



TECHNICAL DATA

**PILOT PRESSURE
REGULATED DELUGE SYSTEM
CONTROLLED BY PNEUMATIC RELEASE**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

(Refer to Figures 1, 2 or 3.)

A Viking Pilot Pressure Regulated Deluge System utilizes a Viking Flow Control Valve to control water flow into the deluge system. The flow control valve must be installed with pilot regulating deluge trim. Pneumatically operated systems require a Viking pneumatic actuator and a pneumatic detection system supplied by a dependable regulated and restricted air or nitrogen supply.

The pilot pressure regulated deluge system is recommended where it is necessary to maintain a predetermined discharge pressure after the system operates. This feature allows regulation of total system demand and can be used to limit excess flow from deluge systems with high pressure water supplies. The system is also recommended where a reduction of pressure surges and/or water hammer is desired.

2. LISTINGS AND APPROVALS



The Viking pneumatically controlled pilot pressure regulated deluge system is UL Listed on a component basis. Refer to the current UL Listing Guide. Consult the manufacturer for any component approvals too recent to appear in the UL Listing Guide.

3. SYSTEM OPERATION

(Refer to Figures 1, 2 or 3.)



A. IN THE SET CONDITION

System water supply pressure enters the priming chamber of the flow control valve (A.1) through the priming line, which includes a normally open priming valve (B.1), strainer (B.2), restricted orifice (B.3), and check valve (B.4). In the SET condition, water supply pressure is trapped in the priming chamber by the check valve (B.4) and pneumatic actuator (G.1) held closed by pneumatic pressure maintained in the pneumatic release system. The pressure in the priming chamber holds the flow control valve clapper closed, keeping the atmospheric chamber and deluge system piping dry.

B. IN FIRE CONDITIONS

In fire conditions, when a detector (G.6, G.7, or G.8) operates, or emergency release (B.11) is operated, pressure in the pneumatic release system escapes, causing the pneumatic actuator (G.1) to open. Hydraulic pressure is released from the priming chamber faster than it is supplied through restricted orifice (B.3). The flow control valve clapper opens to allow water to flow into the system piping and alarm devices (C.1, C.2).

C. PRESSURE REGULATION

When the flow control valve (A.1) operates, water released from its priming chamber enters the inlet of pilot pressure regulating valve (F.1). Sensing line (F.2) connects the deluge system piping, downstream of the flow control valve (A.1), to the outlet chamber of the pilot pressure regulating valve (F.1). When downstream pressure rises above the set point of the pilot pressure regulating valve (F.1), flow through the pilot pressure regulating valve is stopped. When downstream pressure falls below the set point, flow through pilot pressure regulating valve resumes. The regulated flow through the pilot pressure regulating valve controls the pressure in the priming chamber of the flow control valve to open or close the clapper as required to regulate downstream system pressure.

4. INSTALLATION

Systems must be installed and maintained in accordance with applicable NFPA 13, 14 & 25, local Authorities Having Jurisdiction, and Viking Technical Data referenced below.

Refer to current Viking Technical Data describing individual components of the Viking Pilot Pressure Regulated Deluge System. Technical Data describing the Viking flow control valve, the Viking pilot pressure regulating valve, the Viking speed control assembly, pilot regulating deluge trim, and other system components are packed with product and in the *Viking Engineering and Design Data* book.



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5. PLACING THE SYSTEM IN SERVICE

(Refer to Figures 1, 2 or 3.)

NOTE: FOR NEW INSTALLATIONS, OR IF ADJUSTMENT OF OPENING OR CLOSING SPEED OF THE FLOW CONTROL VALVE IS NECESSARY, OR IF DOWNSTREAM PRESSURE ADJUSTMENT IS NECESSARY, REFER TO INSTRUCTIONS PROVIDED IN TECHNICAL DATA DESCRIBING THE VIKING FLOW CONTROL VALVE, THE VIKING SPEED CONTROL ASSEMBLY, AND THE VIKING PILOT PRESSURE REGULATING VALVE.

