



TECHNICAL DATA

MODEL VXD DOUBLE INTERLOCKED PREACTION SYSTEM WITH ELECTRIC/PNEU-LECTRIC 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
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1. INTRODUCTION

Viking VXD Double Interlocked Preaction Systems with Electric/Pneu-Letric release utilize a Viking deluge valve, pneumatic supervision of the automatic sprinkler system via pressurized air/nitrogen, and an electric detection system. The deluge valve release trim utilizes a normally closed electric solenoid valve controlled by an approved release control panel with two initiating circuits configured for "cross-zoned" operation. One initiating circuit is connected to the electric detection system; the other to a "low-air" supervisory switch.

BOTH the electric detection system must activate AND air/nitrogen pressure must be relieved from the sprinkler system before the deluge valve will open to fill the sprinkler system with water. If the electric detection system (alone) operates, an alarm will activate but the deluge valve will NOT open. If the sprinkler piping is damaged or a sprinkler is broken or fused, but the detection system has not activated, an alarm will activate, but the deluge valve will NOT open.

In fire conditions, after both the detection system and a sprinkler operate, the deluge valve opens, allowing water to enter the system.

Electric/pneu-lectric double interlocked preaction systems are commonly used as refrigerated area systems. They are also commonly used where flooding of the sprinkler system piping can have serious consequences and where it is important to control accidental water discharge due to damaged sprinkler piping.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

2. LISTINGS AND APPROVALS



cULus Listed - Categories VLFT and VLFT7



FM Approved - Viking Electric/Pneu-Letric Double-Interlocked Preaction Systems are Factory Mutual (FM) Approved as refrigerated area systems.

3. ORDERING INFORMATION

The Model VXD Double-Interlock Preaction System with Electric/Pneu-Letric Release is available in Pre-Trimmed Riser (PTR) assembly, Pre-trimmed (PT), or loose configurations with optional accessories to complete the system.

Pre-Trimmed Riser (PTR)

Pre-Trimmed Riser packages come completely assembled and ready to install. These packages include the Model VXD deluge valve with trim, a riser check valve, additional components as shown below, and come with galvanized pipe and groove/groove connection only.

The Pre-Trimmed Riser packages include the following components:

- Model VXD valve
- Riser check valve
- completely assembled trim
- electric release solenoid
- water supply control valve
- pressure gauges for air and water
- grooved couplings
- water flow and air supervisory pressure switches
- complete drain manifold with hoses and drain cup

**Table 1: Pre-Trimmed Riser (PTR)
 Model VXD Double Interlock Preaction System
 with Electric/Pneu-Letric Release (Vertical)**

Nominal Size (inch)	Part Number	Notes
1½	24887	Pre-Trimmed Riser assemblies include galvanized trim components and grooved pipe connections.
2	24897	
2½	25465	
3	25398	
4	25413	
6	25439	
8	25499	
10	Not available	

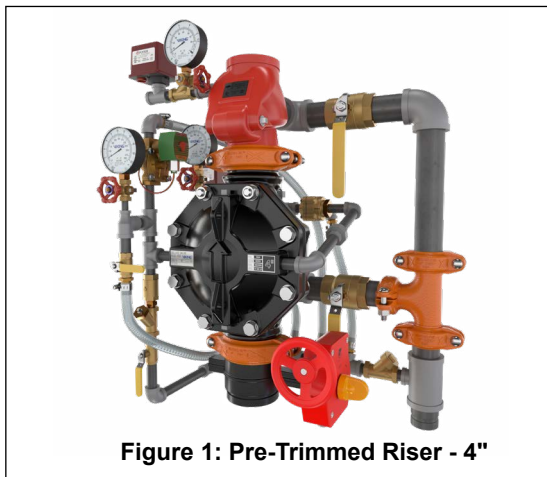


Figure 1: Pre-Trimmed Riser - 4"



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Pre-trimmed (PT) Assemblies

Pre-trimmed packages come completely assembled and ready to install. These packages include the Model VXD deluge valve with trim as shown below, a riser check valve, and come with galvanized pipe and groove/groove connections only.

The Pre-Trimmed riser packages include the following components:

- Model VXD valve
- riser check valve
- completely assembled trim
- electric release solenoid
- pressure gauges for air and water
- loose drain cup

Refer to Table 2 for ordering information.

Loose Trim Packages

NOTICE: The Model VXD valve must be trimmed as shown on the trim diagrams. Any deviation from trim size or arrangement may affect the proper operation of the valve. Refer to the appropriate trim diagram for the system size and type to be used.

Loose trim packages come loose in a box and assembly is required. These packages do NOT include the Model VXD deluge valve or a riser check valve, which must be ordered separately. The Model VXD deluge valve can be ordered with flange/glange or groove/groove connections (refer to the Model VXD deluge valve technical data). The loose trim packages can be ordered with galvanized or brass trim, refer to Table 2 below.

These packages include the following components:

- all required trim components
- electric release solenoid
- pressure gauges for air and water
- loose drain cup

Refer to the "System Components" for more information.

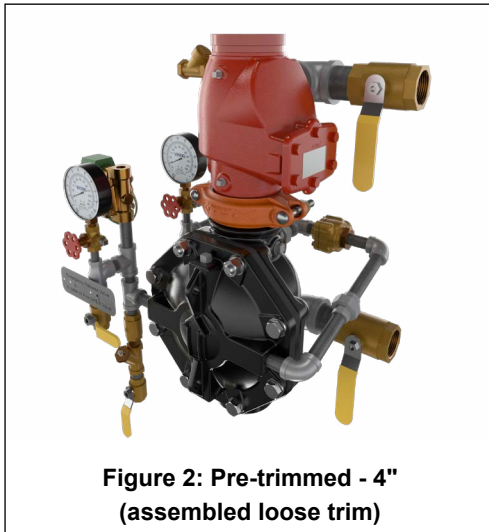


Figure 2: Pre-trimmed - 4"
(assembled loose trim)

Table 2: Pre-trimmed (PT) and Loose trim
Model VXD Double Interlock Preaction System
with Electric/Pneu-Lectric Release (Vertical)

Nominal Size	Ordering Information			
	Pre-trimmed	Loose trim		
	Galvanized	Galvanized	Brass	Notes
1-½	23563	23562-1	23562-2	Loose trim packages do NOT include the VXD valve or the riser check valve. Refer to the Model VXD Deluge valve technical data sheet for more information.
2	23584	23583-1	23583-2	
2½	23605	23604-1	23604-2	
3	23626	23625-1	23625-2	
4	23647	23646-1	23646-2	
6	23669	23668-1	23668-2	
8	23690	23689-1	23689-2	
10	23751	23750-1	23750-2	



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4. SYSTEM COMPONENTS

4.1 VXD Double Interlock (Electric/Pneu-Letric) System PTR Components

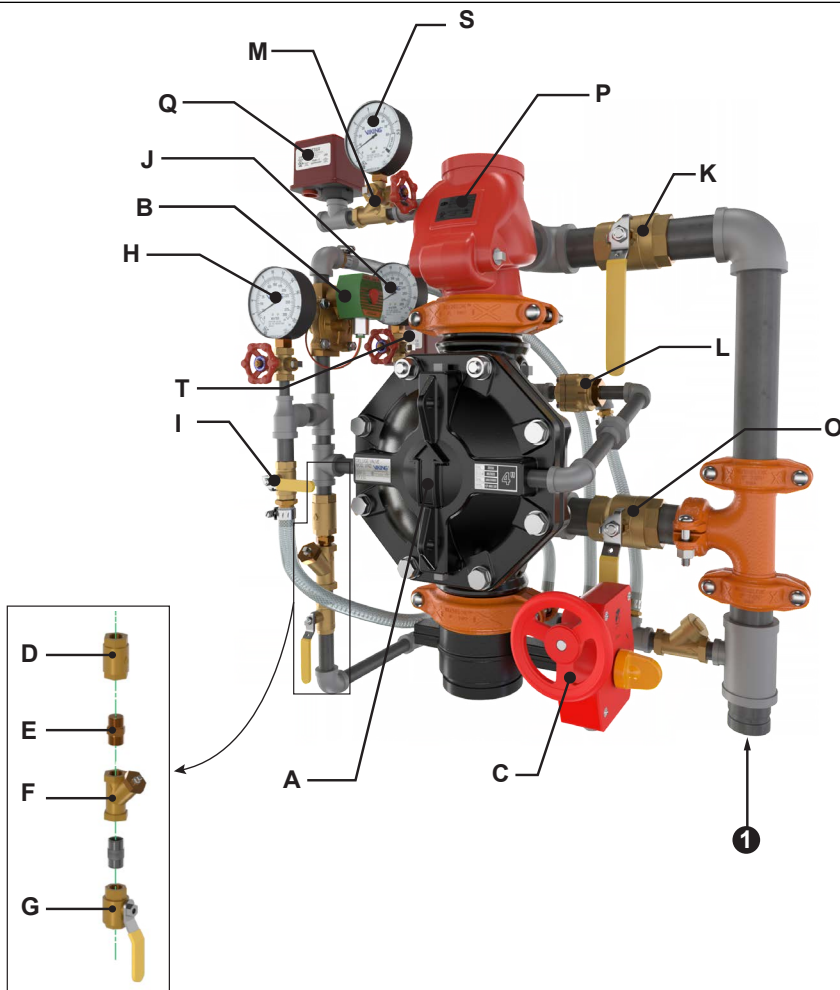


Figure 3: System Components (4\"

