

Datasheet

Self-contained Miniature Sensors



1. Power ON Indicator
2. Received Signal Indicator
3. 2 m Cable or 150 mm (6 inch) Quick-Disconnect

- 10 V to 30 V dc operation
- Visible red or infrared sensing beam, depending on model
- 10 mm (0.4 in) or 15 mm (0.6 in) convergent point, depending on model
- NPN (sinking) or PNP (sourcing) output, and dark or light operate, depending on model
- 3-wire connection; output load capacity to 50 mA
- Choice of integral cable or quick-disconnect connector



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.

Visible Red (860 nm) Beam Models	Infrared (865 nm) Beam Models	Focus	Output Type	Cable ¹
VS1AN5CV10	VS1AN5C10	10 mm (0.4 in)	NPN/LO	2 m (6.5 ft)
VS1RN5CV10	VS1RN5C10		NPN/DO	
VS1AP5CV10	VS1AP5C10		PNP/LO	
VS1RP5CV10	VS1RP5C10		PNP/DO	
VS1AN5CV20	VS1AN5C20	15 mm (0.6 in)	NPN/LO	
VS1RN5CV20	VS1RN5C20		NPN/DO	
VS1AP5CV20	VS1AP5C20		PNP/LO	
VS1RP5CV20	VS1RP5C20		PNP/DO	

Overview

VS1 Series miniature self-contained sensors are designed for precision sensing in small areas previously accessible only to remote or fiber optic models. Typical applications include mounting inside vibrating feeders and electronic component handling equipment, where larger sensors will not fit.

The sensing energy of a convergent-mode sensor is concentrated at the specified focus point. Convergent-mode sensors are less sensitive to background reflections, compared with diffuse-mode sensors. Contact the factory if background reflections are a problem.

¹

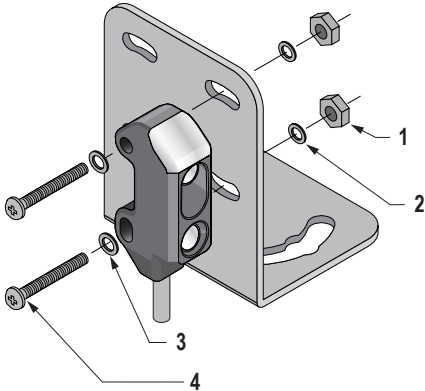
- To order 9 m cables models, add suffix "W/30" to the model number (e.g., VS1AN5CV10 W/30).
- To order 150 mm (6 inch) cable with threaded 3-pin Pico-style quick disconnect fitting models, add suffix "Q" to the model number (e.g., VS1AN5CV10Q). A model with a QD connector requires a mating cable; see [Accessories](#) on page 4.



Installation Notes

Included with each sensor is a hardware packet containing two stainless steel M2 × 0.4 × 16 mm Phillips pan-head machine screws, flat washers, lock washers, and hex nuts. To mount the sensor, use the supplied flat washer against the front surface of the sensor housing, between it and the screw head. If mounting to one of the optional brackets, place the lock washer against the back of the bracket, followed by the nut. If mounting directly to a threaded hole, place the lock washer between the screw head and the flat washer.

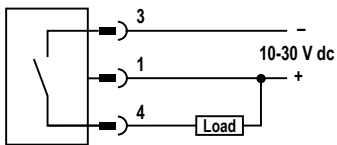
For best results, mount the VS1 where it is protected from moisture, high humidity and dirt.



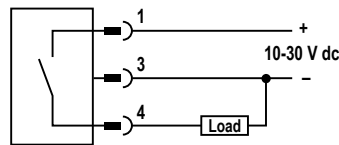
1. Hex Nut (2)
2. Lock Washer (2)
3. Washer (2)
4. M2 × 0.4 × 16 mm Phillips Pan-head Machine Screw (2)

Wiring Diagrams

NPN Outputs



PNP Outputs



Key:

- 1 = Brown
- 3 = Blue
- 4 = Black
- X = Load



NOTE: QD hookups are shown. Cabled hookups are functionally identical.

Specifications

Supply Voltage and Current

10 V to 30 V dc (10% maximum ripple) at less than 25 mA (exclusive of load)

Supply Protection Circuitry

Protected against reverse polarity and transient voltages

Output Protection Circuitry

Protected against false pulse on power-up and continuous overload or short circuit of outputs. Overload trip point ≥ 100 mA.

Output Configuration

SPST solid-state switch
NPN (current sinking) or PNP (current sourcing), depending on model
Light operate (N.O.) or dark operate (N.C.), depending on model

Output Rating

50 mA maximum
OFF-state leakage current: < 1 microamp at 24 V dc
ON-state saturation voltage: < 0.25 V at 10 mA dc; < 0.5 V at 50 mA dc

Output Response Time

1 millisecond ON and OFF

Repeatability

250 microseconds

Indicators

Green ON: sensor power ON
Green flashing: output overload
Amber ON: light is sensed
Amber flashing: marginal excess gain (1 to 1.5 times) in light condition

Construction

Black ABS/polycarbonate housing with clear acrylic lens

Environmental Rating

IEC IP54; NEMA 3

Connections

2 m (6.5 ft) attached cable: three #28 ga stranded conductors with PE insulation; PVC outer cable jacket; or
150 mm (6 inch) cable with 3-pin Pico-style quick-disconnect fitting. QD cables are ordered separately.

