

# V248 Series Three-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants Catalog Page

## Description

The V248 Series Three-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.

Refer to the *V248 Series 3-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants Product Bulletin (LIT-12011515)* for important product application information.

## Features

- no close fitting or sliding parts in water passages
- accessible range spring
- take-apart construction
- pressure-balanced design
- corrosion-resistant material for internal parts

## Repair Information

If the V248 Series Three-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants fails to operate within its specifications, refer to the *V248 Series 3-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants Product Bulletin (LIT-12011515)* for a list of repair parts available.



**WARNING**

This product is made of copper alloy, which contains lead. The product is therefore not to be used on drinking water.



V248 Screw Connection Valve

## Selection Charts

### North American Standard Production Models - Range 200 to 400 psi

Product Code Number	Construction	Valve Size and Connection	Element Style	Shipping Weight, lb (kg)
V248GB1-001C	Direct Acting, Commercial	1/2 in. NPT Screw	Style 5	5.0 (2.3)
V248GC1-001C	Direct Acting, Commercial	3/4 in. NPT Screw	Style 5	6.5 (3.0)
V248GD1-001C	Direct Acting, Commercial	1 in. NPT Screw	Style 5	12.0 (5.4)
V248GE1-001C	Direct Acting, Commercial	1-1/4 in. NPT Screw	Style 5	16.0 (7.2)
V248GF1-001C	Direct Acting, Commercial	1-1/2 in. NPT Screw	Style 5	25.0 (11.3)
V248GK1-001C	Direct Acting, Commercial	3/4 in. Union Sweat	Style 5	7.0 (3.2)
V248GL1-001C	Direct Acting, Commercial	1 in. Union Sweat	Style 5	12.0 (5.4)
V248GM1-001C	Direct Acting, Commercial	1-1/4 in. Union Sweat	Style 5	13.7 (6.2)

### European Standard Production Models - Range 13.8 to 27.8 bar

Product Code Number	Construction	Valve Size and Connection	Element Style	Shipping Weight, lb (kg)
V248GB1B001C	Direct Acting, Commercial	1/2 in. BSPT Screw, ISO 7	Style 5	5.0 (2.3)
V248GC1B001C	Direct Acting, Commercial	3/4 in. BSPT Screw, ISO 7	Style 5	6.5 (3.0)
V248GD1B001C	Direct Acting, Commercial	1 in. BSPT Screw, ISO 7	Style 5	12.1 (5.5)
V248GE1B001C	Direct Acting, Commercial	1-1/4 in. BSPT Screw, ISO 7	Style 5	16.0 (7.2)
V248GF1B001C	Direct Acting, Commercial	1-1/2 in. BSPT Screw, ISO 7	Style 5	25.0 (11.3)
V248HC1B001C	Direct Acting, Maritime	3/4 in. BSPP Screw, ISO 228	Style 5	6.5 (3.0)



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

### Applications

Each application is unique and requires specific engineering data to properly size and design a system to fulfill the appropriate requirements. Typically, a valve is replaced with another valve of the same size in a properly sized and engineered system. In North America, contact Johnson Controls/PENN® Refrigeration Application Engineering at 1-800-275-5676 to obtain specific engineering data. In other areas, contact the local Johnson Controls® sales office to obtain specific engineering data.

To make a rough field estimate of the size of valve for an application, find the valve size needed by locating a point on a flow chart that satisfies these requirements:

- water flow required by the condenser (**Flow**)
- refrigerant head pressure rise (**P<sub>RISE</sub>**)
- available water pressure (**P<sub>AVAIL</sub>**)

Follow these steps, and use the information obtained to locate a point on one of the flowcharts that satisfies all three steps.

1. Take the water flow required by the condenser (**Flow**) from information provided by the manufacturer of the condensing unit. If the manufacturer's information is unavailable, use the following information to make a rough approximation of water flow in gallons per minute (gpm) [cubic meters per hour (m<sup>3</sup>/hr)]:
  - System Capacity (**Tons of Refrigeration**)
  - Outlet Water Temperature (**Temp. Outlet**)
  - Inlet Water Temperature (**Temp. Inlet**)

Calculate the flow using the following formula:

$$\text{Flow} = \frac{\text{Tons of Refrigeration} \times 30}{(\text{Temp. Outlet} - \text{Temp. Inlet})}$$

