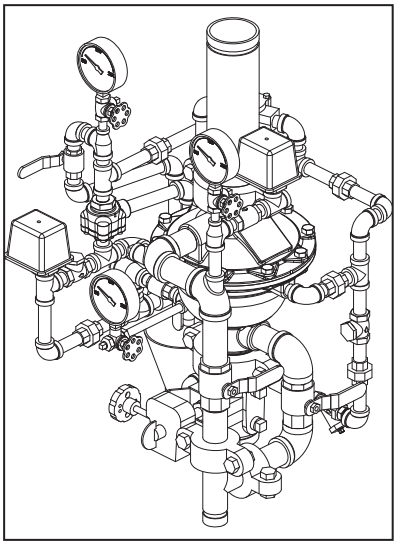
TECHNICAL DATA

3” MODEL G-3000P PREACTION WITH ELECTRIC 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



The 3” Model G-3000P Preaction System with Electric Release can be used as a Single Interlock Preaction System with Electric Release, or as a Double Interlock Preaction System with Electric/Pneu-Lectric Release. These preaction systems are commonly used where it is important to control accidental water discharge due to inadvertent damage to the sprinkler piping. The small profile, lightweight, pilot operated Viking G-3000P Valve comes complete as shown in Figure 8. **This pilot operated externally reset valve also includes an internal check diaphragm, which eliminates the need for a separate check valve being installed in the system riser.**

A. Viking Supervised Single-Interlocked Electric Release Preaction Systems Utilizing the Viking G-3000P Valve

The system piping is pressurized with air or nitrogen as required by NFPA 13 for supervisory purposes only. Viking recommends a minimum of 15 to 20 PSI (1.0 to 1.4 bar) for supervisory air pressure for single interlock systems (refer to Table 2 for double interlock systems). This feature serves to prevent undetected leaks on the system piping network. If the system piping or a sprinkler is damaged, the supervisory pressure is reduced and a “low air” supervisory alarm is activated.

Electrically released preaction systems require a 24 VDC normally closed electric solenoid valve controlled by an approved release control panel with compatible detection system. In fire conditions, when the detection system operates, the system control panel energizes the solenoid valve open. When the solenoid opens, the priming water is relieved from the internal prime chamber assembly. The prime chamber assembly collapses, and water passes through the G-3000P Valve and internal check diaphragm to the system piping network. The entire sprinkler system fills with water. The sprinkler piping will remain filled with water until a sprinkler operates.

B. Viking Supervised Double-Interlocked Electric/Pneu-Lectric Release Preaction Systems Utilizing the Viking G-3000P Valve

The system piping is pressurized with air or nitrogen to serve both as a means of supervising the integrity of the piping network and as one portion of the system release operation. This feature serves to prevent undetected leaks on the system piping network. If the system piping or a sprinkler is damaged, the supervisory pressure is reduced and a “low air” supervisory alarm is activated.

The 24 VDC normally closed electric solenoid and an additional “low air” alarm switch are connected to a compatible release control panel and compatible detection devices. The release control panel is programmed so that a signal from both a release device and the low air alarm switch must be received before the solenoid is allowed to open. The air pressure switch has two independently operating connections. The high side is wired as a low air supervisory switch, and the low side is wired as low air alarm. In fire conditions, a detection device and the low air alarm switch must operate in order to open the solenoid valve. When the solenoid opens, priming water is relieved from the G-3000P Valve’s internal prime chamber assembly. The prime chamber assembly is forced open by the system water supply and water passes through the G-3000P Valve and internal check diaphragm to the system piping network. The entire sprinkler system fills with water.

2. LISTING AND APPROVALS

cULus Listed: VLFT

FM Approved: Preaction Sprinkler Systems

Viking Technical Data may be found on The Viking Corporation’s Web site at http://www.vikinggroupinc.com. The Web site may include a more recent edition of this Technical Data Page.

3. TECHNICAL DATA

Specifications:

Pressure Rating: 250 PSI (17.2 Bar) Water Working Pressure
Factory Hydrostatically Tested to: 500 PSI (34.5 bar)
Friction Loss (Given in feet of Schedule 40 pipe based on Hazen & Williams formula: C = 120):
- Model G-3000P Valve: 17.3’
- 12” Section of Pipe: 1’
- Water Supply Control Valve: 10’

Model G-3000P Valve C_V Factor: 225
Valve Color: Black

Material Specifications:

Refer to Figure 11.

$$Q = C_V \sqrt{\frac{\Delta P}{S}}$$

Q= Flow
C_V= Flow Factor (GPM/1 PSI ΔP)
ΔP= Pressure Loss through Valve
S= Specific Gravity of Fluid

Replaces page 329a-m, dated July 1, 2011. (Revised the replacement parts list and Figure 11.)

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Table 1 - Pipe Capacity for Sizing Air Compressors

Pipe Diameter		Capacity			
US	International	Schedule 40 (1” to 6”) Schedule 30 (8”)		Schedule 10	
		Gal / Ft	L / m	Gal / Ft	L / m
1”	DN25	0.045	0.559	0.049	0.608
1-1/4”	DN32	0.078	0.969	0.085	1.043
1-1/2”	DN40	0.106	1.316	0.115	1.428
2”	DN50	0.174	2.161	0.190	2.360
2-1/2”	DN65	0.248	3.080	0.283	3.515
3”	DN80	0.383	4.756	0.434	5.390
3-1/2”	DN90	0.513	6.370	0.577	7.165
4”	DN100	0.660	8.196	0.740	9.190
5”	DN125	1.040	12.915	1.144	14.206
6”	DN150	1.501	18.640	1.649	20.477
8”	DN200	2.660	33.032	2.776	30.472
For Metric Units 1 Ft. = 0.3048 M, 1 Gal. = 3.785L					

Ordering Information:
Available since 2010
Part Number: Electric Release Preaction System Riser Assembly - 16190-1 (Refer to Figure 8.)
Accessories: (See Figure 9.)
Drain Manifold: 16212
Model E-1 Accelerator: 08055
Model LD-1 Anti-Column Device: 14800

Table 2 - Air Pressure Settings

	Single Interlock	Double Interlock
For Systems with Tank Mounted Compressors:		
Air Maintenance Device	20 PSI (1.4 bar)	30 PSI (2.1 bar)
Air Pressure Supervisory Switch	15 PSI (1.0 bar)	25 PSI (1.7 bar)
Low Air Alarm Switch	--	20 PSI (1.4 bar)
For Systems with Riser Mounted Compressors:		
Compressor On/Off Switch	15 PSI (1.0 bar) / 25 PSI (1.7 bar)	30 PSI (2.1 bar) / 40 PSI (2.8 bar)
Air Pressure Supervisory Switch	10 PSI (0.7 bar)	25 PSI (1.7 bar)
Low Air Alarm Switch	--	20 PSI (1.4 bar)

