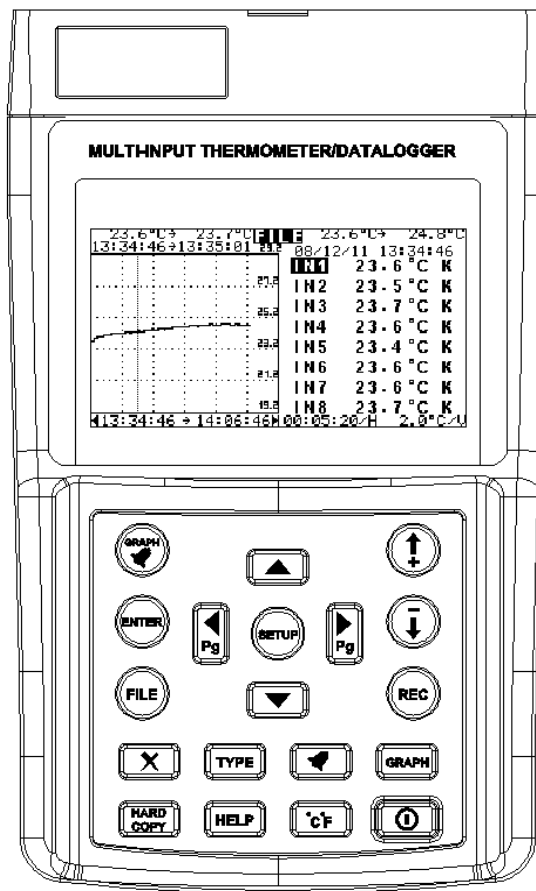


Multi-Input Thermometer/Datalogger

Software Manual



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1. Introduction

1.1 Operation Environment

- * Application Program (the Software) should be installed in the operation system of Microsoft Windows Vista / XP / 2000 (SP3).
- * USB driver program should be installed (the Software will install it automatically).

2. Hardware

- * Personal Computer (PC): we recommend the processor of Pentium 4 Celeron 1.2GHz or above.
- * RAM: we recommend 512MB or above.
- * Screen resolution: requires 1024 x 768 pixels.
- * Multi-Input Thermometer/Datalogger (“Thermometer” for short in this manual; firmware: version 2.0 or above.)
- * USB cable.

2.1 Connecting Procedures

- Step 1: Turn on PC and Thermometer.
- Step 2: Connect USB Cable properly.
- Step 3: Start the Software of Thermometer.
- Step 4: Click “Communication” button on the display.

3. Software Installation

3.1 Install Software

Execute Install.bat (which is in the installation disc) to enter the procedures of installing the Software. Please follow the instructions to install the Software. During the installation, the USB driver program and the Thermometer Software will be installed automatically.

Remark:

1. After putting the software disc into CD-ROM drive, the Software will automatically execute the installation.
2. If the installation is not automatically executed, please choose the Install.bat program in the software disc to perform the installation.
3. After the Software has been installed, please restart the system.

3.2 Install USB Driver

During the installation of the Software, the USB driver program will be installed automatically.

However, if users need to install USB driver program, please choose the USB Driver Directory in the software disc, click [CP210xVCPInstaller.exe](#) program (for Windows Vista / XP / 2000) to execute the installation of USB Driver.

Remark:

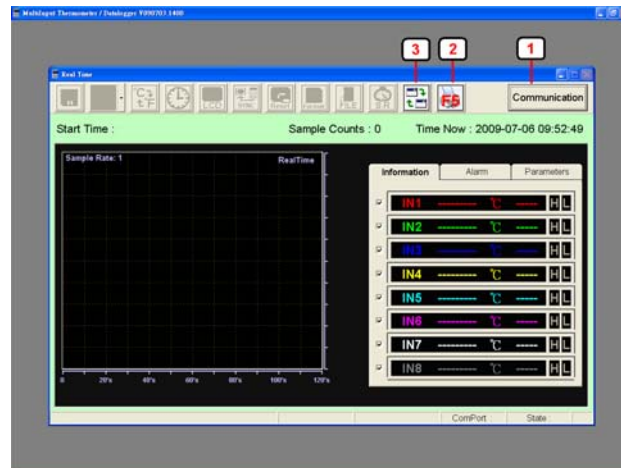
1. If the driver program can't detect the hardware, please remove the hardware and then plug it in properly.

