EQUO Sensor Series

Air Thermo Logger

ZN-THX11-S□

User’s Manual

Rev.C

Introduction

Thank you for purchasing EQUO Sensor Series Air Thermo Logger ZN-THX11-S☐.
This manual describes the information regarding the functions, performance and usage that are necessary to use the Air Thermo Logger.

- This product must be handled by specialists with electrical knowledge.
- Before using this product, read this sheet thoroughly to acquire sufficient knowledge of the product.
- For your convenience, keep this instruction sheet at hand to refer whenever necessary.

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Manual type and usage

The major contents of the manuals are shown below. Select and read a manual according to your need.

Included manual (Print)

Instruction Sheet

Describes the information to ensure the safe and proper use of the product, and information regarding ratings, performance and installation.

Startup Guide

Describes the basic procedures including content check, assembly, setting operation, recording operation and data display.

Manual included in the Utility Disk (PDF data)

User's Manual (This document)

Information to ensure the safe and proper use of the product

Detailed procedures including content check, assembly, setting operation, recording operation and data display

Describes the necessary information such as specifications of the unit to use the Air Thermo Logger ZN-THX11-S☐.

Read and Understand this Manual

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Precautions on Safety

Meanings of Signal Words

For the safe operation of ZN-THX21-S□, this operation manual indicates the precautions by using the marks and symbols as indicated below. The precautions given here contains important information related to safety. Be sure to observe them. The marks and symbols for the safety precautions are as follows:

⚠ **WARNING**	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
⚠ **CAUTION**	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

●Meanings of Alert Symbols

	●Disassembly Prohibition Indicates that disassembly is prohibited to prevent electric shock.
	●Explosion Caution Indicates the possibility of explosion under specific conditions.

●Warning Indications

⚠ **WARNING**	
As this product contains a lithium battery, fire, explosion or burning hazards may occur. Dispose of the product as industrial waste. Do not disassemble, deform, heat, or burn this product.	
Do not disassemble or touch inside the unit. Doing so may result in electric shock and/or injury.	

PRECAUTIONS FOR SAFE USE

Observe the following precautions to ensure safe operation.

- Do not install the product in the places subject to exposure to water, oil, or chemicals.
- When using an AC adapter, use only the provided AC adapter.
- When using a DC cable, use only the provided DC cable.
- If a voltage that exceeds the rated voltage is applied to the AC adapter or DC cable, smoking may occur. Do not connect a power supply that exceeds the rated voltage. In a situation where a voltage higher than the rating is applied, use protective equipment so that the power supply voltage does not exceed the rated voltage.
- Dispose of the product as industrial waste.
- To use the batteries properly, read the precautions written by manufacturer before use.
- Do not subject the product to a shock such as dropping the product. Doing so may cause damage to or malfunction of the product. It is recommended to secure screws when mounted on the wall surface to prevent damage from dropping the product. If strong impact is applied to the product, stop use of the product.
- When inserting or pulling out the SD card, hold the main unit to prevent damage from dropping the product. When inserting or pulling out an AC adapter or DC cable, alarm output cable or sensor connector, hold the unit as well.
- Mount an appropriate load on the alarm output terminals due to the possibility of smoking.
- If liquid crystal leaks due to a damage to the LCD panel, be careful so that your skin will not touch with or you will not inhale or swallow it. If liquid crystal enters into your mouth, seek medical attention.

Precautions for Correct Use

1. Avoid installing the product in the following places:

- Places exceeding the rated ambient temperature
- Places exposed to extreme temperature changes (prevent condensation.)
- Places exceeding the rated RH level
- Places subject to corrosive or flammable gases
- Places subject to mist, droplets, coarse particles, fiber, salt, metal dust, or large amount of particles
- Places subject to direct shock or vibration
- Places subject to direct sunlight
- Places subject to exposure to water, oil, or chemicals
- Places subject to strong magnetic field or electric field
- Outdoors

2. Wiring

- Lay the product cable away from any high-voltage cable or power line.
- If laid in the same conduit or duct, induction noise from them may caused malfunction or breakdown of the product.
- Be sure to turn the power OFF before inserting or removing the I/O terminals. Otherwise it may result in a failure.
- Do not connect the product to a sensor head other than ZN-THS1☐☐-S. Do not hold only the sensor head mounted to the product body.

3. Battery Use

- Do not combine use of new and old batteries, or do not use batteries in combinations with those of different makers or models. Doing so may result in malfunction.
- Do not insert a battery with the polarity inverted.
- Be sure to mount a battery cover during use. Be careful that the operation of the device cannot be guaranteed if a battery is removed because the battery cover is not mounted.
- Remove the batteries if you do not use the product for a long period of time. If leaving the used batteries in the product for a long period of time, corrosion of the device may occur due to a battery leak.
- Do not disassemble or throw the battery into the fire.
- When the battery level is low, a restart may be repeated. If such event occurs, replace the batteries with new ones.

4. Battery Disposal

- For disposal of batteries after replacement, restrictions may apply depending on the local government. Dispose of the battery according to your local government.

5. Seal at the bottom of the main unit

- Never remove the seal at the bottom of the unit as there is a connector used for maintenance purpose conducted by OMRON.

6. Mounting screw holes

- The screw hole is M3 and the depth of the screw is 4 mm. Do not tighten a screw with more than 4 mm in depth. Doing so may damage the product.

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How to Read This Manual

■ Meanings of Symbols

Menu items that are displayed on the screen, and windows, dialog boxes and other GUI elements displayed on the PC are indicated enclosed by brackets "[ ]".

■ Explanation of Symbols

Important: Indicates the description of an essential point regarding a function, such as an important point regarding operation or advice on how to use it.

Note: Indicates application procedures.

Table of Contents

Revision History

1. Product Overview

1.1 Features and Functions

(1) High-precision Air Thermo Sensor

Air Thermo Sensor Head ZN-THS1□□-S allows for the accurate measurement of the temperature and humidity with a temperature resolution of 0.1°C (at 25°C) and humidity accuracy of ±2.5%RH (25°C, 10 to 85% RH). The ZN-THS1□□-S contributes to the improvement for better quality and management of temperature and humidity through accurate measurement.

(2) Recording with SD card

The measurement data is accumulated in the internal memory and output as a CSV file to an SD card by pressing the SET/REC/STOP key.
The internal memory can accumulate approximately 8,500 data, output them to an SD card without stopping measurement and collect the data when required *1.
In the SD card, the measured data is saved in the folder having a unique name to identify the Air Thermo Logger. Therefore, even if two or more Air Thermo Loggers are controlled, the data of each logger can be collected with one SD card while the data in each logger is normally saved in each internal memory.
Approximately 17 million data items can be recorded (can be stored for 5 years with one Air Thermo Logger with a measurement interval of 10 sec).

*1: When "SD" blinks in the display of the main unit, do not remove the SD card. Doing so may damage the data.

(3) Graphical display software provided as standard

The data output to the SD card can be displayed as graphs with the provided PC software SD Viewer ES. The graphs can be displayed by just specifying the SD card drive on the PC. The data items of different periods can be connected, and the data items collected from one or more Air Thermo Logger can be displayed side by side.

(4) Alarm output

The main unit of the Air Thermo Logger has the alarm output terminals. The alarm will output when the measured differential pressure exceeds upper or lower limit. This function allows you to quickly handle problems by visualizing the limit of temperature and humidity.

(5) Battery drive

Other than supplying power from the outside, the product can be operated with batteries (two AAA batteries). The battery drive can last approximately 1 year under the condition with

a measurement interval of 10 minutes, sleep mode and the use of rechargeable nickel metal hydride batteries.*1 The internal memory is always backed up so that it will not be deleted after running out of batteries.

*1: The battery life varies according to measurement environment, conditions, and type or performance of the batteries.

2. Check and Preparation

2.1 Checking the Contents

This product includes the following items:

- Main Unit ZN-THX11-S☐ 1
- AC Adapter or DC Cable 1
- Alaram Output Connector 1
- Utility Disk (CD-ROM) 1
- Instruction Sheet 1
- Startup Guide 1

2.2 Preparing Necessary Items

The following items are required to use this product.

- Fine Differential Pressure Sensor Head ZN-THS1☐☐-S 1 (Sold separately)
- SD card (SDHC compatible) 1 (After operation check HMC-SD291 (2 GB))

For saving and moving measured data

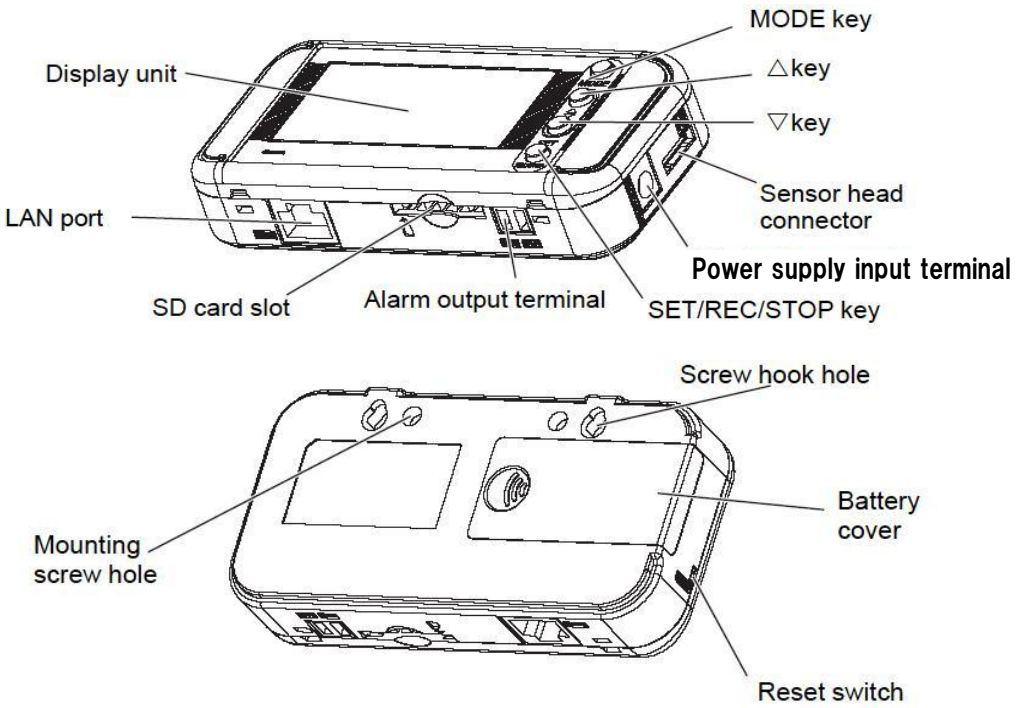
- AAA Batteries (for battery operation) 2

Alkaline batteries or rechargeable nickel hydrogen (Ni-MH) batteries

Important

Use two batteries of the same type. Do not mix the old and new batteries.

2.3 Exterior Features



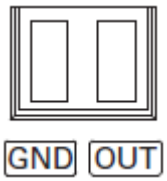
For functions of the keys and display, refer to 3. Functions of Operation Unit and Display.

Refer to: 3. Functions of Operation Unit and Display

2.4 Input/Output Specifications

2.4.1 Alarm output

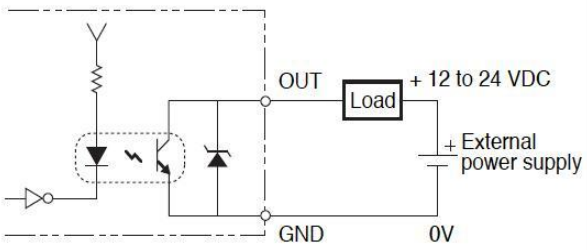
(1) Alarm output terminals



(1) OUT
Outputs the Judgment result allocated in THR mode is output.
(2) GND
It is a common terminal.

Terminal names are inscribed on the unit.
The provided alarm output connector is used for wiring.

(2) Output specifications

External power supply voltage	12 to 24 VDC ±10%
Load current	45 mA max.
ON residual voltage	1.2 V max.
OFF leakage current	0.1 mA max.
Internal circuit diagram	

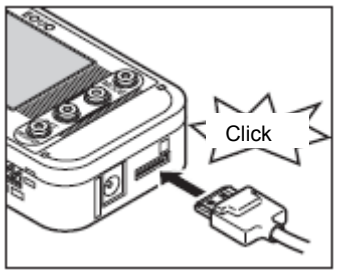
Important

Do not directly connect the external power supply between OUT and GND.
Be sure to connect the load.

2.5 Assembly

2.5.1 Connecting Air Thermo Sensor

To use this product, an optional Air Thermo Sensor Head ZN-THS1□□-S is required.



Insert the Sensor Head into the Sensor Head connector until it clicks.

2.5.2 Connecting alarm output terminals

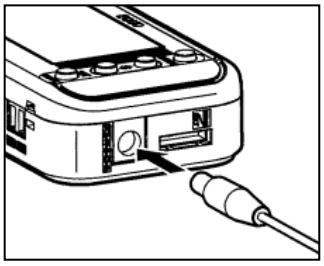
Use the provided alarm output connector to connect OUT and GND to the loads according to the output specifications.

Refer to : 2.4.1 Alarm output

2.5.3 Preparing power supply

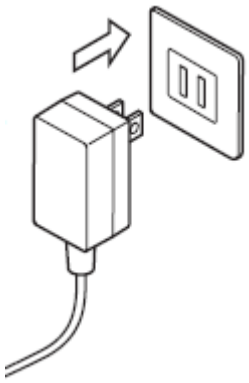
This product can be driven by supplying power from the outside or by batteries.

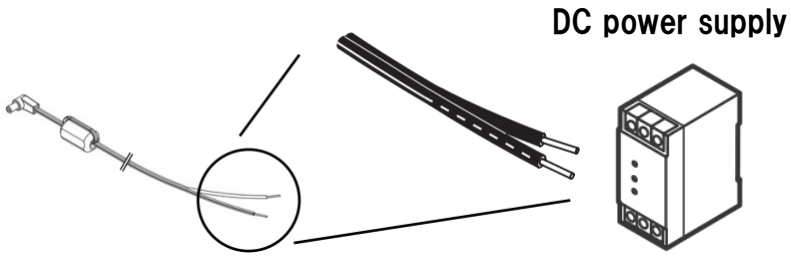
(1) When supplying power from the outside



(1) Insert the plug of the AC adapter or DC cable into the power supply input terminal.

(2) When using an AC adapter, insert the AC plug of the AC adapter into an outlet. (100 VAC to 240 VAC).
When using a DC cable,connect the wire with white line on it to the power(24VDC±10%), and connect the other wire to 0V.





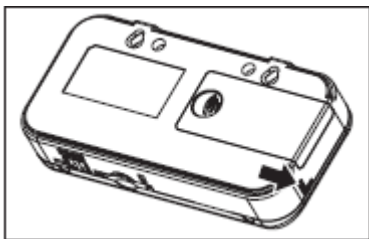
Important

- When using an AC adapter, use the provided AC adapter.
- When using a DC cable, use the provided DC cable.

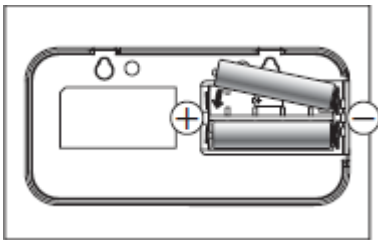
Note

- The main unit does not have a power supply button. When connecting the power supply, the Air Thermo Station starts operation immediately.
- The supplying power from the outside has priority when both the power supply from the outside and rechargeable battery are used. When supplying power from the outside has stopped due to a power failure, it will be automatically switched to battery power if mounted.

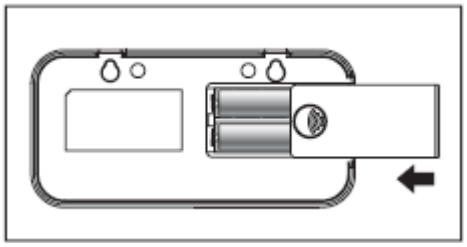
(2) Using batteries



(1) Slide to open the battery cover on the back of the main unit.



(2) Insert two batteries with careful attention to proper polarity.



(3) Slide to close the battery cover.

Important

- When inserting the batteries, be careful about the direction of the polarity. Inserting the battery with wrong polarity may result in damage of the main unit.
- Use two batteries of the same type. Do not mix the old and new batteries.

Note

- It is recommended to operate the product in sleep mode.
- The supplying power from the outside has priority when used in combination with batteries. When supplying power from the outside has stopped due to a power failure, the power supply will be automatically switched to battery drive if mounted.
- The main unit does not have a power supply button. When battery attached, the Air Thermo Station starts operation immediately.
- Charge the batteries before use. The main unit does not have a function to charge batteries.

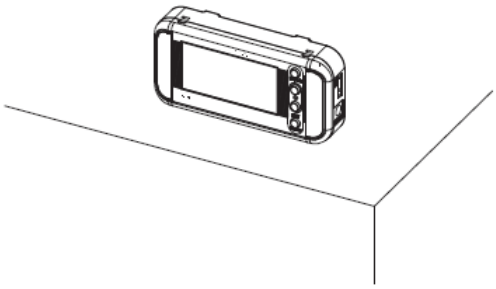
2.6 Installing Air Thermo Logger

This section describes how to install the Air Thermo Station.

Important

This product is precision equipment. Do not drop the product when mounting it.
Use the mounting screw hole to secure the product when installing the product to the wall or equipment where vibration or shock may affect the main unit directly.

