TRI-TRONICS®

Smart Sensing Solutions Since 1954

SMARTEYE®
X-PRO

XPC - Photoelectric Communication Sensor

XPC – Extremely Versatile Photoelectric Communication Sensor

The *SMARTEYE*® X-PRO XPC is the most versatile Photoelectric Communication Sensor available on the market. Its patented communication technology allows for instant access, as well as feedback to and from the sensor. This unique photoelectric sensor is designed to be used in any application where physical contact of the sensor is either restricted, undesirable, or adds too much time to production line throughput. The Smarteye® X-PRO XPC sensor is just the kind of sensor innovation you would expect from Tri-Tronics. We've been pushing the envelope for half a century and continue to offer customers superior performance sensors for their unique application requirements.

The XPC is available in two communications options; RS-485 for multi-drop applications where sensors need to be addressed and bussed together, or RS-232 for single-drop applications where the sensor is behind safety interlocks, or in hard-to-reach areas that restrict easy access. These sensors can be easily interfaced to HMI's or PLC's using MODBUS ASCII or RTU communication protocol. Our unique and comprehensive EyewareXPC software is free of charge in either the development kit or upon request from the factory. We can also custom configure software requirements. ***Please consult factory for details.***

No other communication sensor available on the market provides this kind of accessibility, control, and flexibility. *The SMARTEYE® X-PRO XPC Photoelectric Communication Sensor by Tri-Tronics, another breakthrough technology from a world class leader in innovation.*
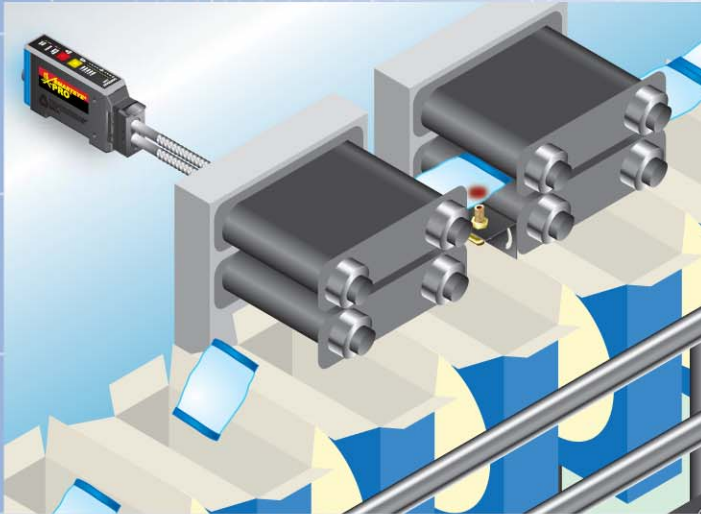
Features
- Downloadable Recipes
- Half-Duplex Communication
  - RS-485 (multi-drop) or RS-232 (single drop)
  - MODBUS ASCII or RTU
- Five Onboard Memory Locations
- Button Lockout
- Configurable Response Time: 60us, 125us, or 450us
- 8-Pin Male, M12 Connector
- Available in White, Red, or Infrared LED
- Patent No.'s 5,621,205 and 6,950,778
- 10-LED Dual-Function Bar Graph
- EyewareXPC Software Includes:
  - Two 4-Segment Digital Displays (Signal Level & Threshold)
  - Digital Sensor Scope
  - Full Featured Command Set

