V148 Series Three-Way Pressure-Actuated Water-Regulating Valve Catalog Page

Description

The V148 Series Three-Way Pressure-Actuated Water-Regulating Valves regulate water flow to control refrigerant head pressure in systems with single or multiple water-cooled condensers. The V148 valves are designed for applications with system water pressures of up to 350 psi (24.1 bar), such as high-rise buildings.

V148EK and V148AL valves have an adjustable opening point in a refrigerant pressure range of 145 to 190 psi (10.0 to 13.1 bar). V148EK and V148AL valves are available in 3/4 in. and 1 in. sizes. Use these valves with standard, non-corrosive refrigerants.

V148GK1 and V148GL1 valves have an adjustable opening point in a refrigerant pressure range of 200 to 400 psi (13.8 to 27.6 bar). The V148GK1 and V148GL1 Valves are available in 3/4 in. and 1 in. sizes for use with standard, non-corrosive, high-pressure refrigerants.

Refer to the *V148 Series 3-Way Pressure-Actuated Water-Regulating Valves Product Bulletin (LIT-121712)* for important product application information.

Features

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

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.

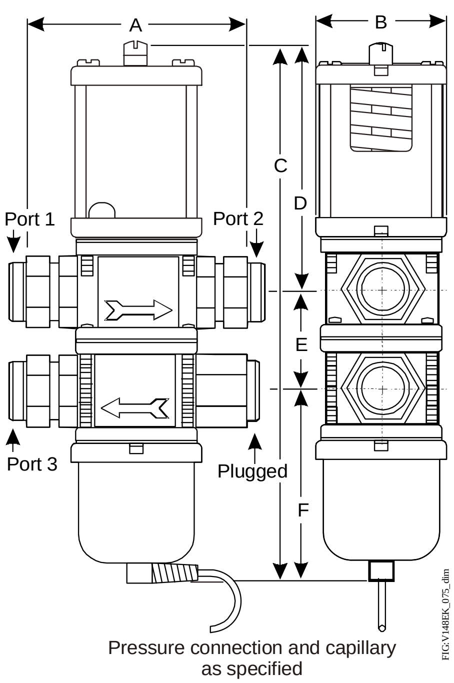
Repair Information

If the V148 Series Three-Way Pressure-Actuated Water-Regulating Valve fails to operate within its specifications, refer to the *V148 Series Three-Way Pressure-Actuated Water-Regulating Valves Product Bulletin (LIT-121712)* for a list of repair parts available.