Item	Description	Item	Description	Item	Description
A	Deluge valve	H	Prime pressure gauge	O	Flow test valve (normally closed)
B	Solenoid valve	I	Emergency release	P	Riser check valve (with drain trim) ¹
C	Butterfly valve	J	Water supply pressure gauge	Q	PS-40 switch
D	In-line check valve	K	Main drain	R	Alarm test valve (not shown)
E	1/8\" Restricted orifice (M x M)	L	Pressure Operated Relief Valve (P.O.R.V.)	S	Air gauge
F	Y-strainer	M	Swing check valve	T	PS-10 switch
G	Priming valve (normally open)	N	1/8\" Restricted orifice (M x F) (not shown)	1	Drain connection

NOTE: Piping shown for reference only.

¹ Zurn is a registered trademark of Zurn Industries, LLC/Wilkins



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4.2 VXD Double Interlock (Electric/Pneu-Lectric) System PT/Loose Components

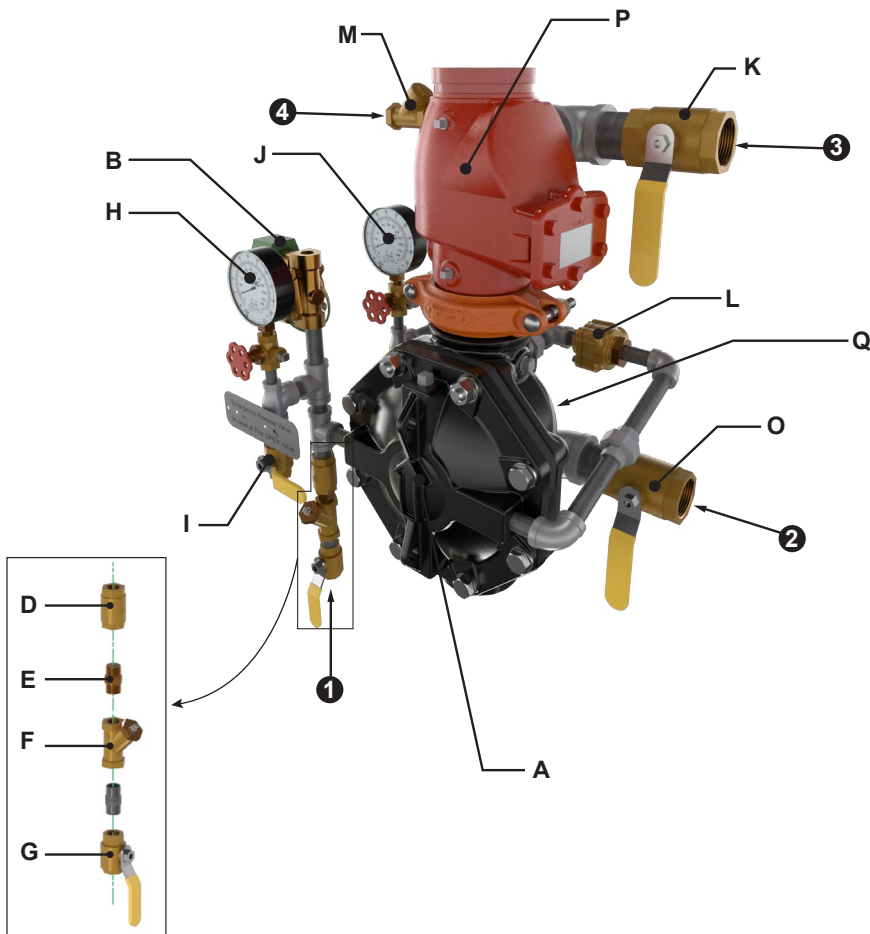


Figure 4: System Components (4" Shown)

Item	Description	Item	Description	Item	Description
A	Deluge valve	J	Water supply pressure gauge	1	Prime supply connection point (must be piped to upstream of main water supply valve; piping not provided)
B	Solenoid valve	K	Main drain		
C	Drain cup (not shown)	L	Pressure Operated Relief Valve (P.O.R.V.)	2	Drain connection point (piping not provided)
D	In-line check valve	M	Swing check valve		
E	1/8" Restricted orifice (M x M)	N	1/8" Restricted orifice (M x F) (not shown)	3	Drain connection point (piping not provided)
F	Y-strainer	O	Flow test valve (normally closed)		
G	Priming valve (normally open)	P	Riser check valve (with drain trim)	4	Air supply or Low Air switch (example: PS-40) connection point (devices purchased separately)
H	Prime pressure gauge	Q	Alarm test valve (normally closed) (not shown)		
I	Emergency release valve (normally closed)				
NOTE: Piping shown for reference only.					



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5. SYSTEM OPERATION

5.1 In the SET condition:

In the SET condition: System water supply pressure enters the priming chamber of the deluge valve through the priming line, which includes a normally open priming valve (A), strainer (B), restricted orifice (not shown), and check valve (C). In the SET condition, water supply pressure is trapped in the priming chamber by the check valve (C), the normally closed solenoid valve (E), and the emergency release (F). The water supply pressure trapped in the priming chamber holds the deluge valve diaphragm closed, keeping the outlet chamber and system piping dry.

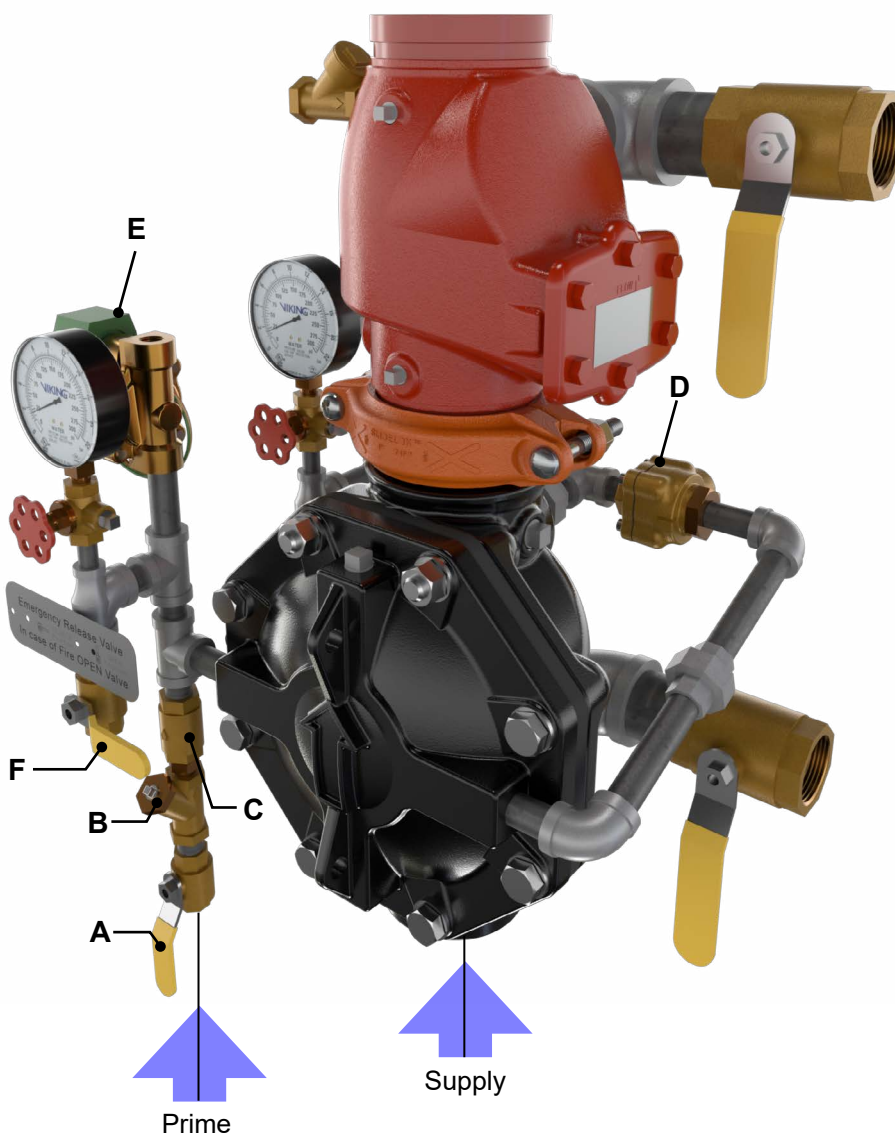


Figure 5: Operational Components



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5.2 In fire conditions:

In a fire condition:

1. Operation of the detection system activates the first initiating circuit in the control panel, causing an alarm to activate.
2. When a sprinkler operates, air/nitrogen pressure escapes from the sprinkler piping. The air supervisory switch (H) activates the second initiating circuit in system release control panel.
3. When BOTH initiating circuits have been activated, the system release control panel energizes the solenoid valve (E) open.

