

Laser methane telemetry instrument

G6000A

User Manual



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ISO9001 Quality Management System Certification

Security tips

Welcome to the G6000A laser methane telemetry instrument. Before use and maintenance, please read this manual carefully and keep it with the instrument. Hereafter, the instrument is referred to as the telemetry instrument.

To ensure the safety of the telemeter and its use, the following three types of safety warnings are used in this manual and on the telemeter. These important information must be followed.

 Warning	If the identifier is ignored and the wrong operation is performed, it may lead to serious accidents or life-threatening situations.
 Caution	If this identifier is ignored and the wrong operation is performed, it may lead to accidents or product damage.
 Remarks	If you ignore this identifier, you may miss useful or additional information.

- ◇ The copyright of this manual belongs to our company.
- ◇ If there is any discrepancy between the actual application and the details of the specification due to the product update, or if the information is not mentioned in the specification, please contact our company directly.

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1. Read Before Use

1.1 User Guidelines

Before using this product, please read this manual carefully. This manual covers all important information and data for product operation. Users must strictly comply with its provisions to ensure the normal operation of the telemeter. At the same time, the relevant information can help users use the product correctly and obtain accurate analysis results.

This manual provides comprehensive guidance for the proper use of telemetry instruments. It serves as an accurate reference for technicians with professional training or knowledge of instrument operation and control. Before operating the instruments, ensure you fully understand the safety information and warnings outlined in this manual and apply them in practice. Due to various constraints, this manual cannot cover every detail. For further information or to address issues not addressed herein, please contact our after-sales service team.

1.2 Quality Assurance and Disclaimer

Choosing our company means choosing premium products. All instruments are provided with free repairs during the warranty period, while replacement fees apply after expiration. For any issues during use, please contact us for prompt assistance. The entire instrument comes with a one-year warranty.

Any repairs beyond the warranty period or any of the following failures during the warranty period will be considered out-of-warranty repairs and will not be covered by free warranty service. Our company reserves the right to charge any on-site maintenance fees. These failures include but are not limited to:

- 1) Due to improper use (internal water intake, corrosion, fire, strong electric current intrusion, etc.);
- 2) Force majeure (damage caused by earthquake, lightning strike, flood, etc.);
- 3) Unauthorized modification of the product without permission;
- 4) Damage to the product caused by failure to use the user manual and training regulations.

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 intrinsically safe, with explosion-proof ratings Ex ia IIC T4 Ga/Ex ia IIIC T₂₀₀130°C Da. It must be used under corresponding environmental conditions.

2. When the instrument is working, do not point the laser at the eyes of people or animals, do not look directly at the lens, the laser of the instrument may cause damage to the vision.

3. Do not charge batteries in places where explosive gases may exist.

1.3.2 Other safety precautions



1) This instrument is an optical precision equipment. Do not try to disassemble or modify the instrument. If the instrument does not work normally or fails, please contact us;

2) If the instrument falls to the ground accidentally, or the instrument shell is damaged, stop operating the instrument immediately, turn off the power supply of the instrument after confirming the safety of the environment, and contact us.

1.4 Preventing failures

To minimize the risk of failure, please read the following carefully. The instrument must be operated, used, and maintained strictly in accordance with its label, warning, and instructions.

1.4.1 Avoiding problems caused by condensation



When moving an instrument between high and low temperatures, condensation (water droplets) may form on its exterior and inside. To

prevent this, allow the instrument to gradually adjust to ambient temperature before use. If condensation appears inside, immediately turn off the power and wait until it completely evaporates before resuming operations.

1.4.2 Precautions for using the instrument in rain



Caution

This instrument prevents vertical water droplets from entering its interior. However, if the instrument is tilted beyond 15 degrees, vertical water droplets may enter and cause damage. When using the instrument during rain, take appropriate rain protection measures.

1.4.3 Precautions for long-term storage

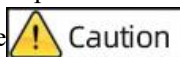


Caution

1) The storage temperature of this telemeter is (0 ~ 50) °C, and the humidity is less than 90%. If you do not intend to use the instrument for a long time, place the instrument in a cool and dry environment.

2) Do not store the telemeter in a place where it is violently shaken.

1.4.4 Precautions during normal use



Caution

1) Do not press or drop the telemetry device during use. Strong mechanical impacts on the LCD screen or window panel may cause damage.

2. Product Overview

2.1 Product Features

The G6000A laser methane telemeter consists of an optical-mechanical system, signal processing system, display and alarm system, and housing components. It is mainly used for long-distance measurement of methane or methane-containing gases (natural gas, gas or similar gases) concentration.

