



Smart Sensing Solutions Since 1954

**SMARTEYE® PRO**



**Self-Adjusting  
General Purpose Sensor**

## SMARTEYE® PRO

The **SMARTEYE® PRO** is a high performance, digital multi-mode sensor that can be adjusted by a single push of a button. From that point on, the sensor will automatically maintain a perfect setting, thanks to the dynamic Automatic Contrast Tracking System (ACT).

The PRO™ is equipped with a Contrast Indicator as well as an Action Alert diagnostic output signal and visual indicator that allows the operator to visually substantiate performance. When the lock feature is enabled, the PRO™ sensor is tamper-proof.

The PRO™ will provide with the automatic, hassle-free performance that is expected from a SMARTEYE®. It can either be side mounted or Din rail mounted and is epoxy encapsulated making it ultra rugged and vibration proof.



### Features

- AUTOSET, one button push setup
- ACT, Automatic Contrast Tracking
- Action alert output
- Pulse stretcher timer - 10ms non-adjustable
- 5-LED Contrast Indicator
- Cable or quick disconnect
- Interchangeable optical blocks
- Button lock out
- NPN and PNP output
- Selectable Light State or Dark State AUTOSET

### Benefits

- Easy to use
- Reduces downtime
- Robust design
- High reliability
- Lower inventory costs
- Tamper-proof

### Applications

- Printing/Marking/Coding
- Pharmaceutical
- Registration mark sensing
- Product detector
- Labeling line sensor
- Packaging machine trigger
- Inspection sensor

# Features



## ACT

ACT (Automatic Contrast Tracking) automatically adjusts the sensor as conditions change. This can include dirty or damaged lenses, reflectors, fiber optics or LED light source, as well as thermal drift and target variations such as position, orientation, or color. ACT 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

AGS (Automatic Gain Select) provides automatic digital selection of the amplifier gain based upon application requirements.

## QUICKSET ADJUSTMENT

This two-step procedure is easy to perform and requires no expertise.

1. Establish one of the following conditions:
  - Proximity Mode
  - Beam Break
2. Depress the red and green button simultaneously for three seconds.

## AUTOSET

The AUTOSET adjustment routine only requires pushing one button once. Even in a dynamic operating conditions, with ongoing input events, just one push of one button to get a perfect setting.

## EDR® (Pat. No. 5,621,205)

The EDR (Enhanced Dynamic Range) circuit is digitally controlled. EDR prevents dark state saturation and expands the operating range without reducing amplifier gain.

## ACTION ALERT

Action Alert 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.

## 5-LED DUAL FUNCTION INDICATOR AND CONTRAST INDICATOR

Provides at-a-glance performance data during both setup and operation.

## STATUS INDICATOR

The Status Indicator displays status of three selectable functions: Lock, Auto Trac, and Timer; 10ms, 25ms, and 50ms.

## VERSATILITY

Choice of ten quick-change optical blocks allows one sensor to be used in proximity, convergent, retroreflective, polarized retroreflective, and fiber optic applications.

## LED LIGHT SOURCES

Choice of four LED light sources — infrared, red, blue, and white light.

