



COMBUSTIBLE GAS LEAK DETECTOR WITH DIGITAL LEVEL READOUT

USER MANUAL



NGD269

Read this manual carefully and thoroughly before using the product.

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INTRODUCTION

Thank you for purchasing General Tools & Instruments' (General's) NGD269 Combustible Gas Leak Detector with Digital Level Readout. The NGD269 is ideal for checking automotive exhaust and fuel systems, liquid- and gas-fired heating systems, propane tanks and filling stations, cracked heat exchangers and manholes/sewers.

KEY FEATURES

- Detects the presence of most combustible gases without measuring or displaying their concentration. The unit's analog bar graph, and the speed and tone of its audible alarm, enable the NGD269 to pinpoint the location of a gas leak by comparing its responses to gas exposure at different points.
- Measures and displays the concentration of CH₄ (methane/natural gas), C₃H₈ (propane) and H₂ (hydrogen) for reference purposes. Readings are displayed in digital form in ppm, %LEL (lower explosive limit) or %Vol (percentage by volume). The digital readings provide a third basis for comparing gas levels at different locations.
- High-sensitivity, durable semiconductor gas sensor
- Automatically self-tests all circuitry (including the gas sensor) upon startup
- Measurements of CH₄, C₃H₈ and H₂ are calibratable at multiple points over specific ranges using a simple sequence of interactions with on-screen interfaces
- 13 in. (330mm) long flexible gooseneck probe
- Fast warmup and response times
- One button press makes the ambient environment the measurement baseline
- Headphone jack
- On-screen battery status indication
- Powered by a rechargeable 3.6V Ni-MH (nickel–metal hydride) battery
- Comes in a hard plastic carrying case along with a 110VAC battery charger
- 1-year limited warranty

SAFETY INSTRUCTIONS

- **WARNING: NEVER** use an open flame (from a cigarette lighter or candle, for example) to help search for gas leaks in dark areas.
- **WARNING: NEVER** charge the NGD269's battery in an environment where combustible gases may be present.

