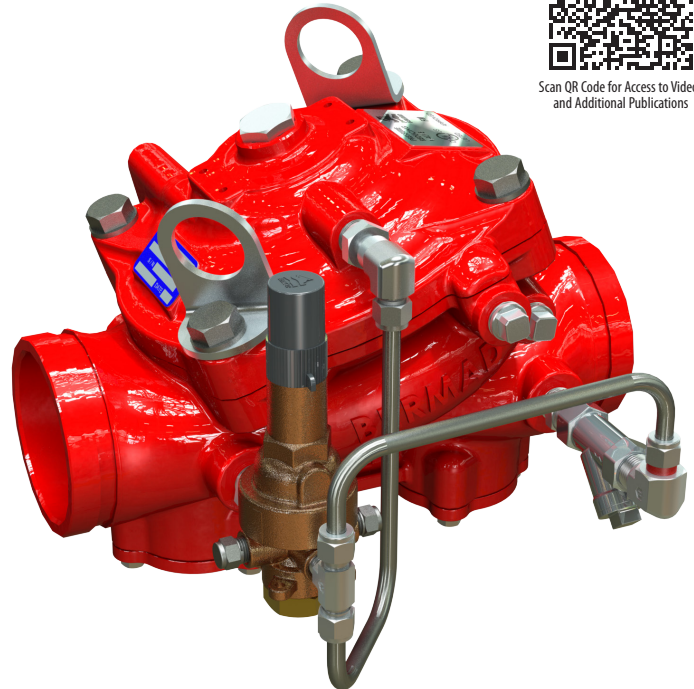


867-42T-20 Pilot Operated, Pressure-Reducing Valve

KEEP THESE INSTRUCTIONS WITH THE INSTALLED VALVE FOR FUTURE REFERENCE



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⚠ WARNING



- Read and understand all instructions before attempting to install any Victaulic products.
 - Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
 - Wear safety glasses, hardhat, and foot protection.
- Failure to follow these instructions could result in death or serious personal injury and property damage.

- The 867-42T-20 Pilot Operated, Pressure-Reducing Valve shall be used only in fire protection systems that are designed and installed in accordance with current, applicable National Fire Protection Association (NFPA 13, 13R, 14, etc.) standards, or equivalent standards, and in accordance with applicable building and fire codes. These standards and codes contain important information regarding protection of systems from freezing temperatures, corrosion, mechanical damage, etc.
 - These installation instructions are intended for an experienced, trained installer. The installer shall understand the use of this product and why it was specified for the particular application.
 - The installer shall understand common industry safety standards and potential consequences of improper product installation.
- Failure to follow installation requirements and local and national codes and standards could compromise system integrity or cause system failure, resulting in death or serious personal injury and property damage.

TABLE OF CONTENTS

Hazard Identification 1
Safety Instructions 2
Introduction 2
Pressure and Flow Ratings 3
Head Loss 3
Installation 4
Operation 5
 Startup 6
 Readjusting 6
Maintenance And Inspection Tests 7
 Weekly Inspection 7
 Monthly Inspection And Test 7
Troubleshooting 7
Difficulty In Performance 7

HAZARD IDENTIFICATION

Definitions for identifying the various hazard levels are provided below.



This safety alert symbol indicates important safety messages. When you see this symbol, be alert to the possibility of personal injury. Carefully read and fully understand the message that follows.

DANGER

- The use of the word “DANGER” identifies an immediate hazard with a likelihood of death or serious personal injury if instructions, including recommended precautions, are not followed.

WARNING

- The use of the word “WARNING” identifies the presence of hazards or unsafe practices that could result in death or serious personal injury if instructions, including recommended precautions, are not followed.



CAUTION

- The use of the word “CAUTION” identifies possible hazards or unsafe practices that could result in personal injury and product or property damage if instructions, including recommended precautions, are not followed.

NOTICE

- The use of the word “NOTICE” identifies special instructions that are important but not related to hazards.

