

SUPERLIGHT VI

PROGRAMMABLE SAFETY LIGHT CURTAIN

Featuring the "QuickView Diagnostic Display"
For Increased Productivity and Maximum Operator Safety



AMERICA'S MACHINE GUARDING/MACHINE CONTROL COMPANY

TRIAD

Triad Controls, Inc.

SUPERLIGHT VI

The Ultimate in Safety-Quality-Value

Diverse Redundancy Design Concept

Triad safety light curtains utilize 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

Triad safety light curtains 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.

Extra Safe Design

Provides two methods of fail-safe design. One utilizes two microprocessors and two captive contact relays, and one 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. SuperLight VI utilizes safety relays which have force-guided contacts. The contacts are mechanically locked together so that if one set of contacts weld, the other contacts cannot change state.

External Diagnostic Display

Standard on all Triad safety light curtains is the "Quickview Diagnostic Display." The alphanumeric display shows status and fault codes of the unit. This is an excellent safety and maintenance feature.

Control Reliable System

Critical components of the SuperLight VI are duplicated so that a single component failure will not cause an unsafe condition. If a component does fail, the unit's self-checking circuitry recognizes the situation and initiates a safe stop of the machine.

Powerful Infrared Light Source

Triad safety light curtains utilize 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. Triad safety light curtains are highly immune to EMI, RFI, and ambient light conditions, and are unaffected by strobe lights, and weld flash generated light sources.

Extensive Testing

Triad safety light curtains incorporate extensive testing and burn-in to establish a high degree of product reliability and safety.

Emitter



Receiver



Standard Features and Capabilities

- Cost competitive
- Very easy to align and install
- Three-Year warranty (industry leader)
- Heavy duty aluminum welded 14 gauge enclosure
- Dust and oil tight
- 3/4" infrared light beam spacing
- External status and diagnostic display on all light curtains
- Compact design
- Single/multiple floating beam blanking
- Single/multiple fixed beam blanking
- Auto-Blanking feature option
- PSDI-Presence Sensing Device Initiation capability option
- Alignment indicator light
- Shock mounts supplied standard
- Easy access for wiring
- Dual self-checking captive contact safety relays
- Fast reacting-Less than 30 ms all sizes
- Light curtain controller box not required
- Light curtain interconnections not required between pylons or a third box or controller
- Non-mated units, matched sets are not required
- 2-, 3-, 4- or 5-sided protection available with mirrors
- Extended scanning ranges available — 75' (22.8m) maximum
- Dual independent channel microprocessor design
- Self-checking circuitry
- Nine standard sizes — 12" (305mm) to 72" (1829mm) lengths
- Meets or exceeds OSHA, ANSI, CSA, and RIA standards
- Not affected by ambient light
- High immunity to EMI and RFI noise sources
- High immunity to strobe type and weld flash generated light sources
- Interfaces easily with all types of machine controllers and PLCs
- Made in the U.S.A

Quickview Diagnostic Display

Standard on all Triad safety light curtains is the revolutionary front panel diagnostic display. The bright red alphanumeric LED display shows the status of the safety light curtain along with various integral fault codes relating to the maintenance and operation of the system.

The diagnostic display monitors microprocessors, captive contact

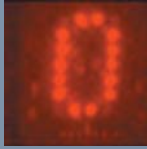
safety relays, bad grounds, external infrared sources, shorts, blanking, etc. Fault conditions are easily read and displayed on the top front panel of the receiver pylon. These easy to read external diagnostic codes and status displays will enhance safety and machine utilization by minimizing machine downtime and set-up time measurably

The advanced design of the SuperLight VI diagnostics will also count and display

the number of beams blanked out in the "Auto-Blank" mode. This is an important feature when computing the depth penetration factor required for proper installation.