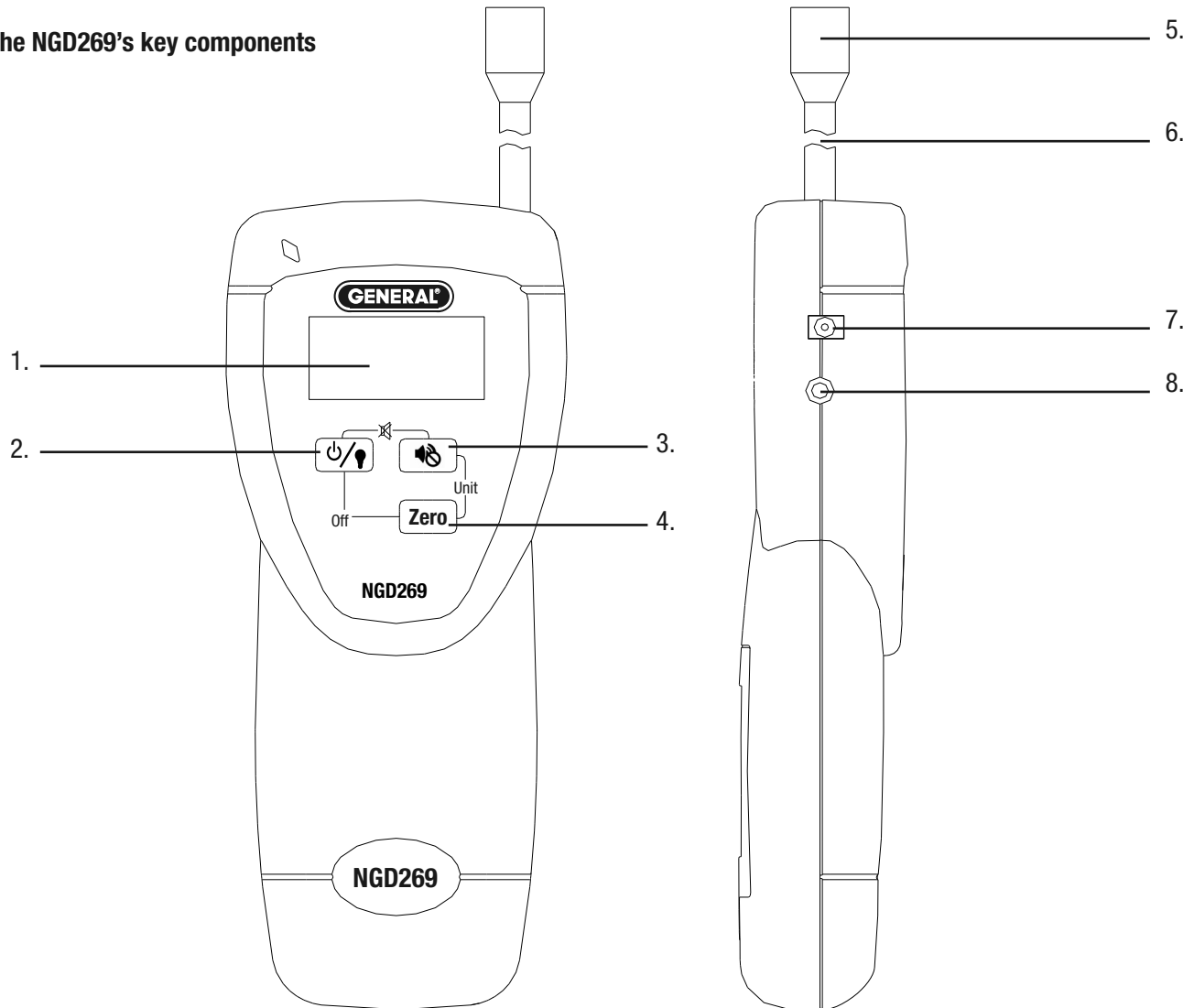
WHAT'S IN THE PACKAGE

The NGD269 comes in a hard plastic case along with a 120VAC-powered battery charger and this user's manual.

PRODUCT OVERVIEW


Fig. 1 shows the key components of the NGD269. Fig. 2 shows a typical readout in detection mode. Use Fig. 1 to familiarize yourself with the position and function of all components before moving on to the safety, setup and operating instructions.

Fig. 1. The NGD269's key components



1. LCD

2.  power on/backlight button. Also used during calibration.

3.  alarm mute button. Also used to select the measurement unit, and during calibration.

4. **Zero** button. Press to make the gas concentration of the current ambient air the measurement baseline. Also used to power the unit off, select the measurement unit, and during calibration.

