



Empowering you to work smarter

NMA1 NMA1P Smart Combustion Analyzer User Manual



Failure to follow warnings could
result in death or serious injury.

**SAVE THIS MANUAL
FOR FUTURE REFERENCE**

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FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference.

When the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

IC statement:

This device complies with Industry Canada licence-exempt RSS standard(s): Operation is subject to the following Two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CAN ICES-3(A)/NMB-3(A).

This equipment complies with relevant RF radiation exposure limits set forth for a public/uncontrolled environment.

Cet équipement est conforme aux limites d'exposition aux radiofréquences pertinentes établies pour un environnement public ou non contrôlé.

1. Preface

Thank you for purchasing the Smart Combustion Analyzer.

- 1) Please read this instruction manual carefully before installing, operating, or maintaining the smart combustion analyzer. Ensure you fully understand its contents. Improper use may lead to accidents and injury.
- 2) Unauthorized modification of the smart combustion analyzer is strictly prohibited. The company assumes no responsibility for accidents caused by unauthorized modification.
- 3) The specifications and contents of this instruction manual are subject to change due to product technical improvements without prior notice. Thank you for your understanding.
- 4) This instruction manual shall be kept by the personnel who actually use the smart combustion analyzer.
- 5) After reading, please keep it in a place readily accessible to the personnel who actually use the smart combustion analyzer at any time.
- 6) Please ensure that this instruction manual is delivered to the end user.

2. Safety Precautions

Before use, be sure to carefully read the "Safety Precautions" to ensure proper operation.

The precautions listed here contain important safety-related information. Please be sure to comply with them. The safety precaution levels are classified as: "Danger", "Caution", and "Electric Shock".

Symbol	Brief Description	Supplementary Explanation
	Danger	Improper use may lead to hazardous situations causing serious consequences, such as personal injury.
	Caution	Improper use may lead to hazardous situations causing moderate injury or equipment damage.
	Electric shock	Improper use may lead to hazardous situations causing electric shock.

Precautions

- Use indoors or outdoors.
- Do not place the probe tip in an open flame.
- The instrument must be kept tightly connected to the probe.
- Before measurement, pay attention to the measuring range of this measuring instrument.
- After measurement, wait until the probe has cooled down before cleaning the instrument and accessories to avoid burns.
- This measuring instrument is specifically designed for flue gas measurement. Do not use it for other purposes.
- This smart combustion analyzer is intended for use by trained professionals in the HVAC field. Proper training can reduce operational risks. No liability is assumed for any uncertainties arising during use.
- To avoid impairing the instrument's protection functions, always use it within the measurement parameter range and as intended.
- When using the measuring instrument, the safety of the integrated device system is the responsibility of the system's relevant responsible party.
- Always use the accessories supplied with the device or other optional accessories.
- Do not power on the device if it is damaged or operates abnormally. Carefully inspect the device before each use. If you have any questions, contact the after-sales service center.

- Use the device within the required pressure range. Do not exceed the pressure range. For detailed pressure values, refer to the specifications in Section 5.3 of this manual.
- Avoid exposing the device to rain or other humid environments (humidity > 95% RH).
- Do not use this measuring instrument in flammable or explosive environments, such as those containing flammable gases, vapors, or large amounts of dust.
- Do not place your fingers in the movable areas (hinges) of the device.
- According to applicable standards and regulations, the measuring instrument cannot be used in explosion-proof areas.
- Do not store the instrument with solvents. Do not use desiccants or organic solvents (e.g., isopropyl alcohol, etc.).
- Do not block the instrument's ventilation openings.
- During measurement, to ensure measurement validity and the safety of personnel, continuously inspect the instrument and accessories.
- Keep out of reach of children.
- If the instrument malfunctions or similar issues occur, return the instrument to the after-sales service department for technical inspection and ensure your own safety.
- If the battery leaks, battery removal and disposal must be carried out by qualified service personnel in accordance with local regulations for the disposal of waste batteries.
- A magnet is attached to the back of the device for easy attachment to metal surfaces.



Magnetic field, may pose a health risk to pacemaker wearers.
—— Maintain a distance of at least 20 cm between the pacemaker and this device.



Magnetic field, may damage other equipment.
—— Keep a safe distance from products that may be damaged by magnetism, such as monitors, computers, and credit cards.

3. Product Introduction

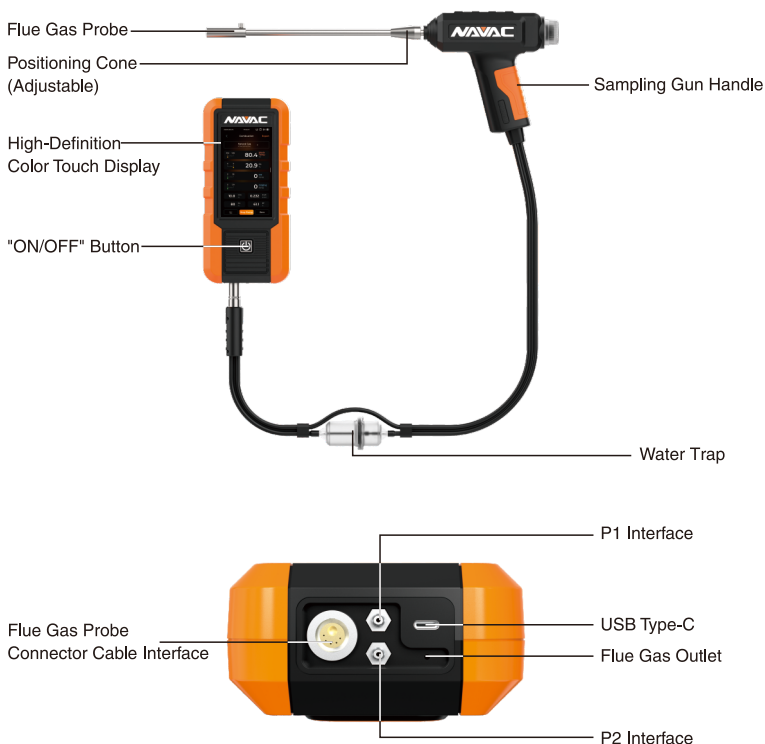
3.1 Product Description:

The NMA1 is suitable for monitoring post-combustion flue gas components and efficiency of boilers, internal combustion engines, and other combustion equipment. It features 2 replaceable gas sensors. Its main characteristics are as follows:

- Replaceable gas sensors include: O₂, CO.
- High-definition color touch display.
- Field-replaceable pre-calibrated sensors.
- Onboard memory can record up to 1000 data sets with cyclic overwrite.
- Can connect wirelessly to a smartphone app to generate reports, with automatic/manual recording of analysis data.
- Built-in rechargeable lithium-ion battery power supply, convenient for on-site integrated testing and mobile use.

Attention

This smart combustion analyzer is intended for parameter measurement of combustion equipment exhaust systems. It is not for permanent use and cannot be used as an alarm system.



3.2 Main Functions

• Screen

High-definition backlit color touchscreen, 5.0 inches, screen resolution: 1280 x 720 pixels, allowing operators to view measurement data more conveniently.

• Main Unit Rechargeable Battery

The main unit is equipped with a rechargeable battery that complies with the PD3.0 fast charging protocol. The charging input power supports 12 V/1 A, 9 V/1.3 A, 5 V/2.6 A. The battery level icon is displayed in the upper right corner of the screen. To ensure the battery is fully charged, please charge for 4 hours.

• Flue Gas Suction Pump

A diaphragm pump with a motor is installed inside the analyzer, powered directly by DC from the analyzer for maximum flue gas suction.

