

Bermad Pneumatically Controlled On Off Deluge Valve

Model: 400E-4D



**INSTALLATION
OPERATION
MAINTENANCE**

**Application Engineering
BERMAD**

1. 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.

2. Description

Bermad Pneumatically controlled Deluge valve (1 fig.1) requires a pneumatic release system, equipped with thermostatic releases, and/or fixed temperature releases and pneumatic pressure supply system.

The Type 4 trim may also use a hydraulic release system with thermostatic releases and/or fixed temperature releases.

The specific trim for the pneumatically controlled Deluge Valve Type 4 includes a PORV Pneumatic Actuator (6B fig.1), normally held closed by pressure maintained in the pneumatic release system, and a Manual Emergency Release (15B fig.1).

In fire conditions the pneumatic pressure drops, causing the PORV to open, releasing trapped water pressure from the top chamber and opening the Deluge Valve, allowing water to enter the system piping.

The releasing device in the hydraulic release system holds the pressure in the top chamber of the Deluge Valve. The opening of the device in a fire condition releases trapped water pressure from the top chamber and opens the Deluge Valve. Water will flow from any open sprinklers and/or spray nozzles on the system.

In emergency the system can be activated by pulling the manual release handle.

Deluge systems are commonly used where, in time of fire, it is necessary to simultaneously spray water from all open sprinklers and/or nozzles on the system.

Note

A regulated supply of pressurized gas (air or nitrogen) is required. See section "Reset the system" below concerning air supplies for release system.

3. Australian Standard SSL

BERMAD 400E-4D Deluge Valve is Australian Standard SSL when installed with specific components & accessories.

4. Installation

Subject to all other instructions, drawings and technical specifications which describe Bermad 400E-4D Deluge Valve, install in their proper positions the components comprising the Deluge Trim Package, according to the drawing relevant to the specific type, hereby enclosed.

Install also the additional accessories, which appear in the drawing and which must be installed as shown in the drawing, although they are not packed together with the Bermad Deluge Valve itself.

Any deviation in trim size or arrangement may adversely affect the proper operation of the Deluge Valve.

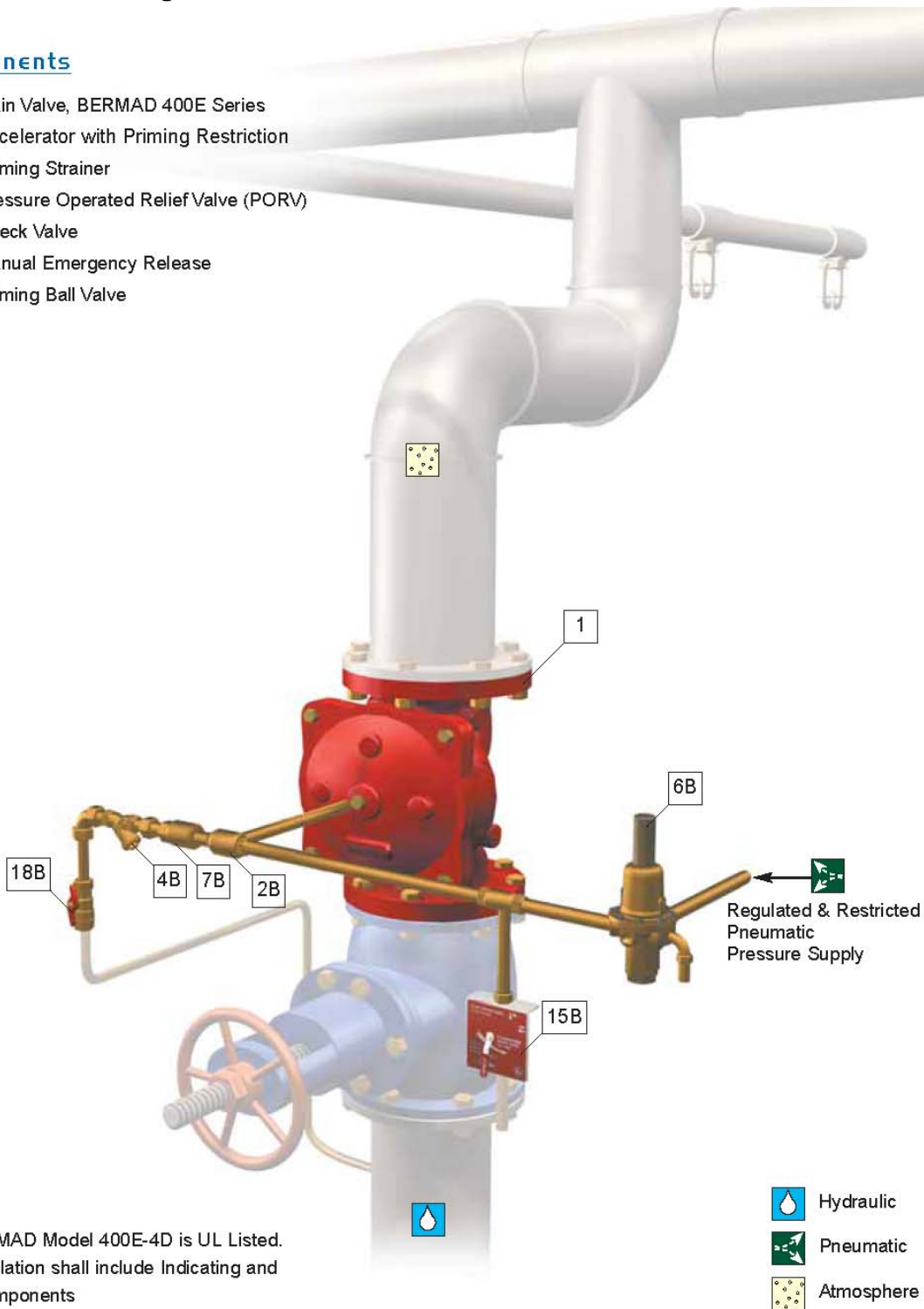
Refer also to NFPA 13 or the applicable installation standards, codes and relevant authorities.

