

Technically Advanced EZ to Use Automatic Push-button Sensor



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 transistors 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

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.

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 three (3) seconds.

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

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. pushbutton 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 tamperproof. Now, the sensor will provide you with the automatic, hassle-free performance that you expect from a **SMARTEYE®**.

SET-UP AND OPERATION INSTRUCTIONS

OPAQUE OBJECT SENSING

OPTION 1

Preferred

Retroreflective and Beam Break sensing modes are the preferred choices for detecting opaque objects.

Sensing Range

Retroreflective

Fiber Optic: Fiber Tip to Reflector...Up to 2 ft.

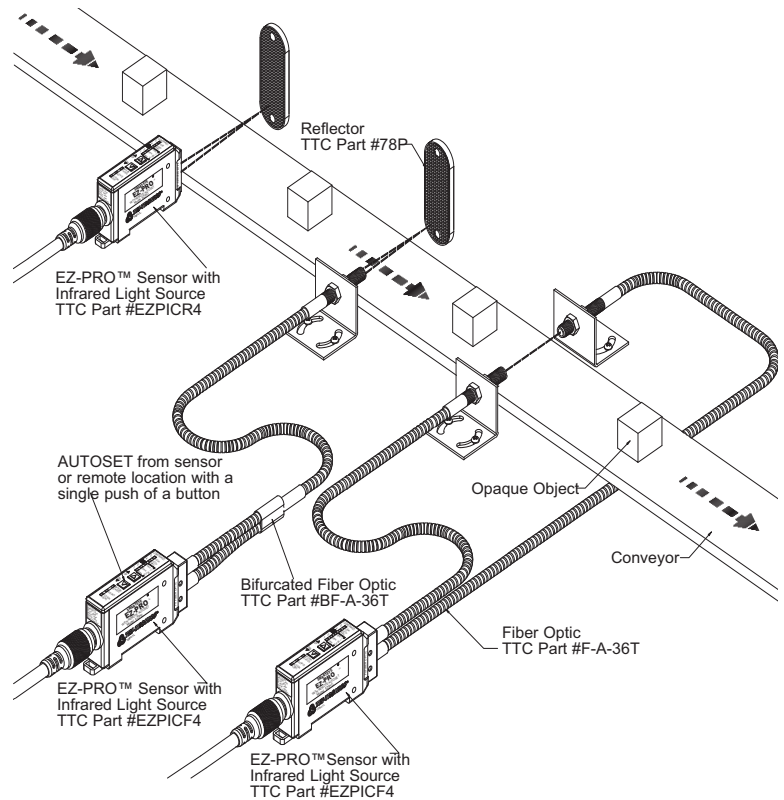
Lens: R4 Lens to Reflector - Up to 12 ft.

Beam Break

Fiber Optic: Fiber Tip to Fiber Tip - Up to 3 ft.

AUTOSET INSTRUCTIONS

1. Remove opaque object from light beam path.
2. Depress the **BLUE** button for three seconds.



OPTION 2

Alternate

Reflective/Proximity beam make mode is an excellent alternative choice when the sensing site precludes using the retroreflective mode.

Sensing Range

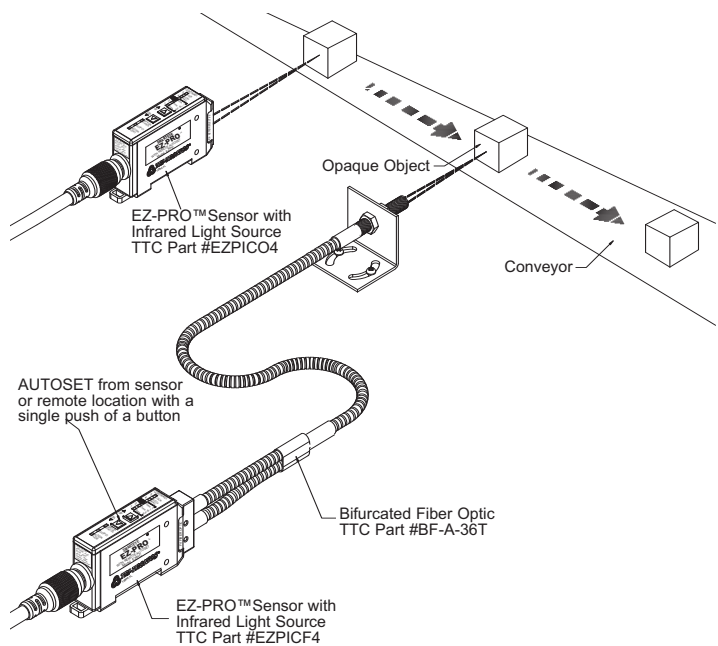
Dependent on size, shape, color and surface reflectivity.

