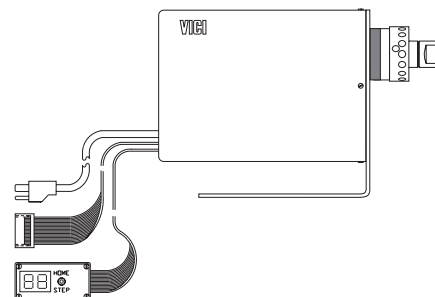




# Operation Notes and Alignment Instructions

## Electrically Actuated MW Type Multiposition Valves



### Initial Precautions

After unpacking the valve, leave the protective tape covering the valve ports until you are ready to install the valve. As supplied, all surfaces are clean and free of contaminants, and must be kept clean to prevent valve damage. Open ports and fittings cause unnecessary risk of particulate matter entering the valve and scratching the sealing surfaces, which is the most frequent cause of premature valve failure. As with all sampling and selector valves, we strongly recommend the use of in-line filters at sample entry points. Streams should be filtered to 10 microns or less.

**NOTE:** The most common source of particulate and chemical contamination is tubing which has not been properly cleaned before installation on the valve. To avoid this problem, Valco suggests purchasing our electrolytically pre-cut and polished tubing, available in standard lengths for any plumbing requirement. If other tubing is to be used, make certain that all tubing ends are burr-free and cut square with the tube axis, and that all tubing has been chemically and mechanically cleaned.

### **CAUTION:**

Failure to observe proper cleanliness procedures during valve installation voids the manufacturer's warranty.

To insure minimum connection volume, make certain that the tubes are seated completely before forming the one-piece Valco ferrule on the tube. (For complete fittings installation instructions, refer to **Technical Note 503**, available in the support section of [www.vici.com](http://www.vici.com).)

### Electric Actuator Implementation

The actuator consists of the following: (a) the actuator assembly, (b) a control box with LED display, and (c) a 20-conductor cable for interface to a computer, data system, etc. When the actuator power cord is plugged in, the LED display in the control box will show the position of the actuator and valve. To move the valve to the next position, momentarily move the three position (normally off) toggle switch toward "STEP" on the control box. The control box display will indicate the new position. If the toggle switch is moved momentarily to the "HOME" position, the actuator will move the valve to Position 1, or "Home". Once it is "home" (Position 1), the actuator will not rotate another 360° if "HOME" is accidentally hit a second time.

Using the interface cable supplied, any of these operations may also be performed by a computer or data system with the capacity to provide external events control. The computer or data system input/output signal must be either negative true logic or a contact closure. Chapter 3 of the **Multiposition Electric Actuator Instruction Manual**, available in the support section of [www.vici.com](http://www.vici.com), contains more detailed information on this subject.

## Valve Alignment

When the valve arrives from the factory installed on an actuator, it is accurately aligned and ready for use. However, anytime the clamp ring on the actuator is loosened, as when removing the valve from the actuator for mounting through an instrument panel or oven wall, the valve and actuator must be realigned so that the internal ports and flow passages on the rotor intersect properly. (See *Causes of Misalignment*, Section 1, below.)

### **CAUTION:**

Before removing the valve from the actuator, mark the factory alignment position of the valve.

**Closemount:** Make temporary registration marks on the face of the valve where it lines up with the slot in the clamp ring on the actuator.

**Standoff:** Make temporary registration marks on the standoff tube where it lines up with the slot in the black anodized clamp ring on the actuator. DO NOT remove the valve from the standoff assembly.

When this mark is lined up with the slot during reassembly, the factory alignment will be approximately reproduced, as long as the valve and the actuator remain in their original positions.

## Chromatographic Symptoms of Misalignment

### 1. Loss of flow or blocked flow

When the valve body, rotor, and actuator are not in proper alignment, the ports of the valve do not completely intersect the engravings on the valve rotor. Often flow is cut to all positions, but a slight misalignment might eliminate flow from ports on one side of the valve only. In liquid applications, blocked flow may cause a pressure buildup, leading to pump shutdown or failure of other components. To confirm that misalignment is the problem, use a rotometer or a line placed into liquid to observe the momentary flow between positions as the actuator cycles the valve.

### 2. Mixing of samples

In some configurations with large ports and their corresponding large engravings which are very close together, poor alignment can cause mixing of samples even when a flow restriction has not been observed. This may be manifested as “ghost” peaks or poor reproducibility.

