



DS18 Series Sensors

Original Instructions

p/n: 128911 Rev. I

27-Oct-25

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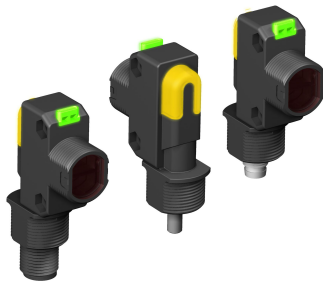
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Chapter 1 Features

Miniature self-contained photoelectric sensors in a universal housing



Patent(s) issued or pending

- Multiple mounting options accommodate almost any mounting requirements
- Exceptional optical performance, comparable to larger “MINI-style” or barrel sensors
- Patented wide-beam retroreflective models for enhanced ease of alignment
- 10 to 30 V DC operation, with solid-state complementary NPN or PNP outputs, light operate or dark operate, depending on model
- Bright output LED indicates object is within the sensor’s field of view
- Rugged sealed housing with protected circuitry, rated IP67/NEMA 6
- All models feature 18 mm threaded barrel and base for easy, versatile mounting
- Choose 2 m (6.5 ft) or 9 m (30 ft) cable, or 4-pin M12 or M8 integral QD fitting or 150 mm (6 in) QD

WARNING:



- **Do not use this device for personnel protection**
- Using this device for personnel protection could result in serious injury or death.
- This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A device failure or malfunction can cause either an energized (on) or de-energized (off) output condition.

Models

Model ⁽¹⁾	Sensing Mode	Sensing Beam	Range	Output	
DS186E	Opposed	Infrared, 940 nm Effective Beam: 13 mm (0.5 in)	20 m (65.6 ft)	N/A	
DS18VN6R				NPN	
DS18VP6R				PNP	
DS18VN6LP	Polarized Retroreflective	Visible red, 660 nm	3.5 m (11.4 ft)	NPN	
DS18VP6LP				PNP	
DS18VN6LPW	Wide-Angle Polarized Retroreflective		3.0 m (9.8 ft)	NPN	
DS18VP6LPW				PNP	
DS18VN6FF50	Fixed-Field		50 mm (2 in)	NPN	
DS18VP6FF50				PNP	

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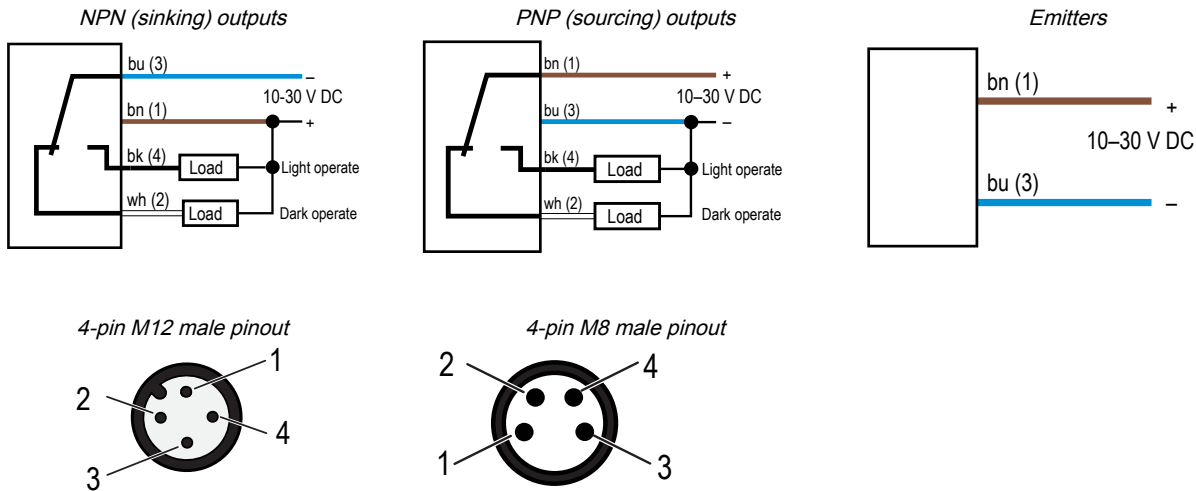
(1)

- Only standard 2 m (6.5 ft) cable models are listed. To order the 9 m (30 ft) cable model, add suffix “W/30” to the model number (for example, DS186E W/30)
- To order the 4-pin integral M12 QD model, add suffix “Q8” (for example, DS186EQ8)
- To order the 4-pin integral M8 QD model, add suffix “Q7” (for example, DS186EQ7)
- To order the 4-pin M12 150 mm (6 in) pigtail QD model, add suffix “Q5” (for example, DS186EQ5)
- To order the 4-pin M8 150 mm (6 in) pigtail QD model, add suffix “Q” (for example, DS186EQ)

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Model	Sensing Mode	Sensing Beam	Range	Output
DS18VN6FF100			100 mm (4 in)	NPN
DS18VP6FF100				PNP

Wiring Diagrams



In light operate (LO) mode, the output is ON when the target returns the same or more light to the sensor and OFF when the sensor detects less light than the configured/taught target. In **opposed and retroreflective sensing modes**, light operate is active when the beam is unblocked. In **diffuse, fixed field, and adjustable field sensor modes**, light operate is active when the target is present.

