



Aerosol Photometer

Model 3991

Operation Manual



01001
23 . 03



Please read and understand the warning precautions specified in this Manual carefully before using the product.

Please keep this Manual in good condition for long-term use.

User Instructions

1. Please read this Manual carefully before using the instrument and be familiar with relevant terms.
2. Failure to operate according to the requirements of this Manual may damage the instrument, result in fire, electric shock or even serious personal injury.

The Company defines the types of warnings used in this Manual as follows.

[Label Description]

- Warning** In order to prevent any personal injury caused by an accident
There may be a risk of personal injury if such warning is ignored.
- Attention** In order to prevent any damage to instruments
The instrument may be damaged or the performance of the instrument may be degraded if such warning is ignored.

[Icon Description]







△ Thus symbol indicates matters needing attention (including danger). Specific matters needing attention are inside the triangle.



⊘ This symbol indicates forbidden matters. Specific forbidden matters are inside the circular frame.



• This symbol indicates coercive behavior. Specific contents are next to the symbol.

Warning	
 Danger! High Voltage	<ul style="list-style-type: none"> ○ Before power on, the instrument should be connected to the ground wire, and the ground wire should not be connected to the gas pipeline. ... Otherwise, it may lead to electric shock or a fire.
 No Placement	<ul style="list-style-type: none"> ○ It is prohibited to place the instrument in inflammable and explosive corrosive gases. ... Otherwise, it may cause a fire or even an explosion.
 No Disassemble	<ul style="list-style-type: none"> ○ Never disassemble or refit the instrument. ... Otherwise, it may lead to electric shock or a fire.
 Correct use	<ul style="list-style-type: none"> ○ Please use the instrument correctly according to the requirements of the Manual. ... Improper use may result in electrical shock, a fire or sensor damage.

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Chapter I. Instrument Introduction

Model 3991 is a linear digital aerosol photometer for scattered light with advanced technology and scientific design, and serves as the optimum test instrument for testing the integrity of the high efficiency particulate air (HEPA) filter or conducting leakage test. Considering the low concentration of atmospheric dust in the upstream of the HEPA filter under test, the aerosol generator should be used to replenish and generate dust to meet the test conditions. The aerosol photometer should be used to measure the concentration of suspended particulate matter in the upstream of the HEPA filter, and display the actual mass concentration value in $\mu\text{g/L}$; then conduct the scanning test at a constant speed in the downstream to get the leakage rate of the HEPA filter under test. It is easy for spotting the leaking points and quantifying it, which can be used for reference during repairing. The product is compact in structure and easy to carry, and all operations can be completed via the 8.4inch color touch screen interface. The noise suppression function can be realized by setting the aerosol sampling time constant, which can make the test data more stable. With the built-in thermal printer, real-time test data printing at the test site can be realized.

1.1 Product Features

- 8.4inch capacitive touch screen;
- Sealed 304 stainless steel enclosure;
- Toggle between Chinese and English;
- Mufti-function scanning probe, 2.0inch LCD, which can display and operate in sync with the host;
- Barcode scanner, equipped with one-dimensional code scanning function, can scan the number of testing device, and data can be automatically categorized and traceable;
- Barcode scanner and the host can be rapidly connected via a 4m cable and air pipe, which is easy to test the long-distance filter;
- With “Measure”, “Setup”, “User”, “Log”, “Data” and “About” total six interfaces;
- Aerosol reagent, noise factor suppression, alarm limits, reporting mode, date and time can be set intelligently.

- The self-equipped flow monitoring device and sampling pump with an adjustable pulse width, which can achieve excellent performance;
- Built-in thermal printer, which can support long-term thermal paper printing, real-time reading and printing of test data;
- Energy saving and consumption reduction, battery powered available;
- Three level administrative privileges, Identities setting, user right assignment and generate the log report.

1.2 Application fields

- Verification of HEPA filters
- Nuclear energy and fuel
- Pharmaceutical and electronic industries
- Medical operating room, clean room
- Bio-safety cabinet, clean bench
- Food processing and scientific experiment
-

1.3 Main specifications

Method		Near-Forward Scattering Light
Data display range		0.0001~100.0%
Dynamic range		0.1μg/L~600μg/L
Flow		1cfm (28.3L/min) ±10%
Languages option		English、Chinese
Zero setting		Manual or auto
display		8.4" Touch screen
Alarm		audio, visual and vibration modes
Print		Built-in thermal paper, 57mm (2 1/4in) in width × outer Dia. 40mm
Data storage		100,000
Communication	USB interface	Data export

	Type-B	115200, 8, 1, N
Aerosol type	PAO, DOP(DEHP), DOS(DEHS), Mineral Oil, Kaydol, Paraffin Oil, Polyethylene Glycol, Corn Oil, High, Ondina, Fine vestan and etc.	
Others	One-dimensional code scanning	
	GMP Three-level administrative privileges	
Operation Condition	5°C~50°C (Non-condensing, no ice)	
Operation Humidity	5~95%RH	
Storage Condition	-20°C~60°C (RH is lower than 95%, non-condensing)	
Power supply	AC100~240V 50/60Hz or Li-ion battery (option)	
Electric fuse	One for mandatory 5×20mm, 2A,250V	
Dimensions (W ×H×L)	Approx.220×300×390mm(W×H×L) 8.7in x11.8in x 15.4in	
Weight	Instrument: Approx.14.2kg and Probe vs. Accessories:1kg	

1.4 Packing list

When unpacking the box, please check the instrument and accessories according to the packing list. If there is any missing or damage, please contact us immediately.

Item.	Quantity
Host (built-in printer)	1
Probe (with rectangular scanning head)	1
Upstream sampling tube (pipe length: 4 m)	1
Downstream quick connection kit (pipe length: 4 m)	1
Power cord	1
Qualification test report	1
Filter and O-ring	2 for each
Manual	1
Thermo-sensitive paper, 57mm (2 ¹ / ₄ in) in width	2 volumes

1.5 Options

Item.	P/SN
Portable protection box	3991-0010

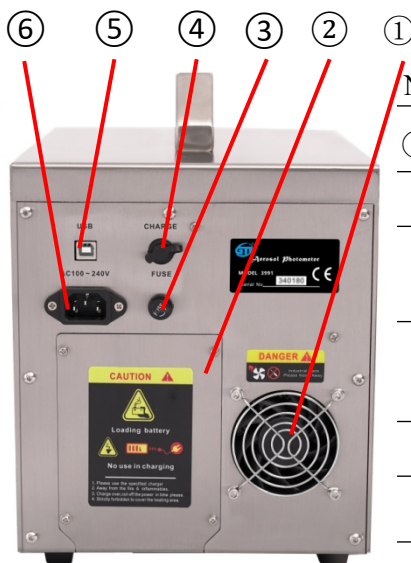
Build-in Li-battery	3991-0020
Charging Adaptor	3991-0030
Round sampling port	3991-0040
Square sampling port	3991-0050

Chapter II. Configuration and Accessories Introduction

2.1. Master



No.	Name	Functions	Remarks
①	Touch screen	Display and operation settings	
②	Handle	Non-folded	
③	Printer	In the summary mode, it can print test data	
④	Downstream sampling port	Connect to the downstream quick connection kit's air pipe.	⚠
⑤	Upstream sampling port	Connect to a single independent air pipe	
⑥	Cable socket	Connect to the downstream quick connection kit's cable plug.	
⑦	USB interface	data exporting	
⑧	Power switch		



No.	Name	Functions	Remarks
①	Fan	Internal heat dissipation of the instrument	
②	Battery bin	Li-battery inside	
③	Fuse	Protect the instrument from over-current burn-out	⚠
④	Battery charging adapter socket	Li-battery charging interface	⚠
⑤	Type-B	Communicate with PC.	
⑥	Power socket	AC power supply	



Attention

Installing a non-specified type of fuse can cause damage to the instrument

Fuse Type: 5×20mm, 2A, 250V.



Attention

Please supply power according to the voltage range indicated on the panel label at the back of the instrument, thus avoiding any damage to the instrument

1) 100~120V 60Hz 0.7A

2) 220~240V 50Hz 0.35A




2.2 Probe



No.	Item.	Functions
①	Rectangular scanning head	Sample the downstream gas
②	Flexible pipe	It can be used to adjust the rectangular scanner angle
③	Probe display panel	Show in sync with the host screen
④	Probe key area	Operation settings
⑤	Air pipe socket	Connect to the air pipe plug in the downstream quick connection kit
⑥	Cable socket	Connect with the small cable plug in the downstream quick connection kit
⑦	Scanning window	It can be used to scan the number of one-dimensional code of the scanned part

Probe keypad functions

Symbol	Function	Symbol	Function
Esc	Cancel/Exit	Set	Confirm/Save
	Alarm reminding of quick start/stop in audio and vibration		One-dimensional code scan control switch

	mode		
	Start/pause data transmission/print		Terminate data transfer/print
	Parameter modification/location moving		

2.3 Downstream Quick Connection Kit



No.	Item.	Function
①	Air pipe plug	Connect with the probe's air pipe socket
②	Small cable plug	Connect with probe's cable socket
③	Large cable plug	Connect with host's cable socket
④	Air pipe	Connected to the host's downstream sampling port

Chapter III. Start-up and Shutdown

3.1 Preparations before start-up

3.1—1 Inspection of sampling joints



① Screw off upstream and downstream sampling port joints along the anti-clockwise direction.

