V46, V47, 246, and 247 Repair Parts and Service Instructions

Application Overview

The V46 pressure-actuated and V47 temperature-actuated water-regulating valves are used for water-cooled condensers, bypass service on refrigeration systems, engine cooling, and various industrial applications.

IMPORTANT: All Series V46 and V47 valves are designed for use **only** as operating devices. Where system closure, improper flow, or loss of pressure due to valve failure can result in personal injury and/or loss of property, a separate pressure relief or safety shutoff valve (as applicable) must be added by the user.

Adjustments

To raise the valve opening point on direct-acting valves, turn the adjusting screw counterclockwise. To lower the valve opening point, turn the range adjusting screw clockwise. See Figure 2. The closing point of the valve is not adjustable. Pressure-actuated valves close approximately 3 to 7 psi (21 to 48 kPa) below the opening point, and temperature-actuated valves close approximately 3 to 5°F (1.7 to 2.8°C) below the opening point.

If the compressor operates in high ambient temperatures, 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 during compressor standby periods. This will also raise the throttling point.

The all-range pressure-actuated valve settings can be adjusted for both low pressure refrigerant ranges of R-134a and higher pressure refrigerant ranges of R-22 (R-502).

Manual Flushing

To clear any sediment that may accumulate, valves may be manually flushed by inserting screwdrivers under both sides of the main spring and lifting upwards to flush the valve. Manual flushing does not affect valve adjustments.

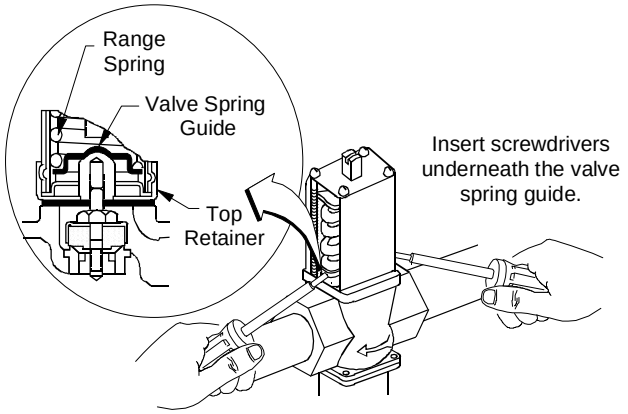

Figure 1: Manual Flushing

Inspection and Service

After long periods of operation, the valve seat and rubber disc may become worn, pitted, or wiredrawn, preventing the valve from completely closing off when the pressure/temperature is below the setpoint.

WARNING: **Personal injury hazard**. Contents of liquid lines could be under pressure. Avoid possible personal injury by shutting off the liquid supply and relieving the pressure before servicing the valve.

Part No. 24-8414-12, Rev. B
Code No. LIT-121695

To inspect and replace internal parts, follow the procedures in this section.

Note: Parts supplied in the renewal kit replace both V46 and V47 Series, and 246 and 247 Series valve assemblies.

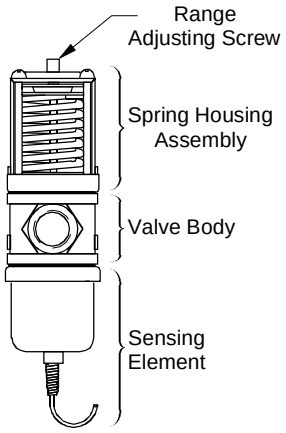

Figure 2: Valve Components

Servicing 246, 247, 2 in., and 2-1/2 in. Valves

CAUTION: **Equipment damage hazard**. To decrease the pressure in the sensing element on 247 and V47 valves, cool the bulb by submerging it in ice water. Do not remove the bulb from the ice water until the element is reinstalled.

