YORK
BY JOHNSON CONTROLS
Service Information

File In/With: N/A
SI0100 Supersedes SI0100 (904)

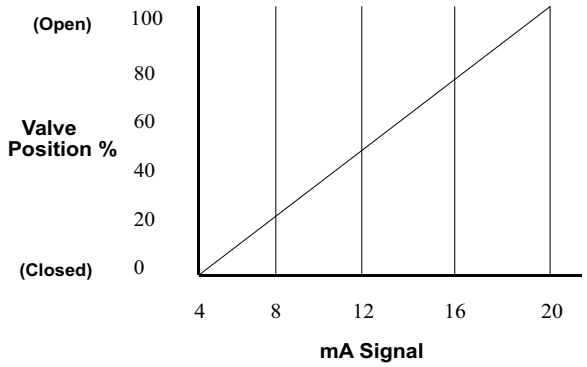
SI0100
Rev 7-11

Equipment Affected: YIA Absorption Chillers

Adjusting and Calibrating Samson 3274 Steam Valve Positioner

GENERAL

All YORK YIA y supplied with a Samson control valve. All two-way, cage-type, steam valves have a fail-safe mechanism that will close the valve to a safe position upon power interruption. All Samson valves incorporate a 4 to 20mA control signal with no feedback capability. A graph, shown below shows the valve position vs. input signal. Control valve wiring can be obtained in YORK literature supplement 155.16-M3 (LS01) or wiring diagram 155.21-W1.



VALVE SETUP

The 2-way and 3-way Samson cage valves utilize a type 3274 electro-hydraulic actuator. These actuators and positioners are fully adjusted and calibrated to YORK'S requirements. **DO NOT remove the cover with the sealed screws on the top of the actuator for any reason, this compartment is factory sealed under a vacuum. Allowing air to enter this chamber will render the valve inoperable. This condition cannot be field repaired and a replacement actuator is the only remedy.**

First make sure the valve is configured to receive the control panel's 4 to 20mA control signal. There are four DIP switches (see Figure 1 page 2) under the actuator's control cover (front of actuator, top center). Remove this cover and make sure DIP switches one and two are in the OFF, or DOWN position. DIP switches three and four must be in the ON, or UP position.

Work on this equipment should only be done by properly trained personnel who are qualified to work on this type of equipment. Failure to comply with this requirement could expose the worker, the equipment and the building and its inhabitants to the risk of injury or property damage.

The instructions on this service bulletin are written assuming the individual who will perform this work is a fully trained HVAC & R journeyman or equivalent, certified in refrigerant handling and recovery techniques, and knowledgeable with regard to electrical lock out/tag out procedures. The individual performing this work should be aware of and comply with all Johnson Controls, national, state and local safety and environmental regulations while carrying out this work. Before attempting to work on any equipment, the individual should be thoroughly familiar with the equipment by reading and understanding the associated service literature applicable to the equipment. If you do not have this literature, you may obtain it by contacting a Johnson Controls Service Office.

Should there be any question concerning any aspect of the tasks outlined in this bulletin, please consult a Johnson Controls Service Office prior to attempting the work. Please be aware that this information may be time sensitive and that Johnson Controls reserves the right to revise this information at any time. Be certain you are working with the latest information.

Product Technical Support

VALVE CALIBRATION

For reference purposes, when the actuator stem extends, it closes the flow off to the chiller. This applies to both 2-way and 3-way valves.

1. Hook up electrical circuitry as follows (refer to Figure 1):
   A. Connect 110V power supply to terminal N and L,
   B. Connect the 4 to 20mA signal wiring to the valve, to terminals 11 and 12. Be sure to observe polarity by connecting the positive lead (+) to terminal 11 and the negative lead (-) to terminal 12.
   C. If you are using a meter to monitor the signal, connect the meter to terminals 31 (+) and 32 (-).
2. Insert a small flat bladed screw driver under the white elongated button on terminal 81. Gently lift the screw-driver until the button pops up (the red marking pin should be visible at this point). This will allow the actuator to be set manually by using the two small black square buttons next to the white button.

