

# Installation Instructions

1. **Read complete instructions** before proceeding and do not discard packing materials until any/all loose items are located. Also, make sure that the installation of the Maxon valves will be in compliance with all applicable governmental, insurance and/or agency requirements or codes, such as NFPA-70, National Electric Code, CSA C22.1, Canadian Electric Code, etc.
2. **General considerations:**
  - A. Prior to shipment, each valve is operated electrically and cycled at rated and 1-1/2 rated pressure while being leak tested. **Every Maxon valve is operationally tested and meets the requirements of ANSI B16.104 Class VI Seat Leakage.**
  - B. **Inspect your valve** for any shipping damage. Contact Maxon Corporation with the valve's serial number (printed on the valve's nameplate) for replacement and/or repair parts.
  - C. **Read the nameplate [10] on your valve.** This gives the maximum pressure, temperature limitation, voltage requirements and service conditions of your specific valve. **DO NOT exceed nameplate ratings.**

- D. **Select mounting location carefully.** Your Maxon valve is designed to operate for many years if installed in a location that is cool, clean and dry.
3. **Pipe the valve** in the direction of the flow arrow [1] on the valve body. The Maxon valve body can shut off flow in one direction only.
    - A. **Remove all thread and flange protectors** before installing valve in your service line.
    - B. **Teflon tape** acts as a lubricant and greatly reduces the pipe wrench turning force required to seal the threads.

**Take care not to overtighten threads as this can damage the valve.**

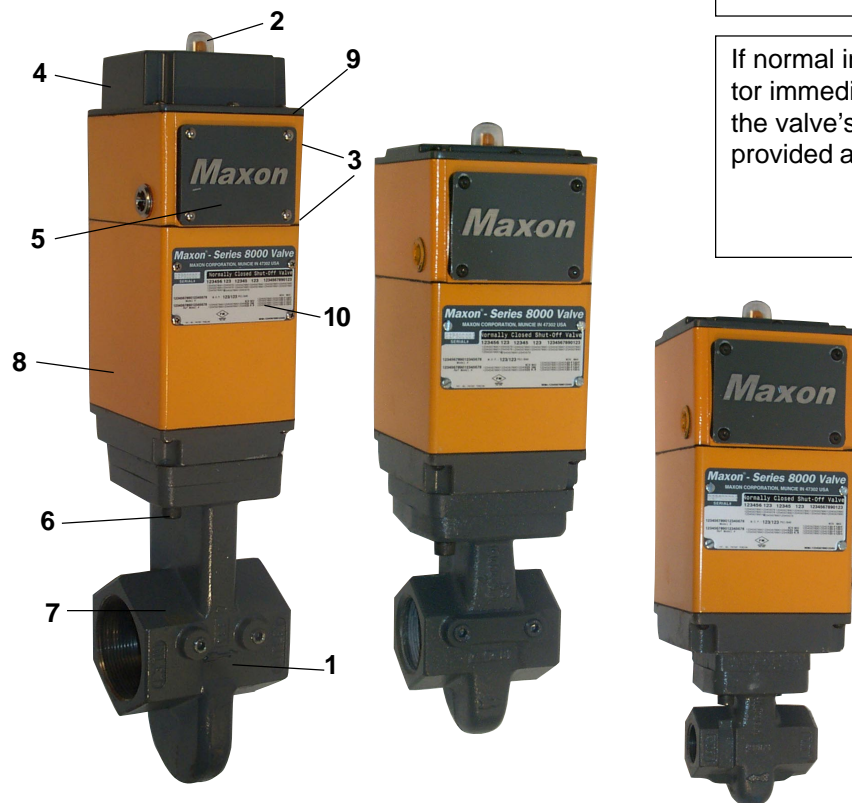
- C. **Good piping practice** dictates that piping be independently supported so that valve bodies are not placed in a bind. In addition, large valves may require support.
- D. **Clean pipe lines** of foreign materials before installing valve into line.

For new installations, a gas filter or strainer shall be installed in the fuel gas piping to protect the downstream safety shut-off valves.

per NFPA 86-4-2.4.3 (1999)  
 NFPA 86C-4-2.4.3 (1999)  
 NFPA 86D-4-2.4-3 (1999)

If normal inlet pressure to the fuel pressure regulator immediately upstream from the valve exceeds the valve's pressure rating, a relief valve shall be provided and it shall be vented to a safe location.

per NFPA 86-5-7.1.7 (1999)  
 NFPA 86C-5-7.1.7 (1999)  
 NFPA 86D-5-7.1.7 (1999)



- E. **Mount valve** so that open/shut indicator [2] will be visible to your operating personnel. **The open/shut indicator should never face downward.** Valves are usually installed in horizontal piping; however, other orientations are acceptable, subject to the above limitation. The top assemblies of all Maxon valves are field rotatable to allow installations involving conflicts with these mounting restrictions.



Contact Esys for more information about this product:  
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## Installation Instructions (cont'd.)

