

Multiple Safety Devices & Control Reliable Controls to fulfill your *Total Safety Solution*!



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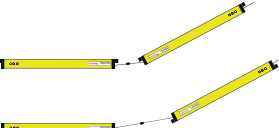
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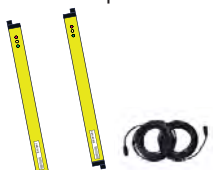
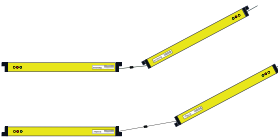
Model SS 		Direction of Travel Mats 	
Model MG 		High Temp Mats 	
Model DR 		Ergonomic Buttons 	
Model CE 		Safety HUB Safety PLC's 	
Model CA 		Safety Interlocks 	
Model PPG 		Stack Lights 	
NSD Safety Mats 		E-Stops 	
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Safety Light Curtain Overview

Model	Guarding For	Input Voltage	Safety Outputs	Beam Spacing	Available Sizes	Scanning Distance	Blanking Capabilities
Model SS Solid State Safety Outputs 	Finger/ Hand	24 VDC	Two monitored solid state (PNP) safety outputs (.5A max. each). * Max .25A draw each	$\frac{1}{2}$ " (13 mm) 1.0" (25.4 mm)	4" – 64" (102 - 1625 mm) 4" – 120" (102 – 3048 mm)	1' – 50' (.3 – 16 m)	Floating or Auto Blank
Model MG Metal Box Controller 	Finger/ Hand	24 VDC 110 VAC 220 VAC	Two monitored captive contact safety relays (dry) rated at 8 amps at 250 VAC resistive	$\frac{1}{2}$ " (13 mm) 1.0" (25.4 mm)	4" – 64" (102 - 1625 mm) 4" – 120" (102 – 3048 mm)	1' – 50' (.3 – 16 m)	Floating or Auto Blank
Model DR Multiple Function DIN-Rail Controller 	Finger/ Hand	24 VDC	Two monitored captive contact safety relays (dry) rated at 8 amps at 250 VAC resistive	$\frac{1}{2}$ " (13 mm) 1.0" (25.4 mm)	4" – 64" (102 - 1625 mm) 4" – 120" (102 – 3048 mm)	1' – 50' (.3 – 16 m)	Floating or Auto Blank
Model CE Designed for the Global Marketplace 	Finger/ Hand	24 VDC	Two monitored solid state (PNP) safety outputs (.5A max. each). * Max .25A draw each	$\frac{1}{2}$ " (13 mm) 1.0" (25.4 mm)	4" – 64" (102 - 1625 mm) 4" – 120" (102 – 3048 mm)	1' – 50' (.3 – 16 m)	Floating or Auto Blank
Model CA Multiple Plane Guarding 	Finger/ Hand	24 VDC	Two monitored solid state (PNP) safety outputs (.5A max. each). * Max .25A draw each	$\frac{1}{2}$ " (13 mm) 1.0" (25.4 mm)	4" – 64" (102 - 1625 mm) 4" – 120" (102 – 3048 mm)	1' – 50' (.3 – 16 m)	Floating or Auto Blank
Model PPG Designed for Perimeter Guarding applications with latching relays 	Body	24 VDC 110 VAC 220 VAC	Two monitored captive contact latching safety relays (dry) rated at 8 amps at 250 VAC resistive	1.5" (38 mm) 3.0" (76 mm) 6.0" (152 mm) 12.0" (305 mm)	24" – 96" (609 – 2438 mm)	1' – 90' (.3 – 27 m)	Constant Scan for Perimeter Guarding

* If mechanical safety relays (dry) are required to switch higher loads, please refer to our Part #52-278 DIN-Rail mount captive contact safety relays. Part Number 52-278 (two required) can be mounted on DIN-Rail or screw mounted on a control panel backplate.

Model SS Safety Light Curtain with Solid State Outputs

- EDM (External Device Monitoring) for external safety relays
- 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



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.

External Device Monitoring (EDM). A method in which the Model SS Category 4 safety light curtain logic monitors the state of various external control devices. The control devices are external and not part of the Model SS light curtain pylons. A lockout or stop signal will result if an unsafe state is detected in an external device.

The External Device Monitoring (EDM) is an optional function of the Model SS safety light curtain for monitoring the status of external devices such as gate and door switches, safety switches or the main control element of the drive (MPCE).

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

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

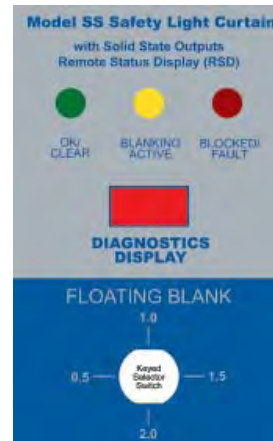
The "Floating Blank" option provides the flexibility necessary to effectively guard all types of equipment that require multiple floating beams. This is quite common in the fabricating industry where the work piece moves.

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.

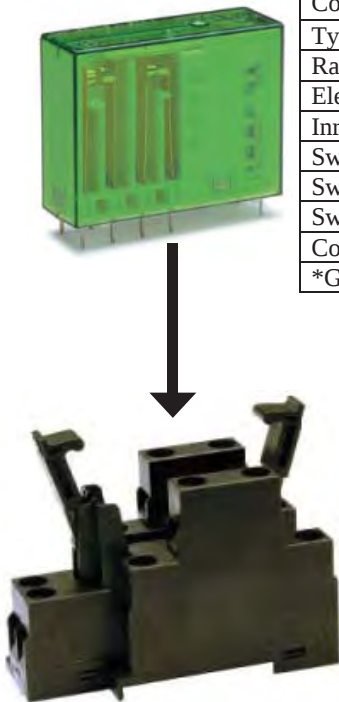
The versatile "Auto Blank" (AB) blanking series includes:

- 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

Safety Relay and Socket Assembly

Part # 52-278 (Two Required)

DIN-Rail or Back Plate Mounting

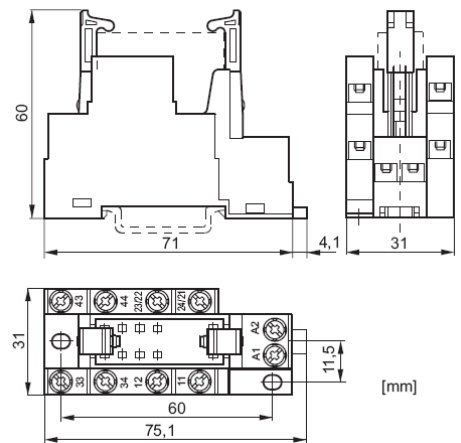


- DIN rail socket
- Integrated retaining/ejector handles
- Screw terminals
- Assembly on DIN rail 35mm or with 2xM3 screws

Contact material	AgSn O ₂ + O.2μm Au
Type of contact	Crest contact
Rated switching capacity	250VAC 8A AC1 2'000VA
Electr. Life AC1 (360 cycles/h)	Approx. 100'00
Inrush current max.	20A for 20ms
Switching voltage range	5 to 250 VDC/VAC
Switching current range*	10mA to 8A
Switching capacity range*	0.06VA(W) to 2'000VA
Contact resistance (as delivered)	≤100m Ω/28V/100mA
*Guide values	

Technical data	
Rate current	6A
Rated voltage	250VAC
Test voltage coil/contacts	2'500Veff
Insulation class (IEC 60664-1)	250VAC
Creepage resistance	CTI 250
Weight	Approx. 65g
Ambient temperature	-25°C to +70°C
Cross sections for connection with	
-wires	2x2.5mm ²
-end sleeves for strands	2x1.5mm ²
Torque max.	0.8 Nm

- Safety relay with force guided contacts (dry)
- Relay configuration: 2NO/1NC
- Mean coil power 0.75W
- Holding power 0.21W
- EN 50205 type A

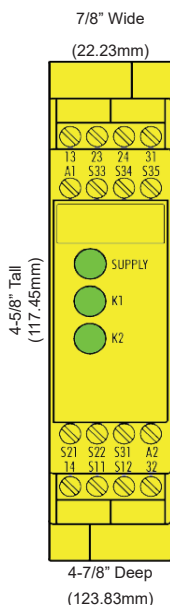


-OR-

SSSR Safety Relay Interface

Part # SSSR

Allows customer selectable Manual or Auto Reset.
Fits in a smaller space than two 52-278 safety relays.



Basic device for Emergency-Stop and Safety Gate Applications

- Basic device to EN 60204-1:2005 and EN ISO 13849:2007 for single or dual E-stop monitoring.
- PL e / category 4 in accordance with EN ISO 13849-1:2007 (previously EN 954:1997 category 4)
- SILCL 3 in accordance with EN 62061:2005
- Stop category 0 acc. EN 60204-1
- Manual or automatic start
- Cross monitoring
- Feedback loop to monitoring external contactors
- 2 Enabling paths, 1 signalling path
- Processing of signals from output switching devices (OSSD) of light curtains acc. EN 61496-1.
- To connect to load side of safety mats acc. EN 1760-1
- Debouncing of inputs

Description of Device and Function

SSSR - This device is a two-channel safety switching device for emergency stop applications with self-monitoring on each ON-OFF cycle. It conforms to EN 60204-1 and is equipped with positively driven relays.

Basic function: After supply voltage has been connected to terminals A1/A2 and the safety inputs closed, operating the reset button closes the enabling current paths (manual start). When the safety inputs are opened/de-excited the enabling current paths will open.

Specifications and Dimensions

- **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 (.5A maxium each output) (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. Maximum 100' (30.4m)
Emitter pylon: Four conductor 24AWG
Receiver pylon: Six conductor 24AWG
Pylons: Yellow | Cables: Black
- **Temperature:** 0 to 50c (up to 95% humidity, non-condensing)

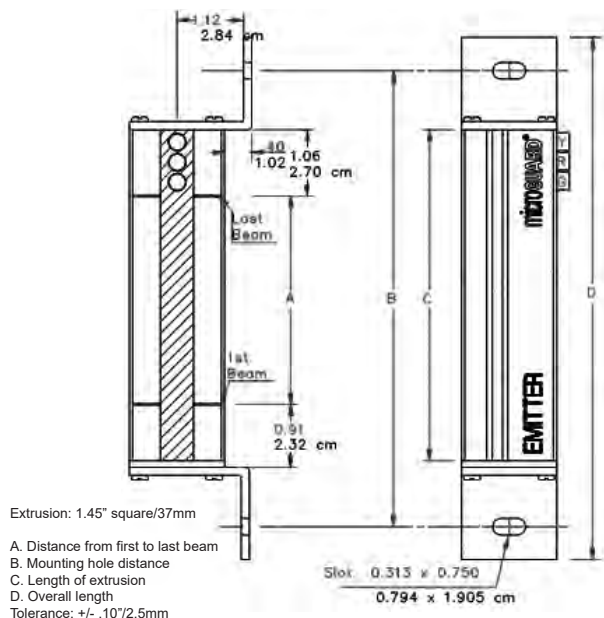
- **Dimensions:** 1.45" (36.8mm) square X selected length (see tables for lengths)
- **Beam Spacing & Minimum Object Sensitivity (MOS)**
.5" (12.7mm) .55" (14mm) MOS
1" (25.4mm) 1.18" (30mm) MOS
(special order, 4" active area followed by a 4" or 8" gap)
- **Response Time and Scanning Frequency:**
< 30 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 (In/mm)

Model	DIM A	DIM B	DIM C	DIM D
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

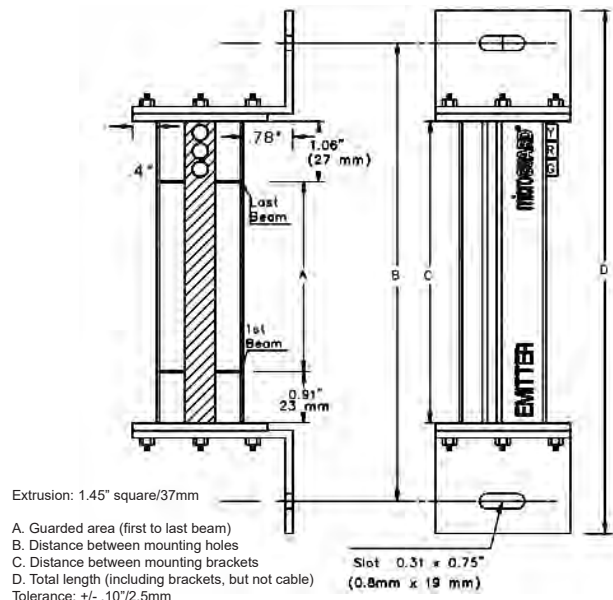
(Incremental additives for longer pylons available)



Pylons with Swivel Mounting Brackets (In/mm)

Model	DIM A	DIM B	DIM C	DIM D
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)



Ordering Procedure

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

Light Curtain Model

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.

No Additional Charge Options (add underlined suff x to part number)

EDM - **External Device Monitoring (EDM):** Feature enabled requires the use of 2 external safety relays

LR - **Resettable Latching Relays:** Requires the light curtain to be manually reset every time the sensing field is penetrated.

Options (Add underlined suffix to part number)

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).

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).

MPI - **Multiple Pylons (two sets)**

Connected via the CAN Network with one light curtain set area/zone share a common output

MP2 - **Multiple Pylons (three sets or more)**

Connected via the CAN Network with light curtain set two areas/zones with two outputs.

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

Accessories

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)

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

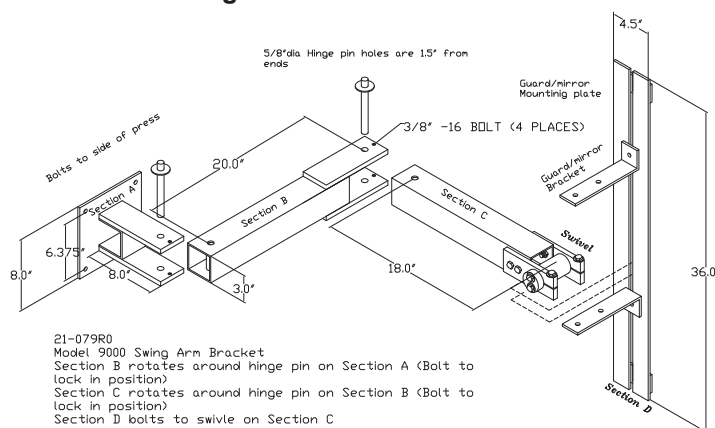
Ordering Procedure

Specify Pedestal Model Number and Quantity

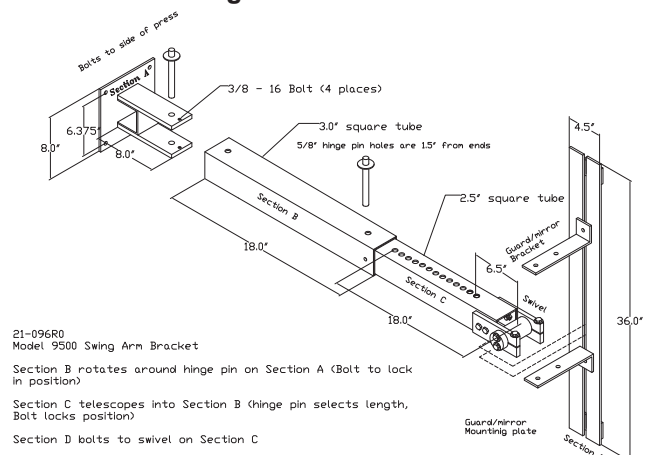
Model 9000 and 9500 Mounting Brackets

Excellent method of mounting the light guard for press brakes or when the light guard is to be moved for die setups or machine maintenance. Model 9000 consists of three 180-pivot points along with light guard diagonal movement capability for virtually unlimited light guard positioning. Two-inch square tubing 3/16" thick painted OSHA yellow which mounts directly onto the machine housing and makes for a heavy duty yet versatile mounting bracket. Model 9500 consists of two 180-pivot points and one adjustable length arm.

Model 9000 Swing Arm Brackets



Model 9500 Swing Arm Brackets



NOTES

NOTES

microGUARD[®]

Advanced control technology
thin profile safety light curtain



- User friendly
- Continual system status checks
- Easily viewed message display
- Fits tight spaces
- Highly reliable solid state performance
- Meets OSHA, UL, ANSI, CSA, RIA, and CE standards
- DeviceNet[™] capable
- Designed to meet international standards
- DIN-rail and Metal Box Controllers available

3rd Party
Certifications



microGUARD®

The Thin Profile Light Curtain With A Smart Controller

More safety features — fits in tight spaces — continual message display communicates system status — high reliability — meets OSHA, ANSI, CSA, RIA, and CE standards.

Introducing MicroGuard, the revolutionary new light curtain. MicroGuard is thin in design, fits into tight spaces, uses reliable infrared technology, solid state construction, is easy to install and continually **visually communicates the system status** with operators and plant personnel.

The MicroGuard advantage is the **advanced smart controller design** that allows the operator and plant personnel to perform **immediate visual** checks on the system status. There are **50 diagnostic messages** which provide an exact determination of the MicroGuard's operational status on a continual basis. **Messages are easily viewed** from the message display on the front of the controller. The operator can verify the condition of operation and status of the system at all times.

For the first time, the MicroGuard's design allows a **quick and easy resolution to system faults and maintenance concerns**. Constant communication between the operator and the MicroGuard will save valuable operating time by reducing machine down time. The self-diagnostic capability allows the MicroGuard to trouble-shoot itself by identifying system faults. This constant operating evaluation allows problems to be immediately corrected. This ensures that each MicroGuard user will get maximum machine utilization.

MicroGuard is **user friendly**. Simple cable hook-ups are used to activate the MicroGuard. Power is common 120VAC, 220VAC, or 24VDC. The thin profile is easily mounted in tight spaces and is available in 30 sizes that can be adapted to any application need. The thin profile pylons feature 1/2" (13mm) or 1" (25mm) beam spacing with an easy alignment feature.

Solid state modular NEMA IV (IP 65) construction is easy to maintain with snap-in circuit board construction. Lens covers are high impact plastic and are easily replaced. The redundant circuit and microprocessor design of the MicroGuard ensures safe, uninterrupted operation.

The MicroGuard is also designed for immunity to noise, light, weld flash, and other ambient light sources and is available in either a metal box enclosure or a compact 35mm DIN-rail mountable enclosure.



Big on Safety/Small in Size

Diverse Redundancy Design Concept

The MicroGuard safety light curtain utilizes the diverse redundancy design concept. This gives the safety light system a higher level of redundancy and control reliability. The two microprocessors are of different design, and the microprocessor or parallel programs are run and made up from different instruction sets written by different programmers.

Self-Checking Circuitry

The MicroGuard safety light curtain self-checks every 20 milliseconds. Self-checking is the ability to electronically verify that all of the systems' critical internal circuit components and their redundant counterparts or back-ups are operating properly.

Extra Safe Design

Provides two methods of cross monitoring design. One utilizes two microprocessors and two captive contact relays and the other uses four watchdog timers monitoring the system and the captive contact relays.

Redundant Captive Contact Safety Relays

Redundant relays assure safety if an output relay should fail. The MicroGuard utilizes safety relays which have force-guided contacts. This is a configuration where the contacts are mechanically locked together so that if one set of contacts weld, the other contacts cannot change state. If one should fail, code "Relay Fault" will be displayed on the diagnostic message display. The complete guarding system consists of two miniature pylons with a controller for system diagnostics and wiring interface.

External Diagnostic Message Display

Standard on all MicroGuard safety light curtains is the "External Diagnostic Display."

Alphanumeric Plain English Messages

Scrolling message display shows status and fault codes of the unit. This is an excellent safety and maintenance feature which is unparalleled in the machine guarding industry for enhancing machine utilization.

Control Reliable System

Critical components of the MicroGuard are duplicated so that a single component failure will not cause an unsafe condition. If a component does fail, the units' self-checking circuitry recognizes the situation and initiates a safe stop of the machine. The fault is then displayed on the message display.

Powerful Infrared Light Source

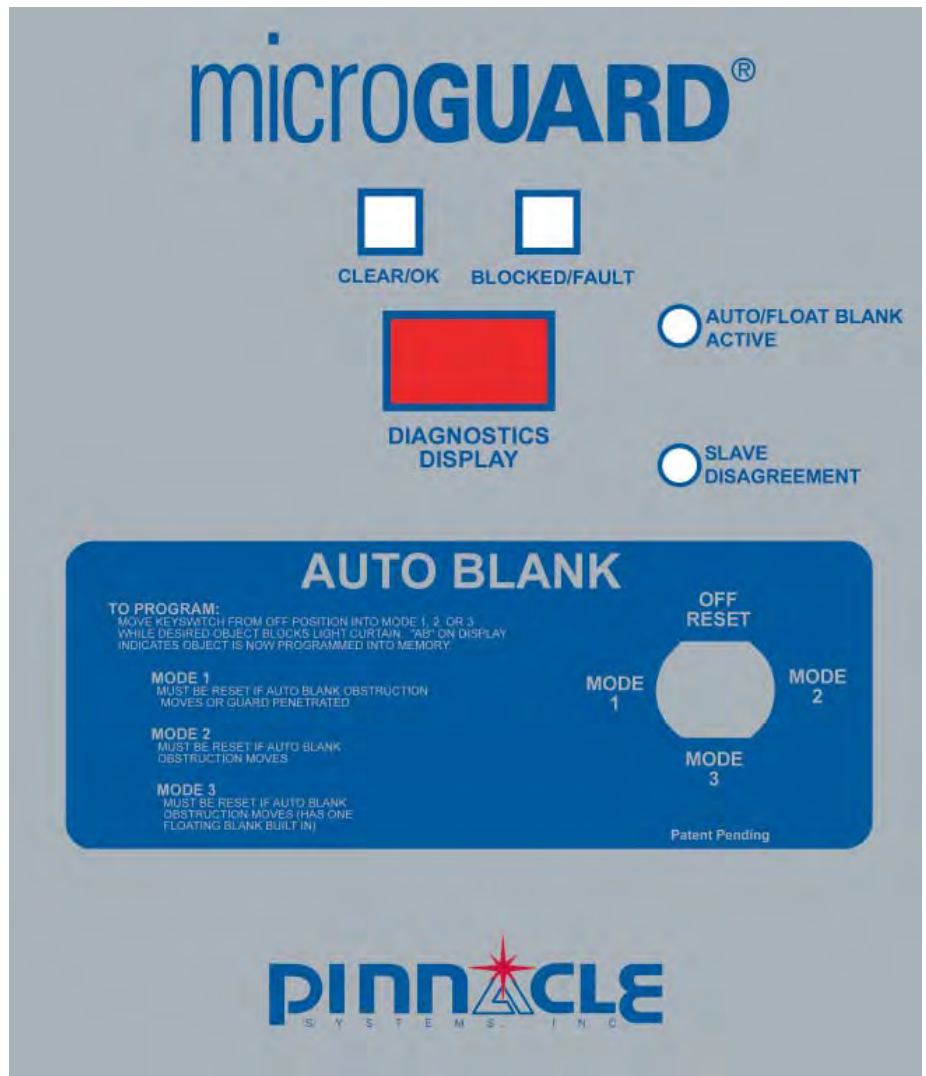
The MicroGuard safety light curtain utilizes powerful, safe, and predictable infrared light as its sensing source. This gives the system greater reliability and enhances machine utilization by minimizing nuisance trips and shutdowns caused by dirt, coolants, lubrication mists, and machine oils. The MicroGuard is highly immune to EMI, RFI, and ambient light conditions and are unaffected by strobe lights and weld flash generated light sources.

Extensive Testing

The MicroGuard safety light curtain incorporates extensive testing and burn-in to establish a high degree of product reliability and safety.

MicroGuard Controller Unique Features

- Same controller for all size light curtains: 4" (102mm) to 120" (3048mm)
- Same controller for various input ranges: 24VDC, 120VAC, 220VAC
- Message display (external) - Bright red LED alphanumeric scrolling message display
- 50 plain English diagnostic and operating status messages
- Counts and displays location of obstructed beams
- Counts and displays number of obstructed beams
- System diagnostics with display to aid in-field maintenance
- Blanking functions controlled by keyed selector switch on front panel with display and indicator
- Smart controller eliminates cumbersome troubleshooting techniques
- Control reliable system
- Internal mute-out system (optional)



MicroGuard Smart Controller

With the “Quickview Diagnostic Message Display”

The Smart MicroGuard Controller makes machine guarding safer, easier to use, and enhances machine utilization measurably. It is unique in the machine guarding industry for the ability to constantly display the operating conditions of the safety light curtain. The Controller informs the user of any faults, failures, and the current operating status of the safety system in plain English on the external message display center. The message display is located on the front panel of the Controller (shown left). This gives the machine operator and front line supervisor access to information quickly and safely.

Sample Display Messages

RECEIVER
LENGTH FAULT

RELAY FAULT
NOT ALL ON

RDY

EXT. RELAY
CONTACT WELDED

The MicroGuard Controller diagnostics message display will show all faults related to redundant circuitry, microprocessors, captive contact safety relays, bad grounds, external infrared sources, shorts, blanking functions, etc. The Controller will also display the locations of misaligned or obstructed beams and then count and display how many beams have been obstructed. Additionally, if a printed circuit board or component should fail, the faulty board and beam number will be shown on the display. The board then can be replaced quickly in the field, eliminating costly downtime.

The counting and displaying the number of beams blanked out is required information when determining the depth penetration factor for proper installation of any light curtain.
ANSI B11.19-2003.

Output Circuitry

Safety Output Configuration

Every MicroGuard comes standard with two Captive Contact Safety Relays, auxiliary relay, and fault relay. The metal box controller can be configured for a “Single Stop” circuit or a “Dual Stop” circuit output.

Single Stop Circuit SS - Both internal Safety Relays are wired in series and the user is provided with one dry contact output. (Open when fault or blocked.) Supplied standard on the Metal Box (MG) Controller.

Dual Stop Circuit DS - Each internal Safety Relay is wired separately which provides the end-user with two separate dry contact outputs. (Both open when fault or blocked.) Add suffix DS to Metal Box (MG) part number.

The DIN-rail controller comes configured for a Dual Stop circuit with a jumper wire between outputs so that the user can wire into a Single Stop circuit system provided they wire both Safety Relays in series.

WARNING - Both safety relays in the dual stop configuration must be wired into the machine isolated stop circuits of the machine control.

Metal Box Controller Module Standard Provisions—designed to facilitate any guarding system interface and monitoring desired. Usage is optional.

CINCINNATI INTERFACE-with Red LED Indicator or EMERGENCY STOP INPUT (optional)

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

EXTERNAL RELAY CHECK-with Green LED Indicator

DESCRIPTION: The External Relay Check allows the MicroGuard to monitor a pair of external relays in series using the external relays secondary set of DRY contacts, provided that they are N.C. force-guided contacts. The captive or force-guided contacts will maintain the identical positions as the primary set of contacts on the external relays, except that the secondary set of contacts are wired to signal the reverse of the primary (i.e., primary are N.O. and secondary are N.C.). The circuit looks for both closing and opening of the external relay contacts. The MicroGuard system is a safe external relay check.

APPLICATION: Monitoring external relay contacts for shorts or opens.

EXTERNAL VOLTAGE CHECK PROVISION-with Green LED indicator

DESCRIPTION: The External Voltage Check allows for the MicroGuard to monitor voltage coming from any outside source as a condition for keeping the light curtain green. This option is very similar to the External Relay Check except that this operates with high voltage so that it can be used to monitor other devices besides relay contacts.

APPLICATION: Monitor voltage at a solenoid, relay, etc.

AUXILIARY OUTPUT CONTACT PROVISIONS

DESCRIPTION: The Auxiliary Output Contact provides both an N.O. and N.C. isolated (DRY) contact output to signal the condition of the light curtain. The output is used in conjunction with the standard pair of output relays that are wired to the safety circuit of the equipment.

APPLICATION: Signal to PLC, etc.

DATA INPUT/OUTPUT FOR USE WITH REMOTE PLC (optional)

DESCRIPTION: This option allows the user to specify up to four signal lines as either input and/or output lines for issuing remote commands to the MicroGuard and/or sending commands to a PLC.

APPLICATION: Use this option if you need to know object size or to use your PLC to program Auto-Blank, Floating-Blank, reset “Penetration,” adjust guarded area, etc. This option is programmed at the factory for the user and is individually customized.

Standard Features and Capabilities

Metal Box Controller Module

- Meets or exceeds OSHA, ANSI, CSA, RIA, CE standards, UL Subject 491, UL1998, IEC 61496 standard parts 1 and 2
- Total system diagnostics and display for component and board level assemblies
- Two sets of operator status indicators
- Modular design for easy in-field maintenance
- Self-checking circuitry
- Fault relay output built-in
- Lockable controller box - NEMA 12 & 13 (IP 64)
- Easy access for wiring
- Push button reset with memory
- High immunity to strobe type and weld flash generated light
- Miniature design
- Extended scanning ranges available
- Replaceable infrared lens cover on pylons
- High immunity to EMI and RFI noise sources
- Interfaces easily with all types of machine controllers and PLC's
- Dual independent channel microprocessor design
- Single/multiple floating beam blanking with indicator
- Single/multiple fixed beam blanking with indicator
- Auto blanking feature with indicator
- Built-in machine interface monitoring
- Dual self-checking captive contact safety relays
- Non-mated units, matched sets are not required
- 2-, 3-, 4-, or 5-sided protection available with mirrors
- 30 standard sizes available: 4" (102mm) to 120" (3048mm) lengths in 4" (102mm) increments
- Easy to align and install
- In-field maintenance
- Multi-lingual diagnostic display available
- Two-year warranty
- Single controller for multiple light curtains (up to four sets)
- Made in the USA

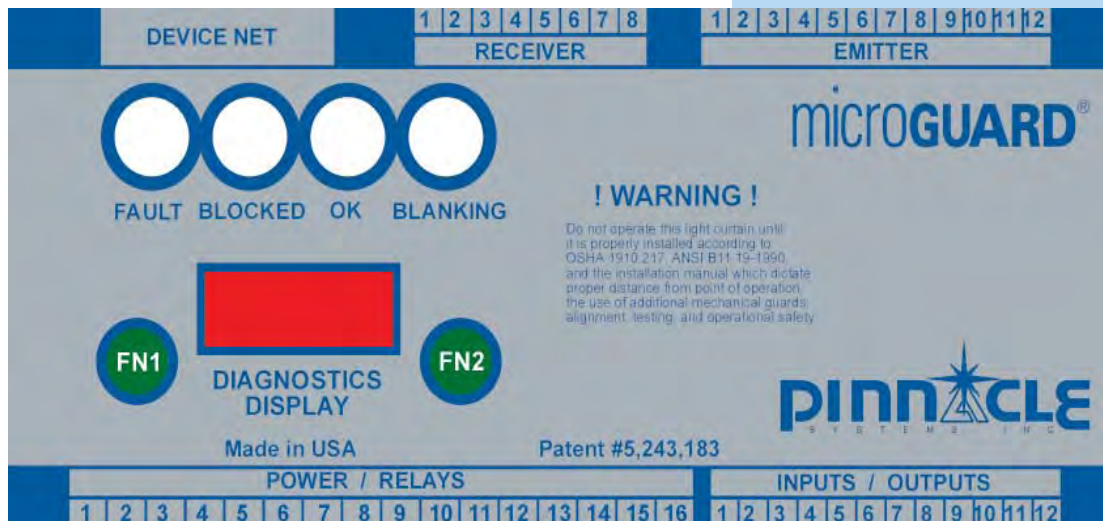


DeviceNet™

Complete system monitoring on DeviceNet fieldbus networks. The MicroGuard controller family is fully compatible with the DeviceNet fieldbus and can be connected directly into the fieldbus for non-safety monitoring of system status. DeviceNet is the leading low-cost communications link that connects a wide range of automated manufacturing devices for greater usability and convenience. Multiple MicroGuard controllers can be networked with numerous other devices on a single DeviceNet network. Add suffix DN to controller part number for this optional feature.

DIN-rail Mountable Controller Module

- Meets or exceeds OSHA, ANSI, CSA, RIA, CE standards, UL Subject 491, UL1998, IEC 61496 standard parts 1 and 2
- Snap-out wiring terminals reduce both installation and maintenance time
- Universal controller for all pylon sizes
- Small and compact DIN-rail Mountable Controller
- Small and compact light curtain pylons
- Multiple status indicators for operator awareness
- Quick disconnect wiring at pylons
- Largest selection of sizes available
- Largest selection of options available
- Multi-lingual diagnostic display available
- Diverse redundant design concept
- Utilizes captive contact force-guided safety relays
- Largest selection of blanking options—fixed or floating blanking
- Patented “auto blank” capable controller
- Remote status display (RSD) capable
- Diagnostic message display built-in
- External relay checking built-in
- Emergency stop input built-in
- Auxiliary relay output built-in
- Fault relay output built-in
- Remote latching reset built-in
- Remote indicator lights output provision built-in
- Push button reset with memory
- Analog output for non-safety related applications (optional) -10v to +10v or 0 to +10v (consult factory)
- Two-year warranty
- Made in the USA



(Actual Size)

DIN-rail Remote Status Display (RSD)TM

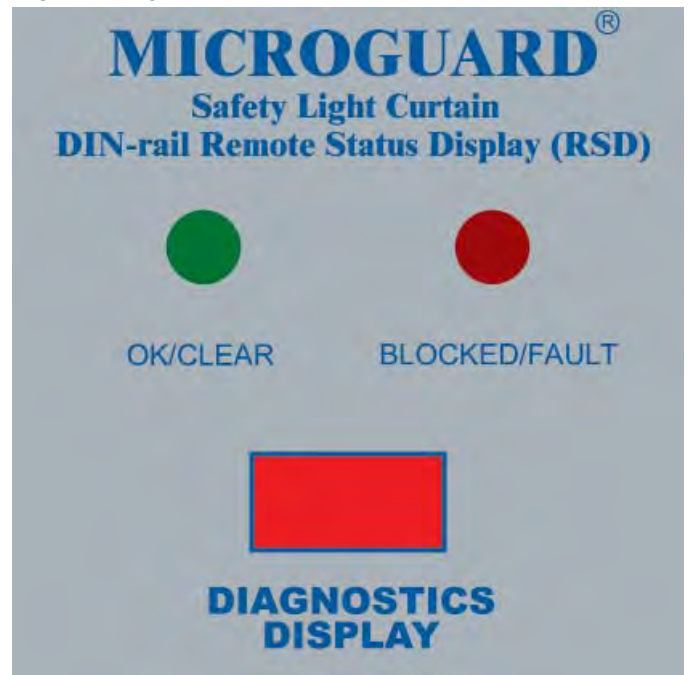
The optional Remote Status Display (RSD) may be used in conjunction with the MicroGuard DIN-rail Controller. The RSD provides the machine operator and front line supervisor immediate system status and diagnostics when the DIN-rail Controller is mounted inside the machine control panel. The RSD can also control all blanking options if that style light curtain is used.

Remote Status Display (RSD) Components:

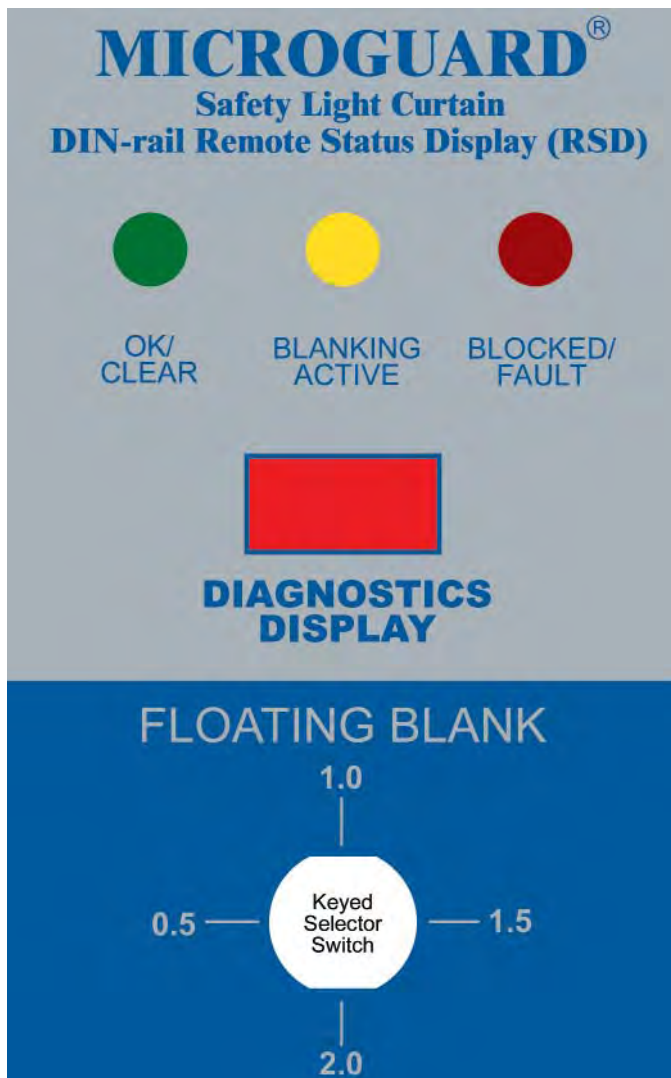
- Red/Green/Yellow indicator lights
- Diagnostic scrolling message display with 5' (1.5m) of connector cable
- Keyed selector switch and yellow blanking active indicator supplied if blanking is used

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.

