

Portable gas detection and alarm instrument

G90

operating instruction



Henan Otywell Electronic Technology Co., Ltd.

Enterprise certified with the ISO9001 Quality Management System

Thank you for choosing our company's products. Before use, please read this manual carefully and follow the operating instructions strictly to fully utilize our services and avoid equipment damage or other accidents caused by improper operation.

Copyright Statement

This manual is the property of our company. No reproduction or distribution in any form is permitted without prior authorization.

User Service Guide

1. Before use, verify that all attachments, certificate of conformity, and warranty card are complete. If any are missing, contact the seller or manufacturer promptly.

2. The product is covered by a one-year warranty from the date of sale. Eligible customers may receive free repairs upon presentation of the warranty card.

3. For issues arising from improper operations, unauthorized repairs, or force majeure, repair services will be charged.

4. Present the warranty card during repairs; otherwise, the repair will be charged.

5. After maintenance, please complete the "Maintenance and Repair Record" and sign for confirmation.

6. If you have any questions or comments, please contact us promptly, and we will handle them appropriately.

Usage Instructions

- Do not use damaged or incomplete products. If you encounter any issues, please contact our company or a distributor immediately.
- Avoid exposing the product to electric shocks, strong vibrations, or harsh environments.
- Waste batteries and sensors should be disposed of by qualified recyclers or hazardous waste handlers; do not discard them indiscriminately.
- Do not disassemble batteries or place them in fire, and avoid short circuits between the positive and negative terminals to prevent fires or explosions.

- It is strictly prohibited to disassemble or repair the product without authorization.
- Never open the cover while powered on! Never charge or replace batteries in hazardous areas!
- Avoid contact of the product with water, chemical solvents, and other harmful substances.
- Protect the product from dropping or severe vibration.
- To ensure accuracy, calibrate the product regularly (no more than once per year).
- Do not frequently expose the sensor to high-concentration gases. Do not use the sensor after it fails or exceeds its service life.
- Follow the instructions strictly. For any other questions, contact the distributor or manufacturer.

The product appearance and color described in the user manual are for reference only; the actual product delivered will be subject to the actual product specifications. The company reserves the right to modify technical parameters without prior notice. For any inquiries, please contact the service hotline.

catalogue

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I. Overview

1.1 The design, manufacture, and verification of this product comply with the following national standards:

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

GB/T 3836.2 — 2021 Explosive Atmospheres Part 2: Equipment protected by flameproof enclosure "d"

GB/T 3836.4 — 2021 Explosive Atmospheres Part 4: Equipment Protected by Intrinsically Safe "i" Protection

GB 12358 - 2024 General Technical Requirements for Gas Detection and Alarm Instruments in Workplace Environments

GB/T 4208 - 2017 Enclosure Protection Rating (IP Code)

1.2 Gas Units and Conversion Relationships

(1) ppm: A unit representing one part per million of a gas volume concentration (e.g., 5 ppm means five parts per million).

(2) LEL: The lower explosive limit concentration of a flammable gas. A 100% LEL indicates reaching the lower explosive limit (e.g., a 10% LEL means 10% of the lower explosive limit concentration).

(3)%VOL: Volume percentage of gas (e.g., 5%VOL indicates 5% by volume).

(4) $\mu\text{mol/mol}$: Micromoles per mole, equivalent to the ppm value ($1 \text{ ppm} = 1 \mu\text{mol/mol} = 1 \times 10^{-6}$).

Interrelationship: $\%VOL > \text{ppm} = \mu\text{mol/mol}$.