A detailed definition, status, reason(s), and cure listing is provided within the installation and operation manual of each Triad safety light curtain.

| DECIMAL POINTS OFF | DECIMAL POINTS ON |
|------------------------------------------------|------------------------|
| DIAGNOSTIC DISPLAY | |
| 0 = Clear | .0. = Clear |
| 1-4 = Blocked | .1. = 1 beam blocked |
| 5-6 = Relay Fault | .2. = 2 beams blocked |
| AUTO Blank * | .3. = 3 beams blocked |
| *7 = Active | .4. = 4 beams blocked |
| *8 = Missing/too large | .5. = 5 beams blocked |
| 9 = Ram Failure | .6. = 6 beams blocked |
| A = Master cannot talk to slave microprocessor | .7. = 7 beams blocked |
| B = Data disagreement with slave unit | .8. = 8 beams blocked |
| C = External infrared source detected | .9. = 9 beams blocked |
| D = Internal short/open | .A. = 10 beams blocked |
| E = Beam selection error | .B. = 11 beams blocked |
| F = Bad computer clock | .C. = 12 beams blocked |
| | .D. = 13 beams blocked |
| | .E. = 14 beams blocked |
| | .F. = 15 beams blocked |



Subject Machine Control Reliability Requirements

Control reliability control circuits shall be designed and constructed so that a single failure or fault within the system does not prevent the normal stopping action from being applied to the press when required or does not create an unintended stroking action

but does prevent initiation of a successive stroke until the failure is corrected (ANSI B11.1-2001). Always refer to the specific ANSI or OSHA code for the complete requirements of the subject machine.

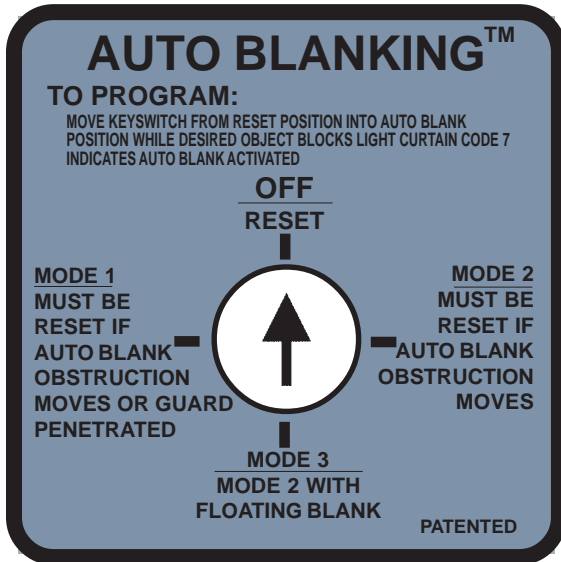
Applications

The Triad infrared safety light curtain is suited for air clutch, hydraulic, and pneumatic equipment such as punch presses, mechanical, pneumatic and hydraulic press brakes, injection molding machines, die casting operations, powered metal compacting presses, filter presses, automatic assembly equipment, bending rolls, robotic operations, FMS systems, slitting lines and food processing machinery.

Blanking Options

The most complete format of blanking options available in the industry
Select the style best suited for your applications

Auto-Blanking - (AB) Option



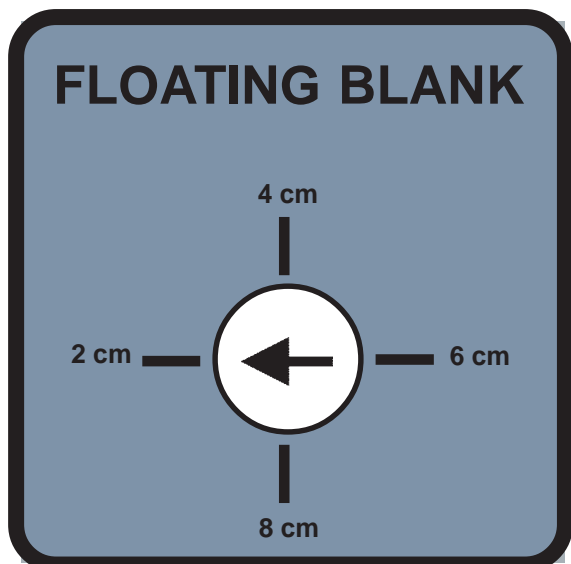
Triad's advanced "Auto-Blank" option is unique because it will automatically blank out only the required number of beams needed to accept an obstruction such as a conveyor, bracket or fixture. The unit is easily programmed by a supervisory controlled four position keyed selector switch located on the front panel of the receiver pylon (shown left). The "Auto-Blank" method of blanking is much safer than DIP switch or master/slave blanking systems because only the area of the obstruction will be blanked. This feature prohibits unsafe oversizing of the blanked area commonly found throughout 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. "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 "Quickview Diagnostic Display" will show the number of blocked beams for two seconds, 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
 - 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 workpiece 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 8cm based on 2cm increments (shown left). 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**.

