VIKING®

TECHNICAL DATA

PILOT PRESSURE REGULATED FLOW CONTROL SYSTEM (ELECTRIC RELEASE)

1. DESCRIPTION

A Viking Pilot Pressure Regulated Flow Control System utilizes a Viking Flow Control Valve to control water flow into the system. The flow control valve must be installed with pilot regulating flow control trim. Release trim for electrically operated systems utilizes an electric solenoid valve controlled by an approved release control panel and compatible detection system.

The pilot pressure regulated flow control 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 flow control systems with high pressure water supplies. The system is also recommended where a reduction of pressure surges and/or water hammer is desired. A flow control system provides the ability for a remote shut-down of the system. This option is used when post operation aborts are required.

2. LISTINGS AND APPROVALS

FM APPROVED **FM Approved**

3. SYSTEM OPERATION

3.1 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 normally closed solenoid valve (G.1) in the release trim. The pressure in the priming chamber holds the flow control valve clapper closed, keeping the atmospheric chamber and flow control system piping dry.

3.2 IN FIRE CONDITIONS

In fire conditions, when the detection system (G.4) operates, the release control panel (G.3) energizes solenoid valve (G.1) open. 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).

3.3 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). The sensing line (F.2) connects the flow control 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 reduced. When downstream pressure falls below the set point, flow through the pilot pressure regulating valve increases. 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. OPERATIONAL DATA

4.1 Pressure Regulator

Discharge Pressure and Flow Ranges (when used with the Viking Model J Straight Through Flow Control Valve)

Inlet Pressure PSI (bar)		Pressure Differential PSI (bar)		Discharge Pressure Range PSI (bar)		Valve Size	Flow Range GPM (LPM)	Valve C_V 1 PSI ΔP Wide Open	Friction Loss Ft. (m)	Approvals
		Minimum	Maximum	Minimum	Maximum					
70 (4.8)	250 (17.2)	20 (1.4)	200 (13.8)	50 (3.4)	175 (12)	3" (DN75)	152-900 (575-3407)	198 GPM (750 LPM)	22 ft. (6.7 m)	FM
						4" (DN100)	50-1250 (189-4732)	416 GPM (1575 LPM)	21 ft. (6.4 m)	FM
						6" (DN150)	300-2500 (1136-9464)	884 GPM (3346 LPM)	39 ft. (11.9 m)	FM
						8" (DN200)	100-4400 (379-16656)	1500 GPM (5678 LPM)	57 ft. (17.4 m)	FM

5. INSTALLATION

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

Refer to current documentation describing individual components of the Viking Pilot Pressure Regulated Flow Control System from all manufacturers. Technical Data describing the Viking products can be found on Viking's website.

Trim

All water from the priming chamber of the flow control valve must pass through the pilot pressure regulating valve for regulation to occur. The flow control valve may be installed vertically or horizontally. The inlet, outlet, and direction of flow are clearly identified on the body casting. For proper operation and approval, the pilot pressure regulating flow control valve must be installed according to the current Viking Pilot Pressure Regulated Flow Control Valve Trim Chart and Viking schematic drawings for the pressure regulating system being installed. These trim charts and schematic drawings are provided in the pilot pressure regulating flow control valve package and in the appropriate design section of the Viking website.

1. Verify that the Viking Flow Control Valve used is trimmed according to current trim charts designed for use with the Viking Pilot Pressure Regulating Flow Control Valve.
2. Remove plastic thread protectors from the openings of the flow control valve.
3. Apply a small amount of pipe-joint compound or tape to the external threads of all pipe connections required. Take care not to allow any compound, tape, or other foreign matter inside any of the nipples or openings of the flow control valve or trim components.
4. Install the flow control valve and trim piping according to the current Viking Trim Chart provided.

6. PLACING THE SYSTEM IN SERVICE

Refer to Figure 1.

NOTE: For new installations, or if downstream pressure adjustment is necessary, refer to section 8. "Verify Downstream Pressure Adjustment".

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 the emergency release (B.10) is closed.
2. Close the system main drain (D.2).
3. Open the priming valve (B.1).
4. Reset the release control panel (G.3). The solenoid valve (G.1) should close.
5. Open the flow test valve (B.14).
6. Partially open the main water supply control valve (D.1).
7. When full flow develops from the flow test valve (B.14), 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. To remove air from the priming chamber:
    a. Remove the plug from the 1/4" ball valve (B.15).
    b. Open the 1/4" ball valve (B.15). Water will flow from the valve.
    c. After approximately 10 seconds with continuous water flow, close the 1/4" ball valve (B.15) and reinstall the plug.
    d. Repeat as necessary until all air has been removed.
12. To verify downstream pressure adjustment, refer to section 8. "*Verify Downstream Pressure Adjustment*".

