TRI-TRONICS®

Smart Sensing Solutions Since 1954

SMARTEYE®
COLORWISE™
TRUE COLOR SENSOR

ttco.com/colorwise

800-237-0946 • 813-886-4000

SMARTEYE® COLORWISE™ TRUE COLOR SENSOR

The ***SMARTEYE®* COLORWISE™ *True Color Sensor*** is the most feature packed color sensor available. Designed to work as well as an instrument or spectrometer, this sensor can solve the most difficult color applications at higher speeds than color cameras or the closest priced competitive product. The 4 Channel Monitor provides a visual confirmation of performance without having to switch channel selections or touch the sensor in any way. Providing a choice in speed versus resolution, the ***SMARTEYE®* COLORWISE™** puts the controls of the performance of the sensor in the hands of the operator; allowing for more application solutions, and removing the limits that either speed or resolution alone can offer.

With control over Tolerance, Light Intensity, Output Configuration (NPN or PNP), Timers, Input Configuration (Edge or Gate), the ***SMARTEYE®* COLORWISE™** provides a tailored and customized solution for the most difficult color sorting, or inspection problems facing today's packaging and production lines. The ***SMARTEYE®* COLORWISE™** also comes equipped with 4 digital and 3 analog outputs that not only help to sort products by color, but can determine specific color signatures as well.

The ***SMARTEYE®* COLORWISE™ *True Color Sensor*** from Tri-Tronics®:

The Wisest choice you can make!

Features

- 4-Digital Outputs (NPN or PNP)
- 4-Channel Monitor for at-a-glance performance evaluation
- 3-Analog Outputs (XYZ or xyY); 0 to 5 VDC
- Adjustable Tolerance for each channel
- Adjustable Timers for each channel: One Shot; On Delay; Off Delay; Latch
- 14-Pin 6" pigtail 1/4-turn locking connector or cable version
- Adjustable LED light intensity
- Select high speed versus high resolution (CW-1 model only)
- Short range and long range models available
- Remote Color Capture
- Button Lockout

Benefits

- Flexible and convertible for many different color applications
- Useful for color sorting and color verification applications all in one sensor
- No-touch setup via remote color capture wire (selectable input; NPN/Negative or PNP/Positive)
- Reduce cost and speed constraints of color cameras or spectrometers
- Quick digital changeover
- Tamperproof with button lockout feature

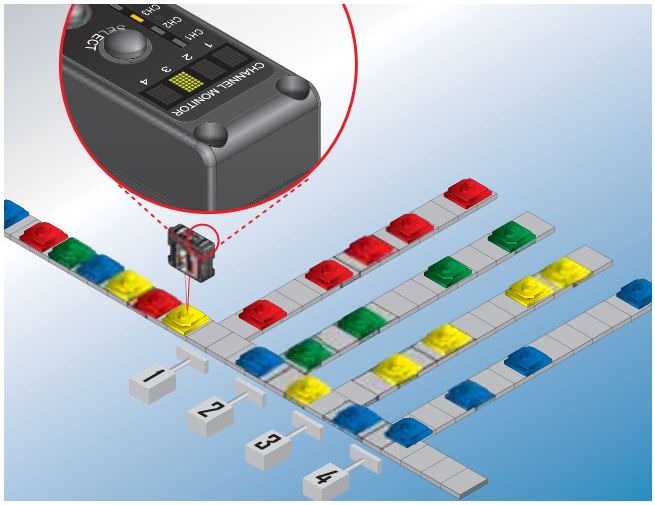
Applications

- Automotive - Trim Color Assembly, Carpet and Mat matching, Paint Verification
- Textile - Color Verification, Die Quality Control
- Bottle Industry - Color Sorting, Color Verification, Quality Inspection
- Food Industry - Cooking Time Control, Quality Inspection/Control
- Graphic Art - Color Verification, Quality Control, Missing Color Detection

