

Deluge Valve Model DS Straight Pattern & DA Angle Pattern

A New dimension in Deluge Valve technology

Deluge Valve



Typical Applications



Petroleum & Refineries



Foam Application



Power plants & Transformers



Gas/LNG storage Tanks



Marine/Ships



Offshore Platforms

Deluge Valve Skid

Optional Features

- Seawater Application
- Pneumatic Trim
- Water Motor Alarm - Gong
- Pressure Switch
- Test Trim
- Ex-proof enclosure for hazardous areas
- Electric Release Trim
- Skid mounted with Isolation Valves
- Siamese Connection
- Control Panel per skid



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Deluge Valve Model DS Straight Pattern & DA Angle Pattern

Description

Rapidrop Deluge Valve is a hydraulically actuated, pilot operated diaphragm control valve.

Two basic designs are available DS-STRAIGHT PATTERN & DA-ANGLE PATTERN. All internal parts and cover are 100% identical in both the designs.

The DS/DA series Deluge Valve is held closed by system water pressure trapped in the top cover chamber. When the releasing system operates, pressure is released from the top cover chamber and the diaphragm assembly moves upward allowing the water to flow into the system.

Operation

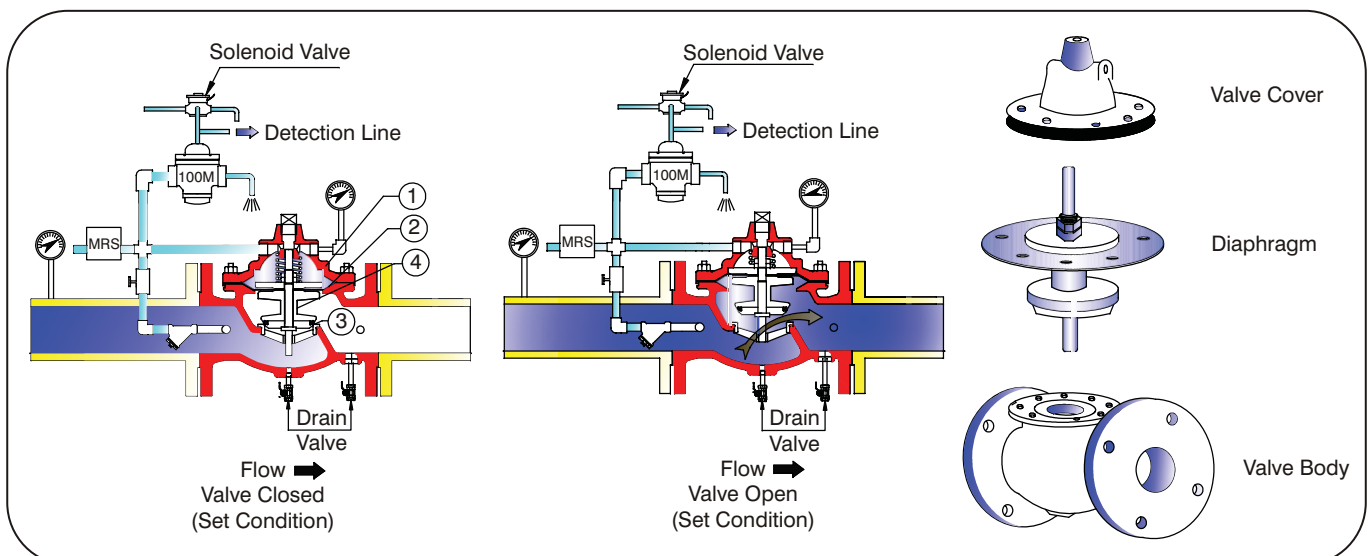
Deluge valves are required to operate independently, regardless to failure in other systems or sources of energy. In emergency Deluge Valve should be operated by line water pressure.

There are three chambers in the valve, Inlet, Outlet and Cover Chamber. The cover chamber & inlet/outlet are separated by a Elastomer Diaphragm. The valve consists of three main parts, Body, Cover and Diaphragm Assembly. When Diaphragm Assembly, moves upward, valve opens and when it moves downward, it seals on the seat and valve closes driptight. The valve is of packless design-having No Gland Packing.

