

# CON-TECH

**INTELLIGENT LABEL SENSORS**

## OPERATIONS MANUAL

### CS2000 & CS2000-QD

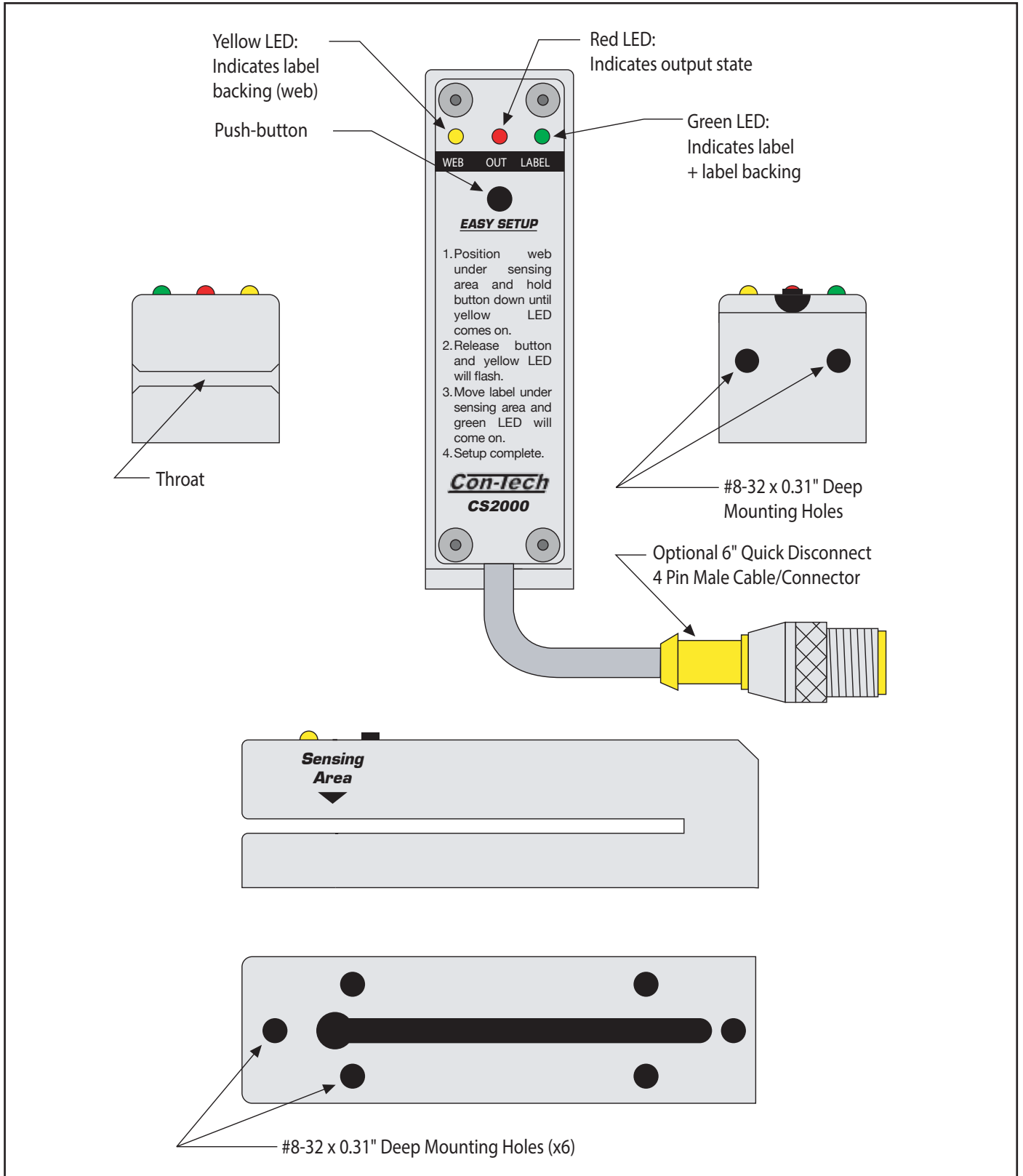


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**Features:**

- *10 to 30 VDC input - reverse polarity protected*
- *Fast RISC microprocessor controlled*
- *Easy one touch setup - label sensitivity easily adjusted, to the optimal setting, by the push of a button*
- *Missing label compensation - outputs a stop pulse even when a label is missing*
- *Level shift or leading edge pulse output selectable*
- *Light or dark operation selectable*
- *Low label contrast setting available*
- *Push-button may be momentarily depressed to output a stop pulse - very useful during machine setup*
- *All settings saved in nonvolatile memory (EEPROM) - settings are not affected by power loss*
- *NPN or PNP output selectable - 100mA, open collector, reverse polarity and short circuit protected*
- *Precision machined and double anodized aluminum housing*
- *8 mounting holes - allows for many different mounting options*
- *Large throat - 3" deep x 0.093 wide*
- *Optional 6" quick disconnect M12 - 4 pin male cable/connector (Turck P/N RS4.4T-2)*

