



2021 FIXED GAS DETECTION PRODUCTS **AND SYSTEM DESIGN GUIDE**

NOVEMBER 2020 | REV 1





EMISSIONS REDUCTION AND GAS MONITORING

Multi-Zone Refrigerant Monitor	8
Ethylene Gas Monitor	10
Single-Zone Refrigerant Monitor	12
PGM-IR Portable Refrigerant Monitor	16
Parasense Refrigerant Tracking & Compliance Software	18

SAFETY AND COMPLIANCE

MGS-250	20
MGS-400 Series	22
MGS-550	30

SAFETY FOR OCCUPIED SPACES / VRF

MVR-300	34
MVR-SC	36

SYSTEM DESIGN CONSIDERATIONS	38
GAS CALIBRATION AND ACCESSORIES	42

The information contained in this document is intended solely to provide general guidance and support on matters of interest for the personal use of the reader, who accepts full responsibility for its use. The application and impact of laws can vary widely based on the specific facts involved. Given the changing nature of laws, rules and regulations there may be delays, omissions or inaccuracies in information contained on this article. Accordingly, the information on this article is provided with the understanding that the author(s) and publisher(s) are not herein engaged in rendering professional advice or services. As such, it should not be used as a substitute for consultation with a competent adviser. Before making any decision or taking any action, the reader should always consult a professional adviser relating to the relevant article posting.



FIXED INSTRUMENT SELECTOR

CHOOSING THE RIGHT FIXED GAS DETECTION SOLUTION FOR YOU

REFRIGERANT	●	●	●	●	●	●	●	●
TOXIC					●		●	
COMBUSTIBLE					●		●	
PROCESS GASES		●						
SENSOR TYPE	IR	IR	IR	IR	EC/CT/SC/ IR	IR	EC/CT/SC/ IR	SC
								
	MULTI-ZONE	ETHYLENE MONITOR	SINGLE-ZONE	PGM-IR	MGS-400	MGS-250	MGS-550	MVR-300

FIXED INSTRUMENT SELECTOR

GAS LIST AND INSTRUMENT SUITABILITY

GAS	SAFETY GROUP	MULTI-ZONE	SINGLE-ZONE	PGM-IR	MGS-250	MGS-400 SERIES	MGS-550	MVR-300
Carbon Monoxide, CO	--		●			●	●	
R-744 (Carbon Dioxide, CO ₂)	A1	●	●	●		●	●	
R-1150 (Ethylene, C ₂ H ₄)	A3	●					●	
FA-188	--	●	●	●				
FC-72	--	●	●	●				
FC-3284	--	●	●					
H1211	--	●	●	●				
H1301	--	●	●	●				
H1336E	--	●						
H1336Z	--	●						
H2402	--	●	●	●				
HFP	--	●	●	●				
LPG	--						●	
R-50 (Methane, CH ₄)	A3					●	●	
N1230	--	●	●	●				
N4710	--	●	●	●				
N5110	--	●						
N7100	--	●	●	●				
N7200	--	●	●	●				
N7300	--	●	●	●				
N7600	--	●	●	●				
Nitrous Oxide, N ₂ O	--		●	●				
Nitrogen Dioxide, NO ₂	--					●	●	
Oxygen, O ₂	A1					●	●	
R-11	A1	●	●	●				
R-12	A1	●	●	●				
R-113	A1	●	●	●				
R-114	A1	●	●	●				
R-123	B1	●	●	●				
R-1224ydz	A1	●	●					
R-1233zd	A2L	●	●	●	●			
R-1234yf	A2L	●	●		●	●	●	
R-1234ze	A2L	●	●	●	●	●	●	
R-124	A1	●	●	●				
R-125	A1	●	●					
R-134a	A1	●	●	●	●	●	●	
R-21	B1	●	●	●				
R-22	A1	●	●	●	●	●		
R-23	A1	●	●	●				
R-227ea	A1	●	●					

GAS	SAFETY GROUP	MULTI-ZONE	SINGLE-ZONE	PGM-IR	MGS-250	MGS-400 SERIES	MGS-550	MVR-300
R-236fa	A1	●	●	●				
R-245fa	B1	●	●	●				
R-290 (Propane)	A3					●	●	
R-32	A2L	●			●	●	●	●
R-401A	A1	●	●	●				
R-402A	A1	●	●	●				
R-402B	A1	●	●					
R-404A	A1	●	●	●	●	●	●	●
R-407A	A1	●	●	●	●	●	●	
R-407C	A1	●		●	●	●	●	●
R-407F	A1	●			●	●	●	
R-408A	A1	●	●	●				
R-409A	A1	●	●	●				
R-410A	A1	●	●	●	●	●	●	●
R-422A	A1	●	●	●	●	●	●	
R-422D	A1	●	●	●	●	●	●	
R-424A	A1	●	●	●				
R-426A	A1	●	●	●				
R-427A	A1	●	●	●	●	●	●	
R-434A	A1					●		
R-438A	A1	●	●	●				
R-448A	A1	●	●		●	●	●	
R-449A	A1	●	●	●	●	●	●	
R-450A	A1					●		
R-452A	A1	●	●	●	●	●	●	
R-452B	A2L	●	●	●	●	●		
R-454A	A2L	●	●			●		
R-454B	A2L	●	●			●		
R-454C	A2L	●	●			●		
R-455A	A2L	●				●		
R-500	A1	●	●	●				
R-502	A1	●	●	●				
R-503	--	●	●	●				
R-507	A1	●	●	●	●	●	●	
R-513A	A1	●	●	●	●	●	●	
R-514A	B1	●	●	●	●			
R-600 (Butane)	A3		●			●	●	
R-717 (Ammonia, NH ₃)	B2L	●	●			●	●	
Sulfur Hexafluoride, SF ₆	--	●	●	●				
Sulfuryl Fluoride, SO ₂ F ₂	B1		●					

SAFETY & EMISSIONS REDUCTION

SAFETY GAS DETECTION AND EARLY WARNING DETECTION



SAFETY GAS DETECTION

ASHRAE 15, EN 378,
CSA B-52, IMC 1106,
IFC 605, NFPA 53

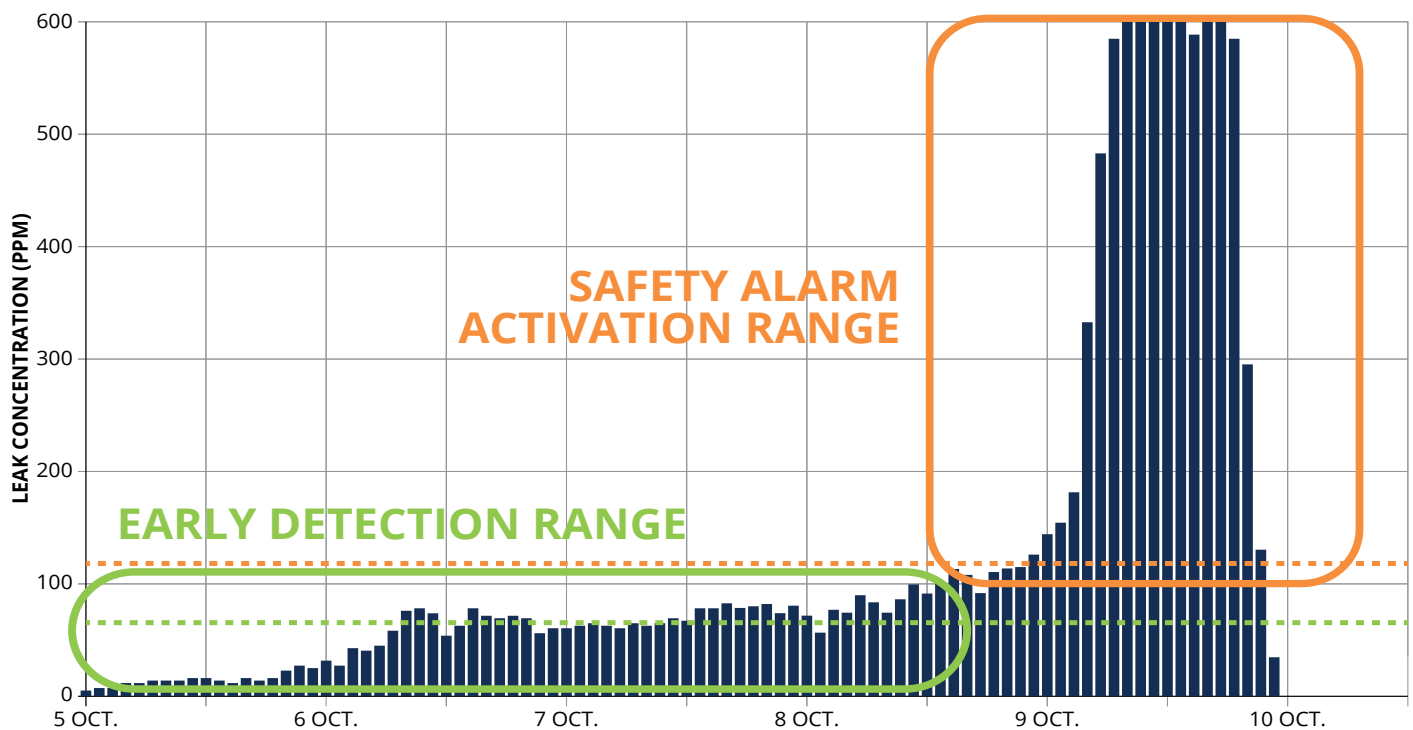
Alarm levels and
response time set by
standards and regulation

At least one detector
required per mechanical
room or walk-in cooler/
freezer

Alarm initiates
ventilation and safety
response



EARLY DETECTION AND REPAIR REDUCES EMISSIONS AND AVOIDS SAFETY INCIDENTS



The innovative, Bacharach Multi-Zone refrigerant monitor provides early detection with an industry leading 1 ppm MDL. [See page 8 for more information.](#)



EARLY WARNING MONITORING

EPA SECTION 608, CARB, F-GAS

Alarm levels set by corporate operations goals

Sample points located as close as possible to known leak points (*e.g. valves, evaporators*)

Alarm initiates leak check and repair to reduce emissions and avoid a safety incident



SYSTEM PERFORMANCE COMPARISON

	SMALL LEAKS	MODERATE LEAKS	LARGE LEAKS
SAFETY DETECTOR 50-100 ppm MDL	WILL NOT DETECT	MAY NOT DETECT	WILL DETECT
EARLY WARNING MONITORING 1 ppm MDL	WILL DETECT	WILL DETECT	WILL DETECT

MDL = Minimum Detection Level
ppm = Parts Per Million

COMPLIANCE:
EPA SECTION 608,
CARB,
F-GAS

COMPLIANCE:
ASHRAE 15,
EN 378,
CSA B-52

MULTI-ZONE REFRIGERANT MONITOR

PRECISION MONITORING FOR LOW-LEVEL REFRIGERANT LEAK DETECTION



BEST IN CLASS FOR EARLY DETECTION

SPECIFICATIONS

SENSOR CHANNELS:	4 to 16
SENSITIVITY / MINIMUM DETECTION LEVEL:	Refrigerants: 1 ppm, Ammonia: 20 ppm, CO ₂ : 10 ppm
ENCLOSURE RATING:	General Purpose
ANALOG COMMUNICATIONS:	4 to 20 mA (optional)
DIGITAL COMMUNICATIONS:	Modbus RTU via RS 485
BUZZER:	80 dB @ 10 cm
PRODUCT DIMENSIONS (L×W×H):	13.7" × 12.3" × 5" (350 mm × 315 mm × 130 mm)
PRODUCT WEIGHT:	15 lbs. (6.8 kg)
SENSOR TYPE:	NDIR
POWER:	120-240 VAC, 50/60 Hz Input
EXPECTED SENSOR SERVICE LIFE:	10 Years
APPROVALS:	CE, UL, CSA, EN 61010-1, EN 61326, EN 378-3:2018, EN 14624,
WARRANTY	2 Years

Bacharach's Multi-Zone refrigerant monitors provides precise measurements enabling early warning, continuous leak detection for compliance with refrigeration safety codes (*ASHRAE 15/34, EN378* and CSA-B52*) and emissions reduction standards (*EPA 608/CARB and F-Gas*).

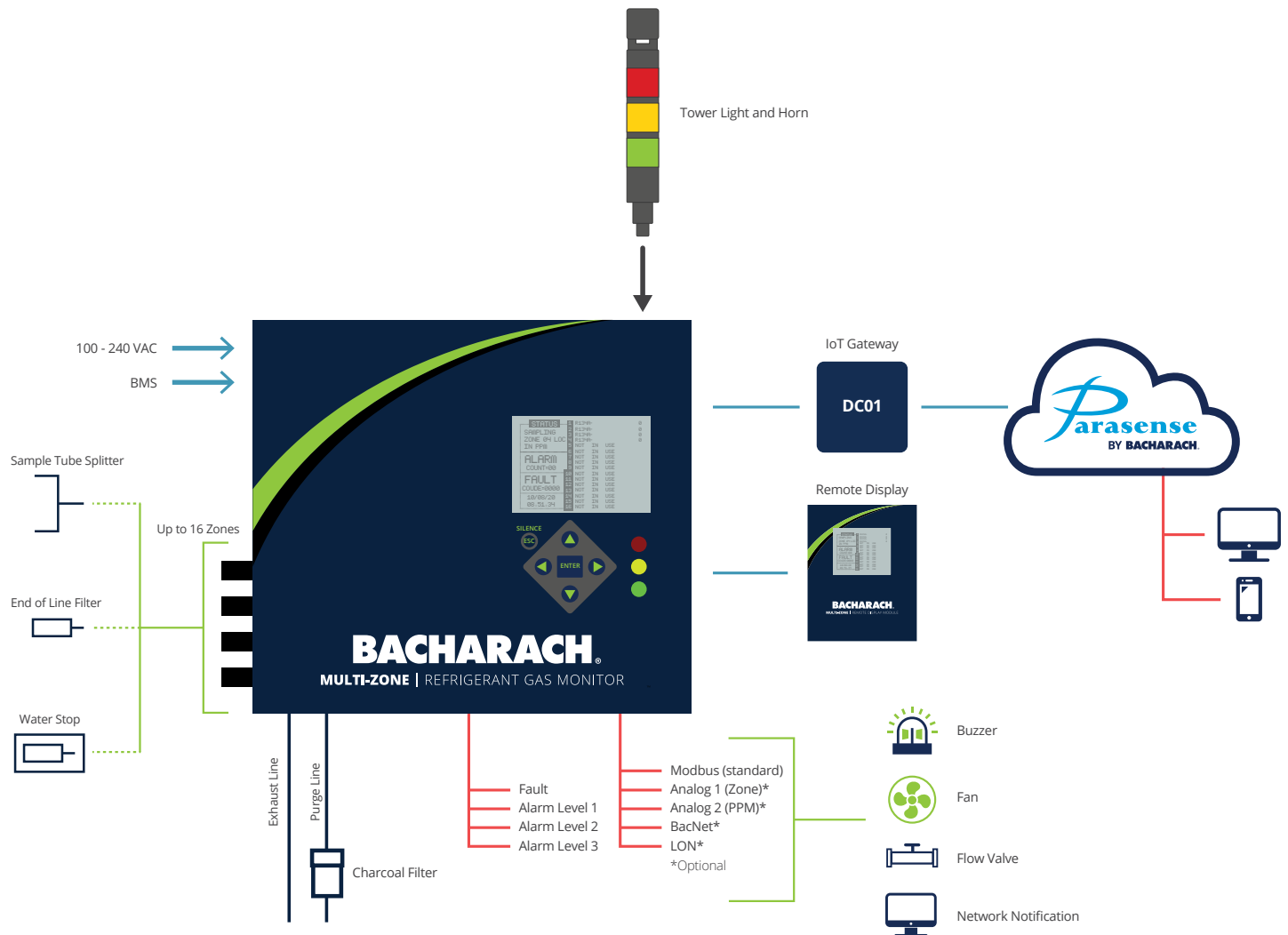
- Proprietary infrared (*NDIR*) sensor accurately detects the presence of a target gas down to an industry-leading 1 ppm Minimum Detection Level (*MDL*)
- Sensor is not prone to false alarms caused by cross-interference from other gases or sudden changes in temperature or humidity
- Gas library contains 65+ refrigerants, including CFCs, HFCs, HCFCs, HFOs and natural refrigerants (*R-744, R-717*)
- Backlit display shows real-time concentration readings and makes configuration and self-diagnostics intuitive
- Capable of monitoring up-to 16 zones and detecting multiple gases with a single monitor
- Two optional analog outputs (*4-20mA*) and Modbus communications (*slave*) for integration with third-party BMS / BAS control systems
- Three user-configurable relays (*leak, spill and evacuate*) may be used to activate external beacons / sounders, ventilation or other countermeasures
- One dedicated fault relay

* for A1 Refrigerants



MORE INFORMATION:
Scan the QR code to learn more about the Multi-Zone and other Bacharach products.