- **Flue Gas Probe**

Stainless steel flue gas probe, standard length 300 mm, with a plastic handle (sampling gun) and an adjustable positioning cone to ensure the probe tip can fully extend into the flue. The probe can be connected to the instrument via a 1.8 m extension cable.

- **Replaceable Gas Sensors**

The analyzer uses electrochemical sensors to measure O_2 and CO. Regularly charging the analyzer ensures the electrochemical sensors remain in optimal working condition. Avoid completely discharging the battery, if the battery remains at 0% charge for a long time, it may cause damage to the battery.

- **Temperature Sensor**

K-type thermocouple sensor measures flue gas temperature. The main unit can measure flue gas temperatures up to 1112 °F (600 °C).

- **Pressure Sensor**

Semiconductor sensor,

For fuel pressure and differential pressure testing: Measurement range: -40 to +40 inWC.

For draft pressure testing: Measurement range: -0.8 to +0.8 inWC.

- **Flue Gas Input And Positive/Negative Pressure Input Ports**

There are 2 hose connection ports on the bottom of the analyzer, connected to P1/P2 respectively.

- **Fuel Types**

The analyzer provides data support for a variety of common fuels. If needed, operators can also manually add fuels and related data.

- **Measured and Calculated Values**

Depending on your analyzer model, the following measurement parameters can be configured:

- **O_2 :** O_2 sensor measurement value.
- **CO:** CO sensor measurement value.
- **Eff.(η):** Combustion efficiency.
- **EA:** Excess air ratio calculated value.
- **Stack Temp:** Flue gas temperature measurement value.
- **P1/P2:** Draft (differential pressure / draft pressure) pressure value.
- **Draft:** Duct pressure measurement value.

3.3 Equipment Package Contents

- Smart combustion analyzer × 1
- Sampling gun × 1
- Dust filter element × 12
- O-ring seal × 2
- Plastic air tube connector × 2 + Adapter air tube × 2
- Hose (matte silicone) × 2 + Connector × 2
- Type-C to Type-C USB cable (1.5 m) × 1
- Instruction manual QR code card × 1
- Certificate of conformity × 1
- Inspection report × 1
- Rigid lined carrying case / soft bag × 1
- **Bluetooth printer (optional), with thermal paper, Type-C to Type-C USB cable (1.2 m) × 1**

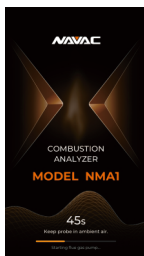
4. First Time Power-On

After powering on for the first time, parameters must be set. Keep the sampling gun properly connected to the main unit, then press and hold the "ON/OFF" button on the panel for more than 3 seconds to power on.

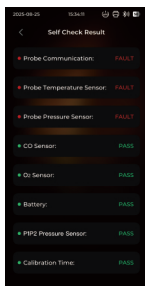
Attention

When powering on, keep the probe in clean air. Do not insert the probe into the flue.

After the power-on countdown ends, the self-diagnostic functions for the sampling probe, sensors, rechargeable lithium-ion battery, etc., will be completed. If any self-diagnostic abnormality is detected, please contact the manufacturer's after-sales service promptly.



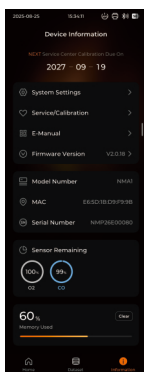
1. Power-on Warm-up



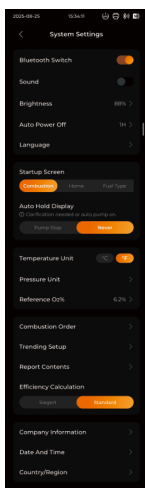
2. Power-on self-diagnostic



3. Enter the main interface



4. Tap the "information" button on the main interface to enter the device information screen.



5. Tap "System Settings" on the device information screen to set the language and time. Tap the return button to go back to the main interface.

After warm-up is complete:

- O₂ sensor concentration displays 20.6% ~ 20.9%.
- CO sensor concentration displays 0~5 ppm.
- Thermocouple displays the current ambient temperature value.

⚠ Attention

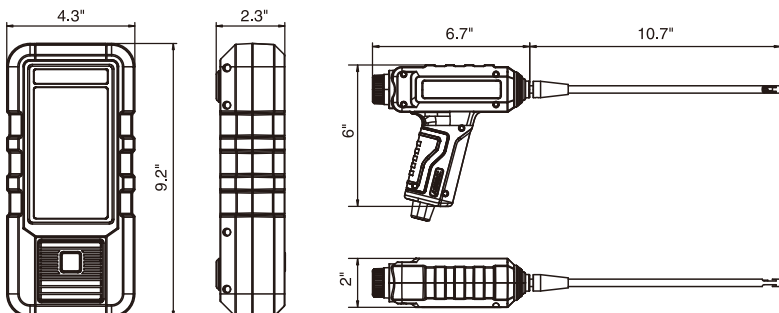
If after warm-up in clean air the sensor readings are not within the above ranges, it is recommended to perform sensor zero calibration. Please refer to the operating instructions in the zero calibration section.

5. Product Functions

5.1 Main Unit Specifications

Product Weight	Complete unit + sampling gun: 2.86 lbs (1.3 kg)
Product Dimensions	4.33" × 9.25" × 2.32" (110 × 235 × 59 mm) (main unit) 6.02" × 17.42" × 2.07" (153 × 442.4 × 52.4 mm) (sampling gun)
Display	High-definition touch display, 5 inches, 720 × 1280 pixels
Product Housing Material	PA + 30% GF / Overmolded TPE
Power Supply	Rechargeable battery, 3.6 V / 6400 mAh; supports 9 V/2 A and 5 V/2.5 A USB chargers
Battery	Battery operating time > 6h; Charging time: 4 h
Memory	Supports 1000 data sets with cyclic overwrite
Connectivity	Supports Bluetooth connection to the app and wireless printer NPR1
Operating Temperature	23 °F~113 °F (-5 °C~45 °C) (Using the device without charging) 32 °F~104 °F (0 °C~40 °C) (Using the device while charging)
Operating Humidity	15%~90% RH (non-condensing)
Maximum Operating Altitude	≤ 6562 ft (2000 m)
Storage Humidity	15%~90% RH (non-condensing)
Storage Temperature	-4 ~ 122 °F (-20 ~ 50°C)
Language	English/French/Spanish

5.2 Dimensions (Unit: inch)



5.3 Parameters

Measuring Range		Accuracy	Resolution	Response time
Stack Temp	32~1112 °F 0~600 °C	±2.5 °F @ (32~212 °F) ±1.4 °C @ (0°C~100 °C) ±(3.6 °F or 1.5% of reading) @ (213~1112 °F) ±(2.0 °C or 1.5% of reading) @ (101~600) °C	0.1 °F 0.1 °C	T90 < 30 s
Oxygen (O ₂)	0~25% vol	±0.3% vol	0.1% vol	T90 < 30 s
Carbon Monoxide (CO)	0~4000 ppm	±10 ppm @ (0~199) ppm ±5% of reading @ (200~2000) ppm ±10% of reading @ (2001~4000) ppm	1 ppm	T90 < 40 s
O ₂ -Referenced Carbon Monoxide Correction Value CO (x%) (calculated value)	CO (0%) refers to CO Air Free	-	1 ppm	-
Carbon Dioxide CO ₂ (calculated value)	0 to CO ₂ max vol.%	-	0.1 vol.%	-
Draft	-0.8 inWC ~0.8 inWC	±(0.01 inWC + 2% of reading)	0.001 inWC	-
Excess Air Ratio EA (calculated value)	0~999%	-	1%	-
Combustion Efficiency EFF (calculated value)	0~100%	-	0.1%	-
Ambient CO	0 to 200 ppm	±10 ppm	1 ppm	-
Primary Air	-4~248 °F -20~120 °C	±3.6 °F ±2 °C	0.1 °F 0.1 °C	T90 < 30 s
Fuel Pressure	-40 inWC ~40 inWC	±0.2 inWC (-20~+20) inWC; ±1% of reading (±20.1~±40) inWC	0.01 inWC	T90 < 10 s
Manometer (ΔP)	-40 inWC ~40 inWC	±0.2 inWC (-20~+20) inWC; ±1% of reading (±20.1~±40) inWC	0.01 inWC	T90 < 10 s