## CONNECTIONS

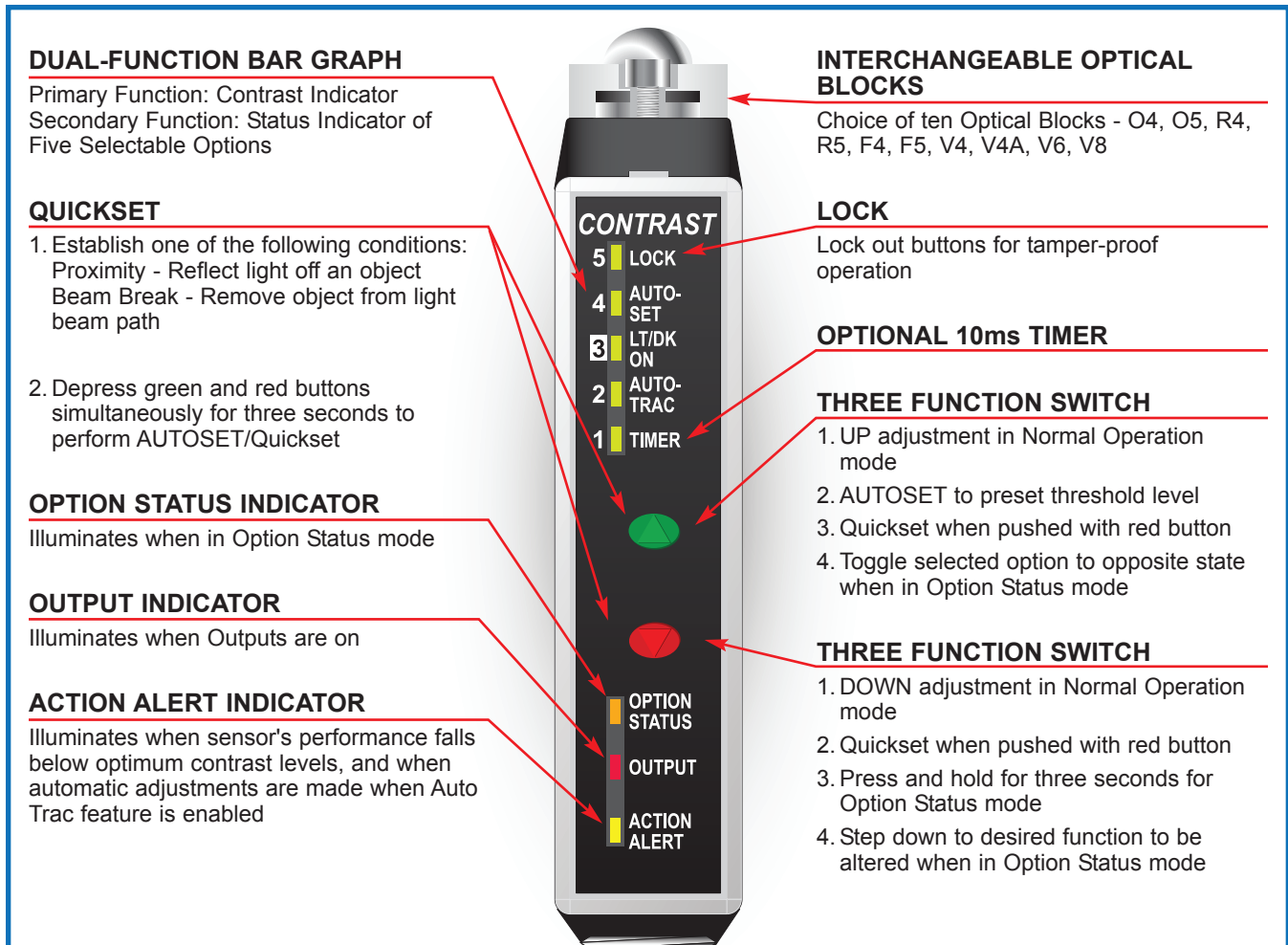
Built-in connector for use with quick disconnect cable or shielded 6ft (1.80 m) cable.

## TIMER

10ms pulse stretcher/off delay.

## MOUNTING OPTIONS

Built-in DIN Rail snap-on design, thruhole, or bracket mount.



# Optical Block Selection



## Convergent V-Axis Blocks

Narrow beam optics useful for proximity sensing to minimize response to reflected light from background objects.



**V4**  
**Convergent 1in V-Axis**  
 Useable range of 1in to 5in.  
**V4A**  
**Convergent 1in V-Axis, Apertured**  
 Useable range of 1in to 5in.



**V6**  
**Convergent 1.5in V-Axis**  
 Useable range of 1.5in to 8in.



**V8**  
**Convergent .5in V-Axis**  
 Useable range of .25in to 5in

## Proximity Blocks



**O4**  
**Proximity**  
 Wide beam optics useful for short-range sensing of a variety of objects.



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

## Retroreflective Blocks



**R4**  
**Retroreflective**  
 Narrow beam optics designed to sense reflectors or reflective materials at long range.



**R5**  
**Polarized Anti-Glare Retroreflective**  
 Polarized to reduce response to hot-spot glare from shiny surfaces. Use with visible light source.

## Fiber Optic Blocks



**F4**  
**Glass Fiber Optics**  
 Adapter for use glass fiber optic light guides.



**F5**  
**Plastic Fiber Optics**  
 Adapter for use plastic fiber optic light guides.

# Sensing Range Guidelines

1 in = 25.4mm / 1ft = 0.3048 meters

Convergent / Proximity / Retroreflective					Glass Fiber Optics					Plastic Fiber Optics		
OPTICAL BLOCKS	IR	RED	BLUE	WHITE	OPTICAL BLOCKS	IR	RED	BLUE	WHITE	OPTICAL BLOCKS	RED	WHITE
V4, V4A	1in (25.4mm)	1in (25.4mm)	1in (25.4mm)	1in (25.4mm)	<b>Opposed Mode</b>					<b>Opposed Mode</b>		
V6	1.5in (38.1mm)	1.5in (38.1mm)	1.5in (38.1mm)	1.5in (38.1mm)								
V8	0.5in (12.7mm)	0.5in (12.7mm)	0.5in (12.7mm)	0.5in (12.7mm)	F4 w/lens	20+ft (6.1m)	20+ft (6.1m)	12ft (3.6m)	9ft (2.7m)	F5 w/lens	6ft (1.8m)	2ft (0.6m)
O4	18in (457.2mm)	11in (279.4mm)	4in (101.6mm)	3in (76.2mm)	<b>Proximity Mode</b>					<b>Proximity Mode</b>		
O5	4ft (1.2m)	3ft (0.9m)	1.5ft (0.5m)	1ft (0.3m)								
R4	20+ft (6.1m)	18+ft (5.5m)	6ft (1.8m)	5ft (1.5m)	F4 w/lens	1ft (0.3m)	1ft (0.3m)	N/A	6in (152.4mm)	F5 w/lens	1ft (0.3m)	1ft (0.3m)
R5	N/A	7ft (2.1m)	4ft (1.2m)	3ft (0.9m)								

Note: Proximity tests utilized a 90% reflective white target. Retroreflective tests utilized a 3in diameter round reflector, Model AR3.