MULTI-ZONE REFRIGERANT MONITOR CONFIGURATION



MULTI-ZONE REFRIGERANT MONITOR PART NUMBERS

GAS	ZONES	PART NUMBER STANDARD UNIT	PART NUMBER W / REMOTE DISPLAY
HALOGEN	4	3015-5043	3015-5330
HALOGEN	8	3015-5044	3015-5331
HALOGEN	12	3015-5045	3015-5332
HALOGEN	16	3015-5046	3015-5333
R-717 (AMMONIA, NH ₃)	4	3015-5047	3015-5334
R-717 (AMMONIA, NH ₃)	8	3015-5048	3015-5335
R-717 (AMMONIA, NH ₃)	12	3015-5049	3015-5336
R-717 (AMMONIA, NH ₃)	16	3015-5050	3015-5337
R-744 (CARBON DIOXIDE, CO ₂)	4	3015-5356	3015-5531
R-744 (CARBON DIOXIDE, CO ₂)	8	3015-5357	3015-5532
R-744 (CARBON DIOXIDE, CO ₂)	12	3015-5358	3015-5533
R-744 (CARBON DIOXIDE, CO ₂)	16	3015-5359	3015-5534

MULTI-ZONE ETHYLENE MONITOR

PRECISION MONITORING FOR ETHYLENE



MONITORS CRITICAL FRUIT AND VEGETABLE RIPENING

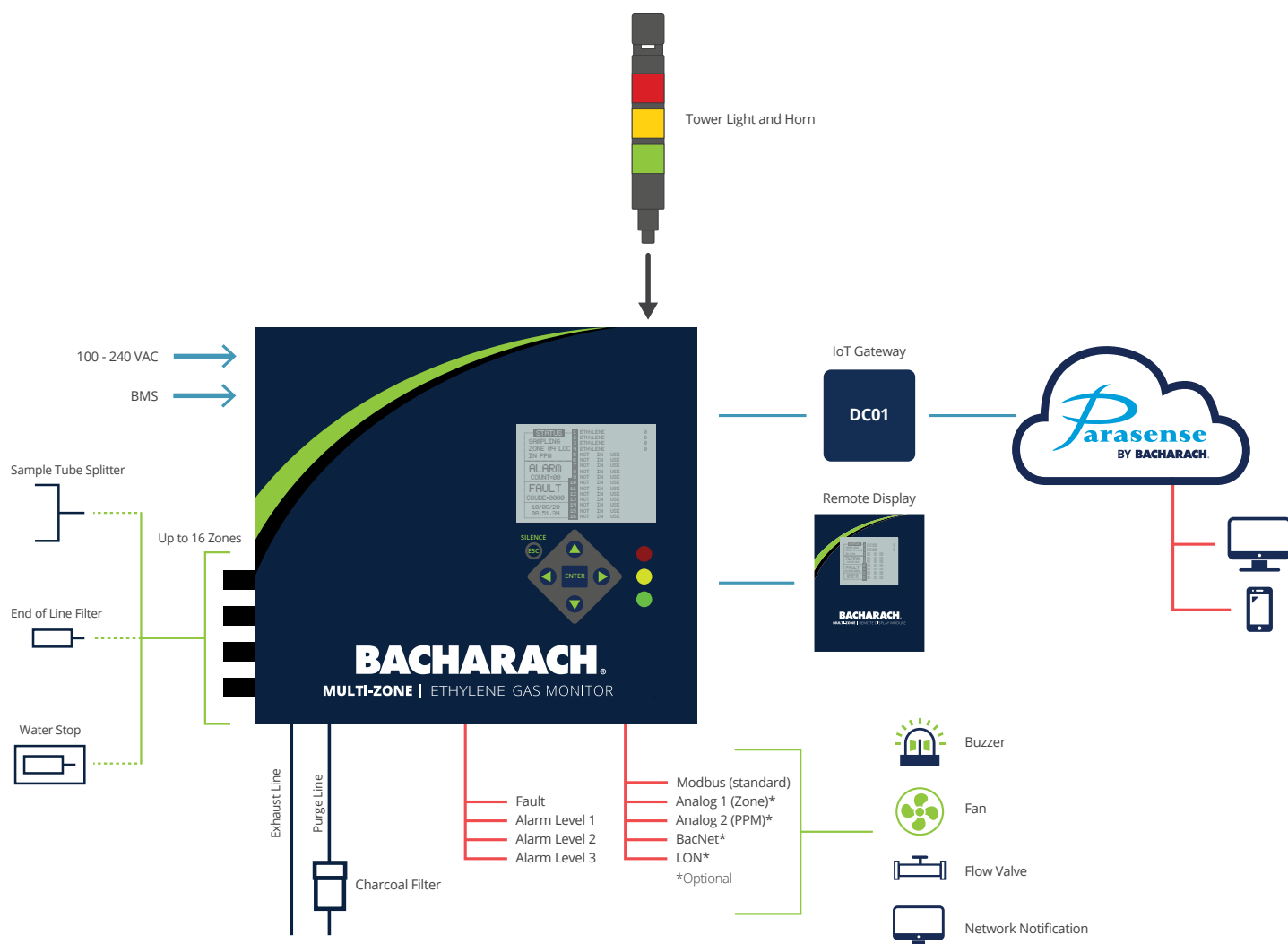
SPECIFICATIONS

SENSOR CHANNELS:	4 to 16
SENSITIVITY / MINIMUM DETECTION LEVEL:	Ethylene (C ₂ H ₄) / R-1150: 10 ppm 10 - 10,000 ppm
ENCLOSURE RATING:	General Purpose
ANALOG COMMUNICATIONS:	4 to 20 mA (optional)
DIGITAL COMMUNICATIONS:	Modbus RTU via RS 485
BUZZER VOLUME:	80 dB @ 10 cm
PRODUCT DIMENSIONS (L×W×H):	13.7" × 12.3" × 5" (350 × 315 × 130 mm)
PRODUCT WEIGHT:	15 lbs. (6.8 kg)
SENSOR TYPE:	NDIR
POWER:	120-240 VAC, 50/60 Hz Input
EXPECTED SENSOR SERVICE LIFE:	10 Years
APPROVALS:	CE, UL, CSA, EN 61010-1, EN 61326, EN 14624
WARRANTY	2 Years

Bacharach's Multi-Zone Ethylene gas monitoring solution has been developed to support the food processing industry, with specific attention to food ripening. This innovative addition to the Bacharach portfolio is ideal for monitoring process Ethylene concentrations in fruit and vegetable ripening rooms where humidity and temperature could fluctuate.

- Proprietary infrared (NDIR) sensor accurately detects the presence of ethylene down to 10 ppm Minimum Detection Level (MDL)
- Sensor is not prone to false alarms caused by cross-interference from other gases or sudden changes in temperature or humidity
- Backlit display shows real-time concentration readings and makes configuration and self-diagnostics intuitive
- Capable of monitoring up-to 16 zones
- Two optional analog outputs (4-20mA) and Modbus communications (slave) for integration with third-party BMS / BAS control systems
- Three user-configurable relays (leak, spill and evacuate) may be used to activate external beacons / sounders, ventilation or other countermeasures
- One dedicated fault relay

MULTI-ZONE ETHYLENE MONITOR CONFIGURATION



ETHYLENE MONITOR PART NUMBERS

GAS	ZONES	PART NUMBER STANDARD UNIT
R-1150 (ETHYLENE, C_2H_4)	4	3015-6301
R-1150 (ETHYLENE, C_2H_4)	8	3015-6302
R-1150 (ETHYLENE, C_2H_4)	12	3015-6303
R-1150 (ETHYLENE, C_2H_4)	16	3015-6304
HGM-RD, Remote Display Module	N/A	3015-5139

SINGLE-ZONE REFRIGERANT MONITOR

PRECISION MONITORING FOR LOW-LEVEL REFRIGERANT LEAK DETECTION



Bacharach's Single-Zone gas library contains 65+ refrigerants including CFCs, HFCs, HCFCs, HFOs, and natural refrigerants.

Proprietary infrared (NDIR) sensor accurately detects the presence of a target gas down to an industry-leading 1 ppm Minimum Detection Level (MDL)

Easy to use interface with LED traffic light notifications

Backlit display shows real-time concentration readings



DETECTS GASES DOWN TO 1PPM FOR EARLY WARNING LEAK DETECTION

SPECIFICATIONS

SENSOR CHANNELS:	1
SENSITIVITY / MINIMUM DETECTION LEVEL:	Refrigerants: 1 ppm, Ammonia: 20 ppm, CO ₂ : 10 ppm, N ₂ O: 2 ppm, CO: 50 ppm
ENCLOSURE RATING:	General Purpose
ANALOG COMMUNICATIONS:	4 to 20 mA (optional)
BUZZER:	80 dB @ 10 cm
PRODUCT DIMENSIONS (L×W×H):	13.7" × 7.7" × 3.6" (350 mm × 195 mm × 95 mm)
PRODUCT WEIGHT:	7 lbs. (3.2 kg)
SENSOR TYPE:	NDIR
EXPECTED SENSOR SERVICE LIFE:	10 Years
APPROVALS:	CE, UL, CSA, EN 61010-1, EN 61326, EN 14624, EN 378-3:2018*
WARRANTY:	2 Years

Bacharach's Single-Zone refrigerant monitors provides precise measurements enabling early warning, continuous leak detection for compliance with refrigeration safety codes (ASHRAE 15/34, EN378* and CSA-B52) and emissions reduction standards (EPA 608/CARB and F-Gas).

- Proprietary infrared (NDIR) sensor accurately detects the presence of a target gas down to an industry-leading 1 ppm Minimum Detection Level (MDL)
- Sensor is not prone to false alarms caused by cross-interference from other gases or sudden changes in temperature or humidity
- Gas library contains 65+ refrigerants, including CFCs, HFCs, HCFCs, HFOs and natural refrigerants (R-744, R-717)
- Backlit display shows real-time concentration readings and makes configuration and self-diagnostics intuitive
- Capable of monitoring up-to 4 sample points
- Three user-configurable relays (*leak, spill and evacuate*) may be used to activate external beacons / sounders, ventilation or other countermeasures

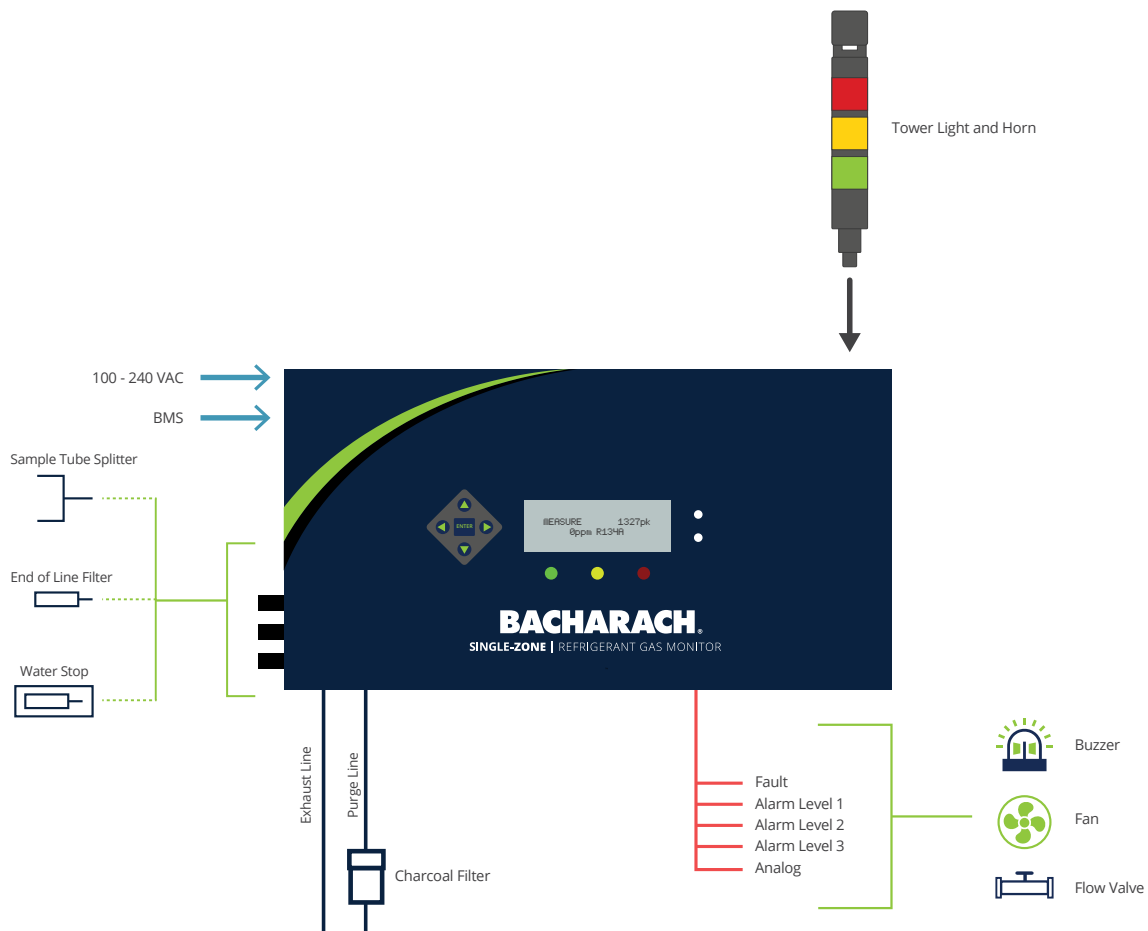
* for A1 Refrigerants



MORE INFORMATION:

Scan the QR code to learn more about the Single-Zone and other Bacharach products.

SINGLE-ZONE REFRIGERANT MONITOR CONFIGURATION



SINGLE-ZONE REFRIGERANT MONITOR PART NUMBERS

GAS	PART NUMBER STANDARD UNIT
HALOGEN	3015-4200
R-717 (AMMONIA, NH ₃)	3015-4280
R-744 (CARBON DIOXIDE, CO ₂)	3015-4601

Other gas monitoring units are available, contact us to find out more:

- Sulfuryl Fluoride: 1 PPM detection limit
- Carbon Monoxide: 50 PPM detection limit
- Nitrous Oxide: 2 PPM detection limit
- SF₆ / Sulfur Hexafluoride: 1 PPM detection limit
- CnHm (Gasoline / Petroleum vapor): 1 PPM detection limit

MULTI-ZONE, ETHYLENE MONITOR AND SINGLE-ZONE ACCESSORIES

DESCRIPTION	PART NUMBER
HGM-RD, REMOTE DISPLAY MODULE (SEE TECHNICAL LIBRARY FOR INSTRUCTION MANUAL)	3015-5138
AUDIBLE/VISUAL ALARM, 110 VAC, BLUE STROBE	3015-5804
AUDIBLE/VISUAL ALARM, 120 VAC, RED STROBE	3015-3076
HORN + STROBE 24 V DC - BLUE LENS	3015-8041
STROBE - BLUE LENS - MP120K 120 V AC ADAPTER	3015-8044
HORN + STROBE 24 V DC - RED LENS	3015-8043
STROBE - RED LENS - MP120K 120 V AC ADAPTER	3015-8046
HORN + STROBE 24 V DC - AMBER LENS	3015-8042
STROBE - AMBER LENS - MP120K 120 V AC ADAPTER	3015-8045
AIR SAMPLE TUBING (250 FT. / 76 M ROLL)	3015-3235
AIR SAMPLE TUBING - AMMONIA ONLY (500 FT. / 152 M ROLL)	3015-5111
AIR SAMPLE TUBING COUPLING, QUICK DISCONNECT	3015-5762
SPLITTER KIT, 2-WAY, INCLUDES LINE END FILTERS AND BRACKETS (NOT FOR USE W/ NH3)	3015-5404
SPLITTER KIT, 3-WAY, INCLUDES LINE END FILTERS AND BRACKETS (NOT FOR USE W/ NH3)	3015-5405
R-22 GAS VERIFICATION KIT	3015-3430
R-134a GAS VERIFICATION KIT	3015-3437
R-123 GAS VERIFICATION KIT	3015-3438
VARIABLE FLOW REGULATOR	3015-3849
1031 CYLINDER, 100 PPM R-22	3015-3850
1031 CYLINDER, 100 PPM R-134A	3015-3851
1031 CYLINDER, 100 PPM R-123	3015-3852
120 VAC SURGE PROTECTOR	3015-4121
4-20 MA DC SURGE PROTECTOR	3015-4123
LON WORKS COMMUNICATIONS PACKAGE	3015-4231
LINE END FILTER ONLY	3015-2906
LINE END FILTER ASSEMBLY	3015-3420

DESCRIPTION	PART NUMBER
CHARCOAL FILTER ASSEMBLY WITH FITTINGS	3015-3125
CHARCOAL FILTER MOUNTING BRACKET	3015-2969
SPLASH/SPRAY-RESISTANT END OF LINE FILTER ASSEMBLY	3015-5748
HYDROPHOBIC FILTER (INTERNAL WATER STOP)	0007-1650
INLINE WATER TRAP	0007-1655
INLINE WATER TRAP, REPLACEMENT FILTER ELEMENT	0007-1656
LINE END WATER STOP	3015-5512
SAMPLE PUMP	3015-5176

MULTI-ZONE AND ETHYLENE

DESCRIPTION	PART NUMBER
BACNET COMMUNICATIONS MODULE PACKAGE	3015-5705
N2 (JCI METASYS) COMMUNICATIONS PACKAGE	3015-4230
DUAL 4-20 MA DC OUTPUT PC BOARD	3015-5152
4 ZONE EXPANSION KIT (MAX OF 3 PER MZ) NOTE: MUST ALSO ORDER 3015-3411	3015-5171



MULTI-ZONE REMOTE DISPLAY

Provides remote display of Multi-Zone gas monitoring status for easy access and single point reference (Part Number 3015-5138).



