



# V246 Series Two-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants Catalog Page

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LIT-1900575



## Description

The V246 Series Two-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants includes direct acting control action. 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. to 2 in. (9.5 mm and 50.8 mm) sizes and have a maximum acceptable water pressure of 150 psig (10.3 bar). Direct acting V246 valves have an adjustable opening point in a refrigerant pressure range of 200 psi to 400 psi (13.8 bar to 27.6 bar). You can use V246 valves with standard non-corrosive 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 *V246 Series 2-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants*

*Product Bulletin (LIT-12011514)* 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 V246 Series Two-Way Pressure-Actuated Water-Regulating Valve for High Pressure Refrigerants fails to operate within its specifications, refer to the *V246 Series Two-Way Pressure-Actuated Water-Regulating Valves for High Pressure Refrigerants Product Bulletin (LIT-12011514)* for a list of repair parts.



### WARNING

#### Warning

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

## Selection charts

**Table 1: North American standard production models**

Product code	Construction	Range, psi (bar)	Valve size and connection	Element style	Shipping weight, lb (kg)
V246GA1-001C	Direct acting, commercial	200 to 400 (13.8 to 27.6)	3/8 in. NPT screw	Style 5	1.8 (0.8)
V246GB1-001C	Direct acting, commercial		1/2 in. NPT screw	Style 5	3.0 (1.4)
V246GC1-001C	Direct acting, commercial		3/4 in. NPT screw	Style 5	3.7 (1.7)
V246GD1-001C	Direct acting, commercial		1 in. NPT screw	Style 5	9.3 (4.2)
V246GE1-001C	Direct acting, commercial		1 1/4 in. NPT screw	Style 5	10 (4.5)
V246GM1-001C	Direct acting, commercial		1 1/4 in. union sweat	Style 5	10 (4.5)
V246GR1-001C	Direct acting, commercial		1 1/2 in. flange	Style 5	13.6 (6.2)
V246GS1-001C	Direct acting, commercial		2 in. flange	Style 5	27 (12.3)
V246HB1-001C	Direct acting, maritime		1/2 in. NPT screw	Style 5	3.0 (1.4)
V246HC1-001C	Direct acting, maritime		3/4 in. NPT screw	Style 5	4.3 (2.0)
V246HD1-001C	Direct acting, maritime		1 in. NPT screw	Style 5	9.5 (4.3)
V246HE1-001C	Direct acting, maritime		1 1/4 in. NPT screw	Style 5	10.3 (4.7)
V246HR1-001C	Direct acting, maritime		1 1/2 in. American Society of Mechanical Engineers (ASME) flange	Style 5	13.6 (6.2)
V246HS1-001C	Direct acting, maritime	2 in. ASME flange	Style 5	27 (12.3)	

**Table 2: European standard production models**

Product code	Construction	Valve size and connection	Element style	Shipping weight, kg (lb)
V246GA1A001C	Direct acting, commercial	3/8 in. British Standard Pipe Parallel (BSPP) screw, ISO 228	Style 5	0.8 (1.8)
V246GB1A001C	Direct acting, commercial	1/2 in. BSPP screw, ISO 228	Style 5	1.4 (3.0)
V246GC1A001C	Direct acting, commercial	3/4 in. BSPP screw, ISO 228	Style 5	1.7 (3.7)
V246GD1B001C	Direct acting, commercial	1 in. British Standard Pipe Taper (BSPT) screw, ISO 7	Style 5	4.2 (9.3)
V246GE1B001C	Direct acting, commercial	1 1/4 in. BSPT screw, ISO 7	Style 5	4.5 (10)
V246GR1B001C	Direct acting, commercial	1 1/2 in. flange, DIN2533	Style 5	6.2 (13.6)
V246HA1B001C	Direct acting, maritime	3/8 in. BSPP screw, ISO 228	Style 5	0.8 (1.8)
V246HC1B001C	Direct acting, maritime	3/4 in. BSPP screw, ISO 228	Style 5	2.0 (4.3)
V246HD1B001C	Direct acting, maritime	1 in. BSPP screw, ISO 228	Style 5	4.3 (9.5)
V246HE1B001C	Direct acting, maritime	1 1/4 in. BSPP screw, ISO 228	Style 5	4.7 (10.3)
V246HR1B001C	Direct acting, maritime	1 1/2 in. flange, DIN86021	Style 5	6.2 (13.6)
V246HS1B001C	Direct acting, maritime	2 in. flange, DIN86021	Style 5	12.3 (27)

