![MSA logo]

The Safety Company

MSA Bacharach Gas Detection and Monitoring Solutions

Product Catalog and System Design Guide

SAFEGUARDING PEOPLE, PLACES & THE PLANET.

Fixed Instrument Selector

CHOOSING THE RIGHT FIXED GAS DETECTION SOLUTION FOR YOU

	Multi-Zone	Ethylene Monitor	Single-Zone	PGM-IR	MGS-400 Series	MGS-250	MGS-550	MVR-300
REFRIGERANT	●		●	●	●	●	●	●
TOXIC	●*		●		●		●	
COMBUSTIBLE	●*				●		●	
PROCESS GASES		●		●*				
SENSOR TYPE	IR	IR	IR	IR	EC/CT/SC/IR	IR	EC/CT/SC/IR	SC

*requires a specific version

Gas List and Instrument Suitability

Color key: 🟢 green, ⚫ gray, 🟠 orange, 🟡 yellow

	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_2H)	A3	🟢						
FA-188	—	🟢	⚫	🟠				
FC-72	—	🟢	⚫	🟠				
FC-3284	—	🟢	⚫					
H1211	A1	🟢	⚫	🟠				
H1301	A1	🟢	⚫	🟠				
R-1336mzz(E)	A1	🟢	⚫					
R-1336mzz(E)	A1	🟢	⚫					
H2402	—	🟢	⚫	🟠				
HFP	—	🟢	⚫	🟠				
LPG	A3						🟢	
R-50 (Methane, CH_4)	A3					🟡	🟢	
N1230	—	🟢	⚫	🟠				
N4710	—	🟢	⚫	🟠				
N5110	—	🟢	⚫					
N7100	—	🟢	⚫	🟠				
N7200	—	🟢	⚫	🟠				
N7300	—	🟢	⚫	🟠				
N7600	—	🟢	⚫	🟠				
Nitrous Oxide, N_2O	A1	🟢		🟠				
Nitrogen Dioxide, NO_2	—					🟡	🟢	
Oxygen, O_2	—					🟡	🟢	
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	🟢	⚫	🟠				
R-236fa	A1	🟢	⚫	🟠				
R-245fa	B1	🟢	⚫	🟠	⚫			

	Safety Group	Multi-Zone	Single-Zone	PGM-IR	MGS-250	MGS-400 Series	MGS-550	MVR-300
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-407H	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-463A	A1		⚫	🟠				
R-500	A1	🟢	⚫	🟠				
R-502	A1	🟢	⚫	🟠				
R-503	A1	🟢	⚫	🟠				
R-507A	A1	🟢	⚫	🟠	⚫	🟡	🟢	
R-508B	A1	🟢	⚫	🟠				
R-513A	A1	🟢	⚫	🟠	⚫	🟡	🟢	
R-514A	B1	🟢	⚫	🟠	⚫			
R-600 (Butane)	A3	🟢*				🟡	🟢	
R-600A	—	🟢*		🟠*				
R-717 (Ammonia, NH_3)	B2L	🟢*	⚫*			🟡	🟢	
Sulfur Hexafluoride, SF_6	—	🟢*	⚫*	🟠*				

*requires a specific version

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, F-GAS

• Alarm levels and response time set by standards and regulation
• 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, MSA Bacharach's Multi-Zone refrigerant monitor provides early detection with an industry leading 1 ppm MDL. *See page 8 for more information.*

SAFETY ALARM ACTIVATION RANGE

EARLY DETECTION RANGE

LEAK CONCENTRATION (PPM)

5 OCT. 6 OCT. 7 OCT. 8 OCT. 9 OCT. 10 OCT.

Early Warning Monitoring

EPA SECTION 608, CARB, F-GAS, AIM Act

- Alarm levels set to detect low level leaks
- 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

Leak Detection Performance Comparison

		SMALL LEAKS	MODERATE LEAKS	LARGE LEAKS
⚠	**SAFETY DETECTOR** 50 - 200 PPM MDL	Will Not Detect	May Not Detect	Will Detect
🔍	**EARLY WARNING MONITORING** 1PPM MDL	Will Detect	Will Detect	Will Detect

MDL = Minimum Detection Level
PPM = Parts Per Million

Compliance: EPA Section 608, CARB, F-Gas, AIM Act

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

Multi-Zone Refrigerant Monitor

PRECISION MONITORING FOR LOW-LEVEL REFRIGERANT LEAK DETECTION

CARB COMPLIANT
MEETS STANDARDS FOR REFRIGERANT LEAK DETECTION

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

Capable of monitoring up to 16 zones

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

Backlit display shows real-time concentration readings

Easy to use interface with LED traffic light notifications

BACHARACH.
MULTI-ZONE | REFRIGERANT GAS MONITOR

BEST IN CLASS FOR EARLY DETECTION

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

- Non-Dispersive 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, R-290, R-600, R-600a, SF6)*
- 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 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
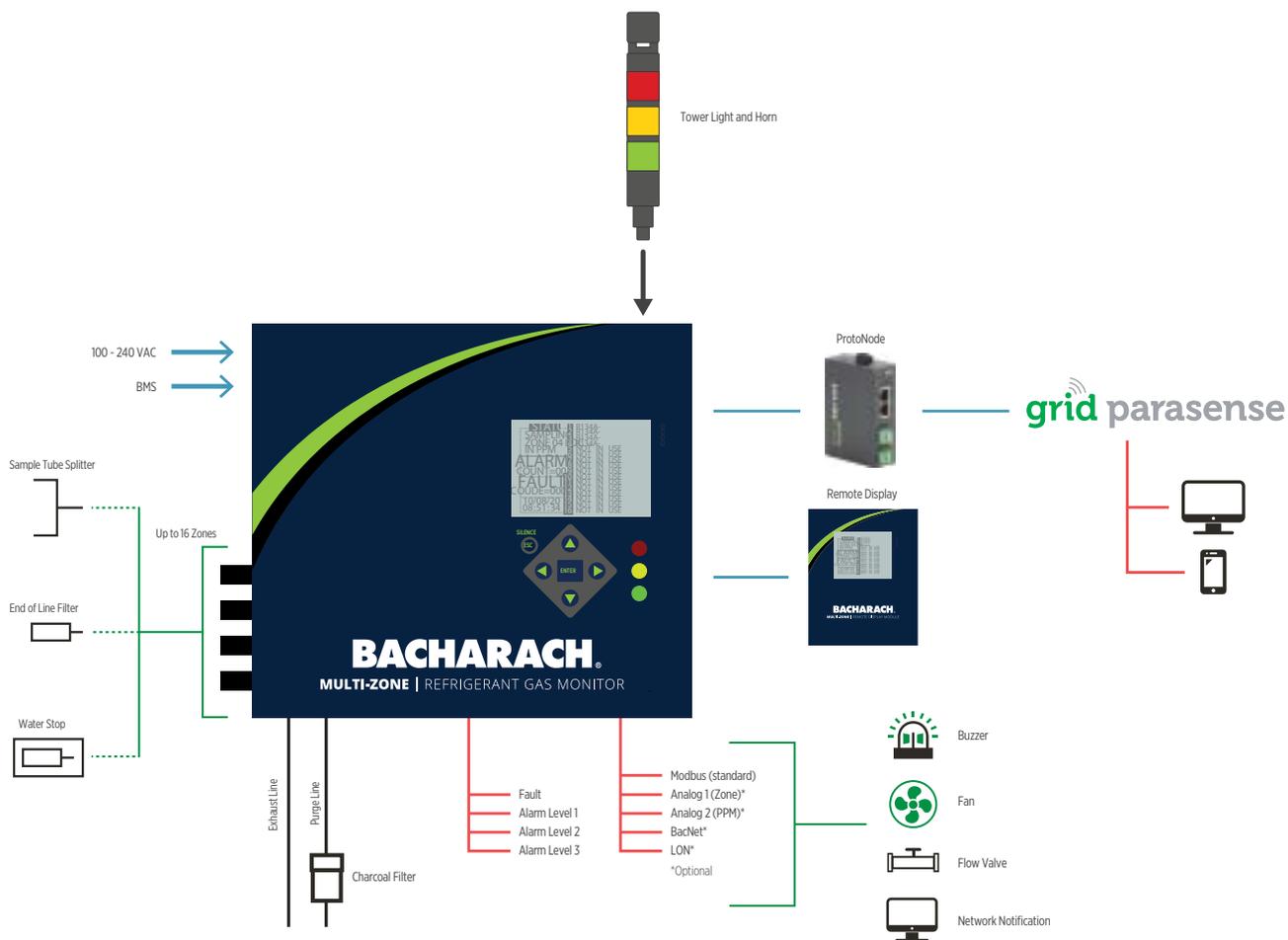- One dedicated fault relay

* sensor-dependent

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

Specifications

Sensor Channels	4 to 16
Sensitivity / Minimum Detection Level	Refrigerants: 1 ppm, Ammonia: 20ppm, CO_2: 10ppm, Hydrocarbons: 5 ppm
Enclosure Rating Sampling distance 0-1200ft (0-365m)	General Purpose
Sampling Mode	Automatic with auto re-zeroing
Analog Communications	4 to 20 mA (optional)
Digital Communications	Modbus RTU via RS 485 BACnet MS/TP and IP (optional)
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	100-240V AC, 50 / 60 Hz Input
Expected Sensor Service Life	10 Years
Supports/Enables Compliance with Industry Codes & Regulations	CARB RMP, F-Gas Regulation
Product Performance Approvals	CE, UL, CSA, EN 61010-1, EN 61326
Warranty	2 Years

Multi-Zone Refrigerant Monitor Configuration

Tower Light and Horn

100 - 240 VAC

BMS

ProtoNode

grid parasense

Remote Display

Sample Tube Splitter

Up to 16 Zones

End of Line Filter

Water Stop

Exhaust Line

Purge Line

Charcoal Filter

Fault
Alarm Level 1
Alarm Level 2
Alarm Level 3

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

Buzzer

Fan

Flow Valve

Network Notification

BACHARACH®
MULTI-ZONE | REFRIGERANT GAS MONITOR

Multi-Zone Refrigerant Monitor Part Numbers

GAS	ZONES	PART NUMBER (STANDARD UNIT)
HALOGEN	4	H3015-5043
HALOGEN	8	H3015-5044
HALOGEN	12	H3015-5045
HALOGEN	16	H3015-5046
R-717 (AMMONIA, NH$_3$)	4	H3015-5047
R-717 (AMMONIA, NH$_3$)	8	H3015-5048
R-717 (AMMONIA, NH$_3$)	12	H3015-5049
R-717 (AMMONIA, NH$_3$)	16	H3015-5050
R-744 (CARBON DIOXIDE, CO$_2$)	4	H3015-5356
R-744 (CARBON DIOXIDE, CO$_2$)	8	H3015-5357
R-744 (CARBON DIOXIDE, CO$_2$)	12	H3015-5358
R-744 (CARBON DIOXIDE, CO$_2$)	16	H3015-5359

Multi-Zone Ethylene Monitor

PRECISION MONITORING FOR ETHYLENE

Proprietary infrared (NDIR) sensor accurately detects the presence of ethylene down to 10 ppm Minimum Detection Level (MDL)

Backlit display shows real-time concentration readings

Capable of monitoring up to 16 zones

Easy to use interface with LED traffic light notifications

MONITORS CRITICAL FRUIT AND VEGETABLE RIPENING

MSA 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
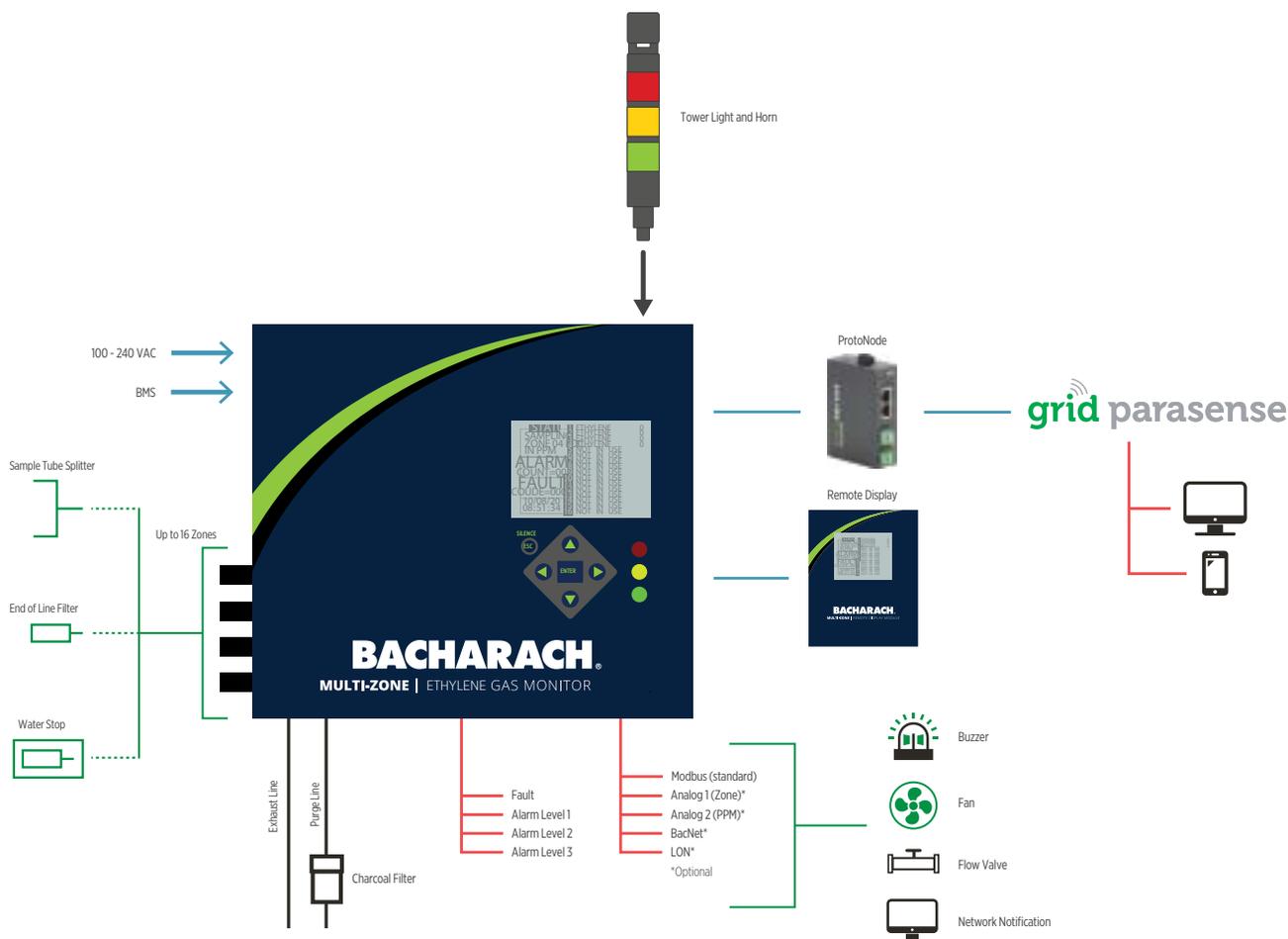- One dedicated fault relay

More Information:
Scan the QR code to learn more about the Multi-Zone Ethylene Monitor.

