

# Installation & Maintenance Instructions

2-WAY INTERNAL PILOT-OPERATED SOLENOID VALVES  
 NORMALLY OPEN OPERATION — 3/4, 1, 1 1/4, 1 1/2 OR 2 NPT  
 FUEL GAS SERVICE

**SERIES**  
**8214**

**NOTICE:** These instructions are divided into two sections. Be sure to read, understand and follow all instructions on I&M No. V7466R3 – Section 1 and 2.

See separate solenoid installation and maintenance instructions for information on: Wiring, Solenoid Temperature, Causes of Improper Operation, and Solenoid Replacement.

## DESCRIPTION

Series 8214 valves are 2-way normally open diaphragm-type solenoid valves designed for fuel gas service. Valve bodies are made of rugged aluminum with trim and internal parts made of steel and stainless steel. Series 8214 valve may be provided with a general purpose, general purpose junction box or watertight/explosionproof solenoid depending upon basic valve construction.

Valve catalog numbers with *Suffix C* have an integral electrical and visual position indicator and proof-of-closure construction. The position indicator gives visual indication of *Open* and *Shut* positions by means of a small ball. The ball travels up and down in a transparent holder between labels *Open* and *Shut*. Electrical indication is accomplished by the operation of a single pole single throw reed switch. Reed switch contact is open when solenoid is de-energized; closed when energized.

## Provisions for Pressure and Seat Leakage Testing

Series 8214 valves are provided with a 1/8 NPT tapped and plugged hole for downstream seat leakage testing. Leakage testing frequency shall be at least annually in accordance with NFPA-86 or original equipment manufacturer recommendations. Testing is also required after valve disassembly and reassembly for inspection, cleaning or rebuilding. See *Testing for Internal (Seat) Leakage* section and refer to Figure 3.

## OPERATION

**Normally Open:** Valve is open when solenoid is de-energized; closed when energized.

## Operating Pressure Differential

- Minimum 0 psig
- Maximum 5 psig

## INSTALLATION

Check nameplate for correct catalog number, pressure, voltage, frequency, and service. Never apply incompatible fluids or exceed pressure rating of the valve. Installation and valve maintenance to be performed by qualified personnel.

## Temperature Limitations

For valve ambient and fluid temperatures, refer to chart below.

Catalog Numbers ‡	Insulation Class	Minimum and Maximum Ambient and Fluid Temperatures
8214G38 8214G54 8214G64 8214G74 8214G84	F or H	-40°F (-40°C) to 140°F (60°C)

‡ Includes catalog numbers with or without *Suffix C*.

## Positioning

Valves with 3/4, 1, 1 1/4, or 1 1/2, NPT connections are designed to perform properly when mounted in any position. The 2 NPT valves may be mounted with solenoid in any position from horizontal to vertical and upright. However, for optimum life and performance, the solenoid on all sizes should be mounted vertically and upright to reduce the possibility of foreign matter accumulating in the solenoid base sub-assembly area.

## Piping

Connect piping to valve according to markings on valve body. Apply pipe compound sparingly to male pipe threads only. If applied to valve threads the compound may enter the valve and cause operational difficulty. Avoid pipe strain by properly supporting and aligning piping. When tightening the pipe, do not use valve or solenoid as a lever. Locate wrenches applied to valve body or piping as close as possible to connection point. Valves should be checked for external leakage at piping connections after installation, see *Testing for External Leakage* section.

**⚠ CAUTION:** To avoid damage to the valve body, **DO NOT OVERTIGHTEN PIPE CONNECTIONS.** If PTFE tape paste, spray or similar lubricant is used, use extra care when tightening due to reduced friction.

**⚠ CAUTION:** To protect the solenoid valve, **install a strainer or filter, suitable for the service involved, in the inlet side as close to the valve as possible.** Clean periodically depending on service conditions. See ASCO Series 8600 and 8601 for strainers.

## Testing for External Leakage

**▲ WARNING: To prevent the possibility of death, serious injury or property damage, extinguish all open flames and avoid any type of sparking or ignition.**

1. Apply pressure to valve within nameplate rating with solenoid energized.
2. Apply a soapy solution or a commercially available leak detecting solution to the pipe connections and check for bubbles. If the valve has been disassembled and reassembled for inspecting, cleaning, or rebuilding apply the solution around solenoid base sub-assembly and bonnet/body joint.
3. If leakage exists, depressurize valve and turn off electrical power supply. Tighten connections as required and retest following the above steps.

