

ELECTRO-PNEUMATICALLY CONTROLLED DELUGE VALVE WITH LOCAL RESET

Model FP-400E-6M

The BERMAD model 400E-6M is an elastomeric, hydraulic, line pressure operated deluge valve, designed specifically for advanced fire protection systems and the latest industry standards. The 400E-6M is activated by a 3-way solenoid valve which in turn activates a pneumatic relay valve that latches the main valve open until locally reset. The optional valve position indicator can include a limit switch suitable for Fire & Gas monitoring systems. The 400E-6M is ideal in systems with open nozzles for water or foam discharge, and is available with electric components to suit any hazardous location.



Features & Benefits

- Safety and reliability
 - Time proven, simple design with a fail safe actuation
 - Single piece rugged elastomer, VRSD technology
 - Obstacle-free, uninterrupted flow path
 - No mechanical moving parts
 - UL429A Listed 3-Way Solenoid Valve
 - Latches open: remains open until reset locally
 - Valve position limit switches (optional)
 - Meets the requirements of the industry standards
- Quick and easy maintenance
 - Designed for high reliability and easy maintenance
 - In-line serviceable
 - Fast and easy cover removal

Approvals



UL-Listed
Special System Water Control
Valves, Deluge Type (VLFT)
Sizes 1½" - 10"



Det Norske Veritas
Type Approval
Sizes 1½" to 12"



ABS
American Bureau of Shipping
Type Approval
Sizes 1½" - 12"



Lloyd's Register
Type Approval
Sizes 1½" - 10"

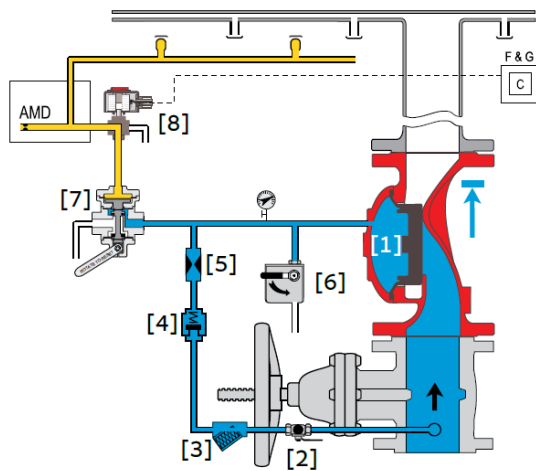
Typical Applications

- Fusible plug loops
- Automatic water spray systems
- Foam applications
- Corrosive water systems
- Freezing Environments

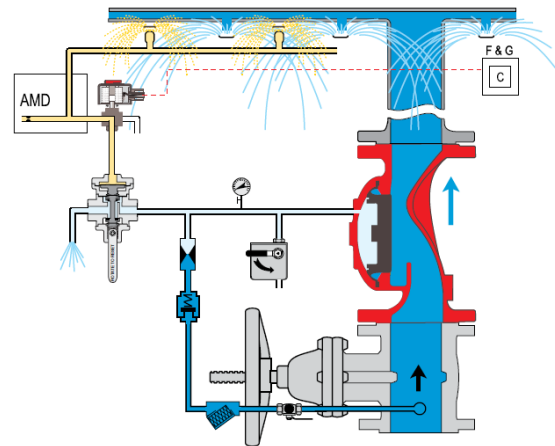
Additional Features

- Valve position limit switches
- Alarm pressure switch
- Seawater compatibility
- Air Maintenance Device
- Water motor alarm
- Corrosion resistant zinc based high build epoxy coating

Operation



Valve Closed (normal conditions)