Specifications

Sensor Channels	4 to 16
Sensitivity / Minimum Detection Level	Ethylene (C2H4) / R-1150: 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
Sampling Distance	0-1200 ft. (0-365 m)
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	100-240V AC, 50 / 60 Hz Input
Expected Sensor Service Life	10 Years
Supports/Enables Compliance with Industry Codes & Regulations	CARB RMP, F-Gas Regulation
Product Performance Approvals	CE, UL, CSA, EN 61010-1, EN 61326
Warranty	2 Years

Multi-Zone Ethylene Monitor Configuration

Tower Light and Horn

100 - 240 VAC

BMS

Sample Tube Splitter

Up to 16 Zones

End of Line Filter

Water Stop

Exhaust Line

Purge Line

Charcoal Filter

ProtoNode

Remote Display

grid parasense

BACHARACH

MULTI-ZONE | ETHYLENE GAS MONITOR

Fault
Alarm Level 1
Alarm Level 2
Alarm Level 3

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

Buzzer

Fan

Flow Valve

Network Notification

Multi-Zone Ethylene Monitor Part Numbers

GAS	ZONES	PART NUMBER (STANDARD UNIT)
R-1150 (ETHYLENE, C2H4)	4	H3015-6301
R-1150 (ETHYLENE, C2H4)	8	H3015-6302
R-1150 (ETHYLENE, C2H4)	12	H3015-6303
R-1150 (ETHYLENE, C2H4)	16	H3015-6304
HGM-RD, REMOTE DISPLAY MODULE	N / A	H3015-5138

Single-Zone Refrigerant Monitor

PRECISION MONITORING FOR LOW-LEVEL REFRIGERANT LEAK DETECTION

CARB COMPLIANT
MEETS STANDARDS FOR 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 1 PPM FOR EARLY WARNING LEAK DETECTION

MSA Bacharach's Single-Zone refrigerant monitors provides precise measurements enabling early warning, continuous leak detection for compliance with refrigeration safety codes (ASHRAE 15/34 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 3 sample points with tubing splitters.
- Three user-configurable relays (leak, spill and evacuate) may be used to activate external beacons / sounders, ventilation or other countermeasures
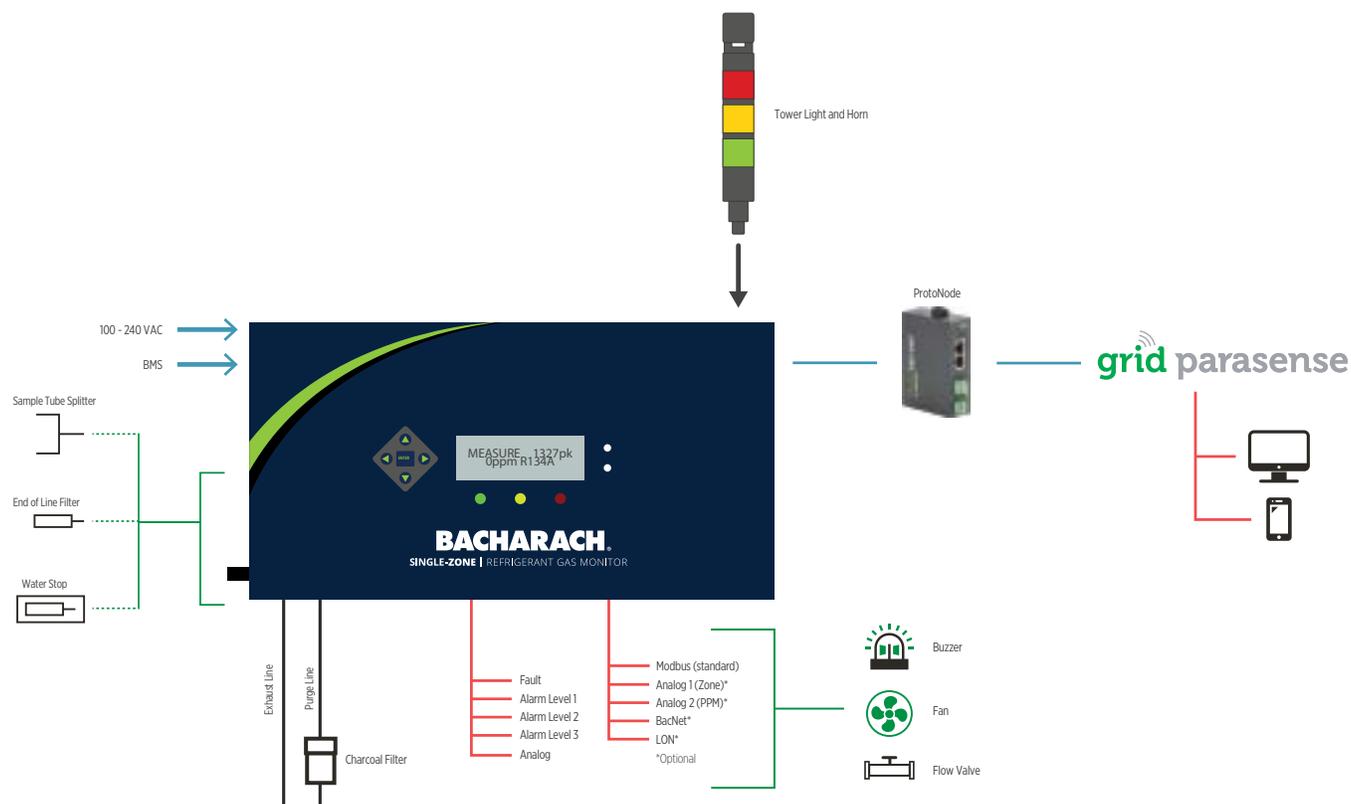- One dedicated fault relay

Specifications

Sensor Channels	1
Sensitivity / Minimum Detection Level	Refrigerants: 1 ppm, Ammonia: 10 ppm, CO_2: 10 ppm
Enclosure Rating	General Purpose
Sampling Distance	0-500 ft. (0-152 m)
Analog Communications	4 to 20 mA
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
Power	100-240V AC, 50 / 60 Hz Input
Expected Sensor Service Life	10 Years
Supports/Enables Compliance with Industry Codes & Regulations	CARB RMP, F-Gas Regulation
Product Performance Approvals	CE, UL, CSA, EN 61010-1, EN 61326
Warranty	2 Years

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

Single-Zone Refrigerant Monitor Configuration

Tower Light and Horn

ProtoNode

grid parasense

100 - 240 VAC

BMS

Sample Tube Splitter

End of Line Filter

Water Stop

MEASURE   1327pk
0ppm R134A

BACHARACH
SINGLE-ZONE | REFRIGERANT GAS MONITOR

Exhaust Line

Purge Line

Charcoal Filter

Fault
Alarm Level 1
Alarm Level 2
Alarm Level 3
Analog

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

Buzzer

Fan

Flow Valve

Single-Zone Refrigerant Monitor Part Numbers

GAS	ZONES
HALOGEN	H3015-4200
R-717 (AMMONIA, NH3)	H3015-4280
R-744 (CARBON DIOXIDE, CO2)	H3015-4601

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

• Carbon Monoxide: 50 PPM detection limit

Multi-Zone Relay Module

16-CHANNEL RELAY EXPANSION MODULE

Relay expansion for 16-channels to provide flexibility and reliability by providing selectable input/output power, user configurable relays.

MODBUS DIP Switch, RS485 connector and Status LEDs

Horn / Strobe grounding terminals

Circuit breaker for improved safety

EXPANSION MODULE FOR GREATER SYSTEM CONTROL

MSA Bacharach's HMZ-RM1 Multi-Zone Relay Module integrates with all Multi-Zone Gas Monitors to expand the available relay capacity from four to thirty six relays when two relay modules are installed. With maximum expanded relay capacity, the Multi-Zone Monitor can provide at least two additional relays per zone with individual triggers and control a variety of horns and strobes in a facility. The HMZ-RM1 adds flexibility and reliability to any monitoring system by providing selectable input/output power, user configurable relays, and onboard status indication.

Combining the HMZ-RM1 with Bacharach's Multi-Zone Gas Monitor provides the peace of mind that when a safety event or system fault occurs, all personnel in previously unreachable locations will be audibly and/or visually alerted to the event.

Specifications

Enclosure Rating	General Purpose
Product Dimensions (L × W × H)	13.7" × 12.3" × 5" (350 × 315 × 130 mm)
Product Weight	15 lbs. (6.8 kg)
Power	100-240V AC, 50 / 60 Hz Input
Product Performance Approvals	CE Mark, UL, CAS, EN 61010-1, EN 61326
Operating Temperature	-4 - 122°F (-4 - 122°C)
Cable Entries	Gland Plate
Output	16 SPDT relays
Output	24V DC 60W total

More Information:

Scan the QR code to learn more about the Multi-Zone Relay Module and other Bacharach products.

Multi-Zone, Ethylene Monitor, and Single-Zone Accessories

DESCRIPTION	PART NUMBER
HMZ-RM1 MULTI-ZONE RELAY MODULE 16-CHANNEL RELAY EXPANSION MODULE	H3015-6265
HGM-RD, REMOTE DISPLAY MODULE (SEE TECHNICAL LIBRARY FOR INSTRUCTION MANUAL)	H3015-5138
AUDIBLE/VISUAL ALARM, 120V AC, BLUE STROBE	H3015-5804
AUDIBLE/VISUAL ALARM, 120V AC, RED STROBE	H3015-3076
HORN + STROBE 24V DC - BLUE LENS (NO CE MARK)	H3015-8041
STROBE - BLUE LENS - MP120K 120V AC ADAPTER	H3015-8044
HORN + STROBE 24V DC - RED LENS (NO CE MARK)	H3015-8043
STROBE - RED LENS - MP120K 120V AC ADAPTER	H3015-8046
HORN + STROBE 24V DC - AMBER LENS (NO CE MARK)	H3015-8042
STROBE - AMBER LENS - MP120K 120V AC ADAPTER	H3015-8045
AIR SAMPLE TUBING (250 FT. / 76 M ROLL)	H3015-3235
AIR SAMPLE TUBING - AMMONIA ONLY (500 FT. / 152 M ROLL)	H3015-5111
AIR SAMPLE TUBING COUPLING, QUICK DISCONNECT	H3015-5762
SPLITTER KIT, 2-WAY, INCLUDES LINE END FILTERS AND BRACKETS (NOT FOR USE W/NH$_3$)	H3015-5404
SPLITTER KIT, 3-WAY, INCLUDES LINE END FILTERS AND BRACKETS (NOT FOR USE W/NH$_3$)	H3015-5405
R-22 GAS VERIFICATION KIT	H3015-3430
R-134A GAS VERIFICATION KIT	H3015-3437
R-123 GAS VERIFICATION KIT	H3015-3438
VARIABLE FLOW REGULATOR	H3015-3849
LINE END FILTER ONLY	H3015-2906
LINE END FILTER ASSEMBLY	H3015-3420
CHARCOAL FILTER ASSEMBLY WITH FITTINGS	H3015-3125
CHARCOAL FILTER MOUNTING BRACKET	H3015-2969
SPLASH/SPRAY-RESISTANT END OF LINE FILTER ASSEMBLY	H3015-5748
HYDROPHOBIC FILTER (INTERNAL WATER STOP)	H0007-1650
INLINE WATER TRAP	H0007-1655
INLINE WATER TRAP, REPLACEMENT FILTER ELEMENT	H0007-1656
LINE END WATER STOP	H3015-5512
SAMPLE PUMP	H3015-5176
RS-232C TO RS-485 ADAPTER KIT	H3015-6028

Multi-Zone and Ethylene

DESCRIPTION	PART NUMBER
BACNET COMMUNICATIONS MODULE PACKAGE	H3015-5705
DUAL 4-20 MA DC OUTPUT PC BOARD	H3015-5152
4 ZONE EXPANSION KIT (MAX OF 3 PER MZ) NOTE: MUST ALSO ORDER 3015-3411	H3015-5171

Multi-Zone Remote Display

Provides remote display of up to 4 Multi-Zone gas monitoring status for easy access and single point reference (Part Number 3015-5138).

Specifications

Connections	Up to 4 Multi-Zones
Output	2 relays
Communication	RS-485
Size	28 x2 5.5 x 8 cm
Weight	5 lbs. (2.3 kg)
Power	100-240V AC, 50 / 60 Hz Input

PGM-IR Portable Refrigerant Monitor

PRECISION MONITORING FOR LOW-LEVEL REFRIGERANT LEAK DETECTION

Robust carry handle and integral protective case

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

Backlit display shows real-time concentration readings

Integrated charcoal purge filter

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

FIND LEAKS LIKE NO OTHER

MSA 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
- Rechargeable Li-ion battery, up to 8 hours of continuous monitoring

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
Power	Rechargeable Li-ion Battery Pack
Product Performance Approvals	CE, UL, CSA, EN 61010-1
A2L and A3 Safety	FM Technical Decision Form TD 221

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	H3015-5696
R-744 (CARBON DIOXIDE, CO_2)	H3015-8001
NITROUS OXIDE, N_2O	H3015-4790
SF6	H3015-5148
HYDROCARBONS (R-290, R-600, AND R-600A)	H3015-8018

Accessories

DESCRIPTION	PART NUMBER
RECHARGEABLE BATTERY PACK WITH CHARGER	H3015-5743
REPLACEMENT SOFT CARRYING CASE FOR ALL PGM UNITS	H3015-5700
REPLACEMENT BATTERY CHARGER (FOR 87 WH BATTERY 3015-5743)	H3015-5847
PGM-IR INTERNAL HYDROPHOBIC FILTER	H0007-1659
EXTERNAL FILTER	H3015-2906
PGM-IR INLINE COALESCING FILTER	H3015-3071
PGM-IR CHARCOAL FILTER REPLACEMENT KIT, FOR 3015-5696	H3015-5714
BATTERY, COIN CELL, FOR MAIN PCB	H0204-0020

Parasense RTC Software

REFRIGERANT TRACKING AND COMPLIANCE SOFTWARE

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

- The work has been carefully designed to distill managing refrigerants 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 reporting 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

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 RTS system can help you improve these metrics even 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 and the AIM Act 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 MSA Grid 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 MSA Bacharach products.
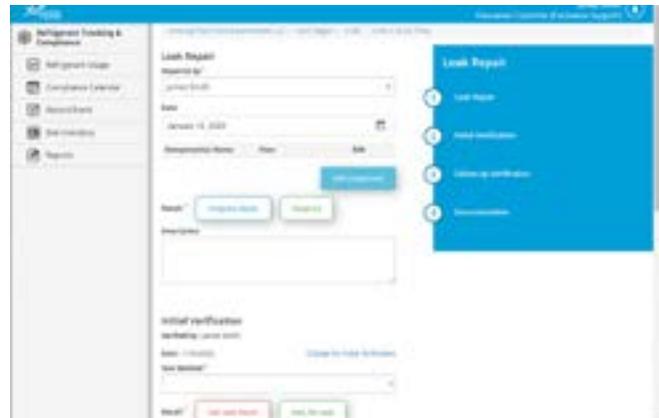
Parasense Enterprise Leak Detection (ELD) Software

The Enterprise Leak Detection (ELD) software provides 24/7 visibility of refrigerant leaks in your connected solutions facility, covering all equipment like display cases, cold rooms, and compressor racks. It offers leading refrigerant management and notification tools that help reduce operating costs, promote sustainability, and heighten visibility across enterprise performance.

It also supports supermarkets' carbon-neutral goals through real-time visibility, enabling an effective and rapid response to refrigerant leaks.

Benefits of Using Parasense ELD Software

Operational Cost Savings

Grocery stores' average leak rate is 25% annually, but best practices can reduce this to under 10%. Saving $10,000 in refrigeration re-charges is the equivalent of $1,000,000 in revenue for a 1% margin organization.

Combined refrigeration and HVAC equipment can account for 75% of supermarket energy usage. Refrigeration equipment uses significantly more energy when the refrigerant charge is less than optimal. Ignoring the impact of low-level leaks on energy consumption is an ongoing and hidden cost.
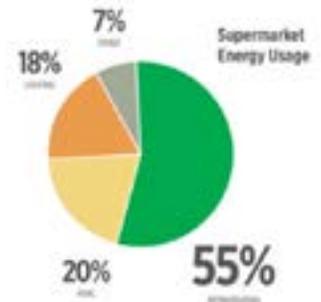

24/7/365 Notification of an Event

Parasense ELD software immediately notifies multiple recipients of refrigerant leaks above a predetermined level.

Monthly analysis

An intuitive dashboard view provides an analysis of any desired time frame, showing even low-level leaks and patterns, which can be sent to multiple recipients. Alerts, alarms, and critical thresholds give users critical visibility and notifications for leak events at their facilities. Catching low-level leaks early is fundamental to cost savings across an enterprise.

