Model DDV Diaphragm Deluge Valve with Electric Actuation, Wet Pilot, & Dry Pilot Trims

UL Listed, FM Approved

Product Features

- Compact Trim with all connections to the valve body
- Valve can be reset without removing cover
- Suitable for horizontal or vertical installation
- Pressure regulating dry pilot version allows up to 400 psi (27.6 bar) inlet pressure

Product Description

The Model DDV deluge valve diaphragm-type deluge valve available in 1-1/2" (40mm), 2" (50mm), 2-1/2" (65mm), 76mm, 3" (80mm), 4" (100mm), 6" (150mm), 165mm, and 8" (200mm) nominal sizes with multiple end configurations (see Table A).

The valve's diaphragm seals against a seat machined in the valve body. Water pressure in the chamber between the diaphragm and the cover presses the diaphragm against the seat to prevent water flow through the valve. The release of water pressure from the chamber allows the diaphragm to deform away from the seat, which permits water to flow through the valve. Maintenance of the valve is simplified because all trim is connected to the valve body, and the diaphragm can be removed without removing the trim.

Three release trim packages are available: electric actuation, wet pilot line, and dry pilot line. The dry pilot line trim can also be ordered with a pressure regulating option to regulate the water pressure downstream of the valve in accordance to the values listed in Table E.

Note: The 8" (200mm) Model DDV Valve is not available with pressure regulating trim.



Representative photo; actual assembly may differ

All trim options include 0-300 psi water pressure gauges for the incoming water supply and control chamber; in addition, the dry pilot pressure regulating trim includes a 0-300 psi water pressure gauge for adjusting the outlet pressure. Optional 0-600 pressure gauges are available. Model DDV systems with groove end connections may be ordered with or without control valves (water supply valve and upper service valve). Control valves will be Reliable RBVG or REL363GT grooved end butterfly valves with integral tamper switches. Plugged outlets are provided for alarm devices that are ordered separately. For convenience, an optional alarm line test valve kit may be installed (see Figures 11 & 12).

End Configuration Options — **Table A**

GR x GR (ANSI/AWWA C606)	Class 150 FLG x FLG (ASME B16.5)	Class 300 FLG x FLG (ASME B16.5)	PN16 FLG x FLG (ISO 7005-2)	BS-E FLG x FLG (BS 10)	NPT THD x THD (ANSI/AMSE B1.20.1)	ISO 7/1 THD x THD
All Sizes	All Sizes (exc 76 & 165mm)	All Sizes (exc 76 & 165mm)	All Sizes (exc 76 & 165mm)	All Sizes (exc 76 & 165mm)	1-1/2", 2", 2-1/2", & 3" (40, 50, 65, & 80mm)	1-1/2", 2", 2-1/2", 3" (40, 50, 65, & 80mm)

Note: Valves are intended to be installed on systems where the pressure does not exceed the working capabilities of the end configurations.

Technical Data: Electric Actuation Trim — **Table B**

Valve Size	Maximum Flow gpm (L/min)	Maximum Rated Pressure psi (bar)	Valve Output Range psi (bar)	Approvals
All	Not Restricted	175 (12.0)	Not Regulated	UL, FM
		300 (20.7)		

Note: Maximum rated pressure determined by solenoid selection. See page 3.

Technical Data: Wet Pilot Trim — **Table C**

Valve Size	Maximum Flow gpm (L/min)	Maximum Rated Pressure psi (bar)	Valve Output Range psi (bar)	Approvals
All	Not Restricted	400 (27.6)	Not Regulated	UL, FM

Technical Data: Dry Pilot Trim — **Table D**

Valve Size	Maximum Flow gpm (L/min)	Maximum Rated Pressure psi (bar)	Valve Output Range psi (bar)	Approvals
All	Not Restricted	400 (27.6)	Not Regulated	UL, FM

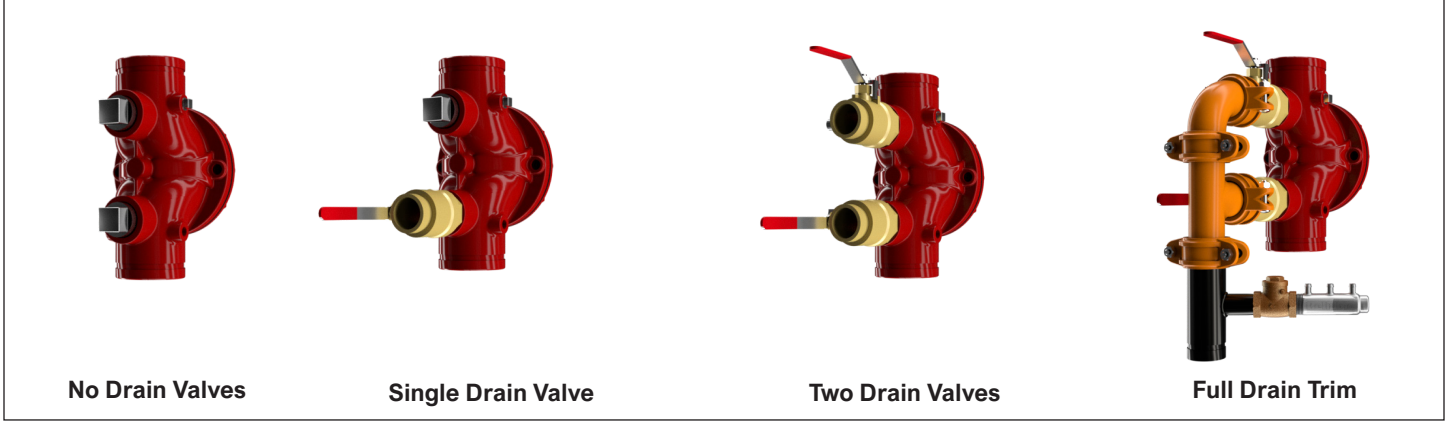
Technical Data: Dry Pilot Pressure Regulating Trim — **Table E**

Valve Size	Maximum Flow gpm (L/min)	Maximum Rated Pressure psi (bar)	Valve Output Range psi (bar)	Approvals
1-1/2" (40mm)	225 (1023)	400 (27.6)	UL 100-200 (6.9-13.8) FM 50-210 (3.4-14.5)	UL, FM
2" (50mm)	250 (1137)			
2-1/2" (65mm) 76mm 3" (80mm)	400 (1514)			
4" (100mm)	1340 (5072)			
6" (150mm) 165mm	3000 (11350)			

Notes for Pressure Regulating Trim:

1. Valves are intended to be installed on systems where the pressure does not exceed the working capabilities of the end configurations.
2. For cULus: Where inlet pressure is between 150 and 400 psi (10.3 and 27.6 bar), a regulated outlet pressure of 100 to 200 psi (6.9 to 13.8 bar) can be maintained within +/- 10% under flowing conditions for inlet pressures that are at least 50 psi (3.4 bar) greater than the outlet set pressure.
3. For FM Global: Where inlet pressure is between 85 and 300 psi (5.9 and 20.7 bar), a regulated outlet pressure of 50 to 210 psi (3.4 to 14.5 bar) can be maintained under flowing conditions with inlet pressures that are at least 35 psi (2.4 bar) greater than the outlet set pressure. Where inlet pressure is more than 300 psi (20.7 bar) and up to 400 psi (27.6 bar), a regulated outlet pressure of 50 to 210 psi (3.4 to 14.5 bar) can be maintained under flowing conditions with inlet pressures that are at least 50 psi (3.4 bar) greater than the outlet set pressure.

Drain Trim Options — **Figure 1**



No Drain Valves | **Single Drain Valve** | **Two Drain Valves** | **Full Drain Trim**

Note: 2" grooved drain shown for 4", 6", 165mm, and 8" valves. Drain on 2-1/2", 3", and 76mm valves is 1-1/4" threaded with 1-1/4" tee provided for connection of drain piping. Drain on 1-1/2" and 2" valves is 3/4" threaded with 1" tee provided for connection of drain piping.