Fiber Optic: Fiber Tip to Object...Up to 6 in.

Lens: Lens to Object - Up to 3 ft.

AUTOSET INSTRUCTIONS

1. Place object in the light beam path at its **Maximum** sensing range.
2. Position object with **Darkest** area facing light beam path.
3. Depress the **YELLOW** button for three seconds.



SET-UP AND OPERATION INSTRUCTIONS

TRANSLUCENT/TRANSPARENT

OPTION 1

Full or Empty Containers

Proximity beam make sensing mode is one method for detecting translucent or transparent objects.

Sensing Range

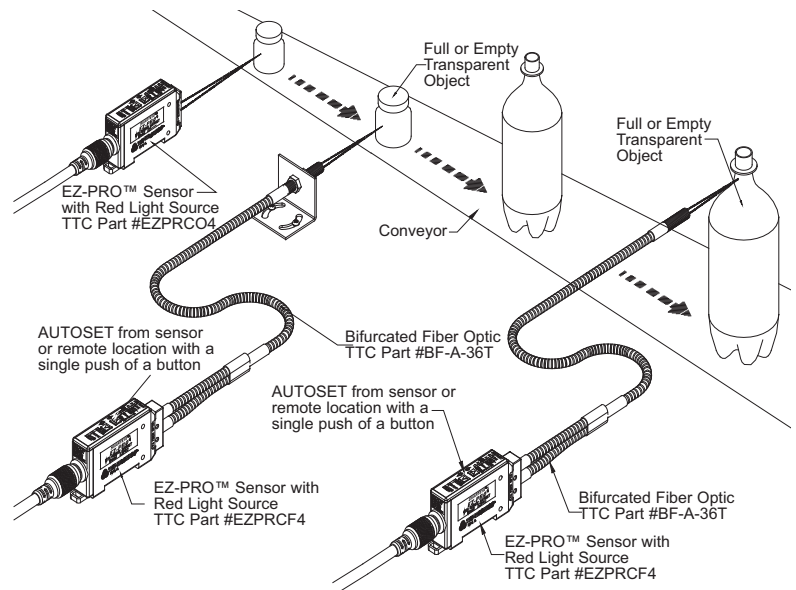
Dependent on size, shape, color, and surface reflectivity.

Fiber Optic: Fiber Tip to Object - Up to 6 in.

Lens: Lens to Object - Up to 3 ft.

AUTOSET INSTRUCTIONS

1. Place translucent/transparent object in the middle of the light beam path at its most distant location.
2. Depress the **YELLOW** button for three seconds.



OPTION 2

Empty Containers

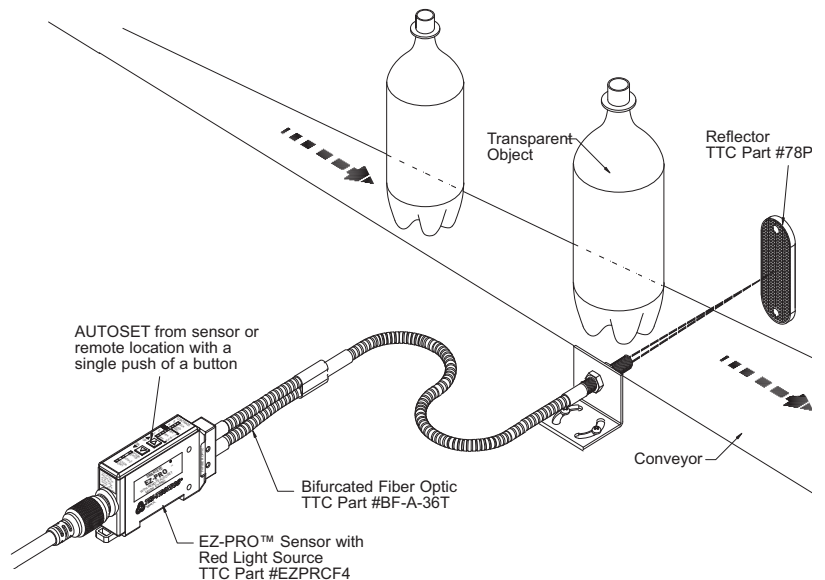
Retroreflective, beam break sensing mode is the preferred choice for detecting empty translucent or transparent objects.