Event Notification
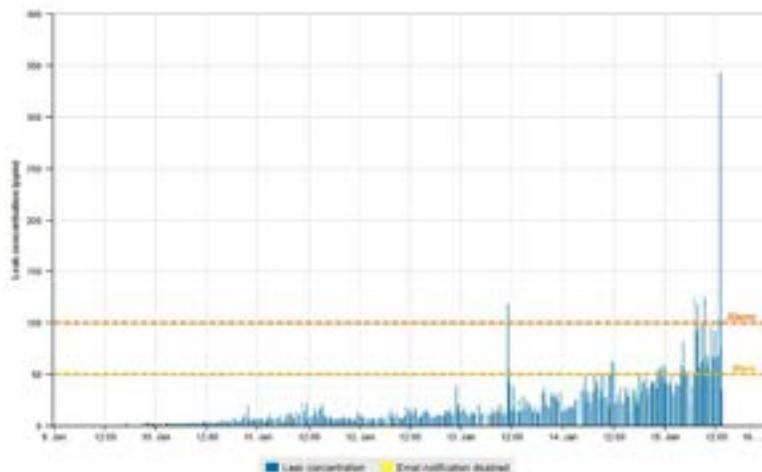
Typical Event Actions

Critical: Local Safety Alarm(s)   **Alarm:** Email Notification, Dispatch Technician   **Alert:** Log Event

MGS-250 Infrared Gas Detector

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

CARB COMPLIANT
MEETS STANDARDS FOR REFRIGERANT LEAK DETECTION

Integrated Audible and Visual Alarms

Four digit alpha numeric LED display

Infrared Sensor Technology, providing up to 7 years of service

Simple user interface for easy control

BACHARACH.
MGS-250 | INFRARED GAS DETECTOR

Modbus connectivity to integrate with BMS / BAS systems

Calibration Port

LONG-LIFE INFRARED-BASED
REFRIGERANT DETECTOR MINIMIZES FALSE ALARMS

MSA 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 5 years of maintenance-free service while detecting the presence of a target gas down to 10 ppm Minimum Detection Level (MDL). Factory preset is 75 ppm
- Broadband version available allow to select group of refrigerants
- 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
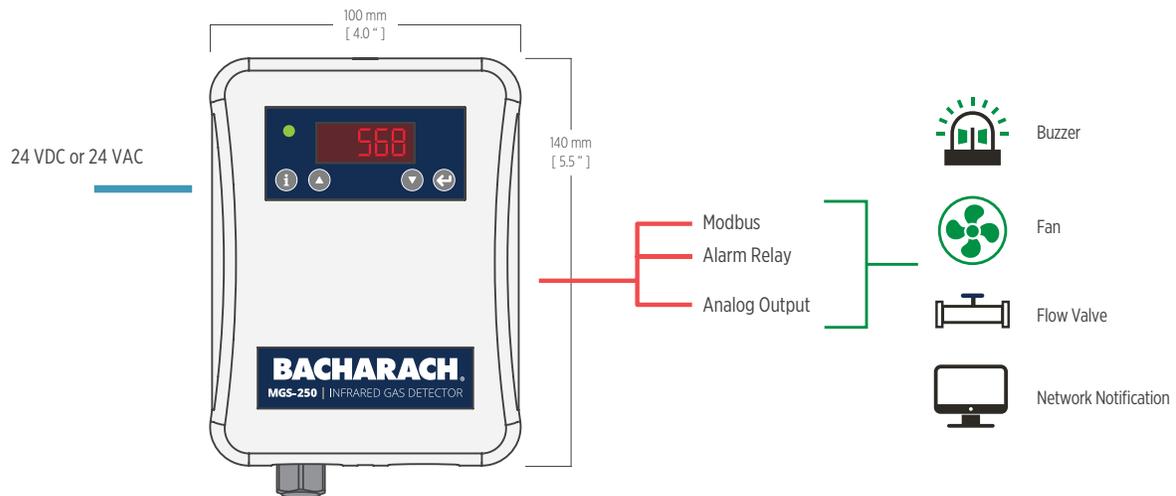
* for A1 Refrigerants

More Information:

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

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 selectable
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 5 Years
Supports/Enables Compliance with Industry Codes & Regulations	ASHRAE 15, CSA B52.2, EN 378, CARB RMP, F-Gas Regulation
Product Performance Approvals	EMC Directives, CE Mark, UL / CSA / IEC 61010-1
Power	24V AC/DC 2.5W
Warranty	1 Year

MGS-250

100 mm [4.0 "]

140 mm [5.5 "]

24 VDC or 24 VAC

Modbus
Alarm Relay
Analog Output

Buzzer
Fan
Flow Valve
Network Notification

MGS-250 Part Numbers

GAS	ACCURACY	GAS GROUP	PART NUMBER	REPLACEMENT SENSOR
BROADBAND	-	-	H6401-0500	H6400-0015
R-134A	±5%	1	H6401-0503	H6400-0018
R-404A	±5%	1	H6401-0504	H6400-0019
R-407A	±3%	1	H6401-0505	H6400-0020
R-407C	±3%	1	H6401-0506	H6400-0021
R-407F	±3%	1	H6401-0507	H6400-0022
R-410A	±3%	1	H6401-0508	H6400-0023
R-427A	±3%	1	H6401-0511	H6400-0026
R-452B	±5%	1	H6401-0521	H6400-0036
R-507	±5%	1	H6401-0512	H6400-0027
R-1233ZD	±5%	1	H6401-0515	H6400-0030
R-448A	±5%	2	H6401-0517	H6400-0032
R-449A	±5%	2	H6401-0518	H6400-0033
R-422A	±5%	2	H6401-0509	H6400-0024
R-422D	±5%	2	H6401-0510	H6400-0025

GAS	ACCURACY	GAS GROUP	PART NUMBER	REPLACEMENT SENSOR
R-1234YF	±5%	2	H6401-0513	H6400-0028
R-1234ZE	±5%	2	H6401-0514	H6400-0029
R-452A	±5%	2	H6401-0520	H6400-0035
R-513A	±5%	2	H6401-0519	H6400-0034
R-514A	±5%	2	H6401-0522	H6400-0037
R-22	±5%	3	H6401-0501	H6400-0016
R-32	±5%	4	H6401-0516	H6400-0031
R-454B	±5%	3	H6401-0524	H6490-0075
R-454C	±5%	2	H6401-0525	H6490-0076

Accessories

DESCRIPTION	PART NUMBER
SPLASH / PROTECTIVE SHIELD (FOR USE IN SPRAY DOWN AREAS)	H6900-0001
REPLACEMENT MOUNTING BASE	H6400-0014

MGS-400 Series Gas Detectors

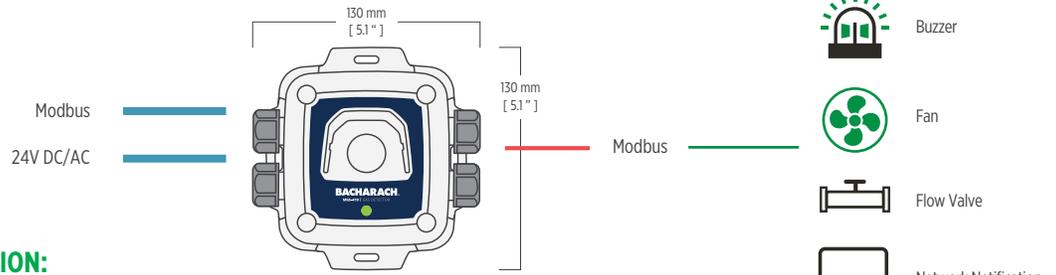## SAFETY GAS DETECTION FOR REFRIGERANTS, TOXIC, AND COMBUSTIBLE GASES

MGS-410

MGS-450

MGS-460

Integrated Audible and Visual Alarms

Multiple Cable Glands

Remote sensor connected via RJ45 cable (up to 5 m / 15 ft)

COMPLIANCE MADE EASY

Unique plug-in field replaceable pre-calibrated sensor for low cost of ownership

Specifications

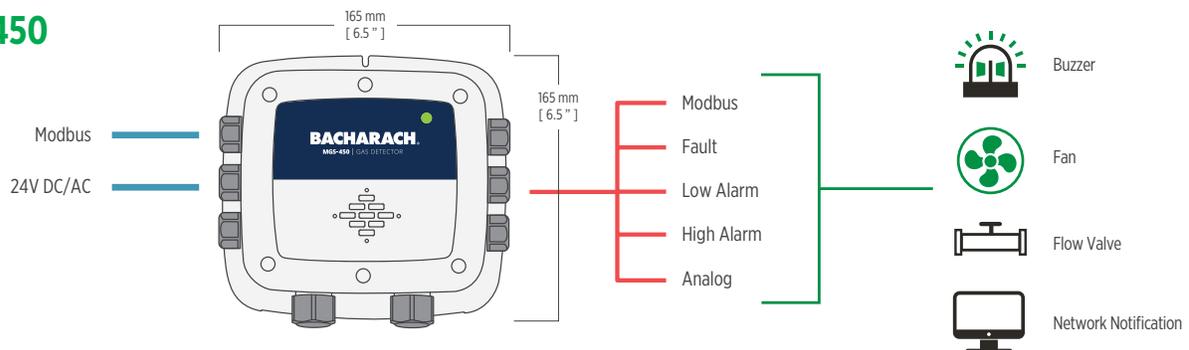|	MGS-410	MGS-450	MGS-460
Sensor Channels	1	1	1
Enclosure Ratings	IP66	IP41, IP66	IP66
Analog Communications	-	4 to 20 mA, 0 to 5V, 0 to 10V, 1 to 5V, 2 to 10V *	4 to 20 mA, 0 to 5V, 0 to 10V, 1 to 5V, 2 to 10V *
Digital Communications	Modbus RTU via RS 485	Modbus RTU via RS 485	Modbus RTU via RS 485
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)
Product Design Standard Conformities	EN 50270, EN 14624*	EN 50270, EN 14624*	EN 50270, EN 14624*
Supports/Enables Compliance with Industry Codes & Regulations	ASHRAE 15, CSA B52.2, EN 378~, F-Gas Regulation	ASHRAE 15, CSA B52.2, EN 378~, F-Gas Regulation	ASHRAE 15, CSA B52.2, EN 378~, F-Gas Regulation
Product Performance Approvals	EMC Directives, CE Mark, UL / CSA / EN 61010-1	EMC Directives, CE Mark, UL / CSA / EN 61010-1	EMC Directives, CE Mark, UL / CSA / EN 61010-1
Warranty	1 Year	1 Year	1 Year
Power	24V AC/DC 410 2W, 450 and 460 4W	24V AC/DC 410 2W, 450 and 460 4W	24V AC/DC 410 2W, 450 and 460 4W
Minimum Detection Limit	Sensor dependent; 50ppm refrigerants	Sensor dependent; 50ppm refrigerants	Sensor dependent; 50ppm refrigerants

* selectable
~ for A1 Refrigerants

![MSA The Safety Company]

MGS-410

130 mm
[5.1 "]

130 mm
[5.1 "]

Modbus

24V DC/AC

Modbus

Buzzer

Fan

Flow Valve

Network Notification

MORE INFORMATION:
Scan the QR code to learn about the MGS-410 and other MSA Bacharach products.

MGS-450

165 mm
[6.5 "]

165 mm
[6.5 "]

Modbus

24V DC/AC

Modbus
Fault
Low Alarm
High Alarm
Analog

Buzzer

Fan

Flow Valve

Network Notification

MORE INFORMATION:
Scan the QR code to learn about the MGS-450 and other MSA Bacharach products.

MGS-460

165 mm
[6.5 "]

165 mm
[6.5 "]

Modbus

24V DC/AC

Modbus
Fault
Low Alarm
High Alarm
Analog

Buzzer

Fan

Flow Valve

Network Notification

5m (16f)

115 mm
[4.5 "]

136 mm
[5.4 "]
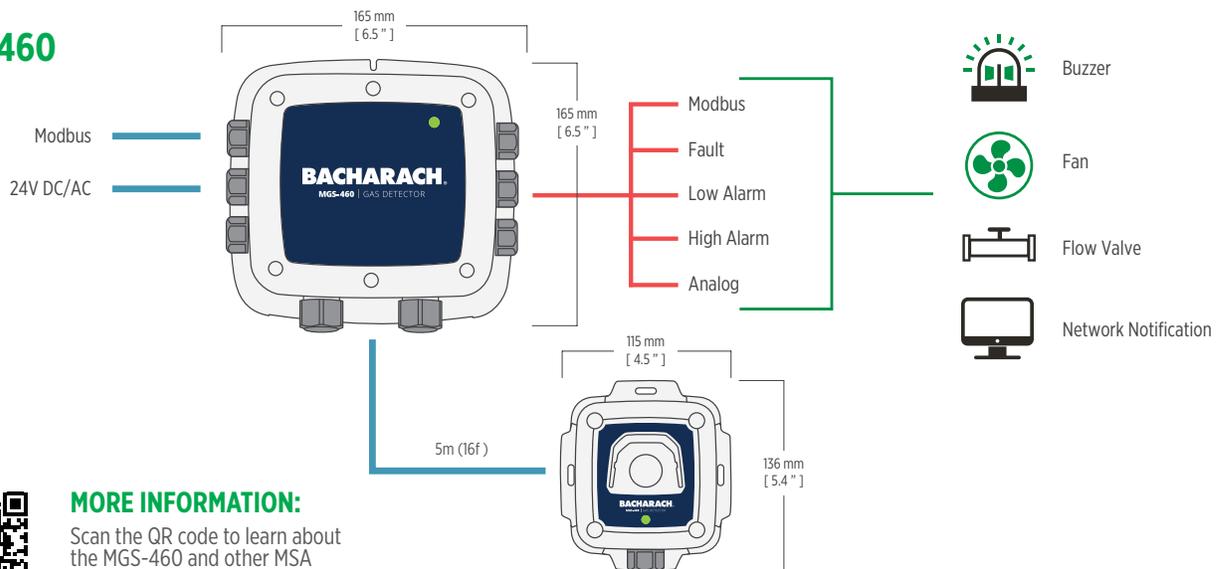
MORE INFORMATION:
Scan the QR code to learn about the MGS-460 and other MSA Bacharach products.

Safety and Compliance

MGS-400 Series Gas Detector Part Numbers

GAS	TYPE	MDL	ALARM RANGE	MGS-410	MGS-450 (IP41)	MGS-450 (IP66)	MGS-460	PRE-CALIBRATED REPLACEMENT SENSORS
R-600 (BUTANE)	IR	700 ppm (5% LEL)	15-100% LEL	H6302-0052	H6302-1052	H6302-2052	H6302-4052	H6302-9052
R-50 (METHANE, CH_4)	IR	2200 ppm (5% LEL)	15-100% LEL	H6302-0053	H6302-1053	H6302-2053	H6302-4053	H6302-9053
CARBON MONOXIDE / CO	EC	10 ppm	20-500 ppm	H6302-0040	H6302-1040	H6302-2040	H6302-4040	H6302-9040
R-744 (CARBON DIOXIDE, CO_2)	IR	200 ppm	750-5000 ppm	H6302-0090	H6302-1090	H6302-2090	H6302-4090	H6302-9090
R-744 (CARBON DIOXIDE, CO_2)	IR	250 ppm	1500-10000 ppm	H6302-0091	H6302-1091	H6302-2091	H6302-4091	H6302-9091
R-744 (CARBON DIOXIDE, CO_2)	IR	300 ppm	3000-20000 ppm	H6302-0092	H6302-1092	H6302-2092	H6302-4092	H6302-9092
R-744 (CARBON DIOXIDE, CO_2)	IR	450 ppm	4500-30000 ppm	H6302-0093	H6302-1093	H6302-2093	H6302-4093	H6302-9093
R-744 (CARBON DIOXIDE, CO_2)	IR	750 ppm	7500-50000 ppm	H6302-0095	H6302-1095	H6302-2095	H6302-4095	H6302-9095
R-717 AMMONIA (-40° F/C)	EC	5 ppm	15–100 ppm	H6302-0026	H6302-1026	H6302-2026	H6302-4026	H6302-9026
R-717 AMMONIA (-40° F/C)	EC	50 ppm	150–1000 ppm	H6302-0028	H6302-1028	H6302-2028	H6302-4028	H6302-9028
R717 AMMONIA (-4°F/-20°C)	EC	250 ppm	750–5000 ppm	H6302-0037	H6302-1037	H6302-2037	H6302-4037	H6302-9037
R717 AMMONIA (-40° F/C)	EC	5 ppm	10-300 ppm	H6302-0029	H6302-1029	H6302-2029	H6302-4029	H6302-9029
R-717 (AMMONIA, NH_3)	CAT	7500 ppm (5% LEL)	15–100% LEL	H6302-0070	H6302-1070	H6302-2070	H6302-4070	H6302-9070
NITROGEN DIOXIDE, NO_2	EC	1 ppm	3–20 ppm	H6302-0041	H6302-1041	H6302-2041	H6302-4041	H6302-9041
OXYGEN, O_2 (-4°F/-20°C)	EC	3000 ppm (3% Vol)	4.5-30% Vol	H6302-0003	H6302-1003	H6302-2003	H6302-4003	H6302-9003
R-1234YF	SC	50 ppm	150–1000 ppm	H6302-0161	H6302-1161	H6302-2161	H6302-4161	H6302-9161
R-1234ZE	SC	50 ppm	150–1000 ppm	H6302-0152	H6302-1152	H6302-2152	H6302-4152	H6302-9152
R-134A	SC	50 ppm	150–1000 ppm	H6302-0101	H6302-1101	H6302-2101	H6302-4101	H6302-9101
R-22	SC	50 ppm	150–1000 ppm	H6302-0109	H6302-1109	H6302-2109	H6302-4109	H6302-9109
R-290	IR	850 ppm (5% LEL)	15–100% LEL	H6302-0054	H6302-1054	H6302-2054	H6302-4054	H6302-9054
R-290	SC	250 ppm	400–2500 ppm	H6302-0310	H6302-1310	H6302-2310	H6302-4310	H6302-9310
R-290	SC	250 ppm	150–1000 ppm	H6302-0301	H6302-1301	H6302-2301	H6302-4301	H6302-9301
R-32	SC	50 ppm	150–1000 ppm	H6302-0155	H6302-1155	H6302-2155	H6302-4155	H6302-9155
R-404A	SC	50 ppm	150–1000 ppm	H6302-0103	H6302-1103	H6302-2103	H6302-4103	H6302-9103
R-407A	SC	50 ppm	150–1000 ppm	H6302-0105	H6302-1105	H6302-2105	H6302-4105	H6302-9105
R-407C	SC	50ppm	150–1000 ppm	H6302-0123	H6302-1123	H6302-2123	H6302-4123	H6302-9123
R-407F	SC	50ppm	150–1000 ppm	H6302-0126	H6302-1126	H6302-2126	H6302-4126	H6302-9126
R-410A	SC	50ppm	150–1000 ppm	H6302-0107	H6302-1107	H6302-2107	H6302-4107	H6302-9107
R-422D	SC	50 ppm	150–1000 ppm	H6302-0166	H6302-1166	H6302-2166	H6302-4166	H6302-9166
R-427A	SC	50 ppm	150–1000 ppm	H6302-0167	H6302-1167	H6302-2167	H6302-4167	H6302-9167
R-434A	SC	50 ppm	150–1000 ppm	H6302-0159	H6302-1159	H6302-2159	H6302-4159	H6302-9159
R-448A	SC	50 ppm	150–1000 ppm	H6302-0156	H6302-1156	H6302-2156	H6302-4156	H6302-9156
R-449A	SC	50 ppm	150–1000 ppm	H6302-0169	H6302-1169	H6302-2169	H6302-4169	H6302-9169

