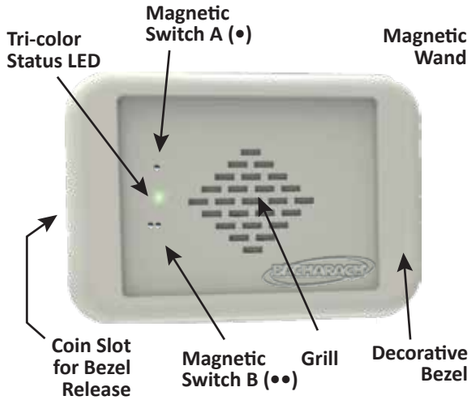
MVR-300™ REFRIGERANT GAS DETECTOR

INSTALLATION GUIDE

P/N: 6203-9001
Revision 3
January 2021

For more detailed information, scan here or visit **www.mybacharach.com** to access the MVR-300 User Manual (P/N 6203-9000).



1: OVERVIEW

The Bacharach MVR-300 detects refrigerant leaks in occupied spaces.

The detector is for indoor applications. It is housed in an ABS enclosure that fits into 3-gang PVC electrical back boxes (not included).

CAUTION: Please confirm the PVC electrical box selected has adequate clearance for the MVR-300 and it's associated wiring. Dimensions available in "4: SPECIFICATIONS". DO NOT INSTALL the MVR-300 in electrical junction boxes.

Gas alarms and status messages are indicated visually by a 3-colored LED and audibly by a buzzer. In case of an alarm and/or fault, relays switch (for example, shut-off valves or alarm devices).

The detector can be calibrated and maintained non-intrusively using a magnetic wand. (included).

2: MOUNTING CONSIDERATIONS

ENVIRONMENTAL CONSIDERATIONS: Carefully consider the full range of environmental conditions to which the instruments will be exposed.

TARGET GAS CONSIDERATIONS: The physical data of the gas or vapor to be detected must be observed.

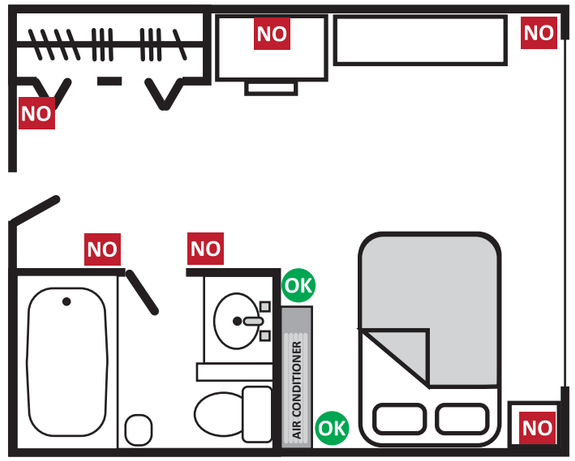
APPLICATION CONSIDERATIONS: The specifics of the application (for example, possible leaks, air movement/draft, etc.) must be observed.

ACCESSIBILITY CONSIDERATIONS: The degree of accessibility required for maintenance purposes must be granted.

ELECTRONIC CONSIDERATIONS: The system contains sensitive electronic components that can be easily damaged. Do not touch nor disturb any of these components.

Mount the MVR-300 according to the above considerations, product dimensions, and maximum wiring lengths.

MVR-300 Proper vs. Improper Placement Locations



3: SAFETY INSTRUCTIONS

CODE COMPLIANCE: Comply with all local and national laws, rules and regulations associated with this equipment.

TECHNICIAN USE ONLY: This unit must be installed by a suitably qualified technician who will install this unit in accordance with these instructions and the standards in his particular industry/country. Operators of the unit should be aware of the regulations and standards in their industry/country for the operation of this unit. These notes are only intended as a guide and the manufacturer bears no responsibility for the installation or operation of this unit.

Failure to install and operate the unit in accordance with these instructions and with industry guidelines may cause serious injury including death and the manufacturer will not be held responsible in this regard.

SAFE MOUNTING: This detector must be connected by a marked, suitably located and easily reached switch or circuit-breaker as means of disconnection.

CAUTION: DO NOT MOUNT the MVR-300 in an area that may contain flammable liquids or vapors. Operation of electrical equipment in such an area constitutes a safety hazard.

CAUTION: The use of MVR-300 in ceiling voids in a hotel room would not strictly comply with EN378.

IMPORTANT: Mount in-room sensors at less than the normal heights of the occupants. E.g., in a hotel room this is less than bed height (between 100 and 150 mm [4 and 6 inches] off the floor). Avoid drafts and heat sources (like radiators), and avoid sources of steam.

