NEW TECH HOLDING

NL10M
Portable Methane Detector

Manual
DTR

April 2024

1 Introduction. Precautions and principle of operation

1.1 Safety Tips

Before using this product, please read the following information carefully and ensure that the appliance is used correctly.

REMARK

When the device is on, do not look directly or use optical instruments (such as a telescope or magnifying glass) to observe the green laser pointer on the front of the device to avoid burning your eyes!

REMARK

When the device is on, do not point the green laser pointer at other people or animals, as this may cause injury or damage!

REMARK

This device is Ex II 3G Ex ic IIA T3 Gc marked and can be used in hazardous areas. However, it is strictly forbidden to charge devices in these zones.

REMARK

It is forbidden to repair or replace the components of the device yourself! If the appliance does not operate properly or an error message appears, refer to the corresponding description in this manual to perform cleaning of the appliance or contact the manufacturer's service department.

REMARK

Please avoid exposing the device to direct sunlight for long periods of time, placing it in a car exposed to direct sunlight, or using it in harsh weather conditions such as rain, snow, hail, and strong winds! It is recommended to store the device in a dedicated case when not in use.

1.2 Functional description

A laser methane detector is a device for remote measurement of methane concentration. The device has two lasers. A green laser indicates the detection area, while an invisible infrared laser measures the methane concentration per unit (ppm·m).

1.3 Measurement principle

"Methane molecules absorb light at specific wavelengths"

- Principle of molecular absorption spectroscopy

"There is a linear relationship between the concentration and absorbance of a solution, which makes it possible to calculate the concentration of a solution by measuring its absorbance."

- Lambert-Beer's law

According to the above laws of physics, a beam of a specific wavelength can be passed through a gas, and depending on how weakened the beam is, the concentration of methane in the transmitted air mass can be measured.

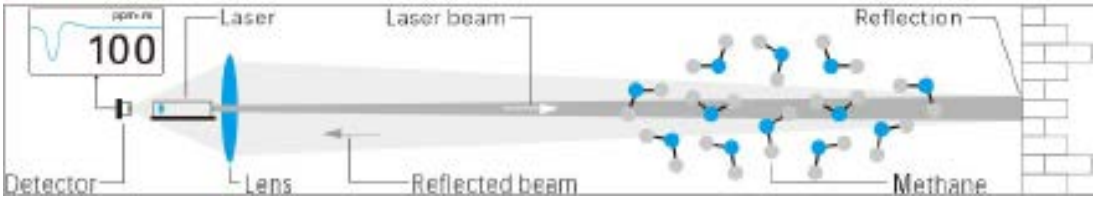
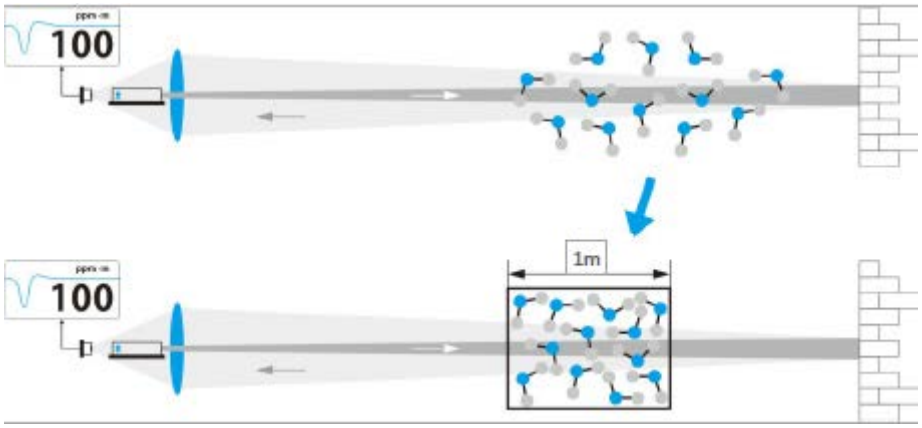


Figure 1 Visualization of absorption

1.4 Unit Concentration（ppm*m）

"A value of 100 ppm·m is equivalent to the distribution of 100 ppm of gas in a mass of air 1 meter long."



The device will also indicate a value of 100 ppm·m for a methane mass whose wavelength is 5m and its concentration is equal to 20 ppm.