6. Product Use

6.1 Preparation for Operation

Please first confirm whether the following tasks have been completed:

Attention

1. During measurement, the measuring instrument must be kept vertical to the ground to ensure the water trap is always in a vertical position. Do not tilt the water trap or place it horizontally.
2. Before using the instrument for the first time, or if it has been stored unused for more than 45 days, the built-in lithium battery may be completely discharged. Ensure that the instrument remains powered on for at least 12 hours to reactivate and fully warm up the built-in electrochemical sensors.
3. If the measuring instrument is found to be malfunctioning or damaged, please contact the after-sales service department promptly.

6.1.1 Using the Flue Gas Probe

⚠ Attention

- The metal sampling tube at high temperature poses a risk of burns!
- Do not touch hot components when measurement is completed.
- In case of burns, immediately cool the burned area with cold water and consult a doctor if necessary. Allow hot components to cool down in the ambient environment.
- Before packing the device, check and ensure the instrument is powered off and hot components have cooled.

6.1.2 Thermocouple Check



The thermocouple of the flue gas probe must not come into contact with the metal tube wall.

- Check this before use. If necessary, bend the thermocouple and restore it to its original position

6.1.3 Adjusting the Flue Gas Probe Sampling Orientation



The flue gas flow must be able to flow freely across the thermocouple.

- Rotate the probe as needed to adjust.
- The probe tip must be positioned in the central area of the flue gas flow.

6.2 Setting Fuel and Device Type

Before performing flue gas measurement, the fuel type must be correctly set.

- Tap "Flue Gas Analysis" on the main interface to enter the measurement value display interface.

Tap the box below "Combustion" to enter the "Fuel Type" interface.

Tap to highlight and select the appropriate fuel type. Fuel types include: Natural Gas, Propane (LPG), Oil #2 (Light), Oil #6 (Heavy), Biofuel, Coal, Coal Town Gas, **Coking Oven Gas**, KOKS.

For the three CUSTOM FUEL types in the lower right corner, users can tap the arrow on the right to enter the CO₂ MAX limit setting.



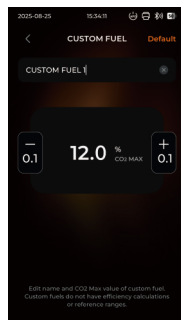
Main Interface



Measurement
Display Interface



Fuel Selection Interface



Custom Fuel Interface

Tap the icon in the upper right corner of the Fuel Type interface to enter the device type selection interface. Device types include: ATMOSPHERIC, POWER BURNER, HIGH EFFICIENCY, OIL BURNER, and OTHER TYPE (five categories in total).

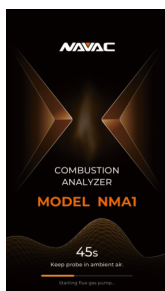


Device Type Selection Interface

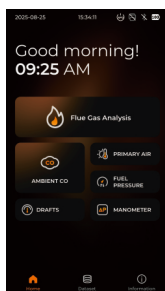
6.3 Flue Gas Measurement

Attention

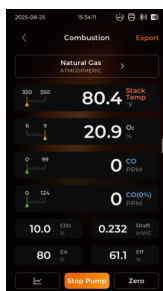
1. To maintain instrument measurement accuracy, the correct fuel and device type must be selected or configured (refer to Section 6.2).
 2. It is recommended to maintain the measurement for at least 3 minutes until the readings stabilize.
- Connect the measuring instrument to the flue gas probe (sampling gun).
 - Power on and wait for 45 seconds for the warm-up to complete. The analyzer will then enter the main interface. Observe the O₂ measurement value at this time. If necessary, manually zero the analyzer in fresh air.
 - Insert the positioning cone of the flue gas probe into the flue opening at the sampling point and secure it.
 - Tap "Flue Gas Analysis" on the main interface to enter the flue gas measurement interface. Select the fuel and device type, and view the real-time measurement values. During the test, tap "Start Pump" / "Stop Pump" to start and stop measurement.
 - After the readings stabilize, tap "Export" to save the flue gas measurement data and jump to the job data interface. In this interface, the icon in the upper right corner of "Flue Gas Analysis" will be highlighted.
 - After the test is complete, remove the flue gas probe from the flue and purge with fresh air. Do not allow the metal probe to come into contact with any objects until it has cooled down.



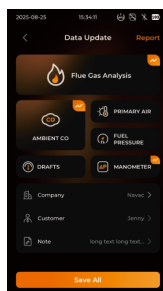
Power-on Countdown



Main Interface



Measurement Display Interface



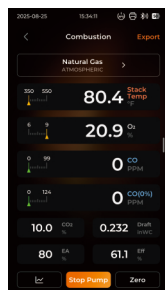
Job Data Interface

6.4 Trend Chart

Flue gas measurement data can be displayed as a trend chart. Tap the trend icon in the lower left corner of the flue gas measurement interface to enter the trend chart display interface.

The upper half of the trend chart display interface shows the trend curves of the parameters, while the lower half shows the real-time values and upper/lower limits of the parameters.

- Tap the settings icon in the upper right corner of the trend chart display interface to enter the trend chart parameter configuration interface, where you can change the 4 measurement parameters to be displayed.
- Tap the icon to the right of the measurement parameter to enter the trend chart parameter limit setting interface to set the upper and lower limits for the corresponding parameter.
- Tap the "02:00" label at the lower right of the curve on the trend chart display interface to set the timeline of the chart, with a maximum of 20 minutes and a minimum of 1 minute.



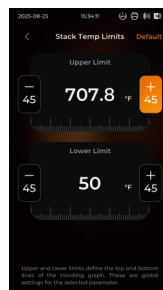
Measurement Display Interface



Trend Chart Display Interface



Trend Chart Parameter Configuration Interface

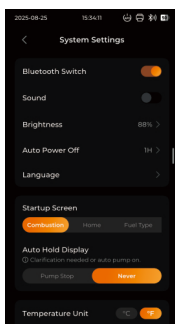


Trend Chart Parameter Limit Setting Interface

6.5 Turning the Gas Sampling Pump On/Off

During measurement, tap "Start Pump" / "Stop Pump" to start and stop measurement.

- Tap "Stop Pump" at the lower center of the measurement value display interface. The pump stops running and gas sampling will pause.
- At this point, whether the measurement interface displays updated data depends on the "Auto Hold Display" configuration.
- Tap "Information" to enter "System Settings", and find "Auto Hold Display". When set to Pump Stop, after the pump pauses, the measurement values on the main interface will not update in real time. When set to Never, the measurement values on the main interface will continue to update in real time after the pump pauses.



Auto Hold Display Setting

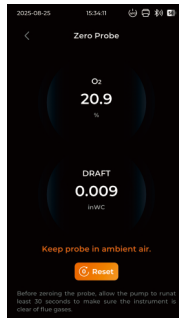
6.6 Zero Calibration

When the O_2 reading is not between 20.6% and 20.9% in clean air, or the CO reading is not between 0 and 5 ppm, manual zero calibration can be performed.