② Check and ensure that the inside O-ring and filter mesh should be undamaged, the filter mesh should be unblocked, and remove any foreign matter such as fluffs on the mesh surface.

③ Tighten the joint again



Attention

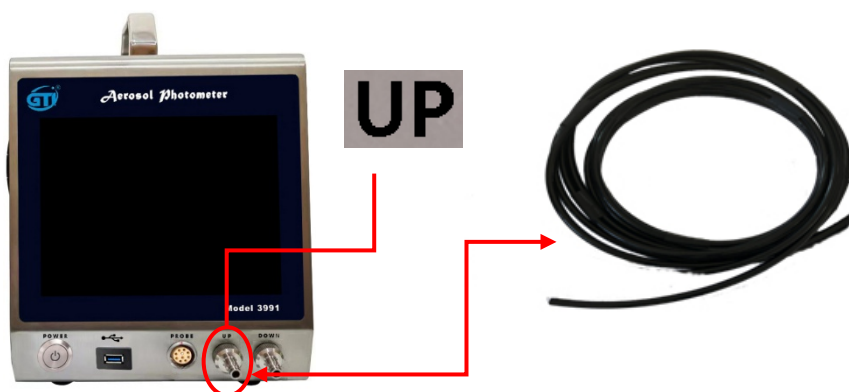
- 1) Before testing, the operator should check the sampling joint and ensure that there are no fluffs or impurities blocking the filter screen.
- 2) During the test, if the pump noise suddenly increases, the operator should check if the gas passage is blocked, especially the filter screen at the sampling joint.
- 3) It's recommended to wipe clean the filter screen at the sampling with a piece of silk cloth before each use.



Attention

During the setting, when there is a prompt of pipeline blockage, the operator should check if the gas passage is clogged, especially the filter screen at the sampling joint.

3.1-2 Test Connection at the upstream (high aerosol concentration zone)



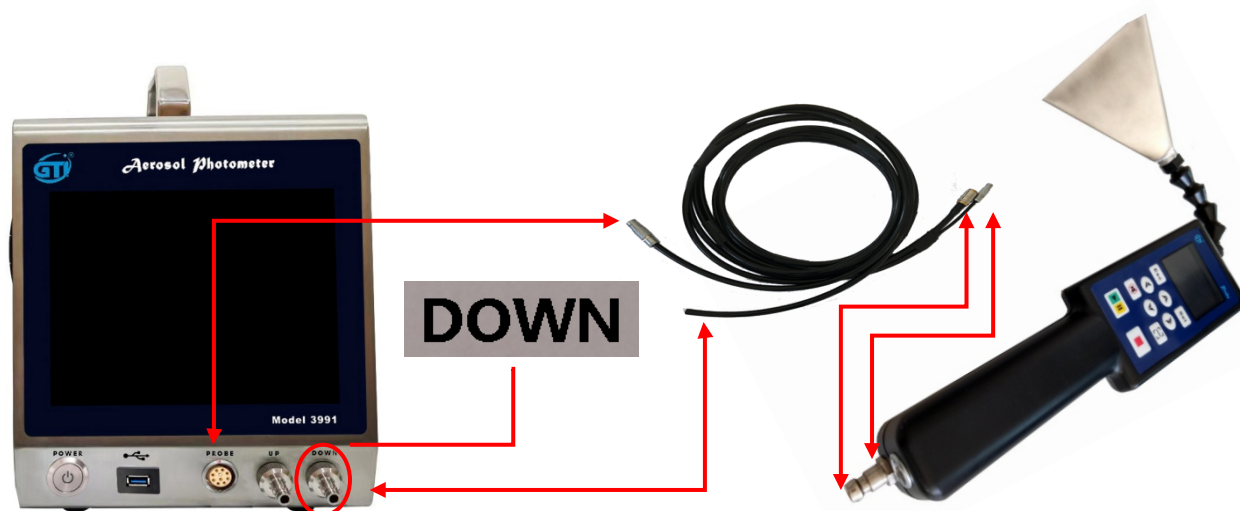
Attention

- 1) The upstream sampling air pipe is a separate air pipe. Please connect the upstream port to the upstream sampling air pipe.



- 2) In order to ensure the accuracy of the test results, the upstream and downstream sampling air pipe should not be mixed.

3.1-3 Test Connection at the downstream (low aerosol concentration zone)



Attention

- 1) Be sure to connect the probe's cable connector before the instrument is powered on.
- 2) Unplug the probe's cable connector after shutdown.
- ※ It is forbidden to plug or unplug the probe cable without permission when the instrument is energized, otherwise, it will cause damage to the instrument.

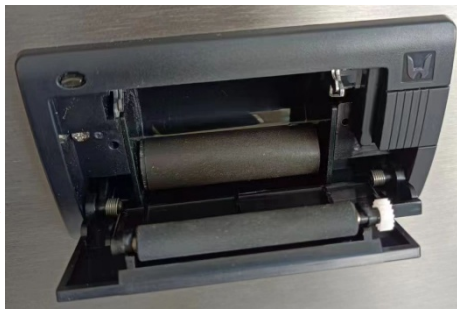
3.2 Loading printing paper into the printer

Please use the printing paper that is matched with the printer, the printing paper's specifications should be 57mm (2 1/4in) in width. If the printing test results need to be saved for a long run, please choose the long-term thermal o-sensitive printing paper. Otherwise, ordinary thermo-sensitive printing paper can also be used.

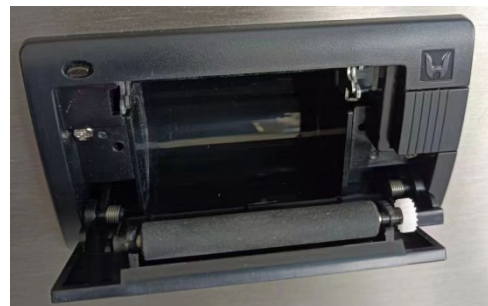
The method of loading the printing paper into the printer is as follows:



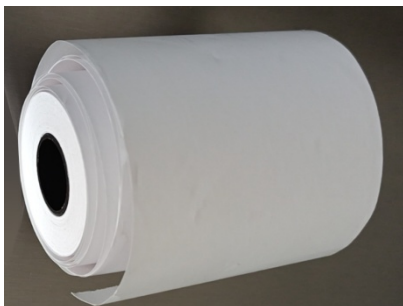
a. Gently pressing the printer open button.



b. Open the printer cover



c. Remove the paper shaft.



d. Uncover the adhesive side of the printer paper, bouncing the paper off so that the paper can be smoothly drawn when printing.

e. If the print paper roll loosen, need to be straightened again. both sides are level with the paper shaft, then the paper is tightly rolled and ready to be put into the printer paper compartment.



e. put the printer paper in and close the cover.

f. Make sure to reserve a small piece of exposed printer paper on the outside of the paper cabinet.



Attention

- 1) Make sure to leave a small piece of exposed printer paper on the outside of the paper cabinet, otherwise there will be print error or unavailable to print. Because of the residual glue may on the paper.
- 2) Make sure to leave a small piece of exposed printer paper on the outside of the paper cabinet after close the paper cabinet. That will make print well smoothly.

3.3 Start-up

3.3—1 Power on



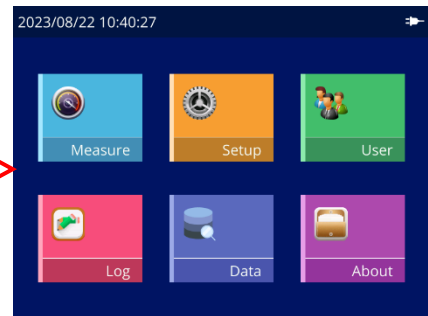
Attention

- 1) Be sure to connect the probe before the instrument is started.
- 2) Unplug the probe after shutdown.
※ It is forbidden to plug the probe cable without permission when the instrument is energized, otherwise it will cause damage to the instrument.



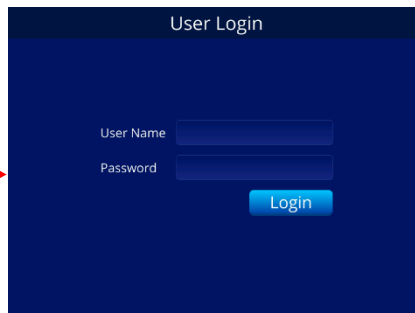
① Power cable connecting

② Keep pressing the power switch



3.3—2 User login

If the security authentication function enabled, the user needs to log in to the user system after initialization.



3.4 Power supply mode

3.4-1 AC Power supply

Specification: AC100~240V 50/60Hz

3.4-2 Power supply by battery

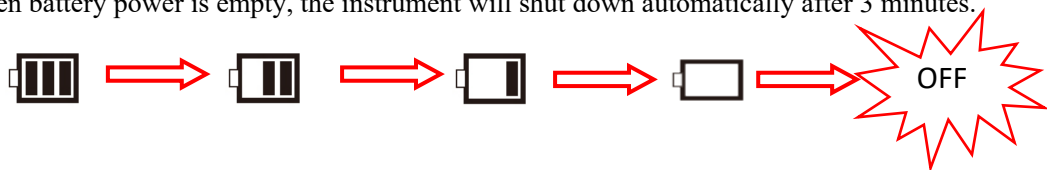
Rechargeable Li-battery packed in the instrument may keep power supply for about 4.5 hours or so.

