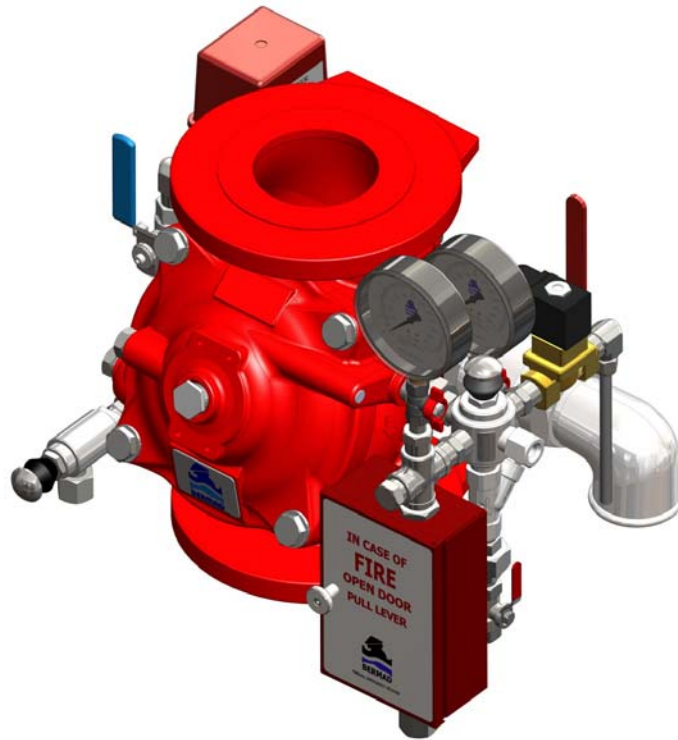


Bermad 400E-Y Torrent Deluge Valve



Installation Operation Maintenance Manual (IOM)

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 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. General

The BERMAD 400E-Y Water Control Valve designed for vertical or horizontal installation and is used for Deluge, Pressure Control Deluge and Pre-action in Firewater or Foam systems.

The 400E-Y straight-through design provides high flow capabilities with minimum head loss and the removable cover enables quick in-line service. The elastomeric assembly can be easily removed from the valve body with no need for disassembling of the valve from the line. Deluge systems are commonly used where, when the system operates, it is desirable to simultaneously spray water or foam from all open nozzles on the system.

1.2 Optional Features

- Valve Position Indicator and Namur interface for industrial switch box
- Valve Seat Ring
- Alarm Pressure Switches
- Water Motor Alarm
- Seawater construction
- Drain Valves – Upstream and/or Downstream

1.3 Approvals

The BERMAD 400E-Y Deluge Valve is UL Listed and FM Approved when installed with specific components & accessories. 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.

1.4 Principal Of Operation

The BERMAD 400E-Y that is assembled with specific trim is suitable for systems that include adequate detecting and piping systems with open nozzles, the valve prevents water from entering the system piping and kept closed by pressure applied to the control chamber through a restricted priming line.

In the SET position (Fig 1-a), the water pressure supplied through the priming line is trapped in the control chamber of the deluge valve and presses the valve seal disc down, thereby sealing the valve and keeping the system piping dry. Under FIRE conditions, when the pressure is released from the control chamber (Fig 1-b) by the opening of the automatic releasing device or by manual release, the deluge valve opens and allows the inlet supply water to flow unrestricted through the valve and into the system piping and alarm devices.

Warning: Whenever the handle of the Manual Emergency Release is pulled, pressure is released from the control chamber, the deluge valve will open, and water will flow into system piping and alarm devices.

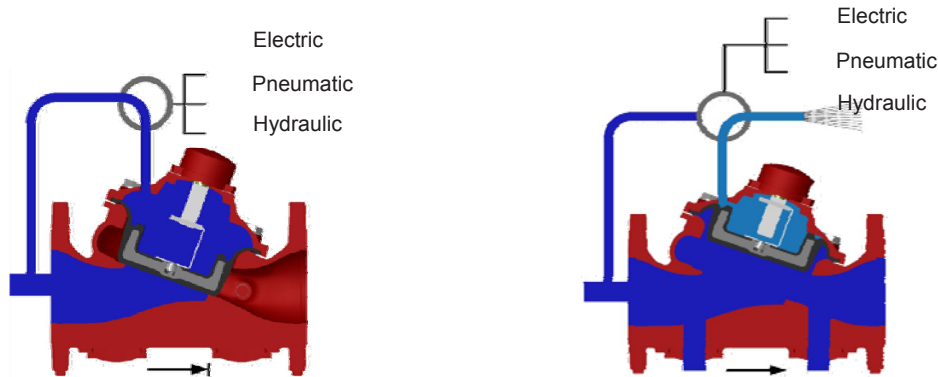


Fig 1 - a: Valve Closed (Set Position)

Fig 1 - b: Valve Open (Operating Conditions)

Table No.1: Pressure Ratings

Valve End Connections	Standard	Rating/ Class	Max Working Pressure	
			barg	psig
Flanged	ANSI B16.5 / 16.42	#150	17.4	250
Flanged	ANSI B16.5 / 16.42	#300	25	365
Flanged	ISO 7005-2	PN16	16	235
Flanged	ISO 7005-2	PN25	25	365
Grooved	ANSI / AWWA C606	365	25	365

Table No.2: 400E-Y Flow Ratings

Valves sizes	3"	4"	6"	8"	10"
CV (Kv)	190 (219)	345 (398)	790 (912)	1160 (1340)	1430 (1652)
Leq m (ft), see Note 1	8 (25)	8 (26)	13 (43)	27 (89)	55 (179)
Max. Flow-Rate m ³ /hr (GPM)	102 450)	159 (700)	363 (1600)	795 (3500)	1136 (5000)

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

2. Installation

NOTES:

- Proper operation of the Bermad 400E-Y Deluge Valves depends upon their trim being installed.
- The 400E-Y valve shall be trimmed with specific trim components and accessories, it must be installed and maintained in compliance with the most recent Bermad publications.
- Any deviation in trim size or arrangement may adversely affect the proper operation of the deluge valve.

Warning: The deluge valve and trim must be installed only in areas where they will not be subject to freezing.

2.1 Installation Instructions

1. Allow enough room around the valve assembly for any adjustments and future maintenance.
2. Before the valve is installed, flush the pipeline to remove any dirt, scale, debris, etc.
Warning: not flushing the line may result in the valve being rendered inoperable.
3. Install the valve on the pipeline with valve flow arrow designated on the body points in the desired direction.
4. Install a listed / approved indicating valve upstream of the system (supervised "open").
5. All other components are positioned correctly as per the appropriate drawing.
6. The water supply priming line must be connected to the upstream of the system control valve.
7. For Hydraulic or Pneumatic trim: Install an "End of Line Release Valve" with maximum bore of 1/2", installed at the same level or higher than the highest fusible plug position and located at the remotest location on the system possible.
8. For pneumatic / Electro-Pneumatic trim: Install a pneumatic pressure supply system, see "Pneumatic System Pressure Requirements" below.
9. Pneumatic System Pressure Requirements: see "Placing in Service" section below prior to any air supply connection.
10. A Solenoid Valve shall be wired to the Releasing Control Panel according to information provided by the panel manufacturer.
11. All additional accessories, although not packed together with the BERMAD Deluge Valve, must be installed as shown in the relevant drawing and other illustrations.
12. After installation in the main line, carefully inspect/correct any damaged accessories, piping, tubing, or fittings; ensure that there are no leaks.

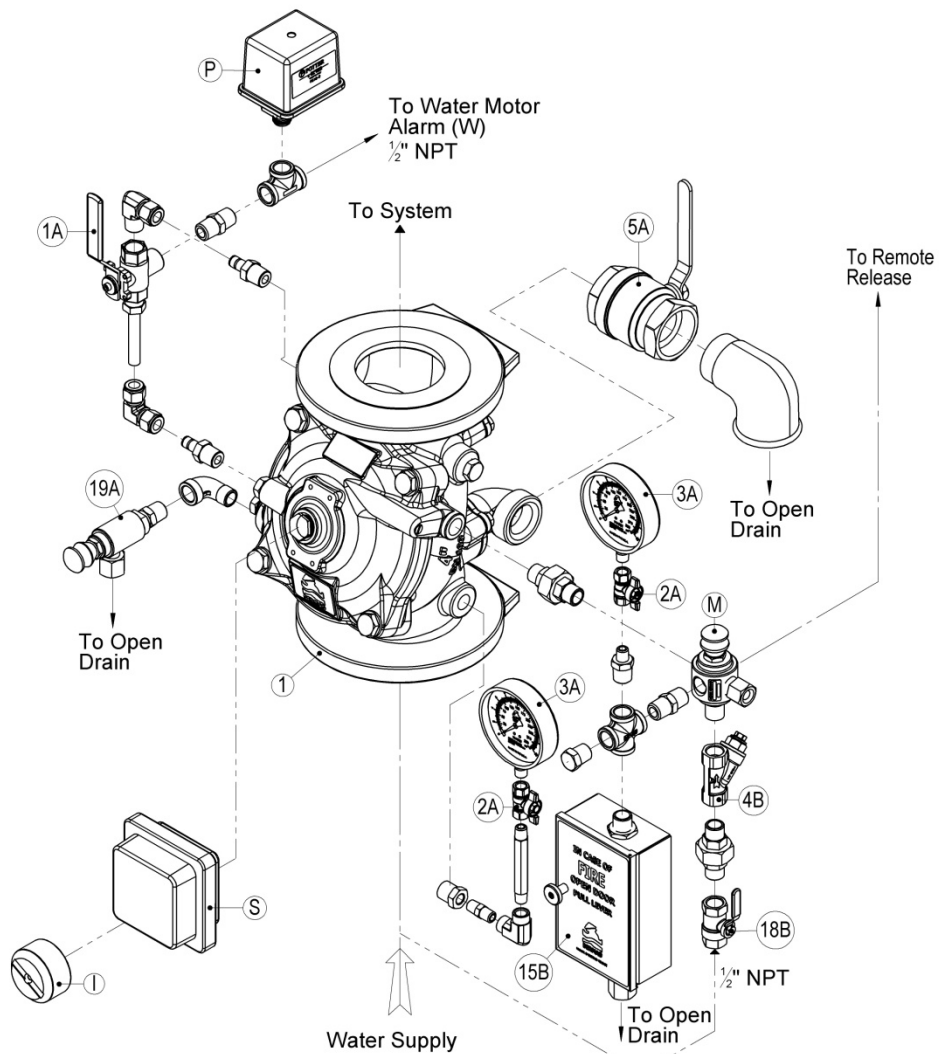
3. Operation

3.1 Hydraulically Controlled

Bermad Hydraulically Controlled Deluge valve is suitable for automatic or remote controlled water or foam systems that include a wet pilot-line with closed fusible plugs (thermal releases) and piping systems. The typical wet pilot-line is installed in a covered area and connected to the valve trim. In fire conditions, operation of a release device on the wet pilot line opens the Deluge Valve, allowing water to enter the system piping.

NOTE: Wet pilot line height should not exceed maximum elevation above valve see attached graph.

3.1.1 Model 1M Trim Illustration: Hydraulically Controlled with EasyLock Manual Reset



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
F	Fittings and Tubing		6
M	Easy Lock Manual Reset	1	

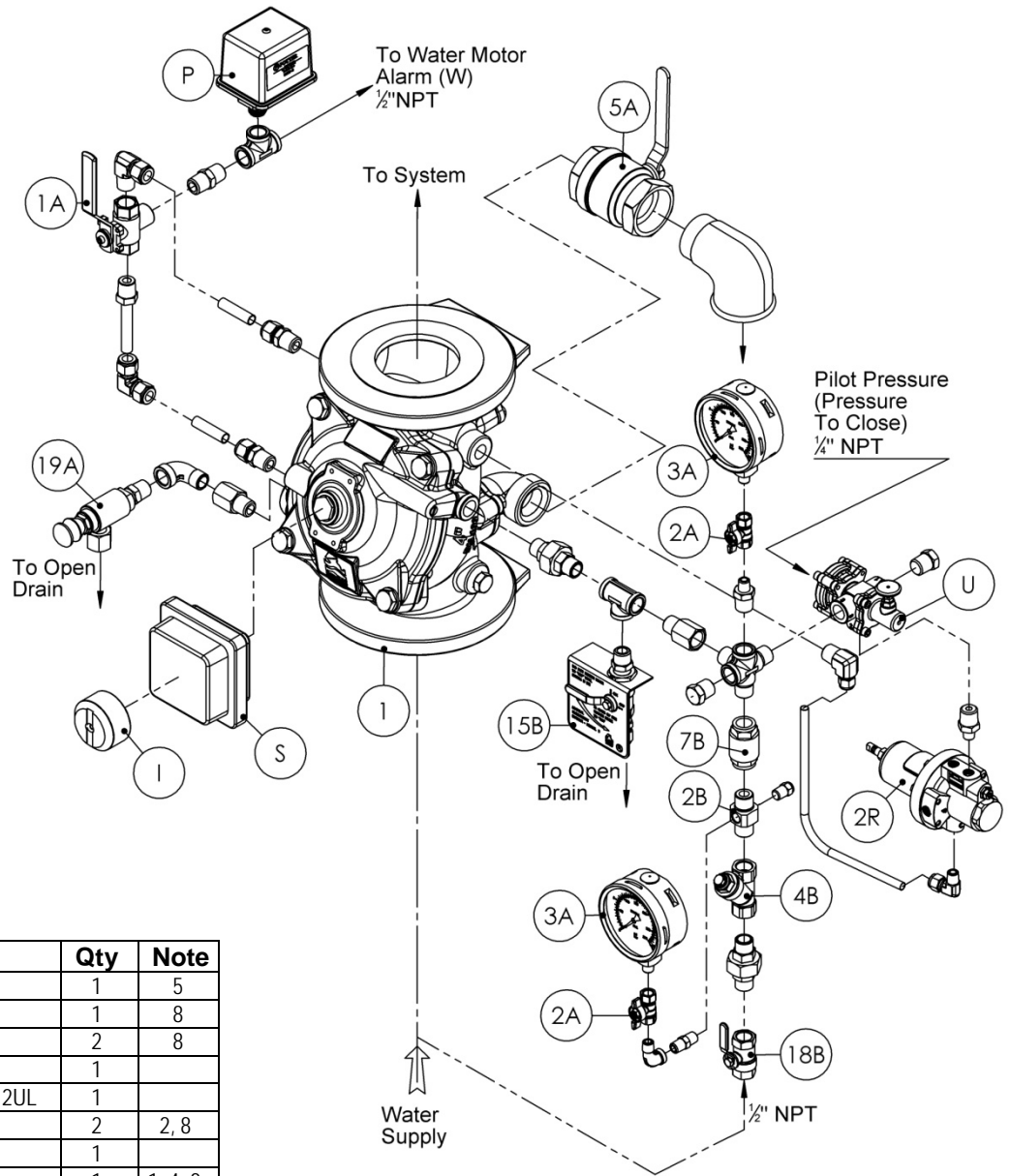
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1 1/2 & 2": 3/4" Drain Valve; 2 1/2 & 3": 1 1/2" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the trim package. These items must be obtained from Bermad or an outside supplier prior to installation.
- (9) Manual Emergency Release may be Model B (open Bracket shown) or Model D (with box)

3.1.2 Model 1MC Trim Illustration: Hydraulic Pressure Control with Manual Reset



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
2R	Pressure Reducing Valve, 2UL	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
F	Fittings and Tubing		6
U	(URV-M) w/ Manual Reset	1	

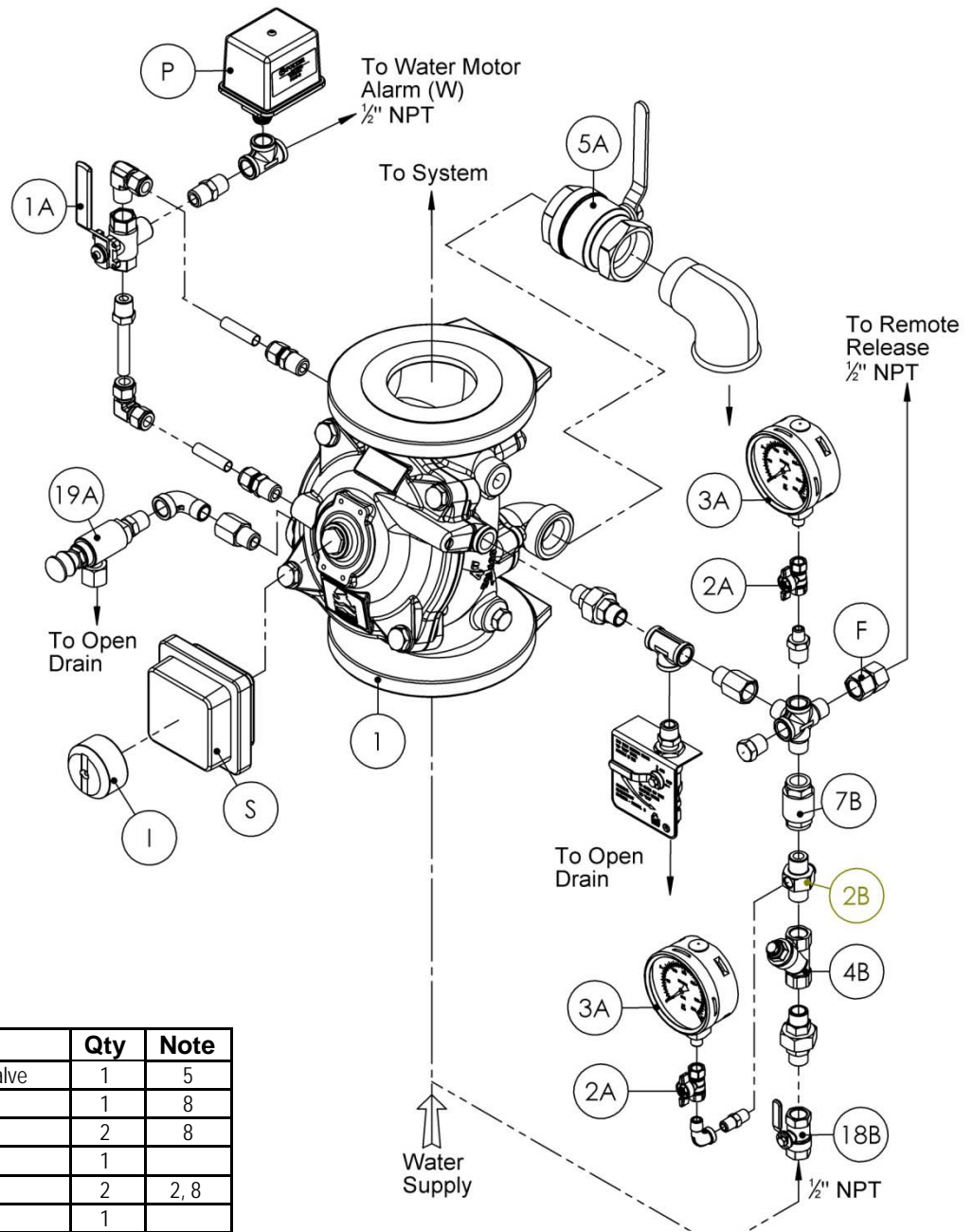
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.1.3 Model 1D Trim Illustration: Hydraulically Controlled, Local and Remote Operation



Item	Description	Qty	Note
1	400E- Y Type Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release(9)	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
F	Fittings and Tubing		6

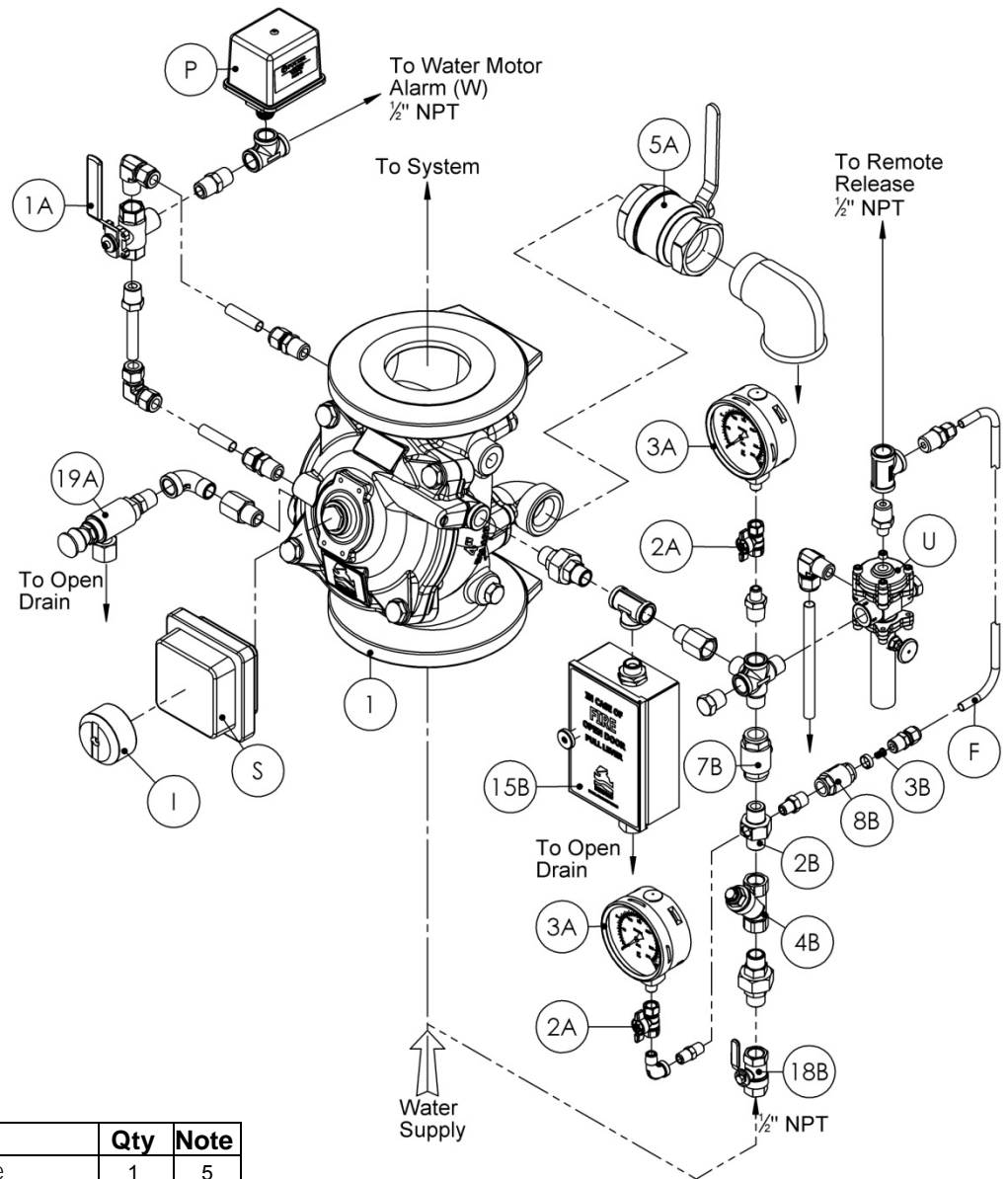
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package.
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.1.4 Model 5M Trim Illustration: Hydraulically Controlled Anti-Columning



Item	Description	Qty	Note
1	400E- Y Type Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	2	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
F	Fittings and Tubing		6
U	URV-MA Manual Reset & Adjustable	1	10

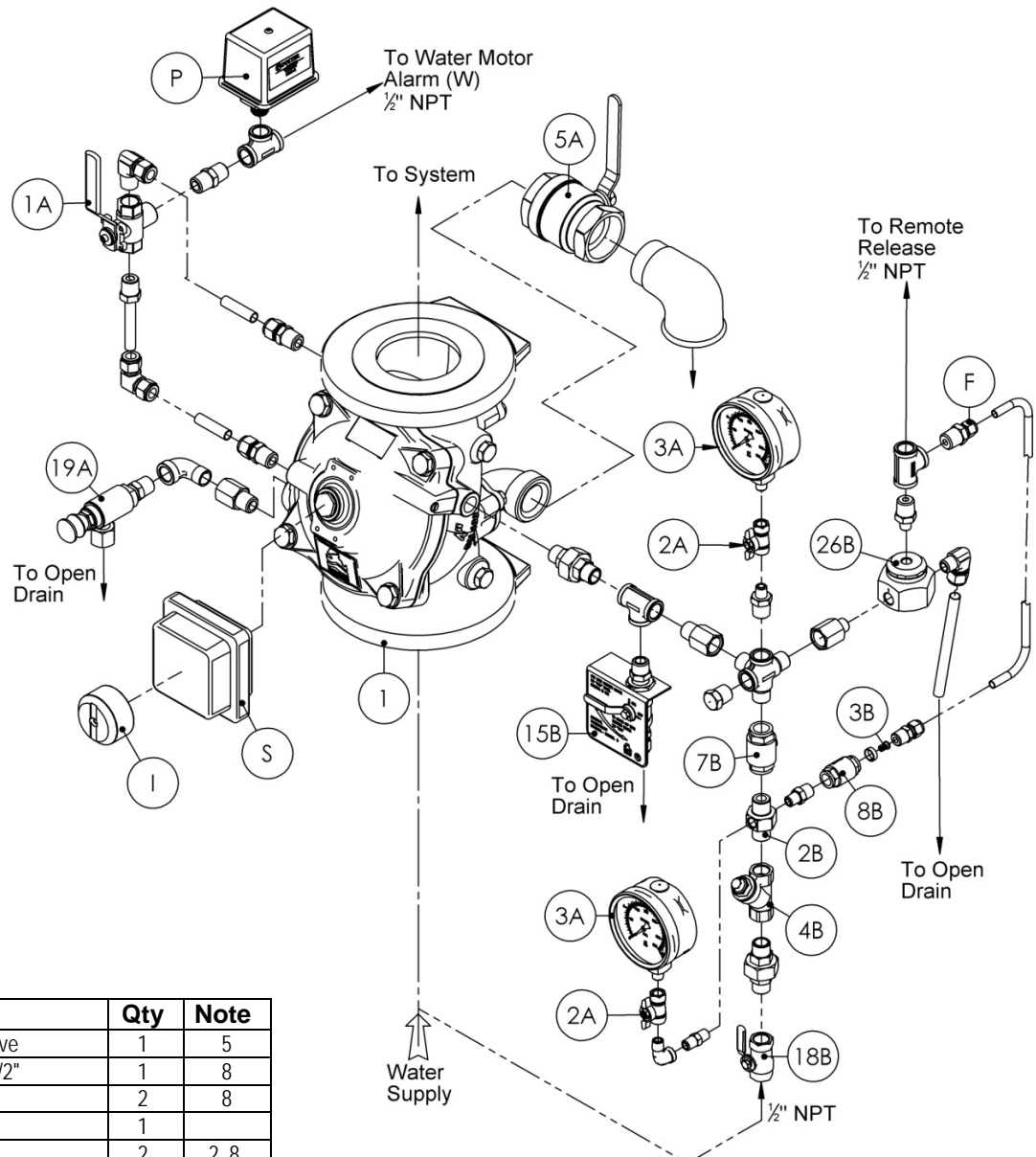
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)
- (10) The URV-AM Pilot Valve is factory set to 30 meter pilot line elevation above valve, in case that any Hydraulic Release exceeds height of 30 meter, additional spring tension must be executed in order to set to the desired height, upto max of 70 meter elevation.

