

**"ONE TOUCH"™**  
THE...

**SMARTEYE®**  
**EZ-PRO™**



**PHOTOELECTRIC  
SENSOR**



**TRI-TRONICS®**



# EZ To Use 1 Button, 1 Push Automatic Advanced Sensor

The SMARTEYE® EZ-PRO™ is a high performance, automatic photoelectric sensor that can be adjusted by a **single push of a button**. As a result, there is no guess work on the part of the operator. Now you can throw away the screwdriver and the manual!

The EZ-PRO™ AUTOSET™ ADJUSTMENT PROCEDURE is as simple as it gets...

1. Establish one of the following conditions:  
Proximity . . . . . Reflect light off object.  
Beam Break . . . . . Remove object from light beam path.
2. Depress either **yellow** or **blue** button for (3) seconds.

That's all there is to it! From that point on, the sensor will automatically maintain a perfect setting, thanks to the dynamic Automatic Contrast Tracking System (ACT™). The EZ-PRO™ AUTOSET™ routine can also be implemented from a momentary remote switch. (I.E. push-button or touch screen). The EZ-PRO™ is equipped with a Contrast Indicator™ as well as an Action Alert diagnostic indicator that allows the operator to visually substantiate performance. When the lock feature is enabled (see advanced features), the EZ-PRO™ sensor is tamper proof. Now, the sensor will provide you with automatic, hassle-free performance that you expect from a Smarteye®.



- **ACT™ AUTOMATIC CONTRAST TRACKING**  
ACT™ automatically adjusts the sensor as conditions change. This can include dirty lens or reflectors, damaged fiber optics or lenses, 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 EZ-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.
- **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™**

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, Auto Track, and Timer; 10ms, 25ms, and 50ms

- **VERSATILITY**

Choice of ten “quick change” optical blocks allows use in the proximity, convergent, retroreflective, polarized retroreflective, fiber optic, 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 molded 6’ cable.

- **MOUNTING OPTIONS**

Built-in DIN Rail “snap-on” design, thru-hole or bracket mount.



*“Large selection of Standard and Custom Fiber Optic Light Guides”*



*“Blue Light source for clear object sensing using Retroreflective Mode”*

# Light Source Guidelines

## 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 fiber light guides Note: Do not use IR light with plastic fiber optic 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 fiber optic light guides
- B. Useful when sensing translucent objects in proximity (beam make) mode
- C. Useful when sensing transparent objects in fiber optic retroreflective (beam break) mode
- D. Can be polarized for retroreflective (beam break) sensing to reduce proxing on shiny objects
- E. Opposed fiber optic 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

### DUAL FUNCTION BARGRAPH

PRIMARY FUNCTION: Contrast Indicator  
 SECONDARY FUNCTION: Status Indicator of Five Selectable Options

### FIVE SELECTABLE OPTIONS

- #5 LOCK ... for tamper-proof operation.
- #4 AUTO TRAC™ ... Automatic Contrast Tracking for perfect setting.
- #3 10 millisecond pulse stretcher/off delay.
- #2 25 millisecond pulse stretcher/off delay.
- #1 50 millisecond pulse stretcher/off delay.

### OPTION STATUS / MODE SELECT

Push both buttons for 3 seconds to switch bargraph display to status indicator of selectable options

### OPTION STATUS MODE INDICATOR

### OUTPUT STATUS INDICATOR

### MARGINAL PERFORMANCE INDICATOR



### INTERCHANGEABLE OPTICAL BLOCKS

Choice of 10 Optical Blocks - O4, O5, R4, R5, F4, F6, V4, V4A, V6, V8

### OPTIONAL TIMER

10, 25, or 50 millisecond pulse stretcher / "OFF" delay

### YELLOW PUSH BUTTON - 3 Functions

- #1 Manual "UP" adjustment
- #2 Light state AUTOSET™ with light "ON" output
- #3 Toggle selected option to opposite state and return to normal operation

