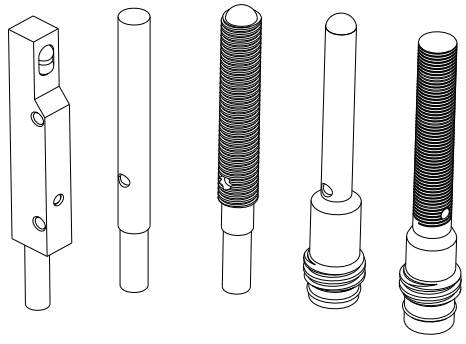
# VSM Series Micro Sensors

## Datasheet

*Miniature self-contained sensors in stainless steel housing*

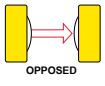
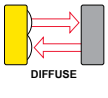


- Tough - 300 series stainless steel body withstands a wide variety of chemicals and cutting fluids
- Tiny sensors are available as small as a 4 mm barrel (about the size of a single optical fiber assembly)
- Economical, self-contained sensors are available in diffuse or opposed sensing modes; no separate amplifier required
- Advanced optical design provides high performance, and very repeatable sensing
- Well-focused, narrow beam allows the entire barrel sensor to be recessed into fixtures (excluding 50 mm range models)
- Smooth, stainless steel barrel is perfect for hygienic applications that require routine cleaning
- A choice of threaded or smooth barrel housings or flat-pack side-looking housing

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

| Housing Style: 4 mm Smooth Barrel | | | | | |
|---|---|---|---|---|---|
| NPN Models | PNP Models | Sensing Mode | Range[1] | Output Type | Connection |
| VSM46E Emitter | |  OPPOSED | 250 mm (9.84 in) | — | 2 m (6.6 ft) |
| VSM46EQ7 Emitter | | | | | 3-Pin Pico QD |
| VSM4RN6R | VSM4RP6R | | | DO | 2 m (6.6 ft) |
| VSM4RN6RQ7 | VSM4RP6RQ7 | | | | 3-Pin Pico QD |
| VSM4AN6CV10 | VSM4AP6CV10 |  DIFFUSE | 10 to 30 mm (0.39 to 1.18 in) typical | LO | 2 m (6.6 ft) |
| VSM4AN6CV10Q7 | VSM4AP6CV10Q7 | | | | 3-Pin Pico QD |
| VSM4AN6CV20 | VSM4AP6CV20 | | 20 to 50 mm (0.79 to 1.97 in) typical | | 2 m (6.6 ft) |
| VSM4AN6CV20Q7 | VSM4AP6CV20Q7 | | | | 3-Pin Pico QD |
| VSM4AN6CV50 | VSM4AP6CV50 | | 50 to 140 mm (1.97 to 5.51 in) typical | | 2 m (6.6 ft) |
| VSM4AN6CV50Q7 | VSM4AP6CV50Q7 | | | | 3-Pin Pico QD |

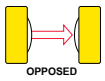
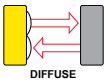
[1] Application Note: These sensors have a specified minimum detection range on a 90% reflectivity diffuse white card, but the maximum detection range varies with target reflectivity, target angle, and sensor tolerance. If reliable background suppression is required in your application, please contact Banner Engineering to specify a fixed-field or adjustable field sensor with background suppression technology.

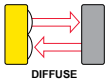
Original Document
157367 Rev. F

7 June 2016

157367

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

| Housing Style: 5 mm Threaded Barrel | | | | | |
|---|---|---|---|---|---|
| NPN Models | PNP Models | Sensing Mode | Range[2] | Output Type | Connection |
| VSM56E Emitter | |   | 250 mm (9.84 in) | — | 2 m (6.6 ft) |
| VSM56EQ7 Emitter | | | | | 3-Pin Pico QD |
| VSM5RN6R | VSM5RP6R | | | DO | 2 m (6.6 ft) |
| VSM5RN6RQ7 | VSM5RP6RQ7 | | | | 3-Pin Pico QD |
| VSM5AN6CV10 | VSM5AP6CV10 |   | 10 to 30 mm (0.39 to 1.18 in) typical | LO | 2 m (6.6 ft) |
| VSM5AN6CV10Q7 | VSM5AP6CV10Q7 | | | | 3-Pin Pico QD |
| VSM5AN6CV20 | VSM5AP6CV20 | | 20 to 50 mm (0.79 to 1.97 in) typical | | 2 m (6.6 ft) |
| VSM5AN6CV20Q7 | VSM5AP6CV20Q7 | | | | 3-Pin Pico QD |
| VSM5AN6CV50 | VSM5AP6CV50 | | 50 to 140 mm (1.97 to 5.51 in) typical | | 2 m (6.6 ft) |
| VSM5AN6CV50Q7 | VSM5AP6CV50Q7 | | | | 3-Pin Pico QD |

