Portable Total Hydrocarbon Analyzer

User Manual

Manual English Version: V25.12

Read Before Use

User Notice

Thank you for choosing the M2 Portable Total Hydrocarbon Analyzer from Aoma. To ensure the safe and efficient operation of the device and to obtain accurate analysis results, please read this user manual carefully before use.

This manual provides detailed explanations of the device's operating principles, installation steps, operating procedures, maintenance, troubleshooting, and crucial safety precautions and protection points. It is designed to help professionals who have received specialized equipment training or have a basic operational foundation to use the device correctly.

Due to the limited length of this manual, it may not cover all details. If you need more in-depth information or encounter issues not addressed in the manual, please contact us.

Notes and Warnings

This manual contains a significant amount of important warning information (indicated by Warning, Note, and Tip icons) to alert you to potential safety risks and situations that could cause equipment damage. Please be sure to read and strictly adhere to all safety tips and operating standards in this manual.

The M2 Portable Total Hydrocarbon Analyzer, manufactured by Aoma, has passed inspection by the National Quality Inspection and Testing Center for Explosion-Proof Safety Products. It complies with the relevant requirements of standards such as GB/T3836.1 - 2021, GB/T3836.2 - 2021, and GB/T3836.4 - 2021. The product's explosion-proof marking is **Ex db ia IIC T4 Gb**. When using and installing this product, users must strictly adhere to the following safety requirements:

- The "X" suffix on the certificate number indicates that the product has specific conditions for safe use.

- Users are strictly prohibited from performing any maintenance involving flameproof joints. Such repairs must be carried out by the manufacturer; otherwise, the explosion-proof performance will be compromised.

- Only use battery packs approved by the manufacturer. The use of unapproved batteries is strictly prohibited to prevent safety incidents caused by battery mismatch.

- Battery pack charging and replacement must be performed in a safe location (e.g., a well-ventilated indoor area free of flammable and explosive materials). These operations are strictly forbidden in hazardous environments to avoid fire or explosion.

- The product's operating ambient temperature range is -20°C to +60°C. Using the device outside this temperature range may lead to performance degradation or even permanent damage.

- Users are strictly prohibited from replacing the product's electrical components without authorization. If a fault occurs during operation, contact the manufacturer immediately to resolve the issue, ensuring that the explosion-proof performance is not affected and preventing further equipment damage.

- The installation, use, and maintenance of the product must strictly follow:

  - This product instruction manual
  - GB/T3836.13 - 2021 "Explosive atmospheres - Part 13: Equipment repair, overhaul, reclamation and modification"
  - GB/T3836.15 - 2017 "Explosive atmospheres - Part 15: Electrical installations design, selection and erection"
  - GB/T3836.16 - 2017 "Explosive atmospheres - Part 16: Electrical installations inspection and maintenance"
  - GB50257 - 2014 "Code for construction and acceptance of electrical device for explosive atmospheres and fire hazard electrical equipment installation engineering

Icon Descriptions Used in This Manual

Icon	Description
	Tip — Used to remind users of general information or parts of this manual that require general attention.
	Note — Used to remind users of important information that needs attention or key sections of the manual.
	Warning — Indicates that failure to observe proper safety measures will result in the equipment or software not functioning correctly, and in severe cases, may cause major damage.
	Caution: Hot Surface — Identifies areas or locations that exceed temperature limits. Affixed to the surface of heated components or nearby enclosures that can be removed without tools. Made of heat-resistant material.

	Caution: Risk of Electric Shock / High Voltage — Applies to locations in the product where the voltage exceeds safe levels, such as the 220V/AC power input terminal.
	Caution: Electrostatic Sensitive — Applies to circuit boards or certain electrostatic-sensitive components.
Ex	Explosion-Proof Mark — Indicates that the product can be safely used in explosion-hazardous locations. Before use, be sure to carefully read and comply with explosion-proof safety operating requirements and relevant site regulations.

Delivery and Transportation

The delivery of the M2 is strictly carried out according to the corresponding terms in the purchase contract. The device and its accessories are packed and transported in a single shipping box. Upon receipt, please be sure to check the following:

- If you find any damage to the shipping box, please notify the shipping company immediately.
- Keep the device and packaging in their original condition for inspection and evidence collection by the shipping company.
- The shipping company is responsible for any damage to the device caused during transportation. For example, if obvious signs of impact are found on the device's housing upon unpacking, you should take photos immediately and contact both the shipping company and the supplier to properly handle the matter.

Warranty and Repair

The warranty and repair services for the M2 are strictly governed by the terms of the purchase contract and are divided into two categories: In-Warranty Repair and Out-of-Warranty Repair.

In-Warranty Repair:

- Applies to failures that occur within the warranty period and fall within the specified warranty scope.

- Provides free repair services, including product/spare part repair or replacement, technical support, and routine on-site engineering services.

- Example: If a device component fails due to a quality issue during the warranty period, and it is confirmed to be a product quality problem after inspection, we will replace the component free of charge and provide technical support to ensure the device returns to normal operation.

Out-of-Warranty Repair:

Applies to failures that occur after the warranty period has expired or under the following circumstances within the warranty period:

- Damage to the device caused by improper use (e.g., water ingress, corrosion, fire, power surge).
- Example: The device is accidentally dropped into water, or it is used in a corrosive gas environment without protective measures, leading to internal circuit corrosion and damage.
- Damage to the device caused by force majeure (e.g., earthquake, lightning strike, flood).
- Damage to the device caused by unauthorized modifications to the product's interior without guidance from our company's R&D or engineering personnel.
- Damage to the device caused by use that does not comply with the user manual and training requirements (e.g., operating outside the specified temperature range, violating operating procedures).

Note:

- Out-of-warranty failures are not limited to the items listed above. The final determination will be made by our company's R&D or engineering personnel.

- If you require out-of-warranty repair services, please contact us. We will assist you in resolving the issue.

Disposal

This device does not contain any toxic materials. However, if it has been contaminated by toxic materials, it should be disposed of with appropriate caution and in accordance with relevant regulations.

When disposing of this device, you must comply with local regulations and procedures.

Before deciding to dispose of a used M2, please be sure to contact our company. We will arrange for professionals to provide guidance.

Example: Components such as batteries in old equipment contain hazardous substances and must be properly handled by professionals in accordance with environmental protection requirements to avoid environmental pollution.

Disclaimer

- This manual does not assume any legal liability towards the user. All legal terms are subject to the formal contract signed by both parties.

- The copyright of this manual belongs to Aoma. The company reserves the right to modify the contents of the manual at any time without prior notice.

- Reproduction of this manual in any form without the written permission of the company is strictly prohibited.

- The company will continuously optimize and improve its products, and the manual content may be updated accordingly. It is recommended that users check the company's official website or other relevant channels for the latest product information and manual versions before using the device.

Contents

Product Overview

To address the new phase of China's air pollution control efforts, which focuses on the synergistic management of PM2.5 and O3, effectively controlling the key precursor VOCs (Volatile Organic Compounds) has become central to achieving coordinated governance. At the same time, the "14th Five-Year Plan" has included VOCs as a new target indicator, bringing both challenges and opportunities for VOCs monitoring and management. Compared to organized emissions, which are easy to identify, unorganized (fugitive) VOCs emissions are characterized by numerous sources, wide distribution, and large concentration fluctuations. With the increasing scale of industrial facilities and rapid production development, problems such as resource waste, environmental pollution, and safety hazards caused by fugitive leaks are becoming increasingly prominent. Traditional laboratory testing and online monitoring methods struggle to meet the needs of fugitive emissions monitoring, whereas on-site monitoring with portable devices can effectively obtain raw data. Therefore, high-precision, high-stability portable VOCs analyzers are highly valued.

Against this backdrop, Aoma introduces the M2 Portable Total Hydrocarbon Analyzer. This device is based on the principle of a Flame Ionization Detector (FID) and is an ultra-lightweight (weighing only about 0.9 ± 0.05 kg), single-hand operable VOCs analyzer specifically designed for fugitive VOCs emission detection. It can quickly and accurately identify leak points in various pipe fittings, valves, discharge ports, and facility sealing systems, helping enterprises to repair leaks promptly and ensure production safety, while also assisting government agencies in strengthening the management of corporate fugitive emissions.

This series offers two detector configurations for users to choose from based on their needs:

FID Single Detector: Focuses on Total Hydrocarbon (THC) detection.

FID + PID Dual Detector: In addition to total hydrocarbon detection, this adds the capability to detect components such as Oxygen (O_2), Carbon Monoxide (CO), Carbon Dioxide (CO_2), and Hydrogen Sulfide (H_2S).

Device Features

The M2 integrates standard functions such as calibration, measurement systems, and data storage, and offers the following significant advantages:

1. **High-Precision Detection:** Utilizes an FID detector to ensure accurate and reliable detection results. It provides precise data even when detecting low concentrations of VOCs.
2. **Extreme Portability:** The main unit weighs only about 0.9 kg and is compact, making it easy to carry and operate with one hand in various locations such as factory workshops and outdoor environments.
3. **Simple Operation:** The testing process requires only two steps. Users can easily view data, perform calibrations, and set parameters through the intuitive panel, allowing even first-time users to get started quickly and improve work efficiency.
4. **Safe Transportation:** Employs low-pressure solid-state hydrogen storage alloy technology to replace traditional high-pressure hydrogen gas cylinders, significantly enhancing safety during transportation and shipping.
5. **Comprehensive After-Sales:** Aoma. provides comprehensive, fast, and professional after-sales service and technical support to promptly resolve user issues.

Flame Ionization Detector (FID)

The FID detector requires hydrogen (H_2) as the fuel gas and air as the support gas to operate. Inside the reaction chamber, sufficient ignition energy causes the hydrogen and air to burn, forming a flame. When an organic compound containing hydrocarbons (RH) passes through this flame, the following ionization reaction occurs:

$$RH + O_2 \rightarrow RHO^+ + e^- \rightarrow H_2O + CO_2$$

(where R represents a carbon-containing organic compound)

A set of polarized and collector electrodes is placed in the reaction chamber. Under the high-voltage electric field applied between them, the positive ions (RHO^+) and electrons (e^-) produced in the flame move towards their respective electrodes, forming a micro-current. The magnitude of this micro-current signal is linearly proportional to the concentration of the hydrocarbon compound within a certain range. A typical FID structure is shown in Figure 1-1.

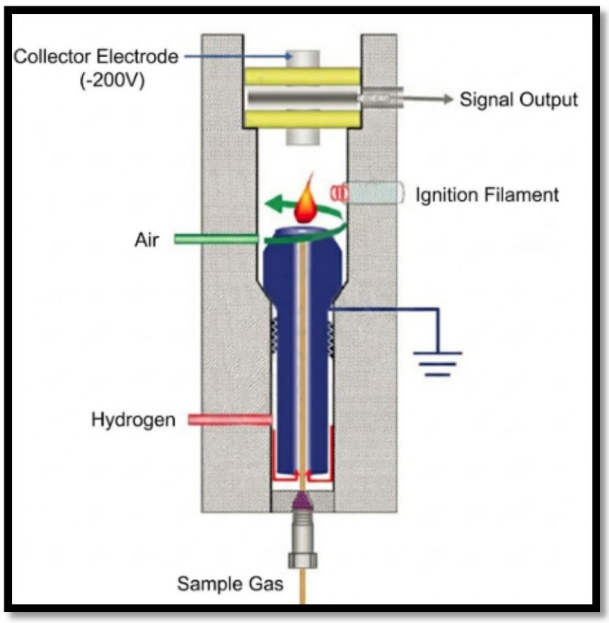


Figure 1-1 Typical FID Device Diagram

Note:

- To maintain a stable flame in the FID, the sample gas must contain an oxygen concentration of no less than 16% by volume.

- The device has an internal dilution system that introduces ambient air rich in oxygen (approximately 20.9% to 21.1%) to increase the oxygen content of the dilution gas, ensuring flame quality.

- It is recommended to use standard gas diluted by a dynamic calibrator (with zero-grade air as the dilution gas) for concentration calibration to achieve the best calibration accuracy.

Detailed Technical Specifications

Item	FID Detector Parameters
Accuracy	1.0–10,000 ppm: ±10% of reading or ±1.0 ppm (whichever is greater). This accuracy is achieved with a single-point calibration using methane at 100–500 ppm (including drift) at the calibration temperature and humidity. 3,000–50,000 ppm: ±10% of reading, with a single-point calibration using 20,000 ppm methane.
Repeatability	±2% at 500 ppm methane

Dynamic Range	1.0–50,000 ppm methane
Linear Range	1.0–50,000 ppm methane
Minimum Detection Limit	Defined as 7 times the standard deviation of the peak-to-peak noise: 0.5 ppm methane
Response Time (T90)	Using 10,000 ppm methane at 20°C: ≤2.5 seconds
Recovery Time (T10)	Using 10,000 ppm methane at 20°C: ≤2.5 seconds
Sampling Speed	Nominal flow rate at probe inlet: 0.8 L/min
Battery	Type: Rechargeable lithium-ion battery pack. Capacity: 5000mAh. Rated Voltage: 7.4V. Charging Voltage: 8.4V. Full Charge Time: 3 hours (when powered off). Operating Time (20°C): Approx. 9 hours. **Warning: Do not replace the battery in a combustible gas environment or in an area with an explosion risk!**
Battery Charger	Input: AC 100–240V. Output: DC 8.4V±0.05V, 2A±0.2A (constant current). Indicator: Red light (charging), Green light (standby/fully charged). Protection: Over-current, over-voltage, short-circuit. **Warning: Do not charge in a combustible gas environment or in an area with an explosion risk!**
FID Lifespan	> 6,000 hours with normal maintenance and cleaning
Hydrogen Storage Alloy	Hydrogen Capacity: 10L (20°C). Dimensions: 30×108 mm. Weight: Approx. 100g. Operating Temperature: -20°C to +60°C (hydrogen release decreases below 0°C). Charging Pressure: 0.7MPa @20°C. Hydrogen Release Flow Rate: 13 ml/min (Max release flow: 300-500 mL/min). Operating Time (20°C): ≥10 hours. Safety: Low-pressure solid-state hydrogen storage, safer than high-pressure cylinders.
Housing Material	Heat-resistant, chemically resistant polymer material (main unit housing and front panel)
Physical Dimensions (Main Unit)	322 mm (L) × 93 mm (W) × 61 mm (H)
Weight (Main Unit)	Single FID model: Approx. 0.90 kg. FID+PID dual detector model: Approx. 0.98 kg
Communication Mode	Supports WIFI, Bluetooth

Data Storage	8G memory, capacity for no less than 1 million data points, adjustable storage
Software Interface	Built-in Chinese/English interface, user-switchable. Data export plugin also supports Chinese and English interfaces.
Hydrogen Generator	Principle: Proton Exchange Membrane (PEM). Dimensions: 146×157×210 mm. Weight: 1.8kg ±5%. Water Type: Pure or deionized water. Water Temperature: 20-65°C. Charging Time: 2-4 hours (depending on temperature).

Table 1: Detailed Technical Specifications

Green Light Status	Red Light Status	Device Status
Solid	Off	Hydrogen storage alloy is fully charged
Flashing	Off	Charging in progress
Off	Solid	Water level is below the critical value

Table 2: Hydrogen Generator Status Indicator Light Meanings

External Operating Conditions

As a portable device, the M2 must adapt to various working environments. The table below lists the recommended values and allowable ranges for key external influencing factors. It is strongly recommended to use the device under conditions that meet the recommended values. Environments that do not meet the recommended values or exceed the operating limits may cause serious damage to the device. If a specific working environment has factors not listed in the table but which may affect the device, short-term operation is permissible, provided that the factors are strictly controlled and pose no danger. If you have any questions, please contact us for consultation.

External Influence	Unit	Ideal Working Conditions	Normal Working Conditions	Operating Limits	Transportation & Storage Limits
Ambient Temperature	℃	23±2	0～+55	-20～+60	-20～+70
Relative Humidity	%	50 ± 10	0～95	0～95 non-condensing	0～100 (non-condensing)
Atmospheric Pressure	kPa	86～106	70～108	none	20～108
Solar Radiation	-	No direct exposure	No direct	Tolerable	Avoid long-term

External Influence	Unit	Ideal Working Conditions	Normal Working Conditions	Operating Limits	Transportation & Storage Limits
			exposure		exposur
Corrosive Compounds	—	No detectable levels	No detectable levels	Avoid contact	Avoid contact
Charger Frequency	V (AC)	220	220	110～240	none
Charger Frequency	Hz	50～60	50～60	50～60	none
Operating Position	—	Main unit inside protective pouch	Main unit inside protective pouch	none	Secured inside packing case
External Electric/Magnetic/Electromagnetic Fields	—	Negligible	Negligible	void strong interference sources	none
Mechanical Vibration	—	none	Normal walking vibrations	Avoid severe impacts	Compliant with transport packaging

Table 3: Reference Values and Ranges for External Influencing Factors

M2 Unpacking and Installation

Safety Instructions

Before using the M2, please be sure to read this section on safety instructions carefully to avoid equipment damage or even safety accidents due to improper operation.

WARNING:

- **Hydrogen poses a high explosion risk!** Hydrogen is highly flammable! If it leaks and accumulates in an enclosed space, it can easily cause an explosion. Therefore, before performing any operation involving hydrogen, all tubing, connections, and valves must be strictly checked for leaks. Ensure there are no leaks before proceeding.