Model DDV Deluge Valve with Electric Actuation Trim

Technical Specifications
Pressure Rating:
Standard: 175 psi (12.7 bar)
Optional: 300 psi (20.7 bar)

Material Specifications
Body: Ductile Iron with Red Oxide Epoxy coating and Urethane external coating
Cover: Ductile Iron with Red Oxide Epoxy coating and Urethane external coating
Diaphragm: Fabric-reinforced EPDM

Installation Orientation
Not Restricted

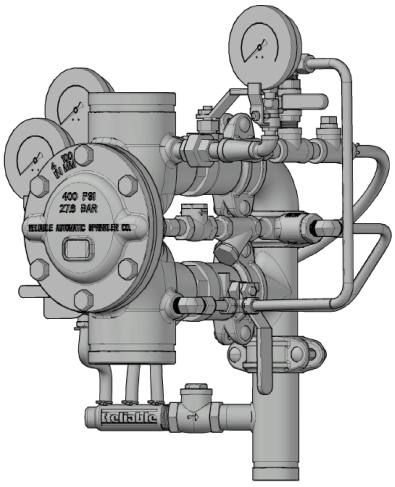
End Connections
See Table A

Drain Trim Options
See Figure 1

Actuator
Standard: Parker Hannifin 24 VDC Normally Closed Solenoid Valve Model 73218BNUNLVNOC111C2 10 Watt, 0.41 Amp Holding, 175 psi (12.7 bar)

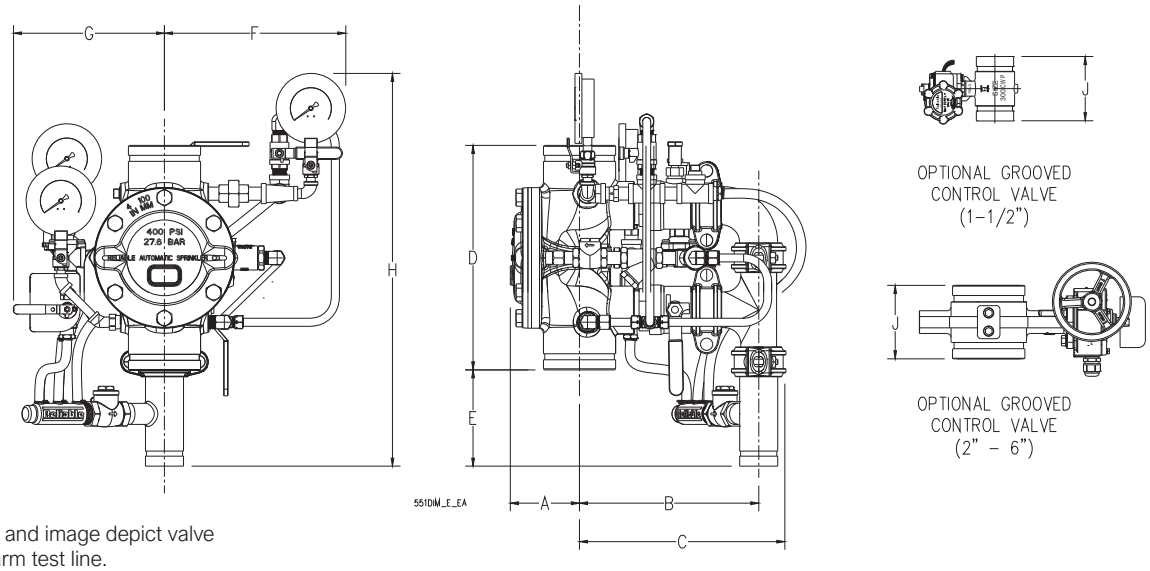
Optional: Parker Hannifin 24 VDC Normally Closed Solenoid Valve Model 73212BN4TNLVNOC322C2 22 Watt, 0.92 Amp Holding, 300 psi (20.7 bar)

Approvals
UL Listed
FM Approved



Model DDV Deluge Valve with Electric Actuation Trim Dimensions

Figure 2



Note: Drawings and image depict valve with *optional* alarm test line.

Model DDV Dimensions - in. (mm)

Table F

Valve Size	A	B	C	D	E	F	G	H	J
1-1/2" (40mm)	3 (76)	9-1/4 (235)	10 (254)	8 (203)	2-1/2 (64)	10-1/8 (257)	8 (203)	15-5/8 (397)	4 (102)
2" (50mm)	3 (76)	9-1/4 (235)	10 (254)	8 (203)	2-1/2 (64)	10-1/8 (257)	8 (203)	15-5/8 (397)	3-7/8 (98)
2-1/2" (65mm) & 76mm	3-1/2 (89)	11-3/4 (298)	12-1/2 (318)	11 (279)	3-1/8 (79)	10-7/8 (276)	8-3/4 (222)	18-1/4 (464)	3-7/8 (98)
3" (80mm)	3-1/2 (89)	11-3/4 (298)	12-1/2 (318)	11 (279)	3-1/8 (79)	10-7/8 (276)	8-3/4 (222)	18-1/4 (464)	3-7/8 (98)
4" (100mm)	4-3/8 (111)	11-1/4 (285)	12-7/8 (327)	14 (356)	6 (152)	11-3/8 (289)	9-1/2 (241)	24-3/8 (619)	4-9/16 (116)
6" (150mm) & 165mm	6-1/2 (165)	11-3/4 (298)	13-3/8 (340)	18 (457)	4 (102)	12-7/8 (327)	11-1/2 (292)	24-3/8 (619)	5-7/8 (149)
8" (200mm)	9-1/8 (232)	12-5/8 (321)	14-1/4 (362)	22-1/2 (572)	1-3/4 (44)	14-3/8 (365)	13 (330)	24-3/8 (619)	5-1/4 (134)

General Operation

Under normal conditions the solenoid valve and the Manual Emergency Release valve on the release trim are closed which maintains hydraulic pressure in the diaphragm chamber. The captured hydraulic pressure holds the diaphragm closed against the valve seat. When the solenoid valve is energized open by the releasing panel, or when the Manual Emergency Release is opened, pressure is relieved from the diaphragm chamber to the drain allowing the diaphragm to relax and water to flow through the Model DDV valve. Water movement through the supply line to the diaphragm chamber closes the Model A Velocity Check Valve which prevents the diaphragm chamber from re-pressurizing and closing the Model DDV deluge valve.

Note: The system pressure gauge on the DDV valve provides an indication of the pressure within the system, but accuracy may be affected by turbulence across the diaphragm created during water flow. Where a more accurate measurement of residual pressure is required, a pressure gauge should be installed downstream of the DDV valve on a straight run of pipe of sufficient length to provide an accurate reading of residual pressure.

