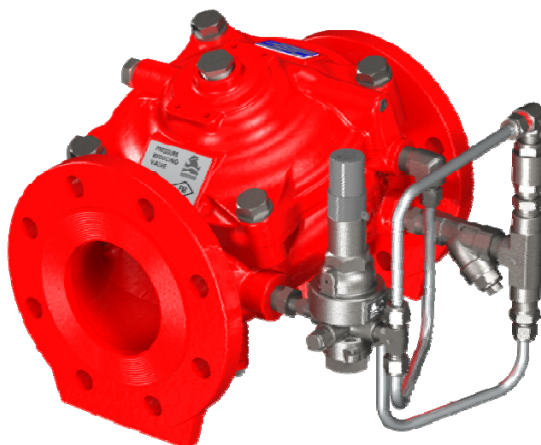


## Model: 43T

### Bermad Pressure Relief Valve



Installation

Operation

Maintenance

Manual (IOM)



## Model: 43T Pressure Relief Valve

### Safety First

BERMAD believes that the safety of personnel working with and around our equipment is the most important consideration. Please read all safety information below and from any other relevant source before attempting to perform any maintenance function.

Comply with all approved and established precautions for working with your type of equipment and/or environment.

Authorized personnel should perform all maintenance tasks.

Prior to performing a procedure, read it through to the end and understand it. If anything is not clear, ask the appropriate authority.

When performing a procedure, follow the steps in succession without omission"

### 1. Description

Bermad 43T Bermad Pressure- Relief Valve is a pilot-operated, diaphragm-actuated, straight-through flow type with low pressure-loss. It is an automatic pressure control high performance valve.

The Model 43T Pressure-Relief Valve reliably relieves excess system pressure to sump or atmosphere, meeting all NFPA, UL and FM requirements for fire pump service.

The Diaphragm Elastomeric design enables quick and smooth valve action. According to the inlet pressure, the pilot valve regulates the main valve throttling. This valve requires only existing line pressure to operate.

#### 1.1 Pressure and Flow ratings

1.1.1 Models and sizes covered by this document include the Bermad 43T Pressure-Relief Valve, sizes: 3", 4", 6", 8" and 10".

1.1.2 Sizing shall be not less than indicated in table 1.

**NOTE:** Maximum Differential pressure across the valve shall not accede 12 bar (175 psi) during flow discharge.

**Table 1: Relief Valve Sizing**

Sizing shall be not less than stated:

Maximum Pump Flow Capacity			Min. Relief Valve Size
GPM	m <sup>3</sup> /h	L/min	inch (mm)
500	114	1895	3" (80)
1000	227	3785	4" (100)
2500	568	9465	6" (150)
4000	908	15140	8" (200)
5700	1295	21580	10" (250)

1.1.3 The Bermad 43T Pressure-Relief Valves are rated to the maximum set pressure as followings:

- Class #150 / PN16: 4 – 15 bar (60 – 235 psi)
- Class #300 / PN25: 7 – 25 bar (100 – 365 psi)

**Table 2: Operating Pressure Rating and Pilot Valve Types:**

Valve Size inch (mm)	3" (80)	4" (100)	6" (150)	8" (200)	10" (250)
Class #150 / PN16 bar (psi)	3-PB-16 Pilot Valve Set Range: 4 – 15 (60 – 235)			3-UL-16 Pilot Valve Set Range: 4 – 15 (60 – 235)	
Class #300 / PN25 bar (psi)	3-PB-25 Pilot Valve Set Range: 8.6 – 25 (125 – 365)			3-UL-30 Pilot Valve Set Range: 8.6 – 25 (125 – 365)	

### Model: 43T Pressure Relief Valve

#### 1.2 Optional Features / Accessories

##### 1.2.1 Valve Position-Flow Indicator (code I)

This option provides the means for Visual Indicating of the Valve Position at all times, by detecting the motion of main the valve internal assembly. This feature must be ordered in advance and therefore not field retrofit-able.

This option provides the means for detecting motion of water through the valve according to requirements of NFPA 20. This item is field retro-fit able.

