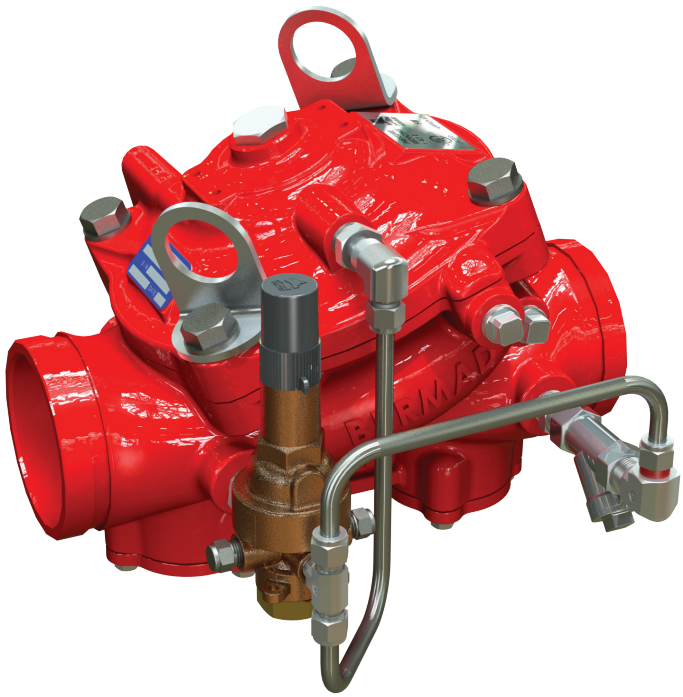
867-42T Pressure Reducing Valve

HANG THESE INSTRUCTIONS ON THE
INSTALLED VALVE FOR FUTURE REFERENCE



⚠ WARNING

- Read and understand all instructions before attempting to install, remove, adjust, or perform maintenance on any Victaulic piping products.
- Depressurize and drain piping systems before attempting to install, remove, adjust, or perform maintenance on any Victaulic piping products.
- Wear safety glasses, hardhat, and foot protection.
- Save this installation, operation, and maintenance manual for future reference.

Failure to follow instructions and warnings could cause system failure, resulting in death or serious personal injury and property damage.

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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

- **An experienced, trained installer must install this product in accordance with all instructions. These instructions contain important information.**
- **Depressurize and drain the piping system before attempting to install, remove, adjust, or maintain any Victaulic piping products.**

Failure to follow these instructions can cause product failure, resulting in death or serious personal injury and property damage.

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 valve and accessories must 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

- **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 is an elastomeric, line-pressure driven, pilot-operated pressure control valve that is designed for fire protection systems.

The 867-42T reduces high upstream pressure to a precise, preset, stable downstream pressure. The 867-42T is suitable for control of fire pump discharge. It is also suitable for preventing over-pressure in sprinklers, hose stations, and other discharge devices.

Valve sizes covered by this manual include 1.5 through 10 inches. Max recommended pressure differential: 175 psi (12 bar) when normal inlet operation pressure is below 330 psi/23 bar. Max recommended pressure differential: 200 psi (14 bar) when normal inlet operation pressure is above 330 psi/23 bar.

PRESSURE AND FLOW RATINGS

The 867-42T pressure reducing valve, sizes 1.5-, 2-, 2.5-, 3-, 4-, 6-, 8-, and 10-inch, are rated for the following pressure and flow capacities detailed in Table 1.

NOTE: Maximum flows below are at a differential of 175 psi (12 bar). Contact Victaulic if your system has greater than 175 psi differential.

Table 1: Pressure Ratings and Flow Capacity

Valve Size inches/mm	**1.5 40**	**2 50**	**3 80**	**4 100**	**6 150**	**8 200**	**10 250**
Max. inlet pressure psi/bar	365 25	365 25	365 25	365 25	365 25	365 25	365 25
Outlet pressure setting range psi/bar	30–175 2–12	30–175 2–12	30–175 2–12	30–175 2–12	30–175 2–12	30–175 2–12	30–175 2–12
Max. recommended flow GPM / m³/h	106 24	172 39	360 82	640 145	1450 330	2570 580	4000 910
Min. recommended flow GPM / m³/h	20 5	20 5	20 5	20 5	20 5	20 5	45 10
Pilot valve model	2-PB	2-PB	2-PB	2-PB	2-PB	2-UL/ 2-PBL	2-UL/ 2-PBL
Recommended relief valve in/mm	¾ 20	¾ 20	1 ½ 40	2 50	3 80	3 80	4 100