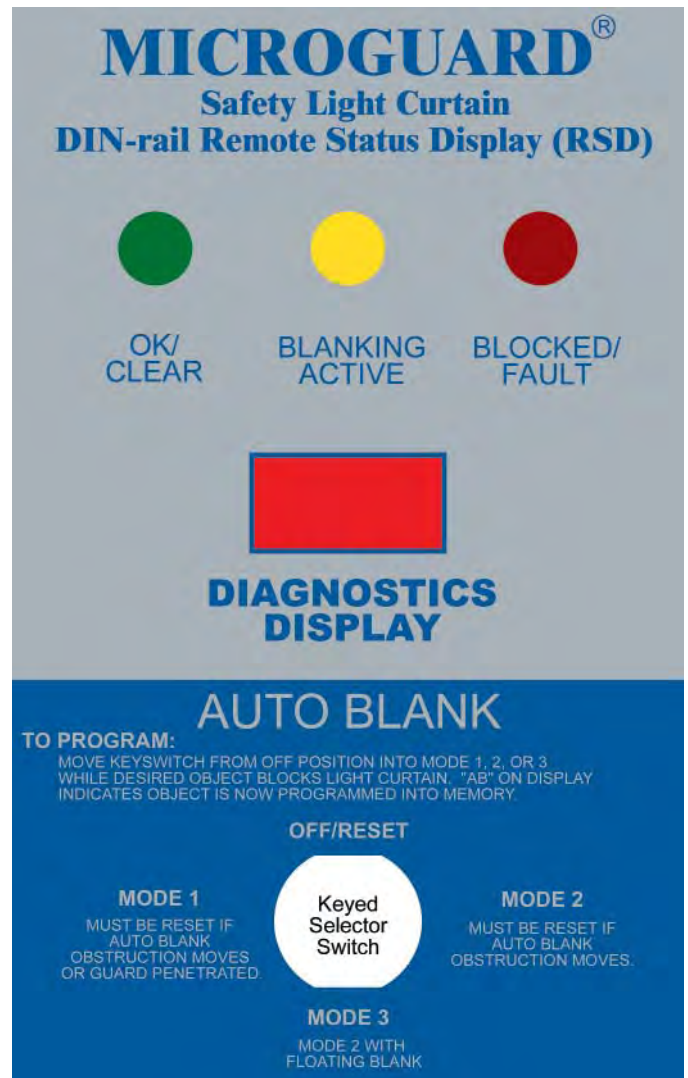
(The RSD's shown are actual size)



Requires 3" (76mm) x 3" (76mm) Panel Cutout
 Mounting Hole Dimensions 3.7" (94mm) x 3.7" (94mm) Center to Center



Requires 3" (76mm) x 5.10" (130mm) Panel Cutout — Mounting Hole Dimensions 3.7" (94mm) x 5.8" (147mm) Center to Center



microGUARD®

Standard System Features for Metal Box and DIN-rail Controllers

- Pylons:**
 - Heavy duty aluminum extrusion NEMA IV (IP 65)
 - Replaceable infrared lens cover (acrylic)
 - Sealed bulkhead positive locking circular connectors
 - Mounting brackets supplied standard
 - Emitter pylon - red/green/yellow status indicators
- Cables:**
 - Shielded PVC 22 AWG cables with quick disconnects and strain relief fittings
 - Emitter cable - 20' (6.1m) supplied standard for the Metal Box Controller Module and 22' (6.7m) supplied standard for the DIN-rail Controller Module
 - Receiver cable - 8' (2.44m) supplied standard for the Metal Box Controller Module and 22' (6.7m) supplied standard for the DIN-rail Controller Module
- **External Alphanumeric Diagnostic & Status Message Display**
- **Infrared Light Source:** Solid state light emitting diodes
- **Beam Spacing:** 1/2" (13mm) or 1" (25mm)
- **Minimum Object Sensitivity:**
 - 1/2" (13mm) beam spacing is .55" (14mm)
 - 1" (25mm) beam spacing is 1.18" (30mm)
- **Response Time:** < 30 milliseconds (all sizes)
- **Scanning Frequency:** 5.9 KHz
- **Temperature Range:** 32° to 120° F (0° -51° C)
- **Shock tested** to withstand high vibration applications per UL991
- **Self-Checking** every 20 milliseconds
- **Scanning Distance:** All units are supplied standard with a 20' (6.1m) scanning capability. Extended range units are available, consult your representative or the factory. Scanning distances must be specified—50' (15.24m) maximum.
- **Complete Guarding System Supplied:** Transmitter and receiver pylons, controller, mounting brackets, connectors and cables, installation and operation manual.
- **CSA Approved, UL Listed, and CE Certified**
- **Two-Year Warranty**
- **Patented #5,243,183**
- **Category 4 Safety Device per EN954**
- **DeviceNet™ Fieldbus Network Compatible (optional)**

Specifications

Metal Box Controller Module

- **Input Power:** 18 to 35VDC @ 10W
90 to 140VAC @ 12VA Standard
140 to 220VAC @ 12VA
All AC voltages work with 50 or 60 Hz
- **Power Consumption:** 11 watts total
- **Output Circuit:** Two captive contact self-checking safety relays
- **Relay Contact Rating:** Rated at 8 AMPS @ 250VAC resistive
- **Auxiliary Output Contact:** Rated at 8 AMPS @ 250VAC resistive
- **Fuses:** AC power: 1 AMP SLOW BLOW
DC power: 1 AMP FAST BLOW
External Voltage Check: 5 AMP FAST BLOW
- **Fault Output Relay:** Isolated output for faults
- **Metal Box Indicators:**

External:	OK/CLEAR	Green LED
	BLOCK/FAULT	Red LED
	AUTO/FLOAT ACTIVE	Yellow LED
	SLAVE DISAGREEMENT	Red LED
	DIAGNOSTICS DISPLAY	Alphanumeric scrolling message display
Internal:	+ 12V	Red LED
	Cincinnati Interface	Red LED
	+ 5V	Yellow LED
	External Relay	Green LED
	+ 5V	Yellow LED
	External Voltage	Green LED
	- 5V	Green LED
- **Diagnostic Message Display:** English or Spanish available. Customized languages are also available, consult factory.
- **Push Button Reset with Memory**
- **Enclosure:** All 18 gauge painted steel NEMA 12 (IP 64) lockable box with sealed front panel and sealed cable entry fittings (8 lbs.)

DIN-rail Controller Module

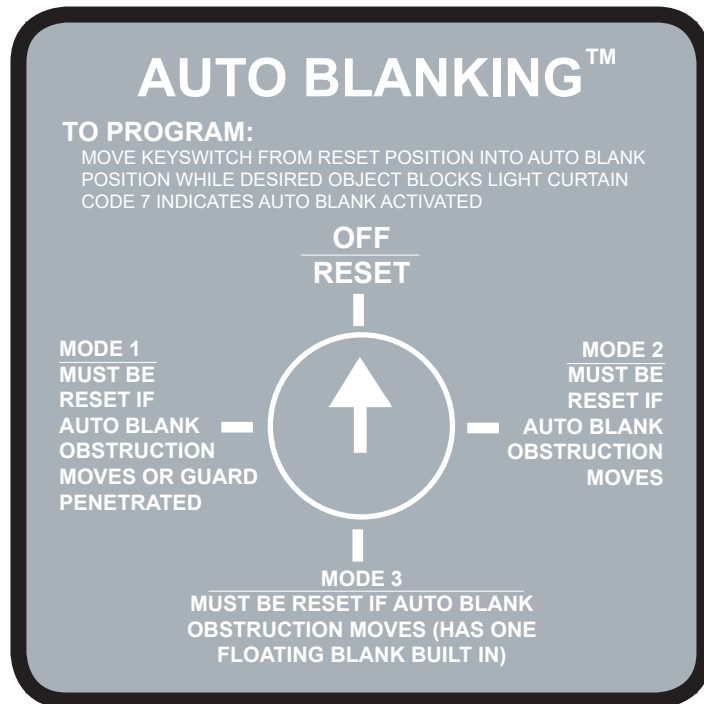
- **Input Power:** 24VDC +/- 20%
- **Power Consumption:** 7 watts maximum
- **Output Circuit:** Two captive contact self-checking safety relays
- **Relay Contact Rating:** Rated at 8 AMPS @ 250VAC resistive
Rated at 8 AMPS @ 120VAC resistive
- **Auxiliary Output Contact:** 5AMP @250VAC resistive
- **Input Fuse:** 1 AMP FAST BLOW (pico size)
- **Fault Output Relay:** 5AMP @250VAC resistive
- **DIN-rail Controller Indicators**

External:	CLEAR/OK	Green LED
	BLOCK/FAULT	Red LED
	BLANKING ACTIVE	Yellow LED
	BLOCKED	Red LED
Internal:	+ 5V	Yellow LED's (2)
	Relays	Green LED's (4)
	+ 12V	Red LED (1)
	- 5V	Green LED (1)
- **Emergency Stop Input Built-In**
- **Diagnostic Message Display:** English or Spanish available. Customized languages are also available, consult factory.
- **Push Button Reset with Memory**
- **Enclosure:** Gray polycarbonate with clear cover. Provides IP40, UL94V-1
- **Enclosure Dimensions:** 5.87" (149mm) length x 4.33" (110mm) depth x 2.95" (75mm) height
- **Enclosure Mounting:** 35mm DIN-rail mountable
or
Mounting screws on corners of enclosure requiring two combo-head screws (3.5 x 0.6mm x 14mm or #6 x .5)

Blanking Options for Metal Box & DIN-rail Controllers

The Most Complete Format of Blanking Options Available in Industry

Select the Style Best Suited for Your Application



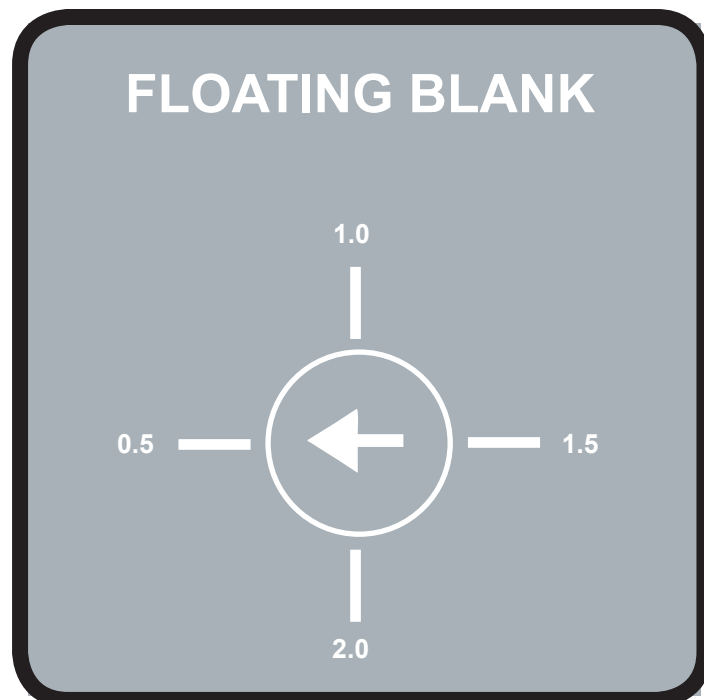
Auto-Blanking - (AB) Option

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 MicroGuard Controller (shown left). 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.

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
 - B. One "Auto Blank" mode with automatic reset when guarded zone is penetrated



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 (shown left). 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:

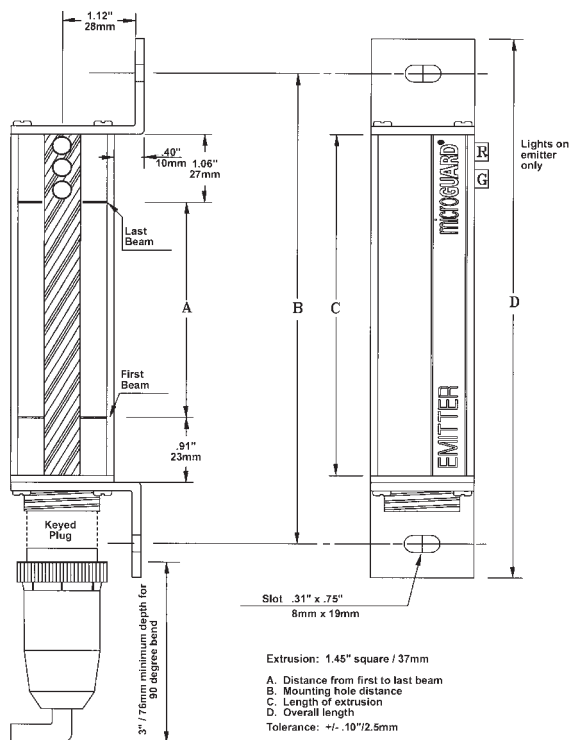
- | | |
|---------------|-------------------------------|
| 1/2" (13mm) | - Constant scan light curtain |
| 1" (25mm) | - One floating beam |
| 1-1/2" (38mm) | - Two floating beams |
| 2" (51mm) | - Three floating beams |

Dimensions

Pylons with Fixed Mounting Brackets

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

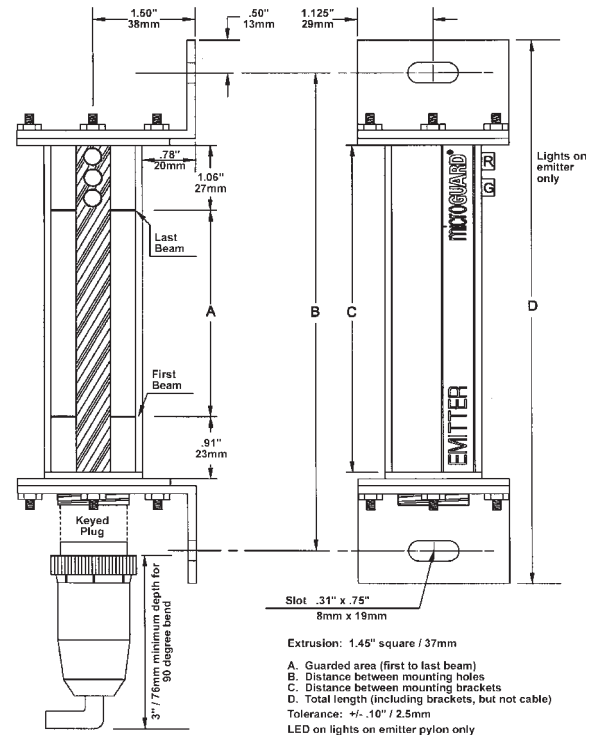
(Incremental additives for longer pylons available)



Pylons with Swivel Mounting Brackets

Model	DIM A (In/mm)	DIM B (In/mm)	DIM C (In/mm)	DIM D (In/mm)
MG-04	3.50 / 89	7.93 / 201	5.35 / 136	8.93 / 227
MG-08	7.50 / 190	11.93 / 303	9.35 / 238	12.93 / 328
MG-12	11.50 / 292	15.93 / 405	13.35 / 339	16.93 / 430
MG-16	15.50 / 394	19.93 / 506	17.35 / 441	20.93 / 532
MG-20	19.50 / 495	23.93 / 608	21.35 / 542	24.93 / 633
MG-24	23.50 / 597	27.93 / 709	25.35 / 644	28.93 / 735
MG-28	27.50 / 698	31.93 / 811	29.35 / 745	32.93 / 836
MG-32	31.50 / 800	35.93 / 913	33.35 / 847	36.93 / 938
MG-36	35.50 / 902	39.93 / 1014	37.35 / 949	40.93 / 1040
MG-40	39.50 / 1003	43.93 / 1116	41.35 / 1050	44.93 / 1141
MG-44	43.50 / 1105	47.93 / 1199	45.35 / 1152	48.93 / 1224
MG-48	47.50 / 1206	51.93 / 1319	49.35 / 1253	52.93 / 1344
MG-52	51.50 / 1308	55.93 / 1421	53.35 / 1355	56.93 / 1446
MG-56	55.50 / 1409	59.93 / 1522	57.35 / 1457	60.93 / 1548
MG-60	59.50 / 1511	63.93 / 1624	61.35 / 1558	64.93 / 1649
MG-64	63.50 / 1613	67.93 / 1725	65.35 / 1660	68.93 / 1751

(Incremental additives for longer pylons available)

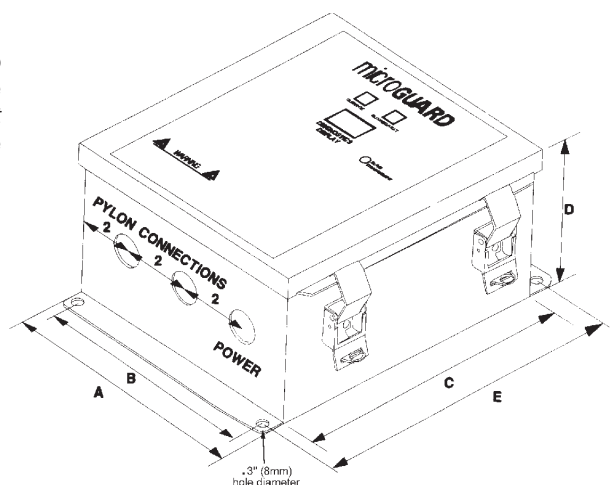


Metal Box Controller Module

For multiple light curtain controllers, the Emitter pylons are plugged into the top of the enclosure and the Receivers are plugged into the bottom as shown. The holes on the top of the box are mirror images of the bottom holes. For single light curtain controllers, the Emitter and Receiver pylons are both plugged into the bottom as shown.

Tol. +/- 0.10 inches / 2.54 mm

Dim	Single	Multiple
A	7" / 178mm	8" / 203mm
B	4" / 102mm	7" / 178mm
C	8" / 203mm	9" / 229mm
D	4" / 102mm	4" / 102mm
E	8.65" / 220mm	9.85" / 250mm



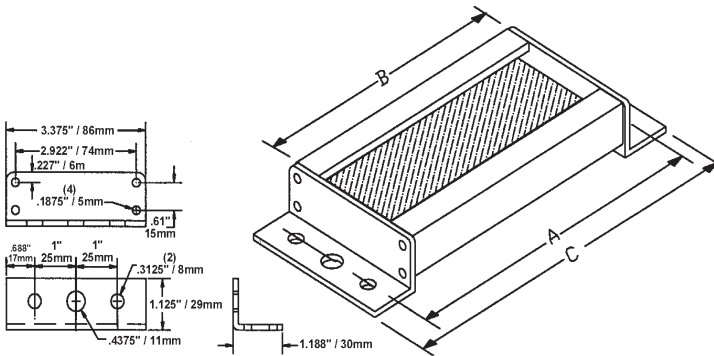
Accessories

Cornering Mirror Dimensions

Through the use of cornering mirrors, multiple sides or work envelopes can be guarded which enhance safety and down-time related to mechanical and electrical interlock systems. Be sure to include a 5% reflectivity loss per mirror when calculating total scanning distance of light curtain.

Note: Mirrors are surface coated.

MODEL	DIM A (in/ mm) (hole to hole)	DIM B (in/mm) (mirror length)	DIM C (in/mm) (total length)
MGM-04	7.45 / 189	6.25 / 159	8.50 / 216
MGM-08	11.45 / 291	10.25 / 260	12.50 / 318
MGM-12	15.45 / 392	14.25 / 362	16.50 / 419
MGM-16	19.45 / 494	18.25 / 464	20.50 / 521
MGM-20	23.45 / 596	22.25 / 565	24.50 / 622
MGM-24	27.45 / 697	26.25 / 667	28.50 / 724
MGM-28	31.45 / 799	30.25 / 768	32.50 / 826
MGM-32	35.45 / 900	34.25 / 870	36.50 / 927
MGM-36	39.45 / 1002	38.25 / 972	40.50 / 1029
MGM-40	43.45 / 1104	42.25 / 1073	44.50 / 1130
MGM-44	47.45 / 1205	46.25 / 1175	48.50 / 1232
MGM-48	51.45 / 1307	50.25 / 1276	52.50 / 1334
MGM-52	55.45 / 1408	54.25 / 1378	56.50 / 1435
MGM-56	59.45 / 1510	58.25 / 1480	60.50 / 1537
MGM-60	63.45 / 1612	62.25 / 1581	64.50 / 1638
MGM-64	67.45 / 1713	66.25 / 1683	68.50 / 1740

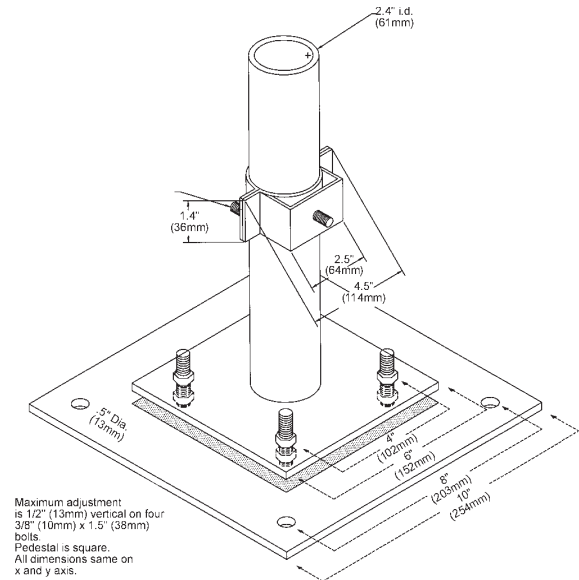


Pedestal Dimensions (Model 8000)

The heavy duty, all-welded steel pedestal floor mounts can be used for mounting either the emitter pylons, receiver pylons, and/or cornering mirrors. Sliding mounts on the pedestal are universal in 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 after installation; they must not be movable.

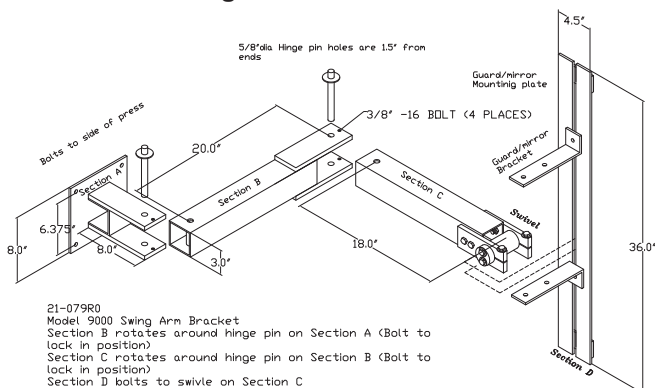
- 1) Sliding mounts supplied
 - 2) Standard height = 72" (1829mm) Model 8000
Optional 96" (2438mm), Model 8096
 - 3) Painted OSHA yellow
 - 4) Pedestal - 12 gauge steel
Base Plate - .25" (6mm) steel plate
- Ordering Procedure:** Specify Pedestal Model # and Quantity



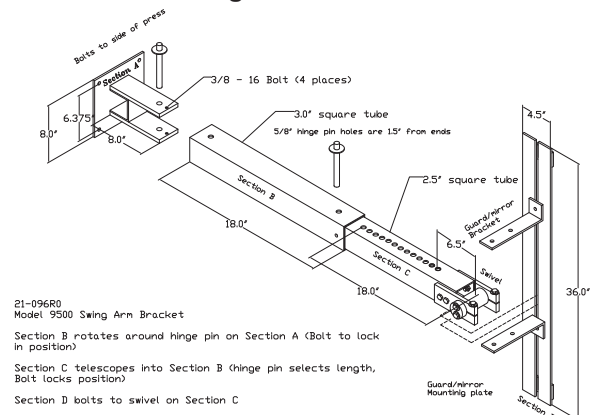
Model 9000 and 9500 Mounting Brackets

Excellent method of mounting the light guard for press brakes or when the light guard is to be moved for die setups or machine maintenance. Model 9000 consists of three 180-pivot points along with light guard diagonal movement capability for virtually unlimited light guard positioning. Two-inch square tubing 3/16" thick painted OSHA yellow which mounts directly onto the machine housing and makes for a heavy duty yet versatile mounting bracket. Model 9500 consists of two 180-pivot points and one adjustable length arm.

Model 9000 Swing Arm Brackets



Model 9500 Swing Arm Brackets



Ordering Procedure



Example
Part #

MG - 04 - OF - 20 - (Options)

Light Curtain Controller
Module Housing

Pylon
Size

Light Curtain
Style and
Beam Spacing

Scanning distance
in feet-20' (6.1m)
standard, 50'
(15.24m) maximum

Light Curtain Controller Module Housing

MG - NEMA 12 & 13 (IP 64) stand alone Metal Box Controller Module

DR - 35mm DIN-rail Mountable Controller Module (24VDC Input Power Only)

Pylon Sizes (Protected Area)

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: 04,08,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92,
96,100,104,108,112,116,120

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.

AB - Includes constant scan light curtain, one beam floating blank, and two auto blank modes.

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.

AB1 - Includes constant scan light curtain, one beam floating blank, and two auto blank modes.

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).

Options (Add underlined suffix to part number)

AVAILABLE ON BOTH METAL BOX & DIN-RAIL CONTROLLERS

SMB - **Swivel Mounting Brackets for Pylons:** Replaces the fixed mounting brackets normally supplied. Provides a 360° rotation of pylons.

MO - **Guarding Mute-Out:** Mutes out the light curtain during the non-hazardous portion of the machine cycle.

DN - **DeviceNet™:** Fieldbus network compatible.

Extended Range Units: 21' (6.4m) to 35' (10.67m) scanning distances (specify desired scanning distance).

AVAILABLE ON THE METAL BOX CONTROLLER

LR - **Resettable Latching Relays:** Requires the light curtain to be manually reset every time the sensing field is penetrated (*built-in standard on the DIN-rail Controller Module*).

SC - **Single Controller for Multiple Light Curtains:** Cost effective approach when a machine requires multiple light curtains. All curtains are controlled by a single MicroGuard controller. Up to four sets of pylons can be connected to the controller.

ES - **Emergency Stop Input:** E-Stop input requiring the MicroGuard to issue a stop command (*built-in standard on the DIN-rail Controller Module*).

24VDC - **24VDC Input Power:** Required for 24VDC input power.

220VAC - **220VAC Input Power:** Required for 220VAC input power.

AVAILABLE ON THE DIN-RAIL CONTROLLER

RSD - **DIN-rail 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 option keyswitch (if applicable), and status indicator lights (all styles).

CI - **Cincinnati Interface:** Requires the MicroGuard to issue a stop command every machine cycle (*built-in standard on the Metal Box Controller Module*).

AO - **Analog Output for Non-Safety Applications:** -10VDC to +10VDC or 0VDC to +10VDC.

EXTRA PYLON PROTECTION (OPTIONAL)

- PT** - **Polycarbonate tube** which will encase the pylons for high impact protection.
- AT** - **Acrylic Tube** which will encase the pylons for protection from caustic and/or chemical agents.

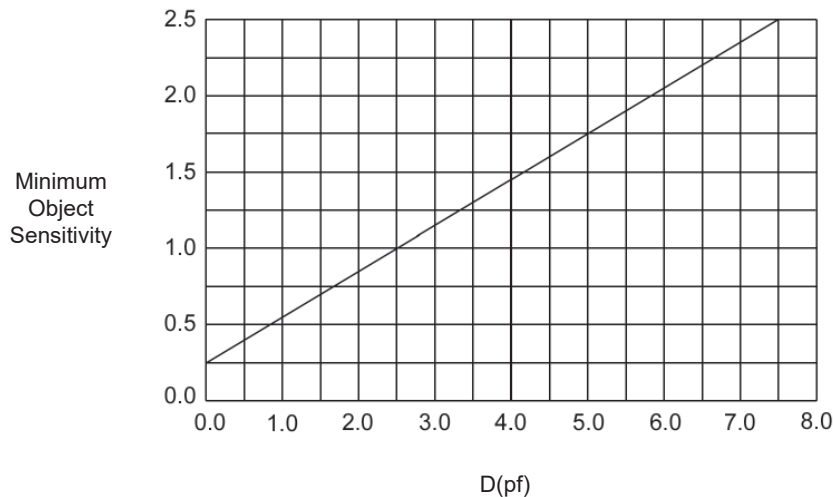
Formula for calculating light curtain safety distance

The effective sensing field of the device shall be located at a distance from the nearest recognized hazards such that the operator or others cannot reach the hazard with a hand or other body part before cessation of motion during the hazardous portion of the machine cycle.

The point at which a device responds to an intrusion may vary. The devices should be located or adjusted such that the device always responds to the intrusion at or prior to the safety distance. Care should be exercised when installing the device to ensure that it does not detect false signals from other devices in the area.

Usually the electro-optical presence-sensing device is used in a manner that provides a protected zone in front of the primary work area with auxiliary devices or guards used to protect secondary access areas. In some cases, however, mirrors may be used in conjunction with the device to provide 2-, 3-, 4-, or 5-sided protection.

The machine stop time should be measured with the machine running at its fastest speed with its heaviest die or tooling and the stop time being measured at the 90° position in the downstroke.



The following formula should be used when calculating the safety distance:

$$Ds = K \times (Ts + Tc + Tr + Tbm) + D(pf)$$

- Ds** = Minimum safety distance between the device and the nearest point of operation hazard (in inches).
- K** = Hand speed constant. This value has been determined by various studies and, although these studies indicate speeds of 63 in/sec to over 100 in/sec, they are not conclusive determinations. The employer should determine this value by considering all factors, including physical ability of the operator.
- Ts** = Stop time of the machine tool measured by a stop time measurement device.
- Tc** = Response time of the control system (usually is taken care of by the measurement device).
- Tr** = Response time of the presence-sending device and it's interface, if any, as stated by the manufacturer or measured by the employer.
- Tbm** = Additional time allowed for the brake monitor to compensate for variations in normal stopping time.
- D(pf)** = Depth Penetration Factor. Added distance as indicated by the above chart. The minimum object sensitivity is stated by the manufacturer.

NOTES

NOTES

Model CE

Safety Light Curtain

with Solid State Outputs and
External Device Monitoring (EDM)



- 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



PINNACLE
SYSTEMS, INC.

The Ultimate in Safety – Quality – Value – Worldwide



The Model CE 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 EN 954-1). A single fault anywhere within the Model CE 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 CE 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" (13mm), up to 8" (203mm) 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 CE employs infrared technology in a small sealed NEMA 4 (IP65) 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 CE: 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.

External Device Monitoring (EDM). A method in which the Model CE Category 4 safety light curtain logic monitors the state of various external control devices. The control devices are external and not part of the Model CE light curtain pylons. A lockout or stop signal will result if an unsafe state is detected in an external device.

The External Device Monitoring (EDM) is an optional function of the Model CE safety light curtain for monitoring the status of external devices such as gate and door switches, safety switches or the main control element of the drive (MPCE).

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

The optional Remote Status Display (RSD) may be used in conjunction with the Model CE Safety Light Curtain. The RSD provides the machine operator and front line supervisor immediate system status and diagnostics when the Model CE 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.

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 8 beams blanked 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

Safety Relay and Socket Assembly

Part # 52-278 (Two Required)

DIN-Rail or Back Plate Mounting



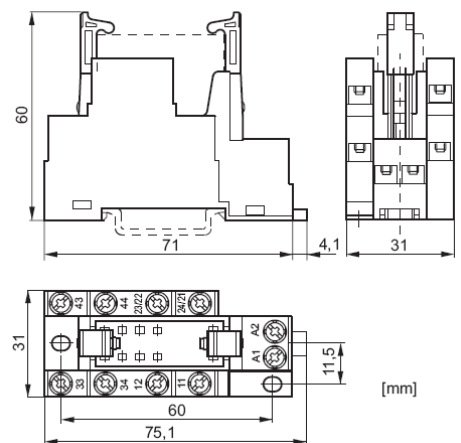
Contact material	AgSn O ₂ + O.2μm Au
Type of contact	Crest contact
Rated switching capacity	250VAC 8A AC1 2'000VA
Electr. Life AC1 (360 cycles/h)	Approx. 100'00
Inrush current max.	20A for 20ms
Switching voltage range	5 to 250 VDC/VAC
Switching current range*	10mA to 8A
Switching capacity range*	0.06VA(W) to 2'000VA
Contact resistance (as delivered)	≤100m Ω/28V/100mA
*Guide values	

- Safety relay with force guided contacts (dry)
- Relay configuration: 2NO/1NC
- Mean coil power 0.75W
- Holding power 0.21W
- EN 50205 type A



- DIN rail socket
- Integrated retaining/ejector handles
- Screw terminals
- Assembly on DIN rail 35mm or with 2xM3 screws

Technical data	
Rate current	6A
Rated voltage	250VAC
Test voltage coil/contacts	2'500Veff
Insulation class (IEC 60664-1)	250VAC
Creepage resistance	CTI 250
Weight	Approx. 65g
Ambient temperature	-25°C to +70°C
Cross sections for connection with	
-wires	2x2.5mm ²
-end sleeves for strands	2x1.5mm ²
Torque max.	0.8 Nm

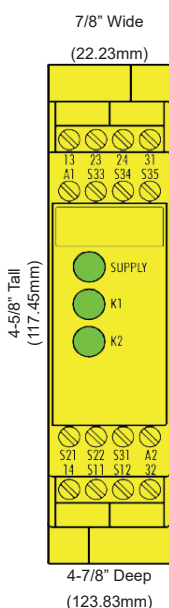


-OR-

SSSR Safety Relay Interface

Part # SSSR

Allows customer selectable Manual or Auto Reset.
Fits in a smaller space than two 52-278 safety relays.



Basic device for Emergency-Stop and Safety Gate Applications

- Basic device to EN 60204-1:2005 and EN ISO 13849:2007 for single or dual E-stop monitoring.
- PL e / category 4 in accordance with EN ISO 13849-1:2007 (previously EN 954:1997 category 4)
- SILCL 3 in accordance with EN 62061:2005
- Stop category 0 acc. EN 60204-1
- Manual or automatic start
- Cross monitoring
- Feedback loop to monitoring external contactors
- 2 Enabling paths, 1 signalling path
- Processing of signals from output switching devices (OSSD) of light curtains acc. EN 61496-1.
- To connect to load side of safety mats acc. EN 1760-1
- Debouncing of inputs

Description of Device and Function

SSSR - This device is a two-channel safety switching device for emergency stop applications with self-monitoring on each ON-OFF cycle. It conforms to EN 60204-1 and is equipped with positively driven relays.

Basic function: After supply voltage has been connected to terminals A1/A2 and the safety inputs closed, operating the reset button closes the enabling current paths (manual start). When the safety inputs are opened/de-excited the enabling current paths will open.

Specifications and Dimensions

- **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 (.5A maximum each output) (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 4 (IP65) protection. Cables are both 21' (6.4m) long with a flexible in-line connector 12" (254mm) from the base of each pylon (shielded). Maximum 100' (30.4m)
 - Emitter pylon: Four conductor 24AWG (Shielded)
 - Receiver pylon: Eight conductor 24AWG (Shielded)
 - Pylons: Yellow, with swivel mounting brackets
 - Cables: Black, shielded
- **Temperature:** 0 to 50c (up to 95% humidity, non-condensing)
- **Dimensions:** 1.45" (36.8mm) x 1.95" (49.5mm)
- **Beam Spacing & Minimum Object Sensitivity (MOS)**
 - .5" (12.7mm) .55" (14mm) MOS
 - 1" (25.4mm) 1.18" (30mm) MOS
 - (special order, 4" (102mm) active area followed by a 4" (102mm) gap)
 - (special order, 4" (102mm) active area followed by a 8" (204mm) 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' (6-15.24m) 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 CE output circuits must be used with
"control reliable" designed control systems.

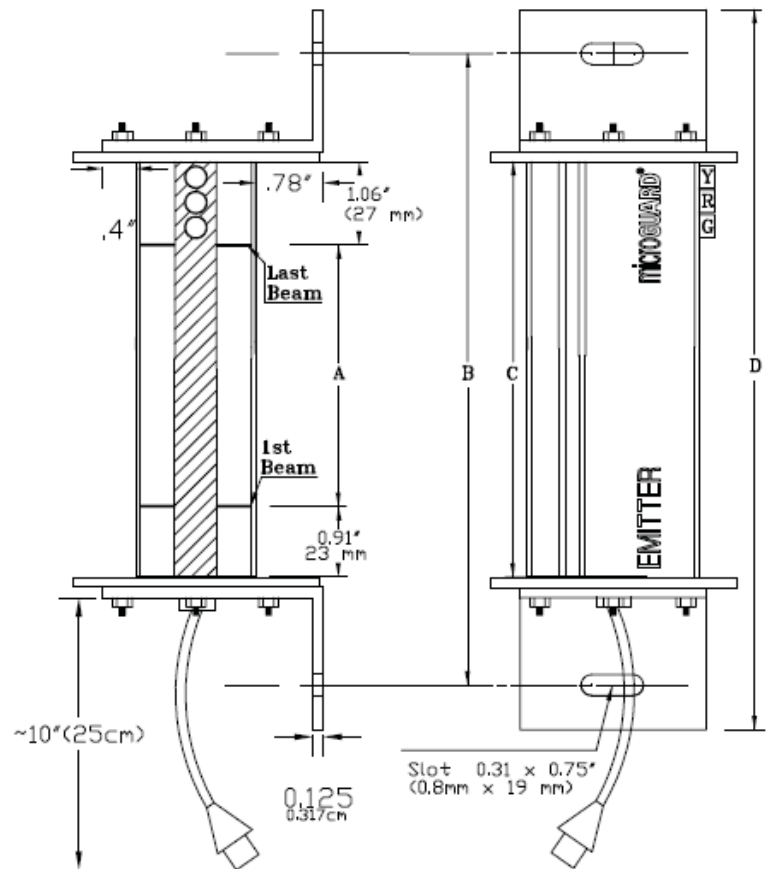


Pylons with Swivel Mounting Brackets

Model	DIM A (In/mm)	DIM B (In/mm)	DIM C (In/mm)	DIM D (In/mm)
CE-04	3.50 / 89	7.93 / 201	5.35 / 136	8.93 / 227
CE-08	7.50 / 190	11.93 / 303	9.35 / 238	12.93 / 328
CE-12	11.50 / 292	15.93 / 405	13.35 / 339	16.93 / 430
CE-16	15.50 / 394	19.93 / 506	17.35 / 441	20.93 / 532
CE-20	19.50 / 495	23.93 / 608	21.35 / 542	24.93 / 633
CE-24	23.50 / 597	27.93 / 709	25.35 / 644	28.93 / 735
CE-28	27.50 / 698	31.93 / 811	29.35 / 745	32.93 / 836
CE-32	31.50 / 800	35.93 / 913	33.35 / 847	36.93 / 938
CE-36	35.50 / 902	39.93 / 1014	37.35 / 949	40.93 / 1040
CE-40	39.50 / 1003	43.93 / 1116	41.35 / 1050	44.93 / 1141
CE-44	43.50 / 1105	47.93 / 1199	45.35 / 1152	48.93 / 1224
CE-48	47.50 / 1206	51.93 / 1319	49.35 / 1253	52.93 / 1344
CE-52	51.50 / 1308	55.93 / 1421	53.35 / 1355	56.93 / 1446
CE-56	55.50 / 1409	59.93 / 1522	57.35 / 1457	60.93 / 1548
CE-60	59.50 / 1511	63.93 / 1624	61.35 / 1558	64.93 / 1649
CE-64	63.50 / 1613	67.93 / 1725	65.35 / 1660	68.93 / 1751

(Incremental additives for longer pylons available)

A. Guarded area (first to last beam)
B. Distance between mounting holes
C. Distance between mounting brackets
D. Total length (including brackets, but not cable)
Tolerance: +/- .10725mm



Pylon Dimensions: 1.45"(3.68cm) x 1.95" (4.95cm)

Ordering Procedure

Example
Part #

CE	-	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		Add suff x to part number

Model CE Light Curtain Model or Style

CE - Solid State Outputs with External Device Monitoring (EDM) option

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 supervisory 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)

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 supervisory 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)

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.

No Additional Charge Options (Add underlined suffix to part number)

AVAILABLE ON THE MODEL CE

- EDM - **External Device Monitoring (EDM):** Feature enabled
- LR - **Resettable Latching Relays:** Requires the light curtain to be manually reset every time the sensing field is penetrated.

Options (Add underlined suffix to part number)

AVAILABLE ON THE MODEL CE

- RSD - **Model CE 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).

Extended Range Units: 21' (6.4m) to 35' (10.7m) scanning distances (specify desired scanning distance).

- MPI - **Multiple Pylons (two sets)**
Connected via the CAN Network with one light curtain set area/zone share a common output

- MP2 - **Multiple Pylons (three sets or more)**
Connected via the CAN Network with light curtain set two areas/zones with two outputs.

Model CE Output Circuits must be used with "Control Reliable" designed control systems.

Accessories

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)

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.

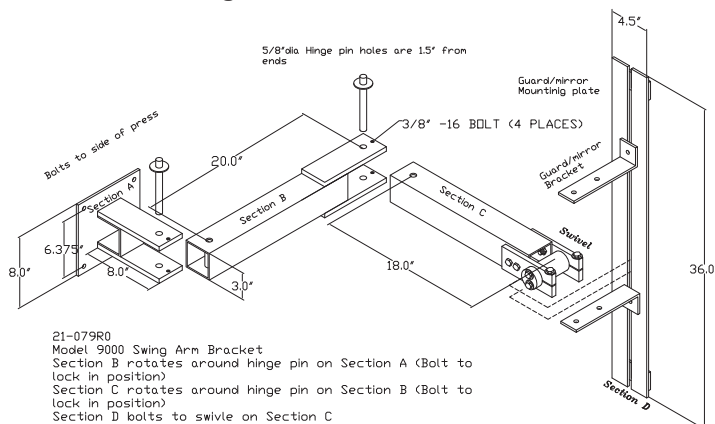
NOTE: Pedestals must be bolted to the floor, they must not be movable (ANSI B11.19-2003).

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

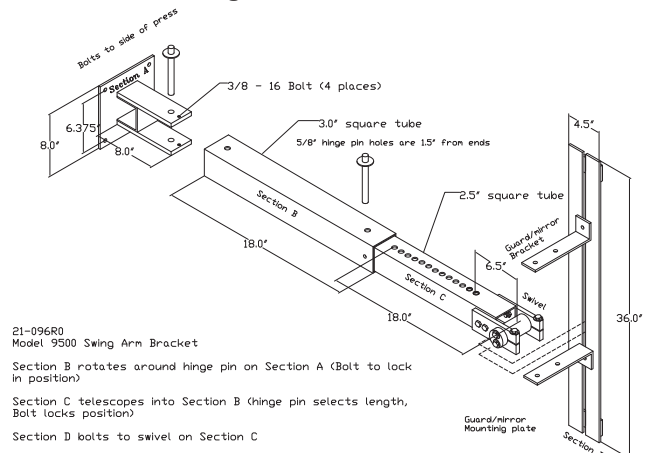
Model 9000 and 9500 Mounting Brackets

Excellent method of mounting the light guard for press brakes or when the light guard is to be moved for die setups or machine maintenance. Model 9000 consists of three 180-pivot points along with light guard diagonal movement capability for virtually unlimited light guard positioning. Two-inch square tubing 3/16" thick painted OSHA yellow which mounts directly onto the machine housing and makes for a heavy duty yet versatile mounting bracket. Model 9500 consists of two 180-pivot points and one adjustable length arm.

