

e. MICRO-PROFILER™

Operation Manual

SMP-306

PC Software V1.51
Manual V1.31



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* Attachment

– Test Certificate and Sample

– A/S Request Form

(You can use the copies of A/S Request Form;

You are kindly requested to provide us with the correct information)

1. Specification of Micro-profiler

1.1 Dimension

(Unit : L×W×H/mm)

MODEL	SMP-304	SMP-306
Memory Unit	240 × 46 × 18	240 × 51.8 × 18
Protect Case	299 × min85(max260) × 26	299 × min88(max263) × 26

1.2 Measurement range : 0~400℃

- If you want to do a measurement at a high temperature, you have to use the Heat-resistant Case.
- Maximum staying time while heating is in progress : 200 ℃ à Max. 5 minutes, 250 ℃ à Max. 2 minutes

1.3 Accuracy : ±1℃

1.4 Channels

- SMP-304 : 4ch by K-type sensor
- SMP-306 : 6ch by K-type sensor

1.5 Battery : 3.6V Ni-Mh Rechargeable Battery(LG Rechargeable battery or equivalent)

- Battery Guarantee : about 6 months(Life can vary depending upon the working condition)

1.6 Resolution

- Sampling Time : 0.1s, 0.2s, 0.5s, 1s, 2s, 5s, 10s.
- Total Samples : 500sec, 1000sec, 2000sec, 4000sec, 6000sec, 8000sec
ex) If sampling time of 0.5sec is selected for a total of 2000 samples, you can make a measurement for about 16 minutes.

1.7 Internal protect temperature : 5min at max70℃

1.8 P.C Spec

- IBM compatible or equivalent.
- Microsoft Windows XP.
- SVGA graphic card(256 color) or more.
- Resolution : 1024*768 pixels or more

1.9 Weight

MODEL	SMP-304	SMP-306
Memory Unit	204g	265g
Protect Case included	612g	706g
Full Package	2913g	3661g

2. How to set up your Micro-profiler

2.1. How to install PC Program


(1) PC system requirements for the use of Micro-profiler

- Windows XP is recommended
- Resolution to be 1024*768 pixels or more

(2) How to install Software

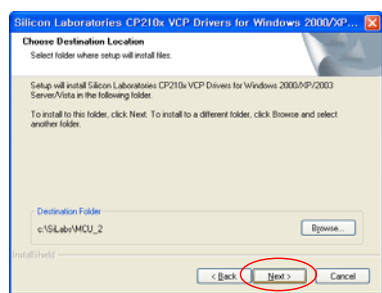
a. Put the CD in the drive and select and click on the following files

“CP210x_VCP_Win2k_XP-S2K3.exe” and “SMP-306.exe” and follow the instructions as shown below.


→









* Restart your PC when the installation is completed















※ An error message may appear as shown on the left depending on the system environment of Windows XP, but it does not affect the program itself

(3) Running the program

Click on the Windows **Start Menu** and select **All Programs** and click on **"SMP-304 or SMP-306"**

(4) Finishing Program

Click on **"Exit"** of the file menu on the main menu or click the  on the icon bar

(5) Creating a shortcut on the Desktop

Click the Start Button and select All Programs to show **"SMP-304 or SMP-306"**.
Place the cursor on the selected file and click the right mouse button,
and then click on the **"Send→Creating a shortcut on Desktop"**

