

SLC1 Series Features



- No user adjustments – Adaptive Digital Logic (ADL)[†] provides revolutionary self-learning capability.
- Continuous automatic internal adjustment of sensing threshold and drift compensation.
- Registration accuracy of ± 0.3 mm (0.012") typical at speeds up to 1000 labels per minute (approximate web speed 1.5 m or 60" per second)
- Reliably detects the presence of most types of labels on web backing
 - Clear labels on an opaque backing
 - Clear labels on a clear backing
 - Opaque labels on an opaque backing
 - Opaque labels on a clear backing
- Perfect for label-registering applications, and also for label-counting tasks in slitting or rewinding applications.
- Heavy-duty metal housing, 1 mm (0.04") slot

[†] Patent Pending



SLC1 Series Models

Model Number	Supply Voltage	Cable	Output Type	User Adjustments
SLC1BB6	10 to 30V dc	5-wire 2 m (6.5')	Bipolar (NPN and PNP)	None Required
SLC1BB6Q		5-pin Euro-style (QD)		

* 9 m (30') cables are available by adding suffix "W/30" to the model number of the cabled version (e.g., **SLC1BB6 W/30**). A model with a QD connector requires an accessory mating cable; see page 6.

SLC1 Series Description

The SLC1 Series Label Sensor was developed to provide trouble-free detection of labels on web backing material. It reliably senses the difference between materials of extremely low visual contrast, including clear labels on clear or opaque backing. The SLC1 uses Banner's exclusive Adaptive Digital Logic (ADL) to automatically make all sensor settings; no user adjustments are necessary.

NOTE: Labels with metallic inks, foil embossing or metal substrates are not recommended for use with SLC1 Series sensors.

