

MicroGuard[®] Model SS Safety Light Curtain with Solid State Outputs

- **Low Cost Solution for OEM's/Integrators**
- **Compact "Control Reliable" Category 4 Design**
- **The Easiest Intelligent Blanking Setup Available**
- **No Dip Switches or Pylon Entry Required for Blanking**
- **System Designed to Eliminate Time Consuming Lockout/Tagout Procedures for Blanking Adjustments**
- **Total System Diagnostics**
- **Made in USA**



Model SS -- The Ultimate in Safety - Quality - Value

The Model SS is an infrared safety light curtain that is designed to the IEC 61496 standard. When properly installed, it protects the machine operator by passing an invisible infrared light beam across an area to be guarded and examining whether or not the light beam(s) are blocked. If the light beam(s) are blocked, monitored solid state outputs will open, issuing a "STOP" command to the machines normally closed (N.C.) "STOP" circuit.

The System is composed of a transmitting unit (EMITTER), and a receiving unit (RECEIVER). The entire system is control reliable Category 4 (per IEC 61496). A single fault anywhere within the Model SS will not prevent at least one of the solid state outputs from opening up, (allowing a "STOP" command) when either a beam is broken or an internal fault occurs.

Theory of operation. The Model SS protects an area by projecting a curtain of infrared light. The infrared emitters and receivers face each other across the field to be protected. Each emitter/receiver pair is spaced along the length of the pylons at regular intervals from .5", up to 8" depending on the application. The smaller spacing are for finger guarding, the larger spacing are for body protection.

The emitter/receiver pairs are scanned sequentially (one at a time) by a very short pulse of infrared light starting from bottom (cable end), and working up to the top, until every beam pair has been scanned. Two 16 bit computers in the emitter pylon and two 16 bit computers in the receiver pylon control the operation, as well as cross check each pylon.

The System. The Model SS employs infrared technology in a small sealed NEMA 4 aluminum housing with an infrared passing (daylight filtering) acrylic lens. This system provides harmless invisible protection and an unobstructed view of the guarded area. There are two parts to the Model SS: An Emitter pylon and a Receiver pylon. The Emitter pylon has no outputs, but does contain a digital CAN data network to allow it to be linked to the Receiver pylon (although not required for operation). The Receiver pylon contains the digital CAN data network and two monitored solid state 24vdc outputs.

Both pylons are synchronized to each other either via the CAN data network or electronically.

System Safety. The Model SS incorporates redundant, and diverse technology that provides a backup for every system that could cause an unsafe condition.

In the Emitter pylon, 1 CPU drives the Infrared LED's while the 2nd CPU monitors to assure proper signals and timing. Improper operation from either CPU will turn off the Infrared LED's.

In the Receiver pylon, 1 CPU drives the Infrared receivers while the 2nd CPU monitors to assure proper signals and timing. Both CPU's are required to drive the solid state outputs as well as monitor the condition of the output. Either CPU can shut down both solid state outputs.

Signals shared between CPU's are isolated from each other to prevent a failure of 1 microprocessor causing a failure in the 2nd. Watchdog circuits on the solid state outputs automatically shut off the outputs should either CPU slow down or lock up.

Solid state outputs are turned on separately to be checked and assure neither output has been shorted, before fully turning on.

Design Criteria. Designed to meet IEC 61496-1 & 2, UL 1998, UL subject 491, OSHA, ANSI, CSA, ANSI-RIA R15.06-1999

Microprocessor redundancy for both Emitter and Receiver pylons

Redundant, monitored, 24vdc solid state outputs (PNP)

Watchdogs on CPU's and outputs prevent unintentional output during lockups.



Blanking Options Model SS

The optional Remote Status Display (RSD) may be used in conjunction with the Model SS Safety Light Curtain. The RSD provides the machine operator and front line supervisor immediate system status and diagnostics when the Model SS is mounted inside the machine control panel. The RSD also controls all blanking options directly from the panel location where it is installed.

Remote Status Display (RSD) Components:

- Red/Green/Yellow indicator lights
- Diagnostic scrolling message display with 5' (1.5m) of connector cable
- Keyed selector switch and yellow blanking active indicator supplied if blanking is used

The RSD components are mounted on a steel plate and are designed to be exterior panel mounted. The RSD option enhances safety and is a time saver at machine set-up and when maintenance diagnostics are required.

