

Otywell



**Thumbs Laser Methane Telemetry
Instrument
G6000Z**

Product User Manual



Henan Otywell Electronic Technology Co., Ltd.

Security Notice



Welcome to the G6000Z Thumb Laser Methane Telemetry Instrument. Before use and maintenance, please carefully read this manual and keep the telemetry instrument together with the manual (hereinafter referred to as the telemetry instrument).

To ensure the safety of telemetry devices and their usage, this manual and the devices themselves employ three distinct markings to indicate safety warning categories. Please strictly adhere to these critical guidelines.

Warning	If this identifier is ignored and incorrect operations are performed, it may lead to serious accidents or pose a threat to life.
Caution	If this warning is ignored and incorrect operations are performed, it may lead to accidents or product damage.
Note	If you ignore this label, you may miss useful or additional information.

- ✧ This manual is copyrighted by Henan Otywell Electronic Technology Co., Ltd.
- ✧ For discrepancies between actual applications and specific details in the product manual due to product updates, or for information not mentioned in the manual, please contact Henan Otywell Electronic Technology Co., Ltd. directly.

catalogue

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I. Essential Reading Before Use

1.1 User Guidelines

Before using this product, please read this manual carefully. The manual covers all critical information and data related to product operation. Users must strictly adhere to its provisions to ensure the proper functioning of the telemetry device. Additionally, the relevant information will assist users in correctly operating the product and obtaining accurate analytical results.

This manual provides comprehensive guidance on the proper use of telemetry instruments. It serves as an accurate reference for technicians who have received professional training or possess relevant knowledge in instrument operation and control. Before operating the instruments, ensure you fully understand the safety instructions and warnings outlined in this manual and apply them during practical operations. Due to various limitations, this manual cannot provide detailed descriptions for every aspect. If users require further information or need assistance with issues not covered herein, please contact the After-sales Department of Henan Otywell Electronic Technology Co., Ltd.

1.2 Quality Assurance and Exemption Clauses

By selecting Henan Otywell Electronic Technology Co., Ltd., you are choosing high-quality products. All products from our company are eligible for free repairs during the warranty period; after the warranty period, corresponding component replacement fees will be charged. If you encounter any issues during use, please contact us for prompt assistance. The entire instrument is covered by a one-year warranty.

Any repairs beyond the warranty period or those occurring during the warranty period due to the following faults are considered out-of-warranty repairs and will not be covered by free warranty services. Our company reserves the right to charge for on-site maintenance fees. These faults include, but are not limited to:

- 1) Due to improper use (internal water ingress, corrosion, fire, or strong electrical current intrusion);
- 2) Force majeure (damage caused by earthquakes, lightning strikes, floods, etc.);
- 3) Unauthorized modification of product internals without permission;
- 4) Failure to use the product in accordance with the user manual and training specifications, resulting in product damage.

1.3 Safety Precautions

Before using this instrument, please ensure that you have read and understood the

safety precautions described below.

1.3.1 Precautions for Safe Operation of Instruments

warn :

- 1. The instrument is designed as intrinsically safe and must be used under corresponding environmental conditions.**
- 2. During operation, do not direct the laser beam of the instrument toward human or animal eyes, and avoid direct viewing of the lens, as the laser may cause visual impairment.**
- 3. Do not charge batteries in areas where explosive gases may be present.**

1.3.2 Other Safety Precautions

1. This instrument is classified as optical precision equipment. Do not attempt to disassemble, assemble, or modify it. If the instrument fails to operate normally or exhibits malfunctions, please contact us.

2. If the instrument is accidentally dropped to the ground or its casing is damaged, immediately cease operation, turn off the power supply after confirming environmental safety, and contact us.

1.4 To avoid failures

To minimize the risk of malfunctions, please read the following content carefully. The instrument must be operated, used, and maintained strictly in accordance with its labels, warnings, and instructions.