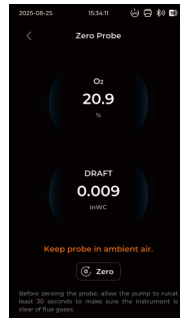
- Tap "Zero" on the flue gas measurement screen to enter the zeroing screen. The current oxygen (O_2) concentration and draft pressure are displayed at the top of the screen.
- Tap "Reset" on the zeroing screen to confirm the zeroing operation. The instrument will reset the draft pressure to 0 inWC, the O_2 concentration to 20.9%, and the CO concentration to 0 ppm.
- Note: Before zeroing, always remove the probe from the flue and make sure the Smart combustion analyzer is exposed to clean ambient air. For optimal O_2 measurement accuracy, start the pump and allow the probe to remain in clean ambient air for 30 seconds before performing the zeroing operation.



Measurement Display Interface



Zero Calibration Interface



Zero Calibration Second Confirmation Interface

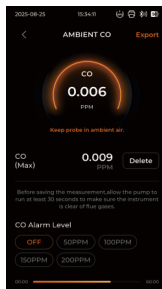
6.7 Ambient CO Measurement

From the main interface or the job data interface, select "AMBIENT CO" to enter the ambient CO measurement interface. The upper part of the interface displays the real-time CO value, which can be observed while walking.

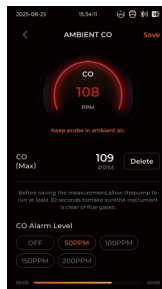
- Tap "Save" in the middle of the ambient CO measurement interface to temporarily save the current displayed ambient CO measurement value. Tap "Delete" to temporarily delete the saved ambient CO measurement value for re-testing.
- In the ambient CO measurement interface, the alarm level can be set, with a range of 50-200 ppm.
- Pay special attention to ambient CO warnings. Once an excessive CO concentration is detected, the system will immediately display a warning. In such cases, evacuate the area immediately.
- Tap "Export" in the upper right corner of the ambient CO measurement interface to save the current ambient CO measurement test data and jump to the job data interface. The AMBIENT CO icon in the upper right corner will be highlighted.



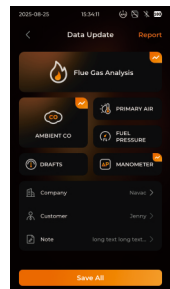
Main Interface



AMBIENT CO Measurement Interface 1



AMBIENT CO Measurement Interface 2

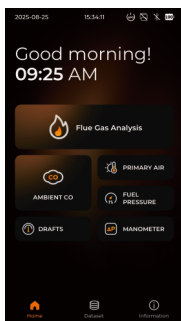


Job Data Interface

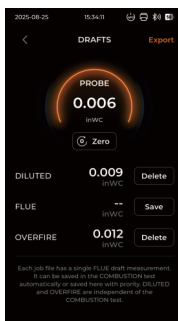
6.8 Draft Measurement

From the main interface or the job data interface, select "DRAFTS" to enter the draft measurement interface. The upper part of the interface displays the real-time draft measurement value.

- Tap "Zero" in the middle of the draft measurement interface to zero the draft sensor.
Note: Before zeroing, the probe should be removed from the flue.
- By moving the sampling point, the operator can collect draft values at three points: "DILUTED", "FLUE", and "OVERFIRE". Tap the corresponding "Save" button to temporarily save the draft measurement value for each sampling point. Tap "Delete" to temporarily delete the saved draft measurement value for re-testing.
- Tap "Export" in the upper right corner of the draft measurement interface to save the current draft measurement test data and jump to the job data interface. The DRAFTS icon in the upper right corner will be highlighted.
- After testing is complete, remove the flue gas probe from the flue sampling point and purge with fresh air. Do not allow the metal probe to come into contact with any objects until it has cooled down.



Main Interface



Pressure Zeroing
and Measurement Interface

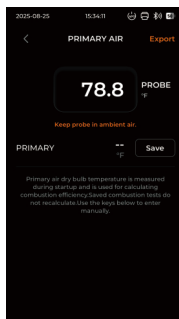
6.9 Ambient Temperature Measurement

From the main interface or the job data interface, select "PRIMARY AIR" to enter the ambient temperature measurement interface. The upper part of the interface displays the real-time ambient temperature measurement value.

- Tap the real-time ambient temperature measurement value on the ambient temperature measurement interface to manually modify the ambient temperature value.
- Tap "Save" in the middle of the ambient temperature measurement interface to temporarily save the current ambient temperature measurement value. Tap "Delete" to temporarily delete the saved ambient temperature measurement value for re-testing.
- Tap "Export" in the upper right corner of the ambient temperature measurement interface to save the current ambient temperature measurement test data and jump to the job data interface. The PRIMARY AIR icon in the upper right corner will be highlighted.



Main Interface

Ambient Temperature
Value Display Interface

6.10 Fuel Pressure Measurement

From the main interface or the job data interface, select "FUEL PRESSURE" to enter the fuel pressure measurement interface. The interface displays real-time pressure measurement values for P1 and P2.

- Before measurement, tap "Zero" to zero the P1 and P2 pressure sensors individually.

Note: When zeroing, the hoses must be placed under atmospheric pressure.

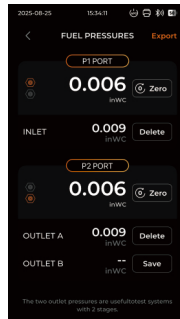
- Connect the hose of the P1 pressure port to the inlet to measure the inlet pressure. Tap "Save" to temporarily save the current real-time pressure measurement value for the P1 port. Tap "Delete" to temporarily delete the saved real-time pressure value for the P1 port for re-testing.
- Connect the hose of the P2 pressure port to Outlet A to measure the pressure at Outlet A. Tap "Save" to temporarily save the current real-time pressure measurement value for the P2 port. Tap "Delete" to temporarily delete the saved real-time pressure value for the P2 port for re-testing.
- Connect the hose of the P2 pressure port to Outlet B to measure the pressure at Outlet B. Tap "Save" to temporarily save the current real-time pressure measurement value for the P2 port. Tap "Delete" to temporarily delete the saved real-time pressure value for the P2 port for re-testing.
- Tap "Export" in the upper right corner of the fuel pressure measurement interface to save the current fuel pressure measurement test data and jump to the job data interface. The FUEL PRESSURE icon in the upper right corner will be highlighted.

- **Note: The hoses and brass fittings supplied with this device are intended for testing gaseous fuel sources/regulators only. Do not use them for liquid fuel testing.**

Before operating the device, strictly follow the manufacturer's specified inlet and outlet fuel pressure targets.



Main Interface

Fuel Pressures
Measurement Interface

6.11 Differential Pressure Measurement

From the main interface or the job data interface, select "MANOMETER" to enter the differential pressure measurement interface. The interface displays real-time pressure measurement values for P1 and P2, as well as the real-time differential pressure value (ΔP).

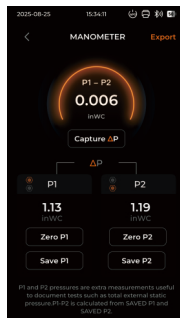
- Before measurement, tap "Zero P1" and "Zero P2" to zero the P1 and P2 pressure sensors individually. Note: When zeroing, the hoses must be placed under atmospheric pressure.
- Tap "Save P1" to temporarily save the current real-time pressure measurement value for the P1 port.
- Tap "Delete" to temporarily delete the saved real-time pressure value for the P1 port for re-testing.
- Tap "Save P2" to temporarily save the current real-time pressure measurement value for the P2 port.
- Tap "Delete" to temporarily delete the saved real-time pressure value for the P2 port for re-testing.
- Tap "Capture ΔP " to temporarily save the current real-time differential pressure measurement value (ΔP). Tap "Delete" to temporarily delete the saved real-time differential pressure measurement value (ΔP) for re-testing.