## CS2000 Diagram:



**CS2000 Quick Start:**

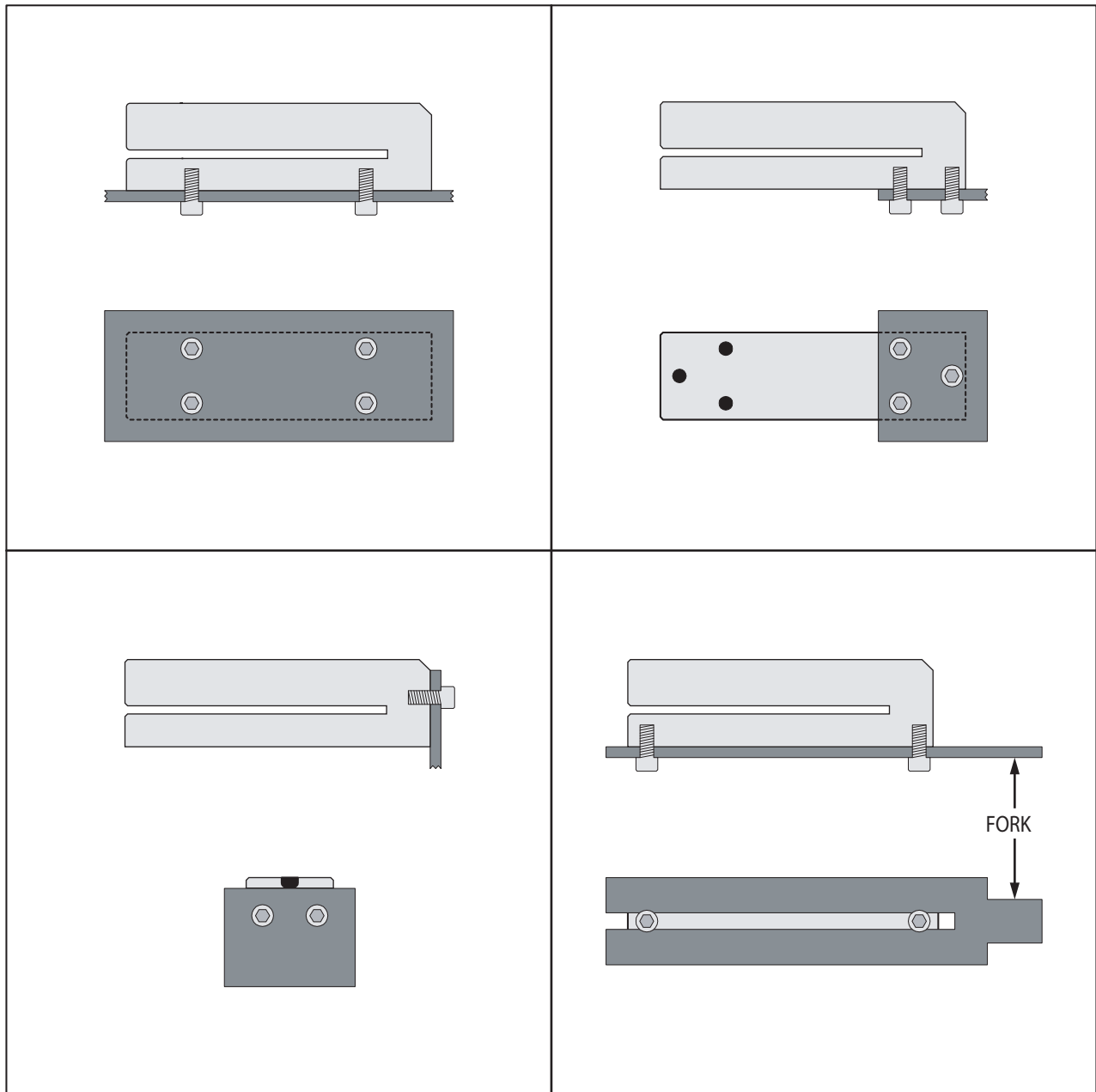
1. *Connect red wire to supply voltage*
2. *Connect black wire to supply common*
3. *For NPN Output - connect orange wire (green wire on newer units) to black wire  
For PNP Output - connect orange wire (green wire on newer units) to red wire*
4. *Connect white wire to your controller - refer to page 6 for wiring diagrams*
5. *Turn on power*
6. *Peel off a label and position the label backing (web) under the sensing area*
7. *Depress the push-button until the yellow LED comes on (1 sec.), then release*
8. *The yellow LED will begin flashing*
9. *Move a label under the sensing area and the green LED will come on*
10. *The label sensitivity is now adjusted and the sensor should function correctly*
11. *The yellow LED indicates when label backing (web) is detected*
12. *The green LED indicates when label over label backing is detected*
13. *The red LED indicates when the output is active - NPN sinking or PNP sourcing*

