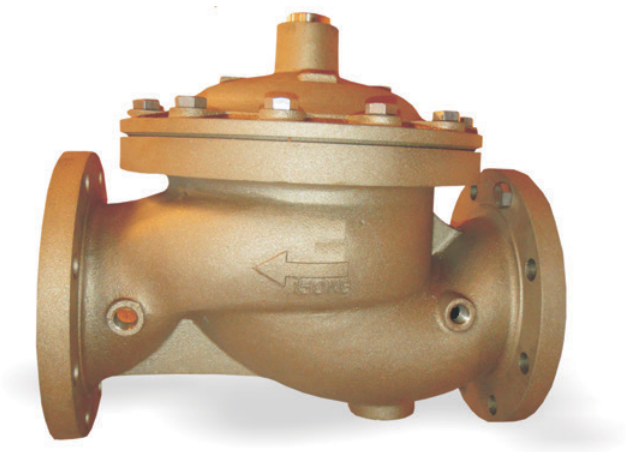
FIREGUARD GLOBAL LTD

DELUGE VALVE

MODEL-N1 (NICKEL ALUMINIUM BRONZE)

TECHNICAL DATA

MODEL	N1 - Nickel Aluminium Bronze
NOMINAL SIZE	200, 150, 100 80 and 50 NB
SERVICE PRESSURE	1.4 to 17.5 Bar (20 to 250 PSI)
THREADED OPENING	BSPT
MOUNTING	Vertical or Horinzontal mounting
FACTORY HYDROSTATIC TEST PRESSURE	35 Kg./sq.cm. (500 PSI)
FLANGE CONNECTION	ANI B 16.5 #150 FF
WET PILOT SPRINKLER HEIGHT LIMITATION	As per graph in the catalogue
NET WEIGHT WITHOUT TRIM	200 NB - 163 Kg 150 NB - 86 Kg 100 NB - 56 Kg 80 NB - 38 Kg 50 NB - 33 Kg
FINISH	RAL 3000
APPROVAL	UL Listed
ORDERING INFORMATION	a) Size of valve b) Flange specification c) Valve trim vertical or horizontal d) Trim Type



UL LISTED

DESCRIPTION

Deluge Valve is known as a system control valve in a deluge system, used for fast application of water in a spray system. Deluge valve protects areas such as power transformer installation, storage tank, conveyor protection and other industrial application etc. With the addition of foaming agent deluge valve can be used to protect aircraft hanger and inflammable liquid fire.

VALVE OPERATION

Deluge valve is a quick release, hydraulically operated diaphragm valve. It has three chambers, isolated from each other by the diaphragm operated clapper and seat seal. While in SET position, water pressure is transmitted through an external bypass check valve and restriction orifice from the system supply side to the top chamber, so that supply pressure in the top chamber act across the diaphragm operated clapper which holds the seat against the inlet supply pressure because of the differential pressure design. On detection of fire the top chamber is vented to atmosphere through the outlet port via opened actuation devices. The top chamber pressure cannot be replenished through the restricted inlet port, and the upward force of the supply pressure lifts the clapper allowing the water flow to the system piping network and alarm devices.

TRIM DESCRIPTION

The trims are functionally termed as Dry Pilot Trim, Wet Pilot Trim, Electric Trim and Test and Alarm Trim as per the mehod of actuation of the deluge valve.
The functionality of these trims is described below..

A) DRY PILOT TRIM (PNEUMATIC RELEASE)

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

When there is an air pressure drop, or due to release of any of the release device on detection of fire, the diaphragm of actuator is lifted and allows the water to drain. This releases the water pressure in the top chamber of the deluge valve, allowing the deluge valve to open and water to flow into the system piping & alarm devices. Recommended air supply pressure for dry pilot trim system is 3.5 kg/sq.cm.

User must install non return valve at air supply connection to deluge valve trim.

In dry pilot trim, an actuator (DPA) is provided. An optional Pneumatic Reset Device (PRD) can be provided, which acts as a manual reset device in the dry pilot line.

B) WET PILOT TRIM (HYDRAULIC RELEASE)
Wet pilot operation uses a pilot line of closed Sprinklers/ QB detectors 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 Deluge valve drops and the Deluge valve opens.

C) ELECTRIC RELEASE TRIM
To actuate a 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, to shut down the desired equipment or to give "Tripped" indication of the Deluge valve. In addition to this a pressure switch can also monitor "Low air pressure" and "Fire condition" when used in dry pilot air line.

D) TEST AND ALARM TRIM
This trim is supplied with a test valve is provided to test the normal operation of the sprinkler alarm bell. The sprinkler alarm can be supplied additionally, which bells on actuation of the Deluge valve.

E) DRAIN AND DRIP TRIM
This consists of main and system drain valve in addition with drip valve.

TRIM TYPES
The trims are designated as following.

W —Wet Pilot trim. D = Dry Pilot Trim

A) Type ET-W and ET-D
This type of trim is basic trim required to operate the deluge valve. A solenoid valve for electric remote actuation and pressure switch for sensing & announciation are optional.

B) Type ETW-D and ETD-D
This trim type is a combination of components of the ET trim along with the drip and drain trim. A solenoid valve for electric remote actuation and pressure switch for sensing & announciation are optional.

C) Type ETW-T and ETD-T
This trim type is a combination of components of the ET trims along with the test and alarm trim. In dry pilot trim, an actuator DPA-H1 is provided with optional Pneumatic Reset Device (PRD-1). A solenoid valve for electric remote actuation and pressure switch for sensing & announciation are optional.

D) Type NT-W and NT-D
This trim type is a combination of components of the ET trim along with the test and alarm trim as well as the drip and drain trim. A solenoid valve for electric remote actuation and pressure switch for sensing & announciation are optional.

TRIM MODEL NO.	TRIM DESCRIPTION	MOUNTING	SCHEMATIC NO.
ET-W	Basic Wet Pilot Trim	Vertical	Schematic 1
ET-D	Basic Dry Pilot Trim	Vertical	Schematic 2
ETW-T	Basic Wet Pilot Trim with Test & Alarm Trim	Vertical	Schematic 3
ETD-T	Basic Dry Pilot Trim with Test & Alarm Trim	Vertical	Schematic 4
ETW-D	Basic Wet Pilot Trim with Drip & Drain Trim	Vertical	Schematic 5
ETD-D	Basic Dry Pilot Trim with Drip & Drain Trim	Vertical	Schematic 6
NT-W	Basic Wet Pilot Trim with Test & Alarm Trim and Drip & Drain Trim	Vertical	Schematic 7
NT-D	Basic Dry Pilot Trim with Test & Alarm Trim and Drip & Drain Trim	Vertical	Schematic 8
ET-W	Basic Wet Pilot Trim	Horizontal	Schematic 9
ET-D	Basic Dry Pilot Trim	Horizontal	Schematic 10
ETW-T	Basic Wet Pilot Trim with Test & Alarm Trim	Horizontal	Schematic 11
ETD-T	Basic Dry Pilot Trim with Test & Alarm Trim	Horizontal	Schematic 12
ETW-D	Basic Wet Pilot Trim with Drip & Drain Trim	Horizontal	Schematic 13
ETD-D	Basic Dry Pilot Trim with Drip & Drain Trim	Horizontal	Schematic 14
NT-W	Basic Wet Pilot Trim with Test & Alarm Trim and Drip & Drain Trim	Horizontal	Schematic 15
NT-D	Basic Dry Pilot Trim with Test & Alarm Trim and Drip & Drain Trim	Horizontal	Schematic 16

RESETTING PROCEDURE FOR THE DELUGE VALVE

(i) Close the upstream side stop valve provided below the deluge valve

(ii) Open both the drain valves/ drain plugs and close when the flow of water has ceased

(iii) Close the release device/replace the Sprinkler if release was through Sprinkler/QB Detector

(iv) Inspect and release if required, or close the section of the detection system subjected to "Fire condition"

(v) In case of dry pilot detection system, open the air supply valve to build-up air pressure. Open the priming valve fully. Open the upstream side of the stop valve provided below the Deluge valve. No water should flow into the system

(vi) Where priming shut off valve is provided for resetting, in addition to above steps press the knob on actuator while resetting

CAUTION ⚠

(a) Do not close the priming valve, downstream and upstream stop valves, while system is in service

(b) The releasing device must be maintained in the open position, when actuated, to prevent the deluge valve from closure if anti shut off valve is not provided

(c) While using a deluge valve in the wet pilot system the height and the length of the wet pilot detection line is to be limited as shown in the wet pilot sprinkler height limitation graph

(d) Do not connect the Sprinkler Alarm outlet drain line to close a common drain as it may create back pressure & Sprinkler Alarm may not function

(e) Deluge valve must have support to absorb sudden opening or closing vibration shock to the piping

(f) To avoid water damage, take precautions when opening the water supply main control valve, since water will flow from all open system valves

(g) The responsibility of maintenance of the protection system and devices in proper operating condition lies with the owner of the system.