##### 1.2.2 Valve Position Limit Switch (code S or SS)

This option is recommended It is recommended to provide remote Valve Position Signal, it shall be assembled and installed according to instructions within it's package, consult Bermad if any field adjustment is to be made.

##### 1.2.3 Large Control Filter (code F)

This option provides extra capacity means for filtering of the water supplied to the control loop to achieve the essential level of debris free water. This feature is recommended for those cases where there is any doubt as to the level of particulate matter in the water.

#### 2. Approvals

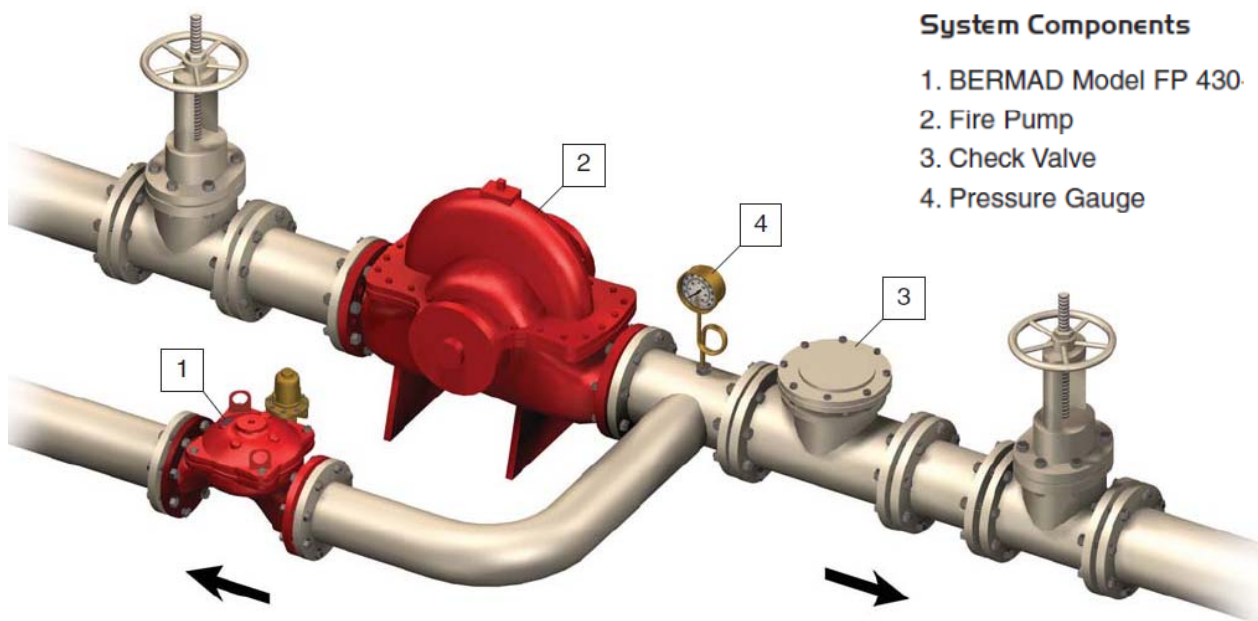
The Bermad 43T Pressure Relief Valve is UL Listed and FM Approved when. Refer to the current UL and/or FM fire protection equipment directory. Consult Bermad for any component approval recently to appear in any equipment directory.

#### 3. Installation

- 3.1 Before the valve is installed, flush the pipeline to remove any dirt, scale, debris, etc. Not flushing the line might result in the valve being rendered inoperable.
- 3.2 In cases where the valve is used for individual pump pressure-relief, locate the relief valve between the pump and the pump discharge check valve. It should be attached in a way that it can be readily removed for repairs without disturbing the piping.
- 3.3 Allow enough room around the valve assembly for any adjustments and future maintenance/disassembly work.
- 3.4 Install the valve in the pipeline with the valve flow arrow on the body casting in the proper direction. Use the lifting eye provided on the main valve cover for lifting and lowering the valve.
- 3.5 For best performance, install the valve horizontally with the cover up. However, other positions are acceptable. Ensure that the valve is positioned so that the actuator can be easily removed for future maintenance.
- 3.6 After installation, carefully inspect/correct any damaged accessories, piping, tubing, or fittings. Ensure that there are no leaks.