| Housing Style: Flat-Pack Side-Looker | | | | | |
|---|---|---|---|---|---|
| NPN Models | PNP Models | Sensing Mode | Range[2] | Output Type | Connection |
| VSMQAN6CV20 | VSMQAP6CV20 |   | 20 to 50 mm (0.79 to 1.97 in) typical | LO | 2 m (6.6 ft) |
| VSMQAN6CV50 | VSMQAP6CV50 | | 50 to 140 mm (1.97 to 5.51 in) typical | | |
| VSMQAN6CV90 | VSMQAP6CV90 | | 90 to 200 mm (3.54 to 7.87 in) typical | | |

[2] Application Note: These sensors have a specified minimum detection range on a 90% reflectivity diffuse white card, but the maximum detection range varies with target reflectivity, target angle, and sensor tolerance. If reliable background suppression is required in your application, please contact Banner Engineering to specify a fixed-field or adjustable field sensor with background suppression technology.

## Specifications

Supply Voltage and Current
10 to 30 V dc (10% maximum ripple)

Supply Protection Circuitry
Protected against reverse polarity and transient voltages

Output Configuration
Single-output: 1 NPN or 1 PNP; light operate (LO) or dark operate (DO), depending on model

Output Rating
100 mA max
OFF-state leakage current: less than 1 µA
ON-state saturation voltage: less than 2 V at 100 mA

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 (AWG) | Required Overcurrent Protection (Amps) |
|---|---|
| 20 | 5.0 |
| 22 | 3.0 |
| 24 | 2.0 |
| 26 | 1.0 |
| 28 | 0.8 |
| 30 | 0.5 |

Output Protection Circuitry
Protected against false power-up and continuous overload or short circuit of outputs
Overload trip point ≥ 100 mA

Response Time
2.5 milliseconds

Delay at Power-Up
20 milliseconds

Repeatability
1 millisecond

Indicators
Yellow LED: light sensed

Construction
300 series stainless steel with PVC cable
CV10, CV20: sapphire lens
CV50, emitter and receiver: glass lens

Environmental Rating
IP67

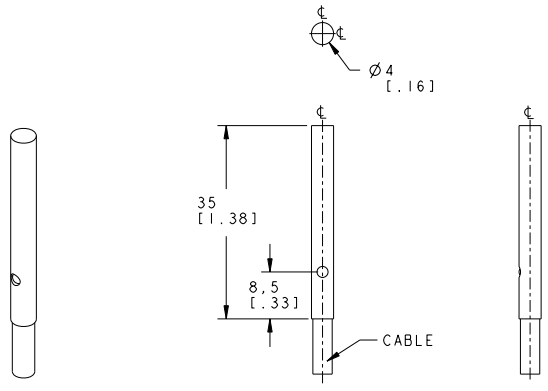
Connection
2 m PVC-jacketed cable or 3-pin Pico-style integral QD (Q7), depending on model.

Operating Conditions
Temperature: 0 °C to +55 °C (+32 °F to +131 °F)

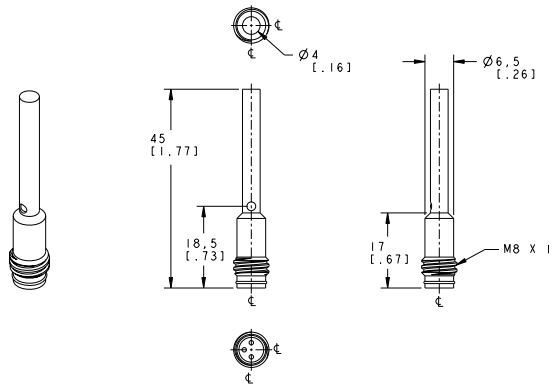
Certifications

## Dimensions

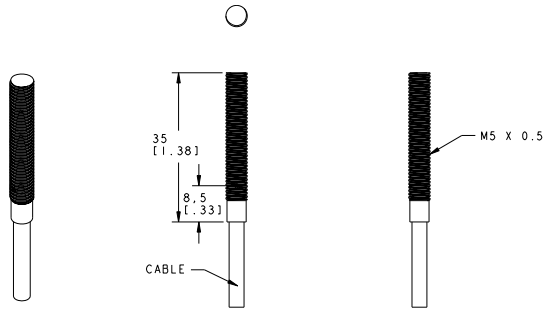
4 mm Smooth Barrel Emitter/Receiver Cable and 50 mm CV Models