Model 9000 Swing Arm Brackets

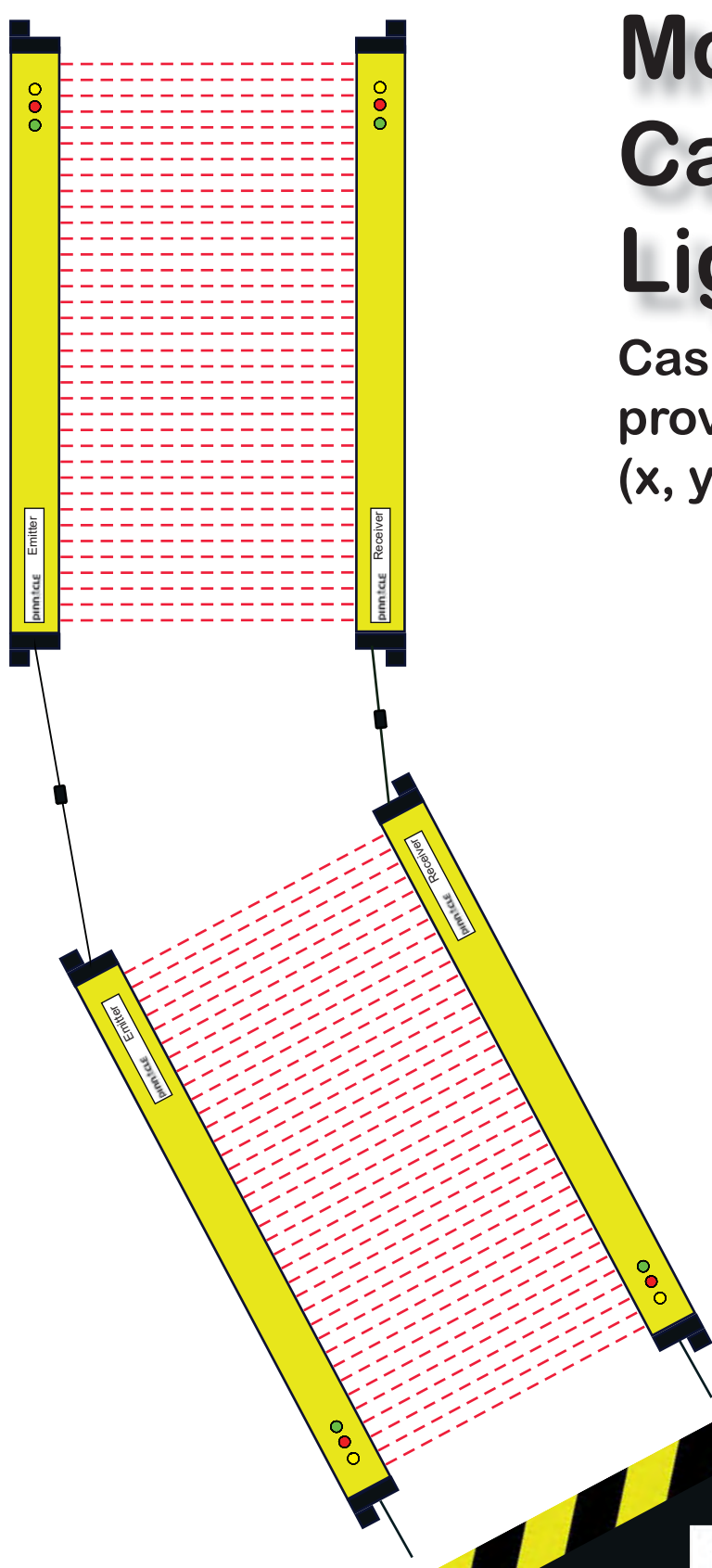


Model 9500 Swing Arm Brackets



NOTES

NOTES



Model CA Cascading Safety Light Curtain

Cascading Safety Light Curtains
provide multiple plane guarding
(x, y and z).

PINNACLE
S Y S T E M S , I N C .

Safety Sensors and Controls for Industrial Machine Guarding Systems

www.pinnaclesystems.com

The Ultimate in Safety – Quality – Value - Flexibility

Cascading safety light curtains provide the user the ability to connect additional sets of light curtains by daisy chaining multiple emitters and receivers together. The interconnecting cables are factory supplied and the user defines length. The cascading of safety light curtains provides multiple areas of guarding in any plane (X, Y, Z), while utilizing the control reliable dual safety outputs from the Category 4 safety device for the safety outputs to the machine control. The ability to guard multiple areas on irregular shaped machines by cascading safety light curtains reduces wiring and provides a lower cost yet effective machine guarding solution.

The Model CA Cascading Safety Light Curtain 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 Model CA System is composed of transmitting units (EMITTERS), and receiving unit (RECEIVERS). The entire system is control reliable Category 4 (per IEC 61496). A single fault anywhere within the Model CA 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 CA Cascading Safety Light Curtain 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 LED pair is spaced along the length of the pylons at regular intervals from .5" (12mm), up to 8" (203mm) 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 end, until every beam pair has been scanned. Two 16 bit computers in the first emitter pylon and two 16 bit computers in the first receiver pylon control the operation, as well as cross check each pylon.

The System.

The Model CA Cascading Safety Light Curtain employs infrared technology in a small sealed NEMA 4 (IP 67) 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 CA: An Emitter pylon and a Receiver pylon. The Emitter pylon has no outputs. The Receiver pylon contains two monitored solid state 24vdc outputs. Both pylon sets are synchronized to each other electronically as they are connected together with the interconnect cables to the top and bottom of the next set of pylons.

System Safety.

The Model CA Cascading Safety Light Curtain incorporates redundant, and diverse technology that provides a backup for every system that could cause an unsafe condition.

External Device Monitoring (EDM).

A method in which the Model CA Category 4 cascading safety light curtain logic monitors the state of various external control devices. The control devices are external and not part of the Model CA light curtain pylons. A lockout or stop signal will result if an unsafe state is detected in an external device. The External Device Monitoring (EDM) is an optional function of the Model CA safety light curtain for monitoring the status of external devices such as gate and door switches, safety switches or the main control element of the drive (MPCE). Solid state outputs are turned on separately to be checked and to assure neither output has been shorted, before fully turning on.

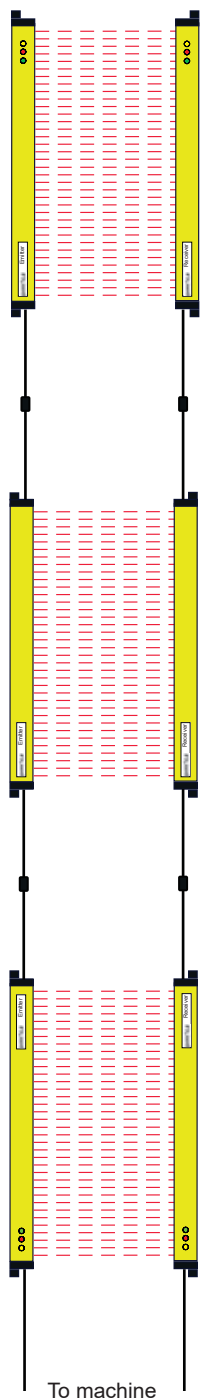
Design Criteria.

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.



Remote Status Display and Blanking Options

Remote Status Display

The optional Remote Status Display (RSD) may be used in conjunction with the Model CA Cascading Safety Light Curtain. The RSD provides the machine operator and front line supervisor immediate system status and diagnostics when the Model CA 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

Blanking Options

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.

(Continued at the top of the next column)

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

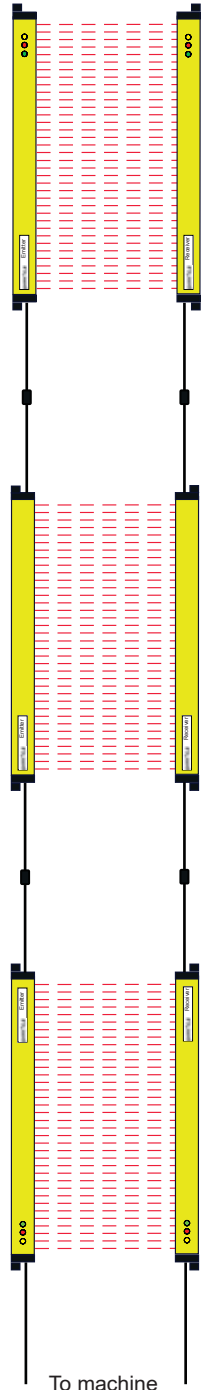
Auto-Blanking - (AB) Option

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 CA 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



Safety Relay and Socket Assembly

Part # 52-278 (Two Required)

DIN-Rail or Back Plate Mounting



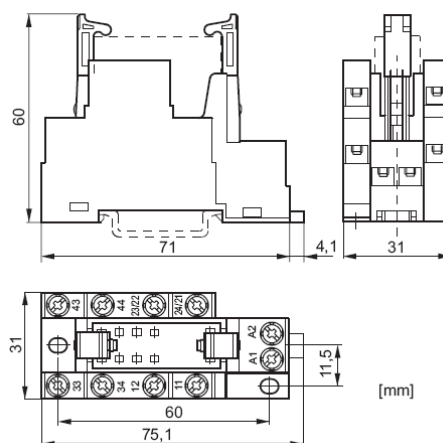
Contact material	AgSn O ₂ + 0.2μm Au
Type of contact	Crest contact
Rated switching capacity	250VAC 8A AC1 2'000VA
Electr. Life AC1 (360 cycles/h)	Approx. 100'00
Inrush current max.	20A for 20ms
Switching voltage range	5 to 250 VDC/VAC
Switching current range*	10mA to 8A
Switching capacity range*	0.06VA(W) to 2'000VA
Contact resistance (as delivered)	≤100m Ω/28V/100mA
*Guide values	

- Safety relay with force guided contacts (dry)
- Relay configuration: 2NO/1NC
- Mean coil power 0.75W
- Holding power 0.21W
- EN 50205 type A



- DIN rail socket
- Integrated retaining/ejector handles
- Screw terminals
- Assembly on DIN rail 35mm or with 2xM3 screws

Technical data	
Rate current	6A
Rated voltage	250VAC
Test voltage coil/contacts	2'500Veff
Insulation class (IEC 60664-1)	250VAC
Creepage resistance	CTI 250
Weight	Approx. 65g
Ambient temperature	-25°C to +70°C
Cross sections for connection with	
-wires	2x2.5mm ²
-end sleeves for strands	2x1.5mm ²
Torque max.	0.8 Nm

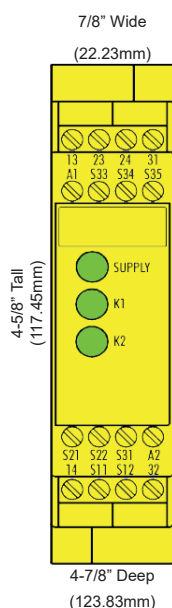


-OR-

SSSR Safety Relay Interface

Part # SSSR

Allows customer selectable Manual or Auto Reset.
Fits in a smaller space than two 52-278 safety relays.



Basic device for Emergency-Stop and Safety Gate Applications

- Basic device to EN 60204-1:2005 and EN ISO 13849:2007 for single or dual E-stop monitoring.
- PL e / category 4 in accordance with EN ISO 13849-1:2007 (previously EN 954:1997 category 4)
- SILCL 3 in accordance with EN 62061:2005
- Stop category 0 acc. EN 60204-1
- Manual or automatic start
- Cross monitoring
- Feedback loop to monitoring external contactors
- 2 Enabling paths, 1 signalling path
- Processing of signals from output switching devices (OSSD) of light curtains acc. EN 61496-1.
- To connect to load side of safety mats acc. EN 1760-1
- Debouncing of inputs

Description of Device and Function

SSSR - This device is a two-channel safety switching device for emergency stop applications with self-monitoring on each ON-OFF cycle. It conforms to EN 60204-1 and is equipped with positively driven relays.

Basic function: After supply voltage has been connected to terminals A1/A2 and the safety inputs closed, operating the reset button closes the enabling current paths (manual start). When the safety inputs are opened/de-excited the enabling current paths will open.

Specifications and Dimensions

- 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 (.5A maximum each output) (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 14 (IP 65) protection.
Optional Polycarbonate tubes (sleeves) over the pylons provides NEMA 4 (IP 65) protection.
Emitter pylon: Four conductor 24AWG
Receiver pylon: Six conductor 24AWG
Pylons: Yellow | Cables: Black
- Temperature:** 0 to 50c (up to 95% humidity, non-condensing)
- Safety Software:** 0 to 50c tested to UL1998 and ISO 9001 standards.
- Pylon Enclosures:** Tested to IEC 60529

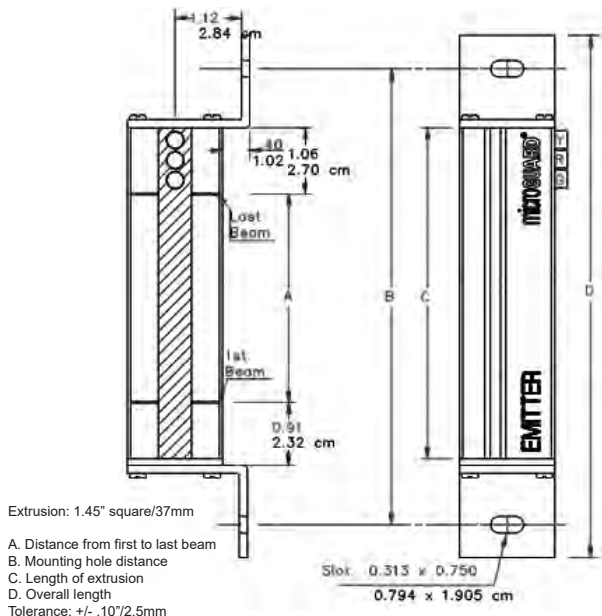
- EMC Testing** to IEC 61000-4 standards.
- Dimensions:** 1.45" (36.8mm) square X selected length (see tables for lengths)
- Beam Spacing & Minimum Object Sensitivity (MOS)**
.5" (12.7mm) .55" (14mm) MOS
1" (25.4mm) 1.18" (30mm) MOS
(special order, 4" active area followed by a 4" or 8" gap)
- Response 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 CA output circuits must be used with either "control reliable" PLC input circuits, or a safety module.

Pylons with Fixed Mounting Brackets (In/mm)

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

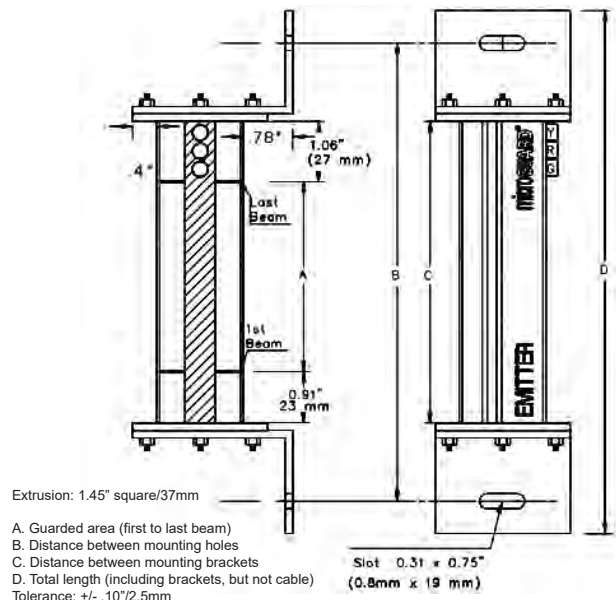
(Incremental additives for longer pylons available)



Pylons with Swivel Mounting Brackets (In/mm)

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

(Incremental additives for longer pylons available)



Ordering/Pricing Procedure

Ordering/Pricing Procedure for Pylons

<u>CA</u>	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3		
Cascading System	Pylon Guarded Zone in inches			Beam Spacing Options			Light Curtain Style or Blanking*	Scanning Distance In Feet
	4" (102mm) to 120" (3,048mm) in 4" (102mm) increments			.5" (13mm) 1" (25mm) 4" (100mm)			OF 1F 8K AB	20' (6.1m) standard, 50' (10.7m) maximum

*Light Curtain Style or Blanking Description

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 supervisory 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)

If modifications are needed, please consult factory.

Options

SMB

- **Swivel Mounting Brackets for Pylons:** Replaces the fixed mounting brackets normally supplied. Provides a 360° rotation of pylons.

PT

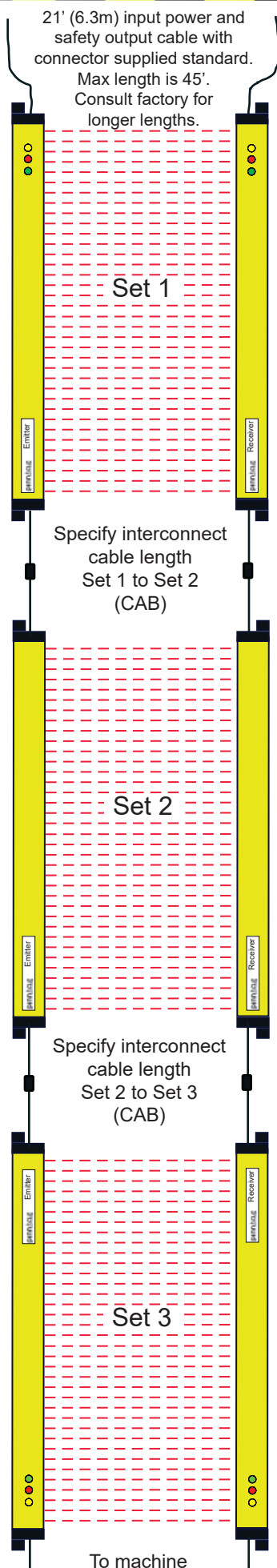
- **Polycarbonate tube** which will encase the pylons for high impact protection.

Ordering/Pricing Procedure for Cables

<u>CAB</u>	<u>21</u>		
Cascading System Cables	21' (6.3m) Supplied Standard	Set 1 to Set 2	Set 2 to Set 3
	Input power (24VDC) and Safety Output Cable with Connector	Interconnecting Cables with Connector	
		Max 6' (1.8m) between sets 24' (7.3m) max cumulative interconnect length in system.	
	200' Maximum Length		

Please note that both the Pylons and Cables part numbers must be submitted to complete the order.

- Pylons can be hard wired together with no connectors if required (consult factory).
- Maximum of 128 beams per system (cumulative).
- Consult factory for larger beam systems or additional segments if needed.



Accessories

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)

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

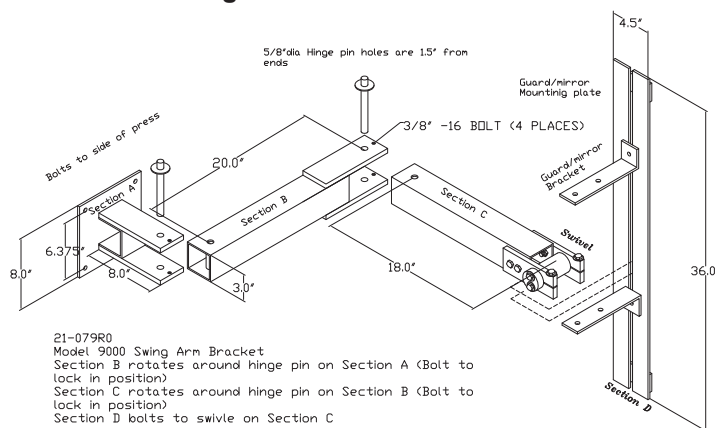
Ordering Procedure

Specify Pedestal Model Number and Quantity

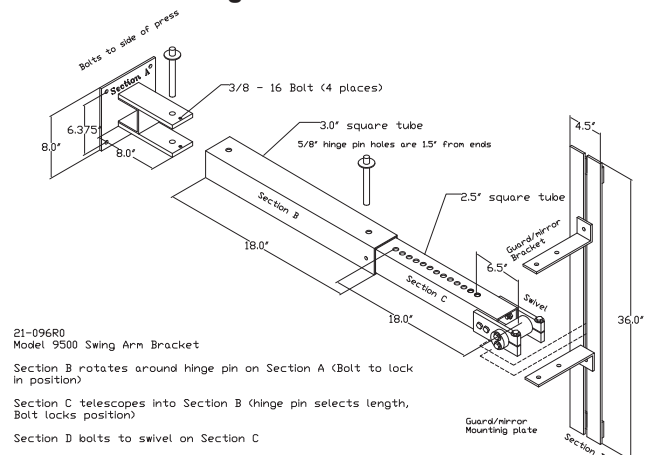
Model 9000 and 9500 Mounting Brackets

Excellent method of mounting the light guard for press brakes or when the light guard is to be moved for die setups or machine maintenance. Model 9000 consists of three 180-pivot points along with light guard diagonal movement capability for virtually unlimited light guard positioning. Two-inch square tubing 3/16" thick painted OSHA yellow which mounts directly onto the machine housing and makes for a heavy duty yet versatile mounting bracket. Model 9500 consists of two 180-pivot points and one adjustable length arm.

Model 9000 Swing Arm Brackets



Model 9500 Swing Arm Brackets



NOTES

NOTES

PPG Series

Perimeter Guarding
(wide beam spacing)



PPG Series (Perimeter Guarding)

Perimeter Guards utilize wider beam spacing than safety light curtains protecting personnel from “pinch point” or “point of operation” hazard zones. Perimeter Guards are designed to detect when an operator or passerby penetrates the perimeter of a hazardous zone. The Perimeter Guard safety light curtain will then initiate a stop signal to the machine control.

Perimeter Guards also incorporate latching safety relays. This requires a manual reset after each penetration into the guarded zone. This is an additional safety feature to protect the intruder from an inadvertent machine actuation while the intruder is within the work area.

Ordering Procedure

Example Part

PPG - 36 - 3.0 - 45 - (Options)

Pref x	Scanning Height	Beam Spacing	Scanning Distance
--------	-----------------	--------------	-------------------

1. Specify height of unit
2. Specify beam spacing
3. Specify scanning distance — 90' (27m) maximum

Pylon Sizes (Protected Area)

Inches: 24, 30, 36, 48, 60, 72, 84, 96

Millimeters: 609.6, 762, 914.4, 1219.2, 1524, 1828.8, 2133.6, 2438.4

Beam Spacing

1.5 - 1.5" (38.1mm) Spacing of Beams
3.0 - 3.0" (76.2mm) Spacing of Beams
6.0 - 6.0" (152.4mm) Spacing of Beams
12.0 - 12.0" (304.8mm) Spacing of Beams

Options

Auxiliary Output Contact. Provides an isolated (dry) contact output to be used as a signal line. Specify N.O. or N.C. output. Add suffix AO to light curtain Model Number.

External Relay Check. This option monitors the control relays of the guarded machine to assure that the machine control relays change state when the safety light curtain sends a stop signal. Add suffix ER to light curtain Model Number.

24VDC Power Source. Add suffix DC to light curtain Model Number.

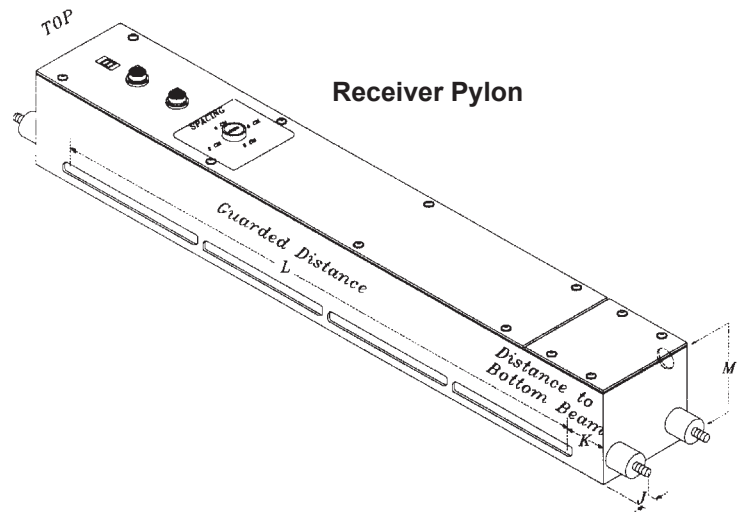
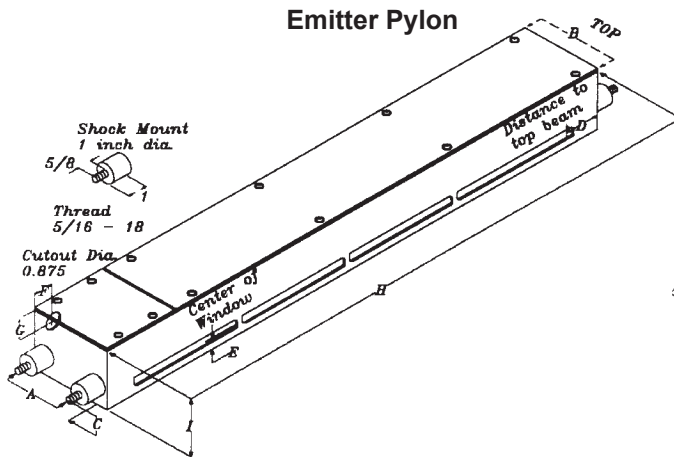


Dimensions

All Models

Dim A	3.00" (76mm)
Dim B	4.25" (108mm)
Dim C	1.00" (25mm)
Dim D	1.87" (48mm)
Dim E	0.62" (16mm)
Dim F	1.00" (25mm)
Dim G	1.00" (25mm)
Dim I	3.25" (83mm)
Dim J	0.62" (16mm)
Dim M	4.25" (108mm)

Model	Dim H (box length)	Dim K (last to end)	Dim L (first to last beam)
PPG-24	28.87" (733mm)	1.87" (48mm)	25.22" (641mm)
PPG-30	36.25" (921mm)	2.87" (73mm)	31.52" (801mm)
PPG-36	42.12" (1070mm)	2.87" (73mm)	37.82" (961mm)
PPG-42	48.37" (1229mm)	2.87" (73mm)	44.12" (1121mm)
PPG-48	54.75" (1391mm)	2.87" (73mm)	50.42" (1281mm)
PPG-60	67.25" (1708mm)	2.87" (73mm)	63.02" (1601mm)
PPG-72	79.75" (2026mm)	2.87" (73mm)	75.62" (1921mm)
PPG-84	91.75" (2330mm)	2.87" (73mm)	88.22" (2241mm)
PPG-96	103.75" (2635mm)	2.87" (73mm)	100.82" (2561mm)

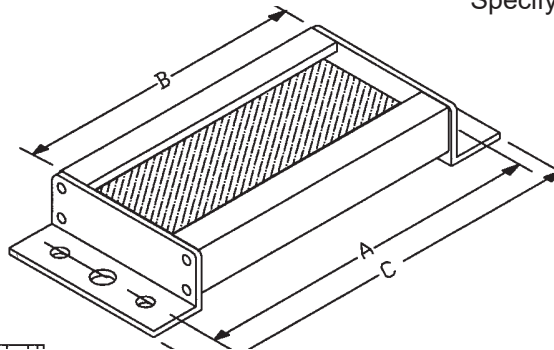
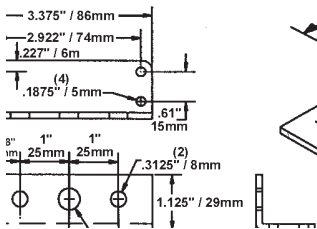


Accessories

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 5% 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)
TRM-12	19.45" (494mm)	18.25" (464mm)	20.50" (521mm)
TRM-18	25.45" (646mm)	24.25" (616mm)	26.50" (673mm)
TRM-24	31.45" (799mm)	30.25" (768mm)	32.50" (825mm)
TRM-30	37.45" (951mm)	35.25" (895mm)	38.50" (978mm)
TRM-36	43.45" (1104mm)	42.25" (1073mm)	44.50" (1130mm)
TRM-42	49.45" (1256mm)	48.25" (1226mm)	50.50" (1282mm)
TRM-48	55.45" (1408mm)	54.25" (1378mm)	56.50" (1435mm)
TRM-60	67.45" (1713mm)	66.25" (1683mm)	68.50" (1739mm)
TRM-72	79.45" (2018mm)	78.25" (1988mm)	80.50" (2045mm)
TRM-84	91.45" (2323mm)	90.25" (2292mm)	92.50" (2350mm)
TRM-96	103.45" (2628mm)	102.25" (2597mm)	104.50" (2654mm)



Ordering Procedure

Specify Mirror Model Number and Quantity

Pedestal Dimensions (Model 8000)

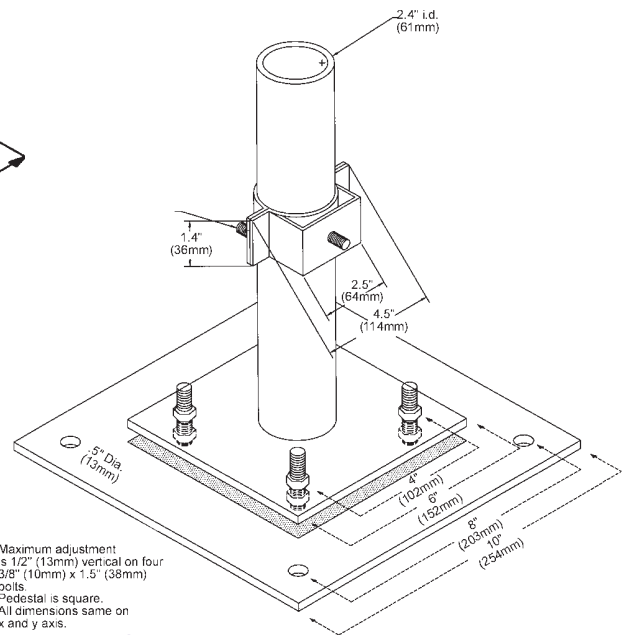
The heavy duty, all welded steel pedestal floor mounts can be used for mounting either the SLT Series, the PPG Series, or cornering mirrors. Sliding mounts on the pedestal are of universal design and are supplied standard. Unique floating base on pedestal is designed to compensate for uneven floors.

NOTE: Pedestals must be bolted to the floor, they must not be movable (ANSI B11.19-1990).

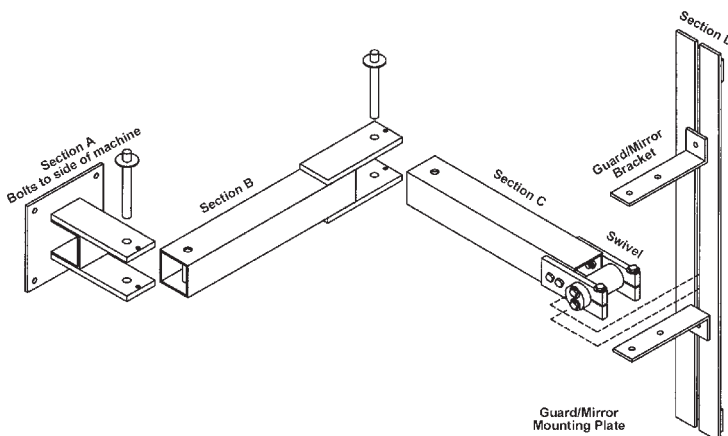
1. Sliding mounts supplied
2. Standard height is 72" (1829mm) - Model #8000
Optional 96" (2438mm) - Model #8096
3. Painted OSHA yellow
4. Pedestal is 12 gauge steel
Base Plate is 1/4" (6.35mm) steel plate

Ordering Procedure

Specify Pedestal Model Number and Quantity



Model 9000 Swing Mount Brackets



Excellent method of mounting light curtain on press brakes or when light curtain is to be removed for die setups 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."

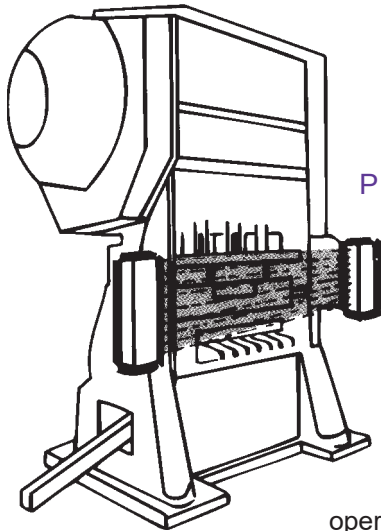
Ordering Procedure

- 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

Applications

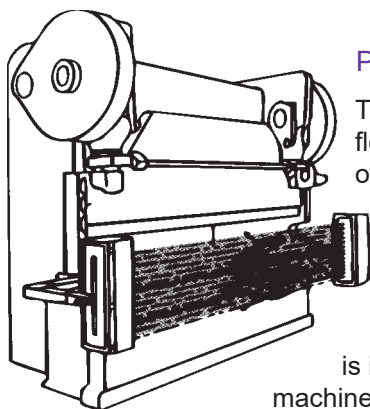
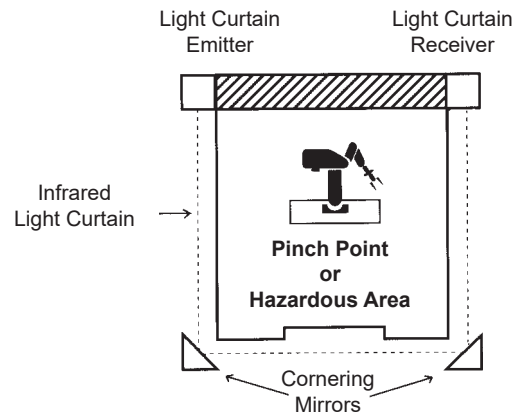
Robotic and Automation Multi-Sided Guarding Systems

Easily installed cornering mirrors, combined with the easy alignment characteristics of the SLT Series, provide multi-sided protection which allows complete visibility and access to the protected pinch point or hazardous zone for a fraction of the cost of physical barriers.



Punch Presses

The SLT Series is designed to accept coil stock movement with no press shutdowns or adjustments to the light curtain. No adjustments are necessary to the light curtain for die height changes or from automatic to hand fed secondary operations.

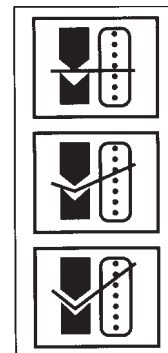


Press Brakes

The Floating Blank light curtain provides the flexibility necessary to effectively guard all types of power press brakes. 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.

While other safety devices must be altered to allow materials to feed through, the Floating Blank is controlled by a keyed selector switch that will allow a work opening of up to 8cm based on 2cm increments.

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 light curtain adapts to mechanical, air clutch, and hydraulic press



Formula for Calculating Light Curtain Safety Distance

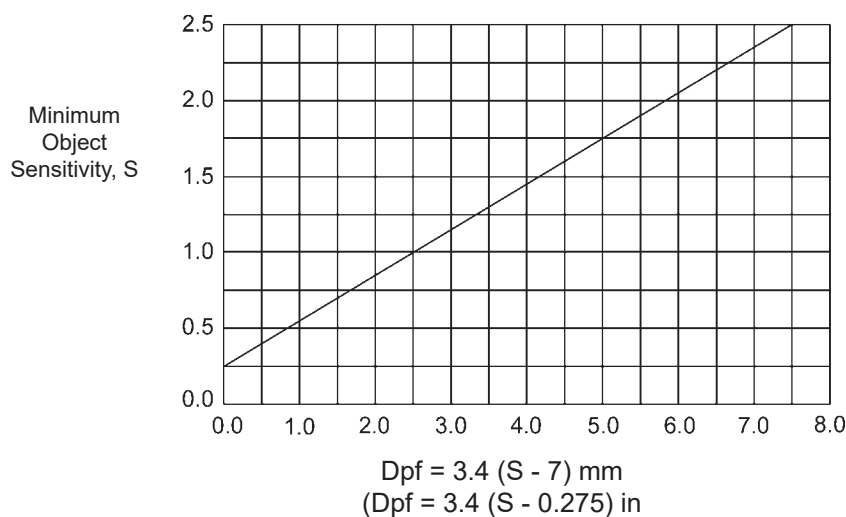
The effective sensing field of the device shall be located at a distance from the nearest recognized hazards such that the operator or others cannot reach the hazard with a hand or other body part before cessation of motion during the hazardous portion of the machine cycle.

The point at which a device responds to an intrusion may vary. The devices should be located or adjusted such that the device always responds to the intrusion at or prior to the safety distance. Care should be exercised when installing the device to ensure that it does not detect false signals from other devices in the area.

Usually the electro-optical presence-sensing device is used in a manner that provides a protected zone in front of the primary work

area with auxiliary devices or guards used to protect secondary access areas. In some cases, however, mirrors may be used in conjunction with the device to provide 2-, 3-, 4-, or 5-sided protection.

The machine stop time should be measured with the machine running at its fastest speed with its heaviest die or tooling and the stop time being measured at the 90° position in the downstroke.



Penetration factor, Dpf, for presence-sensing devices used in a vertical application with object sensitivity less than 64 mm (2.5 inches)

Dpf, the distance added to the safety distance due to the penetration factor compensates for varying object sensitivities of electro-optical presence-sensing devices.

When blanking features are used and when the blanked area is not completely filled by the workpiece or part, or by mechanical guarding, the minimum object sensitivity can be calculated as:

Object sensitivity = size of the blanked area plus minimum object sensitivity without blanking.

Once this value is found, then determine Dpf.

If the entire blanked area is filled with mechanical guarding or other fixed material or guards, use the device's object sensitivity to determine Dpf.

The following formula should be used when calculating the safety distance:

$$D_s = K \times (T_s + T_c + T_r + T_{bm}) + D(pf)$$

D_s = Minimum safety distance between the device and the nearest point of operation hazard (in inches).

K = Hand speed constant. This value has been determined by various studies and, although these studies indicate speeds of 63 in/sec to over 100 in/sec, they are not conclusive determinations. The employer should determine this value by considering all factors, including physical ability of the operator.

T_s = Stop time of the machine tool measured by a stop time measurement device.

T_c = Response time of the control system (usually is taken care of by the measurement device).

T_r = Response time of the presence-sending device and its interface, if any, as stated by the manufacturer or measured by the employer.

T_{bm} = Additional time allowed for the brake monitor to compensate for variations in normal stopping time.

$D(pf)$ = Depth Penetration Factor. Added distance as indicated by the above chart. The minimum object sensitivity is stated by the manufacturer.

NEW
SWITCHING
SD **DEVICE**

Safety Mat System

Complies with ANSI/RIA Standard
R15.06-1999, ANSI/B11.19-2003
OSHA 1910.217b, CSA and
UL 508 Requirements

Designed to EN1760-1, EN954-1
Category 4 Controllers &
EN60204-1 for CE certification

Hazardous area presence sensing
detection

Cross monitored system

NEMA 6 (IP 67) rated mat system

High-grade vinyl plastisol sealed housing

*Customized Safety Mat
Systems are our Specialty
and are available in Ribbed,
Non-Skid or High-Temperature/
Wet Environment Surfaces*

PINNACLE
S Y S T E M S , I N C.