- **Users/operators are strictly prohibited from disassembling the machine, charging/discharging, or replacing hydrogen in hazardous areas!** The customer will be solely responsible for all consequences arising from such actions.

- **Do not replace any electrical components in the presence of flammable gases or other explosion threats.**

- **Do not perform repairs or component replacements in the presence of flammable gases or other explosion threats.** Replacement parts must be original parts supplied by Anhui Aoma Smart Technology Co., Ltd. For repair information, see Chapter 9, "Maintenance and Service."

- **When testing or calibrating with toxic or harmful gases, operations must be conducted in a well-ventilated area (indoors or outdoors) to prevent the accumulation of toxic gases, which could be dangerous.** For operational details, refer to Chapter 5, "Using the M2" and Chapter 6, "Hydrogen Source."

- **The installation and operation of this equipment must be performed by personnel who have been professionally trained and have passed an assessment.** Untrained individuals are not permitted to operate the device.

Note:

- **The power supply must be connected only after all installation steps are completed and checked for correctness.** An incorrect sequence of operations may damage internal components, affecting device performance and even causing safety hazards. • **Upon receiving the device, immediately inspect it for any shipping damage.** If you find that the packaging is broken, the

device's appearance is damaged, or parts are missing, please contact the supplier within 7 working days of receipt for timely resolution.

- **If you encounter any problems during installation, do not disassemble or adjust the device yourself.** You should consult Aoma. or your supplier for professional guidance.

Unpacking and Inspection

The M2 Portable Total Hydrocarbon Analyzer and its accessories are transported together in a dedicated packing case. Upon receiving the device, if you find obvious damage, deformation, or impact marks on the shipping box, you should immediately notify the shipping company and keep the device and packaging in their original state. This will allow the shipping company to conduct an on-site inspection and determine liability. The shipping company will bear full responsibility for any damage to the device caused during transportation.

When unpacking, please carefully read the markings on the packaging materials (such as "This Way Up," "Fragile," etc.) and open the box correctly. After unpacking, check the contents against the packing list one by one. Inspect the main unit, accessories (such as sampling tube, hydrogen storage alloy, power adapter, etc.) to ensure they are intact, without scratches, deformation, or functional abnormalities. Please try to keep the original packaging for future use in case the device needs to be returned for repair or transported.

Accessories List

We offer a range of standard kits and optional accessories for the M2. The specific list is shown below:

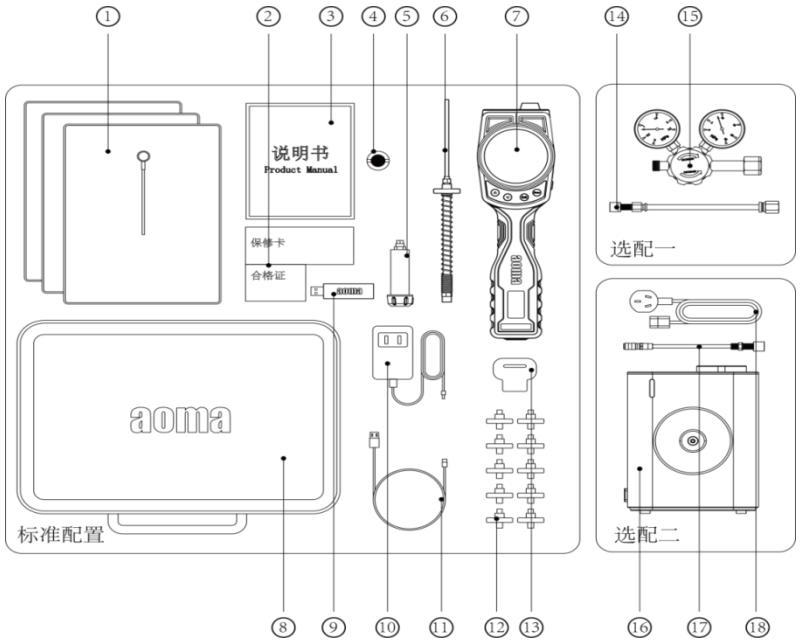


Figure 2-1 M2 Standard Configuration

M2 Standard Kit

1. Standard Gas Bags *3	8. Lightweight Carrying Case *1
2. Warranty Card, Certificate of Conformity *1	9. Remote Upgrade Module *1
3. User Manual *1	10. Adapter *1
4. FID Sintered Filter *1	11. USB Data Cable *1
5. Hydrogen Storage Alloy *1	12. Filter Membranes *10
6. Sampling Probe *1	13. Disassembly Tool *1
7. M2 Detector Main Unit *1	

Table 4 : M2 Standard Kit

M2 Option 1	M2 Option 2
14. Pressure Regulator *1	16. Hydrogen Generator *1
15. Regulator Inflation Connector *1	17. Inflation Connector *1
	18. Power Adapter *1

Table 5: M2 Optional Configurations

For details on different kits and other accessories, please contact Aoma Smart or an authorized distributor.

Installation Requirements

The M2 is a user-friendly portable analysis device. After receiving the device and confirming that all parts are in good condition, users only need to complete two basic installation steps before use. Therefore, please note the following points before installation:

Parameter	Technical Indicator
Installation Site	No magnetic field interference / No corrosive gases / No continuous vibration
Work Surface	Sturdy and stable
Power Supply	110-220VAC ±10%, 50Hz
Temperature/Humidity	-20°C~60°C / 0~95%RH (non-condensing)

Table 6: Basic Environment

Component	Technical Specification
Gas Connection	Probe interface (sampling) and hydrogen storage alloy interface (hydrogen supply) only
FID Gas Source	Hydrogen: Solid-state hydrogen storage alloy. Air: Direct intake from ambient air.
PID Gas Source	Direct intake from ambient air
Sampling Probe	Standard with filter membrane (for dust and moisture removal). The filter membrane needs to be checked and replaced regularly.

Table 7: Gas System

Installing the Sampling Probe

The M2 comes standard with a dedicated sampling probe to meet diverse sample gas collection needs. The front end of the probe is designed with a high-efficiency filter membrane that effectively blocks and absorbs dust, particulate matter, and some moisture from the air, ensuring that the sample gas entering the detector is clean and extending the detector's lifespan.

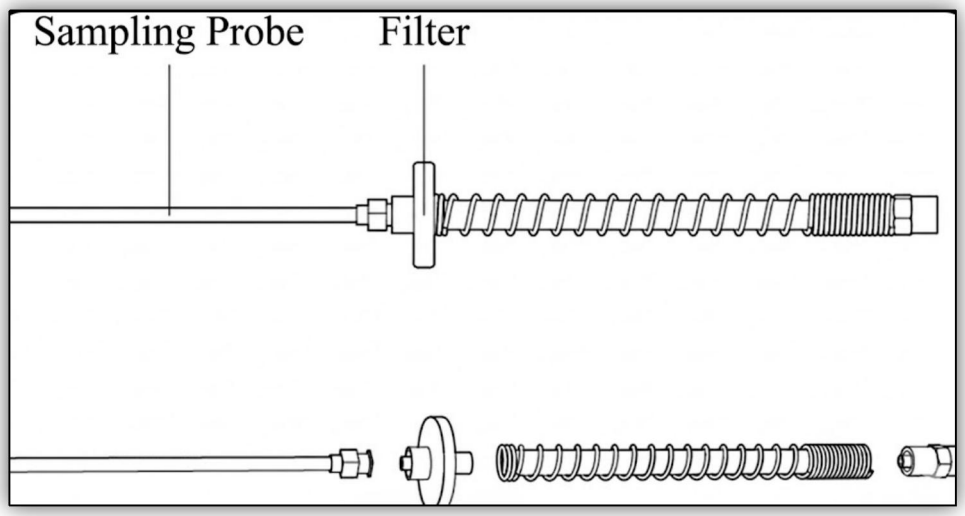


Figure 2-2 M2 Sampling Probe

Install the sampling probe by rotating it clockwise into the probe's female socket on the main unit.

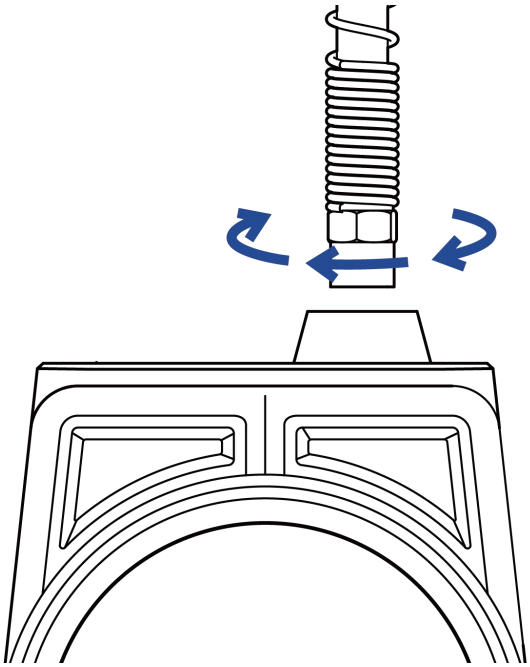


Figure 2-3 M2 Sampling Probe Installation

Installing the Hydrogen Storage Alloy

The M2 is equipped with a hydrogen storage alloy cylinder. Before using the device, align the fully charged hydrogen storage alloy with the socket interface on the rear panel of the instrument. Slowly screw it in clockwise and tighten it to ensure it is not loose, completing the gas supply preparation.

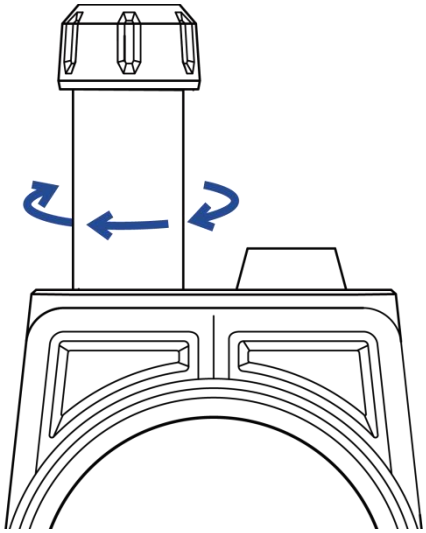


Figure 2-4 Hydrogen Storage Alloy Installation

Device Components

The M2 Portable Total Hydrocarbon Analyzer is a portable detection device featuring a high degree of internal integration and modularization. The modules are arranged compactly, making maintenance easy. These modules include the gas path module, circuit control module, detector module, and sampling module.

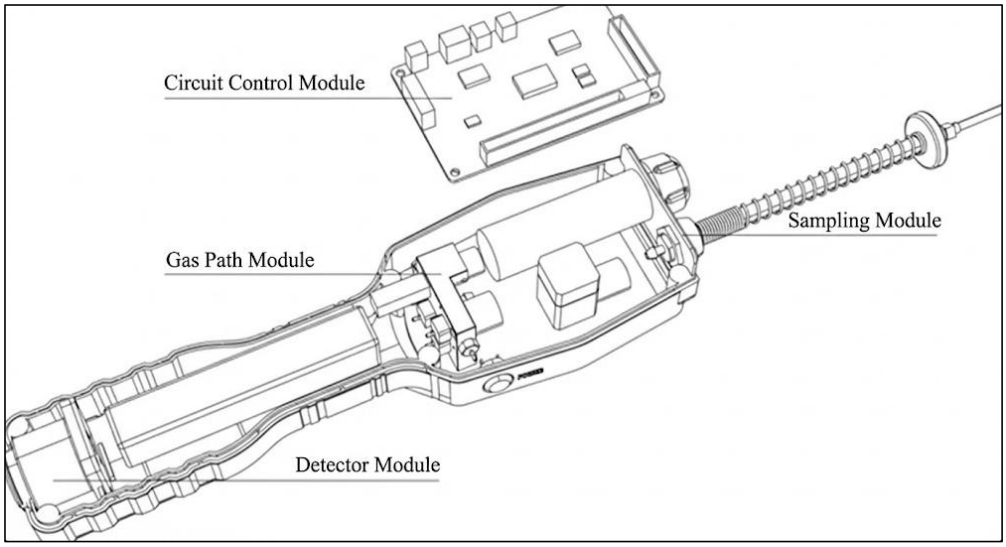


figure3-1 : M2 device component

External Functional Layout

Through the front and side views of the M2 (Figure 3-2), you can clearly understand the functional layout of each part of the device.

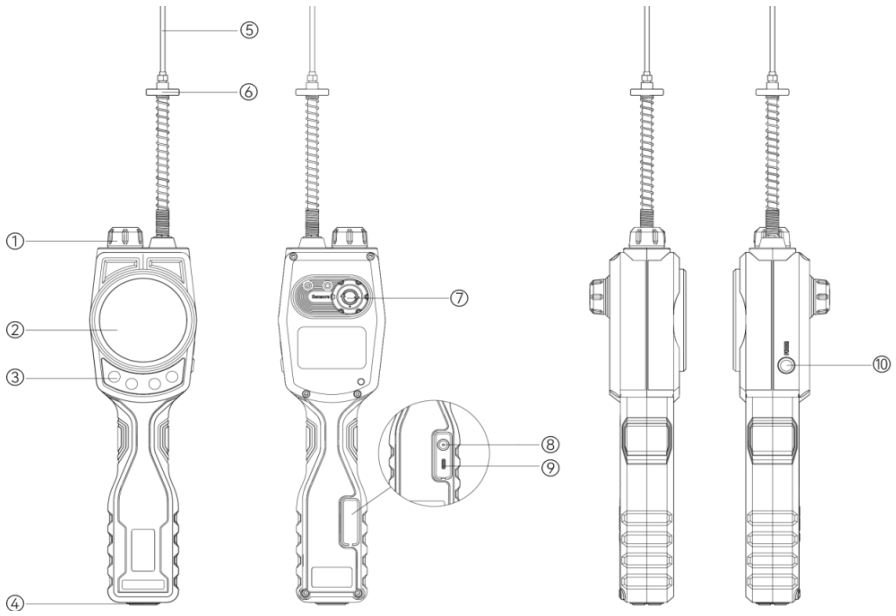


Figure 3-2 M2 layout

① Hydrogen Storage Alloy Cylinder ② Display Screen ③ Function Keys ④ FID Sintered Filter ⑤ Sampling Probe ⑥ Filter ⑦ Optional Detector ⑧ Charging Port ⑨ Data Interface ⑩ Power On/Off Button

Product Dimensions

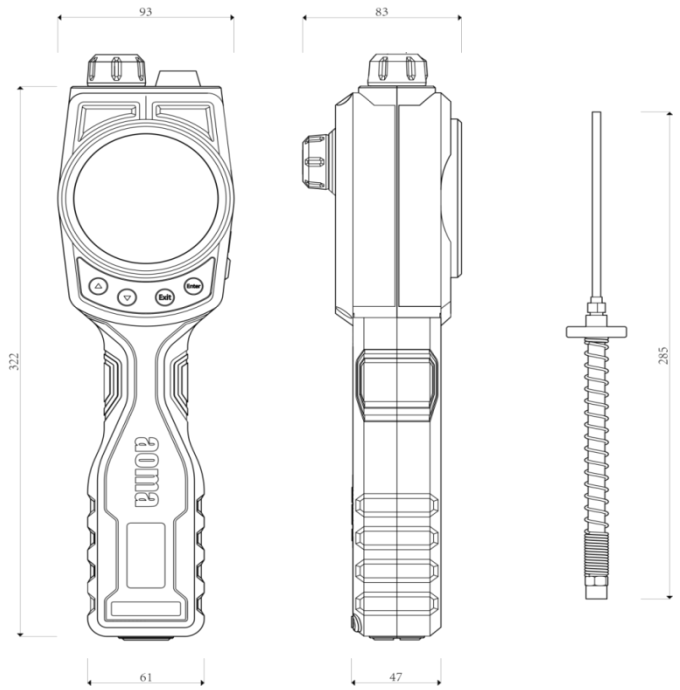


Figure 3-3 M2 dimensions

Key Function Descriptions

Users can operate the device using the membrane keys on the control panel. The membrane keypad keys and their functions are as follows:

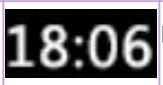
- 【▲】: Up scroll key, for scrolling through options in menus or sub-menus.
- 【▼】: Down scroll key, for scrolling through options in menus or sub-menus.
- **【Exit】**: Back key, to return to the previous menu.
- **【Enter】**: Confirm key, to start or confirm an action.

Generally, settings and application configurations are selected and adjusted using the soft keys. Function items are selected with the 【▲】 and 【▼】 keys, confirmed with the 【Enter】 key, and you can return to the previous screen using the 【Exit】 key.

Understanding the Display

Figure 4-1 M2 screen

As shown in Figure 4-1 above, the main operating screen contains a total of 12 rotary status icons and 7 function menus. The content displayed by the rotary status icons is as follows:

Name	Icon	Description
Unit		The current unit for the device's detection data. Can be changed in the settings menu
Time		Displays the current time. Defaults to Beijing time and can be customized in the settings menu.
Bluetooth		Bluetooth not connected — Indicates the device's Bluetooth signal, can connect to the handheld controller APP.
		Bluetooth connected.
Ignition Coil		Before ignition and after successful/failed ignition.
		Flashes white once during the ignition process.