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

Valve Size		**Full Open**	**Equivalent Length of Pipe**
Nominal Size inches/DN	**Actual Ouside Diameter inches/mm**	**Flow Coefficient C_v/K_v**	**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

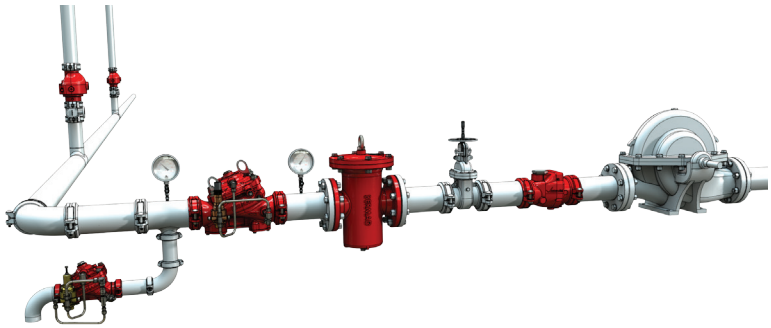
INSTALLATION

A typical installation of the 867-42T features a pilot valve for the automatic 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 provides a standard pressure-reducing system. Installed in parallel, two 867-42T valves provide high flow rates, redundancy, and zero downtime for maintenance. Installed in series, two 867-42T valves provide a two-stage, high reduction in pressure and/or added protection to a reduced-pressure zone.

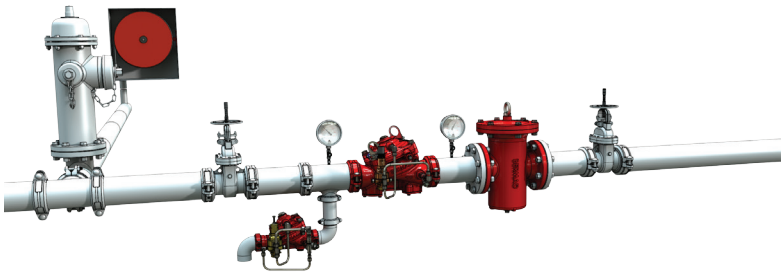
Sprinkler System Pressure Reduction

- 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



Hose System Pressure Reduction

- Reduces a high/unstable pressure supply to suit fire hose pressure
- Limits fire hose pressure to 100 psi/7 bar to meet NFPA 14 regulations 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)
- Backup pressure reducing valve in-line to a master valve to secure pressure zone rating at all times.

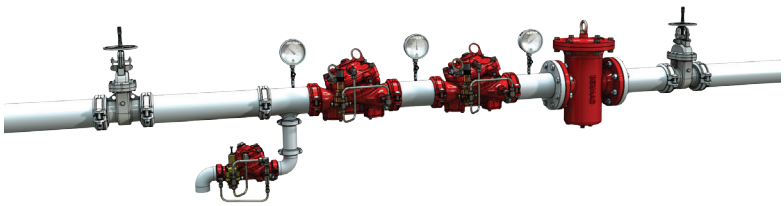


Figure 1 Installation Drawing

OPERATION

The 867-42T pressure control valve reduces water pressure automatically 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 valves 8 inches and larger, an adjustable needle valve (Figure 2, call out 3B) is provided.

