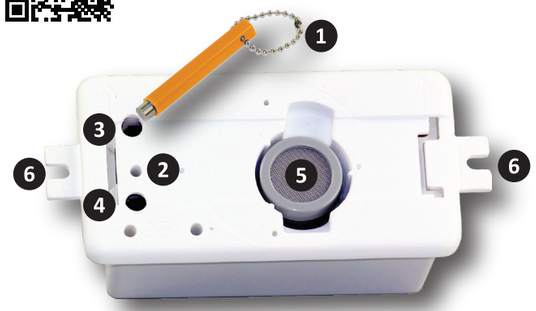
MVR-300™ UK REFRIGERANT GAS DETECTOR

INSTALLATION GUIDE

P/N: 6203-9002 Revision 2 August 2018

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

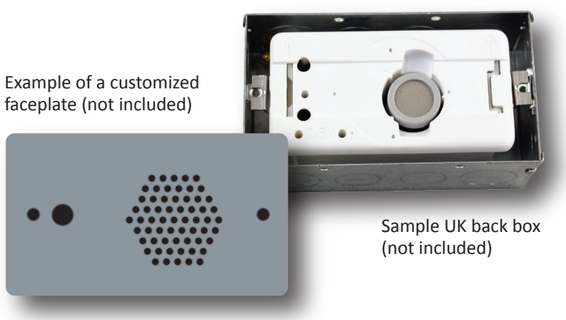


1. Magnetic Wand
2. 3-color status LED
3. Magnetic switch 1 (•)
4. Magnetic switch 2 (••)
5. Sensor Module
6. Plastic Mounting Tabs

1: OVERVIEW

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

The detector is for indoor applications. It is housed in an ABS enclosure that fits into most 2-gang UK electrical back boxes (not included). Thinner *metal* mounting tabs are provided for flush mounting in UK back boxes with higher mounting tabs.



Example of a customized faceplate (not included)

Sample UK back box (not included)

NOTE: The MVR-300 UK is designed for use in 2-gang and 3-gang UK back boxes with a minimum depth of 47 mm (1.9”).

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 refrigerant detector can be calibrated and maintained non-intrusively using a magnetic wand.

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.

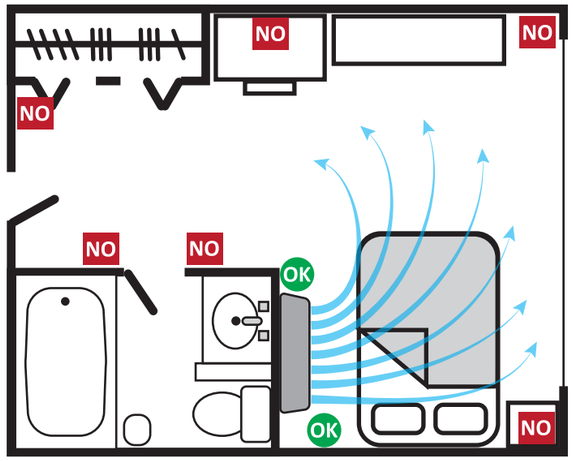
APPLICATION CONSIDERATIONS: The specifics of the application (for example, possible leaks, air movement/draft, etc.) must be observed.

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 or 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: INSTALLATION SPECIFICATIONS

Outputs:	Relay outputs (2) 2 SPDT, 1 A at 30 VDC, 1 A at 125 and 250 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 240 VAC, 50/60 Hz, 4 W
Wiring Power:	3-core cable, 14 to 20 AWG (0.5 to 2.0 mm²)
Wiring Relays:	3-core cable, 18 to 20 AWG (0.5 to 1.0 mm²)
Wiring Modbus:	2-core twisted, shielded pair 18 to 24 AWG (0.2 to 1 mm²) with 120 Ω characteristic impedance; Use Belden 8761 or similar; Maximum diameter of cable + heat shrink must be ≤5 mm (0.2 in)

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4: SAFETY INSTRUCTIONS

CODE COMPLIANCE: Comply with all local and national laws, rules, wiring codes, 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.

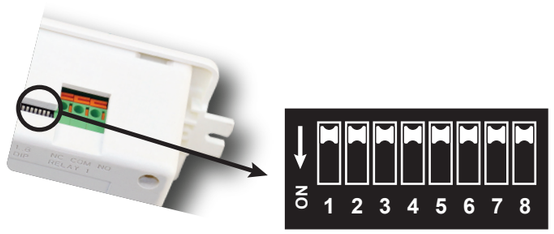
SAFE MOUNTING: This detector must be connected by a marked, suitably located and easily reached switch or circuit-breaker as means of disconnection.

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: Mounting in ceiling voids in a hotel room would not strictly comply with EN378.

CAUTION: RS-485 signal cable must be insulated to the highest voltage level in the system. Protect the RS-485 signal cable by using the supplied installation kit.

