

User Manual R1.2
Santacary Technology Co., Ltd.
XAR-H H₂S Gas Detector



INTRODUCTION

Santacary XAR-H is a precise gas detector for monitoring hydrogen sulfide (H₂S) in the workplace. It has been designed to notify of the presence of H₂S gas.

Hydrogen sulfide is a colorless, flammable, extremely hazardous gas with a “rotten egg” smell. It is heavier than air and can collect in low-lying and enclosed poorly ventilated areas. The XAR-H will continuously display the concentration of H₂S and activate its audible alarms whenever the preset set points are exceeded.

XAR-H can be widely used in iron smelters, oil refineries and petrochemical plant, oil and gas wells, tanks and compressor stations, offshore drilling, steel mills, landfills, food processing plants, breweries, wastewater facilities, pulp and paper industry, incoming cylinder inspection, process or emission gas analysis, and manure processing buildings etc.. In the above scenario, XAR-H can be used to avoid unhealthy and accidents caused by hydrogen sulfide produced in the workplaces.

Please read this manual carefully before use. This operation manual will provide you with all the necessary information for the correct use of your XAR-H H₂S detector.

FEATURES

- Portable H₂S gas detector
- H₂S gas detector range: 0 ~ 500 PPM. Resolution: 1.0 PPM
- Using 3-electrodes electrochemical H₂S sensors, high precision
- Support auto zero and span calibration
- One press to restore factory setting, free from the bother of mis-operation
- Audible alarm

- Two set points of instantaneous alarm
- Trend chart display showing the past readings for H₂S
- With temperature and humidity measurement
- Only two buttons and easy to operate
- Four AA Alkaline Batteries

THEORY OF OPERATION

The Santacary XAR-H H₂S Gas Detector uses 3-electrode electrochemical technology, operating by the diffusion principle, for determining the concentration of H₂S in air samples. In diffusion mode, the atmosphere reaches the sensor by diffusing through the air sampling ports on beside and top of the detector. Normal air movements are enough to carry the sample to the sensor.

UNIT DESCRIPTION

Device

1. Liquid crystal display (LCD)
2. Power button
3. Function button
4. Battery compartment back cover
5. Air sampling ports



OPERATION

1. Power Button

1.1 Turn On/Turn Off Detector

1) When the detector is turned off, press Power button  to turn on the unit.

2) When the detector is turned on, press Power button  for 2 seconds to turn off the unit.

When the unit is first turned on, it performs 5 seconds countdown for detector initial warm up, then enters normal display with current H₂S concentration (PPM), temperature (°C or °F), and humidity (%RH) readings displayed.

The detector starts taking measurements when power on and updates readings every 2 seconds. In the condition of operating environment change, it takes 30 seconds to respond for H₂S, and 30 minutes for humidity.

Note:

Air Sampling Port: Always ensures that the detector vents are not blocked and open to the atmosphere.

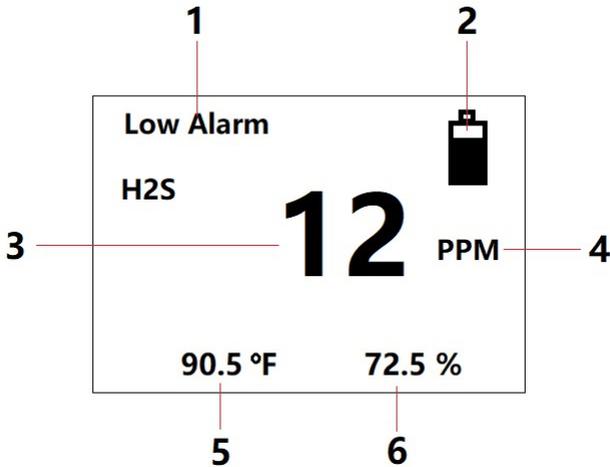
1.2 Fahrenheit and Celsius switching

Press Function button **FUNC** shortly to switch two temperature units: °F and °C.

