DELUGE VALVE

MODEL: SD-DVH5

TECHNICAL SPECIFICATION

Normal Size	200,150,100, 80, 50 NB
Material	Nickel Aluminium Bronze
Sevice Pressure	1.4 to 17.5 Bar (20 to 250 PSI)
Threaded Opening	BSPT
Mounting	Vertical or Horizontal
Factory Hydostatic Test Pressure	35 Kg/sq.cm. (500 PSI)
Flange Connection	ANSI B 16.5 # 150 FF
Wet Pilot Sprinkler	As per graph in the catalogue
Net Weight without Trim	200 NB - 154 Kg 150 NB - 82 Kg 100 NB - 55 Kg 80 NB - 36 Kg 50 NB - 31 Kg
FINISH	RAL 3000
Ordering Information	1. Size of Valve 2. Flange specification 3. Valve trim vertical or horizontal 4. Trim type

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

SHIELD 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 method 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.

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 SH5-TW and SH5-TD
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 & annunciation are optional.

b) Type SH5-TWD and SH5-TDD
This trim type is a combination of components of normal trim along with the drip and drain trim. A solenoid valve for electric remote actuation and pressure switch for sensing & annunciation are optional.

c) Type SH5-TWT and SH5-TDT
This trim type is a combination of components of normal trim along with the test and alarm trim. In dry pilot trim, an actuator is provided. A solenoid valve for electric remote actuation and pressure switch for sensing & announciation are optional.

d) Type SH5-NTW and SH5-NTD
This trim type is a combination of components of normal 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 & annunciation are optional.

TRIM MODEL NO.	TRIM DESCRIPTION	MOUNTING	SCHEMATIC NO.
SH5-TW	Basic Wet Pilot Trim	Vertical	Schematic 1
SH5-TD	Basic Dry Pilot Trim	Vertical	Schematic 2
SH5-TWT	Basic Wet Pilot Trim with Test and Alarm Trim	Vertical	Schematic 3
SH5-TDT	Basic Dry Pilot Trim with Test and Alarm Trim	Vertical	Schematic 4
SH5-TWD	Basic Wet Pilot Trim with Drip and Drain Trim	Vertical	Schematic 5
SH5-TDD	Basic Dry Pilot Trim with Drip and Drain Trim	Vertical	Schematic 6
SH5-NTW	Basic Wet Pilot Trim with Test and Alarm Trim & Drip and Drain Trim	Vertical	Schematic 7
SH5-NTD	Basic Dry Pilot Trim with Test and Alarm Trim & Drip and Drain Trim	Vertical	Schematic 8
SH5-TW	Basic Wet Pilot Trim	Horizontal	Schematic 9
SH5-TD	Basic Dry Pilot Trim	Horizontal	Schematic 10
SH5-TWT	Basic Wet Pilot Trim with Test and Alarm Trim	Horizontal	Schematic 11
SH5-TDT	Basic Dry Pilot Trim with Test and Alarm Trim	Horizontal	Schematic 12
SH5-TWD	Basic Wet Pilot Trim with Drip and Drain Trim	Horizontal	Schematic 13
SH5-TDD	Basic Dry Pilot Trim with Drip and Drain Trim	Horizontal	Schematic 14
SH5-NTW	Basic Wet Pilot Trim with Test and Alarm Trim & Drip and Drain Trim	Horizontal	Schematic 15
SH5-NTD	Basic Dry Pilot Trim with Test and Alarm Trim & Drip and Drain Trim	Horizontal	Schematic 16

RESETTING PROCEDURE FOR THE DELUGE VALVE

1. Close the upstream side stop valve provided below the deluge valve
2. Open both the drain valves/ drain plugs and close when the flow of water has ceased
3. Close the release device/replace the Sprinkler if release was through Sprinkler/QB Detector
4. Inspect and release if required, or close the section of the detection system subjected to “Fire condition”
5. 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.
6. Where priming shut off valve (optional) is provided for resetting, then the water need to be drained from upstream side of valve.

NOTE: The valve can be reset without undergoing above procedure, by just closing/replacing the release device as valve is auto reset type. The reset time may be long or cause vibration while closing depending on back pressure at the outlet of the valve.

CAUTION

- Do not close the priming valve, downstream and upstream stop valves, while the system is in service.
- 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.
- 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.
- Do not connect the Sprinkler Alarm outlet drain line to close a common drain as it may create back pressure and Sprinkler Alarm may not function.
- Deluge valve must have support to absorb sudden opening or closing vibration shock to the piping.
- To avoid water damage, take precautions when opening the water supply main control valve, since water will flow from all open system valves.
- The responsibility of maintenance of the protection system and devices in proper operating condition lies with the owner of the system.
- Deluge Valve & its trim shall be maintained at a minimum temperature of 4ºC, Heat tracing is not permitted.
- Deluge Valve must be used in presssurised system

SYSTEM TESTING PROCEDURE

1. 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.
2. 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.
3. 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 organisation having local jurisdiction.

(i) WARNING

Inspection and testing is to be carried out only by authorised 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

- All main valves are open and are sealed with tamper proof seal
- Drain valves must be kept closed
- No leak or drip is detected from the drip valve
- All the gauges except the system side water pressure gauge, should show the required pressure
- There should be no leakage in the system

(iii) NORMAL CONDITION TEST

- The system should be checked for normal condition at least once in a week
- 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
- Depress the drip valve knob. Significant accumulation indicates a possible seat leakage
- Conduct the water flow test as per the procedure of system testing 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 priming line restriction. This test is to be carried out at least once in three months.