4. Software Operation

4.1 Start Executing Software

Click Start -> All Programs -> "MultiInput Thermometer/Datalogger" or click the shortcut to start executing the Software.

(The display of Real Time is as below)



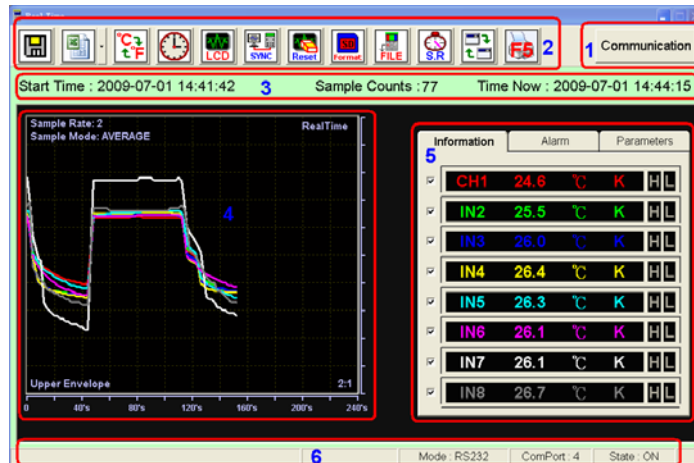
1. Communication: after click "Communication", the software will check if the Thermometer is connecting with PC. When the PC can not locate the Thermometer, the display will show "No ComPort": at this moment please check if the "RS232 to USB cable" is well plugged in PC and the USB driver is installed. (Check the Control Panel: click Control Panel → System → Hardware, refer to the hardware installer of the system).

After the communication between PC and Thermometer is successful, all the functions of the Tool Bar will be open for users. And then, if the PC fails to receive the data from the Thermometer for 10 continuous times, the communication will be stopped and some functions of the Tool Bar will be closed.

2. Print Screen: the PC display will be printed out by a printer.

3. Open Files: The dat files (which are saved in the PC) and the pro files (which are saved in the SD card) can be opened when the Thermometer is not connecting PC.

4.2 “Real Time” Working Window



There are six main parts in this window:

1. Communication.
2. Tool bar.
3. Record information.
4. Data Chart.
5. Information, Alarm and Parameters.
6. Message.

1. Communication

To get the information of the Thermometer, first make sure the communication between the Thermometer and the PC work well.

If the communication with the Thermometer is stopped during operation, the PC will display a warning - "ComPort No Response !", users can always click "Communication" to reconnect the Thermometer. However, if the reconnecting still fails, please restart the Software and the Thermometer.

2. Tool Bar



Save: Save all the present values to a file named *.DAT



Export: All the present record data will be exported to files in the formats of CSV(,) or TAB (tab) which can be read in EXCEL.



Temperature unit switch: The present temperature unit of the Software will be toggled between °C and °F.



Time calibration: The time of the Thermometer will be calibrated per the present time of PC.



Synchronized display: The Software and the Thermometer will display in synchronization for the convenience of recording. Note: This function will let the Thermometer restart recording. Suggestion: first switch the mode of the Thermometer to "GRAPH" before applying this Synchronized display function.



Reset: Remove all the records in the program, re-download the present defaults of the Thermometer, and restart the recording in the program. But this will not make the Thermometer to restart recording.



FILE : Read the files of the Thermometer (SD-CARD). This function is available when the USB cable is used to connect to PC and the Thermometer.

File Name	Size	Date	Time
T0000111.PRO	4096 B	2009-06-04	13:58:46
T0000112.PRO	4096 B	2009-06-04	14:00:06
T0000113.PRO	4096 B	2009-06-04	14:00:20
T0000114.PRO	4096 B	2009-06-04	14:01:24
T0000115.PRO	4096 B	2009-06-04	14:07:30
T0000116.PRO	10KB	2009-06-04	14:43:10
T0000117.PRO	4096 B	2009-06-04	16:27:06
T0000118.PRO	4096 B	2000-01-01	00:02:32
T0000119.PRO	4096 B	2009-06-08	08:38:58
T0000120.PRO	4096 B	2009-06-08	08:40:10
T0000121.PRO	4096 B	2009-06-08	08:40:24
T0000122.PRO	4448 B	2000-01-01	00:02:32
T0000123.PRO	24KB	2009-06-08	14:33:08
T0000124.PRO	4192 B	2000-01-01	00:02:32
T0000125.PRO	6048 B	2000-01-01	00:02:32
T0000126.PRO	4096 B	2000-01-01	00:02:32
T0000127.PRO	7024 B	2000-01-01	00:02:32
T0000128.PRO	4096 B	2000-01-01	00:02:32

When there is an SD-CARD in the Thermometer, users can read the *.PRO files (like above) in the SD-CARD.