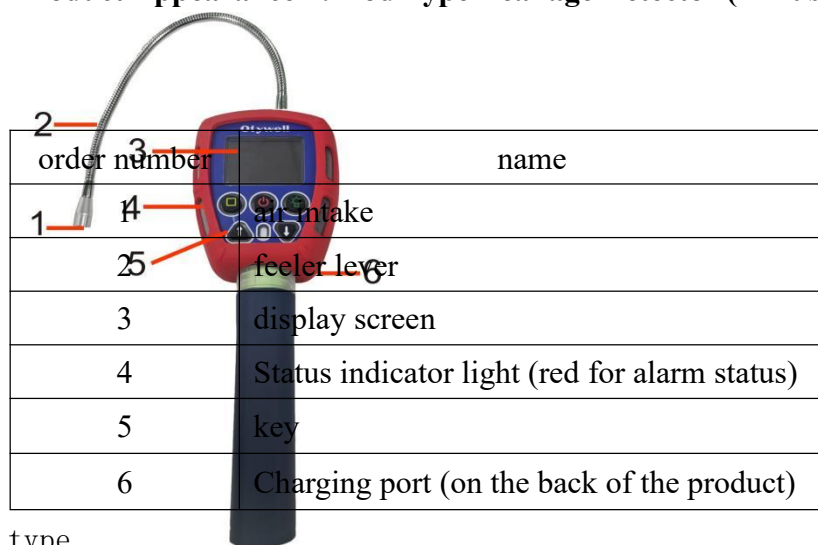
For example, the lower explosive limit of methane is 5% VOL; therefore:

$10\%LEL=0.5\%VOL=5000\text{ppm}=5000\mu\text{mol/mol}=5000 \times 10^{-6}$

二、Product Appearance and Technical Specifications

This device supports various detection modes and configuration combinations, including: 1. Probing rod leak detector (diffusion type); 2. Probing rod leak detector (pump-suction type); 3. Conventional four-in-one detector (pump-suction type); 4. Methane three-range detector (pump-suction type); 5. Methane telemetry version. The methane telemetry version can be flexibly combined with any of the aforementioned detection modes. The appearance and technical specifications of each model are as follows:

Product Appearance 1: Rod Type Leakage Detector (Diffusion Type/Pump-Suction Type)



Exclusive technical specifications of the probe leak detector:

- Detection method: Probing rod leak detection-Diffusion type/pump suction

type

- Detection Principle: Semiconductor Type
- Applicable gases: combustible gases
- Measurement range: (0 - 10000) $\mu\text{mol/mol}$, (0 - 10000) PPM
- Resolution: 1 $\mu\text{mol/mol}$, 1 PPM
- Accuracy level: $\pm 3\%FS$
- Alarm setting value: Can be configured
- Response time T90: $\leq 30s$

Product Appearance 2: Conventional 4-in-1/Methane Three-Range (Pump-Suction Type)

order number	name
1	air intake
2	feeler lever
3	display screen
4	Status indicator light (red for alarm status)
5	key
6	Charging port (on the back of the product)



Standard 4-in-1/Methane three-range proprietary technical specifications:

- Detection method: Three-range methane sensor (pump-suction type)
- Detection Principle: Infrared Type, Semiconductor Type
- Applicable gases: combustible gases
- Detected gas: Methane
- Measurement range: (0 - 100)% LEL, (0 - 100)% VOL, (0 - 10000) $\mu\text{mol/mol}$, (0 - 10000) PPM
- Resolution: 1% LEL, 0.1% VOL, 1 $\mu\text{mol/mol}$, 1 PPM
- Accuracy level: $\pm 3\% \text{FS}$
- Alarm setting value: e.g., underreporting by 20% LEL or overreporting by 50% LEL
- Response time T90: $\leq 30\text{s}$

Product Appearance 3: Laser Telemetry Model

order number	
1	electric
2	Infrared
3	display
4	Status i (status)
5	key



Technical specifications of laser telemetry:

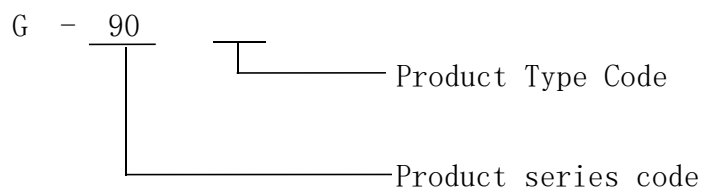
- Applicable gases: combustible gases
- Detected gas: Methane
- Detection range: (0 - 50000) ppm • m
- Detection range: (0 - 15) m or (0 - 30) m (optional)
- Minimum detection limit: 5 ppm • m
- Accuracy: $\pm 10\%FS$
- Response time: 0.5s

The universal technical parameters shared by all product models:

- Display method: LCD display
- Environmental temperature: $-25^{\circ}C$ to $+55^{\circ}C$
- Relative humidity: (20 - 93)% (no condensation)
- Operating voltage: DC 3.7 V
- Battery capacity: 6000 mA lithium-ion rechargeable battery
- Charging time: <5 h
- Working time: ≥ 8 hours (continuous) (at room temperature)
- External dimensions: L 291 mm $\times$ W 100 mm $\times$ H 49 mm
- Explosion-proof certificate number:
- explosion-proof sign :
- levels of protection :

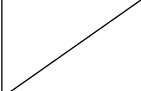
III. Product Model Description

The meaning of the product model number is as follows:



IV. Functions and Operations

4.1 Button Function Description

	selection key	Short press on the main interface to turn the air pump on/off (suction type). Move the cursor to the left in the system menu interface; Short-press on other interfaces to select features
	power switch	Short press: Confirm key/Select key/Exit key; Long press: To power on when the device is off; on the main interface, it means turning off the device.
	Lighting Key	Long press on the main interface to turn the flashlight on/off; The system menu interface displays a moving cursor; Short-press on other interfaces to select or return
	Up Key	Turn page upward/Increase value
	Down Key	Downward page/Reduce value
	Up/Down Key	Long press and hold on the main interface to switch modes: Telemetry/Standard

4.2 Power-on Instructions

When the device is powered off, press and hold the power button until the indicator light turns on and the system sound plays; then release the button. The screen will display "Welcome to Use." Once the progress bar completes, the main interface will appear.

4.3 Power Off Instructions

Long-press the power button on the main interface, wait until the screen turns off, then release the button to shut down the device.

If the device is charged while powered off or with low battery, it will automatically power on and enter the main interface, with a charging indicator displayed on the battery status screen.

4.4 Description of the Main Testing Page

Upon startup, the product enters the main interface as shown in Figures 1 and 2. Figure 1 displays the main interface for the telemetry version, while Figure 2 shows that for other versions (when used in combination, users can switch between interfaces simultaneously by pressing the up and down keys, as illustrated in Figure 3). The main interface primarily displays information such as the name of the detected gas, real-time concentration, current time, and battery level.

The main interface of the telemetry model also displays the light intensity detection indicator: this indicates the intensity of the laser signal reflected back from the target being measured by the instrument. When no reflected signal is received, the display shows "00," and the detection value is meaningless; when a reflected signal is received, the display shows the corresponding signal intensity. During detection, the indicator laser is directed at the target, and the screen displays the integrated methane concentration in the measured area, measured in ppm • m. When the methane concentration exceeds the preset alarm threshold, the instrument triggers an audible alarm.



Figure 1, Figure 2, Figure 3

4.5 Detailed Menu Operation Instructions

Shortly press the power button on the main interface (if the screen has darkened due to prolonged inactivity, first press and hold to wake the screen, then press again) to enter the password input screen as shown in Figure 4. The password is "1111":

Use the up/down keys to adjust the current value; use the power button to confirm and move the cursor to the next value.

After entering the correct password, navigate to the system menu interface as shown in Figure 5. Use the selection key or light key to move the cursor left/right and select menu items for configuration, or press and hold the up/down keys to return to the main detection interface.

Note: If no action is performed for an extended period, the system will automatically return to the main detection interface.



Figure 4 Figure 5

4.5.1 Alarm Record

In the menu interface, press and hold the selection key/light key to move the cursor and select "Alarm Record," then press and hold the power key to enter the interface, as shown in Figure 6. Use the up/down keys to navigate through historical records. Press and hold the selection key to clear the pop-up reminder page; press and hold the selection key to confirm deletion, or press and hold the light key to cancel, as shown in Figure 7. The system menu reopens immediately after completing the operation.



Figure 6 Figure 7

4.5.2 Alarm Range

In the menu interface, press and hold the selection key/light key to move the cursor to "Alarm Range," then press and hold the power key to enter the interface,

as shown in Figure 8. In this interface, use the up/down keys to move the cursor to the "Channel" option, and press and hold the selection key/light key to switch gas channels (using combustible gas as an example). Move the cursor to "Low Alarm Value," press and hold the selection key/light key to enter the value adjustment interface (as shown in Figure 9), adjust the value using the up/down keys, and then press and hold the selection key/light key to confirm or cancel the change. The procedures for "High Alarm Value" and "Range Value" are the same. After completing all settings, press and hold the power key; a save prompt will appear. Press and hold the selection key to save and display "Save Completed," or press and hold the light key to cancel; the system menu will then return immediately.

