



GASGARD[®] 1 Monitor

instruction manual



In the U.S., to contact your nearest stocking location, dial toll-free 1-800-MSA-INST.
To contact MSA International, dial 1-412-967-3354.

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Manufactured by
MSA INSTRUMENT DIVISION

P.O. Box 427, Pittsburgh, Pennsylvania 15230

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WARNING

THIS MANUAL MUST BE CAREFULLY READ BY ALL INDIVIDUALS WHO HAVE OR WILL HAVE THE RESPONSIBILITY FOR USING OR SERVICING THE PRODUCT. Like any piece of complex equipment, the unit will perform as designed only if it is installed, used and serviced in accordance with the manufacturer's instructions. OTHERWISE IT COULD FAIL TO PERFORM AS DESIGNED AND PERSONS WHO RELY ON THIS PRODUCT FOR THEIR SAFETY COULD SUSTAIN SEVERE PERSONAL INJURY OR DEATH.

The warranties made by Mine Safety Appliances Company with respect to the product are voided if the product is not used and serviced in accordance with the instructions in this manual. Please protect yourself and others by following them. We encourage our customers to write or call regarding this equipment prior to use or for any additional information relative to use or repairs.

MSA Permanent Instrument Warranty

- 1. Warranty-** Seller warrants that this product will be free from mechanical defect or faulty workmanship for a period of eighteen (18) months from date of shipment or one (1) year from installation, whichever occurs first, provided it is maintained and used in accordance with Seller's instructions and/or recommendations. This warranty does not apply to expendable or consumable parts whose normal life expectancy is less than one (1) year such as, but not limited to, non-rechargeable batteries, sensor elements, filter, lamps, fuses etc. The Seller shall be released from all obligations under this warranty in the event repairs or modifications are made by persons other than its own or authorized service personnel or if the warranty claim results from physical abuse or misuse of the product. No agent, employee or representative of the Seller has any authority to bind the Seller to any affirmation, representation or warranty concerning the goods sold under this contract. Seller makes no warranty concerning components or accessories not manufactured by the Seller, but will pass on to the Purchaser all warranties of manufacturers of such components. **THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED OR STATUTORY, AND IS STRICTLY LIMITED TO THE TERMS HEREOF. SELLER SPECIFICALLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.**
- 2. Exclusive Remedy-** It is expressly agreed that Purchaser's sole and exclusive remedy for breach of the above warranty, for any tortious conduct of Seller, or for any other cause of action, shall be the repair and/or replacement at Seller's option, of any equipment or parts thereof, which after examination by Seller is proven to be defective. Replacement equipment and/or parts will be provided at no cost to Purchaser, F.O.B. Seller's Plant. Failure of Seller to successfully repair any nonconforming product shall not cause the remedy established hereby to fail of its essential purpose.
- 3. Exclusion of Consequential Damage-** Purchaser specifically understands and agrees that under no circumstances will seller be liable to purchaser for economic, special, incidental or consequential damages or losses of any kind whatsoever, including but not limited to, loss of anticipated profits and any other loss caused by reason of nonoperation of the goods. This exclusion is applicable to claims for breach of warranty, tortious conduct or any other cause of action against seller.

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Section 1

General Information

Introduction

The Gasgard 1 Gas Monitor is designed for remote monitoring of one input sensor (two or three-wire 4-20 mA). Calibration of the sensor is performed at the sensor location and does not require calibration adjustments at the monitor, reducing the personnel required for calibration.

The Gasgard 1 Monitor offers many features and options, available through easy-to-program software. These features and options are accessed through the front panel control buttons or through five pushbuttons located inside the monitor.

Features

The Gasgard 1 Monitor is designed with easy-to-program software, allowing the user to set:

- Full-scale range for the connected 4-20 mA sensor
- Alarm level setpoints for each of the four alarm levels
- Alarm on an upscale or downscale gas reading
- Relays as energized or de-energized
- Alarms as latching or non-latching
- Buzzer output as enabled or disabled
- External alarm reset switch or flow failure fault status.

