

V48 and V49 Series Valves Repair Kit

Application

Follow these guidelines and procedures to repair most V48 Series and V49 Series valves. For information on repairing V48AF type valves (1-1/2 in. size), see *V48AF Type Valves Repair Kit Installation Instructions, Part No. 24-7664-2519*.

Installation

Flushing the Valve and Lines

Manually flush the valve and fluid piping before and after installing, repairing, or replacing a valve to remove filings, chips, or other foreign matter. Insert screwdrivers under both sides of the valve spring guide and lift upward to flush the valve. See Figure 1. Manual flushing does not affect valve adjustment.

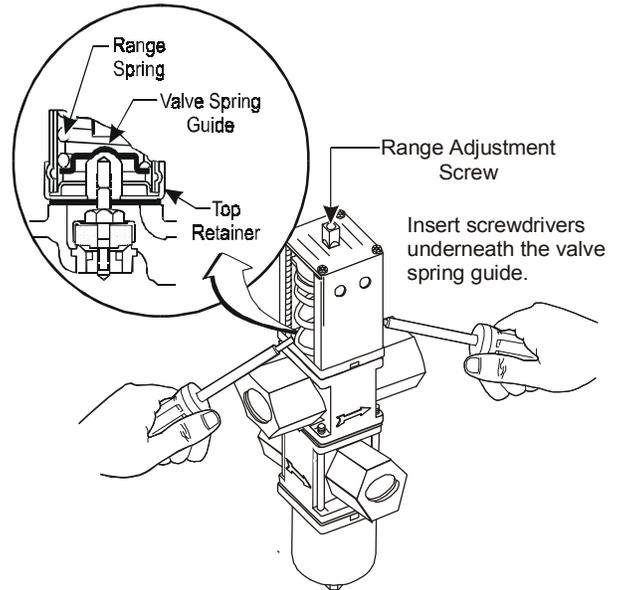


Figure 1: Manual Flushing

Parts Included

Table 1: Seat Repair Kit Contents by Valve Type

Individual Part Description	Seat Repair Kit Product Code Numbers by Valve Type			
	V48AB (1/2 in.)	V48AC, V49AC (3/4 in.)	V48AD (1 in.)	V48AE (1-1/4 in.)
	STT15A-605R	STT16A-604R	STT17A-616R	STT17A-617R
Seat Guide	1	1	1	1
Disc Stud	2	2	2	2
Disc Cup (Retainer)	2	2	2	2
Valve Disc	2	2	2	2
Valve Seat	2	2	2	2
Valve Stem	1	1	1	1
Gasket (Body)	1	1	1	1
Rubber Diaphragm	4	4	5	5
Guide Plate Gasket	1	0	1	1
Bellows Sealing Ring	1	0	1	1
O-ring	1	1	1	1
Seat Wrench	1	1	1	1

Note: 3/8, 1/2, and 3/4 in. valves require two diaphragms on the spring end and two diaphragms on the sensing element end. 1 and 1-1/4 in. valves require two diaphragms on the spring end and three diaphragms on the sensing element end.

New Construction Valves (1/2 in. to 1-1/4 in. Size)



CAUTION: Risk of Personal Injury.

Contents of liquid lines could be under pressure. Shut off the liquid supply and relieve the pressure before servicing the valve to avoid possible personal injury.



CAUTION: Risk of Personal Injury.

Do not disassemble the Spring Housing Assembly. Disassembly could cause the spring to fly out, resulting in personal injury.



CAUTION: Risk of Equipment Damage.

Using excessive force to turn the screw beyond the stop point will damage the screw thread. Do not turn the screw beyond the stopping point.



CAUTION: Risk of Equipment Damage.

Cool the temperature-sensing bulb of temperature-actuated valves by submerging the bulb in ice water. Do not remove the bulb from ice water until the sensing element is reinstalled. Failure to follow this precaution may result in damage to the bellows when the sensing element is removed from the valve.

Use the following procedure to install the repair kits on new-construction valves.

See Figure 2, Figure 3, and Figure 4 for parts identification.

