Model XAV2E-LED System Installation

This document provides instructions for installing the Polara XAV2E-LED Push Button Station (PBS) and the XAVCU2, XAVCU2F, XAVCU2F-DC or XAVCU2-DC Control Unit. Please review it completely before beginning an installation.

This system uses 8 conductor cable to connect each PBS to the Control Unit. The preferred cable type is 18AWG Belden 27601A. This cable is burial rated. The wiring diagrams in this document reference the color coding of this cable type. This cable is not included and is not offered by Polara.

Mounting the Push Button Stations

The recommended button height from the ground to the center of the push button is approximately 42" and maximum is 48". It can be lower, but should not be higher than 48".

Note: The visually impaired use the face of the push button station and the arrow on the button to determine the direction of travel. The arrow should point across the street in the direction of travel and, when mounted, the sign of the PBS should be parallel with the crosswalk. To ensure proper mounting orientation place the outside of your forearm against the sign with your fingers straight. Your arm should be parallel to the crosswalk and point to where the crosswalk ends across the street. If your arm does not point to where the crosswalk ends, remount the PBS so it does. If you are mounting a PBS to a fluted pole, Polara offers a mounting plate that helps achieve parallel mounting. Contact our sales department for more information.

Remove the sign from each PBS by removing the 4 screws holding the sign. Remove the bottom cover by removing the two screws on the bottom of the unit. If the arrow direction is correct, there is no need to remove the main cover. If the arrow needs to be rotated, remove the 9 screws holding the main cover. A Torx screwdriver bit is required for two of the screws. Keep the main cover away from metal pole or other metal objects; the magnet may pull the diaphragm assembly out and possibly damage it if it comes too close to other metal objects. Place the main cover on a flat surface with the backside facing you. To change the arrow direction, loosen the 4 screws that hold it 1-2 turns, then slowly press on the front of the button and turn the button diaphragm counter-clockwise. The button diaphragm assembly should pop out. Orient the arrow in the proper direction. Place the diaphragm so each tab goes under the screw head and into its pocket, then tighten the 4 screws. The screws must not pinch and bind the diaphragm to the cover inhibiting its movement. Reinstall main cover and 9 screws.

For brand new installations where mounting and wire holes do not pre-exist in the poles, determine desired location and button height, then mark the location for two ¼-20 mounting holes for bolting push button to pole. These two holes should be 6" apart. From the bottom hole, measure down 7" and mark for wire hole. Drill and tap the two mounting holes to ¼-20. Drill wire hole to 5/8" minimum. See page 8 for template diagram. Do not drill with the PBS open near the pole. The magnets on the speaker and button will attract shavings potentially causing problems.

For poles with existing push buttons, they often already have the two ¼-20 holes 6" apart and a wire exit hole approximately 3.44" lower. These will work for PBS installation as long as a minimum of 8" of cable can extend from the wire exit hole.

Route the cable as needed, from the control unit location to the inside of the pole, and out the wire hole. Remove about 2 inches of the cable outer jacket from the end of the cable. Strip about ¼" of insulation from the end of each wire.
The unit can be bolted to the pole prior to connecting the wires to the unit. Double check that the wires are the proper length by holding PBS up to mounting holes in pole and routing wires down the channel on the back of the PBS. The wires will wrap around the opening in the bottom of the PBS to the front where they will connect to the terminals on the PBS. Screw in the two provided ¼-20 bolts and washers in the two locations on the PBS until the unit is loosely held in place to the pole. Connect the eight wires to the PBS terminals (see Fig. 1).

PUSH BUTTON TO TURN ON WARNING LIGHTS

Fig. 1

Hand should point in same direction as arrow

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Press any excess wire into the cavity above terminal block or route the excess wire back into the pole. Make sure the wires are within the guide channel of the PBS (not pinched between pole and PBS), then tighten the two bolts until the PBS is secure on the pole. Install the bottom cover by securing the two screws on the bottom of the unit. Reinstall the sign making sure hand symbol points in same direction as arrow on button.