### Model: 43T Pressure Relief Valve

Figure 1: Installation Drawing

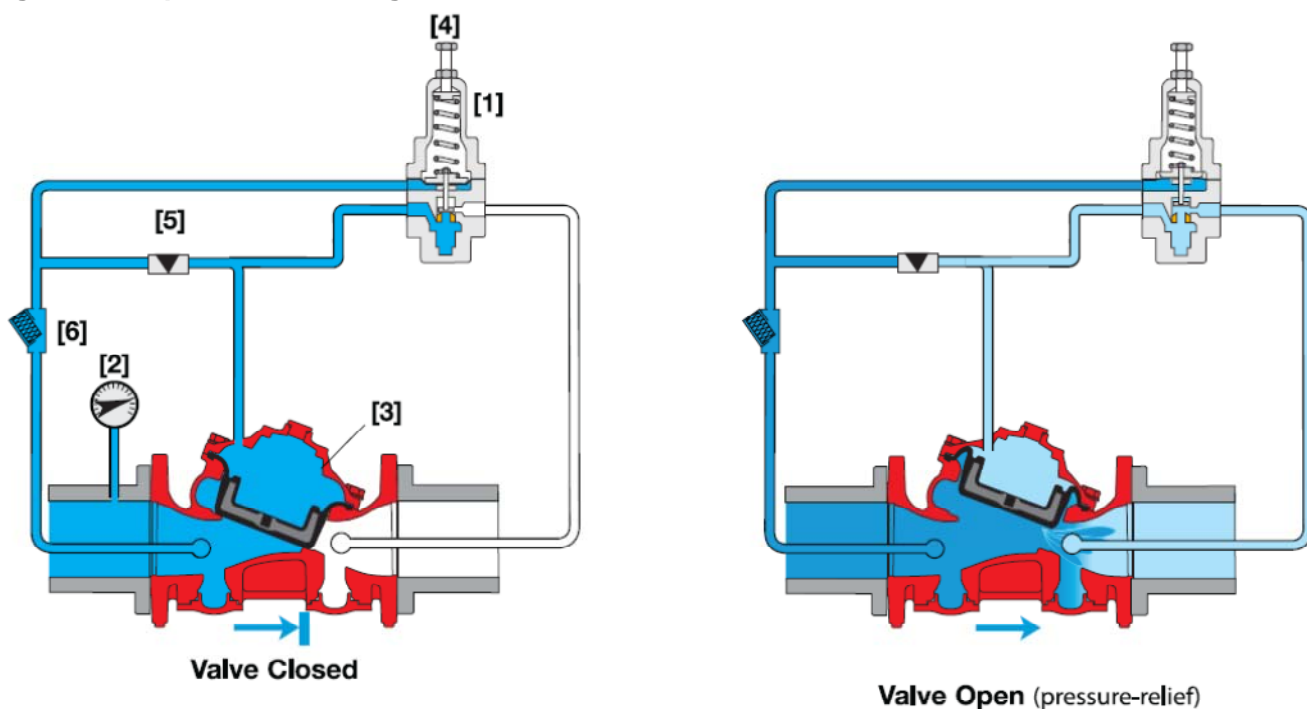


## 4. Operation

The Pressure-Relief Pilot Valve (#1, fig.2) senses inlet pressure and modulates the control chamber causing the main valve to throttle, thus sustaining constant inlet pressure. When the inlet pressure rises above the setting, the pilot valve opens pressure in the control-chamber decreases and the main valve modulates open to relieve inlet pressure and sustain pilot valve setting.