2.6.1 Standing installation

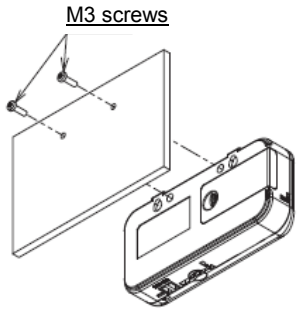


Important

When placing the product on the desk, etc., place it enough distance from the edge of the desk to prevent damage from dropping it. Do not get stuck with the power cable, Sensor Head cable and LAN cable.

2.6.2 Securing with mounting screws

There are mounting screw holes at the back of the unit to secure the products on the wall or other surface. The unit also can be secured with round magnets to the screw holes.

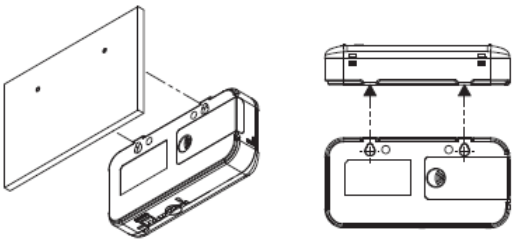


Important

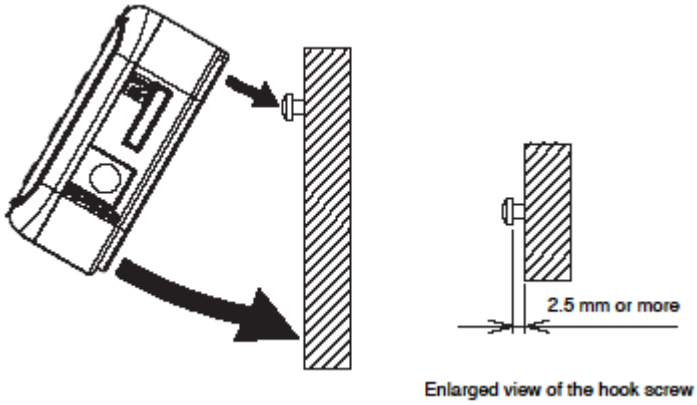
The depth of the screw hole is 4 mm. Do not tighten screws more than 4 millimeters. It will cause the damage to the product.

2.6.3 Mounting with screw hook hole

There are two hook holes below the convex section of the upper unit for the product to be secured on the wall.



Use M3 screws to hook the screw head on the screw hook holes. Set an interval of 2.5 mm or more between the bottom of the screw head and the wall surface.



Enlarged view of the hook screw

Important

To insert or remove the SD card with the Air Thermo Station mounted with screw hook holes, firmly hold the main unit with hands. Failure to do so may result in dropping and damaging the SD card.

2.7 Preparing Software SD Viewer ES

The Air Thermo Logger is provided with PC software SD Viewer ES that displays the data recorded with the Air Thermo Logger on the PC.
Fore details on preparation such as installation to use SD Viewer ES, refer to Chapter 6 Display – Usage of SD Viewer ES -.

Refer to: 6. Display – Usage of SD Viewer ES -

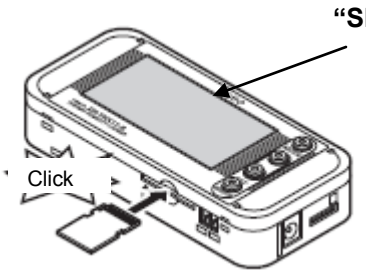
2.8 Inserting/removing SD card

The Air Thermo Logger has an SD card slot to record the measurement data and write/read the setting data.

Important

- When inserting/removing the SD card, firmly hold the main unit with your hands. When the product is mounted with its screw hook hole, inserting/removing the SD card without firmly holding the main unit may result in dropping and damaging the SD card.
- When "SD" on the display is blinking, do not remove the SD card. Doing so may destroy data in the SD card.
- Do not touch the metal terminal of the SD card.
- Do not bend the SD card.
- When inserting/removing the SD card, be aware of static electricity.
- Do not enable the write-protection of the SD card.

2.8.1 Inserting SD card

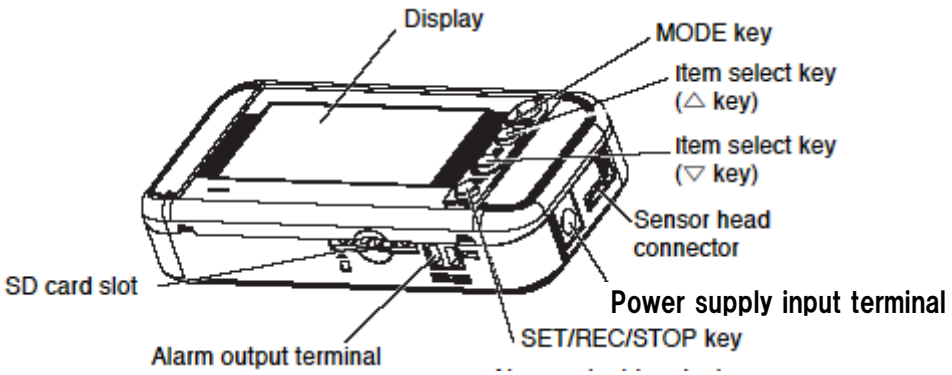


(1) Insert the SD card into SD card slot with the metal terminal face up.
(2) Insert the SD card until it clicks.
(3) "SD" is displayed on the display.

2.8.2 Removing SD card

(1) Push the inserted SD card as far as possible until it clicks.
(2) When you release your hand, the SD card will come out. Be careful not to drop it.
(3) "SD" on the display disappears.

3. Functions of the Operation Unit and Display



3.1 Control Unit

3.1.1 Control key

Name	Main functions
MODE key	Switch operating modes. Release an alarm or an error (press and hold). Cancel settings before fixing.
Item selection key (△ key)	Move up the setting items. Change display screens. Change setting values (increasing).
Item selection key (▽ key)	Move down the setting items. Change display screens. Change setting values (decreasing).
SET/REC/STOP key	Fix setting values etc. Start/stop record (press and hold). Send the recorded data into the SD card.

3.1.2 Reset switch

There is a reset switch at the back of the hole located at the left side of the main unit. Pressing the reset switch with a thin wire, etc restarts the Air Thermo Logger.

When restarting the Air Thermo Logger, do not touch the front key until the temperature and humidity is displayed.

Settings are not initialized by the reset.

3.2 Display Unit

Display Unit

Meanings of indicators

Display	Meaning and operation when turned on
REC	Recording data in the internal memory.
SD	SD card has been inserted. SD is being accessed while light blinking.
ALM	The measured value exceeds the set threshold value.
	The power supply is supplied by the AC adaptor or the DC cable.
	The battery level is displayed in 4 levels. Replace batteries when it blinks
Hi	Upper limit threshold
Lo	Lower limit threshold
MAX	The measurement is processed to extract Max. value.
MIN	The measurement is processed to extract Min. value.
AVE	The measurement is processed to extract Ave. value.
RUN	Current operating mode is set to RUN mode.
FUN	Current operating mode is set to FUN mode.
THR	Current operating mode is set to THR mode.
SCL	Adjusting the measured values when it is turned on with RUN on. Current operating mode is SCL when only SCL is turned on.

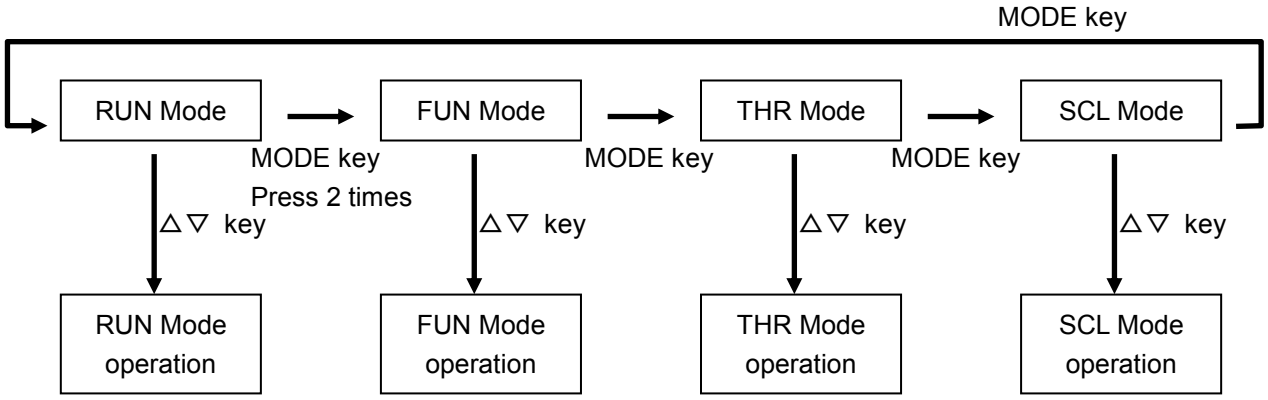
For alphabets, numerals and major displayed images on the display screen, refer to the Appendix.

Refer to : List of displayed characters in Appendix.

4. Setting Air Thermo Logger

4.1 Setting Procedure and Operation Modes

This section describes the operation and setting procedure of the Air Thermo Logger.



The Air Thermo logger has four operation modes. These modes can be switched with the MODE key.

To change mode from RUN to FUN, press the MODE key twice. When pressing the MODE key once, “RUN” blinks. When pressing the MODE key twice, "FUN” blinks to be switched.

Use the △ and ▽ keys to change setting items and display items in each operation mode.

Table: Operation mode

Display	Name	Description
RUN ON	Measurement execution mode (RUN mode)	Executes measurement and recording of temperature and humidity.
FUN blinks	Function setting mode (FUN mode)	Makes measurement and recording settings.
THR blinks	Threshold value setting mode (THR mode)	Makes settings of threshold values (upper/lower limits) for an alarm output of temperature and humidity.
SCL blinka	Measurement value adjustment setting mode (SCL mode)	Makes settings of measurement value adjustment.

4.2 Settings in FUN Mode

In FUN mode, settings regarding measurement and recording of the Air Thermo Logger are made.

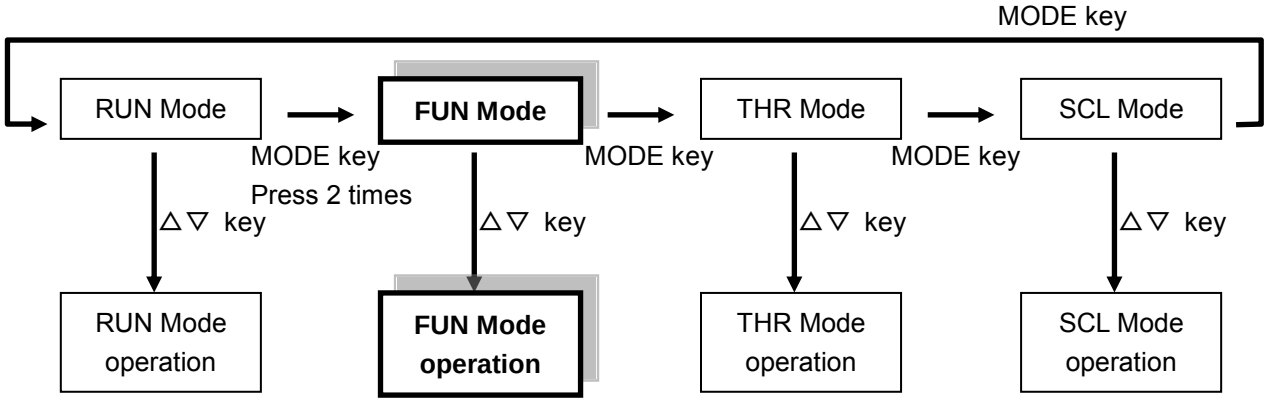
4.2.1 List of setting items

The list below shows the setting items in FUN mode.

Display item			Display	Setting item	Setting value	Factoryd efault
CYCLE			cYcLE	Measurement value update cycle	10 s (sec)/20 s/30 s/ 1 m (min)/2 m/5 m/10 m /20 m//30 m/1 h (hour)	10s
MEAS			nERS	Processing mode	NORM/MAX/MIN/AVE	NORM
MODE			nodE	Measurement operation mode	NORM/SLEEP Air Thermo Logger is reset and restarted when operation mode is changed with the MODE key.	NORM
REC			rEc	Recording mode	CONT/RING	CONT
INIT			init	Restore to factory default	When holding the SET/REC/STOP key, initialization starts. After "DONE" is displayed and operation mode is changed with the MODE key, the Air Thermo Station is reset and restarted.	-
ETC (DISP)	RESTR		rESEr	Read the setting data from the SD card.	When inserting the SD card and holding the SET/REC/STOP key, the setting data is read from the SD card and is set to the main unit. When changing operation mode with the MODE key after DONE has been displayed. The Air Thermo Logger is reset and restarted.	-
	BCKUP		bcPUP	Write the setting data into the SD card.	When inserting the SD card and holding the SET/REC/STOP key, the setting data is saved into the SD card.	-
	TIME (DISP)	YEAR	YEAr	Year	Year setting	Not initialized by INIT.
		MONTH	nonth	Month	Month setting	
		DAY	dAY	Day	Day setting	
		CLOCK	cLocP	Hour : Minute	Hour/minute setting	
	SDISP		SdiSP	Display mode at sleep	OFF/ON	OFF

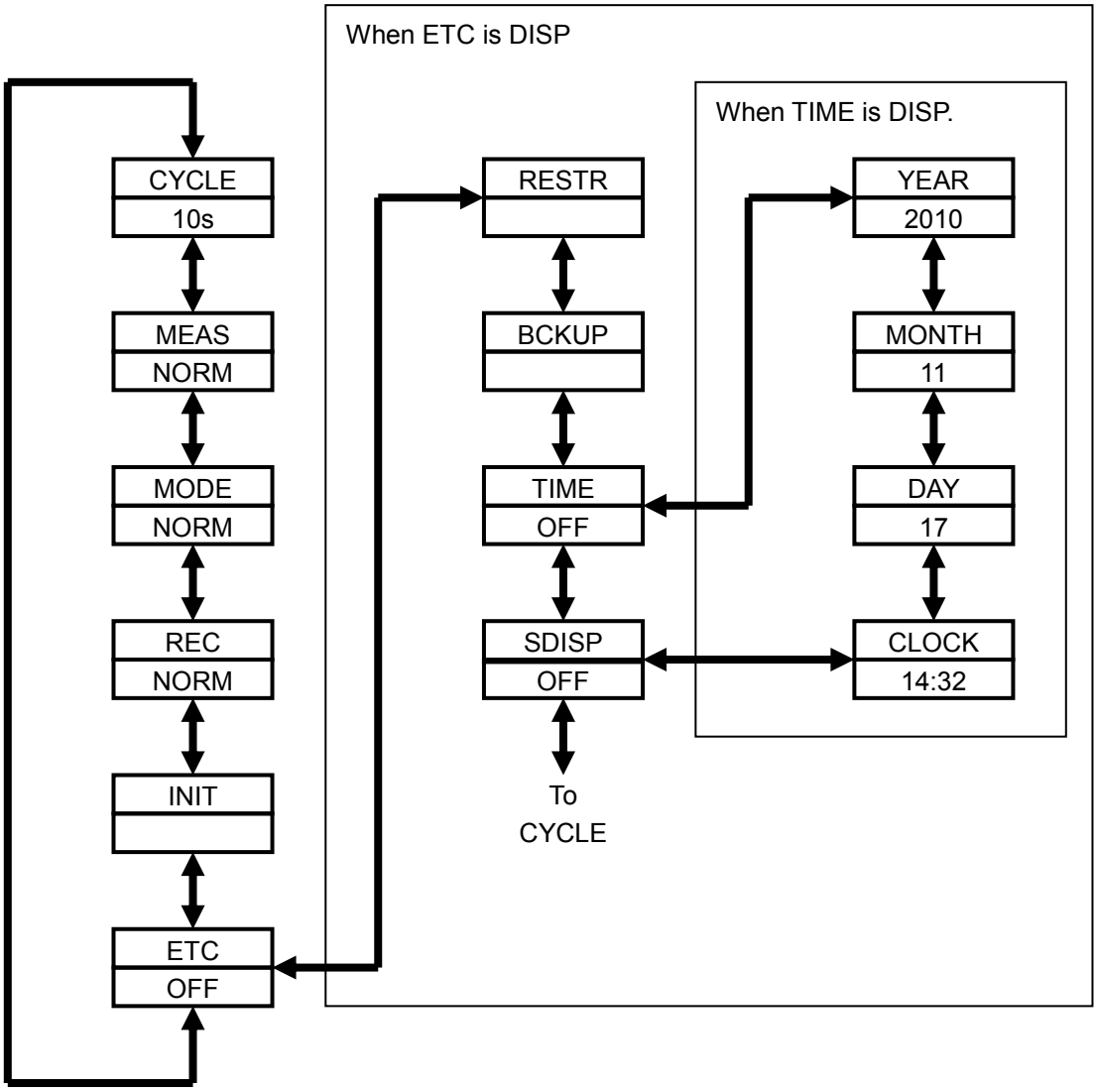
4.2.2 Selecting operation mode “FUN”

Press the MODE key to change the operation mode to “FUN”. “FUN” at the lower right of the display blinks.



4.2.3 Selecting items

Move the items with the △ and ▽ keys. To change the set value, select an item with ▽ or △ key and then confirm it with the SET/REC/STOP key. Press the MODE key to change the operation mode.



4.2.4 Description of items

(1) Measured update cycle (CYCLE)

Specifies an update interval of measured values.

Selected range (selection type):
10 s (second) / 20 s / 30 s / 1 m (minute) / 2 m / 5 m / 10 m / 20 m / 30 m / 1 h (hour)
Initial value: 10 s

(2) Processing mode (MEAS)

Specifies the calculation method of displayed and recorded measured values.

