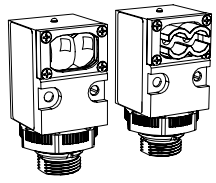
# Features

3-wire AC Self-Contained Sensors with Solid-State Outputs



- Sensors with 3-wire hookup for 24 V AC to 130 V AC
- All sensing modes available: opposed, retroreflective, diffuse (proximity), convergent, and fiberoptic
- Switch-selectable light- or dark-operate
- Totally encapsulated circuitry in a rugged, molded plastic housing; NEMA 1, 2, 3, 3S, 4, 4X, 12, and 13
- Integral conduit fitting and 1.8 m (6 ft) PVC-covered cable supplied on standard models; NEMA-4 Turck *Minifast*™ Quick Disconnect cable/connector combination optional
- Adjustable sensitivity
- Versatile mounting options

**WARNING:**

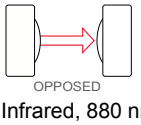
- **Do not use this device for personnel protection**
- Using this device for personnel protection could result in serious injury or death.
- This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A device failure or malfunction can cause either an energized (on) or de-energized (off) output condition.

# Models

To order the 9 m (30 ft) PVC cable model, add the suffix "W/30" to the cabled model number. For example, SMA91E W/30.

To order the 3-pin Mini quick-disconnect (QD) model, add the suffix "QD" to the model number. For example, SMA91EQD. A model with a QD connector requires a mating cable; see "Quick-Disconnect Cordsets" on page 7.

## Opposed Mode Emitter (E) and Receiver (R) SMA912 Models




Infrared, 880 nm

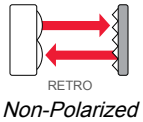
Opposed mode sensors have higher excess gain than other models, and therefore should be used whenever possible. The small size of these sensors makes them ideal for many conveyor applications. Their small effective beam size (particularly of the ESR/RSR models) enables them to reliably detect relatively small objects. VALU-BEAM opposed mode sensors have a visible red tracer beam which simplifies sensor alignment. ESR/RSR models have a wide beam angle for very forgiving alignment within the 3 m (10 ft) range. E/R models have a narrow beam spread and should be used when it is important to minimize optical crosstalk between adjacent emitter-receiver pairs at close range in multiple sensor arrays.

| Models | Range | Supply Voltage | Response | Repeatability | Effective Beam |
|---|---|---|---|---|---|
| **SMA91E** | 61 m (200 ft) | 10 V AC/DC to 250 V AC/DC | 8 ms on/4 ms off | 1 ms | 0.5 in diameter |
| **SMA91R** | | 24 V AC to 130 V AC | | | |
| **SMA91ESR** | 3 m (10 ft) | 24 to 130 V AC | 8 ms on/4 ms off | | 0.14 in diameter |

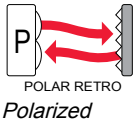
The following models are no longer available for order but are still covered by the information in this document.

| Models | Range | Supply Voltage | Response | Repeatability | Effective Beam |
|---|---|---|---|---|---|
| **SMA91RSR** | 3 m (10 ft) | 24 to 130 V AC | 8 ms on/4 ms off | 1 ms | 0.14 in diameter |

## Retroreflective SMA912 Models




*Non-Polarized*




*Polarized*

Visible red, 650 nm

A visible-red light beam reduces the potential for false signals from highly reflective objects (proxing) and simplifies alignment. Anti-glare (AG) models polarize the emitted light and filter out unwanted reflections, making their use possible in applications otherwise unsuited to retroreflective sensing (when reduced excess gain is acceptable). Maximum range with "LV" units is attained when using the model BRT-3 76 mm (3 in) comer cube reflector. For details on retroreflective target materials, see www.bannerengineering.com.

