Intrinsic Safety Certification:

ETL CLASSIFIED
THIS DEVICE CONFORMS TO UL STD 913;
CERTIFIED TO CSA STD C22.2 NO. 157
Class I & II, Div 1,
Groups A, B, D, E, F, & G
T4 -20° C ≤ Ta ≤ +50° C
Intertek/ETL control number 4004813

Thank You for purchasing the Graphic Controls H_2S Guardian. This Manual summarizes the device operation. Please feel free to contact us if you have any questions. The product can be used as a personal safety device. It is the User's responsibility to respond properly to the alarm. To ensure the highest level of safety the User is responsible to maintain proper records related to device testing, maintenance, and service.

Application:

Hydrogen Sulfide is a toxic gas that is produced from Sour Gas, bacteria, waste breakdown processes, and various other sources. The H_2S Guardian measures Hydrogen Sulfide levels.

Hydrogen Sulfide (H_2S) Concentration Guidelines: (EPA & NIOSH published)

0-0.005 ppm	Most people can smell
10 ppm	NIOSH 8-hr exposure limit
15 ppm	NIOSH 15 min exposure limit
100 ppm	Loss of smell

How the H_2S Guardian Works:

An electrochemical sensor (behind the sensor inlet drawn in the enclosed diagram), creates an electrical signal when H_2S is sensed. Gas concentration is displayed in parts per million (PPM).

How to Operate the H_2S Guardian:

2 buttons control the device.

	Hold for 1 second to turn on. If an alarm occurs and you want to mute the sound, press this button briefly. To turn off, hold for 3 seconds.
	To display only maximum concentration measured, press this button to hold the maximum value. Press again to exit "max mode" and display real-time concentrations.

How to Maintain the H_2S Guardian:

Bump testing is recommended before each day's use in safety critical applications. Clean the device with a damp cloth if it gets dirty. If the battery ever dies, it can be replaced, use only Panasonic CR123A batteries. See battery replacement procedure.

⚠WARNING! DO NOT SERVICE DEVICE IN A HAZARDOUS ENVIRONMENT⚠

See Diagram at the end of this document for illustration and explanation of detector controls, functions, and displays.

Bump Test Procedure:

What is a Bump Test?
Bump testing refers to a functional test of the device to verify calibration. This is accomplished by exposing the device to a known concentration of test gas.

Please note that a Bump Test does not calibrate the device. Calibration is recommended every 180 days to ensure the device will accurately respond to H_2S gas. Gas detection devices can diverge from factory settings over time for a variety of reasons, including: gradual chemical degradation of sensors, chronic exposure to extreme environmental conditions, exposure to over-range concentrations, etc.

To Bump Test the detector, follow these steps:

1. Hold MUTE button for 1 second to turn device on.
2. In a clean air environment use 1/4" OD, 1/8" ID Tygon tubing attached to the calibration gas cylinder and sensor inlet to flow calibration gas at 0.5L/min.
   Note: Graphic Controls recommends the use of 15 ppm calibration gas cylinders. Only use certified traceable gas cylinders before expiration date.
3. When the low alarm level of 10 ppm is reached the LCD will display 10 ppm and visual, audible, vibration alarms will activate. When the high level alarm point of 15 ppm is reached the alarm signals will intensify. Bump test is complete.
4. If Bump Test fails please follow Calibration procedure.
5. Remove flow of calibration gas to device and use as normal.

Calibration Procedure:

Calibration with 15 ppm H_2S is recommended at least every 180 days. Gas detection devices can diverge from factory settings over time for a variety of reasons, including: gradual chemical degradation of sensors, chronic exposure to extreme environmental conditions, exposure to over-range concentrations, etc.

To calibrate the detector, follow these steps:

1. Hold both buttons for 10 seconds to enter calibration mode. Press MUTE at any time to exit.
2. In a clean air environment (outside) press MAX to begin the Zero calibration. Wait for countdown.
3. When zero is complete, use 1/4" OD, 1/8" ID Tygon tubing attached to the calibration gas cylinder and sensor inlet to flow calibration gas at 0.5L/min, then press MAX to start cal step.
   Note: Graphic Controls recommends the use of 15 ppm calibration gas cylinders. Only use certified traceable gas cylinders before expiration date.
4. The Guardian will then automatically calibrate itself, and notify you if calibration is successful.