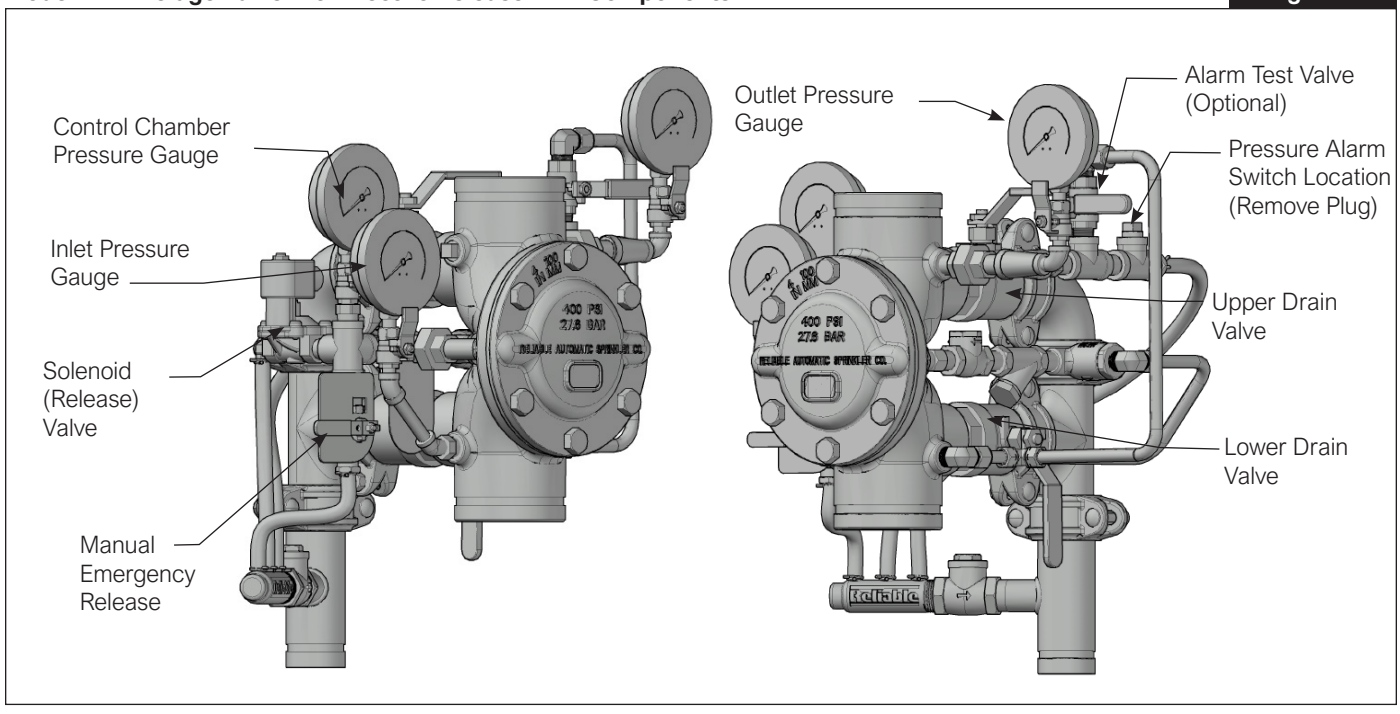
Setup Procedure

1. Ensure the system has been properly drained, and all parts of the system that may have been affected by fire are inspected and, if necessary, replaced.
2. Ensure that the electric detection system is in proper working order and reset.
3. Ensure that the Manual Emergency Release Valve, Solenoid Valve, and Alarm Test Valve (if present) are closed.
4. Open the Upper Drain Valve.
5. Partially open the Lower Drain Valve.
6. Depress and hold the plunger on the Model A Velocity Check Valve. (**Note:** The plunger must remain depressed until the diaphragm chamber is fully pressurized; step 11.)
7. Slightly open the Main Water Supply Control Valve.
8. Once water begins to flow through the Lower Drain Valve, slowly close Lower Drain Valve.
9. Allow hydraulic pressure to stabilize on the diaphragm control face and seal the diaphragm.
10. Observe if water flows through the Upper Drain Valve. If no flow occurs, the deluge valve diaphragm is sealed.
11. Release the plunger on the Model A Velocity Check Valve.
12. Using the Diaphragm Chamber Pressure Gauge, confirm that full hydraulic pressure is present in the diaphragm control chamber.
13. Close the Upper Drain Valve after any residual water has drained from system.
14. Slowly open the Main Water Supply Control Valve. Verify that the Water Control Valve is fully open and properly monitored.
15. Secure the handle of the Manual Emergency Release Valve in the closed position with a cable tie.
16. Fully reset fire alarm panel to clear any active signals.
17. Notify the proper authorities, building occupants, and those responsible for monitoring the system that the system has been placed into service.

Shutdown Procedure

1. Close the main water supply control valve.
2. Close the Diaphragm Chamber Supply Valve.
3. Open the Manual Emergency Release Valve.
4. Open the Upper Drain Valve and Lower Drain Valve to drain the system.
5. Depress the plunger on the Model A Velocity Check Valve to relieve any remaining pressure on the supply line to the diaphragm chamber.
6. Open all auxiliary drain valves throughout the fire protection system, closing them when fully drained.
7. Inspect and replace any sections of the fire protection system that may have been damaged due to fire.

Model DDV Deluge Valve with Electric Release Trim Components **Figure 3**



Model DDV Deluge Valve with Wet Pilot Line Trim

Technical Specifications
Pressure Rating:
400 psi (27.6 bar)

Material Specifications
Body: Ductile Iron with Red Oxide Epoxy coating and Urethane external coating
Cover: Ductile Iron with Red Oxide Epoxy coating and Urethane external coating
Diaphragm: Fabric-reinforced EPDM

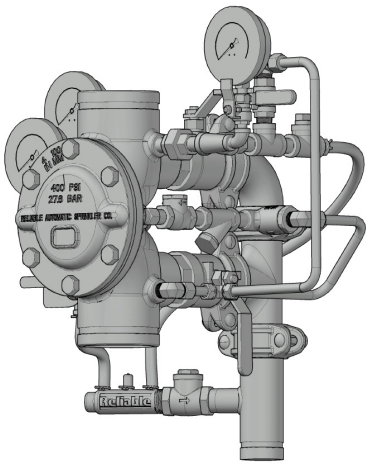
Installation Orientation
Not Restricted

End Connections
See Table A

Drain Trim Options
See Figure 1

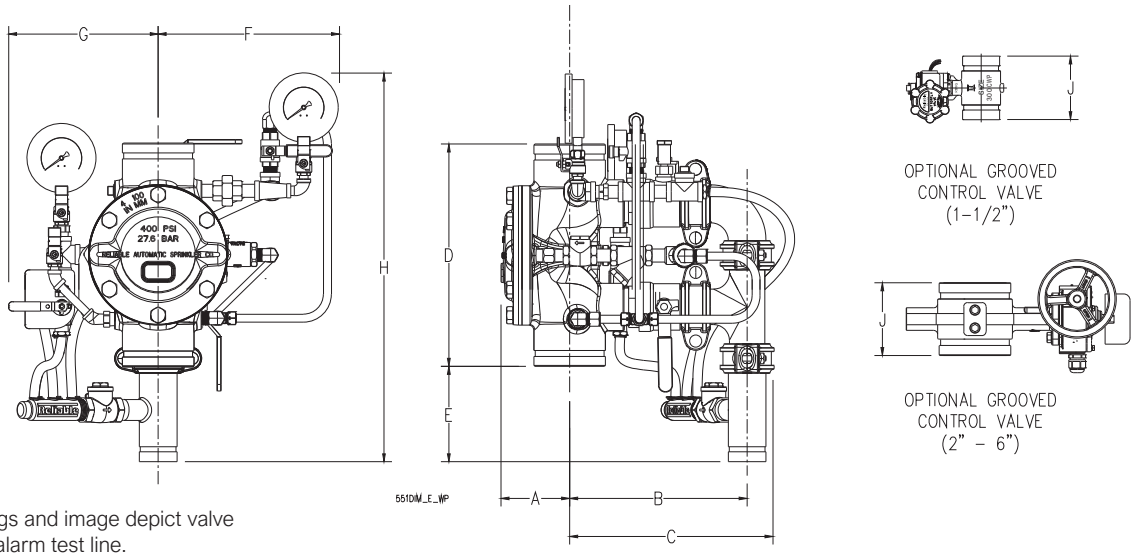
Actuator
Wet Pilot Detection Line

Approvals
UL Listed
FM Approved



Model DDV Deluge Valve with Wet Pilot Line Trim Dimensions

Figure 4



Note: Drawings and image depict valve with *optional* alarm test line.

Model DDV Dimensions - in. (mm)

Table G

Valve Size	A	B	C	D	E	F	G	H	J
1-1/2" (40 mm)	3 (76)	9-1/4 (235)	10 (254)	8 (203)	2-1/2 (64)	10-1/8 (257)	8 (203)	15-5/8 (397)	4 (102)
2" (50mm)	3 (76)	9-1/4 (235)	10 (254)	8 (203)	2-1/2 (64)	10-1/8 (257)	8 (203)	15-5/8 (397)	3-7/8 (98)
2-1/2" (65mm) & 76mm	3-1/2 (89)	11-3/4 (298)	12-1/2 (318)	11 (279)	3-1/8 (79)	10-7/8 (276)	8-3/4 (222)	18-1/4 (464)	3-7/8 (98)
3" (80mm)	3-1/2 (89)	11-3/4 (298)	12-1/2 (318)	11 (279)	3-1/8 (79)	10-7/8 (276)	8-3/4 (222)	18-1/4 (464)	3-7/8 (98)
4" (100mm)	4-3/8 (111)	11-1/4 (285)	12-7/8 (327)	14 (356)	6 (152)	11-3/8 (289)	9-1/2 (241)	24-3/8 (619)	4-9/16 (116)
6" (150mm) & 165mm	6-1/2 (165)	11-3/4 (298)	13-3/8 (340)	18 (457)	4 (102)	12-7/8 (327)	11-1/2 (292)	24-3/8 (619)	5-7/8 (149)
8" (200mm)	9-1/8 (232)	12-5/8 (321)	14-1/4 (362)	22-1/2 (572)	1-3/4 (44)	14-3/8 (365)	13 (330)	24-3/8 (619)	5-1/4 (134)

Wet Pilot Line Requirements

The wet pilot line is a detection system only and does not contribute to controlling the fire. Piping shall be ½" schedule 40 galvanized pipe and extend from the deluge valve control chamber outlet to the protected area. Maximum wet pilot line height shall be in accordance with the tables below. Wet pilot line shall utilize Reliable Model F-FTR fixed temperature release pilot line detectors spaced and positioned in accordance with the device listing or in accordance with NFPA 72 as fixed temperature heat detectors. Wet pilot lines shall not be installed in an areas subject to freezing, or where temperatures in excess of 150°F (65°C) are anticipated.

