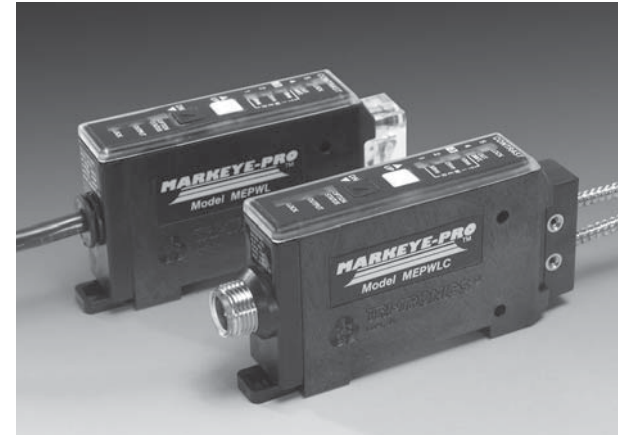# MARKEYE®-PRO
## Installation Manual

# High-Resolution Registration Mark Sensor



The **MARKEYE®-PRO** sensor is a high performance photoelectric sensor that can be adjusted by a single push of a button. As a result, there is no guess work on the part of the operator. Now you can throw away the screwdriver and the manual!

## 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**
- MEP: Light/Dark state response = 175 microseconds
- MEP45: Light/Dark state response = 45 microseconds

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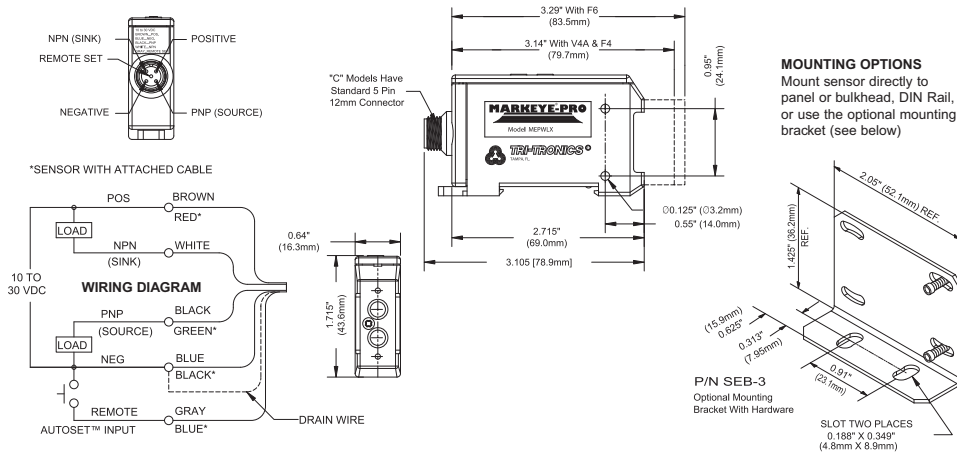
**AMBIENT TEMPERATURE**
- –40°C to 70°C (-40°F to 158°F)

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

## Connections & Dimensions



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

*SENSOR WITH ATTACHED CABLE

POS — BROWN
RED*
NPN (SINK) — WHITE
PNP (SOURCE) — BLACK
GREEN*
NEG — BLUE
BLACK*
REMOTE — GRAY
AUTOSET™ INPUT — BLUE*
10 TO 30 VDC
**WIRING DIAGRAM**
LOAD
DRAIN WIRE

3.29" With F6 (83.5mm)
3.14" With V4A & F4 (79.7mm)
0.95" (24.1mm)

"C" Models Have Standard 5 Pin 12mm Connector

MARKEYE-PRO Model MEPWLX
TRI-TRONICS®

Ø0.125" (Ø3.2mm)
0.55" (14.0mm)
2.715" (69.0mm)
3.105 [78.9mm]
0.64" (16.3mm)
1.715" (43.6mm)

**MOUNTING OPTIONS**
Mount sensor directly to panel or bulkhead, DIN Rail, or use the optional mounting bracket (see below)

2.05" (52.1mm) REF
1.425" (36.2mm) REF
(15.9mm) 0.625"
0.313" (7.95mm)
0.91" (23.1mm)

P/N SEB-3
Optional Mounting Bracket With Hardware

SLOT TWO PLACES
0.188" X 0.349"
(4.8mm X 8.9mm)

## Features & Setup Instructions

**Dual Function Bargraph**
Primary function: Contrast Indicator
Secondary function: Status Indicator of 5 selectable options

