

SENSE-LD101

Gas Leak Detector

User Manual



Item	Details
Target Gas	Ammonia (NH ₃)
Gas Code	SG-2
Product Platform	SENSE-LD101
Enclosure Type	FP - Flameproof
Document Type	User Manual
Document Revision	Rev. 1.0

Important: Read this complete manual before installation, commissioning, operation, calibration or servicing of the detector.

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1. INTRODUCTION

The SENSE-LD101 is a flameproof industrial gas leak detector designed for hazardous industrial environments requiring continuous gas monitoring, alarm annunciation and remote communication. The detector platform supports multiple sensor technologies including electrochemical, catalytic, Pallister and NDIR sensing modules.

The enclosure, electronics, communication and alarm architecture remain common across all variants, while the gas sensing element, gas range, accuracy and sensor characteristics vary according to the target gas application.

Due to this modular technology, a wide range of sensor modules can be connected or exchanged within the same hardware platform, subject to product configuration, calibration and compatibility approval.

Application note: This manual copy is prepared specifically for the Ammonia (NH₃) SG-2 variant. Gas-specific range, accuracy, response and cross-sensitivity values shall always be verified against the final approved sensor datasheet and factory calibration certificate.

2. PRODUCT OVERVIEW

The detector is designed for 24x7 monitoring in hazardous areas where combustible, toxic or oxygen-related gas hazards may occur. The flameproof enclosure architecture provides protection for use in classified industrial environments while maintaining reliable sensing and communication operation.

2.1 PRODUCT AREA SUMMARY

Product Area	Description
Sensing	Gas-specific replaceable sensor module for ammonia, oxygen, toxic or combustible gases.
Indication	Power, communication/status and multi-level gas alarm indication using LEDs.
Output	4-20 mA analog output, relay output, buzzer and RS485 Modbus RTU communication.
Enclosure	Flameproof cast aluminum industrial enclosure suitable for wall mounting in classified industrial areas as per approved configuration.
Serviceability	Sensor replacement, calibration and verification can be performed by qualified personnel only, after following hazardous-area safety procedure.

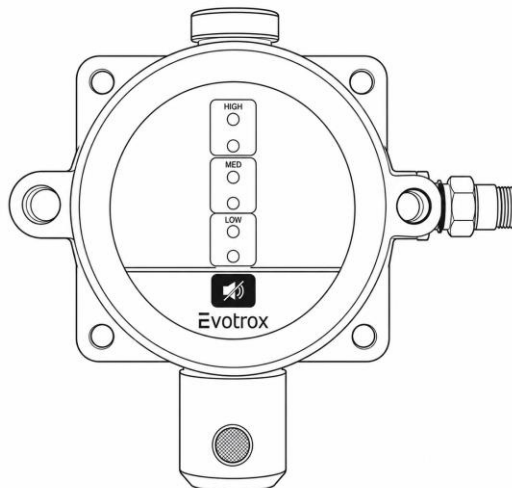


Figure 1: SENSE-LD101 Flameproof Gas Leak Detector - Product Image

3. FEATURES

- Flameproof industrial enclosure suitable for hazardous locations.
- Supports ammonia, oxygen, toxic and combustible gas variants.
- 4-20 mA analog output for PLC, SCADA, BMS, DCS, indicator or data logger integration.
- RS485 Modbus RTU communication for digital monitoring.
- Built-in relay output for hooters, exhaust systems, alarms and safety logic.
- Multi-stage LED indication and integrated buzzer for local annunciation.
- Touch Based Acknowledgement Button
- Continuous 24x7 industrial monitoring operation.
- Compatible with PLC, SCADA, BMS and IoT systems.
- Robust cast aluminum body with industrial finish.
- Suitable for wall or surface mounting using provided mounting provisions.