AGM-MZ AMMONIA GAS MONITOR Multi Zone



Sensor ID	Sensor Description
0001	1.0% Ammonia
0002	1.0% Ammonia
0003	1.0% Ammonia
0004	1.0% Ammonia
0005	1.0% Ammonia
0006	1.0% Ammonia
0007	1.0% Ammonia
0008	1.0% Ammonia
0009	1.0% Ammonia
0010	1.0% Ammonia
0011	1.0% Ammonia
0012	1.0% Ammonia
0013	1.0% Ammonia
0014	1.0% Ammonia
0015	1.0% Ammonia
0016	1.0% Ammonia
0017	1.0% Ammonia
0018	1.0% Ammonia
0019	1.0% Ammonia
0020	1.0% Ammonia

ALARM
COUNTDOWN
FAULT
CODE: 00000
05:48:50



PGM-IR PORTABLE REFRIGERANT MONITOR

PRECISION MONITORING FOR LOW-LEVEL REFRIGERANT LEAK DETECTION



FINDS LEAKS LIKE NO OTHER

SPECIFICATIONS

SENSITIVITY / MINIMUM DETECTION LEVEL: 1 ppm

BACKGROUND ADJUSTMENT: Automatic

PRODUCT DIMENSIONS (L×W×H): 19" × 5" × 8"
(500 mm × 130 mm × 200 mm)

PRODUCT WEIGHT: 7 lbs. (3.2 kg)

SENSOR TYPE: NDIR

APPROVALS: CE, UL, CSA, EN 61010-1

Bacharach's PGM-IR portable refrigerant monitor helps maintenance personnel find small refrigerant leaks fast to enable compliance with emissions reduction standards (*EPA 608/CARB and F-Gas*).

- Proprietary infrared (*NDIR*) sensor accurately detects the presence of a target gas down to an industry-leading 1 ppm Minimum Detection Level (*MDL*)
- Sensor is not prone to false alarms caused by cross-interference from other gases or sudden changes in temperature or humidity
- Gas library contains 65+ refrigerants, including CFCs, HFCs, HCFCs and HFOs
- Backlit display with real-time concentration readings and audible indicator help users track the smallest refrigerant leaks to their source
- Integrated charcoal purge filter allows users to perform inspections in contaminated spaces without leaving to re-zero the monitor in fresh air



MORE INFORMATION:

Scan the QR code to learn more about the PGM-IR and watch PGM-IR demonstration videos.



PGM-IR PART NUMBERS

GAS	PART NUMBER
HALOGEN	3015-5696
R-744 (CARBON DIOXIDE, CO ₂)	3015-8001
NITROUS OXIDE, N ₂ O	3015-4790
SULFUR HEXAFLUORIDE, SF ₆	3015-5148

ACCESSORIES

DESCRIPTION	PART NUMBER
RECHARGEABLE BATTERY PACK WITH CHARGER	3015-5743
REPLACEMENT SOFT CARRYING CASE FOR ALL PGM UNITS	3015-5700
REPLACEMENT BATTERY CHARGER (FOR 87 WH BATTERY 3015-5743)	3015-5847
PGM-IR INTERNAL HYDROPHOBIC FILTER	0007-1659
EXTERNAL FILTER	3015-2906
PGM-IR INLINE COALESCING FILTER	3015-3071
PGM-IR CHARCOAL PURGE FILTER ASSEMBLY, FOR 3015-5696	3015-3125
PGM-IR CHARCOAL FILTER REPLACEMENT KIT, FOR 3015-5696	3015-5714
BATTERY, COIN CELL, FOR MAIN PCB	0204-0020



PARASENSE RTC SOFTWARE

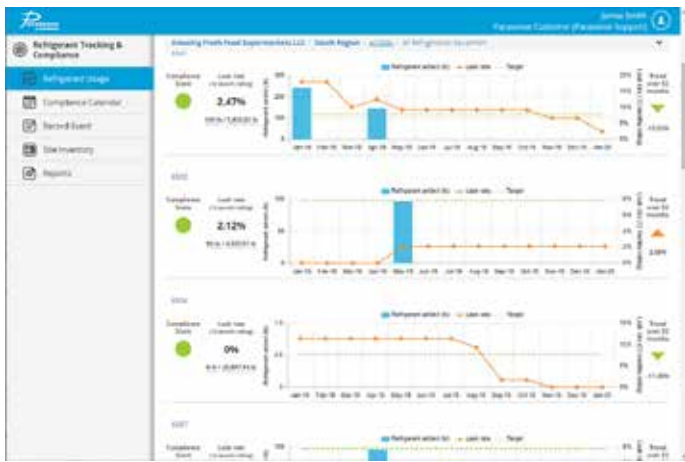
REFRIGERANT TRACKING AND COMPLIANCE SOFTWARE



The Parasense Refrigerant Usage Tracking and Compliance software from Bacharach provides control and refrigerant management across your organization from detailed single site analysis to full enterprise reporting.

- The regulation workflow has been carefully designed to distill regulations into clear processes, procedures and tasks that are easy to understand and follow. All users are guided through the same, correct procedure and any compliance tasks are scheduled automatically
- Meet regulatory requirements through robust record keeping. This includes the type and amount of each refrigerant in each piece of equipment, as well as the repair of identified leaks within a specified time range
- Users can review the cause of refrigerant emissions, identify opportunities for improvement, track repairs and ultimately minimize the consumption of refrigerant
- Automatic leak rate calculations whenever refrigerant is added to an appliance, with the 12 month rolling leak rate. Automatic scheduling of leak checks if the threshold is exceeded





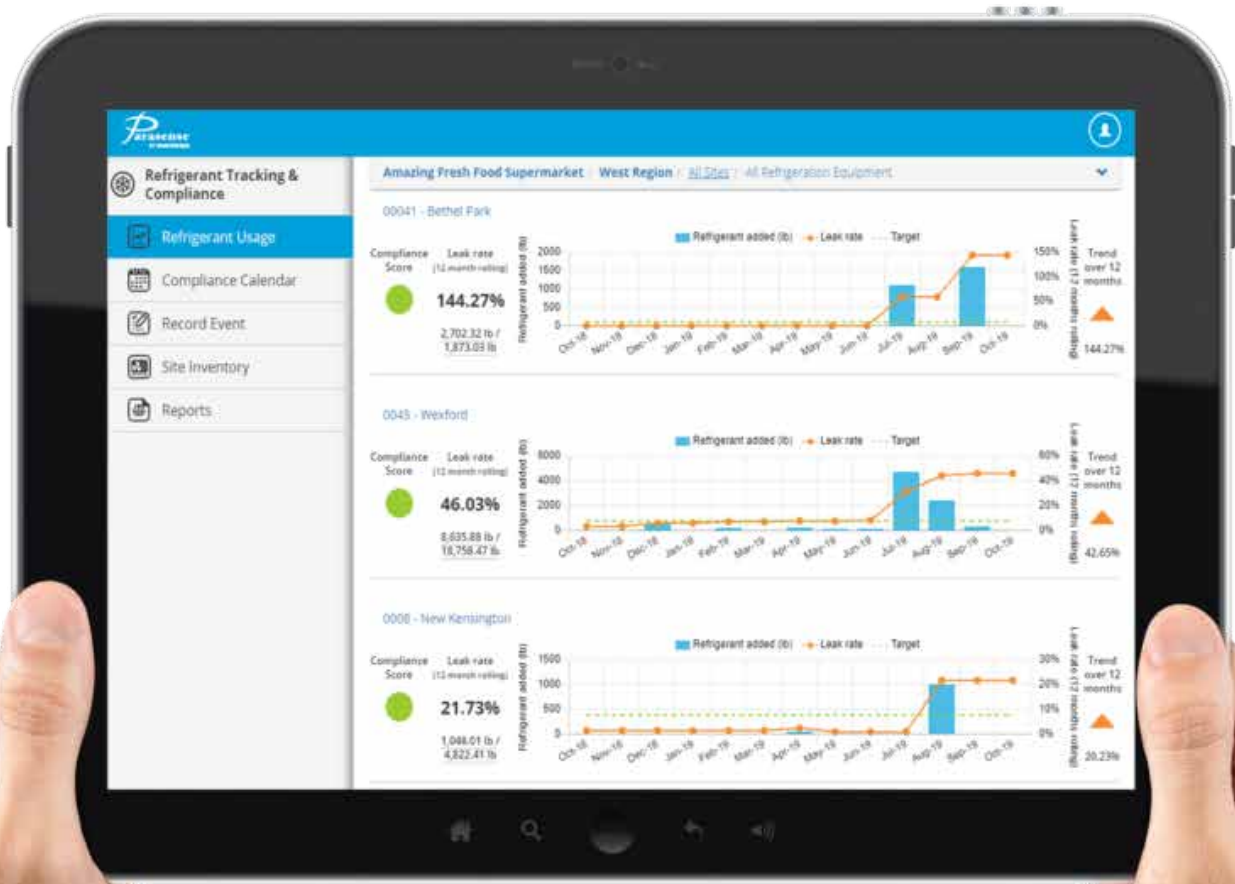
The screenshot shows the 'Leak Repair' form in the Parasense system. It includes fields for 'Requested by' (James Smith), 'Date' (January 10, 2020), and 'Compliance Name' (View). There are buttons for 'Add Equipment', 'Add Equipment', and 'Cancel'. Below the form is a section for 'Initial Verification' with a 'Verified by' field (James Smith), a 'Date' (1/10/2020), and a 'Test Method' dropdown. At the bottom, there are buttons for 'Test passed', 'Test failed', and 'Test not done'.

REDUCE REFRIGERANT EMISSIONS

The average refrigerant emission rate for grocery stores alone is estimated to be 25% per year. Best practice implementations can currently achieve emission rates of 7%. The Parasense refrigerant management tracking and compliance system can help you beat this further. As the cost of refrigerant rises, this has an increasing effect on an organization's profit. For an organization operating at 1% margin, saving \$10,000 in refrigerant re-charge is the equivalent to generating \$1,000,000 of revenue.

REGULATORY COMPLIANCE

With national compliance requirements such as EPA 608 for the US and F-Gas for Europe, and regional compliance such as CARB and SCAQMD to consider, it's important to use a system that ensures your compliance with the latest in legislation. The Parasense platform makes refrigerant compliance simple. It blends a rich user tool-set complete with compliance calendar, automated leak rate calculator, intuitive analysis, guided data entry and compliance reporting.



MORE INFORMATION:

Scan the QR code to learn more about the Parasense Refrigerant Tracking and Compliance Software and other Bacharach products.

MGS-250 INFRARED GAS DETECTOR

SAFETY GAS DETECTION FOR CFC, HFC, HCFC AND HFO REFRIGERANTS



CARB COMPLIANT, LONG-LIFE INFRARED-BASED REFRIGERANT DETECTOR MINIMIZES FALSE ALARMS

SPECIFICATIONS

SENSOR CHANNELS:	1
SENSITIVITY / MINIMUM DETECTION LEVEL:	10 ppm (75 ppm default)
ENCLOSURE RATING:	General Purpose
ANALOG COMMUNICATIONS:	4 to 20 mA, 0 to 5 V, 0 to 10 V, 1 to 5 V, 2 to 10 V
DIGITAL COMMUNICATIONS:	Modbus RTU via RS 485
BUZZER VOLUME:	80 dB @ 10 cm
PRODUCT DIMENSIONS (L×W×H):	4.0" × 5.5" × 1.5" (100 × 140 × 40 mm)
PRODUCT WEIGHT:	6.3 oz (180 g)
SENSOR TYPE:	NDIR
EXPECTED SENSOR SERVICE LIFE:	Up to 7 Years
APPROVALS:	CE, UL, CSA, IEC, EN 61010-1, EN 378-3:2018*
WARRANTY:	1 Year

Bacharach's MGS-250 gas detector is an effective solution for compliance with refrigeration safety codes (*ASHRAE 15/34, EN378* and CSA-B52*) and emissions reduction standards (*EPA 608/CARB and F-Gas*).

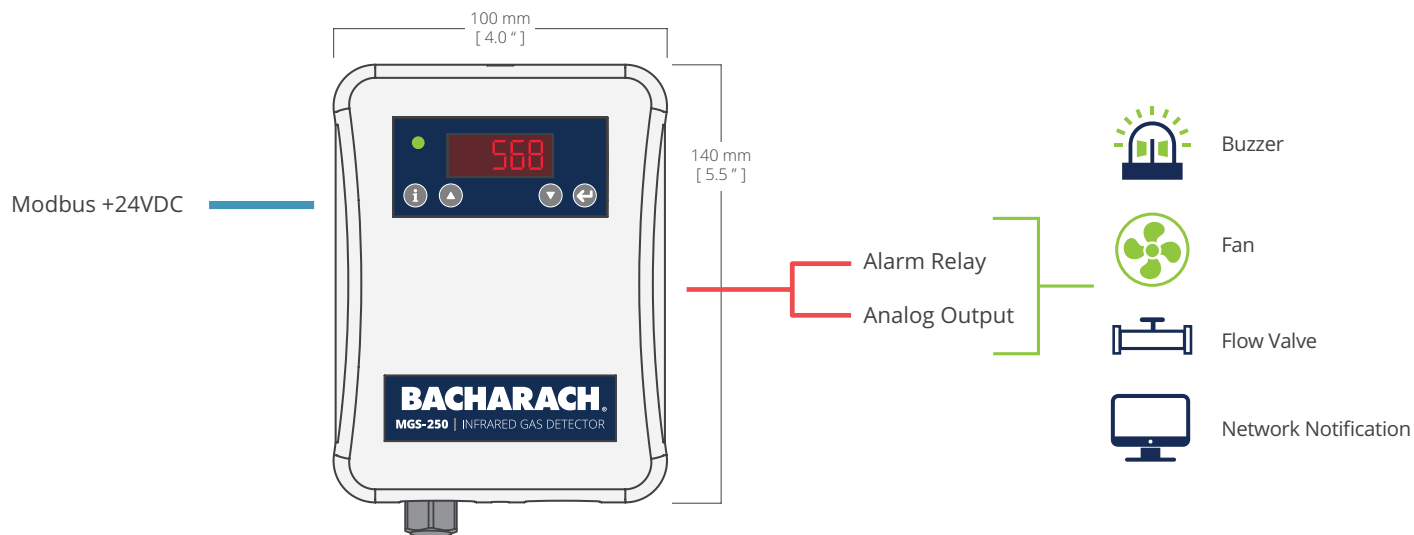
- Long-life, proprietary infrared (*NDIR*) sensor provides up to 7 years of maintenance-free service while detecting the presence of a target gas down to 10 ppm Minimum Detection Level (*MDL*)
- Sensor is not prone to false alarms caused by cross-interference from other gases or sudden changes in temperature or humidity
- 4-digit LED display shows real-time concentration readings and makes configuration and self-diagnostics intuitive
- Configurable analog output (*4-20mA, 0-5V, 0-10V, 1-5V or 2-10V*) and Modbus communications for integration with Bacharach's MGS-408 controller or third-party BMS / BAS control systems
- User-configurable relay (*alarm*) may be used to activate external beacons / sounders, ventilation or other countermeasures
- Integrated audible / visual alarms for refrigeration safety compliance – no additional hardware
- CARB compliance attained at 10 ppm MDL and 100ppm alarming

*for A1 Refrigerants



MORE INFORMATION:

Scan the QR code to learn more about the MGS-250 and other Bacharach products.



