

# V43/V243 Series Pressure-Actuated Water-Regulating Valves

## Product/Technical Bulletin

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The V43/V243 Pressure-Actuated Water-Regulating Valves are designed to regulate water flow through the condenser of large refrigerated cooling systems. These pilot-operated valves open on an increase in refrigerant head pressure and provide modulating operation.

The V43/V243 water-regulating valves are available for commercial and maritime applications.

V43 valves are available for non-corrosive low- and medium-pressure refrigerants such as R-134A, R-404A, R-502, and R-507. Specially designed V43 valves are also available for ammonia service (R-717).

V243 valves are available for non-corrosive high-pressure refrigerants such as R410A.

Commercial V43/V243 valves are constructed with a cast iron body, brass internal parts, and bronze seat material.

To resist the corrosive action of sea water, the V43/V243 maritime and navy models are constructed with a red brass body, bronze and monel interior parts, and monel seat material.



Figure 1: V43 Pressure-Actuated Valve

### **WARNING**

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

Table 1: Features and Benefits

Features	Benefits
Built-in Pilot Valve	Allows more precise throttling.
Easy Adjustment	Allows service and adjustment without breaking line connections.
Drain Plug	Allows water to be drained during shutdown to reduce the possibility of freeze-up.
Mesh Monel Screen	Protects pilot valve from items such as dirt and scale and is easily removed for cleaning and servicing without breaking any line connections.



## Application

**IMPORTANT:** All V43/V243 water-regulating valves are designed for use only as operating devices. Where valve failure can result in personal injury and loss of property, it is the responsibility of the installer to add and maintain devices (pressure relief or safety shutoff) or systems (alarm or supervisory) that protect against or warn of device failure.

**Note:** The V43 and V243 Series Head Pressure Regulating Valves are available for cooling applications only (direct acting).

## Operation

The V43/243 valves are refrigerant actuated units, requiring only system refrigerant head pressure to operate (no electrical power is required). Only the inlet and outlet water lines and refrigerant head pressure connections need to be made for the valve to function.

A built-in pilot valve, driven by refrigerant head pressure, operates the main valve using water and spring pressures as the opening and closing forces.

The main valve seat disc assembly is suspended on a heavy duty rubber diaphragm, eliminating any close-fitting or sliding parts. This reduces friction within the valve, allowing more reliable control. Also, the chance of the valve stem sticking in dirty water conditions is reduced.

## Determining the Required Valve Size

Every system is unique and requires specific engineering data to properly size and design. Typically, a valve is replaced with another valve of the same size.

**IMPORTANT:** An undersized valve does not deliver the required amount of water flow under full load conditions, and an oversized valve tends to hammer under low load conditions.

To select the correct valve size, determine the following variables:

- Maximum Water Flow Required
- Available Water Pressure Drop (Differential) across the Valve

Use these variables to locate a point on one of the flow capacity charts (Figure 5 through Figure 12) that slightly exceeds the maximum water flow required. The flow capacity chart containing this point represents the proper valve size.

## Maximum Water Flow Required

Use the information provided by the manufacturer of the condensing unit to determine the maximum water flow required. If this information is not available, calculate the maximum water flow required by using the following formula:

$$\text{Maximum Water Flow Required (GPM)} = \frac{\text{Tons of Refrigeration} \times 30}{\text{Outlet Temperature} - \text{Inlet Temperature}}$$

Example: If a 100-ton capacity system has an inlet water temperature of 85°F and an outlet water temperature of 95°F, the maximum water flow required is:

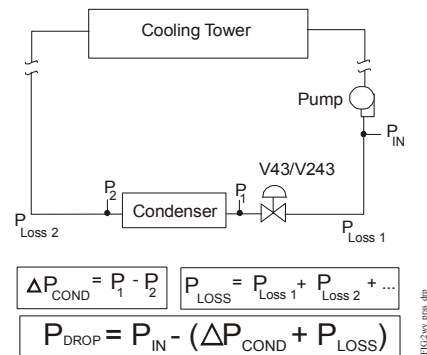
$$\text{Maximum Water Flow Required} = \frac{100 \times 30}{95 - 85}$$

$$\text{Maximum Water Flow Required} = 300 \text{ GPM}$$

## Available Water Pressure Drop (Differential) across the Valve

The available water pressure drop (differential) across the valve is the supply pressure to the valve minus all downstream pressures. This pressure drop is the force available to push water through the valve.

Water supply pressure is the water pressure supplied to the inlet side of the valve from a cooling tower, a city water main, or other source.



**Figure 2: Pressure Drop across the Valve**

$$\text{Pressure Drop Across the Valve} = \text{Supply Pressure} - \text{All Downstream Pressure Drops (Across Condenser Piping, Pipe Fittings, and Valves)}$$

## Opening Point - the Refrigerant Head Pressure Rise Above the Opening Point

The forces that operate the valve are refrigerant head pressure, water pressure, and spring pressure. These forces oppose each other.

When the head pressure rises, and the refrigerant pressure overcomes the spring force (pilot valve), the valve begins to open (the disk lifts off of the seat). This point is called the opening point.

The opening point is adjusted by increasing or decreasing the spring force by using the adjustment stem. If the head pressure continues to rise, the refrigerant pressure further opens the valve until the valve is fully open. The range from the point where the valve lifts off the seat (the opening point) to the point where the valve is fully open is called the throttling range.

The throttling range is fixed and cannot be adjusted. The throttling range is approximately 40 psig for the low-pressure V43 Series Valves, approximately 50 psi for the medium-pressure V43 Series Valves, and approximately 60 psi for the high pressure V243 Series Valves.

**Head Pressure Rise Above the Opening Point**

When the head pressure rises, the force of the refrigerant head pressure overcomes the spring force (plus any hysteresis) and pushes the disc off the seat, allowing water to start flowing through the valve.