These software settings are stored in memory and, due to an internal battery, remain preserved even with a loss of power. In addition, the alarm and fault relays are jumper configurable as normally-opened or normally-closed. The Gasgard 1 Gas Monitor control and indicator features are shown in FIGURE 1-1.

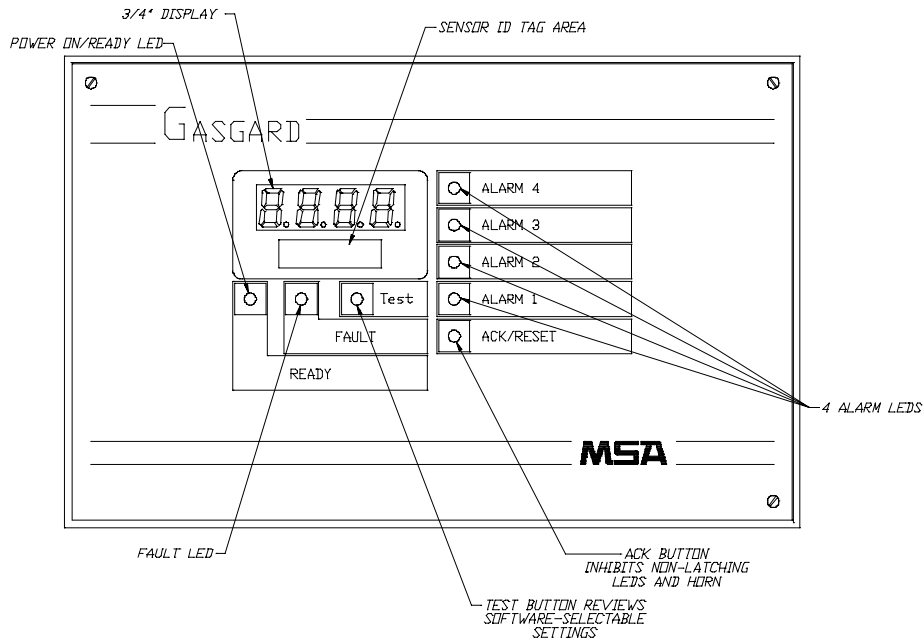


Figure 1-1. Front Panel

Front Panel Features

Display - Four digit, 3/4-inch readout indicates remote sensor gas concentration readings in ppm, % LEL or % oxygen.

Power-On - Green LED indicates unit is powered ON.

Alarms (AL1 through AL4) - Four red LEDs indicate when gas concentrations exceed alarm level setpoints. Each of the four alarm levels has individual relay outputs.

Fault - Red LED indicates all fault conditions within the monitor. The fault indicator has an individual relay output.

Alarm Acknowledge Button (Ack) - Acknowledges alarm and fault conditions and silences buzzer.

Test Button - Inhibits monitor gas reading capability in order to indicate all software settings on the display, including:

- Alarm level setpoints
- Upscale/downscale setting
- Energized/de-energized status
- Latching/non-latching setting
- Buzzer status.

Sensor ID Tag Area - Use this area to identify the sensor type connected to the Gasgard 1 Monitor.

Table 1-1. Gasgard 1 Gas Monitor General Specifications			
ELECTRICAL CHARACTERISTICS			
POWER SUPPLY	AC Voltage	115 VAC \pm 10%, 50/60 Hz	
	DC Voltage	24 VDC	
SENSOR CAPACITY		One sensor	
SENSOR INPUT		4-20 mA; three-wire or two-wire loop powered	
READ-OUT		Four-digit LED display (3/4" digits)	
SETPOINTS	Alarm Level	Four alarm set points (AL1, AL2, AL3, AL4) with indicating LEDs	
	Full-scale Range	Variable .1 to 99.9 or 999	
RELAYS	Alarm	Four programmable	
	Fault	One common	
	External	One common	
	Status	All have one LED to indicate coil voltage	
	Terminals	#12 gauge maximum wire size	
	Contacts	Single-throw, single-pole, 2 amps, 250 VAC, 3 amps, 30 VDC	
AUDIBLE ALARM	Piezo Electric Horn	Approximately 75 decibels	
OPERATING RANGE	Relative Humidity	15 to 90% non-condensing	
	Temperature Range	Operating	0 °C to 50 °C
		Storage	-20 °C to +70 °C
PHYSICAL CHARACTERISTICS			
ENCLOSURE		General Purpose Wall Mount, not suitable for use in hazardous locations	
	Dimensions	6 1/2" (H) x 10" (W) x 2-3/4" (D) (160 x 249 x 70 mm)	
	Case Weight	6-1/2 lbs.	
APPROVALS		CE, European Standards EN 50081-2-1993 / EN 50082-2-1995, CEM 89/336/CEE, LVD 73/23 amended by 93/68/CEE	