## Valve sizing information

Each application is unique and requires specific engineering data to correctly size and design a system to fulfill the appropriate requirements. Typically, a valve is replaced with another valve of the same size in a correctly 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 that you need by locating a point on a flow chart that satisfies these requirements:

- Water flow that the condenser requires (Flow)
- Refrigerant head pressure rise ( $P_{RISE}$ )
- Available water pressure ( $P_{AVAIL}$ )

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

1. Refer to information from the manufacturer of the condensing unit for the water flow that the condenser requires (Flow). If the manufacturer's information is unavailable, use the following information to make an approximation of water flow in gallons per minute (cubic meters per hour):
  - System capacity (tons of refrigeration)
  - Outlet water temperature ( $Temp_{OUTLET}$ )
  - Inlet water temperature ( $Temp_{INLET}$ )

Calculate the flow using the following formula:

**Figure 1: Required flow**

$$Flow = \frac{\text{Tons of Refrigeration} \times 30}{(Temp_{OUTLET} - Temp_{INLET})}$$

① **Note:** If you do not know the outlet temperature, assume it to be 10°F (6°C) above the inlet temperature.

2. Use Figure 3 and the following steps to determine refrigerant head pressure rise above the valve opening point ( $P_{RISE}$ ).

a. The valve closing pressure ( $P_{CLOSE}$ ) is equal to the refrigerant pressure at the highest ambient temperature that the refrigeration equipment experiences in the Off cycle. To find this pressure, use a pressure-temperature chart for the selected refrigerant.

b. To approximate the valve opening pressure ( $P_{OPEN}$ ), add an approximate of 10 psi (0.7 bar) to the valve closing pressure.

① **Note:** Add an approximate of 20 psi (1.4 bar) for 3/8in. valves.

### Figure 2: Valve opening pressure

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

- c. From the pressure-temperature chart for the selected refrigerant, read the refrigerant condensing pressure ( $P_{COND}$ ), also known as operating head pressure, corresponding to the selected condensing temperature.
- d. Subtract the valve opening pressure from the refrigerant condensing pressure. This calculation gives the head pressure rise.

### Figure 3: Refrigerant head pressure rise

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

## Metric conversions

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

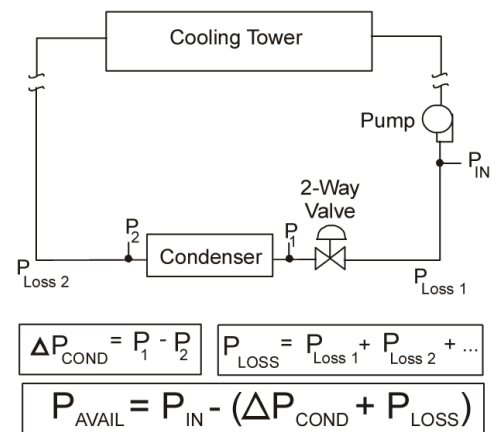
- $1 \text{ dm}^3/\text{s} = 3.6 \text{ m}^3/\text{h} = 15.9 \text{ U.S. gal. /min.} = 13.2 \text{ U.K. gal. /min.}$
- $1 \text{ bar} = 100 \text{ kPa} = 0.1 \text{ MPa} = 1.02 \text{ kg/cm}^2 = 0.987 \text{ atm} = 14.5 \text{ psi}$

## V246 flowcharts

The maximum recommended differential water pressure across a valve is 60 psig (4.1 bar).

