

# Inspection, Testing, and Adjustment of Switches

1. Begin the inspection by recording the switch nameplate and module data. Make copies of the sample forms shown on pages 33 and 34 of the VES CO. catalog to aid in recording this data.
2. Close the switch and measure the resistance of all modules using a micro-ohm meter.
3. Open the switch and hi-pot each module using a 30kVAC hi-pot and record the leakage current at 30kV.
4. When doing work on switches, use the bolt torque values shown on page 32 of the catalog. Torque wrenches and tools for this purpose are contained in the tool kit shown on page 16 of the catalog.
5. Invert the switch, remove the switch cover, and place the switch in the closed position as shown in Figure 1. Place a paper towel or rag in the space between the insulator and pull rod to prevent objects from accidentally falling into the module.
6. Measure and adjust the link angle as shown below. Note that the allowable link angles on switches for motor operated or solenoid switches and with regular or double stack modules are different as shown on the inspection record sheets.
7. Measure and adjust the full travel Figure 5.

Note that the pointer is indicating that the switch is in the closed position

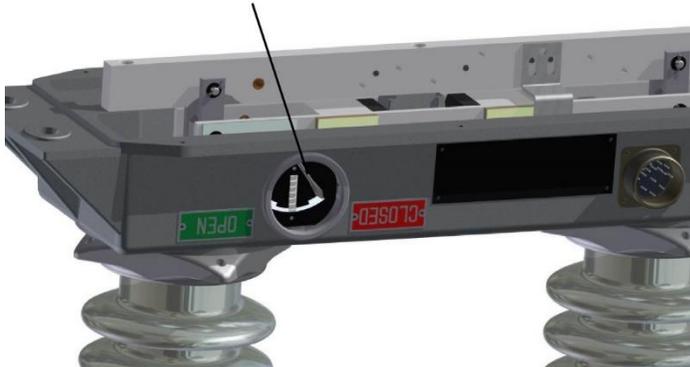


Figure 1

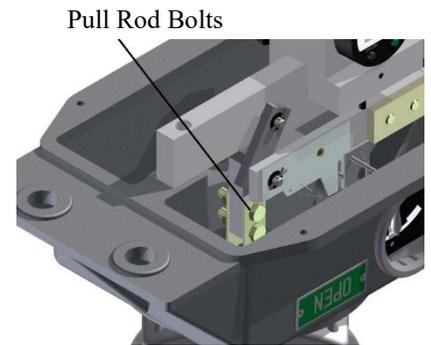


Figure 2

## To Check the Link Angle

1. Start by using 1001104P1 (3 degree measuring tool) or the 1001104P2 (1 degree measuring tool) by placing it on the far end of the handle side of the support bar and against the linkage bar as shown in Figures 3 & 4.
2. The minimal gap between the link and the tool indicates the angle of the link, which corresponds to the angle of the tool.

Gap on the Bottom Edge of Setup Tool

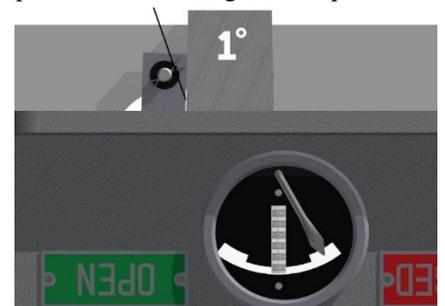


Figure 3

## To Adjust the Link Angle

1. The link angle is controlled by the closing bumper which is one of two bumpers shown in Figure 5.
2. Mark the position of the closing bumper and then open the switch.
3. Loosen the two 5/16" bolts that fasten the closing bumper and move it in a direction to increase or decrease the link angle as required.
4. Re-tighten 5/16" bolts, flip the switch back to the closed position and recheck the link angle.
5. Repeat steps 2-4 until the desired degree link angle is achieved.