Mounting the Control Unit

There are four base model Control Unit options. Additional part numbers designate custom features.

Part Number	Description
XAVCU2	115 VAC Control Unit
XAVCU2F	115 VAC Control Unit with Flash Control
XAVCU2-DC	10-24 VDC Control Unit
XAVCU2F-DC	10-24 VDC Control Unit with Flash Control

The Control Unit is typically installed in the same protective enclosure as the light flashing control system, but if it is mounted on the pole or any other location, it must be in a NEMA 4 or equivalent moisture proof protective box.

For mounting within the light flashing control system enclosure, locate a suitable space for the Control Unit board inside the same enclosure. The board measures 6.5" x 4.5" and has four mounting holes on 5.4" x 3.9" centers. Drill and attach with four screws.

Wiring

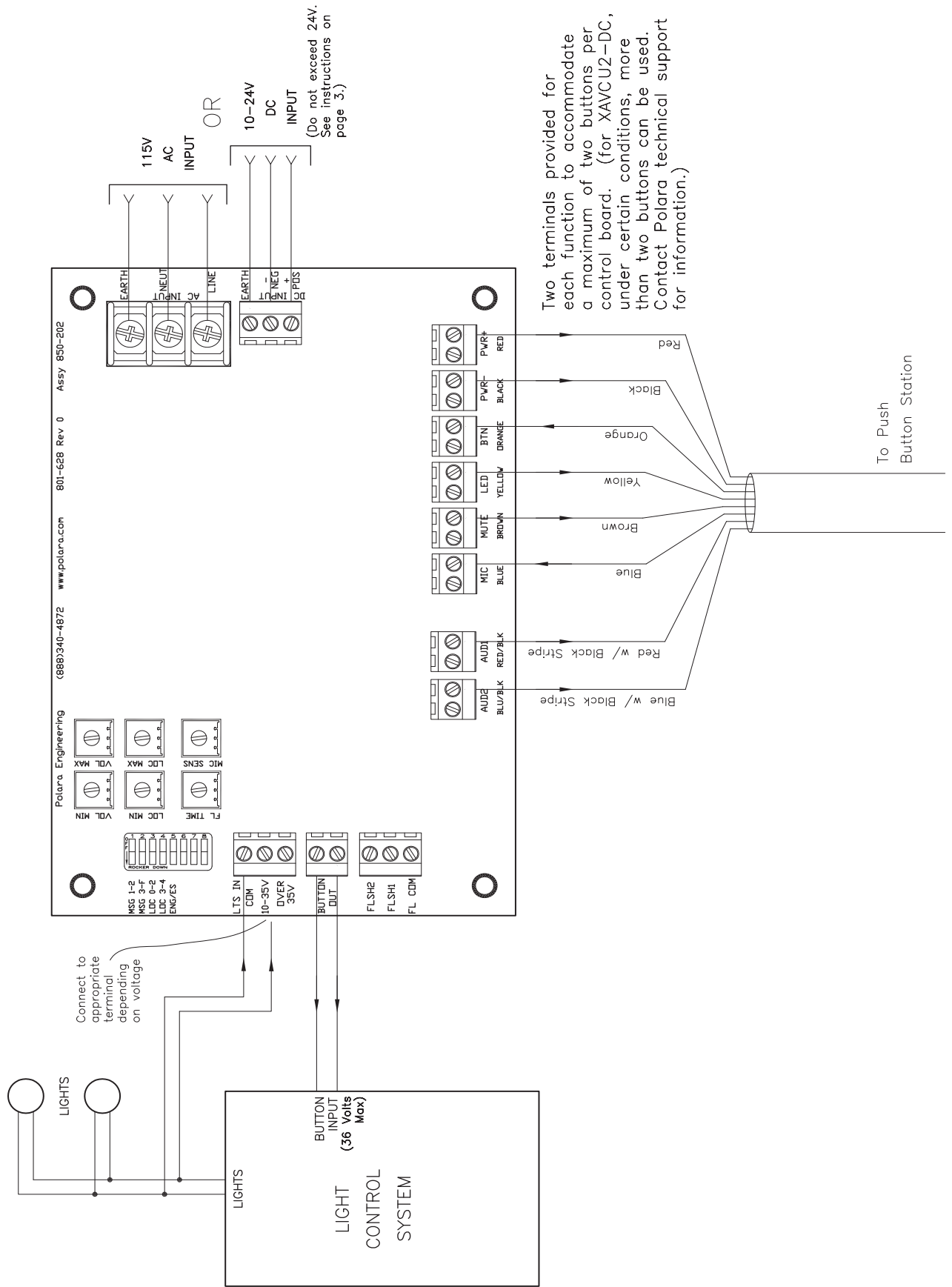(Refer to the accompanying wiring diagram) for Control Unit Model.