- F. Main system shut-off** should always use a manual leak-tight upstream fuel cock.
- G. Time lag** between valve action and fluid flow (or flame response) is reduced if valve is located near the burner (or outlet).
- 4. Wire the valve** in accordance with **all** applicable codes and standards. Supply voltages must agree with valve's nameplate voltage within -15%/+10% for proper operation. For electrical wiring schematics, refer to pages 6400-S-7 & 6400-S-8 and/or the wiring schematic diagram affixed inside your valve's access cover plate or in the terminal block cover housing.
- A. The Maxon valve must be electrically interlocked** with your safety-limit devices in accordance with all applicable codes, standards, and the authority having jurisdiction over the safety requirements for your overall system installation. Normally, Maxon valves are electrically wired in series with all of your safety-limit devices. Therefore, any one device can cause the valve to react. Each valve was production tested when manufactured. If it now appears inoperative, make sure it is being powered properly from and through your control circuit.
- B. Maintain integrity of Maxon top assembly enclosure** by using dust and watertight electrical connectors. Use cable-sealing grips and strain-relief loops for any cord or cable. Use internal sealing materials on all conduit connections. Moisture can have a harmful effect on valve internals if permitted to enter through wiring connectors. Make sure that all access cover plates are in place and securely fastened. All cover screws should be tightened using an alternate cross corner tightening pattern to the values shown in Table 1 at right. While all covers are torqued at time of production testing, torque should be rechecked periodically to ensure adequate sealing protection.

**5. Pre-operational exercising:**

Prior to initial fluid flow start-up and with upstream manual cock still closed, operate the valve electrically for 10-15 cycles. This not only provides an electrical check, but also wipes valve body disc and seat free of accumulated foreign matter.

- 6. Air actuated valves** require clean, dry air at designated pressures. Outlets and vents, where present, should be protected from accidental blockage.

**NOTE:** Although Maxon Series 8000 Valves do not require lubrication, they do contain Buna N seals in the air actuator sub-assembly. Quality of the compressed air supply must not contain any lubricant that is not compatible to Buna N elastomers. Although many synthetic oils and additives have been publicized for advanced lubricating characteristics in pneumatic systems, strict attention should be exercised to avoid their use, even in minute amounts.

**Table 1 - Torque Specifications**

Item Number	Cover	Torque
3	M5 x 0.8 Terminal Block Screws	45 in-lbs.
9	M6 x 1.0 Top Access Plate Screws	50 in-lbs.
6	M8 x 1.25 Actuator/Body Bolts	25 ft-lbs.
6	M10 x 1.50 Actuator/Body Bolts	40 ft-lbs.



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website: <http://www.esys.us>

