

U.S. Pat. No. 8,636,023, 9,526,933 and 9,717,935 B2

### ECS Protector Nitrogen Inerting Vent (PAV-WN)

#### Specifications

<b>Stock Number:</b>	PAV-WN PAV-WNS (Supervised)
<b>Service Pressure:</b>	Up to 175 PSIG (12 Bar)
<b>Regulator Setting:</b>	40 PSIG (2.8 Bar)
<b>System Connection:</b>	1" NPT Male (vent), 1" NPT Male (port)
<b>Temperature Range:</b>	40°F to 120°F (4.5°C to 49°C)
<b>Dimensions:</b>	14.5" (W) X 7.5" (D) X 9" (H) (368mm(W) X 191mm(D) X 229mm(H))
<b>Weight:</b>	10 Lbs (4.5 kg)
<b>Clear Height:</b>	5.5" (140mm)
<b>Optional Equipment:</b>	Remote Inerting Station (RIS-1)



- Patented Redundant Float Design Eliminates Piping to a Drain
- Support Hanger Not Required

#### Order Information

PAV-WN	Nitrogen Inerting Vent
PNIP-1	Nitrogen Injection Port (Included with PAV-WN)
RIS-1	Remote Inerting Station (Sold Separately)

#### General Description

The ECS Protector Nitrogen Inerting Vent (PAV-WN/NS) is the only device that provides automatic controlled venting of trapped gases in wet pipe fire sprinkler systems during the Wet Pipe Nitrogen Inerting (WPNI) process. As a fire sprinkler system is filled with water, trapped gas migrates to the high point of the system near the vent installation location which allows for trapped gas to be vented.

Trapped gas contains oxygen which is the primary cause of corrosion in fire sprinkler systems. Corrosion in wet pipe fire sprinkler systems is directly proportional to the amount of oxygen trapped within the system piping, so a reduction in trapped gas will in turn reduce the internal corrosion activity of the fire sprinkler system. Venting the trapped gas in a wet pipe sprinkler system can also decrease water delivery time and reduce water flow alarms.



The controlled venting is achieved by integrating a pressure relief valve on the gas discharge piping assembly of the ECS Protector Nitrogen Inerting Vent. During the wet pipe nitrogen inerting process, the vent remains closed to facilitate purging of corrosion causing oxygen from the FPS piping network. Once the piping has been appropriately inerted with nitrogen gas using the ECS WPNI protocol and is filled with water, the vent allows trapped gases to vent from the piping as the system returns to normal pressure. When the PAV-WN/WNS is used in conjunction with the nitrogen inerting process to provide internal corrosion control for wet pipe fire sprinkler systems by injecting nitrogen gas into the piping network to achieve a nitrogen gas concentration of at least 98%, this controlled venting achieves the following:



1. Prevents premature venting of nitrogen gas during Wet Pipe Nitrogen Inerting process.
2. Allows for gas sampling remote areas of the FPS piping network to measure the nitrogen concentration levels within the system.
3. Allows for venting the trapped gas within the system when the FPS is filled with water and put into service.

The ECS Protector Nitrogen Inerting Vent must be installed as shown on the engineering design documents, if a location is not provided install the vent at an accessible high point on the fire sprinkler system remote from the system riser where gas can be vented and at a location that the pressure gauge on the bottom of the vent assembly can be viewed from directly below. The PAV-WN/WNS is also equipped with brass components that allows the device to be installed in areas subject to external corrosion.

The float mechanism on the device will automatically close when water reaches the vent and the redundant design eliminates the need to plumb the PAV-WN/WNS to drain.

If the primary gas vent valve allows any significant amount of water to leak past the second gas vent valve will close preventing water from discharging and provide a pressure reading on the pressure gauge above 50 psig (in yellow area). This condition will be an indication that the primary automatic gas vent valve has failed and requires replacement. The pressure gauge on the bottom of the vent assembly is designed to be visible from the floor below the ECS Protector Nitrogen Inerting Vent from a distance of approximately 30 feet.

There are two available models of the ECS Protector Nitrogen Inerting Vent: PAV-WN and PAV-WNS. The PAV-WN and PAV-WNS operate as described previously; however, the PAV-WNS includes a wiring connection for monitoring. The wiring connection is a single contact rated 24VAC/DC @ 2A that may require an end of line resistor (EOLR) for supervision which is to be installed according to the wiring diagram in Figure 1.