1. Decrease the compression on the main spring by turning the range-adjusting screw clockwise until it stops. Count the number of turns until the screw stops.
2. Remove the four spring housing screws.
3. Remove the spring housing assembly from the valve body assembly.
4. Remove the sensing element screws and the sensing element assembly.
5. Pull the lower disc cup and disc assembly away from the valve body and disassemble. Remove the bellows push rod and rubber diaphragms.
6. Remove the seat guide.
7. Turn the disc stud counterclockwise to remove the valve stem assembly.
8. Use the seat wrench supplied with the kit to remove the old valve seat and replace the new valve seat.
9. Replace the old parts with new parts: valve discs, disc cups, disc studs, valve stem, diaphragms, bellows push rod and seat guide post.
10. Remove and replace the body gasket or O-ring located between the valve bodies.
11. Place the new valve stem assembly into the valve body assembly and turn clockwise to tighten.
12. Lightly lubricate two new rubber diaphragms with grease and replace the old diaphragm with the new. Use only slight lubrication on the center hole of the diaphragm to prevent puckering when the assembly is screwed together.
13. Replace the old seat guidepost with the new seat guide and tighten. See Table 2.
14. Reassemble the spring housing assembly and the valve body assembly.
15. Replace and tighten the spring housing screws. See Table 2.
16. Turn the bellows push rod counterclockwise to remove the bellows push rod and the bottom retainer. See Figure 4.
17. Lightly lubricate three new rubber diaphragms with grease and replace the old diaphragms with the new. Use a small amount of lubrication on the center hole of the diaphragm to prevent puckering when the assembly is screwed together.
18. Replace the bellows push rod and the bottom retainer. Turn clockwise to tighten. See Table 2.
19. Replace the old guide plate gasket with the new guide plate gasket.
20. Replace/reinstall the sensing element assembly.
21. Replace the sensing element screws. See Table 2.
22. To approximate the previous setting, tighten the range adjustment screw the same number of turns used in Step 1.

Table 2: Torque Specifications

Valve Size	Sensing Element Screws, Spring Housing Assembly Screws	Bellows Push Rod, Valve Stem Assembly, Seat Guide Post, Disc Stud
3/8 in.	13 lb-in (1.1 N-m)	5.5 lb-in (0.51 N-m)
1/2 in.	23 lb-in (2.2 N-m)	
3/4 in.	33 lb-in (3.4 N-m)	8 lb-in (0.90 N-m)
1 in.	53 lb-in (5.6 N-m)	40 lb-in (4.5 N-m)
1-1/4 in.		