SAFETY INSTRUCTIONS

 WARNING	
	<ul style="list-style-type: none"> • An experienced, trained installer shall install this product in accordance with all instructions. These instructions contain important information. • Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
	<p>Failure to follow these instructions can cause product failure, resulting in death or serious personal injury and property damage.</p>

- 1. Read and understand all instructions before proceeding with the installation, operation, and maintenance of this valve.** For proper operation and approval, the 867-42T-20 valve and accessories shall be installed in accordance with the specific instructions included with the shipment.
- 2. Use only recommended accessories.** Accessories and equipment that are not approved for use with this valve may cause improper system operation.
- 3. Wear safety glasses, hardhat, foot protection, and hearing protection.** Wear hearing protection if you are exposed to long periods of noisy jobsite operations.
- 4. Prevent back injury.** Large and pre-trimmed valves are heavy and require more than one person (or mechanical lifting equipment) to position and install the assembly. Always practice proper lifting techniques.
- 5. Avoid using electrically powered tools in dangerous environments.** When using electrically powered tools for installation, ensure that the area is moisture-free. Keep the work area well lit, and allow enough space to accommodate proper installation of the valve, trim, and accessories.
- 6. Watch for pinch points.** Do not place fingers under the valve body where they could be pinched by the weight of the valve. Use caution around spring-loaded components.
- 7. Keep work areas clean.** Cluttered areas, benches, and slippery floors can create hazardous working conditions.

INTRODUCTION

NOTICE
<ul style="list-style-type: none"> • Drawings and/or pictures in this manual may be exaggerated for clarity. • The valve, along with this operating and maintenance manual, contains trademarks, copyrights, and/or patented features that are the exclusive property of Victaulic.

The 867-42T-20 is an elastomeric, hydraulically-operated, self-actuated, automatic pressure control valve with a check valve feature. This valve is designed for fire protection systems in accordance with NFPA 13.

This valve may be specified for pressure reducing (integrated with a check valve) or as a fire pump surge control valve, and it can reduce a high upstream pressure to a low and stable designed system pressure. The check valve feature makes this valve suitable for fire system pressure control between floors in high-rise buildings.

As a fire pump surge control valve, the 867-42T-20 will prevent pump water surge pressure spikes that are typically caused by accelerated water flow during fire pump startup. In addition, this valve will reduce pump start negative suction pressure, which helps prevent pump cavitation damage.

In fire pump discharge pressure control applications, the 867-42T-20 may be specified due to its actuation capabilities and low head loss.

PRESSURE AND FLOW RATINGS

The 867-42T-20 is rated for the following pressure and flow capacities detailed in Table 1. **NOTE:** Contact Victaulic if the system has differential greater than 175 psi/12 Bar.

Table 1: Pressure Ratings

Nominal Valve Size inches/DN	1 ½ DN40	2 DN50	2 ½	3 DN80	4 DN100	6 DN150	8 DN200	10 DN250
UL Max. Inlet Pressure psi/Bar	400 28	400 28	400 28	365 25	365 25	365 25	365 25	365 25
FM Max. Inlet Pressure psi/Bar	365 25	365 25	365 25	365 25	365 25	365 25	365 25	365 25
UL Outlet Pressure Setting Range psi/Bar	60–220 4–15	60–220 4–15	60–220 4–15	60–175 4–12	60–175 4–12	60–175 4–12	60–175 4–12	60–175 4–12
FM Outlet Pressure Setting Range psi/Bar	30–235 2–16	30–235 2–16	30–235 2–16	30–235 2–16	30–235 2–16	30–235 2–16	30–235 2–16	30–235 2–16
Pilot Valve Model	2-PB	2-PB	2-PB	2-PB	2-PB	2-PB	2-UL/ 2-PBL	2-UL/ 2-PBL
Reference for Pressure Relief Valve Size inches/mm	¾ 20	¾ 20	¾ 20	1 ½ 40	2 50	3 80	3 80	4 100

To maintain FM Approvals, a ½-inch/15-mm minimum size pressure relief shall be provided downstream. Per NFPA 14, the relief valve shall be sized per the manufacturer’s specifications.

NOTE: For single-point pressure relief, reference pressure relief valve size (inches/mm) in Table 1 above.

