

Mechanical Rooms

Potential Gases: Refrigerants and Combustibles

Vulcain System: VA301EM, VA301IRFS, VA301EMRP



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

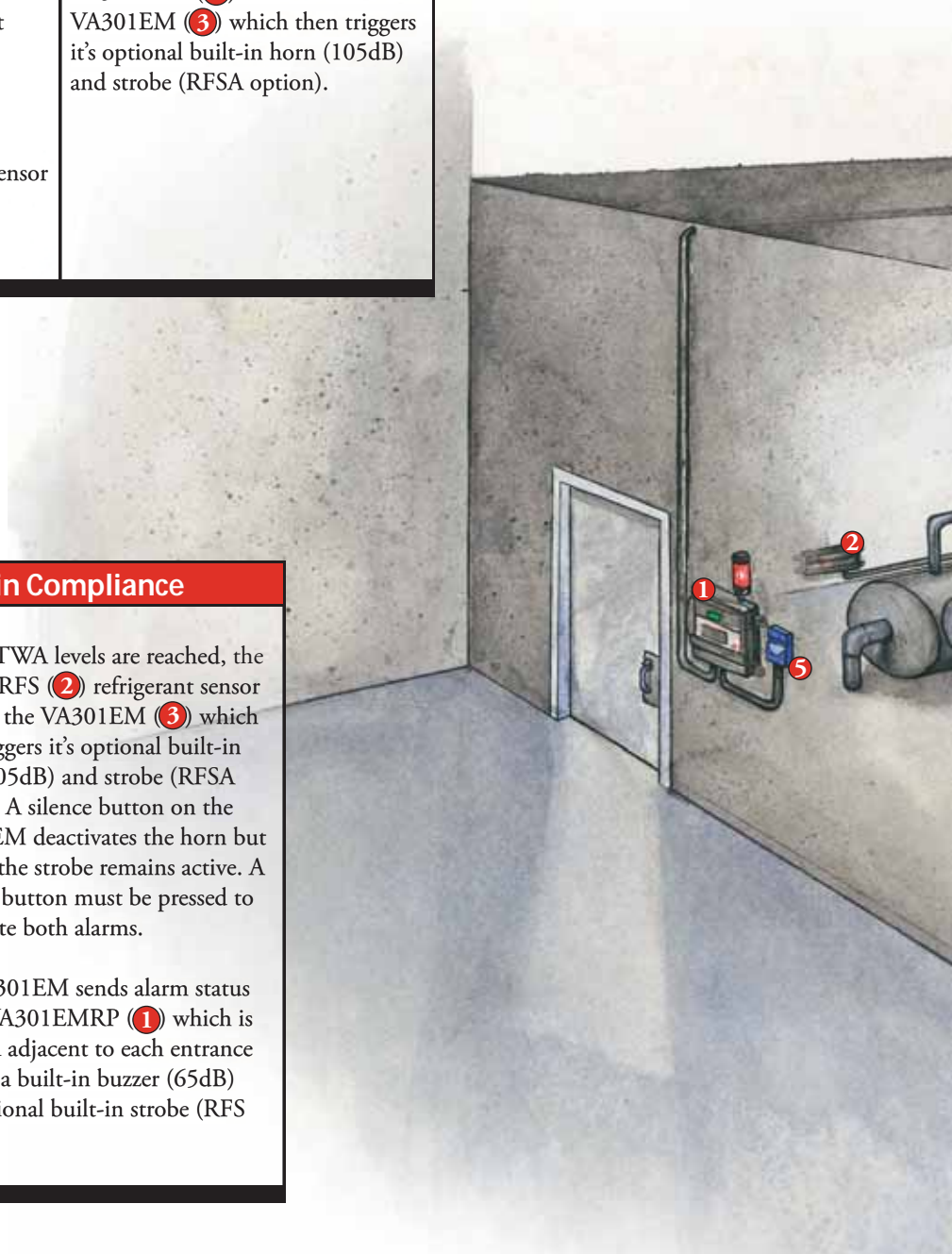
- Visual indication of the gas concentration outside or inside the mechanical room.
- Offers four relay outputs