Revolutionary Switching Mechanism is Changing the Safety Mat Industry

Break through **NSD** technology provides digital (on/off) switching for safety mat applications. The advanced **NSD** switching mechanism provides the following:

- **NSD** safety mats are designed to be machine interfaced with only **NSD** controllers for normally open SPST 4-wire safety mats.
- The **NSD** safety mat has no rigid steel electrodes used in the switching mechanism that can rust and dent.
- The **NSD** safety mat contains no wiring solder joints within the mat assembly that could degrade or short out. Wiring solder joints can fail under loads such as fork truck or hand cart traffic.
- **NSD** flexible electrodes life cycle over 5,000,000 switch activations.
- **NSD** safety mats provide increased reliability and safety with longer product life.
- Customized wire exit positions available with no additional tooling costs.
- **NSD** flexible electrodes provide a product that is flexible and won't kink or short out like rigid steel electrodes when bent.
- The **NSD** mat electrodes are:
 - Non-Corrosive Flexible
 - Non-Magnetic Anti-Static
- **NSD** safety mats can use AC or DC input power.
- Large single mat manufacturing process helps eliminate additional interconnect pieces required by others and simplifies installation.
- Dual 20' (6.1m) lengths of two-conductor, 22 gauge multistrand 300 VAC (four conductors total), CSA & UL Listed wiring per mat eases installation time.
- Fast delivery on custom shapes and sizes with no need for special tooling costs.
- Multiple zones in one mat housing available.
- Designed specifically for the rigorous industrial environment.
- Easy system to install.
- No vacuum seal to break which induces rust and leads to dead zones.
- Can absorb punctures.
- Dual ribbed mat housing.
- High-temp welding mats available
- Non-skid or high temperature/wet environment mats available.
- Hermetically sealed sensor system (NEMA 6, IP67).
- Adapts well to uneven factory floor installations.
- Custom engineered systems available.
- Large selection of sizes and capabilities.
- Maximum intermittent load on an **NSD** mat is 3000 PSI.
- Patents pending.
- Warranty - 2 years.



Questions for the Rigid “Steel Electrode” Safety Mat

1. How are rust pockets (dead zones) monitored within the mat switching electrode?
2. How much can you bend a steel mat before it kinks the steel electrode and shorts out (fails)?
3. How flexible is the system for specials, unique sizes, and wire exits?
4. What happens when a heavy load (fork truck) rides along side a raised elastomer that distorts the steel and shorts out the electrode?
5. What happens when the steel used in the electrode element isn't perfectly flat?
6. Does the steel electrode have a pocket of air (oxygen = rust) between the two steel electrodes?
7. What happens when a steel electrode mat is installed on uneven floors?
8. Does the steel electrode mat manufacturer pull a vacuum and inject an inert gas between the steel electrode switch assembly to assure that no oxygen is exposed to the steel electrode to prevent rusting?
(Remember, oxygen = rust, rust = dead zones, and dead zones = loss of safety)
9. What happens when the vacuum seal is broken?
10. What happens when the elastomer's glue releases and slides out of position?
11. How many switch cycles can be made at the same point before carbon deposits are created by arcing?

Facts on the Use of “Steel Electrode” Safety Mats

Tired of rigid electrode (steel or copper) style mats? No wonder, steel electrode safety mats were designed in the mid 1950's. Some of their disadvantages include:

- Bend with subsequent short outs, especially in the corners of steel mats.
- Naturally rust which creates dead zones.
- Have multiple dead zones on the mat surface where elastomers are installed.
- Cannot handle heavy loads.
- Fail at a high rate.
- Are not flexible.
- Have limited sizes available.
- Are heavy and awkward to install.
- Require multiple wiring connections buried in perimeter trim.
- Require long lead times for special sizes and shapes, if possible at all.
- Have limited wire exit positions available.
- Are extremely difficult to troubleshoot a daisy chained system.
- A punctured steel mat immediately shorts out and will fail due to the metal roll over at the point of puncture.
- Continued switching in the same area “arcing” creates carbon deposits and potentially creates a dead zone and an unsafe condition.
- Steel mats are not PSI based switches but rather “force” related switching.
- Cannot be installed on uneven floors.

NEW SWITCHING DEVICE

NSD Mat Layout Procedure

1. Sketch total area to be guarded.
2. Locate desired mounting position of mat controller.
3. List mat sizes and styles desired to completely guard the hazardous zone.
4. If area to guard is too complex to determine mat sizes, submit drawing to the factory.

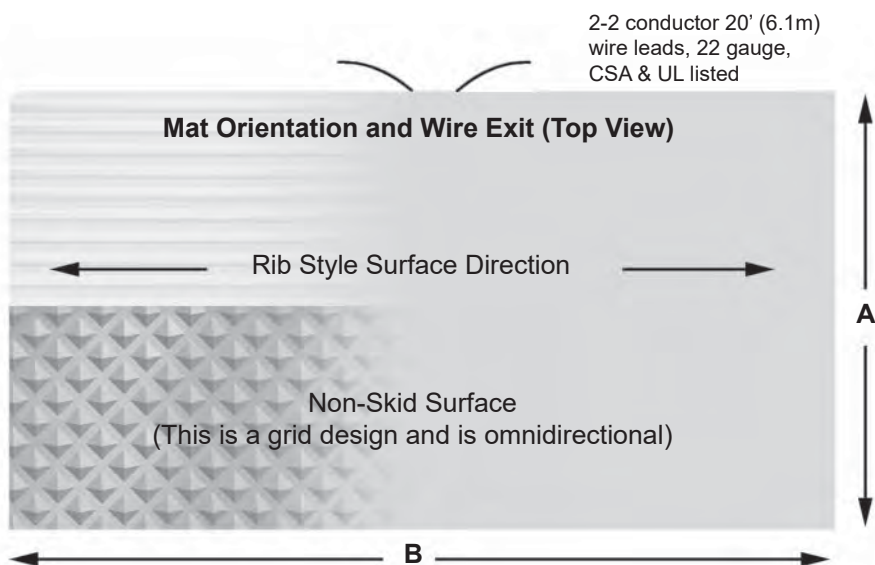
Mat Sizes - Inches/Millimeters

Standard Mat Widths (A)

12" / 305mm	48" / 1219mm
18" / 457mm	54" / 1372mm
24" / 610mm	60" / 1524mm
30" / 762mm	66" / 1676mm
36" / 914mm	72" / 1829mm
42" / 1067mm	

Standard Mat Lengths (B)

12" / 305mm	84" / 2134mm
18" / 457mm	90" / 2286mm
24" / 610mm	96" / 2438mm
30" / 762mm	102" / 2591mm
36" / 914mm	108" / 2743mm
42" / 1067mm	114" / 2896mm
48" / 1219mm	120" / 3048mm
54" / 1372mm	126" / 3200mm
60" / 1524mm	132" / 3353mm
66" / 1676mm	138" / 3505mm
72" / 1829mm	144" / 3658mm
78" / 1981mm	



Example
Part #

NSD - 36 - 96 - Y - R - X - 20 - S

(prefix)	Width	Length	Color	Mat Style	Mat Wiring	Wire Length	Options
	12, 18, 24	12, 18, 24, 30,	Y-Yellow	R-Rib Surface	See options	Order in feet.	S-Designates a
	30, 36, 42	36, 42, 48, 54,	B-Black	N-Non-Skid Surface	shown right	20' (6.1m) supplied	special cut, contour
	48, 54, 60	60, 66, 72, 78,		H-High Temp. Surface	X	standard. Specify	notch, wire exit or
	66, 72	84, 90, 96, 102,		(Excellent for weld splatter,	E	longer lengths if	angle in mat
		108, 114, 120,		molten plastic, die casting,	W	needed, 100'	(please submit
		126, 132, 138,		forging operations, and	P	(30.48m) maximum.	drawing).
		144		wet environments)			

SPECIALS...

The ultimate customized mat system in the industry. This series can provide customized mats, machine inlays, wire exits, etc. Submit drawing and requirements to factory.

Dimensions

Metal Box Controller

Board Only:

Model NSD-TR-BO

5" (127mm) x 7" (178mm) plate with 4 holes 4.25" (108mm) x 6.25" (159mm) on center

Controller:

Model NSD-TR-01 = 1 Zone

8" (203mm) x 6" (152mm) x 3.5" (89mm) with
4" (102mm) x 8.75" (222mm) holes

Model NSD-TR-02 = 2 Zones

12" (305mm) x 10" (254mm) x 5" (127mm) with
8" (203mm) x 12.75" (324mm) holes

Model NSD-TR-03 & TR-04 = 3 & 4 Zones

16" (406mm) x 14" (356mm) x 6" (152mm) with
13" (330mm) x 16.75" (425mm) holes

DIN-rail Controller — Model NSD-DR-01

5.87" (149mm) length x 4.33" (110mm) width x 2.95" (75mm) height.

DIN-rail Controller with Diagnostics — Model NSD-DR-04

5.87" (149 mm) length x 4.33" (110 mm) width x 2.95" (75mm) height.

DIN-rail enclosure mounting:

35mm DIN-rail mountable or mounting screws on corners

of enclosure requiring two combo-head screws (3.5mm x 0.6mm x 14mm or #6 x .5).

Ordering Procedure

Specify controller model number and quantity desired.

Sizing Your Safety Mat System

How to Properly Size your NSD Safety Mat System

The following formula is a domestic and international guideline for the proper positioning and application of safety mats for machine guarding. This formula must be followed for all safety mat applications supplied to the European Community (CE) member nations. CEN is the European Committee for Standardization. Final draft #prEN999. The formula is also incorporated in ANSI/RIA Standard R15.06-1999.

The minimum distance from the danger zone shall be calculated by using the general formula:

$$S = (K \times T) + C$$

S is the safety mat minimum distance in inches/millimeters in a horizontal plane from the danger zone to the detecting edge of the safety mat furthest from the danger zone.

K is a parameter in inches/millimeters per second derived from data on approach speeds of the body or parts of the body. $K = 63"/\text{second}$ (1600mm/second).

T is the total system stopping time performance which includes activating the safety mat, the mat controller output signal switching device, and the time required to stop the machine and remove risk.

C is an additional distance in inches/millimeters, based on intrusion towards the danger zone prior to actuation of the protective safety mat equipment. $C = 48"$ (1219mm).

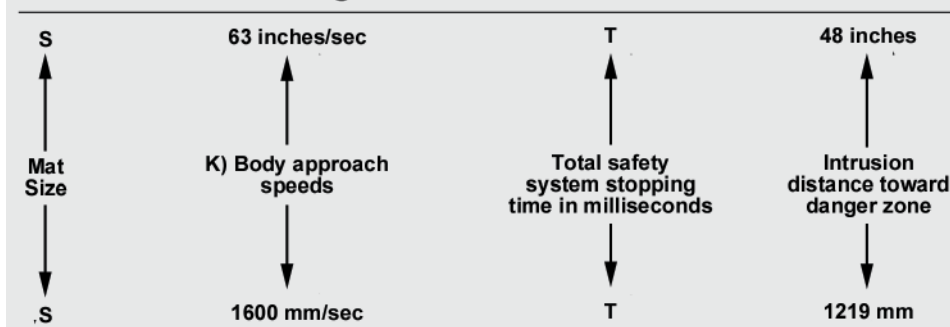
Annex B (informative)

Walking speeds and stride lengths. The positioning of equipment which is activated by a person walking into the detection zone by stepping onto a pressure sensitive mat is affected by speed of approach and stride length. The walking speed and stride length depend on the physical and anthropometric data of the population.

Speed of Approach. This standard assumes the approach of persons towards the danger zone will be at walking speed.

Stride Length. Available research data has shown the 95th percentile of two steps (i.e., starting and finishing with the same foot) measured from heel contact at walking speed is approximately 75" (1905mm). By dividing by two and subtracting the 5th percentile shoe length this gives a stride length of 28" (711mm). If it is assumed that an allowance has to be made (for example, between the detection zone and the stride length of 2"/50mm), this gives a minimum width of 30" (762mm) for the detection zone.

Examples of safety mat sizing calculations using inches and millimeters:



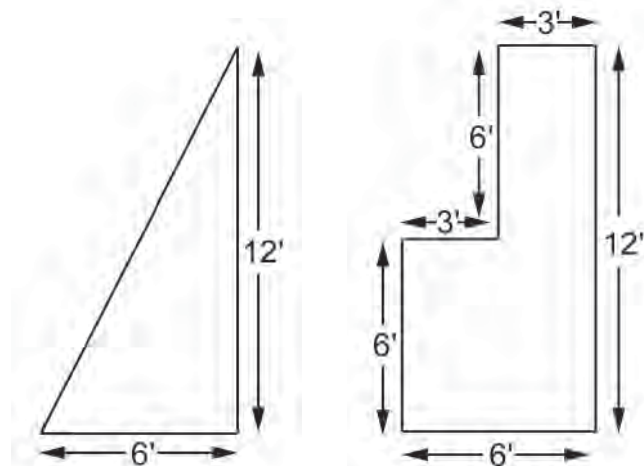
T-The NSD Safety Mat System activation time including controller is 35 ms. This amount is to be added to the machine stopping time in milliseconds to fulfill the T requirement of the formula.

NSD Single Mat Capability

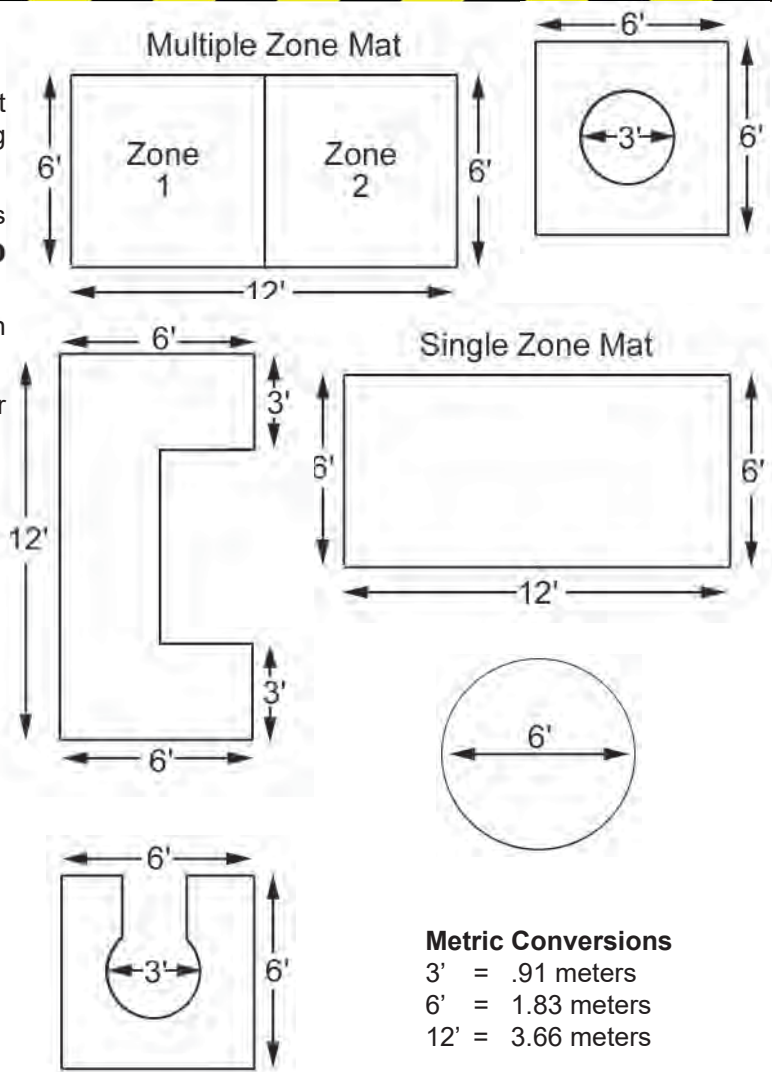
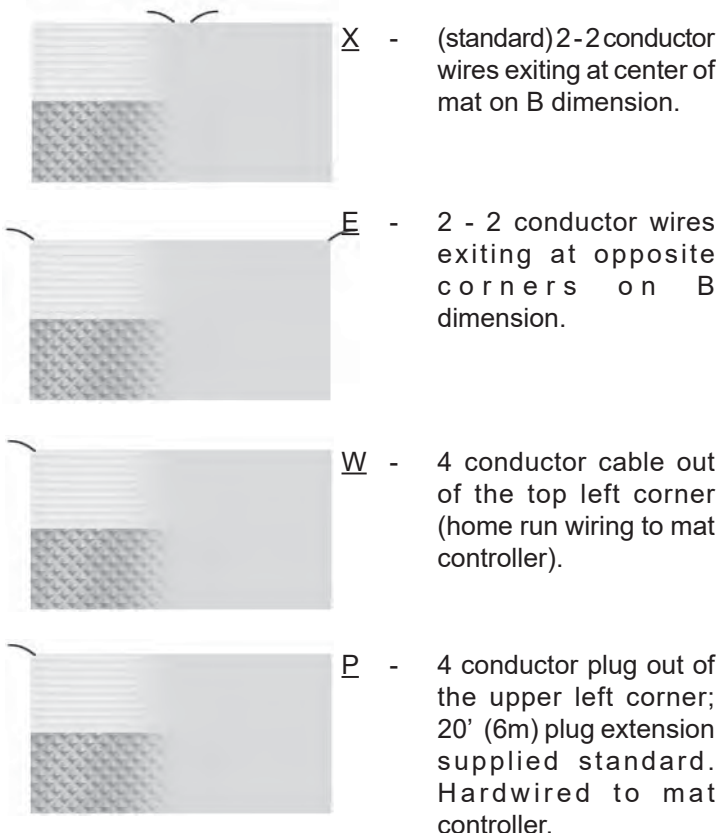
Save time and installation costs with single piece mat installations. Help eliminate or reduce daisy chain wiring practices required by competitive systems.

The sizes shown are typical single piece mat installations that illustrate the manufacturing versatility of the **NSD** Safety Mat System.

- The wiring exit positions can be located anywhere on the mat perimeter.
- The mat sizes shown can easily be altered to fulfill your specific project needs.
- No tooling fees for special mat designs.



NSD Mat Wiring Options



NSD Safety Mat Label

Provides immediate safety mat system information required by international guarding standards. The label is located on the mat surface. Bar coding is supplied standard to ease in receiving and inventory control. Customized labels are available.



(actual size)

Perimeter Trim for ^NSD Mats

Perimeter Trim (Part #M001) is used for anchoring the outside perimeter of the safety mat assembly to the floor and to run the mat wiring back to a location near the mat controller. The unique wire raceway is built into the perimeter trim and is supplied standard with all Part #M001 orders. The perimeter trim adds 2.5" (64mm) to mat dimension per edge.

Ordering Procedure: Specify linear feet or dimensions followed by one of the following:

TK: (picture frame trim kit)
M001: (bulk)
M001-M: (bulk/machined)
Custom Trim Kit: (consult factory)

Example: Part # 2442TK.

This example is a 24" x 42" mat with a 24" x 42" picture frame trim kit; total area is 29" x 47".

Active Coupler (Part #M003D) is used whenever the mats are placed side to side or end to side. This will activate the "Active Edging™" feature which will eliminate dead zones between mats. The active coupler adds .25" (6mm) to mat system's overall dimension.

Ordering Procedure: Specify Part Number and total length required in feet.

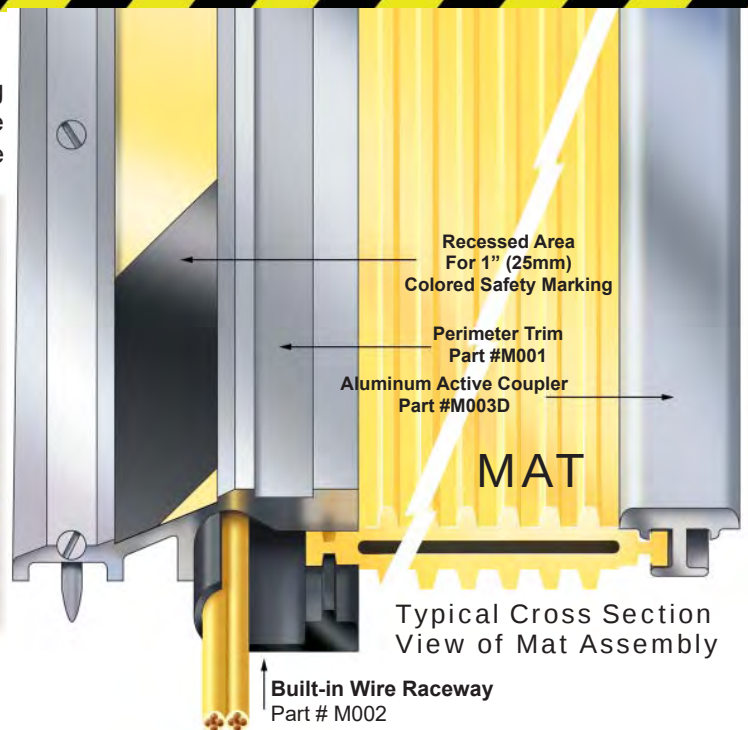
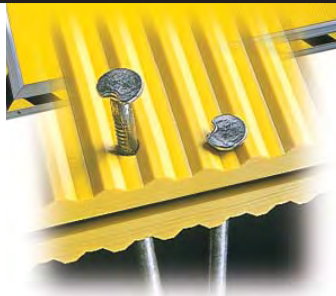
Built-in Wire Raceway (Part #M002)

This innovative design concept provides excellent wiring protection for your safety mat system. The design provides an elevated off the floor wire raceway to protect the wiring and connections from fluids and caustic materials on the floor. It also provides a wiring harness to protect the mat wires from being pinched by improper perimeter trim installations commonly found in the industry.

^NSD vs. Steel Electrode Durability Test

Simple in-house tests for you to try!!!

1. Stab or puncture with nails, ice pick, etc. approximately ten times in various areas on the mat sensing surface.
2. Bend the mat corners and see what happens.
3. Place on uneven floors and compare.



Safety mats are required by law to be "fixed" in position for machine guarding applications.

Mat Wiring: Dual 20' (6.1m) 2 conductor, 22 gauge (wiring styles X and E) and 24 gauge (wiring styles W and P), multistrand wires. CSA & UL Listed.

Mat Cable Diameter: .18" (5mm)

Mat Housing: .25" (6mm) top and bottom mat housing, cross drain built-in on mat bottom, hermetically sealed, NEMA 6 IP(67) rated. Special mat housings available, consult factory.

Perimeter Trim: Part # M001 High-grade aluminum #6063-T5

Active Coupler: Part # M003D High-grade aluminum #6063-T5

Wire Raceway: Part # M002 High-strength PVC (black)

Mat Temperature Rating: -15°C to 55°C / 4°F to 130°F

Maximum Mat Input: 24V (AC or DC) @ 75 mA

Chemical Resistance

The mat housing has excellent resistance to acids, alkalies, and salts. Hot acids and alkalies, as well as concentrated oxidizing and organic acids, have a deleterious affect over prolonged exposure.

Mat Chemical Resistance

Water	E	Acetic Acid	F
Ethyl Alcohol	E	Gasoline	F
Sodium Chloride	E	ASTM 1 Oil	F
Bleach	E	Benzene	P
Hydrochloric Acid	F to E	Aceton	P
Sulfuric Acid	F to E	Trichlorethylene	P to F
Nitric Acid	F to E		

Key: E=Excellent; F=Fair; P=Poor

Safety Mat Controllers

System Overview

The **NSD** Safety Mat System controllers contain two independent control circuits which allow for shut down due to any single failure in one of the control circuits. The N.O. output circuit is controlled by two captive contact relays in series which are both monitored. If the contact in one relay should stick closed (i.e., contact weld), the other relay will shut down and the LED will indicate the fault; if the contact on the bad relay opens back up, you must reset the power to clear the fault. This relay contact monitoring provides a high degree of user safety.

Circuit Description

A low voltage (24VAC or 24VDC) signal is sent out to the safety mat(s) through two wires. Two special optically-isolated diverse redundant circuits look at the signals coming back from the mat(s) detecting the presence of proper positive and negative voltage (AC) levels and output their signals to redundant missing pulse detectors. If the voltage coming back is too high or low, the missing pulse detectors will drop out and de-energize the relay circuit. If the voltage coming back is not AC (missing either positive or negative peaks), then the signal going to the missing pulse detector will disappear which will, in turn, drop out and de-energize the relay circuit.

Redundant relay position detectors watch for a relay contact stuck in the wrong position. The circuits will lock out the reset feature of the **NSD** control unit if a relay contact is closed when it should be open.

Each relay has its own driver circuit to complete the redundancy of the circuits.

Model NSD-TR-01 Metal Box Controller



Specifications

Enclosure:	NEMA 12, 13, IP 54
Input Power:	120VAC +/- 10% @ 3 watts 50-60 Hz fused
Category/Type:	4
Relay Style:	Monitored force-guided captive contact safety relays
Relay Configuration:	2 N.O. Safety Relays (closed when circuit activated) 1 Aux. Output N.O. or N.C
Safety Relay Rating:	4A @ 220VAC
Reset Provisions:	Manual or Automatic
Controller Response Time:	15 ms
Self-Checking Intervals:	Every 20 ms
Number of Isolated Zones:	1 to 13 (customer specified)
Maximum Number of Mats:	20 with daisy chain wiring
External Reset Provision:	Green push button
Indicators:	
<i>Internal (on board):</i>	<u>Yellow LED</u> = +5VDC power supply <u>Red LED</u> = Normally dim, brighter when mat is stepped on. Cut wire detected when not lit. <u>Green LED</u> = Relay contact detected closed when it should have been open when not lit. Must reset power to clear.
<i>External:</i>	<u>Red LED</u> = 1 or both relays are de-energized. <u>Green LED</u> = All relays are energized.
Diagnostic Message Display:	N/A
DeviceNet:	N/A
Warranty:	2 years

Model NSD-DR-01 DIN-rail Controller



NEMA 1, IP 32

24VDC +/- 20% @ 7 watts

4

Monitored force-guided captive contact safety relays

2 N.O. Safety Relays (closed when circuit activated)

1 Aux Output N.O. or N.C.

4A @ 220VAC

Manual or Automatic

19 ms

Every 20 ms

1 per controller

20 with daisy chain wiring

Green push button

Green LED(s) = next to each relay (3)

Red LED = +12V

Yellow LED = +5V

Green LED = -5V

Red LED = 1 or both relays are de-energized.

Green LED = All relays are energized.

Yellow LEDs = 2 to show on/off mat.

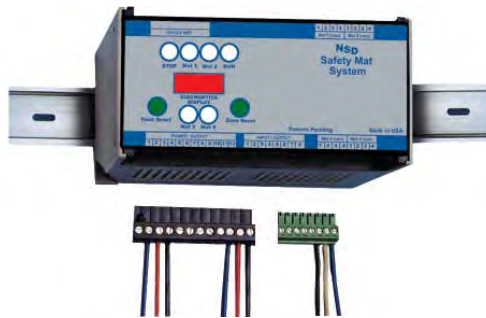
Green LED = Relay fault if it turns off.

N/A

N/A

2 years

Model NSD-DR-04 DIN-rail Controller (with Diagnostics Message Display)



NEMA 1, IP 32

24VDC +/- 20% @ 7 watts

4

Monitored force-guided captive contact safety relays

2 N.O. Safety Relays (closed when circuit activated)

1 Aux Output N.O. or N.C.

1 Fault Relay N.O.

4A @ 220VAC

Manual or Automatic

19 ms per mat input used

Every 20 ms

1 per controller

4 with homerun wiring

20 with daisy chain wiring

Green push button

Red LED = +12VDC

Green LED = +20VDC

Yellow LED = +5VDC

Green LEDs = one for each relay (4 total)

Red LED = 1 or both relays are de-energized.

Green LED = All relays are energized.

Yellow LEDs = 1 for each mat status (4 total)

Built-in diagnostic message display

Add suffix DN to Model #

2 years

Remote Status Display (RSD) Optional for DIN-rail Controller NSD-DR-04

The RSD (front panel shown below) may be used in conjunction with the NSD-DR-04 DIN-rail Controller. The RSD provides the machine operator and front line supervisor immediate system status and diagnostics when the DIN-rail Controller is mounted inside the machine control panel.

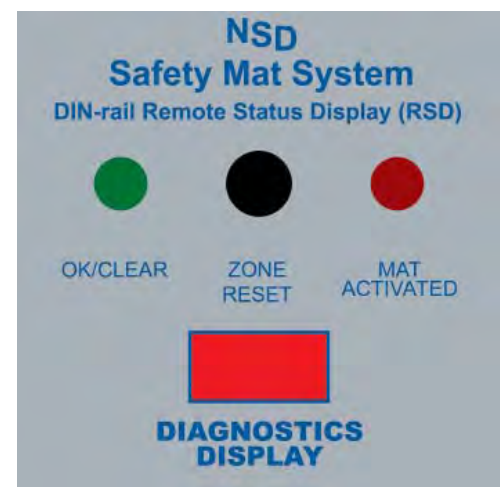
Remote Status Display components:

- Red/Green indicator lights
- Diagnostic scrolling message display with 5' (1.52m) of connector cable
- Zone reset button

The 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.

Ordering Procedure: Add suffix RSD to controller part number.

Example: NSD-DR-04-RSD.



Remote Status Display Requires:

Panel Cutout:
3" (76mm) x 3" (76mm)

Mounting Hole Dimensions:
3.7" (94mm) x 3.7" (94mm)
Center to Center

Safety Mat Controller Modules

Please Choose Input Power of 24 VDC or 115 to 230 VAC.

Both Modules are compliant to OSHA & ANSI Standards - EN ISO 13849-1 EN 62061 EN 81-1 EN 50156-1



24 VDC

115 TO 230 VAC

Model Number	NSD-3580	NSD-3590
Part Number	32-105	32-106
Input Power	24VDC	115 to 230 VAC
Power Consumption	4 VA	1.6 W
Safety Category	Compliant to OSHA and ANSI Standards. Category 4 (EN 954) and up to PL e EN ISO 13849-1.	Compliant to OSHA and ANSI Standards. Category 4 (EN 954) and up to PL e EN ISO 13849-1.
Cross Circuit Monitoring	Yes	Yes
Housing Rating (plastic)	IP 40	IP 40
Temperature Range	13° F to 149° F (-25° C to 65° C)	13° F to 149° F (-25° C to 65° C)
Pluggable Screw Terminals at .5 Nm Torque	Yes	Yes
Safety Category Per EN-954-1	Category 4	Category 4
Performance level acc. to EN ISO 13849-1	e	e
Automatic or Manual Reset	Yes	Yes
Safety Outputs at 6A, 22.5V	3	3
Auxiliary Output at 2A	1	1
Release/Response Time	20 ms	20 ms
Weight of Module	7.05 oz. (.2 kg)	7.05 oz. (.2 kg)
Dimensions		
	Depth	4.48" (114 mm)
	Width	.88" (22.5 mm)
	Height	3.79" (96.5 mm)
Standards	OSHA and ANSI Standards: EN ISO 13849-1 EN 62061 EN 81-1 EN 50156-1	OSHA and ANSI Standards: EN ISO 13849- 1 EN 62061 EN 81-1 EN 50156-1

Pinnacle Safety Mats

We offer the largest selection of safety mat styles and sizes available in the world.
Customized shapes and sizes are our specialty.

	STTS	NSD
	Highest level of monitoring available	Monitored at the level of a normally Open SPST four-wire
Dead Zones	None/100% Active	None/100% Active
Active Edging Place mats side-to-side or end-to-end by sliding an active coupler in place; eliminates thresholds, close-out, and uniting strips. Prevents dead zones.	Yes	Yes
Customized Activation Thresholds Available	Yes	Yes
Customized Mat Sizes Available	Yes	Yes
Types of Controllers Available:		
Metal Box Controller	Yes	Yes
DIN-rail Controller	Yes	Yes
Multi-Lingual Controller with Built-In Diagnostic Message Display	Yes	Yes
Maximum Intermittent Load on Mat	3000 PSI	3000 PSI
Meets or Exceeds all current standards of OSHA , ANSI , CSA , and RIA , including the European 1760-1 Standard used for CE acceptance	Yes	Yes
Category 4 Safety System Controller	Pulsed Mat Monitoring	Yes
Category 3 Safety System	Yes	Yes
Utilizes the Patented STTS Sensor Technology	Yes	No
Designed Specifically for the Rigorous Industrial Environment	Yes	Yes
"Homerun Plug Connector or Wire Capable"	Yes	Yes
Easy System to Install/Troubleshoot	Yes	Yes
Welding Safety Mats Available	Yes	Yes
No Steel Components that Rust or Deform	None	None
Can Absorb Punctures	Yes	Yes
Mat Provides Arc-Free Switching	Yes	Yes
Dual Ribbed Mat Housing	Yes	Yes
Ribbed, Non-Skid, or High-Temperature/Wet Environment Surfaces	Yes	Yes
Hermetically Sealed Sensor System	Yes	Yes
The Mat Electrodes are:	Yes	Yes
Non-Corrosive Flexible		
Non-Magnetic Anti-Static		
Adapts Well to Uneven Factory Floors	Yes	Yes
Custom Engineered Sensor Systems Available	Yes	Yes
Computer Interfaced SmartFloors™ and SmartMats™ Available	Yes	No

NOTES

NOTES

STTS *Soft Tactile Transducer Sensor*™ Safety Mat System

Meets Worldwide Safety Standards



Uniform Activation™

Integrated Modular Design

No Dead Zones™

Ribbed, Non-Skid or High Temperature/Wet Surfaces

Unique Pulsed Mat Monitoring

Customized Mat Inlays

Presence Contact Sensing



par•a•digm (par ə dim,-dim), *noun* 1. an example serving as a model; pattern: 2. in technology; a hybrid product that possesses advanced technological advantages and inherent design features over current products and technologies in the marketplace...the **STTS SafetyMatSystem™**

The **STTS Safety Mat System™** is a technological paradigm in the field of presence-contact sensing/pressure sensitive safety mat systems. This revolutionary mat system is a hybrid design that combines features to meet and surpass both domestic and international safety standards. Through its advanced technology and state-of-the-art design features, the **STTS Safety Mat System** sets a new **World Class Standard** for the mat detection industry.

STTS Soft Tactile Transducer Sensor™ Technology

The The STTS system is a tactile sensor that provides information regarding the distribution and magnitude of tactile force applied to its surface. This patented technology involves the continuous and variable measuring of tactile forces of pressure. In some respects, tactile sensing for electro-mechanical devices is analogous to the human sense of touch--information about the amount and distribution of tactile pressure over a surface can be received and transmitted. When an object comes in contact with the sensor, tactile sensing provides information about the object's shape, texture, position, orientation, deformation, center of mass, and presence of torque or slippage. If you have special needs or applications for uses of the technology, please

contact the factory for our intelligent products.

Why the STTS SAFETY MAT SYSTEM™ is the safest

Unique Pulsed Mat Monitoring

All STTS mats are homerun wired back to the controller and are continuously pulsed. This verifies that each safety mat is wired properly and is connected to the mat controller. Unlike open switch steel mat systems the STTS controller pulses & monitors the safety system. This verifies that the mat wiring has not been bypassed, jumpered or shorted outside of the control box and prevents against an automatic reset of the control (green) with an unsafe condition present.

Each STTS mat in the safety system has a specific value and address that must be

recognized and verified as the STTS controller monitors the safety zone. The STTS continuous pulsed monitoring system provides a higher level of safety mat guarding. This pulsed system eliminates the possibility of wire tampering or jumpering out of safety mats vs. open switch non-pulsed systems.

Uniform Activation™

This feature provides a uniform activation threshold (on/off signal) throughout the entire mat surface area. Our unique design of uniform activation also provides a guarding system that contains no dead zones. This provides the user with a much safer guarding system as well as compliance with domestic and international standards.

No Dead Zones™

Uniform activation means that the "STTS SAFETY MAT SYSTEM" has no dead zones on the mat surface--it is 100% ACTIVE. Other mats that use double-backed foam tape, O-rings, or large perimeter sealing techniques for element encasement create a dead zone around the entire perimeter of the product. Dead zones are also found directly above and below the many silicone spacers, elastomers, or insulators used as standoffs within the element assembly of force style mats. With the advent of specific safety mat

standards, the "STTS SAFETY MAT SYSTEM" gives you the peace of mind of a mat detection system with no dead zones.

Intelligent Matting™

An "Intelligent Mat" is the same as the standard STTS safety mat--with the addition of a pressure-activated, "on/off" analog-controlled switch sensor, for areas based on force/area (psi). An "Intelligent Mat" provides a broad understanding of the kind of tactile event that is occurring and, in the same way as the standard mat, is scalable because of its analog output and natural psi characteristics.

What makes the "Intelligent Mat" unique is that it can be programmed by varying the electrode pattern to determine where the contact has occurred on a multiple position basis (in width "x" and length "y"), and the basis of mass point loading ("z").

Active Edging™

This standard feature of the "STTS SAFETY MAT SYSTEM" enables the user to place the mats side-to-side or end-to-end. Simply sliding the active coupler in place enables the active edging feature of the "STTS SAFETY MAT SYSTEM."

This solves cumbersome multiple mat installation problems normally associated with mats. It also eliminates the need for thresholds, close-out and uniting strips that create dead zones, which increase substantially both product costs and installation time.

Customized Safety Mat Inlays

The "STTS SAFETY MAT SYSTEM" is an excellent method for guarding machine areas such as the back of press brakes, assembly machinery access areas, deck runways, robotic areas, etc. In addition, the "STTS SAFETY MAT SYSTEM" can be custom fabricated to provide an exact fit for those hard-to-guard areas--often with only one mat. It is also excellent for OEM applications.



No, we don't recommend puncturing the STTS Safety Mat with nails (or, for that matter, shooting it with a .357 magnum, as shown on video at various international trade shows). These dramatic demonstrations, however, serve to show the exceptional durability of the STTS Safety Mat System.

Presence Contact Sensing/Pressure Sensitive Mat System

is in a class by itself. This true and uniform activation threshold is unobtainable with competitive "force-style" mats. Competitive mats normally utilize insulators within their switching element as standoffs and around their perimeters as seals. These standoffs or insulators create dead zones and require large amounts of force to activate the mat.

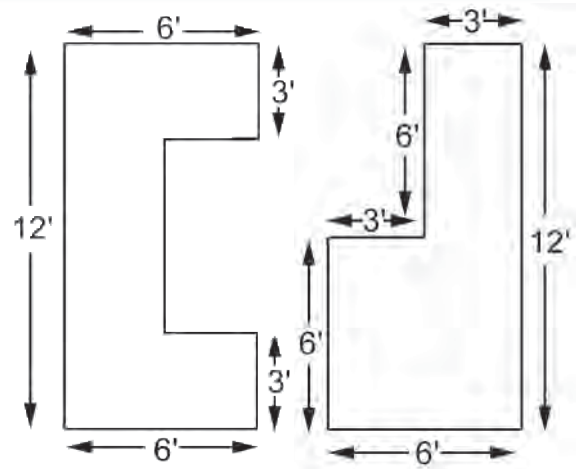
Integrated Modular Design

Because of our unique manufacturing techniques and product versatility, we are able to design a modular system specifically for your project. This means you can safely guard the toughest of applications in an efficient and cost-effective manner. Our experienced factory personnel will make sure detailed system layouts are completed with safety and cost-effectiveness in mind. All aspects of the project are reviewed including layout, shipping, and installation. Safety is always paramount to the project "system design" scope.

Single Mat Capability

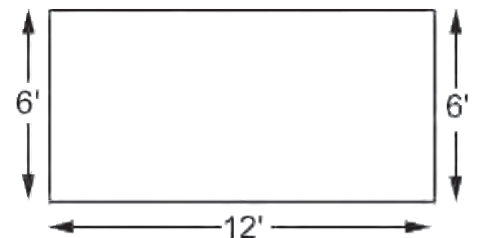
Save time and installation costs with single piece mat installations. Help eliminate or reduce daisy chain wiring practices required by competitive systems.

The sizes shown are typical single piece mat installations that illustrate the manufacturing versatility of the STTS Safety Mat System.

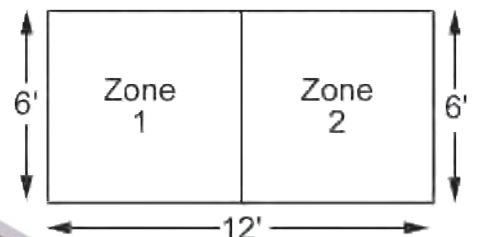


- The wiring exit positions can be located anywhere on the mat perimeter.
- The mat sizes shown can easily be altered to fulfill your specific project needs.
- No tooling fees for special mat designs.

