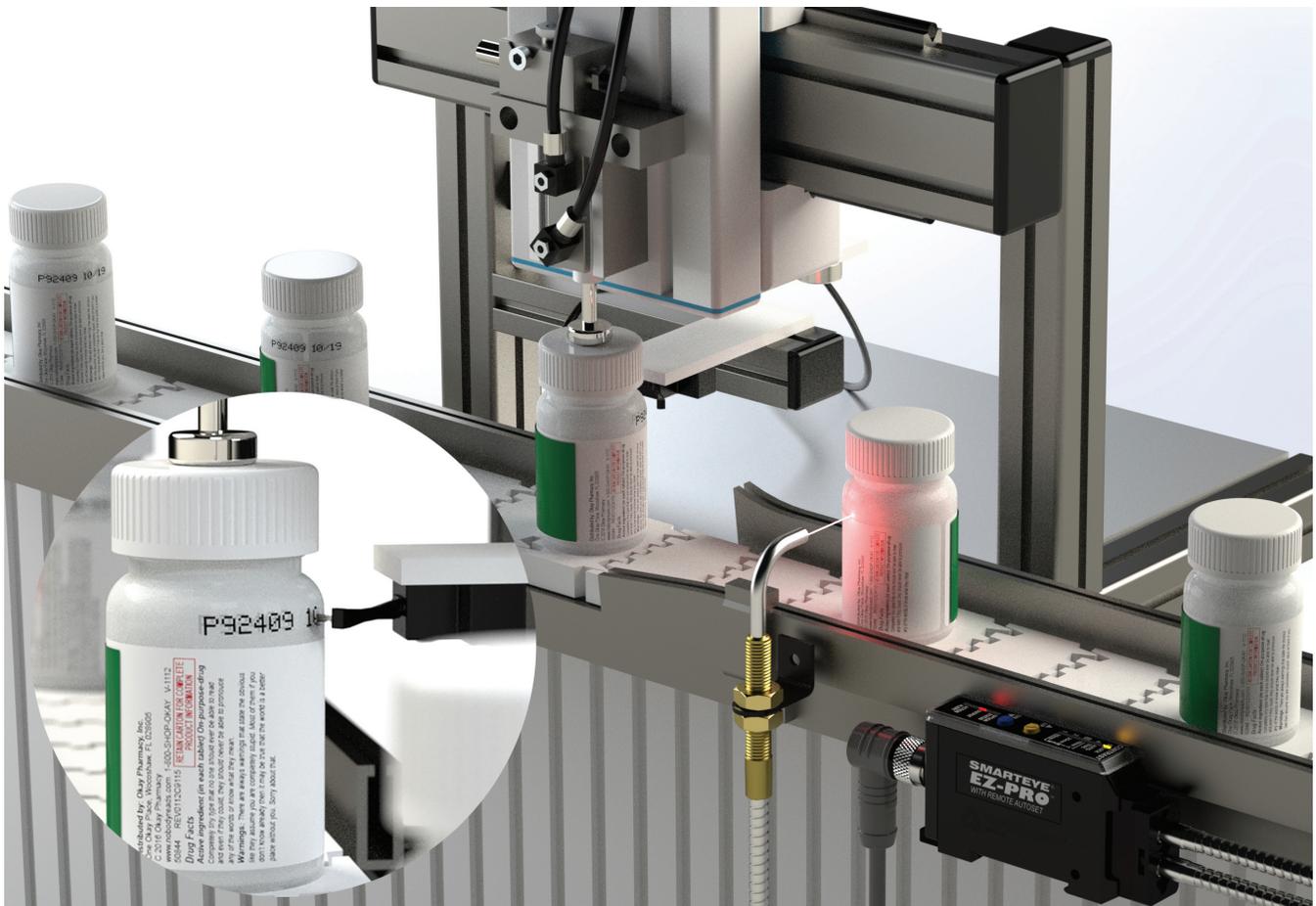# TRI-TRONICS®

Smart Sensing Solutions Since 1954

SMARTEYE®
EZ-PRO™

Automatic Self-Adjusting General Purpose Sensor

SMARTEYE® EZ-PRO™

The *SMARTEYE® EZ-PRO™* is a high performance, automatic 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 EZ-PRO™ AUTOSET routine can also be implemented from a momentary remote switch (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, the sensor is tamper-proof.

The EZ-PRO™ sensor will provide 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
- Remote AUTOSET
- ACT, Automatic Contrast Tracking
- Action Alert indicator
- Three pulse stretchers; 10ms, 25ms, and 50ms (not accumulative)
- 5-LED Contrast Indicator
- Cable or quick disconnect
- Interchangeable optical blocks
- Button lock out
- Light On/Dark On automatic select
- NPN and PNP output

Benefits
- Easy to use
- Reduces downtime
- Robust design
- High reliability
- Lower inventory costs
- Tamperproof

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 **EZ-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.

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

EDR®
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.

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 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.