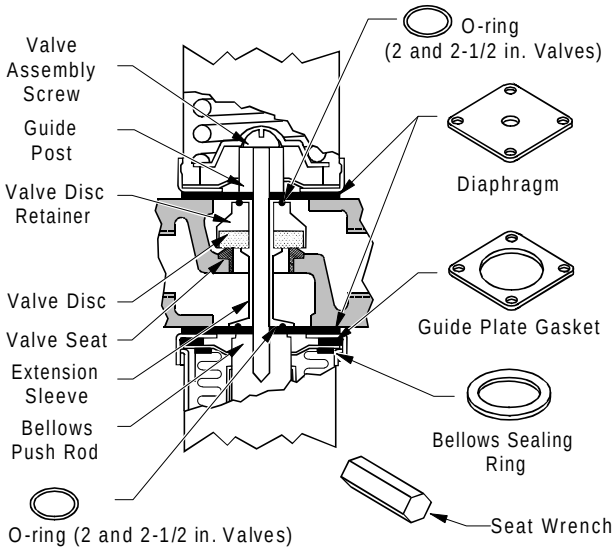

Figure 3: 246, 247, 2 in., and 2-1/2 in. Valves

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

1. Decrease the compression on the main spring by turning the range adjusting screw clockwise until it stops. Using excessive force to turn the screw beyond the stop point will strip the thread.
2. Remove the four screws holding the spring housing and remove the entire housing assembly. See Figure 2.
3. To improve the performance on 3/8 in. direct-acting valves, install the ISO-loss washer that is supplied with the 3/8 in. valve repair kit as follows:

   Note: Reverse-acting 3/8 in. valves do not require the ISO-loss washer.

   a. Slightly squeeze the spring housing assembly to remove the spring housing.
   b. Remove the range adjusting screw, spring, and valve spring guide (Figure 4).
   c. Clean off any excess grease on the valve spring guide.
   d. Place the new ISO-loss washer over the guide plate.
   e. Replace the valve spring guide, spring, range adjusting screw, and spring housing.

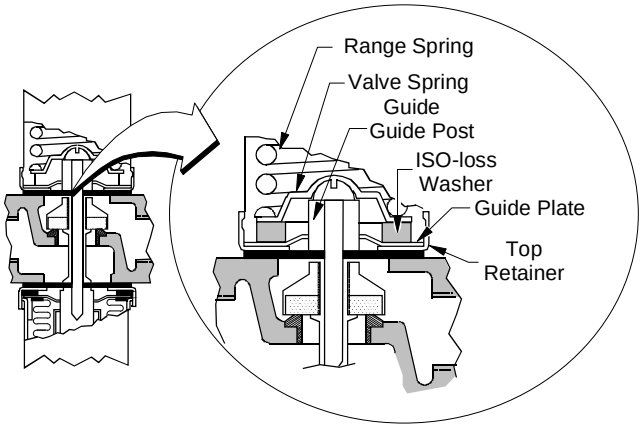

Figure 4: ISO-loss Washer

4. Remove the valve assembly screw (Figure 3).
5. Remove the guide post and old diaphragms (Figure 3).
6. Remove the sensing element and the diaphragms between it and the valve body (Figure 3).
7. Pull the disc, disc retainer, and extension sleeve assembly from the valve (Figure 3).
8. Using the seat wrench supplied with the kit, remove old valve seat and replace with the new valve seat (Figure 3). (Seat wrench not provided for 2 and 2-1/2 in. valves, use 1-1/2 and 1-15/16 in. hex stock, respectively.)
9. Replace the diaphragms between the sensing element and valve body (Figure 5). Use two diaphragms on 3/8 in., 1/2 in., and 3/4 in. valves and three diaphragms on 1 in. and larger valves.
10. On 1 in. and larger pressure valves and all temperature valves, replace the guide plate gasket and bellows sealing ring (Figure 5).
11. Assemble the sensing element to the valve body with the bellows push rod, new diaphragms, guide plate gasket, and bellows sealing ring in place.
12. Assemble the new disc, disc retainer, and extension sleeve.
    a. On 2 and 2-1/2 in. valves, apply a small amount of grease to the grooves on the bottom of the new extension sleeve and the top of the new disc retainer. Place one O-ring into each groove.
    b. Place the subassembly into the valve.
13. Place two new diaphragms on the spring housing end of the valve body.
14. Screw the valve assembly screw through the guide post and into the bellows push rod (Figure 3).
15. Place the spring housing assembly over the guide post and secure in place with the four housing screws.
16. Adjust the valve to desired opening point. Then manually flush the valve. See the *Manual Flushing* section.
17. Before leaving the installation, run the system through at least one complete operating cycle to be sure the valve is operating correctly.