A notification from the PAV-WNS indicates that pressure gauge on the bottom of the vent assembly has a pressure reading above 50 psig (in yellow area) due to a failure of the primary float valve which renders the ECS Protector Nitrogen Inerting Vent inoperable.

#### Installation Instructions

1. The ECS Protector Nitrogen Inerting Vent is equipped with an isolation ball valve to be connected to the fire sprinkler system. Once the PAV-WN/WNS has been assembled at the provided unions (see Figure 3), the contractor must install a 1" outlet (welded or mechanical) to connect the vent assembly to the sprinkler system.
2. Install the PAV-WN/WNS vent assembly at the location provided by the engineering design documents in a level position at an accessible high point on the sprinkler system where trapped gas can be vented.

**NOTE:** Piping to the vent assembly cannot be installed in a configuration that would trap water and prevent drainage to the sprinkler system; a water trap impedes the ability of the vent to remove gas from the fire sprinkler system.

3. Install the PAV-WN injection port at the fire sprinkler system riser on the system side of the main control valve. The contractor must install a 1" outlet (welded or mechanical) to connect the injection port to the fire sprinkler system riser.
4. When electronic supervision is specified the PAV-WNS must be utilized instead of the PAV-WN. When connected to the building fire alarm system, an addressable monitor module with an end of line resistor must be provided and installed in accordance with NFPA 72 (see Figure 1).
5. Inspection of the vent assembly should be performed after installation and hydrostatic testing of the fire sprinkler system and periodically thereafter in accordance with the applicable NFPA codes and standards and/or the authority having

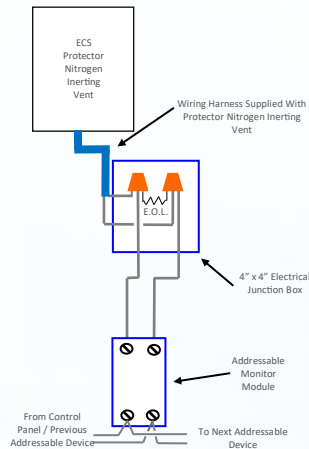


Complete Corrosion Control.

**FIGURE 1 - Wiring Diagram**

**INSTALLATION NOTES:**

1. If Monitored By The Building Fire Alarm System, Provide One Addressable Monitoring Module To Monitor The Ejector Automatic Air Vent.
2. Connect The Ejector Automatic Air Vent To The Addressable Monitoring Module.
3. Supervise The Circuit Using An End-Of-Line (E.O.L.) Resistor In Accordance With NFPA 72.



4. After each fill cycle the system nitrogen concentration can be verified at the gas sampling port on the vent assembly using an ECS Protector Handheld Analyzer (not included)
5. The isolation ball valve must remain in the open position to allow for venting of any additional trapped gas remaining in the system that may migrate to the vent location.
6. The “Y” strainer ball valve on the vent assembly can be used to clear water traps that would restrict operation of the ECS Protector Nitrogen Inerting Vent.

### Maintenance Instructions

1. The ECS Protector Nitrogen Inerting Vent must be inspected annually at minimum. While isolation ball valve is in the open position, check for air/water leaks.
2. Check the pressure gauge on the bottom of the vent assembly for a pressure reading above 50 psig (in yellow area). If a pressure reading is above 50 psig (in yellow area) the primary vent valve may require replacement.
3. While isolation ball valve is in the closed position the inspection must check for blockage in the “Y” strainer and the discharge orifice.

### Operating Instructions

1. Once the fire sprinkler system has been hydrostatically tested, open the isolation ball valve on the PAV-WN. Trapped gas should be expected to vent from the device if the system has been re-filled with water.
2. Follow the Wet Pipe Nitrogen Inerting protocol provided by Engineered Corrosion Solutions to eliminate oxygen from the fire sprinkler system.
3. The injection port provides access to fill the system with nitrogen gas, while the “Y” strainer ball valve on the vent assembly provides a purging location during the WPNI process.

### Gas Vent Valve Replacement

Plumbing the PAV-WN to drain is not required. Occasionally during venting operations a small amount of water may leak past the primary gas vent valve and collect in the intermediate plumbing. This is considered normal and not a failure of the valve. However, if inspection reveals a pressure reading above 50 psig (in yellow area) then the primary vent valve should be inspected. Please contact Engineered Corrosion Solutions for replacement parts and instructions.

