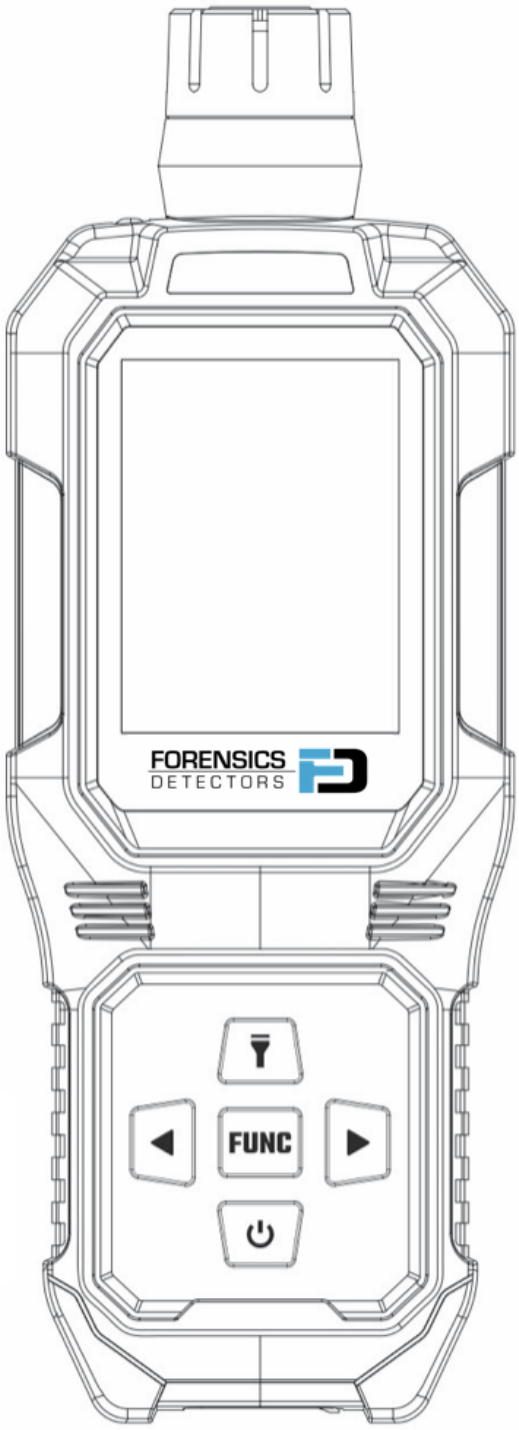
FORENSICS DETECTORS

BASIC AMMONIA GAS DETECTOR

User Manual

Model: FD-92-AMMONIA

Manual Print Version: 1.0



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SPECIFICATIONS

Ammonia (NH3) Detection:	0 - 100 ppm with 0.1 ppm resolution
Calibration Period:	12 months
Gas Sensor Type:	Electrochemical Gas Sensor
Gas Sensor Life:	2 - 3 years
Error:	≤ ± 5% F.S
Response Time:	< 60 sec
Alarm:	LED, Buzzer, and vibration
Store / Operating Temp:	0°F - 122°F
Store / Operating Humidity:	<95%RH
Voltage:	DC 3.7V Li-battery 2000 mAh
Working Time:	> 24 hours
Charging Time:	3 hours
Weight:	5 oz / 140 g (including battery)
Dimensions:	4.3 x 2.3 x 1.7 inches

OUR STORY

Forensics Detectors is a California-based technology leader in advanced gas sensing and measurement solutions. Our mission is to deliver cutting-edge air quality monitoring technology that protects lives and the environment. Based in the stunning Palos Verdes Peninsula of Los Angeles in California, we blend precision engineering with a commitment to safety. Our dedication to excellence drives us to create reliable gas detection systems that set industry standards for accuracy and performance.