1) Power Charge

- ◆ There's an independent charging port for power supply, please use the standard adapter supplied by us to charge. The battery power will be full of charge when the indicator light turns to green.
- ◆ Don't charge in use. It should be charged under Power-off state. Please unplug the adapter after full charge then start to work.
- ◆ The charging port is different from the AC adapter socket, they are not the same, pay attention no to confuse.

2) In use

- ◆ When battery for power supply, the icon of power level will be displayed on the upper right of the LCD screen where the power supply mode is located.
- ◆ when battery power is empty, the instrument will shut down automatically after 3 minutes.



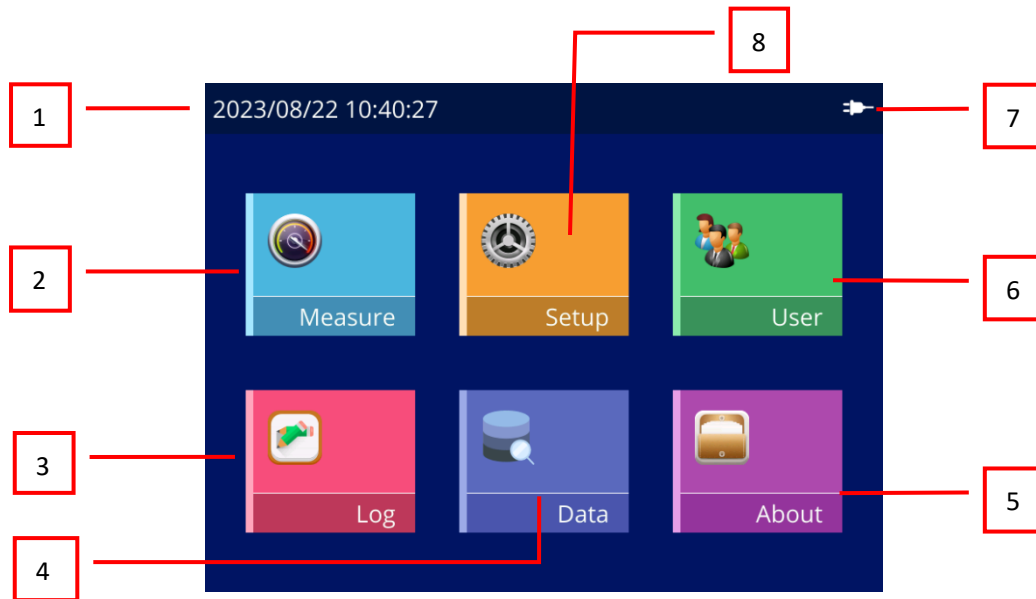
3.5 Shut down



Keep pressing the Power Switch

- 1) Clean: After passing high-concentration aerosol or completing the upstream test, it is recommended to choose "clean" operation before shutdown.
- 2) Shutdown: If the residual aerosol concentration in the gas passage is too high, the instrument will be forced to clean for 3 minutes before shutdown.
- 3) Cancel: Exit the current shutdown operation.

Chapter IV. Home Page



- 1) Date/Time: System time display
- 2) Measure: Concentration and flow tests
- 3) Log : traceability operation record
- 4) Data: storage data browsing, delete, exporting and printing.
- 5) About: underlying information
- 6) User: add User name and configuration appropriate permissions.
- 7) Power supply mode: AC power supply or battery, charge level display, low charge alarm.
- 8) Setup: parameter setting, function selection.

Chapter V. Testing

Test interface includes upstream 100% concentration settings, Zero re-setting, ID input, downstream testing, self-purification function, data printing and transmission and etc.

5.1 Set 100% upstream concentration

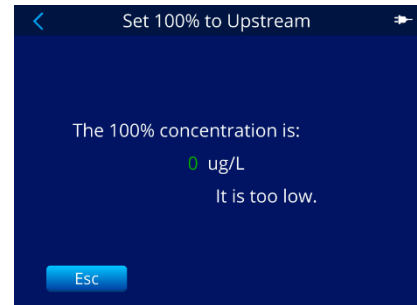
Before the instrument is tested, the upstream concentration should be set to 100%. There are three methods, 100% concentration automatic sampling, 100% concentration self-defined reference value and the last measured value.



Attention

Set the upstream concentration to 100% via either method, The allowable upstream mass concentration scope of instrument for test is 5-120 $\mu\text{g/L}$,

※ When the upstream concentration is more than 120 $\mu\text{g/L}$ or less than 5 $\mu\text{g/L}$, an error prompt will pop out.

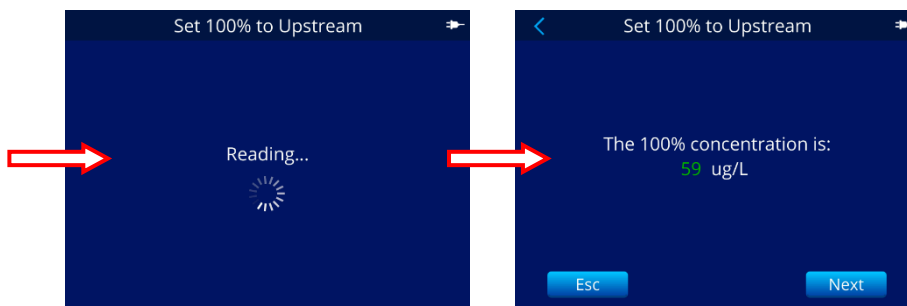


5.1-1 100% concentration automatic sampling



Attention

The host's upstream interface is connected to the filter upstream (high aerosol concentration zone) via a hose.

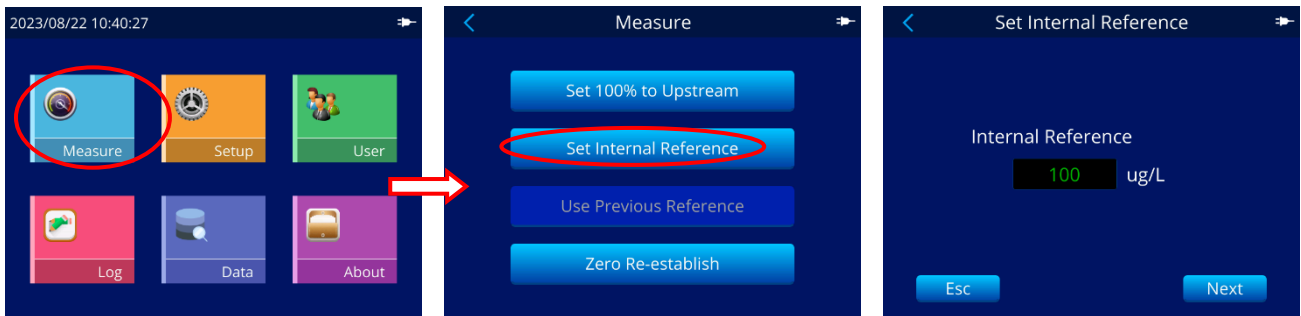


5.1-2 100% concentration self-defined reference value

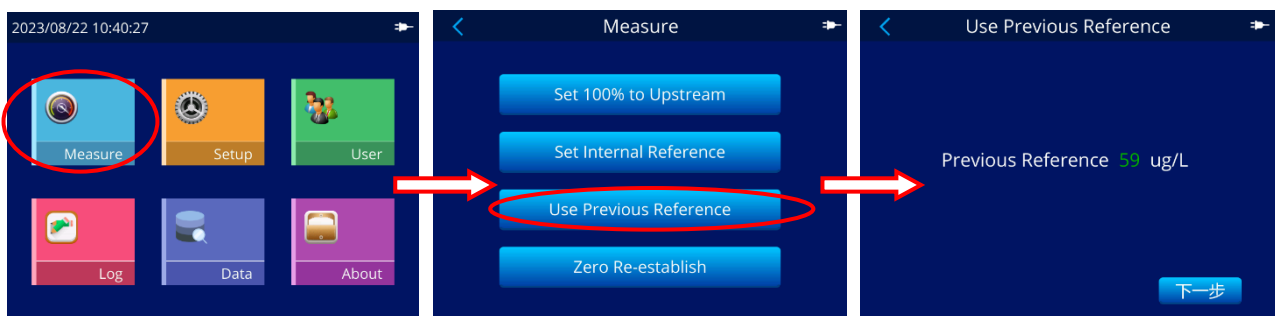


Attention

The input range of the value is 5-120.