Tap "Export" in the upper right corner of the differential pressure measurement interface to save the current differential pressure measurement test data and jump to the job data interface.

The MANOMETER icon in the upper right corner will be highlighted.



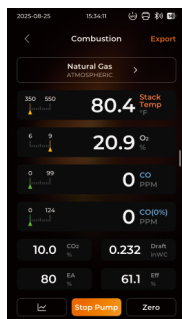
Main Interface

Differential Pressure
Measurement Interface

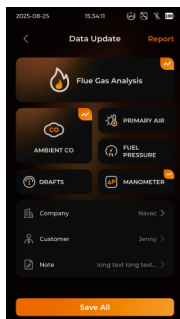
6.12 Saving Job Data

During flue gas analysis, if you want to save job data, you can use the analyzer's save function.

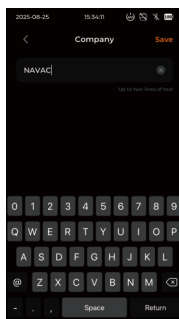
- Tap the "Export" button in the upper right corner of each measurement interface, such as the flue gas measurement interface and ambient CO measurement interface, to enter the job data interface.
- The customer information for the current job report can be edited at the bottom of the Job Data screen, including the Company Name, Customer Name, and Notes.
- When the instrument enters the Job Data screen, a temporary report for the current test is automatically generated. If you exit the screen without saving, the report will be deleted. Tap "Save All" at the bottom of the Job Data screen to save the report. The instrument will display "Saved Successfully" to confirm that the report has been saved. The report will be stored locally on the instrument and can be accessed through "Report" in the upper-right corner of the Job Data screen or through "Dataset" on the main screen. Select the desired report to view the details of the corresponding job.



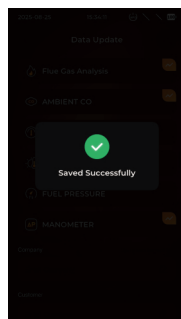
Measurement
Display Interface



Job Data Interface



Customer Information
Edit Interface

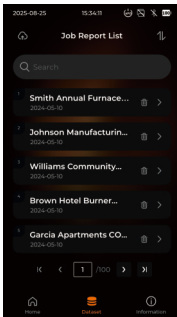


Save Successful Prompt

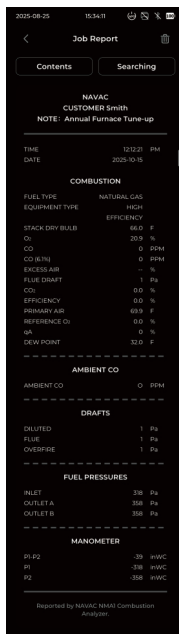
6.13 Job Report

This device supports printing job reports using a printer.

- Tap the "Dataset" button on the main interface to enter the report information interface. Tap a Report in the report list, or tap the "Report" button in the upper right corner of the job data interface to enter the report detail data interface, where you can view the detailed contents of the job report.
- Tap the "Contents" button on the report detail data interface to enter the report content configuration interface, where you can select the desired content items for printing. After configuring the content, tap the return icon in the upper left corner to return to the report detail data interface.
- Tap the "Searching" button on the report detail data interface. The device will automatically search for a Bluetooth printer in the current environment and pair with it. After successful pairing, the "Searching" button will change to "Print".
- Tap the "Print" button in the upper right corner of the report detail data interface to print the data information via the Bluetooth printer. (Bluetooth automatically connects.)
- In the report information interface, you can sort, search, and delete reports.
- Job reports can be synchronized to the APP.



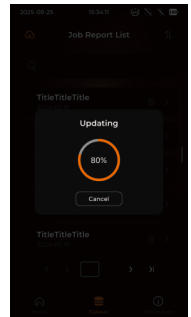
Report Information Interface



Report Detail Data Interface



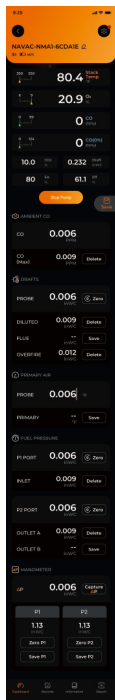
Report Content Configuration Interface



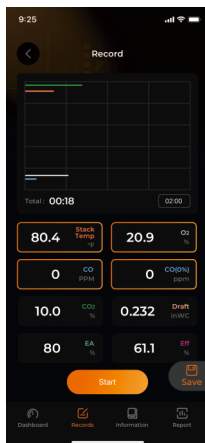
Syncing Job Report

6.14 APP Connection and Viewing

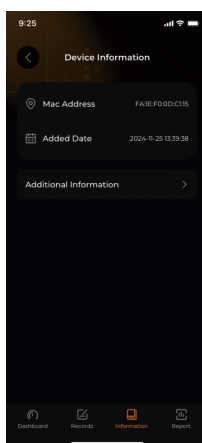
Turn on your phone's Bluetooth, connect the device to the APP, and you can view test data in real time directly in the application. You can tap "Start Pump" / "Stop Pump" in the APP to start and stop measurement. Tap "Save" and "Delete" to save and delete test data. Tap "Zero" to zero the sensors. Tap "Records" to enter the APP trend chart interface. Tap "Information" to enter the APP device information interface. Tap "Report" to enter the APP history record interface.



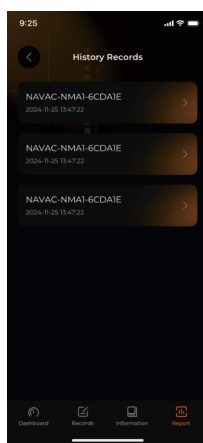
APP Main Interface



APP Trend Chart Interface



APP Device Information Interface



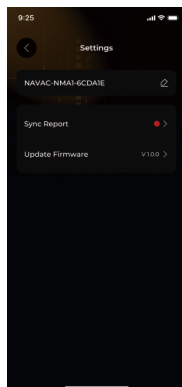
APP History Record Interface

6.15 Job Report Synchronization

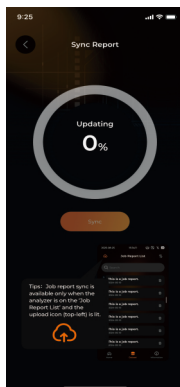
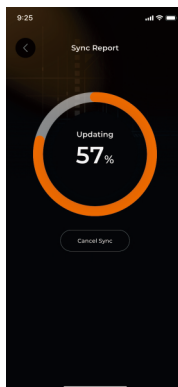
After the device is connected to the APP, tap the settings icon in the upper right corner of the APP main interface to enter the APP settings interface.

- Tap the "Sync Report" button on the APP settings interface to enter the job report synchronization interface. Tap "Sync" on the interface to start the report synchronization function. The job report synchronization percentage will begin to increase. During synchronization, you can tap "Cancel Sync" to cancel the synchronization. When the synchronization percentage reaches 100%, the job report synchronization is complete.

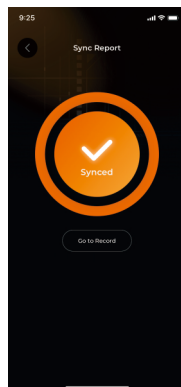
Note: Job report synchronization can only be performed when the smart combustion analyzer is in the "Job Report List" interface and the upload icon in the upper left corner is illuminated.



