

Installation & Maintenance Instructions

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

SERIES
8214(200)

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

For exploded views, see I&M No. V9565R3 - Section 2.

DESCRIPTION

Series 8214(200) valves are 2-way normally closed 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 (200) valves maybe provided with a watertight solenoid with a watertight junction box depending upon basic valve construction.

The valves feature mounting flanges on the inlet and outlet of the valve. These flanges allow like valves to be mounted together in series without the use of an intermediate pipe nipple. This feature is intended for applications where two redundant valves are required by a governing body. The mounting of the two valves in series is accomplished with an optional connecting hardware kit. Please see additional instructions for the use of this kit in the Piping section of this I&M sheet.

Valve catalog numbers with Suffix C have an integral electrical and visual position indicator and proof of closure construction. Valves with Suffix VI (in the catalog number) have a visual only position indicator. 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 closed when solenoid is de-energized; open when energized.

Note: Position indicators not available for DC valves.

Provisions for Pressure and Seat Leakage Testing

(See Figure 1.)

Series 8214 (200) valves are provided with four 1/8" NPT tapped and plugged holes, two on either side of valve body. Two upstream for pressure testing; two downstream for 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.

OPERATION

Normally Closed: Valve is closed when solenoid is de-energized; open 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

Catalog Numbers*	Insulation Class	Minimum and Maximum Ambient and Fluid Temperatures
8214G236 8214G251 8214G261 8214G266 8214G271 8214G276 8214G281	F H	-40 °F (-40 °C) to 125 F (52 °C) -40 °F (-40 °C) to 140 F (60 °C)

*Includes catalog numbers with or without Suffix C or VI

Positioning

Catalog Numbers 8214G236, 251, 261, 266, 271, 276, 281 without Suffix C or VI can be mounted with solenoid in any Position horizontal and above.

All catalog Numbers with Suffix C or VI must be mounted with solenoid in the vertical-upright position

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 piping as close as possible to connection point. Locate wrenches applied to valve body per Figure 1. Valve should be checked for external leakage at piping connections after installation, see Testing for External Leakage section.

These valves feature mounting flanges on the inlet and outlet of the valve for direct connection to one another or connection in a valve train with an optional Flange Adapter Kit. The optional Flange Adapter Kit may also be used in place of direct piping for easy maintenance and disassembly of the valve without breaking any NPT pipe connections. This feature may only be used with an optional ASCO connecting hardware kit containing approved hardware and seals. The use of hardware and seals that are not part of the kit will void your warranty. Please refer to Installation & Maintenance Instructions, I&M No. V9567 for kit part numbers and contact ASCO for availability.

⚠ WARNING: To prevent the possibility of death, serious injury or property damage, only use the optional ASCO connecting hardware kit for the direct connection of these valves to one another. Complete instructions and guidelines for piping the valves together are included with the kit.

⚠ 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 8602 for strainers.

Testing for External Leakage

▲ 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.

1. Block gas flow on downstream side of valve.
2. Apply pressure to valve within nameplate rating and energize solenoid.
3. Apply a soapy solution or a commercially available leak detecting solution to the pipe connections, and/or inlet/outlet flange adapter connections and check for bubbles. If the valve has been tested for seat leakage or disassembled and reassembled for inspecting, cleaning, or rebuilding apply the solution around solenoid base sub-assembly, bonnet/body joint and pipe plugs.
4. 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, severe 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.

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 the medium flowing through the valve as free from dirt and foreign material as possible.
- Periodic exercise of the valve should be considered if ambient or fluid conditions are such that corrosion, elastomer degradation, fluid contamination build up, or other conditions that could impede solenoid valve shifting are possible. The actual frequency of exercise necessary will depend on specific operating conditions. A successful operating history is the best indication of a proper interval between exercise cycles.
- 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 rebuild kit. Rebuild Kits are not available for valves with Electrical Position Indicator Switch

(Suffix 'C'). If parts are worn or damaged on (Suffix 'C') valves, replace valve.