2. Function Button **FUNC**

Press **FUNC** shortly to switch Normal Display, Trend Chart Display and Log Display. In any Displays, press **FUNC** for 3 seconds, the detector enters into Calibration Menu display.

2.1 Normal Display



1. Alarm Status (None/Low Alarm/High Alarm)
2. Battery Life Indicator
3. H₂S concentration
4. H₂S concentration unit in PPM
5. Air Temperature
6. % Relative Humidity

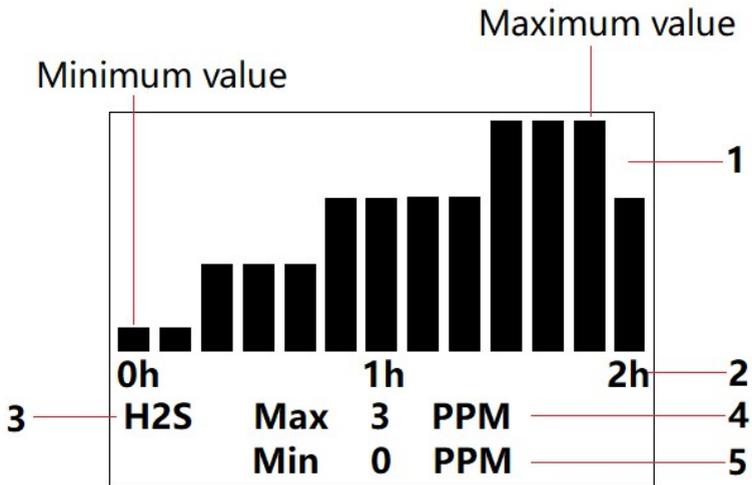
2.2 Trend Chart Display

XAR-H has a data log function that provides up to 2 hours history of H₂S concentration.

The trend chart displays the past readings for H₂S. The time per division (indicates the chart's time per unit division) is 10 min / div. Trend chart contains a maximum of 13 recorded data at one time. The time span is 2 hours. After the chart is full the data is FIFO (first-in, first-out). Below is the example of Trend Chart Display.

1. Vertical bar of H₂S (The higher the bar, the greater the value)
2. Time scale (farther to the right, longer time in the past)
3. Measurement name (H₂S)

4. Maximum value on the chart of H₂S concentration
5. Minimum value on the chart of H₂S concentration

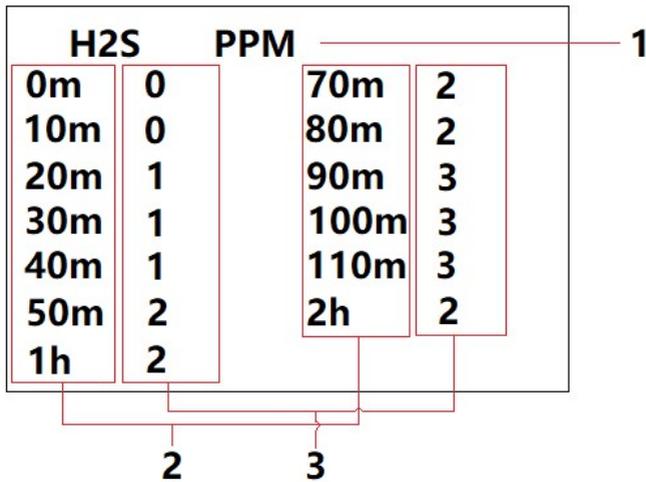


At the bottom of the chart, there are two numerical indicators: Max and Min. The Max and Min values will reflect the maximum and minimum values on the chart of H₂S concentration.

2.3 Log Display

The Log Display lists the 13 recorded data in the trend chart with time stamps.

1. H₂S unit
2. Time stamps in past (m--minute, h--hour)
3. H₂S concentration



2.4 Calibration of Detector

This detector can implement span calibration when needed. Below is the guideline.

- Calibrate the detector at least once every 180 days depending on the use and sensor exposure to poisons and contaminants.
- Calibrate the detector if the ambient gas display varies at startup.
- Calibrate only in a clean atmosphere, which is free of H₂S gas.

