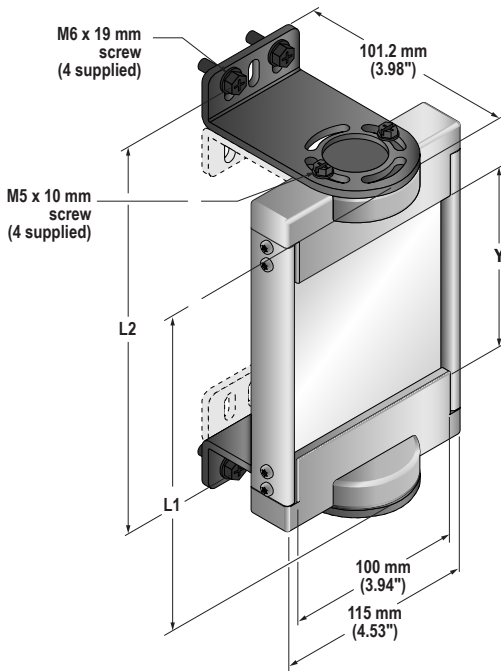


SSM-S Stainless Steel Corner Mirrors



For use with Banner Safety Light Screen and Safety Light Grid Systems



- Allows use of one emitter/receiver pair to guard multiple sides of a machine
- Sturdy, robust construction
- Extra width for use with long-range optical safety systems
- Stainless steel reflective surface provides 50 percent reflectivity
- Black anodized aluminum extrusion
- Molded PBT end caps
- Mounts easily to MSA Series stands or other surfaces
- Available in 20 lengths

Mirror Model	Reflective Area Height (Y)	Overall Height (L1)	Mounting Height (L2) ¹
SSM-100-S	100 mm (3.9")	178 mm (7.0")	211 mm (8.3")
SSM-150-S	150 mm (5.9")	228 mm (9.0")	261 mm (10.3")
SSM-200-S	200 mm (7.9")	278 mm (10.9")	311 mm (12.2")
SSM-250-S	250 mm (9.8")	328 mm (12.9")	361 mm (14.2")
SSM-375-S	375 mm (14.8")	453 mm (17.8")	486 mm (19.1")
SSM-475-S	475 mm (18.7")	553 mm (21.8")	586 mm (23.1")
SSM-550-S	550 mm (21.7")	628 mm (24.7")	661 mm (26.0")
SSM-675-S	675 mm (26.6")	753 mm (29.6")	786 mm (31.0")
SSM-825-S	825 mm (32.5")	903 mm (35.6")	936 mm (36.9")
SSM-875-S	875 mm (34.4")	953 mm (37.5")	986 mm (38.8")
SSM-975-S	975 mm (38.4")	1053 mm (41.5")	1086 mm (42.8")
SSM-1100-S	1100 mm (43.3")	1178 mm (46.4")	1211 mm (47.7")
SSM-1175-S	1175 mm (46.3")	1253 mm (49.3")	1286 mm (50.6")
SSM-1275-S	1275 mm (46.3")	1353 mm (53.3")	1386 mm (54.6")
SSM-1400-S	1400 mm (55.1")	1478 mm (58.2")	1511 mm (59.5")
SSM-1475-S	1475 mm (58.1")	1553 mm (61.1")	1586 mm (62.5")
SSM-1550-S	1550 mm (61.0")	1628 mm (64.1")	1661 mm (65.4")

¹ The mounting brackets may be inverted from the positions shown at left (flanges pointing "inward" instead of "outward," as shown). When this is done, dimension L2 decreases by 58 mm (2.3").

Mirror Model	Reflective Area Height (Y)	Overall Height (L1)	Mounting Height (L2) ¹
SSM-1675-S	1675 mm (65.9")	1753 mm (69.0")	1786 mm (70.3")
SSM-1750-S	1750 mm (68.9")	1828 mm (72.0")	1861 mm (73.3")
SSM-1900-S	1900 mm (74.8")	1978 mm (77.9")	2011 mm (79.2")

Overview

Banner SSM-S Series corner mirrors are designed for use with MICRO-SCREEN®, MINI-SCREEN®, and EZ-SCREEN™ Safety Light Screen systems, and other optical safety systems, including the EZ-SCREEN™ Safety Light Grid and Point. They enable guarding along more than one side of an area using only one emitter/receiver pair.

