

# LogStick

**Temperature and humidity Data-Logger**

**LS320-TH**

***Users Manual***

# Attention on safety      Please guard.

Please read this "Attention on safety" well and use it ahead of the use correctly.

It divides by displaying  warning and  attention and it explains danger and the extent caused when wrong handling is done.

	<p><b>Warning</b> The one with possibility of relating to important results such as deaths and serious injuries when wrong handling is done</p>
 Use prohibition	<p><b>Do not pull out and do not use the battery when abnormality occurs by any chance.</b> It causes a fire and the electric shock when abnormally using it. Please pull out the battery from the main body, and request the repair at once.</p> <p><b>Smoke has risen, and it doesn't use it when it is abnormal of smelling to strangeness etc.</b> It causes a fire and the electric shock when abnormally using it. It moves to the place that doesn't spread to surroundings, and please pull out the battery from the main body after confirming safety, and request the repair at once.</p> <p><b>Do not use it when damaging it.</b> It causes a fire and the electric shock.</p>
 Remodeling prohibition	<p><b>Do not resolve, and remodel it.</b> It causes a fire and the electric shock by the short and generation of heat.</p>
 Prohibition	<p><b>Do not use it outside the purpose.</b> Do not use it in the usages other than the measurement of the temperature and humidity.</p> <p><b>Do not put the foreign body.</b> When metals and the combustible one, etc. enter the inside, it causes a fire and the electric shock.</p> <p><b>Do not put it on the place where child's hand reaches.</b> Please do not set it up in the place where child's hand reaches in the measurement place etc. It swallows, and it causes the injury.</p>
 Water wet prohibition	<p><b>Do not wet it with water.</b> It causes a fire and the electric shock. Please note use in outdoor and near the window in rain, the snow inside, and the coast and the waterside, etc. especially.</p>
 Correct battery	<p><b>Use a specified battery.</b> When a correct battery is not used, it causes a fire, the electric shock, and the breakdown.</p>
	<p><b>Attention</b> The one related to damage of injury or house and household goods, etc. when wrong handling is done</p>
 Installation prohibition	<p><b>Do not put it on the following places when you set it up.</b> Place where lamp soot and steam are hit directly Place where sunlight strikes directly As for the temperature and humidity outside the specification The transformation of the short, generation of heat, and the case etc. might be caused when putting it on such a place, and it cause a fire, the electric shock, and the breakdown. The range that this machine can use is a temperature: -20-70 and humidity: It becomes 5-90%RH.</p>
 Prohibition	<p><b>Not putting the heavy one on main body, and up field</b> The balance collapses, and might it fall, and it cause the injury and the breakdown.</p> <p><b>Put neither finger nor the foreign body in the connector and the space.</b> It causes the injury and the breakdown.</p>
 Wet person prohibition	<p><b>Do not touch by a wet hand.</b> It might cause the electric shock and the breakdown.</p>
 Attention	<p><b>Aged deterioration</b> The battery terminal and the USB connector might become the loose connections by the vibration and the aged deterioration.</p> <p><b>Note static electricity.</b> There is a possibility of causing destruction by static electricity. Please let the touch static electricity go into the metal etc. to prevent it before touching this machine.</p>
 Observing strictly	<p><b>Pull out the battery when not using it for a long term.</b> It might cause the breakdown because of the liquid leakage of the battery.</p>

As for this product, building in the equipment related to the life, equipment that needs the container machine and high reliability and safety, and the container machine (medical, aerospace relation, transportation relation, and nuclear power relation, etc.) etc. are not considered. Even if the accident resulting in injury or death and the property damage occur by having used this product with these equipment and container machine, our company doesn't assume the responsibility at all.

**Thank you indeed for purchasing temperature and humidity data logger 'LS320-TH'. It explains the handling method and the directions point of this product in this manual. Please read this manual to use it ahead of the use correctly and safely. Please read when it is necessary after it reads.**

## **Attention**

It is prohibited to reprint all of the content of this book partially without permission.

This product might change the specification without a previous notice for the function addition and the quality improvement.

Please acknowledge being not able to assume any responsibility such as the losses and passive damages in which the operation of this product is assumed to be a reason beforehand.

### **【It is sensor】**

It is equipped with the humidity Sen Syng element and the band gap temperature sensor of electrostatic capacity Polymer that measures relative humidity as a temperature and a humidity sensor of this machine.

### **【 notes in humidity sensor 】**

The humidity sensor measures the capacity change of the permittivity by the moisture adsorption.

Therefore, dust and the vehicle exhaust emission, etc.

The steam of the organic compound quality might influence the Polymer layer.

Therefore, there is use under the environment where a large amount of these are floating by measurements and is a possibility that the drift doing and the error of measurement occur.

Moreover, when the sensor is polluted because of these, pollution is gradually discharged under a clean environment. However, please note becoming in the sensor permanent damage at high density organism pollution.

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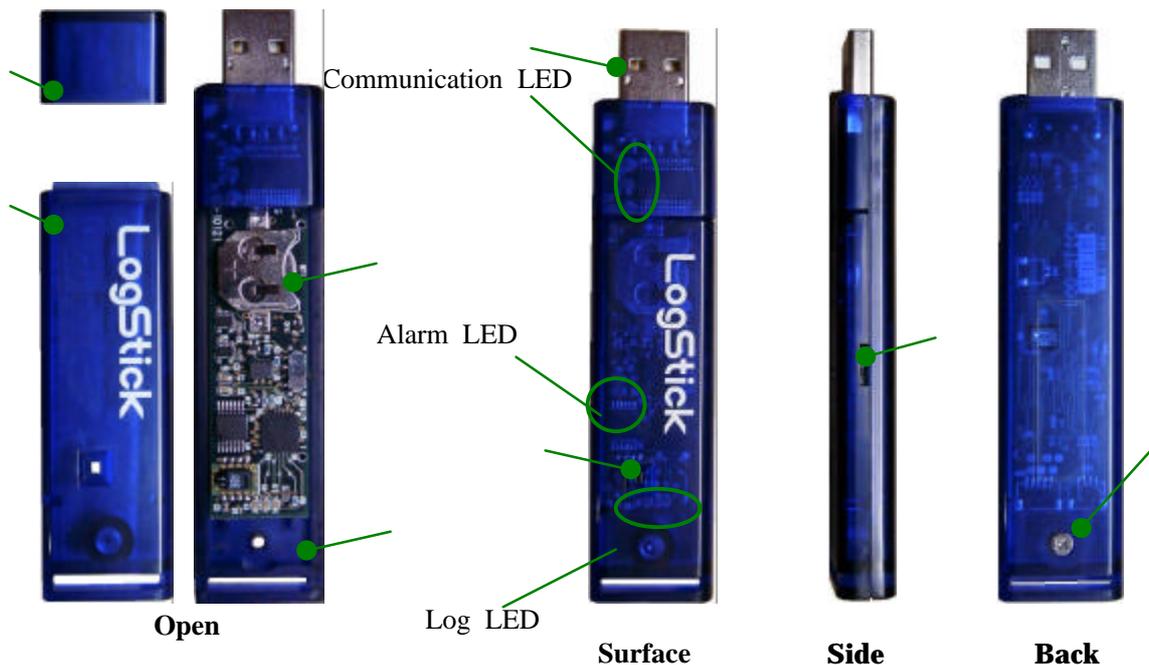
# 1 Outline

LS320-TH builds the highly accurate temperature humidity sensor into, and can record measured temperature and humidity at constant intervals. The use of button battery (CR1220) can be enabled by achieving low power consumption, and it record for the small size and a long time. The clock function is built into the main body, and measured value and date are recorded at the same time. The confirmation can do detailed data to change the dependence temperature humidity to it.

Moreover, the data recorded with the application software can be easily transmitted by using the USB interface for the connection with the personal computer.

## 2 Explanation of each part

### Main body externals



### Name and explanation of each part

USB connector cover

Cover

Main body case

Battery : Please use CR1220.

USB connector : It connects it with the personal computer.

Temperature and the humidity sensor : Please do not close this part.

Record stop switch. : The record is temporarily interrupted by moving to the USB connector side.

Machine screw for battery exchange. : M2×6 plate machine screw

Communication LED : When communicating with the personal computer, it lights.

Alarm LED : When an upper bound abnormal temperature or lower bound temperature abnormality occurs, it blinks in five seconds.  
(Green and the bitter orange blink simultaneously.)

Log LED : Green ... When the log is recorded, it lights.