Pressure is released from the priming chamber to the open drain cup faster than it is supplied through the restricted orifice. The deluge valve diaphragm opens to allow water to flow into the system piping and alarm devices, causing the water motor alarm and water flow alarms connected to the alarm pressure switch to activate. When the deluge valve operates, water is drained from the PORV inlet. When the 10:1 differential is overcome, the push rod opens, allowing the prime water to drain. If a release resets, priming water will continue to escape through the PORV, allowing the deluge valve to continue to operate until the system is reset. The Deluge Valve can only be reset after the system is taken out of service, and the outlet chamber of the deluge valve and associated trim piping are depressurized and drained.

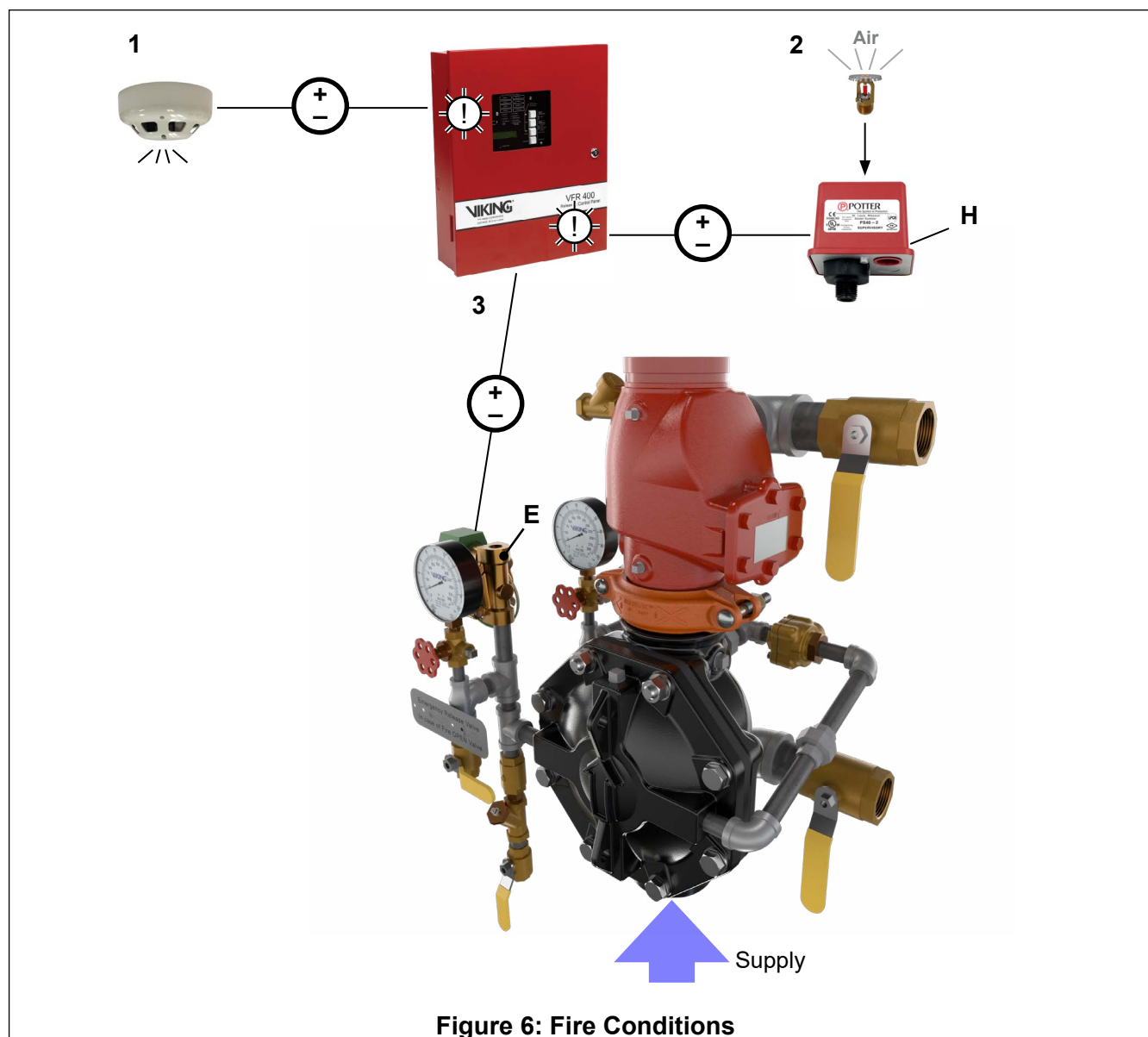


Figure 6: Fire Conditions



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5.3 In trouble conditions:

If a sprinkler opens prior to operation of a release device, or any time air/nitrogen pressure in the sprinkler piping is lost, alarms connected to the air supervisory switch will signal a low air/nitrogen pressure condition, but the deluge valve will NOT open. If the electric detection system (alone) operates due to damage or malfunction, alarms connected to the system release control panel will activate, but the deluge valve will NOT open.

5.4 Manual operation:

Anytime the emergency release is pulled, pressure is released from the priming chamber and the deluge valve will open. Water will flow into the system piping and alarm devices. Water will flow from any open sprinklers and/or spray nozzles on the system.

6. INSTALLATION

Refer to current Viking Technical Data describing individual components of the Viking VXD Preaction System. Also, refer to applicable installation standards, codes, and Authorities Having Jurisdiction.

6.1 Recommended Air Pressure Settings

NOTE: Installation Standards may allow air/nitrogen pressures lower than those recommended in this document. When using air/nitrogen pressures lower than the recommended setting noted below, verify that the air regulation equipment and air supervisory switches used are compatible with the air/nitrogen pressure setting used.

TABLE 3: Recommended Air Pressure Settings		
Device	System Water Pressure	
	Up to 175 PSI (12 bar)	Over 175 PSI (12 bar) to 250 PSI (17 bar)
	Set to Maintain:	
Air Compressor On/Off Switch	ON: 30 PSI (2 bar) OFF: 40 PSI (2.8 bar)	ON: 50 PSI (3.4 bar) OFF: 60 PSI (4.1 bar)
Air Maintenance Device (release system)	30 PSI (2 bar)	50 PSI (3.4 bar)
Air Pressure Supervisory Switch (release system)	25 PSI (1.7 bar)	45 PSI (3.1 bar)
Alarm pressure switch	4 to 8 PSI (0.3 to 0.6 bar)	4 to 8 PSI (0.3 to 0.6 bar)

6.2 Air Supply Design

The air supply compressor should be sized to establish total required air pressure in 30 minutes. The air supply must be regulated, restricted, and maintained automatically. The air maintenance device is used to regulate and restrict the flow of air/nitrogen into the sprinkler system piping.

The air supply must be regulated to maintain the pressure desired in the release system. Pressure settings other than those recommended in section 6.1 above may affect operation of the system. The air supply must be restricted to ensure that the automatic air supply cannot replace air as fast as it escapes when a releasing device operates.

It is recommended practice to provide an inspector's test connection on the pressurized sprinkler piping. The inspectors test connection should be equipped with a ball valve (normally locked closed) capable of being opened to simulate the opening of a releasing device. Locate the connection and valve at the highest, most demanding location of the release system. Test connections provided on pneumatic release systems should terminate in an orifice equal to the smallest orifice of the releasing devices provided. The inspectors test connection may be used to verify that the automatic air supply cannot replace air as fast as it escapes when a releasing device operates. Refer to section 9. Inspections, Tests, and Maintenance.



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Speed of Operation:

An optional accelerator may be installed to allow the system to fill with water faster. An accelerator may be necessary to meet water delivery time requirements.

7. PLACING THE SYSTEM IN SERVICE

Placing the Valve in Service:

1. Verify the following:
 - The system main water supply control valve (not shown) is closed.
 - The system has been properly drained and main drain (H) is open.
 - The emergency release (F) is closed.
2. Close the system main drain (H).