In the closed SET condition, Rapidrop DS/DA Deluge Valve is held closed by line pressure applied and trapped in the COVER CHAMBER (1) Refer drawing. This water pressure multiplied by the effective surface area of the diaphragm (2) creates a differential closing force, resulting the valve remaining bubble tight closed (3) until a control device activates. The closed valve prevents the water or foam from entering the system. During FIRE or TEST condition, the water pressure is released from the cover chamber (1) This enables the line water pressure, without any help from any outside sources, to force the diaphragm plug assembly (4) upward and the valve fully opens for clear unrestricted flow. For RESET of Deluge Valve, line pressure is reintroduced into the cover chamber (1) which closes the valve fully.

Advantages

- Steel body for longer life
- All sizes are with stainless steel pilots for rapid opening
- Valve size upto 8" will open within 2 second.
- Unique Quad Ring seal from Parker/3M-USA for drip tight shut off.
- Diaphragm of even thickness, flexible and strong-rated upto 375 psig pressure.
- Deluge Valve completely Pre-piped with Wet Trim/Pneumatic Trim from factory - saving high labour cost to Trim Fit on site.



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Basic Deluge Valve Controls

Hydraulically Controlled Deluge Valve

This type of system is suitable for wet pilot lines with closed fusible plugs. Provided with boosted local opening, it is recommended for systems with elevated fusible plugs. The Deluge Valve latches open in response to hydraulic pressure drop in the wet pilot line.

Electro-Hydraulically Controlled Deluge Valve

This type of Deluge Valve is Solenoid (Electrically) operated with Hydraulic (Line Fluid) actuated. The Deluge Valve opens in response to an electric signal which drains the cover chamber of pilot and main valve, which allows the valve to fully open.

Pneumatically Controlled Deluge Valve

This type of Deluge Valve opens up in response to pneumatic pressure drop in the dry pilot line. This system is suitable for dry pilot lines with closed pneumatic fusible plugs.

Electro-Pneumatically controlled Deluge Valve

This type of deluge valve has Electric and Electro-Pneumatic device for fire detection. The Deluge Valve opens in response to an electric signal and/or Pneumatic Pressure Drop in the dry pilot line.

Trim Options

Basic Trim

Deluge valve trim consists of Diaphragm, Retained, retainer plate, stem and spring. The whole trim assembly moves together to open/close the valve based on signal received from the controller device. For drip tightness there is soft seat Quad Ring arrangement between the seat and retainer plate in closed position.

Dry Pilot Trim

Dry pilot operation uses a pilot line of closed sprinkler containing air under pressure, located in the protected area. It requires regulated dry air supply with main supply point with restricted orifice. The air pressure to be maintained as specified. The pilot line is connected to air inlet side. The top chamber of the deluge valve is connected to water inlet side.

When there is an air pressure drop, or due to release of any device on detection of fire, the diaphragm of pilot is lifted and allows the water to drain. This releases the water pressure in the top cover chamber of the deluge valve, allowing the deluge valve to open and water to flow into the system's piping and alarm devices. Recommended air supply pressure for dry pilot trim system is 3-4 kg/cm².

Wet Pilot Trim

Wet pilot operation uses a pilot line of closed sprinklers containing pressurized water, supplied through the upstream side of the deluge valve, through a restricted orifice. All the release lines are connected to a common release line. Due to release of any one of the release device, the water pressure in the top chamber of the pilot valve drops which opens the pilots and the deluge valve opens.

Electric Release Trim

To actuate Deluge Valve electrically, a solenoid valve is provided to drain the water from the top chamber of the deluge valve. A pressure switch is provided to activate an electric alarm and signal to shut down the desired equipment or to give tripped indication to deluge valve. In addition to this, pressure switch can also monitor "Low Air Pressure" and "Fire condition" when used in dry pilot air line.