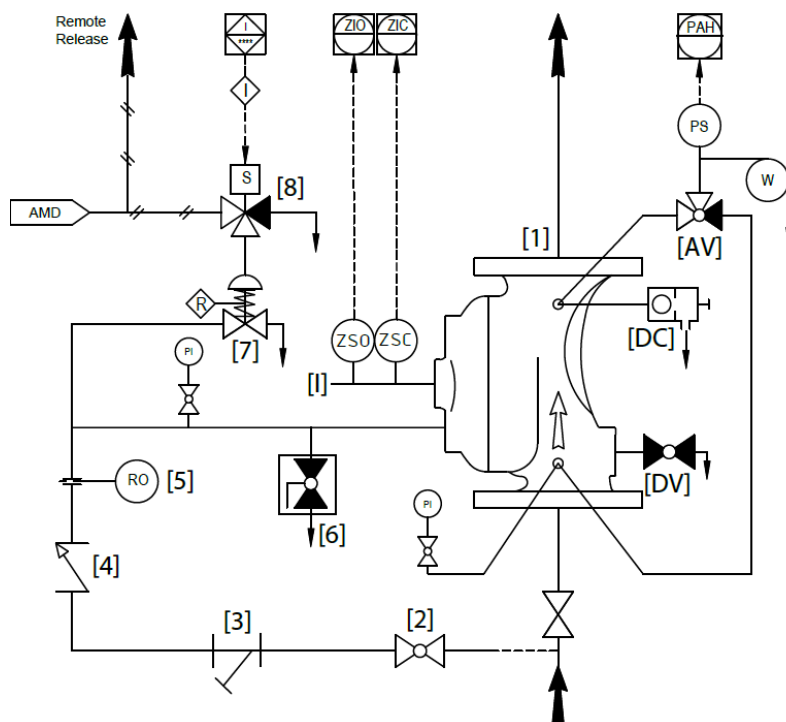
Valve Open (fire conditions)

The BERMAD model 400E-6M is held closed by water pressure in the control chamber [1]. Upon release of pressure from the control chamber, the valve opens.

Under NORMAL conditions, water pressure is supplied to the control chamber by the priming line [2] via the strainer [3], and restriction orifice [5], it is then trapped in the control chamber by a check valve [4], manual emergency release [6], and a relay valve (URV-M) [7]. The relay valve is held closed by pneumatic pressure supplied through a three-way solenoid valve [8]. The water pressure trapped in the main valve control chamber 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. The URV-M opens in response either to a decrease in pneumatic pilot-line pressure [E] or to the solenoid valve being activated by the fire & gas control system [C]. This latches the 400E-6M deluge valve open, allowing water to flow into the system piping and to the alarm device [9].

System P&ID



Components	
1	BERMAD 400E Deluge Valve
2	Priming Ball Valve
3	Priming Strainer
4	Check Valve
5	Restriction Orifice
6	Manual Emergency Release
7	URV-2-M Relay Valve
8	3-Way Solenoid Valve

Optional System Items	
PS	Pressure Switch
W	Water Motor Alarm
ZS	Limit Switch Assembly
AMD	Air Maintenance Device
I	Visual Valve Position indicator
DV	Drain Valve*
PI	Pressure Gauge*
AV	3-way Alarm Test Valve*
DC	Automatic Drip Check Valve*