Table 3 - Quick Reference Compressor Size

Compressor Size (HP)	Free Air @ 40 PSI (2.8 bar) (cfm)	Max System Size to Pump to 40 PSI (2.8 bar) in 30 Minutes (Gal)
1/6	1.0	90
1/3	2.0	180
1/2	3.1	300
1	5.9	600

4. INSTALLATION:

A. General Installation Instructions

1. For proper operation and approval, the valve must be installed in the vertical position as trimmed from the factory. DO NOT modify the factory assembled trim except as described in this technical data sheet.
2. A 12” section of pipe is provided with the G-3000P Electric Release Preaction System Riser Assembly. Prior to valve maintenance, this section of pipe may be removed to provide clearance for lifting the cover from the body.
3. The G-3000P Valve must be installed in an area not subject to freezing temperatures or physical damage. If required, provide a valve house (enclosure) with adequate heat around the valve and trim. Freezing temperatures will damage the G-3000P Valve. When corrosive atmospheres and/or contaminated water supplies are present, it is the owner’s responsibility to verify compatibility with the Model G-3000P Valve and associated equipment.
4. The Viking Model E-1 Accelerator should be installed at the location indicated in Figure 1 when required. Note: The accelerator would only be used for double interlock systems.

B. Air Supply Design

1. Air Compressor Size

Viking recommends a minimum of 15 to 20 PSI (1.0 to 1.4 bar) of supervisory pressure be established within the piping network for single interlock systems (refer to Table 2 for double interlock systems). While lower pressures are allowed by NFPA 13 for single interlock preaction systems, maintaining higher air pressure within the system will assist maintenance personnel in finding and isolating inadvertent or accidental leaks within the system quickly.

NFPA 13 requires that the air supply be capable of filling the entire sprinkler system to its required air pressure within 30 minutes. A common method of sizing an air compressor is to use the following formula:

$$\text{Compressor Size (cfm)} = \frac{V \times P}{7.48 \times 14.7 \times T}$$

Where:
V = Volume
P = Required Air Pressure
T = Fill time (typically 30 min.)
7.48 = gal. / ft.^{3}
14.7 = atmospheric pressure

Example:
System volume as determined by table 1 = 750 gallons
Required Air pressure = 20 PSI (1.4 bar) (Single Interlock System)

$$\text{Compressor Size (cfm)} = \frac{(750 \times 20)}{7.48 \times 14.7 \times 30} = 4.5 \text{ cfm}$$

Therefore, the compressor shall be capable of providing 5 cfm.

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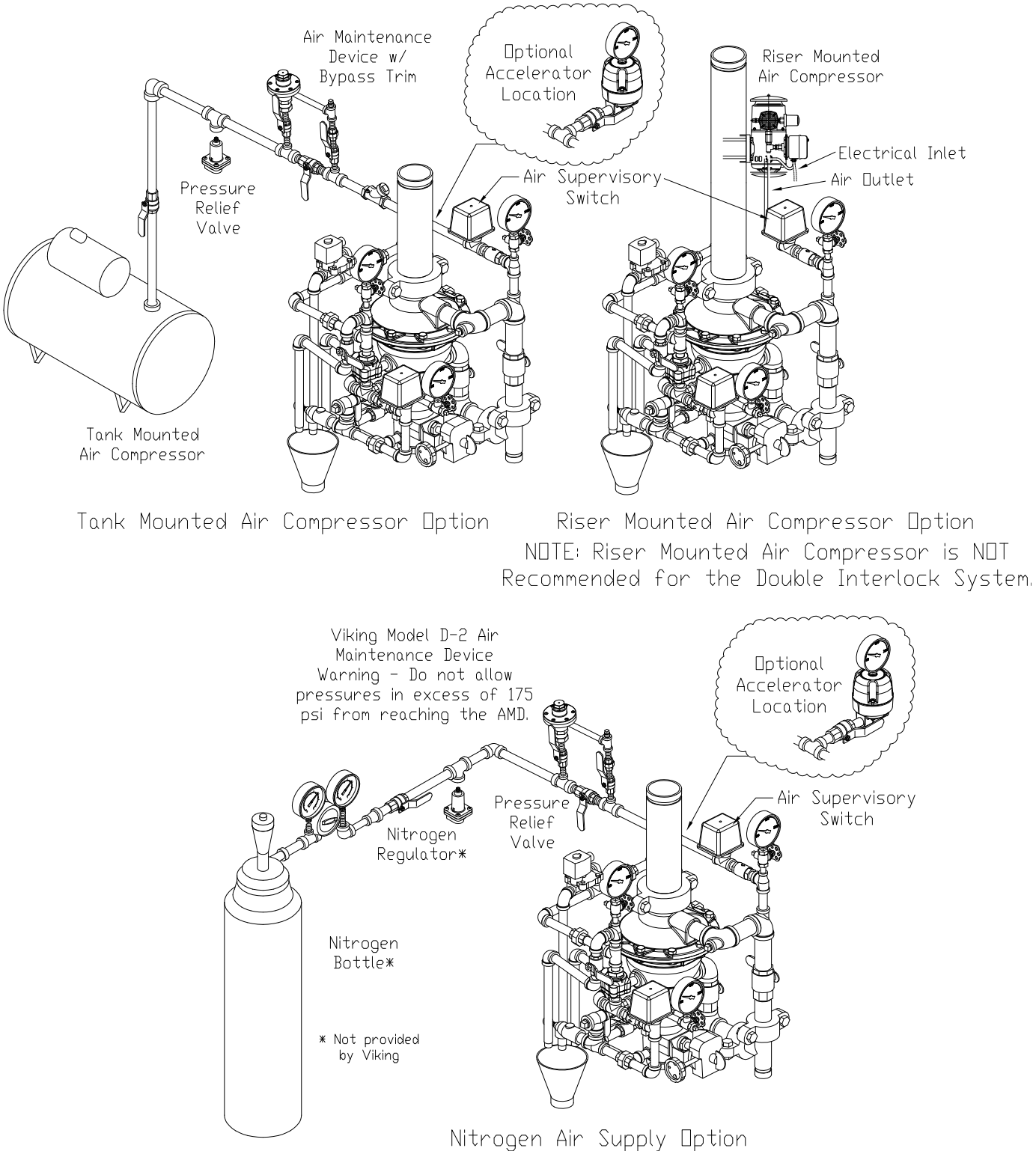

