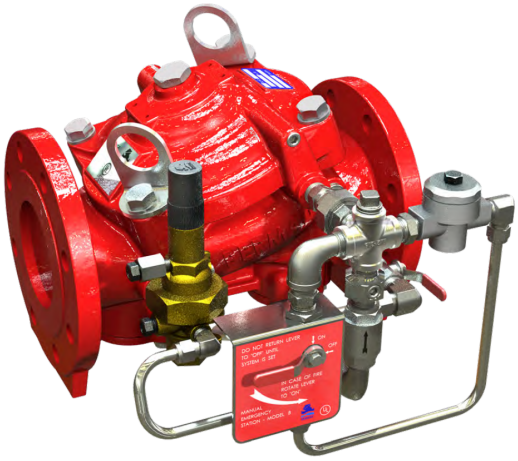
# FLOW CONTROL - PRESSURE DIFFERENTIAL CONTROL VALVE (PDCV)

## Model FP-400Y-06

The BERMAD model 400Y-*-06 is a self operated Pressure Differential Control Valve (PDCV) for flow control, designed specifically for advanced fire protection systems and the latest industry standards. The 400Y-*-06 uses a unique differential sensing pilot to control the differential pressure between two chosen points, typically a foam proportioning pump. The valve can be activated by means of an electric, hydraulic or pneumatic signal.
Refer to the “Valve Code Designations” on page 4, under the Activation Code section to specify the required valve configuration.



### Features & Benefits

- Safety and reliability
  - Fast response to flow changes during pipe filling
  - Time proven, simple design with a fail safe actuation
  - Obstacle-free, uninterrupted flow path
  - No mechanical moving parts
  - Single piece, rugged elastomeric diaphragm seal - VRSD technology
- High performance
  - Efficient Straight through flow
  - Very high flow efficiency
  - Approved for PN25 / 365 psi
- Specifically-designed for fire protection
  - Face-to-face length standardized to ISO 5752 EN 558-1
  - Meets the requirements of the industry standards
- Quick and easy maintenance
  - In-line serviceable
  - Fast and easy cover removal

### Approvals

| | |
|---|---|
| c UL us LISTED | UL-Listed<br>Special System Water Control Valves, Deluge Type (VLFT)<br>Sizes 1½” - 16” |
| DNV | Det Norske Veritas<br>Type Approval |
| ABS TYPE APPROVED PRODUCT | ABS<br>American Bureau of Shipping<br>Type Approval |
| Lloyd's Register TA TYPE APPROVED | Lloyd’s Register<br>Type Approval |

### Typical Applications

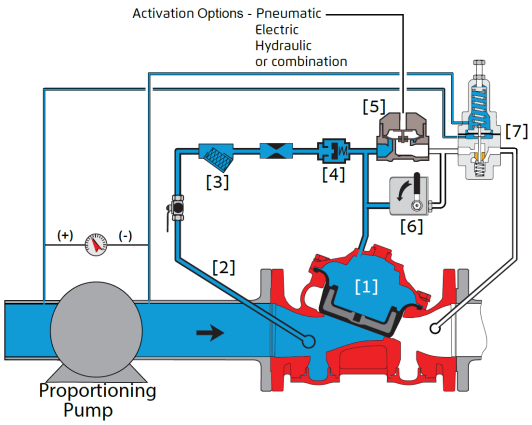
- Foam applications
- Flow regulation for foam proportioning pumps
- Dosing pump flow control
- Remote control