4. APPLICATIONS

- Oil & Gas Plants
- Refineries
- Cold Storage Plants and Ammonia Refrigeration Areas
- Chemical Processing Industries
- LNG / LPG Areas
- Boiler Rooms
- Compressor Rooms
- Hazardous Storage Areas
- Pharmaceuticals
- Industrial Safety Systems
- Gas metering skids and pipeline projects
- Ventilation monitoring and alarm interlock systems

5. TECHNICAL SPECIFICATIONS

5.1 ELECTRICAL AND FUNCTIONAL SPECIFICATIONS

Parameter	Specification
Sensor Technology	Electrochemical / Catalytic / Pallister / NDIR
Configured Target Gas	Ammonia (NH ₃) - SG-2
Sensing Range	0 to 1000 PPM
Cross Sensitivity	Nil
Typical Power Supply	24 VDC
Power Range	12 VDC to 30 VDC
Outputs	4-20 mA, relay and buzzer
Communication	RS485 Modbus RTU
Operating Temperature	-15°C to +50°C
Storage Temperature	-10°C to +60°C
Humidity	<95% RH, non-condensing recommended
Mounting	Wall / surface mount
Operation	Continuous 24x7 monitoring

5.2 FLAMEPROOF ENCLOSURE AND MECHANICAL SPECIFICATIONS

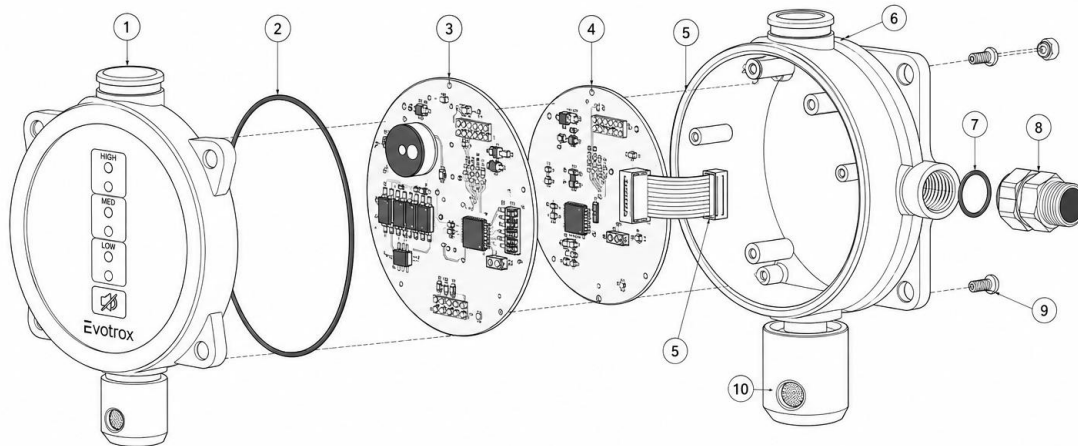
Parameter	Specification
Enclosure	Flameproof cast aluminum enclosure
General Construction	As per IS:2148-2004 / IEC 60079-1:2001 reference shown in drawing; final certification shall be verified from product approval label/certificate.
Area Classification	Hazardous locations of Zone 1 & Zone 2, as per approved configuration.
Protection	IP65
Atmosphere	Suitable for Gas Group I, IIA & IIB as per drawing reference; final approved gas group shall be followed.
Material of Construction	Cast Aluminum Alloy LM-6 / equivalent, or ADC12 aluminum alloy as shown in exploded view.
Gasket	Endless molded neoprene / silicone O-ring as per enclosure construction.
Cable Entry	1 × M20 × 1.5 standard cable entry
Earthing	1 No. inside and 2 Nos. outside as per drawing reference
Hardware	H.T.S. zinc plated / stainless steel as applicable
Finish	Light grey epoxy shade 631 as per IS:5
Glass Window	Ø 103 mm round glass
Overall Dimensions	Refer dimensional drawing; approx. 180 mm × 180 mm front envelope; side depth approx. 90 mm
Mounting Holes	Ø 7 mm, 4 places
Tolerance	±1 mm general; ±5 on overall dimensions as per drawing note

Specification notes: Exact gas range, measuring accuracy, sensor life, response time, calibration interval and environmental limits depend on the selected gas sensor module and final factory configuration.