Original Instructions
08-Apr-26

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p/n: 03345 Rev H

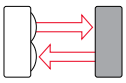
ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

| Models | Range | Supply Voltage | Response | Repeatability | Beam |
|---|---|---|---|---|---|
| **SMA912LV** | 152.4 mm to 9.1 m (6 in to 30 ft ) | 24 V AC to 130 V AC | 4 ms on/4 ms off | 1.3 ms | Visible red, 650 nm |
| **SMA912LVAGQD** | 0.3 m to 4.6 m (1 ft to 15 ft) | | | | Visible red, 650 nm with polarizing filter |

The following models are no longer available for order but are still covered by the information in this document.

| Models | Range | Supply Voltage | Response | Repeatability | Beam |
|---|---|---|---|---|---|
| **SMA912LVAG** | 0.3 m to 4.6 m (1 ft to 15 ft) | 24 V AC to 130 V AC | 4 ms on/4 ms off | 1.3 ms | Visible red, 650 nm with polarizing filter |

## Diffuse Mode SMA912 Models




Infrared, 880 nm

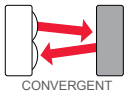
These sensors operate by detecting the reflection of their own light from the object being sensed, and require no special reflectors. "DSR" models have better response than "D" models to objects within 76 mm (3 inches) of the sensor. Use "DSR" models when it is necessary to minimize sensor response to background objects.

| Models | Range | Supply Voltage | Response | Repeatability |
|---|---|---|---|---|
| **SMA912D** | 762 mm (30 in) | 24 V AC to 130 V AC | 4 ms on/4 ms off | 1.3 ms |
| **SMA912DSRQD** | 381 mm (15 in) | | | |

The following models are no longer available for order but are still covered by the information in this document.

| Models | Range | Supply Voltage | Response | Repeatability |
|---|---|---|---|---|
| **SMA912DSR** | 381 mm (15 in) | 24 V AC to 130 V AC | 4 ms on/4 ms off | 1.3 ms |

## Convergent Mode SMA912 Models



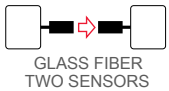

Visible red, 650 nm

VALU-BEAM convergent sensors produce a precise 1.5 mm (0.06 in) diameter sensing spot at a focus point 38 mm (1.5 inches) in front of the sensor lens. Due to their very narrow depth of field, they excel at detecting small objects only a fraction of an inch away from backgrounds. They are also ideal for some high-contrast color-registration applications. Their visible red sensing beam simplifies alignment.

The following models are no longer available for order but are still covered by the information in this document. SMA912CVQD and SMA912CV W/30 are also no longer available for order.

| Models | Focus | Supply Voltage | Response | Repeatability |
|---|---|---|---|---|
| **SMA912CV** | 38 mm (1.5 in) | 24 V AC to 130 V AC | 4 ms on/4 ms off | 1.3 ms |

## Opposed Fiber Optic Mode SMA912 Models (Glass Fibers)




Infrared, 880 nm

The opposed mode fiber optic emitter-receiver pairs are used where the separation between emitting and receiving fibers is greater than a few feet, or where it is inconvenient to run both fibers from a single VALU-BEAM sensor. These models have a watertight o-ring sealed sensor/fiber interface, and are compatible with all Banner glass fiber optic assemblies (see www.bannerengineering.com).

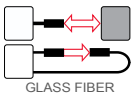
| Models | Range | Supply Voltage | Response | Repeatability |
|---|---|---|---|---|
| **SMA91EF** | See the Excess Gain curves | 10 V AC/DC to 250 V AC/DC | 8 ms on/4 ms off | 1 ms |

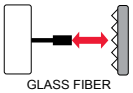
The following models are no longer available for order but are still covered by the information in this document. Models SMA91RFQD and SMA91RF W/30 are also no longer availble for order.

| Models | Range | Supply Voltage | Response | Repeatability |
|---|---|---|---|---|
| **SMA91RF** | See the Excess Gain curves | 24 V AC to 130 V AC | 8 ms on/4 ms off | 1 ms |


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## Glass Fiber Optic SMA912 Models




Infrared, 880 nm

Fiber optic sensing is often the answer when, due to space or environmental limitations, the sensor itself cannot be placed at the actual sensing position. These sensors' powerful modulated infrared beam is compatible with all Banner glass fiber optics in the opposed, retroreflective, and diffuse sensing modes. See www.bannerengineering.com for glass fiber optic selection information. Sensor/fiber interface is waterproof to maintain complete sensing system moisture rejection.

