



Miniature High-Resolution Registration Mark Sensor
White LED
AUTOSET™
Remote Setup Option



High-Resolution Registration Mark Sensor

MARK•EYE® PRO

- See any color mark on any background
- High immunity to all ambient light, including strobes
- 5 LED Contrast Indicator
- “One-touch” AUTOSET™ push-button setup
- Remote AUTOSET™ option
- Lens and fiberoptic light guide options



The MARK•EYE® PRO registration mark sensor was designed to detect printed registration marks on a continuous web. Optimized for high-speed color detection, seeing registration marks on form-fill-seal machinery has never been easier.

The MARK•EYE® PRO sensor was designed to deliver high-resolution performance 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.

The MARK•EYE® PRO sensor was designed for both the apertured V-axis (V4A) lens or fiberoptic light guides. We recommend using glass fiberoptic light guides for detecting low contrast registration marks. Our *NEW* miniature glass fiberoptic light guides are excellent when you need a tight bend radius or for those hard-to-get-to locations.

Plastic light guides can also be used with this new sensor. A variety of fiberoptic accessory lenses can be used to enhance sensing performance.

Setup could not be easier with the “One-Touch AUTOSET™”. 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.

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! Even in a dynamic operating condition, with ongoing input events, all you have to do is push the button for a perfect setting.

EDR®

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.

REMOTE AUTOSET™

To remotely AUTOSET™ the sensor, apply a momentary contact closure from the AUTOSET™ input wire to negative as shown in the wiring diagram. A remote AUTOSET™ command will duplicate the last manual AUTOSET™.

5 LED DUAL FUNCTION INDICATOR

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

Status Indicator – Displays status of selectable features:

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

175 microsecond response when detecting light or dark marks.

CONNECTIONS

Built-in 12 mm 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: Status Indicator of 5 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 3 seconds to switch bargraph display to status indicator of selectable options

Option Status Mode Indicator

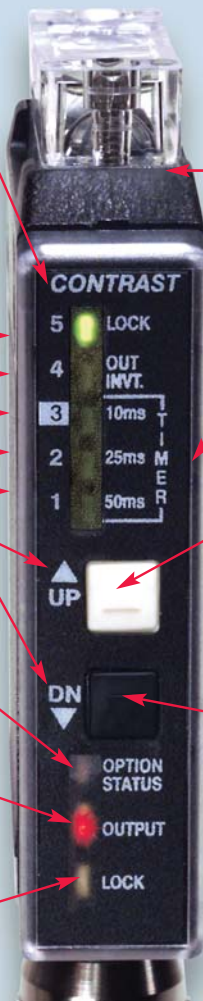
Illuminates when in program mode

Output Status Indicator

When illuminated, Option Status Indicator is enabled

Lock Status Indicator

Illuminates when sensor controls are locked



Interchangeable Optical Blocks

- Choice of 3 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 - 3 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 - 3 functions

1. Manual “DOWN” adjustment
2. AUTOSET™ on “dark” background
3. When in Option Status Mode, tap to desired function to be altered.

Setup Guide *Registration Mark Sensing Using Fiberoptic Light Guides*

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 Material (Non-Foil)

1. Position the fiberoptic light guide to view material looking straight down. (See Fig. 1)
2. Place background in view of fiberoptic light guide.
3. Adjust "offset" as follows...
 - A. For dark mark on light background, adjust for a reading of "5" on the Contrast Indicator with the background in view.
 - B. For light mark on dark background, adjust for a reading of "1" on the Contrast Indicator with the background in view.
4. Set light/dark switch in the position that turns the "mark" indicator off.
5. Move mark into view. Note the new contrast reading. If this reading has deviated from the initial reading by 2 to 3 bars or more, enough contrast exists for proper detection.

Foil Material

1. Position fiberoptic light guide as follows:
 - A. For a black or dark mark on shiny foil, position light guide to view material looking straight down. (See Fig. 1)
 - B. For white or light mark on shiny foil, position light guide to view material looking on a 20° – 30° angle. (See Fig. 2)
2. Place mark in view of fiberoptic light guide.
3. Push appropriate Autoset™ button as follows:
 - A. For black or dark mark on shiny foil, adjust for a reading of "1" when the black mark in view.
 - B. For white or light mark on shiny foil, adjust for a reading of "5" when the white mark is in view.
4. Set light/dark switch in the desired output state.
5. Move mark out of view. With the background in view, note the new contrast reading. If this reading has deviated from the initial reading by 4 to 5 bars or more, enough contrast exists for proper detection.

Transparent Material

1. Position fiberoptic light guide to view shiny back plate looking straight down without the mark in view.
2. Push white Autoset™ for a reading of 5 on the Contrast Indicator.
3. Set light/dark switch in the desired position.
4. Move the mark into view. Note the new contrast reading. If this reading has decreased or deviated from the initial reading by 4 to 5 bars or more, enough contrast exists for proper detection.

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. If the surface of opaque (non-foil) material is extremely shiny, consider placing fiberoptic light guide in a slightly angled position. The position that results in the maximum contrast deviation as displayed on the Contrast Indicator will give the most reliable performance.
3. 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.