The 8 conductor cable connects to the 8 terminal blocks along the bottom edge of the Control Unit. The terminal blocks are labeled with the color of the wire that connects to the block. Each block has two connections which are connected in parallel for easy connection of two PBS units. Strip about 1/4"of insulation off each wire to connect to the terminal block. The functions of the terminal blocks are also marked to aid in troubleshooting so that in case of trouble, you may be able to identify the wires associated with the problem.

Two connections (4 wires) are required between the Control Unit and the crosswalk flashing system. The first is the push button input that triggers the flashing. This wire pair should connect to the BUTTON OUT terminals on the Control Unit. Next is a flashing signal from the flash control. This signal should turn on and off with the flashing lights visible to street traffic. It could be the actual voltage feeding the flashing lights. The voltage may be 10 — 135 volts, AC or DC. The wire pair should connect to the LTS IN terminals. One wire connects to COM and the other to the terminal best matching the voltage present on the wire (10-35V or over 35V). It is this signal which triggers the audible message from the XAV2E system.
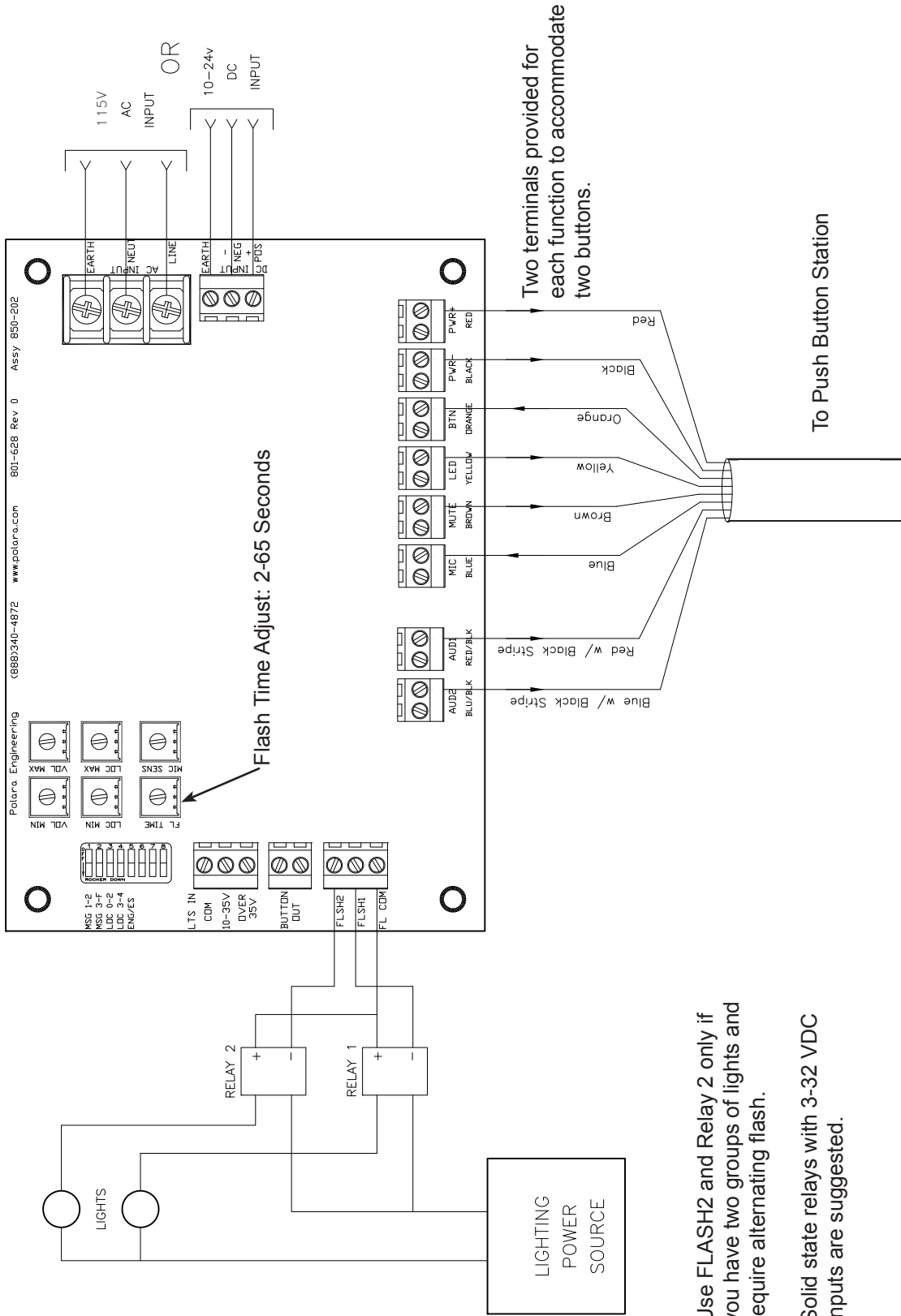
DC MODEL CONTROL UNIT

