

Addendum - Shadow 9 Alternate Controller

This Addendum covers installation only. For operating instructions and safety warnings refer to the Shadow 9 User Manual (1139800, Rev D).

This document explains how to install and wire the alternate controller offered by Wintriss Controls for the Shadow 9 Safety light curtain system. Shadow 9 is a compact, state-of-the-art light curtain consisting of transmitter and receiver optic heads, which can be wired directly to a Wintriss Clutch/Brake Control (WPC1000/2000) or to this alternate Shadow 9 control. You can connect as many as three pairs of Shadow 9 heads in a series that is connected to a control with just one pair of main cables.



Figure 1-1. Shadow 9 Alternate Controller Box (Left), Standard Controller (Right)

⚠ DANGER

DO NOT USE SHADOW LIGHT CURTAINS ON FULL-REVOLUTION POWER PRESSES

- DO NOT use Shadow safety light curtains on full-revolution clutched machinery, which cannot be stopped in mid-stroke.
- Use Shadow safety light curtains only on machinery that can be stopped at any point in the stroke or cycle.

Failure to comply with these instructions will result in death or serious injury.

⚠ WARNING

OBSERVE SAFETY REGULATIONS AND STANDARDS WHEN INSTALLING EQUIPMENT

- Install and use Shadow safety light curtains according to applicable safety regulations and standards.
- Install Shadow safety light curtains on presses according to the requirements and inspection procedures of OSHA regulation 1910.217 and ANSI standard B11.1-2009.
- Install Shadow safety light curtains on other machinery according to OSHA regulation 1910.212 for general machine guarding and any other regulations that apply.

Failure to comply with these instructions could result in death or serious injury.

NOTICE

WHEN UTILIZING THIS CONTROL BOX (OR WHEN SHADOW 9 HEADS ARE WIRED DIRECTLY TO WPC 1000 OR 2000), EXTERNAL DEVICE MONITORING (EDM) MUST BE DISABLED - SET RECEIVER EDM SW1 AND SW2 TO "OFF".

Make DIP switch settings only on the first pair of heads in a cascade. Any settings you make on the second or third heads in a cascade are ignored.

To set the EDM option switches, loosen the retainer screws on the access door (*see Figure 1-2*) on the first receiver, and swing it open. Move switches SW1 and SW2 left to the OFF position, using a slender tool with a blunt tip. When you are finished making settings, swing the access door closed and screw it down. Then cycle power to the heads for the setting change to take effect. For a complete list of DIP Switch settings refer to Shadow 9 User manual.

NOTICE

MISMATCHED DIP SWITCH SETTINGS

If in any pair of DIP switches, one is set to ON and one set to OFF, Shadow 9 transitions to LOCKOUT when it is powered on.

Position	Function	Setting		Description
		DIP-SW1	DIP-SW2	
2	External Device Monitoring (EDM)	OFF <input type="checkbox"/> ON <input checked="" type="checkbox"/>	OFF <input type="checkbox"/> ON <input checked="" type="checkbox"/>	Disabled

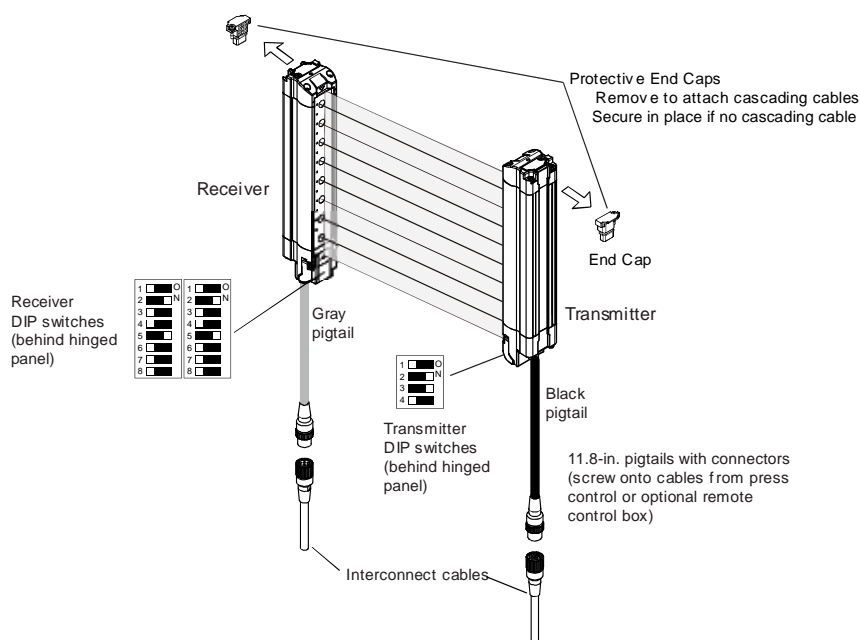


Figure 1-2. Shadow 9 Transmitter and Receiver

Specifications

Electrical	Shadow 9 alternate control: 100-125 VAC; 50-60 Hz; 27 W max
Dimensions Control box	10.25 x 8.25 x 6.25 in. (254 x 203.2 x 152.4 mm). See <i>Figure</i> , page 4.
Construction Control box	16-gauge, .0598 in. (1.52 mm) welded steel with enclosure clasp
Environmental Control Box	IP66
Safety outputs, Alternate Shadow 9 control box	2 cross-checked “Force-Guided” stop relays, one N/O, the other N/O or N/C, rated for 5 A @ 250 Vac or 5 A @ 30 Vdc, with a Rated carry current of 5 A.

