# DS18 Series Sensors

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

# Contents

**Chapter 1 Features ..... 3**
Models ..... 3
Wiring Diagrams ..... 5

**Chapter 2 Specifications ..... 6**
Dimensions ..... 7
Performance Curves ..... 7

**Chapter 3 Accessories ..... 9**

**Chapter 4 Product Support and Maintenance ..... 11**
Repairs ..... 11
Banner Engineering Corp Limited Warranty ..... 11

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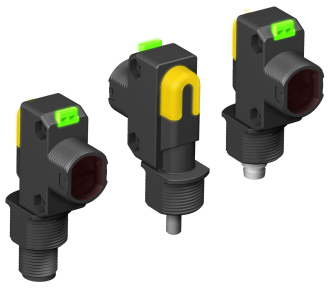
Chapter Contents

Models ..... 3
Wiring Diagrams ..... 5

# 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<br>Effective Beam: 13 mm (0.5 in)<br>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<br>Range: 3.5 m (11.4 ft) | 2 m cable | NPN |
| **DS18VN6LPQ5** | | 150 mm (6 in) cable with a 4-pin M12 QD | NPN |

Continued on page 4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Continued from page 3

| 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<br>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<br>Range: 50 mm (2 in) | 2 m cable | PNP |
| **DS18VP6FF100** | Visible red, 660 nm<br>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<br>Range: 3 m (9.8 ft) | 2 m cable | NPN |
| **DX18VN6FF50** (all models) | Fixed-field | Visible red, 660 nm<br>Range: 50 mm | All models | NPN |
| **DS18VN6FF100** (all models) | Fixed-field | Visible red, 660 nm<br>Range: 100 mm | All models | NPN |


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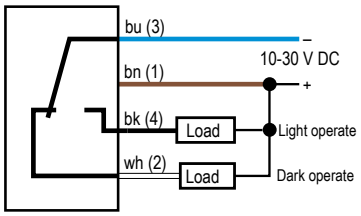
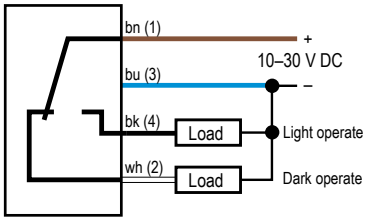
# Wiring Diagrams