Test and Alarm trim with Sprinkler Alarm

This trim is supplied with the sprinkler alarm bell, which rings on actuation of deluge valve. A test valve is provided to test the normal operation of the sprinkler alarm bell. (Water Motor Gong)

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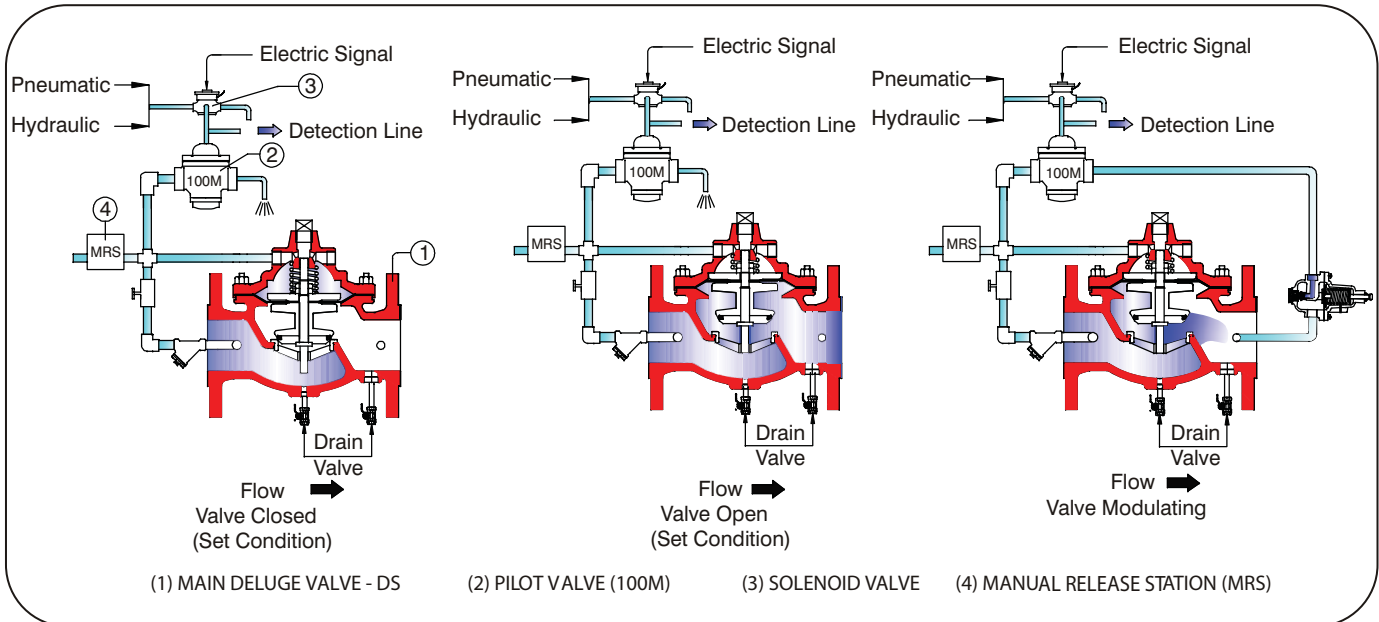
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Schematic of valve operation



Valve Close

Line pressure applied to the cover chamber, which creates higher force due to large area above the seat, which moves valve to the closed position and provides drip tight shut off. Diaphragm area is always 1.5 times larger than seat area in all sizes of valve.

Valve Open

Discharging the pressure out of the cover chamber to atmosphere or other lower pressure zone, causes the line pressure to act below seat area to move valve upward to the open position.

Valve Modulating

The Pressure Reducing Pilot Valve (F15) senses the pressure, changes and opens or closes the valve and modulates the main valve and accordingly controls/reduces the outlet pressure.

Tender Specifications

1. The Deluge Valve shall be pilot operated, diaphragm & line fluid actuated.
2. Pilot can be operated by electric (solenoid valve), pneumatic or hydraulic (line fluid) sources, without any other gadgets.
3. The diaphragm assembly shall be only moving part.
4. The valve cover can be removed for online servicing and inspection without removing the entire valve from the pipeline.
5. The control trim shall be Factory Pre-Assembled and integrated part of the Deluge Valve.

