

NAVIGATOR with PHCU Installation Instructions

Revised: September 11, 2006

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INSTALLATION INSTRUCTIONS FOR NAVIGATOR WITH PED HEAD CONTROL UNIT

General Information

Please read this entire document before proceeding with installation.
CAUTION: Warranty is void if these installation procedures are not properly followed.

The Navigator is designed to be installed on a Pedestrian Push Button pole adjacent to the pedestrian crosswalk. The Navigator control unit is designed to be powered from the “WALK” and “DON'T WALK” lighting power located inside the ped head. The control unit gets its operating power from whichever of the DW or W wires that is on. Power to the DW wire will be interpreted as a “DON'T WALK” or ped clearance interval and the locating tone and push-button functions will operate. Power to the W wire will be interpreted as a “WALK” period and the jumper selected sound for the “WALK” interval will operate. If both DW and W are powered simultaneously, a “DON'T WALK” period is interpreted. If the installer so chooses, separate power lines can be routed from the intersection controller to each ped head and used to power down the Navigator control unit as desired.

The solid state switch in the Navigator push button has been specifically designed to directly interface with the pedestrian inputs on the traffic controller. It is rated for 12-36 volts AC or DC. Rated current is limited to .3A fused, auto resetting. **Exceeding these ratings can permanently damage this switch!**

- Inputs & Outputs are transient protected and clamps any voltage over 36 volts.
- Transient Power Capability: 600W peak
- Input/Output Isolation Voltage: 5000V peak

Detailed Instructions

STEP 1: Set Arrow Direction (and Braille Location)

If the face plate (sign) has braille (an option), then the street name (braille translation) should be on a label on the back of the unit. The street name is of the street being crossed, not the direction of travel. Determine where each Navigator should be positioned to correspond with the braille and arrow direction. Otherwise if there is no Braille, the sign is reversible to configure the Navigator as a right hand or left hand unit.

If the Navigator arrow is not pointing in the desired direction, set the Navigator on the ground or on a flat surface. Loosen the four mounting screws on the ring surrounding the arrow button until they are just free of the base. Carefully lift the ring off the unit. Rotate arrow to desired direction. Reinstall ring. Tighten the screws in an alternating pattern until the ring is very snug.

Check vibration of the unit when mounted. The tightness of the screws effects the vibration of the unit. If the screws are too tight, vibration may be diminished. If the screws are too loose, the arrow/button may rattle. If the screws are tight and button rattles or is noisier than desired, try applying a very small amount of silicone where ring and diaphragm meet.

STEP 2: Mounting Holes

Position Navigator on pole at desired height and at a 90° angle to crosswalk or parallel to crosswalk, depending upon how your city wants the arrow and pushbutton orientated to the crosswalk. Note: The visually impaired often use the Navigator arrow as a directional indicator so it is important that the arrow point in the proper direction. Mark where the wire guide/protector on the Navigator's back plate hits the pole. Drill a 1" diameter hole in the pole. (If you are mounting the Navigator to a flat surface you can eliminate this guide/protector.)

Remove the Navigator's front plate by removing the 4 spanner head screws. Hold the Navigator at the desired position (with the wire guide/protector in the 1" hole if applicable). Mark on the pole through the two Navigator mounting holes. Drill and tap holes in the pole to accommodate ¼"-20 threaded machine screws.

STEP 3: Installing Wires

A minimum of four (4) pair is required for the standard functions. **However, for spares it is recommended that a 5 or 6 pair #18 to #22 awg stranded cable (or wire pairs) be installed between the Navigator and its corresponding ped head.** Different colored/marked pairs of wires are recommended. A suggestion for cable is Belden No. 9157 (4 pair) or Belden No. 8691 (6 pair). Route this wire from each push button station to its corresponding ped head. Some states/cities do not have the corresponding ped head on the same pole as the push button, so please note this. We recommend you leave a minimum of 18" excess wire in the ped head and 10" exiting at the pole/push button station location. Crimp spade lugs (optional) onto the ends of the wires in the ped head.