APP Settings Interface

Job Report
Synchronization Interface

Syncing Report



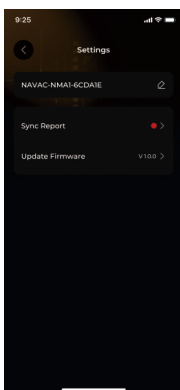
Sync Complete

6.16 OTA Upgrade

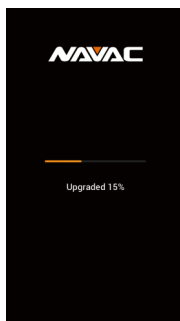
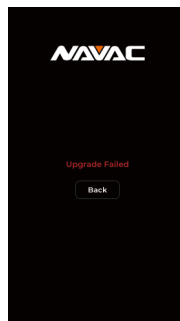
After the device is connected to the APP, tap the settings icon in the upper right corner of the APP main interface to enter the APP settings interface.

- Tap the "Update Firmware" button to enter the OTA upgrade interface. Select the upgrade package to be installed, and tap the "Update" button on the right. The device will enter the OTA upgrade interface and begin upgrading automatically. During the update, the device displays the update progress in real time as a percentage. Once the update is completed successfully, the device will automatically power off. If the update fails, the device will display an "Upgrade Failed" message and retain the current firmware version.

Note: During OTA upgrade, the analyzer must be returned to the main interface and cannot be in an active working state.



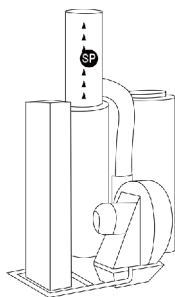
APP Settings Interface

OTA Upgrade
in Progress

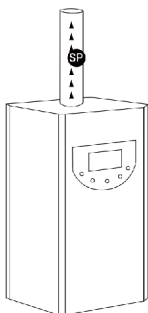
OTA Upgrade Failed

6.17 Sampling Position Selection

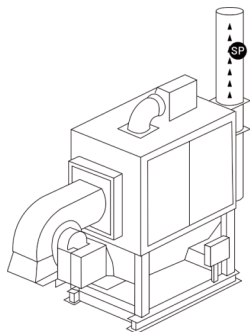
Different combustion equipment corresponds to different device types, and different device types require different sampling points. The following shows reference sampling point positions for some device types. The center of the flue is the conventional sampling position; however, in practice, priority should be given to the area with the highest CO concentration as the sampling position, subject to the manufacturer's instructions.



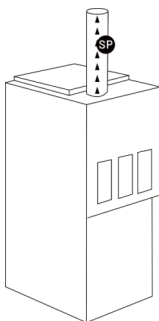
Power Burner
(Induced Draft)



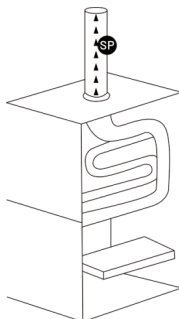
Power Burner
(Induced Draft)
Instantaneous Water Heater



High-Efficiency Condensing
Gas Furnace



Gas Water Heater
(Natural Draft)



Gas Boiler
(Natural Draft)

7. System Settings and Device Information

The following parameters can be set via the system settings menu:

- Bluetooth
- Sound
- Screen brightness
- Auto power off
- Language
- Startup screen
- Display freeze
- Temperature unit
- Pressure unit
- Oxygen reference
- Combustion test parameter order selection
- Trend chart parameters
- Print report content
- Combustion efficiency calculation formula
- Customer information
- Time and date
- Country/region

When exiting the interface using the return icon, any setting changes made will be automatically saved.

7.1 Bluetooth

Tap "Information" → "System Settings" → "Bluetooth Switch" on the main interface to turn Bluetooth on or off.

7.2 Sound

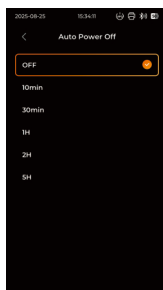
Tap "Information" → "System Settings" → "Sound" on the main interface to turn the buzzer on or off.

7.3 Screen Brightness

Tap "Information" → "System Settings" → "Brightness" on the main interface to enter the screen brightness setting interface. Slide up or down to complete the brightness adjustment.



7.3 Brightness Adjustment



7.4 APO Setting

7.4 Auto Power Off

Tap "Information" → "System Settings" → "Auto Power Off" on the main interface. Select the desired auto power-off time, exit the auto power-off time selection interface, and the auto power-off time update is complete.

7.5 Languages

Tap "Information" → "System Settings" → "Language" on the main interface. Select the desired language, exit the language selection interface, and the language display update is complete.

7.6 Startup Screen

Tap "Information" → "System Settings" → "Startup Screen" on the main interface to select the desired startup screen. Options include the Combustion Test Interface, Main Interface, and Fuel Type Selection Interface.

7.7 Display Freeze

Tap "Information" → "System Settings" → "Auto Hold Display" on the main interface to select whether to automatically freeze the display when the pump is stopped.

7.8 Temperature Unit

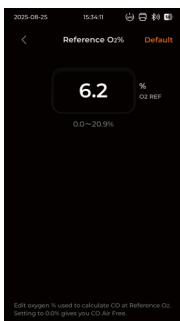
Tap "Information" → "System Settings" → "Temperature Unit" on the main interface to select the desired temperature unit.

7.9 Pressure Unit

Tap "Information" → "System Settings" → "Pressure Unit" on the main interface to select the desired pressure unit. Exit the pressure unit selection interface to complete the pressure unit display update.

7.10 Oxygen Reference

Tap "Information" → "System Settings" → "Reference O₂%" on the main interface to enter the oxygen reference setting interface, and manually enter the appropriate oxygen reference value. Tap the return icon in the upper left corner to save the set oxygen reference value. Tap "Default" in the upper right corner to restore the oxygen reference to the default value.



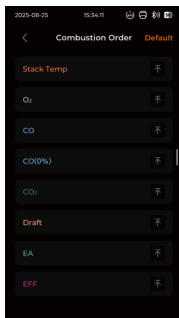
Reference O₂ Default



Reference O₂ Modification Settings

7.11 Combustion Test Parameter Order Selection

Tap "Information" → "System Settings" → "Combustion Order" on the main interface to enter the combustion test parameter order selection interface. Tap the pin icon to the right of a parameter to pin its display order to the top.



Measurement Value Display Order Setting

7.12 Trend Chart Parameters

Tap "Information" → "System Settings" → "Trending Setup" on the main interface to enter the trend chart parameter selection interface. Tap parameters to select up to 4 parameters to be displayed on the trend chart.

7.13 Print Report Content

Tap "Information" → "System Settings" → "Report Contents" on the main interface to enter the print report content setting interface. Check the test items to be printed. Tap the return icon in the upper left corner to save the configured print report content. Tap "Default" in the upper right corner to restore the print report content to the default settings.

7.14 Combustion Efficiency Calculation Formula

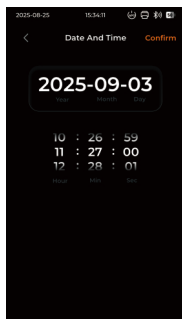
Tap "Information" → "System Settings" → "Efficiency Calculation" on the main interface to select whether to use the Siegert calculation formula or the Standard calculation formula for combustion efficiency.

7.15 Customer Information

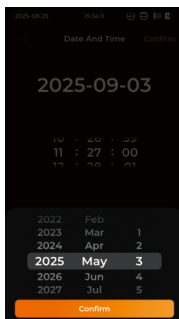
Tap "Information" → "System Settings" → "Company Information" on the main interface to enter the customer information setting interface. Manually enter customer information and tap the "Save" button in the upper right corner to save the customer information.

7.16 Time

Tap "Information" → "System Settings" → "Date And Time" on the main interface. Adjust the year, month, day, hour, minute, and second, then tap the "Confirm" button to complete the time calibration, exit the date/time setting interface, and complete the date/time update.