## Wiring (Electrical Position Indicator)

Wiring must comply with local codes and the National Electrical Code. Switch housing has a 1/2" conduit connection. The position indicator switch has been preset at the factory. This switch is not to be field adjusted. Position indicator housing assembly can be rotated 360° for desirable visual position. Position indicator is furnished standard with one reed switch having a single contact to open when the valve is in the open position. The switch rating is 1 amp maximum, 120/60 AC maximum and 15 volts-amps maximum (Resistive Load) or 1 amp maximum, 120 volts DC maximum and 15 watts maximum (Resistive Load). For lamp and inductive loads, contact protection is required.

## MAINTENANCE

**▲ WARNING: To prevent the possibility of death, serious injury or property damage, turn off electrical power, depressurize valve, extinguish all open flames and avoid any type of sparking or ignition. Vent hazardous or combustible fluid to a safe area before servicing the valve.**

NOTE: It is not necessary to remove the valve from the pipeline for repairs. See *Service Note* under *Valve Disassembly and Reassembly*.

## Cleaning

All solenoid valves should be cleaned periodically. The time between cleanings will vary depending on the medium and service conditions. In general, if the voltage to the coil is correct, sluggish valve operation, excessive noise, or leakage will indicate that cleaning is required. In the extreme case, faulty valve operation will occur and the valve may fail to open or close. Clean strainer or filter when cleaning the valve.

## Preventive Maintenance

- Keep medium flowing through the valve as free from dirt and foreign material as possible.
- While in service, the valve should be operated at least once a month to ensure proper opening and closing.
- Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. If parts are worn or damaged, install a complete ASCO Rebuild Kit. Rebuild Kits are not available for valves with Electrical Position Indicator Switch (Suffix C).

## Causes of Improper Operation

- **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within range specified on nameplate.
- **Excessive Leakage:** Disassemble valve and clean all parts. If parts worn or damaged install a complete ASCO Rebuilt Kit or replace valve.

## Valve Disassembly

### – Service Note –

It is not necessary to remove the valve from the pipeline for inspecting, cleaning, or rebuilding. However, for ease of valve reassembly (after maintenance), the solenoid valve should be temporarily in the upside-down position with the solenoid portion completely assembled. Electrical hookup to the solenoid is also required. This upside-down position allows easy alignment of parts through bottom cavity of the valve and a free hand to help in parts alignment. Therefore, it is recommended that whenever possible the valve be removed from the pipeline for reassembly. This is the preferred method and position for valve reassembly.

1. Disassemble valve in an orderly fashion using exploded view for identification and placement of parts.
2. Remove solenoid enclosure, see separate installation and maintenance instructions.
3. Remove bonnet screws, valve bonnet, diaphragm spring, diaphragm/core assembly and body gasket from valve body.
4. Unscrew solenoid base sub-assembly from opposite side of valve body. Then remove solenoid base gasket from valve body.
5. All parts are now accessible to clean or replace. If parts are worn or damaged, install a complete ASCO Rebuild Kit or replace valve.

## Valve Reassembly

1. Lubricate bonnet gasket and body gasket with DOW CORNING® 200 Fluid lubricant or an equivalent high-grade silicone fluid.
2. Apply a light coat of TFL 50® Dry Lube to:
  - Valve seat
  - Valve body flange where diaphragm assembly seats against valve body and body gasket.
  - Internal surface of valve bonnet where diaphragm assembly seats when valve is in the de-energized (open position).
  - Seating surface of disc on diaphragm assembly.

**IMPORTANT: If valve has been disassembled for inspection and cleaning only and a Rebuild Kit is not being installed, lubricate the diaphragm assembly (on both sides) with TFL 50® Dry Lube.**

3. Position solenoid base gasket in valve body.
4. Thread solenoid base sub-assembly into valve body.
5. Torque solenoid base sub-assembly to 175 ± 25 in-lbs [19,8 ± 2,8 Nm].
6. Reassemble solenoid, see separate installation and maintenance instruction.

NOTE: If possible position valve in upside-down position.