3.1.5 Model 5D Trim Illustration: Hydraulically Controlled On-Off



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
26B	Hydraulic Relay Valve (HRV)	1	
F	Fittings and Tubing		6

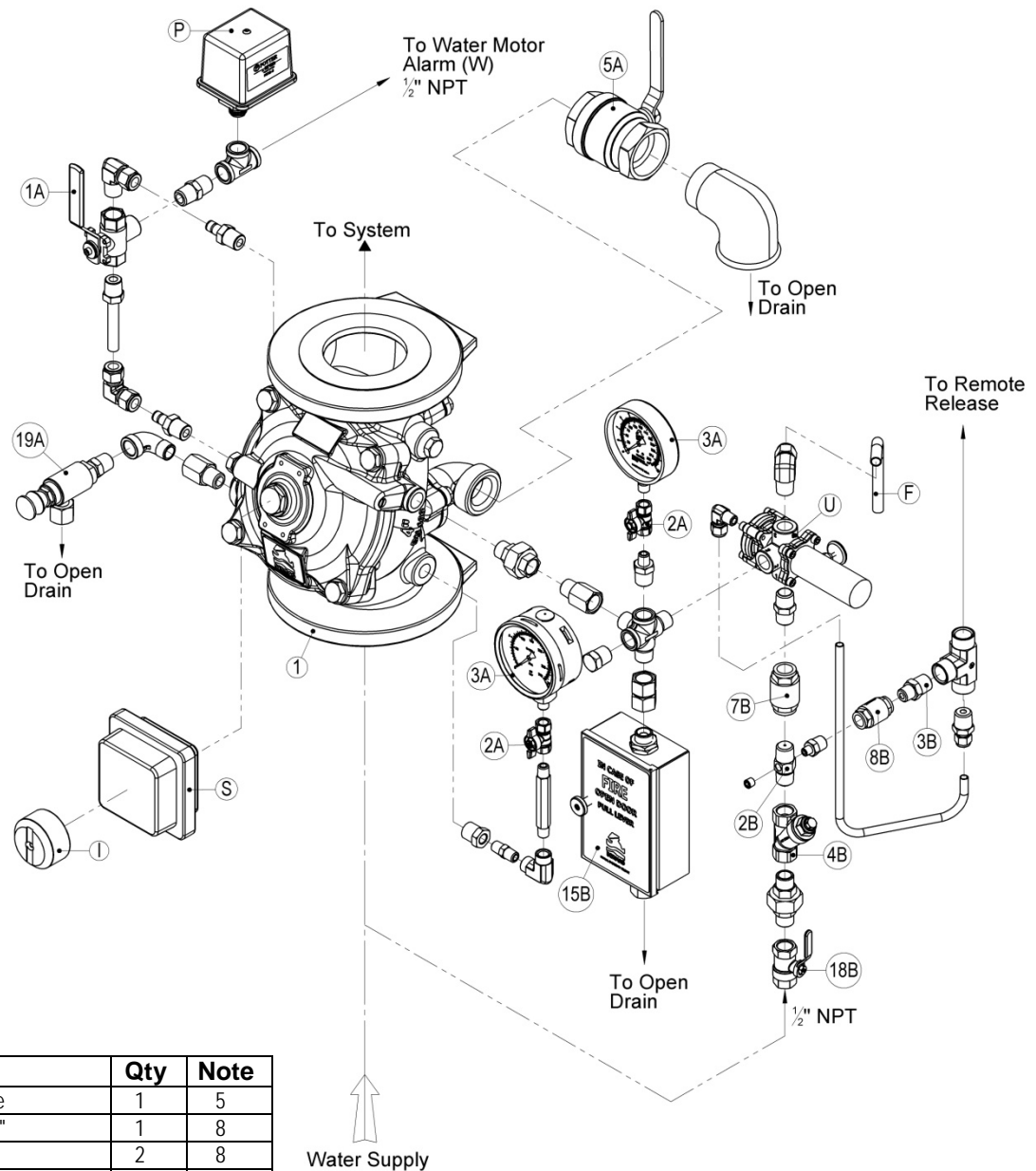
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.1.6 Model 5U Trim Illustration: Hydraulically Controlled with URV



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
F	Fittings and Tubing		6
U	URV	1	

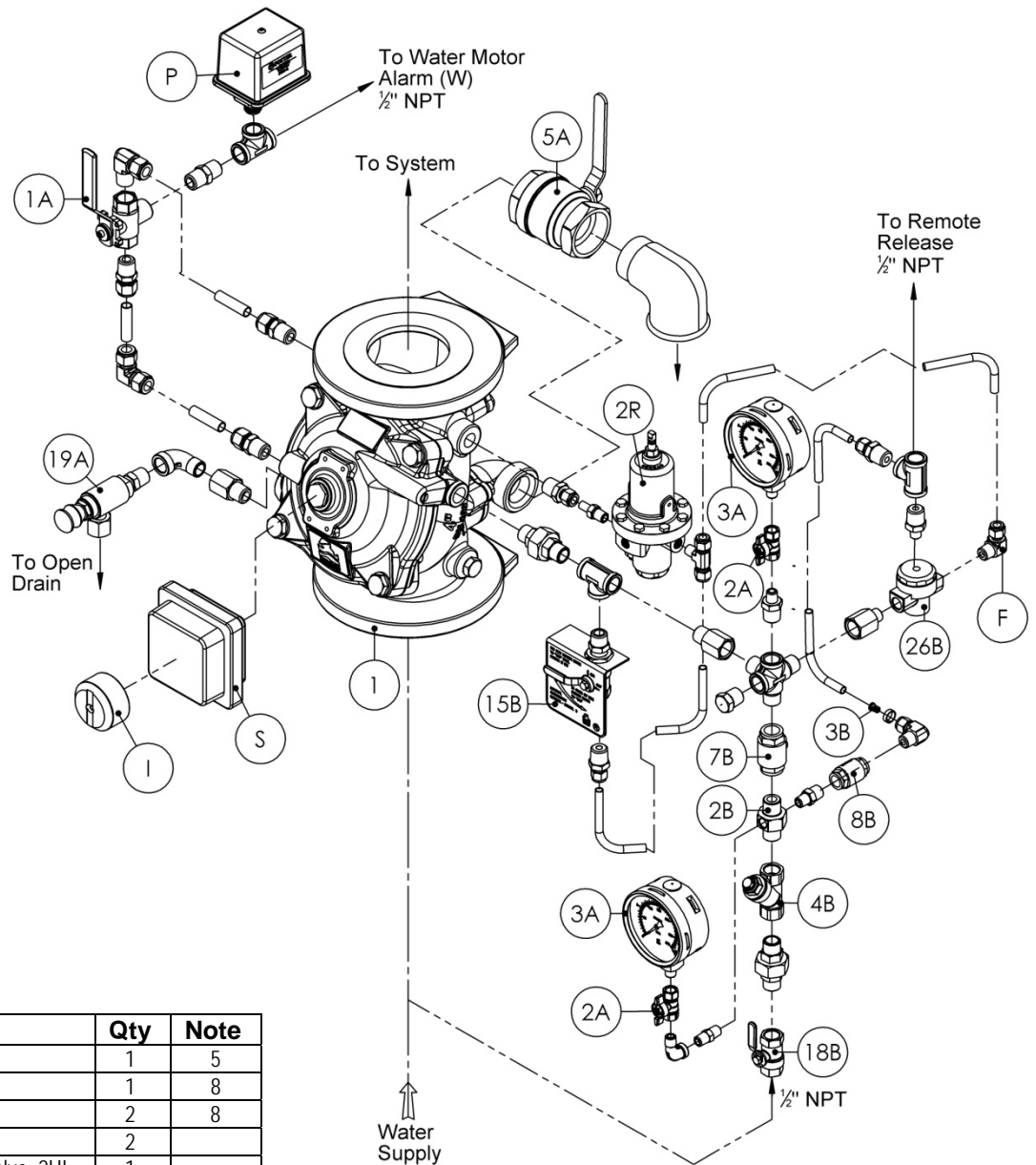
Optional:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm
H	Manual Reset (URV-M)
J	Opening Pressure Adjustment (URV-A/URV-MA)

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.1.7 Model 5DC Trim Illustration: Hydraulic Pressure Control



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	2	
2R	Pressure Reducing Valve, 2UL	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
2R	Pressure Reducing Pilot	1	
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
26B	Hydraulic Relay Valve (HRV)	1	
F	Fittings and Tubing		6

Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm

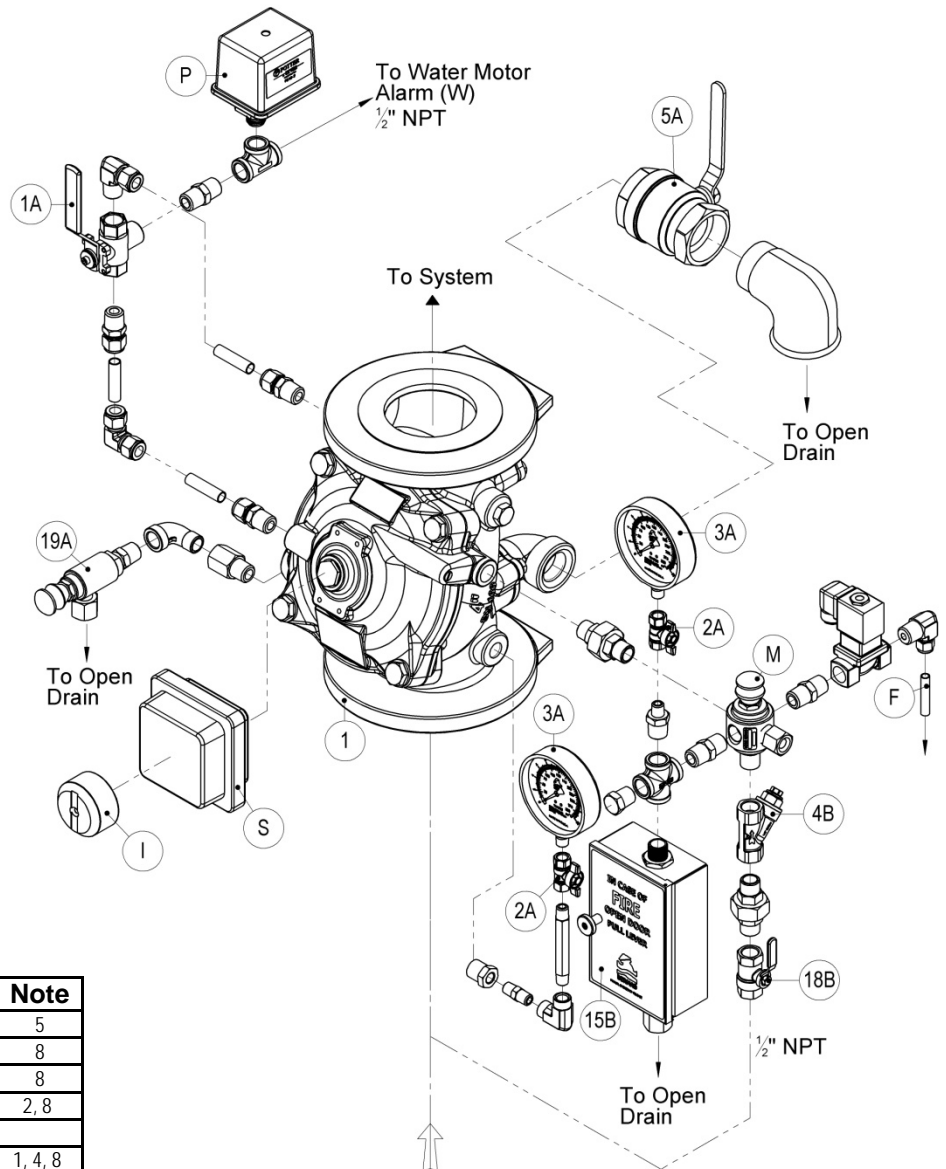
Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.2 Electrically Controlled System

The Bermad Electrically Controlled Deluge Valve is suitable for automatic water spray or foam systems that include electric detection and piping systems with open nozzles. The Deluge Valve is operated by an electric Solenoid Valve and requires a Listed/Approved control panel with a compatible electrical fire detection system. In Fire conditions, activation of the detection system causes the System Control Panel to be activated. This in turn opens the Solenoid Valve, causing the Bermad Deluge Valve to open, and thereby allowing water to enter the system piping.

3.2.1 Model 2M Trim Illustration: Electrically Controlled with EasyLock Manual Reset



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
14B	Solenoid Valve 2-Way	1	5
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
F	Fittings and Tubing		6
M	Easy Lock Manual Reset	1	

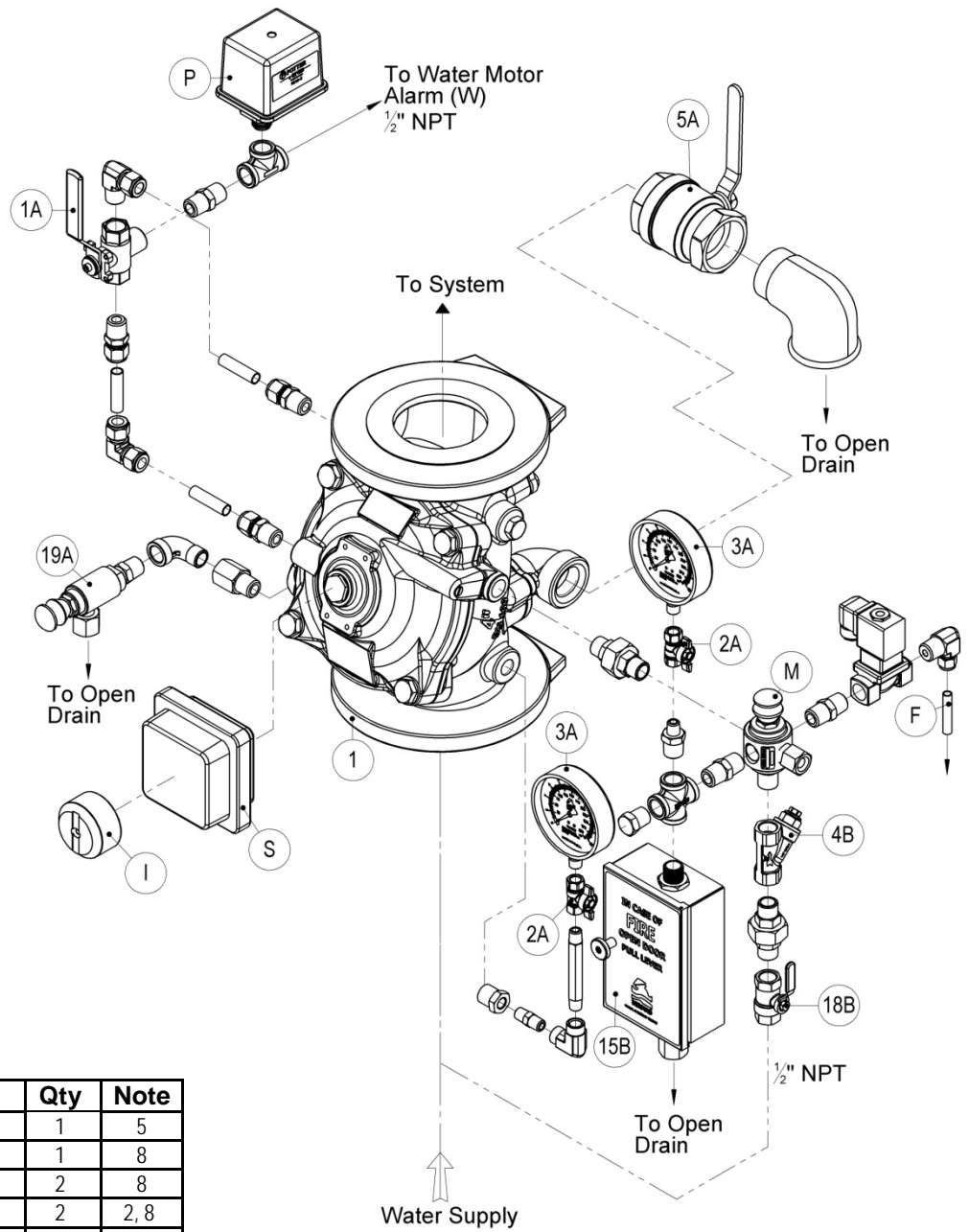
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.2.2 Model 7M Trim Illustration: Electrically Controlled Pre-Action System, Single action



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
14B	Solenoid Valve 2-Way	1	5
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
F	Fittings and Tubing		6
M	Easy Lock Manual Reset	1	

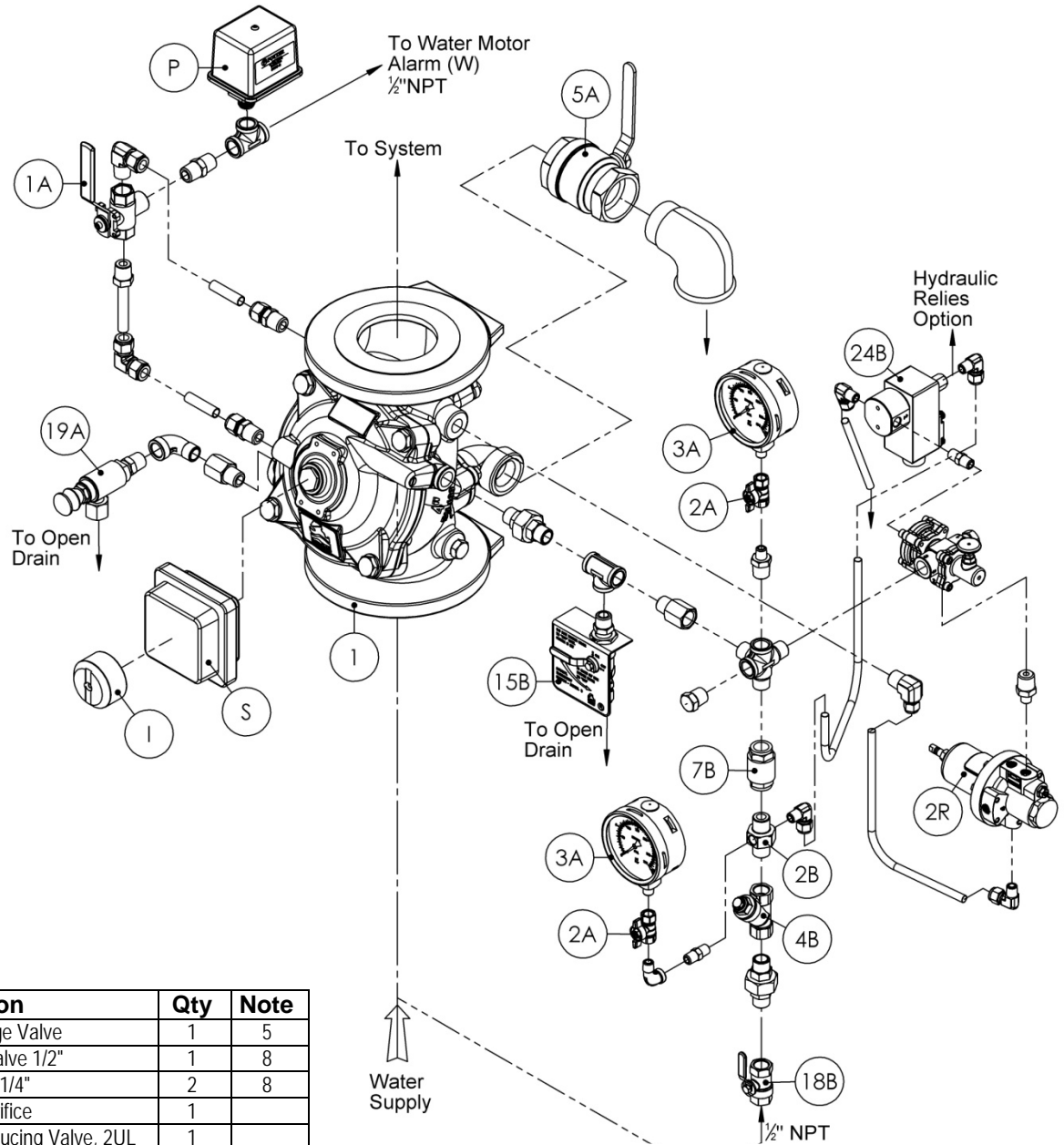
Optional:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm
H	In Line Swing Check Valve and Trim

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.2.3 Model 2MC Trim Illustration: Electric Pressure Control with Manual Reset



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
2R	Pressure Reducing Valve, 2UL	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
24B	Solenoid Valve 3 way	1	5
F	Fittings and Tubing		6
U	URV-M w/ Manual Reset	1	

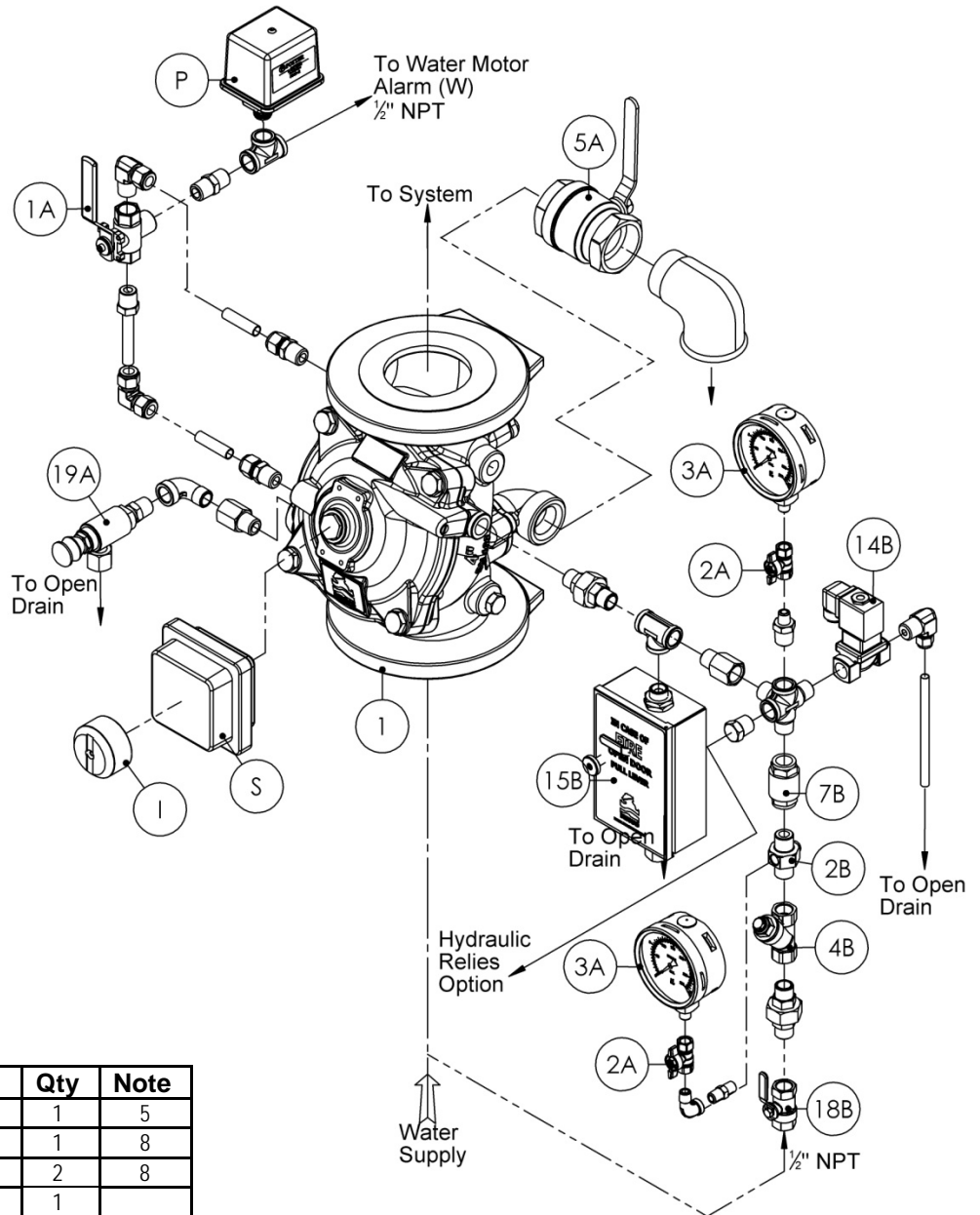
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.2.4 Model 2D Trim Illustration: Electrically Controlled On-Off, 2-Way Solenoid Valve



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
14B	Solenoid Valve 2way	1	5
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
F	Fittings and Tubing		6