Red ... When the voltage of the battery decreases, it blinks in five seconds.

#### Attention

If the voltage decrease is detected, a present log record is ended.

All the settings before it exchanges it are initialized when changing a battery.

Therefore, please connect with the personal computer, and set it when you restart the log record.

### 3 Preparation to use LS320-TH

The following preparations are necessary to use LS320-TH.

- 1) Battery exchange
- 2) Driver installation
- 3) Acquisition of COM port number
- 4) Application soft installation

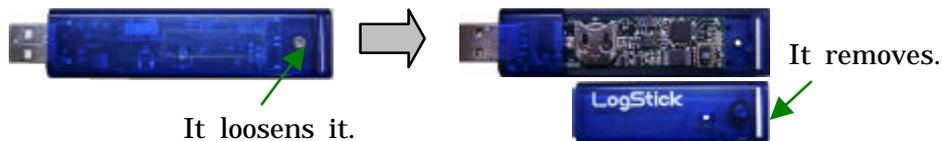
#### 3-1 Battery exchange

##### 3-1-1 The cover is removed.

Please the driver must loosen the machine screw for the battery exchange and remove the cover.

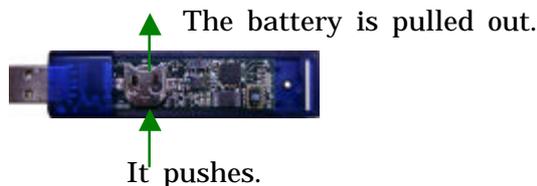
The driver must use plus driver's NO.1.

In this case, please do not lose the machine screw.



##### 3-1-2 An old battery is pulled out.

Please push the battery with the insulation thing such as wooden toothpicks, and pull it out.



##### 3-1-3 A new battery is inserted.

Please insert a new battery. (The plus is the upper part.)

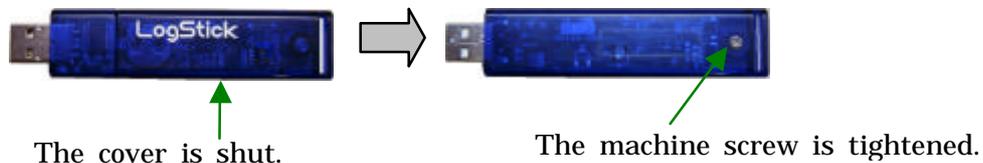
A new battery is inserted.



##### 3-1-4 The cover is shut.

Please cover with the cover, and tighten the machine screw.

There is fear of damage when strongly tightening too much.



#### Attention

The battery in purchase with is for the test.

Please actually exchange it for a new battery before starting using.

We will recommend the download of data beforehand though data doesn't disappear by the battery exchange.

## 3-2 Driver installation

### Recommended spec

#### OS

Windows XP , Windows Vista

#### CPU 500MHz or more

Intel Pentium/Celeron family or compatible CPU

#### Memory 256MB or more

Hard disk: Empty capacity of 10MB or more

Size of display: 1024×748 or more

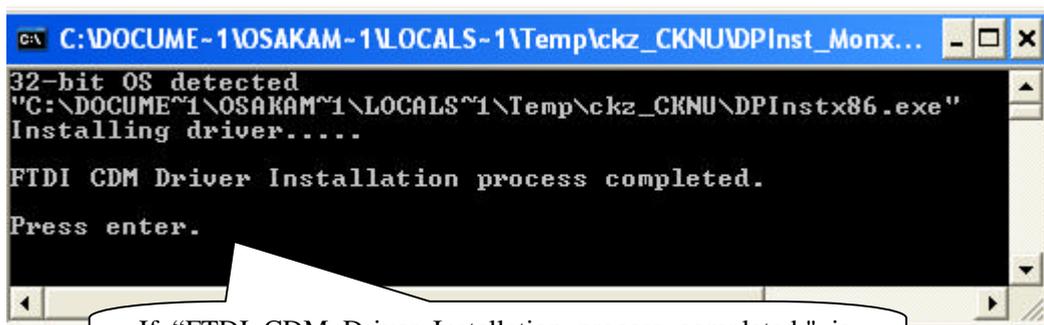
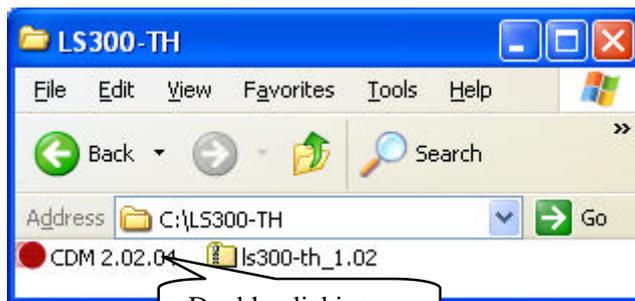
Because the RS232C USB conversion chip is built into LS320-TH, it is recognized from the personal computer side as COM port.

First of all, the driver for the RS232C USB conversion chip is installed before LS320-TH is connected.

### The driver installation program is executed.

"CDM \*.\*.exe "of the driver software is executed. (\* version number)

When the display of "FTDI CDM Driver Installation process completed." appears, it ends pushing 'Enter'.



### 3-3 Acquisition of COM port number

The COM port number is acquired.

#### 3-3-1 Please connect LS320-TH with the personal computer.

The property of device manager USB(Universal Serial Bus) controller USB Serial Converter is opened after it connects it, and the check is put in "Load VCP" of Advanced.

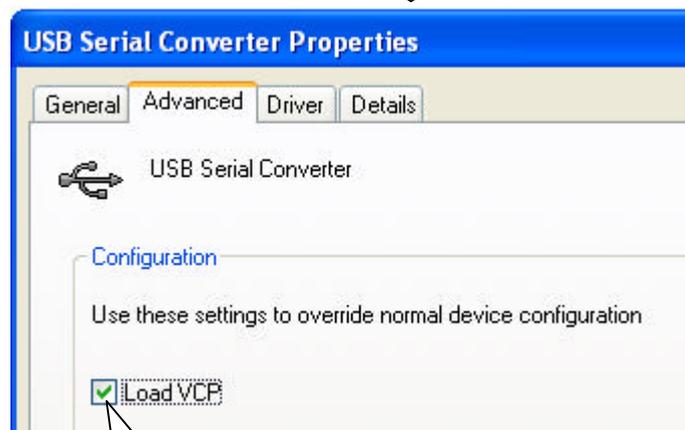
The method of displaying the device manager is as follows.

##### For WindowsXP

Start button control panel system Hardware device manager

##### For WindowsVista

Start button control panel device manager



Check

### 3-3-2 LS320-TH is extracted from the personal computer.

LS320-TH is extracted from the personal computer once.

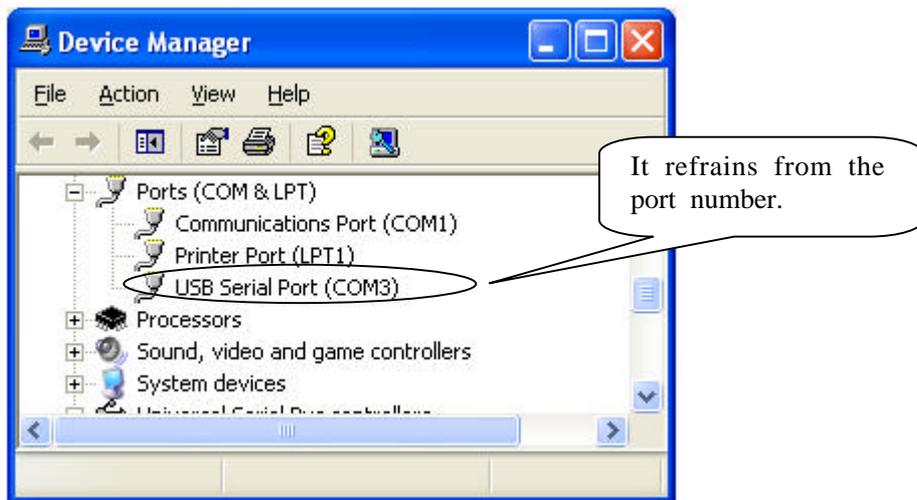


### 3-3-3 LS320-TH is connected with the personal computer.

LS320-TH is connected with the personal computer again.

The thing that USB Serial Port(COMxx) is displayed in device manager port (COM and LPT) is confirmed.

In this case, please refrain from the port number.



