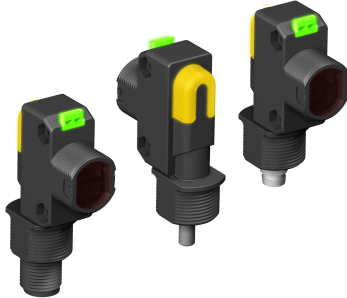


# DS18 Series Sensors



## Datasheet

Miniature self-contained photoelectric sensors in a universal housing



- 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 30V 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 Euro-style or Pico-style integral QD fitting or 150 mm (6 in) QD

Patent(s) issued or pending



**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

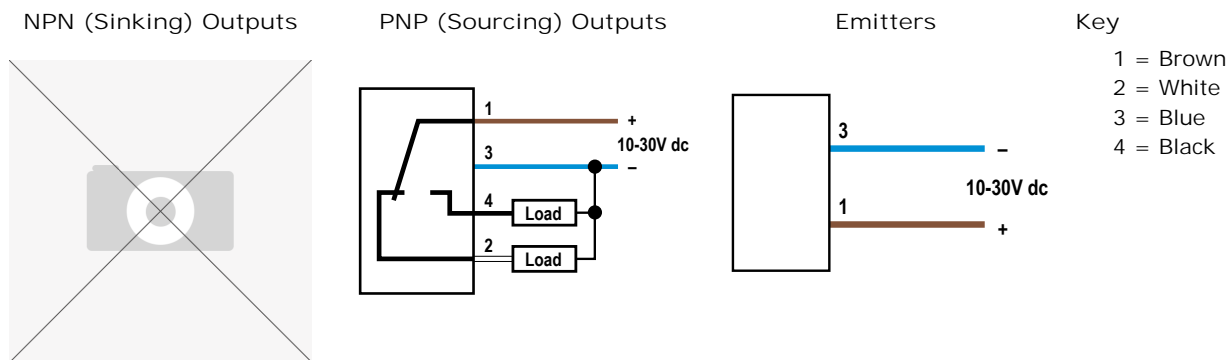
Model <sup>1</sup>	Sensing Mode	Sensing Beam	Range	Output
DS186E	Opposed	Infrared, 940 nm Effective Beam: 13 mm (0.5 in)	20 m (65.6 ft)	N/A
DS18VN6R				NPN
DS18VP6R				PNP
DS18VN6LP	Polarized Retroreflective	Visible red, 660 nm	3.5 m (11.4 ft)	NPN
DS18VP6LP				PNP
DS18VN6LPW	Wide-Angle Polarized Retroreflective		3.0 m (9.8 ft)	NPN
DS18VP6LPW				PNP
DS18VN6FF50	Fixed-Field		50 mm (2 in)	NPN
DS18VP6FF50				PNP
DS18VN6FF100				NPN
DS18VP6FF100				PNP

<sup>1</sup>

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



## Wiring Diagrams



## 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 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

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

### Environmental Rating

IEC IP67; NEMA 6; UL Type 1

### 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 Pico-style integral QD, 4-pin Euro-style integral QD, 4-pin Pico-style Pigtail QD, or 4-pin Euro-style Pigtail QD, depending on model

### Operating Conditions

Temperature: -20 °C to +70 °C (-4 °F to +158 °F)  
90% at +50 °C maximum relative humidity (non-condensing)

### 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.

### 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 <http://www.bannerengineering.com>.

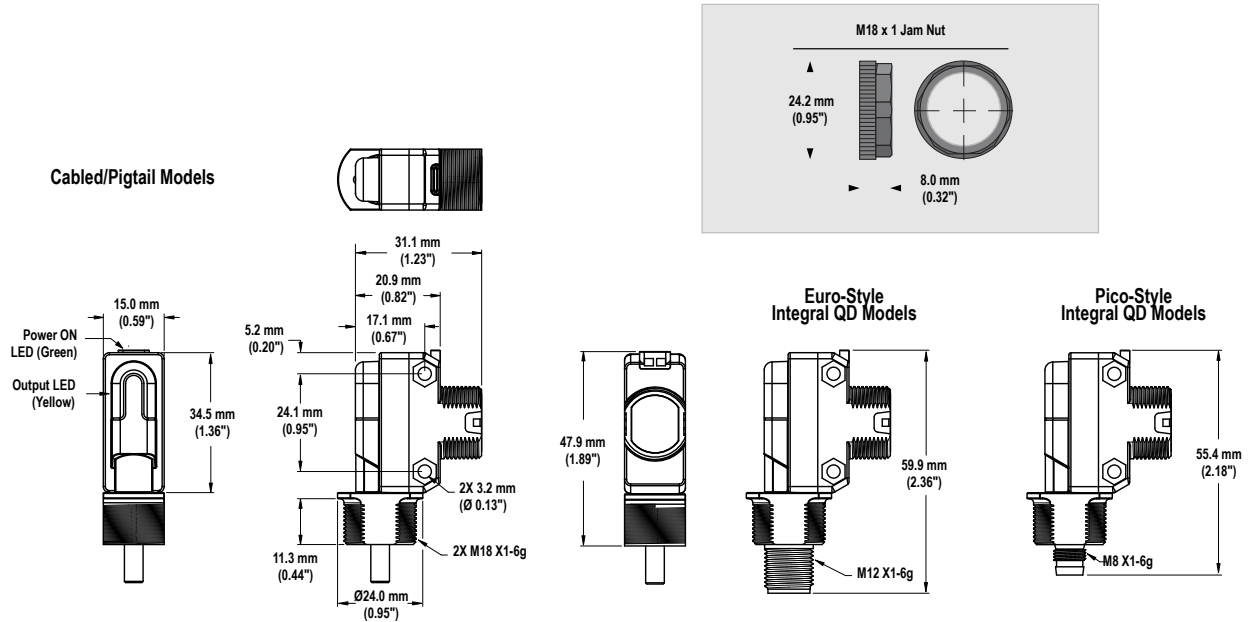
Supply Wiring	Required Overcurrent Protection
20	5.0 Amps
22	3.0 Amps
24	2.0 Amps
26	1.0 Amps
28	0.8 Amps
30	0.5 Amps