**CS2000-QD Quick Start:**

1. Plug the CS2000-QD's male connector into a suitable 4 pin female connector
2. Connect brown wire to supply voltage
3. Connect blue wire to supply common
4. For NPN Output - connect black wire to blue wire  
For PNP Output - connect black wire to brown wire
5. Connect white wire to your controller - refer to page 7 for wiring diagrams
6. Turn on power
7. Peel off a label and position the label backing (web) under the sensing area
8. Depress the push-button until the yellow LED comes on (1 sec.), then release
9. The yellow LED will begin flashing
10. Move a label under the sensing area and the green LED will come on
11. The label sensitivity is now adjusted and the sensor should function correctly
12. The yellow LED indicates when label backing (web) is detected
13. The green LED indicates when label over label backing is detected
14. The red LED indicates when the output is active - NPN sinking or PNP sourcing

**Mounting:**

The CS2000 comes with 8 mounting holes allowing for many different mounting options. The holes are tapped for #8-32 screws and are 0.31" deep. We suggest using #8-32 x 3/8" stainless steel screws. Some different options are shown below.



\* To avoid electro-static discharge and sensor malfunction, the CS2000 should be mounted to a grounded metal surface. If this is not possible, a grounding wire should be connected from one of the mounting screws to a suitable ground.

## CS2000 Wiring:

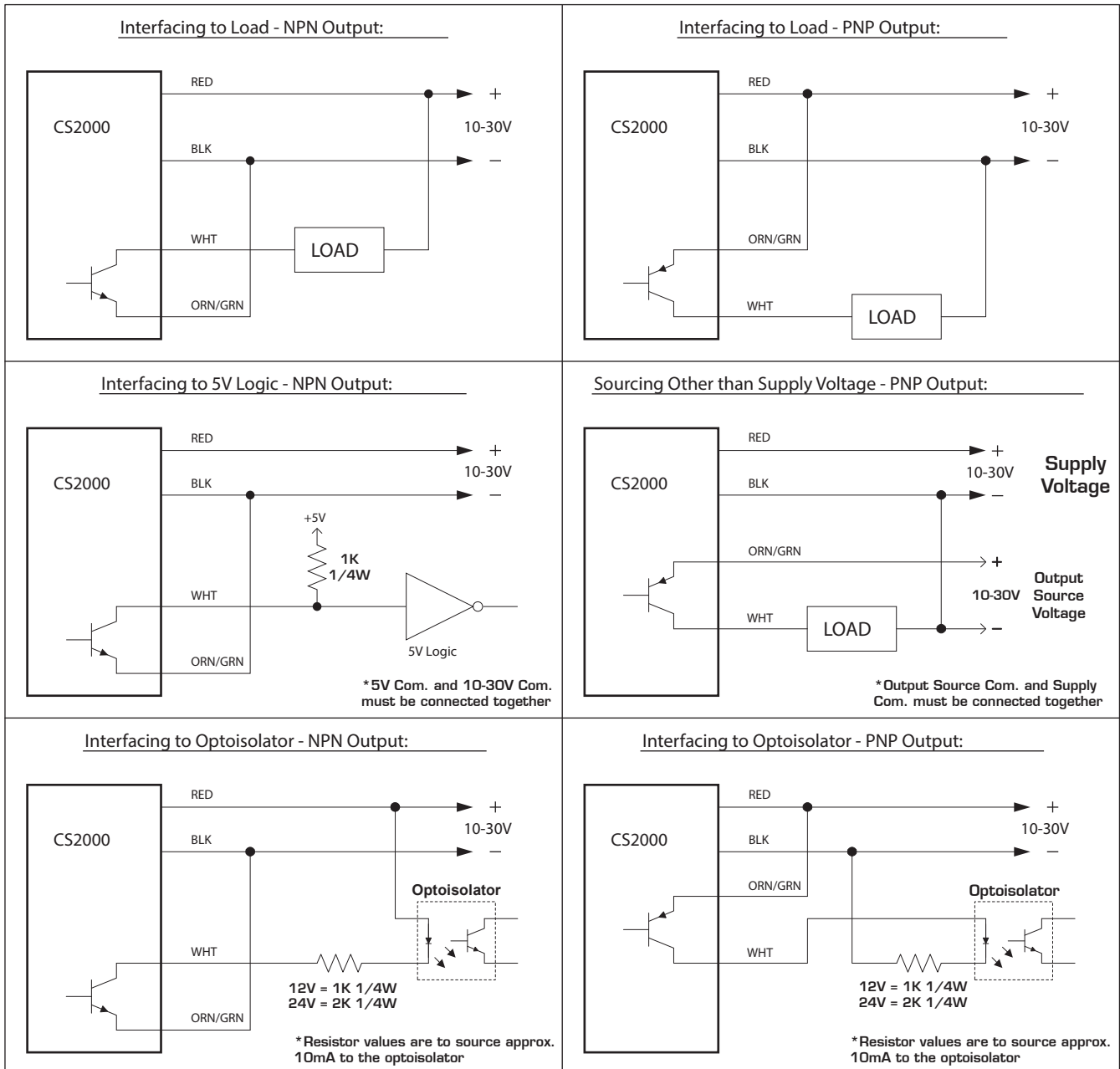
The CS2000 comes with an 8' - 4 conductor cable. Refer below for wire designations.