(6) Removing the software

1) Select **"Control Panel"**

2) Click on the **"Add/Remove Programs"** to show the files

3) Select the following items and click on the **"Change/Remove"** button

A. "SMP-304" or "SMP-306"

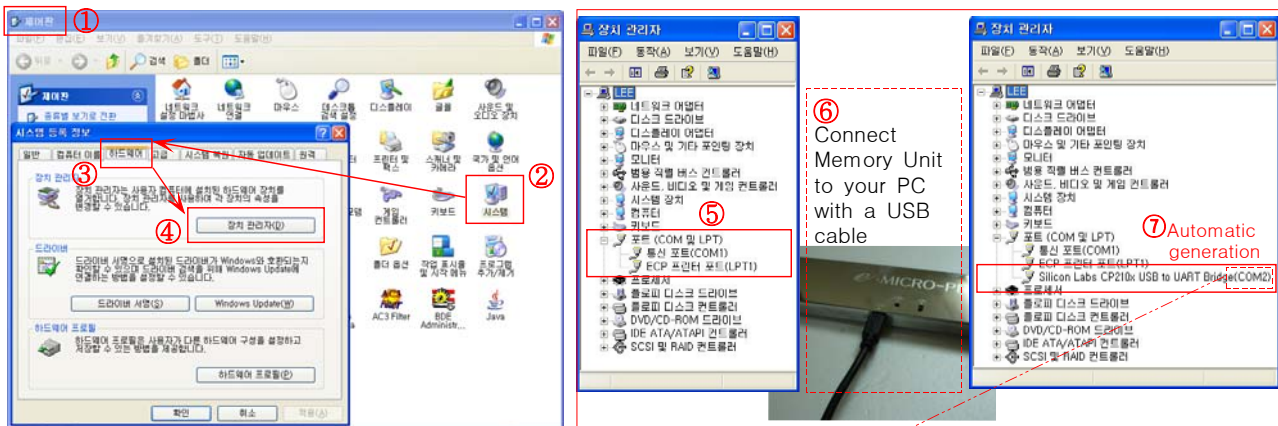
B. Silicon Laboratories CP210x USB toUART Bridge (Driver Removal)

C. Silicon Laboratories CP210x VCP Drivers for Windows 2000/XP/2003 Server/Vista

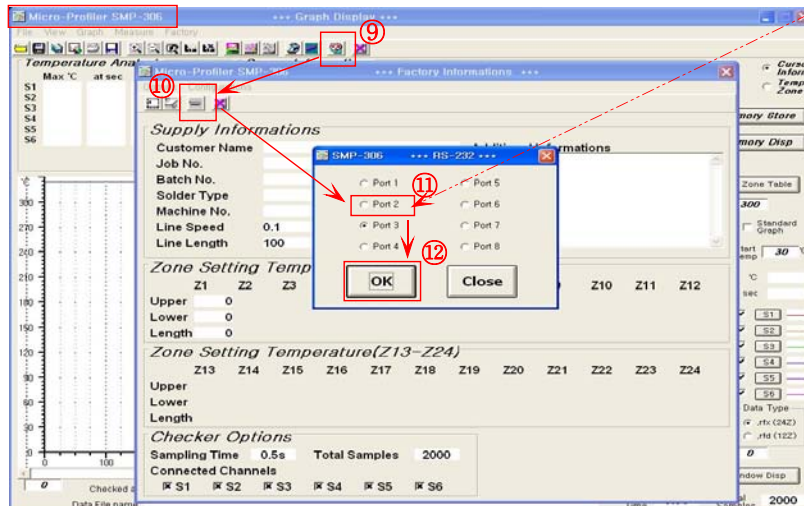
* Folder **"SEILIECO"** containing data will not be removed(C:/Program File/SEILIECO)

2.2. How to assing PC Communication Port

1) This is a process of matching the Device Manager of PC System with Communication Port of SMP-306 Program.



