

Handheld Laser Particle Counter

Model 3886 GEO – α

Operation Manual



Please carefully read and understand the warnings in this manual before operation.

Kanomax Japan Inc.

Please store this manual in good care so that you can use anytime.



0 1 0 0 3
0 3. 0 2

Thank you for purchasing the product of Kanomax Japan Co., Ltd.
Because this device is precision instrument, please carefully read this operation manual, and correctly operate the instrument by keeping the instruction in this manual.

CONTENTS

1. Check the components	1
1.1 Standard accessories	
1.2 Option	
2. Description of Components	2
2.1 Front	
2.2 Rear	
2.3 Side	
2.4 Top	
3. Operation and Cautions	4
3.1 Power supply	
3.2 Turning the power on	
3.3 Cautions before starting the measurements	
3.4 After the measurement	
3.5 Measurements using optional probes (Temperature&Humidity, Air Velocity)	
4. Setting before measurement	9
4.1 Selecting of measuring mode	
4.2 Setting the measuring condition	
4.3 Setting of alarm level	
4.4 Selection of option and units	
4.5 Calendar and computer communication setting	
5. Measurement method	15
5.1 Explanation of measurement screen	
5.2 REPEAT Mode	
5.3 SINGLE Mode	
5.4 CONTINUOUS Mode	
5.5 CALCULATION Mode	
5.6 REMOTE Mode	
6. Data processing	21
6.1 Request for stored data in built-in memory	
6.2 Display of stored data on the screen	
6.3 Dump of stored data	
6.4 Printout of stored data	
6.5 Delete of stored data	
7. How to use option probes	28
7.1 Option probes	
7.2 Installation of probes	
7.3 Setting of display	
7.4 Extension rod	
8. Error message	30
9. Battery check	31
10. Specification	32
11. Trouble shooting	33

Important safety Information

Danger: For prevention of accidents resulting in injury or death

Items under this heading show the conditions that is supposedly have the risk to cause injury or death, if you disregard the instruction and operate the instrument improperly.

Caution: For prevention of the damage of product

Items under this heading show the conditions that may result in the physical damage to the instrument, or may make it impossible to guarantee the performance of instrument, if you disregard the instructions and operate improperly.

[Definition of Signs]








Symbol indicates there are the conditions that urge the caution (incl. danger). Subject of specific caution is drawn inside of symbol (high temperature caution in case of the figure on the left)



Symbol indicates that it is prohibited. Subject of prohibited action is given in or nearby the symbol.



Symbol instruct or force to take a certain action. Specific action is given nearby the symbol.

 Danger			
<p><input type="radio"/> Do not disassemble or heat the batteries</p> <p>..... There is the danger of explosion.</p>	 Explosive	 Use properly	
<p><input type="radio"/> Use the supplied AC adapter for the operation by AC power.</p> <p>..... It may become the cause of damage.</p> <p>..... There is the danger of heat-generation or ignition, and may result in a fire or other accidents.</p>	 Forbidden		

Danger

- Never disassemble or modify the main unit, sensor and the likes.

- This instrument is using class 3B laser or the source of light. Disassembly may result in the accidents like the loss of eyesight by the exposure to laser light.
- It may also cause the short-circuit, or complicate the maintenance of original performance.



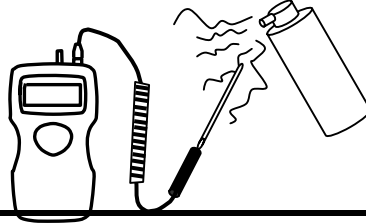
Do not remodel/ disassemble

- Never put terminal into the atmosphere of flammable gas.

- Terminal became hot so that it may cause explosion and ignition.



Do not use near Flammable gas



- Never touch the sensor

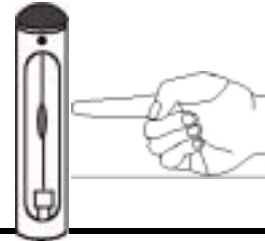
- There is a danger of getting burnt because the sensor is heated. It may also damage the sensor itself.



Hot surface



Don't touch



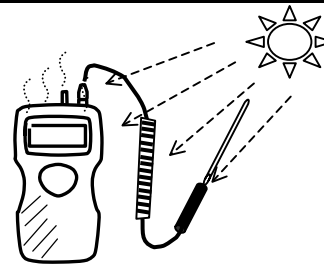
Caution

- Do not carry out the measurement or leave the main unit at the places where it is hot, humid or dusty.

- This instrument may not function properly outside of the operating temperature range.
- Exposure to the direct sunlight may result in the discoloration or disform of the body.



Do not setup

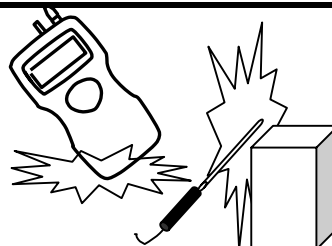


- Do not give the strong impact to the main unit and probe.

- Falling or bumping the instrument will become the cause of damage or malfunctioning.



Forbidden

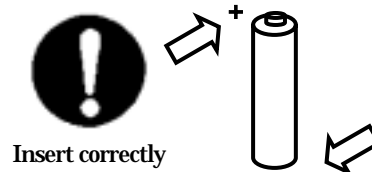




Caution

- Set the batteries in the correct direction

..... It may cause the liquid leakage, and contaminate the surrounding area of the main unit.



- Do not wipe the body with solvent

..... There is the concern that the body will be disformed or deteriorated. Wipe with soft dry cloth when it gets dirty. For serious dirtiness, wipe with the cloth soaked with the neutral detergent. Never use solvents like thinner, benzene etc.



Forbidden

- Do not use this instrument near the equipment emitting the high radiation noise because this is precision instrument.

..... This instrument may cause the malfunctioning due to noise. Air velocity sensor is especially liable to be effected by radiation noise.



Correctly

- Use the AC power that doesn't have much noise.

..... There may be the cases those noise will cause the malfunctioning of the instrument.

- Do not pull the probe cable strongly, nor suspend the main unit by holding the cable.

..... It may became the cause of malfunctioning and snapping of the wire.



Forbidden



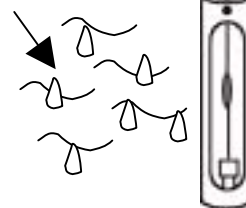
- Do not use in the atmosphere containing the droplets of water

..... The radiation of heat will change, and correct measurement will become impossible. It also becomes the cause of damage to the sensor.



Forbidden

Water drops

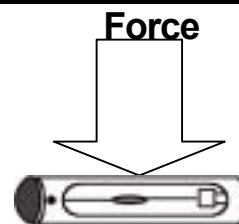


- Do not apply the unreasonable force to the sensor

..... Disformation of sensor may harm the accurate measurement, or may snap the sensor in the worst case.



Forbidden



※Air Velocity probe and Temp.& Humidity probe are options (separately sold)

1. Check of components

When unpacking, check the contents in the box using the list below

1.1 Standard accessories

Name	Model No.	Functions
Filter, Tube	Model 3886-03 ^{*1)}	For the cleaning of air route in the main unit by the clean air.
AC Adapter, Power cable	Model 3886-01 ^{*2)}	For the operation by AC power, especially continuous measurements.

1.2 Options

Name	Model No.	Functions
Temp. & Humidity probe	Model 0842	For the measurements of temperature and relative humidity by connecting with the main unit
Air Velocity probe	Model 0843	For the measurements of air velocity by connecting with the main unit
Extension rod for air velocity probe	Model 0843-01	For the measurements of high places
Printer	DPU-201GS	For the direct printing of measured data
Printer cable	Model 3886-07	For the connection of main unit and printer
Application soft	Model S388-60	For the downloading of stored data in the memory to PC, or remote control of main unit by PC
RS-232C cable	Model 3886-08	For the connection of main unit and PC
Carrying Case	Model 3886-02	For the safe storage of main unit and accessories
Tripod		For fixing the main unit at one place for the measurement

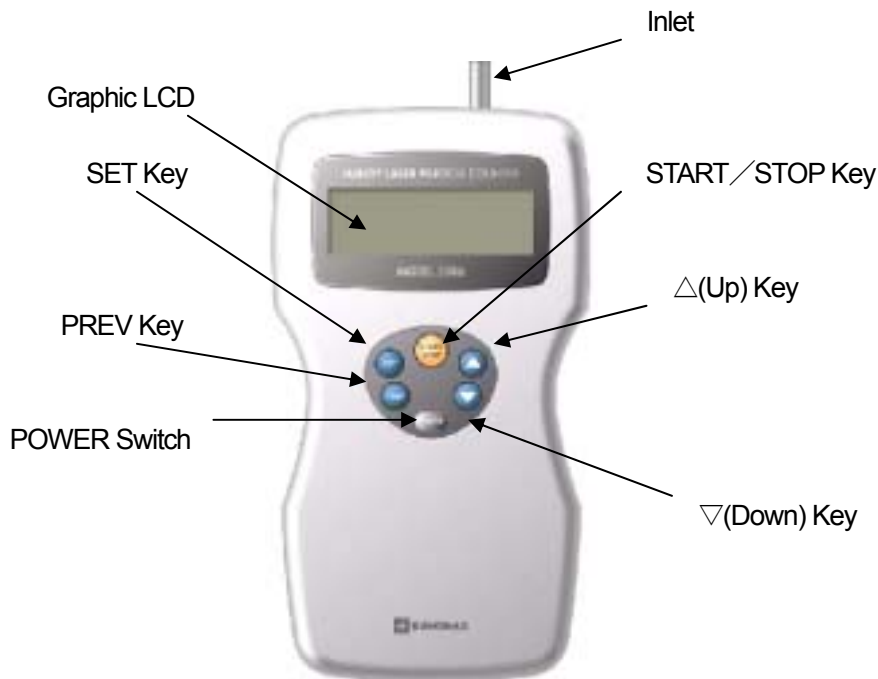
*1) The tube is not included In Model 3886-03.