INTRODUCTION

The FORENSICS DETECTORS Basic Ammonia Gas Detector is made to be a workhorse with its easy one-button operation. The detector is constructed with a high-quality electrochemical sensor and comes factory-calibrated. Ammonia is a toxic gas that requires continuous detection to ensure wellness for human occupants and your livestock, particularly in occupational spaces and farms. For livestock, here are some important Ammonia levels to consider:

Levels (ppm)	Effects	Animal	Notes
< 10ppm	Ideal exposure limit	All livestock	Less than 10 ppm is the ideal limit for exposure
10-20ppm	Levels in ventilated buildings with liquid manure systems	All livestock	Typical ammonia levels with liquid manure systems
10ppm	Trachea irritation	Turkeys	Trachea irritation was shown in turkeys
20ppm	Increased susceptibility to Newcastle disease	Poultry	> 20 ppm, increased rate of infection of Newcastle disease was found
20-25ppm	Increased susceptibility to secondary challenges, decreased feed efficiency, tissue damage	Poultry	Exposure to 20–25 ppm throughout production can result in increased susceptibility to secondary challenges, decreased feed efficiency and tissue damage
25ppm	Maximum suggested exposure limit before harmful effects	All livestock	Best to keep less than 25ppm.
30ppm	Causes local and systemic low-grade inflammation	Laying hens	Systemic low-grade inflammation based on its levels and exposure durations
50ppm	Levels in buildings with solid floors where manure & urine exist	All livestock	Levels can exceed 50 ppm with lower winter ventilation rates
>50ppm	Increased keratoconjunctivitis and tracheitis	Poultry	> 50 ppm, increased levels of keratoconjunctivitis and tracheitis observed
>100ppm	Significantly increased mortality	Chicks	At above 100 ppm, the chick mortality was increased significantly
>100-200ppm	Levels found in poorly ventilated buildings	All livestock	Levels can reach 100 to 200 ppm in poorly ventilated buildings

Poultry manure contains twice as much ammonia as dairy cattle manure. In order of greatest ammonia manure content to least is: chickens, pigs, dairy cows, and beef cows. Ammonia levels are typically 5–18 ppm in confinement swine barns, 3–8 ppm in open dairy barns, and 10–100 ppm in confined poultry facilities.

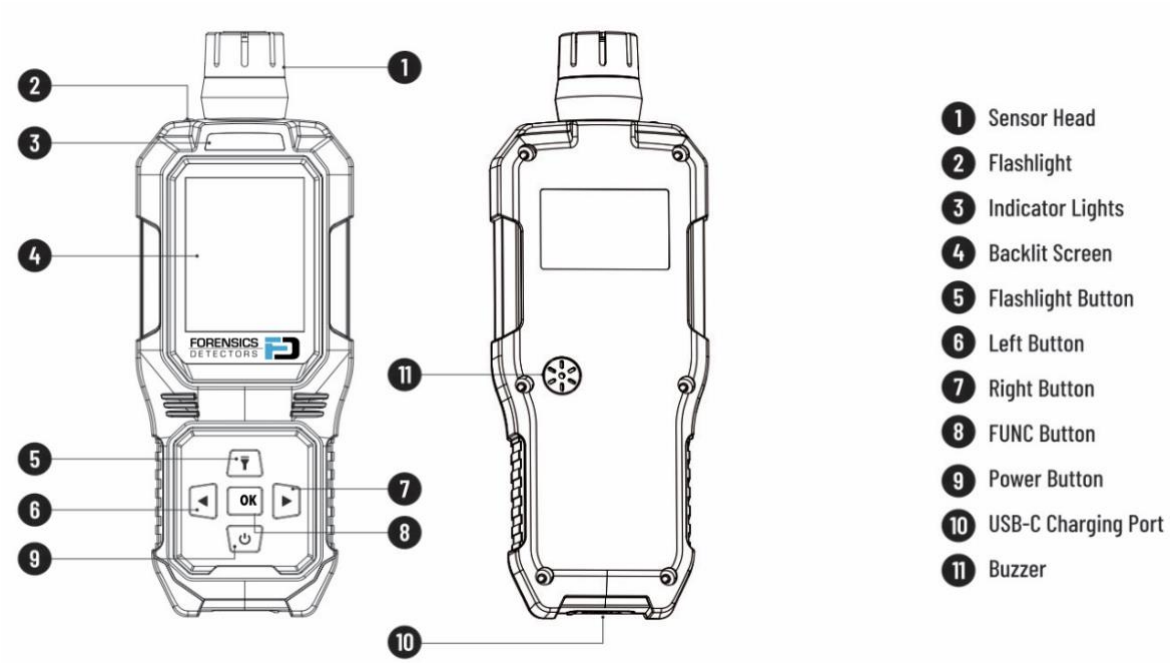
Below we present a table of human ammonia exposure limits:

