

SGA-1

ECS Protector SMART Gas Analyzer



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

Specifications

Stock Number:	SGA-1
Dimensions:	8" (W) x 10" (H) x 6" (D) 203mm (W) x 254mm (H) x 152mm (D)
Temperature Range:	40°F - 105°F (5°C - 40°C)
Power Supply:	120-240VAC, 50-60Hz/.5A 24VDC/2A
Sensor Type:	Zirconium Dioxide
Signal Output:	0-5VDC linear output 4-20mA linear output
Output Display:	%O ₂ or %N ₂
%O₂ Contact Closure Level:	1%, 3%, or 5%
Resolution:	1dp (nn.n%)
Accuracy:	1%
Sample Connection:	5/32" plastic tubing quick connect

General Description

The ECS Protector SMART Gas Analyzer provides a continuous real-time monitoring of nitrogen/oxygen concentration levels within a dry/preaction fire protection system. The analyzer samples discharge gas from an adjacent ECS Protector Manual Vent (PAV-D) or SMART Vent (PSV-D/PSV-DE). The gas flows out of a restricted orifice on the vent through pressure-rated tubing to provide slow, controlled flow to the analyzer. One SGA-1 analyzer is recommended with each ECS Protector Nitrogen Generation System.

The SGA-1 has many different functions. It is equipped with a programmable contact closure for one of three different oxygen concentration levels (1%, 3%, and 5%), which will provide early warning to a user when the nitrogen concentration within the fire protection system falls below the desired level. The SGA-1 is also equipped with an RS-485 port for optional remote control and monitoring. The SGA-1 can also display either oxygen or nitrogen concentration.

The SGA-1 is equipped to protect itself from damage, and also let the user know if the sensor is in poor health. Five minutes after the sensor is powered on, it begins a self-diagnostic protocol. If at this time the oxygen level is below .3%, the alarm relay will energize, and the sensor will automatically shut itself down. It will reboot automatically after 24 hours and resume reading gas concentration levels. This operation is to prevent sampling at extremely low oxygen levels which can eventually cause damage to the sensor. If the sensor detects rapid deviation in oxygen content it will signal an error and energize the alarm relay without shutting down.

Installation Notes

1. When connecting the SGA-1 Gas Analyzer to a fire protection system using the PAV-D Manual Vent, a dedicated PAV-D Manual Vent is required to provide a continuous gas stream to analyze. The muffler in the PAV-D must be removed and replaced with a 5/32" push-connect fitting.
2. When connecting the SGA-1 Gas Analyzer to a fire protection system using the PSV-D/(PSV-DE) SMART Vent, the quick disconnect sampling port in the PSV-D/(PSV-DE) must be removed and replaced with a 5/32" push-connect fitting.

Installation Instructions

1. Mount the ECS Protector SMART Gas Analyzer on a wall adjacent to the PAV-D Manual Vent or the PSV-D (PSV-DE) SMART Vent (not included).
2. Once mounted, connect the 5/32" tubing to the push-connect fitting on the top of the SGA-1.
3. Connect the opposite end of the tubing to the push-connect fitting on the outlet of the PAV-D or PSV-D (PSV-DE) Vent.
4. With the incoming power off, connect the incoming 120-240VAC/50-60Hz power supply to block "J6".
5. Select the appropriate gas concentration level to be displayed on the SGA-1 using 1 of Switch 1. Nitrogen (N₂) or Oxygen (O₂).

NOTE: N₂ is recommended

6. When monitoring and a (N.O.) contact closure required, connect to the "Over" contacts on block J5 (J5-1 & J5-2).
 - a. If a LOW Nitrogen (N₂)/HIGH Oxygen (O₂) percentage alarm is desired, select the corresponding O₂ concentration level using dip 2, 3 or 4 of Switch 1 to energize the "Over" relay output.
 - b. Dip 2 of Switch 1 (5%) is recommended.
7. When monitoring and an analog output is required, connect positive lead to A Out+ (J4-1) and negative lead to A Out- (J4-2).
 - a. Turn on dip 1 of Switch 2 to select 4-20mA output.
 - b. Use dip 2 of Switch 2 to select 5V (for 0-5V) or 10V (for 0-10V).
8. If RS-485 remote control/monitoring is desired, connect RS-485 leads to D+ (J4-4), D- (J4-5) and D Gnd (J4-6).

