ThermGAS

State-of-the-art technology, flexible choices for the fixed gas monitoring goals you set.

Haloguard Refrigerant Gas Monitors



Refrigerant gas monitors since 1988

- Cost-effective solutions for ASHRAE 15, mechanical, fire and building code compliance.
- State-of-the-art Photoacoustic IR technology.
- Exceptional service and support.

Our Experience = Your Gain

With experience extending back to the 1988 Montreal Protocol, no other fixed monitoring system manufacturer can claim a greater history dedicated to the research, manufacture, sales and service of refrigerant gas monitoring systems. Today, the Haloguard product brand has come to mean proven reliability worldwide - designed and constructed to withstand tough mechanical room requirements.

Personal ThermGAS Customer Service

Our monitors are customized to meet any refrigerant gas or oxygen depletion application based on individual project goals - from stringent refrigerant conservation to code compliance. We work with System Engineers, Mechanical Contractors, Facility Managers, Chiller Equipment Manufacturers and Distributors. Customers respect our prompt and knowledgeable response to their needs. For more detail, visit www.thermgas.com.

System configuration proposal based on:

Monitoring priorities: refrigerant conservation, occupant safety, regulatory compliance.

- Mechanical room: size and layout, entrances, airflow patterns.
- Chillers: quantity and sizes.
- Gas of interest: any refrigerant gas, number/type of gas, gas combinations, oxygen depletion.
- Output requirements: relay contacts, analog output, serial communications, data logging.

Refrigerant gas monitoring for:

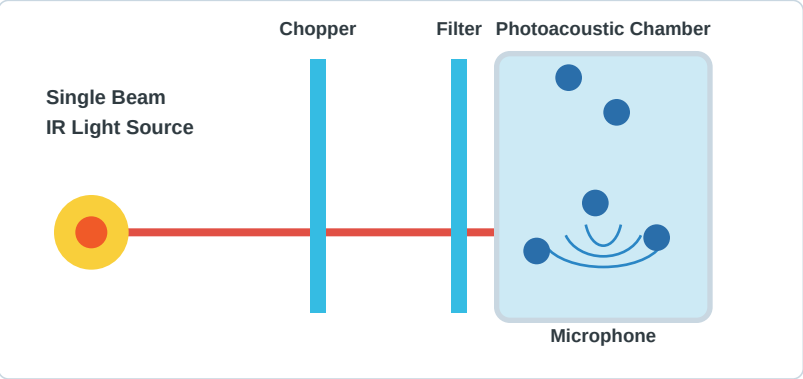
Machine rooms • Refrigeration equipment • Cold storage areas • Process cooling

Complete submittal information is available at www.thermgas.com, or call (800) 896-2996 for a no-obligation system assessment.

HELPFUL INFORMATION FOR MACHINE ROOM FIXED GAS MONITORING

Technology overview and monitoring guidance

Choose ThermGAS Photoacoustic IR for the highest level of monitoring dependability.



Photoacoustic IR directly measures pressure changes caused by IR light absorption. The higher the pressure, the greater the concentration of measured gas.

- Proven, ultra-precise microphone enables unattended operation for longer periods of time.
- PIR reduces installation and maintenance costs. No need for fresh air sampling line or in-line scrubber required by other IR units.
- Higher operating efficiency. PIR technology eliminates downtime for frequent auto-zero processing common in other technologies.
- Temperature controlled, sealed sample cell eliminates effects of temperature, atmospheric pressure and humidity changes on readings.
- Superior signal-to-noise ratio. Highly selective PIR technology outperforms all others in trace measurement concentrations (1 ppm).

Infrared and CMOS technologies

Infrared (IR) technology is based on the absorption of a specific wavelength of IR light by a gas molecule.

Unlike other IR-based technologies, Photoacoustic IR (PIR) is a direct measurement technology that does not rely on reference sampling. This eliminates inaccuracies when reference gas zero drifts due to changes in temperature and pressure, aging IR light, and sample cell contamination. PIR systems measure pulsating changes in pressure that occur after IR light is absorbed by the refrigerant molecule. Specific gases can be selectively monitored by narrowly filtering the IR light, thereby avoiding any absorption when no gas is present.

CMOS technology is based on a conductivity change when sensitized metal oxides are exposed to refrigerant gases. While CMOS systems can perform adequately to satisfy the safety requirements of many refrigerants, IR technology is recommended for toxic applications, conservation efforts, or cross contamination potential.

Or, choose Haloguard CMOS monitors for basic compliance - the flexibility you need to cost-effectively meet standards and code requirements within budget.

