

A. General

1. Manufacturers: Automation Components, Inc., QEL or approved equal
2. The Refrigerant Detection System shall consist of refrigerant detectors, refrigerant detection panel, a horn/strobe mounted inside and outside each entrance to the mechanical room. The panel shall start the fans and shut the chillers down upon alarm levels. A manual start/stop switch shall be mounted inside the room which shall start and stop the fans, and a manual switch mounted outside the mechanical room which shall start but not stop the fans and shall be reset from inside the mechanical room.
3. The detectors shall be installed next to each chiller per manufacturer's recommendations.
4. Enclosure shall be NEMA 4X rated
5. Refrigerant detectors shall use RS-485 to communicate with the refrigerant detection panel.

B. Refrigerant Detectors: QIRF

1. The refrigerant detector shall have a temperature controlled Infrared sensing element, alarm contacts, LCD display and status indicators in a NEMA 4X enclosure. Detectors shall use RS-485 communication to the gas panel. The detectors shall be mounted 6" to 18" Above Floor Level. Detectors shall have 0 – 1000 ppm sensing range, except for R123 which shall be 0 – 100 ppm range. There shall be one detector for each type of refrigerant in the chillers.
2. The detectors shall have programmable alarm points and self-test diagnostics.
3. The detectors shall be field selectable for multiple refrigerants

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

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

Relay: Three SPDT Form C dry contact, 1A @ 30VDC or 0.3A @ 125VAC (Resistive)

Buzzer: 80 dB at 3.94" (10 cm), 2700 Hz (3 Programmable Tones)

Sensing Element: Infrared, Temperature Controlled

Communications: RS-485 to gas control panel

Warranty: 2-Year Warranty

Accuracy:	+/- 3% of Reading
Coverage Area:	7500 Sq. Ft or 49' Radius
Operating Temperature:	-49 to 149 F (-45 to 65 C)

Please consult factory for other gas options and technical specifications

#### C. Refrigerant 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.

#### D. Sequence of Operation for refrigerant detection

##### Settings

1. M-Switch and R-Switch are used as Fan Switches.
  2. The switch located outside the mechanical room is set to be Latched; capable of starting but not stopping ventilation.
  3. The switch located inside the mechanical room is non-latching and capable of starting and stopping ventilation.
  4. The reset switch located inside the mechanical room shall be capable of resetting the switch outside the mechanical room.
  5. Relays on the refrigerant detection panel shall be set to Latching.
1. If any refrigerant detector reaches the first alarm level of 500 ppm (50 ppm for R123), a relay signal shall be sent from the M-Controller to start the fans and to activate the horn/strobe.
  2. If any refrigerant reaches the second alarm level of 750 ppm (75 ppm for R123), the M-Controller shall activate a second relay to alert the BAS.

3. The relay for the first alarm shall be Latched and must be manually reset at the refrigerant detection panel to turn of fans and horn/strobe.
4. The relay for the second alarm shall be Latched and must be manually reset.