**Flow Required**

**Note:** If the outlet temperature is unknown, assume it to be 10F° (6C°) above the inlet temperature.

2. Determine refrigerant head pressure rise above the valve opening point (**P<sub>RISE</sub>**) using the following steps:
  - a. The **Valve Closing Pressure (P<sub>CLOSE</sub>)** is equal to the refrigerant pressure at the highest ambient temperature the refrigeration equipment experiences in the Off cycle. Use a Pressure-Temperature Chart for the refrigerant selected to find this pressure.
  - b. To approximate the **Valve Opening Pressure (P<sub>OPEN</sub>)**, add about 10 psig (0.7 bar) to the Valve Closing Pressure.

$$P_{\text{OPEN}} = P_{\text{CLOSE}} + 10 \text{ psi (0.7 bar)}$$

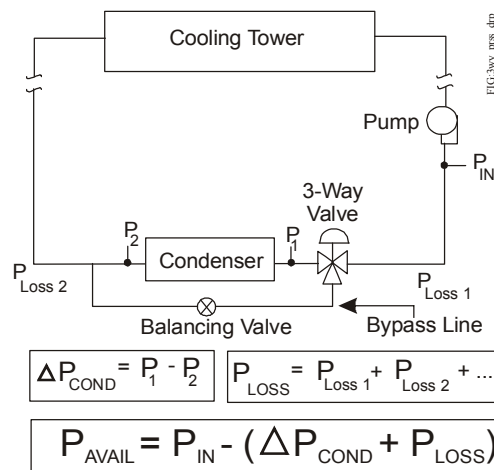
### Valve Opening Pressure

- c. From the Pressure-Temperature Chart for the refrigerant selected, read the **Refrigerant Condensing Pressure (P<sub>COND</sub>)** (operating head pressure) corresponding to the selected condensing temperature.
- d. Subtract the Valve Opening Pressure from the Refrigerant Condensing Pressure. This gives the head pressure rise.

$$P_{\text{RISE}} = P_{\text{COND}} - P_{\text{OPEN}}$$

### Refrigerant Head Pressure Rise

3. Determine the available water pressure to the valve (**P<sub>AVAIL</sub>**) using the following steps. This is the actual water pressure available to force water through the valve.
  - a. Determine the minimum inlet pressure (**P<sub>IN</sub>**). This is the water pressure from city water mains, pumps, or other sources.
  - b. Pressure drop through condenser (**ΔP<sub>COND</sub>**) is the difference in water pressure between the condenser inlet and the condenser outlet. Obtain this information from the condenser manufacturer.
  - c. Estimate or calculate the pressure drop through all associated piping (**P<sub>LOSS</sub>**).
  - d. Subtract the **ΔP<sub>COND</sub>** and **P<sub>LOSS</sub>** from **P<sub>IN</sub>**. The result is **P<sub>AVAIL</sub>**.



### Available Water Pressure

4. Select the proper valve size from the flowcharts by locating a point on a chart that satisfies the flow, the head pressure rise above opening point, and the pressure drop across the valve.

### Metric Conversions

Use these equations to convert between U.S. and S.I. units.

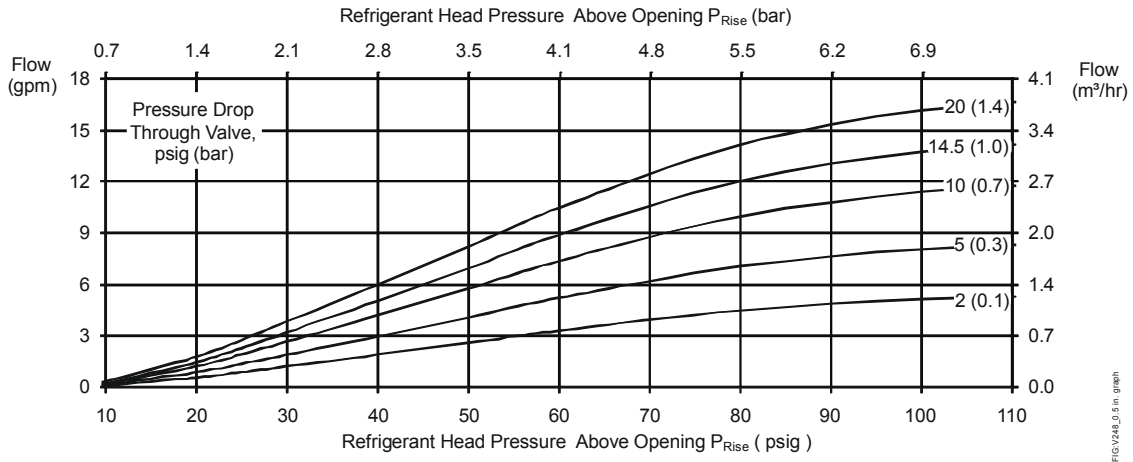
- 1 dm<sup>3</sup>/s = 3.6 m<sup>3</sup>/h = 15.9 U.S. gal. /min. = 13.2 U.K. gal. /min.
- 1 bar = 100 kPa = 0.1 MPa = 1.02 kg/cm<sup>2</sup> = 0.987 atm = 14.5 psig



