



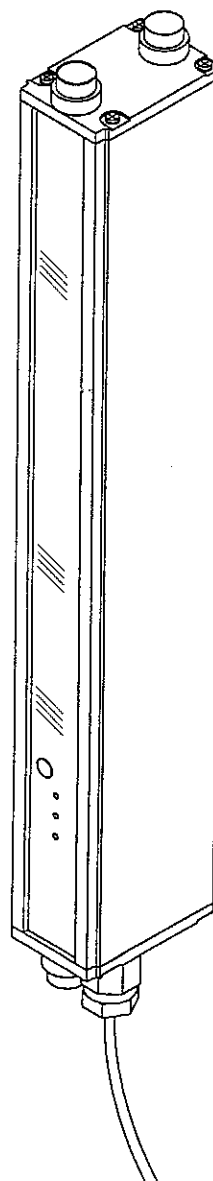
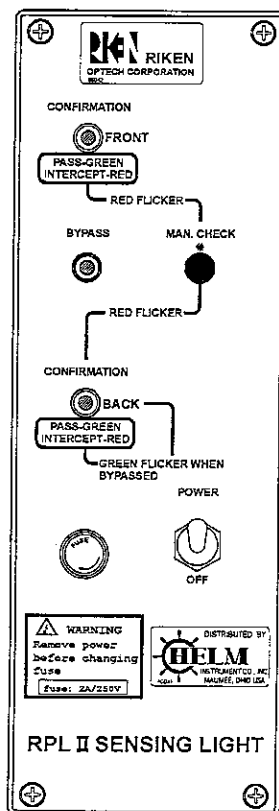
Instruction Manual

for

Helm *Beacon*

Models

HRPL II and HRPB



Revised June, 2000

Instruction Manual For Helm Beacon Model HRPLII & HRPM Presence Safety Device

CAUTION

THE SAFETY OF PERSONNEL INVOLVED IN THE OPERATION OF DANGEROUS INDUSTRIAL EQUIPMENT CAN ONLY RESULT FROM A WELL-CONCEIVED AND RIGIDLY ENFORCED SAFETY PROGRAM DEVELOPED BY THE USER OF SUCH EQUIPMENT. WHILE WELL-DESIGNED PERSONNEL SAFETY MONITORING EQUIPMENT PLAYS AN IMPORTANT ROLE IN SUCH A SAFETY PROGRAM THE USE OF SUCH EQUIPMENT DOES NOT BY ITSELF GUARANTEE ABSOLUTE SAFETY. OF EQUAL OR EVEN GREATER IMPORTANCE IS THE ROLE PLAYED BY USER MANAGEMENT INVOLVING SELECTION OF PROPER EQUIPMENT, PROPER INSTALLATION, GOOD MAINTENANCE PROCEDURES BY TRAINED AND AUTHORIZED PERSONNEL AND RIGIDLY ENFORCED SAFETY RULES FOLLOWING THE PRACTICES RECOMMENDED BY SUCH ORGANIZATIONS AS A.N.S.I. AND O.S.H.A.

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CAUTION

Helm personnel protection devices are presence-sensing devices which protect operators and other personnel working on or around machinery. The presence-sensing device signals the machinery to stop when its light field or capacitive area is penetrated. These devices cannot be used with full revolution or non-clutched machinery. Only part revolution clutched machines which may be electrically signalled to stop at any part of their cycle may be protected with our light curtain. When used with mechanical power presses, O.S.H.A. Industrial Safety Standard stated in Section 1910.217 and A.N.S.I. B11.1-1988 apply. All other machinery or other devices on which our presence-sensing devices are used must meet the general machine guarding requirements in O.S.H.A. Standard 1910-212 and other regulations and standards that apply. Helm takes no responsibility in cases where stopping mechanisms of machinery or other devices are not maintained or do not meet their application regulations or standards.

- ♦ O.S.H.A. Regulations specify the necessary distance from a machine's pinch point to the presence-sensing device in terms of the stopping of the press in seconds. The required safety distance from the safety device to the machine's point-of-operation is determined by the formula:

$D_s = 63 \text{ inches/second} \times T_s$ where

D_s = minimum safety distance (inches)

63 inches/second = hand speed constant and

T_s = stopping time of the press measured at approximately
90 degrees position of crankshaft rotation (seconds)

- ♦ Never operate machinery with Helm safety devices if machinery is not in proper working order.
- ♦ Inspect all stopping mechanisms of the machinery regularly to insure proper function. If machine controls that stop the machine are not working properly the machine may not stop safely enough even though our safety devices are working properly. Helm takes no responsibility in cases where the appropriate machine controls are not working properly.
- ♦ Helm safety devices operation must be tested daily using the check out sequence listed in our manual. Perform check out sequence after any maintenance is done to the safety device. Extra caution labels are available if desired to attach to machinery.
- ♦ Please contact Helm Instrument

CAUTION

- ◆ Helm light curtains must be installed by qualified personnel. Disconnect all power to machinery before making connections to light curtains.
- ◆ Follow all instructions and warnings in Helm's safety device manual. Helm takes no responsibility for operation if you do not follow the procedures and comply with warnings in the manual.
- ◆ The enforcement of the above requirements is beyond Helm's ability to control. It is your responsibility to follow these requirements and any other requirements and procedures which may be specific to your machinery.

INTRODUCTION

You have just purchased the most reliable light curtain available. The Beacon series light curtains incorporate a compact, rugged and light weight design with fail-safe reliable circuitry. With a variety of sizes and models available, you can select the specific light system for your application. Built-in immunity circuitry allows unaffected operation from strobe lights, weld flashes, ambient lighting or other EMI and RF noise sources. Beacon light curtains will help you comply with OSHA 1910.217, 1910.212, ANSIB11.1 and CAN/CSA standards.

Beacon light curtains are designed to protect machine operators and passersby from hazards associated with operating machinery by extending a curtain of light in front of the dangerous area. If the light beams are interrupted, a signal is sent to the stop circuit of the machine.

At Helm, quality is inherent not only in the design of our products but in the attitudes of our employees as well.

We're working together to give you the best . After all, that's what our business is all about - providing innovative products to help make your manufacturing process more safe and productive.

CAUTION

Helm light curtain must be used only on machines that can be stopped immediately after receiving stop signal.

They must be used only on part revolution clutched machinery that can stop at any part of the stroke.

Under no circumstance must the Light Curtain be used on full revolution clutched machinery which is impossible to stop at any part of the stroke or cycle.

CAUTION

The light curtain being a presence-sensing device regulated by specific O.S.H.A. Industrial Standards. When used with mechanical presses, the presses must meet the requirements and inspection procedures of O.S.H.A. regulation 1910.217 and A.N.S.I. Standard B11.1-1988. O.S.H.A. regulation 1910.212 for general machine guarding must apply to any other machine or device, also any other regulations that may apply.

Excerpts from O.S.H.A. regulation 1910.217 and A.N.S.I. Standards for Safety Devices are provided in the appendix of this manual. Please take a moment to read this appendix.

CAUTION

Every presence-sensing device must be mounted no closer than a specific distance from the point of operation or pinch point as stipulated in O.S.H.A. regulation 1910.217 and A.N.S.I. regulation B11.1-1988. As per:

A.N.S.I. Formulas $D_s = K \times (T_s + T_c + T_r + T_{bm}) + D_{pf}$

O.S.H.A. Formulas $D_s = 63 \text{ inches/second} \times T_s$

These formulas will be explained in Pages 24 & 25.

Helm light curtain must be installed adhering strictly to above regulations.

SPECIFICATIONS

- Supply voltage: AC 110V or 220V
- Power supply frequency: 50/60hz
- Variation in supply voltage: $\pm 10\%$
- Output contacts: 2NC, 1NO independent
- Output contact rating: AC 230V, 7A (COSO=1)
- Power requirements: 30W
- Ambient temperature: $-5^{\circ}\text{C}\sim 50^{\circ}\text{C}$
- Response time: Less than 15 msec 11"-24"
 Less than 20 msec 36"-48"
 Less than 25 msec 54"-86"
- Projecting elements: Phototransistors
- Optical axis pitch: 40mm
- Scan distance: 16 feet HRP M
 42 feet HRPL11

HRPL11 Available Sizes

Part #	Protection Height	Scan Distance
H11RPL11-8-0	11"	42'
H17RPL11-12-0	17"	42'
H24RPL11-16-0	24"	42'
H36RPL11-24-0	36"	42'
H49RPL11-32-0	49"	42'
H61RPL11-40-0	61"	42'
H74RPL11-48-0	74"	42'
H86RPL11-58-0	86"	42'

HRPM Available Sizes

Part #	Protection Height	Scan Distance
H11RPM8-0	11"	16'
H17RPM12-0	17"	16'
H24RPM16-0	24"	16'
H30RPM20-0	30"	16'
H36RPM24-0	36"	16'
H42RPM29-0	42"	16'
H48RPM32-0	48"	16'
H55RPM36-0	55"	16'

* Replace the 0 with the letter B for blanking capabilities

* Replace the 0 with the number 2 for dual control

FEATURES

- Meets or exceeds O.S.H.A., ANSI and CAN/CSA
- Failsafe control reliable circuitry
- Dual self-checking captive contact safety relays
- Compact design
- Rugged aluminum extrusion enclosed
- Very easy to align and install
- Wide selection of sizes 11" to 86" of protection heights
- Scanning ranges available up to 50'
- Two sets of any size transmitter or receiver can share the same control box
- Unaffected by strobe lights, weld flash or other ambient light
- High immunity to EMI and RFI noise source
- Upstroke muting capability standard
- Transmitters and receivers are non-mated, no match sets
- Optional blanking capability, auto and manual
- Supervised blanking limits, authorized personnel select maximum allowable area to be blanked
- Obstruction verification stop signal is sent if object being blanked for is removed
- Two year warranty

Optional Accessories:

- Corner turning mirrors
- Universal mounting brackets

DESCRIPTION

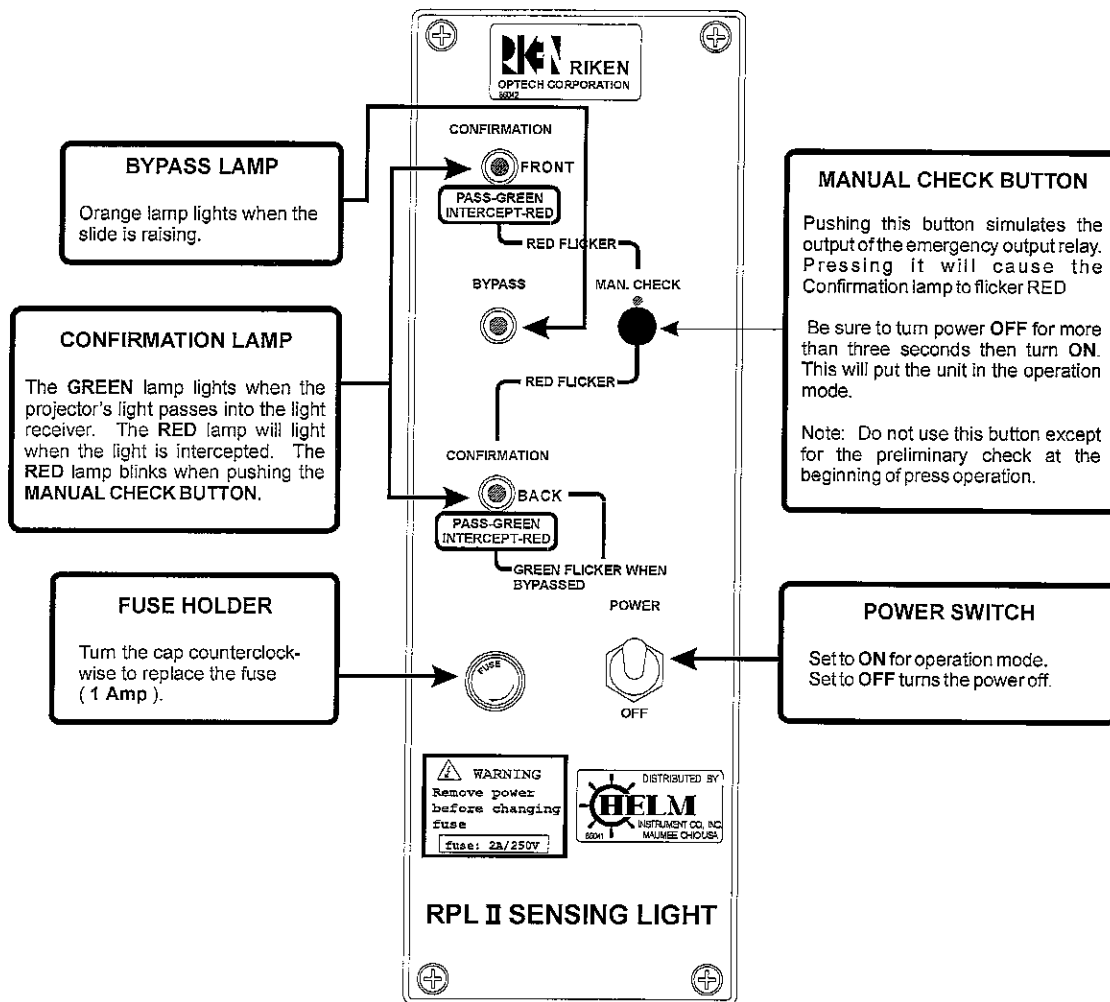
The safety device is composed of a control box, a transmitter and a receiver.

Control Box - The control box supplies direct current to the transmitter, receiver and the blanking circuits. It receives an output signal from the light receiver unit and controls the output relay (R) by means of the control circuit board (MCI-MBI). It also monitors the output relay through a check circuit. The control box for the blanking units also house the blanking control module.

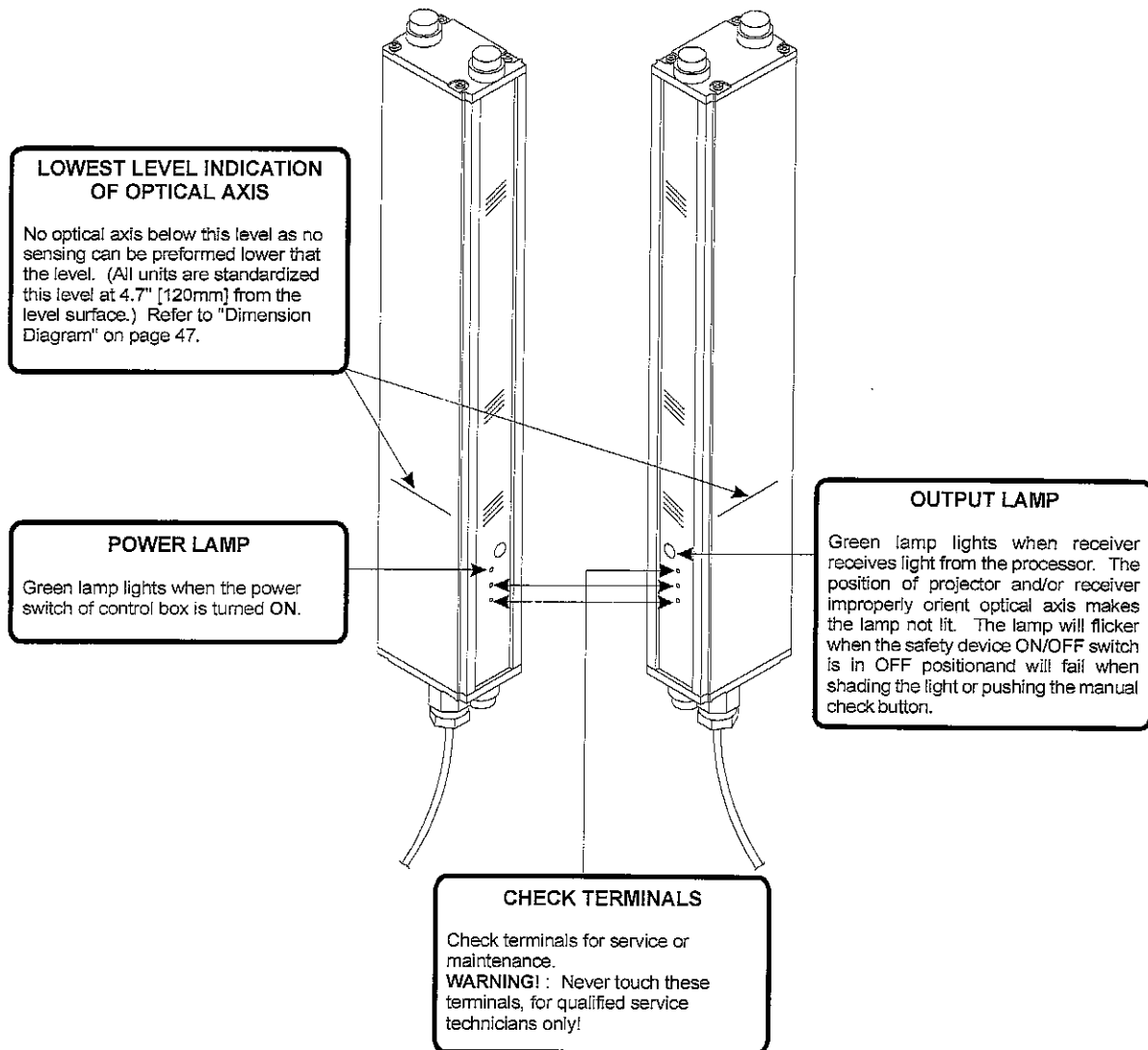
Transmitter Unit - The transmitter unit emits a modulated infrared light to the receiver unit.

Receiver Unit - When all the light beams are received from the transmitter unit. The receiver sends an output confirmation signal to the control box. If any light beams are interrupted the receiver unit will not transmit an output confirmation signal to the control box. This will cause a stop signal to be transmitted to the machine's emergency stop circuit, thus stopping the machine.

Nomenclature and Function of Parts for Non-Blanking Unit



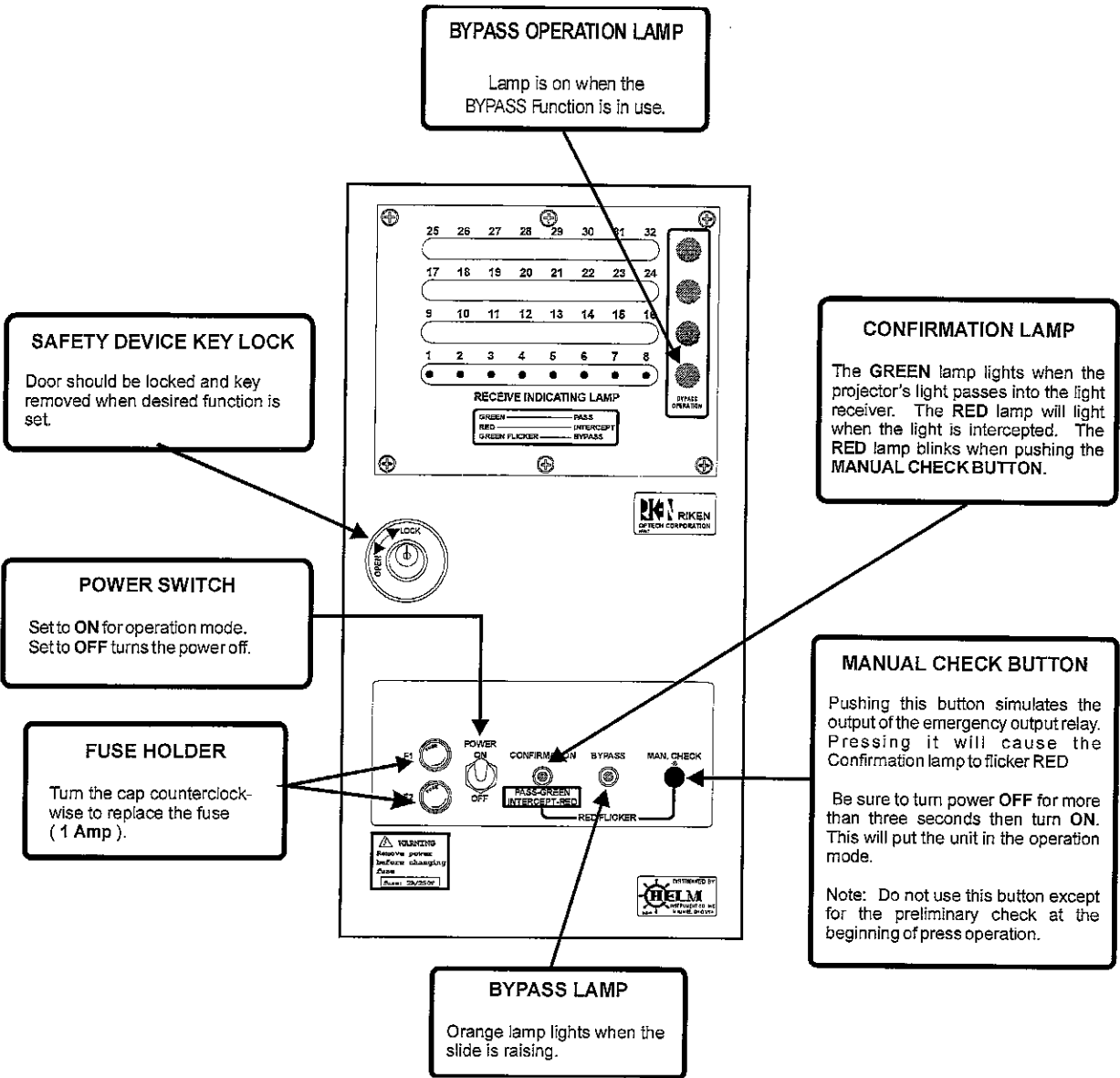
Nomenclature and Function of Light Projector and light Receiver



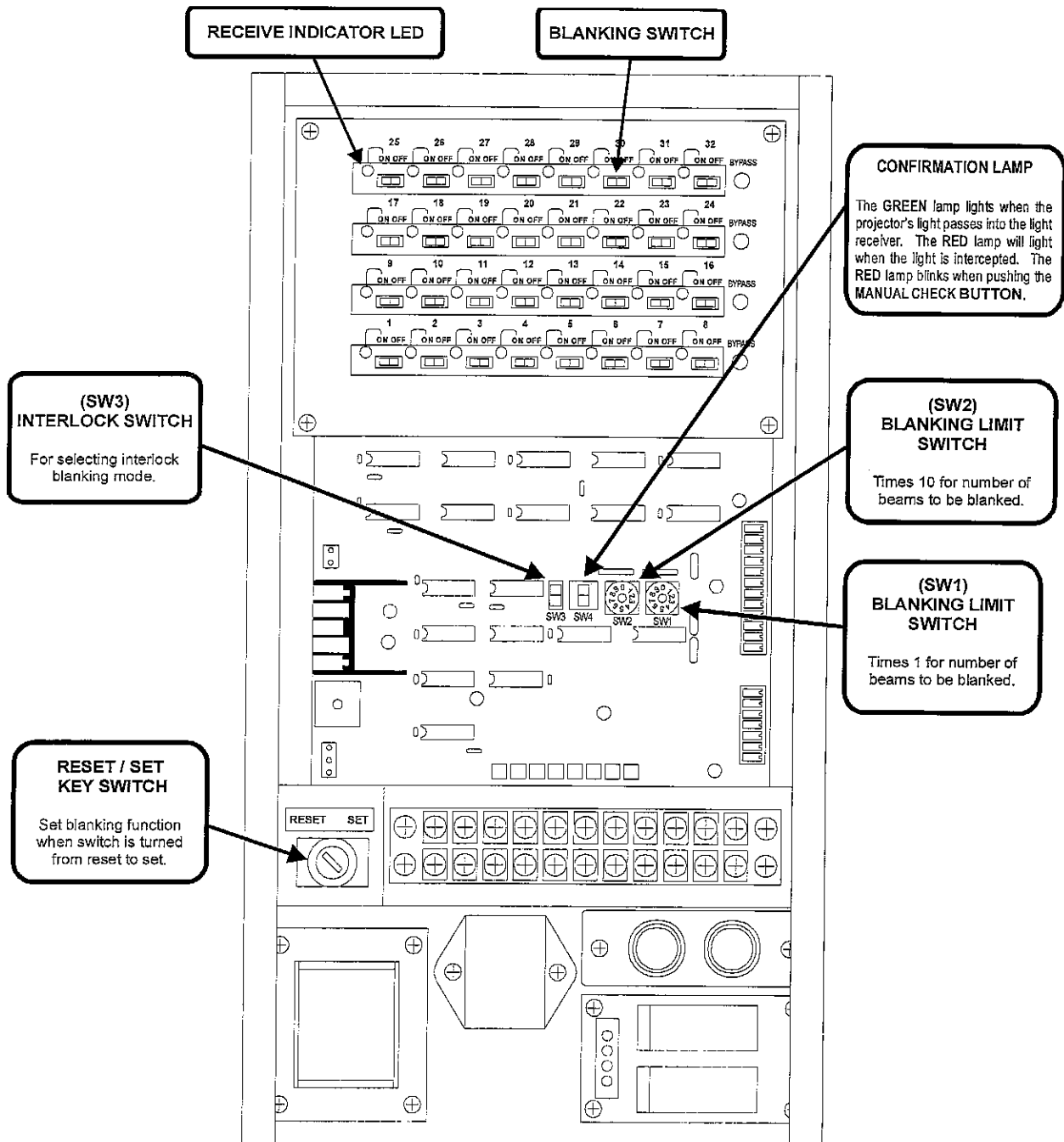
ADJUSTMENT OF OPTICAL AXIS

After setting the projector and receiver in place, check for proper function i.e., confirm setting position, functions, etc. with the check terminals and other points. (The adjustment is only performed by our qualified service technician and is not allowed by any other person.)