MGS-250 PART NUMBERS

GAS	ACCURACY	GAS GROUP	PART NUMBER	REPLACEMENT SENSOR
BROADBAND	-	-	6401-0500	6400-0015
R-134a	±5%	1	6401-0503	6400-0018
R-404A	±5%	1	6401-0504	6400-0019
R-407A	±3%	1	6401-0505	6400-0020
R-407C	±3%	1	6401-0506	6400-0021
R-407F	±3%	1	6401-0507	6400-0022
R-410A	±3%	1	6401-0508	6400-0023
R-427A	±3%	1	6401-0511	6400-0026
R-452B	±5%	1	6401-0521	6400-0036
R-507	±5%	1	6401-0512	6400-0027
R-1233zd	±5%	1	6401-0515	6400-0030
R-448A	±5%	2	6401-0517	6400-0032
R-449A	±5%	2	6401-0518	6400-0033
R-422A	±5%	2	6401-0509	6400-0024
R-422D	±5%	2	6401-0510	6400-0025
R-1234yf	±5%	2	6401-0513	6400-0028
R-1234ze	±5%	2	6401-0514	6400-0029
R-452A	±5%	2	6401-0520	6400-0035
R-513A	±5%	2	6401-0519	6400-0034
R-514A	±5%	2	6401-0522	6400-0037
R-22	±5%	3	6401-0501	6400-0016
R-32	±5%	4	6401-0516	6400-0031

ACCESSORIES

DESCRIPTION	PART NUMBER
SPLASH / PROTECTIVE SHIELD (FOR USE IN SPRAY DOWN AREAS)	6900-0001
REPLACEMENT MOUNTING BASE	6400-0014

MGS-400 SERIES GAS DETECTORS

SAFETY GAS DETECTION FOR REFRIGERANTS, TOXIC AND COMBUSTIBLE GASES



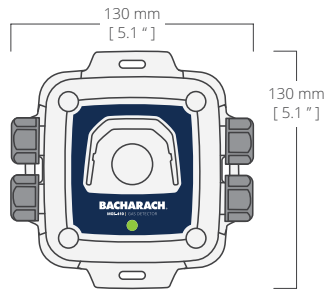
COMPLIANCE MADE EASY

SPECIFICATIONS

	MGS-410	MGS-450	MGS-460
SENSOR CHANNELS:	1	1	1
ENCLOSURE RATING:	IP66	IP41, IP66	IP66
ANALOG COMMUNICATIONS:	-	4 to 20 mA, 0 to 5 V, 0 to 10 V, 1 to 5 V, 2 to 10 V	4 to 20 mA, 0 to 5 V, 0 to 10 V, 1 to 5 V, 2 to 10 V
DIGITAL COMMUNICATIONS:	Modbus RTU via RS 485	Modbus RTU via RS 485	Modbus RTU via RS 485
CONFIGURABLE RELAYS	-	3	3
BUZZER VOLUME:	80 dB @ 10 cm	80 dB @ 10 cm	80 dB @ 10 cm
PRODUCT DIMENSIONS (L×W×H):	5.1" × 5.1" × 2.7" (130 × 130 × 68 mm)	IP41: 6.5" × 6.5" × 3.0" (165 × 165 × 77 mm) IP66: 6.5" × 6.5" × 3.4" (165 × 165 × 87 mm)	Transmitter: 6.5" × 6.5" × 3.4" (165 × 165 × 87 mm) Remote Sensor: 4.5" × 5.4" × 2.7" (115 × 136 × 68 mm)
PRODUCT WEIGHT:	9.2 oz (260 g)	1lb, 1oz (480 g)	1lb, 11.7oz (758 g)
APPROVALS:	CE, UL, CSA, IEC, EN 61010-1	CE, UL, CSA, IEC, EN 61010-1	CE, UL, CSA, IEC, EN 61010-1
WARRANTY:	1 Year	1 Year	1 Year

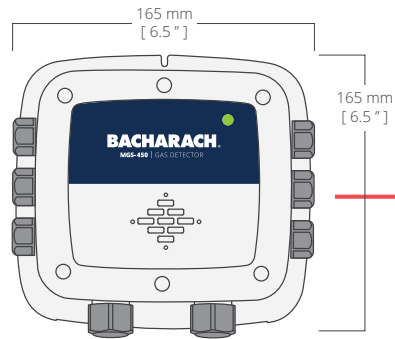
MGS-410

Modbus +24VDC



MGS-450

Modbus +24VDC



Fault
Low Alarm
High Alarm
Analog



Buzzer



Fan



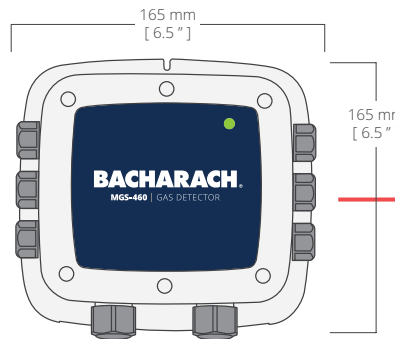
Flow Valve



Network Notification

MGS-460

Modbus +24VDC



Fault
Low Alarm
High Alarm
Analog



Buzzer



Fan

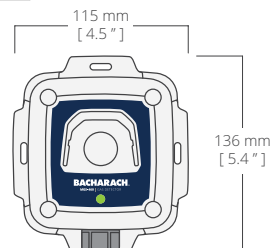


Flow Valve



Network Notification

5m (16f)



MORE INFORMATION:
Scan the QR code to learn about the MGS-400 Series and other Bacharach products.

MGS-400 SERIES GAS DETECTOR PART NUMBERS

GAS	SENSOR RANGE	TYPE	MGS-410	MGS-450 (IP 41)	MGS-450 (IP 66)	MGS-460	REPLACEMENT SENSORS
R-600 (Butane)	0-100% LEL	IR	6302-0052	6302-1052	6302-2052	6302-4052	6302-9052
R-50 (Methane, CH ₄)	0-100% LEL	IR	6302-0053	6302-1053	6302-2053	6302-4053	6302-9053
Carbon Monoxide / CO	0-500 ppm	EC	6302-0040	6302-1040	6302-2040	6302-4040	6302-9040
R-744 (Carbon Dioxide, CO ₂)	0-5,000 ppm	IR	6302-0090	6302-1090	6302-2090	6302-4090	6302-9090
R-744 (Carbon Dioxide, CO ₂)	0-10,000 ppm	IR	6302-0091	6302-1091	6302-2091	6302-4091	6302-9091
R-744 (Carbon Dioxide, CO ₂)	0-20,000 ppm	IR	6302-0092	6302-1092	6302-2092	6302-4092	6302-9092
R-744 (Carbon Dioxide, CO ₂)	0-30,000 ppm	IR	6302-0093	6302-1093	6302-2093	6302-4093	6302-9093
R-744 (Carbon Dioxide, CO ₂)	0-40,000 ppm	IR	6302-0094	6302-1094	6302-2094	6302-4094	6302-9094
R-744 (Carbon Dioxide, CO ₂)	0-50,000 ppm	IR	6302-0095	6302-1095	6302-2095	6302-4095	6302-9095
HC-12A	0-5,000 ppm	SC	6302-0307	6302-2307	6302-2307	6302-4307	6302-9307
R-717 Ammonia (-40° F/C)	0-100 ppm	EC	6302-0026	6302-1026	6302-2026	6302-4026	6302-9026
R-717 Ammonia (-40° F/C)	0-1,000 ppm	EC	6302-0028	6302-1028	6302-2028	6302-4028	6302-9028
R-717 (Ammonia, NH ₃)	0-5,000 ppm	EC	6302-0037	6302-1037	6302-2037	6302-4037	6302-9037
R-717 (Ammonia, NH ₃)	0-100% LEL	CAT	6302-0070	6302-1070	6302-2070	6302-4070	6302-9070
Nitrogen Dioxide, NO ₂	0-20 ppm	EC	6302-0041	6302-1041	6302-2041	6302-4041	6302-9041
Oxygen, O ₂	0-30%	EC	6302-0003	6302-1003	6302-2003	6302-4003	6302-9003
R-1234yf	0-1,000 ppm	SC	6302-0161	6302-1161	6302-2161	6302-4161	6302-9161
R-1234ze	0-1,000 ppm	SC	6302-0152	6302-1152	6302-2152	6302-4152	6302-9152
R-134a	0-1,000 ppm	SC	6302-0101	6302-1101	6302-2101	6302-4101	6302-9101
R-22	0-1,000 ppm	SC	6302-0109	6302-1109	6302-2109	6302-4109	6302-9109
R-290	0-100% LEL	IR	6302-0054	6302-1054	6302-2054	6302-4054	6302-9054
R-32	0-1,000 ppm	SC	6302-0155	6302-1155	6302-2155	6302-4155	6302-9155
R-404A	0-1,000 ppm	SC	6302-0103	6302-1103	6302-2103	6302-4103	6302-9103
R-407A	0-1,000 ppm	SC	6302-0105	6302-1105	6302-2105	6302-4105	6302-9105
R-407C	0-1,000 ppm	SC	6302-0123	6302-1123	6302-2123	6302-4123	6302-9123
R-407F	0-1,000 ppm	SC	6302-0126	6302-1126	6302-2126	6302-4126	6302-9126
R-410A	0-1,000 ppm	SC	6302-0107	6302-1107	6302-2107	6302-4107	6302-9107
R-422	0-1,000 ppm	SC	6302-0165	6302-1165	6302-2165	6302-4165	6302-9165
R-422D	0-1,000 ppm	SC	6302-0166	6302-1166	6302-2166	6302-4166	6302-9166
R-427A	0-1,000 ppm	SC	6302-0167	6302-1167	6302-2167	6302-4167	6302-9167
R-434A	0-1,000 ppm	SC	6302-0159	6302-1159	6302-2159	6302-4159	6302-9159
R-448A	0-1,000 ppm	SC	6302-0156	6302-1156	6302-2156	6302-4156	6302-9156
R-449A	0-1,000 ppm	SC	6302-0169	6302-1169	6302-2169	6302-4169	6302-9169
R-450A	0-1,000 ppm	SC	6302-0160	6302-1160	6302-2160	6302-4160	6302-9160
R-452A	0-1,000 ppm	SC	6302-0157	6302-1157	6302-2157	6302-4157	6302-9157
R-452B	0-1,000 ppm	SC	6302-0163	6302-1163	6302-2163	6302-4163	6302-9163
R-454A	0-1,000 ppm	SC	6302-0164	6302-1164	6302-2164	6302-4164	6302-9164
R-454B	0-1,000 ppm	SC	6302-0171	6302-1171	6302-2171	6302-4171	6302-9171
R-454C	0-1,000 ppm	SC	6302-0170	6302-1170	6302-2170	6302-4170	6302-9170
R-507A	0-1,000 ppm	SC	6302-0111	6302-1111	6302-2111	6302-4111	6302-9111
R-455A	0-1,000 ppm	SC	6302-0172	6302-1172	6302-2172	6302-4172	6302-9172
R-513A	0-1,000 ppm	SC	6302-0158	6302-1158	6302-2158	6302-4158	6302-9158

MGS-400 SERIES ACCESSORIES

DESCRIPTION	PART NUMBER
CALIBRATION ADAPTOR	6302-9990
WALL MOUNTED HORN/STROBE, BLUE LENS, 24V DC	3015-8041
WALL MOUNTED HORN/STROBE, AMBER LENS, 24V DC	3015-8042
WALL MOUNTED HORN/STROBE, RED LENS, 24V DC	3015-8043
WALL MOUNTED HORN/STROBE, BLUE LENS, MP120K 120 V AC BUILT-IN ADAPTER	3015-8044
WALL MOUNTED HORN/STROBE, AMBER LENS, MP120K 120 V AC BUILT-IN ADAPTER	3015-8045
WALL MOUNTED HORN/STROBE, RED LENS, MP120K 120 V AC BUILT-IN ADAPTER	3015-8046
WALL MOUNTED HORN/STROBE, GREEN LENS, 24V DC	3015-8047
WALL MOUNTED HORN/STROBE, GREEN LENS, MP120K 120 V AC BUILT-IN ADAPTER	3015-8048



MGS-400 MOBILE APP

The Bacharach MGS-400 App allows users to configure, maintain and interface with compatible MGS-400 gas detectors. Once a Bluetooth connection has been established, the app replaces the need for specialty training / tools and makes compliance with safety standards (ASHRAE 15, EN 378) easy and effective.

Features include:

- Configuration (*Rename device, define alarm thresholds, adjust Modbus settings, configure relay behavior and manage analog output settings*).
- Maintenance (*Test LED / buzzer function, relays, and analog output level*).
- Calibration (*View sensor type, serial number and "Calibration Due" timer and initiate zero / span calibrations with customizable field calibration certificate*).
- Intuitive Interface (*View current gas measurement and acknowledge alarm / fault status*).



BLUETOOTH CONNECTIVITY.







MGS-400 SERIES GAS DETECTION CONTROLLERS

CONTROLLERS FOR REFRIGERANT, TOXIC AND COMBUSTIBLE GAS DETECTION

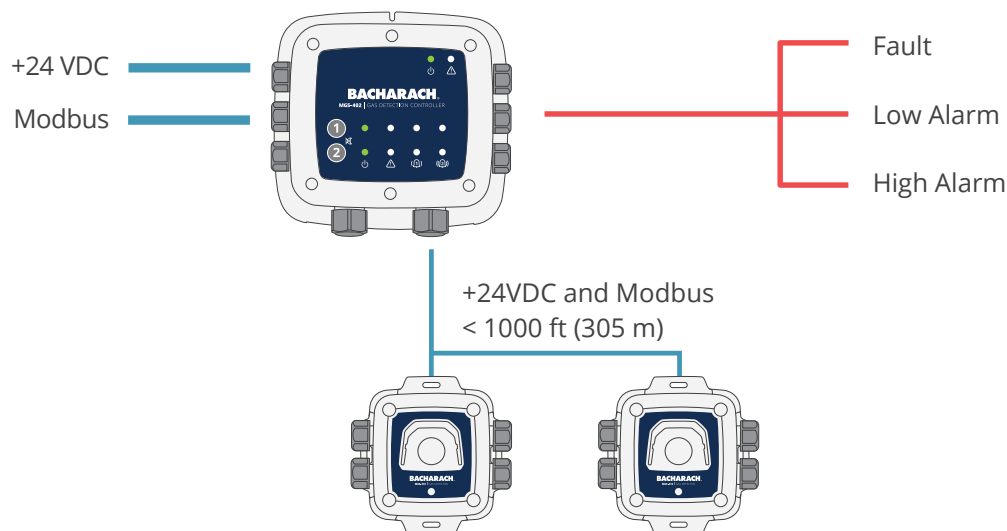
MGS-400 SERIES ACCESSORIES: CONTROLLER SPECIFICATIONS

	MGS-402	MGS-408
MAIN POWER:	24VDC/100- 230VAC	24VDC/100- 230VAC
NUMBER OF SENSORS:	2	8
ANALOG OUTPUTS:	2 - Configurable*	-
RELAY OUTPUTS (ALARMS):	Low and High	Low and High
RELAY POWER:	10A @ 240 VAC	5A @ 240 VAC
DEDICATED FAULT RELAY:	1	1
ALARM SILENCE:	Button on Controller or Remote	Button on Controller
REMOTE BEACON / AUDIBLE:	Optional Accessory	Yes
DISTANCE TO SENSOR:	< 305m (1000ft.)	< 260m (850ft)
POWER TO SENSORS:	Yes	Yes
COMMUNICATIONS:	Modbus RTU	Modbus RTU
VISUAL ALARM:	High Intensity, bezel mounted visual alarm, Channel status Tri-Color LEDs	Channel status Tri-Color LED/Overall System Status LEDs (integrated strobe available**)
AUDIBLE ALARM:	Yes	Yes
PART NUMBER:	6702-8020	6702-8000

*4-20mA, 0-5, 1-5, 0-10, 2-10 VDC , ** Mounts to and is powered (24VDC) by controller - no mounting or wiring cost

MGS-402 GAS DETECTION CONTROLLER

2-CHANNEL CONTROLLER FOR REFRIGERANT, TOXIC AND COMBUSTIBLE GAS DETECTION



MORE INFORMATION:

Scan the QR code to learn more about the MGS-402 and other Bacharach products.

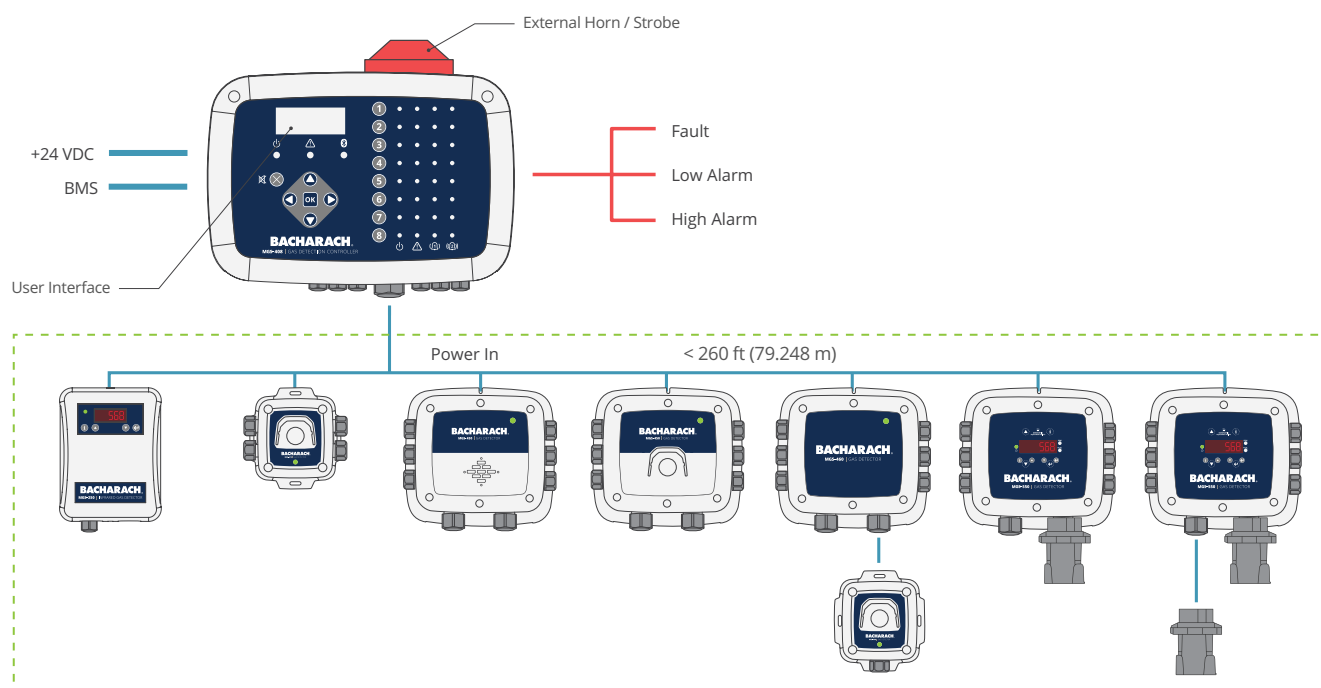
Bacharach's MGS-402 Gas Detection Controller centralizes the status of up to two MGS-400 Series Gas Detectors, provides a complete package for your safety compliance application. On the front panel of the MGS-402 a bank of LEDs corresponds to each connected gas detector; showing power, alarm status and fault indicators. The MGS-402 can provide the power requirements for up to two gas detectors, which can be daisy-chained with Modbus communication to each gas detector; simplifying and reducing the cost of installation.

Combining the MGS-402 Gas Detection Controller with Bacharach's MGS-400 Series Gas Detectors provides a complete, single source gas detection system with an easy means of achieving compliance with refrigeration safety standards such as ASHRAE 15/34, EN378* and CSA-B52.

- Centralized power and alarming for up to 2 connected MGS-400 Series Gas Detectors
- Modbus RTU Master / Slave provides seamless integration from connected
- Gas detectors to third-party BMS / BAS
- Audible and visual alarms enable compliance with ASHRAE 15/34, EN378* and CSA-B52
- No additional hardware required.