Selected range (selection type):
NORM / MAX / MIN / AVE
Initial value: NORM

Processing mode	Measured value
NORM (Instantaneous value)	Measured values at each measurement update cycle (CYCLE).
MAX (Maximum value)	Maximum value of measured values at every 10 seconds during the measurement update cycle (CYCLE).
MIN (Minimum value)	Minimum value of measured values at every 10 seconds during the measurement update cycle (CYCLE).
AVE (Average value)	Average value of measured values at every 10 seconds during the measurement update cycle (CYCLE).

When the measured value update cycle is 1 minute, the actual measurement is performed 6 times every 10 seconds. When processing mode (MEAS) is set to AVE/MAX/MIN, the measured values of these 6 are given as the measurement value.

When processing mode is set to MAX/MIN/AVE, “MAX”, “MIN” and “AVE” are turned ON at lower left of the display.

Note

- When MAX/MIN/AVE is specified as processing mode and the operation mode is switched from “SCL” to “RUN”, the display may keep showing “-----“. This is because the Air Thermo Logger waits for the necessary data to be accumulated. The estimated time (which has been set with CYCLE) will be 1 seconds.

(3) Measurement operation mode (MODE)

Specifies the mode of measurement operation.

Selected range (selection type):
NORM / SLEEP
Initial value: NORM

Measurement operation mode	Operation
NORM	Normal mode
SLEEP	Sleep mode: Air Thermo Station operates in power saving mode. The CPU enters into standby state except when measurement is performed through measurement update cycles. If the SDISP, which will be described later, is OFF, even the display will not be shown. You can press any key to resume the display even if the display has not been shown. However, when there is no operation for 5 seconds, the display will disappears again. It is recommended to operate Air Thermo Station in sleep mode during battery operation.

Note

- Change the measurement mode and press SET/REC/STOP key to confirm. If you change the operation mode with MODE key, the Air Thermo Logger will be reset to restart.
- When the alarm output is ON (including alarm holding state), the power is consumed even though the Air Thermo Station has been in SLEEP mode. To set the threshold value to be beyond the assumed range allows unnecessary power consumption to be reduced.
- When the display is not shown due to sleep mode, pressing the key can only start it to show. To execute functions allocated to the key, press the key again after the display is shown.

(4) Recording mode (REC)

Specifies the operation for SD card writing during data recording.

Selected range (selection type):

CONT / RING

Initial value: CONT

Recording mode	Operation
CONT	Continue mode When the internal memory becomes full during recording, a file is output to the SD card to continue recording. If an error occurs due to the SD card uninserted, the recording will stop and the data in the internal memory is maintained.
RING	Ring mode When the internal memory becomes full during recording, the internal memory is overwritten from the oldest data to continue recording.

Note

- Press the SET/REC/STOP key (less than 3 seconds) during recording to accumulate the data in the internal memory up to that point. The data will be output to the SD card as files while recording continues.

(5) Initialization (INIT)

Initializes the setting values to the factory default (except for year, month, day, hour and minute).

Operation:

Hold the SET/REC/STOP key to start initialization. It will be completed when “DONE” is displayed.

After initialization, press the MODE key to change the operation mode. The Air Thermo Logger will be reset to restart.

(6) Others (ETC)

Specifies whether or not to display the itmes for the setting files to read/write and time settngs.

Setting range:
OFF / DISP
Initial value: OFF

Installation value	Operation
OFF	Not display the items to read/write of the setting data, time setting, and the display settings in sleep mode. Pressing the ▽ key after confirmation with the SET/REC/STOP key returns to the items for CYCLE.
DISP	Displays the items to read/write of the setting data, time setting, and the display setting in sleep mode. Fix them with the SET/REC/STOP key, then press the ▽ key to return to the items for RESTR.

(7) Reading setting data (RESTR)

Restore the settings of the main unit by using SD card in which the setting data has been saved as a backup with BCKUP (described later).

Operation:

Insert the SD card in which the setting data has been saved, and hold the SET/REC/STOP key. Reading is complete when “DONE” is displayed.

When press the MODE key to change the operation, the Air Thermo Logger will be reset and restarted.

Note

- The number of the setting data items that can be backed up in one SD card is one for one unit. The setting data that has been backed up with a different Air Thermo Logger can be restored with other Air Thermo Logger.
- When ETC is OFF, setting data cannot be read.

(8) Writing the setting data (BCKUP)

Saves the setting data of the Air Thermo Logger unit into the SD card.

Operation:

Insert an SD card and hold the SET/REC/STOP key.

Saving is complete when “DONE” is displayed.

Important

The number of the setting data items that can be backed up in one SD card is one for a unit. If you backup the setting data using the SD card in which the data has already been backed up, the data will be overwritten. The data will also be overwritten if a backup is done on another Air Thermo Logger.

Note

- The setting data is written into the system folder of the SD card.
- When ETC is OFF, the setting data cannot be written.

(9) Setting time (TIME)

Specifies the time settings.

Selected range (selection type):

OFF / DISP

Initial value: OFF

Installation value	Action
OFF	Time cannot be set. Press the ▽ key to fix it with he SET/REC/STOP key and move to SDISP.
DISP	Time can be set. Press the ▽ key to fix it with he SET/REC/STOP key and move to YEAR.

Note

When ETC is OFF, TIME cannot be specified.

(10) YEAR, MONTH, DAY, CLOCK

Sets year, month, day and time.

Setting range (numeric value input type):

YEAR: 2000 to 2099
MONTH: 1 to 12
DAY: 1 to 31
CLOCK: 00:00 to 23:59

Note

When ETC is OFF and TIME is OFF, the year, month, day, hour and minute cannot be set.

(11) Display mode at sleep (SDISP)

Specifies whether or not to display during operation in sleep mode.

Selected range (selection type):

OFF / ON

Initial value: OFF

Setting value	Operation
OFF	If there is no operation for 5 seconds during operation in sleep mode, the display disappears. When any key is pressed, the display will be restarted.
ON	Continues the display even during operation in sleep mode.

Refer to : 4.2.4 (3) Measurement operation mode (MODE)

Note

- When the display is not shown, pressing the key can only start it to show. To execute functions allocated to the key, press the key again after the display is shown again.
- When ETC is OFF, SDISP cannot be specified.

4.2.5 Changing the setting value

There are two specification types: the selection type to select among the predetermined options, and to input the numeric value.

(1) Changing the setting value of the selection type (Example: Changing CYCLE)

Press the MODE key for several times to enter FUN mode, and then press the ▽ or △ key to display CYCLE.

Display (upper line/ lower line)	Item	Operation
CYCLE 10 s	CYCLE	Press the MODE key repeatedly until "FUN" will blink. Press the ▽ or △ key to display CYCLE in the upper line of the display.

SET/REC/STOP key ↓

Display (upper line/ lower line)	Item	Operation
CYCLE 10 s ↑ blinks	CYCLE	When pressing the SET/REC/STOP key, the value in the lower line blinks.

▽ or △ key ↓

Display (upper line/ lower line)	Item	Operation
CYCLE 30 s ↑ blinks	CYCLE	Press the ▽ or △ key to display the desired value. Press the MODE key to cancel the settings.

SET/REC/STOP key ↓

Display (upper line/ lower line)	Item	Operation
CYCLE 30 s	CYCLE	Press the △ or ▽ key to display the desired value, and then press the SET/REC/STOP key. A value is confirmed and it stops blinking.

After the settings above, has done, the setting items can be changed again with the ▽ or △ key, as well as the operation mode can be changed again with the MODE key.

(2) Changing the setting value of the numeric value input type (Example: Changing YEAR)

Press the MODE key for several times to enter FUN mode, and then press the ▽ or △ key to display YEAR. To display YEAR, ETC and TIME need to be set to DISP.

Display (upper line/ lower line)	Item	Operation
YEAR 2010	YEAR	Press the MODE key repeatedly until "FUN" will blink. “CYCLE” is displayed in the upper line. Press the ▽ or △ key to display YEAR. To display YEAR, ETC and TIME need to be set to DISP.

SET/REC/STOP key ↓

Display (upper line/ lower line)	Item	Operation
YEAR 2010 ↑ blinks	YEAR	When pressing the SET/REC/STOP, the least significant digit in the lower line blinks.

▽ or △ key ↓

Display (upper line/ lower line)	Item	Operation
YEAR 2011 ↑ blinks	YEAR	When pressing the ▽ or △ key, the value increases/decreases. When holding the ▽ or △ key, the range of increase/decrease becomes wider. When pressing the MODE key at this point, the setting is cancelled.

SET/REC/STOP key ↓

Display (upper line/ lower line)	Item	Operation
YEAR 2011	YEAR	Press the ▽ or △ key to display the desired value, and then press the SET/REC/STOP key. The value will be confirmed and blinking will stop.

After the settings above, the setting items can be changed again with the ▽ or △ key, as well as the operation mode can be changed again with the MODE key.

4.3 Making Settings (Operation in THR Mode)

Set the threshold value regarding the alarm output of the Air Thermo Logger in THR mode.
And set the upper limit and lower limit of temperature and humidity.
When the measured value is whether larger than the upper limit or smaller than the lower limit during operation in RUN mode, the alarm output terminal turns ON and "ALM" on the display turns ON.
When returned from the alarm state during measurement, you can set the alarm output state is maintained can be set.

Note

Alarm monitoring cannot be stopped.
To avoid alarm monitoring, set each threshold value to beyond the assumed measurement range.

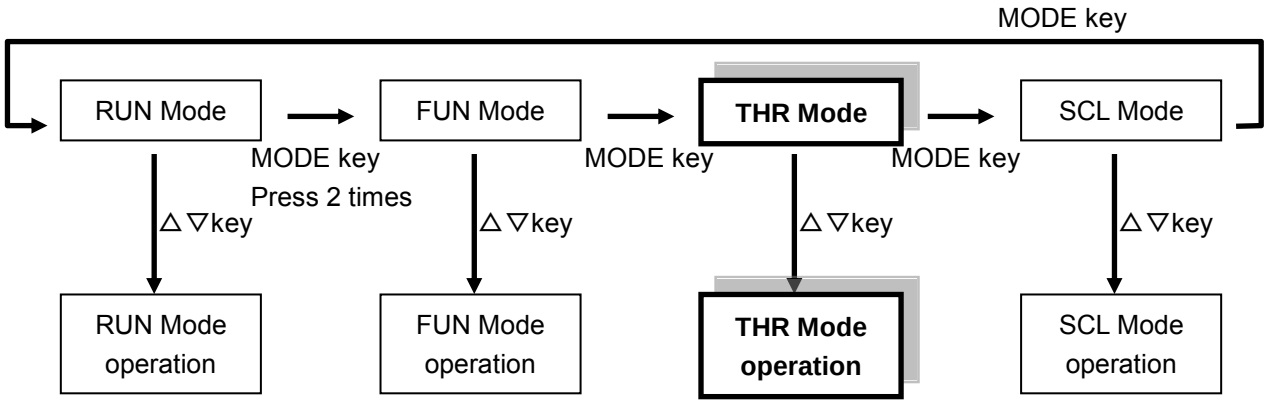
4.3.1 List of setting items

The table below shows a list of setting items in THR mode.

Display item	Display	Setting item	Function/operation	Factory default
DEGHI	dEGH,	Upper limit of temperature threshold value	Sets the upper limit of temperature for an alarm output.	60℃
DEGLO	dEGLo	Lower limit of temperature threshold value	Sets the lower limit of temperature for an alarm output.	-20℃
RH HI	rH H,	Upper limit of humidity threshold value	Sets the upper limit of humidity for an alarm output.	100%
RH LO	rH Lo	Lower limit of humidity threshold value	Sets the lower limit of humidity for an alarm output.	0%
HOLD	Hold	Alarm hold setting	Sets whether or not for alarm output to maintained to be ON when the measured value returns to within the range of upper/lower limit of threshold from the outside of the range (alarm state) during measurement in RUN mode.	OFF

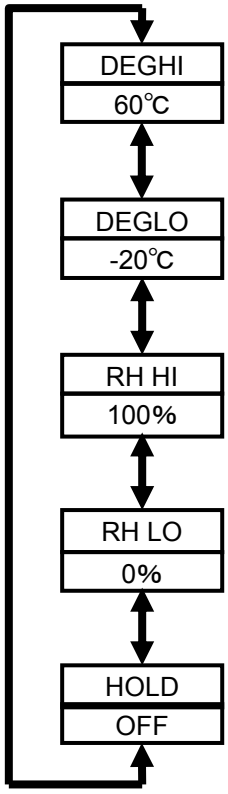
4.3.2 Selecting operation mode

Press the MODE key to change the operation mode to “THR”. “THR” at the lower right of the display blinks.



4.3.3 Selecting items

Move the items with the △ and ▽ keys. To change the set value, select an item with △ or ▽ key and then confirm it with the SET/REC/STOP key. Press the MODE key to change the operation mode.



4.3.4 Description of items

(1) Upper limit of the temperature threshold value (DEGHI)

Sets the upper limit of the temperature threshold value for an alarm output.

When the measured temperature is higher than the set value, “ALM” and the alarm output are turned ON.

Setting range (numeric value input type):
-20.0°C to 60.0°C
Initial value:
60.0°C

(2) Lower limit of the temperature threshold value (DEGLO)

Sets the lower limit of the temperature threshold value for an alarm output.
When the measured temperature is lower than the set value, “ALM” and the alarm output are turned ON.

Setting range (numeric value input type):
-20.0°C to 60.0°C
Initial value:
-20.0°C

(3) Upper limit of the humidity threshold value (RH HI)

Sets the upper limit of the humidity threshold value for an alarm output.
When the measured humidity is higher than the set value, “ALM” and the alarm output are turned ON.

Setting range (numeric value input type):
0.0% to 100.0%
Initial value:
100.0%

(4) Lower limit of the humidity threshold value (RH LO)

Sets the lower limit of the humidity threshold value for an alarm output.
When the measured humidity is lower than the set value, “ALM” and the alarm output are turned ON.

Setting range (numeric value input type):
0.0% to 100.0%
Initial value:
0.0%

(5) Setting alarm hold

Set whether or not for the alarm output ON state and “ALM” ON state on the display to be maintained when the measured value is returned to within the range of upper/lower limit of the threshold value from outside of the range (alarm state) during measurement in RUN mode.

To release the alarm from the maintained state, hold the MODE key (at least 3 seconds) for “ALM” to turn off, then the alarm output stops.

Setting range (selection type):

OFF: Maintains an alarm output ON state.

ON: Maintains the alarm output ON state.

Initial value:

OFF

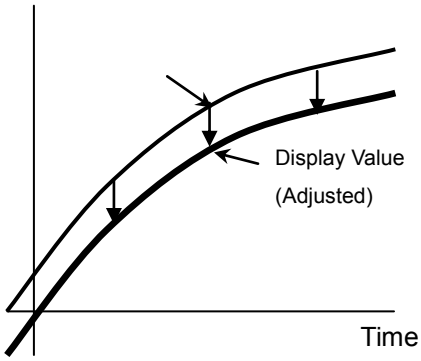
4.3.5 Changing the setting value

Change the value in the same way as changing the settings in FUN mode.

Refer to : 4.2.5 Changing the setting value

4.4 Making Settings (Operation in SCL Mode)

The adjustment of the measured value of the Air Thermo Logger is set in SCL mode
Adjust the values to be displayed or recorded by adding by adding or subtracting by the predetermined setting values for the values measured with the Air Thermo Logger (offset).



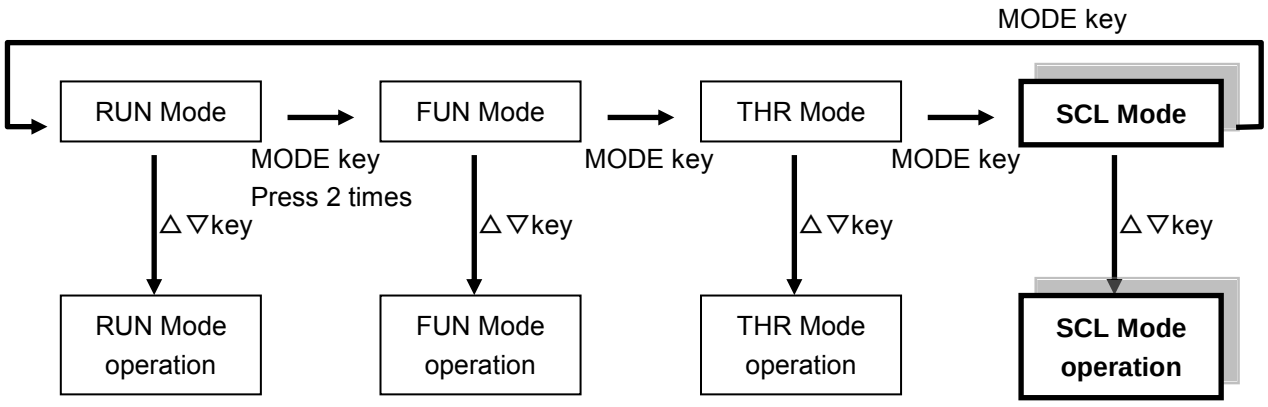
4.4.1 List of setting items

The table below shows a list of setting items in SCL mode.