MSA**safety**.com   24

GAS	TYPE	MDL	ALARM RANGE	MGS-410	MGS-450 (IP41)	MGS-450 (IP66)	MGS-460	PRE-CALIBRATED REPLACEMENT SENSORS
R-450A	SC	50 ppm	150–1000 ppm	H6302-0160	H6302-1160	H6302-2160	H6302-4160	H6302-9160
R-452A	SC	50 ppm	150–1000 ppm	H6302-0157	H6302-1157	H6302-2157	H6302-4157	H6302-9157
R-452B	SC	50 ppm	150–1000 ppm	H6302-0163	H6302-1163	H6302-2163	H6302-4163	H6302-9163
R-454A	SC	50 ppm	150–1000 ppm	H6302-0164	H6302-1164	H6302-2164	H6302-4164	H6302-9164
R-454B	SC	50 ppm	150–1000 ppm	H6302-0171	H6302-1171	H6302-2171	H6302-4171	H6302-9171
R-454C	SC	50 ppm	150–1000 ppm	H6302-0170	H6302-1170	H6302-2170	H6302-4170	H6302-9170
R-507A	SC	50 ppm	150–1000 ppm	H6302-0111	H6302-1111	H6302-2111	H6302-4111	H6302-9111
R-455A	SC	50 ppm	150–1000 ppm	H6302-0172	H6302-1172	H6302-2172	H6302-4172	H6302-9172
R-513A	SC	50 ppm	150–1000 ppm	H6302-0158	H6302-1158	H6302-2158	H6302-4158	H6302-9158

MGS-400 Series Accessories

DESCRIPTION	PART NUMBER
CALIBRATION ADAPTER	H6302-9990
WALL MOUNTED HORN/STROBE, BLUE LENS, 24V DC (NO CE MARK)	H3015-8041
WALL MOUNTED HORN/STROBE, AMBER LENS, 24V DC (NO CE MARK)	H3015-8042
WALL MOUNTED HORN/STROBE, RED LENS, 24V DC (NO CE MARK)	H3015-8043
WALL MOUNTED STROBE, BLUE LENS, MP120K 120 V AC BUILT-IN ADAPTER	H3015-8044
WALL MOUNTED STROBE, AMBER LENS, MP120K 120 V AC BUILT-IN ADAPTER	H3015-8045
WALL MOUNTED STROBE, RED LENS, MP120K 120 V AC BUILT-IN ADAPTER	H3015-8046
WALL MOUNTED STROBE, GREEN LENS, MP120K 120 V AC BUILT-IN ADAPTER	H3015-8048
MAGNETIC WAND	H1100-1004
SWITCH-MODE POWER SUPPLY 110-240V AC - 24V DC	H1100-1089

Plug & Play, pre-calibrated sensors for easy field replacement.
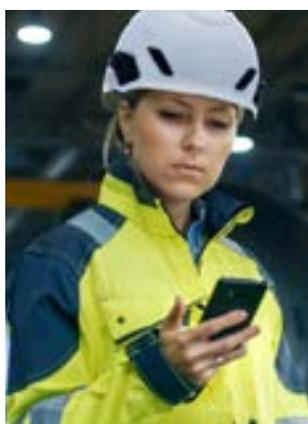
MGS-400 Mobile App

The MSA 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).*

 Download on the App Store

 Available on the Android App Store

BLUETOOTH CONNECTIVITY.

Safety and Compliance

Safety Entrance Monitor
MGS-401 Entrance Monitor

*IIAR, ASHRAE 15, CSA B52,
and EN378*

The MGS-401 improves facility safety by displaying gas concentration levels outside the monitored area. This entrance monitor provides clear audible and visual alarms with a perimeter strobe, enabling compliance with IIAR, ASHRAE 15, CSA B52, and EN378, whilst alerting personnel of potential risks before entering the space.

MGS-401 Entrance Monitor

ENTRANCE MONITOR FOR IMPROVING SAFETY OF COMMERCIAL & INDUSTRIAL APPLICATIONS

Clear gas detector indicators and gas measurements

Audible and visual alarms

Perimeter Strobe Alarm Status Indication

View up to 4 x safety gas monitors to improve safety before entering the monitored room

2 × M20 / 1/2" Conduit (Power)

IMPROVING SAFETY FOR ENTRANCES TO MONITORED AREAS

The MSA Bacharach® MGS-401 Entrance Monitor centralizes the status of up to four (4) MSA Bacharach diffusion Gas Detectors, which in turn provides and audible and visual alarm outside a monitored space. In addition, the MGS-401 displays any gas concentration level in the space for additional information and visual monitoring. System configuration will determine whether the alarms signals are addressed in the monitored space or at a controller or BMS/BAS level.
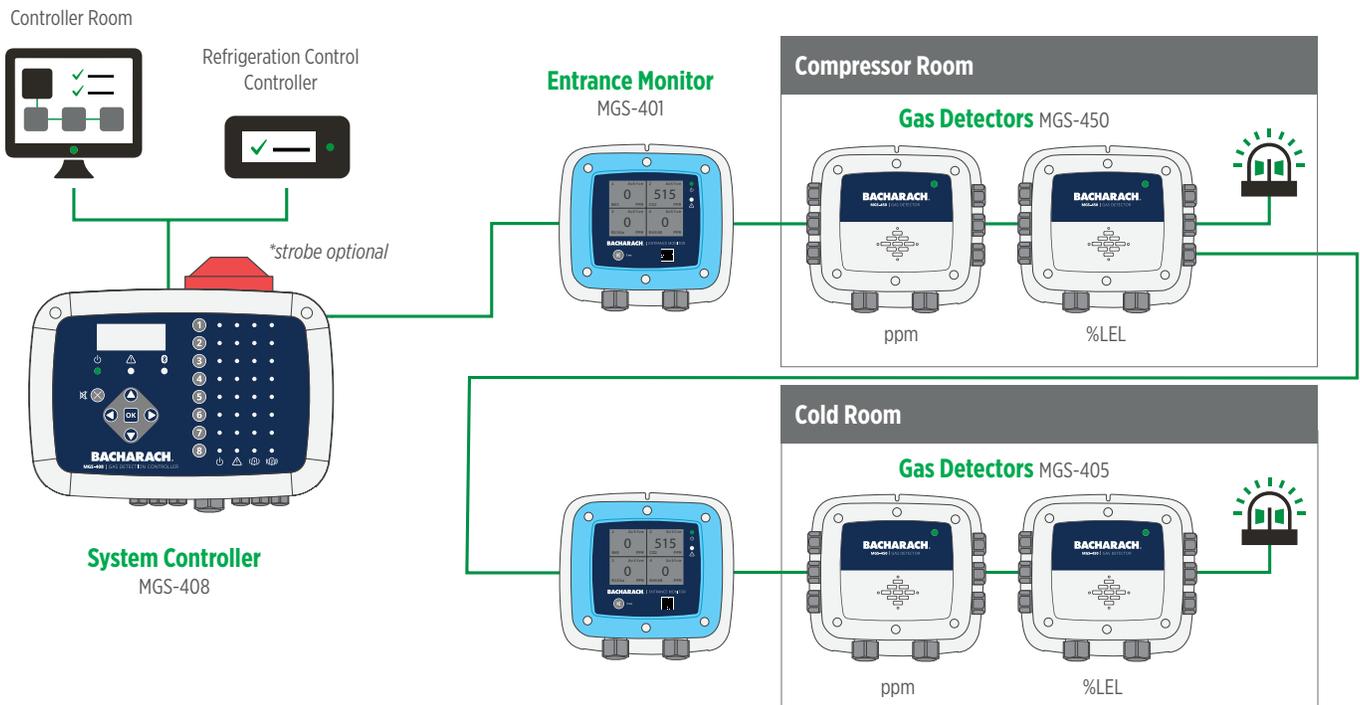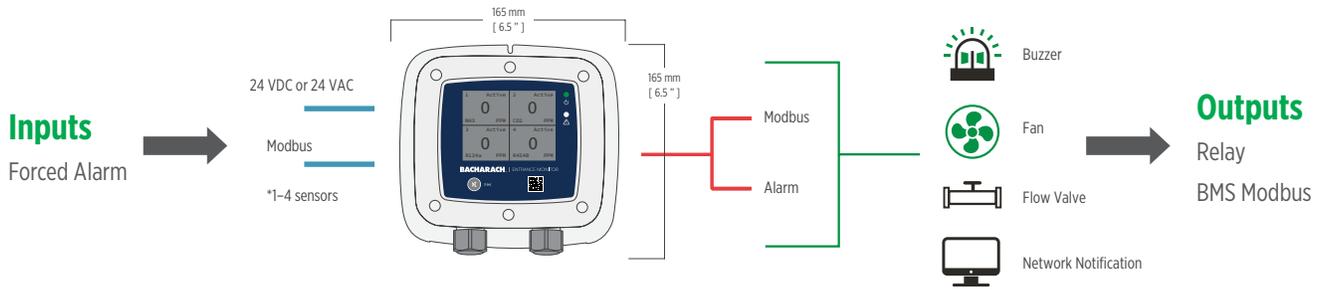
Combining the MGS-401 Entrance Monitor with the MSA Bacharach MGS-408 Gas Controller and diffusion Gas Detectors provides a complete, single source gas detection system with an easy means of achieving compliance with refrigeration safety standards such as IIAR, ASHRAE 15, CSA B52 and EN376.

- Perimeter strobe for "at-a-glance" system / alarm status
- MGS-408 Controller powers up to (8) total of combination of MGS-401(s) and MGS Diffusion Gas Detectors
- Modbus RTU Master / Slave provides seamless integration from connected gas detectors to many third-party BMS / BAS
- Audible and visual alarms enable compliance with IIAR, ASHRAE 15, CSA B52 and EN378 – no additional hardware required

Specifications

Enclosure rating	IP54
Operating Temperature	-4 - 122°F (-20 – 50°C)
Power	24V AC/DC, +20%, 7W max
Product Dimensions (L × W × H)	6.5 × 6.5 × 3.4" (165 × 165 × 87mm)
Weight Approx.	1 lb, 11.07 oz (758 g)
Cable Entries	2 × M20 / 1/2" NPT Conduit (Power), 6 × M16 Cable Glands (Communications)
Product Performance Approvals	CE, EN 50270:2015, UL/CSA/EN 61010-1
Relay output	

More Information:

Scan the QR code to learn more about the MGS-401 and other MSA Bacharach products.

Safety and Compliance
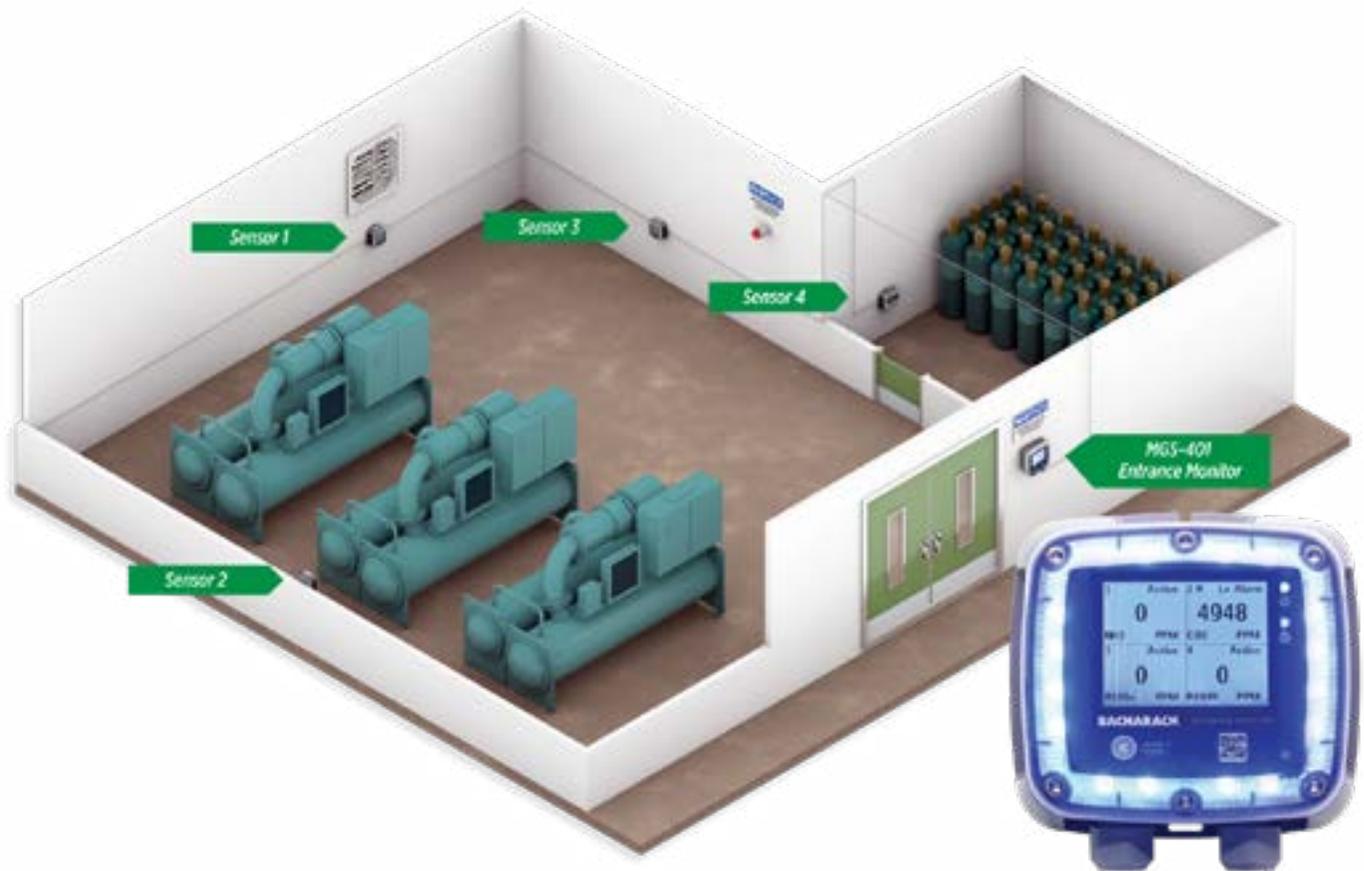
Versatile for safe monitoring

The MSA Bacharach® MGS-401 Entrance Monitor centralizes the status of up to four (4) MSA Bacharach diffusion Gas Detectors, which in turn provides and audible and visual alarm outside a monitored space. In addition, the MGS-401 displays any gas concentration level in the space for additional information and visual monitoring. System configuration will determine whether the alarms signals are addressed in the monitored space or at a controller or BMS/BAS level — listener or controller mode.

Combining the MGS-401 Entrance Monitor with the MSA Bacharach MGS-408 Gas Controller and diffusion Gas Detectors provides a complete, single source gas detection system with an easy means of achieving compliance with refrigeration safety standards such as IIAR, ASHRAE 15, CSA B52 and EN376.

