UNITED FIRE SYSTEMS

NITROGEN N_2 PAC

SPRINKLER CORROSION INHIBITING SYSTEM

MODEL SC–W

INSTALLATION, COMMISSIONING, AND MAINTENANCE MANUAL

SERIAL NUMBER: _____

DATE OF INSTALLATION: _____ **DATE OF COMMISSIONING:** _____

FM APPROVED

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LIST OF ABBREVIATIONS

The following is an explanation of abbreviations used in this manual.

MEASUREMENT UNITS		
ABBREVIATION	**UNIT**	**PARAMETER BEING MEASURED**
A	Amperes	Electric current
°F	Degrees Fahrenheit	Temperature
Hz	Hertz	Frequency (cycles per second)
in	Inches	Length
lbs.	Pounds	Weight
PSI	Pounds per Square Inch	Pressure (reference not specified)
PSIG	Pounds per Square Inch, Gauge	Pressure (referenced to normal atmospheric pressure)
VAC	Volts, Alternating Current	Electrical voltage (electromotive force)
v/v	Volume / Volume	Concentration expressed as a ratio of volumes

OTHER MEASUREMENT TERMS	
ABBREVIATION	**MEANING**
H	Height
L	Length
W	Width

NITROGEN-PAC™ EQUIPMENT	
ABBREVIATION	**MEANING**
NAMD	Nitrogen / Air Maintenance Device
NA	Nitrogen Analyzer
PVA	Purge Vent Assembly
SC-W	“Self-Contained Wall-mount” (refers to self-contained, wall-mounted **NITROGEN-PAC™** Model SC-W assemblies)
TAP	True Advanced Purge device

MISCELLANEOUS TERMS	
ABBREVIATION	**MEANING**
MIC	Microbiologically Influenced Corrosion
N_2	Nitrogen (2 represents two atoms of nitrogen in a naturally-occurring diatomic molecule)
NFPA	National Fire Protection Association
NPT	National Pipe Thread - Tapered
Sch.	Schedule (refers to standard expression of pipe wall thickness)

SAFETY INFORMATION

This manual contains safety information that is important to know and understand. This information is provided for the safety of installers, operators, and users of the **UNITED Fire Systems NITROGEN-PAC™** equipment. Carefully read, understand, and follow instructions identified by these symbols.




DANGER

RISK OF ELECTROCUTION

The use of the words "DANGER" and "RISK OF ELECTROCUTION" with the lightning symbol identifies an immediate electrical hazard with a likelihood of death or serious personal injury if instructions, including recommended precautions, are NOT followed.




DANGER

The use of the word "DANGER" identifies an immediate hazard with a likelihood of death or serious personal injury if instructions, including recommended precautions, are not followed.



WARNING

The use of the word "WARNING" identifies the presence of hazards or unsafe practices that could result in death, personal injury, or serious property damage if instructions, including recommended precautions, are not followed.



CAUTION

The use of the word "CAUTION" identifies possible hazards or unsafe practices that could result in personal injury or property damage if instructions, including recommended precautions, are not followed.



IMPORTANT

The use of the word "IMPORTANT" identifies special instructions, not related to hazards that should be followed.

IMPORTANT NOTICES TO INSTALLERS AND USERS

This manual must be read thoroughly and completely understood before installation and operation of **UNITED Fire Systems NITROGEN-PAC™** equipment. All appropriate safety standards for handling of gases as determined by local or national laws and regulations should be followed at all times.



WARNING

Do not operate assembly if damage occurred during shipping, handling, or use. Contact **UNITED Fire Systems** immediately. Failure to do so could result in death, personal injury, or serious property damage.

General Safety Information



IMPORTANT

Read all of the safety information in this manual before operating this equipment. Use of the equipment in a manner not specified within this manual may impair the protection provided by the equipment and could result in an unplanned release of pressure, which may cause serious injury or damage. Only competent personnel, who have been trained, qualified, and approved by **UNITED Fire Systems** should perform commissioning, servicing, and repair procedures.

When handling, installing, or operating this equipment, personnel must employ safe engineering practices and observe all related local regulations, health, and safety procedures, and legal requirements for safety.

Ensure that the equipment is depressurized and electrically isolated before carrying out any of the scheduled maintenance instructions specified in this manual.

Nitrogen is not a poisonous gas. However, in a concentrated form, there is a risk of asphyxiation. The Model SC-W assembly produces both a flow of nitrogen and a flow of oxygen enriched air which quickly disperses in the atmosphere. However, do not directly inhale the output gas from the outlet pipe.

NITROGEN-PAC™ Model SC-W equipment is classified as non-hazardous for transportation purposes and as non-flammable for fire regulations. This equipment is for indoor use only. Do not operate outdoors.

Specific procedures must be followed for maintenance of the **NITROGEN-PAC™** Model SC-W system and the equipment to which the assembly is connected. Appropriate labels must be continuously displayed in all areas where personnel might be exposed to a nitrogen atmosphere.

FOREWORD

This manual is written for those who install, operate and maintain **UNITED Fire Systems** **NITROGEN-PAC™** Model SC-W sprinkler corrosion inhibiting systems. The manual contains installation, operation, and maintenance information for these assemblies.



IMPORTANT

UNITED Fire Systems assumes no responsibility for the installation, operation, or maintenance of any systems other than those addressed in this manual. The data contained in this manual is for information purposes only. **UNITED Fire Systems** believes this data to be accurate at the time of publication, but the data is published and presented without any guarantee or warranty whatsoever. **UNITED Fire Systems** disclaims any liability for any use that may be made of the data and information contained in this manual by any and all parties.



IMPORTANT

UNITED Fire Systems **NITROGEN-PAC™** Model SC-W sprinkler corrosion inhibiting systems are a vital part of the fire protection of any facility where these units are installed. Life safety and property protection depends on continuing proper operation of these assemblies. The owner of the Model SC-W equipment is responsible for its condition and continued proper operation. **UNITED Fire Systems** strongly recommends that all owners of Model SC-W systems engage the services of qualified, trained fire protection professionals to design, install, commission, and maintain the equipment.

UNITED Fire Systems **NITROGEN-PAC™** Model SC-W sprinkler corrosion inhibiting systems are to be installed and maintained by qualified, trained personnel in accordance with:

- This Installation, Operation, and Maintenance Manual P/N 30-NPWICM-000.
- National Fire Protection Association No. 13, “Standard for the Installation of Sprinkler Systems.”
- National Fire Protection Association No. 25, “Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.”
- National Fire Protection Association No. 70, “National Electrical Code®”.

Any questions on the information in this manual should be addressed to:

UNITED Fire Systems
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1 Mark Road
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908-688-0300
www.unitedfiresystems.com

1. GENERAL INFORMATION

1.1. GLOSSARY. All glossary terms are defined in reference to their use in this manual. Refer to this glossary for definitions of unfamiliar terms encountered when reading and using this manual.

- **Air.** Air is the naturally occurring gas making up Earth's atmosphere. Air consists of a mixture of gases, of which two predominate (refer to the glossary terms Nitrogen and Oxygen).

- **Compressed Air.** Compressed air refers to the output of the **NITROGEN-PAC™** compressor. This air has NOT been conditioned for filtering and nitrogen separation.

- **Pressure Dew Point.** The temperature at which the water in a compressed gas at given pressure condenses into liquid water at the same rate at which it evaporates. At temperatures below the pressure dew point, liquid water will leave the gas. At temperatures above the pressure dew point, liquid water will be taken up by the gas.

- **Dried Compressed Air.** Dried compressed air refers to the output of the **NITROGEN-PAC™** Model SC-W assembly intercooler. This compressed air has been conditioned for entry into the separator membrane.

- **Microbiologically Influenced Corrosion (MIC).** Microbiologically influenced corrosion (also known as MIC) occurs inside steel dry and preaction sprinkler pipes in the presence of certain microbes. This form of corrosion causes thinning of pipe walls, possibly leading to failure under water pressure. Pinhole leaks can occur, leading to water damage. Roughening of the internal pipe surface leads to unpredictable hydraulics, impairing the effectiveness of the sprinkler system. The tubercles formed by the microbes can loosen, clogging sprinkler heads and impairing or preventing the discharge of water onto a fire. MIC microbes can be aerobic, growing in the presence of oxygen, or anaerobic, not needing oxygen but growing in the presence of water. Prevention of MIC results in longer life and better functionality of the sprinkler system. MIC can be inhibited by using nitrogen to displace oxygen and dry out the inside of the pipe.

- **Nitrogen (N_2).** Nitrogen is a naturally occurring diatomic gas present in Earth's atmosphere at a concentration of approximately 78% (v/v). All references to "nitrogen" in this manual are the output from the nitrogen outlet of the Model SC-W assembly. This outlet delivers gas that is at least 98% (v/v) nitrogen, at a pressure dew point of approximately -40°F. The pressure dew point of nitrogen is much lower than of compressed air, making nitrogen much more effective at drying out the inside of a sprinkler pipe.

- **Oxidation Corrosion.** Oxidation corrosion (also known as rust) occurs inside steel dry and preaction sprinkler pipes in the presence of oxygen and water. This form of corrosion causes thinning of pipe walls, possibly leading to failure under water pressure. Pinhole leaks can occur, leading to water damage. Roughening of the internal pipe surface leads to unpredictable hydraulics, impairing the effectiveness of the sprinkler system. Loose rust particles can clog sprinkler heads, impairing or preventing the discharge of water onto a fire. Prevention of oxidation corrosion results in longer life and better functionality of the sprinkler system. Oxidation corrosion can be inhibited by using nitrogen to displace oxygen and dry out the inside of the pipe.

- **Oxygen (O_2).** Oxygen is a naturally occurring diatomic gas present in Earth's atmosphere at a concentration of approximately 21% (v/v). Oxygen is vented from the Model SC-W assembly after being separated from dried compressed air by the separator membrane.

- **Purging.** Because of its low dew point, the nitrogen introduced into the sprinkler piping by the **NITROGEN- PAC™** system absorbs liquid water. To ensure complete drying of the pipe interior, saturated nitrogen within the pipe must be replaced by dry nitrogen. Purging ensures that this process occurs.

1.2. SYSTEM PURPOSE. The **FM Approved UNITED Fire Systems NITROGEN-PAC™** Model SC-W Sprinkler Corrosion Inhibiting System is a fully integrated nitrogen generating system designed to introduce high-purity nitrogen into preaction or dry sprinkler piping. **NITROGEN-PAC™** replaces the existing air compressor, providing the necessary supervisory pressure in the form of nitrogen instead of air. **NITROGEN-PAC™** occupies minimal space, operates quietly, and can be installed near the sprinkler system riser(s).

The interior of preaction and dry sprinkler piping is subject to corrosion, which can lead to clogged sprinkler heads, leaks, and pipe failure. This corrosion can be of two distinct types. Oxidation corrosion takes place in the presence of oxygen, and is accelerated by the presence of water. Microbiologically influenced corrosion (MIC) takes place in the presence of certain microbes that attack metal, again in the presence of water and in many cases oxygen. Reducing the damaging effects of corrosion is best accomplished by greatly reducing or eliminating the amount of water and oxygen left in the pipe. Ordinary air compressors used to provide supervisory pressure keep the oxygen concentration inside the pipe the same as normal air – ideal for oxidation corrosion to take place. Ordinary compressors also do not dry the air – residual water from system testing remains in low points, and moist air can actually increase standing water within pipes from condensation. The introduction of high-purity dry nitrogen with a low dew point reduces or eliminates these two problems. The interior of the pipe remains dry, with very little oxygen remaining to attack the metal.

1.3. FUNCTIONAL DESCRIPTION. Refer to **Figure 1**.

Model SC-W Assembly. This assembly generates either 98% pure nitrogen for protection or air for initial-fill of the sprinkler piping

Outlet Hose. Vibration from the air compressor inside the Model SC-W assembly is damped by the outlet hose, minimizing transmission of the vibration to the piping.

Nitrogen Receiver. Compressor runtime and the number of start / stop cycles are minimized by having a reservoir of nitrogen stored in the nitrogen receiver.

Nitrogen / Air Maintenance Device. Air and nitrogen pressure is properly regulated and delivered to the sprinkler valve by this device.

Preaction or Dry-Pipe Sprinkler Valve. The trim of the sprinkler valve receives the gas pressure from the nitrogen / air maintenance device.

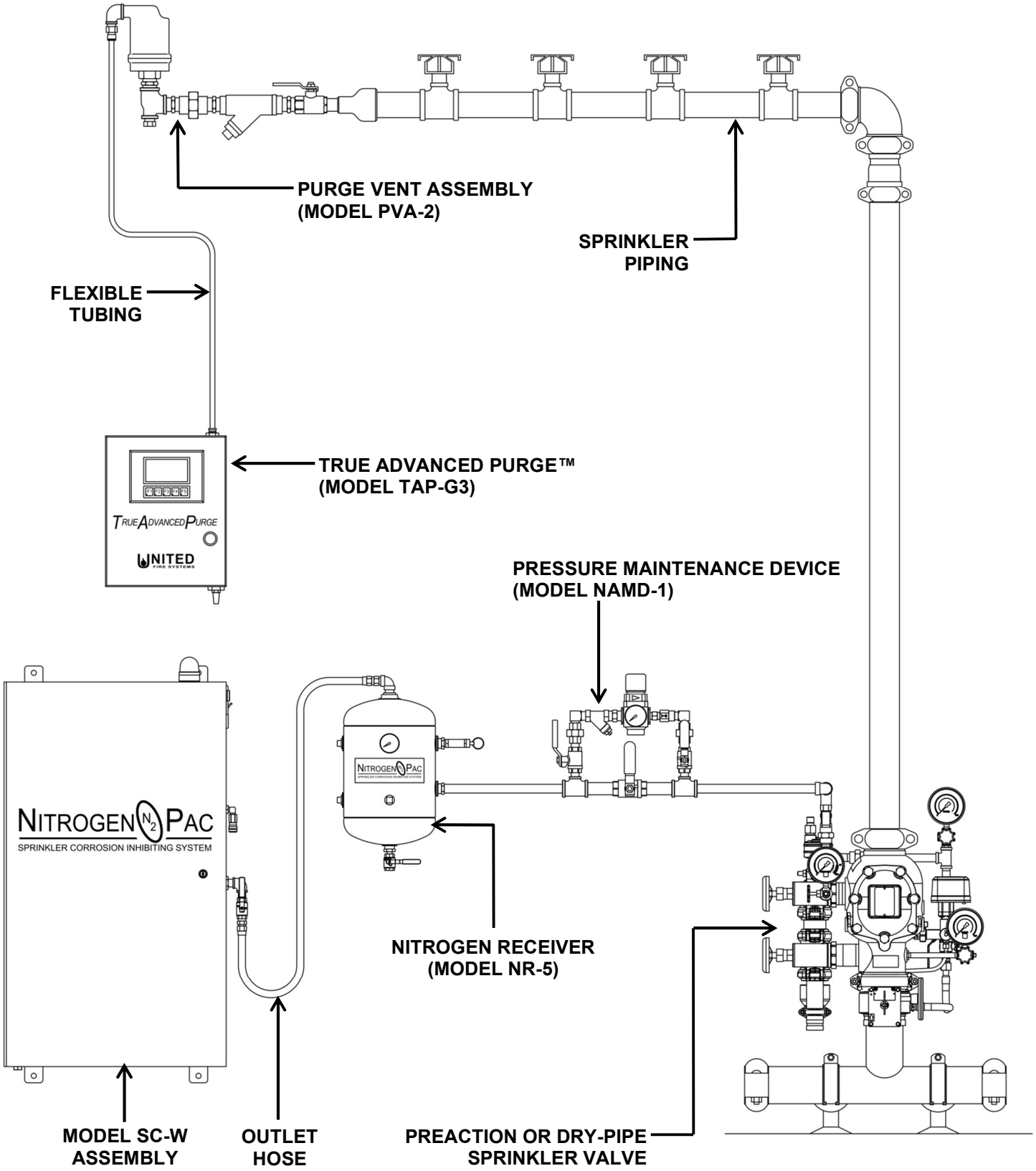
Sprinkler Piping. The interior of the sprinkler piping is protected against oxidation corrosion and MIC by the 98% purity N_2 generated by the **NITROGEN-PAC™** Model SC-W assembly.

Purge Vent Assembly. Air is purged from the sprinkler piping and replaced by 98% pure nitrogen by the Purge Vent Assembly.

(Optional) Flexible Tubing. Optional) Flexible tubing connects the Purge Vent Assembly to the True Advanced Purge (Model TAP-G3) device.

(Optional) TRUE ADVANCED PURGE™ Device Model TAP-G3 with ADC. The True Advanced Purge (Model TAP-G3) device provides automatic control of system purging and includes permanently-connected nitrogen purity monitoring.

Figure 1
Functional Description and General Arrangement



1.4. Model SC-W Assembly – Internal Arrangement. Refer to **Figure 2.**

Air Compressor. The air compressor supplies compressed air for either nitrogen separation or sprinkler system initial fill, depending on the position of the Bypass Valve. The compressor's inlet filter is an important periodic maintenance item (refer to Section 5 - Maintenance).

Intercooler. The intercooler lowers the temperature of the compressed air, condensing water vapor into liquid water for removal by the water separator. A fan draws external air across the intercooler coils. The fan filter is an important periodic maintenance item (refer to Section 5 - Maintenance).

Water Separator. The water separator consists of a rugged cast aluminum housing and a filter element with a stainless steel support core and high performance separator media. The water separator removes condensed water from the compressed air, allowing the water to drain.

Pressure Regulator. The regulator is factory-adjusted to provide the proper compressed air pressure for nitrogen separation. **THIS IS NOT A USER-ADJUSTABLE COMPONENT. DO NOT attempt to adjust the regulator unless instructed to do so by UNITED Fire Systems!**

Particulate Filter. The particulate filter consists of a rugged cast aluminum housing and a filter element with a stainless steel support core and high performance filter media. The particulate filter separates particulate matter from the dried compressed air stream, with the air flowing from the outside of the element to the inside. Periodic replacement of the filter element is an important maintenance item to protect the separator membrane from contamination (refer to Section 5 - Maintenance).

Coalescing Filter. The coalescing filter consists of a rugged cast aluminum housing and a filter element with a stainless steel support core and high performance filter media. The coalescing filter separates oil from the dried compressed air stream, with the air flowing from the inside of the element to the outside. Periodic replacement of the filter element is an important maintenance item to protect the separator membrane from contamination (refer to Section 5 - Maintenance).

Nitrogen Separator Membrane. When dried compressed air is supplied to the inlet of the nitrogen separator membrane, the smaller oxygen and other gas molecules permeate through the walls of hollow fiber membranes. The larger nitrogen molecules flow through the fibers, exit the ends of the fibers, and then discharge 98% purity nitrogen from the outlet of the separator membrane.

Needle Valve. The needle valve is factory-adjusted to provide back pressure to the separator membrane. Proper back pressure results in the production of 98% pure nitrogen. **THIS IS NOT A USER-ADJUSTABLE COMPONENT. DO NOT attempt to adjust the needle valve unless instructed to do so by UNITED Fire Systems!**

Bypass Valve. The Bypass Valve is used to place the Model SC-W assembly into **NORMAL** or **BYPASS** mode. **NORMAL** mode sends the dried compressed air to the separator membrane, resulting in 98% pure nitrogen being sent to the sprinkler system piping. **BYPASS** mode sends the dried compressed air directly to the sprinkler system piping for 30 minute initial fill as required by NFPA 13.

Outlet Valve. The outlet valve is used to turn on and shut off the gas flow from the outlet of the Model SC-W assembly.

Enclosure Inlet Filter. The enclosure inlet filter traps dust from entering the cabinet. Periodic replacement of the filter element is an important maintenance item to protect the separator membrane from contamination (refer to Section 5 - Maintenance).

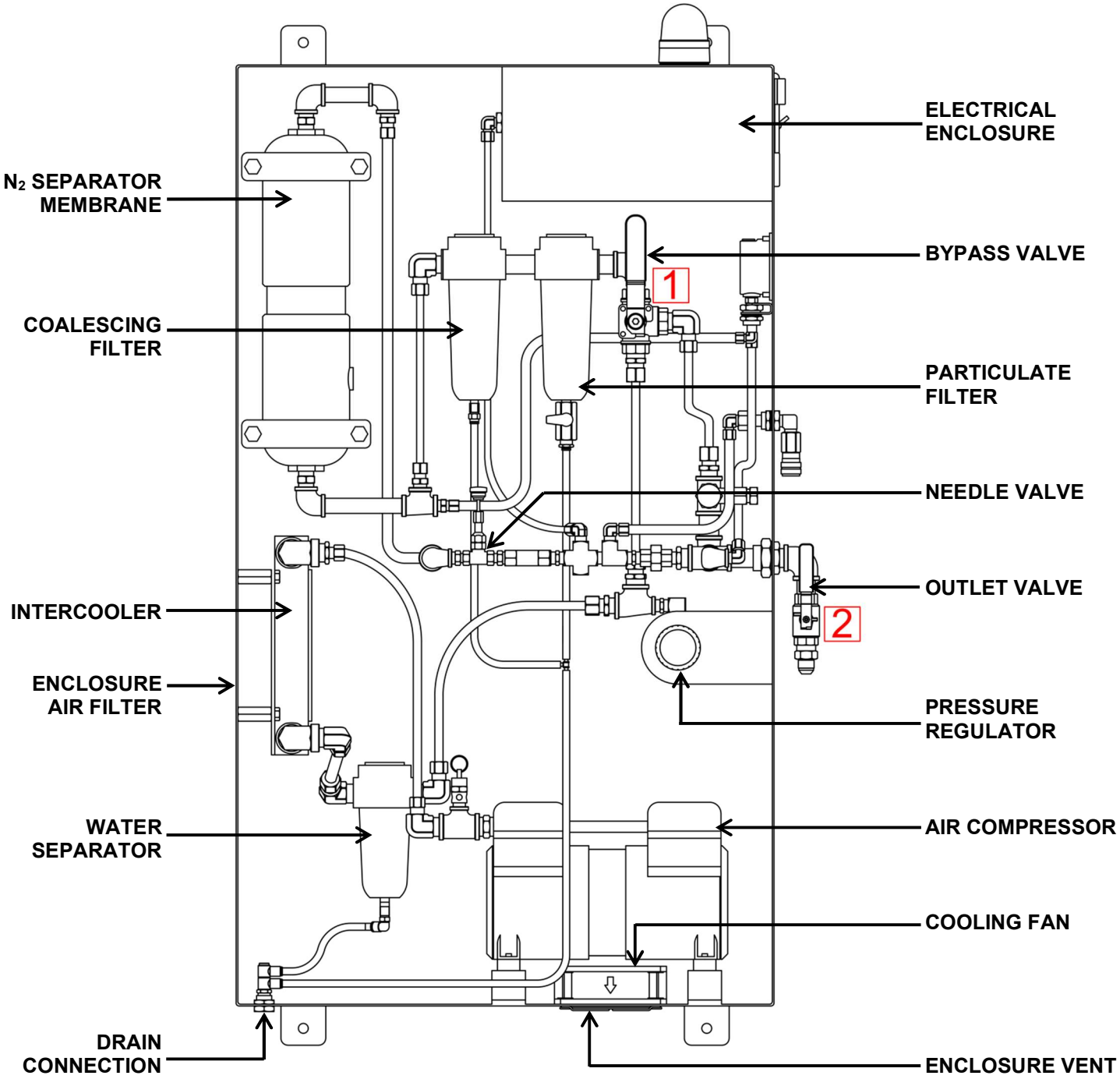
Cooling Fan. The cooling fan draws air through the cabinet, keeping the air compressor cool.

Enclosure Vent. The enclosure vent permits exhaust of compressor cooling air and oxygen from the nitrogen separator membrane.

Electrical Connection Enclosure. The 115 VAC power connection is made inside the electrical connection enclosure.

Drain Connection. Water removed from the compressed air exits at the drain connection.

Figure 2
Model SC-W Assembly - Internal Arrangement



1.5. Model SC-W Assembly – External Arrangement. Refer to **Figure 3.**

1.5.1. Connections.

AC Power Raceway Connection Point. This is the location where raceway is attached to the Model SC-W enclosure for the three (3) conductors carrying 115 VAC 60 Hz single-phase device power.

Alternate AC Power Raceway Connection Point. This is an alternate location where raceway can be attached to the Model SC-W enclosure for the three (3) conductors carrying 115 VAC 60 Hz single-phase device power. Refer to Section 3 – Installation for specific information on the use of this connection point.

Outlet Connection Point. This is the point where the Model SC-W assembly is connected to the nitrogen receiver. The outlet hose (UFS P/N 32-000038-000 – included with assembly) should be connected to the outlet connection point at installation. Refer to Section 3 - Installation for information on connecting to this point.

N_2 Purity Analyzer Connection Point. The Model NA-2 N_2 Purity Analyzer (qty. (1) included with each Model SC-W assembly – refer to Appendix A) may be connected here to verify that the Model SC-W assembly is producing 98% pure nitrogen.

Drain Connection Point. This is the connection point for pipe or tubing to drain away water condensed and separated from the compressed air.

1.5.2. Indicators.

Power On Visual Indicator. This **GREEN** indicator is illuminated when 115 VAC 60 Hz single phase power is applied to the device and the ON / OFF Selector Switch (refer to **Figure 3**) is in the **ON** position.

Bypass Visual Indicator. This indicator flashes **RED** to indicate that the Model SC-W assembly is in **BYPASS** mode, capable of delivering compressed air to the sprinkler system for 30 minute initial fill.

Compressor Runtime Monitor. This is a digital display that monitors the total hours and minutes that the compressor motor has run. This information can be used to evaluate the condition of the sprinkler system.

Pressure Gauges. These pressure gauges monitor the gas pressure upstream and downstream of the separator membrane (refer to **Figure 3**). This information can be used to evaluate the condition of the Model SC-W assembly, and to verify that the assembly is properly de-pressurized for maintenance (refer to Section 5 - Maintenance).

1.5.3. Controls.

ON / OFF Selector Switch. This switch selects device power **ON** or **OFF**.

Outlet Valve. This quarter-turn ball valve is used to open and close the Model SC-W assembly outlet.. Refer to Section 4 - Commissioning, Section 5 - Maintenance, and Section 6 - Troubleshooting for information on when this valve should be used.

1.5.4 Other.

Enclosure Ventilation Inlet. This location is where fresh air enters the Model SC-W assembly enclosure. A foam filter (refer to Section 5 – Maintenance) reduces dust accumulation inside the enclosure. It is vitally important that this vent be kept clear to permit unimpeded airflow.

Enclosure Vent. Vent slots are built-in to the Model SC-W assembly enclosure to permit venting of heated air and oxygen. An exhaust fan inside the enclosure forces the heated air and oxygen out. It is vitally important that this vent be kept clear to permit unimpeded airflow.

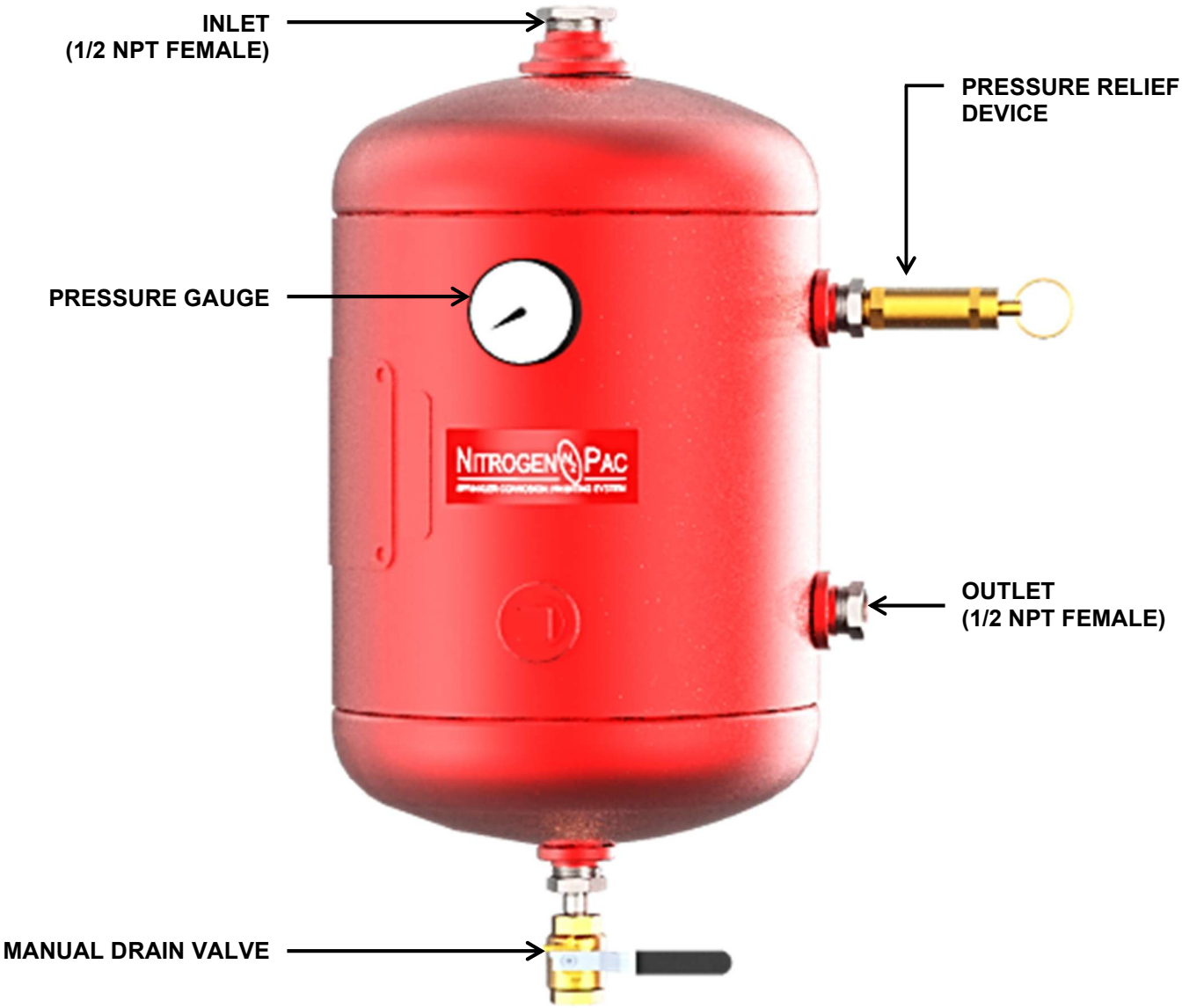
Mounting Ears. Refer to Section 3 – Installation for use of the four (4) mounting ears to attach the Model SC-W assembly to the mounting surface.

Figure 3
Model SC-W Assembly – External Arrangement



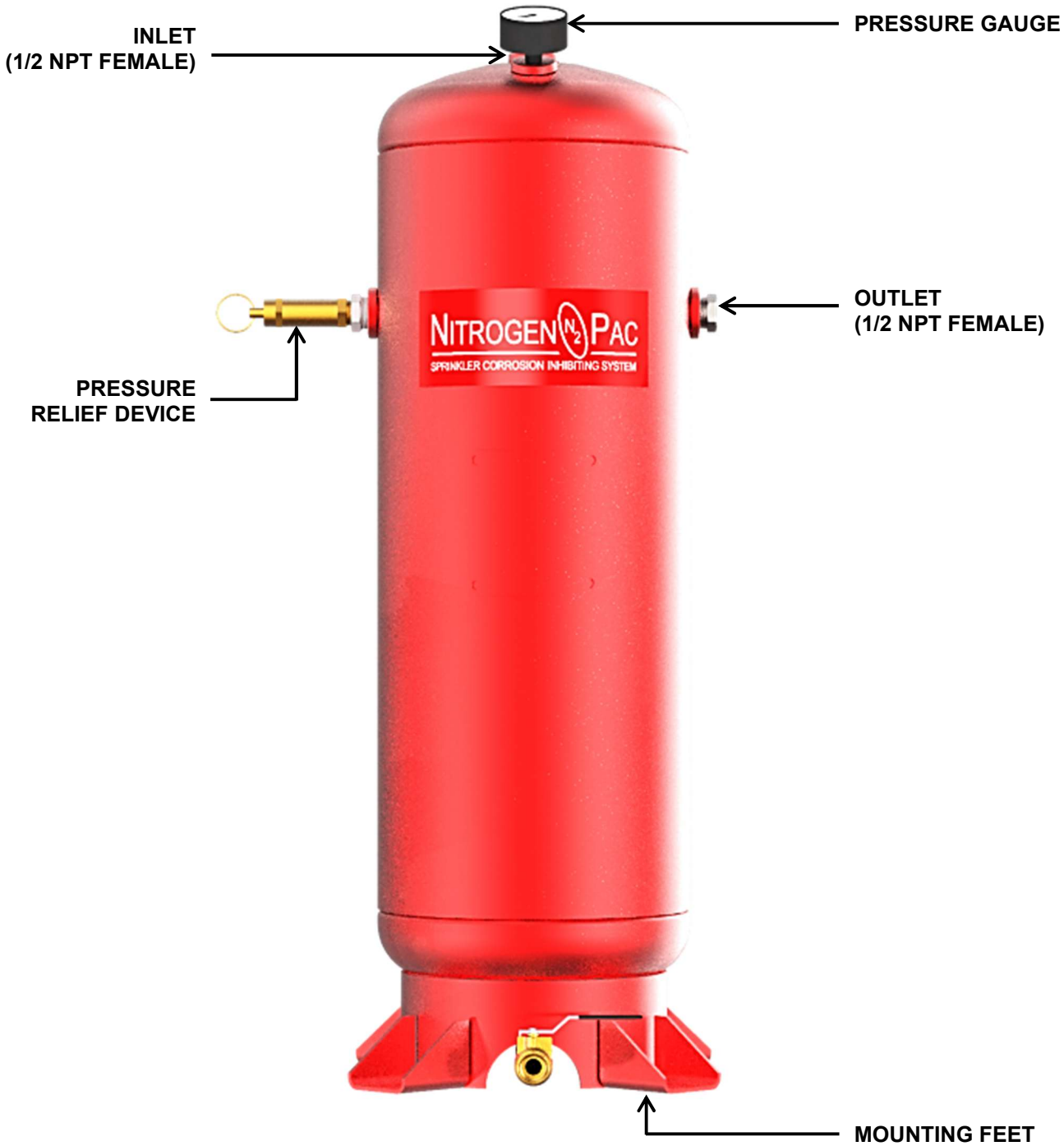
1.6. Nitrogen Receiver, 5 Gallon, Wall-Mount or Riser-Mount – Model NR-5. Refer to **Figure 4**. The Model NR-5 Wall-Mount or Riser-Mount 5 Gallon Nitrogen Receiver is a steel tank for receiving and storing nitrogen from the Model SC-W assembly, and minimizes the Model SC-W assembly compressor runtime by providing a reservoir of nitrogen for the sprinkler system. The nitrogen receiver is designed to be mounted vertically on the wall near the Model SC-W assembly, near the sprinkler system valve(s), or on a sprinkler riser. The tank is manufactured to ASME Section VIII Division I. The device includes an inlet fitting at the top, an outlet fitting on the side, and a manual drain valve at the bottom. Integral brackets permit easy mounting. The device is required to be mounted vertically as shown, so that water drainage can be accomplished.

