



XP10 – Extremely High Speed Sensor





Extremely High Speed (10µs) Photoelectric Sensor

The **SMARTEYE® X-PRO XP10** is the highest speed (10µs) dual-function sensor in the world. This dual-function sensor is designed to be a precision registration mark sensor with 5µs repeatability, and a standard photoelectric sensor for any high speed application, in one package.

Mark Mode allows the user quick and easy set-up for detection of registration marks by performing an AUTOSET with the background in view. When in Mark Mode, the sensor will automatically configure to give an output on the mark.

Standard Mode allows the user independent control of the AUTOSET mode, (Light State or Dark State), and output, (Light ON or Dark ON). Standard Mode provides the greatest flexibility for general purpose applications.

Five Memory Locations are available to be used in either Mark Mode or Standard Mode when the Enable option is selected. These Memory locations can store all options and AUTOSET settings for up to five different application requirements. This Memory feature allows fast changeover when running several different types of materials on the same machine. Additionally, when the Enable option is selected, the sensor has the ability to be programmed by a PLC or other device via the Remote AUTOSET input wire. You can access any option, Memory location, or AUTOSET routine through this uniquely designed input feature.

No other sensor in the world gives you these high performance features packaged together in one compact design. The **SMARTEYE® X-PRO XP10** photoelectric sensor from Tri-Tronics is the most comprehensive sensor available in its class.

2-120

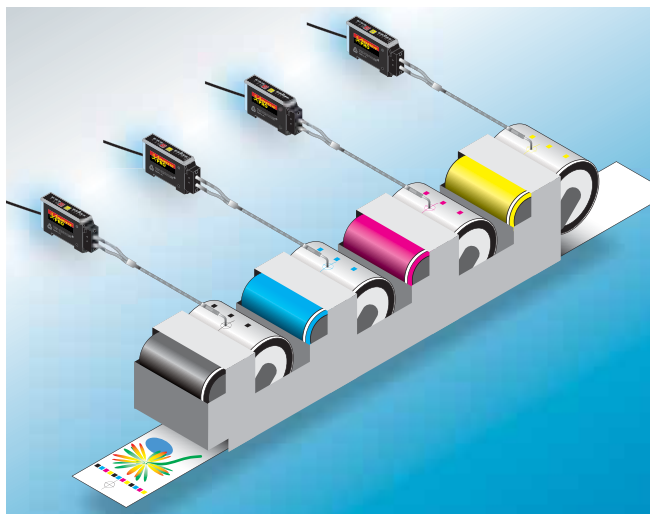


Features

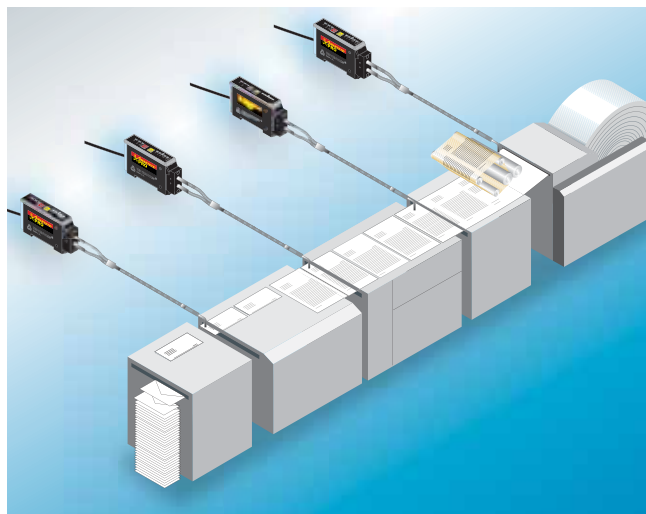
- 10µs Response Time
- 5µs Repeatability
- Dual-Function Sensor
 - Mark Mode – For Registration
 - Standard Mode – Object Sensing
- 5 Memory Locations
- External Programming Through the Remote Input Line
- Connector or Cabled Version
- Available in White, Red and Infrared LED
- Patents No. 5,621,205 and No. 6,950,778
- AUTOSET - One-Touch Setup
- 10-LED Dual-Function Bar Graph

Benefits

- Increase Edge Accuracy at All Speeds
- Virtually Eliminate Setup Time
- Reduce Material Scrap
- Eliminate Compensation Software
- Repeatable Leading Edge or Trailing Edge Accuracy Consistently at 5µs
- Increase Throughput Capacity
- Eliminate Machine Speed Constraint