Anything above that point is head pressure rise above the opening point. Typically, the opening point is approximately 7 psi above the closing point.

$$\begin{matrix} \text{Refrigerant} \\ \text{Head} \\ \text{Pressure} \\ \text{Rise Above} \\ \text{Opening} \\ \text{Point} \end{matrix} = \begin{matrix} \text{Refrigerant} \\ \text{Head Pressure greater} \\ \text{than Opening Point} \end{matrix} - \begin{matrix} \text{Refrigerant Head} \\ \text{Pressure at} \\ \text{Opening Point} \end{matrix}$$

**Proper Valve Size**

A properly sized valve meets the requirements of the maximum water flow required yet functions at an acceptable level when minimum flow is required (does not water hammer, cut, or wire draw the seats and seating discs). See Figure 3 and Figure 4 to select the correct valve size for your application.

Use the following steps to help determine the appropriate valve size for your application:

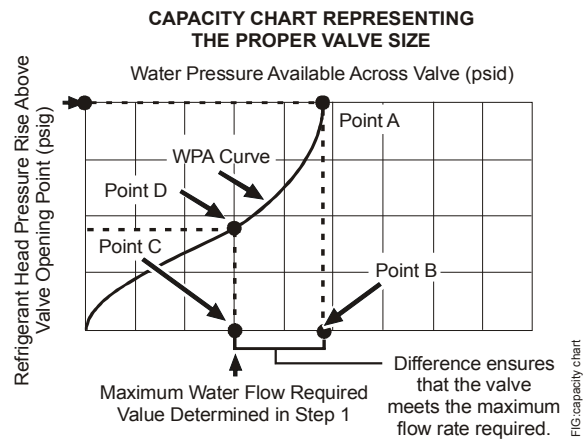
1. Locate the point where the valve is fully open on the Refrigerant Head Pressure Rise Above Valve Opening Point (y-axis).
2. Draw a horizontal line from this point to where the line intersects with the Water Pressure Available WPA curve. This is Point A.

3. Draw a vertical line from point A to where it intersects with Maximum Water Flow Available line (x-axis). This is Point B.

Point B is the maximum amount of water that the valve can flow, when fully open, under the stated conditions. See Figure 3.

4. Locate the Maximum Water Flow Required for your application (x-axis). This is Point C.
5. Draw a vertical line from Point C to where the line intersects with the WPA curve. This Point D.
6. Draw a horizontal line from Point D to the left where it intersects with the Refrigerant Head Pressure Rise Above Opening Point.

This is where the selected value meets the maximum flow requirement of the application.



**Figure 3: Capacity Chart**

Use the flow charts to select the valve that is most appropriate for your application.

**Example**

In this example, the required flow for an R-404A system is 300 GPM. The cooling tower pump discharge pressure is 30 psig, and the condenser manufacturer's table gives a pressure drop through the condenser at 8 psid. The pressure drop through the installed piping, fittings, and valves is approximately 12 psi.

Maximum Water Flow Required = 300 GPM

Water Pressure Available = 30 - (12 + 8)

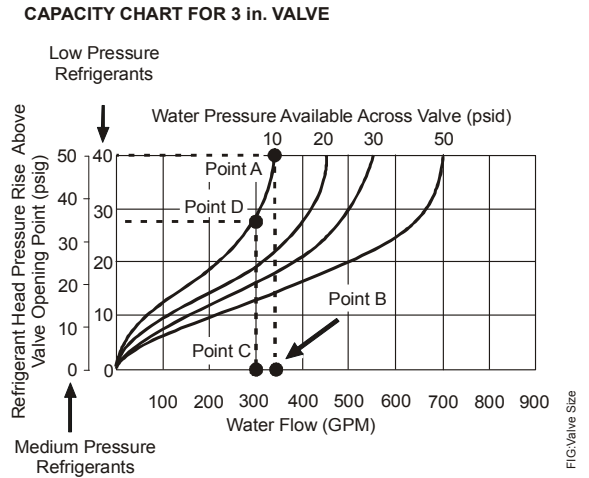
Water Pressure Available = 10 psid

You need to select the proper valve size. The proper size valve is indicated by the flow chart that slightly exceeds the maximum required flow when the valve is wide open.

As indicated in Figure 4, the correct valve for this application is a 3-inch medium-pressure (160/260 psi), non-corrosive, commercially constructed V43 Series Valve. The maximum water flow that a 3-inch valve can deliver (300 GPM) under the stated condition is slightly greater than the maximum water flow required (300 GPM).

Point Where Valve is Wide Open and Intersects with the WPA Curve	= 50 psig	} Point A
Maximum Flow the Valve Provides Under the Given Conditions (Valve Wide Open with a 10 psid)	= Appr. 330 GPM	} Point B
Maximum Water Flow Required for the Application	= 300 GPM	} Point C
Head Pressure Rise Above Opening Point Where Maximum Flow Required for the Application Occurs	= 36 psig	} Point D

**Note:** The maximum flow required for the application is to the left of the dotted vertical line between Point A and Point B (300 GPM when the valve is approximately 72% open).

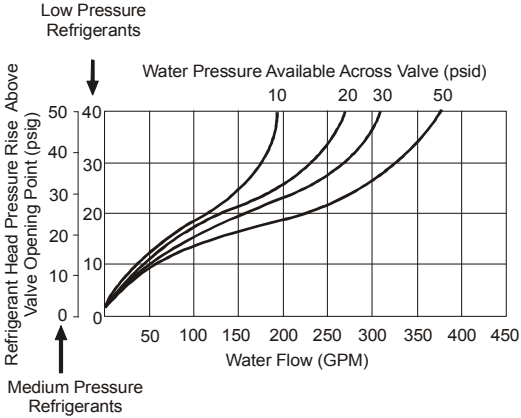


**Figure 4: Correct Valve Size for Application**

Select the valve type from Table 5 through Table 7.