Agency	Limit Type	Value (ppm)	Exposure Duration	Description
OSHA	PEL-TWA	50	8-hour	Permissible Exposure Limit - legally enforceable standard
OSHA	STEL	35	15-minute	Short-Term Exposure Limit
NIOSH	REL-TWA	25	10-hour	Recommended Exposure Limit - advisory guideline
NIOSH	STEL	35	15-minute	Short-Term Exposure Limit
NIOSH	IDLH	300	Immediate	Immediately Dangerous to Life or Health
ACGIH	TLV-TWA	25	8-hour	Threshold Limit Value - recommended guideline
ACGIH	TLV-STEL	35	15-minute	Threshold Limit Value - Short-Term Exposure
AIHA	ERPG-1	25	Emergency	Minimal effects/mild, transient irritation
AIHA	ERPG-2	200	Emergency	Serious health effects, ability to take protective action not impaired
AIHA	ERPG-3	1,000	Emergency	Life-threatening health effects

Abbreviations:

- OSHA: Occupational Safety and Health Administration
- NIOSH: National Institute for Occupational Safety and Health
- ACGIH: American Conference of Governmental Industrial Hygienists
- AIHA: American Industrial Hygiene Association
- PEL: Permissible Exposure Limit
- REL: Recommended Exposure Limit
- TLV: Threshold Limit Value
- TWA: Time-Weighted Average
- STEL: Short-Term Exposure Limit
- IDLH: Immediately Dangerous to Life or Health
- ERPG: Emergency Response Planning Guideline

DESIGN



The FD-92-AMMONIA has five buttons:

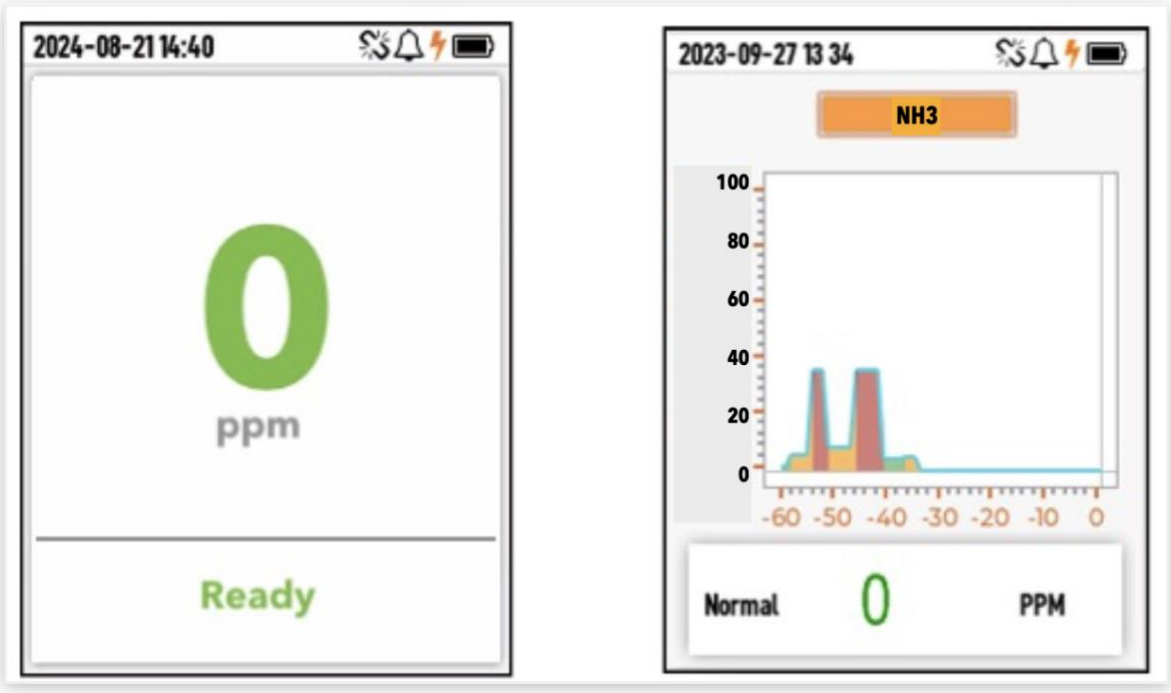
Logo	identification	function definition
	Lighting key	Turn the flashlight on and off
OK	menu	On the home screen, tap to enter the menu. On the other screen, tap to confirm the function
◀	left	Select Cursor up/Value, Option up
▶	right	Select cursor down/Value, Option down
⏻	power	Press and hold to turn on the machine when it is off. On the main screen ,Press and hold it to shut down; On the home screen, tap it to display the shortcut menu. On other screen, tap it to return

The FD-92-AMMONIA has 3 operating LED mode indicators:

mark	function definition
Working light(green)	Equipment in normal condition, no gas detected
Failure light(yellow)	The device is in faulty
Alarm light(red)	Gas detected

QUICK START – AMMONIA Detection

1. Turn ON the detector. After device self-test the unit is READY.
2. Start measuring. Real-time measurements are shown on the HOME screen in **ppm** concentration. PPM stands for “parts per million”.
3. Move the sensor slowly at a inspection site. Ammonia gas levels will be shown on the display.
4. The unit will flash **GREEN LED** in normal operating mode.
   When the alarm has triggered, **RED LED** will flash rapidly.
5. By pressing the left or right button you can toggle between instantaneous levels (left image) and time series bar graph (right image).



DISPLAY ICONS

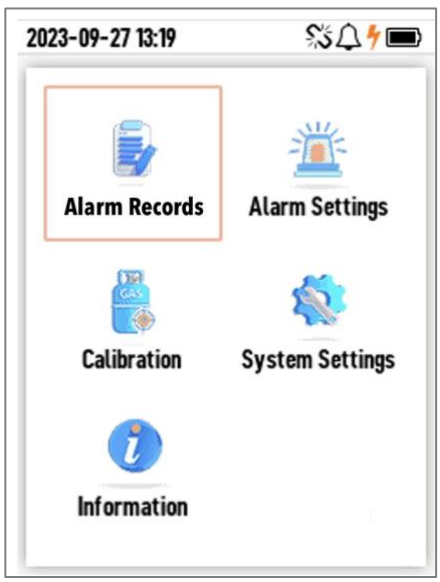
On the top of the FD-92-AMMONIA display is a row for notification icons.

Logo	Name	Definition
	battery capacity	Displays the remaining battery power
	warning	Display: prompt tone on/off; Blinking: The sound is in silent state
	Vibration	Display: Vibration prompts open; Hidden: Vibration prompts off
	charge	Blinking: charging; Steady on: The charging is complete
	Alarm/failure	Blinking red: The device alarms. Blinking yellow: The device is faulty

MENU FUNCTIONS

When in the main screen, press OK to enter the **Main Menu**.