MGS-401 Part Numbers

DESCRIPTION	PART NUMBER
MGS-401 ENTRANCE MONITOR	H6702-8030

Accessories

DESCRIPTION	PART NUMBER
SUN SHIELD FOR OUTDOOR LOCATIONS	H6600-8950
SECURITY KIT	H1100-2534
SECURITY SCREWS ((6) PCS. AND DRIVER BIT)	H1100-8950
>100DB EXTERNAL SOUNDER (MOUNTED IN MGS-401 CABLE GLAND)	H6900-0010

Inputs
Forced Alarm

24 VDC or 24 VAC

Modbus

*1–4 sensors

165 mm [6.5 "]

165 mm [6.5 "]

Modbus

Alarm

Buzzer

Fan

Flow Valve

Network Notification

Outputs
Relay

BMS Modbus

Controller Room

Refrigeration Control Controller

*strobe optional

System Controller
MGS-408

Entrance Monitor
MGS-401

Compressor Room

Gas Detectors MGS-450

ppm

%LEL

Cold Room

Gas Detectors MGS-405

ppm

%LEL

Front View

Right Side View

Left Side View

Safety and Compliance

MGS-400 Series Gas Detection Controllers

SAFETY GAS DETECTION FOR REFRIGERANTS, TOXIC, AND COMBUSTIBLE GASES

MGS-400 Series Accessories: Controller Specifications

	MGS-402	MGS-408
MAIN POWER	24V DC/100-230V AC	100–230V AC
MAX NUMBER OF SENSOR INPUTS	2	8
ANALOG OUTPUTS	2 - Configurable*	-
RELAY OUTPUTS (ALARMS)	Low and High	Low and High
RELAY POWER	10A @ 240V AC/30V DC	5A @ 240V AC/30V DC
DEDICATED FAULT RELAY	1	1
ALARM SILENCE	Button on Controller or Remote	Button on Controller
REMOTE BEACON / AUDIBLE	Optional Accessory	Optional Accessory
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	H6702-8020	H6702-8000

*4-20mA, 0-5V, 1-5V, 0-10V, 2-10V DC - selectable , ** 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

165 mm
[6.5 "]

100-240VAC or 24VDC

165 mm
[6.5 "]

Modbus

Fault

Low Alarm

High Alarm

Ch 1 Analog

Ch 2 Analog

Buzzer

Fan

Flow Valve

Network Notification

+24VDC and Modbus

MGS-410
MGS-450/460

MGS-410
MGS-450/460
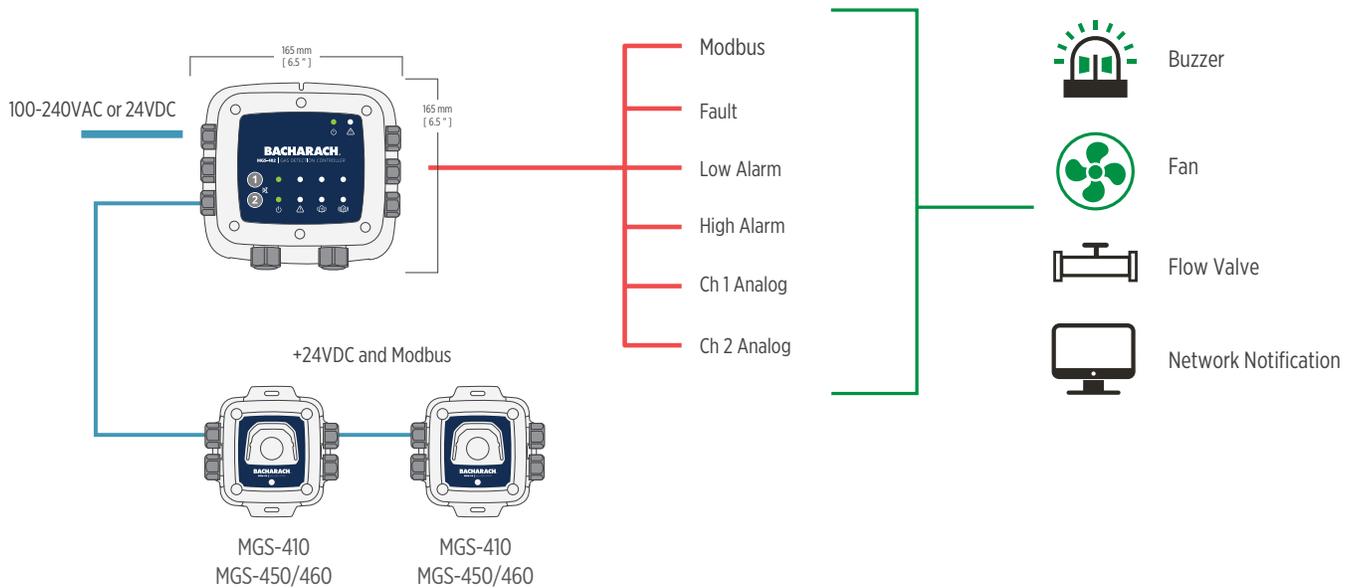
MSA Bacharach's MGS-402 Gas Detection Controller centralizes the status of up to two MGS-400 Series Gas Detectors and provides a complete package for your safety compliance application. On the front panel of the MGS-402, a bank of LEDs displays the power, alarm status, and fault indicators for each connected gas detector; showing power, alarm status and fault indicators.

The MGS-402 can provide the power requirements for to 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-410 Gas Detectors (can also work with MGS-450 & MGS-460)
- 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
- 2x analogue output 4 to 20 mA, 0 to 5 V, 0 to 10 V, 1 to 5 V, 2 to 10 V - selectable
- Enclosure rating IP66
- No additional hardware required.

More Information:

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

MGS-408 Gas Detection Controller

8-CHANNEL CONTROLLER FOR REFRIGERANT, TOXIC, AND COMBUSTIBLE GAS DETECTION
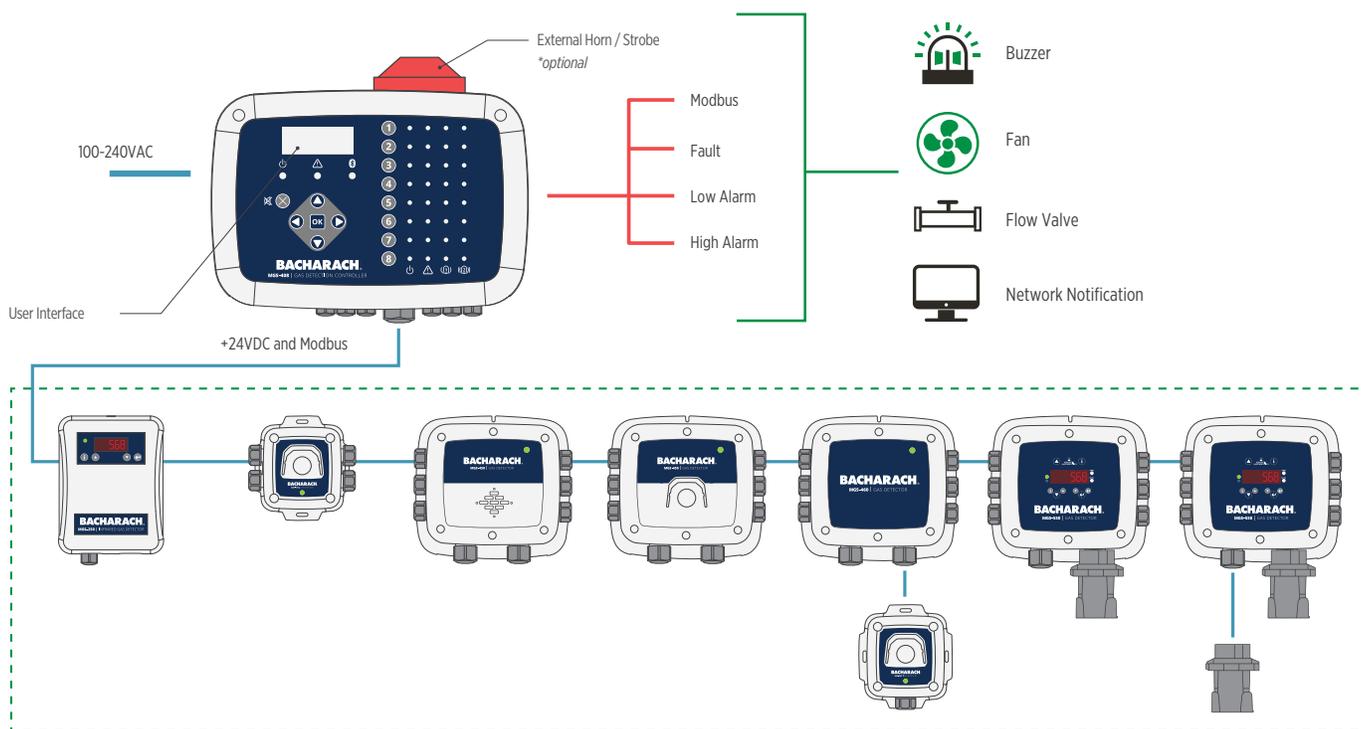
MSA Bacharach's MGS-408 Gas Detection Controller centralizes the status of up to 8 gas detection channels in a single location. Integration is possible with Bacharach's MGS-400 Series, MGS-250 and MGS-550 Gas Detector platforms; allowing for a gas detection system design which can utilize the benefits 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 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
- Integrated system diagnostic

More Information:

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

MGS-550 Dual Gas Detector

SAFETY GAS DETECTION FOR REFRIGERANTS, TOXIC, AND COMBUSTIBLE GASES

5-digit LED Display

Power LED

Configuration
Menu Button

Up Button

Sensor

Magnetic Adjustment
Points (4)

Cable Gland (6)

PPM LED

%LEL LED

Enter / Select Button

Down Button

DUAL-GAS DETECTOR WITH INTEGRATED DISPLAY

GAS	RANGE
REFRIGERANTS (HCFC, HFC, HFO)	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 ppm
COMBUSTIBLE GASES	5,000 ppm / 100% LEL
NO_2	20 ppm

* NH_3 available as low temperature version -40°F / 40°C (not for 5,000 ppm Electrochemical sensor)

Specifications

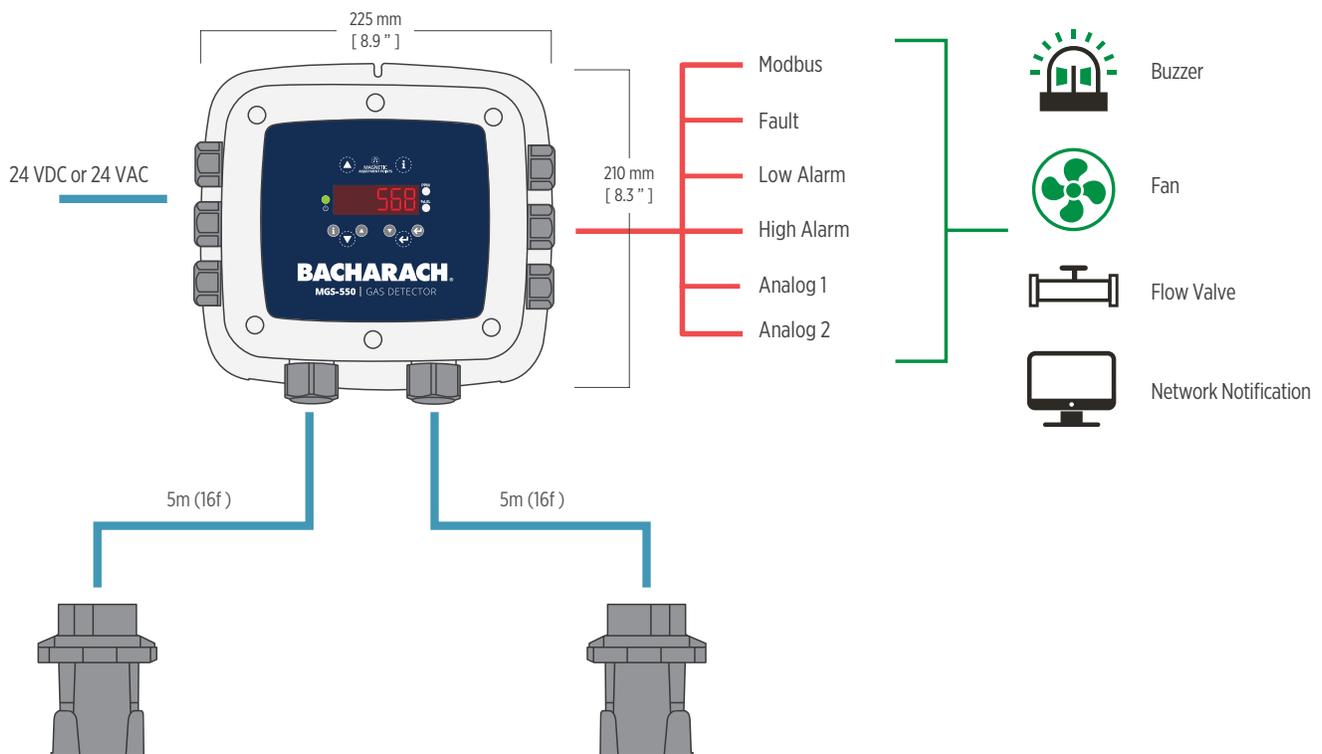|	
Sensor Channels	1 to 2
Sensitivity / Minimum Detection Level	Sensor Dependent (see opposite)
Enclosure Rating	IP66
Analog Communications	4 to 20 mA, 0 to 5V, 0 to 10V, 1 to 5V, 2 to 10V
Digital Communications	Modbus RTU via RS 485
Buzzer Volume	80 dB @ 10 cm
Product Dimensions (L × W × H)	8.3" × 8.9" × 3.4" (210 mm × 225 mwm × 85 mm)
Product Weight	2 lbs (1 kg)
Sensor Type	See Table Below
Supports/Enables Compliance with Industry Codes & Regulations	ASHRAE 15, CSA B52.2, EN 378*, F-Gas Regulation
Product Performance Approvals	EMC Directives, CE Mark, UL / CSA / IEC 61010-1
Warranty	1 Year

More Information:
Scan the QR code to learn more about the MGS-550 and other MSA Bacharach products.

MGS-550 with 1 Local Sensor

225 mm [8.9 "]

24 VDC or 24 VAC

210 mm [8.3 "]

- Modbus
- Fault
- Low Alarm
- High Alarm
- Analog 1
- Analog 2

- Buzzer
- Fan
- Flow Valve
- Network Notification
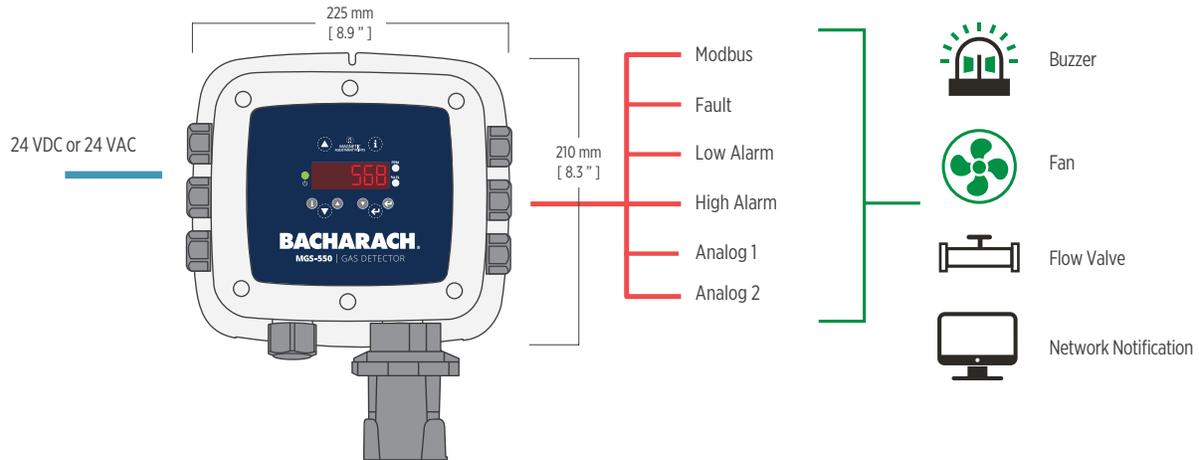
MGS-550 with 2 Remote Sensors

225 mm [8.9 "]

24 VDC or 24 VAC

210 mm [8.3 "]

- Modbus
- Fault
- Low Alarm
- High Alarm
- Analog 1
- Analog 2

- Buzzer
- Fan
- Flow Valve
- Network Notification

5m (16f)   5m (16f)

MSA 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-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

Safety and Compliance

MGS-550 Ordering Guide

The versatile MSA 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 sensrors. 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

* Do not change the length of the remote cable.