Cincinnati Interface

Description: The Cincinnati Interface is provided to allow an external device to determine if the light curtain is still capable of shutting down the safety control circuit. The Cincinnati Interface allows an external device to override the light curtain and initiate a RED condition and open up the standard output relay contacts.

Application: Cincinnati Press, PLC

- Manual Latching Relay Provision

Floating Blank - (8K) Option

The "Floating Blank" option provides the flexibility necessary to effectively guard all types of equipment that require multiple floating beams. This is quite common in the fabricating industry where the work piece moves.

The "Floating Blank" permits work pieces to be formed vertically or horizontally through the guarded area without shutting down the machine. Entry into the protected area by the operator or passerby will prevent the start or, if the machine is in motion, will provide a signal to stop the machine.

The "Floating Blank" is controlled by a keyed selector switch that will allow a work opening of 2" (51mm) based on 1/2" (13mm) increments. This information is displayed on the message display of the controller. Blanking adjustments required when die heights change are not necessary. The "Floating Blank" light curtain automatically adjusts to the various feed positions providing **production with protection**.

The "Floating Blank" (8K) Option includes:

- | | |
|---------------|-------------------------------|
| 1/2" (13mm) | - Constant scan light curtain |
| 1" (25mm) | - One floating beam |
| 1 1/2" (38mm) | - Two floating beams |
| 2" (51mm) | - Three floating beams |



The (RSD) device provides blanking scrolling operator diagnostic message display and system status **without** entry into the machine control panel. This saves time for lockout/tagout requirements and safeguarding blanking adjustments.

Auto-Blanking - (AB) Option

The advanced "Auto Blank" option is unique because it will automatically blank out only the required number of beams needed to accept an obstruction such as a conveyor, bracket, or fixture. The unit is easily programmed by a supervisory controlled four-position keyed selector switch located on the front panel of the RSD Display. The "Auto Blank" method of blanking is much safer than DIP switch or master/slave blanking systems because only the areas of the obstruction will be blanked. This feature prohibits unsafe oversizing of the blanked area commonly found throughout the industry on manually blanked systems. "Auto Blank" also **eliminates the need** to count beams and to locate where and what beams are to be shut off to obtain the correct beam elevation to accept an obstruction. This information is displayed on the message display of the controller. "Auto Blank" will also watch the obstruction and, if it moves or is removed, will go into a "machine stop mode" to prevent further machine operation. This is an additional safety feature not available on manually blanked units. These features truly enhance production while providing the ultimate in safety.

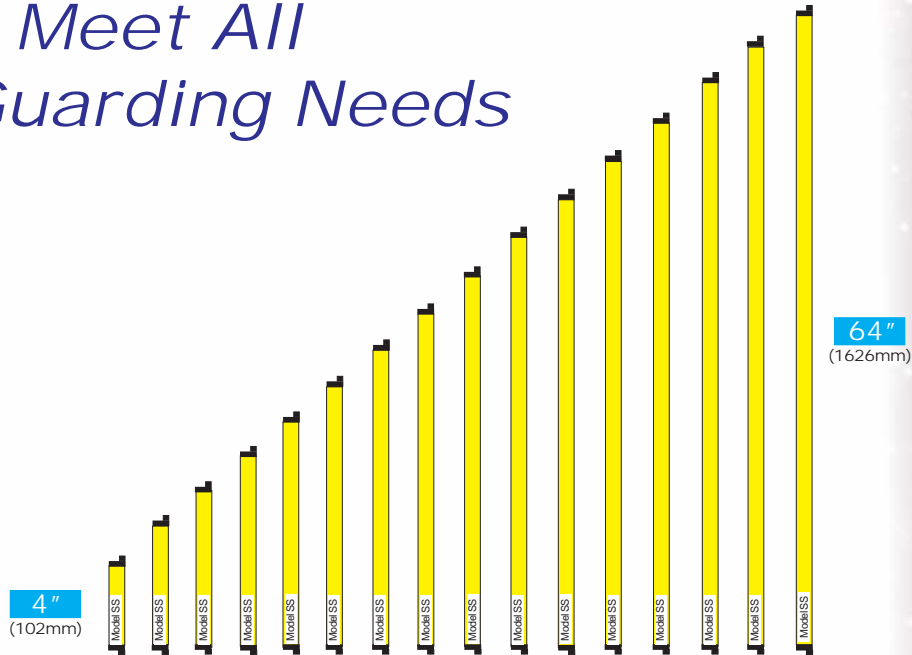
When the key switch is turned to the "Auto Blank" function, the "External Diagnostic Message Display" will show the number of blocked beams and where the obstruction is in the light curtain, then verify that the obstruction is being monitored. This is required information for the depth penetration factor and for proper installation of any safety light curtain. Learned Auto Blank patterns for the Model SS are stored in non-volatile memory for automatic recall at power-up.

