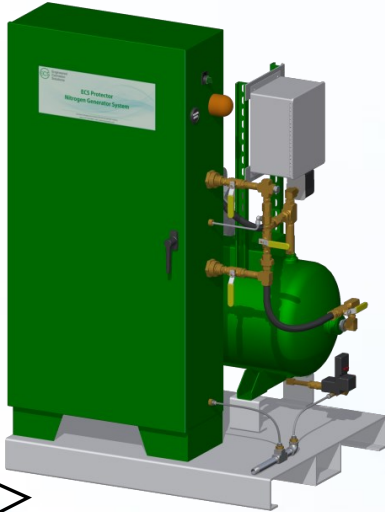




ECS Pre-Engineered Nitrogen Generator PGEN-20



For use under U.S. Patents 8,720,591, 9,144,700 and 9,186,533

Specifications

Dimensions:	32" (W) X 40" (L) X 56.5" (H)
Weight:	425 lbs
Compressor Power Supply:	460v/3 phase/60Hz (Standard) 208v/3 phase/60Hz (Optional) (Dedicated circuit) for the 2 hp compressor
Power Consumption:	460v/3 phase - 6 Amps 208v/3 phase - 9 Amps
Generator Power Supply:	120v/1 phase/60Hz (dedicated circuit) for the nitrogen generator cabinet
Power Consumption:	2 Amps
Nitrogen/air connection:	½" FNPT
Drain connection:	½" MNPT

Ordering Information

Stock Number:	PGEN-20
Replacement Filters:	PGEN-FKS (annual maintenance)
Replacement Membrane:	PGEN-MS (20 year expected service life)



General Description

The ECS Pre-Engineered Nitrogen Generator PGEN-20 is designed for use in facilitating the **Dry Pipe Nitrogen Inerting (DPNI)** process for controlling oxygen corrosion in dry and preaction fire sprinkler systems. The PGEN-20 is designed for "plug and play" performance in a typical dry or preaction fire sprinkler system.

The PGEN-20 can be used to supply nitrogen for single or multiple fire sprinkler systems depending on the number of systems, the volume of the largest system and the cumulative volume of all systems being supplied. The PGEN-20 system is designed to nitrogen inert all systems being served within 14 days. Thereafter, the PGEN-20 continues to automatically provide supervisory nitrogen gas sufficient for pressure maintenance of the fire sprinkler system(s).



The ECS Protector Nitrogen Generator facilitates the patented “fill and purge” breathing process in the fire sprinkler system when paired with a venting device

installed on the sprinkler riser such as the ECS Protector Manual Vent (PAV-D) or the ECS Protector Dry SMART Vent (PSV-D) for dry and preaction systems.

The PGEN-20 is a self-contained skid mounted unit that includes the following components:

- 2 hp air compressor power supply - 460v/3 phase/60Hz (Standard) or 208v/3 phase/60Hz (Optional)
- Oil less air compressor with after cooler
- 20 gallon horizontal air receiver tank with automatic condensate blow down – ½” MNPT
- Steel enclosure cabinet with membrane type nitrogen generator (no nitrogen gas storage) and manual bypass
- Power supply (120v/1 phase/60Hz)
- Single point nitrogen/air discharge – ½” FNPT
- Hour Run Meter
- Cycle Counter

The ECS Nitrogen Generator includes the following function Indications:

- Bypass Alarm - Nitrogen generator is in the “By-Pass” mode (Flashing Indicator)
- Leak Detection/Excessive Run Time - Nitrogen generator running excessively (Steady “On” Indicator and Audible Signal)

The ECS Nitrogen Generator includes the following monitoring outputs:

- System Power (Digital Output)
- Bypass Mode Alarm (Digital Output)
- Nitrogen Generation Mode (Digital Output)
- Nitrogen Supply Line Pressure (Analog Output)
- Leak Detection/System Run Timer (Digital Output)

The ECS Nitrogen Generator is designed to be used in conjunction with the following components as part of the complete ECS Dry Pipe Nitrogen Inerting (DPNI) system:

- Air maintenance device with on board adjustable regulator (recommend Victaulic Series 757, Tyco Model AMD– 1 or Reliable Model A-2)
- Riser-mounted ECS Protector Manual Vent (PAV-D) or ECS Protector Dry SMART Vent (PSV-D)
- ECS Protector SMART Gas Analyzer (SGA-1) – one per nitrogen generator is recommended
- ECS In-Line Corrosion Detector (ILD-X) – monitoring at least one system is recommended