RESET: press RESET button on the above display to re-read the contents of SD-CARD.

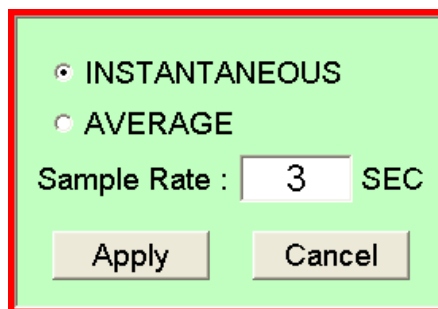
EXIT: press EXIT button on the above display to leave FILE mode for REAL TIME window.

OPEN: double click a file name or press OPEN button on the above display, a file will be opened under “Read File” mode.



Sample Rate: The data logged by the Thermometer is 1 sample per second, but this function allows users to choose a different sample rate.

For example, if users type in 3 seconds for the Sample Rate, then in Real Time mode the data (1 sample) will be logged per 3 seconds (as below).



There are two Sample Rate modes:

(1) INSTANTANEOUS: for example, if the Sample Rate is 3 sec., a data will be logged every 3 seconds.

(2) AVERAGE: for example, if the Sample Rate is 3 sec., the data of 3 seconds (1 figure for 1 sec.) will be summed up and then divided by 3. So the sampled data is an average value of the 3 seconds.

Sample Rate can be set from 1 to 99999 sec.

After setting up the Sample Rate and mode:

(1) press “Apply” to have the new setting for data logging;

(2) press “Cancel” to cancel the settings.



SD CARD format: Format the SD CARD of the Thermometer.



Read File: To open “Read File” working window.



Printing: To print out everything in the present “Real Time” working window.

3. Record Information

Start Time: The starting time of the first record.

Sample Counts: The number of the samples which are already recorded.

Time Now: The present date and time of the PC.

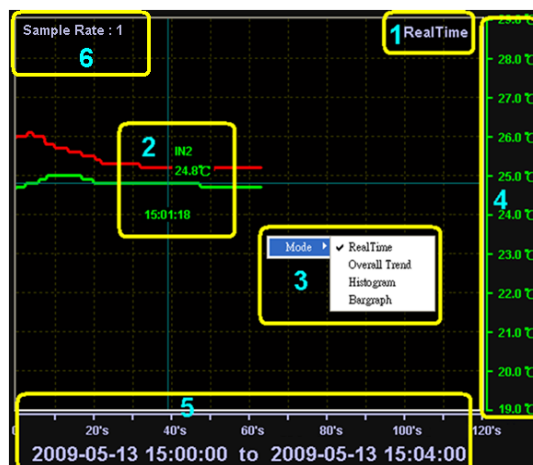
4. Data Chart

All the record data is displayed in this chart by curve or bar graph. Move the cursor to this “Data Chart” area, click the right button of the mouse, then there will be a menu of 4 displays for users to choose:

- A. Real Time
- B. Overall Trend
- C. Histogram
- D. Bar Graph

A. Real Time

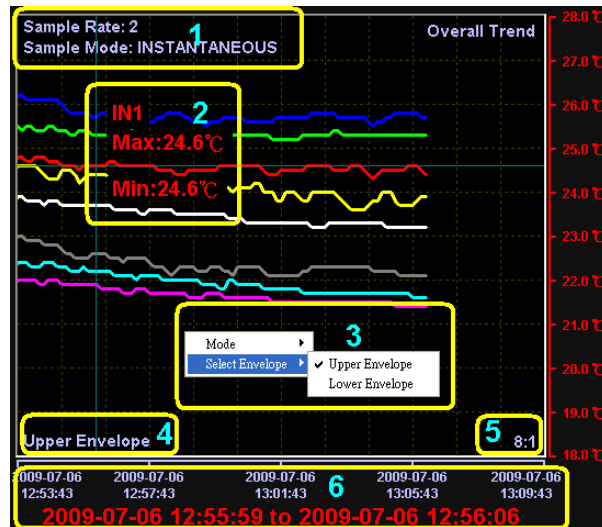
This page contains the record of 120 seconds. This display will be renewed every 120 seconds.