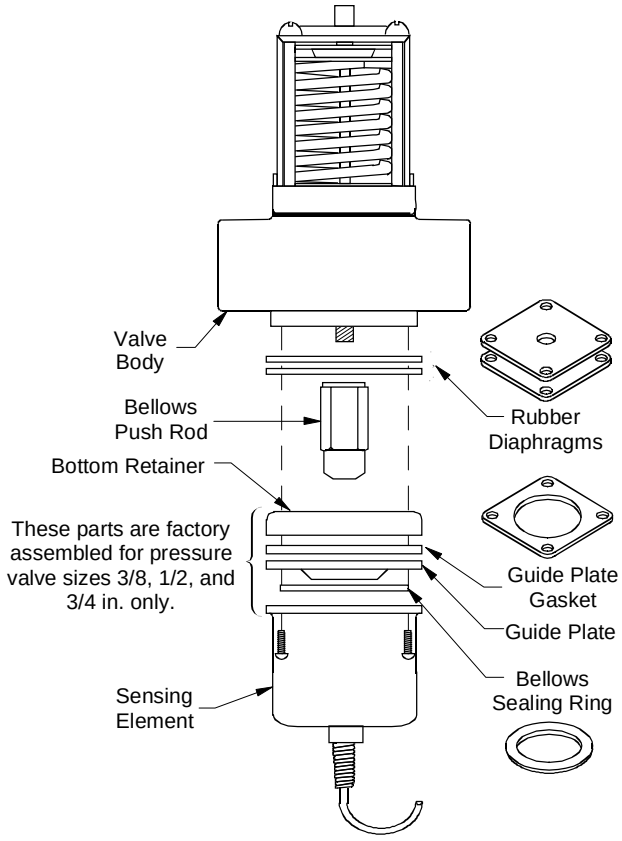

Figure 5: Guide Plate Gasket and Bellows Sealing Ring Identification

Servicing V46 and V47 3/8 in. through 1-1/2 in. Valves

CAUTION: **Equipment damage hazard**. To decrease the pressure in the sensing element on V47 valves, cool the bulb by submerging it in ice water. Do not remove the bulb from the ice water until the element is reinstalled.

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

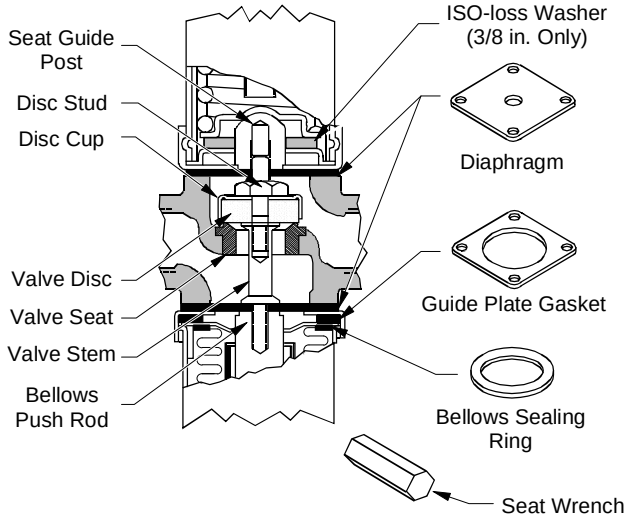

Figure 6: V46 and V47 3/8 in. through 1-1/2 in. Valves

1. Decrease the compression on the main spring by turning the range adjusting screw clockwise until it stops. Using excessive force to turn the screw beyond the stop point will strip the thread.
2. Remove the four screws holding the spring housing and remove the entire housing assembly. See Figure 2.
3. To improve the performance on 3/8 in. direct-acting valves, install the ISO-loss washer that is supplied with the 3/8 in. valve repair kit as follows:

   Note: Reverse-acting 3/8 in. valves do not require the ISO-loss washer.

   a. Slightly squeeze the spring housing assembly to remove the spring housing.

   b. Remove the range adjusting screw, spring, and valve spring guide (Figure 7).

   c. Clean off any excess grease on the valve spring guide.

   d. Place the new ISO-loss washer over the guide plate.

   e. Replace the valve spring guide, spring, range adjusting screw, and spring housing.