7. Replace body gasket and core/diaphragm sub–assembly with core spring and core guide attached. Locate bleed hole in core/diaphragm sub–assembly approximately 30° from the valve inlet. Be sure all bonnet screw holes in diaphragm assembly are in alignment with holes in valve body.
8. Make a temporary electrical hookup to the solenoid. Then energize the solenoid. The core assembly will pull into the solenoid base sub–assembly.

**IMPORTANT:** Solenoid should remain energized until valve is completely assembled and bonnet screws are tightened.

**⚠ WARNING:** If solenoid is accidentally de–energized before complete valve assembly, core/diaphragm sub–assembly could disengage and fly outward. To prevent eye injury wear eye protection.

9. Install diaphragm spring with wide end of spring facing valve bonnet.
10. Replace valve bonnet and bonnet screws, start all bonnet screws by hand. Then torque bonnet screws in a crisscross manner to 100 ± 10 in–lbs [11,3 ± 1,1 Nm].
11. If removed, reinstall pipe plug in valve body. Apply a small amount of Loctite Corporation’s PST® Pipe Sealant 567 (or equivalent) to the pipe plug threads. Then tighten pipe plug securely in valve body using a 3/16” hex key wrench.
12. If necessary, make up piping and final electrical hookup.

**⚠ WARNING:** To prevent the possibility of death, serious injury or property damage, check valve for proper operation before returning to service. Also check for external leakage (with a nonhazardous, noncombustible fluid if practical).

13. Check valve for external leakage as indicated under the *Piping* section.
14. When maintenance is complete, operate the valve a few times to be sure of proper operation. A metallic *click* indicates the solenoid is operating.

#### Testing for Internal (Seat) Leakage (Refer to Figure 3)

1. De–energize shutoff valves in main gas line and valve in vent line. This stops main line gas flow and allows trapped gas to vent to atmosphere.
2. Close the upstream gas cock in the main gas line.
3. Remove the pipe plug from the leak test tap or downstream pressure tap in the normally open vent valve body.

**⚠ WARNING:** Some gas may be released to the atmosphere when the pipe plug is removed.

4. Connect leak test equipment with the test petcock in the closed position, see Figure 3.

5. Close the gas cock on the downstream side of the vent valve.
6. Close the downstream gas cock in the main gas line.
7. Open the upstream manual gas cock in the main gas line. Program the control system to energize the two shutoff valves and the normally open vent valve.
8. Immerse the 1/4” leak test tubing vertically into the plastic container of water to a depth of about 1/2”. Slowly open the test petcock. Bubbles may appear in the water as the pressure equalizes.
9. After the rate of bubbles coming through the water stabilizes, count the number of bubbles appearing in a 10 second period. The allowable leakage in 10 seconds for an orifice diameter of 1 inch (25.4 mm) or less is 6 bubbles (3 cc/min). For valves with an orifice diameter over 1 inch (25.4 mm) the allowable leakage rate is 6 bubbles (3 cc/min.) per inch (25.4 mm) of orifice diameter. If leakage exceeds this rate, rebuild or replace valve. If the valve is rebuilt, retest the valve following previous steps of testing and test for external leakage. See *Testing for External Leakage* section.

**NOTE:** The leakage rate above recognizes that some wear and contamination from use can result in a slight amount of leakage. The allowable leakage rate is well within the leakage limits as recognized by applicable approval agencies.

10. In the main gas line close the upstream manual gas cock.
11. De–energize the main line shutoff valves.
12. Manually close the test petcock.
13. Open the gas cock.
14. Remove the test equipment from valve body.
15. Apply a small amount of Loctite Corporation’s PST® Pipe Sealant 567 (or equivalent) to the pipe plug threads. Reinstall pipe plug and tighten securely.

**⚠ WARNING:** Some gas may be released to the atmosphere when the test equipment is removed.

16. Turn on the main gas line supply at the upstream manual gas cock.
17. Program the control system to energize and maintain the shutoff and vent valve in the energized position. Check pipe plug connection for external leaks with rich soap and water solution or a commercially available leak detecting solution.
18. Restore the system to normal operation.

#### Electrical Position Indicator Switch

The optional electrical position indicator switch is set at the factory. This switch is not to be field adjusted.

### ORDERING INFORMATION FOR ASCO REBUILD KITS

Parts marked with an asterisk (\*) in the exploded view are supplied in Rebuild Kits. When Ordering Rebuild Kits for ASCO valves, order the Rebuild Kit number stamped on the valve nameplate. If the number of the kit is not visible, order by indicating the number of kits required, and the Catalog Number and Serial Number of the valve(s) for which they are intended.