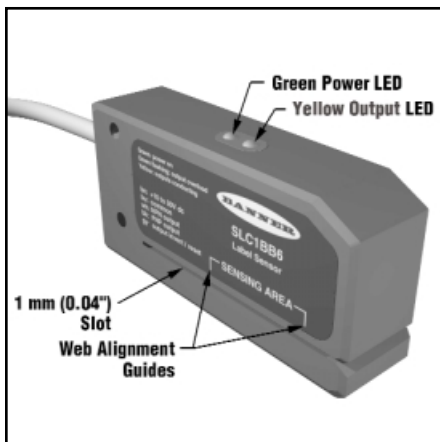


Figure 1. SLC1 Label Sensor features

SLC1 Series Label Sensor

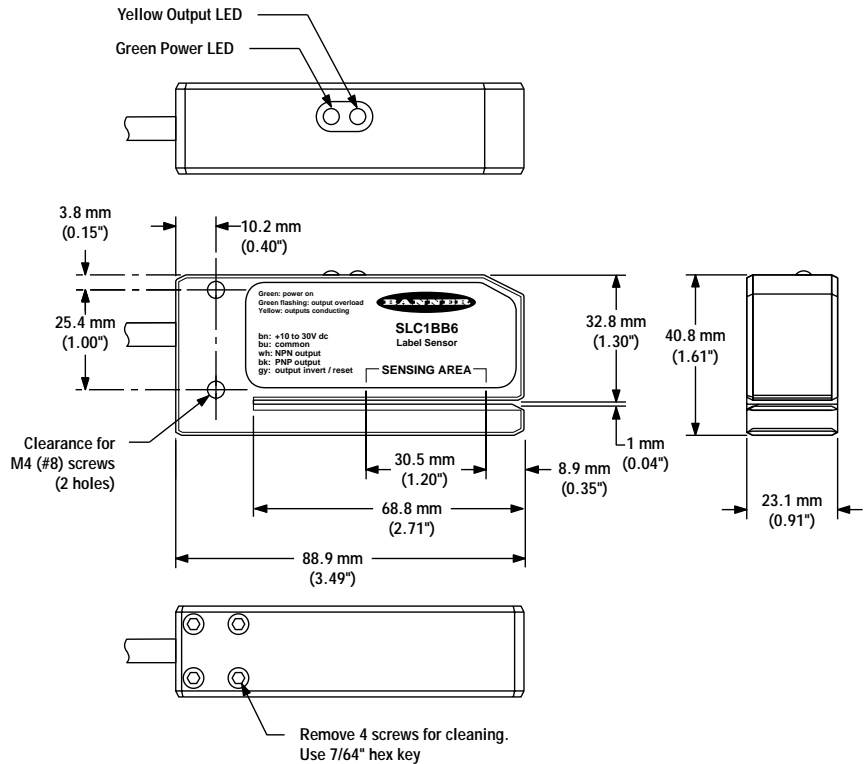
SLC1 Series Specifications

Supply Voltage and Current	10 to 30V dc (10% max. ripple) @ less than 60 mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Power-Up or Reset Delay	1 second typical (outputs are non-conducting during this time)
Output Configuration	Bipolar: one current-sourcing (PNP) and one current-sinking (NPN) open-collector transistor
Output Rating	150 mA max. (each output) OFF-state leakage current: < 5 microamps @ 30V dc Output saturation voltage: < 1V @ 10 milliamps dc; < 1.5V @ 150 milliamps dc
Output Protection	Protected against continuous overload and short-circuit of outputs Overload trip point: > 200 milliamps, typical, at 20°C
Output Invert Control/Reset	Gray wire has dual functionality, and may be controlled by a PLC Input impedance: 10 K Ω Outputs ON during gap (turn OFF at leading edge of label): leave open, or connect to 0 to +1V dc Outputs ON during label (turn ON at leading edge of label): connect to +5 to 30V dc Microprocessor reset: toggle gray wire to opposite polarity for > 100 milliseconds (see Hookups, page 3)
Registration Accuracy*	± 0.012 " (0.3 mm) typical, at up to 1000 labels/minute; web speed of 1.5 m/second (5'/second)
Maximum Counting Speed*	40,000 labels/minute; web speed of 61 m/second (200'/second).
Minimum Sensing Speed*	1 label/minute; web speed of 90 mm/minute (3.5'/minute)
Adjustments	No user adjustments; automatic continuous adjustment of sensing threshold and drift compensation under internal microprocessor control Adjustment interval: every 250 milliseconds or 4 labels, whichever is greater
Indicators	Two LEDs, green and yellow: Green ON steadily: power to sensor is ON Green flashing @ 4 Hz: output is overloaded Yellow ON steadily: NPN and PNP outputs are ON Green and Yellow flashing alternately @ 1 Hz: internal error; reset sensor
Construction	Housings are machined aluminum with black anodized finish
Environmental Rating	IP67, NEMA 6
Connections	2 m (6.5') or 9 m (30") 5-wire attached cable, or 5-pin Euro-style quick-disconnect fitting; cables for QD models are purchased separately, see page 6.
Operating Conditions	Temperature: +5° to 50°C (+41° to 122°F) Maximum relative humidity: 90% at 50°C, non-condensing
Certifications	Approvals expected: CE and UL

*Based on 90 mm (3.5") label, 3.2 mm (0.125") gap between labels. Calculations must take into account instantaneous web speed, not labels per minute, to determine maximum operating speeds in stepped-advance label systems.

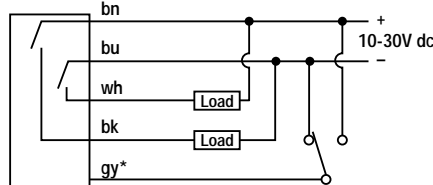
SLC1 Series Label Sensor

SLC1 Series Dimensions

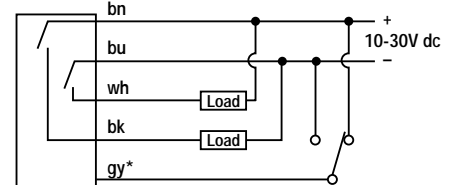


SLC1 Series Hookups

Outputs ON during gap
(Turn OFF at leading edge of label)



Outputs ON during label
(Turn ON at leading edge of label)



*Toggle to opposite polarity for > 100 milliseconds to reset microprocessor



Figure 2. Allowing the web to glide over the bottom fork with slight tension lessens the effects of web flutter

SLC1 Series Installation

Mount directly and securely to a firm surface using M4 (#8) hardware (bolts not included). See dimensions for mounting hole locations. To lessen the effects of web flutter, position the bottom fork of the sensor slightly above the web's path so that the web can glide over the bottom fork with slight tension (see Figure 2).

For the most reliable operation, take steps to eliminate static electricity near the SLC1 Label Sensor.

SLC1 Series Label Sensor

SLC1 Series Operation

The SLC1 Series is completely self-teaching and needs no programming; there are no adjustments to set. Simply align the label web in the slot, between the guides, and allow the labels to run through the sensor. After the passing of four successive labels or 250 milliseconds (whichever is greater), the SLC1 will learn the characteristics of the labels, and adjust for the proper sensing threshold and drift compensation.

For best self-programming results, turn power to the sensor ON or perform a reset after the web has been positioned in the slot. Align the labels within the web alignment guides on the side of the sensor slot, as completely as possible.

For best repeatability, position the label to cover the entire sensing area (between the sensor's web alignment guides, as shown in Figure 2). Some label configurations are sensed with greater repeatability than others; the sensor performs best when there is an abrupt change between labels (see Figure 3). For example, labels with sharply defined edges that are perpendicular to the web direction and that have larger gaps between labels are sensed most easily. Tiny gaps between labels and labels whose shape tapers at the leading and trailing edges are more difficult to sense.