Figure 1 - Air Supply Options

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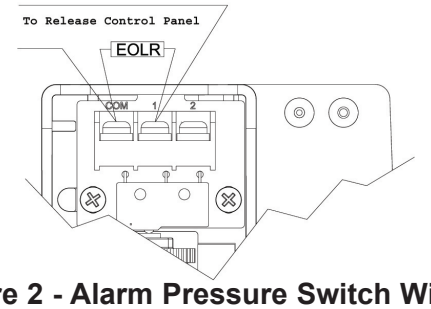
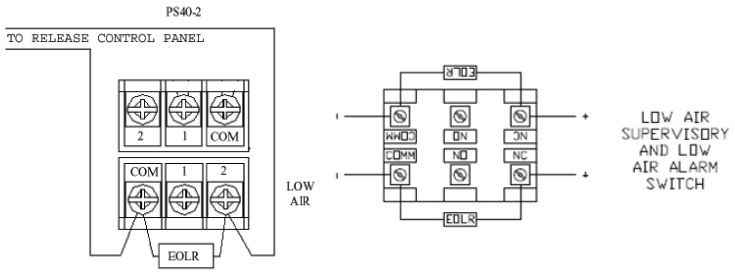
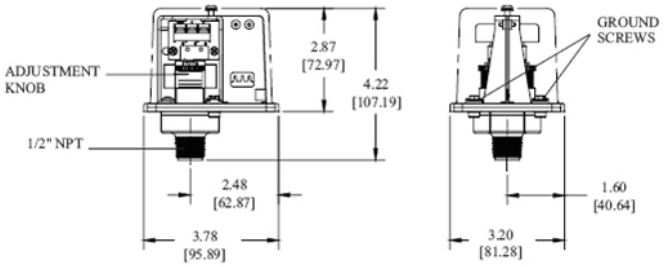


Figure 2 - Alarm Pressure Switch Wiring
(Alarm Pressure Switch should be set to 5 PSI (0.34 bar)



Single Interlock **Double Interlock**

Figure 3 - Air Supervisory Switch Wiring



FIELD ADJUSTMENTS:

Alarm Pressure Switch: The operating point of the switch can be adjusted to any point between 4 PSI (0.27 bar) and 8 PSI (0.55 bar) by turning the adjustment knob(s) clockwise to raise the actuation point or counter-clockwise to lower the actuation point.

Air Supervisory Switch: The operating point of the switches can be adjusted to any point between 10 PSI (0.7 bar) and 60 PSI (4.1 bar) by turning the adjustment knob(s) clockwise to raise the actuation point or counter-clockwise to lower the actuation point. The high and low switches are adjusted independently.

Figure 4 - Pressure Adjustment

NOTE: Viking recommends tank-mounted air compressors for Double Interlock Electric/Pneu-Lectric Release Preaction Systems.

2. Nitrogen Cylinder Gas Supply (See Figure 1)

Nitrogen may be used in place of air compressors. Nitrogen is supplied in pressurized cylinders in various sizes and pressures. Some of the most common are 122 Cu. Ft. at 1,900 PSI (3,455 L at 131 bar), 225 Cu. Ft. at 2,100 PSI (6,372 L at 145 bar), and 280 Cu. Ft. at 2,300 PSI (7,930 L at 159 bar).

When nitrogen cylinders are used as a primary air supply, spare cylinders should be furnished and located at the valve location. To determine the approximate amount of nitrogen to be furnished, the following formula may be used:

English Units

$$Vc = \frac{Vs \times P}{100}$$

Where:
Vc = Volume of Cylinder (ft^3)
P = Required Nitrogen Pressure (PSI)
V = Volume of System (gal)

Metric Units

$$Vc = \frac{Vs \times P}{108}$$

Where:
Vc = Volume of Cylinder (L)
P = Required Nitrogen Pressure (bar)
V = Volume of System (L)

Special attention must be given to systems employing a bottled-gas supply. Because only a limited amount of gas is available, small leaks (which normally would go unnoticed in systems being supplied by mechanical compressors) can become critical to the system's overall performance. If the system is to function at temperatures as low as -40 °F (-40 °C), and, if bottled nitrogen is the gas supply, the system is particularly susceptible to leakage, and special care should be taken to ensure against leaks throughout the entire system.

C. Air Supply Installation

1. Install the required air supply as described in section 4.B. The size of the compressor and amount of air required should be determined in accordance with Tables 1 - 3. The air or nitrogen supply to the preaction system must be clean, dry, and oil free.
2. Automatic air supplies must be regulated, restricted, and from a continuous source. A Viking air maintenance device should be installed on each system equipped with a tank-mounted compressor, plant air, or nitrogen. For compressors with a capacity less than 5.5 ft^3/min at 10 PSI (0.154 m^3/min at 0.69 bar), NFPA 13 does not require an air maintenance device. In addition, an air maintenance device should not be used with riser-mounted compressors as this can lead to compressor "short cycling". Viking recommends that a tank-mounted compressor with air maintenance device be used. This can become critical when accelerators are installed on the system.

D. Pressure Switch Wiring;

Wire the Alarm Pressure Switch (PS10) and Air Supervisory Switch (PS40), and adjust pressure settings as shown in Figures 2 - 4.

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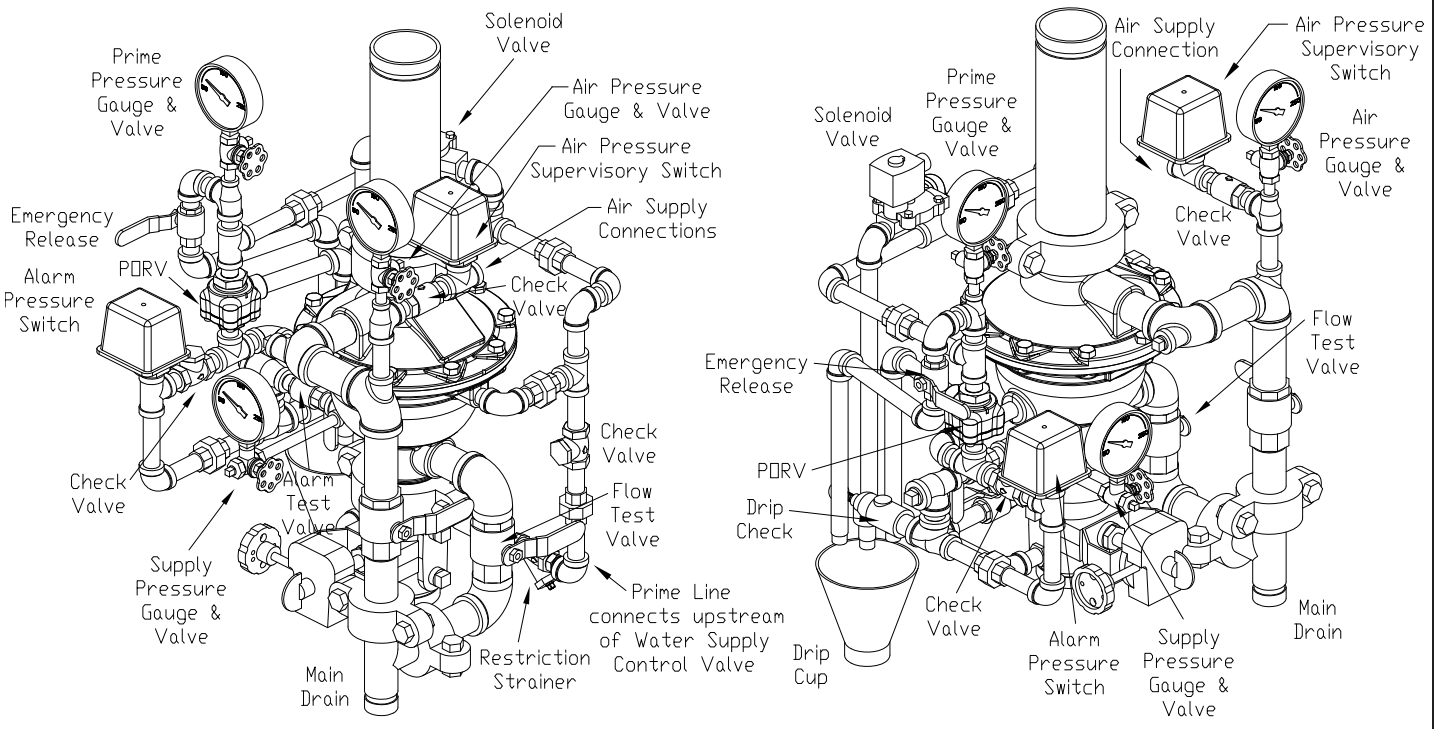