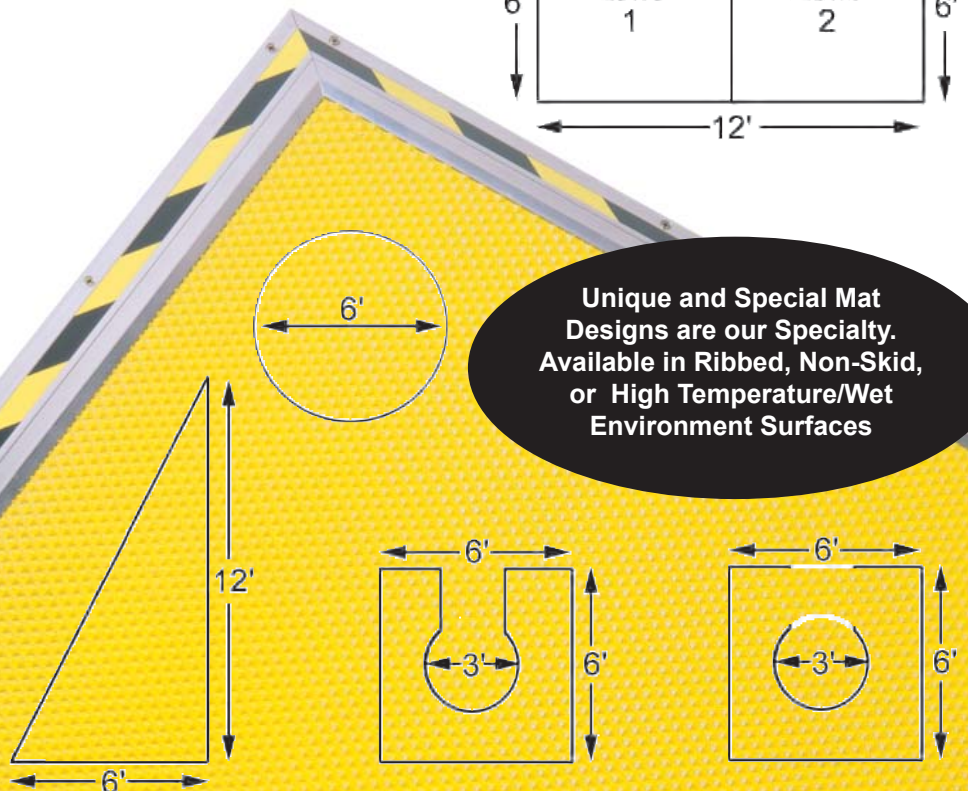
Single Zone Mat



Multiple Zone Mat



Unique and Special Mat Designs are our Specialty. Available in Ribbed, Non-Skid, or High Temperature/Wet Environment Surfaces



Design Criteria

STTS Safety Mat System™

STTS
System

- “Control Reliable” Safety Mat System incorporates Pulsed Mat Monitoring
- Utilizes the patented STTS sensor technology
- Designed specifically for the rigorous industrial environment
- Provides “Uniform Activation™”
- Contains “No Dead Zones™ – ” 100% Active Mat Surface
- “Active Edging™” feature
- “Intelligent Matting™” capability
- “Homerun plug connector or wire capable”
- Multi-lingual mat controller with built-in diagnostic message display available
- A true uniform pressure sensitive (PSI) mat system
- Easy system to install/Easy to troubleshoot
- No adjustments required
- Contains no steel components to rust or deform
- No vacuum seal to break which induces rust and leads to dead zones
- Can absorb punctures
- Mat provides arc-free switching
- Dual ribbed mat housing
- Ribbed, non-skid, or high temperature/wet environment surfaces
- Hermetically sealed sensor system
- The STTS Mat Electrodes are:
 - Non-Corrosive Flexible
 - Non-Magnetic ArcFree
 - Anti-Static Non-Metallic
- Adapts well to uneven factory floors
- Custom engineered sensor systems available
- Customized activation thresholds available
- Largest selection of sizes and capabilities available
- Intelligent floors and mats (zone/force sensitive relationships)
- Computer interfaced SmartFloors™ and Smart-Mats™ available
- Multiple patents pending
- High-temp/non-skid welding safety mat

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

NEW!

Mat Layout Procedure

1. Sketch total area to be guarded.
2. Locate desired mounting position of mat controller.
3. List mat sizes and styles desired to completely guard the hazardous zone.
4. If area to guard is too complex to determine mat sizes, submit drawing to the factory.

Mat Sizes - Inches/Millimeters

Standard Mat Widths (A)

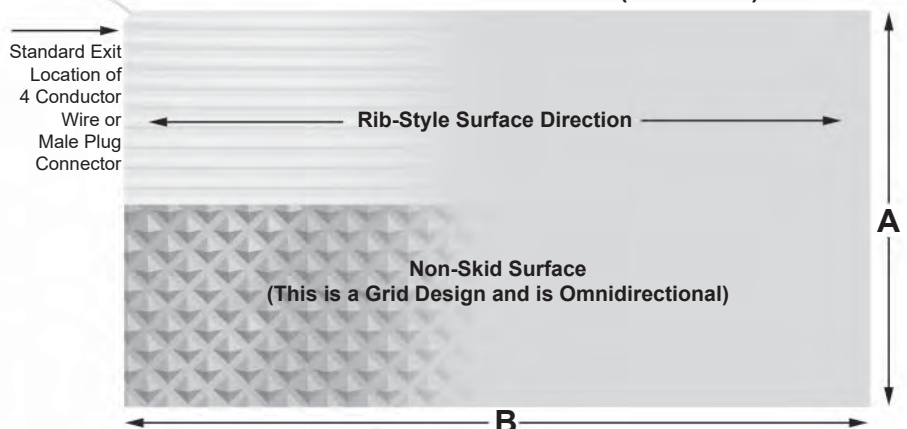
12" / 305mm	48" / 1219mm
18" / 457mm	54" / 1372mm
24" / 610mm	60" / 1524mm
30" / 762mm	66" / 1676mm
36" / 914mm	72" / 1829mm
42" / 1067mm	

Standard Mat Lengths (B)

12" / 305mm	84" / 2134mm
18" / 457mm	90" / 2286mm
24" / 609mm	96" / 2438mm
30" / 762mm	102" / 2591mm
36" / 914mm	108" / 2743mm
42" / 1067mm	114" / 2896mm
48" / 1219mm	120" / 3048mm
54" / 1372mm	126" / 3200mm
60" / 1524mm	132" / 3353mm
66" / 1676mm	138" / 3505mm
72" / 1829mm	144" / 3658mm
78" / 1981mm	



Mat Orientation and Wire Exit (Plan View)



Example
Part #

N - Y - 60 - 96 - P - 20 - S

Mat Style	Mat Color	Mat Width Dimension "A"	Mat Length Dimension "B"	Mat Wiring Style	Mat Wire* Length	Specials (Optional)
R-Ribbed Surface	B-Black	12, 18, 24,	12, 18, 24, 30	W-Hard wire lead from mat to mat controller.	W-For wire leads. Order in feet: 20' feet supplied standard. Specify longer lengths if needed: 100' maximum.	S-Designates a special size, cut, contour, hole, notch, angle or wire exit location in the mat. Please submit drawing.
N-Non-Skid Surface	Y-Yellow	30, 36, 42,	36, 42, 48, 54	P-Plug connector at mat with hard wire lead to mat controller.	P-For plug connector mat with hard wire lead to mat controller. Order in feet; 20' supplied standard. Extension lengths available: 10', 15', 20', 25', 50'.	
H-High Temp Surface (Excellent for weld splatter, molten plastic, die casting, forging operations, and wet environments)		48, 54, 60, 66, 72	60, 66, 72, 78 84, 90, 96, 102, 108, 114, 120, 126, 132, 138, 144	R-Plug connector at mat with plug extension to mat controller receptacle (requires plug receptacle on mat controller).	R-Select plug extension length in feet. Lengths available include 10', 15', 20', 25'.	
(Substitute specific sizes if needed)						

EXAMPLE — Part # N-Y-60-96-P-20 is a non-skid surface yellow mat 60" wide and 96" long with a plug connector. The plug extension is 20' long and will terminate at the mat control box. Plug receptacle mounted on control panel optional. Refer to mat controller ordering procedure section.

***MAT WIRING** — Individual mat homerun wiring or plug extensions back to the control box are required for easing installation and diagnostics for maintenance troubleshooting. This will eliminate cumbersome "daisy chain" wiring practices of mat systems. It also eliminates numerous wiring connection points buried under the perimeter trim which are time intensive to troubleshoot.

SPECIALS...The Customat™ series

The ultimate customized mat system in the industry. Also available with the smart "Intelligent Matting™" capability. This series can provide customized mats, machine inlays, customized activation thresholds, wire exits, etc. Submit drawing and requirements to factory.

Trim Kits for Mats

Perimeter Trim (Part #M001) is used for anchoring the outside perimeter of the safety mat assembly to the floor and to run the mat wiring back to a location near the mat controller. The unique wire raceway is built into the perimeter trim and is supplied standard with all Part #M001 orders. The perimeter trim adds 2.5" (64mm) to mat dimension per edge.

Ordering Procedure: Specify linear feet or dimensions followed by one of the following:

TK: (picture frame trim kit)
M001: (bulk)
M001-M: (bulk/machined)
Custom Trim Kit:
(consult factory)

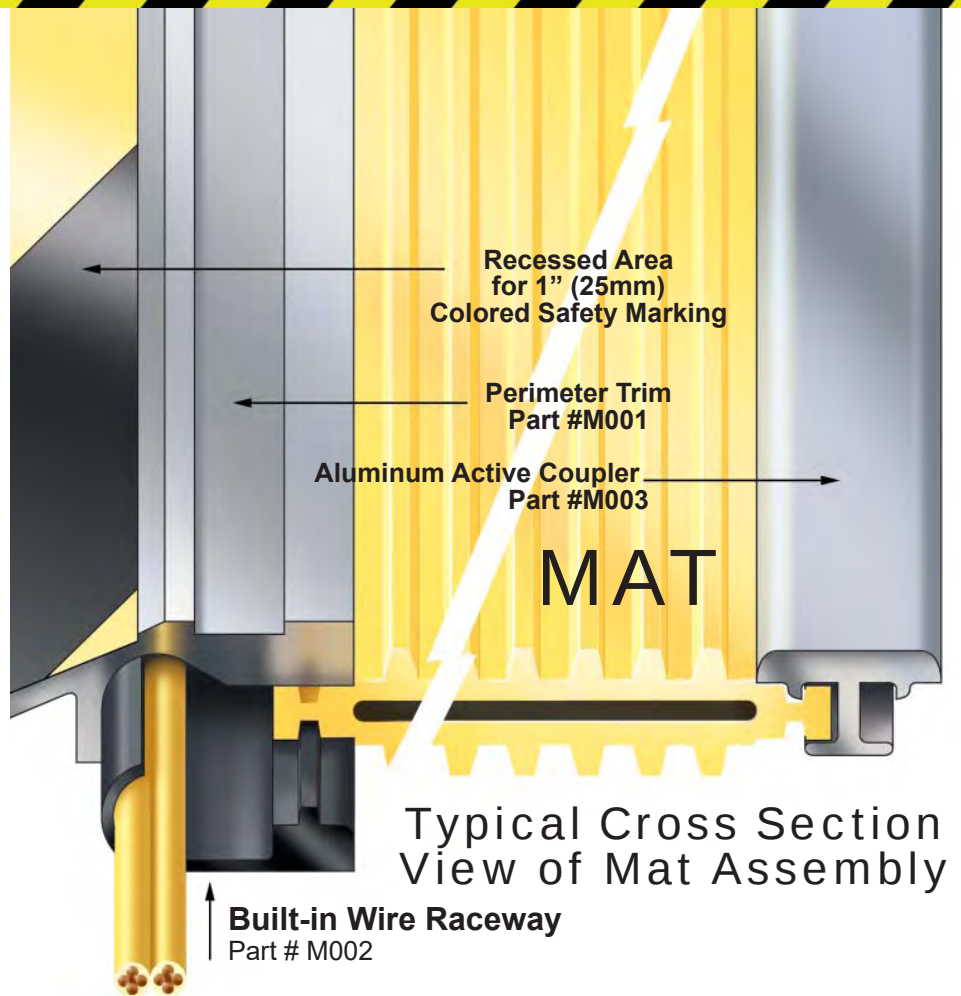
Example: Part # 2442TK
A 24" x 42" mat with a 24" x 42" picture frame trim kit; total area is 29" x 47".

Active Coupler (Part #M003) is used whenever the mats are placed side to side or end to end. This will activate the "Active Edging™" feature which will eliminate dead zones between mats. The active coupler adds .25" (6.35mm) to the mat system's overall dimension.
Ordering Procedure Specify Part # and total length required in feet.

Built-in Wire Raceway (Part # M002)

This innovative design concept provides excellent wiring protection for your safety mat system. The design provides an elevated off the floor wire raceway to protect the wiring and connections from fluids and caustic materials on the floor. It also provides a wiring harness to protect the mat wires from being pinched by improper perimeter trim installations commonly found in the industry.

The built-in raceway promotes individual homerun mat wiring back to the mat controller to ease installation and aid system troubleshooting diagnostics via the message display. The wire raceway provides enough space for six wire/plug assemblies to be run individually within the raceway back to the mat controller. The wire raceway component is supplied standard with the perimeter trim Part #M001.

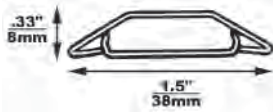
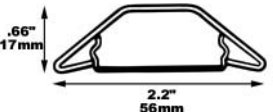


Typical Cross Section View of Mat Assembly

ALL SAFETY MAT ASSEMBLIES ARE REQUIRED BY LAW TO BE "FIXED" IN PROPER LOCATION FOR MACHINE GUARDING APPLICATIONS.

Surface Metal Raceway

Used to shield wire runs across the floor between the perimeter trim and the mat controller.

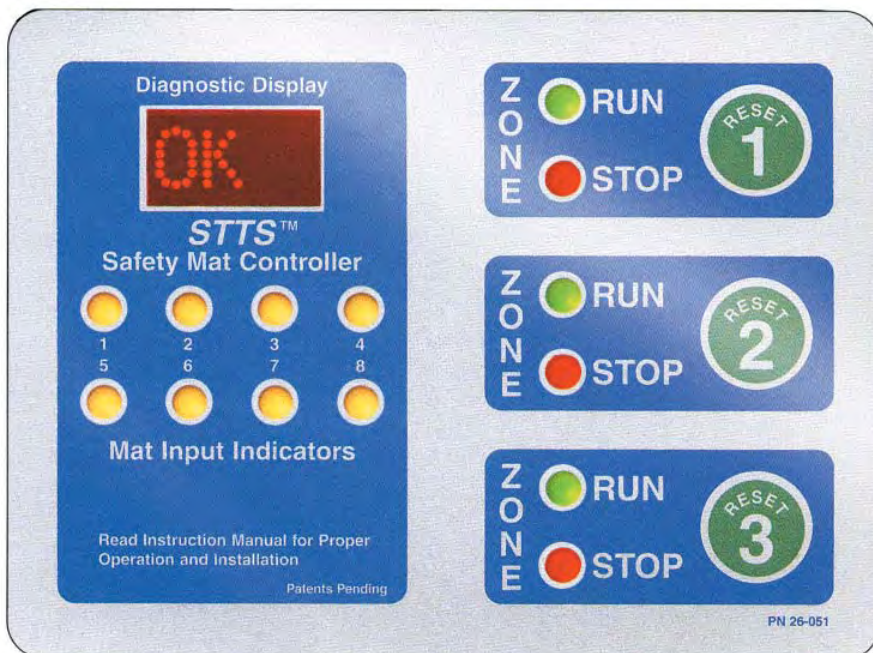
Part No.	Item	Description
M005	Base and Cover	 .040" (1mm) galvanized steel. Base has 9/32" (7mm) diameter mounting holes on centers of approximately 8" (203mm) and is scored every 3" (76mm). Available in 10' (3.05m) lengths. Wire Capacity - 1 to 4 Mat Wires
M006	Base and Cover	 Cover: .050" (1mm) galvanized steel. Base: .040" (1mm) galvanized steel. Base has 9/32" (7mm) mounting holes on centers of approximately 8" (203mm) and is scored every 3" (76mm). Available in 10' (3.05m) lengths. Wire Capacity-5 to 8 Mat Wires

Ordering Procedure — Specify Part # and total length required in feet.

STTS Metal Box Controller Module

Metal Box Features with Pulsed Mat Monitoring

- **Controller Layout**—The STTS Metal Box control system can be ordered with 1 to 3 separate output zones. Each zone has 3 separate isolated dry contact outputs and user optional external relay check. Up to 8 separate mat inputs allow any combination of mats to control any combination of zones and, at the same time, provide instant information of faults via a scrolling diagnostic message display and mat input indicators (LED's). All safety related faults cause a lockout condition requiring internal reset.
- Universal controller for all mat sizes
- Status indicators for operator awareness
- Ultrafast response time
- Multi-lingual diagnostics available
- DeviceNet™ fieldbus network compatible (optional)
- Remote latching reset built-in
- Fault relay output built-in
- Push button reset with memory
- Meets or exceeds UL Subject 491, UL1998, OSHA, ANSI, RIA, and international standard IEC 1760-1
- Two-year warranty
- Made in USA



Metal Box Controller Display

Common Design Criteria

The STTS Mat Controllers utilize the diverse redundant design concept. When combined with the advanced STTS Safety Mat System, the controllers provide compliance with OSHA, ANSI, RIA, CSA, and the European draft standards EN954-1 and EN1760-1.

These standards dictate safety of machinery and the related parts of control systems and their pressure-sensitive protective devices. These standards focus on creating a fault tolerant system.

Control Reliable System—Critical components are duplicated so a single component failure will not cause an unsafe condition. If a component does fail, the self-checking circuitry recognizes the fault and initiates a safe stop of the machine. The fault is then displayed on the message display.

Self-Checking Circuitry—The STTS Mat Controller will self-check every 20 milliseconds. Self-checking is the ability to electronically verify that all of the system's critical internal circuit components and their redundant counterparts or back-ups are operating properly.

Diverse Redundancy Design Concept—The STTS Mat Controllers utilize the diverse redundancy design concept. This gives the mat system a higher level of redundancy and control reliability. The two microprocessors are of different design, and the microprocessor or parallel programs are programmed from different instruction sets written by different programmers.

Redundant Captive Contact Safety Relays—Redundant relays assure safety should an output relay fail. The STTS Mat Controller utilizes safety relays which have force-guided contacts. This is a configuration where the contacts are mechanically locked together so if one set of contacts weld, the other contacts cannot change state.

Alphanumeric Diagnostic Message Display—Scrolling message display shows status and fault codes. This is an excellent safety and maintenance feature unparalleled in the machine guarding industry for increasing uptime.

Complete system monitoring on DeviceNet fieldbus networks. The STTS Mat Controller family is fully compatible with the DeviceNet fieldbus and can be connected directly into the fieldbus for non-safety monitoring of system status. DeviceNet is the leading low-cost communications link that connects a wide range of automated manufacturing devices for greater usability and convenience. Multiple STTS Mat Controllers can be networked with numerous other devices on a single DeviceNet network. Add suffix **DN** to controller part number for this optional feature.

STTS DIN-rail Controller Module

for Both Controllers

Circuit Description—Low voltage DC signal (+/- 20VDC) is pulsed to the mat simulating a

24VAC signal through two wires. The wires are attached to the top and bottom electrodes (internally) of the mat. Force on the mat lowers the resistance between the two wires causing a drop in voltage. A second pair of wires coming back from the mat is used to sense this drop in voltage. The redundant circuits compare the voltage to a reference and shut down the zone when the voltage drops below the reference. The circuit goes through a self-check to verify that the reference, comparators, mat, wiring, and other circuits are all functioning normally every time it scans a mat input. Diverse redundant technology, provided by two different computers, controls the whole system and provides a higher level of safety and system flexibility.

The following standard provisions are designed into both mat controllers to facilitate the guarding system interface and monitoring desired (usage is optional):

External Relay Check Provision—The External Relay Check allows the STTS Mat Controller to monitor a pair of external relays in series using the external relays secondary set of DRY contacts, provided they are N.C. force-guided contacts. The captive or force-guided contacts will maintain the identical position as the primary set of contacts on the external relays, except the secondary set of contacts are wired to signal the reverse of the primary (i.e., primary contacts are N.O. and secondary contacts are N.C.). The circuit looks for both closing and opening of the external relay contacts. The STTS Mat Controller provides a safe external relay check.

Application—Monitoring external relay contacts for shorts, opens, or welded contacts.

Auxiliary Output Contact Provision—The Auxiliary Output contact provides a N.O. or N.C. isolated (DRY) contact output to signal the condition of the mat system. The output is used in conjunction with the standard pair of output relays that are wired to the safety circuit of the equipment.

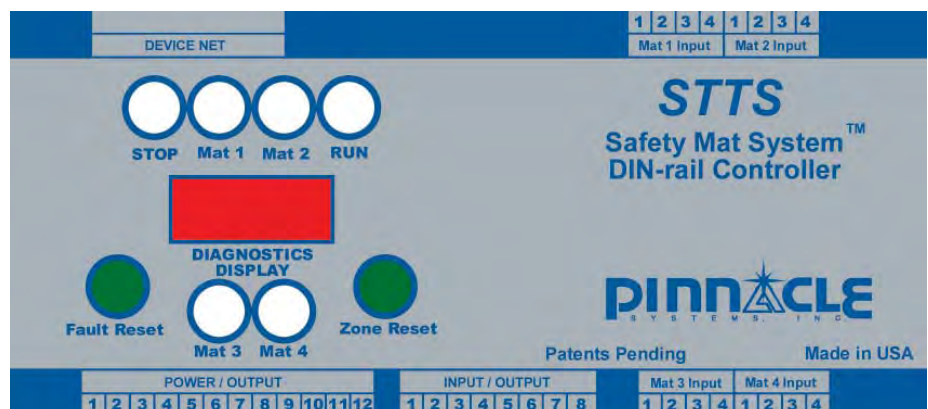
Application—Signal to PLC, etc.

DIN-rail Features with Pulsed Mat Monitoring

- Snap-out wiring terminals reduce both installation and maintenance costs
- Universal controller for all mat sizes
- Status indicators for operator awareness
- Ultrafast response time
- Scrolling diagnostic message display built-in or remote mounted
- Multi-lingual diagnostics available
- Remote status display capable (RSD)
- Emergency stop safety input built-in
- Fault relay output built-in
- Remote latching reset built-in
- Remote indicator light outputs provision built-in
- DeviceNet™ fieldbus network compatible (optional)
- Push button reset with memory
- Meets or exceeds UL Subject 491, UL1998, OSHA, ANSI, RIA, and international standard IEC 1760-1
- Two-year warranty
- Made in USA



Enclosure mounting: 35mm DIN-rail mountable or mounting screws on corners of enclosure requiring two combo-head screws (3.5 x 0.6 mm x 14 mm or #6 x .5)



DIN-rail Controller Display

STTS Controller Specifications

Metal Box Controller Category 4 Design

DIN-rail Controller Category 4 Design

Power:	20-40VDC @18 Watts 85-125VAC @ 19 VA 200-245VAC @ 19 VA		Requires removal of transformer All AC voltages work with 50 or 60 Hz		24VDC +/- 20% @ 7 Watts maximum	
Max # of Mats:	Up to 8 separate mat inputs			Up to 4 separate mat inputs		
Scan Time:	19 mSec/mat input	Pulsed Mat Monitoring		19 mSec/mat input	Pulsed Mat Monitoring	
Outputs:	<i>SAFETY:</i> 2 N.O. outputs (open when RED) per zone <i>AUXILIARY:</i> 1 N.O. or N.C. output per zone <i>FAULT:</i> Normally open (N.O.)	Monitored		<i>SAFETY:</i> 2 N.O. outputs (open when RED) per zone <i>AUXILIARY:</i> N.O. or N.C. with common <i>FAULT:</i> Normally open (N.O.)	Monitored	
Zone Reset Inputs:	3 inputs for N.O. push buttons for manual resetting of each zone located on the control panel door	Monitored		1 input for N.O. push button for manual resetting located on front of DIN-rail Controller or optional Remote Status Display (RSD)	Monitored	
Settings:	Jumpers to select manual or automatic reset, # of mats/zone and how many zones, fault reset and external relay checking			Jumpers to select manual or automatic reset, up to four mats and one zone, fault reset and external relay checking		
Indicators Internal:	Red LED on power supply board	ON= +12V supply ok		+5 V - Yellow LED's (2) +12V - Red LED (1)	Relays-Green LED's (4) -5V - Green LED (1)	
External:	8 Yellow LED's (1 per mat input) on panel door 3 Red/Green LED's (1 set per zone) on panel door	Yellow LED on = Standing on mat Yellow LED flashing=Fault with mat/circuitry Green LED on = Relays energized Red LED on = Relays de-energized Red LED flashing = Relay fault		Yellow LED on = Standing on mat Yellow LED flashing = Fault with mat/circuitry Green LED on = Relays energized Red LED on = Relays de-energized Red LED flashing = Relay fault		
External Display:	Diagnostic scrolling alphanumeric message display (4 character LED)			Diagnostic scrolling alphanumeric message display (4 character LED)		
Safety Relay Contact Rating:	8 AMP Rating @ 220VAC 8 AMP Rating @ 120VAC			8 AMP Rating @ 220VAC 8 AMP Rating @ 120VAC		
Safety Relay Configuration:	Dual captive contact self- checking safety relays			Dual captive contact self- checking safety relays		
Temperature Range:	0° to 50° C			0° to 50° C		
Self-Checking Intervals:	Every 20 milliseconds			Every 20 milliseconds		
Enclosure:	NEMA 12 lockable 18 gauge painted steel (IP 64)			Gray polycarbonate with clear cover. Provides IP40, UL94V-1, NEMA 1		
Multi-Lingual Message Display:	Consult factory for specific languages desired			Consult factory for specific languages desired		

STTS Mat Controller Ordering Procedure

DeviceNet™ fieldbus network compatible. Add suffix DN
to controller part number for this optional feature.

Example
Part #

	A	-	1	-	7	-	2	-	7
A - Metal Box Controller-Mat control and message display mounted in stand alone NEMA 12 lockable enclosure.	Mat Controller input power 1-120VAC 2-220VAC 3-24VDC (24VDC must be used for European Projects "CE")				Number of individual mats (inputs) to be wired back to STTS Mat Controller. Specify quantity: 1 to 8		Number of isolated control zones (outputs) desired. 1-1 Zone 2-2 Zones 3-3 Zones 4-4 Zones (requires larger control box) Etc.		Optional mat plug receptacles mounted on the STTS Mat Controller. Receptacles require mats with wiring style "R." Specify quantity: 1 to 8
B - Board only system supplied on a mounting back plate- Mat controller boards and message display to be installed into an existing control panel.									
D - DIN-rail Controller	3 (24VDC input power only)				1 to 4		1 (1 Zone output only)		RSD (Remote Status Display, optional)

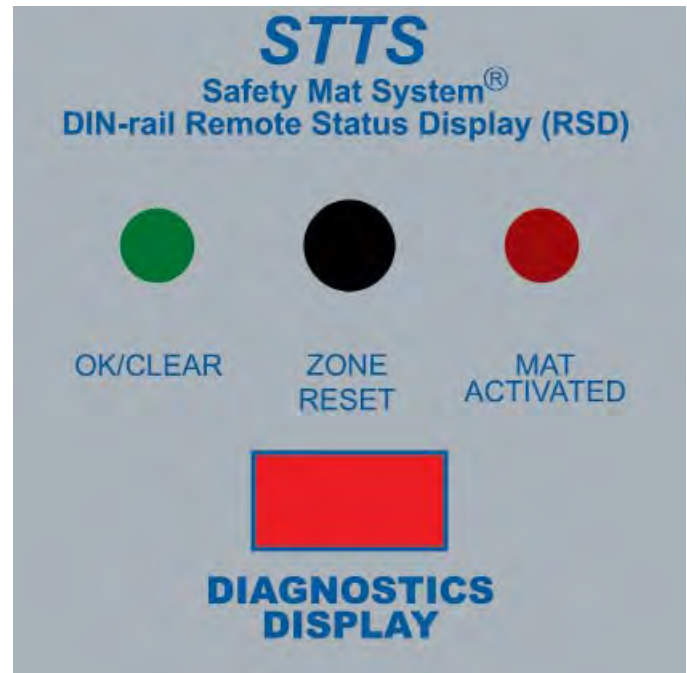
STTS DIN-rail Remote Status Display (RSD)

The optional Remote Status Display (RSD) may be used in conjunction with the STTS DIN-rail Controller. The RSD provides the machine operator and front line supervisor immediate system status and diagnostics when the STTS DIN-rail Controller is mounted inside the machine control panel.

Remote Status Display components:

- Red/Green indicator lights
- Diagnostic scrolling message display with 5' (1.524m) of connector cable
- Zone reset button

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.



(Shown actual size)

Requires 3" x 3" (76mm x 76mm) Panel Cutout

Mounting Hole Dimensions:

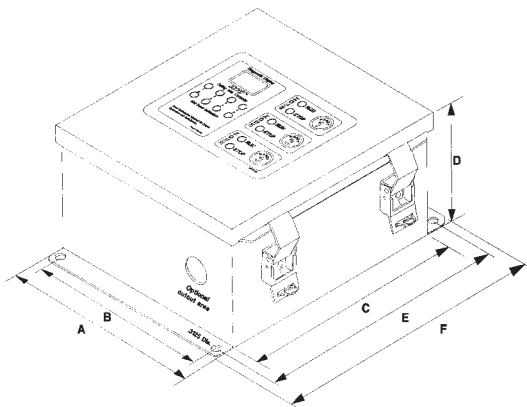
3.7" x 3.7" (94mm x 94mm) Center to Center

Mat Controller Dimensions

Metal Box Controller (shown below)

Inches/Millimeters

<i>Dim A</i>	<i>Dim B</i>	<i>Dim C</i>	<i>Dim D</i>	<i>Dim E</i>	<i>Dim F</i>
9.00"	7.75"	10.00"	5.25"	10.75"	11.50"
229	197	254	133	273	292



*Note: Enclosure mounted plug receptacles are mounted on the enclosure bottom. Requires 3" (76mm) clearance.

Metal Box Board Only System

Printed Circuit Boards

$$\frac{6.5}{165} \times \frac{8}{203} \quad \begin{array}{l} \text{inches} \\ \text{millimeters} \end{array}$$

Mounting Plate Size

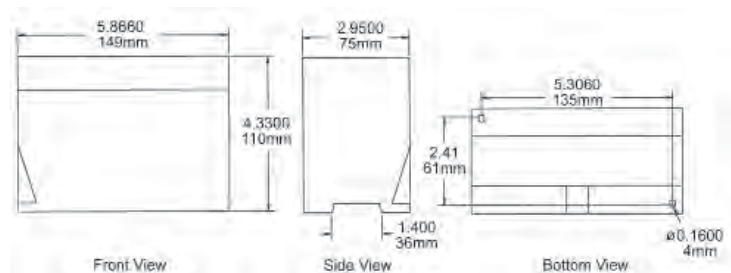
$$\frac{8.87}{225} \times \frac{8.87}{225} \quad \begin{array}{l} \text{inches} \\ \text{millimeters} \end{array}$$

Mounting Backplate Holes

$$\frac{8}{203} \times \frac{8}{203} \quad \begin{array}{l} \text{inches} \\ \text{millimeters} \end{array}$$

DIN-rail Controller

5.87" length x 4.33" depth x 2.95" height
(149mm x 110mm x 75mm)



Sizing Your System

How to Properly Size Your Safety Mat Guarding System

The following formula is an international draft guideline for the proper positioning and application of safety mats for machine guarding. This formula must be followed for all safety mat applications supplied to the European Community (CE) member nations. CEN is the European Committee for Standardization. Final draft #prEN999.

The minimum distance from the danger zone shall be calculated by using the general formula:

$$S = (K \times T) + C$$

S is the safety mat minimum distance in inches/millimeters in a horizontal plane, from the danger zone to the detecting edge of the safety mat furthest from the danger zone.

K is a parameter in inches/millimeters per second, derived from data on approach speeds of the body or parts of the body. $K = 63$ inches/second or 1600 mm/second.

T is the total system stopping time performance, which includes activating the safety mat, the mat controller output signal switching device, and the time required to stop the machine and remove risk.

C is an additional distance in inches/millimeters, based on intrusion towards the danger zone prior to actuation of the protective safety mat equipment. $C = 48$ " (1219mm).

Annex B (informative)

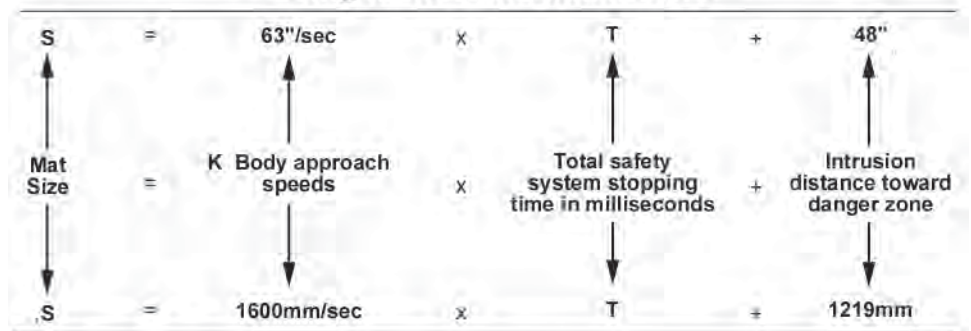
Walking speeds and stride lengths.

The positioning of equipment which is activated by a person walking onto a pressure sensitive mat is affected by speed of approach and stride length. The walking speed and stride length depend on the physical and anthropometric data of the population.

Speed of Approach. This standard assumes the approach of persons towards the danger zone will be at walking speed.

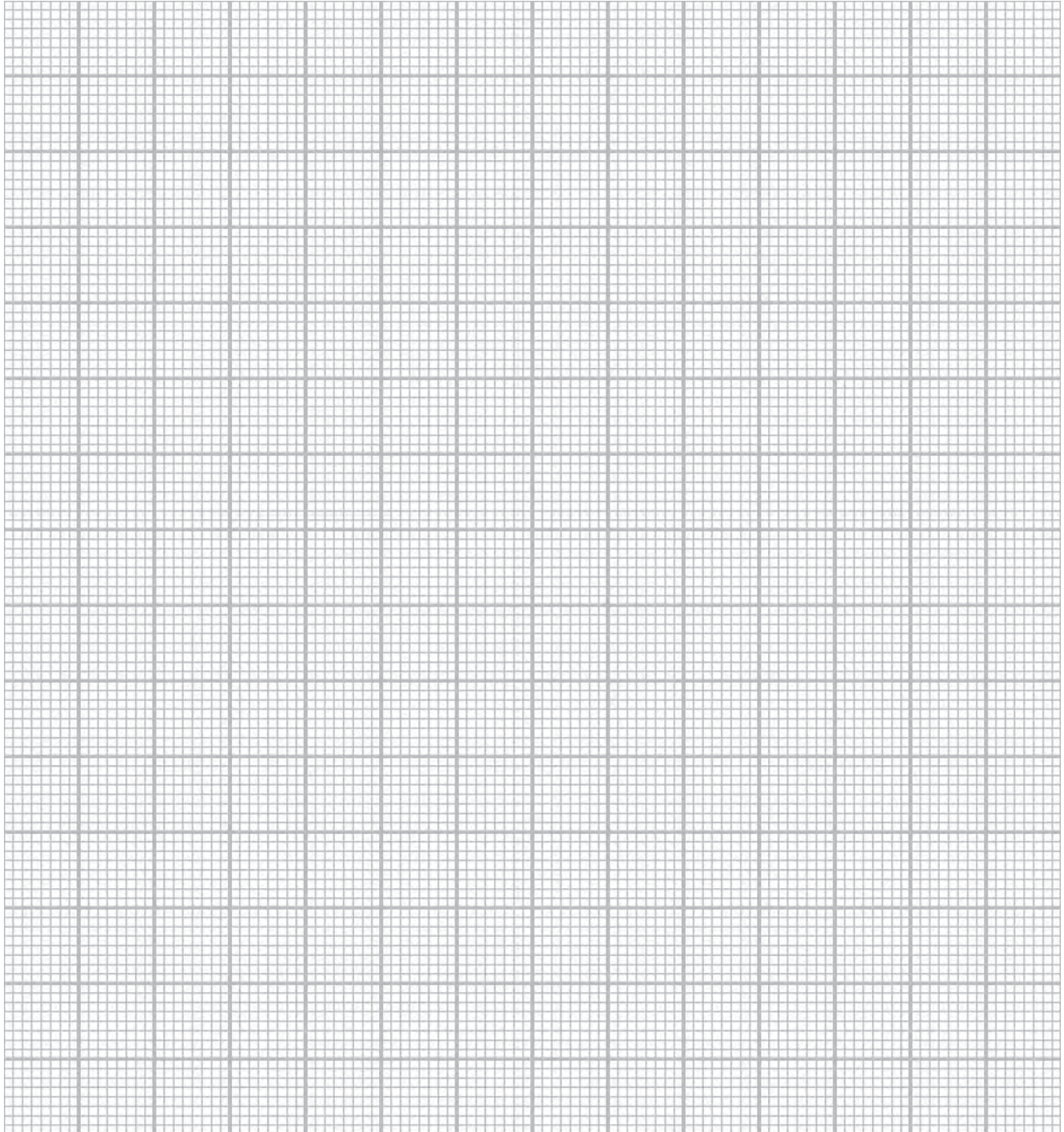
Stride Length. Available research data has shown that the 95th percentile of two steps (i.e., starting and finishing with the same foot) measured from heel contact at walking speed is approximately 7' (1905mm). By dividing by two and subtracting the 5th percentile shoe length provides a stride length of 28" (711mm). If it is assumed that an allowance has to be made, for example, between the detection zone and the stride length of 2" (50mm) this gives a minimum width of 30" (762 mm) for the detection zone.

Examples of safety mat sizing calculations using inches and millimeters



T-The STTS Safety Mat System activation time including controller is 35 msec. This amount is to be added to the machine stopping time in milliseconds to fulfill the **T** requirement of the formula.

Safety Mat Layout Grid Worksheet



Fax to 412-262-4055 for Proposal

Submitted By:

Name: _____

Company: _____

Phone Number: _____

Fax Number: _____

Safety Mat Label

Provides immediate safety mat system information required by international guarding standards. The label is located at the corner of the mat near the wire exit position. Actual size shown right—3-3/8" x 2-1/8" (86mm x 54mm).

Bar coding is supplied standard to ease in receiving and inventory control.

Customized labels are available.



Components & Specifications

Mat Wiring — Yellow PVC jacketed, 4 conductor, black, white, blue, brown 300VAC, 90C, 24AWG, CSA & UL Listed.

Mat Plug Assembly — Yellow PVC jacketed, snap connection, 4 pole black, white, blue, brown 300VAV, 90C, 24AWG, CSA & UL Listed. NEMA 6 (IP 67).

Mat Cable Diameter — .18" (4.6mm) for wire and plug assembly.

Mat Housing — .25" (6.35mm) top and bottom mat housing, cross drain built-in on mat bottom, hermetically sealed. Special mat housings available, consult factory.

Perimeter Trim — Part # M001
High-grade aluminum # 6063-T5

Active Coupler — Part # M003
High-grade aluminum # 6063-T5

Wire Raceway — Part # M002
High-strength PVC (black)

Mat Temperature Rating — -15°C to 55°C
(R & N mat styles) 4°F to 130°F
(H mat style designed for weld flash and molten plastic)

Mat Chemical Resistance

The mat compounds have excellent resistance to acids, alkalies, and salts. Hot acids and alkalies, as well as concentrated oxidizing and organic acids, have a deleterious effect over prolonged exposure.

