

Micro manometer

Model 6850

Instruction Manual



**Be sure to read this manual thoroughly before using the instrument.
Fully understand and pay attention to each caution mentioned.
Please keep this manual as a service reference.**



01001

18.05

Accessories

	Items	Quantity
Includes	Pressure tube	2
	Calibration Certification	1
	Instruction Manual	1
	USB Anti-dust plug	1
	Carrying Case	1
Optional	AC-Adapter	
	Pitot Tube	

[ATTENTIONS & NOTES]

The warning symbols mentioned in this manual are defined below:

(symbol classifications)



Danger: To Prevent Serious Injury or Death

Warnings in this classification indicate a danger that may result in serious injury or death if not observed.



Caution: To Prevent Damage to the Product

Warnings in this classification indicate a risk of damage to the product that may void the product warranty if not observed.

(Description of Symbols)









△ This symbol indicates a condition that requires caution (including danger). The subject of each caution is illustrated inside the triangle (e.g. the high temperature caution symbol is shown on the left).



⊘ This symbol indicates a prohibition. Do not take the prohibited action shown inside or near this symbol (e.g. the disassembly prohibition symbol is shown on the left).









● This symbol indicates a mandatory action. A specific action is given near the symbol.

 WARNING	
 Heating forbidden	<ul style="list-style-type: none"> ○ Never bring the Instrument into a flammable gas atmosphere. … Otherwise, the heat may cause a fire or a explosion.
 Disassembly prohibition	<ul style="list-style-type: none"> ○ Do not disassemble or refit the instrument. … Otherwise, it may cause an electric shock or a fire.
 Using properly	<ul style="list-style-type: none"> ○ Use the instrument properly by following the directions in this instruction manual. … Otherwise, it may cause an electric shock or damage the sensor.
 Using properly	<ul style="list-style-type: none"> ○ If abnormal smells, noises or smoke occur, or if liquid enters the instrument, pull out the AC adapter and remove the batteries immediately. Contact your distributor or the manufacturer for after service. … Otherwise, there is possibility of electric shock, fire or instrument malfunction.
 Forbidden	<ul style="list-style-type: none"> ○ Do not exposure the instrument to rain or water. … Otherwise, it may cause an electric shock, fire or injury.



CAUTION

 Using properly	<ul style="list-style-type: none">○ Always unplug when the instrument not in use.… Failure to do so may cause an electric shock, a fire or circuit damage.
 Using properly	<ul style="list-style-type: none">○ Remove the batteries when storing the instrument for a long period of time. Do not leave drained batteries in the battery compartment and exchange the batteries promptly when they are drained.… Failure to do so may cause battery leakage and damage to the instrument.
 Using properly	<ul style="list-style-type: none">○ Use only the AC adapter supplied by our company.… Or it may cause the instrument damage.
 Forbidden	<ul style="list-style-type: none">○ Do not wipe the instrument with a volatile solvent.… The body may deform or deteriorate. Use a soft dry cloth to remove stains. If stains persist, soak the cloth in a neutral detergent and wipe the instrument with the soft cloth. Never use volatile solvents such as thinner or benzene.
 Forbidden	<ul style="list-style-type: none">○ Do not use or leave the instrument in a high temperature, high humidity or dusty environment. Do not leave the instrument under direct sunlight.… Otherwise, the instrument may not function properly or the inside components may be damaged.
 Forbidden	<ul style="list-style-type: none">○ Never drop the unit or place heavy objects on it.… It may cause damage or malfunction to the instrument.

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1 Introduction

Model 6850 is as micro-manometer with high precision for measuring differential pressure of non-corrosion air. It's available to measure air velocity and air flow when using Pitot. Data storage and exporting functions make user operating more convenient.

1.1 Features

- ◆ Measure differential and static pressure from -2500 to +2500 Pa.
- ◆ Calculate and display velocity and air flow when using a Pitot tube.
- ◆ True color LCD display differential pressure, air flow and velocity at meantime.
- ◆ Stores 10000 samples, available for data browsing, statistics, exporting and delete.
- ◆ Directly exporting data to USB disk without a PC connection.