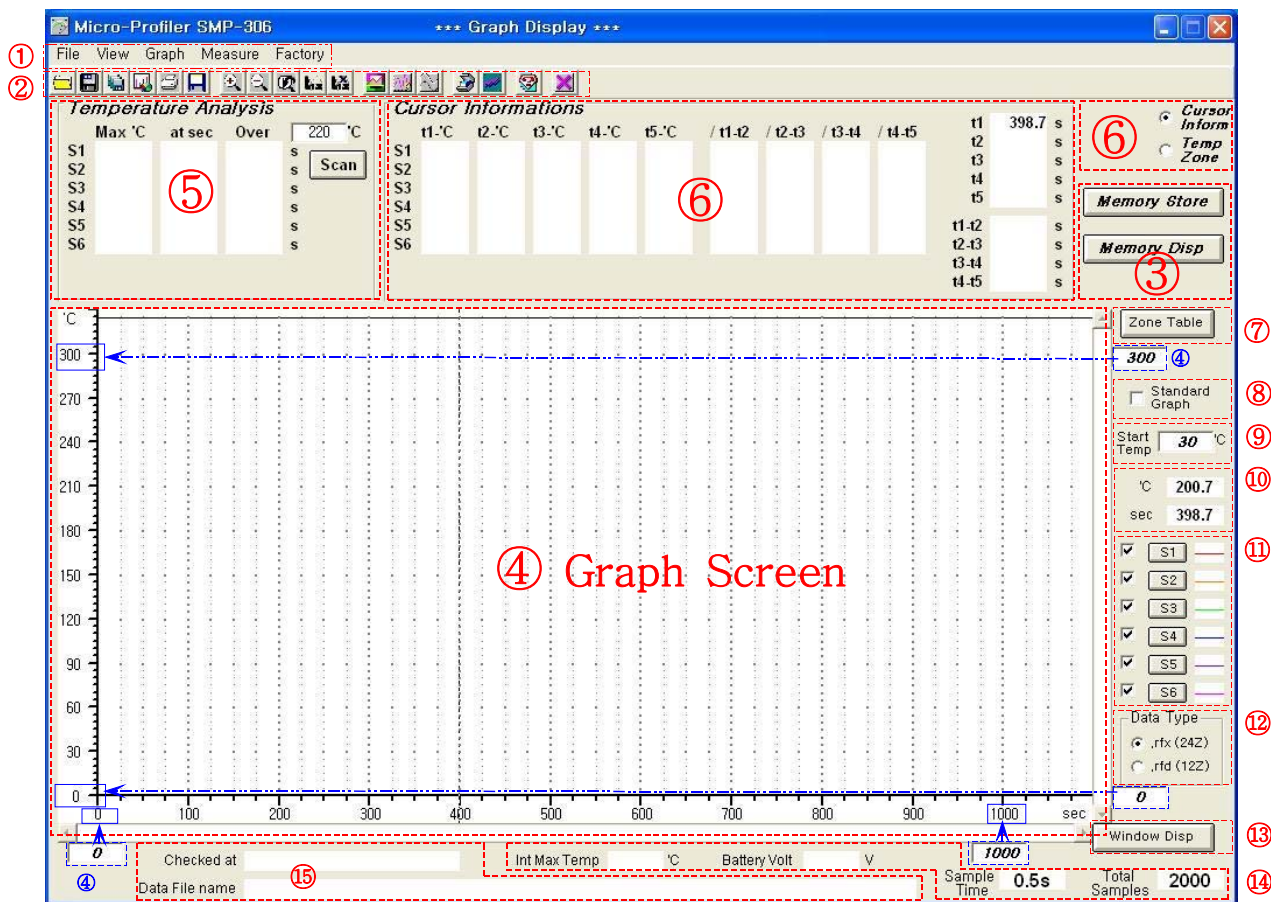
⑧ Running the program



- * 1. If you disconnect USB cable, the menu ⑦ will disappear automatically
- 2. If communication is not happening, please check and match the port of Device manage with the port set on SMP-306 Program
- 3. Device Manager creates the port numbers in accordance with the connecting order of the devices, the port number can change in case other communication devices are connected while SMP-306 is not.

2.3. Introduction to the functions of PC Program

1) Introduction to Main screen



① Menu Bar.

② Icon Bar.

③ Memory Store & Display : [Data display function](#) of memory unit..... ref. P5, 8.

④ Graph Screen : displays in graph the measurement data..... ref. P5, 8.

⑤ Temperature Analysis..... ref. P10.

1. Max. °C : shows the maximum temperature among the data measured by each sensor.

2. At sec : shows the time elapsed from the start of measurement to the point of measurement of the max temperature.

3. ()°C over : shows the time inclusive of time for the temperature exceeding the values preset.

⑥ Cursor Informations..... ref. P 10, 11

⑦ Zone Table :displays the result of data analysis based on device information... ref. P 9

⑧ Standard Graph..... ref. P 13

⑨ Start Temp..... ref. P 12

⑩ 'C & sec' : shows the value of mouse cursor position.