NOTE: For the next 2 steps, Refer to section "6. Installation".

3. Restore supervisory pressure to the sprinkler piping. Verify that the 1/2" valve in the air maintenance device by-pass trim is closed and that both the 1/4" valves are open.
4. Open the priming valve (A).
5. Open flow test valve (G).
6. Slowly and partially open main water supply control valve (not shown).

NOTE: Opening the main water supply valve too quickly can create excessive pressure causing the valve to trip.

7. When full flow develops from the flow test valve (G), close the valve. Verify that there is no flow from the open orifice.
8. Fully open and secure the main water supply control valve.
9. Verify that all valves are in their normal operating position.
10. Verify that no water is discharging into the drain cup.
11. Check for, and repair all leaks.
12. On new installations, those systems that have been placed out of service, or where new equipment has been installed, trip test the system to verify that all equipment functions properly. Refer to Annual Trip Tests, section 9.2.C.
13. After completing a trip test, perform semi-annual maintenance. Refer to section 9.3.B.

⚠ CAUTION

Performing a trip test results in operation of the Deluge Valve. Water will flow into the sprinkler piping. Take necessary precautions to prevent damage.

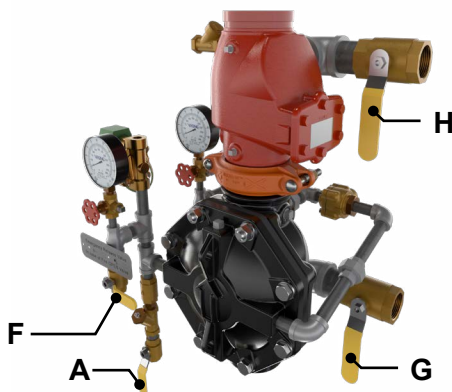


Figure 7: Placing the System in Service



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8. EMERGENCY INSTRUCTIONS

⚠ WARNING

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 (AHJ). Consideration should be given to employment of a fire patrol in the affected areas.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information, Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.

To take system out of service (Refer to Figure 6):

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 water supply control valve (not shown).
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.
2. Open the system main drain (H).
3. Shut off the air supply (optional).
4. Close the priming valve (A).
5. Replace any release devices, sprinklers and/or spray nozzles that have been damaged or have been exposed to fire conditions.
6. Perform all maintenance procedures recommended in Technical Data describing individual components of the system that have operated.
7. Return the system to service as soon as possible. Refer to section "7. Placing the System in Service".

9. INSPECTIONS, TESTS, AND MAINTENANCE

⚠ 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 current Viking Technical Data describing individual components.

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.

9.1 Inspection

Weekly - Viking recommends a weekly visual inspection; check the following items.

- Verify that the main water supply control valve is open and that all other valves are in their normal operating position and appropriately secured. (refer to Figure 3)
- Check for signs of mechanical damage, leakage, and/or corrosive activity. If detected, perform maintenance as required. If necessary, replace the device.
- Verify that the valve and trim are adequately heated and protected from freezing and physical damage.

NOTE: For normal operating position, refer to Figure 3.



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9.2 Periodic System Tests

A. Quarterly Water Flow Alarm Test

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. To test the local electric alarm (if provided) and/or mechanical water motor alarm (if provided), OPEN the alarm test valve in the Deluge Valve trim.
 - a. Electric alarm pressure switches (if provided) should activate.
 - b. Electric local alarms should be audible.
 - c. The local water motor gong should be audible.
 - d. If equipped with remote station alarm signaling devices, verify that alarm signals were received.
3. When testing is complete, CLOSE the Alarm Test Valve.
4. Verify the following:
 - a. All local alarms stop sounding and alarm panels (if provided) reset.
 - b. All remote station alarms reset.
 - c. Supply piping to water motor alarm properly drains.
5. Verify that the Alarm Test Valve is CLOSED.
6. Verify that the outlet chamber is free of water. No water should flow from the alarm drain line.
7. Notify the Authority Having Jurisdiction and those in the affected area that testing is complete.

B. Quarterly Main Drain Test

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. Record pressure reading from the water supply pressure gauge.
3. Verify that the outlet chamber of the Deluge Valve is free of water. No water should flow from the alarm drain line.
4. Fully OPEN the Flow Test Valve.
5. When a full flow is developed from the Flow Test Valve, record the residual pressure from the water supply pressure gauge.
6. When the test is complete, SLOWLY CLOSE the Flow Test Valve.
7. Compare test results with previous flow information. If deterioration of the water supply is detected, take appropriate steps to restore adequate water supply.
8. Verify:
 - a. Normal water supply pressure has been restored to the inlet chamber, the priming chamber, and the release system. The pressure on the priming chamber water pressure gauge should equal the system water supply pressure.
 - b. All alarm devices and valves are secured in normal operating position (refer to Figure 3).
9. Notify the Authority Having Jurisdiction that the test is complete. Record and/or provide notification of test results as required by the Authority Having Jurisdiction.

C. Annual Trip Test

⚠ CAUTION

Performing this test results in operation of the Deluge Valve. Water will flow into the sprinkler piping and from any open sprinklers and/or nozzles. Take necessary precautions to prevent damage.

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. Fully open the Flow Test Valve to flush away any accumulation of foreign material.
3. Close the Flow Test Valve.
4. Trip the system by operating the release system and opening the inspectors test connection. Allow a full flow to pass through the Deluge Valve. Water flow alarms should operate.
5. When test is complete:
 - a. Close the Main Water Supply Control Valve.
 - b. Close the Priming Valve.
 - c. Open all system main drains. Allow the system to drain completely.
6. Perform semi-annual maintenance. Refer to section: 9.3.B: Semi-Annual Maintenance.



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7. Place the system in service. Refer to section: "7. Placing the System in Service".
8. Notify the Authority Having Jurisdiction that the test is complete. Record and/or provide notification of test results as required by the Authority Having Jurisdiction.

D. Quarterly "Low Air" Pressure Alarm Test

IMPORTANT

Do not operate the electric detection system during this test.

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. Close the main water supply valve.
3. Fully OPEN the test connection to simulate operation of a sprinkler.
4. Verify that the low air alarms operate within an acceptable time period and continue without interruption.
5. Close the test connection.
6. Establish recommended air/nitrogen pressure to be maintained. Refer to section "6.1 Recommended Air Pressure Settings".
7. Reset the system release control panel to stop the alarms.
8. Return the system to service. Refer to section: "7. Placing the System in Service".

9.3 Maintenance

A. After Each Operation:

1. 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.
2. Deluge Valves and trim that have been subjected to brackish water, salt water, foam/water solution, or any other corrosive water supply, should be flushed with good quality fresh water before being returned to service.
3. Perform semi-annual maintenance after every operation.

B. Semi-Annually:

1. Remove the system from service.
2. Close the Main Water Supply Control Valve and Priming Valve.
3. Relieve pressure in the priming chamber by opening the emergency release Valve.
4. Inspect all trim for signs of corrosion and/or blockage. Clean and/or replace as required.
5. Clean and/or replace all strainer screens.
6. Refer to section: "7. Placing the System in Service".

C. Every Fifth Year:

1. Internal inspection of Deluge Valves is recommended every five years unless inspections and tests indicate more frequent internal inspections are required. Refer to the Model VXD Valve Technical Data Page.
2. Internal inspection of strainers, and restricted orifices is recommended every five years unless inspections and tests indicate more frequent internal inspections are required.
3. Record and provide notification of inspection results as required by the Authority Having Jurisdiction.