Setting item	Display	Function/operation	Factory default
Temperature adjustment	Upper line: Measured temperature Lower line: Value after adjustment	Sets the temperature adjustment value.	Values of the upper and lower lines are equal. (not adjusted)
Humidity adjustment	Upper line: Measured humidity Lower lilne: Value after adjustment	Sets the humidity adjustment value.	Values of the upper and lower lines are equal. (not adjusted)

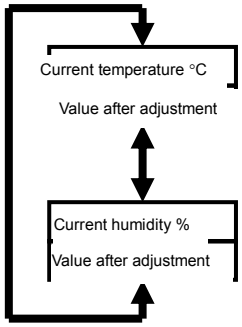
4.4.2 Selecting operation mode

Press the MODE key to change the operation mode to “SCL”. “SCL” at the lower right of the display blinks.



4.4.3 Selecting items

Transition of items can be made with the ▽ and △ keys. To change the set value, select an item with ▽ and △ keys and then confirm it with the SET/REC/STOP key. Press the MODE key to change the operation mode.



4.4.4 Description of items

(1) Adjusting temperature

The temperature measurement value is displayed in the upper line, and the value after adjustment in the lower line.

The value will not be adjusted if in the lower line you set the value after adjustment to the same as the value currently displayed in the upper line. If a different value is set, the difference between the values in the upper line and the lower line will be added to the measured value as an offset. The adjustment range is ±10.0°C.

When adjustment has been set, “SCL" is ON during measurement in RUN mode.

Setting range (numeric value input type):

-10.0°C (Displayed value in the upper line) to +10.0°C (Displayed value in the upper line)

Initial value:

The same value as the measured value (not adjusted)

(2) Adjusting humidity

The humidity measurement value is displayed in the upper line, and the value after adjustment in the lower line.

The value will not be adjusted if in the lower line you set the value after adjustment to the same as the value currently displayed in the upper line. If a different value is set, the difference between the values in the upper line and the lower line will be added to the measured value as an offset. The adjustment range is ±10.0°C.

When adjustment has been set, “SCL" is ON during measurement in RUN mode.

Setting range (numeric value input type):

-10.0% (Displayed value in the upper line) to +10.0% (Displayed value in the upper line)

Initial value:

The same value as the measured value (not adjusted)

4.4.5 Changing the setting value

Change the value in the same way as changing the settings in FUN mode.

Refer to : 4.2.5 Changing the setting value

4.5 Copying the Settings When Using Multiple Air Thermo Stations

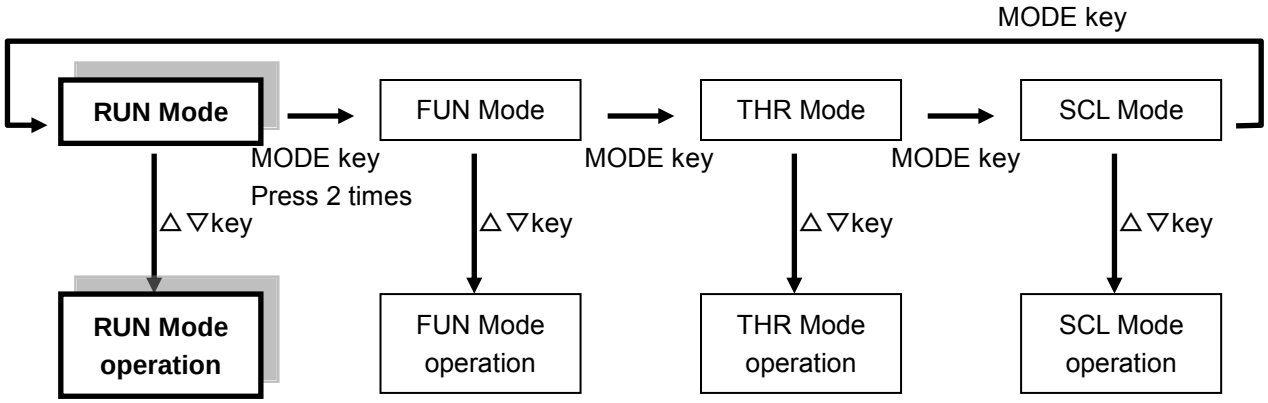
The same settings can be the same among multiple Air Thermo Loggers by reading the setting data from an Air Thermo Logger in other Air Thermo Loggers using the SD card whose setting data has been written on a certain Air Thermo Logger. If the settings are shared among multiple Air Thermo Loggers, only one Air Thermo Logger needs to be set through the unit operation, and the rest of the Air Thermo Loggers can be set by restoring them. This contributes to less setting time and less miss-settings.

Refer to : 4.2.4 (8) Writing setting data (BCKUP), 4.2.4 (7) Reading setting data (RESTR)

5. Measurement and Recording

5.1 Selecting Operation Mode

Temperature and humidity are measured in RUN mode.
Press the MODE key to change the operation mode to “RUN”. “RUN” at the bottom right of the display turns ON.

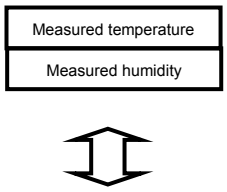


Note

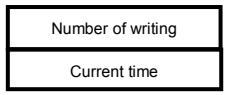
- Shift to another mode other than to RUN mode is prohibited during recording.
- When mode has been changed from other mode to RUN mode, “-----“ may be displayed for a long period of time.
  (Approx. “time that has been set in CYCLE – 10” seconds when processing mode is MAX/MIN/AVE.)

5.2 Screen Transition in RUN Mode

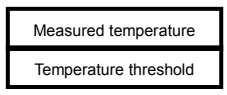
Pressing the ▽ or △ key in RUN mode switches the display as follows. Pressing the MODE key changes the operation mode.



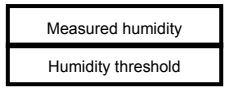
Temperature measurement value (°C) is displayed in the upper line and humidity measurement value (%) is displayed in the lower line.
If computation for the measured value has been set, the value after computation is displayed with “MAX”/”MIN”/”AVE” and “RUN” turned ON.
If adjustment has been set, the value after adjustment is displayed with “SCL” and “RUN” turned ON.



The number of writings to the internal memory since the recording start is displayed in the upper line, the current time is displayed in the lower line.
When measured data is written in the internal memory per time cycle specified by measurement update cycle (CYCLE), the value in the upper line increases by 1. When the internal memory becomes full, "FULL" is displayed. If the data accumulated in the internal memory is written to the SD card due to an event such as the SET/REC/STOP key having been pressed during recording, the value will be cleared to 0.



Temperature measurement value (°C) is displayed in the upper line and temperature threshold value is displayed in the lower line. The threshold value is displayed alternately between upper limit (Hi) and lower limit (Lo).
If computation has been set, a temperature measurement value after computation is displayed with "MAX"/"MIN"/"SCL" and "RUN" turned ON.
If adjustment has been set, a temperature measurement value after adjustment is displayed with "SCL" and "RUN" turned ON.



Humidity measurement value (°C) is displayed in the upper line and threshold value is displayed in the lower line. The threshold value is displayed alternately between upper limit (Hi) and lower limit (Lo).
If computation has been set, a humidity measurement value after computation is displayed with "MAX"/"MIN"/"SCL" and "RUN" turned ON.
If adjustment has been set, a humidity measurement value after adjustment is displayed with "SCL" and "RUN" turned ON.

Returns to the temperature/humidity display.

Note

- “REC” turns ON during data recording.
- “ALM” turns ON when the measured value exceeds the upper limit threshold value or when the measured value falls short of the lower limit threshold value and the alarm output is turned ON. When the alarm hold has been set, the alarm output state is maintained and

"ALM" keeps turned ON even if the alarm state is released. Hold the MODE key for the maintained alarm.

- "MAX", "MIN" and "AVE" turn ON when processing mode has been set to MAX, MIN and AVE. They are not displayed in "NORM".

5.3 Starting/Stopping Recording

5.3.1 Starting recording

When holding the SET/REC/STOP key (for at least 3 seconds) in RUN mode, recordings of the temperature and humidity start and "REC" turns ON.
The measured data is recorded and accumulated in the internal memory, and is output as a CSV file into the SD card when the SET/REC/STOP key is pressed.

Important

If a recording starts when the recorded data still remained in the internal memory, the recorded data will be lost. When pressing the SET/REC/STOP key for less than 3 seconds before recording, the file can be output to the SD card. A state in which the recorded data remains in the internal memory occurs due to a power failure or the reset switch being pressed during recording and therefore the Air Thermo Station restarted. If a recording stop operation is performed properly, the recorded data will not be remained.
In RUN mode, press the ▽ or △ key to display the time at the lower line. If the value in the lower line is 0, there is no recorded data in the internal memory.

Note

- The SD card is not always required to be inserted during recording. However, it needs to be inserted when pressing the SET/REC/STOP key or stopping the recording.
- Shift to another mode other than to RUN mode is prohibited during recording.

5.3.2 Stopping Recording

When pressing the SET/REC/STOP key (for at least 3 seconds) while "REC" is turned ON during recording, the recording stops and the file is output to the SD card, and "REC" is turned OFF.

Important

Be sure to insert a writable SD card when recording stops. Though the writing to the SD card failed, recording will not stop. If the SD card cannot be ready when you want to change the operation mode due to setting changes, press the reset switch or shut down the power supply and then restart the Air Thermo Station. Although the data recorded in the internal memory before a restart will be maintained even after the restart, the data will be lost after recording starts. Insert the SD card before starting recording and press the SET/REC/STOP key to output the file.

5.4 Outputting the File to the SD card

The data recorded in the SD card is output to files in the following conditions.

(a) The SET/REC/STOP key has been pressed during recording (less than 3 seconds). Recording to the internal memory continues.

(b) The SET/REC/STOP key has been pressed during recording (at least 3 seconds). Recording to the internal memory stops.

Refer to : 5.3.2 Stopping recording

(c) The content of the internal memory has become full. Recording to the internal memory continues. (Only when the recording mode is set to be continue mode.)

Refer to : 4.2.4 (4) Recording mode (REC)

(d) Not during a recording but the SET/REC/STOP key was pressed when the recorded data still remains in the internal memory (less than 3 seconds, RUN mode). Such situation occurs after a restart of the Air Thermo Station due to a power failure or the reset switch being pressed during recording.

5.5 Releasing the Held Alarm

“ALM” turns ON when the measured value exceeds the upper limit threshold value or when the measured value falls short of the lower limit threshold value and the alarm output is turned ON. When the alarm hold setting is ON, the alarm output state is maintained and “ALM” keeps turned ON even if the alarm state is released.
To release the held alarm, hold the MODE key for at least 3 seconds.

Refer to : 4.3.4 (5) Setting alarm hold

5.6 Hiding the Display

During operation in RUN mode, if no operation is performed in 5 seconds, the display may disappear. In this case, measurement operation mode is set to be sleep mode and the sleep display mode is OFF. Recording continues during recording even if the display is not shown.
Press any key to restart display. Pressing the key when the display is not shown can only activate the display. To execute functions allocated to the key, press the key again after the display is shown.

Refer to : 4.2.4 (3) Measurement operation mode (MODE), 4.2.4 (11) Display mode at sleep (SDISP)

6. Display – Usage of SD Viewer ES -

6.1 Overview of SD Viewer ES

SD Viewer ES displays the data recorded in the PC as graphs offline with the logging tool, and displays the data recorded in the SD card in Air Thermo Station unit as graphs. SD Viewer ES also connects the data items recorded in different periods, and displays side by side the data items recorded with another Air Thermo Logger.

6.2 Preparation

6.2.1 System requirements of SD Viewer ES

SD Viewer ES operates under the following conditions.

System requirements of SD Viewer ES

OS	Windows XP/Vista/7 (32-bit)
CPU	Intel (x86) compatible processor (1 GHz or faster)
Memory	1 GB or more (2 GB or more recommended)
Display	Resolution 1024 x 768 or more, 65,535 colors (16-bit color) or more
HDD	A minimum of 30 GB free space is required to install SD Viewer ES.
CD-ROM drive	For installation
SD card reader, writer, SD card slot	For recorded data reading

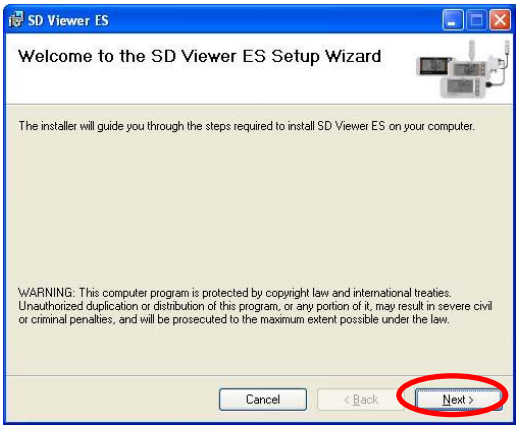
6.2.2 Installing/uninstalling SD Viewer ES

(1) Installing SD Viewer ES

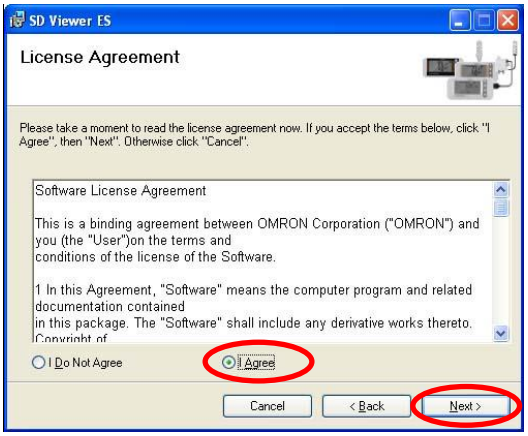
(1) Insert the provided Utility Disk into the CD-ROM of the PC. The window below appears. Click “SD Viewer ES”.

(2) When “Security Warning” appears, click “Run”.

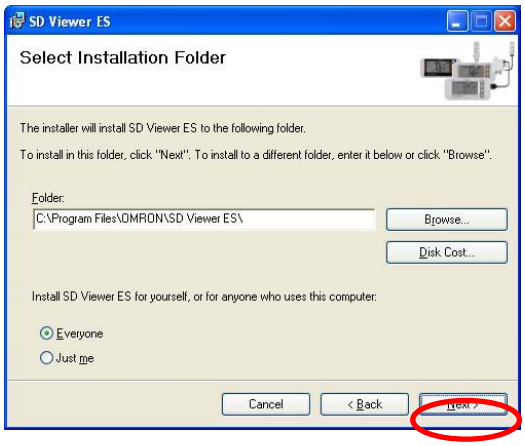
(3) In the “Welcome to the SD Viewer ES Setup Wizard” window, click “Next”.



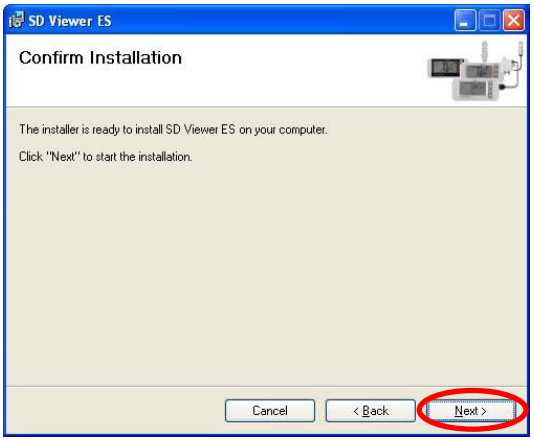
(4) Read the License Agreement shown on the window, and select “I Agree”, and then click “Next".



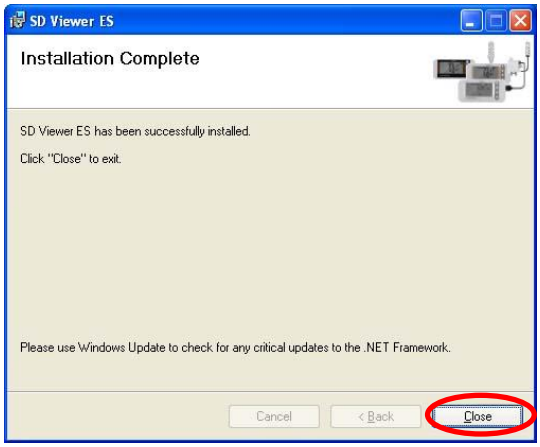
(5) In the “Select Installation Folder” window, check the installation folder, select “Everyone”, and then click “Next”.



(6) In the “Confirm Installation” window, click “Next”.



(7) In the “Installation Complete” window, click “Close”. The installation of SD Viewer ES is complete.



(2) Uninstalling SD Viewer ES

To uninstall SD Viewer ES, click “Add or Remove Programs” (Windows XP), or “Uninstall program” (Windows 7).

6.2.3 Preparing the recording data

Connect a commercially available SD card reader/writer to the PC. This procedure is not necessary if the main unit of the PC has a SD card slot.

Insert the SD card taken from the Air Thermo Logger in which the recorded data has been saved into the SD card reader/writer or the SD card slot of the PC.

6.3 Starting and Stopping SD Viewer ES

6.3.1 Starting SD Viewer ES

(1) From the “start” menu of the Windows, select “All Programs” – “OMRON” – “SD Viewer ES” – “SD Viewer ES Ver.1.00” to start up SD Viewer ES.