Sensing Range

Fiber Optic: Fiber Tip to Reflector - Up to 18 in.

AUTOSET INSTRUCTIONS

1. Remove opaque object from light beam path.
2. Depress the **BLUE** button for three seconds.



IMPORTANT NOTE:

The AUTOSET instructions as shown above, result in the triggering on the arrival of the leading edge of the object at the sensing site. To trigger on the departure of the trailing edge of the object from the sensing site, depress the opposite color AUTOSET button for three seconds.

DYNAMIC AUTOSET

Depressing the appropriate button for three seconds while input events are ongoing will oftentimes result in a perfect setting thanks to the Automatic Contrast Tracking system (ACT). If, after attempting a dynamic quickset routine a couple of times does not produce a satisfactory adjustment, it is recommended that you initiate a series of “up” or “down” manual commands while viewing the Contrast Indicator. When the signal level reaches the threshold of “3” on the indicator, the ACT digital tracking system will automatically complete the adjustment.



MANUAL-ADJUST

Please note that the Yellow “up” button, or the Blue “down” button are functional at all times, as long as the lock feature is disabled. Tap the Yellow button to move the adjustment (as indicated on the Contrast Indicator) toward the light state. Tap the Blue button to move the adjustment toward the dark state. Tapping the manual buttons advances the adjustment in small, incremental steps of about 0.5 bar per step as displayed on the Contrast Indicator. Manual adjustments are particularly useful when finite adjustments are required for very low contrast applications or when detecting highly reflective irregularly shaped objects.

DIAGNOSTICS

The **SMARTEYE® EZ-PRO™** sensor is equipped with two important and useful diagnostic features. The first one is the 5 LED Contrast Indicator, which provides “at-a-glance” analysis of the sensor’s response to the light state vs. the dark state sensing conditions. This device is not only useful in static conditions for alignment purposes, but is also functional during dynamic conditions when input events are ongoing. The second important feature is the Action Alert bright Yellow indicator. This indicator will turn “on” whenever the highest “light state” reading, or the lowest “dark state” reading (as viewed on the contrast indicator) fails to exceed preset levels.

The “light state” reading must exceed 4”

The “dark state” reading must fall below 2”

Whenever the lightest or darkest light levels are unacceptable, the bright Yellow LED indicator will be turned “on” when the light level passes through the sensor’s switch point of 3 on the contrast indicator. Both the Contrast Indicator and the Action Alert indicator can be viewed simultaneously during dynamic conditions when input events are ongoing.

- Note:**
- If the red Output Indicator flashes while the output transistor is in the “ON” state, one of the output leads is shortened (NPN to positive or PNP to negative/ shield).
 - If the grey wire is shorted to ground, the Contrast Indicator cycles repeatedly.

OUTPUT INDICATOR

Red LED illuminates when output transistor is in the “ON” state.

ADVANCED OPTIONS

The **SMARTEYE® EZ-PRO™** is equipped with the following 3 optional features that can help to adapt the sensor to specific application requirements:

Lock When this feature is enabled the sensor becomes tamper proof.

ACT (Automatic Contrast Tracking) - When this feature is enabled the sensor will automatically track with a variety of changing conditions by adjusting itself during normal operation.

Timer When this “off” delay timer is enabled, the output duration is extended by 10, 25, or 50 milliseconds. This timing function helps to prevent erratic triggering of the printer.

DISPLAY STATUS OF SELECTABLE OPTIONS

Press and hold both Blue and Yellow buttons simultaneously for 3 seconds. The 5-LED bargraph will go into a flashing routine. When completed, the 5-LED bargraph will switch from functioning as a contrast indicator to a status indicator. Now the status of the selectable options will be displayed and the amber LED option status indicator will be lit.

SELECT OPTION TO BE ALTERED

Step to the desired function to be toggled to the opposite state by “tapping” the Blue button. The first “tap” will step to the “lock” select function. To indicate the “lock” function has been selected, the #5 LED will blink. The next “tap” will step the blinking of the indicator to the #4 LED. Another “tap” of the Blue button will step the blinking of the indicator to the #3 LED. Another “tap” to the #2 LED and, finally, the fifth “tap” will select the #1 LED. Once the blinking LED is next to the option to be changed, depress the Yellow button to enter your choice into memory. The sensor will then display the choice briefly before returning to normal operation. This sequence must be repeated for each function to be altered. If there is no change in the status of any of the control functions, tap the Blue button a sixth time or wait 5 seconds and allow the sensor to automatically return to normal operation.