4: SPECIFICATIONS

Size (HxWxD):	167 × 119 × 50 mm including bezel (6.58 × 4.68 × 1.96") Depth of bezel: 10 mm (0.39")
Weight:	230 grams (8 ounces)
Indicators:	Multi-color status LED Internal alarm buzzer; 85 dB @ 30 cm (12")
Alarm Delay:	Selectable (0, 5, 10, 15 minutes)
Inputs:	Magnetic switches (2) Power terminal block Configuration DIP switch block Gas sensor (refrigerant)
Outputs:	Relay outputs (2) 2 SPDT, 1 A at 30 VDC, 1 A at 125 and 240 VAC, resistive load
Modbus:	Connection: RS-485 terminal block Baud rate: 9600 or 19200 (selectable) Default baud: 9600 Start bits: 1 Data bits: 8 Parity: None (default), odd, even (selectable) Stop bits: 1 (default) or 2 (selectable) Retry time: 500 ms (min) between retries End of msg: Silent 3.5 characters
Power:	100 to 230 VAC, 50/60 Hz, 4 W
Wiring Power:	3-core cable, 14 to 20 AWG (0.5 to 2.0 mm^2)
Wiring Relays:	3-core cable, 18 to 20 AWG (0.5 to 1.0 mm^2)
Wiring Modbus:	2-core twisted pair shielded cable 18 to 24 AWG (0.2 to 1 mm^2) with 120 Ω characteristic impedance
Enclosure:	Material: ABS; Protection: IP41, NEMA 1
Temperature:	Operation: 32 to 120˚F (0 to 50˚C) Storage: - 5 to 100˚F (- 20 to 40˚C)
Humidity:	5 to 90 %RH, non-condensing
Pressure:	23.6 to 32.5 in. of Hg (800 to 1100 hPa)
Elevation:	0 to 6,560 ft. (2000 m) altitude
Gas Detection:	R-22, R-32, R-134a, R-404a, R-407c, R-410a
Detect Range:	0 to 2,500, 5,000, 10,000 ppm
Sensor Life:	5 to 8 years (typical)

5: CONFIGURATION

1 Restart
- On = Restart MVR-300
- Off = Normal Operation (Default)

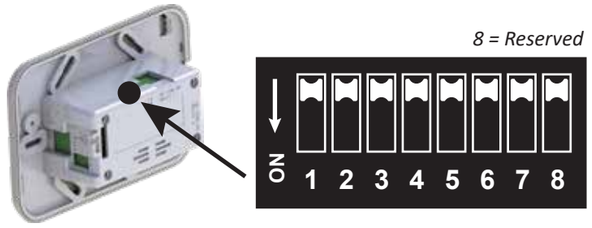
2,3 Alarm ON Delay
- Off, Off = No delay (Default)
- Off, On = 5 minute delay
- On, Off = 10 minute delay
- On, On = 15 minute delay

4 Failsafe Relay Selection
- On = Failsafe Relay Operation
- Off = Normal Relay Operation (Default)

5 Relay 2 Fault Indication
- On = High Alarm Only
- Off = High Alarm or Fault (Default)

6 Alarm Latching
- On = Alarms latch and require manual reset
- Off = Alarms automatically reset (Default)

7 Buzzer Disable
- On = Buzzer disabled
- Off = Buzzer enabled (Default)



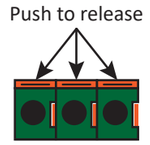
6: INSTALLATION

NOTE: Before installing the MVR-300, refer to the calibration gas concentration label and record the value for use in step 15 of the calibration procedure.

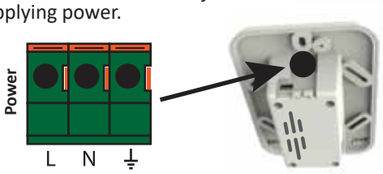
NOTE: The MVR-300 is designed for use in 2-gang and 3-gang wall boxes with a minimum depth of 50 mm (2").

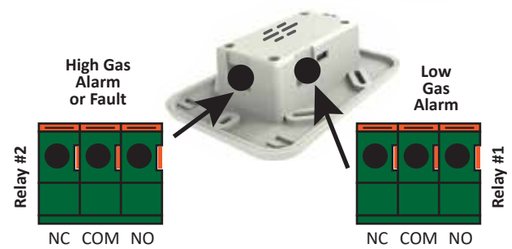
NOTE: The manufacturer of this product requires that a bump test or calibration be performed following installation to verify instrument functionality.