**Figure 2 - ECS Protector Nitrogen Inerting Injection Port Installed on Riser**

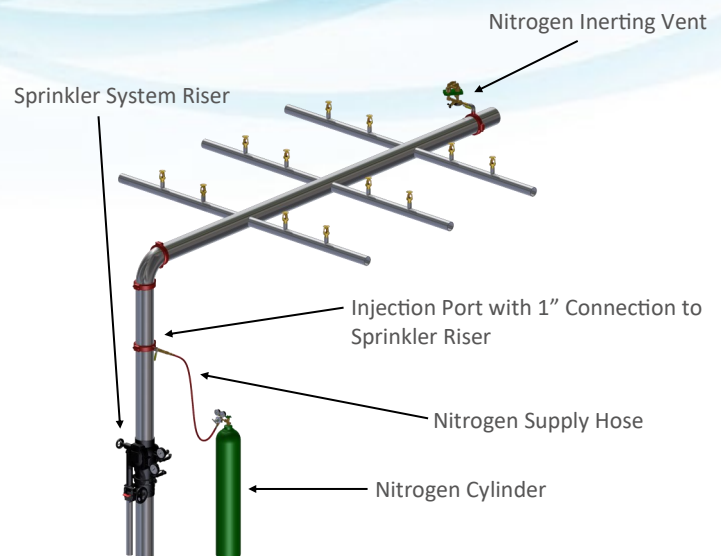




Figure 3 - ECS Protector Nitrogen Inerting Vent Outline Drawing

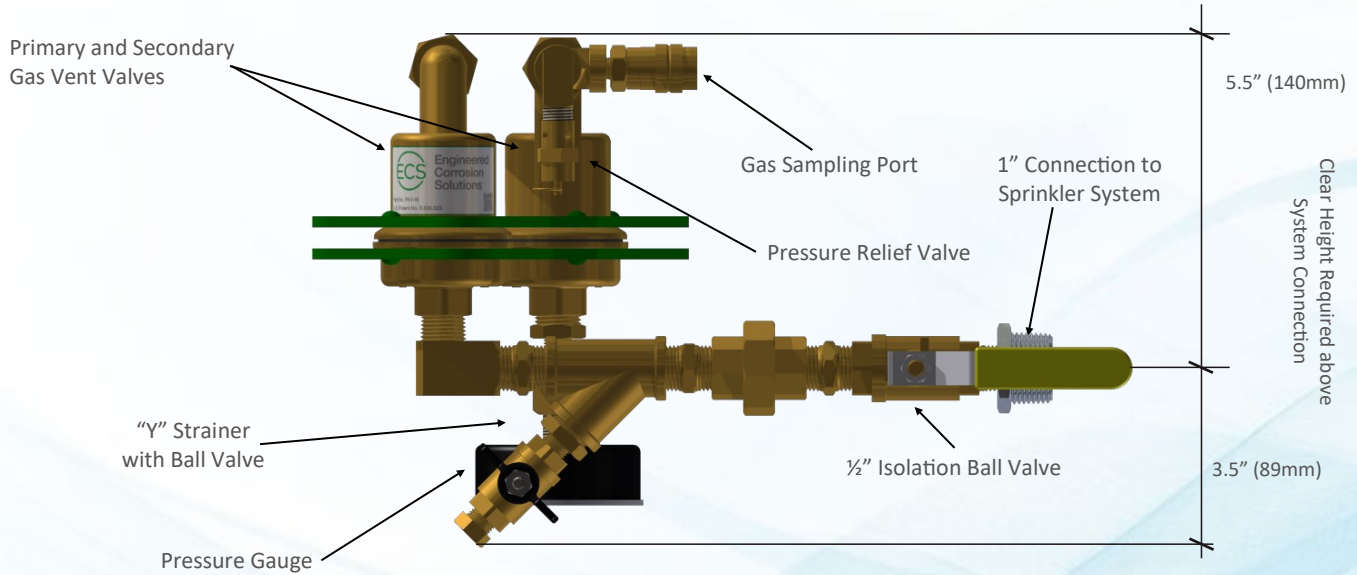
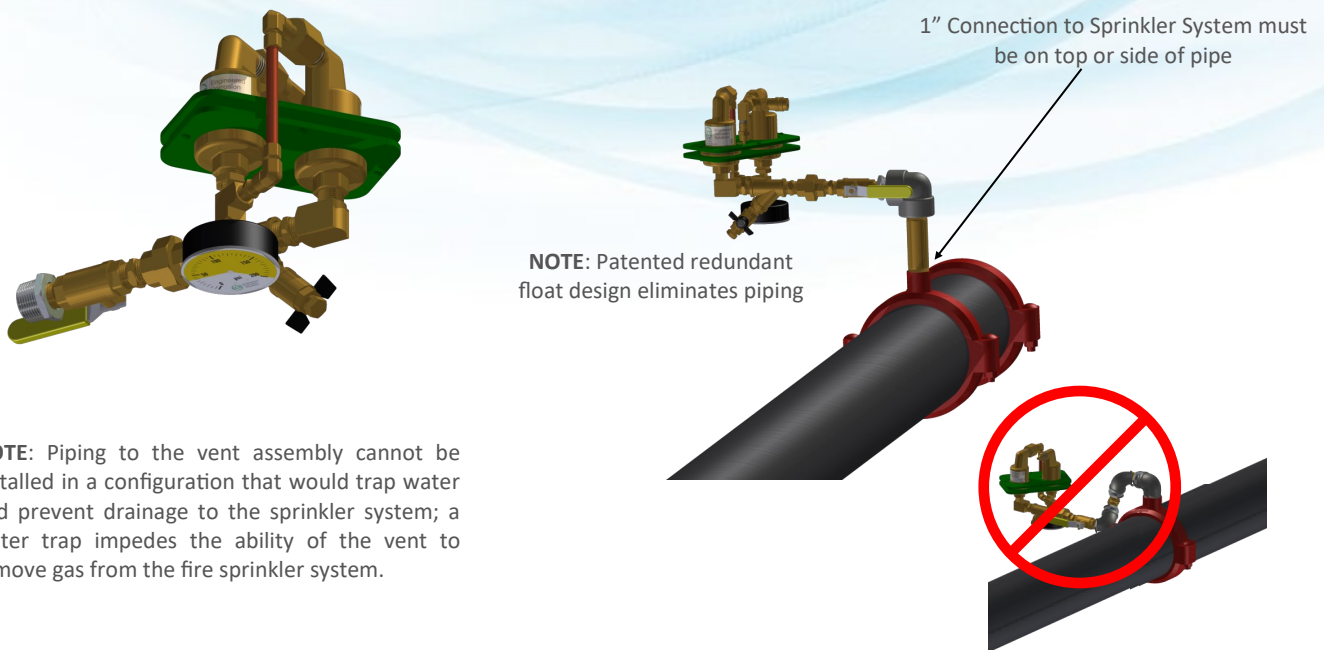


