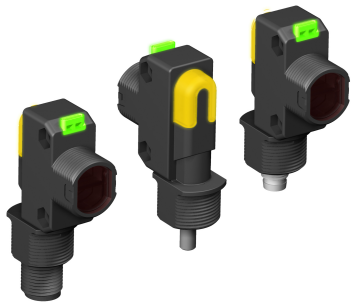
DS18 Series Sensors

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.

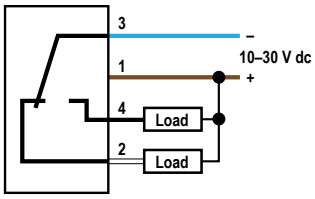
Models

Model[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
DS18VN6FF100			100 mm (4 in)	NPN
DS18VP6FF100				PNP

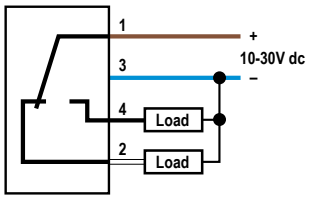
[1]
- Only standard 2 m (6.5 ft) cable models are listed. For 9 m (30 ft) cable, add suffix “W/30” to the model number (for example, DS186E W/30)
- For 4-pin integral Euro-style QD, add suffix “Q8” (for example, DS186EQ8)
- For 4-pin integral Pico-style QD, add suffix “Q7” (for example, DS186EQ7)
- For 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

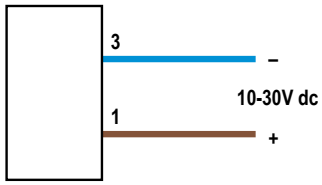
NPN (Sinking) Outputs



PNP (Sourcing) Outputs



Emitters



Key

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

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

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

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.

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

Environmental Rating
IEC IP67; NEMA 6; UL Type 1

Certifications

Industrial Control Equipment 3TJJ

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

Required Overcurrent Protection

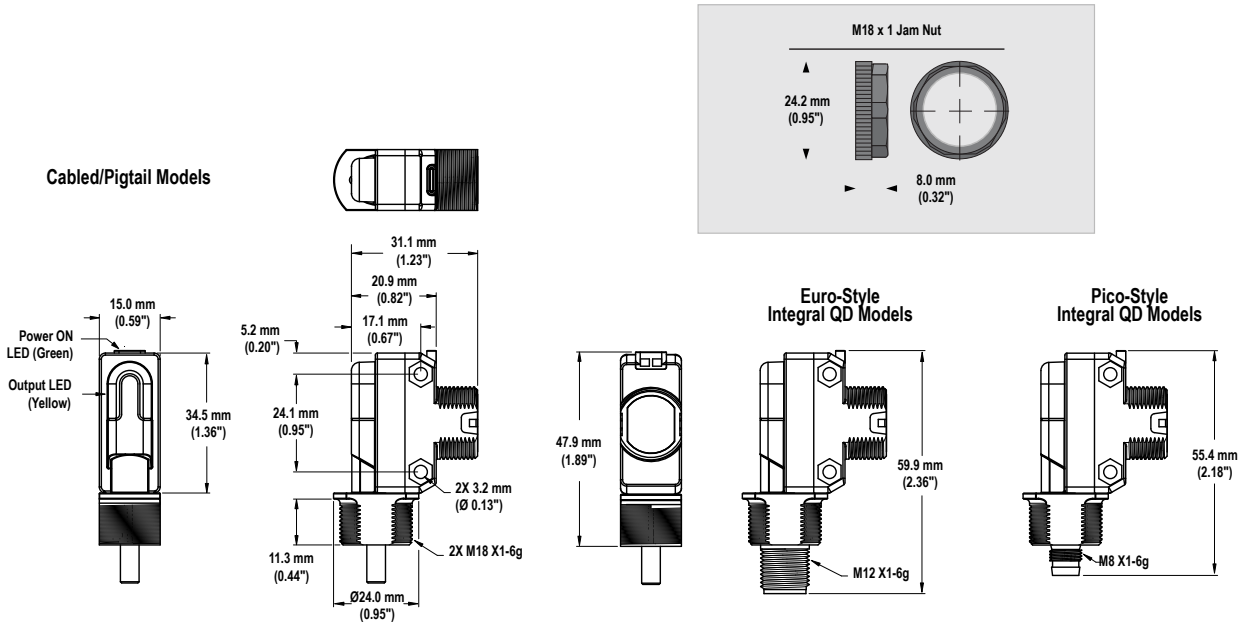
WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

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*.