1. Present mode.
2. Value and time at the current cursor position. Beside using mouse, users can also use the direction buttons on the keyboard:
 - (1) Press \uparrow and \downarrow buttons to select a different input.
 - (2) Press \leftarrow and \rightarrow buttons to review different time of a certain input.
3. Click the right button of the mouse, there will be a menu for users to choose other mode.
4. Value Scale: Each input is displayed in different colors.
5. Time Scale: It shows the record starting time and ending time of this window (page).
6. Present Sample Rate and Sample Mode.

B. Overall Trend

All the data displayed here are curves so that users can observe the overall trend. This function is a great advantage over a traditional recorder which can only display data “page by page”.

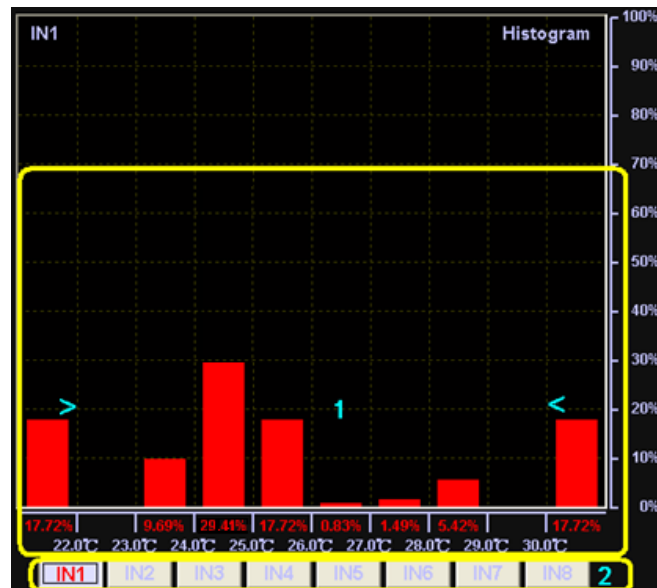


1. Present Sample Rate and Sample Mode.
2. The max. and min. values of the time period at the present cursor position.
3. In “Overall Trend” mode, click the right button of the mouse, there will be a menu for users to select:
 - (1) Mode;
 - (2) Envelope: users can choose a chart mode between
 - Upper Envelope: overall trend is drawn per max. values of every period of time.
 - Lower Envelope: overall trend is drawn per min. values of every period of time.
4. Present chart drawing mode.
5. The compression ratio. For example, 8:1 means there is 8-second data in each cursor position. However, it doesn't mean there are 8 data (sample count) in each cursor position. E.g., if the sample rate is 2 sec. there is 4 data (sample count) in each cursor position. And the max. and min. values are shown at each cursor position.
6. The starting time and ending time at the present cursor position.

C. Histogram

In this Histogram window, the bar graph shows the percentages of data fall within each temperature range.

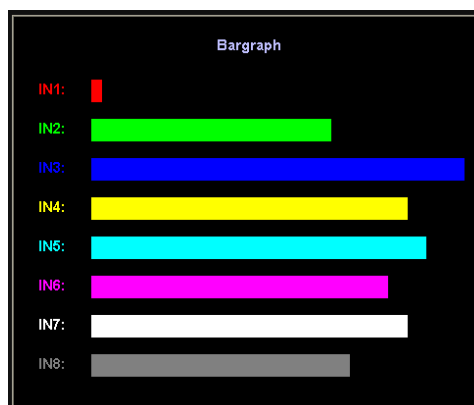
And the total of all the percentages is 100%.



1. The bar graph shows the percentages of data fall within each temperature range. For example, 29.41% of data falls within the temperature range of 24.0~25.0°C. The far left bar shows 17.72% of data falls within the temperature range which is smaller than 22.0°C. The far right bar shows 17.72% of data falls within the temperature range which is bigger than 30.0°C.
2. Users can select any input to review its bar graph.