Chapter 2 Installation

Mounting the Gasgard 1 Gas Monitor

1. Choose a mounting location that is in a clean and accessible area, and as free as possible from shock, vibration, physical damage and water. The housing is a general-purpose enclosure and is not suitable for hazardous locations.

⚠ CAUTION

Make sure the Gasgard 1 unit is not blocked; otherwise front panel lights and controls will be obscured from view.

2. Using two 1/4 or 20 mm mounting screws, mount the Gasgard 1 unit to a wall or suitable structure.

Wiring Connections

Perform all wiring connections and conduit runs in accordance to accepted commercial wiring practices. Install your monitor in compliance with the applicable requirements of the National Electric Code and/or any other local code requirements.

⚠ WARNING

When wiring the unit, disconnect the main power to prevent bodily harm.

AC Power Wiring Connection

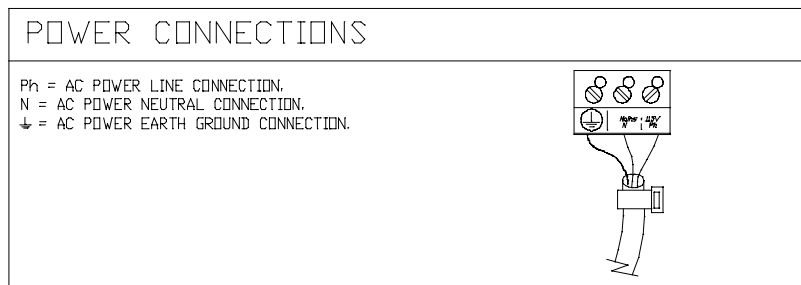
The Gasgard 1 Monitor does not include a power ON/OFF switch; if local power OFF is required, a convenient disconnect should be installed.

1. Route the power, ground and signal wiring through the electrical entry hole in the enclosure.
 - Power and ground wiring should be separated from signal wiring.

2. To connect the Gasgard 1 Monitor to the power source, connect AC, ACN and GND terminals of the AC connector to the power source in accordance with FIGURE 2-1.

⚠ CAUTION

Improper application of the primary power to the system may cause damage to the unit. If unsure of the available power, contact your local power utility for clarification. Verify that the unit's power is rated for the proper AC supply line (See Table 1-1, "Gasgard 1 General Specifications").



*Figure 2-1.
AC Power Wiring Connection*

Optional DC Power Wiring Connection

1. Prior to wiring the DC power supply, disconnect the J9 connector.
2. Rewire the J9 connector in accordance with FIGURE 2-2.
3. Connect the positive (+) and negative (-) of the DC power supply to the terminal strip.
4. This optional DC power capability is not a DC power backup or a non-interruptable power source.