1.4.1 Avoiding issues caused by condensation

Transferring instruments from high temperatures to low temperatures or vice versa may cause condensation (water droplets) to form on the instrument casing and interior. To prevent this occurrence, allow the instrument to gradually adjust to ambient temperature before operation. If condensation is observed inside the instrument,

immediately turn off the power supply and wait until the condensation completely dissipates before proceeding with operations.

1.4.2 Precautions for Instrument Use During Rainfall

This instrument can prevent vertically falling water droplets from entering its interior. However, when the instrument is tilted beyond 15 degrees, vertically falling water droplets may penetrate the interior, potentially causing damage to the instrument. When using the instrument during rainfall, appropriate waterproof measures should be implemented.

1.4.3 Precautions for Long-term Storage

1) The storage temperature for this telemetry device is (0–50)°C, with humidity below 90%. If the instrument is intended for long-term disuse, store it in a cool and dry environment.

2) Do not store the telemetry device in areas with severe shaking.

1.4.4 Precautions for Normal Use

1) When using this telemetry device, avoid forceful squeezing or dropping. Strong mechanical impacts on the LCD screen and window panels may cause fragmentation.

2. Product Overview

2.1 Product Features

The handheld laser gas telemetry instrument consists of an optical-mechanical system, signal processing system, display and alarm system, and housing components. It is primarily used for long-distance measurement of methane or methane-containing gases (natural gas, coal gas, or similar gases) concentration.

The telemetry device emits an infrared laser beam to the detection point, enabling rapid measurement of gas concentration between the detection point and the telemetry unit. For enhanced observation clarity, the device simultaneously projects a visible green laser beam toward the detection point. This system provides real-time, accurate methane concentration detection at specified locations with visual display. When concentrations

exceed preset alarm thresholds, it triggers audible and visual alerts to facilitate immediate response actions by personnel.

2.2 Detection Principle

The measurement principle of this telemetry instrument fully utilizes the absorption characteristics of methane gas at a specific wavelength. When the detection beam encounters methane molecules, part of the beam is absorbed by the molecules. By measuring the absorption rate, the concentration of methane gas distributed between the target point and the telemetry instrument can be determined.

2.3 Applicable Scenarios

This telemetry device is widely used in the gas transmission and distribution industry, suitable for applications including:

- 1) Gas pipeline network inspection;
- 2) Inspection of outdoor natural gas riser pipes;
- 3) Conduct indoor inspections of households without entering their premises;
- 4) Inspection of natural gas storage tanks;
- 5) Remote detection of hazardous gas leakage areas;
- 6) Conduct detection in areas difficult for personnel access.

3. Product Implementation Standards

GB/T 3836.1-2021 Explosive Atmospheres Part 1: Equipment General Requirements

GB/T 3836.4-2021 Explosive Atmospheres Part 4: Equipment Protected by Intrinsically Safe Type 'i' Protection

4. Technical Parameters

Detection range: (0 ~ 50000) ppm·m (default, customizable)

Detection range: (0-15) m, (0-20) m, or (0-30) m

Minimum detection limit: 5 ppm·m

Accuracy: $\pm 10\%$ FS

Response time: 0.5s

Continuous working time: 8h

Power supply method: Lithium battery

Display mode: 1.47-inch LCD

Alarm volume: $\geq 70\text{dB}$ (at 1 meter distance)

Explosion-proof certificate number: CCRI 24.2119X

Explosion-proof rating: Ex ia II C T4 Ga / Ex ia III C T200130°C Da

Protection rating: IP65

Ambient temperature: (-20 to 50) °C

Environmental humidity: (10–93)% RH, no condensation

Battery voltage: DC 3.7V

Battery capacity: 3400mAh

Product dimensions: 122*31*33mm

Net product weight: 220g

5. Button Definitions and Operation Instructions

5.1 Button

There is a button at the bottom



of the product screen: Power button

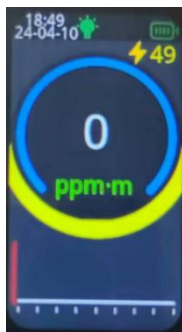
Long press the power button to turn on the instrument. After the device completes preheating, the system automatically enters working mode and displays the main interface. To stop detection, long press the power button to shut down the instrument.