Operating Performance

Model Number	Min. Supply Air (SCFM)	Total System Capacity (Gallons)	Single System Capacity† @ 40 psig (Gallons)	Single System Capacity† @ 20 psig (Gallons)
PGEN-20	10	3,200	950	1,800

† Capacity based on NFPA 13 30-minute fill requirement of largest single system

Nitrogen Quality

N ₂ Purity at Discharge:	98% or greater (maximum of 2.0% oxygen)
N ₂ Pressure at Discharge:	min of 15 psig; max of feed air pressure minus 15 psig
N ₂ Temperature at Discharge:	same as feed air temperature
N ₂ Water Dew Point:	typically less than -30°F



Note: When connecting an ECS Protector Nitrogen Generator to an existing dry pipe/preaction fire sprinkler system, the existing fire sprinkler system(s) must be limited to a maximum leak rate of less than 3 psig within a 24 hour period, per system.

Installation Instructions

Installation of the PGEN-20 requires five (5) steps:

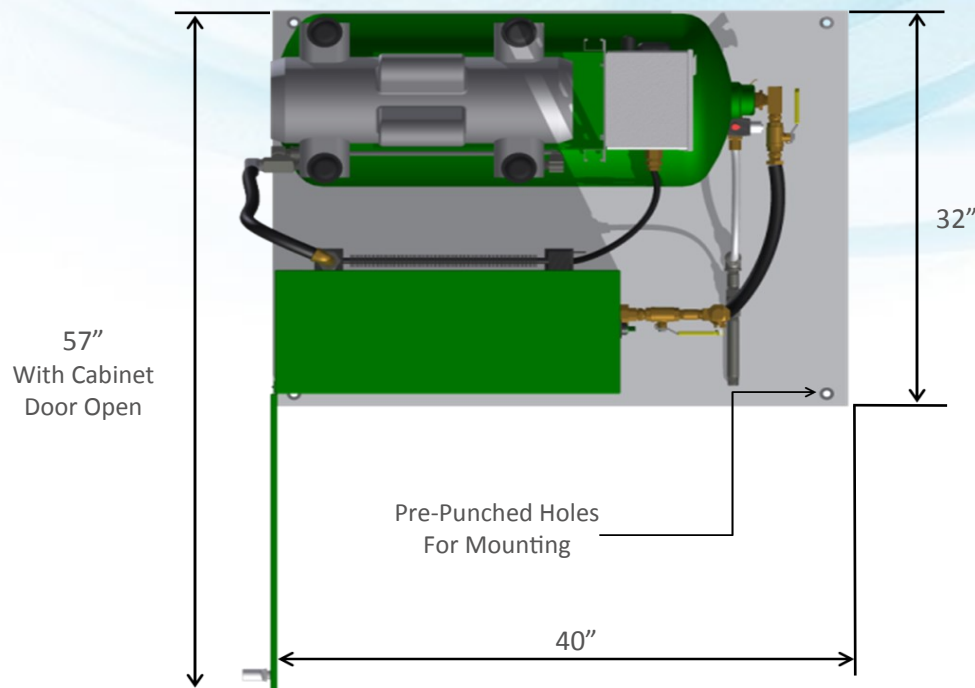
1. Mount the PGEN-20 skid to the floor in the appropriate location within the riser room
2. Bring the two (2) dedicated power supply lines to the NEMA4 power supply box on the skid
3. Plumb the nitrogen/air supply line to the trim work on the dry or preaction zones being served
4. Plumb the drain line to floor drain or building exterior
5. Connect Nitrogen generator output signals to BMS or fire alarm system, where applicable

Step 1: Mounting the Skid

The PGEN-20 is designed to be mounted directly to the floor in the fire sprinkler riser room. Several factors should be considered in choosing the proper mounting location for the PGEN-20:

- Access to the power supply (dedicated circuits as per above)
- Access to the risers with the nitrogen/air discharge ½" supply line
- Access to a drain for the condensate discharge line
- Clearance at the front of the unit to open the cabinet door
- Clearance from the side of the unit to access the power box

The skid base comes with pre-punched holes in the skid feet for easy mounting to the floor using standard anchors. The anchors can be tightened through the pre-punched access holes located at the corners of the skid.