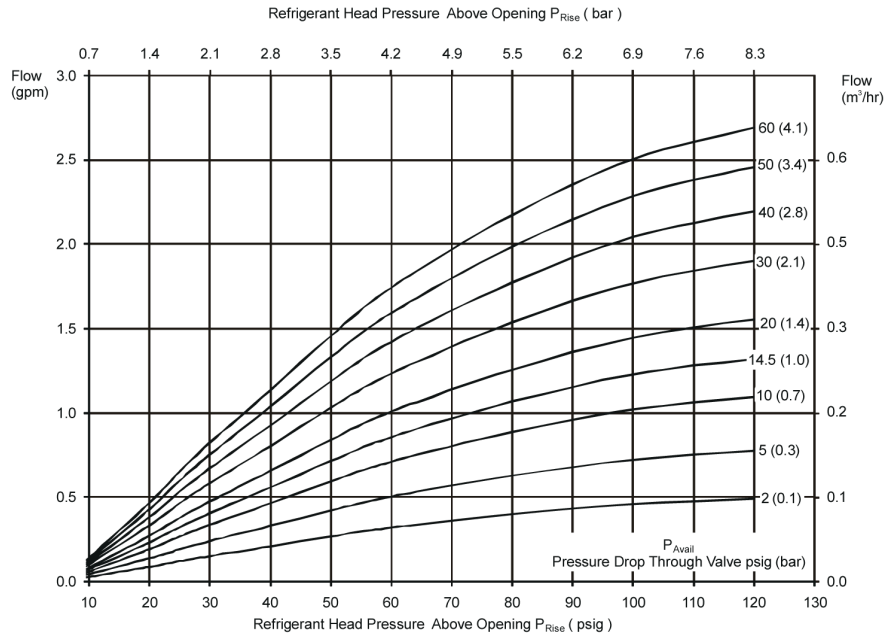
3. Use the following steps to determine the available water pressure to the valve ( $P_{AVAIL}$ ). This is the actual water pressure available to force water through the valve.
- Determine the inlet pressure ( $P_{IN}$ ). This is the water pressure from city water mains, pumps, or other sources.
  - Pressure drop through condenser ( $\Delta P_{COND}$ ) is the difference in water pressure between the condenser inlet and the condenser outlet. Obtain this information from the condenser manufacturer.
  - Estimate or calculate the pressure drop through all associated piping ( $P_{LOSS}$ ).
  - Subtract  $\Delta P_{COND}$  and  $P_{LOSS}$  from  $P_{IN}$ . The result is  $P_{AVAIL}$ .

Figure 4: Available water pressure

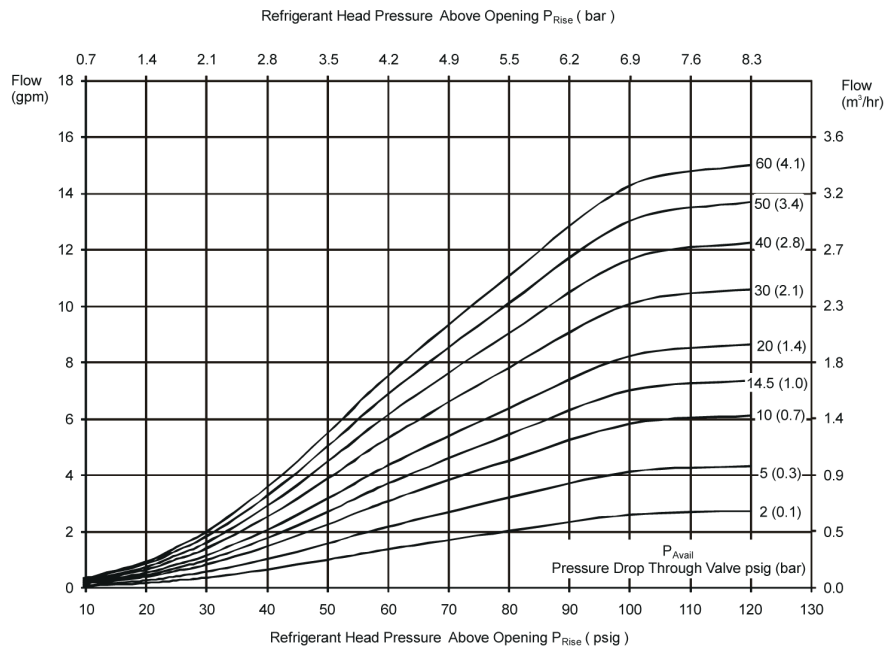


4. Select the correct valve size from the flowcharts by locating a point on a chart that satisfies the flow, the head pressure rise above opening point, and the pressure drop across the valve.