ABNORMAL CONDITION

(i) ALARM FAILS TO SOUND

- Check for any obstruction in the alarm test line, make certain that the sprinkler alarm is free to operate
- If an electric alarm is provided, check the electrical circuitry to the alarm

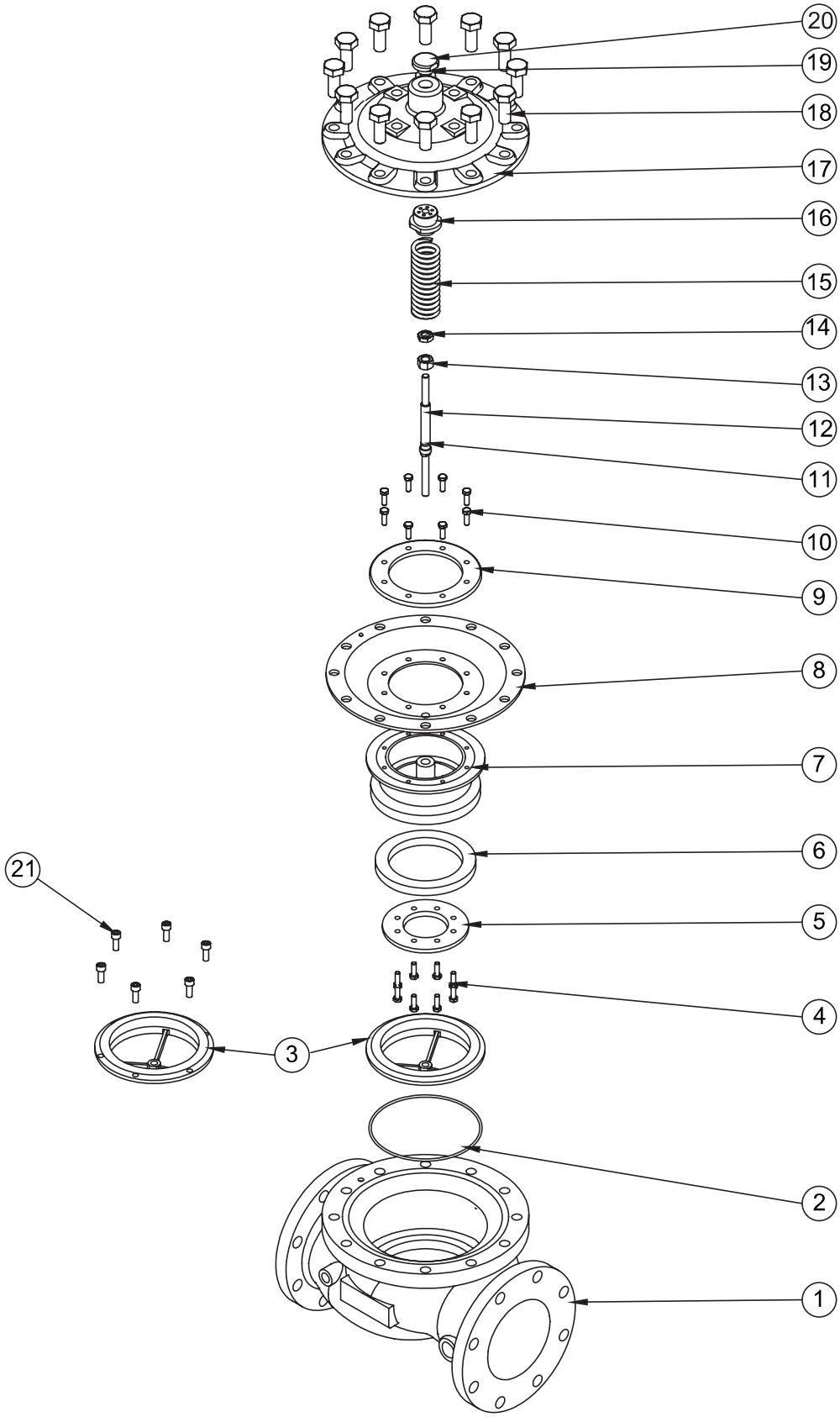
(ii) FALSE TRIPS

- Check for clogging in priming line, restriction orifice check valve, priming valve & strainer
- Leakage in the release system
- The deluge air panel orifice clogged or low supply pressure

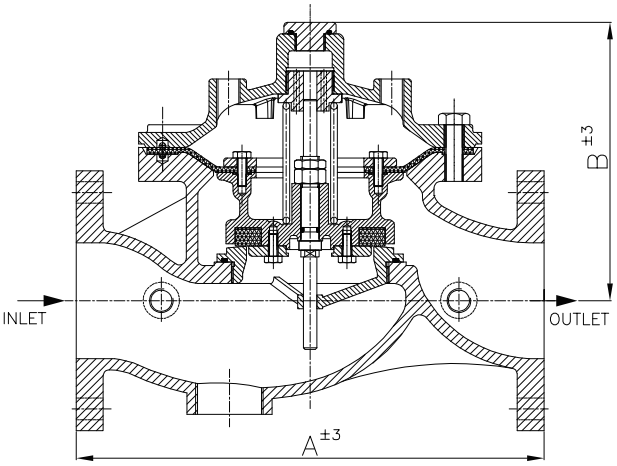
(iii) LEAKAGE THROUGH THE DELUGE VALVE

- Damaged deluge valve seat or obstruction on the seat face by foreign object
- Leakage in release system
- Partly clogged priming line restriction orifice check valve
- Low air pressure on release system line or leakage in release system