*2) The tube is not included in Model 3886-01.

2. Description of Components

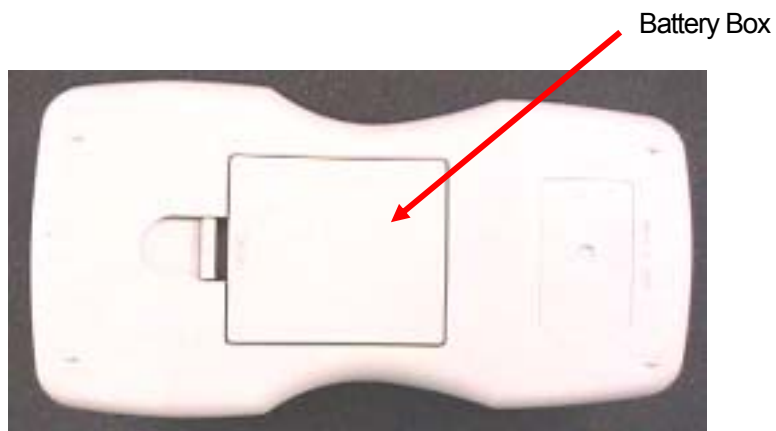
Name and functions of each component are explained in this chapter.

2.1 Front

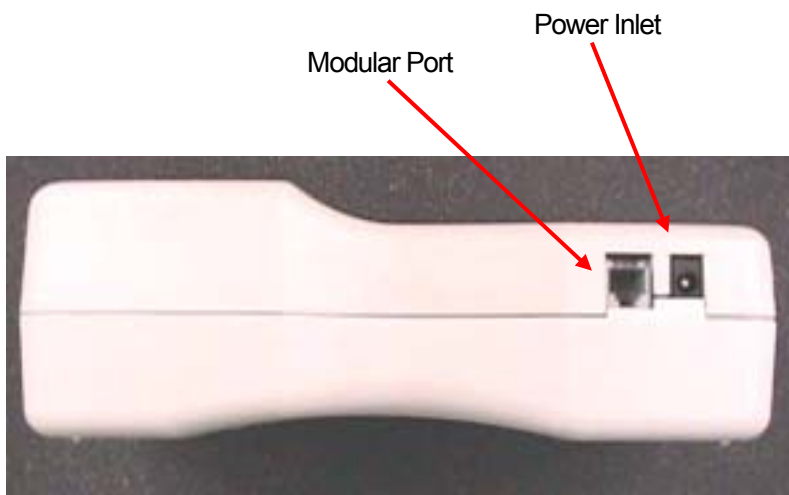


Name of component	Functions
Inlet	For the collection of sampling air
Graphic LCD	For the displays of the measured data or status of operation
SET Key	For the setup of measuring parameters, movement of cursor and transition to next screen
PREV Key	To go back to the previous screen
POWER Switch	For turning on/off of the power
Δ(Up) Key ∇(Down) Key	For the choice of functions/parameters from menu and setting up the numbers
START/STOP Key	For the start and finish the measurement

2.2 Rear

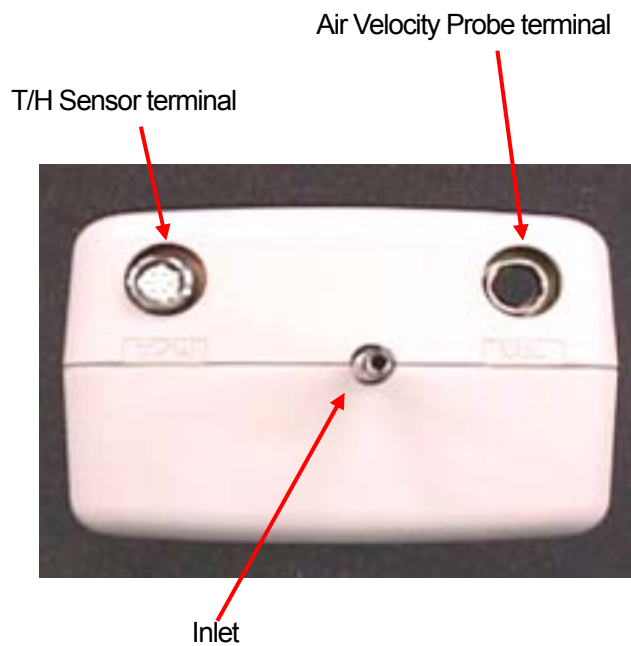


2.3 Side



Component	Functions
Modular Port	For the transfer of the data to a printer or a PC
Power Inlet	For the power supply from AC adapter

2.4 Top



Component	Functions
Inlet	For collection of sampling air
T/H sensor terminal	For the connection with TH Sensor
Air velocity probe terminal	For the connection with air velocity probe

3. Operation & Caution

3.1 Power supply

Please use the supplied AC adapter and refrain from the battery operation for the long consecutive measurements (more than 2 hours)

This instrument has the monitoring function of operating voltage, and battery alarm will be indicated when the voltage goes down below the specified value.

If you leave the instrument in such a conditions for a few minutes, the power automatically goes off. In some of measuring mode, the data of measurement in process will not be stored. (Please refer to Chapter 8 for details)

If the alarm sign is shown, please stop the measurement and charge the batteries, or replace with the charged batteries.

◆Use of AC adapter

Insert the plug of supplied AC adapter into the power inlet at the side of main unit.

Then, plug the another side into AC outlet.

AC power should be in the range of 86-264V 50/60Hz. Do not use the AC power outside of this range.

◆Use of batteries

Prepare 4 pieces of Ni-MH batteries (1.2V 1600mAh recommended) and fully charge them.

After the charging is completed, put the batteries into the main unit in the correct directions.

Battery life is about 3 hours, but it will vary by the type and capacity of battery, or status of charging. When optional Temp.&Humidity probe and Air Velocity probe are used at the same time, there will be the cases that operating hours will become less than 2 hours.

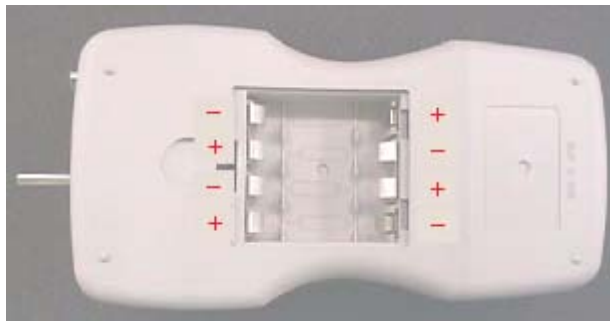


Figure : Direction of battery insert

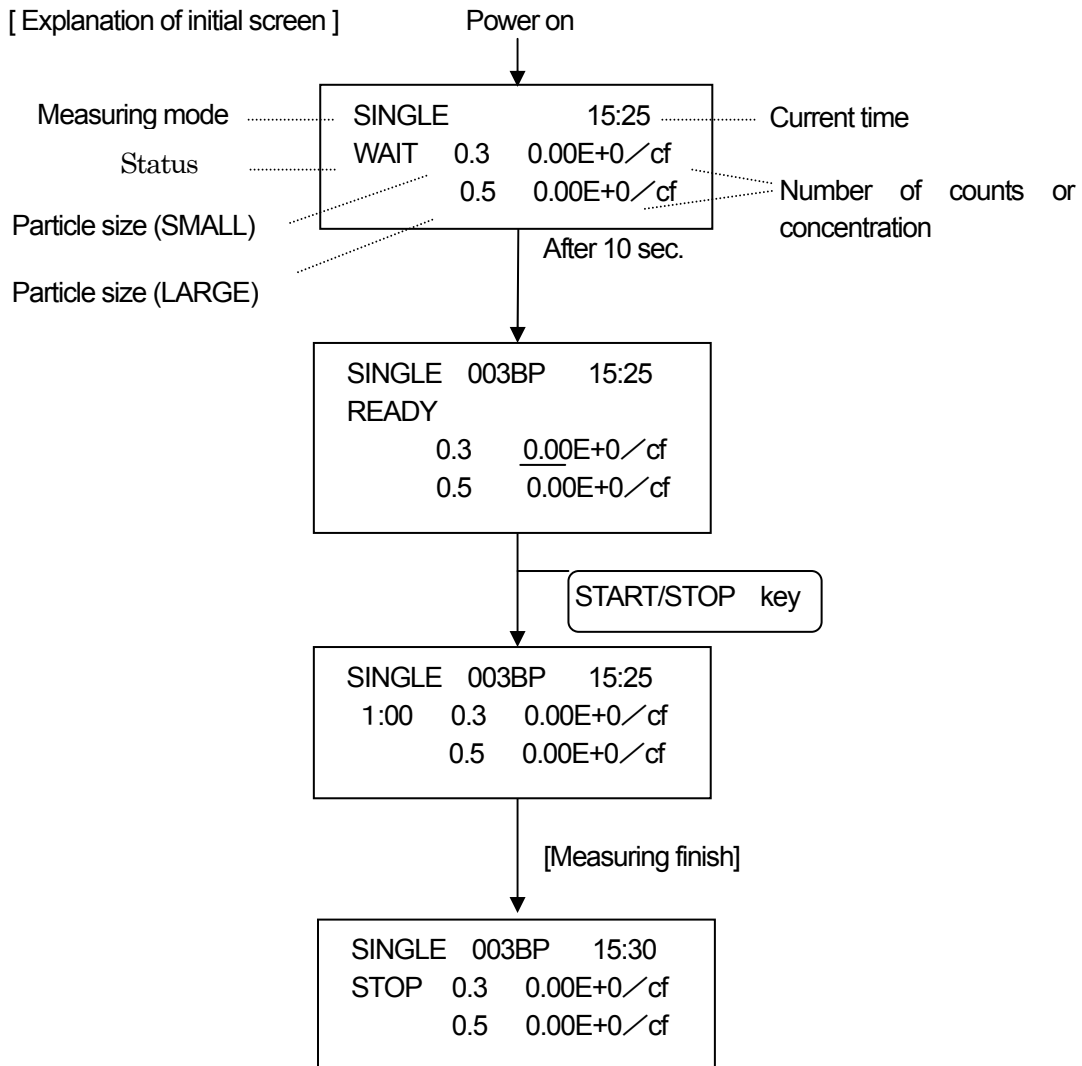
※Please note that longevity in alkaline cell becomes about 1 hour and 30 minutes shorter than the nickel hydrogen battery though alkaline cell is available in this.