Figure 5 - Trim Components

E. Hydrostatic Test:

The Preaction System, including Sprinkler Piping and Sprinklers, shall be hydrostatically tested at 200 PSI (13.8 bar) and maintained for 2 hours, in accordance with NFPA 13. Systems normally subjected to working system pressures in excess of 150 PSI (10.3 bar) shall be tested at a pressure of 50 PSI (3.4 bar) in excess of system working pressure.

F. Placing the Valve in Service: (Refer to Figure 5.)

When the Preaction System is ready to be placed in service, verify that the electric release system has been reset and is in a normal condition.

1. Verify that the water supply main control valve supplying the G-3000P Valve is closed.
2. Close the prime valve.
3. Open the main drain valve.
4. Open the flow test valve.
5. Drain all water from the preaction system. If the system has operated, or if water has entered the system, allow enough time to completely drain the system.
6. Close the main drain valve.
7. Open the priming valve. Prime water pressure will enter and expand the valve's internal diaphragm assembly onto the valve seat, effectively closing the valve. Verify prime pressure has been established on the prime pressure gauge.
8. Establish air pressure on the system.
9. When the priming pressure has been verified as being established, slowly open the water supply control valve.
10. When flow is developed from the flow test valve, CLOSE the flow test valve.
11. Fully open the water supply main control valve.
12. Verify that no water flows from the drip check when the plunger is pushed.
13. Secure all valves in their normal operating position.
14. Reset the release control panel to clear any supervisory alarms.
15. Notify Authorities Having Jurisdiction and those in the affected area that the system is in service.
16. The system is now fully operational.

G. Operational Test:

An operational test shall be performed on the system in accordance with NFPA 13. Refer to Section 6 for Inspection and Operation Test Procedures.

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5. OPERATION

A. In the Set Position:

Air pressure is introduced into the sprinkler piping for supervisory purposes only for single interlock systems. For double interlock systems, air pressure is used for supervisory purposes and as one of the two initiation actions of the cross-zoned solenoid. Prime water is routed to the normally closed solenoid valve, and to the prime chamber. When prime water enters the prime chamber, the prime chamber assembly is pressurized, causing it to expand downward onto the water seat.

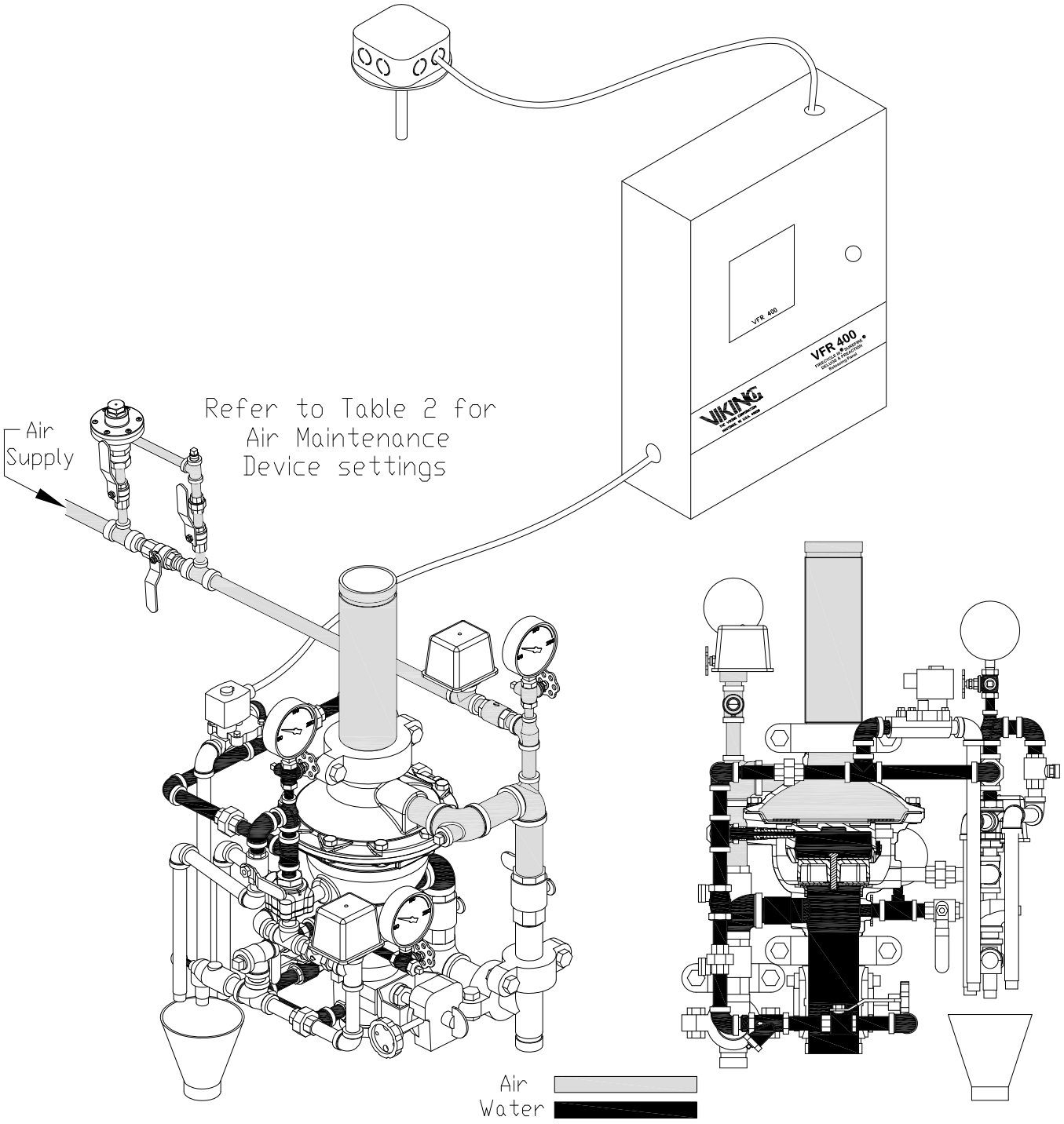

Figure 6 - Set Position

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B. Activation of Release System (Single Interlock System):

When the detection system operates, the normally closed solenoid valve is powered open. Prime water is drained from the prime chamber, causing the G-3000P Valve to open, filling the sprinkler piping with water. Water from the intermediate chamber of the G-3000P Valve pressurizes the sensing end of the PORV, causing the PORV to open. The open PORV prevents water pressure from building in the prime chamber should the solenoid close.