Figure 4
Nitrogen Receiver – Model NR-5



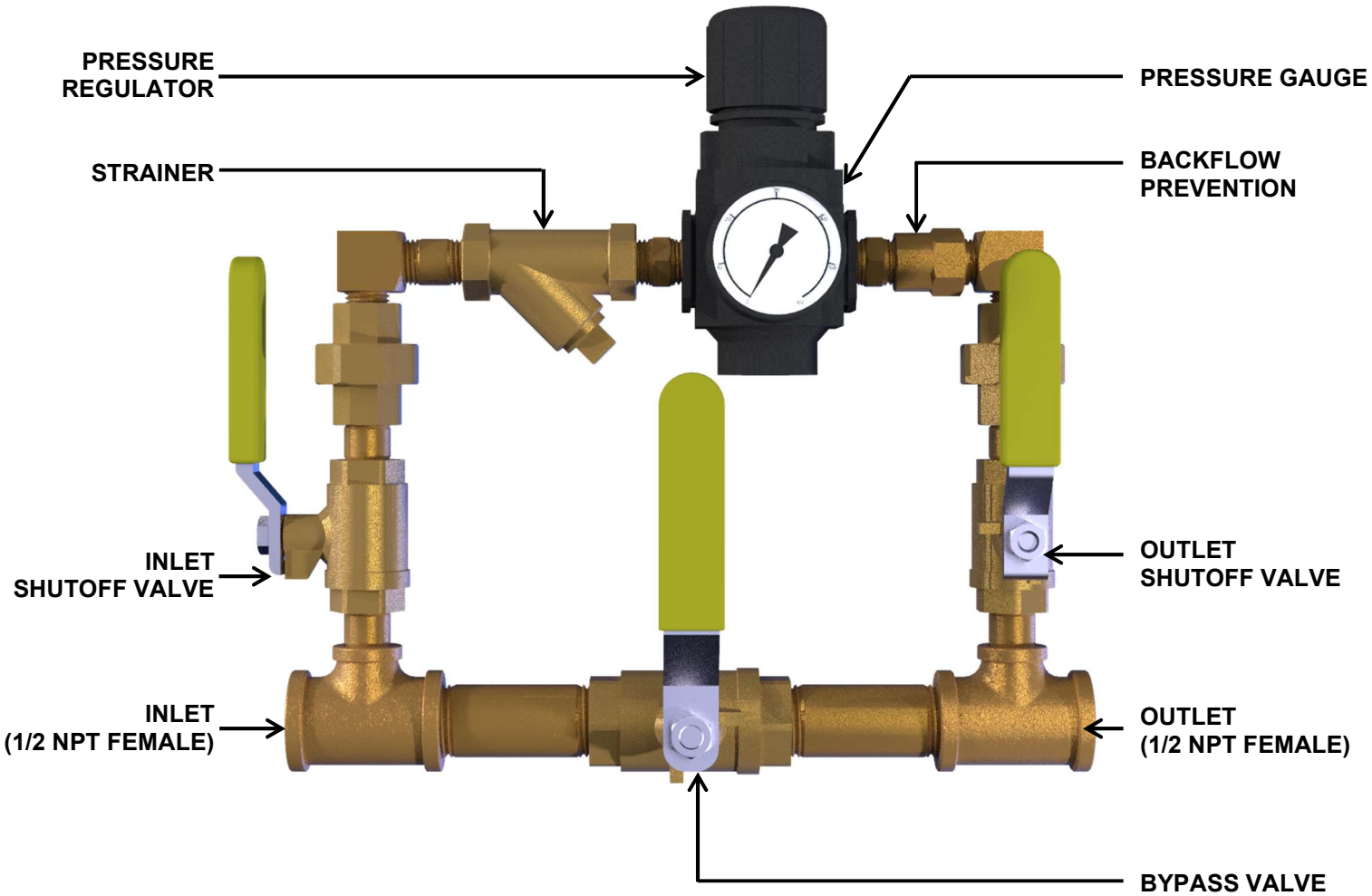
1.7. Nitrogen Receiver, 10 Gallon, Floor-Mount, Vertical – Model NR-10. Refer to **Figure 5**. The Model NR-10 Floor-Mount 10 Gallon Nitrogen Receiver is a steel tank for receiving and storing nitrogen from the Model SC-W assembly, and minimizes the Model SC-W assembly compressor runtime by providing a reservoir of nitrogen for the sprinkler system. The nitrogen receiver is designed to be floor-mounted, when wall- or riser-mount of a nitrogen receiver is not practical. The tank is manufactured to ASME Section VIII Division I. The device includes an inlet fitting at the top, an outlet fitting on the side, and a manual drain valve at the bottom. The device is required to be mounted vertically as shown, so that water drainage can be accomplished.

Figure 5
Nitrogen Receiver – Model NR-10



1.8. Nitrogen / Air Maintenance Device – Model NAMD-1. Refer to **Figure 6**. The FM Approved Model NAMD-1 Nitrogen / Air Maintenance Device is designed for controlling the nitrogen and / or air pressure from the Model SC-W assembly into the sprinkler piping. The gas pressure flows through a high-precision pressure regulator capable of providing accurate regulation over a wide range of inlet pressures and gas flows. Upon activation of a sprinkler head, the gas pressure will not interfere with the operation of the sprinkler valve or unduly lengthen the time for the sprinkler piping to fill with water. Manual ball valves allow the device to be bypassed for initial-fill of the piping with air. A strainer protects the regulator from particulate matter.

Figure 6
Nitrogen / Air Maintenance Device – Model NAMD-1

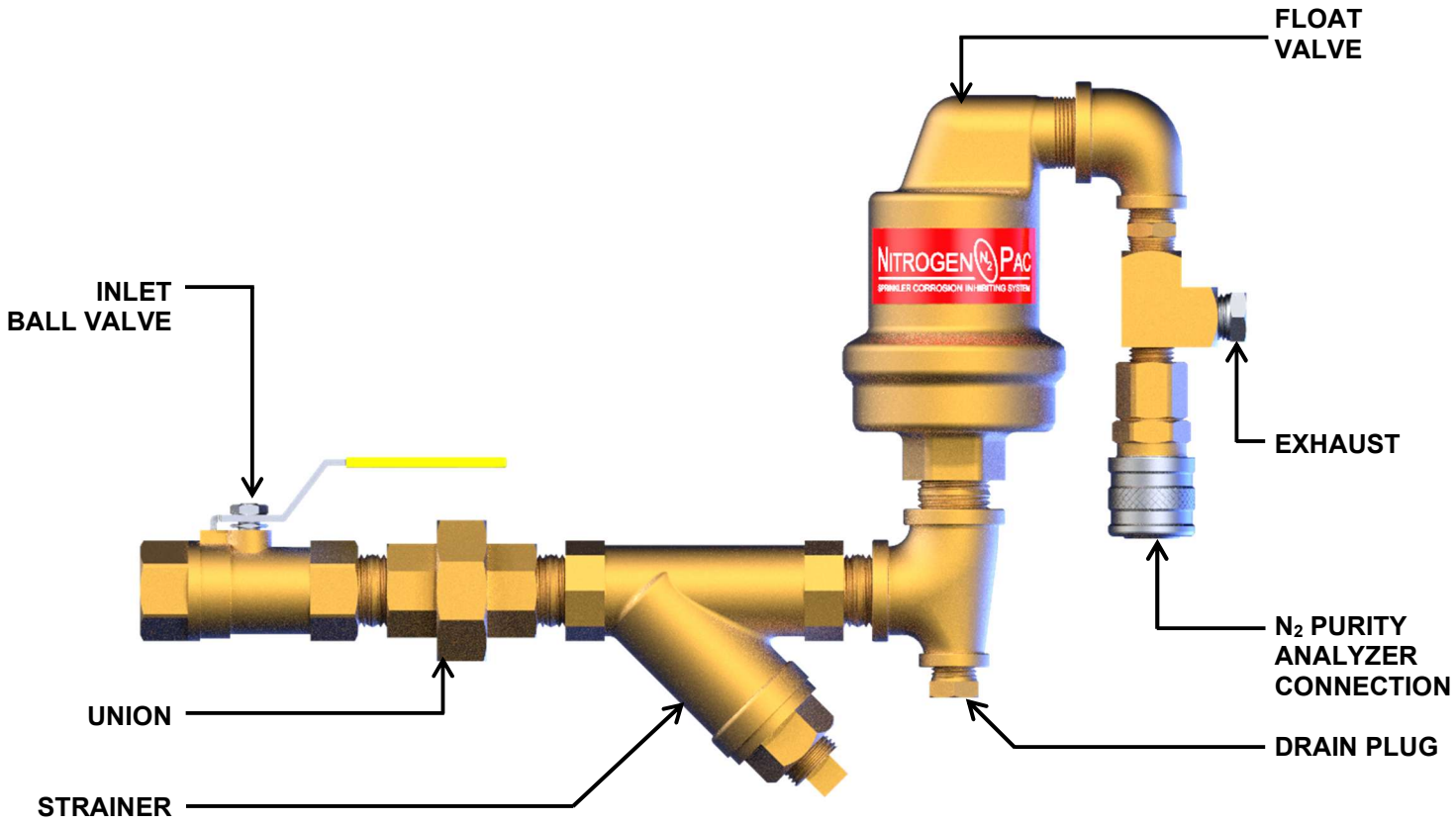


FM APPROVED

1.9 Purge Vent Assemblies. Purge vent assemblies purge gas from the interior of the sprinkler pipe, allowing the Model SC-W assembly to replace air with 98% pure nitrogen. This assembly should be connected to the sprinkler piping at a high point in the vicinity of the inspector's test connection. A float valve prevents the escape of water when the sprinkler valve opens and the sprinkler piping fills with water. A fixed orifice regulates the amount of gas leaving the pipe. A union facilitates installation and positioning. A strainer helps prevent blockage of the orifice by debris. A drain plug allows occasional removal of accumulated liquid water. A minimum of one (1) purge vent assembly (PVA) is required for each sprinkler riser to be filled with nitrogen.

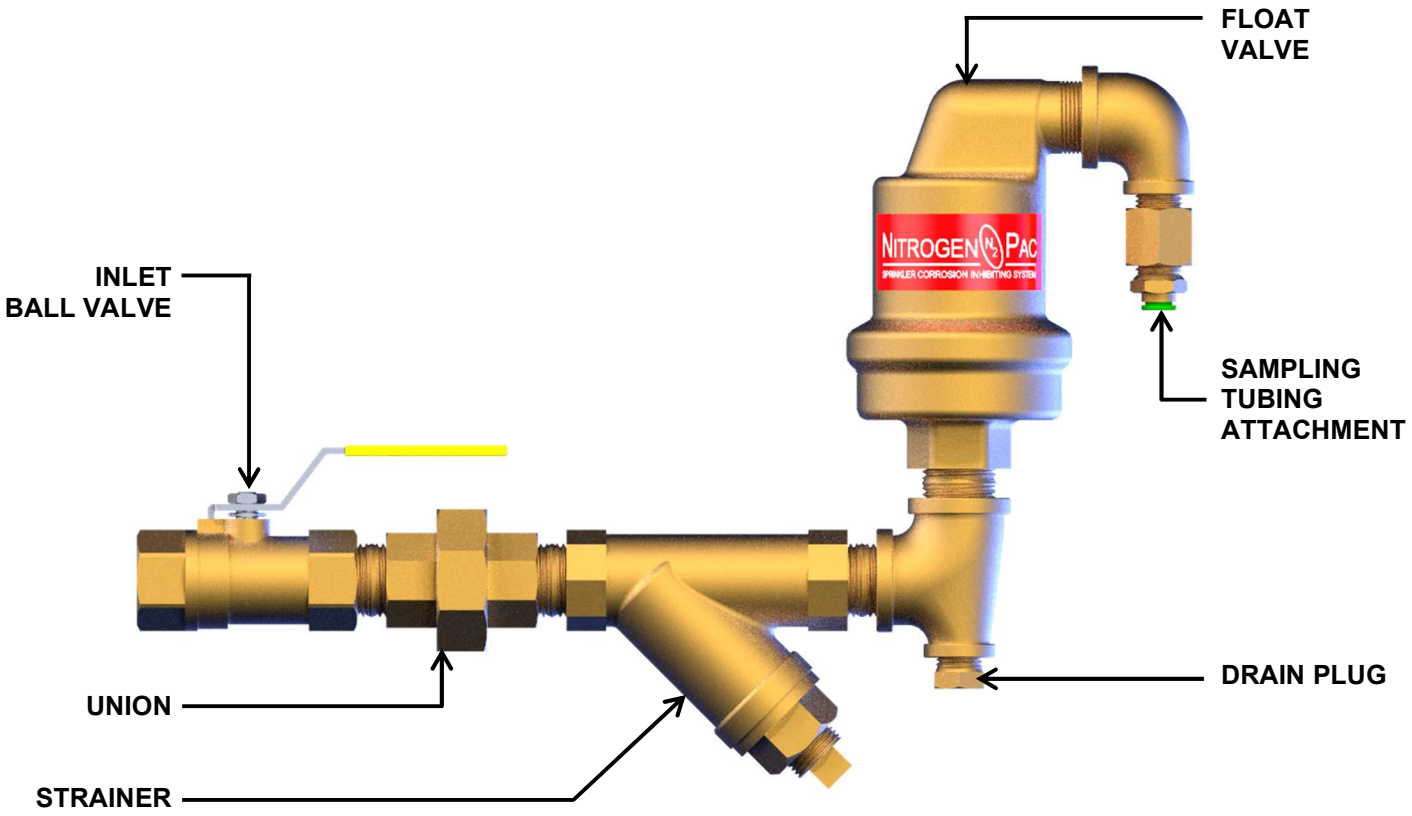
1.9.1. Purge Vent Assembly – Model PVA-4 (For Manual Purging). Refer to **Figure 7**. The Model PVA-4 Purge Vent Assembly serves as a connection point for a Model NA-2 N_2 Purity Analyzer - Hand-Held (refer to Appendix A) to manually measure the purity of nitrogen in the sprinkler pipe. The device includes a built-in exhaust muffler to minimize the noise of purging gas. The N_2 purity analyzer female connection point is normally closed, and automatically opens when the male connector of the analyzer is attached.

Figure 7
Purge Vent Assembly – Model PVA-4 (For Manual Purging)



1.9.2 Purge Vent Assembly – Model PVA-2 (for TRUE ADVANCED PURGE™ Device). Refer to **Figure 8**. The Model PVA-2 Purge Vent Assembly serves as the connection point for flexible tubing that directs gas from the inside of the sprinkler pipe to a **UNITED Fire Systems TRUE ADVANCED PURGE (TAP)** device (refer to **1.11**).

Figure 8
Purge Vent Assembly – Model PVA-2 (For TRUE ADVANCED PURGE™ Device)



1.10. N_2 Purity Analyzer, Hand-Held – Model NA-2. Refer to **Figure 9**. The Model NA-2 hand-held N_2 purity analyzer is designed to permit manual verification of the N_2 purity at either the Model SC-W assembly N_2 purity analyzer connection point or at a Model PVA-4 purge vent assembly. Occasional verification at the Model SC-W assembly provides assurance that the device is performing as intended. Verification at the purge vent assembly provides assurance that 98% N_2 purity is present in the sprinkler piping. The analyzer is hand-held, battery-operated, and contains a large 3-digit display directly reading the N_2 purity in percent. The analyzer is equipped with a length of flexible tubing with a male quick-connect fitting that is compatible with the female quick-connect fittings on the Model SC-W assembly and the Model PVA-4 purge vent assembly. Qty. (1) Model NA-2 analyzer is included with each Model SC-W assembly. The battery in the Model NA-2 analyzer is not replaceable. The entire assembly must be replaced when the battery has reached the end of its useful life.

Figure 9
N_2 Purity Analyzer, Hand-Held – Model NA-2



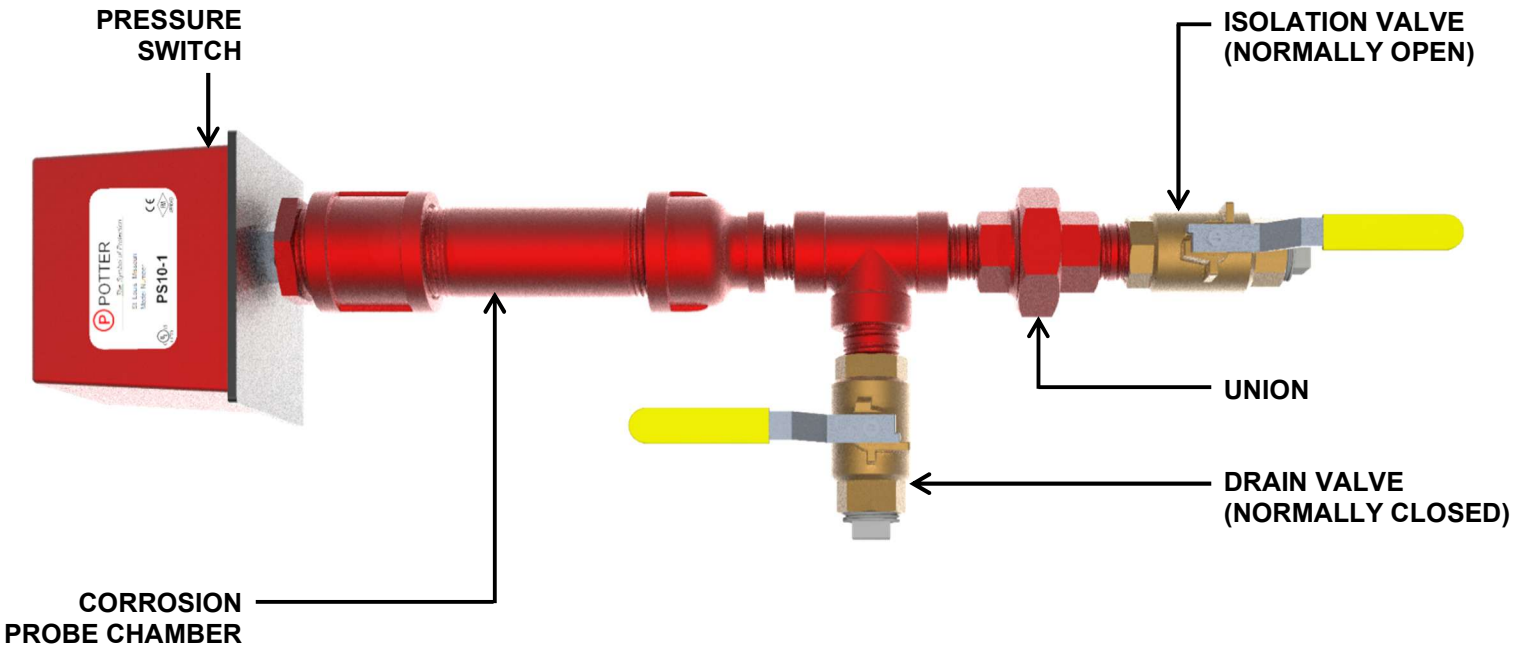
1.11. (Optional) TRUE ADVANCED PURGE (TAP) Device – Model TAP-G3. Refer to **Figure 10**. The Model TAP-G3 device is designed to automatically control the purging of air from the interior of the sprinkler piping. The device is also a permanently connected N_2 purity analyzer for the sprinkler piping, avoiding the need for manual verification of N_2 purity in the piping. Use the Model PVA-2 Purge Vent Assembly with the Model TAP-G3 device. The device is shipped with twenty (20) feet of plenum-rated flexible connection tubing (UFS P/N 33-000003-020). Refer to UFS P/N 33-TG3USE-000 – User Guide and UFS P/N 33-TG3ICM-000 - Installation, Commissioning, and Maintenance Manual (both included with device) for additional information.

Figure 10
TRUE ADVANCED PURGE (TAP) Device – Model TAP-G3



1.12. (Optional) Corrosion Monitor Assembly – Model CMA-1. Refer to **Figure 11**. The Model CMA-1 Corrosion Monitor Assembly is designed to monitor for possible corrosion inside the sprinkler piping. The assembly consists of a corrosion probe in a chamber, a pressure switch, an isolation valve, and a drain valve. The corrosion probe, when intact, keeps pressure from reaching the pressure switch. When corrosion perforates the probe, pressure reaches the pressure switch, actuating a volt-free contact providing an early-warning signal of possible corrosion occurring inside the piping. The isolation valve permits replacement of the corrosion probe without depressurizing the entire system and the drain valve permits safe venting of pressure from the probe chamber.

Figure 11
Corrosion Monitor Assembly – Model CMA-1



2. EQUIPMENT SELECTION

2.1 Introduction. This section outlines the steps to determine when the **UNITED Fire Systems NITROGEN-PAC™** Model SC-W sprinkler corrosion inhibiting system capacity is sufficient for the sprinkler system. If the required needs exceed the capacity of the Model SC-W assembly, an alternate **NITROGEN-PAC™** SC or M Series system should be considered. The entire section should be reviewed and understood by system designers and installers. Proper equipment selection will result in the longest possible system life, fewest number of facility interruptions such as water leaks, pipe ruptures, inadvertent valve trips, and spurious low air signals, and the lowest possible cost for initial equipment, commissioning, operation (especially run time), and ongoing maintenance and repairs.

2.2 Basis for Equipment Selection. Equipment for Model SC-W sprinkler corrosion inhibiting systems is based on the relevant portions of NFPA 13, *Standard for the Installation of Sprinkler Systems*, NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, and the industry-standard target of 98% minimum purity nitrogen in each sprinkler system.

2.3 Steps to Follow.

(a) Read, understand, and follow the instructions in this manual.

(b) Perform a survey of the sprinkler system(s) to be supplied with nitrogen

(c) Use survey information to determine if the Model SC-W is the proper nitrogen generator assembly(s) to be supplied and all other components needed for a complete system.

2.4 Information To Be Obtained During Survey. Refer to **Table 1**.

Table 1
Information To Be Obtained During Survey

Item No.	Item	Result
1	How many sprinkler risers are to be protected?	**1 or 2** - Use (1) Model SC-W assembly
		3 or more: Use: • Multiple Model SC-W assemblies • Model SC-1 or SC-2 assembly • M Series system.
2	What is the volume of Riser 1 (in gallons)?	This is fundamental to determine if the Model SC-W assembly can supply sufficient nitrogen and, if desired, initial-fill air.
	What is the volume of Riser 2 (in gallons)?	
3	What is the volume of the SINGLE LARGEST riser (in gallons)?	This is used to determine if the Model SC-W assembly can supply enough initial-fill air for the NFPA 13 required 30-minute initial fill.
4	What is the volume of ALL risers (in gallons)?	Add the riser volumes together from Item 2.
5	What is the supervisory pressure required by Riser 1 (in PSIG)?	The maximum supervisory pressure supplied by any Model SC-W assembly is 40 PSIG.
	What is the supervisory pressure required by Riser 2 (in PSIG)?	

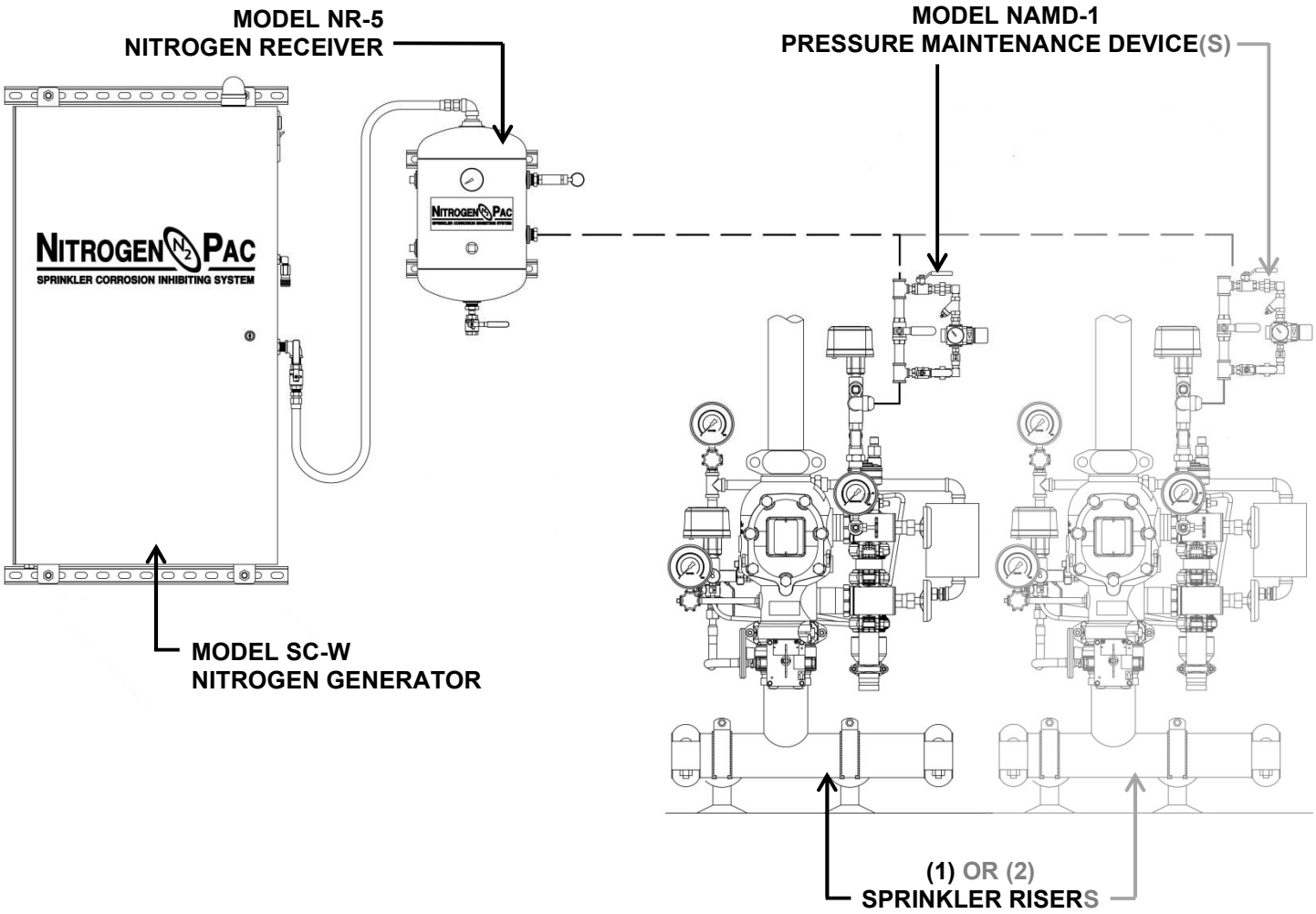
Table 1
Information To Be Obtained During Survey (Continued)

Item No.	Item	Result
6	Is the nitrogen system required to provide initial-fill air in the NFPA 13 required 30 minutes?	If **YES**, then the Model SC-W compressor must supply enough air for BOTH initial-fill and nitrogen generation for all risers.
		If **NO**, then the Model SC-W compressor must only supply air for nitrogen generation. An external compressor must be used for initial-fill.
7	Are the sprinkler systems NEW or EXISTING?	If **NEW**, significant gas pressure leakage is not likely. The maximum leakage is 1-1/2 PSIG in 24 hours starting at 40 PSIG.
		If **EXISTING**, significant gas pressure leakage is likely. To ensure minimum compressor run time and lengthen compressor life, test for and correct leaks until total leakage is no more than 1-1/2 PSIG in 24 hours starting at 40 PSIG.
8	Are any of the sprinkler system(s) equipped with quick-opening devices (dry accelerators)?	If **YES**, the action of the dry accelerator during purging is important. To avoid inadvertent sprinkler valve tripping, consider replacing the dry accelerator with a new device, or close the inlet valve to the dry accelerator during purging. **NOTE:** Closing the dry accelerator inlet valve may result in lengthened time for water to reach the most remote sprinkler head(s). Ensure that the Authorities Having Jurisdiction and the owner are in agreement regarding closing the dry accelerator inlet valve
		If **NO**, no additional consideration is needed.
9	Where will the nitrogen receiver be located?	If **WALL-MOUNT**, choose Model NR-5.
		If **RISER-MOUNT**, choose Model NR-5.
		If **FLOOR-MOUNT**, choose Model NR-10.
10	Will Riser 1 have manual or automatic N_2 purity sensing and purging?	If **MANUAL**, no additional consideration is necessary.
		If **AUTOMATIC**, choose **TRUE ADVANCED PURGE™ Model TAP-G3** device.
	Will Riser 2 have manual or automatic N_2 purity sensing and purging?	If **MANUAL**, no additional consideration is necessary.
		If **AUTOMATIC**, choose **TRUE ADVANCED PURGE™ Model TAP-G3** device.
11	Will Riser 1 need automatic corrosion monitoring?	If **YES**, include a Model CMA-1 – Corrosion Monitor Assembly.
		If **NO**, no additional consideration is necessary.
	Will Riser 2 need automatic corrosion monitoring?	If **YES**, include a Model CMA-1 – Corrosion Monitor Assembly.
		If **NO**, no additional consideration is necessary.

2.5 System Arrangements. Either of two system arrangements may be used.

2.5.1 Type I Arrangement. Refer to **Figure 12.** Type I arrangements use the compressor built-in to the Model SC-W assembly for nitrogen generation as well as for 30-minute initial-fill as required by NFPA 13, and have no additional external compressor. Type I arrangements can be used for single-riser or two-riser systems.

Figure 12
Type I Model SC-W System Arrangement
Shown With Model NR-5 Wall-Mount Nitrogen Receiver

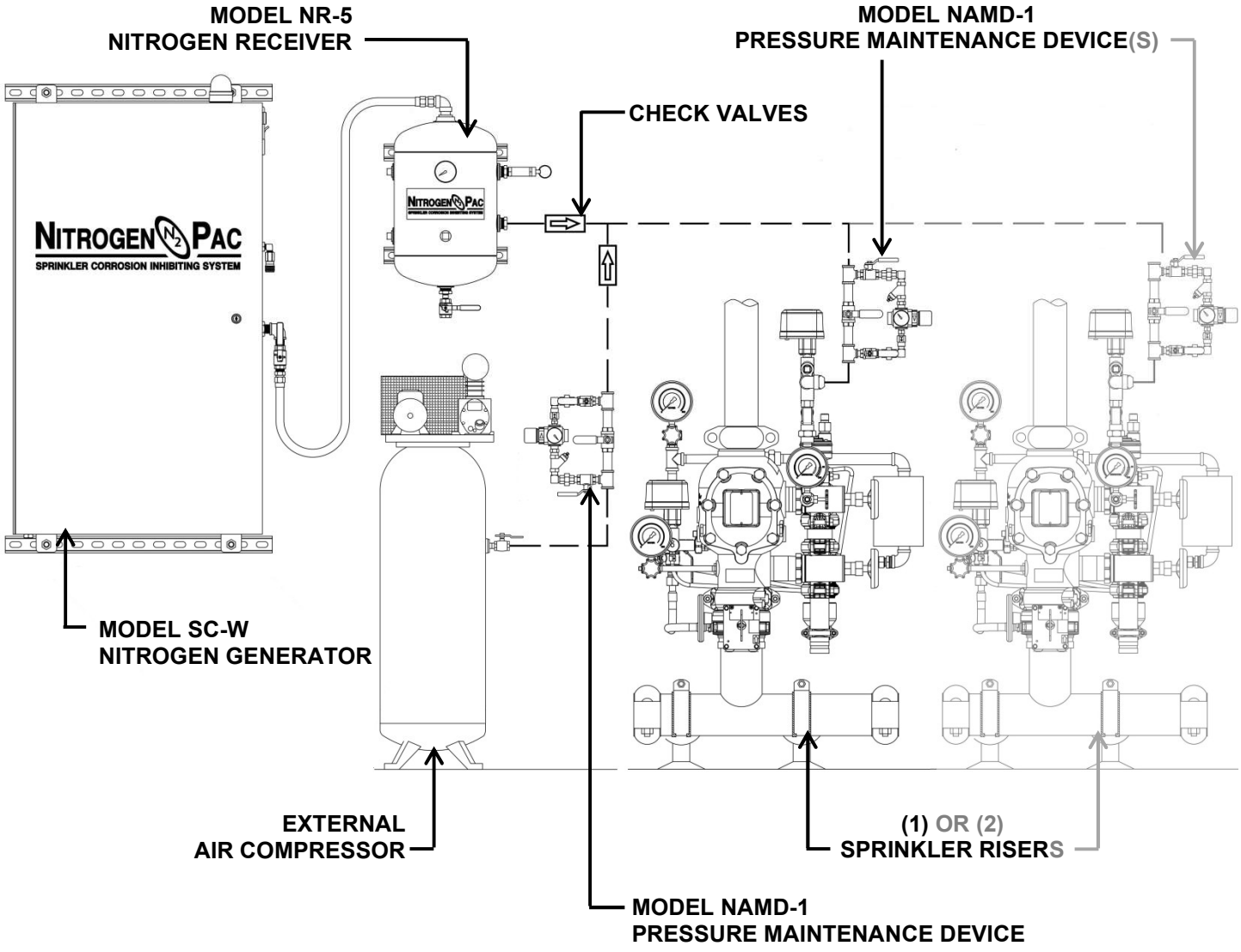


IMPORTANT

Type I arrangements are NOT RECOMMENDED for use with dry-pipe sprinkler systems. Use Type I arrangements for preaction sprinkler systems only. Further information is provided in **Section 2.5.2** – Type II Arrangements.

2.5.2 Type II Arrangement. Refer to **Figure 13**. Type II arrangements use an additional external air compressor to provide 30-minute initial air fill and also can provide a backup pressure source to avoid inadvertent tripping of dry-pipe systems in the event of excessive leakage or nitrogen system failure. Type II arrangements can be used for single-riser or two-riser systems. Installer-supplied check valves shall be used to separate the Model SC-W assembly pressure source from the additional air compressor pressure source. Check valves should be brass, rated for minimum 500 PSIG at 70° F, have a minimum opening pressure of 1 PSIG, and be spring-loaded to permit mounting in any configuration. An acceptable check valve is McMaster-Carr 7768K14 (1/2" NPT female x female) or McMaster-Carr 7768K41 (3/4" NPT female x female).

Figure 13
Type II Model SC-W System Arrangement
Shown With Model NR-5 Wall-Mount Nitrogen Receiver



2.6 Ensuring NITROGEN-PAC™ Model SC-W is Appropriate for the Sprinkler System in Use. Refer to **Table 2**. The Model SC-W assembly must meet or exceed all applicable limits determined by the survey.

Table 2
Maximum Limits – NITROGEN-PAC™ Model SC-W Assembly

WHEN SC-W IS REQUIRED TO PROVIDE INITIAL-FILL (TYPE I)			
MAXIMUM NUMBER OF RISERS	MAXIMUM VOLUME OF ALL RISERS (IN GALLONS)	SINGLE LARGEST RISER (IN GALLONS)	
		UP TO 20 PSIG SUPERVISORY PRESSURE	UP TO 40 PSIG SUPERVISORY PRESSURE
2	900	500	200
WHEN SC-W IS NOT REQUIRED TO PROVIDE INITIAL-FILL (TYPE II)			
MAXIMUM NUMBER OF RISERS	MAXIMUM VOLUME OF ALL RISERS (IN GALLONS)	SINGLE LARGEST RISER (IN GALLONS)	
		UP TO 20 PSIG SUPERVISORY PRESSURE	UP TO 40 PSIG SUPERVISORY PRESSURE
2	900	900	900

2.6.1. Maximum Number of Risers. The maximum number of risers protected by one (1) Model SC-W assembly is two (2). If the number of risers exceeds two (2), use multiple Model SC-W assemblies, or another choice of **NITROGEN-PAC™** system from **UNITED Fire Systems**.

2.6.2. Determining Volume (In Gallons) of Each Sprinkler Riser. Determining the actual volume (in gallons) of each sprinkler riser is necessary to ensure that the Model SC-W assembly is appropriate for the installation being considered.

IMPORTANT

The pipe volume is a fundamental parameter that MUST be determined. If a relatively "inaccurate" method of determining length (such as "pacing off") must be used, make sure that the pipe volume is not underestimated. Underestimating the pipe volume can result in:

1. Not meeting the 30-minute initial-fill requirement.
2. Greatly extended compressor run time, and shortened compressor life.
3. Not reaching or maintaining 98% nitrogen purity in the piping.
4. Not maintaining minimum pipe pressure, resulting in unwanted "low air" signals.

WHEN IN DOUBT, OVERESTIMATE!

One of several methods may be used.

(a) Examine the system layout drawings for completed pipe volume calculations.

(b) Examine the system hydraulic calculation results for completed pipe volume calculations.

(c) Use the system layout drawings to do a "takeoff" of the sizes and lengths of all piping connected to each riser. Use **Table 2** to determine pipe volume based on linear feet of pipe.

(d) As is typical for existing systems, layout drawings and hydraulic calculations may not be available. The last remaining alternative is to do a field survey of all system piping, by size and length.
1. Determine accessible pipe lengths with a tape measure. Use **Table 3** to determine pipe volume based on linear feet of pipe.
2. When pipe is not directly accessible (such as pipe that is hung overhead, above ceilings, or buried in walls), attempt to estimate lengths by "pacing off" each segment. Use **Table 3** to determine pipe volume based on linear feet of pipe.

Table 3
Gallons Per Foot of Pipe
Based On Nominal Pipe Size and Pipe Schedule

Nominal Pipe Size	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	6"	8"
Schedule 40 Pipe	0.016	0.028	0.045	0.078	0.106	0.175	0.249	0.384	0.662	1.501	2.599
Schedule 10 Pipe						0.190	0.284	0.434	0.741	1.649	2.777

2.6.3. Maximum Volume of Single Largest Riser.

(a) When the Model SC-W assembly **IS** required to provide 30-minute initial-fill (no additional air compressor), the maximum volume of the single largest riser is:
1. 500 gallons when the riser supervisory pressure is 20 PSIG or less.
2. 220 gallons when the riser supervisory pressure is over 20 PSIG (up to a maximum of 40 PSIG).

(b) When the Model SC-W assembly is **NOT** required to provide 30-minute initial-fill (separate new or existing air compressor), the maximum volume of the single largest riser is 900 gallons.

2.6.4. Maximum Volume of All Risers. When the volume of each riser has been determined, add these values together to determine the volume of all risers. The maximum volume of all risers is 900 gallons.