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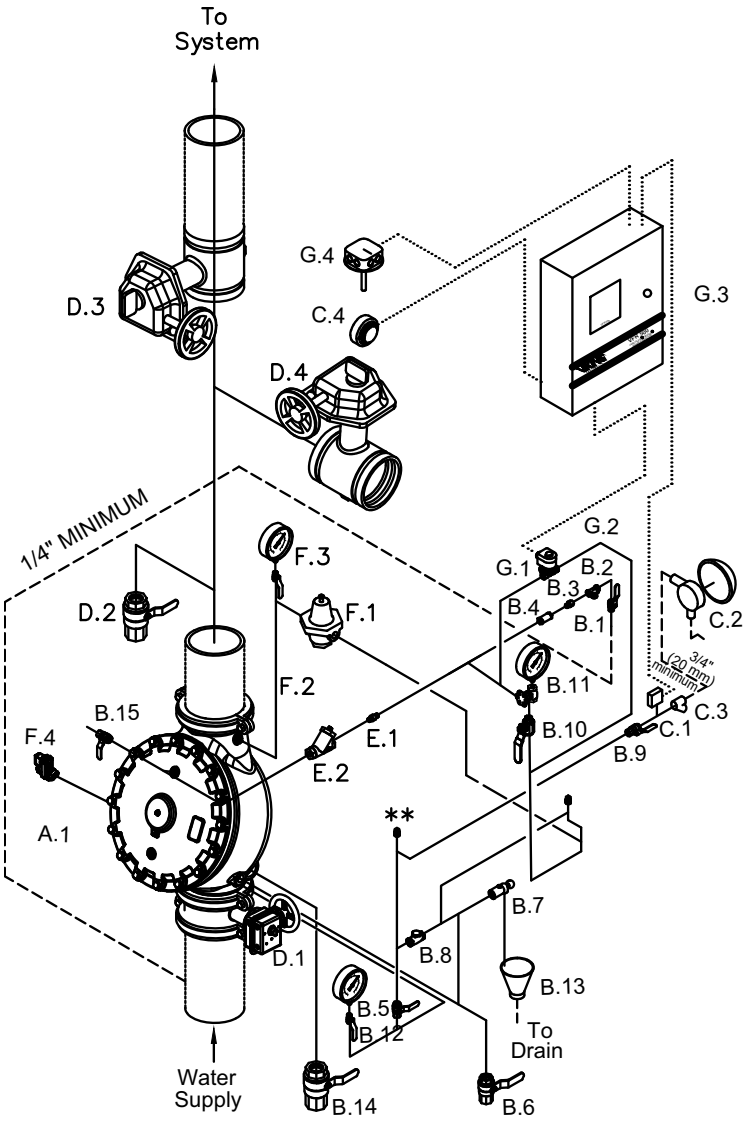

---Dashed lines indicate pipe required but not ncluded with Pilot Regulating Flow Control Trim.

·····Dotted lines indicate electrical detection system wiring required but not included with the "System Components". For additional wiring requirements refer to technical data for components used.

SYSTEM COMPONENTS*

A. Valve
- A.1 Flow Control Valve

B. Flow Control Valve Conventional Trim (See Flow Control 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 Emergency Release
- B.11 Priming Pressure Water Gauge and Valve
- B.12 Water Supply Pressure Gauge and Valve
- B.13 Drain cup
- B.14 Flow Test Valve (Normally Closed)
- B.15 Prime Vent Valve (Normally Closed)

C. Water Flow Alarm Equipment
- C.1 Alarm Pressure Switch and/or
- C.2 Water Motor Alarm (Strainer Required)
- C.3 Strainer
- C.4 Electric Alarm Bell

D. Riser
- D.1 Water Supply Control Valve
- D.2 Deluge System Main Drain Valve
- D.3 Optional System Isolation Valve, Normally Open
- D.4 Optional System Test Valve, Normally Closed

E. Speed Control
- E.1 Speed Control Orifice
- E.2 Strainer

F. Pressure Regulating Valve
- F.1 Viking Pressure Regulating Pilot Valve
- F.2 Pressure Regulating Valve Trim
- F.3 Sensing Line Pressure Gauge and Valve
- F.4 Trim Pressure Relief Valve

G. Release System
- G.1 Solenoid Valve
- G.2 Electric Release Module (See Electric Release Module Trim Chart)
- G.3 System Control Panel configured for Single Zone Deluge operation.
- G.4 Electric Detection System. Heat Detector shown for clarity.