Alarm Bypass While Nitrogen Inerting Feature

The "Over" contacts can be bypassed from transmitting a low nitrogen signal to the building monitoring system during the 14-day nitrogen inerting process when the SGA-1 is used in conjunction with the PSV-D/(PSV-DE) SMART Vent. See Figure 2 for terminal connections.

1. Connect the spare normally closed (NC) contacts (terminals 8 and 11) in the PSV-D/(PSV-DE) SMART Vent Controller with the normally open (NO) contacts of the SGA-1 - Terminals J5-1 and J5-2.
2. Connect the output of the SGA-1 and PSV-D/ (PSV-DE) to the building monitoring system.
3. Connect the building monitoring system's end-of-line supervision device (if needed).

FIGURE 1 - PC Board Wiring Diagram

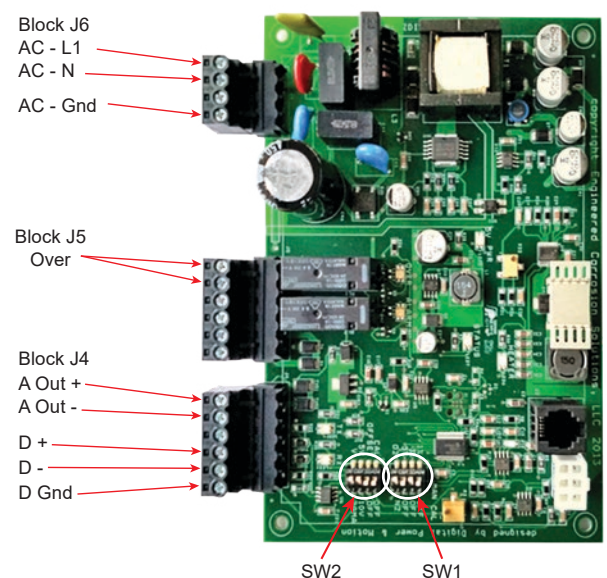
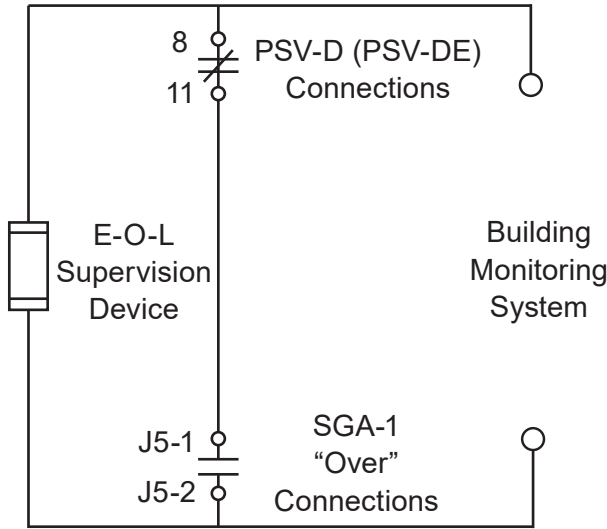


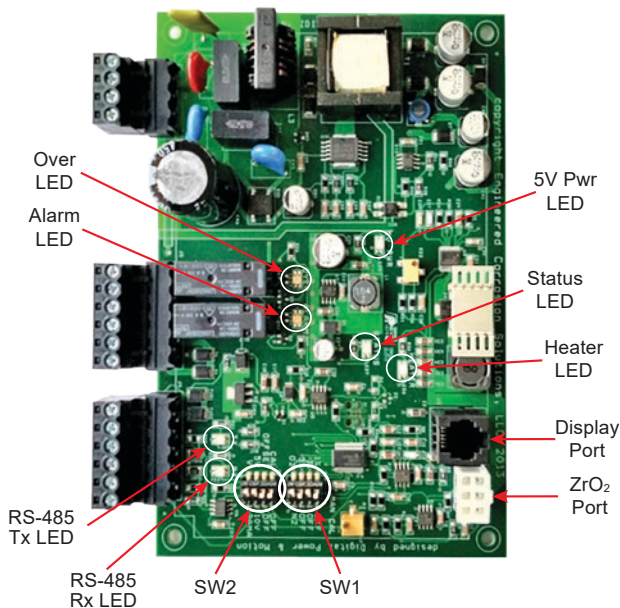
FIGURE 2 - Inerting Bypass Wiring Diagram