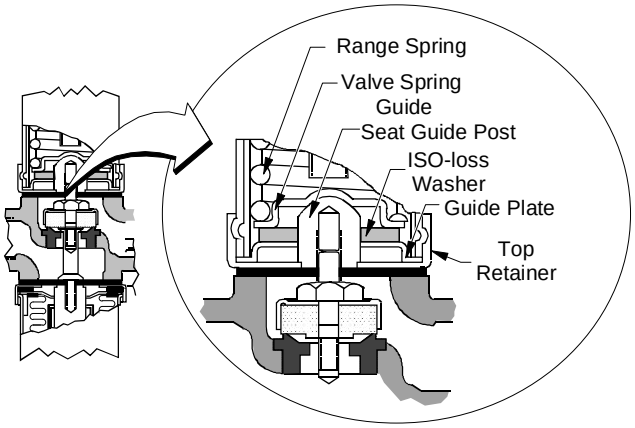

Figure 7: ISO-loss Washer

4. Remove the seat guide post (Figure 6).
5. Remove the rubber diaphragms (Figure 6).
6. Turn the disc stud counterclockwise to remove the valve stem assembly (Figure 6).
7. Remove the sensing element, bellows push rod, and diaphragms. See Figure 9.

8. Using the seat wrench supplied with the kit, remove old valve seat and replace with the new valve seat (Figure 6).
9. Assemble the new valve stem, disc, disc cup, and disc stud, and place into the valve body (Figure 6).
10. On 1 in. and larger pressure valves and all temperature valves, replace the guide plate gasket and bellows sealing ring (Figure 9).
11. If servicing a V47 or V46 valve other than low flow, place new diaphragms on the sensing element end of the valve stem assembly. Use two diaphragms on 3/8 in., 1/2 in., and 3/4 in. valves and three diaphragms on 1 in. and larger valves. Screw into place with the bellows push rod. Attach the sensing element to the valve body. See Figure 6.
12. If servicing a low flow valve, place the stem washer and new diaphragms on the sensing element end of the valve stem assembly. Use two diaphragms on 3/8 in., 1/2 in., and 3/4 in. valves and three diaphragms on 1 in. and larger valves. Screw into place with the bellows push rod. Attach the sensing element to the valve body. See Figure 8.
13. Place two new diaphragms on the spring housing side of the valve body. Screw into place with the seat guide post (Figure 8).
14. Place the spring housing assembly over the seat guide post and secure in place with the four housing screws.
15. Adjust the valve to desired opening point. Then manually flush the valve. See the *Manual Flushing* section.
16. Before leaving the installation, run the system through at least one complete operating cycle to be sure the valve is operating correctly.