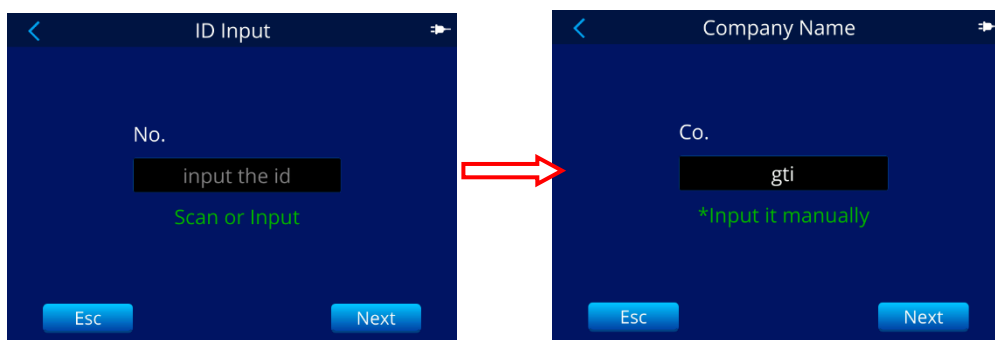


5.1-3 Set 100% concentration based on the last measured value



5.2 Company Name Input

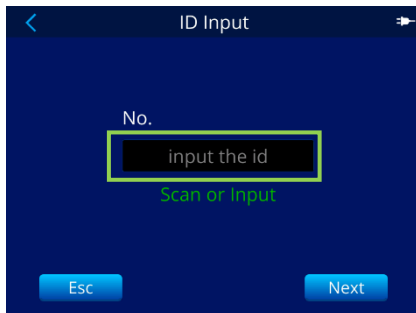
After 100% upstream concentration is established, the operator can input Company Name into the Master and this Name can be traced with the corresponding testing data for printing, data-saving and etc.



5.3 ID. Number input

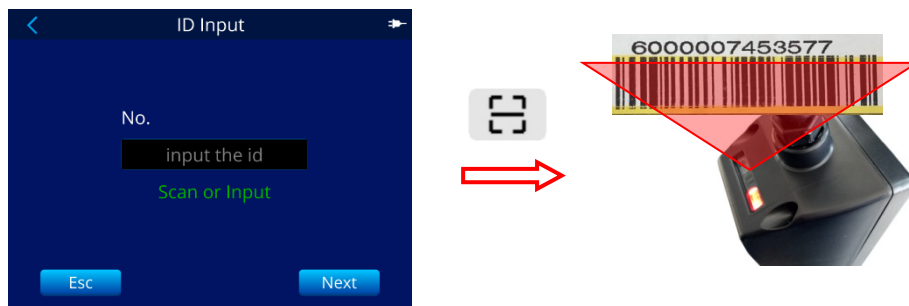
Regarding to the ID number, the operator can input ID into the host, or use the probe to scan the one-dimensional code for automatic identification. If there is no need to input ID number, the operator can directly click "next step" and enter into the test interface

5.3—1 Input ID into the host



If there is no need to input ID number, the operator can directly click "next step" and enter into the test interface。

5.3—2 ID Scanning via a probe



5.4 Testing

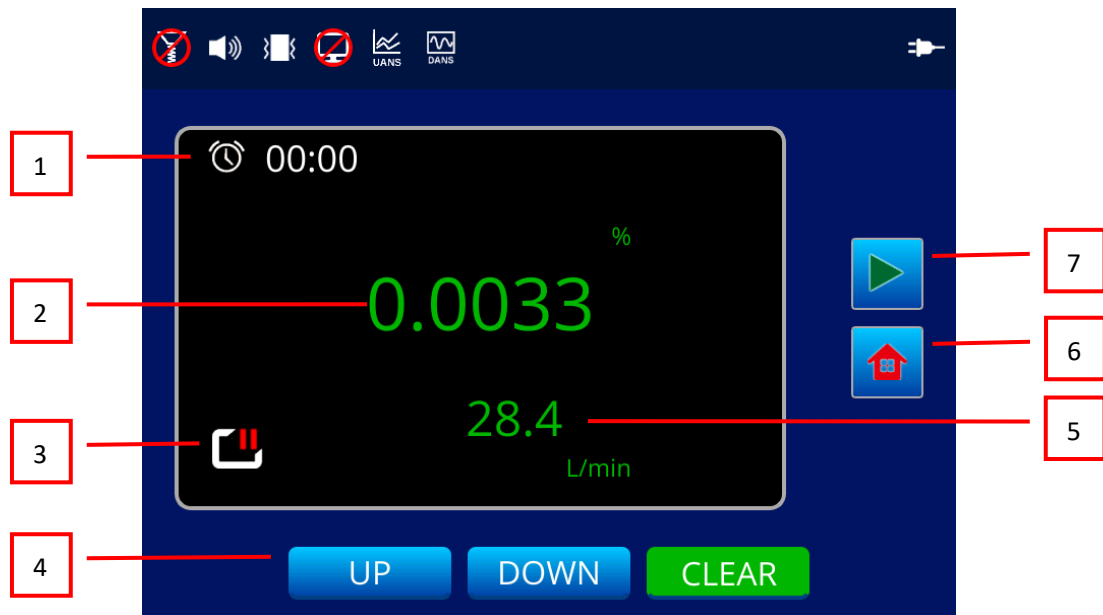
Test interface, probe and host can display the test data synchronously, with "upstream", "downstream", "self-clean" function available for switching at any time.









Attention

After entering the test interface, the default state is "downstream"

Test interface of Master:



No.	Descriptions	Icon	
1	Measure scanning time		The probe has been connected
2	Testing concentration percent (Green for qualified/ red for overloading)		Probe's audio alarm is available
3	Testing status iron		Probe's vibration alarm is available
4	Functions selection		USB interface and PC are connected
5	Testing airflow	 UANS	Upstream sampling time constant is effective
6	Stop testing and return to homepage	 DANS	Downstream sampling time constant is effective
7	Start/ Pause for measuring control		

5.5 Data printing and transmission

5.5—1 Data printing

Select "summary" mode when setting the report mode, as shown in 6.2-4. Once selected, the data-print function can be initiated and will obtain the maximum test value during the test.



Model: Aerosol Photometer 3991
 Serial.: 340001
 Cal. Due.: 2024/02/01
 Now: 2023/01/24

 Company name: GTI
 ID. No. : 1234567890
 Reagent: PAO.
 Upstream Vol.: 100 ug/L
 Sampling methods.: user defined.

 Start time: 2023/01/24 15:50:20

Leakage alarm: 2.000%
 Qualified: OK
 Instantaneous Max.: 0.007%
 Scanning time: 00 min 10 sec

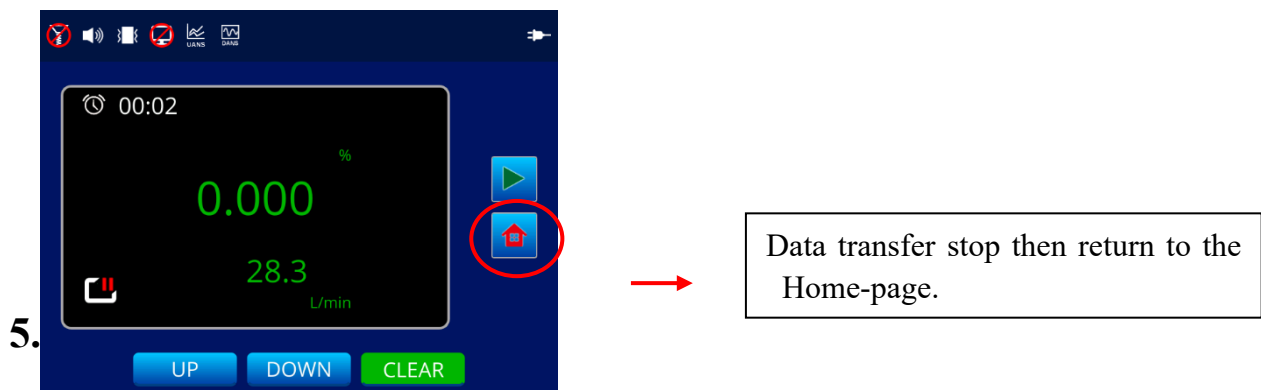
 Leakage alarm: 2.000%
 Qualified: NG
 Instantaneous Max.: 2.336%
 Scanning time: 01 min 10 sec

Leakage alarm: 2.000%
 Qualified: NG
 Instantaneous Max.: 2.336%
 Scanning time: 01 min 10 sec

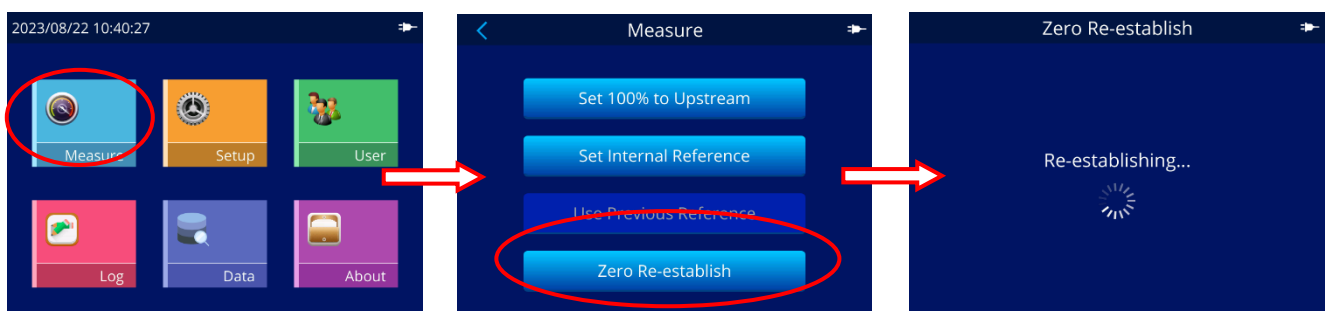
 End time: 2023/01/24 15:52:50
 User:

5.5—2 Data transmission

In Report mode, "Monitoring" or "Continuous" status can be selected, and when connect the USB cable on instrument back panel to PC, the testing data can be kept transferring until the end of setting time.