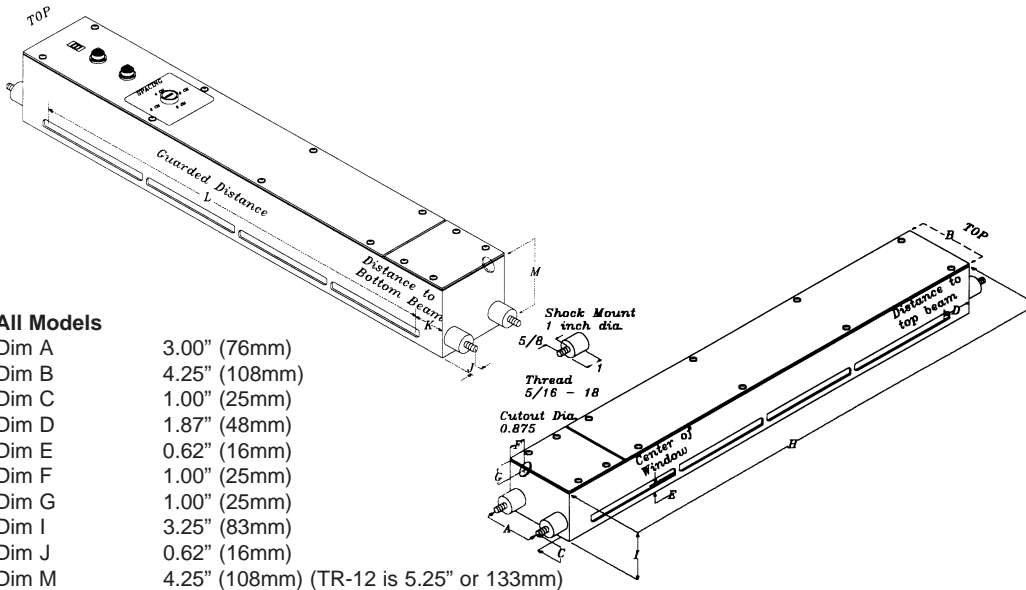
The "Floating Blank" (8K) Option includes:

- 2cm - Constant scan light curtain
- 4cm - One floating beam
- 6cm - Two floating beams
- 8cm - Three floating beams

Specifications-Dimensions-Ordering Procedure

Specifications

- Power Requirements:** 120VAC +/- 10% @ 50-60 Hz with fuse protection (24VDC units optional)
- Power Consumption:** 24 watts total
- Infrared Light Source:** Solid state light emitting diodes
- Beam Spacing:** 3/4"(19mm); 1-1/2" (38mm) for Models TR-48 through TR-72
- Response Time:** Less than 30 milliseconds (All sizes)
- Relay Contact Ratings:** 8 AMP rating @ 220VAC; 16 AMP rating @ 120VAC
- Relay Configuration:** Dual captive contact self-checking safety relays.
- Minimum Object Sensitivity:** 1-1/4" (32mm); 2" (51mm) for Models TR-48 through TR-72
- External Alphanumeric Diagnostic and Status Display**
- Temperature Range:** 32 degrees to 120 degrees F
- Scanning Frequency:** 3.6 KHz
- Shock:** Tested to withstand high vibration applications.
- Self-checking** every 20 milliseconds.
- Indicators:** Red obstruction light on receiver. Green non-obstruction light on receiver. Red alignment indicator light on emitter.
- Construction:** Heavy duty aluminum enclosure (all welded). 14 Gauge - Dust and oil tight. NEMA 12
- 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 — 75' (23m) maximum.
- Specials:** Custom designed light curtains for special applications. Examples: L-shaped, stainless steel. Consult factory.
- CSA Approved, UL Pending**
- Three-Year Warranty**