NOMINAL PRESSURE LOSS VS FLOW



DELUGE VALVE MODEL - SD-DVH5



Valve Nominal Size	'A'	'B'
200 NB	552	332
150 NB	462	282
100 NB	412	245
80 NB	372	232
50 NB	320	232

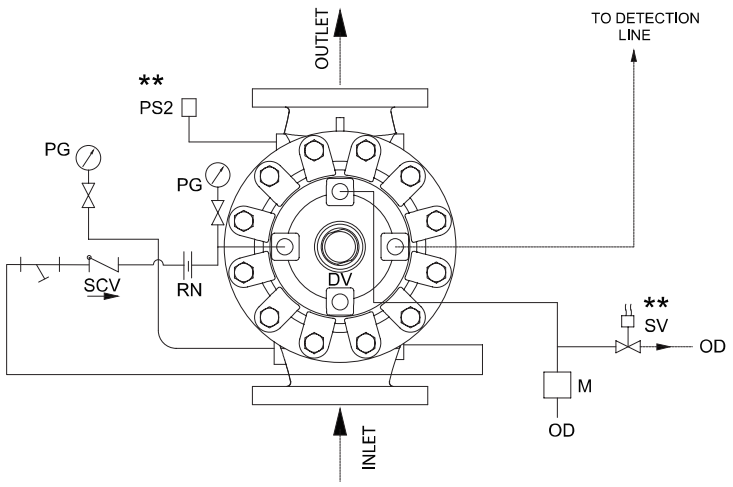
Dimension in mm. (Approximate)

PART LIST

ITEM	PART NO.					DESCRIPTION	QTY.				MATERIAL SPECIFICATION
	200 NB	150 NB	100 NB	80 NB	50 NB		200 NB	150 NB	100 NB	80/50NB	
1	H5201	H5601	H5101	H5801	H5501	Housing	1	1	1	1	Aluminium Bronze BS1400-AB2
2	H5202	H5602	H5102	H5802	H5502	"O" Ring	1	1	1	1	Neoprene Rubber
3	H5203	H5603	H5103	H3803	H5503	Seat	1	1	1	1	Aluminium Bronze BS1400-AB2
4	H5204	H5604	H5104	---	---	Bolt	8	4	4	---	Monel 400
5	H5205	H5605	H5105	H5805	H5505	Rubber Clamp	1	1	1	1	Aluminium Bronze BS1400-AB2
6	H5206	H5606	H5106	H5806	H5506	Rubber Seat	1	1	1	1	Neoprene Rubber
7	H5207	H5607	H5107	H5807	H5507	Clapper	1	1	1	1	Aluminium Bronze BS1400-AB2
8	H5208	H5608	H5108	H5808	H5508	Diaphram	1	1	1	1	Neoprene Rubber
9	H5209	H5609	H5109	H5809	H5509	Clamp Ring	1	1	1	1	Aluminium Bronze BS1400-AB2
10	H5210	H5610	H5110	H5810	H5510	Bolt	12	8	8	8	Monel 400
11	H5211	H5611	H5111	H5811	H5511	"O" Ring	1	1	1	1	Neoprene Rubber
12	H5212	H5612	H5112	H5812	H5512	Spindle	1	1	1	1	Monel 400
13	H5213	H5613	H5113	H5813	H5513	Nut	1	1	1	1	Monel 400
14	H5214	H5614	H5114	H5814	H5514	Lock Nut	1	1	1	1	Monel 400
15	H5215	H5615	H5115	H5815	H5515	Spring	1	1	1	1	Inconel-X-750
16	H5216	H5616	H5116	H5816	H5516	Adaptor	1	1	1	1	Aluminium Bronze BS1400-AB2
17	H5217	H5617	H5117	H5817	H5517	Cover	1	1	1	1	Aluminium Bronze BS1400-AB2
18	H5218	H5618	H5118	H5818	H5518	Bolt	16	12	12	12	Stainless Steel
19	H5219	H5619	H5119	H5819	H5519	"O" Ring	1	1	1	1	Neoprene Rubber
20	H5220	H5621	H5120	H5820	H5520	Plug	1	1	1	1	Aluminium Bronze BS1400-AB2
21	H5221	---	---	---	---	Allen Bolt	6	---	---	---	Monel 400