Battery Replacement Procedure:

To replace the battery, follow these steps:

1. Ensure you are not in a hazardous environment.
2. Unscrew 4 corner screws on back of device with a Phillips screwdriver.
3. Carefully separate top case from back, ensure the housing gasket does not come off of corner posts.
4. Remove existing Panasonic CR123A battery.
5. Insert new Panasonic CR123A battery (ensure correct battery polarity).
6. Ensure housing gasket is in place and screw housing halves together. Torque to 30 in-oz.
7. Bump test device to ensure sensor gasket did not get misaligned. If bump test fails, re-calibrate or re-open device to ensure gaskets are aligned properly.

Please contact Graphic Controls with any questions about operating procedures or to learn more about our factory calibration service program at 1-800-669-1535 or www.graphiccontrols.com.

Limited Warranty:

Graphic Controls warrants that our portable gas detectors ("Product") will be free from defects in material and workmanship for a period of one (1) year beginning on the first day of initial customer activation or factory recommended "activate by date", whichever comes first ("Warranty Period"). The warranty extends only to the sale of new and unused Products to the original buyer, is non-transferrable, and covers normal use, maintenance and storage of the Product. The User is responsible to maintain proper records related to device testing, maintenance, and service.

If you make a warranty claim, you must return the Product to Graphic Controls or an authorized representative; freight prepaid, and provide a written statement describing the nature and date of failure. Graphic Controls will, at its sole discretion, repair, replace, or refund the purchase price paid for the defective product within the Warranty Period.

Upon receipt of a Product warranty claim, we will attempt to respond and correct any defect within fourteen (14) business days.

OUR WARRANTY DOES NOT COVER:
(1) A DEFECT WHICH WE DETERMINE RESULTED FROM AN IMPROPER USE OR APPLICATION OF A PRODUCT;
(2) PRODUCTS WHICH HAVE BEEN DAMAGED, SUBJECTED TO ABNORMAL USE OR OPERATION, OR WHICH HAVE BEEN IMPROPERLY INSTALLED OR MAINTAINED, OR THE USE AND INSTALLATION OF UNAPPROVED PARTS;
(3) ROUTINE REPLACEMENT OF PARTS, SUCH AS DISPOSABLE BATTERIES, RESULTING FROM NORMAL USE OF THE PRODUCT

CONDITIONS OF OUR WARRANTY ARE:
(1) PROPER STORAGE, INSTALLATION, CALIBRATION, USE, MAINTENANCE AND COMPLIANCE WITH THE PRODUCT MANUAL AND ANY OTHER APPLICABLE RECOMMENDATIONS OF GRAPHIC CONTROLS;
(2) GRAPHIC CONTROLS PRE AUTHORIZED RETURN OF PRODUCT (RGA)
(3) RIGHT OF GRAPHIC CONTROLS TO VERIFY PROOF OF PURCHASE AND WARRANTY PERIOD

IN THE EVENT OF A GOOD WARRANTY CLAIM, WE WILL REPAIR, REPLACE, OR REFUND THE PURCHASE PRICE PAID FOR THE DEFECTIVE PRODUCT, AND IN NO EVENT WILL GRAPHIC CONTROLS BE LIABLE FOR ANY LOST PROFITS, LOST BUSINESS, LOST USE, LOST DATA, BUSINESS INTERRUPTION, OR ANY INCIDENTAL, INDIRECT, SPECIAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES, EVEN IF WE HAVE BEEN ADVISED OF THEIR POSSIBILITY.

THE FOREGOING IS OUR EXCLUSIVE WARRANTY LIABILITY AND YOUR EXCLUSIVE REMEDY RELATED TO ANY DEFECTIVE PRODUCT. THE EXPRESS WARRANTIES MADE IN THIS AGREEMENT ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED, OR ORAL, AND WHETHER BASED ON CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, OR OTHERWISE, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF FITNESS OR MERCHANTABILITY.

