DS18 Series Sensors

Original Instructions
p/n: 128911 Rev. J
10-Apr-26
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ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

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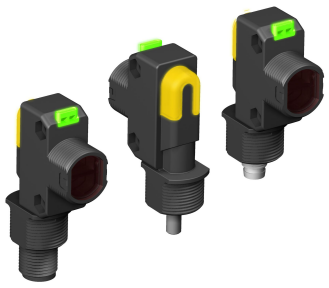
Chapter 1 Features

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

Opposed mode sensors

Model	Sensing Beam	Connection	Output
DS186E	Infrared, 940 nm Effective Beam: 13 mm (0.5 in) Range: 20 m (65.6 ft)	2 m cable	N/A
DS186EQ5		150 mm (6 in) cable with a 4-pin M12 QD	N/A
DS186EQ8		4-pin integral M12 QD	N/A
DS18VN6R		2 m cable	NPN
DS18VP6R		2 m cable	PNP
DS18VP6RQ5		150 mm (6 in) cable with a 4-pin M12 QD	PNP

Polarized retroreflective mode sensors

Model	Sensing Beam	Connection	Output
DS18VN6LP	Visible red, 660 nm Range: 3.5 m (11.4 ft)	2 m cable	NPN
DS18VN6LPQ5		150 mm (6 in) cable with a 4-pin M12 QD	NPN

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Model	Sensing Beam	Connection	Output
DS18VN6LPQ8		4-pin integral M12 QD	NPN
DS18VP6LP		2 m cable	PNP
DS18VP6LP W/30		9 m cable	PNP
DS18VP6LPQ		150 mm (6 in) cable with a 4-pin M8 QD	PNP
DS18VP6LPQ5		150 mm (6 in) cable with a 4-pin M12 QD	PNP
DS18VP6LPQ7		4-pin integral M8 QD	PNP
DS18VP6LPQ8		4-pin integral M12 QD	PNP

Wide-angle polarized retroreflective mode sensors

Models	Sensing Beam	Connection	Output
DS18VP6LPW	Visible red, 660 nm Range: 3 m (9.8 ft)	2 m cable	PNP
DS18VP6LPWQ		150 mm (6 in) cable with a 4-pin M8 QD	PNP
DS18VP6LPWQ5		150 mm (6 in) cable with a 4-pin M12 QD	PNP

Fixed-field mode sensors

Model	Sensing Beam	Connection	Output
DS18VP6FF50	Visible red, 660 nm Range: 50 mm (2 in)	2 m cable	PNP
DS18VP6FF100	Visible red, 660 nm Range: 100 mm (4 in)	2 m cable	PNP
DS18VP6FF100Q		150 mm (6 in) cable with a 4-pin M8 QD	PNP
DS18VP6FF100Q5		150 mm (6 in) cable with a 4-pin M12 QD	PNP
DS18VP6FF100Q8		4-pin integral M12 QD	PNP

Any models not listed in the previous tables are no longer available for order. Obsolete models may include models with the following model number patterns:

- For the 9 m (30 ft) cable model, add suffix "**W/30**" to the 2 m model number (for example, DS186E W/30)
- For the 4-pin integral M12 QD model, add suffix "**Q8**" to the 2 m model number (for example, DS186EQ8)
- For the 4-pin integral M8 QD model, add suffix "**Q7**" to the 2 m model number (for example, DS186EQ7)
- For the 150 mm (6 in) cable with a 4-pin M12 QD model, add suffix "**Q5**" to the 2 m model number (for example, DS186EQ5)
- To order the 150 mm (6 in) cable with a 4-pin M8 QD model, add suffix "**Q**" to the 2 m model number (for example, DS186EQ)

Additional obsolete models include the following:

Model	Sensing Mode	Sensing Beam and Range	Connection	Output
DS18VN6LPW	Wide-angle polarized retroreflective	Visible red, 660 nm Range: 3 m (9.8 ft)	2 m cable	NPN
DX18VN6FF50 (all models)	Fixed-field	Visible red, 660 nm Range: 50 mm	All models	NPN
DS18VN6FF100 (all models)	Fixed-field	Visible red, 660 nm Range: 100 mm	All models	NPN

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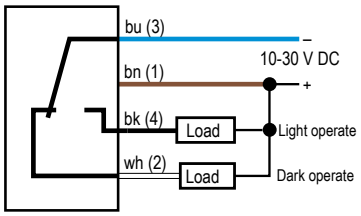
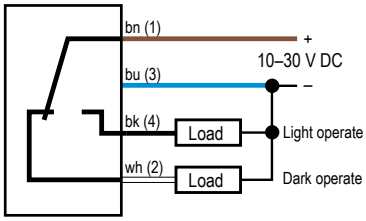
Wiring Diagrams