- 4.1. Allow enough room around the valve assembly for any adjustments and future maintenance/disassembly work.
- 4.2. Before the valve is installed, flush the pipeline to remove any dirt, scale, debris, etc. Failure to do this might render the valve inoperable.
- 4.3. Listed indicating valves should be installed upstream and downstream of the BERMAD 400E-4D Deluge Valve in such a way to allow for future maintenance.
- 4.4. 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.
- 4.5. BERMAD 400E-4D Deluge Valve is intended for horizontal or vertical installation. Ensure that the valve is positioned so that the actuator can be easily removed for future maintenance.
- 4.6. Install also the additional accessories, which appear in the drawing and which must be installed as shown in the schematic drawing.
- 4.7. When using a Pressure control switch, connect the Pressure Control Switch to the Electric Control System and the Control Panel according to the supplied Electrical Wiring Diagram
- 4.8. After installation, carefully inspect/correct any damaged accessories, piping, tubing, or fittings.
- 4.9. Any deviation in trim size or arrangement, which is not performed by a representative of BERMAD, may adversely affect the proper operation of the Deluge Valve. Refer also to NFPA 13 or the applicable installation standards, codes or relevant authorities.
- 4.10. The Deluge Valve and trim must be installed only in areas where they will not be subjected to freezing temperatures.
- 4.11. All initiating devices (detectors) and indicating appliances, as well as the system control panel, must be compatible for use with the particular Deluge System.

Figure 1: Installation Drawing

Components

- 1 - Main Valve, BERMAD 400E Series
- 2B - Accelerator with Priming Restriction
- 4B - Priming Strainer
- 6B - Pressure Operated Relief Valve (PORV)
- 7B - Check Valve
- 15B - Manual Emergency Release
- 18B - Priming Ball Valve



Note
 The BERMAD Model 400E-4D is UL Listed.
 The installation shall include Indicating and Drain Components

5. Equivalent Length

Deluge Valve Equivalent Length Value (Steel Pipe), for use in hydraulically calculated systems

Valve Size	Equivalent Length Value Meter (Ft)
2"	9.1 (30) of 2" pipe
2½"	12.1 (40) of 2½" pipe
3"	13.7 (45) of 3" pipe
4"	14 (46) of 4" pipe
6"	27.4 (90) of 6" pipe
8"	45.7 (150) of 8" pipe

6. Optional Equipment

If required, order a pressure switch to either activate an electric alarm, or shut down desired equipment.

7. Placing in Service/Resetting the System

- 7.1 Check the entire release system for leaks. Replace any fused thermostatic release, fixed-temperature-release heads. Check the emergency release.
- 7.2 Make certain release handle is returned to the CLOSED position.
- 7.3 Operate pneumatic pressure supply system, allowing release system pressure to build up to a range of 20 to 30 psi (1.4 barg to 2.0 barg). Check the entire system for leaks.
Note: Any automatic air or nitrogen pressure supply must feed the system through an orifice restriction. If a low air pressure alarm is utilized, test it by dropping the release line pressure. Restore pressure after the test.
- 7.4 Open the priming-line valve (18B fig.1) and allow pressurized water to fill the top chamber of the Deluge Valve.
- 7.5 When the top chamber pressure gauge indicates full service-line pressure and pressure is no longer rising, open the main control valve slowly. No water should flow into the system.
- 7.6 Depress the Drip Check and drain any water from the system side of the Deluge Valve.
- 7.7 The system is now in service.