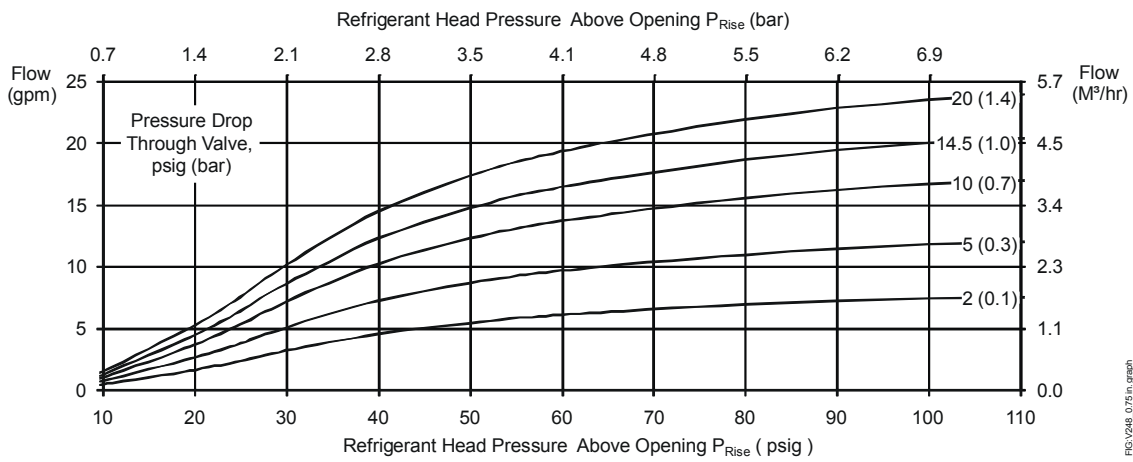
# V248 Series Three-Way Pressure-Actuated Water-Regulating Valves for High-Pressure

## V248 Flowcharts

The maximum recommended differential water pressure across a valve is 20 psig (1.4 bar).



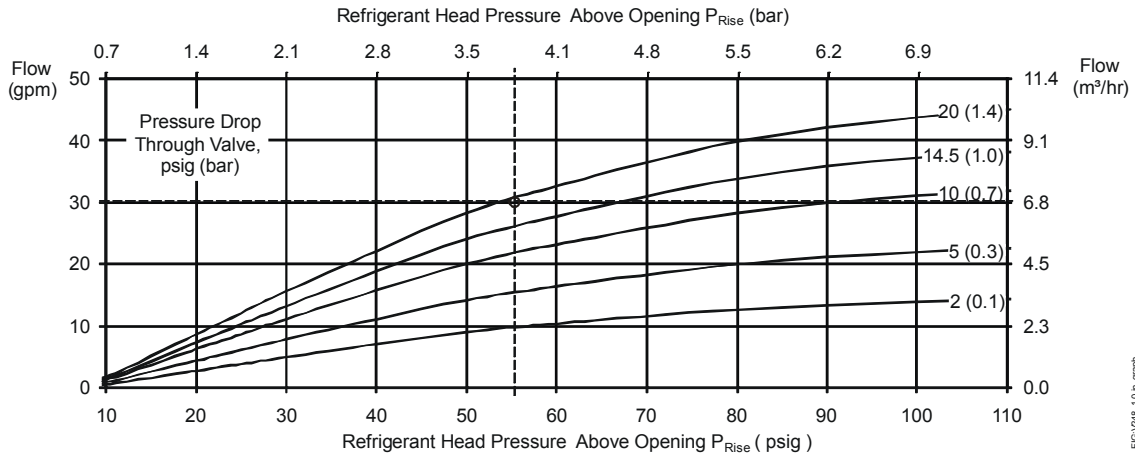
**1/2 in. Direct Acting Valve Flowchart**