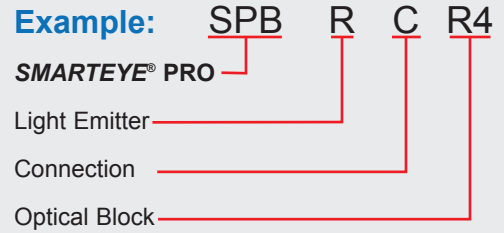
Note: Proximity tests utilized a .125in diameter fiber bundle.

Note: Proximity tests utilized a .040in diameter fiber bundle.

# How To Specify:



- Select sensor type:  
SPB = Includes Action Alert
- Select sensor LED light source:  
I = Infrared  
R = Red  
B = Blue  
WL = White
- Select connection required: Blank = Cable 6ft (1.8m)  
C = Connector
- Select Optical Block.



## Light Source Guidelines

<p><b>INVISIBLE INFRARED LIGHT SOURCE (880nm)</b></p> <ul style="list-style-type: none"> <li>A. Best choice in most opaque object sensing tasks.</li> <li>B. Provides longest possible sensing range.</li> <li>C. Best choice in penetrating lens contamination.</li> <li>D. Preferred for use with small glass fiber optic light guides Note: Not recommended for plastic fiber optic light guides.</li> <li>E. Best for sensing dark colored (black, blue, green, etc.) objects in the proximity mode.</li> <li>F. Useful in penetrating containers for verification of contents, or detecting overlapped splices in dense materials.</li> </ul>	<p><b>RED LIGHT SOURCE (660nm)</b></p> <ul style="list-style-type: none"> <li>A. Best choice for use with plastic fiber optic light guides.</li> <li>B. Useful when sensing translucent objects in proximity mode.</li> <li>C. Useful when sensing transparent objects in fiber optic retroreflective mode.</li> <li>D. Can be polarized for retroreflective sensing to reduce proxing on shiny objects.</li> <li>E. Opposed fiber optic light guides can be polarized for sensing some translucent plastic containers.</li> <li>F. Used as red filter for color perception advantages.</li> </ul>
<p><b>BLUE LIGHT SOURCE (480nm)</b></p> <ul style="list-style-type: none"> <li>A. Useful for detecting translucent/transparent plastic, or glass objects in the retroreflective mode when using the R4 optical block.</li> <li>B. Used as blue filter for color perception advantages.</li> </ul>	<p><b>WHITE LIGHT SOURCE</b> (Broadband Color Spectrum)</p> <ul style="list-style-type: none"> <li>A. Best choice for detecting all printed registration marks on packaging material.</li> <li>B. Recommended for detecting dark colored objects in the proximity mode.</li> <li>C. Best choice for sorting colored objects.</li> </ul>

## Hardware & Accessories

### 5-Wire Shielded MicroCable, M12



- GSEC-6**  
6ft (1.8m) cable
- GSEC-15**  
15ft (4.6m) cable
- GSEC-25**  
25ft (7.62m) cable



- GRSEC-6**  
6ft (1.8m) cable/right angle
- GRSEC-15**  
15ft (4.6m) cable/right angle
- GRSEC-25**  
25ft (7.6m) cable/right angle

### Mounting Brackets



**FMB-1** (8.4 mm diam.)  
Standard Fiber Optic



**SEB-3**  
Stainless L Bracket



**FMB-2** (5.1 mm diam.)  
Mini Glass Fiber Optic



**FMB-3** (3.1 mm diam.)  
Mini Plastic Fiber Optic

# Specifications

## SUPPLY VOLTAGE

- 10 to 30VDC
- Polarity Protected

## CURRENT REQUIREMENTS

- 45mA (exclusive of load)

## OUTPUT TRANSISTORS

(Current Limited)

- (1) NPN and (1) PNP sensor output transistor
- (1) PNP Action Alert output transistor
- Sensor outputs can sink or source up to 150mA
- All outputs are continuously short circuit protected
- Action Alert PNP transistor output source up to 75mA

## RESPONSE TIME

- Light/Dark state response = 300 microseconds

## LED LIGHT SOURCE

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

## PUSH-BUTTON CONTROL

- Automatic set-up routines, QuickSet/AUTOSET
- Manual Adjustments
- Set status of five options: LOCK, AUTOSET, LT/DK ON, Auto Trac, and 10ms TIMER

## 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

## LIGHT IMMUNITY

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

SMARTEYE® PRO



## AMBIENT TEMPERATURE

- -40°C to 70°C (-40°F to 158°F)

## RUGGED CONSTRUCTION

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

## HYSTERESIS

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

RoHS Compliant  
Product subject to change without notice

## Connections and Dimensions