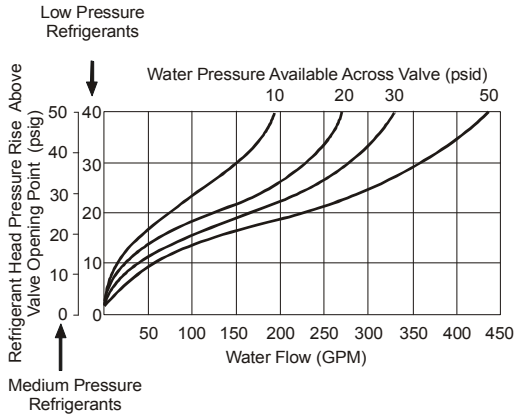
# V43 Capacity Flow Charts

**CAPACITY CHART FOR 2 in. VALVE**



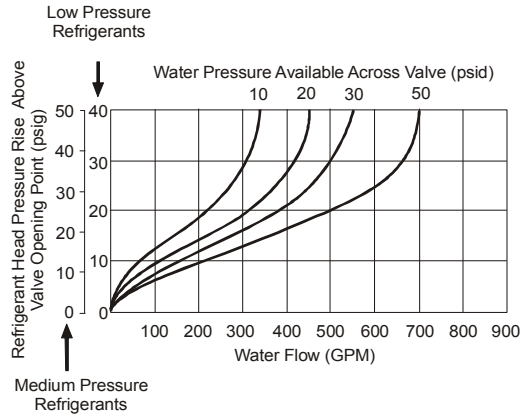
**Figure 5: 2 in. V43 Capacity Flow Chart**

**CAPACITY CHART FOR 2-1/2 in. VALVE**



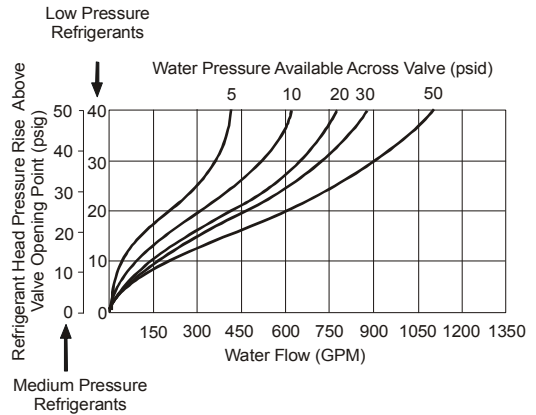
**Figure 6: 2-1/2 in. V43 Capacity Flow Chart**

**CAPACITY CHART FOR 3 in. VALVE**



**Figure 7: 3 in. V43 Capacity Flow Chart**

**CAPACITY CHART FOR 4 in. VALVE**



**Figure 8: 4 in. V43 Capacity Flow Chart**

# V243 Capacity Flow Charts

CAPACITY CHART FOR 2 in. VALVE

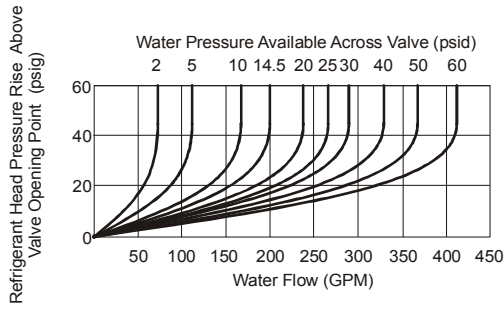


Figure 9: 2 in. V243 Capacity Flow Chart

CAPACITY CHART FOR 2-1/2 in. VALVE

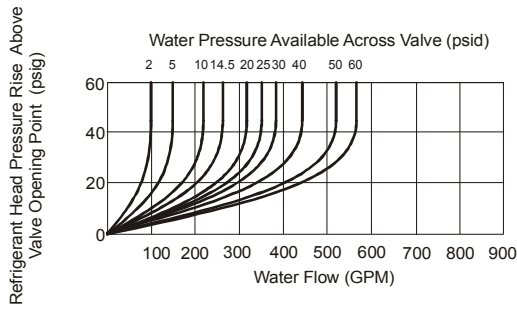


Figure 10: 2-1/2 in. V243 Capacity Flow Chart

CAPACITY CHART FOR 3 in. VALVE

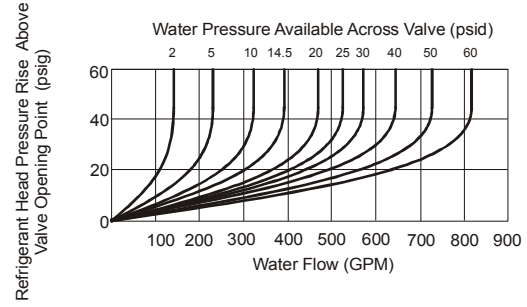


Figure 11: 3 in. V243 Capacity Flow Chart

CAPACITY CHART FOR 4 in. VALVE

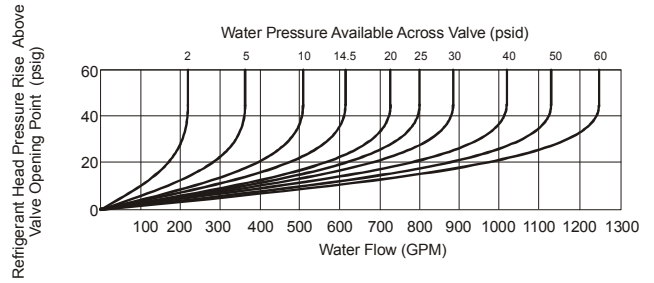


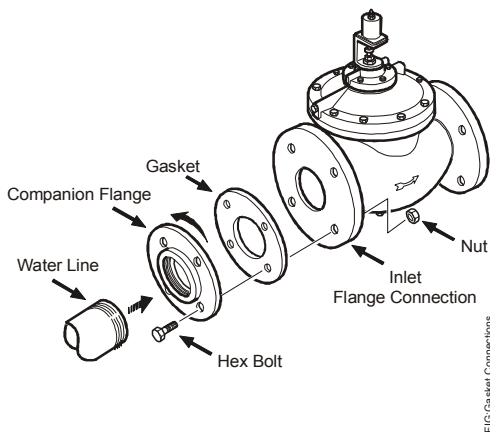
Figure 12: 4 in. V243 Capacity Flow Chart

## Installation and Initial Adjustment

1. Flush the lines to remove any foreign matter before connecting the lines to the valve. See [Servicing](#).
2. Screw each companion flange and gasket onto the inlet and outlet water lines as indicated in Figure 13. The inside of the companion flange is threaded. See Table 10 for flange and gasket kit information.
3. Mount the V43/V243 valves so that the water flow follows in the direction indicated by the arrow on the V43/V243 casting.