### Optional Features

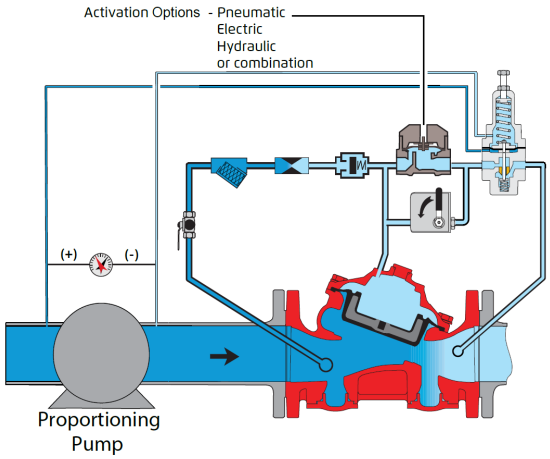
- Valve position limit switches
- Valve Position Indicator
- Seawater compatibility
- Opening and/or closing speed control

All images in this catalog are for illustration only

## Operation



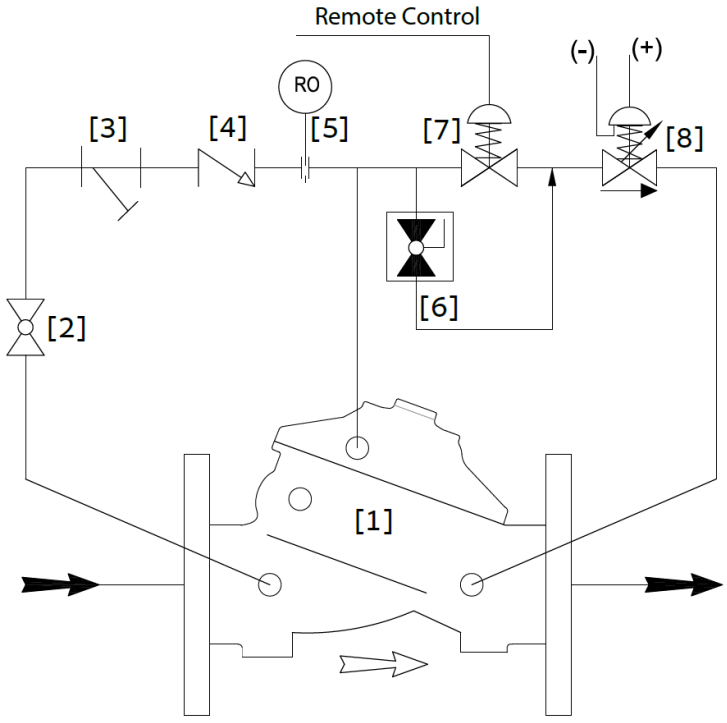

Valve Closed (normal conditions)




Valve Open (fire conditions)

The BERMAD 400Y is held closed by water pressure in the main valve control chamber [1]. Upon release of pressure from the control chamber, the valve will open. Under NORMAL conditions, water pressure is supplied to the control chamber [1] via the priming line [2] and strainer [3], and is then trapped in the control chamber by a check valve [4], the closed relay pilot valve [5] and the manual release override valve [6]. The water pressure trapped in the control chamber of the main valve holds the diaphragm against the valve seat, sealing it drip-tight and keeping the system pipes dry. Under FIRE conditions, water pressure is released from the control chamber, either with the manual release [6], or by the relay pilot valve opening. Once open the differential pressure pilot [7] will modulate the main valve to maintain a preset differential pressure between the pilot sensing points. In this way keeping the flow below the allowable maximum. When fitted with a local reset the valve will remain open until manually and locally reset.

## System P&ID




| | Components |
|---|---|
| 1 | Bermad 400Y Valve |
| 2 | Priming Ball Valve |
| 3 | Priming Strainer |
| 4 | Check valve |
| 5 | Restriction Orifice |
| 6 | Manual Release |
| 7 | Relay Valve |
| 8 | Pressure Differential Pilot Valve |

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## System Installation

The differential pressure sensing of the 400Y-*-06 enables the accurate flow regulation required for dosing and foam proportioning.
Activation of the valve maybe remote or local, electric, pneumatic or hydraulic.

### Foam Concentrate Proportioning

- The BERMAD model 400Y-*-06 is ideally suited for foam concentrate proportioning (Fig. 1), regulating the differential pressure between the foam and the water to ensure accurate foam to water ratio, regardless of changes in the water flow or pressure.