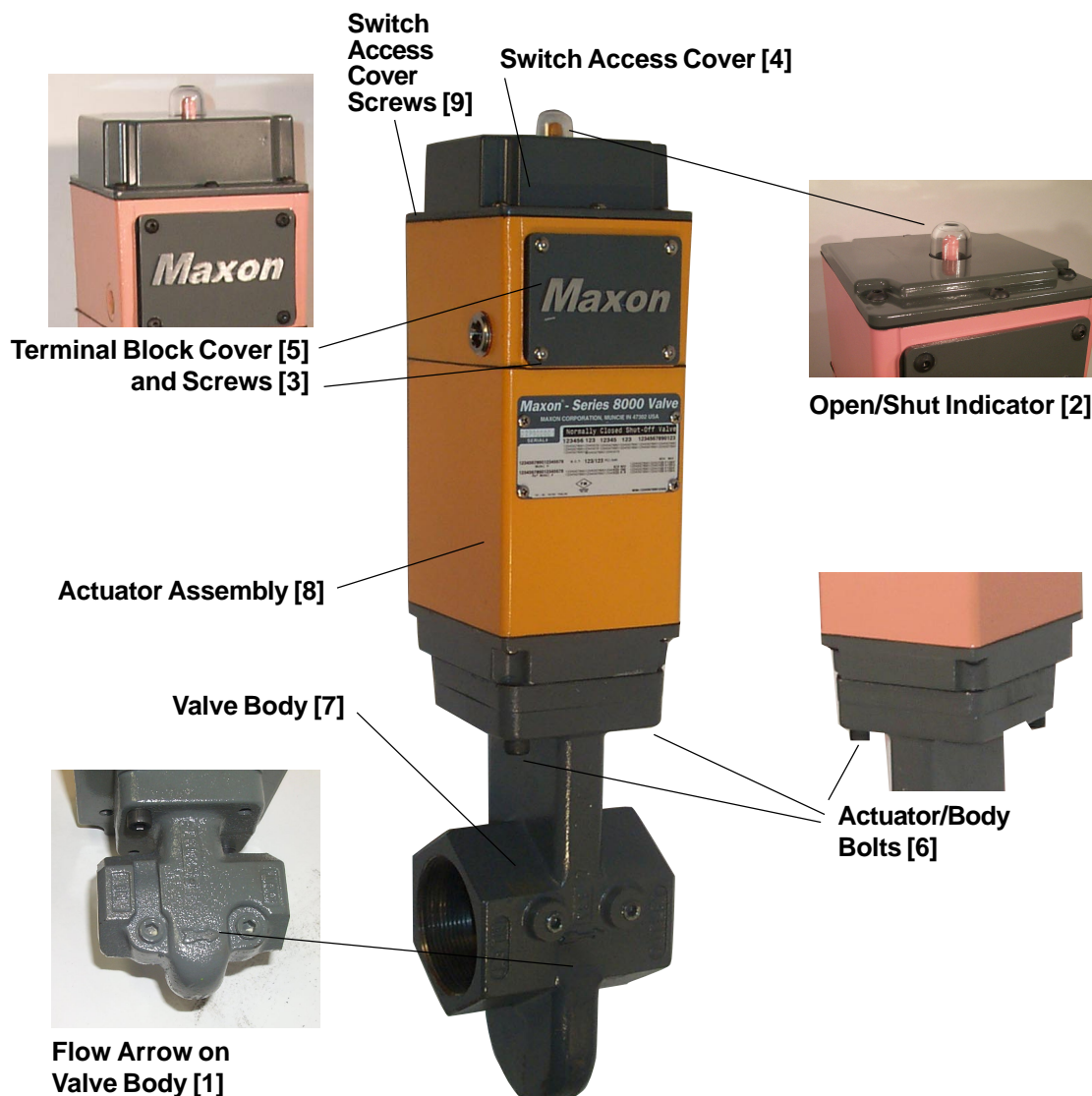


## Installation Instructions (cont'd.)

### Actuator Assembly Rotation/Replacement

Maxon Series 8000 Valves should be ordered in a configuration compatible with planned piping. If valve orientation is not proper, the actuator assembly can be rotated in 90° increments around the valve body centerline axis using the procedure below. This procedure should also be followed for field replacement of the actuator.

1. **Shut off all electrical power** and close off upstream manual cock.
2. **Remove terminal block access cover plate [5]** and disconnect power lead wires. (Tag carefully for later re-assembly.)
3. **Remove conduit and electrical leads.**
4. **Remove all pneumatic lines.**
5. **Unscrew the actuator/body bolts [6]** screwed up from the bottom. These bolts secure the valve actuator [8] to the valve body [7].
6. **Gently lift the actuator [8] off valve body assembly** enough to break the seal between body assembly and the rubber gasket adhering to the bottom of the actuator base plate.



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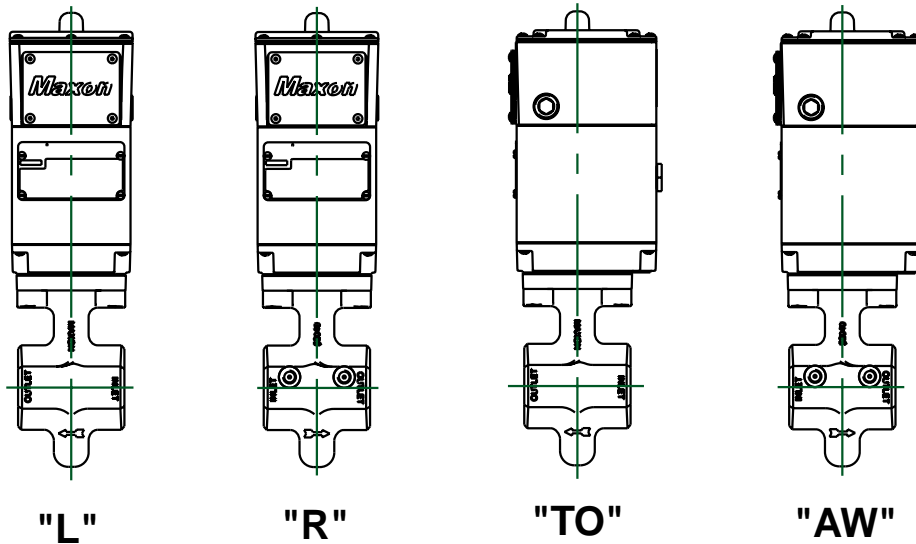


## Installation Instructions (cont'd.)

### Actuator Assembly Rotation/Replacement (cont'd.)

7. Carefully rotate/replace actuator assembly to the desired position. Reposition the actuator back down onto the valve body casting.
8. **Realign holes** in valve body casting with the corresponding tapped holes in the bottom of the actuator base plate. Be sure the gasket is still in place between the body and actuator base plate.
9. **Reinsert the body bolts** up from the bottom through the body and carefully engage threads of the actuator assembly. Tighten securely referring to Table 1 on page 6400-S-2 for appropriate torque specifications.
10. **Reconnect conduit, electrical leads, and all pneumatic lines**, then check that signal switch wands are properly positioned and that open/shut indicator moves freely. **Failure to correct any such misalignment can result in extensive damage to the internal mechanism of your valve.**
11. **Energize valve and cycle several times** from closed to full open position. Also electrically trip the valve in a partially opened position to prove valve operates properly.
12. **Replace and secure cover plates** and place valve in service.