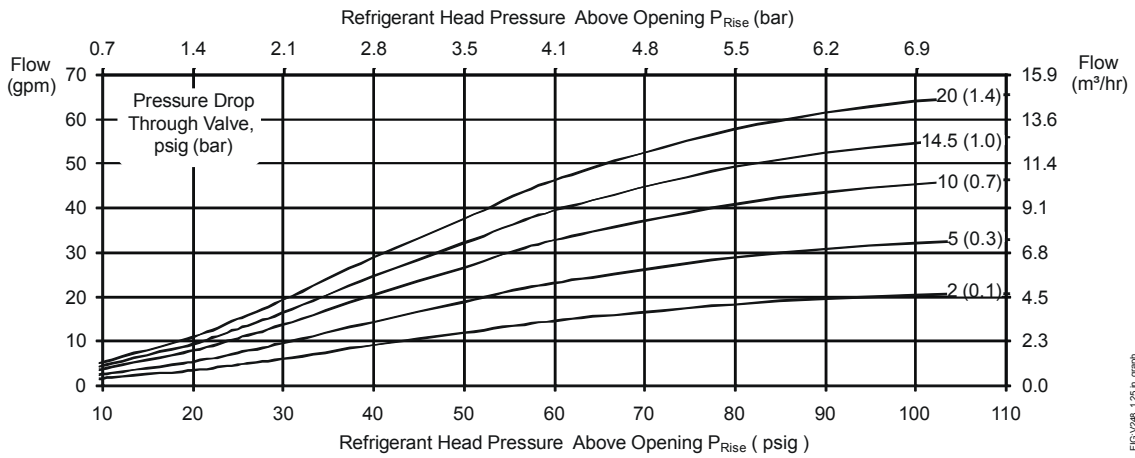
**3/4 in. Direct Acting Valve Flowchart**



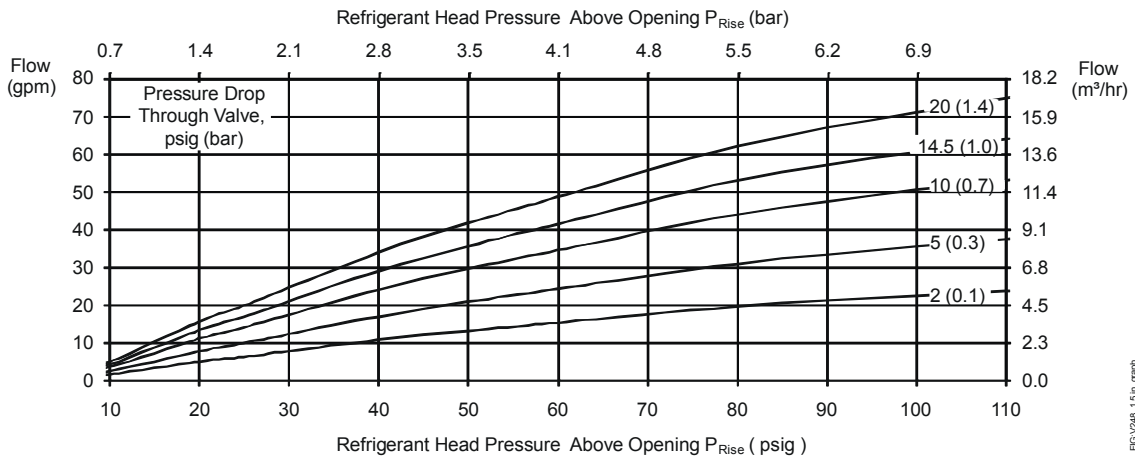
## V248 Series Three-Way Pressure-Actuated Water-Regulating Valves for High-Pressure