## Causes of Misalignment

### 1. Removal of valve from actuator for mounting

As referred to earlier, mounting valves through a bracket or oven wall requires that the valve or valve/standoff assembly be separated from the actuator. In the case of a valve on a standoff, this is accomplished by using a 9/64 hex driver to loosen the socket head screw (HWSC-SC8-8B) in the black anodized clamp ring (CR3) on the actuator (**Figure 3**). For valves utilizing a closemount assembly, the removal is accomplished by using a 7/64 hex driver to loosen the socket head screw (HWSC-SC8-8TDH) in the clamp ring (CR11) on the actuator (**Figure 4**). Any time these screws have been loosened, the alignment of the valve after replacement on the actuator should be checked.

*The chances of proper alignment after reassembly are greatly enhanced by following the suggestion in the **CAUTION** note above.*

## 2. Shock from heavy or continuous use

Occasionally, when valves are used in applications requiring a high-duty cycle, wear or shock can cause the screw and clamp ring to loosen. Instrument vibration may have the same effect. This allows the standoff to move, causing inaccurate rotor rotation. The most obvious symptom is an observable movement of the standoff, valve, or actuator, which normally do not move when the valve is actuated.

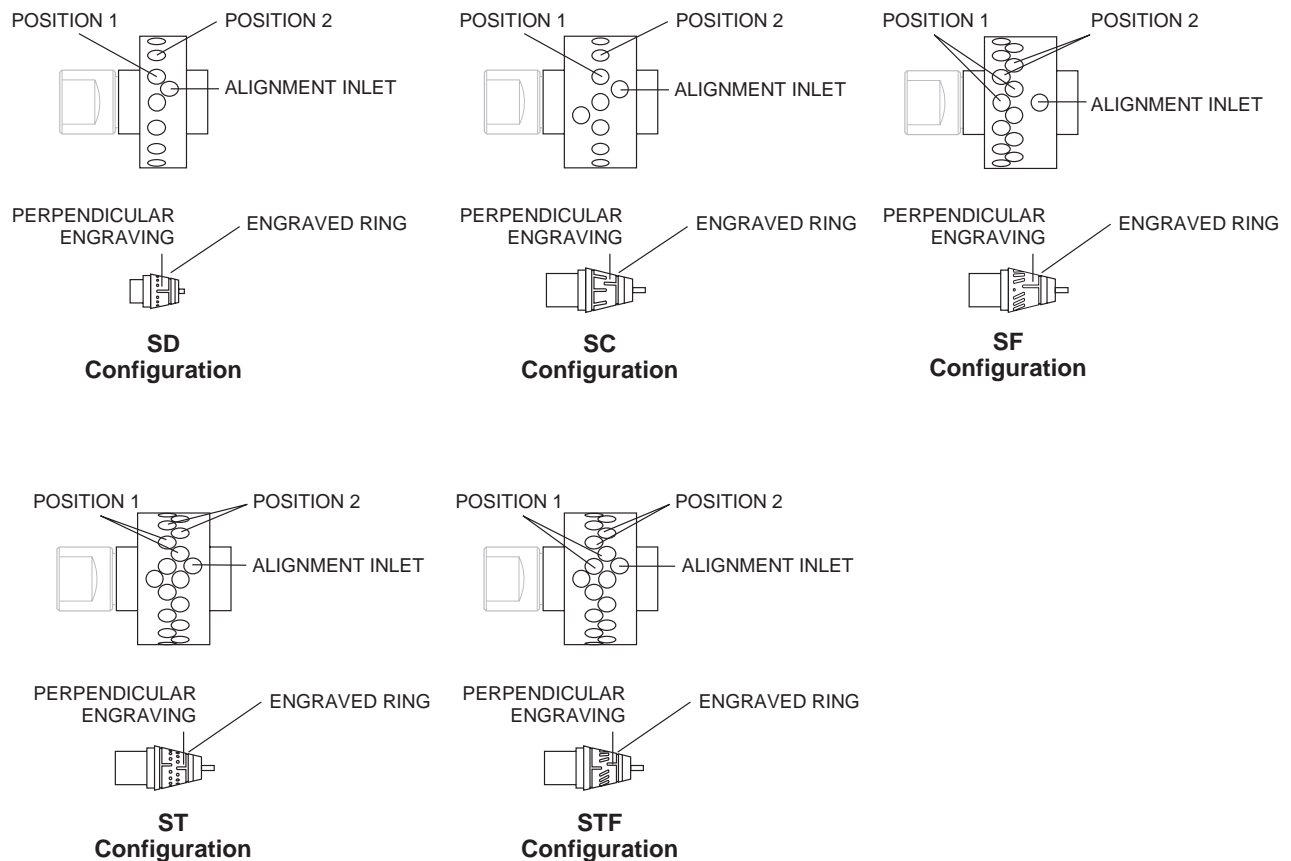
## Alignment Procedure

### CAUTION:

The alignment procedures for air actuated and electrically actuated valves are not the same. For an air actuated valve, see **Technical Note 707**, *Operation Notes and Alignment Instructions, Air Actuated MW Type Multiposition Valves*, found in the support section of [www.vici.com](http://www.vici.com).