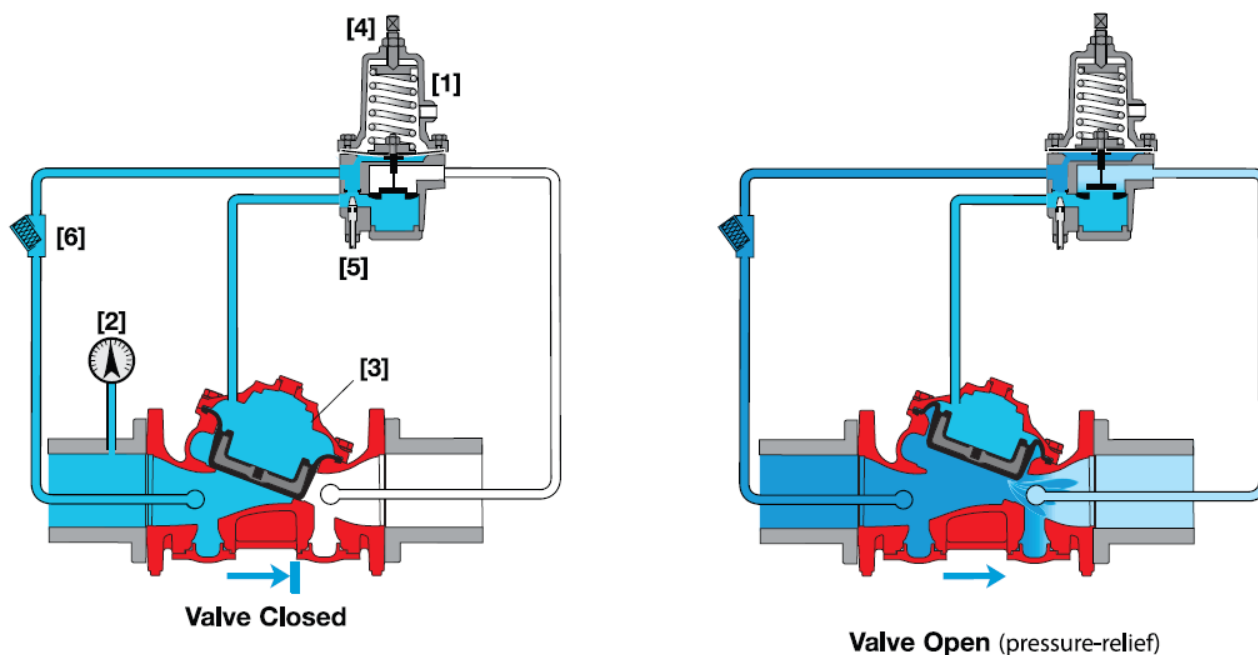
The pressure-relief pilot valve is equipped with an adjusting screw (#4, fig.2) to preset the desired inlet pressure.

Figure 2A: Operation Drawing for Size 3, 4 and 6"



## Model: 43T Pressure Relief Valve

Figure 2B: Operation Drawing for Size 8 and 10"



### Starting –up

- 4.1 Provide pump shut-off pressure to the 43T Pressure-Relief Valve inlet, allow no system demand.
- 4.2 Create sufficient pressure (higher than the valve set pressure) to allow flow through the relief valve.
- 4.3 While relief valve is operating, wait for the valve inlet pressure to stabilize.  
The pressure on the inlet side of the relief valve should be according to the factory pre-set adjusted pressure.
- 4.4 Slowly allow system flow so that system pressure falls below the relief-valve adjusted pressure.  
The relief-valve should slowly shut to drip-tight.

### Readjusting

Tools required:

- Flat head screwdriver
- Adjustable wrench

The pilot valve is factory pre-set. The pre-set is clearly indicated on the pilot valve data-plate.

If readjustment to either the pressure or valve response is required, follow the following steps.

- 4.5 Ensure that there is nominal flow through the relief-valve.
- 4.6 Release the tension between the adjusting screw on the pressure-relief pilot valve and the fastening nut by turning the fastening nut counterclockwise.
- 4.7 By alternately turning the adjusting screw (#4, fig.2) on the pilot valve (#3, fig.2) a half turn and then reading the outlet pressure, gradually adjust the pressure:

Counterclockwise to decrease (-) the inlet pressure  
or Clockwise to increase (+) the inlet pressure.

**NOTE:** Valve response adjustment affects pre-set pressure. Any adjustment to valve response requires rechecking pre-set pressure, see steps 4.1 – 4.4.