		Ignition coil anomaly.
Hydrogen Pressure		Before ignition and when hydrogen is insufficient.
		Ignition successful and hydrogen is sufficient.
		Hydrogen pressure anomaly.
Auxiliary Heating		Not enabled.
		Enabled. Heats the hydrogen storage alloy at low temperatures to help stabilize the hydrogen flow rate.
Current Signal		Used to determine the status of the FID signal.
Device Temperature		Temperature status prompt.
		Ignition successful and device temperature is within the range of -20 to 70°C.
		Device temperature is below -20°C.
		Device temperature is above 70°C.
Sampling Pressure		Sampling pressure status.
		Sampling pressure is normal.
		Sampling pressure anomaly.
Ignition		Before ignition and in a failed ignition state.
		Ignition successful.
WiFi		Wireless LAN signal not connected.
		Wireless LAN signal is connected.
Battery Level		Standard battery charging indicator, shows the current battery level.
		When the battery level is nearly empty, it prompts that the device needs to be charged.

Table 8: Rotary Status Icon Display Summary

The sub-menus on the main operating page are: 【Start】  , 【Flame Off】  , 【Measure】

 , 【Calibrate】  , 【View】  , 【Background】  , and 【Settings】  . You can select them using the【▲】and【▼】keys and then press【Enter】to access the corresponding sub-menu.

Using the M2

This chapter introduces the operating procedure of the device, using the M2 with a single FID detector as an example.

Standard Operating Procedure

As a portable instrument, the daily use of the M2 should follow the procedure below to ensure convenient detection and reliable data.

The standard operating procedure is as follows:

Power On → Warm-up → Calibrate → Measure → Flame Off → Power Off

Powering On/Off

Powering On

To turn on the M2, press the "On/Off" button on the right side of the main unit once. The screen will light up, indicating a successful power-on. The device will perform a self-check before displaying the main operating page. The M2 is now ready for use.

Figure 5-1 M2 self checking

Note:

- Press the power button to turn on the instrument. After the LCD screen lights up and enters the main menu, confirm that the power-on was successful.

- After entering the main menu, you must first check for any alarm messages:

  - If an alarm exists, immediately refer to Chapter 10, "Troubleshooting," in this manual. You may only continue operation after the fault has been resolved.
  - If there are no alarm messages, it indicates that the instrument is operating normally, and you can proceed with subsequent operations.

- The instrument is equipped with a powerful purge function. In the measurement interface, press and hold 【▲】 and 【▼】 simultaneously to activate the powerful purge function, which can clean residual gas from the gas path and speed up the return-to-zero recovery time.

Powering Off

To turn off the M2, press and hold the "On/Off" button on the right side of the main unit for 7 seconds. Wait for the screen to go dark, and the device will shut down.

Note:

- The FID must be turned off before shutting down the instrument.

Ignition On

the main operating page, use the 【▲】 and 【▼】 keys to select 【Start】 ,then press 【Enter】 to begin ignition. At this time, you should also hear the sound of the pump starting to work. With a slight "pop" sound—the sound of hydrogen igniting—the ignition is successful. A prompt window saying "Device startup complete" will appear on the screen, and the purple ring on the screen's rotary display will light up and flash, as shown in the figure below:

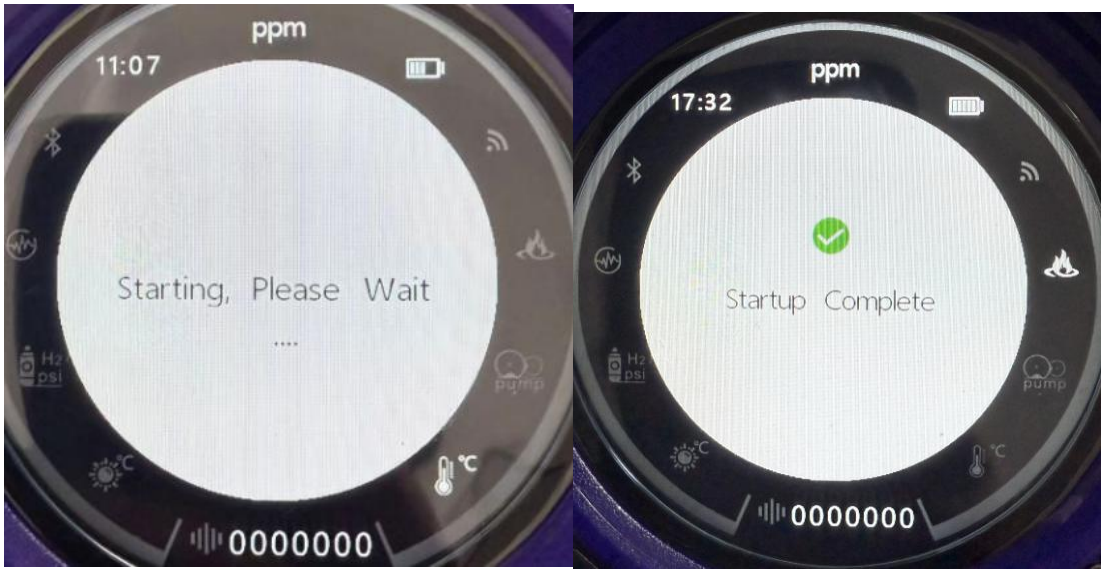


Figure 5-2 ignition on successful

Note:

If ignition fails, you can check the reason according to the prompts:

(1) Ignition coil anomaly prompt, as shown below:

Figure 5-3 ignition abnormal

(2) Hydrogen anomaly prompt, as shown below:

Figure 5-4 **"No Hydrogen Source Detected" Alert Screen**

(3) Sampling gas path anomaly prompt, as shown below:

Figure 5-5 **"Sampling Gas Path Error" Alert Screen**

(4) Flame-out due to concentration exceeding the measurement range prompt, as shown below:

Figure 5-6 concentration over range alert screen

Note:

(1) If an ignition failure is indicated, you can use the 【▲】 and 【▼】 keys to select 【Check】, then press 【Enter】. Next, select 【Operating Parameters】, press 【Enter】, and use the 【▼】 key to view the operation log and find the cause based on the error code, as shown below:

Figure 5-7 "Operation Log" Screen

（2）Factors Affecting Ignition

Status 1: Ignition Failure		
Factor	Indicator	**Situation**
Hydrogen	EPC Pressure	a. No hydrogen installed / Insufficient hydrogen; b. EPC pressure control failure (flame temperature too high/low, command: prohibit operation)
Sampling Flow Rate	Pump Pressure	a. Gas path blocked, flow rate too low; b. Pump control failure (sampling power too high/stopped, command: prohibit operation)
Ignition Coil	Ignition Current	a. Ignition coil aging (current is not sustained); b. Coil damaged (no current)
Combustion Chamber	None	a. Excessive moisture in the combustion chamber/gas path (purge during startup/shutdown)
Status 2: Ignition Successful but Not Sustained		
Factor	Indicator	Situation
Hydrogen	EPC Pressure	a. Insufficient hydrogen; b. Unstable EPC pressure control (flame temperature too high/low, command: prohibit operation)
Sampling Flow Rate	Pump Pressure	a. Gas path blocked, flow rate too low; b. Pump control failure (sampling power too high/stopped, command: prohibit operation)

Table 9 factors affecting ignition

Note: Users can resolve "a" status issues themselves. For "b" status issues, the error code will be

displayed in the view interface under operation log (Error code library: E001: EPC control failure; E002: Pump control failure; E003: Ignition coil damaged; E004: Temperature sensor failure; E005: Auxiliary heating failure; E006: Battery management failure; E007: Communication connection failure; ...).

Warm-up

After successful ignition, the instrument's FID detector needs to go through a warm-up and stabilization phase. During the warm-up period, the instrument should be kept stationary, avoiding movement or vibration, to ensure the detector's temperature rises evenly. The warm-up period is about 5 minutes. Wait for the instrument to stabilize before performing measurement operations.

Calibration

Manual Calibration

Before starting, please prepare zero gas/ambient air and methane standard gases of different concentrations. A complete calibration curve can be established by calibrating at three concentration points. The system supports 6 concentration calibration points for the FID; users can modify the concentration values in the calibration interface.

1. On the main operating page, use the 【▲】 and 【▼】 keys to select 【Calibrate】 and press 【Enter】 to confirm.
2. Select 【FID Calibration】 and press 【Enter】 to confirm.
3. Select 【Manual Calibration】 mode (default is manual) and press 【Enter】 to confirm. This will take you to the calibration interface, as shown below:

Figure 5-8 **"Calibration Method Selection" Screen**

Using zero gas, 500 ppm methane standard gas, and 10,000 ppm methane standard gas to calibrate the FID detector as an example, the specific operating method is as follows:

Step 1: Prepare three gas bags and fill them separately with zero gas/ambient air, 500 ppm methane standard gas, and 10,000 ppm methane standard gas.

Step 2: Power on and ignite the device, and complete the warm-up.

Step 3: On the main operating page, select 【Calibrate】, then choose 【FID Calibration】 and 【Manual Calibration】 to enter the calibration interface.

Step 4: Open the valve of the zero gas bag, connect the M2 probe to the zero gas bag/ambient air, and introduce zero gas/ambient air into the device. Use the 【▲】 and 【▼】 keys to select 【Click to Calibrate】 on the screen and press 【Enter】. The real-time response concentration value will be saved in the recorded response column, completing the zero-point concentration calibration.

Step 5: Use the 【▲】 and 【▼】 keys to select the data column on the left. Press 【Enter】 to open the keypad and manually enter 500. After selecting 【 √ 】, open the valve of the 500 ppm gas bag, connect the M2 probe to the 500 ppm gas bag, and introduce 500 ppm methane standard gas into the device. Then use the 【▲】 and 【▼】 keys to select 【Click to Calibrate】 on the right side of the screen and press 【Enter】. The real-time response concentration value will be saved in the recorded response column, completing the 500-point concentration calibration, as shown below.

Figure 5-9 **Manual 500ppm Calibration Procedure**

- Step 6: Use the 【▲】 and 【▼】 keys to select the data column on the left. Press 【Enter】 to open the keypad and manually enter 10000. After selecting 【√】, open the valve of the 10,000 ppm gas bag, connect the M2 probe to the 10,000 ppm gas bag, and introduce 10,000 ppm methane standard gas into the device. Then use the 【▲】 and 【▼】 keys to select 【Click to Calibrate】 on the right side of the screen and press 【Enter】. The real-time response concentration value will be saved in the recorded response column, completing the 10,000-point concentration calibration.

- Step 7: After calibrating the three concentration points, use the 【▲】 and 【▼】 keys to select 【Save Curve】 and press 【Enter】. The calibration is complete.

Item	Specification	Description
Zero Grade Air	8L pure air with pressure regulator	Calibrates FID detector
500 ppm Methane Standard Gas	8L methane in air with pressure regulator	Calibrates FID detector
10,000 ppm Methane Standard Gas	8L methane in air with pressure regulator	Calibrates FID detector

Table 10: Standard Gas Parameters

Note:

(1) The M2 must be calibrated in a clean air environment. Ensure all components involved in the calibration are available and ready. (2) Entering manual calibration automatically clears the historical curve and supports 6 calibration curves. (3) Except for the zero-point calibration value which cannot be edited by the user, other calibration point values are user-editable. After entering the calibration value with the keypad, select 【√】 and the keypad will automatically close. Then click to calibrate. (4) The current concentration and signal value are displayed. If the deviation between the current concentration and the input concentration value reaches ±8%, the calibration of this point is considered invalid, and a prompt to recalibrate will be shown, as seen below:

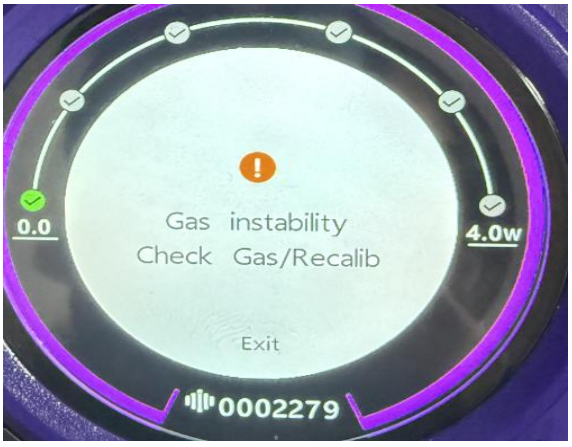


Figure 5-10

(5) The curve cannot be saved if there are fewer than 2 calibration points recorded. It can be saved normally with ≥2 points, as shown below:

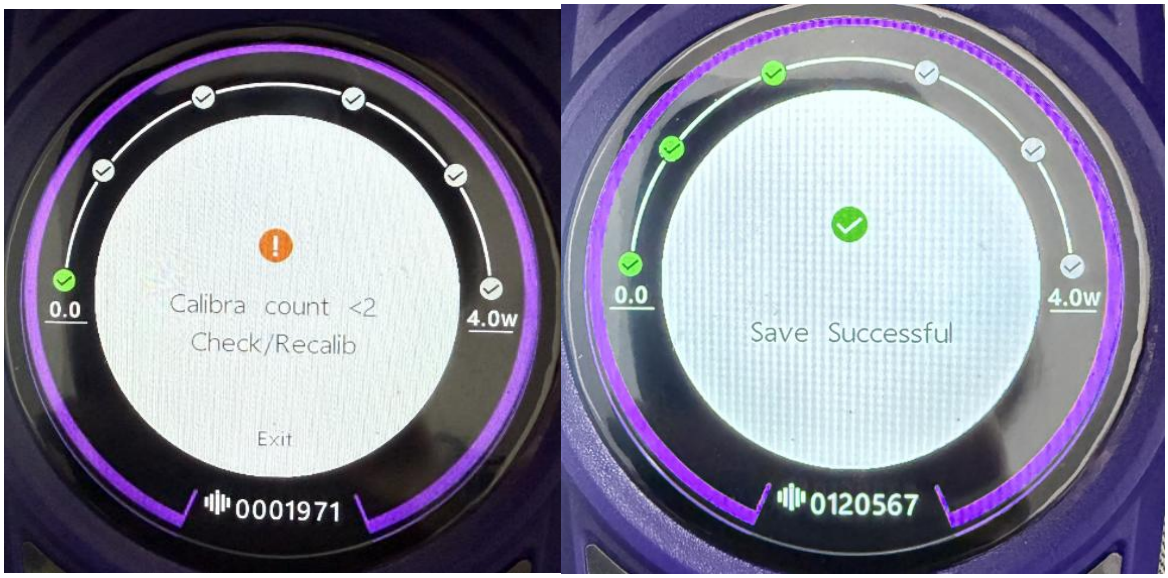


Figure 5-11

Automatic Calibration

- On the main operating page, use the 【▲】 and 【▼】 keys to select 【Calibrate】 and press 【Enter】 to confirm.
- Select 【FID Calibration】 and press 【Enter】 to confirm.
- Select 【Automatic Calibration】 mode (default is manual) and press 【Enter】 to confirm. Wait for 7 seconds for the calibration to complete, as shown below:

Figure 5-12 auto calibration procedure

Note:

(1) At least one manual calibration data set must be stored in the system to perform automatic calibration. If there is no manual calibration data, clicking automatic calibration will automatically jump to the manual calibration page. (2) The current concentration displays the real-time standard gas concentration. If there is a large deviation between the current displayed concentration and the standard gas concentration, you can repeat the calibration until the deviation is within a reasonable error range, or check if the standard gas has expired and if the gas bag valve is fully open, then recalibrate. (3) Modifying Calibration Point Concentrations: The system supports 6 concentration calibration points. The zero point is not modifiable by default. Users can input values for other calibration points as needed. (4) Calibration Method: It is recommended to use zero gas and standard gases of different concentrations for device calibration. Users can select the appropriate concentration points for calibration based on their actual needs. (5) For each calibration, at least 2 concentration points must be calibrated for the curve to be valid. After calibration, the system returns to the main operating page. (6) Calibration Frequency: Each M2 is calibrated and tested before leaving the factory. Nevertheless, to ensure normal operation, the device should be calibrated again before use. Generally, the device should be calibrated once a day and recalibrated after replacing the hydrogen storage alloy. Users can adjust the calibration frequency themselves after becoming familiar with the device.

Figure 5-13 Set Calibration Value

Note: The currently calibrated concentration points will display their values after calibration is complete. You must select "Save Curve" after completing the calibration.

Background Value

Before measuring the sample gas, the background value must be subtracted to eliminate interference from the ambient background. The operating steps are as follows: Move the sampling probe to a clean ambient air environment away from the measurement point (ensure there is no interference from the target pollutant). On the main operating page, use the 【▲】 and 【▼】 keys to select 【Background Value】, press 【Enter】 to confirm the selection. After waiting 7 seconds, the system completes the background value measurement. This operation is valid for a single use and will not be saved after the device is restarted. After a successful operation, a prompt window will appear on the interface, as shown below:

Figure 5-14 **Background Value Detection Successful**

Note: Background value subtraction can be set to "Measure Only" or "Measure and Subtract" in the settings. Users can configure this according to their needs.

Measurement

On the main operating page, use the 【▲】 and 【▼】 keys to select 【Measure】, and press 【Enter】 to confirm and enter the measurement interface. In the measurement interface, you can view relevant information such as 【FID Max Value】, 【FID Real-time Value】, 【FID Average Value】, 【Alarm Threshold】, etc., as shown below:

Figure 5-15 Measurement Screen

- **Carrying and Preparation:** When the instrument is not in use, it is recommended to carry it in the dedicated custom protective case to avoid severe vibration or impact. Check the battery level, remaining hydrogen, and the condition of the sampling probe.