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 are worn or damaged, install a complete rebuild kit. Rebuild Kits are not available for valves with Electrical Position Indicator Switch (Suffix 'C'). If parts are worn or damaged on (Suffix 'C') valves, replace valve.

Valve Disassembly

1. Remove solenoid enclosure. See separate instructions. If position indicator construction is present, refer to appropriate instructions regarding disassembly, reassembly or adjustment.
2. Unscrew solenoid base sub-assembly from valve bonnet.
3. Remove bonnet screws, valve bonnet, bonnet gasket, core/diaphragm sub-assembly, and body gasket.
4. All parts are now accessible to clean or replace. If parts are worn or damaged, install a complete rebuild kit or replace the valve. Rebuild Kits are not available for valves with Electrical Position Indicator Switch (Suffix 'C'). If parts are worn or damaged on (Suffix 'C') valves, replace valve.

Valve Reassembly

1. Lubricate bonnet gasket and body gasket with a light coat of XIAMETER® PMX-200 20CS Fluid lubricant or an equivalent high-grade silicone fluid.
2. Apply a light coat of RemGrit TFL 50® Dry Lubricant to:
 - Valve seat
 - Valve body flange where diaphragm assembly contacts the valve body and body gasket.
 - Internal surface of valve bonnet where diaphragm assembly contacts bonnet when valve is in the energized (open position).

IMPORTANT: If valve has been disassembled for inspection and cleaning only and a Rebuild Kit is not being installed, lubricate the following with RemGrit TFL 50® Dry Lubricant:

- Diaphragm assembly on both sides.
- Main disc at base of core/diaphragm sub-assembly.
- Pilot disc at base of core assembly.

▲ CAUTION: Do not distort hanger spring between core assembly and diaphragm assembly when lubricating pilot disc.

3. Replace body gasket and core/diaphragm sub-assembly with closing spring attached. Locate bleed hole in core/diaphragm sub-assembly approximately 30° from the valve inlet.
4. Replace valve bonnet and bonnet screws (6). Torque screws in a crisscross manner to 100 ± 10 in-lbs [11,3 ± 1,1 Nm].
5. Replace bonnet gasket and solenoid base sub-assembly. Torque solenoid base sub-assembly to 45 ± 5 ft-lbs (61,1 ± 6,8 Nm).
6. Replace solenoid (see separate instructions) and make electrical hookup.

▲ WARNING: To prevent the possibility of death, severe personal injury or property damage, check valve for proper operation before returning to service. Also perform internal seat and external leakage tests (with a nonhazardous, noncombustible fluid if practical).

7. Check valve for external leakage as indicated under the *Piping* section, and for internal (seat) leakage as follows.

Testing for Internal (Seat) Leakage (see Figure 5)

▲ CAUTION: Be sure valve can be tested without affecting other equipment.

1. Shut off upstream and downstream manual gas cocks. The downstream manual gas cock should remain closed throughout the entire test procedure.
2. Program the control system to operate the valve through five cycles. Listen carefully for a metallic *click* indicating proper operation.
3. Open the upstream manual gas cock. Program the control system to energize and maintain the valve in the open (energized) position. Check all valve and piping connections for external leaks with rich soap and water solution or a commercially available leak detection solution.
4. Shut off the upstream manual gas cock and de-energize valve. Remove the plugs from the leak test tap or downstream pressure tap in the valve body. Connect leak test equipment with the test petcock in the closed position (Figure 5).

▲ WARNING: Some gas will be released to the atmosphere when the 1/8" NPT pipe plug is removed.

5. Open the upstream manual gas cock. Program the control system to energize the valve to the open position, then immediately de-energize it to seal the valve operationally.
6. Immerse the 1/4" leak test tubing vertically into a jar of water to a depth of about 1/2". Slowly open the test petcock. Bubbles may appear in the water as the pressure equalizes.
7. 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 (25.4mm) or less is 6 bubbles (3 cc/min). For valves with an orifice diameter over 1 inch (25.4mm) the allowable leakage rate is 6 bubbles (3 cc/min) per inch (25.4mm) of orifice diameter. If the leakage exceeds this rate, rebuild or replace valve.