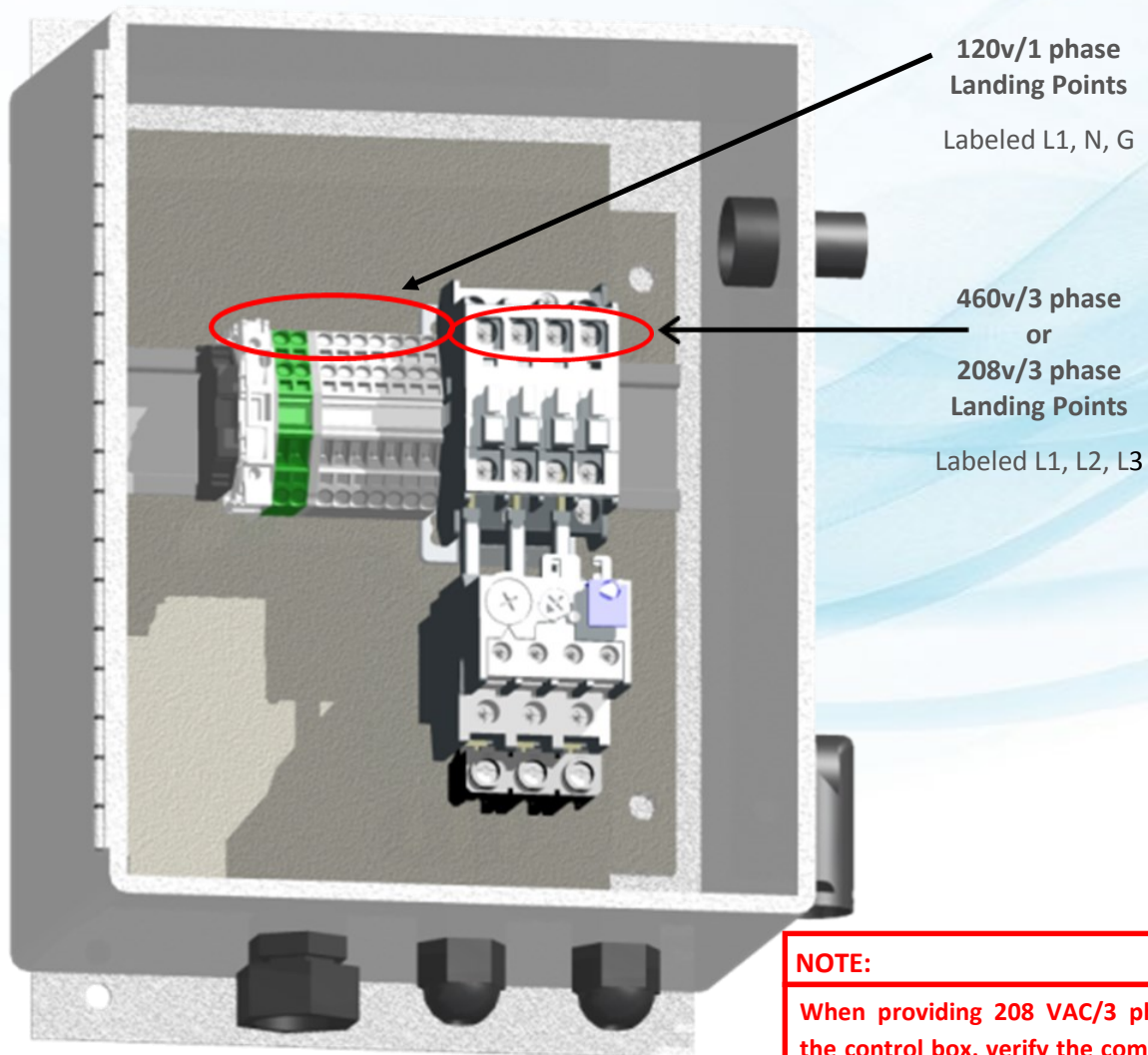




Step 2: Power Supply

The PGEN-20 requires two dedicated power supply lines. Both lines tie into a single point on the bottom of the NEMA4 power supply box (see diagram).