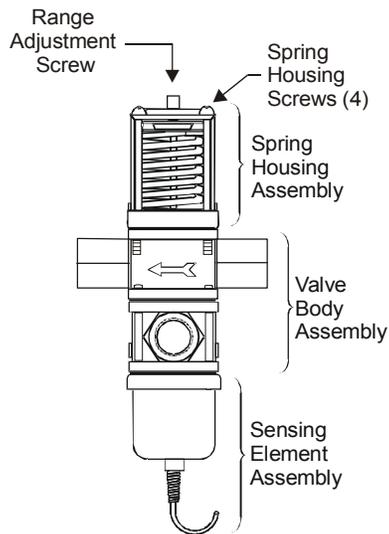


Figure 2: Spring Housing Assembly

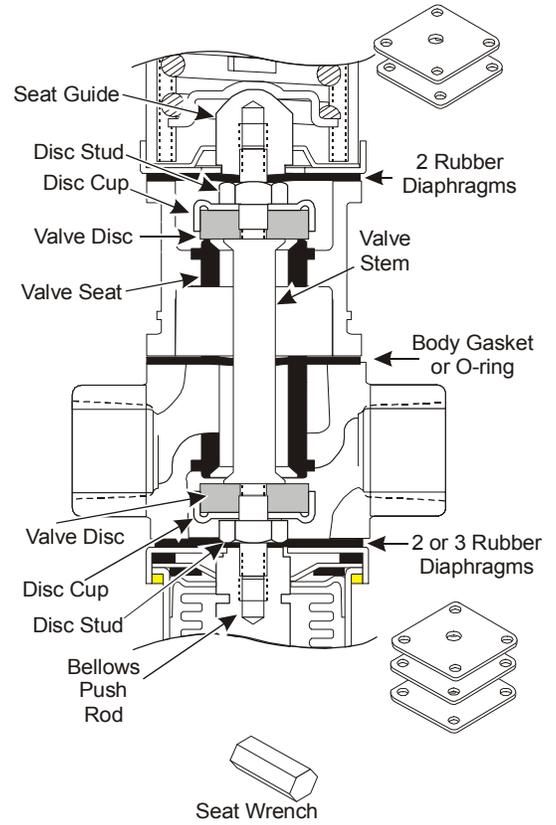


Figure 3: Valve Body Assembly

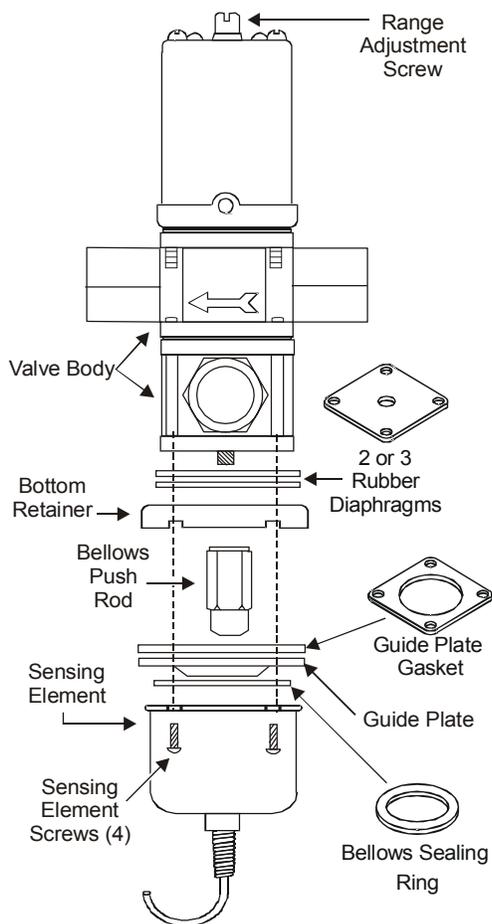


Figure 4: Sensing Element Assembly

Old Construction Valves (1/2 in. to 1-1/4 in. Size)



CAUTION: Risk of Personal Injury.

Contents of liquid lines could be under pressure. Shut off the liquid supply and relieve the pressure before servicing the valve to avoid possible personal injury.

Repair kits are no longer produced with old construction parts. To replace old construction parts with new construction parts, disassemble the valve as indicated here, and reassemble as indicated in *New Construction Valves, 1/2 in. to 1-1/4 in. Size.*

Removing the Spring Housing Assembly



CAUTION: Risk of Personal Injury.

Do not disassemble the Spring Housing Assembly. Disassembly could cause the spring to fly out, resulting in personal injury.



CAUTION: Risk of Equipment Damage.

Using excessive force to turn the screw beyond the stop point will damage the screw thread. Do not turn the screw beyond the stopping point.



CAUTION: Risk of Equipment Damage.

Cool the temperature-sensing bulb of temperature-actuated valves by submerging the bulb in ice water. Do not remove the bulb from ice water until the sensing element is reinstalled. Failure to follow this precaution may result in damage to the bellows when the sensing element is removed from the valve.



CAUTION: Risk of Personal Injury.

The housing contains a compressed spring. Disassembly could cause the spring to fly out resulting in personal injury. For valve sizes 1 in. and larger, do not remove the two screws on the sides of the spring housing.

See Figure 2, Figure 3, Figure 4, and Figure 5 for parts identification.

1. Decrease the compression on the main spring by turning the range adjustment screw clockwise until it stops. Count the number of turns until the screw stops.
2. Remove the four housing screws.
3. Remove the spring housing assembly from the valve body assembly.
4. Remove the sensing element screws and the sensing element assembly.
5. Remove the valve assembly screw.
6. Remove the seat guidepost, bellows push rod, and the rubber diaphragms.