Deluge Valve Model DS Straight Pattern & DA Angle Pattern

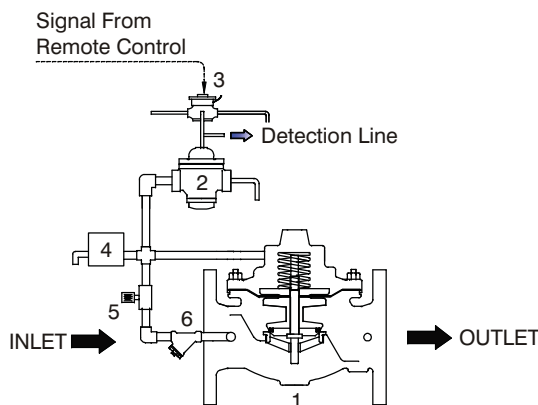
Solenoid Operated Deluge Valve for Freshwater & Seawater



- Model DS-B sizes 4", 6" & 8" (Straight Pattern UL Listed only)
- Fast acting Solenoid Control
- Drip-Tight Shut off
- Simple Design-Pressure Reliability
- Easy installation and maintenance without removing valve from the line.
- All trims are pre-piped at the Deluge Valve factory

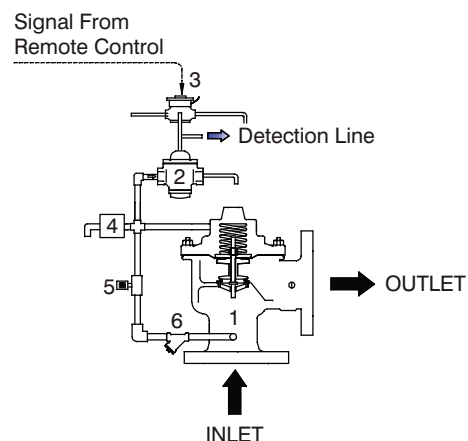
The Rapidrop DS-B Solenoid Controlled Valve is an ON/OFF control valve which either opens or closes upon receiving an Electrical Signal to the Solenoid Pilot Control. This valve consists of DS Main Valve, a 3-way Solenoid Valve, an Auxiliary Pilot -100M and Manual Release Station (MRS).

The Pilot Control System applies line water pressure to or relieves water pressure from the Diaphragm chamber of the main valve to close or open the Deluge Valve. It is supplied either Normally Closed (Energize Solenoid to open) or Normally Open (De-energize Solenoid Valve to open)



- (1) Main deluge valve - DS
- (2) Pilot valve (100M)
- (3) Solenoid valve
- (4) Manual release station (MRS)
- (5) Flow control device
- (6) Flow clean strainer

SCHEMATIC DIAGRAM FOR DS - B



- (1) Main deluge valve - DA
- (2) Pilot valve (100M)
- (3) Solenoid valve
- (4) Manual release station (MRS)
- (5) Flow control device
- (6) Flow clean strainer

SCHEMATIC DIAGRAM FOR DA - B

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Deluge Valve Model DS Straight Pattern & DA Angle Pattern

Model DS-A / DA-A

Pneumatically/Hydraulically Controlled Deluge Valve for Freshwater & Seawater

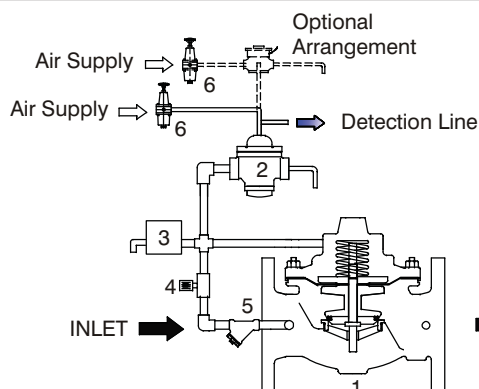


- Model DS-A sizes 4", 6", & 8" (Straight Pattern UL Listed only)
- Quick response to Air supply to Pilot
- No Gland Packing
- Dry Pilot Trim when air is used for sprinkler system

The Rapidrop DS-A Deluge Valve is used for dry Pilot Trim-Air Operated Deluge Systems. The valve can be used with direct air supply to the pilot (100M) in which case, the Deluge Valve will open in case of Air Pressure Loss. The valve can also be used with Solenoid Valve, where air is supplied to Pilot Valve through 3-way Solenoid Valve which keeps Deluge Valve in closed condition.