2.6.5. Required Supervisory Pressure. Different types of sprinkler valves require different values of supervisory pressure, expressed in PSIG. The maximum supervisory pressure that can be supplied by the Model SC-W assembly is 40 PSIG.

2.6.6. Type I Arrangements – Model SC-W Assembly for Initial-Fill With Air. If no additional new air compressor is to be provided, or if there is no existing air compressor that is to be retained, then the Model SC-W air compressor must supply the initial-fill capability required by NFPA 13. Refer to **Table 2** for the maximum limits of the Model SC-W assembly in this circumstance.

2.6.7. Type II Arrangements – External Air Compressor for Initial-Fill With Air. If a new external air compressor is to be provided, or an existing air compressor will be retained, then refer to **Table 2** for the maximum limits of the Model SC-W assembly in this circumstance.

2.6.8. Are Sprinkler Systems NEW or EXISTING? If the answer is EXISTING, it should be understood that existing sprinkler systems typically have large leakage rates. NFPA 25 permits a maximum leakage rate of 3 PSIG in 2 hours starting at 40 PSIG. To avoid excessive **NITROGEN-PAC™** Model SC-W compressor run time and possible premature compressor failure / replacement, leaks should be corrected until the measured leakage rate does not exceed 1-1/2 PSIG in 24 hours starting at 40 PSIG.

2.6.9. Are Sprinkler Systems Equipped with Quick-Opening Devices (Dry Accelerators)? Dry accelerators are used on some sprinkler systems to ensure that water is delivered to the farthest sprinkler head in an acceptable period of time. Dry accelerators combined with natural pipe leakage and deliberate purging to increase nitrogen concentration can lead to unwanted dry-pipe valve trips. To avoid valve trips during purging:

(a) Ensure that the dry accelerator device is functioning properly. Consider replacing an existing dry accelerator with a new device if the device has been in service for an extended period of time.

(b) Reduce natural leakage to as near-zero as possible. Special attention should be paid to existing systems, as natural leakage tends to increase as systems age.

(c) If necessary, close the dry accelerator inlet valve during purging. NOTE! Closing the dry accelerator inlet valve may lengthen the time for water to reach the furthest sprinkler head. Ensure that the system end user and the Authority Having Jurisdiction (AHJ) are aware of the consequences of closing the valve during purging, and consider this acceptable. (It should NOT be necessary to keep the dry accelerator inlet valve closed once the nitrogen purity reaches 98%, and the manual PVA purge valve or the TAP device automatic purge valve is closed.)

2.6.10. Nitrogen Receiver.

(a) The nitrogen receiver can be wall mounted if sufficient wall space exists and if the wall is capable of holding the weight of the device. Select the Model NR-5 Nitrogen Receiver.

(b) The nitrogen receiver can be mounted on the sprinkler riser above the sprinkler valve if sufficient clear space is available on the pipe, and the pipe bracing is capable of handling the additional weight. Select the Model NR-5 Nitrogen Receiver.

(c) The nitrogen receiver can be floor mounted if wall mounting and riser mounting are impractical. Select the Model NR-10 Nitrogen Receiver.

2.6.11. Nitrogen / Air Maintenance Device – Model NAMD-1. If existing sprinkler systems have air maintenance devices already installed, such devices may be re-used. It is recommended that each of these devices be thoroughly inspected and tested for proper operation and absence of internal corrosion and debris before re-use. If sprinkler systems are new, or existing devices require replacement, use qty. (1) Model NAMD-1 per sprinkler riser.

2.6.12. Nitrogen Purging and Sensing.

(a) Purge Vent Assembly (Model PVA). Each sprinkler system requires the installation of a purge vent assembly (PVA) to permit replacement of air within each system with nitrogen. The purge vent assembly includes a manual shutoff valve and an automatic float valve to prevent water discharge when the sprinkler system fills with water. Each model of PVA includes the proper orifice for purging and the proper outlet connection for the nitrogen purity monitoring method chosen. Choose the proper model of purge vent assembly (Model PVA) per **Table 4**.

Table 4
Purge Vent Assemblies

Model	Description	Outlet Connection
PVA-2	For use on systems with **TRUE ADVANCED PURGE™ (TAP)** Device	Push-on tubing
PVA-4	For use on systems with Hand-Held N_2 Purity Analyzer	Female quick-connect
(PVA-1)	**DO NOT use Model PVA-1 Purge Vent Assembly on NITROGEN-PAC™ Model SC-W systems.** The orifice in this assembly is intended for use with M Series systems only.	
(PVA-3)	**DO NOT use Model PVA-1 Purge Vent Assembly on NITROGEN-PAC™ Model SC-W systems.** The outlet connection on this assembly is intended for use with Model SC-1 and SC-2 systems only.	

(b) Hand-Held Nitrogen Purity Analyzer – Model NA-2. The hand-held nitrogen purity analyzer Model NA-2 is used to manually measure nitrogen purity at each PVA-4 and at the N_2 purity analyzer connection point on the Model SC-W assembly.

(c) (Optional) TRUE ADVANCED PURGE (TAP) Device – Model TAP-G3.

1. **TAP Device.** The TRUE ADVANCED PURGE (TAP) Device automatically measures the nitrogen purity in the sprinkler piping, and also automatically controls the required purge cycle. Choose one (1) TAP device per sprinkler riser where such automation is desired. NOTE: Choose Model PVA-2 Purge Vent Assembly for use with each TAP device.
2. **Connection Tubing.** The TAP device inlet is connected to the outlet of the Model PVA-2 Purge Vent Assembly with plenum-rated polyethylene tubing. The device is shipped with twenty (20) feet of suitable tubing. Additional custom-cut lengths of tubing (P/N 33-000003-XXX) are available.
3. **Connector, Tube x Tube.** Connector P/N 33-000006-000 is used to connect individual lengths of tubing together.

2.6.13 (Optional) Corrosion Monitor Assembly – Model CMA-1. The optional corrosion monitor assembly Model CMA-1 may be installed to provide a signal when internal corrosion has occurred inside the sprinkler pipe.

2.7 Equipment Selection Examples. The following examples illustrate the use of the information provided.

Table 5
Equipment Selection Examples

Example Number	No. Of Risers	Supervisory Pressure (PSI)	Largest Riser Vol. (gal.)	Total Riser Vol. (gal.)	Initial-Fill Compressor	System Type
2.7.1	1	40	200	200	SC-W	Type I
2.7.2	2	20	500	900	SC-W	Type I
2.7.3	2	40	500	900	External	Type II

EXAMPLE 2.7.1

RISER

Nominal Pipe Size	Pipe Schedule	Gallons Per Foot	Length	Gallons	Rounded
3”	10	0.434	340	147.6	**148**
1-1/2”	40	0.106	400	42.4	**43**
3/4”	40	0.028	300	8.4	**9**

What is the volume of the riser (in gallons)?	**200**
What is the supervisory pressure (in PSIG)?	**40**
Is the Model SC-W required to provide initial-fill with air?	**YES**

UFS Model Number	Description	Qty.	Notes
SC-W-115-1	**NITROGEN-PAC™** Model SC-W Assembly Includes Model NA-2 – N_2 Purity Analyzer, Hand-Held	**1**	
NR-5	Nitrogen Receiver, 5 Gallon, Wall- or Riser Mount	**1**	1 per Model SC-W
NR-10	Nitrogen Receiver, 10 Gallon, Floor-Mount		
NAMD-1	Nitrogen / Air Maintenance Device	**1**	1 per sprinkler riser
PVA-4	Purge Vent Assembly, for Manual Nitrogen Purity Checking	**1**	1 per sprinkler riser
PVA-2	Purge Vent Assembly, for use with TAP Device		

EXAMPLE 2.7.2

RISER 1

Nominal Pipe Size	Pipe Schedule	Gallons Per Foot	Length	Gallons	Rounded
4”	10	0.741	600	444.6	**445**
2-1/2”	10	0.284	150	42.6	**43**
3/4”	40	0.028	400	11.2	**12**

RISER 2

Nominal Pipe Size	Pipe Schedule	Gallons Per Foot	Length	Gallons	Rounded
4”	10	0.741	460	340.9	**341**
2”	10	0.190	160	45.44	**46**
3/4”	40	0.028	460	12.9	**13**

What is the volume of Riser 1 (in gallons)?	**500**
What is the volume of Riser 2 (in gallons)?	**400**
What is the volume of the SINGLE LARGEST riser (in gallons)?	**500**
What is the volume of ALL risers (in gallons)?	**900**
What is the supervisory pressure (in PSIG)?	**20**
Is the Model SC-W required to provide initial-fill with air?	**YES**

UFS Model Number	Description	Qty.	Notes
SC-W-115-1	**NITROGEN-PAC™** Model SC-W Assembly Includes Model NA-2 – N_2 Purity Analyzer, Hand-Held	**1**	
NR-5	Nitrogen Receiver, 5 Gallon, Wall- or Riser Mount	**1**	1 per Model SC-W
NR-10	Nitrogen Receiver, 10 Gallon, Floor-Mount		
NAMD-1	Nitrogen / Air Maintenance Device	**2**	1 per sprinkler riser
PVA-4	Purge Vent Assembly, for Manual Nitrogen Purity Checking	**2**	1 per sprinkler riser
PVA-2	Purge Vent Assembly, for use with TAP Device		

EXAMPLE 2.7.3

RISER 1

Nominal Pipe Size	Pipe Schedule	Gallons Per Foot	Length	Gallons	Rounded
6”	10	1.649	250	412.3	**413**
2-1/2”	10	0.284	260	73.9	**74**
3/4”	40	0.028	460	12.9	**13**

RISER 2

Nominal Pipe Size	Pipe Schedule	Gallons Per Foot	Length	Gallons	Rounded
4”	10	0.741	310	229.71	**230**
2”	10	0.190	320	60.8	**61**
3/4”	40	0.028	300	8.4	**9**

What is the volume of Riser 1 (in gallons)?	**500**
What is the volume of Riser 2 (in gallons)?	**300**
What is the volume of the SINGLE LARGEST riser (in gallons)?	**600**
What is the volume of ALL risers (in gallons)?	**900**
What is the supervisory pressure (in PSIG)?	**40**
Is the Model SC-W required to provide initial-fill with air?	**NO**

UFS Model Number	Description	Qty.	Notes
SC-W-115-1	**NITROGEN-PAC™** Model SC-W Assembly Includes Model NA-2 – N_2 Purity Analyzer, Hand-Held	**1**	
NR-5	Nitrogen Receiver, 5 Gallon, Wall- or Riser Mount	**1**	1 per Model SC-W
NR-10	Nitrogen Receiver, 10 Gallon, Floor-Mount		
NAMD-1	Nitrogen / Air Maintenance Device	**3**	1 per sprinkler riser
PVA-4	Purge Vent Assembly, for Manual Nitrogen Purity Checking	**2**	1 per sprinkler riser
PVA-2	Purge Vent Assembly, for use with TAP Device		
	External Air Compressor for Initial-Fill with Air	**1**	

Figure 14
Model SC-W with Model NR-5 Wall-Mount

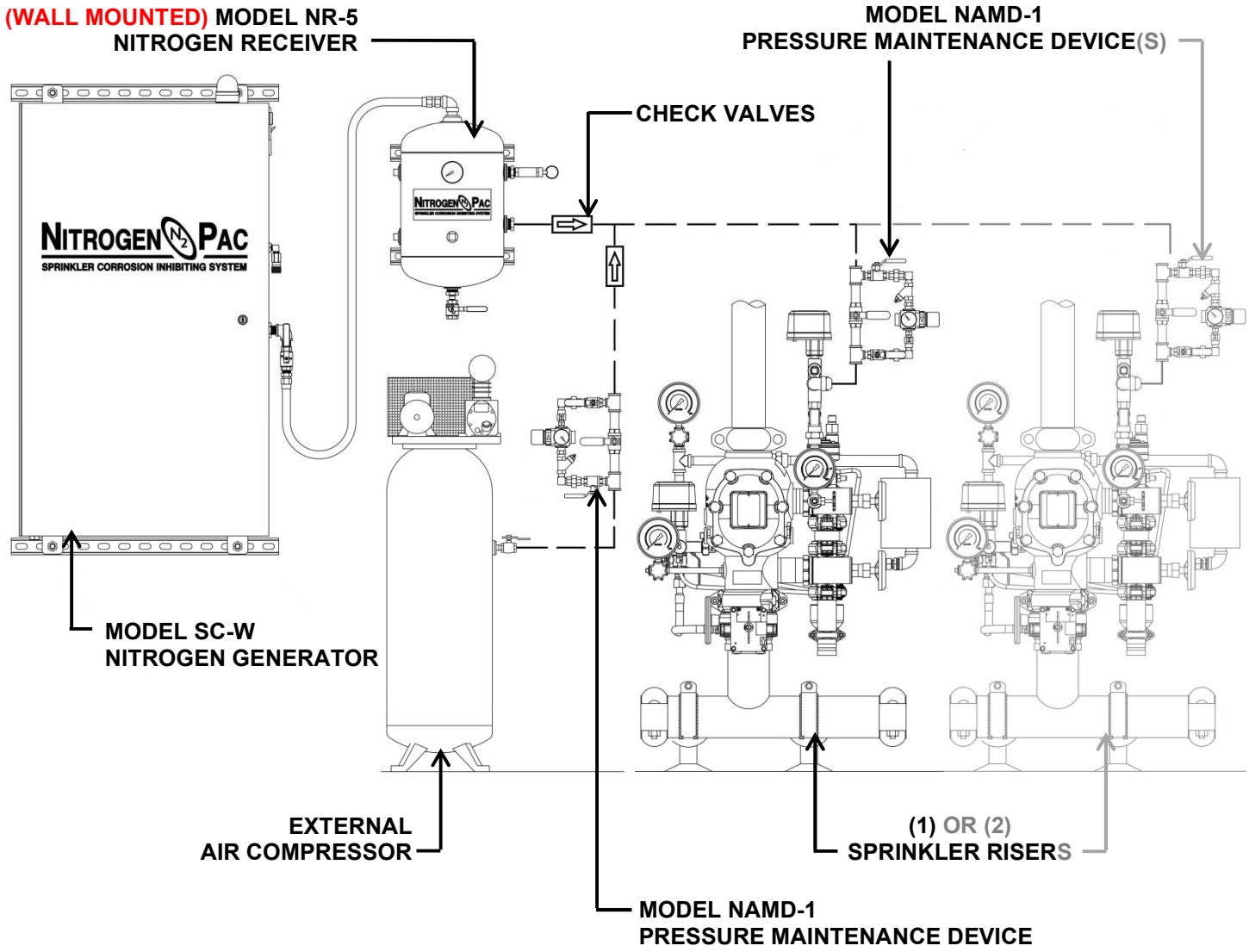


Figure 15
Model SC-W with Model NR-5 Riser-Mount

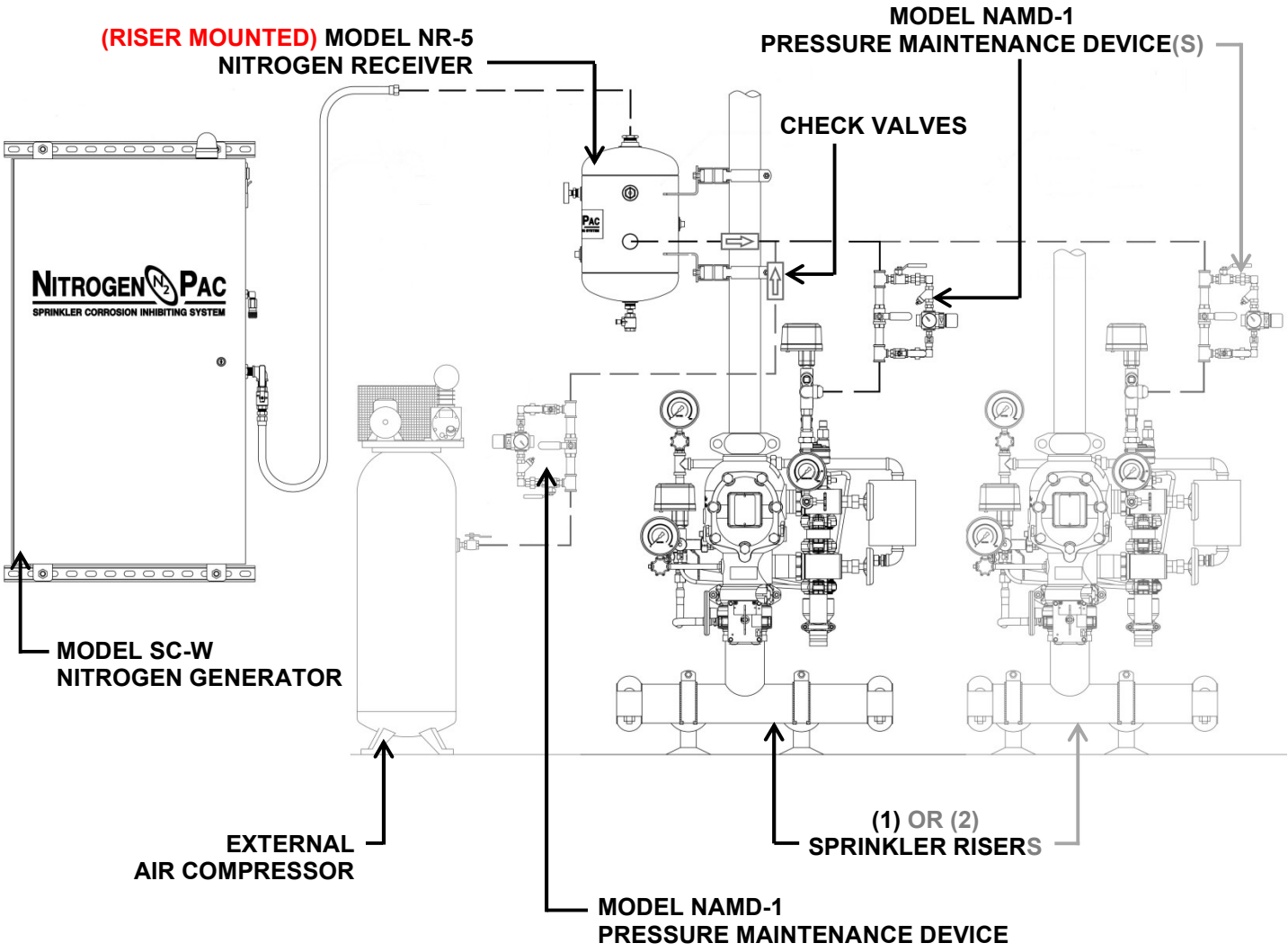
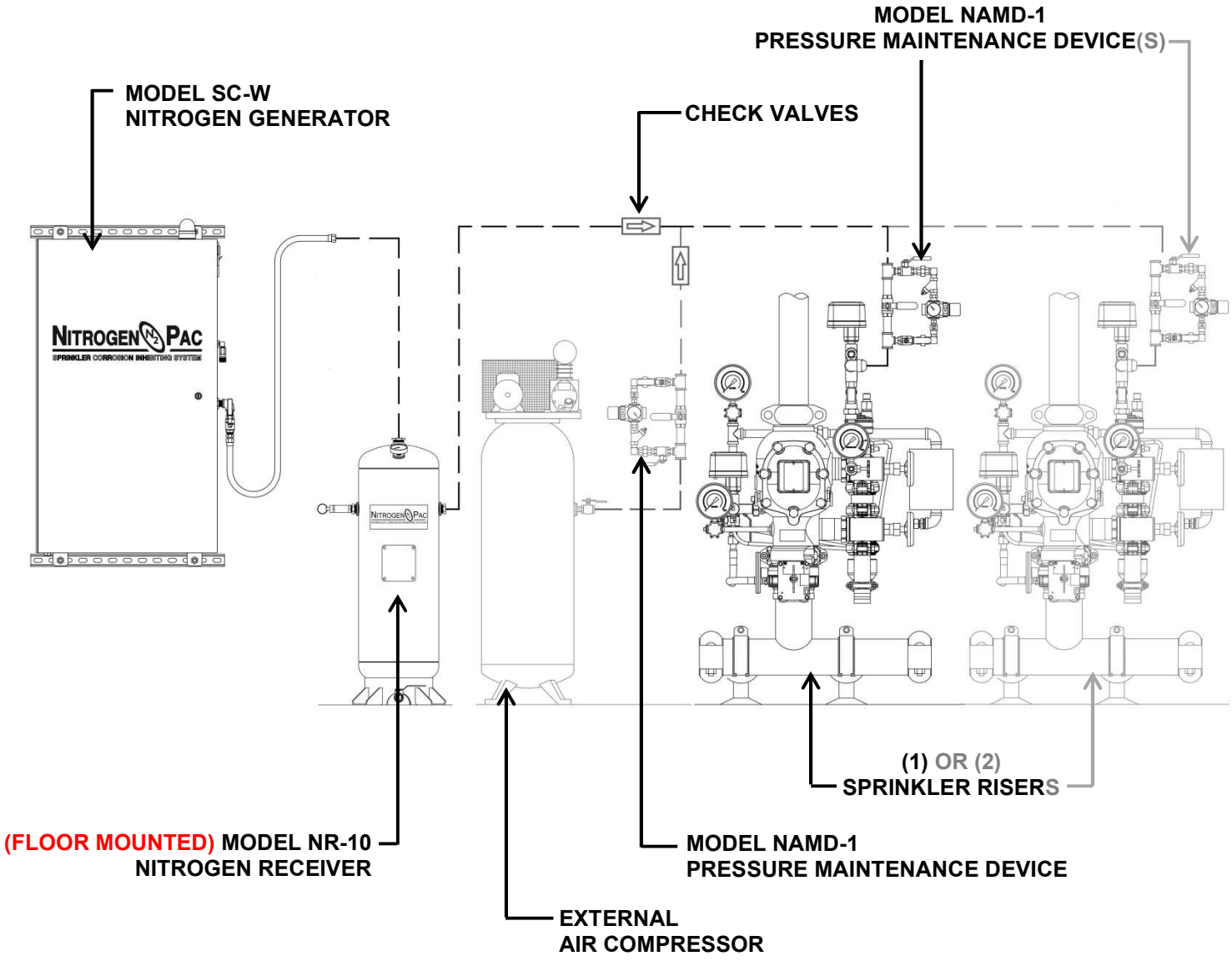


Figure 16
Model SC-W with Model NR-10 Floor-Mount



3. INSTALLATION

IMPORTANT

The installation of the **NITROGEN-PAC™** Model SC-W Sprinkler Corrosion Inhibiting System MUST be in accordance with this manual. Read this manual in its entirety BEFORE beginning installation of the **NITROGEN-PAC™** Model SC-W system. Understand and follow all instructions provided in this manual.

WARNING

The Model SC-W assembly creates a 30% to 40% oxygen concentration exhaust that may present a flammability hazard. Ensure the Model SC-W assembly is NOT located in an area where and oxygen-enriched atmosphere will be a hazard. Failure to comply with this warning can result in increased risk from fire, including death, serious personal injury and property damage.

CAUTION

Understand and follow all safety recommendations when moving heavy pieces of equipment. Equipment may be easily tipped over when moving. Failure to use caution can result in equipment damage and personal injury.

IMPORTANT

Adequate ventilation is important for the Model SC-W assembly. While natural ventilation or existing openings may be adequate, consideration should be given to providing additional ventilation when locating the Model SC-W assembly in a closet or other small space. A louvered door or 1-1/2 inch gap between the door and floor should be sufficient. Check with the owner and local codes before modifying any door.

3.1 General Installation Information.

3.1.1 Unpacking. Check shipment of the **UNITED Fire Systems** Model SC-W equipment and packaging for damage. If there is any damage or missing parts, the transportation company's agent should make a notation to the effect on the Bill of Lading. Claims should be settled directly with the transportation company. Verify that all parts were received in the shipment as ordered. Contact **UNITED Fire Systems** immediately if there are any missing parts or discrepancies.

3.1.2 Equipment Locations. Consider each of the following when locating equipment.

(a) Engineering Drawings (if available). If a survey was conducted, and engineering drawings prepared, locate all equipment per these drawings.

(b) Proximity. Equipment should be installed in reasonably close proximity to the system riser(s) being protected. The most logical location is in the same sprinkler room as the riser(s). If necessary, equipment may be installed remotely. Documentation and signage should be clear to identify which equipment in remote locations is connected together.

3.2 Model SC-W Assembly.

3.2.1 Location

(a) Placement. The Model SC-W assembly is intended as a wall-mounted unit and does not require fastening to the floor surface. The assembly should be installed so the highest point on the nitrogen generator cabinet is between 5’6” and 6’ from the floor surface.

(b) Orientation. The Model SC-W assembly **MUST** be mounted on a vertical surface, and **MUST** be oriented upright, as shown in **Figure 17**. **DO NOT** orient the Model SC-W assembly tilted in any plane.

(c) Weight. The Model SC-W assembly weighs approximately 180 lbs. (shipping weight 200 lbs.). Ensure that the mounting surface is capable of supporting the weight, with a clear safety margin. Consult a structural engineer as necessary to verify suitability of location.

(d) Noise. The Model SC-W assembly emits noise when the compressor is running. Such noise is normal and is part of regular system operation. Evaluate all options for Model SC-W assembly location so that normal noise is not disruptive to building occupants or facility operations. Relocation of the Model SC-W assembly after installation will probably be complex and expensive.

(e) Temperature. The Model SC-W assembly shall be installed in a location with a minimum temperature of +40° F and a maximum temperature of +122° F. Provide heating or cooling as necessary to keep the Model SC-W assembly within these temperature limits.

(f) Clearance. Sufficient clearance should be available after installation for maintenance operations to take place on the Model SC-W assembly. Leave at least (3) feet of clearance in front and on the right side for personnel to access the assembly for maintenance. Leave at least (8) inches on the left side of the Model SC-W assembly to permit proper airflow. The Model SC-W assembly is equipped with a hinged door. Allow sufficient clearance for the door to be swung completely open.

(g) Ventilation. Adequate ventilation is important. While natural ventilation or existing openings may be adequate, consider providing additional ventilation when the equipment is in a closet or other small space. A louvered door or 1-1/2 inch gap between the door and floor should be sufficient. Check with the owner and local codes before modifying any door.

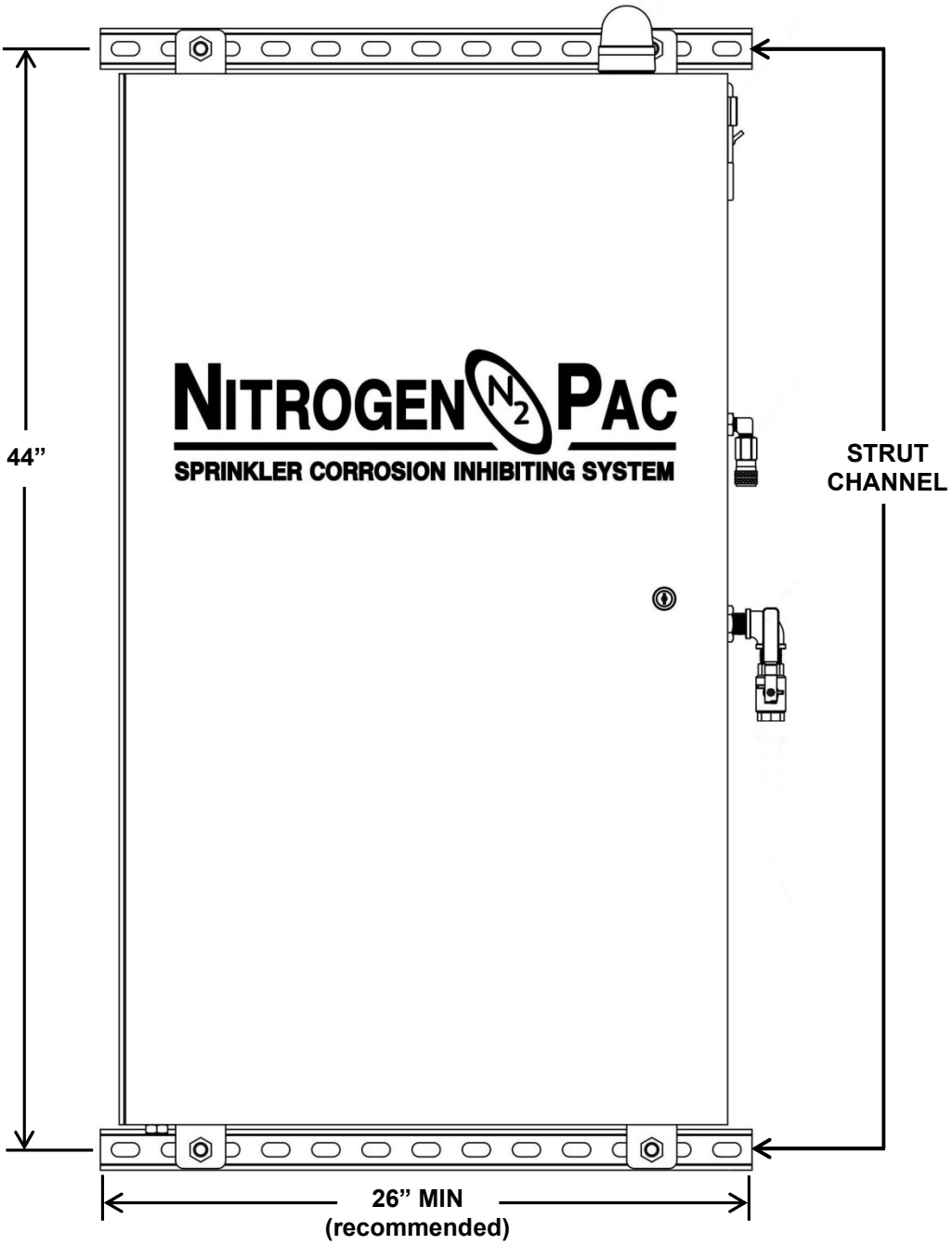
3.2.2. Mounting. The Model SC-W assembly may be wall-mounted with or without strut channel. Strut channel is highly recommended for mounting on sheetrock or similar surfaces, to permit secure attachment to wall studs. Refer to **Figure 17** for mounting tab hole and other dimensions. Refer to **Figure 18** for an illustration of strut channel mounting.

Figure 17
Dimensions – Model SC-W Assembly



NOTES:
- **Mounting Tab hole diameter = 0.44”**
- **Depth is approximately 9.5” with door closed.**

Figure 18
Strut Channel Mounting - Model SC-W Assembly

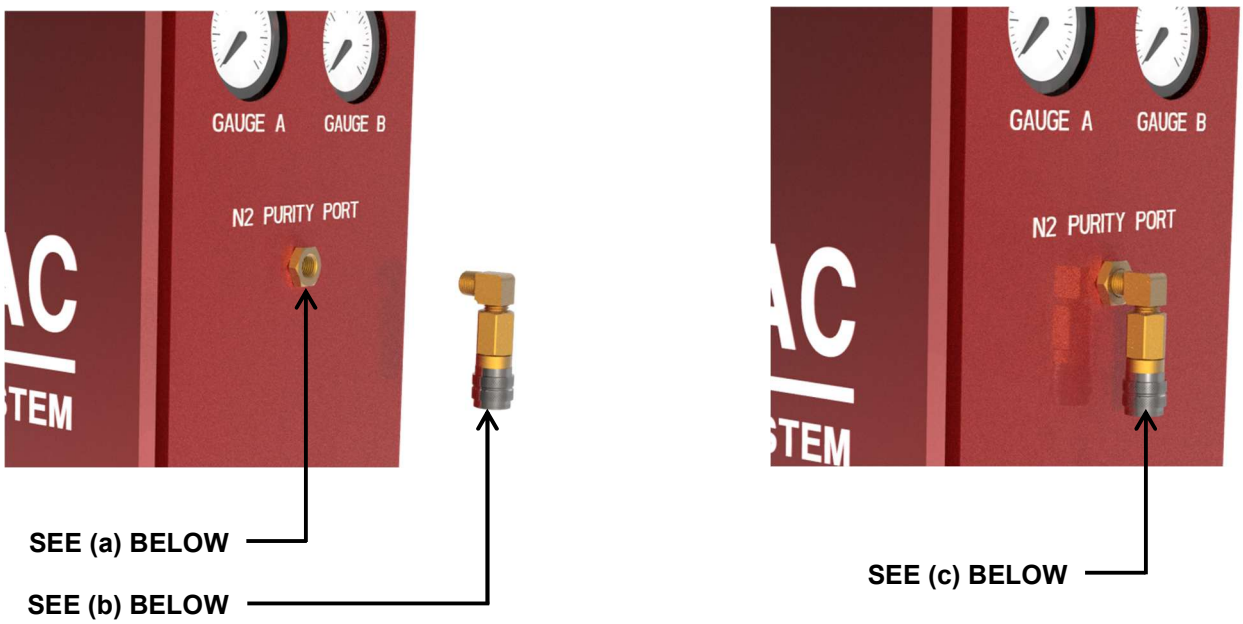


NOTES:

- **Mounting Tab hole diameter = 0.44”**
- **Depth is approximately 9.5” with door closed, not including strut depth**
- **Strut channel by installer**

3.2.3. N_2 Purity Analyzer Connection. Refer to **Figure 19.**

Figure 19
N_2 Purity Analyzer Connection



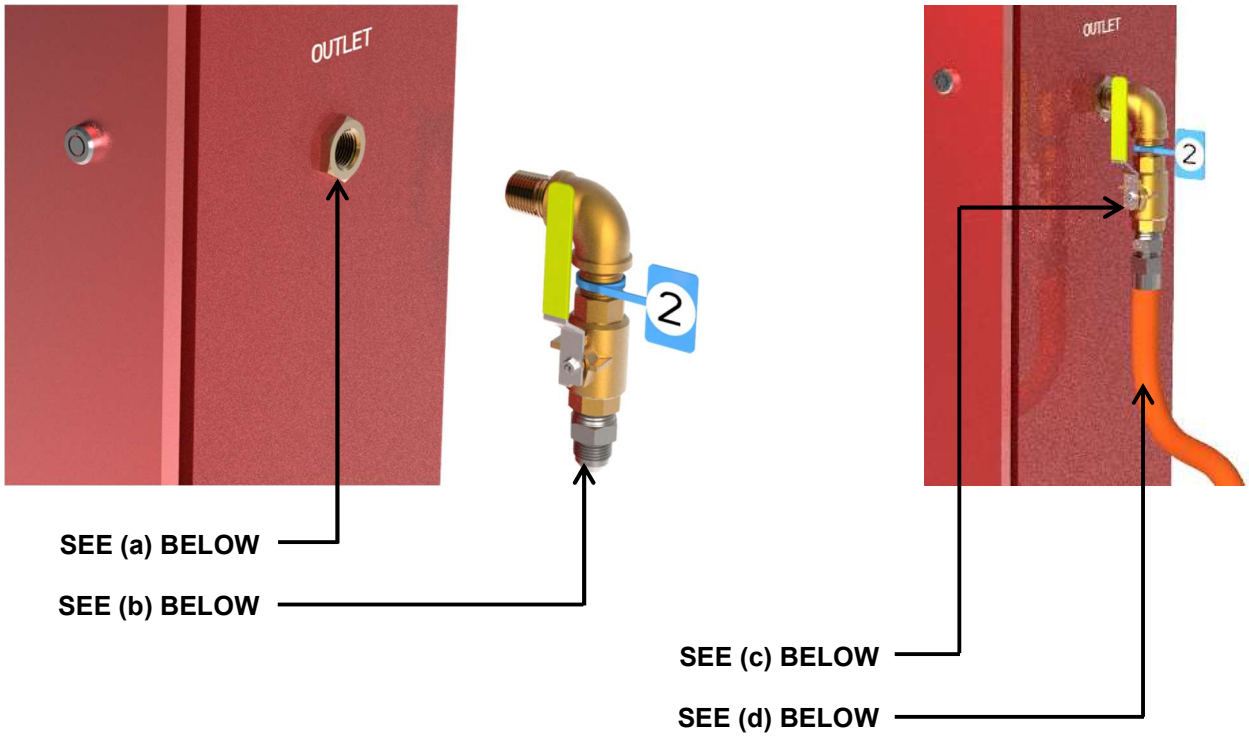
(a) Remove and discard plastic plug from Model SC-W assembly N_2 purity analyzer connection port.

(b) Attach N_2 purity analyzer connection assembly to port. Tighten securely, but do not overtighten.

(c) Orient assembly with quick-disconnect fitting pointed downward.

3.2.4. Outlet Connection. Refer to **Figure 20.**

Figure 20
Outlet Connection



(a) Remove and discard plastic plug from Model SC-W assembly outlet port.

(b) Attach outlet valve assembly to Model SC-W assembly outlet port. Tighten securely, but do not overtighten.

