V48 Series 3-Way Pressure-Actuated Water-Regulating Valves With Union Fittings

Application

IMPORTANT: The V48 Series 3-Way Pressure-Actuated Water-Regulating Valves are intended to control water flow under normal equipment operating conditions. Where failure or malfunction of a V48 valve could lead to an abnormal operating condition that could cause personal injury or damage to the equipment or other property, other devices (limit or safety controls) or systems (alarm or supervisory) intended to warn of, or protect against, failure or malfunction of the V48 valve must be incorporated into and maintained as part of the control system.

The V48 direct-acting models open on an increase in pressure. The V48 valves with Union fittings are available in 1/2-in. through 1-1/4-in. sizes and may be used with standard non-corrosive refrigerants.

Installation

IMPORTANT: If these valves are installed on equipment that contains hazardous or regulated materials, such as refrigerants or lubricants, the installer and user should observe all regulations governing the handling and containment of those materials.

IMPORTANT: It is recommended to apply a non-hardening, pliable sealant (Loctite® 567 or equivalent) to the face of the copper tailpiece to compensate for slight piping misalignments and surface imperfections on union ends.

Dimensions

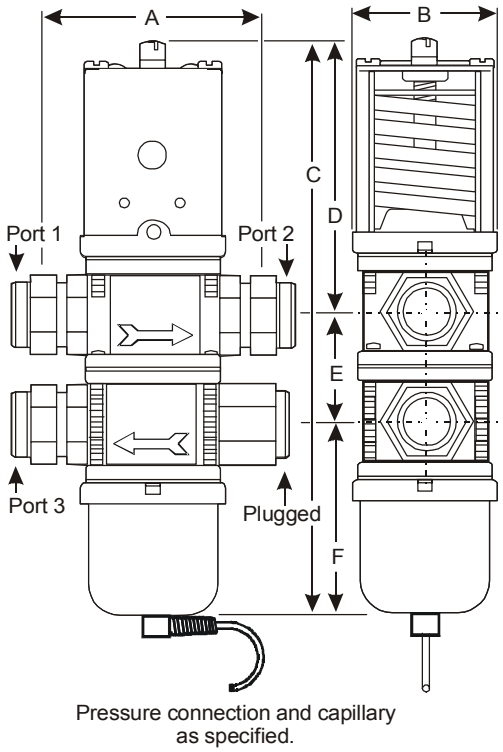

Figure 1: V48 Valve Dimensions for Models With Union Fittings

Table 1: V48 Valve Dimensions, in. (mm)

Product Code Number	Nominal Valve Size	A	B	C	D	E	F
V48AJ-2C	1/2 in.	3-1/2 (89)	1-13/16 (47)	7-15/16 (200)	3-3/4 (96)	1-1/2 (38)	2-5/8 (67)
V48EK-2C	3/4 in.	3-13/16 (97)	2 (52)	8-9/16 (218)	4-3/16 (106)	1-3/4 (44)	2-5/8 (67)
V48AL-2C	1 in.	5-1/8 (130)	2-5/8 (67)	11-5/8 (295)	5-15/16 (151)	2 (51)	3-11/16 (94)
V48AM-2C	1-1/4 in.	5-3/16 (131)	2-5/8 (67)	12-7/16 (316)	6-3/16 (157)	2-3/8 (60)	3-7/8 (99)

Manually Flushing the Valve

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 upwards to flush the valve. See Figure 2. Manual flushing does not affect valve adjustment.

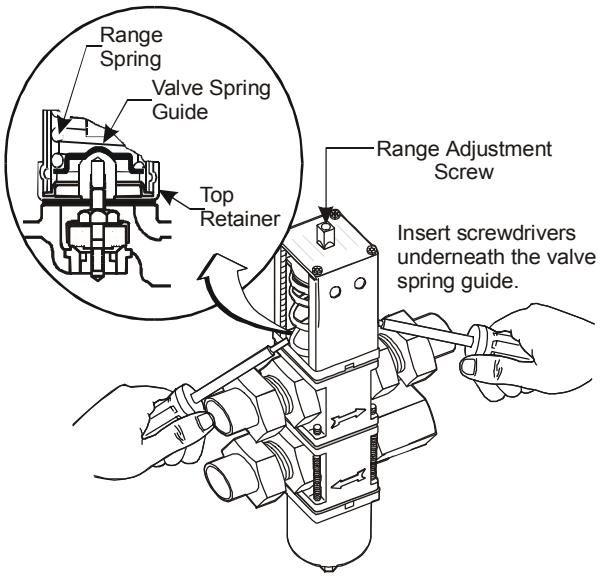

Figure 2: Manual Flushing

Location Considerations

Install the valve vertically with the range adjustment screw on the top, and the bellows and pressure connection line on the bottom to allow oil and refrigerant to drain away from valve bellows.