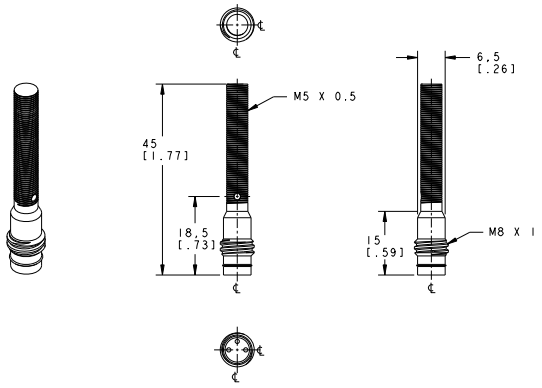

4 mm Smooth Barrel Emitter/Receiver QD and 50 mm CV Models



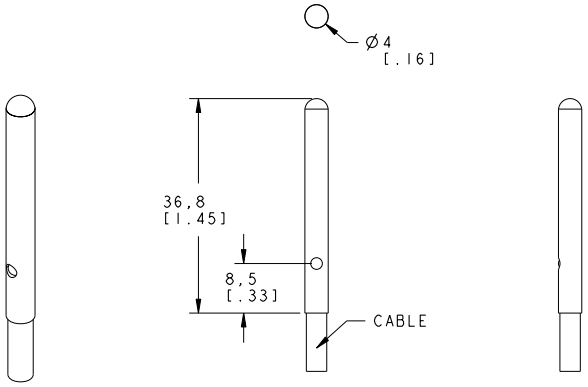
## 5 mm Threaded Barrel Emitter/Receiver Cable and 50 mm CV Models