(c) Orient outlet valve assembly with outlet fitting pointed downward.

(d) Retain the outlet hose for attachment of nitrogen piping to outlet.

IMPORTANT

DO NOT omit the provided outlet hose. The hose minimizes compressor motor vibration from reaching the nitrogen piping.

3.2.5 Drain Connection.

IMPORTANT

Local regulations may require the installation of an oil / water separator in condensate drain piping. Verify local requirements before completing installation. **UNITED Fire Systems** does not supply oil / water separators.

(a) Drain Piping. All points on the Model SC-W assembly requiring drainage are connected to one point. Install drain piping from Model SC-W drain connection to an appropriate drain location. Refer to **Figure 2** for location of drain connection. Drain run may be pipe or tubing. Consult with relevant Authorities Having Jurisdiction, local codes, or building owner for approved materials and discharge location.

(b) Condensate Pump (Installer provided option). A condensate pump may be needed if drain is above the Model SC-W assembly drain outlet, or if drain is some distance from the Model SC-W installation location. **UNITED Fire Systems** does not supply condensate pumps. It is recommended that this drain be run to a building drain or an environmentally-approved condensate collection / disposal system.

(c) Oil / Water Separator (Installer provided option). If run to a building drain, environmental regulations may require installation of an oil / water separator.

3.2.6 Electrical Connections.

DANGER

RISK OF ELECTROCUTION

Voltages and currents associated with the Model SC-W assembly are LETHAL. Follow all instructions provided. Work involving electric power MUST be performed ONLY by qualified individuals. All required precautions to prevent contact with live electrical conductors MUST be taken. Failure to comply with these instructions is an immediate hazard with a likelihood of death or serious personal injury!

3.2.6.1 General.

(a) Codes. All wiring and wiring methods shall be in strict compliance with NEC and local codes.

(b) Personnel. All wiring shall be performed by a licensed electrician.

(c) Power Supply Specification. The Model SC-W assembly uses 120 VAC, 60 Hz, single-phase, 3-wire (HOT, NEUTRAL, GROUND) power, and draws 6 A.

(d) Power for Accessories. **UNITED Fire Systems** recommends that power for accessories (such as a condensate pump) be a separate wiring run from its own circuit breaker, and not be combined with the Model SC-W assembly power or connected to the Model SC-W assembly terminal strip.

(e) Wire Size. Refer to **Table 6.**

IMPORTANT

It is **IMPORTANT** that wire of sufficient size be installed for the 120 VAC 60 Hz single-phase power supplying the Model SC-W assembly. Use **Table 6** to determine the minimum wire gauge to use. Failure to install wire of adequate size as shown in **Table 6** will result in compressor motor overheat and shutdown. Motor and compressor life will be significantly shortened.

Table 6
Minimum Wire Size for Model SC-W Assembly 120 VAC Power

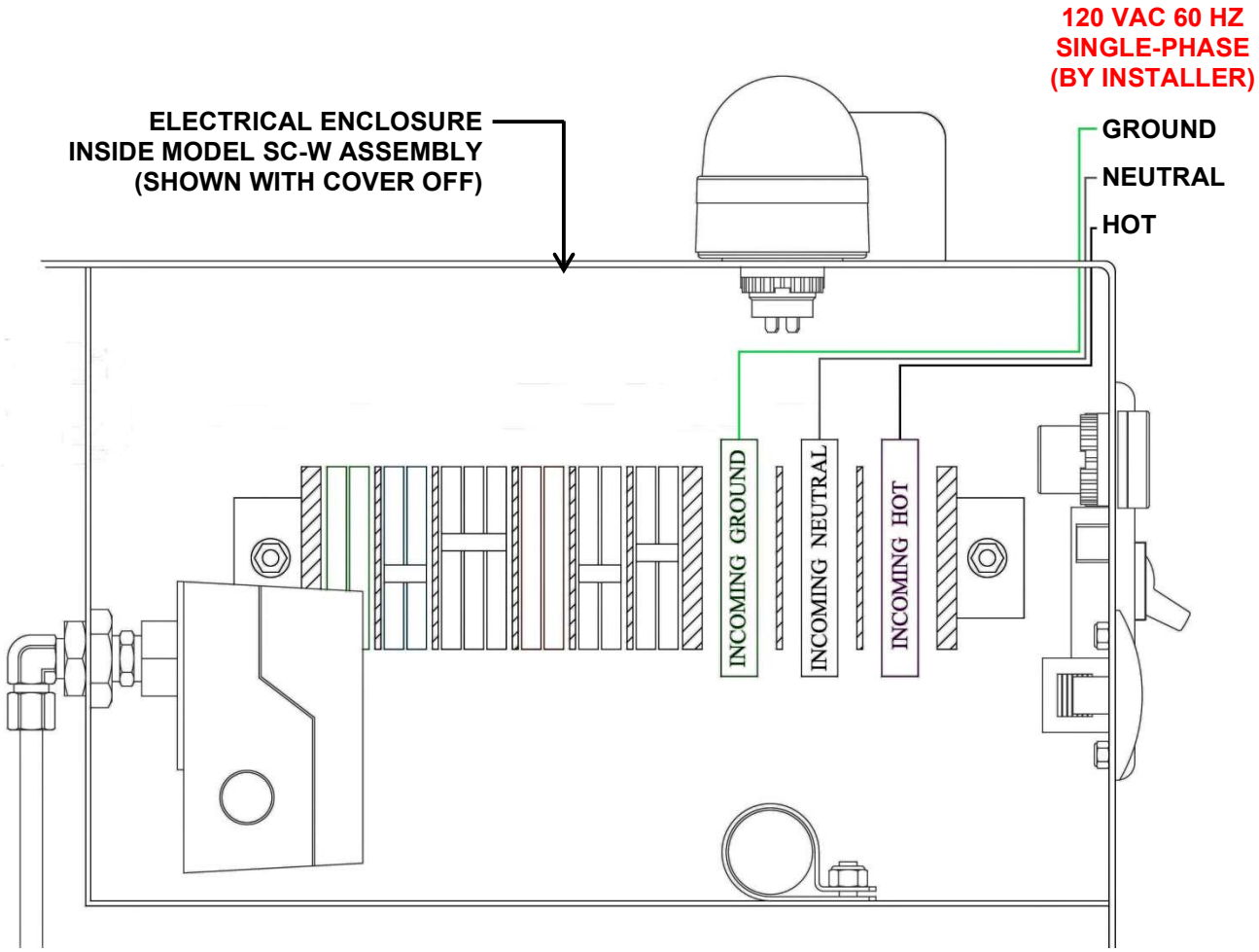
LENGTH OF WIRE RUN FROM CIRCUIT BREAKER PANELBOARD TO MODEL SC-W ASSEMBLY	MINIMUM WIRE SIZE (AWG)
Less than 25 feet	**12 gauge** minimum
Over 25 feet up to 50 feet	**10 gauge** minimum
Over 50 feet up to 100 feet	**8 gauge** minimum (**NOTE:** Terminal block in **Model SC-W** electrical enclosure accepts maximum 10 gauge wire. Use a **SHORT** piece of 10 gauge wire as a pigtail attached to the 8 gauge wire with a mechanical connection device (such as a wire nut) **WITHIN** the Model SC-W electrical enclosure
Over 100 feet	Use latest edition of NFPA 70, *National Electrical Code*, to determine ampacity of conductors to deliver **12 A** minimum at no less than 115 VAC (maximum 4% voltage drop from nominal 120 VAC) under full load.

3.2.6.2 Using Top Entry Raceway Attachment Point. Refer to **Figure 21.**

DANGER
RISK OF ELECTROCUTION

Before removing the cover of the electrical enclosure inside of the Model SC-W assembly, ALWAYS verify that ALL power has been removed from electrical circuits. NEVER assume that conductors are de-energized.

Figure 21
Using Top Entry Raceway Attachment Point



(a) Remove cover from electrical enclosure inside of Model SC-W assembly.

(b) Remove knockout from right-hand top corner of assembly. Use care to avoid damage to contents of electrical enclosure.

(c) Attach approved raceway and fitting to knockout.

(d) Pull three (3) conductors (HOT, NEUTRAL, GROUND) through raceway into electrical enclosure.

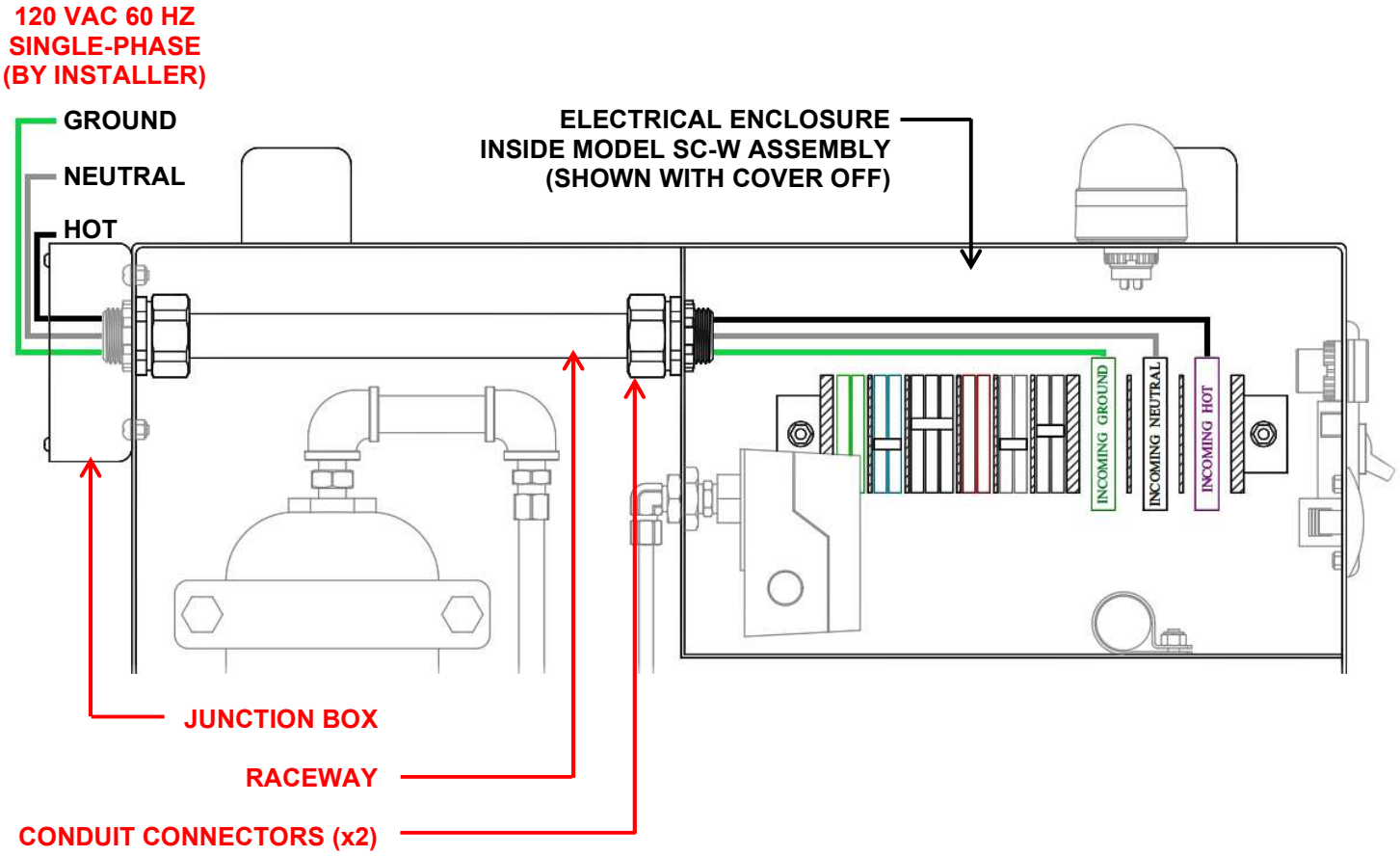
(e) Refer to **Figure 21**. Connect three (3) conductors to terminal strip in electrical enclosure. DO NOT disturb conductors or jumpers connected to other terminals.

3.2.6.3 Using Left-Side Raceway Attachment Point. Refer to **Figure 22**.

DANGER

Before removing the cover of the electrical enclosure inside of the Model SC-W assembly, ALWAYS verify that ALL power has been removed from electrical circuits. NEVER assume that conductors are de-energized.

Figure 22
Using Left-Side Raceway Attachment Point



(a) Remove cover from electrical enclosure inside of Model SC-W assembly.

(b) Remove knockout from left-side of assembly.

(c) Mount a junction box on exterior of Model SC-W assembly, with one of the knockouts aligned with the knockout on the left side of the assembly.

(d) Attach approved raceway and conduit connectors to left-side knockout and knockout on right side of electrical enclosure inside of Model SC-W assembly.

(e) Pull three (3) conductors (HOT, NEUTRAL, GROUND) through junction box and raceway into electrical enclosure.

(f) Refer to **Figure 22**. Connect three (3) conductors to terminal strip in electrical enclosure. DO NOT disturb conductors or jumpers connected to other terminals.

3.3. Piping Requirements. All piping should be Sch. 40 black steel. All fittings should be Class 150 black threaded. Galvanized pipe is not recommended. All pipe should be securely fastened in a workmanlike manner. Limit the pipe lengths between the Model SC-W assembly and the sprinkler valve(s) to those in **Table 7**.

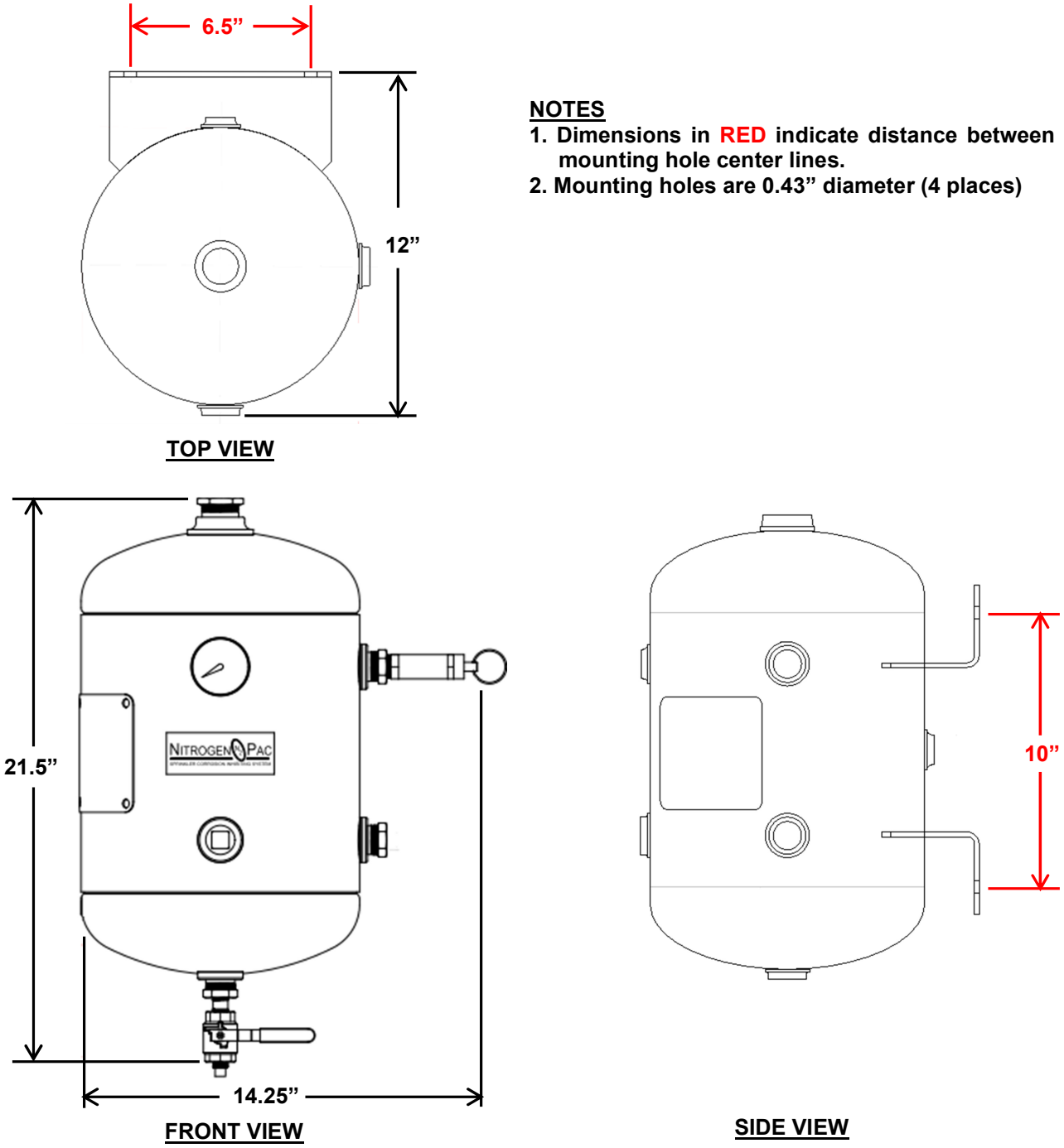
Table 7
Piping Limitations

SINGLE RISER SYSTEM		
CHOOSE ONE OPTION	Pipe Size (NPS)	Maximum Length – All Pipe (feet)
OPTION 1	Supply Pipe from Model SC-W to sprinkler valve = 1/2 inch	300
OPTION 2	Supply Pipe from Model SC-W to sprinkler valve = 3/4 inch	600

TWO RISER SYSTEM		
CHOOSE ONE OPTION	Pipe Size (NPS)	Maximum Length – All Pipe (feet)
OPTION 1	Supply Pipe from Model SC-W to Branch Pipes = 1/2 inch	300
	Branch Pipes from Supply Pipe to sprinkler valve = 1/2 inch	
OPTION 2	Supply Pipe from Model SC-W to Branch Pipes = 3/4 inch	600
	Branch Pipes from Supply Pipe to sprinkler valve = 1/2 inch	
NOTE: On multiple riser systems, branch pipes from supply pipe to AMDs should be as short as possible.		

3.4. Model NR-5 Nitrogen Receiver. The Model NR-5 nitrogen receiver may be mounted on a wall or on the sprinkler riser. The device must be mounted vertically, with the inlet at the top and the drain valve at the bottom, to facilitate drainage.

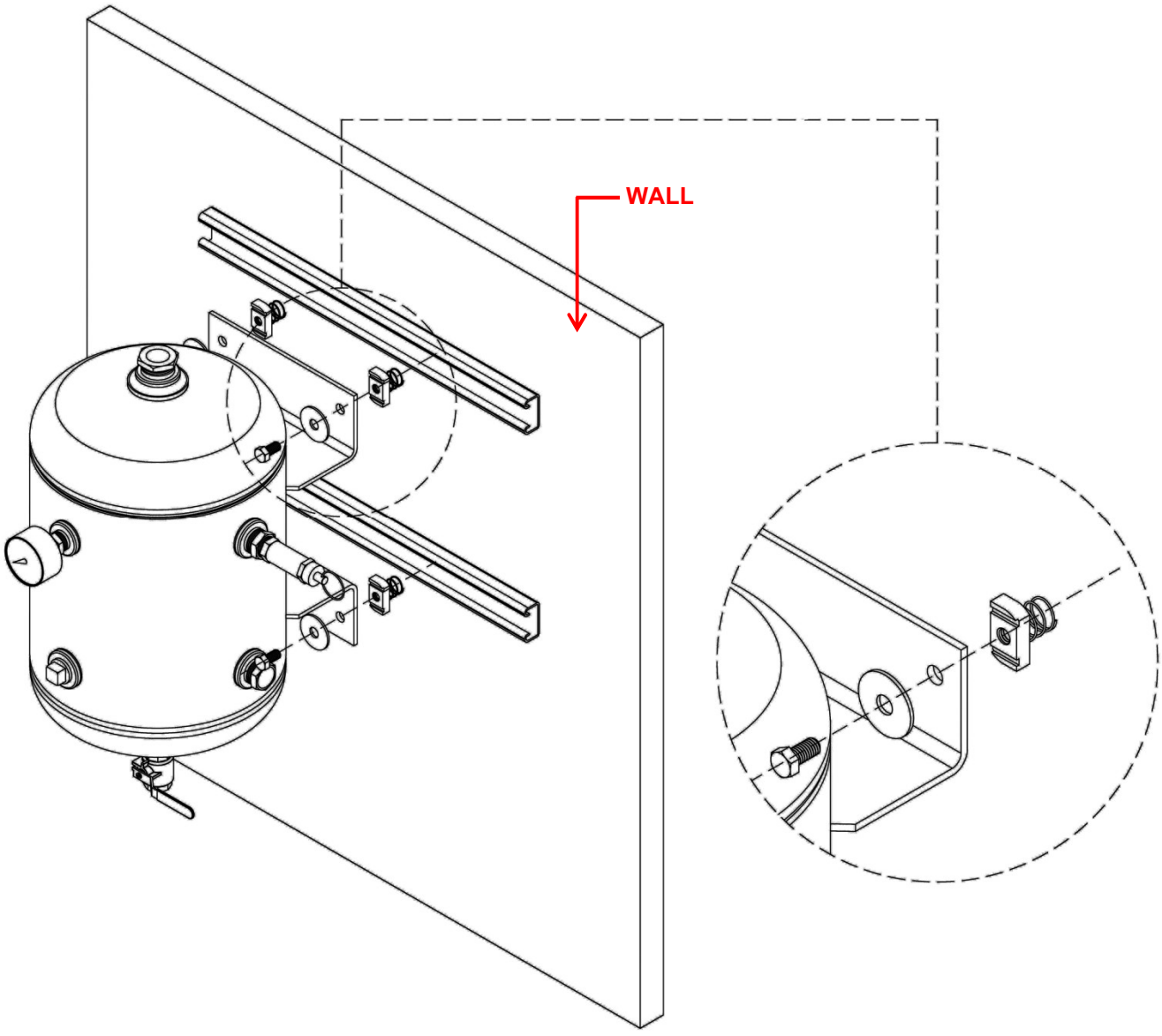
Figure 23
Dimensions – Model NR-5 Nitrogen Receiver



NOTES
1. **Dimensions in RED indicate distance between mounting hole center lines.**
2. **Mounting holes are 0.43” diameter (4 places)**

3.4.1. Wall-Mounting With or Without Strut Channel. The Model NR-5 Nitrogen Receiver may be wall-mounted with or without strut channel. It is recommended that strut channel be used on sheetrock surfaces, to spread the load and ensure that mounting hardware is inserted into wall studs. Refer to **Figure 23** for mounting dimensions and **Figure 24** for use of strut channel.

Figure 24
Wall-Mounting
Model NR-5 Nitrogen Receiver

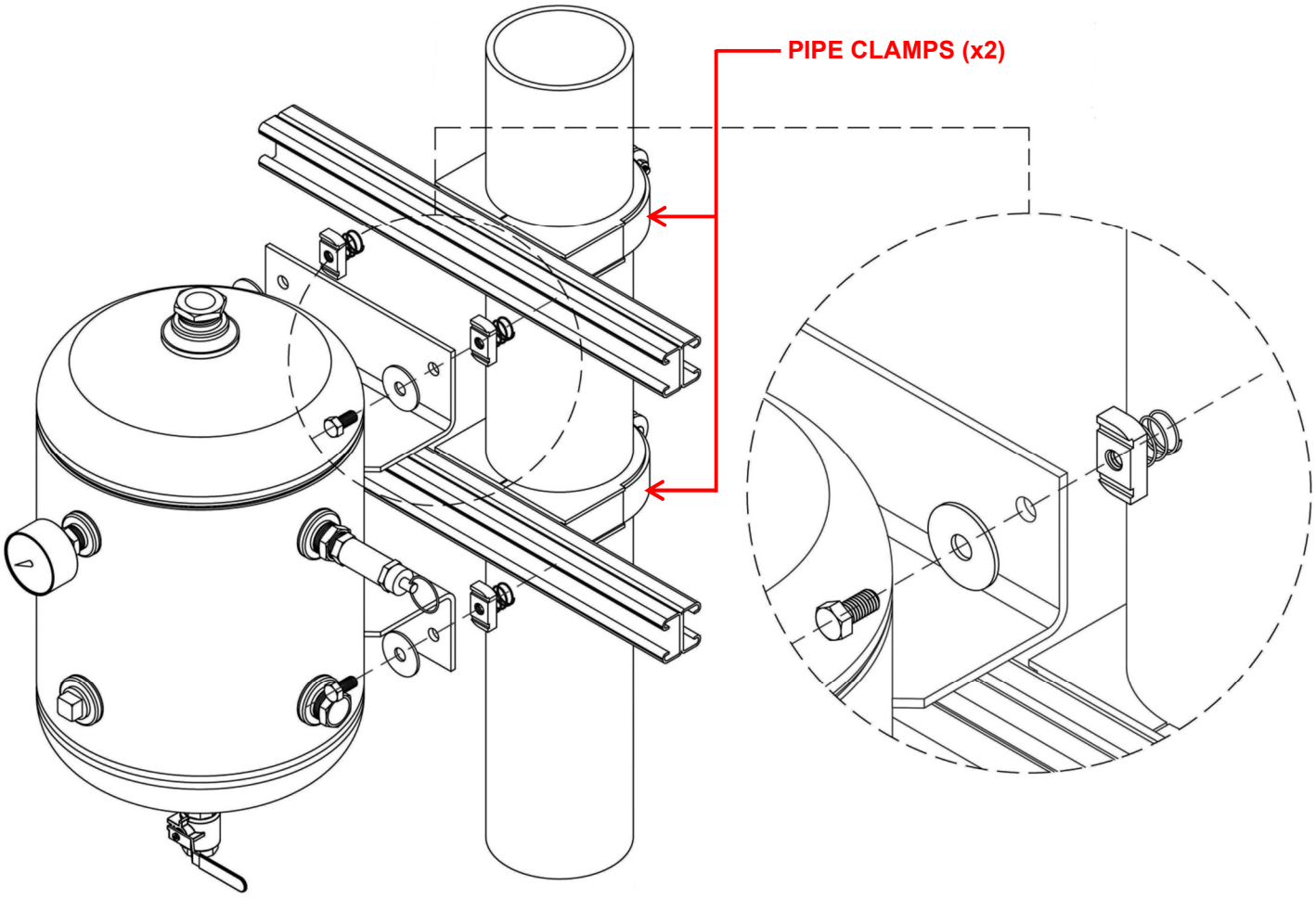


NOTES

- **Minimum recommended strut channel length 8.5”**
- **Strut channel should be long enough to permit mounting hardware to engage two wall studs**
- **Mounting hardware provided by Installer**

3.4.2. Riser-Mounting. Refer to **Figure 25.** The Model NR-5 Nitrogen Receiver may be mounted directly on the sprinkler riser.

Figure 25
Riser-Mounting
Model NR-5 Nitrogen Receiver



NOTES

- **Minimum recommended strut channel length 8.5”**
- **Strut channel should be long enough to accommodate pipe clamps**
- **Pipe clamps should be chosen to fully support the weight of the Model NR-5 assembly**
- **Mounting hardware provided by Installer**

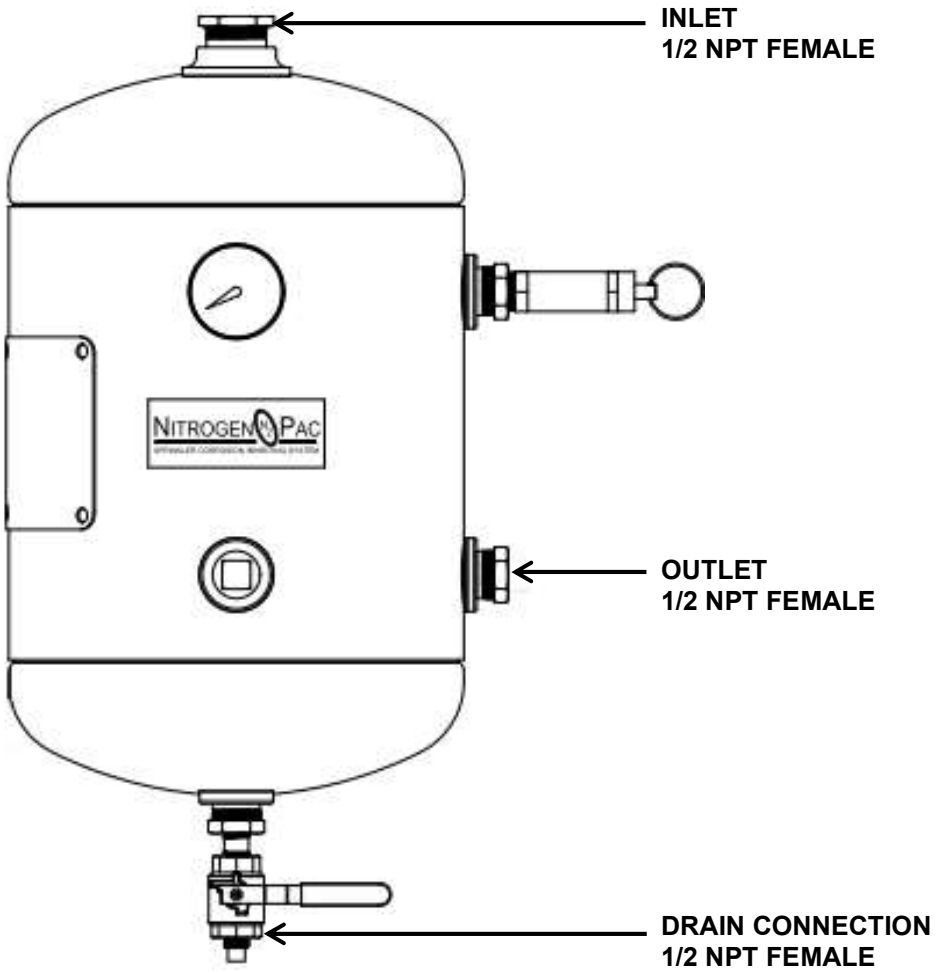
3.4.3. Inlet, Outlet, and Drain Connections. Refer to **Figure 26.** The Model NR-5 Nitrogen Receiver inlet is at the TOP of the device, and the outlet is on the SIDE of the device. The drain valve is on the BOTTOM of the device.

(a) The inlet can receive the 1/2 NPT male end of the outlet hose, or 1/2" pipe may be used to connect the 1/2 NPT male end of the outlet hose to the inlet.

(b) The outlet should receive 1/2 NPT pipe to connect to the inlet of the Model NAMD-1 Nitrogen / Air Maintenance Device(s).

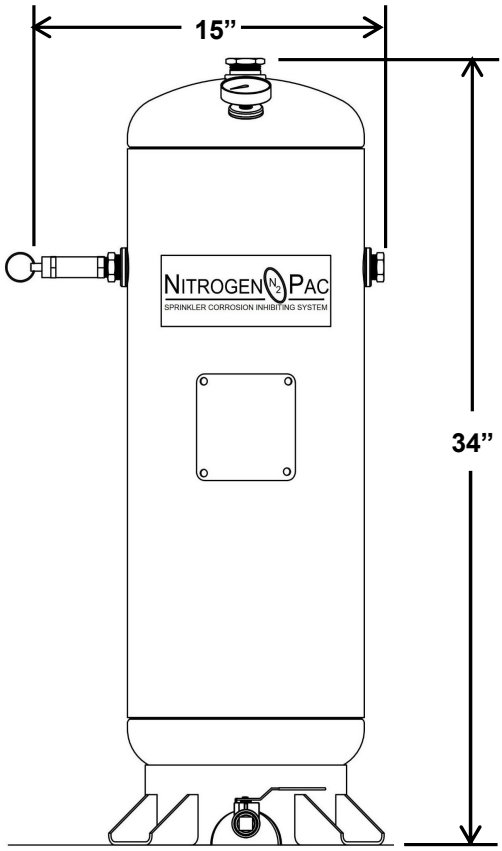
(c) The drain may be left unconnected, or tubing may be run to an approved drain. If the Model NR-5 Nitrogen Receiver is riser-mounted, tubing may be run from the drain to the drain cup on the sprinkler valve.

Figure 26
Connections – Model NR-5 Nitrogen Receiver



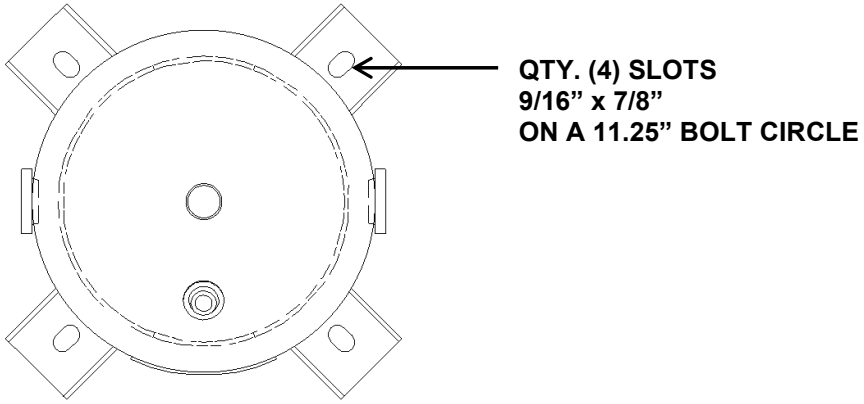
3.5. Model NR-10 Nitrogen Receiver. Refer to **Figure 27.** The Model NR-10 nitrogen receiver is to be mounted on the floor. The device must be mounted vertically, with the inlet at the top and the drain valve at the bottom, to facilitate drainage.

Figure 27
Dimensions – Model NR-10 Nitrogen Receiver



3.5.1. Mounting – Floor-Mount. Refer to **Figure 28.** Locate Model NR-10 Nitrogen Receiver in location to be mounted. Securely fasten device to floor, using suitable bolts or studs / nuts through the mounting slots.

Figure 28
Mounting – Model NR-10 Nitrogen Receiver (TOP VIEW)



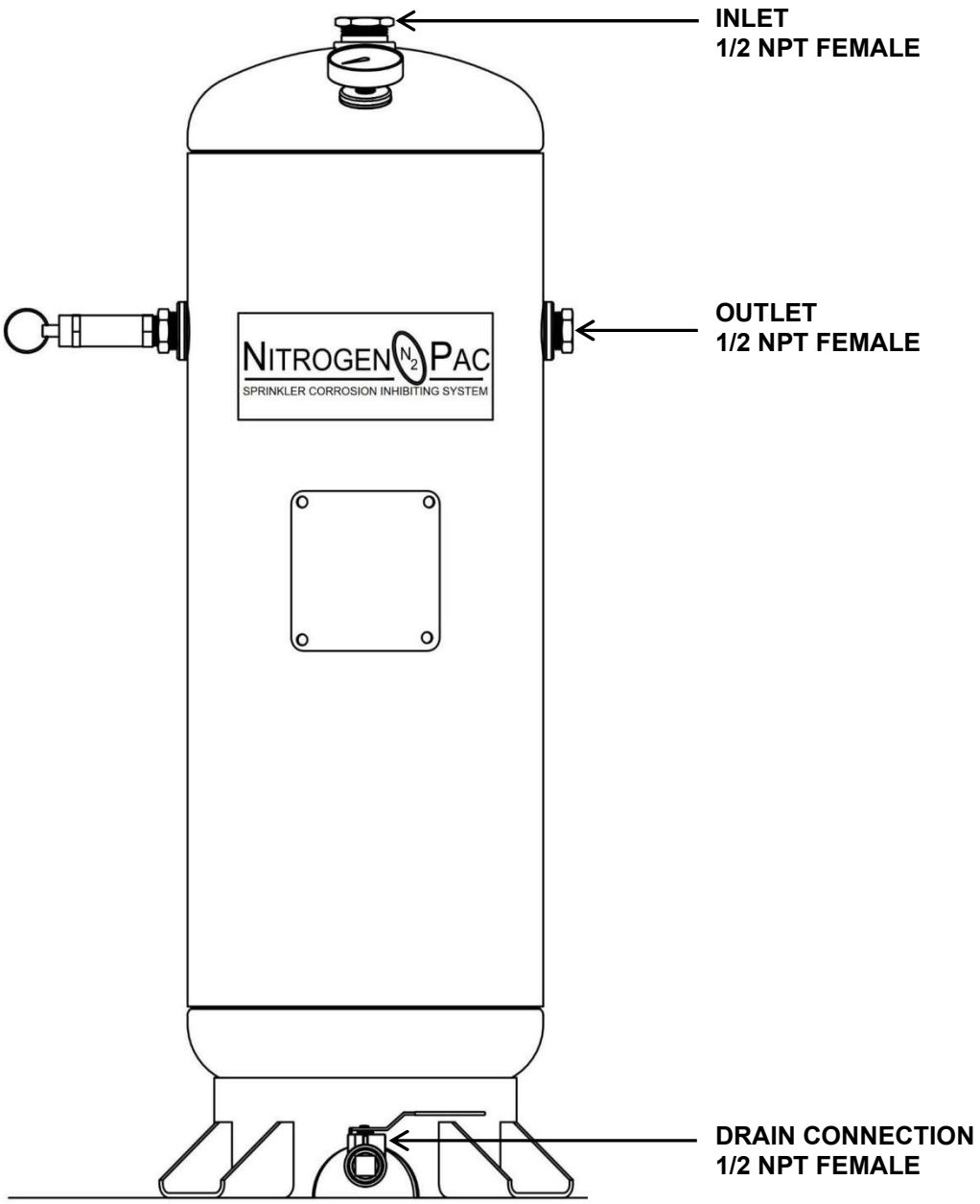
3.5.2. Inlet, Outlet, and Drain Connections. Refer to **Figure 29.**

(a) The inlet can receive the 1/2 NPT male end of the outlet hose, or 1/2" pipe may be used to connect the 1/2 NPT male end of the outlet hose to the inlet.