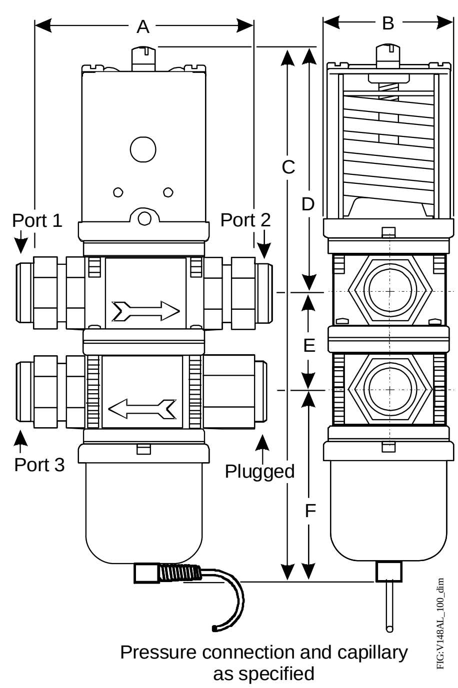
WARNING

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

V148 Series Valve



3/4 in. V148EK Valve

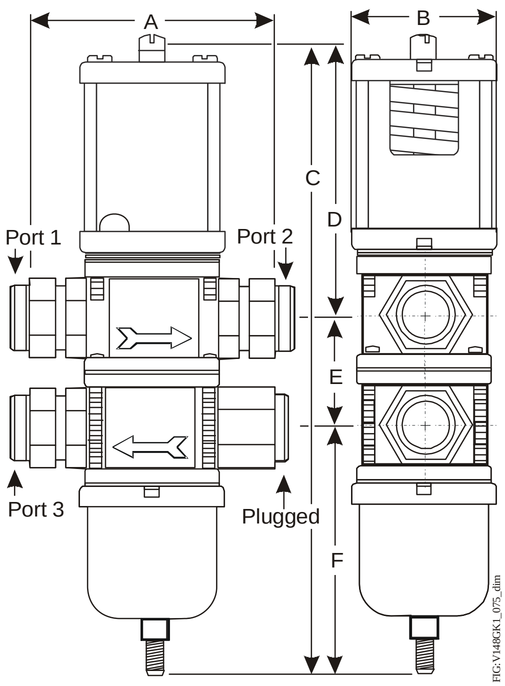


1 in. V148AL Valve

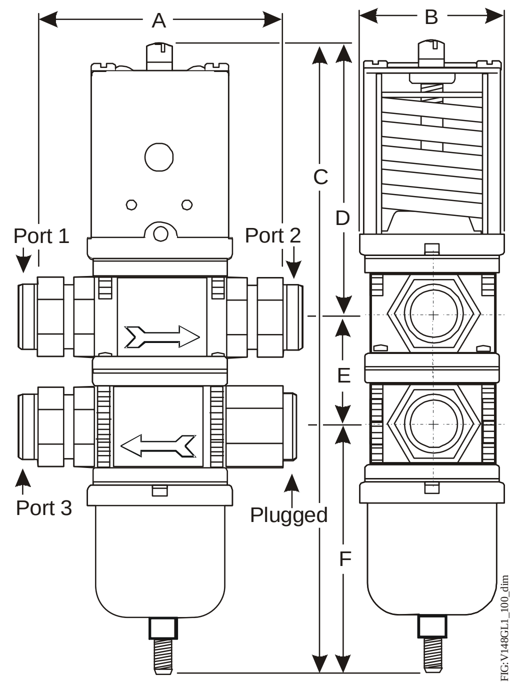
V148 Series Three-Way Pressure-Actuated Water-Regulating Valve Catalog Page

Valve Dimensions, Inches (Millimeters)

Model	Nominal Valve Size	A	B	C	D	E	F
V148EK-1C	3/4 in.	3-3/8 (86)	2-3/16 (56)	9 (229)	4-3/16 (106)	1-3/4 (44)	3 (76)
V148GK1-001C	3/4 in.	3-3/8 (86)	2-3/16 (56)	9-13/16 (249)	4-3/16 (106)	1-3/4 (44)	3-13/16 (97)
V148AL-1C	1 in.	4-3/4 (121)	2-3/4 (71)	12 (305)	5-15/16 (151)	2 (51)	4 (102)
V148GL1-001C	1 in.	4-3/4 (121)	2-3/4 (71)	12-1/2 (318)	5-15/16 (151)	2 (51)	4-1/2 (115)



3/4 in. High Refrigerant Pressure V148GK1 Valves



1 in. High Refrigerant Pressure V148GL1 Valves

Selection

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

- water flow required by the condenser (**Flow**)
- refrigerant head pressure rise (**P_{RISE}**)
- available water pressure (**P_{AVAIL}**)

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 maximum water flow in gallons per minute (gpm) (cubic meters per hour [m^3/hr]):

- System Capacity (**Tons of Refrigeration**)
- Outlet Water Temperature (**Temp. $_{Outlet}$**)
- Inlet Water Temperature (**Temp. $_{Inlet}$**)

Calculate the flow using the following formula:

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

FIG:flw_eqn

Flow Required

Note: If the outlet temperature is unknown, assume it to be 10F° (5.6C°) above the inlet temperature.