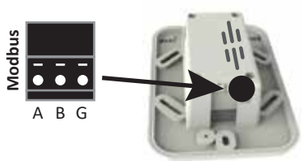
When inserting the wire into the terminal, release the spring clamp by pushing back the release latch.



CAUTION: Ensure all wiring connections are made *before* applying power.



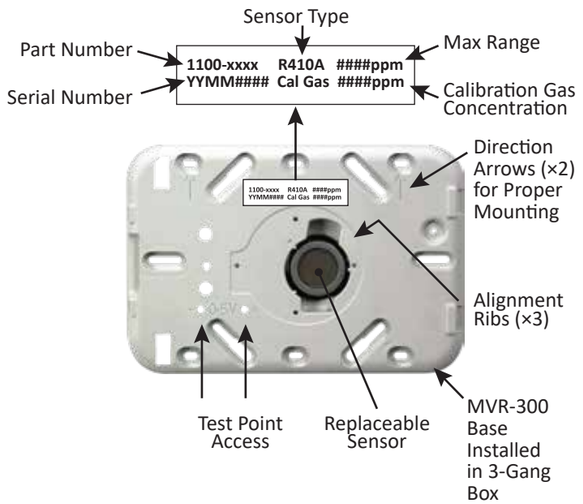




6: INSTALLATION (CONTINUED)

SHIELD WIRE WARNING: Connect the shield of Modbus wires to the earth ground of the central control system (e.g., chassis, ground bus bar, etc.).

Remove bezel by inserting a coin into the side slot. Remove the cover plate by loosening the captive set screw.



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7: OPERATION OVERVIEW

LED Operation

Normal/Alarm/Fault/Special States

G	Normal mode, no alarm
0.5 G	Warmup mode (≈ 6 minutes)
0.5 R	Low gas alarm
2.0 R	High gas alarm
0.5 G/O/R	Offline (not in calibration mode)
O	Fault
2.0 O	Negative gas fault (perform zero adjust)
0.5 G/O	Under range (perform zero adjust)
2.0 R/O	Over range (remove gas)

Zero Cal Mode

G G R	Waiting to start calibration mode
0.5 G 0.5 R 0.5 R 0.5 R	During calibration
2.0 O	Zero calibration error

Span Cal Mode

G G O	Waiting to start calibration mode
0.5 G 0.5 O 0.5 O 0.5 O	During calibration
2.0 O	Span calibration error
0.5 G/O/R	Recovery from span calibration

LED Color: G Green, O Orange, R Red

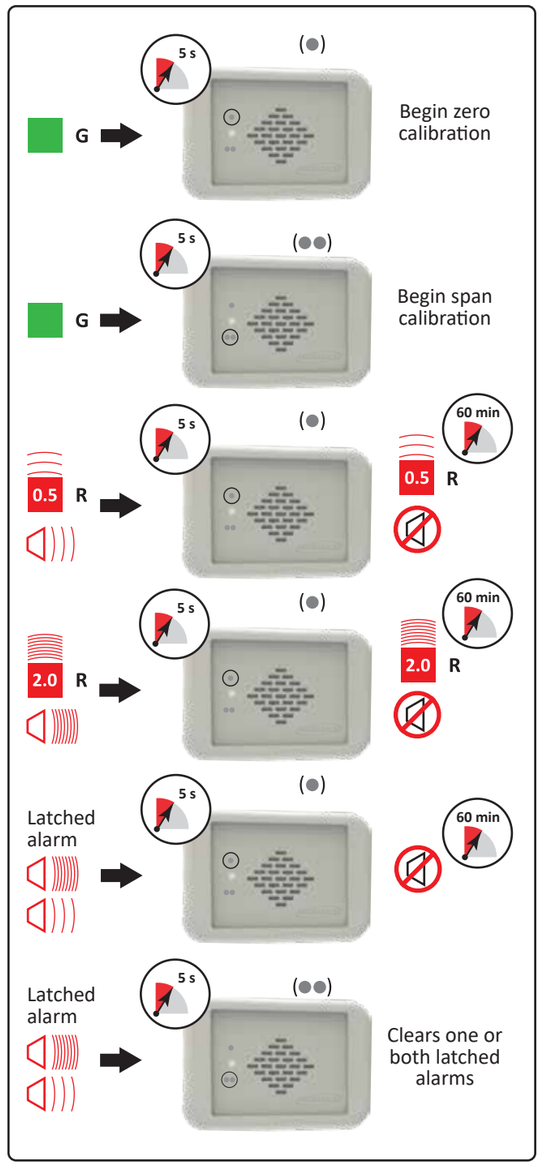
0.5 = 0.5 Hz, 0.5 cycles/second, SLOW flash/chirp