### Alternate Actuator Assembly Positions



**Four actuator assembly positions** are available for Maxon Series 8000 Valves. When looking at the terminal block access cover plate on the actuator, the valve body is positioned on the bottom. From this

view, the unidirectional valve body and the arrow on the valve body casting points in direction of fluid flow: to the right (position "R"), to the left (position "L"), towards you (position "TO") or away from you (position "AW").



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## Operating Instructions

Refer to appropriate catalog bulletin and specification page for operating sequence applying to your specific valve. **Never operate valve until all essential allied equipment is operative and any necessary purges completed.** Failure of valve to operate normally indicates that it is **not** powered or supply air pressure is not adequate. **Check this first!**

**Main system shut-off should always be accomplished with an upstream leak-tight manual fuel cock.**

Normally-closed shut-off valves begin opening cycle immediately upon being powered.

Normally-open vent valves begin to close immediately upon being powered.

Operator should be aware of and observe characteristic opening/closing action of the valve. Should operation ever become sluggish, remove valve from service and contact Maxon for recommendations.

**Address inquiries to:** Maxon Corporation, Muncie, IN 47302  
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**Always include valve serial number and nameplate information for positive identification.**



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# Installation Instructions

## Field Installation of Valve Position Switch

**NOTE: Instructions below are written for normally-closed shut-off valves. For normally-open vent valves, reverse switch nomenclature. (VOS becomes VCS and vice versa.)**

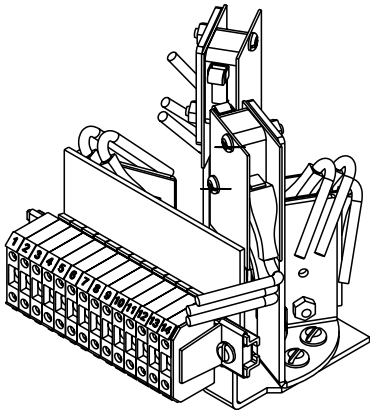
**General:** Shut off fuel supply upstream of valve, then de-energize valve electrically.

- Remove top cover and terminal block cover to provide access, being careful not to damage gasket.

### To replace or add switches:

- Carefully remove field wiring from the terminal block. Insure field wires are clearly marked to correct terminal.
- Unwire the solenoid valve lead wires from terminals labeled #1 and #2.
- Remove screws that secure the switch sub-assembly to the actuator housing. The switch sub-assembly should be easily removable from actuator assembly (see Figure 1: Typical Switch Sub-Assembly).

**Figure 1:  
Typical Switch  
Sub-Assembly**

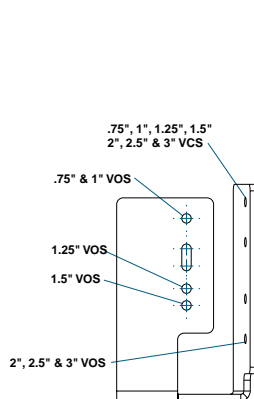


### Replacement Switches:

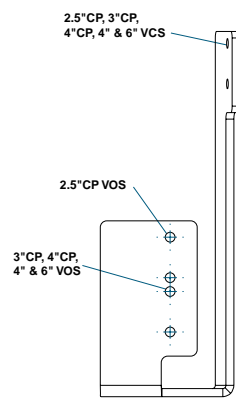
- Note wand position and mounting hole location. Carefully remove the 2 screws and lift existing switch. Reference Figures 2, 3, 4 or 5 (below) to ensure correct switch location.
- Install replacement switch in same mounting holes on bracket and verify correct wand position.
- Replace existing wiring one connection at a time, following original route and placement.

### Add Switches:

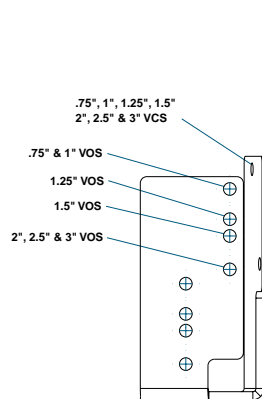
- Reference Figures 2, 3, 4, or 5 to ensure correct switch location. Valve size is depicted in the model number by the first 4 digits. For example, a 3" CP valve should have Model No. 300C.
- Install switch and insulators, when provided, to correct hole. Insure proper alignment. VCS switch should have activation wand pointed upward and VOS activation wand should be pointed downward.
- Wire new switches to terminals provided.
- Reassemble switch sub-assembly in actuator housing. Dowel pins are provided to insure proper placement of switch sub-assembly.
- Wire the solenoid valve leads to terminals labeled #1 and #2.
- Cycle valve, checking switch actuation points carefully. VCS switch actuates at top of stem stroke and VOS at bottom for normally-closed shut-off valves; vice-versa for normally-open vent valves.
- Replace covers, and then return valve to service.