Note: If no changes are made, a save page will appear when you hold down the power button; press the light button briefly to return to the system menu.



Figure 8 Figure 9

4.5.3 Zero Point Setting

In the menu interface, press and hold the selection key/light key to move the cursor and select "Zero Point Setting," then press and hold the power key to enter the interface, as shown in Figure 10. In this interface, use the up/down keys to switch gases. After selection, press and hold the selection key to "Confirm" and enter the zero point setting interface, which displays the historically saved values and the current real-time value, as shown in Figure 11. Once the values stabilize, press and hold the selection key to save; a save prompt will appear. Press and hold the selection key to save with the message "Save Completed," or press and hold the light key to cancel. The system menu will then return immediately after the operation.

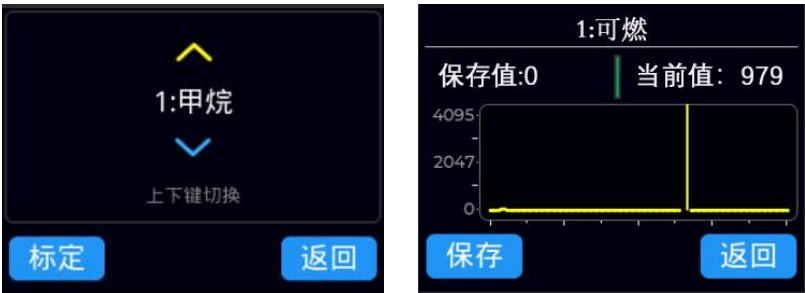


Figure 10 Figure 11

4.5.4 Calibration Settings

In the menu interface, press and hold the selection key/light key to move the cursor and select "Calibration Settings," then press and hold the power key to enter the interface, as shown in Figure 12. In this interface, use the up/down keys to switch gases. After selection, press and hold the selection key "Confirm" to enter the calibration settings interface, where the standard gas value and calibration value are displayed, as shown in Figure 13. Press and hold the selection key "Calibrate" to enter the standard gas value modification interface; adjust the values using the up/down keys. After completion, press and hold the selection key "Calibrate" to enter the calibration interface. Supply the standard gas; once the values stabilize, press and hold the selection key to save. A save prompt will appear; press and hold the selection key to save with the message "Save Completed," or press and hold the light key to cancel. The system menu will then return immediately after completion.



Figure 12 Figure 13

4.5.5 Time Settings

In the menu interface, press and hold the selection key/light key to move the cursor and select "Time Settings," then press and hold the power key to enter the settings, as shown in Figure 14. Use the up/down keys to adjust the values, press and hold the power key to confirm and advance until the last value is set. Pressing the power key again displays a save confirmation prompt, as shown in Figure 15; press the selection key to save and see "Save Successful," or press the light key to cancel. The system menu reopens immediately after completing the operation.



Figure 14 Figure 15

4. 5. 6 Language Settings

In the menu interface, press and hold the selection key/light key to move the cursor to "Language Settings," then press and hold the power key to enter the settings (see Figure 16). In this interface, use the up/down keys to select "Chinese/English"; after confirmation, press and hold the selection key to save the changes and display "Save Complete" (see Figure 17), or press and hold the light key to cancel. The system menu will then return immediately.



Figure 16 Figure 17

4. 5. 7 Gas Pump Configuration

In the menu interface, press and hold the selection key/light key to move the cursor and select "Air Pump Settings," then press and hold the power button to enter the interface, as shown in Figure 18. This interface displays historically saved sampling values and the current real-time sampling values. Once the values stabilize, press and hold the power button to display a save prompt, as shown in Figure 19; press and hold the selection key to save and see "Save Completed," or press and hold the light key to cancel. The system menu will then return immediately after the operation.

Note: If no changes are made, a save page will appear when you hold down the power button; press the light button briefly to return to the system menu.

