One-Touch Setup
Automatic, Self-Adjusting
Light State or Dark State Setup

SMARTEYE® PRO

Action Alert

SMARTEYE® PRO REMOTE

Remote AUTOSET™

Automatic, Self-Adjusting *From Clean to Dirty...It Keeps On Working!*

SMARTEYE® PRO

SMARTEYE® PRO REMOTE

From Clean To Dirty Lens

The **SMARTEYE® PRO** is not a teach mode sensor; it is an automatic sensor. It is a high performance photoelectric sensor that, after the initial set-up, can be adjusted by a single push of a button, (either on the sensor or at a remote location). As a result, there is no guesswork on the part of the operator. Now you can throw away the screwdriver!

After selecting the features of your application requirements, the **SMARTEYE® PRO** sensor is ready to be adjusted. Simply put the target in front of the sensor (proximity mode) and push the AUTOSET™ button. From that point on, the sensor will automatically maintain a perfect setting, thanks to the dynamic ACT™ (Automatic Contrast Tracking) system. The **SPB** Series Sensors are also equipped with a 5-LED Contrast Indicator™ as well as an Action Alert™ diagnostic tool that allows the operator to visually substantiate performance. The **RSP** Series Sensors feature a remote autoset input. When the lock feature is enabled, the SMARTEYE® PRO sensor is tamperproof. Now the sensor will provide you with the hassle-free performance that you expect from a **SMARTEYE®**.

Space-saving Multiple Sensor Mounting Design

***Five* Selectable Options:**

5 LOCK
– for tamperproof operation

4 AUTOSET™
– set up in Light or Dark state

3 OUTPUT STATE
– indicates Light or Dark State output

2 ACT™
– automatic Contrast Tracking for perfect setting

1 TIMER
– 10 ms pulse stretcher timer function

Features

ACT™ AUTOMATIC CONTRAST TRACKING
ACT™ automatically adjusts the sensor as conditions change. This can include dirty or damaged lenses or reflectors, damaged fiberoptics, LED light source or thermal drift, and target variations such as position, orientation, or color. It can also compensate for signal shift or deterioration caused by high-speed input events. The SMARTEYE®-PRO continues to operate requiring far less maintenance than other sensors, making it the choice in tough sensing applications.

AGS™ AUTOMATIC GAIN SELECT
This unique feature provides automatic digital selection of the amplifier gain based upon your application requirements.

QUICKSET™ ADJUSTMENT
This two-step procedure is easy to perform and requires no expertise whatsoever.
1. Establish one of the following conditions:
Proximity Mode – Reflect light off object.
Beam Break – Remove object from light beam path.
2. Depress the red and green button simultaneously for three seconds.

AUTOSET™ ADJUSTMENT
The AUTOSET™ adjustment routine only requires one finger to push one button one time! Even in a dynamic operating condition, with ongoing input events, all you have to do is push a button for a perfect setting.

EDR (Pat. No. 5,621,205)
Another unique feature, the EDR (Enhanced Dynamic Range) circuit is digitally controlled. It prevents dark state saturation and expands the operating range without reducing amplifier gain.

ACTION ALERT™ INDICATOR LED
This indicator provides an early warning to prevent marginal performance, when the sensor can no longer provide full contrast deviation as displayed on the Contrast Indicator.

REMOTE AUTOSET™ (RSP Series)
Remotely adjust the sensor from a push button, momentary switch or a touch screen to PLC instantaneously. The AUTOSET™ routine can occur during static or dynamic operating conditions.

5-LED DUAL FUNCTION INDICATOR CONTRAST INDICATOR™
Provides "at-a-glance" performance data during both setup and operation.