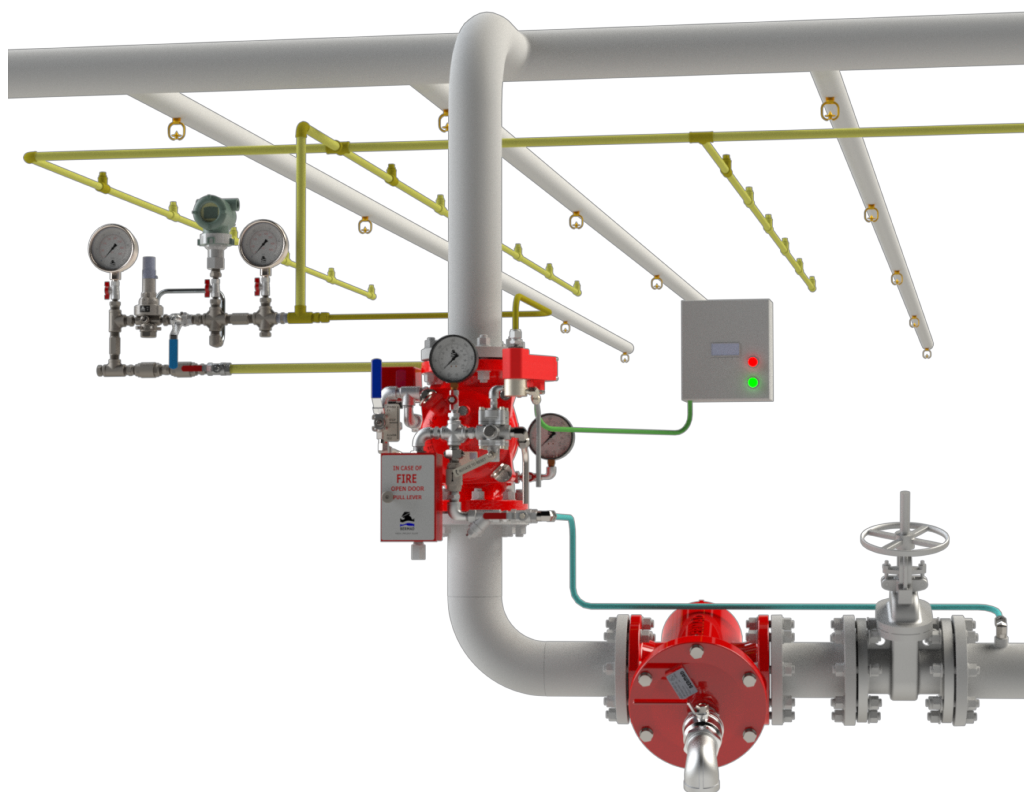
* Included with suffix A in valve code (drain and indicating components)
See code designations and "factory supplied additional items" on page 4

System Installation

A typical installation of the BERMAD model 400E-6M features automatic actuation via a relay valve, triggered by a fusible plug loop. It can also be triggered electrically by a signal from a fire & gas control system or an on-site emergency pushbutton.

When open and fitted with a limit switch the valve can send a feedback signal to a remote valve status monitoring system.

Optional System Items



Suggested Specifications

The deluge valve shall be UL-listed, 250 psi/17.2bar rated.

The valve shall have an unobstructed flow path, with no stem guide or supporting ribs.

The deluge valve shall have no mechanical moving parts, and the actuation shall utilize a single-piece diaphragm assembly of VRSD technology.

The valve shall be coated internally and externally with UV protection. Optional: C5-VH grade of ISO-12944 standard against corrosive conditions.

The solenoid valve shall be a 3-way FM and UL429A-listed for 365 psi/25 bar with 65% of the rated voltage.

The control trim shall include an auxiliary latching relay valve, a manual emergency release unit, a Y-type strainer, two 4-inch pressure gauges, and an automatic drip-check with manual override.

A valve position indicator shall be provided, and equipped with two proximity limit switches.

Removing the valve cover for full inspection and maintenance shall be in-line, and not require removal of the valve from the pipeline.

The deluge valve and control trim shall be pre-assembled and hydraulically tested by a UL/FM and ISO 9000, 9001 certified factory.

Technical Data

Available Sizes:

Flanged- 1½, 2, 2½, 3, 4, 6, 8, 10 & 12"