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10. DIMENSIONS

10.1 Dimensions - Pre-Trimmed and Assembled Loose Packages

*Not to scale.
All dimensions are approximate.*

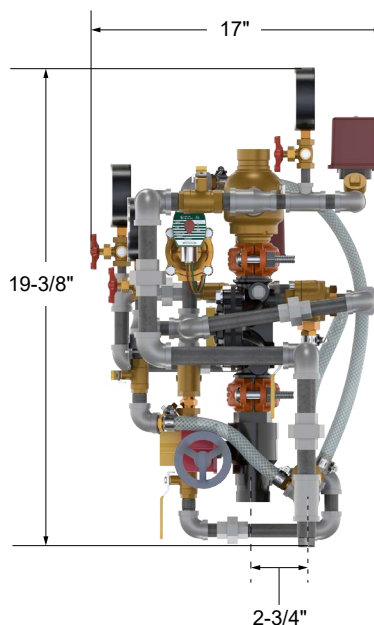
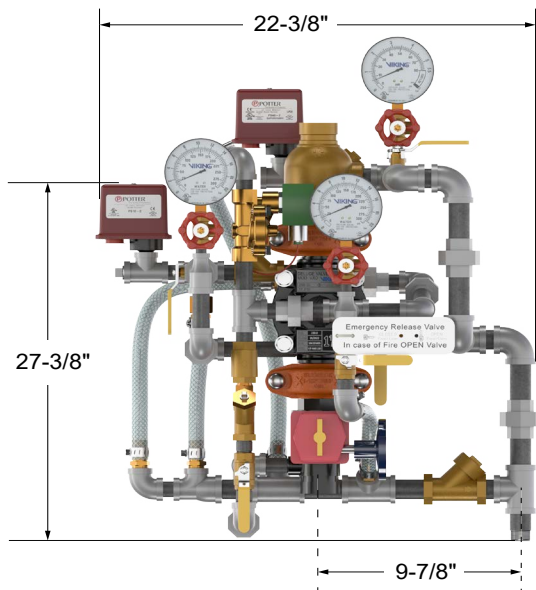


Figure 8: Dimensions - 1-1/2" Pre-trimmed Riser

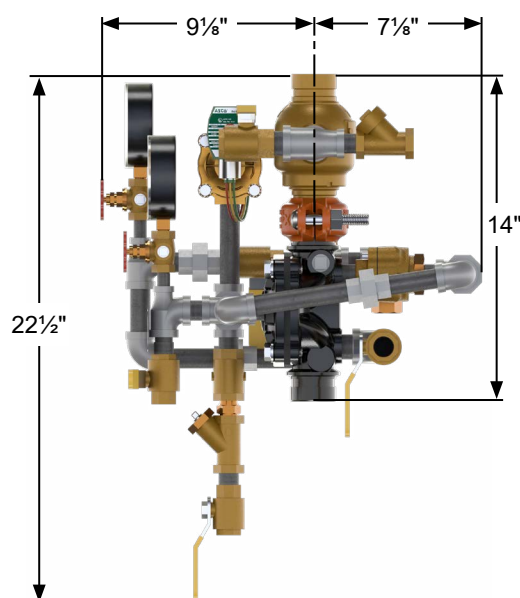
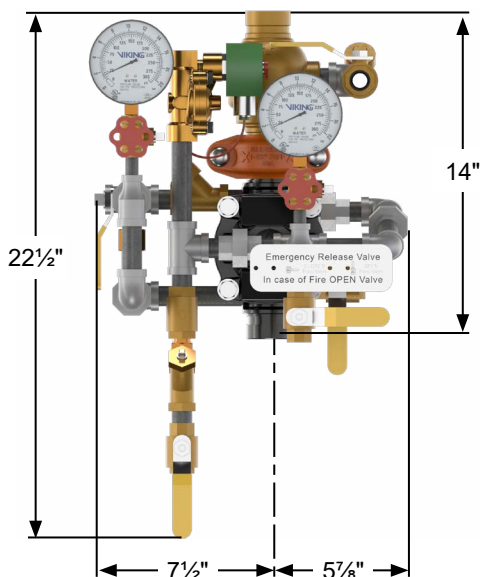


Figure 8: Dimensions - 1-1/2" Pre-Trimmed/Loose

*Not to scale.
All dimensions are approximate.*



TECHNICAL DATA

MODEL VXD DOUBLE INTERLOCKED PREACTION SYSTEM WITH ELECTRIC/PNEU-ELECTRIC RELEASE

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*Not to scale.
 All dimensions are approximate.*