In work mode, press and hold the power button to turn on or off the indicator laser.

Swipe down to enter the function menu to set parameters and view history.

5.2 Main Display Interface

After device startup and self-check completion, it automatically enters the main display interface and operates normally. The displayed content primarily includes concentration values, curve concentration values, backlight signal intensity values, battery level, and time/date information, as shown in Figure 1.



graph 1

- 1) Optical intensity detection indicator: The intensity of the laser signal reflected back by the target object as received by the instrument. When no reflected signal is detected, the signal grid displays 0, and the detection value at this point has no practical significance. When a reflected signal is received, the signal grid displays the corresponding signal intensity.
- 2) Battery level indicator: Displays battery capacity.

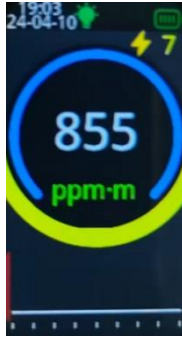
6. Operating Instructions

6.1 Laser On and Off

In main interface mode, short-press the power button to turn on or off the indicator laser. When activated, the icon light in Figure 1 illuminates and the device emits an indicator laser beam, entering detection mode. When deactivated, the icon light in the upper left corner extinguishes and the indicator laser is turned off. Long-press the power button to shut down the instrument, which enters a power-off state.

6.2 Initiate detection

During detection, direct the indicator laser at the target object to be measured. The display screen will show the integrated methane concentration within the measured area, expressed in ppm·m. When the detected methane concentration exceeds the preset alarm threshold, the instrument will emit an alarm sound, as shown in Figure 2.



graph 2

Note: ppm·m is the unit of integrated concentration, representing the product of methane concentration and width. Here, ppm denotes the gas concentration unit, i.e., "parts per million," indicating methane concentration; m is the length unit "meter," representing the width of the measured gas volume.

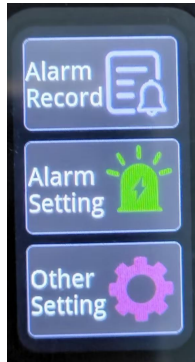
Example: When conducting detection 5 meters away from the target, if the methane leakage plume has a concentration of 500 ppm and a width of 1 meter, its integrated concentration would be calculated as $500 \text{ ppm} \times 1 \text{ m} = 500 \text{ ppm}\cdot\text{m}$. The instrument will then display a reading of 500 ppm·m.

6.3 Alarm

When the methane concentration exceeds the preset alarm threshold, the instrument will trigger an audible alarm.

6.4 Menu

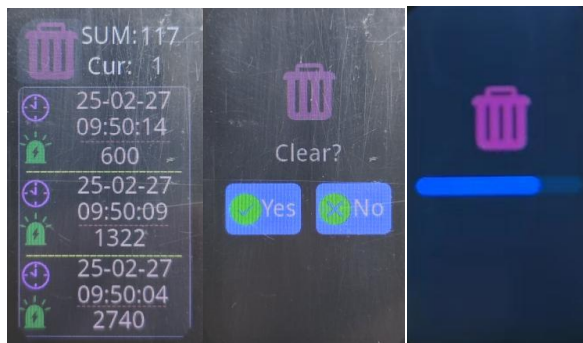
Swipe down on the home screen to access the menu interface, as shown in Figure 3. Tap a button to open the corresponding menu. Swipe up to return to the home screen.



graph 3

6.4.1 Alarm Record

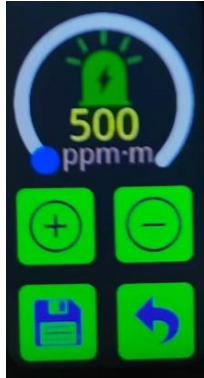
Tap the "Alarm Records" menu to access the interface shown in Figure 4. This interface displays historical alarm times and displayed values during alarms. Swipe left to navigate pages. After viewing, swipe up to return to the main menu. Swipe down to enter the record deletion interface, then tap "Yes" to delete records (as shown in the figure) or tap "No" to exit.



graph 4

6.4.2 Alarm Settings

Tap the finger to enter the 'Alarm Settings' menu, which will display the interface shown in Figure 5.



graph 5

The default alarm threshold is 500 ppm. Use the '+' or '-' keys to adjust the alarm value.