- **On-site Measurement:** The operator holds the instrument and points the sampling probe at the point to be measured (such as pipe joints, equipment leak points, etc.), ensuring an appropriate distance between the probe and the measurement point (1-3 cm is recommended). The instrument will automatically draw in the sample gas and display the VOC concentration value in real time (FID real-time value, maximum value, average value, etc.).

- **Data Storage:**

1. You can select【Manual】storage in the settings interface: Press the【Enter】key to save the current real-time and maximum values. A "Save successful" prompt will appear, as shown below:

Figure 5-16

2. Select 【Automatic】 in the settings interface and customize the storage interval. The system will automatically record measurement data at the preset interval.

Note:

1. During measurement, the instrument should be kept stable to avoid sharp movements that could affect measurement accuracy.
2. If a high concentration of gas is detected (approaching or exceeding 50,000 ppm), the probe should be moved away immediately to prevent the FID detector from flaming out.
3. Press the 【▼】 key to zero the values on the measurement interface.
4. The instrument is equipped with a powerful purge function. Press and hold 【▲】 and 【▼】 simultaneously to activate the powerful purge function to speed up the return-to-zero recovery time.
5. **Alarm Threshold:** Set the threshold value as needed in the settings. During measurement, if the FID real-time value exceeds the threshold, an orange alarm will be displayed, as shown below:

Figure 5-17 Threshold Alarm Display

Flame Off

After the measurement is complete, press the 【Exit】 key to return to the main operating page, select 【Flame Off】, press the 【Enter】 key, and select 【Yes】, as shown below:

Figure 5-18 flame off

Settings

On the main operating page, use the 【▲】 and 【▼】 keys to select 【Settings】, press 【Enter】 to confirm, and enter the settings interface. Select 【Basic Settings】. Here, you can use the 【▲】 and 【▼】

keys to switch units, set thresholds, and perform other settings. Then, use the 【▲】 and 【▼】 keys to scroll to the third page, select 【Save Settings】, and press the 【Exit】 key to return to the main operating page. See the figures below for details:

Figure 5-19 **Basic Settings**

On the main operating page, use the 【▲】 and 【▼】 keys to select 【Settings】, press 【Enter】 to confirm and enter the settings interface. Select 【Time Settings】 to enter and customize the current date and time.

Figure 5-20: time setting

Note:

- **Remote Upgrade:** Software can be upgraded via the upgrade module.
- Detection accuracy, sampling pressure, and shutdown purge functions are configured according to the version; the actual product version shall prevail.
- **Factory Reset:** Select Factory Reset and then press the 【Enter】 key, as shown below:

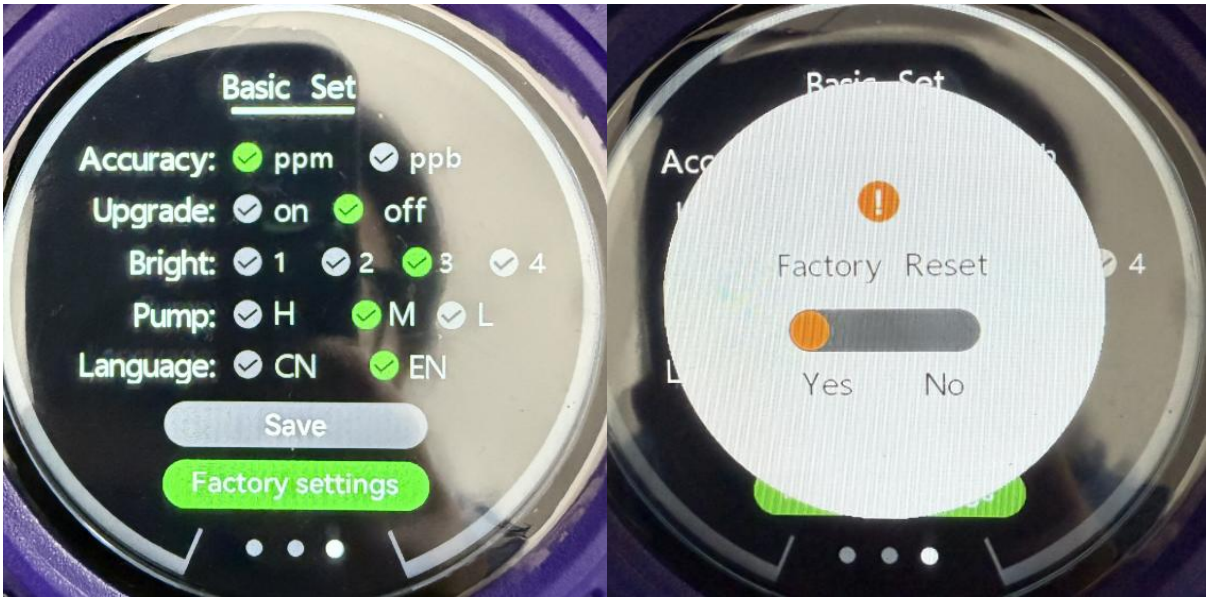


Figure 5-21 **Restore Factory Defaults**

View

On the main operating page, use the 【▲】 and 【▼】 keys to select 【View】 and press 【Enter】 to confirm your selection and enter the view page, as shown in the figure below:

Figure 5-22: view screen

View Data

Use the 【▲】 and 【▼】 keys to select 【Data View】, press 【Enter】 to confirm, and enter the 【Data View】 interface. You can view the data serial number, FID value, other sensor values, etc.

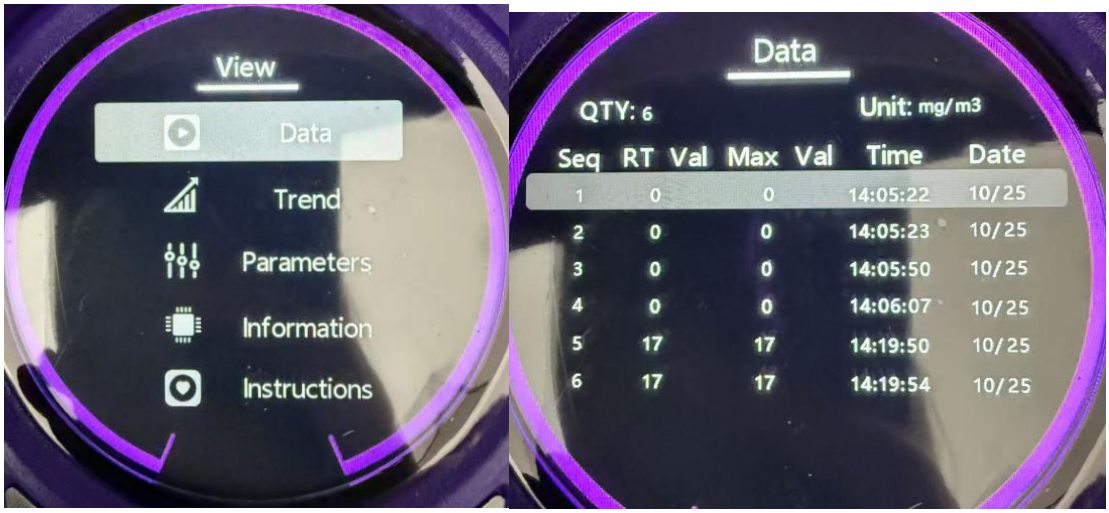


Figure 5-23 data view screen

Note

(1) After selecting data with 【▲】【▼】, press 【Enter】 to choose to delete the file.

Figure 5-24

(2) The device supports viewing up to 100 data entries. If you try to view more, a prompt will ask you to connect to a PC to export and view more data.

Figure 5-25

Trend Curve

Use the 【▲】 and 【▼】 keys to select 【Trend Curve】, press 【Enter】 to confirm, and enter the 【Trend Curve】 interface to view the FID detection trend.

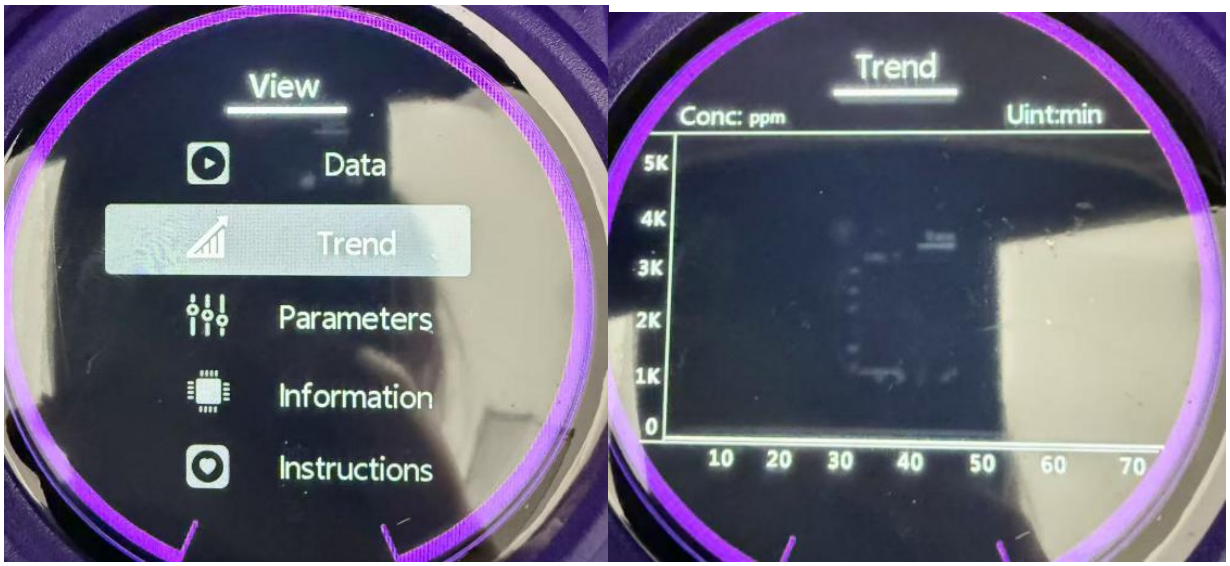


Figure 5-26 "Trend Display" Screen

Operating Parameters

Use the 【▲】 and 【▼】 keys to select 【Operating Parameters】, press 【Enter】 to confirm, and enter the 【Operating Parameters】 interface. You can view the current signal value, FID flame temperature, and main unit temperature.

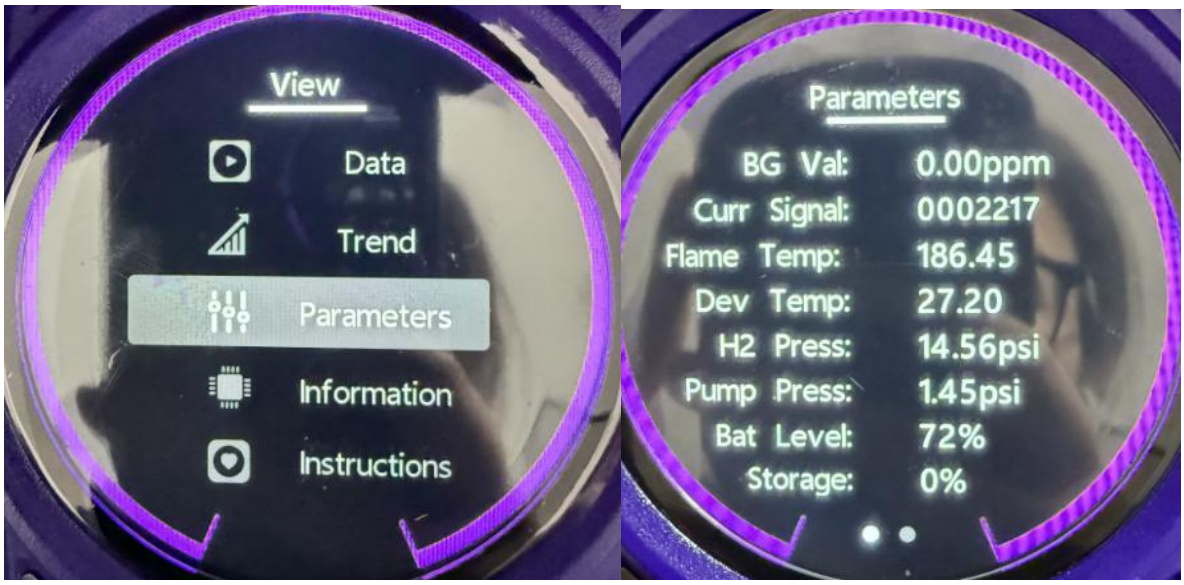


Figure 5-27 operating parameters

Instrument Information

Use the 【▲】 and 【▼】 keys to select 【Instrument Information】, press 【Enter】 to confirm, and enter the 【Instrument Information】 interface. You can view the instrument name, model, software version, serial number, Bluetooth address, memory, screen size, etc.

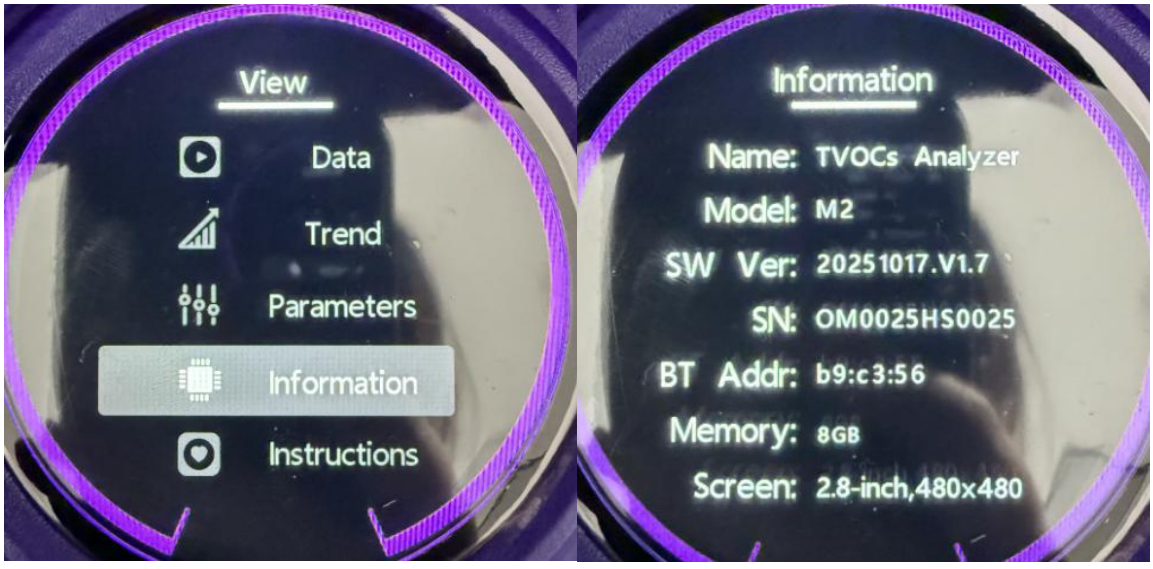


Figure 5-28 instrument information

Service Guide

Use the 【▲】 and 【▼】 keys to select 【Service Guide】, press 【Enter】 to confirm, and enter the 【Service Guide】 interface. Select 【Quick Service Guide】 and press 【Enter】 to access it, or select 【Operation Guide Mode】 and press 【Enter】 to access it.