MGS-408 GAS DETECTION CONTROLLER

8-CHANNEL CONTROLLER FOR REFRIGERANT, TOXIC AND COMBUSTIBLE GAS DETECTION



Bacharach's MGS-408 Gas Detection Controller centralizes the status of up to 8 gas detection channels in a single location. Integration is possible with Bacharach's MGS-400 Series, MGS-250 and MGS-550 Gas Detector platforms; allowing for a gas detection system design which can utilize the benefits of multiple gas detector types as required in different locations (machinery rooms, cold storage rooms, walk-in freezers and food preparation areas).

Combining the MGS-408 with Bacharach's range of gas detectors provides a single system with an easy means of achieving compliance with refrigeration safety standards such as ASHRAE 15/34, EN378* and CSA-B52.

- Centralized power and alarming for up to 8 gas sensors
- Provides a single system with an easy means of achieving compliance with refrigeration safety standards such as ASHRAE 15/34, EN378* and CSA-B52
- Displays real-time status / gas measurement for connected gas detectors
- Modbus RTU interface, analog output and BMS / BAS connectivity
- 3 Relays and integrated horn / strobe (optional external beacon available)
- Retains alarm & status history of connected gas detectors on SD card



MORE INFORMATION:

Scan the QR code to learn more about the MGS-408 and other Bacharach products.

DESCRIPTION	PART NUMBER
EXTERNAL HORN / STROBE FOR MGS-408 (RED LENS)	1100-2307
EXTERNAL HORN / STROBE FOR MGS-408 (GREEN LENS)	1100-2308
EXTERNAL HORN / STROBE FOR MGS-408 (BLUE LENS)	1100-2309
EXTERNAL HORN / STROBE FOR MGS-408 (YELLOW LENS)	1100-2310

MGS-550 DUAL GAS DETECTOR

SAFETY GAS DETECTION FOR REFRIGERANTS, TOXIC AND COMBUSTIBLE GASES



DUAL-SENSOR (2-GASES) GAS DETECTOR WITH PPM, %LEL OR %VOL CONCENTRATION ON THE DISPLAY

SPECIFICATIONS

SENSOR CHANNELS:	1 to 2
SENSITIVITY / MINIMUM DETECTION LEVEL:	Sensor Dependent (see opposite)
ENCLOSURE RATING:	IP66
ANALOG COMMUNICATIONS:	4 to 20 mA, 0 to 5 V, 0 to 10 V, 1 to 5 V, 2 to 10 V
DIGITAL COMMUNICATIONS:	Modbus RTU via RS 485
BUZZER VOLUME:	80 dB @ 10 cm
PRODUCT DIMENSIONS (L×W×H):	8.3" × 8.9" × 3.4" (210 mm × 225 mm × 85 mm)
PRODUCT WEIGHT:	2 lbs (1 kg)(1.6 kg)
SENSOR TYPE:	Sensor Dependent (see opposite)
APPROVALS:	CE, UL, CSA, IEC, EN 61010-1
WARRANTY:	1 Year

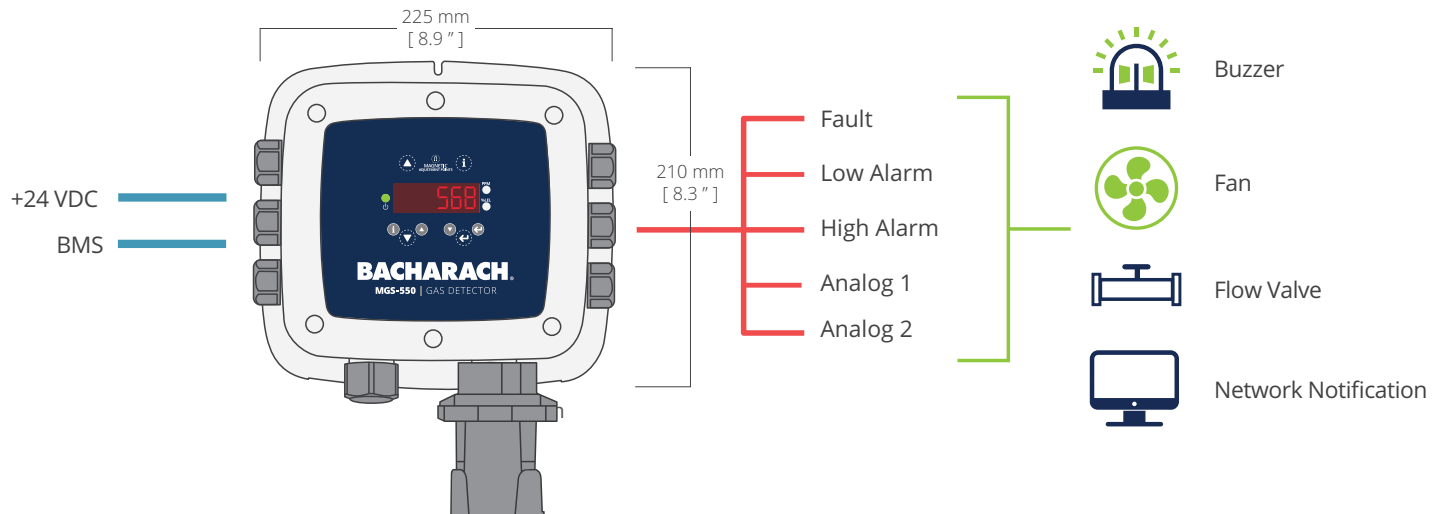
GAS	MDL
Refrigerants	1,000 / 10,000 ppm
CO ₂	5,000 / 10,000 / 20,000 / 30,000 / 40,000 / 50,000 ppm
NH ₃ *	100** / 1,000** / 5,000** / 10,000 ppm / 100% LEL
O ₂	30Vol%
CO**	500 / 1,000 ppm
Combustible Gases	5,000 ppm / 100% LEL
C ₂ H ₄	2,000 ppm
NO ₂ ***	20 ppm

* NH₃ available as low temperature version -40°F / 40°C (not for 5,000 ppm Electrochemical sensor)

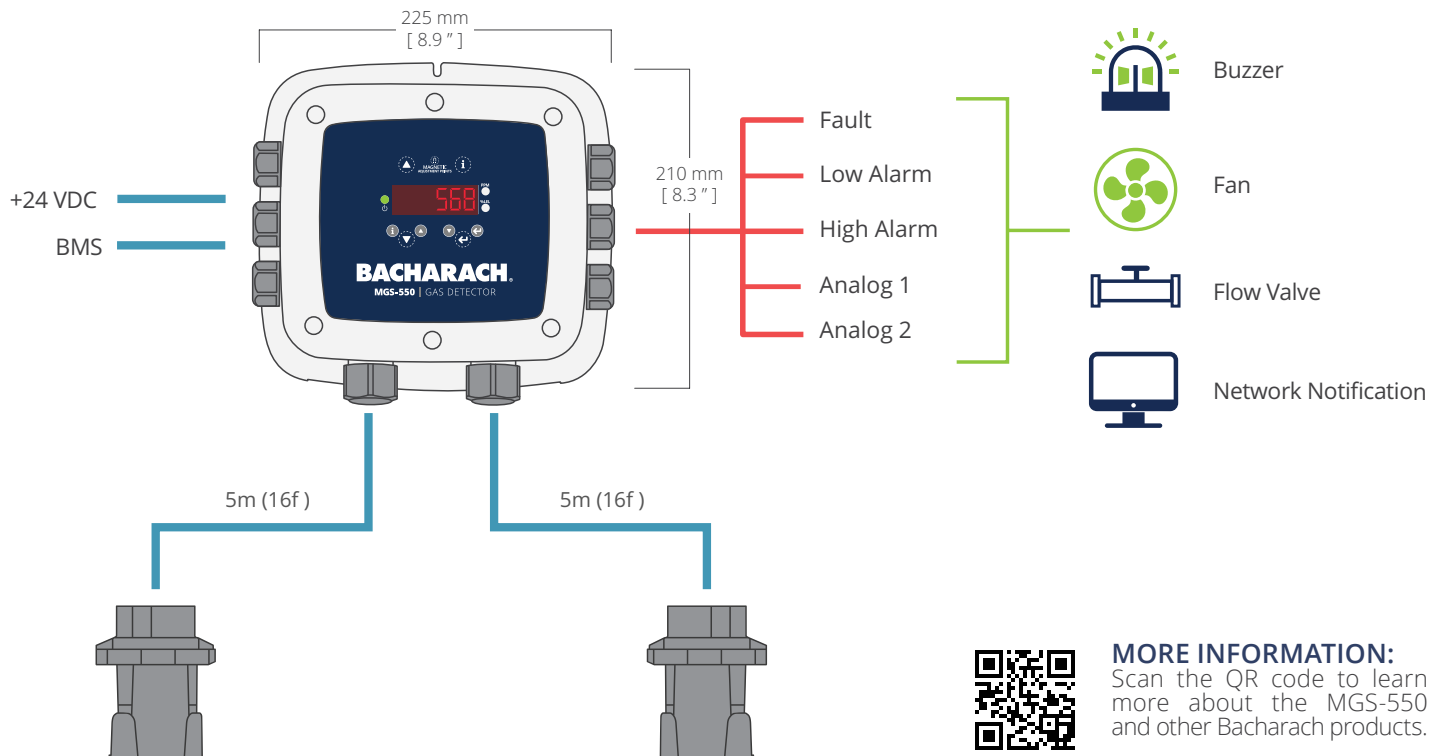
** IP66 rated; not available in XP enclosure

*** Not IP66 rated; not available in XP enclosure

MGS-550 WITH 1 LOCAL SENSOR



MGS-550 WITH 2 REMOTE SENSORS



Bacharach's MGS-550 gas detector is a flexible gas detection platform that enables compliance with refrigeration safety codes (ASHRAE 15/34, EN378* and CSA-B52).

- Two-sensor capability allows for unparalleled flexibility and enables detection of multiple target gases in a variety of ranges or locations (*local and remote sensors available*)
- 5-digit LED display shows real-time concentration readings and makes configuration and self-diagnostics intuitive

- Configurable analog output (4-20mA, 0-5V, 0-10V, 1-5V or 2-10V) and Modbus communications for integration with Bacharach's MGS-402 / MGS-408 controllers or third-party BMS / BAS
- Three user-configurable relays (*fault, low and high alarm*) may be used to activate external beacons / sounders, ventilation or other countermeasures
- Integrated audible / visual alarms for refrigeration safety compliance – no additional hardware

* for A1 Refrigerants



MORE INFORMATION:
Scan the QR code to learn more about the MGS-550 and other Bacharach products.

MGS-550 ORDERING GUIDE



The versatile Bacharach MGS-550 can be configured in a number of ways to suit your particular application. Options include single and double local sensors, single local and single remote sensors or simply single or double remote sensors. Whatever you require, follow the simple ordering guide below and choose which gas detection sensors you want from the tables on these two pages:

SYSTEM	CHOOSE FROM	TOTAL PARTS	NOTES
1 LOCAL SENSOR	COLUMN B	1	LOCAL SENSORS ARE INSTALLED PRIOR TO SHIPMENT
2 LOCAL SENSORS	COLUMN B + C	2	REMOTE SENSOR CABLE LENGTH IS 5M (16 FT)
1 LOCAL + 1 REMOTE	COLUMN B + D	2	ALL ENCLOSURES ARE IP66 RATED.
1 REMOTE	COLUMN A + D	2	REPLACEMENT SENSORS ARE PRE-CALIBRATED
2 REMOTE SENSORS	COLUMN A + 2 FROM D	3	N/A

GAS	SENSOR RANGE	SENSOR TYPE	A BASE UNIT, NO SENSORS	B BASE UNIT, 1 LOCAL SENSOR	C LOCAL SENSOR	D REMOTE SENSOR	PRE- CALIBRATED REPLACEMENT SENSOR
N/A	N/A	N/A	6600-8000	-	-	-	-
Butane	0-100 %LEL	IR	-	6600-8016	6600-8816	6600-8116	6600-8216
Butane	0-100 %LEL	CB	-	6600-8039	6600-8839	6600-8139	6600-8239
Carbon Monoxide / CO	0-500 ppm	EC	-	6600-8080	6600-8880	6600-8180	6600-8280
R-744 (CO ₂)	0-5,000 ppm	IR	-	6600-8010	6600-8810	6600-8110	6600-8210
R-744 (CO ₂)	0-10,000 ppm	IR	-	6600-8011	6600-8811	6600-8111	6600-8211
R-744 (CO ₂)	0-20,000 ppm	IR	-	6600-8012	6600-8812	6600-8112	6600-8212
R-744 (CO ₂)	0-30,000 ppm	IR	-	6600-8013	6600-8813	6600-8113	6600-8213
R-744 (CO ₂)	0-40,000 ppm	IR	-	6600-8014	6600-8814	6600-8114	6600-8214
R-744 (CO ₂)	0-50,000 ppm	IR	-	6600-8015	6600-8815	6600-8115	6600-8215
R-1150 (Ethylene, C ₂ H ₄)	0-2,000 ppm	SC	-	6600-8075	6600-8875	6600-8175	6600-8275
R-1234yf	0-1,000 ppm	SC	-	6600-8052	6600-8852	6600-8152	6600-8252
R-1234ze	0-1,000 ppm	SC	-	6600-8053	6600-8853	6600-8153	6600-8253
R-1234ze	0-10,000 ppm	SC	-	6600-8067	6600-8867	6600-8167	6600-8267
LPG	0-100 %LEL	CB	-	6600-8035	6600-8835	6600-8135	6600-8235
R-50 (Methane, CH ₄)	0-100 %LEL	IR	-	6600-8017	6600-8817	6600-8117	6600-8217
R-50 (Methane, CH ₄)	0-100 %LEL	CB	-	6600-8036	6600-8836	6600-8136	6600-8236
R-50 (Methane, CH ₄)	0-5,000 ppm	SC	-	6600-8073	6600-8873	6600-8173	6600-8273
R-717 (Ammonia, NH ₃)	0-10,000 ppm	SC	-	6600-8069	6600-8869	6600-8169	6600-8269
R-717 (Ammonia, NH ₃)	0-100 %LEL	CB	-	6600-8034	6600-8834	6600-8134	6600-8234
R-717 (Ammonia, NH ₃)	0-100 ppm	EC	-	6600-8019	6600-8819	6600-8119	6600-8219
R-717 (Ammonia, NH ₃)	0-1,000 ppm	EC	-	6600-8020	6600-8820	6600-8120	6600-8220
R-717 (Ammonia, NH ₃)	0-5,000 ppm	EC	-	6600-8021	6600-8821	6600-8121	6600-8221
R-717 (Ammonia, NH ₃)	0-20 ppm	EC	-	6600-8024	6600-8824	6600-8124	6600-8224
Oxygen, O ₂	0-30 Vol%	EC	-	6600-8025	6600-8825	6600-8125	6600-8225
R-290 (Propane)	0-100 %LEL	IR	-	6600-8018	6600-8818	6600-8118	6600-8218
R-290 (Propane)	0-100 %LEL	CB	-	6600-8038	6600-8838	6600-8138	6600-8238



GAS	SENSOR RANGE	SENSOR TYPE	A BASE UNIT, NO SENSORS	B BASE UNIT, 1 LOCAL SENSOR	C LOCAL SENSOR	D REMOTE SENSOR	PRE- CALIBRATED REPLACEMENT SENSOR
R-134a	0-1,000 ppm	SC	-	6600-8042	6600-8842	6600-8142	6600-8242
R-134a	0-10,000 ppm	SC	-	6600-8056	6600-8856	6600-8156	6600-8256
R-290	0-5,000 ppm	SC	-	6600-8070	6600-8870	6600-8170	6600-8270
R-32	0-1,000 ppm	SC	-	6600-8041	6600-8841	6600-8141	6600-8241
R-32	0-10,000 ppm	SC	-	6600-8055	6600-8855	6600-8155	6600-8255
R-404A	0-1,000 ppm	SC	-	6600-8043	6600-8843	6600-8143	6600-8243
R-404A	0-10,000 ppm	SC	-	-6600-8057	-6600-8857	-6600-8157	-6600-8257
R-407A	0-10,000 ppm	SC	-	6600-8044	6600-8844	6600-8144	6600-8244
R-407A	0-1,000 ppm	SC	-	6600-8058	6600-8858	6600-8158	6600-8258
R-407C	0-10,000 ppm	SC	-	6600-8045	6600-8845	6600-8145	6600-8245
R-407C	0-10,000 ppm	SC	-	6600-8059	6600-8859	6600-8159	6600-8259
R-407F	0-1,000 ppm	SC	-	6600-8046	6600-8846	6600-8146	6600-8246
R-407F	0-10,000 ppm	SC	-	6600-8060	6600-8860	6600-8160	6600-8260
R-410A	0-1,000 ppm	SC	-	6600-8047	6600-8847	6600-8147	6600-8247
R-410A	0-10,000 ppm	SC	-	6600-8061	6600-8861	6600-8161	6600-8261
R-422A	0-1,000 ppm	SC	-	6600-8048	6600-8848	6600-8148	6600-8248
R-422A	0-10,000 ppm	SC	-	6600-8062	6600-8862	6600-8162	6600-8262
R-422D	0-1,000 ppm	SC	-	6600-8049	6600-8849	6600-8149	6600-8249
R-422D	0-10,000 ppm	SC	-	6600-8063	6600-8863	6600-8163	6600-8263
R-427A	0-1,000 ppm	SC	-	6600-8050	6600-8850	6600-8150	6600-8250
R-448A	0-1,000 ppm	SC	-	6600-8076	6600-8876	6600-8176	6600-8276
R-449A	0-1,000 ppm	SC	-	6600-8077	6600-8877	6600-8177	6600-8277
R-452A	0-1,000 ppm	SC	-	6600-8078	6600-8878	6600-8178	6600-8278
R-507	0-1,000 ppm	SC	-	6600-8051	6600-8851	6600-8151	6600-8251
R-507	0-10,000 ppm	SC	-	6600-8065	6600-8865	6600-8165	6600-8265
R-513A	0-1,000 ppm	SC	-	6600-8079	6600-8879	6600-8179	6600-8279
R-600	0-5,000 ppm	SC	-	6600-8071	6600-8871	6600-8171	6600-8271