Maximum Wet Pilot Line Height, Vertical Valve Orientation **Table H**

Water Supply Pressure psi (bar)	Valve Size							
	1-1/2", 2"		2-1/2", 76mm, 3"		4"		6", 165mm, 8"	
	Feet	Meter	Feet	Meter	Feet	Meter	Feet	Meter
20 (1.4)	23.7	7.2	25.3	7.7	25.3	7.7	21.2	6.5
40 (2.6)	58.0	17.7	56.6	17.3	56.5	17.2	50.6	15.4
60 (4.1)	86.3	26.3	87.9	26.8	86.4	26.3	83.0	25.3
80 (5.5)	120.4	36.7	114.8	35.0	116.4	35.5	112.3	34.2
100 (6.9)	150.4	45.8	148.4	45.2	147.8	45.0	142.2	43.3
120 (8.3)	180.9	55.1	178.1	54.3	178.0	54.3	169.8	51.8
140 (9.7)	210.0	64.0	209.8	63.9	209.2	63.8	192.4	58.6
160 (11.0)	241.6	73.6	240.8	73.4	239.8	73.1	216.6	66.0
180 (12.4)	271.6	82.8	270.2	82.4	271.0	82.6	248.9	75.9
200 (13.8)	304.0	92.7	301.5	91.9	300.6	91.6	290.2	88.5
220 (15.2)	328.0	100.0	332.0	101.2	331.8	101.1	318.4	97.0
240 (16.6)	363.9	110.9	359.9	109.7	361.6	110.2	346.1	105.5
260 (17.9)	393.5	119.9	392.5	119.6	392.3	119.6	376.0	114.6
280 (19.3)	424.2	129.3	423.0	128.9	423.4	129.1	400.2	122.0
300 (20.7)	440.9	134.4	455.2	138.7	453.7	138.3	443.2	135.1
320 (22.1)	484.5	147.7	485.5	148.0	482.3	147.0	468.3	142.7
340 (23.4)	514.8	156.9	516.4	157.4	512.0	156.1	497.0	151.5
360 (24.8)	550.2	167.7	543.3	165.6	546.1	166.5	528.2	161.0
380 (26.2)	579.9	176.8	577.3	176.0	575.5	175.4	464.1	141.5
400 (27.6)	612.8	186.8	608.3	185.4	601.3	183.3	579.2	176.5

General Operation

The wet pilot detection line is a hydraulically pressurized extension of the diaphragm chamber. Under normal conditions the thermal detectors on the wet pilot line and the Manual Release Emergency valve are closed which maintains hydraulic pressure in the diaphragm chamber. The captured hydraulic pressure holds the diaphragm closed against the valve seat. When a thermal detector in the protected area opens, or the Manual Emergency Release valve is opened, hydraulic pressure is relieved from the diaphragm chamber to the drain allowing the diaphragm to relax and water to flow through the Model DDV valve. Water movement through the supply line to the diaphragm chamber closes the Model A Velocity Check Valve which prevents the diaphragm chamber from re-pressurizing and closing the Model DDV deluge valve. Excessive head pressure on the diaphragm chamber can result in a failure of the valve to operate, therefore, the height of the wet pilot line above the valve is limited to the values shown in Table H in this bulletin. Additional requirements for the wet pilot line are also shown.

Note: The system pressure gauge on the DDV valve provides an indication of the pressure within the system, but accuracy may be affected by turbulence across the diaphragm created during water flow. Where a more accurate measurement of residual pressure is required, a pressure gauge should be installed downstream of the DDV valve on a straight run of pipe of sufficient length to provide an accurate reading of residual pressure.

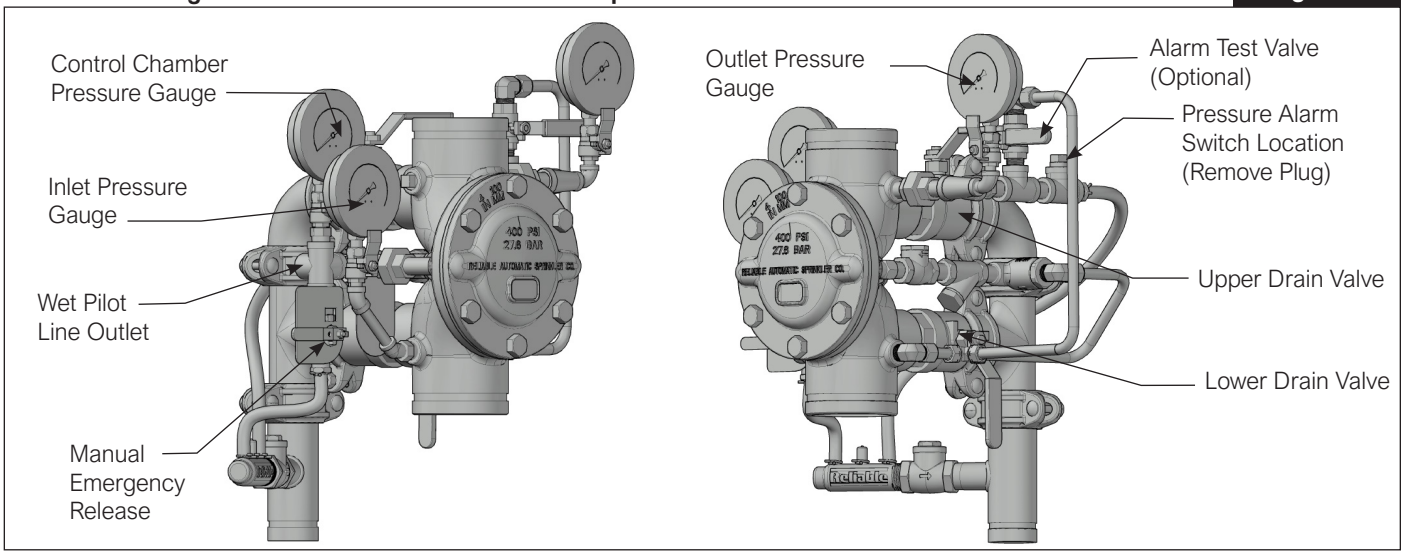
Setup Procedure

1. Ensure the system has been properly drained, and all parts of the system that may have been affected by fire are inspected and, if necessary, replaced.
2. Ensure the wet pilot line detection system is in proper working order and all thermal detection devices and manual release valves are closed.
3. Ensure that the Manual Emergency Release Valve and Alarm Test Valve (if present) are closed.
4. Open the Upper Drain Valve.
5. Partially open the Lower Drain Valve.
6. Open the manual release valve at the remote end of the wet pilot line, or otherwise vent the wet pilot line detection system.
7. Depress and hold the plunger on the Model A Velocity Check Valve. (**Note:** The plunger must remain depressed until the diaphragm chamber is fully pressurized; step 13.)
8. Slightly open the Main Water Supply Control Valve.
9. Once water begins to flow through the Lower Drain Valve, slowly close Lower Drain Valve.
10. Close the manual release valve or other device used to vent the wet pilot line detection system when a steady stream of water is present.
11. Allow hydraulic pressure to stabilize on the diaphragm control face and seal the diaphragm.
12. Observe if water flows through the Upper Drain Valve. If no flow occurs, the deluge valve diaphragm is sealed.
13. Release the plunger on the Model A Velocity Check Valve.
14. Using the Diaphragm Chamber Pressure Gauge, confirm that full hydraulic pressure is present in the diaphragm control chamber.
15. Close the Upper Drain Valve after any residual water has drained from system.
16. Slowly open the Main Water Supply Control Valve. Verify that the Water Control Valve is fully open and properly monitored.
17. Secure the handle of the Manual Emergency Release Valve in the closed position with a cable tie.
18. Fully reset fire alarm panel to clear any active signals.
19. Notify the proper authorities, building occupants, and those responsible for monitoring the system that the system has been placed into service.

Shutdown Procedure

1. Close the main water supply control valve.
2. Close the Diaphragm Chamber Supply Valve.
3. Open the Manual Emergency Release Valve.
4. Open the Upper Drain Valve and Lower Drain Valve to drain the system.
5. Depress the plunger on the Model A Velocity Check Valve to relieve any remaining pressure on the supply line to the diaphragm chamber.
6. Open all auxiliary drain valves throughout the fire protection system, closing them when fully drained.
7. Inspect and replace any sections of the fire protection system and wet pilot detection line that may have been damaged due to fire.