Date and Time
Setting Interface



Select Time

7.17 Country/Region

Tap "Information" → "System Settings" → "Country/region" on the main interface to view your country or region.

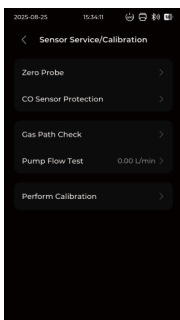
7.18 Sensor Service / Calibration

Tap "Information" → "Service/Calibration" on the main interface to enter the sensor service/calibration interface.

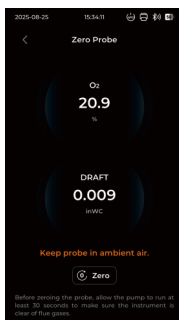
7.18.1 O₂ Zero Calibration

In the sensor service/calibration interface, tap "Zero Probe" to enter the sensor zeroing interface.

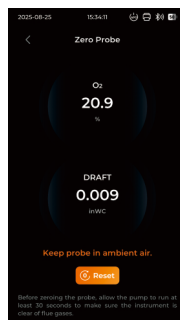
Tap "Zero" to zero the O₂ and draft pressure sensors.



Sensor Service
/Calibration Interface



Sensor Zeroing
Interface

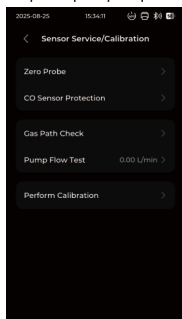


Zeroing Second
Confirmation Interface

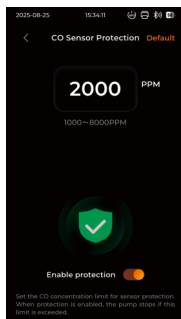
Note: To ensure the accuracy of the analyzer after calibration, it is recommended to power on the analyzer continuously for more than 1 hour before calibrating. First, turn on the gas pump to start sampling. Introduce Air gas into the inlet of the analyzer at a flow rate controlled between 0.4 L/min and 0.9 L/min for approximately 3 minutes. After the analyzer reading stabilizes, tap the calibration button to complete the zero calibration.

7.18.2 CO Range Protection Setting

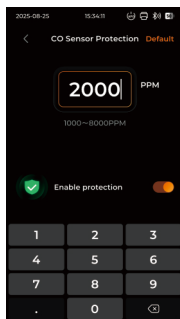
In the sensor service/calibration interface, tap "CO Sensor Protection" to enter the CO upper limit protection setting interface. In this interface, you can set the CO concentration alarm range and enable or disable the alarm limit. If the CO concentration exceeds the preset safety limit, the instrument will immediately display a warning indicating that the CO concentration is above the limit and automatically stop the pump to protect the CO sensor.



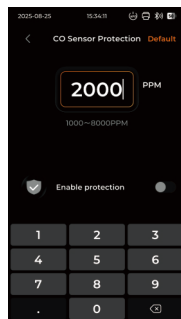
Sensor Service
/Calibration Interface



CO Upper Limit Protection
Setting Interface



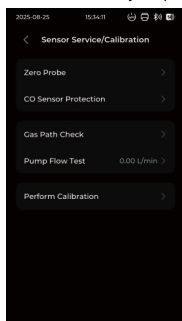
Parameter Modification
Interface



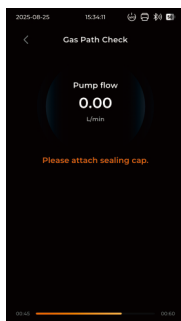
Range Protection
Disable Interface

7.18.3 Airtightness Self-Test

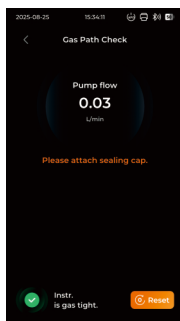
Seal the opening of the sampling probe using the supplied sealing cap. Then, tap "Gas Path Check" on the Sensor Service/Calibration screen to start the leak test. Once the test is complete, the instrument will automatically display the test result.



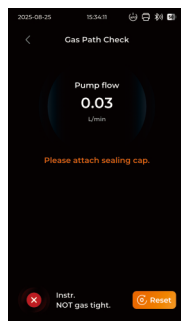
Sensor Service
/Calibration Interface



Airtightness Test
Interface



Airtightness Test Passed

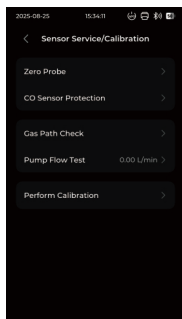
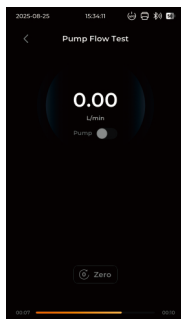


Airtightness Test Failed

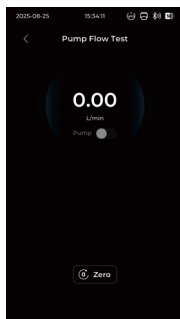
7.18.4 Gas Pump Flow Rate Test

In the sensor service/calibration interface, tap "Pump Flow Test" to enter the gas pump flow rate test.

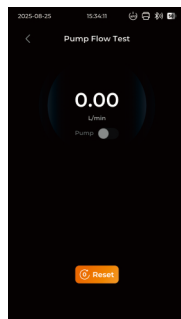
- Turn off the gas pump. The Pump icon will turn gray. Wait for more than 10 seconds until the value stabilizes, then press "Zero" to zero the gas pump flow rate. Press "Reset" to confirm that zeroing has taken effect.
- Turn on the gas pump. The Pump icon will become highlighted, and the flow rate value will display the current measurement in real time.

Sensor Service
/Calibration Interface

Zeroing Countdown

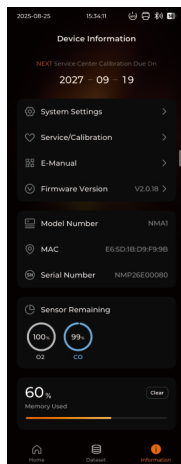


Zeroing Interface

Zeroing Second
Confirmation

7.19 Device Information

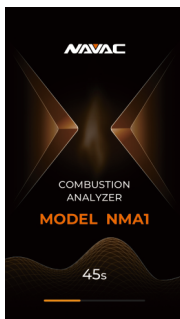
Tap "Information" on the main interface to view all device information, including the digital user manual, firmware version, device model, MAC address, serial number, sensor service life information, and device memory usage.



Settings Interface

7.20 Shutdown

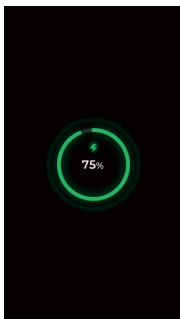
1. After using the analyzer, introduce clean air into the sampling tube inlet to purge any residual gas inside the analyzer.
2. Press and hold the "ON/OFF" button for 3 seconds, then release. The analyzer will perform a 60-second countdown and then power off.



Shutdown Countdown

7.21 Charging When Powered Off

When charging with the device powered off, the charging progress will be displayed in real time.

Charging When
Powered Off Interface

8. Maintenance

8.1 Sensor Life

The gas sensors operate on the electrochemical principle: when a target gas is present inside the sensor, a chemical reaction occurs, generating an electric current. The current intensity detected by the instrument is converted into the corresponding gas concentration. The sensor's life is closely related to the consumption of the reagents present in the sensor. As their consumption increases, the sensor's function progressively degrades until it is depleted, at which point the sensor needs to be replaced. To ensure measurement accuracy, sensors must be calibrated only at our certified service centers.