Operating Conditions

-20 °C to $+55$ °C (-4 °F to $+131$ °F)
80% at $+50$ °C maximum relative humidity (non-condensing)

Application Notes

M2 stainless steel mounting hardware included (see Installation Notes).
Optional mounting brackets are available (see Accessories list).

Certifications



Performance Curves

Table 1: Visible Red Beam Models²

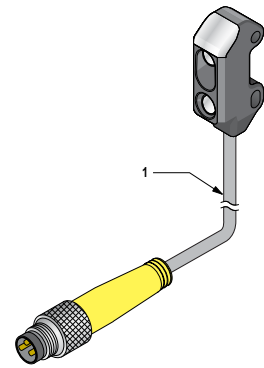
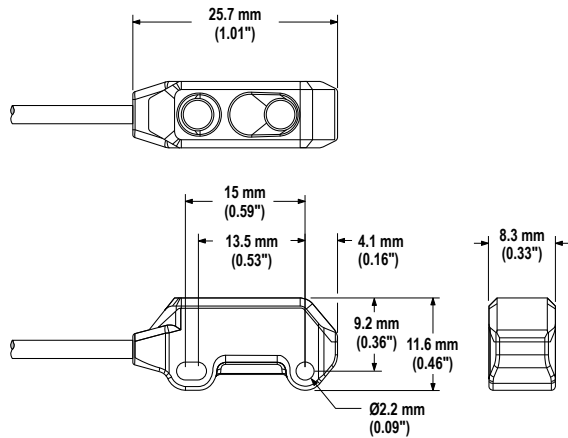
	Excess Gain	Beam Pattern
VS1...CV10		
VS1...CV20		

² Performance based on 90% reflectance white card test

Table 2: Infrared Beam Models²

	Excess Gain	Beam Pattern
VS1...C10		
VS1...C20		

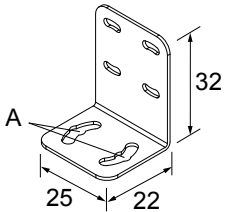
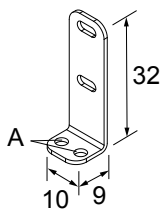
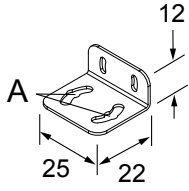
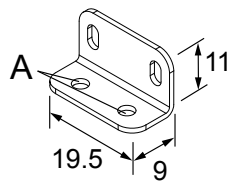
Dimensions



1. 150 mm (6 in) Cable

Accessories

3-Pin Threaded M8/Pico-Style Cordsets				
Model	Length	Style	Dimensions	Pinout (Female)
PKG3M-2	2 m (6.56 ft)	Straight		<p> 1 = Brown 3 = Blue 4 = Black </p>
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)			

Brackets	
<p>SMBVS1T</p> <ul style="list-style-type: none"> Tall right-angle bracket Stainless steel <p>Hole center spacing: A = 16.8</p> <p>Hole size: A = 3.5 x 12.3</p> 	<p>SMBVS1TC</p> <ul style="list-style-type: none"> Tall right-angle compact bracket 300 stainless steel <p>Hole center spacing: A = 5.5</p> <p>Hole size: A = \varnothing 2.8</p> 
<p>SMBVS1S</p> <ul style="list-style-type: none"> Short right-angle bracket 18-ga. stainless steel <p>Hole center spacing: A = 16.8</p> <p>Hole size: A = 3.5 x 12.3</p> 	<p>SMBVS1SC</p> <ul style="list-style-type: none"> Short right-angle bracket 18-ga. stainless steel <p>Hole center spacing: A = 10.0</p> <p>Hole size: A = \varnothing 2.8</p> 

Banner Engineering Corp. Limited Warranty

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.

THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.

This Warranty is exclusive and limited to repair or, at the discretion of Banner Engineering Corp., replacement. IN NO EVENT SHALL BANNER ENGINEERING CORP. BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR ANY EXTRA COSTS, EXPENSES, LOSSES, LOSS OF PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT OR FROM THE USE OR INABILITY TO USE THE PRODUCT, WHETHER ARISING IN CONTRACT OR WARRANTY, STATUTE, TORT, STRICT LIABILITY, NEGLIGENCE, OR OTHERWISE.

Banner Engineering Corp. reserves the right to change, modify or improve the design of the product without assuming any obligations or liabilities relating to any product previously manufactured by Banner Engineering Corp.

Copyright Notice

Any misuse, abuse, or improper application or installation of this product or use of the product for personal protection applications when the product is identified as not intended for such purposes will void the product warranty. Any modifications to this product without prior express approval by Banner Engineering Corp will void the product warranties. All specifications published in this document are subject to change. Banner reserves the right to modify product specifications or update documentation at any time. For the most recent version of any documentation, refer to: www.bannerengineering.com. © Banner Engineering Corp. All rights reserved.