In dark operate (DO) mode, the output is ON when the target returns less light to the sensor than the configured target and OFF when the sensor detects more light than the configured/taught target. In **opposed and retroreflective sensing modes**, dark operate is active when the beam is blocked. In **diffuse, fixed field, and adjustable field sensor modes**, dark operate is active when the target is absent.

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Chapter 2 Specifications

Supply Voltage

10 to 30 V DC (10% maximum ripple) at less than 20 mA, exclusive of load

Protected against reverse polarity and transient voltages

Output Response Time

Opposed Mode: 800 microseconds ON; 400 microseconds OFF

All others: 2 milliseconds ON/OFF

NOTE: 100 millisecond delay on power-up; outputs do not conduct during this time

Repeatability

Opposed Mode: 100 microseconds

All others: 350 microseconds

Indicators

2 LED indicators

Green solid: Power ON

Amber (back cover) ON: Black wire (pin 4) is conducting; an object is within sensor's field of view

Output Configuration

Solid-state complementary; NPN or PNP (current sinking or sourcing), depending on model

Rating:

100 mA combined load from -20°C to $+60^{\circ}\text{C}$ (-4°F to $+140^{\circ}\text{F}$)

Linearly derate combined load from 100 to 50 mA at temperatures from $+60^{\circ}\text{C}$ to 70°C (140°F to 158°F)

Off-state leakage current:

NPN: less than $200\ \mu\text{A}$ @ 30 V dc (See the Application Note)

PNP: less than $10\ \mu\text{A}$ @ 30 V dc

ON-state saturation voltage:

NPN: $< 1.6\ \text{V}$ @ 100 mA

PNP: $< 3\ \text{V}$ @ 100 mA

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

Construction

ABS housing, 3 mm mounting hardware included

Connections

2 m (6.5 ft) 4-wire PVC cable, 9 m (30 ft) 4-wire PVC cable, 4-pin M8 integral QD, 4-pin M12 integral QD, 4-pin M8 Pigtail QD, or 4-pin M12 Pigtail QD, depending on model

Application Notes

NPN off-state leakage current is $< 200\ \mu\text{A}$ for load resistances $> 3\ \text{k}\Omega$ or optically isolated loads. For load current of 100 mA, leakage is $< 1\%$ of load current.

Environmental Rating

IP67; NEMA 6; UL Type 1

Operating Conditions

Temperature: -20°C to $+70^{\circ}\text{C}$ (-4°F to $+158^{\circ}\text{F}$)

90% at $+50^{\circ}\text{C}$ maximum relative humidity (non-condensing)

Certifications



Banner Engineering BV
Park Lane, Culliganlaan 2F bus 3
1831 Diegem, BELGIUM



Industrial
Control
Equipment
3TJJ

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.