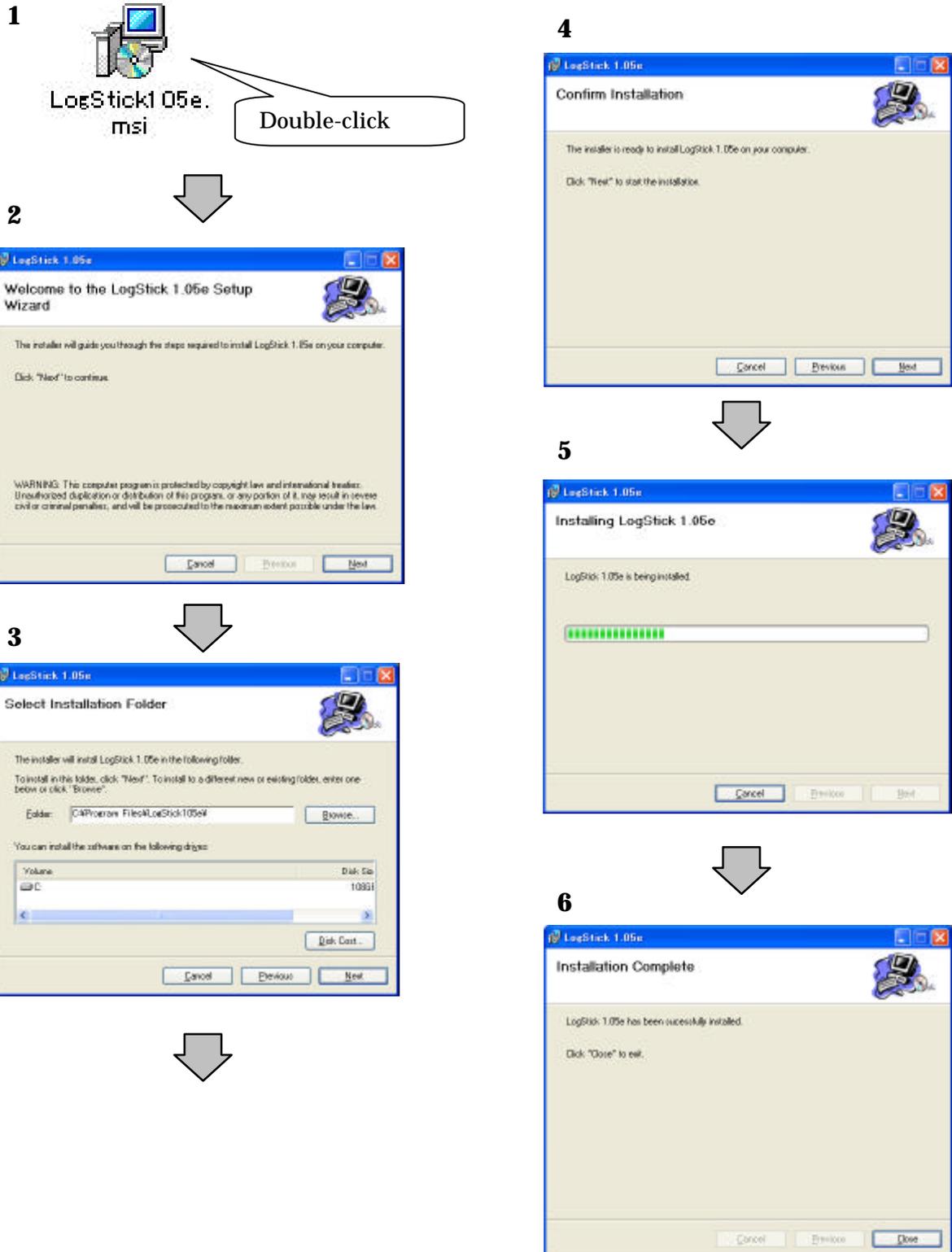
### 3-3-4 Installation of application software

All the operations of LS320-TH are done with special application software.  
The special application software is installed.

**The setup program is executed.**

“LogStick\*\*\*.msi” of the application software is executed.

Please install it according to the screen instruction of the setup program now.



# 4 Use of application software

The application software is executed by start button (all) program LogStick.

## 4-1 Communication

The automatic operation of the port number and the manual operation are selected in the communication.

### Attention

Please use a manual selection when cannot it select automatically, and Auto Select be done by the environment used usually.

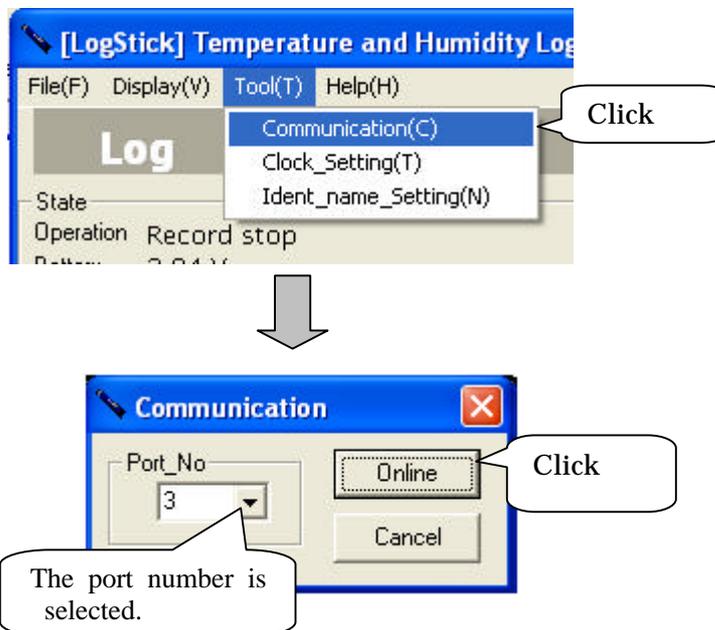
#### 4-1-1 Port number Auto Select

The port number of LS320-TH is set by the automatic operation, and the communication begins.



#### 4-1-2 Port number manual operation selection

When menubar Tool "Communication" is clicked, the communication dialog is displayed. Please select the port number from which it refrains by "Acquisition of the COM port number", and click "Communication beginning".



## 4-2 Clock setting

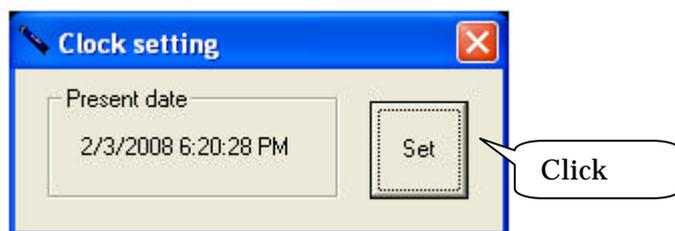
An internal date is set.

### Attention

It is not necessary to usually set it because it sets it automatically when it begins to record the log.

Please select menubar Tool clock setting.

The date is suitable for the clock of the personal computer.



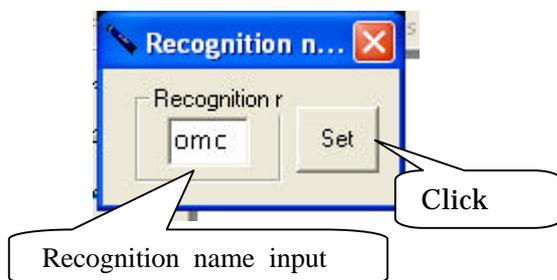
## 4-3 Recognition name setting

An arbitrary name can be set as a recognition name.

It becomes easy to manage when measuring it by this with two or more equipment.

Please click menubar Tool recognition name setting.

The recognition name can be set up to four characters.



## 4-4 Log record

The feature of the log record is as follows.

The temperature and the humidity data measured at set record intervals are recorded in an internal memory.

The record interval can be set in 2-59 seconds and it set it in 1-240 minutes.

(The factory setting is 60 minutes. )

The record beginning date can be reserved one month ahead.

The record in the memory can be selected in the one time mode or the loop mode.

One time mode: When the number of records becomes 15000 points, the record is ended.

Loop mode: It keeps being recorded that the number of records exceeds 15000 points from the oldest data to the overwrite 60000 points or less.

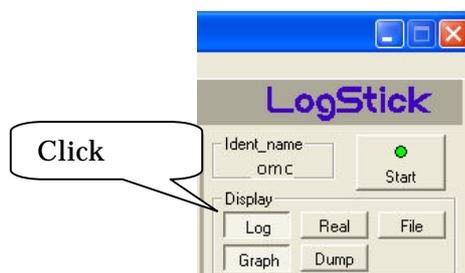
The record can temporarily be interrupted by using the switch on the side.