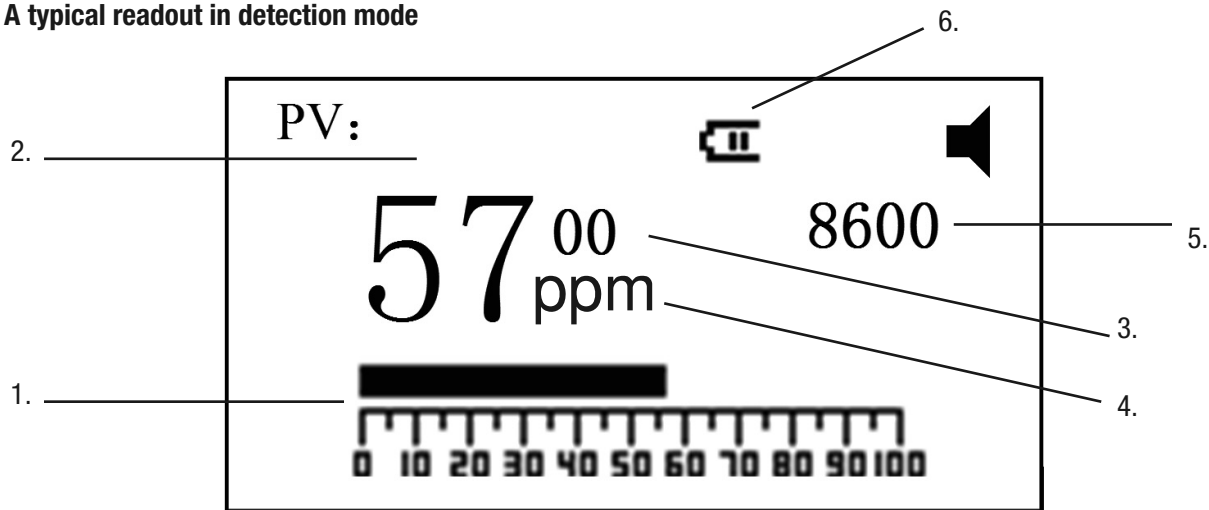
5. Gas sensor assembly

6. 13 in. (330mm) long sensor-tipped gooseneck probe

7. Battery charging jack

8. Headphone jack. Accepts a standard 3.5mm mini-stereo plug.

Fig. 2. A typical readout in detection mode



1. **Analog bar graph readout.** The percentage of detected gas concentration vs. the full selected measurement range (in the above example, 57%).
2. **Present value (PV) of percentage gas concentration** (a digital representation of the bar graph readout); in the above example, the PV is 57%.
3. **00.** Multiplier of concentration percentage, based on the selected measurement range. In the above example, multiplying "57" by "00" yields the measured gas concentration of 5700 ppm.
4. **ppm.** Selected measurement unit. The above example shows ppm; other options are **%LEL** (for lower explosive limit) and **%Vol** (percentage by volume).
5. **8600.** The maximum value of gas concentration in the selected measurement range; in the above example, the maximum value is 8600 ppm.
6. **Battery charge status.** The above screen shows the icon for remaining battery charge. Other possible icons are (full battery), (low battery charge), (battery too low; needs charging), and (battery dead; cannot power unit on).
7. **Audible alarm status.** On the above screen, the icon indicates that the audible alarm is "on" (the default status). The icon would indicate that the alarm has been muted.

SETUP INSTRUCTIONS

CHARGE THE BATTERY

Before using the NGD269 for the first time, charge the battery by plugging one end of the included charger into a 110VAC power source and the other end into the battery charging jack on the left side of the unit (Fig. 1, Callout 7). During charging, it is normal for the back of the unit to feel warm.

Normally, charging a dead battery to full capacity takes four to six hours. The display will indicate **CHARGING OVER** when charging is complete, indicating that it's safe to unplug the charger from the unit and return it to the carrying case.

General recommends re-charging the battery within 12 hours following each measurement session to guarantee that the NGD269 is available for immediate use.




OPERATING INSTRUCTIONS

To power the NGD269 on, press and hold the button for more than two seconds. The unit will then perform a brief self-test of its circuitry, followed by a warmup period that typically takes five seconds. If the sensor is nearing the end of its useful life, or the instrument has not been used in a long time, the warmup period may take longer.

Following the self-test and warmup sequences, the NGD269 will automatically enter detection mode. By default, detection mode begins with the backlight off and the audible alarm on. **To turn the backlight on,** press the button.

DETECTING COMBUSTIBLE GASES


Although a properly calibrated NGD269 can measure the concentrations of three combustible gases (methane/natural gas, propane and hydrogen), it can only detect the presence of several other combustible gases (butane, for example) without measuring their concentration.

In detection mode, changes in the width of the bar graph readout as the probe is moved around pipes and fittings are a reliable proxy for higher and lower detected gas concentration at specific locations. So, too, are the characteristics of the instrument's audible alarm, which sounds at a speed and frequency proportional to the measured gas concentration. The higher the concentration, the faster the beep and the higher the tone. **To mute the alarm**, press the  button. This will change the icon in the upper right corner of the display from  to .


If you are working in a noisy environment, General recommends leaving the alarm on and using headphones to avoid missing any changes in gas concentration reflected by changes in alarm characteristics. The headphone jack on the left side of the NGD269 (Fig. 1, Callout 8) accepts a standard 3.5mm mini-stereo plug.

MEASURING CH₄, C₃H₈ AND H₂

The NGD269's digital readout gives you a third way to compare local concentrations of methane/natural gas, propane and hydrogen (assuming the instrument has been properly and recently calibrated). The callouts below Fig. 2 explain how to convert the values shown on the screen to concentrations. Bear in mind that for methane/natural gas, propane and hydrogen, displayed concentration values are relative, rather than absolute. They are also most accurate for target gas concentrations within the selected measurement range.

When powered on, the NGD269 will begin displaying gas concentrations using the last selected measurement unit. **To change the measurement unit**, press the  and **Zero** buttons at the same time to cycle through the three measurement unit options: ppm, %LEL (lower explosive level) and %Vol (percentage by volume).

To make it easier to detect gas leaks in any setting, the NGD269 allows you to make the gas concentration of the working environment the measurement baseline. To do so, press the **Zero** button.



To power the NGD269 off, press the  and **Zero** buttons at the same time.

CALIBRATION

To make its relative measurements of methane/natural gas, propane and hydrogen concentration as accurate as possible, General recommends calibrating the NGD269 at least once every six months for each gas it is expected to measure. The instrument can be calibrated for one, two or all three potential target gases during a single session.

Calibration for a particular gas requires having one or more cylinders (each with a different concentration) of a standard reference gas on hand. Often called calibration gases, they are readily available from multiple vendors as individual cylinders, or bundled with a flow regulator in a kit.


STEP 1. ENTER CALIBRATION MODE

To begin, with the unit powered off **press the  and  buttons simultaneously**. The unit will respond by powering on with a display that initially shows the text **DEMARCATÉ** . . . After a few seconds, a three-minute warmup will begin, with the display counting down the remaining warmup time in seconds.