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 agency.

8. Close the upstream manual cock and test petcock. Remove the test equipment. Apply a small amount of Loctite Corporation® Pipe Sealant 567 (or equivalent) to the pipe threads. Reinstall the pipe plug and tighten securely.

▲ WARNING: Some gas will be released to the atmosphere when the 1/8" NPT pipe plug is removed.

9. Turn on the gas supply at the upstream manual gas cock and energize the valve.
10. Open the upstream manual gas cock. Program the control system to energize and maintain the valve in the open (energized) position. Check 1/8" NPT pipe plug connection for external leaks with rich soap and water solution or a commercially available leak detection solution.
11. De-energize valve. Open the downstream manual gas cock.
12. 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.

Disassembly and Reassembly of (Suffix VI) Visual Only Position Indicator (Refer to Figure 3)

1. Remove retaining clip and slip end cap, holder, position indicator ball, end cap and spring washer off tube assembly.
2. Unscrew tube assembly and remove tube gasket. All parts are now accessible for cleaning or replacement.
3. Reassemble in reverse order of disassembly paying careful attention to exploded view provided in Figure 3 for identification and placement of parts.
4. Lubricate tube gasket with XIAMETER® PMX-200 20CS Fluid lubricant or an equivalent high-grade silicone fluid.
5. Torque tube assembly to 45 ± 5 ft-lbs [61,1 ± 6,8 Nm].
6. After reassembly, operate the valve a few times to be sure of proper visual indication.

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

Part Name Tool	Torque Value	Torque Value Newton – Meters
Solenoid base sub-assembly	45 ± 5 ft-lbs	61,1 ± 6,8
Tube assembly	45 ± 5 ft-lbs	61,1 ± 6,8
Bonnet screws	100 ± 10 in-lbs	11,3 ± 1,1
Lubrication	Parts to be Lubricated	
XIAMETER® PMX-200 20CS Fluid lubricant or an equivalent high-grade silicone fluid	Solenoid base gasket, body gasket and tube gasket	
RemGrit TFL 50® Dry Lubricant 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.

Partial side view of valve body showing location of wrench flats for piping valve and the location of tapped and plugged holes for pressure and seat leakage testing

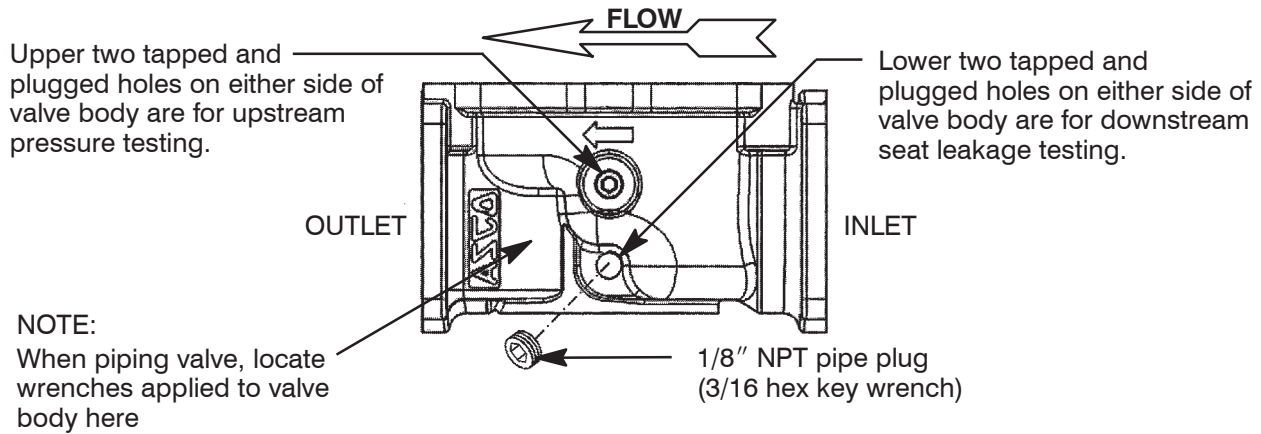


Figure 1. Provisions for wrench flats for piping valve and for pressure and seat leakage testing

