

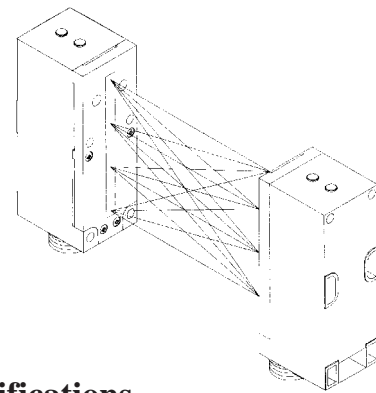
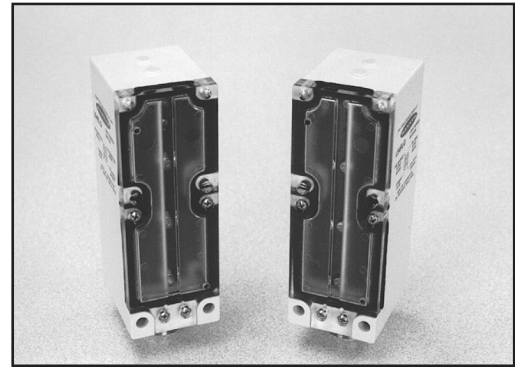
MULTI-BEAM[®] LS4EL/RL Light Screen Systems



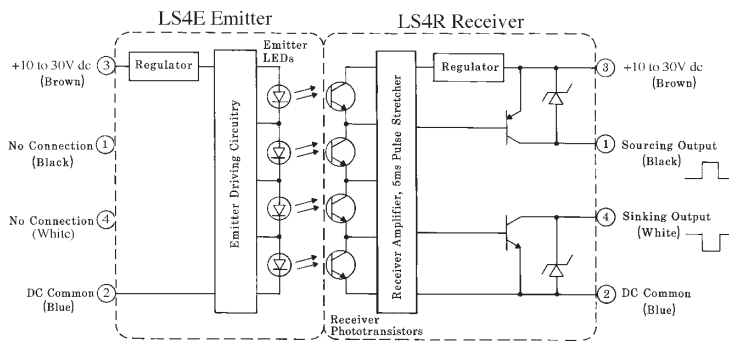
LS4EL/RL Light Screen Systems offer a simple, economical, but highly reliable means of sensing objects moving at high speed through an area (or "window"). Each system consists of two self-contained units: an emitter and a receiver. Emitters contain four infrared light sources aligned in a row and strobed (turned "on" one at a time) in a specific sequence and at a high frequency. Receivers contain a matching array of phototransistors. The height of the array is 3.5 inches (90 mm). The LS4RL receiver may be placed 18 to 90 inches (45,7 to 228,6 cm) opposed from the LS4EL emitter. This produces a "curtain" of light 5 to 6 inches high and as wide as the separation distance between the emitter and receiver.

The smallest object that can be detected depends upon the location of the object within the curtain. Midway between emitter and receiver, an object 1 inch (25 mm) or larger in cross section can be detected anywhere within a 5 inch (127 mm) high window. Near the emitter or receiver, an object of 1.5 inches (38 mm) or larger in cross section can be detected anywhere within a 6 inch (152 mm) high window.

The light from the emitter is modulated to minimize sensitivity of the system to ambient light. An indicator LED on the emitter lights whenever power is applied. The receiver has an alignment LED which lights whenever the beam is broken. Models are available with either attached cable or integral quick disconnect (QD) fitting. The receiver output interfaces directly with dc loads or circuits up to 30V dc, and offers *both* sinking (NPN) and sourcing (PNP) output transistors. Outputs are energized continuously while the beam is broken. A 5 millisecond pulse stretcher (OFF delay) is included to improve interfacing reliability.



Functional Schematic, LS4 Light Screen Systems



Hookup Information

Quick disconnect model emitter and receiver both use Banner mini-type mating cable model MBCC-412 (p/n 25226, length 12 feet). Model MBCC-430 is also available (p/n 29951, length 30 feet). Order cable separately.