Gap on the Top Edge of Setup Tool



Figure 4

## To Check the Full Travel

1. Flip the switch into the closed position and place the dial indicator gauge near the far end by the bumper block as shown in Figure 5.
2. Zero the dial, flip switch to the open position, and record the dial reading. A properly adjusted switch has full travel between 0.200" and 0.210" as shown in Figure 8.

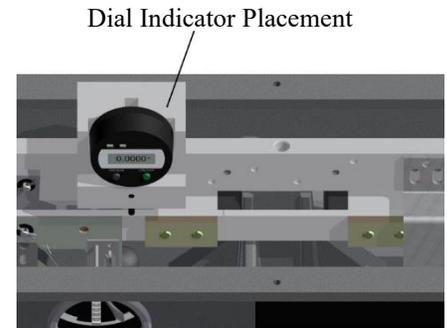


Figure 5

## To Adjust the Full Travel

1. Move the switch to the closed position. Mark the position of the opening bumper.
2. Loosen and move the bumper to increase or decrease the full travel as required. Tighten the bolts.
3. Repeat steps 1 and 2 until the travel is within range.

0.185" is not in Range of Full Travel



Switch is in the Open Position

Figure 6

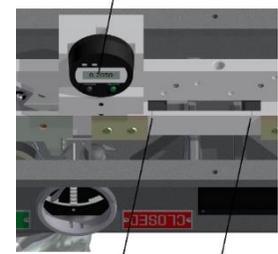
Zero Reading



Closed Position Position Mark

Figure 7

0.205" +/- .005" Full Travel



Position Marks

Figure 8

## To Check the Synchronism Between Vacuum Bottles

1. Hook any type of continuity device (light box, ohm meter, beeper box, or etc.) to the top (red lead) and bottom (black lead) terminal pad of each module.
2. Flip switch to the closed position and zero the dial indicator.
3. Place a 3/4" open end wrench on the center link and pull the switch open while noting the dial indicator reading for each module at moment at which continuity is lost. It should be between 0.036" and 0.044" for a properly adjusted switch.

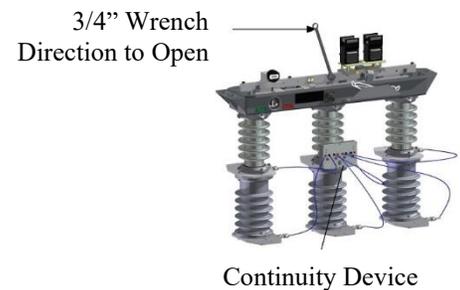
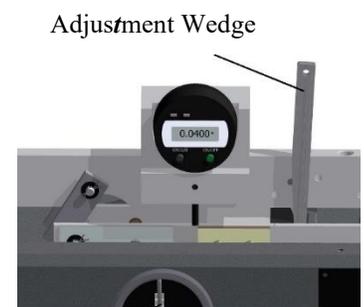


Figure 9

## To Adjust Contact Synchronism

1. With the switch in the closed position loosen all pull rod bolts as shown in Figure 2.
2. Force the adjustment wedge (1001538P1) between the closing bumper block and housing until the dial indicator reads 0.040" +/- .004" as shown in Figure 10.
3. Insert and tighten the pull rod bolts and then remove the wedge.
4. Measure and record the sync of each module the same as in step 3 above.
5. Repeat steps 1-4 until all modules lose continuity between 0.036" and 0.044" of travel.



Note Needle is Half Way Between Open and Close

Figure 10

# Adjustments for Solenoid Operated Switches Only

## To Check the Auxiliary Switch Travel

1. Place the switch in the closed position, zero the dial indicator, and clamp the operating handle to the handle cover with a c-clamp so that the handle does not move.
2. Apply a 3/4" open-end wrench to the center link and open the switch by moving the wrench away from the solenoid.
3. Listen for a click sound indicating the Eaton™ auxiliary switch has changed state. It should change state before 0.175" of travel.
4. Record the dial indicator reading at the change of state.
5. Once the click is heard, return the wrench to its starting position while listening for a click again. It should change state again before the travel decreases to 0.025".
6. Record the dial indicator reading at the second change of state.
7. The auxiliary switch must change state before 0.175" on opening and again before 0.025" on closing.