SSM-S Series mirrors are compact and extremely robust to withstand industrial environments. Brackets are included for quick and easy mounting. Once mounted, a unique mirror end cap design allows rotation of the mirror to any angle.

The stainless steel mirrors are rated at 50 percent efficiency. Refer to the information on sensing range and excess gain.

SSM-S Series mirrors are available in 20 lengths. SSM-S Series mirrors may be used with light screen sensors up to 72" long. The table below recommends which mirror to use with the applicable sensors. The mirror height (Y) should be a minimum of 2" longer than the distance between the top and bottom beams.

Each mirror is supplied with two mounting brackets and associated hardware. Mirrors should be securely mounted to a solid surface that is free from vibration. Mirrors must be mounted parallel to their sensors, with the midpoint of the mirror(s) directly in line with the midpoint of the sensor's defined area.

MSA Series stands may be used to mount SSM-S Series mirrors (requires adapter kit EZA-MBK-2, P/N 61947, sold separately). These stands offer an extruded channel design for convenient mirror (or sensor) height adjustment. See datasheet P/N 43687 for complete information. Several stand heights are available:

Stand Model	Part Number	Stand Height	Mirror Length	
			Brackets Outward	Brackets Inward
MSA-S24-1	43174	24"	100 mm to 250 mm	100 mm to 375 mm
MSA-S42-1	43175	42"	100 mm to 675 mm	100 mm to 825 mm
MSA-S66-1	43176	66"	100 mm to 1275 mm	100 mm to 1275 mm
MSA-S84-1	52397	84"	100 mm to 1675 mm	100 mm to 1900 mm

Specifications

Construction

- Mirror: Highly polished stainless steel
- Mirror Frame: Molded PBT end caps; rigid aluminum extrusion
- Bracket: Cold-rolled steel; black zinc chromate finish

Routine Maintenance

- Mirror surface will scratch easily. When necessary, mirrors should be cleaned with a mild glass cleaning solution and a soft cloth.

¹ The mounting brackets may be inverted from the positions shown at left (flanges pointing "inward" instead of "outward," as shown). When this is done, dimension L2 decreases by 58 mm (2.3").

Aligning Sensors and Corner Mirrors

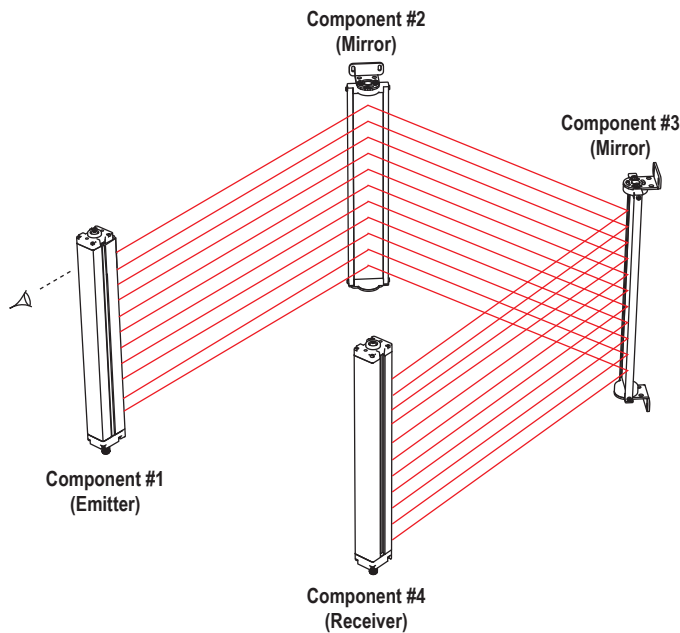


Figure 1. Corner Mirror Alignment

Mount the mirror(s) and the sensors so that they are all parallel. Use a level, if possible. Adjust the position of the sensors and the mirror(s) so that the midpoints of the mirror(s) and the sensors' defined areas are even. (A line connecting the midpoint of all components is illustrated by the dashed line in the drawing.) The midpoint of the defined area of a MICRO-SCREEN or EZ-SCREEN sensor is the midpoint of the window. The upper and lower limits of the defined area of MINISCREEN sensors are marked by arrows along the edge of each sensor window, and are dimensioned in the appropriate instruction manual. The midpoint of the defined area of MACHINE-GUARD/PERIMETER-GUARD sensors corresponds to the midpoint of the sensor length. For EZ-SCREEN Grid sensors, the midpoint is between the top and bottom dots on the housing, adjacent to the sensing window.