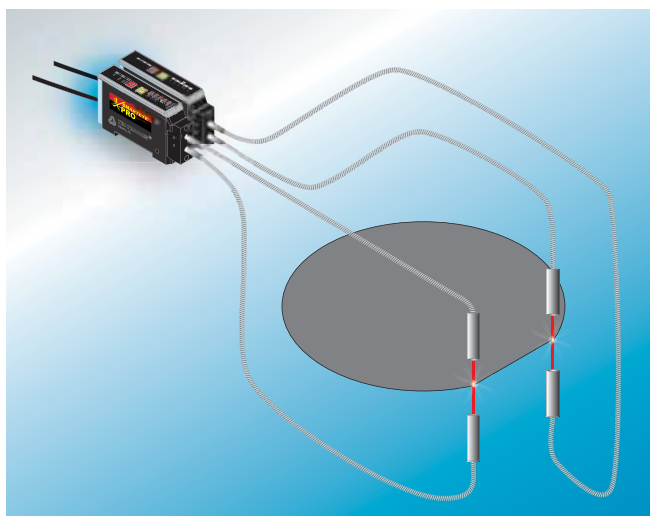


High Speed Offset Printing

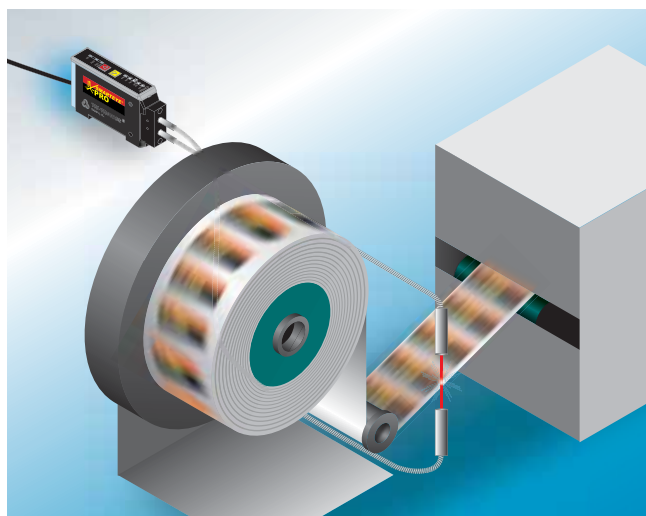


High Speed Paper Converting

When Timing is Everything!



High Speed Edge Detecting



High Speed Label Rewinding

Features



AGS™ AUTOMATIC GAIN SELECT

This unique feature provides automatic digital selection of amplifier gain based upon your sensing requirements.

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.

AUTOSET/ REMOTE PROGRAMMING (Patent No. 6,950,778)

Remotely AUTOSET or program the sensor's multiple options by applying a sequential momentary contact closure from the AUTOSET input wire to negative as shown in the wiring diagram. The remote AUTOSET command will duplicate the last manual AUTOSET.

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.

10 LED DUAL-FUNCTION BAR GRAPH

Contrast Indicator – Provides “at-a-glance” performance data.

Status Indicator – Displays status of selectable options:

Lock – When this option is enabled the sensor becomes tamperproof.

Note: The Remote AUTOSET and Remote Programming are not affected by the Lock option.

Mark - When this feature is enabled, the sensor buttons function like a MARK•EYE® PRO: Push and hold yellow button for light background and red button for dark background.

Pulse Stretcher (PS) – When the “OFF” delay pulse stretcher is enabled, the output duration is extended by 10 or 20 milliseconds (not additive). Enabling the Timer allows ample time for the controller to respond. The time durations of the gap between marks must be longer than the selected delay.

Enable – This option provides access to MEM-1 thru MEM-5 locations and enables remote programming.

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

HIGH SPEED

10µs response time when responding to light or dark state.
5µs repeatability.

CONNECTIONS

Built-in 5-pin M12 connector, or 6' 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: Option Status Indicator of ten selectable options

#10 LOCK

Tamperproof Operation

#9 MARK

When illuminated – “ON” = Mark Mode
When not illuminated – “OFF” = Standard Mode

#8, #7 PULSE STRETCHER (PS)

10 or 20 Millisecond Pulse Stretcher
“OFF” Delay

#6 ENABLE

Illuminates when advanced features are enabled...MEM 1 - MEM 5 and Remote Programming

#5 – #1 MEMORY (MEM)

Illuminates to Indicate Active Memory

OPTION STATUS INDICATOR

Illuminates when in Option Status Mode

OUTPUT INDICATOR

Illuminates when Output is “ON”

MARK MODE INDICATOR

Illuminates when Mark Mode is enabled

LARGE HIGH VISIBILITY OUTPUT INDICATOR

Illuminates when Output is “ON”