⑪ Color options for each sensor and selection of 'show/hide'..... ref. P 12

⑫ Data Type : Selection of file format(file extension) when you save the data..... ref. 8, 9

⑬ Window Disp : orders a change of Graph Screen..... ref. P9,11,12,13

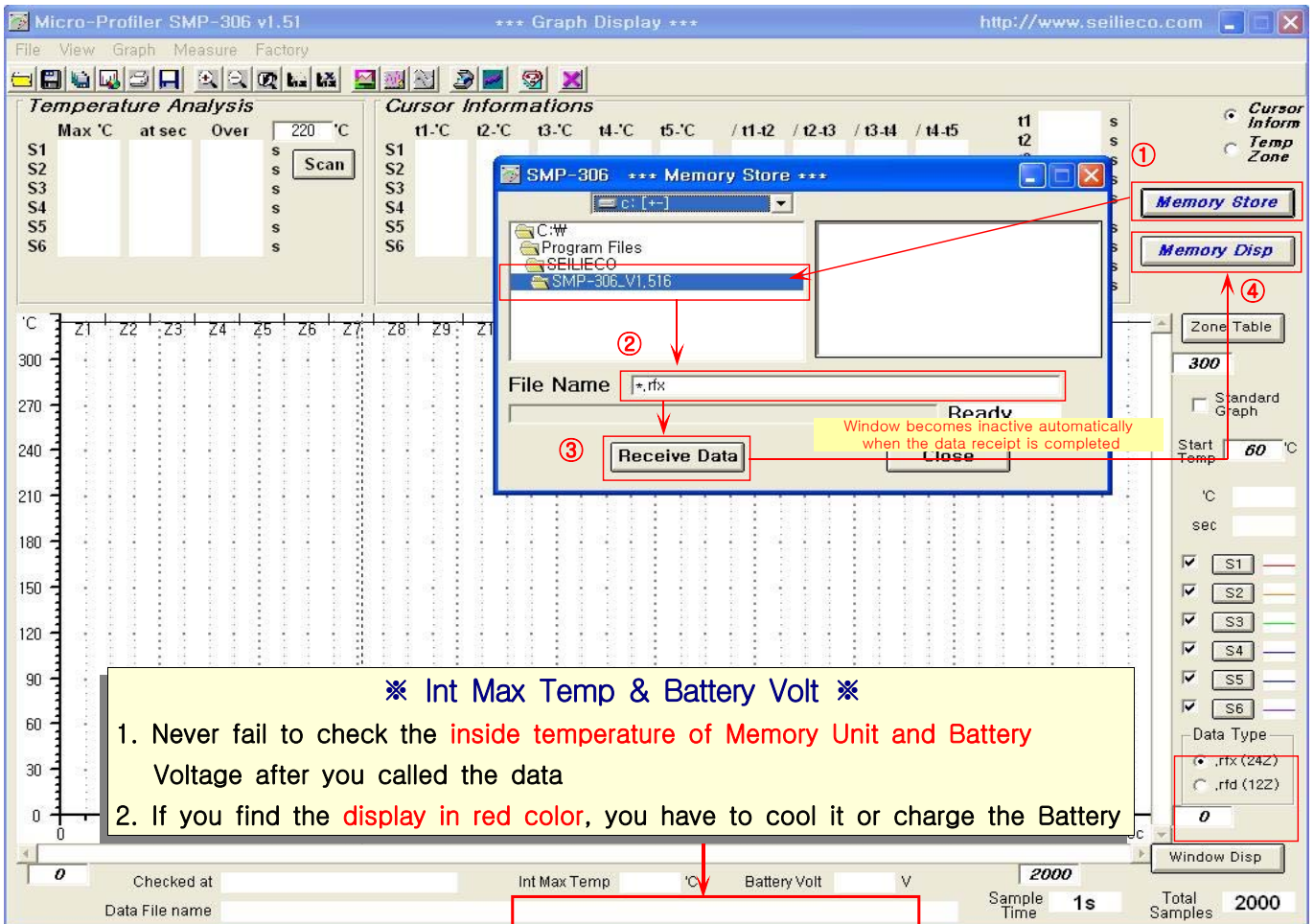
⑭ Shows the status of setting and operation of Memory Unit at the time of your data calling... ref. to P5, 14

⑮ Indicates the time and save paths of your data calling.

3. Guide to a simple way of operating your Micro-profiler

3.1. Data transfer to your PC after measurement temperature

- 1) Measurement temperature with Micro-profiler ref. P6, 7
- 2) Connect Memory Unit to your PC with USB cable ref. P3
- 3) Run Program and assign communication port ref. P3
- 4) Call to your PC the data recorded on Memory Unit




◇ Data calling order

- ① Select "Memory Store"
- ② Designate Save Path and type File Name
- ③ Select "Receive Data"
- ④ Select "Memory Disp"

◇ Opening the data files : Select Icon to open the files

Other Tips.