Operational Life:

The Guardian is designed to function for two years beginning after initial customer activation or factory set "activate by date", whichever comes first. To ensure the highest level of accuracy and safety, Graphic Controls recommends to bump test the sensor before each day's use.

Normal Operating Conditions:

Temperature: -20°C to +50°C (-4°F to +122°F)
Humidity: 20-90% R.H (0-99% intermittent)

Contact Information:

Graphic Controls
400 Exchange Street
Buffalo, NY 14204
(800) 669-1535

GUARDIAN EXTERNAL PARTS/FEATURES:

Lanyard Loop (with Clip on back):
Use this to attach to shirt or other location

Sensor Inlet:
Where the gas is measured, (keep it clean & do not puncture the membrane)

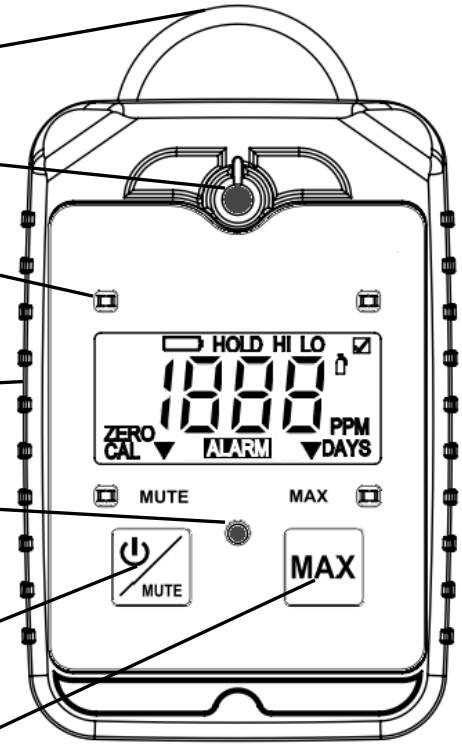
LED Indicators (4 around LCD):
These red lights will flash when H_2S concentration is high enough for an alarm

LCD Display:
Shows H_2S concentration from 0-400 ppm (other details in Display diagram)

Buzzer/Speaker:
Makes beeping noises when an alarm is active, (do not puncture the membrane)

Power/MUTE Button:
Press & hold to turn power ON or OFF
Press to mute the buzzer for up to 5 mins

MAX Button:
Press to make the LCD remain at the maximum H_2S concentration measured



GUARDIAN LCD DISPLAY GUIDE:

Battery Indicator:
Displays when the battery is low

HOLD:
HOLD
Displays with a countdown for powering off or entering calibration mode

HI:
HI
Displays when the High 15ppm alarm is exceeded

LO:
LO
Displays when the Low10ppm alarm is exceeded

Checkbox:
☑
Indicates successful zero or cal step during calibration mode

Gas Calibration:
Displays when applying gas in CAL mode

PPM:
PPM
Displays when measuring H_2S

DAYS:
DAYS
At startup, indicates # of days until calibration due & End of Life (EOL)

Arrows:
▼
Displays over MUTE to indicate alarm is muted. Displays over MAX to indicate max ppm mode on

CAL:
CAL
Indicates device is in calibration mode

ZERO:
ZERO
Displays as 1st step during calibration, to establish 0 ppm status

Alarm:
ALARM
Displays when 10ppm exceeded

GENERAL SPECIFICATIONS:

Detection Range:	0-400 ppm continuous readout
Resolution:	1 ppm
Accuracy:	+/- 10% or 1 ppm whichever is higher
Initial Response Time:	< 5 seconds
T90 Response:	< 40 seconds; time to reach 90% of full signal
Size:	3.2" x 2.2" x 0.86"
Battery Type:	Lithium Panasonic CR123A; replaceable
Battery Life:	2+ years or up to 5,000 alarm minutes
Alarm Setpoints:	TWA low alarm at 10 ppm and STEL high alarm at 15 ppm
Audible Alarm:	85 dB at 10 cm
Visual Alarm:	Red LED
Vibrating Alarm:	Activates at low and high alarm setpoints
Sensor Type:	H_2S specific electromechanical
Temperature Range:	-20°C to +50°C (-4°F to +122°F)
Humidity Range:	20-90% R.H (0-99% intermittent)
Ingress Rating:	IP 6/7