STEP 4A: Installing Control Unit in Ped Head

Polara's control unit is designed to fit into a 16" man/hand clam shell style ped head. It is very important that the ped head be well sealed to prevent water from dripping directly onto the control board. Make sure all mounting brackets, joints, etc. going into top of ped head are well sealed. **Polara's warranty does not cover failures caused by water dripping onto the control board.**

Note: The control unit will not fit in 16" clam shell WALK/DON'T WALK (word) style ped heads or older transformer style ped heads. If you have this type of ped head, you either have to change it out or attach an external weather resistant box to the back and mount the Navigator control unit in this weather resistant box. Polara offers an optional external mounting box p/n EMCB. (See Step 4B)

The control unit converts the 115 VAC WALK and DON'T WALK voltage to 16 VDC required by the Navigator. The installer must supply 3 wires, 12-18 awg (preferably different colors) 18" long with spade terminals crimped onto each end. Connect one end of each wire to the terminals on the control board marked **DW, COM, W.**

This control unit is designed to be mounted using the existing threaded holes in the top portion of the inside back wall of a 16" clam shell style dual incandescent lamp man/hand or solid state insert type ped head. If ped head has an aluminum mounting plate, remove two upper bolts and one lower bolt holding the plate. Position control unit so large oval holes in printed circuit board align with bolt holes. Run wires from control unit behind aluminum plate so they exit near WALK/DON'T WALK power terminals. Install two longer bolts and flat washers supplied (discard the two ¼"-20 nuts) so controller board is held in place, with nylon washer and insulator sheet between bottom of control unit and aluminum plate (or ped head) then reinstall 3rd bottom bolt.

- **CAUTION: Make sure 115 VAC power to ped head is turned off.** Connect the three control unit power wires to same terminals used by the ped head “WALK”, “DON'T WALK” and “COMMON” wires making sure the “DW” wire goes to “Don't Walk”, “W” wire to “Walk” and “COM” to “Common”. This is the 115 VAC provided by the signal controllers load switch. The GND terminal should be connected to an earth ground.
- Connect one pair of the outgoing cable pair (installed in step 3) to terminals on the controller board marked “**vibrator**”. Either wire can be used on either terminal. Connect second pair of outgoing wires to terminals marked “**speaker**”. Connect third pair of outgoing wires to terminals marked “**button**”. Connect the fourth pair to the terminals marked “**LED +/-**”.

STEP 4B: (Optional) Installation Instructions for EMCB

For situations where the control unit will not fit in the ped head, Polara offers a weather resistant box designed to protect the control unit from rain. The box is IP65 (equivalent to NEMA 4) rated.

These installation instructions are guidelines. There are many styles of ped heads so these instructions may not apply to your situation. You may need to improvise as needed.

Remove the lid from the box. Typically we ship the box with the control board mounted on the lid. Do not remove it. Preferably the box should be mounted to the back side of the of the ped head so the power wires can be run directly into the ped head. If you cannot mount the box to the back of the ped head choose a location on the pole (or elsewhere) as close to the ped head as possible. The installer must insure all drilled holes or conduit added to the box are moisture tight to prevent water from leaking in.

Mounting to back of ped head

Position box at desired location noting top and bottom. Determine and mark where holes need to be drilled in order to mount the box and route the control units power wires to the 115 VAC walk and don't walk power terminals in the ped head, and the 4 pair of wires that connect the Navigator to the control unit. Drill holes in the box as needed. Avoid drilling holes in the center where wiring might interfere with transformers and large capacitors on control board.

Reposition box at desired location and mark on the back of the ped head the holes you drilled plus the two mounting holes in the back of the box. Drill these holes in the back of the ped head. Mount box to ped head. We recommend you apply some silicone around all bolts and holes to keep moisture out. Using 4 of the 6 screws for the cover, you can temporarily mount the cover to the 4 top holes of the box so the inside of the cover is open and facing you. This will make it easy to connect wires to the control board terminals blocks without having to hold the cover.

Route all wires (4 pair) from Navigator to the control board and hook them up per Navigator installation instructions. Route power wires from control board to 115 VAC terminal blocks in ped head. Connect power wires per Navigator installation instructions. You must apply silicone around holes and wires going from box to ped head to keep water from getting into the EMCB and Ped Head.

Once units have been tested and volume control pots adjusted, place lid on box, apply pressure so foam seal strip compresses and holes line up, then install six screws.

Other Mounting

If the EMCB box cannot mount to the back of the ped head then mount it on the pole or where desired. You will have to drill holes in the bottom or side of the box and acquire the necessary weather proof fittings and conduit to route the control unit wires from the EMCB to the ped head. Do not drill holes and install conduit to the top or sides of the box. Follow ped head mounting instructions as applicable.