The telemetry device emits an infrared laser beam to the detection point, enabling rapid measurement of methane concentration in the air mass between the two. For visual reference, it simultaneously projects a

visible green laser beam onto the target area. This system provides real-time, accurate methane concentration monitoring with instant display. When alarm thresholds are exceeded, it triggers audible and visual alerts to prompt immediate response from personnel.

2.2 Detection Principle

The measurement principle of this telemeter makes full use of the absorption characteristics of methane gas at a certain specific wavelength. When the detection beam meets the methane molecule, part of the detection beam will be absorbed by the methane molecule. By measuring the absorption rate, the concentration of methane gas distributed between the target point and the telemeter can be known.

2.3 Applicable Scenarios

The G6000A is widely used in the gas transmission and distribution industry, suitable for the following applications:

- 1) Gas pipeline network inspection;
- 2) Check the outdoor vertical pipe of natural gas;
- 3) Do not enter the house to inspect the interior of the household;
- 4) Natural gas storage tank inspection;
- 5) Remote detection of hazardous gas leakage area;
- 6) Conduct detection in areas difficult for personnel to reach.

2.4 Exterior View



3. Product technical indicators

3.1 Product Implementation Standards

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

GB/T 3836.4-2021 "Explosive Atmospheres Part 4: Equipment with Inherent Safety 'i' Protection"

3.2 Technical Parameters

- ◆ Measurement range: Multiple options available (0-5000 ppm·m) and (0-10000 ppm·m).

(0 ~ 50000) ppm·m; (0 ~ 100000) ppm·m

- ◆ Detection range: (0-50) m, (0-100 m, 0-150 m) customizable
- ◆ Minimum detection limit: 5 ppm·m
- ◆ Accuracy: $\pm 10\%FS$
- ◆ Response time: 0.1s
- ◆ Continuous working hours: 8h
- ◆ Power supply: lithium battery

- ◆ Display mode: 2.4-inch touch color screen
- ◆ Alarm shows: concentration value turns red
- ◆ Alarm volume: $\geq 70\text{dB}$ (1 meter away)
- ◆ Product size: $240 \times 185 \times 80\text{mm}$
- ◆ Net product weight: about 920g
- ◆ Explosion-proof certificate number: CCRI 24.2119X
- ◆ Explosion-proof rating: Ex ia IIC T4 Ga/Ex ia IIIC T₂₀₀ 130°C Da
- ◆ Protection level: IP65
- ◆ Ambient temperature: (-20 ~ 50) °C
- ◆ Environmental humidity: (20 ~ 93)%RH, no condensation
- ◆ Battery voltage: DC7.4V
- ◆ Battery capacity: 2800mAh

4. Button Definitions and Interface Description

4.1 Key

When the device is powered  off, press the button for more than 2 seconds to turn on the detector. The system will then automatically run the following self-check procedure:

- 1) System display; welcome screen.
- 2) Sound the startup tone to test the buzzer function.
- 3) Sound alarm indication to check whether these functions are normal; directly enter the normal detection state.

4.2 Main Display Interface

After device startup and self-check completion, it automatically enters the main display interface where normal operation is enabled. Key displays include real-time concentration values or curves, alarm thresholds, maximum values, backlight signal intensity, and battery level. To switch between numerical and graphical concentration displays, click the "PPM·m" button on the main interface (as shown in Figure 1).



Figure 1 Main display interface

Main display interface description:

1) Backlight Intensity Indicator: The instrument displays the intensity of the laser signal reflected from the target through solid signal bars. When no reflected signal is detected, the bars turn completely gray, rendering the measurement value meaningless. When a signal is received, the bars show corresponding intensity levels. At maximum reflection intensity, the bars display full red bars, though the measurement value remains meaningless.

2) Battery power indicator: The full green bar indicates sufficient battery power. When the battery power is low, it is displayed in red, and the battery needs to be charged.

3) Alarm value: Set in the system configuration interface.

4) Current detection value: blue when lower than the warning value, red when higher than the alarm value.

4.3 Set Interface

Full touch control with single-point switching.

5. Operation Instructions

5.1 Laser On/Off

To start the test, press and hold the Home button to power on the

device. The laser indicator will light up. After 3-4 seconds of stabilization, the instrument will perform a self-check. Upon successful completion, the system will automatically switch to measurement mode and display the main interface. To stop the test, press and hold the Home button again to power off the device. The instrument will then enter shutdown mode.

5.2 Start detection

During testing, the laser pointer is directed at the target, and the display shows the integrated methane concentration in the measured area, in ppm·m.



ppm·m is the unit of integrated concentration, representing the product of methane concentration and width. Here, ppm is the gas concentration unit (parts per million) indicating methane concentration, while m is the length unit (meter) representing the width of the measured gas mass.

Example: When measuring at 5 meters from the target, if the methane leakage plume has a concentration of 500ppm and a width of 1 meter, the integrated concentration of the methane leakage plume is $500\text{ppm} \times 1\text{m} = 500\text{ppm} \cdot \text{m}$, and the instrument displays the value of 500ppm·m.