Mount the V43/V243 valves onto a horizontal water line, with the bellows up.

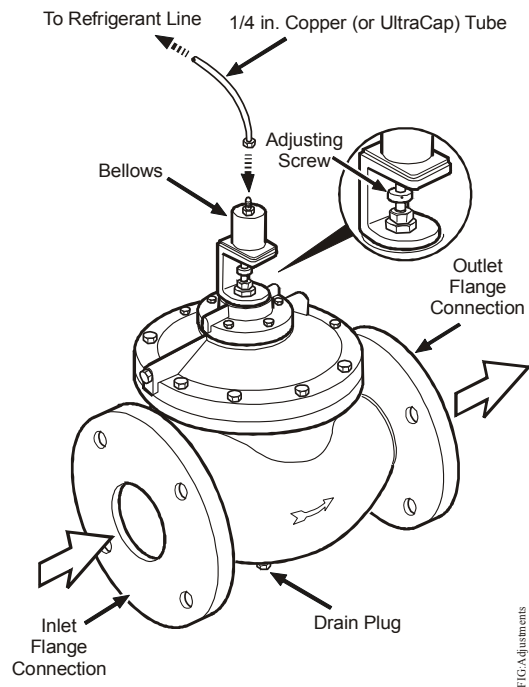
4. Secure the inlet and outlet water lines (with companion flange and gasket) to the inlet and outlet flange connections on the V43/V243 valves with hex bolts and nuts.



**Figure 13: V43/V243 Gasket and Flange Connections (V43AV Shown)**

5. Connect a 1/4-inch copper (or UltraCap) tube from the bellows of the V43/V243 valves to the refrigerant line as indicated in Figure 14. (In reciprocating compressor applications, make the refrigerant connection as far from the compressor discharge as possible.) If possible, make the connection on the outlet side of the condenser.
6. Manually flush the valve to remove debris. See [Servicing](#).
7. Put the system into operation under normal operating conditions.
8. Determine the correct refrigerant operating head pressure for the system. Observe the refrigerant pressure indicated at the high side pressure service gauge.

9. If necessary, adjust the operating head pressure as instructed in the [Valve Adjustment](#) section.



**Figure 14: V43/V243 Connections and Adjustments (V43AV Shown)**

## Checkout Procedure

**Note:** Before operating equipment, always manually flush the valve. See [Servicing](#).

Before leaving the installation site, observe at least three complete operating cycles (bellows open and close) to verify that all components are functioning properly.

## Valve Adjustment

Make adjustments gradually. Adjust by 1/2 revolution and wait for the system to stabilize after each adjustment change. The throttling range (differential) is not adjustable.

- To increase the opening point of the valve, turn the adjusting screw (Figure 15, inset) inward, away from main valve body (clockwise) as viewed from the bottom up.
- To decrease the opening point, turn the adjusting screw outward, toward the main valve body (counterclockwise).



## Servicing

The V43/V243 valves can be disassembled, cleaned, and reassembled without breaking the line connections.

### Accessing Internal Parts

1. Shut off water flow to the V43/V243 valves.
2. Remove the hex bolts (Figure 15) from the top of the bellows flange.
3. Remove the bellows flange.

**Note:** For internal parts replacement instructions, refer to the respective replacement parts instruction sheet.

### Manual Flushing

Before starting equipment, manually flush the valve to remove any foreign material from the valve.

1. Turn the adjusting screw (Figure 15, inset) clockwise, raising the adjusting screw away from the valve body as much as possible (count the number of turns for reference).
2. Insert a standard slotted screwdriver tip between the adjusting screw and the push pin.
3. Pry the push pin down with the screwdriver to open the valve as indicated.
4. Hold the push pin down to hold the valve open. Flush the valve for several minutes, removing all foreign matter from the V43/V243 valves.
5. After flushing the V43/V243 valves, remove the screwdriver and set the adjusting screw to the desired operating pressure. See [Valve Adjustment](#).

### Cleaning the Monel Screen

The pilot valve is protected from debris by a fine mesh monel screen. To clean the screen, shut off the water supply, relieve the water pressure, unscrew the hex bolt (Figure 15), remove the monel screen, brush, and rinse clean.

## Draining the V43/V243 Valves During Shutdown

To reduce the possibility of freeze-up, drain the V43/V243 valves during shutdown. To drain, unscrew the drain plug at the base of the V43/V243 valves. See Figure 15.

**Note:** In order to drain, the V43/V243 valves must be mounted in a horizontal water line with the bellows up and the drain plug down.

