Specifications

SUPPLY VOLTAGE
- 12 to 24 VDC
- Polarity Protected

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 = 880 nm, Red = 660 nm, 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

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 10 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
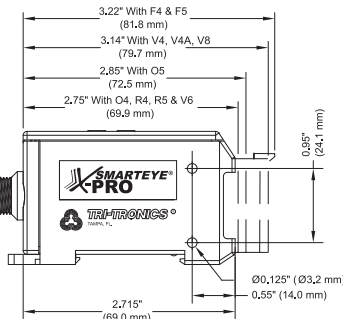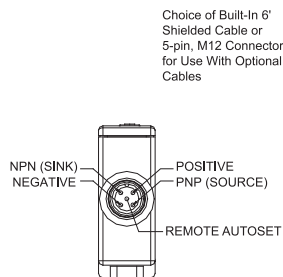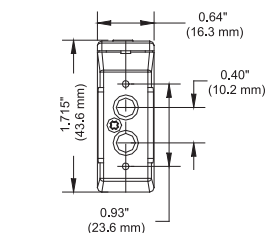
Patents No. 5,621,205 and No. 6,950,778

CE c(UL)us

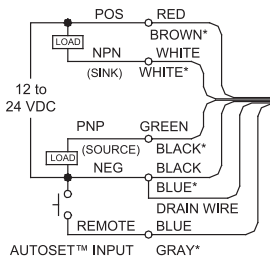RoHS Compliant
Product subject to change without notice.

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 <u>programmed by a PLC</u> 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.

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

Connections and Dimensions — SMARTEYE® X-PRO XP10

0.64" (16.3 mm)
0.40" (10.2 mm)
1.715" (43.6 mm)
0.93" (23.6 mm)

P/N SEB-3 Optional Mounting Bracket With Hardware

2.05" (52.1 mm)
1.45" (36.8 mm)
1.425" (36.2 mm)
0.95" (24.1 mm)
0.625" (15.9 mm)
0.3125" (7.95 mm)
0.91" (23.1 mm)

3.22" With F4 & F5 (81.8 mm)
3.14" With V4, V4A, V8 (79.7 mm)
2.85" With O5 (72.5 mm)
2.75" With O4, R4, R5 & V6 (69.9 mm)
0.95" (24.1 mm)
2.715" (69.0 mm)
Ø0.125" (Ø3.2 mm)
0.55" (14.0 mm)

Choice of Built-In 6' Shielded Cable or 5-pin, M12 Connector for Use With Optional Cables

NPN (SINK)
NEGATIVE
POSITIVE
PNP (SOURCE)
REMOTE AUTOSET

12 to 24 VDC
POS — RED
LOAD — NPN (SINK) — BROWN* / WHITE / WHITE*
PNP (SOURCE) — GREEN / BLACK* / BLACK
LOAD — NEG — BLUE*
DRAIN WIRE / BLUE
REMOTE
AUTOSET™ INPUT — GRAY*

*Sensors with connectors

070-0180

DUAL FUNCTION BAR GRAPH
Primary function: Contrast indicator
Secondary function: Option Status indicator of 10 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"

CONTRAST
10 LOCK
9 MARK
8 PS 10ms
7 PS 20ms
6 ENABLE
5 MEM 5
4 MEM 4
3 MEM 3
2 MEM 2
1 MEM 1
UP
DN
OPTION STATUS
OUTPUT
MARK MODE

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. When in Option Status Mode 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 the "Yellow" AUTOSET Button, tap to alter AUTOSET mode… Light State/Dark State

TRI-TRONICS®

Setup Instructions

Registration Mark Sensing

The *SMARTEYE*® X-PRO XP10 Sensor is factory default set for Registration Mark Sensing… with no other options selected. This means the sensor is not in memory mode or programming mode, as consistent with previous products.

Dark Mark On Light Background

1. Place background in view, then press and hold Yellow button for 2 seconds.
2. Release for AUTOSET.

Light Mark On Light Background

1. Place background in view, then press and hold Red button for 2 seconds.
2. Release for AUTOSET.

Five Selectable Options

Press and Hold both the yellow and red buttons for 2 seconds, the Contrast Indicator® LEDs will move in towards the center, indicating you are in Options Mode.

Tap down the Contrast Indicator selections using the red button until you get to the option you want to change, and then tap the yellow button to alter selection.

