A building’s mechanical room is the hub of its heating, ventilation and air conditioning (HVAC) system. This can include, but is not limited to, central utility plants, boiler and chiller rooms, mechanical and electrical rooms, fuel rooms, as well as metering and communications closets. The chillers, boilers and combustion equipment within these rooms have the potential to leak harmful combustible or toxic gases, including costly refrigerant gases such as R11, R22 and R123. Today’s building codes provide very specific gas detection system installation requirements to safeguard against refrigerant leaks.

Vulcain delivers simple, complete gas monitoring solutions that meet ASHRAE, CSA B52 and International Building Codes. Out-of-the box installation and straightforward operation, coupled with a network of local agents and service support centers, have made Vulcain’s refrigerant gas detection technology an industry leader. Code compliant protection has never been so easy.

**VA301EM**
Mechanical Room Controller
- Network or stand-alone with up to four remote sensors (for refrigerants, combustibles or toxic gases)
- Robust and reliable RS-485 Modbus communication
- Four fully programmable relays
- Three 24 Vdc alarm outputs
- Up to four 4-20mA outputs
- Auto-diagnostic capabilities
- Optional horn and strobe

**VA301IRFS**
Infrared Refrigerant Gas Sensor
- Features Vulcain’s infrared sensing technology; winner of the 2004 AHR Innovation Award
- Stand-alone or network operation
- Three levels of alarm
- Visual indicators
- Easy calibration
- Install up to 200 ft. from transmitter
- Compensates for changes in humidity

**VA301EMRP**
Expansion Module Remote Panel
- Visual indication of the gas concentration outside or inside the mechanical room.
- Offers four relay outputs
<table>
<thead>
<tr>
<th>CSA B-52-05 Code</th>
<th>Vulcain Compliance</th>
</tr>
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<tbody>
<tr>
<td>5.2.5.2.3</td>
<td>Readily accessible independent fan switches shall be installed inside and outside the equipment room. Fan switches located outside the machinery room shall be capable of starting but not stopping the ventilation.</td>
</tr>
<tr>
<td></td>
<td>The VA301EM (3), located inside the mechanical room has a FAN START and FAN STOP switch.</td>
</tr>
<tr>
<td></td>
<td>The VA301EMRP (1), located outside the mechanical room has a FAN START, but you cannot stop the ventilation fan from it.</td>
</tr>
</tbody>
</table>

| 5.2.3 Refrigerant Vapor Detector | If TLV-TWA levels are reached, the VA301IRFS (2) refrigerant sensor actuates the VA301EM (3) which then triggers its optional built-in horn (105dB) and strobe (RFSA option). |
|                                 | If TLV-TWA levels are reached, the VA301IRFS (2) refrigerant sensor actuates the VA301EM (3) which then triggers its optional built-in horn (105dB) and strobe (RFSA option). |

8.11.2.1 Each refrigerating machinery room shall contain a detector, located in an area where refrigerant from a leak will concentrate, that actuates an alarm and mechanical ventilation in accordance with 8.11.4 at a value not greater than the corresponding TLV-TWA* (or a consistent toxicity measure). The sensor when activated, shall (a) sound an audible alarm. |

ASHRAE-15 2004

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*TLV-TWA - Threshold Limit Value - Time Weighted Average
The average concentration under which most people can work consistently for eight hours, day in, day out, with no harmful effects.
**International Mechanical Code 2003**

[F] 1106.5.1 Refrigeration system. A clearly identified switch of the break-glass type shall provide off-only control of all electrically energized equipment and appliances in the machinery room, other than refrigerant leak detectors and machinery room ventilation.

[F] 1106.5.2 Ventilation system. A clearly identified switch of the break-glass type shall provide on-only control of the machinery room ventilation fans.

**Vulcain Compliance**

The VA301EM (3) or the VA301EMRP (1) (with break-glass switch option) can have up to two emergency break-glass switches connected to them.

**Vulcain Highly Recommends**

While not yet a building code requirement, detection for combustible gases in boiler rooms can protect against potential explosions and fires. The S301D2 (4) detects combustible gas and vapor (0-100% LEL) and is easily added to an existing refrigerant detection system.