(b) The outlet should receive 1/2 NPT pipe to connect to the inlet of the Model NAMD-1 Nitrogen / Air Maintenance Device(s).

(c) The drain may be left unconnected, or tubing may be run to an approved drain.

Figure 29
Connections – Model NR-10 Nitrogen Receiver



3.6. Nitrogen / Air Maintenance Device – Model NAMD-1. Refer to **Appendix A** for information on the use of this device.

IMPORTANT

A Pressure Maintenance Device MUST be used between the outlet of the nitrogen receiver and the sprinkler valve.

3.7. Purge Vent Assembly – Model PVA.

IMPORTANT

DO NOT disassemble Purge Vent Assembly to install! The union (refer to **Figures 30** and **31**) may be used to facilitate installation.

3.7.1. Choice of Model PVA To Use. Refer to **Table 8**. The choice of the proper PVA to use is based on the intended method of nitrogen concentration measurement at the device.

Table 8
PVAs for Use with Model SC-W Systems

Model Number	Orifice Size (inch dia.)	Connection Point Type	Nitrogen Measurement Method
PVA-2	0.016	Push-To-Connect Fitting for Tubing	True Advanced Purge (TAP) Device
PVA-4	0.010	Quick-Connect, Female	Model NA-2 Nitrogen Purity Analyzer – Hand-Held

3.7.2 Location. The chosen Purge Vent Assembly should be located:

(a) At the end point of the most remote branch line.

(b) As high as possible (to prevent water from being trapped at the device).

(c) As far away from the sprinkler valve as possible (to facilitate purging of the entire piping network)

(d) At a location where the sprinkler pipe is not pitched towards the device.

3.7.3 Connection to Vertical Piping. Refer to **Figure 30**. Confirm that sprinkler piping system is **NOT** pressurized.

CAUTION

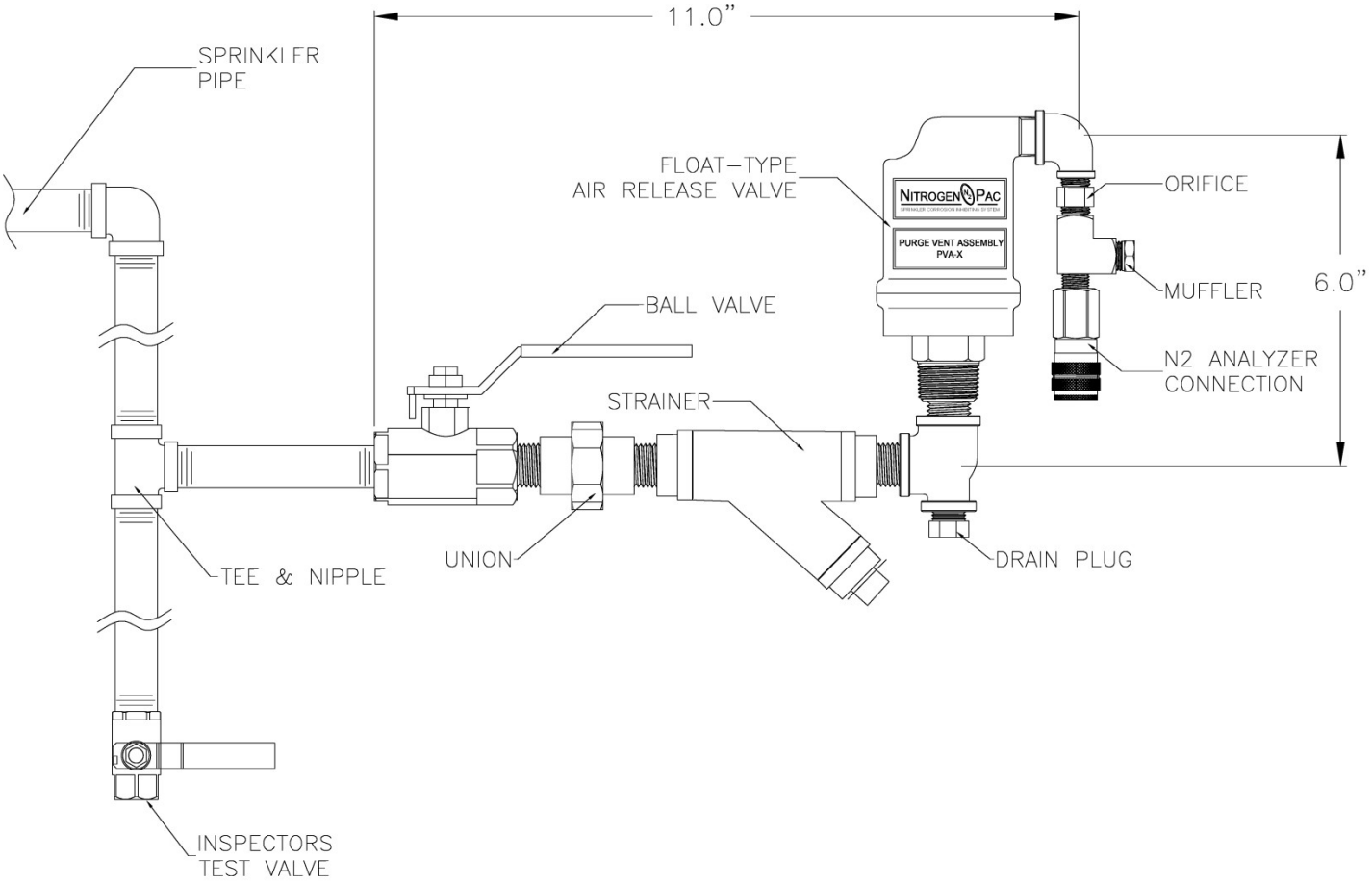
Failure to confirm that the sprinkler piping is **NOT** pressurized could result in personal injury and / or property damage.

(a) Install tee and nipple in vertical piping. Position the tee with the outlet horizontal, as indicated.

(b) Attach Purge Vent Assembly to nipple. It is acceptable to install additional pipe and elbows before the assembly to accommodate proper installation. The assembly MUST be installed vertically as shown for float valve to function properly. Use union to facilitate installation and proper assembly positioning.

(c) Ball valve should remain closed until commissioning.

Figure 30
Purge Vent Assembly Model PVA - Dimensions and Installation in Vertical Piping



3.7.4 Connection to Horizontal Piping. Refer to **Figure 30**. Confirm that sprinkler piping system is **NOT** pressurized.

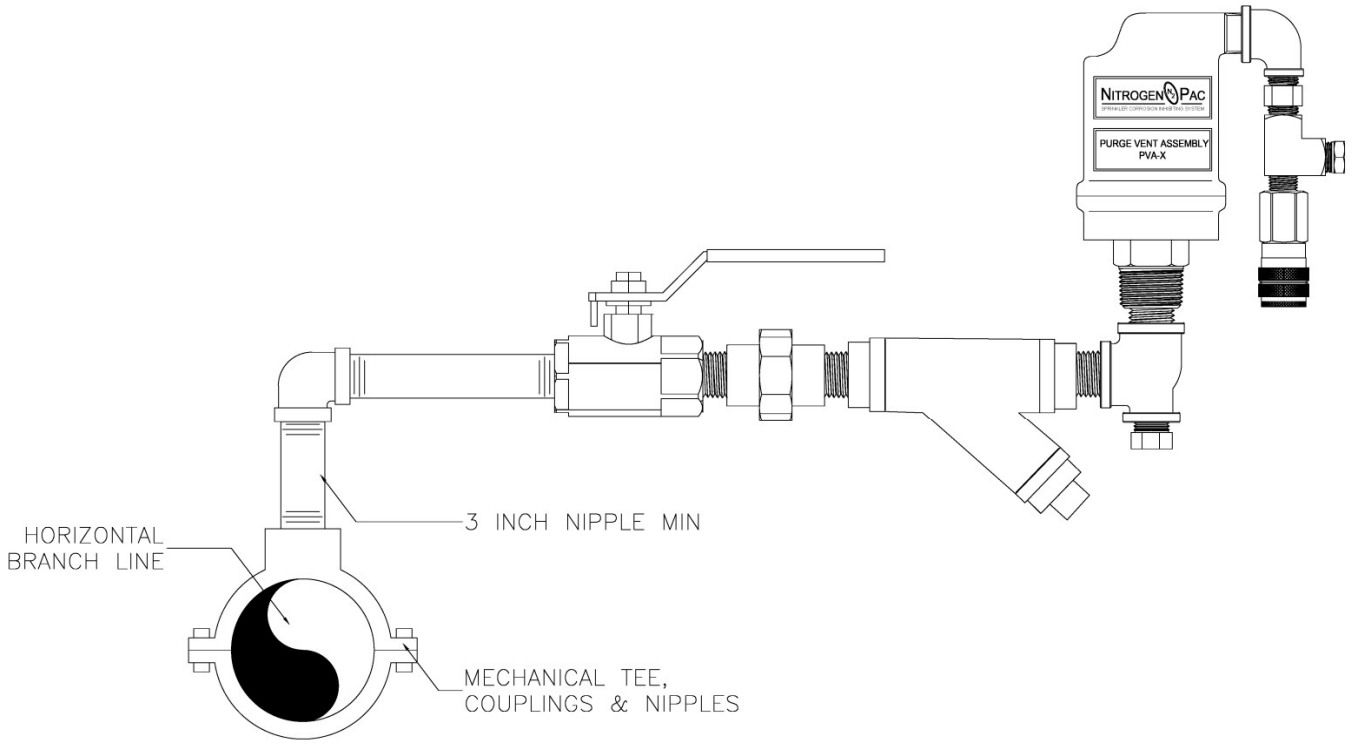
> **CAUTION**
> Failure to confirm that the sprinkler piping is **NOT** pressurized could result in personal injury and / or property damage.

(a) Install tee and nipple in horizontal piping. Position the tee with the outlet vertical, as indicated.

(b) Attach Purge Vent Assembly to nipple. It is acceptable to install additional pipe and elbows before the assembly to accommodate proper installation. The assembly MUST be installed vertically as shown for float valve to function properly. Use union to facilitate installation and proper assembly positioning.

(c) Ball valve should remain closed until commissioning.

Figure 31
Purge Vent Assembly Model PVA - Installation in Horizontal Piping



3.8. Nitrogen Purity Analyzer – Hand-Held Model NA-2.

(a) Unpack pre-assembled analyzer and connection hose assembly.

(b) Press ON button to ensure unit powers up.

(c) Store unit in clean and dry permanent storage location with included instruction manual.

3.9. (Optional) TRUE ADVANCED PURGE™ Assembly Model TAP-G3. The **TRUE ADVANCED PURGE™** Model TAP-G3 may be installed to automatically purge air from within a dry-pipe or preaction sprinkler system and replace the air with 98% nitrogen from a **NITROGEN-PAC™** sprinkler corrosion inhibiting system.

(a) Refer to **Table 4** in section **2.6.12** for selecting a compatible Purge Vent Assembly Model PVA.

(b) For information on installation, refer to Model TAP-G3 manual UFS P/N 33-TG3MAN-000 – Model TAP-G3 Installation Commissioning, and Maintenance Manual.

(c) For information on use of the Model TAP-G3, refer to UFS P/N 33-TG3USE-000 – Model TAP-G3 User Guide.

3.10. (Optional) Corrosion Monitor Assembly Model CMA-1. Refer to **Figure 32**. Proper Model CMA-1 installation is based on the orientation of the pipe at the intended installation location. The Model CMA-1 can be installed horizontally in a vertical riser or branch line; and can be installed horizontally or vertically in a horizontal sprinkler main or branch line. The assembly should be located at an accessible point for future maintenance.

IMPORTANT

DO NOT disassemble Corrosion Monitor Assembly to install! The union (refer to **Figure 32**) may be used to facilitate installation.

3.10.1. Attachment To Sprinkler Piping. Confirm that sprinkler piping system is **NOT** pressurized.

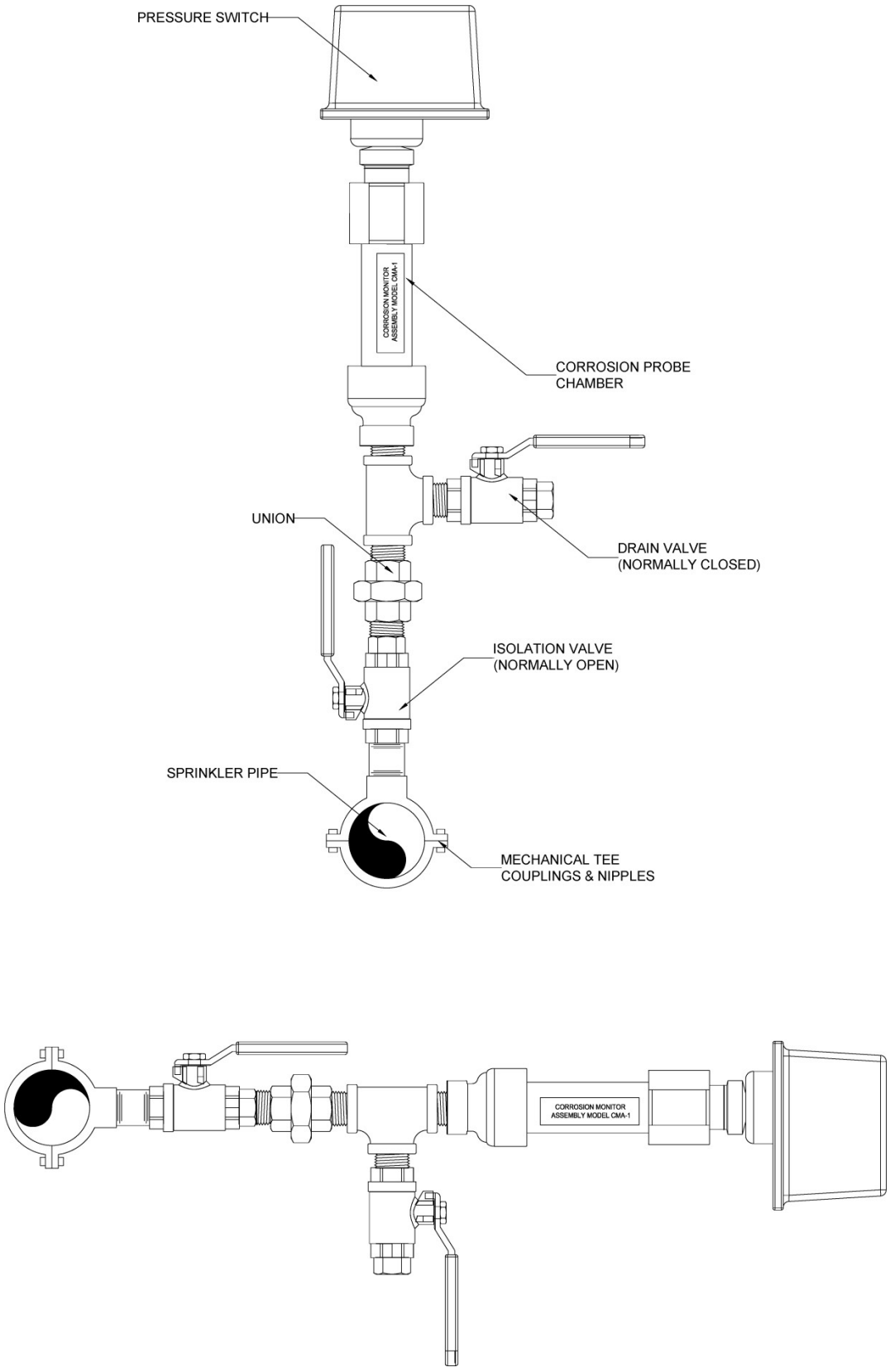
CAUTION

Failure to confirm that the sprinkler piping is **NOT** pressurized could result in personal injury and / or property damage.

3.10.2. Vertical Installation. Refer to **Figure 32**. Install tee and nipple as shown. Position the tee with the outlet vertical, as indicated. Attach Corrosion Monitor Assembly to nipple. It is acceptable to install additional pipe and elbows before the assembly to accommodate proper installation. The assembly MUST be installed as shown for drain valve to function properly. Use union to facilitate installation and proper assembly positioning. Isolation ball valve should remain closed until commissioning. Follow instructions provided with replacement probe kit (UFS P/N: 30-500013-100) when replacement is required.

3.10.3. Horizontal Installation. Refer to **Figure 32**. Install tee and nipple, as shown. Position the tee with the outlet horizontal, as indicated. Install a pipe nipple into the tee before the elbow, as shown. Attach Corrosion Monitor Assembly to nipple. It is acceptable to install additional pipe and elbows before the assembly to accommodate proper installation. The assembly MUST be installed as shown for drain valve to function properly. Use union to facilitate installation and proper assembly positioning. Isolation ball valve should remain closed until commissioning. Follow instructions provided with replacement probe kit (UFS P/N: 30-500013-100) when replacement is required.

Figure 32
Installation – Corrosion Monitor Assembly Model CMA-1

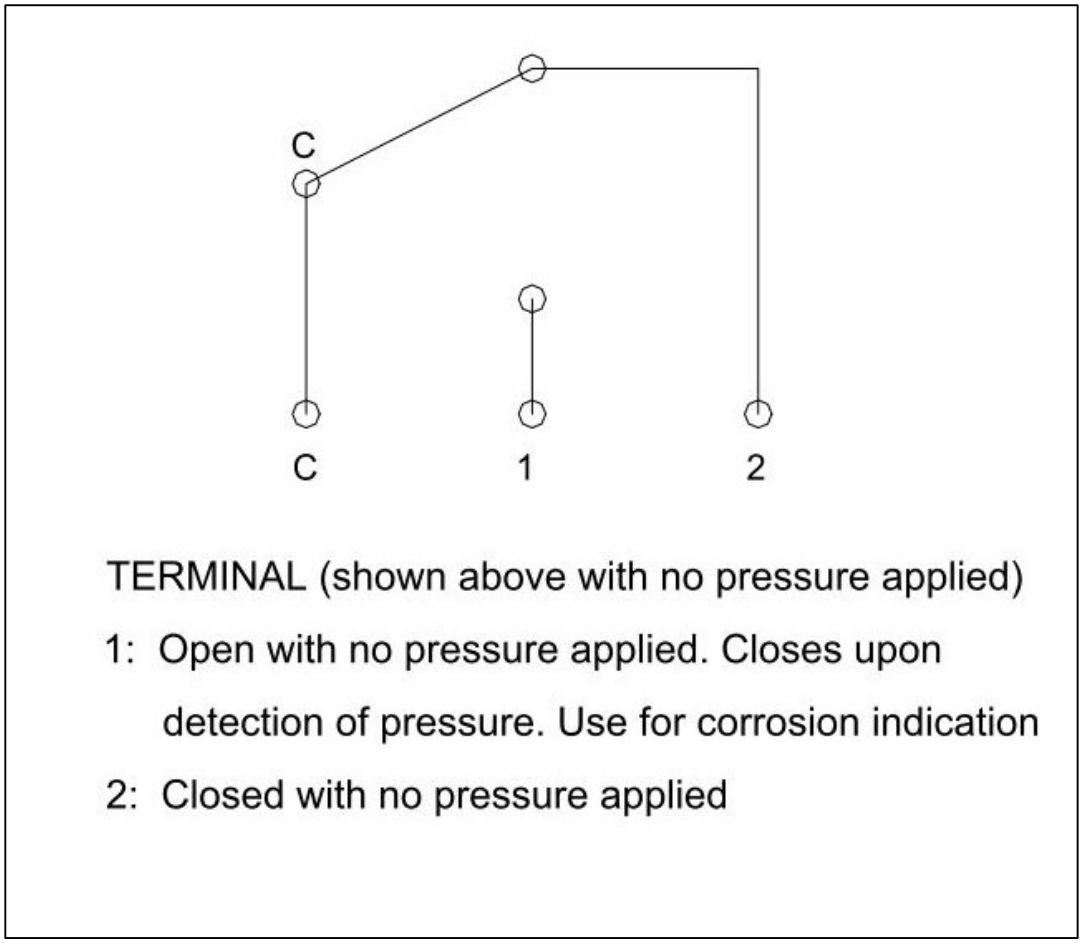


3.10.4. Electrical Connection. Refer to **Figure 33.**

DANGER

Failure to follow **ELECTRICAL CONNECTION** instructions correctly can result in **ELECTROCUTION**!

Figure 33
Electrical Connection
Corrosion Monitor Assembly Model CMA-1



(a) Remove cover by removing tamper resistant screw.

(b) Run wires through an approved raceway and conduit connector and affix the connector on the device. Two knockouts are provided on the pressure switch for ½" conduit. Individual switch compartments and ground screws are suitable for dissimilar voltage.

(c) Connect wires to the appropriate terminal connections shown in **Figure 32.** Switch contacts are SPDT; 10 Amps @ 125/250 VAC, 2 Amps @ 30 VDC.

4. COMMISSIONING. The process of system commissioning is important for achieving satisfactory results.

⚠ DANGER ⚠

The Model SC-W assembly must be installed in an adequately ventilated area. The device creates a 30% to 40% oxygen stream which may pose a flammability problem in an oxygen-sensitive environment. Ensure the area surrounding the Model SC-W assembly is adequately ventilated. Failure to do so creates an increased flammability hazard that can lead to serious property damage, serious injury, or death.

⚠ DANGER ⚠

Rapid release of nitrogen gas into an enclosed space displaces oxygen and can cause an asphyxiation hazard. Inhalation of nitrogen in increased concentration can result in unconsciousness and asphyxiation without warning. All areas containing nitrogen system equipment MUST be adequately ventilated. All nitrogen gas leaks discovered during installation, commissioning, and maintenance of **NITROGEN-PAC™** nitrogen generating equipment MUST be corrected promptly. Failure to comply can result in death or serious personal injury.

⚠ IMPORTANT

Prior to commissioning the Model SC-W nitrogen generating system, the owner, sprinkler contractor, or other sprinkler service professional shall inspect and test the sprinkler piping to establish that maximum leakage is within the allowable limit set by NFPA Standard 13. **THIS LEAKAGE RATE IS MAXIMUM 1-1/2 PSIG LOSS IN 24 HOURS STARTING AT 40 PSIG.** If excessive leakage exists, correct leaks and re-test. Nitrogen generating systems do not reverse pipe corrosion, stop leaks, or overcome excessive leakage.

⚠ IMPORTANT

The needle valve in the Model SC-W assembly is adjusted at the factory for the production of 98% nitrogen by the device, and requires no further field adjustments. **DO NOT DISTURB THE SETTING OF THIS NEEDLE VALVE!** Moving the needle valve can render the device incapable of producing 98% nitrogen. Proper re-adjustment of the needle valve requires training and instrumentation. At any time, if it appears that the Model SC-W assembly is not generating 98% nitrogen, contact **UNITED Fire Systems** for assistance.

⚠ IMPORTANT

Temperature fluctuations can affect nitrogen purity readings. Differences between readings taken at different times may be due to changes in temperature at the Model SC-W assembly and at the reading location. Differences between readings should not be immediately interpreted as a system fault.

- **UNITED Fire Systems** recommends that the technician performing the commissioning become thoroughly familiar with this entire manual, as well as the actual installation, before beginning the process.
- Follow the steps as indicated.
- Each valve in the system is identified by number. Refer to **Figure 34** and **Table 9** for valve locations, numbers, and purposes. Each valve has a blue flag marker with the number. Look for and identify all valves before proceeding.
- Temperature fluctuations can affect nitrogen purity readings. The temperature at the Model SC-W assembly's location and at the system PVAs should be as stable as possible to provide maximum assurance of nitrogen purity measurement accuracy.
- Use a copy of the Commissioning Worksheet / Checklist, Form UFS-622 (**Appendix C**) during the procedure to record all values as indicated and steps followed.
- Open and close all valves *carefully* and *slowly*.

Figure 34
Valve Locations and Numbers

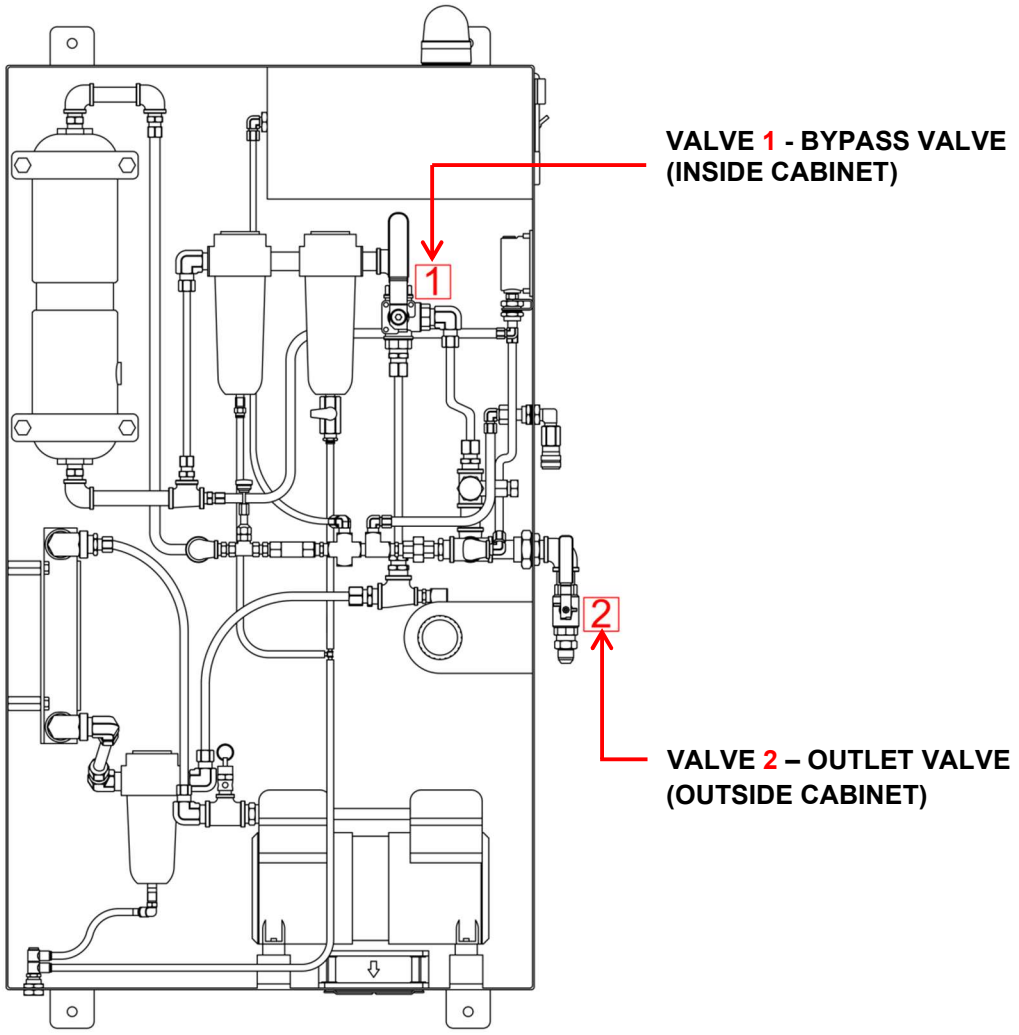
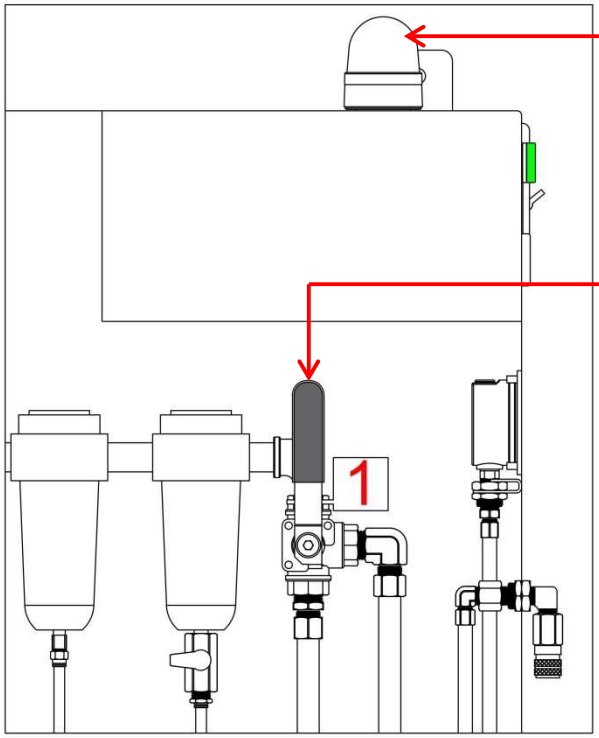


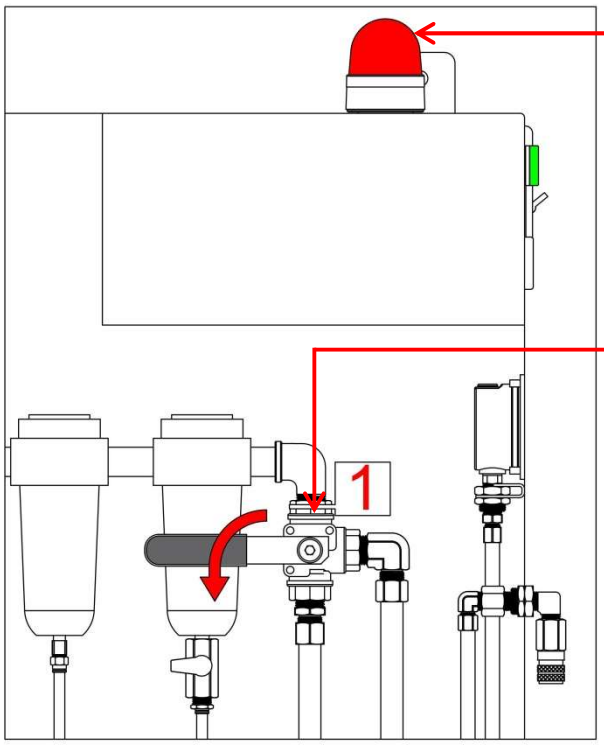
Table 9
Valve Numbers and Purposes

Valve Number	Name	NORMAL Position
1	Bypass Valve	OPEN (System Normal – Handle facing UP)
2	Outlet Valve	OPEN

Figure 35
Bypass Valve and Indicator Operation



NORMAL CONDITION
(SUPPLYING NITROGEN)



BYPASSED CONDITION
(SUPPLYING AIR)

Figure 36
External Indicators and Controls

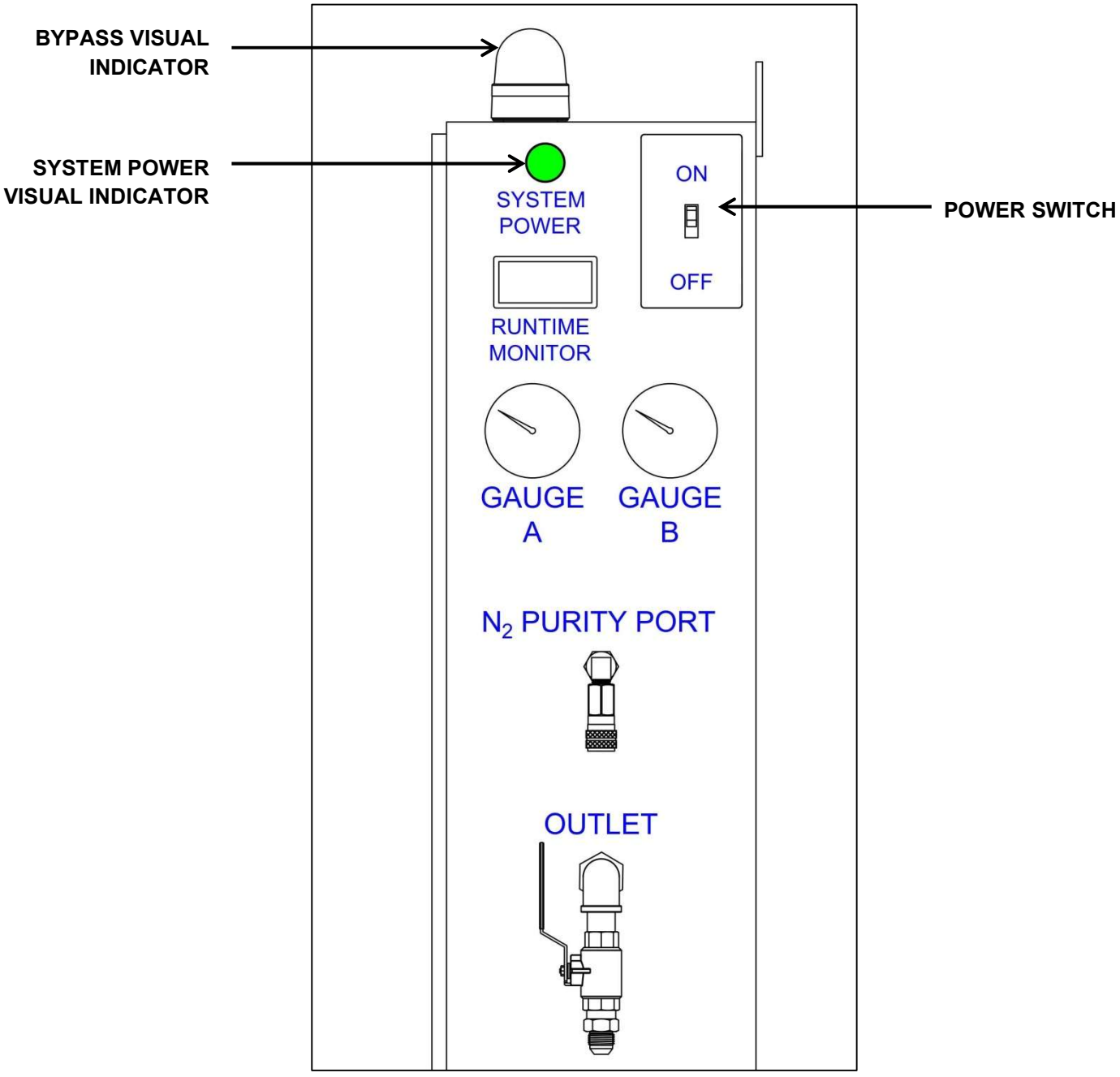
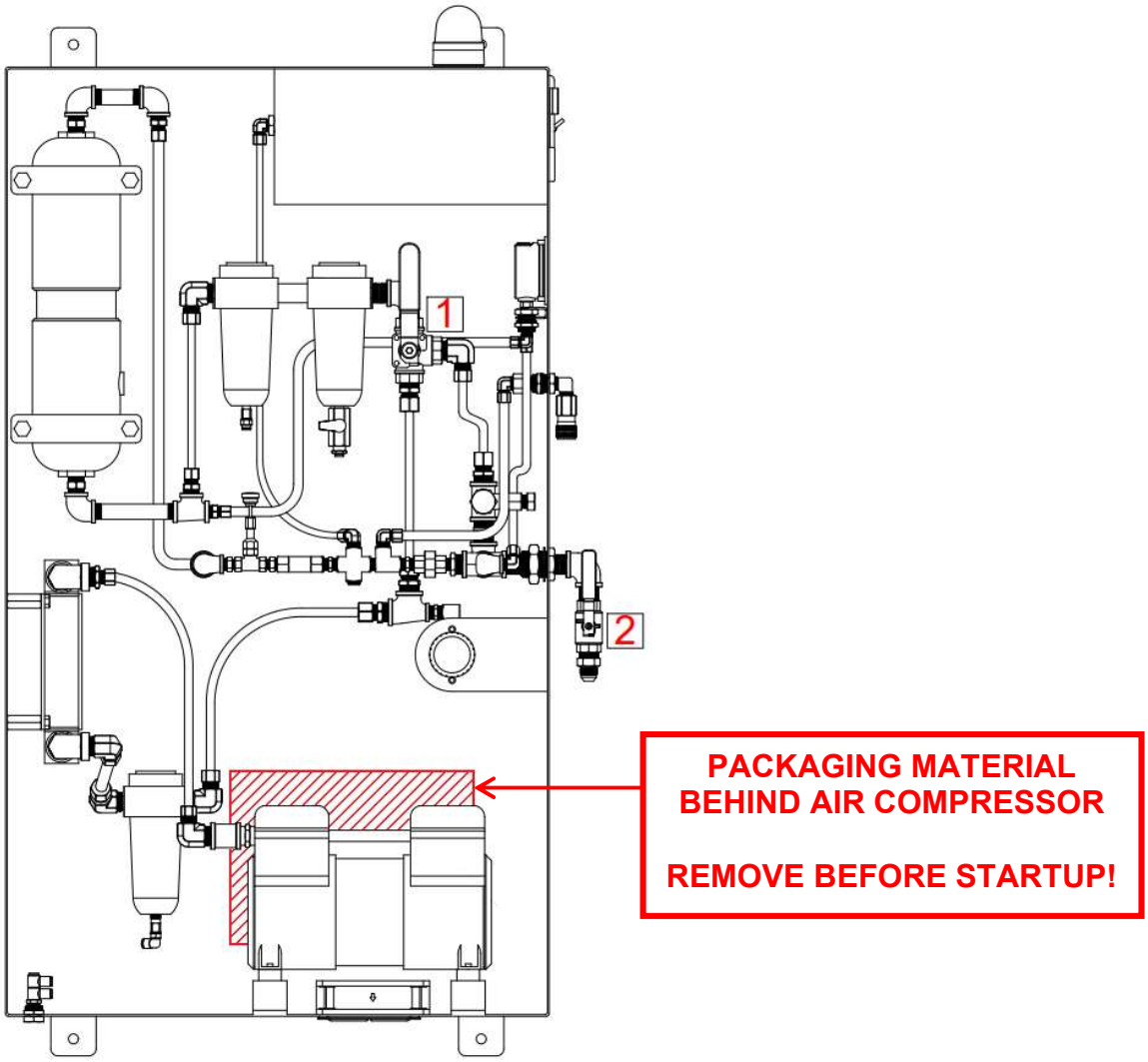


Figure 37
Packaging Material – Air Compressor



4.1. PRELIMINARY.

Step	Procedure
Preliminary 1	Prepare copy of Commissioning Worksheet / Checklist (**Appendix C**) for use during procedure.
Preliminary 2	Refer to **Figure 37**. Remove and discard packaging material from behind air compressor.
Preliminary 3	Verify that electrical connection to Model SC-W assembly is complete in accordance with this manual.
Preliminary 4	Verify that all piping connections are complete in accordance with this manual.
Preliminary 5	Turn off water supply to sprinkler valve.
Preliminary 6	Ensure that valves in **Table 9** are in the NORMAL position, all PVA valves are CLOSED, and all NAMD-1 valves are CLOSED.
Preliminary 7	Ensure that POWER switch is OFF.
SYSTEM IS READY FOR STARTUP – PROCEED TO 4.2. – STARTUP.	