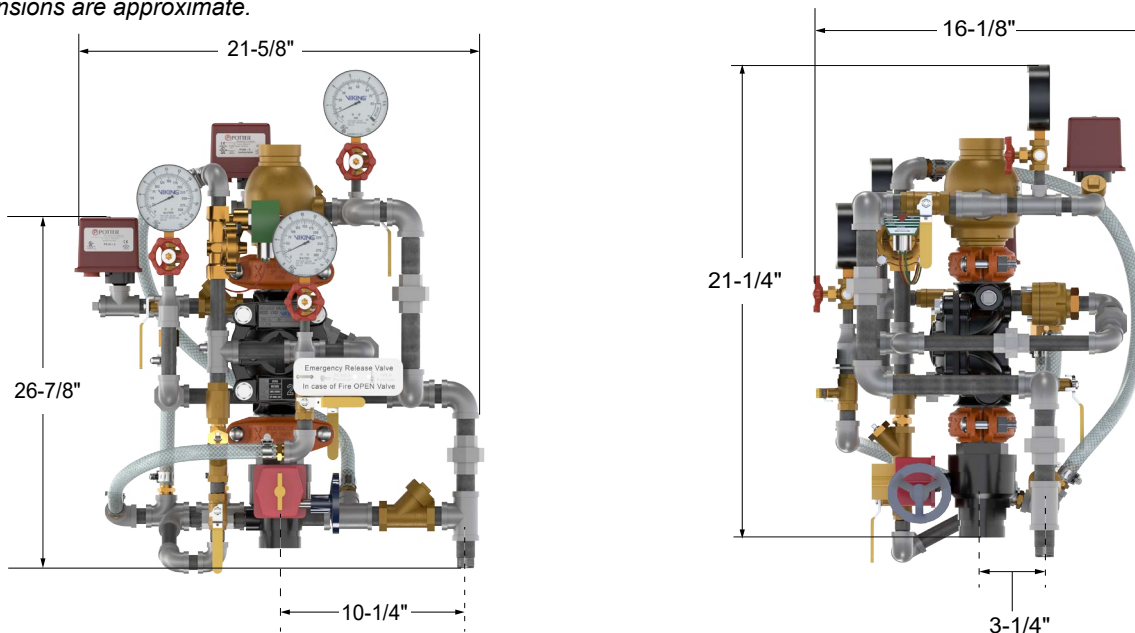


Figure 10: Dimensions - 2" Pre-trimmed Riser

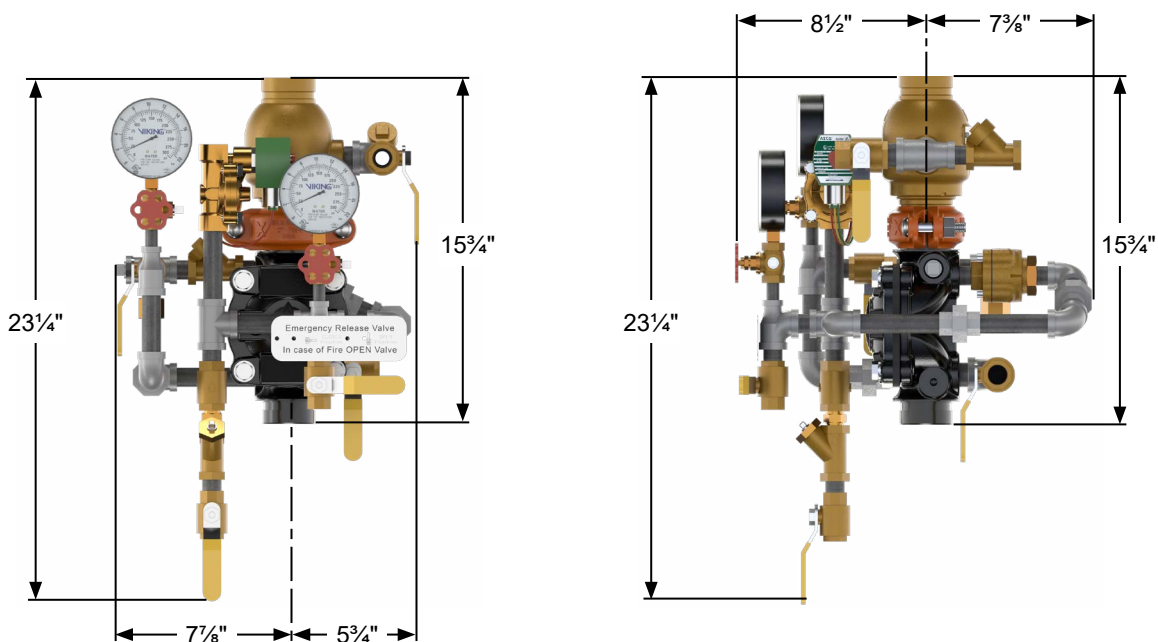


Figure 9: Dimensions - 2" Pre-Trimmed/Loose

*Not to scale.
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*Not to scale.
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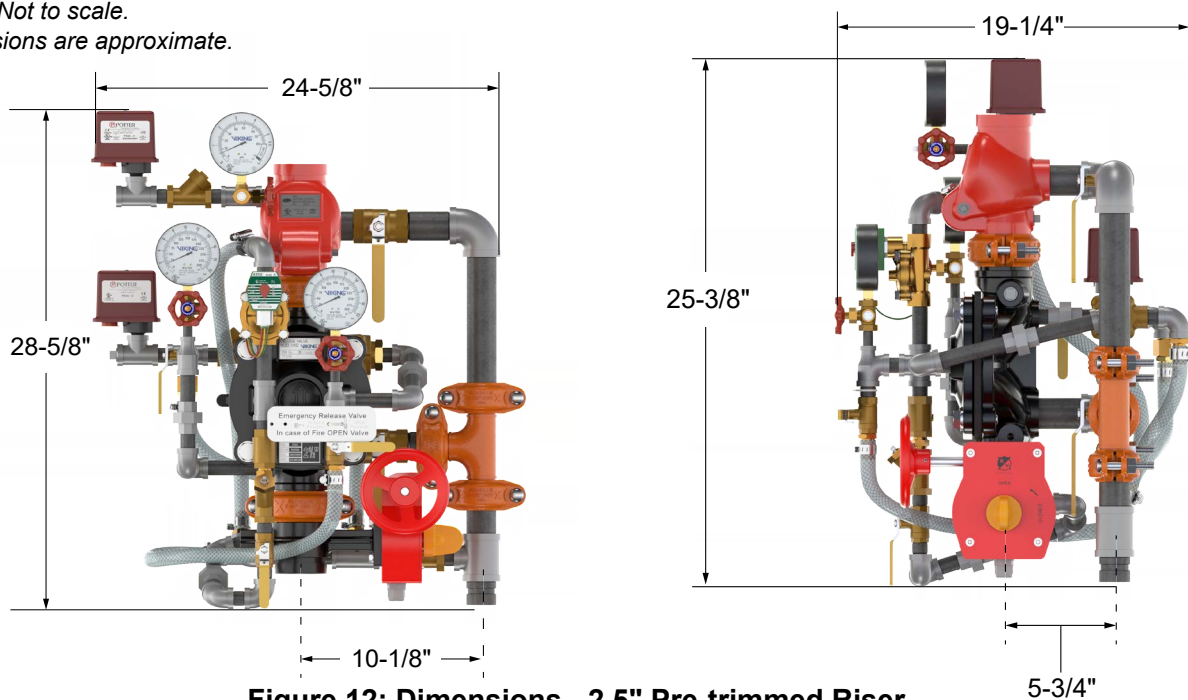


Figure 12: Dimensions - 2.5" Pre-trimmed Riser

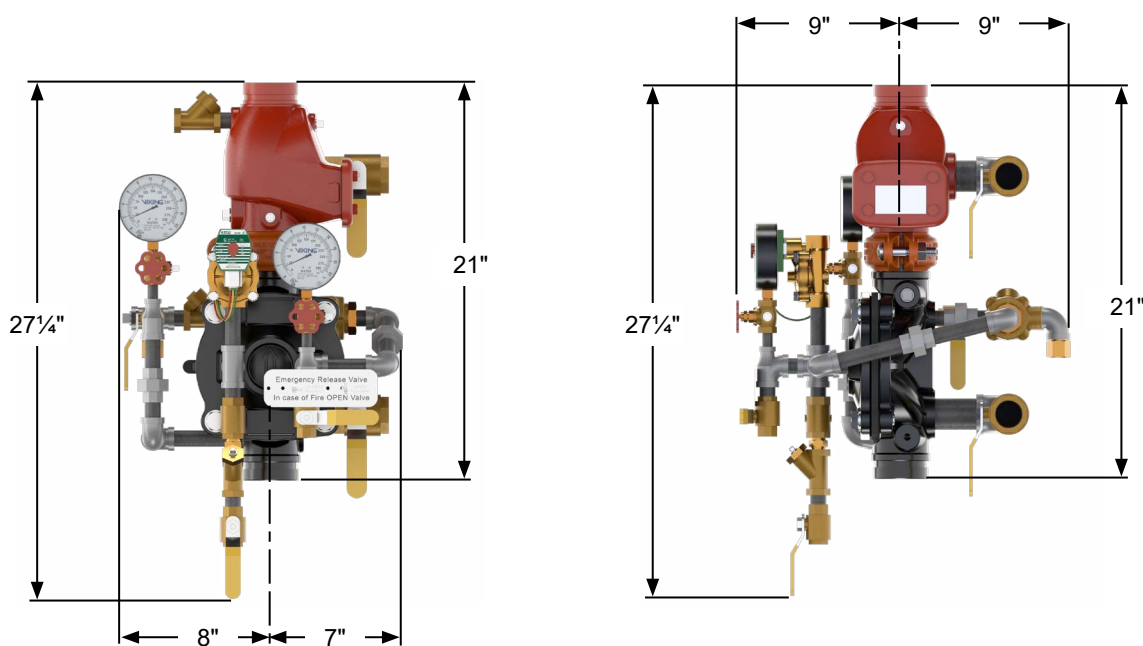


Figure 10: Dimensions - 2 1/2" Pre-Trimmed/Loose

*Not to scale.
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*Not to scale.
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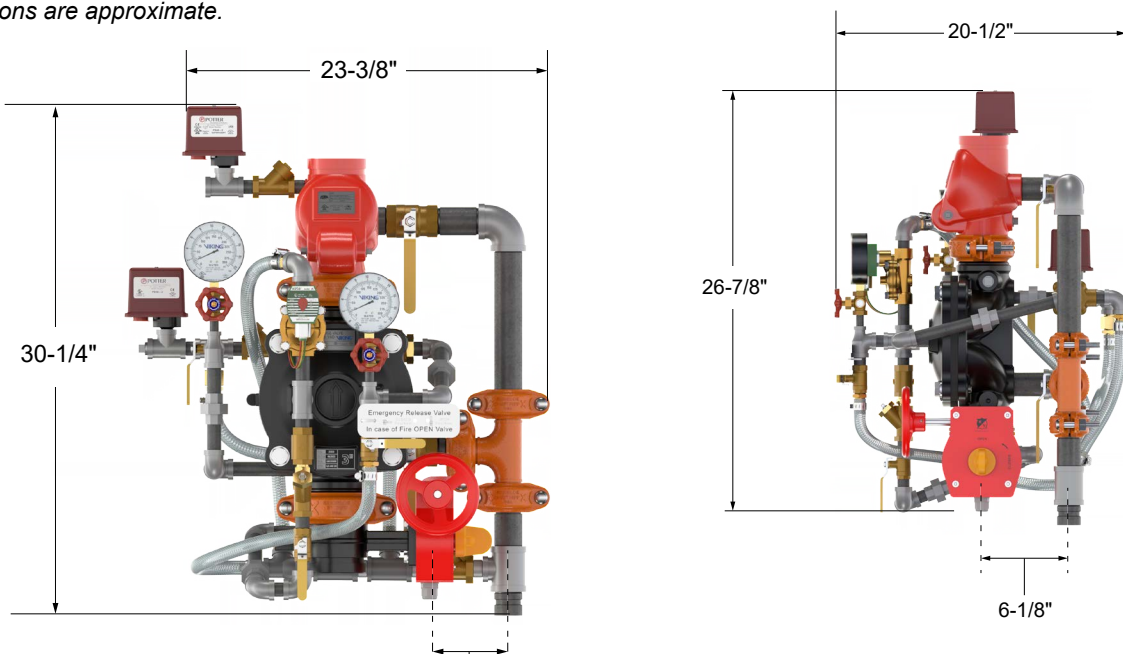


Figure 14: Dimensions - 3" Pre-trimmed Riser

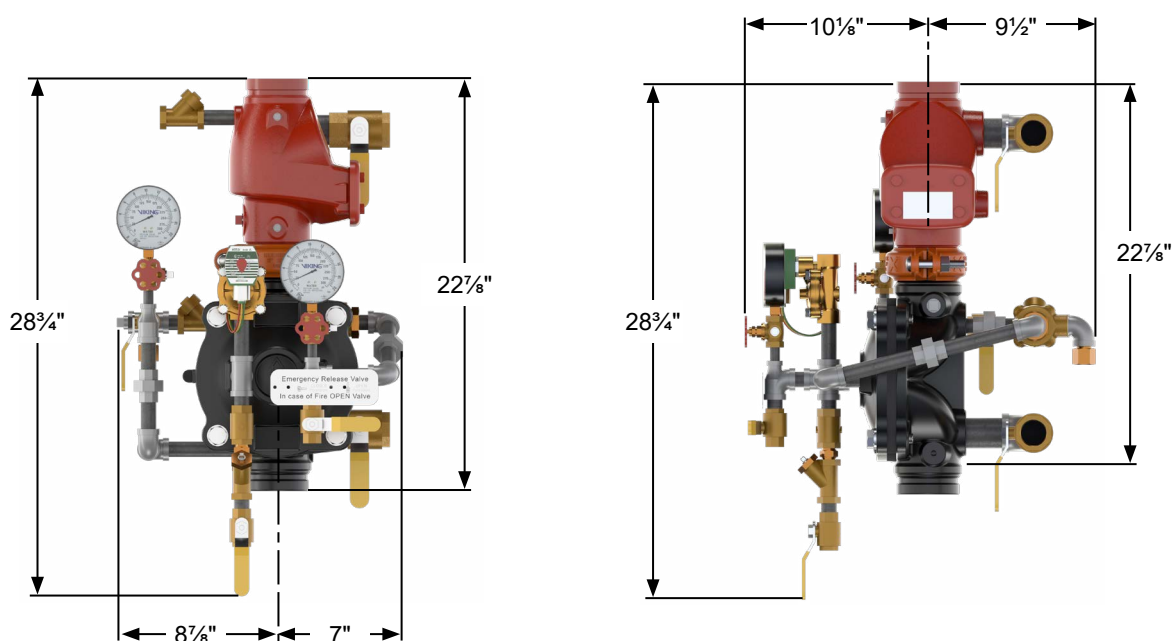


Figure 11: Dimensions - 3" Pre-Trimmed/Loose *Not to scale.
 All dimensions are approximate.*