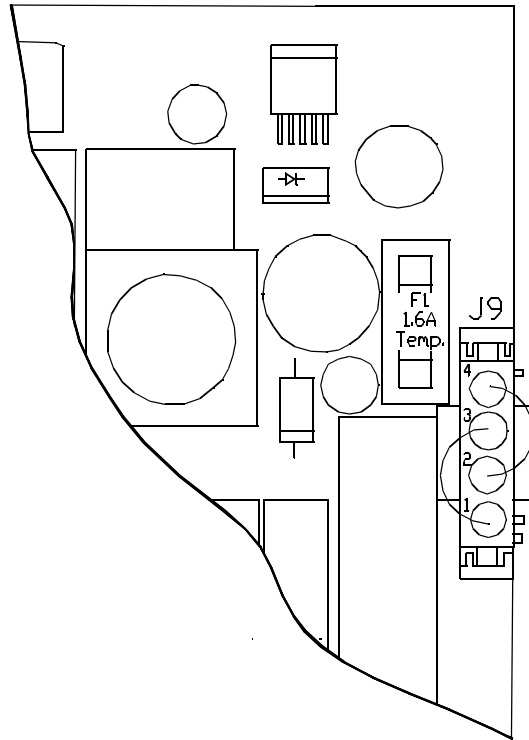


Figure 2-2.
Optional DC Power Wiring Connection

Sensor Wiring Connection

The Gasgard 1 Monitor is capable of taking a two-wire or three-wire loop 4-20 mA sensor. Refer to the sensor manual to determine:

- Optimal sensor placement
 - Required wire size
 - Number of conductors required for proper operation.
1. Connect the sensor to the Gasgard 1 Monitor in accordance with FIGURE 2-3.

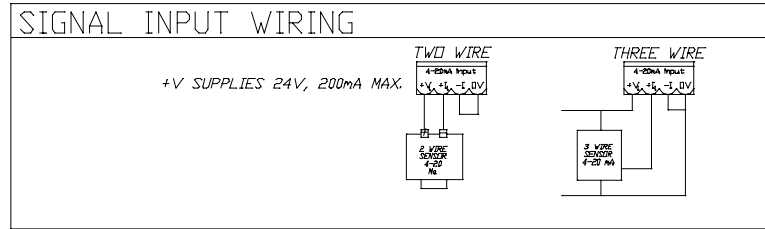


Figure 2-3.
Signal Input Wiring Connection

⚠ CAUTION

Ensure all sensor connections are correct. Use correct wiring techniques and ensure that no wire strands are contacting other conductors. Failure to wire the sensor correctly may result in an inoperative or damaged sensor or Gasgard 1 Gas Monitor.

Relay Wiring Connection

The four alarm relays and the one fault relay are single-pole, single-throw and can be jumper-configured from within the unit. Figure 2-4 identifies jumper locations for normally-opened and normally-closed configurations.

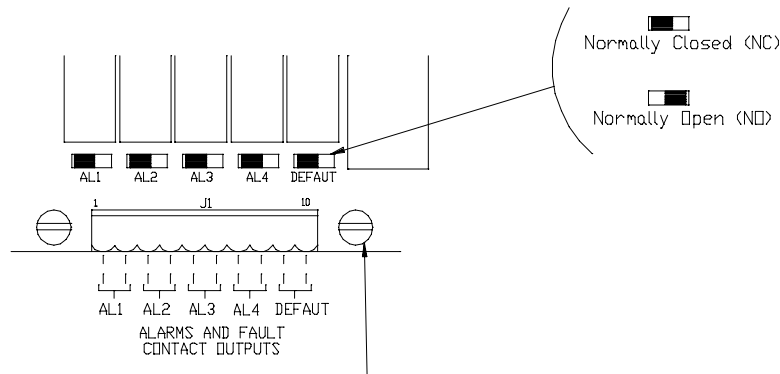


Figure 2-4.
Jumper Settings for Relay Configurations

4-20 mA Output Wiring Connection

The Gasgard I Monitor contains a 4-20 mA output. Wiring is shown in FIGURE 2-5.

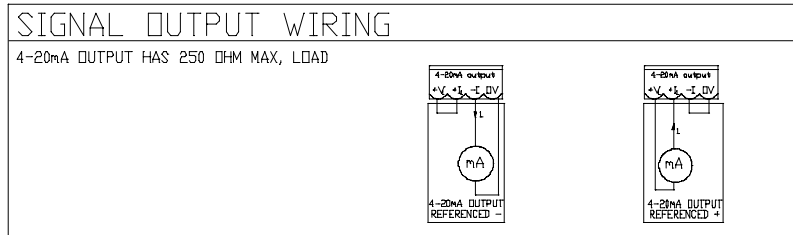


Figure 2-5.
4-20 mA Output Wiring Connection

Remote Device Wiring Connection

The Gasgard I Monitor can be configured:

- With an external reset switch for silencing alarm conditions from a remote location
- For sensor fault input

Wiring must be in accordance with FIGURE 2-6.