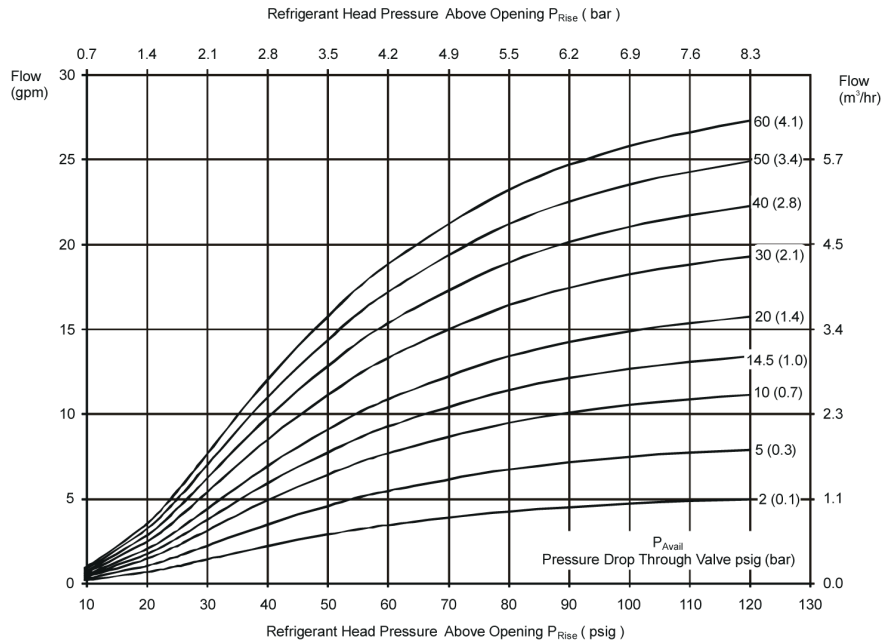
**Figure 5: 3/8 in. direct acting low-flow valve flowchart**



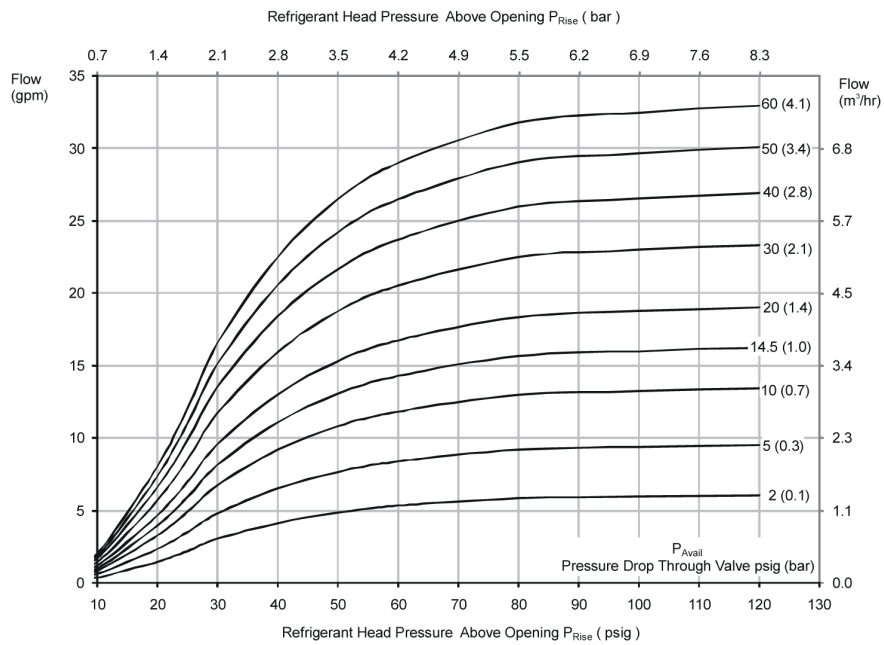
**Figure 6: 3/8 in. direct acting valve flowchart**



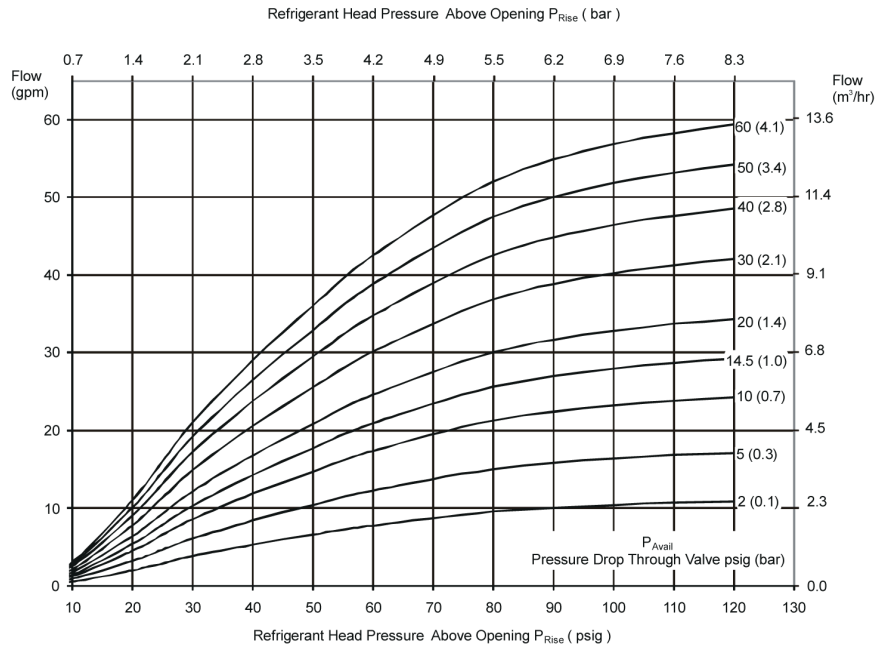
**Figure 7: 1/2 in. direct acting valve flowchart**