If sensing a label with a shape like that shown in Figure 4, best repeatability will result if the most perpendicular edge of the label is aligned fully within the sensing area.

Reset Procedure

Resets are performed at startup, when changing label types, or in response to an internal error indication.

To reset, simply turn the power to the SLC1 ON or cycle the power OFF for 1 second or longer and ON again.

The SLC1 may also be reset using the sensor's gray wire. To do so, toggle the gray wire to the opposite polarity for >100 ms. Again, the sensor will automatically adjust to the current sensing conditions after the passing of four labels or 250 ms, whichever is greater.

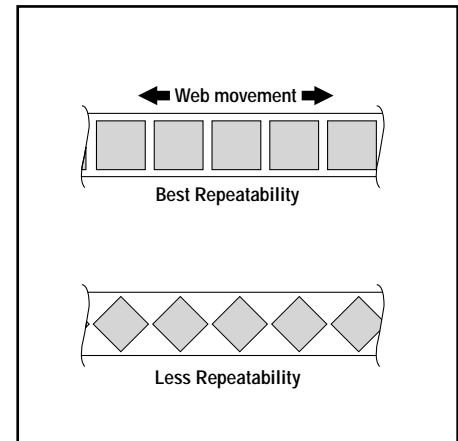


Figure 3. SLC1 Label Sensor preferred sensing configurations

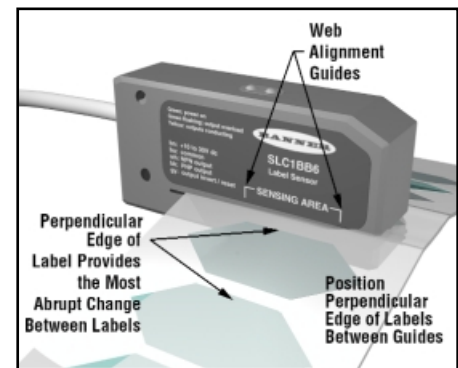


Figure 4. For best repeatability, align the labels' flat sides between the sensor's web alignment guides

Troubleshooting

The SLC1 Series sensor has two LEDs, green and yellow:

Green ON steadily:	Power to sensor is ON
Green flashing @ 4 Hz:	Output is overloaded
Yellow ON steadily:	NPN and PNP outputs are ON
Green and Yellow flashing alternately @ 1 Hz:	Internal error; reset sensor

Internal errors are caused by several factors:

- Moisture in the sensing slot
- Extreme and prolonged web flutter
- Label jams (labels touching both the top and the bottom sensor forks)

If an internal error occurs, correct its cause and perform a reset (cycle the sensor power OFF for at least 1 second and ON again or toggle the gray wire to the opposite polarity for >100 milliseconds).

Maintenance

The SLC1 Series sensor may be disassembled for periodic cleaning, as needed. Use a 7/64" hex key to remove the four screws at the bottom and remove the bottom fork for cleaning. Clean the fork surfaces with a mild solvent, such as isopropyl alcohol, taking care to avoid the clear sensing window.

Repairs

NOTE: Do not attempt any repairs to the SLC1 Series sensor. It contains no field-replaceable components. Return the sensor to the factory for warranty repair or replacement, as described below.

If it ever becomes necessary to return an SLC1 Series to the factory, please do the following:

- 1) Contact the Banner Factory Application Engineering Group at the address or at the numbers listed at the bottom of the back page. They will attempt to troubleshoot the problem from your description. If they conclude that your sensor is defective, they will issue an RMA (Return Merchandise Authorization) number for your paperwork, and give you the proper shipping address.
- 2) Pack the SLC1 Series sensor carefully. Damage which occurs in return shipping is not covered by warranty.

SLC1 Series Label Sensor

Accessory Cables

Cable: PVC jacket, polyurethane connector body, chrome-plated brass coupling nut
Conductors: 22 or 20 AWG high-flex stranded, PVC insulation, gold-plated contacts
Temperature: -40 to +90°C (-40 to +194°F)
Voltage Rating: 250V ac/300V dc

Model	Style	Length	Dimensions	Pin-out
5-Pin Straight	MQDC1-506 MQDC1-515 MQDC1-530	2 m (6.5') 5 m (15') 10 m (30')		
5-Pin Right-angle	MQDC1-506RA MQDC1-515RA MQDC1-530RA	2 m (6.5') 5 m (15') 10 m (30')		



WARRANTY: Banner Engineering Corp. warrants its products to be free from defects for one year. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture found to be defective at the time it is returned to the factory during the warranty period. This warranty does not cover damage or liability for the improper application of Banner products. This warranty is in lieu of any other warranty either expressed or implied.



WARNING . . . Not To Be Used for Personnel Protection

Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death.

These sensors do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition. Consult your current Banner Safety Products catalog for safety products which meet OSHA, ANSI and IEC standards for personnel protection.