SPECIFICATION
CHEMGARD INFRARED GAS MONITOR SERIES

USER INSTRUCTIONS
FOR THE
CHEMGARD INFRARED GAS MONITOR SERIES

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.

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GAS MONITOR SPECIFICATION FOR THE CHEMGARD INFRARED GAS MONITOR SERIES

1.0 Gas Monitor Specification - Paragraphs 1.1 through 1.12 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 (circle appropriate change)	NUMBER OF PICK-UP POINTS (8 Max)
_____	0-10 ppm, 0-100 ppm, 0-1000 ppm, 0-0.1%, 0-1%, 0-10%	_____

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

1.3.1 Description - The system shall consist of a sample draw monitor/readout unit.

1.3.2 Monitor/Readout Configuration - The unit shall be a wall mount type. It shall conform to Paragraphs 1.3.2.1 through 1.3.2.5.

1.3.2.1 Enclosure Type - The enclosure shall be one of three types: Nema 4, 19" rack mount, or explosion proof (XP). Access to the inside of each enclosure and wiring connections shall be as follows for each enclosure type:

a. Nema 4 – front facing, full-length door with a window for viewing a 2 line x 20 character vacuum fluorescent display.
b. 19" Rack Mount – rear panel access for wiring and plumbing, with a window for viewing a 2 line x 20 character vacuum fluorescent display.
c. XP Unit – wiring and plumbing via side fitting ports, with a window for viewing a 2 line x 20 character vacuum fluorescent display.

1.3.2.2 Enclosure Size: Nema 4 – 18"h x 16"w x 7"d, 40 lbs.
19" Rack Mount – 7"h x 17 "w x 15 d, 19 lbs.
Explosion-Proof: 19 "h x 19 "w x 9 "d, 100 lbs.

1.3.2.3 Mounting Provisions - Mounting brackets for the purpose of attaching the unit to a flat surface shall be provided.

1.3.2.4 External Controls - A four (4) button keypad should provide access to all monitor functions including display, calibration, set-up and diagnostics. The keys shall also provide alarm acknowledgment and audible alarm silencing. The explosion-proof model shall have a 4-button wireless communicator to allow non-intrusive system operation/adjustment with access through the front window.

1.3.2.5 Sample Gas Inlet/Outlet - The sample gas inlet/outlet shall be on the bottom of the enclosure for the Nema 4 version. The rack mount version will have the gas inlet/outlet mounted on the back panel. The XP version inlet/outlet will be through a side fitting port. There shall not be any other gas inlet or outlet such as zero or compensation gas inlet.

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

1.3.3.1 Analyzer Sample - The analyzer shall be of the sample draw type with an internal pump and filter.

1.3.3.2 Analyzer Sensitivity – In general, performance characteristics are dependent upon the gas of interest and the desired full-scale range. For the full scale range of 1000 ppm, sensitivity is as follows: the analyzer shall be capable of monitoring over a range of 0-1000 ppm with a sensitivity of 1 ppm in the 0-100 ppm range and $\pm$10% of reading in the 100-1000 ppm range.

1.3.3.3 Analyzer Linearity - The analyzer shall be capable of maintaining a linear response in the range of 0-100 ppm and $\pm$ 2% of full scale in the range of 100-1000 ppm. Linearity shall change if different full-scale ranges are required.

1.3.3.4 Temperature - The system shall operate over the range of 0^{o} to 50^{o} C.

1.3.3.5 Stability - The 30 day zero or span drift must be less than 1% F.S. without the aid of automatic or manual re-calibration. The system must not employ any type of auto zero techniques in order to maintain analyzer stability. Use of fresh air source or scrubber, as a zero reference is not permitted.

1.4 Calibration - The system must provide a menu-driven method of checking both zero and span calibration. Any adjustments must be made through front panel keypad.

1.5 Monitor Unit Requirements

1.5.1 Readout Displays - A 2 line x 20-character vacuum fluorescent 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 non-latching.

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

1.5.4.2 Contact Rating - All relays shall be Form C, single pole, double throw. Contacts shall be rated for 8 amps resistive at 120 VAC.

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

1.5.5 Malfunction Indication - The readout display described in Paragraph 1.4.1 shall display full diagnostics when a fault exists without the use of codes.

1.5.6 Audible Alarm - An audible horn, buzzer or tone shall be optional. If equipped, it sounds when one of the three preselected alarm conditions or a trouble condition occurs.

1.5.7 Front Panel Controls (for Nema 4 and 19" rack mount versions) - The functions listed in this paragraph shall be accomplished using a keypad readily accessible on the front panel. For the XP version, a hand-held communicator shall provide identical functionality as the front panel keypad controls.

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. This filter shall be easily serviced or replaced.

1.5.9 Output Signals - The system shall be capable of supplying a 4-20 mA isolated sourcing signal and 0-10 VDC, signal representing the gas concentration being sampled.

1.6 System Power Requirements - The system shall operate on 115 or 220 VAC. Power input shall not exceed 60 watts in single channel of operation.

1.7 Multi-point Sequencer - The system shall be expandable to include a Multi-Point Sequencer with up to eight (8) sampling points.

1.7.1 System must be capable of allowing the user, through the front panel keypad, to determine which of the eight (8) points are to be active in the sequencer.

1.7.2 The sequencer shall be mounted integral to the analyzer.

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

1.7.4 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).

1.7.5 Indicating Lights - All indications related to the Multipoint Sequencer shall appear on the front panel display.

1.8 Sample Handling - The sample handling system shall conform to Paragraph 1.8.1 thru 1.8.4.

1.8.1 Sample Line Compatibility - The system shall be capable of drawing a sample through 1/8" I.D. tubing for a distance of 150 feet.

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

1.8.3 Sample Conditioning - The system shall provide adequate filtration of the sample suitable to protect the analyzer.

1.8.4 Exhaust - Exhaust fitting shall be provided on the enclosure for the purpose of attaching exhaust lines to the sample and bypass flows.

1.9 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.

1.10 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

1.11 Gas Monitoring System shall be a Mine Safety Appliances Company Chemgard Gas Monitor or equal.