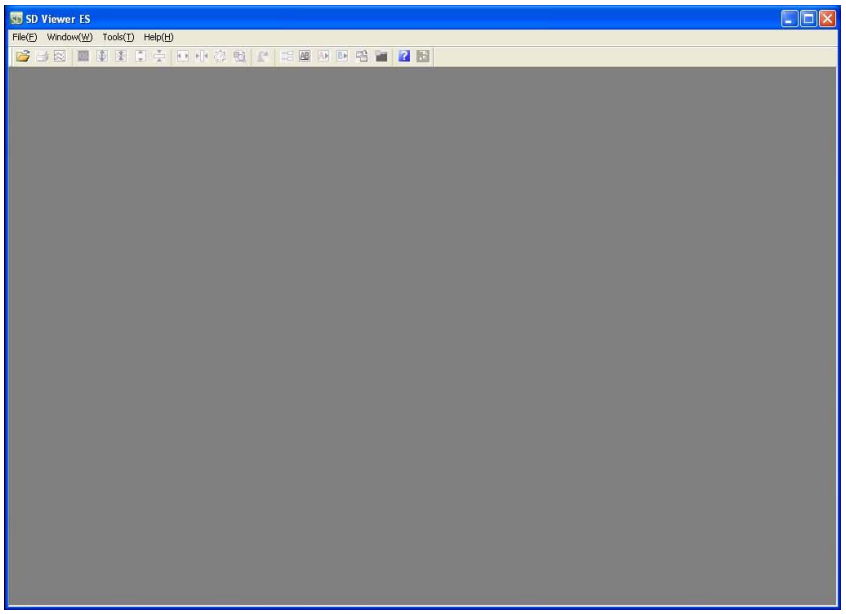
Start menu (Windows XP)

You can also click the icon on the desktop to start SD Viewer ES.

Icon

(2) After the startup image is displayed for a while, the main window will be displayed.

Startup window



Main window

Menu		Function
File	Open data	Opens recorded data. Multiple data items can be selected to specify the display method for either “connected” or “side-by-side”.
	Save data	Saves the recorded data. The data items are saved as one data item for “connected” or “side-by-side” display.
	Exit application	Exits SD Viewer ES.
Window	Toolbar	Specifies whether or not to display the toolbar.
Tool	Initialize settings	Initializes the retained information by each user such as the window size and time axis settings.
Help	Version information	Displays the version of SD Viewer ES.

6.3.2 Stopping SD Viewer ES

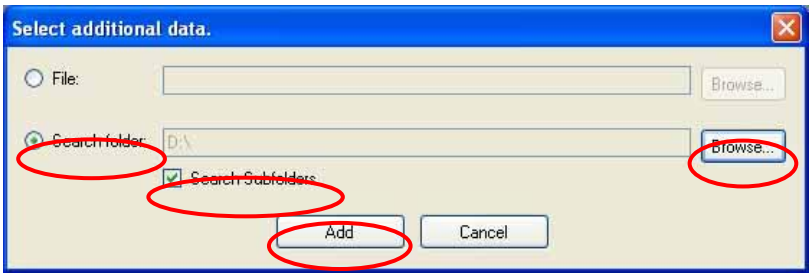
In the menu bar of the main window, select “File” – “Exit application” to exit SD Viewer ES.
If the data has not been saved due to the “tile” display, the message to confirm exiting SD Viewer ES is displayed.

6.4 Opening and Saving Data

6.4.1 Opening data

(1) From the menu bar of the main window, click “File” – “Open Data” to display the “Open Data” window, and then click the “Add Data” button.

(2) In the “Select additional data” window, specify the SD card in which the recorded data of the Air Thermo Logger has been saved.
Select “Search folder” and press “Browse” to specify the drive that is allocated to the SD card (example: E:¥). Check that the check box of “Search Subfolders" is selected, and then click “Add”.



Item	Function
File	Specifies the file.
Search folder	Specifies all the recorded files in the folder.
Browse	Specifies the folder and file names of the recorded data.
Search Subfolders	Specifies whether or not to browse the subfolder as well when “Search folder” is selected, Searches all the recorded files in the SD memory card when the root folder of the SD memory card is specified on “Search folder” and the check box of “Search Subfolders” is selected.
Add	Adds the selected recorded file to “Select data:”.
Cancel	Cancels data addition.

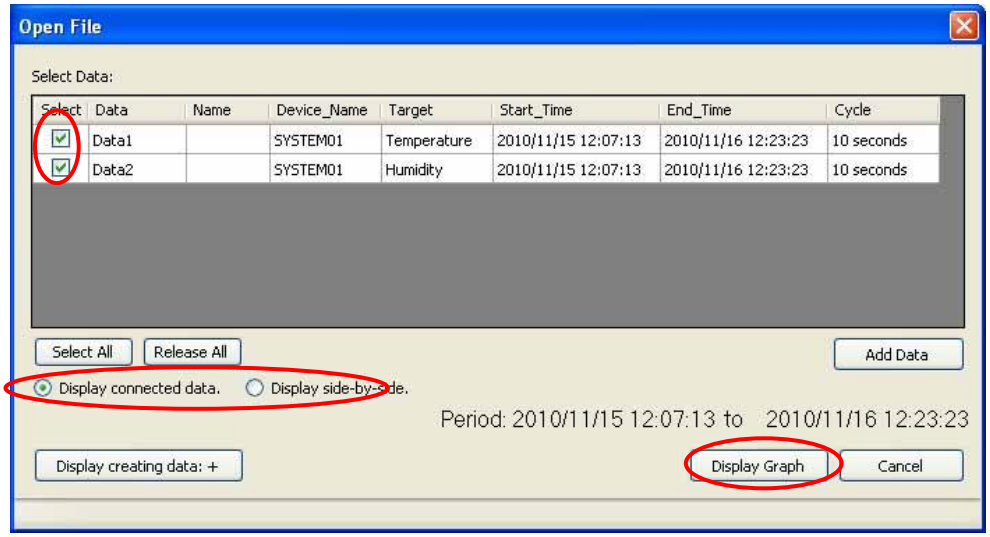
Note

The specific data such as the one saved in the hard disk drive in the PC using SD Viewer ES can be opened by selecting "File”.

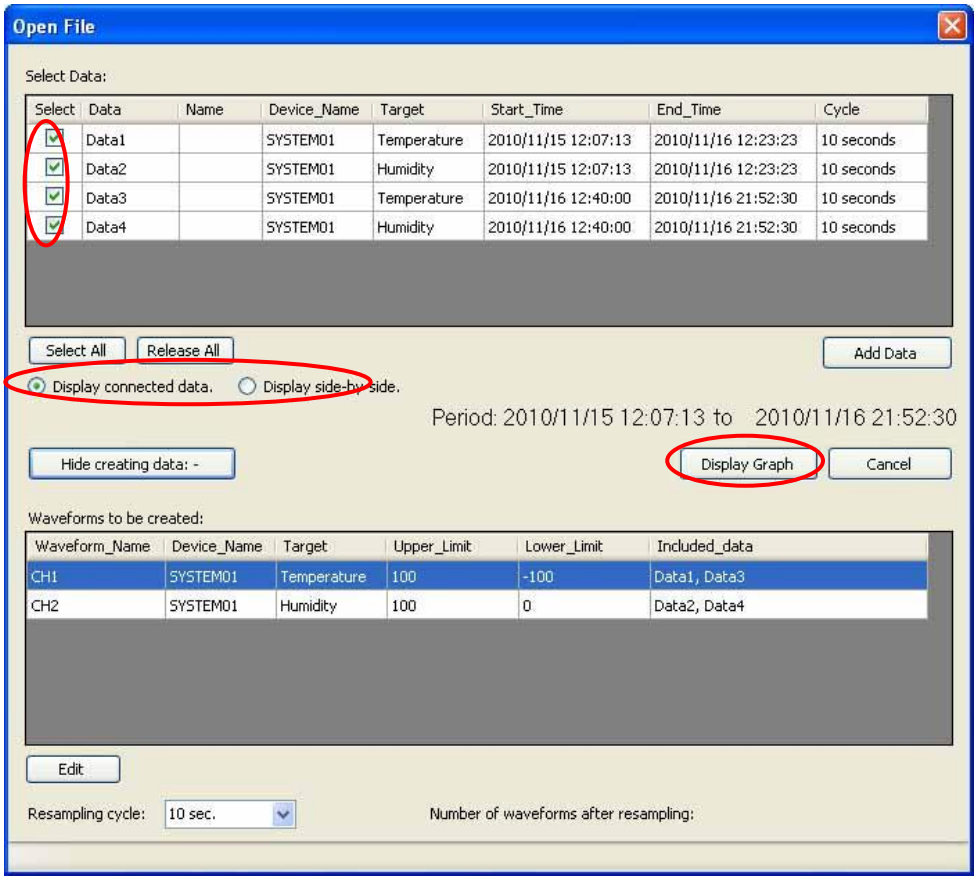
(3) On the “Open File” window, select the data to display a graph.

Select the data to open. Multiple data items can be selected. When selecting multiple items, select the display method from either “Display connected data” or “Display side-by-side”.

Click “Display Graph” to display the graph.



Only one data item has been saved in the SD card.

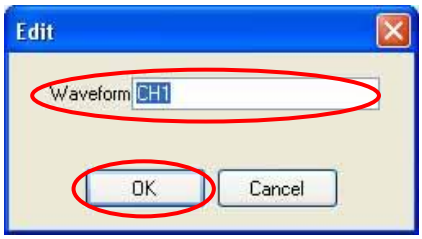


Multiple data items have been saved in the SD card
(“Display creating data:+” has been pressed)

Item			Function
Select Data		Select	Selects data to be added.
		Data	Automatically displays an ID to distinguish the combination (set) of device name, target, start time and end time.
		Name	Displays the waveform name given when opening data saved with SD Viewer ES.
		Device Name	Displays the serial number recorded in the recorded file as a device name.
		Target	Displays the target data that is either temperature or humidity.
		Start Time	Displays the start time of the data recorded in the file.
		End Time	Displays the end time of the data recorded in the file.
		Cycle	Displays the measurement cycle of the data recorded in the file.
Select All			Selects all the data items displayed in the data selection column.
Release All			Releases all the data items displayed in the data selection column.
Add Data			Displays the window to specify the additional data.
Display connected data			Displays the connected data when multiple data items are selected. Data items that can be connected must be the same target of the same model.
Display side-by-side			Displays the data items by overlaying them on a graph when multiple data items are selected.
Period			Displays start time and end time of the selected data. Displays the entire period when multiple data items are selected.
Display creating data			Displays “Waveforms to be created”. Only the waveform name can be edited by the “Edit” button.
Display Graph			Opens the selected data.
Cancel			Cancels the data opening operation.
For "Display waveforms to be created"	Hide creating data		Displays “Waveforms to be created”.
	Waveform to be created	Waveform Name	Displays a waveform name. The default is CHx and it can be changed.
		Device Name	Displays the serial number recorded in the recorded file as a device name.
		Target	Displays the target data that is either temperature or humidity.
		Upper Limit	Displays the alarm upper limit. When the data items are connected and the alarm upper limits of the data to be connected are matched, its value is displayed. The value is not displayed if they are not matched.
		Lower Limit	Displays the alarm lower limit. When the data items are connected and the alarm lower limits of the data to be connected are matched, its value is displayed. The value is not displayed if they are not matched.
		Included data	Displays the ID of the included data when data items are connected.
	Edit		Changes the waveform name.
	Resampling cycle		Resamples the data as a dummy with a new cycle when data items with different sampling cycles are connected or aligned side by side. Specifies this new cycle as a resampling cycle. Normally the automatically calculated value is selected.

Note

・The waveform name can be changed.
In “Waveform to be created”, highlight the data to change the waveform name and then click the “Edit” button. Enter the name and click “OK”.



・The maximum number of the data items that can be open is 1 million samples.
When the number of waveforms increases, the number of samples per waveform decreases.

・The maximum number of waveforms that can be displayed is 1024.

(1) ”Display connected data” and “Display side-by-side”

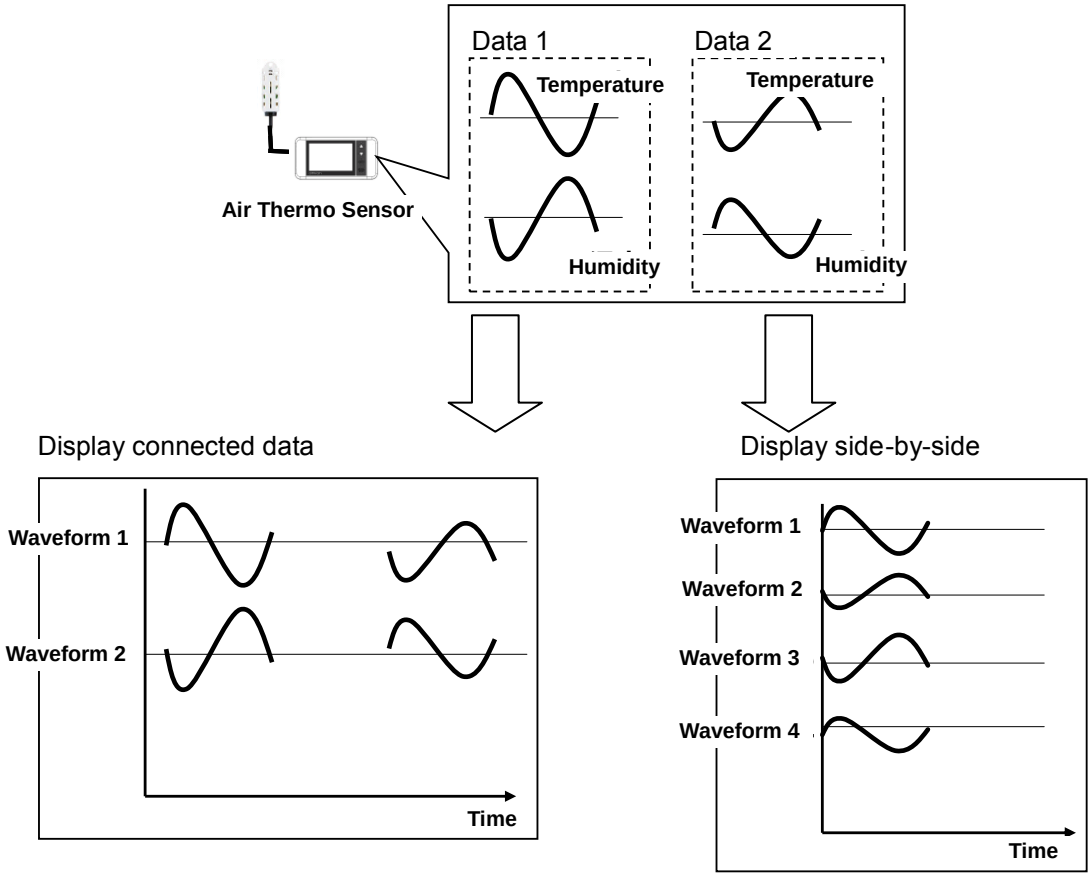
When displaying the multiple data items that have been recorded with the same Air Thermo Logger at the same time, the display method can be selected from either “Display connected data” or “Display side-by-side”.

Display connected data:

Connects the recorded data items and displays them in chronological order.
The data items that can be connected must be the same Air Thermo Logger (same device name), and the same target type (temperature or humidity).
If a different Air Thermo Logger or type is specified, the data items are tiled.
The connected data can be saved as one file.
The connected data items do not need to be in series.

Display side-by-side:

Displays the recorded data items side-by-side.
The arranged data items can be saved as one file.
The time display of the horizontal axis shows relative time.



(2) Resampling cycles

Records the data items at a common sampling cycle again as a dummy when displaying multiple data items at the same time. This operation is called resampling. Normally the resampling is performed automatically. Also, the user can specify the resampling cycle among alternatives.

Note

Example 1: Connecting data A and data B that were recorded with a measurement update cycle of 10 seconds

For example, consider a case where data A recorded for 30 seconds with a measurement update cycle of 10 seconds from 11:13:04, and data B recorded for 20 seconds with a measurement update cycle of 10 seconds from 11:14:12 are automatically connected and displayed.

A waveform is created by the plots made starting from the oldest recorded data to the newest recorded data. In this example, from the start time of 11:13:04 to the end time of 11:14:42, the plotted waveform has been created every 10 seconds set as resampling cycle.

In this example a waveform is created with plots made at every 10 seconds of the resampling cycle between 11:13:04 to 11:14:32.

If data does not exist, the measured value field shows “NO DATA”. If data of the particular time at resampling does not exist, the data immediately before the particular time is plotted.

In this example, as data items at “11:13:44”, “11:13:54” and “11:14:04” between 11:13:35 to 11:14:11, do not exist, the measured value fields display “NO DATA”

The hours of “11:14:14” and “11:14:24” are plotted respectively as “B1” and “B2” that are the data items of the adjacent hours of “11:14:12” and “11:14:22”

Although data “B3” is included in a waveform of “11:14:34”, the data will not be used because the period of time to create the waveform is from11:13:04 to 11:14:32 that is out of the time range for B3.

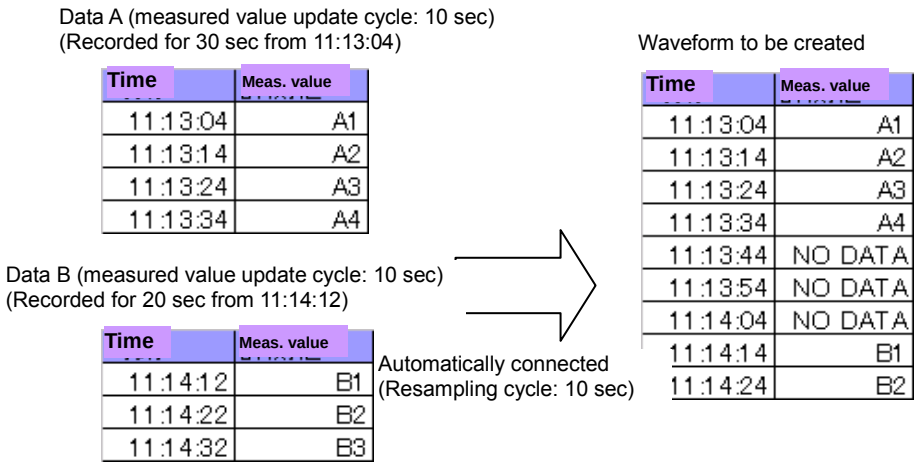


Figure Example of the display of the automatically connected data items

Example 2: Displays a waveform by connecting data A recorded with a measured value update cycle of 30 second and data B recorded with a measured value update cycle of 20 seconds

For example, consider a case where data A recorded for 30 seconds with a measurement update cycle of 30 seconds from 11:13:04, and data B recorded for 40 seconds with a measurement update cycle of 20 seconds from 11:14:02 are automatically connected and displayed.