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) (TR-12 is 5.25" or 133mm) |

| Model | Dim H (box length) | Dim K (last to end) | Dim L (first to last beam) |
|-----------|--------------------|---------------------|----------------------------|
| TR/TPG-12 | 16.37" (416mm) | 1.87" (48mm) | 12.62" (321mm) |
| TR/TPG-18 | 22.62" (575mm) | 1.87" (48mm) | 18.92" (481mm) |
| TR/TPG-24 | 28.87" (733mm) | 1.87" (48mm) | 25.22" (641mm) |
| TR/TPG-30 | 36.25" (921mm) | 2.87" (73mm) | 31.52" (801mm) |
| TR/TPG-36 | 42.12" (1070mm) | 2.87" (73mm) | 37.82" (961mm) |
| TR/TPG-42 | 48.37" (1229mm) | 2.87" (73mm) | 44.12" (1121mm) |
| TR/TPG-48 | 54.75" (1391mm) | 2.87" (73mm) | 50.42" (1281mm) |
| TR/TPG-60 | 67.25" (1708mm) | 2.87" (73mm) | 63.02" (1601mm) |
| TR/TPG-72 | 79.75" (2026mm) | 2.87" (73mm) | 75.62" (1921mm) |
| TR/TPG-84 | 91.75" (2330mm) | 2.87" (73mm) | 88.22" (2241mm) |
| TR/TPG-96 | 103.75" (2635mm) | 2.87" (73mm) | 100.82" (2561mm) |

Ordering Procedure

For 12" (305mm) to 36" (914mm) units with 3/4" (19mm) beam spacing

- Specify height of unit
- Type of unit 2F, 4F, 8K, AB
- Total distance to be scanned (must be specified)

| TR | - | 12 | - | 2F | - | 00 |
|----------------------|---|---------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------------|
| SuperLight VI Prefix | | Scanning Height in Inches | | Type of Unit | | Approximate distance light curtain is to scan in feet |
| | | | | 2F No Floating Blank or Blanking Beams constant scan | | |
| | | | | 4F One beam built-in Floating Blank capability | | |
| | | | | 8K Up to 3 beam Floating Blank adjustable by use of keyswitch removable in all positions on receiver pylon. Capable of constant scan, one, two or three floating beams. | | |
| | | | | AB Constant scan light curtain; One beam floating blank Two Auto-Blank Modes | | |

For 42" (1067mm) to 72" (1829mm) units with 1 1/2" (38mm) beam spacing

- Specify height of unit
- Type of unit 4CM, 4F, AB
- Total distance to be scanned (must be specified)

| TR | - | 42 | - | 4CM | - | 00 |
|----------------------|---|---------------------------|---|-----------------------------------------------------------------------------------|---|-------------------------------------------------------|
| SuperLight VI Prefix | | Scanning Height in Inches | | Type of Unit | | Approximate distance light curtain is to Scan in Feet |
| | | | | 4cm 4cm spacing with constant scan | | |
| | | | | 4F 4cm spacing with one floating blank | | |
| | | | | AB Constant scan Model 4cm; One beam floating blank built-in Two Auto-Blank modes | | |

Light Curtain Options

- Auxiliary Output Contact:** Provides an isolated (dry) contact output to be used as a signal line. Specify NO or NC output. Add suffix AO to light curtain Model Number.
- Cincinnati Interface/Forced Interrupt:** Allows an external device (i.e., Cincinnati Press or PLC) to initiate a Red Condition on the light curtain. This option is required on machines that feed a 24VDC signal back to the safety light curtain to assure that the safety control circuit can be shut down. Add suffix CI 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.
- Resettable Latching Relays:** Requires the light curtain to be manually reset every time the light curtain is penetrated. Add suffix LR to light curtain Model Number.
- 24VDC Power Source:** Add suffix DC to light curtain Model Number.