STEP 5: Installing Microphone in Ped Head

- Choose a location for the microphone on the bottom of the ped head where it will not interfere.
- Drill one ½" hole in bottom of ped head, towards back. (Mic comes already installed in the bottom of the EMCB)
- Place microphone over hole making sure as much of the fur sticks through as possible. (The fur helps reduce wind effect)
- Secure microphone in place with a piece of tape then apply silicone to at least two sides to hold microphone in place.
- Connect the microphone cable to the control unit.

STEP 6: Installing Navigator at the Pole

NOTE: If installing two units on a 5" or smaller diameter pole, you must use optional brackets available from Polara. Do not install one unit upright and the second unit upside down.

- Crimp spade lugs (optional) onto the ends of the wire pairs exiting pole at the Navigator location.
- Connect the control unit “vibrator” incoming wire/cable pair to the terminals marked “VIBRATOR” (polarity is not important). Attach “speaker” pair of control unit incoming wire/cable pair to the terminals marked “SPEAKER” (polarity is not important). Attach “button” pair of control unit incoming wire/cable pair to the terminals marked “BUTTON” (polarity is not important). Connect the original intersection push button wires to the second set of “BUTTON” terminals. Connect the control unit LED incoming wire/cable pair to the terminals marked “LED +, -“. **Caution, you must maintain polarity and hook up + to + and – to –. Note terminal identification label (Fig. 1a) on inside of back panel.**

Fig. 1a

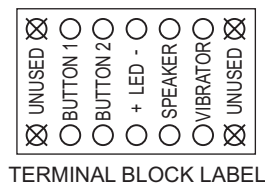
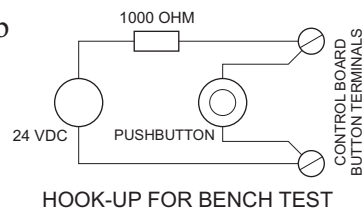
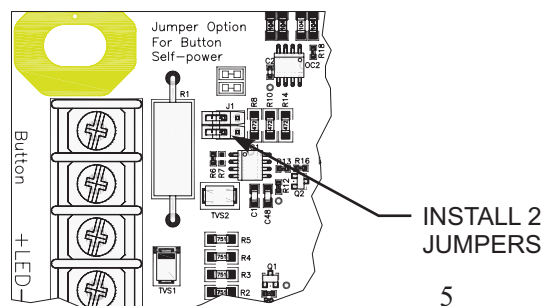


Fig. 1b



- **IMPORTANT:** The control board “Button” input must have an external low current AC or DC voltage source connected in parallel with the pushbutton for the Navigator system to work properly. This input monitors the voltage and interprets 0 volts as a button push. In a typical installation, the ped button wire pair from the intersection control cabinet connects to the second set of button terminals on the Navigator which are in parallel with the Navigator control unit button wires. This connection will normally provide the required voltage. If you do a bench test, you must connect a source of 12 volts AC or 24 volts DC with current limiting such as a 1000 ohm resistor in series (Fig. 1b).

Note: If you are installing an intersection with no pushbuttons (walk phase on every cycle), jumpers at position J3 must be installed on Ped Head Control Unit. See illustration below:



- To ensure Navigator unit is sealed from water, apply Silicone to area as shown in Fig. 3A to prevent water from entering into the back of the unit. Note: There must be a small gap at the bottom to allow any water that may possibly enter the back of the unit to drain. Minor condensation is not a concern in this area. Install back cover onto Navigator and secure with 5 screws.
- Using electrical tape, tape from the wire guide to the wires to create a moisture tight seal. Apply a liberal amount of silicone over tape and around wires so water cannot flow down wires and into terminal block cavity. (see Fig. 2)