8. Removing the System from Service

WARNING: When taking deluge system out of service, a fire patrol should be established in the system area. If automatic fire-alarm signaling equipment is utilized, the proper authority should be notified that the system is being removed from service. The insuring body and owner representative should also be notified when the system is being taken out of service.

Removing Instructions

- 8.1 Shut off the main supply valve.
- 8.2 Priming-line valve (18B fig.1) to Deluge Valve should be closed.
- 8.3 Open all drain valves.
- 8.4 Release the water pressure from the top chamber by pulling the emergency release (15B fig.1).
- 8.5 Shut off air or nitrogen-supply to the release system.
- 8.6 Release air or nitrogen pressure from release system. This may be accomplished by tripping a release or opening a test valve in the release system (if utilized).
- 8.7 "Fire Protection System out of Service" signs in the area protected by the system.

9. Operation

In the Set position: System water supply pressure enters the top chamber of the Deluge Valve through the restricted priming line and is trapped in the top chamber of the Deluge Valve by check valve (7B fig.1), releasing device in the hydraulic release system and/or a normally held closed PORV Pneumatic Actuator (6B fig.1). The pressure trapping is done by the check valve which prevents high pressure back flow, on the one hand, the closed PORV and the closed hydraulic releasing device, on the other hand.

The PORV (6B fig.1) is held closed by pressure maintained in the pneumatic release system. The pressure in the top chamber holds the Deluge Valve seal disc closed, keeping the outlet of the deluge valve and system piping dry.

In fire conditions, when a releasing device (such as fixed temperature release heads and/or thermostatic release) operates, pressure in the pneumatic release system drops, causing the PORV to open. When the PORV opens, or the hydraulic releasing device opens, pressure is released from the top chamber faster than it is supplied through the restricted orifice. The Deluge Valve seal disc opens to allow water to flow through the piping into the system and alarm devices. Water will flow from any open sprinklers and/or spray nozzles on the system.

When the PORV operates, it continually vents the top chamber to prevent the deluge valve from resetting.

The Bermad Deluge Valve can be reset only after the system is taken out of service, and the outlet of the deluge valve and associated trim piping are depressurized and drained.

10. Manual Operation

Whenever the handle of the Manual Emergency Release (15B fig.1) is pulled, pressure is released from the top chamber, the Deluge Valve will open, and water will flow into system piping and alarm devices..

Air Supply Troubles

Any event of an air supply failure, slow leakage of air from the pneumatic release system, and/or failure to restore air supply to the pneumatic release system, will result in activation of the Pneumatic PORV, causing the Deluge Valve to open. Similarly, if the release system is activated due to mechanical damage or malfunction, the Deluge Valve will open. Water will flow from any open sprinklers and/or spray nozzles on the system. Water Motor Alarm will be set off.