5: CONFIGURATION



1 Restart
- Off Normal operation (Default)
- On Restart MVR-300

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
- Off Normal relay operation (Default)
- On Failsafe relay operation

5 Relay 2 Fault Indication
- Off High alarm or fault (Default)
- On High alarm only

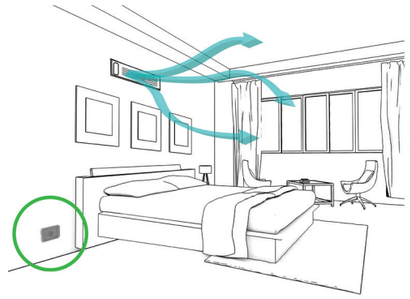
6 Alarm Latching
- Off Alarms automatically reset (Default)
- On Alarms latch and require manual reset

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

8 Enable Reset to Factory Defaults
- Off Normal operation (Default)
- On Reset enabled (see manual for details)

Website: www.mybacharach.com • E-mail: help@mybacharach.com

IMPORTANT: Mount at a 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.

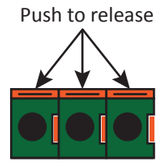


6: INSTALLATION

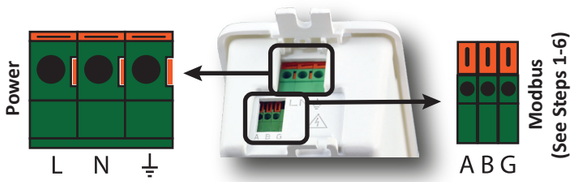
NOTE: Before installing the MVR-300, refer to the calibration gas concentration label and record the value for use in step 16 of the calibration procedure.

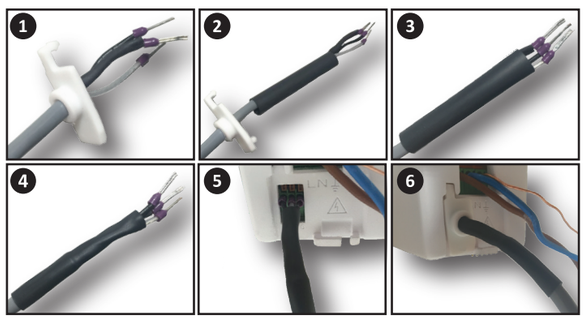
NOTE: The manufacturer of this product requires that a bump test or calibration be performed following installation to verify instrument functionality.

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.





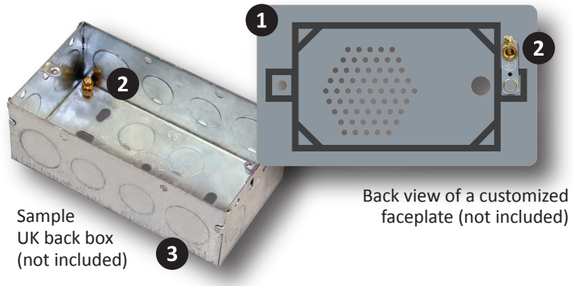
1. Prepare signal cable and put boot over the signal cable.
2. Add appropriately sized ferules (not included) if required.
3. Apply 10 cm piece of shrink wrap as close to the wire ends/ferules as possible while leaving some free wire to allow connection to the detector.
4. Heat the shrink wrap.
5. Connect signal wires/ferules to the detector.
6. Slide rubber boot along the wire and shrink wrap assembly and connect it to the detector.

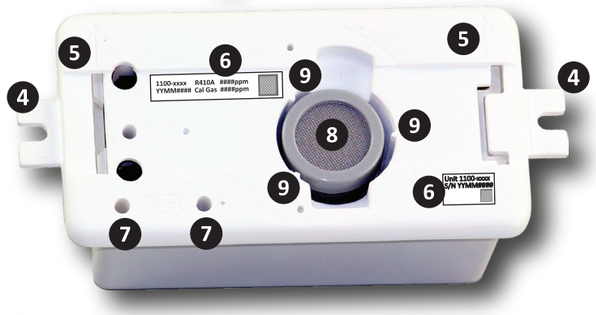
6: INSTALLATION (CONTINUED)

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.).

COVER GROUNDING: For proper cover grounding, wire the ground lug of the faceplate to the ground lug of the earth grounded back box.

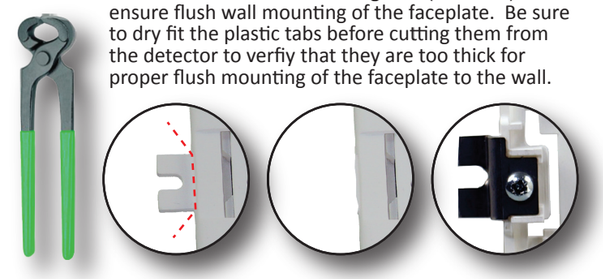
NOTE: For specifications and recommended drill patterns for customizing a metal UK faceplate, visit the MVR-300 product page at www.MyBacharach.com.