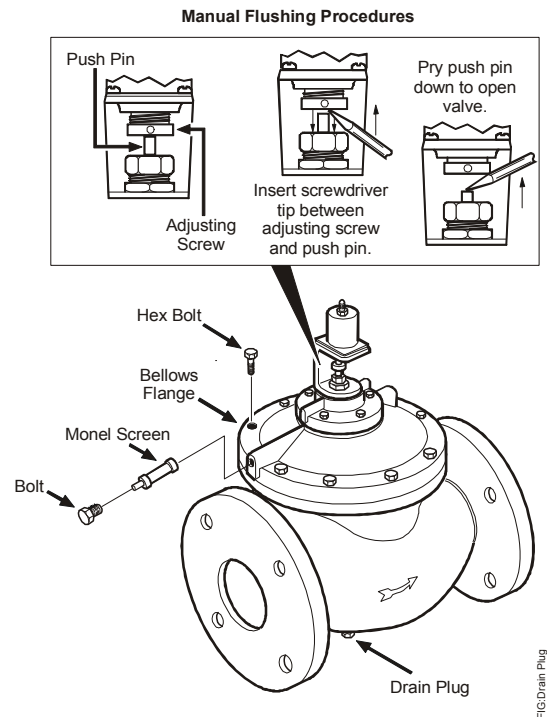
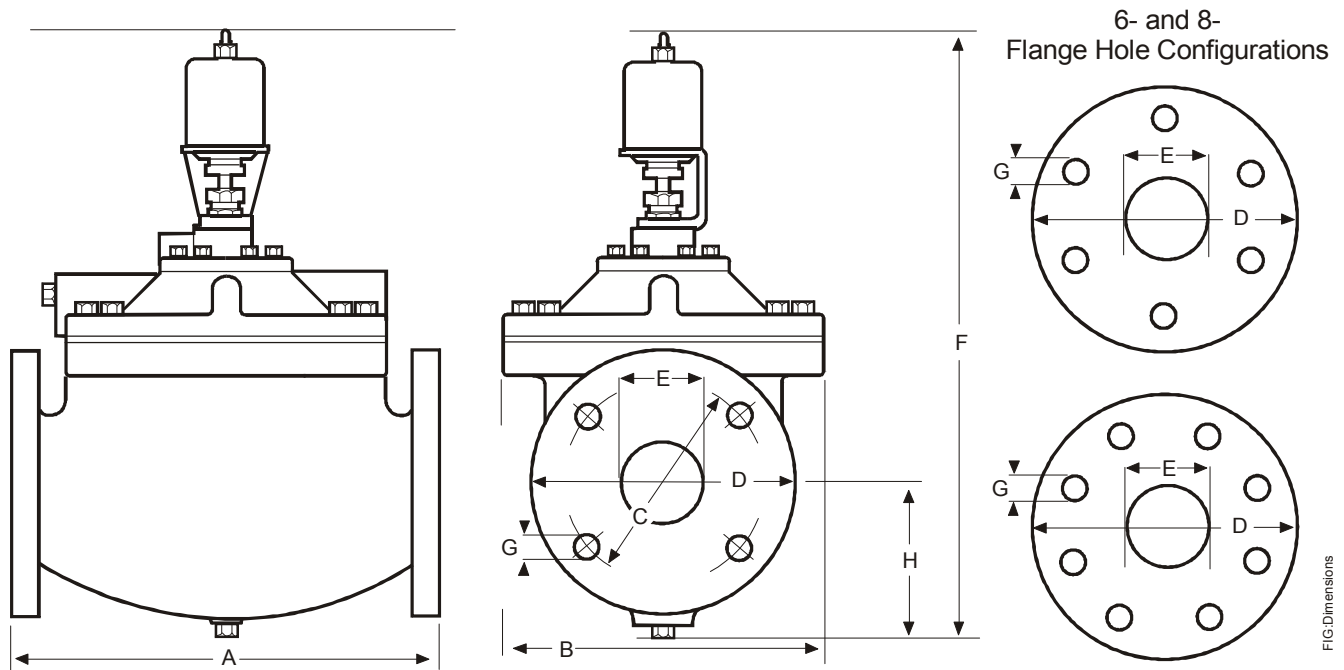


Figure 15: Monel Screen, Drain Plug, and Manual Flushing Procedures



## Dimensions

### V43/V243 Valves Dimensions



**Figure 16: V43/V243 Flange Connection Valves Dimensions**

**Table 2: Dimensions**

Symbol	2 Inch	2-1/2 Inch	3 Inch	4 Inch
<b>A</b> <sup>1</sup>	9-1/2 in. (241 mm)	10-3/4 in. (273 mm)	11-3/4 in. (298 mm)	14 in. (356 mm)
<b>B</b>	7-1/2 in. (191 mm)	8 in. (203 mm)	9 in. (229 mm)	10-3/4 in. (273 mm)
<b>C</b>	4-3/4 in. (121 mm)	5-1/2 in. (140 mm)	6 in. (152 mm)	7-1/2 in. (191 mm)
<b>D</b>	6 in. (152 mm)	7 in. (178 mm)	7-1/2 in. (191 mm)	9 in. (229 mm)
<b>E</b>	2-1/8 in. (54 mm)	2-5/8 in. (67 mm)	3-1/8 in. (80 mm)	4-1/8 in. (105 mm)
<b>F</b> <sup>2</sup>	15-1/4 in. (387 mm)	15-9/16 in. (395 mm)	16-9/16 in. (421 mm)	18-7/32 in. (462 mm)
<b>F</b> <sup>3</sup>	15-29/32 in. (404 mm)	16-7/32 in. (412 mm)	17-7/32 in. (437 mm)	18-7/8 in. (479 mm)
<b>G</b>	3/4 in. (19.05 mm) Dia. (4)	3/4 in. (19.05 mm) Dia. (4)	3/4 in. (19.05 mm) Dia. (4)	3/4 in. (19.05 mm) Dia. (8)
<b>H</b>	3-5/8 in. (92 mm)	3-15/16 in. (100 mm)	4-1/4 in. (108 mm)	5-1/16 in. (128 mm)

1. Flange face to flange face.

2. These are the measurements for the V43 valves.

3. These are the measurements for the V243 valves.

## Selection

When ordering V43/V243 valves, specify the complete product code number including an optional companion flange and gasket kit. A companion flange and gasket kit is required to mount the water lines to commercial type V43/V243 water-regulating valves.

**Table 3: Valve Construction and Pressure Type**

Designator	Construction and Pressure Type
A	Commercial Service with Iron Body, Open on Pressure Increase, V43
B	Maritime Service with Brass Body, Open on Pressure Increase, V43
C	Navy Service with Brass Body, Open on Pressure Increase, V43
G	Commercial Service with Iron Body, Open on Pressure Increase, V243
H	Maritime Service with Brass Body, Open on Pressure Increase, V243

**Table 4: Flange Size**

Designator	Flange Size
S	2 in.
T	2-1/2 in.
V	3 in.
W	4 in.