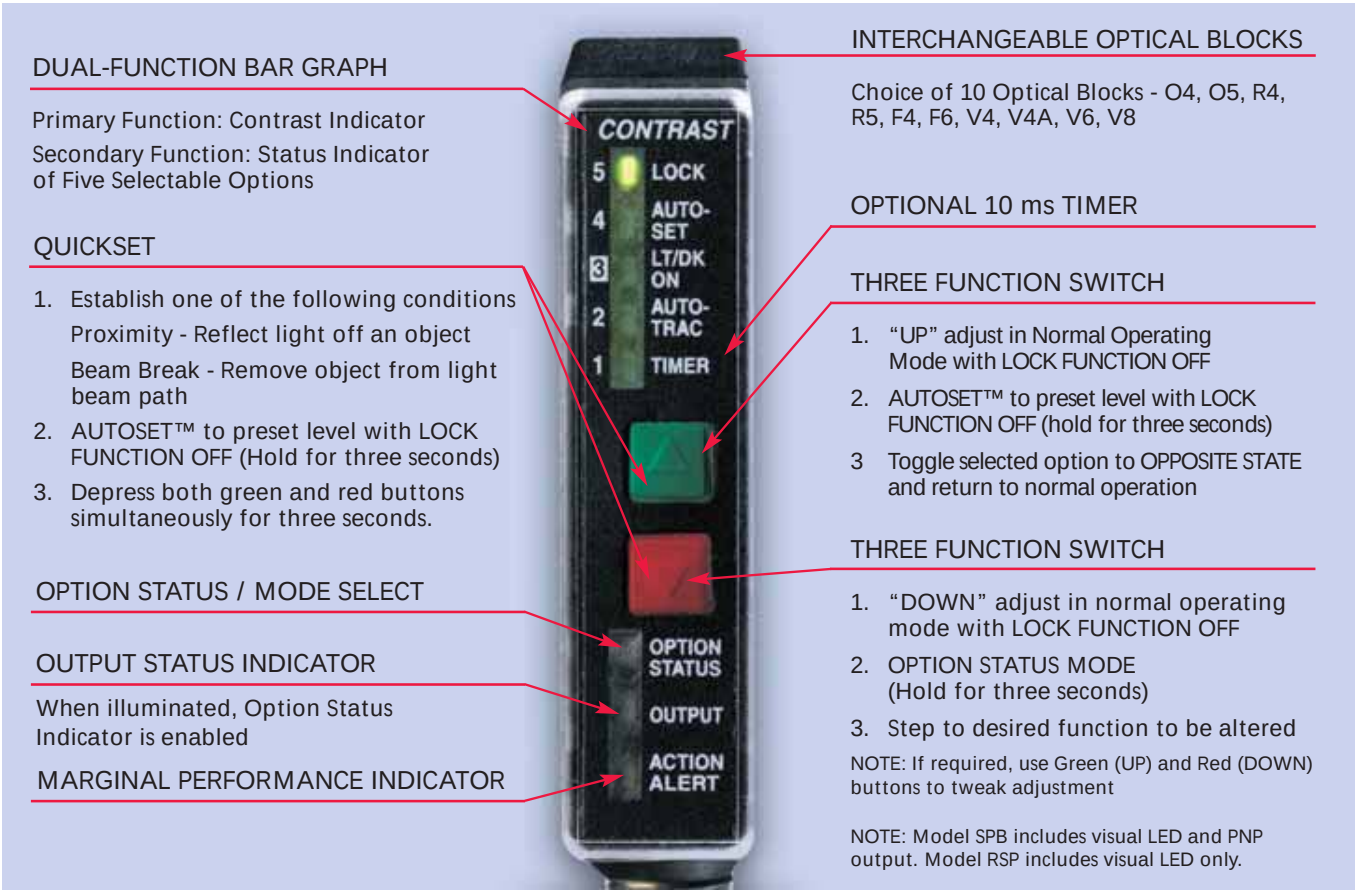
STATUS INDICATOR
Displays status of 5 selectable functions: Lock, AUTOSET™, and Light/Dark, AUTOTRACK and Timer.