- 4.8 Repeat the Starting-up procedure, sections 4.1 – 4.4.



### Model: 43T Pressure Relief Valve

- 4.9 Valve size 8" and 10" are equipped with adjustable needle valve to allow presetting of the valve closing speed. By turning the needle valve screw (#5, fig.2B) on the pilot valve bottom, adjust the valve response. Turn:

Clockwise (while facing the screw) to decrease (-) the closing speed of the main valve  
or  
Counterclockwise to increase (+) the closing speed of the main valve.

Repeat the Starting-up procedure, sections 4.1 – 4.4.

## 5 Maintenance and Inspection Test

Warning: Do not turn off the water supply, to make repairs, without notifying local security guards or firefighting officials.

- 5.1 In any of the following inspections or testing procedures, if an abnormal condition exists, see Troubleshooting for possible cause and corrective action.
- 5.2 The 43T valve is to be inspected, tested and maintained in accordance with the Maintenance Instructions of the plant, this Maintenance Manual, as well as the Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems, NFPA 25.

## 6 Weekly Inspection

- 6.1 The system should be inspected under flow conditions.
- 6.2 Check that the main valve, pilot system, accessories, tubing & fittings, are all in good condition, damage free and not leaking.
- 6.3 The fastening nut, of the pilot valve (3 in fig.2) adjusting screw, should be fastened tightly.
- 6.4 For circulation type installations, verify that sufficient water flows through the valve when fire pump is operating at shut-off pressure (churn) to prevent the pump from overheating.
- 6.5 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.

## 7 Monthly Inspection and Test

- 7.1 Complete Weekly Inspection.
- 7.2 During the monthly fire pump flow test, verify that the pressure relief valve is correctly adjusted and set to relieve at the appropriate pressure and closes below the pressure setting.

### Model: 43T Pressure Relief Valve

## 8 Five-Years Inspection and Test

- 8.1 Complete Weekly and Monthly inspections.
- 8.2 Place the system out of service (See "Removing the System from Service" above).
- 8.3 The interior of the Control Valve should be cleaned and inspected.
- 8.4 The Elastomeric Diaphragm Assembly shall be inspected for wear, and shall be replaced with a new Diaphragm.
- 8.5 Place the system back in service. (See instructions "Placing the System in Service").
- 8.6 The valve and the pilot system must be activated at full flow.
- 8.7 Take all additional measures as required by NFPA-25 "Standard for the Inspection Testing and Maintenance of Water-Based Fire Protection Systems."

## 9 Abnormal Conditions – Troubleshooting

SYMPTOM	PROBABLE CAUSE	REMEDY
Valve fails to regulate	Filter screen (#6, fig.2) blocked.	Remove filter cap and screen to clean. Filter might be insufficient. See Note below.
	Pulsates or hunts.	Slowly adjust needle valve (#5,fig.2) until pulsation stops.
	Needle valve (#5, fig.2) not properly adjusted.	Factory set at ½ or 1½ open. Adjust.
	Air trapped in main valve cover.	Loosen cover tube fitting at the highest point, allow the air to escape and re-tighten.
Valve fails to open	Insufficient inlet pressure.	Check/create inlet pressure.
	Pilot is adjusted to high.	Turn adjusting screw CCW on pilot (4 in fig.2).
Valve fails to seal inlet pressure	Filter screen (6 in fig.2) blocked.	Remove filter cap and screen to clean. Filter might be insufficient. See Note below.
	Debris trapped in main valve.	Remove and inspect actuator assembly. Check seat and disc seal. Check for foreign bodies. Rinse at high flow-rate.
	Diaphragm in main valve is leaking.	Open the valve cover, inspect diaphragm.
	Diaphragm in pilot valve is leaking.	If damaged, replace.