* Indicates parts supplied in ASCO Rebuild Kit.

bonnet screw (6)

Locate bleed hole in core/diaphragm sub-assembly approximately 30° from valve inlet

NOTE:
Wrench flats for piping valve and provisions (tapped & plugged holes) for pressure and seat leakage testing not shown in this view, see Figure 1.

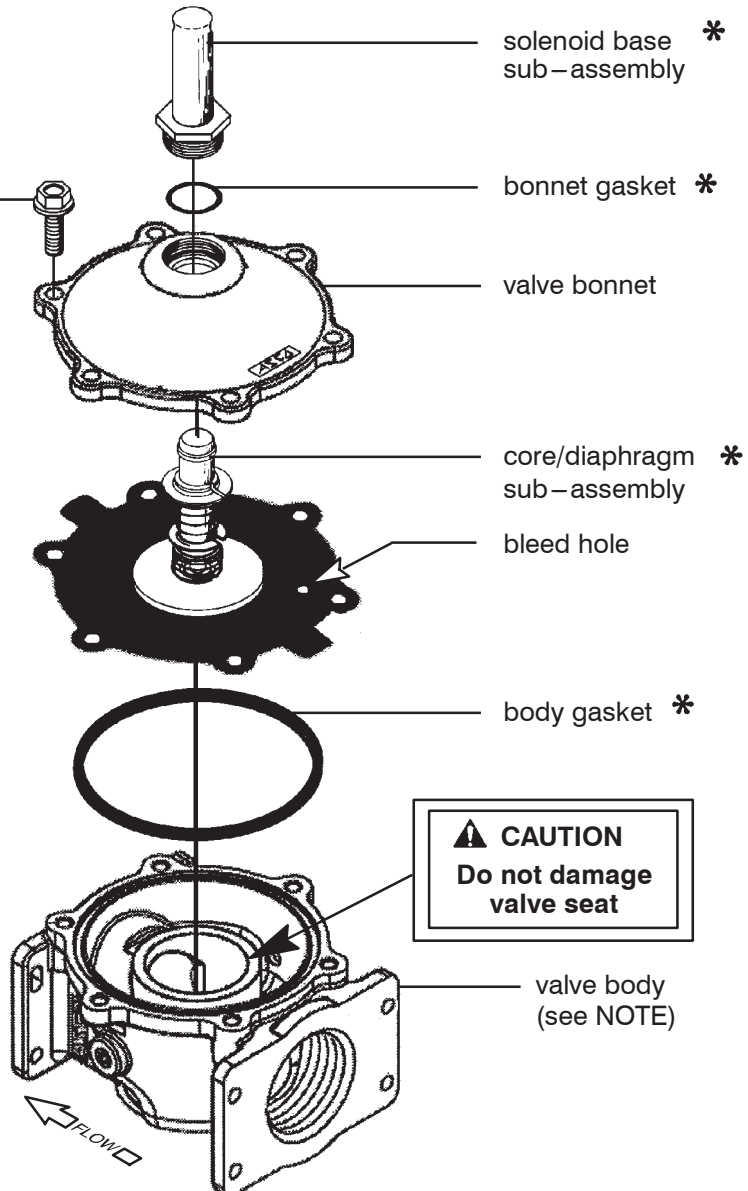


Figure 2. Series 8214G(200) valve without solenoid, AC construction shown

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 NORMALLY CLOSED OPERATION - 3/4", 1", 1 1/4", 1 1/2" OR 2" NPT
 FUEL GAS SERVICE