4.2. STARTUP.

Step	Procedure
Startup 1	Operate panelboard circuit breaker to **ON**.
Startup 2	Operate **POWER** switch to **ON**. **GREEN** power indicator will illuminate, and air compressor should start.
Startup 3	Gauge **A** should begin to indicate pressure.
SYSTEM IS READY FOR 30 MINUTE INITIAL FILL – PROCEED TO 4.3.1. OR 4.3.2.	
IF SYSTEM IS TYPE I (INITIAL-FILL BY INTERNAL COMPRESSOR), PROCEED TO 4.3.1 – 30 MINUTE INITIAL FILL (TYPE I SYSTEM).	
IF SYSTEM IS TYPE II (INITIAL-FILL BY EXTERNAL COMPRESSOR), PROCEED TO 4.3.2 – 30 MINUTE INITIAL FILL (TYPE II SYSTEM) .	

4.3.1. 30 MINUTE INITIAL FILL (TYPE I SYSTEM).

Step	Procedure
Initial Fill 1	Refer to **Figure 34**. Move Valve **1** to **BYPASS** position (handle facing **LEFT**). **RED** Bypass visual indicator should be flashing **ON**.
Initial Fill 2	**OPEN** inlet valve on one (1) Model NAMD-1. NAMD-1 pressure gauge should indicate pressure.
Initial Fill 3	Adjust NAMD-1 regulator to indicate gauge pressure approximately 5-10% above minimum pressure required by low air supervisory switch. Examples: • If low air supervisory switch operates at 13 PSI, adjust NAMD-1 regulator so that gauge indicates approximately 15 PSI. • If low air supervisory switch operates at 40 PSI, adjust NAMD-1 regulator so that gauge indicates approximately 44 PSI. IN NO CASE should regulator be adjusted for pressure higher than can be handled by sprinkler valve.
Initial Fill 4	**CLOSE** Model NAMD-1 Inlet Valve, and **OPEN** NAMD-1 Bypass Valve.
Initial Fill 5	After 30 minutes or less, required valve supervisory pressure should be reached. **CLOSE** NAMD-1 Bypass Valve as soon as possible to avoid overpressurizing. Low air supervisory switch should be satisfied. Signal indicating low pressure should not be present when control unit is reset. If supervisory pressure is **NOT** reached in 30 minutes or less, troubleshoot sprinkler system for leaks. If supervisory pressure still cannot be reached, contact **UNITED Fire Systems**.
Initial Fill 6	If Model SC-W assembly is connected to two (2) sprinkler valves, repeat Initial Fill steps 1 through 6 for the second valve.
SYSTEM IS READY FOR PURGING – PROCEED TO 4.4. – PURGING.	

4.3.2. 30 MINUTE INITIAL FILL (TYPE II SYSTEM).

Step	Procedure
Initial Fill 1	Refer to **Figure 34**. Move Valve **1** to **BYPASS** position (handle facing LEFT). **RED** Bypass visual indicator should be flashing **ON**.
Initial Fill 2	**CLOSE** all valves on Model NAMD-1 connected to outlet of external air compressor.
Initial Fill 3	Apply AC power to external air compressor. Compressor motor should start.
Initial Fill 4	**OPEN** inlet valve on Model NAMD-1 connected to outlet of external air compressor.
Initial Fill 5	Adjust the setting of the regulator on this Model NAMD-1 to be **BELOW** but close to the low air supervisory switch setting of the sprinkler valve. In the case of a dry-pipe sprinkler valve, this setting should also be as high as possible **ABOVE** the pressure where the dry-pipe valve trips. Each system installation requires examination based on the brand and model of sprinkler valve, and the supplied water pressure. Refer to **Table 10** for an example.

4.3.2. 30 MINUTE INITIAL FILL (TYPE II SYSTEM) (Continued).

Step	Procedure
Initial Fill 6	OPEN inlet valve on one (1) Model NAMD-1 at sprinkler valve. NAMD-1 pressure gauge should indicate pressure.
Initial Fill 7	Adjust Model NAMD-1 regulator to indicate gage pressure approximately 5-10% above minimum pressure required by valve pressure switch. Examples: • If valve pressure switch operates at 13 PSI, adjust NAMD-1 regulator so that gauge indicates approximately 15 PSI. • If valve pressure switch operates at 40 PSI, adjust NAMD-1 regulator so that gauge indicates approximately 44 PSI. IN NO CASE should regulator be adjusted for pressure higher than can be handled by sprinkler valve.
Initial Fill 8	**CLOSE** NAMD-1 Inlet Valve, and **OPEN** Bypass Valves on both NAMD-1s connected to external air compressor and sprinkler valve.
Initial Fill 9	After 30 minutes or less, required valve supervisory pressure should be reached. **CLOSE** NAMD-1 Bypass Valve as soon as possible to avoid overpressurizing. Low air supervisory switch should be satisfied. Signal indicating low pressure should not be present when control unit is reset. If supervisory pressure is **NOT** reached in 30 minutes or less, troubleshoot sprinkler system for leaks. If supervisory pressure still cannot be reached, contact **UNITED Fire Systems**.
Initial Fill 10	If Model SC-W assembly is connected to two (2) sprinkler valves, repeat Initial Fill steps 1 through 6 for the second valve.
SYSTEM IS READY FOR PURGING – PROCEED TO 4.4. – PURGING	

Table 10
Example – Setting of Model NAMD-1
Connected to External Air Compressor (Type II System)

Parameter	Setting	Notes
Recommended normal supervisory pressure	40 PSI	Setting of NAMD-1 connected to valve trim
Low air switch setting	28 PSI	Setting allows normal variations in supervisory pressure to be “ridden out” without sending a low air supervisory signal
Setting NAMD-1 connected to outlet of external air compressor	26 PSI	Setting should provide a reliable low air signal, but prevent dry-pipe valves from tripping
Dry-pipe valve trip point	Below 24 PSI	As low as practical below 26 PSI, but still permitting valve tripping within required time

4.4. PURGING. The system is now filled with air. It is necessary to purge the air and replace it with 98% nitrogen. This process will take a period of time (3 to 14+ days) to accomplish.

Step	Procedure
Purge 1	Return Valve **1** to **NORMAL** position. After a short period, **RED** Bypass visual indicator should be **OFF**.
Purge 2	**CLOSE** Model NAMD-1 Bypass Valve, and **OPEN** NAMD-1 Inlet and Outlet Valves.
Purge 3	**OPEN** valve on Model PVA. If Model SC-W assembly is supplying N_2 to multiple risers, open valves on no more than one (1) PVA at one time. (**NOTE:** If TRUE ADVANCED PURGE Model TAP-G3 device is installed, refer to User Guide P/N 33-TG3USE-000 for purging instructions.)
Purge 4	Check to ensure all valves are in **NORMAL** position (refer to Quick Reference Valve Position Table).
Purge 5	If installer provided drain condensate pump has been installed, ensure that pump power is connected to separate power source, and is **NOT** connected to Model SC-W assembly power terminal strip. Also ensure that pump discharge is run to an appropriate drain location, and pump functions as intended.
Purge 6	Switch Model NA-2 Nitrogen Analyzer **ON**. Calibrate if needed – refer to **Appendix A**.

4.4. PURGING (Continued).

Step	Procedure
Purge 8	With SC-W compressor running, attach Model NA-2 to N_2 Purity Test Port on exterior of Model SC-W assembly.
Purge 9	Examine reading on Model NA-2. • If reading is 98% N_2 or more, record reading on Commissioning Checklist, disconnect the Model NA-2, and proceed to Purge 11. • If reading is below 98% N_2, adjustment of needle valve may be necessary. **Contact UNITED Fire Systems before proceeding**!
Purge 10	Record N_2 purity percentage at each PVA. • If using Model NA-2, connect device to test port on Model PVA. • If using TRUE ADVANCED PURGE™ Model TAP-G3, refer to User Guide P/N 33-TG3USE-000 for purging instructions.
Purge 11	Measure and record values on all system gauges and runtime monitor. • Gauge **A** (operating pressure) on Model SC-W assembly • Gauge **B** (receiver pressure) in on Model SC-W assembly • Gauge on each Model NAMD-1
SYSTEM IS NOW PURGING. N_2 PURITY IN SPRINKLER SYSTEM PIPE SHOULD BEGIN TO INCREASE. PROCEED TO 4.5. – FINAL ACCEPTANCE.	

4.5. FINAL ACCEPTANCE.

Step	Procedure
Final Acceptance 1	After appropriate interval and with compressor running, measure and record N_2 purity percentage at Model SC-W assembly test port using Model NA-2 Nitrogen Analyzer. If nitrogen percentage at Model SC-W assembly test port is below 98%, needle valve may require adjustment. Contact **UNITED Fire Systems** before proceeding!
Final Acceptance 2	Measure and record nitrogen percentage at PVA using NA-2 Nitrogen Analyzer or True Advanced Purge (TAP) device.
Final Acceptance 3	If nitrogen percentage at PVA is less than 98%, purge is not complete. Re-measure after appropriate interval. N_2 purity percentage should be increasing between measurements. If nitrogen percentage is not increasing, or does not reach 98%, adjustment of needle valve may be necessary. Contact **UNITED Fire Systems** before proceeding!
Final Acceptance 4	On two-riser systems, repeat purging (4.4) on second riser when first riser is complete.
Final Acceptance 5	When N_2 purity percentage at each PVA reaches 98%, system commissioning is complete. Record hours and minutes displayed on Runtime Monitor.
SYSTEM IS NOW IN SERVICE.	

Table 11
Quick-Reference Valve Position Table

	A	B	C	D	E	F	G
VALVE	NORMAL	BYPASS	PURGE	FILTER SERVICE	N_2 PURITY AT TEST PORT	N_2 PURITY AT PVAs	DRAIN
MODEL SC-W VALVES							
1	Open (handle facing UP)	Closed (handle facing LEFT)	Open (handle facing UP)	Open (handle facing UP)	Open (handle facing UP)	Open (handle facing UP)	Open (handle facing UP)
2	Open	Open	Open	Closed	Open	Open	Closed
MODEL NAMD-1 VALVES							
NAMD-1 Inlet	Open	Closed	Open	Open	Open	Open	Open
NAMD-1 Outlet	Open	Closed	Open	Open	Open	Open	Open
NAMD-1 Bypass	Closed	Open	Closed	Closed	Closed	Closed	Closed
MODEL PVA INLET VALVE(S)							
PVA-4 Inlet Valve(s) with NA-2	Closed	Closed	Open	Closed	Closed	Open	Closed
PVA-2 Inlet Valve(s) with TAP	Open	Open	Open	Open	Open	Open	Closed
TAP = True Advanced Purge device. Leave PVA inlet valve OPEN unless draining water at PVA location. TAP device will be in control of purging.							

NOTES
A = NORMAL – system is providing nitrogen into preaction sprinkler system(s).
B = BYPASS – compressed air is routed to preaction sprinkler system(s) for initial fill (max. 30 minutes) per NFPA 13, or to put sprinkler system on air if nitrogen is not available
C = PURGE – system(s) are purging air out of sprinkler piping, replacing air with nitrogen.
D = FILTER SERVICE – filter elements in Model SC-W cabinet filters are to be replaced.
E = N_2 PURITY AT TEST PORT – nitrogen purity at Model SC-W cabinet is to be checked with NA-2 hand-held meter.
F = N_2 PURITY AT PVAs – nitrogen purity at PVAs is to be checked with NA-2 hand-held meter or TAP device.
G = DRAIN – draining accumulated moisture from Model SC-W.

5. MAINTENANCE

 CAUTION

DO NOT attempt to perform service on filter elements while the Model SC-W assembly is pressurized! **Gauge A** MUST read zero (0) PSIG **BEFORE** attempting to remove filter bowls. Failure to do so can result in serious personal injury!

 IMPORTANT

The needle valve in the Model SC-W assembly is adjusted at the factory for the production of 98+% nitrogen, and requires no further field adjustments. **DO NOT DISTURB THE SETTING OF THIS NEEDLE VALVE!** Moving the needle valve can render the assembly incapable of producing 98% nitrogen. Proper re-adjustment of the needle valve requires training and instrumentation. At any time, if it appears that the Model SC-W assembly is not generating 98% nitrogen, contact **UNITED Fire Systems** for assistance.

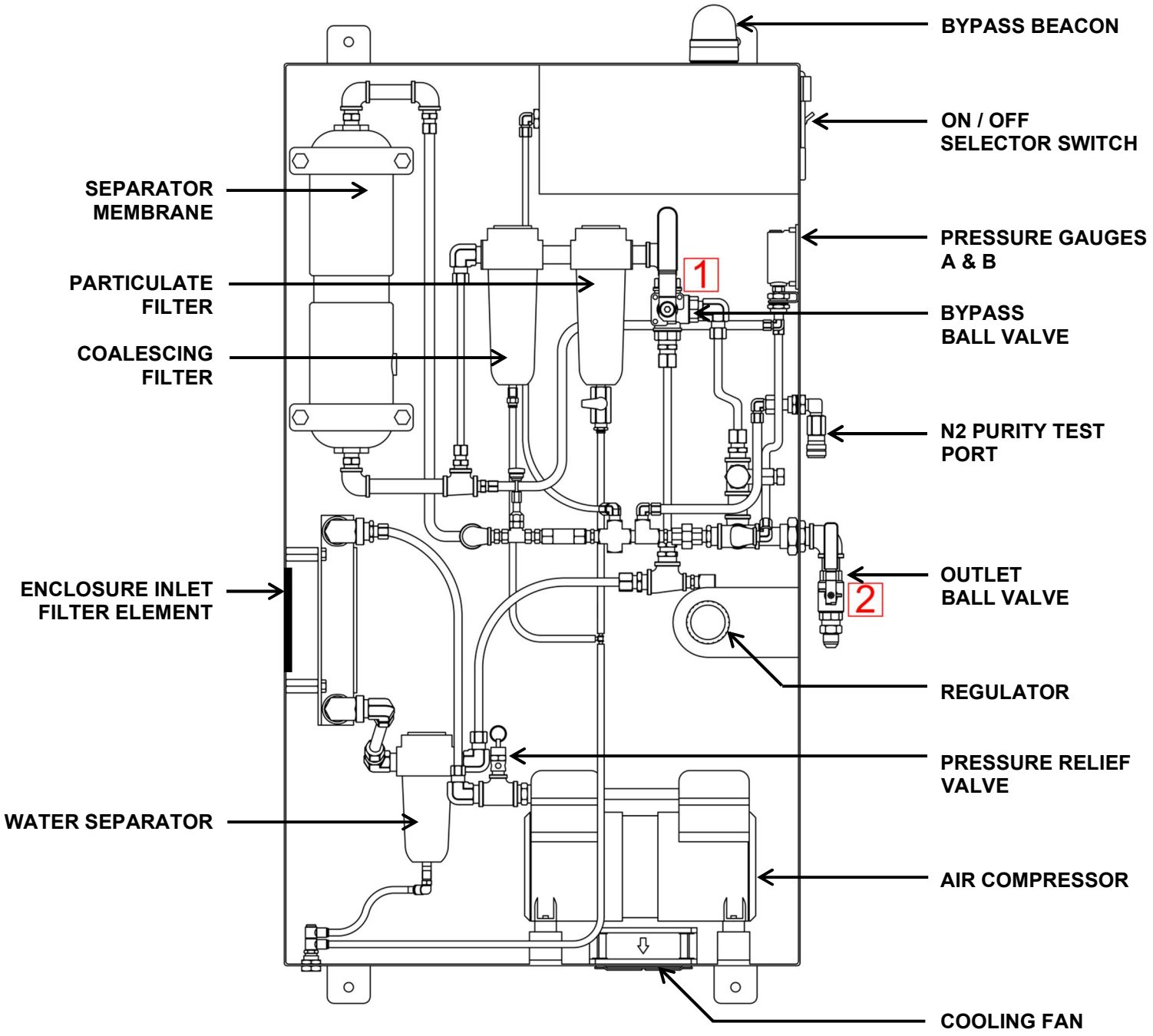
 IMPORTANT

All valves should always be opened and closed *carefully* and *slowly*.

 IMPORTANT

Temperature fluctuations can affect nitrogen purity readings. Differences between readings taken at different times may be due to changes in temperature at the Model SC-W assembly and at the reading location. Differences between readings should not be immediately interpreted as a system fault.

Figure 38
Model SC-W Assembly – Components



5.1. Monthly Inspection.

5.1.1. Objective. Monthly inspection helps assure that the Model SC-W system continues to be in good working order. This inspection involves visual checks of system and valve status, as well as measurement of the nitrogen output of the Model SC-W assembly and the nitrogen purity in the sprinkler pipe.

5.1.2. Personnel. This inspection can be performed by individuals generally familiar with the system and its installation. **UNITED Fire Systems** recommends that individuals performing monthly inspections become familiar with the contents of this manual. Read, understand, and follow all safety information in this manual, indicated by the words **DANGER**, **WARNING**, and **CAUTION**, and all information indicated by the word IMPORTANT.

5.1.3. Instructions. Refer to Form UFS-623 (**Appendix D**) for the steps to follow when performing monthly inspection. If any of the inspection steps indicate a NOT OK condition, refer to this manual for instructions to rectify the condition.

5.2. Specific Procedures – Monthly Inspection

5.2.1. Use of Model NA-2 N_2 Purity Analyzer to Measure Nitrogen Purity at Model SC-W Assembly.
(a) Switch Model NA-2 N_2 Purity Analyzer ON. Calibrate if needed – refer to **Appendix A**.
(b) Refer to **Figure 38**. Attach male quick-connect on analyzer to female quick-connect on N_2 Purity Test Port on exterior right side of assembly. Flow will be heard from holes on Model NA-2.
(c) Record reading from analyzer on inspection form.
(d) Detach Model NA-2 from N_2 Purity Test Port.

5.2.2. Inspection of Enclosure Inlet Filter Element – Model SC-W Assembly.
(a) Refer to **Figure 38**. **CAREFULLY** remove inlet filter element from between enclosure and intercooler.
(b) Examine inlet filter element for dust accumulation. Brush accumulated dust off surface.
(c) Replace inlet filter element by adhering to Velcro strips. DO NOT reverse element – side with dust accumulation should face slots in enclosure.
(d) Check to ensure no gaps exist at filter edges.

5.2.3. Inspection of Exhaust Fan Filter Element – Model SC-W Assembly.
(a) Place ON / OFF Selector Switch in the OFF position.
(b) Refer to **Figure 38**. Ensure that exhaust fan blades have stopped rotating.
(c) **CAREFULLY** remove filter retainer from top of exhaust fan by un-snapping retainer.
(d) Remove exhaust fan filter element from retainer.
(e) Examine exhaust fan filter element for dust accumulation. Brush accumulated dust off surface.
(f) Replace exhaust fan filter element in filter retainer. DO NOT reverse element – side with dust accumulation should face up, away from fan.
(g) Replace retainer on exhaust fan and snap securely in place.
(h) Place ON / OFF Selector Switch in the ON position.
(k) Ensure that exhaust fan blades are rotating.

5.2.4. Use of Model NA-2 Nitrogen Purity Analyzer to Measure Nitrogen Purity at Model PVA-2 Purge Vent Assembly. Refer to **Figure 39.**
(a) Switch Model NA-2 Nitrogen Purity Analyzer ON. Calibrate if needed – refer to **Appendix A**.
(b) Attach male quick-connect on analyzer to female quick-connect on outlet of Model PVA-2 Purge Vent Assembly.
(c) If Model PVA-2 ball valve is not already open for purging, c*arefully* open valve. Flow will be heard from holes on Model NA-2.
(d) Record reading from analyzer on inspection form.
(e) Position Model PVA-2 ball valve in original position.
(f) Detach Model NA-2 from outlet of Model PVA-2.

5.3 Annual Maintenance.

5.3.1 Objective. Annual maintenance helps keep the Model SC-W system in satisfactory condition. This maintenance involves testing various components of the system, as well as replacement of key elements.

5.3.2 Personnel. **UNITED Fire Systems** strongly recommends that trained, experienced fire protection technicians perform this maintenance. Personnel should be thoroughly familiar with all details of system operation and maintenance, as well as the sprinkler equipment that the Model SC-W assembly is connected to. Read, understand, and follow all safety information in this manual, indicated by the words **DANGER**, **WARNING**, and **CAUTION**, and all information indicated by the word **IMPORTANT**.

5.3.3 Instructions. Refer to Form UFS-624 (**Appendix E**) for the steps to follow when performing annual maintenance. This form also indicates the replacement parts that should be on hand to properly perform the maintenance procedure. Specific procedural instructions are shown below in **Section 5.4.**

5.4. Specific Procedures – Annual Maintenance

5.4.1. Replacement of Compressor Intake Filter – Model SC-W Assembly.
(a) Place ON / OFF Selector Switch in the OFF position.
(b) Remove existing filter by unscrewing (no tools required – filter is hand-tight).
(c) Discard existing filter.
(d) Replace with new filter by screwing on hand-tight. DO NOT USE TOOLS TO TIGHTEN FILTER.
(e) Place ON / OFF Selector Switch in the ON position.

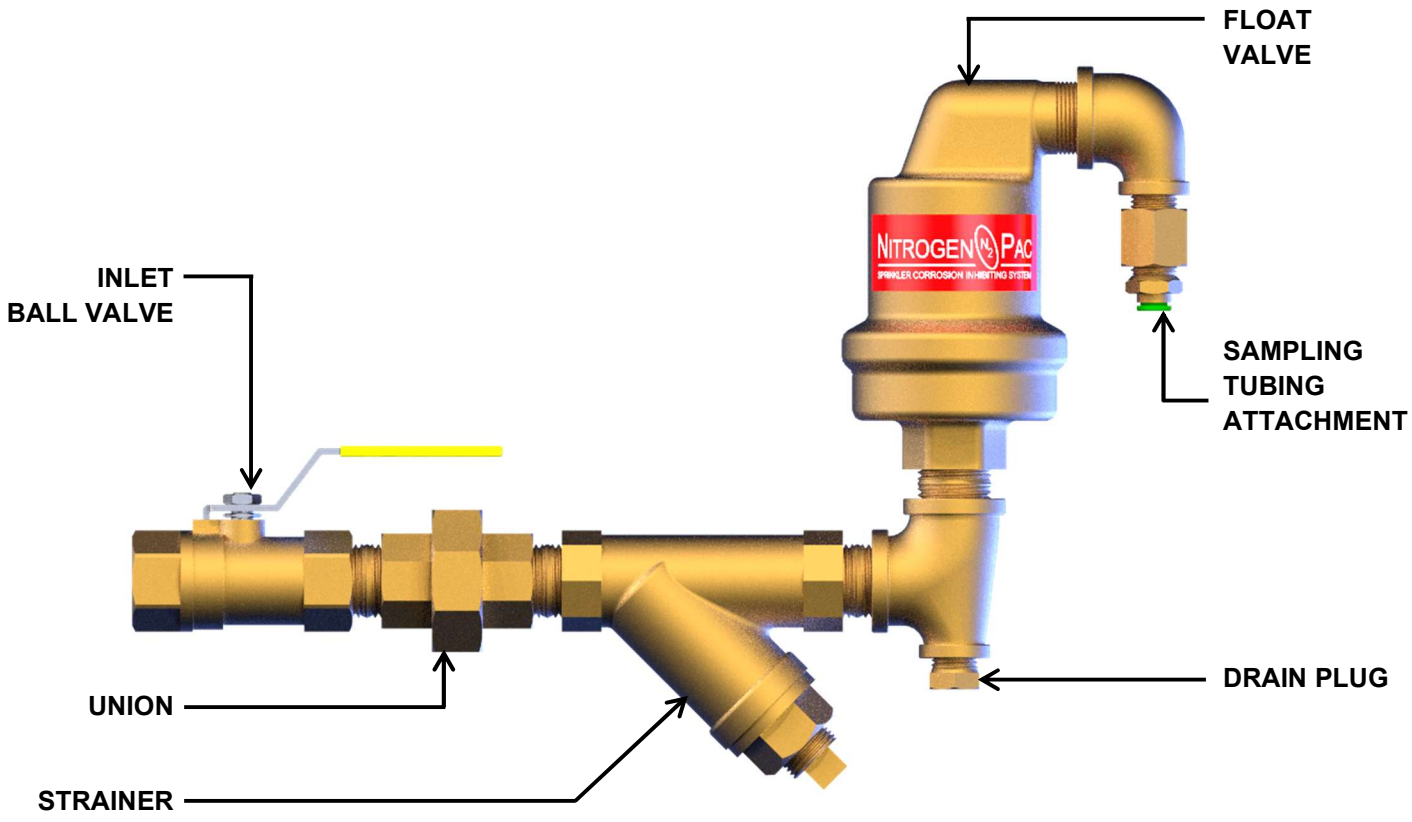
5.4.2. Replacement of Enclosure Inlet Filter Element – Model SC-W Assembly.
(a) Place ON / OFF Selector Switch in the OFF position.
(b) **CAREFULLY** remove existing inlet filter element from between enclosure and intercooler.
(c) Discard existing filter element.
(d) Replace with new inlet filter element by adhering to Velcro strips.
(e) Check to ensure no gaps exist at inlet filter element edges.
(f) Place ON / OFF Selector Switch in the ON position.

5.4.3 Replacement of Exhaust Fan Filter Element – Model SC-W Assembly.
(a) Place ON / OFF Selector Switch in the OFF position.
(b) Ensure that exhaust fan blades have stopped rotating.
(c) **CAREFULLY** remove filter retainer from top of exhaust fan by un-snapping retainer.
(d) Discard filter element.
(g) Place new filter element and retainer on exhaust fan and snap securely in place.
(h) Place ON / OFF Selector Switch in the ON position.
(k) Ensure that exhaust fan blades are rotating.

5.4.4 Replacement of Coalescing and Particulate Filter Elements in Model SC-W Assembly (Refer to Appendix F and Figure 38).

(a) Close Valve **2**.
(b) Place ON / OFF Selector Switch in **OFF** position.
(c) Open drain valve on bottom of particulate filter.
(d) Observe Gauge **A**. Proceed **ONLY** when Gauge **A** has reached zero (0) PSIG.
(e) Disconnect drain tubing from fittings at bottom of each filter.
(f) Unscrew filter bowls from filter bodies. Note relative position of filter bowls – BOWLS **MUST NOT** BE INTERCHANGED AT RE-ASSEMBLY.
(g) Remove and discard used filter elements.
(h) Refer to **Table 12**. Replace with new filter elements.
(j) Re-attached filter bowls to filter bodies. Ensure proper filter bowl is attached to proper filter body, and **DO NOT** interchange.
(k) Re-attach drain tubing to bottom of each filter bowl.
(m) Place ON / OFF Selector Switch in **ON** position. Compressor should start and Gauge **A** should begin reading pressure.
(n) Check connections for leaks. Correct as necessary.
(p) Close drain valve on bottom of particulate filter.
(q) Open Valve **2**.

Figure 39
Model PVA Purge Vent Assembly
(Model PVA-2 Shown)



IMPORTANT

To prevent inadvertent operation of sprinkler valve or actuation of low air signal, **ALWAYS** close Model PVA ball valve **BEFORE** removing drain plug or strainer retainer.

5.4.5. Drainage of Accumulated Water at Model PVA Purge Vent Assembly. Refer to **Figure 39.** Residual water can accumulate at PVAs, possibly blocking purge flow. Periodic removal of this residual water permits purging to take place with no obstruction.

(a) If open, **CLOSE** PVA ball valve.
(b) Hold PVA so that torque applied to drain plug does not move PVA.
(c) With suitable wrench, remove drain plug.
(d) Allow sufficient time for accumulated water to drain.
(e) Apply Teflon tape to male threads of drain plug. (Recommended tape = Hercules Megatape or similar; 1/2 inch wide x 3.5 mils thick.)
(f) Replace drain plug, tightening with suitable wrench.
(g) If TAP device is installed, open ball valve.
(h) If TAP device is not installed, open ball valve only if purging is required.

5.4.6. Replacement of Strainer at Model PVA Purge Vent Assembly. Refer to **Figure 39.**

(a) A clogged strainer may inhibit purging. Replace strainer when clogged.
(b) If open, **CLOSE** PVA ball valve.
(c) Hold PVA so that torque applied to drain plug does not move PVA.
(d) Apply suitable wrench to hex on strainer retainer. Do not remove square plug.
(e) Remove and retain the strainer retainer.
(f) Examine rubber seal on strainer retainer. If damaged during removal, leakage may occur.
(g) Remove old strainer.
(h) Insert new strainer. Ensure strainer remains fully inserted.
(j) Tighten strainer retainer wrench-tight.
(k) If TAP device is installed, open ball valve.
(m) If TAP device is not installed, open ball valve only if purging is required.

5.5 Maintenance Parts

Table 12
Maintenance Parts

Description	UFS P/N
Intake Filter, Compressor	00-100005-558
Element, Particulate and Coalescing Filters	30-500002-101
Element, Water Separator	30-500002-301
Element, Enclosure Intake Filter	32-000043-002
Element, Exhaust Fan Filter	30-500200-002
Screen, Strainer, Model PVA	30-500003-301

6. TROUBLESHOOTING

IMPORTANT

All troubleshooting is to be performed by qualified personnel. Be aware of pressurized system components as some of the troubleshooting procedures require system components to be pressurized. **Failure to do so can result in system damage and/or personal injury.**

SYMPTOM	INDICATION(S)	PROBLEM	SOLUTION	MANUAL REFERENCE
Compressor does not run	Green power indicator is **OFF**	ON / OFF Selector Switch on Model SC-W assembly is **OFF**	Move ON / OFF Selector Switch to **ON** position	**4.2**
		Power from panelboard is **OFF**	Check circuit breaker	
	Green power indicator is **ON**	Possible compressor overheating	Allow compressor to cool	
Nitrogen purity in sprinkler system not increasing	Red “SYSTEM BYPASSED” indicator is **ON**	Model SC-W assembly is in Bypass mode	Verify position of valves has been restored to Nitrogen position.	**Figure 34**
	Red “SYSTEM BYPASSED” indicator is **OFF**	Model SC-W assembly may not be producing nitrogen	Check nitrogen purity at test port by using Model NA-2 analyzer	**5.2.1**
	Model SC-W assembly is producing 98% nitrogen when checked with Model NA-2 analyzer	**Valve 2** on Model SC-W assembly is **CLOSED**	Open valve	
		Valve on Model PVA is **CLOSED**	Open valve	
		Model PVA assembly has been flooded with water	Drain Model PVA assembly	**5.4.5**
		Strainer at Model PVA is clogged	Replace strainer	**5.4.6**
	Model SC-W assembly **NOT** producing 98% nitrogen when checked with Model NA-2 analyzer	Contact **UNITED Fire Systems**		
Excessive compressor runtime (more than 2-1/2 hours per day) during purging	During purging, the Model SC-W assembly compressor is supplying air to make nitrogen for purging. Runtime during purging will be much greater during purging, and “excessive” runtime is normal. Air compressor runtime should be assessed after purging is complete.			

SYMPTOM	INDICATION(S)	PROBLEM	SOLUTION	MANUAL REFERENCE
Excessive compressor runtime (more than 2-1/2 hours per day) after purging	Runtime indicator indicates more than 2-1/2 hours of runtime in a 24 hour period.	Compressor intake filter is clogged	Replace intake filter	**5.4.1**
		Particulate and / or coalescing filters are clogged	Replace filter elements	**5.4.4**
		Leakage in piping between Model SC-W assembly outlet and Model NAMD-1	Repair all leaks.	
		Leakage at Model NAMD-1	Repair all leaks.	
		Excessive leakage in sprinkler piping	Repair leaks until leakage is minimized	
		Model SC-W assembly regulator drift	When compressor is running, check Gauge **A** for reading of 100 PSI.	If Gauge **A** reading is too low, contact **UNITED Fire Systems**
Low air signal	Control panel monitoring sprinkler valve indicates SUPERVISORY – LOW AIR condition	Model NAMD-1 valves not properly positioned	Position Model NAMD-1 ball valves properly	**Table 11**
		Model NAMD-1 regulator not properly adjusted	Adjust Model NAMD-1 regulator to correspond with required supervisory pressure	**Appendix B**
		Compressor is not able to “keep up”	Refer to “Excessive compressor runtime (more than 2-1/2 hours per day) after purging” above	
High air signal	Control panel monitoring sprinkler valve indicates SUPERVISORY – HIGH AIR condition	Model NAMD-1 regulator not properly adjusted	Adjust Model NAMD-1 regulator to correspond with required supervisory pressure	**Appendix B**
Inadvertent dry-pipe valve tripping during purging		Presence of quick-opening device (dry accelerator)	Refer to **2.6.9** for information on dealing with the presence of a quick-opening device (dry accelerator)	

NITROGEN N_2 PAC
SPRINKLER CORROSION INHIBITING SYSTEM

UNITED FIRE SYSTEMS



Model NA-2
Nitrogen Analyzer
Hand-Held

OPERATING MANUAL
&
INSTRUCTIONS FOR USE

R218M06
Industrial

WARNINGS:

Indicate potentially hazardous situations, which if not avoided, could result in death, serious injury, or property damage.

- Before use, all individuals who will be using the N_2 analyzer must become thoroughly familiar with the information contained in this manual.
- Strict adherence to the operating instructions is necessary for safe, effective product performance. This product will perform only as designed if operated in accordance with this manual.
- Repair or alteration of the analyzer beyond the scope of this manual, or by anyone other than authorized service personnel, can cause the product to fail to perform as designed.
- Never allow an excess length of tubing, or any accessory near a person's head or neck, which may result in strangulation.
- Always use protective eyewear and observe proper safety procedures when working with pressurized gases.
- The oxygen sensor is a sealed device containing a mild acid electrolyte, lead (Pb), and lead acetate. Lead and lead acetate are hazardous waste constituents and should be disposed of properly, or returned for proper disposal or recovery.
- Do not expose the analyzer to high temperatures (>70°C).