SCHEMATIC FOR WET PILOT BASIC TRIM FOR VERTICAL MOUNTING

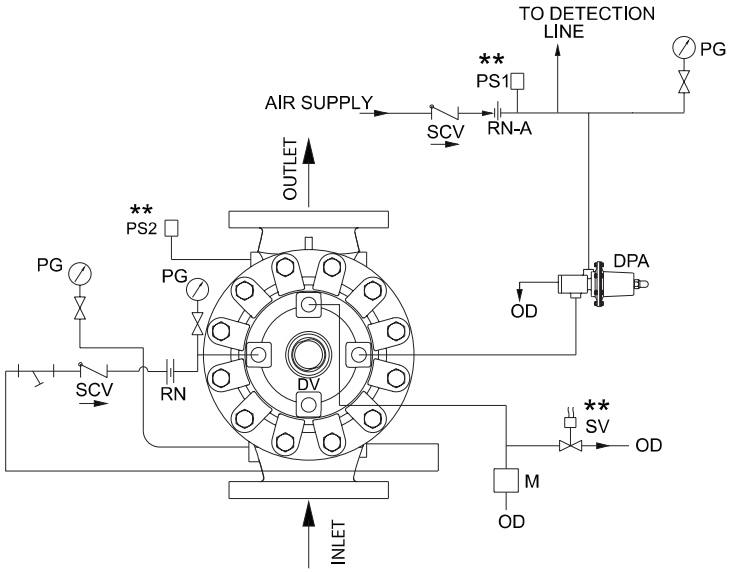
SH5-TW



SCHEMATIC 1

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR VERTICAL MOUNTING

SH5-TD

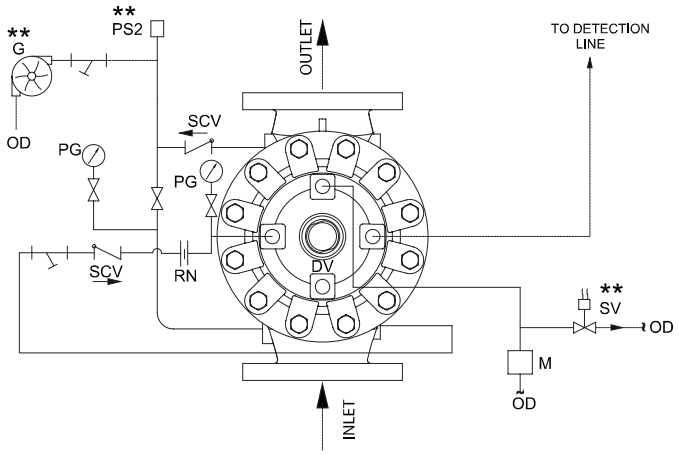


SCHEMATIC 2

DV	Deluge Valve		Valve		Swing Check Valve
SV	Solenoid Valve	---	By User		Angle Valve
G	Sprinkler Alarm (WMG)	**	Optional	DPA	Dry Pilot Actuator
M	Emergency Release Station		Strainer	RN-A	Restriction Nozzle (Air Line)
RN	Restriction Nozzle (Priming Line)	OD	Open Drain	SCV	Swing Check Valve
PS1	Low Air Alarm Pressure Switch	PG	Pressure Guage		
PS2	Waterflow Pressure Alarm Switch				

SCHEMATIC FOR WET PILOT BASIC TRIM WITH TEST AND ALARM TRIM FOR VERTICAL MOUNTING

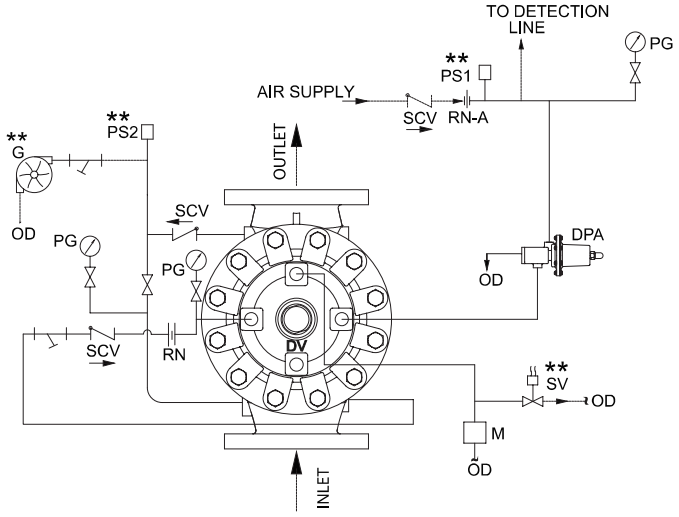
SH5-TWT



SCHEMATIC 3

SCHEMATIC FOR DRY PILOT BASIC TRIM WITH TEST AND ALARM TRIM FOR VERTICAL MOUNTING

SH5-TDT

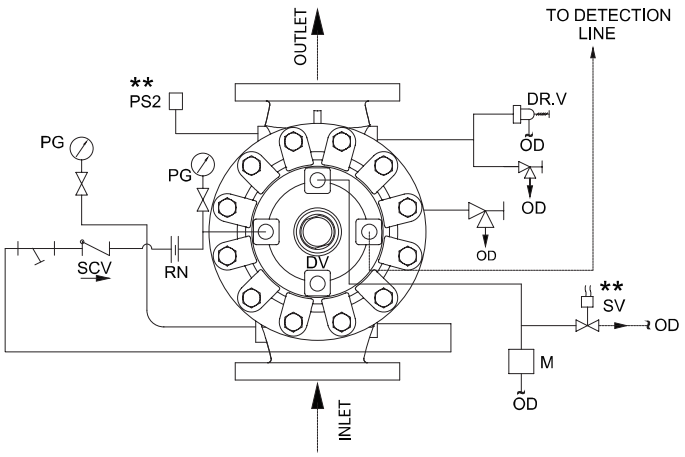


SCHEMATIC 4

DV	Deluge Valve		Valve		Swing Check Valve
SV	Solenoid Valve	---	By User		Angle Valve
G	Sprinkler Alarm (WMG)	**	Optional	DPA	Dry Pilot Actuator
M	Emergency Release Station		Strainer	RN-A	Restriction Nozzle (Air Line)
RN	Restriction Nozzle (Priming Line)	OD	Open Drain	SCV	Swing Check Valve
PS1	Low Air Alarm Pressure Switch	PG	Pressure Guage		
PS2	Waterflow Pressure Alarm Switch				