## Torque and Lubrication Chart

① Part Name Tool	Torque Value	Torque Value Newton–Meters
Solenoid base sub–assembly & Tube assembly	175 ± 25 in–lbs	19,8 ± 2,8
Bonnet screws	100 ± 10 in–lbs	11,3 ± 1,1
Lubrication	Parts to be lubricated	
DOW CORNING® 200 Fluid lubricant or an equivalent high–grade silicone fluid	Solenoid base gasket, body gasket and tube gasket	
TFL 50® Dry Lube or equivalent	Valve seat Valve body flange where diaphragm assembly seats against valve body and body gasket. Internal surface of valve bonnet where diaphragm assembly seats when valve is in the energized (open position).  ② Diaphragm assembly on both sides ② Main disc at base of core/diaphragm sub–assembly ② Pilot disc at base of core assembly	

Notes: ① Thread all parts by hand as far as possible. Then torque evenly in a crisscross manner where applicable.

② Lubricate these parts if a rebuild kit is not installed.

<h1 style="margin: 0;">Installation &amp; Maintenance Instructions</h1> <p style="margin: 0;">2-WAY INTERNAL PILOT-OPERATED SOLENOID VALVES                  NORMALLY OPEN OPERATION — 3/4, 1, 1 1/4, 1 1/2 OR 2 NPT                  FUEL GAS SERVICE</p>	<p style="font-size: 1.2em; margin: 0;">SERIES</p> <p style="font-size: 1.5em; margin: 0;">8214</p>
--	---

**NOTICE:** See separate solenoid installation and maintenance instructions for information on: Wiring, Solenoid Temperature, Causes of Improper Operation, and Solenoid Replacement.