HEAD LOSS

The minimum ΔP across the valve is 5.8 psi/0.4 Bar. In cases where the inlet pressure falls below or is equal to the intended outlet pressure, the outlet pressure shall be determined according to Table 2: Frictional Resistance.

In the case of zero (static) flow through the valve, the maximum increase in the downstream (outlet) pressure above the set pressure of the valve will not exceed 7.2 psi/0.5 Bar.

Table 2: Frictional Resistance

Nominal Valve Size inches/DN	Actual Pipe Outside Diameter inches/mm	Full Open Flow Coefficient C _v /K _v	Equivalent Length of Pipe feet/meters
1 ½ DN40	1.900 48.3	79 68	7 2
2 DN50	2.375 60.3	92 80	16 5
2 ½	2.875 73.0	116 100	28 9
3 DN80	3.500 88.9	219 190	23 7
4 DN100	4.500 114.3	398 345	30 9
6 DN150	6.625 168.3	912 790	49 15
8 DN200	8.625 219.1	1160 1160	89 27
10 DN250	10.750 273.0	1662 1355	203 62

Note 1: Valve Equivalent Length Value (Steel Pipe), for use in hydraulically calculated system

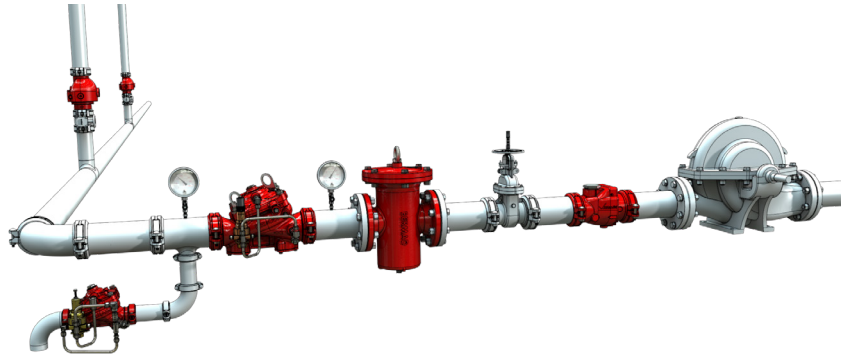
INSTALLATION

A typical installation of the 867-42T-20 features a pilot valve for the reduction of water pressure from a high upstream value to a preset lower downstream value, regardless of fluctuating upstream pressure or flow. The actuator design ensures quick and smooth valve action.

Installed singly, the 867-42T-20 provides a standard pressure-reducing system. Installed in parallel, two 867-42T-20 valves provide high flow rates, redundancy, and zero downtime for maintenance. Installed in series, two 867-42T-20 valves provide a two-stage, high reduction in pressure and/or added protection to a reduced-pressure zone.

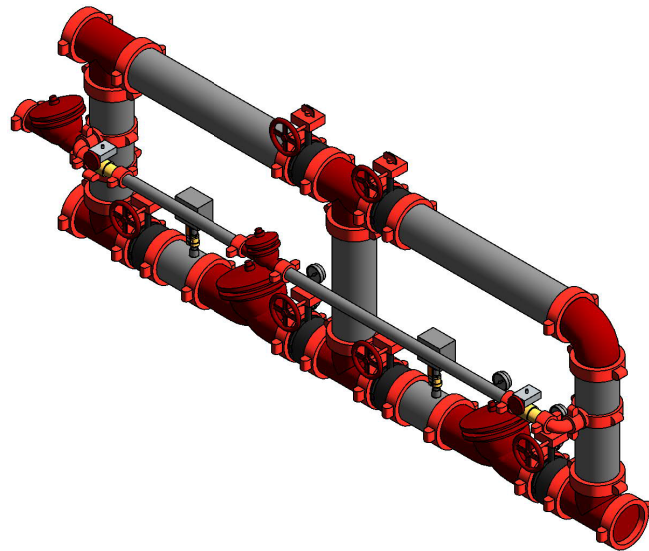
Sprinkler System Pressure Reduction

- Reduces a high, unstable pressure supply to a preset, stable system pressure
- Sets the sprinkler pressure to suit the system design
- For pressure control of zones