3.2 Turning the power on

- (1) Make sure to remove the cap of air inlet at the top of the main unit.
- (2) Push POWER switch in the function key. Initial display shows the mode and setup data of previous measurement in WAIT status (Set at SINGLE mode at the time of delivery). Please refer to Chapter 4 for the customizing of measuring mode or method.
- (3) WAIT sign will change to READY after 10 seconds. Then, measurement can be started by pushing the START key. At the time of delivery, sampling time is set at 1 minute, so the measurement will be automatically stopped after 1 minute.



[Explanation of initial screen]



3.3 Cautions before starting the measurements

3.3.1 Location

This product is designed and produced for the operations in clean room environment. Please refrain from using in the dressing room of clean suits, or in the ordinary environment (e.g. offices, turnery, outdoors, smoking rooms etc.)

It will contaminate the internal components and increase the maintenance frequency.

3.3.2 Connection of sampling tube

Connect the sampling tube to air inlet for the collection of the air at distant place.

—Requirement for sampling tube —

■ Material

Material of tube should be metal (stainless, copper, alloy steel), glass or synthetic resin which will not generate the plastic deposit.

■ Length

Long sampling tube will liable to cause the pressure loss by bending or the obstruction by folding, which will damage the vacuum pump and increase the maintenance frequency. It also cause the deposit loss of particle and lower the accuracy of measurements. Length of sampling tube should be less than 1m.

■ Pressure Loss

Large pressure loss will make it impossible to maintain 0.1cfm (+/-10%) flow rate. Pressure loss at sampling tube must be less than 1kPa (approx. 100mmH₂O).

3.4 After measurement

[Cleaning of internals]

Internals of the main unit may be contaminated after measurement.

Please carry out the following cleaning procedure after finishing the measurement.

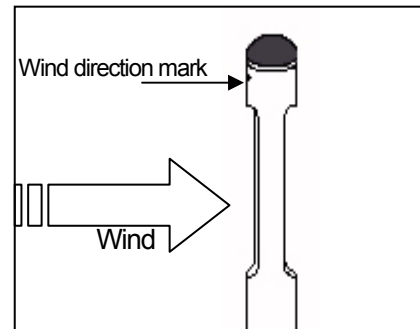
— The method of cleaning and storage —

- ① Stop the measurement before cleaning
 - ② Connect the filter to the air inlet at the top of the main unit, using the supplied tube.
 - * There is a possibility that the tube will be folded and inlet will be blocked when connecting the tube to the inlet. Operation of the instrument in such a condition will overload the vacuum pump and shorten the operating life.
 - ③ Change UNIT to counts (CNT) and start the measurement
 - ④ Finish the operation only after the confirmation that the count value gets stable and doesn't increase or decrease for more than 10 seconds.
 - ⑤ Turn the power off and put the cap over the inlet
- ※ To prevent the contamination during storage, do not fail to cover the inlet by cap.

3.5 Measurements using optional probes (Temperature&Humidity, Air Velocity)

◆ Air velocity probe

- * When you measure, set wind face mark toward wind direction.
- * Check the tip of probe periodically if it is not dirty.
Dust attached to sensor influence accuracy of Measurement.



—Cleaning of the air velocity probe—

- ◇ Rinse tip of probe in alcohol if sensor is oily, dry it in low wind.
- ◇ When you get rid of dust, blow them off by blow blush for camera or rinse in water and dry them completely.
- ※ Turn off power when you wash sensor.
- ※ Do not dry probe with heat.
(Heat damages sensor and became impossible to restore.)

◆ Temperature & Humidity probe

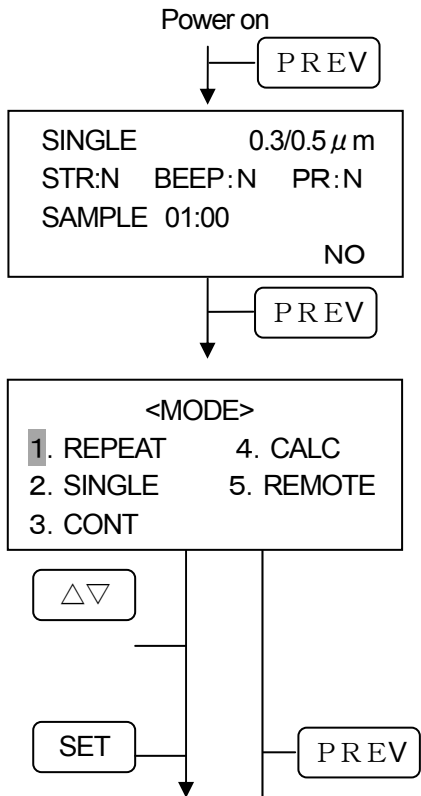
- * As for measurements of air temperature, accurate value will not be given in the still air.
(Exempt from performance-guarantee range.)
You can get correct value in velocity of 0.1m/s or over. (Move probe slowly.)
- * Response time in the air temperature measurement becomes quicker when the velocity is high.
For example, when air velocity is 1m/s the response time is 20 seconds. Please keep the data when indications become stable.
- * The humidity measurement value might rise abnormally by the condensation of the humidity sensor.
In case of the measurement in rapid temperature change or long use in high humidity, keep probe for 24 hrs in 40%RH or less and dry probe when wet.

—Humidity measurement ... Comparison with ASSUMANN type psychrometer—

Because the humidity measurement function is strictly proofread using a standard humidity generation device (two temperature difference method), you will find it is handy.
And, because a steady measurement can be done as an electronic hygrometer, this unit can take the place of ASSUMANN type psychrometer.
When the comparison measurement is done between T/H probe and the ASSUMANN type psychrometer, the ASSUMANN type psychrometer occasionally display high humidity.
Since handling conditions like dust, dew, or how to lap gaze can influence the result of ASSUMANN.
Therefore, it is necessary to be careful when you handle the ASSUMANN type psychrometer.
Please refer to Japan Industrial Standards concerning notice in the measurement with the ASSUMANN type psychrometer etc. (JIS-Z8806 "Method of measuring humidity") etc.



4. Setting before measurement

4.1 Selection of measuring mode



(1) Push POWER key to input the power supply. Then PREV key.

(2) Push PREV key again to proceed to the setup screen

(3) Use   key to move the cursor, and push SET key to select the mode you need.

[1.REPEAT]

REPEAT	0.3/0.5m
STR:N	BEEP:N PR:N
SAMPLE	01:00 2TIMES
INT	00:05:00 NO

[2.SINGLE]

SINGLE	0.3/0.5 μm
STR:N	BEEP:N PR:N
SAMPLE	01:00
	NO

(4) Push PREV key to go back to the MODE screen.