6. PRODUCT MECHANICAL DRAWINGS

6.1 EXPLODED VIEW AND PARTS DESCRIPTION

EXPLODED VIEW



PARTS LIST				
ITEM NO.	PART NAME	DESCRIPTION	QTY.	MATERIAL
1	Front Cover (Display Side)	Front cover with indicator window and branding	1	ADC12 Aluminium Alloy
2	O-Ring (Front Cover Gasket)	Seals front cover to enclosure	1	Silicone
3	Front PCB (Display & Interface)	Main PCB for indicators, buzzer and control	1	FR-4
4	Rear PCB (Power & Sensor Interface)	PCB for power supply, sensor interface and outputs	1	FR-4
5	10-Pin FRC Cable	Interconnects front and rear PCBs	1	FRC (Flat Ribbon Cable)
6	Enclosure (Back Housing)	Main enclosure with mounting bosses	1	ADC12 Aluminium Alloy
7	O-Ring (Cable Entry Seal)	Seal for cable gland	1	NBR
8	Cable Gland (M20 x 1.5)	IP65 rated cable entry gland	1	Brass, Nickel Plated
9	Mounting Screws (M5)	Screws for front cover to enclosure	4	Stainless Steel
10	Gas Sensor Module	Gas sensor assembly	1	Metal / ABS

TECHNICAL SPECIFICATIONS	
Power Supply	: 24V DC (18-30V DC)
Output	: 4-20 mA
Gas Detected	: Ammonia (NH ₃)
Detection Range	: 0 – 300 PPM
Operating Temp.	: -10°C to +50°C
Enclosure Rating	: IP65
Mounting	: Wall / Surface Mount
Cable Entry	: 1 x M20 x 1.5 (Standard)

NOTES:

1. All dimensions are in millimeters (mm).
2. Tolerance: ±1 mm.
3. Mounting holes: Ø 7 mm (4 places).

Figure 2: Dimensional Drawing with Front, Side and Back Views

6.3-Dimensional Drawing

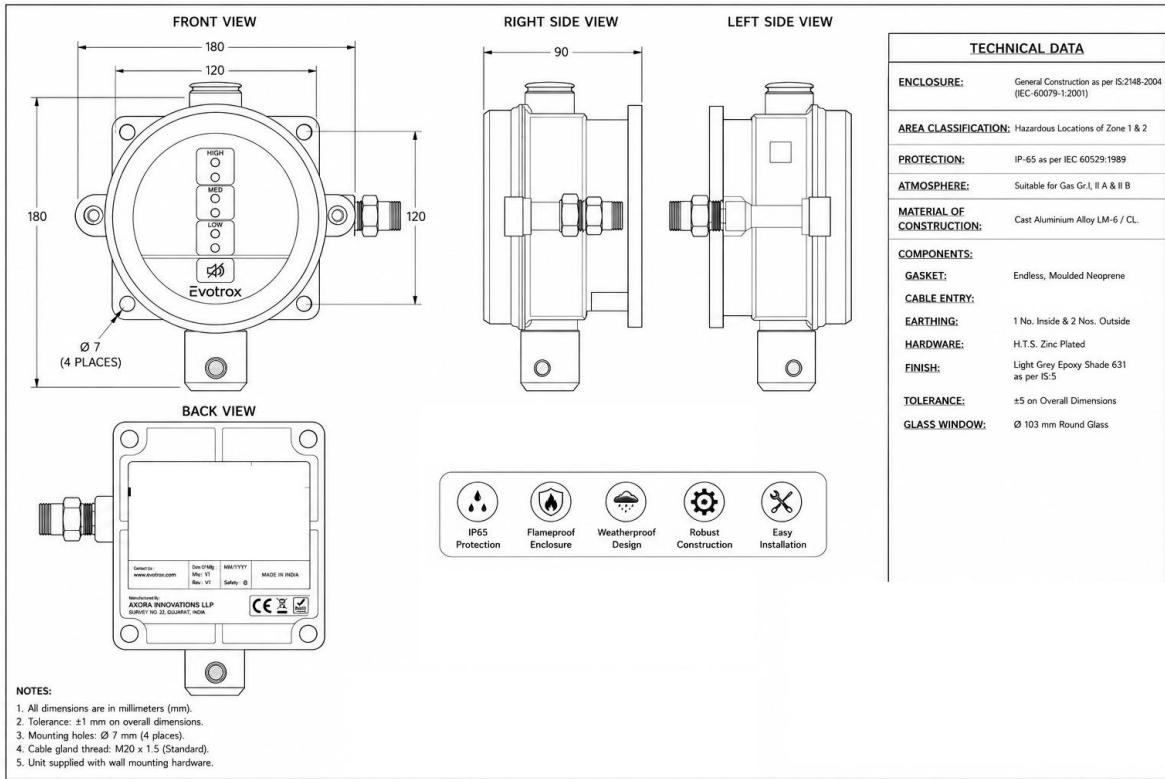


Figure 3: Exploded View and Parts Description

Item No.	Part Name	Description	Qty.	Material
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7. SAFETY PRECAUTIONS

- Installation, wiring, commissioning and servicing shall be performed by qualified personnel only.
- Disconnect power before opening the enclosure or touching internal wiring.
- Never open the enclosure in a hazardous atmosphere while the device is powered.
- Do not replace the sensor in a hazardous atmosphere while the device is powered.
- Ensure proper earthing of enclosure and panel wiring as per site electrical standards.
- Ensure proper earthing of enclosure and cable glands.
- Use certified flameproof cable glands and accessories only.
- Do not install the detector where it can be exposed to direct flame, heavy water jet, corrosive liquid splash or mechanical damage unless the installation is protected accordingly.
- Maintain calibration records periodically for safety and compliance traceability.
- Dispose expired or replaced sensors according to applicable environmental regulations.
- Do not use the detector as the only safety protection layer where local regulation requires redundant detection, emergency shutdown or certified safety system.
- Do not modify enclosure, threads, flame paths, cable entries, fasteners or sealing arrangements.
- Follow local hazardous area safety regulations, electrical codes and site safety procedures.

7.1 FLAMEPROOF SAFETY INSTRUCTIONS

- The flameproof enclosure must remain mechanically intact. Any damage to threaded joints, flame paths, glass window, cover, mounting bosses or cable entries may affect protection.
- Use only approved cable glands, blanking plugs, reducers and accessories suitable for the hazardous area classification.
- Before energizing, ensure that enclosure cover, cable gland, sensor housing and all fastening hardware are properly tightened.
- Do not paint, file, drill, machine, weld or modify flameproof surfaces.
- After maintenance, inspect gasket condition, cable entry sealing, earthing continuity and enclosure closing before returning the detector to service.

8. HAZARDOUS AREA INSTALLATION GUIDELINES

- Install detector as per target gas behavior, leak source, plant layout, ventilation pattern and airflow direction.
- For ammonia (NH₃), installation location shall be selected based on actual plant layout, expected leak source, airflow, ventilation and safety consultant recommendation.
- Avoid dead air zones where gas may not reach the sensor quickly.
- Avoid direct sunlight, heat sources and high vibration areas.
- Ensure adequate ventilation and avoid locations directly in front of strong air discharge where gas dilution may delay detection.
- Maintain safe service clearance around the detector for cable access, sensor replacement and calibration.
- Use proper flameproof cable glands and sealing arrangements to maintain enclosure protection.
- Ensure conduit sealing as required by hazardous area standards and site procedure.
- Mount the detector firmly on a stable wall, frame or structure using suitable fasteners.
- Ensure enclosure cover is properly tightened before energizing.