Accessories

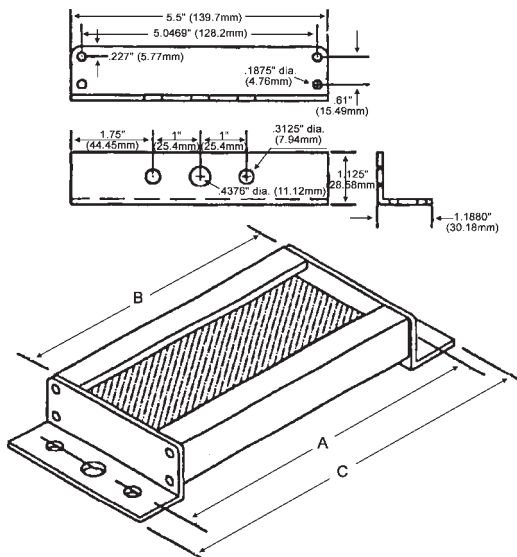
Cornering Mirror Dimensions

Through the use of cornering mirrors, multiple sides or work envelopes can be guarded which enhance safety and reduce down-time related to mechanical and electrical interlock systems.

Include a **5% reflectivity loss per mirror** when calculating total scanning distance of light curtain.

NOTE: Mirrors are surface coated. Wipe surface using only a damp, clean, soft 100% cotton cloth. To replace: remove the end bracket, slide out the mirror with the gasket.

| 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) | 36.25" (921mm) | 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) |

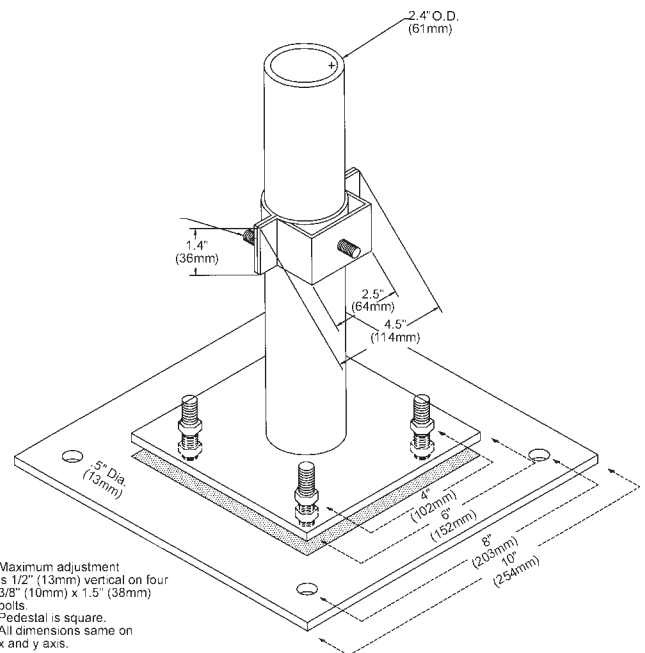


Pedestal Dimensions (Model 8000)

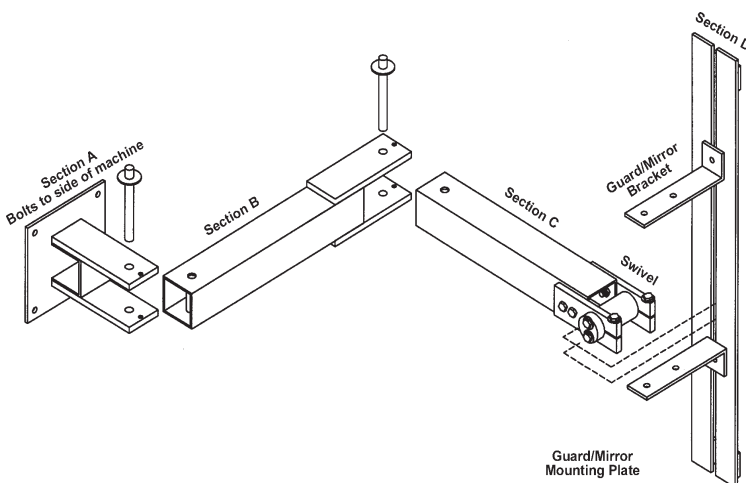
The heavy duty, all welded steel pedestal floor mounts can be used for mounting either the SuperLight VI system or cornering mirrors. Sliding mounts on the pedestal are of universal design and are supplied standard. Unique floating base on pedestal is designed to compensate for uneven floors.