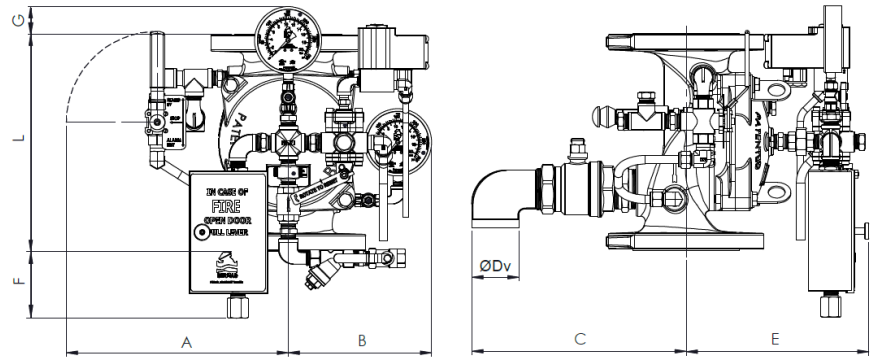
Grooved- 2, 3, 4, 6, & 8"

Pressure Rating:

ANSI#150 - 17.2 bar | 250 psi

Elastomer:

HTNR - Fabric Reinforced High Temperature Compound - See engineering data



Valve Size	L #150 mm in	L Grooved mm in	A mm in	B mm in	C mm in	øD in	E mm in	F mm in	G mm in	Weight #150 kg lb
DN40 1½"	205 8.1	-	313 12.3	191 7.5	199 7.8	¾"	203 8.0	157 6.2	100 3.9	14 31
DN50 2"	205 8.1	205 8.1	313 12.3	191 7.5	199 7.8	1½"	203 8.0	157 6.2	100 3.9	15 33
DN65 2½"	205 8.1	-	325 12.8	196 7.7	253 10.0	1½"	205 8.1	157 6.2	100 3.9	17 37
DN80 3"	257 10.1	250 9.8	345 13.6	205 8.1	266 10.5	1½"	238 9.4	131 5.2	74 2.9	28 62
DN100 4"	320 12.6	320 12.6	328 12.9	212 8.3	316 12.4	1½"	258 10.2	99 3.9	43 1.7	40 88
DN150 6"	415 16.3	415 16.3	349 13.7	204 8.0	347 13.7	2"	334 13.1	52 2.0	-	84 185
DN200 8"	500 19.7	-	383 15.1	270 10.6	364 14.3	2"	385 15.2	9 0.4	-	147 323
DN250 10"	605 23.8	-	396 15.6	280 11.0	384 15.1	2"	382 15.0	-	-	162 356
DN300 12"	725 28.5	-	438 17.2	333 13.1	422 16.6	2"	513 20.2	-	-	242 532