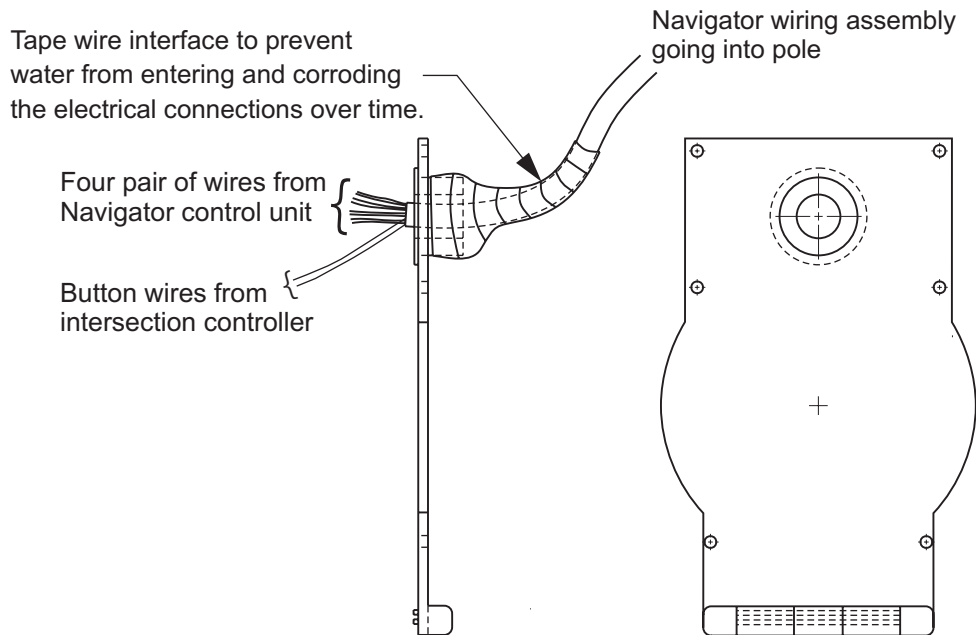


Figure 2

- Move the Navigator into position slowly and check for any internal obstructions. Note: Wiring **MUST NOT** be pinched between the pole and Navigator. Push any excess wire back into the pole. Try to push wire in a downward direction so that any moisture on wire will flow away from the Navigator. Bolt Navigator to pole using two 1/4"-20 bolts provided.
- Silicone area as shown in Fig. 3 to prevent excessive water from entering the top of the unit between the sign and Navigator body. **This also eliminates vibration noises when the Navigator is playing sounds at high volume levels.**

Silicone two places as shown in Fig. 3. This eliminates vibration noises when the Navigator is playing sounds at high volume levels.

- Reinstall front plate with 4 screws.

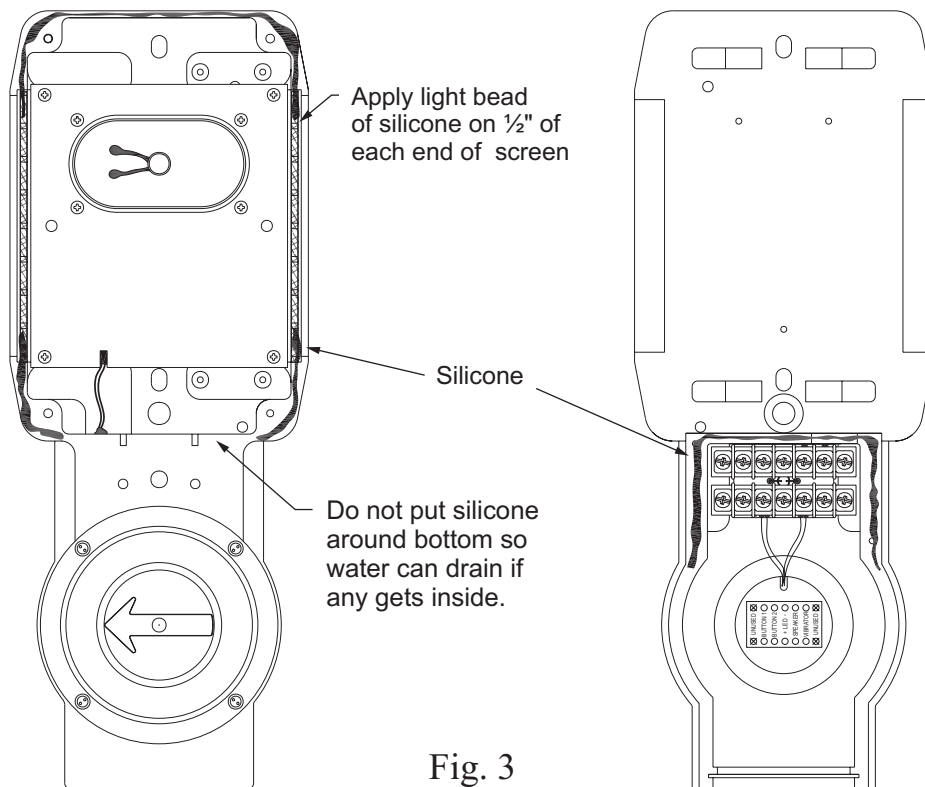


Fig. 3

Operational Testing

STEP 1: Apply power to the WALK/DON'T WALK signal.