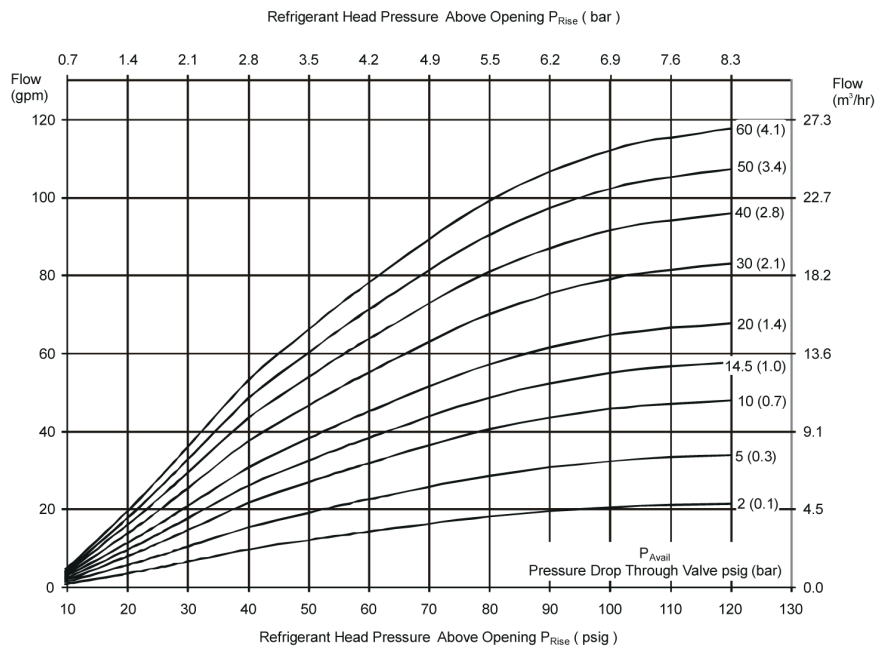
**Figure 8: 3/4 in. direct acting valve flowchart**



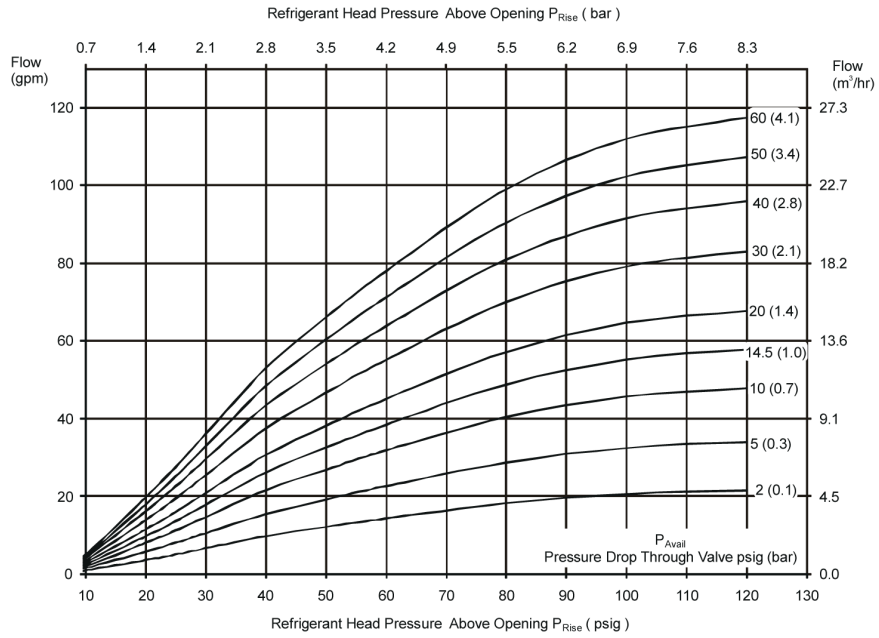
**Figure 9: 1 in. direct acting valve flowchart**