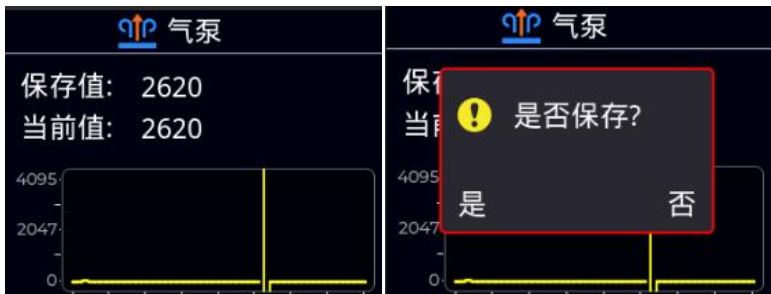


Figure 18 Figure 19

4. 5. 8 4G Settings

In the menu interface, press and hold the selection key/light key to move the

cursor and select "4G Settings," then press and hold the power button to enter the interface (see Figure 20). On this screen, pressing and holding the selection key/light key allows you to switch the 4G on/off status. When 4G is enabled, the interface displays the platform-binding QR code and device identification code. Use the up/down keys to select "IP"; pressing and holding the selection key/light key opens the modification dialog box (see Figure 21). Press and hold the power button to move the cursor, adjust the values using the up/down keys, and confirm with the selection key. The "Port" settings follow the same procedure as "IP": use the up/down keys to select "Upload Frequency" and press and hold the selection key/light key for confirmation; the "Protocol" settings operate similarly. After completing all modifications, press and hold the power button to confirm saving; press and hold the selection key to save and display "Save Completed," or press and hold the light key to cancel. The system menu reopens immediately after completion.

Note: If no changes are made, press and hold the power button to return to the system menu.



Figure 20 Figure 21

4.5.9 Bluetooth Settings

In the menu interface, press and hold the selection key/light key to move the cursor and select "Bluetooth Settings," then press and hold the power key to enter the settings, as shown in Figure 22. In this interface, pressing and holding the selection key/light key allows you to switch the Bluetooth upload status (on/off) and view the devices Bluetooth name. After making changes, press and hold the power key to display the save confirmation prompt (Figure 23); press and hold the selection key to save and see "Save Complete," or press and hold the light key to cancel. The system menu will then return immediately.

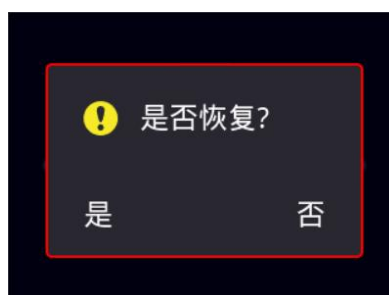
Note: If no changes are made, press and hold the power button to return to the system menu.



Figure 22 Figure 23

4.5.10 Return to factory condition

In the menu interface, press and hold the selection key/light key to move the cursor and select "Restoration to Factory Settings," then press and hold the power key to enter. A prompt screen will appear as shown in Figure 24. Press and hold the selection key to choose "Yes" and confirm with "Restoration Successful," or press and hold the light key to choose "No" to cancel. The system menu will then return immediately after completing the operation.



graph 24

4.5.11 Equipment Information

In the menu interface, press and hold the selection key/light key to move the cursor and select "Device Information," then press and hold the power key to enter the interface, as shown in Figure 25. This interface displays the devices version, serial number (SN), serial ID, next calibration date, temperature, and humidity information; only the serial ID is editable. Use the up/down keys to select "Serial ID," then press and hold the selection key/light key to modify it. After modification, press and hold the power key to see the save confirmation prompt, as shown in Figure 26; press the selection key to save and see "Save Completed," or press the light key to cancel. The system menu reopens immediately after the operation.

Note: If no changes are made, press and hold the power button to return to the system menu.



Figure 25 Figure 26

4.5.12 Exit

In the menu interface, press and hold the selection key/light key to move the cursor and select "Exit," which returns you to the main detection interface.

V. Usage Precautions

- (1) Prevent the device from falling from a height or experiencing severe vibration.
- (2) The device may not function properly in the presence of high-concentration gases.
- (3) Please operate and use strictly in accordance with the instructions; failure to do so may result in inaccurate test results or damage to the device.
- (4) This product must not be stored or used in environments containing corrosive gases (such as high concentrations of chlorine), nor should it be operated or stored under other harsh conditions (including extreme temperatures, high humidity, electromagnetic fields, or intense sunlight).
- (5) If dirt accumulates on the surface of this device after prolonged use, gently wipe it with a clean, soft cloth dampened with water. Avoid using corrosive solvents or hard objects for cleaning, as this may cause scratches or damage to the surface.
- (6) To ensure testing accuracy, this device shall undergo periodic calibration, with the verification cycle not exceeding one year.
- (7) The recommended service life for infrared sensors and semiconductor sensors is 5 years, while that for catalytic combustion sensors and electrochemical sensors is 2 years.
- (8) Please remove the lithium battery and sensors from the discarded detector and dispose of them at the designated location or return them to our company. Do not discard them in trash bins.
- (9) For any application or usage issues beyond those described in this manual,

please contact our company for assistance.