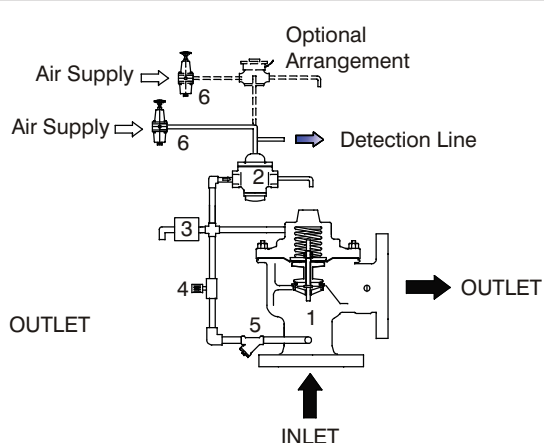
In case of FIRE or TEST, the 3-way Solenoid Valve is energized, which removes air from the Pilot Valve (100M). This opens the Pilot Valve and releases water from the cover chamber of main valve which opens Main Valve - Deluge Valve.

This eliminates separate types of Trim for Hydraulically operated & Pneumatically operated Deluge Valve's and makes it very simple to use, operate and maintain.



- (1) Main deluge valve - DS
- (2) Pilot valve (100M)
- (3) Manual release station (MRS)
- (4) Flow control device
- (5) Flow clean strainer
- (6) Air filter regulator

SCHEMATIC DIAGRAM FOR DS - A



- (1) Main deluge valve - DA
- (2) Pilot valve (100M)
- (3) Manual release station (MRS)
- (4) Flow control device
- (5) Flow clean strainer
- (6) Air filter regulator

SCHEMATIC DIAGRAM FOR DA - A

Deluge Valve Model DS Straight Pattern & DA Angle Pattern

Specifications

DS - Globe	- 2"-16" -Flanged to ANSI B16.5 class 150 & 300
DA - Angle	- 2"-8" -Flanged to ANSI B16.5 class 150 & 300
Pressure Rating	- 150 class, Max 285 PSIG (20 Barg) 300 class, Max 375 PSIG (26 Barg)
Temperature Range	- Water upto 700°C / 1600°F Max.
Main Valve Body & Cover	
Material	- Cast Steel ASTM A216 Gr. WCB - Naval Bronze : ASTM B61 - Nickel Al-Bronze – ASTM B148/BS1400 Gr.AB2 - Stainless Steel – ASTM A351 Gr. CF8/CF8M
Valve Seat	- SS 316
All other internal parts	- SS 304
Stem	- SS 316 - Monal for SEAWATER
Pilot 100M	- Stainless steel
Tubing & Fitting	- All stainless steel

Pilot Valve Specifications - 100M

Body & Trim Material	- Complete stainless steel
Max. Pressure	- 375 psig (26 Barg)
Max. Temperature	- 70° C / 160° F
Fluid	- Air / Water / Light Oil
Elastomers	- Buna-N-Nylon Reinforced