Standpipe and Combined Sprinkler Pressure Reduction

- Reduces a higher incoming pressure to a lower working pressure to support a private fire hydrant system being supplied by a building fire pump
- Limits fire hose pressure to meet NFPA 14 requirements for maximum allowable hose pressure supply



Two-Stage Pressure Reduction

- High pressure reduction to a low, preset, stable system pressure (when required pressure reduction differential is more than 175 psi/12 Bar)
- Provides a lower working pressure downstream of a high-pressure fire pump

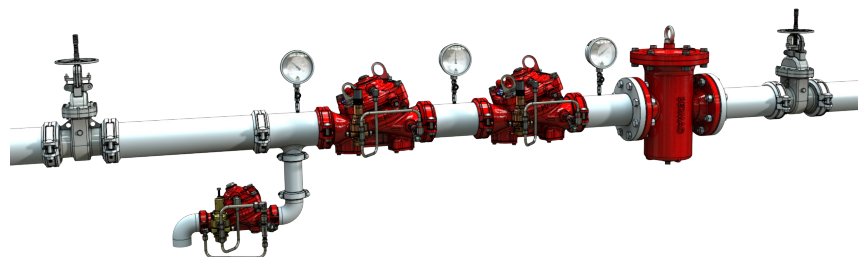


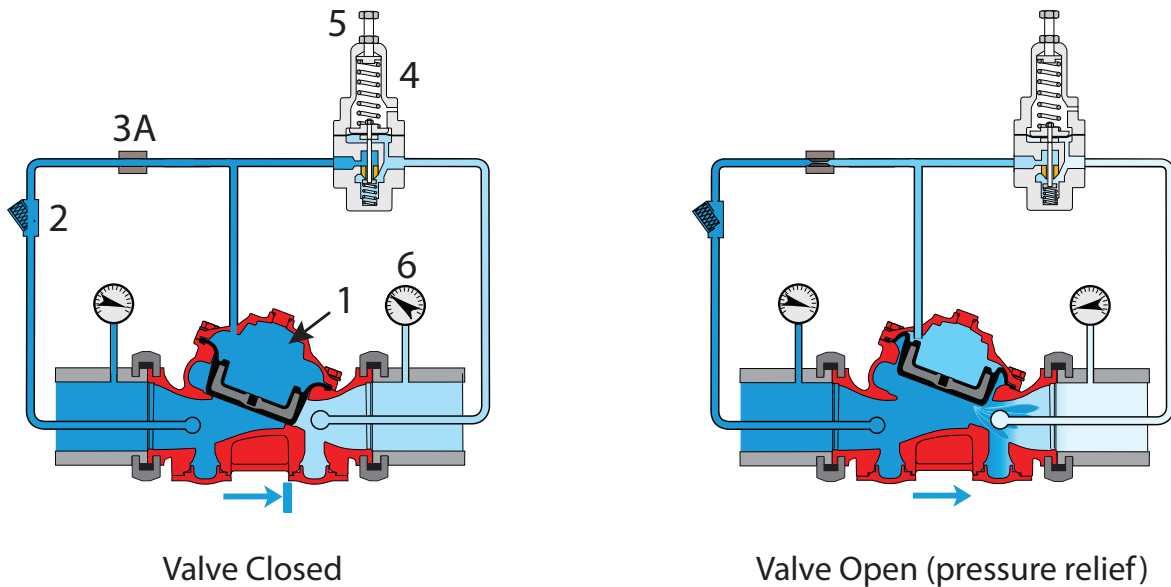
Figure 1 Installation Drawings

OPERATION

The 867-42T-20 reduces water pressure from a high inlet pressure to a lower, pre-set outlet pressure. The outlet set pressure can be adjusted with the pilot valve adjusting screw (Figure 2, call out 5). The valve operates under both flow and static conditions. The pressure-reducing pilot valve (Figure 2, call out 4) senses changes in outlet pressure (Figure 2, call out 6) and modulates the control valve to maintain the pre-set outlet pressure.