STEP 2: Manually feel the 'button' on the Navigator during the "WALK" cycle. A very noticeable pulsing movement should be detected. If the vibration is noisy (sounds rattly) tighten the four screws in the outer ring until rattle sound stops but vibration is still strong. If vibration is not strong, loosen each screw 1/4 turn at a time until vibration is strong, but not noisy.

STEP 3: Manually feel the button during the "DON'T WALK" cycle. There should be no noticeable pulsing movement.

If the locating tone option is used it should sound once every second once power is applied.

If the audible options are used they should sound during the "WALK" cycle and at the same time the button is vibrating. (See jumper setting section under field selectable set up.)

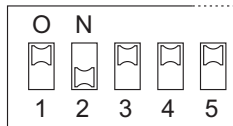
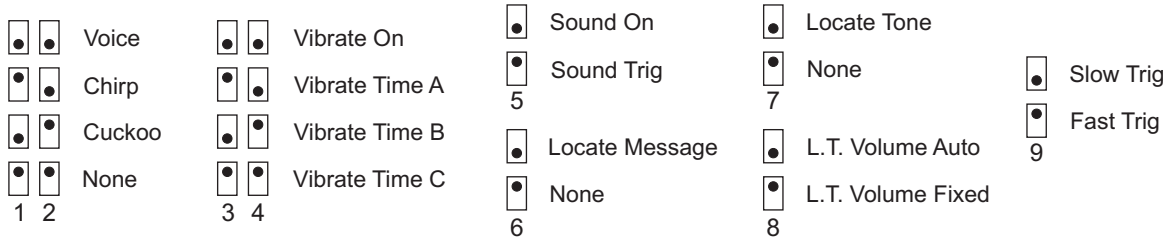
If the "Voice on Location Option" is chosen it should sound when the button is pushed and held for three plus seconds.

See Volume Control Section on page 9 for setting volumes and mic sensitivity.

If everything checks out properly and you are certain you will not need to adjust the four screws on the outer button ring, install the four nylon caps into the screw holes. Press them in firmly with your finger then push with a hard flat object until they are flush to the front of the ring. If it is necessary to remove them later simply drive a sheet metal screw into the center of the plug. These plugs are intended to hide the screws identity from vandals. Replacements can be ordered from Polara or your local distributor.

Navigator Control Unit Field Selectable Setup Options

The Navigator has a 10 position dip switch available for selecting options. The switch is located near the bottom center of the Control Unit. The options are selected by setting the switch on or off for each option as shown.



Example Shows - Chirp Selected
 - Vibrate Time C Selected
 - Sound Trig Selected (extended push activation)

Currently 9 of the 10 positions are used for the following options.

Positions 1 and 2 are used together to select the sound heard during the “WALK” interval.

1 OFF / 2 OFF VOICE

When sounds are enabled, a verbal message will be heard during the “WALK” interval. The verbal message will be either the standard “walk sign is on” , or optionally, a custom programmed message.

1 ON / 2 OFF CHIRP (East/West)

When sounds are enabled, a chirp or peep sound will be heard during the “WALK” interval.

1 OFF / 2 ON CUCKOO (North/South)

When sounds are enabled, a cuckoo sound will be heard during the “WALK” interval.

1 ON / 2 ON NONE

This setting disables all sound during the “WALK” interval.

Positions 3 and 4 are used together to determine the length of time the vibrator and sound operate during the “WALK” interval.

3 OFF/ 4 OFF VIB ON

The vibrator and sound will operate for the full duration of the “WALK” interval. Any in-progress voice message will end when the walk interval ends.

3 ON/ 4 OFF VIB TIME A

The vibrator and sound will operate for typically 6 seconds. (used for rest in walk situation)

3 OFF/ 4 ON VIB TIME B

The vibrator and sound will operate for typically 12 seconds. (used for rest in walk situation)

3 ON/ 4 ON VIB TIME C

The vibrator and sound will operate for typically 18 seconds. (used for rest in walk situation)

5 SOUND ON / SOUND TRIG

OFF enables sounds for every “WALK” interval. ON enables sound only during a “WALK” interval following a button push and hold for 3+ seconds. When the button is pushed and held, a second button click or the VOICE ON LOCATION message confirms the button was held for the required time. **Note: Do not set to “ON” if crosswalk/intersection is set to rest in walk. If a blind person does not push and hold the button, and if a car never triggers the cross street, they could not get a walk indication.**

6 LOCATE MSG (VOICE ON LOCATION)

If a custom programmed VOICE ON LOCATION message is available, this position enables or disables it. OFF enables the message after the button is pushed and held for 3+ seconds. ON disables the VOICE ON LOCATION message. With this setting the button push and hold time is confirmed by a second button click.