Model DDV Deluge Valve with Wet Pilot Line Trim Components — **Figure 5**



Model DDV Deluge Valve with Dry Pilot Line Trim

Technical Specifications
Pressure Rating:
400 psi (27.6 bar)

Material Specifications
Body: Ductile Iron with Red Oxide Epoxy coating and Urethane external coating
Cover: Ductile Iron with Red Oxide Epoxy coating and Urethane external coating
Diaphragm: Fabric-reinforced EPDM

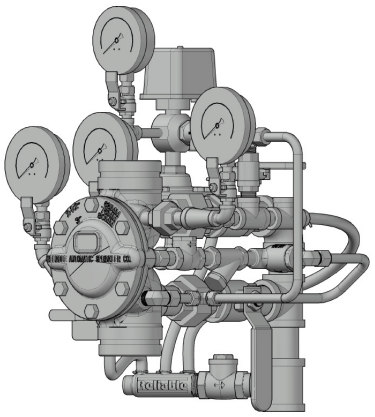
Installation Orientation
Not Restricted

End Connections
See Table A

Drain Trim Options
See Figure 1

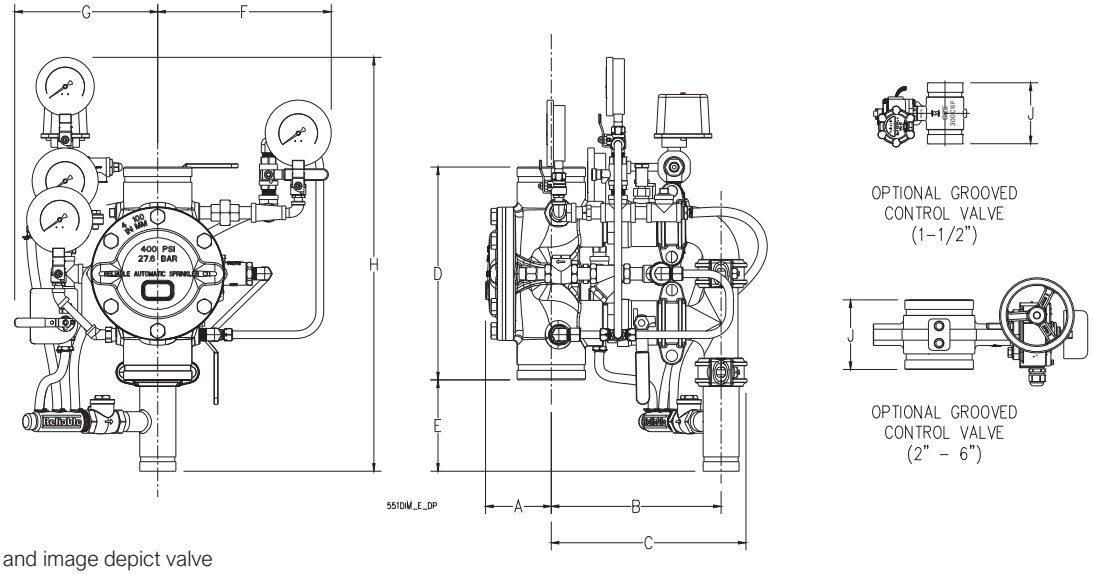
Actuator
Dry Pilot Actuator

Approvals
UL Listed
FM Approved



Model DDV Deluge Valve with Dry Pilot Line Trim Dimensions

Figure 6



Note: Drawings and image depict valve with *optional* alarm test line.

Model DDV Dimensions - in. (mm)

Table I

Valve Size	A	B	C	D	E	F	G	H	J
1-1/2" (40mm)	3 (76)	9-1/4 (235)	10 (254)	8 (203)	2-1/2 (64)	10-1/8 (257)	8 (203)	20-3/4 (527)	4 (102)
2" (50mm)	3 (76)	9-1/4 (235)	10 (254)	8 (203)	2-1/2 (64)	10-1/8 (257)	8 (203)	20-3/4 (527)	3-7/8 (98)
2-1/2" (65mm) & 76mm	3-1/2 (89)	11-3/4 (298)	12-1/2 (318)	11 (279)	3-1/8 (79)	10-7/8 (276)	8-3/4 (222)	22-78 (581)	3-7/8 (98)
3" (80mm)	3-1/2 (89)	11-3/4 (298)	12-1/2 (318)	11 (279)	3-1/8 (79)	10-7/8 (276)	8-3/4 (222)	22-78 (581)	3-7/8 (98)
4" (100mm)	4-3/8 (111)	11-1/4 (285)	12-7/8 (327)	14 (356)	6 (152)	11-3/8 (289)	9-1/2 (241)	27-1/8 (689)	4-9/16 (116)
6" (150mm) & 165mm	6-1/2 (165)	11-3/4 (298)	13-3/8 (340)	18 (457)	4 (102)	12-7/8 (327)	11-1/2 (292)	26-3/4 (679)	5-7/8 (149)
8" (200mm)	9-1/8 (232)	12-5/8 (321)	14-1/4 (362)	22-1/2 (572)	1-3/4 (44)	14-3/8 (365)	13 (330)	26-3/4 (679)	5-1/4 (134)

General Operation

The dry pilot detection line is a pneumatically pressurized extension of the diaphragm chamber. Unlike a wet pilot line, dry pilot lines are not limited in height. The Reliable Model LP Dry Pilot Actuator serves to separate the hydraulic pressure in the diaphragm chamber from the pneumatic pressure in the dry pilot line. Under normal conditions the thermal detectors on the dry pilot line are closed which maintains air or nitrogen pressure on the top side of the Model LP Actuator diaphragm. When properly seated, the Model LP Actuator diaphragm closes the waterway between the Model DDV diaphragm chamber and the drain. The Manual Emergency Release valve, connected directly to the release trim of the diaphragm chamber, is also closed. The captured hydraulic pressure holds the diaphragm closed against the valve seat. When a thermal detector in the protected area opens, pneumatic pressure is released from the dry pilot detection line and the Model LP actuator causing the actuator to open. Hydraulic pressure in the diaphragm chamber is relieved through the Model LP Actuator allowing the diaphragm to relax and water to flow through the Model DDV valve. Alternately, when the Manual Emergency Release valve is opened, hydraulic pressure is directly relieved to the drain, allowing the diaphragm to relax and water to flow through the Model DDV valve. In either case, water movement through the supply line to the diaphragm chamber closes the Model A Velocity Check Valve which prevents the diaphragm chamber from re-pressurizing and closing the Model DDV deluge valve.

Note: The system pressure gauge on the DDV valve provides an indication of the pressure within the system, but accuracy may be affected by turbulence across the diaphragm created during water flow. Where a more accurate measurement of residual pressure is required, a pressure gauge should be installed downstream of the DDV valve on a straight run of pipe of sufficient length to provide an accurate reading of residual pressure.