SYSTEM TESTING PROCEDURE

(i) Keep the upstream side of the stop valve partially open. To avoid water flow to system side, close the system side stop valve. This valve is to be kept in open position after the testing is completed.

(ii) Let any of the release devices to trip. This will result in a sudden drop of water pressure in the deluge valve top chamber which in turn will open the deluge valve. Close the upstream side stop valve immediately

(iii) Reset the valve as per the procedure given under heading "RESETTING PROCEDURE FOR THE DELUGE VALVE"

INSPECTION AND MAINTENANCE

Installed system piping network must be flushed properly before placing the Deluge valve in service. A qualified and trained person must commission the system. After few initial successful tests, an authorized person must be trained to perform inspection and testing of the system. It is recommended to have regular inspection and test run of the system as per NFPA guideline or in accordance to the organization having local jurisdiction.

(i) WARNING ⚠

Inspection and testing is to be carried out only by authorized and trained personnel. DO NOT TURN OFF the water supply or close any valve to make repair(s), or test the valve without placing a roving fire patrol in the area covered by the system. Also inform the local security personnel and central alarm station, so that there is no false alarm signal.

It is recommended to carry out physical inspection of the system at least twice in a week. The inspection should verify that all the control valves are in proper position as per the system requirement and that there are no damages to any component.

The frequency of inspections must be increased in the presence of contaminated water supplies, corrosive/scaling water supplies, and corrosive atmospheres.

(ii) NORMAL CONDITION

(a) All main valves are open and are sealed with tamper proof seal

(b) Drain valves must be kept closed

(c) No leak or drip is detected from the drip valve

(d) All the gauges except the system side water pressure gauge, should show the required pressure

(e) There should be no leakage in the system

(iii) NORMAL CONDITION TEST

(a) The system should be checked for normal condition at least once in a week

(b) Test the sprinkler alarm bell or electric alarm by turning the alarm test valve to the test position. The alarm should sound. This test should be carried out at least once in a week

(c) Depress the drip valve knob. Significant accumulation indicates a possible seat leakage

(d) Conduct the water flow test as per the system testing procedure at least once a month

(iv) PERIODIC CHECK

Conduct the water flow test by actuating few of the release devices provided in the system. Clean all strainer(s) and line restriction nipple. This test is to be carried out at least once in three months.

ABNORMAL CONDITION

(i) ALARM FAILS TO SOUND

(a) Check for any obstruction in the alarm test line, make certain that the sprinkler alarm is free to operate

(b) If an electric alarm is provided, check the electrical circuitry to the alarm

(ii)

(a) Check for clogging in priming line, restriction orifice check valve, priming valve & strainer

(b) Leakage in the release system

(c) The deluge air line restriction orifice clogged or low supply pressure

(iii) LEAKAGE THROUGH THE DELUGE VALVE

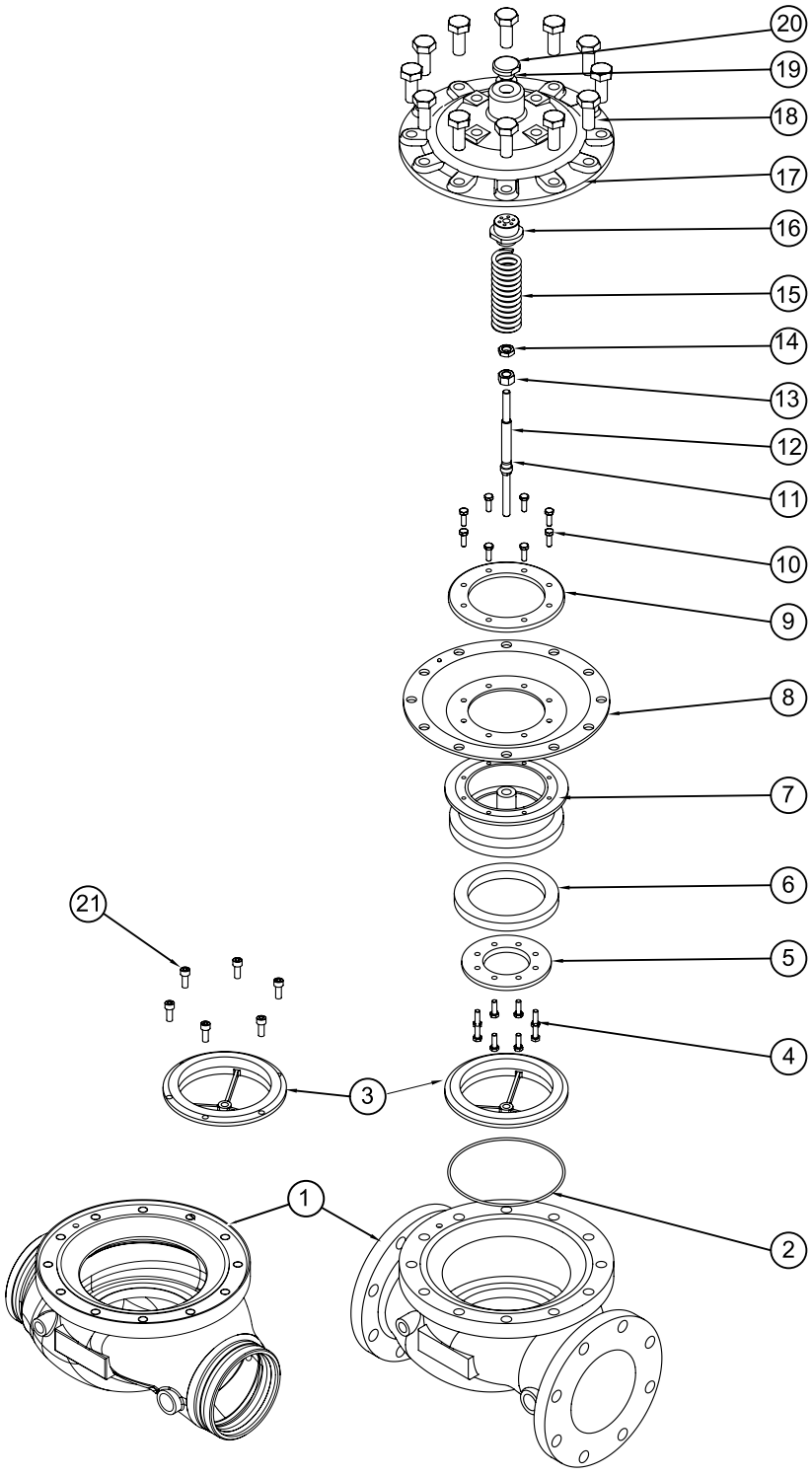
(a) Damaged deluge valve seat or obstruction on the seat face by foreign object

