



## DS18 Series Sensors

Original Instructions

p/n: 128911 Rev. I

27-Oct-25

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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 <sup>(1)</sup>	Sensing Mode	Sensing Beam	Range	Output	
DS18E				N/A	
DS18VN6R	Opposed	Infrared, 940 nm Effective Beam: 13 mm (0.5 in)	20 m (65.6 ft)	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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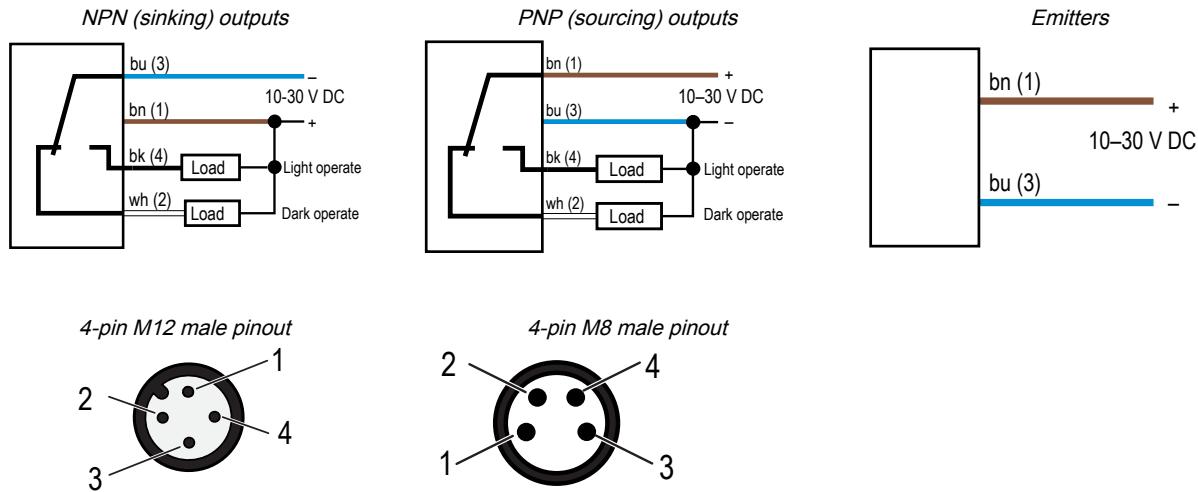
(1)

- 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 °C (-4 °F to +140 °F)  
Linearly derate combined load from 100 to 50 mA at temperatures from +60 °C to 70 °C (140 °F to 158 °F)

**Off-state leakage current:**

**NPN:** less than 200 µA @ 30 V dc (See the Application Note)  
**PNP:** less than 10 µA @ 30 V dc

**ON-state saturation voltage:**

**NPN:** < 1.6 V @ 100 mA  
**PNP:** < 3 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 µA for load resistances > 3 kΩ 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 °C (-4 °F to +158 °F)  
90% at +50 °C maximum relative humidity (non-condensing)

**Certifications**

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



Industrial  
Control  
Equipment  
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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.

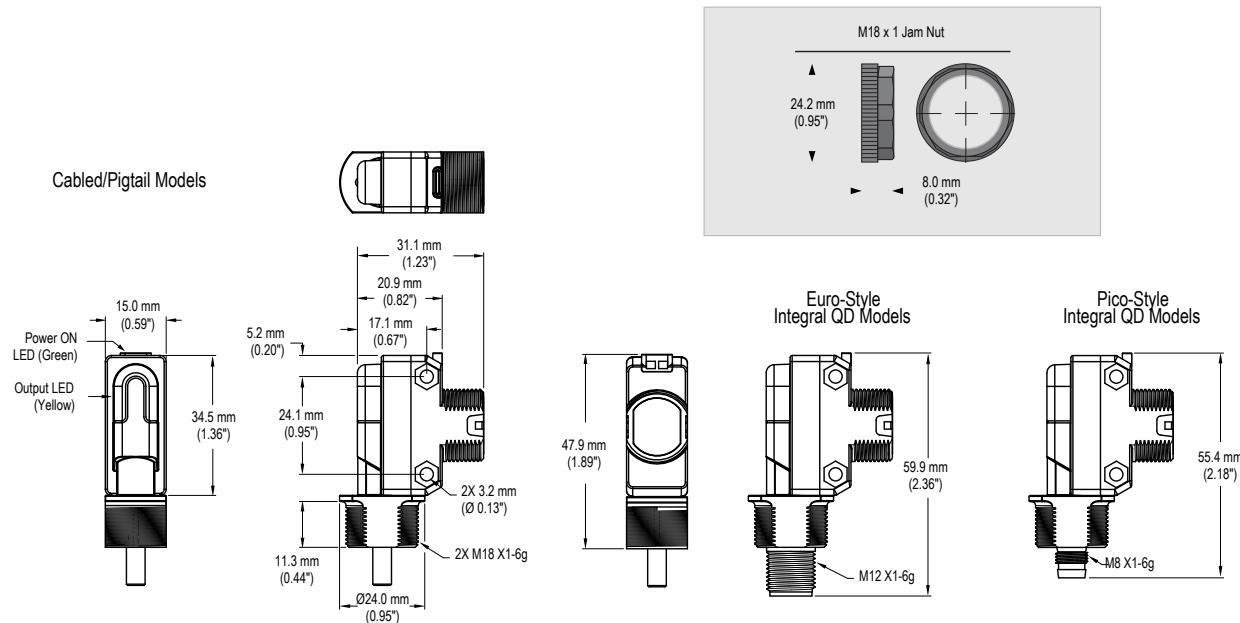
Supply wiring leads < 24 AWG shall not be spliced.