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

- 1) Sliding Mounts supplied
- 2) Standard height - 72" (1829mm) - Model 8000
Optional height - 96" (2438mm) - Model 8096
- 3) Painted OSHA yellow
- 4) Pedestal - 12 gauge steel
Base Plate - 1/4" (6mm) steel plate



Model 9000 Swing Mount Brackets



Excellent method of mounting light guard for press brakes or when 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" (5mm) thick painted OSHA yellow which mounts directly onto the machine housing and makes for a heavy duty yet versatile mounting bracket.

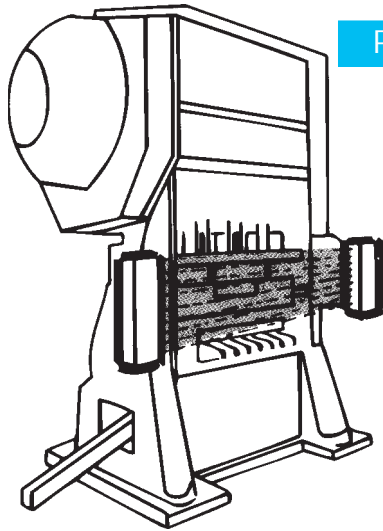
Specify dimensions "B" & "C"

Ordering Procedure:

Specify Pedestal Model # and Quantity.

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

Applications

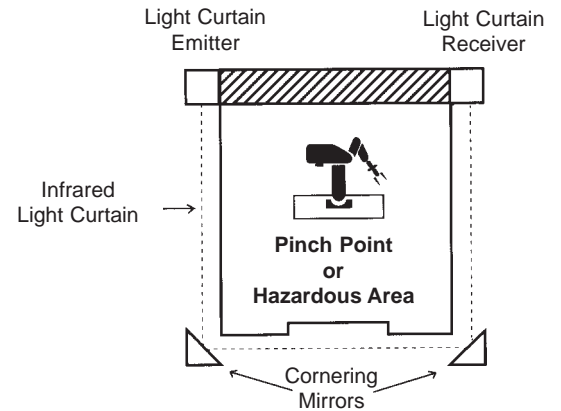


Punch Presses

The SuperLight VI is designed to accept coil stock movement with no press shutdowns or adjustments to light guard. No adjustments necessary to light guard for die height changes or changes from automatic to hand fed secondary operations.

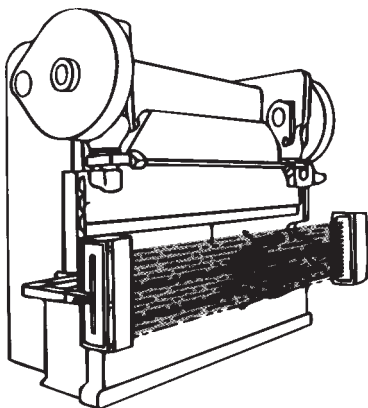
Robotic and Automation Multi-Sided Guarding System

Easily installed cornering mirrors combined with the easy alignment characteristics of the SuperLight VI 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.



Press Brakes

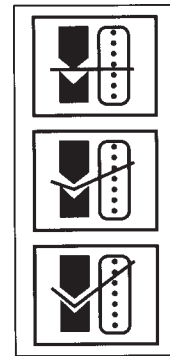
Triad SuperLight VI infrared light curtain now designed for power press brakes, utilizing the Floating Blank series.



How Floating Blank Works:

The Triad 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 brakes.

Triad Controls

Triad Controls manufactures a complete line of standard and customized machine guards and controls for safety and increased productivity. Control systems are control reliable and available in both solid state or relay logic. Controls meet or exceed OSHA regulation 1910.217 and ANSI standards B11.1-2001, B11.19-1990 for control reliability and component monitoring.

Muting Kit - Triad Package #130

Triad SuperLight VI barriers can be bypassed during non-hazardous portions of machine operation. Ideal for press operations where parts or scrap are being ejected or during hand removal of parts on the upstroke of the machine. Reference Triad Package #130 PB for Press Brakes. Always submit the machine electrical schematic for proper point of interface.

Automatic Tripping - PSDI

Presence Sensing Device Initiation Certification must be obtained for proper application of this optional feature. Refer to the specific OSHA or ANSI standard related to the subject machine on which PSDI is to be applied.