If you are installing a DC Model Control Unit, connect a DC source of 10-24 volts to the DC INPUT POS and NEG terminals. **If the DC source is two 12 volt batteries in series, connect the Control Unit to only one of those batteries to avoid exceeding 24 volts.**

WIRING DIAGRAM FOR XAVCU2 AND XAVCU2-DC

115V AC INPUT

OR

10-24V DC INPUT

(Do not exceed 24V. See instructions on page 3.)

EARTH — AC INPUT NEUT — LINE

EARTH — DC INPUT -NEG — +POS

Polara Engineering   (888)340-4872   www.polara.com   801-628 Rev 0   Assy 850-202

VOL MAX   LOC MAX   MIC SENS
VOL MIN   LOC MIN   FL TIME

MSG 1-2
MSG 3-F
LOC 0-2
LOC 3-4
ENG/ES
ROCKER DOWN

LTS IN — COM 10-35V — OVER 35V

BUTTON OUT

FLSH2 — FLSH1 — FL COM

PWR+ RED
PWR- BLACK
BTN ORANGE
LED YELLOW
MUTE BROWN
MIC BLUE

AUD1 RED/BLK
AUD2 BLU/BLK

Red
Black
Orange
Yellow
Brown
Blue
Red w/ Black Stripe
Blue w/ Black Stripe

To Push Button Station

Two terminals provided for each function to accommodate a maximum of two buttons per control board. (for XAVCU2-DC, under certain conditions, more than two buttons can be used. Contact Polara technical support for information.)