Note: EyewareXPC is free demonstration software. Command Set also available for custom interface software.
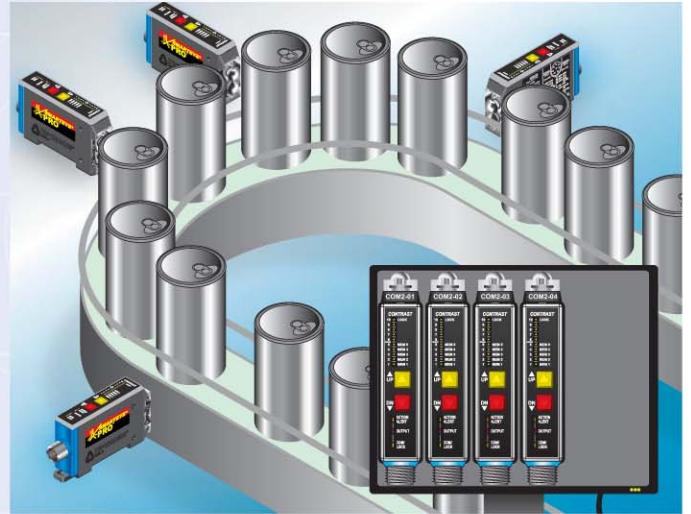
Benefits
- P.A.T. Compliant Process Analytical Technology
- No-Touch Setup
- Quick Digital Changeover
- Tamper Proof
- Capture and Save Setups
- Log Sensor Performance
- Digital Process Validation
- Performance Calibration
- Universal Application Flexibility
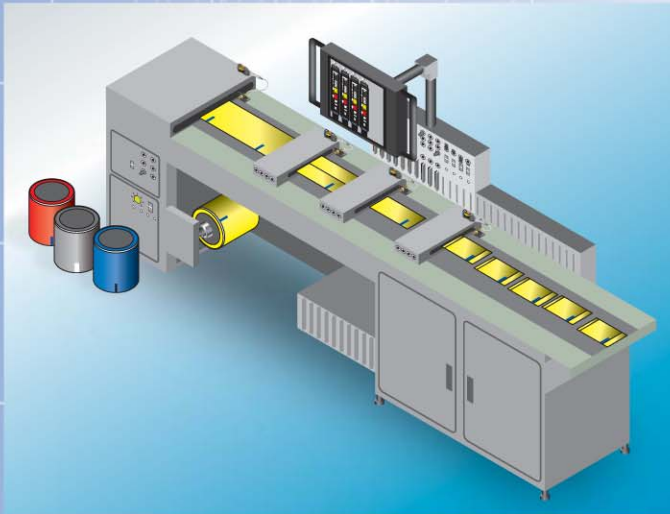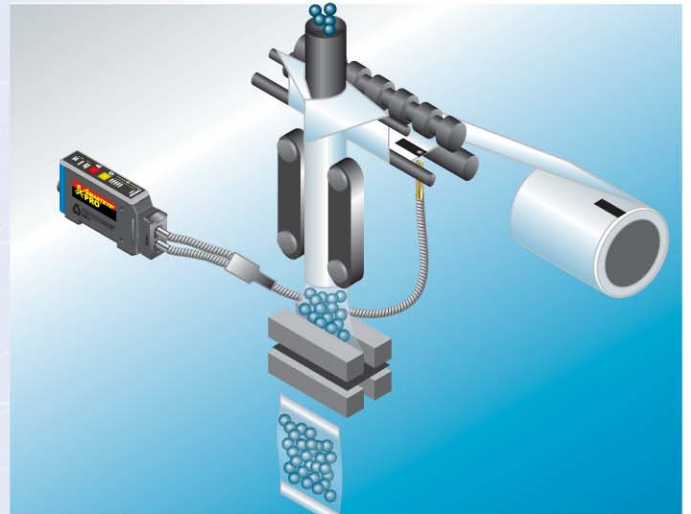- Quality Verification

Applications

Coupon Dispensing - Use Downloadable Recipes for Quick Digital Changeover

Access All Sensors from One Location for Quick Digital Changeover, Process Validation, and Monitoring
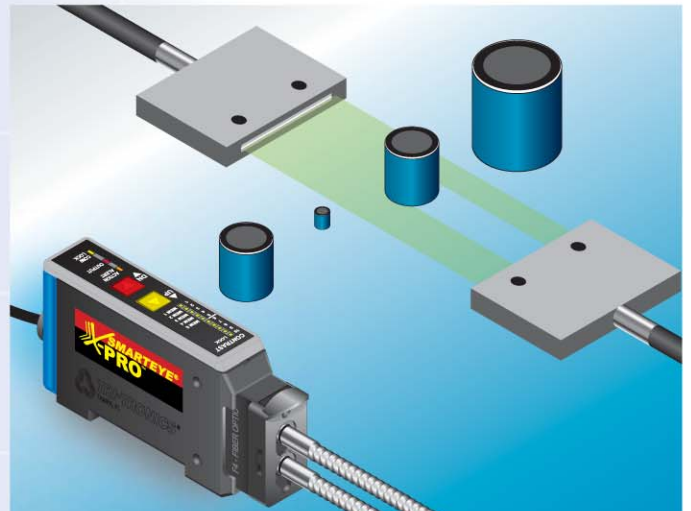

Conversion Machine with Multiple Sensors - Use Downloadable Recipes for Quick Digital Changeover

Form, Fill, & Seal - Registration Mark Sensing with Downloadable Recipes for Quick Digital Changeover

Suture Knot Detection - Use Threshold Adjustment with Digital Sensor Scope to Optimize Performance

Sort Parts by Size - Use Digital Display of Sensor Signal Level for Part Profiling

Features

10 LED DUAL-FUNCTION BAR GRAPH

Contrast Indicator™ – Provides "at-a-glance" performance data.
Lock – When this option is enabled the sensor becomes tamperproof. Note: The remote AUTOSET and programming are not affected by the Lock option.
MEM 1 through MEM 5 - LED indicates MEM location selected.
NOTE: Any changes to the sensor will automatically be saved to current MEM # location.