### Certifications

All Models:   
 Industrial Control Equipment  
 Q8 models only:  3TJJ

## Dimensions

All measurements are listed in millimeters (inches), unless noted otherwise.



## Performance Curves

Performance based on a 90% reflectance white test card

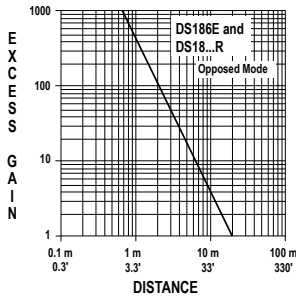


Figure 1. Opposed Mode—Excess Gain

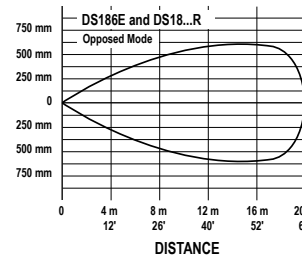


Figure 2. Opposed Mode—Beam Pattern

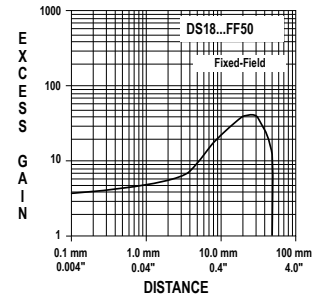


Figure 3. Fixed-Field 50 mm—Excess Gain

Performance based on a 90% reflectance white test card

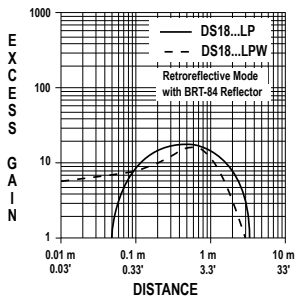


Figure 4. Polarized Retroreflective—Excess Gain

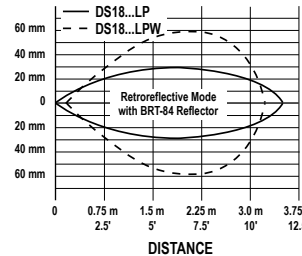


Figure 5. Polarized Retroreflective—Beam Pattern

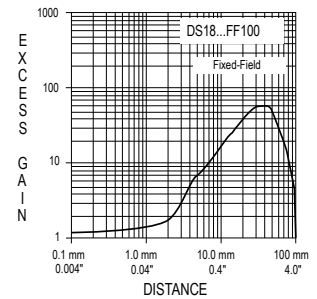


Figure 6. Fixed-Field 100 mm—Excess Gain

## Accessories

### Cordsets

4-Pin Threaded M12/Euro-Style Cordsets				
Model	Length	Style	Dimensions	Pinout (Female)
MQDC-406	1.83 m (6 ft)	Straight		<p>1 = Brown 2 = White 3 = Blue 4 = Black</p>
MQDC-415	4.57 m (15 ft)			
MQDC-430	9.14 m (30 ft)			
MQDC-450	15.2 m (50 ft)			
MQDC-406RA	1.83 m (6 ft)	Right-Angle		
MQDC-415RA	4.57 m (15 ft)			
MQDC-430RA	9.14 m (30 ft)			
MQDC-450RA	15.2 m (50 ft)			

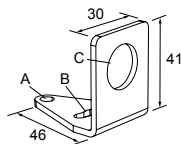
4-Pin Snap-on M8/Pico-Style Cordsets				
Model	Length	Style	Dimensions	Pinout (Female)
PKG4-2	2 m (6.56 ft)	Straight		<p>1 = Brown 2 = White 3 = Blue 4 = Black</p>
PKW4Z-2	2 m (6.56 ft)	Right-Angle		

### Mounting Brackets

See <http://www.bannerengineering.com> for additional 18 mm barrel mounting bracket options.

#### 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 = ø 4.6, B = 17.0 × 4.6, C = ø 18.5

## Retroreflectors

See <http://www.bannerengineering.com> for complete information on retroreflectors.



NOTE: Polarized sensors require corner cube-type retroreflectors.

## Banner Engineering Corp Limited Warranty

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