To Return a System to Service:

1. Verify that the system has been properly drained. The system main drain (D.2) and auxiliary drain (B.6) should be open. Verify that emergency release (B.11) is closed.
2. Close the system main drain (D.2).
3. Open the air supply to the pneumatic release system. Maintain 30 PSI (2.07 bar) for system water pressures up to 175 PSI (12 bar), and at a minimum 50 PSI (3.45 bar) for system water pressures above 175 PSI (12 bar) up to a maximum of 250 PSI (17 bar)
4. Open the priming valve (B.1).
5. Open the flow test valve (B.15).
6. Partially open the main water supply control valve (D.1).
7. When full flow develops from the flow test valve (B.15), close the flow test valve.
 - a. Verify that there is no flow from the open auxiliary drain (B.6).
8. Close the auxiliary drain (B.6).
9. Fully open and secure the main water supply control valve (D.1).
10. Verify that the alarm shut-off valve (B.9) is open and that all other valves are in their normal operating position.

CAUTION: Any air in the water supply or air trapped in the priming chamber of the flow control valve may result in severe water hammer and cycling, which can cause damage to the valve, connected piping, and associated equipment.
11. To ensure smooth regulation, all air must be removed from the priming chamber of the flow control valve.
 - a. Temporarily close the three-way globe valve at the highest water gauge connection (B.12) in the flow control valve trim and remove the 1/4" plug.
 - b. Open the three-way globe valve (water will flow from the opening).
 - c. When all air has been removed, close the three-way globe valve and replace the 1/4" plug.
 - d. Open the three-way globe valve.
12. To verify downstream pressure adjustment, refer to section 7. VERIFY DOWNSTREAM PRESSURE ADJUSTMENT.

6. EMERGENCY INSTRUCTIONS

(Refer to Figures 1, 2 or 3.)

WARNING: PLACING A CONTROL VALVE OR DETECTION SYSTEM OUT OF SERVICE MAY ELIMINATE THE FIRE PROTECTION CAPABILITIES OF THE SYSTEM. PRIOR TO PROCEEDING, NOTIFY ALL AUTHORITIES HAVING JURISDICTION. CONSIDERATION SHOULD BE GIVEN TO EMPLOYMENT OF A FIRE PATROL IN THE AFFECTED AREAS. AFTER A FIRE, VERIFY THAT THE FIRE IS OUT AND THAT PLACING THE SYSTEM OUT OF SERVICE HAS BEEN AUTHORIZED BY THE APPROPRIATE AUTHORITY HAVING JURISDICTION.

1. Close the main water supply valve (D.1).
2. Open the system main drain (D.2).
3. Silence alarms (optional).
 - a. To silence the water motor alarm (C.2), close the alarm shut-off valve (B.9).

NOTE: ELECTRIC ALARMS CONTROLLED BY A PRESSURE SWITCH INSTALLED ON THE 1/2" (15 mm) NPT CONNECTION FOR NON-INTERRUPTIBLE ALARM PRESSURE SWITCH CANNOT BE SHUT OFF UNTIL THE FLOW CONTROL VALVE IS RESET OR TAKEN OUT OF SERVICE.

4. If a fixed-temperature detector (G.7, G.8) has operated or if the pneumatic release system requires repair, shut off the air supply to the pneumatic release system.
5. Open the auxiliary drain (B.6).
6. Close the priming valve (B.1).

Note: Sprinkler systems that have been subjected to a fire must be returned to service as soon as possible. The entire system must be inspected for damage, and repaired or replaced as necessary.
7. Replace any fixed-temperature detectors that have operated.
8. Replace any sprinklers and/or nozzles that have been damaged or exposed to fire conditions.



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9. Perform all maintenance procedures recommended in Technical Data describing individual components of the system that has operated.
10. Return the system to service as soon as possible. Refer to section 5. PLACING THE SYSTEM IN SERVICE.

7. VERIFY DOWNSTREAM PRESSURE ADJUSTMENT

(Refer to Figures 1, 2 or 3.)