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

AUTOMATIC CONTRAST TRACKING (ACT™)
ACT™ automatically adjusts the sensor for diminishing conditions. Ex. Dirty environment, scratched lenses, thermal drift, or LED light power.

MOUNTING OPTIONS
Built-in DIN rail "Snap-On" design, through hole, or bracket mount.

AUTOSET ADJUSTMENT
The AUTOSET adjustment routine only requires the push of one button, one time! Oftentimes, in dynamic operating conditions, all you have to do is push the button for a perfect setting. This is dependent upon at least a 4:1 duty cycle ratio.

(Note: The buttons on the sensor are inactive when in communication mode; if COM/LOCK LED is on or blinking)

COMMUNICATIONS
RS-485 or RS-232 in either MODBUS ASCII or MODBUS RTU protocol. Up to 128 sensors per node, more-or-less, depending on cable length. Baud rate and addresses are user selected and defined when utilizing the EyewareXPC software, or proper commands as defined by the Command Set. When using EyewareXPC software, simply tap the Communications button located on Screen 2 in order to access the Baud Rate or Address widows.

RESPONSE TIME SELECTION
60us, 125us, and 450us available.

AUX IO
AUX IO line can be configured as:
• Remote AUTOSET
Remotely AUTOSET the sensor by applying a momentary contact closure from the Remote AUTOSET input wire to negative as shown in the wiring diagram. The Remote AUTOSET command will duplicate the last manual AUTOSET.
• Remote Input
• Action Alert Output
• Output Mode: On
• Output Mode: Off

Note: Configure AUX IO by using complimentary EyewareXPC software or Full Featured Command Set.

CONNECTIONS
Built-in 8-pin M12 Connector.

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

DUAL FUNCTION BAR GRAPH

Primary function: Contrast Indicator
Secondary function: Option Status Indicator of 6 selectable options

#10 LOCK

Tamperproof Operation

#5 – #1 MEMORY (MEM)

Illuminates to indicate active memory and/or selecting new memory

ACTION ALERT INDICATOR

Illuminates when action alert occurs

OUTPUT STATUS INDICATOR

Illuminates when Output is "ON"

COM/LOCK MODE INDICATOR

Illuminates during communication activity and/or when Lock feature is enabled

LARGE HIGH VISIBILITY OUTPUT INDICATOR

Illuminates when Output is "ON"
Flashes when LOCATE button activated on EyewareXPC Screen 2

10 INTERCHANGEABLE OPTICAL BLOCKS
1. O4 (Wide Beam Proximity)
2. O5 (Long Range Proximity)
3. R4 (Retroreflective)
4. R5 (Polarized Retroreflective)
5. V4 (Convergent, 1" Axis)
6. V4A (Convergent, 1" Axis, Apertured)
7. V6 (Convergent, 1.5" Axis)
8. V8 (Convergent, 0.5" Axis)
9. F4 (Glass Fiberoptic Light Guides)
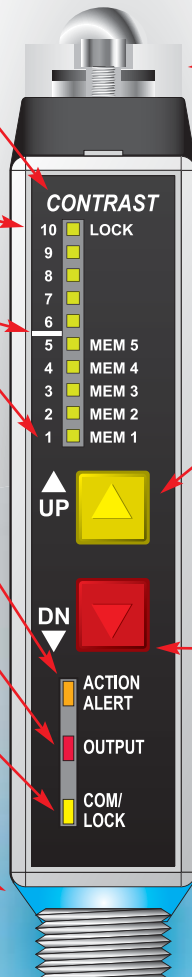10. F5 (Plastic Fiberoptic Light Guides)

YELLOW PUSHBUTTON – 4 Functions
1. Manual "UP" Adjustment
2. Options Select & AUTOSET Programming
3. Toggle selected option to opposite state and return to normal operation
4. When holding red AUTOSET button, tap to alter AUTOSET mode… Light State/Dark State

RED PUSHBUTTON – 4 Functions
1. Manual "DOWN" adjustment
2. Options Select & AUTOSET Programming
3. When in Option Status Mode, tap to desired function to be altered
4. When holding yellow AUTOSET button, tap to alter AUTOSET mode… Light State/Dark State

Note: Press and hold both red and yellow buttons simultaneously for 3 seconds to enter Options mode.