SCHEMATIC FOR WET PILOT BASIC TRIM WITH DRIP AND DRAIN TRIM FOR VERTICAL MOUNTING

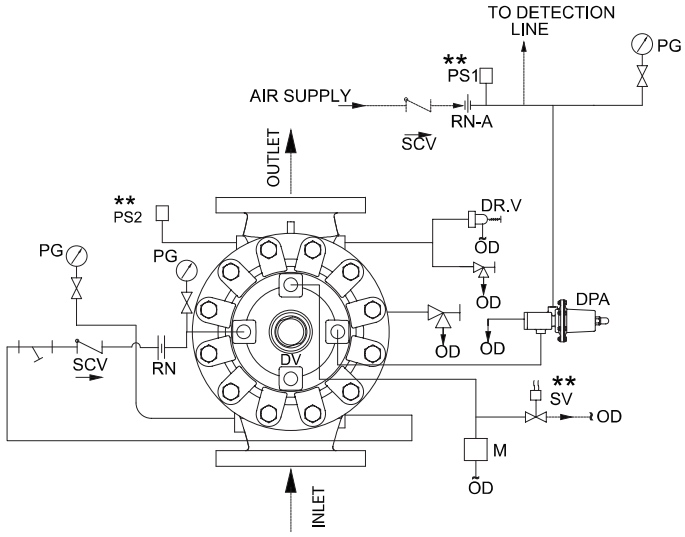
SH5-TWD



SCHEMATIC 5

SCHEMATIC FOR DRY PILOT BASIC TRIM WITH DRIP AND DRAIN TRIM FOR VERTICAL MOUNTING

SH5-TDD

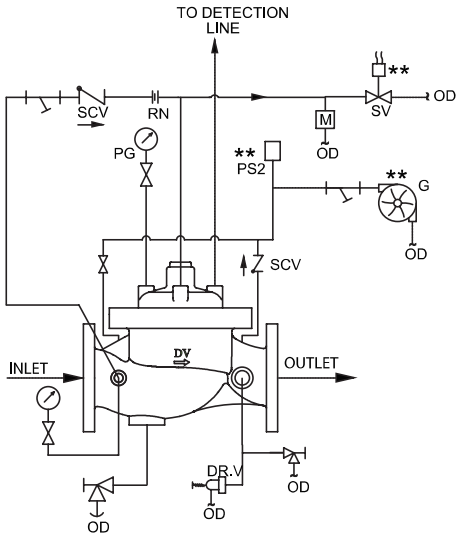


SCHEMATIC 6

DV	Deluge Valve	⋈	Valve	↘	Swing Check Valve
SV	Solenoid Valve	---	By User	⋈	Angle Valve
G	Sprinkler Alarm (WMG)	**	Optional	DPA	Dry Pilot Actuator
M	Emergency Release Station	⊢	Strainer	RN-A	Restriction Nozzle (Air Line)
RN	Restriction Nozzle (Priming Line)	OD	Open Drain	SCV	Swing Check Valve
PS1	Low Air Alarm Pressure Switch	PG	Pressure Guage		
PS2	Waterflow Pressure Alarm Switch				

SCHEMATIC FOR WET PILOT BASIC TRIM WITH TEST AND ALARM TRIM & DRIP AND DRAIN TRIM FOR HORIZONTAL MOUNTING

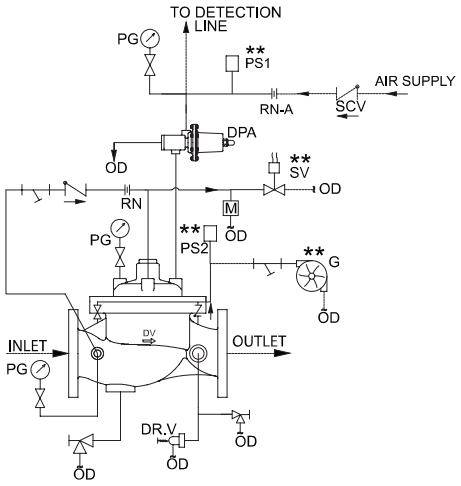
SH3-NTW



SCHEMATIC 15

SCHEMATIC FOR DRY PILOT BASIC TRIM WITH TEST AND ALARM TRIM & DRIP AND DRAIN TRIM FOR HORIZONTAL MOUNTING

SH3-NTD

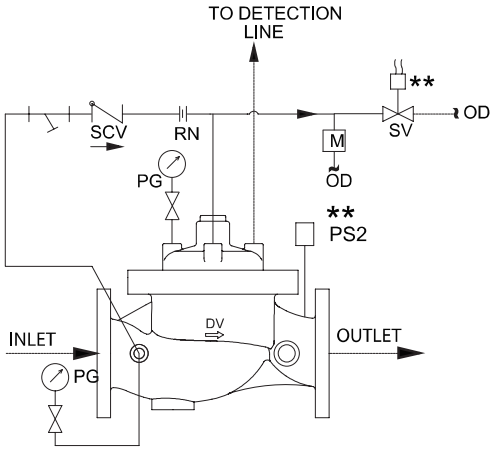


SCHEMATIC 16

DV	Deluge Valve	⋈	Valve	⟀	Swing Check Valve
SV	Solenoid Valve	---	By User	⊬	Angle Valve
G	Sprinkler Alarm (WMG)	**	Optional	DPA	Dry Pilot Actuator
M	Emergency Release Station	⊢	Strainer	RN-A	Restriction Nozzle (Air Line)
RN	Restriction Nozzle (Priming Line)	OD	Open Drain	SCV	Swing Check Valve
PS1	Low Air Alarm Pressure Switch	PG	Pressure Guage		
PS2	Waterflow Pressure Alarm Switch				