### BLUE PUSH BUTTON - 3 Functions

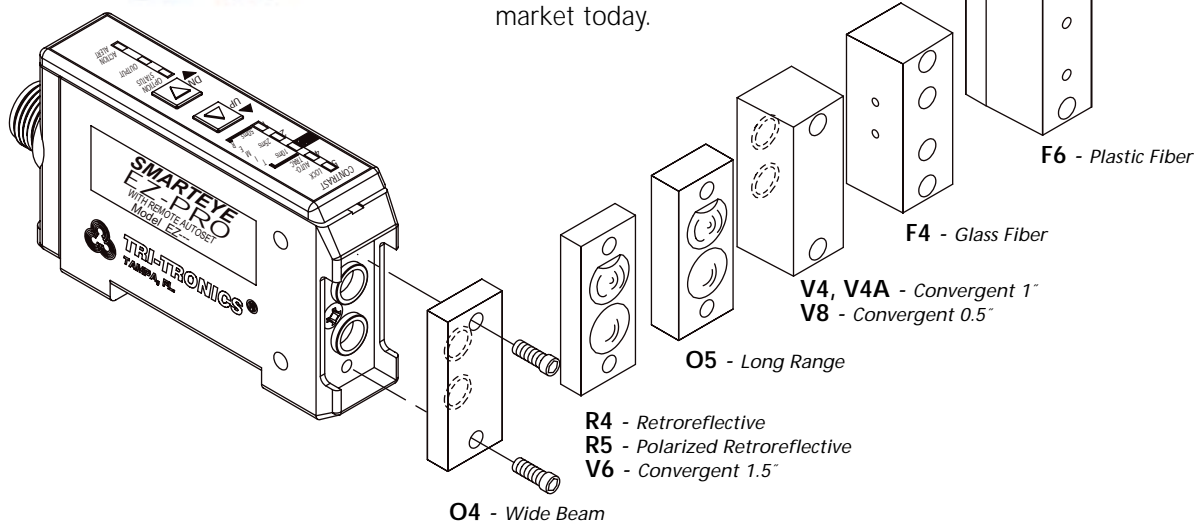
- #1 Manual "DOWN" adjustment
- #2 Light state AUTOSET™ with dark "ON" output
- #3 Step to desired function to be altered when in option status mode

**Note:** Yellow button AUTOSET™ provides light "ON" output.  
 Blue button AUTOSET™ provides dark "ON" output.

# Optical Block Selection



The **SMART EYE® EZ-PRO™** gives you a choice of 10 interchangeable optical blocks, making it one of the most versatile sensors on the market today.



**O4 and O5**  
Proximity Sensing

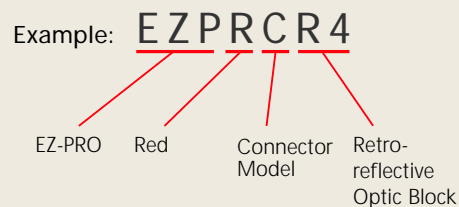
**V4, V4A, V6, and V8**  
Convergent Sensing

**R4 and R5**  
Retroreflective Sensing

**F4 and F6**  
Fiber Optic Sensing

## How To Specify:

1. Select Sensor light source required:  
I = Infrared  
R = Red  
B = Blue  
WL = White
2. Select Connector required:  
Blank = Cable  
C = Connector
3. Select Optical Block based on mode of operation required.