1.5 Choosing the right reflective surfaces

The target's ability to reflect laser light directly affects the quality of the measurement. If the target is dark, steeply inclined, porous, mirrored or highly reflective surface, the angle and position must be adjusted for optimal gas detection.

1.5.1 Highly reflective surfaces

A device directed towards highly reflective surfaces (glass, smooth tiles, water, smooth stainless steel railings) can cause false alarms due to direct reflection of light into the detector.

In addition, highly reflective surfaces can cause the detection beam to scatter and not return. In this case, the device will show a measurement error.

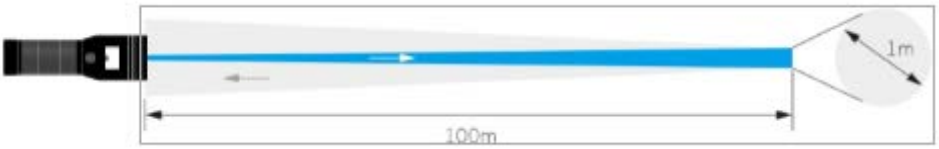
1.5.2 Transparent object interference

The laser can detect methane through transparent objects, but in the detection process, the measured values can be underestimated due to the reflection of the beam from the transparent surface.

When the device is pointed at a clear container placed in front of the correct reflection target (e.g. a wall), the measured value will be lower than the actual value in the container because the laser light will first be reflected from the wall of the container without passing through the gas. The stronger the reflectivity of the container walls, the greater the deviation between the measured value and the actual value of the gas will be recorded.

1.6 For remote detection

The beam emitted by laser collimation is not a strict straight line, and it will propagate and weaken as the distance increases; A divergent cone-shaped beam of light will be created. The size of the gas detection beam spot at a distance of 100 meters is about a circle with a diameter of 1 meter.



When measuring tall buildings, when the measurement angle relative to the façade is too large, there will be a situation where the elliptical light spot will cover multiple floors, and the measured gas cannot be covered by the light spot, resulting in a reduction in the measurement value.

For long-distance detection, the laser itself will be dispersed, and this situation will be exacerbated in windy, sandy, rainy, and foggy weather. This situation can lead to a situation where the intensity of the light reflected back to the detector is too weak, which in turn will generate errors of a low measurement value or too low light intensity.

2 Equipment and maintenance

2.1 Content overview

Remove components from the box and then inspect the devices for visible damage. If you find these or any of the items in the list below are missing, please contact the manufacturer's service.

The set includes:

- Detector
- Calibration container
- Documentation
- Power supply
- Maintenance tools

2.2 Measurement module description

The laser emitter and receiver are located on the front of the machine. The charging port is located on the back, covered by a rubber plug. The operation panel is located in the middle and consists of a button, an indicator light and an LCD display.

[1] Operation panel - button

[2] Buzzer

[3] Band clasp

[4] Charging port (with rubber plug)

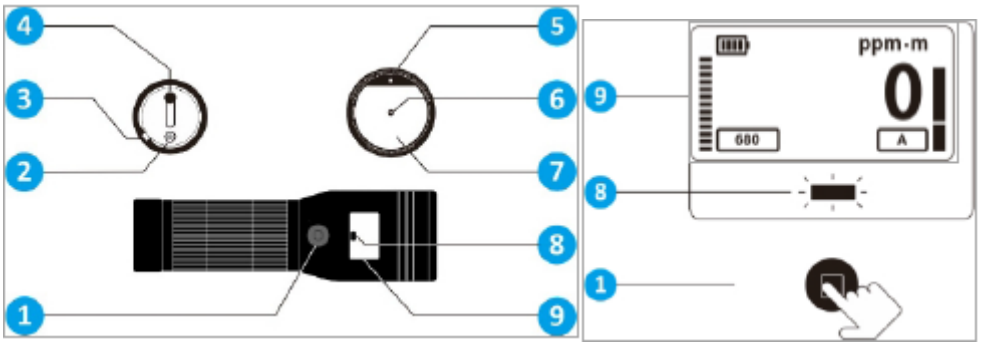
[5] Laser pointer

[6] Laser Detection

[7] Lens

[8] Operating panel - indicator light

[9] Operation panel - LCD display



2.3 Before use

If the device does not respond to the button, charge the device using the original charger. The charging port is located at the bottom of the device. Remove the protective rubber plug, and then insert the DC (direct current) plug of the charger. This process should be done in the following steps:

[1] Plug the charger into a power outlet.