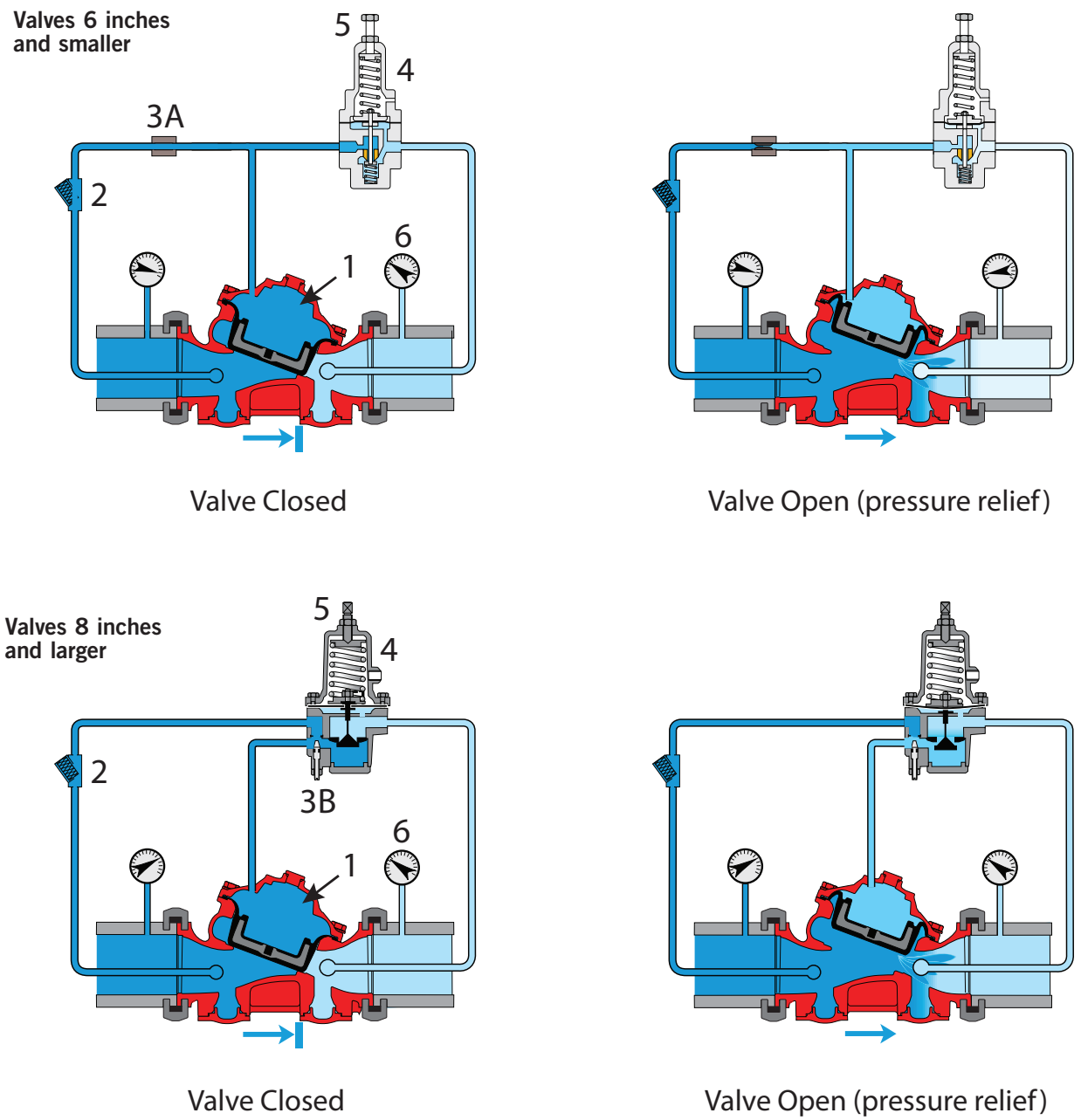


Figure 2 Operation Drawing

START UP

When performing this procedure, refer to Figure 2.

1. Open a hydrant, relief valve, drain valve, or other flow-consumer downstream of the 867-42T pressure reducing valve, creating a system demand.
2. Fully open upstream indicating valve.
3. Gradually open downstream indicating valve to fully open, allowing flow through the 867-42T valve.
4. Wait for downstream pressure stability.
5. Slowly close the flow-consumer that was opened in step #1 above to fully closed.
6. There should be no system flow; the downstream pressure should be between the factory the pre-set pressure and up to 10% different. Follow the readjusting procedure if needed to be changed.

READJUSTING

The pilot valve is factory pre-set according to the stated demands of the customer.

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.
2. The flow rate during adjustment should 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 start up procedure in the previous section.

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 3 from fully closed to fully open. More than 3 turns open might cause the valve to perform at less than optimal functioning. Perform Start Up step 5 with this in mind.

MAINTENANCE AND INSPECTION TESTS

NOTICE

- **Any activities that require taking the valve out of service may eliminate the fire protection provided.**
- **Consideration of a fire patrol should 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, if an abnormal condition exists, see the troubleshooting section for possible cause and corrective action.

The 867-42T valve is to be inspected, tested, and maintained in accordance with this manual and with NFPA 25.

WEEKLY INSPECTION

1. The system should 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) should be fastened tightly.
4. For circulation-type installations, verify that sufficient water is flowing through the valve when the fire pump is operating at shut-off pressure (churn) to prevent the pump from overheating.
5. 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 weekly inspection.
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.

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.
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.
	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.

DIFFICULTY IN PERFORMANCE

Where difficulty in performance is experienced, the manufacturer or an authorized representative should be contacted to determine if any field adjustment is to be made.

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