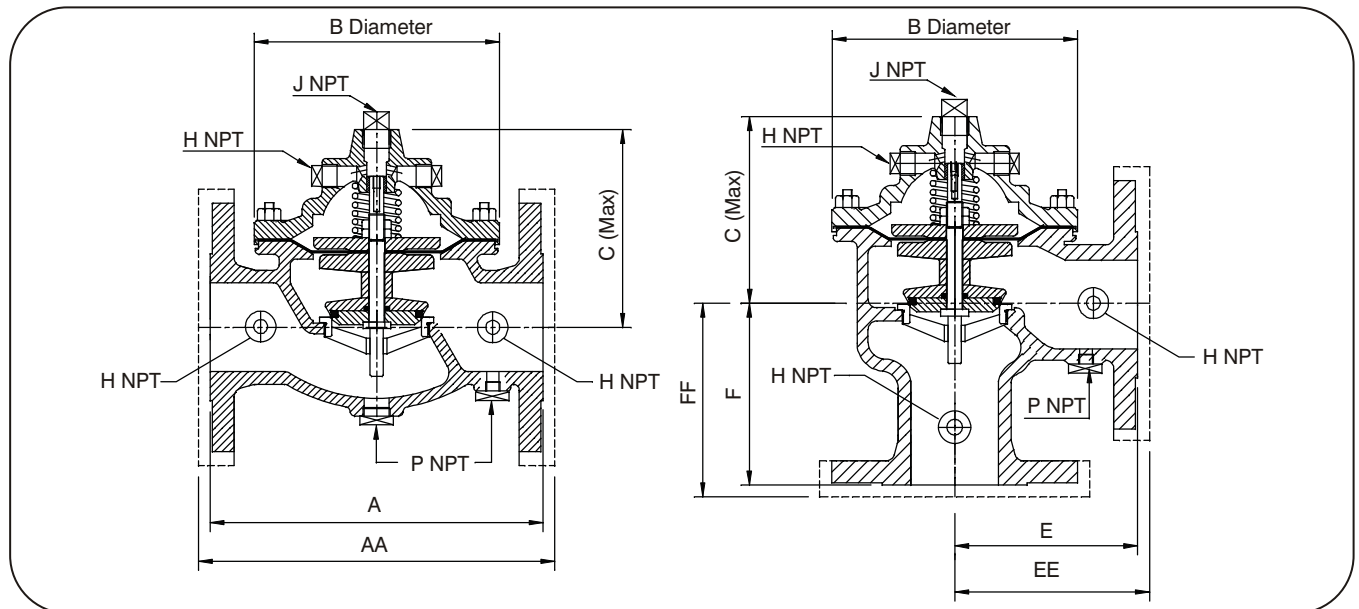
Solenoid Control Specifications

Type	- 3/2 way - Normally Open Energize to open Deluge Valve - 3/2 way - Normally Close De-energize to open Deluge Valve
Body	- Brass ASTM B283 Stainless Steel
Enclosure	- Weatherproof to NEMA type 1,2,3,4,5. NEMA type - 6,7,9 - watertight IP 65. Ex-proof PESO/CMRI certified for Gr.IIA/IIB at extra cost. UL-approved Ex-proof/ATEX at extra cost.
Voltage	- 110V/220V-AC-60Hz/50Hz 24V/48V DC.
Coil	- Class F
Current - AC Coil	- 6 Watts
Current - DC Coil	- 10.6 Watts
Inrush Amp.	- 30 VAC
Holding Amp.	- 16 VAC
Manual Operator	- Available on request at extra cost

Deluge Valve Model DS Straight Pattern & DA Angle Pattern

Flow Data - ACV DS (Globe) / DA (Angle)

Valve Size - Inch	2"	3"	4"	6"	8"	10"	12"	14"	16"
Valve Size - mm	50	80	100	150	200	250	300	350	400
Valve Cover Chamber Capacity (Liters)	0.112	0.28	0.616	1.96	4.73	9.46	15.14	24.6	35.9
CV Valve (Globe) DS (G.P.M.@ 1 PSI ΔP)	55	125	220	460	840	1400	1730	2300	2950
CV Valve (Angle) DA (G.P.M.@ 1 PSI ΔP)	66	150	260	570	990	1600	2500	3060	4210
Maximum Continuous Flow Rate GPM (Water)	208	460	800	1800	3100	4900	7000	8500	11000
Maximum Intermittent Flow Rate GPM (Water)	260	570	1000	2300	3900	6000	8600	10500	14000
Approx. Weight (Kgs)	20	28	55	115	182	375	500	728	1025



Valve Size - Inch	2"	3"	4"	6"	8"	10"	12"	14"	16"
Valve Size - mm	50	80	100	150	200	250	300	350	400
A 150 ANSI	238	305	381	508	645	756	864	991	1051
AA 300 ANSI	254	337	397	533	670	790	902	1029	1105
B Dia	143	200	253	337	445	594	710	819	902
C Max. - DS	140	175	220	305	400	480	530	570	665
E 150 ANSI	150	195	225	275	350				
EE 300 ANSI	156	205	233	286	362				
F 150 ANSI	127	146	173	216	280				
C Max. - DA	140	175	220	305	350				
P NPT	1/2"	1"	1"	1-1/2"	2"	2"	2"	2"	2"
H NPT	3/8"	3/8"	3/8"	3/8"	1/2"	3/4"	1"	1"	1-1/2"
J NPT	1/2"	3/4"	3/4"	1"	1"	1"	1"	1"	1"

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Pressure Drop Chart