It is recommended that the desired discharge pressure of the system be adjusted with a minimum flow of 25 GPM (95 LPM) or greater flowing through the flow control valve. For deluge systems, where flow through open sprinklers and/or nozzles is not practical, a test valve (D.5 - Model H Valve and D.4 - Model J Valve) with discharge pipe must be provided in the riser between the flow control valve (A.1) and an isolation valve (D.4 Model H Valve and D.3 - Model J Valve).

1. For deluge systems, if the use of open sprinklers and/or nozzles is not practical, CLOSE the system isolation valve (D.4 - Model H Valve and D.3 - Model J Valve) and OPEN the system test valve (D.5 - Model H Valve and D.4 - Model J Valve).
2. Open and pull the handle of the emergency release (B.11) to open the flow control valve. Establish a minimum flow of 25 GPM (95 LPM) or greater and observe the downstream pressure gauge.
3. If adjustment of the pilot pressure regulating valve is necessary, refer to instructions provided in Technical Data describing the pilot pressure regulating valve.
4. When downstream pressure adjustment has been verified:
 - a. Close the main water supply control valve (D.1).
 - b. Close the emergency release (B.11).
 - c. If closed in step 1, OPEN the system isolation valve (D.4 - Model H Valve and D.3 - Model J Valve) and close the system test valve (D.5 - Model H Valve and D.4 - Model J Valve).

NOTE: The pressure gauge (F.3) installed on outlet piping from the pilot pressure regulating valve may indicate static pressure approximately 8 to 10 PSIG higher than the outlet "set" pressure determined above. This is due to changes in flow velocity that may occur when flow through the system is stopped. Actual "set" pressure should not be affected.

5. To return the system to service, perform steps 1 through 10 of section 5. PLACING THE SYSTEM IN SERVICE.

8. INSPECTIONS AND TESTS

NOTICE: THE OWNER IS RESPONSIBLE FOR MAINTAINING THE FIRE PROTECTION SYSTEM AND DEVICES IN PROPER OPERATING CONDITION.

It is imperative that the system is inspected and tested on a regular basis in accordance with NFPA 25. Refer to INSPECTIONS and TESTS recommended in current Viking Technical Data describing individual components of the Viking Pilot Pressure Regulated Deluge System used. (See section 9 for hyperlinks to Viking Technical Data.)

The frequency of the inspections may vary due to contaminated water supplies, corrosive water supplies, corrosive atmospheres, as well as the condition of the air supply to the system. For minimum maintenance and inspection requirements, refer to NFPA 25. In addition, the Authority Having Jurisdiction may have additional maintenance, testing, and inspection requirements that must be followed.

WARNING: Any system maintenance that involves placing a control valve or detection system out of service may eliminate the fire protection capabilities of that system. Prior to proceeding, notify all Authorities Having Jurisdiction. Consideration should be given to employment of a fire patrol in the affected areas.

9. ORDERING INFORMATION

To order a complete Pneumatic Release Pilot Pressure Regulated Deluge System, order the following: Pressure Regulation Trim Package [includes Deluge Valve Conventional Trim, and Pilot Regulator Trim, as well as the Speed Control Assembly, and Pilot Pressure Regulating Valve]. Order the following separately: Flow Control Valve, Pneumatic Actuator, and Pneumatic Release Trim package.



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Flow Control Valve Part Numbers

ANGLE STYLE VALVES				
DESCRIPTION		NOMINAL SIZE	PART NUMBERS	
			Painted Red	HALAR®
Threaded NPT	Pipe O.D.		Model H-3	Model H-4
	48 mm	1½" / DN40	09894	09895Q/B
	60 mm	2" / DN50	05856C	08365Q/B
Flange/ Flange	Flange Drilling		Model H-1	Model H-2
	ANSI	3"	05914C	08366Q/B
	ANSI	4"	05911C	08367Q/B
	ANSI	6"	05908C	08368Q/B
	ANSI/Japan	4"	09037	----
	ANSI/Japan	6"	09386	----
	PN10/16	DN80	08627	08873Q/B
	PN10/16	DN100	08630	08874Q/B
PN10/16	DN150	08632	08875Q/B	
Flange/ Groove	Flange Drilling / Pipe O.D.		Model H-1	Model H-2
	ANSI / 89 mm	3"	05837C	11207Q/B
	ANSI / 114 mm	4"	05841C	11208Q/B
	ANSI / 168 mm	6"	05458C	11209Q/B
	PN10/16 / 89 mm	DN80	11658	----
	PN10/16 / 114 mm	DN100	11811	----
PN10/16 / 168 mm	DN150	05458C	11209Q/B	