(10) In explosive gas environments, the battery pack must not be disassembled, replaced, or charged. Peripheral plug-in devices without explosion-proof certification must not be used, and sensors must not be replaced.

(11) For products with explosion-proof certification, it is prohibited to arbitrarily replace or modify any components or structures that affect their explosion-proof performance.

(12) The corresponding national standards contain clear regulations regarding the selection, installation, or use of electrical equipment in explosion-hazardous environments. Installation or operating entities must strictly comply with these regulations to ensure the explosion-proof safety of electrical equipment in such areas.

(13) Charging must be performed in a safe location using the official charger provided with the device.

VI. Common Faults and Solutions

fault phenomenon	Possible cause of the failure	process mode
Cannot start up	voltage below level	Charge promptly
	system halted	Please contact the dealer or manufacturer for repair.
	fault	Please contact the dealer or manufacturer for repair.
No reaction with the test gas	Circuit failure or sensor lifespan expired	Please contact the dealer or manufacturer for repair.
Display is inaccurate	Sensor expired	Please contact the dealer or manufacturer for repair.
	Not calibrated for a long time	Calibrate promptly
Time display error	The battery is completely discharged	Charge promptly and reset the time
	Strong electromagnetic interference	Reset time
Zero-point calibration is unavailable	Excessive sensor drift	Calibrate or replace the sensor in a timely manner.
Display a non-zero value in	Sensor drift	Perform zero calibration

a clean air environment		
The instruments normal detection interface displays full range.	Sensor failure	Contact the dealer or manufacturer to replace the sensor.

VII. Warranty and Maintenance

(1) This product comes with a one-year warranty (excluding wear parts). In the event of a malfunction under normal usage conditions, free factory repair and maintenance services are provided. Damages caused by human error, natural disasters, or improper use are not covered by the warranty.

(2) If the sensors lifespan has expired, please contact our company for a replacement.

(3) If the user cannot resolve the issue, the detector may be returned to our company for repair. We will promptly fix the problem and return it to the user.

VIII. Storage

The product shall be stored in a ventilated room with an ambient temperature ranging from -10°C to $+55^{\circ}\text{C}$ and a relative humidity not exceeding 85%, ensuring that the air contains no harmful gases or impurities that may corrode the product.

IX. Accessories

The accompanying products include one portable gas detection and alarm device, one user manual, one product certification and warranty card, one factory inspection report, and one charger set.

Appendix: Gas Parameter Table

Test gas	measuring range	resolution ratio	Underreported value	Overreported value
combustible	0-100%LEL	1%LEL	20	50
combustible	0-10000ppm	1ppm	500	1500
oxygen O ₂	0-30%VOL	0. 1%VOL	19. 5	23. 5
Hydrogen sulfide (H ₂ S) ₂ S	0-100ppm	1ppm	15	35
carbon monoxide CO	0-1000ppm	1ppm	50	150
nitrogen dioxide NO ₂	0-20ppm	0. 1ppm	5	10
natural gas	0-100%LEL	1%LEL	20	50
methane	0-100%LEL	1%LEL	20	50
carbon dioxide CO ₂	0-5000ppm	1ppm	1500	2500
nitric oxide NO	0-250ppm	1ppm	50	150
nitrogen	0-100%VOL	0. 1%VOL	76. 5	80. 5
sulfur dioxide SO ₂	0-20ppm	0. 1/1ppm	5	10
chlorine Cl ₂	0-20ppm	0. 1ppm	5	10
ammonia NH ₃	0-100ppm	0. 1/1ppm	15	35
hydrogen H ₂	0-1000ppm	1/10ppm	50	150
phosphine PH ₃	0-20ppm	0. 1/1ppm	5	10
chlorine hydride HCl	0-20ppm	0. 1/1ppm	5	10

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