D. Bar Graph

This window can compare the update values of the 8 inputs.



First, compare the 8 inputs and find out the input of the max. value and the input of the min. value. The input of the max. value is plotted as the longest bar (like IN3), and the input of the min. value is plotted as the shortest bar (like IN1). And the bar lengths of the other 6 inputs will be plotted in proportional to the difference between the longest and shortest bars such like (INX temperature – IN1 temperature) : (IN3 temperature – IN1 temperature).

5. Information and Parameter Setting

It shows Information in figures; provides the functions of setting Alarm and Parameters.

Information	Alarm	Parameters
<input checked="" type="checkbox"/> IN1 24.4 °C K H L		
<input checked="" type="checkbox"/> IN2 25.1 °C K H L		
<input checked="" type="checkbox"/> IN3 25.5 °C K H L		
<input checked="" type="checkbox"/> IN4 25.3 °C K H L		
<input checked="" type="checkbox"/> IN5 25.3 °C K H L		
<input checked="" type="checkbox"/> IN6 25.2 °C K H L		
<input checked="" type="checkbox"/> IN7 25.3 °C K H L		
<input checked="" type="checkbox"/> IN8 25.1 °C K H L		

A. Real time Information

A-1: Under Real Time, Overall Trend and Bar Graph modes:

1. Name of each input.
2. Present value.
3. Temperature unit.
4. Thermocouple type or mV.
5. Warning for High/Low temperature:
 - (1) When H turns red means the present temperature is higher than the HI limit;
 - (2) when L turns red means the present temperature is lower than the LO limit.
6. Check to display the selected input. Leave blank to disable display of the selected input.

Information	1	2	3	4	5
<input checked="" type="checkbox"/> IN1 24.4 °C K H L					
<input checked="" type="checkbox"/> IN2 25.1 °C K H L					

A-2: Under Histogram mode:

The "Information" will show:

1. The present reading.
2. The min. value.
3. The data after the Min. means the total time for readings lower than LO limit.
4. The max. value.
5. The data after the Max. means the total time for readings higher than HI limit.

Information	Reading	Min	Max
<input checked="" type="checkbox"/> IN1 24.6°C	24.0°C	000001	25.1°C
<input checked="" type="checkbox"/> IN2 25.1°C	24.8°C		25.5°C

B. Setting Alarm Ranges

1. Type in LO limit. If readings are lower than it, the L mark on Information will glitter.
2. Type in HI limit. If readings are higher than it, the H mark on Information will glitter.
3. Check to display the selected input. Leave blank to disable display of the selected input.

Alarm	1	2
<input checked="" type="checkbox"/> IN1 L 10.0°C H 37.7°C		
<input checked="" type="checkbox"/> IN2 L 10.0°C H 37.7°C		

C. Parameter Setting

	1	2	3	4
	Name	A1	B1	Unit
1:	IN1	0.001	0	VIN1
2:	IN2	0.001	0	VIN2
3:	IN3	0.001	0	VIN3
4:	IN4	0.001	0	VIN4
5:	IN5	0.001	0	VIN5
6:	IN6	0.001	0	VIN6
7:	IN7	0.001	0	VIN7
8:	IN8	0.001	0	VIN8

5 Load Default OK

(Refer to the parameter setting of the Thermometer operation manual).

1. Name of each input.
2. A1 (the gain of analog output).
3. B1 (The offset value).
4. Unit under mV mode.
5. Load Defaults.