※ In case of zero drift during the test, the operator can carry out zero correction at any time.



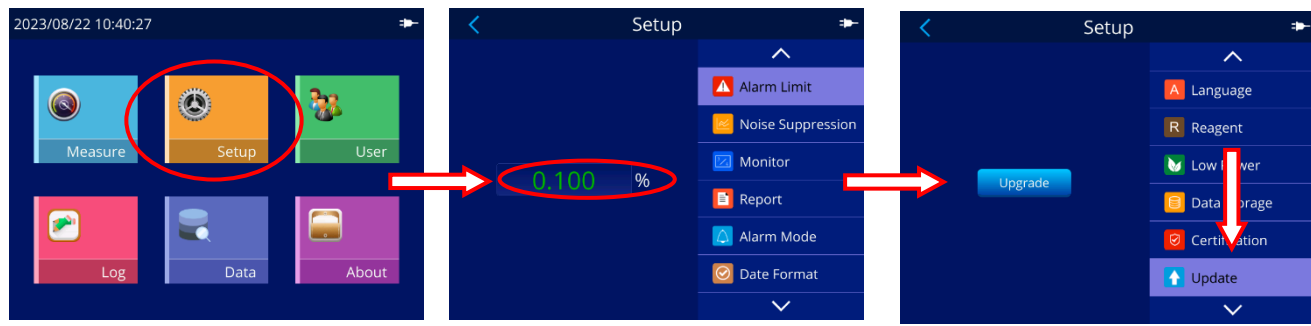
Chapter VI. Setting up



ATTENTION

- 1) When setting up on the main unit, the probe will prompt "main unit setting...", and the probe cannot perform any operations until the main unit returns to the home page interface;
- 2) When operating on the probe, the host will prompt "Probe setting...", and the host cannot perform any operations until the probe returns to the home page interface;
- 3) When the security authentication function is turned on, some setting operations will be controlled according to the assigned permissions, and the probe cannot be operated.

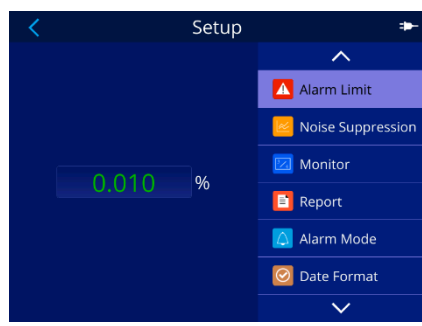
6.1 Entering Interface



6.2 Parameters

6.2—1 Alarm Limit

※Alarm limit: The settable range is 0.001~100.0%. When the measured value exceeds the set value, the probe will alarm according to the selected alarm method.



ATTENTION

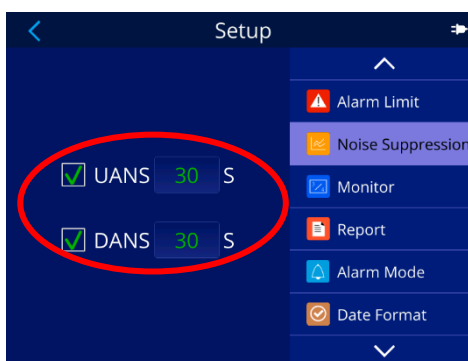
The alarm limit is to set the alarm value in the percent unit of leak rate. If 100%=100μg/L, the alarm value is 20%, then the actual alarm mass concentration=20μg/L;

If 100%=80μg/L, the alarm value is 20%, then the actual alarm mass concentration=16μg/L.

6.2—2 Coefficient Suppression

※Coefficient suppression: It is the noise suppression function. By setting the sampling time constant, the test results are displayed as the average value within this period, thereby suppressing the influence of aerosol fluctuations on the test data. The sampling time constants for upstream and downstream are set separately. The time constant ranges from 1 to 120s.

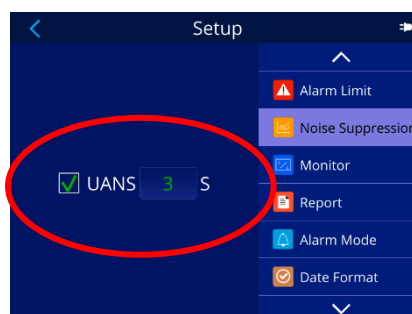
1. The upstream and downstream sampling time constants can be set separately on the host. If the probe cable plug is connected to the host, the time constant setting is invalid which means that the downstream port can only realize the test without scanning probe.



ATTENTION

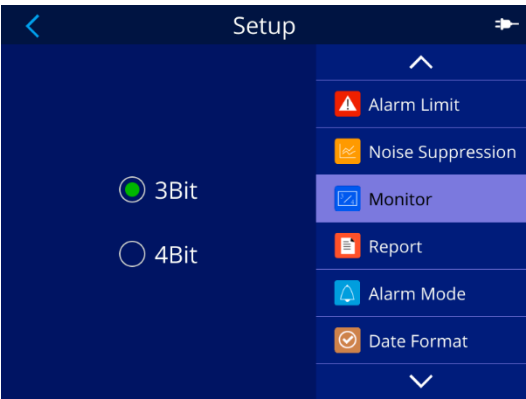
※It is forbidden to unplug and insert the probe cable connector at will when the instrument is powered on, otherwise it will cause damage to the instrument.

2. When the sampling probe is connected to the main unit, only the upstream sampling time constant can be set on the main unit and the probe, which is to prevent accidental distortion of data from affecting the test results.



6.2—3 Digit Display

※ When the leakage rate is less than 1.0%, there are two options for display digits after the decimal point: 3 digits (0. xxx%) or 4 digits (0. xxxx%)



6.2—4 Report Mode

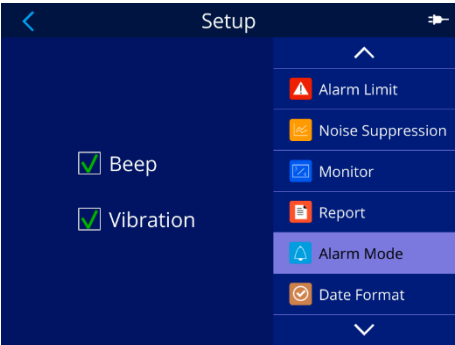
※ Report Mode: Summary, Monitor, Continuous

A screenshot of the 'Setup' menu with 'Summary' selected (green dot). The 'Monitor' item on the right is highlighted with a purple bar.	A screenshot of the 'Setup' menu with 'Monitoring' selected (green dot). The 'Report' item on the right is highlighted with a purple bar. The 'Monitoring' option has a '3 S' label next to it.	A screenshot of the 'Setup' menu with 'Continuous' selected (green dot). The 'Report' item on the right is highlighted with a purple bar. The 'Continuous' option has a '3 S' label next to it.
High-efficiency filter (HEPA/ULPA) test results are verified and saved on-site, and the test ID number is output through the printer interface. The maximum leakage rate within the specified test time.	Through the USB port, output the real-time leak rate according to the set time.	Through the USB port, the percent leak rate is output every second.

6.2—5 Alarm Mode

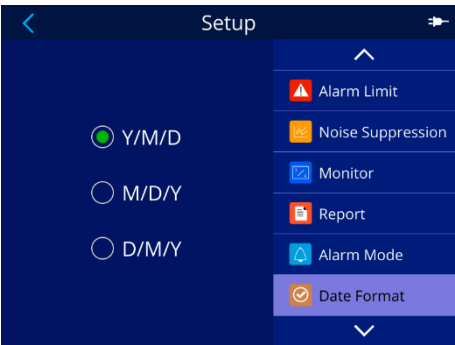
※ Alarm mode: display, sound and vibration.

※Displaying the alarm is the default function which will be displayed in red if it exceeds the judgment limit, and it will be displayed in green if the qualified data is exceeded.



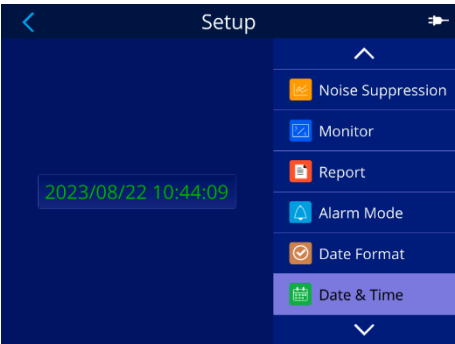
6.2—6 Time Format

Three Modes: Year Month Date, Month Date Year, Date Month Year.