7. Pull the disc retainers, discs, and the extension sleeve from the body.
8. Use the seat wrench supplied with the kit to remove the old valve seats and replace with the new valve seats.
9. Replace the old parts with new parts: valve discs, disc retainers, seat guide, and assembly screw. Secure in place. Refer to Figure 5 for removal of old parts. For installation of the new construction parts, see Figure 3. See Table 1 for information on the number of rubber diaphragms used on each end.
10. Assemble the bellows push rod onto the assembly screw.
11. Tighten the assembly screw in place. Ensure that the rubber diaphragms are properly positioned.
12. Place the sensing element over the push rod and secure in place.
13. Install the spring housing over the guidepost and secure in place with the four long screws.
14. Adjust the valve to the desired opening point.

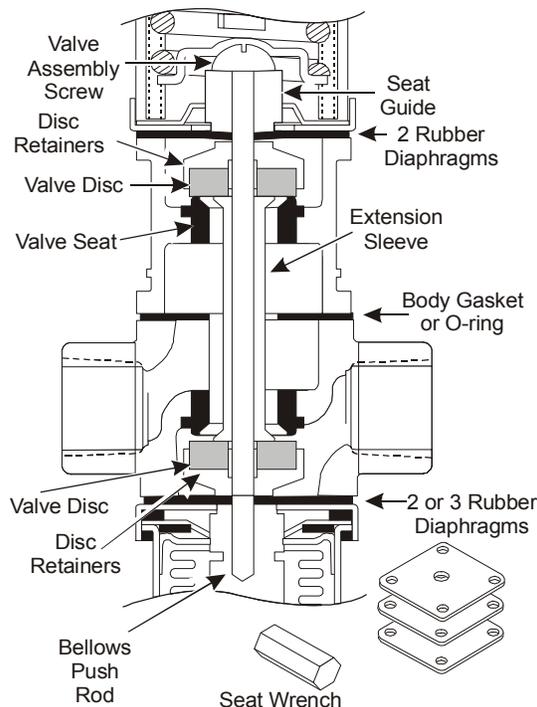


Figure 5: Valve Body Assembly

Setup and Adjustments

Adjusting the Valve after Reassembly

The **opening point** is the refrigerant pressure at the valve's bellows or temperature at the sensing bulb necessary to just lift the valve disc off the valve seat and allow water to flow through the valve body (Port 1 to Port 2). Turning the adjustment screw changes the opening point.

The **throttling range** is the pressure/temperature difference between the opening point and the pressure/temperature necessary to fully open the valve (Port 1 to Port 2) and allow maximum flow. The throttling range is a fixed value. Turning the range adjustment screw to adjust the opening point also moves the fixed throttling range.

Use a standard service valve wrench or screwdriver to adjust the opening point.

- Turn the adjustment screw **counterclockwise to raise the opening point** (and throttling range).
- Turn the adjustment screw **clockwise to lower the opening point** (and throttling range).

Pressure-actuated valves close (Port 1 to Port 2) approximately 3-7 psi (21-48 kPa) below the opening point.

Temperature-actuated valves close (Port 1 to Port 2) approximately 3-5 F° (1.7-2.8 C°) below the opening point.

Use a refrigerant pressure/temperature gauge to adjust the opening point pressure/temperature. Operate the system at normal load conditions and adjust the valve's opening point to the desired pressure/temperature. See Table 3 for pressure/temperature specifications.

Special Considerations

If the compressor is located in an area with high ambient temperatures, refrigerant head pressures may remain high enough during off cycles to prevent the valve from closing completely. In such instances, the opening point of the valve should be raised just enough to cause the valve to close flow to the condenser during compressor standby periods.

If the system uses a single condenser, adjust the balancing valve in the bypass while the compressor is shut off and the tower pump is operating. Adjust the balancing valve so that the amount of water through the bypass is just sufficient to provide the minimum recommended nozzle pressure. See Figure 6.