GAS	SENSOR TYPE	MDL	ALARM RANGE	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			H6600-8000	—	—	—	—
Butane	IR	5% LEL	15-100% LEL	—	H6600-8016	H6600-8816	H6600-8116	H6600-8216
Butane	CB	5% LEL	15-100% LEL	—	H6600-8039	H6600-8839	H6600-8139	H6600-8239
Carbon Monoxide / CO	EC	10 ppm	20-500 ppm	—	H6600-8080	H6600-8880	H6600-8180	H6600-8280
R-744 (CO_2)	IR	250 ppm	750-5000 ppm	—	H6600-8010	H6600-8810	H6600-8110	H6600-8210
R-744 (CO_2)	IR	500 ppm	1500-10000 ppm	—	H6600-8011	H6600-8811	H6600-8111	H6600-8211
R-744 (CO_2)	IR	1000 ppm	3000-20000 ppm	—	H6600-8012	H6600-8812	H6600-8112	H6600-8212
R-744 (CO_2)	IR	1500 ppm	4500-30000 ppm	—	H6600-8013	H6600-8813	H6600-8113	H6600-8213
R-744 (CO_2)	IR	2000 ppm	6000-40000 ppm	—	H6600-8014	H6600-8814	H6600-8114	H6600-8214
R-744 (CO_2)	IR	2500 ppm	7500-50000 ppm	—	H6600-8015	H6600-8815	H6600-8115	H6600-8215
R-1234yf	SC	50 ppm	150-1000 ppm	—	H6600-8052	H6600-8852	H6600-8152	H6600-8252
R-1234ze	SC	50 ppm	150-1000 ppm	—	H6600-8053	H6600-8853	H6600-8153	H6600-8253
R-50 (Methane, CH_4)	IR	5% LEL	15-100% LEL	—	H6600-8017	H6600-8817	H6600-8117	H6600-8217
R-717 (Ammonia, NH_3)	CB	5% LEL	15-100% LEL	—	H6600-8034	H6600-8834	H6600-8134	H6600-8234
R-717 (Ammonia, NH_3)	EC	5 ppm	15-100 ppm	—	H6600-8019	H6600-8819	H6600-8119	H6600-8219
R-717 (Ammonia, NH_3)	EC	50 ppm	150-1000 ppm	—	H6600-8020	H6600-8820	H6600-8120	H6600-8220
R-717 (Ammonia, NH_3)	EC	250 ppm	750-5000 ppm	—	H6600-8021	H6600-8821	H6600-8121	H6600-8221
Nitrogen Dioxide (NO_2)	EC	1 ppm	3-20 ppm	—	H6600-8024	H6600-8824	H6600-8124	H6600-8224

GAS	SENSOR TYPE	MDL	ALARM RANGE	A BASE UNIT, NO SENSORS	B BASE UNIT, 1 LOCAL SENSOR	C LOCAL SENSOR	D REMOTE SENSOR	PRE-CALIBRATED REPLACEMENT SENSOR*
Oxygen, O_2	EC	1.5% Vol	4.5-30% Vol	-	H6600-8025	H6600-8825	H6600-8125	H6600-8225
R-290 (Propane)	IR	5% LEL	15-100% LEL	-	H6600-8018	H6600-8818	H6600-8118	H6600-8218
R-134a	SC	50 ppm	150-1000 ppm	-	H6600-8042	H6600-8842	H6600-8142	H6600-8242
R-134a	SC	500 ppm	1000-10000 ppm	-	H6600-8056	H6600-8856	H6600-8156	H6600-8256
R-290	SC	250 ppm	1000-5000 ppm	-	H6600-8070	H6600-8870	H6600-8170	H6600-8270
R-32	SC	50 ppm	150-1000 ppm	-	H6600-8041	H6600-8841	H6600-8141	H6600-8241
R-404A	SC	50 ppm	150-1000 ppm	-	H6600-8043	H6600-8843	H6600-8143	H6600-8243
R-404A	SC	500 ppm	1000-10000 ppm	-	H6600-8057	H6600-8857	H6600-8157	H6600-8257
R-407A	SC	50 ppm	150-1000 ppm	-	H6600-8044	H6600-8844	H6600-8144	H6600-8244
R-407A	SC	500 ppm	1000-10000 ppm	-	H6600-8058	H6600-8858	H6600-8158	H6600-8258
R-407C	SC	50 ppm	150-1000 ppm	-	H6600-8045	H6600-8845	H6600-8145	H6600-8245
R-407C	SC	500 ppm	1000-10000 ppm	-	H6600-8059	H6600-8859	H6600-8159	H6600-8259
R-407F	SC	50 ppm	150-1000 ppm	-	H6600-8046	H6600-8846	H6600-8146	H6600-8246
R-407F	SC	500 ppm	1000-10000 ppm	-	H6600-8060	H6600-8860	H6600-8160	H6600-8260
R-410A	SC	50 ppm	150-1000 ppm	-	H6600-8047	H6600-8847	H6600-8147	H6600-8247
R-410A	SC	500 ppm	1000-10000 ppm	-	H6600-8061	H6600-8861	H6600-8161	H6600-8261
R-422A	SC	50 ppm	150-1000 ppm	-	H6600-8048	H6600-8848	H6600-8148	H6600-8248
R-422A	SC	500 ppm	1000-10000 ppm	-	H6600-8062	H6600-8862	H6600-8162	H6600-8262
R-422D	SC	50 ppm	150-1000 ppm	-	H6600-8049	H6600-8849	H6600-8149	H6600-8249
R-422D	SC	500 ppm	1000-10000 ppm	-	H6600-8063	H6600-8863	H6600-8163	H6600-8263
R-427A	SC	50 ppm	150-1000 ppm	-	H6600-8050	H6600-8850	H6600-8150	H6600-8250
R-448A	SC	50 ppm	150-1000 ppm	-	H6600-8076	H6600-8876	H6600-8176	H6600-8276
R-449A	SC	50 ppm	150-1000 ppm	-	H6600-8077	H6600-8877	H6600-8177	H6600-8277
R-452A	SC	50 ppm	150-1000 ppm	-	H6600-8078	H6600-8878	H6600-8178	H6600-8278
R-507	SC	50 ppm	150-1000 ppm	-	H6600-8051	H6600-8851	H6600-8151	H6600-8251
R-507	SC	500 ppm	1000-10000 ppm	-	H6600-8065	H6600-8865	H6600-8165	H6600-8265
R-513A	SC	50 ppm	150-1000p ppm	-	H6600-8079	H6600-8879	H6600-8179	H6600-8279
R-600	SC	250 ppm	1000-5000 ppm	-	H6600-8071	H6600-8871	H6600-8171	H6600-8271
H_2 (Hydrogen)	EC	500 ppm	1500-10000 ppm	-	H6600-8033	H6600-8833	H6600-8133	H6600-8233

MVR-300 VRF Refrigerant Gas Detector

GAS DETECTION FOR REFRIGERANTS IN OCCUPIED SPACES
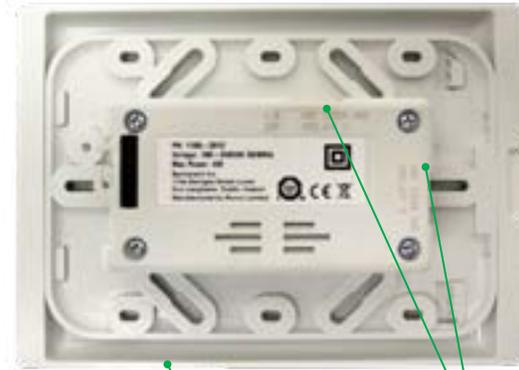
Alarm options (LED, buzzer, two alarm levels, configurable delay and fail-safe) to alert occupants

Self-diagnostics and simple field calibration for easy maintenance

Low profile / flush mount for aesthetically non-intrusive appearance

Fits in standard electrical boxes for easy installation and mains power

Two relays and Modbus Communications for notifying building management & initiate counter measures

LEAK DETECTION FOR HOTELS & OTHER COMMERCIAL OCCUPIED SPACES USING VRF REFRIGERANT SYSTEMS

The MSA Bacharach 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 2-gang electrical boxes for easy installation (45 mm minimum)
- 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

Specifications

Gases Supported	R-32, R-404A, R-407 R-410A (R-454B coming soon! Request info)
Sensor Channels	1
Enclosure Rating	General Purpose
Outputs	2 x Relays, Modbus
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)
Sensor Type	SC
Supports/Enables Compliance with Industry Codes & Regulations	ASHRAE 15, CSA B52.2, EN 378, F-Gas Regulation
Product Performance Approvals	EMC Directives, CE Mark, UL / CSA / IEC 61010-1
Warranty	1 Year
Power	100 to 240V AC
MDL	400 ppm

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

| **Side** | **Front** | **Back** |

1.96" (50mm)

6.58" (167mm)
4.68" (119mm)

2.05" (52mm)
3.78" (96mm)
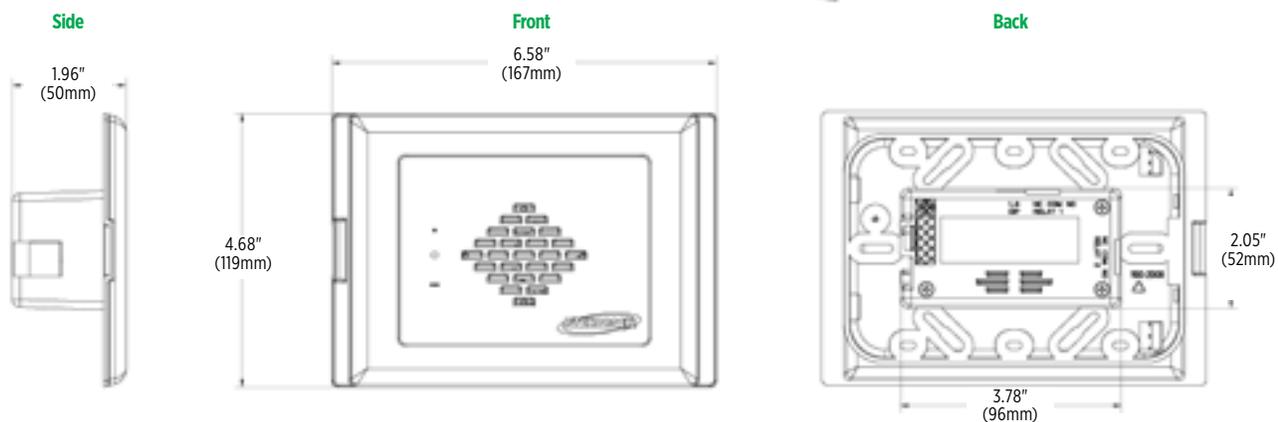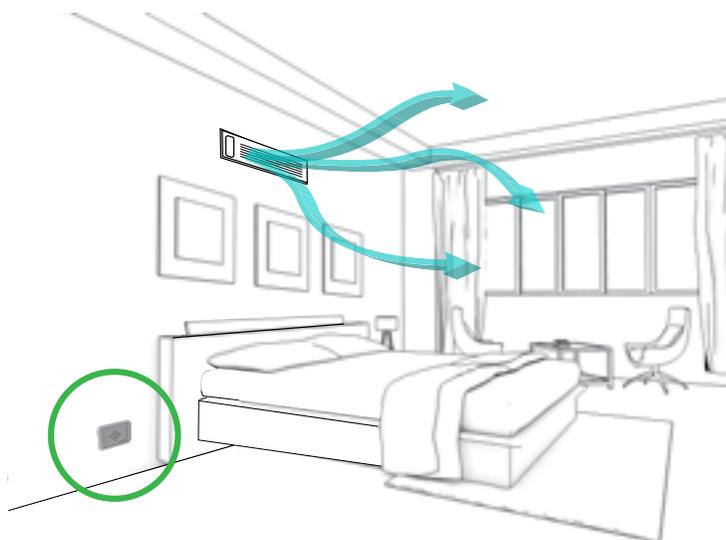
MVR-300 Part Numbers

GAS	LOW ALARM*	HIGH ALARM*	RANGE	PART NUMBER	PRE-CALIBRATED REPLACEMENT SENSOR	SENSOR TYPE
R-410A	500 ppm 1,000 ppm 2,000 ppm	2,000 ppm 2,000 ppm 4,000 ppm	2,500 ppm 5,000 ppm 10,000 ppm	H6203-0001 H6203-0002 H6203-0003	H6203-0101 H6203-0102 H6203-0103	SC
R-32	500ppm 1,000 ppm	2,000 ppm 2,000 ppm	2,500 ppm 5,000 ppm	H6203-0041 H6203-0042	H6203-0141 H6203-0142	SC
R-404A	500 ppm 1,000 ppm 2,000 ppm	2,000 ppm 2,000 ppm 4,000 ppm	2,500 ppm 5,000 ppm 10,000 ppm	H6203-0021 H6203-0022 H6203-0023	H6203-0121 H6203-0122 H6203-0123	SC
R-407	500 ppm 1,000 ppm 2,000 ppm	2,000 ppm 2,000 ppm 4,000 ppm	2,500 ppm 5,000 ppm 10,000 ppm	H6203-0011 H6203-0012 H6203-0013	H6203-0111 H6203-0112 H6203-0113	SC
R-454B	500 ppm 1,000 ppm 2,000 ppm	2,000 ppm 2,000 ppm 4,000 ppm	2,500 ppm 5,000 ppm 10,000 ppm	Coming soon	Coming soon	SC

*Factory default; can be changed through Modbus.

Accessories

DESCRIPTION	PART NUMBER
PRESSURE REGULATOR (0.5 L/MIN, 5/8"-18 UNF)	H0051-2358
MAGNETIC WAND	H1100-1004
CALIBRATION ADAPTER KIT (ADAPTER, TUBING MAGNETIC WAND, EXTRACTOR TOOL)	H1100-2018
EXTRACTOR TOOL (FOR REMOVING SENSOR MODULE DURING REPLACEMENT PROCESS)	H1100-2022

Safety for Occupied Spaces and VRF Systems

MVR-SC Gas Detection Controller
100-CHANNEL CONTROLLER FOR REFRIGERANT GAS DETECTION

Intuitive Touch-Screen Interface

Alarm and fault relays

Quick access navigation for status and alarming

General purpose enclosure for maintenance room or front desk

CONTROL AND MONITOR MVR-300 GAS DETECTORS

The MSA Bacharach 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

Specifications

Sensors Inputs	Up to 100
Enclosure Rating	General Purpose
Display Size	5 inch, 800 × 480 pixels
Output	2 x Relays, Modbus
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)
Product Performance Approvals	CE, UL/CSA/IEC/EN 61010-1
Power	24V DC
Operating Temperature	32 to 122°F (0 to 50°C)
Warranty	1 Year
Part Number	H6702-8010

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

![MSA logo] **MSA** *The Safety Company*

Gateways (unique IP addresses)

FLOOR 1
MVR-300 (Modbus daisy chain)