1. You can create a new folder from  (file open) side window of Windows Explorer or Main Screen.
2. Data will be automatically store when you have received them.

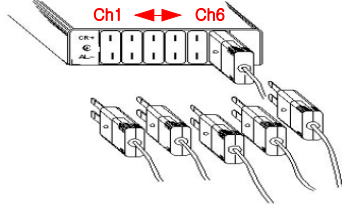
3.2. Printout

If you select the icon of 'Printer' from the icon bar, you can have a printout of graph screen, device information and data.

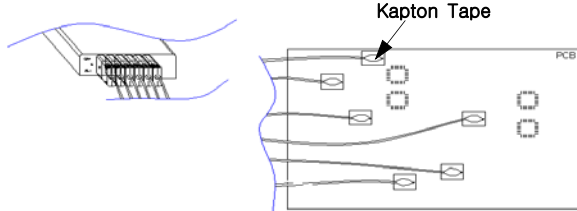
4. How to measure temperature with your Micro-profiler

4.1 Preparation for measurement work

(1) Connect Sensors to Memory Unit.



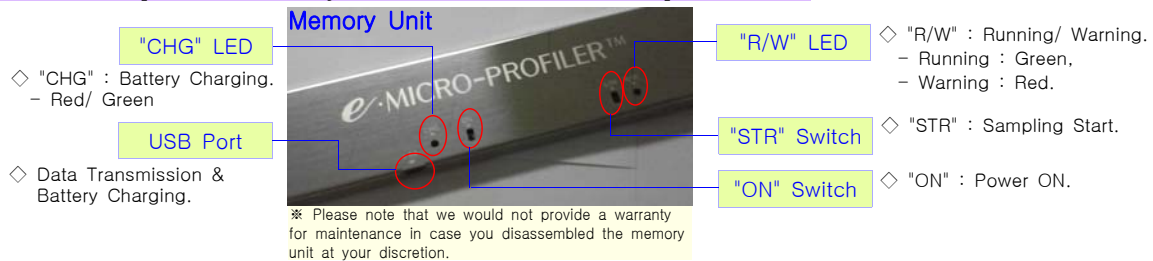
(2) Attach the end of sensor wire to PCB.



Attention

- Sensor numbers : From Left Ch 1 ~ to Right Ch 6
- Check +/- position before you insert the sensor.
Do not plug the sensor forcefully into the sockets
- Be careful not to damage the thin wires of sensors
- Twisting or forceful bending of sensor wires may cause disconnection or interference
- Make sure that the end part of sensors gets good contact with PCB
- If Kapton tapes get loose or Lead is applied excessively, it can lead to variation of temperature
- Make sure that the bare end of sensor wires does not cling to each other
- Fasten the sensor wires at several points to prevent them from twisting or loosening while measurement process is underway

4.2 How to operate Memory Unit (Measurement temperature)



(1) Press the "ON" switch.

- 1) "R/W" LED will blink alternately in **green/red color** before it stops at **green color** (ready for measurement)
 - "R/W" : Run (Green)/Warning (Red)
 - Do not touch "STR" switch while it is blinking, for it is under the process of checking the device
- 2) **If it stops at red color** : It means the battery needs recharging or the memory unit should be cooled off, for inside temperature is too high.
 - **Red warning lamp** comes on when the inside temperature is over 60°C.
You have to cool it until it return to normal temperature.
 - LED will show red if the battery voltage is below DC 3.6V, and goes off when the battery is completely discharged.(refer to P 15 for the battery recharging)

(2) Press the "STR" switch.

please make yourself familiar with the usage and procedure at normal temperature before you put it into a heating device.

- 1) LED will blink in green color and start to measure and record at the pre-set time interval(0.5 sec).

(3) Return the "STR" switch when you finish measurement.

- If you do not return the "STR" switch, it will continue to measure for a basic measure count (2,000 counts) before switching to save-electricity mode.

* Please refer to page 8 for data transfer to PC and device setup etc.