CONTRAST
10 LOCK
9
8
7
6
5 MEM 5
4 MEM 4
3 MEM 3
2 MEM 2
1 MEM 1

▲
UP

DN
▼

ACTION ALERT
OUTPUT
COM/LOCK

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Special Features

EyewareXPC Software - Complimentary

EyewareXPC is a free diagnostic tool to aid the user in setting up, testing, and debugging applications. Write your own custom controls using the available full featured Command Set.

Addressable
RS-485 Multidrop. Distinct, customer defined addresses. Up to 128 sensors on one Node.

On-Screen Adjustment
Buttons are active on screen...manually adjust the sensor UP or DOWN for precise sensor setup.

Output LED
The Blue LED Output Indicator is active on the screen and turns on when the output is activated.

Contrast Indicator
These 10 LEDs are active on the screen and respond up and down to each sensor's received light level.

Load	Save	Sensors	Help
"Load" - Recipe Load	"Save" - Save Recipes & Configurations	"Sensors..." - Locate, Add or Connect Sensors	"Help" - EyewareXPC Details

Detailed Features

"Click" or "Touch" an area of the sensor on the screen, other than the red/yellow buttons, and you will advance to the screen below, Screen Two. To return to the multi-sensor screen view, or Screen One, click on the Back button in the lower right corner.

This area is feature rich with many buttons available to customize any sensing solution.

4-Segment Digital Displays   *Sensor Scope*   **Screen Two**

AUTOSET	Performs previous AUTOSET function
AUTOSET Options...	Change hysteresis multiplier, and set point percentage

• 4 AUTOSET Buttons -

Light On / Light State	Dark On / Light State
Light On / Dark State	Dark On / Dark State

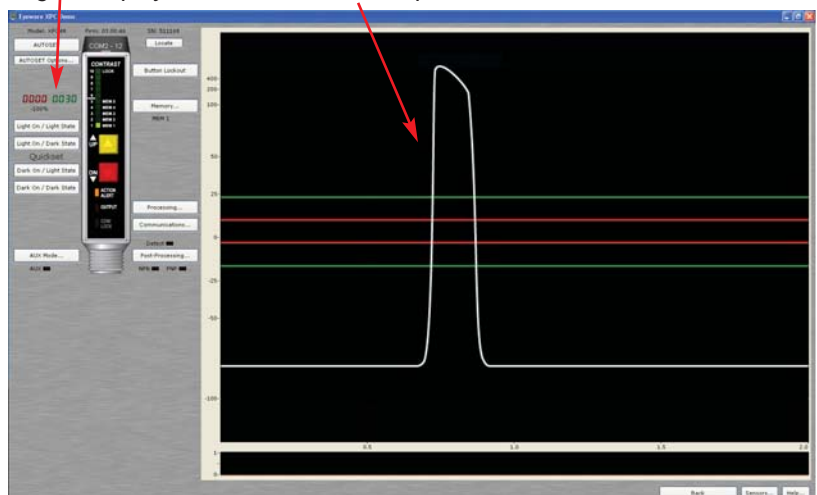| AUX Mode...	Change auxiliary line to Remote AUTOSET, Remote Input, Action Alert, or Input/Output
Locate	Blinks the blue output LED on the back of the sensor
Button Lockout	Locks the buttons on the sensor to make it tamper proof
Memory...	Selection of MEM 1 through 5
Processing...	Change response time, Light On/Dark On, and activate Automatic Contrast Tracking (ACT™)
Communications...	Select Baud rate and device address
Post-Processing...	Select and alter time delays, and output invert

• Sensor Scope - Analyze received light levels, threshold settings, and hysteresis ON/OFF points

All of these features are detailed in the Help button in the lower right corner.