8.1 RECOMMENDED INSTALLATION CHECKS

- Confirm target gas and gas code on product label.
- Confirm power supply rating before applying power.
- Verify terminal wiring as per wiring diagram.
- Check relay logic and external alarm/interlock wiring.
- Verify RS485 polarity and device ID in multi-device network.
- Allow sensor stabilization time after first power-up or sensor replacement.
- Perform bump test or functional test before handing over the system.
- Confirm flameproof glands, sealing and earthing are complete before energizing in hazardous area.

8.2 GAS-BASED MOUNTING LOCATION GUIDELINES

Gas Behavior	Recommended Detector Placement
Lighter-than-air gases	Install approximately 6-12 inches below the ceiling or above expected leak source, subject to site layout.
Heavier-than-air gases	Install approximately 6-12 inches above the floor or below expected leak source, subject to site layout.

Installation note: Final detector location should be validated by plant safety team, gas detection consultant or authorized hazardous-area engineer.

9. WIRING AND ELECTRICAL CONNECTIONS

The detector provides power, analog output, relay output and RS485 communication terminals. All wiring must be carried out with power OFF.

9.1 MAIN TERMINAL DETAILS

Terminal	Terminal Name	Description	Typical Use
1	24 VDC (+)	Positive DC supply input	24 VDC panel power supply positive
2	GND (-)	DC supply common / ground	Power supply negative / signal common
3	CH-1 / 4-20 mA	Analog output channel 1	PLC / data logger / indicator analog input
4	CH-2 / 4-20 mA	Analog output channel 2 or secondary analog output if configured	Secondary monitoring input / spare as configured
5	Relay NO	Normally open relay contact	Alarm hooter, exhaust or interlock
6	Relay C / NC	Relay common or normally closed contact as per configured PCB/wiring label	Fail-safe alarm logic, if configured
7	RS485 A	RS485 communication A line	Modbus RTU network
8	RS485 B	RS485 communication B line	Modbus RTU network