Attention

- ① When you insert Memory Unit into a Reflow Machine/Heating Device, **never fail to use a heat-resistant Case.**
- ② Make yourself familiar with the usage and procedure at normal temperature before you put it into a heating device.
- ③ If "R/W" LED of Memory Unit is lighted in red color and you can feel the heat, **you have to cool it completely before you use.**
- ④ All the measurement **data will disappear** when press the PWR "OFF" button.
- ⑤ Please **press the PWR 'OFF' button** of Memory Unit only when you have finished the transfer of data to your PC.
- ⑥ **Neither excessive force nor bending force** should be applied to the sensor connecting part of Memory Unit and main body(**the part where silicon is filled**) **because this can cause a damage** .(refer to P 7, picture)
- ⑦ **Avoid any contact or interference** with the end of other sensor wires
- ⑧ Memory Unit should be **cooled off at normal temperature** and you should **never try to put it in a freezer and the like.**

※ Please note that we would not provide a warranty for maintenance in case you disassembled the memory unit at your discretion.



The part where silicon is applied

1. Do not bend or put an excessive force onto the sensor connecting part of Memory Unit and main body (the part where silicon is applied) because it can be a main cause of product damage.
2. If damaged, silicon cannot protect Memory Unit from any outside heat.

4.3 How to use Heat-resistant Case.

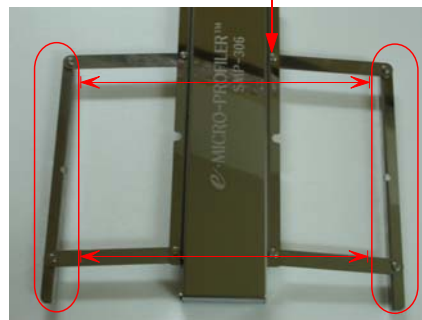
(1) Unlocking Heat-resistant Case



If you find any opening or break on the locked Case due to its aging, please return it to us for repair, for it can affect the performance or cause damage.

(2) Match the width of the extension wing to the width of PCB

- 1) After adjusting the width, with the case cover opened, fasten bolts or fix it with hexagonal wrench.
- * If it is not firmly fixed, the extended wing may collapse due to the vibration during conveyor transport.

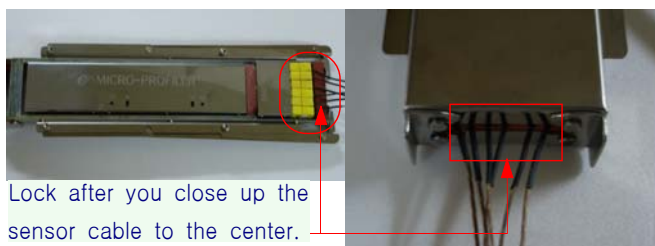


M4 Screw bolt

(3) Open the cover and put Memory Unit and start measurement.

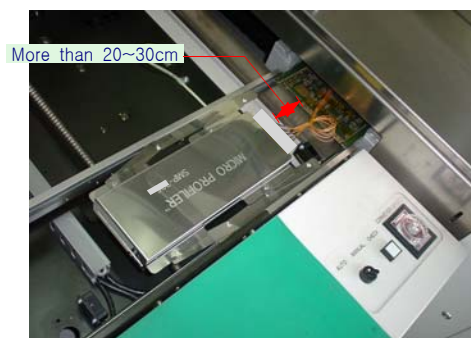
You have to familiarize yourself with the procedures and operation method at a normal temperature before you put it in the heating device

- 1) After placing Memory Unit, press the power "ON" button, check the lamp of LED and then press the "STR" switch.
- 2) Put the cover back and fasten.



Lock after you close up the sensor cable to the center.

(4) Setting/Measurement.