Setup Procedure

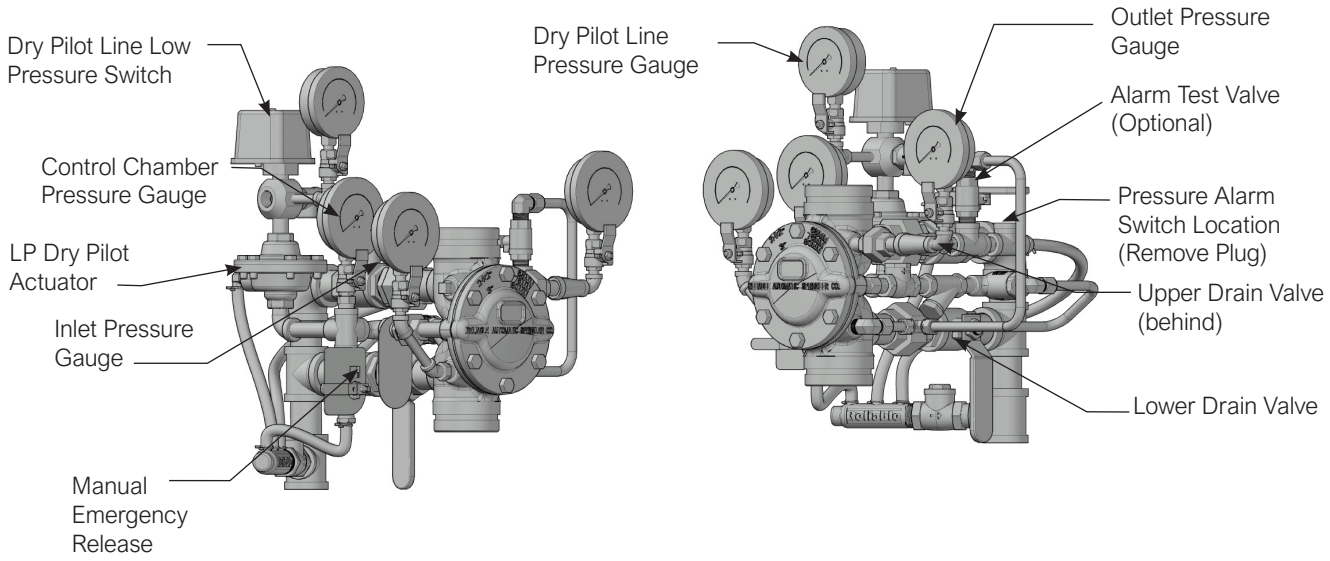
1. Ensure the system has been properly drained, and all parts of the system that may have been affected by fire are inspected and, if necessary, replaced.
2. Ensure the dry pilot line detection system is in proper working order and is pressurized with air or nitrogen in accordance with Table J.
3. Place the air or nitrogen supply system into automatic operation.
4. Ensure that the Manual Emergency Release Valve and Alarm Test Valve (if present) are closed.
5. Open the Upper Drain Valve.
6. Partially open the Lower Drain Valve.
7. Depress and hold the plunger on the Model A Velocity Check Valve. (**Note:** The plunger must remain depressed until the diaphragm chamber is fully pressurized; step 12.)
8. Slightly open the Main Water Supply Control Valve.
9. Once water begins to flow through the Lower Drain Valve, slowly close Lower Drain Valve.
10. Allow hydraulic pressure to stabilize on the diaphragm control face and seal the diaphragm.
11. Observe if water flows through the Upper Drain Valve. If no flow occurs, the deluge valve diaphragm is sealed.
12. Release the plunger on the Model A Velocity Check Valve.
13. Using the Diaphragm Chamber Pressure Gauge, confirm that full hydraulic pressure is present in the diaphragm control chamber.
14. Close the Upper Drain Valve after any residual water has drained from system.
15. Slowly open the Main Water Supply Control Valve. Verify that the Water Control Valve is fully open and properly monitored.
16. Secure the handle of the Manual Emergency Release Valve in the closed position with a cable tie.
17. Fully reset fire alarm panel to clear any active signals.
18. Notify the proper authorities, building occupants, and those responsible for monitoring the system that the system has been placed into service.

Shutdown Procedure

1. Close the main water supply control valve.
2. Close the Diaphragm Chamber Supply Valve.
3. Close the valve(s) controlling air or nitrogen supply to the dry pilot detection line.
4. Open the Upper Drain Valve and Lower Drain Valve to drain the system.
5. Depress the plunger on the Model A Velocity Check Valve to relieve any remaining pressure on the supply line to the diaphragm chamber.
6. Open all auxiliary drain valves throughout the fire protection system, closing them when fully drained.
7. Inspect and replace any sections of the fire protection system and dry pilot detection line that may have been damaged due to fire.

Model DDV Deluge Valve with Dry Pilot Trim Components

Figure 7



Dry Pilot Line Pressure

Table J

Water Pressure psi (bar)	Required Dry Pilot Line Pneumatic Pressure psi (bar)
Maximum	**Not Less Than**
20 (1.4)	8 (0.6)
30 (2.1)	10 (0.7)
50 (3.4)	12 (.8)
75 (5.2)	13 (.9)
100 (6.9)	15 (1.)
125 (8.6)	16 (1.1)
150 (10.3)	17 (1.2)
175 (12.1)	18 (1.2)
200 (13.8)	19 (1.3)
225 (15.5)	21 (1.4)
250 (17.2)	22 (1.5)
275 (19.0)	23 (1.6)
300 (20.7)	24 (1.7)
325 (22.4)	25 (1.7)
350 (24.1)	26 (1.8)
375 (25.9)	27 (1.9)
400 (27.6)	28 (1.9)

Notes:

1. Supervisory air or nitrogen pressure should not exceed 30 psi (2.1 bar). Excess pressure may result in damage to the actuator.
2. Fastest valve operation is achieved with supervisory air or nitrogen pressure indicated; however, pressure must never be less than the minimum specified in the table above.
3. Air maintenance devices that maintain a constant pressure are recommended; however, if a tank-less compressor is used, the "compressor on" setting of the pressure switch must never be lower than the minimum pressure in the table above.

Model DDV Deluge Valve with Dry Pilot Line Pressure Regulating Trim

Technical Specifications
Pressure Rating:
400 psi (27.6 bar)

Flow & Pressure Output Range:
Reference Table E, page 2

Material Specifications
Body: Ductile Iron with Red Oxide Epoxy coating and Urethane external coating
Cover: Ductile Iron with Red Oxide Epoxy coating and Urethane external coating
Diaphragm: Fabric-reinforced EPDM

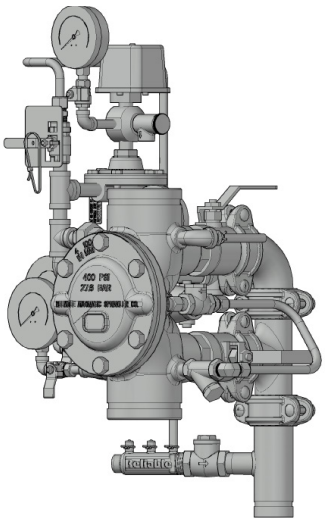
Installation Orientation
Not Restricted

End Connections
See Table A

Drain Trim Options
See Figure 1

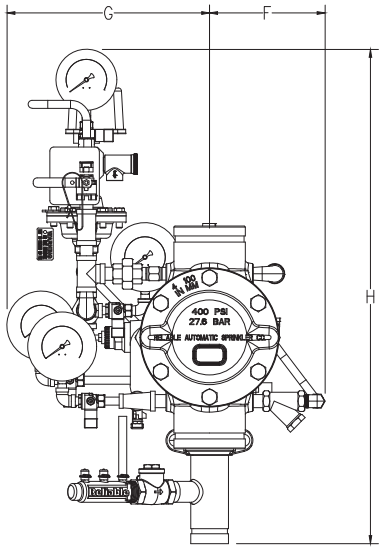
Actuator
Dry Pilot Detection Line

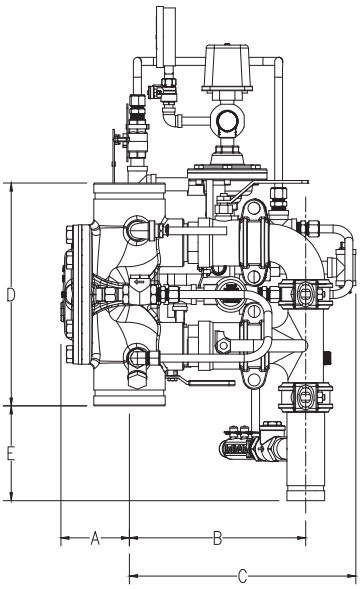
Approvals
UL Listed
FM Approved

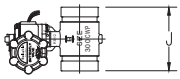


Model DDV Deluge Valve with Dry Pilot Line Pressure Regulating Trim Dimensions

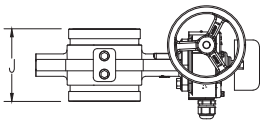
Figure 8







OPTIONAL GROOVED CONTROL VALVE (1–1/2")



OPTIONAL GROOVED CONTROL VALVE (2" – 6")

Note: Drawings and image depict valve with *optional* alarm test line.