STEP 2. SELECT A GAS AND RANGE

Once warmup is complete, the screen will automatically display the following interface (with C₃H₈ or H₂ possibly replacing CH₄, and showing a different range as well.)

GAS:	CH ₄
RANGE:	30000
SAVE	

To change the target gas from the one first shown, press the  button to cycle through the three options: CH₄ (methane/natural gas), C₃H₈ (propane) and H₂ (hydrogen).

For each target gas, the value on the **RANGE** line will change to one of its available measurement ranges. **To change the range** for the selected target gas, **press the Zero button** to cycle through the available ranges (in ppm) for that gas.

A typical display during Calibration Step 2

For CH₄ (methane/natural gas), the available ranges are:

- 0 to 10,000 ppm (0 to 20%LEL or 0 to 1%Vol);
- 0 to 20,000 ppm (0 to 40%LEL or 0 to 2%Vol);
- 0 to 30,000 ppm (0 to 30%LEL or 0 to 3%Vol); and
- 0 to 50,000 ppm (0 to 100%LEL or 0 to 5%Vol)


For C₃H₈ (propane), the available ranges are:

- 0 to 10,000 ppm (0 to 48%LEL or 0 to 1%Vol); and
- 0 to 20,000 ppm (0 to 96%LEL or 0 to 2%Vol)

For H₂ (hydrogen), the only available range is 0 to 10,000 ppm (0 to 25%LEL or 0 to 1%Vol).

Once you have selected a target gas and its measurement range, press the  button to proceed to the next step.

STEP 3. SET AND SAVE CALIBRATION POINTS

At this point in the calibration sequence, pressing the  button changes the display to an interface specific to the selected target gas as well as its chosen measurement range. The screen below shows the interface used to calibrate the NGD269's measurements of CH₄ concentration over a range of 0 to 30,000 ppm (the two column headers).

CH4	30000
0 ✓	* 80
1000 ✓	
5000	
10000	
30000 ✓	
SAVE	BACK



A typical display during Calibration Step 3

Note the presence of a check mark (✓) at the right of multiple values (representing the available ranges for the target gas) in the left column. Also note that the range value highlighted in the left column (in this case, **0**) is accompanied by a highlighted value in the right column on the same line (in this case, **80**). Values in the right column represent conversion factors for real-time measurements of reference gas concentration. During each calibration, the NGD269 compares the factor to a theoretical benchmark value for the target gas at a specific concentration. The instrument then adjusts its sensitivity to



the gas in order to minimize the difference in values.


To thoroughly calibrate the instrument for a particular gas, you must perform separate calibrations for every range value accompanied by a check mark. Calibration of unchecked ranges is optional.

To navigate this interface:


- Use the **Zero** button as you would a down arrow key (▼). Pressing this key with the bottom line of a column highlighted moves the cursor up to highlight the value at the top of the column.
- To save a highlighted value, press the  button (directly below **SAVE**)
- To return to the Step 2 interface (in order to calibrate for a different target gas), press the  button (directly below **BACK**).

To perform the calibration(s), use the **Zero** button to navigate to and highlight the uppermost checked range value in the left column. **Next, insert the tip of the gooseneck probe into a cylinder of reference gas of the type and concentration shown** on the screen.


Exposing the sensor to the calibration gas will produce a change in the highlighted value in the right column. **After the value stabilizes, press the  button to save it.** Doing so will add an asterisk (*) at the left of the value. If the displayed value fluctuates a bit before you remove the probe from the cylinder, you can press the  button again to update the calibration point.


Next, use the **Zero** button to navigate down to, and highlight, the next range in the left column with a check mark (if any exist). Then, **insert the tip of the gooseneck probe into a new cylinder of reference gas of the type and concentration shown** on the screen. Again, wait until the highlighted value in the right changes and stabilizes. Finally, save the stabilized value by pressing the  button and updating it (if you wish) before removing the probe.

Repeat the above steps until all ranges in the left column with a check mark also have an asterisk on their line in the right column.

To complete calibration for the target gas over the range selected in Step 2, use the **Zero** button to navigate down to, and highlight, **SAVE** at the bottom of the left column. Then **press the  button to save the calibration point(s)** for the target gas. If calibration succeeded, **OK** will appear on the bottom of the screen.

However, if any value in the right column with an asterisk is very different from its benchmark value, **ERROR!** will appear at the bottom of the screen to indicate that calibration of the target gas at the current concentration has failed. In this case, General suggests that you use a different cylinder of reference gas and try again. If calibration fails again, contact General's tech support department (at techsupport@generatools.com) to discuss your options.