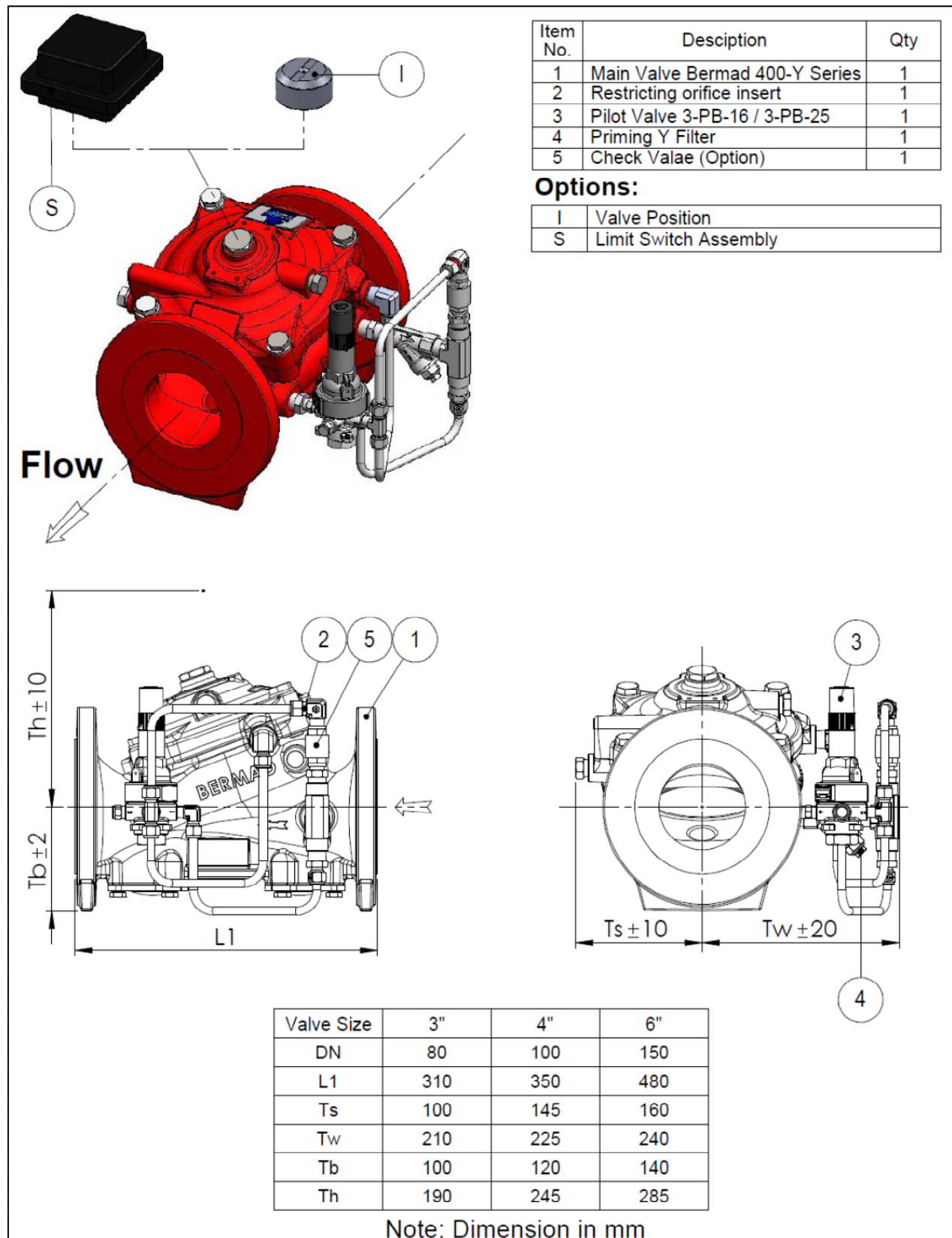
### Note - Large Capacity Filter where the filter screen frequently becomes blocked:

In cases where the filter screen frequently becomes blocked, it is recommend replacing the standard filter with BERMAD's Large Filter Mark "F" (see paragraph 1.2.3).