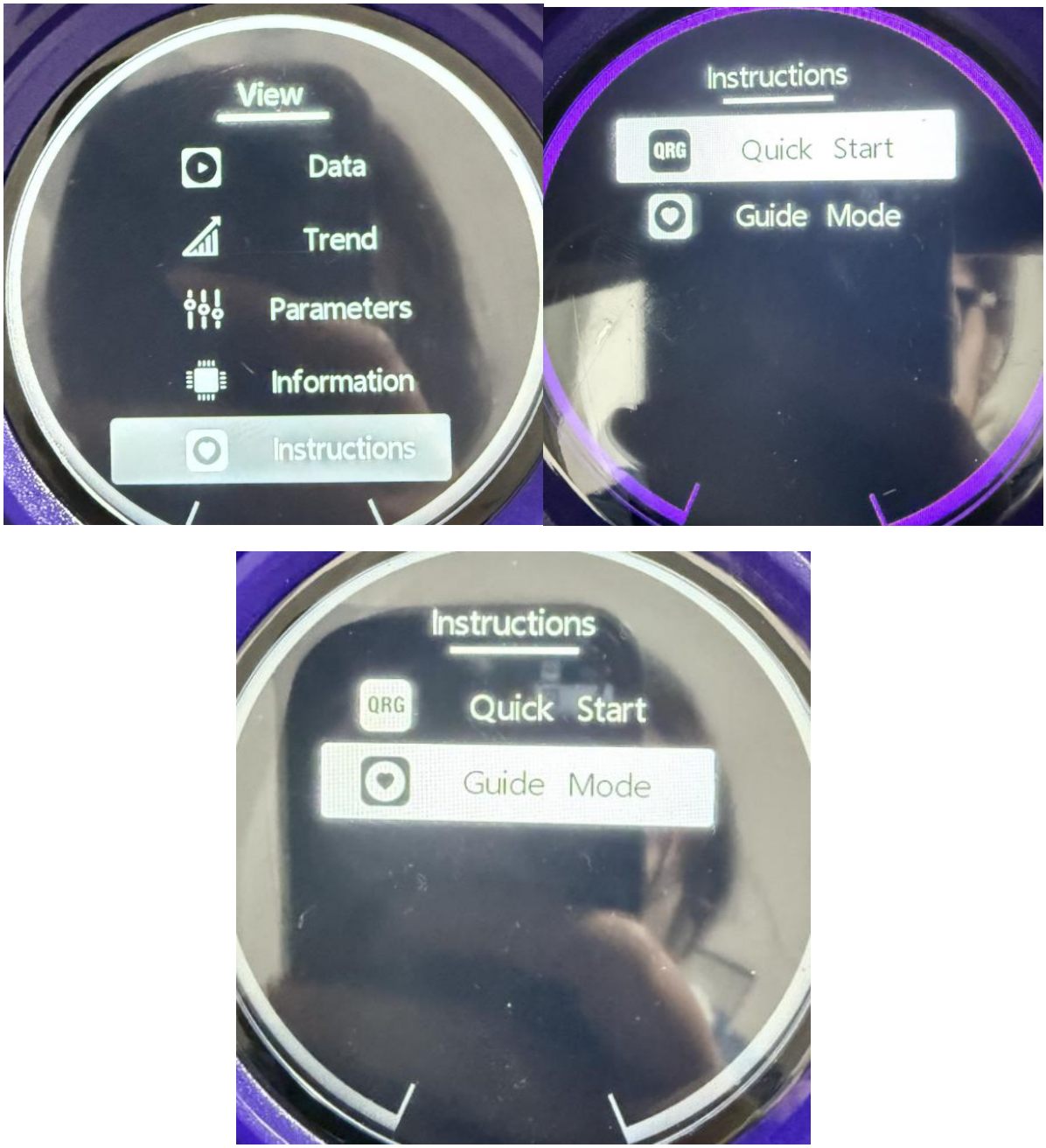


Figure 5-29 Service & Support

Connecting the M2 to a Computer

Before connecting to a computer, please turn off your M2 analyzer first. The M2's USB port (Type C) is located on the back of the main unit, below the charging interface.

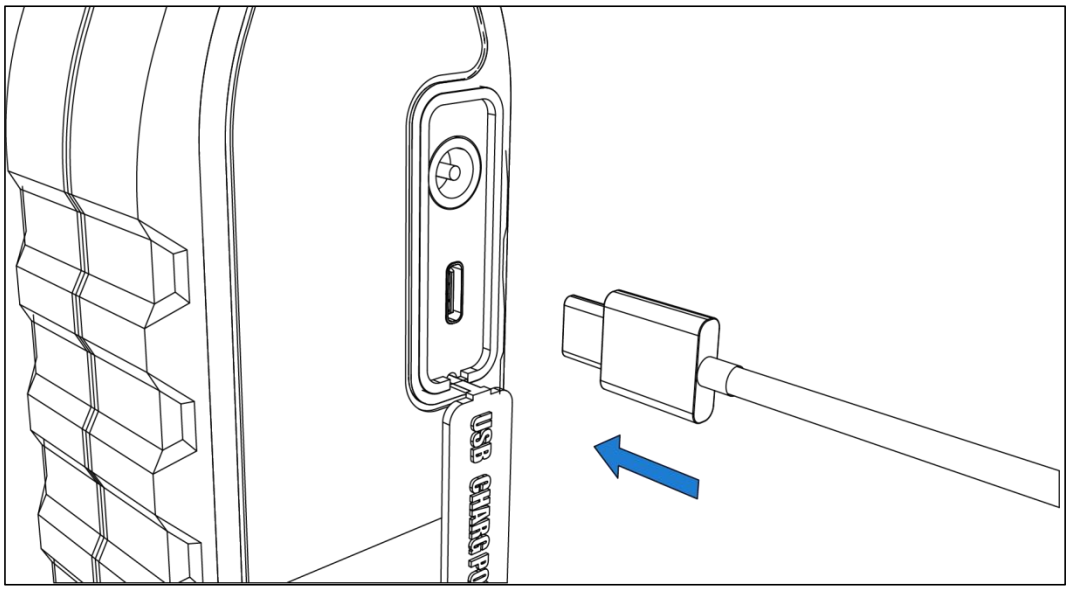


Figure 5-3: M2 USB port

When the M2 is connected to the computer, the analyzer's data will be read. Double-click the M2 icon on the computer to open the M2 and query the detection data entries.

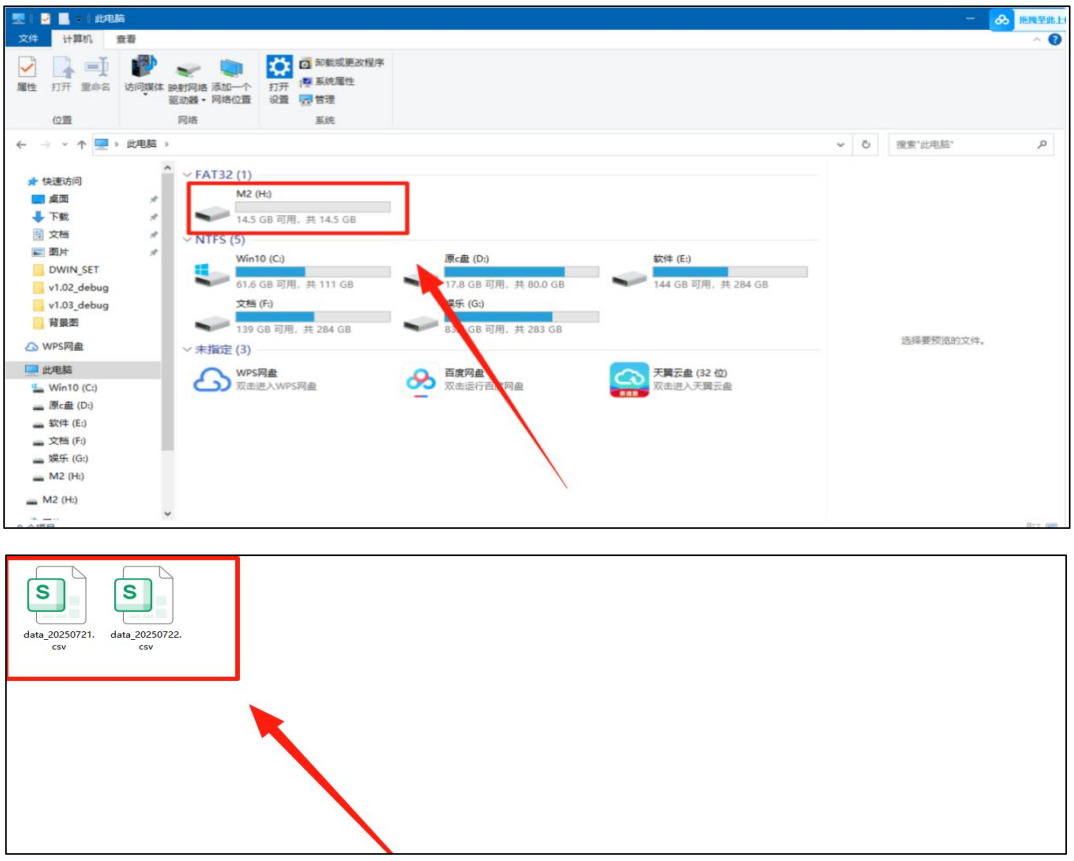


Figure 5-31 **Reading M2 Data via PC**

Hydrogen Source

The core detector of the M2 is the FID (Flame Ionization Detector), which requires hydrogen as the fuel gas to operate. The instrument is equipped with a detachable 10L capacity hydrogen storage alloy cylinder to supply flammable gas to the FID detector. When fully charged, it can operate continuously for about 10 hours.

 **WARNING:**

- The hydrogen storage alloy must be placed in a well-ventilated environment during storage, charging, and use, away from open flames, heat sources (>50°C), and any flammable or explosive hazards.

- It is strictly forbidden to disassemble or cut the hydrogen storage alloy! The alloy oxidizes violently in the air, which can lead to fire/explosion, hydrogen leakage, and a permanent decline in alloy performance.

- Do not use or store the hydrogen storage alloy in the following environments, as it may cause the container to rupture, hydrogen to leak, or performance to degrade:

    - Outside the ambient temperature range (-20°C to 60°C).
    - In direct sunlight or inside a sealed, high-temperature vehicle.
    - In an environment with corrosive gases.
    - In an enclosed space.

- Avoid subjecting the hydrogen storage alloy to strong impacts or dropping it, to prevent container rupture, leakage, or performance damage.

- Only fill with hydrogen of >99.99% purity! Filling with other gases (especially those containing oxygen) will cause a sharp decline in alloy performance and may trigger a violent oxidation reaction, posing a risk of fire and explosion. Be extremely cautious!

- If you need to transport or store an empty hydrogen storage alloy for a long period, the hydrogen should be vented.

- **Rapid Charging/Discharging (Gas Exchange):** For a hydrogen storage alloy that has not been used for a long time (more than 1 month), a gas exchange cleaning must be performed before use to prevent residual gas inside from affecting purity. After the gas is completely vented (no sound of gas flow), follow the normal charging procedure to fill it.

- For disposal or handling of the hydrogen storage alloy, please contact our company! Improper disposal can be dangerous.

- Keep the hydrogen storage alloy out of reach of children.

- When connecting accessories to the hydrogen storage alloy, tighten them moderately. Overtightening can damage the seal and cause leaks!

- After charging the hydrogen storage alloy is complete, the connector must be unscrewed slowly. Do not twist it off forcefully. If unscrewed quickly, it may cause a sudden spray of high-pressure gas, accompanied by a loud hissing sound, which is a safety hazard.

- Handle with care throughout the entire process to avoid impact or severe vibration to the hydrogen storage alloy.

The hydrogen in the storage alloy cylinder can be filled by the accompanying small hydrogen generator or by a high-pressure cylinder with a pressure regulator. This chapter details these two methods of charging the hydrogen storage alloy.

Hydrogen Generator

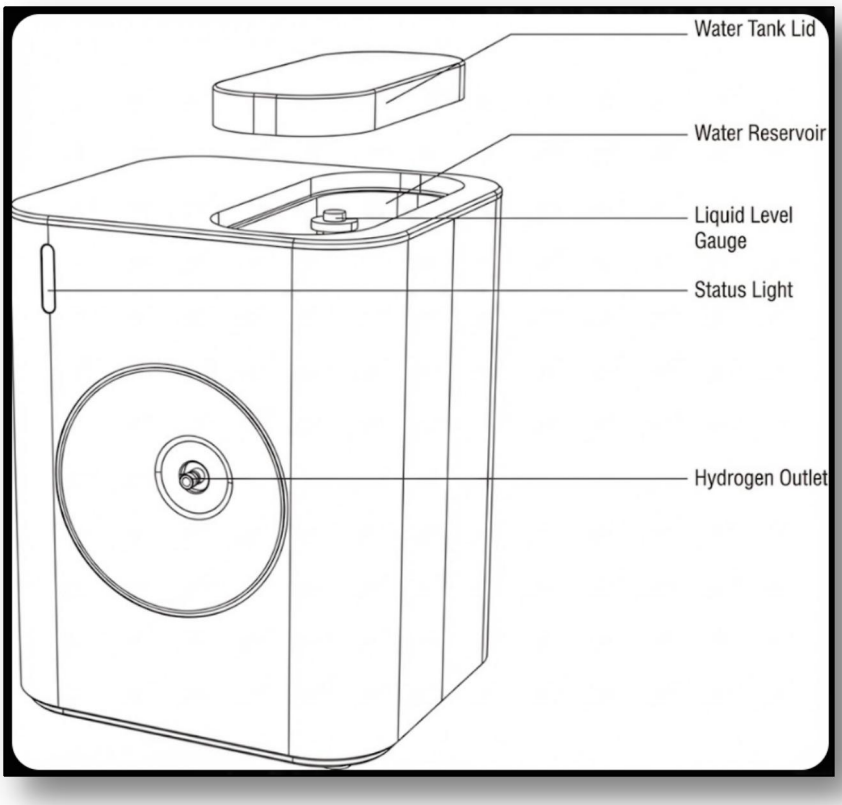


Figure 6-1 **Structure Diagram of Hydrogen Generator**

The structure of the hydrogen generator is shown in Figure 6-1. It is mainly used to charge the hydrogen storage alloy with hydrogen. The specific operating steps are as follows:

- Place the hydrogen generator upright on a stable, well-ventilated surface, ensuring there are

no open flames, heat sources, or flammable/explosive materials nearby.

- Open the water tank lid and add distilled or deionized water to the tank up to the fill line, then close the lid.

- Connect the provided power adapter. The generator's indicator light will flash green. If it is the first time using it or if it has been out of use for more than 2 months, let it sit for half an hour before connecting the power. After connecting the power, the status light will turn to a flashing green, indicating that charging has begun.

- As shown in Figure 6-2, use the inflation connector to slowly screw and connect the hydrogen storage alloy to the hydrogen generator until it is tight.

- When the status light changes from a flashing green to a solid green, it means the hydrogen storage alloy is fully charged with hydrogen. At this point, slowly unscrew the hydrogen storage alloy counter-clockwise, then remove the inflation connector, disconnect the power, and empty the water from the waste water tank. The charging time is typically about 3 hours at room temperature, and 1.5-2 hours at 0°C.

- If you need to charge multiple hydrogen storage alloys, repeat steps 4-5.

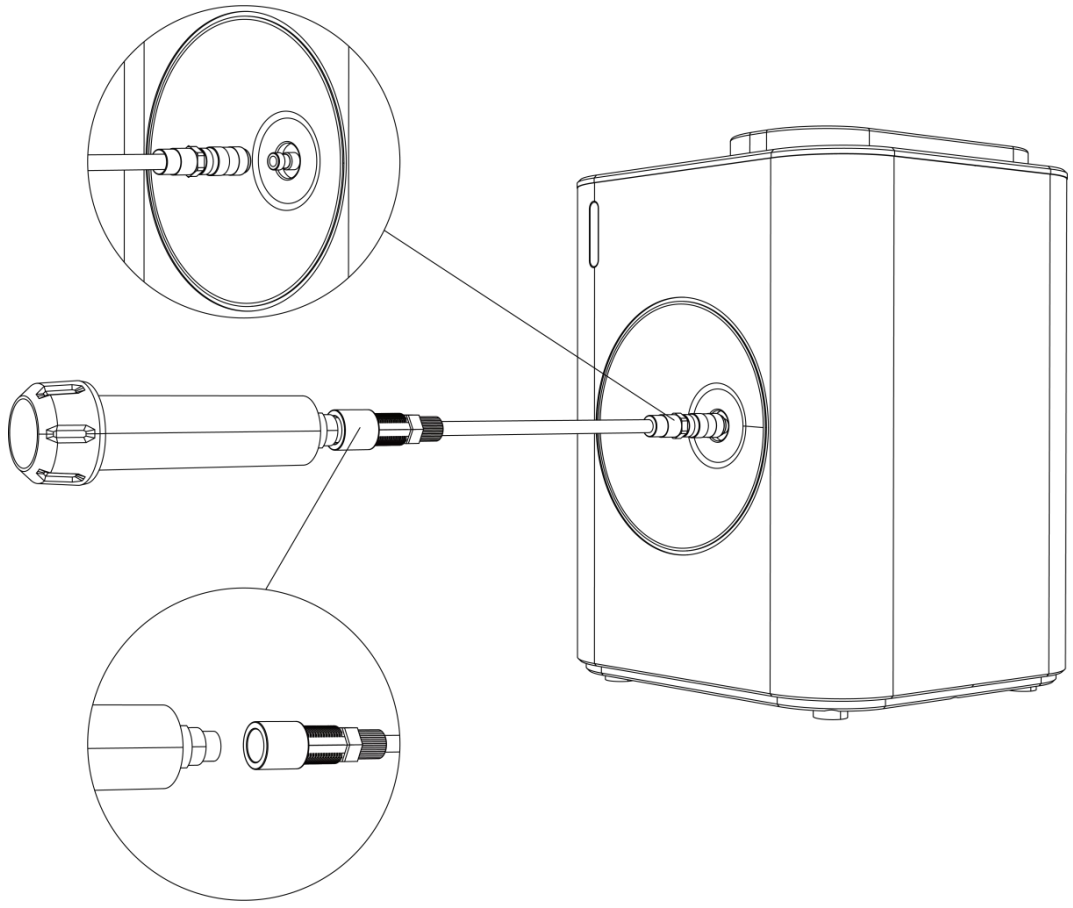


Figure 6-2 Metal Hydride Cylinder Charging Diagram

Note:

- The hydrogen generator must always be kept upright. Do not tilt, invert, or disassemble it, to avoid damaging internal components or causing water leakage.

- During the charging process, the generator and the hydrogen storage alloy must be in a ventilated environment, away from open flames, heat sources, and flammable/explosive substances, to ensure there are no safety hazards nearby.

- A brief pumping sound during charging is a normal part of the system's water removal process and is no cause for concern. A slight hissing sound when unscrewing the hydrogen storage alloy is the release of residual gas and is also normal.

- You must use distilled or deionized water in the water tank. Do not use tap water, mineral water, or other water containing impurities, to prevent clogging of internal tubing or affecting hydrogen purity.