Figure 2-6.
Remote Device Wiring Connection

Chapter 3

Start-up and Operation

Internal Buttons and Features

The Gasgard 1 Controller is customer configured by push buttons located inside the enclosure. These settings are protected during power OFF and can be user-modified.

1. Remove the Gasgard cover and locate the six buttons on the left portion of the printed circuit board inside the enclosure; these buttons are divided into two groups:
 - The five red pushbuttons configure the Gasgard 1 Controller; these buttons are identified on the unit as **↑**, **↓**, **RES** (reset), **VAL** (validation), and **CONF** (configuration).
 - Separate from the five buttons is the RESET button which allows the Gasgard 1 Controller to restart without altering the configuration.

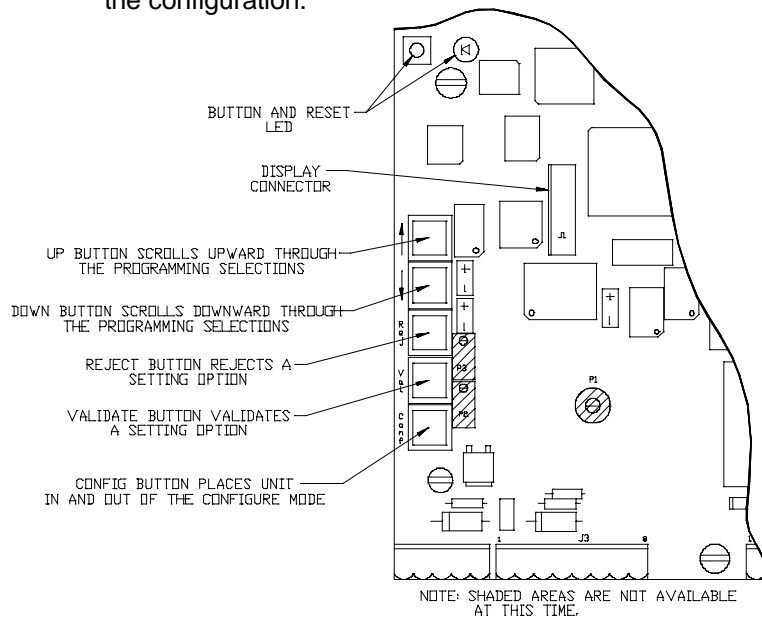


Figure 3-1.
Internal Buttons and Features

Configuration Mode

1. Power unit ON.
 - Ready light turns ON.
2. The Gasgard I Monitor must be configured for:
 - Sensor range
 - Alarm level
 - Alarm upscale or downscale
 - Alarm status
 - Relay state.

To Access Configure Mode:

1. Simultaneously press the **Conf** (configure) button and the **Val** (validate) button for five seconds.

NOTE: Pressing the **REJ** (reject) button at any time allows the user to go out of the current selection and return to the previous selection.
2. Configuration of the Gasgard I Monitor is performed by selecting through the programming flowchart (FIGURE 3-2).

Sensor Select

2. Press the **↓** button to access the Sensor Select mode.
 - "Sens" appears on the screen
3. To enter the Sensor Select mode, press Val (validate) button.
 - "4-20" appears on the screen.
4. Press the **Val** button to validate.
 - "rAnG" appears on the screen.
5. Press the **Val** button to validate.
6. To set the sensor range, press the **↑** or **↓** buttons and stop at the desired range (.5 to 6,000).
7. Press the **Val** button to validate.
 - "SEnS" appears on the screen.