For additional product support, go to [www.bannerengineering.com](http://www.bannerengineering.com).

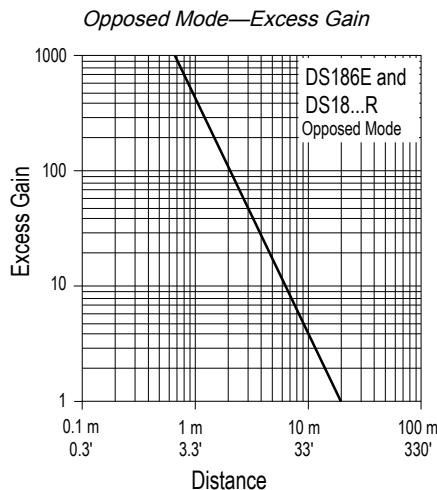
Supply Wiring (AWG)	Required Overcurrent Protection (A)	Supply Wiring (AWG)	Required Overcurrent Protection (A)
20	5.0	26	1.0
22	3.0	28	0.8
24	2.0	30	0.5

## Dimensions

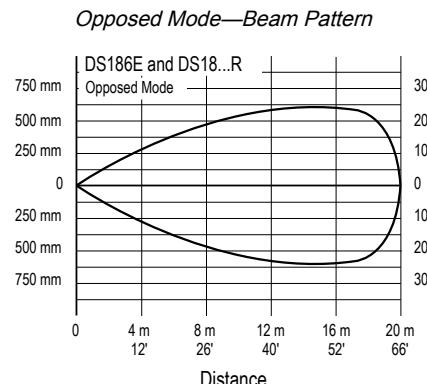
All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.