### Description

The valve will have either one (SD and SC) or two (SF, ST, and STF) rows of ports evenly spaced around the circumference of the body. See **Figure 1**. In addition, there will be one (SD and SF) or two (SC, ST, and STF) “common” ports offset to either side of these rows. With the valve close to you and the actuator away, Position 1 falls to the left of or counterclockwise from the common port(s). The rotor will have either one or two flow passages appearing as engraved rings around the seal, which intersect the common port(s). Flow passages perpendicular to the ring(s) connect the ring(s) to the selected port(s).



**Figure 1:**  
Typical MW type multiposition valve bodies and seals

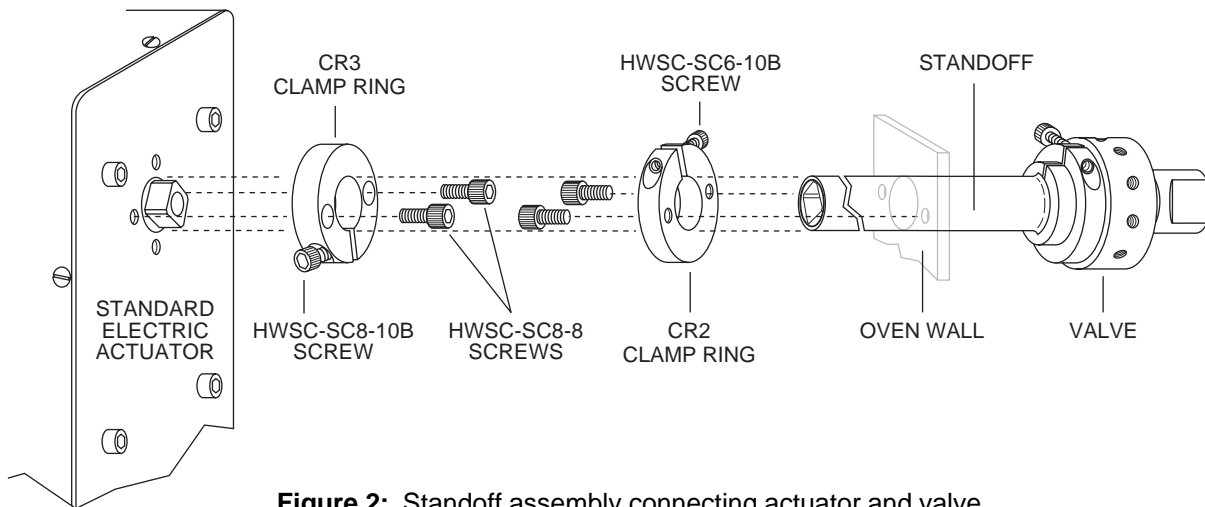
Basically, this alignment procedure is a way of centering the perpendicular engraving on the selected port by determining the point at which flow begins (when the engraving is just beginning to intersect the port) and the point at which flow ends (when the engraving has ceased to intersect the port), and centering the rotor between those two points.

1. Plug the actuator in. If the position indicator doesn't read "1", flip the switch to the HOME position.
2. Place the valve or valve/standoff assembly on the actuator. By convention, the factory alignment places the common port(s) at 12 o'clock. Re-orienting the standoff or the slotted coupling (in closemount applications) on the square drive of the actuator allows three other possibilities.