MVR-300 VRF REFRIGERANT GAS DETECTOR

GAS DETECTION FOR REFRIGERANTS IN OCCUPIED SPACES



LEAK DETECTION FOR HOTELS, OFFICES AND OTHER OCCUPIED SPACES USING VRF REFRIGERATION SYSTEMS

SPECIFICATIONS

GASES SUPPORTED:	R-32, R-404A, R-407C, R-410A
SENSOR CHANNELS:	1
ENCLOSURE RATING:	General Purpose
DIGITAL COMMUNICATIONS:	Modbus RTU via RS 485
BUZZER VOLUME:	80 dB @ 10 cm
PRODUCT DIMENSIONS (L×W×H):	6" × 4.1" × 1.75" (150 × 105 × 45mm)
PRODUCT WEIGHT:	8 oz (230 g)
APPROVALS:	CE, UL/CSA/IEC/EN 61010-1
WARRANTY:	1 Year

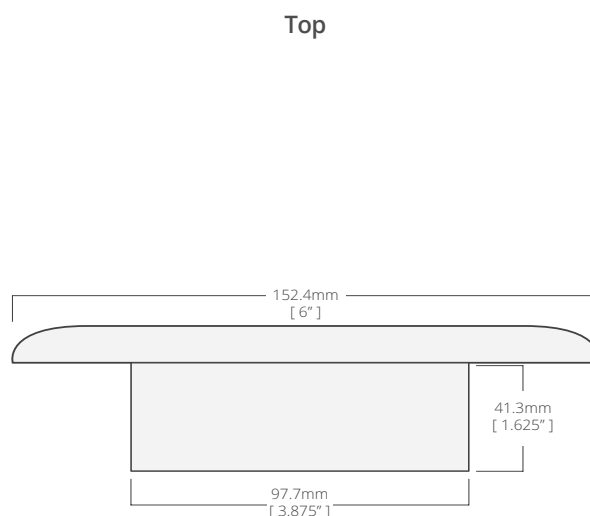
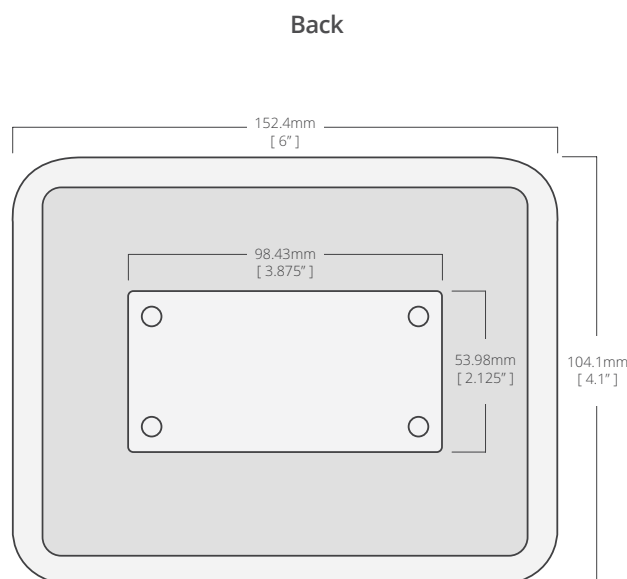
The MVR-300 VRF Refrigerant Gas Detector is specifically designed to provide continuous monitoring for refrigerants associated with high-efficiency, high volume refrigerant cooling and heating systems, such as VRF systems.

- Fits in standard 3-gang electrical boxes for easy installation
- Low profile / flush mount for aesthetically non-intrusive appearance
- Two relays and Modbus Communications for notifying building management & initiate counter measures
- Alarm options (*LED, buzzer, two levels, configurable delay and fail-safe*) to alert occupants and remotely inform building management of alarm location for rapid response as required
- Refrigerant specific sensors for enhanced safety
- Self-diagnostics and simple field calibration for easy maintenance
- Unique plug-in field replaceable pre-calibrated sensor for low cost of ownership



MORE INFORMATION:

Scan the QR code to learn more about the MVR-300 and other Bacharach products.



MVR-300 PART NUMBERS

GAS	LOW ALARM*	HIGH ALARM*	RANGE	PART NUMBER	PRE-CALIBRATED REPLACEMENT SENSOR
R-410A	500ppm	2,000 ppm	2,500 ppm	6203-0001	6203-0101
	1,000 ppm	2,000 ppm	5,000 ppm	6203-0002	6203-0102
	2,000 ppm	4,000 ppm	10,000 ppm	6203-0003	6203-0103
R-407C	500ppm	2,000 ppm	2,500 ppm	6203-0011	6203-0111
	1,000 ppm	2,000 ppm	5,000 ppm	6203-0012	6203-0112
	2,000 ppm	4,000 ppm	10,000 ppm	6203-0013	6203-0113
R-404A	500ppm	2,000 ppm	2,500 ppm	6203-0021	6203-0121
	1,000 ppm	2,000 ppm	5,000 ppm	6203-0022	6203-0122
	2,000 ppm	4,000 ppm	10,000 ppm	6203-0023	6203-0123
R-32	500ppm	2,000 ppm	2,500 ppm	6203-0041	6203-0141
	1,000 ppm	2,000 ppm	5,000 ppm	6203-0042	6203-0142
	2,000 ppm	4,000 ppm	10,000 ppm	6203-0043	6203-0143

*Factory default; can be changed through Modbus.

ACCESSORIES

DESCRIPTION	PART NUMBER
PRESSURE REGULATOR (0.5 L/MIN, 5/8"-18 UNF)	0051-2358
PRESSURE REGULATOR (0.3 L/MIN, 5/8"-18 UNF)	0051-3299
MAGNETIC WAND	1100-1004
CALIBRATION ADAPTER KIT (ADAPTER, TUBING MAGNETIC WAND, EXTRACTOR TOOL)	1100-2018
EXTRACTOR TOOL (FOR REMOVING SENSOR MODULE DURING REPLACEMENT PROCESS)	1100-2022

MVR-SC GAS DETECTION CONTROLLER

100-CHANNEL CONTROLLER FOR REFRIGERANT GAS DETECTION



CONTROL AND MONITOR UP TO (100) MVR-300 GAS DETECTORS AND REDUCE WIRING WITH HYBRID ETHERNET/MODBUS DEPLOYMENT

SPECIFICATIONS

SENSORS:	100
ENCLOSURE RATING:	General Purpose
DISPLAY SIZE:	5 inch, 800 × 480 pixels
DIGITAL COMMUNICATIONS:	Modbus RTU via RS 485
BUZZER VOLUME:	80 dB @ 10 cm
PRODUCT DIMENSIONS (L×W×H):	13.56" × 11.43" × 5.46" (344 × 291 × 139 mm)
PRODUCT WEIGHT:	7.8 lb (3.54 kg)
APPROVALS:	CE, UL/CSA/IEC/EN 61010-1
WARRANTY:	1 Year
PART NUMBER:	6702-8010

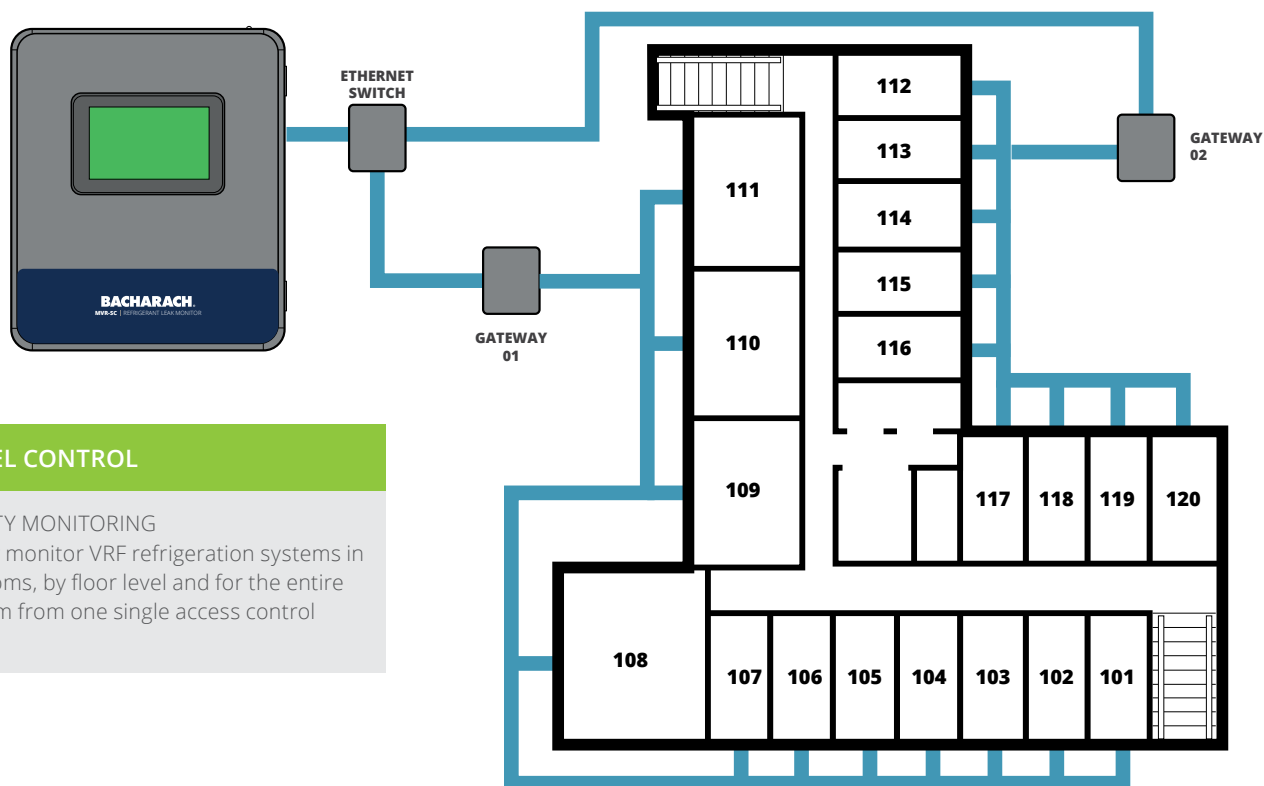
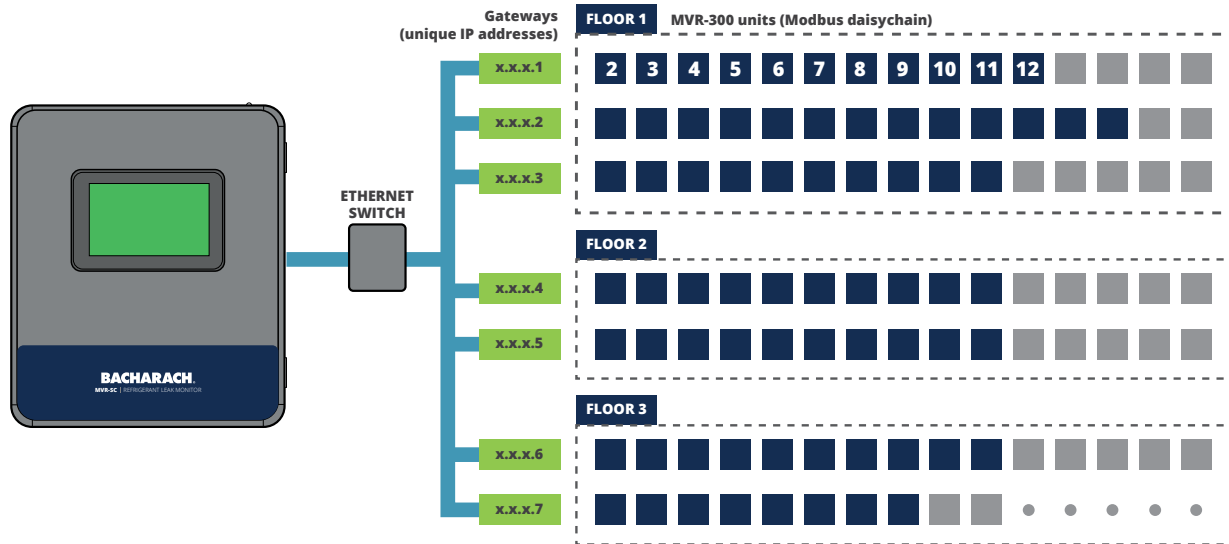
The MVR-SC Refrigerant Leak Monitor provides centralized monitoring and alarming for multi-occupant applications utilizing the MVR-300™ VRF Refrigerant Leak Detector. The MVR-SC continuously monitors all connected gas detectors for alarm and fault conditions, and will provide alerts via the integrated color touchscreen display, integrated buzzer, and on-board relay outputs.

- Centralized monitoring for multi-occupant applications utilizing the MVR-300™ VRF Refrigerant Gas Detector
- At-a-glance visualization of whole system alarm, fault, or connectivity status
- Continuously monitors up to 100 connected devices for alarm and fault conditions, ensuring and warning in case of any disconnect
- Rolling event log of 100 most recent events (alarms, faults, connectivity, etc.) saved to SD card
- 1 Alarm Relay; 1 Fault Relay; automatic system action to be taken for fault or alarm condition via built-in relays
- Self-diagnostics and simple field calibration for easy maintenance
- Commissioning via dynamic device pairing and remote Modbus auto-assign save



MORE INFORMATION:

Scan the QR code to learn more about the MVR-SC and other Bacharach products.



HOTEL CONTROL

SAFETY MONITORING

Safely monitor VRF refrigeration systems in all rooms, by floor level and for the entire system from one single access control point.

ACCESSORIES

DESCRIPTION	PART NUMBER
MODBUS CABLE (1,000' (304.8 M) SPOOL OF INDUSTRIAL-GRADE MODBUS CABLE)	1100-2193
ETHERNET SWITCH (CONNECTS THE MVR-SC AND INDIVIDUAL GATEWAYS)	1100-2172
MODBUS GATEWAY (EACH GATEWAY SUPPORTS A NETWORK OF UP TO 15 MVR-300 VRF REFRIGERANT LEAK DETECTORS)	1100-2198
MODBUS EZ-WIRE KIT (PRECISELY STRIPPED, PRE-BONDED WIRE PROVIDES FASTER, MORE CONSISTENT INSTALLATION TO THE MVR-300 MODBUS PORT)	1100-2190

SYSTEM DESIGN CONSIDERATIONS

GUIDELINES FOR DETECTOR QUANTITIES AND LOCATIONS

SENSOR QUANTITY

AT LEAST ONE DETECTOR FOR:

- Each gas to be detected
- Each enclosed space
- Each pit or trench
- Every two chillers

When choosing how many sensors to install, always err on the side of caution and get as many units as are required to provide maximum coverage. While there are no legal guidelines on how many gas monitors should be installed, we recommend gas detectors are installed no more than 16.5 feet (5 m) from a potential leak source.

WHAT TO MONITOR

MONITORING LOCATIONS:

- Chiller area
- Pit or trench
- Cylinder storage areas
- Vent lines

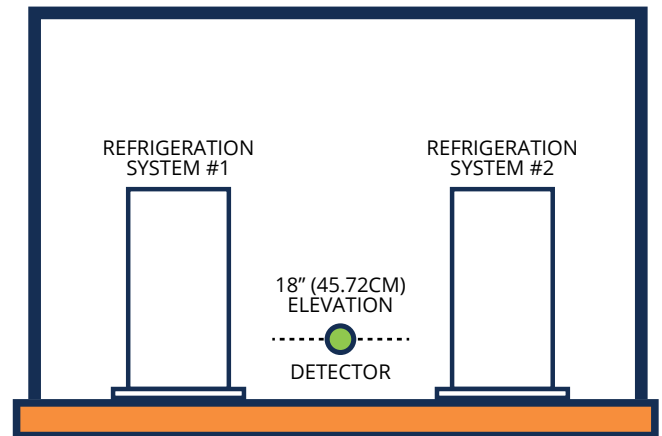
As gas monitors cover a fixed point and not a general area, you need to ensure any space which may be directly exposed to gas is monitored. This is typically near the equipment itself although may vary depending on environmental conditions such as target gas characteristics, currents and airflow and other adverse conditions.