Model DDV Dimensions - in. (mm)

Table K

Valve Size	A	B	C	D	E	F	G	H	J
1-1/2" (40mm)	3 (76)	9-1/4 (235)	13-1/8 (333)	8 (203)	2-1/2 (64)	6-1/8 (156)	11-1/4 (286)	19-3/4 (502)	4 (102)
2" (50mm)	3 (76)	9-1/4 (235)	13-3/8 (340)	8 (203)	2-1/2 (64)	6-1/4 (159)	11-3/8 (289)	20-3/8 (518)	3-7/8 (98)
2-1/2" (65mm) & 76mm	3-1/2 (89)	11-3/4 (298)	13-3/8 (340)	11 (279)	3-1/8 (79)	7 (178)	12-1/8 (308)	22-3/8 (586)	3-7/8 (98)
3" (80mm)	3-1/2 (89)	11-3/4 (298)	13-3/8 (340)	11 (279)	3-1/8 (79)	7 (178)	12-1/2 (318)	21-5/8 (549)	3-7/8 (98)
4" (100mm)	4-3/8 (111)	11-1/4 (285)	14-1/4 (362)	14 (356)	6 (152)	7-1/4 (184)	12-3/4 (324)	31 (787)	4-9/16 (116)
6" (150mm) & 165mm	6-1/2 (165)	11-3/4 (298)	13-5/8 (346)	18 (457)	4 (102)	9 (229)	14-1/2 (368)	27 (686)	5-7/8 (149)

General Operation

The dry pilot detection line is a pneumatically pressurized extension of the diaphragm chamber. The Reliable Model LP Dry Pilot Actuator serves to separate the hydraulic pressure in the diaphragm chamber from the pneumatic pressure in the dry pilot line. Under normal conditions the thermal detectors on the dry pilot line are closed which maintains air or nitrogen pressure on the top side of the Model LP Actuator diaphragm. When properly seated, the Model LP Actuator diaphragm closes the waterway between the Model DDV diaphragm chamber and the drain. The Manual Emergency Release valve, connected directly to the release trim of the diaphragm chamber, is also closed. The captured hydraulic pressure holds the diaphragm closed against the valve seat. When a thermal detector in the protected area opens, pneumatic pressure is released from the dry pilot detection line and the Model LP actuator causing the actuator to open. Hydraulic pressure in the diaphragm chamber is relieved through the Model LP Actuator allowing the diaphragm to relax and water to flow through the Model DDV valve. Alternately, when the Manual Emergency Release valve is opened, hydraulic pressure is directly relieved to the discharge side of the deluge valve, allowing the diaphragm to relax and water to flow through the Model DDV valve. The adjustable pilot valve on the release trim decreases or increases pressure in the diaphragm chamber, thereby regulating the outlet (downstream) flowing pressure.

Note: The system pressure gauge on the DDV valve provides an indication of the pressure within the system, but accuracy may be affected by turbulence across the diaphragm created during water flow. Where a more accurate measurement of residual pressure is required, a pressure gauge should be installed downstream of the DDV valve on a straight run of pipe of sufficient length to provide an accurate reading of residual pressure.

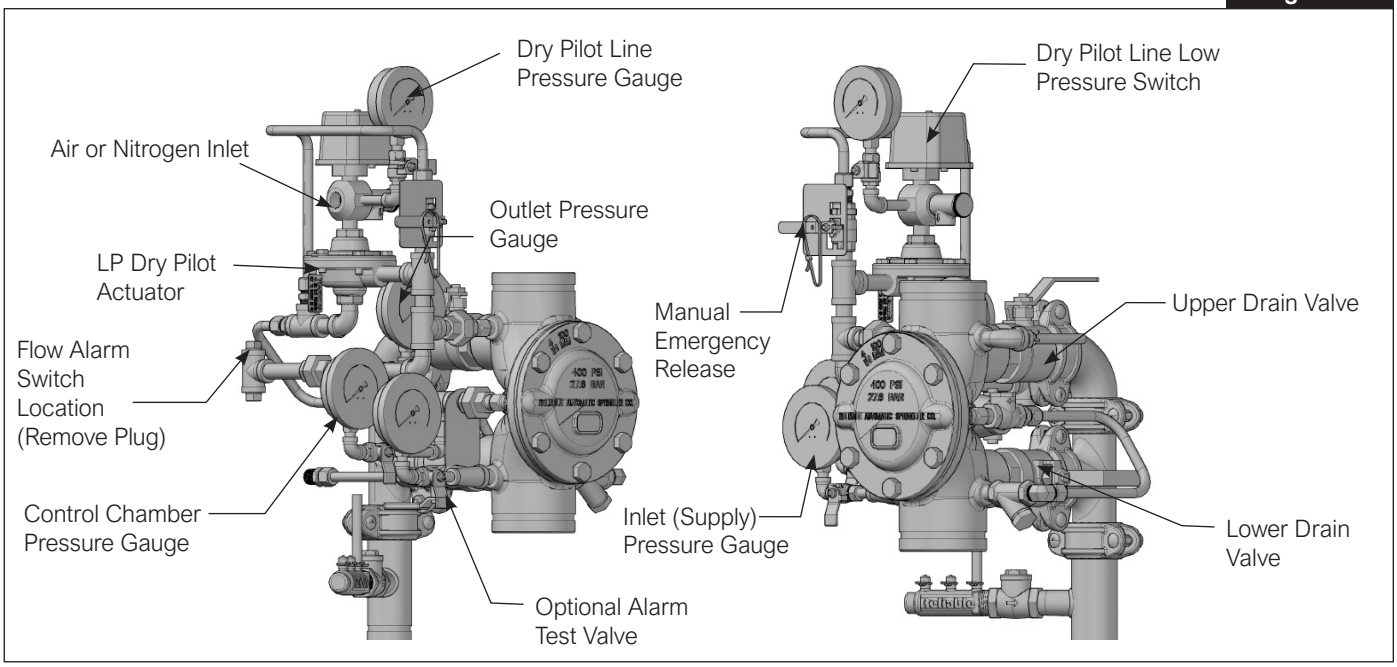
Setup Procedure

1. Ensure the system has been properly drained, and all parts of the system that may have been affected by fire are inspected and, if necessary, replaced.
2. Ensure the dry pilot line detection system is in proper working order and is pressurized with air or nitrogen in accordance with Table J.
3. Place the air or nitrogen supply system into automatic operation.
4. Ensure that the Manual Emergency Release Valve and Alarm Test Valve (if present) are closed.
5. Open the Upper Drain Valve.
6. Partially open the Lower Drain Valve.
7. Slightly open the Main Water Supply Control Valve.
8. Once water begins to flow through the Lower Drain Valve, slowly close Lower Drain Valve.
9. Allow hydraulic pressure to stabilize on the diaphragm control face and seal the diaphragm.
10. Observe if water flows through the Upper Drain Valve. If no flow occurs, the deluge valve diaphragm is sealed.
11. Using the Diaphragm Chamber Pressure Gauge, confirm that full hydraulic pressure is present in the diaphragm control chamber.
12. Close the Upper Drain Valve after any residual water has drained from system.
13. Slowly open the Main Water Supply Control Valve. Verify that the Water Control Valve is fully open and properly monitored.
14. Secure the handle of the Manual Emergency Release Valve in the closed position with a cable tie.
15. Fully reset fire alarm panel to clear any active signals.
16. Notify the proper authorities, building occupants, and those responsible for monitoring the system that the system has been placed into service.

Shutdown Procedure

1. Close the main water supply control valve.
2. Close the valve(s) controlling air or nitrogen supply to the dry pilot detection line.
3. Open the Upper Drain Valve and Lower Drain Valve to drain the system.
4. Open all auxiliary drain valves throughout the fire protection system, closing them when fully drained.
5. Inspect and replace any sections of the fire protection system and dry pilot detection line that may have been damaged due to fire.

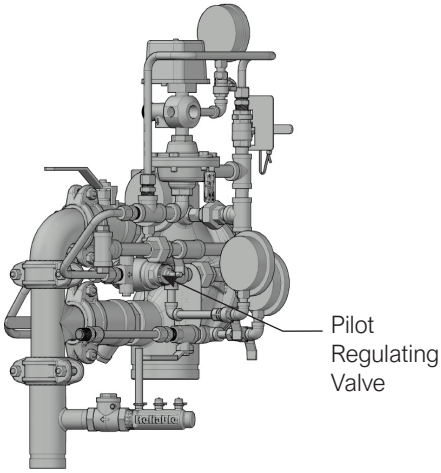
Model DDV Deluge Valve with Dry Pilot Pressure Regulating Trim Components **Figure 9**



Pressure Adjustment (Refer to Fig. 10)

1. Loosen the lock nut on the Pilot Regulating Valve adjustment screw.
2. Operate a manual or automatic release to open the Model DDV valve. **Note:** This will allow water to flow into the fire protection system.
3. Turn the adjustment screw of the pilot regulating device clockwise to increase downstream flowing pressure of the system, or counterclockwise to decrease downstream flowing pressure of the system.
4. Adjust in 1/2 turns and allow time for the valve to stabilize at the new set point.
5. When the desired outlet pressure is reached, securely tighten the locknut.
6. Close the main water control valve and drain the system.
7. Reset the system in accordance with the setup procedure.