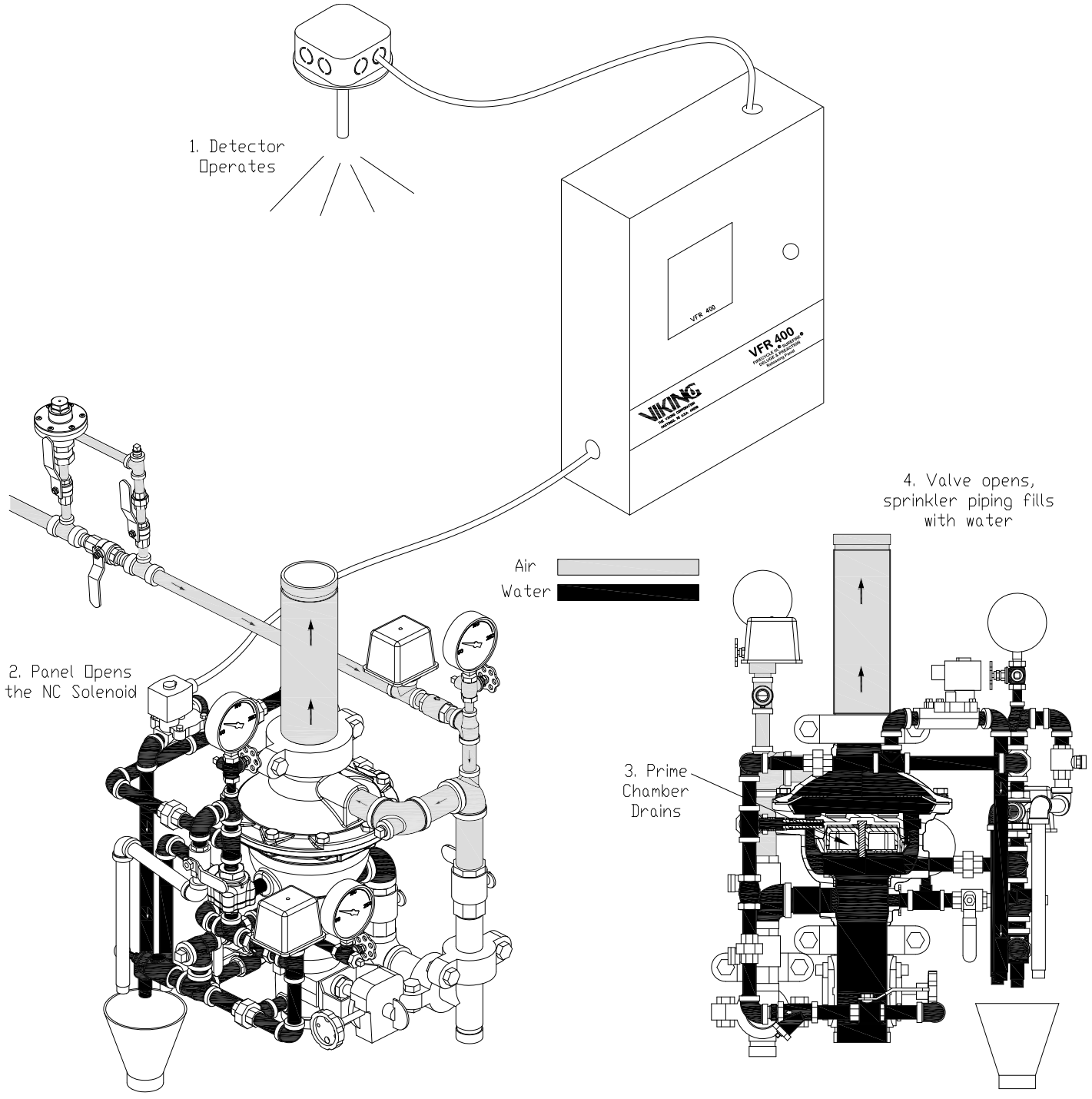

Figure 7a - Activation of Release System - Single Interlock System

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C. Fire Condition (Double Interlock System):

In a fire condition, operation of the detection system activates the first initiating circuit in the release control panel, causing an alarm to activate. When a sprinkler operates, air pressure escapes from the sprinkler piping. The air supervisory switch activates the second initiating circuit in release control panel. When BOTH initiating circuits have been activated, the release control panel energizes the solenoid valve open. With the solenoid valve open, prime water is drained from the prime chamber, causing the G-3000P Valve to open, filling the sprinkler piping with water. Water from the intermediate chamber of the G-3000P Valve pressurizes the sensing end of the PORV causing the PORV to open. The open PORV prevents water pressure from building in the prime chamber should the solenoid close.