9.2 WIRING DIAGRAM AND TYPICAL SYSTEM CONNECTION

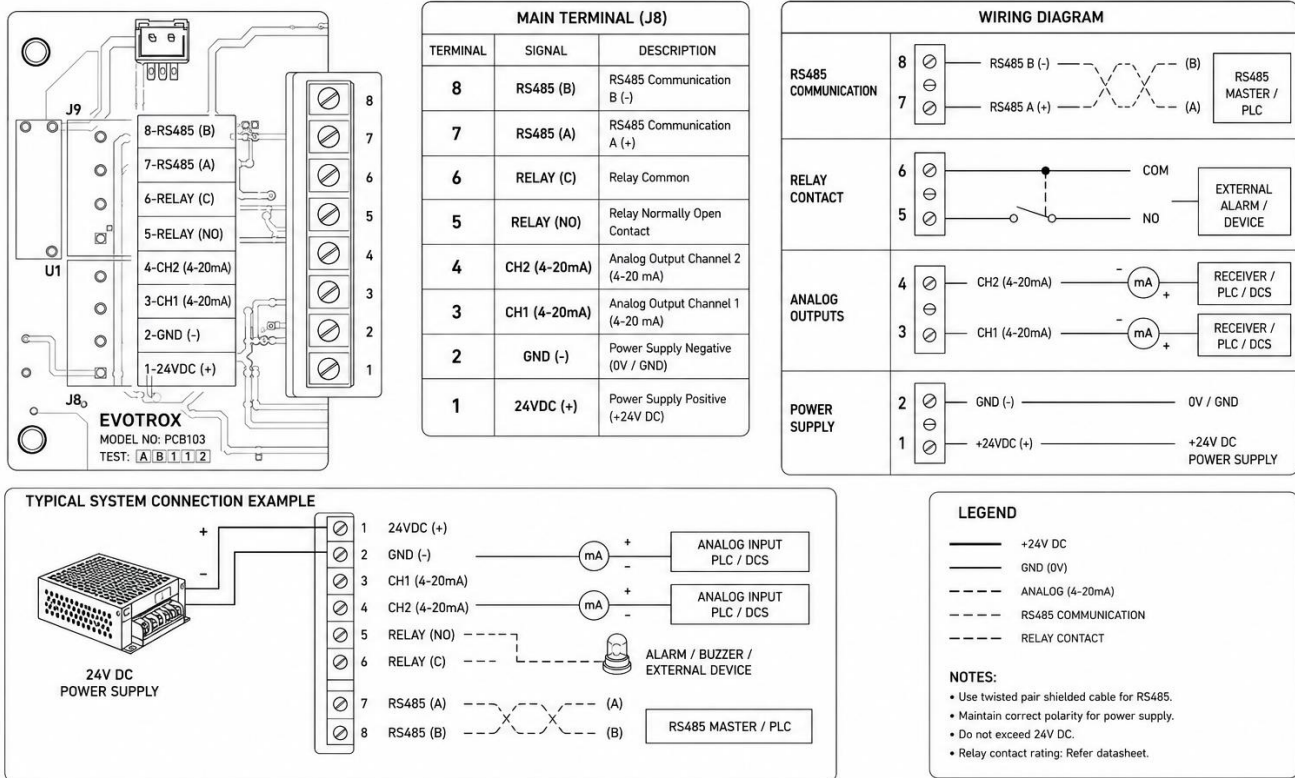


Figure 4: Main Terminal, Wiring Diagram and Typical System Connection

9.3 WIRING NOTES

- Terminal naming shall be verified with the final product label and approved wiring diagram before installation.
- Use shielded twisted pair cable for RS485 communication in industrial environments.
- Maintain correct polarity for power supply.
- Relay contact rating shall be verified from final product datasheet before connecting external load.
- For hazardous area installation, cable gland, cable type, sealing and earthing shall be selected as per site classification and approved flameproof practice.
- For long RS485 networks, use proper cable routing, shielded twisted pair, common reference where required, end-of-line termination and unique device ID for each detector.

10. OPERATING PRINCIPLE AND ALARM OPERATION

The gas sensor module generates an electrical response proportional to the target gas concentration. The controller processes the signal, compares it with configured level set values, operates visual indication, buzzer and relay output, and transmits data over RS485 Modbus RTU.

10.1 ALARM LEVEL OPERATION

Level	Threshold	LED	Buzzer
1	< Level 2 set value	Green LED ON	OFF
2	> Level 2 set value	Yellow LED ON	ON every 30 seconds
3	> Level 3 set value	Red LED ON	ON every 1 second

10.2 ALARM ACKNOWLEDGEMENT

The built-in buzzer can be acknowledged as per configured acknowledgement logic. Alarm acknowledgement silences or controls buzzer behavior only as configured; it shall not be treated as removal of gas hazard. The gas concentration and alarm LEDs must be monitored until the area returns to safe condition.

11. LED AND BUZZER INDICATIONS

LED / Indicator	Condition	Description
Power	Red	Power ON
Status	Flashing	RS485 communication OK
Status	Steady	RS485 error
Green	Steady	Normal gas condition
Yellow	Steady	Warning level
Red	Steady	Alarm level
Buzzer	Intermittent / continuous as configured	Warning or alarm annunciation based on level and buzzer mode

12. COMMUNICATION PROTOCOL - MODBUS RTU

The device can be connected to an RS485 port either in single-device mode or multi-device mode. In multi-device mode, each connected detector must have a unique device ID.

12.1 DEVICE ID SETTING USING DIP SWITCHES

Switch	Value
S1	+1
S2	+2
S3	+3
S4	+8

Device ID can be set in the range of 1 to 16. To set a device ID, turn ON the DIP switches whose values add up to the required ID.

Example: For Device ID = 9, turn ON S4 (+8) and S1 (+1). Keep S2 and S3 OFF. Final setting: S4 = ON, S1 = ON, S2 = OFF, S3 = OFF.