Calculating the Safety Distance

See the Shadow 9 User manual for instructions on calculating proper safety distance.

The “safety distance,” as shown in *Figure 1-3*, is the distance away from the pinch point (or hazardous area) of the press that the Shadow 9 heads must be mounted to allow enough time for Shadow 9 to react, and the press to stop, before the operator can penetrate the light curtain and reach the hazard. The “pinch point” is the area of the press where moving parts can cause injury.

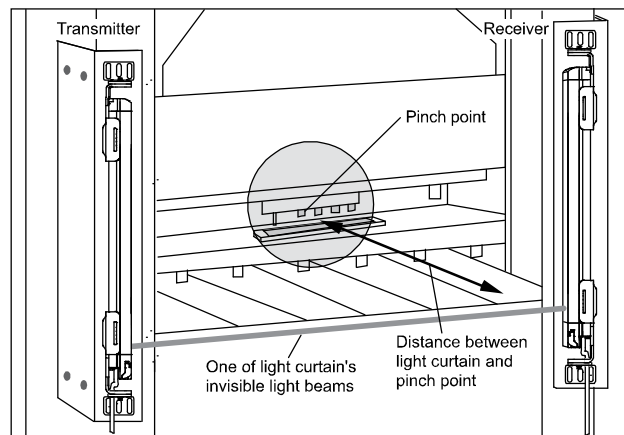


Figure 1-3. Safety Distance: Distance between Pinch Point and Light Curtain

The safety distance is calculated using a formula that incorporates the stopping time of your press. You must mount your light curtains slightly beyond this calculated distance to ensure that Shadow 9 is able to stop the press before an operator’s hand reaches the hazardous area.

Mounting the Alternate Shadow 9 Control

⚠ DANGER

DO NOT MOUNT CONTROL WHERE IT CAN AFFECT LIGHT CURTAIN OPERATION

Install the light curtain control in a location where access to it will not affect the operation of the light curtain.

Failure to comply with these instructions will result in death or serious injury.

⚠ DANGER

DO NOT INSTALL CONTROL INSIDE THE GUARDED AREA FOR PERIMETER GUARDING

Install the light curtain control outside the guarded area for perimeter guarding applications.

Failure to comply with these instructions will result in death or serious injury.

Choose an appropriate location when mounting the Alternate Shadow 9 control box. The control should be mounted in a location where personnel can easily turn the Program/Run/Start key switch without interfering with the operation of the light curtains. The control must never be installed inside the protected area in perimeter guarding applications. The enclosure can be mounted to the press, on a free-standing pedestal, on a pendant, or at the entrance of a location used for area guarding.

Once you have selected a mounting location, drill four holes for mounting, and tap, if necessary. Shock mount studs are 1/4-20. Mount the enclosure using the included shock mounts. Use a No. 7 drill and 1/4-20 tap. Refer to *Figure* , below, for mounting dimensions.