[3.CONT]

CONT	0.3/0.5m
STR:N	BEEP:N PR:N

[4. CALC]

CALC	0.3/0.5 μm
STR:N	BEEP:N PR:N
SAMPLE	01:00 2TIMES
	NO

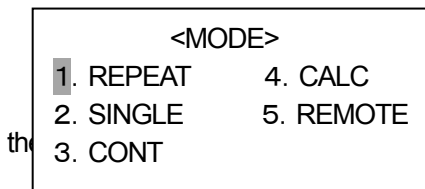
[5. REMOTE]

REMOTE	0.3/0.5m
BEEP:N	
	NO

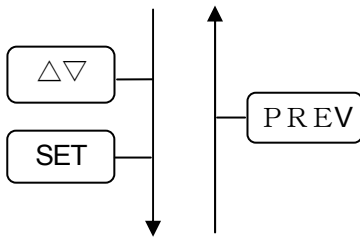
Measuring mode	Content of measurement	SAMPLE Sampling time	TIME Sampling frequency	INT Sampling interval
Repeat [5.2]	Measurement repeatedly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Single [5.3]	Measurement once	<input type="radio"/>	Once	<input type="radio"/>
Continuous [5.4]	Continuous measurement ; The measurement ends if STOP is pushed.	—	—	—
Calculation [5.5]	It measures repeatedly, and mean value, a standard deviation, the maximum value are calculated from data. Only result is done and the store is not done in the data store as for the store doing and each measurement result.	<input type="radio"/>	<input type="radio"/>	—
Remote [5.6]	Measurement by remote control from computer. (The application software of the option is necessary)	—	—	—

4.2 Setting the measuring condition

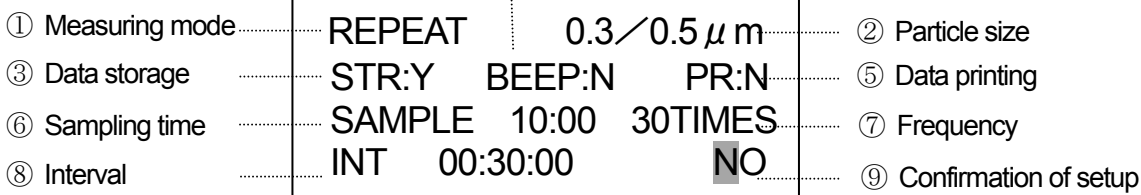
In the case of REPEAT mode (other mode even same)



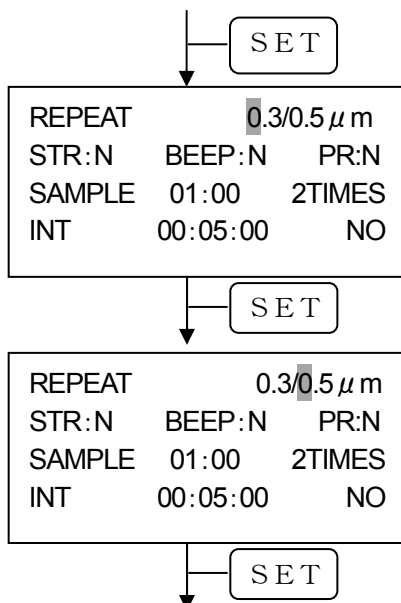
Use △ ▽ key to move the cursor, and push SET key to select mode you need.



④ Warning beep sound



	Name	Explanation
①	Measuring mode	Five kinds of REPEAT, SINGLE, CONT, CALC, REMOTE
②	Particle size	Two kinds selection from 0.3, 0.5, 1.0, 3.0, 5.0 μm
③	Data storage	Y : data stored N : data not stored
④	Warning beep sound	Y : beep sounded N : beep not sounded
⑤	Data printing	Y : data printed after the measurement N : data not printed (refer to 6.4)
⑥	Sampling time	1 second~99 minutes59 seconds
⑦	Frequency	1~99 times and continuous (CNT)
⑧	Interval	1 second~24 hours
⑨	Confirmation of setup	NO : not confirmed OK : confirmed. Press SET key to shift measurement screen.





(1) For change setting, push SET key to move the cursor.

(2) Push SET key to the item you need to change.

REPEAT	0.3/0.5m
STR:N	BEEP:N PR:N
SAMPLE	01:00 2TIMES
INT	00:05:00 NO



(3) Use   key to change the setting condition.

REPEAT	0.3/0.5 μ m
STR:N	BEEP:Y PR:N
SAMPLE	01:00 2TIMES
INT	00:05:00 NO



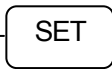
(4) If you finished your set up , push SET key to move the cursor to the position of "NO" .

REPEAT	0.3/0.5 μ m
STR:N	BEEP:Y PR:N
SAMPLE	01:00 2TIMES
INT	00:05:00 NO



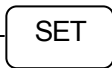
(5) Change "NO" to OK using   key.

REPEAT	0.3/0.5 μ m
STR:N	BEEP:Y PR:N
SAMPLE	01:00 2TIMES
INT	00:05:00 OK



(6) Push SET key.

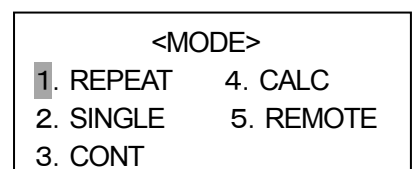
MEASURING	
SAMPLE TIME	0:02:00
TOTAL TIME	0:06:00
	OK



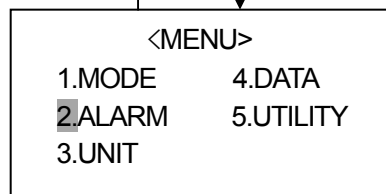
(7) Push SET key to proceed to the measuring screen.

REPEAT	29B	20:32
WAIT	0.3	0.00E+0/m ³
00/02	0.5	0.00E+0/m ³

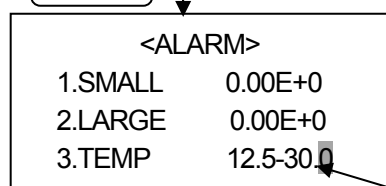
4.3 Setting of Alarm level



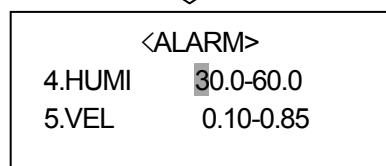
If PREVIOUS key is pushed at <MODE> screen, it becomes <menu> なります。



- 1. MODE Selection of measurement mode and setup of parameter
- 2. ALARM Setup of alarm level
- 3. UNIT Selection of optional probe and unit
- 4. DATA Request for stored data in built-in memory



In case the particle concentration exceed the acceptable level, or temperature, Relative humidity or air velocity go out of the specified range, this unit can notify the occurrence of these alarm situation. This menu is to preset the alarm level.



If SET key is pushed when the cursor is here, it moves to the following page.

key	Adjust the value
key	Move the cursor
key	Go back to MENU after the setup

			Lower bound	Upper bound	unit	Setting range
1	SMALL	Small particle	—	○	*	0~7.00E+7
2	LARGE	Large particle	—	○	*	0~7.00E+7
3	TEMP	Temperature	○	○	*	0~122.0
4	HUMI	Humidity	○	○	%RH	0~100.0
5	VEL	Air velocity	○	○	*	0~200.0

* : Selected unit (refer to 4.4)

The number flashed at the end of the sampling time if a certain parameter of measurement is not within the specified level.

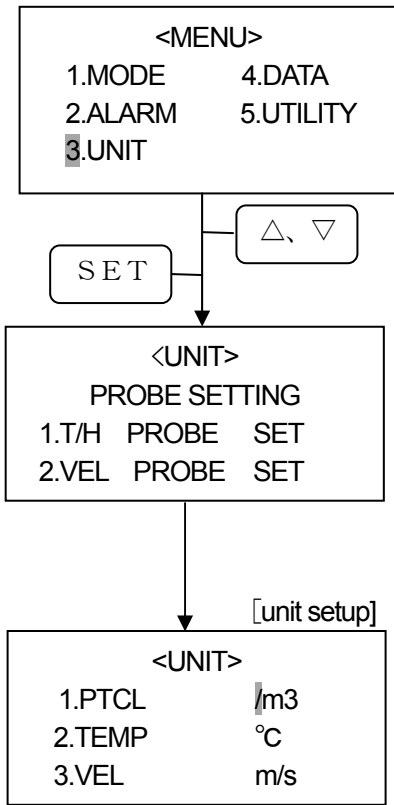
Once the alarm situation occurred, it will not be reset until the data of following measurements gets within the specified level.

If the unit of particle is set at "COUNT", the number flashes at the movement the count exceeded the specified level.

When the buzzer is activated (BEEP:Y), it goes off when the alarm situation occurred. To operate the buzzer, make sure to set "BEEP:Y" on the setup screen of measurement mode.

To stop the buzzer, push any key other than POWER key.

4.4 Selection of option and units



This menu is to select the optional probes and the units of particle, Temperature and air velocity.

key	Move the cursor
key	Shift the screen of the selected menu
key	Go back to MENU after the setup

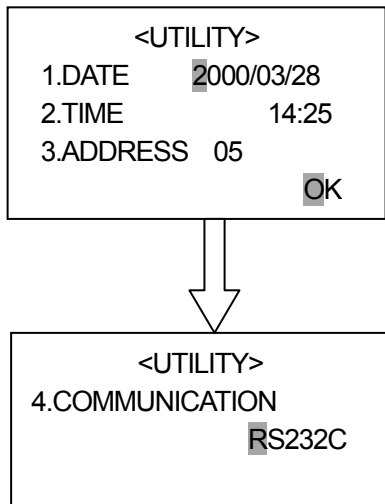
1	T/H PROBE	T/H probe	SET : use	NO : not use
2	VEL PROBE	Velocity probe	SET : use	NO : not use

1.PTCL : particle CNT : count, /m³ : concentration in 1m³/cf : concentration in 1cf