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

Dimensions

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



Performance Curves

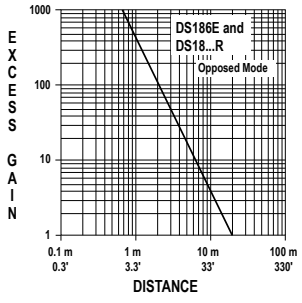


Figure 1. Opposed Mode—Excess Gain

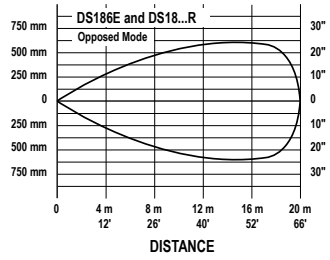


Figure 2. Opposed Mode—Beam Pattern

Performance based on a 90% reflectance white test card

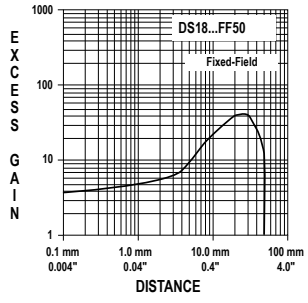


Figure 3. Fixed-Field 50 mm—Excess Gain

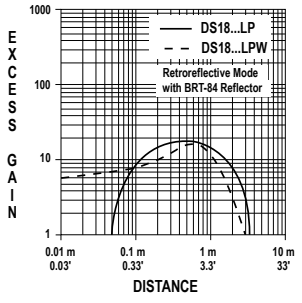


Figure 4. Polarized Retroreflective—Excess Gain

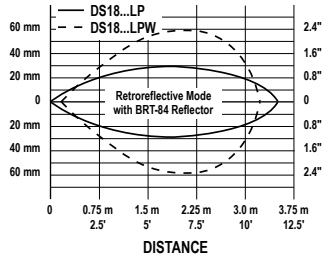


Figure 5. Polarized Retroreflective—Beam Pattern

Performance based on a 90% reflectance white test card

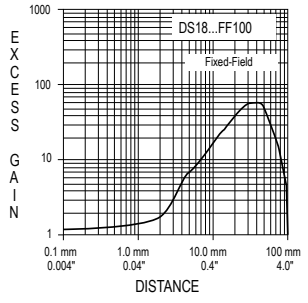
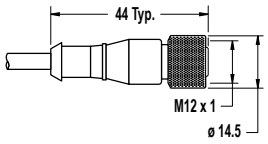
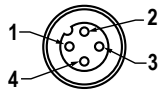
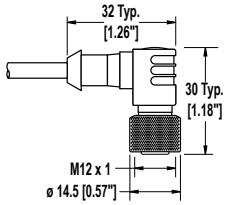
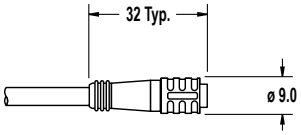
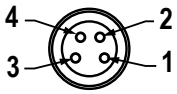
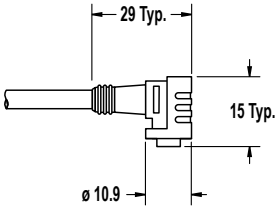


Figure 6. Fixed-Field 100 mm——Excess Gain

Accessories

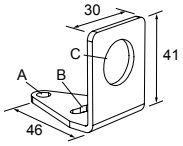
4-Pin Threaded M12/Euro-Style Cordsets				
Model	Length	Style	Dimensions	Pinout (Female)
MQDC-406	1.83 m (6 ft)	Straight		 1 = Brown 2 = White 3 = Blue 4 = Black
MQDC-415	4.57 m (15 ft)			
MQDC-430	9.14 m (30 ft)			
MQDC-450	15.2 m (50 ft)			
MQDC-406RA	1.83 m (6 ft)	Right-Angle		
MQDC-415RA	4.57 m (15 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		 1 = Brown 2 = White 3 = Blue 4 = Black
PKW4Z-2	2 m (6.56 ft)	Right-Angle		

Mounting Brackets

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

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

Retroreflectors

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

NOTE: Polarized sensors require corner cube-type retroreflectors.

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