STRAIGHT THROUGH VALVES				
DESCRIPTION		NOMINAL SIZE	PART NUMBERS	
			Painted Red	HALAR®
Threaded NPT	Pipe O.D.		Model J-1	Model J-2
	NPT 48 mm	1½"	12130	----
	NPT 60 mm	2"	12063	----
	NPT 65 mm	2½"	12405	12406Q/B
	BSP 48 mm	DN40	12684	----
	BSP 60 mm	DN50	12688	----
Flange/ Flange	Flange Drilling		Model J-1	Model J-2
	ANSI	3"	12016	12017Q/B
	ANSI	4"	11968	11977Q/B
	ANSI	6"	11970	11979Q/B
	ANSI	8"	11993	11994Q/B
	ANSI/Japan	4"	11975	----
	ANSI/Japan	6"	11981	----
	PN10/16	DN80	12028	12029Q/B
	PN10/16	DN100	11973	11982Q/B
	PN10/16	DN150	11971	11980Q/B
	PN10	DN200	11997	11998Q/B
	PN16	DN200	12001	12002Q/B
	Flange/ Groove	Flange Drilling / Pipe O.D.		Model J-1
ANSI / 89 mm		3"	12020	12021Q/B
ANSI / 114 mm		4"	11967	11976Q/B
ANSI / 168 mm		6"	11969	11978Q/B
PN10/16 / 89 mm		DN80	12031	12646Q/B
PN10/16 / 114 mm		DN100	11974	12647Q/B
PN10/16 / 165 mm		DN150	12642	12643Q/B
PN10/16 / 168 mm		DN150	11969	11978Q/B
Groove/ Groove	Pipe O.D.		Model J-1	Model J-2
	48 mm	1½" / DN40	12129	12131Q/B
	60 mm	2" / DN50	12061	12062Q/B
	73 mm	2½" / DN65	12407	12408Q/B
	76 mm	DN80	12731	12732Q/B
	89 mm	3" / DN80	12024	12025Q/B
	114 mm	4" / DN100	11516	11517Q/B
	165 mm	DN150	11912	11913Q/B
	168 mm	6" / DN150	11527	11528Q/B
	219 mm	8" / DN200	11019	11119Q/B

Note: When viewing this data page online, part numbers displayed in **BLUE** are hyperlinks. Clicking the part number will open the corresponding technical data page.



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Pressure Regulating Trim (Includes Conventional Trim)

Release Trim Package Part Numbers

DESCRIPTION	NOMINAL SIZE	PART NUMBER		
PRESSURE REGULATING TRIM Includes Deluge Valve Conventional Trim	Rated to 250 psi (17 bar)			
	Use with Angle Style Valves			
	Galvanized	Loose	Modular	
	1½" / DN40	----	----	
	2" / DN50	14715-1	14715-1P	
	2½" / DN65	----	----	
	3" / DN80	14716-1	14716-1P	
	4" / DN100	14717-1	14717-1P	
	6" / DN150	14718-1	14718-1P	
	Brass	Loose	Modular	
	1½" / DN40	----	----	
	2" / DN50	14715-2	14715-2P	
	2½" / DN65	----	----	
	3" / DN80	14716-2	14716-2P	
	4" / DN100	14717-2	14717-2P	
	6" / DN150	14718-2	14718-2P	
	Use with Straight Through Valves			
	Horizontal	Galvanized	Loose	Modular
		1½" / DN40	14750-1	14750-1P
		2" / DN50	14750-1	14750-1P
2½" / DN65		14751-1	14751-1P	
3" / DN80		14751-1	14751-1P	
4" / DN100		14752-1	14752-1P	
6" / DN150		14753-1	14753-1P	
8" / DN200		14714-1	14714-1P	
Vertical		1½" / DN40	14746-1	14746-1P
		2" / DN50	14746-1	14746-1P
		2½" / DN65	14747-1	14747-1P
		3" / DN80	14747-1	14747-1P
	4" / DN100	14748-1	14748-1P	
	6" / DN150	14749-1	14749-1P	
	8" / DN200	14713-1	14713-1P	
	Brass			
Horizontal	1½" / DN40	14750-2	14750-2P	
	2" / DN50	14750-2	14750-2P	
	2½" / DN65	14751-2	14751-2P	
	3" / DN80	14751-2	14751-2P	
	4" / DN100	14752-2	14752-2P	
	6" / DN150	14753-2	14753-2P	
	8" / DN200	14714-2	14714-2P	
	Vertical	1½" / DN40	14746-2	14746-2P
2" / DN50		14746-2	14746-2P	
2½" / DN65		14747-2	14747-2P	
3" / DN80		14747-2	14747-2P	
4" / DN100		14748-2	14748-2P	
6" / DN150		14749-2	14749-2P	
8" / DN200		14713-2	14713-2P	