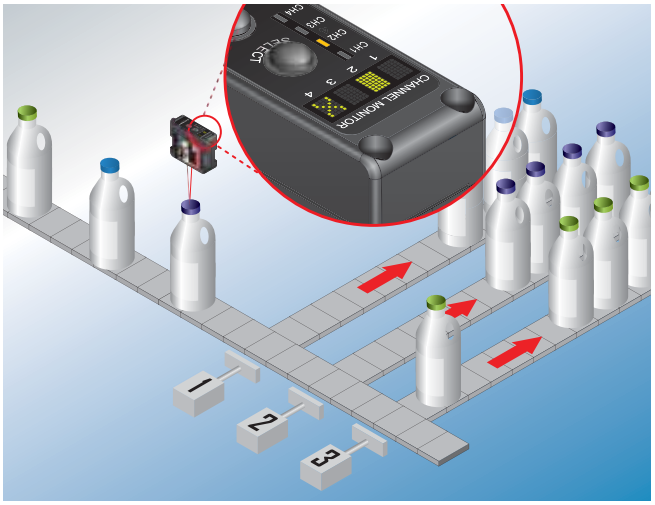
Applications

SMARTEYE® COLORWISE™ TRUE COLOR SENSOR

Color Sorting

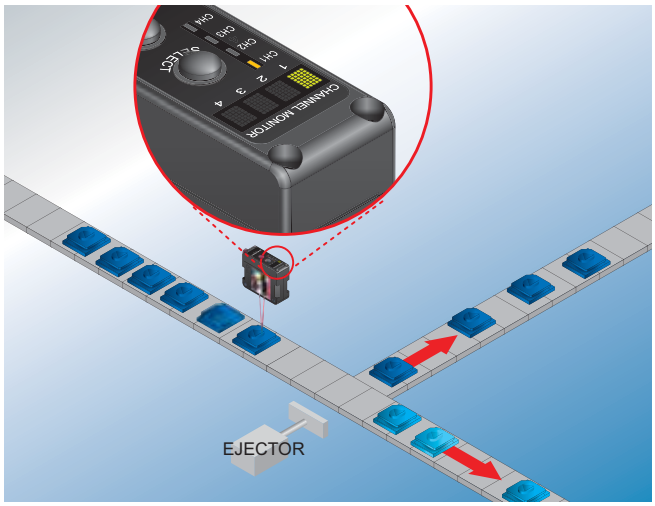


Sort items by color

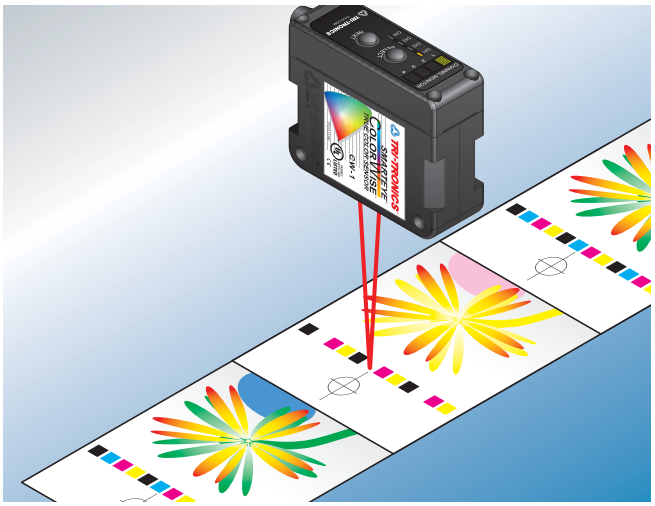


Separate grouped items by color

Color Verification for Quality Inspection

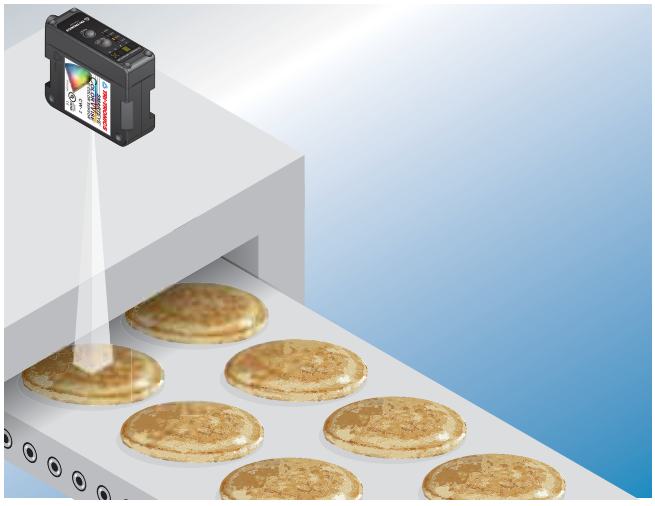


Verify proper shade of color

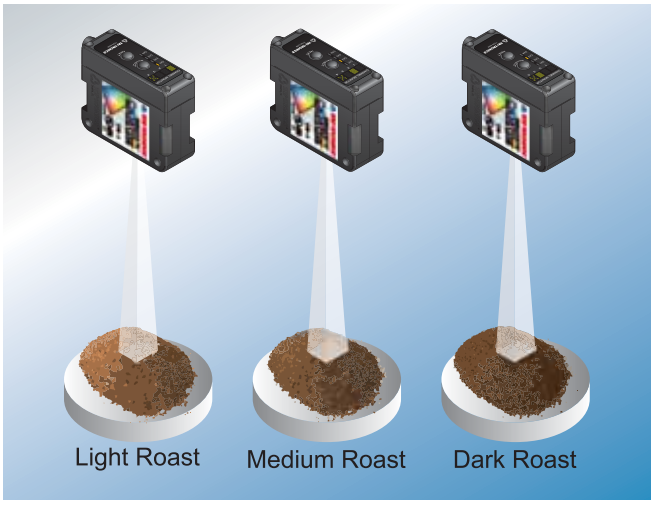


Inspect for missing colors

Color Process Control



Guarantee uniform cooking for efficient process



Control energy usage via color process control

Features

SMARTEYE® COLORWISE™ TRUE COLOR SENSOR

Color Capture CAPT
Setup on target color with a simple push of a button. Four individual digital channels.

Four Channel Color Monitor
At-a-glance visual confirmation of real time performance for all four channels.

Tolerance Adjustment
Precise adjustment of tolerance levels for each of the four channels provides a wide range of resolution capabilities.

Color or Color + Intensity
The ability to select between Color and Color + Intensity provides the ability to differentiate between slight color differences, or shade-to-shade changes.

Output Mode
Select LO for output ON for color match; DO for output OFF for color match; and MUTE to de-select channel monitor and disable output.

Speed versus Resolution
Select Uspd - Ultra High Speed (75us); HSpd - High Speed (150us); or HRes -High Resolution (300us).
Note: This feature available on CW-1 models only.

Light Intensity
