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 indictor 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:	24 VDC or 24 VAC, AC must not be grounded
Signal Output:	4-20 mA or 2-10 VDC Linear, Digital RS-485

Relay:	Three SPDT Form C, 1A @ 30VDC or
	0.3A @ 125VAC, dry contact
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. Garage Exhaust and Jet Fan Control

1. The Garage Exhaust Fans and Garage Intake Fans in all zones shall run continuously at (Minimum Speed), to provide minimum ventilation of (xx CFM) at all times

2. If any Q5 sensor in a zone indicates a level of 25ppm of CO or 1ppm of NO2, a signal shall be sent from the M-Controller to all garage fans to output 50% of maximum airflow and a signal shall be sent to start the Jet Fans.

3. If any of the Q5 sensors detect 50ppm CO or 3ppm NO2, a signal shall be sent from the M-Controller to all VFDs to output 80% airflow.

4. If at any time the fans are commanded to run at a speed based upon CO/NO2 levels, the fans shall continue to run at that speed for a minimum of five minutes regardless of the CO/NO2 levels

5. If after the fans have run at elevated speed for five minutes the CO/NO2 levels have decreased the fans shall be decelerated to 50% flow as the CO/NO2 levels drop to 20 ppm CO or 0.8ppm NO2

6. The fans shall continue to run for five minutes after the CO/NO2 levels have reached 20ppm (CO) or 0.8ppm (NO2) at which point the jet fans shall be deactivated and the garage fans shall go to minimum speed.