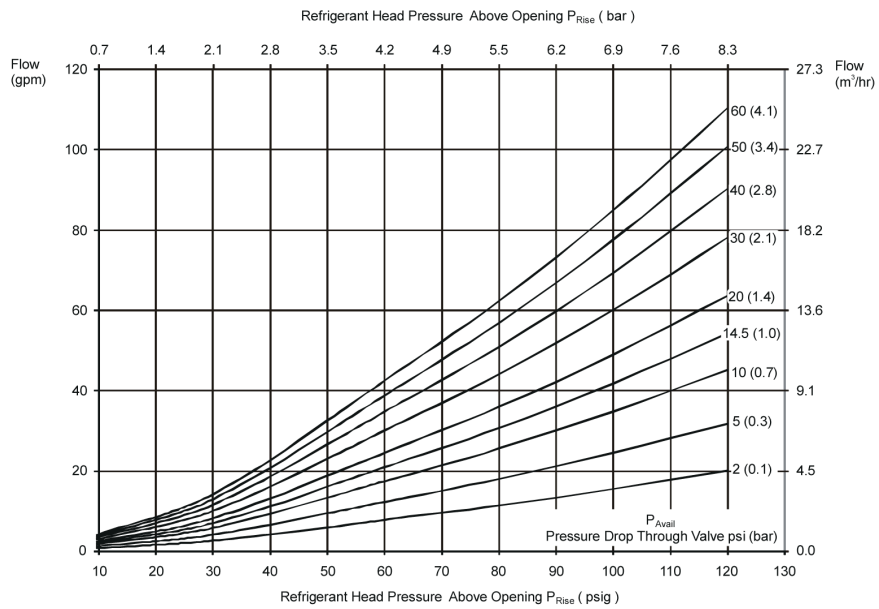
**Figure 10: 1 1/4 in. direct acting valve flowchart**



**Figure 11: 1 1/2 in. direct acting valve flowchart**



**Figure 12: 2 in. direct acting valve flowchart**





## Dimensions

Figure 13: V246 screw connection valves dimensions

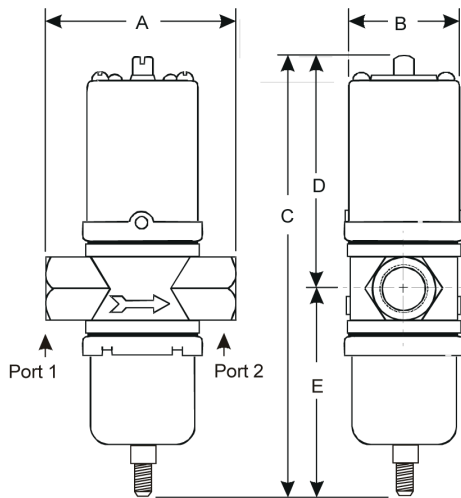


Figure 14: V246 angle-body screw connection valves dimensions

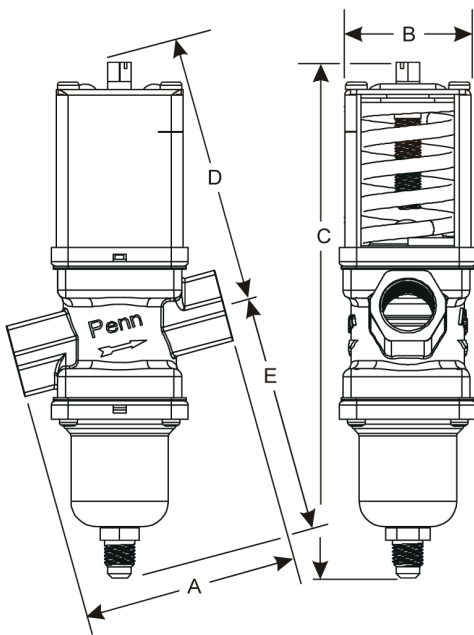


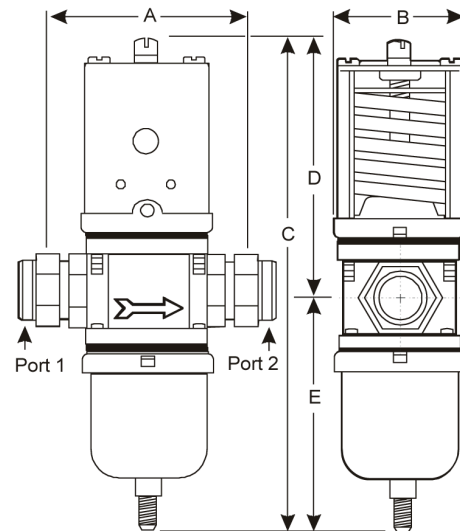
Table 3: V246 screw connection valves dimensions