Adjust Light Intensity (L100) in System Parameter from L10, dimmest to L100, brightest. Useful when mechanical restrictions limit sensor position or distance.

Timers
Timer available for each of the four channels: Toff = No Timer; OffD = Off Delay; OnD = On Delay; Shot = One Shot; Ltch = Latch. Adjustable from 1ms to 9999ms.

Remote Capture
Pulse the Remote Capture wire to Negative or Positive, dependent upon the IN> setting, NPN or PNP, respectively.
Note: Each pulse on for 40ms to 400ms. The time between pulses is 40ms to 400ms.

Signal Strength Monitor
Displays the total signal strength as a number from 0 (low) to 100 (high). Useful for setup in determining sensor position.

Input (Gate or Edge)
Provides a window of time to detect/capture allowing for inspection of color at the proper space and time during continuous product flow and normal production line speeds.

Connections
Available with standard 6', 14 wire cable; or optional 6" pigtail, 14 pin, 1/4-turn locking connector. Mating cable model #BCC-6.

Mounting Options
Through-hole or available bracket mounting.

ALPHANUMERIC DISPLAY
1. 4-Channel Color Monitor for "At-A-Glance" performance feedback
2. Alphanumeric display of available options

OUTPUT INDICATORS
LED's for CH1 through CH4 ON when outputs are ON

SELECT
1. Select sub menu
2. Initiate color capture
3. Alter system parameters
4. Alter numeric values
5. Change from Channel Monitor to Signal Strength display

NEXT
Advance through menu options

Note: If any output indicators (CH1 - CH4) blink, output is shorted or overloaded.