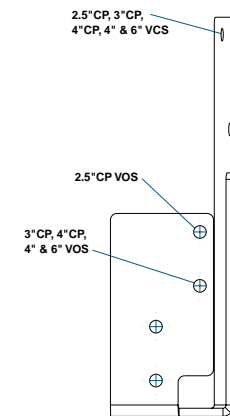
**Figure 2:  
IP67 Switch Bracket**



**Figure 3:  
IP67 Switch Bracket**



**Figure 4:  
General Purpose  
Switch Bracket**



**Figure 5:  
General Purpose  
Switch Assembly**



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# Electrical Data

## Normally-Closed Shut-Off Valves

### General Purpose Normally-Closed Valves

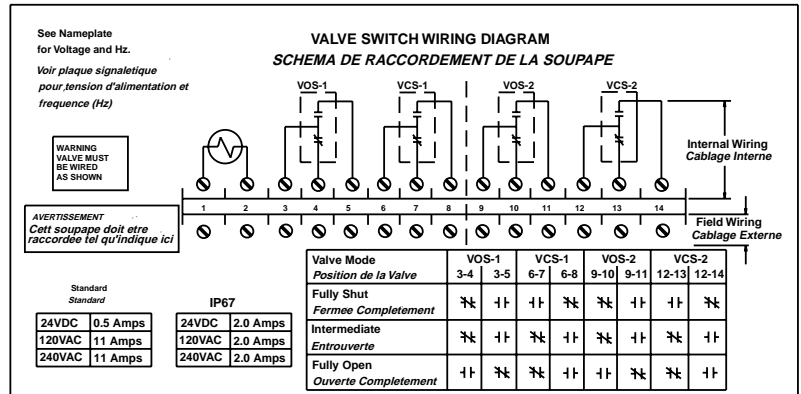
Series 8011 & Series 8111  
 Switches: Standard  
 Solenoid Valve: Standard  
 24 VDC, 4.8W  
 120VAC, 50/60 Hz, 11/9.4 VA Peak,  
 8.5/6.9 VA Holding  
 240VAC, 50/60 Hz, 11/9.4 VA Peak,  
 8.5/6.9 VA Holding

### Class I, Div. 2 Hazardous Location

*(Future availability)*

### Normally-Closed Valves

Series 8012 & Series 8112  
 Switches: IP67  
 Solenoid Valve: Standard  
 24 VDC, 4.8W  
 120VAC, 50/60 Hz, 11/9.4 VA Peak, 8.5/6.9 VA Holding  
 240VAC, 50/60 Hz, 11/9.4 VA Peak, 8.5/6.9 VA Holding



### Class I, Div. 1 Hazardous Location

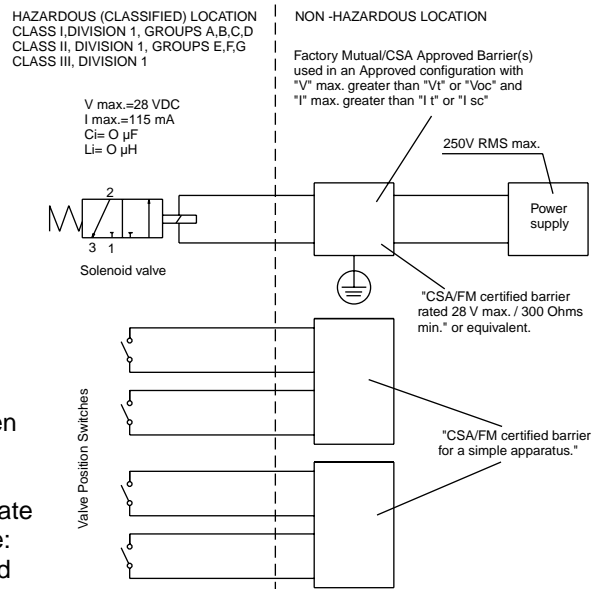
*(Future availability)*

### Normally-Closed Valves

Series 8013 & Series 8113  
 Switches: Standard  
 Solenoid Valve: Intrinsically Safe

**NOTES:**

- Power supply by attested and intrinsically safe circuits with  $12VDC \leq V \leq 28VDC$ ,  $39mA \leq I \leq 115mA$  and  $P \leq 1.6W$ .
- The barrier must not be connected to any device that uses or generates in excess of 250 Volts RMS or DC unless it has been determined that the voltage has been adequately isolated from the burner.
- Simple apparatus is defined as a device that will neither generate nor store more than 1.2V, 0.1A, 25 mW, or 20μJ. Examples are: switches, thermocouples, light-emitted diodes, connectors, and resistance temperature devices.
- The installation must be in accordance with the National Electric Code®, NFPA 70, Article 504, and ANSI/ISA-RP 12.6.
- The barrier must be connected to a suitable ground electrode per NFPA 70, Article 504. The resistance of the ground path must be less than 1 Ohm.
- CSA requires "Installation to be in accordance with the Canadian Electrical Code, Part I."