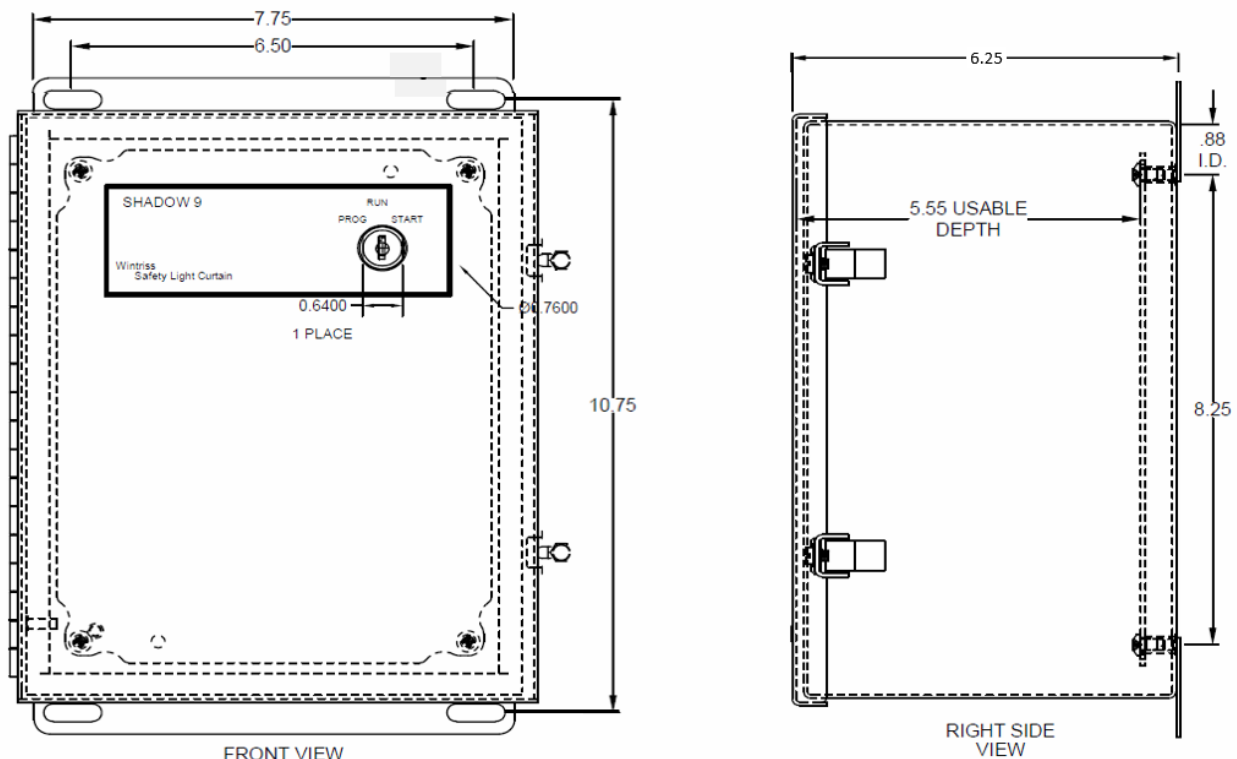


Figure 1-4. Shadow 9 Alternate Control Box: Mounting Dimensions

Light Curtain Installation

Using the safety distances you calculated, plan how to arrange the light curtain heads.

Mounting Location Requirements

DANGER

AVOID IMPROPER INSTALLATION

Ensure that the light curtain is installed so it is impossible for anyone to reach over, under, or around it and into the hazardous area of the machine without being detected. Use the correct height light curtain, combined with ancillary physical guards.

Failure to comply with these instructions will result in death or serious injury.

DANGER

PREVENT OPERATOR FROM BEING ABLE TO STAND BETWEEN LIGHT CURTAIN AND HAZARDOUS AREA

Ensure that the operator cannot position himself or herself between the light curtain and the hazardous area. Use another pair of light curtains or a mechanical barrier at knee to waist height to prevent the operator or a passerby from being “trapped” between the light curtain and the hazard.

Failure to comply with these instructions will result in death or serious injury.

DANGER

LOCATE PROGRAM/RUN/START KEY SWITCH OUTSIDE THE HAZARDOUS ZONE

Install the WPC or optional Shadow 9 control box containing the Program/Run/Start key switch in a location that provides a clear view of the entire hazardous zone and where it cannot be activated from within the hazardous zone.

Failure to comply with these instructions will result in death or serious injury.

The mounting location you choose for your Shadow 9 heads must meet the following requirements:

- It must be impossible for anyone to reach over, under, or around the light curtains and into the hazardous area of the press without being detected.
- Light curtains should not be mounted near pathways used by forklifts, die carts, and other material-handling equipment.
- The mounting location must allow unobstructed access to the point of operation.
- Light curtains must be mounted an adequate safety distance from the pinch point to allow time for the press to stop once the light curtain has been interrupted (see *Calculating the Safety Distance*, in Chapter 2 of the Shadow 9 User Manual).
- The mounting location must be chosen so that every route to the press’s pinch point or hazardous area is guarded.
- Ambient light from the sun, electric lamps, and other sources must not interfere with Shadow 9 operation.

For complete instructions on installing the Shadow 9 light curtain heads refer to *Planning Your Light Curtain Installation*, in Chapter 2 of the Shadow 9 User Manual.

Wiring AC to the Alternate Shadow 9 Control

WARNING

GUARD AGAINST ELECTRIC SHOCK HAZARD

- Ensure that the power source is off before you make any wiring connections.
- Turn off and disconnect power from the Shadow 9 safety light curtain and from the machinery it is connected to, including the machine control and motor, before making any wiring connections.
- Ensure that all procedures are performed by qualified personnel.
- Complete all installation procedures before connecting wires to the AC power source.

Failure to comply with these instructions could result in death or serious injury.

The control is wired to a 100-125 VAC@ 30 VA power source. In bringing AC wiring to the control, follow these guidelines:

- All wires can be run through flexible liquid-tight conduit provided all circuits are in the same voltage range. If your emergency stop circuits are low voltage circuits (such as 24 Vdc), run two conduits—for instance, one for 100-125 VAC wires and one for 24 Vdc wires.
- Bring the wiring connections for AC power to a convenient point so that you can connect them to the appropriate connector. No. 16 wire is recommended for these circuits; use No. 14 if local codes require it.

Perform the following steps to connect AC wiring to the Shadow 9 control:

1. Open the door of the control and locate L1/L2/GND connections on the Shadow 9 alternate control power supply terminal strip in the upper right corner of the enclosure (see *Figure 1* at the end of the Addendum). These are the connections for AC power.
2. Determine how you will bring wiring from your 100-125 VAC power source to the appropriate flexible liquid-tight conduit installed within a drilled hole in the top right of the unit. These wires should be connected directly to the press control transformer. For 100-125 VAC, you need three wires— high (black), neutral (white) and ground (green).
3. Run the power wires to the control box. If your stop circuits are 100-240 VAC, the AC wiring and stop circuits will be run through the same flexible, liquid-tight conduit and will enter the enclosure ideally through the upper right drilled hole. If the stop circuits are 24 Vdc, then wire the 24 Vdc wires through the flexible liquid-tight conduit installed in the bottom right drilled hole. To maintain the control box's IP66 rating, you must use conduit of the same rating and make proper connections to the control.
4. Connect the black wire to the “L1” terminal, the white wire to the “L2” terminal, and the green (or green-and-yellow) electric service ground wire to GND on the top terminal strip as shown in *Figure 1* at the end of this document.

