



TRI-TRONICS®

Smart Sensing Solutions Since 1954



SMARTDot®
LASER SENSOR 

ttco.com

800-237-0946 • 813-886-4000

SMARTEYE® **SMARTDOT** LASER SENSOR

Precision Laser Sensor

The **SMARTEYE® SmartDot Laser Sensor** is designed for General Purpose sensing applications, and can also be used for precise, small parts detection at long ranges. The consistently small laser beam is used to detect such things as a tab on a battery, a misaligned or missing bottle cap, or a cross-threaded can lid. The **SmartDot Laser Sensor** is easily aligned, easily set up, and designed for repeatability of performance from sensor to sensor. It is useful in general purpose applications such as a product detector for vision systems, and simple inspection applications. The sensor can also be used in high precision applications for small parts detection, critical identifying feature inspection, and detection of micro electronic packages.

The **SMARTEYE® SmartDot Laser Sensor** has an OLED display providing the kind of visual confirming information which makes setup a breeze, and instills confidence in the user as to the longterm performance of the sensor. Displaying all the necessary information to determine proper setup for maximum up-time was the ultimate deciding factor in including the OLED display in this highly capable sensing device. For any applications, either general purpose, or those requiring small spot precision, the **SmartDot Laser Sensor** from Tri-Tronics should be the first choice.



Features

- OLED Graphic Display
- 180° Rotating Connector
- NPN and PNP Outputs
- M12, 5 pin Connector, or Cable
- 240µs Response Time
- Threshold and Set-Point Numeric Graphic
- Timers; On Delay, Off Delay, One Shot
- Sensor Scope Diagnostics
- Built-in Digital Instructions

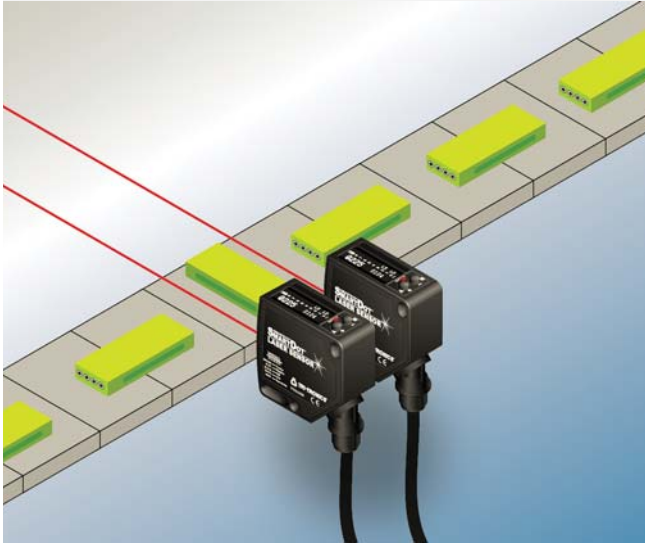
Benefits

- Easily Align Replacement Sensors
- See Through Tight Spaces at Long Distances
- Easy Setup
- Low Maintenance
- Confident Setup
- Robust and Durable
- High Speed
- Accurate
- Repeatable

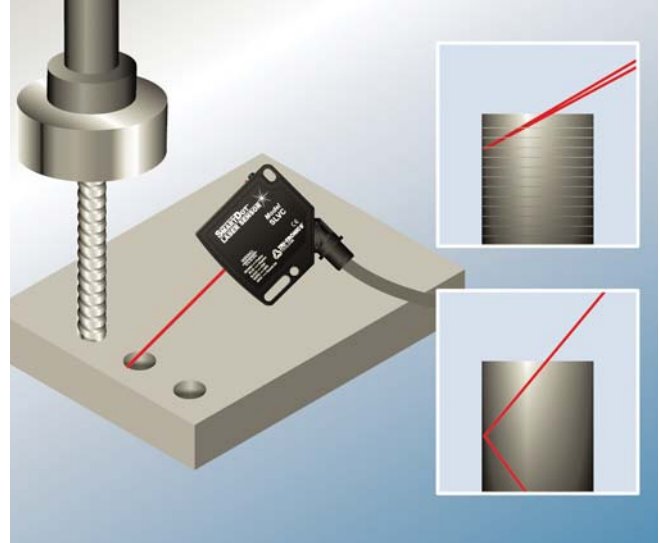
Applications

- Edge Detection - Packaging, Wafers, etc.
- Shaft Key Orientation
- Small Parts Detection
- Container Cap Alignment
- Vision System Trigger
- Metal Thread Detection on Machined Parts
- Small Hole Detection at up to 18 Inches

