the machine safety specialist

Safety Application Note # SA104 (57477)

LAT-1 Safety Light Curtain Alignment Procedures

Scope

The following procedure is intended for BANNER safety light curtains. The same general procedure may be used for the BANNER measuring light curtains and other devices.

The LAT-1 is designed to aid in the alignment of BANNER safety light curtains.

1) Mount the emitter and receiver (and the corner mirrors, if used) per the instructions in the appropriate manual; ensure that the defined area (sensing field) is properly positioned. Leave the hardware slightly loose to allow for positioning and alignment adjustments.

2) Ensure power is off and that the system to be aligned is **not** connected to the machine control at this time. Ensure personnel are **not** exposed to any hazards during the alignment procedure.

3) Using a level or plumb, ensure that the emitter, receiver, and any mirrors are vertical (plumb). This is very important; a mirror has the ability to send emitted light in directions astray from its intended path with very small amounts of physical movement. Also, guard against irregularities in the mounting surfaces, which can cause the mirrors to twist, again making alignment difficult.

4) Ensure the bottom of both sensors are at the same distance above the floor, assuming a level floor. If using mirrors, the center of the defined area must be centered on the reflective surface of the mirror.

Note: To verify that the floor is level, or determine the amount of variance, set the LAT-1 on the floor, on a carpenter's level, or on the stand to center the bubble level in the sight. Then compare the distance above the floor where the center of red spot appears on a ruler, tape measure, or other target and the red centerline on the LAT-1 label. The amount variance can be used to adjust the mounting height or the tilt of the emitter and receiver accordingly to assist in alignment.

5) When aligning a safety light curtain, it is helpful to configure it for Auto Start/Restart (Trip operation). This allows the safety light curtain to reach a "GREEN" condition when alignment is achieved, giving both a visual and potentially an audible indication of alignment (relays will "click"). Ensure the safety light curtain is **not** connected to the machine control at this time.

6) Apply power to the system to be aligned. Assuming that Auto Start/Restart is ON, the safety light curtain system should be in a blocked (RED) condition (if not aligned). If set for Manual Power-up/Restart (latch operation), a key reset will be required once aligned. See the appropriate safety light curtain manual for the indication of aligned versus blocked status.

Note: If the system is in alignment; either continue to step #7 to fine-tune the alignment, or tighten down the mounting hardware for both sensors, ensuring the alignment does not drift off position and proceed to step #16.

7) **Assuming the system has been approximately aligned, leveled (plumb), and the sensors are facing square to each other**, attach the LAT-1 to one end of the emitter (e.g. the cable end) by using the appropriate mounting clip, or hold the LAT-1 flush to the window. Ensure the mounting clip and the LAT-1 is square and flush to the housing. Do not mount over labels or end caps, doing so may result in a slight angular error making alignment more difficult.

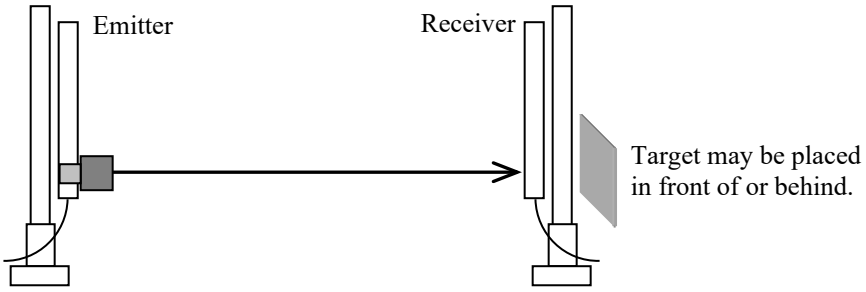
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8) Turn on the LAT-1 and aim the laser beam down range to the receiver or the first mirror.