By pressing the Function button **FUNC** for 3 seconds, the detector enters into Calibration Menu. In this menu, there are four items by pressing the Function button **FUNC** shortly to loop switching: “Fresh Air Calibration 0 PPM H₂S”, “H₂S Span Calibration 25 PPM”, “Factory Reset” and “Exit” as described in below table.

Calibration Menu

Menu Items	Functional Description
Fresh Air Calibration 0 PPM H ₂ S	The XAR-H will perform an automatic fresh air adjustment (to zero the sensor). If the fresh air adjustment is successful,

	the unit will proceed to Normal Display
H2S Span Calibration 25 PPM	To implement the span calibration with 25 PPM H2S gas. If the span calibration is successful, the unit will proceed to Normal Display
Factory Reset	To restore factory settings. One press to restore factory setting, free from the bother of mis-operation
Exit	Exit the Menu and proceed to Normal Display

Procedures of Calibration

Step 1. To zero the sensor

Place the detector in clean atmosphere which is free of H₂S gas. Pressing the Function button **FUNC** for 3 seconds, the detector enters into Calibration Menu. By pressing Power button  shortly in the “Fresh Air Calibration 0 PPM H₂S” item to auto zero the H₂S sensor.

Step 2. To do span calibration

Apply a 25 PPM calibration H₂S gas to the detector. Pressing the Function button **FUNC** for 3 seconds, the detector enters into Calibration Menu. Continuously pressing the Function button **FUNC** shortly to select “H₂S Span Calibration 25 PPM” item. By pressing Power button  shortly to start span calibration. Or pressing Power button  shortly in the “Exit” item to cancel calibration and return to Normal Display.

Note:

- LCD backlight will turn off automatically after 2 minutes of buttons

inactivity.

- When LCD backlight is off, press any button to turn on the backlight.

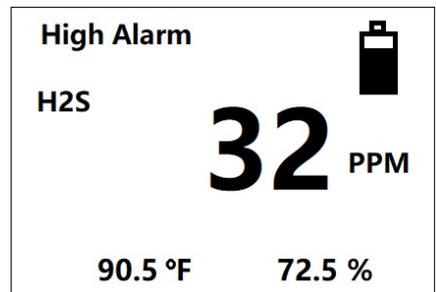
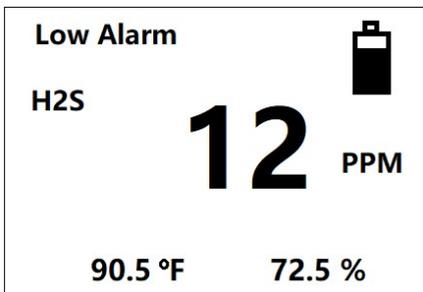
ALARM

Low Alarm and High Alarm

XAR-H has two alarm set points: High Alarm (H₂S: 15 PPM) and Low Alarm (H₂S: 10 PPM). These set points are factory set and cannot be changed. XAR-H is equipped with audio alarms to alert you when the ambient gas concentration exceeds one of the two alarm set points. When H₂S value exceeds the defined high alarm set point (15 PPM), the audio alarm will sound at 3 beeps/sec. When H₂S value exceeds the defined low alarm set point (10 PPM) but less than the defined high alarm set point (15 PPM), the audio alarm will sound at 2 beeps/sec.