2.TEMP : temperature °C、 ° F

3.VEL : air velocity m/s、 FPM

4.5 Calendar and computer communication setting

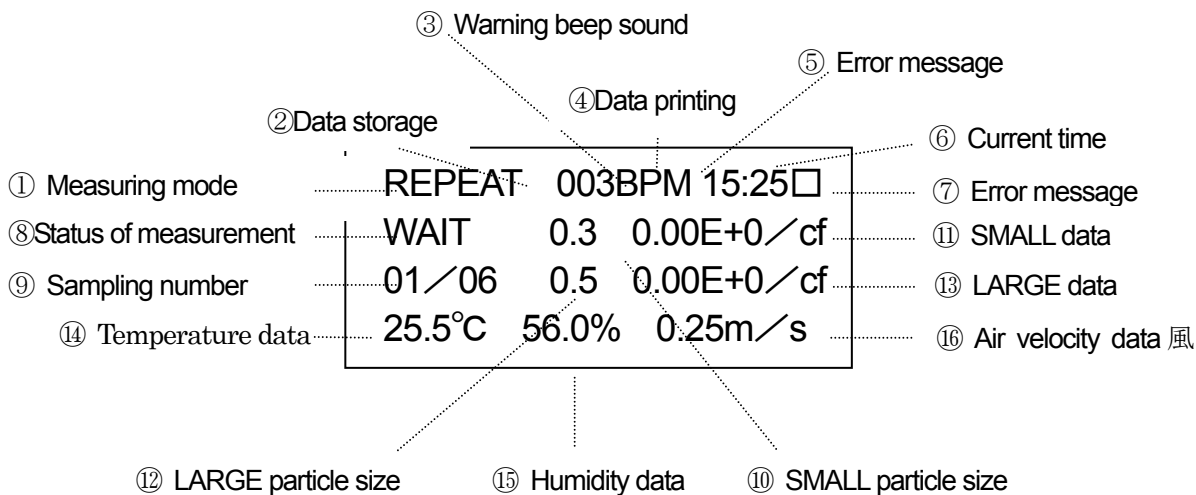


1	DATA	Year/ Month/ Date
2	TIME	Time
3	ADDRESS	Address communication through RS-485terminal
4	COMMUNICATION	Communication with PC

key	Adjust the value
key	Move the cursor
key	Go back to MENU after the setup

5. Measurement method

5.1 Explanation of measurement screen



	Name	Explanation
1	Measuring mode	Five kinds of REPEAT, SINGLE, CONT, CALC, REMOTE
2	Data storage	003: Store No. Display no : data not store
3	Warning beep sound	B : Beep sounded Display no : beep not sounded
4	Data printing	P : data printed Display no : data not printed (refer to 6.4)
5	Error message	M : the buffer memory is over loaded when printing the data (refer to 8)
6	Current time	Refer to 4.5
7	Error message	F : Flow rate L : Light source O : Over the maximum concentration (refer to 8)
8	Status of measurement	WAIT : Starting up READY : Ready for measurement STOP : Measurement finished (refer to 5.2-5.6)
9	Sampling time	Tag number of the current measurement/ the specified sampling frequency.
10	SMALL particle size	Smaller of 2 particle sizes chose at setup screen.
11	SMALL data	The number of counts or concentration of the particle size on 10. (refer to 4.4)
12	LARGE particle size	Lager of 2 particle sizes chose at setup screen.
13	LARGE data	The number of counts or concentration of the particle size on 10. (refer to 4.4)
14	Temperature data	Show the data by selected the T/H probe uses (refer to 4.4)
15	Humidity data	Show the data by selected the T/H probe uses (refer to 4.4)
16	Air velocity data	Show the data by selected the Air velocity probe uses (refer to 4.4)

5.2 REPEAT Mode

By setting the sampling time, frequency and interval of each measurement, this unit automatically measures as specified and stops after measurements. Interval is the time between the beginning of first measurement and the next. The setting of the particle size (um), data storage (STR), alarm (BEEP) and printout (PR) are possible.

Display screen	Operation key	Operation explanation
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;"><MODE></p> <p>1.REPEAT 4.CALC 2.SINGLE 5.REMOTE 3.CONT</p> </div>	POWER	Push POWER key to input the power supply.
	PREV	Push PREV key twice to proceed MODE screen
	△ ▽ SET	Select 1.REPEAT
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>REPEAT 0.3/0.5 μm STR:Y BEEP:N PR:N SAMPLE 10:00 30TIMES INT 00:30:00 <input type="checkbox"/>OK</p> </div>	△ ▽ SET	<p>■ Setup the particle size, requirement of data storage , alarm , printout, sampling time, frequency and interval of measurement. Use △ ▽ key to change the setting condition, then push SET key.</p> <p>After the input is done, change NO to OK and push SET key.</p>
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">MEASURING</p> <p>SAMPLE TIME 5:00:00 ← ① TOTAL TIME 14:40:00 ← ② <input type="checkbox"/>OK</p> </div>	△ ▽ SET	<p>① : sum total of sampling time ② : total length of time from the beginning to the end of measurement</p> <p>After confirming these TIMES, change NO to OK and push SET key.</p>
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>REPEAT 003BPM 15:25 WAIT 0.3 0.00E+0/cf 01/30 0.5 0.00E+0/cf</p> </div>	WAIT Mode	WAIT sign is shown for the stabilization of internal pump.
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>REPEAT 003BPM 15:25 READY 0.3 0.00E+0/cf 01/30 0.5 0.00E+0/cf</p> </div>	READY Mode	WAIT sign turns to READY in 10 seconds and measurement can be started.
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>REPEAT 004BPM 15:25 ③ →09:59 0.3 0.00E+0/cf ④ →01/30 0.5 0.00E+0/cf</p> </div>	START/STOP	<p>Push START/STOP key to start the measurement. The display shows the real-time data.</p> <p>③ : remaining time of each measurements ④ : measurement number</p>
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>NEXT 004BPM 15:35 ⑤ →15:55 0.3 0.00E+0/cf 02/30 0.5 0.00E+0/cf</p> </div>	Interval menu	<p>Screen changes to interval mode after the sampling time is over.</p> <p>⑤ : starting time of next measurement</p>
<div style="border: 1px solid black; padding: 5px;"> <p>REPEAT 004BPM 15:55 09:59 0.3 0.00E+0/cf 02/30 0.5 0.00E+0/cf</p> </div>	Measuring	<p>Measurement is automatically started from the indicated starting time.</p> <p>★ The data is printed after the sampling time is over if you chose printout. (refer to 6.4)</p> <p>★ To stop the measurement halfway Push START/STOP key. Only the data of finished previous measurement before pushing the STOP key will be stored if you chose data storage</p>

5.3 SINGLE mode

By setting the sampling time, this unit automatically stops after the specified time.

The setting of the particle size (um), data storage (STR), alarm (BEEP) and printout (PR) are possible.

Display screen	Operation key	Operation explanation
<pre> graph TD A["<MODE> 1.REPEAT 4.CALC 2.SINGLE 5.REMOTE 3.CONT"] --> B["SINGLE 0.3/0.5 μm STR:Y BEEP:N PR:N SAMPLE 10:00 OK"] B --> C["SINGLE 003BPM 15:25 WAIT 0.3 0.00E+0/cf 0.5 0.00E+0/cf"] C --> D["SINGLE 003BPM 15:25 READY 0.3 0.00E+0/cf 0.5 0.00E+0/cf"] D --> E["⑥ → SINGLE 004BPM 15:25 09:59 0.3 0.00E+0/cf 0.5 0.00E+0/cf"] E --> F["SINGLE 004BPM 15:35 STOP 0.3 0.00E+0/cf 0.5 0.00E+0/cf"] </pre>	POWER	Push POWER key to input the power supply.
	PREV	Push PREV key twice to proceed MODE screen
	SET	Select 2. SINGLE
	SET	<p>■ Setup the particle size, requirement of data storage, alarm, printout, sampling time.</p> <p>Use key to change the setting condition, then push SET key.</p> <p>After the input is done, change NO to OK and push SET key.</p>
	WAIT Mode	WAIT sign is shown for the stabilization of internal pump.
	READY Mode	<p>WAIT sign turns to READY in 10 seconds and measurement can be started.</p> <p>Push START/STOP key to start the measurement</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>The particle size can be switched with the key on the measurement screen.</p> <p>UNIT:[CNT] [m³] [cf]</p> </div>
START/STOP	<p>The display shows the real-time data.</p> <p>Remaining time of each measurements</p> <p>⑥ : measurement number</p>	
INTERVAL menu	<p>Screen changes to interval menu after the sampling time is over.</p> <p>★ The data is printed after the sampling time is over if you chose printout. (refer to 6.4)</p> <p>★ To stop the measurement halfway</p> <p>Push START/STOP key.</p> <p>Only the data of finished previous measurement before pushing the STOP key will be stored if you chose data storage</p>	

5.4 CONTINUOUS mode

It is a mode not to set the sample time, and nor to begin, and to end the measurement with the START/STOP key. Particle size(μm), data store(STR), Warning(BEEP), Printer(PR) can be set.