After setting the alarm value , click the "" icon to save . Click the "" icon to return to the menu interface.

6.4.3 Function Settings

Tap the 'Function Settings' menu to access the interface shown in Figure 6.

Click "Time Settings", select the options, and confirm to enter the date settings as shown in Figure 7. Swipe up or down  to adjust the time and date. Tap  the "" icon to save. Tap the "" icon to return to the menu interface.

Click "Language Settings", select the desired language, and confirm to access the interface as shown in Figure 8. To switch the device language to Chinese or English, simply tap the circle next  to the language option to mark it with a "✓". After selection, tap the "" icon in the top-left corner of the screen or swipe up to return to the menu interface.



Figure 6



Figure 7

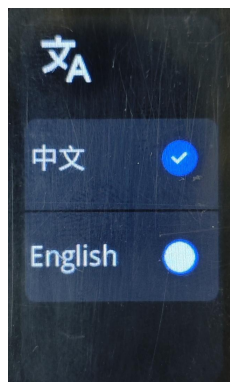


Figure 8

6.4.4 Exit Menu

Click the "" icon in the upper  left corner of the menu interface to exit the menu and return to the main display interface.

6.5 Equipment Charging

When the battery level is too low, the device should be charged using either the built-in charger or a standard charger with output specifications of 5V/2A. During charging, the device will display a charging status as shown in Figure 9.



graph 9

6.6 Usage Precautions

6.6.1 Prevent the machine from falling from a height or experiencing severe vibration.

6.6.2 The machine may not function properly in the presence of high-concentration gases.

6.6.3 Please strictly follow the instructions for operation and use; otherwise, it may lead to inaccurate test results or damage to the device.

6.6.4 This product shall not be stored or used in environments containing corrosive gases (such as high concentrations of chlorine gas), nor shall it be used or stored under other harsh conditions (including extreme temperatures, high humidity, electromagnetic fields, or intense sunlight).

6.6.5 If dirt accumulates on the device surface after prolonged use, gently wipe it with a clean soft cloth dampened with water. Avoid using corrosive solvents or abrasive materials, as these may cause scratches or damage to the surface.

6.6.6 Please remove the lithium battery and sensor from the discarded portable gas detector and deliver them to the designated location or return them to our company. Do not dispose of them in trash bins.

6.6.7 For any applications or usage issues beyond those described in this manual, please contact our company for assistance.

6.7 Explosion-proof Precautions

6.7.1 Explosion-proof marking refers to the identification used to describe the explosion-proof rating, temperature class, explosion-proof type, and applicable areas of explosion-proof electrical equipment.

6.7.2 Relevant national standards contain explicit regulations on the selection, installation, or use of electrical systems in explosion-hazardous environments. Installation or user entities must strictly comply with these provisions to ensure explosion-proof safety of electrical equipment in such areas.

6.7.3 Battery packs shall not be disassembled or replaced, nor shall they be charged in explosive gas environments. Peripheral plug-in devices without explosion-proof certification shall not be used, and sensors shall not be replaced in such environments.

6.7.4 Products with explosion-proof certification shall not be arbitrarily replaced or modified with components or structures that compromise their explosion-proof performance.

7. Detection Techniques

7.1 General Guidelines

- 1) Due to the lower density of methane gas compared to air, it tends to disperse

upward after leakage. Therefore, it is optimal to direct the indicator laser 10–20 cm above the target during detection.

2) During detection, observe the backlight intensity indicator on the display screen. If the number of backlight intensity indicators is minimal, it indicates that the instrument is receiving very weak signals from the reflected laser. In this case, adjust the angle or position for detection.

3) During detection, the indicator laser should be directed onto objects prone to reflection such as the target building, pipelines, walls, floors, soil, and trees, to enable the instrument to receive stronger reflected laser signals.