Do not mount the valve in any position other than vertical unless specified by the manufacturer of the equipment on which the valve is installed. Follow the manufacturer's installation instructions.

Install the V48 valve as shown in Figure 3. Port 1 is for the inlet connection from the tower. Port 2 is for the outlet connection to the condenser inlet. Port 3 is the bypass connection.

Install the valve on the inlet side of the condenser. If it is necessary to keep the condenser flooded with water, install the valve on the outlet side of the condenser.

If the system 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 pressure of the valve should be raised just enough to cause the valve to stop flow to the condenser during compressor standby periods.

When used on a single condenser system, adjust the balancing valve in the bypass with the compressor shut off and the tower pump 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 3.

On a multiple condenser system, adjust the balancing valves in the bypasses evenly with the compressors Off and the tower pump On. The total flow through all the bypasses should be just sufficient to provide the minimum recommended nozzle pressure.

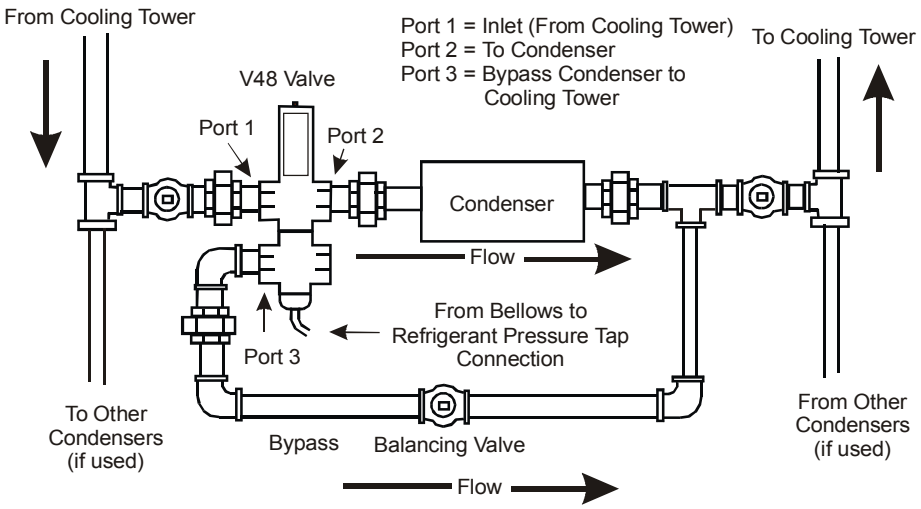

Figure 3: Recommended Piping Arrangement for V48 Valves

Pressure Connections

WARNING: Risk of Personal Injury.
To avoid possible personal injury, shut off the liquid supply and relieve the pressure before servicing the valve.

Connect the refrigerant-side flare connector to the appropriate high-side pressure tap point. If additional capillary tubing is necessary, use 1/4-in. tradesize copper tubing.

Follow the guidelines below when making pressure connections:

- ***Use Pressure Tap Points Located on the Top Side of the Refrigerant Lines***

  This reduces the possibility of oil, liquids, or sediment accumulating in the pressure connection line or valve bellows, which could cause valve malfunction.

- ***Avoid Sharp Bends in the Capillary Tubes***

  Sharp bends can weaken or kink capillary tubes, which may result in refrigerant leaks or restrictions.

- ***Allow for Slack in the Capillary Tubes to Dampen Vibration***

  Mechanical vibration can weaken or damage the capillary tubes.

- ***Avoid Contact Between the Capillary Tubing and Sharp or Abrasive Objects***

  Vibration or rubbing of sharp or abrasive objects in contact with capillary tubes can cause leaks.