The versatile "Auto Blank" (AB) blanking series includes:

- Constant scan light curtain
- One beam floating blank built-in plus "Auto Blank" capability
- Two "Auto Blank" modes - up to 4" blanked out (larger sizes available upon request) but need not be sequential
 - A. One "Auto Blank" mode with keyed reset when guarded zone is penetrated (latch)
 - B. One "Auto Blank" mode with automatic reset when guarded zone is penetrated

Model SS

*A Size to Meet All
of Your Guarding Needs*



Model SS Safety Relay Interface



Part # SSSR



Converts the solid state PNP
Outputs to force guided safety
relay outputs (dry)

- Base device to IEC 60204-1 and EN 954-1 for single-channel and two-channel emergency stop monitoring.
- Category 4 to EN954-1
- Stop category 0 to EN 60204-1
- Manual or automatic start
- With/without cross monitoring
- Feedback circuit for monitoring external contactors
- 3 enabling current paths, NO contacts, positively driven safety relays
- For processing signals from the output signal switching devices (OSSD) of a light curtain acc. to DIN EN 61496-1
- Input Power - 24VDC
- Rated Frequency - 50-60 Hz
- Outputs Rated Voltage - DC 22V Rated
- Output Current - 100 MA

Specifications and Dimensions Model SS

- **Input Power:** Emitter pylon: 24vdc @ .125A
Receiver pylon: 24vdc @ .125A (solid state outputs are PNP which may draw up to .25A additional)
- **Internal fuses:** Emitter Pylon: F1 @ 1A
Receiver Pylon: F1 @ 1A, F2 @ 1/2A, F3 @ 1/2A
- **Outputs:** Receiver pylon: monitored, 2 outputs, solid state PNP (24vdc when GREEN, float when RED/off). Max .25A draw each.
- **Indicators:** Emitter pylon: Yellow, Red, Green.
Receiver pylon: Yellow, Red, Green.
- **Construction:** Painted aluminum extrusion with Acrylic IR lens and Viton Seals providing NEMA 12,13 protection.
Optional Polycarbonate tubes (sleeves) over the pylons provides NEMA 4 protection.
Cables are both 21' (6.4m) long with a flexible in-line connector 12" (254mm) from the base of each pylon.
Emitter pylon: Four conductor 24AWG
Receiver pylon: Six conductor 24AWG
Pylons: Yellow
Cables: Black
- **Temperature:** 0 to 50c (up to 95% humidity, non-condensing)