VERSATILITY
Choice of nine "quick change" optical blocks allows use in the proximity, convergent, retroreflective, polarized retroreflective, fiberoptic, or gap sensing modes.

LED LIGHT SOURCES
Choice of four LED light sources – invisible infrared, red, blue, and white light.

CONNECTIONS
Built-in connector for use with quick disconnect cable or shielded 6' (1.80 m) cable.

TIMER
10 ms pulse stretcher/off delay.



Light Source Guidelines

SMARTEYE® PRO | SMARTEYE® PRO REMOTE

INVISIBLE INFRARED LIGHT SOURCE (880 nm)

A. Best choice in most opaque object sensing tasks
B. Provides longest possible sensing range in either Beam Make or Beam Break sensing modes
C. Best choice in hostile environments; useful in penetrating lens contamination
D. Preferred for use with small glass fiberoptic light guides Note: Do not use IR light with plastic fiberoptic light guides
E. Preferred when sensing dark colored objects in the proximity (Beam Make) mode, i.e., black, blue, green, etc.
F. Useful in penetrating containers for verification of contents; also useful in detecting overlapped splices in dense materials
G. Color perception; tends to favor blue colored objects

BLUE LIGHT SOURCE (480 nm)

A. Useful for detecting translucent, transparent, plastic, or glass objects in the retroreflective mode when using the R4 optical block
B. Used as blue filter for color perception advantages, i.e., resolving yellow vs. white colored objects or printed registration marks

RED LIGHT SOURCE (660 nm)

A. Best choice for use with plastic fiberoptic light guides
B. Useful when sensing translucent objects in proximity (Beam Make) mode
C. Useful when sensing transparent objects in fiberoptic retroreflective (Beam Break) mode
D. Can be polarized for retroreflective (Beam Break) sensing to reduce proxing on shiny objects
E. Opposed fiberoptic light guides can be polarized for sensing some translucent plastic containers (consult factory for details)
F. Used as red filter for color perception advantages

WHITE LIGHT SOURCE

(Broadband Color Spectrum)

A. Best choice for detecting all printed registration marks on packaging material
B. Recommended for detecting dark colored objects in the proximity (Beam Make) mode
C. Best choice for sorting colored objects

Optical Block Selection

Interchangeable optical blocks provide for universal application of the SMARTEYE® PRO to any sensing application from large object sensing to finite sensing of small parts, registration mark detection, and product inspection tasks.

Type O4
Proximity
Wide beam optics useful for short-range sensing of transparent, translucent, or irregular shaped shiny objects.

Type O5
Proximity
Narrow beam optics useful in long-range sensing of medium to large size objects.

Type R4
Retroreflective
Very narrow beam optics designed to sense reflectors or reflective materials at long range. Designed for Beam Break sensing.

Type R5
Polarized Anti-Glare Retroreflective
Polarized to reduce response to "hot spot" glare from shiny surface of detected object. Use with red or blue light source.

Type F4
Glass Fiberoptics
Adapter for use with a wide variety of glass fiberoptic light guides for both the proximity and opposed sensing modes.

Type V4, V4A
Convergent 1" "V" Axis
Narrow beam optics that focus at a sensing range of 1". Useful for sensing small parts. Also useful for proximity sensing (range of 1" to 5") to minimize response to reflected light from background objects.

Type V6
Convergent 1.5" "V" Axis
Narrow beam optics that focus at a sensing range of 1.5". Useful for sensing small parts. Also useful for proximity sensing (range of 1.5" to 8") to minimize response to reflected light from background objects.

Type V8
Convergent .5" "V" Axis
Narrow beam optics that focus at a sensing range of .5". Useful for sensing small parts or registration color marks. Also useful for proximity sensing (range of .25" to 5") to minimize response to reflected light from background objects.

Type F6
Plastic Fiberoptics
Adapter for use with a wide variety of plastic fiberoptic light guides for both the proximity and opposed sensing modes.