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# Electrical Data

## Normally-Open Vent Valves

### General Purpose Normally-Open Vent Valves

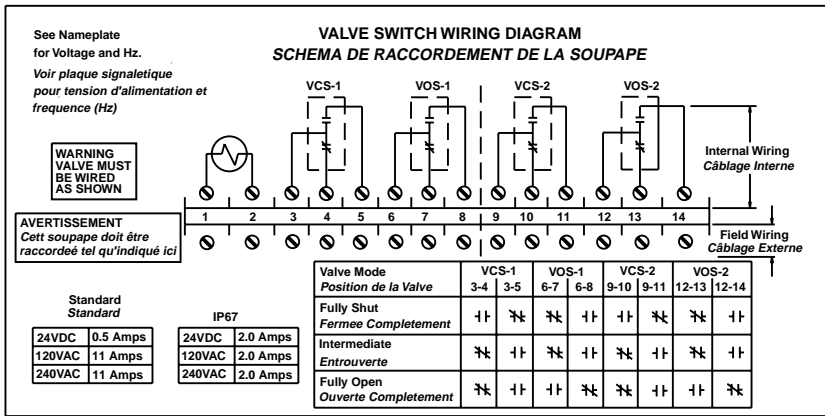
Series 8021 & Series 8121  
 Switches: Standard  
 Solenoid Valve: Standard  
 24 VDC, 4.8W  
 120VAC, 50/60 Hz, 11/9.4 VA Peak,  
 8.5/6.9 VA Holding  
 240VAC, 50/60 Hz, 11/9.4 VA Peak,  
 8.5/6.9 VA Holding

### Class I, Div. 2 Hazardous Location

(Future availability)

### Normally-Open Vent Valves

Series 8022 & Series 8122  
 Switches: IP67  
 Solenoid Valve: Standard  
 24 VDC, 4.8W  
 120VAC, 50/60 Hz, 11/9.4 VA Peak, 8.5/6.9 VA Holding  
 240VAC, 50/60 Hz, 11/9.4 VA Peak, 8.5/6.9 VA Holding



### Class I, Div. 1 Hazardous Location

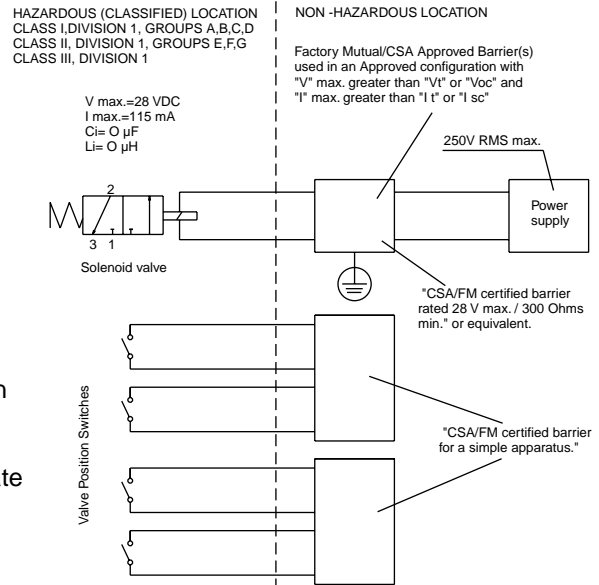
(Future availability)

### Normally-Open Vent Valves

Series 8023 & Series 8123  
 Switches: Standard  
 Solenoid Valve: Intrinsically Safe

**NOTES:**

1. Power supply by attested and intrinsically safe circuits with  $12VDC \leq V \leq 28VDC$ ,  $39mA \leq I \leq 115mA$  and  $P \leq 1.6W$ .
2. The barrier must not be connected to any device that uses or generates in excess of 250 Volts RMS or DC unless it has been determined that the voltage has been adequately isolated from the burner.
3. Simple apparatus is defined as a device that will neither generate nor store more than 1.2V, 0.1A, 25 mW, or 20μJ. Examples are: switches, thermocouples, light-emitted diodes, connectors, and resistance temperature devices.
4. The installation must be in accordance with the National Electric Code®, NFPA 70, Article 504, and ANSI/ISA-RP 12.6.
5. The barrier must be connected to a suitable ground electrode per NFPA 70, Article 504. The resistance of the ground path must be less than 1 Ohm.
6. CSA requires "Installation to be in accordance with the Canadian Electrical Code, Part I."



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## Maintenance Instructions

Maxon Series 8000 Valves are endurance tested far in excess of the most stringent requirements of the various approval agencies. They are designed for long life even if frequently cycled, and to be as maintenance-free and trouble-free as possible.