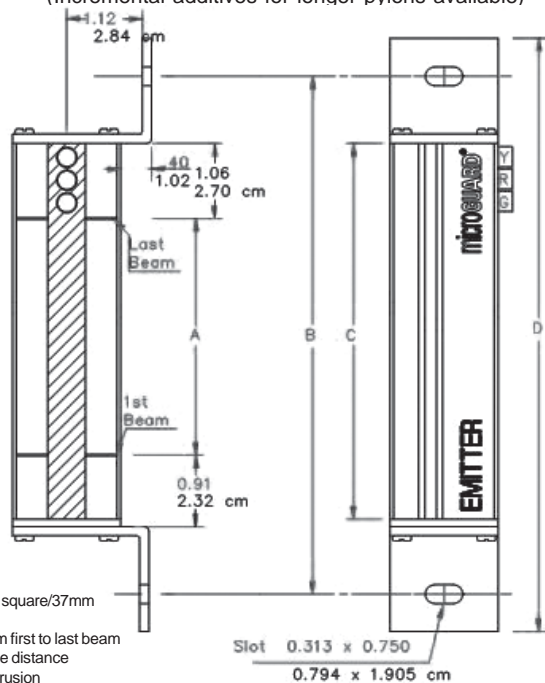
- **Dimensions:** 1.45" (36.8mm) square X selected length (see tables for lengths)
- **Beam Spacing & Minimum Object Sensitivity (MOS)**
.5" (12.7mm) .55" (14mm) MOS
1" (25.4mm) 1.18" (30mm) MOS
(special order, 4" active area followed by a 4" gap)
(special order, 4" active area followed by a 8" gap)
- **Response Time and Scanning Frequency:**
< 30 mSec total, 10 khz
- **Shock:** Tested to withstand high vibration (using shock mounts)
- **Self-Checking:** Every 15mSec
- **Scanning distance**
From 1' to 20' standard (1-6m)
From 21' to 50' (6-15m) extended range (optional)
The range is stated as a two digit number within the Model #
- **Specials:** Custom designed light curtains for special applications. Consult factory.
- **Surface Mount Technology**
- **One Year Warranty**
- **Made in USA**

Model SS output circuits must be used with either "control reliable" PLC input circuits, or a safety module.

Pylons with Fixed Mounting Brackets

Model	DIM A (In/mm)	DIM B (In/mm)	DIM C (In/mm)	DIM D (In/mm)
SS-04	3.50 / 89	7.20 / 183	5.35 / 136	8.20 / 208
SS-08	7.50 / 190	11.20 / 284	9.35 / 237	12.20 / 310
SS-12	11.50 / 292	15.20 / 386	13.35 / 339	16.20 / 411
SS-16	15.50 / 394	19.20 / 488	17.35 / 441	20.20 / 513
SS-20	19.50 / 495	23.20 / 589	21.35 / 542	24.20 / 615
SS-24	23.50 / 597	27.20 / 691	25.35 / 644	28.20 / 716
SS-28	27.50 / 698	31.20 / 792	29.35 / 745	32.20 / 818
SS-32	31.50 / 800	35.20 / 894	33.35 / 847	36.20 / 919
SS-36	35.50 / 902	39.20 / 996	37.35 / 949	40.20 / 1021
SS-40	39.50 / 1003	43.20 / 1097	41.35 / 1050	44.20 / 1123
SS-44	43.50 / 1105	47.20 / 1199	45.35 / 1152	48.20 / 1224
SS-48	47.50 / 1207	51.20 / 1300	49.35 / 1253	52.20 / 1326
SS-52	51.50 / 1308	55.20 / 1402	53.35 / 1355	56.20 / 1427
SS-56	55.50 / 1410	59.20 / 1504	57.35 / 1457	60.20 / 1529
SS-60	59.50 / 1511	63.20 / 1605	61.35 / 1558	64.20 / 1631
SS-64	63.50 / 1613	67.20 / 1707	65.35 / 1660	68.20 / 1732

(Incremental additives for longer pylons available)

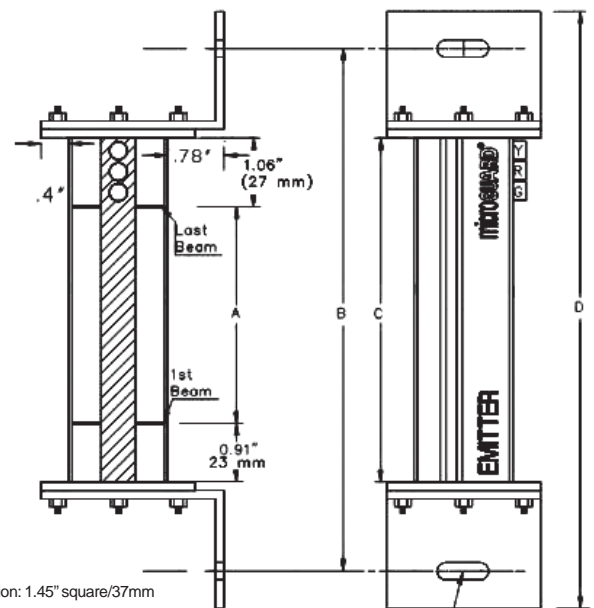


- Extrusion: 1.45" square/37mm
- Distance from first to last beam
 - Mounting hole distance
 - Length of extrusion
 - Overall length
- Tolerance: +/- .10"/2.5mm