Sensing Range Guidelines

Convergent / Proximity / Retroreflective

OPTICAL BLOCKS	IR	RED	BLUE	WHITE
V4, V4A	1 in.	1 in.	1 in.	1 in.
V6	1.5 in.	1.5 in.	1.5 in.	1.5 in.
V8	0.5 in.	0.5 in.	0.5 in.	0.5 in.
O4	18 in.	11 in.	4 in.	3 in.
O5	4 ft.	3 ft.	1.5 ft.	12 in.
R4	20+ ft.	18+ ft.	6 ft.	5 ft.
R5	N/A	7 ft.	4 ft.	3 ft.

NOTE: *Proximity test utilized a 90% reflective white target. Retroreflective tests utilized a 3˝ diam. round reflector, Model AR-3*

Glass Fiber Optics

OPTICAL BLOCKS	IR	RED	BLUE	WHITE
Opposed Mode				
F4	3 ft.	1 ft.	8 in.	5 in.
F4 w/lens	20+ ft.	20+ ft.	12 ft.	9 ft.
Proximity Mode				
F4	7 in.	5 in.	1 in.	1 in.
F4 w/lens	1 ft.	1 ft.	N/A	6 in.

NOTE: *Range tests utilized a .125˝ diam. fiber bundle*

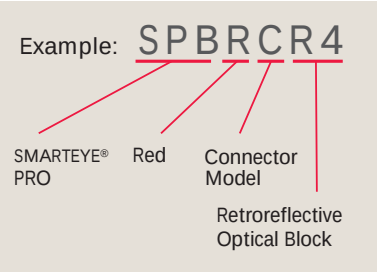
Plastic Fiber Optics

OPTICAL BLOCKS	RED	WHITE
Opposed Mode		
F6	9 in.	2 in.
F6 w/lens	6 ft.	2 ft.
F6w/right angle lens	3 ft.	1 ft.
Proximity Mode		
F6	7 in.	5 in.
F6 w/lens	1 ft.	1 ft.

NOTE: *Range tests utilized a .040˝ diam. fiber*

How to Specify

1. Select Sensor Type (SPB or RSP)
   SPB – Includes Action Alert RSP – Includes Remote AUTOSET™
2. Select Sensor Light Source required: I = Infrared; R = Red; B = Blue; WL = White.
3. Select Connection required: Blank = Cable; C = Connector (RSP available with connector only)
4. Select Optical Block.



Accessories

Micro Cable Selection Guide, 5-wire M12

GSEC-6
6' (1.8 m) Shielded cable

GSEC-15
15' (4.6 m) Shielded cable

GSEC-25
25' (7.62 m) Shielded cable

GSEC-2MU
6.5' (2.0 m) Low-cost, unshielded

GSEC-5MU
16.4' (5.0 m) Low-cost, unshielded

GRSEC-6
6' (1.8 m) Right angle shielded cable

GRSEC-15
15' (4.6 m) Right angle shielded cable

GRSEC-25
25' (7.62 m) Right angle shielded cable

GX-25
25' (7.62 m) extension cable

FMB-1 (8.4 mm diam.)
Standard Fiberoptic Mounting Bracket

SEB-3
Stainless “L” Bracket

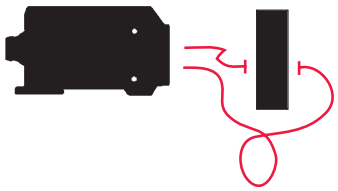
FMB-2 (5.1 mm diam.)
FMB-3 (3.1 mm diam.)
Miniature Glass or Plastic Fiberoptic Mounting Brackets

LK-4
Lens Kit
(See Optical Blocks Accessories for contents)