### Model: 43T Pressure Relief Valve

#### 10 General Arrangement (GA) & Outline Dimension Drawings

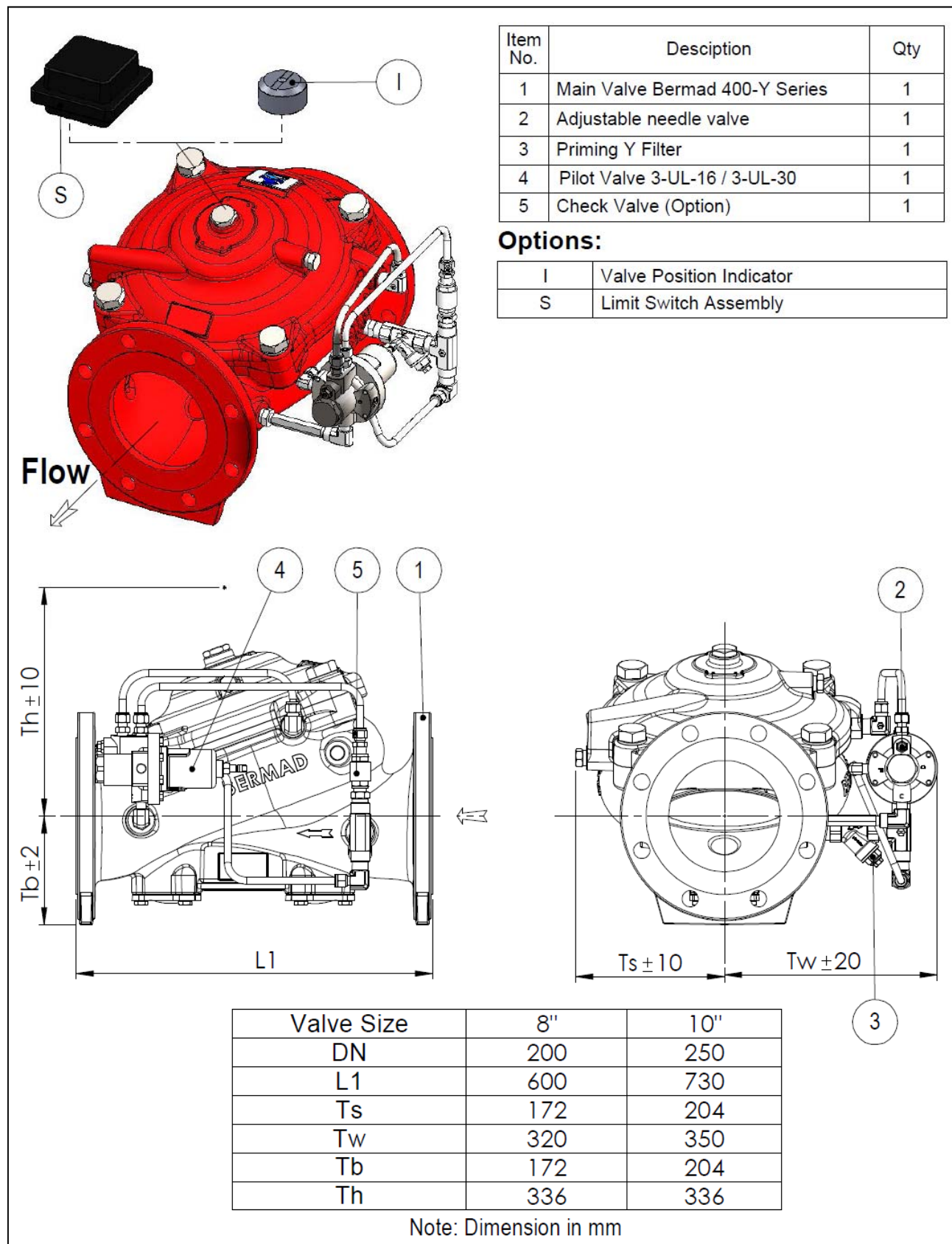
Figure 3A: GA Drawing for Size 3 - 6"





### Model: 43T Pressure Relief Valve

Figure 3B: GA Drawing for Size 8 - 10"



### Model: 43T Pressure Relief Valve

**Table 3: Discharge Chart**

Inlet Pressure as Function of Discharge Flow Capacity