WARNING

GUARD AGAINST ELECTRIC SHOCK HAZARD

Do not connect wires to AC power source until you are done with all other installation procedures.

Failure to comply with these instructions could result in death or serious injury.

Wiring First Pair of Optic Heads to the Control

⚠ DANGER

AVOID WIRING OTHER DEVICES TO SHADOW 9 POWER

Wire only the Shadow 9 light curtain heads to the alternate Shadow 9 control box. **Do not** wire any other device to the control box or its power supply.

Failure to comply with these instructions could result in death or serious injury.

To wire a pair of heads, transmitter and receiver, to the alternate Shadow 9 control, perform the following steps, referring to *Tables 1 and 2*, on page 8 and *Figure 1* at the end of the Addendum for wiring connections:

1. Plug the two quick-disconnect cables into the pigtail connectors on transmitter and receiver (the connection is keyed) and twist the locknut until the connection is tight. The transmitter cable is gray, and the receiver cable is black.

NOTICE

When joining cables with quick-disconnect fittings, be sure to make the connections between the two cables as tight as you can make them by hand. Do not use tools such as wrenches or pliers to tighten quick-disconnects.

2. Run the cables from the transmitter and receiver to the flexible liquid-tight conduit couplings installed in the bottom left drilled hole of the control box. The receiver cable will be inserted into the left most drilled hole, the transmitter cable into the center drilled hole. You will want to install cabling in liquid-tight conduit to maintain the control box's IP66 rating, you must use conduit of the same rating and make proper connections to the control.
3. Locate terminal strip for light curtain head, receiver and transmitter, in the alternate Shadow 9 control box (see *Figure 1-5*).

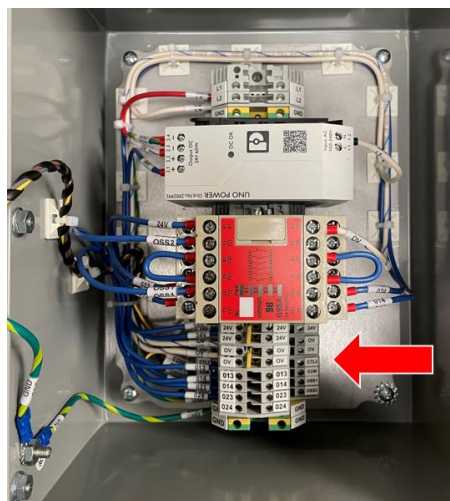


Figure 1-5. Shadow 9 Alternate Control Box: Internal View

4. Measure the wires to fit and cut the wires as necessary. Allow 4 1/2 in. at the end of the cable jacket for connections at the control.

5. Thread the receiver cable through the flexible liquid-tight conduit, then through the hole in the tapered end of the threaded coupling. Make proper connections to the control to maintain the control box's IP66 rating.
6. Connect receiver wires to the terminal strip on the bottom of the Shadow 9 alternate control box, as shown in *Table 1*, below, and *Figure 1* at the end of the Addendum.

Table 1. First Receiver Wiring Connections

Wire Color	Signal Label (TB2)
Brown	+24 Vdc
Blue	0 Vdc
Gray	CTL2
Yellow	RST/EDM
Black	OSS 1
White	OSS 2
Red	N/C
Pink	N/C

*N/C indicates no connection

7. Repeat steps 3-5 for the transmitter cable.
8. Connect transmitter wires to the terminal strip on the bottom of the Shadow 9 alternate control box, as shown in *Table 2*, below, and *Figure 1* at the end of the Addendum.

Table 2. First Transmitter Wiring Connections

Wire Color	Signal Label (TB20)
Blue	0 Vdc
Brown	+24 Vdc
White, Yellow, Black	N/C

*N/C indicates no connection

9. When you have finished, double-check all connections.
10. If you are using a single pair of transmitter and receiver heads, make sure the end caps are securely installed and retained with the captive screw.

NOTICE

Make sure the end caps are correctly installed on the transmitter and receiver for a standalone pair of heads. For cascaded pairs of heads, make sure the end caps are correctly installed on the last pair of heads in the cascade. End caps protect connectors from oil and other contaminants.

Connecting Cascaded Heads

To connect pairs of cascaded heads, refer to *Connecting Cascaded Heads* in Chapter 2 of the Shadow 9 User Manual.

NOTICE

Install end caps on the connectors of the last pair of heads in a cascade. End caps protect the connectors from contaminants. Also, if end caps or a state indicator lamp is not installed on the last pair of heads, a fault condition will result.

NOTICE

Be sure the small gasket on the cascading connector is present and correctly placed.

Connecting Stop Circuits to the Alternate Control

DANGER

AVOID WIRING STOP CIRCUITS THAT ARE NON-OPERATIVE IN SOME MODES

Wire the light curtain in series with your press control circuit so the stop signal from the light curtain stops the machine immediately in all modes of operation, including Inch.

Failure to comply with these instructions will result in death or serious injury.