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)

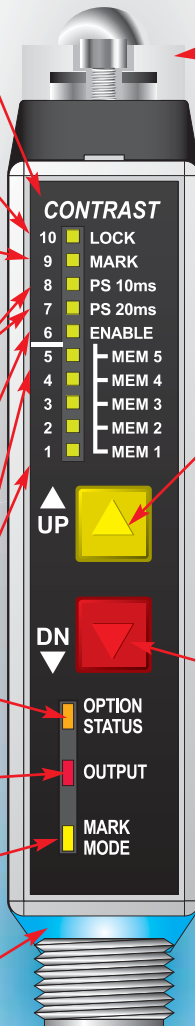
YELLOW PUSHBUTTON – Four Functions

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 – Four 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.



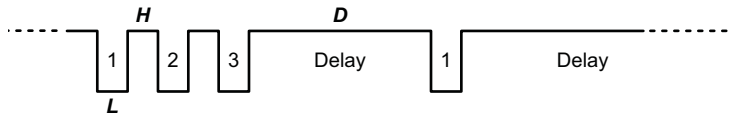
REMOTE PROGRAMMING

The Remote Programming feature of the SMARTEYE® X-PRO XP10 allows the customer to configure, AUTOSET, and tweak the sensor using a PLC pulse-train, HMI, NPN transistor output, or momentary pushbutton switch to 0 VDC/ground. This provides the customer with control over every aspect of the sensor configuration without having to physically touch the sensor. If you have several sensors on your machine; have sensors buried deep within the mechanical structure of the machine; or have your sensors in safe areas behind interlocks... you can easily access these sensors remotely to perform a "digital changeover" due to this unique, special feature.



HMI - Human Machine Interface

Ex. Selection of MEM 1



Each pulse (L) is low for 40ms to 400ms. The idle time (H) between pulses is 40ms to 400ms. The delay (D) between sets of pulses is .75 seconds to 5 seconds.



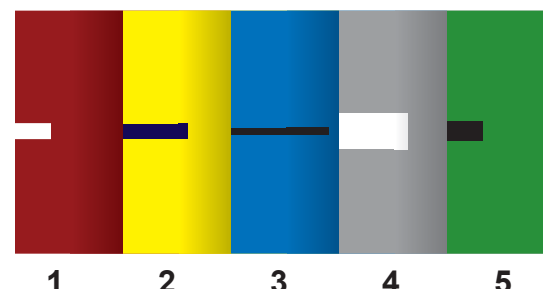
FIVE MEMORY LOCATIONS

There are Five Memory locations available to store various configurations of the sensor for particular applications. For instance, if you have 5 different web materials...the background colors are different, the mark colors are different, and the marks are different sizes...you would need to perform a different AUTOSET for each background, and you might need to add a Pulse Stretcher timer for the different sized marks. The SMARTEYE® X-PRO XP10 sensor allows you to store and recall that information so the setup time is eliminated completely, reducing down-time and change-over complications when running different materials. This feature is also a benefit for any other application with changing conditions; different sized bottles, different colored labels, varying background materials, varying product textures, etc.

Packaging Five Memory locations together with the unique Remote Programming feature above makes the SMARTEYE® X-PRO XP10 sensor the fastest sensor in the world for "rapid digital changeover", as well as for speed and accuracy.

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

Ex. Five Registration Marks



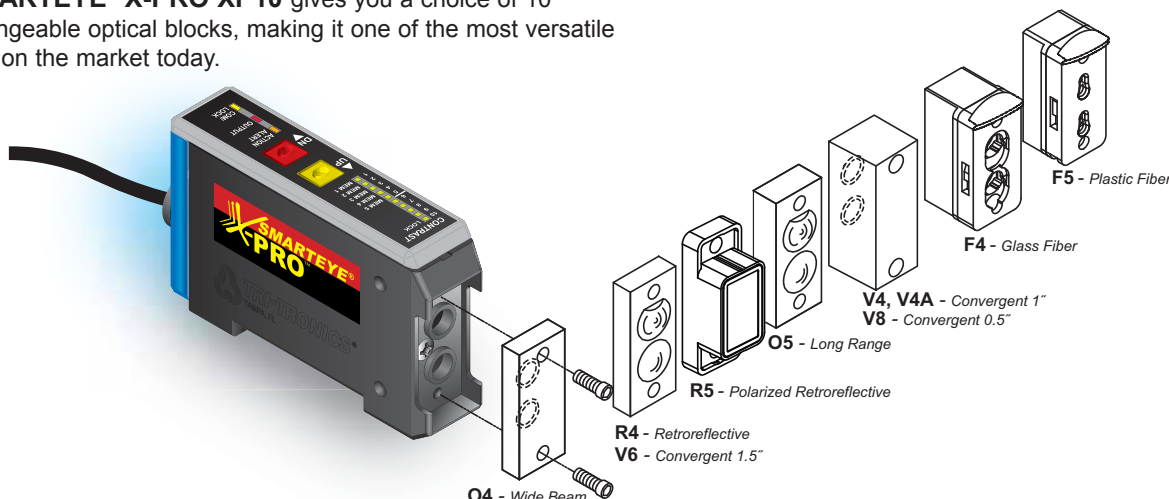
(Mark Samples)