Red (RED) = 10-30 VDC

Black (BLK) = Common

White (WHT) = Output

Orange (ORN) or Green (GRN) = NPN / PNP Output Selector





## CS2000-QD Wiring:

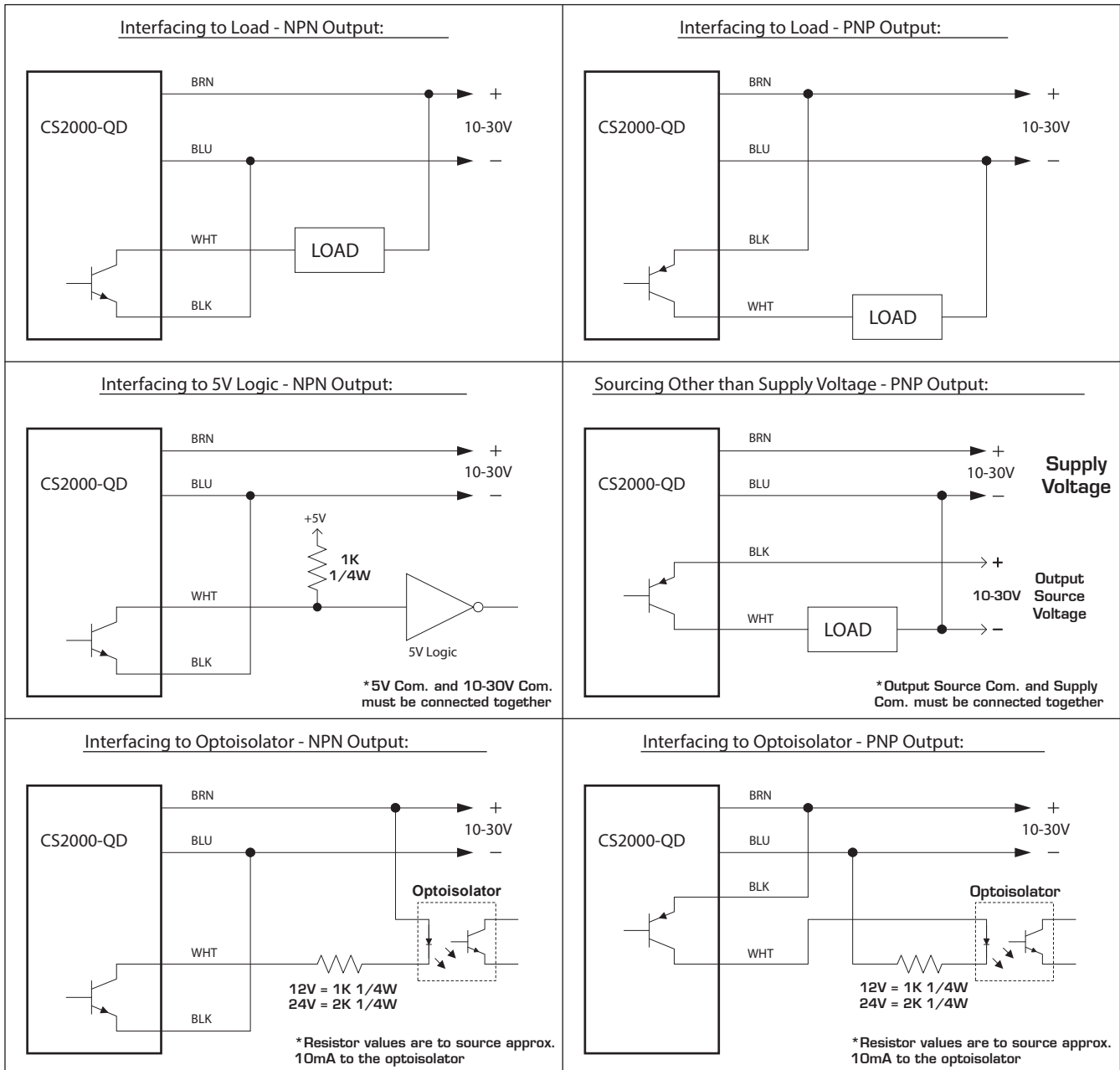
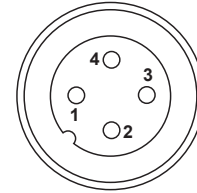
The CS2000-QD comes with a 6" quick disconnect M12 - 4 pin male cable/connector (Turck P/N RS4.4T-2). Refer below for wire designations.