[2] Remove the protective rubber cap at the bottom of the unit and insert the charger's DC plug into the charging port.

[3] When you hear a short beep, a battery icon will appear on the screen.

When the battery icon is full, the battery is fully charged.

2.4 Checking the battery

When the device is turned off, press the function button to allow the battery status to be checked. After a short beep, the screen will display the current battery status.

The capacity of the battery depends on its age and the ambient temperature. In winter, it is recommended to turn on the device indoors. The heat generated by the device itself contributes to improved battery life; If the battery capacity is significantly reduced, contact the manufacturer's service to replace it.

2.5 Maintenance

2.5.1 Routine device inspection

To keep your device in good working order:

[1] When not in use, store the appliance in its packaging

[2] Turn on the pointer laser only when using the machine

[3] Do not allow the battery to fully discharge

[4] Clean the exterior with wet wipes

[5] Use maintenance tools to clean the lens (when the lens is dirty)

[6] Periodic servicing and calibration of the unit is recommended to rule out damage

REMARK

Strong vibrations and impacts can damage equipment and accessories! Do not use the device as a tool to strike other hard objects.

2.5.2 Lens element maintenance

A lens is a precision optical element with a coating on the surface. Clean the lens if it becomes contaminated during use.

To clean a lens, blow compresed air through the dust surface (do not blow with your mouth) and then wipe it with a soft lens cloth. If the contamination is large, you can wipe it first with wet optical wipes and then with a lens cloth.

Wiping the lens too hard when there is dust on it can cause scratches to the coating and damage to the lens.

2.5.3 Battery Maintenance

The device is equipped with a lithium-ion battery. During extended periods of non-use, it is recommended to charge the battery to between 50% and 80%. In addition, the device should be stored in a dry and cool place.

Charging your device once a month will prevent irreversible loss of capacity caused by self-discharge due to long-term storage.

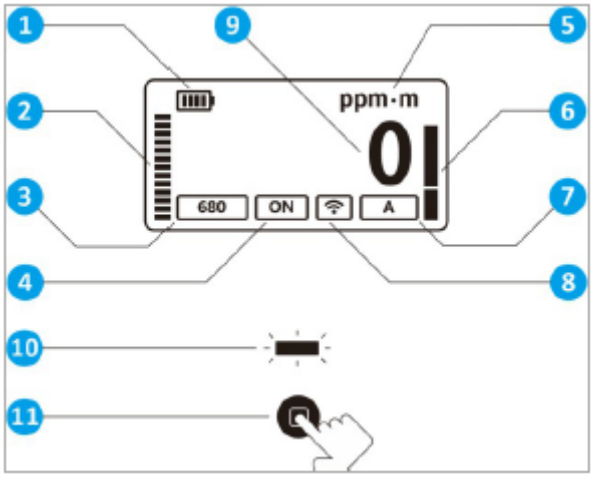
GUIDANCE

To extend the life of the battery, it is recommended that you perform a full charge and discharge cycle at least once a month, charging the battery to 100% capacity and running it until a low battery warning is displayed.

3 Operations - User Interface and Operations

3.1 User Interface

The device displays information to the user through the display screen, light indicators and buzzer, and responds to operations with a button.



[1] Power supply

[2] Light intensity indicator

[3] Maximum concentration

[4] Laser pointer on/off

[5] Unit of concentration

[6] Concentration Indicator Bar

[7] Detection Mode

[8] Transport connection

[9] Concentration value

[10] LED indicator

[11] Function button

3.2 Action

3.2.1 Turning the device on/off

Press and hold the button, when you hear a long beep, the device will be turned on.

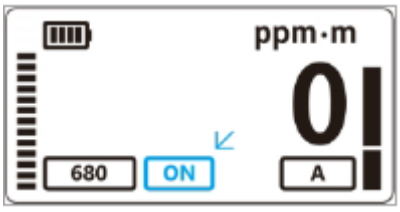
The switch-off operation is analogous to switch-on： after the pointer laser has been switched off, press and hold the button. When you hear a long beep, the unit will turn off.

3.2.2 Switching the pointing laser on/off

After starting the device, press the button twice, and when you hear a short beep, the green laser pointer will turn on and the " ON " icon will appear on the screen.

Press the button once to turn off the pointer laser.

Please note that the device will sound an alarm if it detects methane only when the pointer laser is on.