How to Specify

Example: XPC 4 W F4

X-PRO, Photoelectric Communication Sensor

2 = RS-232 MODBUS ASCII
3 = RS-232 MODBUS RTU
4 = RS-485 MODBUS ASCII
5 = RS-485 MODBUS RTU

Light Emitter
I = Infrared
R = Red
W = White

Optical Block

1. Select Sensor
Communication Type required:

XPC**2** = RS-232 MODBUS ASCII
XPC**3** = RS-232 MODBUS RTU
XPC**4** = RS-485 MODBUS ASCII
XPC**5** = RS-485 MODBUS RTU

2. Select Sensor LED Light Source required:

XPC#**W** = White
XPC#**R** = Red
XPC#**I** = Infrared

3. Select Optical Block:

F4 Glass Fiber Optic
F5 Plastic Fiber Optic
V4 Convergent Lens, 1.0" Focal Point
V4A Convergent Lens, 1.0" Focal Point
V6 Convergent Lens, 1.5" Focal Point
V8 Convergent Lens, 0.5" Focal Point
R4 Retroreflective Lens
R5 Polarized Retroreflective Lens
O4 Wide Beam Proximity Lens
O5 Long Range Proximity Lens

Sensing Range Guidelines

**Convert to Inches
25.4mm = 1"**

Speed Setting Sensing Mode		60µs Reflective			125µs Reflective			450µs Reflective		
Fiber	Block	IR	Red	White	IR	Red	White	IR	Red	White
Glass Fibers	F4	89mm	63mm	76mm	178mm	115mm	102mm	229mm	127mm	115mm
	F4 w/UAC-15	178mm	152mm	203mm	330mm	330mm	330mm	356mm	357mm	356mm
Plastic Fibers	F5	N/A	38mm	95mm	N/A	44mm	115mm	N/A	59mm	127mm
	F5 w/HLA-2	N/A	102mm	57mm	N/A	140mm	76mm	N/A	152mm	83mm
Speed Setting Sensing Mode		**60µs Opposed**			**125µs Opposed**			**450µs Opposed**		
Fiber	Block	IR	Red	White	IR	Red	White	IR	Red	White
Glass Fibers	F4	254mm	203mm	356mm	406mm	305mm	457mm	610mm	357mm	559mm
	F4 w/UAC-15	4.6M	3.7M	6+M	6+M	5.5M	6+M	6+M	6+M	6+M
Plastic Fibers	F5	N/A	127mm	115mm	N/A	203mm	152mm	N/A	241mm	165mm
	F5 w/GLA-2	N/A	1.2M	1.1M	N/A	2.1M	9.5M	N/A	2.5M	1.5M
Lens Blocks		**60µs**			**125µs**			**450µs**		
		IR	Red	White	IR	Red	White	IR	Red	White
	O4 SR Proximity	178mm	127mm	203mm	279mm	203mm	254mm	406mm	229mm	305mm
	O5 LR Proximity	1.1M	813mm	610mm	254mm	1.3M	9.1M	2.4M	1.5M	965mm
	R4 Retro	4.6M	5.5M	3M	7.6M	8.2M	4.3M	9.1M	8.5M	4.6M
	R4 Retro wo/prox	1.5M	2.8M	1.1M	2.4M	2.7M	762mm	1.5M	2.7M	1.1M
	R5 Polarized Retro	N/A	2.1M	N/A	N/A	2.1M	N/A	N/A	2.1M	N/A

Note: Proximity tests utilized a 90% reflective white target. Retroreflective tests utilized a 3" (76.2mm) diameter round reflector, Model AR3.

Note: R4 retroreflective tests utilized a Kraft paper target, with no proxing.

Note: Glass fiber tests utilized a .125" (3.175mm) diameter fiber bundle. Plastic fiber tests utilized a diplex, .040" (1.016mm) diameter fiber bundle.

Hardware & Accessories

Micro Cable Selection Guide, 8-wire, M12

TJC-3
T-Junction Cable, 8-pin F, 5-pin M, DB9 for RS-232

TJC-5
T-Junction Cable, 8-pin F, 5-pin M, DB9 for RS-485

DCS8-2M
2 meter 8-pin cable

DCS8-5M
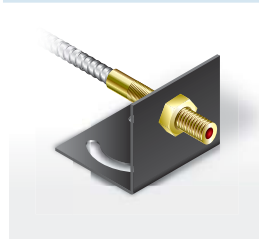5 meter 8-pin cable

RDCS8-5M
5 meter 8-pin cable, right angle

XPC4-DEV
Development Kit for RS-485 Models
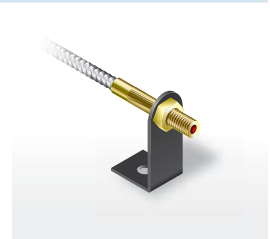
XPC2-DEV
Development Kit for RS-232 Models