Figure 4 - ECS Protector Nitrogen Inerting Vent Installed on Sprinkler System





### Optional Equipment—Remote Inerting Station (RIS-1)

The ECS Protector Remote Inerting Station (RIS-1) allows for the nitrogen inerting functions of the Nitrogen Inerting Vent (PAV-WN) to be located to an easily accessible location near the ground thereby eliminating the need to access the PAV-WN to perform the following:

- Wet Pipe Nitrogen Inerting (WPNI) protocol
- Nitrogen gas purity sampling
- Monitor system pressure
- Remove trapped water from vent assembly
- Relocate vent assembly exhaust gas when venting into the atmosphere is impractical or undesirable

### Installation Instructions

1. Install the RIS-1 on a wall or vertical surface near the vent assembly in an accessible location.
2. Close PAV-WN vent assembly ball valve prior to extending piping between PAV-WN and RIS-1.
3. Remove the gas sampling port and orifice from the vent assembly and extend the gas sampling port connection to the ¼” NPT gas sampling port inlet connection on the RIS-1.

**NOTE:** Gas sampling port “Tee” ball valve in RIS-1 to remain closed until needed.

4. Remove the plug in the “Y” strainer “Tee” ball valve and extend the “Y” strainer connection to the ¼” NPT WPNI “purge” inlet connection with pressure gauge on the RIS-1.

**NOTE:** Once the WPNI “purge” connection is extended to the RIS-1:

- The “Y” strainer “Tee” ball valve on the vent to remain in the open position.
- The WPNI “purge” connection “Tee” ball valve in the RIS-1 to remain closed, unless performing “purge” process.