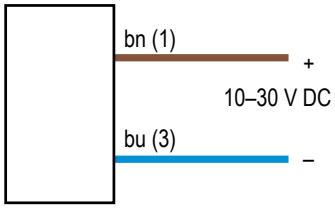
*NPN (sinking) outputs*



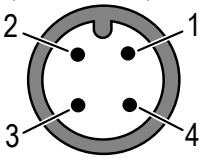

*PNP (sourcing) outputs*



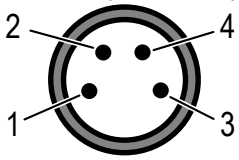

*Emitters*




*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 Contents

Dimensions ..... 7
Performance Curves ..... 7

# 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**

Banner Engineering BV
Park Lane, Culliganlaan 2F bus 3
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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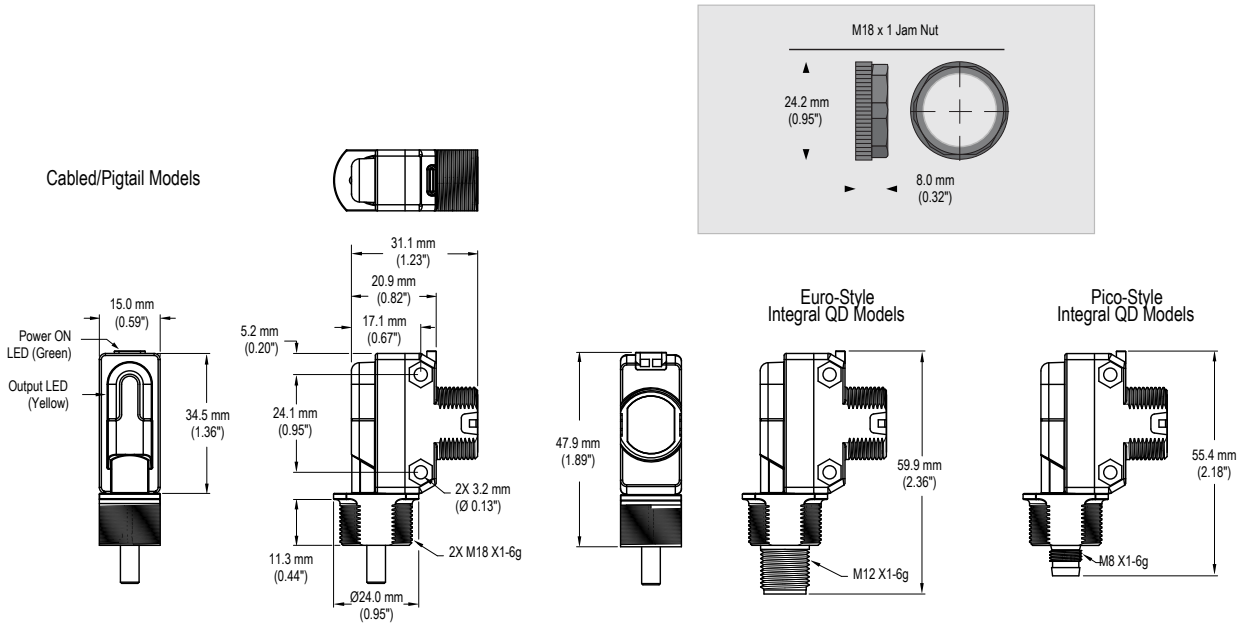
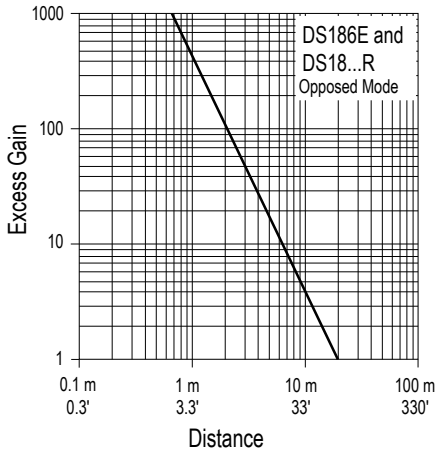
# Dimensions

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

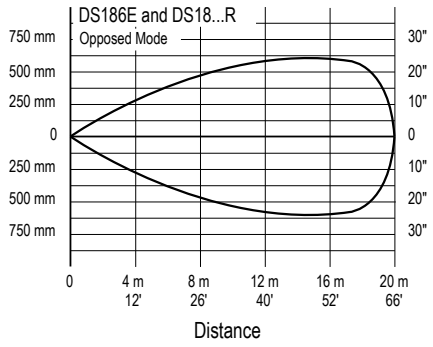



# Performance Curves

*Opposed Mode—Excess Gain*




*Opposed Mode—Beam Pattern*




Continued on page 8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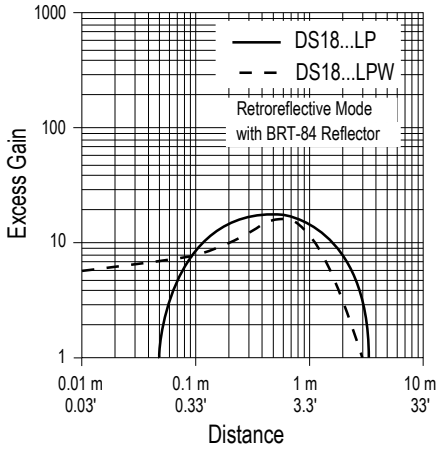
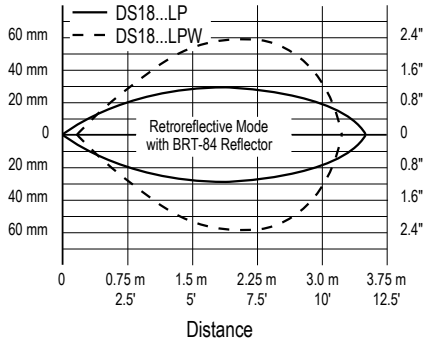
Continued from page 7

