

SPECIFICATION
CHILLGARD L-SERIES
REFRIGERANT MONITOR

USER INSTRUCTIONS
FOR THE
CHILLGARD L-SERIES REFRIGERANT
MONITOR

To completely customize the specification to your exact application, modification to the following paragraph is necessary:

1. Paragraph 1.2 - Fill in the number of points monitored and the gas to be monitored.

SPEC – CHILLGARD L-SERIES REFRIGERANT MONITOR

**GAS MONITOR SPECIFICATION FOR THE
CHILLGARD L-SERIES REFRIGERANT MONITOR**

1.0 Gas Monitor Specification - Paragraphs 1.1 through 1.13 details the specification for the Gas Monitoring System.

1.1 General - The gas monitoring system shall continuously measure and display the specified gas concentration. The system shall provide visual indicators when preset limits are exceeded. Relay output for alarms and control shall be provided.

1.2 Number and Types of Monitoring Points - The number and type of monitors shall be as follows:

GAS	RANGE/FULL SCALE	NUMBER OF POINTS
R-123	0-1000 ppm	_____
R-11	0-1000 ppm	_____
R-22	0-1000 ppm	_____
R-134a	0-1000 ppm	_____
R-12	0-1000 ppm	_____

1.3 System Configuration - The system design shall conform to Paragraphs 1.3 through 1.9.

1.3.1 Description - The system may consist of one of the following configurations:

- 1.3.1.1 Base remote sensor module including the Photoacoustic IR (PAIR) sensor, power supply.
- 1.3.1.2 Split construction with a control module and remote sensing module.
- 1.3.1.3 Stand-alone type with integrated control and sensing modules in a single enclosure.

1.3.2 Sensor Module-The unit shall be a wall mount type. It shall conform to Paragraphs 1.3.2.1 to 1.3.2.9.

- 1.3.2.1 NEMA 4X enclosure
- 1.3.2.2 Photoacoustic IR Sensor.
- 1.3.2.3 Five LED status indicators.
- 1.3.2.4 24 VAC or VDC operation or 110/220, 50/60 Hz options.
- 1.3.2.5 Optional beacon
- 1.3.2.6 4-20 mA and RS-485 ModBus outputs.
- 1.3.2.7 Single channel diffusion or optional pump sampling.
- 1.3.2.8 4-channel sequencer with sample solenoids can be added as an option but requires the use of the Control Module to drive the sequencer.

SPEC – CHILLGARD L-SERIES REFRIGERANT MONITOR

1.3.2.9 20 PPM detection limit.

1.3.3 Control Module- The unit shall be a wall mount type. It shall conform to Paragraphs 1.3.3.1 through 1.3.3.9.

1.3.3.1 Enclosure Type - The enclosure shall be a NEMA 4X version.

1.3.3.2 The control module shall feature digital signal processing with RS-232 system compatible. A 4-20 mA output and 0-10VDC shall also be available.

1.3.3.3 Accepts up to 8 remote sensor inputs over a single pair cable or up to 2 remote sensors with 4-channel pump/sequencer or any combination up to 8 channels.

1.3.3.4 Digital Display with optional remote display. 1.3.3.5 Three

levels of Alarm and Fault indicators. 1.3.3.6 System configured via

the front panel keypad. 1.3.3.7 Provides 24VDC power to operate

remote sensors.

1.3.3.8 An 85 Db audible alarm with an acknowledge switch shall be available as standard on the control module.

1.3.3.9 A visual alarm strobe shall be available as an option on all units. 1.3.3.10

System power shall be 110/220 VAC 50/60 Hz.

1.3.4 Stand-Alone, Integrated Unit- The unit shall be wall mount type. It shall conform to Paragraphs 1.3.4.1 through 1.3.4.9.

1.3.4.1 Photoacoustic IR sensor

1.3.4.2 Diffusion operation or pumped with up to 4 sampling points. 1.3.4.3

20 PPM detection limit

1.3.4.4 Digital signal processing

1.3.4.5 Digital display with optional remote display 1.3.4.6 4-20 mA, 0-10VDC and RS-232 Outputs standard.

1.3.4.7 Three levels of Alarm and Fault status indicators.

SPEC – CHILLGARD L-SERIES REFRIGERANT MONITOR

1.3.4.8 System configured via the front panel keypad.

1.3.4.9 Enclosure Type - The enclosure shall be a NEMA 4X version.

1.3.3 Operating Principle - The principle of operation shall be of the infrared photo-acoustic absorption type.

1.3.3.1 Analyzer Sample – Any version of the analyzer may be configured as a diffusion type monitor or be equipped with an internal pump and filter that can draw a sample from a distance of 300 feet. All sample connections shall be on the bottom of the enclosure.

1.3.3.4 Analyzer Sensitivity - The analyzer limit of detection for all refrigerants shall be 20 PPM.

1.3.3.5 Analyzer Linearity - The analyzer shall be within +/-5 PPM of a linear response in the range of 0-100 ppm and + 5% of full scale in the range of 100-1000 ppm.

1.3.3.6 Temperature - The system shall operate over the range of 0° to 45° C.

1.3.3.7 Stability - The 24 hour zero or span drift must be less than 5 PPM. The long term (1 year) zero drift shall be less than 5 PPM. The long term span drift shall be less 10 PPM.

