

## SECTION 15xxx

### REFRIGERANT LEAK DETECTION SYSTEM

In accordance with ASHRAE 15-2004 and CSA B-52 Mechanical Code

#### 1.0 GENERAL

- 1) Provide a complete installation of a refrigerant leak detection system including a main control panel, sensors, audible/visual alarm devices and emergency break glass switches. This system can be linked to a Controller Unit or to a BAS.
- 2) The system design shall consist of diffusion type sensors and a control unit. Sample draw systems with sample tubing are unacceptable
- 3) The system shall include, but not be limited to, the following:
  1. Future expandability
  2. Display of refrigerant gas concentration
  3. Ability to modify alarm set points
  4. Interlocking with emergency system shut down
  5. Automatic and manual fan start/stop
  6. Display of alarm status
- 4) Provide self contained breathing apparatus (SCBA) as follows:
  1. One (1) unit will be provided and located immediately outside the mechanical room door.
  2. A second backup unit will also be provided

#### 2.0 PRODUCTS

##### 2.01 EXPANSION UNIT VA301EM

- A. The controller shall provide a 4 -20 mA output signal for each sensor corresponding to the measured refrigerant levels of each sensor. In the event of a sensor or controller malfunction, the controller shall energize an on board fault relay and turn on a fault indicator on the front panel.
- B. The controller shall continuously display the specified refrigerant concentration of each sensor via an LCD display. The controller shall have a minimum of three levels of activation for each detected refrigerant level. There shall be 3 relays corresponding to three alarm levels. The alarm A relay shall be energized and the first alarm (Alarm A) shall be initiated when the refrigerant concentration reaches or exceeds the programmed Alarm A level. Alarm A shall start the mechanical room ventilation equipment. The Alarm B relay shall be energized and the second alarm (Alarm B) shall be initiated when the refrigerant concentration levels reach or

exceed the programmed Alarm B level. Alarm B shall energize an onboard red horn strobe unit attached to the controller or a remote red alarm horn strobe. All relays shall be form C, double pole double throw. Dry contacts shall be rated for 5 amps (resistive load) at 240 Vac.

The controller shall provide an audible alarm silence button on the front panel to silence the audible alarm but will automatically reset and sound again at the next alarm occurrence.

**D. The controller shall be wall mount type with the following features.**

- 1). Enclosure Type- The enclosure shall be NEMA 4 type. Access to the inside of the enclosure and wiring connections shall be through a front facing, full length door. The door shall have a window size sufficient to allow viewing of a 2 line by 20 character LCD display.
- 2). Enclosure Size- the enclosure shall be no more than 12 inches in any dimension.
- 3). Mounting Provisions – mounting brackets for the purpose of attaching the unit to a flat surface shall not be needed.
- 4). Front Panel Controls- a four button keypad and fan start stop and alarm silence buttons shall provide access to all monitor functions including display, calibration, set-up and diagnostics.
- 5) Audible Alarm – A 65dBa (at 3 feet) audible alarm shall be internal to the controller; it shall sound when one of the pre-selected alarm conditions occurs.
- 6) No tools or special adapters shall be used for:
  - a.) display of alarm set point level on front panel readout.
  - b) Resetting any alarm set point,
  - c) Zero and Span calibration adjustments
- 7) System Power Requirements – the system shall operate on 24Vac 2A max.

**2.02 BACNET COMMUNICATIONS CAPABILITY**

- 1) Optional BACnet IP communications capability can be provided to connect to the Building Automation System.

## 2.03 DETECTORS VA301 IRFS

**A. Operating Principal:** the principal of operation shall be non-dispersive infrared type by Honeywell Analytics.

- 1) Detector sample: The detector shall be of diffusion type with no internal sample pump or filter
- 2) Detector sensitivity: The detector shall be capable of monitoring over a range of 0-1000 ppm with a resolution of 1 ppm.
- 3) Detector accuracy: The detector shall be capable of maintaining a response of  $\pm 8\%$  @ range of 500 ppm
- 4) Temperature- the system shall operate over a range of 0 to 40 degrees centigrade (32 to 104 degrees F)
- 5) Stability- the 30 day zero and span drift shall be less than 1% F.S. without the aid of automatic or manual recalibration. The system shall not employ any type of auto-zero techniques in order to maintain stability. The use of fresh air sources or scrubbers as zero reference is not permitted.
- 6) Calibration – The system must provide a menu driven method of checking both zero and span calibrations. Any adjustments must be made through the front panel keyboard.
- 7) Maximum distance between the sensor and controller shall not exceed 200 ft 60 m)
- 8) Maximum System Maintenance Requirements – The detectors shall require no periodic maintenance other than yearly zero and span checking with calibrated zero and span gas. Periodic checking or adjustments of the unit shall be capable of being accomplished by one person at the unit location

**Detector alarm levels are to be activated and the unit is to be installed in accordance with the following parameters:**

| <b>TOXIC GASES</b>   | <b>1st ALARM SET POINT (TLV-TWA)</b> | <b>2nd ALARM SET POINT (TLV-STEL)</b> | <b>3<sup>rd</sup> ALARM SET POINT</b> | <b>MOUNTING HEIGHT</b>             | <b>COVERAGE</b> |
|----------------------|--------------------------------------|---------------------------------------|---------------------------------------|------------------------------------|-----------------|
| Carbon Monoxide (CO) | 25 ppm                               | 200 ppm                               | 225 ppm                               | 5 ft (150 cm) above finished floor | 50 ft (15 m)    |
| Refrigerants         | 250 PPM                              | 500 PPM                               | 900 PPM                               | 1 ft (30 cm) above finished floor  | 1 per Chiller   |

**Local Building Codes recommendations have preference over these parameters. Coverage can differ depending on application**

## **2.04 ACCESSORIES**

### **A. Strobe and Horn (VA 301EM-IRFSA) or STASR**

Strobe and horn may be integral to the controller (VA301EM-RFSA) or remote mounted (STAS)

The remote mounted unit shall be rated at 85dba at 10 feet

The integral horn strobe unit shall be rated at 90dba at 3 feet.

### **B. Emergency break glass switches shall be provided**

Break glass manual switches shall be equivalent to Honeywell Analytics, type EMBG

### **C. Self Contained Breathing Apparatus**

SCBA must be equivalent to Honeywell Analytics NIOSHSCBA with the ability to be wall mounted using Honeywell Analytics wall mount case SCBAWALLCASE

## **3.00 EXECUTION**

### **3.01 INSTALLATION**

The Refrigerant Leak Detection system shall be installed complete and in accordance with the manufacturer's installation instructions.

### **3.02 COMMISSIONING**

The Refrigerant Leak Detection system shall be inspected and commissioned on site by a factory trained and authorized Honeywell Analytics technician. A factory generated certification document shall be presented certifying the operation of the unit and the alarm system.

### **3.03 WARRANTY.**

The system shall be warranted by the manufacturer to be free from defects in workmanship and materials for a period of one year.

**END OF SECTION**