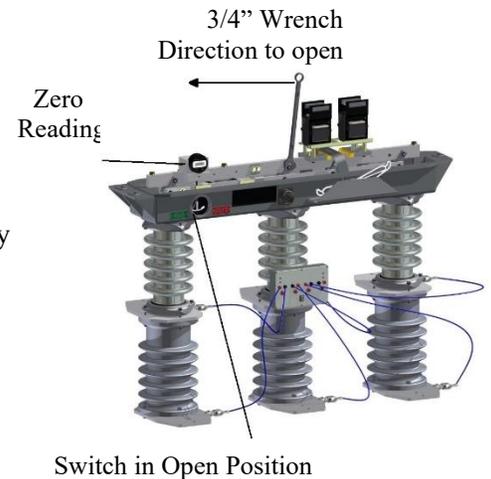


Figure 11

## To Adjust the Auxiliary Switch Travel

1. With the switch in the closed position, mark a line on the support bar to indicate the position of the auxiliary switch mounting bracket.
2. Slightly loosen the two 1/4-20 bolts, move the bracket to the desired position, and retighten screws as shown in Figure 12.
3. Check the auxiliary switch travel by repeating steps 2-5 above.
4. Repeat the readjustment until the auxiliary switch changes state before 0.175" on opening and 0.025" on closing.

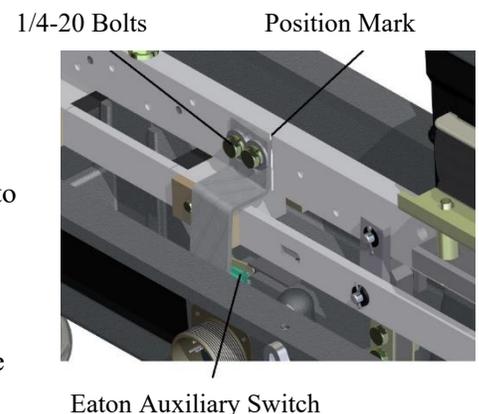


Figure 12

## To Check and Adjust Solenoid Pin Gap

1. Place the switch in the closed position and measure pin gap for the opening solenoid by sliding thickness gauges between the nylon and metal pins as shown in Figure 13.
2. Place the switch in the open position and similarly measure the pin gap for the closing solenoid.
3. The pin gaps must be between 0.060" and 0.090".
4. To adjust the gap remove solenoid assembly mounting bolts one at a time and add or remove shims (1000754P1) between the solenoid mounting plate and the zinc plated spacers. This gap controls switch speed. Larger and smaller gaps increase or decrease switch speed respectively.

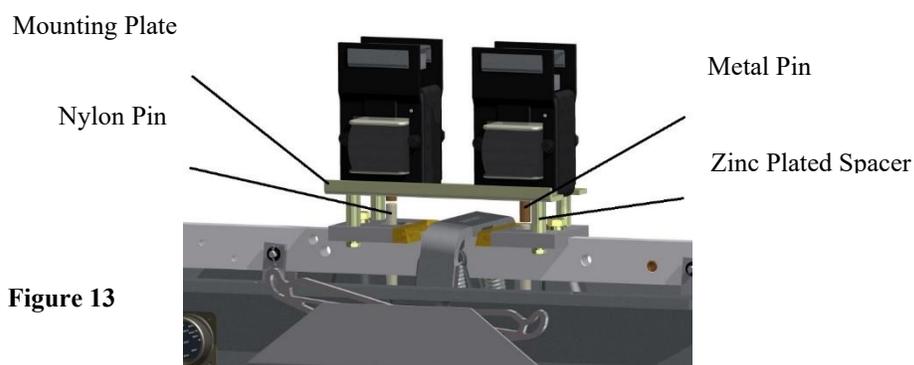


Figure 13