Valve size	Dimensions, in. (mm)				
	A	B	C	D	E
3/8 in.	2 5/8 (67)	1 5/8 (41)	6 1/2 (166)	3 1/2 (89)	3 (77)
1/2 in.	3 1/16 (78)	2 (51)	7 3/16 (182)	3 13/16 (96)	3 3/8 (86)
3/4 in.	3 3/8 (86)	2 3/16 (55)	8 (203)	4 3/16 (106)	3 13/16 (98)
1 in.	4 3/4 (121)	2 13/16 (71)	10 1/2 (267)	5 15/16 (151)	4 9/16 (116)
1 1/4 in.	4 3/4 (121)	2 13/16 (71)	10 7/8 (276)	6 1/8 (156)	4 3/4 (121)

Table 4: V246 angle-body screw connection valves dimensions

Valve size	Dimensions, in. (mm)				
	A	B	C	D	E
3/8 in.	2 3/4 (70)	1 5/8 (41)	6 15/16 (176)	3 5/8 (92)	3 1/8 (80)
1/2 in.	3 1/8 (80)	2 (51)	7 1/2 (191)	3 7/8 (98)	3 1/2 (88)
3/4 in.	3 9/16 (90)	2 1/8 (55)	8 9/16 (217)	4 5/16 (110)	4 (101)

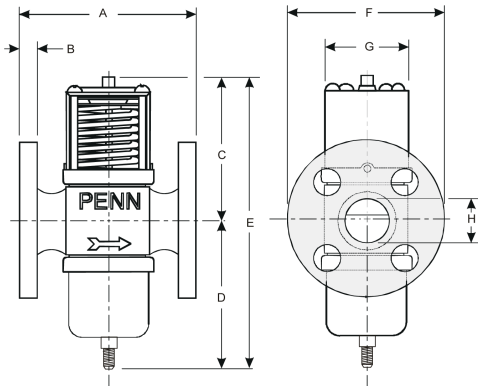
Figure 15: V246 union sweat connection valves dimensions



**Table 5: V246 union sweat connection valves dimensions**

Valve size	Dimensions, in. (mm)				
	A	B	C	D	E
1 1/4 in.	4 3/4 (121)	2 13/16 (71)	10 7/8 (276)	6 1/8 (156)	4 3/4 (121)

**Figure 16: V246 flange valve dimensions**



**Table 6: V246 flange valve, commercial service - dimensions**

Valve size	Dimensions, in. (mm)							
	A	B	C	D	E	F	G	H
1 1/2 in.	5 5/16 (135)	9/16 (14)	6 1/8 (156)	4 3/4 (121)	10 7/8 (276)	5 1/4 (133) <sup>1</sup>	2 5/8 (67)	1 7/8 (48)
2 in.	6 5/8 (168)	5/8 (16)	7 1/8 (181)	6 1/8 (156)	13 1/4 (336)	6 3/16 (157) <sup>2</sup>	3 1/2 (89)	2 1/4 (57)

- 1 The dimensions on the European versions are 5 29/32 in. (150 mm).
- 2 The dimensions on the European versions are 6 1/2 in. (165 mm).

**Table 7: V246 flange valve, commercial service - flange specifications**

Valve size	Regional version	Number of holes	Hole size	Bolt circle
1 1/2 in.	North American	4	5/8 in. (16 mm)	3 7/8 in. (98 mm)
2 in.			3/4 in. (19 mm)	4 3/4 in. (121 mm)
1 1/2 in.	European, DIN2533 flanges	4	18 mm	110 mm
2 in.				125 mm

**Table 8: V246 flange valve, maritime service - dimensions**

Valve Size	Dimensions, in. (mm)							
	A	B	C	D	E	F	G	H
1 1/2 in.	5 5/16 (135)	9/16 (14)	6 1/8 (156)	4 3/4 (121)	10 7/8 (276)	5 1/4 (133) <sup>1</sup>	2 5/8 (67)	1 7/8 (48)
2 in.	6 3/8 (162)	5/8 (16)	7 1/8 (181)	6 1/8 (156)	13 1/4 (337)	6 (152) <sup>2</sup>	3 1/2 (89)	2 3/4 (70)

- 1 The dimensions on the European versions are 5 29/32 in. (150 mm).
- 2 The dimensions on the European versions are 6 1/2 in. (165 mm).