1. Example of custom faceplate
2. Grounding lugs
3. Example of UK back box
4. Mounting tabs
5. Direction arrows (×2) for proper mounting
6. Sensor type/calibration and ID/serial number labels
7. Test point access holes (×2)
8. Replaceable sensor module
9. Sensor alignment ribs (×3)

NOTE: For UK back boxes with "higher" mounting tabs, remove the thick plastic mounting tabs from the detector (using wire snips or nippers) and screw on the thinner metal mounting tabs (included) to ensure flush wall mounting of the faceplate. Be sure to dry fit the plastic tabs before cutting them from the detector to verfiy that they are too thick for proper flush mounting of the faceplate to the wall.



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
G/O/R 0.5	Offline (not in calibration mode)
O	Fault
2.0 O	Negative gas fault (perform zero adjust)
G/O 0.5	Under range (perform zero adjust)
R/O 2.0	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

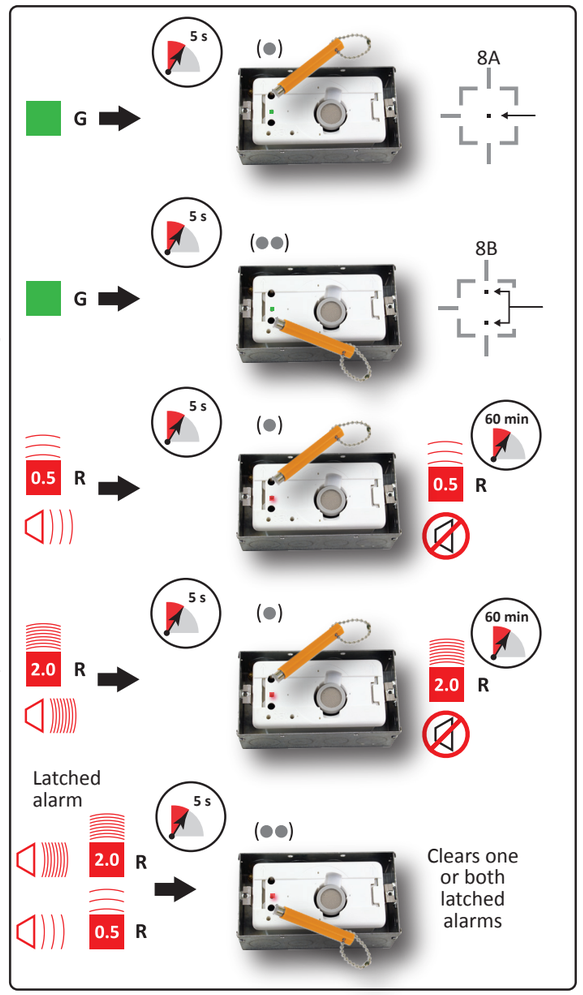
G G O	Waiting to start calibration mode
0.5 G 0.5 O 0.5 O 0.5 O	During calibration
2.0 O	Span calibration error
G/O/R 0.5	Recovery from span calibration

Buzzer Operation

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

Magnetic Switch Functions

If the custom faceplate drill pattern does not accommodate the two magnetic switch locations, the faceplate must be removed to use the magnetic wand functions.



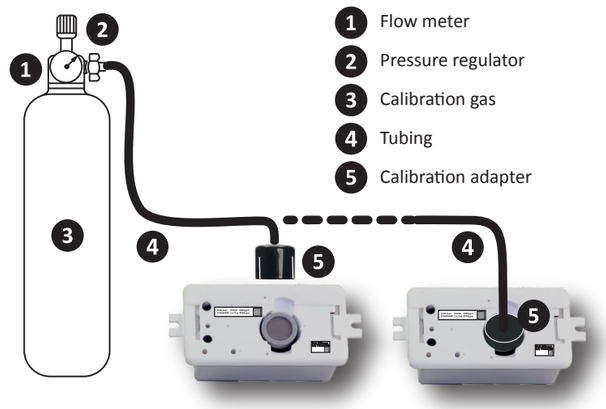
0.5 = 0.5 Hz
0.5 cycles/second
SLOW flash/chirp

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

LED Colors
G Green
O Orange
R Red

8: GENERAL CALIBRATION PROCEDURE

1. The detector must not be in alarm or fault condition. (One exception is a negative gas concentration fault -- which requires a zero calibration.)
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 over sensor module, aligning its 3 notches with the sensor alignment ribs.
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.
8. Always perform a zero adjustment before a span adjustment.



1. Flow meter
2. Pressure regulator
3. Calibration gas
4. Tubing
5. Calibration adapter

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.

9. Tap and hold (•) for >5 seconds. The LED will blink green-green-red when the detector is ready.
10. Apply synthetic air (or use ambient air per warning above).
11. Tap (•) within 30 seconds to confirm start of calibration. Otherwise the detector will time-out and return to normal operation.
12. 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 13.
    - 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.
13. Turn off gas flow from synthetic air.
14. Replace synthetic air tank with calibration gas tank in preparation for span adjustment (if required).

8B. SPAN ADJUSTMENT

15. Tap and hold (••) for >5 seconds. The LED will blink green-green-orange when the detector is ready.
16. 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.
17. Tap (••) within 30 seconds to confirm initiation of the calibration. Otherwise the detector will time-out and return to normal operation.
18. 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 after 6 minutes of recovery time.
    - 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.