TRI-TRONICS®

Smart Sensing Solutions Since 1954

MARK·EYE® PRO

High Resolution/High Speed Registration Mark Sensor

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The ***MARK•EYE® PRO*** sensor detects printed registration marks on a continuous web running at high-speeds. It delivers high-resolution by utilizing the broadband characteristics of a white light LED for detecting the greatest variety of color combinations on any color background.

The one-touch AUTOSET routine can be accomplished by pushing the appropriate button on the sensor or from a remote push-button switch. Simply put the background in view: and press the black button if the background is darker than the registration mark; or press the white button if the background is lighter than the registration mark.

Utilize either apertured V-axis (V4A) lens or fiber optic light guides. We recommend using glass fiber optic light guides for detecting low contrast registration marks. Plastic light guides can also be used as well as a variety of fiber optic accessory lenses to enhance sensing performance.

Features

- White Light LED
- 175µs or 45µs models available
- Interchangeable optical blocks; Fiber Optic or V-axis lens.
- Pulse Stretch Timers; 10ms, 25ms, or 50ms selectable.
- One button push setup
- Outputs automatically configured for mark
- Remote AUTOSET wire
- Button lock
- Cable or connector version

Benefits

- Highly accurate for precise detection of marks at high speeds
- High resolutions for a variety of colored marks on various colored backgrounds
- Timers to assist in overcoming inconsistent web materials, or false triggers
- Remote setup for hard to reach areas
- Flexibility in sensing applications reduces inventory costs and setup time

Setup Guide

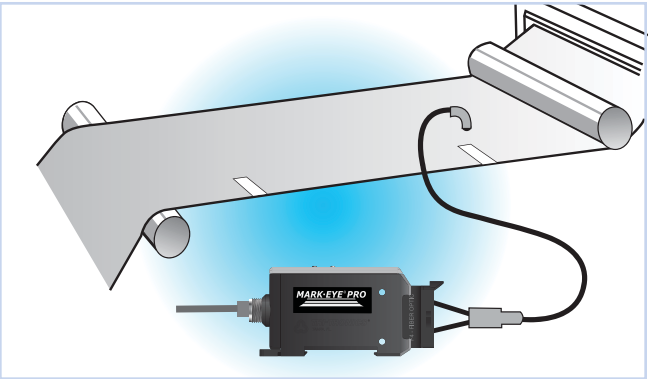
TRI-TRONICS *MARK•EYE® PRO* Series Sensors are easier to set up than conventional color mark sensors because of their unique built-in Contrast Indicator. Examples of setup instructions for various materials are shown below.

Opaque or Transparent Web Material

1. Position the sensor or fiber optic light guide to view material looking straight down.
2. Place background in view of fiber optic light guide.
3. Push button as follows:
   A. For dark mark on light background, push and hold the white AUTOSET button for about one second with background in view. The contrast indicator will illuminate from 1 to 5, flash, and then remain on 5.
   B. For a light mark on a dark background, push and hold the black AUTOSET button for about one second with background in view. The contrast indicator will illuminate from 5 to 1, flash, and then remain on 1.
4. Move mark into view to test the setup. The contrast indicator should move from 5 to 1 on a dark mark, and 1 to 5 on a light mark. If the contrast is less than a full swing, then use the buttons to manually adjust the sensor by tapping up or down to dial in the proper contrast. If the contrast is less than 5 bars of deviation, then move closer to the web.

Hints and Tips:

1. False tripping or erratic operation is usually caused by excessive web flutter, wrinkles, or variations in material background color or marks. Minor adjustments of the manual Up/Down adjustment can help to eliminate erratic operation.
2. A metal guide plate for the material to flow across provides several necessary advantages:
   A. Helps to iron out wrinkles.
   B. Helps to eliminate web flutter.
   C. Provides shiny background when sensing marks on transparent material.
3. For foil or shiny material with black mark, angle the sensor or fiber optic light guide slightly, 10 degrees or more.
4. For foil or shiny material with white mark, angle the sensor or fiber optic light guide by 30 degrees or more.