x.x.x.1 — 2 3 4 5 6 7 8 9 10 11 12
x.x.x.2
x.x.x.3

FLOOR 2
x.x.x.4
x.x.x.5

FLOOR 3
x.x.x.6
x.x.x.7

ETHERNET SWITCH

BACHARACH MVR-SC | REFRIGERANT LEAK MONITOR

SWITCH

GATEWAY 1

GATEWAY 2

112
113
114
115
116

111

110

109

108   107 106 105 104 103 102 101

E E

MAINTENANCE

117 118 119 120
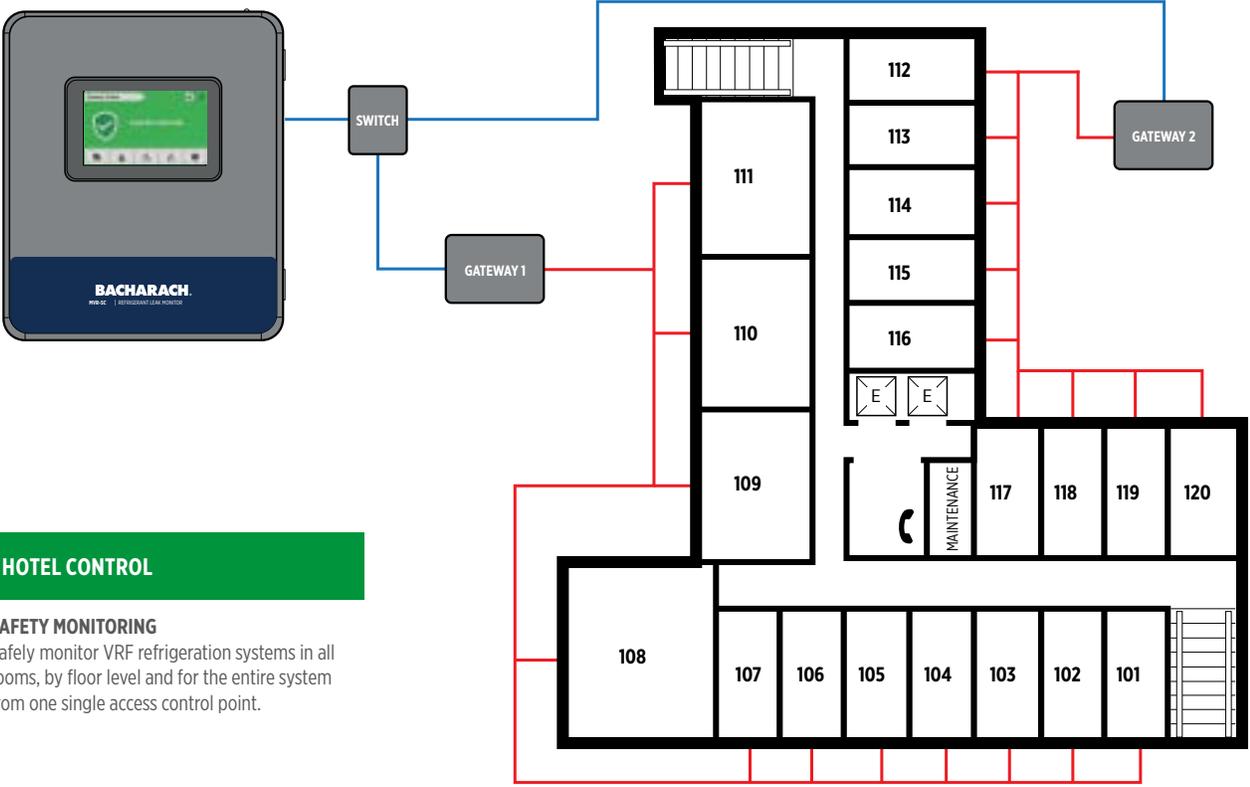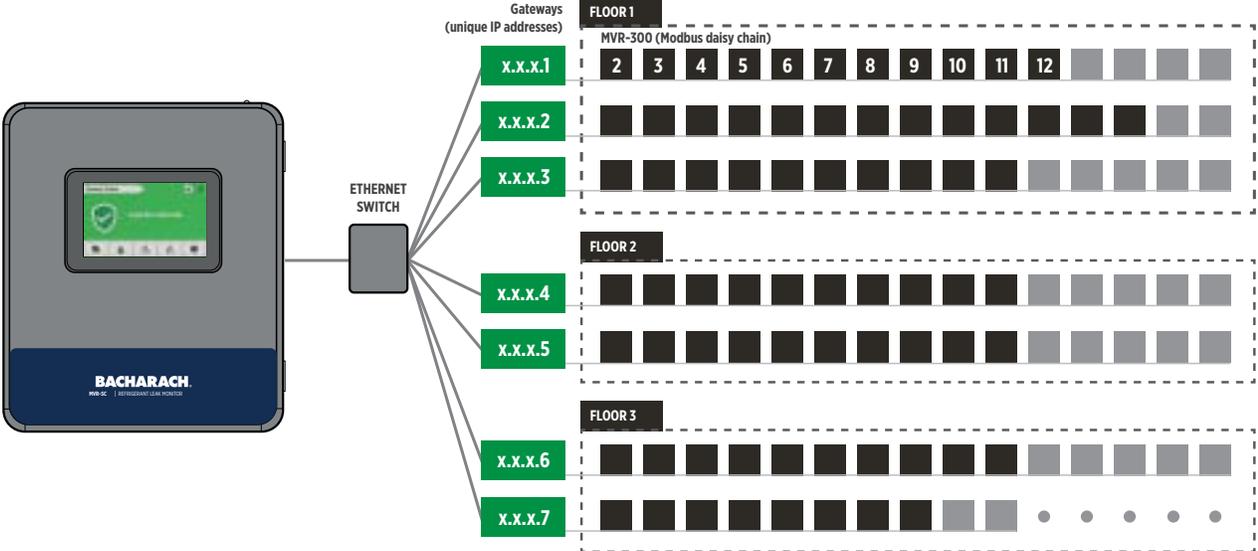
HOTEL CONTROL

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)	H1100-2193
ETHERNET 8 PORT SWITCH (CONNECTS THE MVR-SC AND INDIVIDUAL GATEWAYS)	H1100-2172
MODBUS GATEWAY (EACH GATEWAY SUPPORTS A NETWORK OF UP TO 15 MVR-300 VRF REFRIGERANT LEAK DETECTORS)	H1100-2198
MODBUS EZ-WIRE KIT (PRECISELY STRIPPED, PRE-BONDED WIRE PROVIDES FASTER, MORE CONSISTENT INSTALLATION TO THE MVR-300 MODBUS PORT)	H1100-2190

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 chiller

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 installing at least one detector per chiller. Ensure all access routes to machine rooms are equipped with A/V signals triggered from the detectors inside.

What to Monitor

MONITORING LOCATIONS:

- Each chiller
- Pit or trench
- Cylinder storage areas
- Vent lines
- Evaporators
- Condenser units
- Expansion valves

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. When considering position of the detector ensure A/V signals will be easy visible for personnel.

Sensor Location Height

MONITORING LOCATIONS:

- Locate detectors in areas the specific gas is likely to accumulate
- Low (1 ft. / 30 cm from the floor level)
- Middle (breathing zone)
- High

When installing detectors, consideration should also be given to the weight of the target gas compared to air. Gases heavier than air, such as R134a, R449, butane, propane and others, will drop to the lowest point of the installation. Placing sensors at 30cm or lower will increase the chances of detecting leaks earlier. Gases lighter than air, such as hydrogen, ammonia, methane and others, will rise to the highest point of the installation. Placing sensors at height, close to the highest point, will increase the chances of capturing leaks early. Gases with equal weight should have detectors mounted in the breathing zone at head height.
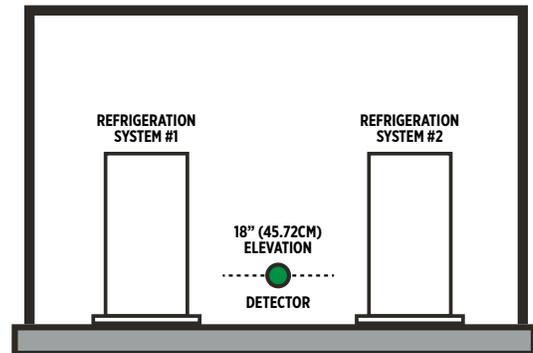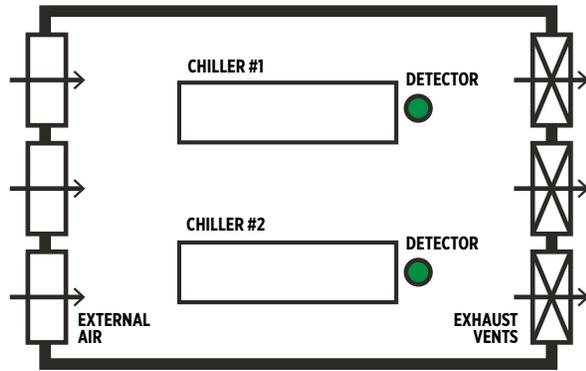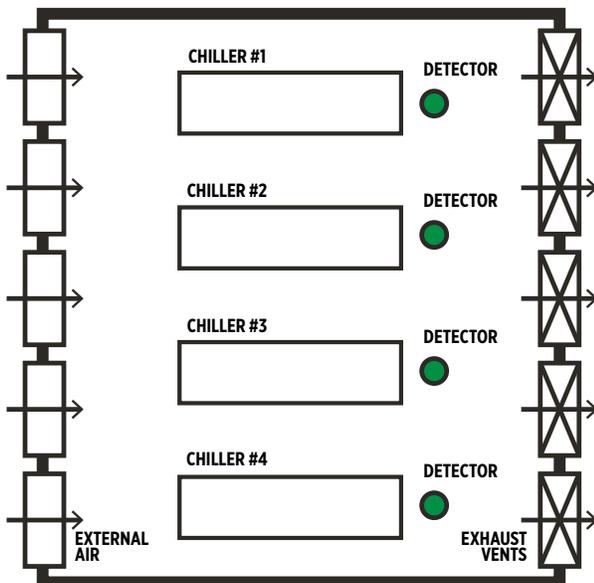
HEAVIER THAN AIR TARGET GAS EXAMPLE
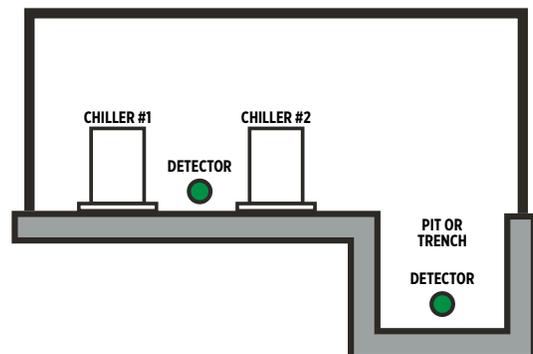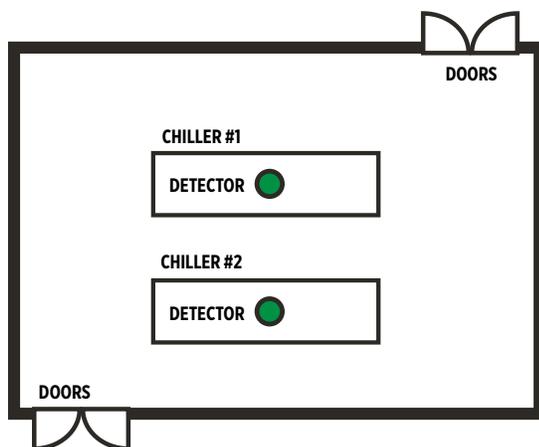
HEAVIER THAN AIR TARGET GAS - TRENCH
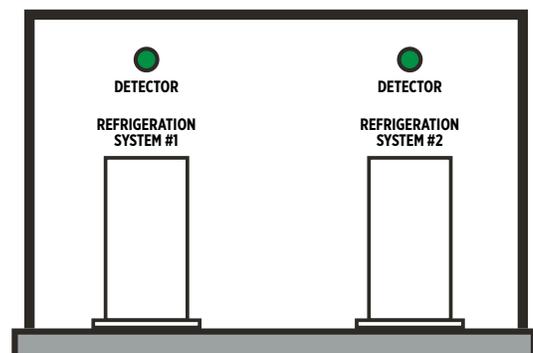
LIGHTER THAN AIR TARGET GAS

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.

For walk-in freezers and cold rooms, mount a detector under the evaporator to maximize the possibility of detecting a leak. Also, consider additional protection against mechanical damage, such as pallets, forklifts, etc.

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.

A remote entrance monitor can be used to read gas concentration levels before personnel need to enter a room.
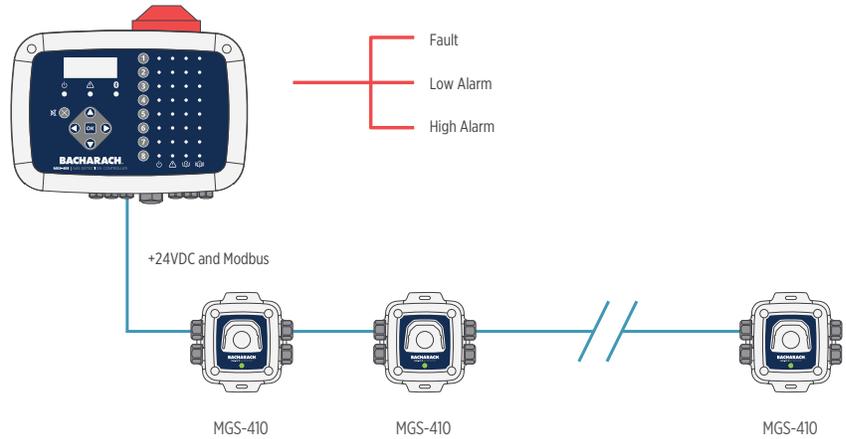
System Design Examples

MGS-400 GAS DETECTION SERIES

Ammonia (NH$_3$) System IIAR Example

<div style="background:green">REFRIGERATED AREA</div>

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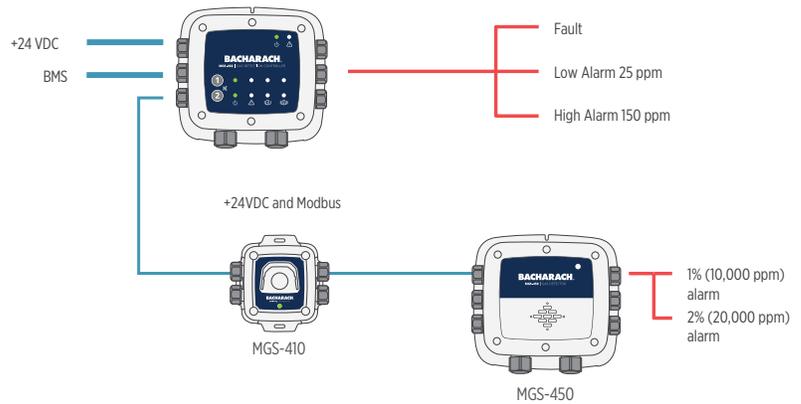**35PPM:** close liquid and hot gas solenoid valves

Fault
Low Alarm
High Alarm

+24VDC and Modbus

MGS-410   MGS-410   MGS-410

Ammonia (NH$_3$) System IIAR Example

COMPRESSOR ROOM

+24 VDC
BMS

Fault
Low Alarm 25 ppm
High Alarm 150 ppm

+24VDC and Modbus

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

MGS-410   MGS-450

1% (10,000 ppm) alarm
2% (20,000 ppm) alarm

Multi-Door Room

MACHINE ROOM

Alarms and ventilation gas dependent

DOOR 1   DOOR 2

Additional Alarm / Beacon

Controller Outside Mechanical Room / Freezer / Cooler

MGS-402

System Design Examples

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

Modbus

Exhaust Line—Charcoal Filter

Purge Line (to external source clean air)

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

Fault
Alarm 1
Alarm 2
Alarm 3

BACHARACH
MULTI-ZONE | REFRIGERANT GAS MONITOR

MULTI-ZONE

Supermarket Application

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.
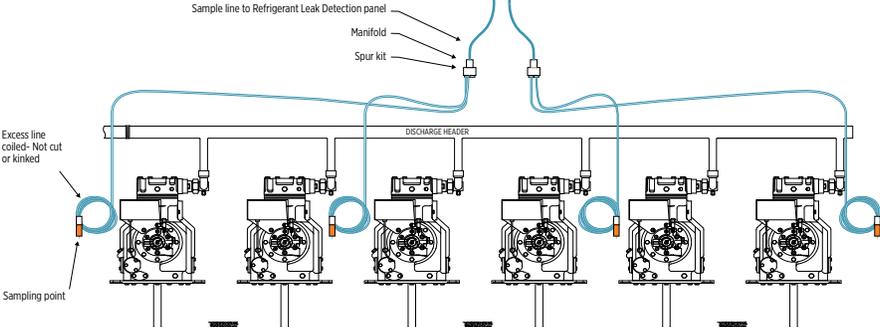
DISPLAY CASES

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

Sample line to Refrigerant Leak Detection panel
Manifold
Spur kit
Liquid line solenoid
Sealed both sides of penetration
Excess line coiled- Not cut or kinked
Sampling point

Evaporator
Approx. 8"
Sampling point- 1 per evaporator
Insulated wall

Sample line to Refrigerant Leak Detection panel
Manifold
Spur kit
Excess line coiled- Not cut or kinked

Excess line coiled- Not cut or kinked
Cover plate
Sampling point

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

Sample line to Refrigerant Leak Detection panel
Manifold
Spur kit

Excess line coiled- Not cut or kinked
DISCHARGE HEADER

Sampling point

Gas Calibration and Accessories
CALIBRATION ACCESSORIES AND KITS FOR CALIBRATING EQUIPMENT

Calibration Adapters

DESCRIPTION	PART NUMBER
MGS-410, MGS-450, MGS-460 CALIBRATION ADAPTER	H6302-9990
MGS-550 IP66 CALIBRATION ADAPTER	H1100-0034
MVR-300 STANDARD VERSION, CALIBRATION ADAPTER	H1100-2017
MVR-300 UK VERSION, CALIBRATION ADAPTER	H1100-2056

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	H0051-3299
REGULATOR (0.5 L/MIN, 5/8″-18 UNF) - FOR USE WITH MVR-300	H0051-2358
REGULATOR, 1.0 LPM, 5/8″-18 UNF - FOR USE WITH MGS-250, MGS-550	H0051-2320
VARIABLE FLOW REGULATOR, 4.0 LPM, 5/8″-18 UNF - FOR USE WITH HGM-SZ, AGM-SZ, CO_2-SZ, HGM-MZ, AGM-MZ, CO_2-MZ, PGM-IR	H3015-3849

Calibration Kits (w/o Gas)

DESCRIPTION	PART NUMBER
TWO CYLINDER CARRYING CASE	H0051-1560
KIT: CARRYING CASE WITH 0.3 LPM REGULATOR	H0051-3285
KIT: CARRYING CASE WITH 0.5 LPM REGULATOR	H0051-3286
KIT: CARRYING CASE WITH 1.0 LPM REGULATOR	H0051-3287