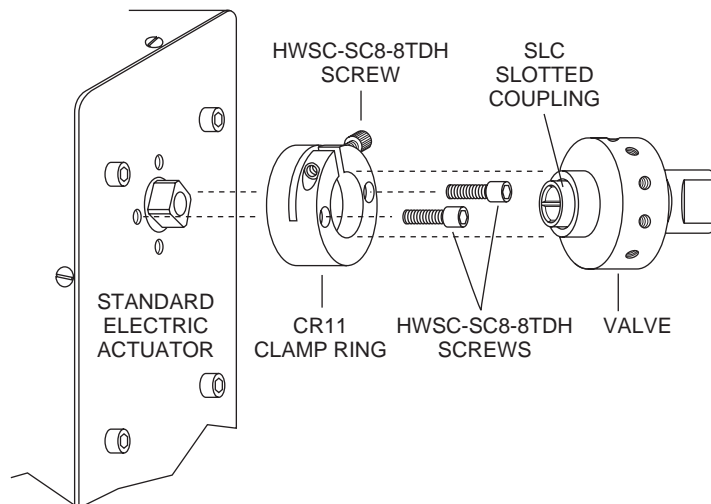
**For a valve on a standoff (Figure 2)**, make sure the standoff butts all the way against the actuator so that the drive mechanism is completely engaged. Tighten the HWSC-SC8-8B screw in the CR3 clamp ring enough to keep the standoff from falling out when it is released, but make sure it is loose enough to allow the assembly to be turned during the alignment procedure.

**For a closemount valve (Figure 3)**, make sure that the ends of the pin in the rotor are engaged by the slots of the coupling. Tighten the HWSC-SC8-8TDH screw in the CR11 clamp ring enough to keep the valve from falling out when it is released, but make sure it is loose enough to allow the valve to be turned during the alignment procedure.

3. Establish a flow of clean gas (50 psi is adequate) into the port offset toward the actuator. This port, called the alignment inlet in **Figure 1**, will be the designated inlet throughout this procedure.



**Figure 2:** Standoff assembly connecting actuator and valve



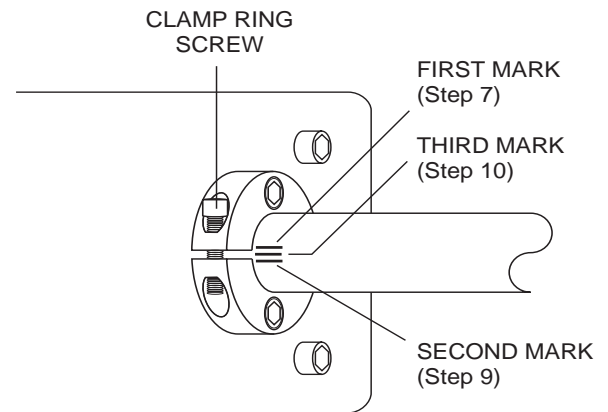
**Figure 3:** Closemount assembly connecting actuator and valve

4. With the valve closest to you and the actuator away from you, grip the valve and rotate it (the actuator keeps the rotor fixed) until gas flows from the port to the *left* of or counterclockwise from the alignment inlet. This port corresponds to Position 1. (See **Figure 1**)

NOTE: When listening for flow, it is helpful if the fittings are removed from the port under consideration but left in the adjacent ports. If all the fittings have been removed, install a loop connecting the two adjacent ports to better isolate the sound of the flow.

5. Grip the valve and rotate it *counterclockwise* a few degrees past the point where flow stops. This sets the stage for a systematic approach to Position 1.
6. Slowly rotate the valve *clockwise* until the first traces of flow are heard from the Position 1 port. (The first port to the *right* of the alignment inlet.)

7. While holding the valve steady, use a soft pencil or ink marker to make a mark on the standoff corresponding to the slot in the actuator clamp ring. (**Figure 4**) This slot makes a clear fixed reference point for observing relative rotational positions. In the case of a closemount valve, make this mark on the valve body.



8. Continue the slow manual *clockwise* rotation of the valve body through the point of peak flow and beyond until the flow stops or is barely audible, as in Step 6.