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*Not to scale.
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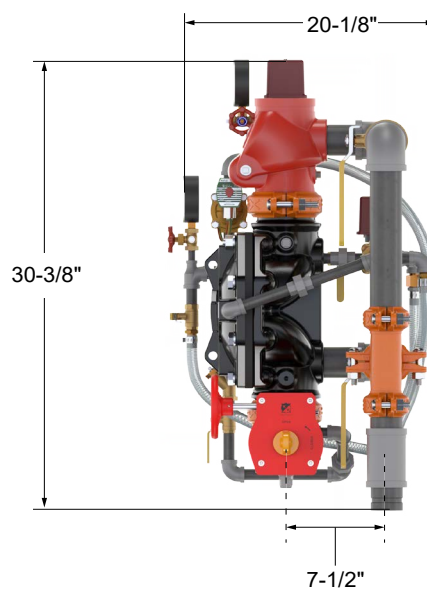
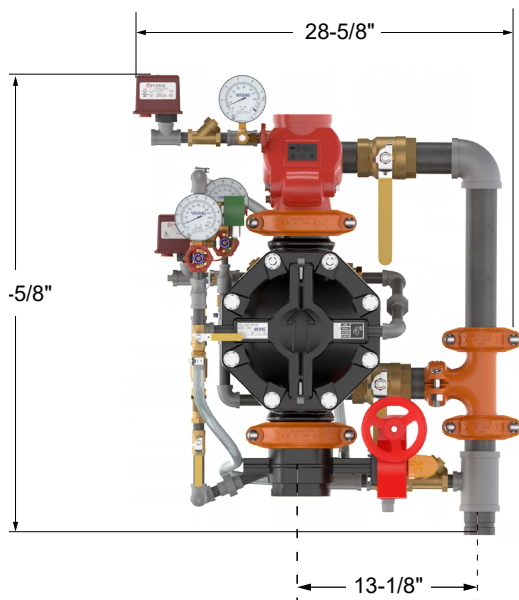


Figure 16: Dimensions - 4" Pre-trimmed Riser

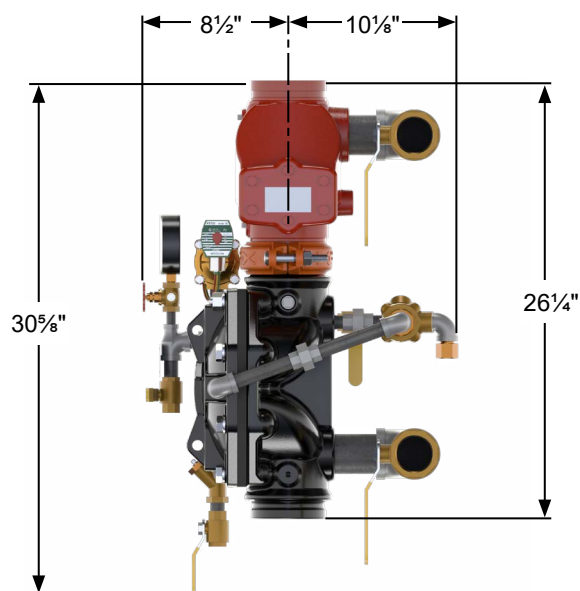
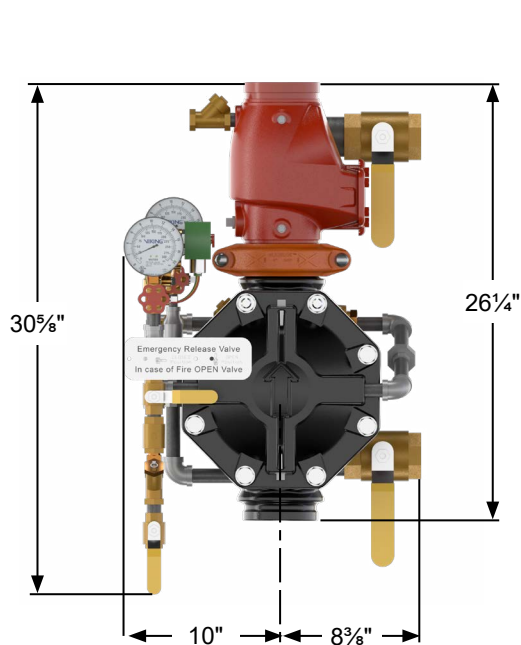


Figure 12: Dimensions - 4"

*Not to scale.
All dimensions are approximate.*



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Not to scale.

All dimensions are approximate.

