

Specifications

SUPPLY VOLTAGE

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

CURRENT REQUIREMENTS

- TCS-1 10mA@12VDC, 80mA@24VDC
- TCS-2 140mA@12VDC, 85mA@24VDC

PERFORMANCE

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

OPTICAL CHARACTERISTICS

- Light emitter: White LED
- Optical axis: TCS-1: Coaxial; TCS-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

ALPHA NUMERIC DISPLAY

- 4-Channel Color Monitor for "At-A-Glance" Performance Feedback
- Alpha-Numeric Display for Available Options

RESPONSE TIME

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

DIAGNOSTIC INDICATORS

- Output Indicator – (Amber) CH 1 through CH 4
- Four Character Alpha-Numeric 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

LENS MATERIAL

- Acrylic or glass

RUGGED CONSTRUCTION

- Chemical resistant, high impact polycarbonate housing
- Waterproof ratings: IP65.



RoHS Compliant

Product subject to change without notice.

TRUE COLOR SENSOR

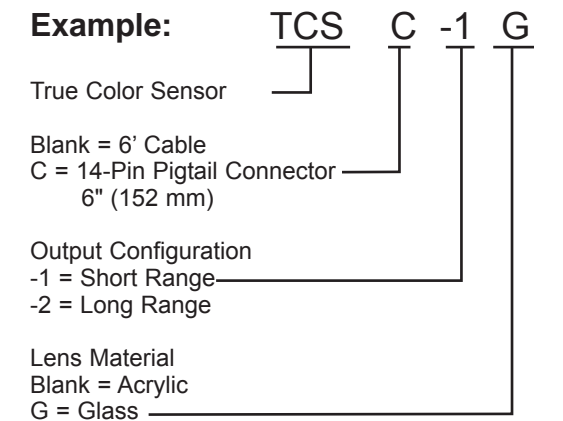
Installation Manual

Four Channel Models

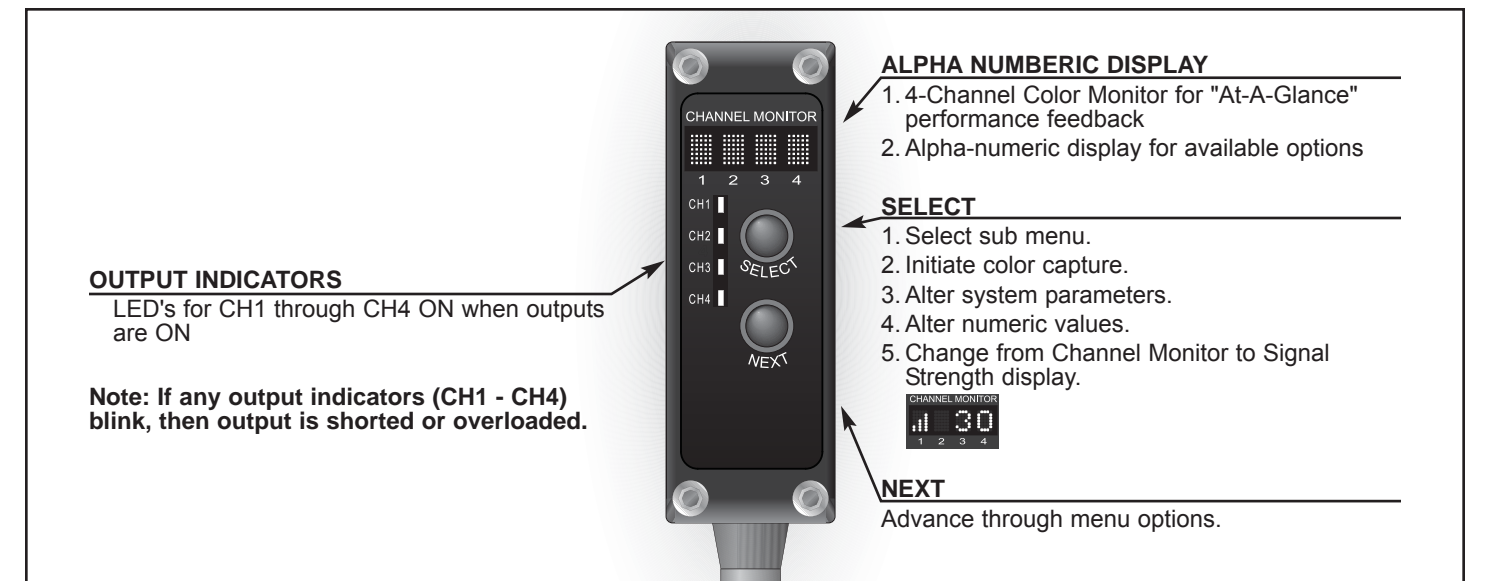
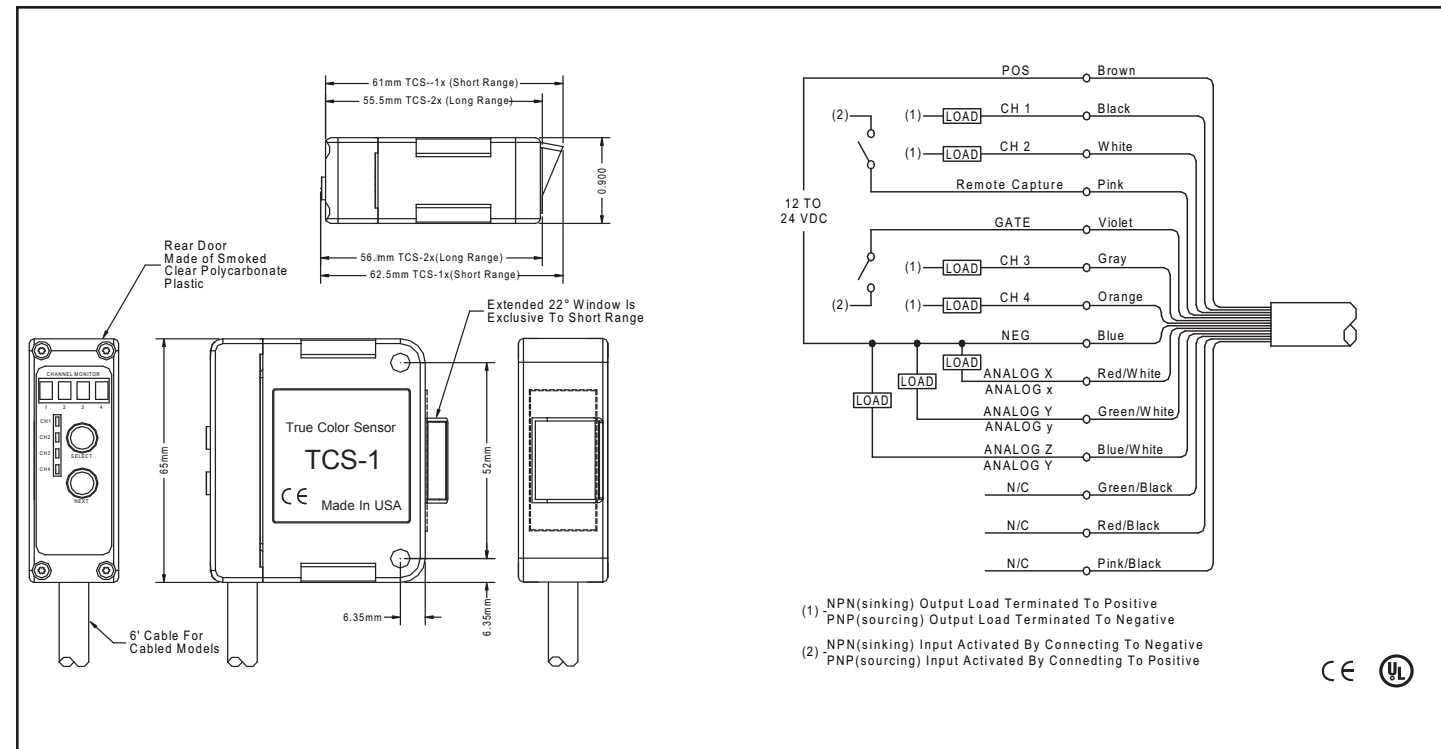
The True Color Sensor is the most feature packed color sensor available. Designed to work as well as an instrument or spectrometer, this sensor can solve the most difficult color applications at higher speeds than color cameras or the closest priced competitive product. The 4 Channel Monitor provides 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 True Color Sensor 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 True Color Sensor provides a tailored and customized solution for the most difficult color sorting, or inspection problems facing today's packaging and production lines. The True Color Sensor 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.