Mounting Brackets

FMB-1 (8.4 mm diam.)
Standard Fiberoptic

SEB-3
Stainless "L" Bracket

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

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Specifications

SUPPLY VOLTAGE
- 10 to 30 VDC
- Polarity Protected
- Intended for use in Class 2 circuits

CURRENT REQUIREMENTS
- 45mA (exclusive of load)

OUTPUT TRANSISTORS
- (1) NPN and (1) PNP sensor output transistors
- Outputs sink or source up to 150mA (current limit)
- All outputs are continuously short circuit protected

REMOTE AUTOSET INPUT/AUX I/O
- Opto-isolated momentary sinking input (10mA)
- Can be configured as INPUT or OUTPUT (PNP Sourcing up to 150mA)

2-WIRE COMMUNICATION
- RS-485 or RS-232 models available

RESPONSE TIME
- 60µs (High Speed Mode)
- 125µs (Standard Mode)
- 450µs (Long Range/High Rez Mode)

REPEATABILITY
- 20µs (High Speed Mode)
- 25µs (Standard Mode)
- 50µs (Long Range/High Resolution Mode)

LED LIGHT SOURCE
- Infrared = 880 nm, Red = 660 nm, White = Broadband Color Spectrum

PUSHBUTTON CONTROL
- AUTOSET
- Manual Adjustments
- Set status of options: 10) Lock, 5–1) Five Memory Locations

NOTE: Any changes to the sensor will automatically be saved to current MEM # location.

HYSTERESIS
- Software Configured by User; Factory Default Setting = 1. (See EyewareXPC Help for details)

LIGHT IMMUNITY
- Responds to sensor's pulsed modulated light source – immune to most ambient light including indirect sunlight

DIAGNOSTIC INDICATORS
- 10-LED dual-function bar graph operates 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 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 Action Alert occurs
- Yellow LED – Illuminates during Com Activity and/or when Lock feature is enabled
- Blue LED Output Indicator - Illuminates when output is "ON"

Flashes when Locate button activated on EyewareXPC Screen 2

AMBIENT TEMPERATURE
- 0°C to 70°C (32°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
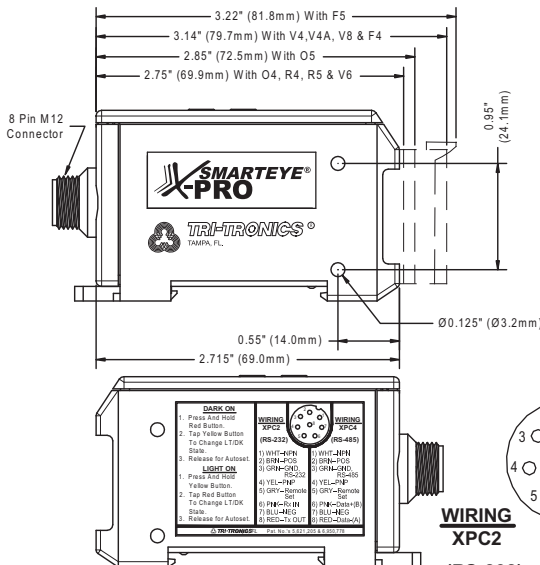
Patents No. 5,621,205 and No. 6,250,778

CE   c(UL)us

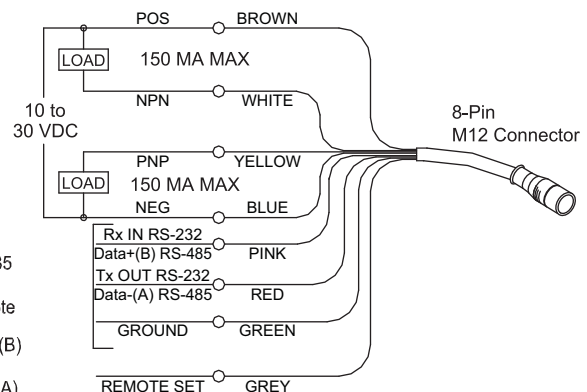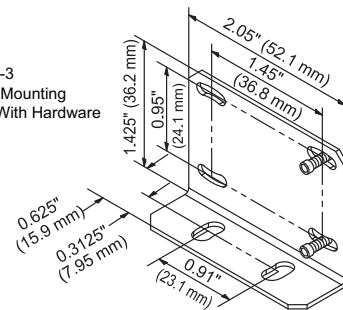RoHS Compliant
Product subject to change without notice.

Connections and Dimensions   *SMARTEYE*® X-PRO XPC

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