**FIVE SELECTABLE OPTIONS**
#5 LOCK... for tamper-proof 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**

**Output Status Indicator**
Illuminates in the "ON" state, switching at "3" on the contrast indicator

**Lock Status Indicator**

**Interchangeable Optical Blocks**
Choice of 3 optical blocks
1. F4 (Glass fiber optic light guides)
2. F6 (Plastic fiber optic light guides)
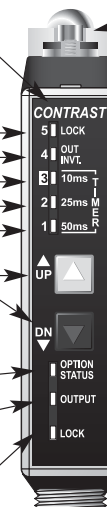3. V4A (Aperture V-Axis Convergent lens)

**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
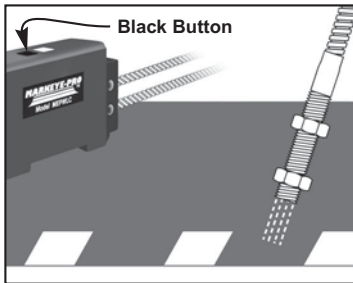3. Toggle selected option to opposite state and return to normal operation

**Black Push Button** - 3 functions
1. Manual "DOWN" adjustment
2. AUTOSET™ on "dark" background
3. Step to desired function to be altered when in option status mode (see Selectable Options)



CONTRAST
5 LOCK
4 OUT INVT.
3 10ms
2 25ms
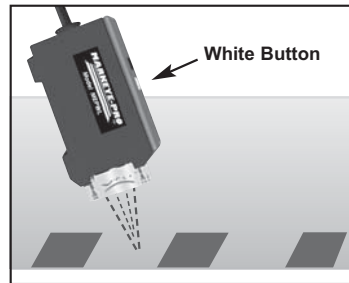1 50ms
TIMER
UP
DN
OPTION STATUS
OUTPUT
LOCK

## SETUP Instructions

For best sensing results, it is recommended that the axis of the sensing tip be within 10 to 15 degrees of perpendicular to the target mark.



**Black Button**

**Light Mark/Dark Background**
Place the background in view and press the "Black" button.



**White Button**

**Dark Mark/Light Background**
Place the background in view and press the "White" button.

**NOTE:** Use White "Up" or Black "Down" buttons to tweak adjustment.

**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™ command.

## Selectable Options

The **MARKEYE®-PRO** Sensor is equipped with the following 3 optional features that can help to adapt the sensor to specific application requirements.

**Lock** – When this feature is enabled the sensor becomes tamper proof (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.

**How to select options:**

1. Press and hold the **White** and **Black** buttons simultaneously for 3 seconds. The 5-LED bargraph will go into a flashing routine and the 5-LED bargraph switches to a status indicator. The status of the selectable options will be displayed and the amber Option Status indicator will be lit.

2. Step to the desired function to be changed by "tapping" the **Black** button. For example, the first "tap" will step to the "Lock" select function. To indicate the "Lock" function has been selected, the #5 LED will **flash**. Once the LED next to the option is **flashing**, depress the **White** button to change the status to the opposite state. The sensor will then display the choice briefly before returning to normal operation. This sequence must be repeated for each function to be altered. If you make no change in the status of any control function, "tap" the **Black** button a sixth time, or wait 5 seconds to allow the sensor to automatically return to the preexisting selections.

**Options**

| LED | FEATURE | ON/OFF | STATUS |
|---|---|---|---|
| **#5 LED** | Lock | On<br>Off ✓ | The manual up/down and Auto-Set adjustments are disabled.<br>The manual up/down and Auto-Set adjustments are enabled. |
| **#4 LED** | Output Invert | On<br>Off ✓ | Output is "ON" when mark is in view.<br>Output is "OFF" when mark is in view. |
| **#3 LED** | 10ms Timer | On<br>Off ✓ | 10ms Timer/Pulse Stretcher is enabled.<br>10ms Timer/Pulse Stretcher is disabled. |
| **#2 LED** | 25ms Timer | On<br>Off ✓ | 25ms Timer/Pulse Stretcher is enabled.<br>25ms Timer/Pulse Stretcher is disabled. |
| **#1 LED** | 50ms Timer | On<br>Off ✓ | 50ms Timer/Pulse Stretcher is enabled.<br>50ms Timer/Pulse Stretcher is disabled. |

✓ = Factory presets

## Diagnostics

The **MARKEYE®-PRO** Sensor's 5-LED Contrast Indicator provides "at-a-glance" analysis of the sensor's response to the **"light state"** vs. **"dark state"** sensing condition. This device is not only useful in static conditions for alignment purposes, but is also functional during dynamic conditions when input events are ongoing.

**NOTE:** If the Contrast Indicator is cycling repeatedly, check to insure that the gray wire is not shorted to ground.

## Output Indicator

Red LED illuminates when output transistor is in the "ON" state.
The "light state" reading must exceed "3"
The "dark state" reading must fall below "3"

**NOTE:** If the red output indicator flashes while the output transistor is in the "ON" state, one of the output leads is shorted (NPN to positive or PNP to negative/shield).