Special Features

SMARTEYE® COLORWISE™ TRUE COLOR SENSOR

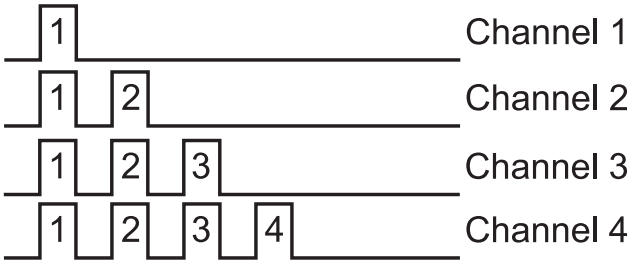
Analog XYZ and xyY

There are three analog outputs which may be configured in the System Parameters to either XYZ or xyY (please see data sheet for details).
The XYZ color space can be found on any search engine by entering the term "XYZ color space" or "CIE 1931 color space."
Wikipedia has a nice page for this information
http://en.wikipedia.org/wiki/colormodel

The three analog outputs provide a 0-5 VDC swing, and the xyY output selection adds the intensity component to the algorithm for shade-to-shade applications. The ColorWise analog outputs can easily be evaluated by a PLC or HMI and can be used for controlling a process, or determine quality during an inspection application.

Remote Capture

Pulse the Remote Capture wire to Negative or Positive, dependent upon IN> setting; NPN or PNP, respectively.
NOTE: Each pulse on for 40ms to 400ms. The idle time between pulses is 40ms to 400ms



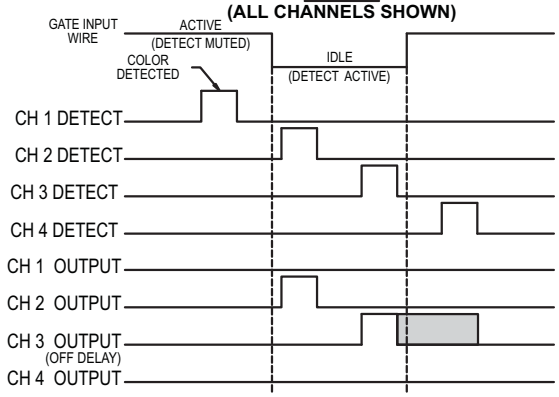
Input Gate/Window

The Input Gate/Window can be used with or without the Latch Timer function. Useful for resetting the latch, gating or triggering the sensor at a specific time and location on the target, and windowing the sensor to ignore other targets or objects that may come into view which should be ignored. The Input can be configured for either an NPN/Negative, or a PNP/Positive signal.

GATE INPUT FUNCTIONALITY - LATCH DISABLED

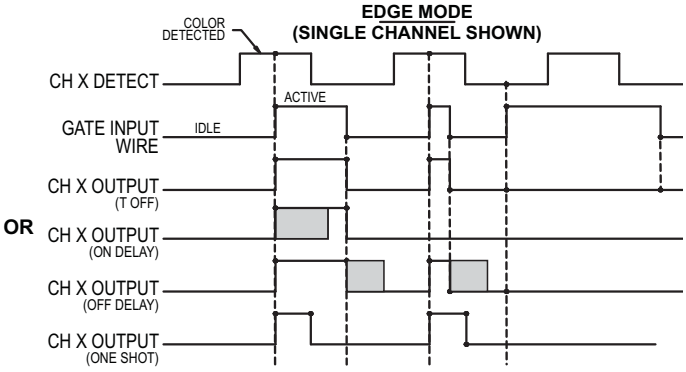
GATE MODE OR EDGE MODE SET IN SYSTEM MENU

GATE MODE (ALL CHANNELS SHOWN)



NOTE: Output can extend beyond idle to active transition for off-delay & one shot.

EDGE MODE (SINGLE CHANNEL SHOWN)

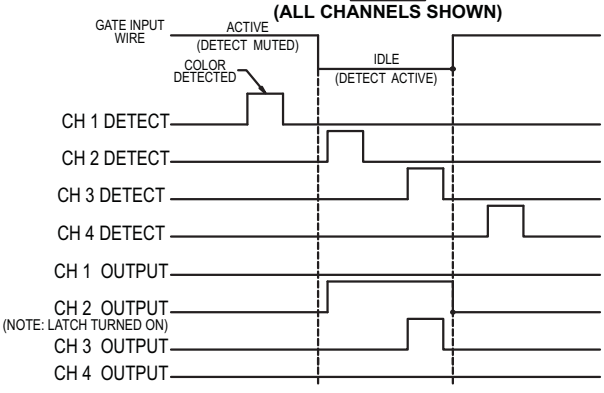


NOTE: DEFAULT STATE OF LINE IS RELEASE (OUTPUTS ARE ACTIVE)
NOTE: IN EDGE MODE: 1. SAMPLE ON GATE INPUT TRANSITION TO ACTIVE
2. RESET OUTPUT ON GATE INPUT TRANSITION TO IDLE