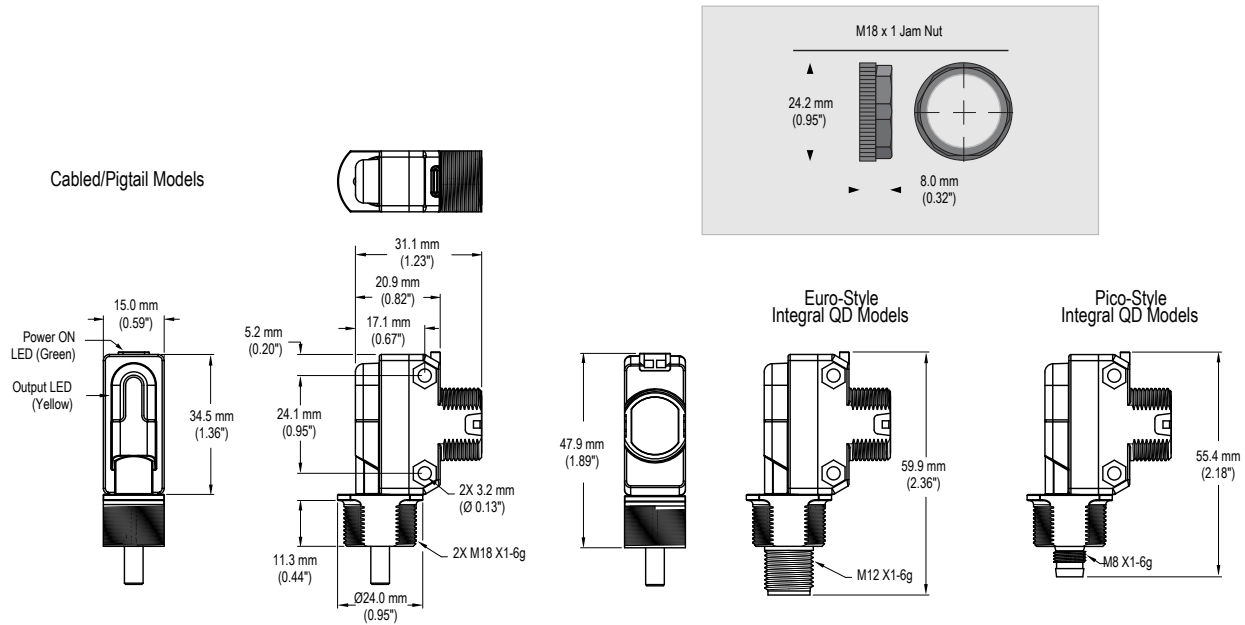
Supply wiring leads $< 24\ \text{AWG}$ shall not be spliced.

For additional product support, go to www.bannerengineering.com.

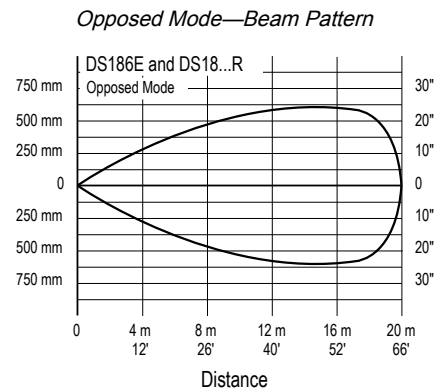
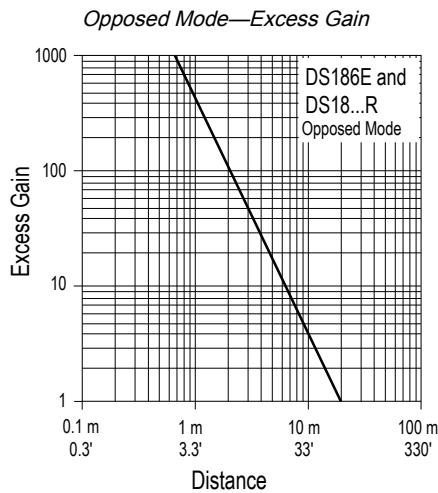
Supply Wiring (AWG)	Required Overcurrent Protection (A)	Supply Wiring (AWG)	Required Overcurrent Protection (A)
20	5.0	26	1.0
22	3.0	28	0.8
24	2.0	30	0.5

Dimensions

All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.

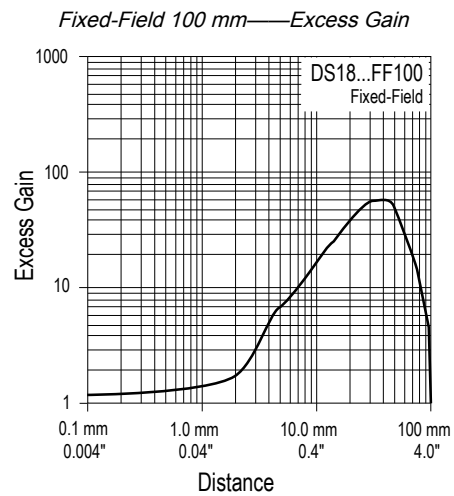
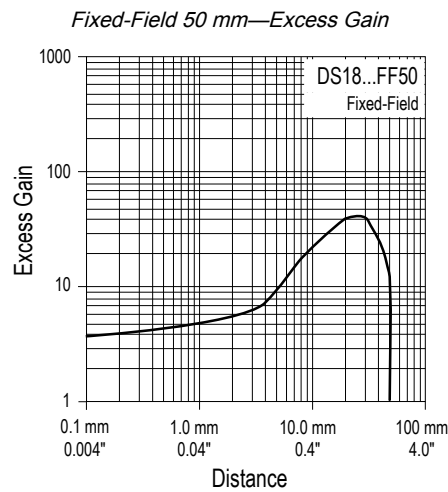
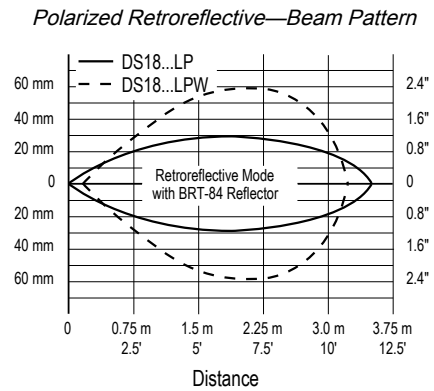
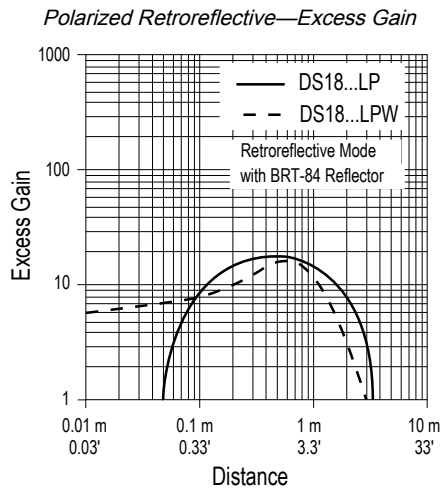