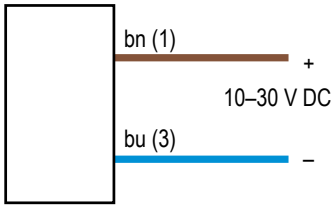
NPN (sinking) outputs



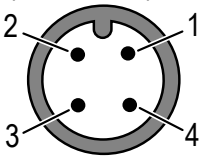
PNP (sourcing) outputs



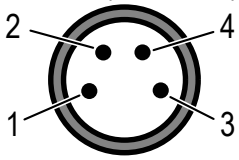
Emitters



4-pin M12 male pinout



4-pin M8 male pinout



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

Two LED indicators

Green on: 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 the 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; 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

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1831 Diegem, BELGIUM

c UL us LISTED
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 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

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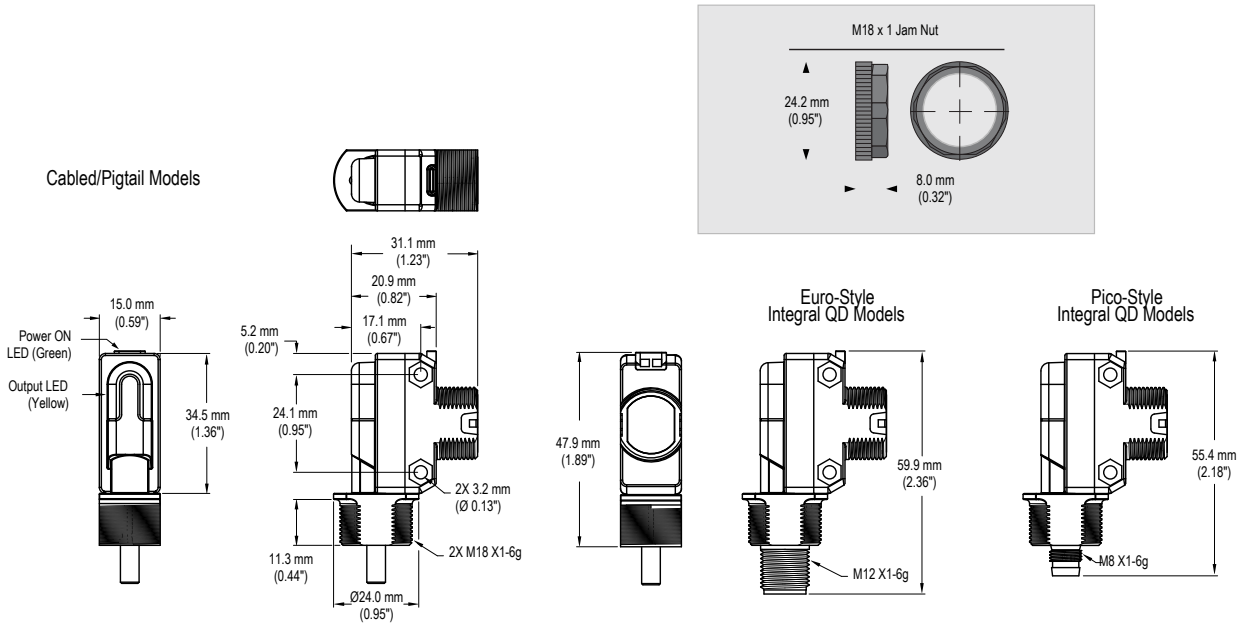
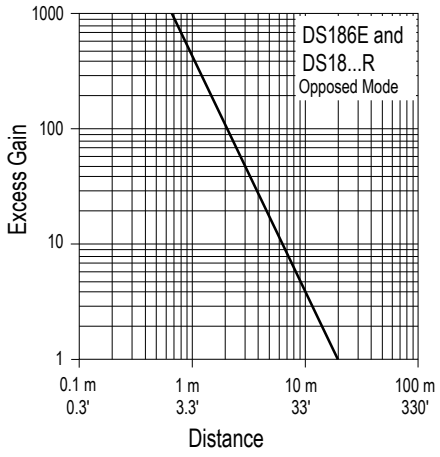
Dimensions