- **Alarm Records:** Shows recorded alarm triggers with time and date stamp. Triggers when low and high alarms are triggered.
- **Alarm Settings:** Settings for low and high alarm points.
- **Calibration:** Settings for ZERO and Span Calibration.
- **System Settings:** Allows to change the time, date, displays and alarm modality.
- **Information:** General detector information.



ALARM RECORDS - Menu

The alarm record of the equipment includes alarm trigger events. The alarm record stamps the alarm trigger time, alarm type, gas type, alarm point, the starting value of gas concentration triggering the alarm, the maximum value of gas concentration after triggering the alarm, and the duration of the alarm.

ALARM SETTINGS - Menu

Low Value: When the gas concentration exceeds this value, a low alarm will be triggered.
High Value: When the gas concentration exceeds this set value, a high alarm will be triggered.
Low Backlash: The low alarm hysteresis is a parameter that prevents frequent toggling of the alarm due to fluctuations near the low alarm value. A low alarm is triggered when the gas concentration exceeds the set value, but it will only be cleared when the concentration drops below the set value minus the low backlash value. For example, if the low alarm value is 80ppm and the low backlash is 5ppm, the alarm will only clear when the concentration drops below 75ppm.
High Backlash: A parameter that prevents frequent toggling of the alarm due to fluctuations near the high alarm value. A high alarm is triggered when the gas concentration exceeds the set value, but it will only be cleared when the concentration drops below the set value minus the high backlash value. For example, if the high alarm value is 90ppm and the high backlash is 5ppm, the high alarm will only clear when the gas concentration reaches 85ppm.

CALIBRATION - Menu

What is CALIBRATION?
Your FD-92-AMMONIA comes already calibrated. However, calibration is an important function to be performed to ensure your gas detector operates accurately. We recommend annual calibration. Accuracy and Calibration drift can happen over time because of chemical degradation of sensors and the natural drift in electronic components. There are two parts to the calibration, ZERO Calibration and SPAN Calibration.

ZERO CALIBRATION: Ensures a good baseline to ZERO target gas exposure. This ensures the detector reads a true ZERO. At times you may experience the unit is not reading exatly ZERO in fresh air. In this case, you can perform a ZERO calibration to readjust the ZERO point. Select ZERO and press Enter.

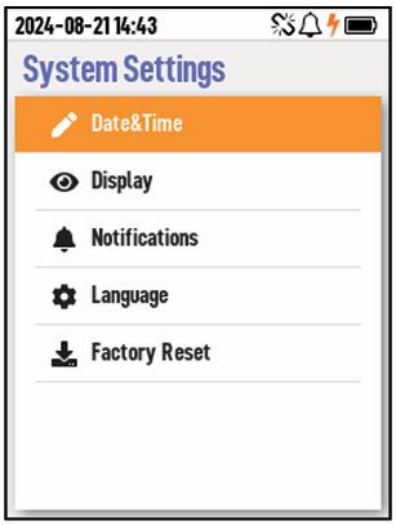
SPAN CALIBRATION: Ensures accurate gas concentration reading in ppm. To undertake a span calibration, you need ammonia calibration reference gas, a gas regulator and tubing. This is a detailed and technical procedure and best described via our YouTube step by step tutorial found on our website under the main Calibration menu, then select FD-92.

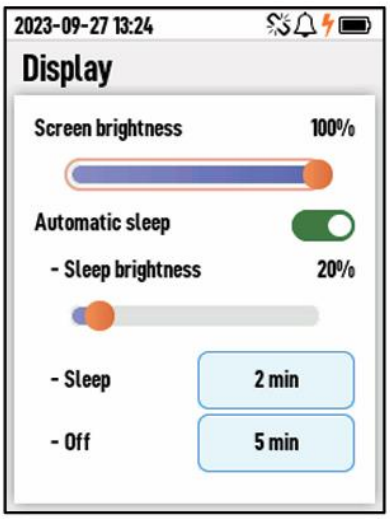
What is Bump Testing?
Bump testing is a quick procedure to expose the gas detector to a small amount of “blast” target gas to ensure the detector operates and alarms as programmed. The function of this test is to verify detection operation and build user confidence, particularly in hazardous and critical user applications. Recommended to bump test when first purchased and unpacking detector and before use. You can do this by exposing the gas detector to ammonia bump gas.

