



1451 Control Valve

General Instructions

The SOR® 1451 “Freezeless” control valve is a high-pressure, reverse-seating liquid control valve typically used in separators and other process vessels. The body screws directly into the vessel connection, placing the trim inside the vessel where any warm fluid present will impede freezing inside the valve body.



NOTE: If you suspect that a product is defective, contact the factory or the SOR Representative in your area for a Return Material Authorization number (RMA). This product should only be installed by trained and authorized personnel.

Design and specifications are subject to change without notice.

*For latest revision, go to **SORInc.com***

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Installation

- 1 Before beginning installation, inspect the valve for damage that may have occurred during shipment.
- 2 Flush out all pipelines to remove any accumulated debris. Threaded and gasketed surfaces should also be cleaned before installing the valve.
- 3 When installing the valve, apply PTFE tape or pipe thread sealant to the external pipe threads.
- 4 Before connecting the supply pressure to the valve, confirm it will not exceed the maximum supply pressure marked on the nameplate. Verify that the valve is operating correctly by cycling the actuator several times and confirming the travel indicator moves with the cycling accordingly.

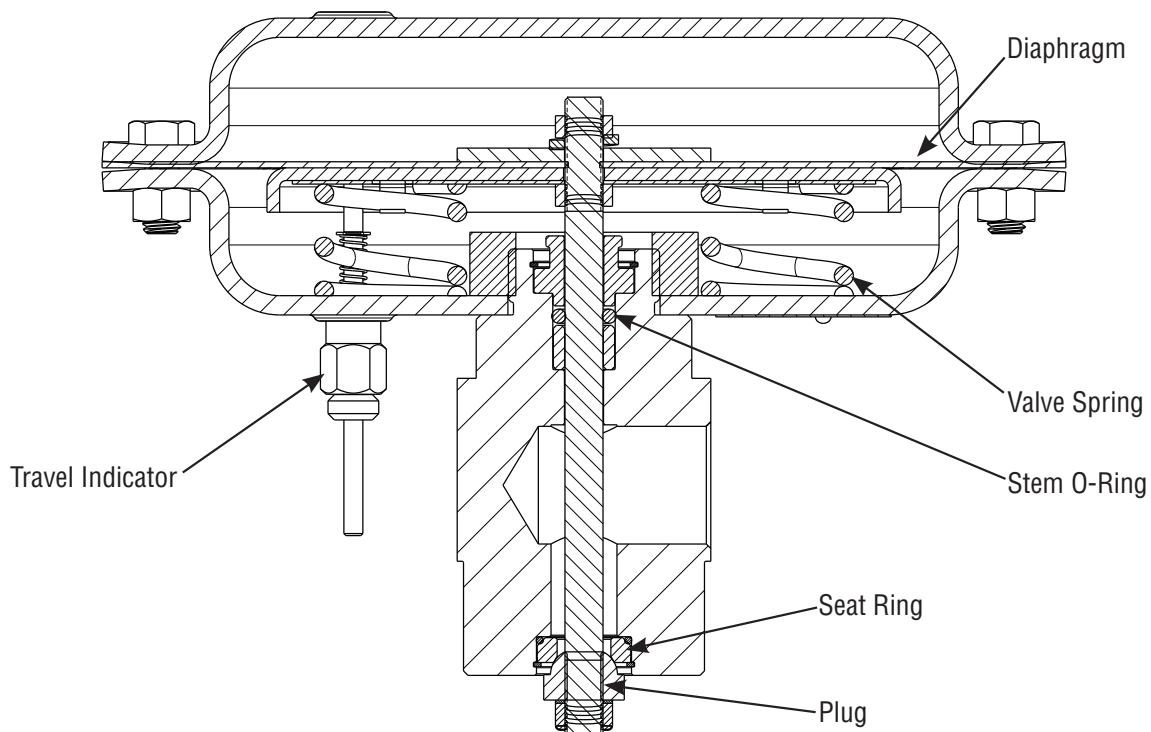


Where piping is insulated, DO NOT insulate the valve actuator housing.



Ensure the system working pressure cannot exceed the pressure rating marked on the nameplate. DO NOT exceed the maximum process pressure rating.

