Cable: PVC jacket Short cable QD: Nickel-plated brass and PVC jacket QD connector and mounting nuts: Nickel-plated brass

#### **Operating Conditions**

Temperature: -40 °C to +70 °C (-40 °F to +158 °F) 95% at +50 °C maximum relative humidity (non-condensing)

**Environmental Rating** IEC 60529 IP67 and IP69K

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

CE



Class 2 power

UL Environmental Rating: Type 1

**Required Overcurrent Protection** 



WARNING: Electrical connections must be made by gualified 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 (AWG)	Required Overcurrent Protection (Amps)
20	5.0
22	3.0
24	2.0
26	1.0
28	0.8
30	0.5

#### Performance Curves















### Dimensions

All measurements are listed in millimeters [inches], unless noted otherwise.



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MI8 X I MAX TORQUE IO Nm [88 IN-LBS] 2X 4.1 L.16] MIS X 1 MAX TORQUE 10 Nm [88 IN-LBS]

> 23.9 [.94]

**QD Models** 



2X 4.1

# Accessories

#### Cordsets

All measurements are listed in millimeters, unless noted otherwise.

4-Pin Threaded M12/Euro-Style Cordsets				
Model	Length	Style	Dimensions	Pinout (Female)
MQDC-406	1.83 m (6 ft)		<del>→</del> 44 Typ. —————	
MQDC-415	4.57 m (15 ft)			
MQDC-430	9.14 m (30 ft)	Straight		
MQDC-450	15.2 m (50 ft)		M12 x 1 → ø 14.5 →	1-2-2
MQDC-406RA	1.83 m (6 ft)		. 32 Тур.	4-0-3
MQDC-415RA	4.57 m (15 ft)			1 = Brown 2 = White
MQDC-430RA	9.14 m (30 ft)			
MQDC-450RA	15.2 m (50 ft)	Right-Angle	M12 x 1 +	3 = Blue 4 = Black

#### Washdown Cordsets

4-Pin Threaded M12/Euro-Style Cordsets—Washdown, Stainless Steel				
Model	Length	Style	Dimensions	Pinout (Female)
MQDC-WDSS-0406	1.83 m (6 ft)			
MQDC-WDSS-0415	4.57 m (15 ft)			1-2-2
MQDC-WDSS-0430	9.14 m (30 ft)	Straight	Ø15.5 mm 04.8 mm 04.8 mm	1 = Brown 2 = White 3 = Blue 4 = Black

### Apertures

Model	Units	Aperture Description	Product
AP18SCN	3	Kit includes round apertures of 0.5 mm (0.02 in), 1.0 mm (0.04 in), and 2.5 mm (0.10 in) diameter.	
AP18SRN	3	Kit includes rectangular apertures of 0.5 mm (0.02 in), 1.0 mm (0.04 in), and 2.5 mm (0.10 in) wide. Each kit also includes a thread-on housing, Teflon <sup>®</sup> FEP <sup>®</sup> lens, and o-ring.	<b>○ ● ● ● ● ● ● ● ● ● ●</b>
APG18S	1	Kit with glass lens to protect plastic sensor lens from chemical environments and weld splatter damage.	000

#### Brackets



- 18 mm sensor mounting hole
- Clearance for M4 (#8) . hardware

Hole center spacing: A to B = 24.2Hole size: A = Ø 4.6, B = 17.0 × 4.6, C = Ø 18.5



- available
- 18 mm sensor mounting hole

Hole size: B=ø 18.1

Model	Bolt Thread (A)
SMB18FA	3/8 - 16 × 2 in
SMB18FAM10	M10 - 1.5 × 50
SMB18FAM12	n/a; no bolt included. Mounts directly to 12 mm $(\frac{1}{2} \text{ in})$ rods

For additional brackets, check the current Banner catalog or visit www.bannerengineering.com. All measurements are listed in millimeters, unless noted otherwise.

#### Reflectors

#### BRT-2X2

- Square, acrylic target •
- . Reflectivity factor: 1.0
- Max. temperature: +50 °C . (+122 °F)
- Optional brackets are available .
- Approximate size: 51 mm  $\times$  51 . mm



#### BRT-84X84A

- Square, acrylic target
- Reflectivity Factor: 2.0
- Temperature: -20 °C to +60 °C (-4 °F to +140 °F)
- Approximate size: 84 mm × 84 mm



#### BRT-40X19A

- Rectangular, acrylic target
- Reflectivity Factor: 1.3
- Temperature: -20 °C to +60 °C (-4 °F to +140 °F)
- Approximate size: 19 mm × 60 mm overall; 19 mm × 40 mm reflector

## BRT-84

- Round, acrylic target
- Reflectivity Factor: 1.4
- Temperature: -20 °C to +60 °C (-4 °F to +140 °F)
- Optional brackets are available
- Size: 84 mm diameter
- Mounting Hole: 4.5 mm diameter



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#### BRT-60X40C

- Rectangular, acrylic target
- Reflectivity Factor: 1.4
- Temperature: -20 °C to
- +60 °C (-4 °F to +140 °F)
- Optional brackets are available
- Approximate size: 40 mm × 60 mm



#### Retroreflective Tape

Model	Reflectiv ity Factor	Maximum Temperatur e	Size
BRT- THG-2-100	0.7	+60 °C (+140 °F)	50 mm (2 in) wide, 2.5 m (100 in) long

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