Pylons with Swivel Mounting Brackets

Model	DIM A (In/mm)	DIM B (In/mm)	DIM C (In/mm)	DIM D (In/mm)
SS-04	3.50 / 89	7.93 / 201	5.35 / 136	8.93 / 227
SS-08	7.50 / 190	11.93 / 303	9.35 / 238	12.93 / 328
SS-12	11.50 / 292	15.93 / 405	13.35 / 339	16.93 / 430
SS-16	15.50 / 394	19.93 / 506	17.35 / 441	20.93 / 532
SS-20	19.50 / 495	23.93 / 608	21.35 / 542	24.93 / 633
SS-24	23.50 / 597	27.93 / 709	25.35 / 644	28.93 / 735
SS-28	27.50 / 698	31.93 / 811	29.35 / 745	32.93 / 836
SS-32	31.50 / 800	35.93 / 913	33.35 / 847	36.93 / 938
SS-36	35.50 / 902	39.93 / 1014	37.35 / 949	40.93 / 1040
SS-40	39.50 / 1003	43.93 / 1116	41.35 / 1050	44.93 / 1141
SS-44	43.50 / 1105	47.93 / 1199	45.35 / 1152	48.93 / 1224
SS-48	47.50 / 1207	51.93 / 1319	49.35 / 1253	52.93 / 1344
SS-52	51.50 / 1308	55.93 / 1421	53.35 / 1355	56.93 / 1446
SS-56	55.50 / 1409	59.93 / 1522	57.35 / 1457	60.93 / 1548
SS-60	59.50 / 1511	63.93 / 1624	61.35 / 1558	64.93 / 1649
SS-64	63.50 / 1613	67.93 / 1725	65.35 / 1660	68.93 / 1751

(Incremental additives for longer pylons available)



- Extrusion: 1.45" square/37mm
- Guarded area (first to last beam)
 - Distance between mounting holes
 - Distance between mounting brackets
 - Total length (including brackets, but not cable)
- Tolerance: +/- .10"/2.5mm

Example
Part #

SS	-	04	-	OF	-	20	-	(Options)
Solid State Outputs		Pylon Size		Light Curtain Style and Beam Spacing		Scanning distance in feet-20' (6.1m) standard, 50' (15.24m) maximum		

MicroGuard Light Curtain Model or Style

SS - Solid State Outputs

Pylon Sizes (Protected Area in inches)

- 1/2" (13mm) Beam Spacing: 04,08,12,16,20,24,28,32,36,40,44,48,52,56,60,64
- 1" (25mm) Beam Spacing: 04,08,12,16,20,24,28,32,36,40,44,48,52,56,60,64
- 4" (102mm) Beam Spacing: 04,08,12,16,20,24,28,32,36,40,44,48,52,56,60,64

Light Curtain Style and Beam Spacing

1/2" (13mm) Spacing of Beams

- OF** - Constant scan - no blanking.
- 1F** - 1 beam floating blank built-in.
- 8K** - Up to 3 beam floating blank adjustable by the use of a keyswitch removable in all positions. Capable of constant scan or one, two, or three floating beams. (Requires RSD option)
- AB** - Includes constant scan light curtain, one beam floating blank, and two auto blank modes. (Requires RSD option)
- CE** - No blanking, 24VDC input power, 2° angle of divergence, and CE certified (designed to conform to the European Market and worldwide IEC 61496 Parts 1 & 2 Standards).