7 LOCATE TONE (Locating Tone)

OFF enables the locate tone which is heard except when “WALK” interval sound or vibration is active. Locate tone is also paused while the button is pushed and during the location message. ON disables the locating tone.

8 LT VOL

OFF enables the locating tone volume to adjust automatically in response to ambient noise. ON disables this so that the locating tone volume is constant.

9 TRIG DELAY

Applies only when switch 5 is in "Sound Trig" (ON) position. OFF requires a button push of 3+ seconds to enable sound during "WALK" interval. ON will cause a button push of any duration to enable sound during the walk.

Push Button Click: This is not a selectable option. As long as the controller board is powered, and is connected to the ped push button, whenever the push button is pressed during a “DON'T WALK” interval, a confirming click will be heard from the speaker. If an extended push of 3+ seconds is maintained you will then hear either the VOICE ON LOCATION message (If switch/jumper 6 is off) or, a second click. The VOICE ON LOCATION or second click after the extended push is confirmation that sounds will be enabled for the next “WALK” interval if 5 is ON.

Volume Control: There are four volume controls located on the lower right portion of the control board. The LOCATE MIN control sets the minimum volume for the locate tone. The LOCATE MAX control sets the maximum volume for the locate tone. The microphone connected to the control board listens for the ambient noise and adjusts the volume between the minimum and maximum levels. In the absence of noise, or with no microphone the volume will stay at the minimum level. The VOLUME MIN control sets the minimum volume for all sounds except the locate tone. The VOLUME MAX control sets the maximum volume for all sounds except the locate tone. The ambient noise level adjusts the volume between the minimum and maximum levels. In case the MAX control is at a lower setting than the MIN control, the MAX control sets the volume and there will be no change due to ambient noise. With the MAX control at the minimum rotation, the sound will be silent.

Note: Adjust pots carefully, these pots adjust only approximately 270°. Do not force the pot past stops or you will damage the pot.

With everything hooked up as specified and the pots set at their midpoint, you should hear a locating tone sound once per second during the “Don't Walk” and ped clearing phases. When you push and hold the button for 3 or more seconds you should hear a second click at 3 seconds or the voice on location message will play if the unit was ordered with this option. During the walk interval a cuckoo, chirp or voice message should play. All of these sounds must be adjusted to fit the needs of the intersection. The easiest way to do this is as follows.

Set the Mic Sensitivity control at its midpoint. Turn the LOCATE MIN control to 9 o'clock and the LOCATE MAX control to 3 o'clock.. Continuously tap on the ped head (to create noise) and note how loud the locating tone gets. Note: In the highest ambient noise condition (and in normal conditions) you should only be able to hear the locating tone within approximately 10-15 feet of the pole. Do not set it so high that it will disturb surrounding neighbors or businesses. Adjust the MIN and MAX controls as needed such that the locate tone volume is appropriate for the particular environment and noise conditions.