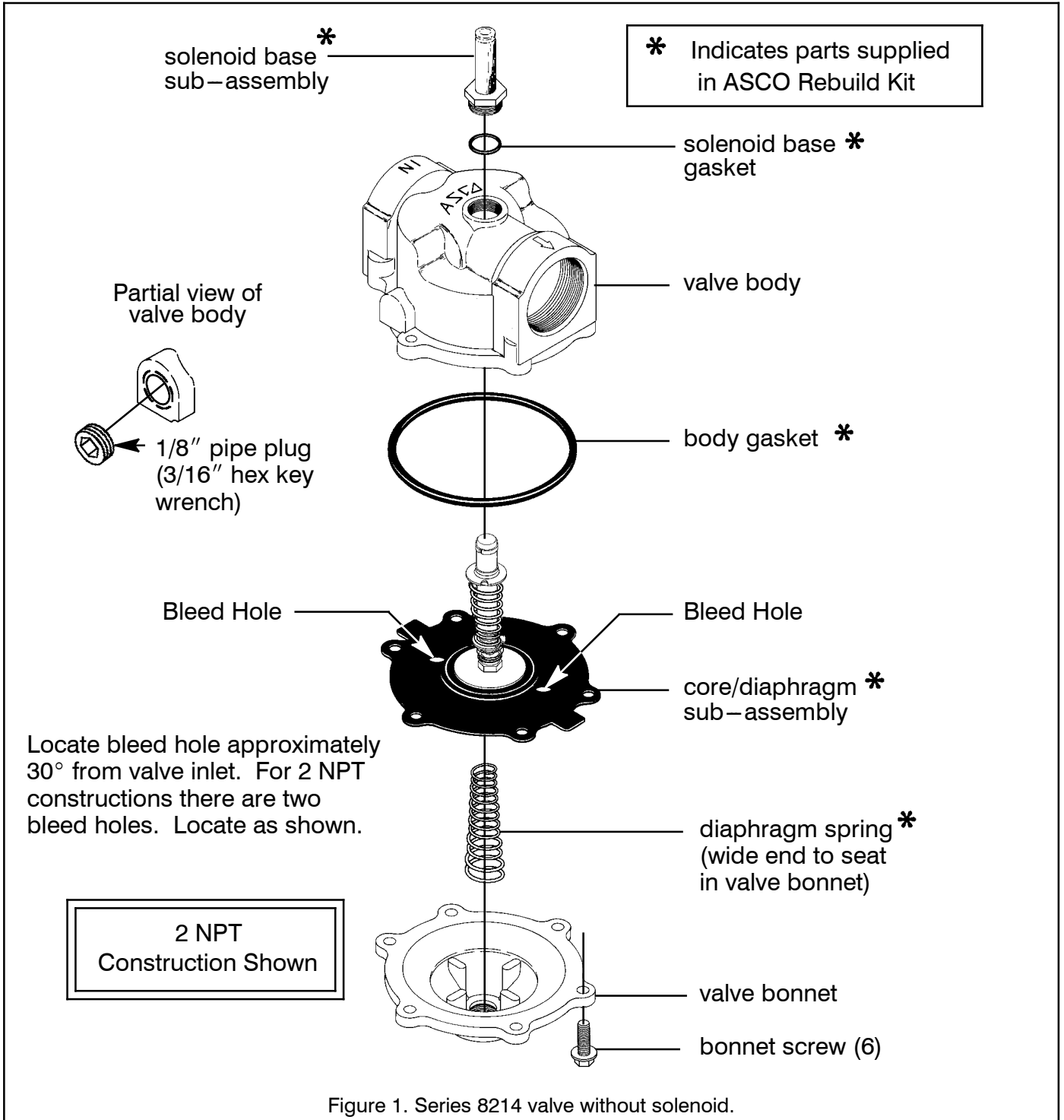


Figure 1. Series 8214 valve without solenoid.

Rebuild Kits are not available for valves with Suffix 'C'.

**Suffix C**

Wrench adapter for tube assembly order No.168146-001

**2 NPT Construction Shown**

**NOTE:**  
 Tamper seal applied to bottom 2 screws to prevent field access to electrical enclosure.

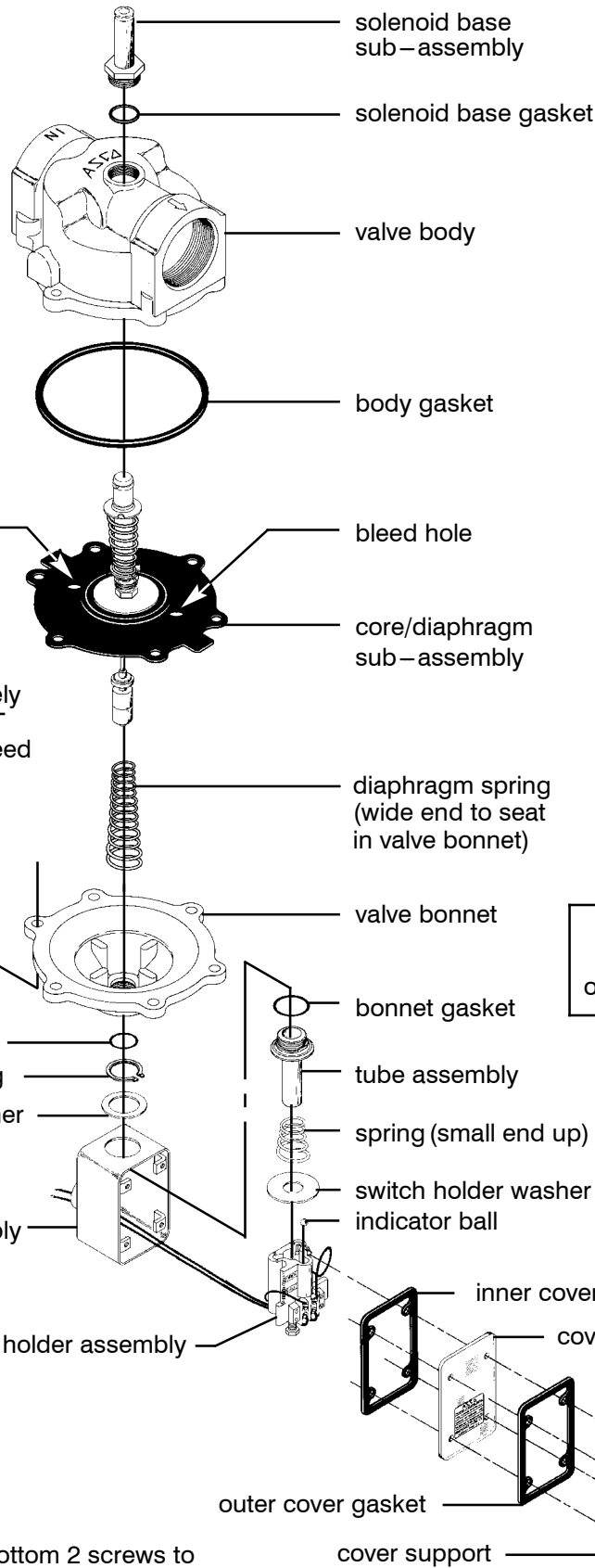


Figure 2. Series 8214 valve with watertight position indicator.