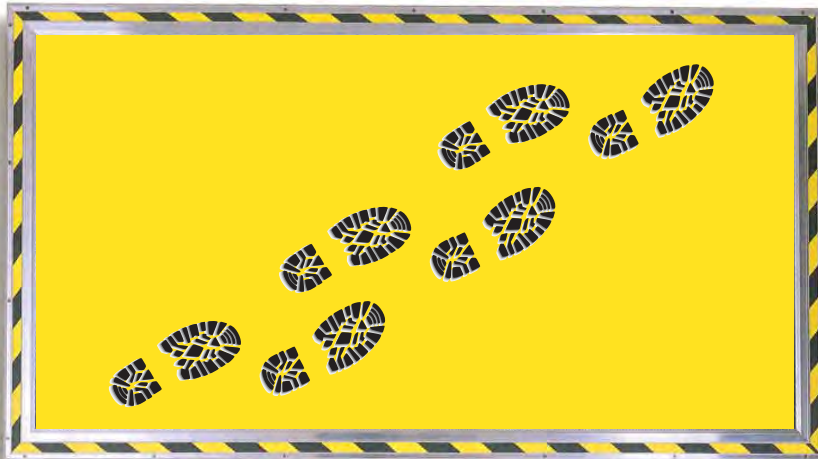
Mat Chemical Resistance

Water	E	Acetic Acid	F
Ethyl Alcohol	E	Gasoline	F
Sodium Chloride	E	ASTM 1 Oil	F
Bleach	E	Benzene	P
Hydrochloric Acid	F to E	Aceton	P
Sulfuric Acid	F to E	Trichlorethylene	P to F
Nitric Acid	F to E		

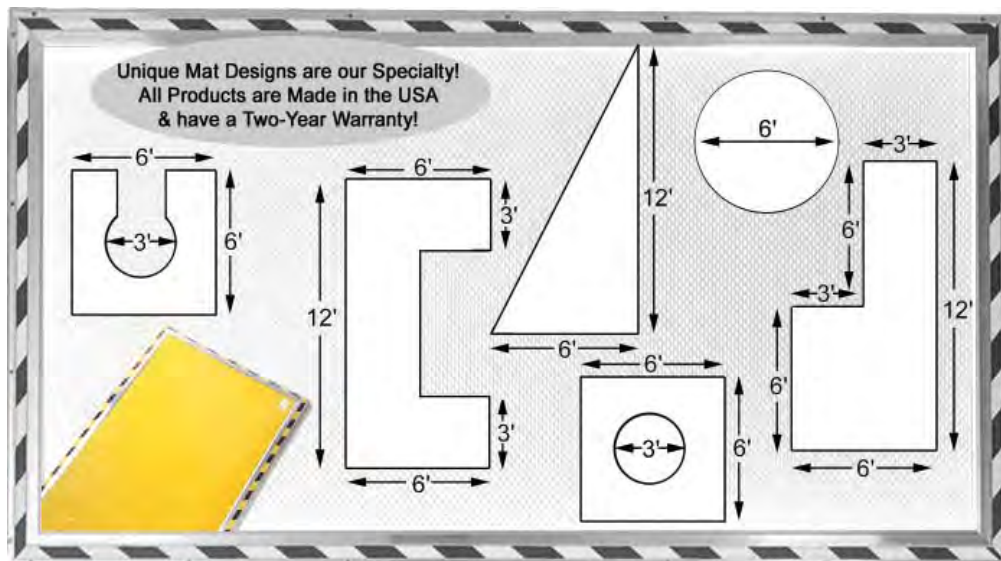
Key: E=Excellent; F=Fair; P=Poor

Additional Safety Mat Systems Available**Direction of Travel Mats**

A Revolutionary Technological Breakthrough! Provides electronic tracking of personnel as they move across the mat surface. Excellent for high security or homeland security applications.

**High-Temp Welding Mats**

High-temp non-skid safety mat for use in harsh environments such as robotic welding and hot forging applications. The mats can have irregular cuts, contours, notches or wiring locations to accommodate specific welding cell layouts. The maximum size of one mat is 72" wide x 144" long and can be made into any configuration.



For questions on any of the mats shown here, email us at mats@pinnaclesystems.com

NOTES

NOTES

Advanced Ergonomic Engineering

*Ultra***Touch**[®]

The safest and only
“control reliable”
ergonomic zero
force palm button
that can be used as
a two hand control
device for operator
safety.



Press Control
UL 508
LISTED
42EL
UL Subject 491

PINNACLE
S Y S T E M S , I N C .

Safety Sensors and Controls for Industrial Machine Guarding Systems

www.pinnaclesystems.com

The Industrial Problem of Cumulative Trauma Disorders (CTDs) and Carpal Tunnel Syndrome (CTS)

Cumulative Trauma Disorders (CTDs) is the most common term used to refer to the diseases related to the upper limbs. Similar terms used to describe these problem areas are:

- repetitive strain injuries
- occupational cervicobrachial disorders
- occupational overuse syndromes

Cumulative Trauma Disorders are caused by repetitive stresses on a particular body part after periods of job related micro-trauma. Basically there are three types of injuries to the machine operator. These injuries include nerve disorders, tendon disorders or neuro-vascular disorders.

Nerve Disorders-Carpal Tunnel Syndrome (CTS)

Common Tendon Disorders-Tendinitis, Tenosynovitis, DeQuervain's disease, Stenosing Tendynovitas, Stenosing Tenosynovitas Crepitans.

Neurovascular Disorders-Thoracic outlet syndrome.

What *UltraTouch*® Does For You

The patented sound ergonomic design criteria of *UltraTouch*® advances machine cycle initiation into the 21st century. The *UltraTouch* system has been designed so the machine operator can initiate the machine cycle with their hand and wrist area in the neutral position and with no exertion of force or pressure.

This minimizes hand, wrist, and arm stresses related to the potentially harmful extension and flexion positions of the hand required to activate conventional spring-loaded palm buttons. No flexing of the wrist is necessary with *UltraTouch*®.

Wrist and hand positions are most important as contributing elements of Carpal Tunnel Syndrome. Wrist position is important because it affects the length and tension relationship of contracting muscles. As the angle of the joint (wrist) increases or decreases beyond its midpoint (neutral position), there is a proportional decrease in the machine operators effective strength. This means that more exertion or tendon tension is required to do a task with a bent wrist than the same task with the wrist in the neutral position. Hand and wrist posture along with force required are base contributing elements to Carpal Tunnel Syndrome.

Benefits

Human Factor Engineering (Ergonomics)

UltraTouch® has been designed to interact with the operator, machine operation, and the work place in a safe and efficient way. This effective design of equipment will be most helpful in the controlling of Carpal Tunnel Syndrome and other Cumulative Trauma Disorders.

Productivity Increases

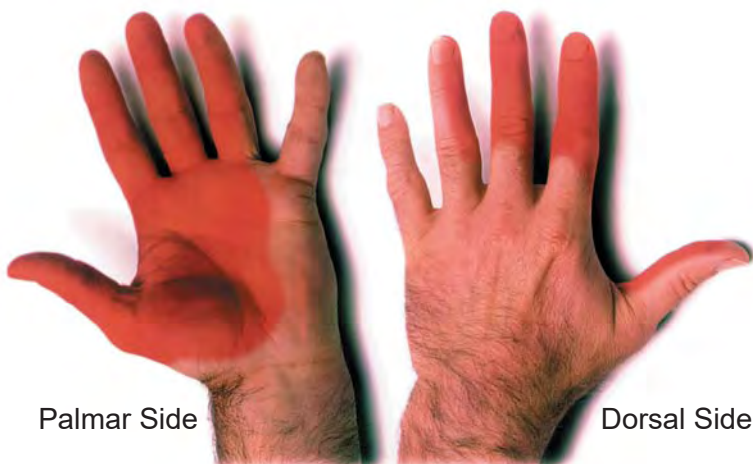
Increases in productivity are achieved by a reduction in operator fatigue and operator injury along with basic production line cycle time decreases.

Employee Morale

Easier job related actions and movements with both work methods analysis and ergonomic checklist analysis provide a healthier and more positive work environment.

Fatigue Control

Ease of safe machine activation enables the machine operators to utilize their energy for more productive efforts. The reduction of fatigue is an essential element when trying to control Cumulative Trauma Disorders such as Carpal Tunnel Syndrome.



Palmar Side

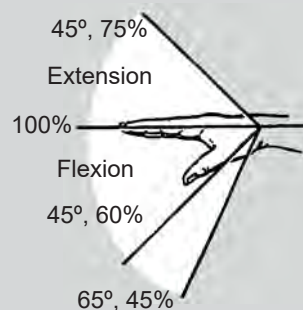
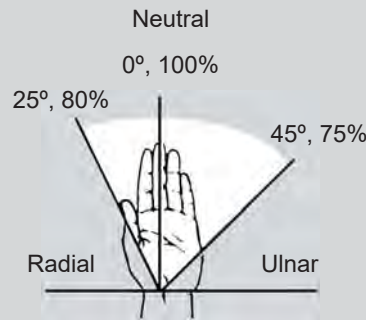
Dorsal Side

Median Nerve

The *UltraTouch®* system negates these problems by permitting the machine operator to activate the machine with no force or pressure and with the operator's hand and wrist in the premier ergonomic position of neutral, 0° deviation and 100% hand power position.

UltraTouch® eliminates the normal pressure required for machine activation with conventional palm buttons of the median, ulnar and radial nerve at the wrist and hand area.

UltraTouch® also permits the machine operator to activate the machine cycle with or without hand protection devices such as splints and even heavy metal fabrication work gloves.



Reference - Hand and Wrist Positions

The machine operator's reference hand and wrist positions illustrate the degree of wrist deviation (bending) expressed as a percentage of hand power grip as measured in the neutral (natural) position. The *UltraTouch®* system utilizes the premier ergonomic position of neutral, 0° deviation and 100% hand power for the machine operator.

The photo shows an operator's hand actuating the *UltraTouch®* module with the correct ergonomic hand position.

The hand is at rest with no angle or bending at the wrist joint and the hand is at the "thumbs up" position. This is the same natural hand and wrist position that is maintained when one's arms are at rest hanging at their side. There is no need to cup and curl the fingers or to roll the wrist to actuate the *UltraTouch®* system.

This further illustrates the total advanced ergonomic engineering displayed by the *UltraTouch®* design.



Economic Justification

There are substantial costs related to Carpal Tunnel Syndrome versus the costs and benefits to prevent them. Various factors that can be incorporated into the analysis are reduced overhead costs, employee morale, reductions in non-productive time, and improved productivity. Factors involved with overhead expense may include: medical costs, compensation costs, lost productivity due to injuries, absenteeism, and labor turnover.

Workman's Compensation Cost Control

UltraTouch® can reduce the costs related to Cumulative Trauma Disorders in relation to Workman's Compensation Insurance claims. Both medical and disability costs can be reduced with the control of Carpal Tunnel Syndrome.

The actual costs of Cumulative Trauma Disorders and Carpal Tunnel Syndrome are actually higher than those covered by Workman's Compensation Insurance. Insurance does not cover medical treatments rendered directly by the employer, and many employees supplement the disability coverage provided by the insurance carrier. Additional costs are incurred when expenses are paid for by the injured worker or by comprehensive health insurance, which may be provided by the employer as a fringe benefit.

Reduced Maintenance

The solid state design of *UltraTouch®* assures long life when compared to conventional spring-loaded mechanical palm buttons. The only component with a moving part is the industrial grade captive contact safety relay, and it is rated for an excess of 10 million cycles and is easily replaceable.

The *UltraTouch®* module is designed to be a direct replacement into existing operator run bar stations which is a true maintenance and installation time saver.

Applications

The *UltraTouch®* system is designed to activate electric, pneumatic, air clutch, and hydraulic equipment such as punch presses, press brakes, molding machines, assembly equipment, tube benders, compacting presses, riveters, etc. Virtually any machine that is currently using conventional mechanical spring-loaded palm buttons can now utilize the sound ergonomic design of *UltraTouch®*.

UltraTouch® Design

The patented *UltraTouch®* system has been designed as a direct replacement for standard spring-loaded mechanical palm buttons and is designed to fit into existing operator palm button stations without modification.

The *UltraTouch®* enclosure is a molded high strength NEMA 4 polycarbonate module designed to meet the high impact and vibration requirements of industry. The solid state electronics of the *UltraTouch®* switch incorporates an advanced redundant diverse sensor design. This means that each module has two different sensors with isolated circuits along with a monitoring redundant circuit. The circuitry of *UltraTouch* is also designed to provide second-order failure protection. This gives the *UltraTouch®* an unparalleled level of safety and assurance against inadvertent actuation, or failing in the "on" or conducting mode, which is a common problem found throughout industry with competitive ergonomic switch replacements. The *UltraTouch®* design is so safe against inadvertent actuation that two *UltraTouch®* modules when spaced and located properly in accordance to OSHA and ANSI hand control distance formulas (the same formula is used for mechanical palm buttons), permit its use as

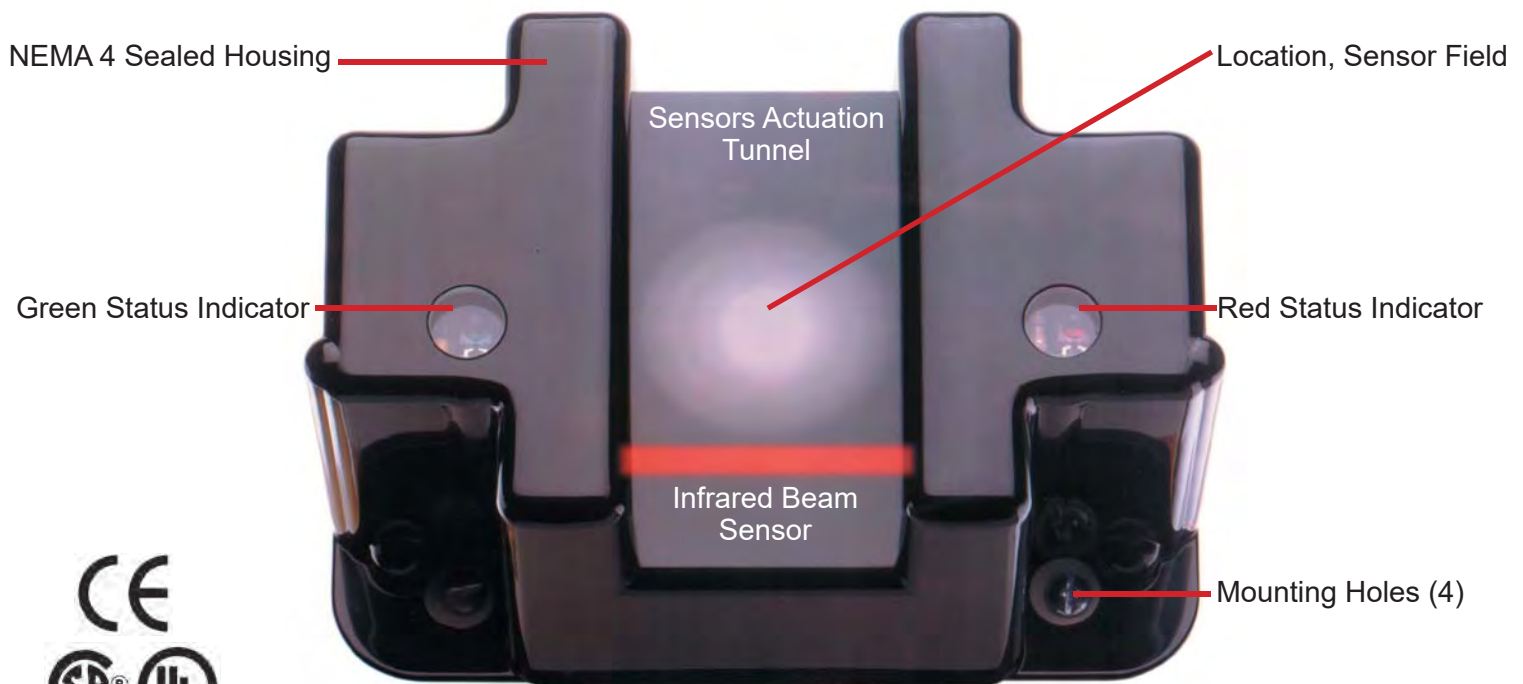
an operator safety two-hand control device. The *UltraTouch®* dual dissimilar sensor format is designed for the machine operator to actuate the switch, and that no inadvertent foreign objects such as sleeves, insects, broomsticks, playing cards, rags, mists or droplets can activate or trigger the switch. This gives *UltraTouch* an unparalleled level of safety while giving the operator the benefit of using the correct ergonomic hand position of neutral, 0° deviation and 100% hand power.

UltraTouch® Configuration

The *UltraTouch®* dual dissimilar sensor ergonomic palm switch is configured in the following manner:

A U-shaped sensors actuation channel (shown below) provides a triggering point for the machine operators hand. This is where the invisible infrared light beam is located and is crossing the channel. There is also a unique U-shaped location sensor mounted on the inside of the *UltraTouch®* enclosure that hugs the sensor channel and is insulated by the enclosure itself. When the machine operator inserts their hand into the sensor actuation tunnel, both the infrared sensor and the location sensor must be satisfied in order to energize an electromechanical relay to send a cycle

UltraTouch®



UL Subject 491

Patent Number 5,410,148 - U.S. Patent and Trademark Office

UltraTouch® Design Cont.

start signal to the machine. Both individual sensors within each module are time interlocked, and if both sensors are not triggered concurrently by the operator's hand, the *UltraTouch®* output will be inhibited to the machine control. The module also contains two visible LED indicators which informs the status of the *UltraTouch®* module to the operator. A green LED indicates that the relay contacts are closed, both sensors have been activated, and no failures have been detected. The red LED indicates that the relay contacts are open and no satisfactory conditions were detected on both sensors. This advanced patented *UltraTouch®* design is not available on any competitive unit and gives the *UltraTouch®* user an unparalleled level of safety when using ergonomic zero force actuation devices. Additionally, the operator will be activating the machine properly by using the correct ergonomic hand position of neutral, 0° deviation, and 100% hand power.

Easy to Install

UltraTouch® installs with ease and comes with complete installation instructions.

Simple module design permits direct exchange for existing spring-loaded mechanical palm buttons and even utilizes the existing screw holes on the run bar. All systems have normally open (N.O.) and normally closed (N.C.) contacts, and are also available in a four pole wiring configuration depending on the machine control requirements. The ultimate in versatility!

New installations and retrofit projects are completely installed in minutes by a qualified electrician. Also supplied is a toll free 800 number if any questions should arise by your installation personnel.

UltraSafe Design

Each *UltraTouch®* switch module incorporates the following safety design features:

- Two dissimilar sensors
 - a) Infrared sensor
 - b) Positive location sensor
- Redundant circuitry
- Chatterfree design circuit
- Anti-noise circuit
- No false trip on power up circuit
- Captive contact safety relays
- Operator status indicators
- Interlock circuit between the diverse sensors
- Immune to EMI and RFI noise
- Immune to weld field interference
- Control reliable design

OSHA, ANSI & CSA Standards

The mounting locations of *UltraTouch®* must conform to all State, Province, and Federal codes and all regulations pertaining to the subject machine on which the *UltraTouch®* is to be applied.

Point of Operation Guarding

The *UltraTouch®* system is a machine cycle initiation component that is designed to be a two-hand control device for the machine operator. If a point of operation guarding device is desired or required, please contact your local distributor or the factory for devices to comply with ANSI B11.1 or the various OSHA regulations.

References for Proper Installation

Please refer to the following ANSI (American National Standards Institute) Standards for the proper installation location for "two hand control devices" for your specific machine and application.

ANSI Standard B11.19-2003 Annex D Safety Distance (Informative)

ANSI Standard B11.1-2009 Annex C Safety Distance (Informative)

Ergonomic Palm Button Replacement Grid Checklist

"Compare the Difference"

UltraTouch

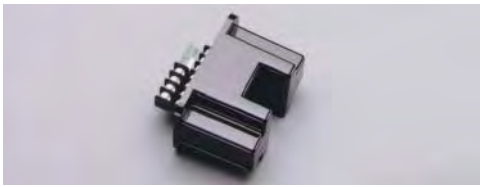
Design Criteria				
			YES	
Design Criteria	• Diverse dual sensor design		YES	
	• <i>Control reliable</i> design of sensor circuits		YES	
	• Redundant circuitry		YES	
	• Incorporates second-order circuit failure protection		YES	
	• Internal self-checking of infrared sensor and system circuits		YES	
	• Built-in timed interlock within each module for the two diverse sensors		YES	
	• Utilizes captive contact safety relays		YES	
	• Diagnostics of sensor circuits and diverse sensors interlock circuit		YES	
	• Not affected by external infrared light sources		YES	
	• Built-in hysteresis		YES	
	• No false trip on power up		YES	
	• Anti-noise circuitry built-in		YES	
	• Chatter free design built in		YES	
	• Weld field immune		YES	
	• EMI and RFI immune		YES	
	• Completely self-contained unit, requires no additional relays or interface boards		YES	
	• Operator status indicator lights— A. Red – Ready to cycle B. Green – Cycle initiated		YES	
	• Fast reacting—Less than 20 ms		YES	
	• NEMA 4 enclosure		YES	
	• Designs available for all machines: 110 VAC – 2 pole or 4 pole configuration 24 VDC – 2 pole or 4 pole configuration		YES	
	• Directly interchangeable with existing mechanical palm buttons: A. Electrically B. Mechanically		YES	
	• Requires correct ergonomic hand position for zero force machine actuation of neutral, 0° deviation, and 100% hand power		YES	
	• Cannot be actuated by screwdrivers, playing cards, rags, sleeves, broomsticks, mists or droplets		YES	
	• Tactile feedback feel requires the operator to have the proper hand location for both safety and ergonomics		YES	
	• Cannot be actuated by the operator's elbows		YES	
	• Can be used as an operator two-hand safety control device*		YES	
	• Complies with all applicable sections of OSHA, ANSI and CSA standards for operator two-hand control devices		YES	
	• Repairable unit—not a disposable design		YES	
	• Captive screws and gaskets supplied to ease installation		YES	
	• Two-year warranty		YES	
	• Made in USA		YES	
				
	Press Control LISTED UL 508 42EL Subject 491			

* Requires two *UltraTouch* modules spaced and mounted in accordance with current OSHA and ANSI standards. OSHA and ANSI standards also require machines to have "control reliable" control circuitry.

UltraTouch® Models

Model

Description



UL-101-2P

One *UltraTouch* module--Direct replacement into most existing operator stations into existing mechanical palm buttons space and screw configurations. Excellent for retrofit projects.



UL-102-2P

One *UltraTouch* module with a complete self-contained NEMA 12 enclosure. Dimensional configuration of NEMA 12 enclosure of 3.50" (89mm) x 6.375" (162mm) x 2.95" (75mm). Excellent for installations when the *UltraTouch* system must be mounted individually due to space limitations.



UL-301-2P

Two *UltraTouch* modules mounted on a NEMA 12 operator station run bar. The *UltraTouch* modules are mounted in accordance to OSHA, ANSI, and CSA standards in regards to run button spacing.



UL-401-2P

Two *UltraTouch* modules mounted on a NEMA 12 operator station run bar with a red mushroom emergency stop button located in the center. Excellent for installations requiring an emergency stop button for the operator. All the modules are mounted in accordance to OSHA, ANSI, and CSA standards in regards to run button spacing.



UL-501-2P

Two *UltraTouch* modules mounted on a NEMA 12 operator station run bar with a red mushroom emergency stop button located in the center and a yellow mushroom top button located off center. Ideal for the metal stamping/metal fabrication industry. All the modules are mounted in accordance to OSHA, ANSI, and CSA standards in regards to run button spacing.



UL-601 Specify AC or DC

Anti-tie down/concurrent operation module. This assembly supplies the control that, when added to two *UltraTouch* devices, assures that the operator occupies both hands and must initiate both *UltraTouch* devices within a preset period of time. The anti-tie down/concurrent module comes in a NEMA 12 enclosure and can be added to any of the styles. NEMA 12 enclosure 6" (152mm) x 8" (203mm) x 6" (152mm). This is required on all machines that do not have this capability in the machine control. (Available without control box. Part #UL-601-NB module. Requires 4" (102mm) x 5" (127mm) space.)



8500

The Model 8500 adjustable pedestal mount can be utilized for mounting the operator stations or the *UltraTouch* modules off the machine. These adjustable height pedestals are painted OSHA yellow and are of heavy angle construction with a floor mounting plate that can be lagged to the floor. The adjustable height feature assures the correct ergonomic position for various size operators. This will help control stretching and pulling strains of the operator.

Specifications

NEMA 4 Sealed Housing
Solid State Circuitry
Dual Sensor Sources--Infrared/Capacitive
Response Time <20 ms
CSA Approved, UL Listed
Module requires a 2" (51mm) mounting depth in run bar

Current Requirements

110 VAC 2 pole -- 50 mA
4 pole -- 60 mA
24 VDC 2 pole -- 150 mA
4 pole -- 250 mA

Operator Status Indicator -- LED's

- A. Red -- Ready to cycle
- B. Green -- Cycle initiated

Relay Type -- Captive Contact Safety Relay

Relay Rating -- 8 amp @ 220 VAC; 8 amp @ 120 VAC

Relay Cycle Life

Mechanical -- 50 million cycles
Electrical -- 100,000 cycles at 220 VAC, 4 amp

Voltage Range -- +/- 10%

Warranty -- 2 years



Press Control
UL 508 LISTED
42EL

UL Subject 491

Ordering Procedure

UltraTouch®

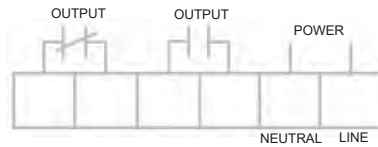
Wiring Configuration

Ordering Procedure

2 Pole Double Throw Relay 120 VAC

Model #
UL-101-2P

Relay Contact Rating
16 amps



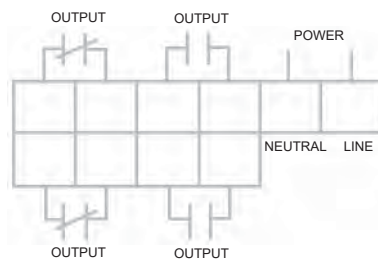
Relay operates when hand is inserted into sensors actuation tunnel.

If customized assemblies are required, please consult the factory. When ordering, please specify quantity required.

4 Pole Double Throw Relay 120 VAC

Model #
UL-101-4P

Relay Contact Rating
8 amps



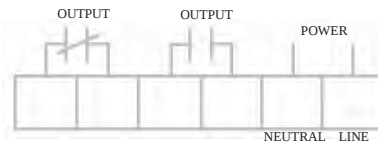
Relay operates when hand is inserted into sensors actuation tunnel.

When ordering, please specify quantity desired and Model Number shown on preceding page. Add the suffix 4P to the Model Number to designate the UltraTouch Model to be supplied with a 4 pole double throw relay configuration. Examples: UL-101-4P, UL-102-4P, UL-301-4P, UL-401-4P, UL-501-4P

24VDC Voltage System 2 Pole Double Throw Relay

Model #
UL-101-2P-DC

Relay Contact Rating
8 amps



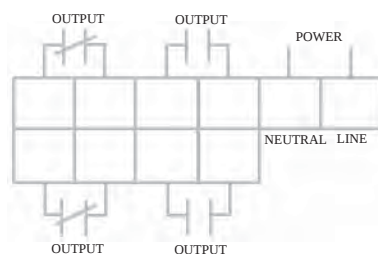
Relay operates when hand is inserted into sensors actuation tunnel.

When ordering, please specify quantity desired and Model Number shown on preceding page. Add the suffix 2P-DC to the Model Number to designate the Model to be supplied with a 24VDC 2 pole system. Examples: UL-101-2P-DC, UL-102-2P-DC, UL-301-2P-DC, UL-401-2P-DC, UL-501-2P-DC

24VDC Voltage System 4 Pole Double Throw Relay

Model #
UL-101-4P-DC

Relay Contact Rating
8 amps



Relay operates when hand is inserted into sensors actuation tunnel.

When ordering, please specify quantity desired and Model Number shown on preceding page. Add the suffix 4P-DC to the Model Number to designate the Model to be supplied with a 24VDC 4 pole system. Examples: UL-101-4P-DC, UL-102-4P-DC, UL-301-4P-DC, UL-401-4P-DC, UL-501-4P-DC

UltraTouch machine actuation devices are not to be used on full revolution power presses or on machinery utilizing restraints or pull-out devices as the point of operation guarding systems.

Mounting Dimensions

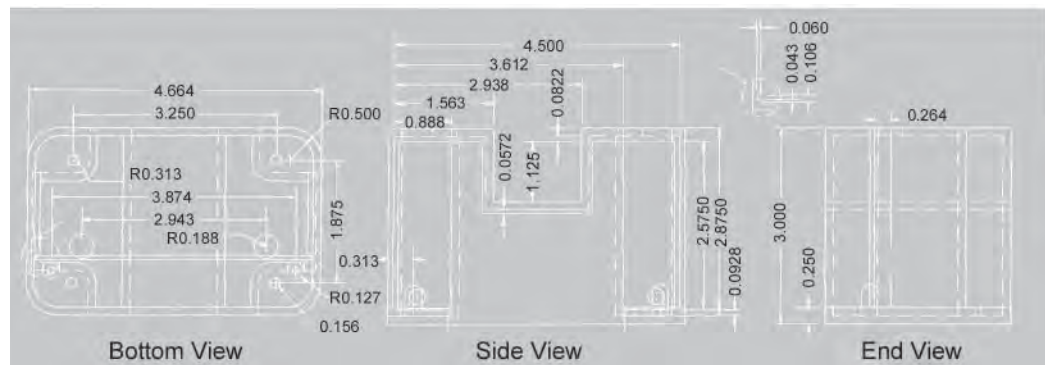
Dimensions in Inches

UltraTouch®

UL-101 UltraTouch® Module

Enclosure Specifications

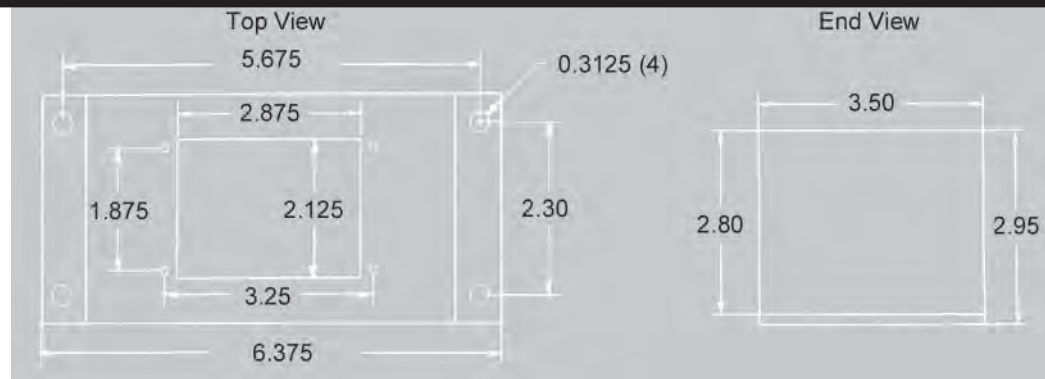
- Material 0.125 in plastic



UL-102 Module Base All Styles

Enclosure Specifications

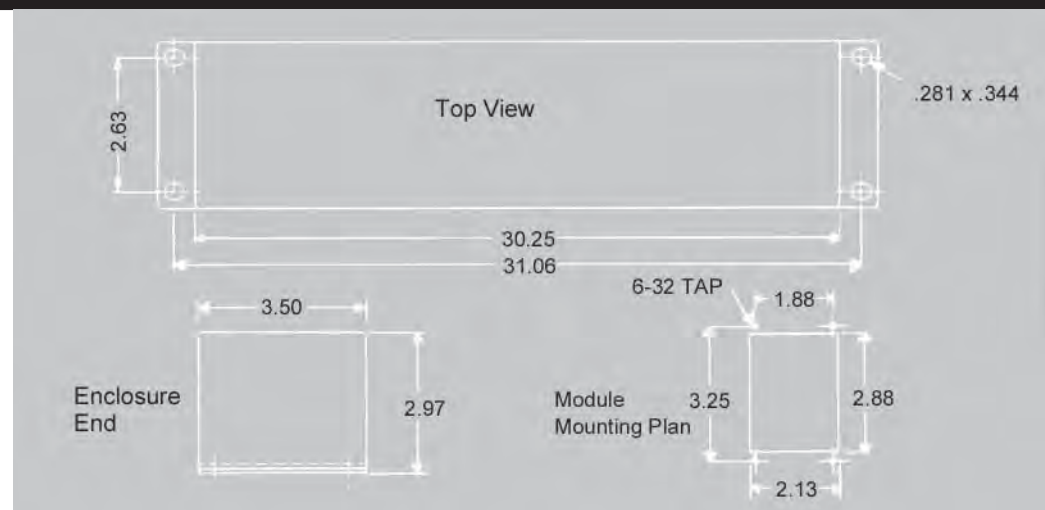
- NEMA 13
- 14 Gauge
- Steel Enclosure



UL-301 UL-401 UL-501 All Styles

Enclosure Specifications

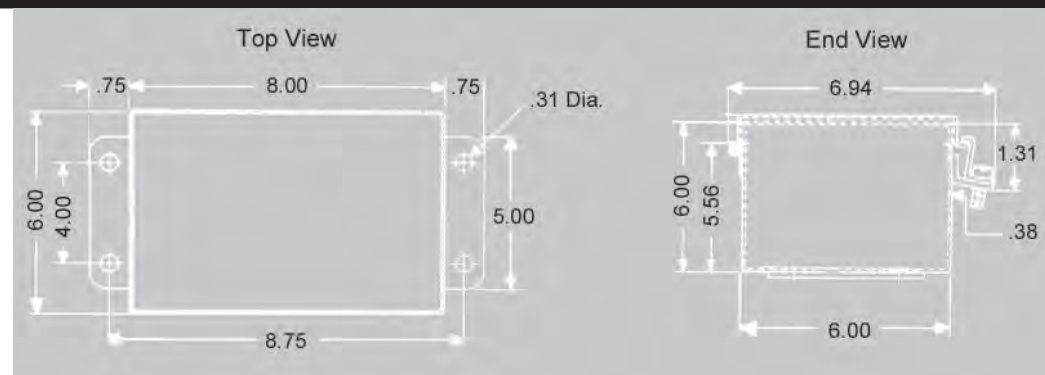
- NEMA 13
- 14 Gauge
- Steel Enclosure



UL-601

Enclosure Specifications

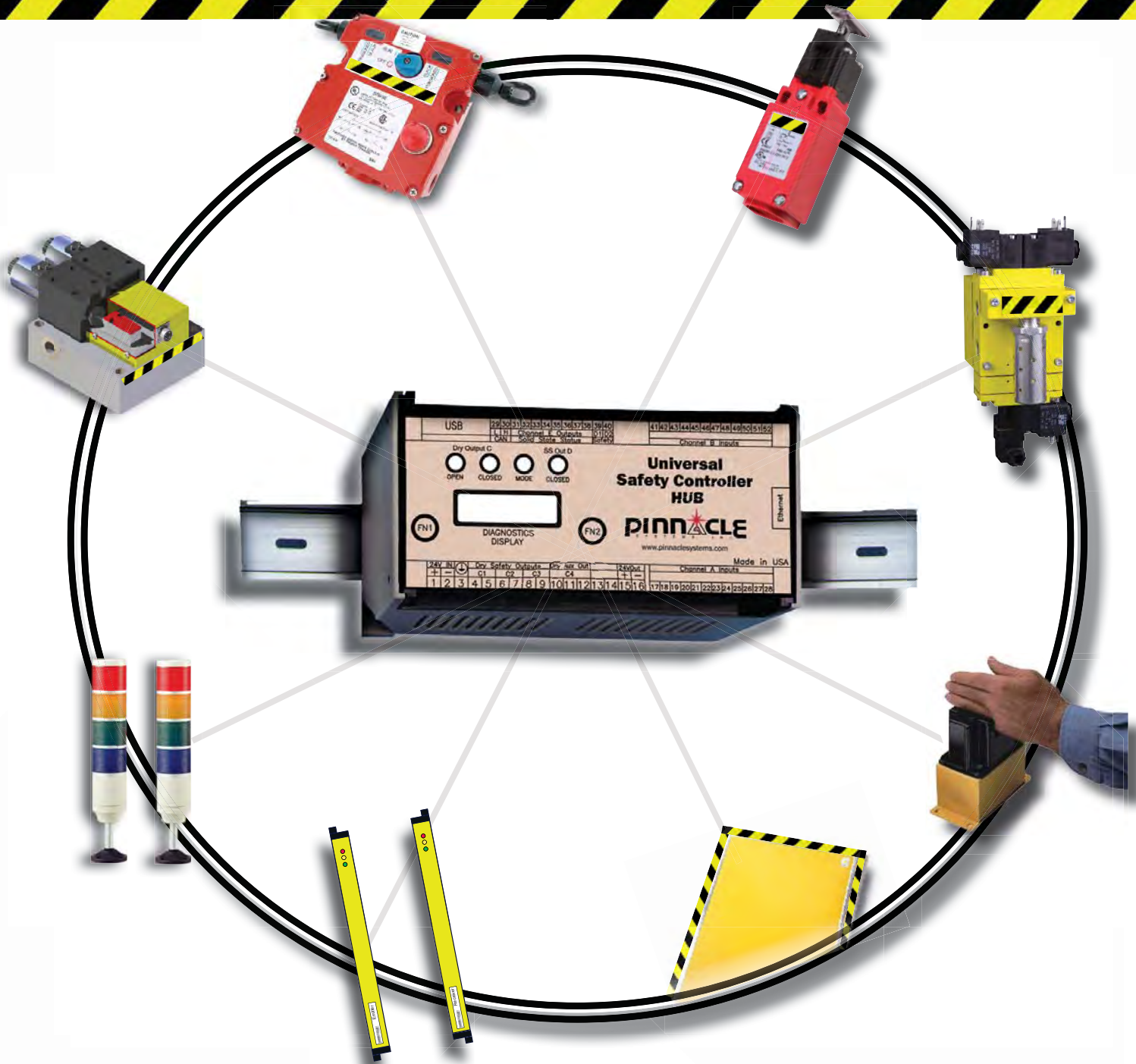
- NEMA 12 & 13
- UL 50 Type 12 & 13
- JIC Std. EGP-1967
- CSA Enclosure 5
- IEC 529, IP65
- 14 Gauge
- Steel Enclosure



Specials 1. Stainless steel module bases. 2. Cast malleable iron module bases.

NOTES

Multiple Safety Devices . . . One Safety Controller!



Universal Safety Controller HUB™

"Control reliable" Category 4 safety center replaces multiple safety relays/modules and seamlessly integrates many safety devices, outputs and control logic functions.

PINNACLE
SYSTEMS, INC.

Safety Sensors and Controls for Industrial Machine Guarding Systems



The Universal Safety Controller HUB from Pinnacle Systems replaces multiple individual freestanding safety relay modules into one completely integrated and multi-faceted safety center. The Safety Controller HUB contains a multitude of input wiring provisions for various safety devices that will be incorporated on the machine to be guarded or controlled. The HUB also contains dry contact safety relays and solid-state outputs in one complete, compact control reliable safety controller package. This provides ease of installation, improved safety and economic improvement on both installation and hardware cost.

Typical safety device inputs that can be monitored and controlled by the Safety HUB are: safety interlock switches (all types), safety light curtains, E-stop switches, cable – pull switches, safety mats, muting systems, operator two hand controls which contains anti-tie down/concurrency logic functions, EDM (External Device Monitoring) and much more.

Standard Features

- The Safety Controller HUB has 24 safety input terminals that can utilize safety or non-safety devices. (Expandable).
- The Safety HUB can monitor an input signal or provide 24 VDC when needed.
- Inputs can be NPN sinking/ground or PNP sourcing /+24VDC.
- Monitored mechanical captive contact safety relay outputs (dry) are built-in standard within the Safety HUB.
- Monitored solid state outputs are built-in the Safety HUB.
- Safety Channels A and B are both pulsed independently and sequentially to protect from component and internal shorts of 4 wire E-stop devices.
- No dip switches for inadvertent tampering of safety circuit, outputs or ancillary functions.
- No programming - Pinnacle Systems does everything for you!

Resets

- Fault reset button on Safety HUB Controller front panel.
- Manual relay reset button on Safety HUB Controller front panel.
- *Remote reset button – Uses any of the 24 safety inputs for remote reset away from the Controller HUB.

The Universal Safety Controller HUB has built-in field replaceable captive (dry) contact safety relays. This is quite advantageous when compared to regular safety relay modules that require the entire module to be discarded and replaced when a single internal mechanical relay goes bad. The Universal Safety Controller HUB is extremely cost efficient when compared to the total cost of using standard freestanding safety relays, their installation time and repair.