1" (25mm) Spacing of Beams

- OF1** - Constant scan - no blanking.
- 1F1** - 1 beam floating blank built-in.
- 8K1** - Up to 3 beam floating blank adjustable by the use of a keyswitch removable in all positions. Capable of constant scan or one, two, or three floating beams. (Requires RSD option)
- AB1** - Includes constant scan light curtain, one beam floating blank, and two auto blank modes. (Requires RSD option)
- CE1** - No blanking, 24VDC input power, 2° angle of divergence, and CE certified (designed to conform to the European Market and worldwide IEC 61496 Parts 1 & 2 Standards).

4" (102mm) Spacing of Beams (no blanking options available)

- OF4** - For perimeter guarding, body detection. 4.25" (108mm) object sensitivity. 4" (102mm) active area followed by a 4" (102mm) gap.

Options (Add underlined suffix to part number)

AVAILABLE ON THE MODEL SS

- RSD** - **Model SS Remote Status Display (RSD):** Remote mounting plate providing a single location to mount the following on existing panel door: light curtain scrolling diagnostic message display, blanking keyswitch (if applicable), and status indicator lights (all styles).

AVAILABLE ON SOLID STATE MODELS (SS)

- SMB** - **Swivel Mounting Brackets for Pylons:** Replaces the L-shaped fixed mounting brackets normally supplied. Provides a 360° rotation of pylons.
- SSSR** - **Captive Contact Safety Relay Module**
- Extended Range Units:** 21' (6.4m) to 50' (15.24m) scanning distances (specify desired scanning distance).

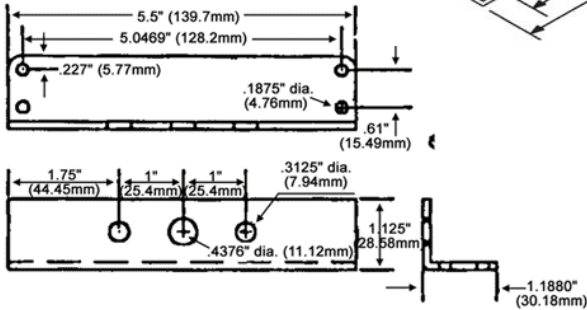
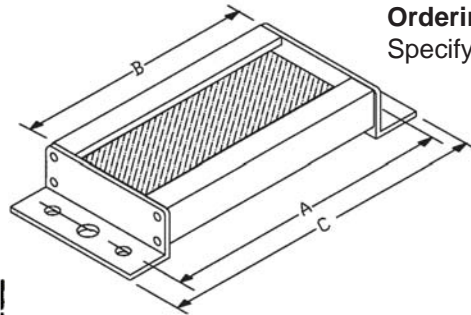
Model SS Output Circuits must be used with either "Control Reliable" PLC Safety Input Circuits or a Safety Relay Module.

Accessories - Model SS

Cornering Mirror Dimensions

Through the use of cornering mirrors, multiple sides or work envelopes can be guarded which enhance safety and reduce downtime related to mechanical and electrical interlock systems. Include a 15% reflectivity loss per mirror when calculating the total scanning distance of the light curtain.

Model	Dim A (hole to hole)	Dim B (mirror)	Dim C (total)
MGM-12	19.45" (494mm)	18.25" (464mm)	20.50" (521mm)
MGM-18	25.45" (646mm)	24.25" (616mm)	26.50" (673mm)
MGM-24	31.45" (799mm)	30.25" (768mm)	32.50" (825mm)
MGM-30	37.45" (951mm)	35.25" (895mm)	38.50" (978mm)
MGM-36	43.45" (1104mm)	42.25" (1073mm)	44.50" (1130mm)
MGM-42	49.45" (1256mm)	48.25" (1226mm)	50.50" (1282mm)
MGM-48	55.45" (1408mm)	54.25" (1378mm)	56.50" (1435mm)
MGM-60	67.45" (1713mm)	66.25" (1683mm)	68.50" (1739mm)
MGM-72	79.45" (2018mm)	78.25" (1988mm)	80.50" (2045mm)
MGM-84	91.45" (2323mm)	90.25" (2292mm)	92.50" (2350mm)
MGM-96	103.45" (2628mm)	102.25" (2597mm)	104.50" (2654mm)



Ordering Procedure

Specify Mirror Model Number and Quantity

Pedestal Dimensions (Model 8000)