In this case a waveform is created by the plots made starting from the oldest recorded data at the starting time of 11:13:04 to the newest recorded data at the ending time of 11:14:42 in every resampling cycle (10 seconds.)

As the hours “11:13:44” and “11:13:54” have no data, the measured value fields show “NO DATA”.

An hour without data (such as “11:13:14”) will be plotted by the adjacent hours (for “11:13:14", the replacement measured value is “A1”, which is the data item at “11:13:04”).

Data A (measured value update cycle: 30 sec)
(Recorded for 30 sec from 11:13:04)

Time	Meas. value
11:13:04	A1
11:13:34	A2

Data B (measured value update cycle: 20 sec)
(Recorded for 40 sec from 11:14:02)

Time	Meas. value
11:14:02	B1
11:14:22	B2
11:14:42	B3

Automatically connected
(Resampling cycle: 10 sec)

Waveform to be created

Time	Meas. value
11:13:04	A1
11:13:14	A1
11:13:24	A1
11:13:34	A2
11:13:44	NO DATA
11:13:54	NO DATA
11:14:04	B1
11:14:14	B1
11:14:24	B2
11:14:34	B2

Example 3: Displays waveforms side-by-side for data A recorded with a measured value update cycle of 30 second and data B recorded with a measured value update cycle of 20 seconds

For example, consider a case where data A recorded for 30 seconds with a measurement update cycle of 30 seconds from 11:13:04, and data B recorded for 40 seconds with a measurement update cycle of 20 seconds from 11:14:12 are automatically connected and displayed.

The waveforms will be created from the data at 0:00:00 (relative time), and will be plotted the recorded time of the data with longer recorded time in every resampling cycle.

In this example waveforms are created with plots made every 10 seconds of the resampling cycle for 40 seconds starting from 00:00:00.

The data items of the remaining hours of the shorter recorded time are displayed as “NO DATA”. In this example, the data of “0:00:40” of waveform A will be displayed as “NO DATA” since data A is the recording data for 30 seconds.

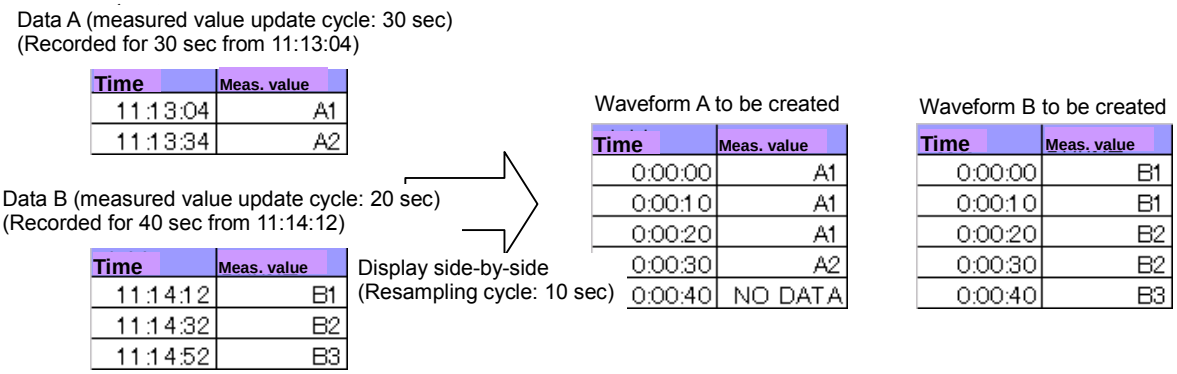
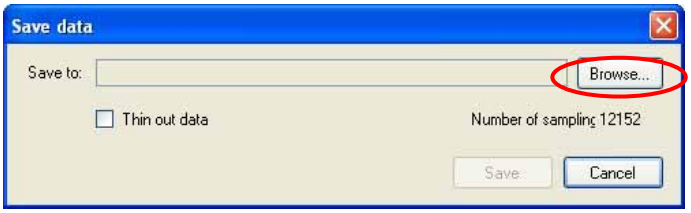


Figure Example of side-by-side display

6.4.2 Saving data

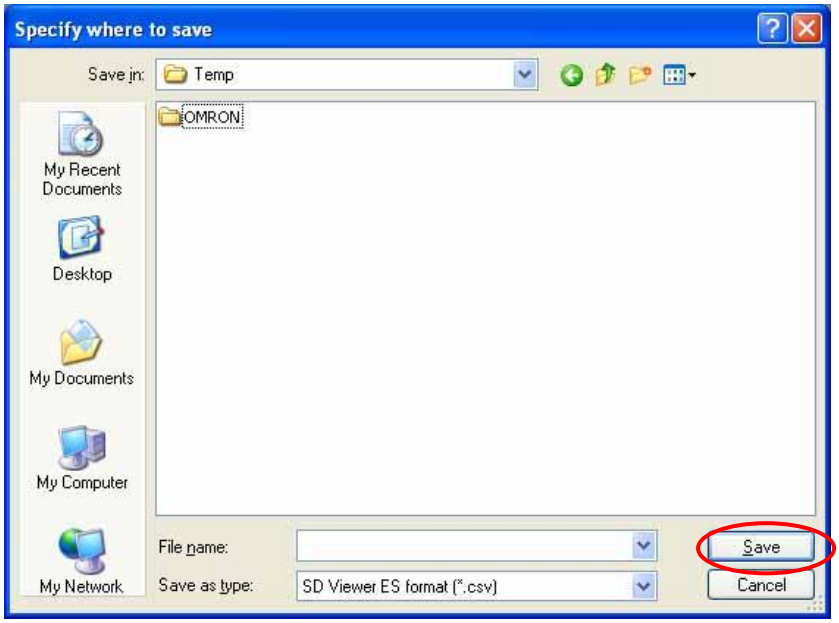
You can save the multiple data items to be displayed connected or side-by-side as one data item.

(1) From the menu bar, select “File” – “Save Data” to display the “Save Data” window. Press the “Browse” button to specify the folder and file name to save file.

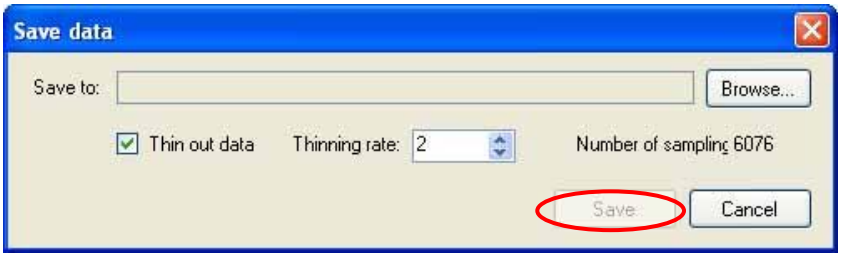


Item	Function
Save to	Displays the names of the destination folder and file.
Browse	Specifies the names of the destination folder and file.
Thin out data	Select this check box when thinning out the data before saving it.
Number of samplings	Displays the number of samples of data to be saved. When “Thin out data” has been selected, the thinned-out result is displayed.
Save	Saves data.
Cancel	Cancels data saving.

(2) Click the “Save” button.



(3) Click "Save” to save data.



To thin out the data to reduce the file capacity before saving, select the “Thin out data” check box and specify the thinning rate.

6.5 Displaying Graph

6.5.1 Names and functions in the graph window

(1) Recording date (If multiple data items are open, the earliest date is displayed.)
(2) Sampling cycle
(3) Time interval of each scale on the horizontal axis
(4) Waveform name
(5) Vertical axis scale
(6) Right-click menu (ON/OFF to change time axis change and to display max/min/ave.)

List of menu bar items

Item			Function
File	Open Data		Opens the recorded file. Multiple data items can be selected and displayed using tile or cascade display. The data that has been displayed is closed.
	Save Data		Saves the recorded file. For tile or cascade display, the data items will be saved in one file.
	Print		Prints the graph.
	Print Preview	-	Check the print image.
	Exit Application	-	Exits SD Viewer ES. A message to confirm the exit is displayed when the displayed data has not been saved.

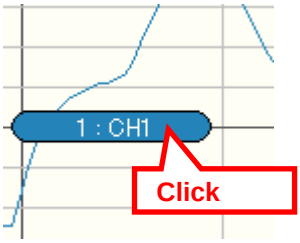
Display	Initialize graph			Returns te graph window to the initial state.
	Tile			Displays all the waveforms side-by-side with the reduced size.
	Cascade			Displays all the waveforms overlayed with the enlarged size.
	Narrow space			Narrows the waveform spacing.
	Widen space			Widens the waveform spacing.
	Enlarge vertical size			Enlarges all the waveforms or selected waveform in the vertical direction.
	Reduce vertical size			Reduces all the waveform or selected waveform in the vertical direction.
	Enlarge horizontal size			Enlarges all the waveforms in the horizontal direction.
	Reduce horizontal size			Reduces all the waveforms in the horizontal direction.
	Display all horizontally		-	Reduces the size of waveforms horizontally for all the waveforms to fit in one screen.
Cursor	Select cursor	Hide		Cursor
		Vertical cursor		
		Horizontal cursor		
	Cursor A&B			Synchronizes A and B cursors.
	Cursor A			Calls cursor A.
	Cursor B			Calls cursor B.
Window	Toolbar		-	Enables/disables the toolbar display.
Tool	Option	Relative time	-	Tool
		Lock horizontal grid	-	
		Display scale	-	
		Highlight background	-	
Help	Display help			Displays help.
	Version information		-	Displays the version information.

List of right-click menu items

Item		Function
Time scale setting		Sets the time axis on the graph.
Display Max/Min/Ave	-	Displays max/min/ave values on the graph.

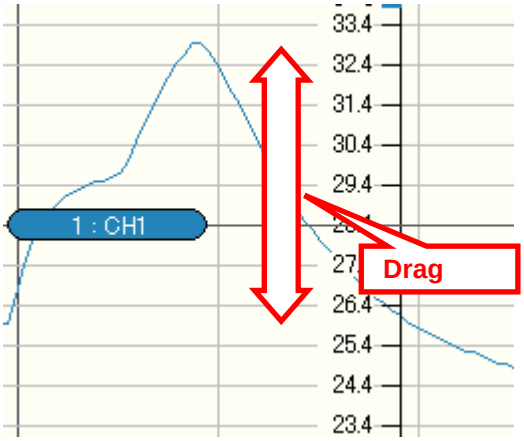
6.5.2 Basic graph operation

(1) Selecting the waveform



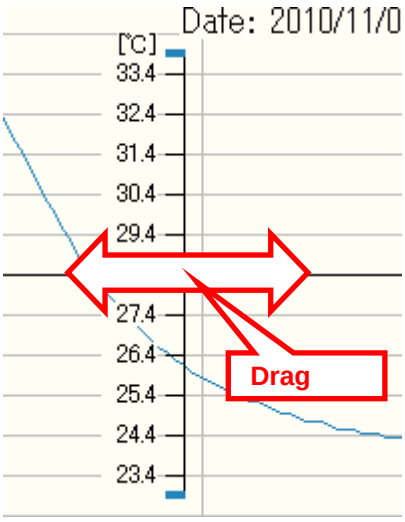
Click the tag of the target waveform.
The tage is highlighted and the selected waveform becomes active.
When clicking any location other than the waveform, the selection can be released.
When clicking the waveform while holding the Ctrol key, the multiple waveforms can be selected.
Click the waveform with holding the Shift key to select all waveforms.
Press the tab key to select the next waveform.

(2) Moving the waveform



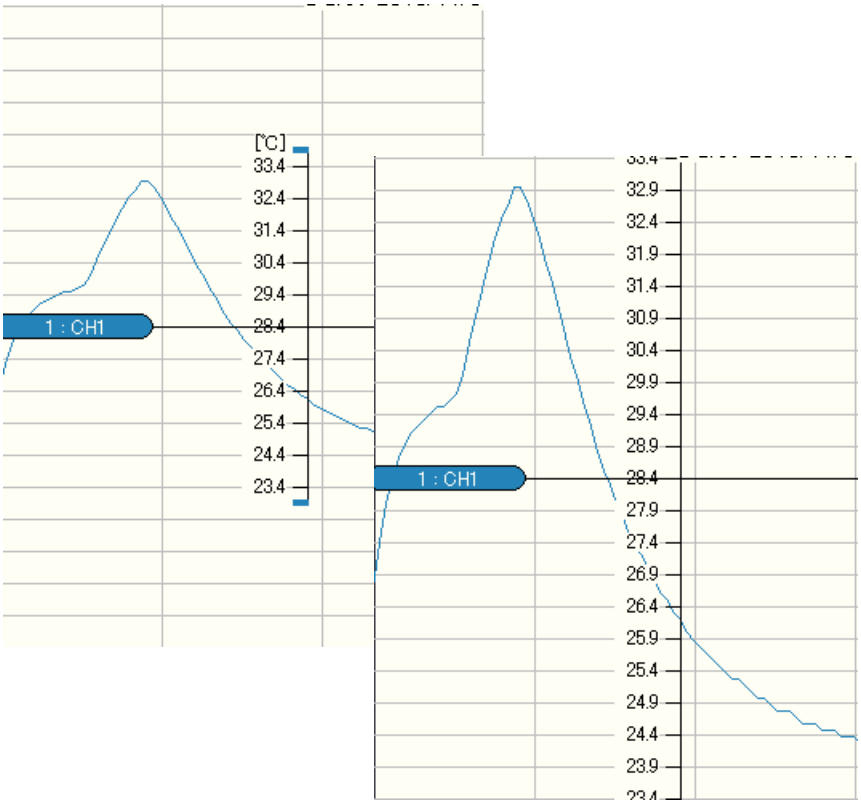
The selected waveform can be moved by a drag.

(3) Moving the scale



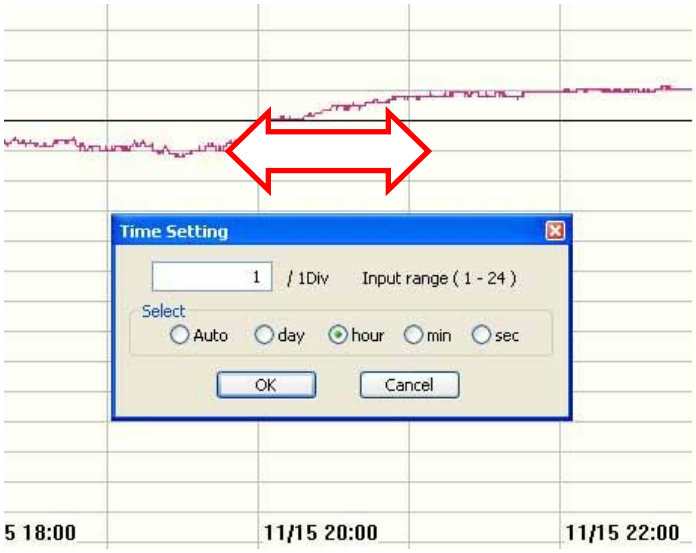
Drag the scale to move to any location.

(4) Enlarging/reducing the waveform



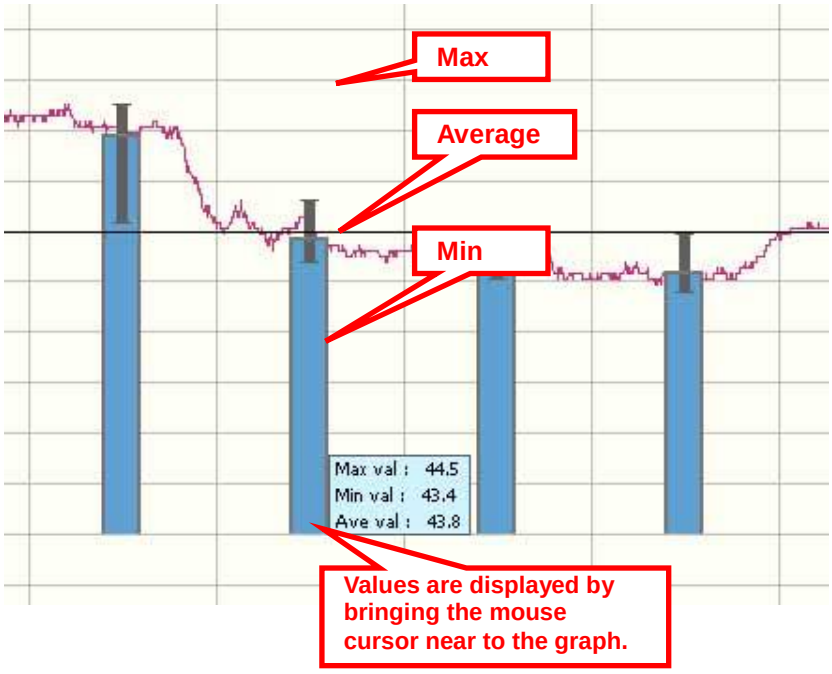
Rotating the mouse wheel while pressing the Ctrl key enlarges or reduces the waveform size.