Display screen	Operation key	Operation explanation
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;"><MODE></p> <p>1.REPEAT 4.CALC 2.SINGLE 5.REMOTE 3.CONT</p> </div>	POWER	Push POWER key to input the power supply.
	PREV	Push PREV key twice to proceed MODE screen
	set	Select 3. CONT
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>CONT 0.3/0.5 μm STR:Y BEEP:N PR:N</p> <p style="text-align: right;"><input type="checkbox"/>OK</p> </div>	set	<p>■ Setup the particle size, requirement of data storage , alarm , printout. Use key to change the setting Condition, then push SET key. After the input is done, change NO to OK and push SET key.</p>
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>CONT 003BPM 15:25 WAIT 0.3 0.00E+0/cf 01/06 0.5 0.00E+0/cf</p> </div>	WAIT Mode	<p>WAIT sign is shown for the stabilization of internal pump</p> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p>The particle size can be switched with the key on the measurement screen. UNIT:[CNT] [m^3] [cf]</p> </div>
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>CONT 003BPM 15:25 READY 0.3 0.00E+0/cf 01/06 0.5 0.00E+0/cf</p> </div>	READY Mode	<p>WAIT sign turns to READY in 10 seconds and measurement can be started. Push START/STOP key to start the measurement</p>
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>CONT 004BPM 15:25 ⑦ →00:01 0.3 0.00E+0/cf 0.5 0.00E+0/cf</p> </div>	START/STOP	<p>The display shows the real-time data. Remaining time of each measurements ⑦ : Measurement time (Count up) ★ “01h00m” and the display change into the following of 59:59 (It is 59second of 59 minutes.)</p>
<div style="border: 1px solid black; padding: 5px;"> <p>CONT 004BPM 15:58 STOP 0.3 0.00E+0/cf ⑧ →32:48 0.5 0.00E+0/cf</p> </div>	START/STOP	<p><input type="button" value="START/STOP"/> key is pushed, and the measurement is ended. ⑧ : Measurement time ★ The data is printed after the sampling time is Over if you chose printout. (refer to 6.4)</p>

5.5 CALCULATION mode

It is a mode by which measures repeatedly, and mean value from the measurement data, a standard deviation, the maximum value, and minimum value are calculated. Only result is preserved, and each measurement result is not preserved in the data store. The measurement frequency can be set at the grain size, the data store, warning, the printer, and the sample time.

Display screen	Operation key	Operation explanation	
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;"><MODE></p> <p>1.REPEAT 4.CALC 2.SINGLE 5.REMOTE 3.CONT</p> </div> <p style="text-align: center;">↓</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>CALC 0.3/0.5 μm STR:Y BEEP:N PR:N SAMPLE 10:00 06TIMES OK</p> </div> <p style="text-align: center;">↓</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>CALC 003BPM 15:25 WAIT 0.3 0.00E+0/cf 01/06 0.5 0.00E+0/cf</p> </div> <p style="text-align: center;">↓</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>CALC 003BPM 15:25 READY 0.3 0.00E+0/cf 01/06 0.5 0.00E+0/cf</p> </div> <p style="text-align: center;">↓</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>⑧ →CALC 004BPM 15:25 ⑨ →09:59 0.3 0.00E+0/cf 01/06 0.5 0.00E+0/cf</p> </div> <p style="text-align: center;">↓</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>CALC AVE 0.00E+ /cf 0.3 μm S.D 0.00E+0 /cf 06T MAX 0.00E+0 /cf MIN 0.00E+0 /cf</p> </div> <p style="text-align: center;">↕</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>CALC AVE 0.00E+ /cf 0.5 μm S.D 0.00E+ /cf 0.6T MAX 0.00E+0 /cf MIX 0.00E+0 /cf</p> </div> <p style="text-align: center;">↓</p> <div style="border: 1px solid black; padding: 5px;"> <p>CALC 0.3/0.5 μm STR:Y BEEP:N PR:N SAMPLE 10:00 06TIMES OK</p> </div>	POWER	Push POWER key to input the power supply.	
		PREV	Push PREV key twice to proceed MODE screen
		△ ▽ SET	Select 4. CALC
		△ ▽ SET	<ul style="list-style-type: none"> ■ Setup the particle size, requirement of data storage, alarm, printout, sampling time, frequency. Use △ ▽ key to change the setting Condition, then push SET key. After the input is done, change NO to OK and push SET key.
		WAIT Mode	WAIT sign is shown for the stabilization of internal pump
		READY Mode	WAIT sign turns to READY in 10 seconds and measurement can be started. Push START/STOP key to start the measurement
		START/STOP	<p>The display shows the real-time data. Remaining time of each measurements</p> <p>⑧ : The sample time of the remainder is displayed.</p> <p>⑨ : Present measurement frequency</p> <p>The last measurement data is maintained on the screen for five seconds though the following measurement begins at the same time as ending measuring time.</p>
		Display of result. SET	<p>After the last data is displayed for five seconds, result is displayed when the set measurement frequency ends. The data of the small<SMALL> particle is displayed first. It is possible to switch with the data of the large<LARGE> particle in the SET key.</p> <p>★ Data changes in order saying the temperature, humidity, Air velocity, the small particle, and the large particle whenever the SET key is pushed when the temperature humidity and Air velocity probe are used.</p>
		PREV	<p>It returns to measuring the set screen with the PREV key.</p> <p>★ When the measurement ends when setting the printer is Y, the result is printed at once. (refer to 6.4)</p> <p>★ When the START STOP key is pushed while measuring, the measurement is stopped, and the measurement data of times ahead of that is used and operated.</p>

5.6 REMOTE mode

From computer to measurement mode by remote control

(The application software of the option is necessary.)

The connection method with the computer is the same method as forwarding the record data. (Refer to 6.3)

Display screen	Operation key	Operation explanation
<pre> <MODE> 1.REPEAT 4.CALC 2.SING 5.REMOTE 3.CONT </pre> <p>↓</p> <pre> REMOTE 0.3/0.5 μm BEEP:N [OK] </pre> <p>↓</p> <pre> REMOTE B 15:25 0.3 0.00E+0/cf 0.5 0.00E+0/cf 25.5°C 56.0% 0.25m/s </pre>	POWER	Push POWER key to input the power supply.
	PREV	Push PREV key twice to proceed MODE screen
	SET	Select 5. REMOTE
	SET	<ul style="list-style-type: none"> Setup the particle size, alarm ,. Use key to change the setting Condition, then push SET key. After the input is done, change NO to OK and push SET key.
		The measurement begins automatically when the application software is operated.





6. Data processing

6.1 Request for stored data in built-in memory... <4.DATA>

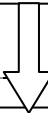




























<DATA>	
STORE □□□	
1.DISPLAY	3.PRINT
2.DUMP	4.CLEAR

Maximum 500 data can be stored, but the one measurement of CALC mode is regarded as 4 data. For example, if the first data is stored at number 016, next one is stored at number 020.

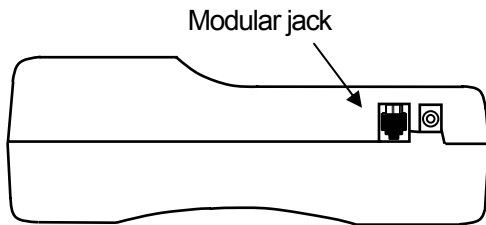
	STORE □□□	Indicates the current total number of stored data
1	DISPLAY	Display of stored data on the screen
2	DUMP	Dump of stored data
3	PRINT	Printout of stored data
4	CLEAR	Delete of stored data

  key	Move the cursor
 key	Shift the setting screen of the selected function
 key	Go back to MENU after the set up

6.2 Display of stored data on the screen... <4.DATA>→<1.DISPLAY>

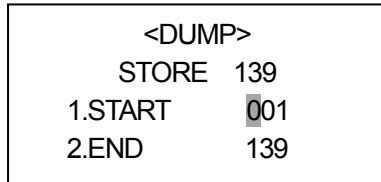
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;"><DISPLAY></p> <p style="text-align: center;">STORE 139</p> <p style="text-align: center;">START 001</p> </div> <div style="text-align: center;">  </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;">STORE 001</p> <p style="text-align: center;">0.3 μm 0.00E+0 /cf</p> <p style="text-align: center;">0.5 μm 0.00E+0 /cf</p> </div> <div style="text-align: center;">  </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">STORE 001</p> <p style="text-align: center;">1 μm 0.00E+0 /cf</p> <p style="text-align: center;">3 μm 0.00E+0 /cf</p> <p style="text-align: center;">5 μm 0.00E+0 /cf</p> </div>	<table border="1"> <tr> <td>  key</td> <td>Adjust the value</td> </tr> <tr> <td> key</td> <td>Move the cursor</td> </tr> <tr> <td> key</td> <td>Shift the data display screen</td> </tr> <tr> <td> key</td> <td>Go back to DATA</td> </tr> </table> <p style="text-align: center; margin-top: 20px;">Push START/STOP key to display the selected data</p> <table border="1"> <tr> <td>  key</td> <td>Shift the previous/subsequent stored data</td> </tr> <tr> <td> key</td> <td>Shift the other data of the same stored data</td> </tr> <tr> <td> key</td> <td>Go back to Display</td> </tr> </table>	  key	Adjust the value	 key	Move the cursor	 key	Shift the data display screen	 key	Go back to DATA	  key	Shift the previous/subsequent stored data	 key	Shift the other data of the same stored data	 key	Go back to Display
  key	Adjust the value														
 key	Move the cursor														
 key	Shift the data display screen														
 key	Go back to DATA														
  key	Shift the previous/subsequent stored data														
 key	Shift the other data of the same stored data														
 key	Go back to Display														

6.3 Dump of stored data... <4.DATA>→<2.DUMP>



Put the optional RS-232C cable into the modular jack of GEO- α , and connect other side of the cable with the PC to transmit the stored data.

Do the communication setting of the PC and make the condition that the PC can readout the data.