View of connector on sensor (male pins)



- Pin #1 (Black): sourcing output (receiver only)
- Pin #2 (Blue): common (dc neg.) (emitter and receiver)
- Pin #3 (Brown): +10 to 30V dc (emitter and receiver)
- Pin #4 (White): sinking output (receiver only)

NOTE: Emitters have no connection to pins #1 and #4.

Specifications

MODELS: One receiver and one emitter per system. LS4EL (p/n 39679), emitter, 6-1/2 foot (2 m) cable LS4RL (p/n 39680), receiver, 6-1/2 foot (2 m) cable LS4ELQ (p/n 38429), emitter, 4-pin mini-style QD LS4RLQ (p/n 38430), receiver, 4-pin mini-style QD

Use either emitter with either receiver.

SUPPLY VOLTAGE: 10 to 30 V dc at 35mA (for LS4EL(Q) and 25 mA for LS4RL(Q), exclusive of load.

OUTPUT CONFIGURATION: one current sinking (NPN) and one current sourcing (PNP) open collector transistor.

OUTPUT RATING: 125mA continuous, either output.

OUTPUT PROTECTION: short-circuit and reverse-polarity protected.

RANGE: 18 to 90 inches (45,7 to 228,6 cm).

RESOLUTION: 1 inch to 1.5 inches, depending upon the location of the object within the curtain (see text, above).

RESPONSE TIME: 1 millisecond. Successive parts must have at least 10 milliseconds separation.

CONSTRUCTION: reinforced VALOX[®] housing; acrylic lens. Lens fully gasketed. NEMA 1, 2, 3, 12, and 13. Stainless steel hardware.

CABLING: 6-1/2 foot (2 m) attached cable or 4-pin mini-style quick disconnect fitting. See model listing (above).

OPERATING TEMPERATURE RANGE: 0 to 50 degrees C (32 to 122 degrees F).

Installation and Alignment

The reliable performance of Light Screen Systems requires careful alignment and secure mounting. The model SMBLS 2-part, 3-axis mounting bracket (shown below) is highly recommended. *Solid* mounting is important. Mounting locations should be as free from vibration as possible. If vibration is unavoidable, allow the emitter and receiver to vibrate *together*: no high-amplitude differential vibration is allowed.

Mount the emitter and receiver facing each other at their operating locations. Their faces (front panels) should be exactly parallel and opposite each other. The line of transmitter LEDs should be exactly parallel with and opposite to the line of receiver phototransistors. This constitutes optimal *mechanical* alignment.

Optimum mechanical alignment does not always result in optimum *optical* alignment. When optical alignment is optimum, the receiver status indicator (on the front of the receiver) will be "off" and remain "off" with a moderate level of vibration at either the emitter or the receiver.

Beginning with optimum mechanical alignment, adjust for optimum optical alignment as described in steps #1 through #5. The procedure assumes use of the SMBLS mounting bracket shown in the drawings below.

1) Loosen the two bolts holding the two parts of the bracket together just enough to allow the upper ("carriage") bracket along with the emitter to be rotated about the emitter's vertical axis. Also, slightly loosen the mounting bolts in the curved slots of the "base" bracket, which will allow the SMBLS bracket to be tipped "side-to-side".