(b) Leakage in release system

(c) Partly clogged priming line restriction orifice check valve

(d) Low air pressure on release system line or leakage in release system

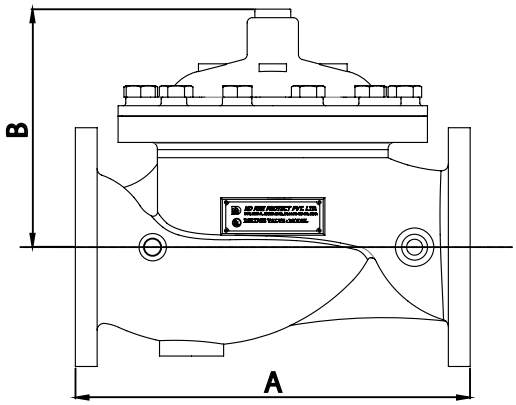
DELUGE VALVE MODEL - N1 SIZE 200 / 150 / 100 / 80/ 50 NB



Groove x Groove

Flange x Flange

DELUGE VALVE MODEL - N1 SIZE 200 / 150 / 100 / 80/ 50 NB

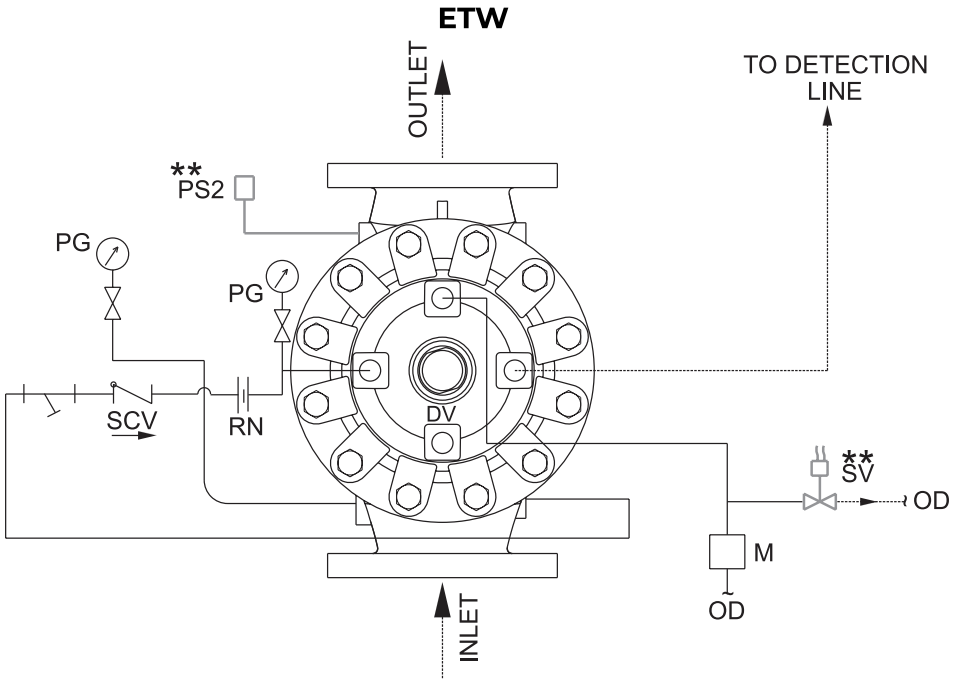


DIMENSION *in millimeter (Approximate)*

VALVE NOMINAL SIZE	AB	
200 NB	552	332
150 NB	462	282
100 NB	412	245
80 NB	372	232
50 NB	320	232

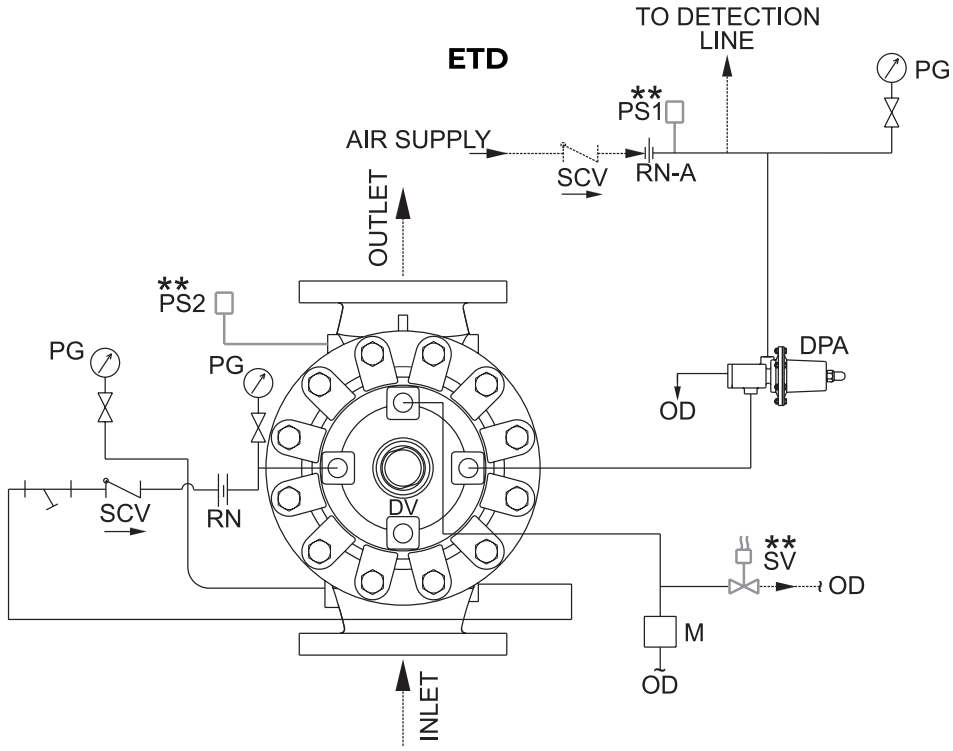
ITEM NO.	PART NO.					DESCRIPTION	QTY				MATERIAL SPECIFICATION
	200 NB	150 NB	100 NB	80 NB	50 NB		200 NB	150 NB	100 NB	80/50 NB	
1	4151	3911	3951	3971	3965	HOUSING	1	1	1	1	AL. BRONZE BS 1400 - AB2
2	8561	9783	9784	9791	9791	"O" RING	1	1	1	1	NEOPRENE RUBBER
3	4155	3925	3955	3986	3986	SEAT	1	1	1	1	AL. BRONZE BS 1400 - AB2
4	9898	9899	9899	-	-	BOLT	8	4	4	-	MONEL 400
5	4156	3926	3956	3984	3984	RUBBER CLAMP	1	1	1	1	AL. BRONZE BS 1400 - AB2
6	4027	4000	4005	4023	4023	RUBBER SEAT	1	1	1	1	NEOPRENE RUBBER
7	4153	3927	3953	3985	3985	CLAPPER	1	1	1	1	AL. BRONZE BS 1400 - AB2
8	4035	2427	2507	2786	2786	DIAPHRAGM	1	1	1	1	NEOPRENE RUBBER
9	4158	3918	3958	3978	3978	CLAMP RING	1	1	1	1	AL. BRONZE BS 1400 - AB2
10	9842	9898	9898	9898	9898	BOLT	12	8	8	8	MONEL 400
11	9986	9986	9986	9986	9986	"O" RING	1	1	1	1	NEOPRENE RUBBER
12	4157	3917	3957	3977	3977	SPINDLE	1	1	1	1	MONEL 400
13	9896	9896	9896	9896	9896	NUT	1	1	1	1	MONEL 400
14	9897	9897	9897	9897	9897	LOCK NUT	1	1	1	1	MONEL 400
15	4154	3914	3954	3974	3974	SPRING	1	1	1	1	INCONEL-X-750
16	4159	3919	3959	3979	3979	ADAPTOR	1	1	1	1	AL. BRONZE BS 1400 - AB2
17	4152	3912	3952	3972	3972	COVER	1	1	1	1	AL. BRONZE BS 1400 - AB2
18	9841	9841	8801	9123	9123	BOLT	16	12	12	12	STAINLESS STEEL
19	9982	9982	9982	9982	9982	"O" RING	1	1	1	1	NEOPRENE RUBBER
20	3920	3920	3920	3920	3920	PLUG	1	1	1	1	AL. BRONZE BS 1400 - AB2
21	9843	-	-	-	-	ALLEN BOLT	6	-	-	-	MONEL 400

SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - N1 FOR VERTICAL MOUNTING



SCHEMATIC 1

SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - N1 FOR VERTICAL MOUNTING



SCHEMATIC 2

DV – DELUGE VALVE
OD–OPENDRAIN
–STRAINER
DR.V–DRIPVALVE
PS2 - WATER FLOW PRESSURE ALARM SWITCH

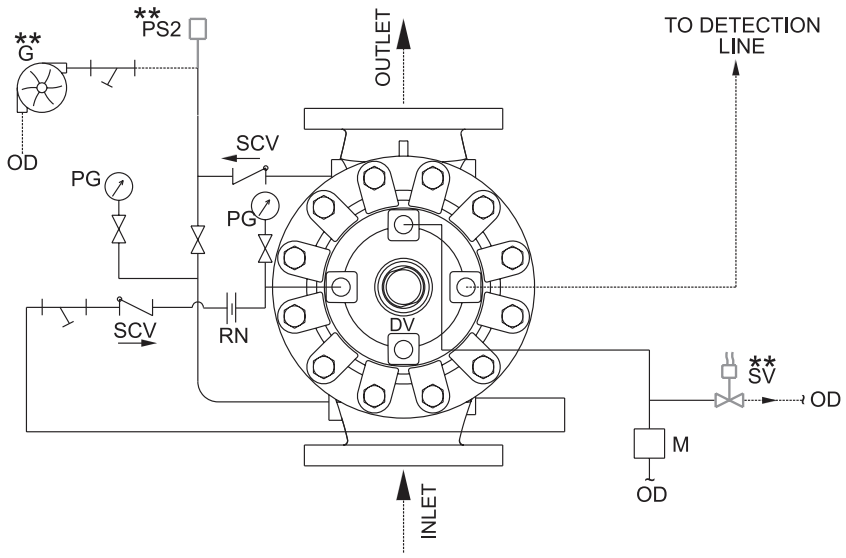
G – SPRINKLER ALARM (WMG)
– VALVE
SV – SOLENOIDVALVE
––– –BYUSER

–SWINGCHECKVALVE
RN–RESTRICTIONNOZZLE(PRIME LINE)
–ANGLEVALVE
PS1–LOWAIRALARMPRESSURESWITCH
RN-A–RESTRICTIONNOZZLE(AIRLINE)

M–EMERGENCYRELEASESTATION
DPA - DRYPILOTACTUATOR
PG– PRESSUREGAUGE
** – OPTIONAL

SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - N1 FOR VERTICAL MOUNTING

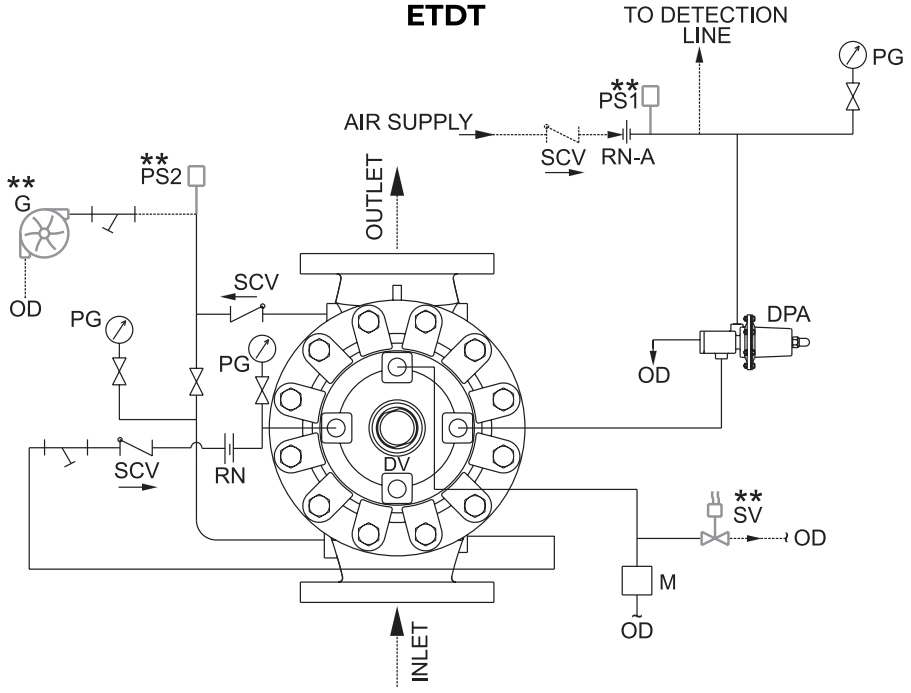
ETWT



SCHEMATIC 3

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - N1 FOR VERTICAL MOUNTING

ETDT



SCHEMATIC 4

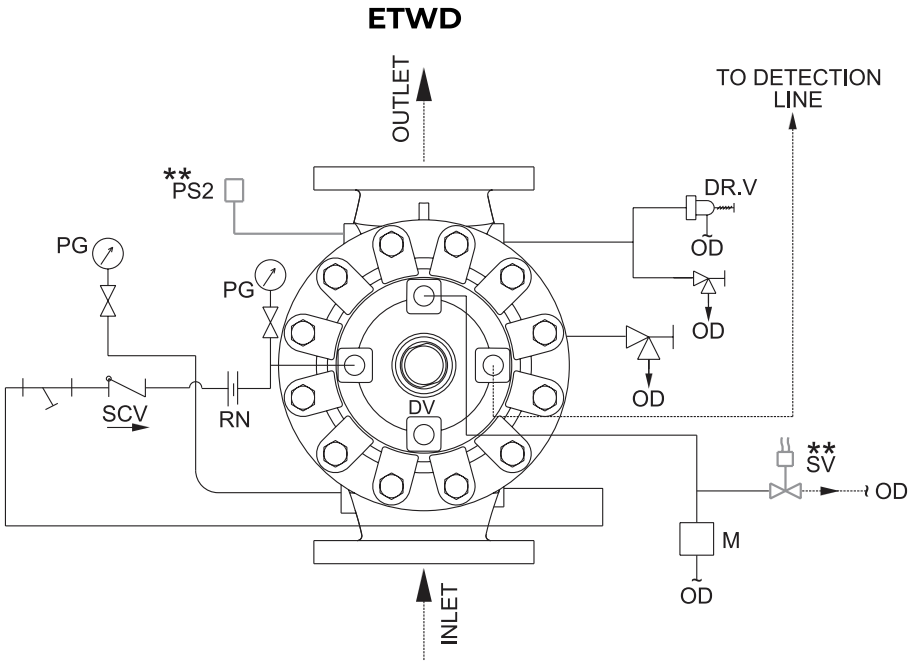
DV – DELUGE VALVE
OD–OPENDRAIN
–STRAINER
DR.V–DRIPVALVE
PS2 - WATER FLOW PRESSURE ALARM SWITCH

G – SPRINKLER ALARM (WMG)
– VALVE
SV – SOLENOIDVALVE
––– –BYUSER

–SWINGCHECKVALVE
RN–RESTRICTIONNOZZLE(PRIME LINE)
–ANGLEVALVE
PS1–LOWAIRALARMPRESSURESWITCH
RN-A–RESTRICTIONNOZZLE(AIRLINE)