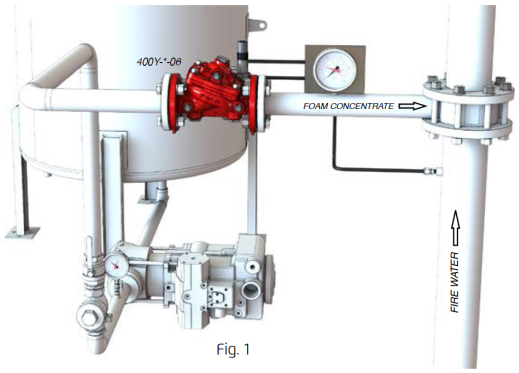

Fig. 1

### Dosing Flow Control

- In Fig. 2 the 400Y-*-06 is installed to prevent excessive flow, protecting the dosing pump from overflow damage often experienced during pump start up and during initial system pipe filling.
- By sensing the differential pressure across the pump the 400Y-*-06 will modulate, preventing the flow from exceeding the recommended maximum.
- When the differential pressure is lower than the pre-set maximum the 400Y-*-06 fully opens. The exceptional flow efficiency of the 400Y-*-06 ensures a reliable and fully functioning system performance.

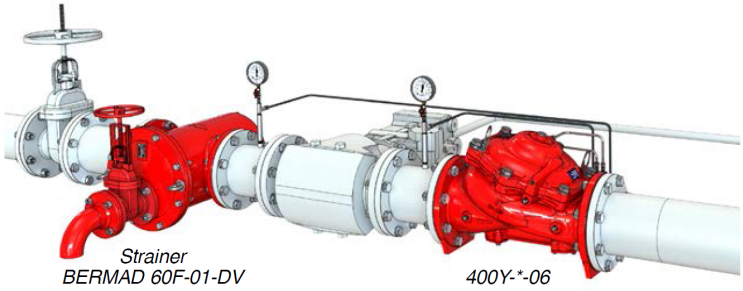

Fig. 2

## Suggested Specifications

The pressure control valve shall be a UL-listed, 25-bar/365-psi rated, straight-through, Y-type-body valve.
The valve shall have an unobstructed flow path, with no stem guide or supporting ribs.
Valve actuation shall be accomplished by a single-piece, rolling diaphragm bonded with a rugged radial seal disk.
The diaphragm assembly shall be the only moving part.
The valve shall include a Y-type strainer, and a local manual release, and shall be equipped with a linear valve position indicator.
Removing the valve cover for inspection or maintenance shall not require removing the control trim.
The valve and its entire control trim shall be supplied pre-assembled and hydraulically tested by a factory certified to ISO 9000 and 9001 standards.

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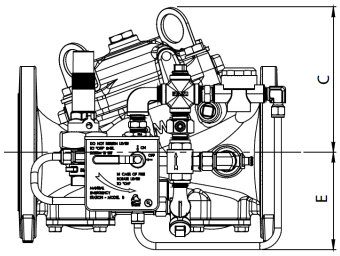
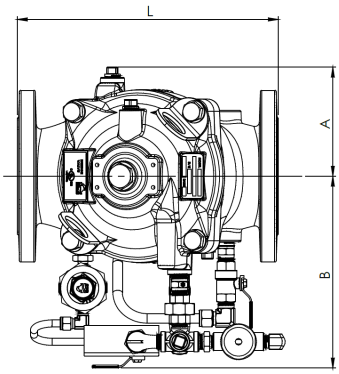
## Technical Data

**Available Sizes:**
Flanged- 1½, 2, 2½, 3, 4, 6, 8, 10, 12, 14 & 16"
Grooved- 1½, 2, 2½, 3, 4, 6, 8 & 10"

**Pressure Rating:**
ANSI#150 - 17.2 bar | 250 psi
ANSI#300 - 1½" to 10" - 25 bar | 365 psi
ANSI#300 - 12" to 16" - 20 bar | 300 psi
Grooved - 17.2 bar | 250 psi
Setting range: 0.5 - 3 bar | 7 - 43 psi