(Interrupt on the USB connector side. )

### Attention

The measurement resolution decreases every two seconds.

Please click the display to operate the log record and click "Log".



It is possible to operate it on "Log" screen as follows.

### 4-4-1 State confirmation

A present state is confirmed clicking "Update".



Operation ... Operation is displayed. (record stops, recording, reserving)

Battery ... The battery voltage is displayed.

Beginning date ... The record beginning date is displayed.

Recording points ... Recording points are displayed.

Record interval ... The record interval is displayed.

Record mode ... The record mode is displayed. (One time , Loop)

Upper bound temperature: The alarm upper bound temperature setting value is displayed.

Lower bound temperature: The alarm lower bound temperature setting value is displayed.

### Attention

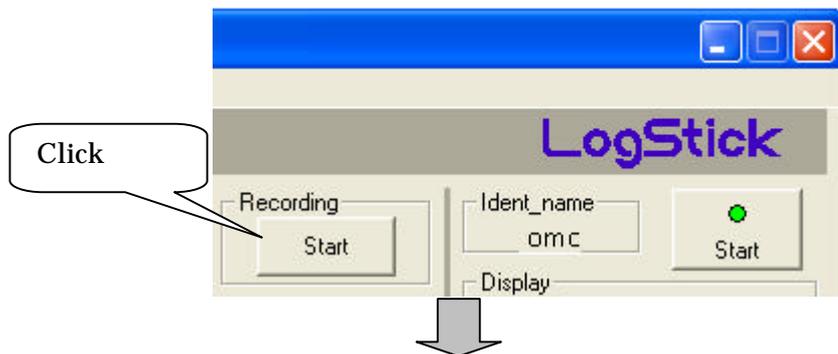
The display of the voltage of the battery is a standard.

Please exchange the batteries beforehand before the record of a long-term log.

When the voltage of the battery becomes 2.5V or less, the log record cannot be operated.

## 4-4-2 Record beginning

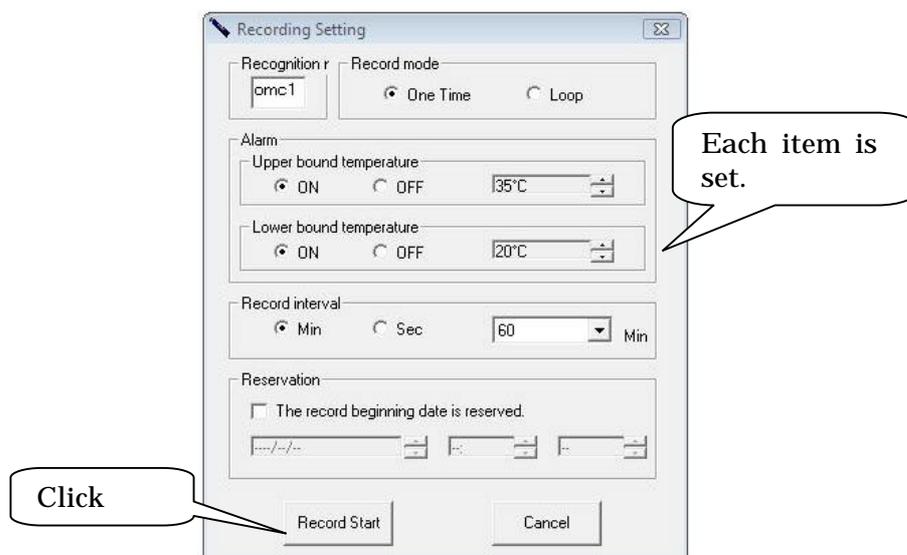
When "Record beginning" is clicked, the record beginning dialog is displayed.



The recognition name, the record mode, and the record interval are set. Please put the check in "When beginning to record, in is reserved", and set the date when you reserve the beginning time. Please click "Record beginning" ("Reservation registration") after all the settings end.

### Attention

When "Record beginning" ("Reservation registration") is clicked, the data before is deleted. Please exchange the batteries beforehand before the record of a long-term log.  
 For "Record beginning"  
 After the time set at record intervals at the clicked date passes, the first data is recorded.  
 For "Reservation registration"  
 The first data is recorded at the set record beginning date.



### Explanation of each item

#### Record mode

One time: When the number of records becomes 15000, the record is ended.  
 Loop : It overwrites from the oldest data even if the number of records exceeds 15000 and it keeps recording.

#### Alarm Set(Details are 4.4.5 alarm functions.)

Upper bound temperature: The upper bound temperature is set.  
 Lower bound temperature: The lower bound temperature is set.

#### Record interval

The record interval is set.

#### Reservation

The date when the record begins is set.

### 4-4-3 Record end/reservation cancellation

Reservation cancellation ("record stop ") is clicked.



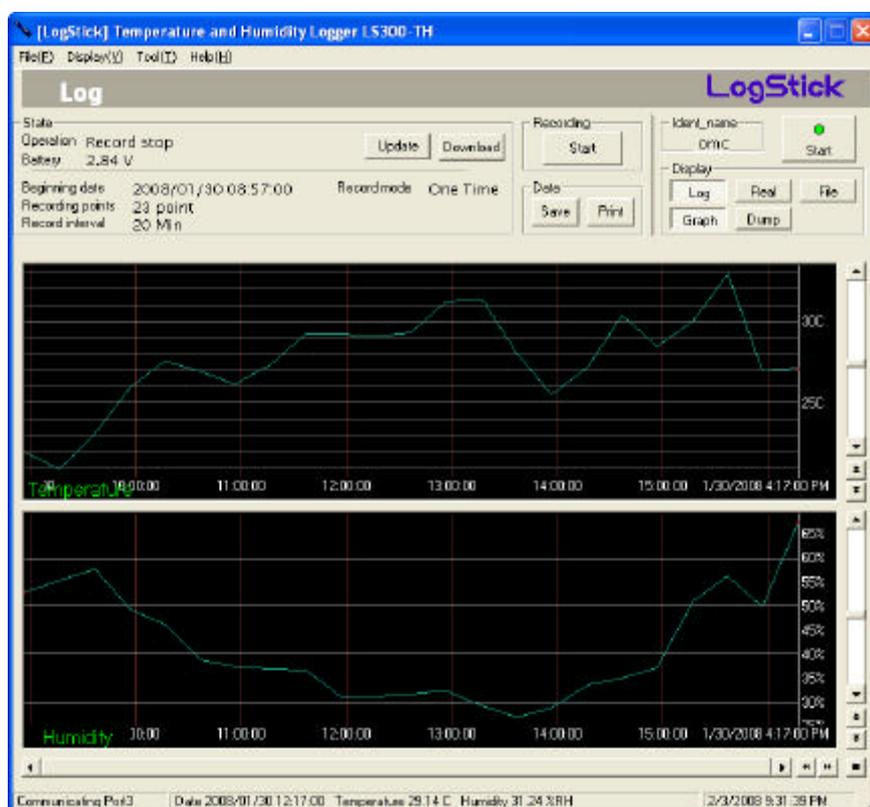
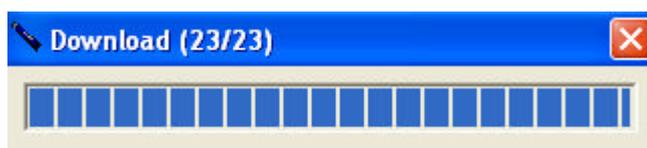
#### 4-4-4 Download

Recorded temperature and humidity data are transmitted to the personal computer. Please click "Download".

When forwarding to the personal computer ends, the graph or the dump data is displayed.

Attention

- Please do not do other operations while downloading it.
- Please set the download mode to a low-speed mode, and download it again when the message of "Failed in download" appears while downloading it. (Refer to 4-4-5 download to the mode. )



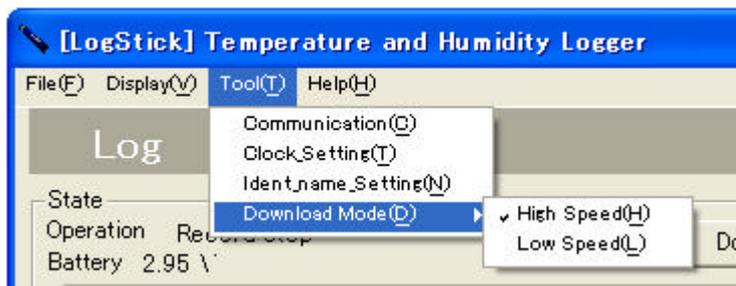
#### 4-4-5 Download mode

There are a high-speed mode and a low-speed mode.