Start transmitting

1	START	The first tag number of the stored data to be transmitted
2	END	The last tag number of the stored data to be transmitted

<input type="button" value="△"/>	<input type="button" value="▽"/>	key	Adjust the value
<input type="button" value="SET"/>		key	Move the cursor
<input type="button" value="START/STOP"/>		key	Start transmitting of the stored data
<input type="button" value="PREV"/>		key	Go back to DATA

Preparations

Computer, Application soft (Option), RS-232C cable (Model 3886-08 : Option), Signal cable connect GEO- α with PC

Setting up the computer

Function	GEO- α
Word length	8 bit
Parity bit	None
Set parity	Odd number
Baud rate	9600

Signal cable

GEO- α		Connection	Computer (D-sub 9 pin)	
Pin number	Signal name		Pin number	Signal name
1	TXD	—————	2	RXD
3	RXD	—————	3	TXD
5	CTS	—————	7	RTS
6	GND	—————	5	GND
			4	DTR
			6	DSR

◆Forwarding data format

(1) Repeat, Single, Continuous mode

Format	Byte	Explanation
999 crlf	5	Store No
9 crlf	3	Measurement mode (1 : Repeat, 2 : Single, 3 : Continuous)
99,99,99 crlf	10	Measurement start date
99,99,99 crlf	10	Measurement start time
99,99,99 crlf	10	Sampling time (hours, minutes, seconds)
xxx crlf	5	Particle unit (CNT , /cf , /m ³)
x crlf	4	Temperature unit (C , F)
xxx crlf	5	Air velocity unit (m/s , FPM)
x,x,x crlf	7	Error message (L : Light source, F : Flow rate, O : Over the maximum concentration)
999999999 crlf	11	Count data of 0.3 μ m, 90999E+99crlf using /cf or /m ³ as unit
999999999 crlf	11	Count data of 0.5 μ m, 90999E+99crlf using /cf or /m ³ as unit
999999999 crlf	11	Count data of 1 μ m, 90999E+99crlf using /cf or /m ³ as unit
999999999 crlf	11	Count data of 3 μ m, 90999E+99crlf using /cf or /m ³ as unit
999999999 crlf	11	Count data of 5 μ m, 90999E+99crlf using /cf or /m ³ as unit
*999.9 crlf	7	Temperature data
*999.9 crlf	7	Humidity data
*9.999 crlf	7	Air velocity data, 999.9 crlf using FPT as unit
Total	135	

*) • T/H or Air velocity probe is not selected it becomes "***** crlf".

- It becomes "###.#" when the value of T/H probe exceeds measurement range.
- It becomes "###.#" using m/s as unit (when the value of Air velocity probe exceeds measurement range.)

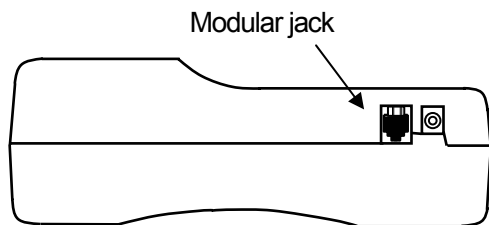
Using FRM as unit, it becomes "###.#".

(2) Calculation mode

Format	Byte	Explanation
999 crlf	5	Store No
9 crlf	3	Measurement mode (4 : Calculation)
99,99,99 crlf	10	Measurement start date
99,99,99 crlf	10	Measurement start time
99999 crlf	7	Measurement number
99,99,99 crlf	10	Sampling time (hours, minutes, seconds)
xxx crlf	5	Particle unit (CNT , /cf , /m ³)
x crlf	4	Temperature unit (C , F)
xxx crlf	5	Air velocity unit (m/s , FPM)
x,x,x crlf	7	Error message (L : Light source, F : Flow rate, O : Over the maximum concentration)
9.999E+99,	10	Average of 0.3 μ m
9.999E+99,	10	Standard deviation of 0.3 μ m
999999999,	10	Maximum data of 0.3 μ m, 9.999E+99 crlf using /cf or /m ³ as unit
999999999 crlf	11	Minimum data of 0.3 μ m, 9.999E+99 crlf using /cf or /m ³ as unit
9.999E+99,	10	Average of 0.5m
9.999E+99,	10	Standard deviation of 0.5 μ m
999999999,	10	Maximum data of 0.5 μ m, 9.999E+99 crlf using /cf or /m ³ as unit
999999999 crlf	11	Minimum data of 0.5 μ m, 9.999E+99 crlf using /cf or /m ³ as unit
9.999E+99,	10	Average of 1 μ m
9.999E+99,	10	Standard deviation of 1 μ m
999999999,	10	Maximum data of 1 μ m, 9.999E+99 crlf using /cf or /m ³ as unit
999999999 crlf	11	Minimum data of 1 μ m, 9.999E+99 crlf using /cf or /m ³ as unit
9.999E+99,	10	Average of 3 μ m
9.999E+99,	10	Standard deviation of 3 μ m
999999999,	10	Maximum data of 3 μ m, 9.999E+99 crlf using /cf or /m ³ as unit
999999999 crlf	11	Minimum data of 3 μ m, 9.999E+99 crlf using /cf or /m ³ as unit
9.999E+99,	10	Average of 5 μ m
9.999E+99,	10	Standard deviation of 5 μ m
999999999,	10	Maximum data of 5 μ m, 9.999E+99 crlf using /cf or /m ³ as unit
999999999 crlf	11	Minimum data of 5 μ m, 9.999E+99 crlf using /cf or /m ³ as unit
999.9,	6	Average of Temperature
999.9,	6	Temperature data standard deviation
999.9,	6	Maximum data of Temperature
999.9 crlf	7	Minimum data of Temperature
999.9,	6	Average of Humidity
999.9,	6	Standard deviation of Humidity
999.9,	6	Maximum data of Humidity
999.9 crlf	7	Minimum data of Humidity data
9.999,	6	Average of Air velocity 999.9 using FRM as unit
9.999,	6	Standard deviation of Air velocity 999.9 using FRM as unit
9.999,	6	Maximum data of Air velocity 999.9 using FRM as unit
9.999 crlf	7	Minimum data of Air velocity 999.9 using FRM as unit
Total	346	

- *) • T/H or Air velocity probe is not selected it becomes "***** crlf".
- It becomes "###.#" when the value of T/H probe exceeds measurement range.
 - It becomes "###.#" using m/s as unit
(when the value of Air velocity probe exceeds measurement range.)

6.4 Printout of stored data··· <4.DATA>→<3.PRINT>



Put the optional Printer cable into the modular jack of GEO- , and connect other side of the cable with the Printer to print the stored data.

```

<PRINT>
STORE 139
1.START 001
2.END 139
  
```

↓
Start printing

1	START	The first tag number of the stored data to be printed
2	END	The last tag number of the stored data to be printed

<input type="button" value="▲"/> <input type="button" value="▼"/> key	Adjust the value
<input type="button" value="SET"/> key	Move the cursor
<input type="button" value="START/STOP"/> key	Start printing of the stored data
<input type="button" value="PREV"/> key	Go back to DATA

Preparations

Printer (Option) Recommendatory Printer Model. DPU-201GS (SEIKO CO., LTD),
Signal cable (Model 3886-07 : Option), Signal cable connect GEO- α with Printer

DIP Switch Setting

Switch Number	Function	GEO- α	Printer
SW1	Word length	8 bit	ON
SW2	Parity bit	None	ON
SW3	Set parity	Odd number	ON
SW4~6	Baud rate	9600	following table

Baud rate	SW4	SW5	SW6
9600	OFF	OFF	ON

Signal cable

GEO- α		Printer	
Pin number	Signal name	Pin number	Signal name
1	TXD	3	DATA
6	GND	4	GND
5	CTS	8	BUSY
6	GND	5	GND

«Attention»

When interval is set lower than 15 seconds at REPEAT mode, it may not print the data causing of buffer memory over.

◆ Example of printout

(1) Repeat, Single, Continuous mode

```

2000/03/21 16:40:00 E=
REPEAT STORE 10 05:30
0.3um 564700 CNT
0.5um 10457 CNT
1.0um 323 CNT
3.0um 36 CNT
5.0um 8 CNT
23.2°C 45.7%RH 0.64m/S
    
```

(2) Calculation mode

```

2000/03/21 16:40:00 E=LFO
CALCULATION STORE 13 05:30
10TIMES
0.3um AVE 6.66E+04 CNT
      STD 3.94E+03 CNT
      MAX 71334 CNT
      MIN 60875 CNT
0.5um AVE 2.78E+03 CNT
      STD 2.76E+02 CNT
      MAX 3096 CNT
      MIN 2422 CNT
1.0um AVE 9.83E+01 CNT
      STD 3.90E+01 CNT
      MAX 156 CNT
      MIN 67 CNT
3.0um AVE 3.76E+00 CNT
      STD 3.46E+00 CNT
      MAX 9 CNT
      MIN 0 CNT
5.0um AVE 3.00E-01 CNT
      STD 4.56E-01 CNT
      MAX 1 CNT
      MIN 0 CNT
TEMP AVE 23.5 °C
      STD 0.3 °C
      MAX 24.0 °C
      MIN 23.2 °C
HUM AVE 52.9 %RH
     STD 1.2 %RH
     MAX 54.4 %RH
     MIN 51.5 %RH
VEL AVE 0.20 m/S
     STD 0.03 m/S
     MAX 0.25 m/S
     MIN 0.18 m/S
    
```

(3) During measurement
(Repeat, Single, Continuous mode)

```

2000/03/21 16:40:00 E=LFO
REPEAT 1 05:30
0.3um 564700 CNT
0.5um 10457 CNT
23.2°C 45.7%RH 0.64m/S
    
```

Only two particle sizes are printed.