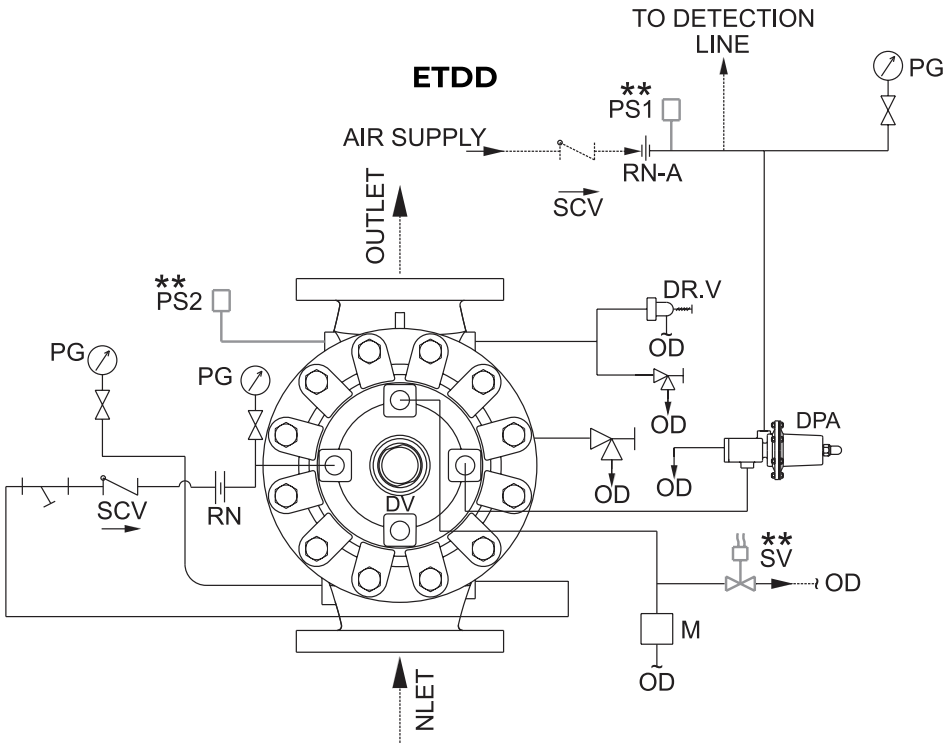
M–EMERGENCYRELEASESTATION
DPA - DRYPILOTACTUATOR
PG– PRESSUREGAUGE
** – OPTIONAL

SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - N1 FOR VERTICAL MOUNTING



SCHEMATIC 5

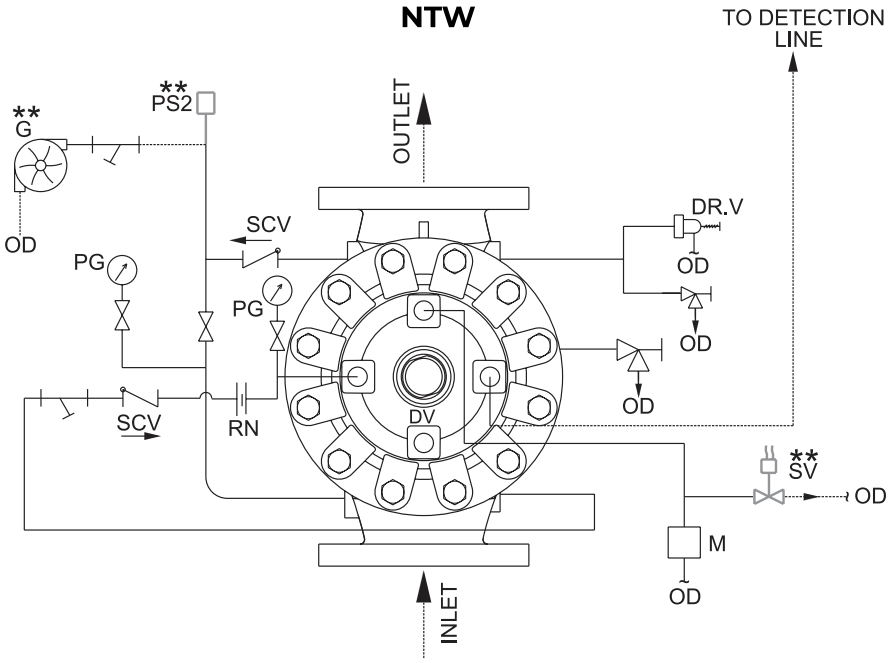
SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - N1 FOR VERTICAL MOUNTING



SCHEMATIC 6

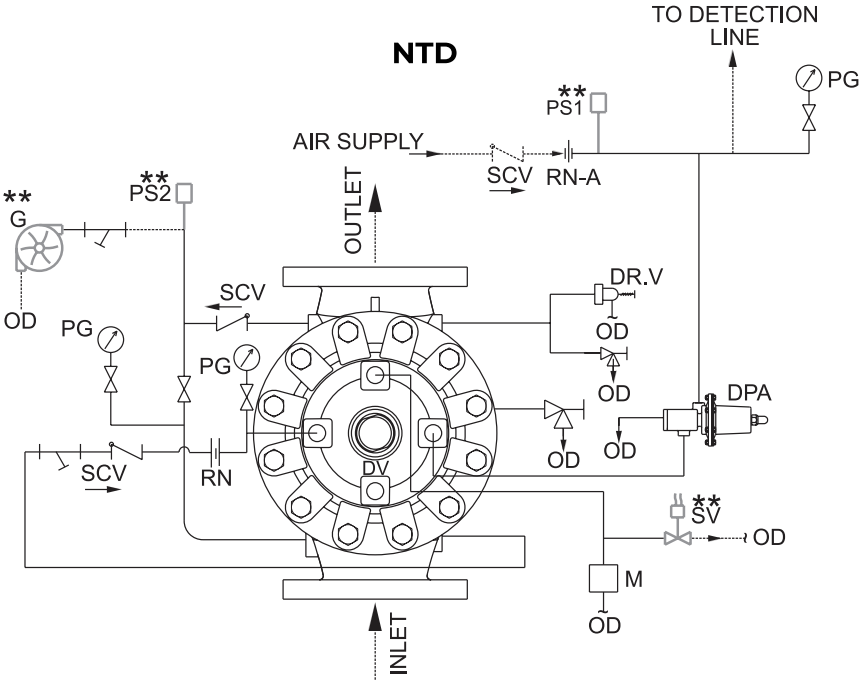
DV – DELUGE VALVE
OD–OPENDRAIN
–STRAINER
DR.V–DRIPVALVE
PS2 - WATER FLOW PRESSURE ALARM SWITCH
G – SPRINKLER ALARM (WMG)
– VALVE
SV – SOLENOIDVALVE
––– –BYUSER
–SWINGCHECKVALVE
RN–RESTRICTIONNOZZLE(PRIME LINE)
–ANGLEVALVE
PS1–LOWAIRALARMPRESSURESWITCH
RN-A–RESTRICTIONNOZZLE(AIRLINE)
M–EMERGENCYRELEASESTATION
DPA - DRYPILOTACTUATOR
PG– PRESSUREGAUGE
** – OPTIONAL

SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - C1 FOR VERTICAL MOUNTING



SCHEMATIC 7

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - C1 FOR VERTICAL MOUNTING



SCHEMATIC 8

DV – DELUGE VALVE
OD–OPENDRAIN
–STRAINER
DR.V–DRIPVALVE
PS2 - WATER FLOW PRESSURE ALARM SWITCH

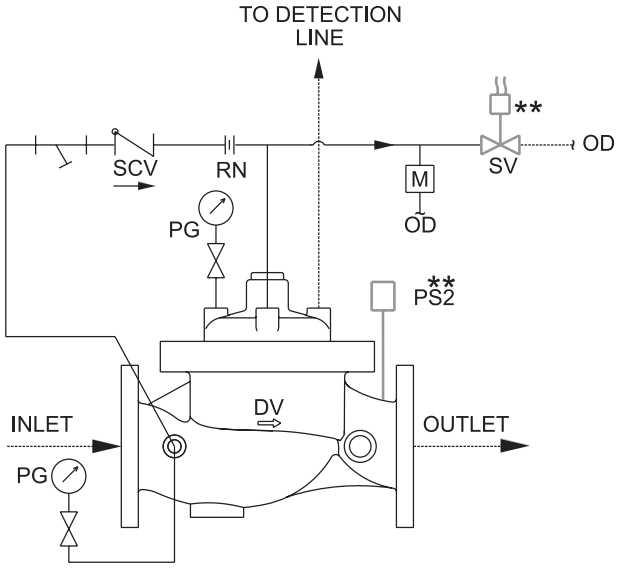
G – SPRINKLER ALARM (WMG)
– VALVE
SV – SOLENOIDVALVE
––– –BYUSER

–SWINGCHECKVALVE
RN–RESTRICTIONNOZZLE(PRIME LINE)
–ANGLEVALVE
PS1–LOWAIRALARMPRESSURESWITCH
RN-A–RESTRICTIONNOZZLE(AIRLINE)

