



# V248 Series 3-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants

## Installation Instructions

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Refer to the [QuickLIT Web site](#) for the most up-to-date version of this document.

### Applications

**IMPORTANT:** The V248 Series 3-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants are intended to control coolant media flow under normal operating conditions. Where failure or malfunction of the V248 valve could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the V248 valve.

The V248 Series 3-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants regulate water flow and control refrigerant head pressure in systems with single or multiple water-cooled condensers.

V248 valves have an adjustable opening point in a refrigerant pressure range of 200 to 400 psi (13.8 to 27.6 bar). V248 valves are available in 1/2 in. through 1-1/2 in. size for use with standard, non-corrosive, high-pressure refrigerants.

Maritime models, which have nickel copper (Monel®) internal parts, are available for applications where the media may be corrosive to the internal parts.

### Installation



**CAUTION: Risk of Environmental Damage.**

Provide proper containment for any potential release of refrigerant, solvent, or oil. Such hazardous materials can be harmful to the environment if they are released.

**IMPORTANT:** If the V248 valve is installed on equipment that contains hazardous or regulated materials such as certain refrigerants or lubricants, you must comply with all standards and regulations governing the containment and handling of those materials.

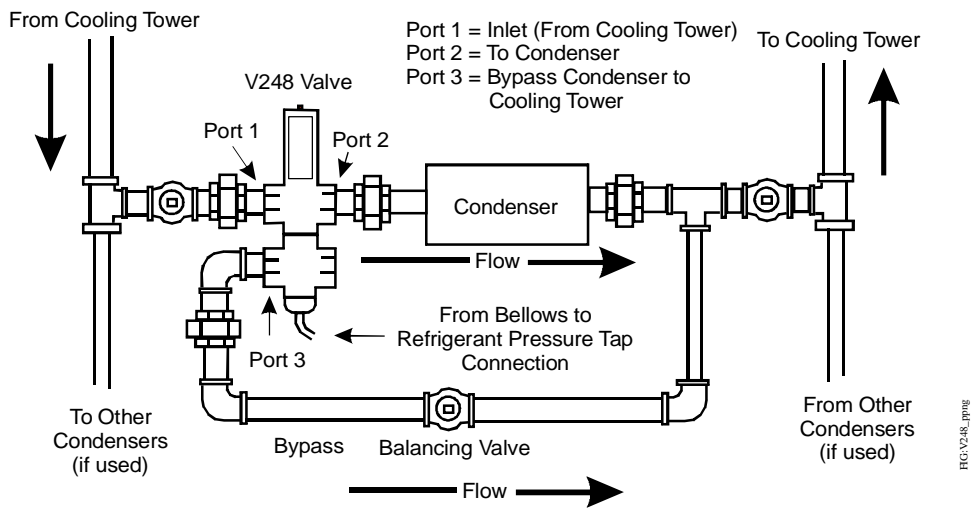
**IMPORTANT:** After installing the V248 valve, evacuate pressure connection lines to remove air, moisture, and other contaminants in a manner consistent with applicable environmental regulations and standards.

**IMPORTANT:** Take care to prevent foreign materials such as weld slag, thread burrs, metal chips, and scale from entering the piping system. This debris can damage or severely impede the operation of the valve by embedding itself in the seats, scoring the valve, and ultimately resulting in seat leakage. If the debris becomes embedded in the seats, subsequent flushing and filtering of the piping system with the valve installed does not remedy the problem.

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 top side of the high side line. This action 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.



**Figure 1: Recommended Piping Arrangement for V248 Valves**

Install the V248 valve as shown in Figure 1. 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.

The direction of water flow is indicated by an arrow on the valve body. See Figure 2.

### 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 completely closing Port 1 to Port 2. 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.

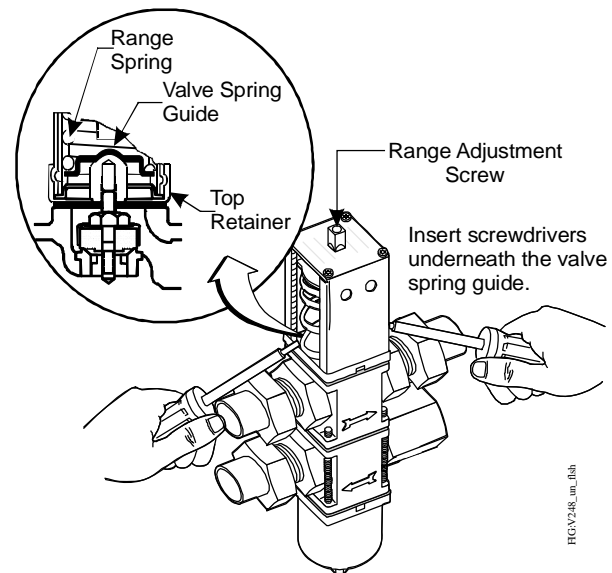
When used on a single condenser system, adjust the balancing valve in the bypass with the compressor shut off and the tower pump operating. Adjust the balancing valve so that the amount of water through the bypass is just sufficient to provide the minimum recommended flow. See Figure 1.