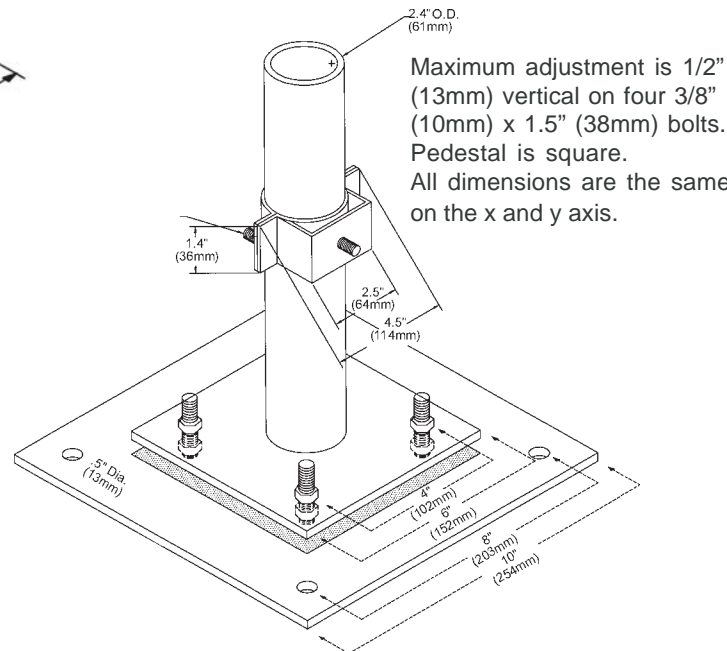
The heavy duty, all welded steel pedestal floor mounts can be used for mounting either light curtain pylons or cornering mirrors. Sliding mounts on the pedestal are of universal design and are supplied standard. Unique floating base on pedestal is designed to compensate for uneven floors.

NOTE: Pedestals must be bolted to the floor, they must not be movable (ANSI B11.19-2003).

1. Sliding mounts supplied
2. Standard height is 72" (1829mm) - Model #8000
Optional 96" (2438mm) - Model #8096
3. Painted OSHA yellow
4. Pedestal is 12 gauge steel
Base Plate is 1/4" (6.35mm) steel plate

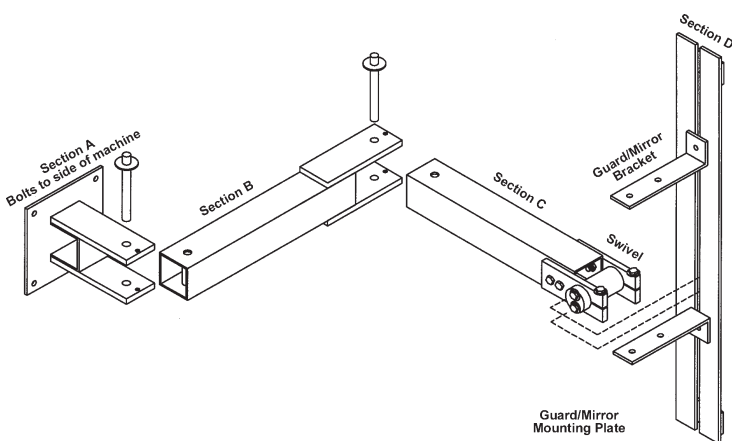
Ordering Procedure

Specify Pedestal Model Number and Quantity



Maximum adjustment is 1/2" (13mm) vertical on four 3/8" (10mm) x 1.5" (38mm) bolts. Pedestal is square. All dimensions are the same on the x and y axis.

Model 9000 Swing Mount Brackets



Excellent method of mounting light curtain on press brakes or when light curtain is to be removed for die set-ups or machine maintenance. Model 9000 consists of three 180 degree pivot points along with light guard diagonal movement capability for virtually unlimited light guard positioning. Two-inch square tubing (3/16" or 4.76mm thick) painted OSHA yellow which mounts directly onto the machine housing and makes for a heavy duty, yet versatile mounting bracket. Specify dimensions "B" and "C."

Ordering Procedure

- Specify Pedestal Model Number and Quantity
- Specify Model 9000 Swing Mount Brackets and quantity
- Specify B & C dimensions
- Specify light curtain or mirror size to be mounted