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"	400E-6M	03	V	C	A5	ER	4DC	NN	N6nW																																																																																																																																	
<table><tr><th>Category</th><th>Code</th></tr><tr><td>Standard</td><td>FP</td></tr><tr><td>Seawater</td><td>FS</td></tr><tr><td>Foam</td><td>FC</td></tr></table>	Category	Code	Standard	FP	Seawater	FS	Foam	FC	<table><tr><th>Valve Size</th><th></th></tr><tr><td>1½"</td><td>40 mm</td></tr><tr><td>2"</td><td>50 mm</td></tr><tr><td>2½"</td><td>60 mm</td></tr><tr><td>3"</td><td>80 mm</td></tr><tr><td>4"</td><td>100 mm</td></tr><tr><td>6"</td><td>150 mm</td></tr><tr><td>8"</td><td>200 mm</td></tr><tr><td>10"</td><td>250 mm</td></tr><tr><td>12"</td><td>300 mm</td></tr></table>	Valve Size		1½"	40 mm	2"	50 mm	2½"	60 mm	3"	80 mm	4"	100 mm	6"	150 mm	8"	200 mm	10"	250 mm	12"	300 mm	<table><tr><th>Installation</th><th>Code</th></tr><tr><td>Vertical</td><td>V</td></tr><tr><td>Horizontal</td><td>H</td></tr></table>	Installation	Code	Vertical	V	Horizontal	H	<table><tr><th>Material Body & Cover ⁽¹⁾</th><th>Code</th></tr><tr><td>Ductile Iron A356 ⁽²⁾</td><td>C</td></tr><tr><td>Steel ASTM A216 WCB ⁽²⁾</td><td>S</td></tr><tr><td>Stainless Steel 316</td><td>N</td></tr><tr><td>Nickel Al Bronze C95800</td><td>U</td></tr><tr><td>Super Duplex Grade 5A</td><td>D</td></tr></table>	Material Body & Cover ⁽¹⁾	Code	Ductile Iron A356 ⁽²⁾	C	Steel ASTM A216 WCB ⁽²⁾	S	Stainless Steel 316	N	Nickel Al Bronze C95800	U	Super Duplex Grade 5A	D	<table><tr><th>End Connections</th><th>Code</th></tr><tr><td>ANSI#150RF</td><td>A5</td></tr><tr><td>ANSI#150FF</td><td>a5</td></tr><tr><td>ISO PN16</td><td>16</td></tr><tr><td>Grooved ANSI</td><td>VI</td></tr></table>	End Connections	Code	ANSI#150RF	A5	ANSI#150FF	a5	ISO PN16	16	Grooved ANSI	VI	<table><tr><th>Coating</th><th>Code</th></tr><tr><td>High Build Epoxy</td><td>ER</td></tr><tr><td>Zinc Based High Build Epoxy ⁽⁵⁾</td><td>ZR</td></tr><tr><td>Uncoated</td><td>UC</td></tr></table>	Coating	Code	High Build Epoxy	ER	Zinc Based High Build Epoxy ⁽⁵⁾	ZR	Uncoated	UC	<table><tr><th>Voltage - Main Valve N.O or N.C *</th><th>Code</th></tr><tr><td>24VDC - N.C.</td><td>4DC</td></tr><tr><td>24VDC - N.O.</td><td>4DO</td></tr><tr><td>110VDC - N.C.</td><td>5DC</td></tr><tr><td>110VDC - N.O.</td><td>5DO</td></tr><tr><td>110 - 120/AC - N.C.</td><td>5AC</td></tr><tr><td>110 - 120/AC - N.C.</td><td>5AO</td></tr><tr><td>220 - 240/AC - N.C.</td><td>2AC</td></tr><tr><td>221 - 240/AC - N.C.</td><td>2AO</td></tr></table>	Voltage - Main Valve N.O or N.C *	Code	24VDC - N.C.	4DC	24VDC - N.O.	4DO	110VDC - N.C.	5DC	110VDC - N.O.	5DO	110 - 120/AC - N.C.	5AC	110 - 120/AC - N.C.	5AO	220 - 240/AC - N.C.	2AC	221 - 240/AC - N.C.	2AO	<table><tr><th>Factory Supplied Additional Items</th><th>Code</th></tr><tr><td>General Purpose NEMA-4 Pressure Switch</td><td>P</td></tr><tr><td>Ex Proof NEC, Div.1 Pressure Switch ⁽³⁾</td><td>P7</td></tr><tr><td>Ex d ATEX Pressure Switch ⁽³⁾</td><td>P9</td></tr><tr><td>Ex d Pressure Switch, SS316 Enclosure ⁽³⁾</td><td>P9Jn</td></tr><tr><td>Ex d Pressure Switch, SS316 Enclosure, Single Limit Switch, General Purpose</td><td>P9mJn</td></tr><tr><td>Single Limit Switch, General Purpose</td><td>S</td></tr><tr><td>Single Ex d Proximity Limit Switch</td><td>S9</td></tr><tr><td>Double Ex d Proximity Limit Switch</td><td>SS9</td></tr><tr><td>Double Ex d Proximity Limit Switch with Pressure Gauge Assembly ⁽³⁾</td><td>SS9Jn</td></tr><tr><td>Pressure Gauge Assembly ⁽³⁾</td><td>6</td></tr><tr><td>S.S Glycerin Pressure Gauge Assembly ⁽³⁾</td><td>6n</td></tr><tr><td>Monel Pressure Gauge Assembly ⁽³⁾</td><td>6m</td></tr><tr><td>Ex Proof NEC Class 1 Div 1 Solenoid</td><td>7</td></tr><tr><td>Ex. d ATEX Solenoid</td><td>9</td></tr><tr><td>Stainless steel 316 Solenoid Valve</td><td>K</td></tr><tr><td>Drain Valve</td><td>DV</td></tr><tr><td>Water Motor Alarm Assembly ⁽³⁾</td><td>W</td></tr><tr><td>Special Elastomer</td><td>E</td></tr><tr><td>Large Control Filter</td><td>F</td></tr><tr><td>Valve Position Indicator</td><td>I</td></tr><tr><td>S.S 316 Trim Accessories</td><td>N</td></tr><tr><td>S.S Solenoid Valve</td><td>K</td></tr><tr><td>Pressure Transmitter ⁽³⁾</td><td>Q</td></tr><tr><td>Drain and Indicating Components</td><td>A</td></tr></table>	Factory Supplied Additional Items	Code	General Purpose NEMA-4 Pressure Switch	P	Ex Proof NEC, Div.1 Pressure Switch ⁽³⁾	P7	Ex d ATEX Pressure Switch ⁽³⁾	P9	Ex d Pressure Switch, SS316 Enclosure ⁽³⁾	P9Jn	Ex d Pressure Switch, SS316 Enclosure, Single Limit Switch, General Purpose	P9mJn	Single Limit Switch, General Purpose	S	Single Ex d Proximity Limit Switch	S9	Double Ex d Proximity Limit Switch	SS9	Double Ex d Proximity Limit Switch with Pressure Gauge Assembly ⁽³⁾	SS9Jn	Pressure Gauge Assembly ⁽³⁾	6	S.S Glycerin Pressure Gauge Assembly ⁽³⁾	6n	Monel Pressure Gauge Assembly ⁽³⁾	6m	Ex Proof NEC Class 1 Div 1 Solenoid	7	Ex. d ATEX Solenoid	9	Stainless steel 316 Solenoid Valve	K	Drain Valve	DV	Water Motor Alarm Assembly ⁽³⁾	W	Special Elastomer	E	Large Control Filter	F	Valve Position Indicator	I	S.S 316 Trim Accessories	N	S.S Solenoid Valve	K	Pressure Transmitter ⁽³⁾	Q	Drain and Indicating Components	A
Category	Code																																																																																																																																										
Standard	FP																																																																																																																																										
Seawater	FS																																																																																																																																										
Foam	FC																																																																																																																																										