More than 20~30cm

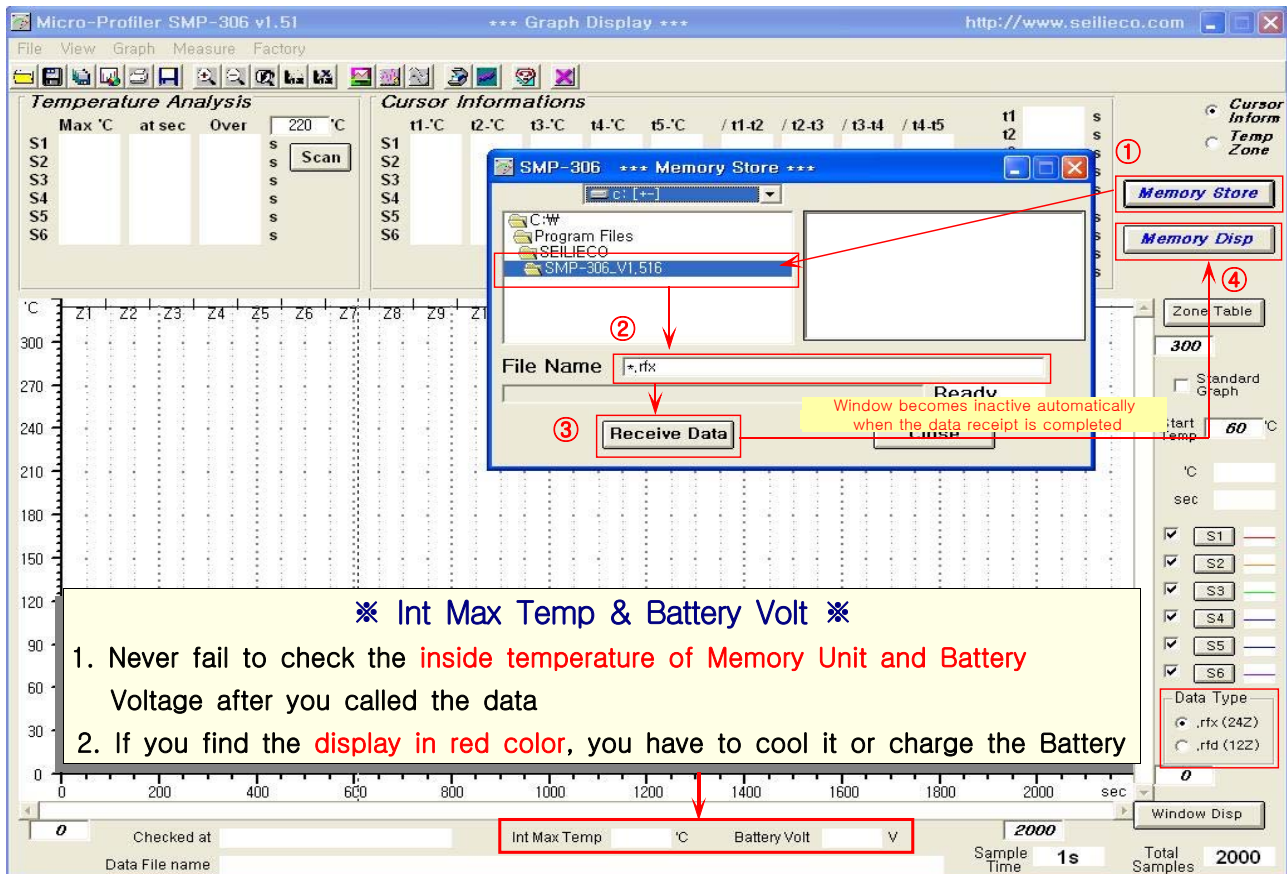
! Attention

1. Be careful not to cut off sensor wires when you fix the cover.
2. Check the LED always in case of continuous operation-In case of red sign, cool it completely.
3. You have to wear heat-resistant glove to prevent a burn, for the case is very hot after it passed through the heating device.
4. You can cool the heat-resistant case with its covers opened or with the cover standing on its side in "V" shape.
5. Before setting/measurement, please make sure there exists no interference with its moving path by sensors or guide.
6. If sensor wires sag while moving, damage can be caused. So, fasten the full length of the wires at several points by using heat-resistant tape and keep the wire length taut between PCB and Unit.
7. Make sure of earthing of the Unit because static electricity is easily generated by hot air blowing in the heating device.

5. How to run Program on your PC.

5.1. Calling the data from Memory Unit



- 1) Run Program.
- 2) Connect Memory Unit to your PC with USB cable.
- 3) Assign Port...refer to P 3 for the designation of PC communication port.
- 4) Calling the data recorded in Memory Unit.