M–EMERGENCYRELEASESTATION
DPA - DRYPILOTACTUATOR
PG– PRESSUREGAUGE
** – OPTIONAL

SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - N1 FOR HORIZONTAL MOUNTING

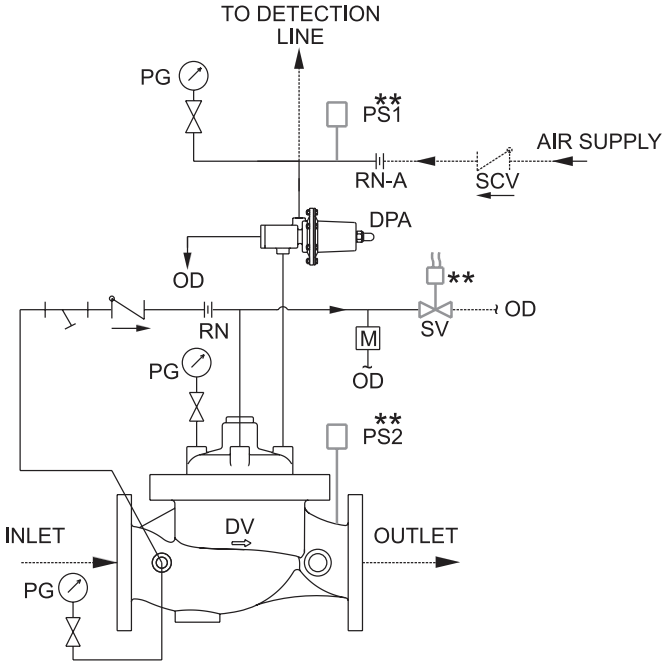
ETW



SCHEMATIC 9

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - N1 FOR HORIZONTAL MOUNTING

ETD



SCHEMATIC 10

DV – DELUGE VALVE
OD–OPENDRAIN
–STRAINER
DR.V–DRIPVALVE
PS2 - WATER FLOW PRESSURE ALARM SWITCH

G – SPRINKLER ALARM (WMG)
– VALVE
SV – SOLENOIDVALVE
––– –BYUSER

–SWINGCHECKVALVE
RN–RESTRICTIONNOZZLE(PRIME LINE)
–ANGLEVALVE
PS1–LOWAIRALARMPRESSURESWITCH
RN-A–RESTRICTIONNOZZLE(AIRLINE)

M–EMERGENCYRELEASESTATION
DPA - DRYPILOTACTUATOR
PG– PRESSUREGAUGE
** – OPTIONAL

SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - N1 FOR HORIZONTAL MOUNTING

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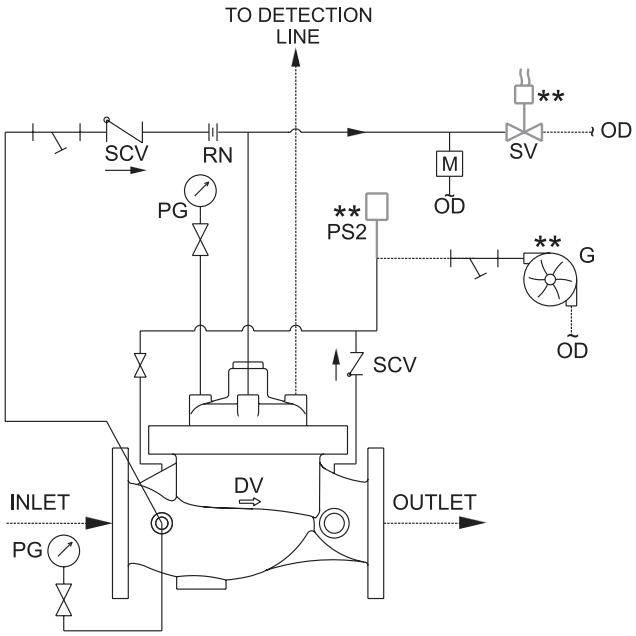
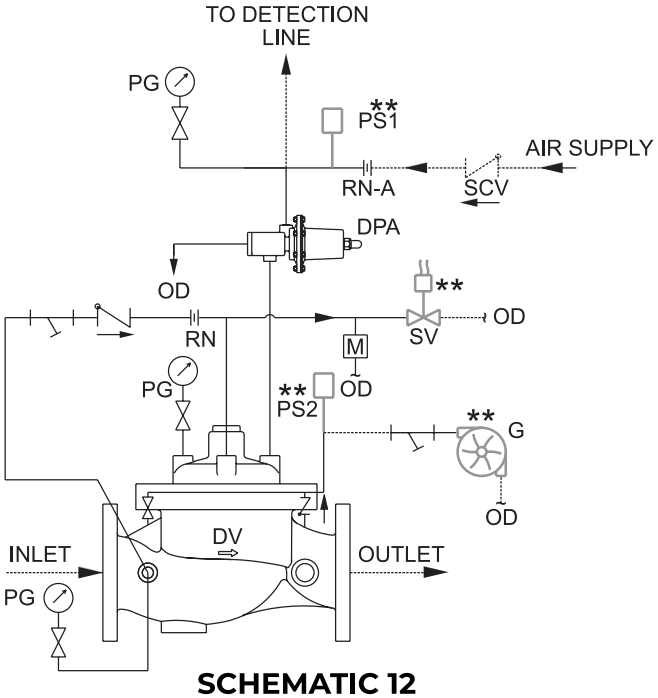


SCHEMATIC 11

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - N1 FOR HORIZONTAL MOUNTING

ETDT



SCHEMATIC 12

DV – DELUGE VALVE
OD–OPENDRAIN
–STRAINER
DR.V–DRIPVALVE
PS2 - WATER FLOW PRESSURE ALARM SWITCH

G – SPRINKLER ALARM (WMG)
– VALVE
SV – SOLENOIDVALVE
––– –BYUSER

–SWINGCHECKVALVE
RN–RESTRICTIONNOZZLE(PRIME LINE)
–ANGLEVALVE
PS1–LOWAIRALARMPRESSURESWITCH
RN-A–RESTRICTIONNOZZLE(AIRLINE)

M–EMERGENCYRELEASESTATION
DPA - DRYPILOTACTUATOR
PG– PRESSUREGAUGE
** – OPTIONAL

SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - N1 FOR HORIZONTAL MOUNTING