**Elastomer:**
HTNR - Fabric Reinforced High Temperature Compound - See engineering data




| Valve Size | L #150 mm \| in | L Grooved mm \| in | L #300 mm \| in | A mm \| in | B mm \| in | C mm \| in | ⌀D in | E mm \| in | F mm \| in | G mm \| in | Weight #150 kg \| lb | Weight #300 kg \| lb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DN40 \| 1½" | 230 \| 9.1 | 230 \| 9.1 | 230 \| 9.1 | 77.5 \| 3 | 155 \| 6.1 | 64 \| 2.5 | - | 120 \| 4.7 | - | - | 18 \| 39 | 21 \| 44 |
| DN50 \| 2" | 230 \| 9.1 | 230 \| 9.1 | 238 \| 9.4 | 77.5 \| 3 | 155 \| 6.1 | 11 \| 3 | - | 120 \| 4.7 | - | - | 20 \| 43 | 21 \| 47 |
| DN65 \| 2½" | 235 \| 9.3 | 235 \| 9.3 | 241 \| 9.5 | \| - | \| - | \| - | - | \| - | - | - | 25 \| 55 | 27 \| 59 |
| DN80 \| 3" | 310 \| 12.2 | 310 \| 12.2 | 326 \| 12.8 | 100 \| 4 | 251 \| 9.9 | 106 \| 4.2 | - | 146 \| 5.8 | - | - | 34 \| 75 | 39 \| 76 |
| DN100 \| 4" | 350 \| 13.8 | 350 \| 13.8 | 368 \| 14.5 | 115 \| 4.5 | 266 \| 10.5 | 121 \| 4.8 | - | 158 \| 6.2 | - | - | 44 \| 96 | 51 \| 102 |
| DN150 \| 6" | 480 \| 18.9 | 480 \| 18.9 | 506 \| 19.9 | 140 \| 5.5 | 372 \| 14.7 | 140 \| 5.5 | - | 228 \| 9 | - | - | 87 \| 192 | 107 \| 235 |
| DN200 \| 8" | 600 \| 23.6 | 600 \| 23.6 | 626 \| 24.7 | 172 \| 6.8 | 490 \| 19.3 | 172 \| 6.8 | - | 295 \| 11.7 | - | - | 150 \| 331 | 170 \| 400 |
| DN250 \| 10" | 730 \| 28.7 | 730 \| 28.7 | 730 \| 28.7 | 204 \| 8 | 490 \| 19.3 | 204 \| 8 | - | 296 \| 11.7 | - | - | 180 \| 397 | 216 \| 477 |
| DN300 \| 12" | 850 \| 33.5 | - | 888 \| 35 | 242 \| 9.5 | 656 \| 25.8 | 247 \| 9.7 | - | 4.41 \| 17.4 | - | - | 323 \| 712 | 363 \| 822 |
| DN350 \| 14" | 980 \| 38.6 | - | 980 \| 38.6 | 242 \| 9.5 | 656 \| 25.8 | 272 \| 10.7 | - | 441 \| 17.4 | - | - | 356 \| 784 | 428 \| 943 |
| DN400 \| 16" | 1100 \| 43.3 | - | 1100 \| 43.3 | 242 \| 9.5 | 656 \| 25.8 | 316 \| 12.4 | - | 415 \| 16.3 | - | - | 403 \| 886 | 523 \| 1150 |

**IMPORTANT:** Dimensions for the trim envelope or extents refer to a vertical orientation and may vary with specific component positioning -Apart from the "L" dimension, allow a tolerance of at least ±15%