Object Sensing

Changing from Mark Mode to Standard Mode Object detection is simple…follow the above instructions and alter LED 9, which is labeled Mark. LED 9 will turn off, and the Mark Mode LED indicator at the bottom of the sensor will also extinguish. Establish Light State or Dark State conditions as needed.

Note: The direction of the LED "Sweep" indicates current Light or Dark State AUTOSET. Toggle to preferred AUTOSET by tapping opposite button while holding selected mark status button.

"DARK ON" Output

1. Press and hold Red button.
2. Tap Yellow button to change LT/DK State.
3. Release Red button for AUTOSET.

"LIGHT ON" Output

1. Press and hold Yellow button.
2. Tap Red button to change LT/DK State.
3. Release Yellow button for AUTOSET.

Changing to Special Operations Mode for 5 memory locations and remote programming…

Follow the above Five Selectable Options instructions and alter LED 6, which is labeled Enable. This provides access to the 5 memory locations and the external programmable Remote AUTOSET feature.

When the Enable option is selected, and any one of the five memory locations is selected, any changes made to the Options menu, or any AUTOSET performed will be stored in that memory location.

FACTORY DEFAULT

If several changes are made concurrently, and there is confusion concerning the programming, options, and setup of the sensor, a Factory Default setting should be performed.

Press and hold both buttons for one second; while holding both buttons, momentarily release the yellow UP button. Then, momentarily release the red DN button three times. Finally, release the yellow UP button. The sensor displays a flash and dance pattern while performing the Factory Default reset. Release all buttons when the flash and dance pattern begins.

Note: This procedure resets all memory locations.

Remote Programming

When the ENABLE option is ON, the sensor can be configured and adjusted from the AUTOSET line. This is accomplished by sending a simple sequence of 0VDC pulses. For example, sending a sequence of three 0VDC pulses followed by one 0VDC pulse selects MEM 1 location as illustrated below.
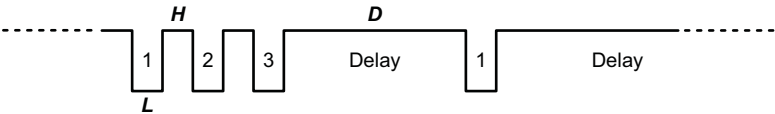
Each pulse (L) is low for 40ms to 400ms. The idle time (H) between pulses is 40ms to 400ms. The delay (D) between sets of pulses is .75 seconds to 5 seconds.

As pulses are received by the sensor, they are displayed on the contrast indicator and the mode light is illuminated. When a delay is detected the contrast indicator clears. A command timeout or command error is indicated by the mode light flashing briefly and then returning to normal operation. A command success is indicated by displaying the new option status and then returning to normal operation.

Standard AUTOSET

Hold the remote set line low for at least .75 seconds.

Quickset AUTOSET

Output Mode	AUTOSET Mode	Pulse Sequence	Notes
Light On	Lightstate	2-1	Quicksets configure Output Mode and AUTOSET mode, then performs an AUTOSET
Light On	Darkstate	2-2	
Dark On	Lightstate	2-3	
Dark On	Darkstate	2-4	
Light Mark, Dark Background		2-2	Place background in view
Dark Mark, Light Background		2-3	
Proximity / Convergent		2-1	Place background in view
Retroreflective / Opposed		2-3	Remove Object

Options / Commands

Option/Command	Setting	Pulse Sequence	Notes
Threshold Adjust	Tap "Up"	1-1-#	# is the number of adjustments from 1 to 10
	Tap "Down"	1-2-#	
Memory Location	MEM 1	3-1	Sensor restarts after selecting a new memory location. Includes: Output Mode, AUTOSET Mode, and Pulse Stretch setting.
	MEM 2	3-2	
	MEM 3	3-3	
	MEM 4	3-4	
	MEM 5	3-5	
Button Lock	Off	4-1-1	Recommended when sensor is primarily controlled by remote set commands
	On	4-1-2	
Output Mode	Light On	4-2-1	Overwritten by manual AUTOSET or Quickset
	Dark On	4-2-2	
AUTOSET Mode	Lightstate	4-3-1	Overwritten by manual AUTOSET or Quickset
	Darkstate	4-3-2	
Pulse Stretch	None	4-4-1	
	10ms	4-4-2	
	20ms	4-4-3	
Button Mode	Normal/Advanced	4-6-1	
	Mark	4-6-2	