Nomenclature and Function of Parts for Blanking Unit



Nomenclature and Function of Parts for Blanking Unit



OPERATION OF NON-BLANKING UNIT

1. Check procedure before operation.
 - A. Place the power switch to the "ON" position.
 - B. The power lamp located at the lower end of the transmitter is lit green.
2. Light receiving confirmation
 - A. The output lamp located at the lower end of the receiver unit is lit green.
 - B. The confirmation lamp located on the control box will be lit green. If the lamp is red, check for alignment and obstruction.
3. Interrupted light confirmation.
 - A. Interrupt each light beam one by one with a pole.
 - B. The output lamp located at the lower end of the receiver unit will not be lit.
 - C. The confirmation lamp located on the control box will be lit red.
 - D. Remove pole and both the output lamp and confirmation lamp will be lit green.

CAUTION

PERFORM THE ABOVE FUNCTIONS EACH DAY BEFORE OPERATING AND AFTER THE LIGHT CURTAIN HAS BEEN SERVICED. USED ANY OPAQUE 2 1/4" DIAMETER OBJECT TO PERFORM THE TEST.

Output Confirmation

1. Interrupt the Light Curtain with a pole and at the same time depress the start button on the press, the machine will not cycle.
2. Remove the pole from interrupting the light beams and depress the start button on the press, the machine will cycle.
3. While the machine is cycling, interrupt the light beams and the machine will come to a sudden stop.

Sudden Stop

The modulated light is emitted from the transmitter and is received by the receiver element. It is then put through a synchronizer and amplifier, then to the discriminator circuitry which operates the output relay. If part of the human body or an object accidentally comes into the danger zone, thus interrupting the light beam, the output relay will open, sending a signal to the machine stop circuit.

Upstroke (Muting)

When this feature is being utilized, the RAM will not stop by interrupting the light beam while the RAM is in the upstroke. When the RAM is in the upstroke, the bypass lamp is lit (amber) and the configuration lamp is lit (green). To utilize this feature, connect the leads of 2 rotary limit switches to U1 and U2.

Self Check Circuit

Depress the manual check push-button switch; the confirmation lamp on the control box will flicker in red. To cancel the check condition, turn the power supply switch off for 3 seconds, then turn it back to the "ON" position.

Check operation

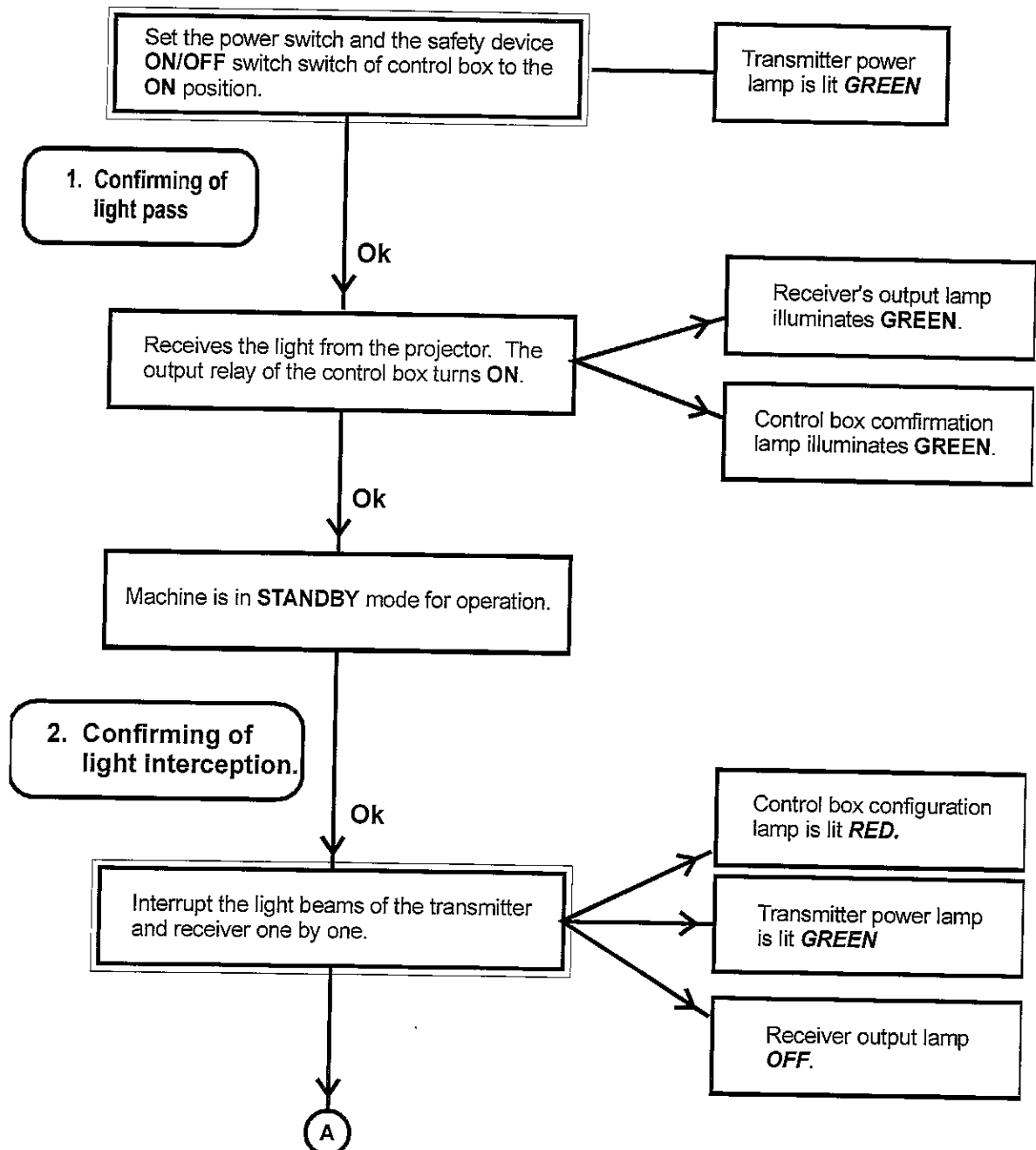
In case the (R) relay of the control box does not open by interrupting the light beam, the check circuit operates to make the (X) relay self maintain, which results in the confirmation lamp flickering in red and the press will come to a stop.

CAUTION

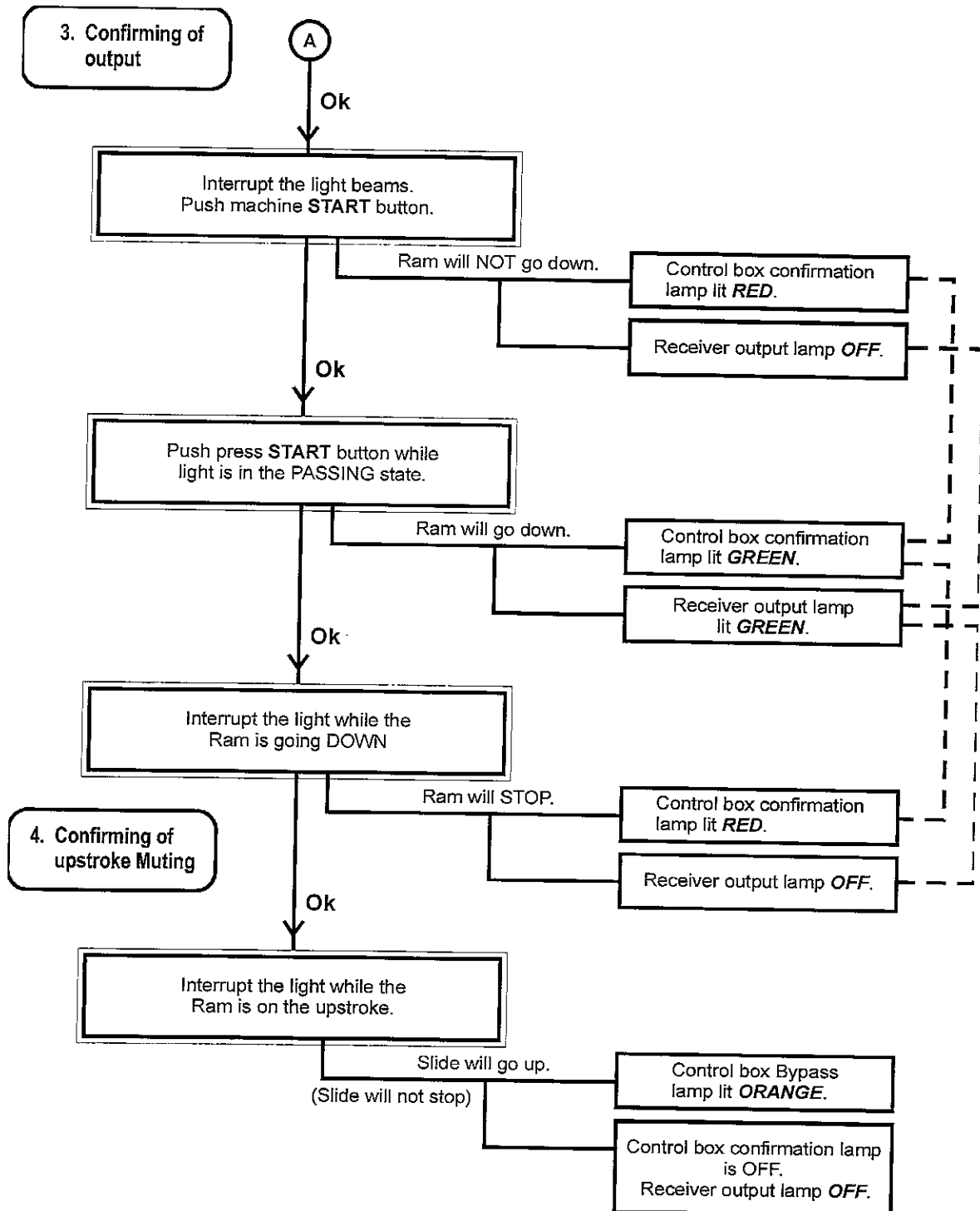
Whenever rotary limit switching is required in safety operation, always use 2 rotary limit switches in series. In the event of one switch remaining closed, the second switch will perform the function. If one switch remains open, then the upstroke muting function will be disabled and the press will stop if the beam is interrupted in the upstroke.

OPERATION FLOW CHARTS

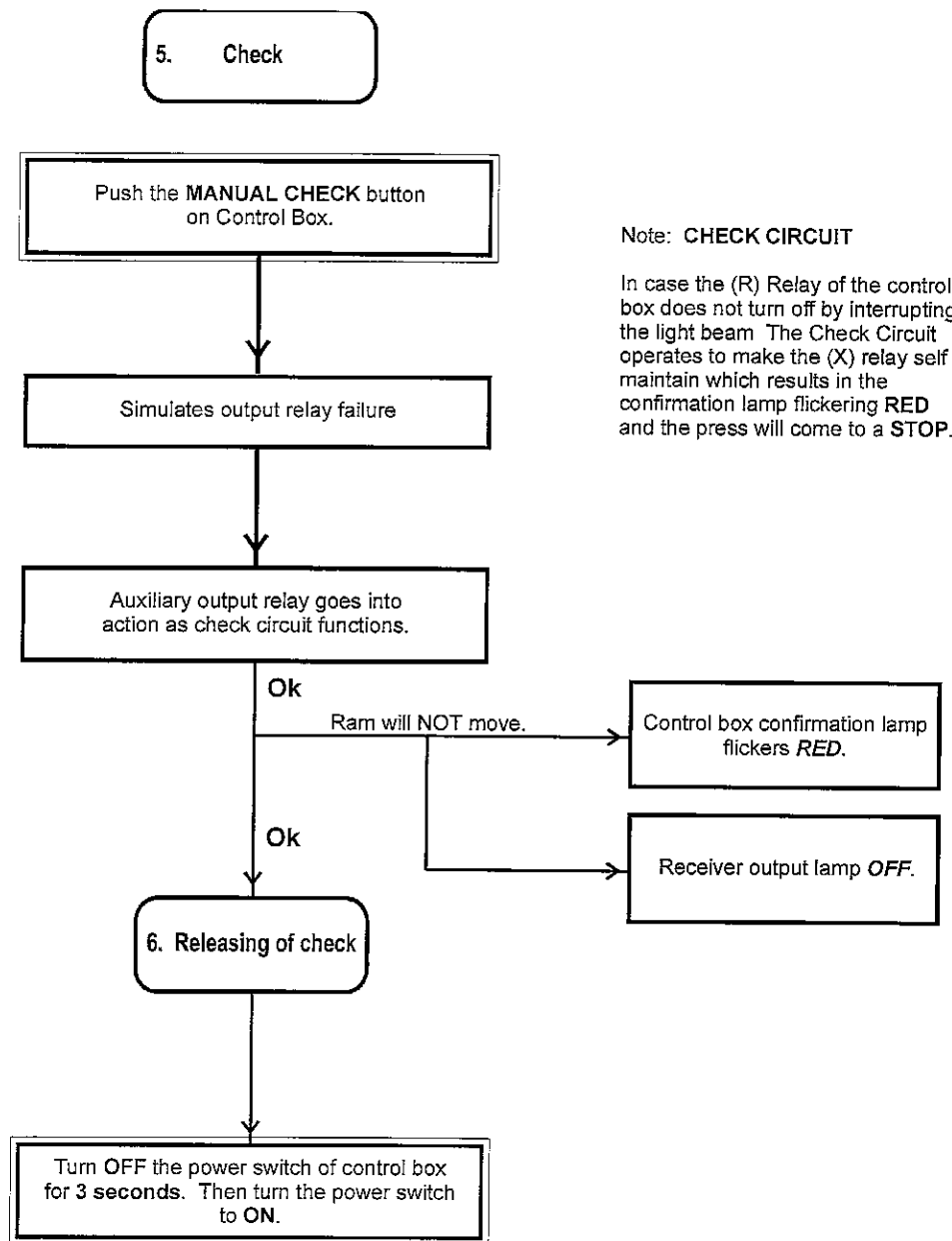
Perform operational test daily, also after installing Light Curtain, use 2 1/4" diameter opaque to perform test.



Operational Test (Sheet 1 of 3)



Operational Test (Sheet 2 of 3)



Operational Test (Sheet 3 of 3)

OPERATION OF BLANKING SYSTEM

Blanking enables you to disable one or more light beams when there is a necessary interruption protruding into the light curtain, such as conveyors, material feed, or work tables.

If area that is blanked permits intrusion into the point of operation, then such intrusion area must be guarded by some other method.

If blanking is desired for only part of the stroke, the Helm light curtain can accomplish this by special switching capabilities which are incorporated in our control box.

Avoid blanking where possible because blanking can increase the object sensitivity thereby increasing the distance from the pinch point (safety distance).

When it is desired that the blanked object not be removed, Helm light curtain control can be so set that it will activate the stop circuit if the blanked object is removed. This will prevent a blanked area remaining blanked even though the blanked object was removed.

Unit will remain in stop mode until object is restored in its original position or the blanked area is cleared by the reset key.

In all cases when blanking is no longer desired, be sure to reset unit clearing the former blanked area.

CAUTION

Blanking is recommended only when definitely necessary. If any area is blanked, check and verify that such blanking does not create access to the pinch point. If such access is created such **MUST BE** protected by some other method.

Blanking of consecutive light beams is not recommended. When blanking is no longer necessary verify that unit is returned to a non-blanked state.

OPERATION OF BLANKING SYSTEM

Be sure that BY1 and BY2 also BM1-BM2 are jumpered. Be sure to set a number in SW1 or SW2 for blanking to be accomplished.

When it is necessary to blank out light beams for such purposes as material feed or parts blow-off, follow these instructions.

- ◆ Turn switch SW3 to "OFF" position.
- ◆ Turn switch SW4 to "MAN" position.
- ◆ Locate area which is to be blanked.
- ◆ Locate corresponding blanking switch and slide it to the left or "ON" position.
- ◆ Turn the reset/set key switch from "RESET" to "SET" position. (This will make that single beam inoperative and the corresponding bypass lamp will blink green.)
- ◆ To make this light beam operational again, slide the blanking switch to the right or "OFF" position and turn reset/set key to reset them back to "SET" position.
- ◆ Any light beam can be blanked.

Detecting if the blanked item is removed from the beam.

- ◆ Turn switch SW3 to "ON" position.
- ◆ Turn switch SW4 to "AUTO" position.
- ◆ Place item to be blanked in beam.
- ◆ Turn reset/set switch from "RESET" to "SET" position.

NOTE

If switch is in "SET" position turn to "RESET", then back to "SET" position.

The blanking lamp or lamps corresponding to the area blanked will blink green and will be inoperative.

If the chute is removed from the beam, all blanking lamps will glow red and the unit will be inoperative.

To make unit operative again whether chute is replaced or not, turn reset/key switch from "RESET" to "SET" position.

NOTE

If chute was returned to beam, area will again be blanked. If chute was not returned to beam, then no area will be blanked.

Operation Procedure for Blanking Unit

In case of manual operation

♦ Initialization

SW1,2..... Set to number of light beams to be blanked.
SW3..... OFF
SW4..... MANU
Terminals BY1,2..... Jumpered
Terminals BM1,2..... Jumpered

♦ Operating Sequence

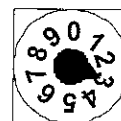
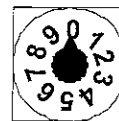
1. Turn on power supply.
2. Turn on the switch or switches for the light beam or beams required to be blanked.
3. Turn the blanking key switch (from the “RESET” position to the “SET” position)
(the LED for the blanked beam flickers in green).
4. Remove the key from the key switch.

If using the manual blanking function, set SW1 and SW2 to the numbers of light beams to be blanked.

Example: To make it impossible to blank four light beams or more (up to three light beams to be blanked), set SW1 and SW2 as follows:

SW2
0

SW1
3



Automatic Operation

♦ Initialization

SW1,2..... Set to number of light beams to be blanked.
SW3..... ON
SW4..... AUTO
Terminals BY1,2..... Jumpered.
Terminals BM1,2..... Jumpered.

♦ Operating Sequence

1. Turn on power supply.
2. Turn the blanking key switch (from the "RESET" position to the "SET" position) (the LED (receiver indicator (red)) for the light beam intercepted by an article is then blanked and flickers green.

* As the interlock function is enacted, the machine is stopped when the light beam intercept is removed.

When using the Blanking Synchro Function

♦ Initialization

SW1,2..... Set to (number of light beams - 1) for the transmitter and receiver used.

SW3..... OFF

SW4..... AUTO or MANU

Terminals BM1,2..... Jumpered.

♦ Operating Sequence

Connect 2 rotary limit switches (*user supplied*) in series between terminals BY1 and BY2 (the light beam set to be blanked is blanked only when the limit switch is turned on). In case of manual operation follow steps proceeding. In case of automatic operation follow steps proceeding.

In the case of using the Blanking Auto Memory Function

♦ Initialization

SW1,2..... Set to (number of light beams -1) for the transmitter and receiver

SW3..... OFF

SW4..... AUTO

Terminals BY 1,2..... Jumpered

Operating Procedure

Follow the steps for automatic operation and connect 2 rotary limit switches (*user supplied*) between terminals BM1 and BM2. By doing so, the light beams intercepted are memorized and blanked each time the limit switches are turned on.

CAUTION

After completing blank setting, do not fail to confirm before setting to operation that every light beam is as set. No detection function is provided for the light beams blanked.

CAUTION

Whenever the use of limit switch is necessary be sure to use 2 rotary limit switches in series so as to assure fail-safe operation. If one switch fails, the second switch will function until the failed switch is replaced.

Setting Method

◆ Manual Blanking (SW4.....MANU)

Place the switch corresponding to the light beam, required to be blanked, in the "ON" position, then turn the key switch from the "RESET" position to the "SET" position, the light beam will be blanked (the LED flashes green).

◆ Auto Blanking (SW4.....AUTO)

Turn the key switch from the "RESET" position to the "SET" position and the light beam intercepted will get into the blanked state (the LED flashes green).

Interlock Function

- ◆ Memory Set (Terminals BM1, BM2)

When the circuit between terminals BM1 and BM2 is open, no data is set in the memory, so bypass action cannot be done.

With the key switch placed in the "SET" position, memory set can be remotely controlled by an external contact signal from BM1, BM2.

- ◆ Blanking Output (Terminals BY1, BY2)

When the circuit between terminals BY1 and BY2 is open, the bypass signal is not sent.

The bypass action can be controlled by an external contact signal from BY1, BY2.

- ◆ Stop at the time of passing the light beam kept in the blanked state.

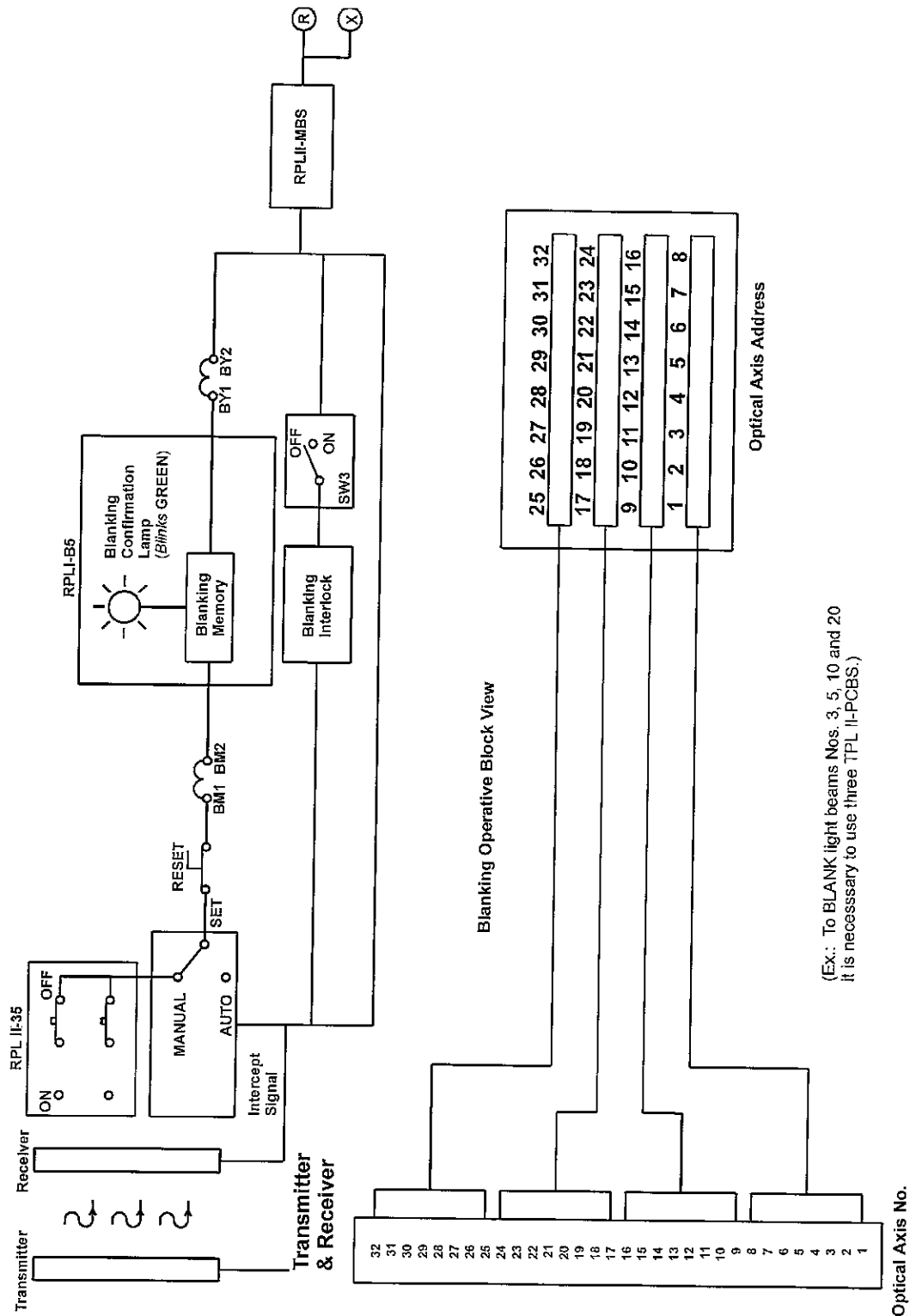
When the light beam being blanked (the LED flashes green) is allowed to pass while the blanking action is in effect, all light beams are interrupted and the output relay is turned off.