**Table 5: V43 Series Pressure Actuated Water Valves (except NAVSEA valves, see Table 6)**

Code Number	Pipe Size (in.)	Inlet and Outlet	Opening Point Adjustment Range psig (kPa)	Ship Wt. lb (kg)
<b>Commercial Type – Non-Corrosive Refrigerants (R)</b>				
V43AS-1C	2	4 Hole ASME Flanged	70 to 150 (483 to 1,034)	59 (26.76)
V43AS-2C			160 to 260 (1,103 to 1,793)	
V43AT-1C	2-1/2		70 to 150 (483 to 1,034)	65 (29.48)
V43AT-2C			140 to 260 (1,103 to 1,793)	
V43AV-1C	3		70 to 150 (483 to 1,034)	90 (40.82)
V43AV-2C			160 to 260 (1,103 to 1,793)	90 (40.82)
V43AW-2C	4	8 Hole ASME Flanged		142 (64.41)
<b>Commercial Type - Ammonia (R)</b>				
V43AV-5C	3		160 to 260 (1,103 to 1,793)	90 (40.82)
<b>Maritime Type – Non-Corrosive Refrigerants (R)</b>				
V43BS-6C	2	4 Hole ASME Flanged	70 to 150 (483 to 1,034)	59 (26.76)
V43BS-7C			160 to 260 (1,103 to 1,793)	
V43BT-6C	2-1/2		70 to 150 (483 to 1,034)	65 (29.48)
V43BT-7C			140 to 260 (1,103 to 1,793)	
V43BV-10C	3		70 to 150 (483 to 1,034)	90 (40.82)
V43BV-7C			140 to 260 (1,103 to 1,793)	

**Table 6: V43 Series Pressure Actuated Water Valves, Navy NAVSEA Certified**

Code Number	Pipe Size (in.)	Inlet and Outlet	Pressure Connector	Opening Point Adjustment Range – psig (kPa)	Ship Wt. lb (kg)
<b>Navy NAVSEA Certified – Non-Corrosive Refrigerants (R)</b>					
V43BS-3C	2	4 Hole ASME Flange	1/4 in. Male Flared Conn.	70 to 150 (483 to 1,034)	59 (26.76)
V43CS-1C		6 Hole Navy Flange			
V43CS-2C			Female Sweat Conn.		
V43BT-3C	2-1/2	4 Hole ASME Flange	1/4 in. Male Flared Conn.		65 (29.48)
V43CT-2C		6 Hole Navy Flange			
V43BV-4C	3	4 Hole ASME Flange	Female Sweat Conn.		90 (40.82)
V43CV-1C		8 Hole Navy Flange	1/4 in. Male Flared Conn.		
V43CV-2C			Female Sweat Conn.		
V43BW-7C	4	8 Hole ASME Flange	1/4 in. Male Flared Conn.	140 to 260 (1,103 to 1,793)	142 (64.41)
V43BW-2C					

**Table 7: V243 Series Pressure Actuated Water Valves**

Code Number	Pipe Size (in.)	Inlet and Outlet	Opening Point Adjustment Range – psig (kPa)	Ship Wt. lb (kg)
<b>Commercial Type – High Pressure Refrigerants</b>				
V243GS-1C	2	4 Hole ASME Flange	200 to 400 (1,379 to 2,758)	59 (26.76)
V243GT-1C	2-1/2			65 (29.48)
V243GV-1C	3			90 (40.82)
V243GW-1C	4	8 Hole ASME Flange		142 (64.41)
<b>Maritime Type – High Pressure Refrigerants</b>				
V243HS-1C	2	4 Hole ASME Flange	200 to 400 (1,379 to 2,758)	59 (26.76)
V243HT-1C	2-1/2			65 (29.48)
V243HV-1C	3			90 (40.82)
V243HW-1C	4	8 Hole ASME Flange		142 (64.41)

## Repair and Replacement Information

If a V43/V243 Pressure-Actuated Water-Regulating Valve fails to operate within its specifications, replacement sensing elements, internal parts, and diaphragms are available for valve repair.

See [Servicing](#) for servicing instructions.

To obtain replacement parts kits instructions and details, contact your nearest Johnson Controls® distributor at [http://cgproducts.johnsoncontrols.com/dist\\_locate/locateDIST.asp](http://cgproducts.johnsoncontrols.com/dist_locate/locateDIST.asp).

For replacement parts kits product code numbers, see Table 8 and Table 9.