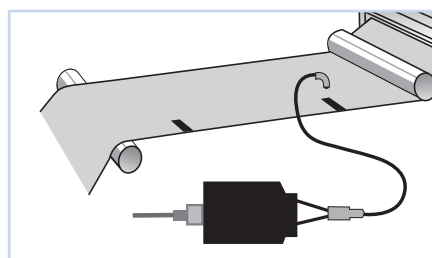


Fig. 1 Straight Position

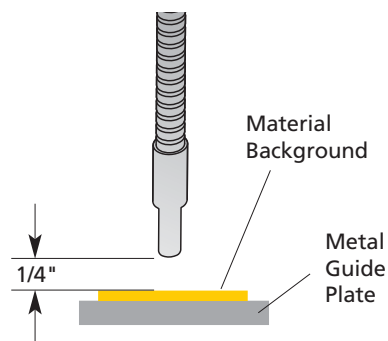
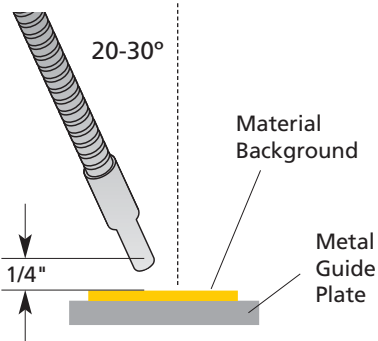


Fig. 2 20-30° Angle Position



White Light Source

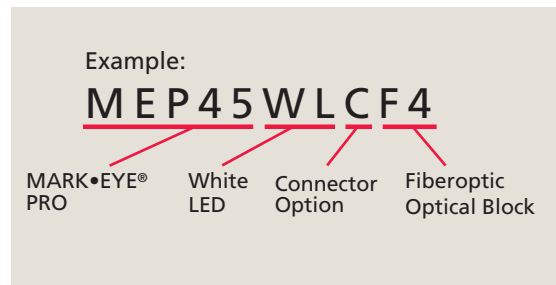
(Broadband Color Spectrum)

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. By combining a White LED light source, our **Contrast Indicator** and the "One-Push" **AUTOSET™** setup, you have a winning combination of high performance with an easy to use sensor:

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

How to Specify

Model	Description
5-Conductor, Cable Attached:	
MEP45WL	45 μs Response Time, White LED
MEPWL	175 μs Response Time, White LED
5-Pin Micro Connector (M12):	
MEP45WLC	45 μs Response Time, White LED
MEPWLC	175 μs Response Time, White LED



1. Sensor model: MEP45, MEP
2. White light source: WL
3. Select Connector
Blank = 6' Cable, C = Connector
4. Select Optical Block based on sensing mode:
 - F4** – Glass Fibers 0.25" (6.4 mm) to 0.50" (12.7 mm) range
 - V4A** – Apertured V-Axis 0.75" (19.1 mm) to 1.0" (25.4 mm) range
 - F5** – Plastic Fibers 0.25" (6.4 mm) range

Hardware & Accessories

- Micro Cable Selection Guide, 5-wire, M12



GSEC-6
6' (1.8 m) Shielded cable



GSEC-15
15' (4.6 m) Shielded cable



GSEC-25
25' (7.62 m) Shielded cable

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

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

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

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

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

GX-25
25' (7.62 m) extension cable



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



SEB-3
Stainless "L" Bracket



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



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

(Mark Samples)



Specifications

SUPPLY VOLTAGE

- 10 to 30 VDC
- 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 = 45 μ s Repeatability = 13 μ s
- MEP – Light/Dark = 175 μ s

LED LIGHT SOURCE

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

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

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 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 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 Lock feature is activated

AMBIENT TEMPERATURE

- -40°C to 70°C (-40°F to 158°F)

MARK-EYE® PRO



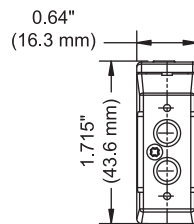
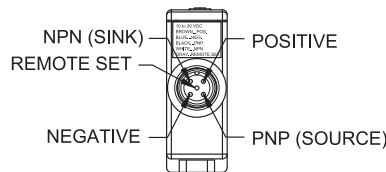
RUGGED CONSTRUCTION

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

Product subject to change without notice. Consult Factory for RoHS Compliance.

Connections and Dimensions

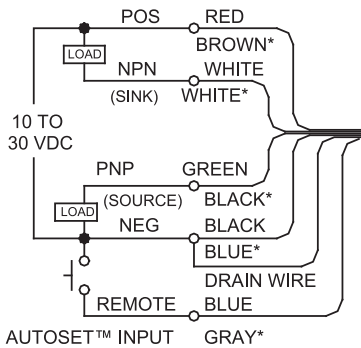
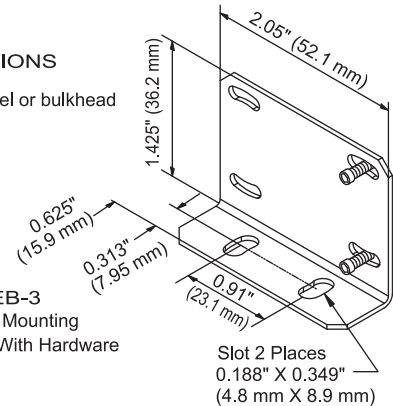
MARK-EYE® PRO



MOUNTING OPTIONS

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

P/N SEB-3
Optional Mounting
Bracket With Hardware



*SENSORS WITH CONNECTORS

"C" Models Have
Standard 5 Pin,
M12 Connector