- ***Coil and Secure Excess Capillary Tubing Away from Contact with Sharp or Abrasive Objects or Surfaces***

  Carefully loop any excess capillary tube into smooth, circular coils (minimum 2 in. [5 cm] diameter). Securely fasten the coiled capillary tube.

- ***Do Not Overtighten Flare Nuts on Pressure Connection Line Fittings***

  Overtightening flare connections may damage the threads and result in refrigerant leaks. Do not exceed 9 lb·ft (12 N·m) of torque when tightening brass flare connections.

- ***Avoid Severe Pressure Pulsation at Pressure Tap Points***

  Install pressure connection lines to pressure tap points away from the compressor discharge to minimize the effects of pressure pulsation from reciprocating compressors.

Table 2: Pressure Specifications for V48 Series Valves with Union Fittings

Product Code Number	Nominal Valve Size	Maximum Refrigerant Pressure at Bellows	Maximum Water Pressure	Opening Point Adjustment Range	Factory-Set Opening Point (Port 1 to Port 2)	Pressure Connection Style
V48AJ-2C	1/2 in.	320 psi (2206 kPa)	150 psi (1034 kPa)	145 to 190 psi (1000 to 1310 kPa)	165 psi (1138 kPa)	45
V48EK-2C	3/4 in.	370 psi (2551 kPa)				46
V48AL-2C	1 in.	320 psi (2206 kPa)				
V48AM-2C	1-1/4 in.					

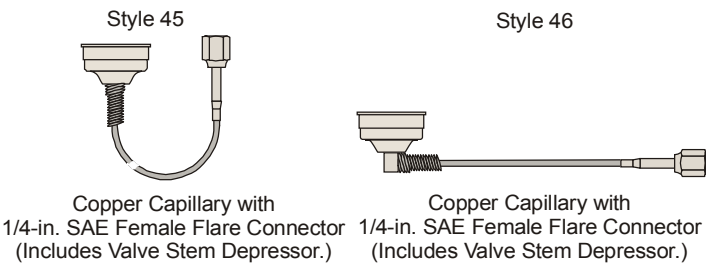

Figure 4: Pressure Connection Styles

Setup and Adjustments

The V48 valves are factory adjusted for the settings shown in Table 2.

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

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

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

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

Use a refrigerant pressure gauge to adjust the opening point pressure. Operate the system at normal load conditions and adjust the valve's opening point to the desired pressure. See Table 2 for refrigerant pressure specifications.

Repairs and Replacement

Replacement of the sensing element, internal parts, and the rubber diaphragm can be made.

For a replacement valve or replacement parts kit, contact the nearest Johnson Controls/PENN distributor. For replacement kit part numbers, refer to Table 3.

For replacement kit instructions and details, refer to the following bulletin:

- *V46, V47, V48, and V49 Sensing Element Replacement Technical Bulletin (LIT-121700)*

Table 3: Repair and Replacement Kits

Valve Product Code Number	Nominal Valve Size	Valve Shipping Weight	Seat Repair Kit Product Code Number	Sensing Element Replacement Kit Product Code Number
V48AJ-2C	1/2 in.	5.4 lb (2.4 kg)	STT15A-605R	SEP77A-605R
V48EK-2C	3/4 in.	6.5 lb (2.9 kg)	STT16A-604R	SEP127A-600R
V48AL-2C	1 in.	12.4 lb (5.6 kg)	STT17A-616R	SEP107A-602R
V48AM-2C	1-1/4 in.	14.2 lb (6.4 kg)	STT17A-617R	