SCHEMATIC FOR WET PILOT BASIC TRIM FOR HORIZONTAL MOUNTING

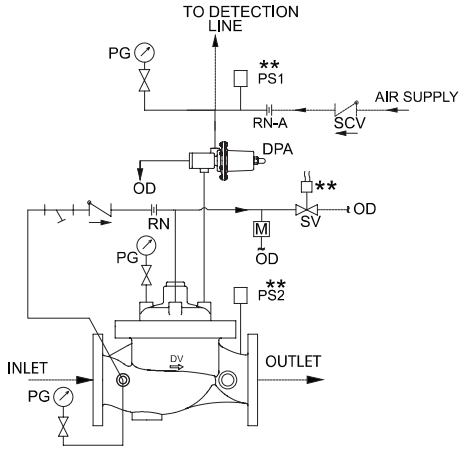
SH5-TW



SCHEMATIC 9

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR HORIZONTAL MOUNTING

SH5-TD

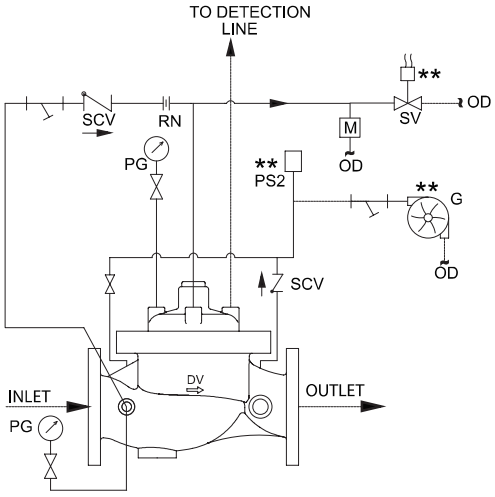


SCHEMATIC 10

DV	Deluge Valve	⋈	Valve	↘	Swing Check Valve
SV	Solenoid Valve	---	By User	⋈	Angle Valve
G	Sprinkler Alarm (WMG)	**	Optional	DPA	Dry Pilot Actuator
M	Emergency Release Station	⊣	Strainer	RN-A	Restriction Nozzle (Air Line)
RN	Restriction Nozzle (Priming Line)	OD	Open Drain	SCV	Swing Check Valve
PS1	Low Air Alarm Pressure Switch	PG	Pressure Guage		
PS2	Waterflow Pressure Alarm Switch				

SCHEMATIC FOR WET PILOT BASIC TRIM WITH TEST AND ALARM TRIM FOR HORIZONTAL MOUNTING

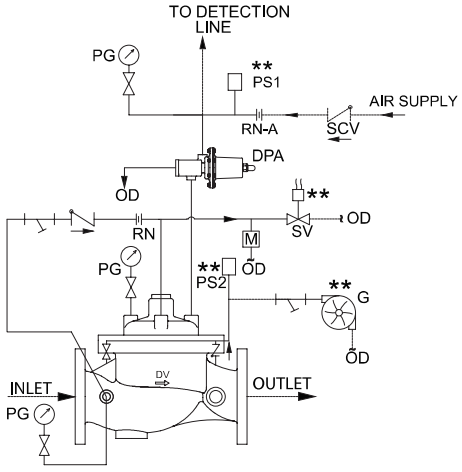
SH5-TWT



SCHEMATIC 11

SCHEMATIC FOR DRY PILOT BASIC TRIM WITH TEST AND ALARM TRIM FOR HORIZONTAL MOUNTING

SH5-TDT

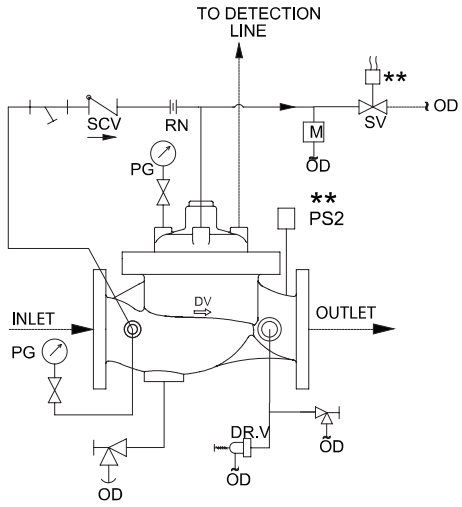


SCHEMATIC 12

DV	Deluge Valve		Valve		Swing Check Valve
SV	Solenoid Valve	---	By User		Angle Valve
G	Sprinkler Alarm (WMG)	**	Optional	DPA	Dry Pilot Actuator
M	Emergency Release Station		Strainer	RN-A	Restriction Nozzle (Air Line)
RN	Restriction Nozzle (Priming Line)	OD	Open Drain	SCV	Swing Check Valve
PS1	Low Air Alarm Pressure Switch	PG	Pressure Guage		
PS2	Waterflow Pressure Alarm Switch				