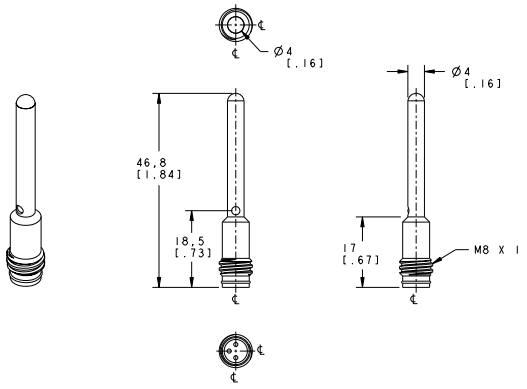

## VSM5 Emitter/Receiver QD and 50 mm CV Models



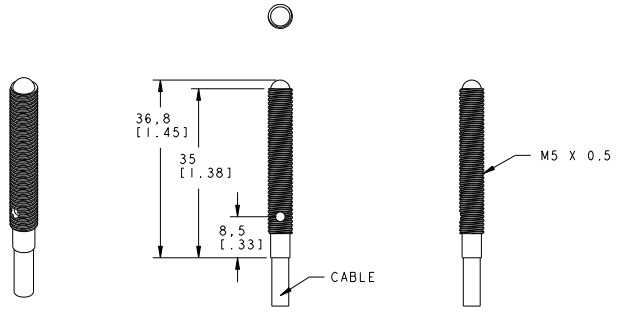

## 4 mm Smooth Barrel Cable/10 and 20 mm CV Models



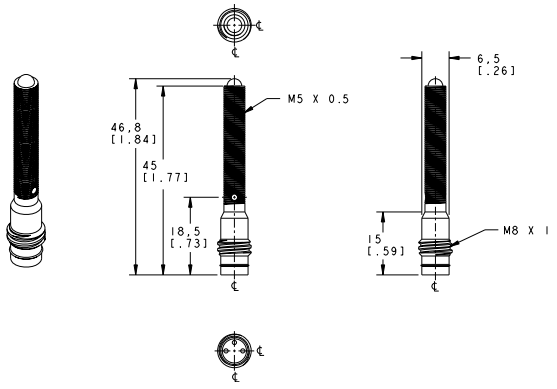

## 4 mm Smooth Barrel QD/10 and 20 mm CV Models

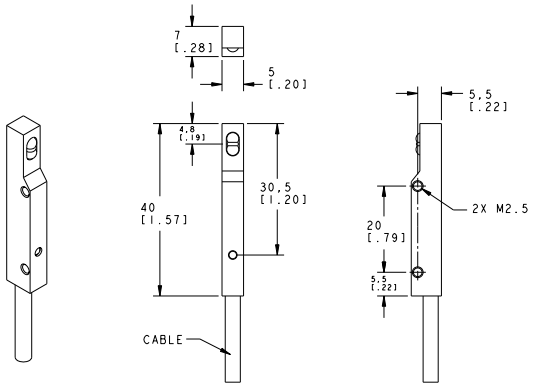



## 5 mm Threaded Barrel Cable/10 and 20 mm CV Models



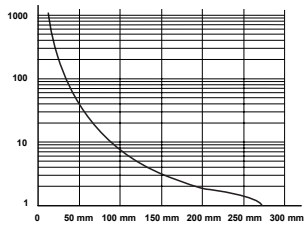
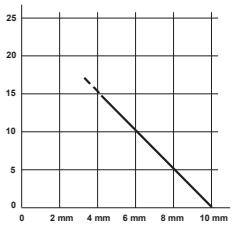
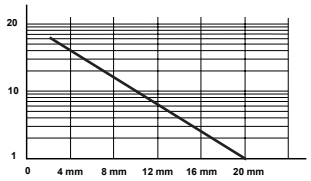
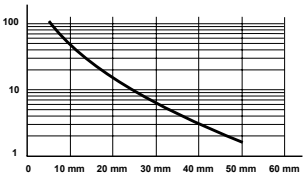

## 5 mm Threaded Barrel QD/10 and 20 mm CV Models



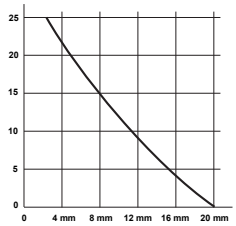
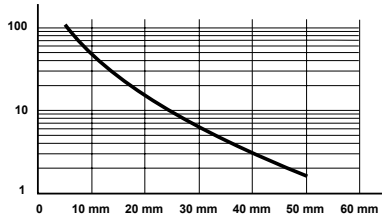
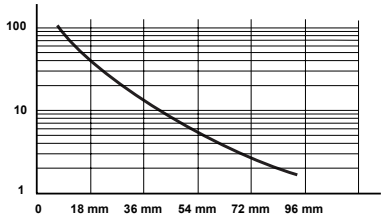
| Flat-Pack Side-Looker |
|---|
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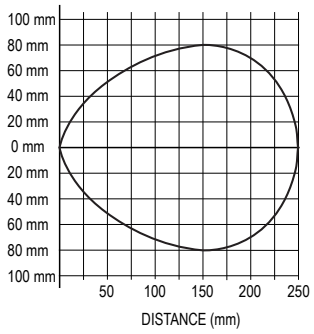
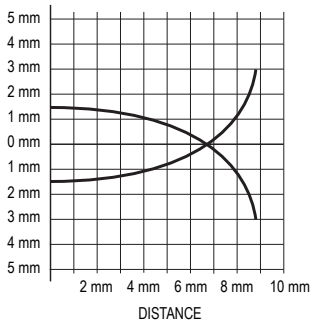
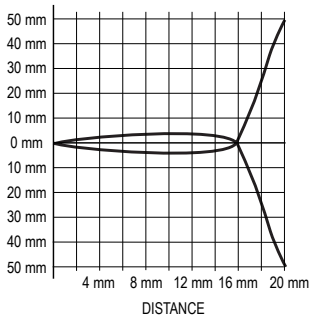
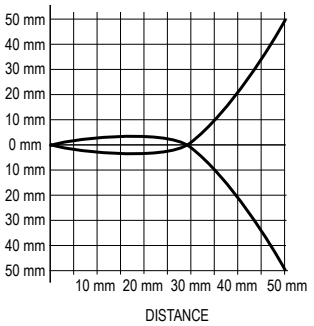
## Excess Gain Curves

| Opposed Mode VSM4 and VSM5 | Diffuse Mode VSM4 and VSM5 | | |
|---|---|---|---|
| Range 250 mm | Range 10 mm | Range 20 mm | Range 50 mm |
|  |  |  |  |



| Diffuse Mode VSMQ | | |
|---|---|---|
| Range 20 mm | Range 50 mm | Range 90 mm |
|  |  |  |