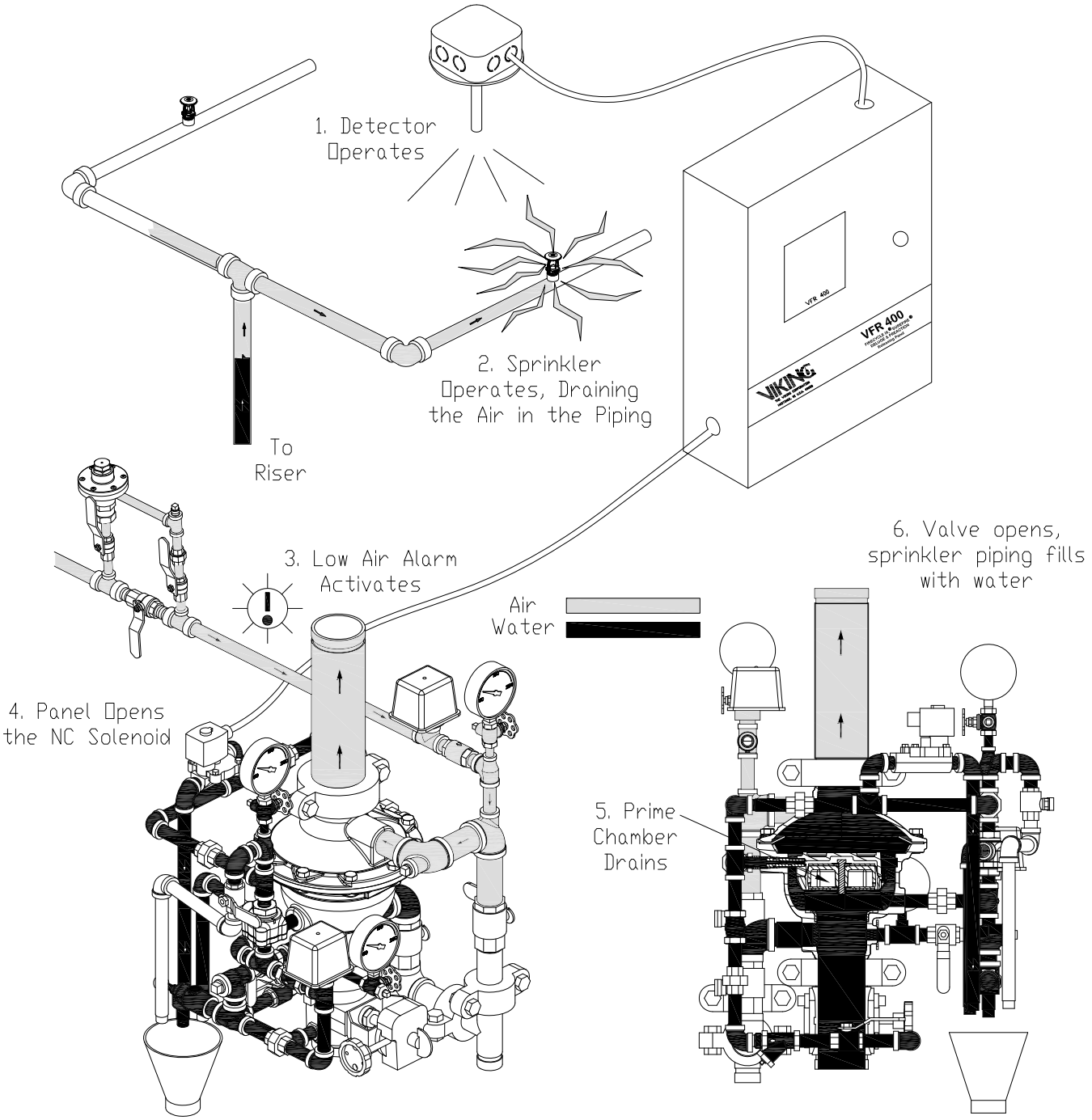

Figure 7b - Fire Condition - Double Interlock System

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6. INSPECTION AND OPERATIONAL TEST

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.

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. Viking does not require internal inspection of the valve as part of routine inspection and testing. Internal maintenance is generally only required for valve repairs and internal component replacement.

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.

A. Low Air Pressure Alarm Test: (Refer to Figure 5.)

Quarterly testing of low air alarms is recommended.

To Test Sprinkler System "Low Air Supervisory" Alarm:

1. To prevent operation of the G-3000P Valve and filling the system with water during the test, DO NOT operate the electric detection system during the test. Consider closing the main water supply control valve.
2. Partially open the sprinkler system main drain or test connection.
3. Verify that low air alarms operate within an acceptable time period and continue without interruption.
4. Close the main drain or test connection.
5. Establish supervisory air pressure to the recommended pressure.
6. Reset the system release control panel. The supervisory alarms should stop.

When testing is complete, return the system to service following steps 1 through 8 below.

B. Full Flow Trip Test: (Refer to Figure 5)

Performance of a trip test is recommended annually during warm weather. Consider coordinating this test with operation testing of the detectors.

CAUTION! PERFORMANCE OF THIS TEST WILL CAUSE THE G-3000P VALVE TO OPEN AND THE SPRINKLER SYSTEM TO FILL WITH WATER.

To Trip Test the Electrically Controlled Preaction System:

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. Trip the G-3000P Valve by performing option "a" or "b" below.
   a. Operate the electric release control system according to the manufacturer's instructions (for the single interlock or double interlock system) and open the sprinkler system test connection (for double interlock systems).
   b. Operate the emergency release valve.
3. The G-3000P Valve should open, filling the sprinkler system with water. Water flow alarms should operate.
4. Open the sprinkler system main drain valve or sprinkler system test valve to verify adequate flow.

When Trip Testing is complete:

5. Perform steps 1 through 16 of section 4.F - PLACING THE SYSTEM IN SERVICE to return the system to service.
6. Notify the Authority Having Jurisdiction and those in the affected area that testing is complete.

7. MAINTENANCE

Viking does not require an internal inspection of the G-3000P Valve unless there is an indication of damage to internal components.

A. Taking the system out of service: (Refer to Figure 5.)

1. Close the water supply main control valve, placing the system out of service.
2. Open the flow test valve located in the base of the G-3000P Valve.
3. Close the air (or nitrogen) supply to the preaction system piping.
4. Close the priming valve
5. Relieve all air pressure from the preaction system piping. If the system has operated, open the main drain valve to allow the system to drain completely.

B. Removing the Cover from the Body: (Refer to Figures 1 & 11.)

1. Remove the 3" grooved coupling from the top of the G-3000P Valve.
2. Remove the 12" section of pipe directly above the G-3000P Valve.
3. Remove the air supply line from the air supervisory switch.
4. Remove the 1-1/4" grooved coupling below the main drain.

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5. Remove the 10 cover screws (8).
6. The cover and trim that is still connected may now be removed from the valve body. (It may be necessary to pry the valve open as the diaphragm may bond itself to the cover and body over time.)

C. Removing / Replacing the Check Diaphragm: (Refer to Figure 11.)

1. The check diaphragm (7) may be lifted from the valve body (1).
2. If necessary, replace the check diaphragm (7).

D. Inspecting the Prime Chamber and Coupling for Leaks: (Refer to Figure 5.)

If desired, it is possible to set the G-3000P Valve and inspect for leaks with the cover removed.

1. Slowly open the prime valve.
2. With prime water established, partially open the main water supply control valve.
3. Visually inspect the inside of the G-3000P Valve for leaks.
4. Close the water supply control valve.

E. Removing / Replacing the Prime Coupling: (Refer to Figure 11.)

1. Open the 1/2” union on the prime line.
2. Using a wrench on the flats of the coupling (6), remove the coupling (6) from the valve body (1).
3. Inspect the coupling (6) and O-rings (5). Replace if necessary, using the instructions in O-Ring Replacement Bulletin F_ 120611.

F. Removing / Replacing the Prime Chamber Assembly: (Refer to Figure 11.)

1. The prime chamber assembly (4) is now held in place by two flanges on the outside diameter of the assembly. Slide the prime chamber assembly (4) toward the prime line and remove from the body (1).
2. Inspect and replace if necessary.
3. Inspect the seat. The seat should be clean and free of foreign material. If the seat is damaged, the G-3000P Valve must be replaced.

G. Re-Assembling the Valve: (Refer to Figure 11)

1. Place the prime chamber assembly (4) in the valve body (1). Make sure the two flanges are positioned in the groove.
2. Thread the prime coupling (6) into the valve body (1). Make sure the end of the prime coupling (6) is inserted into the prime chamber assembly (4).
3. Lay the check diaphragm (7) into the valve body (1).
4. Position the cover onto the valve body (1), and install and tighten the cover screws (8).
5. Re-install any trim that was removed.
6. Place the valve in service by following the steps in Section 4.F.

8. AVAILABILITY

The Viking Model G-3000P Valve is available through a network of domestic and international distributors. See the Viking Corp. Web site for closest distributor or contact The Viking Corporation.