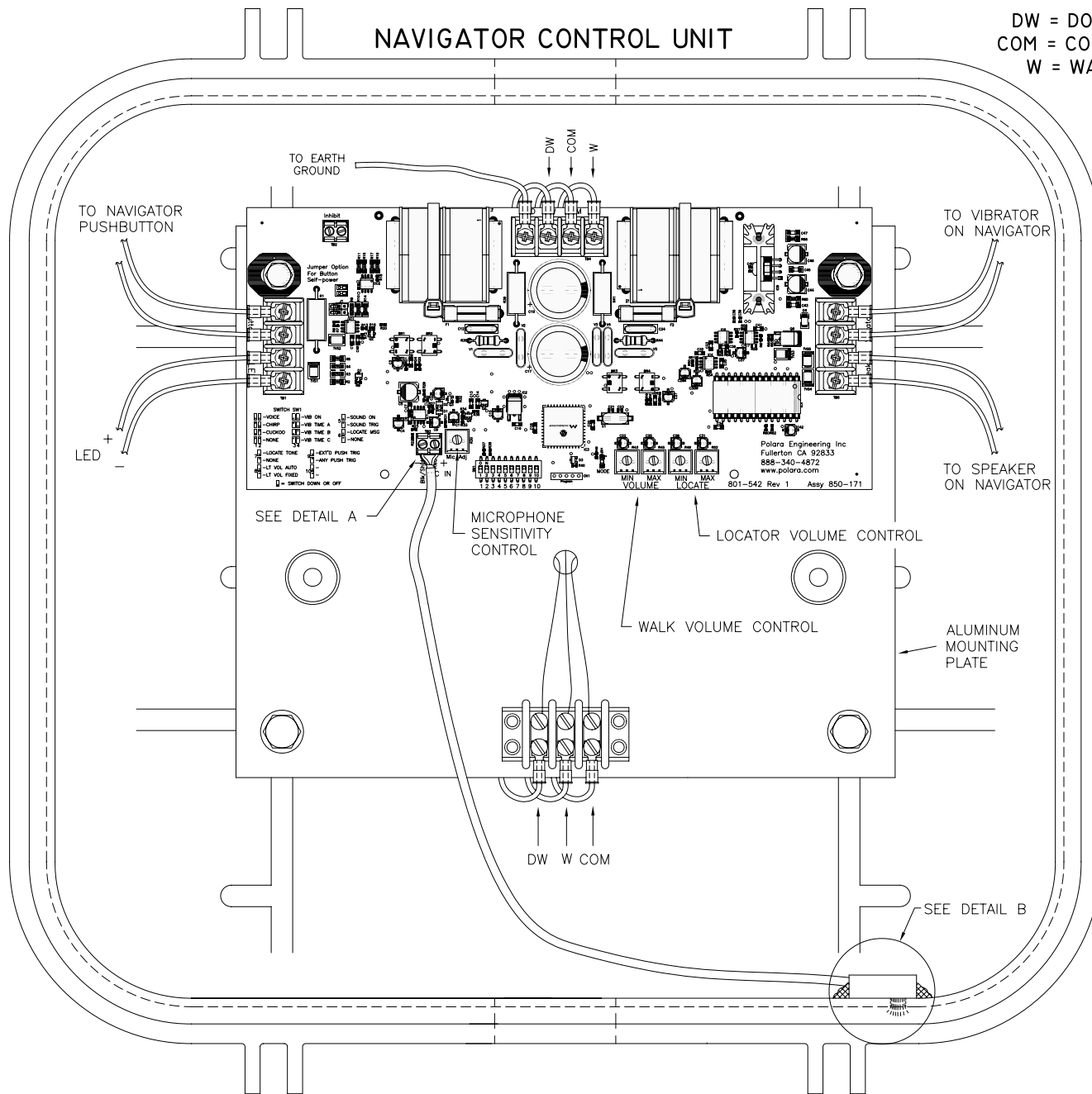
Next, adjust the volume of the walk message in the same manner, however, it should be fairly loud so it can be heard clearly by a user. Now adjust the mic sensitivity pot until, in normal ambient conditions, the sounds increase as needed for normal increases in ambient noise. Typically the mic pot setting should be between zero and 50 percent.

Remember: The locating tone, at all times, should only be loud enough to be heard within approximately 15 feet or less from the push button.

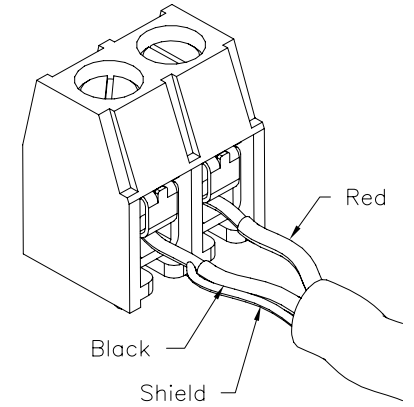
The INHIBIT input can optionally be used to silence sound at any time. This is a 115 volt AC input. The two terminals at the Inhibit terminal block are one connection shorted together and should connect to AC Line voltage. The COM terminal at the top center of the control board is also the common for the Inhibit input. With no voltage, the sounds operate normally. With 115 volts AC present, the sounds are muted.

NAVIGATOR CONTROL UNIT

DW = DON'T WALK
 COM = COMMON
 W = WALK



DETAIL A



DETAIL B