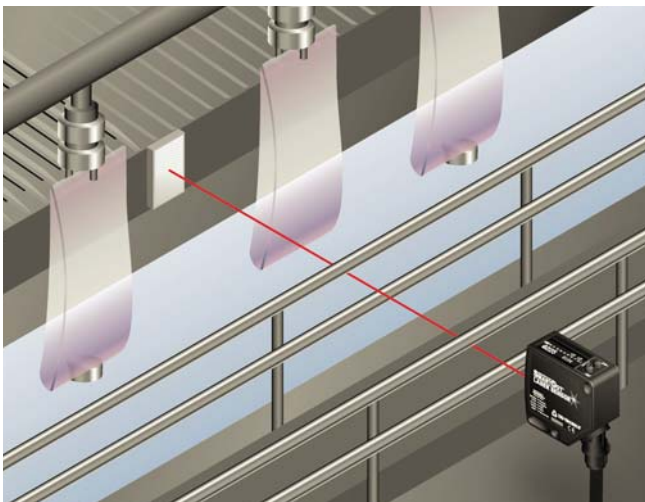
Applications



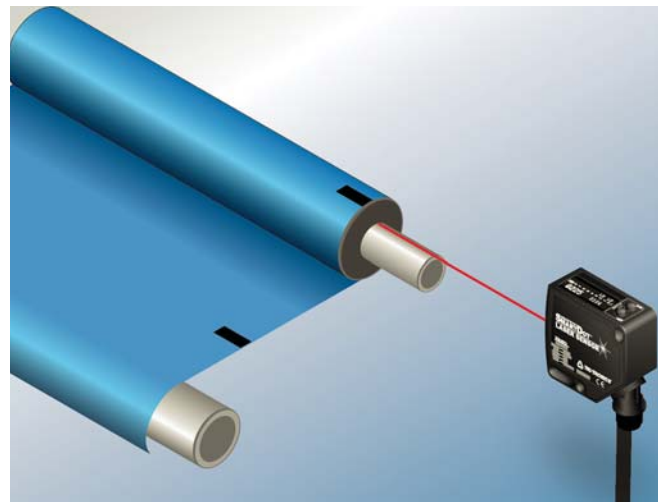
Product Orientation



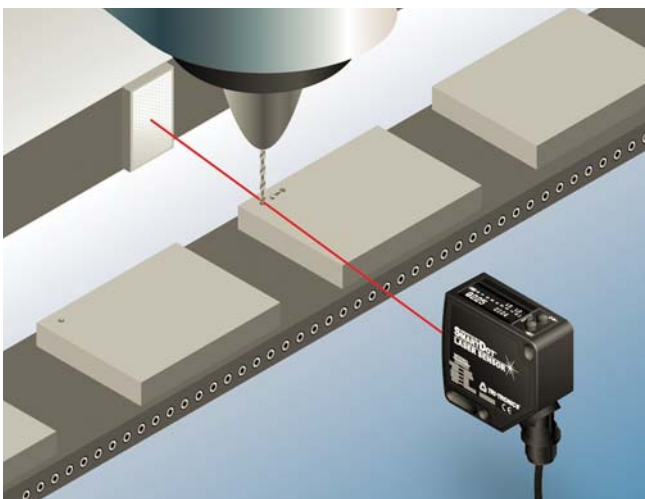
Thread Verification/Inspection



Missing Cap Inspection



End of Roll Sensing



Broken Drill Bit



Small Part Orientation Verification/Inspection

AUTOSET

- Autoset Mode: Light State (LS)** The Light State AUTOSET (**LS**) is normally used in Proximity, thru-beam, and retroreflective sensing modes. In Proximity mode, the AUTOSET is initiated when the target is in view. In Thru-beam or Retroreflective mode, the AUTOSET is initiated with the target out of view.
- Autoset Mode: Dark State (DS)** The Dark State AUTOSET (**DS**) is normally used for long range sensing in Proximity mode. Very helpful for suppressing the background when shiny objects or structures are in view behind the target.
- Autoset Mode: Two Point (2P)** Two-Point AUTOSET (**2P**) is used when there is a smaller amount of contrast between the target and background, and determining which mode to set up on is difficult to discern. This mode is also helpful if spanning equally beyond the threshold is required.
- Autoset Mode: Dynamic (DN)** Dynamic AUTOSET (**DN**) is used when the target is not easily accessible during setup, and jogging the part past the sensor is required. Only one or two passes is sufficient for a robust and repeatable setup.

