V46 Series 2-Way Pressure-Actuated Water-Regulating Valves With Union Fittings

Application

IMPORTANT: The V46 Series 2-Way Pressure-Actuated Water-Regulating Valves are intended to control water flow under normal equipment operating conditions. Where failure or malfunction of the V46 valves 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 V46 valve must be incorporated into and maintained as part of the control system.

The V46 direct-acting models open on an increase in pressure. The V46 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

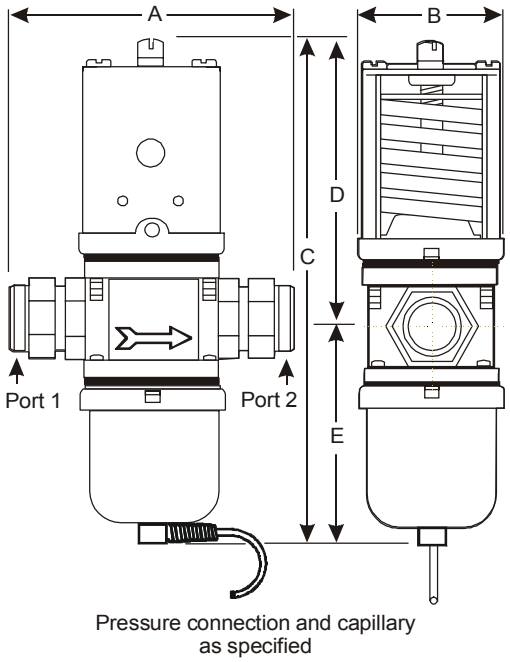

Figure 1: V46 Valve Dimensions For Models With Union Fittings

Table 1: V46 Valve Dimensions, inches (millimeters)

Product Code Number	Nominal Valve Size	A	B	C	D	E
V46AJ-2C	1/2 in.	4-9/16 (115)	1-13/16 (47)	6-3/8 (162)	3-3/4 (96)	2-5/8 (67)
V46EK-2C	3/4 in.	5-3/8 (136)	2 (52)	6-13/16 (173)	4-3/16 (106)	
V46AL-2C	1 in.	7-1/16 (179)	2-5/8 (67)	9-11/16 (246)	5-15/16 (151)	3-3/4 (95)
V46AM-2C	1-1/4 in.	7-3/16 (182)		10-1/16 (260)	6-3/16 (160)	3-15/16 (100)

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.

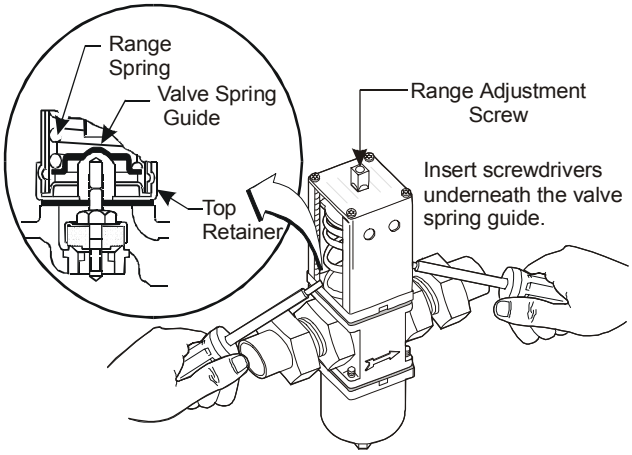

Figure 2: Manual Flushing

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 drainage of oil and refrigerant 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 valve on the inlet side of the condenser. If it is necessary to keep the condenser flooded with water, the valve may be installed 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 of the valve should be raised just enough to cause the valve to close flow to the condenser during compressor standby periods.

IMPORTANT: After installing the valve, evacuate bellows and pressure connection lines, in accordance with EPA and other regulations, to remove air, moisture and other contaminants.

Pressure Connections

WARNING: Risk of Personal Injury.
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.

Connect the refrigerant-side flare connector to the appropriate high-side pressure tap point. If additional capillary tubing is necessary, use 1/4-in. 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 affects of pressure pulsation from reciprocating compressors.

Table 2: Specifications for V46 Series Valves with Union Fittings

Product Code Number	Nominal Valve Size	Maximum Refrigerant Pressure at Bellows	Opening Point Adjustment Range	Factory-Set Opening Point	Pressure Connection Style
V46AJ-2C	1/2 in.	320 psi (2206 kPa)	70 to 260 psi (483 to 1793 kPa)	165 psi (1138 kPa)	45
V46EK-2C	3/4 in.	370 psi (2551 kPa)			46
V46AL-2C	1 in.	320 psi (2206 kPa)			
V46AM-2C	1-1/4 in.				

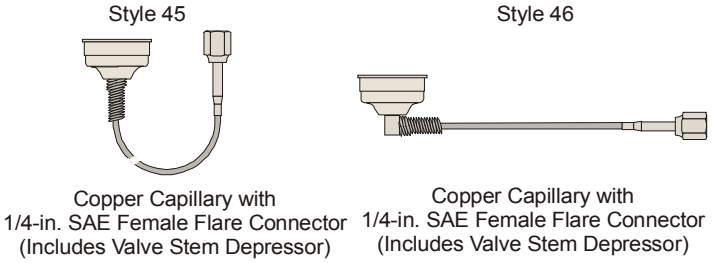

Figure 3: Pressure Connection Styles

Setup and Adjustments

The V46 valves are factory adjusted for the settings shown in Table 3.

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 range adjustment screw changes the opening point pressure.

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**.
- Turn the range adjustment screw **clockwise to lower the opening point pressure.**

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 3 for refrigerant pressure specifications.