5.3 Alarm

When the methane concentration value is detected to exceed the set alarm value, the instrument will give an audible alarm.

5.4 Clock Settings

In the main display interface shown in Figure 2, double-click the blank area to the left of the battery symbol to open the clock settings interface, where you can adjust the time as shown in Figure 3. This

interface allows modification of parameters such as "year, month, day, hour, minute, second". For example, when adjusting the "year" parameter, double-click the number "24" following "year" to display the interface shown in Figure 4, where you can directly modify the settings.

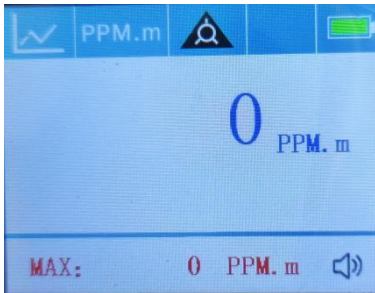


Figure 2 Main display interface



Figure 3 Clock setting interface

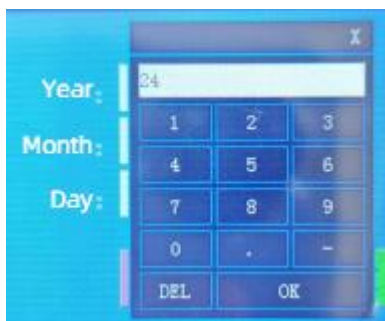


Figure 4 Modify parameters

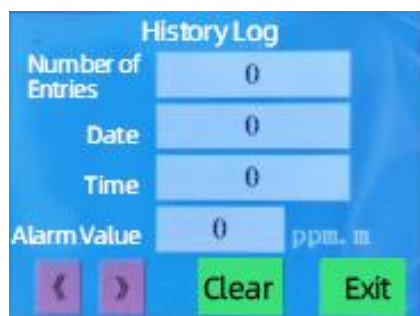


Figure 5 History interface

5.5 View History

In the main display interface shown in Figure 2, double-click the battery icon to open the history interface, where you can view the history as shown in Figure 5. Click "Clear" to empty the records, or click "Exit" to return to the main display interface.

5.6 Device Charging

When the battery is low, charge the device using its built-in charger or a standard 9V/1A charger. During charging, the indicator light turns yellow

and the screen saver activates. Click any button to wake up the screen saver and check the charging status.

5.7 Usage Notes

5.7.1 Prevent the machine from falling from a height or being subjected to violent vibration;

5.7.2 The machine may not be used normally in the presence of high concentration of gas;

5.7.3 Please operate and use the instrument strictly according to the instructions, otherwise the test results may be inaccurate or the instrument may be damaged;

5.7.4 This product shall not be stored or used in an environment containing corrosive gases (such as high concentration of chlorine gas, etc.), nor shall it be used or stored in other harsh environments (including high or low temperature, high humidity, electromagnetic field and strong sunlight);

5.7.5 If the surface of the machine is dirty after long-term use, please gently wipe it with a clean soft cloth dipped in water, and do not use corrosive solvents and hard objects to wipe the surface of the machine, otherwise it may cause scratches or damage to the surface of the machine.

5.7.6 Please remove the lithium battery and sensor of the abandoned portable gas detector and send them to the designated place or return them to our company. Do not throw them into the trash can.

5.7.7 For any application or use failure beyond the description in this manual, please contact our company for solution.

5.7.8 Do not disassemble or replace the battery pack, nor charge it in an explosive gas environment. Do not use peripheral plug-in devices that are not explosion-proof certified in an explosive gas environment. Do not replace the sensor.

5.7.9 For products with explosion-proof certificates, it is not allowed

to replace or modify components or structures that affect the explosion-proof performance at will.

5.8 Explosion Prevention

5.8.1 Explosion-proof marking refers to the identification used to describe the explosion-proof grade, temperature group, explosion-proof form and applicable area of explosion-proof electrical equipment.

5.8.2 In the corresponding national standards, there are clear provisions on the selection, installation or use of electrical design in the explosive hazard place. The installation or use unit shall strictly comply with these provisions to ensure the explosion-proof safety of electrical equipment in the explosive hazard place.

5.9 Meaning of explosion-proof marking

Explosion-proof marking refers to the identification used to describe the explosion-proof level, temperature group, explosion-proof type and applicable area of explosion-proof electrical equipment.

For example: Ex ia IIC T4 Ga (intrinsically safe type)

Ex——Explosion-proof symbol.

ia-the explosive gas mixture cannot be ignited under normal working or non-counting fault conditions, and when there is one or two counting faults in the circuit plus non-counting faults under the most unfavorable working conditions.