Reference Diagram



Maintenance

Valve parts are subject to normal wear and must be inspected and replaced as necessary with the frequency of inspection and maintenance depending upon the severity of service conditions. The following section describes the procedures for disassembling and reassembling the valve for normal maintenance and troubleshooting.

See the parts list on Page 4 for the Item No. referenced in the following maintenance steps.



The valve must be removed from service before performing maintenance procedures.

TRIM REPLACEMENT

- 1 Connect supply pressure to the actuator and pressurize the diaphragm housing until the valve opens.
- 2 Remove the lock nut (4) from the bottom of the stem (21).
- 3 Remove the valve plug (15) from the bottom of the stem (21).
- 4 *Remove the seat ring (18) from the end of the valve body (27).
- 5 Remove the seat (20) from the valve body (27).
- 6 For reassembly, follow the reverse order of the trim replacement instructions.

****NOTE: The seat ring must be replaced with a new one each time it is removed.***

ACTUATOR DISASSEMBLY

- 1 Remove seat (20) and valve plug (15) per trim replacement procedure above.
- 2 Vent and disconnect the supply pressure from the actuator.
- 3 Remove the nuts (2) and bolts (3) from around the diaphragm housing flange.
- 4 Remove the diaphragm upper housing (24).
- 5 Remove the nut (1) from the top of the stem (21).



There may be spring tension on the diaphragm upper housing (24). Relieve spring tension slowly when removing the nut (1) from the stem (21).

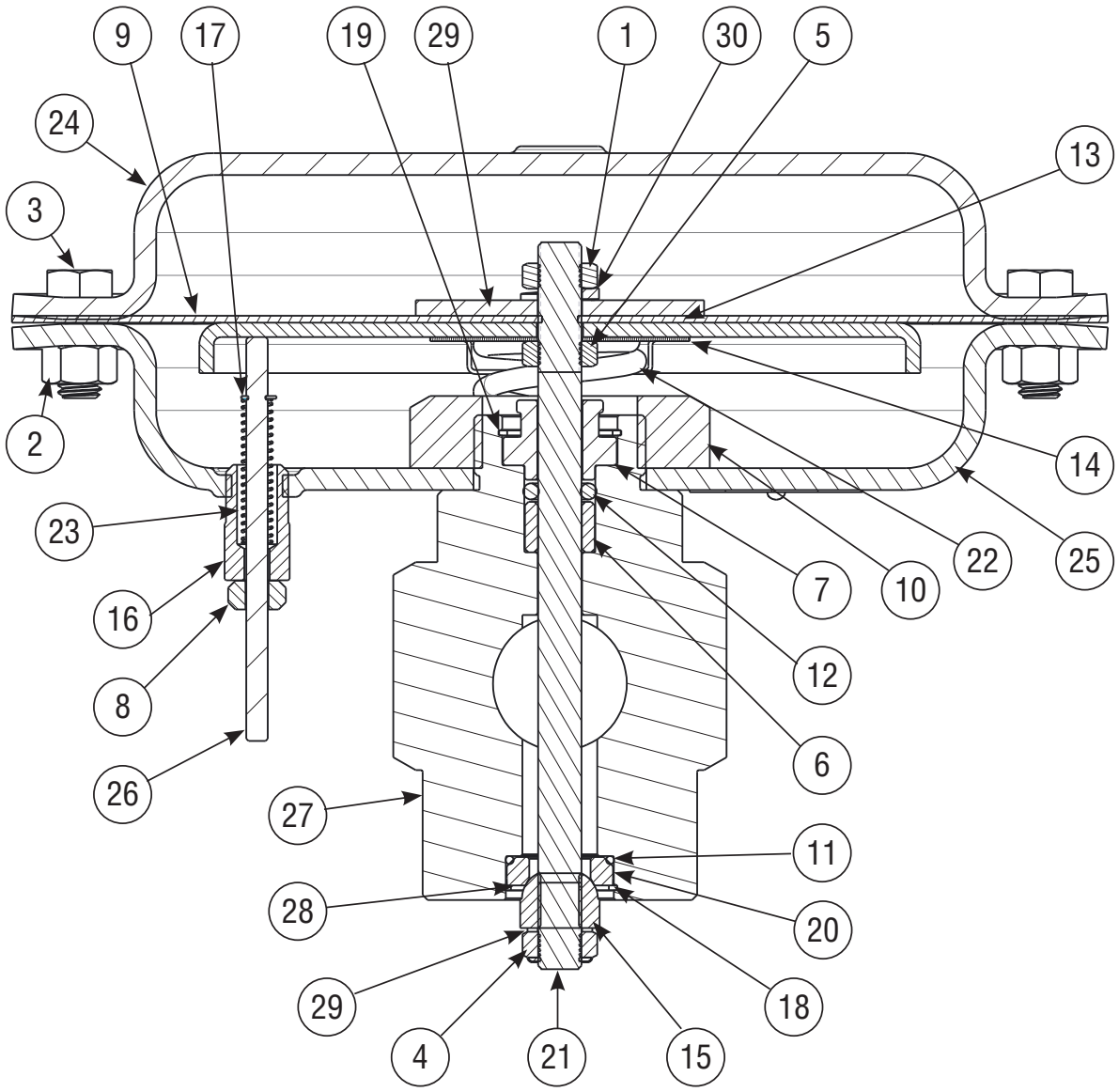
- 6 Remove the lock washer (30), valve spring retainer (14), bearing washer (29), diaphragm plate (13) and diaphragm (9).
- 7 Remove the valve springs (22).