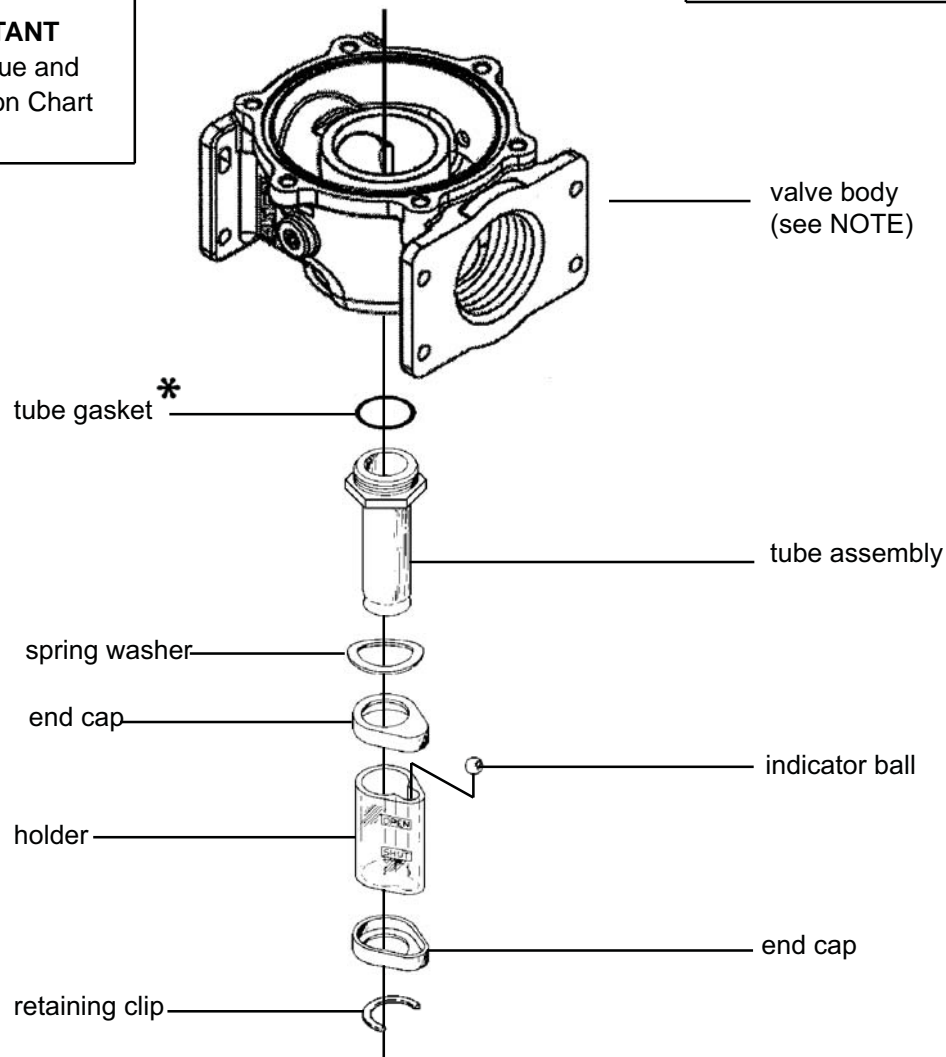
SERIES
 8214(200)

NOTICE: For instructions and exploded view, see I&M No. V9565R3 - Section 1.

Suffix VI

IMPORTANT
 See Torque and
 Lubrication Chart

* Indicates parts supplied in
 ASCO Rebuild Kit



NOTE:
 Wrench flats for piping valve and provisions (tapped & plugged holes) for pressure and seat leakage testing not shown in this view, see Figure 1.