Performance Curves



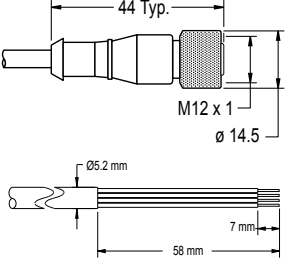
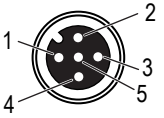

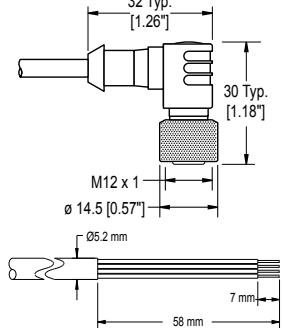
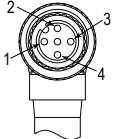

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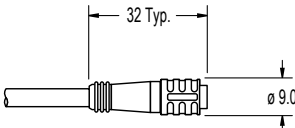

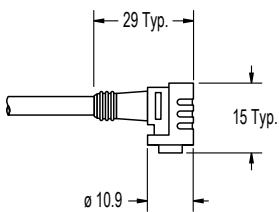

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Fixed field performance is based on a 90% reflectance white test card

Chapter 3 Accessories

4-Pin Single-Ended M12 Female Cordsets					
Model	Length	Style	Dimensions	Pinout (Female)	
MQDC-406	2 m (6.56 ft)	Straight			<p>1 = Brown 2 = White 3 = Blue 4 = Black 5 = Not used</p> 
MQDC-415	5 m (16.4 ft)				
MQDC-430	9 m (29.5 ft)				
MQDC-450	15 m (49.2 ft)	Right-Angle			<p>1 = Brown 2 = White 3 = Blue 4 = Black 5 = Not used</p> 
MQDC-406RA	2 m (6.56 ft)				
MQDC-415RA	5 m (16.4 ft)				
MQDC-430RA	9 m (29.5 ft)				
MQDC-450RA	15 m (49.2 ft)				

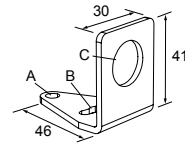
4-Pin Single-Ended Snap-on M8 Female Cordsets					
Model	Length	Style	Dimensions	Pinout (Female)	
PKG4-2	2.03 m (6.66 ft)	Straight			1 = Brown 2 = White 3 = Blue 4 = Black
PKW4Z-2	2 m (6.56 ft)	Right-Angle			

SMB18A

- Right-angle mounting bracket with a curved slot for versatile orientation
- 12-ga. stainless steel
- 18 mm sensor mounting hole
- Clearance for M4 (#8) hardware

Hole center spacing: A to B = 24.2

Hole size: A = \varnothing 4.6, B = 17.0 \times 4.6, C = \varnothing 18.5



See <http://www.bannerengineering.com> for additional 18 mm barrel mounting bracket options and for complete information on retroreflectors.

NOTE: Polarized sensors require corner cube-type retroreflectors.

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Chapter 4 Product Support and Maintenance

Repairs

Contact Banner Engineering for troubleshooting of this device. **Do not attempt any repairs to this Banner device; it contains no field-replaceable parts or components.** If the device, device part, or device component is determined to be defective by a Banner Applications Engineer, they will advise you of Banner's RMA (Return Merchandise Authorization) procedure.

IMPORTANT: If instructed to return the device, pack it with care. Damage that occurs in return shipping is not covered by warranty.

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.

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