CAUTIONS:

Indicate potentially damaging situations, which if not avoided, could result in minor injury, property damage, or impaired analyzer performance.

- Use only genuine accessories and replacement parts. Failure to do so may seriously impair the analyzer's performance.
- Before use, ensure that the protective seal has been removed from the sensing port.
- Before use, ensure that the analyzer has been properly calibrated. Calibrate the analyzer if environmental conditions (such as temperature, humidity, pressure or elevation) have changed significantly. Refer to "Factors Influencing Accurate Readings".
- Use of the analyzer near devices that generate electrical fields may cause erratic readings.
- Dropping the analyzer can adversely affect its performance.
- Do not immerse the analyzer in water or expose the analyzer to high humidity or moisture. The analyzer is not watertight.
- Do not immerse the analyzer in any cleaning solution or use an autoclave.
- Do not over-pressurize the analyzer. Doing so may destroy the sensor. Allow no more than 3 PSI (or 2 liters per minute of gas flow) to enter the analyzer.
- If the LCD display goes blank immediately after operating the ON button, or the analyzer will not properly calibrate, then the analyzer has expired. Do not use the device. Refer to Section 9 – Disposal for proper disposal instructions.

1. INTRODUCTION

This manual describes the function; operation and maintenance of the N_2 analyzer. The N_2 analyzer is engineered for long life, maximum reliability and stable performance.

NOTE: In order to obtain optimum performance from your analyzer, all operation and maintenance must be performed in accordance with this manual. Please read the manual thoroughly before using the analyzer and do not attempt any repair or procedure that is not described herein. We cannot warranty any damage resulting from misuse, unauthorized repair or improper maintenance of the instrument.

2. N_2 ANALYZER FEATURES AND FUNCTIONS

LCD Display: A 3-digit display provides a direct readout of nitrogen concentration in the range of 0 - 99.9%. The display is blank when the N_2 Analyzer enters its sleep (power off) mode. The N_2 Analyzer will automatically enter the sleep mode after 2 minutes from the last time the analyzer was energized. You can manually turn off the analyzer by pressing the on/off switch.

ON Button/Auto OFF: Use this button to turn the N_2 Analyzer on or off. When the N_2 Analyzer is in the Sleep (power off) mode, the LCD display is blank. When the ON button is pressed once, the analyzer will display the nitrogen concentration for 2 minutes. Pressing the ON button during this 2 minute "window" will prolong the ON period to 2 minutes from the most recent time that the button was pressed.

Calibration Button: This button is used to place the analyzer into enter calibration mode. Holding the button for more than three seconds will place the analyzer into enter calibration mode.

Over-Range Indicator: The appearance of a decimal point after the first digit means that the N_2 Analyzer is reading in excess of 99.9%.

Example: 0.0.0 = 100% 0.0.1 = 101%; 0.0.2 = 102%. The displayed value is not valid. Re-calibrate the analyzer and repeat the measurement.

Oxygen Sensor: This is used to measure oxygen concentration in sample gas.

Sample Inlet Connection: This is the port at which the analyzer is connected to determine nitrogen concentration.

3. PRINCIPLE OF OPERATION

The instrument display corresponds directly to the oxygen sensor. The oxygen diffuses through the membrane and an electrical current is generated that is proportional to the partial pressure of oxygen in the gas sample. The oxygen percentage is subtracted from 100, with the remainder being displayed as percent nitrogen. The sensor has a minimal response to gases other than oxygen.

4. PRE-USE CHECKOUT/CALIBRATION:

Follow these steps before using the N_2 analyzer.

4.1. Prior to turning on the analyzer, a protective film covering the threaded sensor face must be removed. After removing the film, wait approximately 20 minutes for the sensor to reach equilibrium.

4.2. Pre-assembly, if required.
- Thread the barbed adapter onto the oxygen sensor.
- Connect the clear tubing to the barbed adapter.

4.3. Using the "ON/OFF" button, make sure the unit is in the power "ON" mode.

4.4. Press and hold the Calibration button for 3 seconds until the display reads “CAL”. This will calibrate the N_2 analyzer to room air. Thereafter, we recommend calibration on a weekly basis.

A new calibration is required when:
- The measured N_2 percentage in 79.1% N_2 (normal air) is **above** 80.1%.
- The measured N2 percentage in 79.1% N_2 (normal air) is **below** 78.1%.

If you are unsure about the displayed N_2 percentage, see Factors Influencing Accurate Readings.

4.5. The N_2 analyzer is now ready for use.

5. FACTORS INFLUENCING ACCURATE READINGS

Elevation Changes: Changes in elevation result in a reading error of approximately 1% of reading per 250 feet. In general, calibration of the instrument should be performed when elevation at which the product is being used changes by more than 500 feet.

Temperature Effects: The N_2 analyzer will hold calibration and read correctly within ±3% when in thermal equilibrium within the operating temperature range. The analyzer must be thermally stable when calibrated and allowed to thermally stabilize after experiencing temperature changes before readings are accurate. For best results, perform calibration at a temperature close to the temperature where the analyzer will be used. "**CAL Err St**" may be displayed if the analyzer has not reached thermal equilibrium.

Pressure Effects: N_2 analyzer readings are proportional to the oxygen partial pressure. Partial pressure is concentration multiplied by absolute pressure. Thus, if pressure is constant, readings are proportional to the oxygen concentration. For best results:

- Calibrate the analyzer at the same pressure as the sample gas.
- The oxygen sensor is intended for use up to two atmospheres absolute pressure. Use the analyzer within this parameter.

Humidity Effects: Non-condensing humidity (up to 95% RH) should have no significant effect upon analyzer performance (other than possibly diluting the sampled gas up to 4%, proportionately reducing the oxygen concentration). For best results:

- Do not use the analyzer in environments where condensation may occur. Condensation can block the sampling tubing, resulting in erroneous readings and slower response time.
- Avoid use of the analyzer in environments greater than 95% relative humidity.

6. CALIBRATION ERRORS AND ERROR CODES

The N_2 analyzer has a self-test feature built into the software to detect faulty calibration, oxygen sensor failures, and low operating voltage. These are listed below, and include possible actions to take, if an error code occurs.

E03: No valid calibration data available: Make sure the analyzer has reached thermal equilibrium. Press and hold the Calibration button for three seconds to manually force a new calibration.

E04: Battery below minimum operating voltage: Unit is at end of life. See Section 9 for proper disposal.

CAL Err St: O2 Sensor reading not stable. Wait for displayed oxygen reading to stabilize when calibrating the analyzer at 100% oxygen. Wait for unit to reach thermal equilibrium. (Please note that this can take up to one half hour, if the analyzer is stored in temperatures outside the specified operating temperature range.)

CAL Err lo/hi: Sensor voltage too low/high: Press and hold the Calibration button for three seconds to manually force a new calibration. If unit repeats this error more than three times, contact **UNITED Fire Systems** for possible sensor replacement.

CAL Err Bat: Battery voltage too low to recalibrate. Analyzer is at end of life. See Section 9 for proper disposal.

7. STORAGE:

Store the N_2 analyzer in a temperature similar to its ambient environment of daily use. The instructions given below describe the methods to clean the instrument, sensor and its accessories:

8. CLEANING

Instrument: When cleaning or disinfecting the exterior of the N2 analyzer, take appropriate care to prevent any solution from entering the instrument. Do not immerse instrument in fluids.

Oxygen Sensor: Clean the sensor with a cloth moistened with a 65% alcohol / water solution. Do not use spray disinfectants because they can contain salt, which can accumulate in the sensor membrane and impair readings.

Accessory: The threaded barbed adapter may be cleaned by washing with a 65% alcohol / water solution. The part must be thoroughly dry before it is re-used.

9. DISPOSAL

Do not throw away. Dispose of properly in accordance with local regulations. The sensor, batteries, and circuit board are not suitable for regular trash disposal. Follow local guidelines for disposal of components.

10. SPECIFICATIONS

Sensor Type: Galvanic fuel cell

Measurement Range: 0-99.9% Nitrogen

Resolution/Display: 0.1%. The three digit LCD indicates values between 0.0 - 99.9% oxygen. Over range indicated by one decimal point on display located after the first digit.

Accuracy and Linearity: ± 1% of full scale at constant temperature, R.H. and pressure when calibrated at full scale. ± 3% actual oxygen level over full operating temperature.

Response Time: < 15 seconds for 90% step change (at 25˚C)

Warm-up Time: None required

Operating Temperature: 15˚C - 40˚C (59˚F - 104˚F)

Storage Temperature: -15˚C - 50˚C (5˚F - 122˚F)

Operating Pressure: Atmospheric pressure to 3 psig

Environmental: General purpose housing equivalent to NEMA 1. The analyzer is not waterproof. 0-95% RH, non-condensing

Power Requirement: Powered by one internal, non-replaceable Lithium battery, CR2450. Power on push button automatically shuts off after 80 seconds time-out. Electronics rated general purpose; not for use in hazardous areas or for use with flammable gases.

Weight: Approx. 3 Ounces

Battery Life: Approx. 1850 hours (74,000 cycles)

Sample Port: M16 x1 thread with barbed tubing adapter.

Operating Pressure: Atmospheric pressure to 3 psig

Expected Storage Life: Two months with freshness seal on sensor

Protection Against Electric Shock: Internally powered equipment.

Protection Against Water: IPX1.

Mode Of Operation: Continuous.

Suitability for Use with Flammable Anesthetic Mixtures: Not suitable for use in presence of flammable anesthetic mixtures.

INSTRUCTION SHEET

Nitrogen / Air Maintenance Device for Fire Sprinkler Systems
Model **NAMD-1**

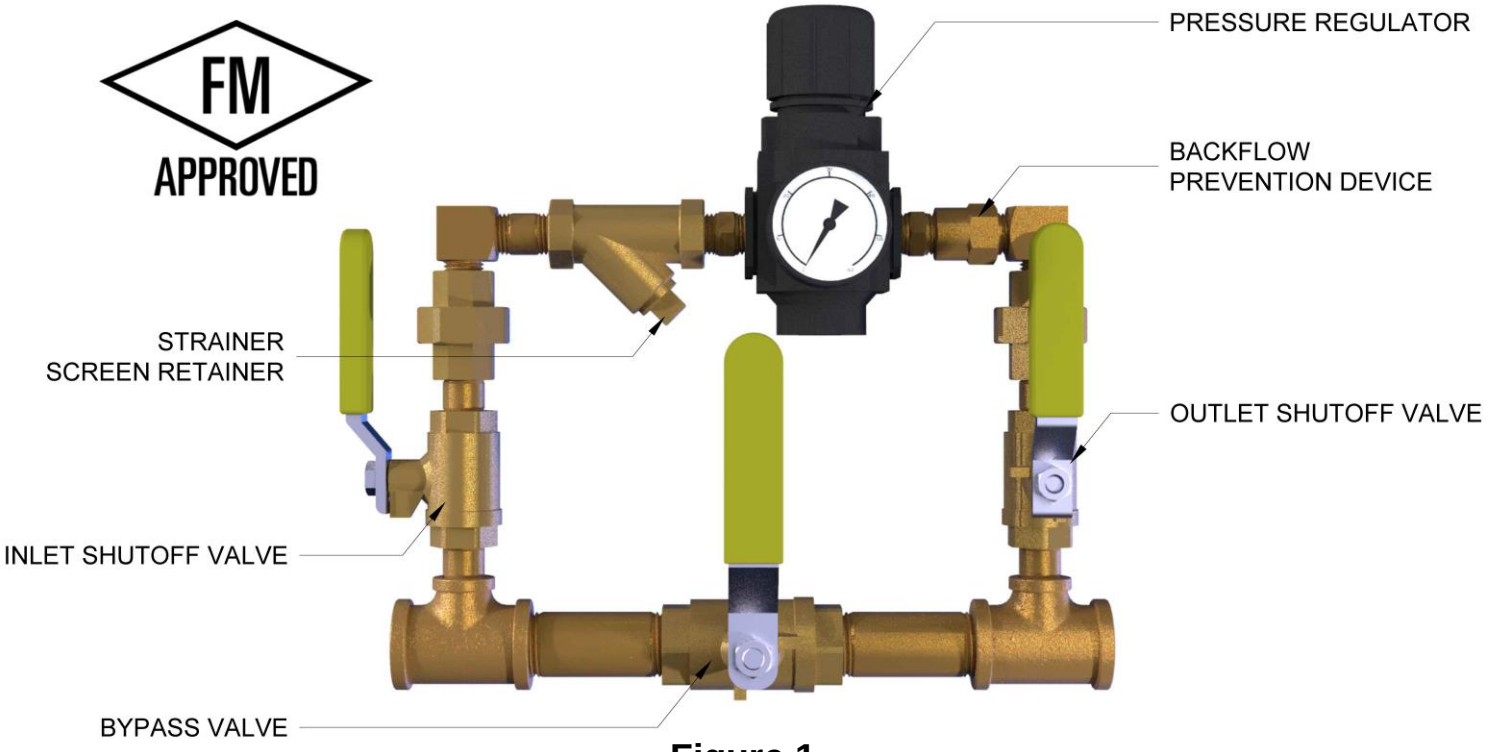


Figure 1

DESCRIPTION

The **UNITED Fire Systems** **Model NAMD-1** is an FM Approved device for controlling the nitrogen and / or air pressure in preaction and dry-pipe fire sprinkler piping. The device is equipped with a high-precision pressure regulator capable of providing accurate regulation over a wide range of inlet pressures and gas flows. This is especially important for sprinkler corrosion inhibiting systems supplying nitrogen to the sprinkler system, since most nitrogen systems provide less gas flow that a conventional air compressor.

SPECIFICATIONS

Model No.:	NAMD-1
Material (other than regulator):	Brass
Material (regulator body):	Zinc
Inlet:	1/2” NPT Female
Outlet:	1/2” NPT Female
Inlet Pressure Range:	0-175 PSIG (0-1200 kPa gauge)
Outlet Pressure Range:	15-60 PSIG (100-410 kPa gauge)
Maximum Pressure:	175 PSIG (1200 kPa)
Temperature Range:	-30°F to +150°F (-34°C to +65°C)
Dimensions (approx.):	9.75” L x 8.25” H (248 mm x 210 mm)
Weight (approx.):	7 lbs. (3.2 kg)

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INSTRUCTION SHEET

Nitrogen / Air Maintenance Device for Fire Sprinkler Systems
Model **NAMD-1**

1. INSTALLATION INSTRUCTIONS – READ AND UNDERSTAND BEFORE INSTALLATION

IMPORTANT
DO NOT disassemble the **Model NAMD-1** device!

1.1. Install the **Model NAMD-1** device in the nitrogen / air pressure supply line to the sprinkler valve trim.
1.2. **UNITED Fire Systems** highly recommends installing one (1) **Model NAMD-1** device for each sprinkler valve.
1.3. The device may be installed in any orientation.
1.4. Install the device as close as possible to the sprinkler valve receiving the pressure.
1.5. Locate the device in as a convenient place as possible, where the ball valves may be easily operated and the pressure gauge observed.
1.6. If the rigidity of the inlet and outlet piping is sufficient, no additional bracketing should be necessary. Otherwise, use standard split ring hangers and hardware to attach the device to the wall or other solid mounting location.

IMPORTANT
The **Model NAMD-1** device is designed to operate in one direction only. Refer to **Figure 1** to positively identify the **INLET** and **OUTLET** ports of the device.

1.7. Attach the piping from the pressure source to the **INLET** of the device. Piping shall be 1/2" nominal pipe size minimum. Use Teflon tape on the male pipe threads of the pipe only. DO NOT permit pipe thread sealant to enter the device.
1.8. Attach the piping from the **OUTLET** of the device to the proper connection point on the sprinkler valve trim. Piping shall be 1/2" nominal pipe size minimum. Use Teflon tape on the male threads of the pipe only. DO NOT permit pipe thread sealant to enter the device.
1.9. Proceed to the **COMMISSIONING** instructions below.

2. COMMISSIONING

2.1. Ensure all three (3) ball valves on the **Model NAMD-1** device are **CLOSED**.
2.2. Determine proper supervisory pressure for the sprinkler valve which the device is connected to.
2.3. Pull pressure regulator adjustment knob UP.
2.4. Turn pressure regulator adjustment knob COUNTERCLOCKWISE to remove all force from the regulating spring.
2.5. Apply nitrogen pressure from sprinkler corrosion inhibiting system to the device inlet.
2.6. Leak check the piping from the pressure source to the Model NAMD-1 device. Piping should be as leak-free as possible. Correct all leaks before proceeding.
2.7. Gradually open inlet shutoff valve. Pressure gauge on the device pressure regulator should indicate pressure.

IMPORTANT
When adjusting pressure regulator, always approach the desired adjustment from a LOWER to a HIGHER pressure.

A. If pressure adjustment (as indicated on device pressure gauge) is LOW, turn pressure regulator adjustment knob CLOCKWISE to increase pressure to desired setting.

B. If pressure adjustment (as indicated on the device pressure gauge) is HIGH, turn pressure regulator adjustment knob COUNTERCLOCKWISE to reduce pressure 3-5 PSIG below desired setting, then turn knob CLOCKWISE to increase pressure to desired setting.

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INSTRUCTION SHEET

Nitrogen / Air Maintenance Device for Fire Sprinkler Systems
Model **NAMD-1**

2. COMMISSIONING (continued)

2.8. Turn pressure regulator adjustment knob clockwise until pressure gauge indicates 2-3 PSIG above the desired supervisory pressure determined in step 2.2.
2.9. Gradually open outlet shutoff valve. Nitrogen pressure will reach the sprinkler valve trim.
2.10. Leak check the piping from the **Model NAMD-1** device to the sprinkler valve trim. Piping should be as leak-free as possible. Correct all leaks before proceeding.
2.11 Check that pressure gauge continues to indicate 2-3 PSIG above supervisory pressure. Adjust if necessary.
2.12. Push pressure regulator adjustment knob DOWN.

3. OPERATION

Table 1 – Valve Positions

MODE	INLET Shutoff Valve	OUTLET Shutoff Valve	BYPASS Valve
No Gas Supply To Sprinkler Valve	Closed	Closed	Closed
Initial-Fill With Air	Closed	Closed	**OPEN**
Supply System With Nitrogen	**OPEN**	**OPEN**	Closed
DO NOT Operate	**OPEN**	**OPEN**	**OPEN**

4. INSPECTION AND MAINTENANCE

4.1 Monthly
4.1.1 Inspect the **Model NAMD-1** device valve position. Use Table 1 to verify that valve position is in accordance with desired MODE.
4.1.2 Inspect the pressure gauge. Verify that indicated pressure is 2-3 PSI above the desired supervisory pressure of the connected sprinkler valve. Refer to **2. COMMISSIONING** if regulator adjustment is required.

4.2 Annual At least annually, inspect and clean the device strainer screen.

DANGER

Ensure that **Model NAMD-1** device is completely depressurized before inspecting and cleaning the strainer screen. Failure to do so can result in death or serious personal injury!

IMPORTANT

When ball valves have been CLOSED, the nitrogen / air supply is not available to pressurize the sprinkler system piping. Take required precautions to prevent inadvertent sprinkler valve operation. Notify applicable personnel of possible “low air” signals.

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INSTRUCTION SHEET

Nitrogen / Air Maintenance Device for Fire Sprinkler Systems
Model **NAMD-1**

4. INSPECTION AND MAINTENANCE (Continued)

4.2 Annual (Continued)

4.2.1 Ensure there is no pressure present in the **Model NAMD-1** device.
4.2.2 Hold device so that torque applied to strainer screen retainer does not move the device.
4.2.3 Refer to **Figure 1.** Apply suitable wrench to HEX on strainer screen retainer. Do NOT remove square plug.
4.2.4 Remove strainer screen retainer. Retain for replacement.
4.2.5 Examine rubber seal on strainer screen retainer. If damaged during removal, leakage may occur.
4.2.6 Remove strainer. Empty any loose material, and then flush with clean water. If necessary, use a wire brush to remove trapped particles. Dry strainer screen thoroughly before replacement.
4.2.7 If strainer screen is damaged, replace with new strainer screen UFS P/N 30-500003-401.
4.2.8 Insert strainer screen.
4.2.9 Replace strainer screen retainer, tightening wrench-tight.
4.2.10 See 2. COMMISSIONING to return Model NAMD-1 device to service.
4.2.11 Leak check the strainer screen retainer / strainer body connection. Correct leak if necessary.

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NITROGEN N_2 PAC
SPRINKLER CORROSION INHIBITING SYSTEM

COMMISSIONING WORKSHEET AND CHECKLIST
NITROGEN-PAC™ MODEL SC-W SYSTEM
UFS-622 REVISION 2.00 – PAGE 1 OF 4

UNITED FIRE SYSTEMS

DATE	

LOCATION INFORMATION	
User	
Address 1	
Address 2	
City, State, Zip	
System	

SPRINKLER SYSTEM INFORMATION				
Riser #1			Riser #2	
System Type (I or II)			System Type (I or II)	
Volume in Gallons			Volume in Gallons	

NITROGEN-PAC™ MODEL SC-W SERIAL NUMBER	
TRUE ADVANCED PURGE™ #1 SERIAL NUMBER	
TRUE ADVANCED PURGE™ #2 SERIAL NUMBER	

PRELIMINARY	**OK**	**NOT OK**
Has the packaging material been removed from behind air compressor and discarded?		
Are all electrical connections complete?		
Are all piping connections complete?		
Is the water supply to the sprinkler valve(s) off?		
Are all SC-W assembly valves positioned for Nitrogen Generation (see Quick Reference Valve Position Table), all PVA valves **CLOSED**, and all NAMD-1 valves **CLOSED**?		
Is the **POWER** switch **OFF**?		

STARTUP	**OK**	**NOT OK**
Has the panelboard circuit breaker been turned **ON**?		
Has the POWER switch been turned **ON**, the **GREEN** power indicator illuminated, and has the air compressor started?		
Has Gauge **A** begun to indicate pressure?		

NITROGEN N_2 PAC
SPRINKLER CORROSION INHIBITING SYSTEM

COMMISSIONING WORKSHEET AND CHECKLIST
NITROGEN-PAC™ MODEL SC-W SYSTEM
UFS-622 REVISION 2.00 – PAGE 2 OF 4

UNITED FIRE SYSTEMS

30 MINUTE INITIAL FILL (TYPE I SYSTEM)	OK	NOT OK
Has Valve 1 been moved to the **BYPASS** position (handle facing **LEFT**), and is the **RED** bypass visual indicator flashing?		
Has an inlet valve on one (1) Model NAMD-1 been **OPENED**, and is the NAMD-1 pressure gauge indicating pressure?		
Has the Model NAMD-1 regulator been properly adjusted?		
Has the Model NAMD-1 inlet valve been **CLOSED**, and the bypass valve **OPENED**?		
Did the sprinkler system reach supervisory pressure in 30 minutes or less?		
If the sprinkler system did not reach supervisory pressure in 30 minutes or less, has the sprinkler system been checked for leaks and have leaks been corrected?		
If the Model SC-W is connected to a second sprinkler valve, have the 30 minute initial fill steps been successfully on the second system?		

30 MINUTE INITIAL FILL (TYPE II SYSTEM)	OK	NOT OK
Has Valve 1 been moved to the **BYPASS** position (handle facing **LEFT**), and is the **RED** bypass visual indicator flashing?		
Have all valves on the Model NAMD-1 connected to the external air compressor been **CLOSED**?		
Has AC power been applied to the external air compressor?		
Has the inlet valve on the Model NAMD-1 connected to the external air compressor been **OPENED**?		
Has the regulator on the Model NAMD-1 connected to the external air compressor been properly adjusted?		
Has an inlet valve on one (1) Model NAMD-1 been **OPENED**, and is the NAMD-1 pressure gauge indicating pressure?		
Has the Model NAMD-1 regulator been properly adjusted?		
Has the Model NAMD-1 inlet valve been **CLOSED**, and the bypass valve **OPENED**?		
Did the sprinkler system reach supervisory pressure in 30 minutes or less?		
If the sprinkler system did not reach supervisory pressure in 30 minutes or less, has the sprinkler system been checked for leaks and have leaks been corrected?		
If the Model SC-W is connected to a second sprinkler valve, have the 30 minute initial fill steps been successfully on the second system?		

NITROGEN N_2 PAC
SPRINKLER CORROSION INHIBITING SYSTEM

COMMISSIONING WORKSHEET AND CHECKLIST
NITROGEN-PAC™ MODEL SC-W SYSTEM
UFS-622 REVISION 2.00 – PAGE 3 OF 4

UNITED FIRE SYSTEMS

PURGING	OK	NOT OK
Has Valve 1 been returned to the **NORMAL** position (handle facing **UP**), and is the **RED** bypass visual indicator **OFF**?		
Has the bypass valve on a Model NAMD-1 been **CLOSED**, and the inlet and outlet valves **OPENED**?		
Has the valve on one (1) Model PVA been **OPENED**?		
Are all valves in the **NORMAL** position per the Quick Reference Valve Position Table?		
If provided, is the condensate pump properly installed and does it function as intended?		
Has the Model NA-2 Nitrogen Analyzer been switched **ON** and calibrated, if needed?		

Have the N_2 purity values been recorded?	Model SC-W Assembly N_2 Purity Test Port		PVA or TAP-G3 #1		PVA or TAP-G3 #2	

PROPER GAUGE READINGS MODEL SC-W ASSEMBLY	Gauge A		Gauge B	
	Minimum	Maximum	Minimum	Maximum
	0 PSIG	**100 PSIG**	**75 PSIG**	**95 PSIG**
Have the values on the Model SC-W gauges been recorded?				

Have the values on the Model NAMD-1 gauges been recorded?	**Sprinkler System 1**	**Sprinkler System 2**	**External Air Compressor**

Has the time on the Runtime Monitor been recorded?	**Hours**	**Minutes**

NOTE: Initial time will NOT be zero. Indicated time includes factory test run time and commissioning run time.

FINAL ACCEPTANCE	OK	NOT OK
Are all valves in the **NORMAL** position per the Quick Reference Valve Position Table?		
Has the Model NA-2 Nitrogen Analyzer been switched **ON** and calibrated, if needed?		

Have the N_2 purity values been recorded?	Model SC-W Assembly N_2 Purity Test Port		PVA or TAP-G3 #1		PVA or TAP-G3 #2	

PROPER GAUGE READINGS MODEL SC-W ASSEMBLY	Gauge A		Gauge B	
	Minimum	Maximum	Minimum	Maximum
	0 PSIG	**100 PSIG**	**75 PSIG**	**95 PSIG**
Have the values on the Model SC-W gauges been recorded?				

Have the values on the Model NAMD-1 gauges been recorded?	**Sprinkler System 1**	**Sprinkler System 2**	**External Air Compressor**

Has the time on the Runtime Monitor been recorded?	**Hours**	**Minutes**

NOTE: Initial time will NOT be zero. Indicated time includes factory test run time and commissioning run time.

NITROGEN N_2 PAC
SPRINKLER CORROSION INHIBITING SYSTEM

COMMISSIONING WORKSHEET AND CHECKLIST
NITROGEN-PAC™ MODEL SC-W SYSTEM
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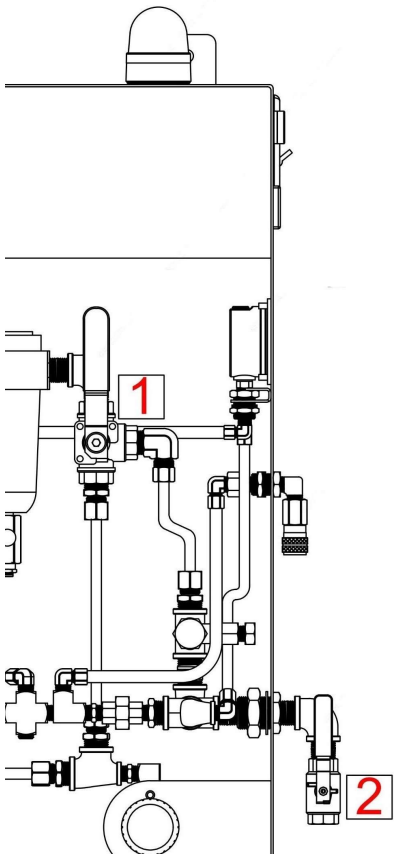
UNITED FIRE SYSTEMS

FINAL ACCEPTANCE SIGNATURES			
	PRINT NAME	**SIGNATURE**	**DATE**
CUSTOMER			
INSTALLING CONTRACTOR			

QUICK REFERENCE VALVE POSITION TABLE

	A	B	C	D	E	F	G
VALVE	**NORMAL**	**INITIAL FILL**	**PURGING**	**FILTER SERVICE**	**N_2 PURITY AT TEST PORT**	**N_2 PURITY AT PVAs**	**DRAIN**
MODEL SC-W VALVES							
1	Normal	Bypass	Normal	Normal	Normal	Normal	Normal
2	Open	Open	Open	Closed	Open	Open	Closed
MODEL NAMD-1 VALVES							
Inlet(s)	Open	Closed	Open	Open	Open	Open	Open
Outlet(s)	Open	Closed	Open	Open	Open	Open	Open
Bypass(es)	Closed	Open	Closed	Closed	Closed	Closed	Closed
MODEL PVA VALVES)							
PVA-4 (with NA-2)	Closed	Closed	Open	Closed	Closed	Open	Closed
PVA-2 (with TAP)	Open	Open	Open	Open	Open	Open	Closed

TAP = TRUE ADVANCED PURGE™ device. Leave PVA inlet valve OPEN unless draining water at PVA location.
TAP device will be in control of purging.



A	**NORMAL**	System is providing N_2 into sprinkler pipe.
B	**INITIAL FILL**	Compressed air into sprinkler pipe for initial fill (max. 30 minutes), or air only if N_2 is not available.
C	**PURGING**	Air is purging from sprinkler pipe and being replaced with N_2.
D	**FILTER SERVICE**	Filter elements in Model SC-W assembly are to be replaced.
E	**N_2 PURITY AT TEST PORT**	N2 purity at Model SC-W assembly is to be measured with Model NA-2.
F	**N_2 PURITY AT PVAs**	N2 purity at PVAs is to be measured with Model NA-2
G	**DRAIN**	Draining of accumulated moisture from Model SC-W assembly.

NITROGEN N_2 PAC
SPRINKLER CORROSION INHIBITING SYSTEM

MONTHLY INSPECTION CHECKLIST
NITROGEN-PAC™ MODEL SC-W SYSTEM
UFS-623 REVISION 2.00 – PAGE 1 OF 3

UNITED FIRE SYSTEMS

DATE	
USER	
ADDRESS 1	
ADDRESS 2	
CITY, STATE, ZIP	

MODEL SC-W ASSEMBLY SERIAL NUMBER	
TRUE ADVANCED PURGE™ #1 SERIAL NUMBER	
TRUE ADVANCED PURGE™ #2 SERIAL NUMBER	

INSPECTION – MODEL SC-W ASSEMBLY

STEP	MANUAL REF.	PROCEDURE	OK	NOT OK
1		Is the **GREEN** visual indicator on?		
2		Has the manual particulate filter drain valve been opened, allowing any condensate to drain, and the valve then been closed?		
3	**5.2.2**	Has the enclosure inlet filter been checked and cleaned, if necessary?		
4	**5.2.3**	Has the exhaust fan filter element been checked and cleaned, if necessary?		
5		Are all valves at the Model SC-W assembly positioned for Nitrogen Generation per the Quick Reference Valve Position Table?		
6	**5.2.1**	Has the nitrogen purity value at the Model SC-W assembly N2 Purity Test Port and the Runtime Monitor value been checked and recorded below?		

Model SC-W Assembly N_2 Purity Test Port	%	**Runtime Monitor**	HRS	MIN

STEP	MANUAL REF.	PROCEDURE	OK	NOT OK
7		Have the values on the Model SC-W assembly gauges been recorded?		

PROPER GAUGE READINGS MODEL SC-W ASSEMBLY	**Gauge A**		**Gauge B**	
	0 PSIG MIN.	**100 PSIG MAX.**	**75 PSIG MIN.**	**95 PSIG MAX.**
OBSERVED GAUGE VALUES MODEL SC-W ASSEMBLY	PSIG		PSIG	

NITROGEN N_2 PAC
SPRINKLER CORROSION INHIBITING SYSTEM

MONTHLY INSPECTION CHECKLIST
NITROGEN-PAC™ MODEL SC-W SYSTEM
UFS-623 REVISION 2.00 – PAGE 2 OF 3

UNITED FIRE SYSTEMS

INSPECTION – MODEL NAMD-1 ASSEMBLIES

STEP	PROCEDURE	OK	NOT OK
1	Are the valves at each Model NAMD-1 in the proper position?		
2	Have the values on the Model NAMD-1 gauges been recorded?		

Sprinkler System 1	PSIG	Sprinkler System 2	PSIG	External Air Compressor	PSIG

INSPECTION – MODEL PVA ASSEMBLIES

STEP	MANUAL REF.	PROCEDURE	OK	NOT OK
1		Are the inlet valves at all the Model PVAs in their proper position?		
2	5.2.4	Have the nitrogen purity values at the Model PVAs been checked with the Model NA-2 Nitrogen Analyzer or the Model TAP-G3s?		

PVA or TAP-G3 Sprinkler System 1	%	PVA or TAP-G3 Sprinkler System 2	%

	PRINT NAME	SIGNATURE	DATE
INSPECTOR			

QUICK REFERENCE VALVE POSITION TABLE

	A	B	C	D	E	F	G
VALVE	NORMAL	INITIAL FILL	PURGING	FILTER SERVICE	N_2 PURITY AT TEST PORT	N_2 PURITY AT PVAs	DRAIN
MODEL SC-W ASSEMBLIES							
1	Normal	Bypass	Normal	Normal	Normal	Normal	Normal
2	Open	Open	Open	Closed	Open	Open	Closed
MODEL NAMD-1 ASSEMBLIES							
Inlet(s)	Open	Closed	Open	Open	Open	Open	Open
Outlet(s)	Open	Closed	Open	Open	Open	Open	Open
Bypass(es)	Closed	Open	Closed	Closed	Closed	Closed	Closed
MODEL PVA ASSEMBLIES							
PVA-4 (with NA-2)	Closed	Closed	Open	Closed	Closed	Open	Closed
PVA-2 (with TAP)	Open	Open	Open	Open	Open	Open	Closed

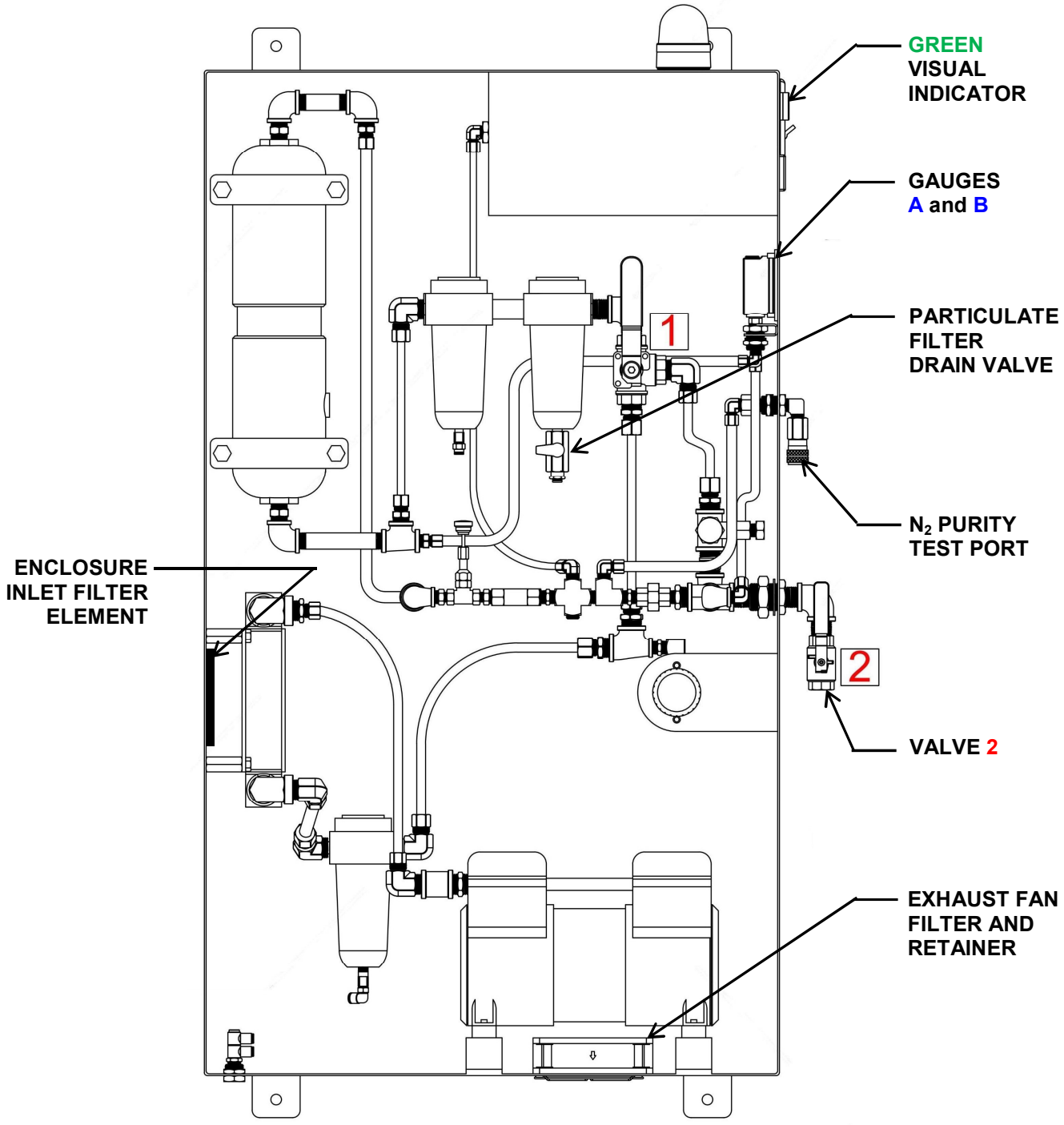
TAP = TRUE ADVANCED PURGE™ device. Leave PVA inlet valve OPEN unless draining water at PVA location. TAP device will be in control of purging.

