

VS1 Series

Miniature, Self-Contained Convergent-Mode Sensors

Features



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

1. Power ON Indicator
2. Received Signal Indicator
3. 2 m Cable or Pigtail Quick-Disconnect



Convergent

Visible Red, 630 nm



Convergent

Infrared, 865 nm

Models

Visible Red Beam Models	Infrared Beam Models	Focus	Cable*	Supply Voltage	Output Type		
VS1AN5CV10	VS1AN5C10	10 mm (0.4")	2 m (6.5') 3-wire integral cable	10 to 30V dc	NPN/LO		
VS1RN5CV10	VS1RN5C10				NPN/DO		
VS1AP5CV10	VS1AP5C10				PNP/LO		
VS1RP5CV10	VS1RP5C10				PNP/DO		
VS1AN5CV20	VS1AN5C20	15 mm (0.6")			2 m (6.5') 3-wire integral cable	10 to 30V dc	NPN/LO
VS1RN5CV20	VS1RN5C20						NPN/DO
VS1AP5CV20	VS1AP5C20						PNP/LO
VS1RP5CV20	VS1RP5C20						PNP/DO

* Only standard 2 m (6.5') cable models are listed above. For other cable/connector options:

- **9 m cables:** add suffix "W/30" to the model number (e.g., **VS1AN5CV10 W/30**).
- **150 mm (6") pigtail with threaded 3-pin Pico-style QD:** add suffix "Q" to the model number (e.g., **VS1AN5CV10Q**).
A model with a QD connector requires a mating cable; see [Quick-Disconnect \(QD\) Cordsets](#) on page 5.



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 (see [Models](#) on page 1). Convergent-mode sensors are less sensitive to background reflections, compared with diffuse-mode sensors. Contact the factory if background reflections are a problem.

Installation Notes

Included with each sensor is a hardware packet containing two stainless steel M2 x 0.4 x 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 (see Figure 1).

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

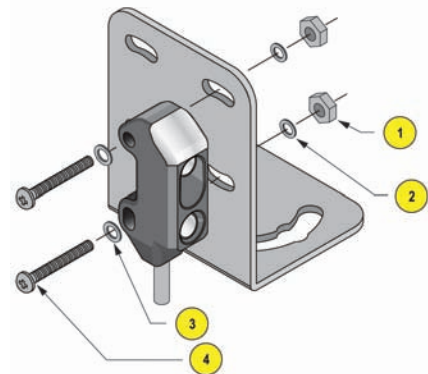


Figure 1. Sensor Mounting

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




WARNING . . . Not To Be Used for Personnel Protection

Never use this product as a sensing device for personnel protection. Doing so could lead to serious injury or death

This product 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 deenergized sensor output condition. Consult your Banner Safety Products catalog for safety products that meet OSHA, ANSI and IEC standards for personnel protection.

Specifications

Feature	Description
Supply Voltage and Current	10 to 30V dc (10% maximum ripple) at less than 25 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
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 24V dc ON-state saturation voltage: < 0.25V at 10 mA dc; < 0.5V at 50 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs. Overload trip point \geq 100 mA.
Output Response Time	1 millisecond ON and OFF
Repeatability	250 microseconds
Indicators	Two LEDs: Green and Yellow Green ON steady: sensor power ON Green flashing: output overload Yellow ON steady: light is sensed Yellow flashing: marginal excess gain (1-1.5x) in light condition
Construction	Black ABS/polycarbonate housing with clear acrylic lens
Environmental Rating	IP54; NEMA 3
Connections	2 m (6.5') attached cable: three #28 ga stranded conductors with PE insulation; PVC outer cable jacket; or pigtail with 3-pin Pico-style quick-disconnect fitting. QD cables are ordered separately.
Operating Conditions	Temperature: -20° to +55° C (-4° to +131° F) Maximum Relative Humidity: 80% at 50° C (non-condensing)
Application Notes	M2 stainless steel mounting hardware included (see "Installation Notes"). Optional mounting brackets are available (see Accessory Mounting Brackets on page 6).
Certifications	