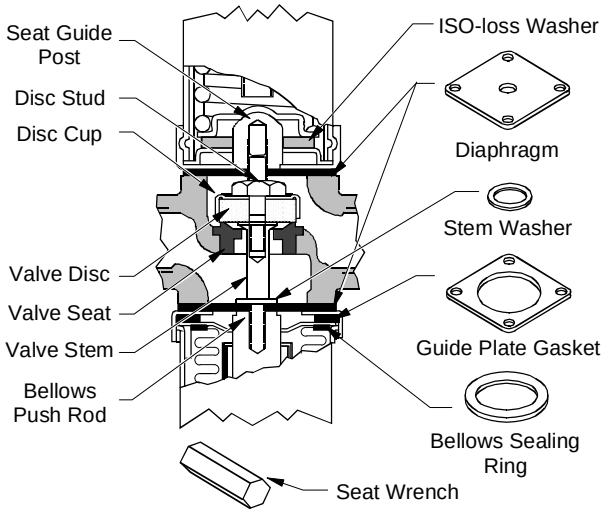

Figure 8: Low Flow Valves

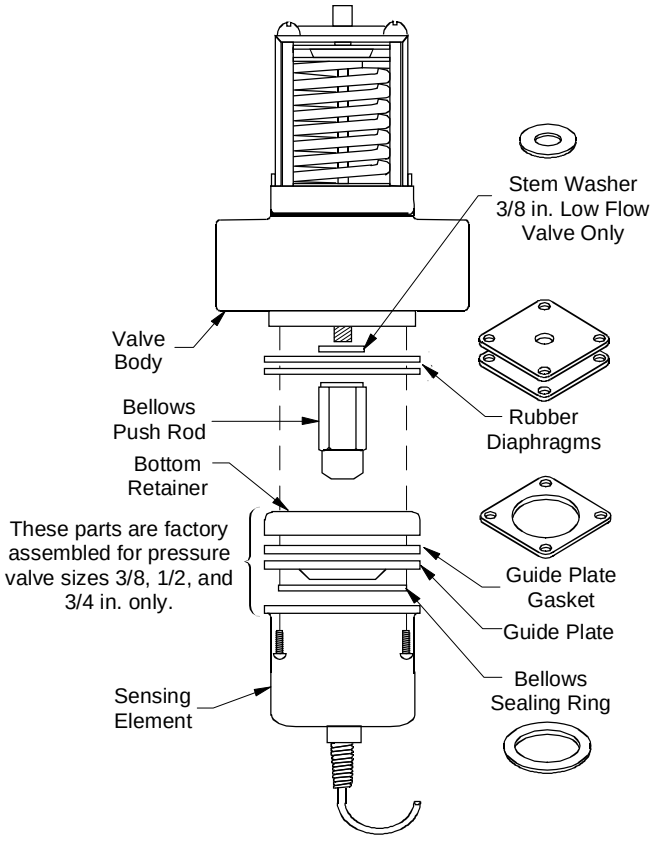

Figure 9: Guide Plate Gasket and Bellows Sealing Ring Identification

Table 1: Renewal Kits

Individual Part Description	Commercial Type: V46A, V46D, V47A, V47N Old Construction: 246P, 246T								Maritime and Navy Type: V46B, V46C Old Construction: 246MP, 246NP						Diaphragm Kits for All Types	
	STT14A-600R 3/8 In.	STT14A-603R 3/8 in. Low Flow	STT15A-602R 1/2 in.	STT16A-601R 3/4 in.	STT17A-609R 1 in.	STT17A-610R 1-1/4 and 1-1/2 in.	STT18A-600R 2 in.	STT18A-601R 2-1/2 in.	STT14A-601R 3/8 In.	STT15A-603R 1/2 In.	STT17A-613R 3/4 in.	STT17A-611R 1 in.	STT17A-612R 1-1/4 and 1-1/2 in.	STT18A-602R 2 and 2-1/2 in.	DPM17A-600R 1, 1-1/4, 1-1/2 in.	DPM17A-601R 2 and 2-1/2 in.
Seat Guide Post	1	1	1	1	1	1			1	1	1	1	1			
Disc Stud	1	1	1	1	1	1			1	1	1	1	1			
Disc Cup (Retainer)	1	1	1	1	1	1			1	1	1	1	1			
Valve Disc	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Valve Seat	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Valve Stem	1	1	1	1	1	1			1	1	1	1	1			
Rubber Diaphragm*	4	4	4	4	5	5	5	5	4	4	4	5	5	5	5	5
Guide Plate Gasket	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Bellows Sealing Ring	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Valve Assembly Screw							1	1						1		
Guide Post							1	1						1		
Valve Disc Retainer							1	1						1		
Extension Sleeve							1	1						1		
Seat Wrench	1	1	1	1	1	1			1	1	1	1	1			
Sensing Element	Contact Application Engineering at (414)-274-5535															
Stem Washer		1														
ISO-loss Washer**	1	1							1							
O-ring Seals							2	2								

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

** Reverse-acting 3/8 in. valves do not require an ISO-loss washer.

Notes

Notes

JOHNSON CONTROLS

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