Operating Instructions

1. Once unit is verified to be wired correctly, power unit on. The status LED light will repeatedly flash green two times quickly for two minutes. The sensor heater is warming up during this period.
2. After the two minute warm-up period, the sensor and status LED light will flash green one time repeatedly indicating normal operation. At this time, the display will show the current average concentration of the sample gas.

PC Board - LED Locations



Calibration

NOTE: Please contact ECS before any calibration adjustment

As the elevation increases the density of the oxygen molecules in the air decreases. Decreased oxygen molecules in the air can cause the SMART Gas Analyzer to display slight inaccuracies in the displayed oxygen/nitrogen percentage concentration value. To recalibrate the SGA-1, the procedure is as follows:

1. Verify the SMART Gas Analyzer (SGA-1) is connected to a sprinkler system that is pressurized with fresh compressed air.
2. Verify the SMART Gas Analyzer (SGA-1) is sampling the fresh compressed air for a minimum of 10-minutes.
3. Switch the N₂/O₂ switch (SW 1-1) to the O₂ position, if the digital display is not reading approximately 20.9%, switch the "CAL" switch (SW 2-4) to the "CAL" position.
4. Allow the SMART Gas Analyzer (SGA-1) to remain in the "Calibrate Mode" and sample the gas for 10-minutes to allow the SMART Gas Analyzer to re-calibrate.
5. Switch the "CAL" switch (SW 2-4) to the "Off" position.
6. Verify the digital display is reading approximately 20.9%
7. Switch the N₂/O₂ switch (SW 1-1) to the N₂ position.

LED Identification Chart

STATUS LED COLOR	FLASH CODE	CONDITION
RED	1	ERROR: Low O ₂ Level (<.3%)
RED	2	ERROR: Asymmetry >5%
GREEN	1	Normal Operation
GREEN	2	Heater Warming Up
GREEN	3	Averaging Calibration Value
GREEN	4	Set Calibration Value If Needed

OUR PRODUCTS. YOUR SYSTEMS.

Solutions for every environment

DRY PIPE SYSTEMS



Corrosion control technology located in the riser room.

WET PIPE SYSTEMS



Automatic air venting and nitrogen corrosion control.

MONITORING SOLUTIONS



Ensure effective corrosion control with real time corrosion monitoring solutions.

SERVICES



Corrosion assessments, pipe analysis, and long term corrosion control programs to mitigate future risk.

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
Total System Capacity	675 gal	950 gal	2,000 gal	3,200 gal	6,500 gal	11,000 gal	18,500 gal	22,500 gal
Single System Capacity @ 40 psi⁽¹⁾	215 gal	265 gal	560 gal	950 gal	1,150 gal	1,440 gal	2,025 gal	2,900 gal
Single System Capacity @ 20 psi⁽¹⁾	540 gal	590 gal	1,120 gal	1,800 gal	2,300 gal	2,880 gal	4,050 gal	5,800 gal
Air Compressor	Integral	Integral	Integral	Integral	Separate	Separate	Separate	Separate
Size (H x W x D)	36x24x9	36x24x9	38x29x11	57x32x40	53x24x9 ⁽²⁾	53x24x9 ⁽²⁾	76x24x12 ⁽²⁾	76x24x12 ⁽²⁾
Weight	115 lbs	125 lbs	175 lbs	420 lbs	152 lbs ⁽²⁾	152 lbs ⁽²⁾	300 lbs ⁽²⁾	300 lbs ⁽²⁾

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 one (1) year manufacturer's warranty per ECS terms and conditions