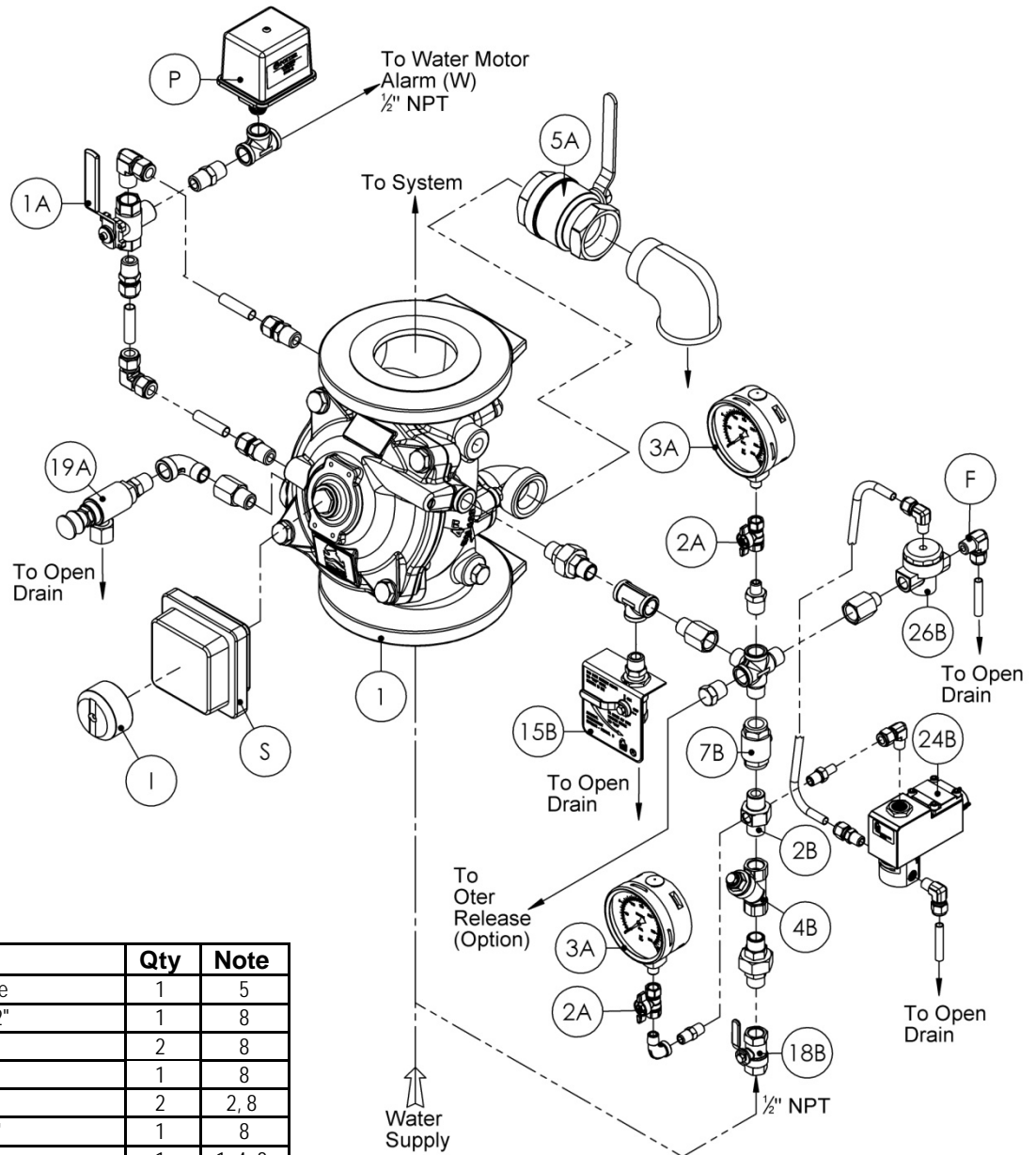
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.2.5 Model 3D Trim Illustration: Electrically Controlled On-Off, 3- way solenoid valve



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	8
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	8
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
24B	Solenoid Valve 3-Way	1	5
26B	Hydraulic Relay Valve (HRV)	1	
F	Fittings and Tubing		6

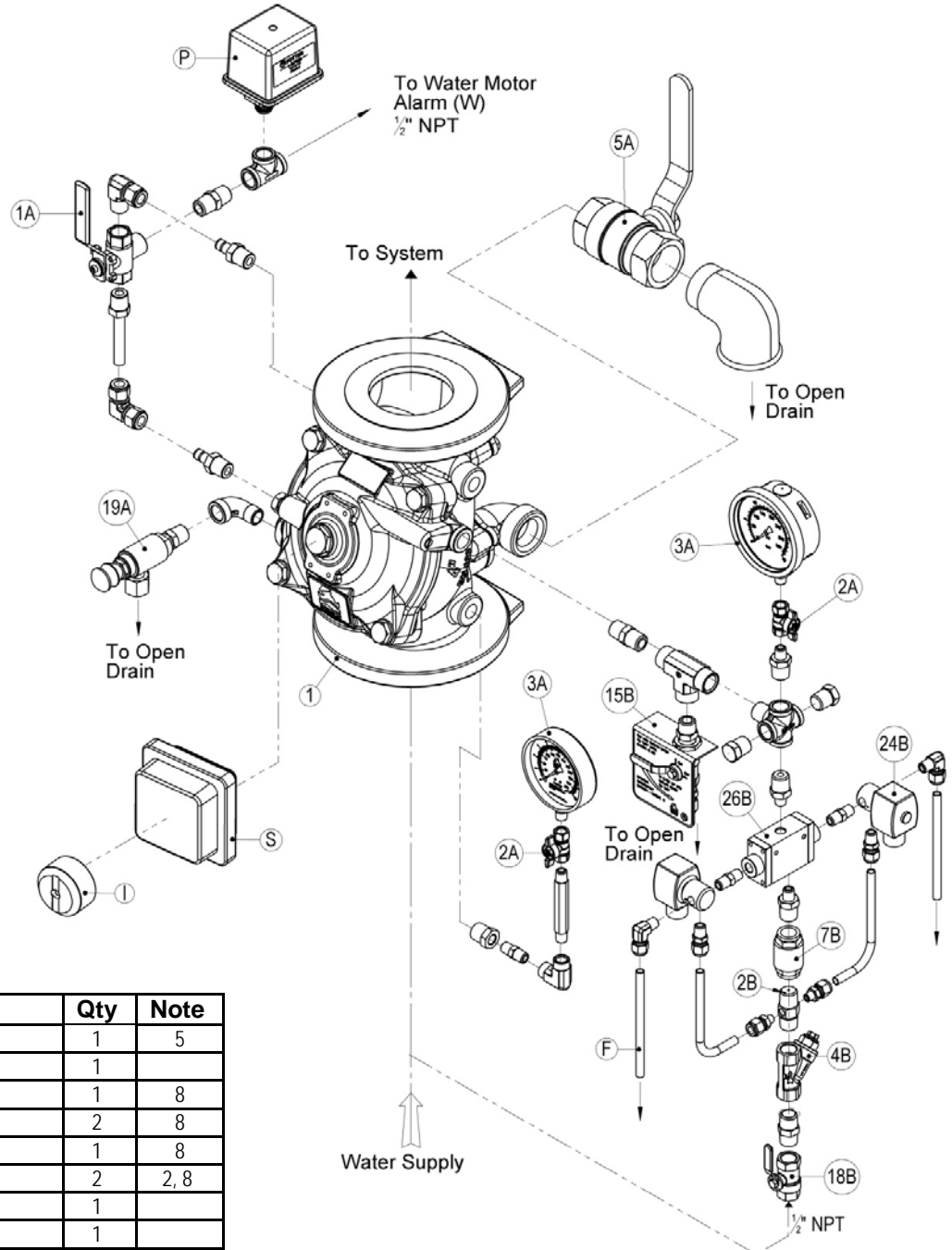
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.2.6 Model 3D-RL Trim Illustration: Electrically Controlled w/ Remote Reset



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
2B	Restriction Orifice	1	
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	8
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
24B	Solenoid Valve 3-Way	2	5
26B	Double Acting Relay Valve (DRV)	1	
F	Fittings and Tubing		6

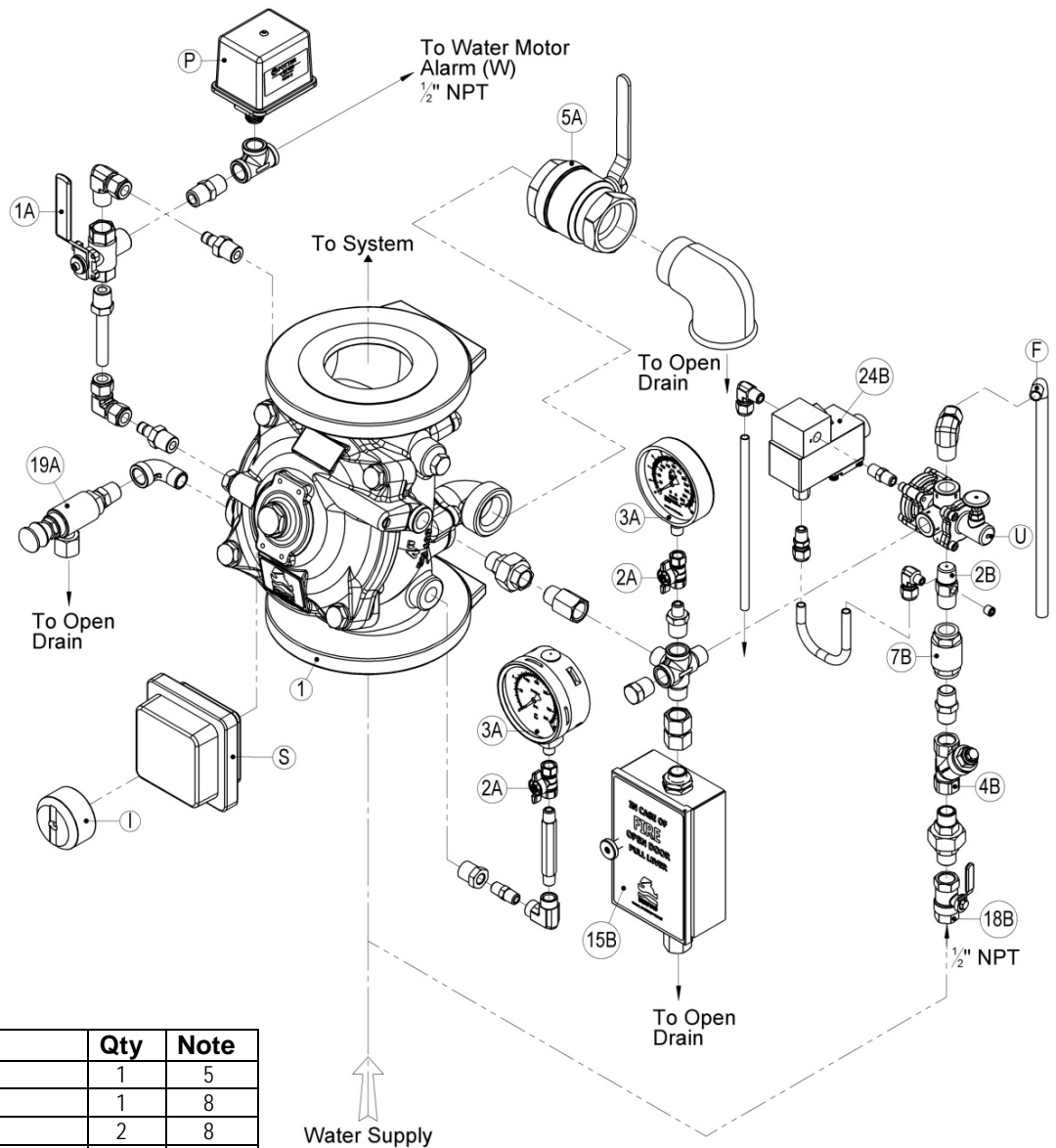
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.2.7 Model 3U Trim Illustration: Electrically Controlled with URV



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
24B	Solenoid Valve 3-Way	1	5
F	Fittings and Tubing		6
U	Universal Relay Valve (URV)	1	

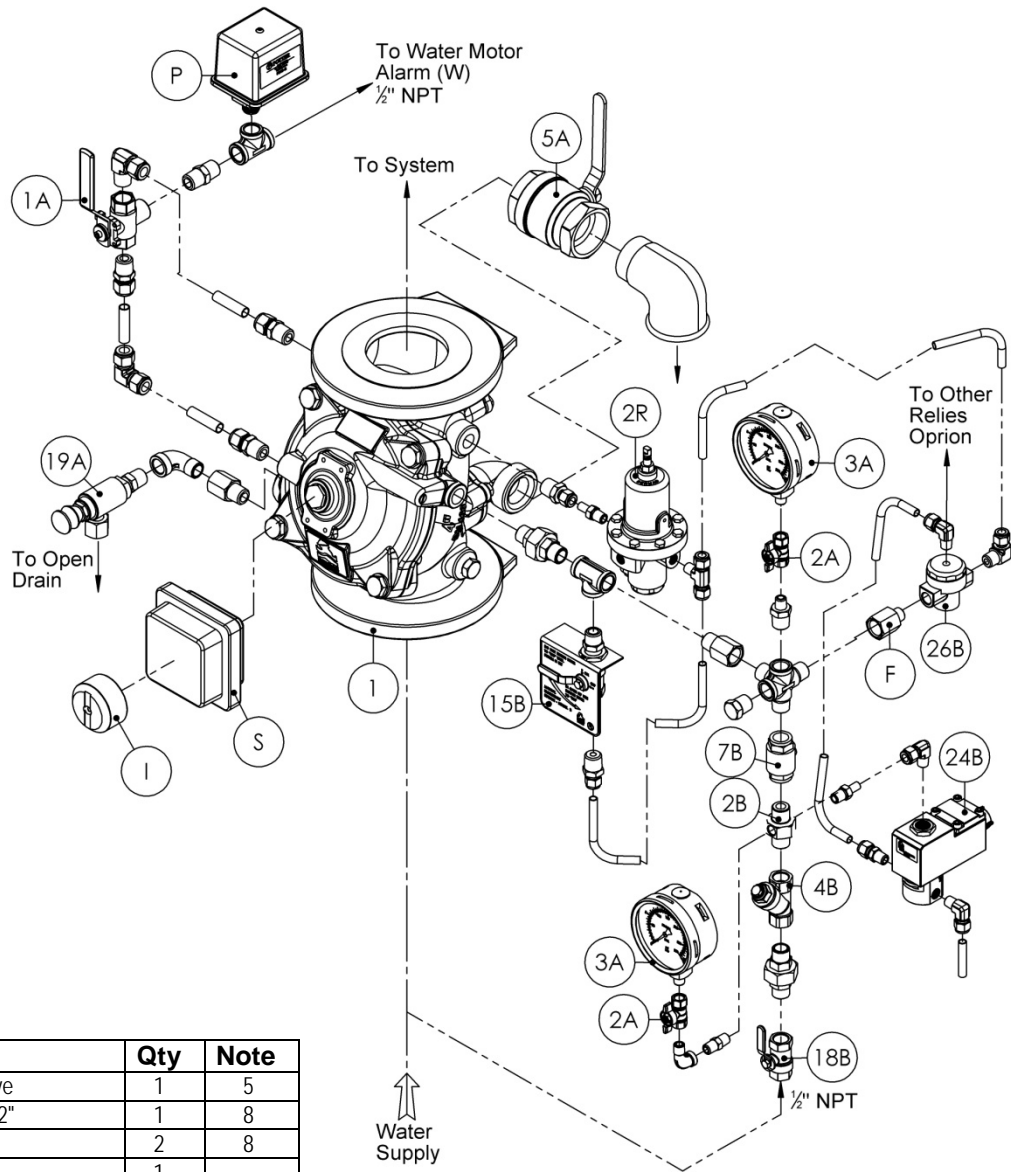
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm
H	Manual Reset (URV-H)

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.2.8 Model 3DC Trim Illustration: Electric Pressure Controlled



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
2R	Pressure Reducing Valve, 2UL	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
5B	Union 1/2"	2	
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
24B	Solenoid Valve 3-Way	1	5
F	Fittings and Tubing		6
U	Universal Relay Valve (URV)	1	

Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm

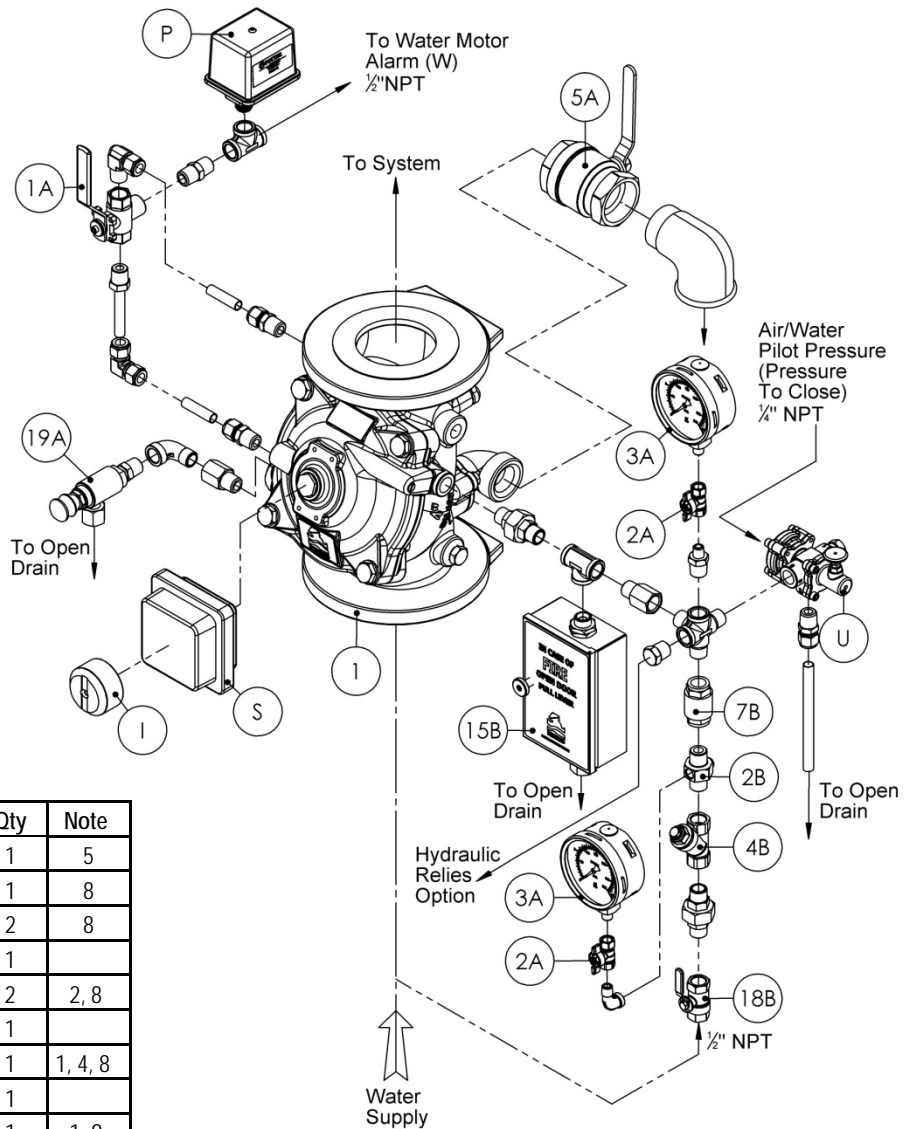
Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.3 Pneumatically Controlled System

BERMAD Pneumatically Controlled Deluge Valve is suitable for systems that include dry pilot lines with closed pneumatic fusible plugs and piping systems with a wide variety of open nozzles. In SET position, the water pressure supplied to the deluge valve control chamber is trapped by a closed Pneumatic Pilot Valve and holds the main valve's diaphragm and plug against the valve seat, sealing it drip-tight and keeping the system piping dry. In FIRE conditions, a pilot line pneumatic pressure drop, opens the pilot valve, pressure is then released from the control chamber, causing the Deluge Valve to open, and thereby allowing water to enter the system piping.

3.3.1 Model 4M Trim Illustration: Pneumatically Controlled Deluge Valve with Manual Reset



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
F	Fittings and Tubing		6
U	URV-M w/ Manual Reset	1	

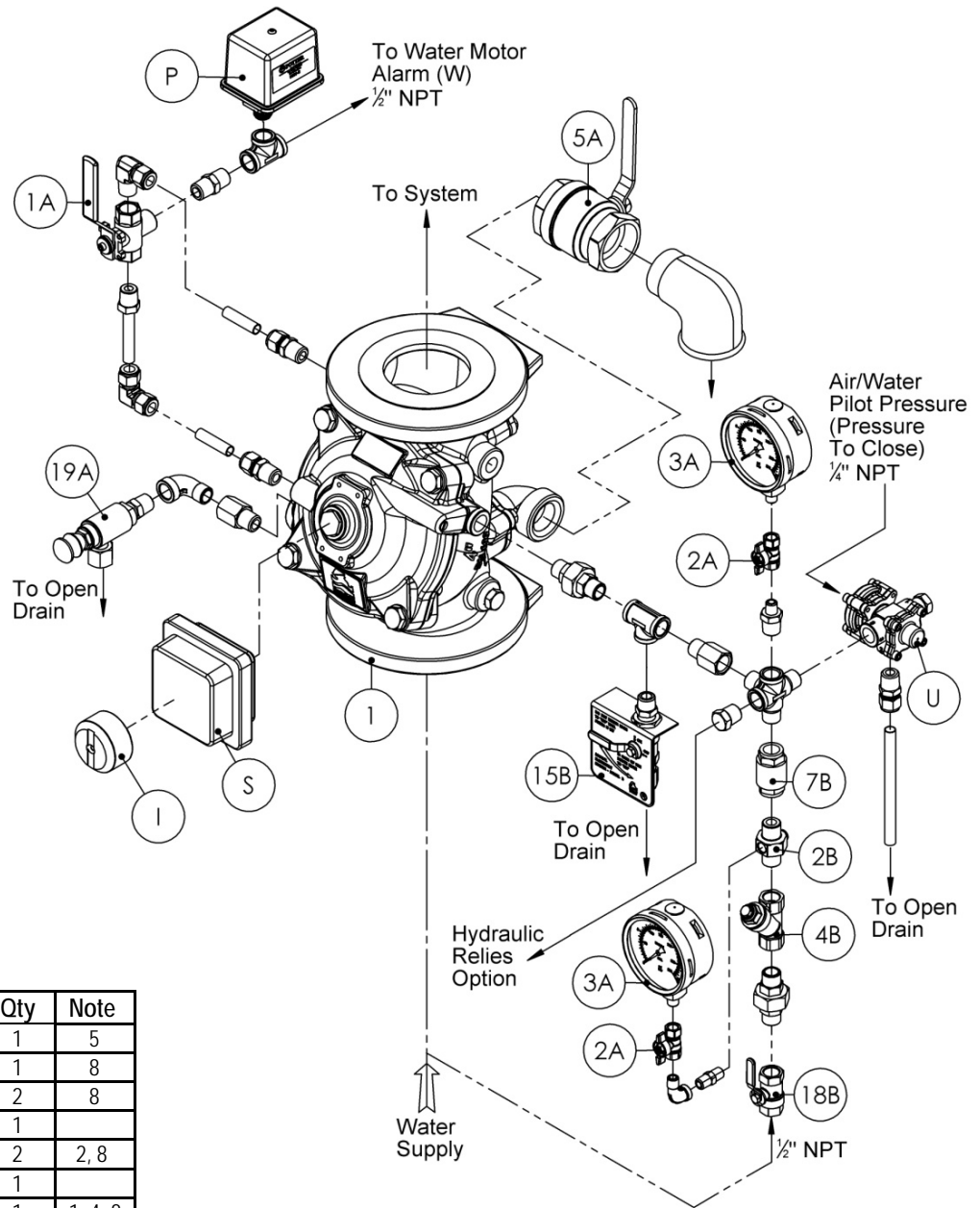
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.3.2 Model 4D Trim Illustrations: Pneumatically Controlled On-Off Deluge Valve.



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
F	Fittings and Tubing		6
U	Universal Relay Valve (URV)	1	

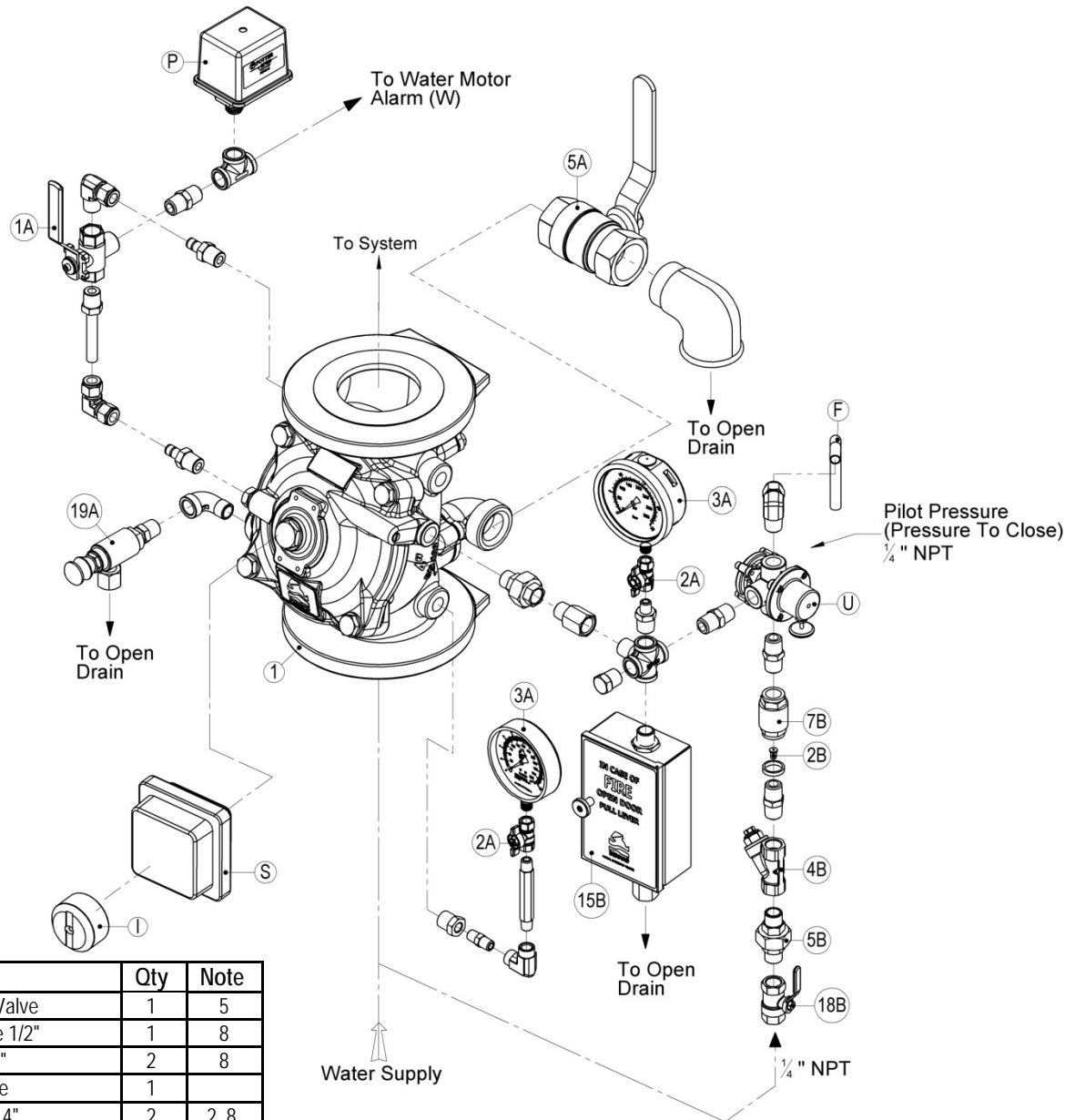
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm
H	Manual Reset (URV-M)

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.3.3 Model 4U Trim Illustration: Pneumatically Controlled Deluge Valve with URV.