- Turn the hydrogen storage alloy slowly to avoid damaging the threads from excessive force. After charging is complete, remove the hydrogen storage alloy promptly and clear the water from the waste water tank.

- In a 0°C environment, charge for 1.5-2 hours only; it does not need to be fully charged. If fully charged, the internal pressure may reach 1 MPa, which can easily lead to gas leaks during use, affecting the accuracy of measurement data.

- After charging is complete, remove the hydrogen storage alloy and the inflation connector. The device must be disconnected from power, the waste water tank emptied, and then stored properly.

- Securely ground all equipment and connecting lines related to hydrogen.

- Place in a well-ventilated area, away from open flames, heat sources (such as heaters, ovens, etc.), and high-temperature environments. Do not expose to direct sunlight.

- Do not store with strong acids, strong bases, oxidizing agents, or other hazardous chemicals to prevent chemical reactions that could cause danger.

- Handle with care during transportation and handling. Do not drop, roll, or impact, to avoid damage to the hydrogen storage alloy casing that could lead to hydrogen leakage.

High-Pressure Cylinder Charging Apparatus

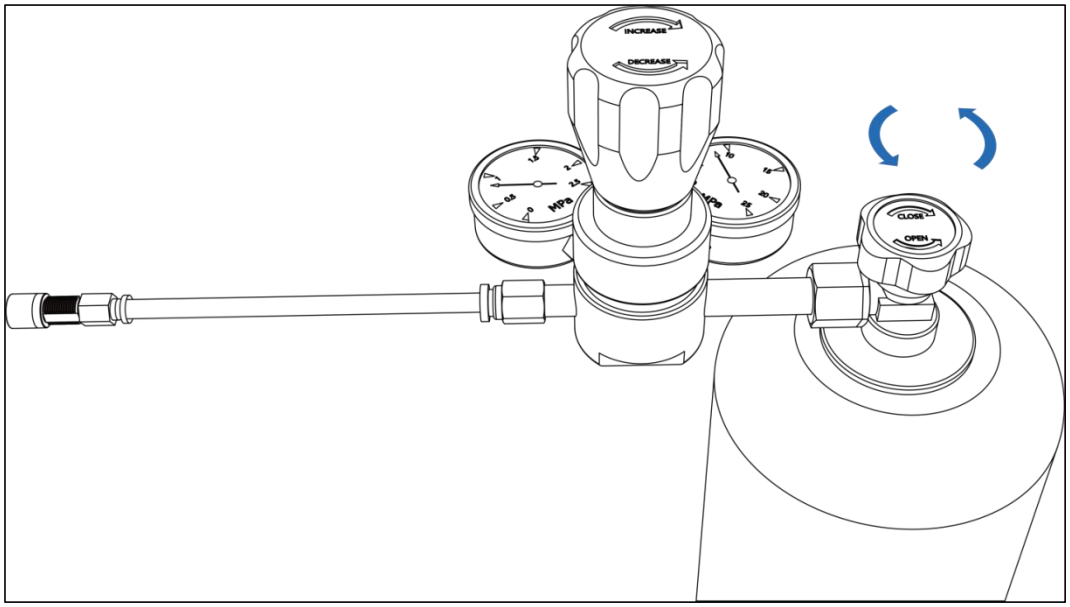


Figure 6-3 High-Pressure Hydrogen Cylinder Filling Setup Diagram

Installing the Pressure Regulator

The preferred pressure regulator is a high-quality stainless steel diaphragm stainless steel regulator. Installation is simple: just screw the nut on the regulator assembly onto the threaded interface of the high-pressure cylinder and tighten it.

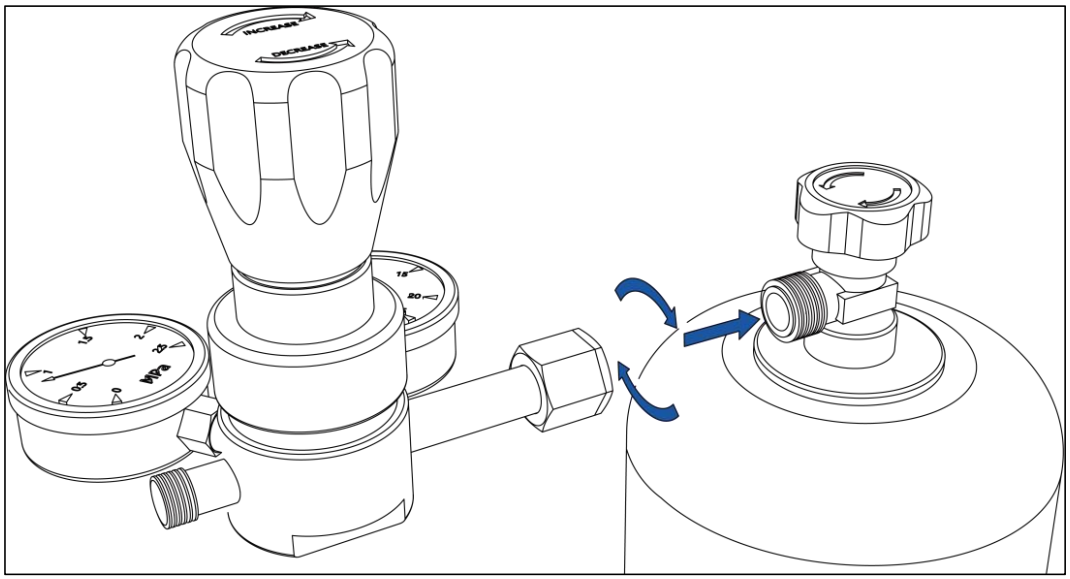


Figure 6-4 Pressure Regulator Installation Diagram

Insert the inflation connector into the threaded interface on the regulator assembly and tighten it.

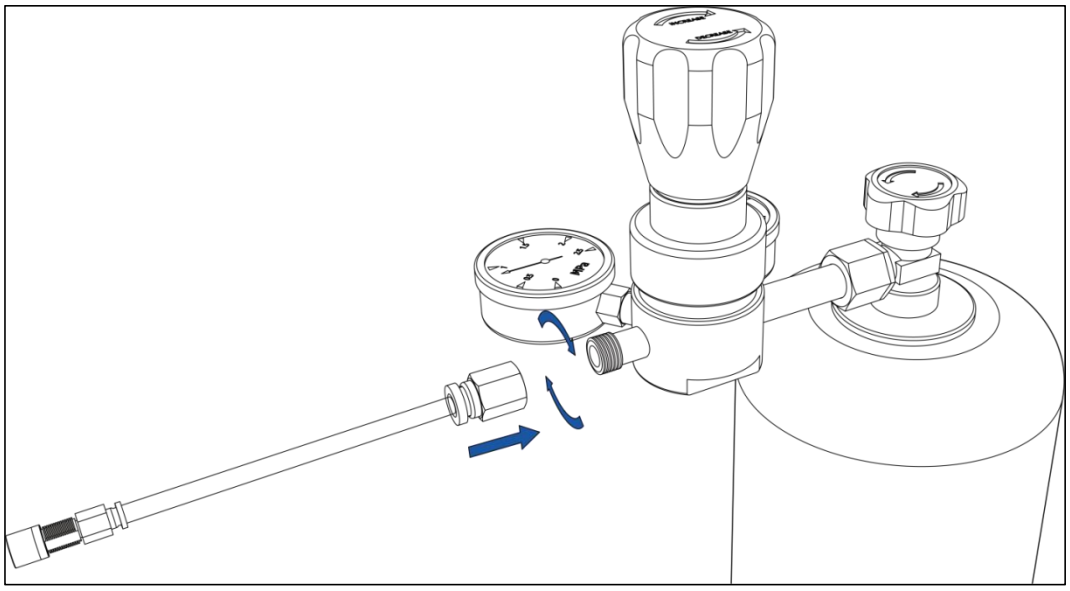


Figure 6-5 Charging Adapter Kit

Note:

- Standard gas pressure regulators have a limited lifespan. An expired regulator may pose a risk of gas leakage.

- Based on our years of experience with instrument use and operation, we provide the following precautions to extend the life of the hydrogen pressure regulator for user reference: (1) Before installing the pressure regulator, wipe the dirt off the cylinder valve to prevent dust and moisture from entering the regulator. The operator should not stand in front of the cylinder valve outlet when opening it to prevent injury from a sudden burst of high-pressure gas. (2) The regulator's pressure adjustment knob should be loosened before opening the cylinder valve. Open the cylinder valve slowly and without excessive force to prevent high-pressure gas from damaging the regulator and high-pressure gauge. (3) After opening the cylinder valve, check for leaks in all parts and whether the pressure gauges are working correctly. Connect the hose only after this check is complete. (4) The pressure regulator must not be contaminated with grease. If there is grease, it must be wiped clean before use. (5) If the pressure regulator freezes during use, thaw it with hot water or steam. Do not heat it with an open flame. (6) When stopping work, close the cylinder valve, slowly release the gas inside the regulator (until the pressure gauge reads zero), and leave the pressure adjustment spring in a relaxed state. (7) The pressure regulator must be inspected regularly, and the pressure gauges must be calibrated regularly to ensure reliable pressure regulation and accurate readings.

Charging Procedure for the Charging Apparatus

- **Step 1:** First, confirm that the main valve of the high-pressure hydrogen cylinder and the pressure switch of the inflation adapter are in the closed state.

- **Step 2:** Open the main valve of the high-pressure hydrogen cylinder, then slightly open the pressure switch of the inflation adapter. When you hear a "hissing" sound of gas being released while the pressure gauge pointer has not moved, you are purging the air from the inflation adapter's tubing.

- **Step 3:** Tightly screw the hydrogen storage alloy onto the threaded interface of the inflation adapter.

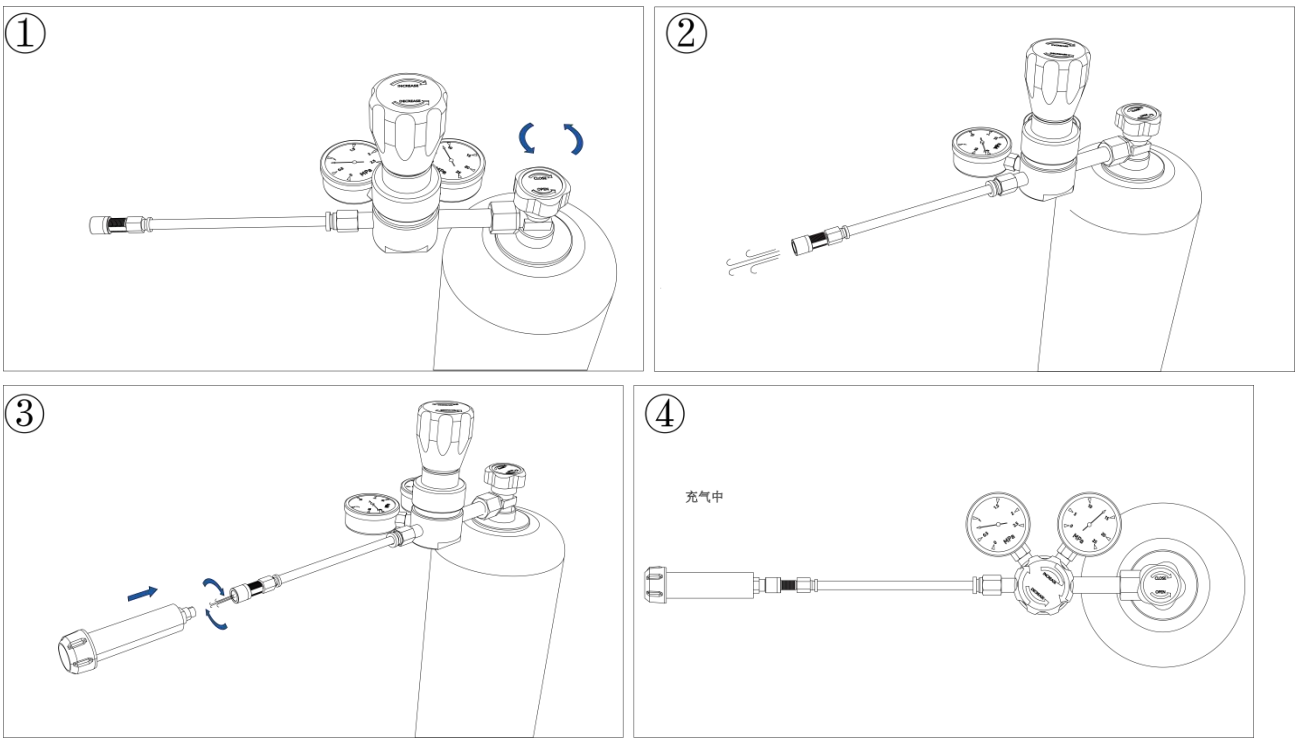
- **Step 4:** Turn to open the pressure switch on the inflation adapter. Lightly turn the pressure adjustment knob clockwise to increase pressure. Watch the pressure gauge and adjust it to 0.7 MPa.

- **Step 5:** The charging time is 3 hours. Wait for the charging to complete.

- **Step 6:** First, turn the main valve of the high-pressure hydrogen cylinder clockwise to close it, then turn the pressure adjustment knob counter-clockwise to close it.

- **Step 7:** Unscrew the hydrogen storage alloy from the inflation adapter.

- **Step 8:** Finally, open the pressure adjustment switch on the inflation adapter again to release the residual hydrogen in the pipeline, then close the pressure adjustment switch. Charging is complete.



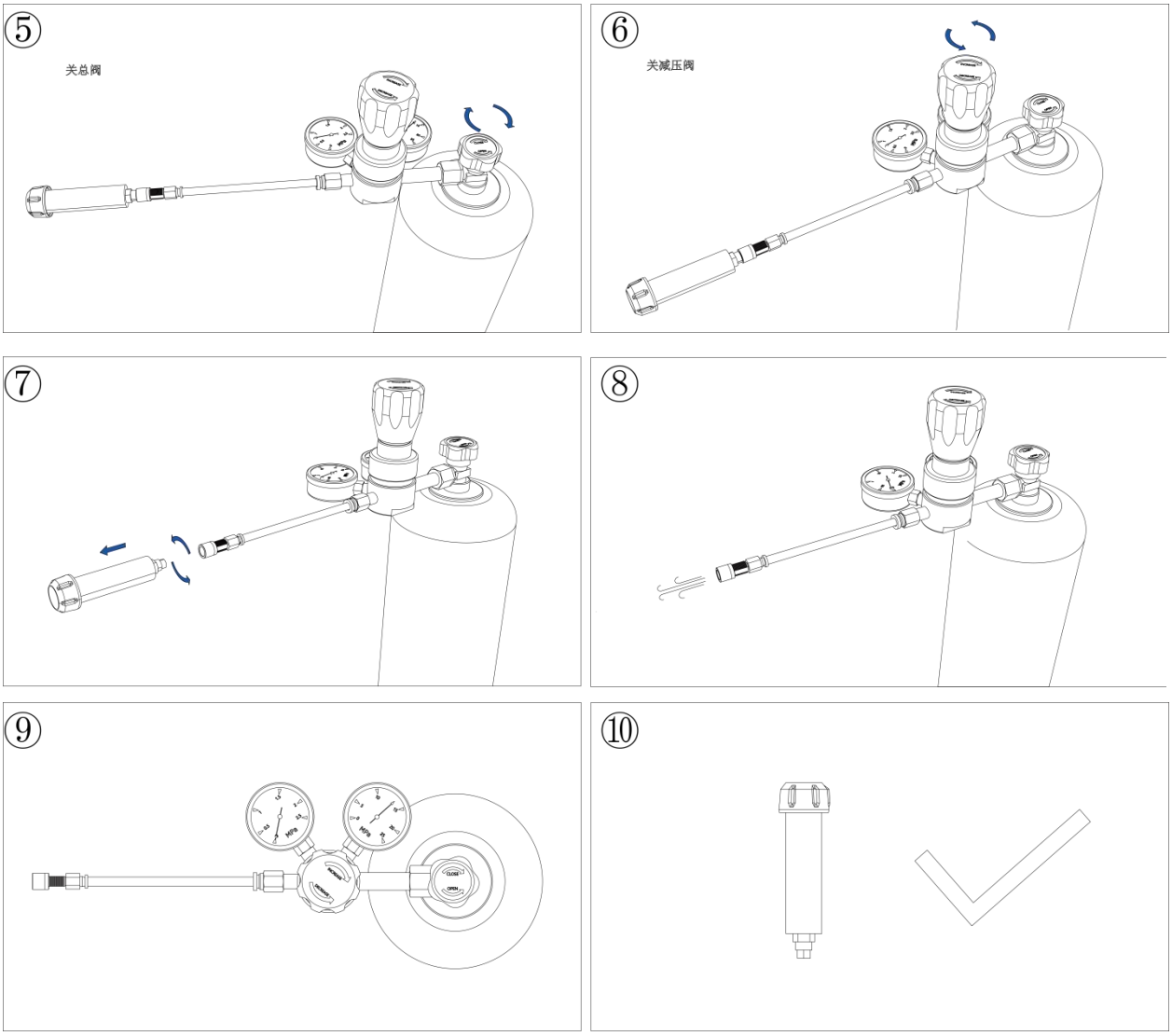


Figure 6-6 **High-Pressure Cylinder Filling Procedure**

WARNING:

- Hydrogen is a highly flammable gas! Before charging, a strict leak check must be performed on the charging line and all connections to ensure there are no leaks.