The following models are no longer available for order but are still covered by the information in this document.

| Models | Range | Supply Voltage | Response | Repeatability |
|---|---|---|---|---|
| **SMA912F** | See the Excess Gain curves | 24 V AC to 130 V AC | 4 ms on/4 ms off | 1.3 ms |

# Overview

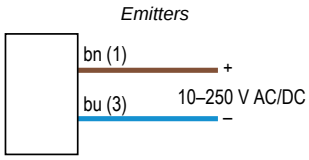
Banner SMA912 Series VALU-BEAMs are rugged, self-contained photoelectric sensors designed for especially demanding industrial applications where economy, performance, and durability are important.

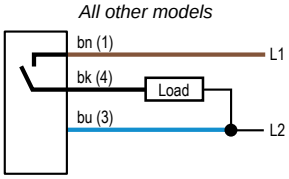
SMA912 Series sensors may be mounted from either the front or the rear using their two through-mounting holes, or by the outside threads of their base (mounting nut supplied), making them ideal for conveyor and other production line applications.

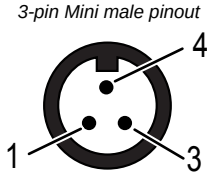
Power-modulated LED light sources give the SMA912 a high degree of immunity to ambient light.

SMA912 Series VALU-BEAM sensors have an easily visible top-mounted red LED indicator to assist in alignment and system monitoring. SMA912 series sensors have Banner's Alignment Indicating Device (AID™) system[1], which lights the indicator LED whenever the sensor sees its modulated light source, and also pulses the LED at a rate proportional to the received light signal strength.

# Wiring Diagrams




**Key**

1 = Brown
3 = Blue
4 = Black

There is no polarity for emitter connections to AC voltage.

# Specifications

**Supply Voltage**

24 V AC to 130 V AC (50/60 Hz), except for SMA91E, ESR, and EF emitters, which operate from 10 V AC/DC to 250 V AC/DC

**Output Configuration**

Solid-state switching element

**Output Rating**

500 mA continuous (60 VA); 5 A inrush

**Response Time**

4 milliseconds ON, 8 milliseconds OFF (except receiver-only units, which are 4 ms ON and 4 ms OFF)

Response time specification of the load should be considered when it is important

**Repeatability**

1.3 milliseconds, except for receiver-only units, which are 1 millisecond

**Environmental Rating**

Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 12, and 13

**Construction**

Reinforced PBT polyester housing

Totally encapsulated, molded acrylic lenses

Stainless steel hardware

**Cable**

2 m (6.5 ft) PVC-jacketed 3-conductor cable are standard

3-pin Mini male quick-disconnect (QD) models are available (one connector pin is unused for emitters). A model with a QD connector requires a mating cable.

**Adjustments**

LIGHT/DARK OPERATE select switch and SENSITIVITY control potentiometer, both located on the rear of the sensor

**Indicator LED**

Top-mounted red AID™ system[2] LED indicator turns on when the sensor sees its own (or its emitter's) modulated light, and pulses at a rate proportional to the received signal strength

Model SMA91E emitter has a visible-red tracer beam, which indicates power on and enables easy line-of-sight alignment

[2] US Patent #4356393

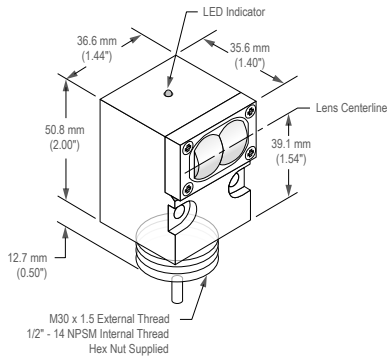
[1] US patent #4356393


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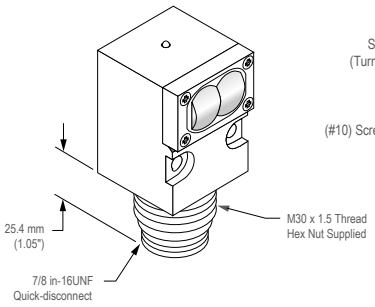
| | |
|---|---|
| **Operating Temperature** | –20 °C to +70 °C (–4 °F to +158 °F) |