Factory Alarm Set points

Gas	Low	High
H ₂ S	10 PPM	15 PPM



MATERIALS SUPPLIED

- XAR-H H₂S Gas Detector
- Protector Bag
- English User Manual

SPECIFICATIONS

H₂S Sensor Specification:

Measurement Range	0 ~500 PPM
Resolution	1.0 PPM
Repeatability	<±5% of signal
Sample Method	Diffusion
Temperature Range	-20 to 40°C (-4°F ~ 104°F)
Humidity Range	15 to 90%RH
Response Time	<30 seconds

Temperature Specification

Temperature Range	-10.0~60.0°C (14~140°F) display
Display Resolution	0.1°C (0.1°F)
Display Options	°C/°F switchable
Accuracy	±0.5°C (±0.9°F)
Response Time	5~30 seconds (device must equilibrate with environment)

RH Specification

Measurement Range	0.0~99.9%RH
Display Resolution	1%RH
Accuracy	±4.5%RH
Response Time	<8 seconds for 63% of step change

General Specification

Operating	-10°C to 40°C (14°F to 104°F), 15~90% RH non-condensing
Storage	-10°C to 60°C (14°F to 140°F), <99% RH non-condensing
Power Supply	Four AA Alkaline Batteries
Dimensions	75x165x25mm (2.95x6.49x0.98")
Weight	125 grams (4.41 oz.) without batteries

Out of range of operating conditions will impact the accuracy of H₂S measurement.

MAINTENANCE

To maintain the detector in good operating condition, perform the following basic maintenance as required.

1. Calibrate and inspect the detector at regular intervals.
2. Clean the exterior with a soft damp cloth. Do not use solvents, soaps, or polishes.
3. Do not immerse the detector in liquids.

Troubleshooting

If a problem occurs, refer to the solutions provided in below table. If the problem persists, contact Santacary Technology Co., Ltd..

Problem	Possible cause	Solution
The detector can't power on	Batteries are not properly placed	Please check that the batteries are properly placed
	Damaged or	Contact Santacary

	defective detector	Technology Co., Ltd.
The detector enters alarm immediately when activated	Sensor needs to stabilize	If the detector is not used for long time, the warm up time of H ₂ S sensor needs more than 1 minute.
	Sensor requires calibration	Calibrate the sensor
	Hazardous environment	Leave the area immediately. Deactivate and reactivate the detector in a safe area that is free of hazardous gas.
Detector does not accurately measure H ₂ S gas.	Sensor requires calibration	Calibrate the sensor.
	Detector is colder/hotter than H ₂ S gas temperature	Allow the detector to attain ambient temperature before use
	Air vents are blocked	Make sure that the air vents are ventilated

WARRANTY

The XAR-H is warranted to be free from defects in material and workmanship for a period of one year from the date of purchase. This warranty covers normal operation and does not cover misuse, abuse, alteration, neglect, improper maintenance. Proof of purchase is required for warranty. Warranty is void if the detector has been opened.

HYDROGEN SULFIDE LEVELS AND HEALTH EFFECTS

Concentration (PPM)	Short Term Symptoms/Effects
0.00011-0.00033	Typical background concentrations
0.01-1.5	Odor threshold (when rotten egg smell is first noticeable to some.)
	Odor becomes more offensive at 3-5 ppm. Above 30 ppm, odor described as sweet or sickeningly sweet.
2-5	Prolonged exposure may cause nausea, tearing of eyes, headaches or loss of sleep.
	Airway problems (bronchial constriction) in some asthma patients.
20	Possible fatigue, loss of appetite, headache, irritability, poor memory, dizziness.
50-100	Slight conjunctivitis (eye irritation and redness).
	Respiratory tract irritation after 1 hour.
	May cause digestive upset or loss of appetite.
100	IDLH- Immediately Dangerous to Life and Health
	Leave area and get to your safety zone
	Coughing, eye irritation, loss of sense of smell
	Altered breathing, drowsiness after 15-30 minutes
	Throat irritation after 1 hour
	Gradual increase in severity of symptoms over several hours
Death may occur after 48 hours.	
200-300	Marked conjunctivitis and respiratory tract irritation after 1 hour

	Pulmonary edema (fluid in lungs) may occur from prolonged exposure
500-700	Staggering, collapse in 5 minutes. Serious damage to the eyes in 30 minutes
	Death after 30-60 minutes.
700-1000	Rapid unconsciousness, “knockdown” or immediate collapse within 1 to 2 breaths
	Breathing stops.
	Death within minutes.
1000-2000	Nearly instant death

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