2. Determine refrigerant head pressure rise above the valve opening point (**P_{RISE}**) using the following steps:
   a. The **Valve Closing Pressure** (**P_{CLOSE}**) 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_{OPEN}**), add about 7 psi (0.5 bar) for EK and AL models or 10 psi (0.7 bar) for GK1 and GL1 models to the Valve Closing Pressure.

V148 Series Three-Way Pressure-Actuated Water-Regulating Valve Catalog Page

$$P_{OPEN} = P_{CLOSE} + 7 \text{ psi } (0.5 \text{ bar})$$

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

FIG:V14x_eqn_opn_prssr

Valve Opening Pressure, EK and AL Models (Top) or GK1 and GL1 Models (Bottom)

c. From the Pressure-Temperature Chart for the refrigerant selected, read the **Refrigerant Condensing Pressure** (**P_{COND}**) (operating head pressure) corresponding to the selected condensing temperature.

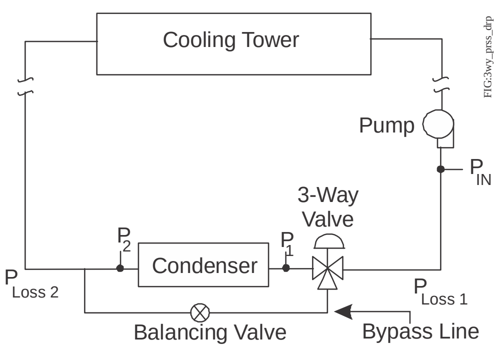
d. Subtract the Valve Opening Pressure from the Refrigerant Condensing Pressure. This gives the head pressure rise.

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

FIG:eqn_hd_prssr_rs

Refrigerant Head Pressure Rise

3. Determine the available water pressure to the valve (**P_{AVAIL}**) using the following steps. This is the actual water pressure available to force water through the valve.
   a. Determine the minimum inlet pressure (**P_{IN}**). This is the water pressure from city water mains, pumps, or other sources.
   b. Pressure drop through condenser (**ΔP_{COND}**) 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_{LOSS})**.
   d. Subtract the **ΔP_{COND}** and **P_{LOSS}** from **P_{IN}**. The result is **P_{AVAIL}**.



$$\Delta P_{COND} = P_1 - P_2 \qquad P_{LOSS} = P_{Loss\,1} + P_{Loss\,2} + \ldots$$

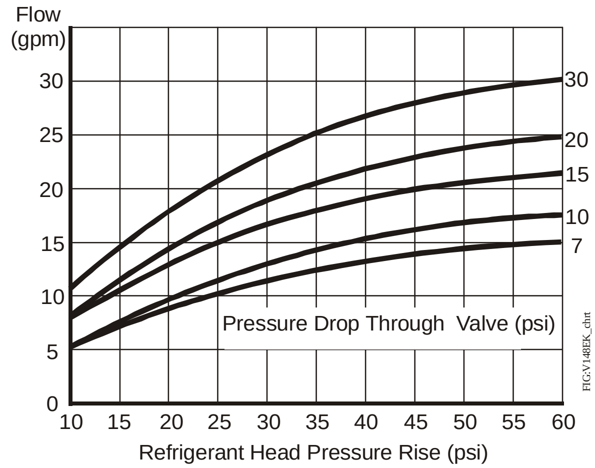
$$P_{AVAIL} = P_{IN} - (\Delta P_{COND} + P_{LOSS})$$

Available Water Pressure

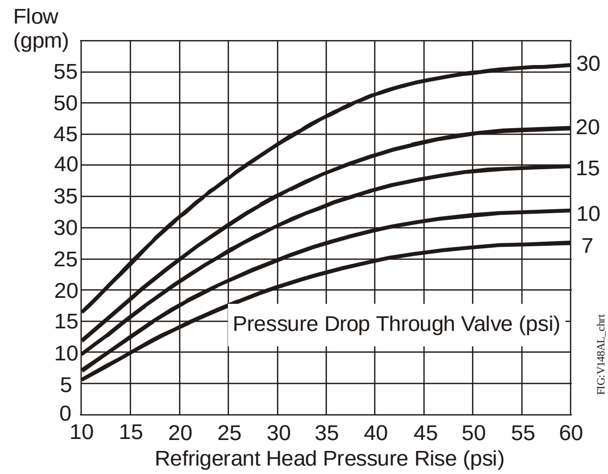
4. Select the proper valve size from the flowcharts by locating a point on a chart that satisfies the flow, the head pressure rise above opening point, and the pressure drop across the valve.