1. 2 hp compressor power supply – 460v/3 phase/60Hz (Standard) or 208v/3 phase/60Hz (Optional) - dedicated 20 amp circuit
2. Nitrogen generator power – 120v/1 phase/60Hz dedicated 20 amp circuit





Step 3: Plumb the Nitrogen/Air Supply Line

The nitrogen/air discharge plumbing from the PGEN-20 is to be connected directly to the dry or pre-action valve trim work as per standard fire sprinkler compressed air supply lines using ½” black steel, galvanized steel or copper lines. The PGEN-20 requires an in-line Air Maintenance Device (AMD) that is equipped with an on board field adjustable pressure regulator for each zone being served. The preferred AMD is the Victaulic Series 757.

Note: When both dry pipe and preaction fire sprinkler systems are connected to one nitrogen generator, additional equipment may be required if the fire sprinkler systems operate at different supervisory gas pressures.

Step 4: Plumb the Condensate Drain Line

The ECS Protector Nitrogen Generator and air compressor will discharge condensate water from the coalescing filters inside the cabinet and the air compressor tank. It is recommended that the 1/2” drain connection be plumbed to a floor drain or building exterior. When plumbing to a drain is not feasible an evaporative collection chamber can be used.

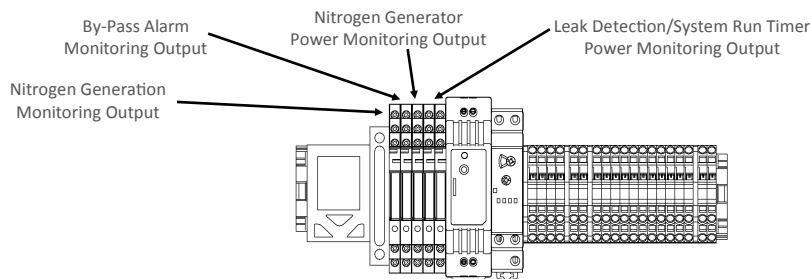
Step 5: System Signals and Monitoring, where used

The nitrogen generator cabinet has two (2) system signals and five (5) outputs that can be monitored by the facility’s BMS or fire alarm system.

- The nitrogen generator is operating in the bypass mode which is activated when the bypass valve is in the “fast fill” position to fast fill the fire sprinkler system and the air supplied directly from the air compressor has reached a pressure of 20 psig. (Flashing amber light)
- The nitrogen generator is equipped with a Leak Detection/Excessive Run Time audible and visual signal which is activated when the nitrogen generator runs excessively as a result of system leaks. (Steady amber light and audible signal)

The nitrogen generator cabinet includes system monitoring signals which can be monitored through a building monitoring system, if desired:

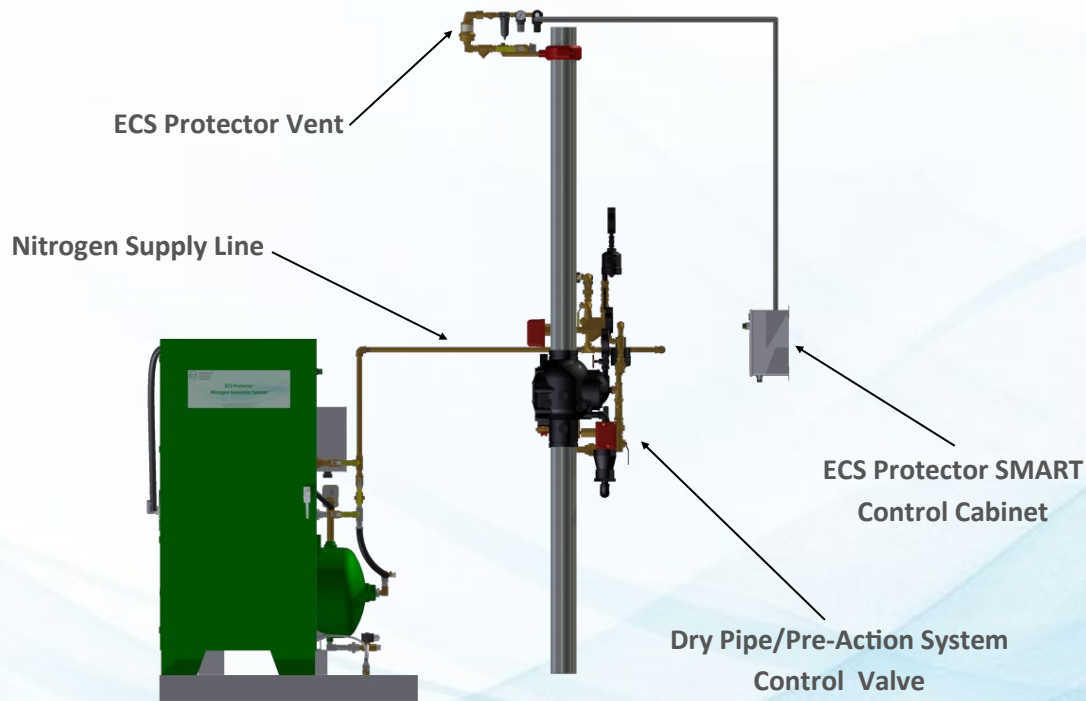
- Nitrogen Generator Loss of Power (Form C contacts)
- Bypass Mode Alarm (Form C contacts)
- Nitrogen Generation Mode (Form C contacts)
- Nitrogen System Supply Line Pressure (Analog Signal)
- Leak Detection/System Run Timer (Form C contacts)