Please set to a high-speed mode, and download it usually.

(Default is a high-speed mode. )

Please set to a low-speed mode, and download it again when the message of "Failed in download" appears while downloading it.



#### 4-4-6 Alarm Function

The set upper bound and the lower bound temperature can be compared with the recorded temperature.

When the upper bound or the lower bound temperature is exceeded, the following operation is done.

LED of green and the bitter orange blinks every five seconds.

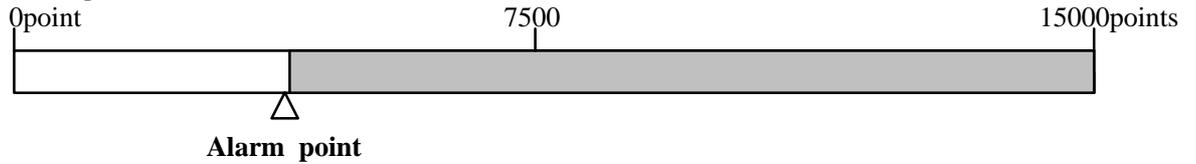
The data before the alarm is protected at the loop mode. 7500 points or less

When new data hangs to the protection data area, blinking and the measurement of LED are ended.

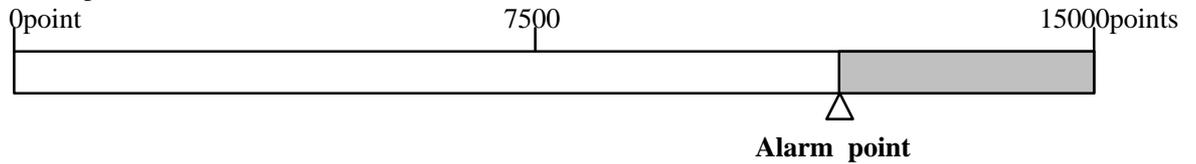
#### Writing image in memory

##### One time mode

(Example 1)



(Example 2)

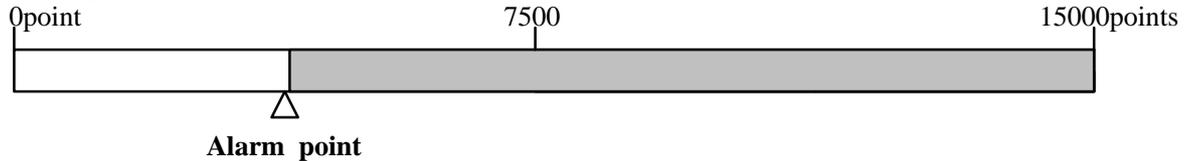


The LED lighting begins by abnormal generation.

When recording up to 15000 points of the maximum record point, the record is ended.

##### Loop mode

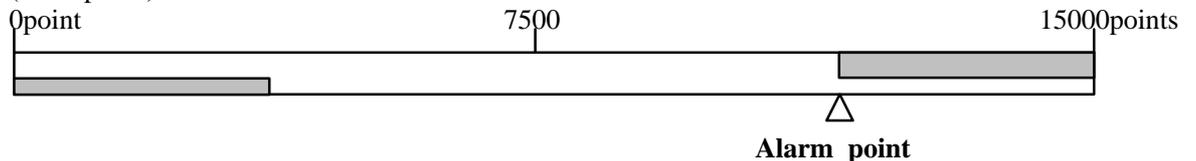
(Example 1)



The LED lighting begins by abnormal generation.

When recording up to 15000 points of the maximum record point when recording points are 7500 points or less, the record is ended.

(Example 2)



The LED lighting begins by abnormal generation.

When 7500 points are recorded when recording points are 7500 points or more, the record is ended.

 Recorded data after it is alarm point

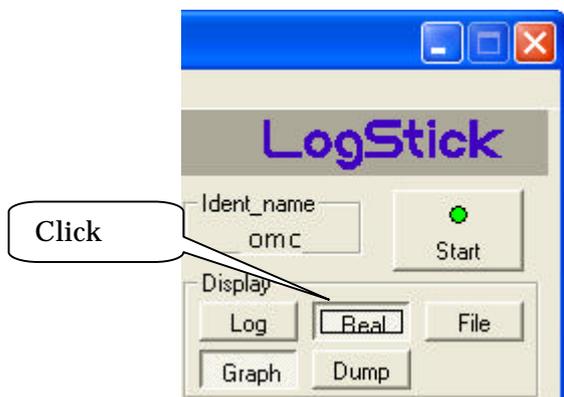
#### 4-5 Real-time measurement

The feature of a Real-time measurement is as follows.

A present temperature and humidity are measured while connected with the personal computer.  
The measurement interval can be set in 2-59 seconds,1-240 minutes at a continuous measurement.

Attention  
The measurement resolution decreases every two seconds.

Please make the display "Real time" to operate a real-time measurement.

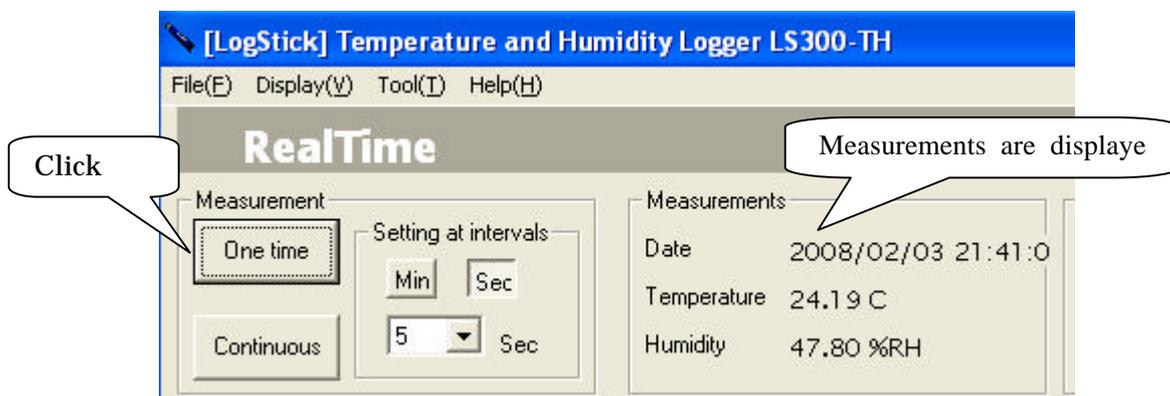


It is possible to operate it on "Real time" screen as follows.

##### 4-5-1 One time measurement

A present temperature and humidity are measured while connected with the personal computer.  
Please click "one time measurement".

Attention  
An interval set item is disregarded.