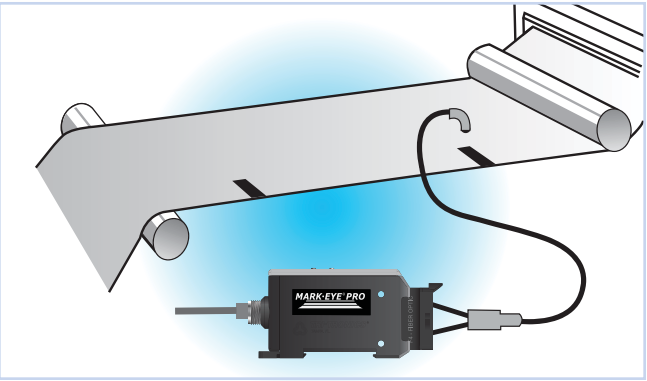


Fig. 1 Straight Position

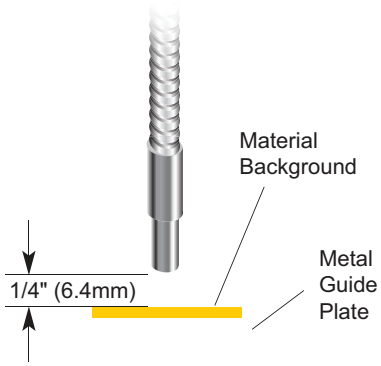
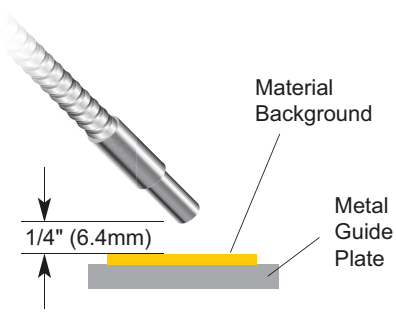


Fig. 2 45º Angle Position



Features

MARK·EYE® PRO

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.

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 – When this feature is enabled the sensor becomes tamperproof. *Note: The remote AUTOSET is not affected by the lock.*

Output Invert – Allows the sensor to be programmed for the output transistors to be ON or OFF when the registration mark comes into view.

Timer – When the OFF delay pulse stretcher is enabled, the output duration is extended by 10, 25, or 50 milliseconds (not additive). Enabling the Timer allows ample time for the controller to respond. The time durations of the gap between marks must be less than the selected delay.

HIGH SPEED
45 or 175 microsecond response when detecting light or dark marks.

LED LIGHT SOURCE
(Broadband Color Spectrum)
The white light LED light source promotes easy detection of the largest variety of color marks printed on the largest variety of colored web materials.

CONNECTIONS
Built-in M12 connector or 6ft 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

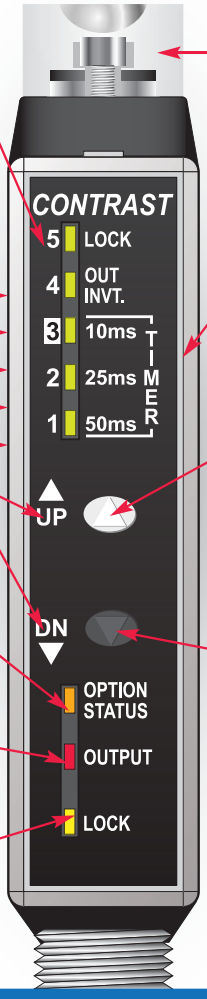
5 Selectable Options
#5 LOCK – for tamperproof operation
#4 Output Invert
#3 10 ms pulse stretcher/OFF delay
#2 25 ms pulse stretcher/OFF delay
#1 50 ms pulse stretcher/OFF delay

Option Status Mode Select
Push both buttons for three seconds to switch bargraph display to status indicator of selectable options.

Option Status Indicator
Illuminates when in Option Status mode.

Output Status Indicator
Illuminates when outputs are ON.

Lock Status Indicator
Illuminates when sensor buttons are locked.



Interchangeable Optical Blocks
Choice of three interchangeable optical blocks:
1. F4 (Glass fiberoptic light guides)
2. F5 (Plastic fiberoptic light guides)
3. V4A (Apertured V-Axis Convergent lens)

Optional Timer
10, 25, or 50 millisecond pulse stretcher/OFF delay

White Push-button - three functions
1. Manual UP adjustment
2. AUTOSET on light background
3. Toggle selected option to opposite state and return to normal operation.

Black Push-button - three functions
1. Manual DOWN adjustment
2. AUTOSET on dark background
3. When in Option Status mode, tap to desired function to be altered.

How to Specify

1. Select sensor model:
MEP45 = 45µs response time
MEP = 175µs response time

2. White light source:
WL = White LED, full spectrum

3. Select Connector
Blank = 6ft (1.8m) cable
C = Connector

4. Select optical block based on sensing mode:

F4 = Glass Fiber Optics
Range: 0.25in to 0.50in
(6.4mm to 12.7mm)

F5 = Plastic Fiber Optics
Range: 0.25in (6.4mm)

V4A = Apertured V-Axis
Range: 0.75in to 1.0in
(19.1mm to 25.4mm)

Example: MEP45 WL C V4

- MEP45 — MARK•EYE® PRO
- WL — Light Emitter
- C — Connector
- V4 — Optical Block

White Light Source (Broadband Color Spectrum)

The white light LED light source built into the *MARK•EYE® PRO* promotes easy detection of the largest variety of color marks printed on the largest variety of colored web materials.