- When charging with a high-pressure hydrogen cylinder, you must ensure the gas source is zero-grade hydrogen (total hydrocarbons <0.5 ppm). The maximum allowable inlet pressure for the hydrogen storage alloy is 0.7 MPa (approx. 100 psi). Over-pressurizing may lead to alloy failure or even danger.

- Do not charge or operate the hydrogen storage alloy in a high-temperature environment or in the presence of an open flame.

- The lower explosive limit of hydrogen in air is 4% (by volume). If the concentration exceeds this limit and encounters an ignition source such as a spark or static electricity, an explosion is highly likely. To prevent explosion accidents:

1. Smoking, welding, creating sparks, or static discharge is strictly prohibited near this equipment, the high-pressure hydrogen cylinder, and connecting pipelines.
2. Regularly check this equipment and the hydrogen connection lines for leaks. If a leak is found, stop using it immediately and contact Aoma professionals for handling. Do not disassemble or repair the container or valve parts yourself.
3. Always keep this equipment and the high-pressure hydrogen cylinder-related equipment in a well-ventilated place.

Note:

- After charging is complete, you need to perform a leak test with soapy water. Apply soapy water with a cotton swab to the charging line and connections in sequence. If there is a leak, bubbles will form.

- The charging device is equipped with a needle valve to limit the flow rate. Please open the needle valve slowly during the charging process.

- If you hear a "hissing" sound from the hydrogen storage alloy during charging or use (suspected leak), turn off the equipment immediately. You may only continue operation after the leak hazard has been completely eliminated.

- Ground all equipment and pipelines related to hydrogen.

- When charging the hydrogen storage alloy with hydrogen, be sure to comply with all safety, labeling, and warning regulations.

Tips:

When charging, please confirm:

- Ensure the inlet of the hydrogen storage alloy and the hydrogen charging device are clean and uncontaminated.

Battery and Power Adapter Usage

The M2 uses a rechargeable lithium-ion battery pack (see Table 1 for parameters). It can be charged and discharged inside or outside the device using the power adapter (see Table 1 for parameters). When the device displays a "Battery level is too low" prompt (the battery indicator turns red) or automatically shuts

down and cannot be restarted, it means the battery is depleted and needs to be charged. There is a charging port on the side of the device. The specific charging steps are as follows:

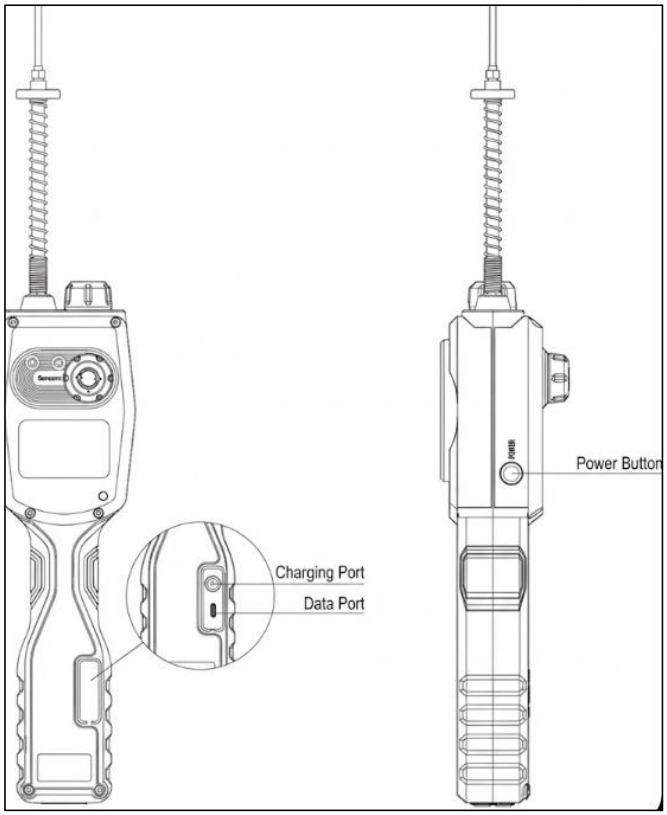


Figure 7-1 Power Button and Charging Port Diagram

- Take out the provided power adapter, insert one end into the device's charging port, and connect the other end to a 220V/50Hz AC power outlet.

- After connecting the power, the adapter's indicator light turns red, indicating that it is charging. Simple operations (like viewing data) can be performed on the device during charging, but avoid power-consuming operations like measurement and calibration.

- When the adapter's indicator light changes from red to green, it means the battery is fully charged. At this point, you can disconnect the power and unplug the adapter.

- After charging is complete, the device can be turned on and used normally.

WARNING:

- Do not perform charging operations in an environment with flammable gases or other explosion threats.

- Do not charge when the ambient temperature is below 0°C or above 45°C.

- Do not charge when the battery or charger is near a fire source.

Note:

- The power adapter must be the original model provided with the device. Do not use other models to prevent damage to the battery or device due to voltage mismatch.

- **Charger Indicator Light Status:**

  - **Red light:** Charging in progress.
  - **Green light:** Standby for charging or battery is fully charged.
  - **No light or abnormal:** The charger may be faulty. Do not use this charger until the fault is confirmed, to avoid damaging the battery or device.

- When the device is turned off, it takes about 3 hours to fully charge the battery from depletion. Charging time will be longer if the device is on and running.

- Avoid leaving the battery in the charger for a long time (more than 96 hours). If you need to remove the battery for charging or replace it with a spare, please turn off the device power first.

- Disconnect the power promptly after a full charge to avoid damaging the battery from prolonged overcharging.

Optional Sensor Instructions

The M2 is an efficient portable device for determining organic and inorganic compounds, used in industrial gas measurement. It is also equipped with dual detector ports and can be optionally fitted with sensors such as PID/O_2/CO/SO_2/H_2S. Users can choose to purchase a single detector or a dual detector combination based on their actual needs.

This chapter takes PID as an example to introduce its parameters and usage methods.

PID (Photoionization Detector)

A photoionization detector (PID) consists of an ultraviolet lamp and an ionization chamber. When a mixture passes through the ionization chamber, it absorbs UV light energy, causing a change in energy levels, and the molecules are excited to produce ions, according to the following photochemical reaction: R + hv → R+ + e- Where R represents most organic/inorganic compounds. The ions generated in the reaction migrate

under an electric field to form a current, which is proportional to the concentration of the compound. It should be noted that for molecules to undergo a photochemical reaction, the energy of the UV light must be greater than the excitation energy required for the molecular energy level transition.

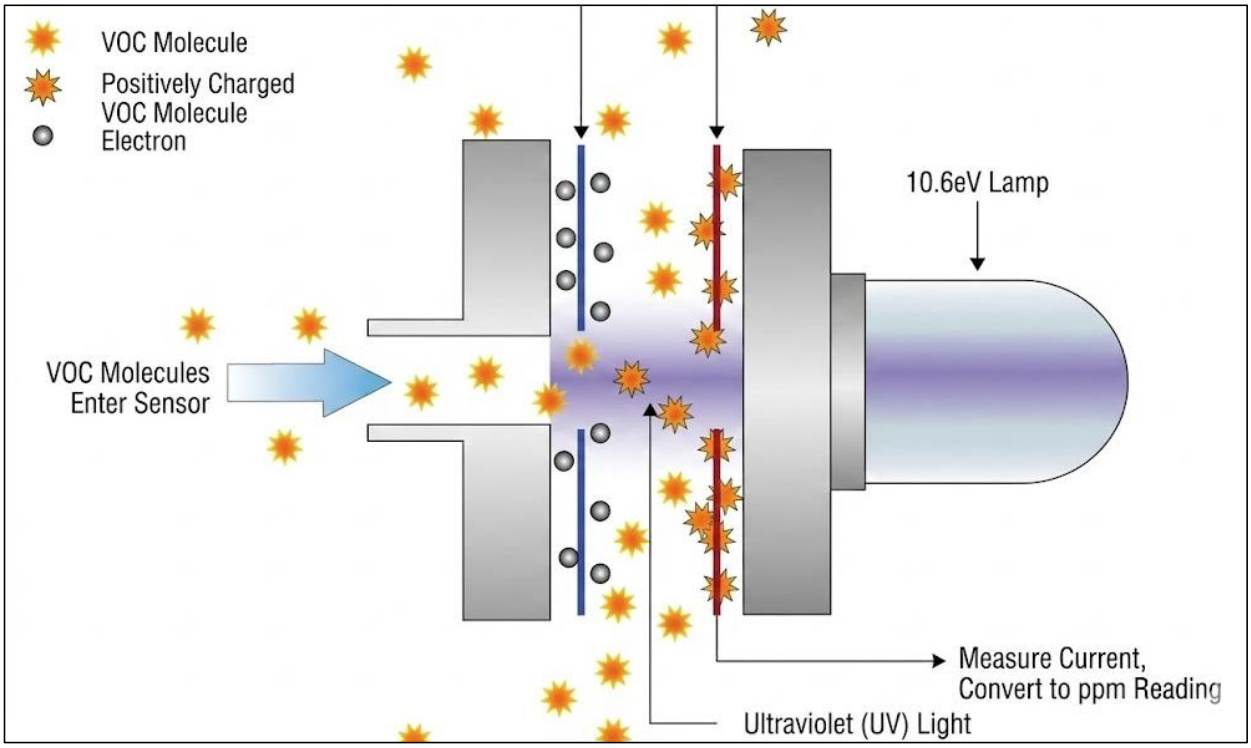


Figure 8-1 Typical PID Sensor Diagram

Although the PID detector is not suitable for detecting high-concentration gases due to its smaller dynamic range, it can effectively compensate for the shortcomings of FID testing in some inorganic components to which FID does not respond or responds poorly. Furthermore, since PID detection does not require combustion gas and oxygen, it is considered the preferred detector for analysis in some extreme environments, such as flammable, explosive, and low-oxygen environments. Therefore, the dual-detector combination of PID + FID not only helps the instrument to broaden its detection range and enhance its detection capability by comparing detection data, but in some cases, it can also help users identify certain components in the detection environment. For example, FID has no response to inorganic components while PID does, whereas PID has no response to some organic components like methane, but FID has a good response. Since the PID is a non-destructive detector, the gas detected by the PID can be restored and enter the FID for re-detection. The dual-detector combination can help users save gas sources to the greatest extent and reduce detection costs while broadening the detection range.

PID Technical Specifications

Item	PID Sensor Parameters
Accuracy	0.5–2000 ppm: ±10% of reading or ±0.5 ppm (whichever is greater). This accuracy is achieved with a single-point calibration using isobutylene at 1000 ppm (including drift) at the calibration temperature and humidity.
Repeatability	±1% at 100 ppm isobutylene
Dynamic Range	0.5–2000 ppm isobutylene
Linear Range	0.5–2000 ppm isobutylene
MDL	0.5 ppm isobutylene
Response Time (T90)	Using 500 ppm isobutylene at 20°C: ≤ 3.5 seconds
Baseline Voltage	50mV-85mV

Table 11: PID Technical Specifications

Installation/Removal

The installation port for the PID sensor is located on the back of the M2 main unit.

First, please ensure that the M2 is turned off and the environment is clean to prevent the sensor components from being contaminated by dust, oil, or grease.

Remove the protective cap of the PID sensor by turning it counter-clockwise. Align the PID sensor connector plug with the host connection hole for installation.

Install the protective cap by turning it clockwise.

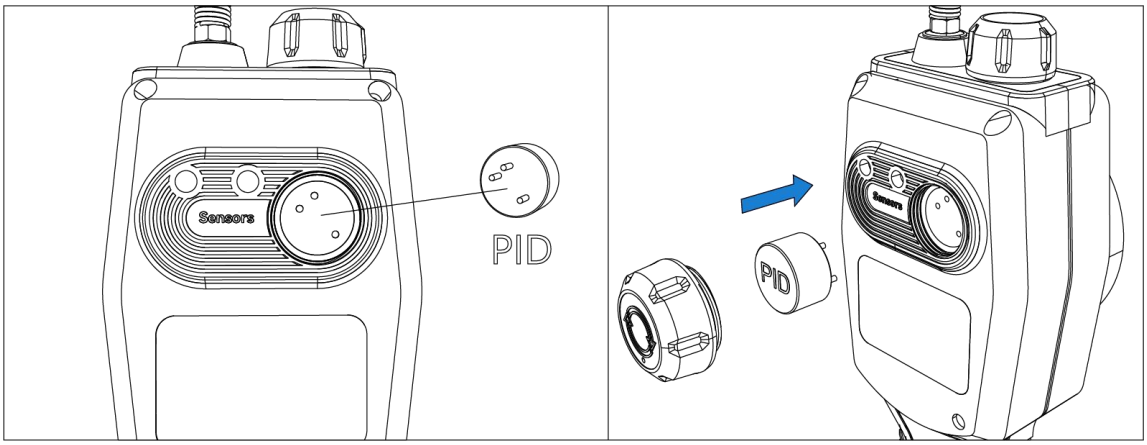


Figure 8-2 PID Sensor Installation Diagram

Note: The PID is a very sensitive detection instrument. Hands and tools must be clean during

installation and removal operations. Please be extremely careful during operation and do not drop it.

Calibration

Before starting, please prepare zero gas/ambient air and isobutylene standard gases of different concentrations. A complete calibration curve can be established by calibrating at two or more concentration points. The system also supports 6 concentration calibration points for the PID; users can modify the concentration values in the calibration interface.

- On the main operating page, use the 【▲】 and 【▼】 keys to select 【Calibrate】 and press 【Enter】 to confirm.
- Select 【PID Calibration】 and press 【Enter】 to confirm, entering the calibration interface.

Figure 8-3 PID calibration diagram

Taking a PID with a range of 0–2000 ppm as an example, before performing calibration, ensure that all pre-calibration preparations have been completed: no interfering gases, good ventilation, and appropriate standard gases (such as isobutylene standard gas). The specific operating method is:

- Step 1: Prepare three standard gas bags and fill them separately with zero gas/ambient air, 500 ppm isobutylene standard gas, and 2000 ppm isobutylene standard gas.
- Step 2: Turn on the device.

- Step 3: On the main operating page of the device, select 【Calibrate】 and then 【PID Calibration】 to enter the calibration interface.

- Step 4: Open the valve of the zero gas bag, connect the M2 probe to the zero gas bag/ambient air, and introduce zero gas/ambient air into the device. Use the 【▲】 and 【▼】 keys to select 【Click to Calibrate】 on the screen and press 【Enter】. The real-time response concentration value will be saved in the recorded response column, completing the zero-point concentration calibration.

- Step 5: Use the 【▲】 and 【▼】 keys to select the data column on the left. Press 【Enter】 to open the keypad and manually enter 500. After selecting 【√】, open the valve of the 500 ppm gas bag, connect the M2 probe to the 500 ppm gas bag, and introduce 500 ppm standard gas into the device. Then use the 【▲】 and 【▼】 keys to select 【Click to Calibrate】 on the right side of the screen and press 【Enter】. The real-time response concentration value will be saved in the recorded response column, completing the 500-point concentration calibration.

- Step 6: Use the 【▲】 and 【▼】 keys to select the data column on the left. Press 【Enter】 to open the keypad and manually enter 2000. After selecting 【√】, open the valve of the 2000 ppm gas bag, connect the M2 probe to the 2000 ppm gas bag, and introduce 2000 ppm standard gas into the device. Then use the 【▲】 and 【▼】 keys to select 【Click to Calibrate】 on the right side of the screen and press 【Enter】. The real-time response concentration value will be saved in the recorded response column, completing the 2000-point concentration calibration.

Item	Specification	Description
Zero Grade Air	8L pure air with pressure regulator	PID Detector
500 ppm Isobutylene Standard Gas	8L isobutylene in air with pressure regulator	Calibrate PID Detector
2000 ppm Isobutylene Standard Gas	8L isobutylene in air with pressure regulator	Calibrate PID Detector

Table 12: Standard Gas Parameters

Note:

- It is recommended to use zero gas and standard gases of different concentrations for device calibration. Users can select the appropriate concentration points for calibration based on their actual needs.

- For each calibration, at least 2 concentration points must be calibrated for the calibration curve to be valid.

- Each M2 is calibrated and tested before leaving the factory. Nevertheless, to ensure normal operation, the device should be calibrated again before use.