12.2 PROTOCOL TYPE

Serial protocol: Modbus RTU slave over RS485.

Address	Access Type	Function Code	Description	Use
30001	READ	04	Read input register	To read all channel sensor data
40001	READ + WRITE	03 + 06	Read/write holding registers	To read or write all setting parameters

12.3 PARAMETER ADDRESS DETAILS

Sr. No.	Address	Parameter	Low	High
1	40001	Alarm set value	0	65535
2	40002	Alarm mode	0	1
3	40003	Alarm hysteresis	0	65535
4	40004	Level 2 set value	0	65535
5	40005	Level 3 set value	0	65535
6	40006	Level hysteresis	0	65535
7	40007	Timer hour	0	255
8	40008	Timer minute	0	59
9	40009	Buzzer mode	0	1
10	40010	Offset	0	65535
11	40011	Zero	0	65535
12	40012	Span	0	65535
13	40013	4 mA count	0	1000
14	40014	20 mA count	0	1000
15	40015	Analog output mode	0	2
16	40016	Acknowledgement	0	1

Communication note: For long RS485 networks, use proper cable routing, shielded twisted pair, common reference where required, end-of-line termination and unique device ID for each detector.

13. SENSING INFORMATION - AMMONIA SG-2

Item	Information
Target Gas	Ammonia (NH ₃)
Gas Code	SG-2
Sensing Range	0 to 1000 PPM
Cross Sensitivity	Nil
Sensor Type	Electrochemical ammonia sensor module
Application	Ammonia gas monitoring and leak detection

13.1 BASIC SENSITIVITY CHARACTERISTICS

This section defines how the sensor converts gas concentration into a measurable electrical signal. The sensor provides a linear output signal directly proportional to ammonia concentration. To read this signal, an I-V conversion amplifier, also known as a transimpedance amplifier, is required to transform nano-ampere (nA) current into voltage.

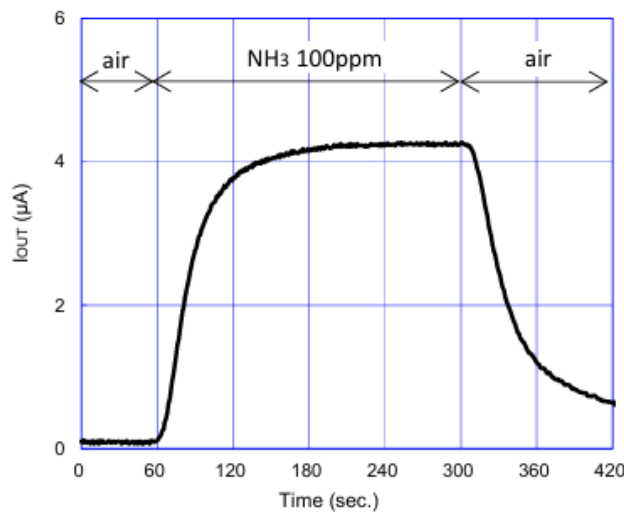


Figure 5: Typical NH₃ Sensor Response Characteristic

13.2 GAS RESPONSE

This describes the speed at which the sensor detects gas and how quickly it clears after the gas is removed. The sensor typically reaches 90% of its stable output within 120 to 150 seconds. Once returned to clean air, the signal gradually returns to the baseline level.

13.3 CROSS SENSITIVITY

This characteristic indicates the sensor ability to ignore other gases and focus on ammonia. The sensor is designed to be highly selective to ammonia (NH₃) with minimal interference from other common industrial gases. Under standard conditions, gases such as carbon monoxide, hydrogen and ethanol typically result in a 0 ppm equivalent reading.

13.4 TEMPERATURE DEPENDENCY

Since the sensor relies on a chemical reaction, its performance changes based on surrounding temperature. The output signal gradually decreases as temperature drops below room temperature of approximately 20°C. For high-accuracy applications, temperature compensation using an NTC thermistor or equivalent compensation method is recommended.