IIC — Electrical equipment for use in explosive gas environments of Class II, excluding coal mines.

T4 — Temperature Group: The maximum surface temperature allowed by the equipment shall not exceed 135°C.

G—Equipment Protection Level: Equipment for use in explosive gas environments with a "very high" protection level that is not a ignition source under normal operating conditions, expected failures, or rare failures.

6. Testing Techniques

6.1 General guidelines

1) Since methane gas is less dense than air, it will spread upward after leakage. Therefore, it is better to point the indicator laser at 10~20 cm above the target during detection.

2) During testing, pay attention to the backlight intensity indicator on the display. If the backlight intensity indicator is very few, it means that the instrument receives a weak signal of the reflected laser. In this case, change the Angle or position for testing.

3) During detection, the indicator laser should be irradiated to the building, pipeline, wall, ground, soil, tree and other objects that are easy to reflect, so that the instrument can receive stronger reflected laser signal.

4) During detection, grasp the aiming and control of scanning speed, violent or sudden action will cause false measurement or false alarm of the instrument.

5) When the target under test has a detection blind spot that may not be irradiated by the laser, please change the position for detection, or perform approximate detection on the adjacent area of the target under test.

6.2 Testing for different occasions

1) When inspecting underground pipelines, since gas leaks typically escape not directly from the leak point but gradually diffuse through the soil, escaping through loose soil, cement cracks, or kiln well openings, these areas should be prioritized for scanning.

2) When testing the ground pipeline, try to use the pipeline itself or the object beside it as the reflector, and focus on scanning the places where leakage is easy to occur, such as valves and flanges.

3) When testing in residents' homes, there is no need to enter the house within the testing range, but only scan the kitchen glass downstairs.

4) When detecting small leakage points, stand in the leeward place, and repeatedly detect about 3 meters away from the target to be tested, and pay attention to the change of the value on the display screen.

5) When measuring the target on the high reflectivity background, false alarm may occur. Please pay special attention to observe whether the backlight intensity indicator bar of the display panel is too high. In this case, adjust the measurement Angle to avoid false alarm caused by strong reflection.

6) The detection range of this instrument is 50 meters. In practice, the actual detection range depends on factors such as the on-site environment, reflective objects, and reflection angles. Generally, the farther the detection range, the weaker the laser signal intensity received by the instrument, resulting in reduced detection accuracy. Therefore, when detecting gas leakage indicators at a considerable distance, the instrument should be moved closer to the target for detailed inspection to obtain more precise detection results.

6.3 How to Determine the Leak Scope

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

- 1) Start scanning with the instrument facing the direction of the wind.
- 2) Take the place with the highest concentration as the boundary point.
- 3) Change the orientation and scan the leak area again.
- 4) If the leakage is still displayed after changing the orientation, the defined position is correct.
- 5) If no leakage is detected after changing the orientation, the leakage gas may be affected by the wind direction. Scan in another direction.

6.4 General factors affecting detection accuracy

1) Some objects or materials reflect or absorb laser too strongly, which may cause the instrument to display incorrect detection values. For example, glass, lens, mirror, etc.

2) Because the gas diffuses faster when the temperature is high or the wind is strong, when the leakage is small, the gas leakage can not be

concentrated, and the detection value may be greatly deviated.

3) The telemeter does not respond to other combustible gases such as ethane and propane; targets behind opaque obstructions cannot be measured.

7. Common faults and their solutions

question	probable cause	resolvent
The instrument is not operational	The power switch is not on	Turn on the instrument
	The battery is low	■ Charge the battery
The battery is running out quickly	The battery capacity decreases after a long period of inactivity after full charging	■ Replace the battery
	Exceeds battery life	■ Replace the battery
The battery cannot be charged	Charger and charging contact are poor	■ Securely insert the charger into the charging port ■ Securely plug the charger's power cord into both the charger and the power outlet
	Exceeds battery life	■ Replace the battery
The alarm sound is too low	The sound hole is blocked	■ Gently wipe with a dedicated cleaning cloth or a clean soft cloth

8. EQUIPMENT MAINTENANCE

To keep your instrument in good condition, perform daily maintenance as follows.

organism	Use a clean soft cloth or other special cloth to clean and wipe the body.
	Warning: Do not use alcohol, benzene, diluents, gaseous organic solvents or water to clean the instrument, so as not to damage the instrument.
	Note: Do not wipe the lens with your hands or other unclean fabrics to avoid scratches.
	When not in use, store the telemeter in the password box to prevent lens damage.
display screen	Use a dedicated cleaning cloth or a clean soft cloth to gently wipe the display.
	Note: Do not wipe the display with your hands or unclean cloth to avoid scratches.
	Do not wipe the display screen with force to avoid damage.

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