PNEUMATIC RELEASE TRIM PACKAGES		
FINISH	PART NUMBER	
Use with Straight Through and Angle Style Valves		
	Loose	Modular
Galvanized	10809	10809-P
Brass	10811	10811-P
NOTE: Pneumatic Actuator must be ordered separately.		
Pneumatic Actuator	Model H-1	Model R-1 (corrosion resistant)
	06459B	09733

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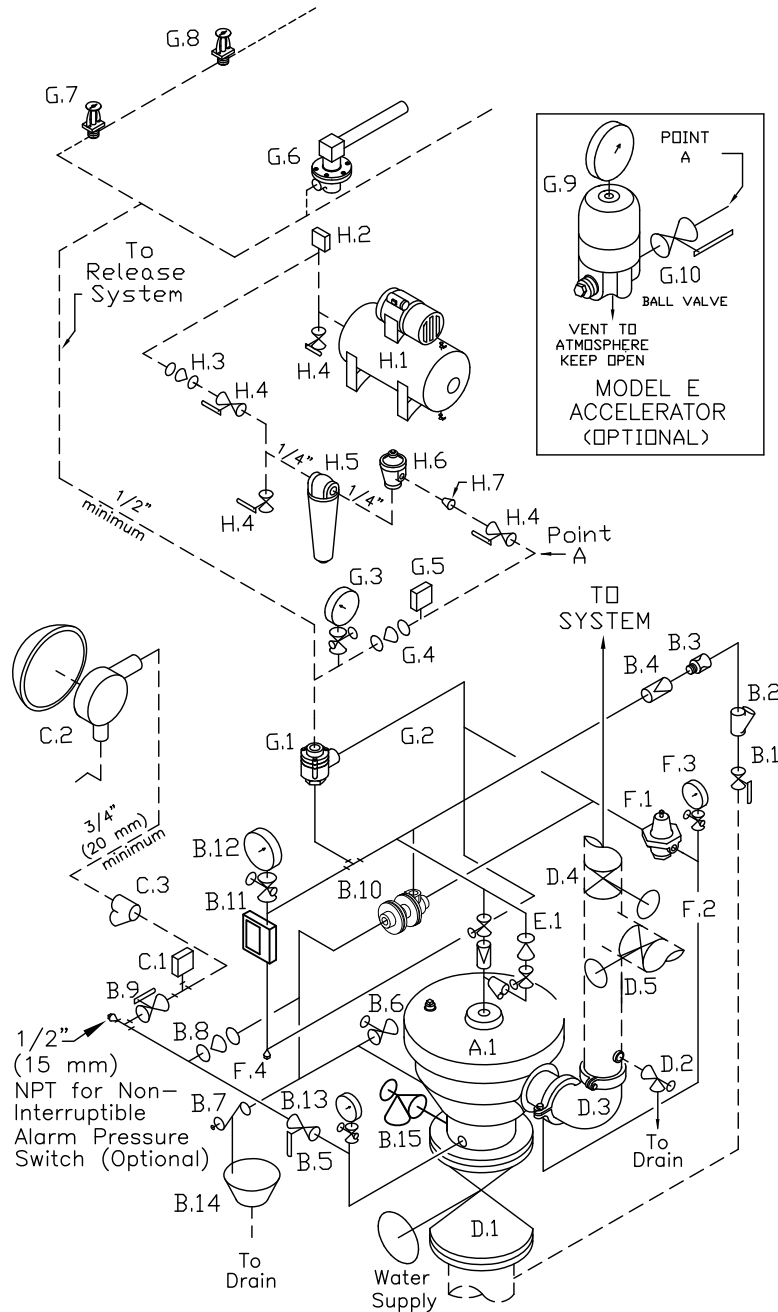