Sensor	Average Life	Calibration Frequency (Recommended)
O ₂	4-5 years	Annually
CO	2-3 years	Annually

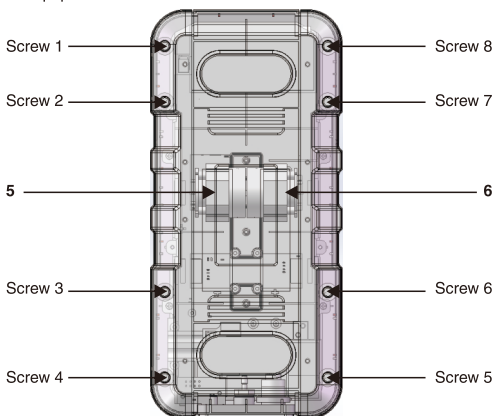
⚠ Attention

Please regularly charge the smart combustion analyzer to ensure the electrochemical sensors remain in optimal operating condition. Do not allow the smart combustion analyzer's charge level to reach zero. If the instrument has not been used for more than 45 days, recharge the analyzer promptly.

8.2 Replacing the Sensor

It is recommended to send the product to a professional service center designated by NAVAC for repair. Follow the steps below to replace the sensor :

The analyzer must be kept powered off.



- Flip the analyzer over with the back side facing up.
- Use a suitable screwdriver to remove screws 1/2/3/4/5/6/7/8, then open the analyzer back cover.
- Identify the correct slots for the CO / O₂ sensors.
- Insert the new sensor into the corresponding slot.
- Confirm, close the back cover, and fasten the 8 screws.

Sensor Position Diagram: 5 is the O₂ sensor; 6 is the CO sensor.

Typically, after installing new sensors, a waiting period is required for the sensors to activate and stabilize. The stabilization time required for each sensor is as follows:

- O₂: 12 hours
- CO: 8 hours

8.3 Replacing the Sampling Gun Filter Element

It is recommended to replace the internal filter element of the instrument annually or when necessary:

- Unscrew the transparent protective cover at the end of the sampling gun counterclockwise.
- Remove the used filter element.
- Install a new filter element.
- Tighten the filter element protective cover clockwise.

8.4 Cleaning the Water Trap

It is recommended to clean the water trap when the accumulated water reaches the riser pipe opening. After each use, clean the water inside the water trap.

8.5 Cleaning the Analyzer

Clean the analyzer housing with a damp cloth. Distilled water is recommended.

Warning

Do not use isopropyl alcohol for cleaning.

9. Common Troubles

Faults	Cause	Remedy
No response after powering on.	1. Rechargeable lithium-ion battery is depleted; 2. Button open circuit, device damaged	1. When the device has been stored for an extended period without use, the battery may enter a low-battery protection mode. If this occurs, charge the device for at least 4 hours. (The charging process includes both the low-current pre-charge and normal-power charging stages). 2. Promptly return to the factory for repair
Slow response time of measured values; measured values change slowly or not at all.	Air leak or blockage in the gas path	1. Check whether the air-electric hybrid tube is kinked; 2. Check whether the water trap is blocked or disconnected.
Large fluctuation in measured values, exceeding the tolerance.	1. Insufficient instrument warm-up; 2. Unstable sampling	1. Properly start the instrument and allow it to warm up; 2. Check whether the gas path is kinked or leaking.
Measured values do not return to zero after measurement.	1. Residual gas inside the gas path; 2. Instrument zero drift effect	1. Perform measurement, introduce clean air to purge residual gas; 2. Perform zero adjustment or return to factory for calibration.
After starting the pump, the pump does not work, properly or heats up excessively.	1. Sampling gun power supply abnormal; 2. Sampling gun communication abnormal; 3. Pump abnormal or gas path blocked.	1. Check whether the flue gas probe connector cable interface is plugged into the main unit; 2. Return to the factory for repair; 3. Check whether the gas path is kinked.
Rechargeable lithium-ion battery runtime < 6h.	1. Rechargeable lithium-ion battery capacity reduced; 2. Operating environment temperature too low.	1. Promptly return to the factory for rechargeable lithium-ion battery replacement; 2. Ensure the device is not operated outside the specified operating temperature range.
The device cannot be charged.	1. Insufficient charger power; 2. Charging cable loss too high or damaged.	1. Use a fast charger; 2. Promptly replace the double-ended Type-C charging cable.
Display text unclear.	1. Screen brightness too low; 2. External sunlight too strong.	1. Increase screen brightness in settings; 2. Avoid using the device in strong light environments.

9. Common Troubles

Faults	Cause	Remedy
Smart combustion analyzer cannot connect to Bluetooth printer.	1. Bluetooth printer not turned on; 2. Bluetooth printer rechargeable lithium-ion battery low; 3. Communication distance too far; or excessive wireless interference in the current environment.	1. Check whether the Bluetooth printer is turned on and ensure it is powered on; 2. Ensure the Bluetooth printer has sufficient battery power; 3. Use the smart combustion analyzer and Bluetooth printer in an open area.
Smart combustion analyzer cannot connect to the mobile APP.	1. Phone Bluetooth not turned on Smart combustion analyzer 2. Bluetooth not turned on. 3. The distance between the two is too far.	1. Ensure the phone Bluetooth is turned on; 2. Ensure the smart combustion analyzer Bluetooth is turned on; 3. Use the Bluetooth communication function at an appropriate distance.
Water trap leaking	Water trap seal ring sealing performance degraded	Promptly replace the water trap seal ring
No response when tapping the screen	1. Screen sensor abnormal 2. Screen ribbon connector disconnected	Promptly return to the factory for repair
Screen display scrambled or striped	Screen cable poor contact or partial damage	Promptly return to the factory for repair
Unable to power off properly	Button short circuit, device damaged	Promptly return to the factory for repair

Attention

- If the fault persists after the above checks, please contact the manufacturer.
- Do not disassemble the instrument yourself unless you are a professional or have permission from the manufacturer. Otherwise, the manufacturer will not provide warranty coverage or repair services for instrument damage.

Note:

1. During transport, the sensors must not be subjected to severe mechanical shock, direct sunlight, or rain. Prevent them from being dropped, tossed, rolled, or crushed.
2. Please read the instruction manual before use to understand the performance and operating methods, so as to avoid accidents or instrument damage caused by improper operation.
3. To ensure good measurement accuracy, the sensor power supply must be within the range specified in the technical parameters.
4. Before testing, inspect the instrument to prevent liquid water from directly entering the analyzer.
5. The instrument contains a built-in magnet. Place the analyzer on a stable surface that can securely support its magnetic mounting. To prevent the analyzer from tipping over or falling, avoid locations subject to excessive vibration or strong magnetic fields. The analyzer should also be used in an area with clean ambient air.
6. Dust is strictly prohibited from entering the instrument's gas path. Regularly inspect the instrument's filter components. Replace them if dust accumulation or blackening of the filter element is observed.
7. Ensure that before connecting the analyzer, the connected device does not have significant static electricity (greater than 3000V) remaining. Special care is required when connecting to a computer USB port.
8. If you encounter an unsolvable problem, please contact the manufacturer promptly. Do not disassemble internal sensors for repair.

10. Environmental Disposal Instructions

This instrument is a handheld Smart Combustion Analyzer.

At the end of its lifecycle, dispose of it in the following manner:

1. Used lithium batteries must be handled by qualified service personnel and disposed of in accordance with local battery recycling regulations.
2. The removed O₂/CO electrochemical sensors contain electrolyte and must be handled by qualified service personnel. Collect used sensors and dispose of them as hazardous waste through an authorized waste disposal provider in accordance with local regulations.
3. Dispose of the complete unit as electronic waste. Do not discard with household waste. 

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