## Valve Code Designations

FP | 6" | 400Y | 1MC | 06 | 03 | H | C | A5 | PR | 4DC | NN | P6W

| Category | code |
|---|---|
| Standard | FP |
| Seawater | FS |
| Foam | FC |

| Valve Size | |
|---|---|
| 1½" | 40 mm |
| 2" | 50 mm |
| 3" | 80 mm |
| 4" | 100 mm |
| 6" | 150 mm |
| 8" | 200 mm |
| 10" | 250 mm |
| 12" | 300 mm |
| 14" | 350 mm |
| 16" | 400 mm |

| Activation | code |
|---|---|
| Hydraulic local reset | 1MC |
| Electric On-Off 2-Way SOV | 2DC |
| Electric local reset 3-Way SOV | 2MC |
| Electric On-Off 3-Way SOV | 3DC |
| Pneumatic On-Off | 4DC |
| Hydraulic On-Off | 5DC |
| Electro-Pneumatic On-Off | 6DC |

| Speed Controls | code |
|---|---|
| Closing speed control | 01 |
| Opening speed control | 02 |
| Opening & Closing speed control | 03 |
| None | |

| Installation | code |
|---|---|
| Vertical | V |
| Horizontal | H |

| Material Body & Cover [1] | code |
|---|---|
| Ductile Iron A536 [2] | C |
| Steel ASTM A216 WCB [2] | S |
| Stainless Steel 316 | N |
| Nickel Al Bronze C95800 | U |
| Super Duplex Grade 5A | D |

| End Connections | code |
|---|---|
| ANSI#150RF | A5 |
| ANSI#150FF | a5 |
| ANSI#300RF | A3 |
| ANSI#300FF | a3 |
| ISO PN16 | 16 |
| ISO PN25 | 25 |
| Grooved 235psi/PN16, ANSI C606 | VI |
| Grooved 365psi/PN25, ANSI C606 | V2 |
| Threaded 235psi/PN16, ISO-7-Rp | BP |
| Threaded 365psi/PN25, ISO-7-Rp | PH |
| Threaded 235psi/PN16, NPT | NP |
| Threaded 365psi/PN25, NPT | NH |

| Coating | code |
|---|---|
| Polyester Red | PR |
| High Build Epoxy | ER |
| Uncoated | UC |

| Voltage (N.O. or N.C.)* | code |
|---|---|
| 24VDC - N.C. | 4DC |
| 24VDC - N.O. | 4DO |
| 24VDC - Latch | 4DS |
| 110VDC - N.C. | 5DC |
| 110-120/AC - N.C. | 5AC |
| 110-120/AC - N.O. | 5AO |
| 220-240/AC - N.C. | 2AC |
| 220-240/AC - N.O. | 2AO |

* NO or NC refers to main valve status when solenoid de-energized

| Factory Fitted Options* | Code |
|---|---|
| Mechanical Latching Pilot | H |
| General Purpose Pressure Switch | P |
| Ex Proof NEC, Div.1 Pressure Switch | P7 |
| Ex d ATEX Pressure Switch | P9 |
| Single Limit Switch, General Purpose | S |
| Single Ex d Proximity Limit Switch | S9 |
| Double Ex d Proximity Limit Switch | SS9 |
| Pressure Gauge Assembly | 6 |
| S.S Glycerin Pressure Gauge Assembly | 6n |
| Monel Pressure Gauge Assembly | 6m |
| Ex Proof NEC Class 1 Div 1 Solenoid | 7 |
| Ex. d Atex Solenoid | 9 |
| Water Motor Alarm Assembly | W |
| Drain Valve | DV |
| Special Elastomer EPDM | E1 |
| Large Control Filter | F |
| Valve Position Indicator | I |
| Stainless Steel 316 Trim Accessories | N |
| Stainless Steel Solenoid Valve | K |
| Pressure Transmitter | Q |
| Drain and Indicating Components | A |

* For more Factory Fitted Options see: Ordering Guide

| Tubing & Fittings | code |
|---|---|
| Stainless Steel 316 | NN |
| Monel 400 | NM |
| Super Duplex | DD |

Notes:
[1] Other materials available see: 400Y engineering
[2] Coated internally and externally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