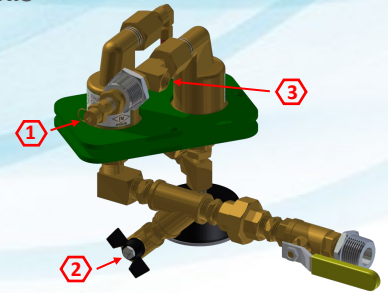
5. If exhausting gas into atmosphere is impractical, extend the exhaust gas from the pressure relief valve tank bushing to ¼” NPT exhaust gas inlet connection on RIS-1.

6. The RIS-1 exhaust connection can exhaust nitrogen gas and/or water. Verify the exhaust connection is piped to a desirable location that accepts nitrogen gas and water.
7. Open PAV-WN vent assembly ball valve once all connection piping between PAV-WN and RIS-1 have been completed.

### Operating Instructions

1. The pressure gauge indicates current system pressure.
  - Indicates system pressure during WPNI process.
2. To verify nitrogen purity in system piping while performing WPNI protocol, open gas sampling port “Tee” ball valve momentarily and measure purity level from gas sampling with handheld gas analyzer.
3. To “purge” system piping during WPNI process, open the “purge” connection “Tee” ball valve.

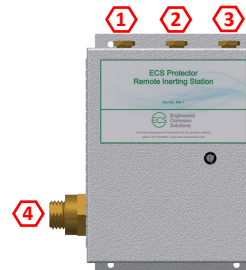
**Figure 5 - ECS Protector Nitrogen Inerting Vent Connections to RIS**



### PAV-WN/RIS-1 Connections

1. Exhaust Gas Connection
2. Y-Strainer “Purge” Connection
3. Gas Sampling Port Connection
4. Nitrogen Gas/Water Exhaust Connection

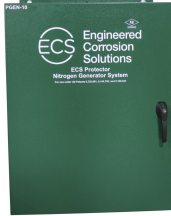
**NOTE:** Y-Strainer “Purge” Connection will be exposed to system operating pressure



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## DRY PIPE SYSTEM NITROGEN GENERATORS



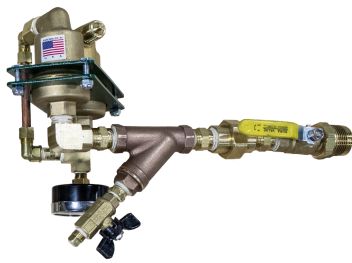
*Corrosion control technology located in the riser room*

	Wall Mount			Skid Mount	Stand Alone w/Separate Air Compressor			
	PGEN-3	PGEN-5	PGEN-10	PGEN-20	PGEN-30	PGEN-40	PGEN-50	PGEN-60
<b>Total System Capacity</b>	675 gal	950 gal	2,000 gal	3,200 gal	6,500 gal	11,000 gal	18,500 gal	22,500 gal
<b>Single System Capacity @ 40 psi<sup>(1)</sup></b>	215 gal	265 gal	560 gal	950 gal	1,150 gal	1,440 gal	2,025 gal	2,900 gal
<b>Single System Capacity @ 20 psi<sup>(1)</sup></b>	540 gal	590 gal	1,120 gal	1,800 gal	2,300 gal	2,880 gal	4,050 gal	5,800 gal
<b>Air Compressor</b>	Integral	Integral	Integral	Integral	Separate	Separate	Separate	Separate
<b>Size (H x W x D)</b>	36x24x9	36x24x9	38x29x11	57x32x40	53x24x9 <sup>(2)</sup>	76x24x12 <sup>(2)</sup>	76x24x12 <sup>(2)</sup>	76x24x12 <sup>(2)</sup>
<b>Weight</b>	115 lbs	125 lbs	175 lbs	420 lbs	152 lbs <sup>(2)</sup>	264 lbs <sup>(2)</sup>	300 lbs <sup>(2)</sup>	300 lbs <sup>(2)</sup>

**Notes**

- (1) Single system capacity based on 30 min. fill requirement of largest single sprinkler system; a secondary air compressor with normally closed isolation valve can be used to meet fill requirement for larger individual systems
- (2) Size and weight of nitrogen generator only, does not include separate air compressor
- (3) All nitrogen generators include 1 year manufacturer's warranty per ECS terms and conditions

## WET PIPE SYSTEMS



*Automatic air venting and nitrogen corrosion control*



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