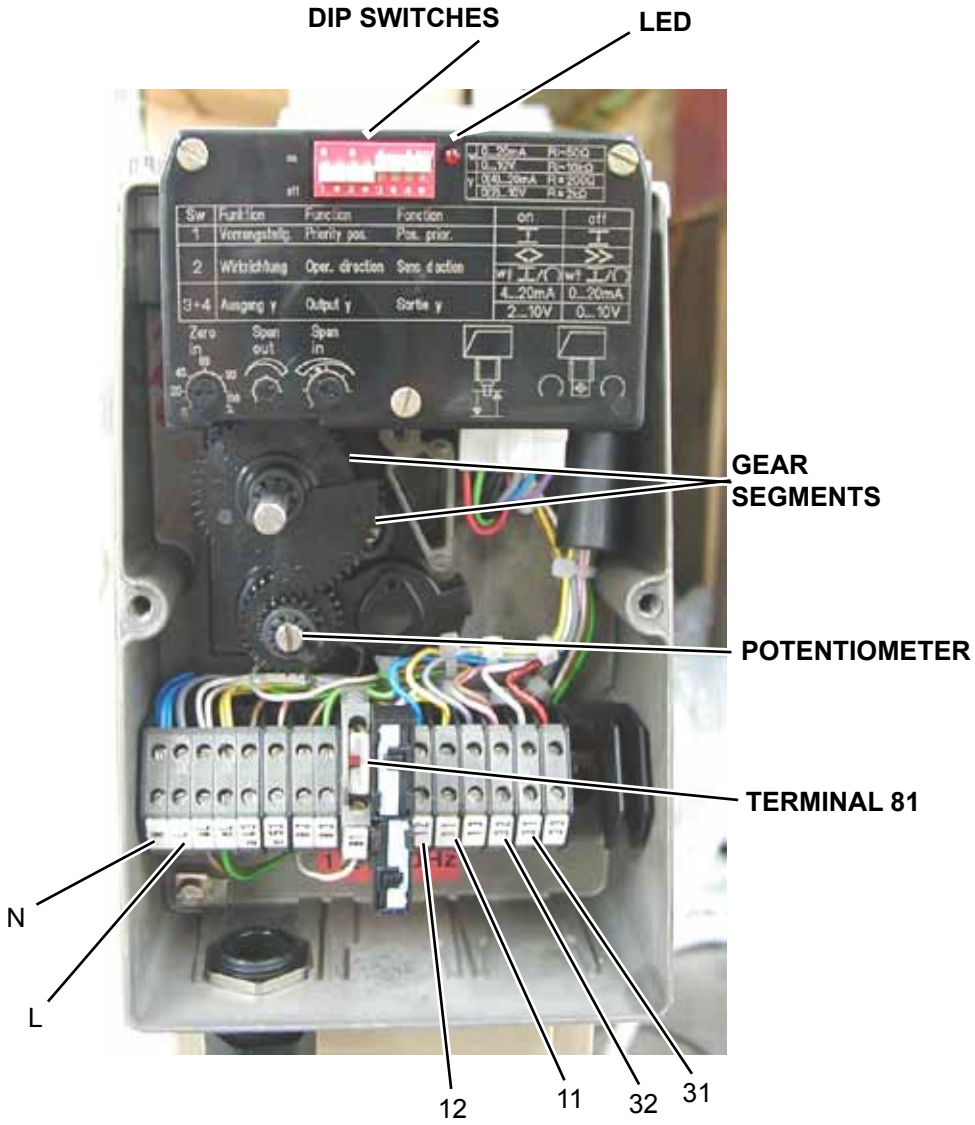


FIGURE 1 - ACTUATOR WITH COVER REMOVED

3. Manually adjust the actuator stem length to 75mm from the bottom of the actuator case to the flat end of the actuator stem. Do this by pressing the top black button until the stem reaches the correct length. For reference purposes all valves have a 15mm stem travel except for 6" valves which have stem travel of 30mm.