A	NORMAL	System is providing N_2 into sprinkler pipe.	D	FILTER SERVICE	Filter elements in Model SC-W assembly are to be replaced.
B	INITIAL FILL	Air into sprinkler pipe for initial fill (max. 30 minutes) or air only if N_2 not available	E	N_2 PURITY AT TEST PORT	N2 purity at Model SC-W assembly is to be measured with Model NA-2.
C	PURGING	Air is purging from sprinkler pipe and being replaced with N_2.	F	N_2 PURITY AT PVAs	N2 purity at PVAs is to be measured with Model NA-2
			G	DRAIN	Draining of accumulated moisture from Model SC-W assembly.

NITROGEN N_2 PAC
SPRINKLER CORROSION INHIBITING SYSTEM

MONTHLY INSPECTION CHECKLIST
NITROGEN-PAC™ MODEL SC-W SYSTEM
UFS-623 REVISION 2.00 – PAGE 3 OF 3

UNITED FIRE SYSTEMS



NITROGEN N_2 PAC
SPRINKLER CORROSION INHIBITING SYSTEM

ANNUAL MAINTENANCE CHECKLIST
NITROGEN-PAC™ MODEL SC-W SYSTEM
UFS-624 REVISION 2.00 – PAGE 1 OF 4

UNITED FIRE SYSTEMS

DATE	

LOCATION INFORMATION	
User	
Address 1	
Address 2	
City, State, Zip	
System	

NITROGEN-PAC™ MODEL SC-W ASSEMBLY SERIAL NUMBER	
TRUE ADVANCED PURGE™ #1 SERIAL NUMBER	
TRUE ADVANCED PURGE™ #2 SERIAL NUMBER	

MAINTENANCE – MODEL SC-W ASSEMBLY

STEP	MANUAL REF.	PROCEDURE	OK	NOT OK
1		Is the **GREEN** visual indicator on?		
2		Has the manual particulate filter drain valve been opened, allowing any condensate to drain, and the valve then been closed?		
3		Is the SC nitrogen outlet hose present, secure and in good condition?		
4		When the valves are positioned for system Fast Fill, is the bypass visual indicator flashing **RED**? See Quick Reference Valve Position Table.		
5		Have the valves at the SC assembly been returned to the Nitrogen Generation position per the Quick Reference Valve Position Table?		
6		When the valves are positioned for Nitrogen Generation, does the bypass visual indicator turn **OFF**? See Quick Reference Valve Position Table.		
7		Is the drain connection connected to a hose or piping leading to a proper drain?		
8		If present, is the condensate drain pump properly connected and in good working order?		
9	**5.4.1**	Has the compressor inlet filter been replaced?		
10	**5.4.2**	Has the enclosure intake filter been replaced?		
11	**5.4.3**	Has the exhaust fan filter element been replaced?		
12	**5.4.4**	Have the filter elements in the coalescing and particulate filters been replaced?		
13	**5.4.4**	Has the filter element in the water separator been replaced?		
14	**5.2.1**	Has the nitrogen purity value at the Model SC-W assembly N_2 Purity Test Port been checked and the Runtime Monitor value been checked and recorded below?		

Model SC-W Assembly N_2 Purity Test Port		**Runtime Monitor**	HRS	MIN

NITROGEN N_2 PAC
SPRINKLER CORROSION INHIBITING SYSTEM

ANNUAL MAINTENANCE CHECKLIST
NITROGEN-PAC™ MODEL SC-W SYSTEM
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UNITED FIRE SYSTEMS

MAINTENANCE – MODEL SC-W ASSEMBLY (CONTINUED)

STEP	PROCEDURE	OK	NOT OK
14	Have the values on the Model SC-W assembly gauges been recorded?		

PROPER GAUGE READINGS MODEL SC-W ASSEMBLY	Gauge A		Gauge B	
	0 PSIG MIN.	100 PSIG MAX.	75 PSIG MIN.	95 PSIG MAX.
OBSERVED GAUGE VALUES MODEL SC-W ASSEMBLY	PSIG		PSIG	

MAINTENANCE – MODEL NAMD-1 ASSEMBLIES

STEP	PROCEDURE	OK	NOT OK
1	Are all the valves at each Model NAMD-1 in the proper position?		
2	Have the values on the Model NAMD-1 gauges been recorded?		

Sprinkler System 1	PSIG	Sprinkler System 2	PSIG	External Air Compressor	PSIG

MAINTENANCE – MODEL PVA ASSEMBLIES

STEP	MANUAL REF.	PROCEDURE	OK	NOT OK
1		Are the inlet valves at all PVAs in their proper position?		
2	**5.4.5**	Has residual water (if present) been drained from each PVA? (CAUTION: Close inlet valve at PVA before attempting water drainage.)		
3	**5.4.6**	If necessary, has the strainer screen been replaced?		
4	**5.2.4**	Have the nitrogen purity values at the Model PVAs been checked with the Model NA-2 Nitrogen Analyzer or the Model TAP-G3s?		

MAINTENANCE – MISCELLANEOUS

STEP	PROCEDURE	OK	NOT OK
1	Is all nitrogen piping secure and tight?		
2	Is the NA-2 Nitrogen Analyzer located in its proper storage location, is the location still clean and dry, and has the device been tested?		

REPLACEMENT PARTS FOR ANNUAL MAINTENANCE

Quantity	UFS P/N	Description
1	00-100005-558	Intake Filter, Compressor
2	30.500002-101	Element, Particulate and Coalescing Filters
1	30.500002.301	Element, Water Separator
1	00.100005-556	Element, Enclosure Intake Filter
1	30-500200-002	Element, Exhaust Fan Filter
1	30-500003-301	Screen, Strainer, Model PVA

NITROGEN N_2 PAC
SPRINKLER CORROSION INHIBITING SYSTEM

ANNUAL MAINTENANCE CHECKLIST
NITROGEN-PAC™ MODEL SC-W SYSTEM
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UNITED FIRE SYSTEMS

COMPLETION SIGNATURES			
	PRINT NAME	**SIGNATURE**	**DATE**
INSPECTOR			
CUSTOMER			

QUICK REFERENCE VALVE POSITION TABLE

	A	B	C	D	E	F	G
VALVE	**NORMAL**	**INITIAL FILL**	**PURGING**	**FILTER SERVICE**	**N_2 PURITY AT TEST PORT**	**N_2 PURITY AT PVAs**	**DRAIN**
MODEL SC-W ASSEMBLIES							
1	Normal	Bypass	Normal	Normal	Normal	Normal	Normal
2	Open	Open	Open	Closed	Open	Open	Closed
MODEL NAMD-1 ASSEMBLIES							
Inlet(s)	Open	Closed	Open	Open	Open	Open	Open
Outlet(s)	Open	Closed	Open	Open	Open	Open	Open
Bypass(es)	Closed	Open	Closed	Closed	Closed	Closed	Closed
MODEL PVA ASSEMBLIES							
PVA-4 (with NA-2)	Closed	Closed	Open	Closed	Closed	Open	Closed
PVA-2 (with TAP)	Open	Open	Open	Open	Open	Open	Closed

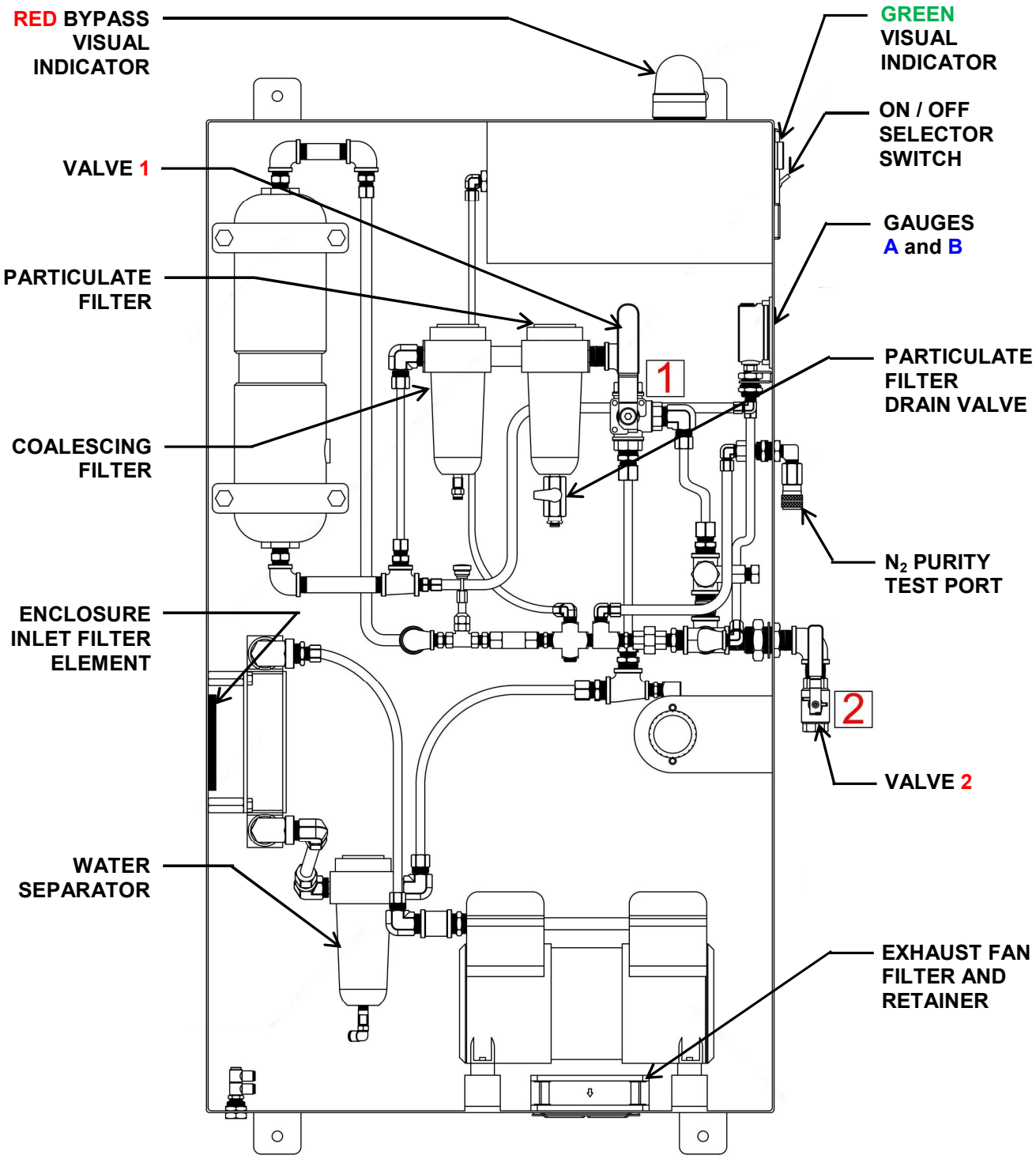
TAP = TRUE ADVANCED PURGE™ device. Leave PVA inlet valve OPEN unless draining water at PVA location.
TAP device will be in control of purging.

A	**NORMAL**	System is providing N_2 into sprinkler pipe.	**D**	**FILTER SERVICE**	Filter elements in Model SC-W assembly are to be replaced.
B	**INITIAL FILL**	Air into sprinkler pipe for initial fill (max. 30 minutes) or air only if N_2 not available	**E**	**N_2 PURITY AT TEST PORT**	N2 purity at Model SC-W assembly is to be measured with Model NA-2.
C	**PURGING**	Air is purging from sprinkler pipe and being replaced with N_2.	**F**	**N_2 PURITY AT PVAs**	N2 purity at PVAs is to be measured with Model NA-2
			G	**DRAIN**	Draining of accumulated moisture from Model SC-W assembly.

NITROGEN N_2 PAC
SPRINKLER CORROSION INHIBITING SYSTEM

ANNUAL MAINTENANCE CHECKLIST
NITROGEN-PAC™ MODEL SC-W SYSTEM
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UNITED FIRE SYSTEMS



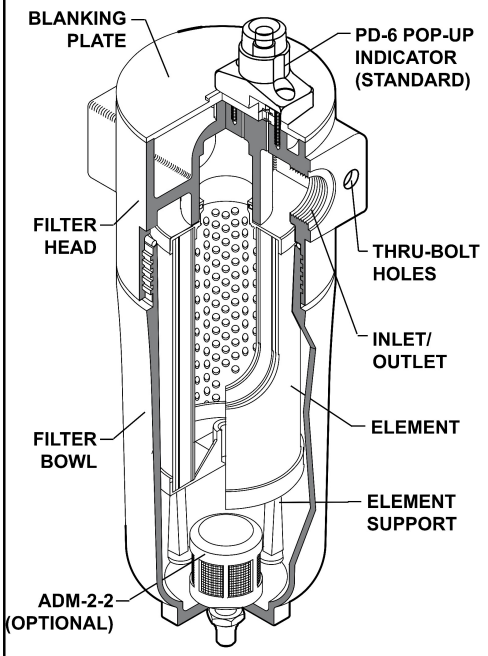
VAN AIR

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

F200 SERIES COMPRESSED AIR FILTERS

PRODUCT PURPOSE & FUNCTION: Van Air's F200 series filters are designed to remove contaminants from compressed air systems. The F200 series can remove oil aerosols, oil vapors, and particulates. Housings are made of cast aluminum. They are E-coated and epoxy powder coated for corrosion resistance. All units include push-on elements with durable polyester drain layer.

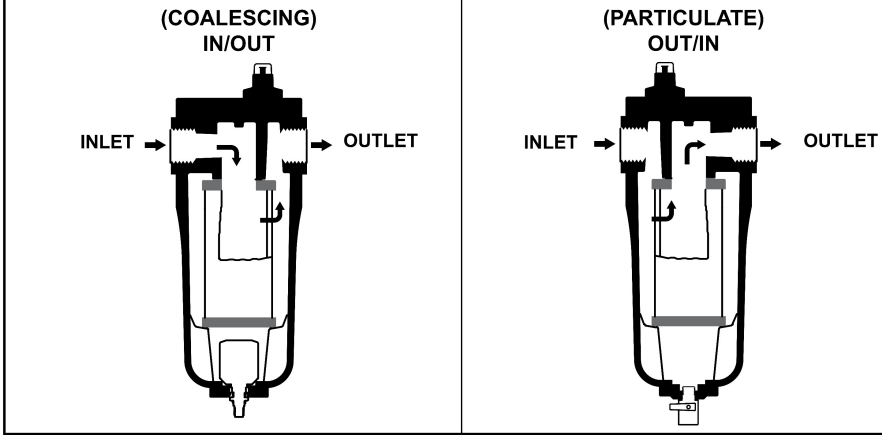
FILTER DETAILS



OPERATING CONDITIONS

MAXIMUM WORKING PRESSURE	250 PSIG
OPERATING TEMP Min 35°F	Max 225°F
MAX RECOMMENDED INLET TEMP	175°F

FLOW DIRECTION THROUGH ELEMENT



FILTRATION GRADES

APPLICATION	ELEMENT GRADE	PURPOSE	NOMINAL PARTICLE REMOVAL	ELEMENT FLOW DIRECTION	COLOR CODE
OIL REMOVAL (LIQUIDS)	B	General Purpose Coalescing	1.00 µ	IN/OUT	RED
PARTICULATE REMOVAL (SOLIDS)	RB	General Purpose Particulate	1.00 µ	OUT/IN	RED

WARNINGS

DO NOT REPLACE ANY ITEM ON FILTER WHILE IT IS PRESSURIZED.

DO NOT OPERATE A LEAKING FILTER. TAKE FILTER OUT OF SERVICE IMMEDIATELY.

DO NOT OPERATE ABOVE MAXIMUM WORKING PRESSURE (MWP) AT MAXIMUM OPERATING TEMPERATURE (°F).

SAFETY PRECAUTIONS

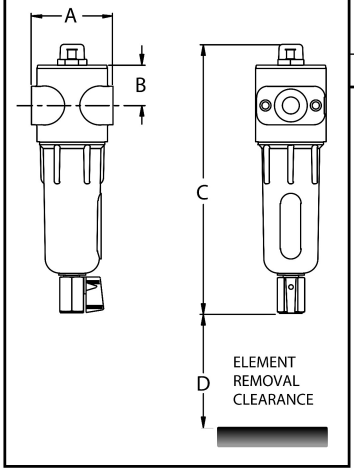
Safety is everybody's business and is based on your use of good common sense. All situations or circumstances cannot always be predicted and covered by established rules. Therefore, use your past experience, watch out for safety hazards and be cautious.



APPENDIX F - SC-W MANUAL

FILTER HOUSING DIMENSIONS & WEIGHTS

DIMENSIONS FOR: F200-15-1/4



FLOW** (SCFM)	IN/OUT CONN. (NPT)	HOUSING WEIGHT**** (LBS)	ELEMENT WEIGHT**** (LBS)
25	1/2"	1.3	0.1
A (IN)	**B (IN)**	**C*** (IN)**	**D (IN)**
2-13/16	1-5/8	9-1/4	3

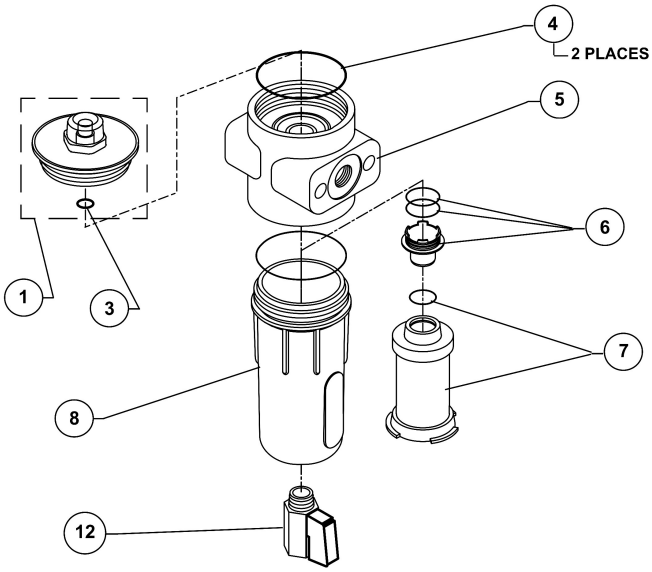
**Flow is based on SCFM @ 100 PSIG @ 100°F.
***Dimensions include filter housing, PD-6 and manual drain.
****For total filter weight, add element weight to housing weight.

VAN AIR

2950 Mechanic Street
Lake City, PA 16423-2095
Phone: 800-840-9906
Fax: 814-774-3482
www.vanairsystems.com

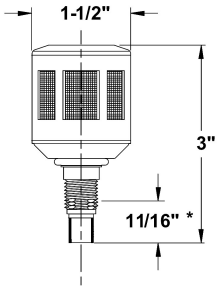
FLOW CAPACITIES AT VARIOUS OPERATING PRESSURES (SCFM)										
FILTER MODEL	25 PSIG	50 PSIG	75 PSIG	100 PSIG	125 PSIG	150 PSIG	175 PSIG	200 PSIG	225 PSIG	250 PSIG
F200-25-1/2	9	14	20	25	30	36	41	47	52	58

F200- 25-1/2 REPLACEMENT PARTS



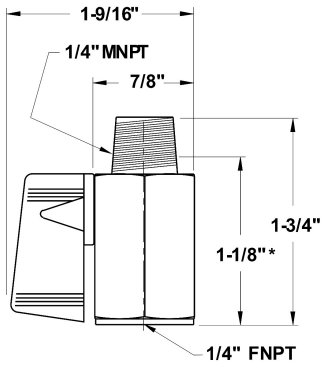
REPLACEMENT PARTS			
ITEM	PART DESCRIPTION	QTY	PART NO.
1	PD-6A-C DIFFERENTIAL PRESSURE INDICATOR KIT FOR COALESCING FILTERS	1	84-10126
	PD-6A-P DIFFERENTIAL PRESSURE INDICATOR KIT FOR PARTICULATE FILTERS	1	84-10127
3	BLANKING PLATE O-RING FOR F200-25-1/2	1	475-00110
4	BODY O-RING FOR F200-25-1/2	2	475-01000
5	1/2" NPT FILTER HEAD FOR F200-25-1/2	1	201-00120
6	EPL1 ELEMENT ADAPTOR FOR F200- 25-1/2	1	326-00005
7	REPLACEMENT ELEMENT E200-15/25-B/RB	1	26-10404
8	FILTER BOWL FOR F200- 25-1/2	1	201-01000
12	MANUAL DRAIN 1/4" KIT	1	84-10852

ADM-2-2 AUTODRAIN (P/N: 84-10120)



KIT INCLUDES (1) AUTO DRAIN, (1) NUT, (1) O-RING & INSTRUCTION SHEET.
* DIMENSION EXTENDING OUT OF FILTER HOUSING

1/4" BALL VALVE MANUAL DRAIN (P/N: 84-10852)



* DIMENSION EXTENDING OUT OF FILTER HOUSING

November 2019

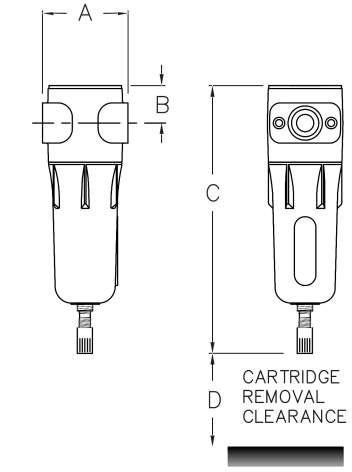
INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS FOR
MOISTURE SEPARATOR

PRODUCT PURPOSE & FUNCTION:

Van Air's Moisture Separators are designed to remove liquid water from compressed air systems. Housings are made of cast aluminum and they are E-coated and epoxy powder coated for corrosion resistance. All units include push-on cartridge and ADM-3 automatic drain valve.

DIMENSIONS & WEIGHTS

MODEL: SEP-25



FLOW* (SCFM)	IN/OUT CONN. (NPT)
25	1/2"

*Flow is based on SCFM @ 100 PSIG @ 100°F.
**Dimension includes Auto Drain (AD option)
***For total filter weight, add element weight to housing weight.

HOUSING WEIGHT*** (LBS)	ELEMENT WEIGHT*** (LBS)
1.7	0.1

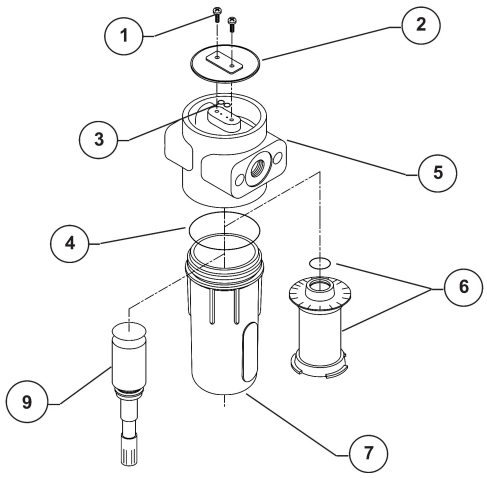
MAXIMUM WORKING PRESSURE: 232 PSIG

OPERATING TEMPERATURE: 176°F

A (INCHES)	B (INCHES)	C* (INCHES)	D (INCHES)
2-13/16	1-1/4	10-5/16	3

WARNINGS

- DO NOT REPLACE ANY ITEM ON SEPARATOR WHILE IT IS PRESSURIZED.
- DO NOT OPERATE A LEAKING SEPARATOR, TAKE IT OUT OF SERVICE IMMEDIATELY.
- DO NOT OPERATE ABOVE MAXIMUM WORKING PRESSURE (MWP) OR MAXIMUM OPERATING TEMPERATURE (°F).



REPLACEMENT PARTS

ITEM	PART DESCRIPTION	QTY	PART NO.
1	BLANKING PLATE SCREW	2	460-00049
2	BLANKING PLATE SEP-25	1	326-00090
3	BLANKING PLATE O-RING	2	475-00006
4	BODY O-RING SEP-25	1	475-01000
5	HEAD SEP-25 (1/2" NPT)	1	201-00120
6	SEP-25 CARTRIDGE	1	26-7907
7	BOWL SEP-25	1	201-01000
9	ADM-3 AUTO DRAIN KIT	1	551-00008



MAINTENANCE

- Verify separator is draining properly every shift.
- The separator should be disassembled and cleaned periodically. When cleaning the separtaor, inspect body O-ring for nicks and/or cracks. If nicks or cracks are resent, replace the O-ring.

SAFETY PRECAUTIONS

Safety is everybody's business and is based on your use of good common sense. All situations or circumstances cannot always be predicted and covered by established rules. Therefore, use your past experience, watch out for safety hazards and be cautious.

2950 Mechanic Street
Lake City, PA 16423-2095
Phone: 800-840-9906
Fax: 814-774-3482
www.vanairsystems.com

LIMITED WARRANTY NITROGEN-PAC™ SC SERIES

What Does This Warranty Cover?
This Limited Warranty covers all manufacturing defects in material and workmanship in all equipment supplied by **UNITED Fire Systems** for new **NITROGEN-PAC™ SC SERIES** sprinkler corrosion inhibiting systems.

How Long Does The Coverage Last?
This Limited Warranty lasts for eighteen (18) months from the date of shipment to the original purchaser.

What Will UNITED Fire Systems Do?
UNITED Fire Systems will repair, replace, or refund the purchase price of, at its option, any defective **NITROGEN-PAC™ SC SERIES** equipment at no charge.

What Does This Warranty Not Cover?
- Equipment that is not supplied by **UNITED Fire Systems** is not covered.
- Equipment that has not been installed, commissioned, operated, and maintained per the instructions in the applicable **UNITED Fire Systems** instruction manual is not covered.
- Equipment that has been repaired, modified, or otherwise tampered with not in accordance with the applicable **UNITED Fire Systems** instruction manual is not covered.
- Any problem that is caused by abuse, misuse, or an act of God (such as a flood) is not covered.
- Transportation and shipping charges to return equipment to **UNITED Fire Systems** or for **UNITED Fire Systems** to return repaired or replacement equipment are not covered.
- Consequential and incidental damages are not covered. Some states do not allow the exclusion or limitation of incidental or consequential damages, so this exclusion may not apply.

What Are The Customer's Responsibilities?
- Ensuring that the **UNITED Fire Systems** equipment is installed, commissioned, operated, and maintained per the instructions in the applicable **UNITED Fire Systems** instruction manual.
- Where applicable, ensuring that checklists supplied by **UNITED Fire Systems** are properly used and completed at the time of installation, commissioning, operation, and maintenance, and such checklists are retained as records of proper completion.
- Noting and recording the serial number(s) of **UNITED Fire Systems** equipment.
- Notifying **UNITED Fire Systems** or a trained distributor of the need for service under this Limited Warranty.

How Is Warranty Service Obtained?
If anything goes wrong with **UNITED Fire Systems** equipment, contact:

UNITED Fire Systems
Division of United Fire Protection Corporation
1 Mark Road
Kenilworth, NJ 07033 USA
Phone: 908-688-0300
Fax: 908-481-1131
https://unitedfiresystems.net/

= OR =

Your
Trained
Distributor

Be prepared to supply the serial number(s) of the equipment requiring service, and copies of the installation, commissioning, and maintenance checklists, as applicable.

LIMITED WARRANTY NITROGEN-PAC™ SC SERIES

Is This Limited Warranty Transferable?
If the **NITROGEN-PAC™ SC SERIES** equipment is moved from one to another installation during the time period of Limited Warranty coverage, the **NITROGEN-PAC™ SC SERIES** equipment must be re-commissioned by **UNITED Fire Systems** or a trained distributor to be eligible for continuing coverage. There will be a quoted charge for this re-commissioning.

Is This The Entire Warranty?
This Limited Warranty is the entire warranty given by **UNITED Fire Systems** to the purchaser of new **NITROGEN-PAC™ SC SERIES** equipment. Component warranties supplied by component manufacturers to **UNITED Fire Systems** that are valid for a longer period of time than the **UNITED Fire Systems** Limited Warranty may apply. Contact **UNITED Fire Systems** for more information. There are no other warranties expressed or implied, beyond those required by law.

How Do State and Federal Laws Apply?
This Limited Warranty grants specific legal rights per Federal law. There may also be other rights which vary from state to state.

UFS-306A Rev. 2.00 Sep 2019

LIMITED WARRANTY
TRUE ADVANCED PURGE

What Does This Warranty Cover?
This Limited Warranty covers all manufacturing defects in material and workmanship by **UNITED Fire Systems** new **TRUE ADVANCED PURGE** equipment.

How Long Does The Coverage Last?
This Limited Warranty lasts for eighteen (18) months from the date of shipment to the original purchaser.

What Will UNITED Fire Systems Do?
UNITED Fire Systems will repair, replace, or refund the purchase price of, at its option, any defective **TRUE ADVANCED PURGE** equipment at no charge.

What Does This Warranty Not Cover?
- Equipment that is not supplied by **UNITED Fire Systems** is not covered.
- Equipment that has not been installed, commissioned, operated, and maintained per the instructions in the applicable **UNITED Fire Systems** instruction manual is not covered.
- Equipment that has been repaired, modified, or otherwise tampered with not in accordance with the applicable **UNITED Fire Systems** instruction manual is not covered.
- Any problem that is caused by abuse, misuse, or an act of God (such as a flood) is not covered.
- Transportation and shipping charges to return equipment to **UNITED Fire Systems** or for **UNITED Fire Systems** to return repaired or replacement equipment are not covered.
- Consequential and incidental damages are not covered. Some states do not allow the exclusion or limitation of incidental or consequential damages, so this exclusion may not apply.

What Are The Customer's Responsibilities?
- Ensuring that the **UNITED Fire Systems** equipment is installed, commissioned, operated, and maintained per the instructions in the applicable **UNITED Fire Systems** instruction manual.
- Where applicable, ensuring that checklists supplied by **UNITED Fire Systems** are properly used and completed at the time of installation, commissioning, operation, and maintenance, and such checklists are retained as records of proper completion.
- Noting and recording the serial number(s) of **UNITED Fire Systems** equipment.
- Notifying **UNITED Fire Systems** or a trained distributor of the need for service under this Limited Warranty.

How Is Warranty Service Obtained?
If anything goes wrong with **UNITED Fire Systems** equipment, contact:

UNITED Fire Systems
Division of United Fire Protection Corporation
1 Mark Road
Kenilworth, NJ 07033 USA
Phone: 908-688-0300
Fax: 908-481-1131
https://unitedfiresystems.net/

= OR =

Your
Trained
Distributor

Be prepared to supply the serial number(s) of the equipment requiring service, and copies of the installation, commissioning, and maintenance checklists, as applicable.

LIMITED WARRANTY
TRUE ADVANCED PURGE

Is This Limited Warranty Transferable?
If the **TRUE ADVANCED PURGE** equipment is moved from one to another installation during the time period of Limited Warranty coverage, the **TRUE ADVANCED PURGE** equipment must be re-commissioned by **UNITED Fire Systems** or a trained distributor to be eligible for continuing coverage. There will be a quoted charge for this re-commissioning.

Is This The Entire Warranty?
This Limited Warranty is the entire warranty given by **UNITED Fire Systems** to the purchaser of new **TRUE ADVANCED PURGE** equipment. Component warranties supplied by component manufacturers to **UNITED Fire Systems** that are valid for a longer period of time than the **UNITED Fire Systems** Limited Warranty may apply. Contact **UNITED Fire Systems** for more information. There are no other warranties expressed or implied, beyond those required by law.

How Do State and Federal Laws Apply?
This Limited Warranty grants specific legal rights per Federal law. There may also be other rights which vary from state to state.

UFS-306D Rev. 1.00 Sep 2019

LIMITED WARRANTY SPRINKLER ACCESSORIES

SPRINKLER ACCESSORIES

What Does This Warranty Cover?
This Limited Warranty covers all manufacturing defects in material and workmanship by **UNITED Fire Systems** for new **SPRINKLER ACCESSORIES**.

How Long Does The Coverage Last?
This Limited Warranty lasts for one (1) year from the date of shipment to the original purchaser.

What Will UNITED Fire Systems Do?
UNITED Fire Systems will repair, replace, or refund the purchase price of, at its option, any defective **SPRINKLER ACCESSORIES** at no charge.

What Does This Warranty Not Cover?
- Equipment that is not supplied by **UNITED Fire Systems** is not covered.
- Equipment that has not been installed, commissioned, operated, and maintained per the instructions in the applicable **UNITED Fire Systems** instruction manual is not covered.
- Equipment that has been repaired, modified, or otherwise tampered with not in accordance with the applicable **UNITED Fire Systems** instruction manual is not covered.
- Any problem that is caused by abuse, misuse, or an act of God (such as a flood) is not covered.
- Transportation and shipping charges to return equipment to **UNITED Fire Systems** or for **UNITED Fire Systems** to return repaired or replacement equipment are not covered.
- Consequential and incidental damages are not covered. Some states do not allow the exclusion or limitation of incidental or consequential damages, so this exclusion may not apply.

What Are The Customer's Responsibilities?
- Ensuring that the **UNITED Fire Systems** equipment is installed, commissioned, operated, and maintained per the instructions in the applicable **UNITED Fire Systems** instruction manual.
- Where applicable, ensuring that checklists supplied by **UNITED Fire Systems** are properly used and completed at the time of installation, commissioning, operation, and maintenance, and such checklists are retained as records of proper completion.
- Noting and recording the serial number(s) of **UNITED Fire Systems** equipment.
- Notifying **UNITED Fire Systems** or a trained distributor of the need for service under this Limited Warranty.

How Is Warranty Service Obtained?
If anything goes wrong with **UNITED Fire Systems** equipment, contact:

UNITED Fire Systems
Division of United Fire Protection Corporation
1 Mark Road
Kenilworth, NJ 07033 USA
Phone: 908-688-0300
Fax: 908-481-1131
https://unitedfiresystems.net/

= OR =

Your
Trained
Distributor

Be prepared to supply the serial number(s) of the equipment requiring service, and copies of the installation, commissioning, and maintenance checklists, as applicable.

LIMITED WARRANTY SPRINKLER ACCESSORIES

SPRINKLER ACCESSORIES

Is This Limited Warranty Transferable?
If **SPRINKLER ACCESSORIES** are moved from one to another installation during the time period of Limited Warranty coverage, the **SPRINKLER ACCESSORIES** must be re-commissioned by **UNITED Fire Systems** or a trained distributor to be eligible for continuing coverage. There will be a quoted charge for this re-commissioning.

Is This The Entire Warranty?
This Limited Warranty is the entire warranty given by **UNITED Fire Systems** to the purchaser of new **SPRINKLER ACCESSORIES**. Component warranties supplied by component manufacturers to **UNITED Fire Systems** that are valid for a longer period of time than the **UNITED Fire Systems** Limited Warranty may apply. Contact **UNITED Fire Systems** for more information. There are no other warranties expressed or implied, beyond those required by law.

How Do State and Federal Laws Apply?
This Limited Warranty grants specific legal rights per Federal law. There may also be other rights which vary from state to state.

UFS-704 Rev. 1.00 Sep 2019

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UNITED Fire Systems
Division of UNITED Fire Protection Corporation
1 Mark Road
Kenilworth, NJ USA 07033
908-688-0300
Unitedfiresystems.com

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Revision 1.02
Nov 2026