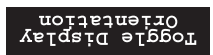
Output

- Output Mode: Light On (Lo)** The **Light On** selection provides a leading edge output for Proximity sensing, and a trailing edge output for thru-beam and retroreflective sensing.
- Output Mode: Dark On (DO)** The **Dark On** output option provides for a trailing edge on proximity sensing and a leading edge on thru-beam and retroreflective sensing.

Timer Mode

- Timer Mode: Enabled** Timers allow for many different output conditioning considerations. Ensuring outputs are on long enough; ignoring blips, or small optical disturbances; and stabilizing the output signal when input signals are erratic.
- Timer Mode: Off Delay (o)** **Off Delay** timers are most useful as a pulse stretcher. This feature adds the selected time to the duration of the input signal.
- Timer Mode: On Delay** **On Delay** timers are most useful in ignoring shorter inputs between targets.
- Timer Mode: One Shot** **One Shots** are useful for ignoring different sizes and shapes of targets, and keeps the output timing consistent.
- Timer Mode: Debounce** **Debounce** is very useful for targets that may vibrate on the leading or trailing edge of the beam.

Display Orientation

- Toggle Display Orientation** This feature helps the user view the display more easily.
- 


Advanced Options:

- Advanced Options...** The ability to change the output to either NPN or PNP provides for flexibility in input devices.

Input Mode:

- Input Mode NPN / Sink** There are many controllers available which might have either NPN or PNP outputs. This Input Mode feature provides flexibility for interfacing with different types of controllers.
- Input Mode PNP / Source**


Button Lockout

- Button Lockout: Off** The button lockout feature provides a way for production engineers and maintenance personnel to ensure the sensor maintains proper setup, and prevents tampering or improper adjustment.
- Button Lockout: On ()**

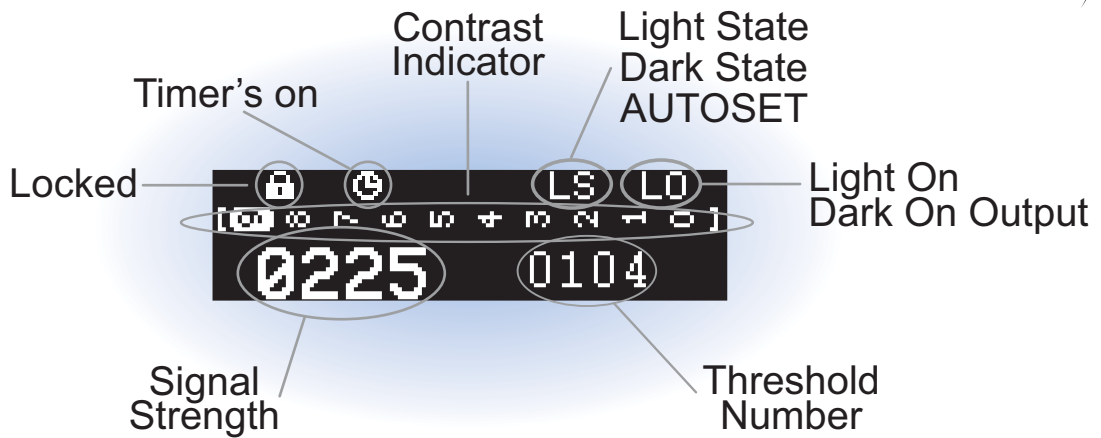
Quick Reference

- Quick Reference Tap A: Scroll Text** Reference for adjustments quickly.

Sensor Scope

-  This option allows the operator to visually inspect the current setup for repeatability.

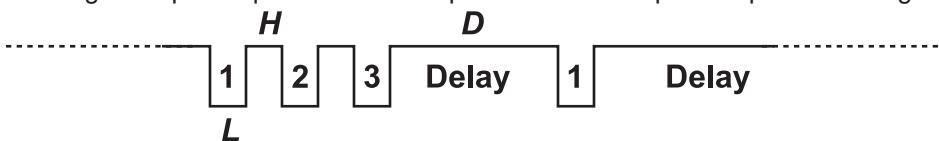
OLED Alpha/Numeric Display



The **OLED Alpha/Numeric** display provides all the information a line operator needs for maximum up time. There is a 10 segment Contrast Indicator for viewing dynamic signal strength and sensor performance; a set-point number and signal strength number for static viewing of the long-term contrast attributes; symbols to indicate the sensing mode, output mode, timer status, and button lockout status. This display also provides visual aid when configuring the sensor specifically for any application requirement. With this unique OLED display, the user may also view the Sensor Scope in order to confirm the long-term robustness of the application contrast. This feature ensures that the production line will not have to be constantly monitored for consistent production throughput.