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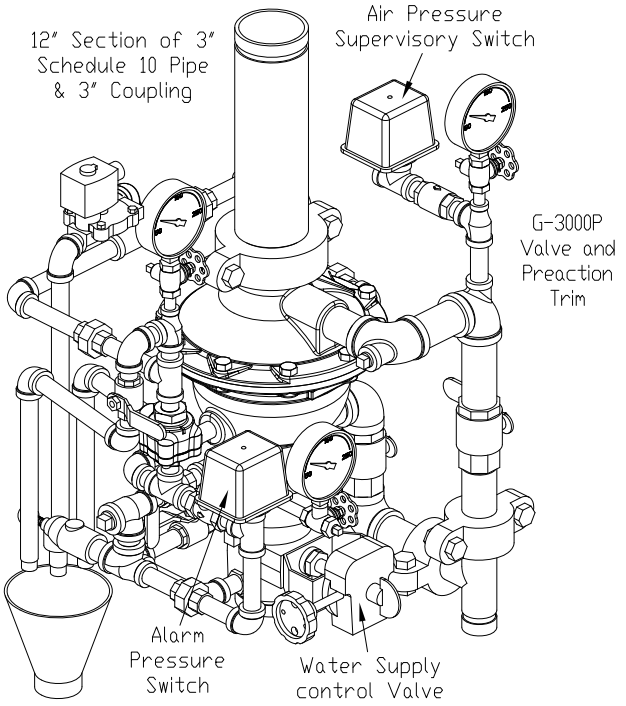
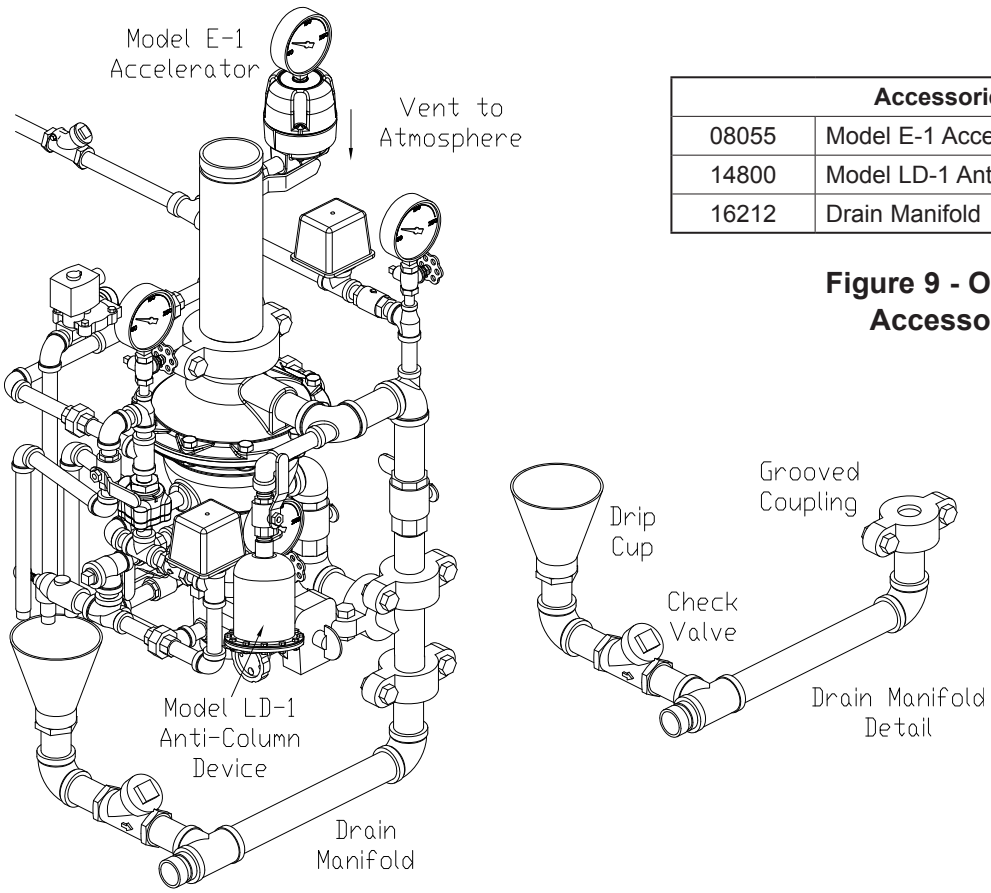


Part Number 16190-1:	
1	Model G-3000P Valve
1	Model G-3000P Electric Release Trim (Includes NC Solenoid)
1	12" Section of Schedule 10 Pipe and Coupling
1	Air Pressure Supervisory Switch (PS40-2A)
1	Alarm Pressure Switch (PS10-2A)
1	Water Supply Control Valve

Figure 8 - 16190-1 Assembly



Accessories:	
08055	Model E-1 Accelerator
14800	Model LD-1 Anti-Column Device
16212	Drain Manifold

Figure 9 - Optional Accessories

VIKING®

TECHNICAL DATA

3” MODEL G-3000P PREACTION WITH ELECTRIC 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