- ◆ Setting the limit number of light beams to be brought into the blanked state (SW1, SW2).

The upper limit of the number of light beams required to be brought into the blanked state is set by SW1 and SW2. (Ex.: When SW2 is set to 0 and SW1 to 3, a total of three light beams can be brought into the blanked state.)

NOTE

At the time of shipping, set to (number of light beams - 1) so that all light beams cannot be brought into the blanked state. (Ex.: Set to $16-1 = 15$ when the number of light beams for the transmitter and receiver is 16.)

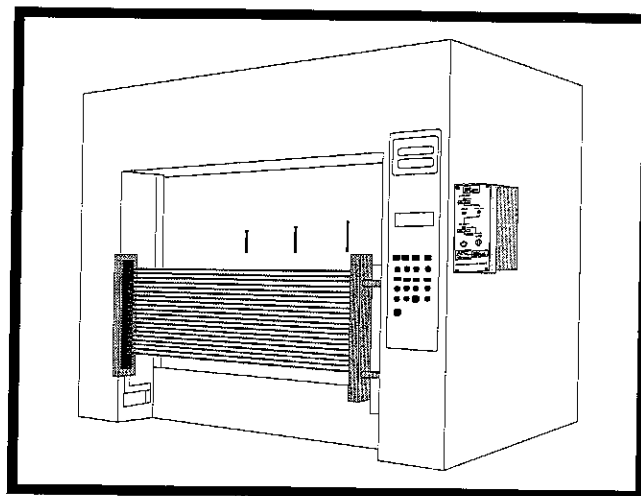
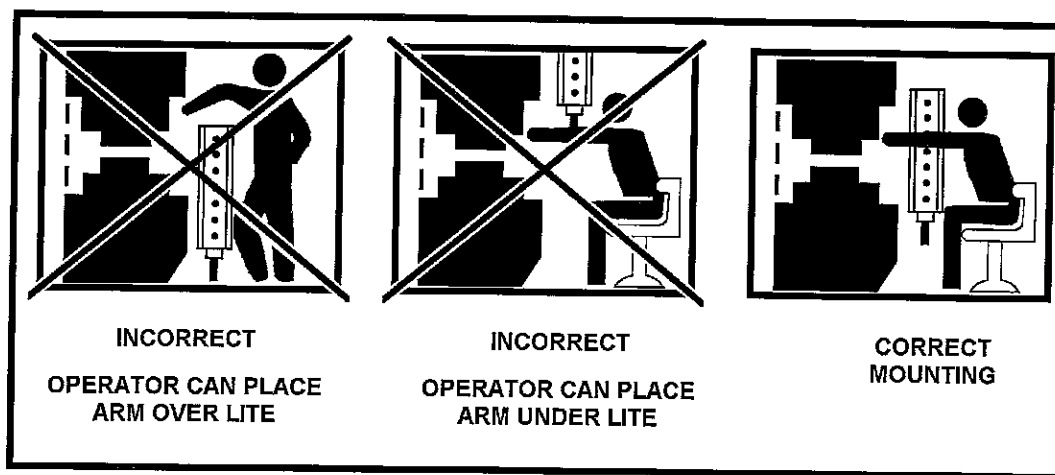


Setting Method and Interlock Functions

INSTALLATION

Installation of Helm light curtain is a straight forward procedure, however, this should be carefully handled since it is a safety device that protects machine working personnel. Read carefully the following instructions in the sections listed below before proceeding so as to insure proper installation.

- ♦ Obtaining the Safety Distance
- ♦ Locating and Mounting the Brackets
- ♦ Mounting the Control Box
- ♦ Universal Mounting Brackets
- ♦ Using Mirrors with Light Curtains
- ♦ Use of Horizontal Lights



Typical Installation

♦ Obtaining Safety Distance

It is important that the safety distance be properly calculated. If the light curtain is installed too close to the point of operation, the light curtain may not be able to stop the press before an intrusion, such as an operator's hand, reaching the danger area, therefore the machine guarding function is thus lost. If any doubt exists as to the calculation of the safety distance, contact Helm Instrument. We will provide you with the information you need to calculate the safety distance properly.

The A.N.S.I. Safety Distance Formulas

The A.N.S.I. safety distance formula is more precise than O.S.H.A. Therefore we recommend that the A.N.S.I. formula be used for calculating the safe distance. The formula is as follows:

$$Ds = Kx (s + Tc + T1 + Tbm) + Dpf$$

Ds is safety distance we will find using the formula.

K is the O.S.H.A. recommended hand speed constant, which is 63 inches per/second, which indicates how far you could theoretically move your hand and arm in one second.

Ts is the stopping time of the press (or other machines) in seconds measured at approximately 90 deg of crank shaft rotation.

Tc is the response time of the press control or other machine control. This is the time it takes for the press control to actually stop the machine after the stop signal has been initiated.

T1 is the response time of the light curtain. Helm response time is 20 milliseconds.

Tbm is the additional time of the press allowed by the brake monitor. The brake monitor stops the press when the stop time set is exceeded. The brake gradually wears until the limit is reached, you allow for brake wear.

$$Tbm = \text{Brake monitoring setting} - (Tc + Ts)$$

Now the gradual increase in stopping time as the brake wear is accounted for right up to the limit. If brake wear was not accounted for, the safety distance would be right at the time of measuring stop time, but as the brake gradually wore safety distance would be too short for proper protection. The general stopping time is 120% (Tc + Ts) when brake is new and a 110% when brake is older.

Dpf is the depth penetration factor. This is a measure of how far an object, such as an operator's hand can move through the light curtain before the light reacts.

O.S.H.A. safety distance as specified in regulation 1910.217 is calculated with formula when press stopping time = 0.150 secs.

$$Ds = 63 \text{ inches/seconds} \times Ts$$

$$Ts = \text{Minimum safety distance inches} \\ 63 \text{ inches/second} \times \text{hand speed constant}$$

Ts = stopping time of the press measured at approximately 90° positions of crank shaft rotation in seconds, plus 15 milliseconds for light curtain response.

$$Ts = 0.15 + .015 = 0.165 \text{ inches}$$

$$Ds = 63 \times 0.165 = 10.395 \text{ inches}$$

♦ Locating and Mounting Brackets

The mounting brackets should be placed on a flat surface of the machine so as to assure that the projector and receiver units are parallel to each other, at the same height, and perpendicular to the floor.

LOCATE THE POSITION FOR THE BRACKET MOUNTING BLOCK SO THAT WHEN THE TRANSMITTER OR RECEIVER IS MOUNTED ON THE BRACKET THE LINE SIGNIFYING THE LOWEST LEVEL OF PROTECTION ON THE UNIT IS AT THE SAME HEIGHT AS THE TOP OF THE BOLSTER OF THE PRESS. IF ON OTHER EQUIPMENT, MAKE SURE THE LOWEST LEVEL LINE IS LEVEL WITH THE LOWEST POINT TO BE PROTECTED. USE A SPIRIT LEVEL TO ENSURE THAT THE MOUNTING BLOCK IS LEVEL HORIZONTALLY AND VERTICALLY.

Locate second mounting block position by carefully measuring the distance from the floor of the first block and using a spirit level to ensure that bracket is mounted at same height as the other and is on the same horizontal plane.

Mount brackets into mounting blocks and tighten so that bracket is firm but can still be adjusted. Mount projector and receiver on brackets. Proceed with mounting of control box, wiring of unit before aligning unit.

♦ Mounting the Control Box

Choose a place where there is the least possible amount of vibration and oil. The control box should be easily accessible to the operator and the LEDS should also be visible. Make sure that the door can open readily for maintenance and inspection. Also be sure that the location does not hamper the running of the wires from the projector and receiver and the press controls.

♦ Brackets

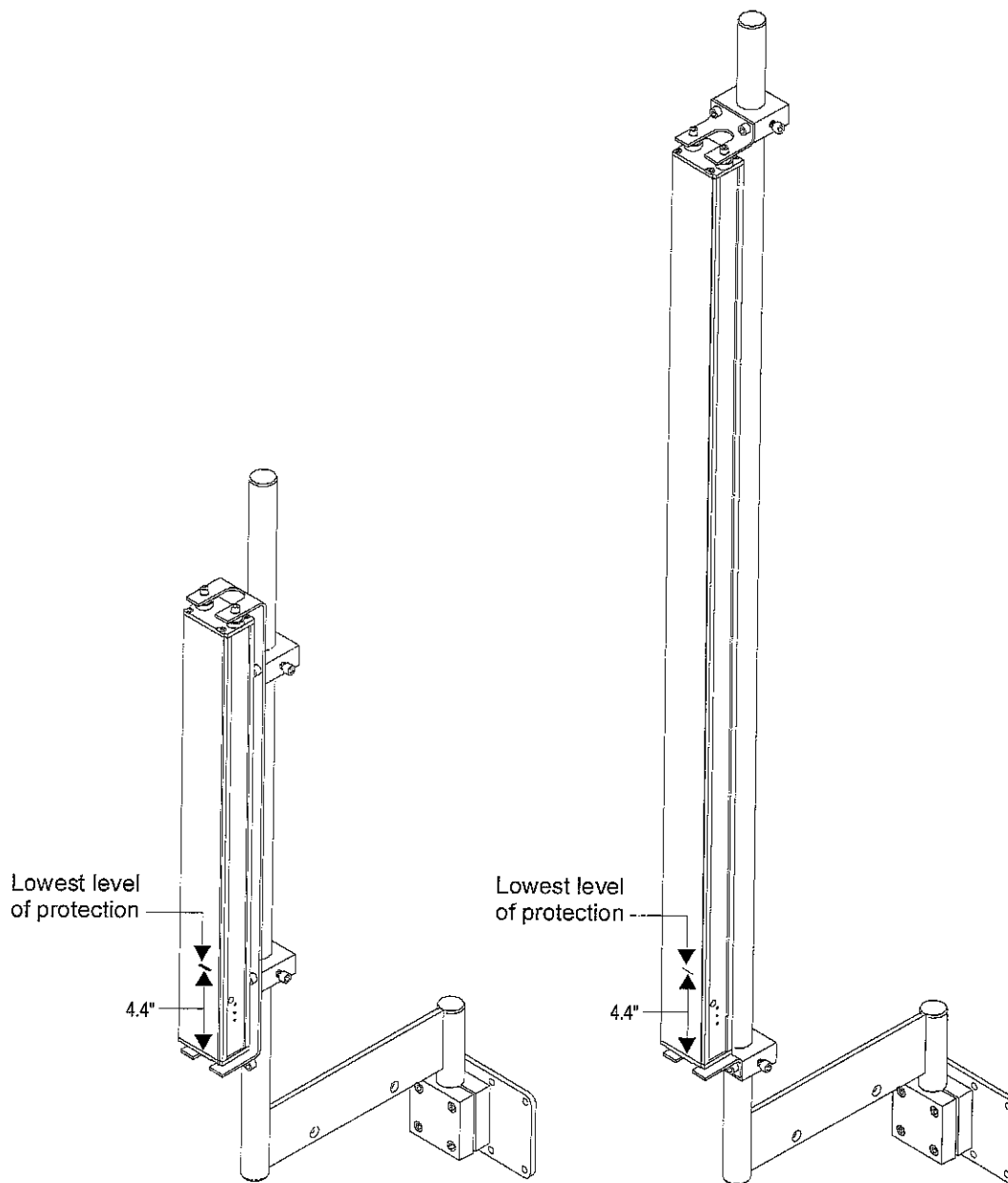
Helm manufactures universal mounting brackets for mounting of the light curtain and mirrors. These brackets are applicable 95% of the time. However, if it is necessary for you to fabricate your own brackets, please note the following requirements:

1. Light curtain should be mounted so that it is impossible for anyone to reach over, under or around the light curtain into the hazardous area.
2. Be sure your safety distance is correct and complies with the O.S.H.A. and A.N.S.I. regulation mentioned in the back of this manual.
3. Be sure the operator cannot position himself between the light curtain and the machine. If this is possible, mount a light horizontal at about knee level.
4. The light curtain must be mounted out of the way of forklifts and other material handling equipment.

CAUTION

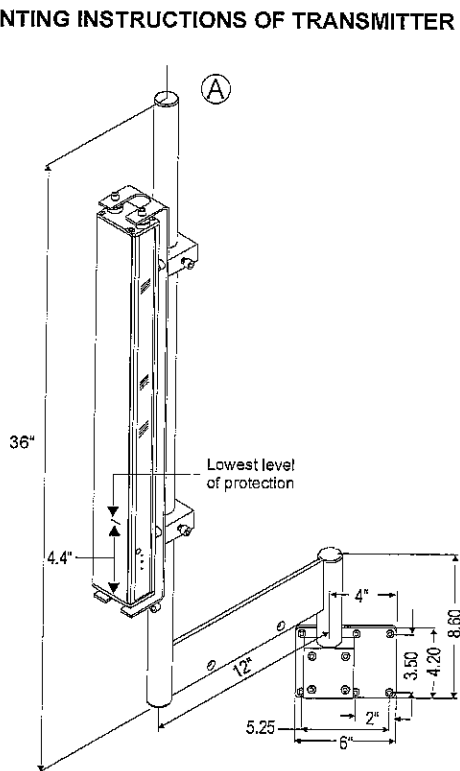
Be sure that the safety distance from the light curtain beam to the pinch point is calculated using O.S.H.A. and A.N.S.I. formulas provided in Appendix.

The universal mounting brackets can mount any of our light curtains. The brackets must be strapped at the top after a certain height. The unstrapped brackets are Type "A" and the strapped brackets are Type "B". A chart below shows units used on Type "A" and on Type "B" brackets.

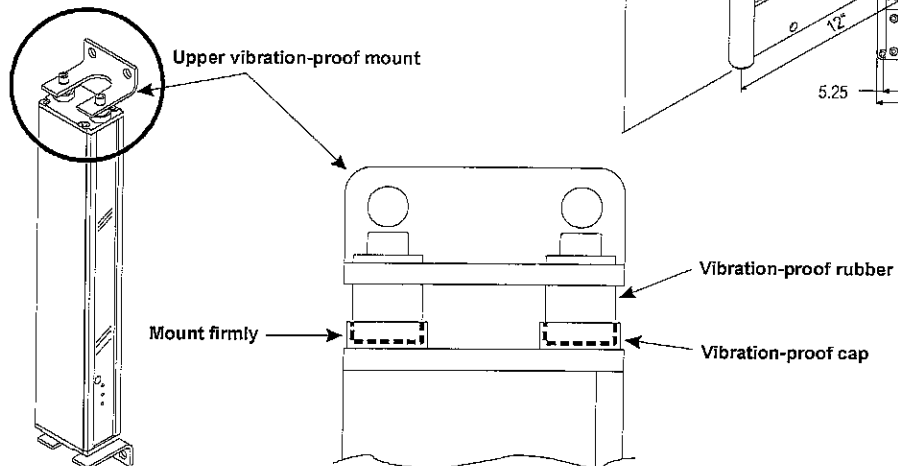
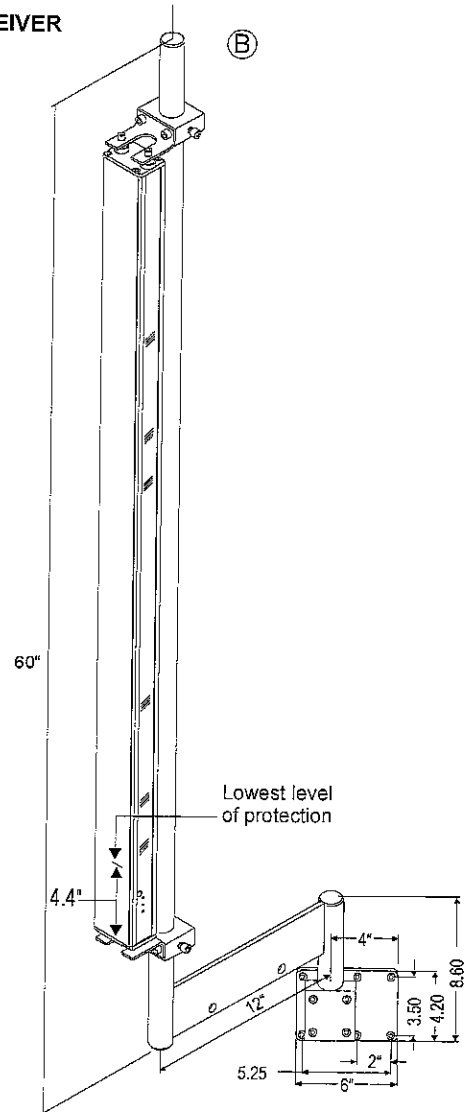


Mounting Brackets

MOUNTING INSTRUCTIONS OF TRANSMITTER AND RECEIVER



1. Note the following points before mounting lights
 - a.) Safety distance
 - b.) Lowest level of light beam
 - c.) Mounting hardware and type of fitting
2. Attach the mounting panel to the press.
3. Attach the fittings to the mounting panel.
4. Put the vibration-proof legs on the top and bottom of the projector and receiver as illustrated.



♦ Using Mirrors with Light Curtains

Helm light curtains, when used alone, can protect only one side of a press or machine. However, sometimes it is necessary to protect more than one side. If it is necessary to use the light curtain to protect more than one side this can be done by the use of mirrors.

If two sides are to be protected, then one mirror can be installed.

If three sides are to be protected, then two mirrors must be installed.

If four sides are to be protected, then three mirrors must be installed.

CAUTION

All operators and supervisors must be made aware of what function the light curtain protects and what function it does not protect. If the light curtain is wired to a metal stamping press it will not send a stop signal to the scrap chopper, feed or conveyors.

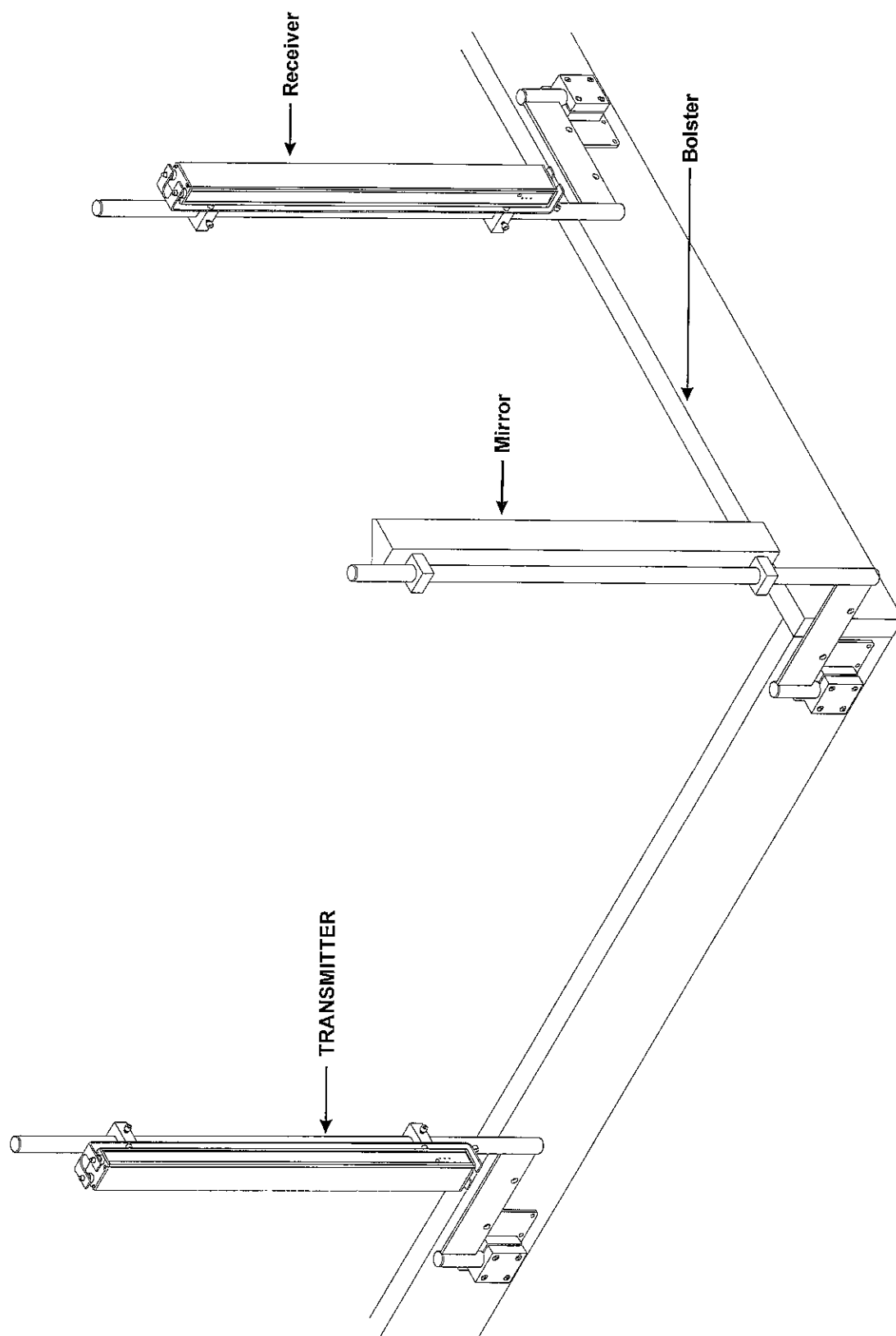
Mirrors must be installed on the same plain as the light curtain since they reflect the beam in any angle from the transmitter to the receiver.

Using mirrors affects the scanning distance the transmitter can be from the receiver. For each mirror used, deduct 10% of the scanning distance. Helm HRPLII light curtain can scan a distance of 42 feet when used alone. If mirrors are added, deduct 10% per mirror, e.g.

For one mirror = $42 \times 10/100 = 4.2$ new scanning distance =
 $42 - 4.2 = 37.8'$

For two mirrors = $42 \times 20/100 = 8.4$ new scanning distance =
 $42 - 8.4 = 33.6'$

For three mirrors = $42 \times 30/100 = 12.6$ new scanning distance =
 $42 - 12.6 = 29.4'$



Mounting Arrangement

♦ Use of Horizontal Lights

After calculating safety distance using ANSI or OSHA formulas, if the distance from the pinch point to the light curtain is sufficiently large so as to permit the operator to get between the machine and the light curtain, then a horizontal mounted light must be added to provide full protection (see below).



WIRING THE UNIT

The Helm light curtain must be wired into the machinery so that any stop initiated by the light curtain will stop the machine immediately.

The transmitter and receiver are wired in to the control box. Also wired into the control box will be 115AC, A1 & A2 for the emergency stop and U1 & U2 for upstroke muting if used. If special blanking is done, BM1 or BM2 or BY1 or BY2, whichever is used will also be wired into the control box. All wiring should be done through sealtight conduit.

CAUTION

Be sure that all power to the machinery including machine controls and motor is off, before making wiring connections, especially when connecting 115AC and emergency stop connections.