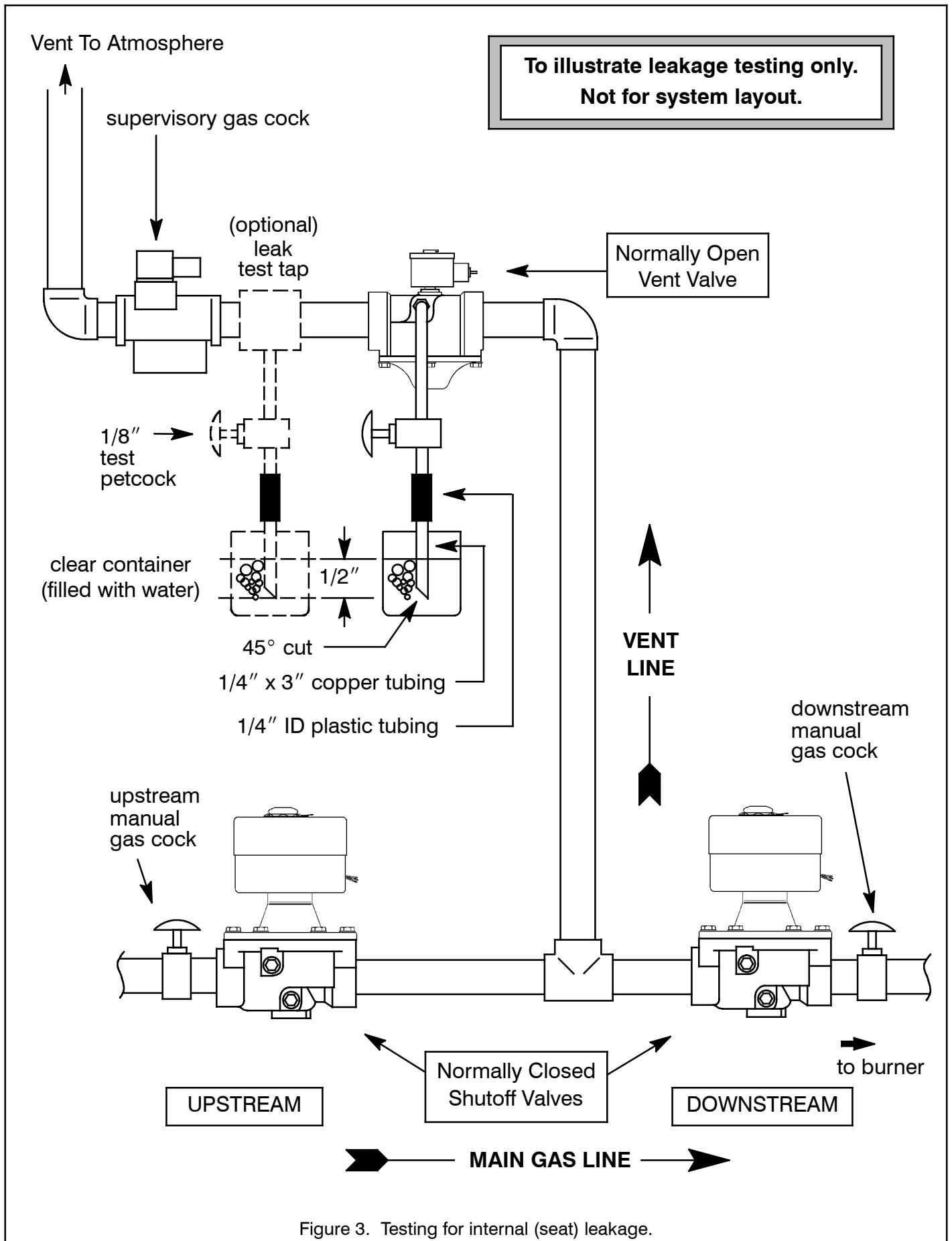


Figure 3. Testing for internal (seat) leakage.