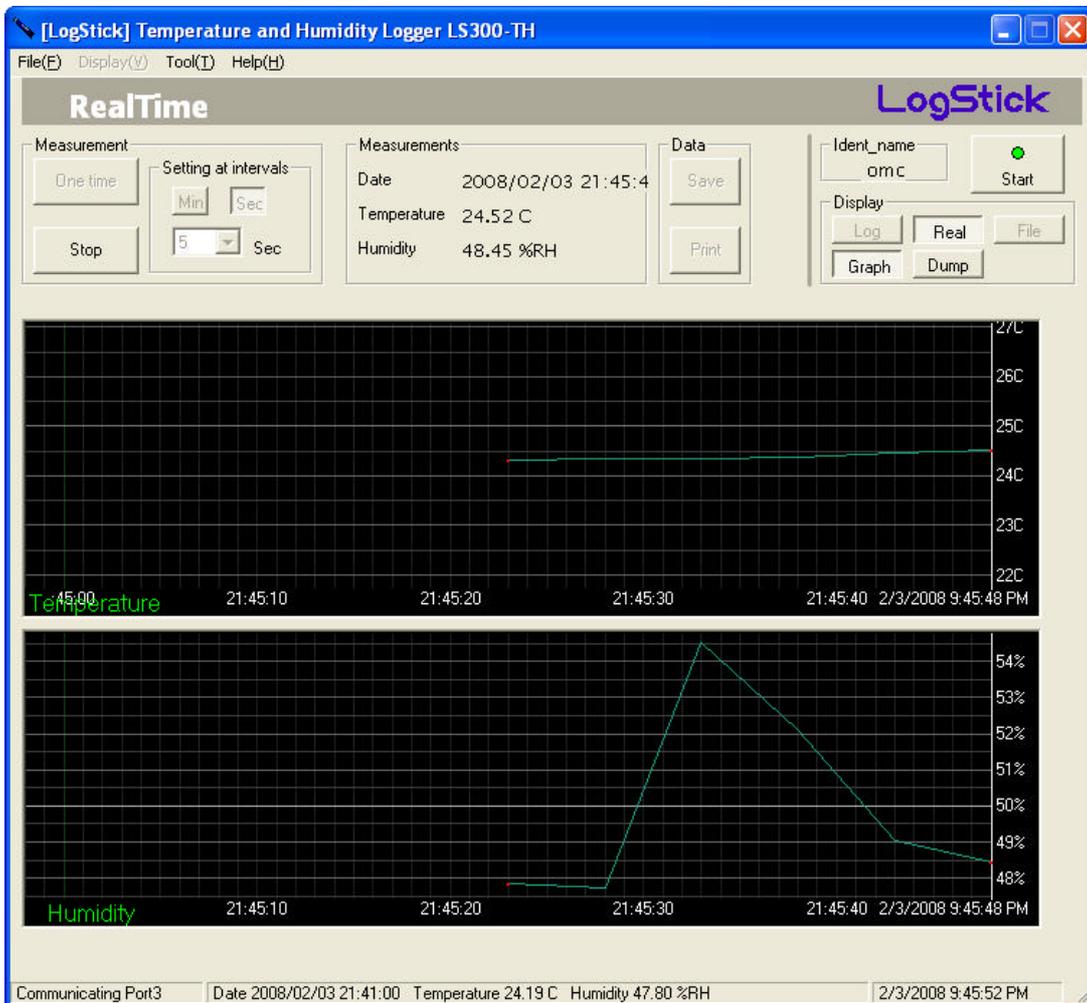
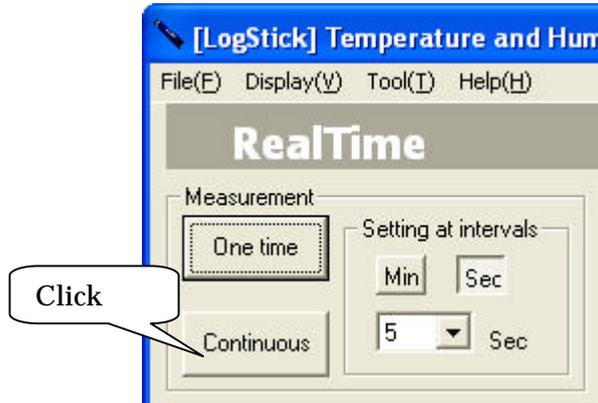


#### 4-5-2 Continuous measurement

The temperature at constant intervals and humidities are measured while connected with the personal computer.

Measurements do the graph or the dump display.

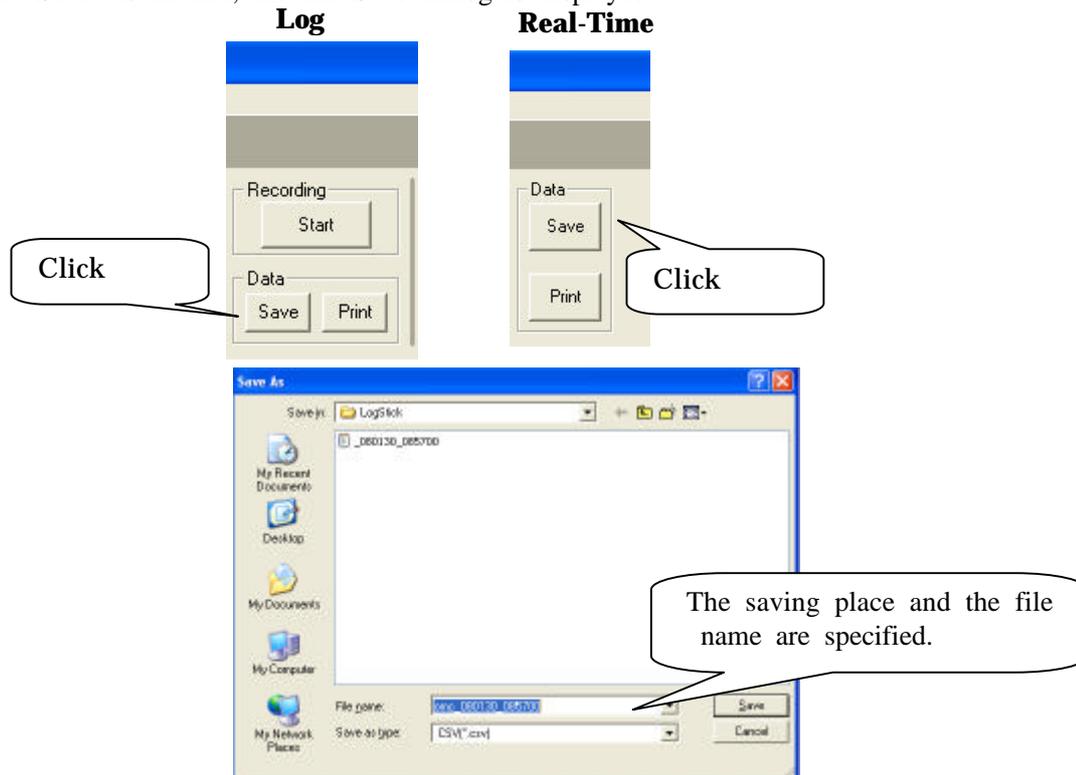
Please set the measurement interval and click "continuous measurement "



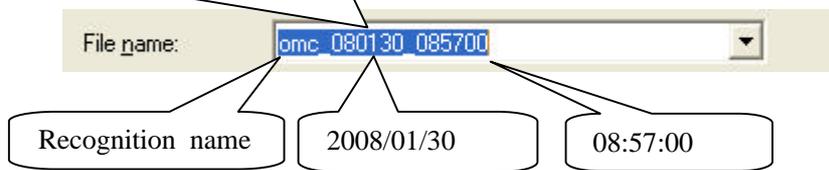
#### 4-6 File preservation of temperature and humidity data

The recorded data can be preserved in the file of Comma Separated Value.

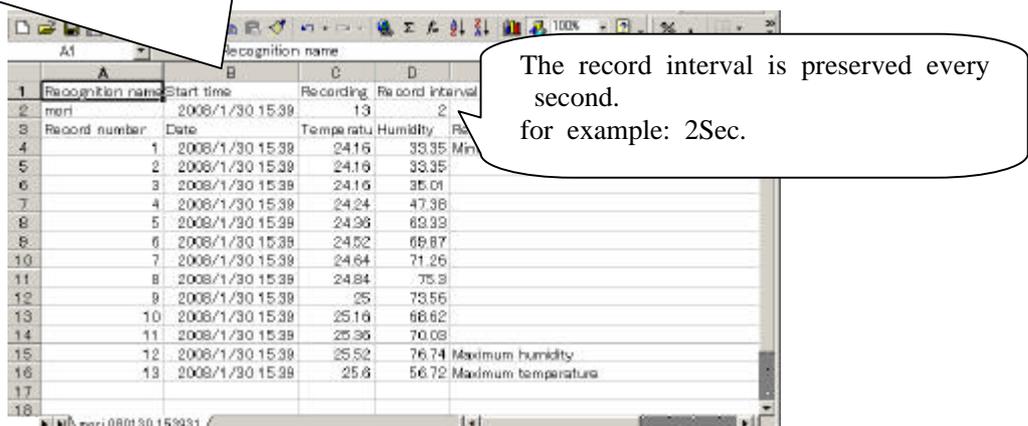
When "Save" is clicked, the file Save dialog is displayed.