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
F	Fittings and Tubing		6
U	Universal Relay Valve (URV)	1	

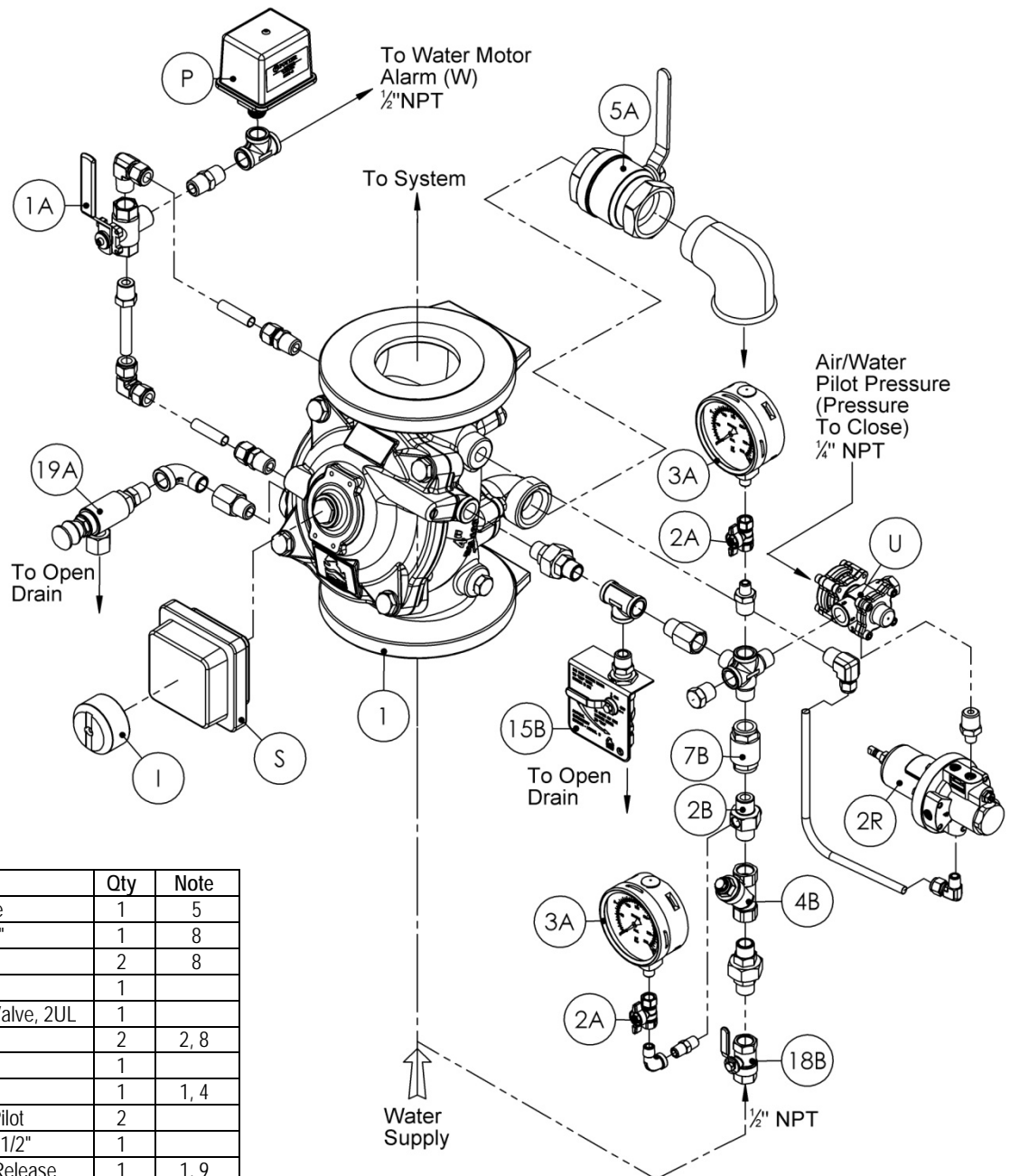
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm
H	Manual Reset (URV-M)

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

3.3.4 Model 4DC Trim Illustration: Pneumatically Pressure Controlled Deluge Valve.



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
2R	Pressure Reducing Valve, 2UL	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4
2R	Pressure Reducing Pilot	2	
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	5
F	Fittings and Tubing		6
U	Universal Relay Valve (URV)	1	5

Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm
H	Local Reset (URV-M)

Notes:

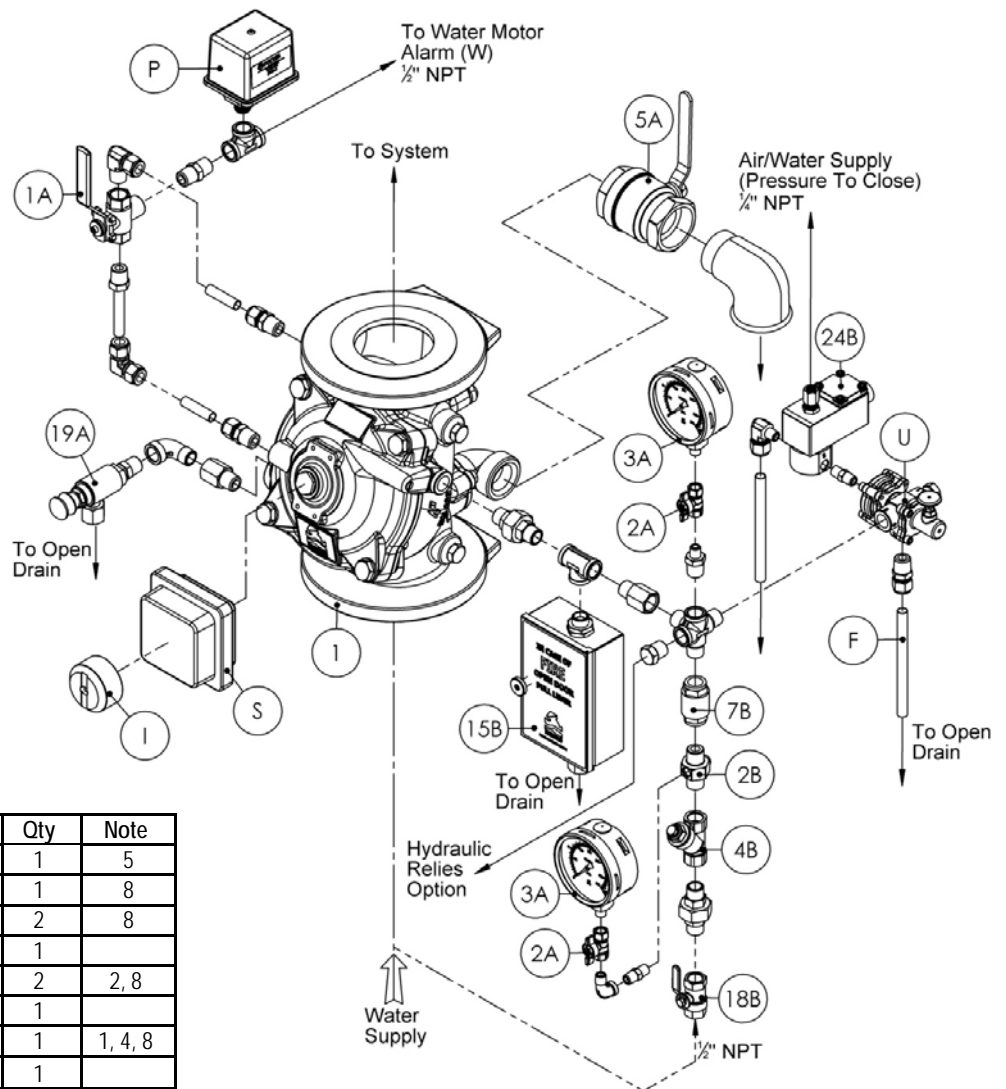
- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

2.4 Electro-Pneumatically Controlled System

The Bermad Electro-Pneumatically Controlled Deluge Valve is suitable for automatic water spray or foam systems that include Pneumatic Release and Electric Detection and are controlled either Electrically or through a Dry Pilot Line.

The Bermad Deluge Valve is operated by a solenoid valve and a pneumatic pilot valve. The pneumatic pilot valve is normally held closed by the air pressure maintained through a 3-way solenoid valve. In FIRE condition response of the pneumatic release or when the solenoid valve is activated, the pneumatic pilot valve turned open, releasing water pressure from the control chamber causing the Bermad Deluge Valve to open, and allowing water to enter the system piping.

2.4.1 Model 3M Trim Illustration: Electro -Pneumatically Controlled Deluge Valve with Manual Reset.



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
24B	Solenoid Valve 3-Way	1	5
F	Fittings and Tubing		6
U	URV-M w/ Manual Reset	1	

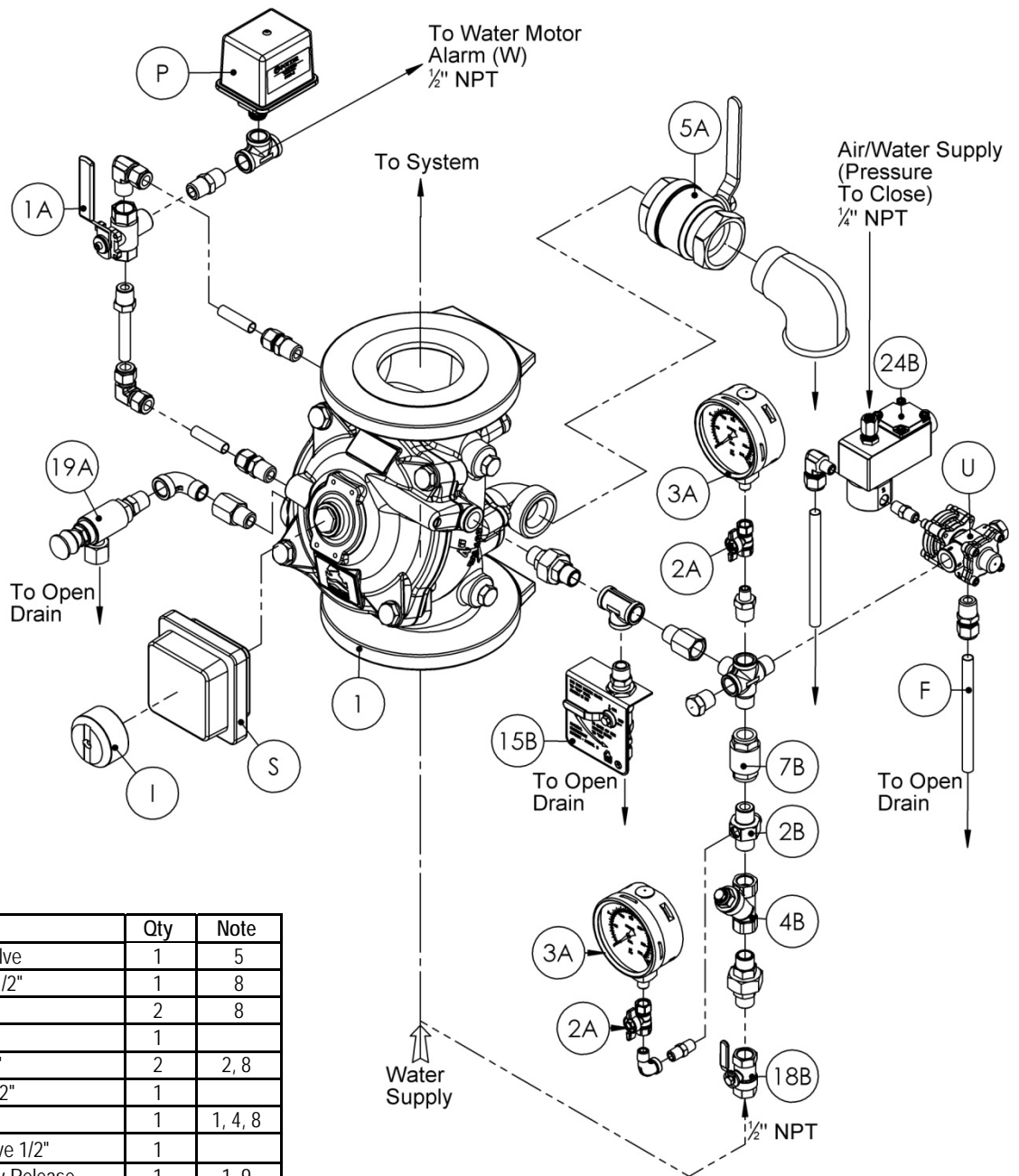
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

2.4.2 Model 6D Trim Illustration: Electro -Pneumatically Controlled On-Off Deluge Valve.



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
24B	Solenoid Valve 3-Way	1	5
F	Fittings and Tubing		6
U	Universal Relay Valve (URV)	1	

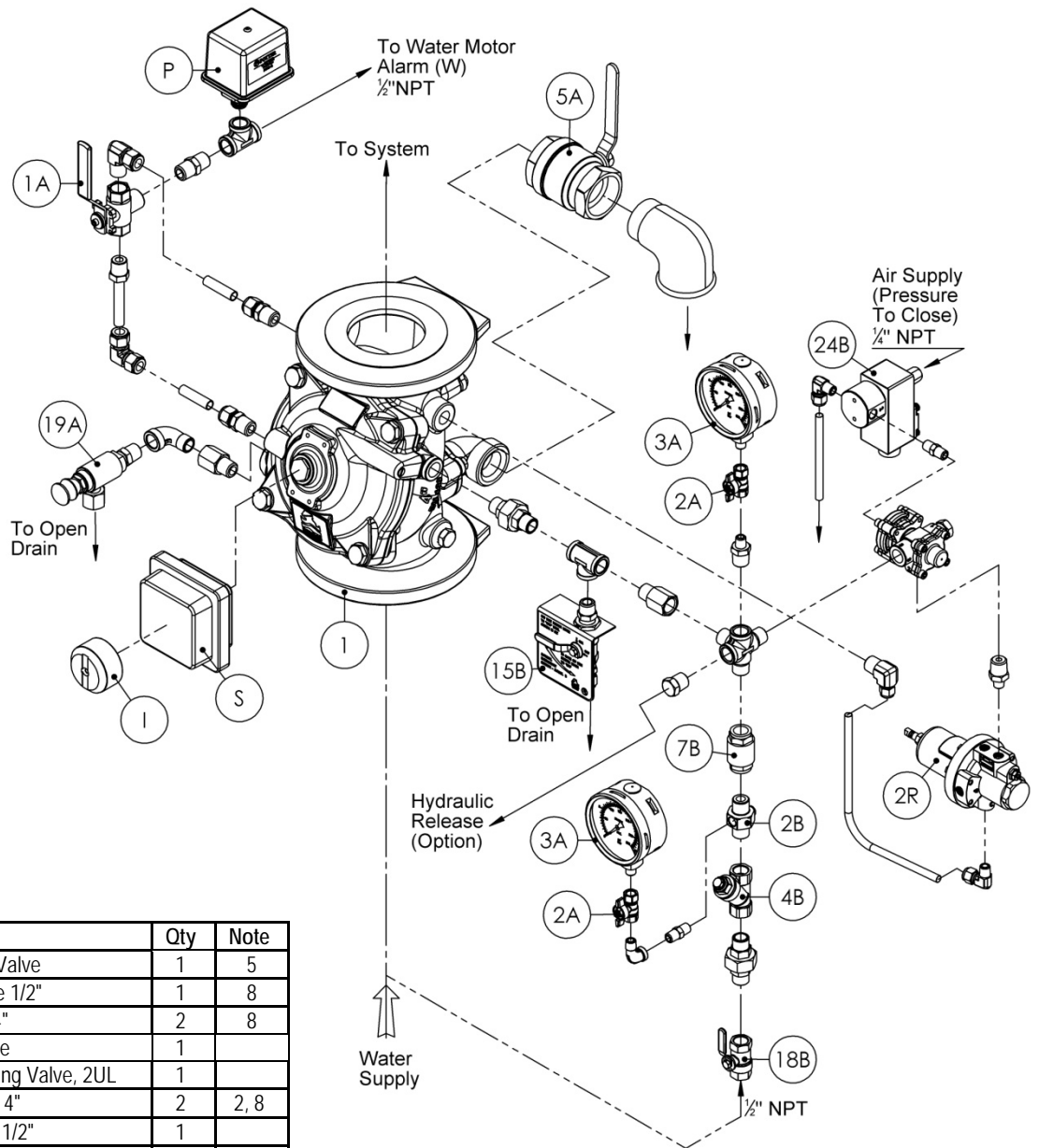
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm
H	Manual Reset (URV-M)

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

2.4.3 Model 6DC Trim Illustration: Electro -Pneumatically Pressure Controlled Deluge Valve.



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
2R	Pressure Reducing Valve, 2UL	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	
24B	Solenoid Valve 3-Way	1	5
F	Fittings and Tubing		6
U	Universal Relay Valve (URV)	1	

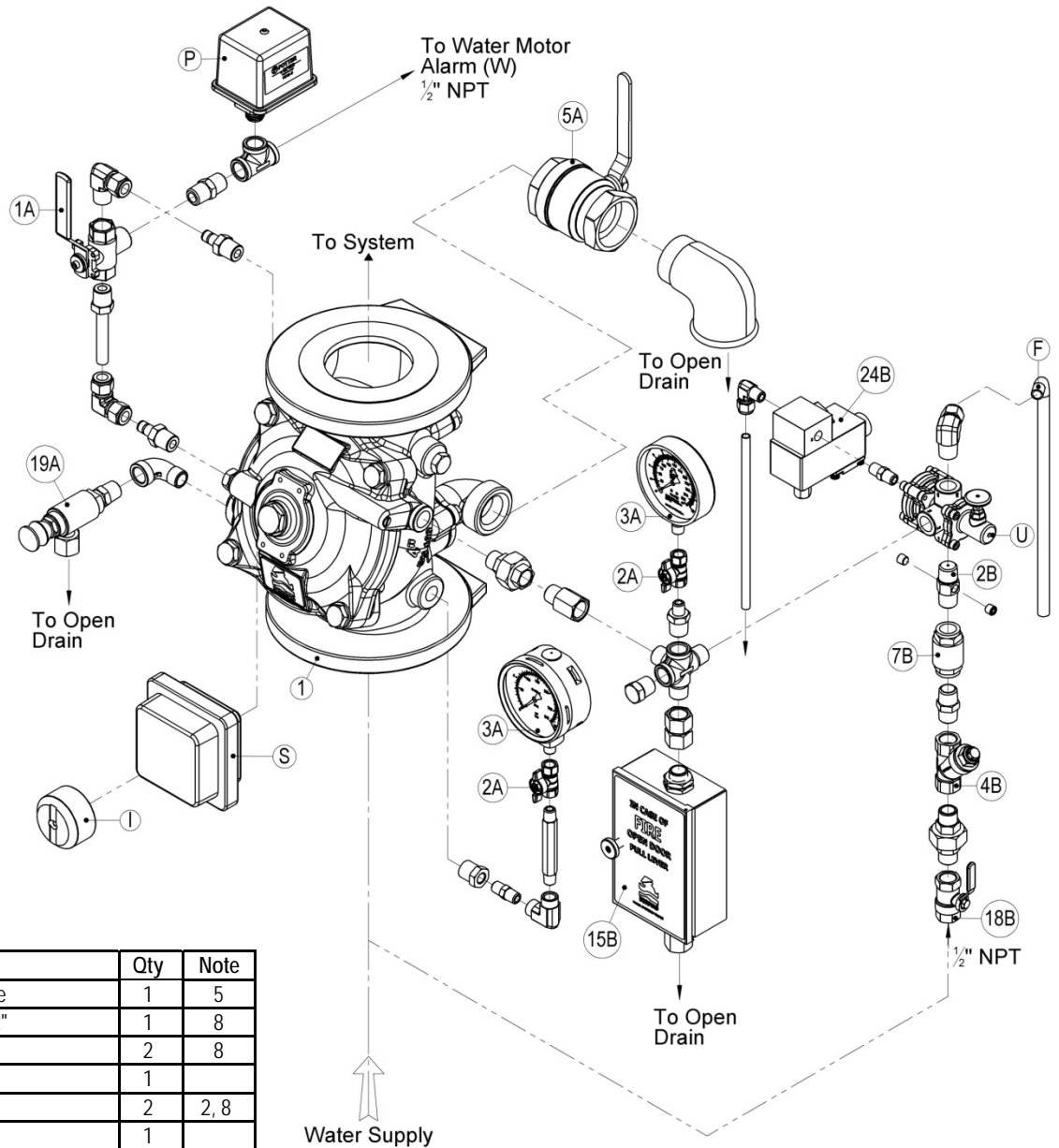
Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm
H	Manual Reset (URV-M)

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

2.4.4 Model 6U Trim Illustration: Electro -Pneumatically Controlled Deluge Valve with URV.



Item	Description	Qty	Note
1	400E-Y Deluge Valve	1	5
1A	Alarm Test Valve 1/2"	1	8
2A	Gauge Valve 1/4"	2	8
2B	Restriction Orifice	1	
3A	Pressure Gauge 4"	2	2, 8
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	1	1, 4, 8
7B	Priming Check valve 1/2"	1	
15B	Manual Emergency Release	1	1, 9
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	8
24B	Solenoid Valve 3-Way	1	5
F	Fittings and Tubing		6
U	Universal Relay Valve (URV)	1	

Optional System Items:

P	Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm
H	Manual Reset (URV-H)

Notes:

- (1) Shall be UL Listed in accordance with UL 258
- (2) Shall be UL Listed in accordance with UL 393
- (3) Shall be UL Listed in accordance with UL 753
- (4) For 1½ & 2": ¾" Drain Valve ; 2½ & 3": 1½" Drain Valve & 4" and larger: 2" Drain Valve
- (5) Shall be UL Listed for fire protection service
- (6) Construction material Brass/S.S 316 or corrosion resistant equivalent
- (7) Items marked by 'B' standard Trim components provided in the Trim package
- (8) Items marked by 'A' are required trim components for the proper installation and use of the deluge valve and are not provided in the Trim package. These items must be obtained from Bermad or an outside supplier prior to installation package of the deluge valve and trim.
- (9) Manual Emergency Release may be Model B (open Bracket) or Model D (with box)

4. Placing in Service/Resetting

The deluge valve and the control trim shall be placed in Service in accordance to the instructions below. After all relevant instructions are performed, slowly open the supply-isolating valve and check that no water flows into the system.

4.1 Electrical Detection System:

- A. Place the detector circuit in service.
- B. Reset the Solenoid Valve by resetting the releasing control panel.
- C. Test supervisory circuits in releasing control panel.

4.2 Hydraulically Control / Wet Pilot Systems:

- A. Open the pressure supply isolating valve, allowing release system pressure to build up, check the entire system for leaks.
- B. Check the entire Wet Pilot line/Fusible Plugs for leaks, replace any fused temperature-release plugs.

NOTE: Any automatic air or nitrogen pressure supply must feed the system through an orifice restriction. If a low air pressure switch is utilized, test it by dropping the release line pressure, restore pressure after the test.

4.3 Pneumatic System Pressure Requirements:

- C. Supply of day air or nitrogen is required to maintain a pneumatic pressure between 2.4-2.6 bar (35-38 psi).
- D. The Pneumatic system shall use a clean, dependable and continuous compressed-air source using an independent air compressor or an AMD (Air Maintenance Device) supplied by a dry nitrogen-gas or external high air pressure source.

NOTE: Any event of an air supply failure, slow leakage of air from the pneumatic system, will result in activation of the Pneumatic Pilot Valve, causing the Deluge Valve to Open.

- E. The Low-Pressure Alarm Switch is recommended and shall be set to operate at 2.2 bar (32 psi) with decreasing air pressure. If necessary, adjustments can be made by following the manufacturer's instructions.
- F. Operate pneumatic pressure supply system, allowing release system pressure to build up to the above range of 20 to 30, check the entire system for leaks.
- G. Check the entire Fusible Plugs/Dry Pilot line for leaks, replace any fused temperature-release plugs.

NOTE: Any automatic air or nitrogen pressure supply must feed the system through an orifice restriction. If a low air pressure switch is utilized, test it by dropping the release line pressure, restore pressure after the test.

4.4 Placing In Service

- A. Close all emergency release valves.
- B. Open the priming-line valve .Check that there is no water flow from the Solenoid Valve.
- C. Push and hold the Manual Reset button, this allows upstream water pressure to fill the Deluge Valve's control chamber through the Control Trim.
- D. When the control chamber pressure gauge indicates full upstream pressure and is no longer rising, the release system is reset.
- E. Slowly Open the supply Isolating Valve and check that no water flows into the system.
- F. Depress the Drip Check and drain any water from the system side of the Deluge Valve.

NOTE: The system is now operational and in a standby mode, ensures that the following Set Conditions are met.

Table No. 3: Set Conditions (Normal Conditions)

Item	Status
All Main Isolating Valves	OPEN and sealed with tamperproof seals
All Manual Releases	CLOSE position and sealed
Alarm Shut-Off Valve (11A)	OPEN position
Priming Ball Valve (18B)	OPEN
Control-Chamber Gauge	OPEN gauge valve, the gauge indicates pressure in control-chamber
Upstream Pressure Gauge	OPEN gauge valve, the gauge indicates supply pressure to deluge valve
Drip-Check Device (19B)	VENTED: Push the knob to confirm that there is no leakage
Wet Pilot Line System	IN SERVICE – no leaks in the system
Control Panel & Detections	IN SERVICE and in there stand-by position.
Pneumatic Release System	ON , maintained to 2.4-2.6 bar (35-38 psi) and functioning properly
Releasing Devices	CLOSED with no leaks

5. Maintenance

Bermad Deluge Valves require no lubrication, packing or tightening and require minimum maintenance

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.