Adjust the corner mirror(s) so that the angle of incidence to the mirrors equals the angle of reflection from the mirror. Sight from behind one of the sensors directly towards the mirror (or the first mirror in line). When alignment is correct, you will see the straight and centered reflection of the lens of the other sensor in the mirror.

Use the alignment indicator(s) of the safety light screen system (and the appropriate instruction manual) for final alignment.

Range Reduction Using SSM-S Series Corner Mirrors

Use of corner mirrors reduces light screen range (the maximum separation between the emitter and receiver). The following table lists the resultant range when using from one to three SSM-S Series corner mirrors in the sensing path.

Maximized excess gain is always important when installing a safety light screen. Use hard guarding whenever possible to reduce the overall sensing range and the number of mirrors required. Also, keep sensor lenses and mirrors clean and properly aligned.

Table 1: Light Screen/Light Grid Maximum Range

Light Screen/Light Grid Sensors		0 Mirrors	1 Mirror	2 Mirrors	3 Mirrors
MICRO-SCREEN	Standard Series	9 m (30')	7.1 m (23')	5.5 m (18')	4.2 m (14')
	V-Series – 24" to 48"	9 m (30')	7.1 m (23')	5.5 m (18')	4.2 m (14')
	V-Series – 56", 64", 72"	6 m (20')	4.7 m (15.5')	3.7 m (12')	2.8 m (9')
MINI-SCREEN	Standard Series	9 m (30')	7.1 m (23')	5.5 m (18')	4.2 m (14')
	XL-Series	18 m (60')	14.2 m (46.5')	11 m (36')	8.5 m (28')
MACHINE-GUARD/ PERIMETER-GUARD		14 m (45')	10.6 m (35')	8.2 m (27')	6.4 m (21')
EZ-SCREEN Grid/ Point	Short-Range	20 m (65')	15.3 m (50')	12 m (39')	9.2 m (30')
	Long-Range	70 m (230')	54.3 m (178')	42.1 m (138')	32.6 m (107')
EZ-SCREEN	14 mm Resolution	6 m (20')	4.7 m (15.5')	3.7 m (12')	2.8 m (9')
	30 mm Resolution	18 m (60')	14.2 m (46.5')	11 m (36')	8.5 m (28')

Excess Gain

$$\text{Excess Gain} = \text{Maximum Range}^2 \div \text{Separation Distance}^2$$

Given the range from [Range Reduction Using SSM-S Series Corner Mirrors](#) on page 3, excess gain can be calculated for any distance by using the inverse square law. For example, the excess gain for a 30 ft range MINI-SCREEN system at a 10 ft separation, using two corner mirrors, is calculated as follows:

$$\text{E.G.} \div 1x = 14.8^2 \div 10^2 = 2.19$$

$$\text{E.G.} = (1x)(2.19) = 2.19x$$

For the same situation at a 10' separation, using MACHINE-GUARD sensors:

$$\text{E.G.} \div 3x = 23^2 \div 10^2 = 5.29$$

$$\text{E.G.} = (3x)(5.29) = 15.87x$$



NOTE: MACHINE-GUARD maximum sensor range is the separation between emitter and receiver where 3x excess gain remains. The calculated excess gain should be multiplied by 3 to determine the true system excess gain.

Excess Gain Value Guidelines	
Maximum Excess Gain Required	Operation Environment
1.5x	Clean air: no dirt buildup on lenses or mirrors
5x	Slightly dirty: slight buildup of dust, dirt, oil, moisture, etc. on lenses or mirrors. Lenses and mirrors cleaned on a regular schedule.
10x	Moderately dirty: obvious contamination on lenses or mirrors (but not obscured). Lenses and mirrors cleaned occasionally or when necessary.
50x	Very dirty: heavy contamination on lenses and mirrors. Heavy fog, mist, dust, smoke, or oil film. Minimal cleaning of lenses and mirrors.

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