Pilot Regulating Valve Location **Figure 10**

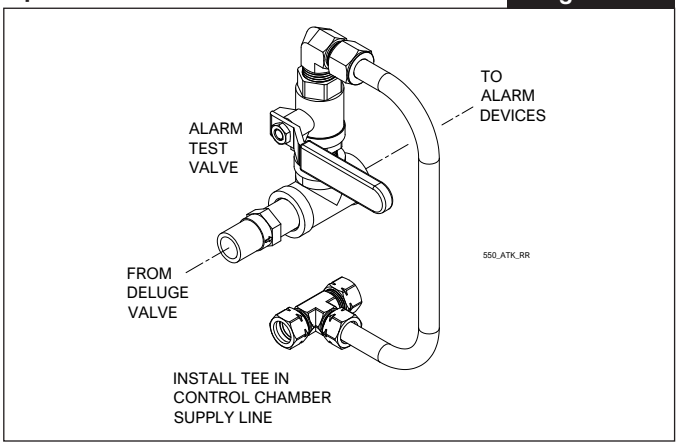


Model DDV Hydraulic Friction Loss Data **Table L**

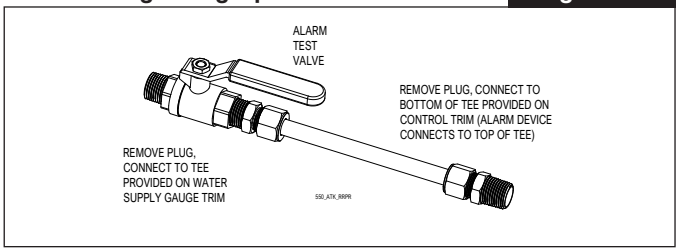
Valve Size	Cv Flow Coefficient gpm/(psi)$^{1/2}$	Kv Flow Coefficient m^3/h/(bar)$^{1/2}$	Approximate Equivalent Length ft (m) C= 120 Sch 40 Steel Pipe	Approximate Equivalent Length ft (m) C= 100 Sch 40 Steel Pipe
1-1/2" (40mm)	81.6	70	4.6 (1.4)	3.3 (1.0)
2" (50mm)	110.5	95	8.8 (2.7)	6.3 (1.9)
2-1/2" (65mm)	144	124	12.9 (3.9)	9.2 (2.8)
76mm, 3" (80mm)	182	157	24.1 (7.3)	17.2 (5.2)
4" (100mm)	393	339	28.6 (8.7)	20.4 (6.2)
6" (150mm), 165mm	815	703	52.2 (15.9)	37.2 (11.3)
8" (200mm)	1455	1254	59.7 (18.2)	42.6 (13.0)

Note: The Cv flow coefficient (amount of flow to generate a 1 psi loss) was used to calculate the approximate equivalent length.

Optional Alarm Test Kit **Figure 11**



Pressure Regulating Optional Alarm Test Kit **Figure 12**



Installation

The Model DDV valve should be installed in accordance with NFPA 13, "Standard for the Installation of Sprinkler Systems," as well as the requirements of any authorities having jurisdiction. Failure to follow installation instructions and/or revisions to the trim arrangement of the valve may void the warranty and listing of the valve. Verify compatibility of the Model DDV valve's materials with the water supply and the environment where the valve will be installed prior to installation. Do not apply lubricants, sealants, or other chemicals to the diaphragm or seat. The Model DDV valve must be installed in a location where the temperature is maintained at a minimum of 40°F (4°C) and the maximum temperature of the valve must not exceed 120°F (49°C). The Model DDV valve shall not be installed in direct sunlight. Heat tracing of the valve and trim is not permitted. Design and installation of the detection and release system must be performed in accordance with applicable NFPA standards and the authority having jurisdiction.

For Electric Release Valves, at least one electric manual release should be installed near the release control panel to facilitate commissioning and routine testing of the system. Drain should be piped to a location that will avoid damage to property and injury to personnel.

Maintenance

The owner is responsible for maintaining the fire protection system in proper operating condition. Any system maintenance or testing that involves placing a control valve or detection/control system out of service may eliminate the fire protection that is provided by the fire protection system.

The Reliable Model DDV valve and associated equipment shall periodically be given a thorough inspection and test. NFPA 25, "Inspection, Testing and Maintenance of Water Based Fire Protection Systems," provides minimum maintenance requirements. System components shall be tested, operated, cleaned, and inspected at least annually, and parts replaced as required.

Reliable recommends that the diaphragm be replaced every 10 years or more frequently if inspections identify wear warranting more frequent replacement.

Recommended torque for cover plate bolts is as follows:

- 1-1/2" (40 mm) & 2" (50 mm) = 30 (+/- 5) ft-lb
- 2-1/2" (65 mm), 76 mm, & 3" (80 mm) = 50 (+/- 5) ft-lb
- 4" (100 mm) = 70 (+/- 5) ft-lb
- 6" (150 mm) & 165 mm = 130 (+/- 5) ft-lb
- 8" (200mm) = 200 (+/-5) ft-lb

Replacement Diaphragm

- 1-1/2" & 2" - PN 95277620
- 2-1/2", 76mm, & 3" - PN 95277630
- 4" - PN 95277640
- 6" & 165mm - PN 95277660
- 8" - PN 95277680

Guarantee

For Reliable Automatic Sprinkler Co., Inc. guarantee, terms, and conditions, visit www.reliablesprinkler.com.

Ordering Information

Specify the following when ordering:

Valve Model
- DDV

Valve Size
- 1-1/2" (40mm)
- 2" (50mm)
- 2-1/2" (65mm)
- 76 mm
- 3" (80mm)
- 4" (100mm)
- 6" (150mm)
- 165 mm
- 8" (200mm)

End Configuration
- Grooved, flanged, or threaded (reference Table A)

Operational Trim
- Electric Actuation 175 psi (12.7 bar)
- Electric Actuation 300 psi (20.7 bar)
- Wet Pilot
- Dry Pilot
- Dry Pilot Pressure Regulating

Drain Trim Options
- No Drain Valves
- Single Drain Valve
- Two Drain Valves
- Full Drain Trim (**Note**: Full Drain Trim option will arrive disconnected at the couplings/unions)

Grooved Control Valve Option
- No control valves
- Water supply (lower) control valve only
- Both water supply (lower) and service (upper) control valves

  Note: Control valve option is not available on the 76mm and 165mm systems.

Pressure Gauges
- 0-300 psi (20.7 bar) (standard)
- 0-600 psi (41.4 bar) (optional)

(Optional) Alarm Line Trim (If ordered separately)
- Electric Release, Wet Pilot, and Dry Pilot Trim: PN 6501040001
- Dry Pilot Pressure Regulating Trim: PN 6501040002

Note: When included on a fully assembled valve, the alarm line test option is designated with a 4, 5, 6, or 7 in the 9th digit of the production part number (see below).

(Optional) Alarm Pressure Switch
- PN 6990006382

Model DDV Ordering Information Part Number — **Figure 11**

6507 U V W X Y Z

End Connections U	Valve Size V	Trims W	Control Valve[1] [2] X	Drains Y	Gauges Z
0 = Groove/Groove	0 = 1-1/2" (40mm) Valve	0 = Wet Pilot	0 = W/O Control Valve	0 = W/ Drain Plugs, W/O Alarm Test	0 = 0-300 psi
1 = Flange/Flange Class 150	2 = 2" (50mm) Valve	1 = Dry Pilot	1 = Lower Control Valve Only	1 = W/ 1 Drain Valve, W/O Alarm Test	1 = 0-600 psi
2 = Flange/Flange Class 300	1 = 2-1/2" (65mm) Valve	2 = Electric	3 = Lower & Upper Control Valves	2 = W/ 2 Drain Valves, W/O Alarm Test	
3 = Flange/Flange PN16	7 = 76mm Valve	5 = Dry Pilot Pressure Regulating		3 = W/ Full Drain, W/O Alarm Test	
4 = Flange/Flange BS-E	3 = 3" (80mm) Valve	**Note:** Pressure regulating trim is not available for 8" valve.		4 = W/ Drain Plugs, W/ Alarm Test	**Solenoid Valve[3] Z**
5 = Thread/Thread NPT	4 = 4" (100mm) Valve			5 = 1 Drain Valve, W/ Alarm Test	0 = 175 psi Solenoid
6 = Thread/Thread ISO 7/1	6 = 6" (150mm) Valve			6 = W/ 2 Drain Valves, W/ Alarm Test	1 = 300 psi Solenoid
	5 = 165mm Valve			7 = W/ Full Drain, W/ Alarm Test	
	8 = 8" (200mm) Valve				

Notes:
1. Control valves not available for 76mm and 165mm systems. "X" must be 0 for 76mm and 165mm systems.
2. Control valves are available for grooved Model DDV only. Where end connection "U" is 1 through 6, control valve "X" must be "0".
3. Use when "W" = 2 to select either solenoid pressure rating. All gauges will be 0 - 300 psi.

P/N 9999970532