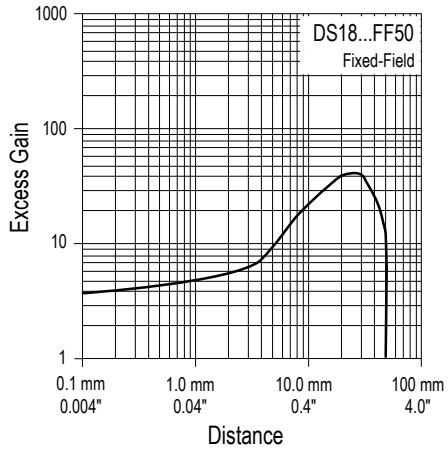
*Polarized Retroreflective—Excess Gain*



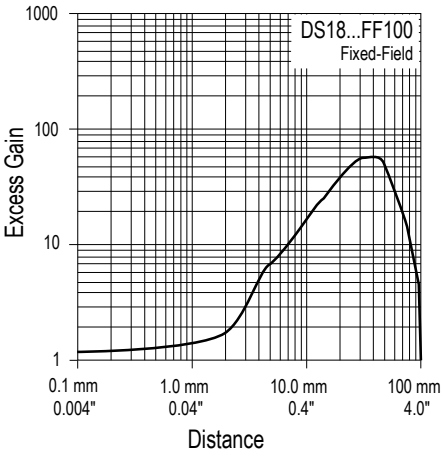

*Polarized Retroreflective—Beam Pattern*




*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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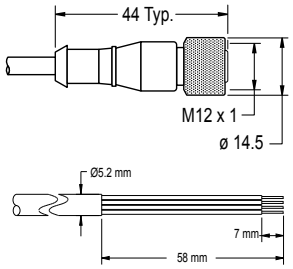
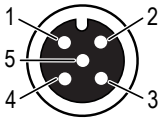
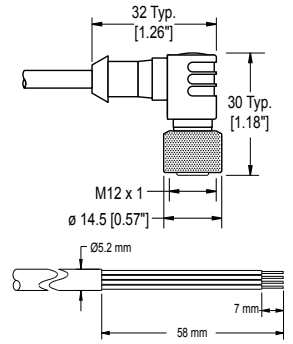
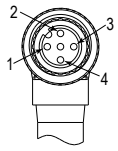
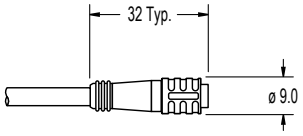
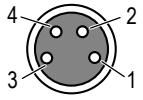
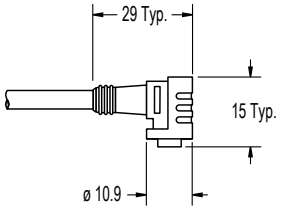
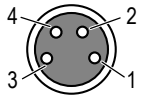
Chapter Contents

# Chapter 3 Accessories

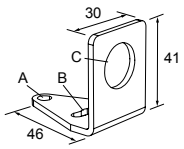
| 4-Pin Single-Ended M12 Female Cordsets | | | | | |
|---|---|---|---|---|---|
| **Model** | **Length** | **Style** | **Dimensions** | **Pinout (Female)** | |
| **MQDC-406** | 2 m (6.56 ft) | Straight |  |  | 1 = Brown<br>2 = White<br>3 = Blue<br>4 = Black<br>5 = Not used<br>c UL us |
| **MQDC-415** | 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<br>2 = White<br>3 = Blue<br>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 Contents

Repairs ..... 11
Banner Engineering Corp Limited Warranty ..... 11

# 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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