Pin 1. Brown (BRN) = 10-30 VDC

Pin 2. White (WHT) = Output

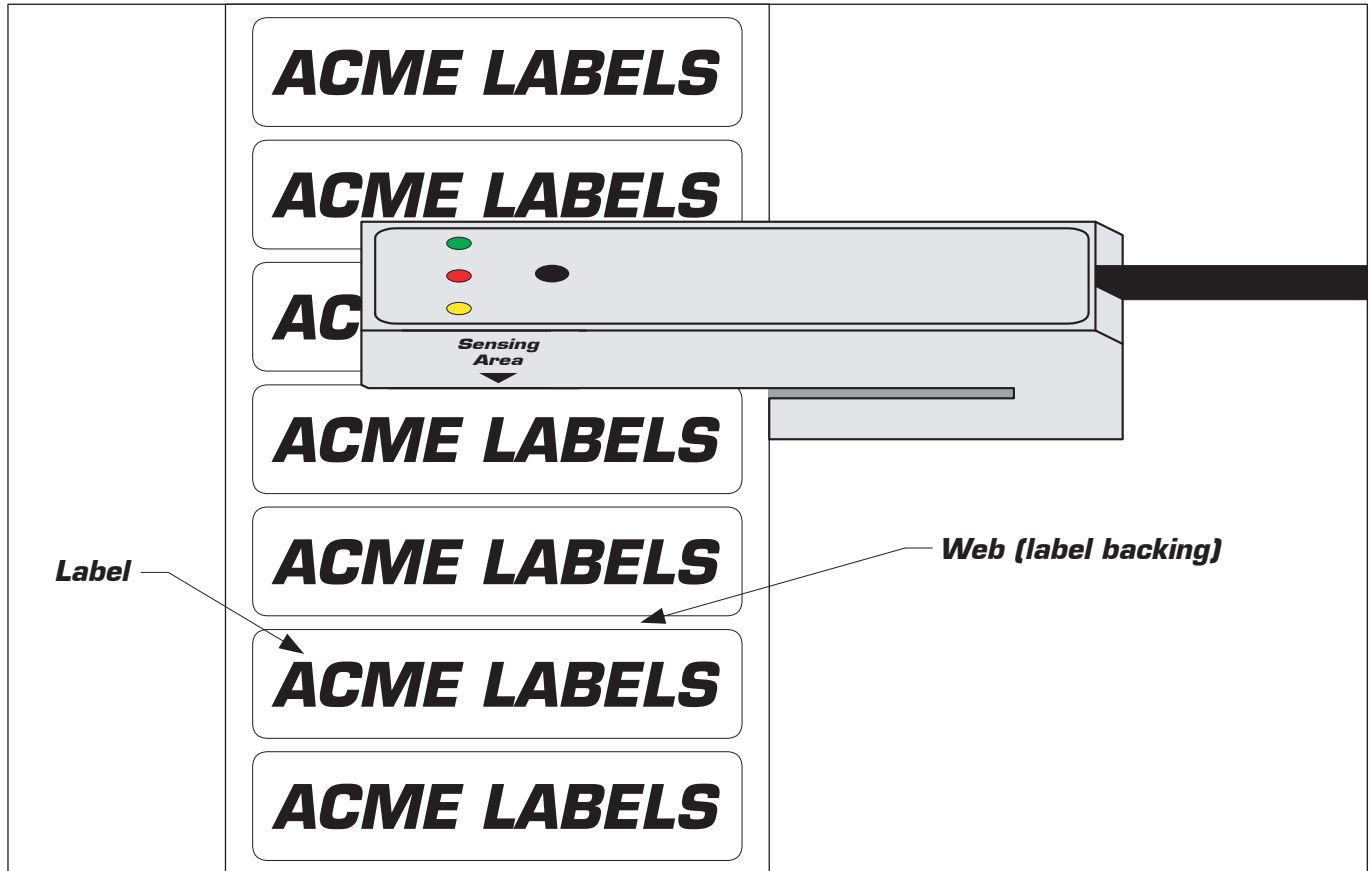
Pin 3. Blue (BLU) = Common

Pin 4. Black (BLK) = NPN / PNP Output Selector



### Label Placement:

For best results, position straight edge of label under the sensing area. Try to avoid sensing on rounded corners or other curved areas. Refer to diagram below.



### Push-button Functions:

<b>Push-button is depressed for...</b>	<b>LED's</b>	<b>Function</b>
<i>Less than 1 second</i>	<i>YEL/GRN - off</i>	<i>Outputs a stop pulse</i>
<i>1 to less than 5 seconds</i>	<i>YEL - on</i>	<i>Adjust Label Sensitivity (refer to page 10)</i>
<i>5 to less than 10 seconds</i>	<i>GRN - on</i>	<i>Set Missing Label Compensation (refer to page 11)</i>
<i>30+ seconds</i>	<i>YEL/GRN - toggle</i>	<i>Enter Program Mode (refer to page 12)</i>

**LED Functions:**

*Yellow - comes on when label backing (web) is under the sensing area  
 Red - comes on when output is active - NPN sinking or PNP sourcing  
 Green - comes on when label over label backing is under the sensing area*