SCHEMATIC FOR WET PILOT BASIC TRIM WITH DRIP AND DRAIN TRIM FOR HORIZONTAL MOUNTING

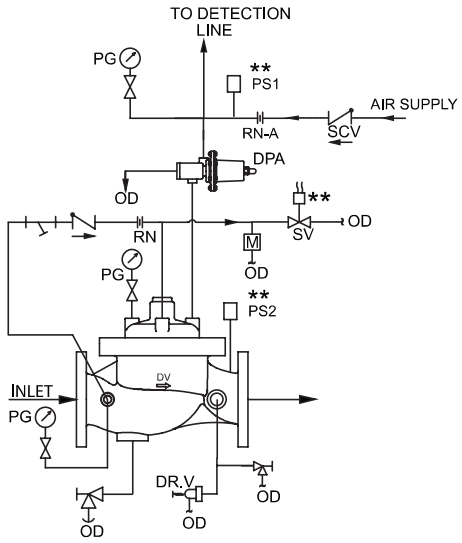
SH5-TWD



SCHEMATIC 13

SCHEMATIC FOR DRY PILOT BASIC TRIM WITH DRIP AND DRAIN TRIM FOR HORIZONTAL MOUNTING

SH5-TDD

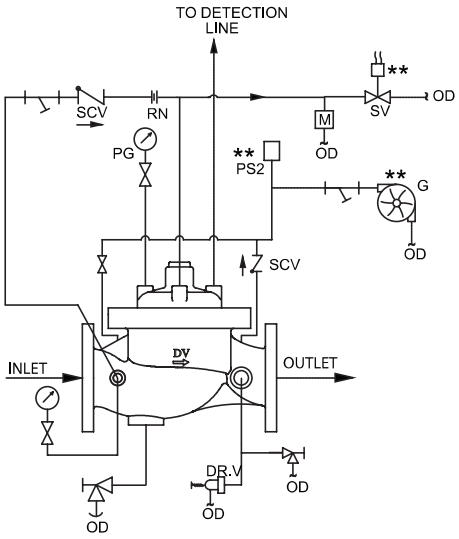


SCHEMATIC 14

DV	Deluge Valve		Valve		Swing Check Valve
SV	Solenoid Valve	---	By User		Angle Valve
G	Sprinkler Alarm (WMG)	**	Optional	DPA	Dry Pilot Actuator
M	Emergency Release Station		Strainer	RN-A	Restriction Nozzle (Air Line)
RN	Restriction Nozzle (Priming Line)	OD	Open Drain	SCV	Swing Check Valve
PS1	Low Air Alarm Pressure Switch	PG	Pressure Guage		
PS2	Waterflow Pressure Alarm Switch				

SCHEMATIC FOR WET PILOT BASIC TRIM WITH TEST AND ALARM TRIM & DRIP AND DRAIN TRIM FOR HORIZONTAL MOUNTING

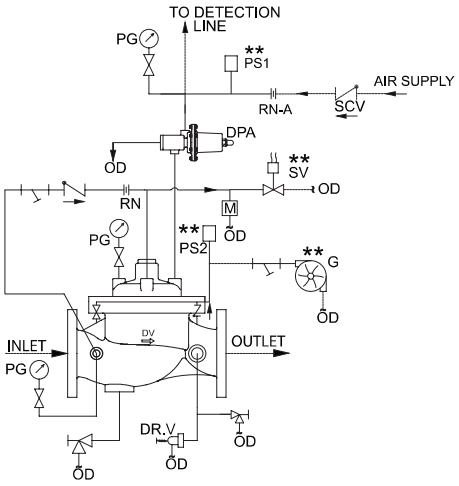
SH5-NTW



SCHEMATIC 15

SCHEMATIC FOR DRY PILOT BASIC TRIM WITH TEST AND ALARM TRIM & DRIP AND DRAIN TRIM FOR HORIZONTAL MOUNTING

SH5-NTD



SCHEMATIC 16

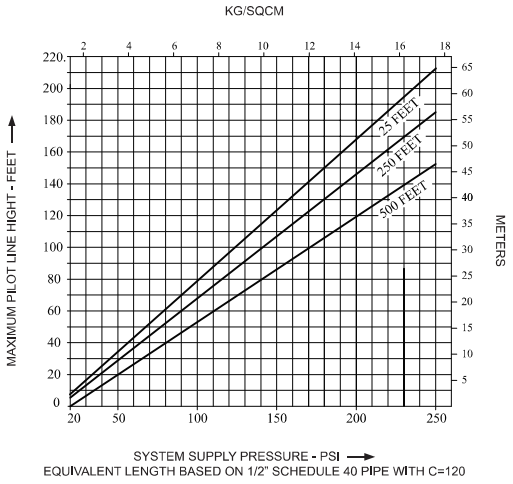
DV	Deluge Valve
SV	Solenoid Valve
G	Sprinkler Alarm (WMG)
M	Emergency Release Station
RN	Restriction Nozzle (Priming Line)
PS1	Low Air Alarm Pressure Switch
PS2	Waterflow Pressure Alarm Switch

	Valve
---	By User
**	Optional
	Strainer
OD	Open Drain
PG	Pressure Guage

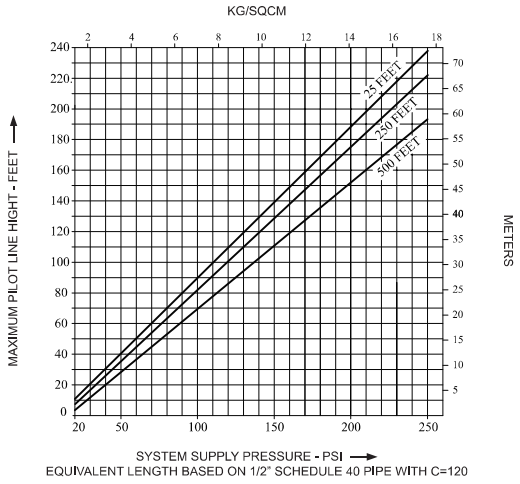
	Swing Check Valve
	Angle Valve
DPA	Dry Pilot Actuator
RN-A	Restriction Nozzle (Air Line)
SCV	Swing Check Valve