(5) Setting the time axis



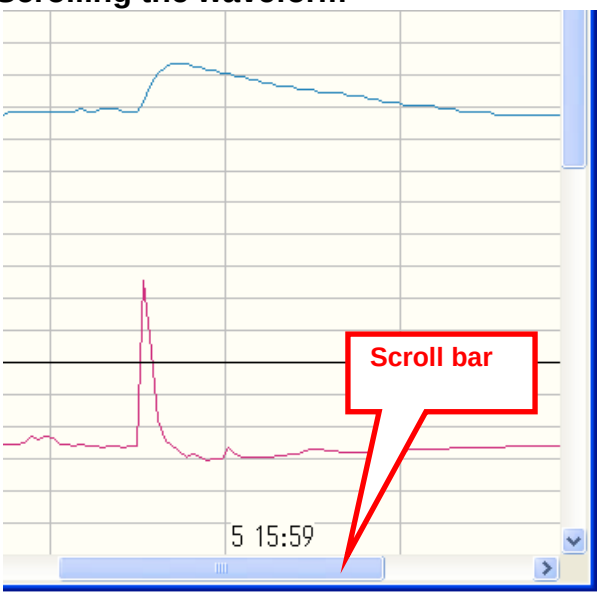
Select “Time scale setting” with right-click or click “Time Setting” on the toolbar to set the time interval in the vertical grid.

(6) Displaying Max/Min/Average values



The max/min/average values of the measured data can be displayed in vertical grids.
Select “Display Max/Min/Ave values” with a right-click.
The max/min/average values can be displayed by moving the mouse cursor closer to the graph.

(7) Scrolling the waveform



Move the scroll bar right and left to view waveforms from the start to end of recording.

(8) Initializing display settings

From the menu bar, select “Display” –“Initialize Graph”, or press “Initialize Graph” on the toolbar to cancel enlarge/reduce, moving of the scale, etc. to return to the initial state.

6.5.3 File menu

(1) Opening data

Opens the data saved with Air Thermo Logger or SD Viewer ES.

Refer to: 6.4.1 Open data

(2) Saving data

Saves the displayed graph.

Refer to: 6.4.2 Save data

(3) Print preview

Displays the print image.

(4) Print

Prints the graph.

(5) Exiting application

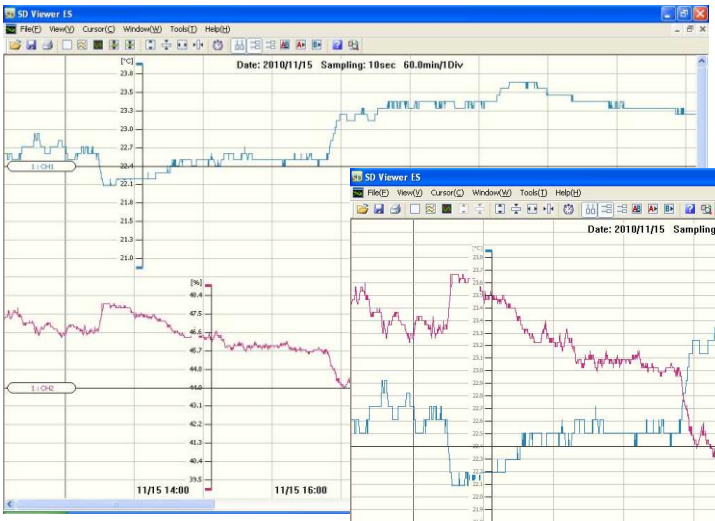
Exits SD Viewer ES.

6.5.4 Displayed menu

(1) Initializing graph

Cancels enlarge/reduce, scale moving, etc. and returns to the initial state.

(2) Tile/cascade



Tile

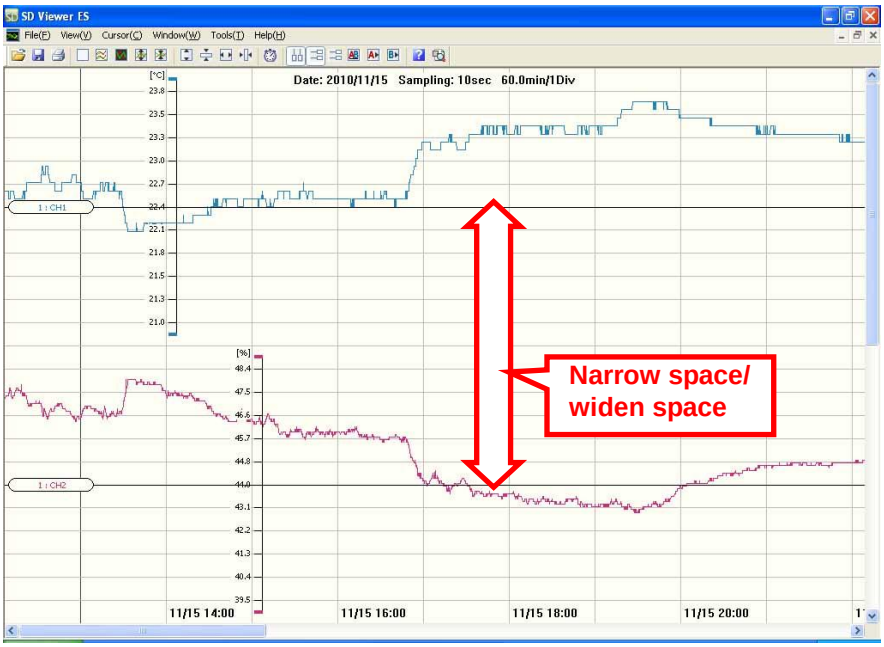
Cascade

Multiple waveforms can be displayed side-by-side or overlaid.
From the menu bar, select “Display” – “Tile” to arrange the waveforms side by side.
Select “Display” – “Cascade” to display the waveforms overlaid.
For cascade display, the selected waveform scale is displayed.

Note

While a cascade display is showing, you cannot activate “Narrow interval” and “Widen interval” command, and “FIX” is shown on the upper right.

(3) Narrowing/widening space



Narrow or widen the waveform interval.
From the menu bar, select “Display” – “Narrow space” to narrow the space of the waveform.
Selecting “Display” – “Widen space” widens the space of the waveform.
The operation using the keyboard or mouse is also available.
Narrow space: Press the ↑ key while holding the Shift key (or mouse wheel operation)
Widen space: Press the ↓ key while holding the Shift key (or mouse wheel operation)

Note

While a cascade display is showing, you cannot activate “Narrow space” and “Widen space” command.

(4) Widening/reducing in the vertical direction

Widen/reduce the graph or waveform in the vertical direction.
From the menu bar, select “Display” – “Enlarge vertical size” to widen the size in the vertical direction.
Select “Display” – “Narrow vertical size” to reduce the size in the vertical direction.

- When a waveform is not selected: Widen/reduce the entire graph.
- When a waveform is selected: Only the selected waveform is enlarged/reduced in the vertical direction.

The operation using the keyboard or mouse is also available.

Reduce vertical size: Press the ↓ key while holding the Ctrl key (or mouse wheel operation)
Enlarge vertical size: Press the ↑ key while holding the Ctrl key (or mouse wheel operation)

(5) Enlarging/reducing in the horizontal direction

Enlarge/reduce the entire waveform in the horizontal direction.

From the menu bar, select “Display” – “Enlarge horizontal size” to widen the size in the horizontal direction.

Selecting “Display” – “Reduce horizontal size” to reduce the size in the horizontal direction.

Select “Display” – “Display all horizontally” to fit all the waveforms in one screen

These operations can also be performed using the keyboard.

Reduce horizontal size: Press the ← key while holding the Ctrl key.

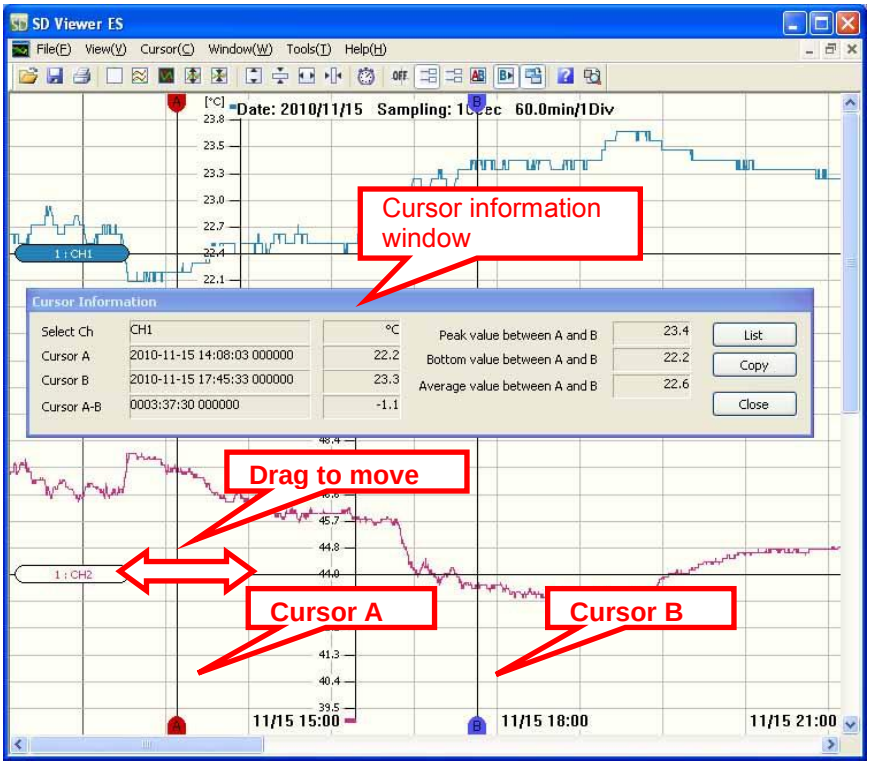
Enlarge horizontal size: Press the → key while holding the Ctrl key.

Note

- From “Tool” – “Option”, a change/lock of “horizontal grid” can be switched.
  When [Fix H grid] is selected:
  The size of the horizontal grid will not change even if the graph is enlarged or reduced in the horizontal direction.
  When [Fix H grid] is not selected:
  The size of the horizontal grid will change when the graph is enlarged or reduced in the horizontal direction.
- The horizontal grid time interval can be set by right-clicking “Set Time Axis”.
  When the time interval has been set with “Fix H grid” not selected:
  The time interval between horizontal grids will not change even if enlarged or reduced in the horizontal direction.
  When the time interval has been set with “Fix H grid” selected:
  The horizontal grid lock will be released when time axis setting is made.
  The size of the horizontal grid will not change even if the graph is enlarged or reduced in the horizontal direction.
- When the span of the displayed data is long, executing “Display all horizontally” may turn the entire graph in gray due to the grid display. In such case, execute “Set Time Axis” to set the time interval of the horizontal grid wider.

6.5.5 Cursor menu

(1) Displaying cursors



From the menu bar, select “Cursor” – “Cursor A” to display cursor A.
Selecting “Cursor” – “Cursor B” displays cursor B.
Calling up cursor to display the “Cursor information” window and the position and value that the cursor is pointed at on the selected waveform.
Drag the cursor by moving the mouse pointer on the cursor.

Note

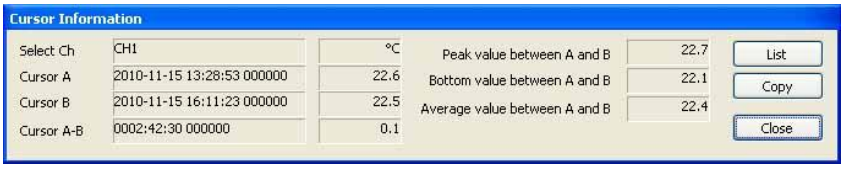
When cursor information is left blank, a waveform is not selected. Select a waveform to display the value.

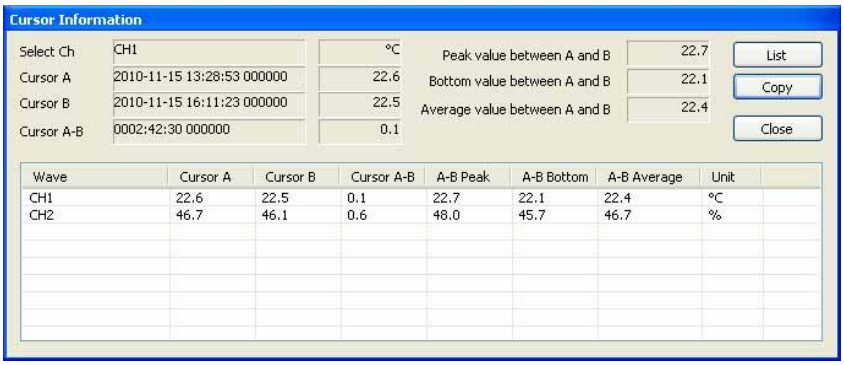
(2) Hiding cursor

From the menu bar, select “Cursor” – “Select Cursor” – “OFF” to hide the cursor.

(3) Cursor information

The cursor window appears when a cursor is called.





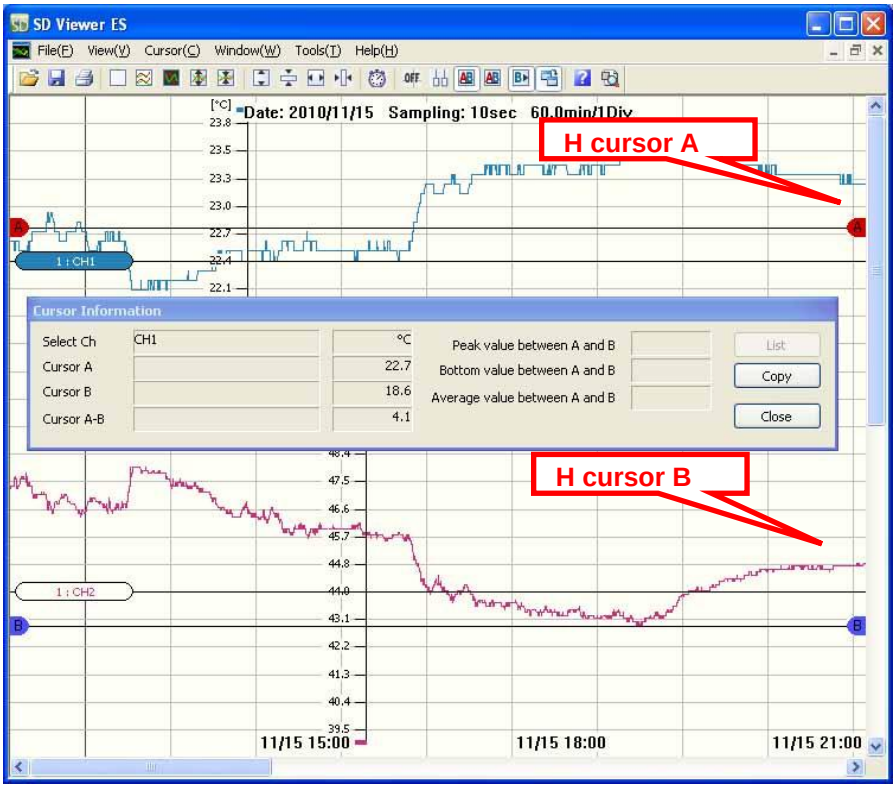
Name	Function
Select waveform	Displays the selected waveform name. The waveform name can be displayed as follows. - “Connection name” waveform name
Cursor A	Displays the position information of cursor A. - Year month day hour: min: sec (vertical cursor only) - Value
Cursor B	Displays the position information of cursor B. - Year month day hour: min: sec (vertical cursor only) - Value
Cursor A-B	Displays the difference between cursor A and B
Peak value between cursor A and B	Displays the peak value between cursor A and B
Bottom value between cursor A and B	Displays the bottom value between cursor A and B
Average value between cursor A and B	Displays the average value between cursor A and B
List (Vertical cursor only)	For all the displayed waveforms, displays waveform name/cursor A/cursor B/difference between cursor A and B/A-B Peak/A-B Bottom/A-B Average/Unit.
“List” button (Vertical cursor only)	Switches display/nondisplay of waveforms list.
“Copy” button	Copys the data of “Cursor Information” to the clip board with a CSV format.
“Close” button	Closes the “Cursor Information” window.

(4) Synchronizing cursors

Cursor A and cursor B can be moved at the same time.

Select “Cursor” – the “Cursor A&B” check box. When the check box is cleared, the cursors can be moved individually.

(5) Selecting vertical/horizontal curosor



Use of vertical cursor or horizontal cursor can be selected.

From the menu bar, select “Cursor” – “Select Cursor” – “Vertical cursor” to display the vertical cursor.

Select “Cursor” – “Select Cursor” – “Horizontal cursor” to display the horizontal cursor.

Note

The vertical cursor and horizontal cursor cannot be displayed at the same time.

6.5.6 Others

(1) Displaying relative time

Specifies whether or not to display the time of a graph with relative time range.

When it is not selected, the absolute time is displayed. From the menu bar, select “Tool” – “Option” – “Display Relative Time” to specify.

(2) Fixing horizontal grid

Specifies whether or not to fix the horizontal grid when operating enlarging/reducing graph horizontally.

When it is not selected, the size can be varied. From the menu bar, select “Tool” – “Option” – “Fix H grid” to specify.

(3) Displaying scale

Specifies whether or not to display the scale of the all waveforms of the graph.

From the menu bar, select “Tool” – “Option” – “Display Scale”” to specify.

(4) Highlighting the background color

Highlights the background color of the graph.

From the menu bar, select “Tool” – “Option” – “Highlight Background Color” to specify.