1.2 Main Specifications

Items		Specifications
Differential Pressure	Range	-2500 ~ 2500 Pa
	Accuracy	± 0.5% of Reading ±1 Pa
	Resolution	0.1 Pa
	Over pressure	±10kPa
Air Velocity ^①	Range	0.2 ~ 60 m/s
	Accuracy	±1.5% of Reading (At 10.0m/s)
	Resolution	0.01 m/s
Airflow	Range	0 ~ 999999 m ³ /h
	Resolution	1 m ³ /h
Operating Temperature		0 ~ 60 °C (non-condensing)
Storage Temperature		-20 ~ 70 °C (non-condensing)
Power supply		Four AA-size batteries (15hours approx.) or AC adapter (optional) 5V
Weight		360g approx.

Note①: Accuracy is a function of converting pressure to velocity. Conversion accuracy improves when actual pressure values increase.





2 Outlook & Structure

2.1 Overview



No.	Item
①	Display LCD
②	Function Keypad
③	Power On/Off
④	USB Port
⑤	AC adapter Port

2.2 Keypad Functions

Keypad	Function
F1, F2, F3	Corresponding with the displaying key
	In test interface, change the position of display value In Menu, for parameter selection and modifying
	In test interface, change the position of display value In Menu, for parameter selection and modifying
	In Menu, for quit or cancel
	In test interface, enter Menu In Menu, for setting or data saving

3 Operation

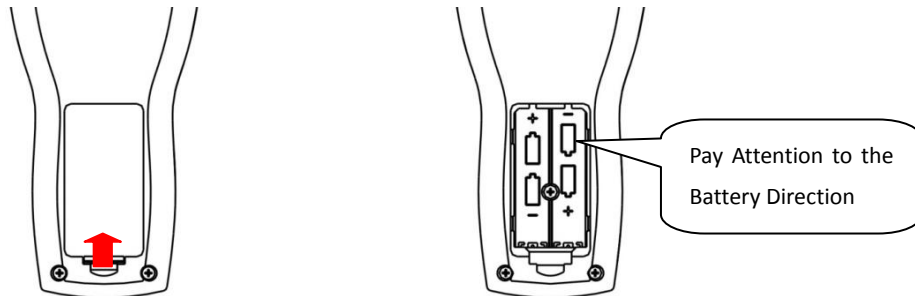
3.1 Power Supply

Two available ways for power supply: Batteries or AC Adapter.

1. Batteries

- (1) 4 AA-size batteries can be used for a power supply.
- (2) Open the back cover, insert the batteries as under the +/- indication.
- (3) Tightly lock the back cover after batteries insert.

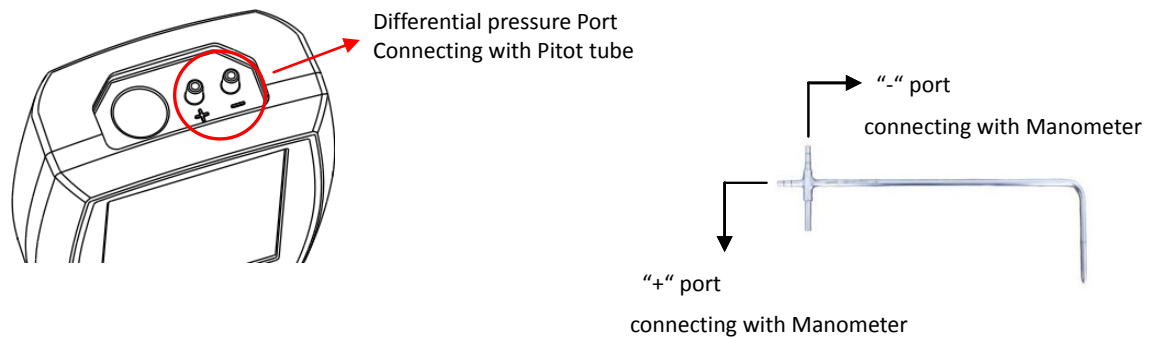
Note: New alkaline battery or rechargeable Ni-MH battery can be used. Never mix battery types, or battery leakage or damage to the instrument may occur.