SENSOR LOCATION HEIGHT

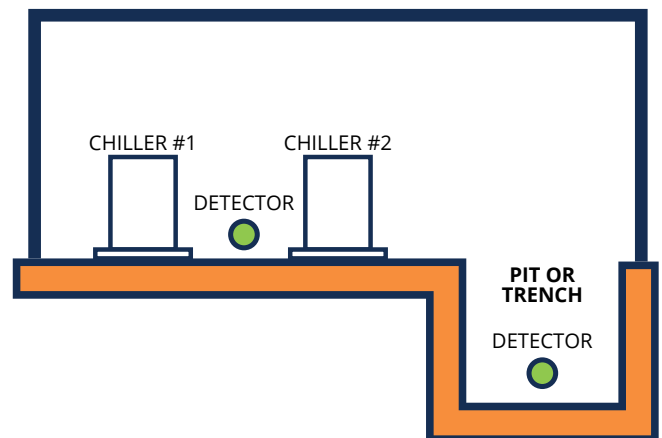
GAS CHARACTERISTICS:

- Locate detectors in areas the specific gas is likely to accumulate
- Low (18" / 45.72 cm off floor)
- Middle (breathing zone)
- High

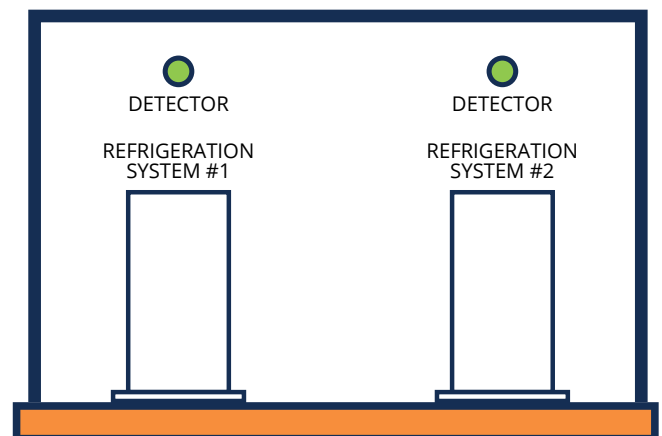
Consider the heaviness or lightness (specific gravity) of the target gas. Place sensors for heavier than air gases – such as butane, propane, LPG or ozone – close to ground level. Gas detectors meant to detect the presence of gases that are lighter than air – such as hydrogen, methane, and ammonia – should have monitors located closer to the ceiling. Equal density gases should have monitors mounted in the breathing zone at head height (usually 4 – 6 feet from the ground).



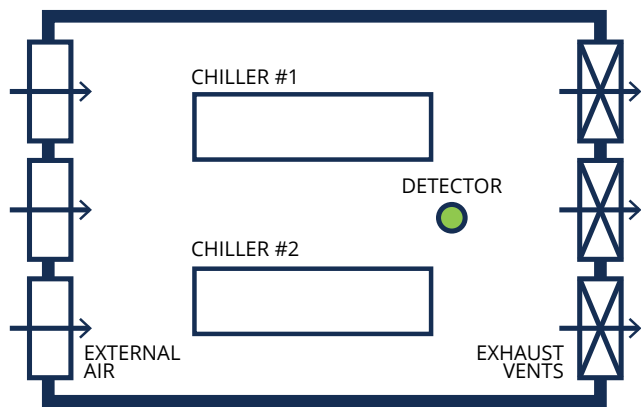
HEAVIER THAN AIR TARGET GAS EXAMPLE



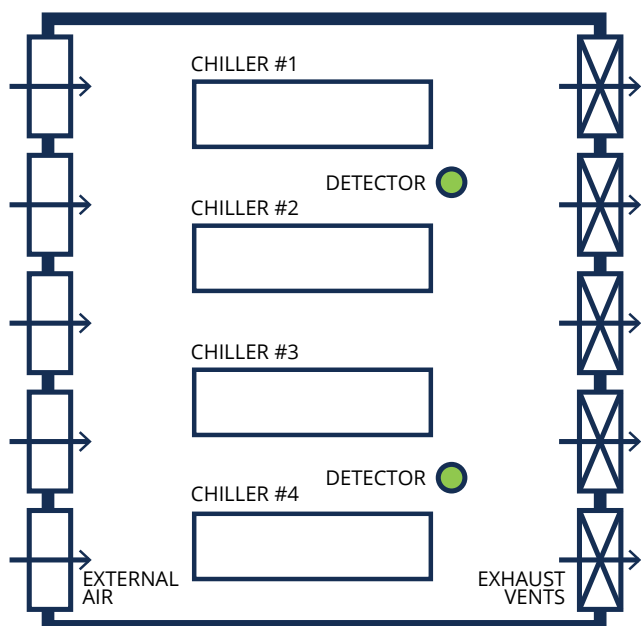
HEAVIER THAN AIR TARGET GAS- TRENCH



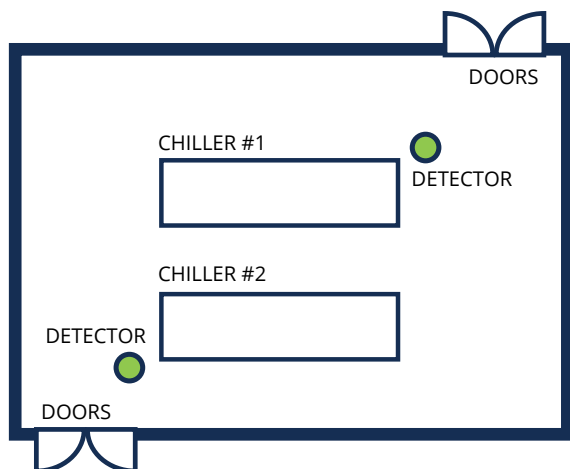
LIGHTER THAN AIR TARGET GAS



CONTINUOUS VENTILATION



CONTINUOUS VENTILATION



INTERMITTENT VENTILATION

CURRENTS / AIRFLOW

CURRENTS AND AIRFLOW CONDITIONS:

Continuous ventilation: locate detectors in the air flow path between the chillers and exhaust vents

Intermittent ventilation: locate detectors between the chillers and each entry door

Additionally, installers should take into account the airflow in the monitored space. Room ventilation can alter the airflow pattern and affect how efficiently the gas is monitored. In other words, installers should consider how escaping gas may behave due to air currents. (If appropriate, an installer may choose to mount gas detectors in ventilation ducts.) A smoke test may be conducted to ensure optimal placement.

High airflow may dilute the target gas. Because of this, placing sensors closer to a potential gas source may improve leak detection in spaces with high airflow.

Never locate a refrigerant detector where airflow may become obstructed. This commonly occurs in walk-in freezers where personnel may (inadvertently) push boxes against the instrument. Obstructed airflow to the sensor will result in ineffective gas detection.

AVOID ADVERSE CONDITIONS

Gas detectors should not be installed in locations where they will be subjected to adverse conditions such as extreme temperatures, high humidity, high concentration of airborne particles which are outside of the device's specifications. It is important that the instrument's Ingress Protection (IP) rating is sufficient to protect its sensitive electronics.

Likewise, sensors should not be installed where they are exposed to damage in the daily use of the space. Such environments may impact the instrument's ability to effectively detect the target gas.

ACCESSIBILITY TO PERSONNEL

Gas detectors require regular maintenance to ensure functionality. Where possible, they should be installed in an area that is easily accessible for functional testing and servicing.

Instruments featuring a remote sensor(s) allow installers to monitor for refrigerant leaks in inaccessible locations without forfeiting convenient access for electrical / communications wiring.

SOURCE: ASHRAE 12-2001 USER'S MANUAL FOR ASHRAE STANDARD 15-2001

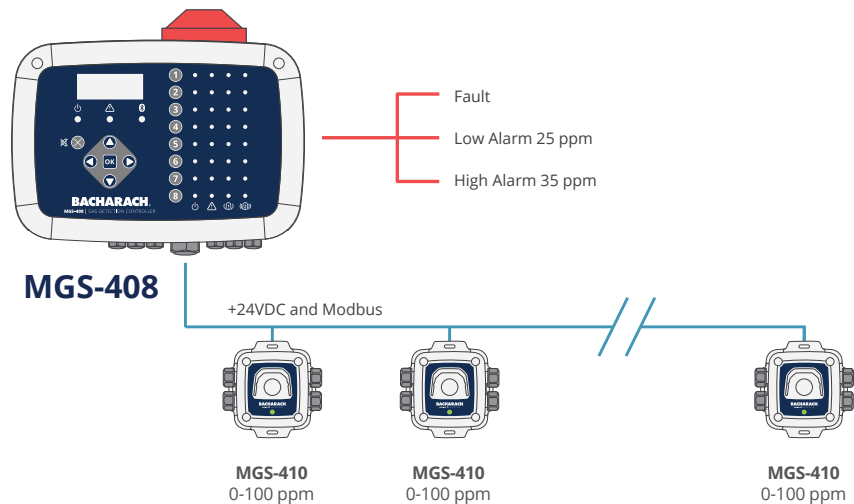
SYSTEM DESIGN EXAMPLES

MGS-400 GAS DETECTION SERIES

AMMONIA (NH₃) SYSTEM IIAR COMPLIANCE

REFRIGERATED AREA

25ppm: alarm to monitored location
35ppm: close liquid and hot gas solenoid valves

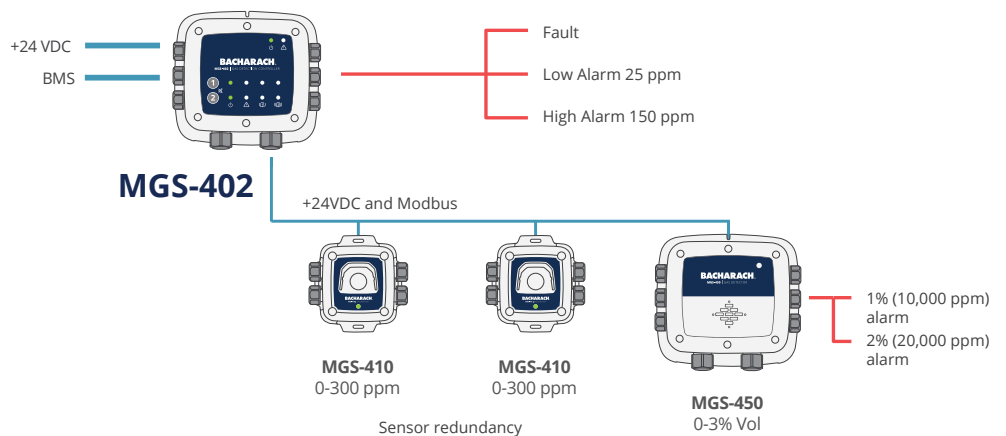


AMMONIA (NH₃) SYSTEM IIAR COMPLIANCE

COMPRESSOR ROOM

ALARM
25ppm: alarm to monitored location and horn strobe outside each entrance and inside the compressor room
150ppm: emergency ventilation activated

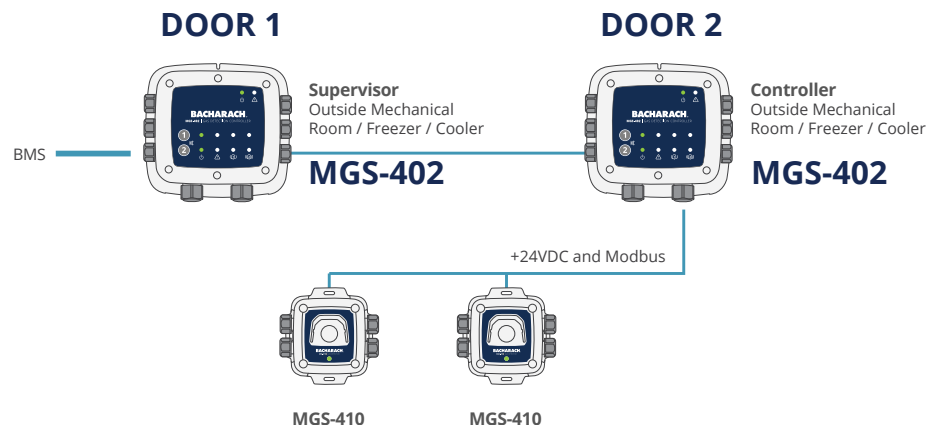
SHUTDOWN
10,000ppm: Redundant emergency ventilation
20,000ppm: De-energize pumps, compressors and valves that are normally closed



MULTI-DOOR ROOM

MECHANICAL ROOM

Alarms and ventilation gas dependent



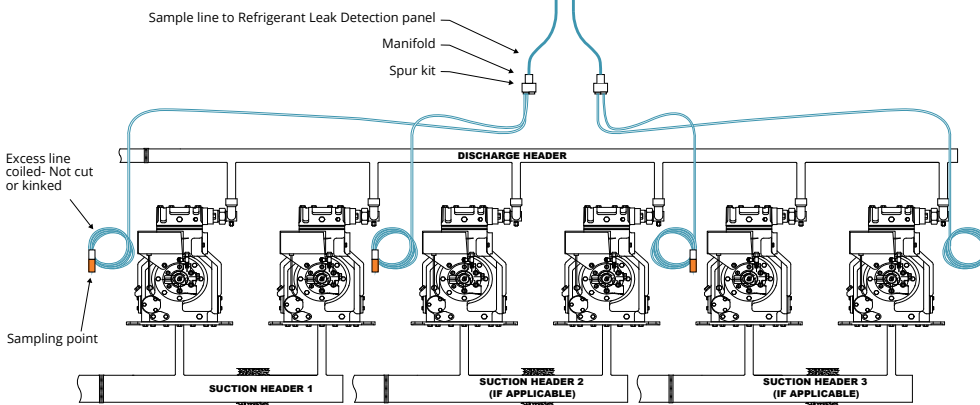
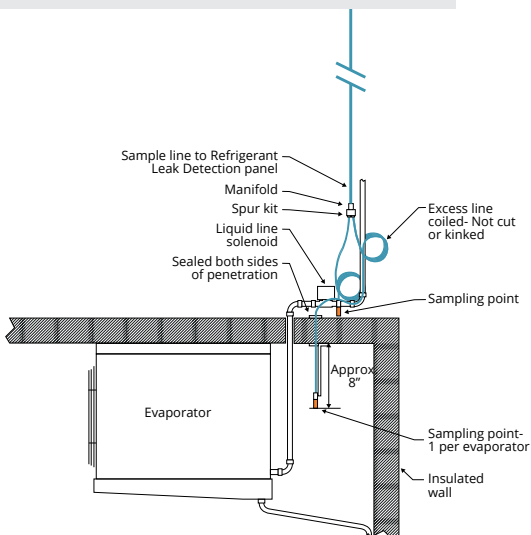
SYSTEM DESIGN EXAMPLES

MULTI-ZONE PRECISION MONITORING FOR LOW-LEVEL REFRIGERANT LEAK DETECTION

SUPERMARKET APPLICATIONS

WALK-IN FREEZER

The optimal location for a sample point in a walk-in freezer monitors air in the evaporator return airflow. This avoids icing on the sample point itself.



MULTI-ZONE

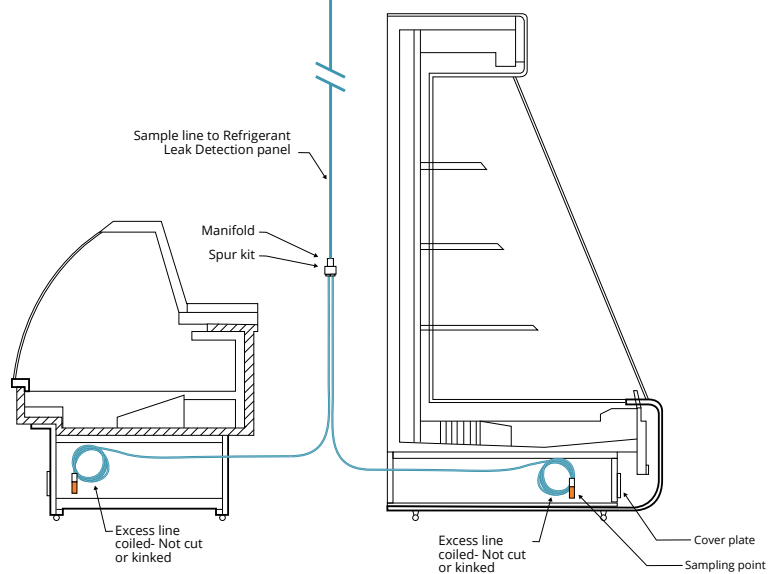
Modbus
Exhaust Line
Purge Line (to external source)

Analog 1 (Zone)*
Analog 2 (PPM)*
BacNet*
LON*
*Optional

Fault
Alarm 1
Alarm 2
Alarm 3

DISPLAY CASES

Applicable sample point locations include inside the case (as shown), under cases and thermal expansion valve locations.



