

Gas Detection System

A. General

1. Manufacturers: QEL or equal
2. The Parking Garage Ventilation System shall consist of wall mounted garage exhaust fans, ceiling mounted jet fans, intake louvers and space mounted Carbon Monoxide and Nitrogen Dioxide sensors
3. All fans and sensors shall be controlled by a dedicated control system with a BACnet interface for alarm and monitoring purposes.
4. All garage exhaust fans shall be controlled by associated space mounted VFDs. The Jet Fans will require a motor starter.
5. The space mounted CO/NO2 sensors shall be distributed throughout the garage. The quantity and mounting locations shall be determined by the System Manufacturer to provide required coverage

B. Sensors: Q5 Carbon Monoxide (CO) and Nitrogen Dioxide (NO2)

1. Provide Carbon Monoxide/Nitrogen Dioxide monitor as listed below. The Q5 detectors shall have electrochemical sensor, alarm contacts, LCD display, and status indicator LED LEDs mounted in a NEMA 4X enclosure. Detectors shall use RS-485 Communication to gas detection panel. Must have replaceable sensing element.
2. Detectors shall have programmable alarm points and self-test diagnostics.
3. Detectors shall display STEL, TWA and Peak gas levels.
4. Detectors shall have UL 61010-1 for CO and NO2, UL 2075 for Carbon Monoxide.
5. Local building codes take precedent for mounting heights of detectors.

Gas to be Detected: Carbon Monoxide (CO)/ Nitrogen Dioxide (NO2)

Power Requirements: 24VDC or 24VAC, AC must not be grounded

Signal Output: 4-20 mA or 2-10 VDC Linear, Digital RS-485

Relay:	Three SPDT Form C dry contact, 1A @ 30VDC or 0.3A @ 125VAC (Resistive)
Buzzer:	80 dB at 3.96" (10cm)
Factory Set Ranges:	0 – 250ppm CO 0-10ppm NO2
Remote Sensor:	Electrochemical
Communications:	RS-485 to gas control panel
Sensor Life:	2 to 3 years Typical Nitrogen Dioxide 7 years Typical Carbon Monoxide
Warranty:	2-Year Warranty
Mounting:	CO: 4-5 feet above floor level NO2: 12" above floor level or 12" below ceiling level
Coverage:	7500 sq ft (50' Radius)
Operating Temp Range:	-20 to 50C (-4 to 122 F)

Please consult factory for other gas options and technical specifications

B. Gas Detection Controller

1. M-Controller: The M-Controller is a multi-channel controller and alarm unit that utilizes both digital and analog communications to interface with a maximum of 32 remote digital transmitters/sensors, and 8 analog transmitters/sensors. Has four parallel RS-485 communication ports and three DPDT programmable relays. Common relay configurations include voting, averaging, delay on actuation and de-actuation, normally/not-normally energized and latching. RS-422 output responds as Modbus RTU to BAS.

2. Q-Controller: Can accept up to 128 digital sensors using RS-485 communication on four parallel ports. Has four SPDT programmable relays. Common relay configurations include voting, averaging, delay on actuation and de-actuation, normally/not-normally energized and latching. Modbus RTU output and optional BACnet IP to BAS for monitoring.

C. Gas Detection System Sequence of Operations.

1. The gas detection system shall continuously monitor the Carbon Monoxide (CO) and Nitrogen Dioxide (NO₂) levels in the parking garage to maintain a safe environment.
2. If any gas detector in a zone reaches the first alarm level of 25 ppm for CO or 1 ppm for NO₂, the controller shall signal to open all louvers.
3. If any gas detector in a zone reaches the second alarm level of 50 ppm CO or 3 ppm NO₂, the controller shall signal to start all exhaust fans.
4. The fans shall run until the CO or NO₂ levels fall below 35ppm CO or 2 ppm NO₂. Once the gas levels fall below these levels, the exhaust fans shall continue to run for 10 minutes before the fans shall be deactivated.
5. The louvers shall stay open until the CO or NO₂ levels fall below 15 ppm CO or 0.8 ppm. Once the gas levels fall below these levels, the louvers shall remain open for 10 minutes before closing.