Measurement

On the main operating page, use the 【▲】 and 【▼】 keys to select 【Measure】, and press 【Enter】 to confirm your selection and enter the measurement interface. In the measurement interface, you can view the 【PID Real-time Value】, as shown in the figure below:

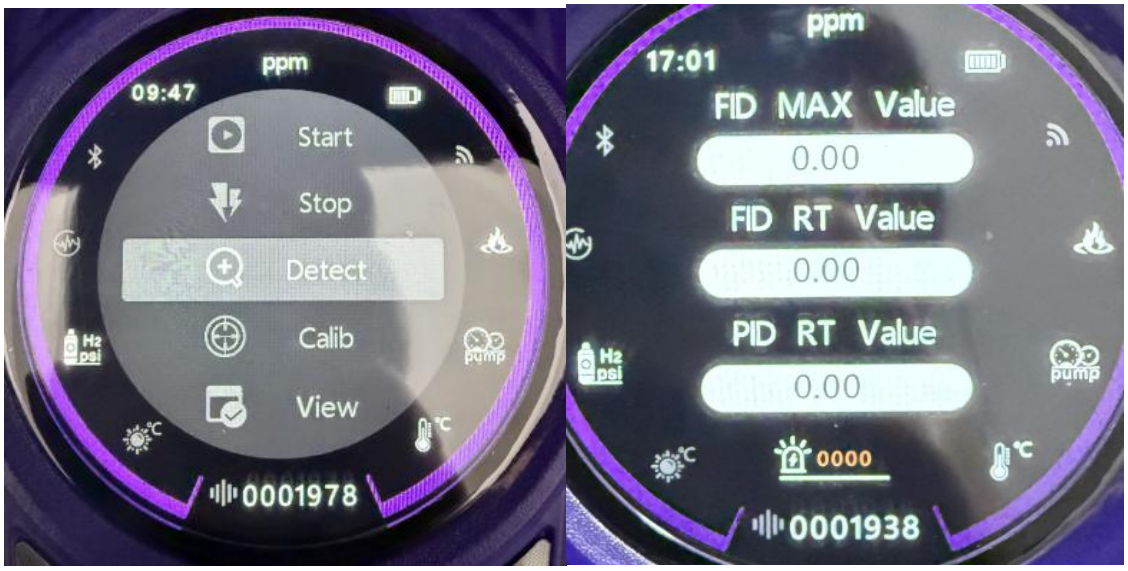


Figure 8-4:FID+PID Dual Sensor Screen

Maintenance and Service

The contents of this chapter are intended only for professionally trained and qualified operators. If you are unfamiliar with the specific operating procedures, please be sure to read this chapter carefully, or contact the customer service department of Aoma. or your distributor for technical support. Do not perform any disassembly operations without professional guidance.

Note:

- If you must open the instrument casing, be sure to turn off the gas supply and disconnect all power before operating to prevent gas leakage or electric shock risks.

- Static electricity can damage the instrument's circuit boards. Do not touch the circuit boards unless necessary. If handling is required, you must wear a grounded anti-static wrist strap or take other effective anti-static measures.

- Before performing maintenance on FID detector components (including the explosion-proof tube, detector body, sintered filter, etc.), you must first disconnect the power and wait for them to cool completely to avoid burns or component damage from high temperatures.

- After maintenance work is completed, carefully inspect the interior of the instrument to ensure no tools or foreign objects have been left behind, to prevent short circuits or mechanical failures after powering on.

- When the instrument is powered on, it is strictly forbidden to use metal tools or metal parts to directly contact internal circuit connection points or to perform short-circuit operations, to prevent electric shock or circuit burnout.

- Maintenance work is recommended to be performed by professional maintenance personnel. Using spare parts not provided by our company or that are unauthorized, as well as making unauthorized modifications to the instrument, may cause unpredictable safety accidents, and the user will bear the consequences.

Maintenance Schedule

To ensure the long-term stable operation of the equipment, a regular maintenance plan should be established based on the frequency of use and environmental conditions. The following are the recommended

maintenance work frequencies and requirements for continuous use of the M2. Users can adjust them according to their actual situation:

Time (hours)	Task	Frequency	Required Materials
0.5~1.0	Instrument Calibration	Once daily to once weekly	Standard gas, dynamic calibrator, or clean gas bag
0.1	Clean/Replace Probe Sampling Filter Membrane	Once per hour	Spare probe filter membranes
0.5	Clean FID end metal sintered flame arrestor	Once every three months	Pliers, isopropyl alcohol, distilled water, oven
0.5	Clean FID polarization cell	Once every three months	Alcohol, lint-free cotton swabs, ultrasonic cleaner, oven
2	Clean FID detector inner chamber	Once every six months	Aoma Smart service personnel or trained professionals only
2	Clean main unit inner chamber	Once a year	Aoma Smart service personnel or trained professionals only

Table 13: Maintenance Schedule

Gas Path Component Maintenance

To prevent dust and moisture in the sample gas from contaminating the detection system, a filter membrane is installed at the inlet of the sampling probe, which can effectively block particles larger than a certain diameter. After frequent use, dust will accumulate on the surface of the filter membrane. If not handled in time, it may cause the gas path to become blocked, leading to slow detection response, distorted data, and other problems.

Filter Membrane Maintenance Key Points:

1. **Inspection Frequency:** It is recommended to observe the condition of the filter membrane from time to time. If obvious contamination is found on the surface or the instrument displays "Flow anomaly," it needs to be addressed immediately.
2. **Cleaning and Replacement:**
    - For light contamination, the filter membrane can be removed, rinsed with distilled water, and reused after drying.
    - For severe contamination or damage, a new filter membrane must be replaced to ensure filtration effectiveness.

Note:

- Under normal operating conditions, it is recommended to replace the filter membrane once a week. If the on-site dust concentration is high and the humidity is high, the replacement frequency should be increased (e.g., daily replacement).

- When installing the filter membrane, ensure that the filter membrane base and the nut fit tightly and are not misaligned, to prevent the probe from leaking and affecting measurement accuracy.

- After replacing the filter membrane, tighten the nut slowly to avoid damaging the threads or breaking the filter membrane from excessive force.

Battery

The M2 is powered by a rechargeable lithium battery, and its service life is affected by the number of charge-discharge cycles. When the battery charge-discharge cycle reaches a certain number, if you find that the single-use battery life is significantly shortened (e.g., less than 50% of the nominal value), the battery needs to be replaced in time to ensure the normal use of the instrument.

WARNING:

- Do not replace the battery in an environment with flammable gases or other explosion threats.

- Please use the original battery provided by our company to avoid circuit failures or safety risks due to model mismatch.

- Do not dispose of waste lithium batteries randomly or place them in high-temperature environments or even near fire sources! Please hand them over to professional institutions for recycling according to national regulations.

Note

- Do not use or store the battery in a high-temperature environment (such as direct sunlight, a high-temperature car, or direct heating >60°C).

- Do not allow the battery to come into contact with water or moisture.

- Do not use tools to disassemble the battery casing.
- Do not hit or step on the battery with hard objects.
- Do not assemble or modify existing batteries at will.
- If the battery pack leaks, is deformed, or has an abnormal structure, do not install it in the device. If electrolyte accidentally splashes into your eyes, rinse immediately with plenty of clean water and seek medical attention.
- At an ambient temperature of 20°C, the battery life is about 9 hours. Excessively high or low ambient temperatures will significantly shorten the usage time.

Replacement Tips:

1. Battery replacement must be performed in a safe place. It is strictly forbidden to operate in a flammable and explosive environment.
2. Please use the original battery provided by our company to avoid circuit failures or safety risks due to model mismatch.
3. For specifics, please contact Aoma for assistance from professional technicians.

Trouble-shooting

The design of the M2 fully considers the reliability of the equipment's operation. This chapter focuses on troubleshooting problems or faults with the equipment and provides alarm information and handling methods, which will be helpful in diagnosing equipment problems.

Common Issues and Trouble-shooting

Issue	Possible Cause	Solution
FID ignition failure	Hydrogen storage alloy is not installed.	Please install the hydrogen storage alloy.
	Insufficient hydrogen remaining in the storage alloy; needs to be charged.	Please charge with hydrogen.
	Hydrogen gas path is leaking; needs to be returned to the factory for repair.	Please contact after-sales service or return to the factory for repair.
	The probe filter membrane is dirty, blocking the gas path. Unscrew the probe nut, take out the filter membrane. If it is dirty, it needs to be replaced.	Replace with a new probe membrane.
	Other reasons, such as ignition failure caused by an internal module abnormality; needs to be returned to the factory for repair.	Please contact after-sales service or return to the factory for repair.
FID flame extinguishes	Insufficient hydrogen remaining in the storage alloy; needs to be charged.	Please charge with hydrogen.
	The probe filter membrane is dirty, blocking the gas path. Unscrew the probe nut, take out the filter membrane. If it is dirty, it needs to be replaced.	Replace with a new probe membrane.
	The VOC concentration in the sample gas is too high (exceeding 50,000 ppm), causing insufficient oxygen in the sample gas, which extinguishes the flame.	If the VOC concentration is found to be too high, the probe should be moved away immediately to avoid flameout.

	Other reasons, such as flameout caused by an internal module abnormality; needs to be returned to the factory for repair.	Please contact after-sales service or return to the factory for repair.
Slow response time	The probe filter membrane is dirty, or the probe tubing is blocked by inhaled foreign matter.	Investigate and clear the blockage, replace the probe membrane.
	Other reasons, such as internal tubing blockage or a contaminated FID detector; needs to be returned to the factory for repair.	Please contact after-sales service or return to the factory for repair.
Device cannot start	Insufficient battery power.	Please charge the device.
	Other reasons, such as a damaged battery or a control module abnormality; needs to be returned to the factory for repair.	Please contact after-sales service or return to the factory for repair.
Pump cannot run	Damaged pump head, pump control module abnormality, etc.; needs to be returned to the factory for repair.	Please contact after-sales service or return to the factory for repair.
Cannot calibrate or calibration is non-linear	FID is extinguished.	Re-ignite the FID.
	Incorrect calibration concentration point setting.	Reset the correct calibration points.
	Contaminated tubing/detector/filter components; needs to be returned to the factory for repair.	Please contact after-sales service or return to the factory for repair.

Table 14: Common Issues and Troubleshooting

Usage Precautions

To ensure the safe operation of the M2 Portable Total Hydrocarbon Analyzer and the accuracy of its detection data, the following regulations must be strictly observed during use:

Hydrogen Storage Alloy Operating Standards: When installing or removing the hydrogen storage alloy, rotate the connector slowly to avoid damaging the threads from excessive force. If the threads are stripped or deformed, stop using it immediately and contact after-sales for replacement to prevent hydrogen leakage.

Hydrogen Safety Protection: Hydrogen is a highly flammable gas. The hydrogen storage alloy and hydrogen generator must be placed in a well-ventilated environment, away from open flames, heat sources (such as heaters, direct sunlight), and flammable and explosive substances (such as alcohol, gasoline, etc.), to ensure there is no potential explosion risk in the surrounding area.

Pipeline Purging Requirements: For a hydrogen storage alloy that has just been filled with hydrogen or has been stationary for more than 2 hours, the pipeline must be purged through the instrument's 【Maintenance】 function before ignition (a duration of 30 seconds or more is recommended). During the purge, it is strictly forbidden to perform the ignition operation to prevent residual air from mixing with hydrogen and causing a hazard.

Calibration Unit Note: The instrument's calibration concentration unit is ppm (volume concentration). Do not change the unit parameters without authorization, as this may affect the accuracy of the detection results.

Calibration Gas Requirements: To avoid extinguishing the FID detector, the dilution gas for the calibration gas must be zero-grade air (total hydrocarbon content <0.5 ppm). It is strictly forbidden to use inert gases such as nitrogen as the dilution gas.

Warm-up and Stabilization Requirements:

- For an instrument being used for the first time or after being out of service for a long period (more than 1 month), check the instrument's operating status after powering on, igniting, and warming up. Perform calibration and measurement only after the detector is fully stabilized.
- When restarting after a short shutdown (interval <2 hours), the instrument needs to stabilize for 5 minutes after successful ignition to ensure data accuracy.

Operating State Protection: The instrument should be kept stable during operation, avoiding sharp shaking or vibration, to prevent affecting flame stability and detection accuracy.

Calibration Timeliness: After each replacement of the hydrogen storage alloy, observe the numerical status. If a large drift occurs, the instrument must be recalibrated.

Calibration Operating Standards: A single calibration must complete at least 2 concentration points (including the zero point). Do not exit the interface midway through the calibration process, otherwise the system will only retain the data of the completed calibration points, which may invalidate the calibration curve.

Filter Membrane Maintenance Requirements: The sampling probe filter membrane is prone to clogging due to dust accumulation. It is recommended to check the status of the filter membrane every hour and clean or replace it immediately upon finding contamination or blockage to avoid affecting the response speed due to a restricted gas path.

Sample Condition Restrictions: It is strictly forbidden to test the following types of samples to avoid damaging the instrument:

- ❖ High-temperature gases (temperature > 70°C).
- ❖ High-humidity gases (relative humidity > 95% RH).
- ❖ Gases containing corrosive substances (such as acid mist, alkali vapor, salt spray, etc.).

High Concentration Sample Handling: If a VOC concentration >50,000 ppm is detected, the probe must be moved away from the detection point immediately to prevent the FID detector from extinguishing due to lack of oxygen. It is recommended that the single detection time for high-concentration points does not exceed 3 seconds.

High-Adhesion Sample Handling: If a high-concentration, highly adhesive VOC sample is detected, the instrument may experience a prolonged return-to-zero recovery time, affecting detection efficiency. The instrument is equipped with a powerful purge function; press and hold 【▲】 and 【▼】 simultaneously to activate it and speed up the recovery time.

Figure 11-: Power Purging...display

Post-Use Handling: After using the instrument, the hydrogen storage alloy should be removed in a timely manner and stored in a ventilated and dry place to avoid chronic leakage caused by being installed on the instrument for a long time.

Appendix

Response Factor Table:

Compound Name		Response Factor
Chinese	English	10-10000ppm
乙烷	**Ethane**	0.342-0.552
丙烷	**Propane**	0.558-1.208
丁烷	**Butane**	0.484-0.78
异丁烷	**Isobutane**	0.444-1.191
戊烷	**Pentane**	0.452-0.538
己烷	**Hexane**	0.364-0.382
庚烷	**Heptane**	0.329-0.349
辛烷	**Octane**	0.205-0.314
壬烷	**Nonane**	0.329-0.509
癸烷	**Decane**	0.376-0.708
环己烷	**Cyclohexane**	0.387-0.59
甲基环己烷	**Methylcyclohexane**	0.217-0.349
乙烯	**Ethylene**	1.078-1.783
丙烯	**Propylene**	0.853-1.783
1-丁烯	**1-Butene**	0.672-0.72
异丁烯	**Isobutylene**	0.596-1.39
1-辛烯	**1-Octene**	0.281-0.87
1,3-丁二烯	**1,3-Butadiene**	0.656-0.679
苯	**Benzene**	0.263-0.517
甲苯	**Toluene**	0.255-0.451
乙苯	**Ethylbenzene**	0.231-0.457
二甲苯	**Xylene**	0.228-0.468
邻二甲苯	**o-Xylene**	0.228-0.52
间二甲苯	**m-Xylene**	0.220-0.439
对二甲苯	**p-Xylene**	0.233-0.442
苯乙烯	**Styrene**	0.259-0.561
甲醇	**Methanol**	3.418-10.468
乙醇	**Ethanol**	1.399-3.303
异丙醇	**Isopropanol**	0.715-1.806
异丁醇	**Isobutanol**	0.792-0.860
戊醇	**Pentanol**	0.620-1.653
烯丙醇	**Allyl alcohol**	1.069-1.702
异丙醚	**Isopropyl ether**	0.402-0.592
丙二醇甲醚	**Propylene glycol methyl ether**	0.756-2.104
甲醛	**Formaldehyde**	8.745-21.057
丙酮	**Acetone**	0.720-1.757
乙酸	**Acetic acid**	1.856-3.159

丙烯酸	**Acrylic acid**	5.875-13.725
乙酸乙酯	**Ethyl acetate**	0.551-1.670
乙酸乙烯酯	**Vinyl acetate**	0.987-1.933
乙酸丁酯	**Butyl acetate**	0.455-0.769
丙烯酸乙酯	**Ethyl acrylate**	0.679-1.205
丙烯酸丁酯	**Butyl acrylate**	0.530-1.095
乳酸乙酯	**Ethyl lactate**	0.882-2.141
乙腈	**Acetonitrile**	1.022-2.702
丙烯腈	**Acrylonitrile**	0.806-1.861
三乙胺	**Triethylamine**	0.345-0.517
二硫化碳	**Carbon disulfide**	2.466-3.714
叔壬基硫醇	**tert-Nonyl mercaptan**	0.751-1.933
氯甲烷	**Methyl chloride**	1.036-2.881
二氯甲烷	**Dichloromethane**	1.417-3.402
二氟二氯甲烷	**Dichlorodifluoromethane**	5.104-12.014
1,1,1,2-四氟乙烷	**1,1,1,2-Tetrafluoroethane**	0.28-0.873
三氟三氯乙烷	**Trichlorotrifluoroethane**	0.67-2.072
氯乙烯	**Vinyl chloride**	1.148-2.347
偏二氟乙烯	**Vinylidene fluoride**	1.037-1.959
三氯乙烯	**Trichloroethylene**	1.036-2.078
氯苯	**Chlorobenzene**	0.311-0.396
邻氯甲苯	**o-Chlorotoluene**	0.374-0.777
氯化苄	**Benzyl chloride**	0.873-1.364
1-丁醇	**1-Butanol**	0.748-1.329
1.1-二氯乙烯	**1,1-Dichloroethylene**	1.135-2.535
二甲基甲酰胺	**Dimethylformamide**	1.532-4.572
乙二醇单乙醚	**Ethylene glycol monoethyl ether**	1.178-2.786
甲基异丁基酮	**Methyl isobutyl ketone**	0.57-1.306
正壬烷	**n-Nonane**	0.329-0.509
正辛硫	**n-Octyl mercaptan**	0.538-1.662
醇丙二醇甲醚乙酸酯	**Propylene glycol methyl ether acetate**	0.604-1.451

Aoma company is committed to more advanced and reliable analytical detection methods and services and cross-industry gas analysis applications. Helping customers achieve safe and compliant sustainable solutions.