Remote Programming

The SmartDot sensor can be configured and adjusted from the Remote AUTOSET line. This is accomplished by sending a simple sequence of 0VDC pulses. For example: Output Mode: Light On



Each pulse (L) is low for 40ms to 400ms. The idle time (H) between pulses is 40ms to 400ms. The delay (D) between sets of pulses is .75 seconds to 5 seconds.

NOTE: Default remote input is NPN. See Advanced Options for change to PNP input.

Standard AUTOSET

Hold the Remote AUTOSET line low for at least .75 seconds.

Option/Command	Setting	Pulse Sequence	Notes
Threshold Adjust	Tap "Up"	1 - 1 - #	# is the number of adjustments from 1 to 8
	Tap "Down"	1 - 2 - #	
AUTOSET Mode	Light State	2 - 1	<i>Note:</i> Changes the AUTOSET mode used by the next AUTOSET
	Dark State	2 - 2	
	Two-Point	2 - 3	
	Dynamic	2 - 4	
Output Mode	Light On	3 - 1	Leading Edge/Trailing Edge Detection
	Dark On	3 - 2	

Press Menu for Detailed Setup

- ## 1 AUTOSSET

Tap **A** to move through screens, Tap **M** for next option

Autoset Mode: Light State (LS) **Light State (LS): Push and hold "A" button for Light State AUTOSSET.** Light State is most useful for Leading Edge Triggering. And fastest "On" time in Proximity sensing.

Autoset Mode: Dark State (DS) **Dark State (DS): Push and hold "A" button for Dark State AUTOSSET.** Dark State is most useful for Trailing Edge triggering, and Maximum range settings in Proximity sensing modes.

Autoset Mode: Two Point (2P) **Two-Point (2P): Push and hold "A" button for Two-Point AUTOSSET. Release "A" button for first point AUTOSSET. Push and release "A" button for second point AUTOSSET.** Two-Point is most useful for spanning between two contrast levels that may not have a great amount of difference. Low contrast applications work best using this AUTOSSET mode.

Autoset Mode: Dynamic (DN) **Dynamic (DN): Push and hold "A" button while passing target in and out of beam then release "A" button.** Dynamic is most useful when automatic set up is necessary due to mechanical constraints.
- ## 2 Output

Tap **A** to toggle, Tap **M** for next option

Output Mode: Light On (LO) **Light On** - Output turns on when received light level exceeds threshold.

Output Mode: Dark On (DO) **Dark On** - Output turns on when received light level drops below threshold
- ## 3 Timer Mode

Tap **A** to move through screens, Tap **M** for next option

Timer Mode: Enabled To set Timer Duration, tap "A" button to scroll through 1-9, tap "M" button to move through 1000, 100, 10, 1 place holders. Then tap "M" button to complete selection.
Note: Timer must be enabled to have available options displayed

Timer Mode: Off Delay (o) Off Delay: Outputs stay on for set time after duration of input.	Timer Mode: On Delay On Delay: Outputs turn on when input exceeds set time	Timer Mode: One Shot One Shot: Outputs turn on for set time when triggered by input	Timer Mode: Debounce Debounce: Outputs are stabilized and held in current state for duration of time setting
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- ## 4 Display Orientation

Tap **A** to toggle, Tap **M** for next option

Toggle Display Orientation Tap "A" button to Toggle Orientation. Useful for left or right hand visibility.

Toggle Display Orientation
- ## 5 Advanced Options:

Advanced Options... Tap "A" button to select Advanced Options. Provides for NPN or PNP Remote AUTOSSET input.
- ## 6 Input Mode:


Input Mode NPN / Sink Tap "A" button to change from NPN to PNP Input. Choose NPN if output device in Sinking (0VDC); Choose PNP if output device is Sourcing (10-30VDC).

Input Mode PNP / Source
- ## 7 Button Lockout

Button Lockout: Off Tap "A" button to select Button Lockout. The Button Lockout prevents tampering with AUTOSSET and displays Sensor Locked should AUTOSSET be attempted.