- A. 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 raised.
- B. In any of the following inspections or testing procedures, if an abnormal condition exists, see "Abnormal Conditions" for possible cause and corrective action.
- C. See NFPA Pamphlet No. 25 and also relevant publications by authorities having jurisdiction.

6. Removal Instructions

WARNING: When taking a 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's representative should also be notified when the system is being taken out of service.

- A. Shut off the main supply-isolating valve.
- B. Close the priming line valve to the deluge valve control chamber.
- C. Open all drain valves to drain all the water from the system .
- D. Release the water pressure from the control chamber of the deluge valve by pulling the manual emergency release, or by tripping the electrical circuit (de-energize the Solenoid Valve)
- E. If auxiliary power is used, disconnect all power supply and batteries.
- F. Place "Fire Protection System Out of Service" signs in the area protected by the system.

5.1 Inspection

5.1.1 Weekly Inspection

- A. The system should be checked for Set Condition. See above "Set Condition (Normal condition)".
- B. Observe the upstream pressure gauge: it should indicate that the normal supply of water pressure to the Deluge Valve is maintained.

5.1.2 Monthly Inspection and Test

- A. Complete Weekly Inspection.
- B. Test the water-motor alarm and/or electric alarm, by turning the alarm test valve to the open position. The alarm should sound. Turn to closed position.
- C. Depress the Drip Check to release accumulated water and to check main valve leakage (Significant water accumulation on the system side may indicate a sealing problem).

5.1.3 Semi-Annual Inspection

- A. Complete Weekly and Monthly Inspection and Test.
- B. Inspect the electric detection system and electric release control panel, as suggested by the release control panel manufacturer.

5.1.4 Annual Inspection and Test

- A. Complete Weekly, Monthly and Semi-Annual inspections.
- B. Place the system out of service (See "Removing the System from Service" above).
- C. Trip the release-line system.
- D. The interior of the Deluge Valve should be cleaned and inspected.
- E. The interior of the URV, including its diaphragm and seal, should be inspected and cleaned.
- F. Place the system back in service. (See instructions "Placing the System in Service").
- G. The Deluge Valve must be activated at full flow.
- H. Note: The system will be flooded! Take all necessary precautions to drain water and prevent damage in the area protected by the system.

- I. Trip-test the deluge system via the electric release control panel. The release may be tripped by the method suggested by the release control panel manufacturer.
- J. Trip test the deluge system by decreasing pressure in the pneumatic release system.
- K. The manual emergency release handle is to be pulled. The Deluge Valve should open and discharge water. Observe upstream Pressure Gauge while full flow is on. Inspect all system nozzles.
- L. Take all additional measures as required by NFPA-25 "Standard for the Inspection Testing and Maintenance of Water-Based Fire Protection Systems."
- M. Clean the priming strainer prior to resetting the Deluge Valve.

5.2 Abnormal Conditions

5.2.1 Alarm Pressure Switch Fails to Sound

- A. Check for obstructions in the alarm test line.
- B. Clean the alarm-line strainer (if a water motor alarm is installed).
- C. Make certain the alarm is free to operate.
- D. Test the electrical circuit to the electric alarm (if utilized).

5.2.2 False Trip

Check for any of the following possible causes:

- A. Check and test the electrical circuit to the Solenoid Valve.
- B. Check for Malfunctioning EMR device.

5.2.3 Leakage through Deluge Valve

Check for any of the following possible causes:

- A. Check for clogged priming strainer
- B. Leaking control trim system.
- C. Inadequate pneumatic pressure supply.
- D. Leaking Dry Pilot release system.
- E. Damaged deluge valve internal elastomer or seat.

5.2.4 Deluge Valve Will Not Reset

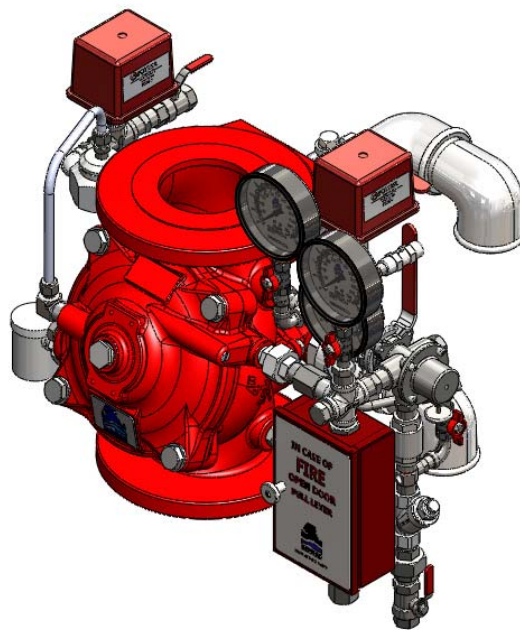
Check for any of the following possible causes:

- C. The Pilot Valve is clogged or not reset properly
- D. Inadequate Pneumatic Pressure supply.
- E. Check for clogged priming strainer, the screen should be properly cleaned.
- F. Closed priming valve.
- G. Check for Foreign object lodged between seal and valve seat.
- H. Control Panel is not reset. Check for Faulty circuits, using manufacturer instructions.
- I. Leak in Dry Pilot Line release system.
- J. Clogged orifice assy.

5.2.5 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.

400E-DP-Y Torrent Dry-Pipe Valve



Installation Operation Maintenance Manual (IOM)

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 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. General

The BERMAD 400E-Y Water Control Valve designed for vertical or horizontal installation. The 400E-DP straight-through design provides high flow capabilities with minimum head loss and the removable cover enables quick in-line service. The elastomeric assembly can be easily removed from the valve body with no need for disassembling of the valve from the line.

1.2 Optional Features

- Valve Position Indicator and Namur interface for industrial switch box
- Valve Seat Ring
- Alarm Pressure Switches
- Water Motor Alarm
- Seawater construction
- Drain Valves – Upstream and/or Downstream

1.3 Approvals

The Bermad 400E-DP Dry Pipe Valve is UL Listed and FM Approved when installed with specific components & accessories. 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.

1.4 Principal Of Operation

The Bermad 400E-DP that is assembled with specific trim is suitable for systems that include adequate detecting and piping systems with open nozzles, the valve prevents water from entering the system piping and kept closed by pressure applied to the control chamber through a restricted priming line.

In the SET position (Fig 1-a), the water pressure supplied through the priming line is trapped in the control chamber of the water control valve and presses the valve seal disc down, thereby sealing the valve and keeping the system piping dry. Under FIRE conditions, when the pressure is released from the control chamber (Fig 1-b) by the opening of the automatic releasing device or by manual release, the water control valve opens and allows the inlet supply water to flow unrestricted through the valve and into the system piping and alarm devices.

WARNING: Whenever the handle of the Manual Emergency Release is pulled, pressure is released from the control chamber, the water control valve will open, and water will flow into system piping and alarm devices.

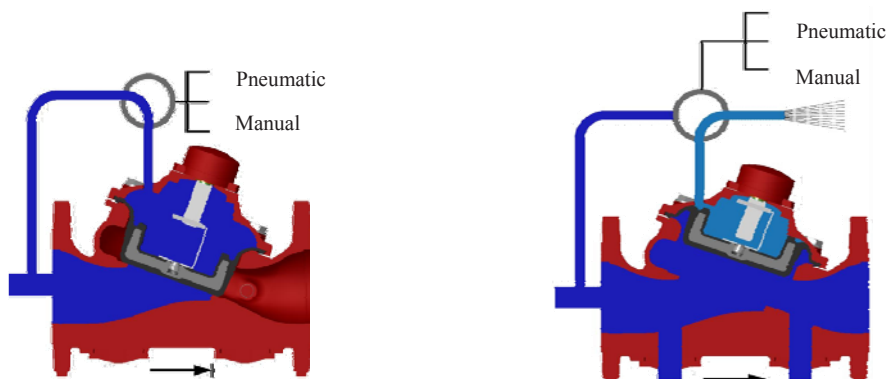


Fig 1 - a: Valve Closed (Set Position)

Fig 1 - b: Valve Open (Operating Conditions)

Table No.1: Pressure Ratings

Valve End Connections	Standard	Rating/ Class	Max Working Pressure	
			barg	psig
Flanged	ANSI B16.5 / 16.42	#150	17.4	250
Flanged	ANSI B16.5 / 16.42	#300	25	365
Flanged	ISO 7005-2	PN16	16	235
Flanged	ISO 7005-2	PN25	25	365
Grooved	ANSI / AWWA C606	365	25	365

Table No.2: 400E-Y Flow Ratings

Valves sizes	3"	4"	6"	8"	10"
CV (Kv)	190 (219)	345 (398)	790 (912)	1160 (1340)	1430 (1652)
Leq m (ft), see Note 1	8 (25)	8 (26)	13 (43)	27 (89)	55 (179)
Max. Flow-Rate m ³ /hr (GPM)	102 450)	159 (700)	363 (1600)	795 (3500)	1136 (5000)

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

2. Installation

Proper operation of the FP 400-Torrent Deluge Valves depends upon their trim being installed in accordance with the appropriate trim configuration guidelines.

Notes:

- Any deviation in trim size or arrangement may adversely affect the proper operation of the deluge valve.
- All the pilot system devices, must be UL-Listed, FM Approved and compatible with the particular system. Refer to current “Fire Protection Equipment Directory”.

Warning: The deluge valve and trim must be installed only in areas where they will not be subject to freezing temperatures.

2.1 Installation Instructions

- 2.1.1 Allow enough room around the valve assembly for any adjustments and future maintenance.
- 2.1.2 Before the valve is installed, flush the pipeline to remove any dirt, scale, debris, etc.
Warning: not flushing the line may result in the valve being rendered inoperable.
- 2.1.3 Install the valve on the pipeline so that the valve flow arrow designated on the body casing points in the desired direction. Ensure that the valve is positioned so that the cover can be easily removed for future maintenance.
- 2.1.4 Install a Listed indicating valve upstream of the Dry Pipe valve (supervised “open”).
- 2.1.5 Install another Listed Indicating Valve downstream of the Dry Pipe Valve (supervised “open”) to shut off and isolate the sprinkler piping in order to allow water flow testing and maintenance.
- 2.1.6 Install a Drain Valve of appropriate size downstream of the Dry Pipe Valve (normally closed), this drain valve shall be installed between the Dry Pipe valve and the downstream Indicating Valve for flow test and accumulated water drain.
- 2.1.7 The water supply priming line must be connected to the upstream of the main isolating valve.
- 2.1.8 Subject to all other instructions, drawings and technical specifications, which describe Bermad Valve, install in their proper positions the components comprising the Water Control Trim Package, according to the drawing relevant to the specific type, hereby enclosed.
- 2.1.9 Install the necessary accessories, which appear in the drawing.
- 2.1.10 All additional accessories, although not packed together with the BERMAD Dry Pipe valve, must be installed as shown in the relevant drawing and other illustrations.
- 2.1.11 Install additional accessories that are required by the NFPA codes or by authorities having jurisdiction.
- 2.1.12 The water supply priming line must be connected to the upstream of the Dry Pipe valve.
- 2.1.13 After installation in the main line, carefully inspect/correct any damaged accessories, piping, tubing, or fittings; ensure that there are no leaks.

2.2 System Air-Pressure Requirements

The system shall maintain a pneumatic pressure between 2.4-2.6 barg (36-38 psig), requiring a dry, clean, dependable and continuous compressed-air source using an Air Maintenance Device which includes a pressure regulator, restriction orifice and a ½" normally closed by-pass valve, the Air Maintenance Device should be provided with a downstream pressure gauge to indicate system pressure.

A dry nitrogen-gas can be an alternative for air pressure system.

NOTE: In refrigerated areas, the supply air dew point must be maintained below the lowest temperature to which the Dry piping might be exposed. Introducing moisture into system piping exposed to freezing temperatures can create ice blockage, which could interfere with the system's correct operation. At the least, the air supply should be taken from refrigerated areas at the lowest system temperature. The air supply must be carefully regulated to prevent clogging by frost deposits.

2.3 Temperature Considerations

The Water Control Valve, all interconnecting water piping and trim components must be installed in an accessible, clearly visible area maintained at a minimum temperature of 4°C.

NOTE: The Water Control Valve must be installed only in areas where it will not be subjected to freezing temperatures. No heat tracing is allowable for the Water Control Valve or for interconnecting piping. Avoid situations in which the dry sprinkler network is exposed to extreme temperature variations. A rise in the temperature of the compressed air might increase pressure to more than that recommended.

3. Operations

The Bermad Dry-Pipe Control Valve is best suited for automatic dry sprinkler systems. Dry-Pipe Valves are defined as systems that admit water to sprinkler piping only upon operation of automatic sprinkler and/or pneumatic pressure drop in the system-piping network. The sprinkler piping is automatically supervised.

The system includes a Bermad Water Control Valve with Dry-Pipe Control Trim, attached to dry sprinkler-piping system with automatic sprinklers.

The Bermad Water Control Valve remains locked by water trapped in the control chamber. The closed valve prevents unintentional water flow into the sprinkler-system piping.

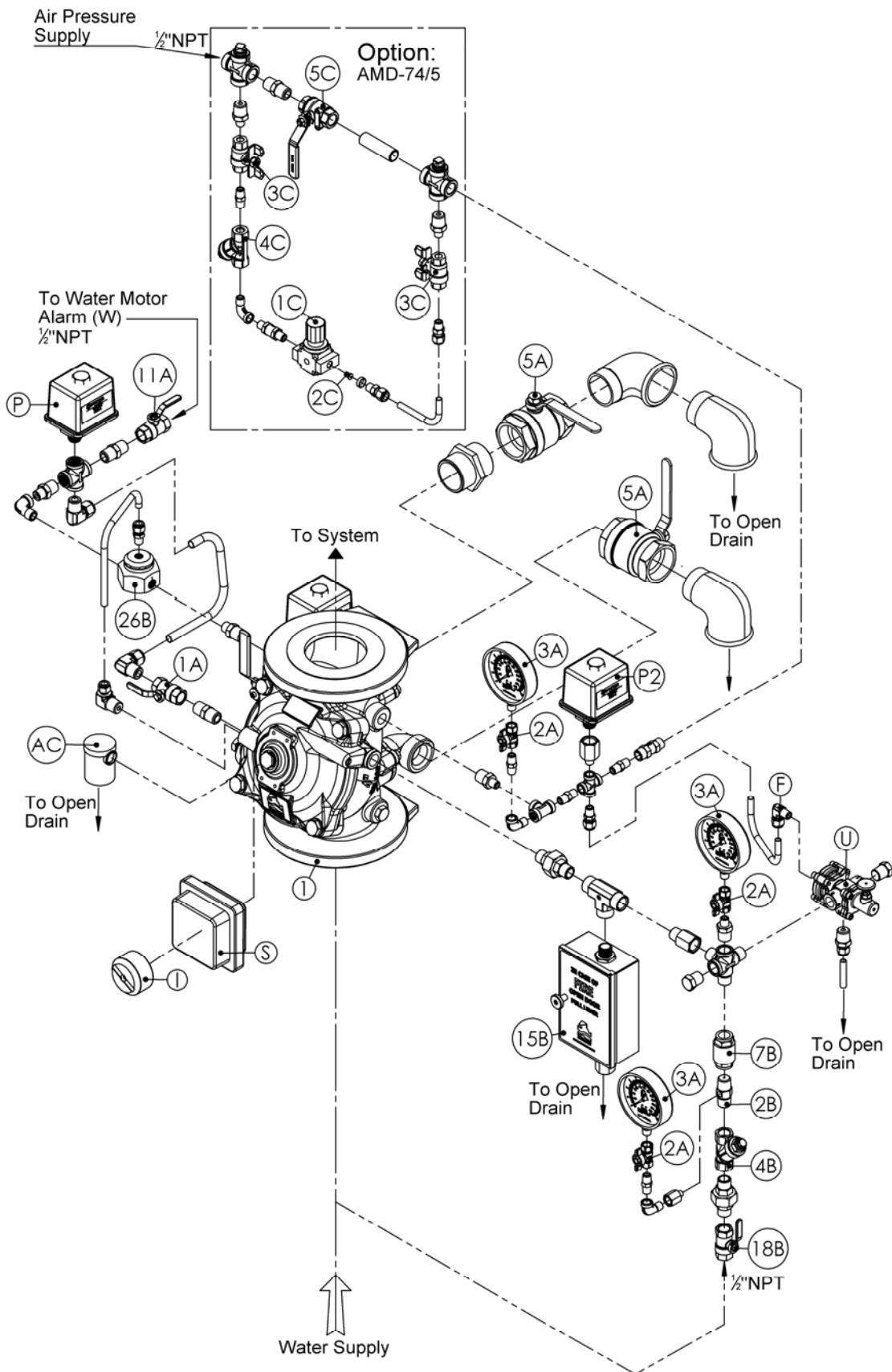
To flow water into the sprinkler piping, the URV-M (U) air pressure operated valve must be activated by the loss of pneumatic system pressure due to sprinkler operation and pneumatic release, causing the Bermad Water Control Valve to open and allow water flow into the piping system, the URV-M (U) prevents line-pressure from entering the control chamber, latching the main valve open and allowing water to flow into the system piping and to the alarm devices.

The Dry-Pipe Valves are mostly used where sprinkler piping may be exposed to freezing temperatures.

Warning: Whenever the Manual Emergency Release (15B) is activated, the Water Control Valve will open allows water to flow into the sprinkler piping system.

NOTE: The Valve must be installed where it will not be subjected to freezing temperatures, when installed in freezing conditions the FP 400E-DP must be located in a heated structure and air supply must be dried in order to prevent from water residuals and humidity from freezing within the system and piping.

3.1.1 Model 400E-DP trim illustration: Dry-Pipe Valve



Model 400E-DP Components List

Item	Description	Qty	Note
1	400E-Y Water Control Valve	1	1
1A	Alarm Test Valve 1/2"	1	
2A	Gauge Valve 1/4"	3	
2B	Restriction Orifice	1	
3A	Pressure Gauge 4"	3	2
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	2	4
7B	Priming Check valve 1/2"	1	
11A	Alarm Shutoff Valve 1/2"	1	
15B	Manual Emergency Release	1	
18B	Priming Valve - 1/2" Ball Valve	1	
26B	Hydraulic Relay Valve (HRV)	1	
F	Fittings and Tubing		3
U	URV-M w/ Manual Reset	1	

Optional Accessories

P	Water-flow Alarm Pressure Switch (PSH)
P2	Low Pressure Switch (PSL)
AC	Automatic Water Drain Valve
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm
AMD	Air Maintenance Device
1C	Air Pressure Regulator
2C	Restriction Orifice
3C	Ball Valve
4C	Strainer
5C	Ball Valve

Notes:

- (1) Suitable for Vertical or Horizontal installation
- (2) UL-Listed, FM approved
- (3) Fitting material: Galvanized/S.S or corrosion resistant equivalent
- (4) For 1½ & 2": ¾" Drain Valve; 3": 1½" Drain Valve ; 4" and larger: 2" Drain Valve

4. Placing in Service/Resetting

The Dry Pipe valve and the control trim shall be placed in Service in accordance to the most recent IOM procedures for the specific model.

- 4.1 Close the supply Isolating Valve.
- 4.2 Close the emergency release valves.
- 4.3 Apply supervisory air pressure to the system's piping and set the pressure at 2.5 ± 0.1 barg (36.5 ± 1.5 psi) .
- 4.4 Close All Drain Valves.
- 4.5 Open the priming-line valve, pull the URV-M reset lever, this allows upstream water pressure to fill the Water Control Valve's control chamber.
- 4.6 When the control chamber pressure gauge indicates full upstream pressure and is no longer rising, the release system is reset.
- 4.7 Open the downstream Drain Valve to drain any water from the downstream side of the valve.
- 4.8 Slowly Open the supply Isolating Valve and check that no water flows into the system.

The system is now operational and in a standby mode.

Ensure that the following Set Conditions are met.

Table No.2: Set Conditions (Normal Conditions) Table

Item	Status
All Main Isolating Valves	OPEN and sealed with tamperproof seals
All Manual Releases	CLOSE position and sealed
Alarm Shut-Off Valve (11A)	OPEN position
Priming Ball Valve (18B)	OPEN
Control-Chamber Gauge	OPEN gauge valve, the gauge indicates control-chamber pressure
Upstream Pressure Gauge	OPEN gauge valve, the gauge indicates the supply pressure
Drip-Check Device (19B)	VENTED : Push the knob to confirm that there is no seat leakage
Alarm Panel (if installed)	In service and are stand-by
Supervised Air System	The pressure gauge shows 2.5 ± 0.1 barg (36.5 ± 1.5 psi) and stable
Releasing Devices	CLOSED with no leaking

5. Maintenance

Bermad Dry Pipe Valve requires no lubrication, packing or tightening and requires minimum maintenance.

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.

- A. 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 raised.
- B. In any of the following inspections or testing procedures, if an abnormal condition exists, see "Abnormal Conditions" for possible cause and corrective action.
- C. See NFPA Pamphlet No. 25 and also relevant publications by authorities having jurisdiction.

5.1 Removal Instructions

WARNING: When taking the Dry-Pipe Valve and its sprinkler network out of service, a roving fire patrol should survey 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's representative should also be notified when the system is being taken out of service.

- A. Shut off the main supply-isolating valve.
Close the pneumatic pressure supply to the system.
Close the priming line valve to the Bermad valve control chamber.
Open all drain valves to drain all the water from the system .
Release the water pressure from the control chamber of the water control valve by pulling the manual emergency release.
Place "Fire Protection System Out of Service" signs in the area protected by the system.

5.2 Inspection

5.2.1 Weekly Inspection

- B. The system should be checked for Set Condition. See above "Set Condition (Normal condition)".
- C. Observe the upstream pressure gauge: it should indicate that the normal supply of water pressure to the Deluge Valve is maintained.

5.2.2 Monthly Inspection and Test

- D. Complete Weekly Inspection.

WARNING: Manually activating the alarm may affect the Detection System Control Panel, which in turn can cause a general alarm. Take all of the necessary precautions in order to prevent causing a general false alarm.

- E. Water-Flow Alarm: By turning the Alarm-Test Valve (1A) to the open position. The alarm should sound.
- F. Open the downstream drain valve to release any accumulation of water. The dripping should stop completely.

5.2.3 Annual Inspection and Test

- A. Complete Weekly and Monthly and inspections.
- B. Close the Sprinkler-System Isolating Valve, to isolate the sprinkler system.
- C. The Water Control Valve trim, releasing devices such as manual release must be activated at full flow.
- D. Trip test the Dry Pipe Valve with the Control Panel. Operate the detecting system by operating both the Heat Detectors and the Low-Pressure Switch (P2). The release should be tripped according to the method suggested by the manufacturer of the Control Panel.
- E. Observe upstream Pressure Gauge while full flow is on.

NOTE: Water will be discharged to the drain. In cases where a Sprinkler- Piping Isolating Valve is not installed, other arrangement must be made in order to perform the trip test without causing water damage.

- F. Place the system out of service. (See "Removal instructions").
- G. The interior of the Deluge Valve should be cleaned and inspected.
- H. The interior of the URV-M, including its diaphragm and seal, should be inspected and cleaned.
- I. Place the system back in service. (See instructions "Placing the System in Service").
- J. Take all additional measures as required by NFPA-25 "Standard for the Inspection Testing and Maintenance of Water-Based Fire Protection Systems."
- K. Clean the priming strainer prior to resetting the valve.

5.3 Abnormal Conditions

5.3.1 Alarm Pressure Switch Fails to Sound

- A. Check for obstructions in the alarm test line.
- B. Clean the alarm-line strainer (if a water motor alarm is installed).
- C. Make certain the alarm is free to operate.
- D. Test the electrical circuit to the electric alarm (if utilized).

5.3.2 False Trip

Check for any of the following possible causes:

- A. Check for Malfunctioning Manual Emergency Release device.
- B. Check and test the URV-M activation.

5.3.3 Leakage through Water Control Valve

Check for any of the following possible causes:

- C. Check for clogged priming strainer.
- D. Leaking control trim system.
- E. Damaged main valve internal elastomer or seat.

5.3.4 Water Control Valve Will Not Reset

Check for any of the following possible causes:

- F. The Manual Emergency Release device is clogged or not reset properly.
- G. Check for clogged priming strainer, the screen should be properly cleaned.
- H. Closed priming valve.
- I. Check for Foreign object lodged between seal and valve seat.

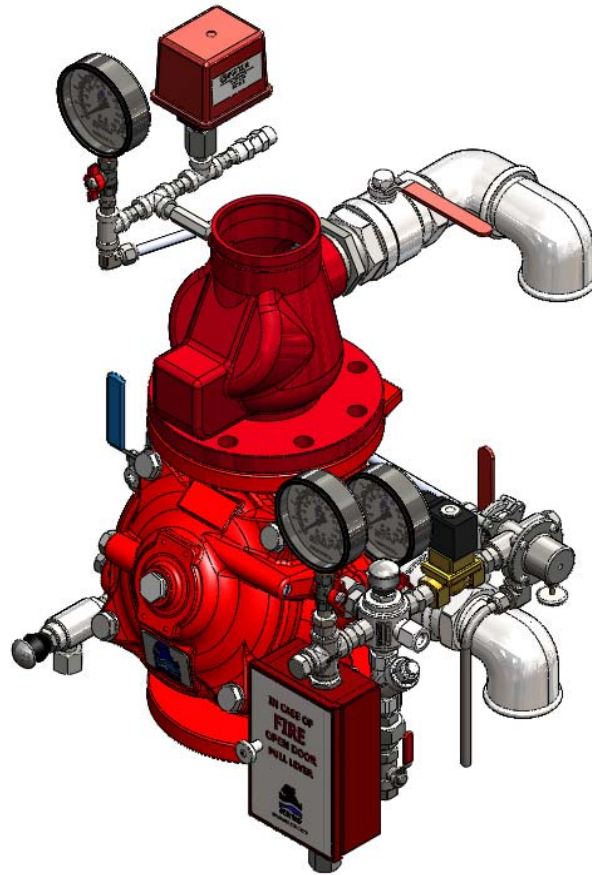
5.3.5 Difficulty in Performance

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

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400E-Y Torrent Pre-Action Systems



**Installation
Operation
Maintenance
Manual (IOM)**

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 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. General

The BERMAD 400E-Y Water Control Valve designed for vertical or horizontal installation and is used for Deluge and Pre-action in Firewater or Foam systems.