**1 in. Direct Acting Valve Flowchart**



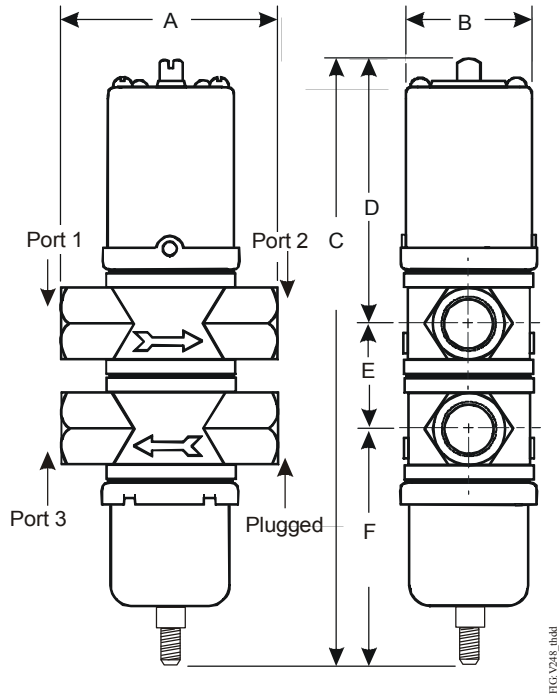
**1-1/4 in. Direct Acting Valve Flowchart**



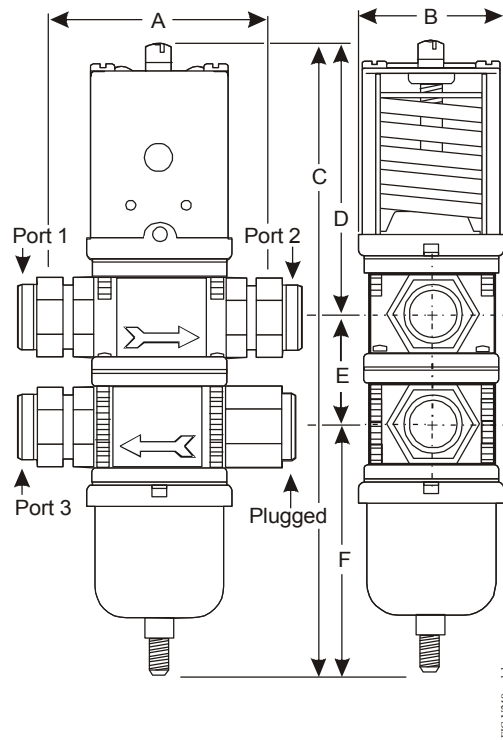
**1-1/2 in. Direct Acting Valve Flowchart**



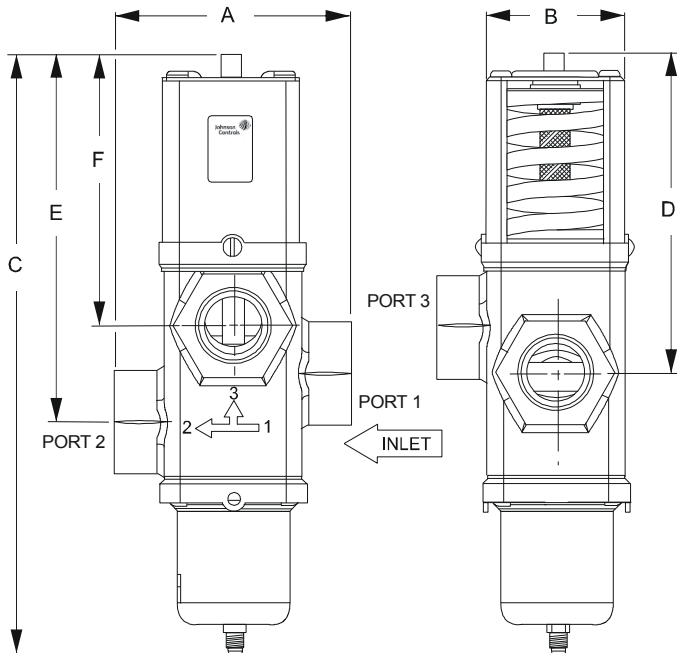
## V248 Series Three-Way Pressure-Actuated Water-Regulating Valves for High-Pressure