Topic	Guidance
Sensitivity	Both CMOS and IR technologies deliver adequate sensitivity to meet safety standards that call for an alarm, remote notification, and ventilation at the TLV-TWA (AEL-TWA). Highly selective IR: 1 ppm; Wideband multi-gas IR: 20 ppm; CMOS: 30-40 ppm for HCFCs, 40-50 ppm for HFCs, and 60-80 ppm for CFCs. Example: 1 lb. of refrigerant evaporates to occupy 3-4 cubic feet, raising a 30,000-40,000 cubic-foot room to 100 ppm.
Gas selectivity	Selectivity is the ability to differentiate refrigerants or interfering vapors from other areas. Consider a highly selective Haloguard IR or II/IR monitor when both Group A1 and non-Group A1 refrigerants are present, or when halocarbons, volatile hydrocarbons, or extraneous chemicals such as cleaning products may be present.
Number of sensors / sensing points	Rule of thumb: one sensor or sample point for each 20,000-30,000 cubic feet of room volume, or one sensor fewer than the number of chillers, whichever is less; provided there is one sensor for each refrigerant in the room.
Placement	For continuous drafts, locate a sensor downstream from the last potential leak source. Smoke tubes help determine airflow patterns. Adding points near each potential leak source enhances gas conservation goals. Since refrigerants are heavier than air, sensors are typically located about 18 inches off the floor and in low-lying areas such as stairwells.
Remote notification	ASHRAE 15 requires audible and visual alarms inside the mechanical room and outside each entrance. The optional Remote Display Panel provides gas concentration and diagnostic information at a safe place outside the mechanical room.

COMPLIANCE REFERENCE

ASHRAE 15-2013 code excerpts and exposure limits

Section 8.11.2.1 Refrigerating Machinery Room, General Requirements.

Each refrigerating machinery room shall contain a detector, located in an area where refrigerant from a leak will concentrate, that actuates an alarm and mechanical ventilation in accordance with 8.11.4 at a value not greater than the corresponding TLV-TWA (or toxicity measure consistent therewith). The alarm shall annunciate visual and audible alarms inside the refrigerating machinery room and outside each entrance to the refrigerating machinery room.

Section 8.11.6 Combustion Equipment

Combustion equipment shall not be installed in the same machinery room with refrigerant-containing equipment except under one of the following conditions: (a) combustion air is ducted from outside the machinery room and sealed in such a manner as to prevent any refrigerant leakage from entering the combustion chamber, or (b) a refrigerant detector, conforming to 8.11.2.1, is employed to automatically shut down the combustion process in the event of refrigerant leakage.

11.7 Responsibility for Operation and Emergency Shutdown.

The emergency procedures shall forbid entry into the refrigerating machinery room when the refrigerant alarm required by 8.11.2.1 has been activated except by persons provided with the appropriate respiratory and other protective equipment and trained in accordance with jurisdictional requirements.

Complete submittal information available at www.thermgas.com

Exposure limits for common refrigerants

Gas	TLV-TWA1	STEL-C2	WEEL3	PEL4	RCL5	Group
R-11	.	1,000	.	1,000	1,100	A1
R-12	1,000	.	.	1,000	18,000	A1
R-22	1,000	.	.	1,000	59,000	A1
R-123	50	.	50	50	9,100	B1
R-134a	1,000	.	1000	1,000	50,000	A1
R-500	1,000	.	.	1,000	29,000	A1
R-502	1,000	.	.	1,000	73,000	A1

- 1) ACGIH (American Conference of Government Industrial Hygienists) - TLV-TWA = 8 hr./day 40 hr./wk avg.
- 2) ACGIH - Short Term Exposure Limit Ceiling. Should not exceed 3-5 times the TWA for more than 30 min./day.
- 3) AIHA - Workplace Environment Exposure Level.
- 4) OSHA - Permitted Exposure Limit.
- 5) ASHRAE 34 - Refrigerant Concentration Level for Occupied Space.

Monitoring priorities supported by Haloguard systems

- Refrigerant conservation
- Occupant safety
- Regulatory compliance
- Alarm and ventilation actuation
- Remote notification and building management system interface

HALOGUARD IR AND HALOGUARD III

Photoacoustic IR systems



Haloguard IR and Haloguard III combine the most sensitive, highly selective Photoacoustic Infrared (PIR) detection with microprocessor digital control to provide the most advanced, state-of-the-art system for refrigerant gas detection. PIR technology virtually eliminates false alarms and reference sample drift.

All Haloguard PIR models feature:

- Six available user adjustable alarms and one fault alarm.
- Seven dry contact relays enable remote event triggers such as ventilation, remote notification and signalling systems, or interface with building management systems.
- Conforms to applicable UL/CSA/EN Electrical Safety and EMC standards.
- Options include 2, 4, or 8 channel scanner for increased area coverage, analog output ppm concentration and fault diagnostic data for each sampling point, strobes and audible alarms, oxygen depletion sensor and battery backup.

Haloguard IR

Most sensitive (1 ppm), highly selective Photoacoustic infrared gas monitoring.