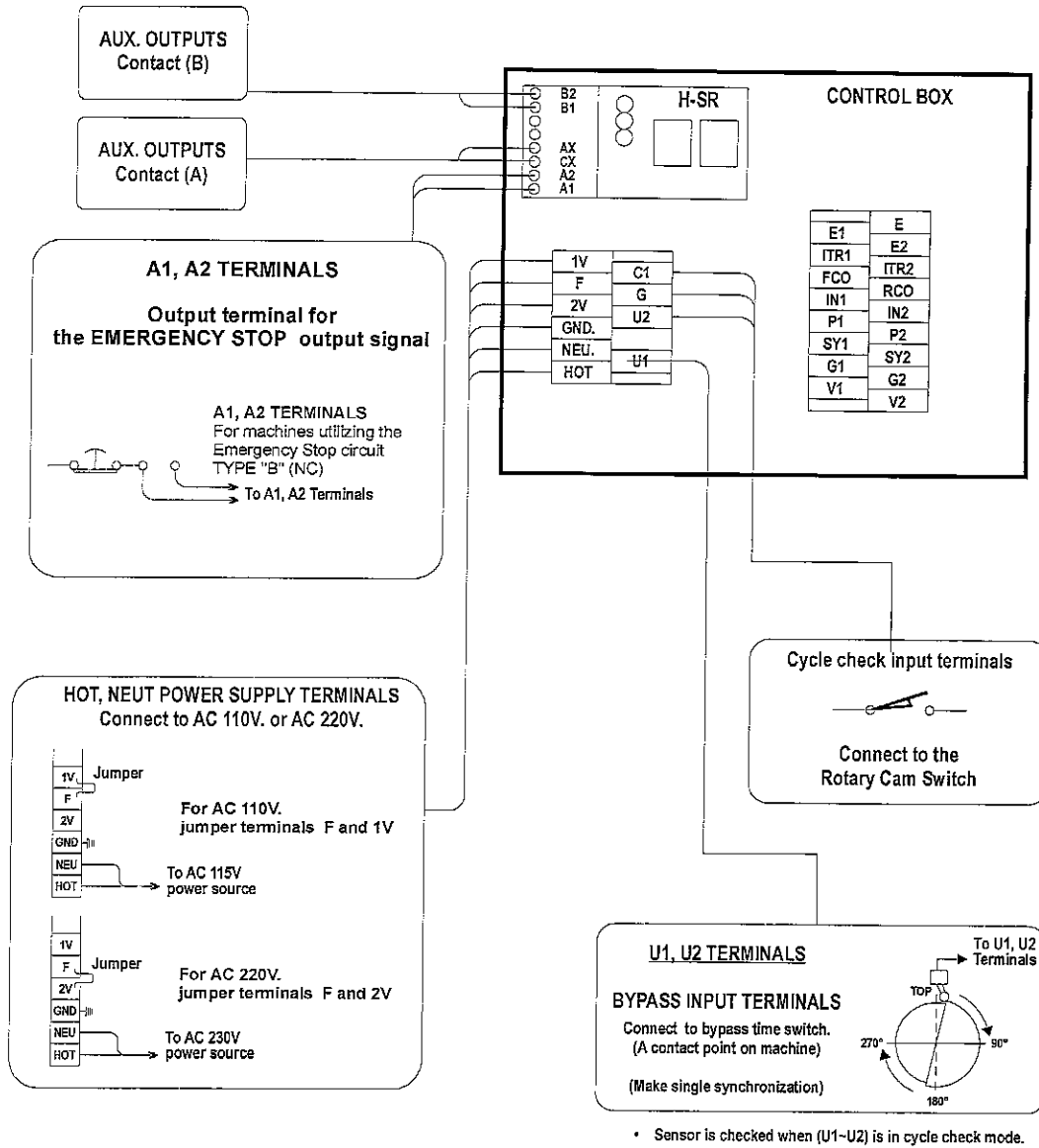
PLEASE FOLLOW THESE INSTRUCTIONS CAREFULLY TO ENSURE THE PROPER FUNCTIONING OF THE LIGHTS AFTER WIRING IS COMPLETED.

CAUTION

A brake monitor must be used in conjunction with the light curtain during hand-in-die feeding operation according to O.S.H.A. 1910.217.

Non-Blanking Unit

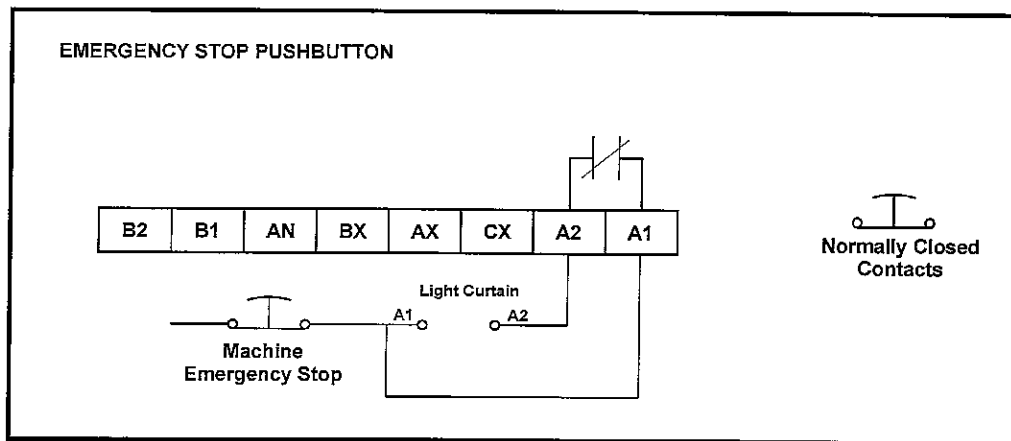
Connect the control box to press or other machine as illustrated below.



♦ Wiring of the Emergency Stop Circuit

If the machine emergency stop circuit is normally closed (Type “B” with normally closed contacts), run the output cable from the terminals labeled A1 and A2 of the control box to the emergency stop circuit and wire in series (see below).


If the machine emergency stop circuit is normally open (Type “A” with normally open contacts), run the output cable from the terminals labeled B1 and B2 of the control box to the emergency stop circuit and wire in parallel (see below).



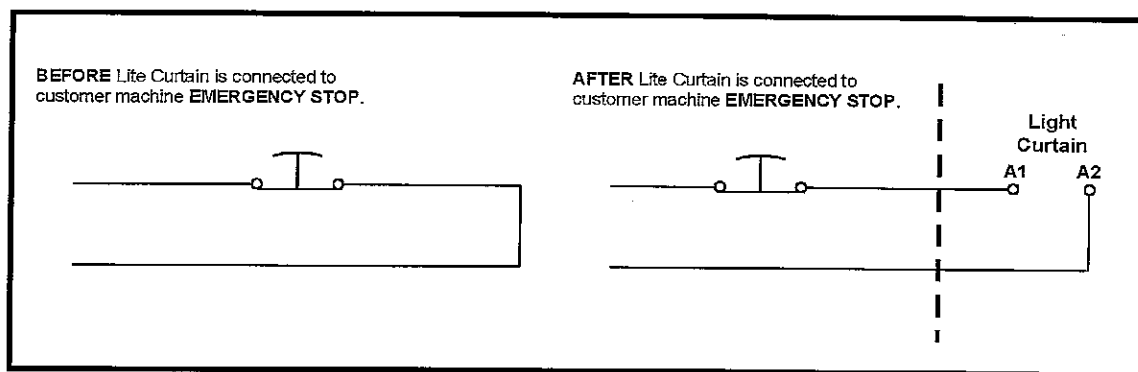
Wiring of Output Contacts Type “B”

Connections of output contacts

♦ Description of Contacts

Emergency Stop Push-Button on  normally closed contacts.

♦ Connections to Press



Output Contact Connection to Emergency Stop Circuit

CAUTION

Helm light curtain must be wired into the circuit of the press that will stop the press immediately after a stop signal is initiated by the light curtain. Helm light curtain cannot be used on full revolution clutched machinery under any circumstances. Since it is impossible to stop these machines at any point of their stroke or cycle.

CAUTION

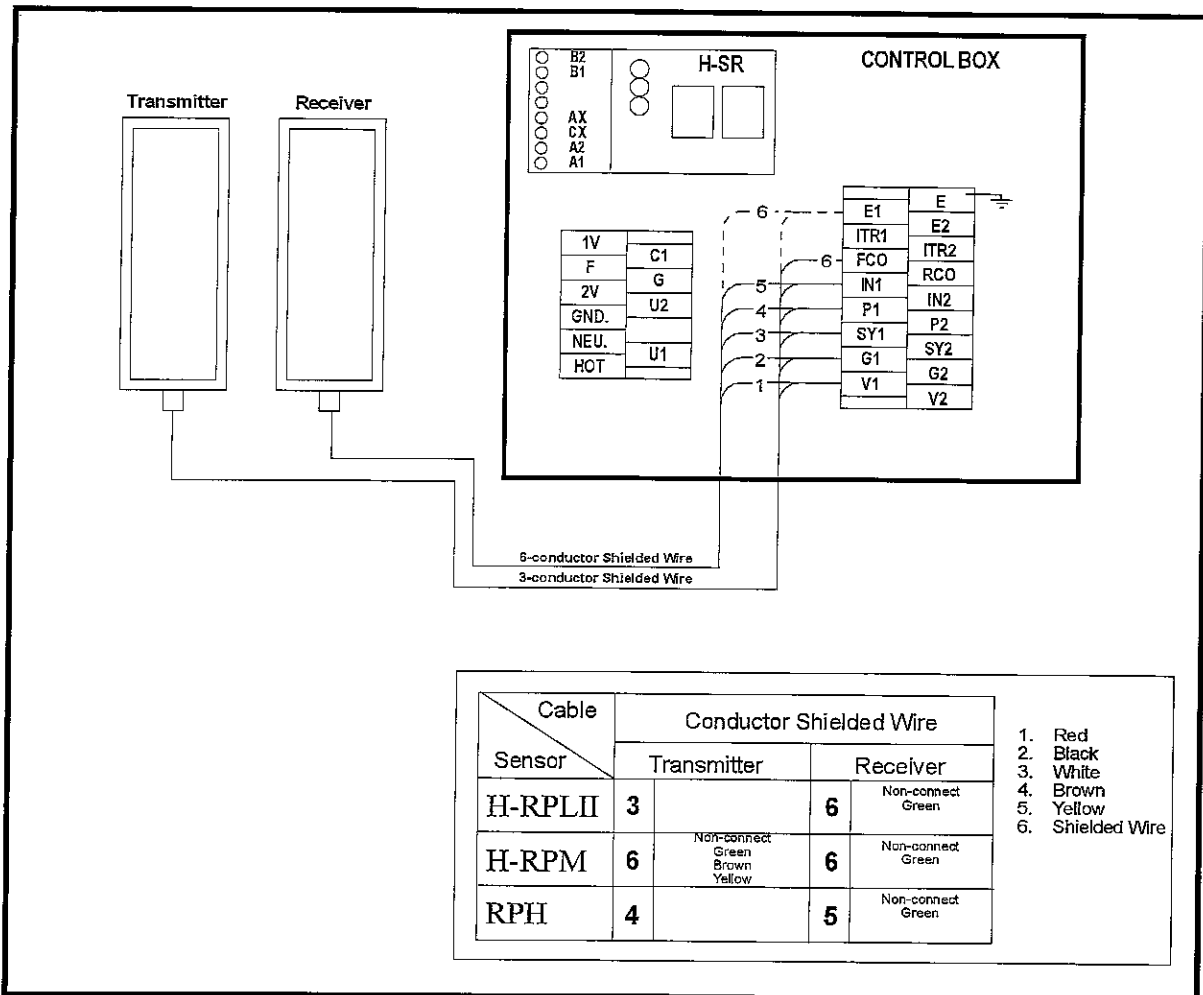
Be sure that all power to machinery is off before making any light curtain connections. Make sure power is off at the point you are making your 115AC power connections and your emergency stop connections. This also includes machine controls and motor.

All wiring should be done by qualified personnel only.

CAUTION

Be sure to use qualified personnel only for wiring light curtain. Follow the wiring diagrams precisely so that no errors can be made. Always double check completed wiring.

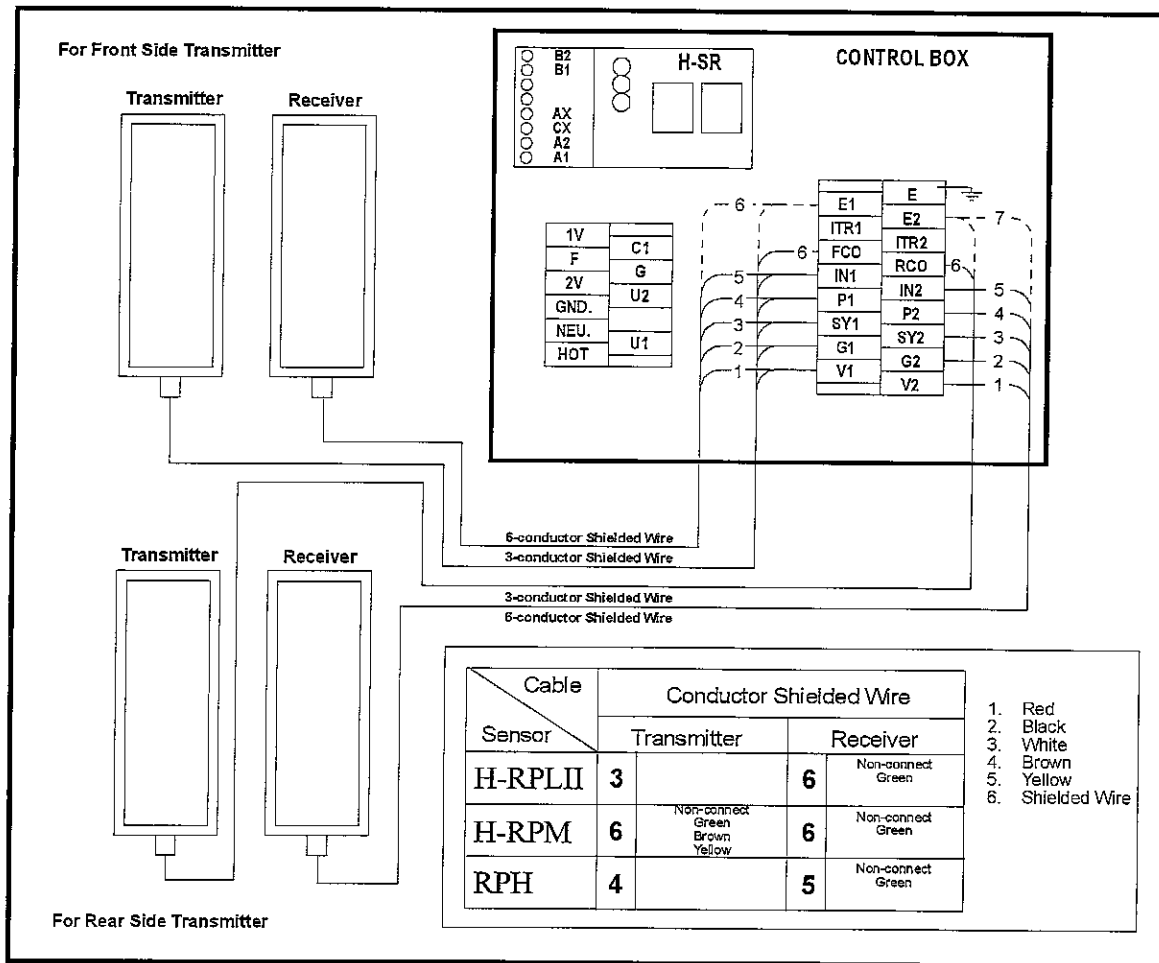
- ◆ Connections for transmitter/receiver and control box without interconnection box - single side



CAUTION

Be sure your number for Ts includes the response times of all devices that react to stop the press. If your measurement of stop time does not include response time of the machine control, light curtain, and any other devices that react to stop the machinery, the safety distance will be too short.

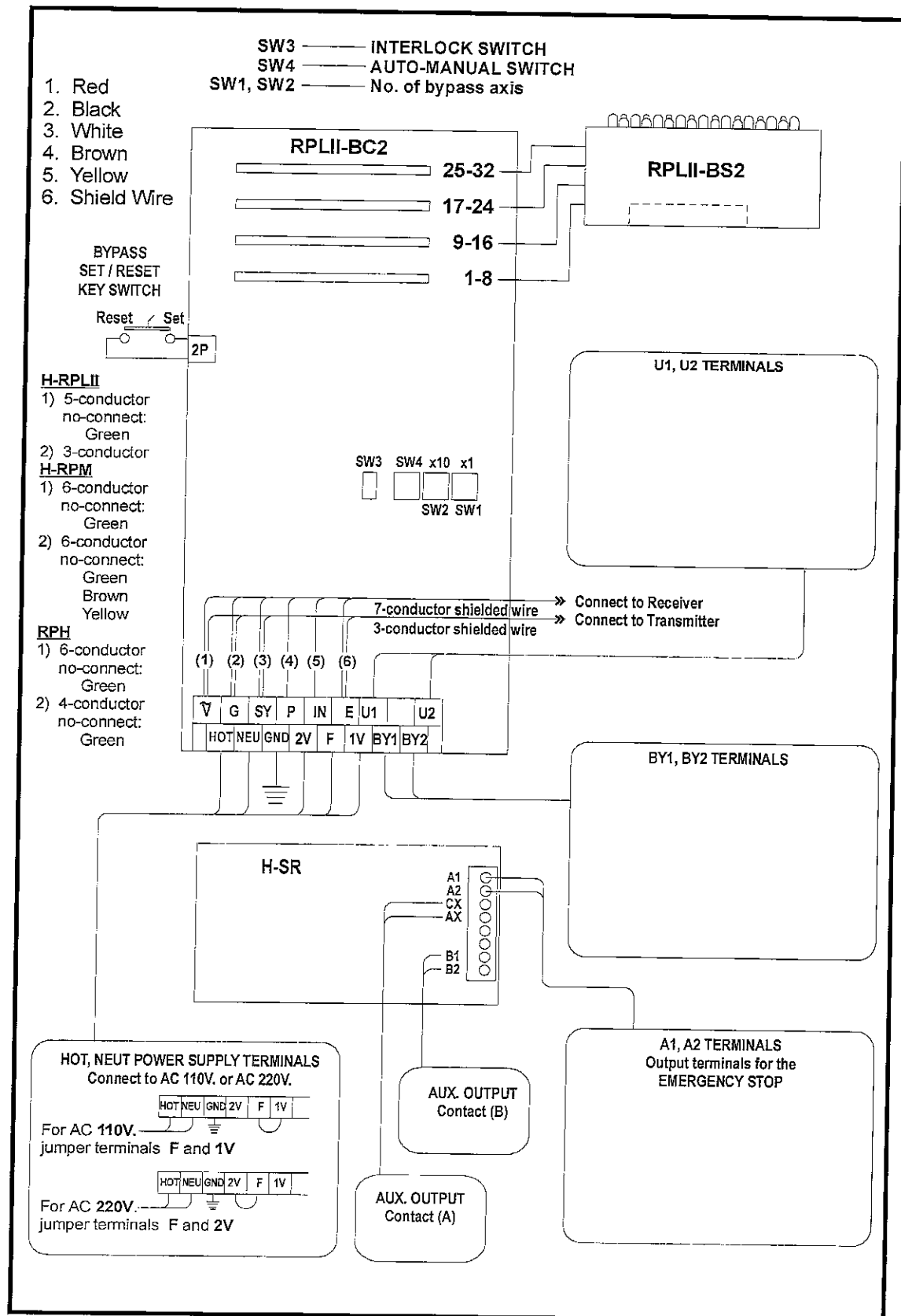
- ◆ **Conections for transmitter/receiver and control box without interconnection box - Both sides**



CAUTION

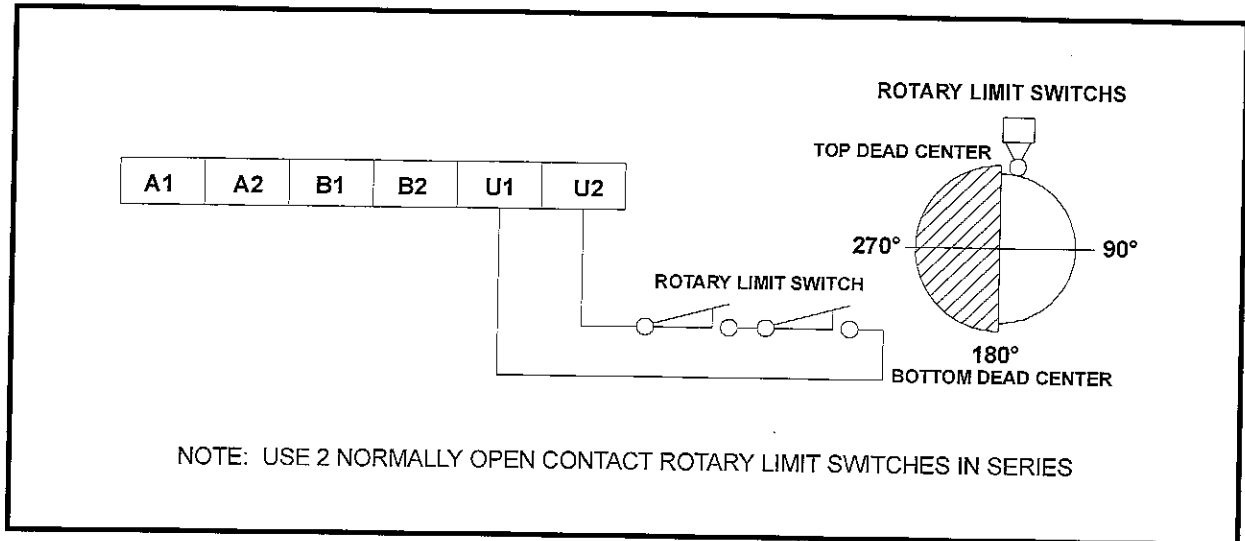
After installation and wiring is completed be sure that no one can get under, over or around the light curtain pinch point area.

♦ Wiring - Blanking Unit



♦ Upstroke Muting

When this feature is being utilized, the RAM will not stop by interrupting the light beams while the RAM is on the upstroke. To utilize this feature, connect the leads of two limit switches as follows: (see figure below).



Connections of leads to rotary limit switches to utilize upstroke mutting

NOTE: Use 2 normally open contact rotary limit switches in series.

♦ Alignment

To align the projector unit with receiver unit use a square to make sure the unit is perpendicular to the floor or press bed.

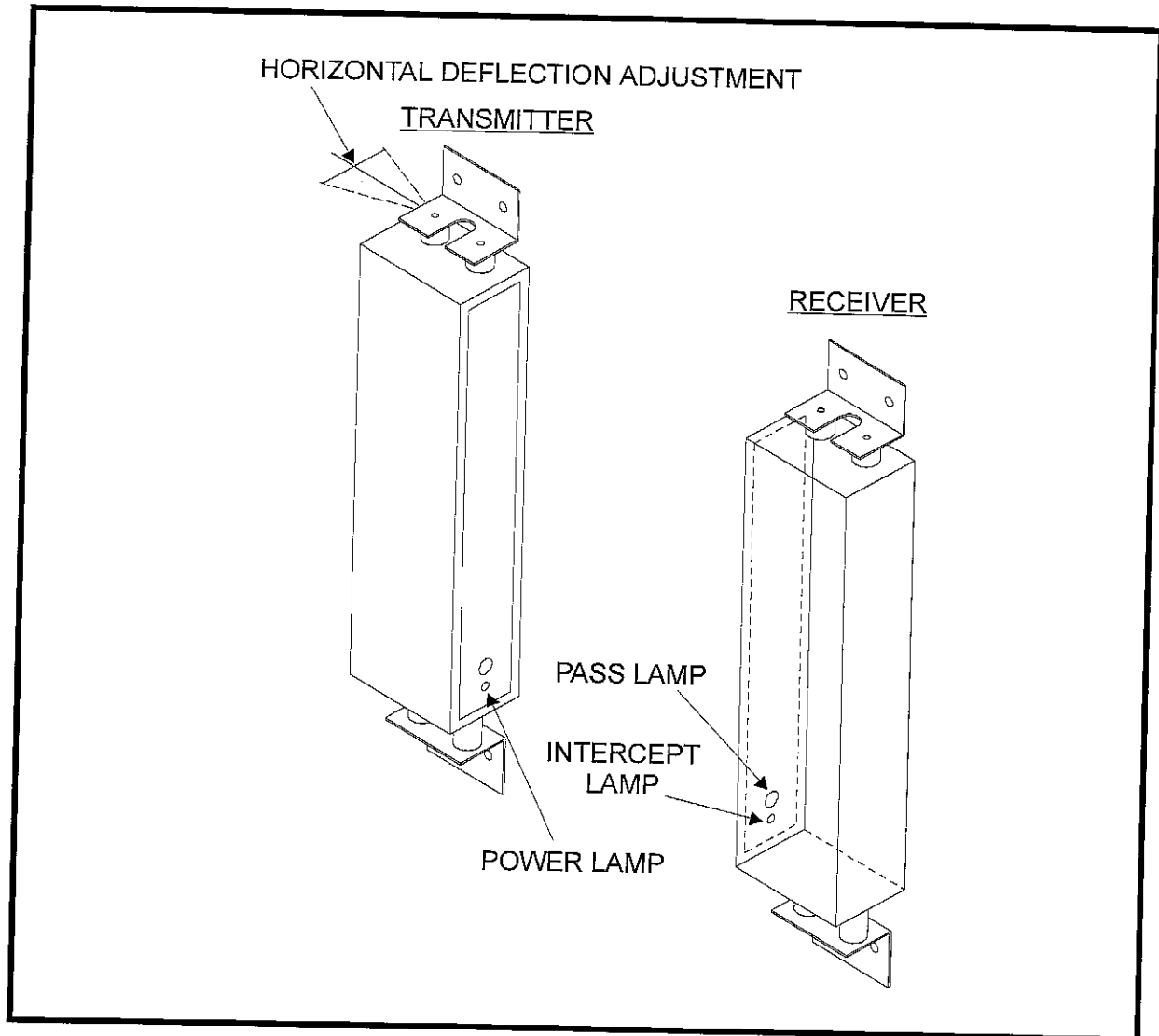
Use a level line to make sure the projector unit is at the same height as the receiver unit.