V248 1/2 in. Through 1-1/4 in. Screw Connection Valves Dimensions



V248 Union Sweat Connection Valves Dimensions



V248 1-1/2 in. Screw Connection Valves Dimensions



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

### V248 1/2 in. Through 1-1/4 in. Screw Connection Valves Dimensions

Valve Size	Dimensions in Inches (Millimeters)					
	A	B	C	D	E	F
1/2 in.	3-1/16 (78)	2 (51)	8-11/16 (220)	3-13/16 (96)	1-1/2 (38)	3-3/8 (86)
3/4 in.	3-3/8 (86)	2-3/16 (55)	9-3/4 (248)	4-3/16 (106)	1-3/4 (44)	3-13/16 (98)
1 in.	4-3/4 (121)	2-13/16 (71)	12-1/2 (318)	5-15/16 (151)	2-1/16 (52)	4-1/2 (114)
1-1/4 in.	4-3/4 (121)	2-13/16 (71)	13-1/4 (336)	6-1/8 (156)	2-3/8 (60)	4-3/4 (121)

### V248 Union Sweat Connection Valves Dimensions

Valve Size	Dimensions in Inches (Millimeters)					
	A	B	C	D	E	F
3/4 in.	3-3/8 (86)	2-3/16 (55)	9-3/4 (248)	4-3/16 (106)	1-3/4 (44)	3-13/16 (98)
1 in.	4-3/4 (121)	2-13/16 (71)	12-1/2 (318)	5-15/16 (151)	2-1/16 (52)	4-1/2 (114)
1-1/4 in.	4-3/4 (121)	2-13/16 (71)	13-1/4 (336)	6-1/8 (156)	2-3/8 (60)	4-3/4 (121)

### V248 1-1/2 in. Screw Connection Valves Dimensions

Valve Size	Dimensions in Inches (Millimeters)					
	A	B	C	D	E	F
1-1/2 in.	6 (152)	3-1/2 (89)	15-1/4 (382)	8 (203)	9-5/16 (237)	6-7/8 (175)



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

### Materials

#### North American V248 Materials

Nominal Valve Size:	3/8 in. to 3/4 in. (Commercial)	1 in. to 1-1/2 in. (Commercial)	Maritime (All Sizes)	
<b>Material</b>				
<b>Body</b>	Cast brass	Cast iron/rust resisting finish	Cast bronze	
<b>Seat</b>	Aluminum bronze	Aluminum bronze	Monel	
<b>Disc</b>	BUNA-N	BUNA-N	BUNA-N	
<b>Disc Cup</b>	Brass	Brass	Monel	
<b>Disc Stud</b>	Brass	Brass	Monel	
<b>Stem/Extension Sleeve</b>	Brass	Brass	Monel	
<b>Diaphragms</b>	Nylon reinforced BUNA-N	Nylon reinforced BUNA-N	Nylon reinforced BUNA-N	
<b>Refrigerant Contact</b>				
<b>Pressure Element</b>	<b>Cup</b>	300 Series stainless steel	300 Series stainless steel	300 Series stainless steel
	<b>Bellows</b>	300 Series stainless steel	300 Series stainless steel	300 Series stainless steel
	<b>Bellows Ring</b>	Steel/nickel plated	Steel/nickel plated	Steel/nickel plated

#### European V248 Materials

Nominal Valve Size:	3/8 in. to 3/4 in. (Commercial)	1 in. to 1-1/2 in. (Commercial)	Maritime (All Sizes)	
<b>Material</b>				
<b>Body</b>	Hot forged brass	Cast iron/rust resisting finish	Cast bronze	
<b>Seat</b>	Aluminum bronze	Aluminum bronze	Monel	
<b>Disc</b>	BUNA-N	BUNA-N	BUNA-N	
<b>Disc Cup</b>	Brass	Brass	Monel	
<b>Disc Stud</b>	Brass	Brass	Monel	
<b>Stem/Extension Sleeve</b>	Brass	Brass	Monel	
<b>Diaphragms</b>	Nylon reinforced BUNA-N	Nylon reinforced BUNA-N	Nylon reinforced BUNA-N	
<b>Refrigerant Contact</b>				
<b>Pressure Element</b>	<b>Cup</b>	300 Series stainless steel	300 Series stainless steel	300 Series stainless steel
	<b>Bellows</b>	300 Series stainless steel	300 Series stainless steel	300 Series stainless steel
	<b>Bellows Ring</b>	Steel/nickel plated	Steel/nickel plated	Steel/nickel plated

### Technical Specifications

V248 Series Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants	
<b>Maximum Working Pressure</b>	630 psig (43.4 bar)
<b>Factory-Set Opening Point (Port 1 to Port 2)</b>	275 psig (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 psig (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