LED	FEATURE	On/Off	STATUS
#5 LED	Lock	On	The manual up/down and AUTOSET adjustments are disabled.
		Off	Manual adjustments are enabled.
#4 LED	ACT	On	ACT is enabled.
		Off	ACT is disabled.
#3 LED	10ms Timer	On	10ms Timer/Pulse Stretcher is enabled.
		Off	10ms Timer/Pulse Stretcher is disabled.
#2 LED	25ms Timer	On	25ms Timer/Pulse Stretcher is enabled.
		Off	25ms Timer/Pulse Stretcher is disabled.
#1 LED	50ms Timer	On	50ms Timer/Pulse Stretcher is enabled.
		Off	50ms Timer/Pulse Stretcher is disabled.

FACTORY PRESET OPTION MENU

LED	FEATURE	On/Off	STATUS
#5 LED	Lock	Off	Lock disabled, Manual and AUTOSET adjustments are enabled.
#4 LED	ACT	Off	ACT is disabled.
#3 LED	10ms Timer	Off	10ms Timer/Pulse Stretcher is disabled.
#2 LED	25ms Timer	Off	25ms Timer/Pulse Stretcher is disabled.
#1 LED	50ms Timer	Off	50ms Timer/Pulse Stretcher is disabled.

LOCK FUNCTION

When enabled (#5 LED lit), the Blue (down) and Yellow (up), manual and AUTOSSET commands will be disabled. This will provide tamper-proof operation. To toggle the lock function to the opposite state, hold in the both buttons for 3 seconds. Then, tap the Blue button once. The #5 LED should be blinking. Now, push and hold the Yellow button for one second.

ACT (AUTOMATIC CONTRAST TRACKING)

When enabled (#4 LED lit), the sensor will automatically track with a variety of changing conditions by adjusting itself during normal operation. For example, the sensor will continue to maintain the proper setting to compensate for changing detrimental conditions:

1. Lens or reflector contamination.
2. Scratched or damaged lens.
3. Broken fibers in light guides.
4. LED light source or thermal drift.
5. Target variations such as position, orientation or color.
6. Diminishing contrast deviation/shift caused by high speed events, particularly when input duty cycles are severely offset.

The dynamic adjustments of the sensor maintains excess gain and contrast deviation. As automatic adjustments occur, there will be an occasional flash of the bright yellow action alert indicator.

Note: On rare occasions (usually associated with low contrast sensing or product inspection applications) the ACT self-adjusting may have to be disabled.

TIMER FUNCTION

The optional "Pulse Stretcher" timer can be activated to help prevent false triggering of the printer in difficult sensing applications. The timer will extend the sensors output duration by either 10, 25, or 50 milliseconds. (not additive) Therefore the time duration of the gap between objects must be less than the timers duration. There are 3 selectable time durations which can be enabled only one at a time. They can be activated by toggling LED #3, #4, or #5 (note selectable options as listed above).

Important: When triggering off trailing edge of object, the timer must be disabled.

Accessories

Micro Cable Selection Guide, 5-wire M12



GSEC-6
6' (1.8m) Shielded cable



GSEC-15
15' (4.6m) Shielded cable



GSEC-25
25' (7.62m) Shielded cable

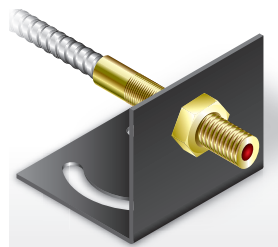
GSEC-2MU
6.5' (2.0m) Low-cost, unshielded

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

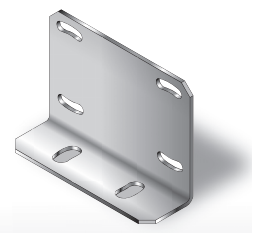
GRSEC-6
6' (1.8m) Right angle shielded cable

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

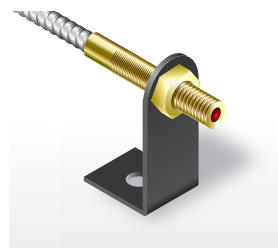
GRSEC-25
25' (7.62m) Right angle shielded cable