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

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

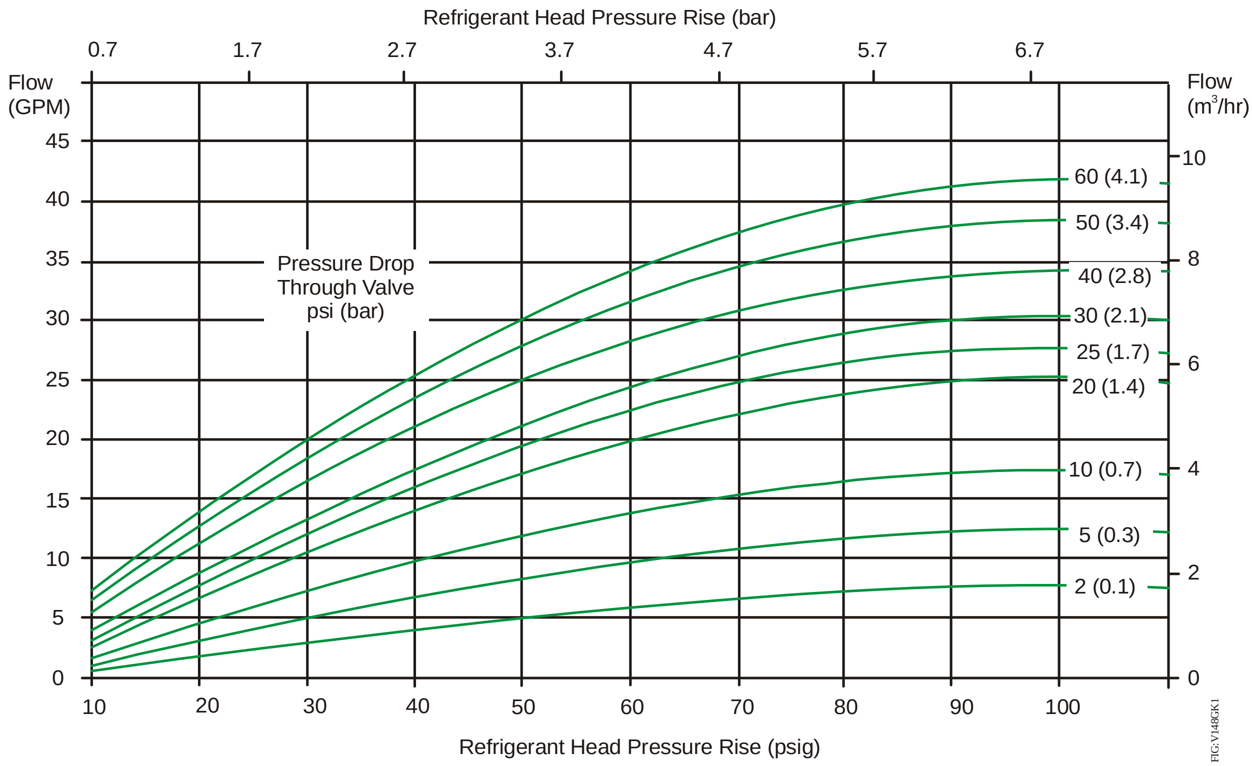


3/4 in. V148EK Valve

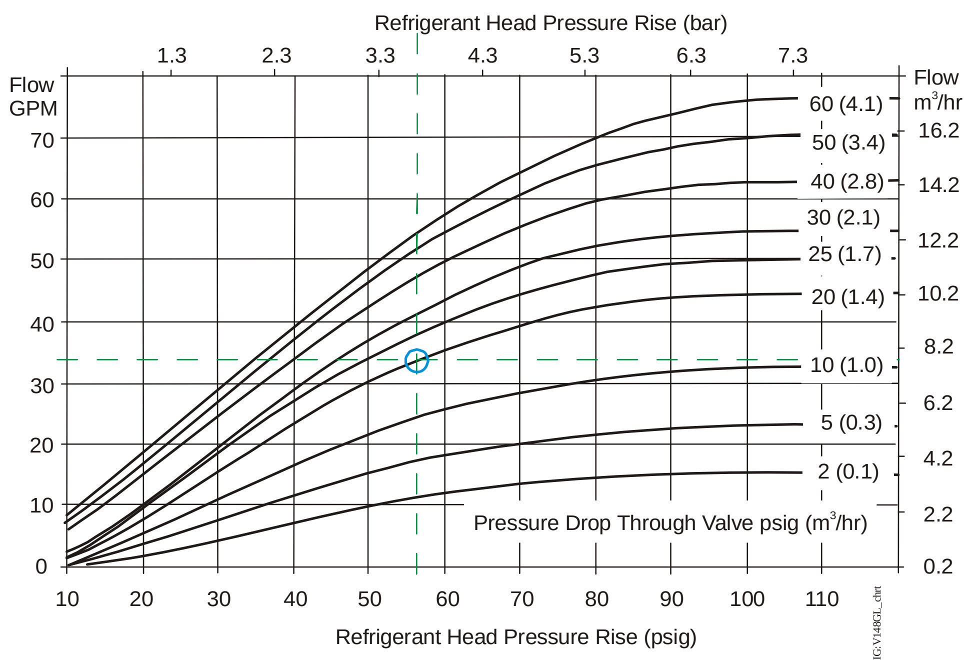


1 in. V148AL Valve

V148 Series Three-Way Pressure-Actuated Water-Regulating Valve Catalog Page

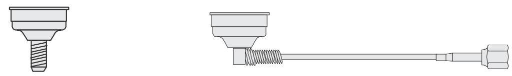


High Refrigerant Pressure 3/4 in. V148GK1 Valve



High Refrigerant Pressure 1 in. V148GL1 Valve

V148 Series Three-Way Pressure-Actuated Water-Regulating Valve Catalog Page



Pressure Connection Styles

Selection Chart

Product Code Number	Nominal Valve Size	Inlet and Outlet Ports	Pressure Connection Style	Shipping Weight, lb (kg)
V148EK-1C	3/4 in.	Union (Sweat)	46	7 (3.2)
V148GK1-001C	3/4 in.	Union (Sweat)	5	7 (3.2)
V148AL-1C	1 in.	Union (Sweat)	46	12 (5.4)
V148GL1-001C	1 in.	Union (Sweat)	5	12 (5.4)

Technical Specifications

V148 Series 3-Way Pressure-Actuated Water-Regulating Valves	
Maximum Refrigerant Pressure	V148EK: 370 psig (25.5 bar) V148AL: 320 psig (22.1 bar)
Maximum Working Pressure	V148GK1, V148GL1: 630 psig (43.4 bar)
Factory-Set Opening Point (Port 1 to Port 2)	V148EK, V148AL: 165 psig (11.4 bar) V148GK1, V148GL1: 275 psig (19.0 bar)
Opening Point Adjustment Range (Port 1 to Port 2)	V148EK, V148AL: 145 to 190 psi (10.0 to 13.1 bar) V148GK1, V148GL1: 200 to 400 psi (13.8 to 27.6 bar)
Throttling Range	V148EK, V148AL: 70 psig (4.8 bar) V148GK1, V148GL1: 100 psig (6.9 bar)
Media	350 psi (24.1 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