User Manual R2.0
Santacary Technology Co., Ltd.
XAR-AP NH_3 Gas Detector

INTRODUCTION

Santacary XAR-AP NH_3 Gas Detector is a precise gas detector for monitoring ammonia (NH_3) in the ambient air and in the workplace. It has been designed to notify of the presence of NH_3 gas. Its sensor is placed at the front end of the gooseneck to quickly sense changes in gas.

Ammonia is a colorless gas or compressed liquid with an extremely pungent odor. It reacts violently with water and can seriously damage the skin, eyes and respiratory system. The XAR-AP will continuously display the ambient concentration of ammonia and activate its audible alarms whenever the preset set points are exceeded.

XAR-AP can be widely used in farms/poultry house, livestock and lab animal facilities, liquid ammonia plants, public toilets, septic tanks, loading rack and storage area, at the vaporizer, injection section and other locations near the ammonia fluid handling equipment, having significant leak probability. In farm, ammonia volatilization from poultry litter commonly causes a buildup of ammonia in the atmosphere of chicken houses that has a negative impact on both farm workers and birds. In industrial, ammonia has also been used for over a century as refrigeration gas and has no global warming potential or effect on the ozone level. The drawback of ammonia is the fact that it is very toxic with a pungent odour and, in high concentrations, can be flammable. In the above scenarios, XAR-AP can be used to avoid unhealthy and accidents caused by ammonia 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-AP Ammonia detector.

FEATURES

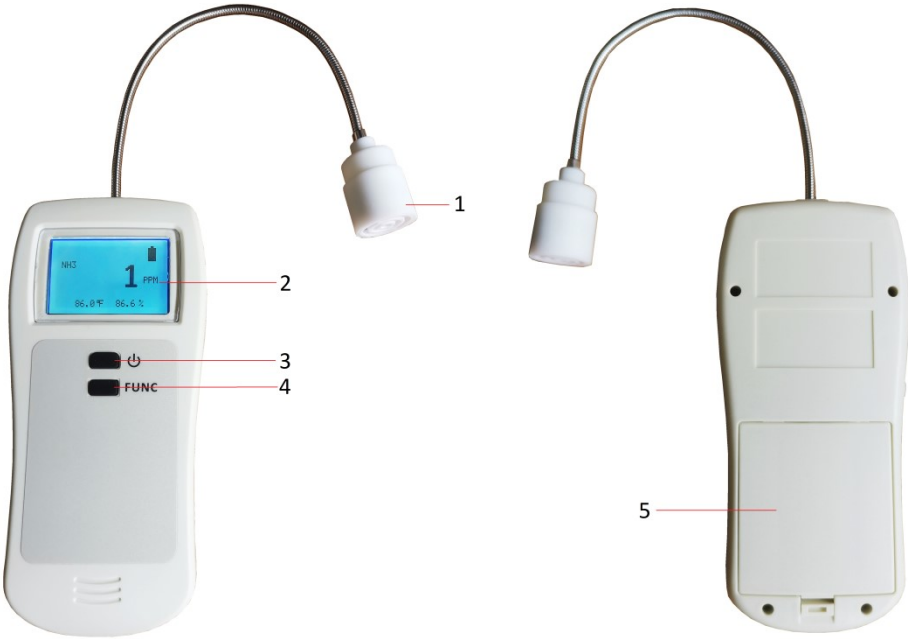
- Portable NH_3 gas detector
- NH_3 gas detector range: 0 ~ 500 PPM. Resolution: 1.0 PPM
- Using 3-electrodes electrochemical ammonia sensors, high precision
- Support zero and span calibration
- One press to restore factory setting, free from the bother of mis-operation
- Audible alarm
- Two set points of instantaneous alarm
- Trend chart display showing the past readings for NH_3
- Application in farms/poultry house, livestock and lab animal facilities, liquid ammonia plants, public toilets, septic tanks, loading rack and storage area near the ammonia fluid handling equipment etc.
- With temperature and humidity measurement
- Only two buttons and easy to operate
- Sensor is placed at the front end of gooseneck for quick measurement
- Four AA alkaline batteries

THEORY OF OPERATION

The Santacary XAR-AP Ammonia Gas Detector uses 3-electrode electrochemical technology for determining the concentration of ammonia in air samples. In diffusion mode, the atmosphere reaches the sensor in the front end of gooseneck by diffusing. Normal air movements are enough to carry the sample to the sensor.

UNIT DESCRIPTION

Device



1. Sensor at the front end of gooseneck
2. Liquid crystal display (LCD)
3. Power button
4. Function button
5. Battery compartment cover

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 60 seconds count down for detector initial warm up, then enters normal display with current NH_3 concentration (PPM), temperature (°C or °F), and humidity (%RH) readings displayed. If the detector is not used for a long time, the warm up time of ammonia sensor needs more than 5 minutes.

The detector starts taking measurements when power on and updates readings every 0.5 second. In the condition of operating environment change, it takes 40 seconds to respond for NH_3, and 30 minutes for humidity.

Note:

Always ensures that the sensor compartment at the front end of gooseneck is not blocked and open to the atmosphere.