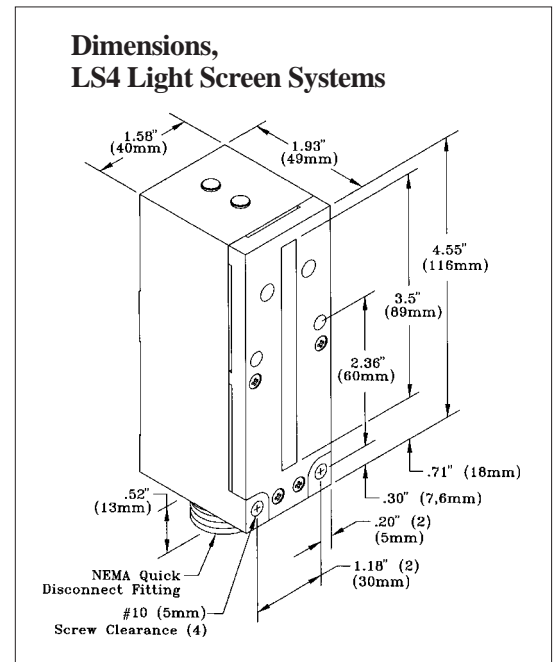
2) With power applied to both units, "tip" the entire SMBLS bracket slightly from side to side. Find the extremes of movement between which the receiver's red indicator LED remains "off". Secure the base bracket at the point midway between the extremes.

3) Rotate the carriage bracket (to which the emitter is attached) slightly in both directions about the emitter's vertical axis. Find the extremes of bracket rotation between which the receiver's red indicator LED remains "off". Secure the emitter midway between the extremes by tightening the two bolts that lock the two parts of the SMBLS bracket together.

4) Loosen the two mounting bolts that hold the emitter to the carriage bracket. Slide the emitter up and down vertically in the bracket, noting the extremes between which the receiver's red LED indicator remains "off". Tighten the bolts to secure the emitter midway between the extremes. (Note: If the initial mechanical alignment was inadequate, it may be necessary to repeatedly alternate tipping, rotating, and sliding movements before optimal optical alignment can be attained.)

5) Perform step #3 again, this time using the receiver unit and its bracket.

6) Check for proper alignment by breaking one or more of the beams. The receiver indicator LED and outputs should come "on" when one or more beams are broken. Tighten all mounting hardware securely in position.

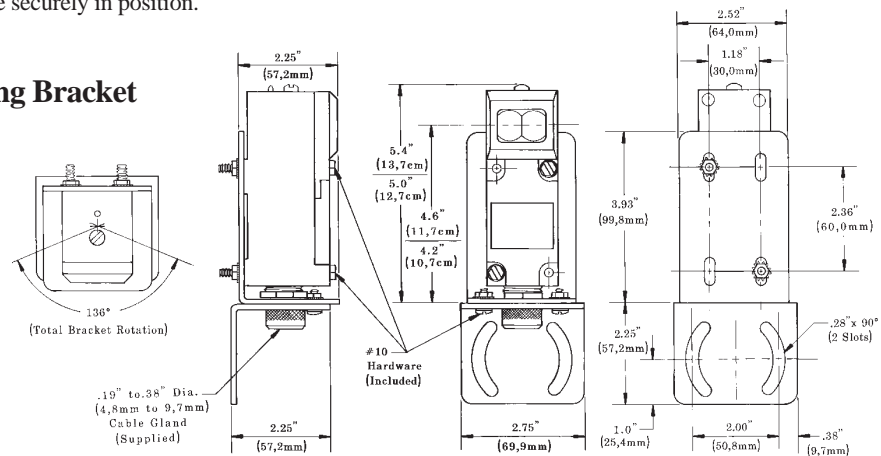


Model SMBLS Accessory Mounting Bracket

Model SMBLS is an accessory two-part bracket assembly that allows adjustment in three directions. It consists of two 11-gauge zinc-plated steel right-angle brackets that fasten together so that they rotate relative to each other.

The light screen sensor attaches to the upper ("carriage") bracket. Slots are provided for vertical adjustment.

The SMBLS must be ordered separately from the light screen sensors.



WARNING These photoelectric presence sensors do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can result in *either* an energized or a de-energized sensor output condition. Never use these products as sensing devices for personnel protection. Their use as safety devices may create an unsafe condition which could lead to serious injury or death.

Only MACHINE-GUARD and PERIMETER-GUARD Systems, and other systems so designated, are designed to meet OSHA and ANSI machine safety standards for point-of-operation guarding devices. No other Banner sensors or controls are designed to meet these standards, and they must NOT be used as sensing devices for personnel protection.

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