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SYSTEM COMPONENTS*

- A. Valve
 - A.1 Viking Flow Control Valve
- B. Deluge Valve Conventional Trim (See Deluge Valve Conventional Trim Charts)
 - B.1 Priming Valve (Normally Open)
 - B.2 Strainer
 - B.3 1/8" Restriction
 - B.4 Spring Loaded Check Valve
 - B.5 Alarm Test Valve (Normally Closed)
 - B.6 Auxiliary Drain Valve (Normally Closed)
 - B.7 Drip Check Valve
 - B.8 Drain Check Valve
 - B.9 Alarm Shut-Off Valve (Normally Open)
 - B.10 Pressure Operated Relief Valve (PORV)
 - B.11 Emergency Release
 - B.12 Priming Pressure Water Gauge and Valve
 - B.13 Water Supply Pressure Gauge and Valve
 - B.14 Drain Cup
 - B.15 Flow Test Valve
- C. Water Flow Alarm Equipment
 - C.1 Alarm Pressure Switch and/or
 - C.2 Water Motor Alarm (Strainer Required)
 - C.3 Strainer
- D. Riser
 - D.1 Water Supply Control Valve
 - D.2 Deluge System Main Drain Valve
 - D.3 90 Ell. (Grooved Ell Shown. Deluge Valve also available with Flanged Outlet.)
 - D.4 Optional system isolation valve (Normally Open)
 - D.5 Optional System Test Valve (Normally Closed) and discharge piping.
- E. Speed Control
 - E.1 Viking Speed Control Module (pre-assembled)
- F. Pressure Regulating Valve
 - F.1 Viking Pressure Regulating Pilot Valve
 - F.2 Pressure Regulating Pilot Valve Trim
 - F.3 Sensing Line Pressure Gauge and Valve
 - F.4 1/2" (15 mm) NPT Plug
- G. Release System
 - G.1 Pneumatic Actuator
 - G.2 Pneumatic Release Module Trim
 - G.3 Air Pressure Gauge and Valve
 - G.4 Soft Seat Check Valve
 - G.5 Air Pressure Supervisory Switch
 - G.6 Thermostatic Release and/or
 - G.7 Fixed Temperature Release and/or
 - G.8 Pilot Head (Sprinkler)
 - G.9 Accelerator (Optional. See Inset.)
 - G.10 Accelerator Isolation Valve (See Inset.)
- H. Air Supply
 - H.1 Automatic Air Supply. Air Compressor and Tank shown for clarity.
 - H.2 Air Supervisory Pressure Switch (For Compressor)
 - H.3 Soft Seat Check Valve
 - H.4 Shut Off Valve (Indicating Ball Valve recommended.)
 - H.5 Dehydrator
 - H.6 Air Maintenance Device
 - H.7 1/2" X 1/4" Reducing Coupling (Optional)

--- Dashed lines indicate pipe required but not listed in the "System" Components" Table.

* Viking Pressure Regulating Trim Packages contain items B.1 through B.15, E.1, and F.1 through F.4, and associated nipples required to install the Viking Pilot Pressure Regulating Valve on a Viking Flow Control Valve equipped with Deluge Valve Conventional Trim.