CAUTION

Whenever muting is required in safety operation, always use 2 rotary limit switches in series. In the event of one switch remaining closed, the second switch will perform the function. If one switch remains open, then the upstroke muting function will be disabled and the press will stop if the beam is interrupted in the upstroke.

- ♦ **Adjustment**

Horizon Adjustment



Optical Axis Adjustment

Turn the power switch to the "ON" position. The transmitter and receiver should be mounted loosely so they may be adjusted easily. Adjust the projector and receiver until the pass lamp goes on, the receiver lamp is lit and the intercept lamp goes off. The confirmation lamp on the front of the control box should be light green.

MAINTENANCE

Routing Maintenance

The routine maintenance and check are required for keeping this light curtain in good order. Follow the instructions in the table and check the device.

ITEM	HOW TO	HOW OFTEN
Cleaning and replacing of transmitter/receiver filter	<p>Clean the filter with a soft cotton cloth. (Do not use solvent thinner or similar agent since it is made of acrylic resin).</p> <p>Replace the filter by setting the surface which will not dim with breath (one side is anti-dim processed) to inner side.</p>	<p>Every 3-5 days</p> <p>Replace as necessary</p>
Screw	Check for securing	Once or twice a month
Replacing of relays	<p>Replace used relays with new ones and be sure to clamp them.</p> <p>(R) Relay LY-2 DC 12V (X) Relay LY-2 DC 12V</p> <p>Reference: General life of relay is approximately 2-3 million times activated.</p> <p>NOTE: The relays are vital components which affect the function of the light curtain. Be sure to replace it annually.</p>	Once a year

NOTE: In addition to the maintenance schedule shown above, a daily inspection of the system should be made.

CAUTION

Light curtain must be wired into your machine control circuit so that the stop signal from the light curtain will result in an immediate stop of the machine.

TROUBLESHOOTING

CONDITION	PROBABLE CAUSE	REMEDY
Transmitter power lamp or the receiver output lamp fails, and the control box confirmation lamp is lit red (interrupted condition).	Light beams from transmitter to the receiver are not aligned.	Check alignment.
	Lens surface of the projector and receiver is dirty.	Clean with a soft cloth.
	A transmitter element may be burnt out.	Replace with new element.
Receiver output lamp is lit green. Control box confirmation lamp is lit red. Interrupted condition.	Breakage or disconnection or receiver cord.	Replace cord.
	Defective electronic component on the RPL2BC2 printed circuit board.	Replace RPL2BC2 printed circuit board.
Transmitter power lamp and receivers output lamp are lit green. The control boxes confirmation lamp is not lit.	Fuse blown (1 amp).	Replace (1 amp.)
	No voltage at 14V terminal of power transformer.	Replace with new transformer.
	Defective electronic component on the printed circuit board.	Replace RPL2BC2 printed circuit board.
Confirmation lamp flickers red, (X) relay is holding.	Unable to reset after pushing the check button.	Turn power switch to off for 3 seconds, then turn back to ON.

* The start buttons are pushed, but the press does not cycle

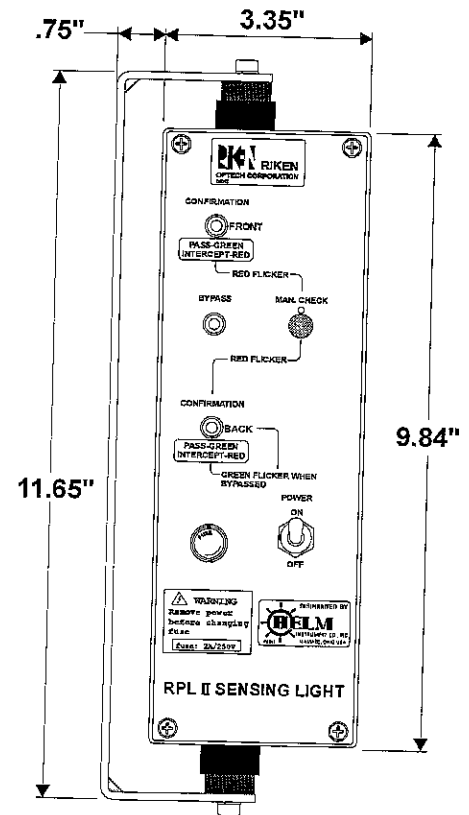
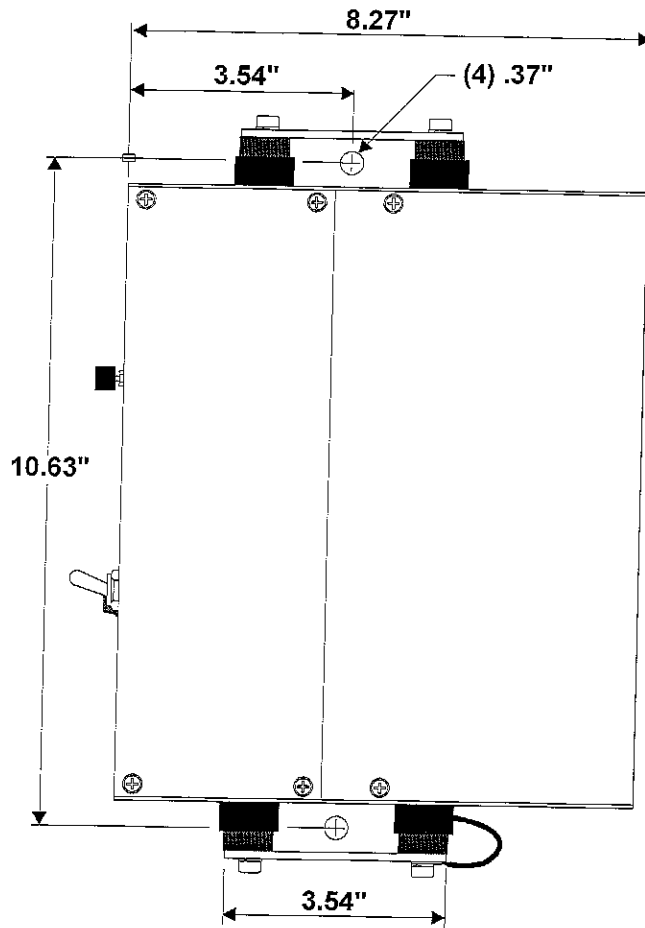
When check button is pressed confirmation lamp does not flicker red	(X) Relay is defective	Replace (X) relay
	Defective electronic component on the RPL2BC2 circuit board	Replace RPL2BC2 printed circuit board

* Check button does not function

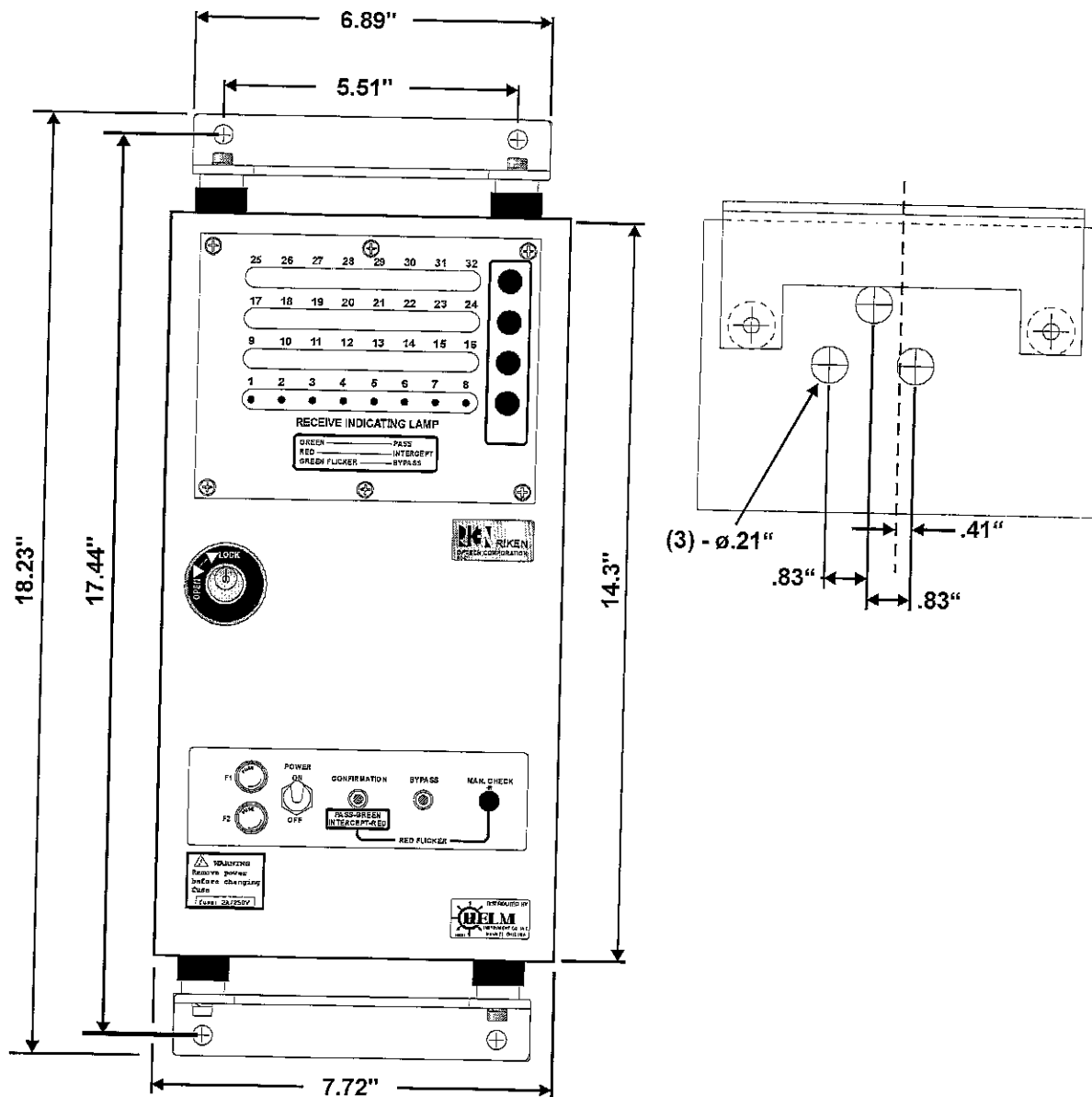
When the press does not start and the light curtain is functioning properly.	The output cord running between the control box and the press control emergency stop circuit.	Replace output cord
	Contact of (R) relay worn.	Replace (R) relay.

* Press does not start and the Light Curtain is normal

♦ **Standard Control Box Dimensions**

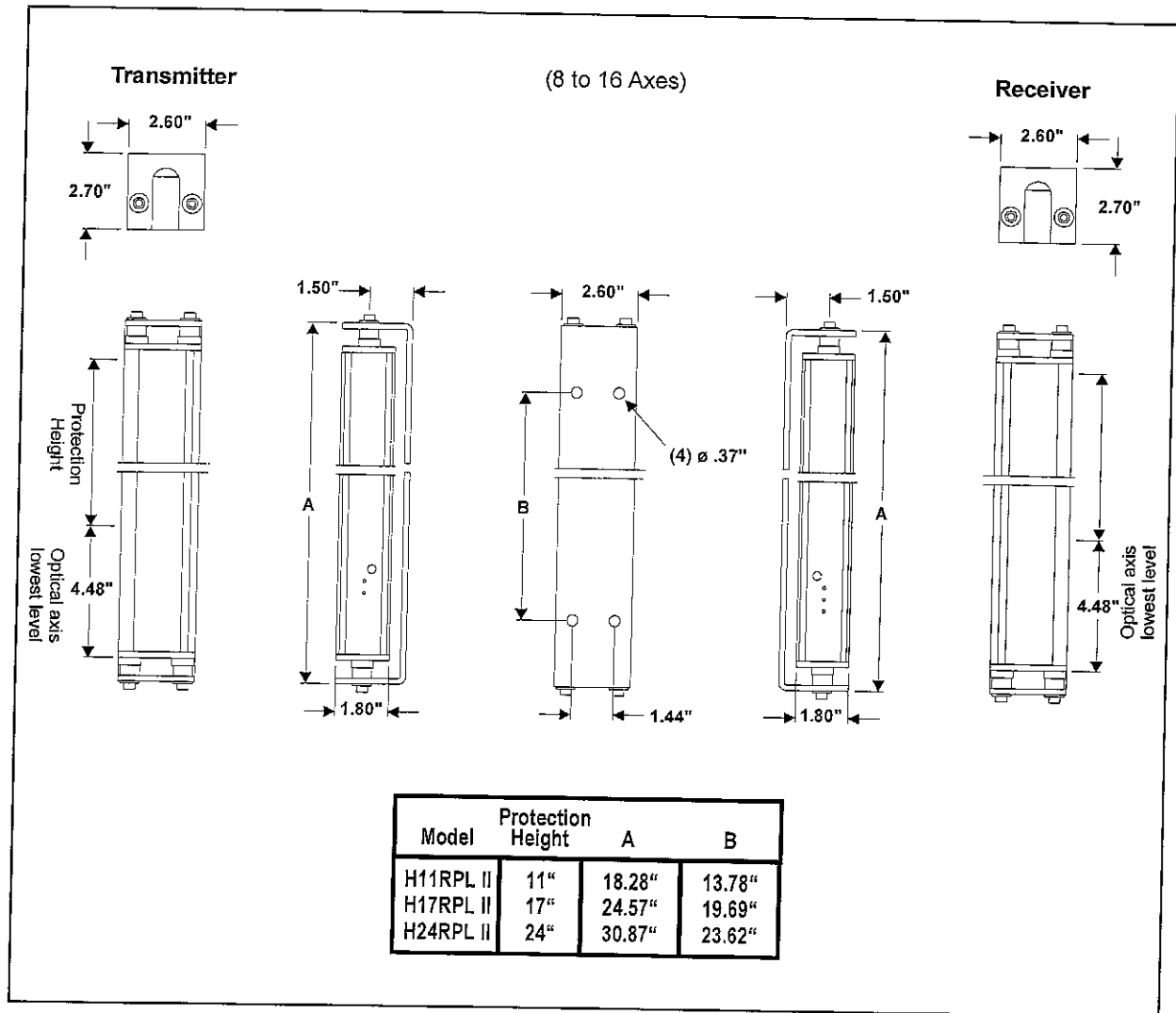


♦ Blanking Control Box Dimensions



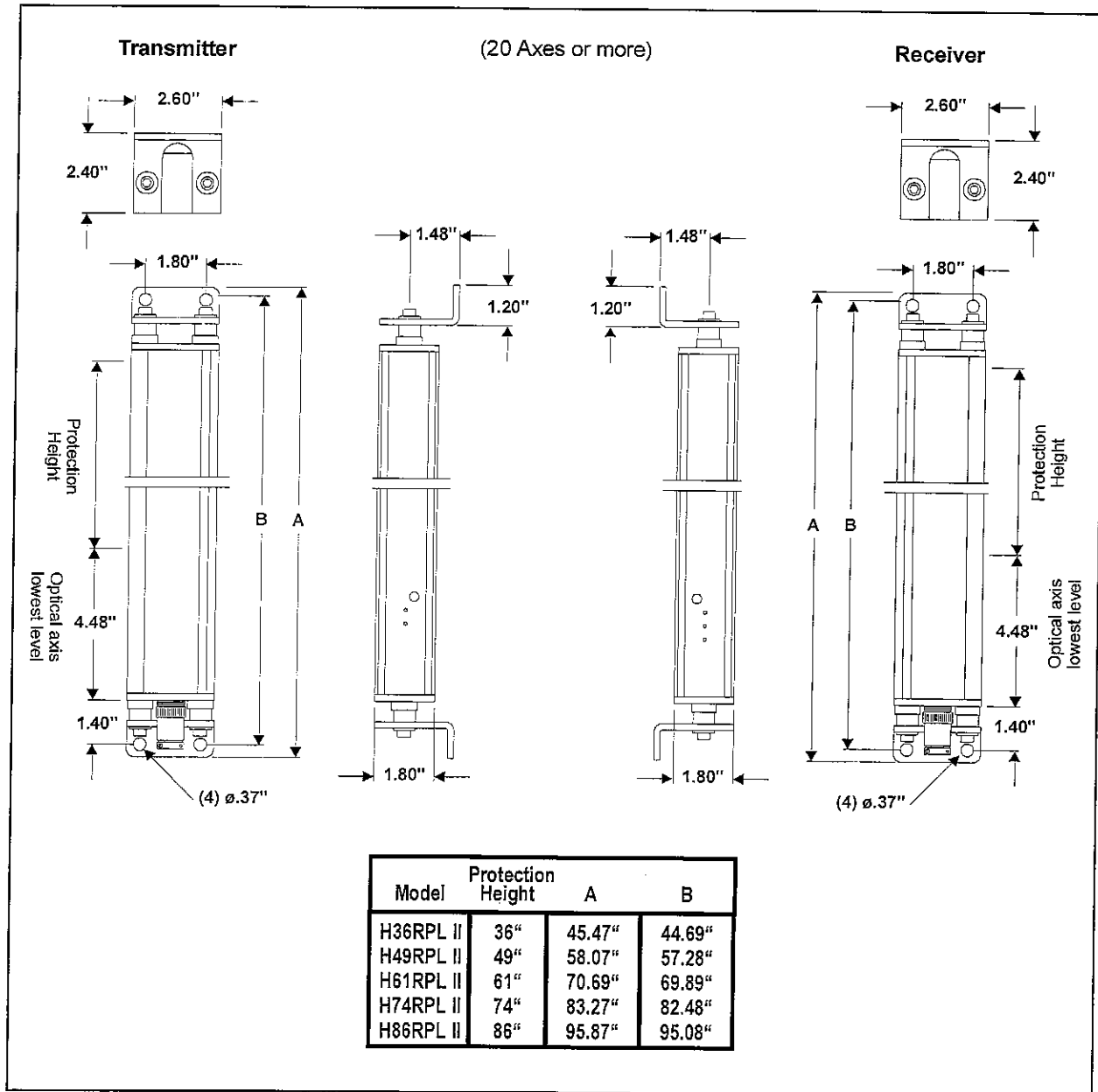
Blanking Control Box - Model RPLII-CBBP

◆ Transmitter and Receiver Dimensions for HRPLII



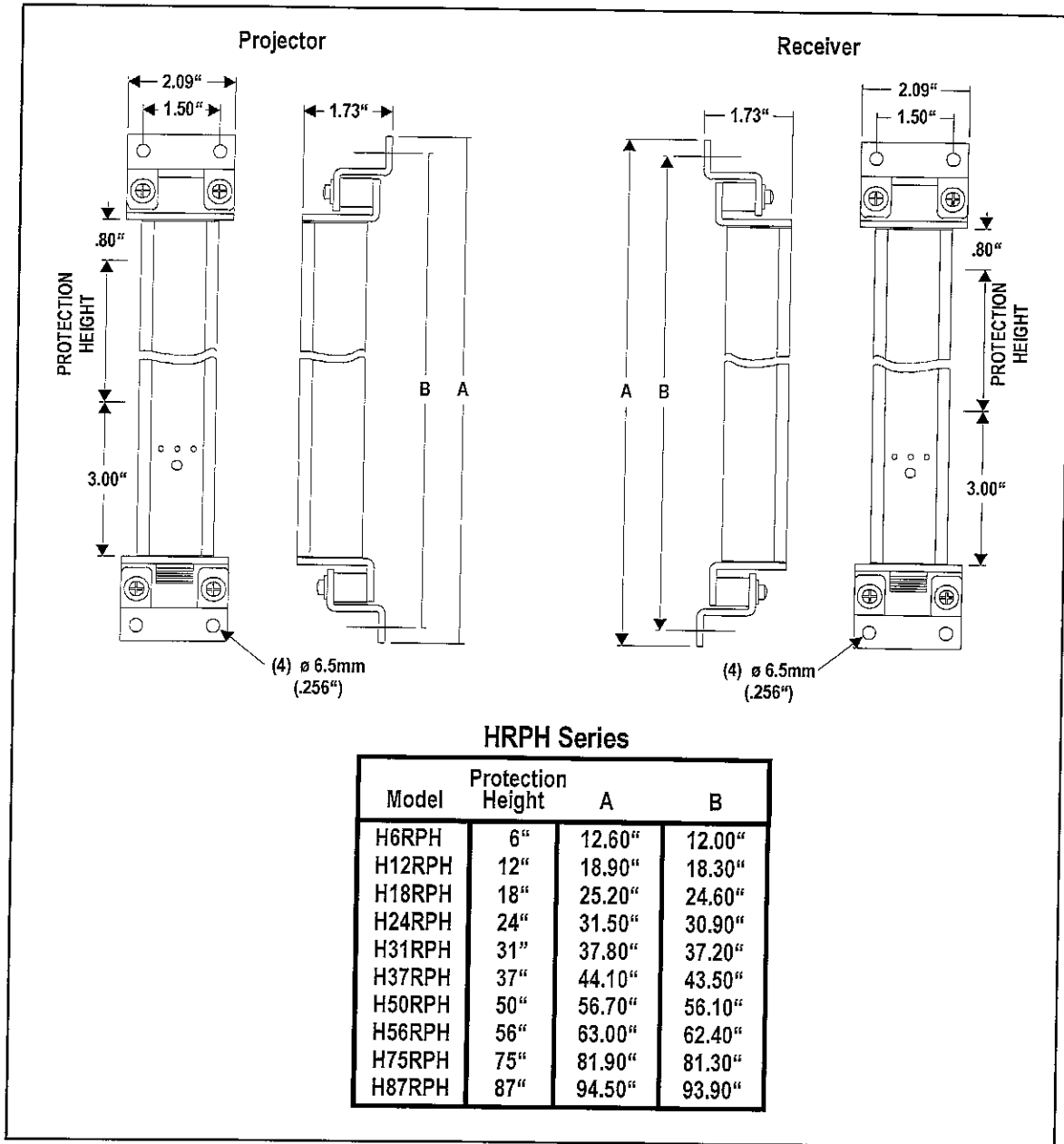
Transmitter Receiver dimensions (Sheet 1 of 2)

◆ Transmitter and Receiver Dimensions for HRPLII (continued)