Valve Size																																																																																																																																											
1½"	40 mm																																																																																																																																										
2"	50 mm																																																																																																																																										
2½"	60 mm																																																																																																																																										
3"	80 mm																																																																																																																																										
4"	100 mm																																																																																																																																										
6"	150 mm																																																																																																																																										
8"	200 mm																																																																																																																																										
10"	250 mm																																																																																																																																										
12"	300 mm																																																																																																																																										
Installation	Code																																																																																																																																										
Vertical	V																																																																																																																																										
Horizontal	H																																																																																																																																										
Material Body & Cover ⁽¹⁾	Code																																																																																																																																										
Ductile Iron A356 ⁽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																																																																																																																																										
ISO PN16	16																																																																																																																																										
Grooved ANSI	VI																																																																																																																																										
Coating	Code																																																																																																																																										
High Build Epoxy	ER																																																																																																																																										
Zinc Based High Build Epoxy ⁽⁵⁾	ZR																																																																																																																																										
Uncoated	UC																																																																																																																																										
Voltage - Main Valve N.O or N.C *	Code																																																																																																																																										
24VDC - N.C.	4DC																																																																																																																																										
24VDC - N.O.	4DO																																																																																																																																										
110VDC - N.C.	5DC																																																																																																																																										
110VDC - N.O.	5DO																																																																																																																																										
110 - 120/AC - N.C.	5AC																																																																																																																																										
110 - 120/AC - N.C.	5AO																																																																																																																																										
220 - 240/AC - N.C.	2AC																																																																																																																																										
221 - 240/AC - N.C.	2AO																																																																																																																																										
Factory Supplied Additional Items	Code																																																																																																																																										
General Purpose NEMA-4 Pressure Switch	P																																																																																																																																										
Ex Proof NEC, Div.1 Pressure Switch ⁽³⁾	P7																																																																																																																																										
Ex d ATEX Pressure Switch ⁽³⁾	P9																																																																																																																																										
Ex d Pressure Switch, SS316 Enclosure ⁽³⁾	P9Jn																																																																																																																																										
Ex d Pressure Switch, SS316 Enclosure, Single Limit Switch, General Purpose	P9mJn																																																																																																																																										