The 400E-Y straight-through design provides high flow capabilities with minimum head loss and the removable cover enables quick in-line service. The elastomeric assembly can be easily removed from the valve body with no need for disassembling of the valve from the line.

1.2 Optional Features

- Valve Position Indicator and Namur interface for industrial switch box
- Valve Seat Ring
- Alarm Pressure Switches
- Water Motor Alarm
- Seawater construction
- Drain Valves – Upstream and/or Downstream

1.3 Approvals

The Bermad 400E-Y Pr-Action System is UL Listed and FM Approved when installed with specific components & accessories. 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.

1.4 Principal Of Operation

The Bermad 400E-Y that is assembled with specific trim is suitable for systems that include adequate detecting and piping systems with open nozzles, the valve prevents water from entering the system piping and kept closed by pressure applied to the control chamber through a restricted priming line.

In the SET position (Fig 1-a), the water pressure supplied through the priming line is trapped in the control chamber of the water control valve and presses the valve seal disc down, thereby sealing the valve and keeping the system piping dry. Under FIRE conditions, when the pressure is released from the control chamber (Fig 1-b) by the opening of the automatic releasing device or by manual release, the water control valve opens and allows the inlet supply water to flow unrestricted through the valve and into the system piping and alarm devices.

WARNING: Whenever the handle of the Manual Emergency Release is pulled, pressure is released from the control chamber, the water control valve will open, and water will flow into system piping and alarm devices.

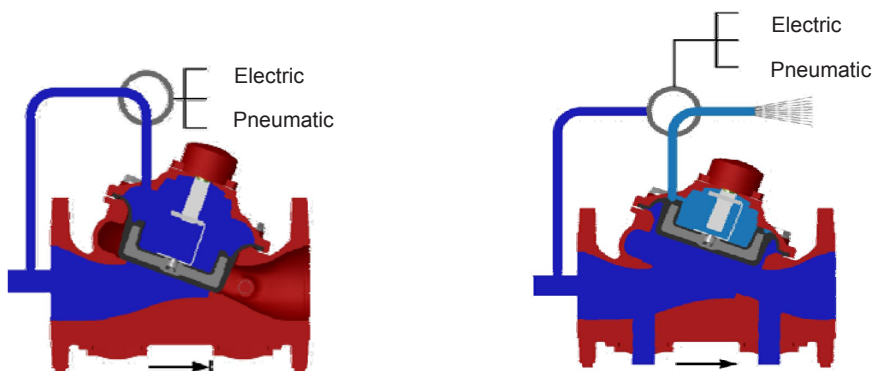


Fig 1 - a: Valve Closed (Set Position)

Fig 1 - b: Valve Open (Operating Conditions)

Table No.1: Pressure Ratings

Valve End Connections	Standard	Rating/ Class	Max Working Pressure	
			barg	psig
Flanged	ANSI B16.5 / 16.42	#150	17.4	250
Flanged	ANSI B16.5 / 16.42	#300	25	365
Flanged	ISO 7005-2	PN16	16	235
Flanged	ISO 7005-2	PN25	25	365
Grooved	ANSI / AWWA C606	365	25	365

Table No.2: 400E-Y Flow Ratings

Valves sizes	3"	4"	6"	8"	10"
CV (Kv)	190 (219)	345 (398)	790 (912)	1160 (1340)	1430 (1652)
Leq m (ft), see Note 1	8 (25)	8 (26)	13 (43)	27 (89)	55 (179)
Max. Flow-Rate m ³ /hr (GPM)	102 (450)	159 (700)	363 (1600)	795 (3500)	1136 (5000)

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

2. Installation

Notes:

- Any deviation in trim size or arrangement may adversely affect the proper operation of the system.
- All the pilot system devices, must be UL Listed and compatible with the particular system. Refer to current "UL Listed Fire Protection Equipment Directory".

2.1 Installation Instructions

- 2.1.1 Allow enough room around the valve assembly for any adjustments and future maintenance/disassembly work.
- 2.1.2 Before the valve is installed, flush the pipeline to remove any dirt, scale, debris, etc. Not flushing the line may result in the valve being inoperable.
- 2.1.3 Install the valve in the pipeline with the valve flow arrow on the body casting in the proper direction. Ensure that the valve is positioned so that the cover/actuator can be easily removed for future maintenance.
- 2.1.4 Ensure that the EMR is Mounted Vertically (with the reset button up), and all other components are positioned correctly as per the appropriate drawing.
- 2.1.5 Install a Listed Indicating Valve upstream of the Pre action System (supervised "open").
- 2.1.6 Install also another Listed Indicating Valve downstream of the Pre action System (supervised "open") to shut off and isolate the sprinkler piping in order to allow water flow testing and maintenance.
- 2.1.7 The water supply priming line must be connected to the upstream of the main isolating valve.
- 2.1.8 Subjected to all other instructions, drawings and technical specifications, which describe Bermad Valve, install in their proper positions the components comprising the Water Control Trim Package, according to the drawing relevant to the specific type, hereby enclosed.
- 2.1.9 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 Valve itself. After installation in the main line, carefully inspect/correct any damaged accessories, piping, tubing, or fittings; ensure that there are no leaks.

2.2 Electrical Requirements

All releasing and detection devices in the double-interlock system shall be controlled by a Releasing Control Panel. Wire all connections according to information and detailed wiring diagrams in publications provided by the releasing Control Panel manufacturer.

Connect the Low-Air-Supervised-Pressure Switch (P2) terminals Common and NC to the control panel. These contacts must be in the open position when the system is pneumatically pressurized.

All system isolating valves must be equipped with a supervisory switch to monitor the normally open position. The switch must be wired to the Control Panel.

The Power Supply, the Standby Emergency Power Supply, the Battery Charger and the Rectifier circuitry are all contained within the Control Panel.

2.3 System Air-Pressure Requirements

The system shall maintain a pneumatic pressure between 2.4-2.6 barg (35-38 psi), requiring a dry nitrogen-gas supply or a clean, dependable and continuous compressed-air source using an independent air compressor or an Air Maintenance Device supplied by an external high pressure source.

The Low-Pressure Alarm Switch (P2) is factory-set to operate at 2.2 barg (32 psi) with decreasing air pressure. If necessary, adjustments can be made by following the manufacturer's instructions

NOTE: In refrigerated areas, the air's dew point must be maintained below the lowest ambient temperature to which the Double-Interlock System's piping might be exposed. Introducing moisture into system piping exposed to freezing temperatures can create ice blockage, which could interfere with the system's correct operation. At the least, the air supply should be taken from refrigerated areas at the lowest system temperature. The air supply must be carefully regulated to prevent clogging by frost deposits.

2.4 Temperature Considerations

The Water Control Valve, all interconnecting water piping and trim components must be installed in an accessible, clearly visible area maintained at a minimum temperature of 4°C.

NOTE: The Water Control Valve must be installed only in areas where it will not be subjected to freezing temperatures. No heat tracing is allowable for the Water Control Valve or for interconnecting piping. Avoid situations in which the dry sprinkler network is exposed to extreme temperature variations. A rise in the temperature of the compressed air might increase pressure to more than that recommended.

3. Operations

3.1 Model 400E-7BM, Double interlock Pre-Action System, Electric/Pneumatic-Electric Release Operated by Cross-Zone Releasing Control Panel

The Bermad 400E-7BM Double-Interlock Pre-action System is suited for water-sensitive areas that require the maximum protection against false actuation. Double-Interlock systems are defined as systems that admit water to sprinkler piping only upon operation of both detection devices and automatic sprinklers. The sprinkler piping and electric fire detection devices are automatically supervised.

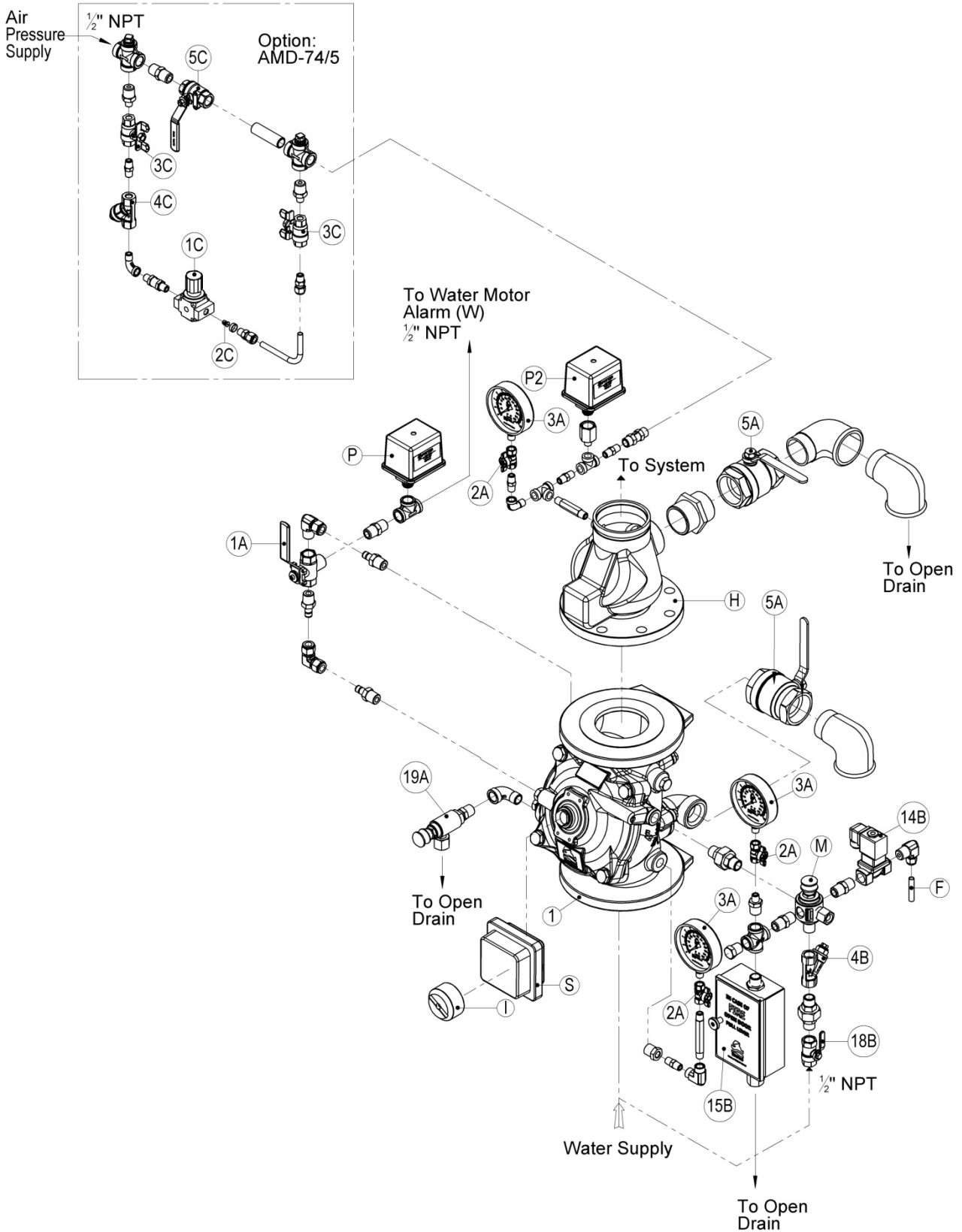
The system include a Bermad Water Control Valve with double-interlock control trim, attached to dry sprinkler piping system with automatic sprinklers and a supplementary electric detection system installed in the same area (as defined by NFPA 13).

The Bermad Water Control Valve remains locked by water trapped in the control chamber. The closed valve prevents unintentional water flow into the sprinkler-system piping.

To flow water into the sprinkler piping, two operational requirements must be preformed: First the fire-detection device must be activated and second the low pressure switch must make contact as sprinkler-operation opening results in the loss of pneumatic-system pressure. These two conditions must simultaneously coexist in the Cross-Zone Releasing Control Panel, which only then energizes the Solenoid Valve, causing the Bermad Water Control Valve to open and allow water flow into the piping system.

WARNING: whenever either the Solenoid or the Manual Emergency Release is activated, the EMR locks the Bermad Water Control Valve in its open position. The Bermad Water Control Valve will close again only when the reset button on the EMR is pressed while solenoid is de-energized.

**Model 400E-7BM, Double Interlock Pre-action System,
Electric/Pneumatic-Electric Release, Trim Illustration:**



3.1.1 Model 400E-7BM, Double Interlock Pre-Action System, Electric/Pneumatic-Electric Release, Components List:

Item	Description	Qty	Note
1	400E - Y Water Control Valve	1	1, 2
1A	Alarm Test Valve 1/2"	1	
2A	Gauge Valve 1/4"	3	
3A	Pressure Gauge 4"	3	2
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	2	3, 4
14B	Solenoid Valve 2 way	1	2
15B	Manual Emergency Release	1	
18B	Priming Valve 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	
AC	Automatic Water Drain	1	
F	Fittings and Tubing		5
H	In Line Swing Check Valve	1	1, 2
M	Easy Lock Manual Reset	1	

Optional Accessories

P	Pressure Switch
P2	Low Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm
AMD	Air Maintenance Device Model 74 / 5
1C	Air Pressure Regulator
2C	Restriction Orifice
3C	Ball Valve
4C	Strainer
5C	Ball Valve

Notes:

- (1) Suitable for Vertical or Horizontal installation
- (2) UL-Listed / FM approved
- (3) Shall be UL Listed in accordance with UL 258
- (4) For 1½ & 2": ¾" Drain Valve; 3": 1½" Drain Valve; 4" and larger: 2" Drain Valve
- (5) Fitting material: Galvanized/S.S or corrosion resistant equivalent

3.2 Model 400E-7DM, Double Interlock Pre-Action System, Electric-Pneumatic Release

The Bermad 400E-7DM Double-Interlock Pre action System is suited for water-sensitive areas that require the maximum protection against false actuation. Double-Interlock systems are defined as systems that admit water to sprinkler piping only upon operation of both detection devices and automatic sprinklers. The sprinkler piping and electric fire detection devices are automatically supervised.

The system include a Bermad Water Control Valve with double-interlock control trim, attached to dry sprinkler piping system with automatic sprinklers and a supplementary electric detection system installed in the same area (as defined by NFPA 13).

The Bermad Water Control Valve remains locked by water trapped in the control chamber. The closed valve prevents unintentional water flow into the sprinkler-system piping.

To flow water into the sprinkler piping, two operational requirements must be preformed:

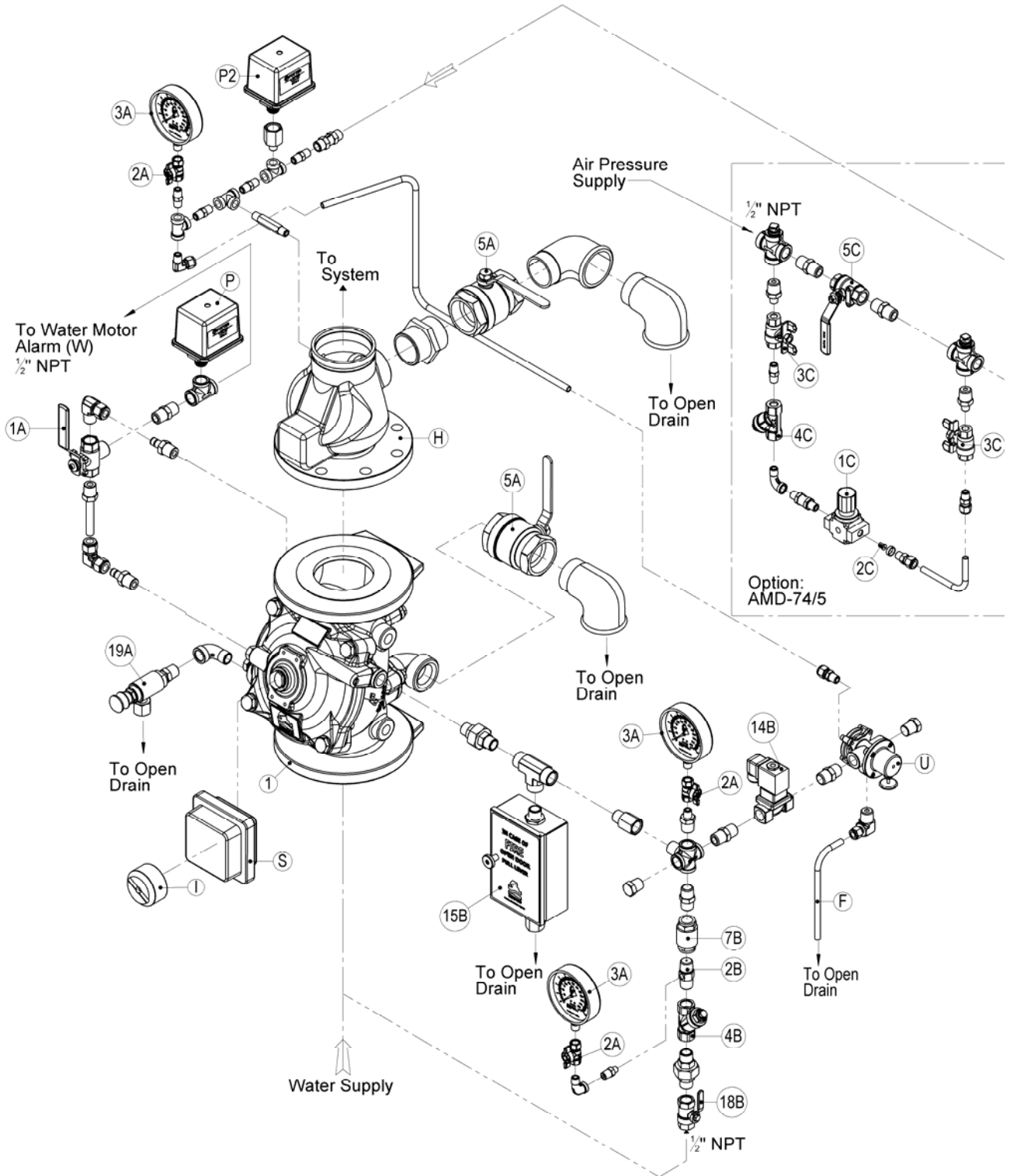
- The Solenoid valve must be activated by the releasing control panel.
- The URV-M, pilot valve must be activated by the loss of pneumatic system pressure due to sprinkler operation and pneumatic pressure release.

The Bermad 400E-7DM valve is equipped with URV-M pilot valve, which locks it into an open position during system activation. The Bermad 400E-7DM is operated by an electric Solenoid Valve and URV-M pilot valve and requires a listed and approved control panel with a compatible electrical fire detection system.

The Bermad 400E-7DM will rest only when the reset handle on the URV-M is pulled while solenoid is de-energized.

WARNING: Whenever the Manual Emergency Release is activated, the Bermad Water Control Valve will open fully, allow water to flow to the sprinkler piping.

3.2.1 Model 7DM, Double Interlock Pre-Action System, Electric-Pneumatic Release, Trim Illustration:



3.2.2 Model 7DM, Double Interlock Pre-Action System, Electric-Pneumatic Release, Components List:

Item	Description	Qty	Note
1	400E - Y Type Water Control Valve	1	1, 2
1A	Alarm Test Valve 1/2"	1	
2A	Gauge Valve 1/4"	3	
3A	Pressure Gauge 4"	3	2
4B	Priming Strainer 1/2"	1	
5A	Drain Valve	2	3, 4
14B	Solenoid Valve 2 way	1	2
15B	Manual Emergency Release	1	
18B	Priming Valve - 1/2" Ball Valve	1	
19A	Drip Check Device 1/2"	1	
F	Fittings and Tubing		5
H	In Line Swing Check Valve	1	1, 2
U	URV-M w/ Manual Reset	1	

Optional Accessories

P	Pressure Switch
P2	Low Pressure Switch
I	Valve Visual Position Indicator
S	Valve Limit Switch
W	Water Motor Alarm
AMD	Air Maintenance Device Model 74 / 5
1C	Air Pressure Regulator
2C	Restriction Orifice
3C	Ball Valve
4C	Strainer
5C	Ball Valve

Notes:

- (1) Suitable for Vertical or Horizontal installation
- (2) UL-Listed / FM approved
- (3) Shall be UL Listed in accordance with UL 258
- (4) For 1½ & 2": ¾" Drain Valve; 3": 1½" Drain Valve; 4" and larger: 2" Drain Valve
- (5) Fitting material: Galvanized/S.S or corrosion resistant equivalent

4. Placing in Service/Resetting

The Pre-Action valve and the control trim shall be placed in Service in accordance to the most recent IOM procedures for the specific model.

- 4.1 Place the Detecting System's circuit in service and test regulatory circuits in the Release Control Panel, locating and replacing any faulty items. Test supervisory circuits in releasing control panel.
- 4.2 Apply supervisory air pressure to the system's piping and set the pressure at 2.5 ± 0.1 barg (36.5 ± 1.5 psi).
- 4.3 De-energize the Solenoid Valve by resetting the Electric Control Panel.
- 4.4 Close all emergency release valves.
- 4.5 Close All Drain Valves.
- 4.6 Open the priming-line valve, operate the reset button, this allows upstream water pressure to fill the Water Control Valve's control chamber.
- 4.7 When the control chamber pressure gauge indicates full upstream pressure and is no longer rising, the release system is reset.
- 4.8 Slowly Open the supply Isolating Valve and check that no water flows into the system.
- 4.9 Depress the Drip-Check and drain any water from the downstream side of the valve.
- 4.10 Test settings for the Low Air-Pressure Switch (P2) by releasing air from the Sprinkler Test Valve or gradually open the Sprinkler-System Drain Valve. The Low Air-Pressure Switch should be set to operate at 2.2 barg (32 psi).

The system is now operational and in a standby mode. Ensure that the following Set Conditions are met.

Table No.2: Set Conditions (Normal Conditions) Table

Item	Status
All Main Isolating Valves	OPEN and sealed with tamperproof seals
All Manual Releases	CLOSE position and sealed
Alarm Shut-Off Valve (11A)	OPEN position
Priming Ball Valve (18B)	OPEN
Control-Chamber Gauge	OPEN gauge valve, the gauge indicates control-chamber pressure
Upstream Pressure Gauge	OPEN gauge valve, the gauge indicates the supply pressure
Drip-Check Device (19B)	VENTED : Push the knob to confirm that there is no seat leakage
Control Panel & Detections	Are in service and are stand-by
Supervised Air System	The pressure gauge shows 2.5 ± 0.1 barg (36.5 ± 1.5 psi) and stable
Releasing Devices	CLOSED with no leaking

5. Maintenance

Bermad Pre Action Valve requires no lubrication, packing or tightening and require minimum maintenance
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.

- A. 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 raised.
- B. In any of the following inspections or testing procedures, if an abnormal condition exists, see "Abnormal Conditions" for possible cause and corrective action.
- C. See NFPA Pamphlet No. 25 and also relevant publications by authorities having jurisdiction.

Removal Instructions

WARNING: When taking the Pre action System and its sprinkler network out of service, a roving fire patrol should survey 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's representative should also be notified when the system is being taken out of service.

- A. Shut off the main supply-isolating valve.
- B. Close the pneumatic pressure supply to the system.
- C. Close the priming line valve to the Bermad valve control chamber.
- D. Open all drain valves to drain all the water from the system .
- E. Release the water pressure from the control chamber of the water control valve by pulling the manual emergency release.
- F. If auxiliary power is used, disconnect all power supply and batteries.
- G. Place "Fire Protection System Out of Service" signs in the area protected by the system.

5.1 Inspection

5.1.1 Weekly Inspection

- A. The system should be checked for Set Condition. See above "Set Condition (Normal condition)".
- B. Observe the upstream pressure gauge: it should indicate that the normal supply of water pressure to the Water Control Valve is maintained.

5.1.2 Monthly Inspection and Test

- A. Complete Weekly Inspection.

WARNING: Manually activating the alarm affects the Control Panel, which in turn can cause a general alarm. Take all of the necessary precautions in order to prevent causing a general false alarm.

- B. Test the Electric Alarm Bell and the Water-Flow Alarm (if installed) by turning the Alarm-Test Valve (1A) to the open position. The alarm should sound.
- C. Depress the Drip Check (19B) to release any accumulation of water. The dripping should stop completely.

5.1.3 Annual Inspection and Test

- A. Complete Weekly, Monthly and Semi-Annual inspections.
- B. Close the Sprinkler-System Isolating Valve, to isolate the sprinkler system.
- C. The Water Control Valve trim, releasing devices such as Solenoid valve, URV-M device and manual release must be activated at full flow.
- D. Trip test the Pre action System with the electric and pneumatic system activation. Operate Control Panel by operating the Heat Detectors; also release air pressure to operate the URV-M. The Control Panel shall be tripped according to the method suggested by the Panel manufacturer. Observe upstream Pressure Gauge while full flow is on.

NOTE: Water will be discharged to the drain. In cases where a Sprinkler- Piping Isolating Valve is not installed, another arrangement must be made in order to perform the trip test without causing water damage.

- E. Place the system out of service. (See Removal instructions above).
- F. Clean the priming strainer prior to resetting the Water Control Valve.
- G. Place the system back in service (See instructions in the section "Placing the System in Service").
- H. Take all additional measures as required by NFPA-25 "Standard for the Inspection Testing and Maintenance of Water-Based Fire Protection Systems".

5.2 Abnormal Conditions

5.2.1 Alarm Pressure Switch Fails to Sound

- A. Check for obstructions in the alarm test line.
- B. Clean the alarm-line strainer (if a water motor alarm is installed).
- C. Make certain the alarm is free to operate.
- D. Test the electrical circuit to the electric alarm (if utilized)

5.2.2 False Trip, Check for any of The Following Possible Causes:

- A. Check and test the electrical circuit to the Solenoid Valve
- B. Check for Malfunctioning resetting pilot valve/device.

5.2.3 Leakage through water Control Valve, Check for Any Of The Following Possible Causes:

- A. Check for clogged priming strainer.
- B. Leaking control trim system.
- C. Damaged main valve internal elastomer or seat.

5.2.4 Main Valve Not Resetting, Check for Any Of The Following Possible Causes:

- A. The EMR Device is clogged or not reset properly
- B. Check for clogged priming strainer, the screen should be properly cleaned.
- C. Closed priming valve.
- D. Check for Foreign object lodged between seal and valve seat.
- E. Control Panel is not reset. Check for Faulty circuits, using manufacturer instructions.

