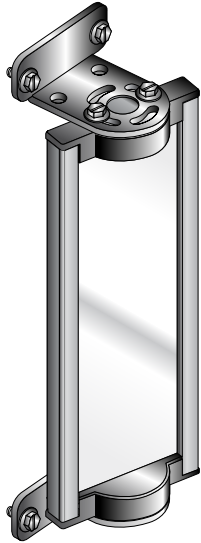


# MSM Series Corner Mirrors



## Datasheet

For use with Banner Safety Light Screen Systems



- Designed for use with Banner safety light curtain systems
- Allows guarding of multi-sided applications with one emitter and receiver pair
- Small and lightweight
- Mounting bracket design allows 360° rotation of mirror for easy installation and alignment
- Once mounted, a unique mirror end cap design allows rotation of the mirror to any angle
- Rear-surface glass mirrors are rated at 85 percent efficiency.
- Available in 12 lengths

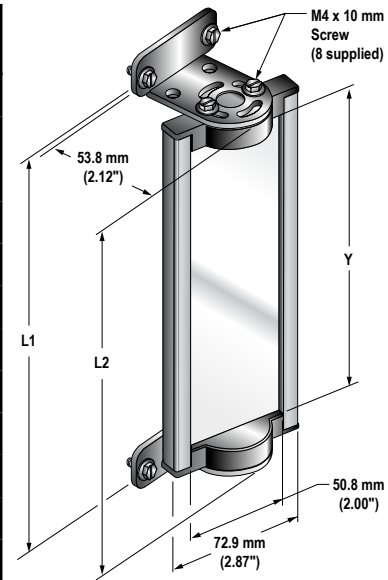
See the specifications for specific information on sensing range and excess gain. The appropriate mirror length should be about 50 mm greater than the corresponding light curtain's defined area.



**Note:** The mounting brackets may be inverted from the positions shown at right (flanges pointing "inward" instead of "outward," as shown). When this is done, dimension L1 decreases by 56.9 mm (2.24"), and rotation decreases to ± 45°.

## Models

Mirror Model	Part Number	Reflective Area Length (Y)	Mounting Length (L1)	Mirror Height Overall (L2)
MSM4A	43162	165 mm (6.5")	221 mm (8.7")	191 mm (7.5")
MSM8A	43163	267 mm (10.5")	323 mm (12.7")	292 mm (11.5")
MSM12A	43164	356 mm (14")	411 mm (16.2")	381 mm (15")
MSM16A	43165	457 mm (18")	513 mm (20.2")	483 mm (19")
MSM20A	43166	559 mm (22")	615 mm (24.2")	584 mm (23")
MSM24A	43167	660 mm (26")	716 mm (28.2")	686 mm (27")
MSM28A	43168	762 mm (30")	818 mm (32.2")	787 mm (31")
MSM32A	43169	864 mm (34")	919 mm (36.2")	889 mm (35")
MSM36A	43170	965 mm (38")	1021 mm (40.2")	991 mm (39")
MSM40A	43171	1067 mm (42")	1123 mm (44.2")	1092 mm (43")
MSM44A	43172	1168 mm (46")	1224 mm (48.2")	1194 mm (47")
MSM48A	43173	1270 mm (50")	1326 mm (52.2")	1295 mm (51")



## Overview

MSM Series mirrors may be used with light screen sensors up to 48 inches long. Refer to the table to determine which MSM models can be used with which EZ-SCREEN Safety Light Screen sensors.



MSM Model	EZ-SCREEN Models			
	SLS Defined Area	LP Defined Area	LS Defined Area	Type 2 Defined Area
MSM4A				
MSM8A	150			150
MSM12A	300	270	280	300
MSM16A		410	350	
MSM20A	450		490	450
MSM24A	600	550	560	600
MSM28A		690	630/700	
MSM32A	750		770	750
MSM36A	900	830	840/910	900
MSM40A		970	980	
MSM44A	1050	1110	1050/1120	1050
MSM48A	1200		1190	1200

Each mirror is supplied with two mounting brackets and associated hardware. Securely mount the Mirrors to a solid surface that is free from vibration. Mount the mirrors 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 MSM Series mirrors. These stands offer an extruded channel design for convenient mirror (or sensor) height adjustment. See [datasheet 43687](#) for complete information. Several stand heights are available:

Stand Model	Part Number	Stand Height (in)	Mirror Length	
			Brackets Outward (in)	Brackets Inward (in)
MSA-S24-1	43174	24	4 to 8	4 to 12
MSA-S42-1	43175	42	4 to 24	4 to 28
MSA-S66-1	43176	66	4 to 48	4 to 48

## Specifications

### Construction

Mirror: Safety glass; rear-surface mirror  
 Mirror Frame: Molded ABS end caps; rigid PVC sides  
 Bracket: Cold-rolled steel; black zinc chromate finish

### Maintenance

Clean with a mild glass cleaning solution and a soft cloth

## Aligning Sensors and Corner Mirrors

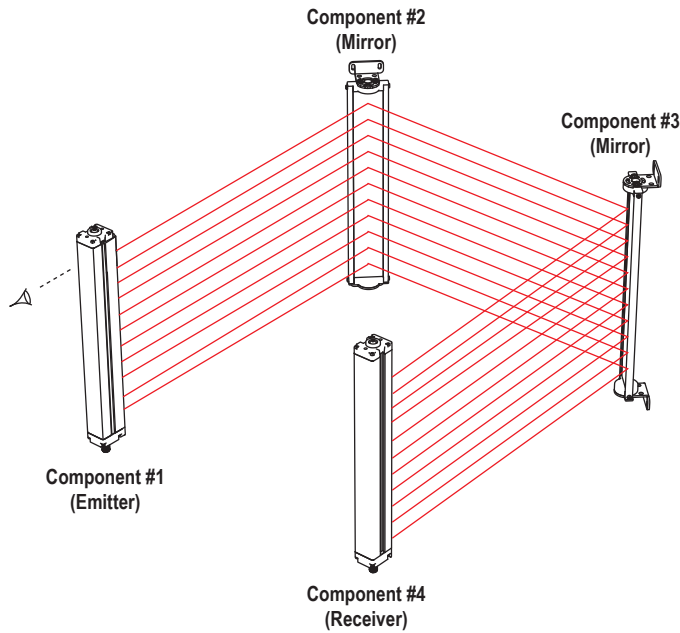


Figure 1. Corner Mirror Alignment

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 light curtain system can be determined by referring to the dimensions of the light curtain in its instruction manual.

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 MSM 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 four MSM Series corner mirrors in the sensing path.

Light Screen Series	Light Screen Maximum Range				
	0 Mirrors	1 Mirror	2 Mirrors	3 Mirrors	4 Mirrors
14 mm EZ-SCREEN® (SLS)	6 m (20 ft)	5.6 m (18.4 ft)	5.2 m (17.0 ft)	4.8 m (15.7 ft)	4.4 m (14.5 ft)
30 mm EZ-SCREEN® (SLS)	18 m (60 ft)	16.8 m (55 ft)	15.5 m (51 ft)	14.3 m (47 ft)	13.1 m (43 ft)
EZ-SCREEN® LP (SLP)	7 m (23 ft)	6.5 m (21.2 ft)	6.0 m (19.5 ft)	5.5 m (18.0 ft)	5.1 m (16.6 ft)
EZ-SCREEN® LP Basic (SLPVA)	4 m (13 ft)	3.7 m (12.1 ft)	3.4 m (11.2 ft)	3.1 m (10.3 ft)	2.8 m (9.2 ft)
EZ-SCREEN® LS (SLL)	12 m (39 ft)	11 m (36 ft)	10.1 m (33 ft)	9.3 m (30.5 ft)	8.6 m (28 ft)
EZ-SCREEN® LS Basic (SLLV)	8 m (26.2 ft)	7.4 m (24.3 ft)	6.8 m (22.3 ft)	6.2 m (20.3 ft)	5.7 m (18.7 ft)
EZ-SCREEN® Type 2 (LS2)	15 m (50 ft)	13.8 m (45 ft)	12.7 m (42 ft)	11.7 m (38 ft)	10.8 m (35 ft)

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.

## Excess Gain

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

Given the range, excess gain can be calculated for any distance by using the inverse square law. For example, the excess gain for a 12 m range EZ-SCREEN LS system at 3 m separation, using two corner mirrors, is calculated as follows:

$$\text{E.G.} \div 1x = 10.1^2 \div 3^2 = 11.3$$

$$\text{E.G.} = (1x) (11.3) = 11.3x$$

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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