Button Lockout: On (🔒) To UNLOCK, press and hold "M" for two seconds to enter new options mode. Tap "M" to scroll through to Button Lockout and tap "A" to unlock.
- ## 8 Quick Reference

Quick Reference Tap "A" to scroll through Quick Reference
Tap A: Scroll Text
- ## 9 Sensor Scope

 The sensor scope will reveal any nominal setup issues or sensitivities to changes in background or target. Momentarily press the **minus (-)** button to shorten the time between signals. Momentarily press the **plus (+)** button to lengthen the time between signals.

How to Specify



1. Select Sensor:
 SMARTEYE® SMARTDOT™
 Laser Sensor

2. Select Output Configuration:
 V = Short Range
 P = Long Range
 R = Retroreflective
 (Includes AR51 Reflector)

3. Select Cable:
 Blank = 6 foot Cable (1.8m)
 C = 6 inch (152mm)
 M12 5-Pin Connector

Example:

SMARTEYE® SMARTDOT™ Laser Sensor

SL P C

V = Short Range
 P = Long Range
 R = Retroreflective

Blank = 6 foot Cable (1.8m)
 C = M12 Connector

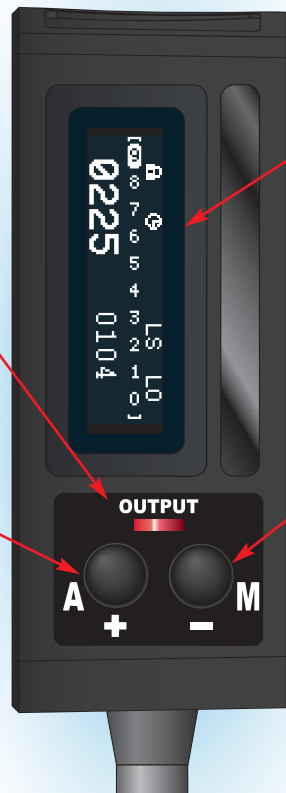
OLED Alpha/Numeric Display Visual Confirmation of Proper Sensor Performance

OUTPUT INDICATOR

Red LED illuminates when outputs are ON. Flashes when short circuit or overload detected

AUTOSET

1. Press and hold for 2 seconds to initiate AUTOSET.
2. When in Menu, momentarily tap to make changes to Menu Options.
3. When in normal operation, momentarily tap to adjust threshold up (+).



OLED NUMERICAL DISPLAY

1. 1 to 10 bar Contrast Indicator
2. Numerical display provides visual feedback of threshold settings and signal strength feedback.
3. Displays button lockout, AUTOSET mode, timers on/off, and output mode.

MENU BUTTON

1. Push and Hold for 2 seconds to enter Menu options mode.
2. When in Menu options mode, tap to scroll through available options.
3. When in normal operation, momentarily tap to adjust threshold down (-).

Accessories



GSEC-6
 6' Shielded Cable (1.83m)

GSEC-15
 15' Shielded Cable (4.57m)

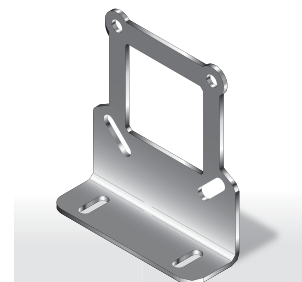
GSEC-25
 25' Shielded Cable (7.62m)



AR51
 Laser Reflector 51mm



PRD1
 Round Press-on Reflector
 1" (25.4mm)



SLB-1
 Stainless Steel
 Mounting Bracket

Specifications

SMARTEYE® SMARTDOT™ LASER SENSOR

SUPPLY VOLTAGE:

- 10 to 30 VDC
 - Polarity Protected
- Note: For use in Class 2 circuits*

CURRENT REQUIREMENTS:

- 35 milliamps max. at 24VD

OUTPUT TRANSISTORS:

- (1) NPN and (1) PNP sensor output transistors
- Outputs sink or source up to 150 milliamps (current limit)
- All outputs are continuously short circuit protected

REMOTE AUTOSET INPUT:

- Selectable: Advanced Options
- NPN Input, Connect to 0VDC
 - PNP Input, Connect to 10-30VDC

RESPONSE TIME:

- Light state response = 240 microseconds
- Dark state response = 240 microseconds

LASER LIGHT EXPECTANCY:

- 50,000 hours @ 25°C

LIGHT SOURCE:

- Red Laser: Class 1 or II
- EN 60825-1 (2003)

SPOT SIZE:

- Short Range: .05"X.03" @ 6"(152mm)
- Long Range: .07"X.05" @ 18"(456mm) (Class II Laser)
- Retroreflective: .1"X.1" @ 5'(1.52m) (Polarized)

PUSHBUTTON CONTROL:

- Two push buttons

AMBIENT TEMPERATURE:

- -40°C to 70°C (-40°F to 158°F)

RUGGED CONSTRUCTION:

- Chemical resistant high impact ABS plastic housing
- Waterproof rating: IP68
- Conforms to heavy industry grade CE requirements
- RoHS Compliant

DIMENSIONS:

- Width: 2.037 in (51.73mm)
- Height: 2.005 in (50.9mm)
- Depth: .812 in (20.6mm)



FOCAL DISTANCE:

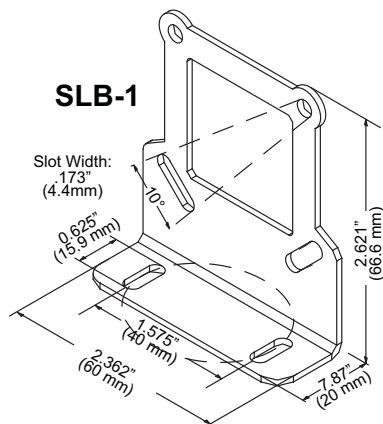
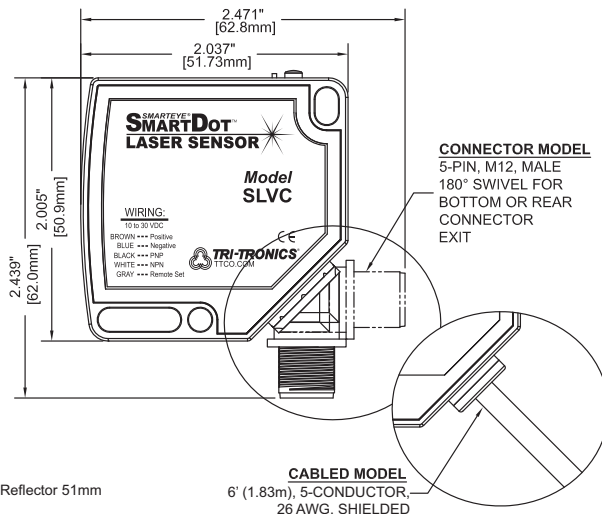
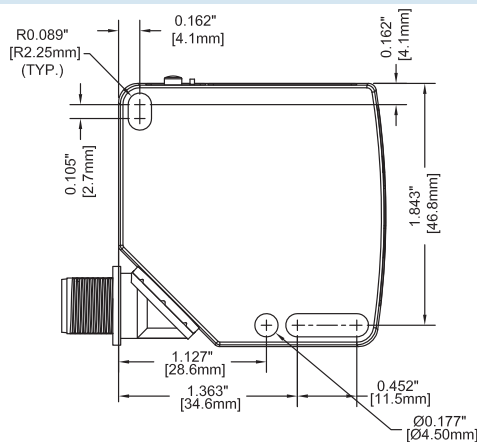
- Short Range Proximity: 6" (152mm)
- Long Range Proximity: 18" (456mm)
- Retroreflective: 5' (1.520m)

Note: Ranges are determined by optimal beam spot focus. Increased ranges are possible, but are application specific and can not be adequately specified herein.

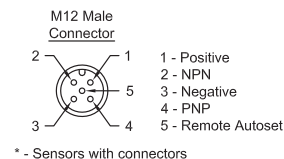
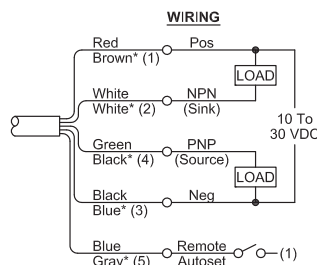
RoHS Compliant
Product subject to change without notice

Connections and Dimensions

SMARTEYE® SMARTDOT®



Accessory:
AR51 High Performance Laser Reflector 51mm



(1) - NPN (SINKING) INPUT ACTIVATED BY CONNECTING TO NEGATIVE
PNP (SOURCING) INPUT ACTIVATED BY CONNECTING TO POSITIVE