## Sensing Range Guidelines

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	1 IN	1 IN	1 IN	1 IN	Opposed Mode					Opposed Mode		
V6	1.5 IN	1.5 IN	1.5 IN	1.5 IN						F4	3 FT	1 FT
V8	0.5 IN	0.5 IN	0.5 IN	0.5 IN	F4 w/lens	20+ FT	20+ FT	12 FT	9 FT	F6 w/lens	6 FT	2 FT
O4	18 IN	11 IN	4 IN	3 IN	Proximity Mode					F6w/right angle lens	3 FT	1 FT
O5	4 FT	3 FT	1.5 FT	12 IN						F6	7 IN	5 IN
R4	20+ FT	18+ FT	6 FT	5 FT	F4 w/lens	1 FT	1 FT	N/A	6 IN	F6 w/lens	1 FT	1 FT
R5	N/A	7 FT	4 FT	3 FT								

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

**NOTE:** Range tests utilized a .125" dia. fiber bundle

**NOTE:** Range tests utilized a .040" dia. fiber





**REMOTE AUTOSET™**

*Remotely adjust the sensor from a push button momentary switch or a touch screen to PLC instantly.*



**AUTOSET™ ADJUSTMENT**  
*The AUTOSET™ adjustment routine only requires one finger to push one button one time!*

## 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



**FMB-1**  
 Fiber Optic Bracket



**SEB-3**  
 Stainless "L" Bracket



**FMB-2**  
 Miniature Fiber Optic Bracket



**LK-4**  
 Lens Kit

# Specifications

## SUPPLY VOLTAGE

- 10 to 30 VDC
- Polarity Protected

## CURRENT REQUIREMENTS

- 45 milliamps (exclusive of load)

## OUTPUT TRANSISTORS

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

## REMOTE AUTO-SET™ INPUT

- Opto isolated sinking input (10 milliamps)

## RESPONSE TIME

- Light state response = 300 microseconds
- Dark state response = 300 microseconds

## LED LIGHT SOURCE

- Infrared = 880 NM, Red = 660 NM, Blue = 480 NM, White = Broadband Color Spectrum
- Pulse modulated

## PUSH BUTTON CONTROL

- Yellow/Blue – AUTOSET™
- Manual Adjustments
- Set status of 5 options: 5) Lock, 4) Auto-Trac, 3) 10ms, 2) 25ms, 1) 50ms

## HYSTERESIS

- “Factory-set” for high resolution – less than one bar on the contrast indicator

## LIGHT IMMUNITY

- Responds to sensor’s pulsed modulated light source ... immune to most ambient light, including indirect sunlight or strobes

## INDICATORS

- 5-LED Bargraph 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”
- Amber LED ... Illuminates when in the options select mode
- Yellow LED ... Illuminates when action alert is activated. Also indicates when ACT™ adjusts sensor

## AMBIENT TEMPERATURE

- - 40°C to 70°C (- 40°F to 158°F)