**Operation Features:**

*The CS2000 has 3 different operation features that can be changed to accommodate individual needs. They are Output Mode, Light/Dark Operation, and Contrast Setting.*

**Operation Features - Output Mode:**

*The CS2000 has 2 different output modes - Level Shift Output and Pulse Output. Level Shift Output is either on for the length of the web, or on for the length of the label, depending on the Light/Dark Operation setting. Pulse Output either comes on for 2 m.s. at the leading edge of a label, or goes off for 2 m.s. at the leading edge of a label, depending on the Light/Dark Operation setting. Refer to Program Mode (page 12) for more information.*

**Operation Features - Light/Dark Operation:**

*The CS2000 allows you the option of having the sensor's output active on the web (Light Operate), or having the sensor's output active on the label (Dark Operate). Light Operate is either on for the length of the web, or comes on for 2 m.s. at the leading edge of a label, depending on the Output Mode setting. Dark Operate is either on for the length of the label, or goes off for 2 m.s. at the leading edge of a label, depending on the Output Mode setting. Refer to Program Mode (page 12) for more information.*

**Operation Features - Contrast Setting:**

*The CS2000 comes with a Normal Contrast Setting and a Low Contrast Setting. Normal Contrast Setting should be fine for 99% of labels. But with labels that offer very little contrast between the web and the label, the Low Contrast Setting can be selected very easily. Refer to Program Mode (page 12) for more information. Adjustments to the label sensitivity should be made more frequently when the Low Contrast Setting is selected.*

**\*Factory Settings:**

*Output Mode..... Factory set to Level Shift  
 Light/Dark Operation..... Factory set to Light  
 Contrast Setting..... Factory set to Normal*

**Overview:**

The CS2000 will automatically adjust its label sensitivity, to the optimal setting, by simply depressing a push-button. This adjustment process is referred to as "Easy Setup." It is recommended that the operator adjust the label sensitivity for each new roll of labels due to differences in label rolls.

**Easy Setup:**

To adjust label sensitivity for each new roll of labels follow steps 1-4.

1. Peel off a label and position the web (label backing) under the sensing area.
2. Depress the push-button until the yellow LED comes on (1 sec.), then release.
3. The yellow LED will begin flashing.
4. Move a label under the sensing area and the green LED will come on.

The sensor is now adjusted and should function correctly.

**\*Note:** If in the Adjusting Label Sensitivity mode by mistake, the push-button may be depressed to exit with no changes made.

**Possible Problems:**

<b>Symptom</b>	<b>Problem</b>	<b>Solution</b>
Red LED flashes after the push-button is released.	The sensor cannot adjust to the label backing. Probable cause is a build up of paper dust or some other obstruction is under the sensing area.	Blow out any paper dust present and remove any obstructions, labels, or label residue from sensing area (refer to page 15).
Yellow LED continues flashing even after a label is placed under the sensing area.	There is not enough contrast between the label and the label backing.	Try the Low Contrast Setting. See Program Mode (page 12) for more information.

**Overview:**

The CS2000 has the capability to detect a single missing label and output a stop pulse as though the label were present. In order for Missing Label Compensation to function properly the operator must first: a) have Pulse Output selected - see Program Mode (page 12) for more information. b) adjust the label sensitivity - see Easy Setup (page 10) for more information. c) have the labeling machine set to desired speed.

**Enabling Missing Label Compensation:**

1. Make sure a label is under the sensing area.
2. Depress the push-button until the green LED begins flashing at a slow rate (5 sec.), then release. If the green LED flashes at a fast rate it indicates that the label was not positioned correctly and you need to start over.
3. Jog 1 label.

Missing Label Compensation is now enabled and should function correctly.

**Disabling Missing Label Compensation:**

1. Depress the push-button until the green LED begins flashing (5 sec.), then release.
2. Depress the push-button once again to disable.

\*You can also disable Missing Label Compensation by selecting Level Shift Output. Refer to Program Mode (page 12) for more information.

### Entering Program Mode:

Program Mode is used to change any or all of the Operation Features. To enter Program Mode depress the push-button until the yellow and green LED's begin toggling (30 sec.), then release. The LED's will then output the current set-up configuration (and every 3 sec. thereafter). For example: an output of yellow, yellow, yellow tells you that the current configuration is Level Shift, Light Operate, and Normal Contrast Setting.

### Table of Features:

1	<b>OUTPUT MODE</b>	
	*A. Level Shift - (default factory setting)	● Yellow LED
	B Pulse	● Green LED
2	<b>LIGHT/DARK OPERATION</b>	
	*A. Output on Web - Light - (default factory setting)	● Yellow LED
	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><u>Level Shift Output</u></p> </div> <div style="text-align: center;"> <p><u>Pulse Output</u></p> </div> </div>	
	B. Output on Label - Dark	● Green LED
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><u>Level Shift Output</u></p> </div> <div style="text-align: center;"> <p><u>Pulse Output</u></p> </div> </div>		
3	<b>CONTRAST SETTING</b>	
	*A. Normal Contrast Setting - (default factory setting)	● Yellow LED
	B. Low Contrast Setting	● Green LED

### Changing a Feature:

To change a feature, depress the push-button the corresponding number of times. This will change the current feature from A to B, or from B to A. For example: If you wanted to change the output from Level Shift to Pulse, you would depress the push-button 1 time - the LED's would then output green, yellow, yellow. Repeat this step if you want to change more than one feature.