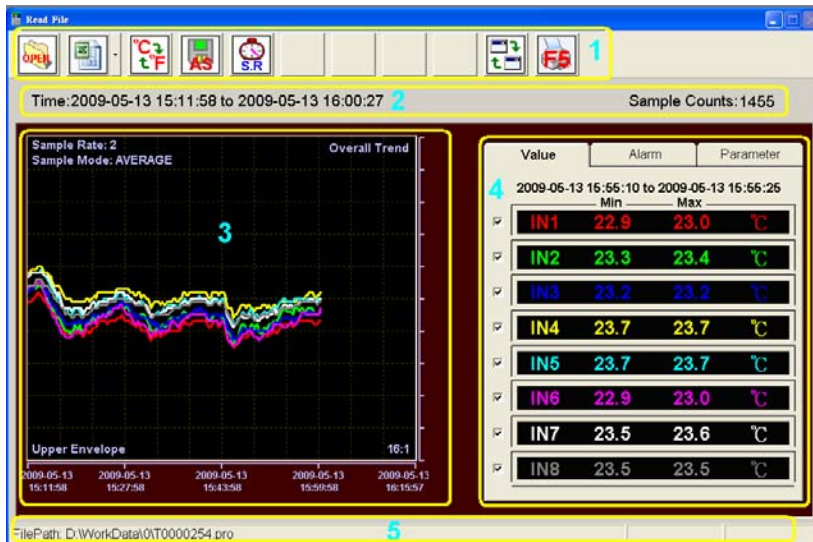
Users can type in new names and numbers. When press OK button, the present (parameter) settings will be sent to the Thermometer. After the parameters of the Thermometer is updated, the software will then download the (new) parameters from the Thermometer. Both the software and the Thermometer will operate according to the new parameters.

6. Message

Search Paperless Recorder Loading... Mode: RS232 ComPort: 4 State: ON

This part shows “the percentage of progress” of various software operation and the communication status with the Thermometer.

4.3 “Read File” Working Window



The operation of “Read File” window is the same as the operation of “Real Time” window.

There are five main parts in this window:

1. Tool bar.
2. Record information.
3. Data Chart.
4. Value, Alarm and Parameters.
5. Message.

1. Tool Bar



Open: Open the files named *.DAT (files saved by PC) or *.PRO (files saved by the Thermometer).



Export: All the present record data will be exported to files in the formats of CSV(,) or TAB (tab) which can be read in EXCEL.

Note: This function will be unavailable when the file format of *.PRO or *.DAT is HARDCOPY (the hardcopy file is always 4096 byte).



Save as a new file: After click FILE → press OPEN button under Real Time mode, a Read File window will be opened if users open a file named *.PRO. And then, if users want to save this data as a new file (*.DAT or *.PRO), they can use this function.



Temperature unit switch: The present temperature unit of the Software will be toggled between °C and °F.



Real Time: To return to the “Real Time” working window.



Printing: To print out everything in the present “Read File” working window.



Sample Rate: The data logged by the Thermometer is 1 sample per second, but this function allows users to choose a different sample rate.

For example, if users type in 3 seconds for the Sample Rate, then in Real Time mode the data (1 sample) will be logged per 3 seconds (as below).

☒ INSTANTANEOUS
☐ AVERAGE
Sample Rate : 3 SEC
Apply Cancel

This function is available only when the sample rate of the opened file is 1 (sec.). The curves will be changed according to different settings. This function is also available when reading the SD-CARD files of the Thermometer.

If users open a *.PRO file and then use the function "Save as a new file" to save a new file:

- (1) the Sample Rate and Sample Mode of this new file (*.DAT) will be the same as the ones of the original *.PRO;
- (2) that is, the Sample Rate and Sample Mode of this new file (*.DAT) will not be changed if users use the "Sample Rate" function to set up new Sample Rate.

There are two Sample Rate modes:

- (1) INSTANTANEOUS: for example, if the Sample Rate is 3 sec., a data will be logged every 3 seconds.
- (2) AVERAGE: for example, if the Sample Rate is 3 sec., the data of 3 seconds (1 figure for 1 sec.) will be summed up and then divided by 3. So the sampled data is an average value of the 3 seconds.

Sample Rate can be set from 1 to 99999 sec.

After setting up the Sample Rate and mode:

- (1) press "Apply" to have the new setting for data logging;
- (2) press "Cancel" to cancel the settings.

2. Record Information

Time: The starting time and the ending time of recording.

Sample Counts: The number of the samples which are already recorded.