* Viking Pressure Regulating Trim Packages contain items B.1 through B.15, E.1, E.2, and F.1 through F.4, and associated nipples required to install the Pressure Regulating Flow Control Trim on a Viking Flow Control Valve.

** 1/2" (15 mm) NPT for Non-Interruptible Alarm Pressure Switch (Optional)

Figure – 1: Pilot Pressure Regulated Flow Control System Controlled by Electric Release (Shown within Conventional Trim)

7. EMERGENCY INSTRUCTIONS

Refer to Figure 1.

To Take the System Out of Service:

⚠ 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 ½" (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. Open the auxiliary drain (B.6).
5. 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.
6. Replace any detectors that have been damaged.
7. Replace any sprinklers and/or nozzles that have been damaged or exposed to fire conditions.
8. Perform all maintenance procedures recommended in Technical Data describing individual components of the system that has operated.
9. Return the system to service as soon as possible. Refer to section 6. "*Placing the System in Service*"

8. VERIFY DOWNSTREAM PRESSURE ADJUSTMENT

Refer to Figure 1.

It is recommended that the desired discharge pressure of the system be adjusted with the minimum flow rate shown in section 4. "*Operational Data"* or greater flowing through the flow control valve.

For flow control systems, where flow through open sprinklers and/or nozzles is not practical, a test valve (D.4) with discharge pipe must be provided in the riser between the flow control valve (A.1) and an isolation valve (D.3).

1. For flow control systems, where flow through open sprinklers and/or nozzles is not practical, CLOSE the system isolation valve (D.3) and OPEN the system test valve (D.4).
2. Open and pull the handle of the emergency release (B.10) to open the flow control valve. Establish a minimum flow rate as shown in section 4. "*Operational Data"* or greater and observe the downstream pressure gauge.
3. If adjustment of the pilot pressure regulating valve is necessary, follow this procedure (refer to Figure 2):

NOTICE

Risk of permanent system damage. Adjusting the pressure too quickly may damage system components as well as associated devices. Adjust the pressure very SLOWLY as instructed in the procedure below.

   a. Loosen the locknut (1).
   b. SLOWLY Turn the adjusting screw (2) clockwise to increase pressure or counter-clockwise to decrease pressure.

⚠ WARNING

The adjustment screw must engage the spring to ensure proper operation.

   c. When desired pressure has been set, tighten the locknut (1).

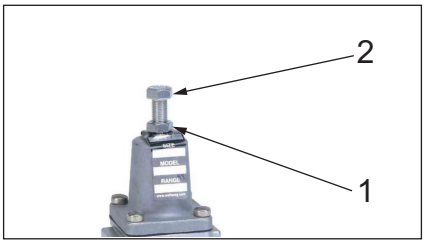

Figure – 2: Adjusting Pressure

4. When downstream pressure adjustment has been verified:
   a. Close the main water supply control valve (D.1).
   b. Close the emergency release (B.10).
   c. If closed in step 1, open the system isolation valve (D.3) and close the system test valve (D.4).

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 6. "*Placing the System in Service"*

9. INSPECTIONS AND TESTS

⚠ 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.

NOTICE

The owner is responsible for maintaining the fire protection system and devices in proper operating condition.

It is imperative that the system be inspected and tested on a regular basis in accordance with NFPA 25. Refer to “Inspections and Tests” recommended in the most current manufacturer’s documentation describing individual components of the Viking Pilot Pressure Regulated Flow Control System used.

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.

10. ORDERING INFORMATION

To order a complete Electric Release Pilot Pressure Regulated Flow Control System, order the following:

- Pressure Regulation Trim Package (includes Flow Control Valve Conventional Trim, and Pilot Regulator Trim, as well as the Pilot Pressure Regulating Valve).

Order the following separately:

- Flow Control Valve
- Solenoid Valve
- Release Control Panel
- Electric Release Trim package

11. CONTACT

The system components are available through Viking distributors only. Contact your local Viking sales office which can be found on our website:

Americas and Asia: www.vikinggroupinc.com/locations OR Europe, Middle East, Africa (EMEA): www.viking-emea.com/contact

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