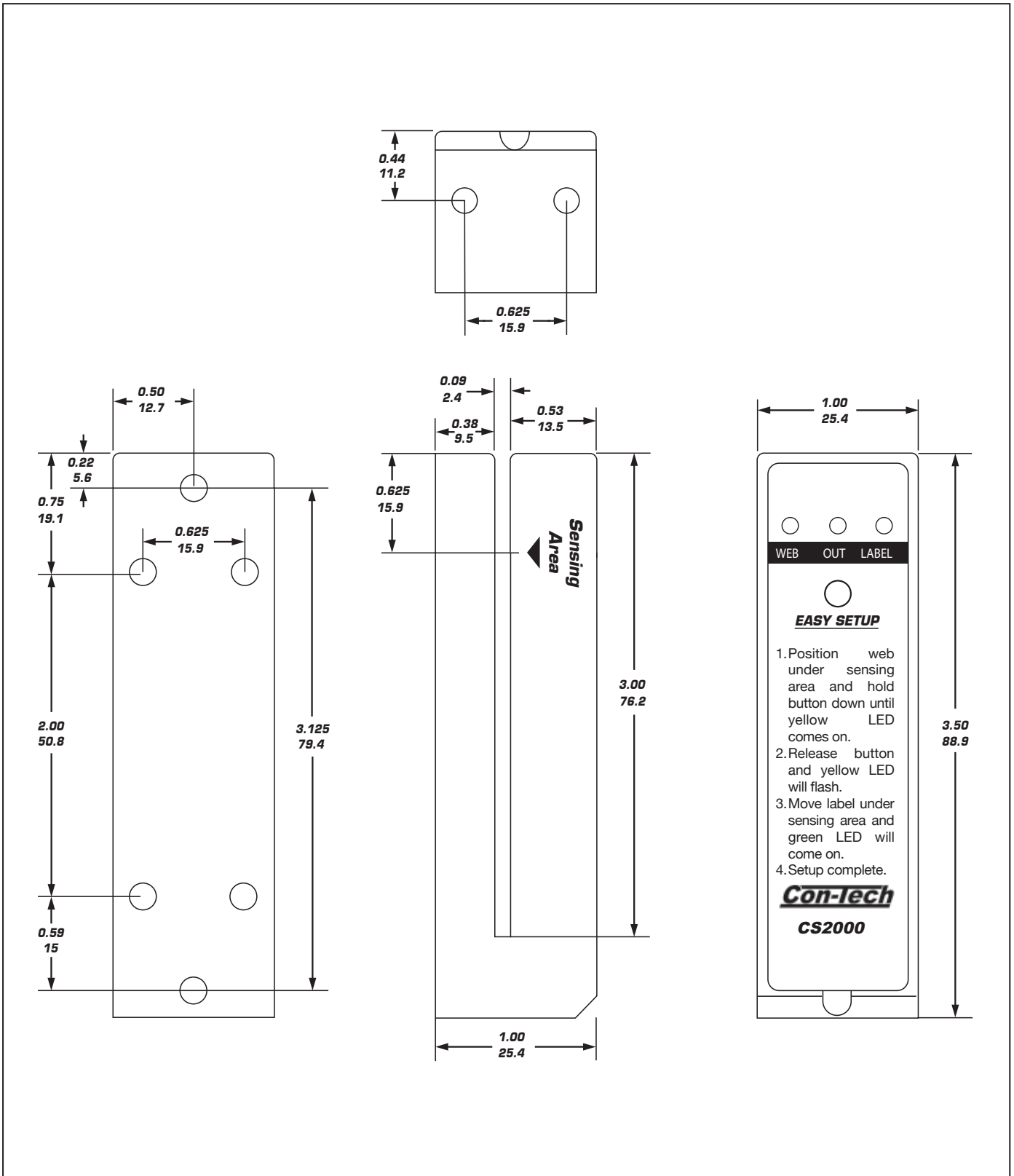
### Exiting Program Mode:

To exit Program Mode depress the push-button until the yellow and green LED's begin toggling (2 sec.), then release. This puts you back in the standard operating mode.