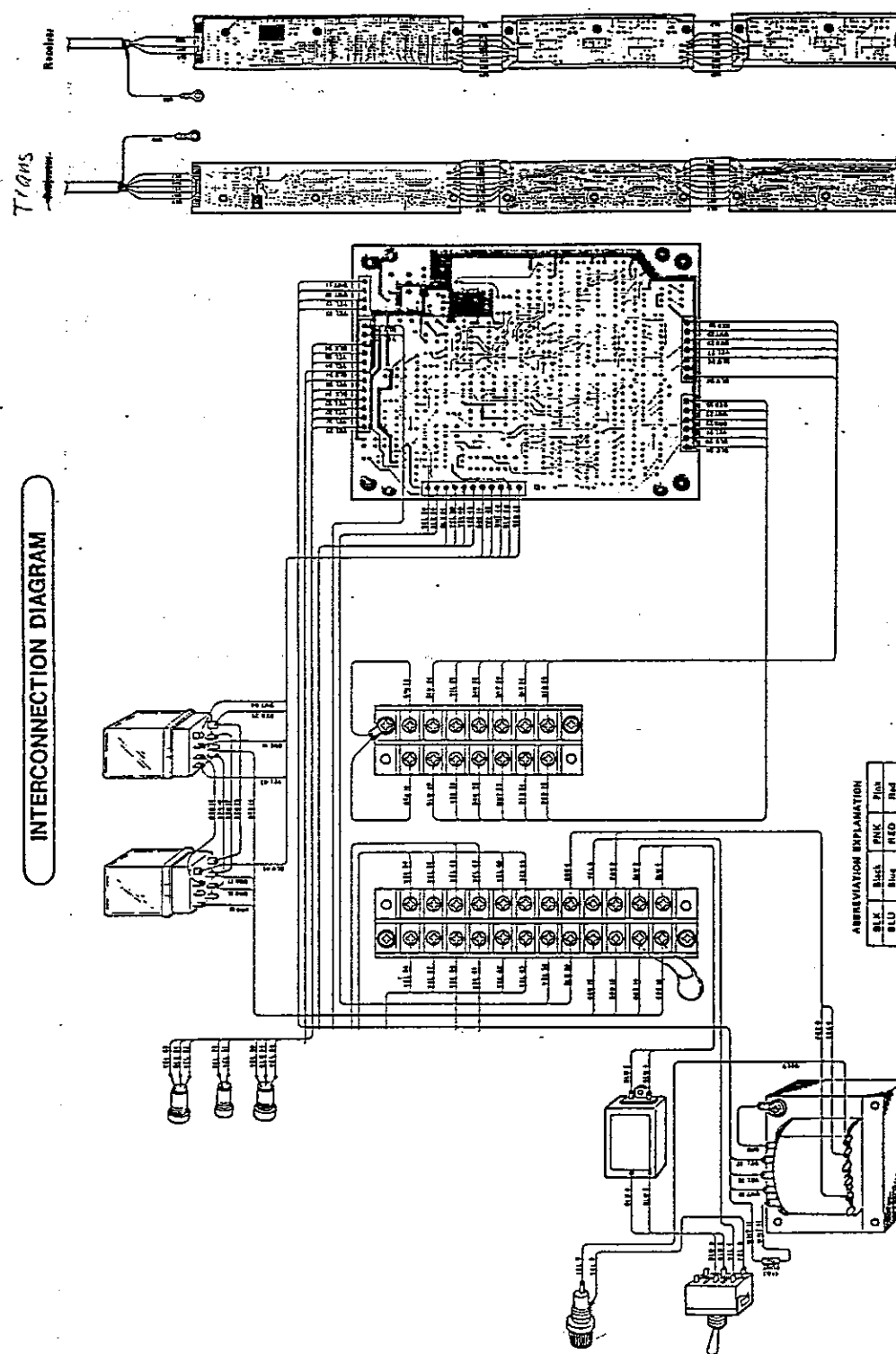


Transmitter Receiver dimensions (Sheet 2 of 2)

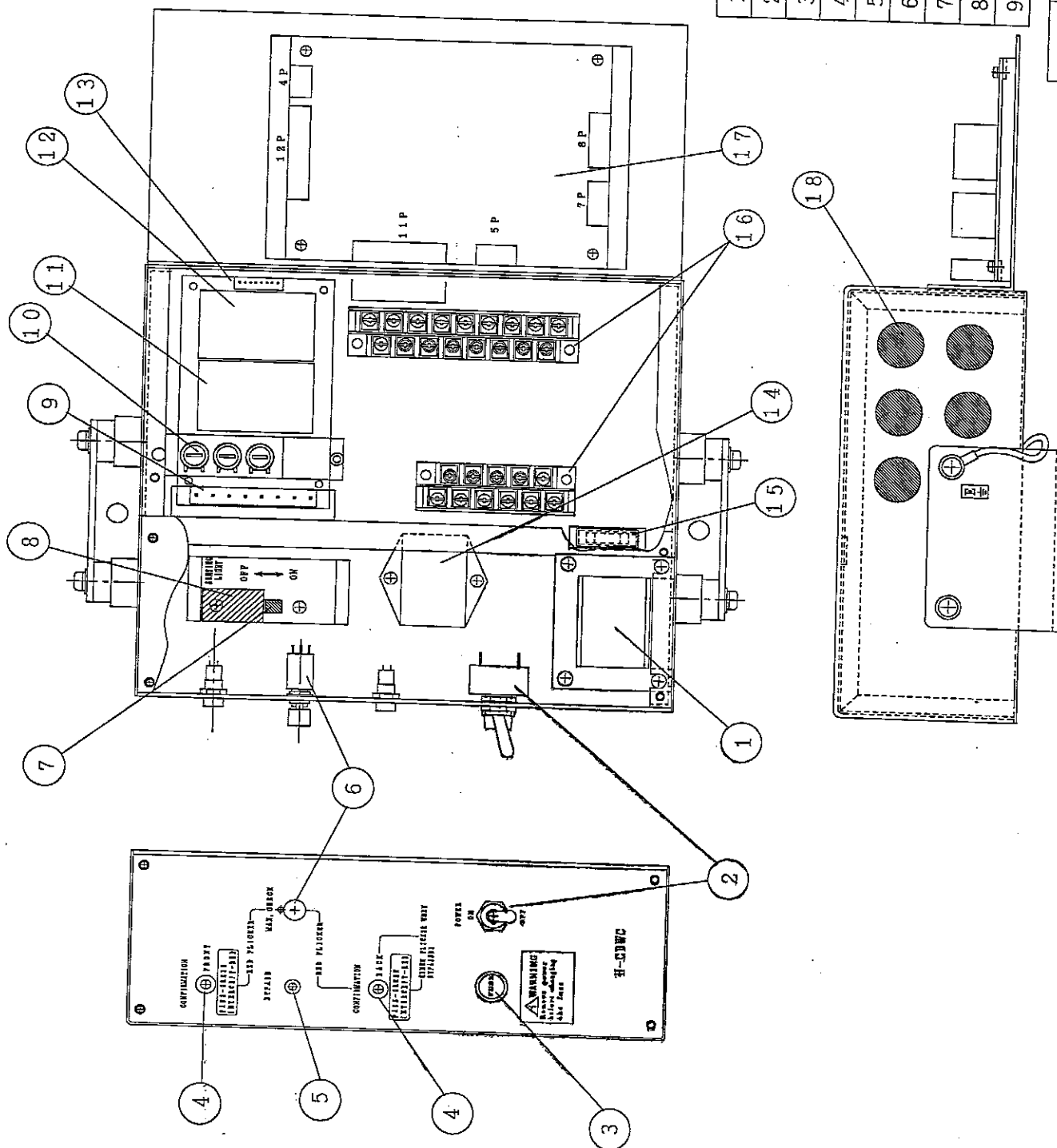
♦ Transmitter and Receiver Dimensions for HRPH



♦ H-CBW Control Box



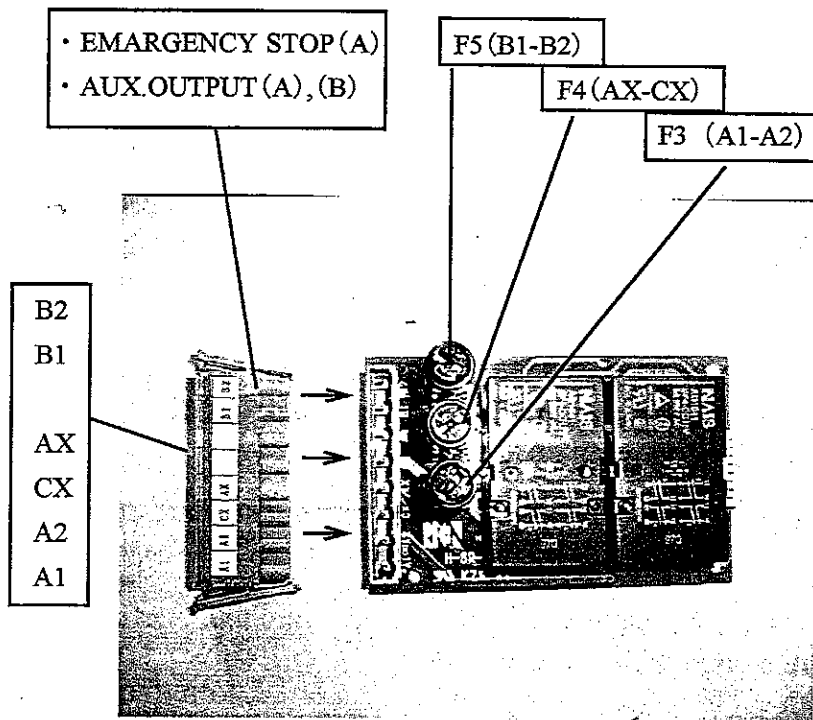
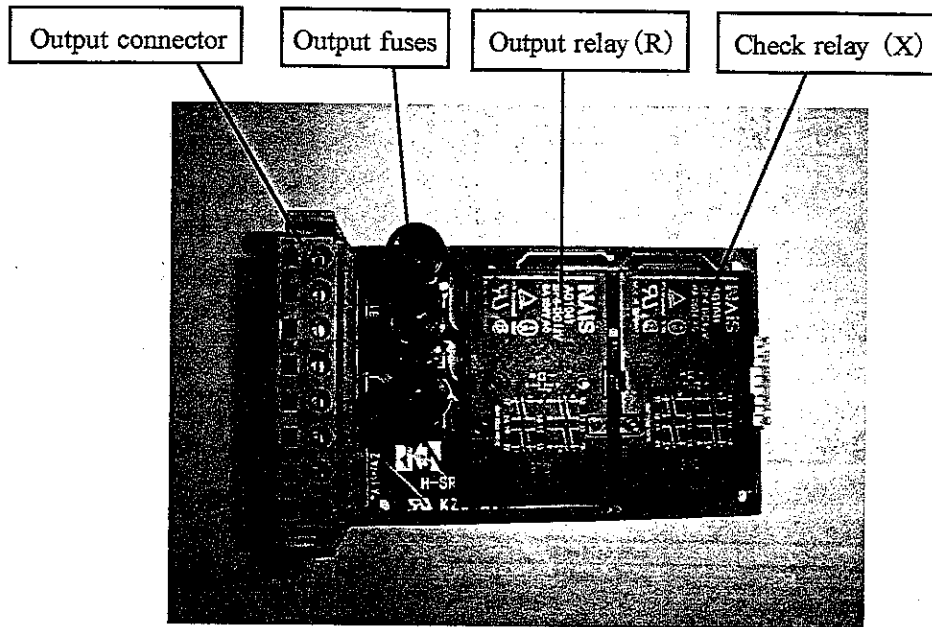
H-CBWC CONTROL BOX



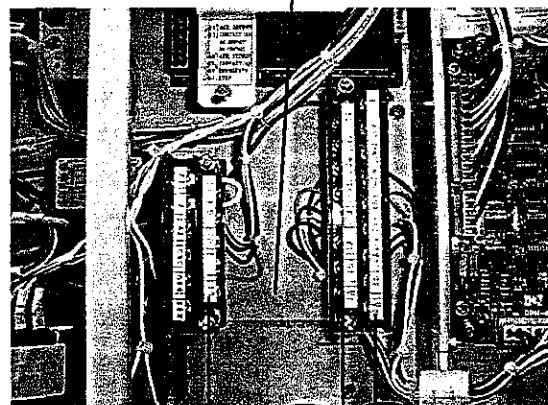
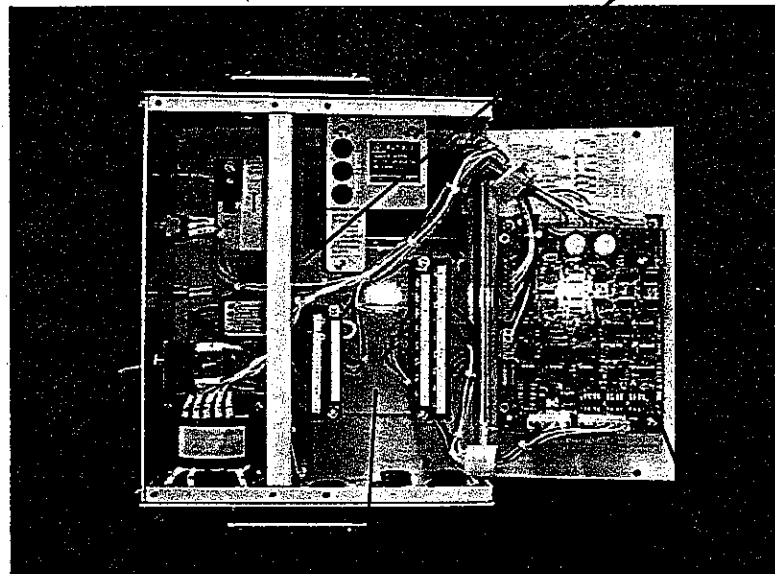
1	Transformer (RPL-TC)	10	Fuse holders (F3, F4, F5) (H-813VA) (Fuses: 3A/250V)
2	Power Switch (WD-12119)	11	R Relay (SP4-DC12V)
3	Fuse holders (F1) (PH-043) (Fuses: 2A/450V)	12	X Relay (SP4-DC12V)
4	LED (BD-801RG)	13	H-SR P.W.B.
5	LED (BD-709V)	14	Noise filter (PWB-1203-33)
6	Pushbutton (MB-2061)	15	Fuse holders (F2) (P-61AB) (Fuses: 2A/450V)
7	Slide Switches (S-1)	16	Terminal Blocks (M206-17) (M206-11)
8	Slide Stopper	17	RPLT-MBWA P.W.B. or RPH-MB1 P.W.B.
9	Nylon connector (331-238/001-000)	18	Hole plugs (DP-812)

TITLE		H-CBWC CONTROL BOX		DATE		PART NO.	
Parts Lay-out		98.1.6		RIKEN OPTECH			

New Model: Relay board (H-SR) of
H-CBWC Control-box



New Model: H-CBWC Control-box



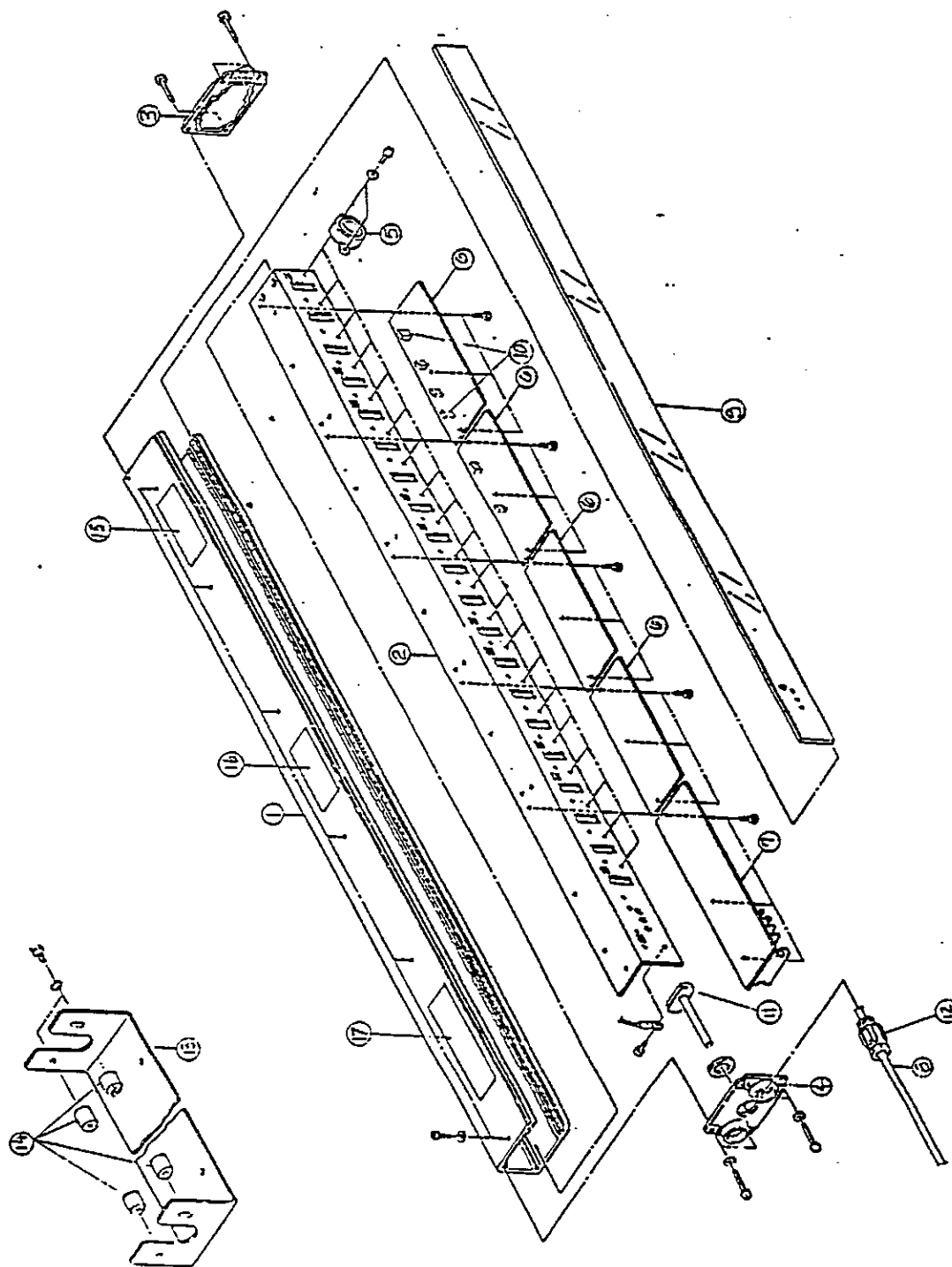
P.W.B.
(RPH-MB1)

- Cycle check input
- Bypass (U1,U2) input
- Power supply input

(For rear side) Transmitter
& Receiver

(For front side) Transmitter
& Receiver

Transmitter Receiver Assembly



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HRPLII PARTS LIST

TRANSMITTER ASSEMBLY

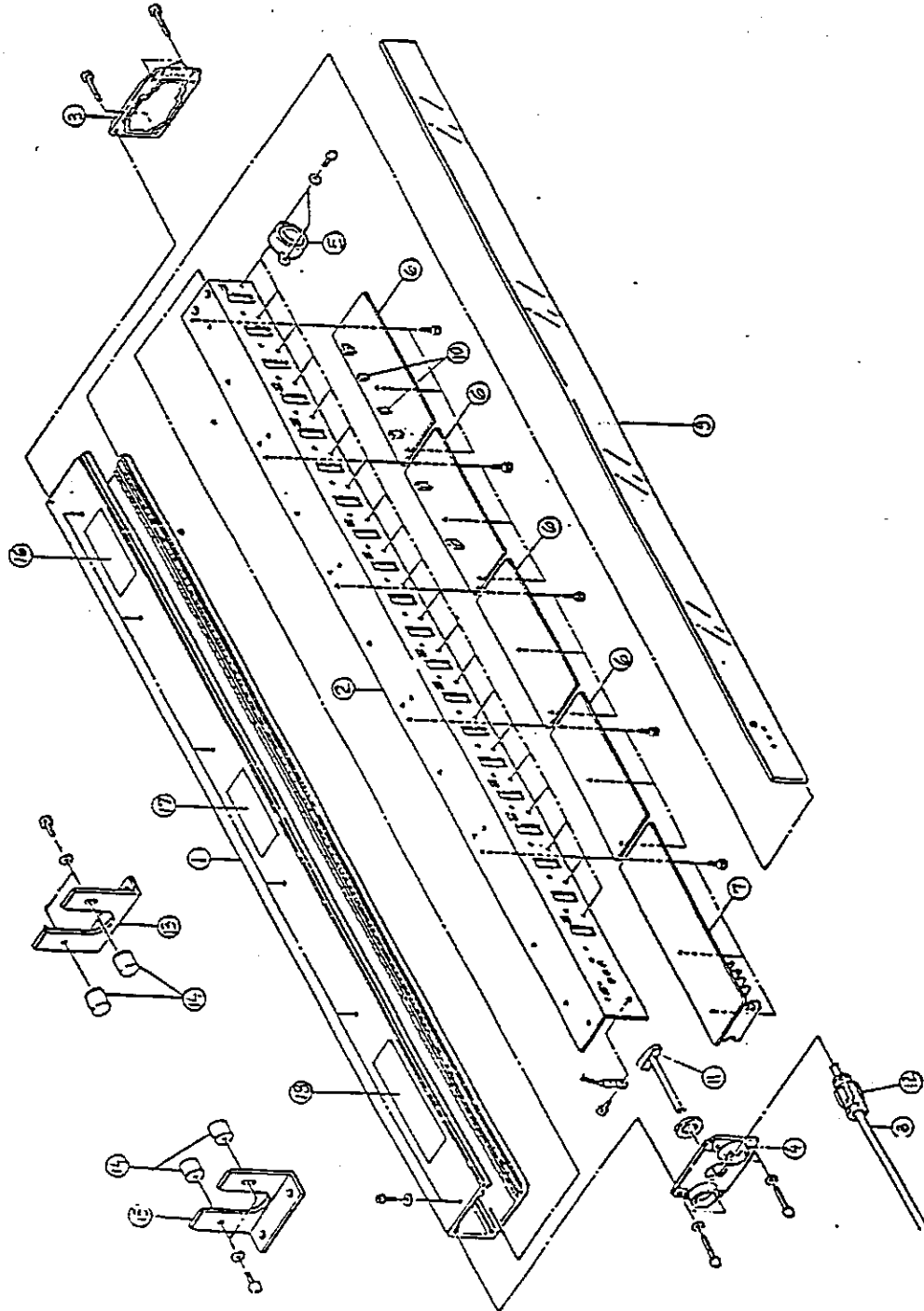
<u>ITEM #</u>	<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	RK19905	CASE TRANSMITTER H11RPLII-8	1
	RK19891	CASE TRANSMITTER H17RPLII-12	1
	RK19892	CASE TRANSMITTER H24RPLII-16	1
	RK19893	CASE TRANSMITTER H36RPLII-24	1
	RK19894	CASE TRANSMITTER H60RPLII-40	1
	RK20366	CASE TRANSMITTER H72RPLII-48	1
2	RK20358	CHASSIS, TRANSMITTER H11RPLII-8	1
	RK20951	CHASSIS, TRANSMITTER H17RPLII-12	1
	RK20952	CHASSIS, TRANSMITTER H24RPLII-16	1
	RK20953	CHASSIS, TRANSMITTER H36RPLII-24	1
	RK20954	CHASSIS, TRANSMITTER H48RPLII-32	1
	RK20955	CHASSIS, TRANSMITTER H60RPLII-40	1
	RK20956	CHASSIS, TRANSMITTER H72RPLII-48	1
	RK20957	CHASSIS, TRANSMITTER H86RPLII-56	1
3	RK20280	COVER, UPPER END	1
4	RK20385	COVER, LOWER END	1
5	RK20354	LENS UNIT	8
6	RK20283	CONTROL CIRCUIT BOARD	1
7	RK20284	CONTROL CIRCUIT BOARD	1
8	CB20356	3-CONDUCTOR SHIELDED WIRE	1

**HRPLII
PARTS LIST**

TRANSMITTER ASSEMBLY

<u>ITEM #</u>	<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY</u>
9	RK19900	FILTER H11RPLII-8	1
	RK19901	FILTER H17RPLII-12	1
	RK19902	FILTER H24RPLII-16	1
	RK19903	FILTER H36RPLII-24	1
	RK19904	FILTER H48RPLII-32	1
	RK20263	FILTER H60RPLII-40	1
	RK20364	FILTER H72RPLII-48	1
	RK20365	FILTER H86RPLII-56	1
10	RK20350	TRANSMITTER ELEMENT	8
11	CQ20359	CONNECTOR	1
12	RK20357	SUPPER LOCK	1
13	RK20351	MOUNTING BRACKET H11RPL11-8	1
	RK20958	MOUNTING BRACKET H17RPL11-12	1
	RK20959	MOUNTING BRACKET H24RPL11-16	1
14	RK19046	VIBRATION PROOF LEG	4