2. AC Adapter


When the AC adapter is connected and batteries are installed, power will be supplied from the AC adapter.
 The specification of the AC adapter is: I/P: AC 110-240V 50/60 HZ O/P: DC 5V/ 2A

3.2 Pitot Connection




3.3 On/Off Key

1. Key "On"

Keep pressing "  " for 2 ~ 3 seconds for power on. And will display the start interface.

2. Key "Off"

Keep pressing "  " for 2 ~ 3 seconds for switching to power off.

4 Mode Introduction

Two available modes for display: Testing mode and Holding mode.

4.1 Testing Mode

When Power On, testing mode will be available right away, and it's available for start measuring the differential pressure, air velocity and airflow with real-time displaying.

Quantity of Storage samples in current ID

Unit

Optional function Key

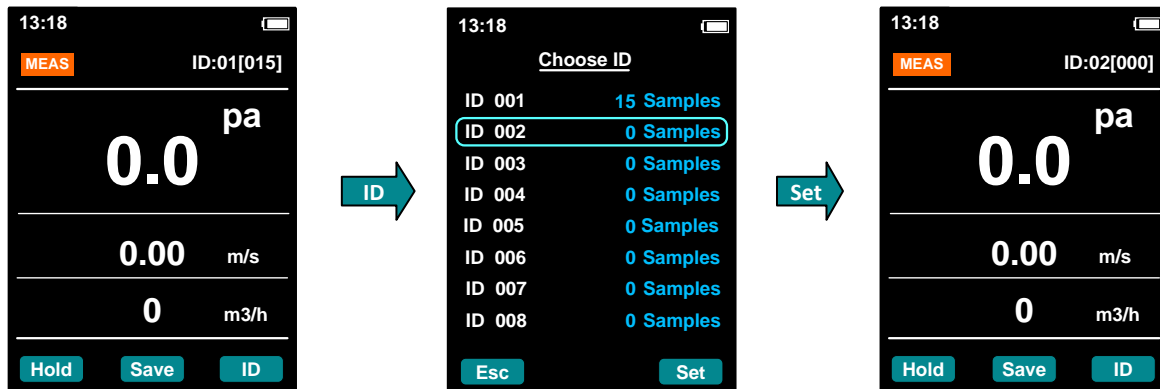
"Hold"	Entering Holding mode
"Save"	Data saving
"ID"	Select ID No. for saving samples
▲	change the position of display value
▼	change the position of display value

1. Display Position

Press "▲" or "▼" for change relative position of differential pressure, velocity and airflow.

The diagram illustrates the effect of pressing the up arrow key (▲). On the left, the display shows Differential Pressure (0.0 pa), Velocity (0.00 m/s), and Airflow (0 m3/h). An arrow points to the right, where the display shows Velocity (0.00 m/s) at the top, Airflow (0 m3/h) in the middle, and Differential Pressure (0.0 Pa) at the bottom. The up arrow key icon is shown above the transition arrow.

2. ID Setting

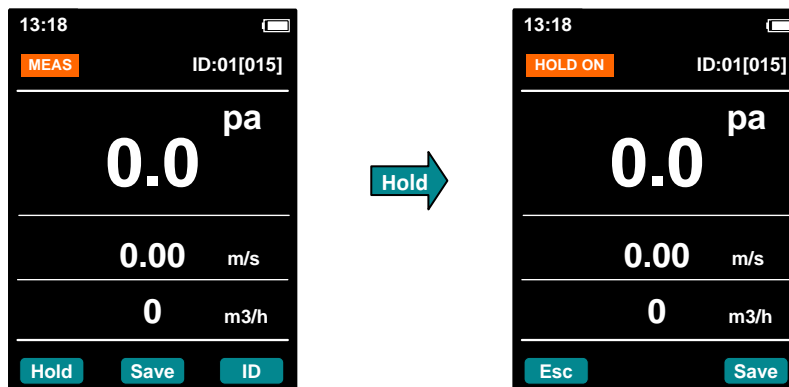


3. Data Saving

Press “ **Save** ” for saving the displaying data on screen.