When outlet pressure rises above the pre-set pressure, the pilot valve throttles, enabling pressure to accumulate in the control chamber (Figure 2, call out 1). This causes the control valve to close further and reduce outlet pressure. When outlet pressure falls, the pilot valve opens wider, releasing pressure from the control chamber. This causes the control valve to open wider and increase outlet pressure. An integral restrictor (Figure 2, call out 3A) controls the valve's closing speed. For 8-inch/DN200 and larger size valves, an adjustable needle valve (Figure 2, call out 3B) is provided.

6-inch/DN150 and Smaller Valve Sizes



8-inch/DN200 and Smaller Valve Sizes

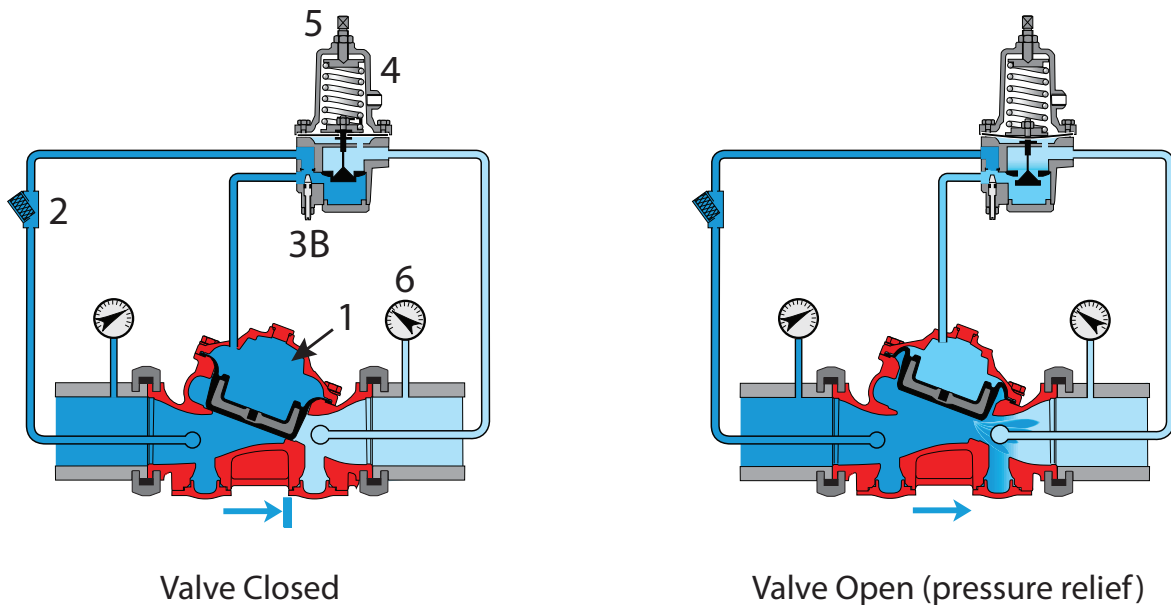


Figure 2 Operation Drawings

STARTUP

When performing this procedure, refer to Figure 2.

1. Open downstream appurtenance device(s), creating a flow equal to the greatest system demand.
2. Fully open upstream indicating valve.
3. Gradually open downstream indicating valve to fully open, allowing flow through the 867-42T-20.
4. Verify flow and pressure meet system demand. (if pressure or GPM for design criteria are not met, follow the “Readjusting” section below).
5. Slowly close the downstream appurtenance device(s).
6. There shall be no system flow. The downstream pressure shall be between the set pressure and the relief valve set point.
7. Acceptance testing shall be completed per local code requirements.

READJUSTING

The pilot valve is factory set at 90 psi/6 Bar, per the label on the pilot valve. To readjust for system requirements, follow the steps below.

The pre-set is clearly indicated on the pilot valve tag. If readjustment to either the pressure or valve response is required, perform the following steps.