# Dimensions

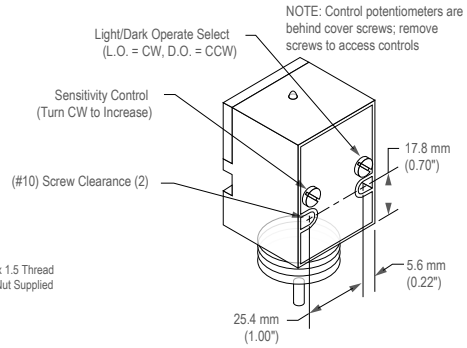
Cabled Models




QD Models

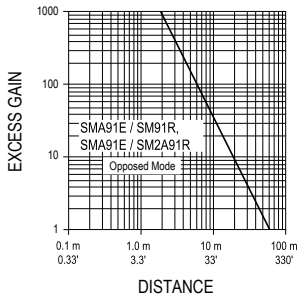
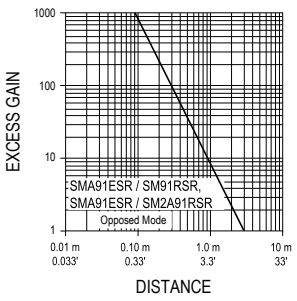
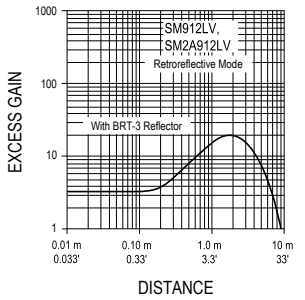
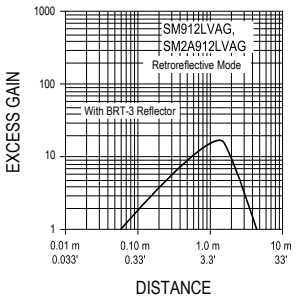
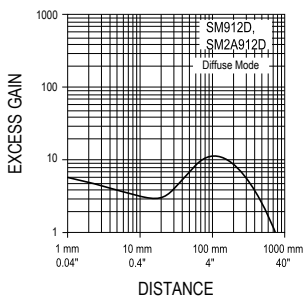
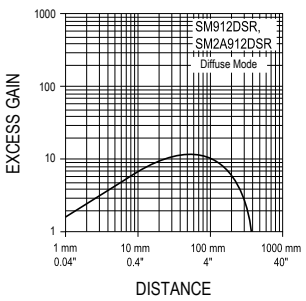



Rear View




**NOTE:** Emitters have no light/dart operate switch, sensitivity control, or indicator LED.

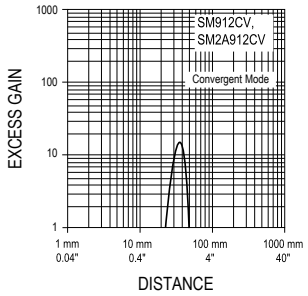
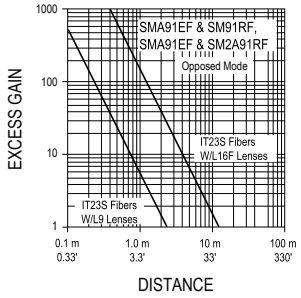
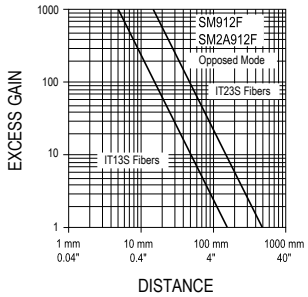
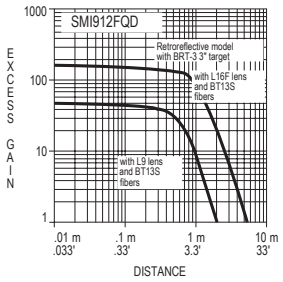
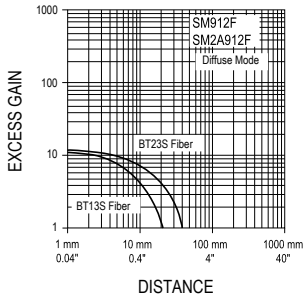
# Excess Gain Curves