FIGURE 1: PILOT PRESSURE REGULATED DELUGE SYSTEM CONTROLLED BY PNEUMATIC RELEASE SHOWN WITH CONVENTIONAL TRIM

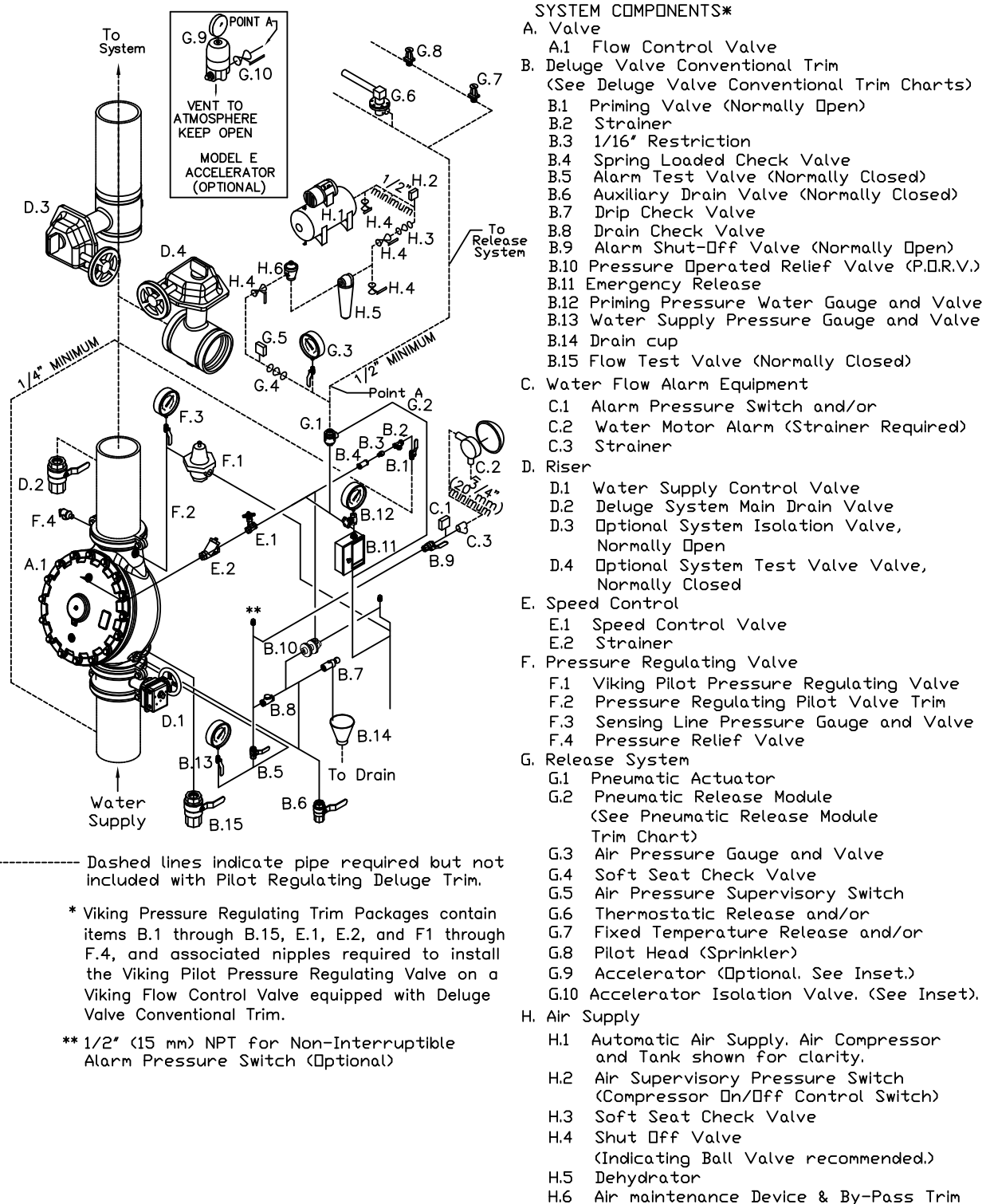
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**FIGURE 2: PILOT PRESSURE REGULATED DELUGE SYSTEM
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