Receiver Assembly



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**HRPLII
PARTS LIST**

RECEIVER ASSEMBLY

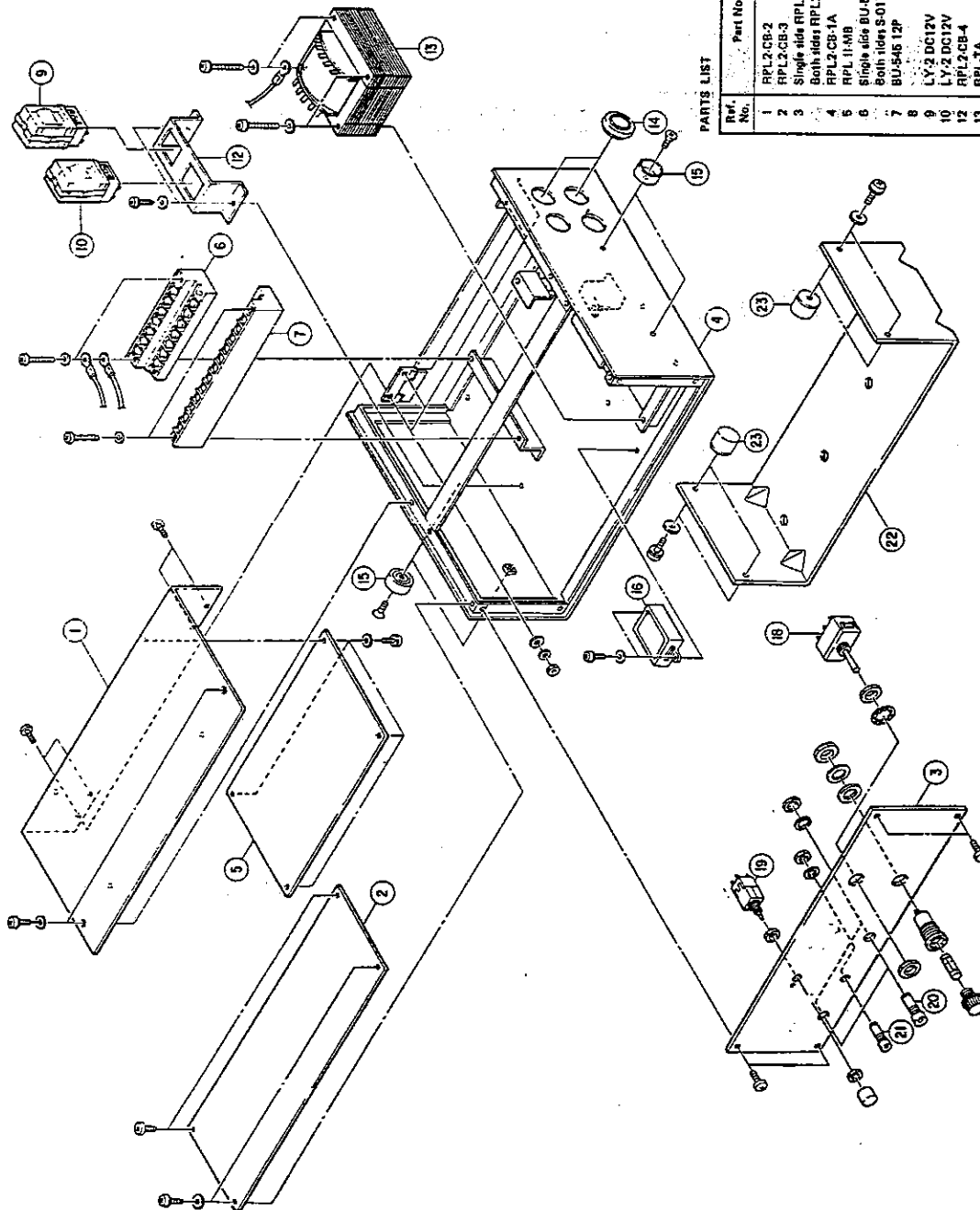
<u>ITEM #</u>	<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	RK19895	CASE RECEIVER H11RPLII-8	1
	RK19896	CASE RECEIVER H17RPLII-12	1
	RK19897	CASE RECEIVER H24RPLII-16	1
	RK19898	CASE RECEIVER H36RPLII-24	1
	RK19899	CASE RECEIVER H47RPLII-32	1
	RK20377	CASE RECEIVER H60RPLII-40	1
	RK20378	CASE RECEIVER H72RPL11-48	1
	RK20379	CASE RECEIVER H86RPL11-56	1
2	RK20360	CHASSIS, RECEIVER H11RPLII-8	1
	RK20951	CHASSIS, RECEIVER H17RPL11-12	1
	RK20952	CHASSIS, RECEIVER H24RPL11-16	1
	RK20953	CHASSIS, RECEIVER H36RPL11-24	1
	RK20954	CHASSIS, RECEIVER H49RPLII-32	1
	RK20955	CHASSIS, RECEIVER H60RPLII-40	1
	RK20956	CHASSIS, RECEIVER H72RPLII-48	1
	RK20957	CHASSIS, RECEIVER H86RPLII-56	1
3	RK20280	COVER, UPPER END	1
4	RK20285	COVER, LOWER END	1
5	RK20354	LENS UNIT	8
6	RK20278	CONTROL CIRCUIT BOARD	1
7	RK20277	CONTROL CIRCUIT BOARD	1
8	CB20349	6-CONDUCTOR SHIELDED WIRE	1

**HRPLII
PARTS LIST**

RECEIVER ASSEMBLY

<u>ITEM #</u>	<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY</u>
9	RK19900	FILTER H11RPLII-8	1
	RK19901	FILTER H17RPLII-12	1
	RK19902	FILTER H24RPLII-16	1
	RK19903	FILTER H36RPLII-24	1
	RK19904	FILTER H48RPLII-32	1
	RK20263	FILTER H60RPLII-40	1
	RK20364	FILTER H72 RPLII-48	1
	RK20365	FILTER H86RPLII-56	1
10	RK20369	RECEIVING ELEMENT	8
11	CQ20359	CONNECTOR	1
12	RK20357	SUPER LOCK	1
13	RK20351	MOUNTING BRACKET H11RPLII-8	1
	RK20958	MOUNTING BRACKET H17RPLII-12	1
	RK20959	MOUNTING BRACKET H24RPL11-16	1
14	RK19046	VIBRATION PROOF LEG	4

CONTROL BOX EXPLODED VIEW



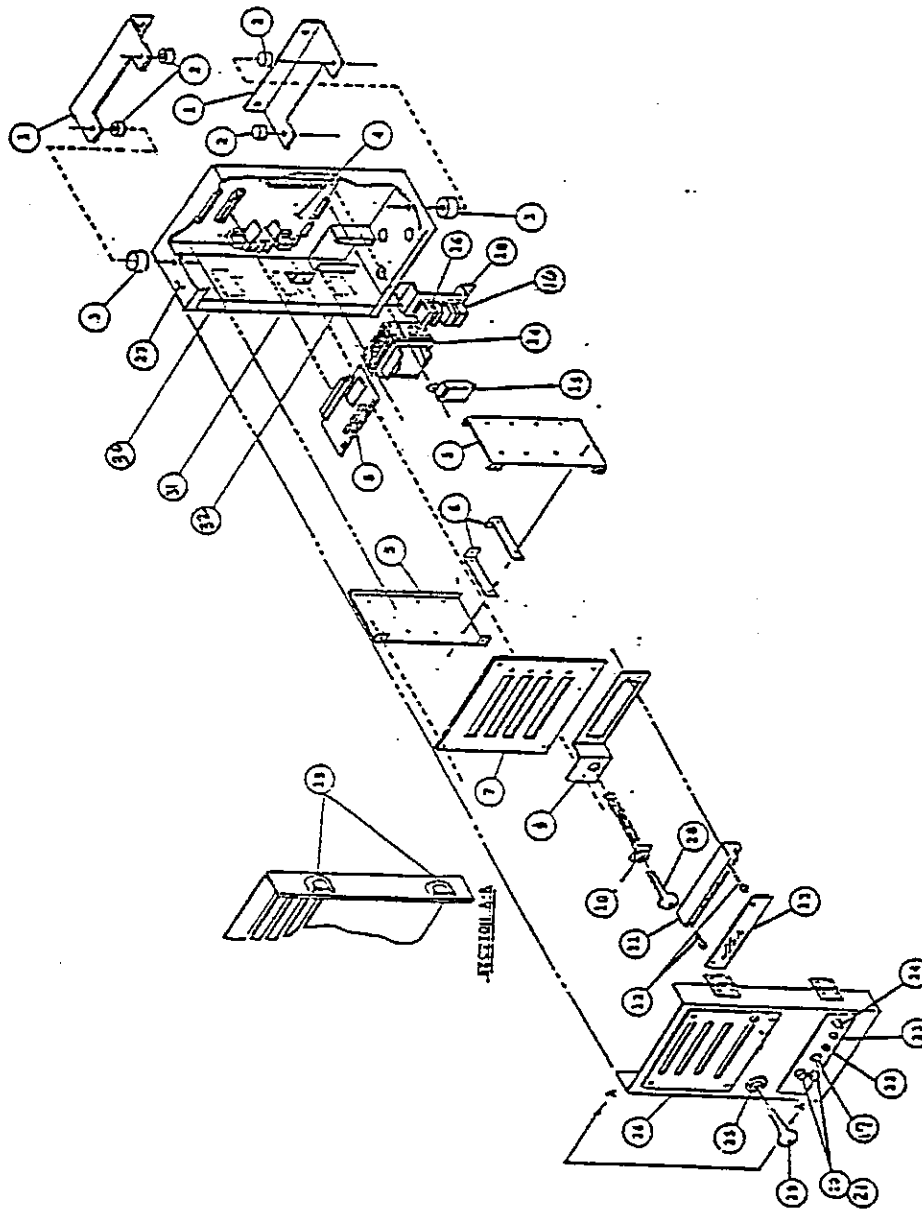
PARTS LIST

Ref. No.	Part No.	Description	Remarks
1	RPL2-CB-2	Cover-1	
2	RPL2-CB-3	Cover-2	
3	Single side RPL2-NP-4A	Printed Circuit Board (RPL II-MBI)	
4	Both sides RPL2-NP-2A	Terminal Block (7P)	
5	RPL2-CB-1A	Terminal Block (12P)	
6	RPL II-MB	Mounting Bracket, Terminal Block	
7	Single side BU-546 7P	R Relay	
8	Both sides S-017P	X Relay	
9	BU-546 12P	Mounting Bracket, Relay	
10	LY-2 DC12V	Power Transformer	
11	LY-2 DC12V	Grommet	
12	RPL2-CB-4	Vibration-proof Cap	
13	RPL-TA	Noise Filter	
14	SG-24A	Key Switch	
15	SE-3B	Toggle Switch	
16	MC-2020	Push Switch	
17	AV26-J2822C	Lamp	
18	WD-1281	Holder	
19	MS-300	Vibration-proof Leg	
20	BD-801RG		
21	BD-709Y		
22	RPL2-CB-2		
23	SE-4B (Type III)		

STANDARD CONTROL BOX PARTS LIST

<u>ITEM #</u>	<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	RK20279	CABINET COVER #1	1
2	RK20382	CABINET COVER #2	1
3	RK20383	PANEL	1
4	RK20384	CABINET, CASE	1
5	RK20168	RPLIIMB MOTHER BOARD STD. CONTROL BOX	1
6	TL20385	TERMINAL BLOCK	1
7	TL20386	TERMINAL BLOCK	1
8	RK20387	MTG BRACKET, TERMINAL BLOCK FOR 8220 SER	1
9	SW16345	RELAY LY-4 DC 12V	2
10	FZ15832	FUSE HOLDER RPLII-CB	1
11	FZ16342	FUSE, 250V, 1A	1
12	RK20390	MOUNTING BRACKET, RELAY	1
13	TR20169	XFMR, STD CONTROL BOX RPLTA	1
14	RK20391	GROMMET	4
15	RK15802	RUBBER CUSHION CAP	4
16	RK20392	NOISE FILTER	1
17	SW16338	SWITCH	2
18	SW15831	POWER SWITCH RPL-CB	1
19	SW16341	CHECK SWITCH SEII	1
20	LT20393	LAMP, CONTROL BOX	2
21	LT20394	LAMP, CONTROL BOX	1
22	RK20395	BRACKET	1
23	RK19046	VIBRATION PROOF LEG RPL11	4

Blanking Control Box Assembly



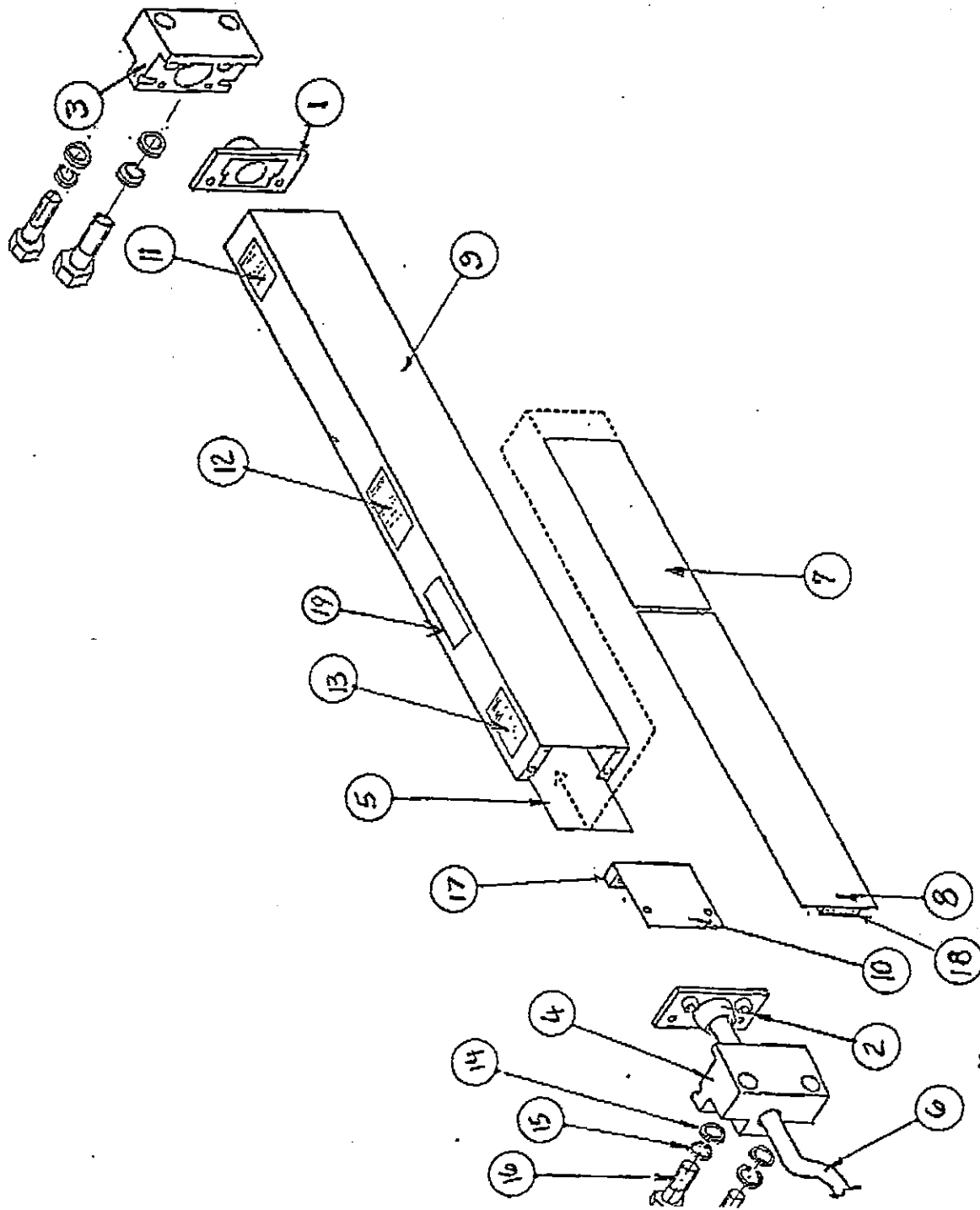
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BLANKING CONTROL PARTS LIST

<u>ITEM#</u>	<u>PART#</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	RK20398	CONTROL BOX MTG FIXTURE FOR BLANKING	2
2	RK15801	RUBBER CUSHION TYPE III	4
3	RK15802	RUBBER CUSHION CAP	4
4	RK20167	PCB, MOTHER BD RPLIIBC2	1
5	RK20399	GUIDE RAIL BRACKETS FOR BLANKING	2
6	RK20400	GUIDE RAIL FOR BLANKING CONTROL BOX	8
7	RK20401	CHASSIS COVER FOR BLANKING	1
8	RK20402	BOARD	1
9	RK20403	PLATE FOR BLANKING CONTROL BOX	1
10	SW20404	KEY, BLANKING CNTRL SW 8220	1
11	TL20406	TERMINAL STRIP FOR BLANKING CONTROL	1
12	RK20407	STUD FOR BLANKING CONTROL BOX	2
13	TL20408	TERMINAL STRIP COVER FOR BLANKING	1
14	TR20409	TRANSFORMER FOR BLANKING CONTROL BOX	1
15	FL20410	NOISE FILTER FOR BLANKING CONTROL BOX	1
16	SW16345	RELAY LY-4 DC 12V	2
17	SW15831	POWER SWITCH RPL-CB	1
18	RK20411	RELAY BRACKET FOR BLANKING CONTROL BOX	1
19	RK20412	SEMI-SNAP LOCK FOR BLANKING CONTROL BOX	2
20	FZ15832	FUSE HOLDER RPLII-CB	2
21	FZ20416	FUSE FOR BLANKING CONTROL BOX	2
22	LT20413	CONFIRMATION LAMP FOR BLANKING CONTROL	1
23	LT20414	BYPASS LAMP FOR BLANKING CONTROL BOX	1
24	SW16341	CHECK SWITCH SEII	1
25	SW20415	KEYED LOCK FOR BLANKING CONTROL BOX	1
26	RK20388	FRONT DOOR FOR BLANKING CONTROL BOX	1
27	RK20389	CABINET FOR BLANKING CONTROL BOX	1
28	LA20316	KEY FOR KEY SWITCH BY-PASS	2
29	LA20317	KEY FOR DOOR LOCK	2

Transmitter Assembly



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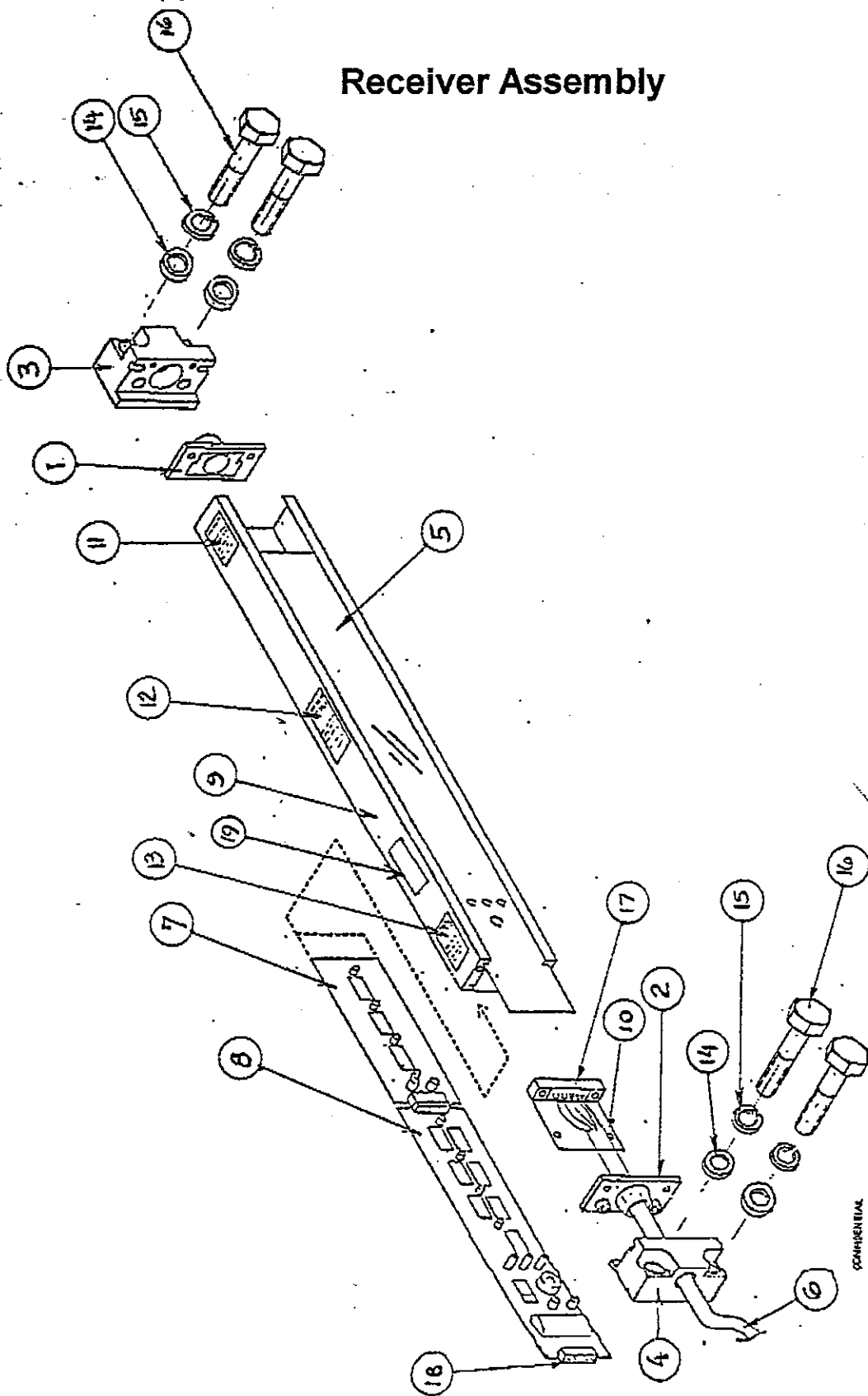
HRPH PARTS LIST **TRANSMITER ASSEMBLY**

<u>ITEM #</u>	<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	RK20611	END COVER - UPPER	1
2	RK20612	END COVER - LOWER	1
3	RK20613	VIBRATION PROOF LEG - UPPER	1
4	RK20614	VIBRATION PROOF LEG - LOWER	1
5	RK20624	TRANSMITTER FILTER MODEL H11RPH	1
	RK20625	TRANSMITTER FILTER MODEL H17RPH	1
	RK20626	TRANSMITTER FILTER MODEL H24RPH	1
	RK20627	TRANSMITTER FILTER MODEL H30RPH	1
	RK20628	TRANSMITTER FILTER MODEL H36RPH	1
	RK20629	TRANSMITTER FILTER MODEL H42RPH	1
	RK20630	TRANSMITTER FILTER MODEL H48RPH	1
	RK20631	TRANSMITTER FILTER MODEL H55RPH	1
6	RK20616	TRANSMITTER CABLE	1
7	RK20617	TRANSMITTER PCB	1
8	RK20618	TRANSMITTER CONTROL BOARD	1
9	RK20632	CABINET-MODEL H11RPH	1
	RK20633	CABINET-MODEL H17RPH	1
	RK20634	CABINET-MODEL H24RPH	1
	RK20635	CABINET-MODEL H30RPH	1
	RK20636	CABINET-MODEL H36RPH	1
	RK20637	CABINET-MODEL H42RPH	1
	RK20638	CABINET-MODEL H48RPH	1
	RK20639	CABINET-MODEL H55RPH	1

**HRPH PARTS LIST
TRANSMITER ASSEMBLY**

<u>ITEM #</u>	<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY</u>
10	RK20615	CHASIS RPM	1
11	WA2346	WASHER, FLAT	4
12	WA9186	WASHER, LOCK	4
13	SS3607	SCREW, HEX	4
14	RK20948	FEMALE 5 PIN CONN.	1
15	RK20949	MALE 5 PIN CONN.	1

Receiver Assembly



OPTIONAL

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**HRPM PARTS LIST
RECEIVER ASSEMBLY**

<u>ITEM #</u>	<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	RK20611	END COVER - UPPER	1
2	RK20612	END COVER - LOWER	1
3	RK20613	VIBRATION PROOF LEG - UPPER	1
4	RK20614	VIBRATION PROOF LEG - LOWER	1
5	RK20640	RECEIVER FILTER MODEL H11RPM	1
	RK20641	RECEIVER FILTER MODEL H17RPM	1
	RK20642	RECEIVER FILTER MODEL H24RPM	1
	RK20643	RECEIVER FILTER MODEL H30RPM	1
	RK20644	RECEIVER FILTER MODEL H36RPM	1
	RK20645	RECEIVER FILTER MODEL H42RPM	1
	RK20646	RECEIVER FILTER MODEL H48RPM	1
	RK20647	RECEIVER FILTER MODEL H55RPM	1
6	RK20619	RECEIVER CABLE	1
7	RK20620	RECEIVER PCB PH	1
8	RK20621	RECEIVER CONTROL BOARD PC	1
9	RK20632	CABINET-MODEL H11RPM	1
	RK20633	CABINET-MODEL H17RPM	1
	RK20634	CABINET-MODEL H24RPM	1
	RK20635	CABINET-MODEL H30RPM	1
	RK20636	CABINET-MODEL H36RPM	1
	RK20637	CABINET-MODEL H42RPM	1
	RK20638	CABINET-MODEL H48RPM	1
	RK20639	CABINET-MODEL H55RPM	1

**HRPH PARTS LIST
RECEIVER ASSEMBLY**

<u>ITEM #</u>	<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY</u>
10	RK20615	CHASIS RPM	1
11	WA2346	WASHER, FLAT	4
12	WA9186	WASHER, LOCK	4
13	SS3607	SCREW, HEX	4
14	RK20948	FEMALE 5 PIN CONN.	1
15	RK20949	MALE 5 PIN CONN.	1

Appendix

OSHA and ANSI regulations for light curtains

The Occupational Safety and Health Administration (OSHA) regulations and the American National Standards Institute (ANSI) standards for presence-sensing devices are listed here. The OSHA regulations are in section 1. ANSI standards are in section 2.