| CSA B-52-05 Code | Vulcain Compliance |
|---|--|
| 5.2.5.2.3 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. | <p>The VA301EM (3), located inside the mechanical room has a FAN START and FAN STOP switch.</p> <p>The VA301EMRP (1), located outside the mechanical room has a FAN START, but you <i>cannot</i> stop the ventilation fan from it.</p> |
| 5.2.3 Refrigerant Vapor Detector For all refrigerants except ammonia, a refrigerant vapor detector shall be located in an area where refrigerant from a leak is most likely to concentrate, and shall be actuated 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. | <p>If TLV-TWA levels are reached, the VA301IRFS (2) sensor actuates the VA301EM (3) which then triggers it's optional built-in horn (105dB) and strobe (RFSa option).</p> |

| ASHRAE-15 2004 | Vulcain Compliance |
|--|---|
| 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 toxicity measure consistent therewith). The alarm shall annunciate visual and audible alarms inside the refrigerating machinery room and outside each entrance to the refrigerating machinery room. The alarms required in this section shall be of the manual reset type with the reset located inside the refrigerating machinery room. | <p>If TLV-TWA levels are reached, the VA301IRFS (2) refrigerant sensor actuates the VA301EM (3) which then triggers it's optional built-in horn (105dB) and strobe (RFSa option). A silence button on the VA301EM deactivates the horn but ensures the strobe remains active. A RESET button must be pressed to deactivate both alarms.</p> <p>The VA301EM sends alarm status to the VA301EMRP (1) which is installed adjacent to each entrance and has a built-in buzzer (65dB) and optional built-in strobe (RFS option).</p> |

*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.