Communications: The Safety Controller HUB contains USB Port, CAN Network and optional Ethernet connections.

Control Reliable Control Systems

Control reliable resolver based (rotary and linear) position based systems available. Excellent for machine tools such as punch presses and press brakes (consult factory).

Regulatory Design Requirements

OSHA (Occupational Safety & Health Administration), ANSI (American National Standard Institute), and the European Standard (CE) mandate that safety circuits and safety systems used for machine guarding applications be “control reliable.”

Monitoring is also required of the safety circuits to assure that system redundancy is maintained. The Safety Controller HUB performs the monitoring functions required & assures that circuit redundancy is maintained with the safety devices utilized. All safety outputs are also monitored by the control reliable internal dual channel control logic of the Safety Controller HUB.

If any fault occurs during the machine operation, (examples safety device, dual channel control logic or the safety output relays), the self-contained safety relay outputs will shut down & remove power. The power when removed from the MPCE (Machine Primary Control Element) assures that the machine will achieve a safe state status until the fault is cleared. The contacts of the MPCE & additional external safety relays can also be monitored by the Universal Safety Controller HUB when required.

More Inputs Needed?

Safety Controller HUB Expansion

CAN – (Controller Area Network) Safety HUB communication on how multiple Safety Controller HUBs are connected and communicate with each other. The wiring connections for expansion are made on the two dedicated terminals (29 & 30) located on the upper left wiring connector on the Safety HUB. (CAN L Slave/CAN H Master) The CAN wiring connection is supplied standard on each Safety HUB for future expansion.

Communications

Ethernet (Optional) – Connected on the right side of the Safety HUB enclosure with a RJ-45 jack. The Ethernet capability provides the ability to program and review system status of the Safety HUB via the Internet.

Specifications

- Power: 24V dc +/-10%
- Power consumption:
 - Inputs: 24 Opto inputs – Each E-Stop requires 2 inputs
 - Each Category 4 E-stop requires 4 inputs
 - Safety Outputs: 3 normally open (N.O held closed) Dry safety outputs @ 8 Amps @ 250VAC
 - Solid state Outputs: 2 1/2 Amps
 - Auxiliary Output: 1 normally open/normally closed N.O./N.C. auxiliary relay for external status indicators. @ 5Amps @ 250 VAC
- Status Outputs: 8
- Indicators on controller HUB front: Red, Red, Green, Amber
- Reset buttons on controller HUB front: Fault Reset, Manual Relay Reset, Provision for Remote Reset button (requires one input)
- Standards: Designed to meet: EN 954-1 Cat 4, IEC 61508-SIL3, ISO 13849-1 Performance Level e, ISO, OSHA and ANSI.
- Response Time: 15 milliseconds
- Self-checking Intervals: Every milliseconds 19 msec
- USB Port: 1
- CAN Network: Expansion capability for additional inputs/outputs or additional logic functions built in.
- Temperature Range: 32°-120°F (0°-51°C)
- Shock: Tested to withstand high vibration application per UL 991
- Ethernet Network: Optional
- Warranty - 2 years

Enclosure

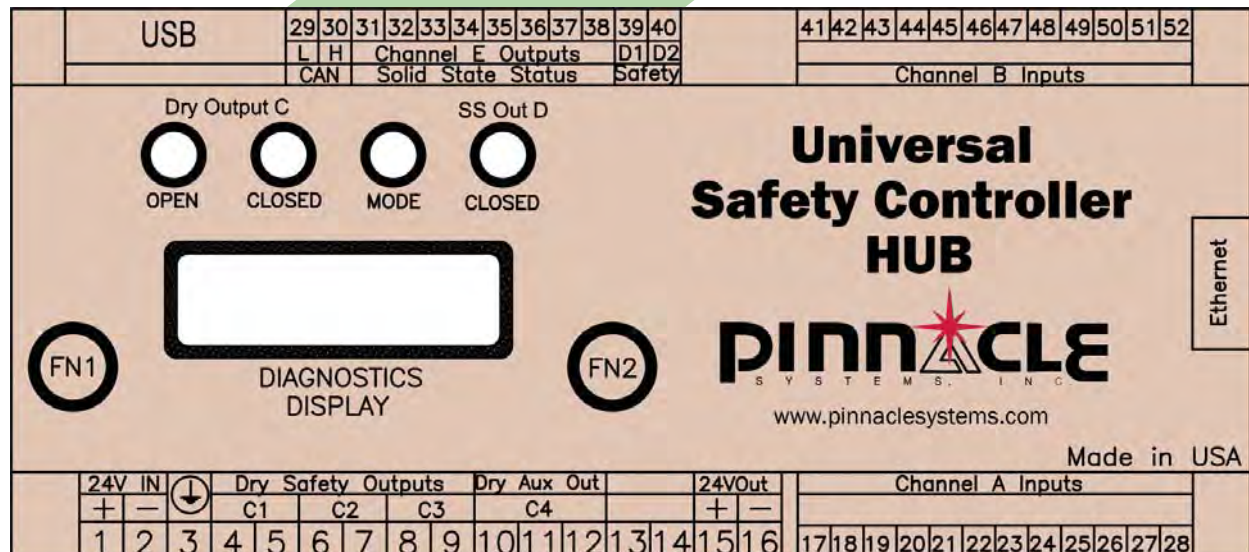
- Enclosure Housing: Gray polycarbonate with clear cover provides IP40, UL94V-1 Rating
- Enclosure Dimensions: 5.87" (149mm) length x 4.33" (110mm) depth x 2.95" (45mm) height
- Enclosure Mounting: 35mm Din-rail mountable or mounting screws on corners of enclosure requiring two combo-head screws (3.5 x 0.6mm x 14mm or #6 x .5)

- **Options Available:**

Mute-out	External Device Monitoring (EDM)	Expansion
Cincinnati Interface CI	Two Hand Control for operator machine initiation	Ethernet
Latching Relays	Customized logic functions	

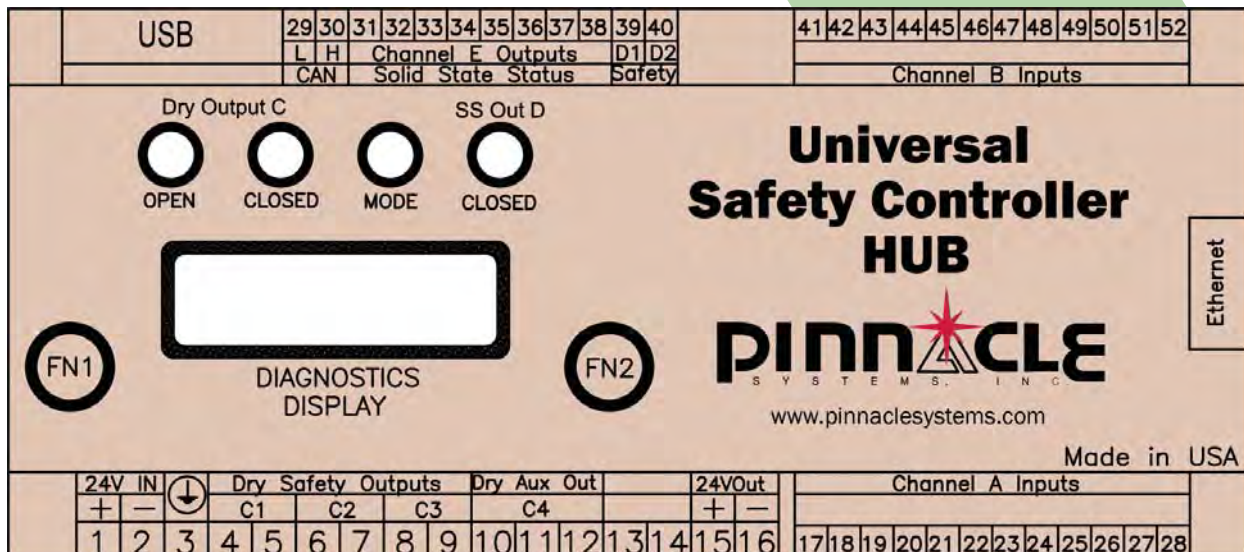
* Must be wired to control reliable system or our 52-278 captive contact safety relays.
Higher Amp Output for Channel D also available

12 Position Connector	CAN Network /		
Upper Left	Solid State Status Outputs / Solid State Safety Outputs		
Terminal 29	CAN L (Slave)	Expansion HUB	
Terminal 30	CAN H (Slave)	Expansion HUB	
Terminal 31	Status Output E-1	(1/2A Solid State, +24V or GND out)	
Terminal 32	Status Output E-2	(1/2A Solid State, +24V or GND out)	
Terminal 33	Status Output E-3	(1/2A Solid State, +24V or GND out)	
Terminal 34	Status Output E-4	(1/2A Solid State, +24V or GND out)	
Terminal 35	Status Output E-5	(1/2A Solid State, +24V or GND out)	
Terminal 36	Status Output E-6	(1/2A Solid State, +24V or GND out)	
Terminal 37	Status Output E-7	(1/2A Solid State, +24V or GND out)	
Terminal 38	Status Output E-8	(1/2A Solid State, +24V or GND out)	
Terminal 39	D-1 Safety Output	(1/2A Solid State Safety Output)	Monitored *
Terminal 40	D-2 Safety Output	(1/2A Solid State Safety Output)	Monitored *



16 Position Connector	Power Input / Safety Relay Output / Auxiliary Relay		
Lower Left	Power Supply Input (+24vdc input)		
Terminal 1	Power Supply Input (+24vdc input)		
Terminal 2	Power Supply Input (ground)		
Terminal 3	Earth Ground		
Terminal 4	C-1a	Safety Output (N.O. held closed)	8A@250vac (Dry) Monitored
Terminal 5	C-1b	Safety Output (N.O. held closed)	8A@250vac (Dry) Monitored
Terminal 6	C-2a	Safety Output (N.O. held closed)	8A@250vac (Dry) Monitored
Terminal 7	C-2b	Safety Output (N.O. held closed)	8A@250vac (Dry) Monitored
Terminal 8	C-3a	Safety Output (N.O. held closed)	8A@250vac (Dry) Monitored
Terminal 9	C-3b	Safety Output (N.O. held closed)	8A@250vac (Dry) Monitored
Terminal 10	C-4a	Auxiliary Output (N.O.)	5A@250vac (Dry)
Terminal 11	C-4b	Auxiliary Output (C)	5A@250vac (Dry)
Terminal 12	C-4c	Auxiliary Output (N.C.)	5A@250vac (Dry)
Terminal 13	Open		
Terminal 14	Open		
Terminal 15	+24vdc out (feed thru from Terminal #1)		
Terminal 16	Ground out (feed thru from Terminal #2)		

12 Position Connector Upper Right	Channel B / Safety or non-safety inputs B-1 to B-12		
Terminal 41	Channel B-1	(pnp/npn input or signal output)	
Terminal 42	Channel B-2	(pnp/npn input or signal output)	
Terminal 43	Channel B-3	(pnp/npn input or signal output)	
Terminal 44	Channel B-4	(pnp/npn input or signal output)	
Terminal 45	Channel B-5	(pnp/npn input or signal output)	
Terminal 46	Channel B-6	(pnp/npn input or signal output)	
Terminal 47	Channel B-7	(pnp/npn input or signal output)	
Terminal 48	Channel B-8	(pnp/npn input or signal output)	
Terminal 49	Channel B-9	(pnp/npn input or signal output)	
Terminal 50	Channel B-10	(pnp/npn input or signal output)	
Terminal 51	Channel B-11	(Mat + IN) (pnp/npn input or signal output)	Dedicated terminals 11 & 12 for powering control logic for Safety Mats, Edges and Bumpers.
Terminal 52	Channel B-12	(Mat - IN) (pnp/npn input or signal output)	



12 Position Connector Lower Right	Channel A / Safety or non-safety inputs A-1 to A-12		
Terminal 17	Channel A-1	(pnp/npn input or signal output)	
Terminal 18	Channel A-2	(pnp/npn input or signal output)	
Terminal 19	Channel A-3	(pnp/npn input or signal output)	
Terminal 20	Channel A-4	(pnp/npn input or signal output)	
Terminal 21	Channel A-5	(pnp/npn input or signal output)	
Terminal 22	Channel A-6	(pnp/npn input or signal output)	
Terminal 23	Channel A-7	(pnp/npn input or signal output)	
Terminal 24	Channel A-8	(pnp/npn input or signal output)	
Terminal 25	Channel A-9	(pnp/npn input or signal output)	
Terminal 26	Channel A-10	(pnp/npn input or signal output)	
Terminal 27	Channel A-11	(Mat + OUT) (pnp/npn input or signal output)	Dedicated terminals 11 & 12 for powering control logic for Safety Mats, Edges and Bumpers.
Terminal 28	Channel A-12	(Mat - OUT) (pnp/npn input or signal output)	



System Layout/Design and Programming Guideline

- Maximum 24 inputs per Safety Controller HUB (expandable).
- Safety device wiring is always divided equally between Channel A and Channel B inputs for dual channel redundancy.
- Each E-Stop requires the use of two safety inputs: One in Channel A and one in Channel B.
- Each Category 4 E-Stop requires the use of four safety inputs; Two Inputs in Channel A and two Inputs in Channel B.
- Non-safety devices use one input in Channel A or B.
- Dedicated inputs for four wire safety mats, edges and bumpers.
- Factory (with Design Questionnaire) or customer configures input type with supplied jumpers

Sinking

NPN
= Ground

or

Sourcing

PNP per input
+24V

Factory default setting is PNP sourcing

Options (Add underlined as suffix to part number)

Mute-out – (MO) – Mutes out a safety light curtain device during the non-hazardous portion of the machine cycle. Requires one safety input.

MOC - Mute out the signal routed thru safety output C

MOD - Mute out the signal routed thru safety output D

MOB - Mute out the signal routed thru safety output C and D

Amber Anmuting light (indicator) output can also be supplied

External Device Monitoring – (EDM) – Method in which the Safety Controller HUB monitors the state of various external control devices in a control reliable manner. EDM requires the use of two safety inputs.

EDMC - External Device Monitoring routed thru safety output C

EDMD - External Device Monitoring routed thru safety output D

EDMB - External Device Monitoring routed thru safety output C and D

Two Hand Control – (2H) – Provides anti-tie down/concurrent operation logic for operator two hand controls for machine actuation. Requires one safety input.

2HD - The two-hand control option is routed thru safety output D.

Cincinnati interface – (CI) – Requires the Safety Controller HUB to issue a stop command on every machine cycle. Requires one safety input.

CIC - Cincinnati Interface signal routed thru safety output C

CID - Cincinnati Interface signal routed thru safety output D

CIB - Cincinnati Interface signal routed thru safety output C and D

Latching Relay – (LR) – Resettable latching relays option requires that the individual safety device be manually reset after every time the device signals a stop. (The latching relay option does not occupy a safety input.) Reset requires remote manual reset button.

LRC - Latching relay signal routed thru safety output C

LRD - Latching relay signal routed thru safety output D

LRB - Latching relay signal routed thru safety output C and D

Expansion Module – (EXP) – Doubles the Safety HUB inputs & outputs. The modules are interconnected via the two wire CAN network connections on each module.

Ethernet – (ET) – Capability provides the ability to program or review status of the Safety HUB via the Internet.

The complete system can be upgraded or changed in the field for any system changes that may occur. Pinnacle Systems will configure the Safety HUB to meet your specific requirements.

For additional information regarding the HUB, please email us at hub@pinnaclesystems.com

Available Models

- 53-448 Standard Safety HUB as shown and described on the preceding page pre-programmed and ready to plug and play.

Options with 53-448

- 30-012 24vdc @ 2.2A power supply (90-260vac In) 3.9" L x 3.8" W x 1.4" H (99.1mm x 96.5mm x 35.6mm)
(Option is standard in the 53-455)



- 53-455 Basic pre-programmed Safety HUB in a 16" x 14" x 6" painted steel control panel, with a Plexiglass clearview cutout on the front door to view status display. Also included is a 24VDC 2A power supply and terminal strip, all mounted on to a backplate.



Examples

- Example#1: Safety Center with 1 Mat, 4 4-wire ESTOP switches with the first ESTOP switch muted by key-switch, and a Momentary key-switch to Reset a TRIP condition.
- Example#2: Small Hydraulic press control with Up Limit switch, Down Limit switch, 1 Light curtain, 1 ESTOP button, 1 Cancel/return Button, and 1 palm button station (with anti-tie-down, concurrency)

Custom Programming

Available for all special system layouts and electrical interfaces. The Safety HUB comes complete for any special or unique logic functions you may desire (consult factory).

For additional information regarding the HUB, please email us at hub@pinnaclesystems.com

Ordering/Pricing Procedure

Format Model#: SH-XX(YY)-XX(YY)-XX(YY)- ...

(where XX is the Input device type, where YY is an OPTIONAL Output device type)

Example Model#: SH-2-2-6-10-2-2D-6D-8C

(2 light curtains + 1 ESTOP tied to C with latching RESET, 1 light curtain + mat tied to C with no latching, 1 light curtain + 1 ESTOP tied to D with no latching)

Custom programming optional.

Current List of Input Device Types

XX	Terminals used	Input Device Type
1(T)	2	START or STOP or CANCEL button inputs
2	2	CAT 4 Light curtain or CAT 2 ESTOP
3	2	Foot Pedal
4	3	Cat 3 ESTOP input
5		Reserved
6	4	Cat 4 ESTOP input
7(T)	2	Palm button station (2 palm buttons) N.O. from each button
8	4	NSD Safety Mat or any 4-wire pressure sensor device
9(T)	2	Limit Switch (mechanical or Pressure)
10(T)	2	Reset Button for Channel C
11(T)	2	Reset Button for Channel D
12(T)	2	Cincinnati Interface for Channel C
13(T)	2	Cincinnati Interface for Channel D
14(T)	2	Mute-Out bypass for Channel C
15(T)	2	Mute-Out bypass for Channel D
16(T)	2	EDM (External Device Monitor) for Channel C
17(T)	2	EDM (External Device Monitor) for Channel D
18		Reserved
19		Reserved
20(T)	2	Key Switch bypass (used to bypass other devices)
21(T)	2	Prox sensor input (1/4" pinch point)
22(T)	2	Mute-Out bypass for Foot Switch device #3
23(T)	4	Palm button station (2 palm buttons) N.O. and N.C. from each button

(T) - optional Timer Function to allow time limits. User programmable times.

Current List of Output Device Types

YY	Channel output	Output Device Type
	C	Assume Devices use Channel C if left blank Assume Device Status tied to each Channel E output
E	E	Device Status Output (default)
C	C	Devices tie to Channel C mechanical relays
D	D	Devices tie to Channel D solid state relays
240C	C	Timer function to hold Channel C ON
241C	C	Timer function to hold Channel C OFF
242D	D	Timer function to hold Channel D ON
243D	D	Timer function to hold Channel D OFF
251CD	C/D	Devices Latch C ON and D OFF
252CD	C/D	Devices Latch D ON and C OFF
253CD	C/D	Devices Latch both C & D OFF
254CD	C/D	ESTOP devices turn C & D OFF both
255CD	C/D	Devices turn C & D OFF both

For additional information regarding the HUB, please email us at hub@pinnaclesystems.com

E-Stop Buttons



Part # 52-302

Complete Assembly for Part Number 52-302 Includes:

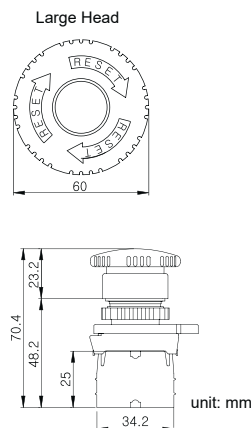
- 1 - 60mm red mushroom push button
- 1 - Emergency Stop Legend Plate with yellow background
- 2 - NC Contact Blocks
- 1 - Aluminum enclosure mounting box which contains the E-Stop components listed above.

Push Button

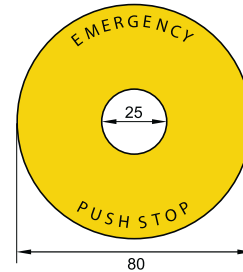


Features:

- Ø60mm Mushroom head
- Push Lock and Twist-to-release
- Non-illuminated
- Red in color
- UL, cUL, CE approved contact blocks



Legend Plate



Contact Blocks

Contact Capacity:

- 110 VAC 10A / 220 VAC 5A
- 2 NC Contact Blocks

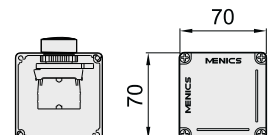
Approvals:   



Enclosure

Features:

- Aluminum enclosure
- 1 Hole



E-Stop Buttons - Stainless Steel

NEMA 4X (IP 56) E-Stop Assembly)



Part # 52-305

Complete Assembly for Part Number 52-305 Includes:

- 1 - 22mm red mushroom push button
- 1 - Emergency Stop Legend Plate with yellow background
- 2 - NC Contact Blocks
- 1 - NEMA 4X (IP 56) Stainless Steel Enclosure which contains the E-Stop components listed above. Enclosure Dimensions are: 3.5" (89mm) High x 3.25" (82mm) Wide x 2.75" (70mm) Deep

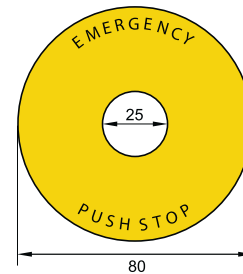
Push Button



Features:

- Ø22mm Mushroom head
- Push Lock and Twist-to-release
- Non-illuminated
- Red in color
- UL, cUL, CE approved contact blocks

Legend Plate

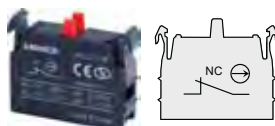


Contact Blocks

Contact Capacity:

- 110 VAC 10A / 220 VAC 5A
- 2 NC Contact Blocks

Approvals:   



Enclosure

Features:

- Stainless Steel Enclosure
- Enclosure is NEMA 4X (IP 56)
- Enclosure Dimensions are:
- 3.5" (89mm) High
- 3.25" (82mm) Wide
- 2.75" (70mm) Deep

Safety Interlock Switches



Including Rope Pull, Non-Contact and Explosion Proof

GKM Series Global Miniature Safety Key Interlock Switch



GKM Series

Description:

The GKM Series Global Miniature Safety Key Interlock Switch is designed for use on machinery where key removal brings the machine to an immediate safe condition. The GKM Series provides enhanced operator safety when added to hinged or sliding guard doors, screens and protective covers on enclosures. Key sold separately.

Features:

- Red body color
- Integrated cable or connector(s)
- Bottom or side-entry
- Bottom, side-entry, or dual connector versions (for daisy chaining a number of switches together)
- 90° or straight key
- Extremely compact enclosure
- Positive opening operation of normally closed contacts (conforming to IEC/ EN 60947-5-1-3)
- IP67 rating
- Stackable design allows side-by-side mounting
- Robust keys
- UL listed, CSA certified, CE compliant
- High current switching capabilities
- Small door swing radius down to 160 mm [6.3 in]

Benefits:

- Reduced installation time and costs.
- Flexibility of mounting and actuation options.
- Ability to function as a final switching device for small, low-risk equipment.
- Operates with safety control modules for more complex applications.
- Durable, tough design.
- Fits extremely compact spaces, and is often suitable for wet applications.
- Simple mechanical and electrical redundancy for some options.
- Easy application in multiple door modular machinery (no difficulty in wiring small switch enclosures).
- Global acceptance.

Accessories



Part Number:
GKZ52M
Description:
90° key



Part Number:
GKZ51M
Description:
Straight Key

Models Available

GKMB33, GKMA23, GKME03, GKMD03 and GKME06

Common attributes in the models listed above:

Description: Most compact key operated switch available

Housing Material: Glass filled Polyester

Approvals: UL, CSA, CE, S-mark

Measurements: 69.4 mm x 34.0 mm x 16.0 mm

Temperature Range: -25C to 85C (-13F to 185F)

Potential Applications:

- Small enclosures and compact spaces
- Multiple door modular machinery
- Stackable design allows one switch to be mounted on top of another

Part Number: GKME06

Features: M12 Connector, Side and bottom exit. Can daisy chain for reduced wiring

Sealing: IP 67, NEMA 1, 12, 17

Electrical: 30 Vdc and 2A max

Circuitry: 2NC

Part Number: GKME03

Features: M12 Connector, Side and bottom exit.

Can daisy chain for reduced wiring

Sealing: IP 67, NEMA 1, 12, 15

Electrical: 30 Vdc and 2A max

Circuitry: 1NC/1NO

Part Number:

GKMB33

Features: Bottom Exit
3 m Cable

Sealing: IP 67, NEMA 1, 12, 13

Electrical: 2.8A @ 24VDC; 3A @120VAC

Circuitry: 1NC/1NO

Part Number: GKMA23

Features: Side Exit 2 m Cable

Sealing: IP 67, NEMA 1, 12, 14

Electrical: 2.8A @ 24VDC; 3A @120VAC

Circuitry: 1NC/1NO

Part Number: GKMD03

Features: M12 Connector, bottom exit

Sealing: IP 67, NEMA 1, 12, 16

Electrical: 2.8A @ 24VDC; 3A @120VAC

Circuitry: 1NC/1NO

GKN Series Safety Interlock



GKN Series

Description:

The GKN Series safety interlock switches provide superior reliability in a compact, cost-effective package size.

Features:

- Red body color
- Positive opening operation of normally closed contacts(conforming to IEC/EN 60947-5-1-3)
- Choice of actuators
- Double insulated per IEC 60947-5-1
- Global approvals (cULus, CE, CCC)
- Three cable entries
- Large wiring cavity
- Large M20 cable entry
- Oblique native 0.5 in NPT conduit
- Common footprint
- Four-entry head

Benefits:

- Flexibility in positioning on door/machine.
- Ease of wiring/installation.
- No conduit or cable adapters.
- Meets global safety standards.
- Drop-in compatibility with most brands.
- No need to reconfigure head orientation.

Potential Applications:

- Woodworking machinery
- Printing/paper finishing equipment
- Plastic molding equipment
- Printing machinery
- Bailing and pumping equipment
- Semiconductor manufacturing equipment
- Packaging wrapping
- Specialty equipment

Accessories:



Part Number: GKZ42

Description: 90° key



Part Number: GKZ43

Description: Flexible key with left/right movement



Part Number: GKZ45

Description: Flexible key with multi-directional movement



Part Number: GKZ41

Description: Straight Key

Available Models:

Part Number: GKNA21

Description: 3 circuit switch with front or top key entry

Features: ½" NPT Conduit

Housing Material: Glass reinforced Polyamide

Approvals: UL, CSA, CE, BG

Sealing: IP65, NEMA 4

Electrical: 6A @ 24VDC; 10A @ 110VAC

Circuitry: 2NC/1NO

Measurements: 90mm x 52mm x 33mm

Temperature Range: -30C to 80C

Part Number: GKNA30

Description: 3 circuit switch with front or top key entry

Features: ½" NPT Conduit

Housing Material: Glass reinforced Polyamide

Approvals: UL, CSA, CE, BG

Sealing: IP65, NEMA 5

Electrical: 6A @ 24VDC; 10A @ 110VAC

Circuitry: 3NC

Measurements: 90mm x 52mm x 33mm

Temperature Range: -30C to 80C

GKE Series Dual Entry Safety Interlock



GKE Series

Description:

The GKE Series safety key-operated switch provides superior reliability for safety hard guarding applications in a compact, cost-effective package. The GKE conforms to IEC 60947-5-1 and carries the cULus, CE, and CCC approvals.

Features:

- Red body color
- Positive opening safety contacts
- Head orientation configured to order
- Rotating head
- Head may be ordered in four possible orientations
- Double insulation per IEC 60947-5-1
- Choice of two standard actuators
- Small size
- Global approvals: cULus, CE, CCC

Benefits:

- Small footprint.
- Applicable to various safety schemes, including low and high voltage/energy.
- May be used as final switching device for small, low-risk applications.
- Environmentally sealed for challenging applications.

Available Models:

Part Number: GKEA03L

Description: Compact housing with small MIN-DIN footprint; 20 mm mounting; Cost effective solution

Features: Break Before Make contacts; ½" NPT Conduit

Housing Material: Plastic

Approvals: cUL, CE, CCC

Sealing: IP66, NEMA 1,12,13

Electrical: 2.8A @ 24VDC; 6A @120VAC

Circuitry: 1NC/1NO

Measurements: 92.2mm x 29.4mm x 30.5 mm

Temperature Range: -25 to 85C

Part Number: GKEA06L

Description: Compact housing with small MIN-DIN footprint; 20 mm mounting; Cost effective solution

Features: Break Before Make contacts; ½" NPT Conduit

Housing Material: Plastic

Approvals: cUL, CE, CCC

Sealing: IP66, NEMA 1,12,14

Electrical: 2.8A @ 24VDC; 6A @120VAC

Circuitry: 2NC

Measurements: 92.2mm x 29.4mm x 30.5 mm

Temperature Range: -25 to 85C

Accessories:



Part Number:

GKZ52M

Description:

90° key



Part Number:

GKZ51M

Description:

Straight Key

Potential Applications:

- Plastic molding equipment
- Packaging machinery
- Semiconductor manufacturing equipment
- Woodworking machinery
- Metal converting equipment
- Printing/paper finishing equipment

GKS Series Multi-Entry Trapped Key Safety Interlock



GKS Series

Description:

The GKS product marks a significant new product class for your **Total Safety Solution**. Our switching expertise has been applied to a cost-effective, trapped key safety interlock switch. This product allows OEMs to hold a door or gate closed while a hazard still exists.

Features:

- Red body color
- Global approvals (CE, cULus, and CCC)
- Glass-filled polyester body
- Power-to-lock and power-to-unlock schemes for key trap
- Flexible switching arrangement
- 24 Vdc, 110 Vac, and 230 Vac coil voltages
- Override mechanism in cover
- Four head positions available
- Three conduit openings (knock-out style)
- Switch position provides status

Benefits:

- Ease of safety module integration.
- Tough, cost-effective, double-insulated enclosure.
- Choice of key trapping methodology.
- Flexible wiring options.
- Four contacts can be arranged in any configuration and multiple voltages for every geography.
- Ability to open door (in case of power loss, etc)
- Can diagnose status of gate/door open, closed, locked.

Available Models:

Part Number: GKSA46LA2

Description: Cost Effective Solenoid or "Trapped Key" switch; Power to unlock

Features: 1/2" Conduit, Head to Front, 24V DC Solenoid

Housing Material: Glass reinforced Polyester

Approvals: cUL, CE, CCC

Sealing: IP67; NEMA 1, 4, 12, 13

Electrical: 2.8A @ 24VDC; 3A @120VAC

Circuitry: 3NC/1NO

Measurements: 196.8mm x 41mm x 40mm

Temperature Range: -25 to 50C

Part Number: GKSA46LA5

Description: Cost Effective Solenoid or "Trapped Key" switch; Power to unlock

Features: 1/2" Conduit, 110V AC Solenoid

Housing Material: Glass reinforced Polyester

Approvals: cUL, CE, CCC

Sealing: IP67; NEMA 1, 4, 12, 14

Electrical: 2.8A @ 24VDC; 3A @120VAC

Circuitry: 3NC/1NO

Measurements: 196.8mm x 41mm x 40mm

Temperature Range: -25 to 50C

Accessories:



Part Number:

GKZS7

Description:

90° key



Part Number:

GKZS6

Description:

Straight Key

Potential Applications:

- Woodworking machinery
- Printing/paper finishing equipment
- Plastic molding equipment
- Packaging machinery
- Bailing
- Pumping equipment
- Semiconductor manufacturing equipment
- Packaging wrapping
- Specialty equipment
- Machine tool
- Robot cell

GK Series Key-Operated Safety Interlock



GK Series

Description:

The GK Series Dual Entry Key Operated Safety Interlock Switch is designed for use on machinery where key removal brings the machine to an immediate safe condition. It provides enhanced operator safety when added to hinged or sliding guard doors, screens and protective covers on enclosures. Key sold separately.

Features:

- Red body color
- Positive opening operation of normally closed contacts
- Standard mounting per EN50041
- Available with 2NC/2NO, 3NC/1NO or 4NC positive opening contacts
- Side or top key entry
- Unique friction feature for key retention
- Choice of four heavy duty keys (Key sold separately)
- Die-cast zinc housing
- Lockout device available
- UL, CSA, CE

Accessories:



Part Number:
GKZ57

Description:
90° key

Benefits:

- Designed for use on machinery where key removal brings the machine to an immediate safe condition.

Available Models:

Part Number: GKBA14LX

Description: Rugged environment housing; long term durability (tested 15 million cycles); designed for large doors

Features: Break Before Make contacts; ½" NPT Conduit

Housing Material: Die Cast Zinc

Approvals: UL, CSA, CE

Sealing: IP67; NEMA 1, 4, 12, 14

Electrical: 2.8A @ 24VDC; 6A @120VAC

Circuitry: 2NC/2NO

Measurements: 121.6mm x 42.1mm x 42.6mm

Temperature Range: -40 to 85C

Part Number: GKBA10LX

Description: Rugged environment housing; long term durability (tested 15 million cycles); designed for large doors

Features: ½" NPT Conduit

Housing Material: Die Cast Zinc

Approvals: UL, CSA, CE

Sealing: IP67; NEMA 1, 4, 12, 14

Electrical: 2.8A @ 24VDC; 6A @120VAC

Circuitry: 4NC

Measurements: 121.6mm x 42.1mm x 42.6mm

Temperature Range: -40 to 85C

Potential Applications:

- Hinged or sliding guard doors, screens, protective covers and enclosures on:
 - machine tools machinery, metalworking machines, special purpose machinery, robotics assembly cells, and plastic molding machines.

GKR/GKL Dual-Entry Solenoid Trapped Key Safety Interlock



GKR/GKL Series

Accessories:



Part Number: GKZ57

Description: 90° key

Description:

The GKR/GKL Series Dual Entry Solenoid Key Operated Safety Interlock Switch is designed for use on machinery where instant stop and access to the machinery is either impossible (due to the momentum of the machine) or impractical (due to tool or machine damage or scrapped product if the current machine cycle is interrupted). The switch incorporates a manual override feature that allows removal of the key for emergency access. Key sold separately (see Accessories).

Features:

- Metal housing
- Red body color
- Solenoid power to lock or power to unlock
- Side or top key entry
- Separate switch detection for key position and solenoid status
- Available with several switch configurations
- 100 mm [3.94 in] x 100 mm [3.94 in] mounting
- Choice of four heavy-duty keys
- Key retain force 1000 N max.
- IP68 (NEMA 6P)
- Two solenoid voltages available
- Dual LEDs
- UL listed/CSA certified/CE compliant
- Fluorocarbon-sealed enclosure available

Benefits:

- Robust body design for harsh environments.
- High force resistance.
- Fluorocarbon version often suitable for metal-working fluid-splash environment.
- Allows up to eight key entry positions.
- Standard mounting, key mounting flexibility and security.
- Often suitable for harsh-duty environments.
- Operates at standard control voltage.
- Global acceptance.

Available Models:

Part Number: GKLE36PXA2

Description: Rugged environment housing; long term durability (tested 15 million cycles) solenoid; Power to unlock

Features: ½" NPT, 24 Vdc LED Head Left

Housing Material: Die Cast Zinc

Approvals: UL, CSA, CE

Sealing: IP 68; NEMA 1,4, 6P, 12, 13

Electrical: 2.8A @ 24VDC; 6A @120VAC

Circuitry: 3NC/1NO

Measurements: 110mm x 110mm x 48.8mm

Temperature Range: -25 to 40C

Part Number: GKRE36PXA2

Description: Rugged environment housing; long term durability (tested 15 million cycles) solenoid; Power to unlock

Features: ½" NPT, 24 Vdc LED Head Right

Housing Material: Die Cast Zinc

Approvals: UL, CSA, CE

Sealing: IP 68; NEMA 6P

Electrical: 2.8A @ 24VDC; 6A @120VAC

Circuitry: 3NC/1NO

Measurements: 110mm x 110mm x 48.8mm

Temperature Range: -25 to 40C

Potential Applications:

- | | | |
|--|----------------------------|---------------------------|
| Hinged or sliding guard doors, screens, protective covers and enclosures on: | -Machine tools machinery | -Robotics assembly cells |
| | -Metalworking machines | -Plastic molding machines |
| | -Special purpose machinery | |

GSS Series



Features:

- Red body color
- EN50041 and EN50047 mounting and characteristics
- IEC electrical standard for global applications
- Positive opening operation of normally closed contacts (conforming to IEC/EN60947-5-1-3)
- Rugged housing (zinc die-cast)
- Full range of actuator heads and levers
- Sealing up to IP67; NEMA 1, 4, 12, and 13
- Snap-action and slow-action basic switches
- International conduit sizes
- Galvanically isolated contacts
- UL listed; CSA and CE certified

Benefits:

- Standard mounting and characteristics are globally available and accepted.
- Welded NC contacts will separate (vital security in safety applications).
- Range of actuation methods for detecting conditions in guarding and machine status applications.
- Wiring and body flexibility.
- Often suitable for inductive switching and safety relay interfaces.

Available Models:

Part Number: GSDA01S1

Description: Low profile hinge mount switch for doors; minimizes alignment problems

Features: Left Actuation ½" NPT Conduit

Housing Material: Plastic

Approvals: UL, CSA, BG

Sealing: IP66; NEMA 1, 4, 12, 13

Electrical: 2.8A @ 24VDC; 6A @120VAC

Circuitry: 2NC

Measurements: 167.6mm x 30.5mm x 34mm (Approx.)

Temperature Range: -40 to 85C

Potential Applications:

- Machine tools
- Material handling equipment
- Packaging machinery
- Textile machinery
- Construction machinery and equipment

Part Number: GSDA01S2

Description: Low profile hinge mount switch for doors; minimizes alignment problems

Features: Center Actuation ½" NPT Conduit

Housing Material: Plastic

Approvals: UL, CSA, BG

Sealing: IP66; NEMA 1, 4, 12, 14

Electrical: 2.8A @ 24VDC; 6A @120VAC

Circuitry: 2NC

Measurements: 167.6mm x 30.5mm x 34mm (Approx.)

Temperature Range: -40 to 85C

1CPS Series Cable Pull Switch



1CPS Series

Potential Applications:

- Conveyor systems having a high amount of vibration
- Conveyor systems that experience wide temperature swings
- Conveyor systems where easy through wiring, or highly visible trip status is required
- Perimeter guarding where hosedown conditions are present

Description:

The 1CPS Cable Pull Safety Switch is intended for use in applications with the cable runs up to 76 m [250 ft], such as conveyor runs within defined system zones. It is a cost-effective means of providing this emergency stop signal compared to multiple emergency stop push buttons. (Cable Pull Safety Switches are not, however, to be used as a means of personnel safeguarding. They may be used to prevent further injury or damage to equipment when used for emergency stop signaling.)

The 1CPS Series Cable Pull Safety Switch is designed to provide emergency stop protection for exposed conveyor lines. The internal mechanism latches on both slackened cable (push) and pulled cable. This capability enhances productivity by eliminating nuisance stops due to variations in temperature, stretch of cable over time, and other application variables.

A line in the midpoint of the cable tension window indicates proper cable tension, providing easy and intuitive set-up. The direct acting switch contacts are held closed when the actuating cable is under proper tension and the reset knob is set to RUN. When the actuating cable is pulled, slackened or broken, a cam positively opens the NC (Normally Closed) switch contacts. The snap action, trip operation causes the switch contacts to change state and mechanically latch almost simultaneously when the cable is pulled, slackened or broken. The NC switch contacts remain open until the 1CPS is reset by properly tensioning the cable and manually rotating the reset knob.

When the direct acting switch contacts open, the auxiliary contacts also actuate (open contacts close and closed contacts open). The auxiliary contacts are electrically isolated from the direct acting switch contacts. These NO (Normally Open) contacts may be used for monitoring or signaling.

The 1CPS complies with: Low Voltage Directive 73/23/EEC, as amended by directive 93/68/EEC; Machinery Directive 98/37/EEC only as the directives relate to the components being used in a safety function; IEC/EN60947-1; IEC/EN60947-5-1; IEC/EN60947-5-5.