4.2 Holding Mode





In Testing Mode, press key “ **Hold** ” for entering the Holding Mode, while the testing data will not update for convenient user review and record. Press key “ **Esc** ” for quit under Holding Mode. Press key “ **Save** ” for data saving.

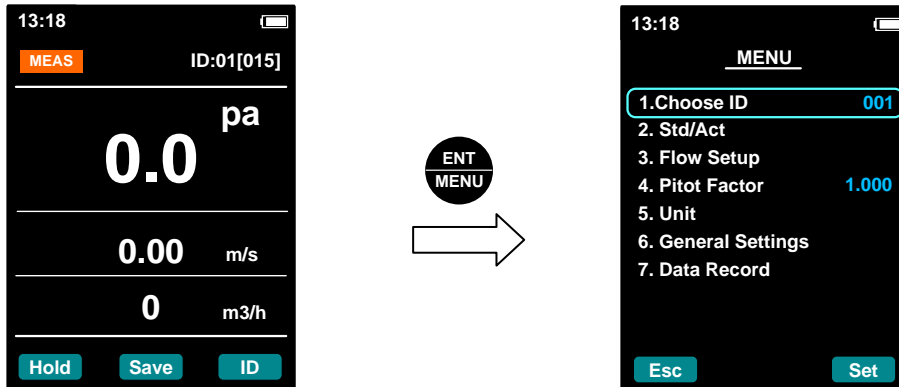


5 Menu Setting

In Testing Mode, press “  ” for entering the menu setting.

Under this menu, 7 choice items are available for the user: eg. Chose ID. , set up the STD/ACT, duct area, unit, data record, pitot parameters and etc.

In Menu, press “  ” or “  ” for parameters set up, press “  ” or “  ” for quit.

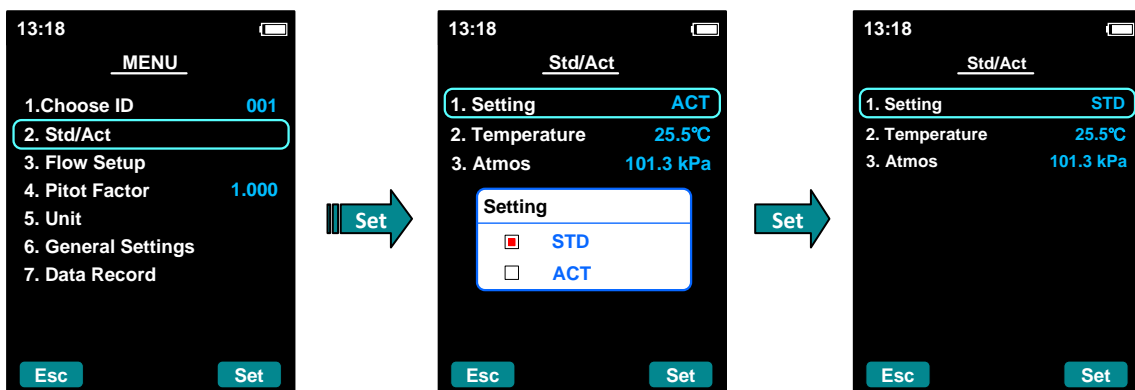


5.1 STD/ACT Setting

The air velocity is related with the environmental factors, such as the temperature, atmosphere pressure. Mode ACT is measuring the actual air velocity and Mode STD is converting the actual air velocity to the value under standard condition of 21.1°C , 101.32kpa.