SPRINKLER HEIGHT LIMITATION

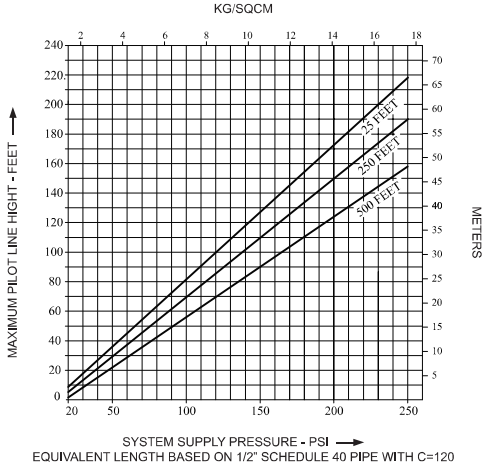
DV 200NB



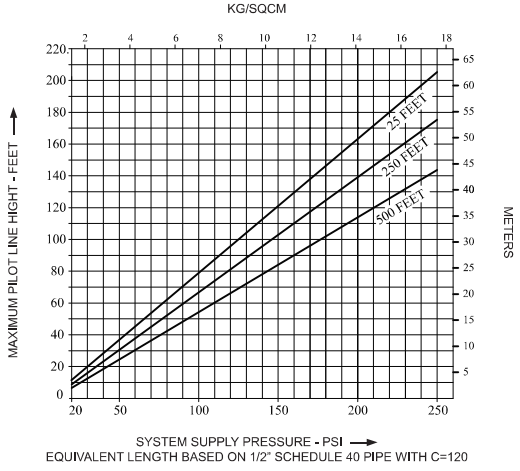
DV 150NB



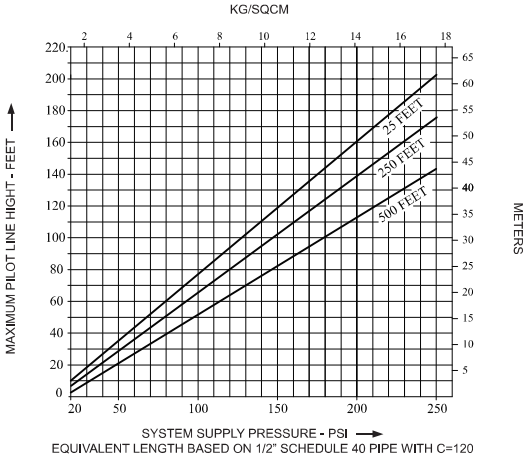
DV 100NB



DV 80NB

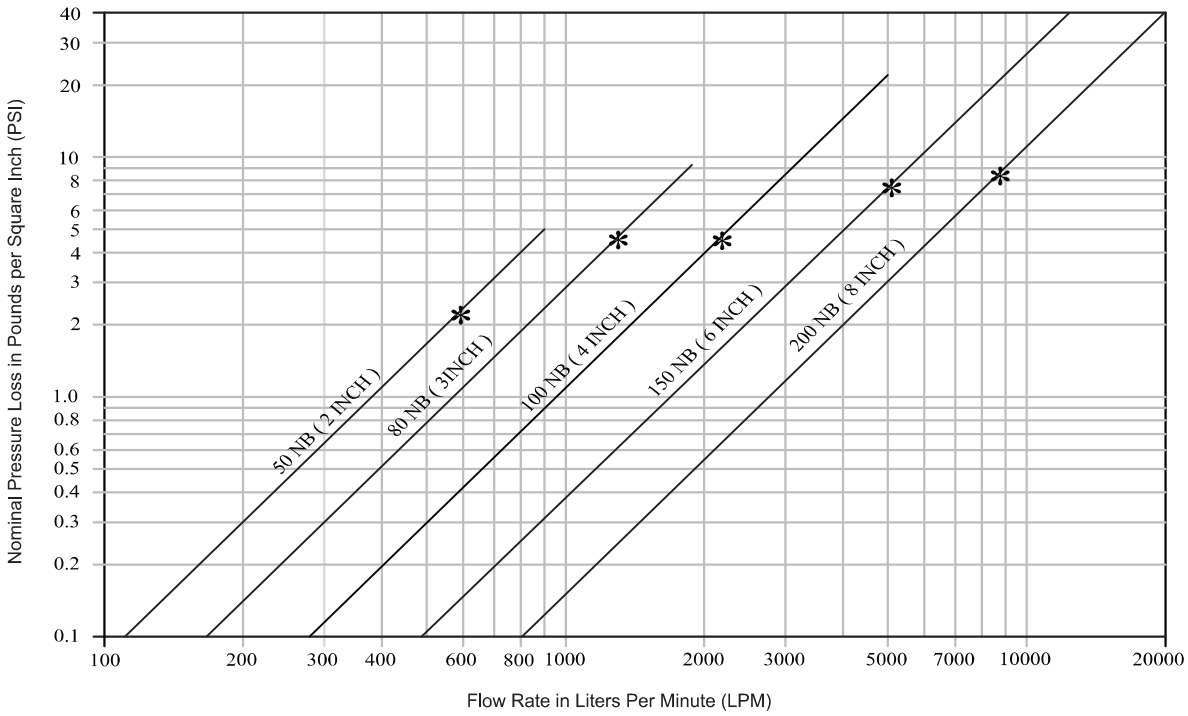


DV - 50NB



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 thru 50NB DV
* 4.7 PSI Pressure loss @ 15 feet per second (4.57 met/sec) velocity having flow of 1308 LPM thru 80NB DV
* 4.7 PSI Pressure loss @ 15 feet per second (4.57 met/sec) velocity having flow of 2255 LPM thru 100NB DV
* 7.5 PSI Pressure loss @ 15 feet per second (4.57 met/sec) velocity having flow of 5117 LPM thru 150NB DV
* 8.4 PSI Pressure loss @ 15 feet per second (4.57 met/sec) velocity having flow of 8854 LPM thru 200NB DV