**Diagram:**

1. VA301EMRP Relay Panel with strobe
2. VA301IRFS Infrared Refrigerant Sensor
3. VA301EM MER Controller with horn and strobe
4. S301D2 Combustible Gas Sensor
5. EMBG Break-Glass Switch
VA301EM
Mechanical Room Controller

**Power Requirement:**
22-27 Vac, 29-38 Vdc, 1.5A max.

**Distance Between MER Controller and Sensor:**
VA301IRFS: up to 200 ft. / 60.9 m
S301D2: up to 500 ft. / 154.2 m

**Relay Output Rating:**
5 A, 30 Vdc or 250 Vac (resistive load)

**Visual Indicators:**
- Normal Operation: Green LED
- Alarm Level 1: Red LED
- Alarm Level 2: Red LED
- Alarm Level 3: Red LED
- Signal Tx: Blinking amber LED
- Failure Indication: Yellow LED

**Alarm Levels:**
3 with high and low setpoints

**Outputs:**
- 4 DPDT relays (alarms and/or fault), 65dBA buzzer
- RS-485 Modbus
- 3 24 Vdc, 250mA (per output)
- 4 4-20mA outputs
- RFS option: 24 Vdc red strobe
- RFSA option: 24 Vdc red strobe + 105 dBA horn

**Display/ User Interface:**
Alphanumeric display and keypad

**Operating Temperature Range:**
Refrigerant: 32 to 100 °F (0 to 40 °C)
Toxic: -40 to 100 °F (-40 to 40 °C)
Combustible: -40 to 122 °F (-40 to 50 °C)

**Operating Humidity Range:**
0-95% RH, non-condensing

**Ratings and Certification:**
Certified to: C22.2 No 205
Conforms to: Standard 1244

**General Specifications**
- Size: 11.02 x 4.02 x 2.48 in. / 28 x 10.2 x 6.3 cm
- Weight: 1.33 lb. / 603 g

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VA301IRFS
Infrared Refrigerant Gas Sensor

**Power Requirement:**
17-27 Vac, 24-38 Vdc, 24 Vdc @ 600 mA

**Gases Detected:**
R-11, R-12, R-22, R-123, R-125 and R-134a
(other mixes also available)

**Sensing Technology:**
Vulcan's award-winning IR technology
Measurement Range: 0-1000 ppm
Resolution: 1 ppm
Response Time: 60 sec.
Cold to Start: 15 minutes

**Relay Output Rating:**
5A, 30 Vdc or 250 Vac (resistive load)

**Optional Audible Alarm:**
65 dBA at 3 ft. / 1 m

**Operating Temperature Range:**
32 to 100 °F / 0 to 40°C

**Operating Humidity Range:**
0-95% RH, non-condensing

**Ratings and Certification:**
Certified to: C22.2 No 205
Conforms to: Standard 1244

**General Specifications**
- Sensor:
  - Size: 11.02 x 4.02 x 2.48 in. / 28 x 10.2 x 6.3 cm
  - Weight: 1.33 lb. / 603 g
- Display: Backlit LCD
- Circuit Protection: Long Time-Lag Polyswitch Type TT
- Overvoltage Category: II
- Operating Temperature Range:
  - 32 to 100°F (0 to 40°C)
- Operating Humidity Range:
  - 0-95% RH, non-condensing
- Operating Altitude:
  - Up to 9843 ft. / 3000 m
- Pollution Degree:
  - 2
- Ratings and Certification:
  - Certified to: C22.2 No 205
  - Conforms to: Standard 1244
- General Specifications:
  - Size: 7.99 x 11.02 x 2.76 in. / 20.3 x 28 x 7 cm
  - Weight: 2.26 lb. / 1.02 kg
  - Enclosure: Polycarbonate - ABS

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VA301EMRP
Expansion Module Remote Panel

**Power Requirement:**
22-27 Vac, 50 or 60 Hz, 29-38 Vdc, 2.0 A max. at 24 Vdc

**Max. distance from VA301EM to last VA301EMRP:**
1000 ft. / 304.8 m

**Relay Output Rating:**
5A, 30 Vdc or 250 Vac (resistive load)

**Visual Indicators:**
- Normal Operation: Green LED
- Alarm A, B and C: Red LED
- Fault/service alarm: Yellow LED
- Transmission (Tx): Orange LED
- (activated in network mode)

**Audible Alarm:**
65 dBA at 3 ft. / 1 m

**Standard Outputs:**
- 4 DPDT relays
- 3 Outputs at 24 Vdc @ 250 mA each

**Optional Horn:**
- 105 dBA, 4-28 V, 2800 Hz (RFSA)
- Min. Voltage 80 dBA min. at 2 ft. and 6 Vdc
- Max Voltage 90 dBA min. at 2 ft. and 28 Vdc

**Optional Strobe:**
- STAS flashing LED, 24 Vac/Vdc
- Display: Backlit LCD

**Circuit Protection:**
Long Time-Lag Polyswitch Type TT

**Overvoltage Category:** II

**Operating Temperature Range:**
32 to 100°F (0 to 40°C)

**Operating Humidity Range:**
0-95% RH, non-condensing

**Operating Altitude:**
Up to 9843 ft. / 3000 m

**Pollution Degree:**
2

**Ratings and Certification:**
Certified to: C22.2 No 205
Conforms to: Standard 1244

**General Specifications**
- Size: 7.99 x 11.02 x 2.76 in. / 20.3 x 28 x 7 cm
- Weight: 2.26 lb. / 1.02 kg
- Enclosure: Polycarbonate - ABS