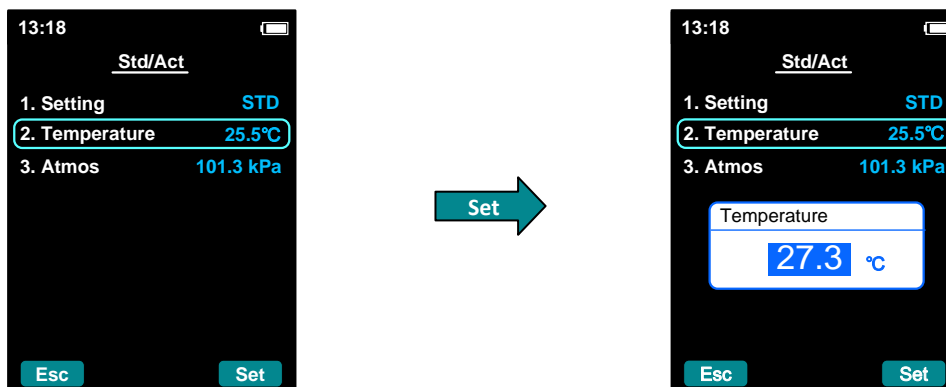
Note: Either under Mode ACT or Mode STD, both need to input the current temperature and atmosphere pressure for correct air velocity calculation.

1. Std/Act Setting



2. Temperature Setting

Press “” or “” for data modification.



Atmos setting is as same as Temperature setting.





5.2 Flow Setup

Since air velocity multiply by duct cross sectional area will be calculated the air flow. So just inputting the cross sectional area in optional “Flow Setup” item for obtaining the airflow value. Two optional ducts shape can be selected: round and rectangular. For a round shape, inputting the diameter, or inputting the length of side of the rectangular.

5.3 Pitot Factor

Pitot factor refers to the correction index of pitot tube. According to the calibration regulation of pitot tube, each pitot tube has a correction index supplied by the pitot manufacturer.

5.4 Unit Setting

In “Unit” setting, the unit of differential pressure, air velocity and airflow can be set. Press “” or “” for selection and press “” or “” for setting or back.

Items	Units
Differential Pressure	Pa、inH ₂ O、mmH ₂ O、mmHg
Velocity	m/s、ft/min
Air Flow	m ³ /h、CFM、l/s

5.5 General Settings

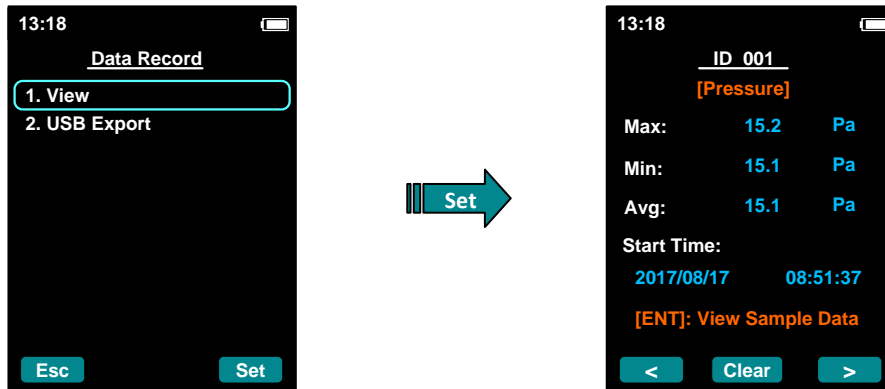
In general settings, parameters such as date, time, screen lightness, Auto-off time, key-touch beep and etc. can be set.

5.6 Data Record

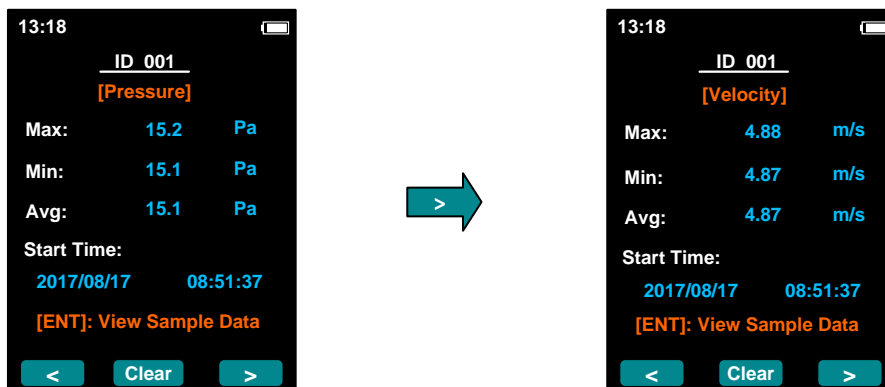
In data record, the statistics are calculated for each test ID or clean-up the ID. It's available for reviewing all sample data of one ID or deleting any sample in one ID.