| Mode | | |
|---|---|---|
| **Opposed Mode Emitter and Receiver Models** |   |   |
| **Retroreflective Mode Models** |   |   |
| **Diffuse Mode Models** |   |   |

Continued on page 5

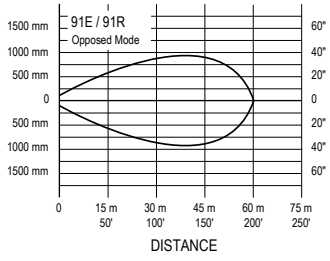
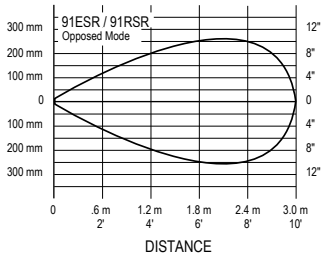
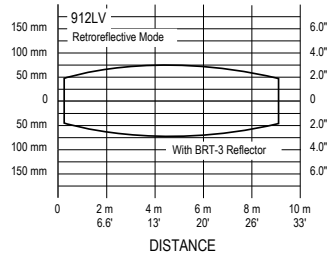
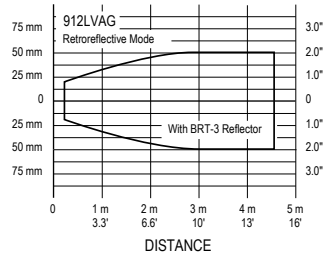
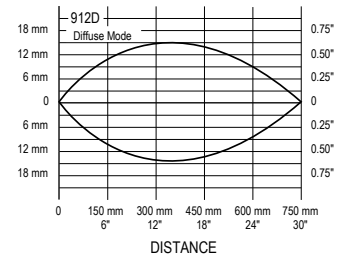
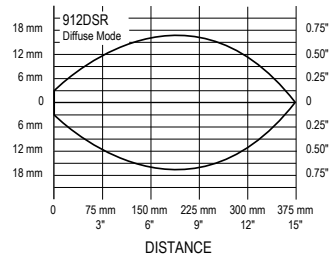
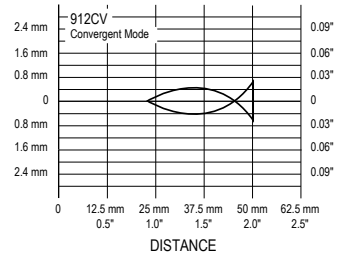
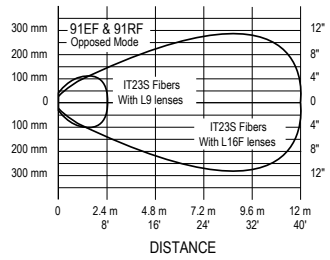

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Continued from page 4

| Mode | | |
|---|---|---|
| **Convergent Mode Models** |  | |
| **Opposed Glass Fiber Optic Models** |  | |
| **Glass Fiber Optic Models** |  |  |
| |  | |