**Table 8: Repair Parts (Part 1 of 2)<sup>1</sup>**

Model	Diaphragm Kit	Seat Disc and Diaphragm Kit	Seat Repair Kit	Screen Repair Kit	Push Rod Kit <sup>2</sup>	Sensing Element Kit	Disc Body Kit
V43AS-1C	DPM18A-600R	DSC16A-600R	STT19A-602R	SCN10A-600R	ROD18A-600R	SEP88A-600R	DBK11A-600R
V43AS-2C	DPM18A-600R	DSC16A-600R	STT19A-602R	SCN10A-600R	ROD18A-600R	SEP88A-601R	DBK11A-600R
V43AS-5C	DPM18A-600R	DSC16A-600R	STT19A-602R	SCN10A-600R	ROD18A-600R	SEP87A-600R	DBK11A-600R
V43AT-1C	DPM18A-601R	DSC16A-601R	STT19A-603R	SCN10A-600R	ROD18A-601R	SEP88A-600R	DBK11A-601R
V43AT-2C	DPM18A-601R	DSC16A-601R	STT19A-603R	SCN10A-600R	ROD18A-601R	SEP88A-601R	DBK11A-601R
V43AT-5C	DPM18A-601R	DSC16A-601R	STT19A-603R	SCN10A-600R	ROD18A-601R	SEP87A-600R	DBK11A-601R
V43AV-1C	DPM18A-602R	DSC16A-602R	STT19A-606R	SCN10A-600R	ROD18A-601R	SEP88A-600R	DBK11A-602R
V43AV-2C	DPM18A-602R	DSC16A-602R	STT19A-606R	SCN10A-600R	ROD18A-601R	SEP88A-601R	DBK11A-602R
V43AV-5C	DPM18A-602R	DSC16A-602R	STT19A-606R	SCN10A-600R	ROD18A-601R	SEP87A-600R	DBK11A-602R
V43AW-1C	DPM18A-603R	DSC16A-603R	STT19A-608R	SCN10A-600R	ROD18A-602R	SEP88A-600R	DBK11A-603R
V43AW-2C	DPM18A-603R	DSC16A-603R	STT19A-608R	SCN10A-600R	ROD18A-602R	SEP88A-601R	DBK11A-603R
V43AW-5C	DPM18A-603R	DSC16A-603R	STT19A-608R	SCN10A-600R	ROD18A-602R	SEP87A-600R	DBK11A-603R
V43BS-1C <sup>1</sup>	DPM18A-600R	DSC16A-600R	STT19A-602R	SCN10A-601R	ROD18A-602R	SEP88A-600R	DBK11A-600R
V43BS-2C <sup>1</sup>	DPM18A-600R	DSC16A-600R	STT19A-602R	SCN10A-601R	ROD18A-602R	SEP88A-601R	DBK11A-600R
V43BS-3C	DPM18A-600R	DSC16A-600R	STT19A-600R	SCN10A-601R	ROD18A-602R	SEP88A-600R	DBK10A-600R
V43BS-6C	DPM18A-600R	DSC16A-600R	STT19A-600R	SCN10A-601R	ROD18A-602R	SEP88A-600R	DBK10A-600R
V43BS-7C	DPM18A-600R	DSC16A-600R	STT19A-600R	SCN10A-601R	ROD18A-602R	SEP88A-601R	DBK10A-600R
V43BT-1C <sup>1</sup>	DPM18A-601R	DSC16A-601R	STT19A-603R	SCN10A-601R	ROD18A-603R	SEP88A-600R	DBK11A-601R
V43BT-2C <sup>1</sup>	DPM18A-601R	DSC16A-601R	STT19A-603R	SCN10A-601R	ROD18A-603R	SEP88A-601R	DBK11A-601R
V43BT-3C	DPM18A-601R	DSC16A-601R	STT19A-605R	SCN10A-601R	ROD18A-603R	SEP88A-600R	DBK10A-602R
V43BT-6C	DPM18A-601R	DSC16A-601R	STT19A-605R	SCN10A-601R	ROD18A-603R	SEP88A-600R	DBK10A-602R
V43BT-7C	DPM18A-601R	DSC16A-601R	STT19A-605R	SCN10A-601R	ROD18A-603R	SEP88A-601R	DBK10A-602R
V43BV-1C <sup>1</sup>	DPM18A-602R	DSC16A-602R	STT19A-606R	SCN10A-601R	ROD18A-603R	SEP88A-600R	DBK11A-602R
V43BV-2C <sup>1</sup>	DPM18A-602R	DSC16A-602R	STT19A-606R	SCN10A-601R	ROD18A-603R	SEP88A-601R	DBK11A-602R
V43BV-4C	DPM18A-602R	DSC16A-602R	STT19A-607R	SCN10A-601R	ROD18A-603R	SEP88A-600R	DBK10A-601R
V43BV-5C <sup>1</sup>	DPM18A-602R	DSC16A-602R	STT19A-606R	SCN10A-601R	ROD18A-603R	SEP88A-600R	DBK11A-602R
V43BV-6C <sup>1</sup>	DPM18A-602R	DSC16A-602R	STT19A-606R	SCN10A-601R	ROD18A-603R	SEP88A-601R	DBK11A-602R
V43BV-7C	DPM18A-602R	DSC16A-602R	STT19A-607R	SCN10A-601R	ROD18A-603R	SEP88A-601R	DBK10A-601R
V43BV-8C	DPM18A-602R	DSC16A-602R	STT19A-607R	SCN10A-601R	ROD18A-603R	SEP88A-600R	DBK10A-601R
V43BV-9C	DPM18A-602R	DSC16A-602R	STT19A-607R	SCN10A-601R	ROD18A-603R	SEP88A-601R	DBK10A-601R
V43BV-10C	DPM18A-602R	DSC16A-602R	STT19A-607R	SCN10A-601R	ROD18A-603R	SEP88A-600R	DBK10A-601R
V43BW-1C	DPM18A-603R	DSC16A-603R	STT19A-609R	SCN10A-601R	ROD18A-602R	SEP88A-600R	DBK10A-603R
V43BW-2C	DPM18A-603R	DSC16A-603R	STT19A-609R	SCN10A-601R	ROD18A-602R	SEP88A-601R	DBK10A-603R
V43BW-5C	DPM18A-603R	DSC16A-603R	STT19A-609R	SCN10A-601R	ROD18A-602R	SEP88A-600R	DBK10A-603R
V43BW-6C	DPM18A-603R	DSC16A-603R	STT19A-609R	SCN10A-601R	ROD18A-602R	SEP88A-601R	DBK10A-603R
V43BW-7C	DPM18A-603R	DSC16A-603R	STT19A-609R	SCN10A-601R	ROD18A-602R	SEP88A-600R	DBK10A-603R
V43CS-1C	DPM18A-600R	DSC16A-600R	STT19A-600R	SCN10A-601R	ROD18A-602R	SEP88A-600R	DBK10A-600R
V43CS-2C	DPM18A-600R	DSC16A-600R	STT19A-600R	SCN10A-601R	ROD18A-602R	SEP88A-600R	DBK10A-600R
V43CS-3C	DPM18A-600R	DSC16A-600R	STT19A-600R	SCN10A-601R	ROD18A-604R	SEP88A-600R	DBK10A-600R