1. Data Statistics

Data statistics refers to calculate the average, minimum or maximum value of the selected ID.

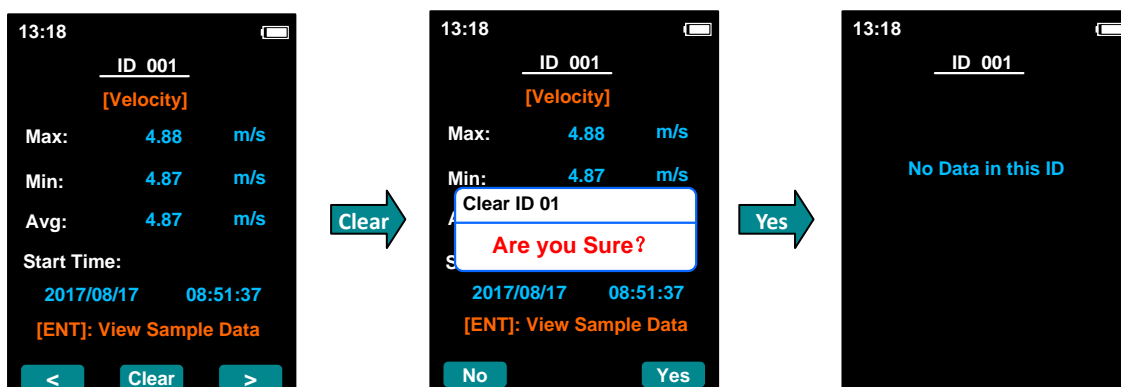


Click "<" or ">" for reviewing the statistic value of differential pressure, air velocity and airflow.



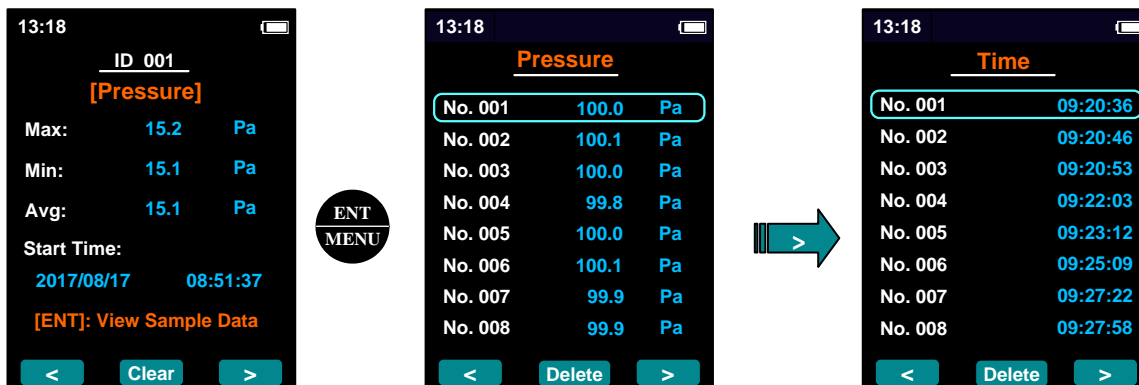
2. Clean up ID

Clean-up all data under a selected ID.