How to Specify

- Select Sensor:**
True Color Sensor
- Select Cable:**
Blank = 6 foot, 14 conductor, 28AWG Cable
C = 6 inch pigtail with 14-pin, 1/4-turn locking connector
- Select Range:**
-1 = Short Range
-2 = Long Range
- Select Lens Material:**
Blank = Acrylic
G = Glass



Connections and Dimensions



Setup Instructions



Channel Monitor*

PRESS
SELECT
(TOGGLES)

The Channel Monitor indicates color match quality as follows:

- Full Bars = Perfect color match
- At Least One Bar = Color inside tolerance
- No Bars = Outside of tolerance; no match.
- Returned light level too low. Reposition sensor or adjust Light Intensity.
- Returned light level too high. Reposition sensor or adjust Light Intensity.
- X = Muted Channel Monitor and output.

Signal Strength

* **FACTORY DEFAULT SETTING**

The Signal Strength display indicates total signal strength as a number from 0 (low) to 100 (high). This is a useful setup tool for sensor positioning.

- Adjust Signal Strength by repositioning the sensor, or adjusting Light Intensity, "L", in System Parameters.
- The higher the Signal Strength, the better the color detection.
- Signal Strength, returned light level, too low. Reposition sensor or adjust Light Intensity.
- Signal Strength, returned light level, too high. Reposition sensor or adjust Light Intensity.

Pressing NEXT will advance through each channel followed by the system menu.



See next page for System Parameters.

In channels 1-4, press SELECT to advance to detailed setup for each channel.

1 Capture Color



Aim the sensor at the desired color and press SELECT to capture color. If display flashes "HIGH" or "LOW" this indicates an out of range condition.

2 Tolerance



Fine tune tolerance by pressing/holding SELECT (1-50). The lower the number the greater the sensitivity.

3 Color / Color + Intensity Mode



Pressing SELECT toggles between Color (C) and Color + Intensity (CI) mode. Color + Intensity is used for shade-to-shade applications.

4 Output Mode



Pressing SELECT toggles LO (Light On or Color Match); DO (Dark On or No Match); MUTE (Disable Channel Monitor and Output).

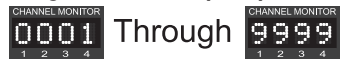
5 Timer Mode



Pressing SELECT changes timer mode: Timer off (Toff), Off Delay (OffD), On Delay (OnD), One Shot (Shot), and Latch (Ltch).

Press Next

Adjust Time (ms)



Pressing/holding SELECT increases timer in milliseconds.
Note: Only displayed when timer is enabled.

Range and Spot Size

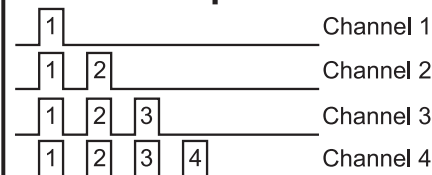
Short Range – TCS-1

Distance (Min to Max Range)	Spot Size (Circular)
10mm/.394"	5.00mm/0.197"
15mm/.590"	4.75mm/0.187"
20mm/.787"	5.75mm/0.226"
25mm/.984"	7.75mm/0.305"

Long Range – TCS-2

Distance (Min to Max Range)	Spot Size (Square)
51mm/2"	19.1mm/0.752"
154mm/6"	31.8mm/1.252"
254mm/10"	41.3mm/1.624"
305mm/12"	47.6mm/1.874"
406mm/16"	60.3mm/2.374"

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.

System Parameters



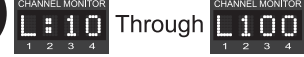
Press SELECT to enter System Parameters menu.
Note: System Parameters changes will affect all channels.

1 Unlock / Lock



Pressing SELECT enables and disables button Lockout (ULOC, LOCK).

2 Light Intensity (Emitter)



Pressing SELECT increases intensity (10-100).

3 Response Time (TCS-1 models only)



Pressing SELECT changes: 75µs Ultra High Speed (Uspd), 150µs High Speed (Hspd), and 300µs High Resolution (Hres). See specs on page 4 for details.

4 Adjust Input



Press SELECT to adjust Input.