Highly selective single gas monitor with sensor and controller all-in-one, with 1, 2, 4, or 8 channels. Six alarms are adjustable between 10 ppm and full scale. Optionally, monitor up to 3 different gases simultaneously from up to 24 points by adding Remote IR Modules and Channel Scanners.

Electrical supply	100-240V, 50-60Hz, 65W
Fuse	3A/240V; fast acting
Output signal	Std: 7 x 10A dry contact relays; Opt: RS-232; Opt: 0-5, 10VDC or 4-20mA analog
Sensitivity	1 ppm
Resolution	1 ppm
Response time	<1 minute
Clearing time	<3 minutes
Measuring range	0-1,000 ppm all refrigerants
Operating conditions	+32°F to +120°F non-condensing
Enclosure / weight	Std: NEMA 12, 24 lbs.; Opt: NEMA 4, 28 lbs.

Haloguard III

Multi-gas, wideband PIR cost-effective 20 ppm sensitivity.

Haloguard III features wideband photoacoustic infrared (PIR) technology for monitoring up to 8 gases with sensor and controller all-in-one. Six alarms are adjustable between 50 ppm and full scale. Optionally, monitor up to 24 different gases from up to 24 points by adding optional Remote IR Modules with multi-channel scanners.

Same as HALOGUARD IR except:	
Sensitivity	30 ppm



Remote Display

ASHRAE compliance for notification outside mechanical rooms. Couple the Remote Display Panel with any Haloguard system to display refrigerant concentrations, fault diagnostics, visual and audible alarms at a safe location outside the machine room.

Remote IR Sensor Module

For monitoring additional gases and/or sampling points on any Haloguard PIR monitor. Can be located up to 1000 ft. from controller.

PRODUCT OPTIONS

CMOS monitoring, ancillary equipment and support



Haloguard CMOS Fixed Gas Monitors feature two adjustable alarm levels between 10% and 100% of scale, plus fault and offscale alarms. Options include battery backup, strobes and audible alarms. Solid state electronics ensure dependability. Sensors can be located up to 300 feet from the controller.

Haloguard

Single-sensor CMOS monitoring. Your most cost-effective single gas refrigerant monitoring solution.

Four alarm relays are standard, analog outputs are available to interface with building management systems or other remote devices.

Electrical supply	100-240V, 50-60Hz, 65W
Output signal	Std: 4x3A dry contact relay; Opt: 0-10VDC or 4-20mA analog
Accuracy	10% full-scale
Measuring range	0-1000 ppm All CFC, HFC, HCFC (except R123); 0-300 ppm R123
Response time	<1 minute
Recovery time	<3 minutes
Operating conditions	Sensor: -20°F to +120°F non-condensing; Controller: -0°F to +120°F non-condensing
Materials	Controller: NEMA 4; Sensor: PVC and PP filter
Weight	6 lbs. (Add 4 lbs. for optional battery backup).

Haloguard II

Multi-sensor, multigas plus oxygen CMOS monitoring.

Multiplex up to 6 sensors of any gas type (CFC, HCFC, HFC, Ammonia or Oxygen). Dry contact relays are activated when any sensor reaches an alarm condition. Analog output for up to 4 sensors.

Electrical supply	100-240V, 50-60Hz, 65W
Output signal	Std: Dry contact relay; Opt: 4 x 0-5VDC analog
Accuracy	10% full-scale
Measuring range	0-1,000 ppm All CFC, HFC, HCFC (except R123); 0-300 ppm R123, R717 (ammonia); 0-25% Oxygen
Response time	<1 minute
Recovery time	<3 minutes
Operating conditions	CMOS Sensor: -20°F to +120°F non-condensing; O2 Sensor: -20°F to +140°F non-condensing; Controller: 0°F to +120°F non-condensing
Materials	Sensor: PVC and PP filter; Controller: NEMA 12/13
Weight	8 lbs. (add 4 lbs. for optional battery backup).

Ancillary Safety Equipment



Oxyguard Oxygen Depletion Monitor

Economical 24 hour Oxygen Depletion Monitor utilizes an electro-chemical cell for virtually maintenance-free monitoring for oxygen depletion in sensitive environments. Two alarm levels with LEDs, local audible and strobe alarm with remote notification to BMS, ventilation or other systems. Remote sensor with 6 ft. cable and DIN plug. Options: remote sensor extension cable, battery backup, and gas test kit.



SCBA

Self-contained breathing apparatus (SCBA) provides an independent supply of breathing air in hazardous atmospheres. Equipment must be selected and used by trained personnel in accordance with applicable respiratory protection standards and site procedures.



Calibration & Demo Kits

Span Gas Calibration Kit is available for demonstrating new PIR units, calibrating them after the first 12 months of operation, or recalibrating for a different gas type. Kit includes cylinder of calibrated refrigerant gas, regulator, gas sampling bag, tubing and fittings, microprocessor or digital calibrator, carrying case and instructions. Additional gas cylinders can be ordered separetely.