V246 Series 2-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants

Installation Instructions

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Applications

IMPORTANT: The V246 Series 2-Way Pressure-Actuated Water-Regulating Valves are intended to control refrigerant head pressure under normal equipment operating conditions. Where failure or malfunction of a V246 Series 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 V246 Series Valve must be incorporated into and maintained as part of the control system.

The V246 Series 2-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants come in two types of control action: direct acting or reverse acting. V246 valves regulate water flow to control refrigerant head pressure in systems with water-cooled condensers.

The V246 Series Valves are available in 3/8 in. through 1-1/2 in. sizes for use with standard, non-corrosive, high-pressure refrigerants.

The V246 Series Valves have a maximum allowable water pressure of 150 psi (10.3 bar). The opening point of the V246 Series Valves is adjustable from 200 to 400 psi (13.8 to 27.6 bar).

For applications where the fluid may be corrosive to the internal parts, maritime models are available, which have nickel copper (Monel®) internal parts.

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: After installing the valve, evacuate sensing element and pressure connection lines, in accordance with Environmental Protection Agency and other regulations, to remove air, moisture, and other contaminants.

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

Mount the valve so that the valve sensing element is above the refrigerant tap point, if possible. If it is not possible to mount the bellows of the valve above the tap point, loop the capillary above the tap point and below the bellows and then connect to the valve. Tap off of the topside of the high side line. This minimizes the effect of refrigerant oil in the capillary on valve reaction time.

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.

The direction of water flow is indicated by an arrow on the valve body. See Figure 1.

Setup and Adjustments

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, raise the opening point pressure of the valve just enough to cause the valve to stop flow to the condenser during compressor standby periods.

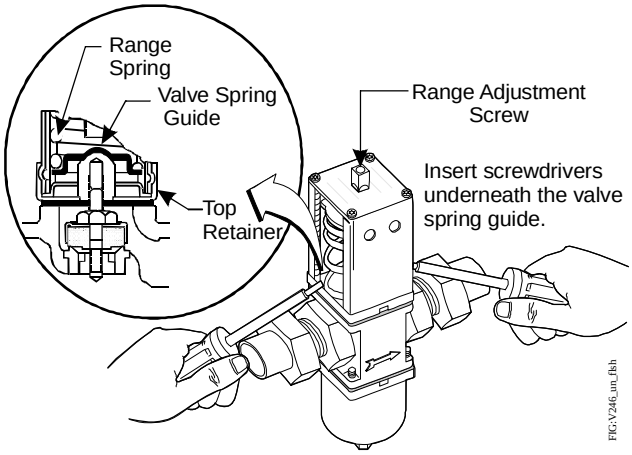

Figure 1: Manual Flushing

Manually Flushing the Valve

Manually flush the valve and piping before and after installing, repairing, or replacing a valve to remove filings, chips, or other foreign matter. Manual flushing does not affect valve adjustment.

To flush the valve, insert screwdrivers under both sides of the valve spring guide and lift upwards. See Figure 1.

Pressure Connections

WARNING: Risk of Personal Injury. Shut off the liquid supply and relieve pressure in the line before servicing the valve. Contents of liquid lines could be under pressure and the release of liquid under pressure may cause severe personal injury.

Connect the refrigerant side of the valve to the high pressure side of the system, preferably away from the compressor as far as possible. Additional tubing may be used to make the connection if needed. Use 1/4-inch tradesize copper tubing.

Follow the guidelines below when making pressure connections:

- Purge all tubing and lines before making pressure connections.
- Use pressure tap points located on the top side of the refrigerant lines; these reduce the possibility of oil, liquids, or sediment accumulating in the pressure connection line or valve sensing element, 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 tubing 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 10 ft·lb (14 N·m) of torque when tightening 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.

Adjustments

The V246 valves are factory adjusted for the settings shown in Table 1.

The **opening point pressure** (also called the crack-open point) is the refrigerant pressure (at the valve's sensing element) 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 **counterclockwise 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 1 for refrigerant pressure specifications.

Table 1: Specifications for V246 Series Valves for High-Pressure Refrigerants

Maximum Refrigerant Pressure at Sensing Element	Opening Point Adjustment Range	Factory-Set Opening Point
630 psi (43.4 bar)	200 to 400 psi (13.8 to 27.6 bar)	200 psi (13.8 bar)

Torque Specifications

To prevent water leakage, ensure that the spring housing and sensing element screws are tightened to the torque specification in Table 2. To prevent refrigerant leakage, ensure that the 1/4 in. flare pressure connection is tightened to 10 lb·ft (14 N·m).

Table 2: Maximum Torque Specifications, lb·in. (N·m)

Valve Size	Spring Housing Screws	Sensing Element Screws
3/8 in.	15 (1.7)	15 (1.7)
1/2 in.	25 (2.8)	25 (2.8)
3/4 in.	33 (3.7)	33 (3.7)
1 in.	52 (5.9)	69 (7.8)
1-1/4 in.	52 (5.9)	69 (7.8)
1-1/2 in.	52 (5.9)	69 (7.8)

Repair Information

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

To obtain replacement kit instructions and details:

- In North America, contact Johnson Controls® Product Sales Operations Team at 1-800-275-5676.
- In Europe, contact your local sales office.

Technical Specifications

V246 Series 2-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants

Refrigerant Pressure Range	200 to 400 psi (13.8 to 27.6 bar)
Maximum Sensing Element Pressure	630 psi (43.4 bar)
Maximum Water Pressure	150 psi (10.3 bar)
Maximum Water Temperature	170°F (77°C)

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, contact Johnson Controls/PENN Refrigeration Technical Support at 1-800-275-5676. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

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