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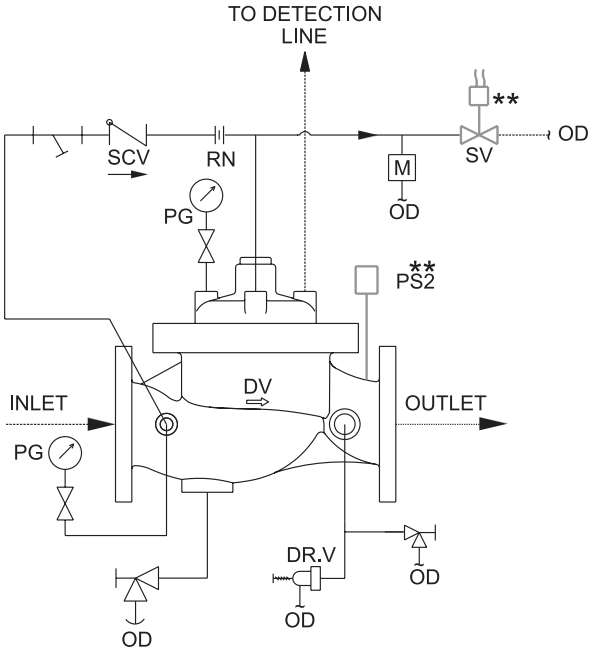
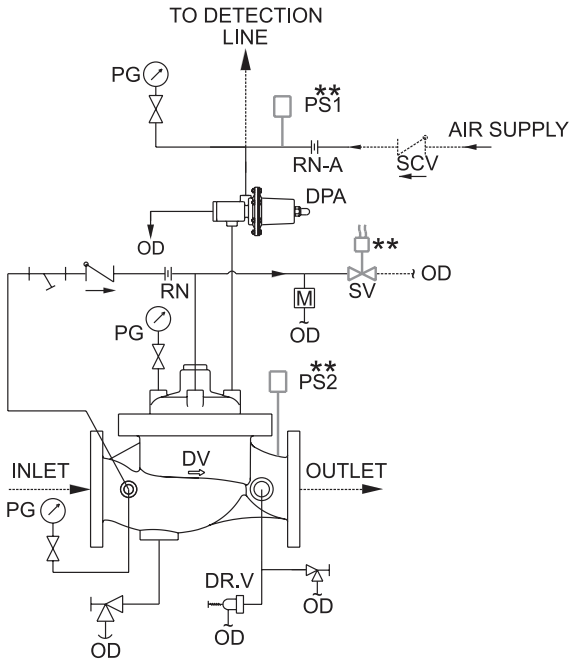


SCHEMATIC 13

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - N1 FOR HORIZONTAL MOUNTING

ETDD



SCHEMATIC 14

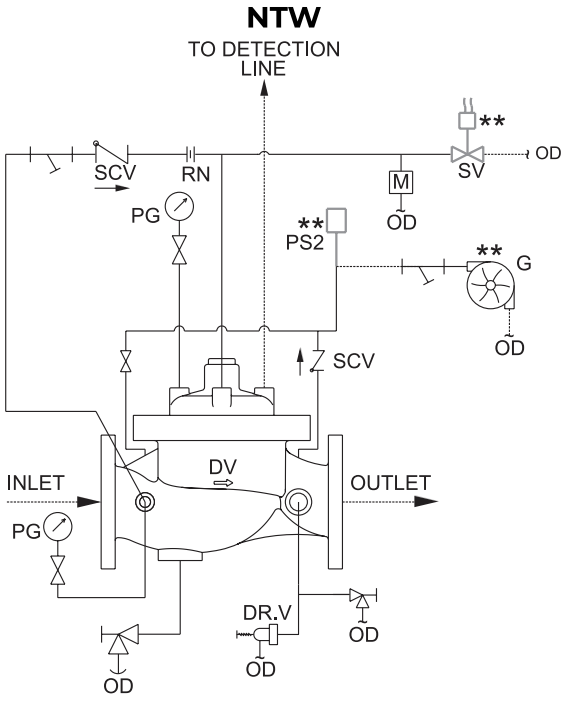
DV – DELUGE VALVE
OD–OPENDRAIN
–STRAINER
DR.V–DRIPVALVE
PS2 - WATER FLOW PRESSURE ALARM SWITCH

G – SPRINKLER ALARM (WMG)
– VALVE
SV – SOLENOIDVALVE
––– –BYUSER

–SWINGCHECKVALVE
RN–RESTRICTIONNOZZLE(PRIME LINE)
–ANGLEVALVE
PS1–LOWAIRALARMPRESSURESWITCH
RN-A–RESTRICTIONNOZZLE(AIRLINE)

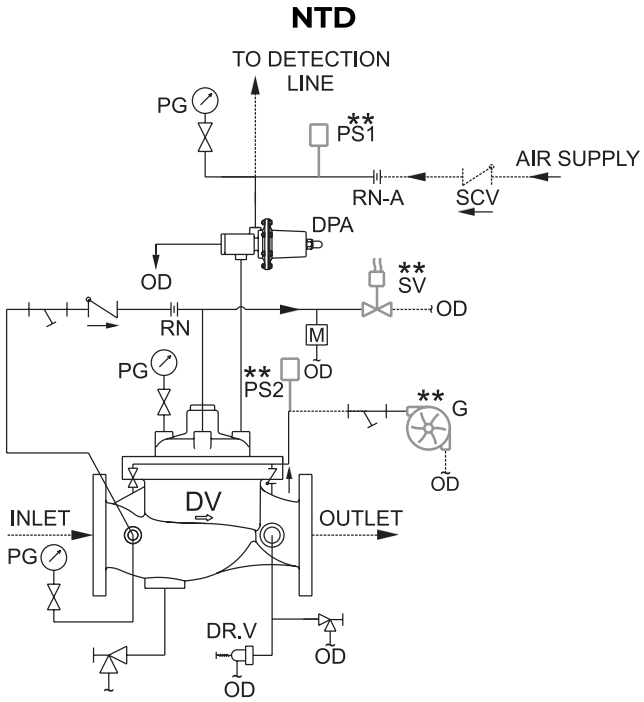
M–EMERGENCYRELEASESTATION
DPA - DRYPILOTACTUATOR
PG– PRESSUREGAUGE
** – OPTIONAL

SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - N1 FOR HORIZONTAL MOUNTING



SCHEMATIC 13

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - N1 FOR HORIZONTAL MOUNTING



SCHEMATIC 14

DV – DELUGE VALVE
OD–OPENDRAIN
–STRAINER
DR.V–DRIPVALVE
PS2 - WATER FLOW PRESSURE ALARM SWITCH

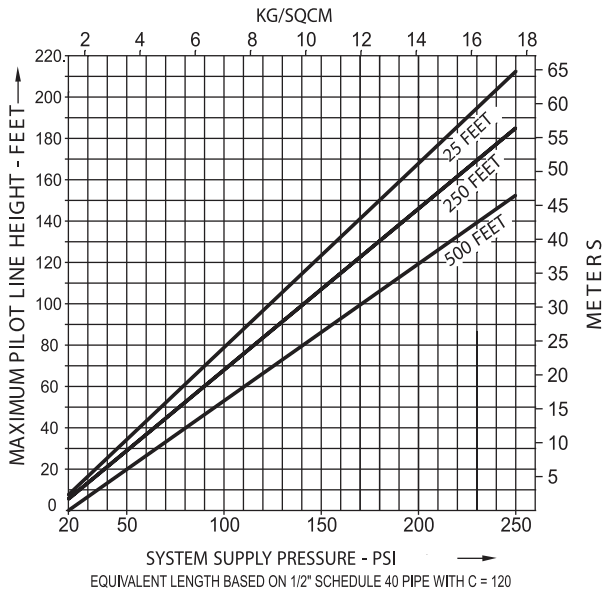
G – SPRINKLER ALARM (WMG)
– VALVE
SV – SOLENOIDVALVE
––– –BYUSER

–SWINGCHECKVALVE
RN–RESTRICTIONNOZZLE(PRIME LINE)
–ANGLEVALVE
PS1–LOWAIRALARMPRESSURESWITCH
RN-A–RESTRICTIONNOZZLE(AIRLINE)

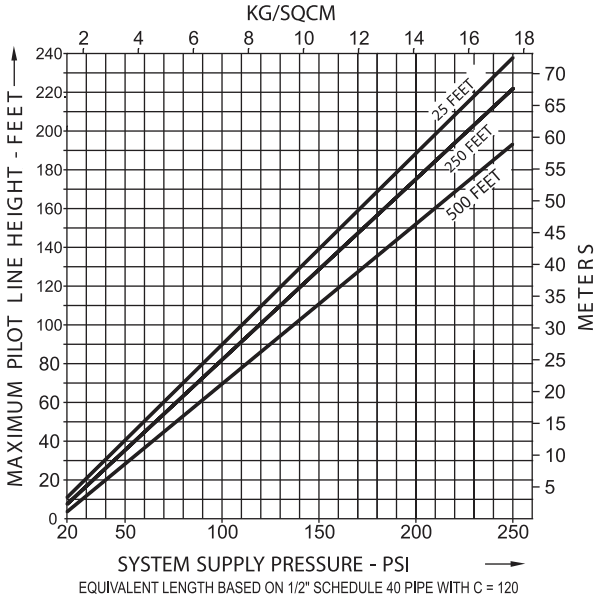
M–EMERGENCYRELEASESTATION
DPA - DRYPILOTACTUATOR
PG– PRESSUREGAUGE
** – OPTIONAL