Figure 3. Visual position indicator (partial view)

Suffix C

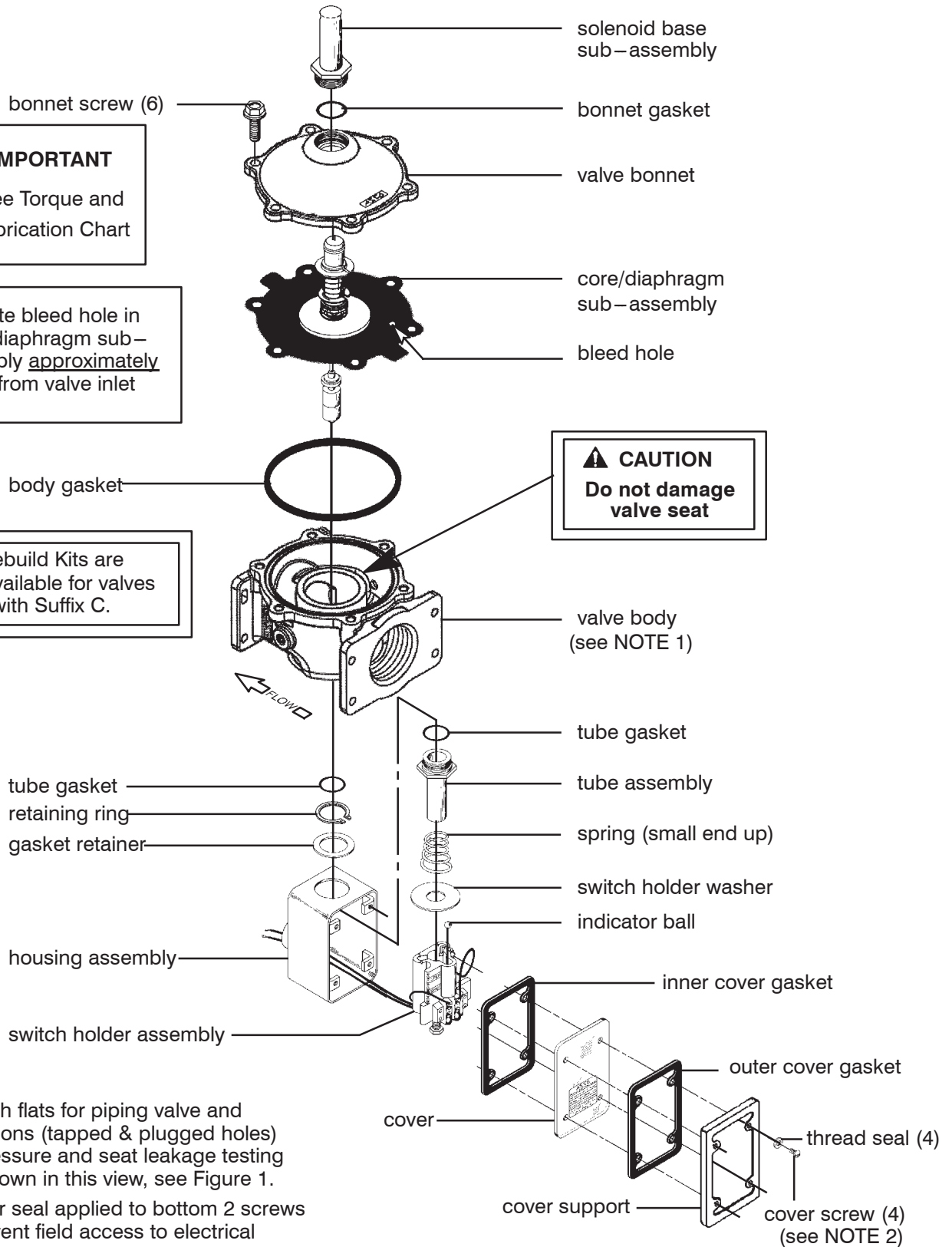
IMPORTANT

See Torque and Lubrication Chart

Locate bleed hole in core/diaphragm sub-assembly approximately 30° from valve inlet

Rebuild Kits are not available for valves with Suffix C.