2.0 = 2.0 Hz, 2 cycles/second, FAST flash/chirp

Buzzer Operation

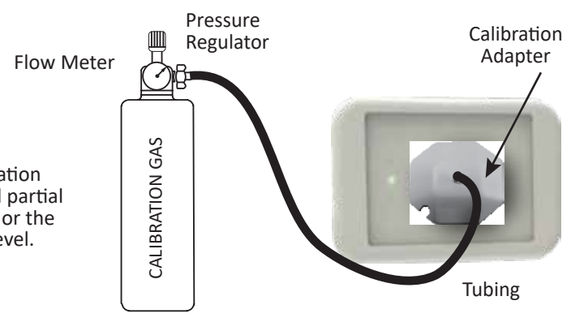
No alarm	0.5 Low gas alarm
Muted alarm	2.0 High gas alarm
Fault (continuous)	

Magnetic Switch Functions



8: GENERAL CALIBRATION PROCEDURE

1. The detector must not be in alarm or fault condition.
2. Calibration gas must be in balance of air, not Nitrogen (N_2).
3. Attach the pressure regulator to the calibration gas cylinder.
4. Fit calibration adapter to the cover plate.
5. The gas flow should be approximately 0.3 to 1.0 L/min.
6. If operation is intended to be at higher altitudes, the factory calibration will result in a reading lower than the reading at sea level (reduced partial pressure). A new span adjustment is recommended if the altitude or the ambient pressure is changed. The factory calibration is set to sea level.
7. Connect the tubing to the barbed fitting.



8A. ZERO ADJUSTMENT

WARNING: Ambient air can be used to zero the sensor instead of synthetic air only if the area is known to be free of the target gas or any gas to which the sensor may be cross-sensitive. In this case, no cylinder or calibration adapter is needed for the zero adjustment.

8. Tap and hold (•) for >5 seconds. The LED will blink green-green-red when the detector is ready.
9. Apply synthetic air (or use ambient air per warning above).
10. Tap (•) within 30 seconds to confirm start of calibration. Otherwise the detector will time-out and return to normal operation.
11. As the process progresses, the LED will blink green-red, green-red-red, green-red-red-red, etc.
    - To abort calibration, tap and hold (•) for >5 seconds, turn off gas flow and remove the calibration adapter. The detector will return to normal operation.
    - If calibration is successful (green LED), skip to step 12.
    - If calibration is unsuccessful (orange LED blinks @ 2 Hz), then tap (•) to discard the calibration attempt, and see User Manual (P/N 6203-9000) for troubleshooting.
12. Turn off gas flow from synthetic air.
13. Replace synthetic air tank with calibration gas tank in preparation for span adjustment.

8B. SPAN ADJUSTMENT

14. Tap and hold (••) for >5 seconds. The LED will blink green-green-orange when the detector is ready.
15. Apply span gas in the concentration listed on the cal gas concentration label (beneath the detector's cover plate). This may require the temporary removal of the bezel and cover plate to see the label.
16. Tap (••) within 30 seconds to confirm initiation of the calibration. Otherwise the detector will time-out and return to normal operation.
17. As the calibration process progresses, the LED will blink green-orange, green-orange-orange, green-orange-orange-orange, etc.
    - To abort calibration, tap and hold (••) for >5 seconds, turn off gas flow and remove the calibration adapter. The detector will return to normal operation.
    - If calibration is successful, the LED will blink green-orange-red indicating 'offline'). Turn off gas flow and remove the calibration adapter. After 6 minutes the detector will return to normal operation.
    - If calibration is unsuccessful (orange LED blinks @ 2 Hz), then tap (••) to discard the calibration attempt, and see User Manual (P/N 6203-9000) for troubleshooting. Turn off gas flow and remove the calibration adapter. After 6 minutes the detector will return to normal operation.

9. BUMP TEST

1. Inform building personnel of test so that certain alarms may be inhibited (e.g., shutdown valves, notification of authorities, etc.).
2. Connect adapter and target gas according to instructions in General Calibration Procedure.
3. Apply a sufficiently high concentration of target gas to trigger alarms, but not pure refrigerant or hydrocarbons (e.g., do not use a butane lighter).
4. Once the alarm thresholds are exceeded, all designated gas alarm relays will be activated and the digital outputs will transmit the corresponding gas concentrations.
5. Turn off gas flow and remove calibration adapter.