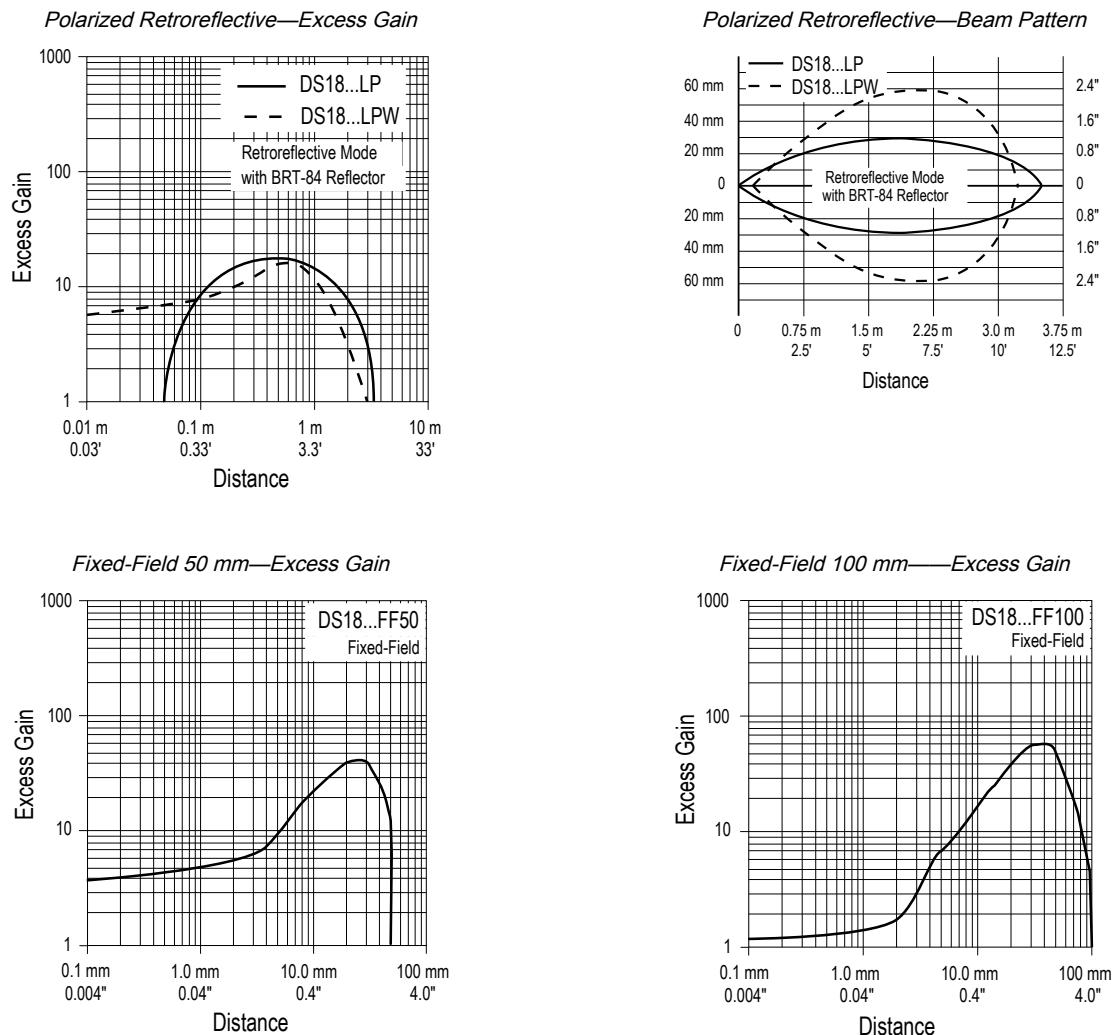
## Performance Curves



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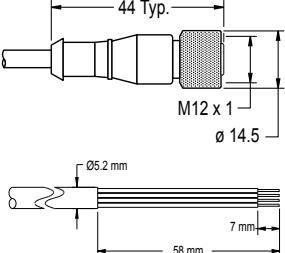
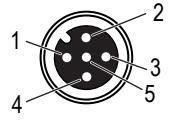
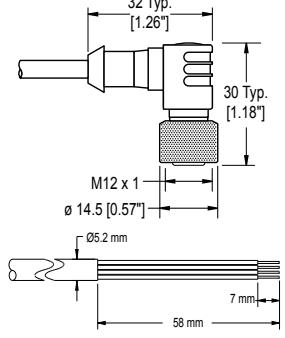
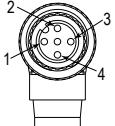


Fixed field performance is based on a 90% reflectance white test card

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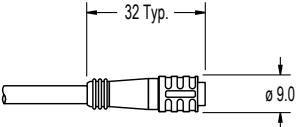
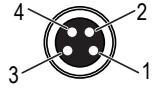
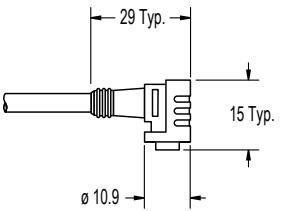
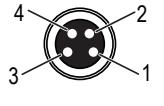
## Chapter 3

## Accessories

4-Pin Single-Ended M12 Female Cordsets				
Model	Length	Style	Dimensions	Pinout (Female)
MQDC-406	2 m (6.56 ft)	Straight		
MQDC-415	5 m (16.4 ft)			
MQDC-430	9 m (29.5 ft)			
MQDC-450	15 m (49.2 ft)			
MQDC-406RA	2 m (6.56 ft)	Right-Angle		
MQDC-415RA	5 m (16.4 ft)			
MQDC-430RA	9 m (29.5 ft)			
MQDC-450RA	15 m (49.2 ft)			

1 = Brown  
 2 = White  
 3 = Blue  
 4 = Black  
 5 = Not used



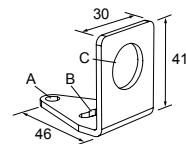
4-Pin Single-Ended Snap-on M8 Female Cordsets				
Model	Length	Style	Dimensions	Pinout (Female)
PKG4-2	2.03 m (6.66 ft)	Straight		
PKW4Z-2	2 m (6.56 ft)	Right-Angle		

1 = Brown  
 2 = White  
 3 = Blue  
 4 = Black

**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.

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