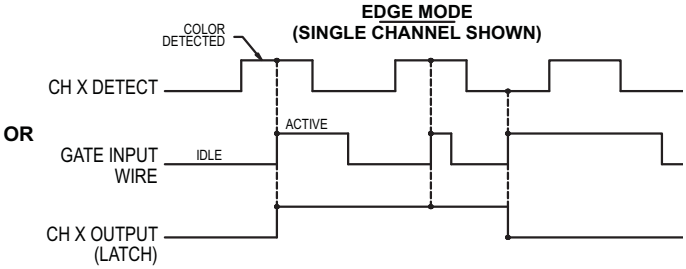
GATE INPUT FUNCTIONALITY - LATCH ENABLED

GATE MODE OR EDGE MODE SET IN SYSTEM MENU

GATE MODE (ALL CHANNELS SHOWN)



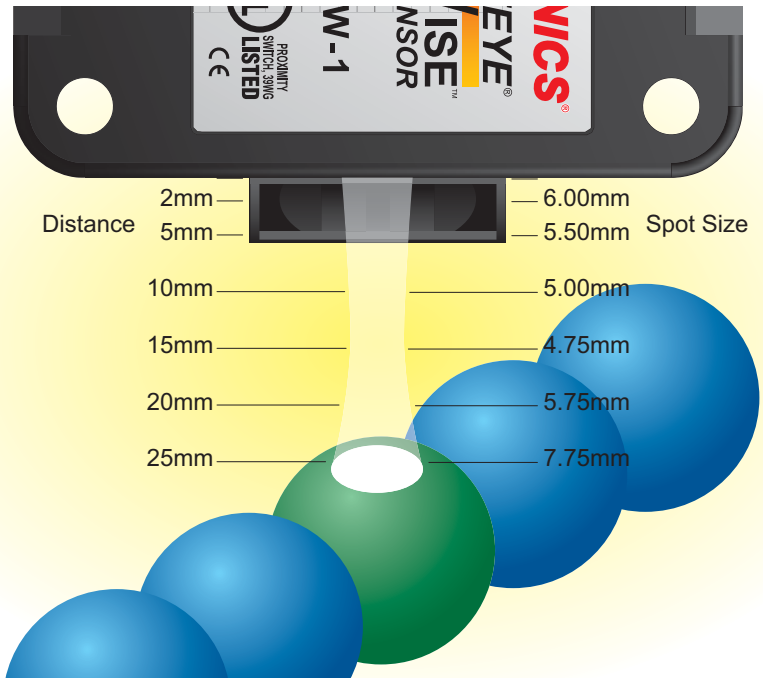
EDGE MODE (SINGLE CHANNEL SHOWN)



NOTE: DEFAULT STATE OF LINE IS RELEASE (OUTPUTS ARE ACTIVE)

ColorWise Range Guidelines

SMARTEYE® COLORWISE™ TRUE COLOR SENSOR



Short Range Guideline (CW-1)

The short range version is useful when the color is consistent across the entire product: when product is small; when the target is a color registration mark; or when the target is a specific color on a label. Applications that may be solved with the short range models are cap color, registration marks, label orientation, pharmaceutical color coding, tote sorting, etc.

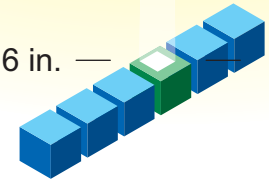
The short range version allows for a selection of speed versus resolution to resolve high speed color applications as well as low levels of color shade changes.

Long Range Guideline (CW-2)

The long range models should be used when distance to the target exceeds the range of the short range model, the physical or mechanical constraints require a longer range, or the product needs a larger spot of light for averaging, as in applications such as textile, food, or grainy products or surfaces.

The long range model provides a wide range of focal distances, with a large beam to view over surfaces that require more color averaging over many different substrate surface textures.

Distance	Spot Size
2 in.	0.750”in.
6 in.	1.250 in.
10 in.	1.625 in.
12 in.	1.875 in.
16 in.	2.375 in.