4) During detection, master aiming and control of scanning speed, as abrupt or vigorous movements may cause false measurements or false alarms on the instrument.

5) When the target under test has detection blind spots where laser beams may not reach, reorient the detection angle or conduct approximate detection in adjacent areas of the target.

7.2 Testing for Different Applications

1) During the inspection of buried pipelines, since leaked gases often do not escape directly from the leakage point but gradually diffuse through the soil, escaping from areas with loose soil or cement cracks, priority should be given to scanning areas with loose soil, cement cracks, and kiln shaft openings.

2) When inspecting surface pipelines, utilize the pipeline itself or adjacent objects as reflectors whenever possible, with focused scanning on high-risk leakage areas such as valves and flanges.

3) When conducting home testing for residents, there is no need to enter the interior of the household within the testing distance range. Simply scan the kitchen glass from below the building.

4) When detecting minor leakage points, stand in the downwind direction and conduct repeated measurements approximately 3 meters away from the target area, while closely monitoring changes in the display screen readings.

5) When measuring targets against highly reflective backgrounds, false alarms may occur. Carefully monitor the backlight intensity indicator on the display panel for excessive energy levels. Adjust the measurement angle accordingly to avoid false alarms

caused by strong reflections.

6) The detection range of this instrument during actual operation is influenced by factors such as the surrounding environment, reflective surfaces, and reflection angles. Generally, as the detection distance increases, the laser signal intensity received by the instrument weakens, leading to reduced detection accuracy. Therefore, when detecting gas leakage indicators at distant locations, the instrument should be moved closer to the target area for thorough inspection to obtain more precise results.

7.3 How to Determine the Scope of Leakage

To determine the leakage range during detection, follow these steps.

1) Begin scanning by aligning the instrument directly toward the direction of incoming wind.

2) The location with the highest concentration was designated as the cutoff point.

3) Change the orientation and re-scan the leakage area.

4) If leakage persists after orientation adjustment, it indicates that the defined position is correct.

5) If no leakage indication appears after changing the orientation, the detected gas may be affected by wind direction. Please scan in another orientation.

7.4 General Factors Affecting Detection Accuracy

1) Certain objects or materials exhibit excessive reflection or absorption of laser light, which may lead to erroneous detection values displayed by instruments. Examples include glass, lenses, and mirrors.

2) Due to high temperatures or strong winds accelerating gas diffusion, when leakage volumes are low, the escaping gas cannot be effectively contained, potentially leading to significant deviations in detection readings.

3) This telemetry instrument shows no response to other flammable gases such as ethane and propane; targets behind opaque obstructions cannot be measured.

8. Common Faults and Their Solutions

question	probable cause	resolvent
The instrument is not operational	The power switch is not turned on	Turn on the instrument power supply

	Battery level is low	■Charging the battery
The battery is running low quickly	Prolonged disuse after full battery charging leads to reduced battery capacity	■Replace with a new battery
	Exceeding the battery's service life	■Replace with a new battery
The battery cannot be charged	Charging device and poor charging contact	■ Insert the charger securely into the charging port ■ Insert the power cord of the charger securely into both the charger and the power socket
	Exceeding the battery's service life	■Replace with a new battery
The alarm sound is too faint	The vent hole is blocked.	■ Gently wipe with a dedicated cleaning cloth or clean soft cloth

9. Equipment Maintenance

To maintain the instrument in optimal condition, perform daily maintenance as follows.

organism	Clean the body using a clean soft cloth or other specialized cloth.
	Warning: Do not clean instruments with alcohol, benzene, diluents, gaseous organic solvents, or water to avoid instrument damage.
	Note: Do not wipe the lens with your hands or other unclean fabrics to avoid scratching.
	When not in use, store the telemetry device in the password box to prevent lens damage.
display screen	Please gently wipe the display screen with a dedicated cleaning cloth or a clean soft cloth.

	Note: Do not wipe the display screen with your hands or unclean fabrics to avoid scratches. Do not scrub the display screen forcefully to avoid damage.
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