LIGHTS

Connect to appropriate terminal depending on voltage

LIGHTS

BUTTON INPUT (36 Volts Max)

LIGHT CONTROL SYSTEM

WIRING DIAGRAM FOR XAVCU2F AND XAVCU2F-DC

115V AC INPUT

OR

10-24v DC INPUT

Polara Engineering   (888)340-4872   www.polara.com   801-628 Rev 0   Assy 850-202

EARTH
NEUT
LINE
AC INPUT

EARTH
NEG −
PDS +
DC INPUT

MSG 1-2
MSG 3-F
LDC 0-2
LDC 3-4
ENG/ES
ROCKER DOWN

VOL MAX
LDC MAX
MIC SENS

VOL MIN
LDC MIN
FL TIME

Flash Time Adjust: 2-65 Seconds

LTS IN COM
10-35V OVER 35V
BUTTON OUT
FLSH2
FLSH1
FL COM

PWR+ RED
PWR− BLACK
BTN ORANGE
LED YELLOW
MUTE BROWN
MIC BLUE

AUD1 RED/BLK
AUD2 BLU/BLK

Two terminals provided for each function to accommodate two buttons.

Red
Black
Orange
Yellow
Brown
Blue

Red w/ Black Stripe
Blue w/ Black Stripe

To Push Button Station

RELAY 2
+ −

RELAY 1
+ −

LIGHTS

LIGHTING POWER SOURCE

Use FLASH2 and Relay 2 only if you have two groups of lights and require alternating flash.

Solid state relays with 3-32 VDC inputs are suggested.

Operation

The Control Unit has two LED indicators. The red PWR LED flashes once per second and indicates that the board has operating power and the on-board microcontroller is functioning. The red BUTTON LED indicates whenever a PBS button is pressed and activated.

MESSAGE REPEAT SELECTION

Dip switch positions 1 and 2 are used to select the number of message repeats whenever flashing starts.

SW1	SW2	Result
OFF	OFF	1 Repeat
ON	OFF	2 Repeats
OFF	ON	3 Repeats
ON	ON	Continuous while flashing

If any of the message repeats, 1, 2, or 3, is selected, then any button push during the flashing will restart the message count.

LOCATE TONE SELECTION

Dip switch positions 3 and 4 are used to configure the PBS locating tone.

SW3	SW4	Result
OFF	OFF	No Locate Tone
ON	OFF	Locate tone every 2 seconds
OFF	ON	Locate tone every 3 seconds
ON	ON	Locate tone every 4 seconds

MESSAGE SELECTION

Dip switch position 5 selects the message type.

SW5	Result
OFF	English Language Only
ON	English message followed by Spanish message

Volume Control

The output volume from the XAV2E system is chosen automatically based on the ambient noise level received by the microphone. The volume can self-adjust over a wide range. A microphone sensitivity (MIC SENS) control can increase or decrease the volume change due to a change in ambient noise. MIN and MAX controls are provided for both voice message and locate tone. These adjustments restrict the volume range chosen by the microphone control. The MIN control sets the lower limit for the volume and the MAX control sets the upper limit. If both controls are set the same, or the MAX is set below the MIN, the volume will be fixed. The MAX control takes precedence over the MIN.

Troubleshooting Information

The following are descriptions of the Control Unit terminals to help identify sources of trouble.

PWR+ TERMINAL — This point should always have a DC voltage present. For the XAVCU2 and XAVCU2F models, this voltage should be 13 to 15 volts most of the time. It will typically fluctuate some if the voice message is currently playing. For XAVCU2-DC, and XAVCU2F-DC models the voltage should match the DC INPUT voltage. This voltage is measured between PWR+ and PWR-.

PWR- TERMINAL — This is the circuit ground for the XAV2E system.

BTN TERMINAL — Connecting this terminal to ground (PWR-) should cause the BUTTON LED to light and cause the BUTTON OUT terminals to change to a low resistance state between them. Pressing the PBS button should cause the voltage at the BTN terminal to drop to near zero.

LED TERMINAL — This is an output from the Control Unit to the PBS. It's an open collector type output that connects to ground to turn on the PBS LEDs. This output should turn on the LEDs whenever the voltage is present at the LTS IN input.

MUTE TERMINAL — This is an output signal which switches the audio amplifier in the PBS between operate and standby modes. It should go to ground whenever a sound is to be played.