How to Specify

SMARTEYE® ColorWise™ True Color Sensor

1. **Select Sensor:**
   SMARTEYE® ColorWise™ True Color Sensor
2. **Select Cable:**
   Blank = 6 foot (1.8 m), 14 conductor, 28AWG Cable
   C = 6 inch (152 mm) pigtail with 14-pin, 1/4-turn locking connector
3. **Select Range:**
   -1 = Short Range
   -2 = Long Range
4. **Select Lens Material:**
   Blank = Acrylic
   G = Glass

Example: CW C -1 G

SMARTEYE® ColorWise™ True Color Sensor

Blank = 6' Cable (1.8 m)
C = 14-Pin Pigtail Connector 6" (152 mm)

Output Configuration
-1 = Short Range
-2 = Long Range

Lens Material
Blank = Acrylic
G = Glass

Hardware & Accessories

Extension Cable and Bracket Selection Guide

XMB-1L
Left-hand Universal Mounting Bracket

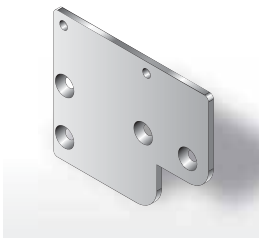
XMB-1R
Right-hand Universal Mounting Bracket

XMB-2
Front-mount Mounting Bracket

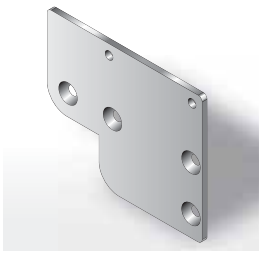
SEB-4
Stainless Steel Vertical Mounting Bracket

BCC-6
6-ft. (1.8 m), 14-pin, twist-lock Connector Cable

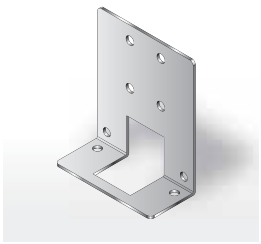
BCC-6
Sensor Cable, 6 ft. (1.8 M)



XMB-1L
Left



XMB-1R
Right



XMB-2
Front Mount

SEB-4
Stainless Stealth Mounting Bracket

Specifications

SMARTEYE® COLORWISE™
TRUE COLOR SENSOR

SUPPLY VOLTAGE
- 12 to 24 VDC
- Polarity Protected
- Intended for use in Class 2 circuits

CURRENT REQUIREMENTS
- CW-1: 110mA@12VDC, 80mA@24VDC
- CW-2: 140mA@12VDC, 85mA@24VDC

PERFORMANCE
- CW-1: Effective Resolution: Min. 12 bit, Max. 16 bit
- CW-2: Effective Resolution: 14 bit

OPTICAL CHARACTERISTICS
- Light emitter: White LED
- Optical axis: CW-1: Coaxial; CW-2: Convergent
- Receiving spectrum: 400nm to 700nm

DIGITAL OUTPUTS
- Four (4) selectable NPN or PNP open collector outputs
- 75 mA capacity
- Short circuit & transient voltage protected
- Residual voltage: NPN, 1.35 max.; PNP, 2.05 max.

ANALOG OUTPUTS
- Three outputs: Selectable as XYZ for color differentiation (RGB equivalent) or xyY for color + intensity differentiation
- 0-5 VDC +/-1%
- 10 bit resolution
- Max load per channel: 2k OHMS
- Transient Suppression

OUTPUT SELECTION
- LO (Light On or Color Match)
- DO (Dark On or No-Match)
- Mute (Channel Off)

REMOTE CAPTURE INPUT
- Input time: 25ms (ON) / 25ms (OFF) minimum
- Selectable (sinking or sourcing)
- Contact or solid-state input 1mA
- Transient suppression

GATE/LATCH INPUT
- Selectable NPN/Sinking or PNP/Sourcing
- Selectable EDGE or GATE trigger for latch reset or inhibit for windowing
- Contact or solid-state input 1mA
- Transient suppression

TIMER
- On delay, off delay, one shot, and latch
- Duration: 1mS to 10 seconds +/-1%

DETECTION MODE
- Color or color + intensity

ALPHANUMERIC DISPLAY
- 4-Channel Color Monitor for "At-A-Glance" Performance Feedback
- Alphanumeric Display for Available Options