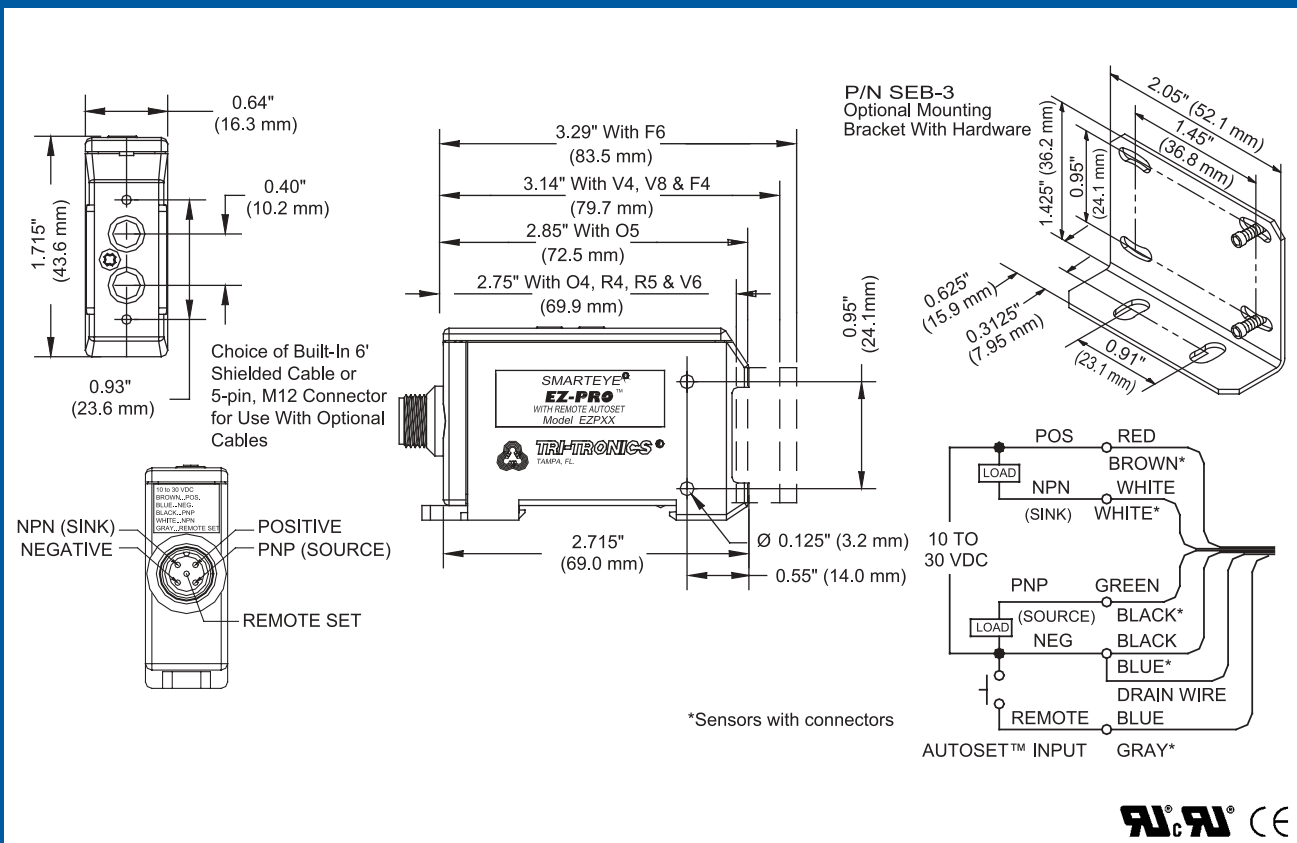


## RUGGED CONSTRUCTION

- Chemical resistant high impact polycarbonate housing
- Waterproof, ratings: NEMA 4X, 6P and IP67
- Conforms to heavy industry grade CE requirements

Product subject to change without notice.

## Connections and Dimensions SMARTEYE® EZ-PRO® PHOTOELECTRIC SENSOR





# About Us:

## Tri-Tronics Company, Inc.

MADE IN THE U.S.A. since 1954... and still under the same dependable ownership and management.

TRI-TRONICS designs, manufactures, and supplies high-quality photoelectric sensors.

This brochure was specifically designed to simplify the process of selecting the proper sensor to meet a particular sensing requirement. Using this brochure, combined with the expertise of a local TRI-TRONICS stocking distributor, should provide quick answers to your questions regarding photoelectric sensors.

For the name and location of the nearest TRI-TRONICS representative, call 1-800-237-0946 or E-Mail us at: [info@ttco.com](mailto:info@ttco.com). Factory application engineers are available to provide technical assistance and for solving your most difficult sensing problems.

TRI-TRONICS' manufacturing facility is located in Tampa, Florida, in close proximity to Tampa International Airport. We cordially invite you to schedule a visit to our facility on your next business or vacation trip to Florida. We welcome customers visits!



# TRI-TRONICS®



**TRI-TRONICS COMPANY, INC.**

P.O. Box 25135, Tampa, FL 33622-5135

TEL: (813) 866-4000 / (800) 237-0946

FAX: (813) 884-8818

[www.ttco.com](http://www.ttco.com) / [info@ttco.com](mailto:info@ttco.com)

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