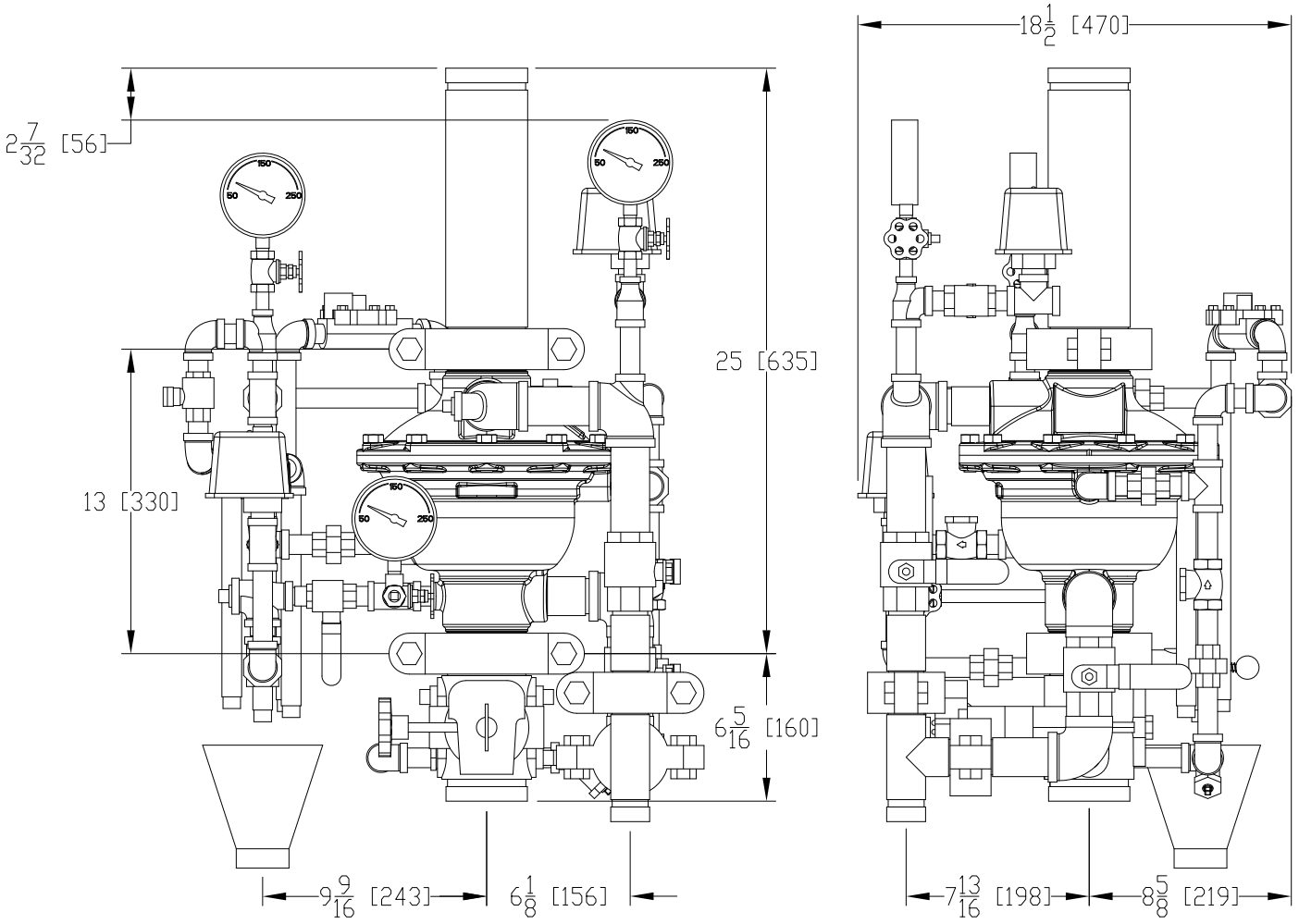


Figure 10 - Installation Dimensions

TECHNICAL DATA

3” MODEL G-3000P PREACTION WITH ELECTRIC RELEASE

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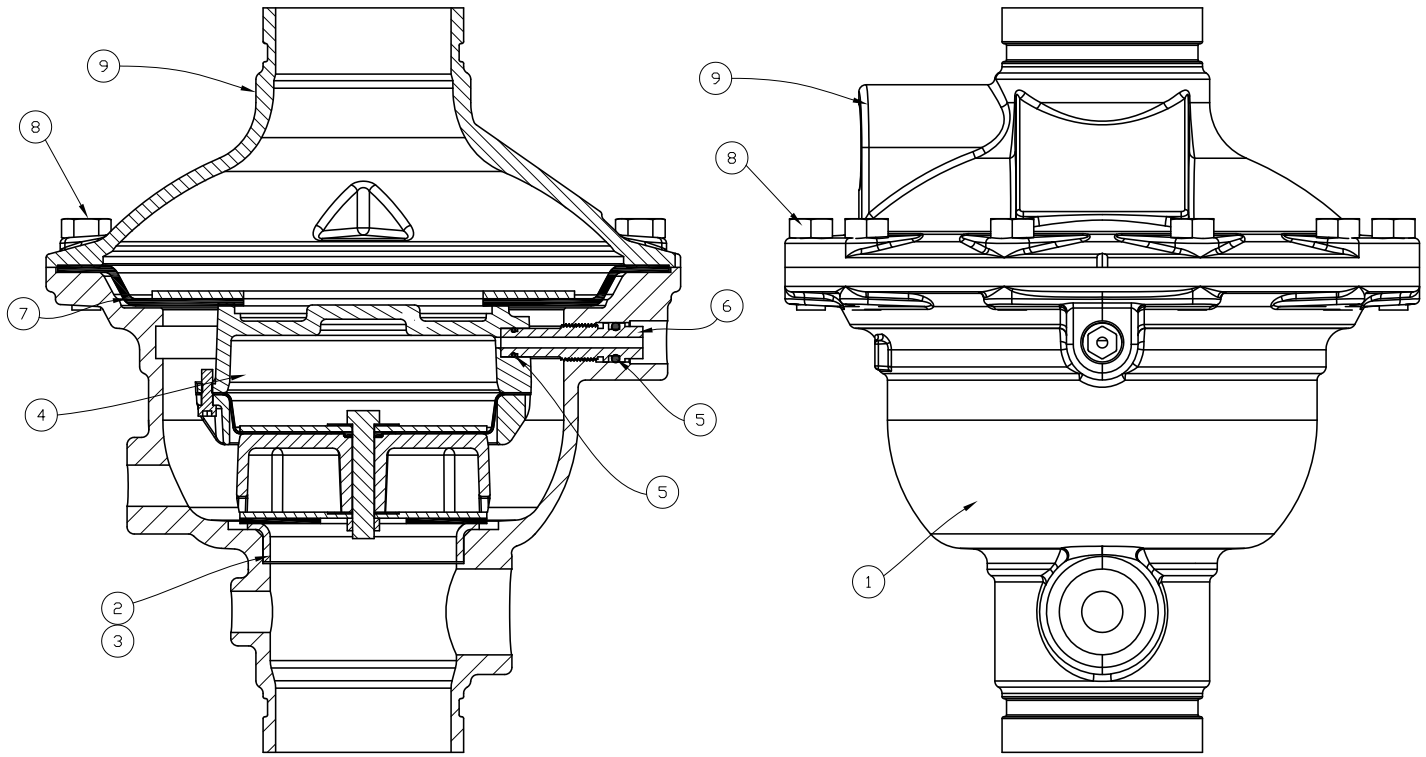

Figure 11 - Model G-3000P Valve Components List/Replacement Parts

Item Number	Part Number	Description	Material	Number Required
1	--	Body	65-45-12 Ductile Iron	1
2	--	Seat	UNS-C11000 Copper or UNS-S30400 Stainless Steel	1
3	--	Anaerobic Adhesive	--	1
4	16075	Prime Chamber Assembly	Brass, EPDM, Nitrile, 304 Stainless Steel, Bronze Alloy	1
5	*	O-Rings	EPDM and Nitrile	2 or 3**
6	16074	Coupling	UNS-S17400 Stainless Steel	1
7	15941	Check Diaphragm	EPDM	1
8	08081	1/2-13 x 1-1/4” HHS	UNS-S30400 Stainless Steel	10
9	--	Cover	65-45-12 Ductile Iron	1
10	--	Data Plate	Aluminum	2
11	--	Tack	Alloy Carbon Steel	4
-- Replacement part is not available. * Indicates part available only in a Sub-Assembly, as indicated below.				
Sub-Assembly				
5	17444	O-Ring Replacement Kit **(**Refer to O-Ring Replacement Bulletin Form No. F_120611 for instructions.)**		

Replaces page 329a-m, dated July 1, 2011. (Revised the replacement parts list and Figure 11.)