5.2.5 Difficulty in Performance

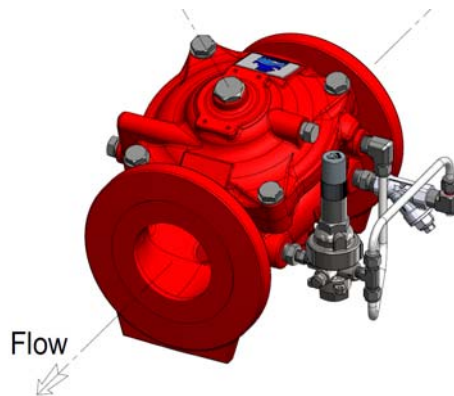
Where difficulty in performance is experienced, the manufacturer or his authorized representative should be contacted if any field adjustment is to be made.

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Model: 42T

Bermad Pressure Reducing Valve



Installation

Operation

Maintenance

Manual (IOM)

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 42T Pressure-Reducing Valve is a pilot-operated, diaphragm-actuated, straight-through flow type with low pressure-loss. It is an automatic pressure control valve that reduces higher inlet pressure to lower constant outlet pressure regardless of fluctuating flow-rates and/or varying inlet pressure.

2. Pressure and Flow Ratings

The Bermad 42T pressure-reducing valves size 3", 4", 6", 8" and 10" are rated for the following pressure and flow capacities detailed in table 1.

Table 1: Pressure Ratings and Flow Capacity

Valve Size in (mm)	3" (80)	4" (100)	6" (150)	8" (200)	10" (250)
Max. Inlet pressure bar (psi)	25 (365)	25 (365)	25 (365)	25 (365)	25 (365)
Outlet pressure setting range, bar (psi)	2 - 12 (30-175)	2 - 12 (30-175)	2 - 12 (30-175)	2 - 12 (30-175)	2 - 12 (30-175)
Max. recommended flow m3/h (GPM)	82 (360)	145 (640)	330 (1450)	580 (2570)	910 (4000)
Pilot Valve model	2-PB	2-PB	2-PB	2-UL	2-UL
Min. recommended Pressure Relief Valve Size, inch (mm)	2" (50)	2" (50)	3" (80)	3" (80)	4" (100)

3. Head Loss

3.1 The minimum ΔP across the valve is 0.4 bar (5.8 psi). In cases where the inlet pressure falls below or is equal to the intended outlet pressure, the outlet pressure shall be determined according to the "Valve Outlet Pressure Fall-off Chart".

3.2 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 0.5 bar (7.2 psi).

Table 2: Valve Head Loss Data

Valve Size in (mm)	3" (80)	4" (100)	6" (150)	8" (200)	10" (250)
CV (Kv)	190 (219)	345 (398)	790 (912)	1160 (1340)	1430 (1652)
Leq m (ft), see Note 1	8 (25)	8 (26)	13 (43)	27 (89)	55 (179)

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

4. Approvals

The Bermad 42T pressure reducing valve is UL Listed and FM Approved when installed with specific system components as described in this installation manual.

Consult Bermad for any component approval recently to appear in any equipment directory.

NOTE: A Pressure Relief Valve, UL/FM approved size 1-1/2" or larger must be supplied for installation with every pressure reducing valve, see table 1 for recommended size.

5. Installation

- 5.1 Allow enough room around the Bermad 42T pressure reducing valve assembly for any adjustments and future maintenance/disassembly work.
- 5.2 Before the valve is installed, flush the pipeline to remove any dirt, scale, debris, etc. Failure to do this might result in the valve being rendered inoperable.
- 5.3 A UL-listed and FM approved indicating valves should be installed upstream and downstream of the Bermad 42T pressure-reducing valve to allow future maintenance, see figure 1.
- 5.4 Install the valve in the pipeline with the valve flow arrow on the body casing in the proper direction. Use the lifting eye provided on the main valve cover for lifting and lowering the valve.
- 5.5 The Bermad 42T pressure-reducing valve is suitable for horizontal or vertical installation. Ensure that the valve is positioned so that the cover is facing upwards and can be easily removed for future maintenance.
- 5.6 After installation, carefully inspect/correct any damaged accessories, piping, tubing, or fittings.
- 5.7 A listed/approved pressure relief valve shall be installed in accordance with NFPA 13. The pressure relief valve must be installation with every pressure reducing valve, install the pressure relief valve offline, downstream of the Bermad 42T pressure reducing valve, see figure 1.
NOTE: The pressure relief valve shall be set to open at 0.5 – 1.0 bar (8 – 16 psi) above the 42T valve setting, see table 1 for recommended size.
- 5.8 Install a listed/approved pressure gauge on both the upstream & downstream of the Pressure Reducing Control Valve. See installation drawing, see figure 1 for indicated installation.
- 5.9 Install the Bermad 42T pressure-reducing valve in accordance with the Standard for Installation of Fire Sprinkler Systems, NFPA 13, or the Standard for Installation of Standpipe and Hose System, NFPA 14, as appropriate. The Bermad 42T pressure-reducing valve is to be tested after installation in accordance with NFPA 13.
- 5.10 The Bermad 42T pressure-reducing valve is to be inspected, tested and maintained in accordance with the Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems, NFPA 25.

6. Optional Instrument

6.1 Valve Position Indicator (code I)

This option provides the means for Visual Indicating of the Main valve Valve Seal Disc Position at all times, by detecting the motion of the valve internal elastomer assembly.

6.2 Valve Position Limit Switch (code S, or S9)

The Valve Position Limit Switch option is highly recommended for indication of the valve operation. It is recommended to provide an Electric Remote Valve Position Signal.

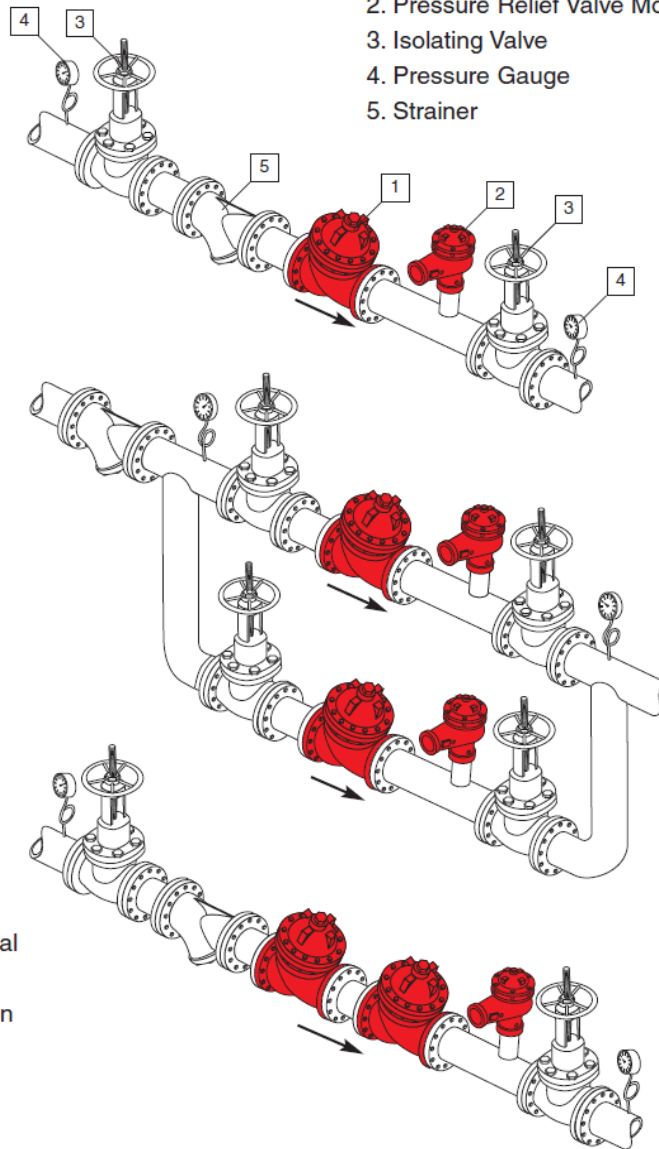
Caution: Verify that the switch is certified to suit to the hazardous location of the valve location.

6.3 Large Control Filter – Mark "F"

This "F" option provides extra capacity means for filtering of the water supplied to the pilot system, it is recommended for those cases where there is any doubt as to the level of particulate matter in the water.

Figure 1: Installation Drawing

1. BERMAD Model FP 42T
2. Pressure Relief Valve Model FP 43T
3. Isolating Valve
4. Pressure Gauge
5. Strainer



Parallel Pressure Reducing System

- Wide flow range
- Redundant safety
- Serviceable with zero down time

Two-Stage Pressure Reducing System

- High pressure differential
- Added reduced pressure zone protection

7. Operation

The pressure-regulating pilot senses downstream pressure and modulates the upper control chamber causing the main valve to throttle, thus maintaining constant downstream pressure. When the downstream pressure falls below the pilot setting, the pilot opens, pressure in the upper control chamber decreases, and the main valve modulates open to increase downstream pressure and maintain pilot setting.

If the downstream pressure rises above the pilot setting, the pilot valve closes, pressure in the upper chamber increases and the main valve throttles close to decrease downstream pressure to the pilot setting.

The pressure-reducing pilot is equipped with an adjusting screw to preset the desired downstream pressure and an internal factory preset restrictor to control the closing speed.

Starting -up

When performing this procedure refer to figure 2.

- 7.1 Open a hydrant, relief valve, drain valve, or other flow-consumer downstream of the Bermad 42T “Y” type Pressure-Reducing Valve, creating a system demand.

Model: 42T

- 7.2 Fully open upstream indicating valve
- 7.3 Gradually open downstream indicating valve to fully open, allowing flow through the Bermad 42T Pressure-Reducing Valve.
- 7.4 Wait for downstream pressure stability.
- 7.5 Slowly close the flow-consumer that was opened in step #1 above to fully close.
- 7.6 There is no flow; the pressure on the downstream side of the system that is reflected through the pressure gauge. Should be according to the factory pre-set adjusted pressure plus up to an additional 10%.

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, follow the following steps.

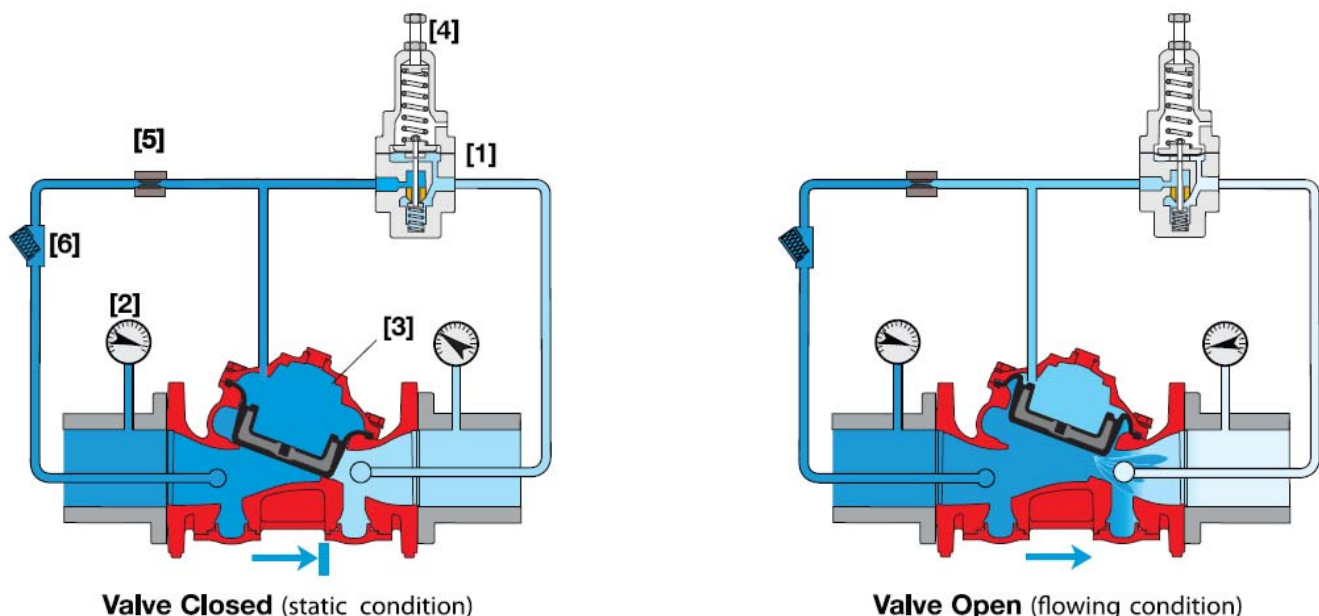
- 7.7 When readjusting the outlet pressure, the inlet pressure should be at least 15 psi (1 bar) higher than the set outlet pressure.
- 7.8 Ensure that there is minimum flow through the main valve (see Table 1, for minimum flow rate for pilot valve setting).
- 7.9 Free the tension between the adjusting screw on the pressure reducing pilot valve (4 in figure 2) and the fastening nut by turning the fastening nut counterclockwise.
- 7.10 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.

- 7.11 Repeat the Starting-up procedure, steps 6.1-6.5.

Caution: If needle valve is furnished (optional), changes in the adjustment of the needle valve have great 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 toward open might cause the valve to perform at less than optimal functioning. Perform step 6.5 with this in mind.

Figure 2: Operation Drawing



8. Maintenance and Inspection Test

8.1 Normal Conditions

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.

Prior to turning off any valves or water supply, notify local site fire officials.

In any of the following inspections or testing procedures, if an abnormal condition exists, see Troubleshooting for possible cause and corrective action.

The Bermad 42T Pressure-Reducing Valve is to be inspected, tested and maintained in accordance with the Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems, NFPA 25.

- 8.1.1 All main isolating valves should indicate a fully open position.
- 8.1.2 Upstream pressure gauge should (2 figure 2) reflect the upstream pressure supplied to the valve.
- 8.1.3 Downstream pressure gauge should be according to the system design criteria.

8.2 Quarterly Inspection

- 8.2.1 The system should be checked for normal condition.
- 8.2.2 Check that the main valve, pilot system, accessories, tubing & fittings, are all in good condition, damage free and not leaking.
- 8.2.3 The fastening nut of the pilot valve (4 figure 2) adjusting screw , should be fastened tightly.

8.3 Annual Inspection and Test

- 8.3.1 Complete Quarterly Inspection.
- 8.3.2 Conduct a flow test in systems nominal flow. The downstream pressure gauge should show the adjusted downstream pressure, and according to the system design criteria, this pressure should be stable.
If re-adjusting is needed it should be according to paragraph 5.

8.4 Five-Years Inspection and Test

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

8.5 Abnormal Conditions

SYMPTOM	PROBABLE CAUSE	REMEDY
Valve fails to regulate	Restrictor is Blocked	Dismount the Connecting tube and Clean and flash the restriction.
	Air trapped in main valve cover.	Loosen cover tube fitting at the highest point, allow the air to escape and re-tighten.
	Filter screen (4) blocked.	Remove filters cap and screen to clean.
Valve fails to open	Insufficient inlet pressure.	Check/create inlet pressure.
	No downstream demand.	Create demand/flow.
	Insufficient pilot valve spring compression.	Turn adjusting screw CW on pilot valve (4 figure 2).
	Indicating valves closed.	Open.
Valve fails to hold set static outlet pressure	Filter screen (4) blocked.	Remove filters cap and screen to clean.
	Debris trapped in main valve.	Remove and inspect actuator assembly. Check seat and disc seal.
	Diaphragm in main valve is leaking.	CAUTION: This test will cause the valve to fully open. Close downstream indicating valve or omit this test if this may cause damage. Test for leakage. Close indicating valves and remove the plug in the main valve cover. If a continuous flow exists, the diaphragm is damaged or loose.

NOTE: Large Capacity Filter where the filter screen frequently becomes blocked:

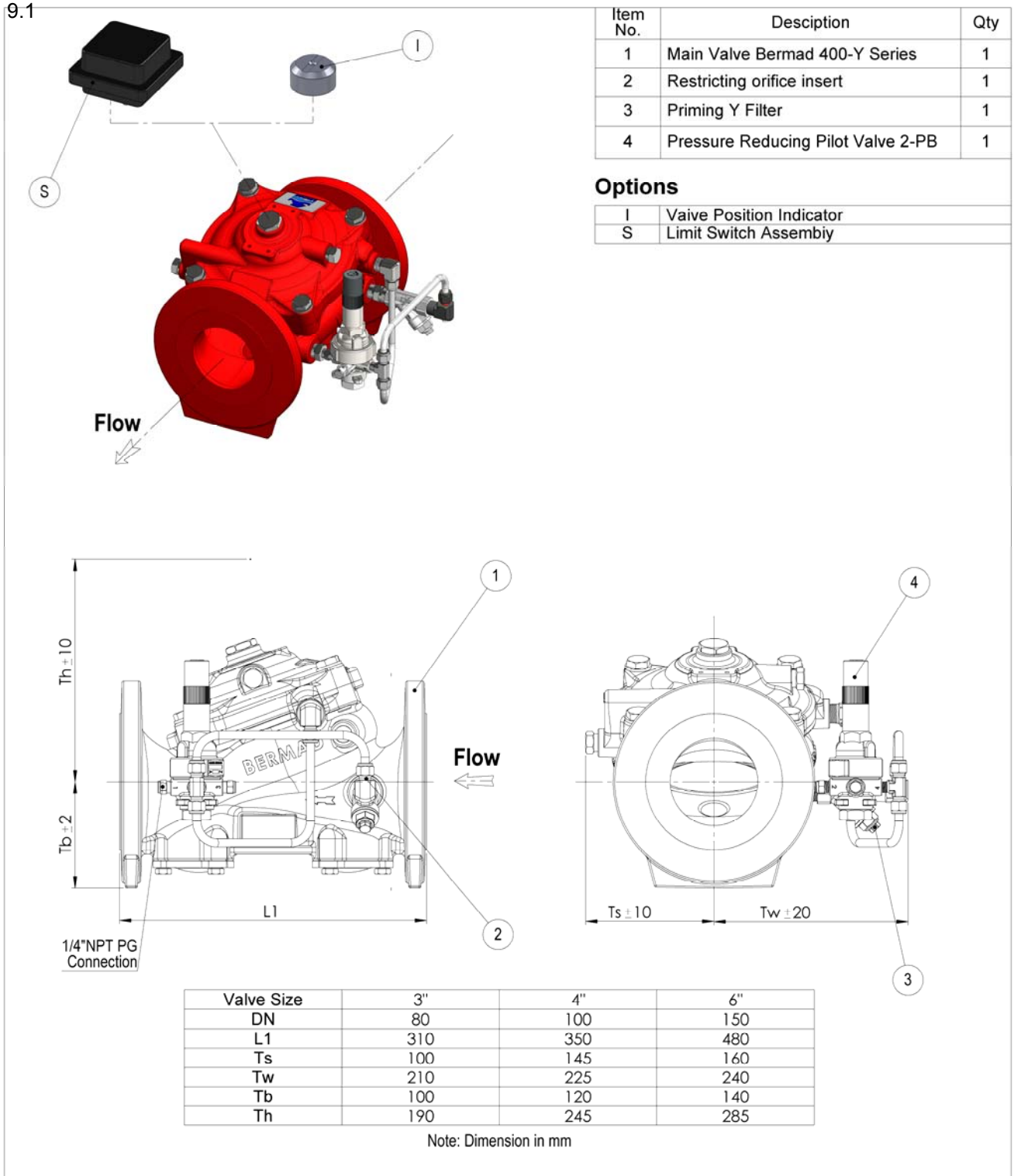
In cases where the filter screen frequently becomes blocked, it is recommended replacing the standard filter with BERMAD's Large Filter Mark "F" (see paragraph 6.3).

8.6 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.

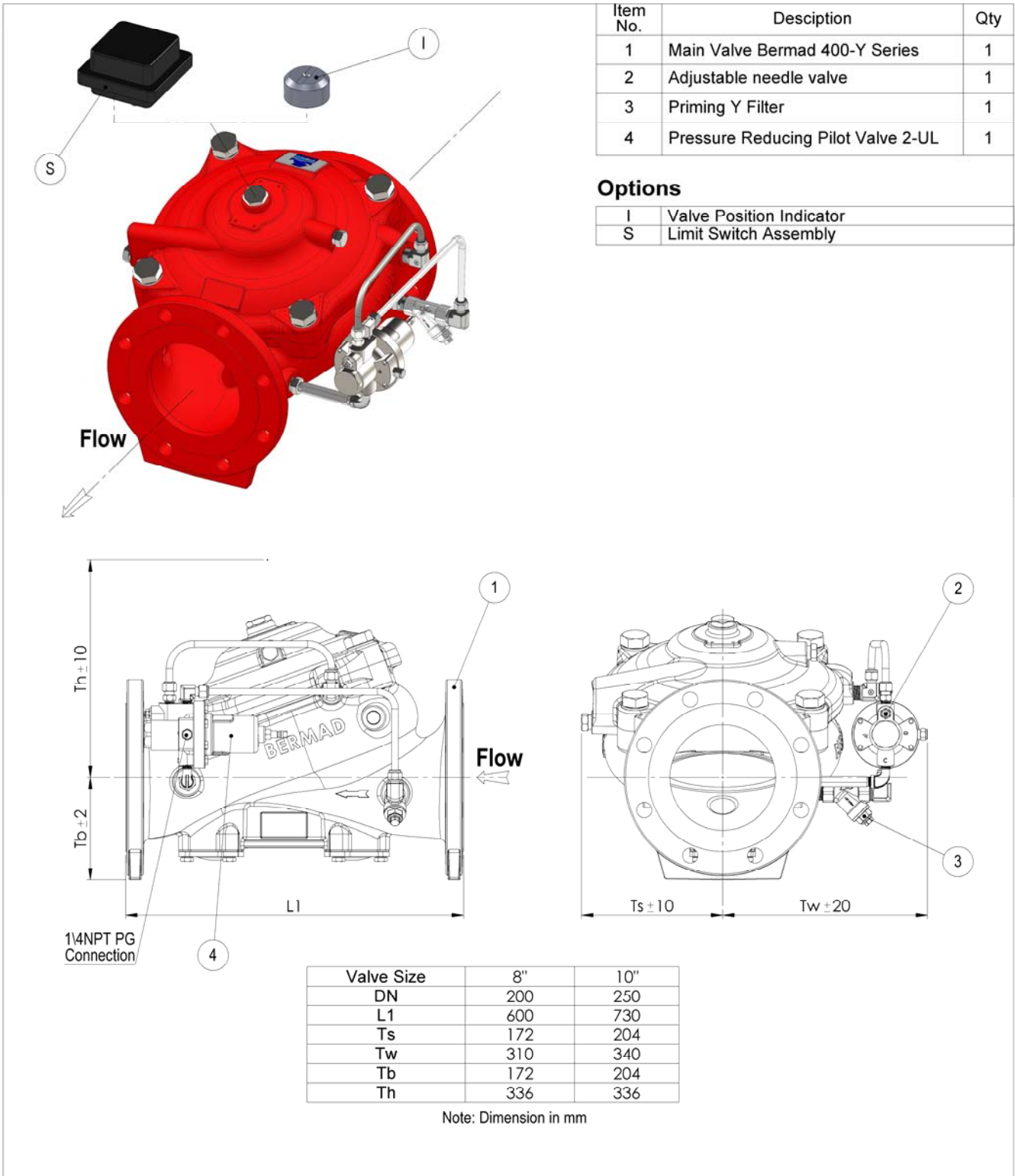
9. General Arrangement (GA) & Outline Dimension Drawings

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

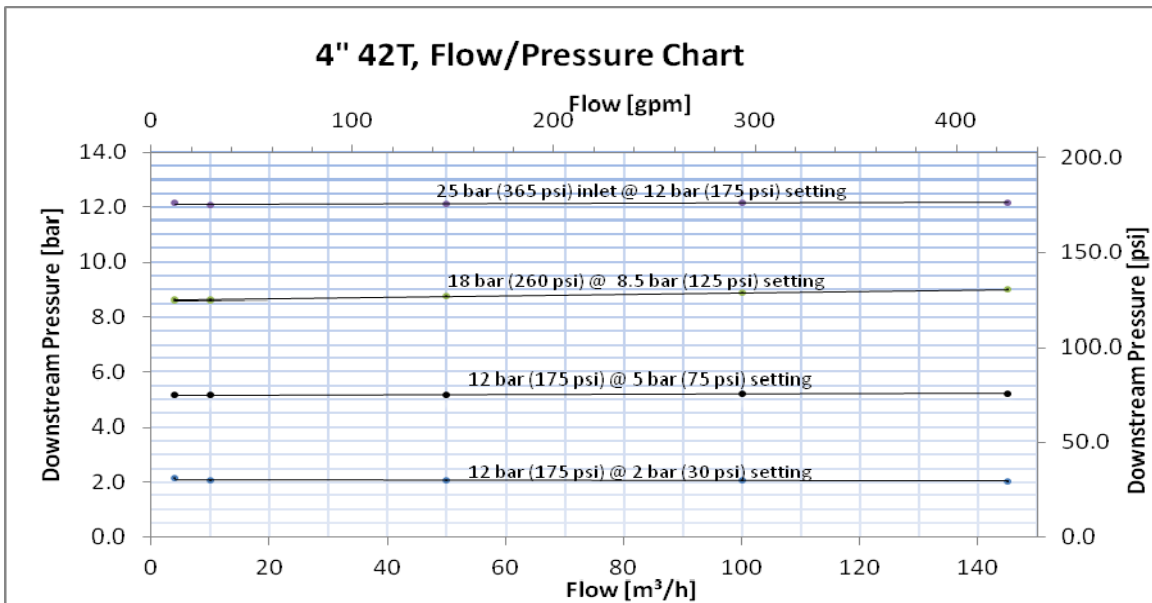
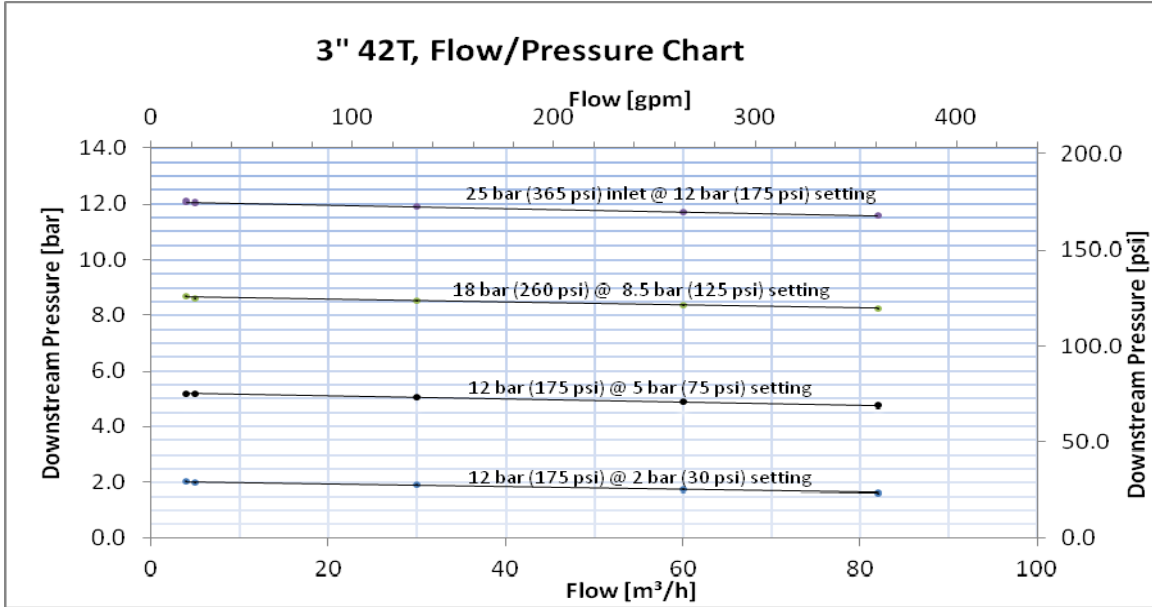