13.5 SENSOR INFORMATION

- SG-2 sensor module is designed for ammonia gas monitoring applications using electrochemical sensing technology.
- Linear sensor output proportional to gas concentration.
- High selectivity to ammonia gas.
- Minimal cross sensitivity to common industrial gases.
- Typical response time: 120-150 seconds.
- Recommended temperature compensation for high accuracy applications.

14. ORDERING INFORMATION

Ordering format: **SENSE-LD101-SG2-GF2**

Code Segment	Meaning
SENSE	Product Family
LD101	Product Model
SG2	Targeted Gas
GF2	Filter Category

Ordering note: Final ordering code may include additional options such as gas range, relay logic, output configuration, cable gland type, calibration certificate and communication settings.

14.1 FILTER VARIANTS

Code	Filter Type	Working Area	Protection
GF1	SS Mesh	Normal factory air	Dust protection, fast response
GF2	SS Sintered	Dusty industrial areas	Strong dust protection
GF3	PTFE Membrane	Outdoor / condensation	Blocks liquid water
GF4	PTFE + AC Membrane	Chemical vapors	Protects from chemicals

Note: If no filter option is specified during ordering, standard F1 filter variant will be supplied by default.

15. MAINTENANCE AND PERIODIC CHECKS

- Clean enclosure using soft dry cloth only.
- Inspect cable glands periodically.
- Verify sensor response periodically.
- Perform periodic bump testing using approved test gas.
- Replace expired sensors.
- Check relay operation and external alarm/interlock operation periodically.
- Verify RS485 communication and data logging where applicable.
- Maintain calibration, bump test and sensor replacement records.
- For flameproof installation, periodically inspect enclosure closing, cable gland tightness, earthing and physical damage.

16. TROUBLESHOOTING

Issue	Possible Cause	Recommended Action
No power indication	Power supply not available, wrong polarity or loose terminal	Verify 24-36 VDC supply, polarity and wiring.
Status LED steady / RS485 error	Incorrect RS485 wiring, wrong baud setting or duplicate device ID	Check RS485 A/B polarity, device ID, network wiring and master settings.
Analog output not correct	Output calibration mismatch or wiring issue	Perform 4-20 mA output calibration and check loop wiring.
Frequent alarm without gas presence	Wrong set value, sensor drift, cross gas exposure or environmental issue	Check set values, perform zero/span check and inspect installation location.
No response during bump test	Expired sensor, blocked sensor path or wrong test gas	Inspect sensor opening, verify test gas and replace/calibrate sensor if required.
Relay not operating	Alarm threshold not reached, relay wiring issue or wrong relay logic	Check level set values, relay contacts and external circuit.
Flameproof enclosure cannot be closed properly	Damaged thread, obstruction, gasket issue or incorrect assembly	Do not energize in hazardous area. Inspect enclosure, clean mating surfaces and contact authorized service team if damage is observed.

17. LEGAL NOTICE AND DISCLAIMER

Specifications are subject to change without prior notice. The user is responsible for ensuring proper installation, commissioning, operation and maintenance according to local industrial safety regulations, electrical codes and site safety procedures.

This product is intended to assist in gas leak monitoring and alarm generation. It does not replace statutory safety systems, ventilation design, emergency response procedure, certified fire and gas system or operator training where such systems are required by applicable regulation or site safety policy.

Sensor performance depends on installation location, airflow, target gas behavior, calibration condition, sensor age, environmental exposure and maintenance practices. Periodic functional testing and calibration are essential for reliable operation.

Hazardous area classification, flameproof suitability, gas group, temperature class, cable gland selection and installation method must be verified against the final certified product label, certificate and local regulatory requirements before use.

18. CONTACT INFORMATION

Company	Details
Brand	EVOTROX
Location	Ahmedabad, Gujarat, India
Phone	support@evotrox.com
Website	www.evotrox.com