TRIM INSPECTION

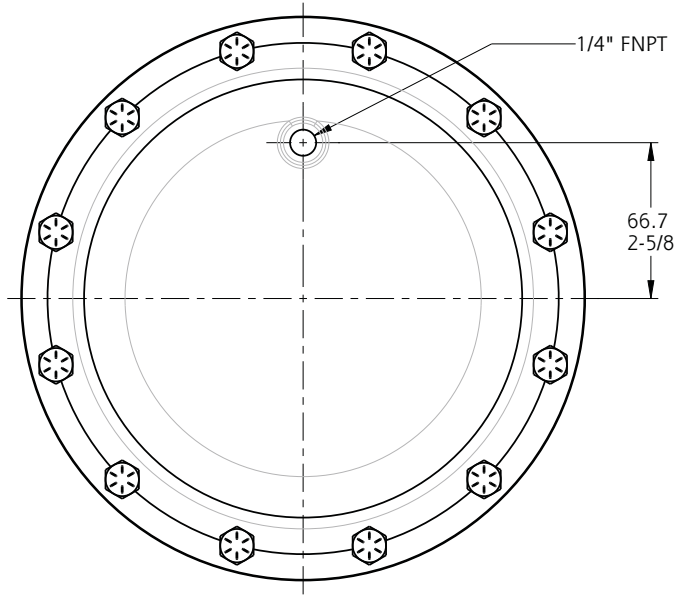
- ❶ Visually inspect the valve plug (15) and seat (20) exteriors for indication of damage.
- ❷ Place the valve plug (15) in to the seat (20). While looking into the orifice from the bottom of the seat, hold the trim assembly in front of a strong light source. If any light passes between the valve plug and seat contact surfaces, the trim should probably be replaced.
- ❸ Oftentimes, the valve plug and seat contact surfaces can be restored to their original finish by re-lapping. Replace any components that are unable to be restored to a usable condition.
- ❹ Examine the stem (21) for damage in the area adjacent to the stem o-ring (12). If there is significant wear and tear, replace the stem.

Parts List

Item	Qty	Description	Item	Qty	Description
1	1	3/8-24 Hex Nut	16	1	Travel Indicator Plug
2	12	3/8-16 Hex Nut	17	1	Retaining Ring
3	12	3/8-16 Hex Nut X 7/8 Hex Bolt	18	1	Seat Ring
4	1	3/8-24 Hex Jam Lock Nut	19	1	Stem Ring
5	2	3/8-24 Hex Jam Nut	20	1	Seat
6	1	Bushing	21	1	Stem
7	1	Busing Travel Stop	22	2	Valve Spring
8	1	Travel Indicator Cap	23	1	Travel Indicator Spring
9	1	Diaphragm	24	1	Diaphragm Upper Housing
10	1	1-1/2-12 Hex Nut	25	1	Diaphragm Lower Housing
11	1	Seat O-Ring	26	1	Travel Indicator
12	1	Stem O-Ring	27	1	Valve Body
13	1	Diaphragm Plate	28	1	Seat Washer
14	1	Valve Spring Retainer	29	1	Bearing Washer
15	1	Valve Plug	30	1	Lock Washer