SPRINKLER HEIGHT LIMITATION

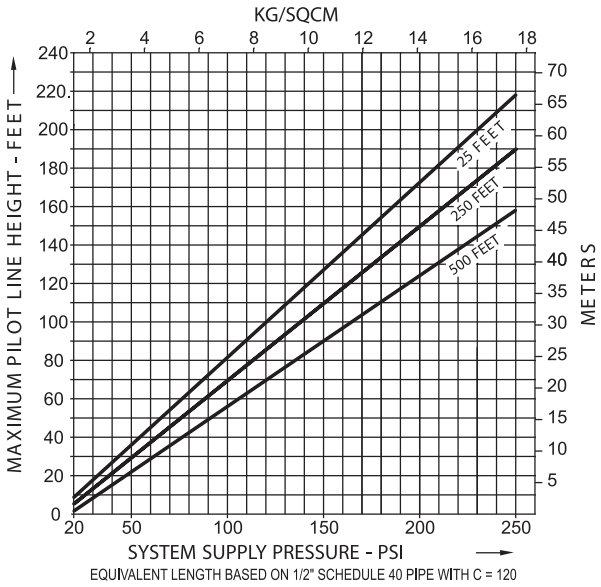
DV 200NB



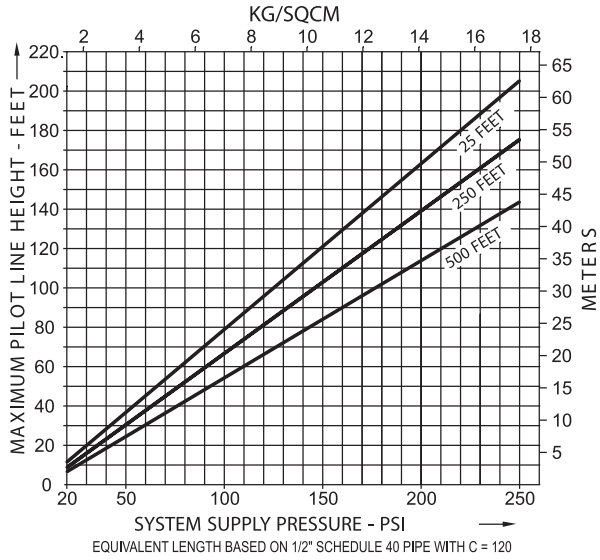
DV 150NB



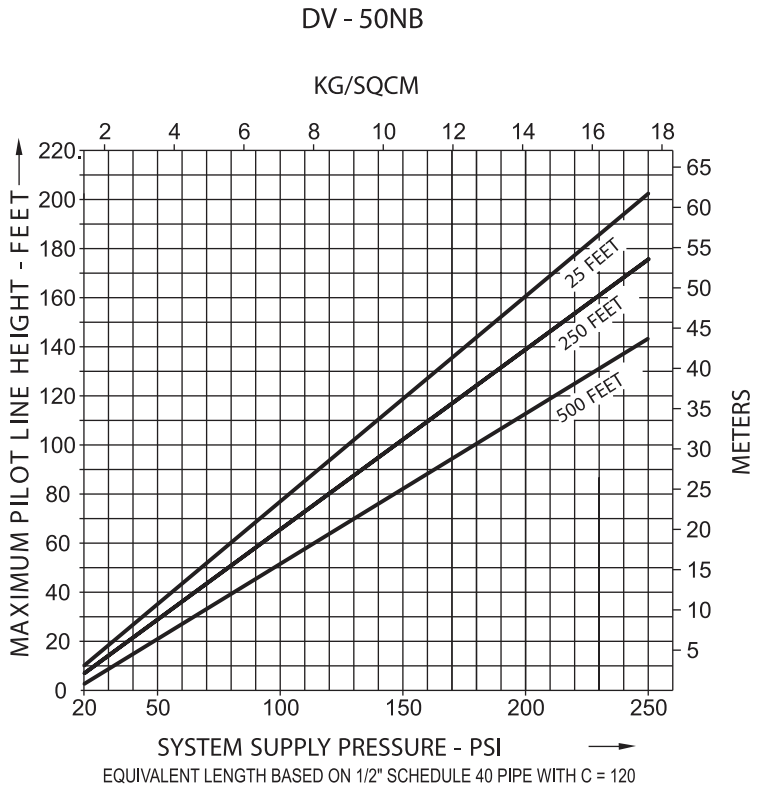
DV 100NB



DV 80NB



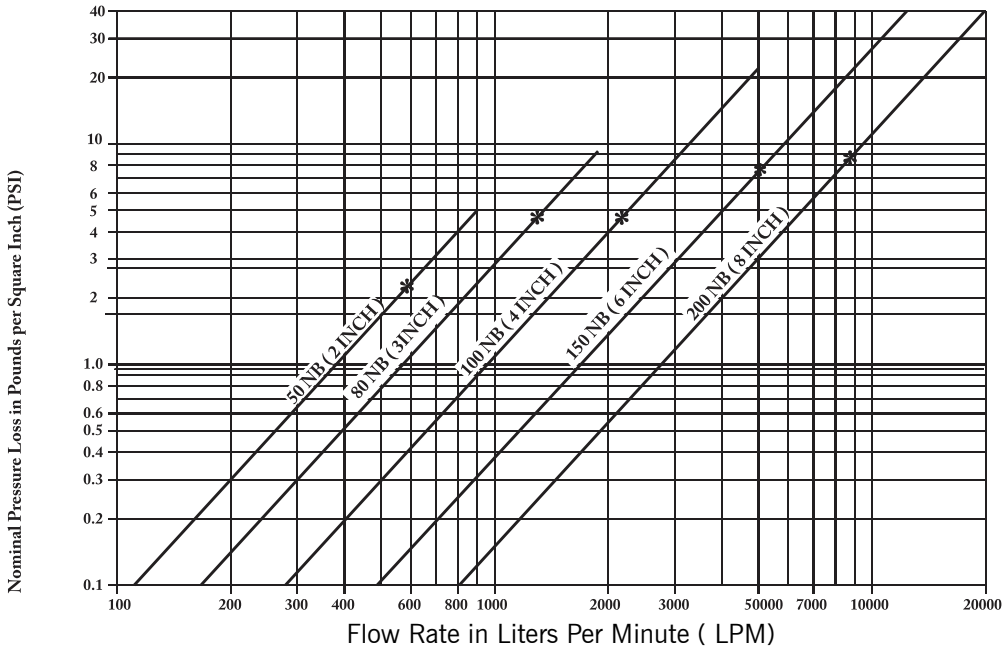
SPRINKLER HEIGHT LIMITATION



DELUGE VALVE MODEL N1

Nominal Pressure Loss vs Flow

(* flow at 15 feet per second (4.57 meter per second)



* 2.3 PSI pressure loss @ 15 feet per second (4.57 met/sec) velocity having flow of 594 LPM
* 4.7 PSI pressure loss @ 15 feet per second (4.57 met/sec) velocity having flow of 1308 LPM
* 4.7 PSI pressure loss @ 15 feet per second (4.57 met/sec) velocity having flow of 2255 LPM
* 7.5 PSI pressure loss @ 15 feet per second (4.57 met/sec) velocity having flow of 5117 LPM
* 8.4 PSI pressure loss @ 15 feet per second (4.57 met/sec) velocity having flow of 8854 LPM