7. Ratings and Performance

(1) Main unit: ZN-THX11-S☐

Item	Content
Connectable sensor	Air Particle Sensor Head ZN-THS1□□-S
Display	LCD 7-seg 5-digit 2-step display, auxiliary information indicator display
Measurement cycle	10s,20s,30s,1min,2min,5min,10min,20min,30min,1h
Processing mode	Instantaneous value, maximum value, minimum value, average value
Measurement operation mode	Normal mode, sleep mode*1
Recording mode	Continue*2, ring*3
External output	Alarm output*4 (Photocoupler output) Alarm hold is configurable.
Memory capacity (internal)	Internal memory: Approx. 8,500 data items
Storage device (external)	SD card with SDHC support (save measured value, save and read setting value)
Power supply	DC input: 24 VDC±10%, AC adapter: 100 to 240 VAC/50 to 60 Hz, Battery: 2 AAA batteries
Current consumption	70 mA max. (AC adapter used)
Battery life*5	Approx. 1 year (2 AAA nickel metal hydride (Ni-MH) batteries, sleep mode, measurement interval of 10 minutes, and SD card not inserted)
Operating temperature	Main unit: 0 to 60°C, AC adapter: 0 to 40°C
Storage temperature	–15 to +60°C (no condensation or icing)
Operating humidity	20 to 85%RH (no condensation)
Storage humidity	20 to 85%RH (no condensation or icing)
Insulation resistance	20 MΩ (500 VDC)
Withstand voltage	1000 VAC, 50/60 Hz 1 min
Vibration resistance	10 to 150 Hz, 0.35 mm double amplitude, acceleration: 50 m/s2 for each in X, Y and Z directions for 80 min
Shock resistance	150 m/s2 in 6 directions (+/-X, +/-Y, and +/-Z directions), 3 times each
Material	ABS
Degree of protection	IP30
Mounting method	Screw mounting, hook, floor installation
Dimensions (WDH)	117.2×24.6×56.8 mm (excluding protruding part)
Weight (packaged)	Approx. 500g
Accessories	Instruction Sheet, Startup Guide, AC adapter or DC cable*6, alarm output connector, Utility Disk (CD-ROM)

*1 Power saving mode. The display is always OFF in default setting (It turns ON with button operation).

*2 Automatically writes data into the SD card when the internal memory reaches the upper

limit, and continues recording until the SD card will reach the capacity limit. If the SD card is not inserted when the internal memory reaches the upper limit, recording ends. (Data can be output to the SD card by pressing the button after inserting the SD card.)

*3 A mode to record the latest measurement value for the maximum capacity of the internal memory at all times. (when reaching the upper limit of the internal memory, data item will be discarded from the oldest.)

*4 Output when the value exceeds the upper limit that has been set in threshold value setting mode, or falls short of the lower limit.

*5 The battery life varies according to measurement environment, sampling, measurement operation mode, battery's type and performance.

*6 AC adaptor is provided to ZN-THX11-S. DC cable and the ferritic core are provided to ZN-THX11-SA.

(2) PC software SD Viewer ES

Item	Content
Supporting device	Air Thermo Logger ZN-THX11-S☐
OS	Windows XP/Vista/7 (32-bit version)
CPU	Intel (x86) compatible processor (1 GHz or faster)
Memory	1 GB or more (2 GB or more recommended)
Display	Resolution 1024 x 768 or more, 65,535 colors (16-bit color) or more
HDD	A minimum of 30 GB free space is required to install SD Viewer ES.
CD-ROM drive	For installation
SD card reader/writer, SD card slot	For recorded data reading
Standard functions	The following functions are available for Air Thermo Logger: Displaying waveforms of the recorded data Displaying multiple recorded data items connected/side-by-side Saving the connected/side-by-side data
Number of data samples that can be opened	Up to 1 million samples as a total. Greater the waveform count, fewer the sample count per waveform.
Number of waveforms that can be displayed	1024 at maximum

Appendix

List of Displayed Errors

▪ Main Unit: ZN-THX11-S□

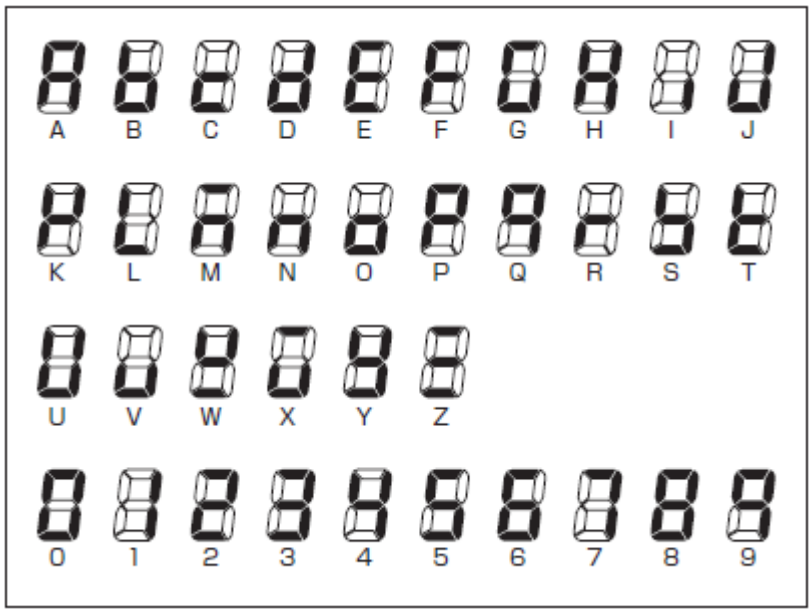
Display Upper/lower	Contennt	Action to be taken
DATA E1100	Failed to write measured data	Failed to write the recorded data to the SD card due to no free space or card being removed during writing. Insert the writable SD card. Hold the MODE key for 3 seconds or more to release the error display.
SEN E2000	Sensor error	The sensor Head is not connected. Connect the Sensor Head properly.
NO SD E3000	SD card not inserted	SD card is not inserted. Insert the writable SD card. Hold the MODE key for 3 seconds or more to release the error display.
BATLO E3001	Unable to access SD card	Unable to access to the SD card due to low battery voltage. Replace the battery or connect to the AC adapter. Hold the MODE key for 3 seconds or more to release the error display.
SDLCK E3002	SD card write prohibited	Writing to the SD card is prohibited. Insert the writable SD card. Hold the MODE key for 3 seconds or more to release the error display.
SD ER E3003	SD card recognition error	Failed to recognize the SD card. Insert an appropriate SD card. Hold the MODE key for 3 seconds or more to release the error display.
RESTR E5000	Invalid setting file data	The setting data within the SD card is invalid due to invalid model type or setting value. Hold the MODE key for 3 seconds or more to release the error display.
BCKUP E5001	Failed to write the setting file	Failed to write to the SD card of the setting file due to no free space or writing prohibited. Insert a writable SD card. Hold the MODE key for 3 seconds or more to release the error display.

RESTR E5002	Failed to read the setting file	There is not setting file in the SD card. Insert the SD card in which the setting file has been written. Hold the MODE key for 3 seconds or more to release the error display.
HARD E****	Hardware error	There may be a hardware error. Please contact the distributor or OMRON representative office to inform the displayed error code.

▪ PC software SD Viewer ES

Message	Action to be taken
”You cannot add data of more than 10000 data items.”	Too many data items selected in “Open Data”. Execute “Open Data” on the menu again and select only the data that you want to display.
”Waveforms of more than 1024 cannot be displayed.”	The number of waveforms that can be displayed on one graph is 1024. Narrow the data that you want to display and execute again.
“All the waveforms cannot be displayed due to too much data amount. Is it OK to display data in the following span?”	The number of data items exceeds 1 million samples. Setting the resampling cycle longer may allow the data to be displayed.
	Even the non-data period is treated as data called “NO DATA” per sampling cycle and the number of samples is counted inside. On the “Open data” window – “Select Data” – the “Select” column, select data item individually to reduce the non-data period.
“Data cannot be found because the necessary data has been broken or deleted.”	Saving cannot be performed because the data necessary for file saving does not exist. Redo the operation from opening the recorded data.
“The following file could not be read.”	The data necessary to display graph is not recorded. Check that the recorded data has not been edited and specify the data again.
	Data cannot be open when the recorded data is open with software such as Excel. Exit other software and read the data again.

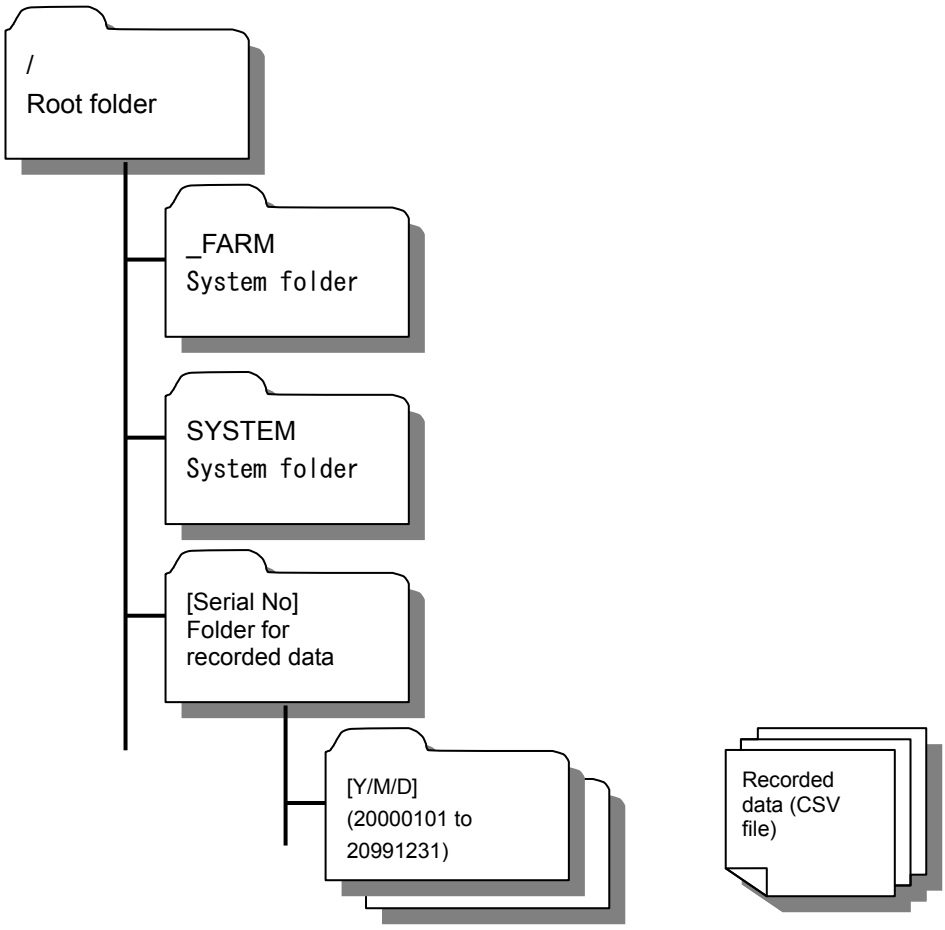
List of Displayed Characters



Display	Character strings	Display	Character strings	Display	Character strings
cYcLE	CYCLE	ñonth	MONTH	AuE	AVE
ñEAS	MEAS	dAY	DAY	SLEEP	SLEEP
ñodE	MODE	cLocP	CLOCK	cont	CONT
rEc	REC	Sd ,SP	SDISP	r inG	RING
in it	INIT	oFF	OFF	dEGH ,	DEGHI
Etc	ETC	on	ON	dEGLo	DEGLO
rESTr	RESTR	d ,SP	DISP	rH H ,	RH HI
bcPUP	BCKUP	norñ	NORM	rH Lo	RH LO
t iME	TIME	ñAU	MAX	HoLd	HOLD
YEAr	YEAR	ñ in	MIN	rESEt	RESET

Major messages

Configuration of SD Card Folder



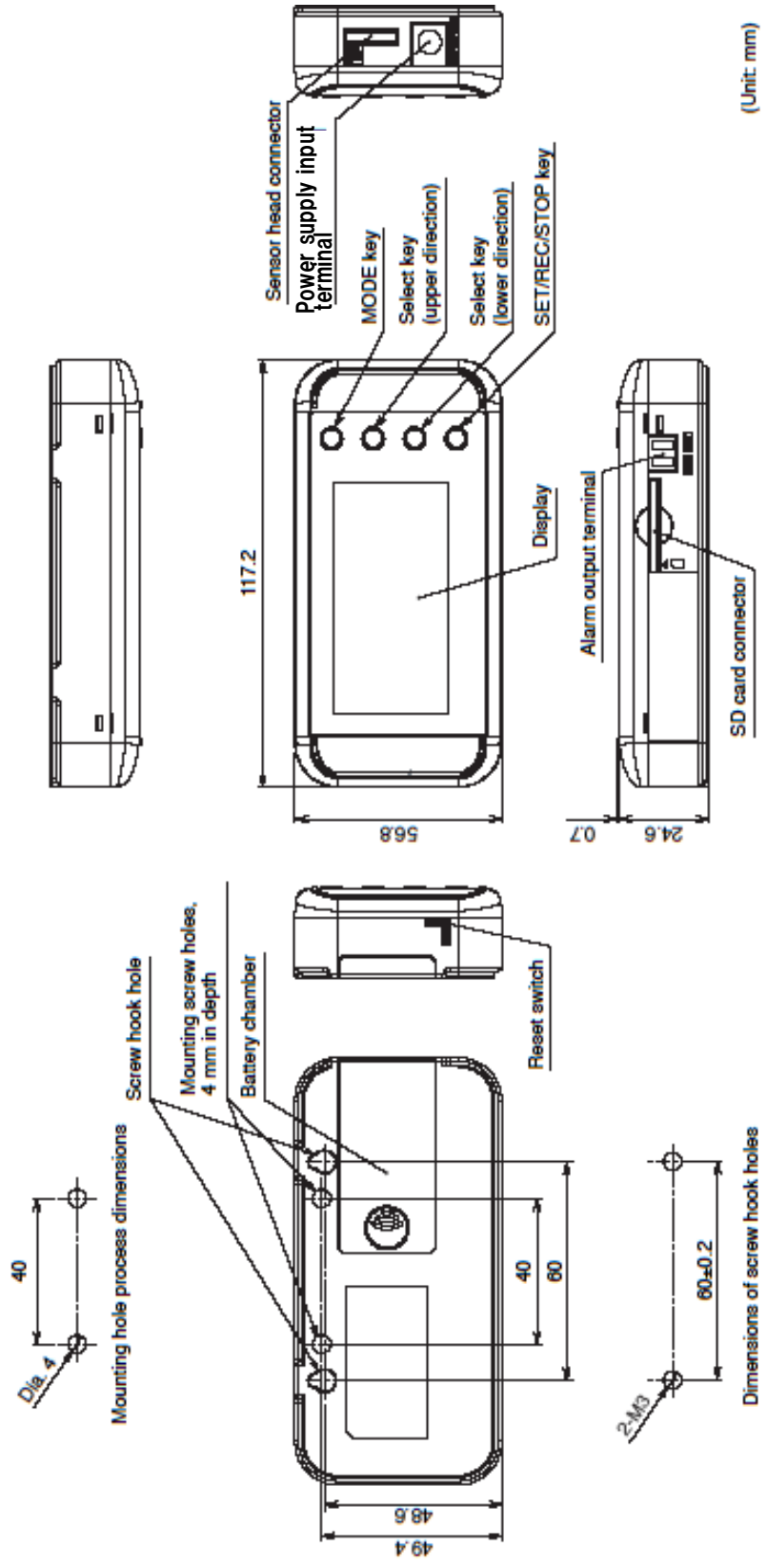
File/folder name	Content
_FARM	For system. Do not change the file name or internal file.
SYSTEM	For system. Do not change the file name or internal file.
“Serial No”	Folder to store recorded data. The serial number of the Air Thermo Logger is used for the folder name.
“Y/M/D”	Subflder to store recorded data. Recorded date (YYYYMMDD) is used for the folder name. The recorded data file is CSV format. The file name is as follows. “Hour, minute, second + serial No” .CSV Example: 12345601.CSV Recorded data file written to the file at 12:24:56.

Calibration

Calibration is not required for the Air Thermo Logger unit.

The Air Particle Sensor Head (ZN-THS1□□-S) is needed to calibrate. Read the Instruction Sheet of the Sensor Head.

Dimensions

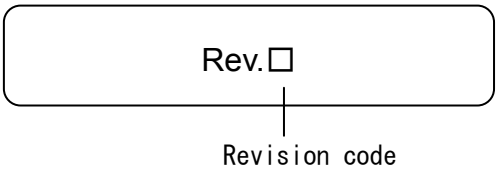

(Unit: mm)
Sensor head connector
Power supply input terminal
MODE key
Select key (upper direction)
Select key (lower direction)
SET/REC/STOP key
Display
Alarm output terminal
SD card connector
117.2
56.8
24.6
0.7
Screw hook hole
Mounting screw holes, 4 mm in depth
Battery chamber
Reset switch
Mounting hole process dimensions
40
Dia. 4
40
60
48.6
49.4
60±0.2
2-M3
Dimensions of screw hook holes

Revision History

The specifications of this product you have just purchased are subject to changes in adding new functions or making improvements. This operation manual will be revised whenever such changes incur with the changes reflected on its contents. The revised manual contains the history of revision with the manual revision codes and the revision descriptions.

About the manual revision code

The manual revision code is affixed to the tail of the “Rev. No.” given in the lower right corner of the manual.



History of Revision

Revision code	Date	Description of revision
A	December 2010	First edition
B	June2011	Addition of DC cable model
C	February2012	Power-supply-voltage clerical error correction

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As of February 2012 (WEB Ver.3)