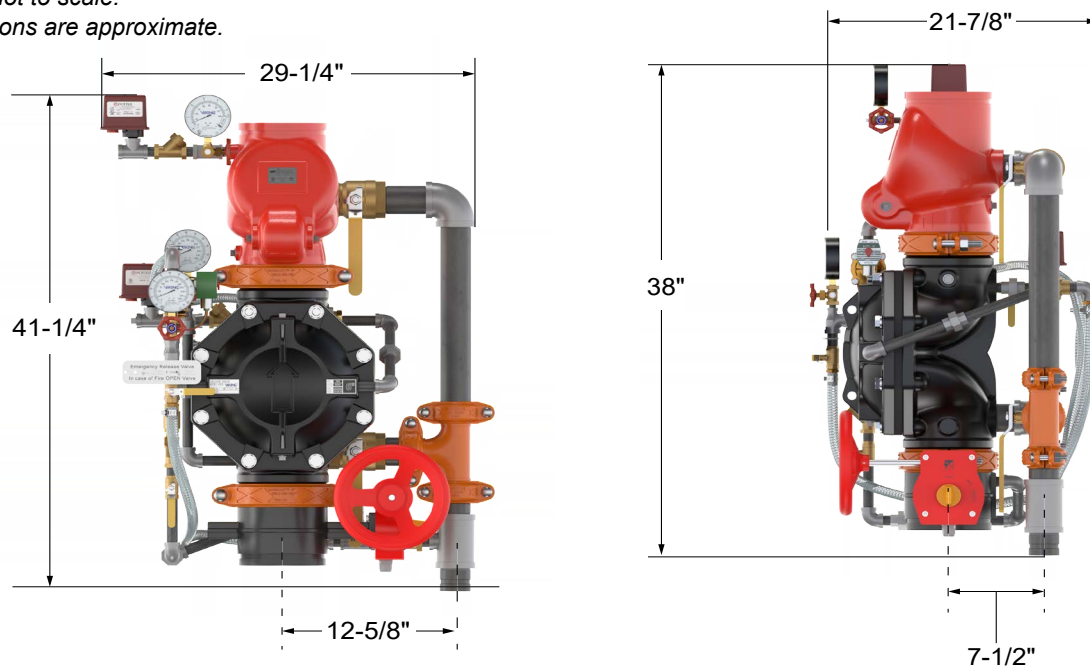


Figure 18: Dimensions - 6" Pre-trimmed Riser

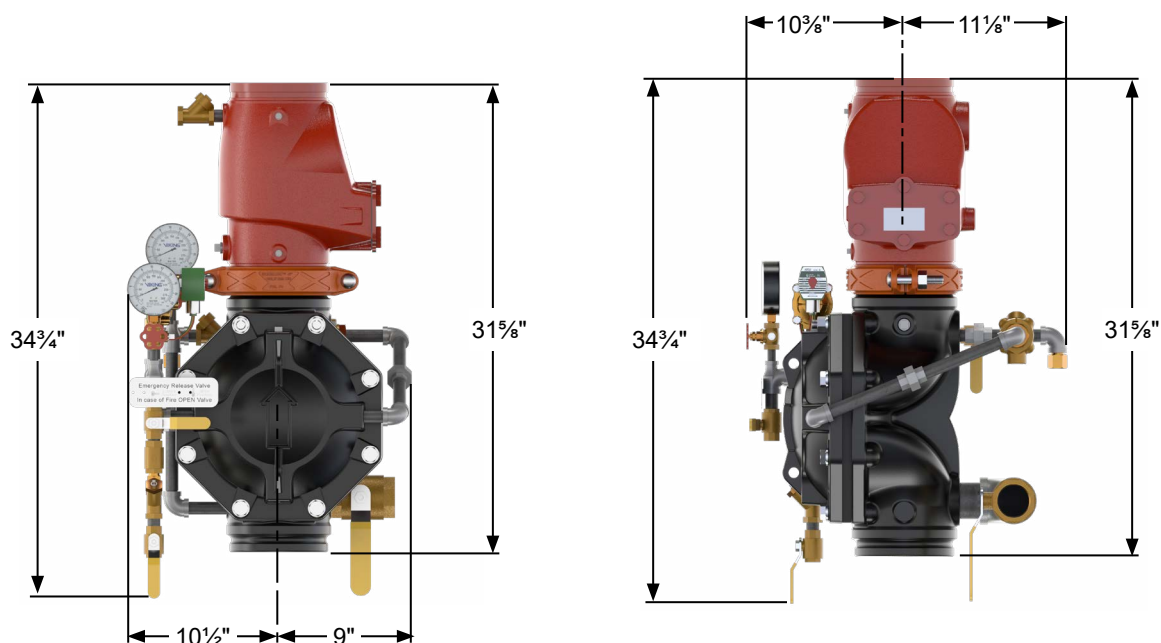


Figure 13: Dimensions - 6"

*Not to scale.
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Not to scale.
All dimensions are approximate.

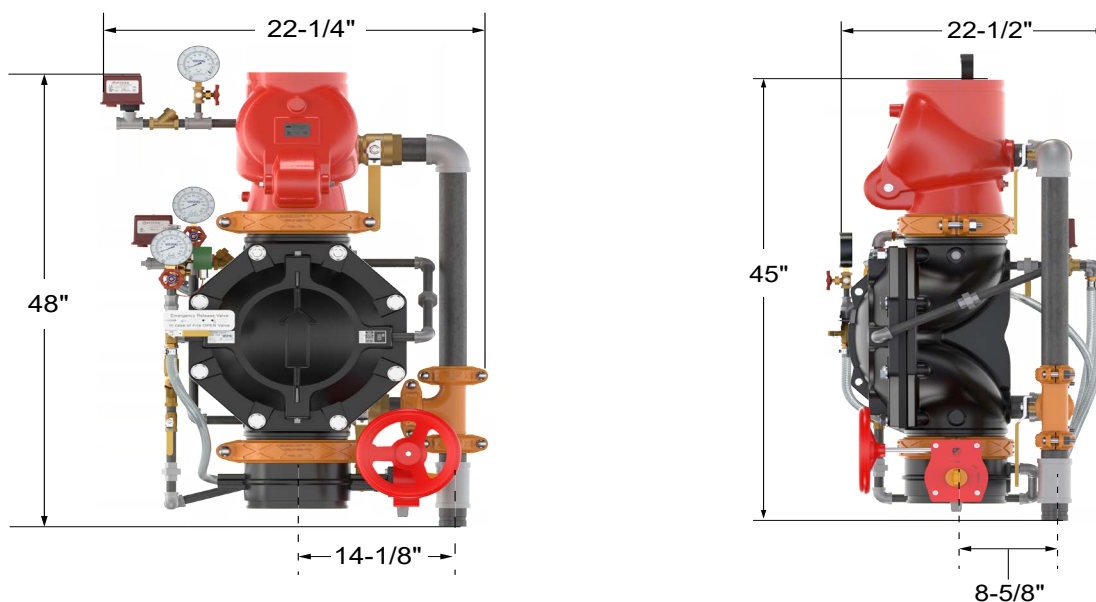


Figure 20: Dimensions - 8" Pre-trimmed Riser

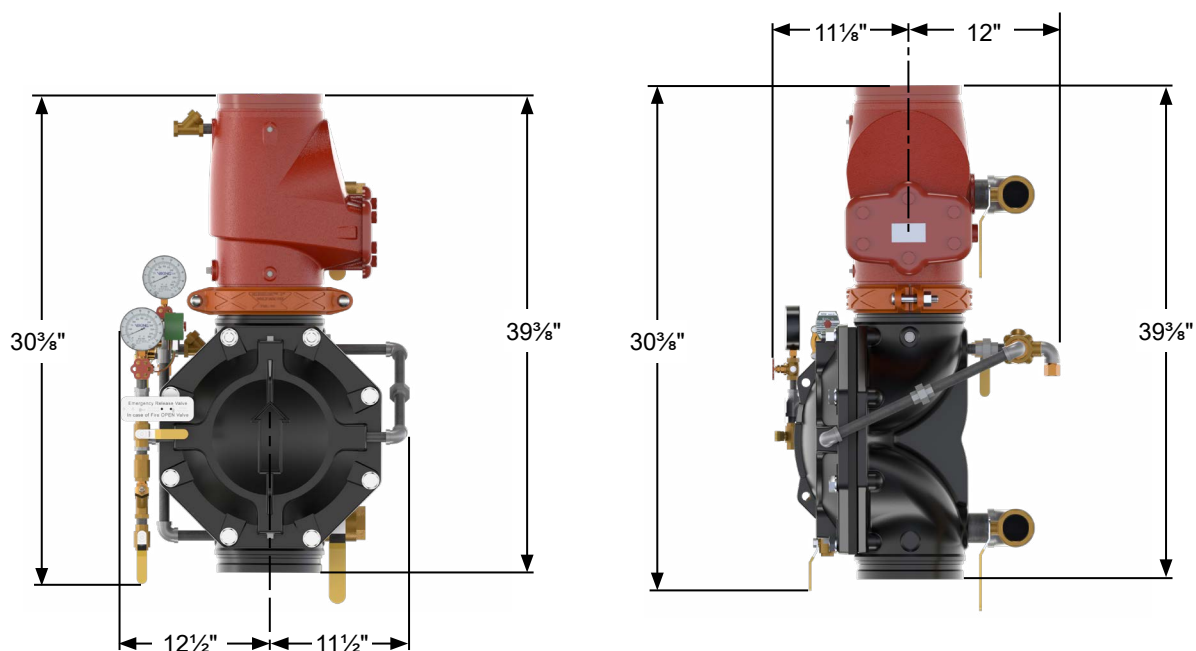


Figure 14: Dimensions - 8"

Not to scale.
All dimensions are approximate.



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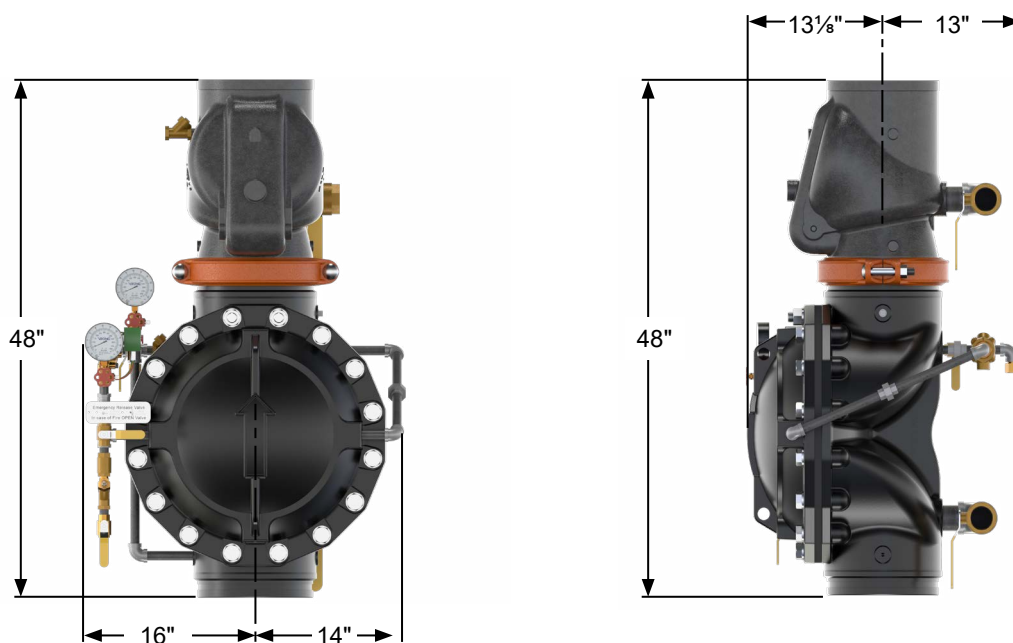


Figure 15: Dimensions - 10"

*Not to scale.
All dimensions are approximate.*