On a multiple-condenser system, adjust the balancing valves in the bypasses evenly while the compressors are shut down and the tower pump is operating. The total flow through the bypasses should be just sufficient to provide the minimum recommended nozzle pressure.

The sensing bulb of V49 valves must be secured in the fluid or area being controlled.

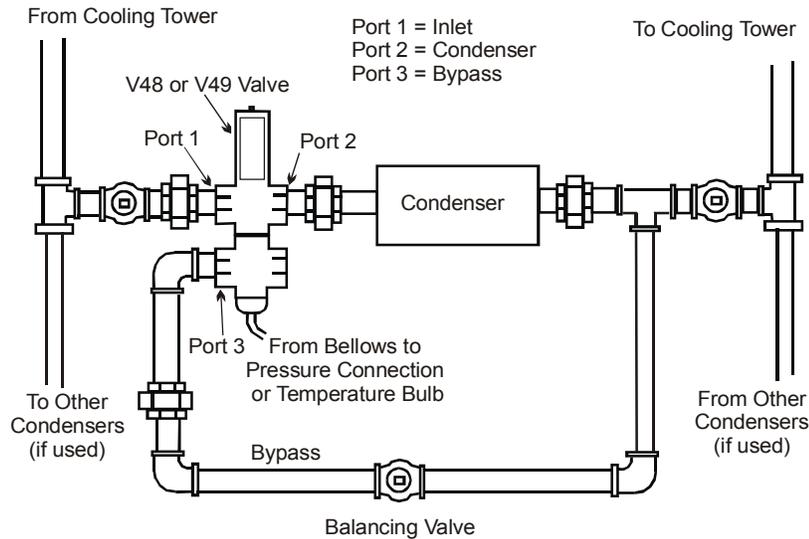


Figure 6 : Recommended Piping Arrangement for V48 or V49 Valves

Table 3: Valve Specifications

	V48 Series		V49 Series
	Low Pressure¹	High Pressure²	V49AC-3C
Maximum Permissible Refrigerant Pressure	230 psi (1585 kPa)	320 psi (2206 kPa)	—
Maximum Bulb Temperature	—	—	155°F (68°C)
Opening Point Adjustment Range	85-110 psi (586-750 kPa)	145-190 psi (1000-1310 kPa)	75-135°F (24-57°C)
Factory-Set Opening Point (Port 1 to Port 2)	95 psi (655 kPa)	165 psi (1138 kPa)	103°F (39°C)
Throttling Range	35 psi (241 kPa)	50 psi (345 kPa)	24°F (13°C)
Closing Point (Port 1 to Port 3)	130 psi (896 kPa)	215 psi (1482 kPa)	127°F (52°C)
Maximum Water Pressure	150 psi (1034 kPa)		
Maximum Water Temperature	170°F (77°C)		

1. V48AB-1C, V48AC-1C, V48AD-1C, V48AE-1C, V48AF-1C

2. V48AB-2C, V48AB-4C, V48AC-2C, V48AC-4C, V48AD-2C, V48AD-7C, V48AE-2C, V48AE-6C, V48AE-8C

Checkout

Before leaving the installation, observe at least one complete operating cycle to be sure that all components are functioning correctly.

Repairs and Replacement

See Table 4 and Table 5 for information on part numbers for replacing or repairing sensing elements.

See *V46, V47, V48, and V49 Sensing Element Replacement Technical Bulletin, LIT-121700* for information on replacing the sensing element.

Table 4: V48 Valves Sensing Element Replacement

Valve Product Code Number	Bellows Replacement Product Code Number	Capillary Replacement Product Code Number
V48AB-1	SEP91A-602R	SEC99AA-36
V48AB-2		
V48AB-4		
V48AC-1	SEP91A-601R	
V48AC-2		
V48AC-4		
V48AD-1	SEP91A-603R	
V48AD-2		
V48AD-7		
V48AE-1		
V48AE-2		
V48AE-6		
V48AE-8		

Table 5: V49 Valves Sensing Element Replacement

Valve Product Code Number	Sensing Element Replacement Product Code Number
V49AC-3C	SET98A-651



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