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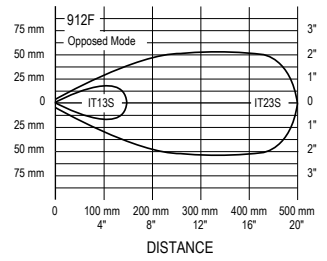
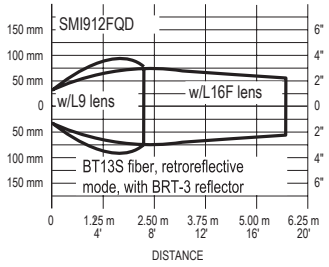
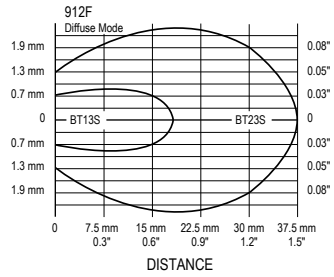
# Beam Patterns

| Mode | | |
|---|---|---|
| **Opposed Mode Emitter and Receiver Models** |  |  |
| **Retroreflective Mode Models** |  |  |
| **Diffuse Mode Models** |  |  |
| **Convergent Mode Models** |  | |
| **Opposed Glass Fiber Optic Models** |  | |

Continued on page 6

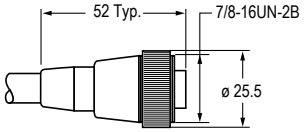
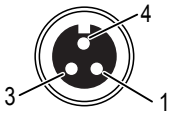

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Continued from page 6

| Mode | | |
|---|---|---|
| Glass Fiber Optic Models |  |  |
| |  | |

# Accessories

## Quick-Disconnect Cordsets

| 3-pin Single-Ended 7/8-in Female Cordsets | | | | |
|---|---|---|---|---|
| **Model** | **Length** | **Style** | **Dimensions** | **Pinout (Female)** |
| MBCC-306 | 1.83 m (6 ft) | Straight |  | <br>1 = Brown<br>3 = Blue<br>4 = Black |
| MBCC-312 | 3.66 m (12 ft) | | | |
| MBCC-330 | 9.14 m (30 ft) | | | |

## Cabling Accessories

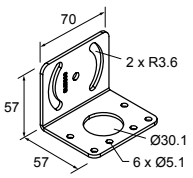
| Model | Description | |
|---|---|---|
| AC-6 | 2 m (6.5 ft) armored cable jacket | I.D. 5/16-in; O.D. 7/16-in |
| PVC-6 | 2 m (6.5 ft) flexible PVC tubing (not for QD models) | I.D. 1/4-in; O.D. 3/8-in |
| RF1-2NPS | Compression fitting for attaching armored cable or PVC tubing | – |
| HF1-2NPS | • Flexible black nylon cable protector<br>• Includes a neoprene gland that compresses around the VALU-BEAM cable to provide an additional seal against moisture<br>• Resistant to gasoline, alcohol, oil, grease, solvents and weak acids<br>• Working temperature range of –30 °C to +100 °C (–22 °F to +212 °F) |  |


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# Mounting Brackets

**SMB900**

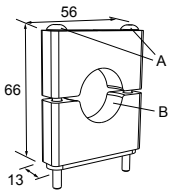
- Right angle mounting
- 11 gauge stainless steel
- Curved mounting slot for versatility/ orientation
- CAD Files: DXF, PDF, IGS, STP




**SMB30C**

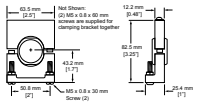
- 30 mm split clamp, black PBT bracket
- Stainless steel mounting hardware included
- Mounting hole for 30 mm sensor
- CAD Files: DXF, PDF, IGS, STP

**Hole center spacing:** A=ø 45
**Hole size:** B=ø 27.2




**SMB30S**

- Swivel bracket with 30 mm mounting hole for sensor
- Adjustable captive swivel ball
- Black reinforced thermoplastic polyester
- Stainless steel mounting and swivel locking hardware included
- CAD Files: DXF, PDF, IGS, STP



# Extension Cable (without connectors)

The following cable extends the length of the existing sensor cable. Connectors, if used, must be customer-supplied. The following models are no longer available for order but are still covered by the information in this document.

| Model | Type | Length | Used With: |
|---|---|---|---|
| **EC900A-100** | 3-conductor | 30 m (100 ft) | SMA912 Series AC sensors |

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