**Table 8: Repair Parts (Part 2 of 2)<sup>1</sup>**

Model	Diaphragm Kit	Seat Disc and Diaphragm Kit	Seat Repair Kit	Screen Repair Kit	Push Rod Kit <sup>2</sup>	Sensing Element Kit	Disc Body Kit
V43CT-1C	DPM18A-601R	DSC16A-601R	STT19A-605R	SCN10A-601R	ROD18A-603R	SEP88A-600R	DBK10A-602R
V43CT-2C	DPM18A-601R	DSC16A-601R	STT19A-605R	SCN10A-601R	ROD18A-603R	SEP86A-600R	DBK10A-602R
V43CV-1C	DPM18A-602R	DSC16A-602R	STT19A-607R	SCN10A-601R	ROD18A-603R	SEP86A-600R	DBK10A-601R
V43CV-2C	DPM18A-602R	DSC16A-602R	STT19A-607R	SCN10A-601R	ROD18A-603R	SEP88A-600R	DBK10A-601R
V243GS-1C	DPM18A-600R	DSC16A-600R	STT19A-602R	SCN10A-600R	ROD18A-600R	SEP90A-600R	DBK11A-600R
V243GT-1C	DPM18A-601R	DSC16A-601R	STT19A-603R	SCN10A-600R	ROD18A-601R	SEP90A-600R	DBK11A-601R
V243GV-1C	DPM18A-602R	DSC16A-602R	STT19A-606R	SCN10A-600R	ROD18A-601R	SEP90A-600R	DBK11A-602R
V243GW-1C	DPM18A-603R	DSC16A-603R	STT19A-608R	SCN10A-600R	ROD18A-600R	SEP90A-600R	DBK11A-603R
V243HS-1C	DPM18A-600R	DSC16A-600R	STT19A-600R	SCN10A-601R	ROD18A-602R	SEP90A-600R	DBK10A-600R
V243HT-1C	DPM18A-601R	DSC16A-601R	STT19A-605R	SCN10A-601R	ROD18A-603R	SEP90A-600R	DBK10A-601R
V243HV-1C	DPM18A-602R	DSC16A-602R	STT19A-607R	SCN10A-601R	ROD18A-603R	SEP90A-600R	DBK10A-602R
V243HW-1C	DPM18A-603R	DSC16A-603R	STT19A-609R	SCN10A-601R	ROD18A-602R	SEP90A-600R	DPK10A-603R

1. Repair parts are supplied in kits only and include all parts required to recondition that portion of the valve. To order, specify code number only.
2. Replacement push rod kit requires a seat repair kit and/or a diaphragm kit when replaced.

The following valves, manufactured after date code 8702, contain monel interior trim. Order replacement kits as listed in Table 8 or *V43xx and V243xx Series Repair Parts Kits Technical Bulletin (LIT-121690)*.

**Table 9: Parts Kits**

Valve Model	Order Parts Kits for:
V43BS-1C	V43BS-6C
V43BS-2C	V43BS-7C
V43BT-1C	V43BT-6C
V43BT-2C	V43BT-7C
V43BV-1C	V43BV-10C
V43BV-2C	V43BV-7C
V43BV-5C	V43BV-10C
V43BV-6C	V43BV-9C

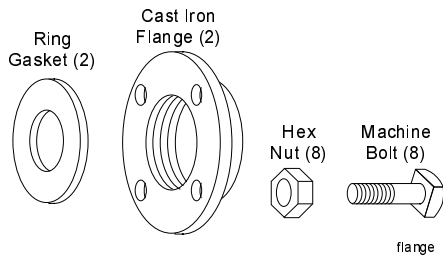
## Accessories

**Table 10: Companion Flanges and Gaskets**

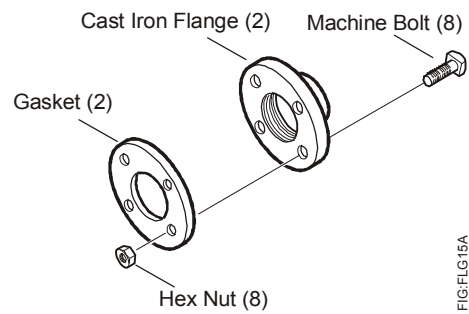
Kit Code Number	Water Valve Size (in.)	Shipping Wt. lb (kg)
<b>KIT14A-613</b> <sup>1,2</sup>	2	11.8 (5.4)
<b>KIT14A-614</b> <sup>1,2</sup>	2-1/2	16.5 (7.5)
<b>FLG15A-600</b> <sup>1,3</sup>	3	20 (9.1)
<b>FLG15A-601</b> <sup>1,3</sup>	4	34 (15.4)

1. Commercial valves only.
2. See Figure 17 for a diagram of the parts included in the flange and gasket kit for the 2-inch and 2-1/2-inch valves.
3. See Figure 18 for a diagram of the parts included in the flange and gasket kit for the 3-inch and 4-inch valves.

A companion flange and gasket kit is required to mount the water lines to commercial type V43/V243 water-regulating valves.



**Figure 17: KIT14A**



**Figure 18: FLG15A**

## Technical Specifications

### V43/V243 Pressure-Actuated Water-Regulating Valves

<b>Maximum Water Supply Pressure</b>			150 psig (1,034 kPa)
<b>V43 Maximum Head Pressure</b>			300 psig (2,068 kPa)
<b>V243 Maximum Head Pressure</b>			630 psig (4,344 kPa)
<b>Head Pressure Range (Opening Points)</b>	<b>V43</b>	<b>Low Pressure Refrigerants</b>	R-134A – 70 to 150 psig (482 to 1,034 kPa)
		<b>Medium Pressure Refrigerants</b>	R-22, R-502, R404A – 160 to 260 psig (1,103 to 1,793 kPa)
		<b>Ammonia</b>	160 to 260 psig (1,103 to 1,793 kPa)
	<b>V243</b>	<b>High Pressure</b>	R410A – 200 to 400 psig (1,379 to 2,758 kPa)
<b>Factory Settings<sup>1</sup></b>	<b>V43</b>	<b>Low Pressure Refrigerants</b>	90 psig (621 kPa)
		<b>Medium Pressure Refrigerants</b>	180 psig (1,241 kPa)
		<b>Ammonia</b>	180 psig (1,241 kPa)
	<b>V243</b>	<b>High Pressure</b>	200 psig (1,379 kPa)
<b>Maximum Water Supply Temperature</b>			160°F (71°C)
<b>Valve Body Material</b>		<b>Commercial</b>	Cast Iron
		<b>Maritime</b>	Red Brass
<b>Internal Parts Material</b>		<b>Commercial</b>	Brass
		<b>Maritime</b>	Bronze, Monel
<b>Seat Material</b>		<b>Pilot</b>	Monel
		<b>Main Valve</b>	Commercial – Bronze, Maritime – Monel
<b>Seat Disc Material</b>			Buna N™
<b>Packing – Bellows Assembly</b>			Brass Stem, Stainless Steel Spring, Synthetic Rubber Boot
<b>Pressure Connection Refrigerant Side</b>		<b>Non-corrosive</b>	1/4 in. SAE Male Flare
		<b>Ammonia</b>	1/4 in. FNPT

1. Factory setpoint for the valve is adjustable.

*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 shall not be liable for damages resulting from misapplication or misuse of its products.*



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