- The best choice for detecting printed registration marks on packaging materials
- The best choice for detecting pale yellow marks on white backgrounds

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) right angle connector

GRSEC-15
15ft (4.6m) right angle connector

GRSEC-25
25ft (7.6m) right angle connector

5-Wire Unshielded Cable, M12

GSEC-2MU
6.5ft (2.0m) cable

GSEC-5MU
16.4ft (5.0m) cable

5-Wire Extension Cable, M12

GX-25
25ft (7.6m) extension cable

Mounting Brackets

FMB-1 (8.4 mm 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

Lens Kit

LK-4
Includes: F4, F5, O4, O5, R4, R5, V4, V4A, V6, V8

Specifications

SUPPLY VOLTAGE
- 10 to 30VDC
- Polarity protected

CURRENT REQUIREMENTS
- 45 milliamps (exclusive of load)

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

REMOTE AUTOSET INPUT
- Opto-isolated momentary sinking input (10 milliamps)

RESPONSE TIME
- MEP45WL – Light/Dark = 45µs Repeatability = 13µs
- MEP – Light/Dark = 175µs

LED LIGHT SOURCE
- White LED provides detection of registration marks of the widest variations of contrasting colors

HYSTERESIS
- Set for high resolution – less than one bar on the contrast indicator.

PUSH-BUTTON CONTROL
- AUTOSET
- Manual Adjustments
- Set status of 5 options: 5) Lock, 4) Output Invert, and Pulse Stretchers 3) 10ms, 2) 25ms, and 1) 50ms

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

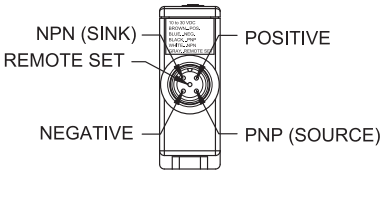
DIAGNOSTIC INDICATORS
- 5-LED bargraph functions in one of two modes:
  1. Contrast Indicator – Displays scaled reading of sensor's response to contrasting light levels (light to dark).
  2. Status Indicator – Displays status of five selectable options.
- Red LED output indicator – Illuminates when the 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 Lock feature is activated.

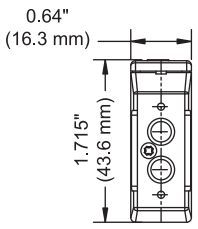
AMBIENT TEMPERATURE
- -40°C to 70°C (-40°F to 158°F)

RUGGED CONSTRUCTION
- Chemical resistant high impact polycarbonate housing
- Industry Ratings: NEMA 4X, 6P, IP67

RoHS Compliant
Product subject to change without notice

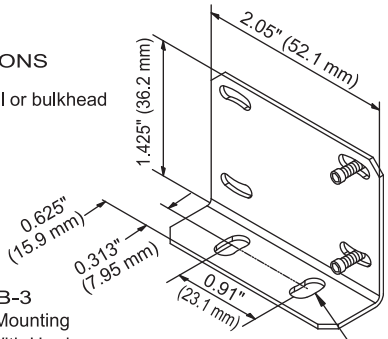
Connections and Dimensions MARK•EYE® PRO





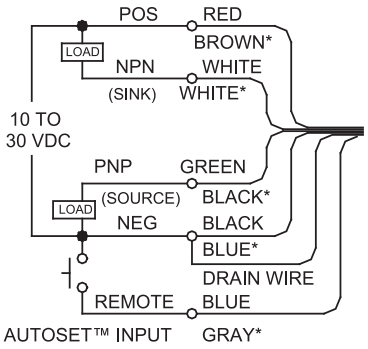
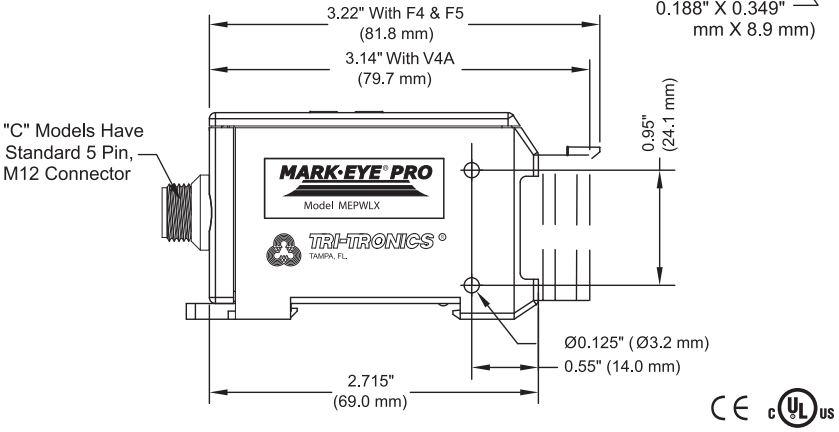
MOUNTING OPTIONS

Direct mount to panel or bulkhead
Din Rail
Bracket (see below)



P/N SEB-3
Optional Mounting
Bracket With Hardware

Slot 2 Places
0.188" X 0.349"
mm X 8.9 mm)



*SENSORS WITH CONNECTORS