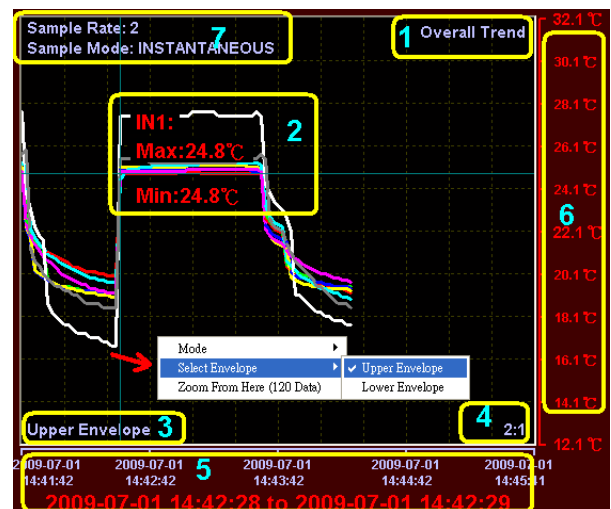
3. Data Chart

Move the cursor to this “Data Curve” area, click the right button of the mouse, then there will be a menu of 3 displays for users to choose:

- A. Overall Trend
- B. Step by Step
- C. Histogram.

A. Overall Trend

All the data displayed here are curves so that users can observe the overall trend. This function is a great advantage over the traditional Recorder which can only display data “page by page”.



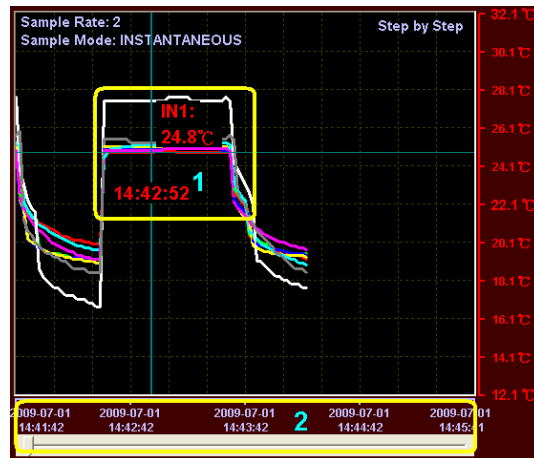
1. Present mode.
2. The max. and min. values of the time period at the present cursor position.
3. Present chart drawing mode.
4. The compression ratio. It shows the time period of each cursor position. For example, 2:1 means the time period of each cursor position is 2 seconds.
5. Starting time and ending time at the present cursor position.
6. Y Scale: The scale of each input is displayed in different colors.
7. Present Sample Rate and Sample Mode.

In “Overall Trend” mode, click the right button of the mouse, there will be a menu for users to select:

- (1) Mode: Step by Step; Overall Trend; Histogram.
- (2) Select Envelope: users can choose a chart mode between
 - Upper Envelope: overall trend is drawn per max. values of every period of time.
 - Lower Envelope: overall trend is drawn per min. values of every period of time.
- (3) Zoom From Here (120 Data): (Switch the mode from Overall Trend to Step by Step) The display will show the detail data of the time period at the present cursor position.

Note: The functions of “Mode” and “Zoom From Here (120 Data)” will be unavailable when the file format of *.PRO or *.DAT is HARDCOPY (the hardcopy file is always 4096 byte).

B. Step by Step



1. The value and time of the cursor position. Beside using the mouse, users can also use the direction keys of the keyboard to select a cursor position:

(1) ↑ and ↓ buttons: to choose an input.

(2) press ← button (time scale turn left) means backward:

If the cursor is already at the 1st data, when users press ← button, it will roll over to the last data.

(3) press → button (time scale turn right) means forward: If the cursor is already at the last data, when users press → button, it will roll over to the 1st data.

2. The time of the present data. When users press ← and → buttons to select a position out of the present (time) scale range, the scale and display will be changed accordingly. Users also can use the tracking bar on below to quickly search for the desired area. (The desired data won't be displayed until users release the tracking bar.)

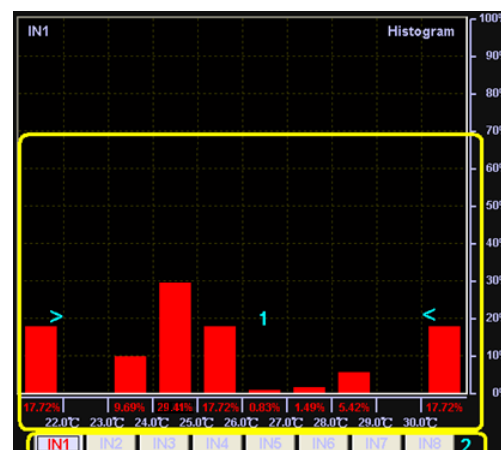
C. Histogram

In this Histogram window, the bar graph shows the percentages of data fall within each temperature range.