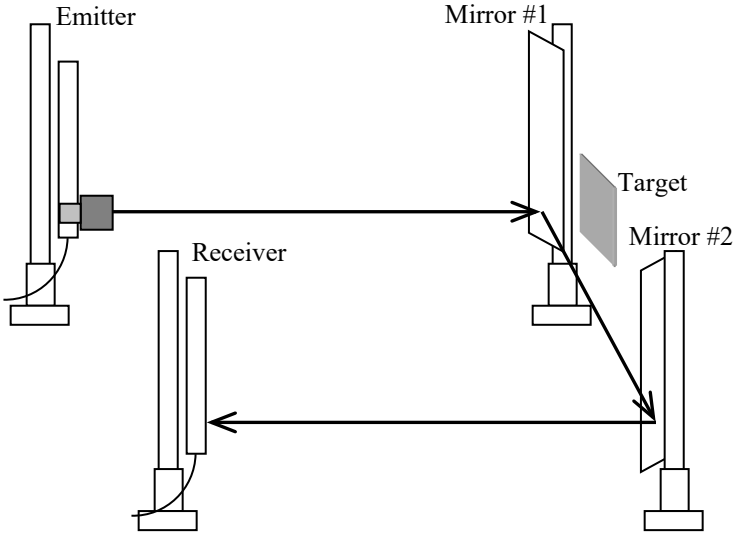
WARNING: DO NOT stare directly into the laser beam emitted by the LAT-1, damage to the eye may result.

9) It is helpful to place a target, such as a white piece of paper, white cardboard, or retroreflective tape, in front, behind or along side of the receiver (or mirror) to increase the target area and the visibility of the red dot created by the laser beam. If using retroreflective tape, **do not** affix to the sensor's window, it may not be easy to remove the adhesive from the acrylic window.

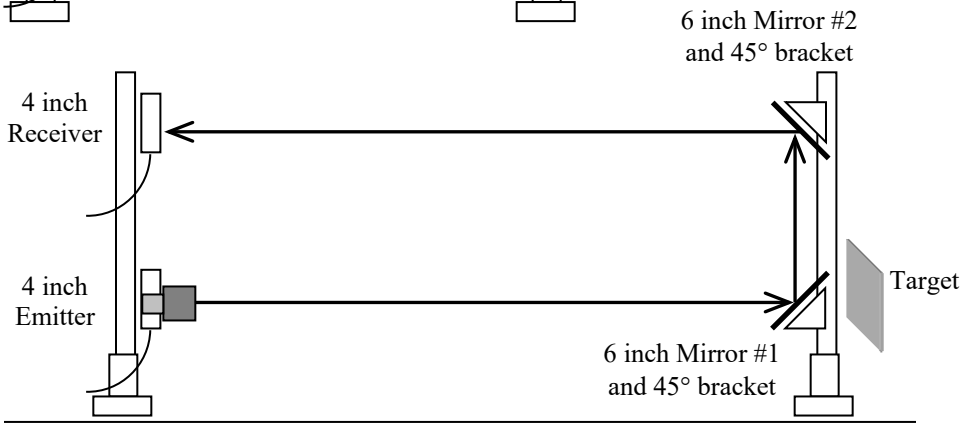
Note: To find the general direction the laser beam is pointing, place a target at arm's reach, look along the side of the LAT-1, and slowly raise the target until the red dot appears at the edge. Using this method and rotating the emitter will send the beam in the approximate direction of the receiver. If the dot still can not be located at the receiver (or mirror), walk the target down the path of the beam while keeping the dot centered on the target until reaching the desired range.



OR



OR



10) Rotate or otherwise adjust the physical positioning of the emitter so as to place the red dot at the same approximate position on the receiver (or mirror) (distance from the end of the unit) as the red line on the LAT-1 label is positioned on the emitter. (See above). When aligning multiple mirrors, the important key is to "work around" from one mirror to the next to place the red dot on the opposite sensor.