RESPONSE TIME
- Color-to-color: CW-1: 75µs (Uspd), 150µs (Hspd), and 300µs (Hres); CW-2: 600µs
- Shade-to-shade: CW-1: 100µs (Uspd), 200µs (Hspd), and 800µs (Hres); CW-2: 800µs

DIAGNOSTIC INDICATORS
- Output Indicator – (Amber) CH 1 through CH 4
- Four Character Alphanumeric Display – (Green)

AMBIENT LIGHT IMMUNITY
- Responds to sensor's pulsed modulated light source – immune to most ambient light including indirect sunlight

HUMAN INTERFACE
- Pushbutton control: Select, Next

AMBIENT TEMPERATURE
- -5°C to 55°C (23°F to 131°F) No ice, frost, or fogging allowed

STORAGE TEMPERATURE
- 5°C to 90°C (41°F to 104°F)

RELATIVE HUMIDITY
- 35% to 85%

VIBRATION
- 10 to 55 Hz, 0.5 mm, 30 minutes each axis

SHOCK
- Half-sine wave, 30g, 11µs 6 time 3 axis

CERTIFICATIONS
- CE - Complies with IEC 60947-5-2 edition 3.0 2007-10
- UL & CUL listed; CCN NRKH & NRKH7

LENS MATERIAL
- Acrylic or glass

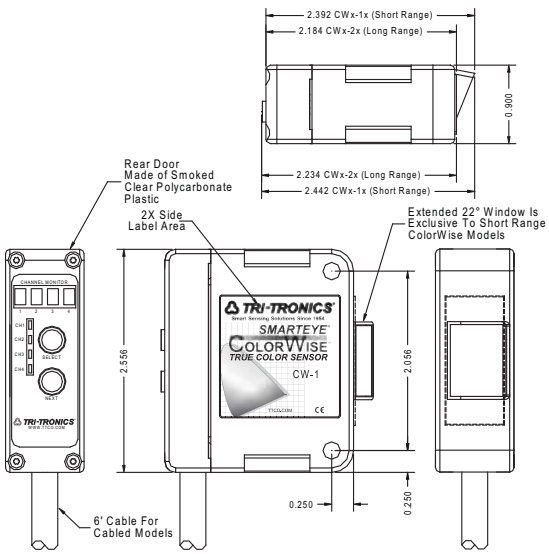
RUGGED CONSTRUCTION
- Chemical resistant, high impact polycarbonate housing
- Waterproof ratings: NEMA 4, IP65.

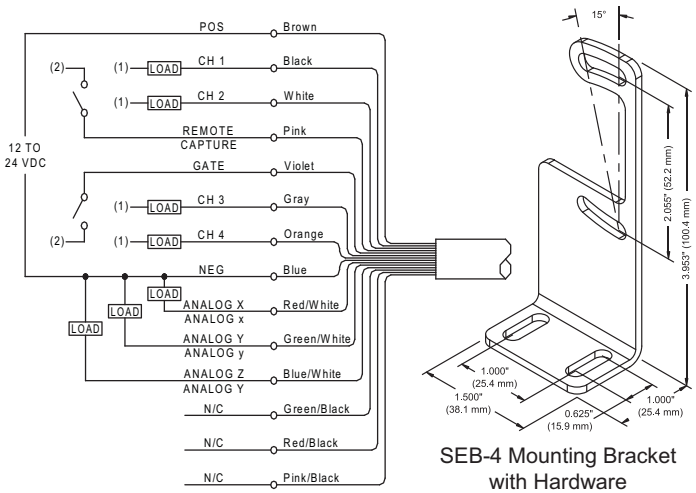
CE c UL us

RoHS Compliant
Product subject to change without notice.

Connections and Dimensions

SMARTEYE® ColorWise™





SEB-4 Mounting Bracket with Hardware

(1) - NPN (SINKING) OUTPUT LOAD TERMINATED TO POSITIVE
PNP (SOURCING) OUTPUT LOAD TERMINATED TO NEGATIVE

(2) - NPN (SINKING) INPUT ACTIVATED BY CONNECTING TO NEGATIVE
PNP (SOURCING) INPUT ACTIVATED BY CONNECTING TO POSITIVE

For connector models use:
BCC-6 - 6 ft. 14 Wire Cable with ¼ Turn Locking Connector

CE c UL us