4a Gate / Edge Gate/Edge

Pressing SELECT switches between Gate and Edge mode. *Note: Edge is a momentary trigger; gate is a window trigger or inhibit/reset.*

4b NPN / PNP NPN/PNP Input

Pressing SELECT switches gate and remote set inputs to sinking (NPN) or sourcing (PNP). *Note: Sensor resets after a change.*

5 Adjust Output



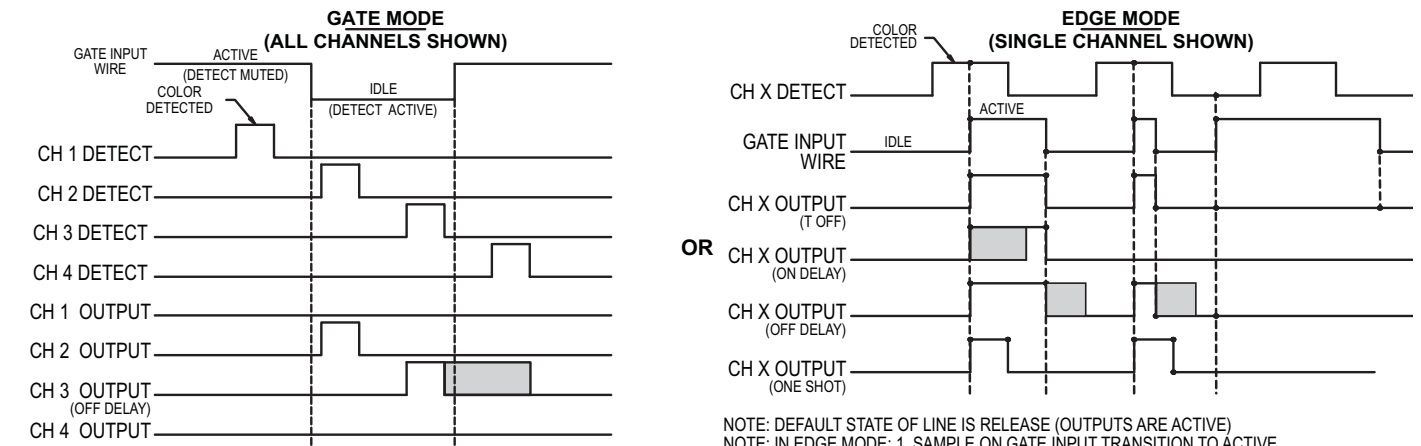
Press SELECT to adjust Output.



- Press NEXT to scroll through digital channels and analog output.
- Press SELECT to alter outputs: NPN to PNP for digital channels 1 through 4; and XYZ to xyY on analog output.

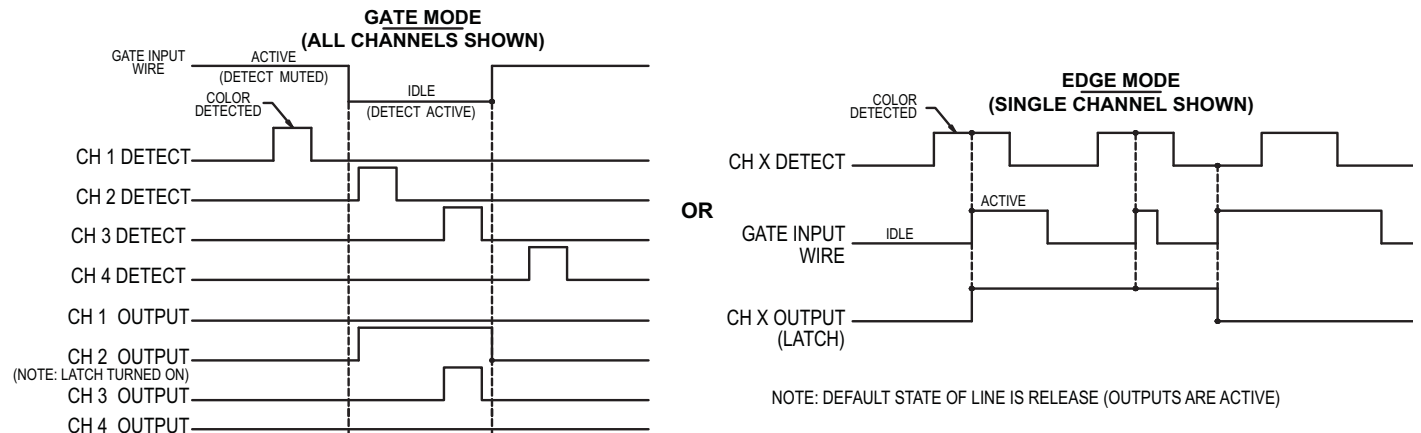
Note: Do not change IN> or OUT> selections while connected to input device or damage may occur to input device.

GATE INPUT FUNCTIONALITY - LATCH DISABLED



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

GATE INPUT FUNCTIONALITY - LATCH ENABLED



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