Selection Guidelines *Opaque Object Sensing*

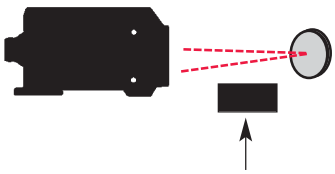
Preferred Mode: Beam Break

Option 1



Fiberoptic opposed mode is best choice for detecting any opaque object.
Sensor: Model SPBI/SPBIC/RSPIC with F4 Optical Block (IR lightsource)
Cable: Shielded cable w/connector Model GSEC-6 (6 ft.) or GSEC-15 (15 ft.)
Fiberoptic Light Guides: Model F-A-36T (Two Required)
NOTE: Select smaller fiber bundle for small part detection. (See Fiberoptic Section)
Sensing Range: Up to 16 in.
Accessories: Two Model UAC-15 lenses, extends sensing range to over 20 ft.
Mounting bracket: Model SEB-3, FMB-1

Option 2



Retroreflective mode. Use with reflector to detect medium to large size opaque objects
NOTE: Not recommended for detecting highly reflective objects.
Sensor: Model SPBI/SPBIC/RSPIC with R4 Optical Block (IR light source)
Cable: Shielded cable w/connector Model GSEC-6 (6 ft) or GSEC-15 (15 ft.)
Reflector: Model 78P, Plastic, 4.4 in. X 1.9 in. screw mounted. (See Accessories Section for complete listing of reflectors)
Sensing Range: Up to 20 ft.
Accessories: Mounting bracket, Model SEB-3

Alternate Mode: Beam Make (Proximity)

Option 1

Fiberoptic proximity is used to detect medium to large flat-sided opaque objects
Sensor: Model SPBI/SPBIC/RSPIC with F4 Optical Block (IR Light Source)
Cable: Shielded cable w/connector Model GSEC-6 (6ft.) or GSEC-15 (15ft.)
Fiberoptic Light Guides: Model BF-A-36T
NOTE: Select smaller fiber bundle for small part detection. (See Fiberoptic Section)
Sensing Range: Up to 6 in.
Accessories: Model UAC-15 lens. Use to extend sensing range up to 1 ft.
Mounting bracket: Model SEB-3, FMB-1
NOTE: Consider proximity mode when installation sensing site conditions preclude using the preferred Beam Break mode.

Option 2

Convergent/proximity mode is useful to detect opaque objects when there is little (if any) gap between objects.
Sensor: Model SPBI/SPBIC/RSPIC with V6 Optical Block (IR light source)
Cable: Shielded cable w/connector Model GSEC-6 (6 ft.) or GSEC-15 (15 ft.)
Sensing Range: From 1.5 to 8 in.
Accessories: Mounting bracket, Model SEB-3

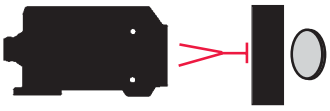
Option 3

Proximity (divergent beam) mode sensing is useful in detecting some large size opaque objects from longer range. Generally speaking, there must be substantial gaps between objects for this mode to be effective.
Sensor: Model SPBI/SPBIC/RSPIC with O5 Optical Block (IR light source)
Cable: Shielded cable w/connector Model GSEC-6 (6 ft.) or GSEC-15 (15 ft.)
Sensing Range: From 1 to 5 ft.
Accessories: Mounting bracket, Model SEB-3

Selection Guidelines *Translucent/Transparent Object Sensing*

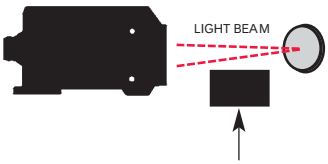
Preferred Mode: Retroreflective Beam Break