Wiring the control into your press's emergency stop or equivalent circuitry ensures that whenever an obstruction or intrusion is detected, the press will stop as quickly as its clutch/ brake system (or other system) will permit.

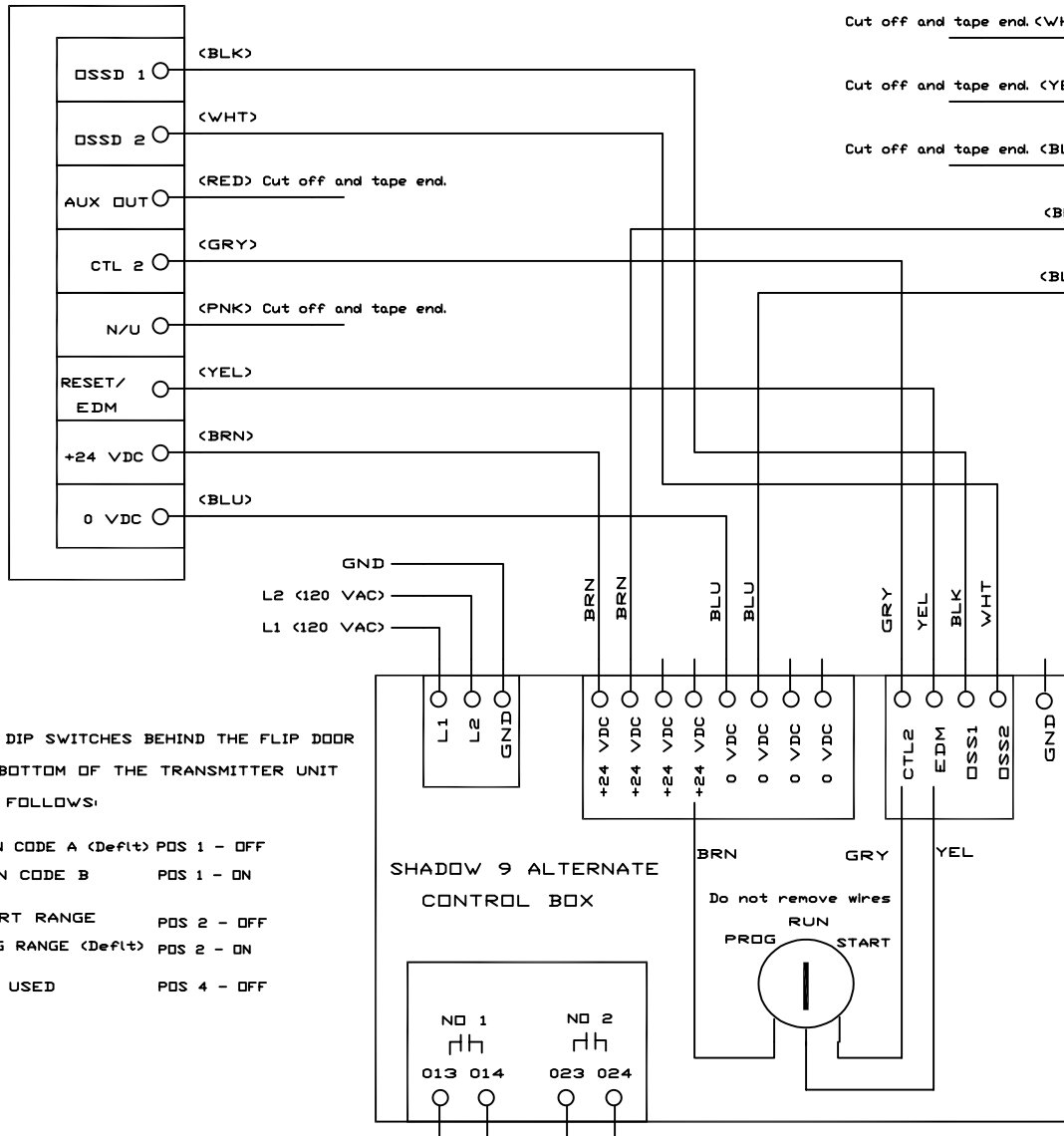
Follow these guidelines when making connections:

- Bring the wiring connections for the emergency stop circuits to a convenient point so that you can tie them to the appropriate connector. No. 16 wire is recommended for these circuits. No. 14 should be used if local codes require it.
- Determine how you will connect the wires from the control to your press control emergency stop circuit. Refer to Figures 2, 3, and 4 at the end of this document or your press control manual or other electrical prints. You need two wires for the emergency stop circuit.
- If your stop circuits are 100-240 VAC, the AC wiring and stop circuits will enter the control in the same flexible liquid-tight conduit installed within a drilled hole in the top right of the unit (see *Wiring AC to the Alternate Shadow 9 Control*, page 6). If the stop circuits are 24 Vdc, then 100-240 VAC wiring goes through the top right hole, 24 Vdc wiring goes through the flexible liquid-tight conduit installed in the bottom right drilled hole.

Performing Checkout and Test Procedures

For instructions on performing functional tests and operation of Shadow 9 light curtain systems refer to *Performing Checkout and Test Procedures* in Chapter 2 of the Shadow 9 User Manual.