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 flow.

### Manually Flushing the Valve

Manually flush the fluid piping after installation to remove filings, chips, or other foreign material. 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 2.



**Figure 2: Manual Flushing**

## 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 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 10 ft·lb (14 N·m) of torque when tightening stainless steel 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 V248 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 adjustment screw changes the opening point pressure.

The **throttling pressure range** is the non-adjustable difference between the opening point pressure and the pressure necessary to fully open the valve and allow maximum flow.

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 read the operating 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.

## System Check

Before leaving the installation, observe the system through at least one complete operating cycle to ensure that the valve is operating correctly.

**Table 1: Pressure Specifications for V248 Series Valves for High-Pressure Refrigerants**

Maximum Working Pressure	Throttling Range	Opening Point Adjustment Range (Port 1 to Port 2)	Factory-Set Opening Point (Port 1 to Port 2)
630 psi (43.4 bar)	120 psi (8.3 bar) for 1/2 in. size 100 psi (6.9 bar) for 3/4 in., 1 in., and 1-1/4 in. sizes 140 psi (9.6 bar) for 1-1/2 in. size	200 to 400 psi (13.8 to 27.6 bar)	275 psi (19 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	Flare Pressure Connection
1/2 in.	25 (2.8)	25 (2.8)	10 lb-ft (14 N-m)
3/4 in.	35 (4.0)	35 (4.0)	10 lb-ft (14 N-m)
1 in.	55 (6.2)	72 (8.1)	10 lb-ft (14 N-m)
1-1/4 in.	55 (6.2)	72 (8.1)	10 lb-ft (14 N-m)
1-1/2 in.	95 (10.7)	95 (10.7)	10 lb-ft (14 N-m)

## Repair Information

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

For North American replacement kit product code numbers, refer to Table 3. For European replacement kit product code numbers, refer to Table 4.

**Table 3: North American Replacement Kits**

Nominal Valve Size	Valve Type	Seat Replacement Kit Product Code Number	Diaphragm Replacement Kit Product Code Number	Sensing Element Replacement Kit Product Code Number
1/2 in.	Commercial	STT15A-605R	DPM15A-605R	SEP93A-601R
3/4 in.	Commercial	STT16A-604R	DPM16A-604R	SEP93A-602R
1 in.	Commercial	STT17A-616R	DPM17A-616R	SEP93A-603R
1-1/4 in.	Commercial	STT17A-617R	DPM17A-609R	SEP93A-603R
1-1/2 in.	Commercial	STT17A-605R	DPM17A-604R	SEP93A-604R

**Table 4: European Replacement Kits**

Nominal Valve Size	Valve Type	Seat Replacement Kit Product Code Number	Diaphragm Replacement Kit Product Code Number	Sensing Element Replacement Kit Product Code Number
1/2 in.	Commercial	STT15A-605R	DPM15A-605R	SEP93A-601R
3/4 in.	Commercial	STT16A-604R	DPM16A-604R	SEP93A-602R
	Maritime/Navy	STT16A-605R		
1 in.	Commercial	STT17A-616R	DPM17A-616R	SEP93A-603R
1-1/4 in.	Commercial	STT17A-617R	DPM17A-609R	SEP93A-603R
1-1/2 in.	Commercial	STT17A-605R	DPM17A-604R	SEP93A-604R

## Technical Specifications

### V248 Series Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants

<b>Maximum Working Pressure</b>	630 psi (43.4 bar)
<b>Factory-Set Opening Point (Port 1 to Port 2)</b>	275 psi (19.0 bar)
<b>Opening Point Adjustment Range (Port 1 to Port 2)</b>	200 to 400 psi (13.8 to 27.6 bar)
<b>Throttling Range</b>	120 psi (8.3 bar) for 1/2 in. size 100 psi (6.9 bar) for 3/4 in., 1 in., and 1-1/4 in. sizes 140 psi (9.6 bar) for 1-1/2 in. size
<b>Media</b>	150 psi (10.3 bar) Maximum, -4°F to 170°F (-20°C to 77°C) glycol/water or liquids with low freezing points that are compatible with valve materials

*The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult local 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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