Option 1



Fiberoptic retroreflective is the best choice for detecting empty transparent or translucent objects. The SMARTEYE® PRO featuring a unique blue LED light source is recommended for detecting transparent or translucent plastic or glass objects. A red light source is recommended when detecting translucent (non-transparent) objects only.
Sensor: Model SPBB/SPBBC/RSPBC with F4 Block (Blue light source) or Model SPBR/SPBRC/RSPRC with F4 Block (Red light source)
Cable: Shielded cable w/connector Model GSEC-6 (6ft.) or GSEC-15 (15ft.)
Fiberoptic Light Guides: Model BF-A-36T
Reflector: Model 78P, plastic 4.4 in. x 1.9 in, screw mounted
Sensing Range: Up to 1 ft.
Accessories: Model UAC-15 lens. Use to extend sensing range from 1 ft. maximum without lens to over 3 ft. with lens. Mounting bracket, Model SEB-3, FMB-1

Option 2



Retroreflective (R4 optical block) is a good choice for detecting medium to large size empty, transparent, or translucent objects. The SMARTEYE® PRO, featuring a unique blue LED light source, is recommended for detecting transparent or translucent plastic or glass objects. A red light source is recommended when detecting translucent (non-transparent) objects only.
Sensor: Model SPBB/SPBBC/RSPBC with R4 Block (Blue light source) or ModelSPBR/SPBRC/RSPRC with R4 Block (Red light source)
Cable: Shielded cable w/connector Model GSEC-6 (6ft.) or GSEC-15 (15ft)
Reflector: Model 78P, plastic 4.4 in. X 1.9 in., screw mounted.
Sensing Range: Up to 5 ft.
Accessories: Mounting bracket, Model SEB-3

Alternate Mode: Beam Make (Proximity)

Option 1

Fiberoptic proximity mode is useful to detect transparent/translucent objects.
Sensor: Model SPBR/SPBRC/RSPRC with F4 Block (Red light source)
Cable: Shielded cable w/connector Model GSEC-6 (6 ft.) or GSEC-15 (15 ft.)
Fiberoptic Light Guides: Model BF-A-36T
NOTE: Select smaller fiber bundle for small part detection. (See Fiberoptic Section)
Sensing Range: Up to 4 in.
Accessories: Model UAC-15 lens. Use to extend sensing range up to 1 ft.
Mounting bracket, Model SEB-3, FMB-1
NOTE: Consider proximity mode when translucent/transparent objects are containers filled with clear liquid or when site conditions preclude using the preferred retroreflective Beam Break mode.

Option 2

Convergent/proximity mode is useful to detect most transparent/translucent objects when there is little (if any) gap between objects.
Sensor: Model SPBR/SPBRC/RSPRC with V6 Block (Red light source)
Cable: Shielded cable w/connector Model GSEC-6 (6 ft.) or GSEC-15 (15 ft.)
Sensing Range: From 1 to 4 in
Accessories: Mounting bracket, Model SEB-3

Option 3

Proximity (divergent beam) mode sensing is useful in detecting some large size translucent/transparent objects from longer range. Generally speaking, there must be substantial gaps between objects for this mode to be effective.
Sensor: Model SPBB/SPBBC/RSPBC with O5 Block (Red light source)
Cable: Shielded cable w/connector Model GSEC-6 (6 ft.) or GSEC-15 (15 ft.)
Sensing Range: From 1 to 4 ft.
Accessories: Mounting bracket, Model SEB-3

Specifications

SMARTEYE® PRO SMARTEYE® PRO REMOTE

SUPPLY VOLTAGE
- 10 to 30 VDC
- Polarity Protected

CURRENT REQUIREMENTS
- 45 mA (exclusive of load)

OUTPUT TRANSISTORS (Current Limited)
- (1) NPN and (1) PNP sensor output transistor
  (1) PNP Action Alert output transistor (SPB Series)
- Sensor outputs can sink or source up to 150 mA
- All outputs are continuously short circuit protected
- Action Alert PNP transistor source up to 75 mA
  (Action Alert available on SPB models only)

REMOTE AUTOSET™ INPUT
- Opto isolated sinking input (10 mA) (RSP Series)

RESPONSE TIME
- Light/Dark state response = 300 microseconds

HYSTERESIS
- Set for high resolution – less than one bar on the Contrast Indicator