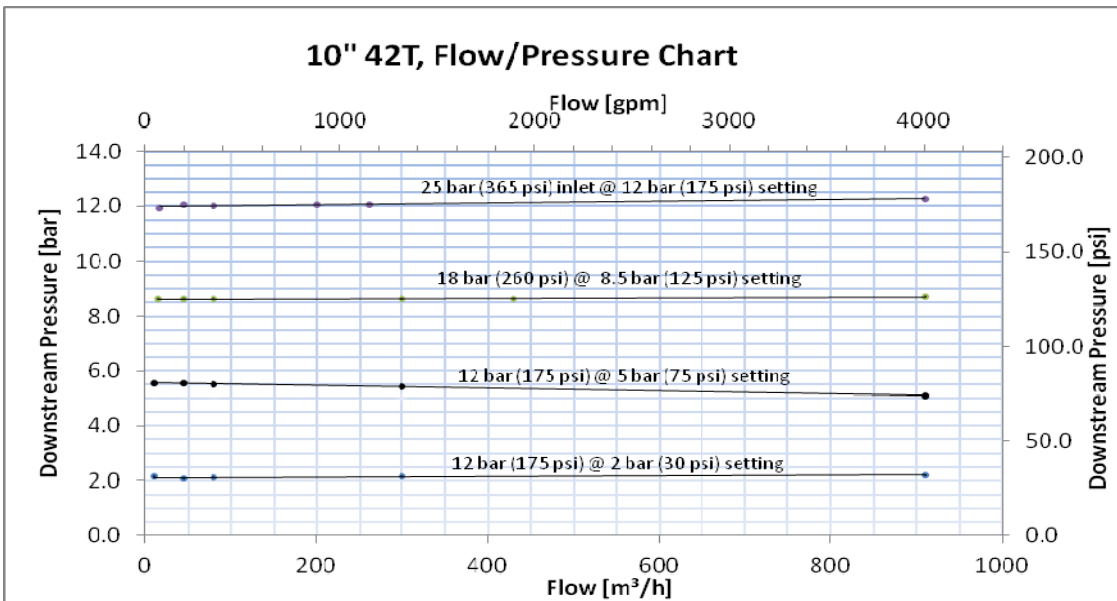
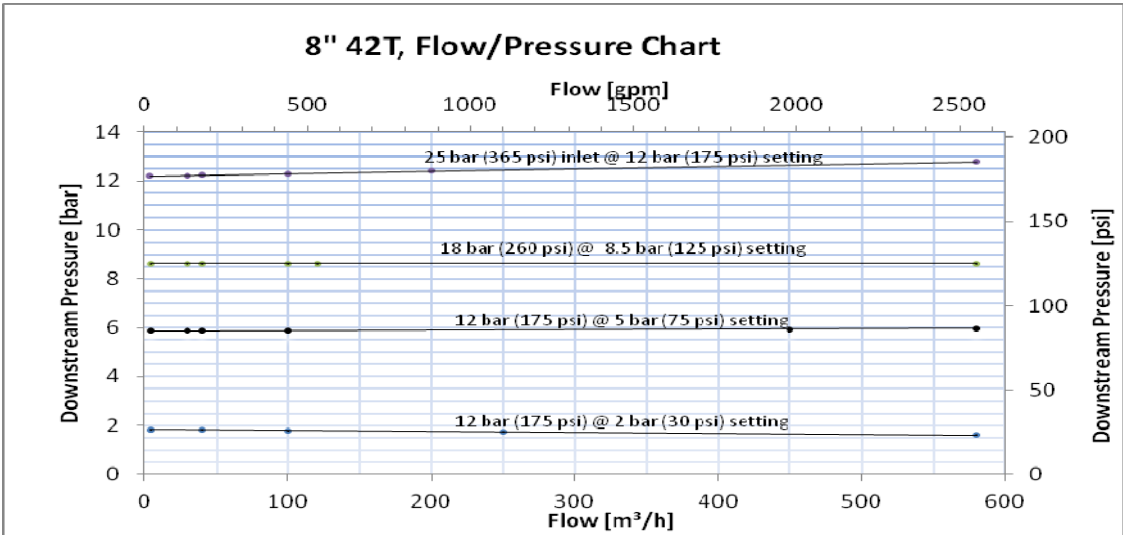
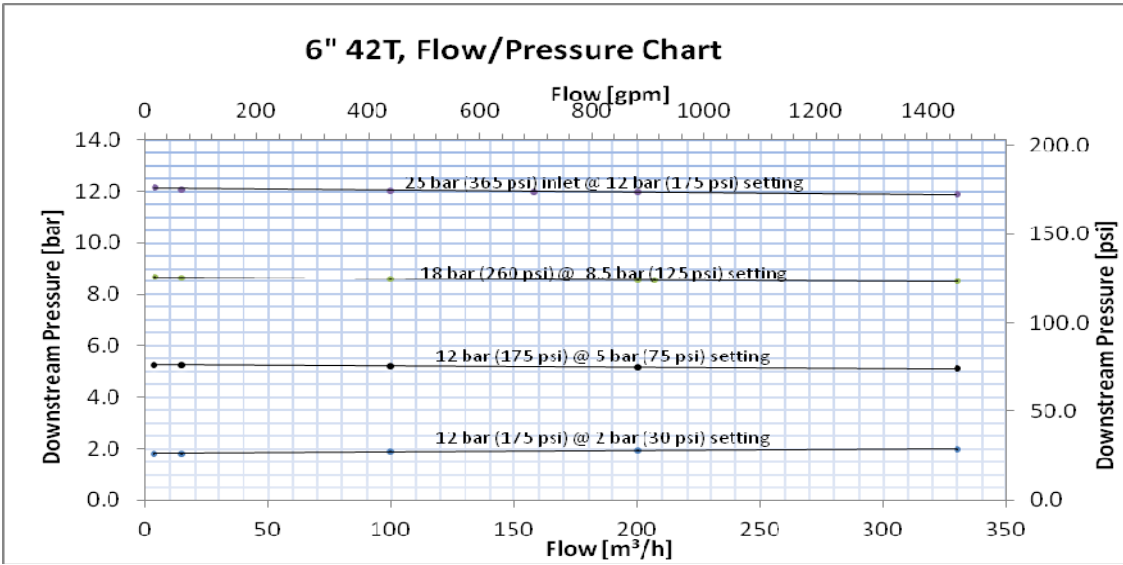
Model: 42T

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



APPENDIX A: Performance Testes

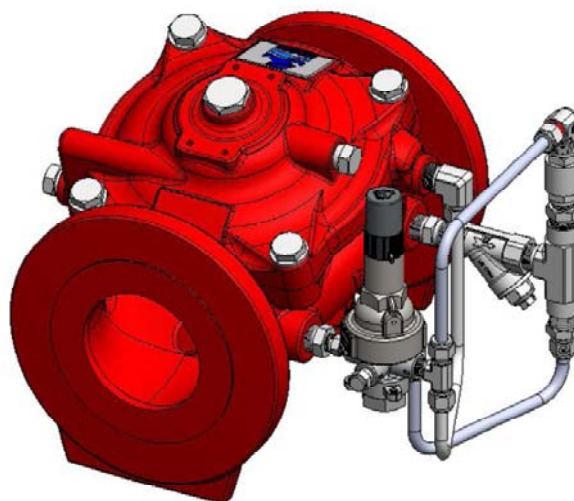




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Model: 43T

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

Table 1: Relief Valve Sizing

The minimum relief valve size shall be as follows:

Pump Flow Capacity			Min Relief Valve Size
<i>GPM</i>	<i>L/min</i>	<i>(m3/h)</i>	<i>inch (mm)</i>
400 - 500	1515 – 1895	(91 – 114)	3” (80)
750 - 1000	2840 – 3785	(170 – 227)	4” (100)
1250-2500	4730 – 9465	(284 – 568)	6” (150)
3000-4000	11355 – 15140	(681 – 908)	8” (200)
4100-5700	15520 - 21580	(930 - 1295)	10” (250)

- 1.1.2 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 Setting Range:

Valve Size in 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: 7 – 25 (100 – 365 psi)			3-UL-16 pilot valve set range: 7 – 25 (100 – 365 psi)	



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

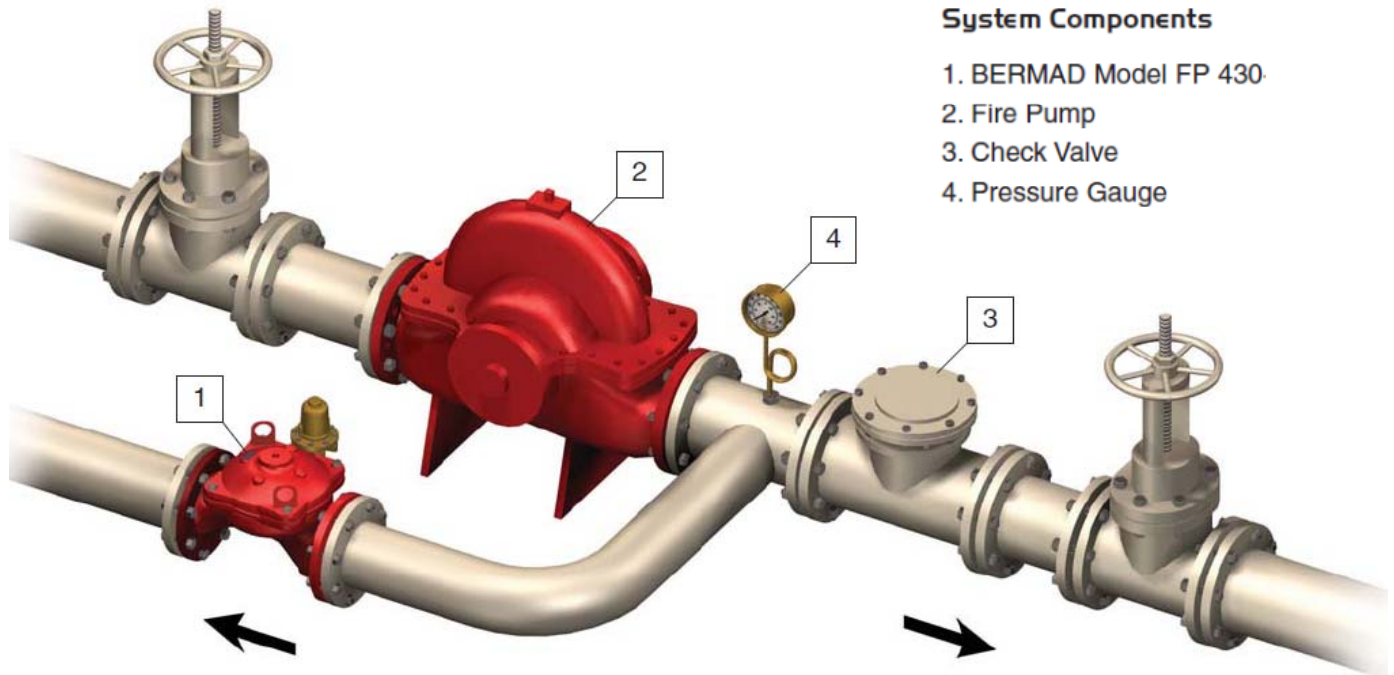
The Bermad 43T Pressure Relief Valve is UL Listed and FM Approved when. Refer to the current UL and/or FM fire protection equipment directory. Consult Bermad for any component approval recently to appear in any equipment directory.

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



System Components

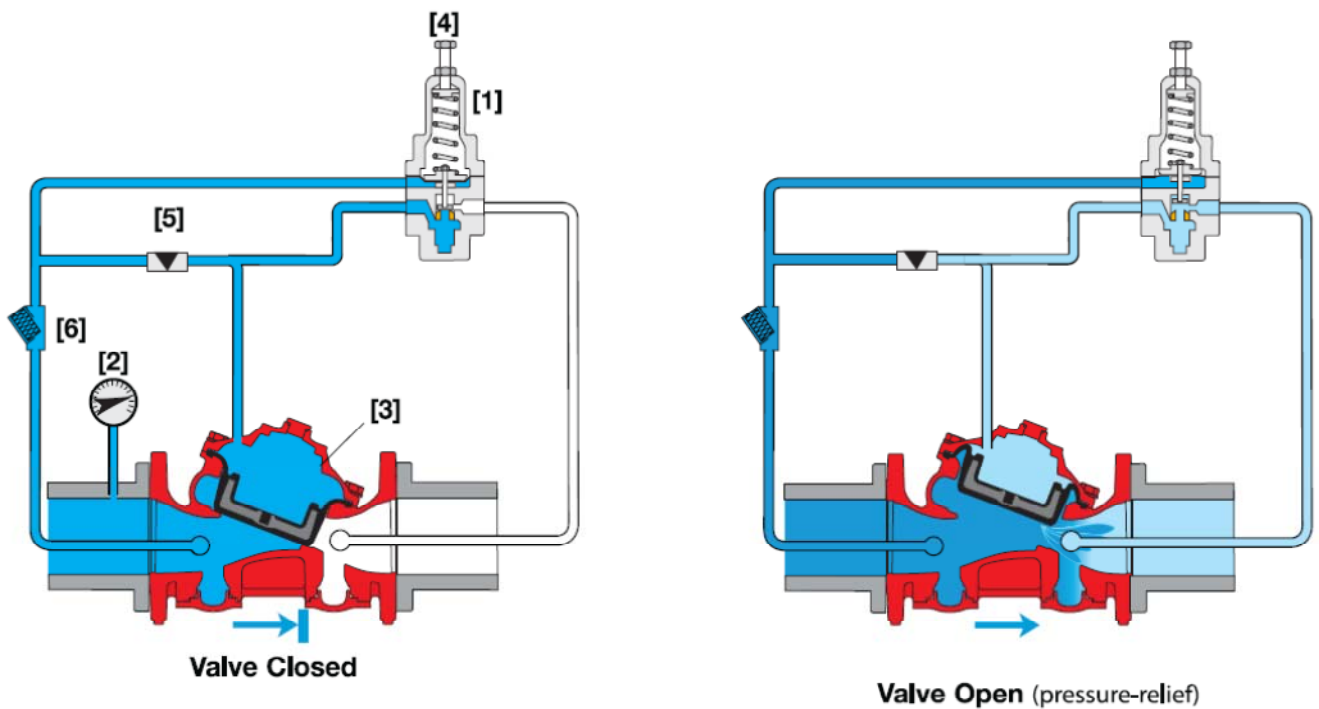
1. BERMAD Model FP 430
2. Fire Pump
3. Check Valve
4. Pressure Gauge

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.

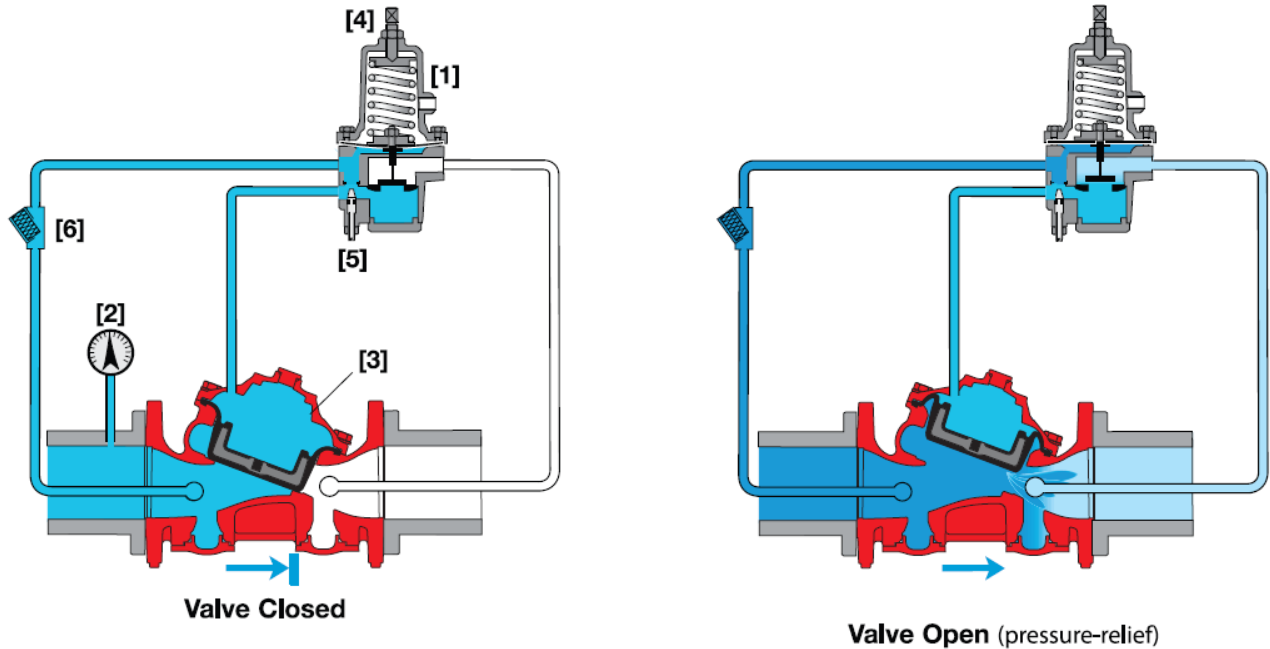
The pressure-relief pilot valve is equipped with an adjusting screw (#4, fig.2) to preset the desired inlet pressure.

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. If damaged, replace.
	Diaphragm in pilot valve is leaking.	

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

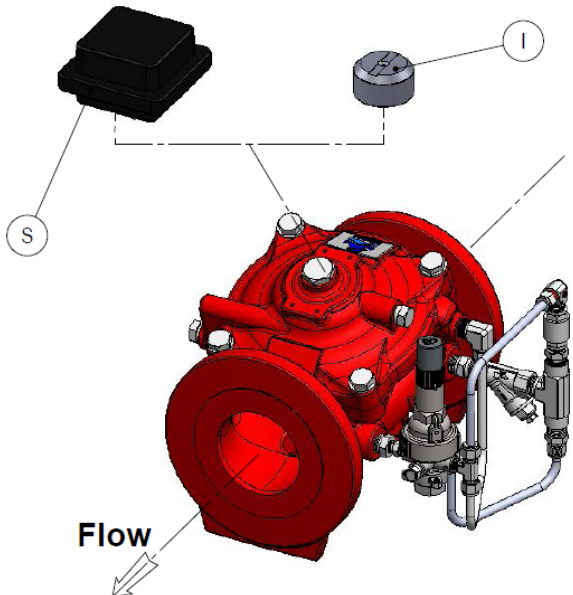
In cases where the filter screen frequently becomes blocked, it is recommend replacing the standard filter with BERMAD's Large Filter Mark "F" (see paragraph 1.2.3).



Model: 43T Pressure Relief Valve

10 General Arrangement (GA) & Outline Dimension Drawings

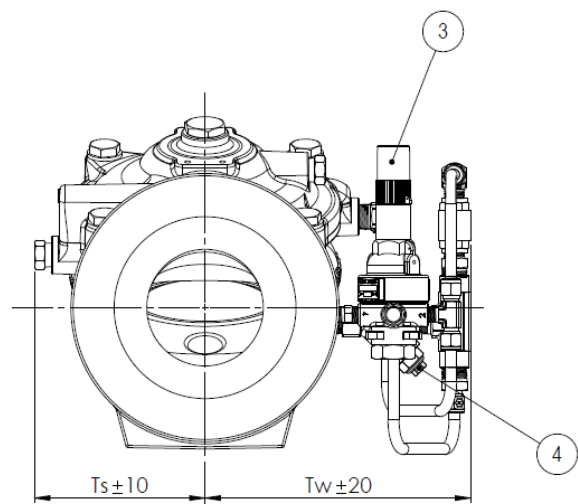
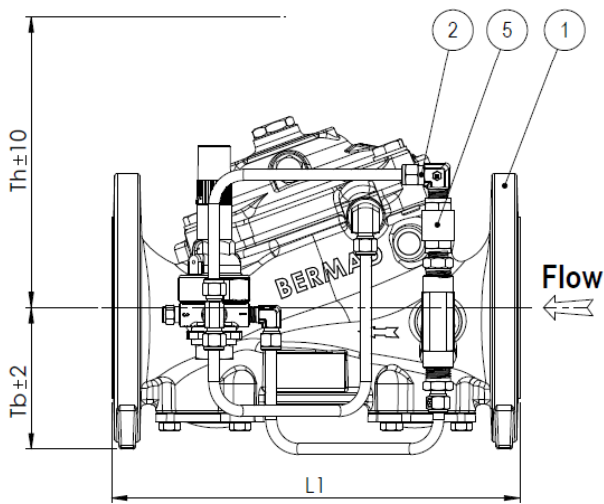
Figure 3A: GA Drawing for Size 3 - 6"



Item No.	Description	Qty
1	Main Valve Bermad 400-Y Series	1
2	Restricting orifice insert	1
3	Pressure Relif Pilot Valve 3-PB	1
4	Priming Y Filter	1
5	Check Valae (Option)	1

Options

I	Valve Position
S	Limit Switch Assembly

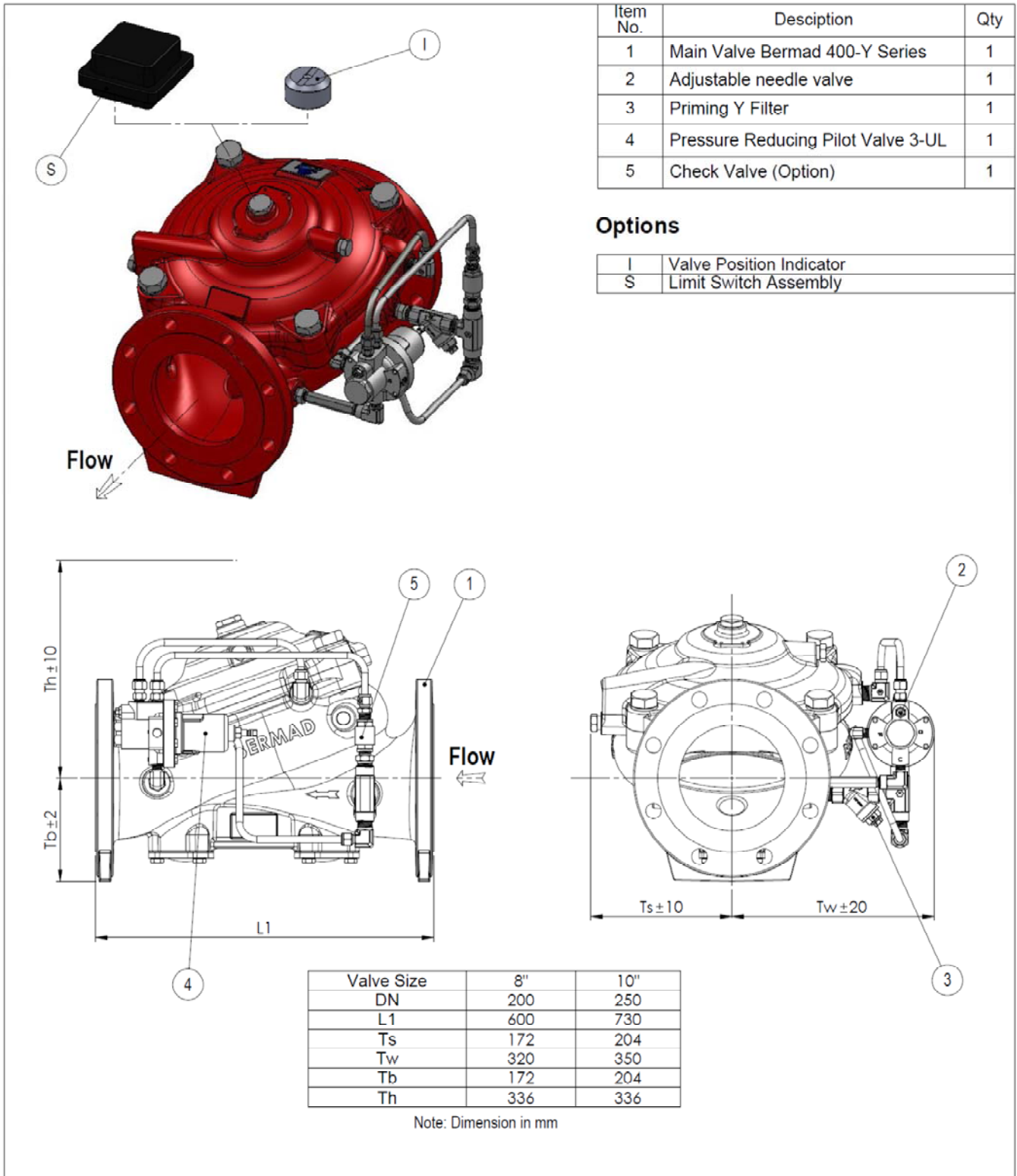


Valve Size	3"	4"	6"
DN	80	100	150
L1	310	350	480
Ts	100	145	160
Tw	210	225	240
Tb	100	120	140
Th	190	245	285

Note: Dimension in mm

Model: 43T Pressure Relief Valve

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



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