1. When readjusting the outlet pressure, the inlet pressure should be at least 20 psi/1.4 Bar higher than the set outlet pressure. Where this is not possible, contact Victaulic.
2. The flow rate during adjustment shall be as close as possible to the systems design flow rate. Where this is not possible, at least a minimal flow is essential.
3. Free the tension between the adjusting screw on the pressure reducing pilot valve (Figure 2, call out 4) and the fastening nut by turning the fastening nut counterclockwise.
4. By alternately turning the adjusting screw on the pilot valve a half turn and then reading the downstream pressure, gradually adjust the pressure counterclockwise to decrease the downstream pressure, or clockwise to increase the downstream pressure.
5. Repeat the “Startup” procedure above.

CAUTION: If needle valve is furnished (optional), changes in the adjustment of the needle valve will have impact on the valve performance. The needle valve is factory set at one-half turn open to one and one-half turn open. The maximum number of turns is three from fully closed to fully open. More than three turns open may cause the valve to perform less than optimally. Perform step 5 of the “Startup” section with this in mind.

TROUBLESHOOTING

Problem	Possible Cause	Solution
Valve fails to regulate.	Needle valve not properly adjusted.	Factory set at ½ or 1½ open. Adjust.
	Pulsates or hunts.	Slowly adjust needle valve until pulsation stops.
	Air trapped in main valve cover.	Loosen cover tube fitting at the highest point, allow the air to escape, and re-tighten.
	Filter screen blocked.	Remove filter’s cap and screen to clean. Filter might be insufficient. See note below this table.
Valve fails to open.	Insufficient inlet pressure.	Check/create inlet pressure.
	Pilot is adjusted too high.	Turn adjusting screw CCW on pilot.
Valve fails to seal inlet pressure.	Filter screen blocked.	Remove filter’s cap and screen to clean. Filter might be insufficient. See note below this table.
	Debris trapped in main valve.	Remove and inspect actuator assembly. Check seat. Check for foreign bodies. Rinse at high flow rate.
	Diaphragm in main valve is leaking.	Open the valve cover and inspect diaphragm. If damaged, replace.
	Diaphragm in pilot valve is leaking.	

NOTE: Mark “F” – Large Filter

In cases where the filter screen frequently becomes blocked, install a filter with filtration capacity of at least 80 mesh/250 µm.

MAINTENANCE AND INSPECTION TESTS

NOTICE
<ul style="list-style-type: none"> • Any activities that require taking the valve out of service may eliminate the fire protection provided. • Consideration of a fire patrol shall be given for the affected areas. • Before servicing or testing the system, notify the authority having jurisdiction.

Prior to turning off any valves or activating any alarms, notify local security guards and the central alarm station, if used, so that a false alarm will not be signaled.

In any of the following inspections or testing procedures, or if an abnormal condition exists, refer to the “Troubleshooting” section for possible cause and corrective action.

The 867-42T-20 shall be inspected, tested, and maintained in accordance with NFPA 25, along with the requirements listed in this manual.

WEEKLY INSPECTION

Refer to NFPA 25, FM Datasheets, or any applicable local requirements to perform inspections. The authority having jurisdiction in the area may require these inspections on a more frequent basis. Verify these requirements by contacting the authority having jurisdiction in the affected area.

1. The system shall be inspected under flow conditions.
2. Check that the main valve, pilot system, accessories, tubing, and fittings are all in good condition, are free of damage, and are not leaking.
3. The fastening nut of the pilot valve adjusting screw (Figure 2, call out 5) shall be fastened tightly.
4. Verify that the pressure upstream of the relief valve fittings in the fire pump discharge piping does not exceed the pressure for which the system components are rated.

MONTHLY INSPECTION AND TEST

1. Complete all steps in the “Weekly Inspection” section above.
2. During the monthly fire pump flow test, verify that the pressure relief valve is correctly set to relieve at the appropriate pressure and to close below the pressure setting.

DIFFICULTY IN PERFORMANCE

When difficulty in performance is experienced, contact Victaulic or an authorized representative to determine if any field adjustment is required.

867-42T-20 Pilot Operated, Pressure-Reducing Valve

For complete contact information, visit victaulic.com

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