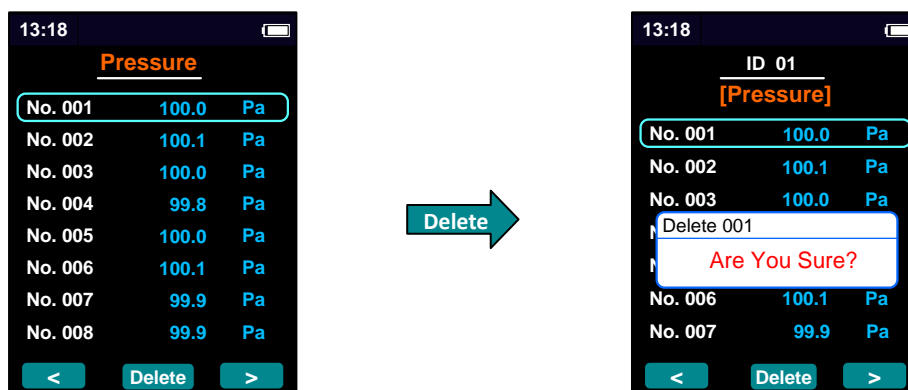


3. Data View

It's available for reviewing the differential pressure, air velocity, airflow and memory time of all samples under a selected ID.

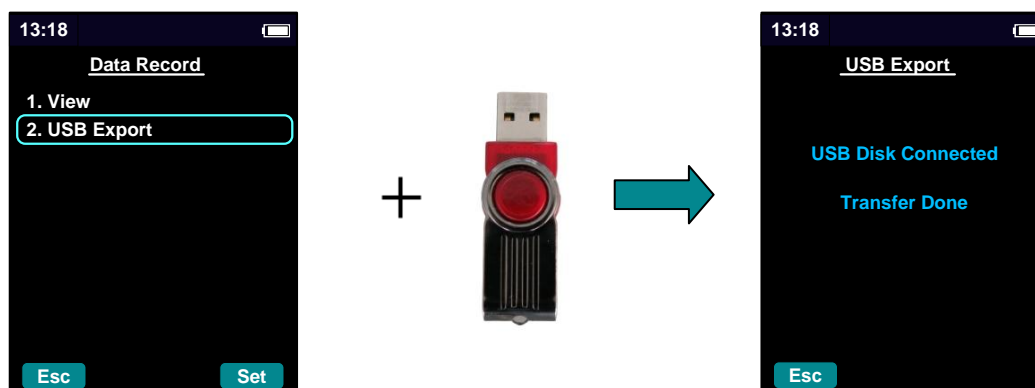


4. Data Delete



5.7 Data Export

Under "Data Record", click for "USB Export", inset USB disk as indication for exporting data. "Transfer Done" will be indicated when finish exporting.



6 Error and Troubleshooting

Symptom	Possible Causes	Corrective Action
No display when power On	Incorrect specification of the AC Adapter	Check and refer to Chapter3.1 in Manuel
	Battery installation error	Check and refer to Chapter3.1 in Manuel
	Low or dead battery power	Replace the batteries
Fail for data storage	Storage area full	Delete part of or all data
Fail to entering the menu	Unavailable for entering the menu when in Holding mode	Quit and back to the Testing mode.
USB data exporting failure	Not Support this USB disk	The available USB disk should be: support USB2.0 protocol and FAT 32 file format.
	Not enough memory space left in USB disk.	Clear files in USB disk for available space.

7 Warranty and Service

7.1 Product Warranty

The limited warranty set forth below is given by KANOMAX GROUP COMPANIES with respect to the KANOMAX brand Micro manometer and other accessories (hereafter referred to as “PRODUCT”) purchased directly from KANOMAX GROUP COMPANIES or from an authorized distributor.

Your PRODUCT, when delivered to you in new condition in its original container, is warranted against defects in materials or workmanship as follows: for a period of one (1) year from the date of original purchase, defective parts or a defective PRODUCT returned to KANOMAX GROUP COMPANIES, as applicable, and proven to be defective upon inspection, will be exchanged for a new or comparable rebuilt parts, or a refurbished PRODUCT as determined by KANOMAX GROUP COMPANIES. Warranty for such replacements shall not extend the original warranty period of the defective PRODUCT.