LED LIGHT SOURCE
- Options:
  A. Infrared = 880 nm,
  B. Red = 660 nm,
  C. Blue = 480 nm,
  D. White = Broadband spectrum
- Pulse modulated

PUSH BUTTON CONTROL
- Automatic set-up routines, i.e., QuickSet™/AUTOSET™
- Manual Adjustments
- Set status of five options: LOCK, AUTOSET, LT/DK ON, AUTOTRAC, and 10 ms TIMER

LIGHT IMMUNITY
- Responds to sensor's pulse modulated light source, resulting in high immunity to most ambient light, including indirect sunlight

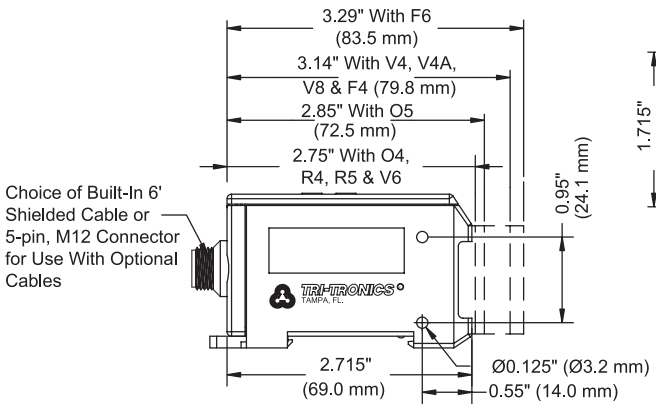
AMBIENT TEMPERATURE
- - 40°C to 70°C (- 40°F to158°F)

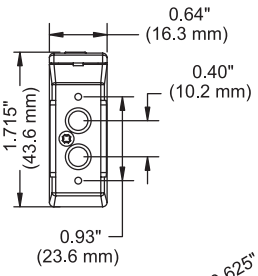
RUGGED CONSTRUCTION
- Chemical resistant, high-impact polycarbonate housing
- Waterproof ratings: NEMA 6 and IP67
- Conforms to heavy industry grade CE requirements

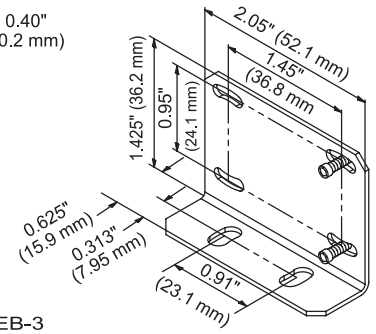
INDICATORS
- 5-LED Bar graph functions in one of two modes:
  1. Contrast Indicator – Displays scaled reading of sensor's response to contrasting light levels (light to dark)
  2. Status Indicator – Displays status of 5 selectable options
- Red LED output indicator – Illuminates when the sensor's output transistors are "on." NOTE: If Output LED flashes, a short circuit condition exists
- Amber LED – Illuminates when in the options select mode
- Yellow LED – Illuminates when action alert is activated. Also indicates when ACT™ adjusts sensor

Product subject to change without notice.
Consult Factory for RoHS Compliance.

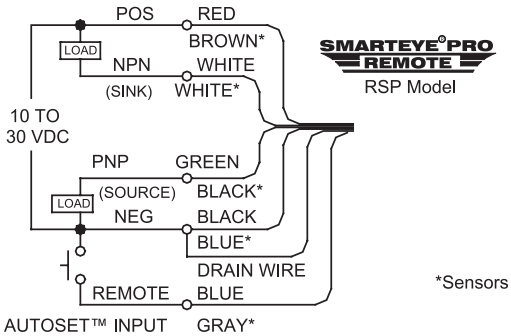
Connections and Dimensions SMARTEYE® PRO PHOTOELECTRIC SENSOR







SEB-3
Optional Mounting Bracket with Hardware



*Sensors with connectors