ECS PRE-ENGINEERED NITROGEN GENERATION SYSTEM

(typical installation schematic)



Maintenance of the PGEN-20

The nitrogen cabinet contains three (3) separate cartridge filters. **It is recommended that each of the filter cartridges be replaced as part of an annual preventative maintenance program.** In some environments it may be necessary to replace filters more frequently. The filter replacement kit for the PGEN-20 is part number PGEN-FKS. When maintained properly the nitrogen separation membrane will provide up to 20 years of service life. The membrane replacement part number is PGEN-MS.

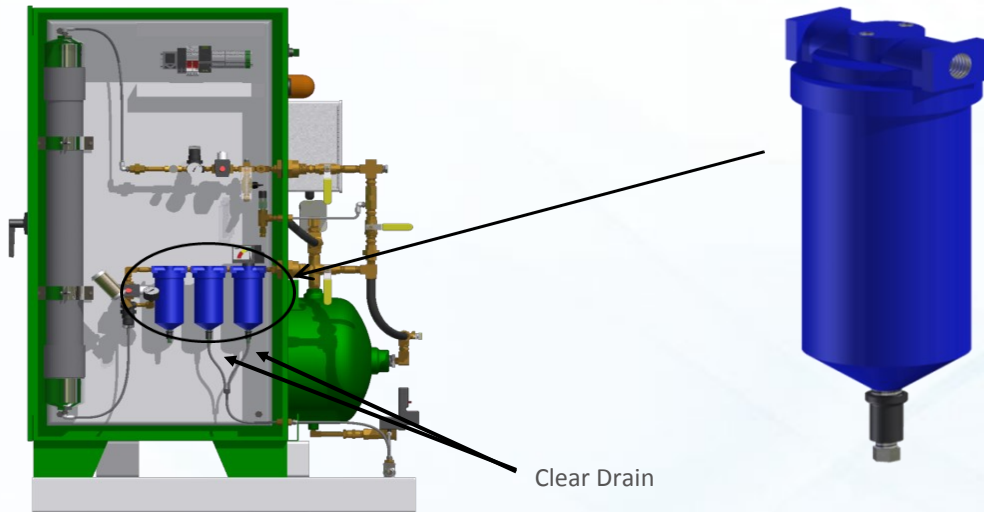
Cartridge Filter Exchange Procedure

Preliminary Steps (taking the PGEN-20 out of service)

1. Turn the power supply to the unit off
2. Close the inlet and outlet ball valves on the bypass loop
3. Depressurize the nitrogen generator internal inlet piping by slowly unscrewing the petcock valve on the bottom of the leftmost filter housing
4. Once the pressure has stopped venting through the petcock the filter housings have been depressurized.