Section 1—OSHA regulation 1910.217

Reprinted below are excerpts from OSHA regulation 1910.217 pertaining to the use of presence-sensing devices for point-of-operation guarding on mechanical power presses. Portions from the text of the OSHA regulations are presented in the left-hand column of the pages in this section. Additionally, an interpretation provided by the Precision Metalforming Association (PMA) is presented in the right-hand column. Helm Instrument Co., Inc. makes no claim regarding the accuracy or effectiveness of the PMA interpretation reprinted here. The material is listed for informational purposes only. It should not be relied upon for use in any specific application. Persons making use of this interpretive material do so at their own risk. It has been reprinted with the permission of the PMA.

OSHA Regulations

PMA Interpretation

OSHA 1910.21 (c) (3) (i) (a)

(3) Point of operation devices

(i) Point of operation devices shall protect the operator by:

(a) Preventing and/or stopping normal stroking of the press if the operator's hands are inadvertently placed in the point-of-operation

Presence-sensing device

OSHA 1910.217 (c) (3) (iii)

(iii) A Presence-sensing point-of-operation device shall protect the operator as provided in paragraph (c) (3) (i) (a) of this section, and shall be interlocked into the control circuit to prevent or stop slide motion if the operator's hand or other part of his body is within the sensing field of the device during the downstroke of the press slide.

(c) (3) (i) (a) Refers to the functional requirement of a presence-sensing device which prevents and/or stops normal stroking of the press.

(a) The device may not be used on machines using full revolution clutches.

(b) The device may not be used as a tripping means to initiate slide motion.

(c) The device shall be constructed so that a failure within the system does not prevent the normal stopping action from being applied to the press when required, but does prevent the initiation of a successive stroke until the failure is corrected. The failure shall be indicated by the system.

(d) Muting (bypassing of the protective function) of such device, during the upstroke of the press slide is permitted for the purpose of parts ejection, circuit checking and feeding.

(e) The safety distance (D_s) from the sensing field to the point of operation shall be greater than the distance determined by the following formula:

$D_s = 63 \text{ inches/second} \times T_s$ where

D_s = minimum safety distance (inches);

63 inches/second = hand speed constant and

T_s = stopping time of the press measured approximately 90° position of crankshaft rotation (seconds)

European method (curtain of light) uses self trip safety system effectively. Variance applied for 11/17/73 by Interlake Stamping Company to use this fail-safe system.

When failure occurs, the best indication is the press won't run.

Top of stroke is the point at which muting shall cease as it is not possible to set a point on the downstroke as the exact position where the hazard of die closing starts.

Safety distance represents the distance an operator can move his hand during the time it takes a press to stop. The internationally recognized hand reach speed is 63 inches/second.

To determine this safety distance, the stopping time of the press is measured with some appropriate measuring device. The measurement is taken such that the stop signal is given to the press at the 90 degree point of the crank position.

Since some stopping time increase must be accommodated due to braking system deterioration, a percentage factor must be added to the measure time to obtain the factor for use in the equation for determining safety distance. A percentage factor of 20% is recommended for presses with new brakes or brakes of good condition. For older brakes, a 10% factor is recommended.

Example:

Measured stopping time = 0.190

Time factor = $1.2 \times 0.19 = 0.228$ seconds

Calculation = 63×0.228

Safety distance = 14.4 inches

(f) Guards shall be used to protect all areas of entry to the point of operation not protected by the presence-sensing device.

(3) (iii) (f) Great care must be taken to assure that no access to the die area exists unguarded.

OSHA 1910.217 (c) (3) (5)

(5) Additional requirements for safe-guarding. Where the operator feeds or removes parts by placing one or both hands in the point-of-operation, and a two hand control, presence-sensing device of Type B gate or movable barrier (on a part revolving clutch) is used for safeguarding:

This paragraph tells the condition under which a brake monitoring system is required after November 1, 1975.

(i) The employer shall use a control system and brake monitor which comply with paragraphs (b) (13) and (14) of this section. This requirement should be complied with by November 1, 1975.

(b) (13) Control reliability

(b) (14) Construction requirements.

OSHA 1910.217 (e) (1)

(e) INSPECTION, MAINTENANCE, AND MODIFICATION OF PRESSES

(i) It shall be the responsibility of the employer to establish and follow a program of periodic and regular inspections of his power presses to insure that all their parts, auxiliary equipment, and safeguards are in safe operating condition and adjustment. The employer shall maintain records of these inspections and the maintenance work performed.

Records of clutch and brake will be weekly. Other inspections are periodic subject to time factor determined by employer.

(ii) Each press shall be inspected and tested no less than weekly to determine the condition of the clutch/brake mechanism, anti-repeat feature and single stroke mechanism. Necessary maintenance or repair or both shall be performed and completed before the press is operated. The employer shall maintain records of these inspections and the maintenance work performed. These requirements do not apply to those presses which comply with paragraphs (b) (13) and (14) of this section.

If brake monitoring system is installed, weekly inspection and records are not required for clutch/brake mechanism. Other parts of the press will require periodic inspections and records.

OSHA REGULATIONS

OSHA regulations pertaining to the use of presence-sensing devices for point-of-operation guarding on the mechanical power presses.

(iii) A presence-sensing point-of-operating device shall protect the operator as provided in paragraph (c) (3) (i) (a) of this section, and shall be interlocked into the control circuit to prevent or stop slide motion if the operator's hand or other part of his body is within the sensing field of the device during the downstroke of the press slide.

(a) The device may not be used on machines using full revolution clutches.

(b) The device may not be used as a tripping means to initiate slide motion.

(c) The device shall be constructed so that a failure within the system does not prevent the normal stopping action from being applied to the press when required, but does prevent the initiation of a successive stroke until the failure is corrected. The failure shall be indicated by the system.

(d) Muting (bypassing of the protective function) of such device, during the upstroke of the press slide, is permitted for the purpose of parts ejection, circuit checking, and feeding.

(e) The safety distance (D_s) from the sensing field to the point-of-operation shall be greater than the distance determined by the following formula:

$$D_s = 63 \text{ inches/second} \times T_s$$

where:

D_s = minimum safety distance (inches); 63 inches/second = hand speed constant; and

T_s = stopping time of the press measured at approximately 90° position of crankshaft rotation (seconds).

(f) Guards shall be used to protect all areas of entry to the point-of-operation not protected by the presence-sensing device.

1910.217 (c) (3) (5)

(5) Additional requirements for safeguarding. Where the operator feeds or removes parts by placing one or both hands in the point-of-operation, and a two hand control, presence-sensing device of Type B gate or movable barrier (on a part revolution clutch) is used for safeguarding.

(i) The employer shall use a control system and a brake monitor which comply with paragraphs (b) (13) and (14) of this section.

1910.217 (e) (1)

(e) Inspection, maintenance, and modification of presses — (1) Inspection and maintenance records. (i) It shall be the responsibility of the employer to establish and follow a program of periodic and regular inspections of his power presses to insure that all their parts, auxiliary equipment, and safeguards are in a safe operating condition and adjustment. The employer shall maintain records of these inspections and the maintenance work performed.

(ii) Each press shall be inspected and tested no less than weekly to determine the condition of the clutch/brake mechanism, anti-repeat feature and single stroke mechanism. Necessary maintenance or repair or both shall be performed and completed before the press is operated. The employer shall maintain records of these inspections and the maintenance work performed. These requirements do not apply to those presses which comply with paragraphs (b) (13) and (14) of this section. (i.e. those presses equipped with brake monitors.)

1910.212 General requirements for all machines (covers press brakes, hydraulic & pneumatic machines not covered by mechanical power press standard.)

(a) Machine guarding — (1) Types of guarding. One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point-of-operation, ingoing nip points, rotating parts, flying chips and sparks. Examples of guarding methods are -- barrier guards, two-hand tripping devices, electronic safety devices, etc.

This reprint is not to be used as a substitute for the law -- refer to your federal register. These statements are only partial highlights regarding point-of-operation guarding. Other construction and control requirements must be satisfied.

Section 2---ANSI standards for presence-sensing devices

Reprinted below are the American National Standards Institute (ANSI) standards for presence-sensing devices (light curtains). ANSI is the United States clearinghouse and coordinating body for voluntary standards activity on the national level. It is a federation of trade associations, technical societies, professional groups, and consumer organizations. Some 1000 companies are affiliated with the Institute as company members.

ANSI creates voluntary standards to eliminate duplication and to weld conflicting standards into single, nationally accepted standards under the designation "American National Standards." The standards reflect a national consensus of manufacturers; consumers; scientific, technical, and professional organizations; and governmental agencies.

The ANSI standards below are American National Standard Institute B11.1-1988 for presence-sensing devices (light curtains). Both the ANSI standard and its interpretation are part of ANSI standard B11.1-1988. To get a complete copy of the ANSI standard, write to: ANSI, 1430 Broadway, New York, NY 10018.

Standard

6.3.2 Presence-Sensing Point of Operation Device.

A presence-sensing point-of-operation device, if used, shall protect the operator and others, and shall be interfaced with the control circuit to prevent or stop slide motion if the operator's hand or other body part is within the sensing field of the device during the closing portion of the stroke. In addition:

(1) Presence-sensing devices shall not be used for safeguarding the point-of-operation on presses using full-revolution clutches.

(2) When the sensing field has been interrupted, use of the normal press stroke-initiating means shall be required after clearing the sensing field to resume press operation.

(3) Muting (bypassing of the protective function) of the device shall be permitted after the hazardous portion of the press stroke has been completed. Muting of the device shall be accomplished in such a manner that no single component failure shall prevent the normal stop command, but shall prevent subsequent press strokes until the failure is corrected.

Interpretation

E6.3.2 Presence-Sensing Point-of-Operation Device.

Various presence-sensing devices employ different sensing and adjustment techniques. The point at which a device responds to an intrusion may vary. The device should be located or adjusted so that the device always responds to the intrusion at or prior to the safety distance $D(s)$. See E6.3.2 (13). Also, care should be taken when installing the device so that it does not detect false signals from other devices or equipment 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 two- or three- or four-sided protection. Also, see Illustration 3.

(3) Muting is typically accomplished by interface circuits or auxiliary controls. The muting element should incorporate a similar level of control reliability as the presence-sensing device itself. A simple cam-operated limit switch wired in parallel with the device's output is inadequate as its failure can remain undetected.

(4) The device shall have an identifiable minimum object sensitivity so that an obstruction of an equal or greater size will be detected anywhere within the sensing field regardless of the plane of intrusion.

(5) The device shall have a maximum response time which shall not be affected by object sensitivity adjustments or environmental changes.

(6) The devices which require adjustments to accommodate variations in ambient or operating conditions or which incorporate channel blanking or floating window features shall be designed so that the adjustments or features are capable of being supervised by the employer.

(7) The presence-sensing device shall be provided with a means that visibly indicates when it is and is not in use and functioning properly. The device shall also indicate which sections, if any, have been blanked out.

(8) The device shall not fail to respond to the presence of the operator's or other's hand or body part due to the presence of a reflective object or workpiece.

(9) The device shall be designed and constructed so that any single component failure, including output devices, shall not prevent the normal STOP command from being sent to the press, but shall prevent operation of the press stroke until the failure has been corrected. In the event of a power failure to the device, it shall initiate a STOP command to the press-control system.

(10) The device and the press-control system shall be interfaced so that the device's STOP command shall initiate stopping action during the closing portion of the press stroke. The interface shall be designed to ensure that a single component failure within the interface of the control system shall not prevent the normal STOP command from being sent to the press, but shall prevent operation of the press stroke until the failure has been corrected.

(4) The device should have a minimum object sensitivity stated by the device manufacturer. For example, electro-optical devices may detect a 1-1/4-inch-diameter opaque object anywhere in its sensing field but allow 1 inch obstructions to pass undetected at certain points in the field.

(5) The device manufacturer should state the maximum total response time, including output devices, of the presence-sensing device.

(6) Typically, these adjustments or controls are key-operated or located under lockable covers.

(7) It is useful to observe a display such as a meter or signal lamp to indicate the degree of penetrations as an aid to setup and shaping of the radio frequency field as well as the separate signal to indicate intrusion resulting in a STOP command. Red and green indicator lamps or other means that can be easily seen by the operator and others should be provided to indicate that the device is functioning. When the device is bypassed, an amber indicator lamp or other means should be used to indicate to the operator and others that the device is bypassed.

(9) See Control Component Failure (4.10)

(10) See Control Component Failure (4.10). Also see Ensure (3.22).

(11) The device's sensitivity to intrusion shall not be adversely affected by changing conditions around the press.

(12) The effective sensing field of the device shall be located at a distance from the nearest point-of-operation hazard so that the operator or others cannot reach into the point of operation with a hand or other body part before cessation of motion during the closing portion of the stroke.

(11) Some devices may be affected by changes in the conditions around the press such as the placement of parts and tote boxes, grounding conditions of the operator, or the movement of forklift trucks.

(12) The total stopping time of the press should include the total response time of the presence-sensing device, as stated by the manufacturer, the response time of the interface, the response time of the control system, and the time it takes the press to cease slide motion. The following formula should be used when calculating the safety distance:

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

where

K = the hand speed constant = 63 inches per second

T_s = the stop time of the press measured from the final de-energized control element, usually the air valve

T_c = the response time of the press control

NOTE: $T_s + T_c$ = are usually measured by a stop time measuring device.

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

T_{bm} = the additional stopping time allowed by the stopping performance monitor before it detects stop time deterioration. See *Stopping-Performance Monitor* (4.11).

D_{pf} = the added distance due to the penetration factor as recommended in Figure 2. The minimum object sensitivity is stated by the manufacturer. If beam blankouts or floating window features are used, these figures should be added to the object sensitivity figure before using the chart.

Whenever the press-stroke stop command or stopping-performance monitor time or angle setting is changed, the safety distance should be recalculated. See *Stopping-Performance Monitor* (4.11).

ANSI standards for light curtains

NOTE: No increase in safety distance is required for fixed-channel blanking applications if the blanked area is entirely occupied by the material or fixtures.

In some instances, the use of blanking does not allow efficient production of certain piece parts. Horizontal placement of the sensing field, so that it detects the operator's waist area, may present a solution. In this application, the operator may freely manipulate the workpiece and operate the press as long as the operator stands outside of the horizontal sensing field. The sensing field should be located so that the operator cannot reach the point-of-operation prior to interrupting the sensing field and completion of the stopping action. Where possible, the sensing field should be of sufficient depth to prevent the operator from standing between the field and the point of operation.

However, if the position of the device will allow the operator or others to place themselves between the sensing field and the point of operation, auxiliary guards or devices such as but not limited to barrier guards, safety mats, or other devices should be used in conjunction with the device to prevent the operator or others from exposure to the point-of-operation hazard.

(13) The device shall not be affected by ambient light or by light-source decay so that the increase in response time or object sensitivity is greater than the value used to calculate the safety distance.

(14) All areas of entry to the point of operation not protected by the presence-sensing device shall be otherwise safeguarded.

(15) When a device is used on a press in a single-stroke mode and when the protection of the operator is dependent upon the stopping action of the press, a stopping-performance monitor shall be required.

(13) Examples of ambient light are associated with windows, light fixtures, skylights, bay doors, or die lights.

(15) See *Stopping-Performance Monitor* (4.11).

UPDATE

OSHA LOCKOUT/TAGOUT REGULATIONS

Dear Customer:

As you know, OSHA required all manufacturers to enact hazardous energy control (lockout/tagout) programs by January 2, 1990. Metalforming companies and other manufacturers have expressed a great deal of concern about this new regulation.

According to OSHA staff in Washington, DC, a "compliance directive" for use by OSHA personnel in enforcing the lockout/tagout regulations should be completed and available to the public.

WARNING

This standard covers the servicing and maintenance of machines and equipment in which the unexpected energization or start up of the machines or equipment, or release of stored energy could cause injury to employees. This standard establishes minimum performance requirements for the control of such hazardous energy.

In the meantime, a special committee of PMA members met recently to discuss the lockout/tagout regulations and what metalforming companies can do to make sure they are in complete compliance. All agreed you can expect to be required to provide documentation for your company's lockout/tagout program in any future OSHA inspections, just as OSHA inspectors have asked to see your company's hazard communication program and occupational injury records in the past.

The committee focused on several key issues, which are summarized below:

- Sources of hazardous energy in a typical metalforming operation;
- Determining when it is necessary to lockout equipment;
- Outlining OSHA's "paperwork requirements" that are written into the rule; and
- Developing guidelines to help metalforming companies implement its lockout/tagout program.

Sources of Hazardous Energy

OSHA's lockout regulations define an energy source as: "Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy." You must lockout or block these sources when servicing or maintaining equipment "in which the unexpected energization or startup of the machine or equipment, or release of stored energy could cause injury to employees."

OSHA Lockout/Tagout Regulations

Page 2

You will find many sources of hazardous energy in your plant which needs to be controlled and/or locked out during servicing and maintenance. These hazards range from unanticipated machine startup to springs and unblocked rams. Here are a few examples:

- Metalforming equipment (press brakes, power presses, spinning machines, slide forming machines, and roll forming equipment, for example);
- Flywheels on mechanical power presses and press brakes;
- Unblocked rams and springs (especially torsion springs);
- Sources of hydraulic power and devices that control hydraulic power, such as solenoid valves;
- Air-powered parts and slug ejectors, as well as any other air-powered equipment;
- Other residual energy stored in hydraulic and pneumatic systems that may need to be bled or blocked;
- Material handling and feeding equipment, such as sheet loaders/stackers, independently powered transfer systems, coil feeds and straighteners, and conveyors;
- Tool room equipment, including machining centers, grinders, wire EDM, etc.; and
- Other equipment, including grinding or deburring machines and welding equipment.

Depending on the operations performed at your company, you may find additional energy sources of hazardous energy.

Determining If You Must Lockout

The goal of OSHA's lockout/tagout rule is to provide complete protection to employees servicing machinery and equipment. According to OSHA, servicing or maintenance procedures that mandate use of lockout/tagout include:

"Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning, or unjamming of machines or equipment and making adjustments or tool changes; where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy."

Servicing or maintenance that takes place during normal production operations is covered by lockout if:

- An employee is required to remove or bypass a guard or safety device; or
- An employee is required to place any part of his or her body into a point of operation or similar danger zone that exists while the machine is operating.

However, OSHA has provided an exception to this rule, which states that:

"Minor tool changes and adjustments, and other minor servicing activities, which take place during normal production operations are not covered by this standard if they are routine, repetitive, and integral to the use of the equipment for production, provided that the work is performed using alternative measures which provide effective protection."

"Alternative measures which provide effective protection" include OSHA and American National Standards Institute (ANSI) approved machine guarding methods typically used to protect equipment operators. (Consult OSHA and ANSI standards to ensure that your machine guarding methods are up-to-date.) These methods include:

- Light curtain
- Interlocked barriers guards
- Pullback safety devices
- Two hand controls

Each employer -- your company -- must determine when to lockout each piece of machinery and equipment during each step of a maintenance or service procedure. Because each company is unique, uniform guidelines for locking out equipment cannot be provided. You may find that you need to lockout machinery for part of a procedure, but not all.

You might wish to use the following four "key questions" to help make your decisions. Weldotron recommends that you answer these questions conservatively -- no "maybe's" allowed. Answering them incorrectly could result in OSHA fines or, more importantly, a severe employee injury.

1. Is power (energy) necessary to perform the servicing or maintenance on the machine?

YES: Lockout is not required. It would make it impossible to perform the servicing or maintenance. All other OSHA machine guarding standards must be followed.

NO: Go to question 2.

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2. Is there an "unexpected energization or startup" hazard that could cause injury to employees?

YES: Go to question 3.

NO: Lockout is not required. If you can prove that startup of the machine will not cause injury to any employee, there is no unexpected energization hazard. Similarly, this would apply if you can prove that there is no chance of the machine unexpectedly being energized. All other OSHA machine guarding standards must be followed.

3. Is the work being performed ("Minor tool changes and adjustments, and other servicing, activities which take place during normal production operations...") routine, repetitive, and integral to the production function?

YES: Go to question 4.

NO: Lockout is required.

4. Is the work performed "using alternative measures which provide effective protection?"

YES: Lockout is not required. Remember, these measures are those recognized by OSHA and ANSI machine guarding standards.

NO: Lockout is required.

Lockout/Tagout Paperwork Requirements

There are several documentation and certification requirements written into the lockout/tagout standard. This is the information an OSHA inspector will want to see in an inspection. Following is a brief explanation of each.

1. You must have a written energy control procedure for each machine (or groups of machines with similar controls and hazards). This written procedure must include:

- The scope, purpose, authorization, rules, and how your company will enforce compliance;

- A specific statement of the procedure's intended use;

- Specific steps for the placement, removal, and transfer of lockout devices, and the responsibility for them.

- Requirements for testing a machine to verify the effectiveness of lockout or other energy control measures.

2. You must certify that employee training in specific lockout/tagout procedures has taken place and is being kept up-to-date. This must include the name of each employee trained, and the dates of training.

3. You must certify that you inspect your lockout/tagout procedures at least annually to identify any problems and ensure that they are being followed by employees. This certification must:
 - Identify the machines and equipment the lockout/tagout procedure is being used on;
 - List the date of the inspection;
 - The employees included in the inspection; and
 - The name of the person performing the inspection.
4. You must certify that you have re-trained your employees whenever an inspection of your procedures shows that lockout is being properly implemented, or that your procedures need to be revised. Changes in procedures, job reassignments, or purchase of a new piece of equipment also trigger re-training that must be certified.

Guidelines for Implementation and Compliance

If you haven't already, start implementing your lockout/tagout program today. Following are six steps to take that will help you evaluate and/or begin implementing your procedures.

1. Identify the sources of hazardous energy in your plant. Remember, these sources will likely exist both inside and out of the press room.
2. Develop appropriate procedures for locking out each source of hazardous energy. You will probably want to include your shop foreman and production employees in this process.
3. Document these procedures.
4. With your employees, ask the four "key questions" about situations that might require lockout/tagout. This is a key element in developing your training program. Different machines and activities may or may not trigger the lockout requirements.
5. Develop and implement your lockout/tagout employee training. Employees will be trained in one of two groups:
 - Authorized employees, who work on machines and implement the lockout procedure. Authorized employee training must include recognition of hazardous energy sources; the type and magnitude of energy available in the workplace, and the methods of isolating and controlling hazardous energy.
 - Affected employees, who may be in the work area where equipment is being locked out. Affected employee training must include awareness of the purpose and use of the energy control procedure; that locks are not to be bypassed or defeated.

6. Not less than once a year, and whenever you have reason to believe the lockout procedure is not being followed, inspect your procedure and retrain employees.

OSHA and ANSI Standards

All OSHA machine guarding regulations are part of Chapter 29, Subpart O in the Code of Federal Regulations (29 CFR). They can be purchased by calling (202-783-3238) or writing the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Regulations affecting machinery found in metalforming companies include:

- 29 CFR 1910.212. General requirements for all machines;
- 29 CFR 1910.215. Abrasive wheel (grinding) machinery;
- 29 CFR 1910.217. Mechanical power presses; and
- 29 CFR 1910.219. Mechanical power transmission apparatus (belts).

ANSI Standards can be purchased by writing the American National Standards Institute, 1430 Broadway, New York, NY, 10018. Key standards affecting metalforming companies are:

- ANSI B11.1 Mechanical power presses;
- ANSI B11.2 Hydraulic power presses;
- ANSI B11.3 Power press brakes;
- ANSI B11.4 Shears; and
- ANSI B11.12 Roll forming and bending machines.

NOTE

This update has been developed to help customers comply with federal OSHA lockout/tagout requirements. It should not be construed as a substitute for professional legal counsel on requirements under the standard. Weldotron assumes no liability or responsibility for an employer's failure to comply with applicable federal, state, or local laws, or for failure to provide adequate information and training to employees.