Optical Block Selection



The **SMARTEYE® X-PRO XP10** 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..

Sensing Range Guidelines

Convergent / Proximity / Retroreflective				Glass Fiberoptics				Plastic Fiberoptics				
Optical Blocks	IR	RED	WHITE	Optical Blocks	IR	RED	WHITE	Optical Blocks	.04" Diameter		.02" Diameter	
									RED	WHITE	RED	WHITE
V4, V4A	1 in. (25.4mm)	1 in. (25.4mm)	1 in. (25.4mm)	Opposed Mode				Opposed Mode				
V6	1.5 in. (38.1mm)	1.5 in. (38.1mm)	1.5 in. (38.1mm)	F4	6 in. (152.4mm)	6 in. (152.4mm)	11 in. (279.4mm)	F5	4 in. (101.6mm)	4 in. (101.6mm)	1 in. (25.4mm)	1 in. (25.4mm)
V8	0.5 in. (12.7mm)	0.5 in. (12.7mm)	0.5 in. (12.7mm)	F4 w/lens	6 ft. (1,829mm)	6 ft. (1,829mm)	6 ft. (1,829mm)	F5 w/lens	4 ft. (1,219mm)	3 ft. (914.4mm)	N/A	N/A
O4	4 in. (101.6mm)	3.75 in. (92.3mm)	5 in. (127mm)	Proximity Mode				F5 w/right angle lens	3 ft. (914.4mm)	1 ft. (304.8mm)	N/A	N/A
O5	30 in. (762mm)	26 in. (660.4mm)	18 in. (457.2mm)	F4	2.0 in. (50.8mm)	2.0 in. (50.8mm)	1.75 in. (44.5mm)	F5	1 in. (25.4mm)	1 in. (25.4mm)	0.25 in. (6.35mm)	0.25 in. (6.35mm)
R4	15 ft. (4,572mm)	12 ft. (3,657mm)	8 ft. (2,438mm)	F4 w/lens	6 in. (152.4mm)	6 in. (152.4mm)	6 in. (152.4mm)	F5 w/lens	1.5 in. (38.1mm)	1.5 in. (38.1mm)	N/A	N/A
R5	N/A	3 ft. (914.4mm)	1 ft. (304.8mm)					Proximity Mode				
No Prox on craft paper												
R4	4 ft. (1,219mm)	6 ft. (1,829mm)	4 ft. (1,219mm)									

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

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

How to Specify



1. Select Sensor Model based on LED Light Source required:

XP10I = Infrared
XP10R = Red
XP10W = White

2. Select Connection required:

Blank = Cable
C = Connector

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

Example:

XP10 W C F4

X-PRO, 10 μ s Response Time
Light Emitter
I = Infrared
R = Red
W = White
C = Connector
Blank = 6 Ft Cable
Optical Block
F4, F5, V4, V4A, V6, V8, R4, R5, O4, O5

Hardware & 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

GX-25
25' (7.62m) extension 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)

Specifications



SUPPLY VOLTAGE

- 12 to 24 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

- Opto-isolated momentary sinking input (10mA)

RESPONSE TIME

- Light/Dark = 10µs
- Repeatability = 5µs

LED LIGHT SOURCE

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

PUSHBUTTON CONTROL

- AUTOSET
- Manual Adjustments
- Set status of 10 options: 10) Lock, 9) Mark, 8) PS 10ms, 7) PS 20ms, 6) Enable, 5–1) Five Memory Locations

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

HYSTERESIS

- 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

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 ten 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 Option Status Mode
- Yellow LED – Illuminates when Mark Mode feature is activated
- Blue LED output indicator - Illuminates when output is "ON".

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

Patents No. 5,621,205 and No. 6,950,778

RoHS Compliant
Product subject to change without notice

Connections and Dimensions

SMARTEYE® X-PRO XP10