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

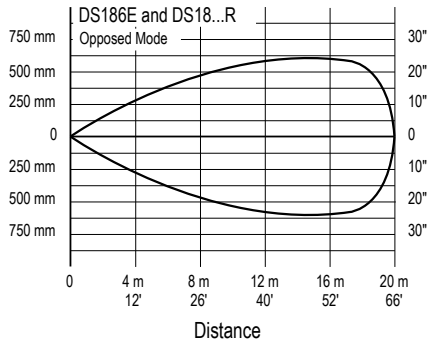


Performance Curves

Opposed Mode—Excess Gain



Opposed Mode—Beam Pattern



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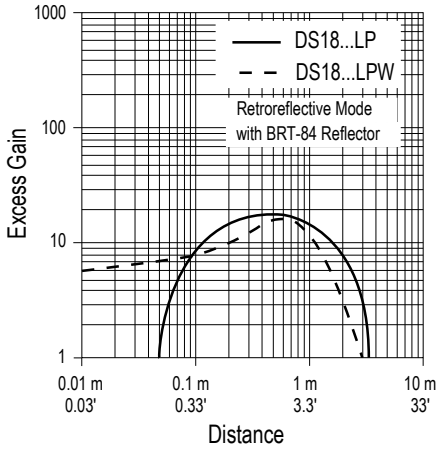
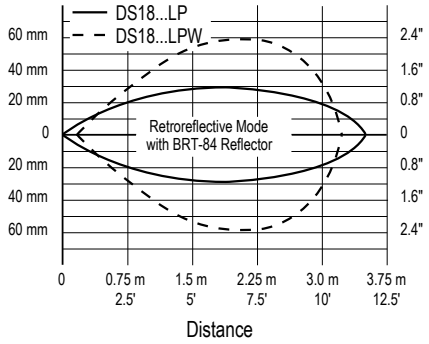
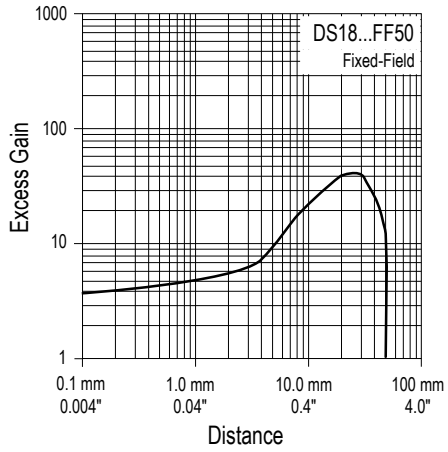
Polarized Retroreflective—Excess Gain



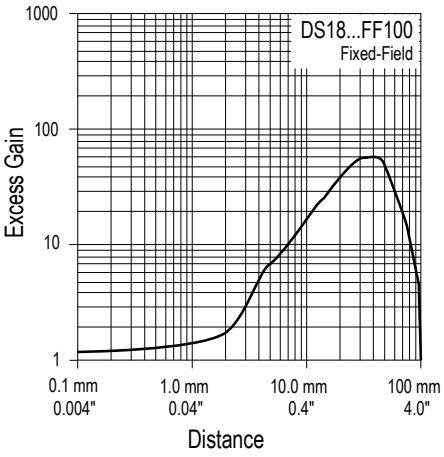
Polarized Retroreflective—Beam Pattern



Fixed-Field 50 mm—Excess Gain



Fixed-Field 100 mm——Excess Gain



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

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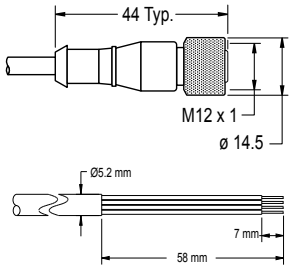
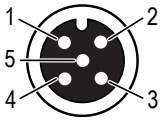
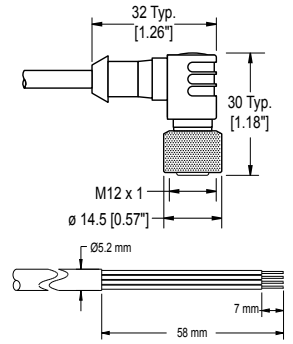
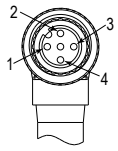
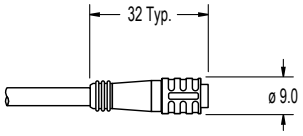
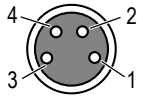
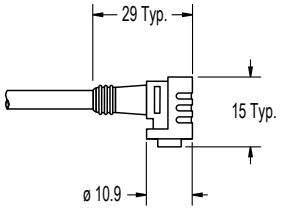
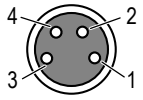
Chapter 3 Accessories

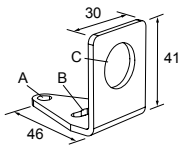
4-Pin Single-Ended M12 Female Cordsets					
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**	
MQDC-406	2 m (6.56 ft)	Straight			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Not used c UL us
MQDC-415	5 m (16.4 ft)				
MQDC-430	9 m (29.5 ft)				
MQDC-450	15 m (49.2 ft)				
MQDC-406RA	2 m (6.56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

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
- CAD Files: DXF, PDF, IGS, STP

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



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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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