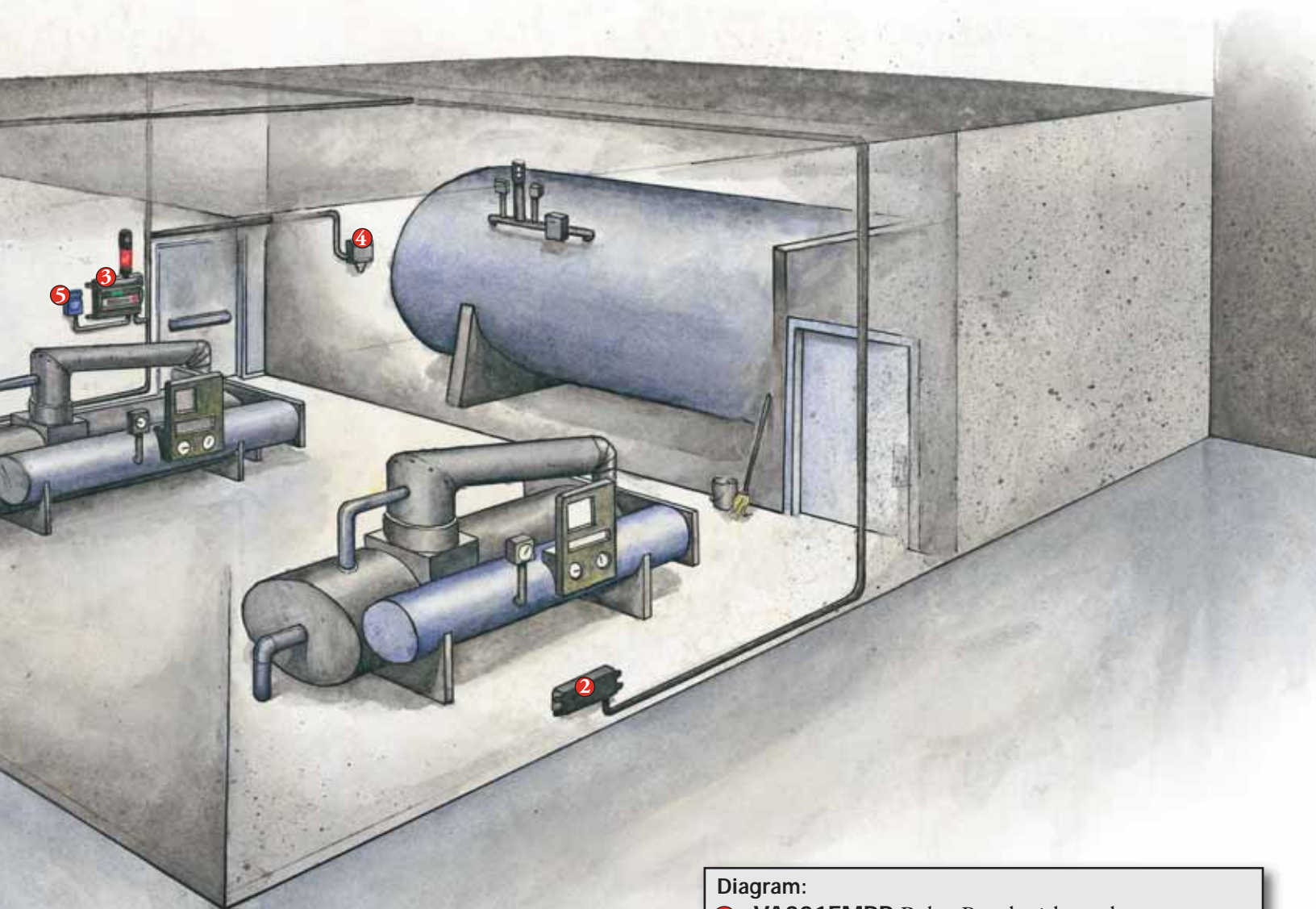


Diagram:

- 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 Certifications:

Certified to:  C22.2 No 205
Conforms to:  Standard 1244

General Specifications

Size: 11.02 x 7.99 x 2.73 in. /
28 x 20.3 x 7 cm

Weight: 2.6 lb. / 1.2 kg

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:

Vulcain'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 Certifications:

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

Enclosure: Polycarbonate - ABS

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 Certifications:**

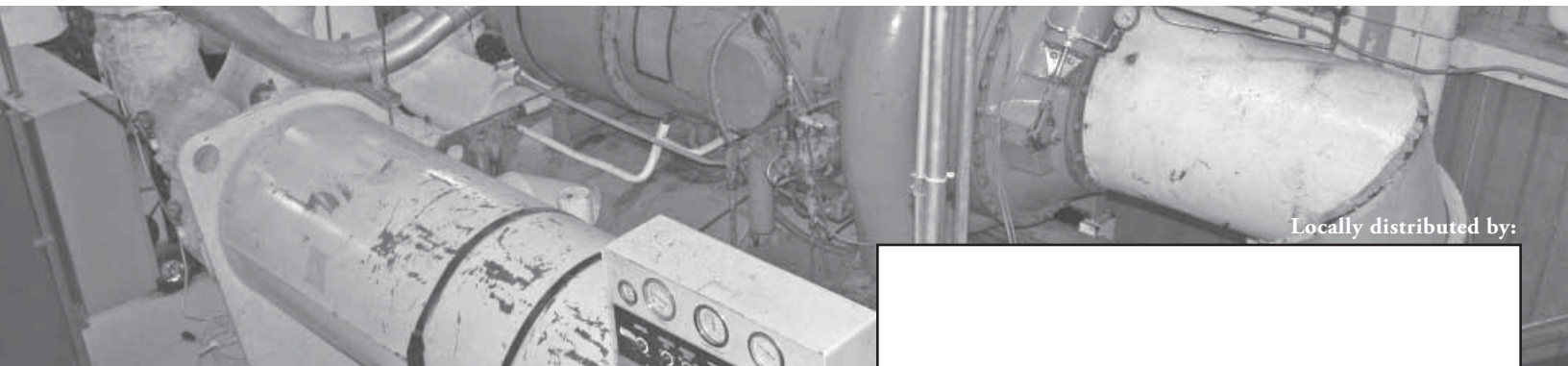
Certified to:  C22.2 No 205
Conforms to:  Standard 1244

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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