Single Limit Switch, General Purpose	S																																																																																																																																										
Single Ex d Proximity Limit Switch	S9																																																																																																																																										
Double Ex d Proximity Limit Switch	SS9																																																																																																																																										
Double Ex d Proximity Limit Switch with Pressure Gauge Assembly ⁽³⁾	SS9Jn																																																																																																																																										
Pressure Gauge Assembly ⁽³⁾	6																																																																																																																																										
S.S Glycerin Pressure Gauge Assembly ⁽³⁾	6n																																																																																																																																										
Monel Pressure Gauge Assembly ⁽³⁾	6m																																																																																																																																										
Ex Proof NEC Class 1 Div 1 Solenoid	7																																																																																																																																										
Ex. d ATEX Solenoid	9																																																																																																																																										
Stainless steel 316 Solenoid Valve	K																																																																																																																																										
Drain Valve	DV																																																																																																																																										
Water Motor Alarm Assembly ⁽³⁾	W																																																																																																																																										
Special Elastomer	E																																																																																																																																										
Large Control Filter	F																																																																																																																																										
Valve Position Indicator	I																																																																																																																																										
S.S 316 Trim Accessories	N																																																																																																																																										
S.S Solenoid Valve	K																																																																																																																																										
Pressure Transmitter ⁽³⁾	Q																																																																																																																																										
Drain and Indicating Components	A																																																																																																																																										
Notes: (1) Other materials available see engineering data (2) Coated internally and externally (3) Supplied loose (4) Consult BERMAD for availability (5) For valves up to 10" inclusive	<table><tr><th>Additional Feature</th><th>Code</th></tr><tr><td>Closing Speed Control</td><td>01</td></tr><tr><td>Opening Speed Control</td><td>02</td></tr><tr><td>Opening & Closing Speed Control</td><td>03</td></tr><tr><td>None</td><td>-</td></tr></table>	Additional Feature	Code	Closing Speed Control	01	Opening Speed Control	02	Opening & Closing Speed Control	03	None	-	<table><tr><th>Tubing & Fittings</th><th>Code</th></tr><tr><td>Stainless Steel 316</td><td>NN</td></tr><tr><td>Monel 400</td><td>MM</td></tr><tr><td>Super Duplex</td><td>DD</td></tr></table>	Tubing & Fittings	Code	Stainless Steel 316	NN	Monel 400	MM	Super Duplex	DD																																																																																																																							
Additional Feature	Code																																																																																																																																										
Closing Speed Control	01																																																																																																																																										
Opening Speed Control	02																																																																																																																																										
Opening & Closing Speed Control	03																																																																																																																																										
None	-																																																																																																																																										
Tubing & Fittings	Code																																																																																																																																										
Stainless Steel 316	NN																																																																																																																																										
Monel 400	MM																																																																																																																																										
Super Duplex	DD																																																																																																																																										

Notes:

- (1) Other materials available see engineering data
(2) Coated internally and externally
(3) Supplied loose
(4) Consult BERMAD for availability
(5) For valves up to 10" inclusive

* NO or NC refers to the main valve status when the Solenoid is de-energized

*More options available – consult BERMAD