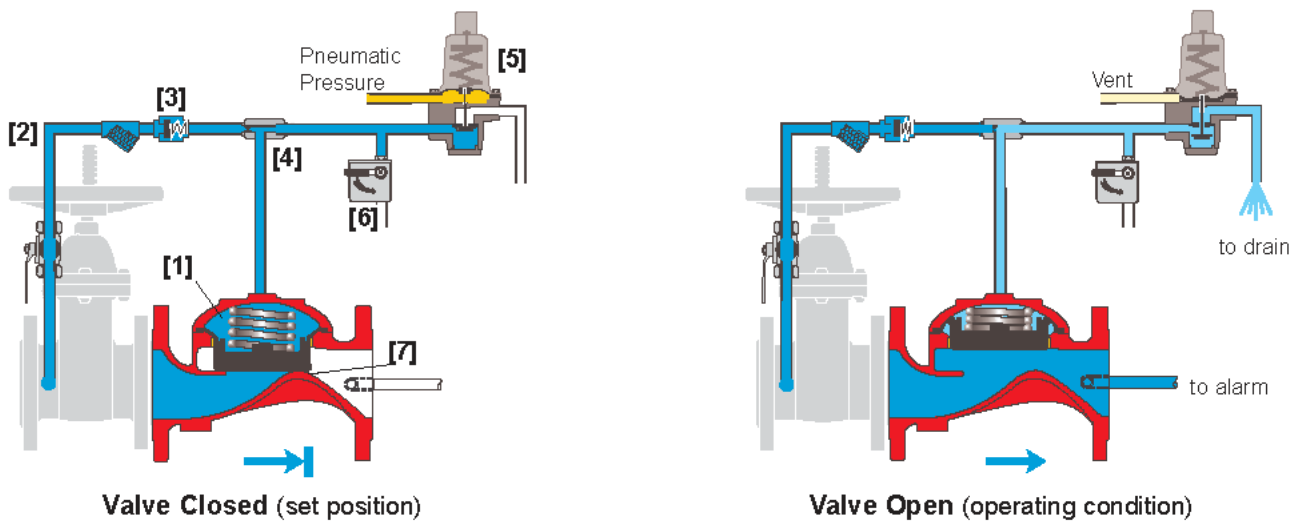
11. Normal Conditions

- 11.1 All main control valves are open and sealed with tamperproof seals.
- 11.2 The alarm shut off valve is in the OPEN position.
- 11.3 The priming-line valve (18B fig.1) is OPEN.
- 11.4 The top chamber gauge valve should be OPEN and gauge should indicate rate of pressure in the top chamber.
- 11.5 Upstream pressure gauge valve is OPEN. The gauge should reflect the upstream supply pressure to the Deluge Valve.

Pneumatic Release System

- 1. The Pneumatic Release System Pressure Gauge should indicate 20 to 30 psi (1.4 barg to 2.0 barg).
- 2. Pneumatic pressure supply system (including its dehydrator) is functioning properly.
- 3. Automatic air or nitrogen-supply is ON, compressor is ON.

Figure 2: Operation Drawing



12. Maintenance and Inspection Test

- 12.1 Warning: Do not turn off the water supply to make repairs without placing a roving fire patrol in the area covered by the system. The patrol should continue until the system is back in service.
- 12.2 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.
- 12.3 If an abnormal condition is found to exist in any of the following inspections or testing procedures, consult Abnormal Conditions for possible cause and corrective action.
- 12.4 See NFPA Pamphlet No.25.

13. Weekly Inspection

- 13.1 The system should be checked for normal condition.
- 13.2 Observe the upstream pressure gauge: it should indicate that the normal supply of water pressure to the Deluge Valve is maintained.

14. Monthly Inspection and Test

- 14.1 Complete Weekly Inspection.
- 14.2 Test the water-motor alarm or electric alarm (optional) by turning the alarm test valve to the open position. The alarm should sound. Turn to close position.
- 14.3 Depress the Drip Check to release accumulation. (Significant water accumulation on the system side may indicate a sealing problem).

15. Annual Inspection and Test

- 15.1 Complete Weekly, Monthly and Semi-Annual inspections.
- 15.2 Place the system out of service (See instructions above).
- 15.3 Trip the release-line system, clean all strainers (4B fig.1), and priming-line restriction (4B fig.1).
- 15.4 The interior of the Deluge Valve should be inspected and cleaned.
- 15.5 The interior of the PORV (6B fig.1), including its diaphragm and seal, should be inspected and cleaned.
- 15.6 Place the system back in service.
- 15.7 (See instructions "Placing the System in Service").
- 15.8 The Deluge Valve, trim, auxiliary devices and manual release must be activated at full flow.
Note: The system will be flooded! Take all necessary precautions to drain water and prevent damage in the area protected by the Deluge system.
- 15.9 Trip test the deluge system by decreasing pressure in the pneumatic release system. Reset system.
- 15.10 The manual emergency release handle (15B fig.1) is to be pulled and tested. The Deluge Valve should open and discharge water.
- 15.11 Observe pressure on upstream Pressure Gauge while full flow is on. Inspect all nozzles in the system. Take all additional measures as required by NFPA 25 "Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems."

16. Abnormal Conditions

- 16.1 Alarm Pressure Switch Fails to Sound
 - A. Clean the alarm-line strainer.
 - B. Test for obstructions in the alarm test line.
 - C. Make certain the water-motor alarm is free to operate.
- 16.2 False Trip

Check for any of the following possible causes:

- D. Plugged priming-line, priming restriction (2B fig.1), or priming strainer (4B fig.1).
- E. Malfunctioning or leaking release system.
- F. PORV (6B fig.1) out of order.
- G. Deluge air orifice assembly plugged.
- H. Inadequate pressure supply on release system (pneumatic).

16.3 Leakage through Deluge Valve

Check for any of the following possible causes:

- A. Partially plugged priming restriction (2B fig.1).
- B. Inadequate pressure supply on release system (Pneumatic).
- C. Leaking release system.
- D. Damaged deluge valve seat.

16.4 Deluge Valve Will Not Reset

Check for any of the following possible causes:

- A. An open main control valve.
- B. Release system not properly drained.
- C. Closed priming valve (18B fig.1).
- D. Damaged deluge valve seat.
- E. Foreign object lodged between seal disc and valve seat.

16.5 Difficulty in Performance

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