SHADOW 9 RECEIVER



REVISIONS			
REV	DESCRIPTION	DATE	APP'D

SET DIP SWITCHES SW1 AND SW2
BEHIND A FLIP DOOR ON BOTTOM OF THE
RECEIVER UNIT AS FOLLOWS:

	SW1	SW2
SCAN CODE A <Deflt>	POS 1 - OFF	OFF
SCAN CODE B	POS 1 - ON	ON
EDM ENABLED <Deflt>	POS 2 - ON	ON
EDM DISABLED	POS 2 - OFF	OFF
AUTOMATIC START <Deflt>	POS 3 - OFF	OFF
START/RESTART INTERLOCK	POS 3 - ON	ON
NOT USED	POS 4 - OFF	OFF
FIXED BLANKING ENABLED <Deflt>	POS 5 - ON	ON
BLANKING DISABLED	POS 5 - OFF	OFF
FLOATING BLANKING DISABLED <Deflt>	POS 6 - OFF	OFF
FLOATING BLANKING ENABLED	POS 6 - ON	ON
NOT USED	POS 7 - OFF	OFF
NOT USED	POS 8 - OFF	OFF

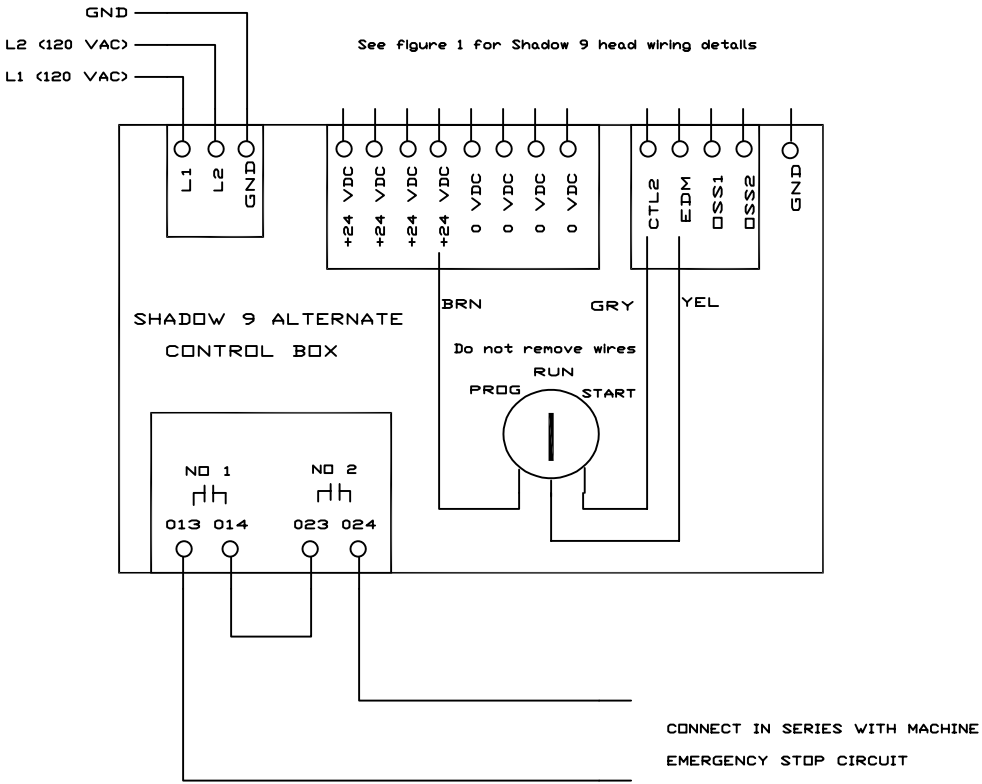
WARNING !!!!

The Shadow 9 heads are shipped with the EDM ENABLED.

This must be changed to EDM DISABLED for the system to work with this control box. Turn off SW1 and SW2 position 2 DIP switches in the receiver.

DRAWN ADB	DATE 9/8/21	WINTRISS CONTROLS GROUP		
CHK.		TITLE		
APPROVALS		SHADOW 9 TX AND RX HEAD TO ALTERNATE CONTROL BOX WIRING DIAGRAM		
ENG.		CODE IDENT NO.		
MFG.		SIZE B		
FILENAME		DRAWING NUMBER		REV
REL		FIGURE 1		
SCALE		SHEET		OF