Note: The safety light curtains (not the grids) may display the number of blocked beams. Either the display or alignment LEDs are of great assistance in determining where in the defined area beams are broken or blocked. Pass the test rod along the defined area, if the number of blocked beams does not change, this is the point in the sensing field where the beams are already blocked or are out of alignment.

11) Snug down (do not tighten at this time) the emitter's mounting hardware ensuring the dot does not drift off position.

12) Move the LAT-1 to the opposite end of the emitter and verify that the dot is at the same approximate position on the receiver as the red line on the LAT-1 label is positioned on the emitter. If it is not, then re-check the emitter and the receiver for level (plumb).

13) Tighten down the emitter's mounting hardware ensuring the dot does not drift off position.

14) Turn off and remove the LAT-1 from the emitter and re-attach to one end of the receiver and repeat steps 7 through 13 for the receiver.

15) Turn off and remove LAT-1 from the receiver. At this point, the system should be in alignment.

Note: If the system is still RED but indicates the alignment is very close (See the "NOTE" in step #10), a slight rotational, side-to-side, or back-to-front adjustment may be required on either the receiver or the emitter. If the system indicates the alignment is poor, the range specification has been exceeded, or the system/LAT-1 is malfunctioning. To verify that the system is functional move one sensor close to the other (approximately 12 to 24 inches apart), if the system will not indicate a "CLEAR" or "GREEN" condition, please refer to the troubleshooting section of the appropriate manual.

16) Remove power from the system and if required, configure the system for the desired operational parameters.

17) Continue installation instructions as contained in the appropriate manual.

Note: The useable range (red dot viewed at the target) depends on the color/reflectance of the target, the level of ambient light, and air-borne contaminates. With a 90% White-card, under average lighting with no airborne contaminates, the red dot is viewable at approximately 150+ feet. For longer-range applications, the lighting should be dimmed or retroreflective targets should be used.

Model:

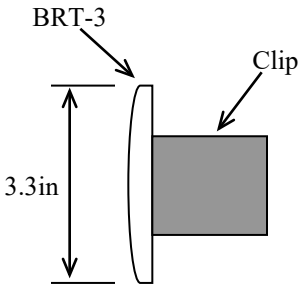
LAT-1	LAT-1, target, and all clips
LAT-1-S4B	LAT-1, target, and S4B clip
LAT-1-SS	LAT-1, target, and EZ-SCREEN/LS clip
LAT-1-LP	LAT-1, target, and EZ-SCREEN LP clip
LAT-1-SGS	LAT-1, target, and SGS clip
LAT-1-LS	LAT-1, target, and EZ-SCREEN Type 2 clip

Accessories:

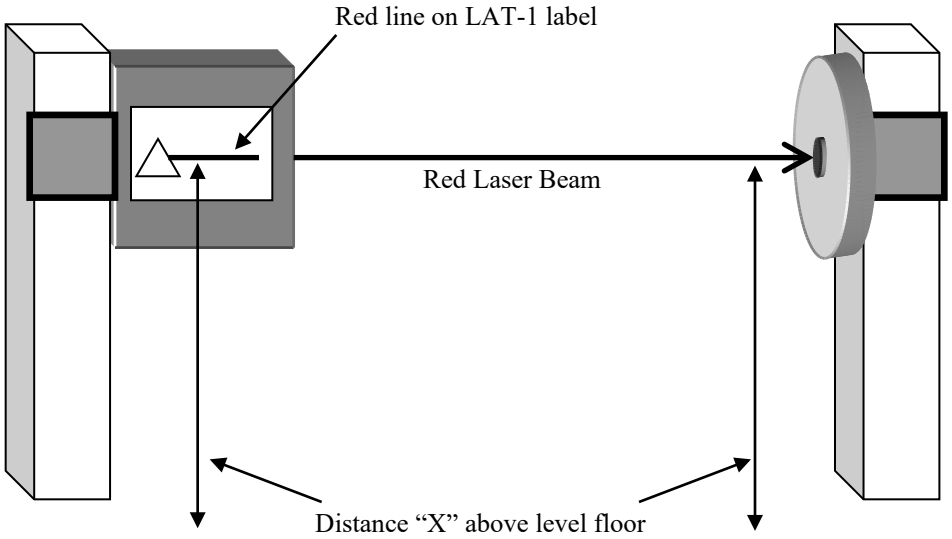
EZA-LAT-2	EZ-SCREEN/LS clip-on target
LPA-LAT-1	EZ-SCREEN LP clip-on target
S4BA-LAT-2	S4B clip-on target
SGSA-LAT-1	SGS Grid clip-on target
LSA-LAT-1	EZ-SCREEN Type 2 clip-on target
BRT-3	Retroreflective circular target
BRT-THG-1-100	reflective tape (1×100 in)
BRT-THG-2-100	reflective tape (2×100 in)