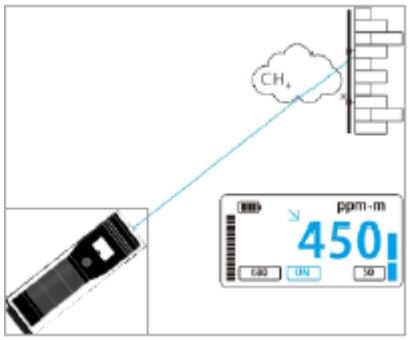


3.2.3 Measurement

Point the device at the suspicious leak area. A green laser pointer will indicate the exact location of the measurement.

If there are methane (CH4) molecules in a straight line (detection line) between the device and the target, the device will display their concentration on the screen.

The device changes the real-time indication of the concentration value and triggers an audible alarm when the alarm threshold is exceeded, while the LED indicator flashes red.



3.2.4 Detection Mode

The device has 4 detection modes: "automatic", "pipeline", "building" and "high sensitivity".

When the "Mode" icon at the bottom right of the screen is "A", it means the device is in auto-detection mode, "S" means pipeline inspection mode, "H" means building detection mode, and "F" means high sensitivity mode.

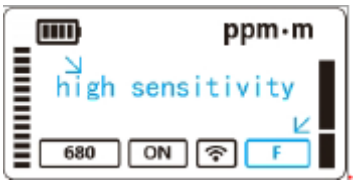
With the pointer laser turned on, press and hold the button until a short beep is heard. Then press the button to switch between the 4 modes. If no action is performed for 3 seconds, the current mode will be saved.

Auto-detect mode [A]: General use.

Pipeline Inspection Mode [S]: Suitable for daily inspections of pipelines and gas systems.

Building Detection Mode [H]: Suitable for measuring gas concentrations in residential buildings as well as for long-distance gas detection.

High Sensitivity Mode [F]: Suitable for measuring leaks at close range.



REMARK

Before changing the detection mode, you need to turn on the pointer laser first, and then enter the mode settings.

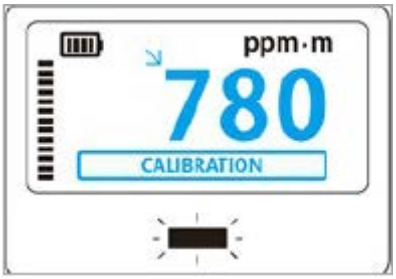
After pressing and holding the middle button and hearing a short beep, you should release the button immediately, otherwise the device will enter calibration mode.

3.3 Calibration

Changes in temperature may cause the internal parameters of the device to drift, resulting in an incorrect measurement reading. In this case, it is necessary to restore the appropriate parameters of the device through calibration. The device should be systematically calibrated every 3 months.

Calibration procedure:

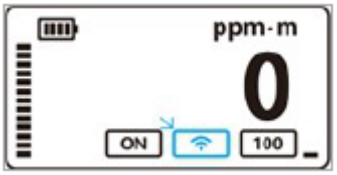
1. Place the unit in the package with the panel facing up. Turn on the device and wait for the self-test to complete.
2. Press the button twice to turn on the pointer laser, then press and hold the button until you hear two short beeps at regular intervals and "Start Calib" appears on the screen. Press the button to start calibration. If no action is performed for 3 seconds, calibration is canceled and the detection interface is restored.
3. The device will automatically complete calibration without user intervention. During the process, the calibration progress (0~100%) is displayed on the screen, accompanied by a flashing green LED indicator.
4. If the calibration is successful, the device will display "Calib Finish". Press the button to exit calibration mode.
5. The device will emit three short beeps. To save the calibration, press and hold the button. The unit will emit a short beep. To restore the previous settings (if the calibration fails, the device will display "Calib Failure" and display an error code), press and hold the button.



3.4 App connection

The device has Bluetooth function and can be connected to mobile devices.

The app automatically searches for and connects to your device. Once the connection is successful, the Bluetooth icon on your device will automatically light up to indicate the connection status.



4 Error codes

The device has a self-diagnostic function. If an error occurs, a long beep will be emitted, followed by a short beep. During this time, the error code "E001" will be displayed on the screen.

E001	Temperature is outside the range of the device

E005/E006/E202	Unstable device temperature
E101	Charging voltage error
E102/E103	Abnormal battery temperature
E104/E105	Battery failure
E200	Calibration gas cell not detected
E205	Calibration error

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