And the total of all the percentages is 100%.

1. The bar graph shows the percentages of data fall within each temperature range. For example, 29.41% of data falls within the temperature range of 24.0~25.0°C. The far left bar shows 17.72% of data falls within the temperature range which is smaller than 22.0°C. The far right bar shows 17.72% of data falls within the temperature range which is bigger than 30.0°C.

2. Users can select any input to review its bar graph.



4. Value, Alarm, Parameter

It shows the information of the time period at the cursor position:

(1) Value: max. and min. values of each input.

(2) Alarm.

(3) Parameter.

Here users can only review the alarm settings and parameter settings, they can not change these settings.

Value	Alarm	Parameter
2009-04-18 09:06:19 to 2009-04-18 09:14:50		
	Min	Max
<input checked="" type="checkbox"/> IN1	-34.00u	-38.00u VIN1
<input checked="" type="checkbox"/> IN2	-104.0u	-108.0u VIN2
<input checked="" type="checkbox"/> IN3	-96.00u	-98.00u VIN3
<input checked="" type="checkbox"/> IN4	98.2	98.1 °F
<input checked="" type="checkbox"/> IN5	53.2	53.0 °F
<input checked="" type="checkbox"/> IN6	53.4	53.2 °F
<input checked="" type="checkbox"/> IN7	98.8	98.7 °F
<input checked="" type="checkbox"/> IN8	53.0	52.8 °F

The VALUE under different modes are with different messages (see below).

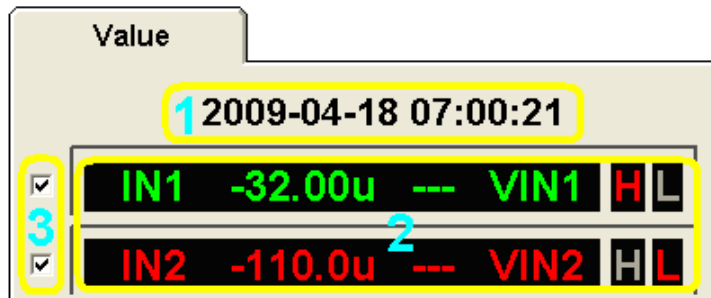
A. Value under Overall Trend mode

Value		
1 2009-04-18 03:50:35 to 2009-04-18 03:59:06		
	Min	Max
<input checked="" type="checkbox"/> 3 IN1	-32.00u	-36.00u VIN1
<input checked="" type="checkbox"/> IN2	-110.0u	-112.0u VIN2

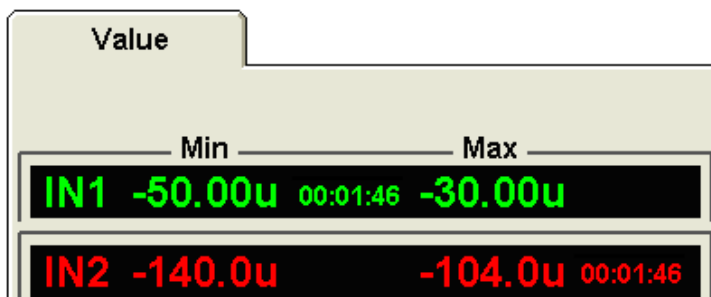
1. It shows the time period at the present cursor position.

2. It shows the name of each input and its Min./Max. values during the time period.

3. Put a tick to let the curve of this input be drawn.

B. Value under Step by Step mode

1. It shows the time at the present cursor position.
2. It shows below information of each input:
 - (1) the name of each input;
 - (2) its present value and unit;
 - (3) if the value is higher than the HI limit: if yes, then the H letter will be in red;
 - (4) if the value is lower than the LO limit: if yes, then the L letter will be in red.
3. Put a tick to let the curve of this input be drawn.

C. Value under Histogram mode

It shows:

- (1) the Min. and Max. values of one input;
- (2) the data after Min. is the total time for readings lower than LO limit;
- (3) the data after Max. is the total time for readings higher than HI limit.

5. Message

FilePath: D:\WorkData\830\T0000077.pro

This part shows the file path and file name of the loading file; and the export progress.