SYSTEM SETTINGS - Menu

The system settings menu helps you adjust certain parameters of the gas detector for customization and a better user experience. Options include:

Date and Time: Adjust the date and time to your local settings.
Display: Change screen brightness and auto sleep settings.
Notifications: Toggle options for light, vibrator, and buzzer operation.
Factory Reset: ONLY do this if confirmed by our technical team.





INFORMATION - Menu

Some basic gas detector information that may be required for identification and troubleshooting.

Device information: Includes device name, software version, hardware version, and product ID.

Operational Status: Includes battery voltage, charge status, temperature, sensor ADC (Analog-to-Digital Converter), boot status, and uptime.

BATTERY CHARGING

The FD-92-AMMONIA has a built-in lithium battery and can be charged via Type C USB cable. USB Charger should be rated >1.0A for fast charging. Before charging, TURN OFF the analyzer to avoid any potential damage. Charging takes about 4 hours. When active in charging, an animated battery icon will appear to indicate charging is in progress. When done, "Charging Complete" will appear.

MEASUREMENT

Gas Monitoring: When the analyzer is in the ON state, it is presenting the live, continuously ammonia gas sensor concentration readings. The data displayed updates twice per second. Walk slowly from location to location to obtain various indoor ammonia gas concentration levels. To get a true reading, ensure unit is stationary for at least 2 minutes in one location. Beware, that ventilation and height can impact an ammonia reading, and rarely will one obtain consistent results.

Maximum Concentration: When you have reached the maximum detection limit of the sensor, it will read "**100".** When this occurs, seek fresh air otherwise the sensor can be damaged and poisoned.

Alarming: The analyzer has LED, BUZZER and VIBRATION alarm modes. These can be disabled.

WARNING

- **Read, understand, and adhere to all instructions to ensure safe operation - failure to comply may result in serious injury or death from explosive gases.**
- **Incorrect calibration in contaminated areas may result in false readings.**
- **Do not store the detector with water, solvents, acids, or corrosive substances - avoid extreme temperatures, high humidity, electromagnetic fields, and intense sunlight.**
- **If detecting gas or feeling unwell, immediately evacuate the area and seek fresh air.**
- **Follow instructions carefully as the detector is highly sensitive to ensure accurate readings and personal safety.**
- **Ensure the analyzer is stored in a room temperature environment with moderate humidity, not exceeding 95%RH with no mechanical vibration.**
- **Ensure the environment is not corrosive, no chemical vapors.**

This product is covered by a one-year limited warranty.
This warranty does not cover damage resulting from accident, misuse, disassembly, abuse or lack of reasonable care of the product, or applications not in accordance with the user manual. It does not cover events and conditions outside of our control, such as Acts of God (fire, severe weather etc.). It does not apply to retail stores, service centers or any distributors or agents. We will not recognize any changes to this warranty by third parties. We shall not be liable for any incidental or consequential damages caused by the breach of any express or implied warranty. Except to the extent prohibited by applicable law, any implied warranty of merchantability or fitness for a particular purpose is limited in duration for 1 year.
THIS PRODUCT CANNOT BE REPAIRED IF THE UNIT IS TAMPERED WITH IT WILL INVALIDATE THE GUARANTEE. IF THE UNIT IS FAULTY PLEASE RETURN IT TO YOUR ORIGINAL SUPPLIER WITH YOUR PROOF OF PURCHASE.

SUPPORT

Forensics Detectors has a dedicated support team. You can email our Chief Engineer directly at drkoz@forensicsdetectors.com or visit our website for further information.

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