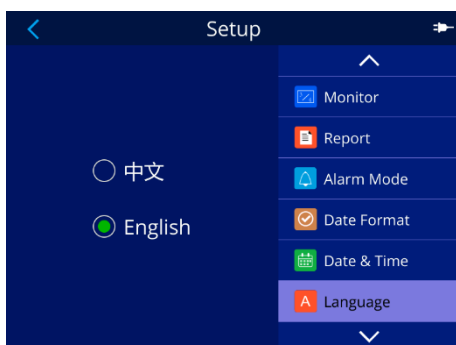
6.2—7 Date & Time

※Only by host



6.2—8 Language Toggle

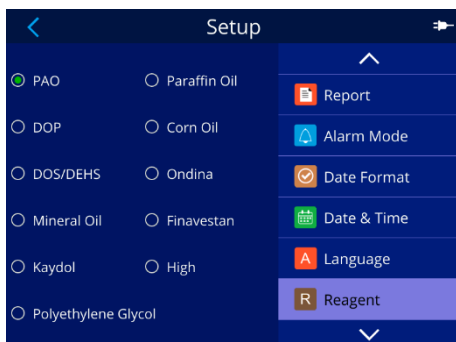
※Chinese & English



6.2—9 Re-agents Type

※Options:

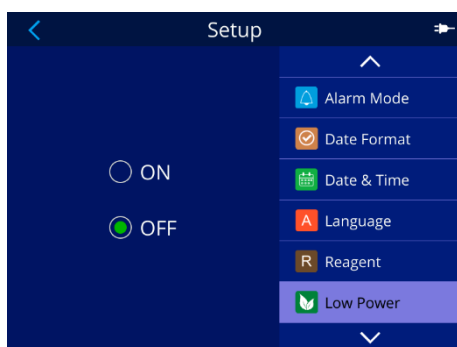
PAO, DOP (DEHP), DOS (DEHS), Mineral Oil, Kaydol, Polyethylene Glycol, Paraffin Oil, Corn Oil, High, Ondina and Finevestan.



If the upstream aerosol concentration is too high which is higher than the test range, the internal reference medium should be selected as High. Using the High setting allows sampling of aerosol concentrations up to 600 µg/L. However, within this high concentration, only short-term sampling is allowed.

6.2—10 Low Power Consumption

※Model 3991 has a built-in air pump and battery, and long-term use will reduce the service life. When the low power consumption mode is turned on, the air pump will run in a low power consumption mode, which greatly reduces battery power consumption and improves service life.

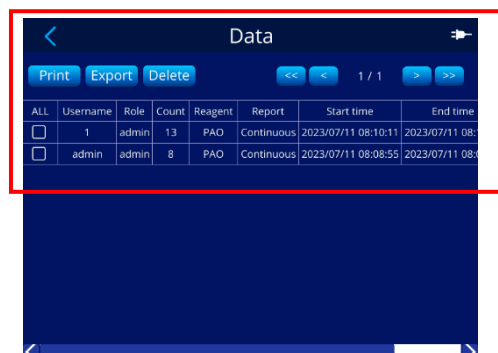
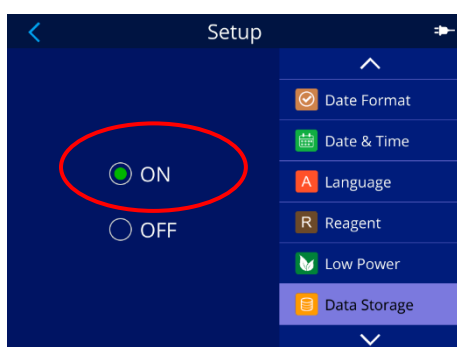


6.2—11 Data Storage

※ The 3991 has the data storage function. When the data storage is turned on, the corresponding data will be stored according to the report mode rules. The stored data can be browsed, printed, exported and deleted in the data system.

Data: the total storage capacity is 100,000 groups.

※ When there is too much data stored, the system access will be slow. Please export the test data in time to ensure the smooth operation of the system.

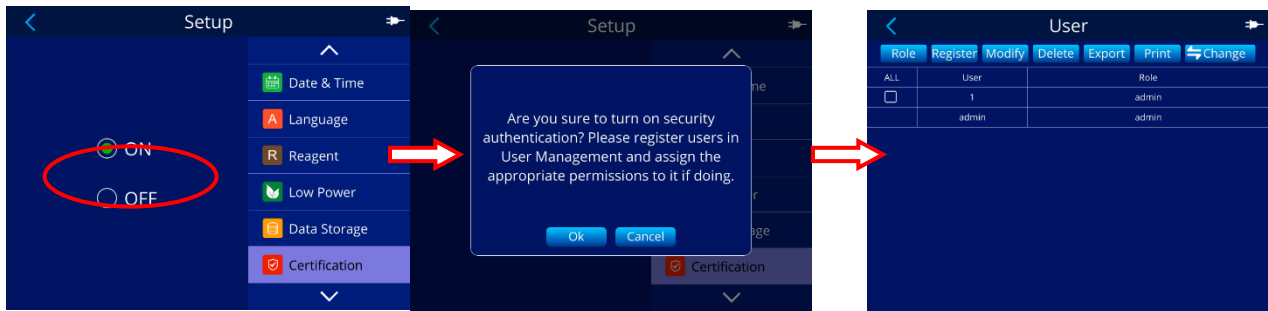


6.2—12 Safety Certificate

※ 3991 has 3-level rights management function. If you turn on the security authentication, you will start management system.

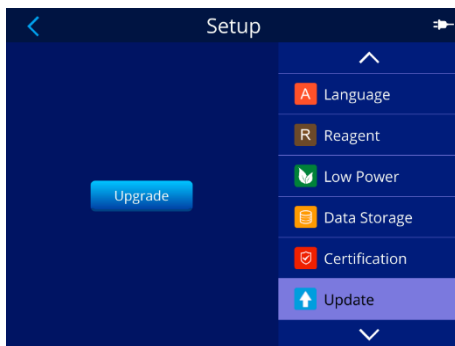
※ When using the system for the first time, you need to log in to the default account admin, password 123456, and then change the password according to the prompts.

※ If you use the authority management function, you need to formulate the relevant authority level and the operation options that allow access under the user system, and assign corresponding authority to the registered user name.



6.2—13 Online Upgrade

※ This function is used to upgrade the system patch, please use it under the technical guidance of GTI, and beware of system damage caused by random operation.

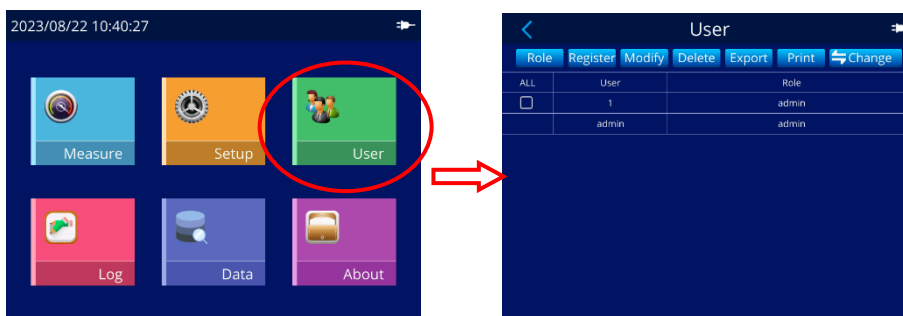


Chapter VII. User

※ The user system needs to enable the security authentication function to access.

※ The registered user name and password are valid for 180 days. After the valid period, you will be prompted to change the password. Please change the password according to the prompt.

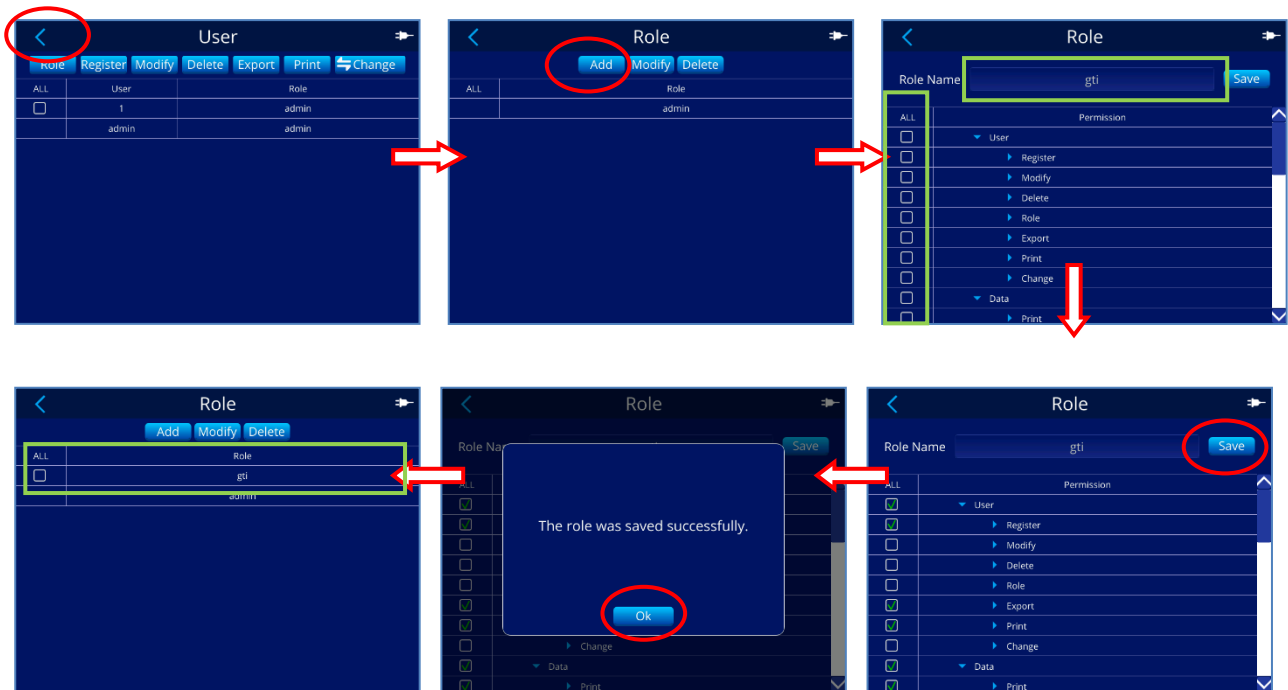
※ Permission settings and the upper limit of registered users are 100.