**Table 9: V246 flange valve, maritime service - flange specifications**

Valve size	Regional version	Number of holes	Hole size	Bolt circle
1 1/2 in.	North American	4	5/8 in. (16 mm)	3 7/8 in. (98 mm)
2 in.			3/4 in. (19 mm)	4 3/4 in. (121 mm)
1 1/2 in.	European, DIN86021 flanges	4	18 mm	110 mm
2 in.				125 mm

## Materials

**Table 10: North American V246 materials**

Nominal valve size:	3/8 in. to 3/4 in., commercial	1 in. to 2 in., commercial	Maritime, all sizes
<b>Material</b>			
Body	Cast brass	Cast iron/rust resisting finish	Cast bronze
Seat	Aluminum bronze	Aluminum bronze	MONEL
Disc	BUNA-N	BUNA-N	BUNA-N
Disc cup	Brass	Brass	MONEL
Disc stud	Brass	Brass	MONEL
Stem or extension sleeve	Brass	Brass	MONEL
Diaphragms	Nylon reinforced BUNA-N	Nylon reinforced BUNA-N	Nylon reinforced BUNA-N
<b>Refrigerant contact</b>			

**Table 10: North American V246 materials**


Nominal valve size:		3/8 in. to 3/4 in., commercial	1 in. to 2 in., commercial	Maritime, all sizes
Material				
Pressure element	Cup	300 Series stainless steel	300 Series stainless steel	300 Series stainless steel
	Bellows	300 Series stainless steel	300 Series stainless steel	300 Series stainless steel
	Bellows ring	Steel/nickel plated	Steel/nickel plated	Steel/nickel plated

**Table 11: European V246 materials**

Nominal valve size:		3/8 in. to 3/4 in., commercial	1 in. to 2 in., commercial	Maritime, all sizes
Material				
Body		Hot forged brass	Cast iron/rust resisting finish	Cast bronze
Seat		Aluminum bronze	Aluminum bronze	MONEL
Disc		BUNA-N	BUNA-N	BUNA-N
Disc cup		Brass	Brass	MONEL
Disc stud		Brass	Brass	MONEL
Stem or extension sleeve		Brass	Brass	MONEL
Diaphragms		Nylon reinforced BUNA-N	Nylon reinforced BUNA-N	Nylon reinforced BUNA-N
<b>Refrigerant contact</b>				
Pressure element	Cup	300 Series stainless steel	300 Series stainless steel	300 Series stainless steel
	Bellows	300 Series stainless steel	300 Series stainless steel	300 Series stainless steel
	Bellows ring	Steel/nickel plated	Steel/nickel plated	Steel/nickel plated

## V246 Series Two-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants technical specifications

**Table 12: V246 Series Two-Way Pressure-Actuated Water-Regulating Valves for High-Pressure Refrigerants**

Specification	Description
Factory-set opening point	200 psig (13.8 bar)
Maximum working pressure	630 psig (43.4 bar)
Opening point adjustment range	200 psi to 400 psi (13.8 bar to 27.6 bar)
Media	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
Compliance	United States: cULus Listed; UL 207 File SFJQ.SA45221
	Canada: cULus Listed; UL 207 File SFJQ7.SA45221
	Applies to: <ul style="list-style-type: none"> <li>• V246GA1-001C</li> <li>• V246GB1-001C</li> <li>• V246HA1-001C</li> <li>• V246HB1-001C</li> </ul>
	 <p>① <b>Note:</b></p> <ul style="list-style-type: none"> <li>• The valve body and internal parts are not compatible with ammonia (R717).</li> <li>• The design pressure marked on these components shall not be less than the installed system working pressure or less than the values outlined in ASHRAE 15 for the charged refrigerant. After charging, mark the installed equipment with the refrigerant type and oil used.</li> </ul>

### Product warranty

This product is covered by a limited warranty, details of which can be found at [www.johnsoncontrols.com/buildingswarranty](http://www.johnsoncontrols.com/buildingswarranty).

### Single point of contact

APAC	Europe	NA/SA
JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 32 CHANGJIANG RD NEW DISTRICT WUXI JIANGSU PROVINCE 214028 CHINA	JOHNSON CONTROLS WESTENDHOF 3 45143 ESSEN GERMANY	JOHNSON CONTROLS 507 E MICHIGAN ST MILWAUKEE WI 53202 USA

### Contact information

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