(4) During measurement (Calculation mode)

```

2000/03/21 16:40:00 E=
CALCULATION 05:30
10TIMES
0.3um AVE 6.66E+04 CNT
      STD 3.94E+03 CNT
      MAX 71334 CNT
      MIN 60875 CNT
0.5um AVE 2.78E+03 CNT
      STD 2.76E+02 CNT
      MAX 3096 CNT
      MIN 2422 CNT
TEMP AVE 23.5 °C
      STD 0.3 °C
      MAX 24.0 °C
      MIN 23.2 °C
HUM AVE 52.9 %RH
     STD 1.2 %RH
     MAX 54.4 %RH
     MIN 51.5 %RH
VEL AVE 0.20 m/S
     STD 0.03 m/S
     MAX 0.25 m/S
     MIN 0.18 m/S
    
```


6.5 Delete of stored data... <4.DATA>→<4. CLEAR >

<DATA CLEAR> STORE 139 CLEAR YES
--

ALL the stored data will be deleted by executing this function.

CLEAR	YES : data deletion	NO : delete not
-------	---------------------	-----------------

<table border="1"><tr><td>△</td><td>▽</td></tr></table> key	△	▽	Adjust the value
△	▽		
START/STOP key	Shift the data display screen		
PREV key	Go back to DATA		

7. How to use option probes

7.1 Option probes

Temperature/Humidity probe Model 0842



Air velocity probe Model 0843



7.2 Installation of probes

<<Attention>>

Please install probes after the power supply of GEO- α is turned off.

Put T/H probe into "T/H" of GEO- α (refer to 2.4) and put Air velocity probe into "VEL", then close each lock screw cap. Please remove the cover when probes are installed.

GEO- α with T/H probe and Air velocity probe installed



7.3 Setting of display

To display the data, please refer to 4.4.

To set the alarm, please refer to 4.3.

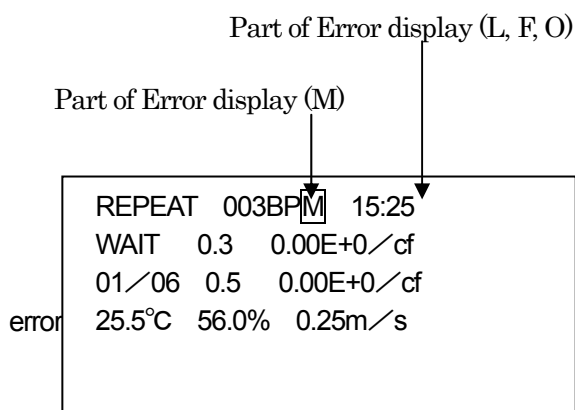
7.4 Extension rod for air velocity probe

To measure air velocity of right under the filter, please use Extension rod Model 0843-01 as occasion demands. Put the probe into the rod from the side of sensor. At this time, please pay attention so as not touch the element of the sensor.

Extension rod for air velocity probe



8. Error message



The error display under the measurement display as shown in left figure.

As for the display error, one character of the initial is displayed based on the display priority level of each

Error message	Content of error	Action
L	Abnormality of laser power	It's a breakdown of the laser luminescence part. Please contact the nearest office for information.
F	Error of flow rate	It is displayed that flow rate exceeds regulated value. (2.83L/min \pm 10%) When "GEO- α " is applied the filter or tube to inlet, please remove it. When "F" doesn't disappear even if it's removed, it is a breakdown of the passage system which contains the pump. Please contact the nearest office for information.
O	Over the maximum concentration	It is displayed to exceed the concentration which can be measured by GEO- α . Please move to cleaner place, measure or install and measure with filter. When "O" doesn't disappear, please contact the nearest office for information.
M	Over the printer buffer	It is displayed that the printer buffer exceeded that when printing data during measurement. Please note that the data after that is not printed.

《Attention》

There is a possibility of an exaggerated buffer when 15 seconds or less are set, and measurement interval (INT) of REPEAT mode is printed during measurement. Please go after setting the measurement interval at 15 seconds or more when printing during measurement.

9. Battery check

```

BATTERY
REPEAT 003BPM 15:25
WAIT 0.3 0.00E+0/cf
01/06 0.5 0.00E+0/cf
25.5°C 56.0% 0.25m/s
    
```

(1) First alarm

```

BATTERY
    
```

(2) Second alarm

If the battery voltage become below 4.5 V the first alarm message "BATTERY" indicate in the top of the display. In this case, it is need to replace the batteries or using AC adapter. If there is no action for about 5 min. at this situation, the second alarm message "BATTERY" only indicate in the center of the display. Then GEO- α stop the measurement and turn off..

- In the case of the first alarm message, it can store the collecting data. Refer the under the table. Basically it can be stored the data while indicating the first alarm message.

Measurement mode	Data store
REPRAT	All data can be stored
SINGLE	If the measurement is finished between the first alarm, the data can be stored.
CONTINUOUS	If you push the "stop" key between at the first alarm, the data can be stored.
CALCULATION	The data can be stored by using the data until collecting until the first alarm message.

10. Specification

Measuring particle size	0.3、0.5、1.0、3.0、5.0 μ m
Light Source	Laser Diode
Counting Efficiency	Meets JIS B9921
Zero Count	Meets JIS B9921
Coincidence Loss	Less than 5% at 2,000,000 particles/cf
Flow Rate	0.1 cfm (2.83 L/min)
Sampling Time	1 second-99 minutes 59second (adjustable in second)
Sampling Frequency	1-99 times, or Continuous
Mode of measurement	Single/Repeat/Continuous/Calculation
Display	20 letters, 4lines LCD
Error sign	Counts beyond max concentration, Drop of laser power, Out of regulated flow rate (+/-10%), Low battery
Interface	RS-232C or RS-485 (Selectable on menu page), RJ-11 Connector N.B. RS-485 is for cascade connection
Communication protocol	Baud Rate 9600bps
Buffer Memory	500 data (In Calculation mode, 1 measurement is counted as 4 data)
Power supply	4 pieces of AA-size Ni-MH battery (4.8V-1.6Ah) or AC adapter (Input 100-240V) Battery are not included and cannot be chaged by AC adapter.
Operating hours	Max. 3 hours (By Ni-MH batteries)
Dimensions	115(W) \times 70(H) \times 211(D) mm
Weight	Approx. 980 g (without batteries)
Environment operation condition	Ambient temperature range:10-35 $^{\circ}$ C
Standard Accessories	AC adapter, Filter, Tube, Handle, Operation manual
Options	Printer, Printer cable, Temperature/Humidity probe, Air velocity probe, Extension rod for Air velocity probe, Carrying case, Tripod, Application software, RS-232C cable

Temperature/Humidity Probe Model 0842	
Temperature range	0~50 $^{\circ}$ C(32~122 $^{\circ}$ F)
Accuracy	+/-0.5 $^{\circ}$ C (at over 0.2 m/s air velocity)
Humidity range	3-98%RH
Accracy	+/-3%RH (+/-5% at the outside of 30-85%RH)
Dimensions	ϕ 20 \times 150mm

Air velocity Probe Model 0843	
Air velocity range	0~1m/s(0~197FPM)
Accuracy	\pm 0.05m/s(10FPM)
Dimension	ϕ 20 \times 150 mm Curl cord 0.2m(Max. extended length 1.5m)

Carrying case	Model 3886-02
---------------	---------------

Extension rod for air velocity probe	Model 0843-01
--------------------------------------	---------------

11. Troubleshooting

Symptom	Possible Cause/Corrective Action	Reference
No Display	Not corrective plug in AC adapter → Confirm plugging AC adapter Low or dead batteries → Replace Batteries → or charging batteries	3.1
Display "BATTERY" alarm	Need charging batteries → Charge batteries	3.1
Flashing the reading	Exceed the alarm level → Confirm the alarm level	4.3
Not display the reading of the option Prove	Not set the optional prove → Set the optional prove	4.4
Not begin measurement	If display is "WAIT" → Wait until display "READY" After the changing the display, Re – push the "START" key If display is "READY" → Push the "START" key If display is "STOP" → Push the "STRAT"READY Wait until display "READY" After the changing the display, Re – push the "START" key	4
The particle count or particle concentration is high	The environmental particle concentration may be high → Attach the filter to inlet of the counter	
The particle count or particle concentration is low	It may be occur "L"(abnormality of laser power) or "F" error.	8
Display "##.##"	It means over range.	
The reading of velocity is low	Confirm the direction of wind velocity to probe.	
The reading of temperature is High	If the wind velocity is actually zero, the reading is not correct. Measure at the place of upper 0.1m/s wind velocity.	
No printing	• The setting of the BAUD rate is not correct. → Confirm the setting of the printer. • Confirm the cable.	6.4
At the "DUMP" mode, not take the data	• The setting of the BAUD rate is not correct. → Confirm the setting of the HOST PC. • Confirm the cable. • Confirm the condition of the HOST PC.	6.3
At the "DUMP" mode, data is not correct	Output format is not correct → Re – set the format	6.3、6.4