Note:

Since ammonia is lighter than air, sensors are normally positioned in four to six feet above grade, or above the potential leak sources.

Warm Up

NH_3 detection need time to warm up. When XAR-AP is turned on, it will automatically enter into preheat and the word "Warm Up" appears on the top of the LCD. If the detector is not used for long time, the warm up time of ammonia sensor needs more than 5 minutes.

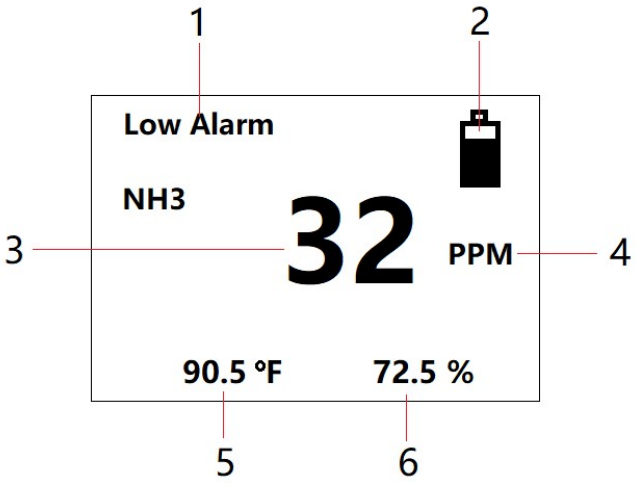
1.2 Fahrenheit and Celsius switching

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 gauge
3. Ammonia concentration in PPM
4. Ammonia concentration unit
5. Air Temperature
6. % Relative Humidity

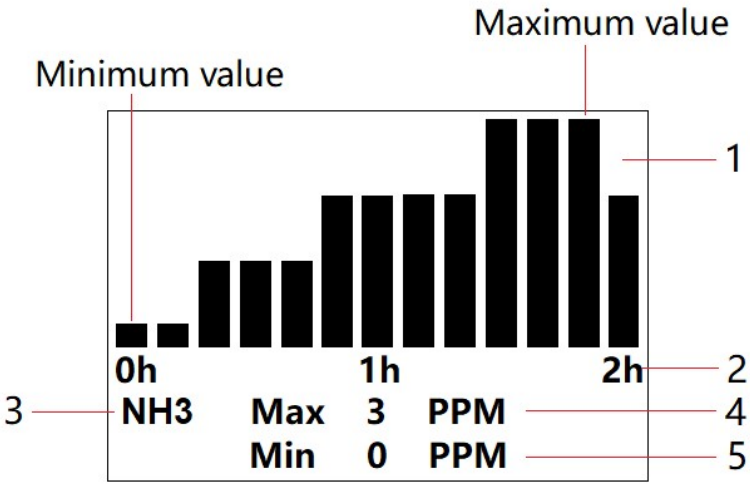
2.2 Trend Chart Display

XAR-AP has a data log function that provides up to 2 hours history of

NH_3 concentration.

The trend chart displays the past readings for NH_3. 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 NH_3 (The higher the bar, the greater the value)
2. Time scale (farther to the right, longer time in the past)
3. Measurement name (NH_3)
4. Maximum value on the chart of NH_3 concentration
5. Minimum value on the chart of NH_3 concentration

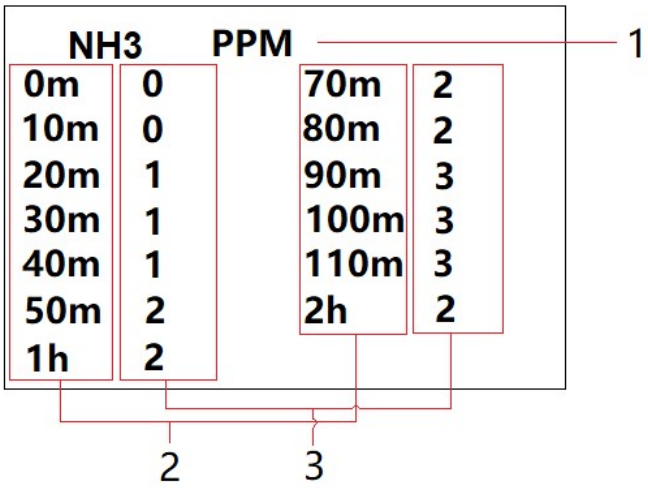


At the bottom of the chart, there are two numerical indicators: Max and Min. The Max and Min values will reflect the maximum and minimum values on the chart of NH_3 concentration.

2.3 Log Display

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

1. NH_3 unit
2. Time stamples in past (m--minute, h--hour)
3. NH_3 concentration



2.4 Calibration of Detector

This detector can implement span calibration when needed. Below are the guidelines.

- 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 ammonia gas.

By pressing the Function button **FUNC** for 3 seconds, the detector enters into Calibration Menu Mode. In this menu, there are four items by pressing the Function button **FUNC** shortly to loop

switching:“Fresh Air Calibration 0 PPM NH3”, “NH3 Span Calibration 50 PPM”, “Factory Reset” and “Exit” as described in the below table.