Flowchart

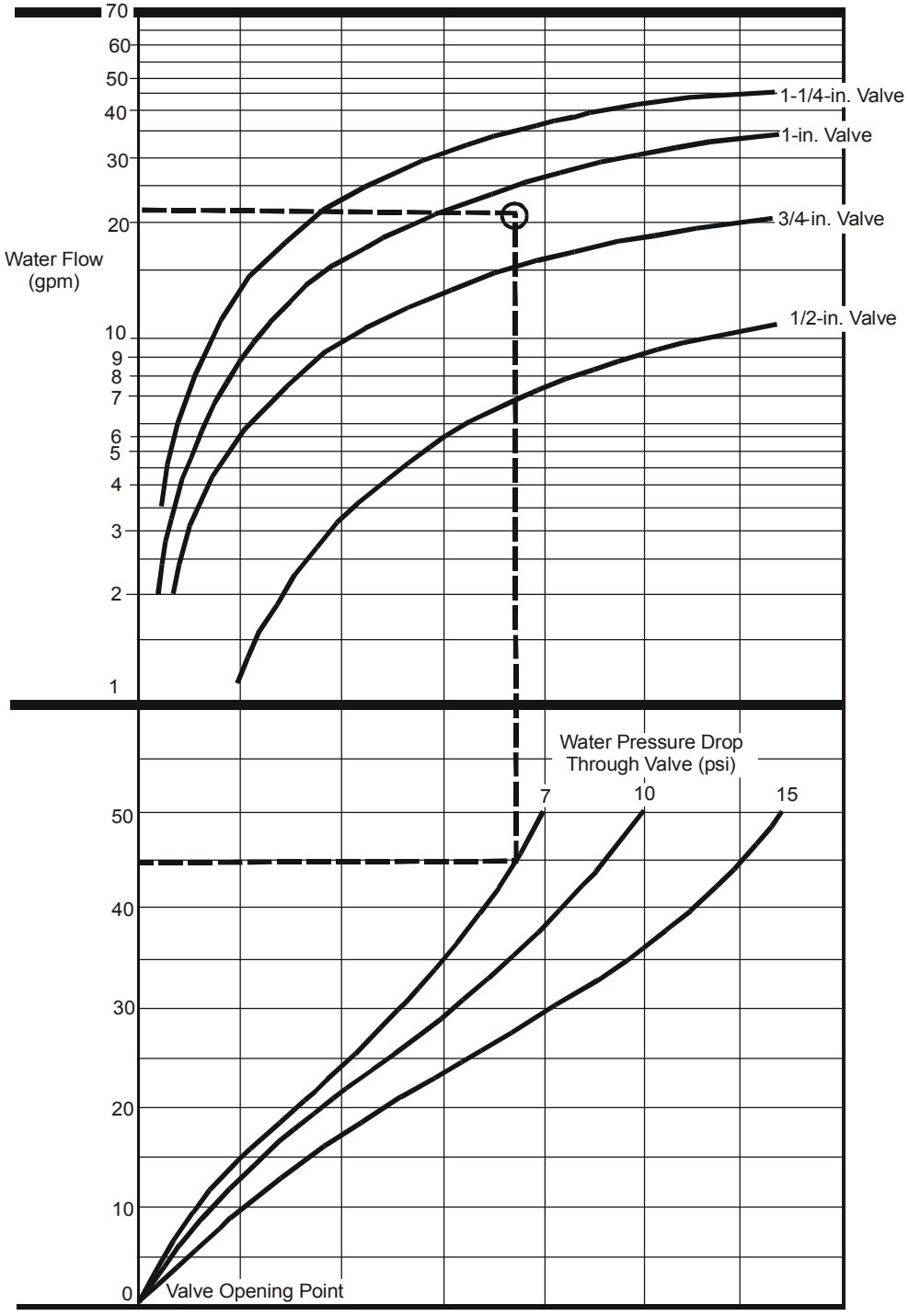

Figure 5: Water Flow Related to Valve Size and Water Pressure

Technical Data

Product	V48 Series Pressure-Actuated Water-Regulating Valves
Body Material	1/2-and 3/4-in. Sizes - Cast Brass Bodies, 1-in. and 1-1/4-in. Sizes - Cast Iron Bodies with Rust-Resisting Finish
Extension Sleeve, Disc, Stud, Disc Holder Material	Brass
Valve Seat Material	Aluminum Bronze
Valve Disc	Buna-N
Diaphragm	Nylon-Reinforced Buna-N
Water Supply Pressure	150 psig (1034 kPa) Maximum
Water Supply Temperature	170°F (77°C) Maximum
Water Flow	See Figure 5.
Sensing Element	Brass and Phosphor Bronze Bellows in Brass Cup
Pressure Range	See Table 2.
Shipping Weight	See Table 3.

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult local Johnson Controls/PENN Application Engineering at (800) 275-5676. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

Refer to the *V48 Series 3-Way Pressure-Actuated Water Regulating Valves for Cooling Tower Systems Product Bulletin (LIT-121705)* for necessary information on operating and performance specifications of this product.

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