**Specification for: Multi-Zone CO/NO2 Gas Detection and Ventilation Control System**

**Part 1 General**

The Ventilation Control System (VCS) shall consist of carbon monoxide / nitrogen dioxide (CO/NO2) gas sensors located throughout the garage and a central controller which continuously monitors the gas values and executes a pre-defined fan control strategy.   
  
Recognizing that this is a life safety application, the system shall be third-party certified to UL 2075, EN 50545-1, or an equivalent performance standard, must be certified to UL safety standard 61010-1 / CSA22.2, and the manufacturer must be certified to the ISO-9001 quality standard.

* 1. **Section Includes**

1. Commercial Series Gas Detectors/Transmitters
2. Combination Carbon Monoxide/Nitrogen Dioxide
   1. DT6
   2. DC6
   3. SCM6
3. Detection Ventilation control Panel
4. Multi-Point Digital Gas Detection and Control System
   1. DGC6

**Part 2 Products**

**2.1 Approved Manufacturer**

The parking garage ventilation and control system shall be the PolyGard 2 Series: DGC6 Control Panel and DT6/DC6/SCM6 Sensors/Transmitters by INTEC Controls (12700 Stowe Drive, Poway, CA, 92064, 858-578-7887, www.inteccontrols.com).

* 1. **Gas Sensors**

1. CO / NO2 sensors shall be placed throughout the garage such that there is at least 1 CO/NO2 sensor for each 7,500 square feet of enclosed parking or as required for compliance with applicable codes. Additional sensors shall be placed as necessary to ensure adequate coverage in alcoves and other areas with limited air movement.
2. The sensors/transmitters must be Listed to UL 2075 to conform with IMC 2018 and later requirements. Non-UL Listed products will not be approved.
3. To minimize installation cost, CO / NO2 sensing must be integrated into a single transmitter device.
4. To facilitate lifecycle maintenance, all sensor elements must be integrated into smart sensor modules. The sensor modules must be field replaceable without special tools. Each sensor module must store its calibration history and next service due date.
5. All devices must be rated NEMA4X / IP65 to ensure sufficient protection from dust and moisture in the garage.
6. Gas sensors shall meet all performance specifications including accuracy and repeatability in environments between -4 and 149 degrees Fahrenheit with relative humidity between 15 and 90% (non-condensing).
7. CO / NO2 sensors must be electrochemical type.
   1. **Gas Controller**
8. The gas controller must be intended specifically for ventilation control applications. General purpose devices that are custom programmed for this application, including the facility’s building management system, will not be accepted unless the hardware/software combination has been third party certified to UL 2017 and EN50271 (Electrical apparatus for the detection and measurement of combustible gases, toxic gases and oxygen – Requirements and tests for apparatus using software and/or digital technologies).
9. The controller shall provide a continuous, scrolling display of all gas values with a visual indication of values that are in alarm.
10. A password shall be required to change all system parameters.
11. The controller must include an audible horn (minimum 85 dB) to annunciate alarms and system faults.
12. To ensure the long-term performance of the system, a service due date shall be assigned to every sensor in the system. At the service due date, each sensor shall visually indicate its need for service and the gas controller shall activate the affected zone’s ventilation (fail-safe).
13. Optional: The gas controller must include a {BACnet-IP} interface port such that the building management system can read the gas values in real time.
14. Optional: The gas controller must include a data logging function to record gas values, alarm occurrences and system fault occurrences.

**Part 3 Execution**

**3.1 Fan Activation and Control**

1. The system shall support on/off and variable speed fan control.
2. The system shall support ventilation designs using (1) supply and exhaust fans, (2) exhaust fans with supply louvers, (3) ductless systems using axial or induction fans.
3. The sequence of operation shall allow “zones” to be configured such that the ventilation may be controlled in response to the maximum or average gas reading within the zone.
4. Exhaust fans are to be activated at low speed when the maximum value of any sensor in that fan’s area of ventilation reaches 25 ppm CO, 2 ppm NO2, or 20% LEL and the fan shall be increased to full speed if the maximum gas value in the zone reaches 50 ppm CO, 4 ppm NO2 or 40% LEL.
5. The variable speed fans shall be set to 25% speed when the maximum value of any sensor in that fan’s area of ventilation reaches 25 ppm CO, 2 ppm NO2, or 20% LEL and the fan shall increase until it reaches full speed if the maximum gas value in the zone reaches 50 ppm CO, 4 ppm NO2 or 40% LEL.

**3.2 Commissioning**

1. The system shall be installed and commissioned according to the manufacturer’s recommendations.
2. The commissioning contractor shall provide a riser drawing showing the layout of the system and identifying the individual identifier/address of each component in the system. The riser drawing shall also include the project-specific sequence of operation. The riser drawing, product data sheets and user manuals shall be accessible by scanning a QR code on the gas controller.
3. The commissioning contractor shall provide a written report certifying that all devices are operational, and the design sequence of operation is fully functional.