Flowcharts

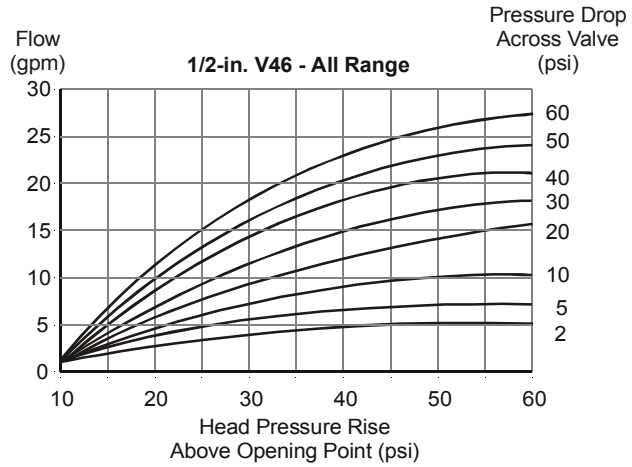

Figure 4: 1/2-in. V46 Valve

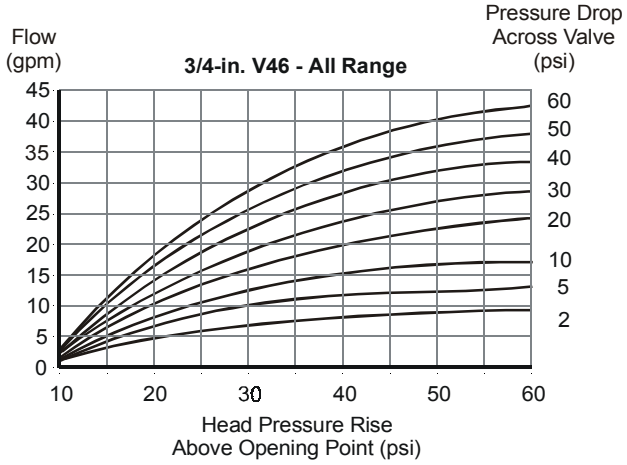

Figure 5: 3/4-in. V46 Valve

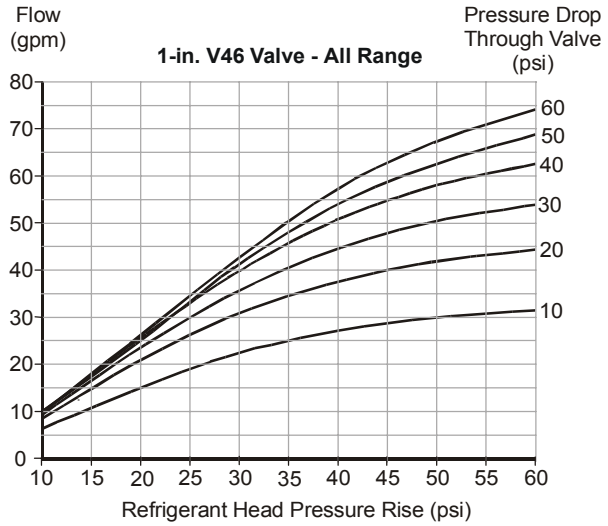

Figure 6: 1-in. V46 Valve

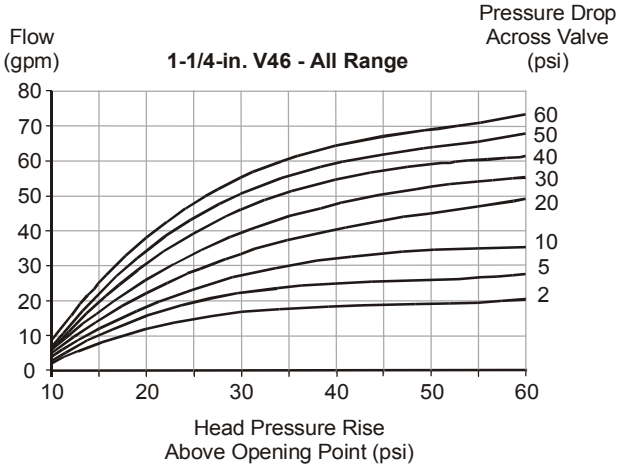

Figure 7: 1-1/4-in. V46 Valve

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 2.

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

- *V46, V47, 246, and 247 Repair Parts and Service Instructions Repair Parts Bulletin, LIT-121695*
- *V46, V47, V48, and V49 Sensing Element Replacement Technical Bulletin, LIT-121700*

Table 3: Repair and Replacement Kits

Valve Product Code Number	Nominal Size	Shipping Weight	Seat Repair Kit Product Code Number	Sensing Element Replacement Kit Product Code Number
V46AJ-2C	1/2 in.	3.3 lb (1.5kg)	STT15A-602R	SEP91A-602R, SEC99AB-48C
V46EK-2C	3/4 in.	4.3 lb (2.0kg)	STT16A-601R	SEP91A-601R, SEC99AB-48C
V46AL-2C	1 in.	9.3 lb (4.0kg)	STT17A-609R	SEP91A-603R, SEC99AB-48C
V46AM-2C	1-1/4 in.	10.0 lb (4.5kg)	STT17A-610R	SEP91A-603R, SEC99AB-48C

Technical Data

Product	V46 Series 2-Way Pressure-Actuated Water-Regulating Valves
Body Material	1/2-in. 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 Figures 4-7.
Sensing Element	Brass and Phosphor Bronze Bellows in Brass Cup
Pressure Range	See Table 3.
Shipping Weight	See Table 2.

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

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Printed in U.S.A.
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