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



SEB-3
Stainless "L" Bracket



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

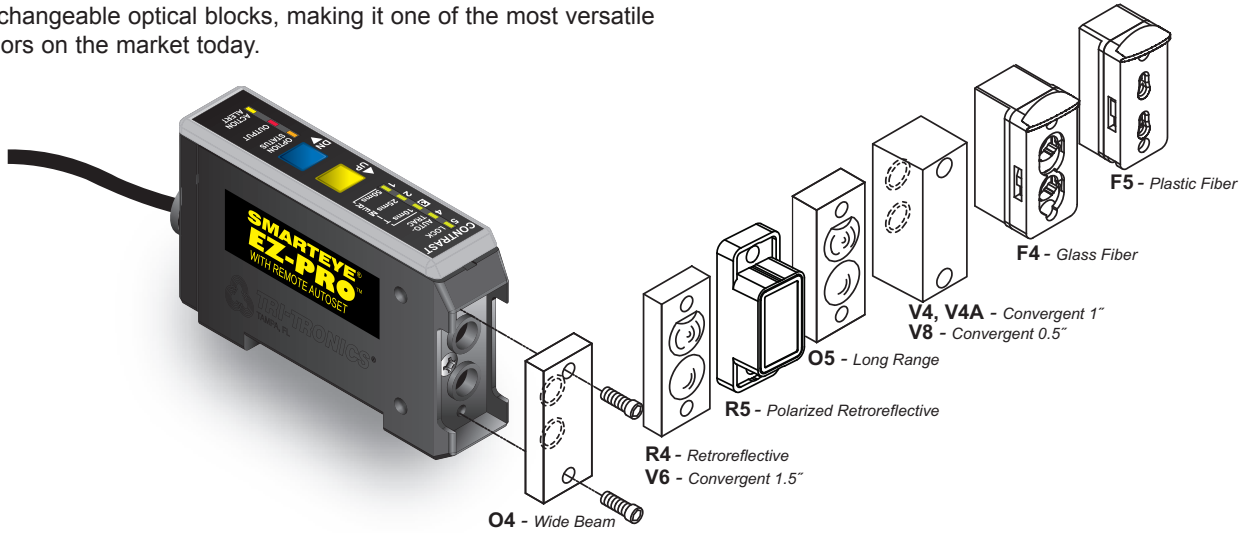


LK-4
Lens Kit
(See Optical Blocks
Accessories for contents)

Optical Block Selection



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



Type O4 Proximity

Wide beam optics useful for short-range sensing of transparent, translucent, opaque, 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 visible 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 F5 Plastic Fiberoptics

Adapter for use with a wide variety of plastic fiberoptic light guides for both the proximity and opposed sensing modes

Type V4, V4A Convergent 1" "V" Axis

Useable range of 1" to 5".

Type V6 Convergent 1.5" "V" Axis

Useable range of 1.5" to 8".

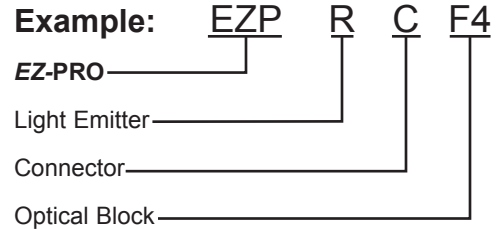
Type V8 Convergent .5" "V" Axis

Useable range of .25" to 5"

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

How To Specify:

1. Select Sensor light source required:
I = Infrared
R = Red
B = Blue
WL = White
2. Select Connector required:
Blank = Cable 6 ft. (1.8m)
C = Connector
3. Select Optical Block based on mode of operation required.



Sensing Range Guidelines

1 in. = 25.4mm / 1 ft. = 0.3048 meters

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.	1 ft.
R4	20+ ft.	18+ ft.	6 ft.	5 ft.
R5	N/A	7 ft.	4 ft.	3 ft.

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

Glass Fiberoptics				
OPTICAL BLOCKS	IR	RED	BLUE	WHITE
Opposed Mode				
F4	16 in.	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: Proximity tests utilized a .125" diameter fiber bundle.

Plastic Fiberoptics		
OPTICAL BLOCKS	RED	WHITE
Opposed Mode		
F5	9 in.	2 in.
F5 w/lens	6 ft.	2 ft.
F5 w/right angle lens	3 ft.	1 ft.
Proximity Mode		
F5	7 in.	5 in.
F5 w/lens	1 ft.	1 ft.