**General:**

Power Supply.....	10-30 VDC, reverse polarity protected
Power Consumption.....	50mA max.
Output.....	NPN / PNP open collector
Output Current.....	100mA max., reverse polarity & short circuit protected
Response Time.....	10 microseconds
Output Voltage Drop.....	0.5V max. (NPN) @ 10mA 1.5V max. (NPN) @ 100mA 0.5V max. (PNP) @ 10mA 1.5V max. (PNP) @ 100mA
Emission.....	IR LED (880 nm)
Indicators.....	Yellow LED - Indicates label backing only Red LED - Indicates output state and errors Green LED - Indicates label + label backing
CS2000 Connections.....	8' cable - 4 conductors
CS2000-QD Connections.....	6" Quick Disconnect M12 4 Pin Male Cable/Connector (Turck P/N RS4.4T-2)
Slot Width.....	0.093" (2.4mm)
Slot Depth.....	3.00" (76.2mm)
Min. Label Gap (matrix) Detection.....	0.03" (.76mm)
Housing Material.....	Double Hard Anodized Aluminum

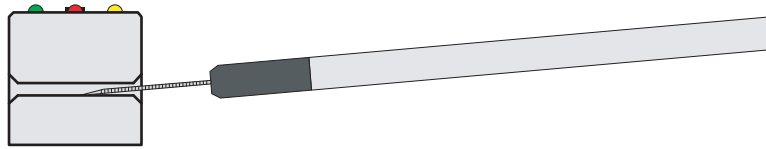
## Dimensions:



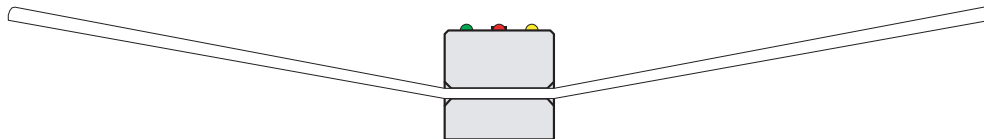


**Cleaning Instructions:**

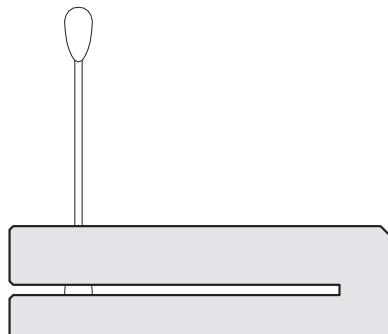
1. Begin by removing the sensor lid's 4 screws with a 1/16" L wrench.
2. Gently lift the sensor's circuit board out by grasping the switch and pulling upward. Do not remove the insulation tape.
3. Clean the lens of the sensor's photo eye with a clean soft cloth moistened with 99% isopropyl alcohol (available from most electronics supply & tool distributors - e.g. Techni-Tool, Contact East, Jensen Tools, Future Active, etc.)
4. Lightly scrape off sticky label residue using an Xacto knife with a #17, #18, or #19 chisel blade. The CS2000 has double hard anodizing that is not easily penetrated, but nonetheless, care should be taken when using the Xacto knife.



5. Fold the cloth over a couple of times to make it thicker. Saturate a 2" x 2" area on the edge of the cloth with 99% isopropyl alcohol.
6. Insert the wet area of the cloth into the throat of the sensor. Pull the cloth back and forth (like shining shoes) to loosen up the sticky residue.



7. Repeat steps 4 through 6 as necessary until all traces of residue have been removed.
8. Insert a cotton swab dipped in 99% isopropyl alcohol into the hole on the top half of the sensor's case intended for the photo eye.
9. Rub the lens of the photo emitter (located on bottom half of sensor case) with the cotton swab to remove any residue present.



10. Verify that the insulation tape is still in place and re-install the sensor's circuit board.
11. Re-insert the sensor's cable into the strain relief slot located in the top/rear of the case.
12. Re-install the sensor's lid making sure the cable is pinched tight and cannot be pulled out.

**Warranty:**

*The CS2000 Label Sensor is warranted for a period of two (2) years from the time of purchase. Control Technologies guarantees the CS2000 to be free from defects in materials or workmanship, and that, if used correctly will perform within specifications. The warranty covers normal wear and tear, but does not cover physical abuse, physical damage, improper installation, or exposure to voltages greater than 35V. The warranty also does not cover standard maintenance such as removal of paper dust, label residue build up, regular cleaning, etc. If a CS2000 is found to be defective while still under warranty, Control Technologies will either repair or replace the defective label sensor at our discretion. For warranty repair service, the OEM should send defective label sensor to Control Technologies with a brief description of the problem and sample labels if available.*

**Repairs:**

*CS2000 Label Sensors out of warranty will be repaired (if possible) at a flat rate. As of 01/01/2014 this rate is \$50. For non-warranty repair service, the OEM should send defective or damaged label sensor to Control Technologies with a brief description of the problem and sample labels if available.*

**After Repair Warranty:**

*Upon completion of repair to CS2000 Label Sensor out of warranty, a new warranty for a period of six (6) months will be issued.*

**Liability:**

*Control Technologies assumes no liability, in any event, for any consequential damages; for anticipated or lost profits, incidental damages or loss of time or other losses incurred by purchase or any third party in connection with the CS2000 Label Sensor covered by this warranty or otherwise.*