To calibrate NGD269 measurements of the same target gas over a different range, or calibrate measurements of a different target gas, press the  button (directly below **BACK**) to return to the Step 2 interface and make a new selection.

After completing your calibration(s), power the NGD269 off by pressing the  and **Zero** buttons at the same time. Then plug in the battery charger so the instrument will be immediately available the next time it is needed.

OPERATING & MAINTENANCE GUIDELINES

- When using the measurement units ppm and %LEL, do not expose the sensor to gas concentrations exceeding the selected range over a long period of time. Doing so will compromise measurement accuracy and possibly damage the sensor.
- Likewise, avoid exposing the sensor to any environment containing silicon or compounds of lead, sulfur or organic phosphorus. Doing so will “poison” the sensor.
- Along the same lines, avoid long-term exposure of the sensor to any environment containing hydrogen sulfide, hydrocarbon gas or any highly corrosive gas. Doing so will compromise the response of the sensor and reduce its sensitivity.
- Finally, do not expose the NGD269 to electric or mechanical shocks, a strong magnetic field, sunlight or high temperatures.
- Charge the battery within 12 hours following each measurement session to guarantee that the unit is available for immediate use. Also make sure to fully charge the battery before placing the NGD269 into long-term storage, and whenever you don’t expect to use it for months.
- Never use a sensor that appears defective (due to a crack in its housing, for example), or especially one that produces the on-screen warning **SENSOR FAIL!** The sensor has an average useful life of two years.
- Using spare parts from an unknown source, or a battery charger other than the one supplied voids the NGD269’s one-year limited warranty. Attempting to disassemble or repair the instrument also voids the warranty.

SPECIFICATIONS

Gases detected without concentration measurements	Most combustible hydrocarbon gases
Gases whose concentrations are measured on a relative basis	CH₄ (methane/natural gas) C₃H₈ (propane) H₂ (hydrogen)
Available measurement ranges	For CH₄: 0 to 10,000 ppm (0 to 20%LEL or 0 to 1%Vol); 0 to 20,000 ppm (0 to 40%LEL or 0 to 2%Vol); 0 to 30,000 ppm (0 to 30%LEL or 0 to 3%Vol); 0 to 50,000 ppm (0 to 100%LEL or 0 to 5%Vol) For C₃H₈: 0 to 10,000 ppm (0 to 48%LEL or 0 to 1%Vol); 0 to 20,000 ppm (0 to 96%LEL or 0 to 2%Vol) For H₂: 0 to 10,000 ppm (0 to 25%LEL or 0 to 1%Vol)
Sampling method	Natural diffusion
Response time	< 5 seconds
Sensor type	Semiconductor
Sensitivity	Better than 50 ppm
Sensor life	Two years
LCD size	1-5/8 in. (41mm) diagonal
Power supply	Rechargeable 3.6V Ni-MH (nickel–metal hydride) battery rated at 2200mAh, with a useful life of two years/300 recharging cycles
Charging time	Four to seven hours
Operating temperature	14° to 132°F (-10° to 55°C) at <95% RH
Storage temperature	-22° to 140°F (-30° to 60°C) at <95% RH
Dimensions	7.1 x 2.8 x 1.4 in. (180 × 72 × 35.5mm)
Weight	10.6 oz. (300g)
Limited warranty term	1 year

WARRANTY INFORMATION

General warrants its instruments and accessories, and digital tools products against defects in material or workmanship for one year from the date of purchase unless otherwise stated on the packaging, user's manual, and/or marketing materials. General also warrants its non-digital tools products against defects in material or workmanship on a limited lifetime term.

General will replace or repair the defective unit, at its option, subject to verification of the defect.

This warranty does not apply to defects resulting from abuse, neglect, accident, unauthorized repair, alteration, or unreasonable use of the product. It also does not cover products purchased from unauthorized distributors. A proof of purchase must accompany each warranty claim.

Any implied warranties arising from the sale of a General product, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the above. General shall not be liable for loss of use of the product or other incidental or consequential damages, expenses, or economic loss, or for any claim of such damage, expenses, or economic loss. State laws vary. The above limitations or exclusions may not apply to you.

For more details or to file a warranty claim, contact General Tools & Instruments Technical Support at techsupport@generatools.com.

RETURN FOR REPAIR POLICY

Every effort has been made to provide you with a reliable product of superior quality. However, in the event your instrument requires repair, please contact our Customer Service to obtain an RGA (Return Goods Authorization) number before forwarding the unit via prepaid freight to the attention of our Service Center at this address:



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Specifications subject to change without notice.
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