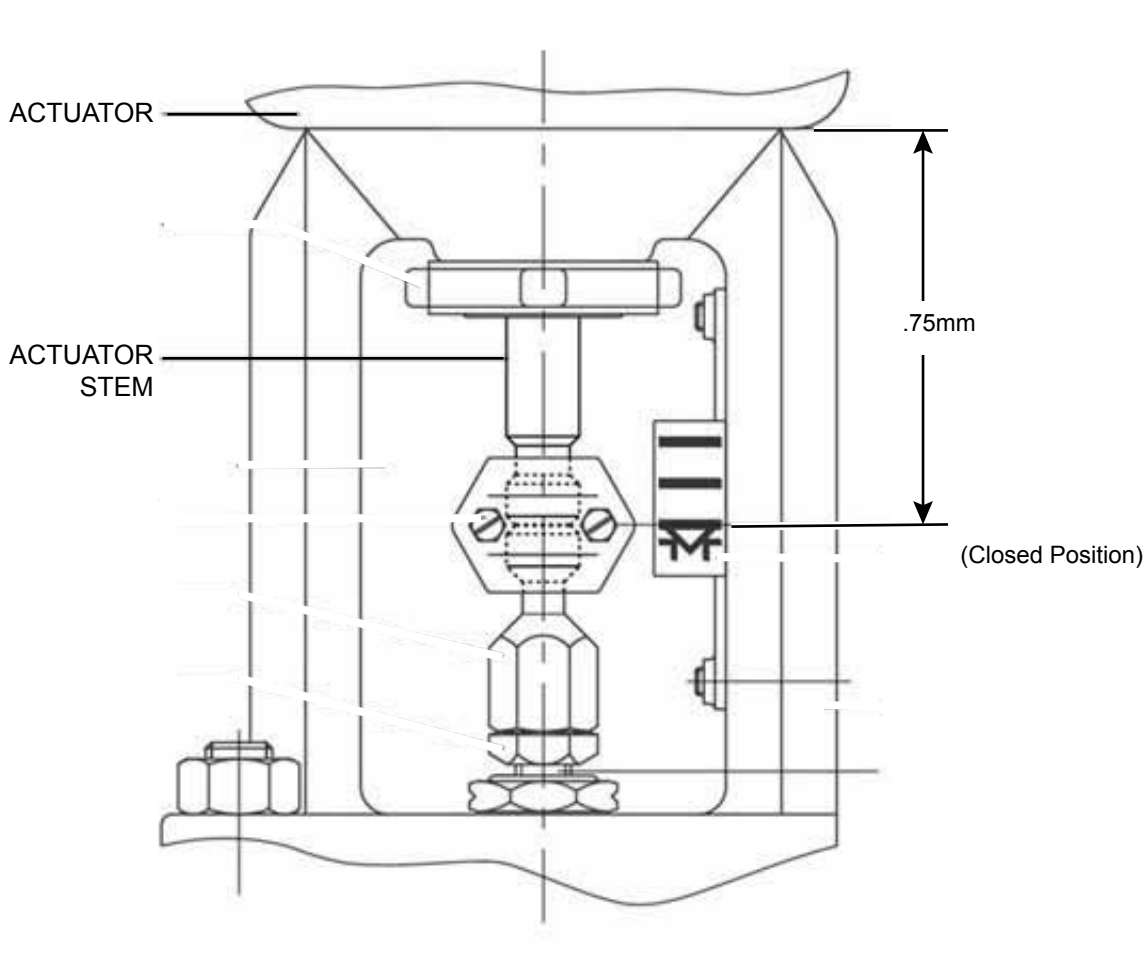
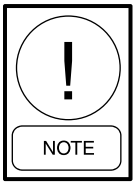


FIGURE 2 - ADJUSTING ACTUATOR STEM LENGTH

4. Ensure the valve is in the closed position and the travel indicator is matched with the closed position.
5. Connect a mA driver to terminals 11 (+) and 12 (-). Set driver to 4mA.
6. There are two gears to the left-center of the actuator; these are the potentiometer gearing, one for 15mm stem travel valves and one for 30mm stem travel valves. These gears will need to be set to zero in the following manner:
   A. Match the correct gear to your valves stem travel.
   B. Using a flat bladed screwdriver, place it in the metal slot on the gear center and hold the gear in place while twisting the associated gear until the arrow on the gear points down to the point where the gears mesh.

C. While still holding the gear steady, gently turn the rod with the screwdriver clockwise until it stops.



While aligning the arrow it may be necessary to gently turn the center rod counter-clockwise to prevent binding and possible damage.

The potentiometer is now set.

7. Just above the gearing are three adjustment knobs. First is the "Zero In" adjustment:
   A. Before beginning, set the "Span In" adjusting knob to the mid position.
   B. With the mA driver hooked up, and set to 4mA, turn the "Zero In" adjustment counter-clockwise (CCW) until it reads zero.
   C. Slowly turn the "Zero In" clockwise (CW) until the red LED light goes OFF.
   D. Once the red LED goes OFF, turn very gently CCW again until the red LED comes back ON.

   "Zero In" is now set.
8. To set the top end of the travel stroke:
   A. Set the mA driver to 20mA and push the top black square button on the actuator to start the stem moving up.
   B. Hold the button in until the stem reaches the top and the motor stops running.
   C. Turn the "Span Out" knob with a small screwdriver in the "Span Out" slot until 20mA is displayed on the readout. You may have to turn the knob CCW or CW but be gentle; a small amount will make a big difference in readout.
9. The "Span In" knob can now be set:
   A. Turn the "Span In" adjustment knob all the way CCW then slowly turn it CW until the red LED goes OFF.
   B. Continue turning it CW very gently until the red LED comes back ON.
10. You may now push the elongated white button for terminal 81 back in until it locks into place.
11. Stroke the actuator open and closed while checking your readout, it should read between 4.0mA and 4.3mA on the lower end (closed) and 19.8mA and 20.1mA on the upper end (open).
12. To check mA current, connect one lead of a digital voltmeter to test point TP5 (+V) on the I/O board and the other lead to TP3 (GND). Current can be calculated by measuring the voltage at TP5 and solving the following formula:

$$Ima = \frac{E}{226} \times 1000$$

with E equal to the voltage measured at TP5

To solve for Volts use the following formula:

$$E = Ima \times 226$$

Two examples are listed as follows:

- 4.0mA = .004 x 226 = .904 volts
- 20.0mA = .02 x 226 = 4.52 volts