An initial value of the file name shows the recognition name and the record



The saved file can be inspected by the spreadsheet like the note pad and Excel,

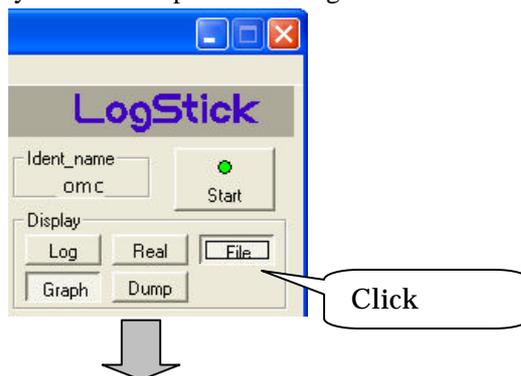


**Attention**

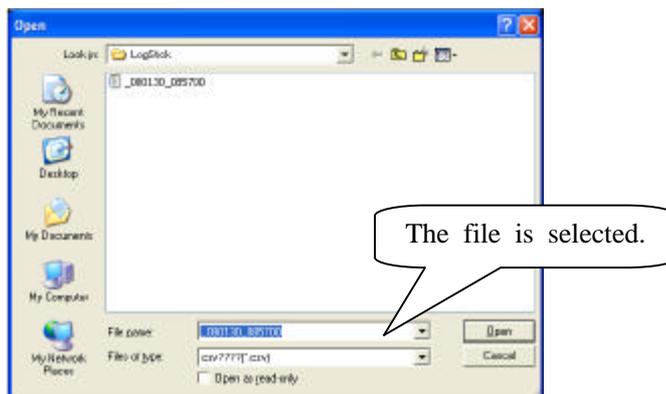
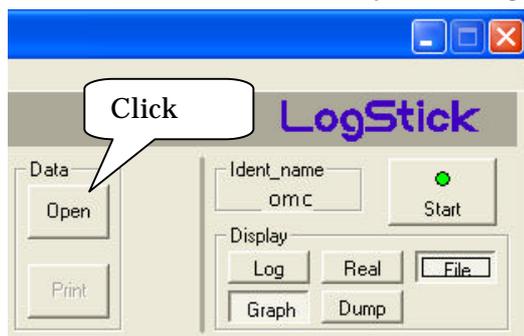
- Time and data might be omitted according to the spreadsheet used. In that case, please change, and display the setting of the spreadsheet. Example: The second with Excel2003 at the display Please set it to second display at format > cell > display form > time.

#### 4-7 Reading of temperature and humidity data file

The temperature and the humidity data file preserved in the personal computer are read. Please make the display "File" to operate reading the file.



Please click "Load" and select the file read by the dialog.

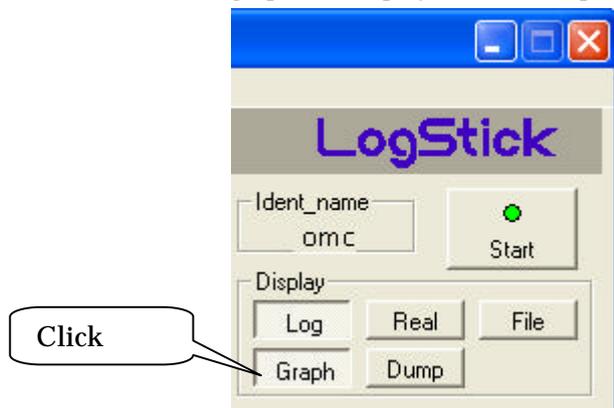


## 4-8 Graphical /Dump display

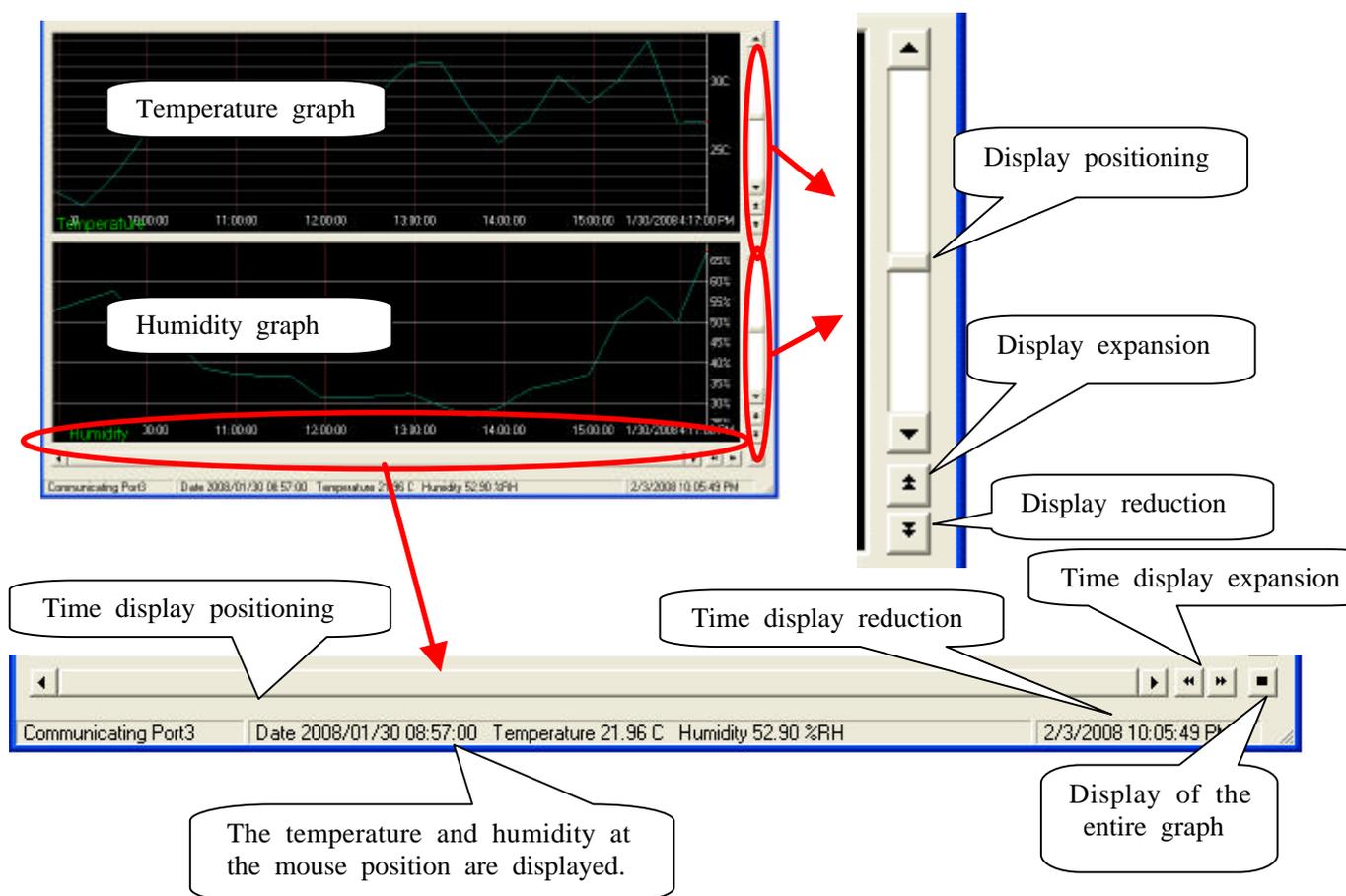
As for the temperature and the humidity data, the display confirmation can be done by the graph and the dump.

### 4-8-1 Graphical display

The switch to the graphical display clicks "Graph "



### Graph display each part explanation





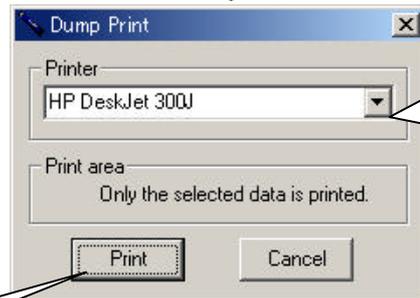
## 4-9 Print

### 4-9-1 Graph print

The printed range is displayed, and "Print" is clicked.



printed range is displayed.