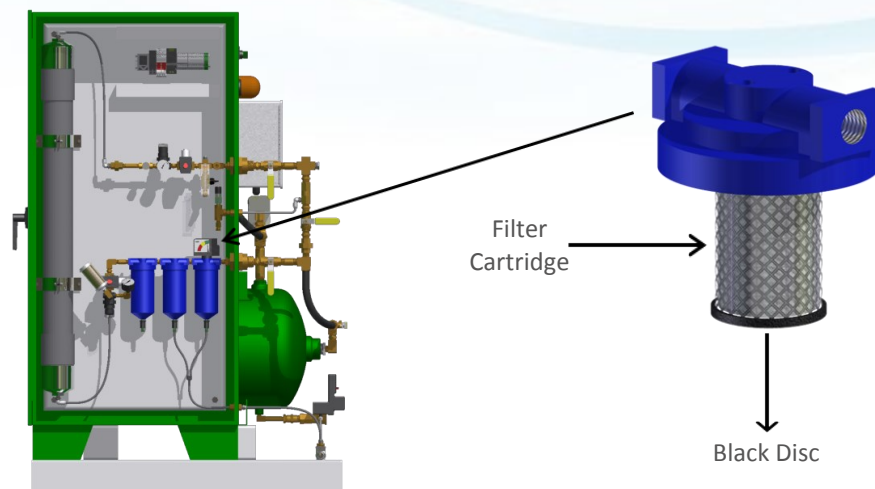
Coalescing Filter Cartridge Exchange Procedure

The two filters with the condensate drain tube extending from the bottom of the filter housing are coalescing filters. To replace the filter cartridges follow Step 1 through Step 6.



- Step 1:** Grasp the ¼" clear drain tube on the bottom of the filter housing with the right hand. With the left hand, push upward on the grey retaining ring on the filter housing outlet fitting. This motion will allow for the ¼" clear drain tube to be removed from the fitting. Gently pull the ¼" clear drain tube downward out of the fitting and let it hang.
- Step 2:** Once the ¼" clear drain tube has been disconnected, the filter housing bowl may be unscrewed from the top portion of the filter housing which is connected to the internal system piping.
- Step 3:** Once the filter housing bowl has been removed, the filter cartridge inside is removed by first unscrewing the black retaining disc at the base of the cartridge and then pulling down on the cartridge. Discard the old filter cartridge and replace it with the appropriately marked filter cartridge from the maintenance kit by pushing up so that it fits snugly onto the receiving stepped cylinder in the upper part of the filter housing. Screw the black retaining disc back onto the central metal threaded rod.

Important: HAND TIGHTEN ONLY!





Step 4: Replace the filter housing bowl by screwing it onto the filter housing top.

Important: HAND TIGHTEN ONLY!

Step 5: Reconnect the ¼" clear drain tube into the fitting on the filter housing bowl. Make sure that it fully seats in the fitting and is retained snugly.

Step 6: Repeat Step 1 through Step 5 for the remaining coalescing filter.

Activated Carbon Filter Cartridge Exchange Procedure

The filter without condensate drain tube extending from the bottom of the filter housing is an activated carbon filter. To replace the filter cartridge follow the steps below.

Step 7: Remove the filter housing bowl by unscrewing it from the top portion of the filter housing which is connected to the internal system piping.

Step 8: Once the filter housing bowl has been removed, the filter cartridge inside is removed by first unscrewing the black retaining disc at the base of the cartridge and then pulling down on the cartridge. Discard the old filter cartridge and replace it with the appropriately marked filter cartridge from the maintenance kit by pushing up so that it fits snugly onto the receiving stepped cylinder in the upper part of the filter housing. Screw the black retaining disc back onto the central metal threaded rod.

Important: HAND TIGHTEN ONLY!

Step 9: Replace the filter housing bowl by screwing it onto the filter housing top.

Important: HAND TIGHTEN ONLY!

Step 10: Tighten the petcock valve to the closed position.

Step 11: The PGEN-20 unit can now be placed back into service.

Return the PGEN-20 to Service

1. Turn the power supply to the unit on
2. Open the inlet and outlet ball valves on the bypass loop

ECS Protector Nitrogen Generator Optional Monitoring Equipment

- **ECS Protector Handheld Gas Analyzer (PHGA-1):** portable handheld gas analyzer includes one-button calibration and enables user to measure nitrogen concentration at nitrogen generator cabinet or gas sampling ports on ECS venting devices
- **ECS Protector SMART Gas Analyzer (SGA-1):** permanently installed near an ECS Protector Manual/SMART Vent to continuously report nitrogen gas concentration to a building information or management system; includes digital display and provides 0-5V DC or 4-20mA output signals
- **ECS In-Line Corrosion Detector (ILD-X):** installed in-line within the fire sprinkler system piping at locations most susceptible to corrosion; provides either a local push-button test/indicator or control panel monitoring