COMPRESSOR RACKS AND HEADERS

For optimal detection in the compressor room, it is recommended to have at least four sample points distributed across the full length of the rack array providing an even coverage

GAS CALIBRATION AND ACCESSORIES

CALIBRATION ACCESSORIES AND KITS FOR CALIBRATING EQUIPMENT

CALIBRATION ADAPTORS

DESCRIPTION	PART NUMBER
MGS-250, FOR USE WITH IR HALOCARBON SENSOR	0051-3305
MGS-410, MGS-450, MGS-460 CALIBRATION ADAPTER	6302-9990
MGS-550 IP66 CALIBRATION ADAPTER	1100-0034
MVR-300 STANDARD VERSION, CALIBRATION ADAPTER	1100-2017
MVR-300 UK VERSION, CALIBRATION ADAPTER	1100-2056

CALIBRATION GAS REGULATORS

DESCRIPTION	PART NUMBER
REGULATOR, 0.3 LPM, 5/8"-18 UNF - FOR USE WITH MVR-300, MGS-410, MGS-450, MGS-460	0051-3299
REGULATOR (0.5 L/MIN, 5/8"-18 UNF) - FOR USE WITH MVR-300	0051-2358
REGULATOR, 1.0 LPM, 5/8"-18 UNF - FOR USE WITH MGS-250, MGS-550	0051-2320
VARIABLE FLOW REGULATOR, 4.0 LPM, 5/8"-18 UNF - FOR USE WITH HGM-SZ, AGM-SZ, CO2-SZ, HGM-MZ, AGM-MZ, CO2-MZ, PGM-IR	3015-3849

CALIBRATION KITS (W/O GAS)

DESCRIPTION	PART NUMBER
TWO CYLINDER CARRYING CASE	0051-1560
KIT: CARRYING CASE WITH 0.3 LPM REGULATOR	0051-3285
KIT: CARRYING CASE WITH 0.5 LPM REGULATOR	0051-3286
KIT: CARRYING CASE WITH 1.0 LPM REGULATOR	0051-3287

CALIBRATION KITS

DESCRIPTION	PART NUMBER
MVR-300 STANDARD VERSION, CALIBRATION KIT (CALIBRATION CUP, PLASTIC HOSE) - RECOMMEND (1) KIT FOR EVERY (10) GAS DETECTORS PURCHASED	1100-2018
MVR-300 UK VERSION, CALIBRATION KIT (CALIBRATION CUP, PLASTIC HOSE) - RECOMMEND (1) KIT FOR EVERY (10) GAS DETECTORS PURCHASED	1100-2065
MAGNETIC WAND - RECOMMENDED (1) FOR EVERY (10) GAS DETECTORS PURCHASED	1100-1004

CALIBRATION GAS (EUROPE)

GAS	CONCENTRATION	FILL GAS	VOLUME	PART NUMBER (EUROPE)
Carbon Monoxide, CO	300ppm	Balance Air	110L	1200-0112
Carbon Monoxide, CO	1000ppm	Balance Air	110L	1200-0110
Chlorine, CL ₂	10ppm	Balance N ₂	58L	1200-0194
Nitrogen Dioxide, O ₂	10ppm	Balance Air	58L	1200-0143
R-1150 (Ethylene, C ₂ H ₄)	2000ppm	Balance Air	110L	1200-0196
R-1234ze	300ppm	Balance Air	110L	1200-0131
R-134a	50ppm	Balance Air	110L	1200-0150
R-134a	500ppm	Balance Air	110L	1200-0151
R-134a	5000ppm	Balance Air	110L	1200-0200
R-134a	100ppm	Balance Air	110L	1200-0147
R-134a	1000ppm	Balance Air	110L	1200-0148
R-290	800ppm	Balance Air	110L	1200-0212
R-290	2000ppm	Balance Air	110L	1200-0159
R-290	1000ppm	Balance Air	110L	1200-0158
R-290 (Propane, C ₃ H ₈)	1700ppm	Balance Air	110L	1200-0102
R-32	300ppm	Balance Air	110L	1200-0160
R-32	2000ppm	Balance Air	110L	1200-0225
R-404A	500ppm	Balance Air	110L	1200-0165
R-404A	300ppm	Balance Air	110L	1200-0164
R-404A	2000ppm	Balance Air	110L	1200-0224
R-404A	100ppm	Balance Air	110L	1200-0161
R-404A	1000ppm	Balance Air	110L	1200-0162
R-407A	500ppm	Balance Air	110L	1200-0210
R-407A	300ppm	Balance Air	110L	1200-0169
R-407C	500ppm	Balance Air	110L	1200-0174
R-407C	300ppm	Balance Air	110L	1200-0173
R-407C	100ppm	Balance Air	110L	1200-0170
R-407C	1000ppm	Balance Air	110L	1200-0171
R-407C	10000ppm	Balance Air	110L	1200-0172
R-407F	100ppm	Balance Air	110L	1200-0204
R-407F	1000ppm	Balance Air	110L	1200-0176
R-410A	500ppm	Balance Air	110L	1200-0209
R-410A	5000ppm	Balance Air	110L	1200-0203
R-410A	2000ppm	Balance Air	110L	1200-0222
R-410A	100ppm	Balance Air	110L	1200-0177
R-410A	1000ppm	Balance Air	110L	1200-0178
R-410A	10000ppm	Balance Air	110L	1200-0179
R-422D	1000ppm	Balance Air	110L	1200-0183
R-449A	500ppm	Balance Air	110L	1200-0208
R-449A	1000ppm	Balance Air	110L	1200-0207
R-50 (Methane, CH ₄)	7200ppm	Balance Air	110L	1200-0109
R-50 (Methane, CH ₄)	2500ppm	Balance Air	110L	1200-0214
R-50 (Methane, CH ₄)	25000ppm	Balance Air	110L	1200-0106
R-50 (Methane, CH ₄)	1000ppm	Balance Air	110L	1200-0104
R-507A	100ppm	Balance Air	110L	1200-0191
R-507A	1000ppm	Balance Air	110L	1200-0192
R-717 (Ammonia, NH ₃)	800ppm	Balance Air	110L	1200-0142
R-717 (Ammonia, NH ₃)	50ppm	Balance Air	110L	1200-0140
R-717 (Ammonia, NH ₃)	500ppm	Balance Air	110L	1200-0141
R-717 (Ammonia, NH ₃)	200ppm	Balance Air	110L	1200-0137
R-717 (Ammonia, NH ₃)	100ppm	Balance Air	110L	1200-0134
R-717 (Ammonia, NH ₃)	1000ppm	Balance Air	110L	1200-0135
R-717 (Ammonia, NH ₃)	10000ppm	Balance Air	110L	1200-0136
R-744 (Carbon Dioxide, CO ₂)	9000ppm	Balance N ₂	110L	1200-0100
R-744 (Carbon Dioxide, CO ₂)	9000ppm	Balance N ₂	110L	1200-0126
R-744 (Carbon Dioxide, CO ₂)	770ppm	Balance N ₂	110L	1200-0125
R-744 (Carbon Dioxide, CO ₂)	5000ppm	Balance N ₂	110L	1200-0123
R-744 (Carbon Dioxide, CO ₂)	50000ppm	Balance N ₂	110L	1200-0124
R-744 (Carbon Dioxide, CO ₂)	4500ppm	Balance N ₂	110L	1200-0122
R-744 (Carbon Dioxide, CO ₂)	350ppm	Balance N ₂	110L	1200-0121
R-744 (Carbon Dioxide, CO ₂)	30000ppm	Balance N ₂	110L	1200-0120
R-744 (Carbon Dioxide, CO ₂)	2000ppm	Balance N ₂	110L	1200-0117
R-744 (Carbon Dioxide, CO ₂)	20000ppm	Balance N ₂	110L	1200-0118
R-744 (Carbon Dioxide, CO ₂)	1400ppm	Balance N ₂	110L	1200-0115
R-744 (Carbon Dioxide, CO ₂)	10000ppm	Balance N ₂	110L	1200-0114

CALIBRATION GAS (NORTH AMERICA)

GAS	CONCENTRATION	FILL GAS	VOLUME	PART NUMBER (NORTH AMERICA)
R-600 (Butane)	50 %LEL	Balance Air	34L	0051-4030
Chlorine, Cl ₂	5 ppm	Balance N ₂	34L	0051-4022
Carbon Monoxide, CO	1,000 ppm	Balance N ₂	103L	0024-0794
Carbon Monoxide, CO	1,000 ppm	Balance Air	103L	0051-4027
Carbon Monoxide, CO	100 ppm	Balance Air	103L	0051-1994
Carbon Monoxide, CO	100 ppm	Balance Air	34L	0051-4025
Carbon Monoxide, CO	25 ppm	Balance Air	34L	0051-4023
Carbon Monoxide, CO	4,000 ppm	Balance Air	103L	0024-1155
Carbon Monoxide, CO	50 ppm	Balance Air	34L	0051-4024
Carbon Monoxide, CO	500 ppm	Balance Air	103L	0024-0492
Carbon Monoxide, CO	500 ppm	Balance Air	34L	0051-4026
R-744 (Carbon Dioxide, CO ₂)	1,000 ppm	Balance Air	103L	0051-4017
R-744 (Carbon Dioxide, CO ₂)	10,000 ppm	Balance Air	34L	0051-4008
R-744 (Carbon Dioxide, CO ₂)	100,000 ppm	Balance Air	34L	0051-4012
R-744 (Carbon Dioxide, CO ₂)	15,000 ppm	Balance Air	34L	0051-4009
R-744 (Carbon Dioxide, CO ₂)	150,000 ppm	Balance N ₂	34L	0051-4013
R-744 (Carbon Dioxide, CO ₂)	2,500 ppm	Balance Air	103L	0051-4018
R-744 (Carbon Dioxide, CO ₂)	25,000 ppm	Balance Air	34L	0051-4010
R-744 (Carbon Dioxide, CO ₂)	250,000 ppm	Balance N ₂	34L	0051-4014
R-744 (Carbon Dioxide, CO ₂)	4,000 ppm	Balance N ₂	103L	0051-4019
R-744 (Carbon Dioxide, CO ₂)	5,000 ppm	Balance N ₂	34L	0051-4020
R-744 (Carbon Dioxide, CO ₂)	50,000 ppm	Balance Air	103L	0051-4011
R-744 (Carbon Dioxide, CO ₂)	50,000 ppm	Balance Air	17L	0024-1126
R-744 (Carbon Dioxide, CO ₂)	500,000 ppm	Balance N ₂	34L	0051-4015
R-744 (Carbon Dioxide, CO ₂)	7,500 ppm	Balance Air	34L	0051-4021
R-744 (Carbon Dioxide, CO ₂)	750,000 ppm	Balance Air	34L	0051-4016
R-1150 (Ethylene, C ₂ H ₄)	1,000 ppm	Balance Air	34L	0051-4038
R-1150 (Ethylene, C ₂ H ₄)	10 ppm	Balance Air	34L	0051-4036
R-1150 (Ethylene, C ₂ H ₄)	500 ppm	Balance Air	34L	0051-4037
Ethylene Oxide, C ₂ H ₄ O	5 ppm	Balance N ₂	58L	0051-4035
Hydrogen, H ₂	1 Vol%	Balance N ₂	103L	0051-4039
Hydrogen, H ₂	1,000 ppm	Balance Air	34L	0051-4041
Hydrogen, H ₂	100 ppm	Balance Air	34L	0051-4040
Hydrogen Sulfide, H ₂ S	25 ppm	Balance N ₂	34L	0051-4044
Hydrogen Sulfide, H ₂ S	5 ppm	Balance N ₂	34L	0051-4043
Hydrogen Chloride, HCl	5 ppm	Balance N ₂	58L	0051-4042
Isobutylene	1,000 ppm	Balance Air	34L	0051-4078
Isobutylene	150 ppm	Balance Air	34L	0051-4077
Isobutylene	25 ppm	Balance Air	34L	0051-4076
R-50 (Methane, CH ₄)	2,500 ppm	Balance Air	34L	0051-4033
R-50 (Methane, CH ₄)	25 %LEL	Balance Air	34L	0051-4031
R-50 (Methane, CH ₄)	5,000 ppm	Balance Air	34L	0051-4034
R-50 (Methane, CH ₄)	50 %LEL	Balance Air	103L	0051-1121
R-50 (Methane, CH ₄)	50 %LEL	Balance Air	34L	0051-4032
R-50 (Methane, CH ₄)	500 ppm	Balance Air	103L	0051-1816
R-717 (Ammonia, NH ₃)	1,000 ppm	Balance N ₂	34L	0051-4005
R-717 (Ammonia, NH ₃)	10,000 ppm	Balance Air	58L	0051-4282
R-717 (Ammonia, NH ₃)	100 ppm	Balance Air	58L	0051-4002
R-717 (Ammonia, NH ₃)	150 ppm	Balance Air	58L	0051-4281
R-717 (Ammonia, NH ₃)	2,500 ppm	Balance N ₂	34L	0051-4006
R-717 (Ammonia, NH ₃)	25 ppm	Balance Air	34L	0051-4000
R-717 (Ammonia, NH ₃)	250 ppm	Balance Air	34L	0051-4003
R-717 (Ammonia, NH ₃)	30,000 ppm	Balance Air	58L	0051-4265
R-717 (Ammonia, NH ₃)	5,000 ppm	Balance N ₂	34L	0051-4007
R-717 (Ammonia, NH ₃)	50 ppm	Balance Air	34L	0051-4001
R-717 (Ammonia, NH ₃)	500 ppm	Balance N ₂	34L	0051-4004
Nitrogen, N ₂	Pure Nitrogen	Pure Nitrogen	103L	9550-0049
Nitrogen, N ₂	Pure Nitrogen	Pure Nitrogen	17L	0023-4003
Nitrogen, N ₂	Pure Nitrogen	Pure Nitrogen	34L	0051-4053
Nitrogen Oxide, NO	10 ppm	Balance Air	34L	0051-4047
Nitrogen Oxide, NO	25 ppm	Balance N ₂	34L	0051-4045
Nitrogen Oxide, NO	250 ppm	Balance N ₂	58L	0024-1156
Nitrogen Oxide, NO	50 ppm	Balance Air	34L	0051-4046
Nitrogen Dioxide, O ₂	100 ppm	Balance N ₂	58L	0024-1157

CALIBRATION GAS (NORTH AMERICA)

GAS	CONCENTRATION	FILL GAS	VOLUME	PART NUMBER (NORTH AMERICA)
Nitrogen Dioxide, O ₂	5 ppm	Balance Air	34L	0051-4048
Oxygen, O ₂	19.0 Vol%	Balance N ₂	34L	0051-4051
Oxygen, O ₂	20.9 Vol%	Balance N ₂	34L	0051-4049
Oxygen, O ₂	23 Vol%	Balance N ₂	34L	0051-4050
PH ₃	1 ppm	Balance N ₂	34L	0051-4052
R-290 (Propane, C ₃ H ₈)	25 %LEL	Balance Air	34L	0051-4028
R-290 (Propane, C ₃ H ₈)	50 %LEL	Balance Air	17L	0023-4009
R-290 (Propane, C ₃ H ₈)	50 %LEL	Balance Air	34L	0051-4029
R-123	100 ppm	Balance Air	103L	3015-3852
R-1233zd	1,000 ppm	Balance Air	58L	0051-4213
R-1233zd	500 ppm	Balance Air	58L	0051-4212
R-1234ze	1,000 ppm	Balance Air	58L	0051-4196
R-134a	1,000 ppm	Balance Air	34L	0051-4057
R-134a	100 ppm	Balance Air	103L	3015-3851
R-134a	100 ppm	Balance Air	34L	0051-4055
R-134a	50 ppm	Balance Air	34L	0051-4054
R-134a	500 ppm	Balance Air	34L	0051-4056
R-22	1,000 ppm	Balance Air	34L	0051-4061
R-22	100 ppm	Balance Air	103L	3015-3850
R-22	100 ppm	Balance Air	34L	0051-4059
R-22	50 ppm	Balance Air	34L	0051-4058
R-22	500 ppm	Balance Air	34L	0051-4060
R-290	1,000 ppm	Balance Air	34L	0051-4062
R-290	2,000 ppm	Balance Air	34L	0051-4063
R-32	500ppm	Balance Air	103L	0051-4241
R-32	1,000 ppm	Balance Air	58L	0051-4205
R-404A	1,000 ppm	Balance Air	34L	0051-4067
R-404A	100 ppm	Balance Air	34L	0051-4065
R-404A	50 ppm	Balance Air	34L	0051-4064
R-404A	500 ppm	Balance Air	34L	0051-4066
R-407A	1,000 ppm	Balance Air	58L	0051-4187
R-407A	50 ppm	Balance Air	34L	0051-4068
R-407A	500 ppm	Balance Air	34L	0051-4069
R-407A	1,000 ppm	Balance Air	58L	0051-4188
R-407F	1,000 ppm	Balance Air	58L	0051-4189
R-410A	1,000 ppm	Balance Air	58L	0051-4190
R-410A	2,000 ppm	Balance Air	103L	0051-4208
R-410A	50 ppm	Balance Air	34L	0051-4070
R-410A	500 ppm	Balance Air	34L	0051-4071
R-422A	1,000 ppm	Balance Air	58L	0051-4191
R-422D	1,000 ppm	Balance Air	58L	0051-4192
R-427A	1,000 ppm	Balance Air	58L	0051-4193
R-434A	1,000 ppm	Balance Air	103L	0051-4251
R-448A	500 ppm	Balance Air	103L	0051-4252
R-448A	1,000 ppm	Balance Air	58L	0051-4200
R-449A	1,000 ppm	Balance Air	58L	0051-4201
R-450A	1,000 ppm	Balance Air	103L	0051-4254
R-452A	1,000 ppm	Balance Air	58L	0051-4202
R-452B	1,000 ppm	Balance Air	58L	0051-4203
R-454A	1,000 ppm	Balance Air	103L	0051-4258
R-454B	1,000 ppm	Balance Air	34L	0051-4280
R-454C	1,000 ppm	Balance Air	100L	0051-4260
R-455A	1,000 ppm	Balance Air	100L	0051-4279
R-507	1,000 ppm	Balance Air	58L	0051-4194
R-507	50 ppm	Balance Air	34L	0051-4072
R-507	500 ppm	Balance Air	34L	0051-4073
R-513A	500 ppm	Balance Air	103L	0051-4261
R-513A	1,000 ppm	Balance Air	58L	0051-4204
R-514A	1,000 ppm	Balance Air	58L	0051-4214
R-600A	800 ppm	Balance Air	34L	0051-4074
Sulfur Dioxide, SO ₂	100 ppm	Balance N ₂	58L	0024-1158
Sulfur Dioxide, SO ₂	5 ppm	Balance Air	34L	0051-4075



Bacharach, Inc., 621 Hunt Valley Circle, New Kensington, PA 15068, USA

www.mybacharach.com
marketing@mybacharach.com