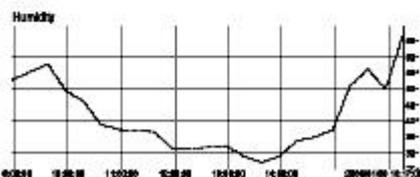
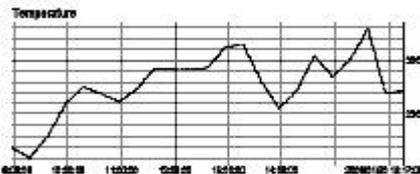
The printer is selected.  
A standard setting of the printer becomes effective.  
Please set the form to the A4 length.

```

Recorded items      Print area
Start time 2008/01/30 08:57:00      Only the selected data is printed.
Recording width 23 Point
Record interval 20 Min

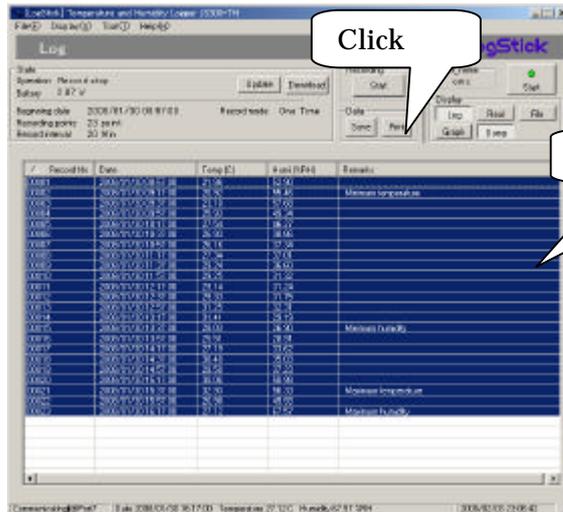
Print events
Minimum temperature 40.000C-40.000C(99.2F) 15:17:00-40.000C
Minimum humidity 40.000%-40.000% 08:17:00-40.000%
Minimum humidity 40.000%-40.000% 08:17:00-40.000%
Minimum humidity 40.000%-40.000% 15:17:00-40.000%

Range of selection
Maximum temperature 40.000C-40.000C(99.2F) 15:17:00-40.000C
Minimum temperature 40.000C-40.000C(99.2F) 08:17:00-40.000C
Maximum humidity 40.000%-40.000% 08:17:00-40.000%
Minimum humidity 40.000%-40.000% 15:17:00-40.000%
    
```

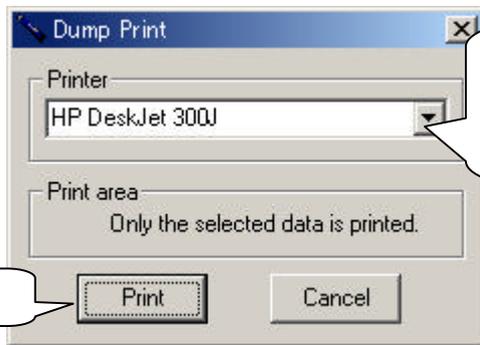


## 4-9-2 Dump print

The printed data is selected by mouse and "Shift key" (range selection) and "Ctrl key" (individual selection), and "Print" is clicked.



printed data is selected.



The printer is selected.  
A standard setting of the printer become effective.  
Please set the form to the A4 length.

Recognition name omc In all records  
 Start time 2008/1/30 16:17:00 Maximum temperature\* @ 00021\* @2008/01/30 16:37:00\* @32.83 C  
 Recording pointer @25 Point Minimum temperature\* @ 00003\* @2008/01/30 08:17:00\* @20.92 C  
 Record interval 20 Min Maximum humidity\* @ 00023\* @2008/01/30 16:17:00\* @97.57 %RH  
 Minimum humidity\* @ 00916\* @2008/01/30 13:37:00\* @26.80 %RH

Range of selection  
 Maximum temperature\* @ 00021\* @2008/01/30 16:37:00\* @32.83 C  
 Minimum temperature\* @ 00003\* @2008/01/30 08:17:00\* @20.92 C  
 Maximum humidity\* @ 00023\* @2008/01/30 16:17:00\* @97.57 %RH  
 Minimum humidity\* @ 00916\* @2008/01/30 13:37:00\* @26.80 %RH

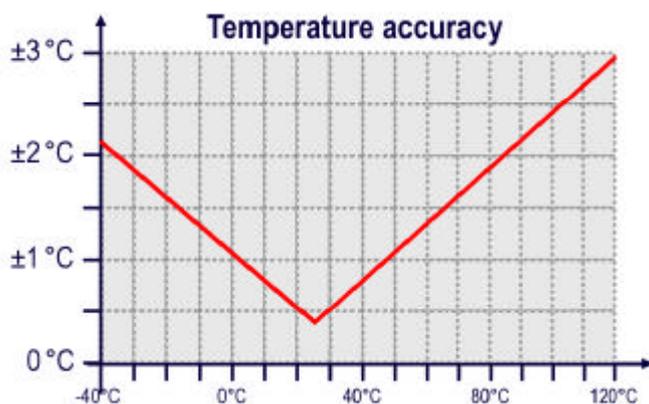
Record No	Time	Temp (C)	Hum (%RH)	Remarks
0001	2008/01/30 08:57:00	21.98	32.00	
0002	2008/01/30 09:17:00	23.82 * e	35.45	Minimum temperature
0003	2008/01/30 09:37:00	24.10	37.36	
0004	2008/01/30 09:57:00	25.85	49.34	
0005	2008/01/30 10:17:00	27.54	48.77	
0006	2008/01/30 10:37:00	28.05	33.83	
0007	2008/01/30 10:57:00	28.16	37.34	
0008	2008/01/30 11:17:00	27.34	37.01	
0009	2008/01/30 11:37:00	28.24	36.60	
0010	2008/01/30 11:57:00	29.25	31.32	
0011	2008/01/30 12:17:00	28.14	31.34	
0012	2008/01/30 12:37:00	29.35	31.75	
0013	2008/01/30 12:57:00	31.26	32.31	
0014	2008/01/30 13:17:00	31.41	28.19	
0015	2008/01/30 13:37:00	29.05	23.90 * e	Minimum humidity
0016	2008/01/30 13:57:00	25.51	23.91	
0017	2008/01/30 14:17:00	27.19	33.82	
0018	2008/01/30 14:37:00	30.40	33.02	
0019	2008/01/30 14:57:00	29.50	37.23	
0020	2008/01/30 15:17:00	30.06	30.85	
0021	2008/01/30 15:37:00	32.33 * *	33.33	Maximum temperature
0022	2008/01/30 15:57:00	29.88	38.82	
0023	2008/01/30 16:17:00	27.12	37.97 * *	Minimum humidity

## 5 Specification

Sensor specification		
Temperature Sensor	Number of channels	1CH
	Range	-20 deg C - +70 deg C    -4 deg F- +158 deg F
	Resolution	0.01 deg C(14 bit) more than 3seconds sampling rate
		0.04 deg C(12 bit) 2 seconds sampling rate
		0.02 deg F(14 bit) more than 3seconds sampling rate
0.07 deg F(12 bit) 2 seconds sampling rate		
Accuracy	±0.8 deg C(at 25degC)    ±0.7 F(at 77 deg F) <b>Fig.1</b>	
Humidity Sensor	Number of channels	1CH
	Range	5-90%
	Resolution	0.03%RH(12bit) more than 3seconds interval
		0.5%RH (8bit) 2 seconds interval
Accuracy	± 4.0% (20-80%) <b>Fig.2</b>	
Product specification		
Storage capacity	15000 points or less (100 times or less of prohibition/permission switch)	
Measurement interval	2-59 sec,1-240 min	
Interface	USB	
Clock function	Building into	
Battery	CR1220 (It is possible to exchange it.)	
Battery longevity	One year(In measurement interval = one hour. )	
Size	100 * 10 *21 mm	
Weight	About 20g(The weight of the battery doesn't contain it. )	
OS(The personal computer control software free is distributed. )	Windows Xp    Windows Vista	
Accessory	CR1220    Button battery for test(Install it in the main body. ) Keeping bag for main body Guarantee certificate Install Software CD	

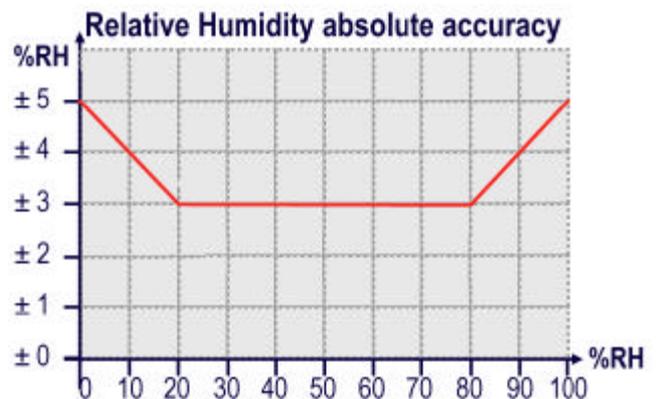
**Fig.1**

The temperature measurement accuracy changes depending on the measurement temperature.



**Fig.2**

The humidity measurement accuracy changes depending on the measurement humidity.



**Osaka Micro Computer,INC**