7.1 Permission Setting

※The permission name is limited to 20 characters or less.

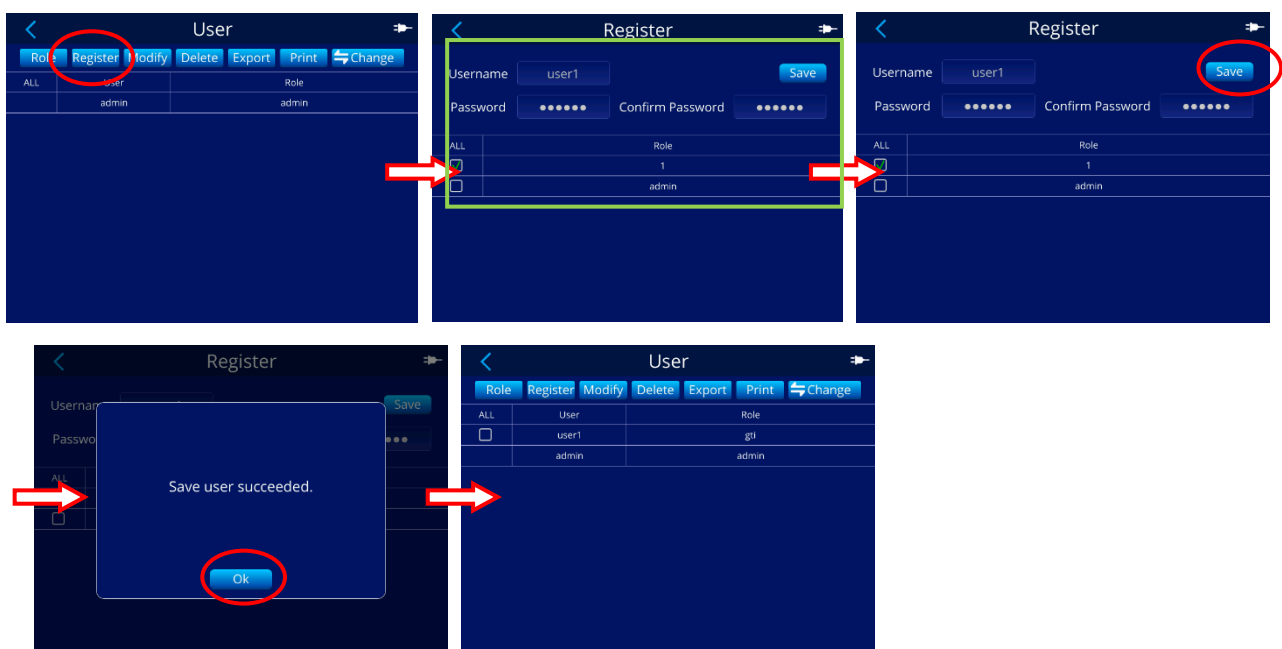
※The permission content refers to the functions that can be used under the permission name, and those that are not selected are unusable.



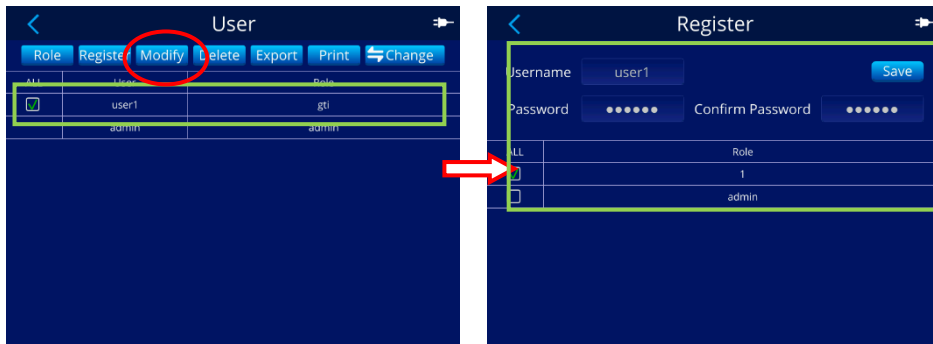
7.2 Registration

※The username is limited to 20 characters or less.

※The user's name must choose a permission.



7.3 User Modify



7.4 Delete

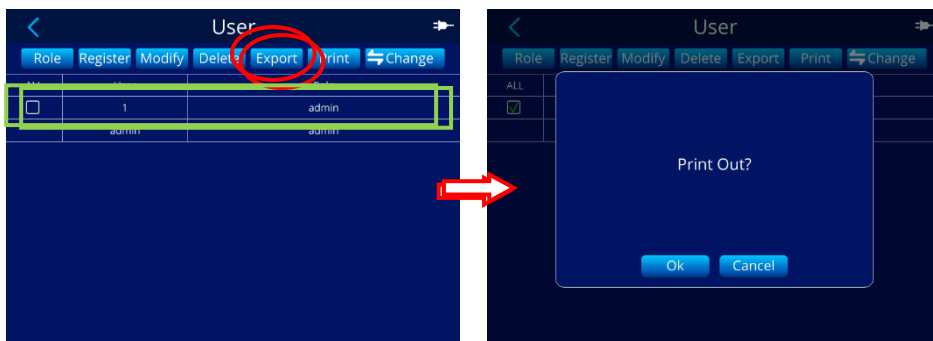
※The admin system cannot be deleted.



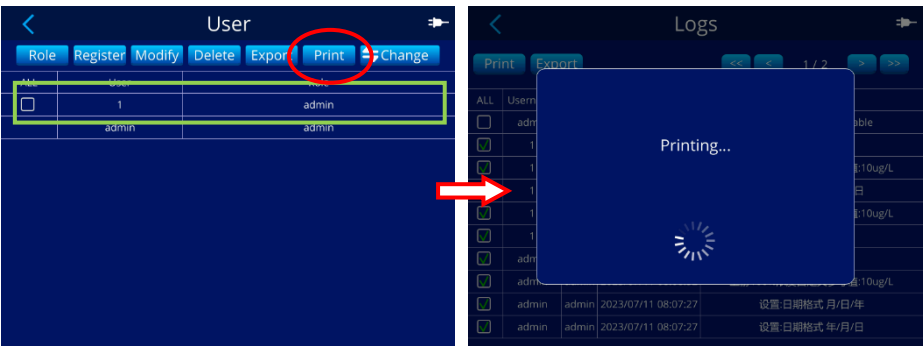
7.5 Data exporting

※Connect the U disk to the USB interface on the front panel.

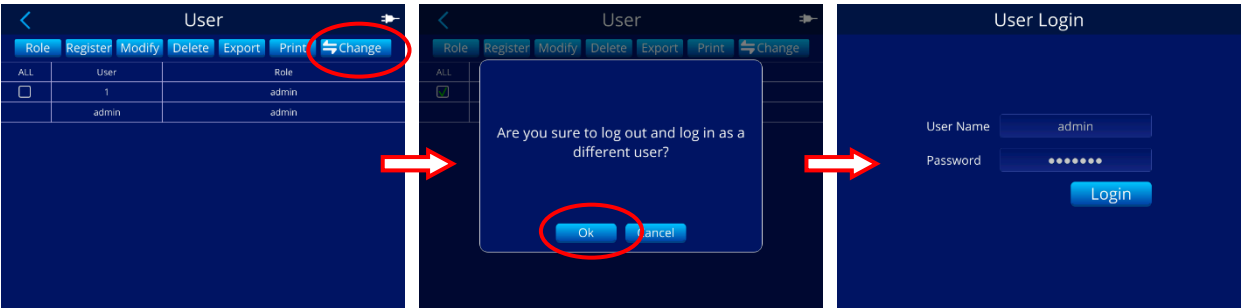
※The export file format is txt and the name is 3991Users.



7.6 Print



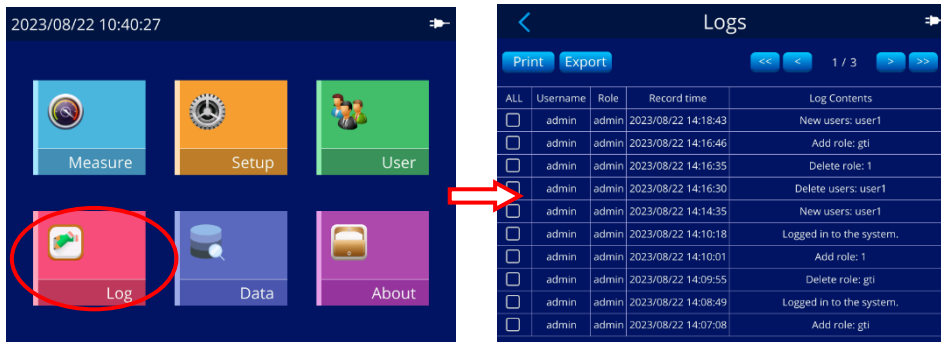
7.7 User Toggle



Chapter VIII. Records

- ※When the security authentication function is turned on, the log function will keep all operation records, which is convenient for instrument traceability.
- ※The log cannot be cleared. When the storage space reaches the upper limit, it will follow the "first in, first out" principle to remove old logs and keep the latest logs.