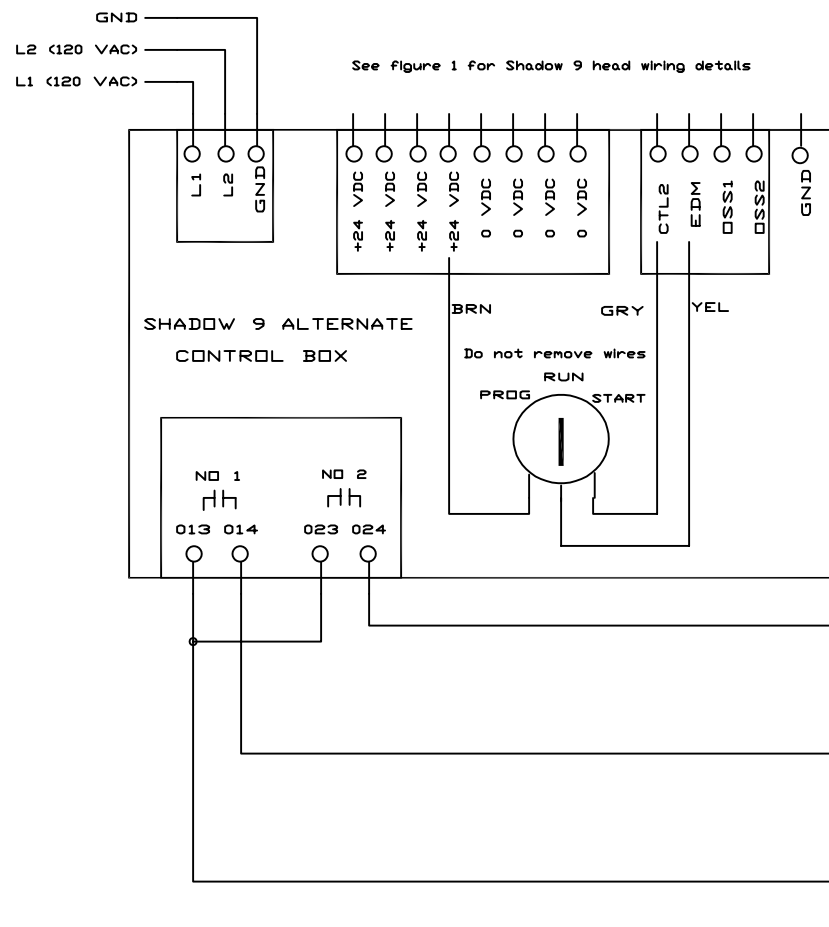
REVISIONS			
REV	DESCRIPTION	DATE	APP'D



WARNING !!!!

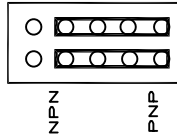
The Shadow 9 heads are shipped with the EDM ENABLED.
This must be changed to EDM DISABLED for the system to work with this control box. Turn off SW1 and SW2 position 2 DIP switches in the receiver.

DRAWN ADB	DATE 9/8/21	WINTRISS CONTROLS GROUP			
CHK.					
APPROVALS		TITLE SHADOW 9 ALTERNATE CONTROL BOX FOR SIMPLE N/O ESTOP CIRCUIT WIRING DIAGRAM			
ENG.					
MFG.					
FILENAME		CODE IDENT NO.	SIZE B	DRAWING NUMBER FIGURE 2	REV
REL		SCALE		SHEET	OF

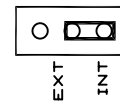


LIGHT CURTAIN MODE SWITCHES ON WPC 1000 BOARD

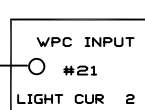
LIGHT CURTAIN (JP106)



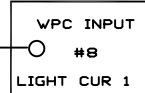
LIGHT CURTAIN (JP107)



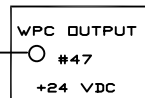
SET TO PNP WITH INTERNAL TEST



GROUP 3 LED #7



GROUP 2 LED #7



WARNING !!!!

The Shadow 9 heads are shipped with the EDM ENABLED.

This must be changed to EDM DISABLED for the system to work with this control box. Turn off SW1 and SW2 position 2 DIP switches in the receiver.

REVISIONS			
REV	DESCRIPTION	DATE	APP'D

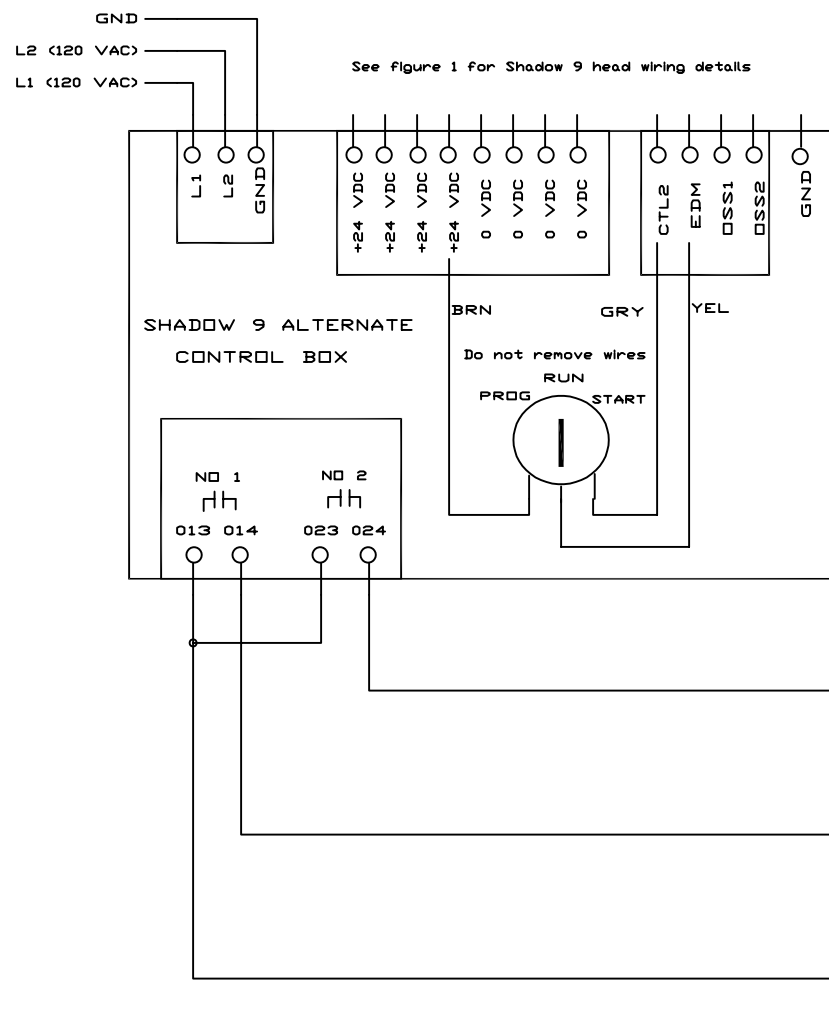
SET DIP SWITCHES SW1 AND SW2
BEHIND A FLIP DOOR ON BOTTOM OF THE
RECEIVER UNIT AS FOLLOWS:

	SW1	SW2
SCAN CODE A (Deflt)	POS 1 - OFF	OFF
SCAN CODE B	POS 1 - ON	ON
EDM ENABLED (Deflt)	POS 2 - ON	ON
EDM DISABLED	POS 2 - OFF	OFF
AUTOMATIC START (Deflt)	POS 3 - OFF	OFF
START/RESTART INTERLOCK	POS 3 - ON	ON
NOT USED	POS 4 - OFF	OFF
BLANKING DISABLED (Deflt)	POS 5 - OFF	OFF
FIXED BLANKING ENABLED	POS 5 - ON	ON
FLOATING BLANKING DISABLED (Deflt)	POS 6 - OFF	OFF
FLOATING BLANKING ENABLED	POS 6 - ON	ON
NOT USED	POS 7 - OFF	OFF
NOT USED	POS 8 - OFF	OFF

SET DIP SWITCHES BEHIND THE FLIP DOOR
ON BOTTOM OF THE TRANSMITTER UNIT
AS FOLLOWS:

SCAN CODE A (Deflt)	POS 1 - OFF
SCAN CODE B	POS 1 - ON
SHORT RANGE	POS 2 - OFF POS 3 - OFF
LONG RANGE (Deflt)	POS 2 - ON POS 3 - ON
NOT USED	POS 4 - OFF

DRAWN ADB	DATE 9/8/21	WINTRISS CONTROLS GROUP		
CHK.				
APPROVALS		TITLE		
ENG.		WPC 1000 NEW STYLE AND SHADOW 9		
MFG.		ALTERNATE CONTROL BOX WIRING DIAGRAM		
FILENAME		CODE IDENT NO.	SIZE B	DRAWING NUMBER FIGURE 3
REL		SCALE	SHEET OF	



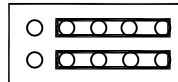
WARNING !!!!

The Shadow 9 heads are shipped with the EDM ENABLED.

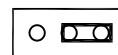
This must be changed to EDM DISABLED for the system to work with this control box. Turn off SW1 and SW2 position 2 DIP switches in the receiver.

LIGHT CURTAIN MODE SWITCHES ON WPC 2000 BOARD

LIGHT CURTAIN A (J123)



LIGHT CURTAIN A (J124)



SET TO PNP WITH INTERNAL TEST

LED GROUP 7 #3



LED GROUP 7 #2



REVISIONS

REV	DESCRIPTION	DATE	APP'D
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SET DIP SWITCHES SW1 AND SW2

BEHIND A FLIP DOOR ON BOTTOM OF THE

RECEIVER UNIT AS FOLLOWS:

	SW1	SW2
SCAN CODE A (Deflt)	POS 1 - OFF	OFF
SCAN CODE B	POS 1 - ON	ON
EDM ENABLED (Deflt)	POS 2 - ON	ON
EDM DISABLED	POS 2 - OFF	OFF
AUTOMATIC START (Deflt)	POS 3 - OFF	OFF
START/RESTART INTERLOCK	POS 3 - ON	ON
NOT USED	POS 4 - OFF	OFF
BLANKING DISABLED (Deflt)	POS 5 - OFF	OFF
FIXED BLANKING ENABLED	POS 5 - ON	ON
FLOATING BLANKING DISABLED (Deflt)	POS 6 - OFF	OFF
FLOATING BLANKING ENABLED	POS 6 - ON	ON
NOT USED	POS 7 - OFF	OFF
NOT USED	POS 8 - OFF	OFF

SET DIP SWITCHES BEHIND THE FLIP DOOR

ON BOTTOM OF THE TRANSMITTER UNIT

AS FOLLOWS:

SCAN CODE A (Deflt)	POS 1 - OFF
SCAN CODE B	POS 1 - ON
SHORT RANGE	POS 2 - OFF POS 3 - OFF
LONG RANGE (Deflt)	POS 2 - ON POS 3 - ON
NOT USED	POS 4 - OFF

DRAWN ADB	DATE 9/8/21	WINTRISS CONTROLS GROUP		
CHK.				
APPROVALS		TITLE		
ENG.		WPC 2000 AND SHADOW 9 ALTERNATE CONTROL BOX WIRING DIAGRAM		
MFG.				
FILENAME		CODE IDENT NO.	SIZE B	DRAWING NUMBER FIGURE 4
REL		SCALE	SHEET OF	