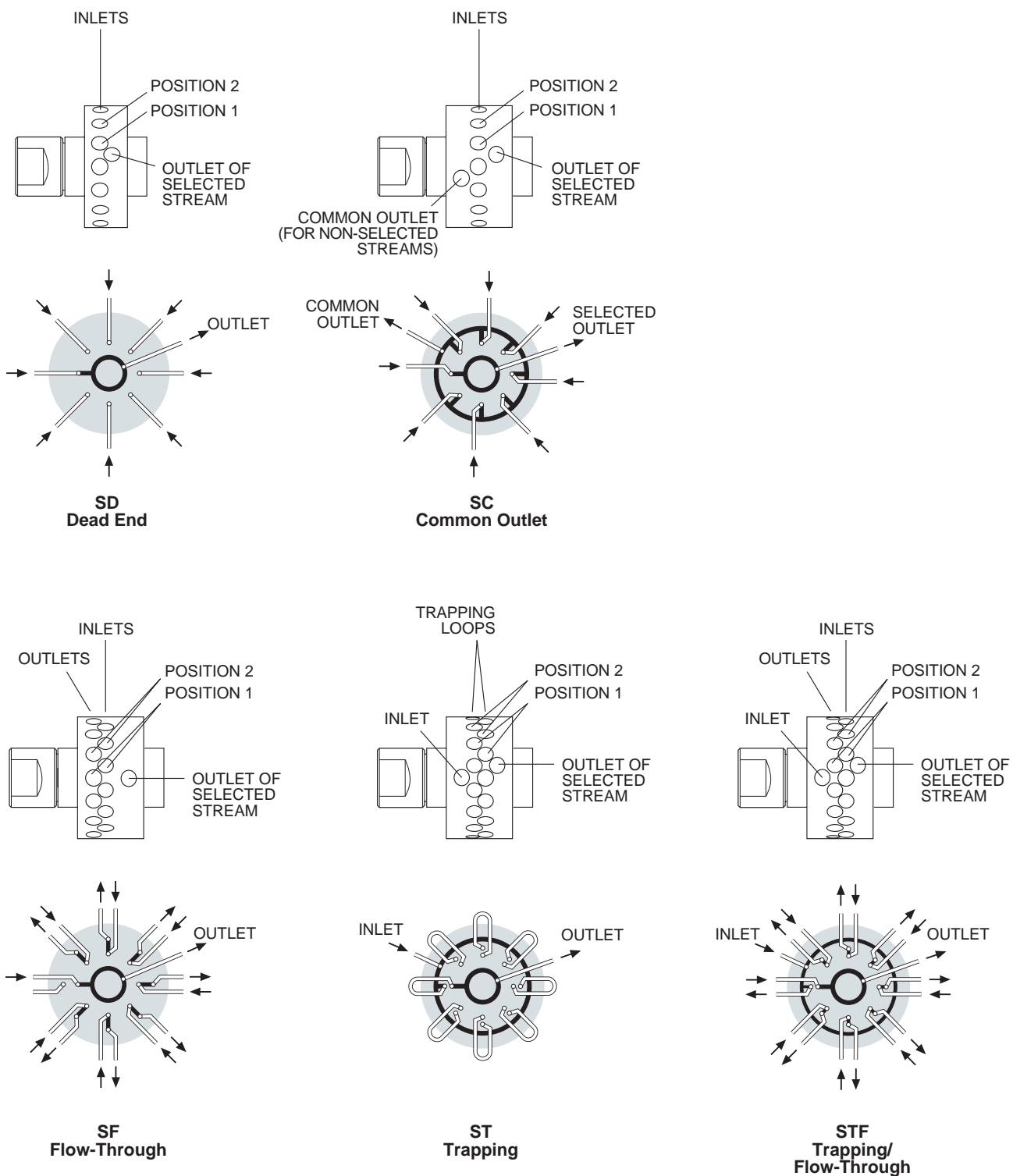
**Figure 4:** Marking valve or standoff during alignment procedure

9. Make another mark as in Step 7. (**Figure 4**)
10. Make a third pencil mark halfway between the first two and rotate the valve *counterclockwise* until this midway mark is reached. (**Figure 4**)

11. While holding the valve steady, firmly tighten the clamp ring screw. The rotor should be properly positioned at the point of maximum flow when the actuator is stepped to the next position.

Congratulations, the procedure is complete. It is a good idea to cycle the valve through all positions to be certain everything is functioning properly. In some cases it is possible to do an additional check by simply looking down the fitting detail and into the port as the valve is stepped from position to position. If it is a valve which has a relatively short distance from the bottom of the detail to the internal taper, the engraved “dimples” on the seal are visible as they come into alignment with the port.

Consult the factory if additional help is needed.



**Figure 5:**  
MW type multiposition valve port conventions and schematic flow diagrams  
(Port designations for Positions 1 and 2 are applicable to multiposition valves on standard *electric* actuators only)

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