**Every Maxon valve is operationally tested and meets the requirements of ANSI B16.104 Class VI Seat Leakage when it leaves our plant.**

**Actuator assembly components require no field lubrication** and should **never** be oiled.

Auxiliary switches or complete actuator may be replaced in the field.

**WARNING: Do not attempt field repair of valve body or actuator. Any alterations void all warranties.**

Valve leak test, performed with valve in line as prescribed by jurisdictional authorities, is strongly encouraged and should be done on a regularly scheduled basis. In rare instances where valve shows leakage, perform **Pre-Operational Exercising** (see Page 6400-S-2) and retest. If leakage does not stop, remove valve from service.

**Maxon valves are designed to be used with clean fluids. If foreign material is present in the fuel line, it will be necessary to inspect the valve to make certain it is operating properly. If abnormal opening or closing is observed, the valve should be removed from service. Contact your Maxon representative for instructions.**

### Insurance authorities agree . . .

. . . that the safety of any industrial fuel burning installation is dependent upon well-trained operators who are able to follow instructions and to react properly in cases of emergency. Their knowledge of, and training on, the specific installation are both vital to safe operation.

Safety controls may get out of order without the operator becoming aware of it unless shutdowns result. Production-minded operators have been known to bypass faulty controls without reporting the trouble.

Continued safe operation of any installation is then assured only if the plant management carefully develops an exact schedule for regular periodic inspection of all safety controls, insisting that it then be rigidly adhered to.

A main gas shut-off cock should be located upstream from all other fuel train piping components and used to shut off all flow of fuel for servicing and other shutdowns.

All safety devices should be tested at least monthly\* and more often if deemed advisable. Periodic testing for tightness of manual or motorized shut-off valve closure is equally essential.

\*per NFPA 86-Appendix B-4 (1995)

Operator should be aware of and observe characteristic opening/closing action of the valve. Should operation ever become sluggish, remove valve from service and contact Maxon for recommendations.

**Address inquiries to:** Maxon Corporation, Muncie, IN 47302

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**Always include valve serial number and nameplate information for positive identification.**

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## Maintenance Instructions

**CAUTION:** Valve leak testing should be undertaken only by trained and experienced personnel. Instructions provided by the company and/or individuals responsible for the manufacture and/or overall installation of complete system incorporating Maxon valves take precedence over those provided by Maxon. If Maxon instructions conflict with any codes or regulations, contact Maxon Corporation before attempting this procedure.

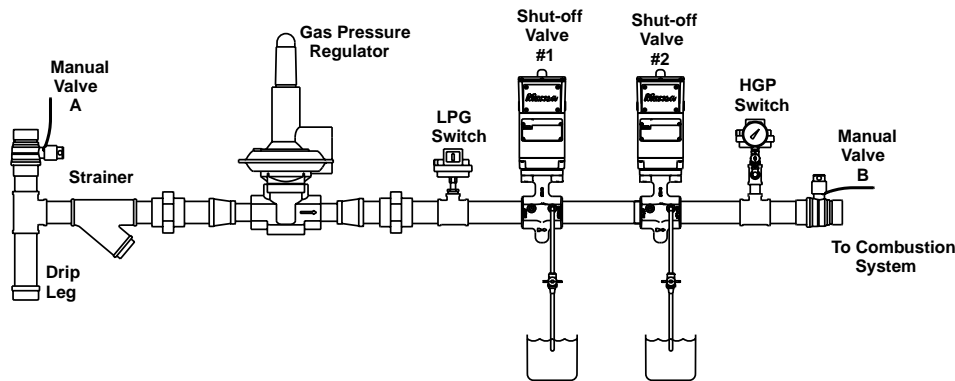
Valve leak test should be performed on a quarterly basis to assure continued safe and reliable operation. Each valve should be checked with available line pressure. Absolute zero leakage may not be obtained in the field. Any valve that exceeds the allowable leakage, as set forth by your local codes or insurance requirements (15 bubbles per minute), should be removed from service and your Maxon representative should be contacted.

Every Maxon valve is operationally tested and meets the requirements of ANSI B16.104 Class VI seat leakage when it leaves our plant.

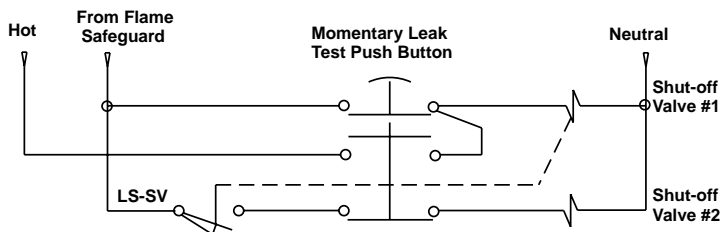
### Suggested leak test procedure for double-blocking shut-off valves (without vent line)