MIC TERMINAL — This is a low voltage signal from the PBS which represents the ambient noise level. It is generally less than 1 volt above ground and can range from 0 to 1.5 volts. It should change as the ambient noise changes.

AUD1, AUD2 — This is a balanced audio signal which provides the input signal to the audio amplifier.

FLSH COM, FLSH1, FLSH2 — Output signals for driving external flash relays. These are typically used only on the XAVCU2F.

BUTTON OUT — Solid state opto-relay contact closure while BUTN terminal is grounded.

LTS IN — Input from an external flash controller. For the XAVCU2, this signal must be present in order to trigger the voice message and also to flash the PBS LEDs.
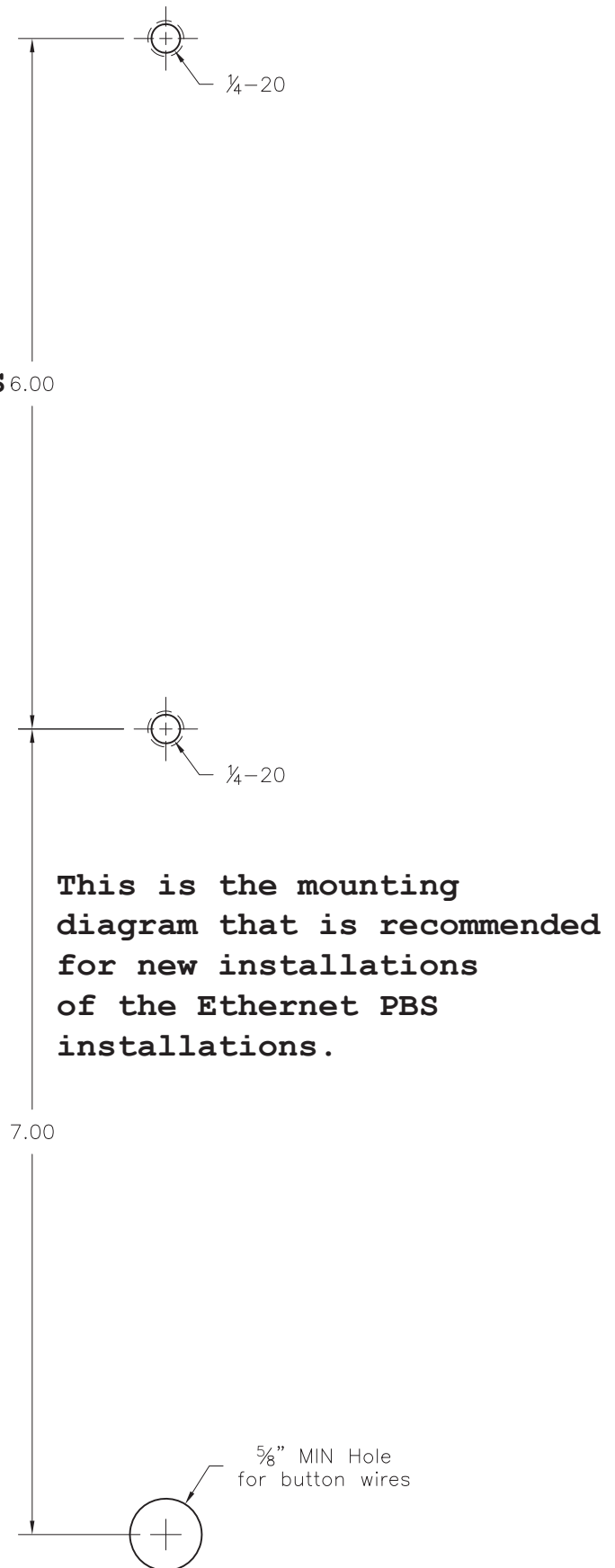

IMPORTANT!