This limited warranty covers all defects encountered in normal use of the PRODUCT, and does not apply in the following cases:

- (1) Use of parts or supplies other than the PRODUCT sold by KANOMAX GROUP COMPANIES, which cause damage to the PRODUCT or cause abnormally frequent service calls or service problems.
- (2) If any PRODUCT has its serial number or date altered or removed.
- (3) Loss of damage to the PRODUCT due to abuse, mishandling, alternation, improper packaging by the owner, accident, natural disaster, electrical current fluctuations, failure to follow operation, maintenance or environmental instructions prescribed in the PRODUCT's operation manual provided by KANOMAX GROUP COMPANIES, or service performed by other than KANOMAX GROUP COMPANIES.

No implied warranty, including any implied warranty of merchantability or fitness for a particular purpose, applies to the PRODUCT after the applicable period of the express limited warranty stated above, and no other express warranty or guaranty, except as mentioned above, given by any person or entity with respect to the PRODUCT shall bind KANOMAX GROUP COMPANIES. KANOMAX GROUP COMPANIES shall not be liable for loss of storage charges, loss or corruption of DATA, or any other special, incidental or consequential damages caused by the use or misuse of, or inability to use, the PRODUCT, regardless of the legal theory on which the claim is based, and even if KANOMAX GROUP COMPANIES has been advised of the possibility of such damages. In no event shall recovery of any kind against KANOMAX GROUP COMPANIES be greater in amount than the purchase price of the PRODUCT sold by KANOMAX GROUP COMPANIES and causing the alleged damage. Without limiting the foregoing, owner assumes all risk and liability for loss, damage of, or injury to the owner and the owner's property and to others and their property arising out of use or misuse of, or inability to use, the PRODUCT not caused directly by the negligence of KANOMAX GROUP COMPANIES. This limited warranty shall not extend to anyone other than the original purchaser of the PRODUCT, or the person for whom it was purchased as a gift, and states the purchaser's exclusive remedy.

7.2 After Service

- ◆ When you have a problem with your instrument, please check out the “Error and Troubleshooting” section first.
- ◆ If that does not help, please contact your local distributor, or contacts on the last page.
- ◆ During the warranty period, we will repair at no charge a product that proves to be defective due to material or workmanship under normal use.

All return shipping charges are the responsibility of the customer.

◆ Repair after warranty expiration:

Upon request, we will repair the instrument at the customer's expense, if the instrument's performance is found to be recoverable by providing the repair.

◆ Replacement parts are available for a minimum period of five (5) years after termination of production. This storage period of replacement parts is considered as the period during which we can provide repair service. For further information, please contact your local distributor, or contacts on the last page.

When making an inquiry, please provide the following information:

- * PRODUCT Name: -----
- * Model No. -----
- * Serial No. -----
- * Description of the problem: -----
- * Data of Purchase: Day, Month and Year.

Appendix 1 Actual vs. Standard Air Velocity and Measurements

Actual Air Velocity is measured with a Pitot tube using the basic formula:

$$V_{ACT} = K \sqrt{\frac{2 \times P}{\rho_{ACT}}}$$

V_{ACT} is Actual Air Velocity (m/s);

P is Velocity Pressure (Pa);

ρ_{ACT} is the air density (Kg/m³);

K is Pitot Factor;

Air density, ρ_{ACT} can be calculated from the equation:

$$\rho = 1.293 \times \frac{273.15}{273.15 + T_{ACT}} \times \frac{P_{ACT}}{101.32}$$

P_{ACT} is the atmospheric pressure;

T_{ACT} is the local air temperature (°C);

Standard Conditions are defined as air at 21.1°C and 101.32kPa.

$$\rho_{STD} = 1.293 \times \frac{273.15}{273.15 + 21.1} \times \frac{101.32}{101.32} = 1.2003$$

From the continuity of mass equation, we can state the following

$$V_{ACT} \times \rho_{ACT} = V_{STD} \times \rho_{STD}$$

Thus, to convert from Actual Velocity to Standard Velocity, use the following equation:

$$V_{STD} = V_{ACT} \times \frac{\rho_{ACT}}{\rho_{STD}}$$

V_{STD} is Standard Air Velocity (m/s)

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