Calibration Kits

DESCRIPTION	PART NUMBER
MVR-300 STANDARD VERSION, CALIBRATION KIT (CALIBRATION CUP, PLASTIC HOSE) - RECOMMEND (1) KIT FOR EVERY (10)GAS DETECTORS PURCHASED	H1100-2018
MVR-300 UK VERSION, CALIBRATION KIT (CALIBRATION CUP, PLASTIC HOSE) - RECOMMEND (1) KIT FOR EVERY (10) GAS DETECTORS PURCHASED	H1100-2065
MAGNETIC WAND - RECOMMENDED (1) FOR EVERY (10) GAS DETECTORS PURCHASED	H1100-1004

Calibration Gas (Europe)

GAS	CONCENTRATION	FILL GAS	VOLUME	PART NUMBER (EUROPE)
Carbon Monoxide, CO	1000ppm	Balance Air	110L	H1200-0110
Nitrogen Dioxide, O_2	10ppm	Balance Air	58L	H1200-0143
R-1150 (Ethylene, C_2H_4)	2000ppm	Balance Air	110L	H1200-0196
R-134a	50ppm	Balance Air	110L	H1200-0150
R-134a	500ppm	Balance Air	110L	H1200-0151
R-134a	5000ppm	Balance Air	110L	H1200-0200
R-134a	100ppm	Balance Air	110L	H1200-0147
R-134a	1000ppm	Balance Air	110L	H1200-0148
R-290	800ppm	Balance Air	110L	H1200-0212
R-290	2000ppm	Balance Air	110L	H1200-0159
R-290	1000ppm	Balance Air	110L	H1200-0158
R-290 (Propane, C_3H_8)	1700ppm	Balance Air	110L	H1200-0102
R-32	2000ppm	Balance Air	110L	H1200-0225
R-404A	500ppm	Balance Air	110L	H1200-0165
R-404A	2000ppm	Balance Air	110L	H1200-0224
R-404A	100ppm	Balance Air	110L	H1200-0161
R-404A	1000ppm	Balance Air	110L	H1200-0162
R-407A	500ppm	Balance Air	110L	H1200-0210
R-407C	500ppm	Balance Air	110L	H1200-0174
R-407C	100ppm	Balance Air	110L	H1200-0170
R-407C	1000ppm	Balance Air	110L	H1200-0171
R-407C	10000ppm	Balance Air	110L	H1200-0172
R-407F	100ppm	Balance Air	110L	H1200-0204
R-407F	1000ppm	Balance Air	110L	H1200-0176
R-410A	500ppm	Balance Air	110L	H1200-0209
R-410A	5000ppm	Balance Air	110L	H1200-0203
R-410A	2000ppm	Balance Air	110L	H1200-0222
R-410A	100ppm	Balance Air	110L	H1200-0177
R-410A	1000ppm	Balance Air	110L	H1200-0178
R-422D	1000ppm	Balance Air	110L	H1200-0183
R-449A	500ppm	Balance Air	110L	H1200-0208
R-449A	1000ppm	Balance Air	110L	H1200-0207
R-50 (Methane, CH_4)	7200ppm	Balance Air	110L	H1200-0109
R-50 (Methane, CH_4)	2500ppm	Balance Air	110L	H1200-0214
R-50 (Methane, CH_4)	1000ppm	Balance Air	110L	H1200-0104
R-507A	100ppm	Balance Air	110L	H1200-0191
R-507A	1000ppm	Balance Air	110L	H1200-0192
R-717 (Ammonia, NH_3)	50ppm	Balance Air	110L	H1200-0140
R-717 (Ammonia, NH_3)	500ppm	Balance Air	110L	H1200-0141
R-717 (Ammonia, NH_3)	100ppm	Balance Air	110L	H1200-0134
R-717 (Ammonia, NH_3)	1000ppm	Balance Air	110L	H1200-0135
R-717 (Ammonia, NH_3)	10000ppm	Balance Air	110L	H1200-0136
R-744 (Carbon Dioxide, CO_2)	5000ppm	Balance N_2	110L	H1200-0123
R-744 (Carbon Dioxide, CO_2)	50000ppm	Balance N_2	110L	H1200-0124
R-744 (Carbon Dioxide, CO_2)	30000ppm	Balance N_2	110L	H1200-0120
R-744 (Carbon Dioxide, CO_2)	20000ppm	Balance N_2	110L	H1200-0118
R-744 (Carbon Dioxide, CO_2)	10000ppm	Balance N_2	110L	H1200-0114

Gas Calibration and Accessories

Calibration Gas (North America)

	CONCENTRATION	FILL GAS	VOLUME	PART NUMBER (NORTH AMERICA)
R-600 (Butane)	50 %LEL	Balance Air	34L	H0051-4030
Chlorine, Cl_2	5 ppm	Balance N2	34L	H0051-4022
Carbon Monoxide, CO	1,000 ppm	Balance N2	103L	H0024-0794
Carbon Monoxide, CO	1,000 ppm	Balance Air	103L	H0051-4027
Carbon Monoxide, CO	100 ppm	Balance Air	103L	H0051-1994
Carbon Monoxide, CO	100 ppm	Balance Air	34L	H0051-4025
Carbon Monoxide, CO	25 ppm	Balance Air	34L	H0051-4023
Carbon Monoxide, CO	4,000 ppm	Balance Air	103L	H0024-1155
Carbon Monoxide, CO	50 ppm	Balance Air	34L	H0051-4024
Carbon Monoxide, CO	500 ppm	Balance Air	103L	H0024-0492
Carbon Monoxide, CO	500 ppm	Balance Air	34L	H0051-4026
R-744 (Carbon Dioxide, CO_2)	1,000 ppm	Balance Air	103L	H0051-4017
R-744 (Carbon Dioxide, CO_2)	10,000 ppm	Balance Air	34L	H0051-4008
R-744 (Carbon Dioxide, CO_2)	100,000 ppm	Balance Air	34L	H0051-4012
R-744 (Carbon Dioxide, CO_2)	15,000 ppm	Balance Air	34L	H0051-4009
R-744 (Carbon Dioxide, CO_2)	150,000 ppm	Balance N2	34L	H0051-4013
R-744 (Carbon Dioxide, CO_2)	2,500 ppm	Balance Air	103L	H0051-4018
R-744 (Carbon Dioxide, CO_2)	25,000 ppm	Balance Air	34L	H0051-4010
R-744 (Carbon Dioxide, CO_2)	250,000 ppm	Balance N_2	34L	H0051-4014
R-744 (Carbon Dioxide, CO_2)	4,000 ppm	Balance N_2	103L	H0051-4019
R-744 (Carbon Dioxide, CO_2)	5,000 ppm	Balance N_2	34L	H0051-4020
R-744 (Carbon Dioxide, CO_2)	50,000 ppm	Balance Air	103L	H0051-4011
R-744 (Carbon Dioxide, CO_2)	50,000 ppm	Balance Air	17L	H0024-1126
R-744 (Carbon Dioxide, CO_2)	500,000 ppm	Balance N_2	34L	H0051-4015
R-744 (Carbon Dioxide, CO_2)	7,500 ppm	Balance Air	34L	H0051-4021
R-744 (Carbon Dioxide, CO_2)	750,000 ppm	Balance Air	34L	H0051-4016
R-1150 (Ethylene, C_2H_4)	1,000 ppm	Balance Air	34L	H0051-4038
R-1150 (Ethylene, C_2H_4)	10 ppm	Balance Air	34L	H0051-4036
R-1150 (Ethylene, C_2H_4)	500 ppm	Balance Air	34L	H0051-4037
Ethylene Oxide, C_2H_4O	5 ppm	Balance N_2	58L	H0051-4035
Hydrogen, H_2	1 Vol%	Balance N_2	103L	H0051-4039
Hydrogen, H_2	1,000 ppm	Balance Air	34L	H0051-4041
Hydrogen, H_2	100 ppm	Balance Air	34L	H0051-4040
Hydrogen Sulfide, H_2S	25 ppm	Balance N_2	34L	H0051-4044
Hydrogen Sulfide, H_2S	5 ppm	Balance N_2	34L	H0051-4043
Hydrogen Chloride, HCl	5 ppm	Balance N_2	58L	H0051-4042
Isobutylene	1,000 ppm	Balance Air	34L	H0051-4078
Isobutylene	150 ppm	Balance Air	34L	H0051-4077
Isobutylene	25 ppm	Balance Air	34L	H0051-4076
R-50 (Methane, CH_4)	2,500 ppm	Balance Air	34L	H0051-4033
R-50 (Methane, CH_4)	25 %LEL	Balance Air	34L	H0051-4031
R-50 (Methane, CH_4)	5,000 ppm	Balance Air	34L	H0051-4034
R-50 (Methane, CH_4)	50 %LEL	Balance Air	103L	H0051-1121
R-50 (Methane, CH_4)	50 %LEL	Balance Air	34L	H0051-4032
R-50 (Methane, CH_4)	500 ppm	Balance Air	103L	H0051-1816

Calibration Gas (North America) *continued*

	CONCENTRATION	FILL GAS	VOLUME	PART NUMBER (NORTH AMERICA)
R-717 (Ammonia, NH$_3$)	1,000 ppm	Balance N$_2$	34L	H0051-4005
R-717 (Ammonia, NH$_3$)	10,000 ppm	Balance Air	58L	H0051-4282
R-717 (Ammonia, NH$_3$)	100 ppm	Balance Air	58L	H0051-4002
R-717 (Ammonia, NH$_3$)	150 ppm	Balance Air	58L	H0051-4281
R-717 (Ammonia, NH$_3$)	2,500 ppm	Balance N$_2$	34L	H0051-4006
R-717 (Ammonia, NH$_3$)	25 ppm	Balance Air	34L	H0051-4000
R-717 (Ammonia, NH$_3$)	250 ppm	Balance Air	34L	H0051-4003
R-717 (Ammonia, NH$_3$)	30,000 ppm	Balance Air	58L	H0051-4265
R-717 (Ammonia, NH$_3$)	5,000 ppm	Balance N$_2$	34L	H0051-4007
R-717 (Ammonia, NH$_3$)	50 ppm	Balance Air	34L	H0051-4001
R-717 (Ammonia, NH$_3$)	500 ppm	Balance N$_2$	34L	H0051-4004
Nitrogen, N$_2$	Pure Nitrogen	Pure Nitrogen	103L	H9550-0049
Nitrogen, N$_2$	Pure Nitrogen	Pure Nitrogen	17L	H0023-4003
Nitrogen, N$_2$	Pure Nitrogen	Pure Nitrogen	34L	H0051-4053
Nitrogen Oxide, NO	10 ppm	Balance Air	34L	H0051-4047
Nitrogen Oxide, NO	25 ppm	Balance N$_2$	34L	H0051-4045
Nitrogen Oxide, NO	250 ppm	Balance N$_2$	58L	H0024-1156
Nitrogen Oxide, NO	50 ppm	Balance Air	34L	H0051-4046
Nitrogen Dioxide, O$_2$	100 ppm	Balance N$_2$	58L	H0024-1157
Nitrogen Dioxide, O$_2$	5 ppm	Balance Air	34L	H0051-4048
Oxygen, O$_2$	19.0 Vol%	Balance N$_2$	34L	H0051-4051
Oxygen, O$_2$	20.9 Vol%	Balance N$_2$	34L	H0051-4049
Oxygen, O$_2$	23 Vol%	Balance N$_2$	34L	H0051-4050
PH$_3$	1 ppm	Balance N$_2$	34L	H0051-4052
R-290 (Propane, C$_3$H$_8$)	25 %LEL	Balance Air	34L	H0051-4028
R-290 (Propane, C$_3$H$_8$)	50 %LEL	Balance Air	17L	H0023-4009
R-290 (Propane, C$_3$H$_8$)	50 %LEL	Balance Air	34L	H0051-4029
R-123	100 ppm	Balance Air	103L	H3015-3852
R-1233zd	1,000 ppm	Balance Air	58L	H0051-4213
R-1233zd	500 ppm	Balance Air	58L	H0051-4212
R-1234ze	1,000 ppm	Balance Air	58L	H0051-4196
R-134a	1,000 ppm	Balance Air	34L	H0051-4057
R-134a	100 ppm	Balance Air	103L	H3015-3851
R-134a	100 ppm	Balance Air	34L	H0051-4055
R-134a	50 ppm	Balance Air	34L	H0051-4054
R-134a	500 ppm	Balance Air	34L	H0051-4056
R-22	1,000 ppm	Balance Air	34L	H0051-4061
R-22	100 ppm	Balance Air	103L	H3015-3850
R-22	100 ppm	Balance Air	34L	H0051-4059
R-22	50 ppm	Balance Air	34L	H0051-4058
R-22	500 ppm	Balance Air	34L	H0051-4060
R-290	1,000 ppm	Balance Air	34L	H0051-4062
R-290	2,000 ppm	Balance Air	34L	H0051-4063
R-32	500ppm	Balance Air	103L	H0051-4241
R-32	1,000 ppm	Balance Air	58L	H0051-4205

Gas Calibration and Accessories

Calibration Gas (North America) *continued*

	CONCENTRATION	FILL GAS	VOLUME	PART NUMBER (NORTH AMERICA)
R-404A	1,000 ppm	Balance Air	34L	H0051-4067
R-404A	100 ppm	Balance Air	34L	H0051-4065
R-404A	50 ppm	Balance Air	34L	H0051-4064
R-404A	500 ppm	Balance Air	34L	H0051-4066
R-407A	1,000 ppm	Balance Air	58L	H0051-4187
R-407A	50 ppm	Balance Air	34L	H0051-4068
R-407A	500 ppm	Balance Air	34L	H0051-4069
R-407A	1,000 ppm	Balance Air	58L	H0051-4188
R-407F	1,000 ppm	Balance Air	58L	H0051-4189
R-410A	1,000 ppm	Balance Air	58L	H0051-4190
R-410A	2,000 ppm	Balance Air	103L	H0051-4208
R-410A	50 ppm	Balance Air	34L	H0051-4070
R-410A	500 ppm	Balance Air	34L	H0051-4071
R-422A	1,000 ppm	Balance Air	58L	H0051-4191
R-422D	1,000 ppm	Balance Air	58L	H0051-4192
R-427A	1,000 ppm	Balance Air	58L	H0051-4193
R-434A	1,000 ppm	Balance Air	103L	H0051-4251
R-448A	500 ppm	Balance Air	103L	H0051-4252
R-448A	1,000 ppm	Balance Air	58L	H0051-4200
R-449A	1,000 ppm	Balance Air	58L	H0051-4201
R-450A	1,000 ppm	Balance Air	103L	H0051-4254
R-452A	1,000 ppm	Balance Air	58L	H0051-4202
R-452B	1,000 ppm	Balance Air	58L	H0051-4203
R-454A	1,000 ppm	Balance Air	103L	H0051-4258
R-454B	1,000 ppm	Balance Air	34L	H0051-4280
R-454C	1,000 ppm	Balance Air	100L	H0051-4260
R-455A	1,000 ppm	Balance Air	100L	H0051-4279
R-507	1,000 ppm	Balance Air	58L	H0051-4194
R-507	50 ppm	Balance Air	34L	H0051-4072
R-507	500 ppm	Balance Air	34L	H0051-4073
R-513A	500 ppm	Balance Air	103L	H0051-4261
R-513A	1,000 ppm	Balance Air	58L	H0051-4204
R-514A	1,000 ppm	Balance Air	58L	H0051-4214
R-600a	800 ppm	Balance Air	34L	H0051-4074
Sulfur Dioxide, SO_2	100 ppm	Balance N_2	58L	H0024-1158
Sulfur Dioxide, SO_2	5 ppm	Balance Air	34L	H0051-4075

MSA—The Safety Company

Established in 1914, MSA Safety Incorporated is the global leader in the development, manufacture, and supply of safety products that protect people and facility infrastructures. Many MSA products integrate a combination of electronics, mechanical systems, and advanced materials to protect users against hazardous or life-threatening situations. The company's comprehensive product line is used by workers around the world in a broad range of markets, including the oil, gas, and petrochemical industry, the fire service, the construction industry, mining, and the military. MSA's core products include self-contained breathing apparatus, fixed gas and flame detection systems, portable gas detection instruments, industrial head protection products, firefighter helmets and protective apparel, and fall protection devices. With 2024 revenues of $1.8 billion, MSA employs approximately 5,200 people worldwide. The company is headquartered north of Pittsburgh in Cranberry Township, PA, and has manufacturing operations in the United States, Europe, Asia, and Latin America. With more than 40 international locations, MSA realizes approximately half of its revenue from outside North America. For more information visit MSA's web site at www.MSAsafety.com.

Our Mission

MSA's mission is to see to it that men and women may work in safety and that they, their families, and their communities may live in health throughout the world.

MSA: SAFEGUARDING PEOPLE, PLACES & THE PLANET.

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