1. **The message will not play without proper inputs from light flashing controller on "LTS IN" (Does not apply to XAVCU2F).**

2. **Check to see that the striped "RED/BLK" and "BLU/BLK" and non-striped "RED" and "BLUE" wires are not mixed with each other. All wires should be connected to their appropriate matching color.**

¼−20

¼−20

6.00
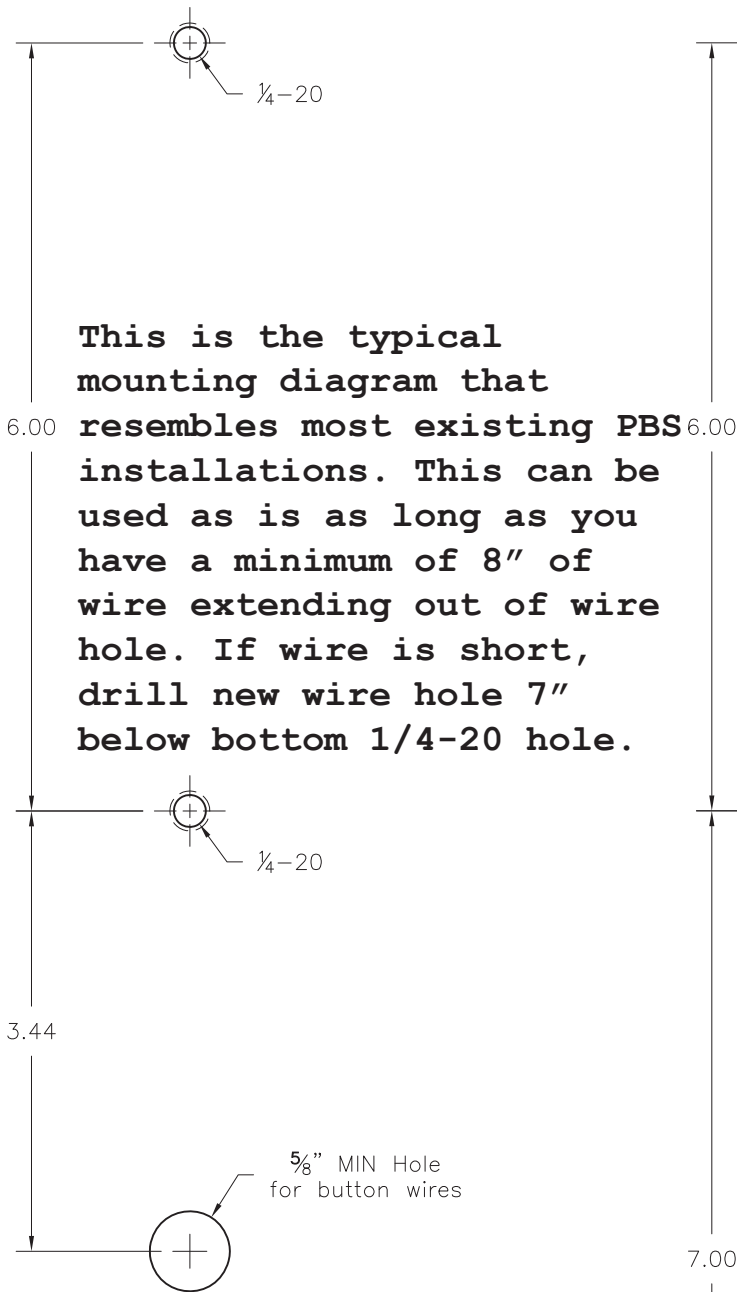
This is the typical
mounting diagram that
resembles most existing PBS
installations. This can be
used as is as long as you
have a minimum of 8″ of
wire extending out of wire
hole. If wire is short,
drill new wire hole 7″
below bottom 1/4-20 hole.

6.00

¼−20

¼−20

3.44

⅝″ MIN Hole
for button wires

This is the mounting
diagram that is recommended
for new installations
of the Ethernet PBS
installations.

7.00

This diagram is not
acual size. Recreat
the dimensions
shown on the pole
and mark the proper
positions.

⅝″ MIN Hole
for button wires

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