Alternate methods

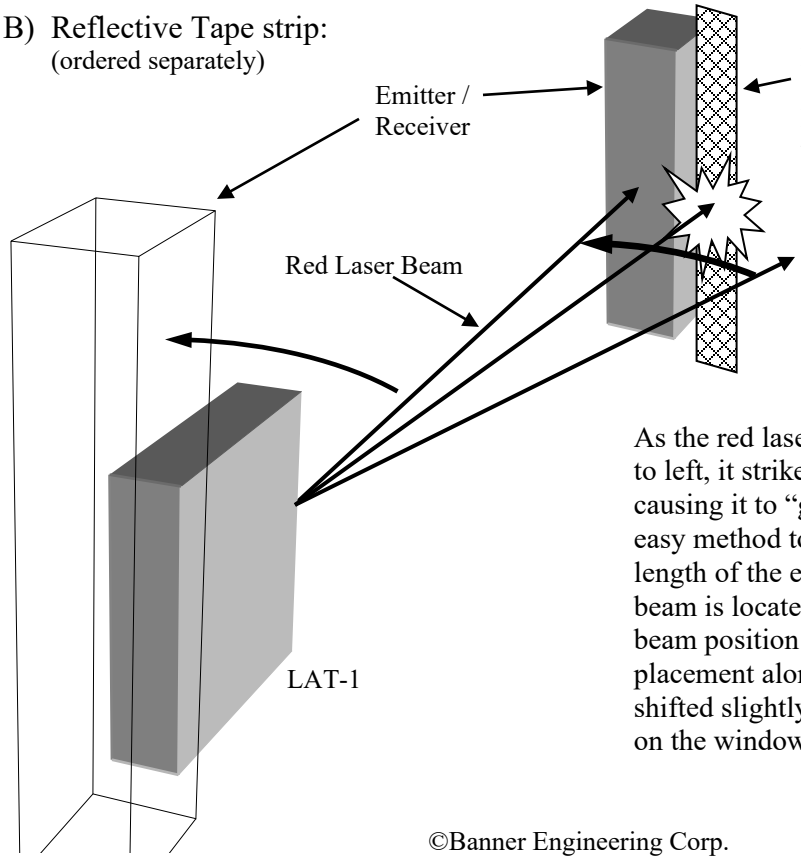
A) Clip-on target:
(ordered separately)



As the red laser beam strikes the clip-on target, the BRT-3 reflector will "glow" a bright red. When the beam strikes the mounting screw the "glow" will dim slightly. At this point, if the LAT-1 and the Clip-on target are mounted at the same point on a plumb emitter and receiver, the two points should be approximately the same distance above a level floor.



B) Reflective Tape strip:
(ordered separately)



As the red laser beam is swung from right to left, it strikes the reflective tape strip causing it to "glow" a bright red. This is an easy method to determine where along the length of the emitter or the receiver the beam is located. Once located, then the beam position is adjusted for proper placement along the length, and then shifted slightly to the left to place the beam on the window of the emitter or receiver.