MOUNTING OPTIONS
Built-in DIN rail snap-on design, through-hole, or bracket mount.

DUAL-FUNCTION BAR GRAPH

Primary Function: *Contrast Indicator*
Secondary Function: *Status Indicator* of Five Selectable Options

FIVE SELECTABLE OPTIONS

#5 LOCK – for tamperproof 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 bar graph display to status indicator of selectable options

OPTION STATUS INDICATOR

Illuminates when in Option Status mode

OUTPUT STATUS INDICATOR

Illuminates when output transitors are "ON."

MARGINAL PERFORMANCE INDICATOR

Illuminates when sensor's performance falls below optimum contrast levels

INTERCHANGEABLE OPTICAL BLOCKS

Choice of 10 Optical Blocks - O4, O5, R4, R5, F4, F5, V4, V4A, V6, V8

OPTIONAL TIMER

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

YELLOW PUSHBUTTON - 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 PUSHBUTTON - 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

Optical Block Selection

SMARTEYE EZ-PRO™

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

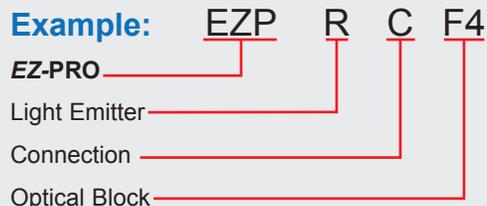| OPTICAL BLOCKS	IR	RED	BLUE	WHITE	OPTICAL BLOCKS	IR	RED	BLUE	WHITE	OPTICAL BLOCKS	RED	WHITE
	Convergent / Proximity / Retroreflective					Glass Fiber Optics				Plastic Fiber Optics		
V4, V4A	1in (25.4mm)	1in (25.4mm)	1in (25.4mm)	1in (25.4mm)		**Opposed Mode**					**Opposed Mode**	
V6	1.5in (38.1mm)	1.5in (38.1mm)	1.5in (38.1mm)	1.5in (38.1mm)	F4	16in (406.4mm)	1ft (0.3m)	8in (203.2mm)	5in (127.0mm)	F5	9in (228.6mm)	2in (50.8mm)
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)						F5 w/right angle lens	3ft (0.9m)	1ft (0.3m)
O5	4ft (1.2m)	3ft (0.9m)	1.5ft (0.5m)	1ft (0.3m)		**Proximity Mode**					**Proximity Mode**	
R4	20+ft (6.1m)	18+ft (5.5m)	6ft (1.8m)	5ft (1.5m)	F4	7in (177.8mm)	5in (127.0mm)	1in (25.4mm)	1in (25.4mm)	F5	7in (177.8mm)	5in (127.0mm)
R5	N/A	7ft (2.1m)	4ft (1.2m)	3ft (0.9m)	F4 w/lens	1ft (0.3m)	1ft (0.3m)	N/A	6in (152.4mm)	F5 w/lens	1ft (0.3m)	1ft (0.3m)

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:

1. Select EZ-PRO Sensor

2. Select light source required:
I = Infrared
R = Red
B = Blue
WL = White

3. Select Connector required:
Blank = Cable 6ft (1.8m)
C = Connector

4. Select Optical Block based on mode of operation required.

Example: EZP R C F4

EZ-PRO
Light Emitter
Connection
Optical Block

Light Source Guidelines

INVISIBLE INFRARED LIGHT SOURCE (880nm)

A. Best choice in most opaque object sensing tasks.
B. Provides longest possible sensing range.
C. Best choice in penetrating lens contamination.
D. Preferred for use with small glass fiber optic light guides
Note: Not recommended for plastic fiber optic light guides.
E. Best for sensing dark colored (black, blue, green, etc.) objects in the proximity mode.
F. Useful in penetrating containers for verification of contents, or detecting overlapped splices in dense materials.

RED LIGHT SOURCE (660nm)

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

BLUE LIGHT SOURCE (480nm)

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.

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 mode.
C. Best choice for sorting colored objects.

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 (8.4mm 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
• (1) NPN and (1) PNP sensor output
  transistor
• Sensor outputs can sink or source up to
  150mA (current limited)
• All outputs are continuously short circuit
  protected

REMOTE AUTOSET INPUT
• Opto isolated sinking input (10mA)

RESPONSE TIME
• Light/Dark state response = 300
  microseconds

LED LIGHT SOURCE
• Infrared = 880nm, Red = 660nm,
  Blue = 480nm, White = Broadband Color
  Spectrum
• Pulse modulated

PUSH-BUTTON CONTROL
• Yellow/Blue – AUTOSET
• Manual Adjustments
• Set status of three options: 5) Lock,
  4) Auto-Trac, 3) Timers: 10ms, 25ms,
  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, resulting in high immunity
  to most ambient light, including indirect
  sunlight or strobes

DIAGNOSTIC 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

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

Connections and Dimensions — SMARTEYE® EZ-PRO® SENSOR