8.1 Viewing the Log



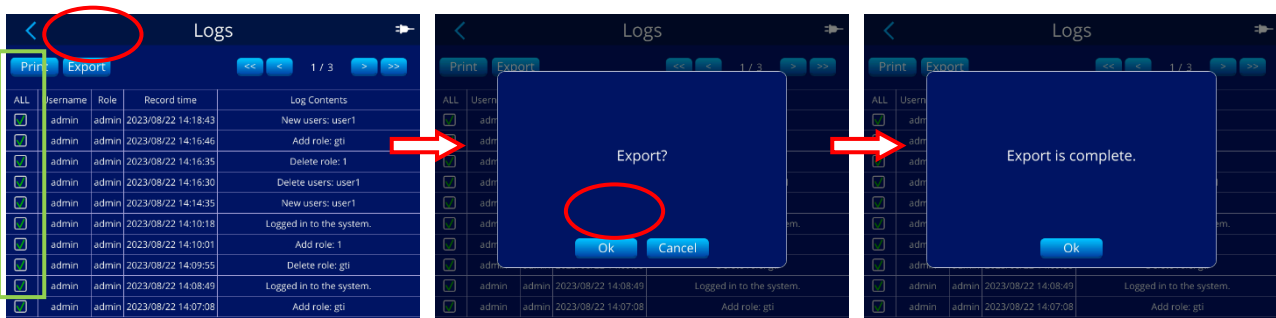
8.2 Print Out



8.3 Output

※ Connect the U disk to the USB interface on the front panel.

※ The export file format is txt and the name is 3991OperationLog.



Chapter IX. DATA

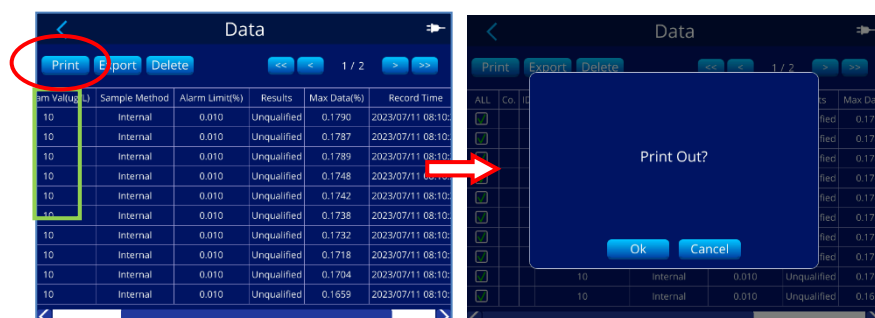
※ When the data storage function is turned on, you can enter the system for data viewing and processing;

※ The stored data can be printed, exported, and deleted in the statistics mode and detail mode. The method is the same, and the introduction will not be repeated.

9.1 Check DATA



9.2 Print



9.3 OUTPUT

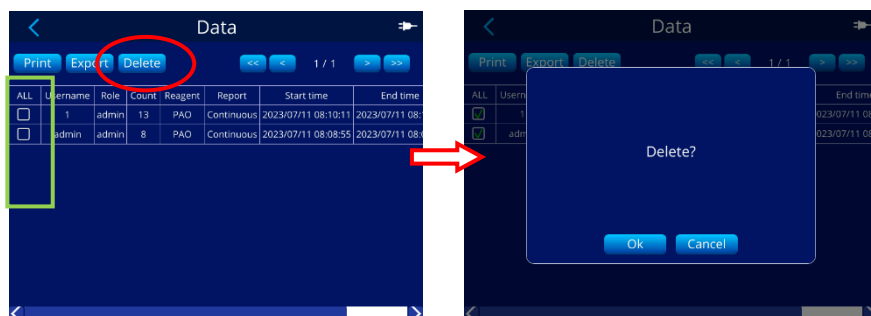
※ Connect the U disk to the USB interface on the front panel.

※ The export file format is PDF and the name is 3991MeasureData.

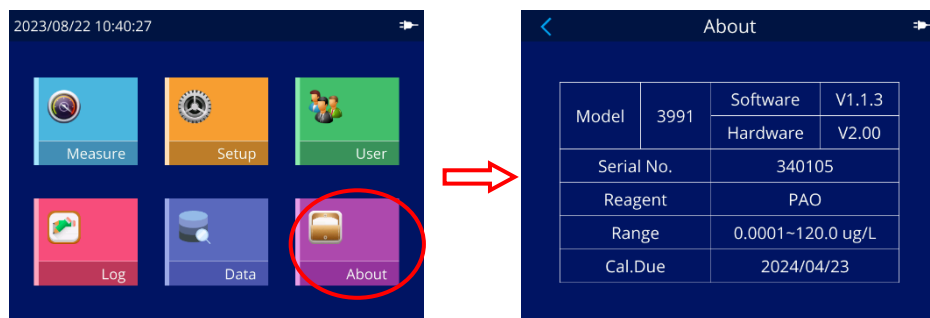


9.4 DELETE

※ Deleted data cannot be recovered, please operate with caution.



Chapter X. About



Chapter XI. Maintenance

After the 3991 aerosol photometer is powered on, the internal vacuum air pump runs, and its own fan also rotates at the same time. There is a cooling fan at the rear of the chassis. On-site maintenance is limited to replacing the fuse and cleaning the sampling connector, and to ensure that the instrument does not run continuously with power for a long time, it can be used

according to the following intervals.

The interval time is defined as follows:

- 8 hours a day
- 40 hours of operation per week
- Run 2080 hours a year



ATTENTION

Users are not allowed to dismantle the shell or repair the internal components without authorization.

Problems with any device inside this product must be addressed and repaired at a GTI authorized service facility.

Recommended Periodic Maintenance

Daily: Clean the port of the aerosol sampling connector, see 3.1-1 for details.

Once a year: return the 3991 to the GTI authorized institution for cleaning or calibration, please consult the dealer for details.

Chapter XII. Common Trouble Shooting

Symptom : Black screen and cannot be turned on

Symptom	Possible causes / troubleshooting
Power cord not connected to outlet	Connect the power cord to the matching socket reliably
Fuse blown	Check the fuse and replace it if damaged.
Low battery	Please use the adapter to charge the battery with the power off
The power button is broken	Contact the maintenance department

Symptom: Initialization exception

Symptom	Possible causes / troubleshooting
Problems with pressure and flow	There is a problem with the internal power components, contact the maintenance department
Zero build exception	There is a problem with the optical system, contact the maintenance department

The ambient temperature is lower than 5°C or higher than 50°C	Ensure that the temperature of the instrument's operating environment is within the range of 5°C to 50°C
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Symptom: All or part of the host touch is unresponsive

Symptom	Possible causes / troubleshooting
There is an insulating substance on the surface of the touch area	Wipe the screen with a cleaning cloth
Insulators on the surface of the finger	Keep fingers clean or wear conductive gloves
The touch screen is cracked and damaged	Contact the maintenance department
Abnormal probe connection socket	Do not connect the probe when the power is off, restart the machine for verification and reanalysis

Symptom: The host is operating normally, but all or part of the probe buttons are unresponsive

Symptom	Possible causes / troubleshooting
The cable plug and the host socket are not tightly inserted	The cable plug is tightly inserted into the host socket
The cable plug and the probe socket are not tightly inserted	The cable plug is tightly inserted into the probe socket

Symptom: During the test, the interface prompts that the pipeline is abnormal

Symptom	Possible causes / troubleshooting
Sampling connector clogged	Check the sampling joint according to 3.1-1, and clean the foreign matter and oil on the filter
Probe line blocked	Blow compressed air from the rectangular scanning head to check whether the pipeline is unobstructed
Quick connect air tubing kit plugged	Blow compressed air into the trachea to check whether the pipeline is unobstructed

Symptom: Indicates damage to optical components

Symptom	Possible causes / troubleshooting
The instrument has long-term exposure to high-concentration aerosols, optical pollution	Contact the maintenance department

Device aging	Contact the maintenance department
Circuit failure	Contact the maintenance department

Chapter XIII. Warranty and After Service

13.1 Warranty

- ◆ Under the premise that the user carefully reads the product instruction manual and operates normally according to the instructions, if there is a product quality problem, the warranty will be 1 year from the date of product purchase.

13.2 After Service

- ◆ When the instrument breaks down, the user should check and troubleshoot by himself first.
- ◆ If the fault cannot be eliminated, please contact our company (for contact information, please refer to the last page of the instruction manual).
- ◆ Repairs within the warranty period. Due to the failure of our company's manufacturing, free repairs will be given.
- ◆ Repairs outside the warranty period. After the warranty period expires, if the user wants to maintain the function and accuracy of the instrument through repairs, our company will carry out paid repairs according to the user's requirements.
- ◆ Regarding the retention period of repaired parts. After cessation of production, the repaired parts are kept for a minimum of 5 years. The retention period is the repairable period, please contact our company for details.
- ◆ The annual calibration service is provided by GTI or a partner who has been trained and certified by the GTI service system, or by an authoritative certification body.

When service is required, please provide the following

- * Product Name: _____
- * Model No.: _____
- * Serial No.: _____
- * Description of the problem in detail
- * Data of Purchase: Day _ Month _ Year



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