Performance Curves

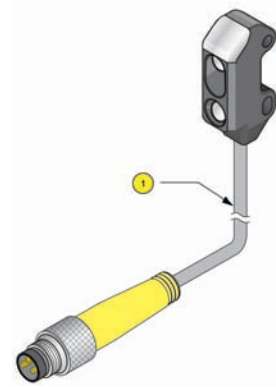
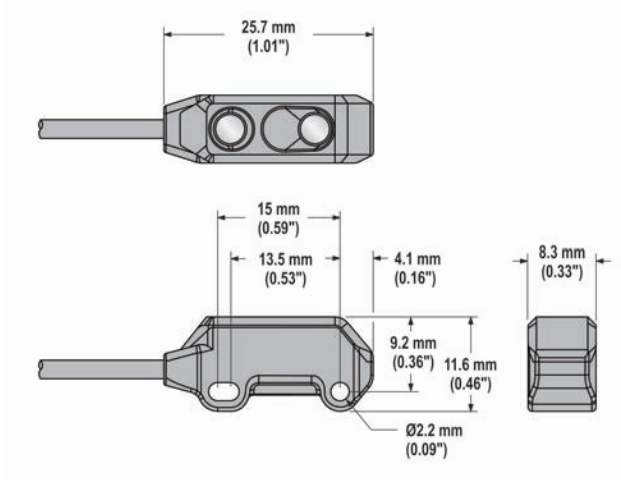
Visible Red Beam Models

	Excess Gain	Beam Pattern
	Performance based on 90% reflectance white card test	
VS1...CV10		
VS1...CV20		
	X: Distance Y: Excess Gain	X: Distance Y: Beam Pattern

Infrared Beam Models

	Excess Gain	Beam Pattern
	Performance based on 90% reflectance white card test	
VS1...C10		
VS1...C20		
	X: Distance Y: Excess Gain	X: Distance Y: Beam Pattern

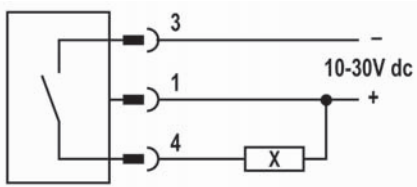
Dimensions



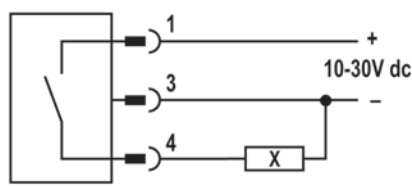
1. 150 mm (6") Pigtail

Hookups

NPN Outputs



PNP Outputs



Key:



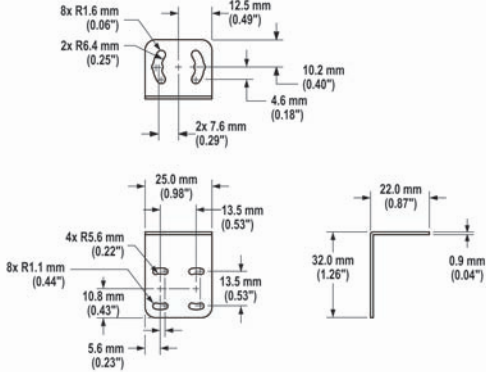
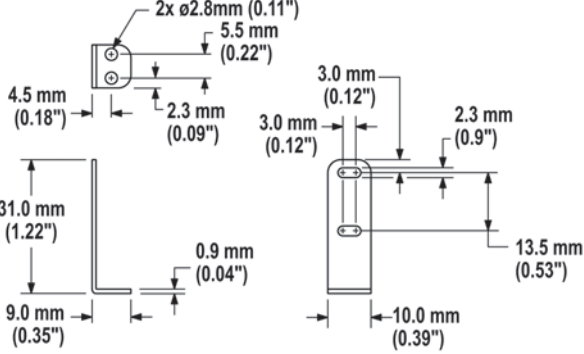

- 1 = Brown
- 3 = Blue
- 4 = Black
- X = Load

QD hookups are shown. Cabled hookups are functionally identical.

Quick-Disconnect (QD) Cordsets

Style	Model	Length	Dimensions	Pinout
3-pin Pico-style straight with M8 threads	PKG3M-2 PKG3M-9	2 m (6.5') 9 m (30')		Female
				Wiring Key: 1 = Brown 3 = Blue 4 = Black

Accessory Mounting Brackets

<p>SMBVS1T</p> <ul style="list-style-type: none"> Tall bracket 300 series stainless steel 		<p>SMBVS1TC</p> <ul style="list-style-type: none"> Tall compact bracket 300 series stainless steel 	
			
<p>SMBVS1S</p> <ul style="list-style-type: none"> Tall compact bracket 300 series stainless steel 		<p>SMBVS1SC</p> <ul style="list-style-type: none"> Tall compact bracket 300 series stainless steel 	