- (a) Shut down combustion system per manufacturer's recommended procedure.
- (b) Close manual valves A and B.
- (c) Visually inspect to verify that shut-off valves #1 and #2 are closed.
- (d) Remove the 1/4" pipe plug from downstream side of shut-off valve #1. Install leak test apparatus. Safely vent any trapped gas pressure.
- (e) Open manual shut-off valve A, then close leak test apparatus. Insert tube into a container of water just below the surface.
- (f) Open test apparatus and test valve for leakage. As a guideline, valve should be tested for 2 minutes per inch of pipe diameter. Large diameter pipes or long piping runs between shut-off valves may need additional testing time.
- (g) If valve testing indicates leakage exceeding 15 bubbles per minute, perform pre-operational exercising as outlined on Page 6400-S-2 and retest the valve. If valve continues to exceed allowable leakage limit, remove from service and contact Maxon.

### Example of a gas piping diagram for leak test without vent line



Example of a wiring diagram for leak test



**NOTES:**  
Push button must be tamper resistant.

LS\_SV - Closes when shut-off Valve#1 is fully open.

The "From Flame Safeguard" line is energized only when all conditions for safe operation have been satisfied.

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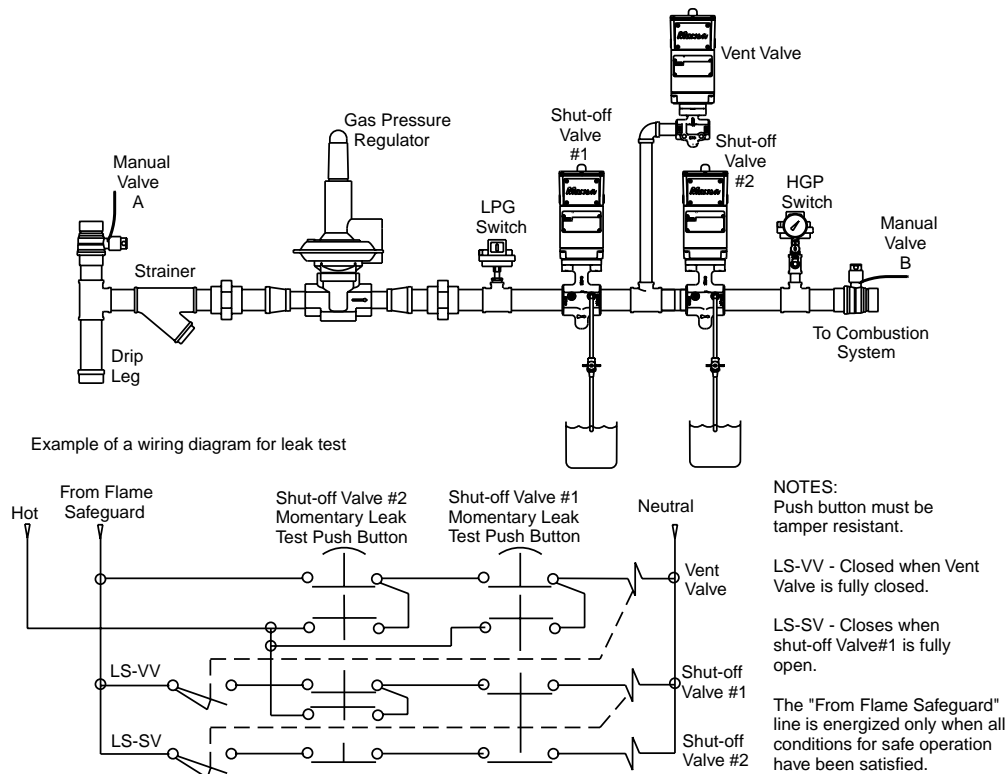
## Suggested leak test procedure for double-blocking shut-off valves (without vent line) - *continued*

- (h) Secure test apparatus on valve #1.
- (i) Remove the 1/4" pipe plug from downstream side of shut-off valve #2. Install leak test apparatus.
- (j) With an auxiliary power supply connected to valve #1, open test apparatus and test valve for leakage. As a guideline, valve should be tested for 2 minutes per inch of pipe diameter. Large diameter pipes or long piping runs between shut-off valves may need additional testing time.
- (k) If valve testing indicates leakage exceeding 15 bubbles per minute, perform pre-operational exercising as outlined on Page 6400-S-2 and retest the valve. If valve continues to exceed allowable leakage limit, remove from service and contact Maxon.
- (l) Secure test apparatus on valve #2.
- (m) Upon completion of valve leak testing, test all other safety interlocks per manufacturer's instructions and verify they are operational.
- (n) Restore combustion system to operational condition. Be sure to remove all auxiliary power supplies and jumpers that may have been used during testing.

## Suggested leak test procedure for double-blocking shut-off valves with vent line

If vent valve is present, use auxiliary power supply to power vent valve to closed position during this test procedure. Follow test instructions above. Once test is complete, be sure vent valve is restored to normal operation.

### Example of a gas piping diagram for leak test with vent line



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