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

Specifications



SUPPLY VOLTAGE

- 10 to 30 VDC
- 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

PUSHBUTTON 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

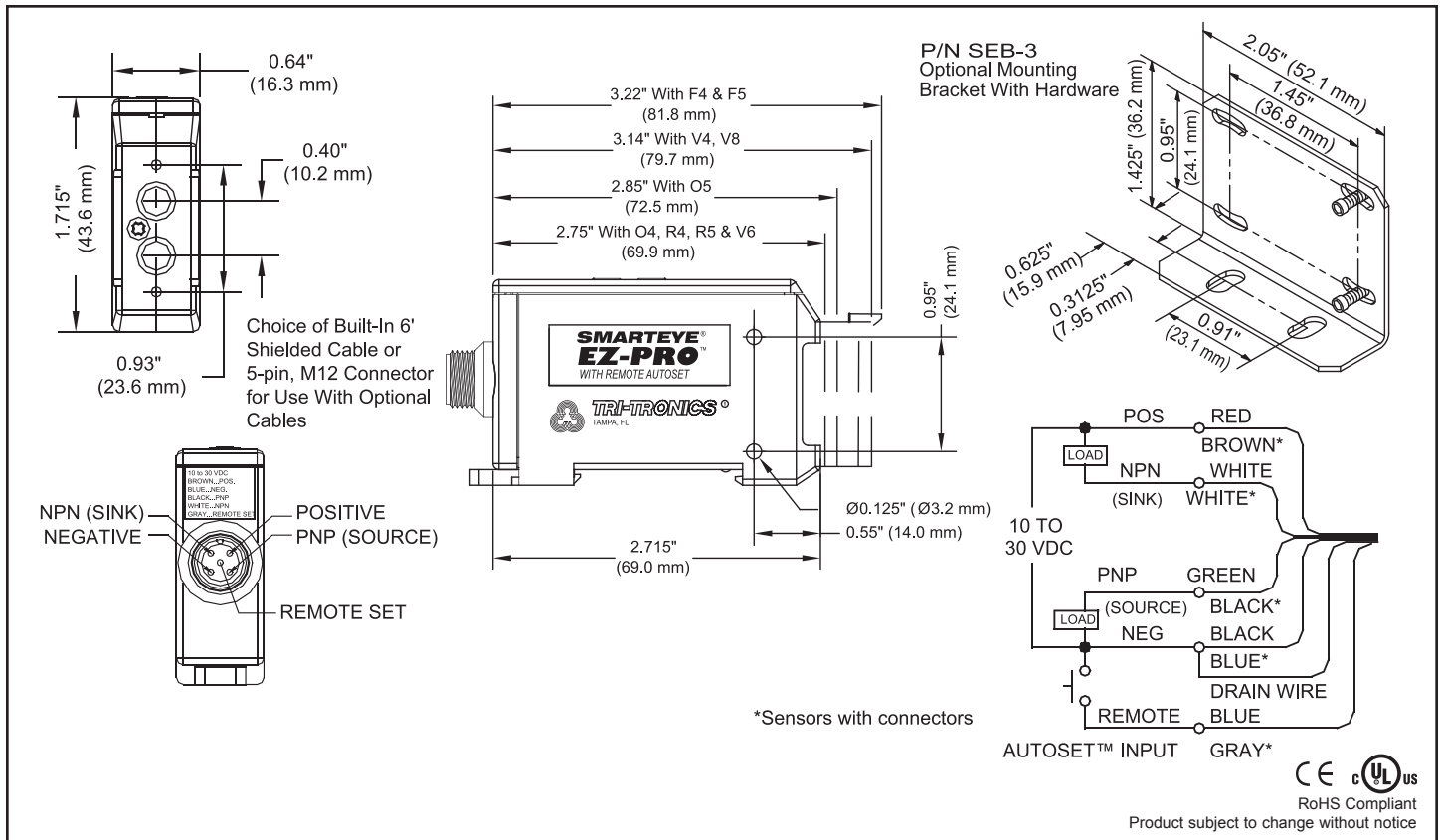


RoHS Compliant

Product subject to change without notice

Connections and Dimensions

SMARTEYE® EZ-PRO® PHOTOELECTRIC SENSOR



RoHS Compliant

Product subject to change without notice



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