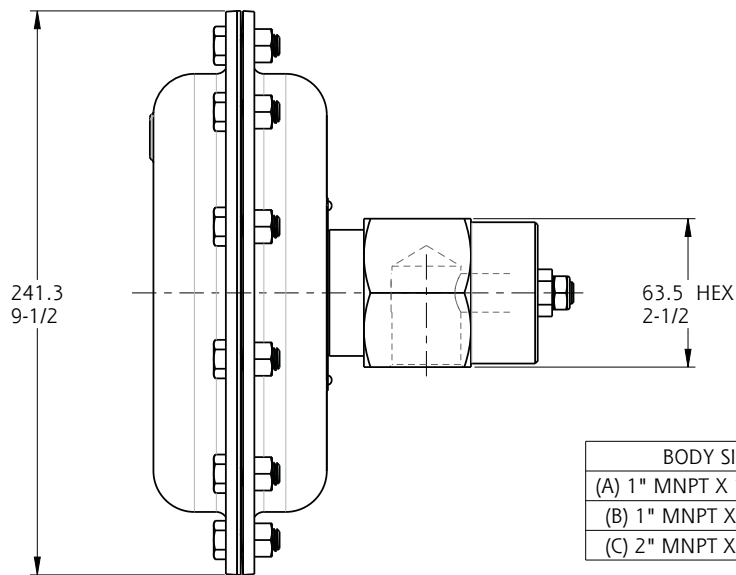
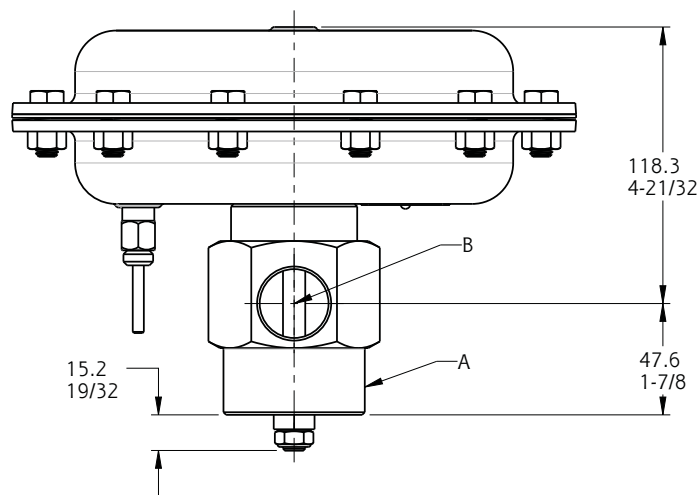
Dimensions



Linear = mm/inches

Drawing 5678454

Dimensions are for reference only. Contact the factory for certified drawings for a particular model number.



BODY SIZE	DIM A	DIM B
(A) 1" MNPT X 1/2" FNPT	1" MNPT	1/2" FNPT
(B) 1" MNPT X 1" FNPT	1" MNPT	1" FNPT
(C) 2" MNPT X 1" FNPT	2" MNPT	1" FNPT

Troubleshooting

Symptom	Probable Cause(s)	Corrective Action(s)
The valve leaks when in the closed position.	Material is trapped beneath the valve plug or the valve plug and seat contact surfaces have become worn or damaged.	Remove the valve from service and pressurize the diaphragm housing until the valve opens, and then inspect the valve plug and seat. A visual examination can determine if the valve plug and seat contact surfaces are worn and need replacing.
The diaphragm housing leaks air from the breather plug.	The diaphragm has worn out or its plates are loose and need tightening.	Depressurize the diaphragm housing until the valve closes, then disassemble the valve per the actuator disassembly instructions. This will allow you access to replace the diaphragm. If the nuts holding the diaphragm plates are loose, tighten them.
The valve, which is typically closed, leaks but the seat and plug, and the spring are OK. Nothing is under the plug.	The pressure drop across the valve is too large.	Consult factory for maximum allowable pressure drop specifications.
The valve is unable to open.	The pressure drop across the valve seat is too large.	Increase the actuator supply pressure to a maximum of 50 psi. If this does not open the valve, then the valve orifice is too big. A smaller size plug is needed. Consult factory for maximum allowable pressure drop specifications.



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