Calibration Menu Mode

Menu Items	Functional Description
Fresh Air Calibration 0 PPM NH3	The XAR-AP will perform an automatic fresh air adjustment (to zero the sensor). If the fresh air adjustment is successful, the unit will proceed to Normal Mode
NH3 Span Calibration 50 PPM	To implement the span calibration with 50 PPM NH_3 gas. If the span calibration is successful, the unit will proceed to Normal Mode
Factory Reset	To restore factory settings. One press to restore factory setting, free from the bother of mis-operation
Exit	Exit the Menu Mode and proceed to Normal Mode

Procedures of Calibration

Step 1. To zero the sensor

Place the detector in clean atmosphere which is free of ammonia gas. Pressing the Function button **FUNC** for 3 seconds, the detector enters into Calibration Menu status. By pressing Power button ⏻ shortly in the “Fresh Air Calibration 0 PPM NH3” item to auto zero the NH_3 sensor.

Step 2. To do span calibration

Apply a 50 PPM calibration NH_3 gas to the detector. Pressing the Function button **FUNC** for 3 seconds, the detector enters into Calibration Menu status. Continuously pressing the Function button

FUNC shortly to select “NH3 Span Calibration 50 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 Mode.

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.

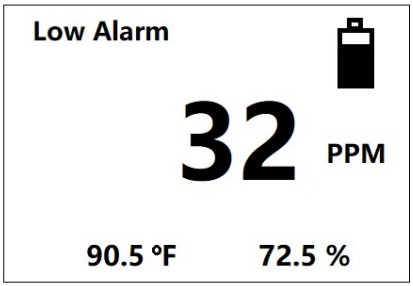
ALARM

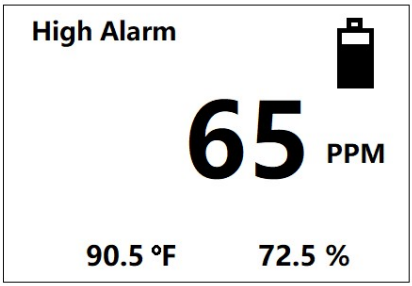
Low Alarm and High Alarm

XAR-AP has two alarm set points: High Alarm (NH_3: 50 PPM) and Low Alarm (NH_3: 25 PPM).These set points are factory set and cannot be changed. XAR-AP is equipped with audio alarms to alert you when the ambient gas concentration exceeds one of the two alarm set point. When Ammonia value exceeds the defined high alarm set point (50 PPM), the audio alarm will sound at 6 beeps/sec. When Ammonia value exceeds the defined low alarm set point (25 PPM) but less than the defined high alarm set point, the audio alarm will sound at 4 beeps/sec.

Factory Alarm Set points

Gas	Low	High
NH_3	25 PPM	50 PPM





GOOSENECK PIPE

With the sensor placed at the front end of the gooseneck, XAR-AP is able to monitor the NH_3 concentration quickly in inaccessible or dangerous places. XAR-AP is also able to detect the leakages of NH_3 gas.

MATERIALS SUPPLIED

- XAR-AP NH_3 Gas Detector
- Carry case
- English User Manual

SPECIFICATIONS

NH_3 Sensor Specification:

Measurement Range	0 ~500 PPM
Resolution	1.0 PPM
Repeatability	3% of signal
Sample Method	Diffusion
Temperature Range	-20 to 50°C (-4°F ~ 122°F)
Humidity Range	10 to 90%RH

Response Time	<40 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 to50°C (14°F to 122°F),10~90% 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	75x400x25mm (2.95x15.35x0.98”)
Weight	166 grams (5.86 oz.) without batteries

Out of range of operating conditions will impact the accurate of NH_3 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 defective detector	Contact Santacary 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 Ammonia sensor needs more than 5 minutes.
	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 NH_3 gas.	Sensor requires calibration	Calibrate the sensor.
	Detector is colder/hotter than NH_3 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-AP 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.

AMMONIA LEVELS AND CONSEQUENCES

Main known consequences of ammonia levels to poultry health:

Concentration (PPM)	**Consequences of ammonia levels to poultry health**
10	Trachea irritation (in turkeys)
20	Increased rate of infection of Newcastle disease vaccination
25	Impaired growth rate of feed conversion. Reduced final body weight
	Air sac inflammation

50	Increased levels of kerato conjunctivitis
100	Increased chick mortality

Ammonia levels to health effects

- Ammonia levels in the air as low as 5 PPM can be recognized by odor. An average person detects ammonia by odor at around 17 ppm.
- According to the World Health Organization (WHO), continuous exposure to 25 ppm of ammonia in the air does not result in a significant increase in blood levels of ammonia in the body.
- According to the Occupational Safety and Health Administration (OSHA), the least amount of ammonia which is found to be irritating to the eyes, nose and throat of the most sensitive individuals is 50 ppm.
- Because ammonia is present in the human body at all times, no long-term health effects from inhalation exposure to low levels of ammonia would be expected.
- Because ammonia is a respiratory tract irritant, persons who are hyper reactive to other respiratory irritants, or who are asthmatic, may be expected to be more susceptible to inhalation of high concentrations of ammonia.

CONTACT US

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