CAUTION
Do not damage valve seat



NOTES:

1. Wrench flats for piping valve and provisions (tapped & plugged holes) for pressure and seat leakage testing not shown in this view, see Figure 1.
2. Tamper seal applied to bottom 2 screws to prevent field access to electrical enclosure.

Figure 4. Series 8214G(200) with electrical and visual position indicator

To illustrate leakage testing only.
Not for system layout.

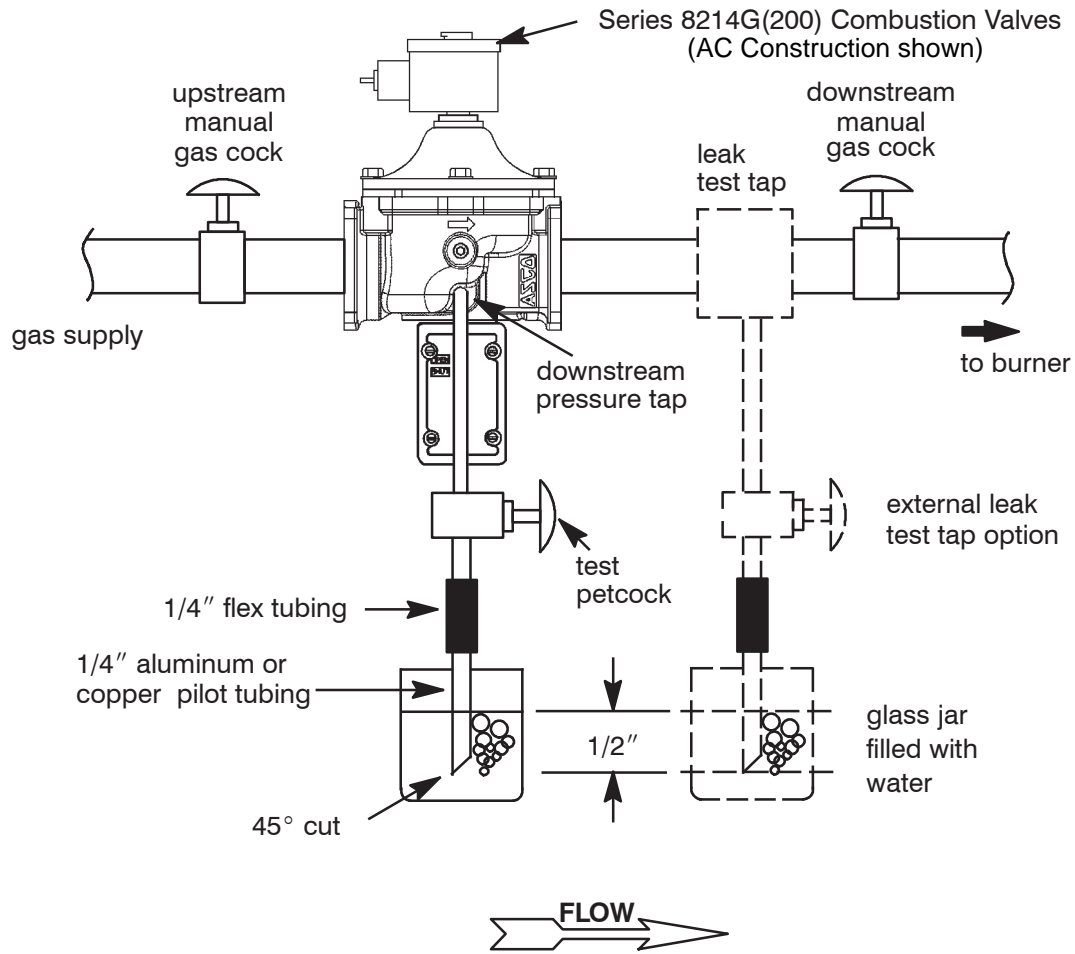


Figure 5. Testing for Internal Seat Leakage