## Beam Patterns

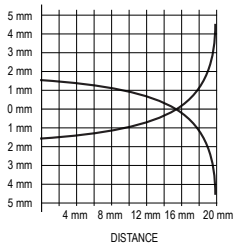
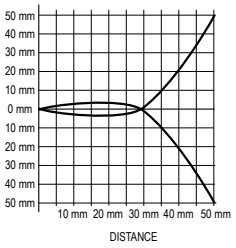
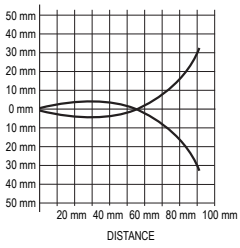
| Opposed Mode VSM4 and VSM5 | Diffuse Mode VSM4 and VSM5 | | |
|---|---|---|---|
| Range 250 mm | Range 10 mm | Range 20 mm | Range 50 mm |
|  |  |  |  |









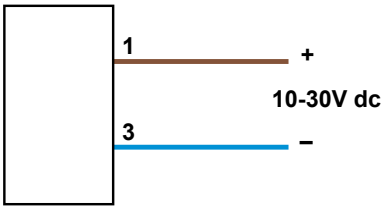
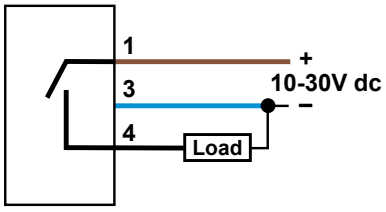
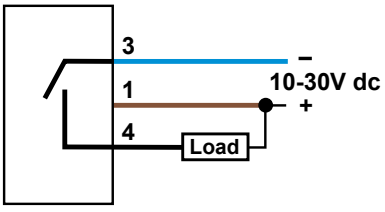
| Diffuse Mode VSMQ | | |
|---|---|---|
| Range 20 mm | Range 50 mm | Range 90 mm |
|  |  |  |





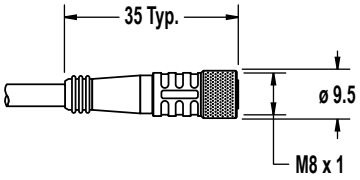
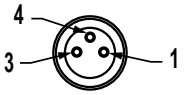
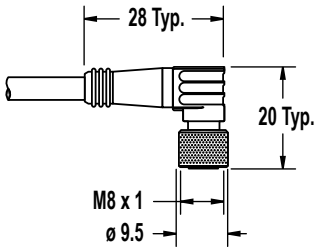


## Wiring

| Emitters | PNP Models | NPN Models |
|---|---|---|
|  |  |  |

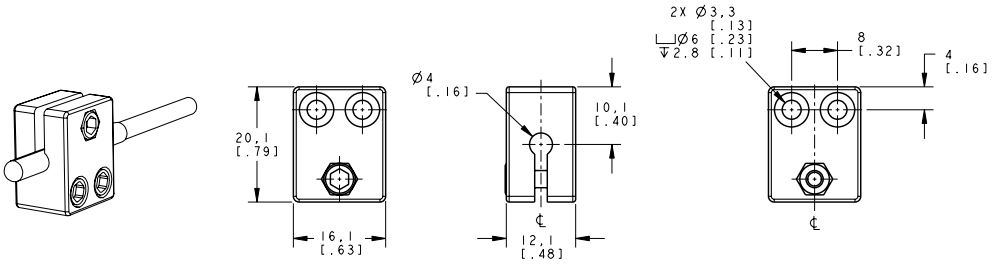
# Accessories

## Cordsets

| 3-Pin Threaded M8/Pico-Style Cordsets | | | | |
|---|---|---|---|---|
| Model | Length | Style | Dimensions | Pinout |
| PKG3M-2 | 2 m (6.56 ft) | Straight |  |  1 = Brown<br>3 = Blue<br>4 = Black |
| PKG3M-5 | 5 m (16.40 ft) | | | |
| PKG3M-7 | 7 m (22.97 ft) | | | |
| PKG3M-9 | 9 m (29.53 ft) | | | |
| PKG3M-10 | 10 m (32.81 ft) | | | |
| PKW3M-2 | 2 m (6.56 ft) | Right-Angle |  | |
| PKW3M-5 | 5 m (16.40 ft) | | | |
| PKW3M-9 | 9 m (29.53 ft) | | | |

## Brackets

SMBVSM4




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Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

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