Features:

- Direct opening actions of normally closed contacts
- Choice of 1NC/1NO, 2NC/2NO or 3NC/1NO, 4NC contact configurations
- Typical cable span of 76 m [250 ft] in an environment with a temperature change of $\pm 17^{\circ}\text{C}$ [$\pm 30^{\circ}\text{F}$] an end-spring is used (longer spans are possible depending upon temperature change and installation)
- Large wiring cavity with straight-through wiring
- 24 Vdc or 120 Vac single red high intensity LED status indicator light available
- Gold-plated or silver contacts available
- Die-cast zinc housing
- Optional hardware packs available

Available Models:

Part Number: 1CPSA2

Description: Single direction cable (rope pull) switch; Up to 250 foot span; Wide temperature tolerance; Designed to reduce nuisance stops

Features: Cable, Maintained, 1/2" NPT Conduit; Hardware packets available separately

Housing Material: Die Cast Zinc

Approvals: UL, CSA, CE, BG

Sealing: IP67, NEMA 1, 4, 12, 13

Electrical: 2.8A @ 24VDC; 6A @ 120VAC

Circuitry: 2NC/2NO

Measurements: 172.7mm x 88.9mm x 65.2mm

Temperature Range: -25C to 80C

2CPS Series Cable Pull Switch



2CPS Series

Description:

The 2CPS Cable Pull Safety Switch provides readily accessible emergency stop over a long, linear distance. It is a cost-effective means of providing this emergency stop signal compared to multiple emergency stop push buttons. (Cable Pull Safety Switches are not, however, to be used as a means of personnel safeguarding. They may be used to prevent further injury or damage to equipment when used for emergency stop signaling.)

The 2CPS Series Cable Pull Safety Switch is designed to provide emergency stop protection for exposed conveyor lines. The internal mechanism latches on both slackened cable (push) and pulled cable. This capability enhances productivity by eliminating nuisance stops due to variations in temperature, stretch of cable over time, and other application variables.

A line in the midpoint of the cable tension window indicates proper cable tension, providing easy and intuitive set-up. The direct acting switch contacts are held closed when the actuating cable is under proper tension and the reset knob is set to RUN. When the actuating cable is pulled, slackened or broken, a cam positively opens the NC (Normally Closed) switch contacts. The snap action, trip operation causes the switch contacts to change state and mechanically latch almost simultaneously when the cable is pulled, slackened or broken. The NC switch contacts remain open until the 2CPS is reset by properly tensioning the cable and manually rotating the reset knob.

When the direct acting switch contacts open, the auxiliary contacts also actuate (open contacts close and closed contacts open). The auxiliary contacts are electrically isolated from the direct acting switch contacts. These NO (Normally Open) contacts may be used for monitoring or signaling.

The 2CPS complies with: Low Voltage Directive 73/23/EEC, as amended by directive 93/68/EEC; Machinery Directive 98/37/EEC only as the directives relate to the components being used in a safety function; IEC/EN60947-1; IEC/EN60947-5-1; IEC/EN60947-5-5.

Potential Applications:

- Long conveyor systems found in warehouses and distribution centers
- Conveyor systems having a high amount of vibration
- Conveyor systems that experience wide temperature swings
- Long conveyor systems where easy through wiring, or highly visible trip status is required
- Perimeter guarding where hosedown conditions are present

Features:

- Positive opening operation of normally closed contacts
- Choice of 2NC/2NO or 3NC/1NO contact configurations
- Maximum cable length in a single direction is 76 m (250 ft) for a combined length of 152 m (500 ft) in dual directions
- Choice of three actuator configurations
- Removable contact block version available
- Large wiring cavity with straight-through wiring
- 24 Vdc or 120 Vac bright, multi-cluster LED status indicator light available
- Gold-plated contacts are standard
- Die-cast zinc housing
- Optional hardware packs available

Available Models:

Part Number: 2CPSA1A1

Description: Dual direction cable (rope pull) switch; Up to 500 foot span; Wide temperature tolerance; Designed to reduce nuisance stops and reduce number of switches required to cover long distances

Features: Cable, Maintained, ½" NPT Conduit; Hardware packets available separately

Housing Material: Die Cast Zinc

Approvals: UL, CSA, CE, BG

Sealing: IP67, NEMA 1, 4, 12, 14

Electrical: 2.8A @ 24VDC; 6A @120VAC

Circuitry: 2NC/2NO

Measurements: 152.4mm x 152.4mm x 79.8mm

Temperature Range: -25C to 80C

Part Number: 2CPSA1A1B

Description: Dual direction cable (rope pull) switch; Up to 500 foot span; Wide temperature tolerance; Designed to reduce nuisance stops and reduce number of switches required to cover long distances

Features: Cable, Maintained, ½" NPT Conduit 120v indicator light; Hardware packets available separately

Housing Material: Die Cast Zinc

Approvals: UL, CSA, CE, BG

Sealing: IP67, NEMA 1, 4, 12, 15

Electrical: 2.8A @ 24VDC; 6A @120VAC

Circuitry: 2NC/2NO

Measurements: 152.4mm x 152.4mm x 92.9mm

Temperature Range: -25C to 80C

FF3-21-DC-03 - Non-Contact Safety Interlock Switch



FF3-21-DC-03

Description:

The FF3 is an 30 mm barrel (thread) mounting, magnetically actuated safety switch with up to two safety contacts and one indicator contact. The barrel, thread, mount design is easy to install to the frame of a machine guard and allows for flush mounting, reducing potential switch damage and space constraint issues. Sealed to IP67 enabling use in most harsh environments.

Features:

- Options of one or two safety contacts
- Tested to over 1,000,000 operations, full load
- Simple M18 and M30 barrel (thread) mounting
- Guard status indication available
- ac and dc versions
- UL and CE approvals

Potential Applications:

- Can forming and filling (aluminum, steel, and plastic)
- Pick and place packaging equipment
- Pick and place assembly equipment
- Semicon equipment
- Plastic molding equipment
- Woodworking machinery
- Textile machinery
- Printing machinery

Available Models:

Part Number: FF3-21-DC-03

Description: Non-contact

Features: 30mm cylindrical with 3m Cable; DC voltage

Housing Material: Plastic

Approvals: CE, UL

Sealing: IP67

Electrical: 30VDC 1A

Circuitry: 2NC/1NO

Measurements: 74mm x 30mm dia

Temperature Range: -10 to 55C

FF5-21-DC-03 - Non-Contact Safety Interlock Switch



FF5-21-DC-03

Description:

Honeywell FF5 switches are magnetically operated, non-contact safety switches designed for use in many machine-guarding applications. The FF5 is available in both ABS and 316 grade stainless steel and is capable of switching up to 300 mA at 24 Vdc. The switch and actuator are fully sealed and can often be used in wet or dusty environments. With correct installation, the FF5 safety switches comply with the guidelines given in EN1088. Sealed to IP67 enabling use in most harsh environments.

Features:

- Non-contact safety switches
- Switches can be magnetically actuated from almost any angle
- Compact, rugged design
- Tested to over 1,000,000 operations, full load
- 6 mm [0.24 in] operating distance
- Up to 300 mA at 24 Vdc switching capability
- IP67 sealing
- Stainless steel option
- UL and CE approvals

Available Models:

Part Number: FF5-21-DC-03

Description: Non-contact

Features: Also available in stainless steel; flat mounting
DC 3m Cable Rectangle

Housing Material: Plastic

Approvals: CE, UL

Sealing: IP67

Electrical: 24VDC 300mA

Circuitry: 2NC/1NO

Measurements: 52mm x 28mm x 14mm

Temperature Range: -10 to 55C

Potential Applications:

- Can forming and filling (aluminum, steel, and plastic)
- Pick and place packaging equipment
- Pick and place assembly equipment
- Semicon equipment
- Plastic molding equipment
- Woodworking machinery
- Textile machinery
- Printing machinery

FF6-10-DC-03 - Non-Contact Safety Interlock Switch



FF6-10-DC-03

Description:

Honeywell FF6 switches are magnetically operated, non-contact safety switches designed for use in many machine guarding applications. The FF6 is available in both ABS and 316 grade stainless steel. The switch and actuator are fully sealed to IP67 and can often be used in wet or dusty environments. With the correct installation, FF6 safety switches comply with the guidelines given in EN1088.

Features:

- Non-contact safety switches
- Up to three contacts
- 10 mm [0.4 in] operating distance
- Up to 2 A switching
- IP67
- Stainless steel option
- UL and CE approvals

Available Models:

Part Number: FF6-10-DC-03

Description: Non-contact

Features: Also available in stainless steel; 1NC DC 3mtr Cable "Slimline"

Housing Material: Plastic

Approvals: CE, UL

Sealing: IP67

Electrical: 30VDC 1A

Circuitry: 1NC

Measurements: 82.5mm x 19mm x 19mm

Temperature Range: -10 to 55C

Potential Applications:

- Can forming and filling (aluminum, steel, and plastic)
- Pick and place packaging equipment
- Pick and place assembly equipment
- Semicon equipment
- Plastic molding equipment
- Woodworking machinery
- Textile machinery
- Printing machinery

FFS-11-03 - Non-Contact Safety Interlock Switch



FFS-11-03

Description:

Honeywell FFS switches are designed to be tamper-proof, standalone safety switches that can often be used to switch relays, contacts, or safety relays directly. By removing the separate control unit, Honeywell has made it possible to use its electronic switching technology in smaller, simpler safety systems. The FFS is often suitable for use on its own, for lower category safety systems, providing two volt-free outputs (2NC or 1NC/1NO). It can be used in conjunction with safety relays where a higher category of performance is required. For ease of operation, the fixed switch has a green LED, giving true indication of FFS safety switch contacts.

Features:

- Tamper-proof electronic switching
- IP67 sealing
- 7 mm to 10 mm [0.28 in to 0.4 in] operating distance
- Guard status indication
- UL and CE approvals

Available Models:

Part Number: FFS-11-03

Description: Non-contact

Features: AC/DC 3mtr Cable with Coded Actuator and relay contacts

Housing Material: Plastic

Approvals: CE, UL

Sealing: IP67

Electrical: 30VDC 1A;230VAC 2A

Circuitry: 1NC/1NO

Measurements: 87mm x 24mm x 17mm

Temperature Range: -10 to 55C

Potential Applications:

- Can forming and filling (aluminum, steel, and plastic)
- Pick and place packaging equipment
- Pick and place assembly equipment
- Semicon equipment
- Plastic molding equipment
- Woodworking machinery
- Textile machinery
- Printing machinery

BX Series - Explosion Proof Switches



BX Series

Description:

Honeywell explosion-proof switches are designed specifically for use in hazardous location applications. The MICRO SWITCH™ BX enclosure is sealed for protection against corrosion, water, dust and oil as defined in NEMA 1, 3, 4, 6, 7, 9 and 13 and IP67 as defined in IEC 529. These enclosures also meet the European Hazardous Locations Designation: EExd IIC T6 category II 2 GD, SIRA 00ATEX 1037X. The entire series BX complies with the European Directive on Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres (94/9/EC) commonly referred to as the ATEX Directive. Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN50014 1997 and EN50018 1994. MICRO SWITCH™ BX with conduit types 1/2-14NPT, 3/4-14NPT also meet the North American Hazardous Locations Designation: Class I, Groups B, C and D; Class II, Groups E, F and G and comply with UL Standard: UL 894, CSA Standard: C22.2 No. 25-1966, C22.2 No. 30-M1986. The MICRO SWITCH™ BX is ideal for outdoor use or in adverse environments where a combination of explosion-proof plus sealing requirements are needed. To comply with explosion-proof requirements the BX has flame paths within the housing, which cool exploding gases below the ignition temperature before they reach explosive gases surrounding the housing. Flame paths on the BX are (1) an extended plunger between the switch cavity and head and (2) the cover-housing threads on the front of the switch.

Potential Applications:

- Control valves and actuators
- Offshore drilling
- Grain elevators
- Petrochemical plants
- Chemical plants
- Waste treatment
- Paint booths
- Mining conveyors
- Pulp and paper coating
- Hazardous waste handling

Available Models:



Lever not included in photo above.

Part Number: BX4A3K-1A

Description: Weather sealed, Explosion-proof switch; Div 1, Class I1, Groups B, C, & D; Div 1, Class II, Groups E, F, & G

Features: Side rotary switch with 1.5 inch lever; snap action, double break

Housing Material: Die Cast Zinc

Approvals: UL, CSA, ATEX, IEC Ex

Sealing: IP67; NEMA 1, 3, 4, 6, 7, 9, 13

Electrical: 10A continuous

Circuitry: 1NC/1NO

Measurements: 146.1mm x 80.8mm x 72.9mm

Temperature Range: -40 to 70C



Part Number: BX4C3K

Description: Weather sealed, Explosion-proof switch; Div 1, Class I1, Groups B, C, & D; Div 1, Class II, Groups E, F, & G

Features: Top pin plunger; snap action, double break

Housing Material: Die Cast Zinc

Approvals: UL, CSA, ATEX, IEC Ex

Sealing: IP67; NEMA 1, 3, 4, 6, 7, 9, 13

Electrical: 10A continuous

Circuitry: 1NC/1NO

Measurements: 146.1mm x 80.8mm x 72.9mm

Temperature Range: -40 to 70C

Features:

- UL, CSA and European approvals
- Sealing - applicable portions of IP67 and NEMA 1, 3, 4, 6, 7, 9, and 13
- Diverse conduit selection for wide range of applications
- Compatible with LSX
- Tracking interchangeability with MICRO SWITCH ML-E1 and HDLS
- Variety of heads and non-sparking actuators
- 10 A continuous carry electrical rating
- Choice of silver or gold contacts
- Internal grounding screw

GSX Series - Non-Contact Safety Interlock Switch



GSX Series

Description:

Honeywell Sensing and Control MICRO SWITCH™ GSX Series Explosion-Proof Safety Switches combine the world-class MICRO SWITCH™ global safety switch (GSS) with our superior explosion-proof housing from our LSX and BX product lines, offering our customers the best of our engineering expertise. The positive break feature is designed to provide a safe failure mode, ensuring the machine will not start, and therefore supporting a safer work environment. The GSX Series switch platform allows for over 10,000 actuator and switch combinations, enabling customers to source most of their safety and explosion-proof switch requirements to a single, global supplier.

Potential Applications:

Gates, doors, access panels, or cages on machinery in:

- Hydrocarbon refining
- Chemical processing
- Agricultural equipment
- Food processing
- Grain elevators

Features:

- Snap-action contacts with positive break
- Positive action push plunger breaks current upon opening of door or aperture
- Explosion-proof housing for hazardous locations
- NEMA 1, 3, 4, 12, 13 and IP67 sealing
- cULus, ATEX, IEC Ex
- Simple installation
- Positive break feature
- Extensive switching options and actuator styles

Available Models:

Part Number: GSXA42A1E

Description: Explosion-proof switch with direct acting (positive break) contacts

Features: Slow acting contacts, break before make; Side rotary with bronze roller

Housing Material: Die Cast Zinc

Approvals: cULus, ATEX, IECEx

Sealing: IP67; NEMA 1, 4, 6, 7, 9, 12, 13

Electrical: 2.8A @ 24VDC; 6A @120VAC

Circuitry: 2NC/1NO

Measurements: 154.2mm x 44.5mm x 72mm

Temperature Range: -40 to 70C

Part Number: GSXA42B

Description: Explosion-proof switch with direct acting (positive break) contacts

Features: Slow acting contacts, break before make; Top pin plunger

Housing Material: Die Cast Zinc

Approvals: cULus, ATEX, IECEx

Sealing: IP67; NEMA 1, 4, 6, 7, 9, 12, 13

Electrical: 2.8A @ 24VDC; 6A @120VAC

Circuitry: 2NC/1NO

Measurements: 154.2mm x 44.5mm x 72mm

Temperature Range: -40 to 70C

Part Number: GSXA42C

Description: Explosion-proof switch with direct acting (positive break) contacts

Features: Slow acting contacts, break before make; Top roller plunger

Housing Material: Die Cast Zinc

Approvals: cULus, ATEX, IECEx

Sealing: IP67; NEMA 1, 4, 6, 7, 9, 12, 13

Electrical: 2.8A @ 24VDC; 6A @120VAC

Circuitry: 2NC/1NO

Measurements: 154.2mm x 44.5mm x 72mm

Temperature Range: -40 to 70C

CLSX Series - Explosion Proof Switches



CLSX Series

Description:

The CLSX Series Cable Pull Safety Limit Switch is designed to provide emergency stop protection for conveyor lines in hazardous atmospheres. The CLSX Series withstands the pressure of an internal explosion and cools the exploding gases below the kindling temperature of the explosive atmosphere. Flame paths are provided by the cover housing threads and an extended plunger between the switch cavity and head.

Features:

- Positive-opening operation of normally closed contacts
- Available with up to 2NC positive-opening contacts
- Cable length may be up to 200 ft in a straight line
- Maintained version has broken/slacked cable detection
- Tension indicator mark for easy adjustment
- For use either indoors or outdoors
- Sealing meets NEMA 1, 3, 4, 13
- Internal grounding screw
- UL/CSA approvals
-

Available Models:

Part Number: CLSXB4N1

Description: Explosion-proof cable (rope pull)

Features: Emergency stop device in an explosion proof housing

Housing Material: Die Cast Zinc

Approvals: UL, CSA

Sealing: IP67 NEMA 1, 3, 4, 7, 9, 13

Electrical: 2.8A @ 24VDC; 6A @120VAC

Circuitry: 1NC/1NO

Measurements: 141mm x 120mm x 73mm (approx)

Temperature Range: -1 to 70C

Potential Applications:

- Conveyor lines in hazardous atmospheres

[illegible]



Stack Lights



Model PTE

Ø 56mm **LED** Modular Style Steady & Flashing with Buzzer Option

Stack Lights



- LED modular components
- Bright & even light distribution through prism-cut lenses
- Fast & easy assembly with inter-locking construction
- 3 base body options
- Optional 85dB Buzzer (fixed or adjustable volume)
- NEMA 4x / IP65 rated
- RoHS compliant



Order Information

PTE	-	A	F	-	3	02	-	RYGBC
①		②	③		④	⑤		⑥

① Top Head Style	PTE	Standard
	PTD	Dome Head

② Body Unit Mounting / Connection	A	Pole Mounting/ Lead Wires
	S	Surface Mounting / Lead Wires
	TP	Pole Mounting/ Terminal Connection
	TC	Surface Mounting/ Terminal Connection

③ Light Style		Steady Light
	F	Steady & Flashing Light

④ Number of Stacks	1	1 Light
	2	2 Lights
	3	3 Lights
	4	4 Lights
	5	5 Lights

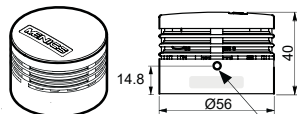
⑤ Power Supply	02	DC/AC 24V
	FF	AC 90~240V

⑥ Lens Colors (top to bottom)	R	Red
	Y	Yellow
	G	Green
	B	Blue
	C	Clear

Buzzer Kits (Optional)

Buzzer Style	Part Number
Fixed Sound Level	MPZ-56F
Adjustable Sound Level	MPZ-56G

*Note: Max. number of tier including Buzzer is 5.



Sound Level Adjuster

Optional Orders

Body Units

Body Type	Voltage	Part Number	
		Steady	Steady & Flashing
Lead Wire Connection	Pole Mounting	AC 90~240V	PTE-A-FF
		DC/AC 24V	PTE-A-02
	Surface Mounting	AC 90~240V	PTE-S-FF
		DC/AC 24V	PTE-S-02
Terminal Connection	Pole Mounting	AC 90~240V	—
		DC/AC 24V	—
	Surface Mounting	AC 90~240V	—
		DC/AC 24V	—



LED Modules

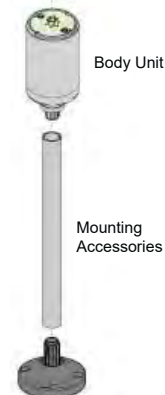
LED Color	Part Number	
	Standard Module	Dome Head Module
RED	PTE-02-R	PTD-02-R
Yellow	PTE-02-Y	PTD-02-Y
Green	PTE-02-G	PTD-02-G
Blue	PTE-02-B	PTD-02-B
*Clear	PTE-02-C	PTD-02-C

*Clear Module cannot be used with Buzzer.

Locking Bolts

Number of LED Stacks	Part Number	Size
1 Stack	B-PTE-1	M4, 65mm
2 Stacks	B-PTE-2	M4, 105mm
3 Stacks	B-PTE-3	M4, 145mm
4 Stacks	B-PTE-4	M4, 185mm
5 Stacks	B-PTE-5	M4, 225mm

*Note: Do NOT count Buzzer as a stack.



Specifications

Body Units

Operation/Function	Steady/ Flashing	
Power Supply	AC/DC 24V (±10%)	AC 90~240V 50/60 Hz (±10%)
Buzzer Sound Level	Fixed: 85dB	Adjustable: 10~85dB
Lens Color	Red, Yellow, Green, Blue & Clear	
Lens Diameter	56 mm (2.2 inch)	
Maximum Tier	5	
Flash Rate	80 times/ minute	
Vibration	3mm at 10~55Hz	
Ambient Temperature	-15°C~40°C	
Storage Temperature	-40°C ~ 70°C	
Ambient Humidity	45~85% RH	
Degree of Protection	NEMA 4x, IP65 / IP50 (with Buzzer)	
Approvals	CE , UL, RoHS	
Recommended Wire Size	1007 UL / 22 AWG	

LED Modules

		Red	Yellow	Green	Blue	Clear
Current / Power	Standard Module	27mA / 0.65W		35mA / 0.84W		
	Dome Head Module	58mA / 2.64W		52mA / 1.25W		53mA / 1.27W
Weight		Standard Module: 42.8g Dome Head Module: 53g				

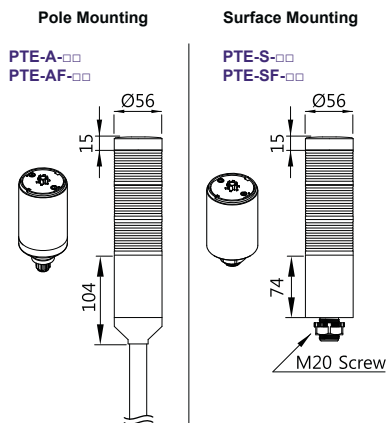
Buzzer Kits

Model	MPZ-56F	MPZ-56G
Style	Fixed Sound Level	Adjustable Sound Level
Sound Level	85 dB	10~85 dB
Current Consumption / Power	30mA / 0.72W	30mA/ 0.72W
Weight	32.2g	33g

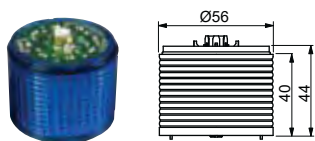
Dimensions

unit: mm

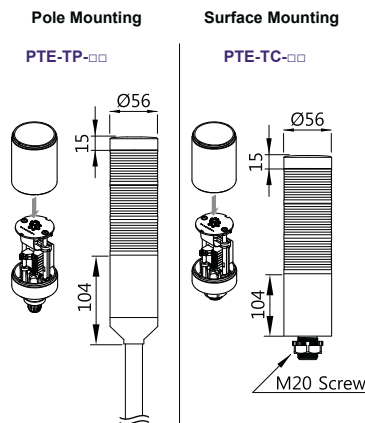
Lead Wire Connection



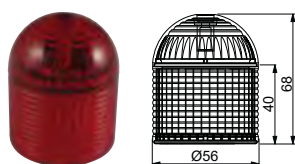
Standard Modules



Terminal Connection

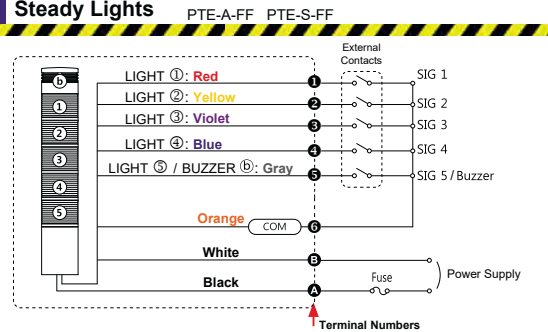


Dome Head Modules

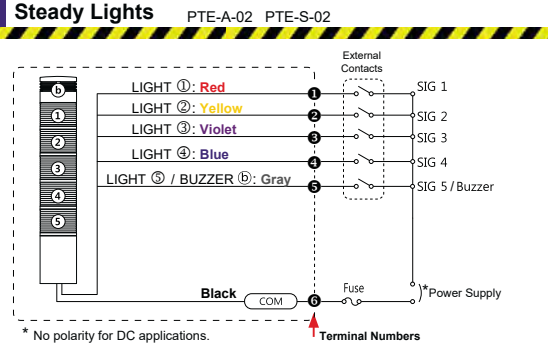


Wiring Diagram

AC 90~240V Steady Lights

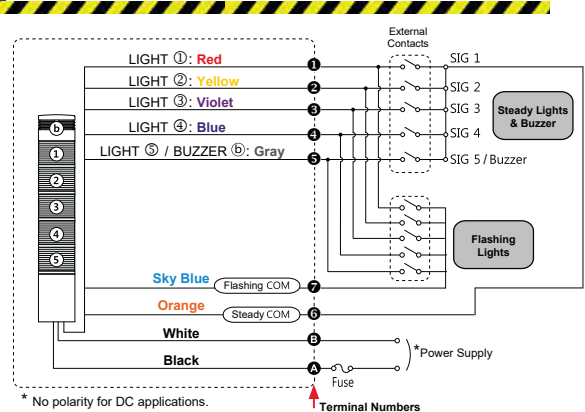


DC/AC 24V Steady Lights

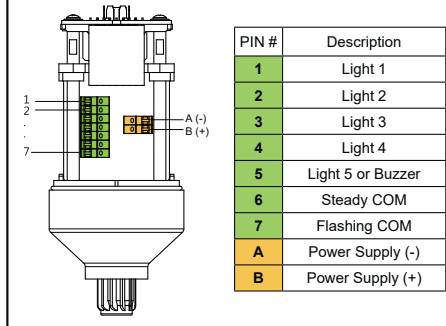


AC 90~240V DC/AC 24V Steady & Flashing Lights

PTE-AF-02 PTE-AF-FF
PTE-SF-02 PTE-SF-FF
PTE-T-02 PTE-T-FF



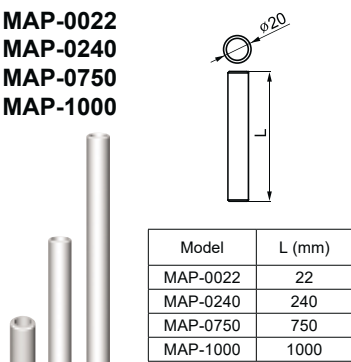
Terminal Connections



Accessories

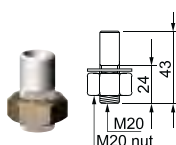
Mounting Poles

MAP-0022
MAP-0240
MAP-0750
MAP-1000

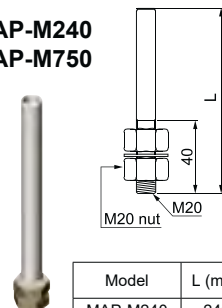


Threaded Poles

MAP-M043



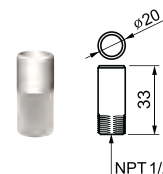
MAP-M240
MAP-M750



Model	L (mm)
MAP-M240	240
MAP-M750	750

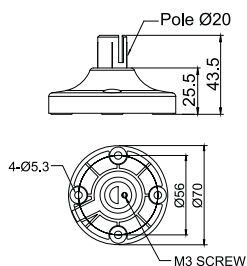
NPT Adaptor

MAP-NPT1/2

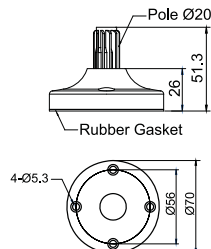


Mounting Bases

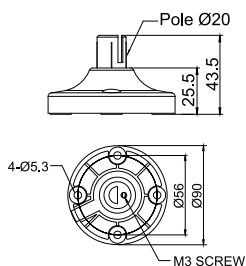
MAM-B070



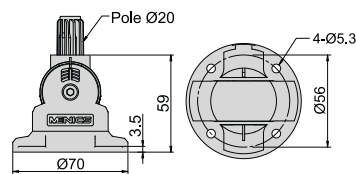
MAM-B070D



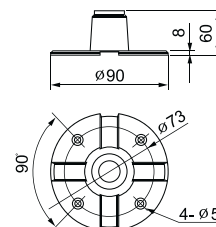
MAM-B090



MAM-B070R

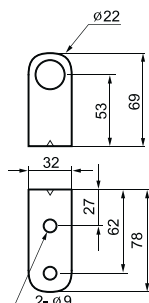


MAM-DS23-20

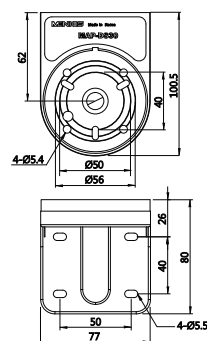


Wall Mount Brackets

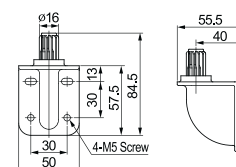
MAM-DS25



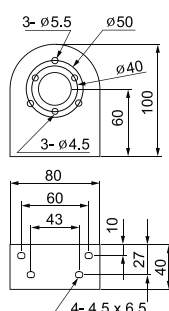
MAP-DS30



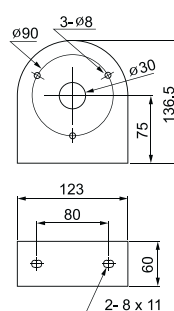
MAP-DS40



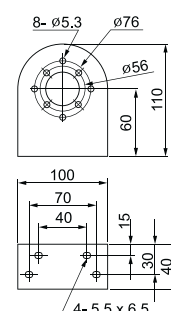
MAM-DS26



MAM-DS27



MAM-DS28





Physical Barrier Fencing

PINNACLE
S Y S T E M S , I N C .

Safety Sensors and Controls for Industrial Machine Guarding Systems

www.pinnaclesystems.com

Fencing Overview

The Pinnacle Fencing System is ideal for protecting machinery and plant personnel. The guarding of welding machines, robotics, automated equipment, printing/paper finishing equipment, plastic molding equipment, packaging and wrapping, specialty equipment or any hazardous zone or area is easily accomplished with our fencing system. Our designs are engineered to comply with OSHA and ANSI Standards.

We offer a large selection of wire mesh sizes, customized heights, sweeps, colors and finishes utilizing carbon steel. Stainless steel is also available. Also offered is a full line of hinge and sliding doors to easily integrate into your facility's layout and machine accessibility requirements. We stock a wide variety of safety interlocks if needed for your fencing application. To ease installation, we can pre-drill all holes in the doors, so your safety interlock installation time is minimized.

To round out your **Total Safety Solution**, we manufacture safety light curtains, safety mats and "control reliable" safety controllers which integrate effectively with our fencing system to provide additional guarding and protection. The Pinnacle Fencing System offers protection to keep your workplace and personnel safe and secure.

Features

- Standard size panels – 6'- 2"H (1880 mm) H & 8'-1 ¼" (2480 mm) H.
- Panels install vertically between 6'-6" (1981 mm) H & 8'-5 1/4" (2597 mm) H Posts (4" (102 mm) sweep).
- Custom size panels and special heights available.
- Fully framed panel adds strength and stability unequalled in the industry.
- Hinged and slide doors available in 48 hour quick ship.
- Lift-Out design allows for 75% faster installation.
- One piece of special tool removable hardware meet OSHA & RIA standards: R15.06-1999 (R2009), SS-EN 953, CSA-Z432, CSA-Z434.
- All hardware including anchors included.
- Stock powder coat black panel & yellow post finish.
- Panels may be ordered in alternate woven and welded mesh options, expanded metal, sheet metal, or clear Lexan.
- Lock out plate and pull handle standard all door mounting plates.
- Safety Interlocks available with mounting plates.

Material Specifications

PANELS

Panels are available in standard heights: 6'- 2"H (1880 mm) H & 8'-1 ¼" (2480 mm) H.

DOORS

Hinged or sliding doors are available. Locks and Interlocks are also available.

MESH

Standard 2 ½" x 1 ¼" (63 mm x 32 mm) 10 Gauge Welded Wire. Alternate meshes available depending on your guarding requirements.

FRAMES

1-1/4" x 1-1/4" (32 mm x 32 mm) 13 Gauge angle frame.

FINISH

Available with Powder Coat Finish; black panels, yellow posts.

Mechanical Guarding / Fencing Proposal Request

Please complete the form on the next two pages in order for us to assess your Mechanical Guarding / Fencing needs. An electronic version of this form can also be found on our website at www.pinnaclesystems.com/Proposal-Request.html

Name		Email	
Company		Contact Preference:	☐ Email
			☐ Phone
Phone			☐ Fax
Fax			

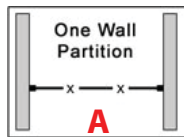
1. Please select wire mesh:

- ☐ Standard - 2 1/2" x 1 1/4" (63 mm x 32 mm) 10 Gauge Welded Wire
☐ 2" x 2" (51 mm x 51 mm) Square 6 Gauge Woven Wire
☐ 2" x 2" (51 mm x 51 mm) Square 10 Gauge Welded Wire
☐ 1-1/2" x 1-1/2" (38 mm x 38 mm) Square 8 Gauge Woven Wire
☐ 1-1/2" x 1-1/2" (38 mm x 38 mm) Square 10 Gauge Welded Wire
☐ 1/2" x 1/2" (13 mm x 13 mm) Square 12 Gauge Woven Wire

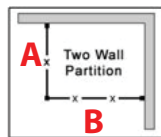
2. Please select fencing base material:

- ☐ Standard Carbon Steel
☐ Stainless Steel

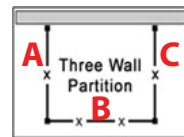
3. Select Configuration:



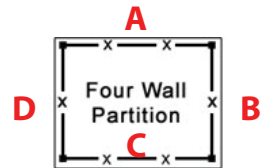
- ☐ 1 Wall Partition
 (One Sided Partition)



- ☐ 2 Wall Partition
 (Two Sided Partition)



- ☐ 3 Wall Partition
 (Three Sided Partition)



- ☐ 4 Wall Partition
 (Four Sided Partition)

Configurations more complex than those show above may be sketched and faxed to us at (412) 262-4055 or scanned and emailed to fencing@pinnaclesystems.com.

Length of Wall A: feet inches

- ☐ Post at wall-recommended for dry wall/gypsum/metal walls.
☐ Panels connect directly to masonry or block wall.
☐ Panels connect directly to wood wall.
☐ Panels connect directly to dry wall/gypsum/metal walls.

Length of Wall C: feet inches

- ☐ Post at wall-recommended for dry wall/gypsum/metal walls.
☐ Panels connect directly to masonry or block wall.
☐ Panels connect directly to wood wall.
☐ Panels connect directly to dry wall/gypsum/metal walls.

Length of Wall B: feet inches

- ☐ Post at wall-recommended for dry wall/gypsum/metal walls.
☐ Panels connect directly to masonry or block wall.
☐ Panels connect directly to wood wall.
☐ Panels connect directly to dry wall/gypsum/metal walls.

Length of Wall D: feet inches

- ☐ Post at wall-recommended for dry wall/gypsum/metal walls.
☐ Panels connect directly to masonry or block wall.
☐ Panels connect directly to wood wall.
☐ Panels connect directly to dry wall/gypsum/metal walls.



5. Does your fencing require a ceiling? ☐ Yes ☐ No

6. Height Desired for fencing:

- ☐ 6'-6" (1981 mm) (would include a 4 inch (102 mm) sweep) ☐ 8'-5 1/4" (2597 mm) (would include a 4 inch (102 mm) sweep)
☐ Custom Dimensions (list dimensions in box below)

7. Sweep Space: (if different than 4 inches (102 mm)) ☐ 6 inch (152 mm)

Sweep Space is the distance from the floor to the bottom of the fence.

☐ 10 inch (254 mm)

☐ Other

☐ 8 inch (203 mm)

☐ 12 inch (144 mm)

8. Desired Coating:

☐ Yellow Powder Coated Posts and Black Powder Coated Panels (Standard)

☐ Powder Orange

☐ Powder Blue

☐ Other

☐ Powder White

Match RAL (color

Specify Post Color:

☐ Powder Tan

☐ matching system in

Specify Panel Color:

☐ Powder Red

Europe) or paint chip

9. Do you want a door(s)?:

☐ Yes.

If "Yes" Specify: ☐ Hinged Doors

☐ Sliding Doors

☐ No

10. Do you want the door to have Safety Interlock Switches? (available with mounting plates): ☐ Yes ☐ No

11. Do you need installation service?: ☐ Yes ☐ No

12. What Zip Code will this material be shipped to?:

13. Does your application require additional Safety Solutions? Please check all that apply.

☐ Safety Light Curtains

☐ Ergonomic Palm Buttons

☐ Stack Lights

☐ Safety Mat Systems

☐ Safety HUB / Safety PLC's

☐ E-Stops

☐ Punch Press Guards & Controls

☐ Press Brake Guards & Controls

☐ Resolver or Rotary Cam Based Controls

Additional Information:

For an additional door on a wall, special locks or other important information regarding your layout, please list below:

[illegible]

Press Controls and Guarding for the Metal Stamping / Forming Industry



- Punch Press Clutch / Brake Controls
- Resolver Based Clutch / Brake Controls
- Rotary Cam Based Clutch / Brake Controls
- Punch Press Automation Controls
- Time Based Brake Monitor
- Die Protection Systems
- OSHA and ANSI Compliant Controls
- Programmable Limit Switches

- Tonnage Monitoring
- Servo Feed Interface
- Customized Punch Press Controls
- Press Brake Guarding for Mechanical, Air Clutch and Hydraulic Press Brakes
- Stainless Steel Enclosures Available
- LazerSafe™ - Safeguarding system for Hydraulic Press Brakes

www.pressroomelectronics.com

(412) 262-1115



WARRANTY

Manufacturer warrants that this product will be free from defects in material and workmanship for a period of one year from the date of shipment thereof. Within the warranty period, manufacturer will repair or replace such products which are returned to it with shipping charges prepaid and which will be disclosed as defective upon examination by the manufacturer. This warranty will not apply to any product which will have been subject to misuse, negligence, accident, restriction, and use not in accordance with manufacturer's instructions or which will have been altered or repaired by persons other than the authorized agent or employees of the manufacturer.

DISCLAIMER

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WARNING: The entire machine safety system must be tested at the start of every shift. Machine testing should include: (1) proper machine operation and stopping capability; and (2) verification of proper installation and settings of all point of operation guards and devices before the operation is released for production.

Additional products to achieve your **Total Safety Solution!!!**

- Safety Light Curtains (All Types and Styles)
- Universal Safety Controller HUB / Safety PLC
- Safety Mat Systems and Controls
 - Area Guarding Systems
 - NSD Safety Mat Systems
 - STTS Safety Mat Systems
 - Direction of Travel Mats
 - High-Temp Welding Mats
- Ergonomic Palm Buttons
 - UltraTouch Palm Buttons
- Safety Interlock Switches (including explosion proof)
- Customized "control reliable" controls for dual solenoid activated pneumatic and hydraulic valve applications
- Fencing with Interlocks
- E-Stop Buttons
- Stack Lights

- Energy Isolation and Single Point Lockout Systems
- Plant Surveys, Risk Assessment & Installation Services
- Customized Control Panels; Stainless Steel enclosures available for all products

Punch Press / Metal Stamping Industry

- Resolver or Rotary Cam Based Clutch / Brake Controls - OSHA/ANSI Compliant
- Punch Press Automation Controllers
- Time-Based Brake Monitors
- Programmable Limit Switches
- Die Protection & Tonnage Monitoring Systems
- Servo Feed Interfaces

Press Brake Guarding and Controls

- Press Brake Guarding for Mechanical, Air Clutch and Hydraulic Press Brakes
- Press Brake Control Systems



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