1.4 Calibration of all versions shall be performed using standard RP cylinders and existing calibration equipment.

1.5 Monitor Unit Requirements

1.5.1 Readout Displays - A 2 line x 20 character alpha numeric display shall be provided for the purpose of displaying the gas concentration, diagnostics, set-up and calibration menu.

1.5.2 Visual Alarm Indicators - All alarm indications shall be displayed on the front panel display.

1.5.3 Alarm Set Point Levels - Three separate alarm set point levels shall be provided. The set points shall be independently adjustable for any value for a given range. The set points shall provide drive signals to user interface relays. The alarm set points shall have the capability of providing the user a selection of latching or nonlatching.

1.5.4 Relay Outputs - The alarm set point drive signals shall activate user relays as

SPEC – CHILLGARD L-SERIES REFRIGERANT MONITOR

specified in Paragraphs 1.5.4.1 through 1.5.4.3.

1.5.4.1 Number of Relays - As a minimum, one relay for each alarm set point level shall be provided on the control unit.

1.5.4.2 Contact Rating - All relays shall be Form C, single pole, double throw. Dry contacts shall be rated for 5 amps resistive at 240 VAC.

1.5.4.3 Contact Selection - The contacts shall be capable of being selected normally energized or non-energized, latching or non-latching.

1.5.4.4 The Trouble (Fault) relay is normally energized and closed for normal conditions. If a system fault is detected the Trouble relay will de-energize.

1.5.5 Malfunction Indication - The readout display described in Paragraph 1.5.1 shall display full diagnostics when a fault exists without the use of codes.

1.5.6 Audible Alarm - An audible buzzer is included, it sounds when one of the three pre-selected alarm conditions or a trouble condition occurs.

1.5.7 Front Panel Controls - The function listed in this paragraph shall be accomplished using a keypad readily accessible on the front panel.

No tool or special adapters shall be used for:

- a. Display of alarm set point level on the readout display
- b. Resetting any alarm set point
- c. Zero and Span calibration adjustments

1.5.8 Sample Gas Filter - There shall be an internal sample gas filter on pumped units. This filter shall be easily serviced or replaced.

1.5.9 Output Signals

1.5.9.1 The 4-20 mA output shall have the following features:

- a. Scalable to 1-10% of the full scale. The default shall be 100% full scale.
- b. The output shall be sourcing current to module ground.
- c. For refrigerants, software will have a dead-banding feature not allowing a value less than 10 PPM to be displayed on the front panel.

1.5.9.2 RS-485 using ModBus communication protocol will be included in all sensor modules.

SPEC – CHILLGARD L-SERIES REFRIGERANT MONITOR

1.5.9.3 The control modules will have an ATO output option of RS-232, 4-20mA, or 0-10VDC.

1.5.9.4 The 10 volt analog output may be used to identify the station being monitored in a multipoint sequencing unit.

1.6 System Power Requirements shall be standard at 24 VDC or VAC. Optional input voltages shall be available for either module at 110 or 220 VAC, 50/60 Hz.

1.7 Multi Point Capability - The system shall be expandable to include a Multi Point Sequencer with up to four (4) sampling points. Use of the sequencer requires the Control Module for control.

1.7.1 System must be capable of allowing the user, through the front panel keypad, to determine which of the four (4) points are to be active in the sequencer.

1.7.2 A method of detecting a flow blockage shall be provided.

1.8 Sequencer Programming Limits - The sequencer system parameters shall be within the following limits.

1.8.1 Sample Tubing Connection - Fittings suitable for the connection of 1/4" O.D. tubing shall be provided on the bottom of the enclosure for the purposes of connection, sample lines, calibration gases and exhaust.

1.8.2 Alarm - Three alarm set point levels shall be provided for each sample location. Any alarm set point shall be capable of activating one relay (SPDT, 8 amp at 120 VAC, resistive).

1.8.3 Indicating Lights - All indications related to the Multi Point Sequencer shall appear on the front panel display.

1.8.4 Software shall be installed in the pumped versions to allow the user to enter the station dwell time to allow for the line length and sample transport time for each sensor.

1.9 Sample Handling - The sample handling system shall conform to Paragraphs 1.9.1 through 1.9.4.

1.9.1 Sample Line Compatibility - The system shall be capable of drawing a sample through 1/8" I.D. tubing for a distance of 300 feet.

1.9.2 Sequencer Operation - A sample shall be drawn from the next line in sequence regardless of which location is being analyzed.

SPEC – CHILLGARD L-SERIES REFRIGERANT MONITOR

- 1.9.3 Sample Conditioning - The system shall provide adequate filtration of the sample suitable to protect the analyzer.
- 1.9.4 Exhaust - Exhaust fitting shall be provided on the bottom of the enclosure for the purpose of attaching lines to the exhaust and bypass flows.
- 1.10 Maximum System Maintenance Requirements - The system shall require no periodic maintenance other than periodic checking. Periodic checking or adjustments of the unit shall be capable of being accomplished by one person at the unit location.
- 1.11 Manufacturer Capability Requirements - As a minimum, the Gas Monitoring Equipment manufacturer must meet the following requirements:
- a. Be capable of supplying all equipment used to check or calibrate the unit
 - b. Be capable of providing on site service with factory trained personnel
 - c. Be capable of providing start-up assistance and training for the owner / operator
- 1.12 Gas Monitoring System shall be a Mine Safety Appliances Company Chillgard L-Series Refrigerant Monitor or equal.
- 1.13 The Gas Monitoring System shall be tested, approved, and certified for electrical safety.