Alarm Select

8. Press the **↓** button to access the Alarm Select mode.

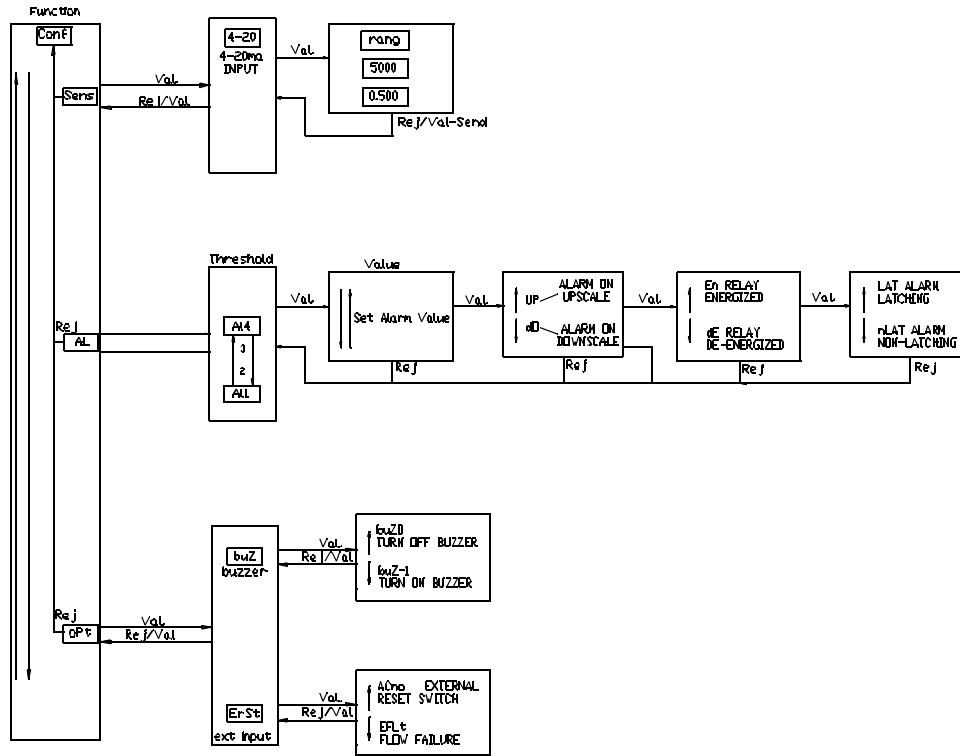


Figure 3-2.
Programming Flowchart

- "Alarm" appears on the screen.
9. Press the **Val** button to validate.
 - "AL1" appears on the screen.
 10. Press the **Val** button to validate Alarm 1 (AL1).
 11. Press **↑ ↓** buttons to select your alarm range setting.
 12. Press the **Val** button to validate.
 13. Select Alarm "UP":
 - for alarm to sound when detected gas concentration rises above the setpointor select Alarm "DOWN":
 - for alarm to sound when detected oxygen concentration falls below the setpoint.
 14. Press the **Val** button to validate.
 15. Select "En" (relays energized) or "dE" (relays de-energized).
 16. Press the **Val** button to validate.
 17. Select "nLAt" for non-latching alarms (for automatic alarm silence when unit goes out of an alarm state)
or select "LAt" for latching alarms (for *no* automatic alarm silence when unit goes out of an alarm state).
 18. Press the **Val** button to validate.
 - Alarm 1 settings are complete.
 19. Perform steps 8 through 18 for alarms 2, 3 and 4 (AL2, AL3, and AL4).

Option Select

20. Press the **↓** button until you access the Option Select mode.
 - "oPt" appears on the screen.
21. Select "bUZ 0" to turn the buzzer OFF
or "bUZ 1" to turn the buzzer ON.
22. Press the **Val** button to validate.
 - "ErSt" (error status) appears on the screen.
23. Press the **Val** button to validate.
24. Select "ACno" (for external reset switch)
or "EFLt" (for flow fault failure).

25. Press the **Val** button to validate.

To Exit the Configure Mode:

26. Hold the **Conf** (configure) button for five seconds.

- "End" appears on the screen.
- The unit is now configured.

NOTE: The instrument will exit software configuration if no button is pushed for 15 minutes.