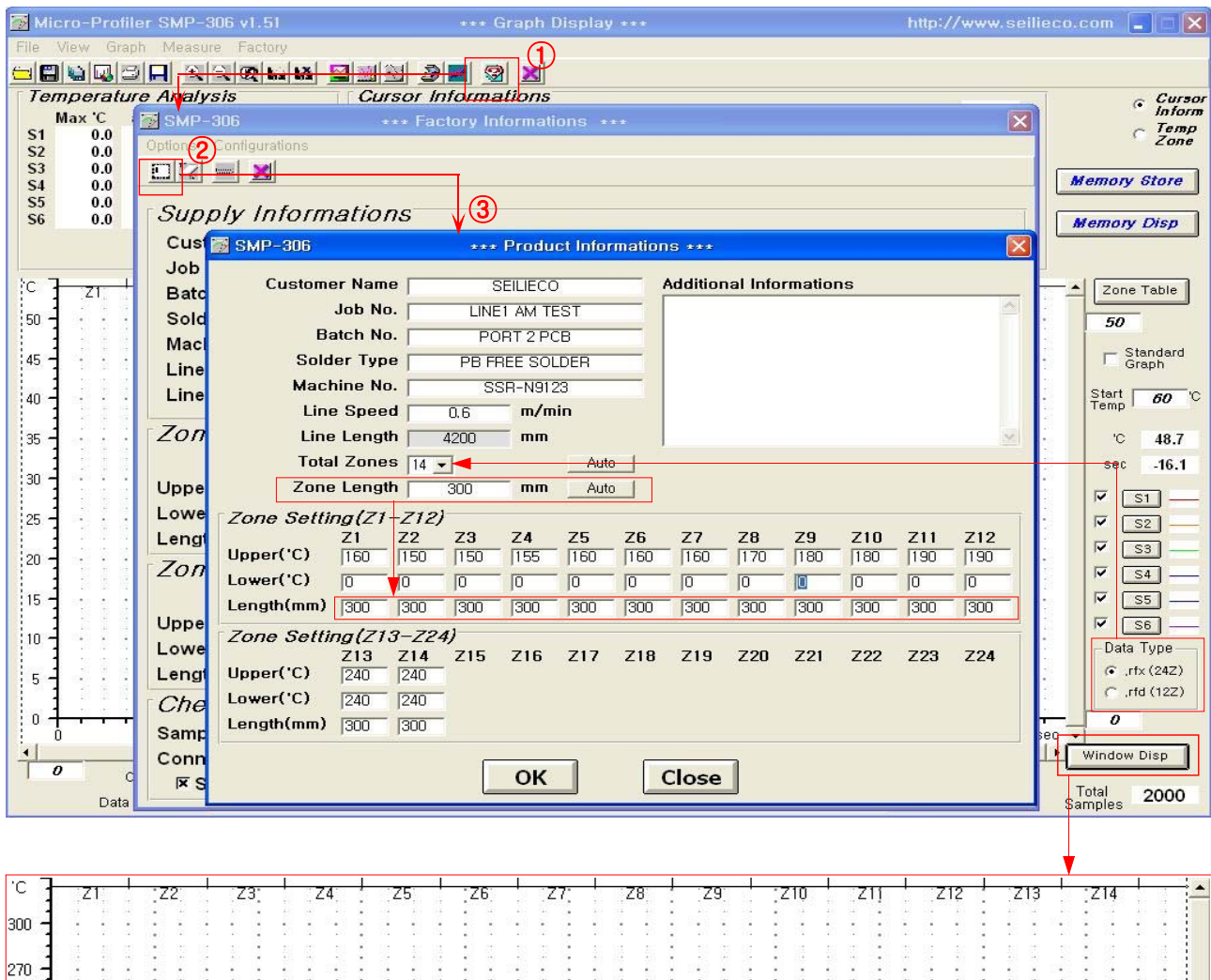
◇ Data calling order

- ① Select : **Memory Store**
- ② Designate Store Path and **type file name**
- ③ Select **"Receive Data"**
- ④ Select **"Memory Disp"**

Tips

1. You can **create a new folder** by clicking **"OPEN"**  on the Windows Explorer or Main Screen.
2. When you have received the data, they **will be automatically stored**.
3. For a separate store, select  and type a different file name.
4. Select **"Data Type"** before you click on **"Memory Store"** (".rfx" is preset at the time of installation).
You cannot change data type once you have received the data.

5.2. Input of Product Information



◇Operating Order

- ① Select
- ② Select
- ③ Enter Product Information and Select "OK"

Tips

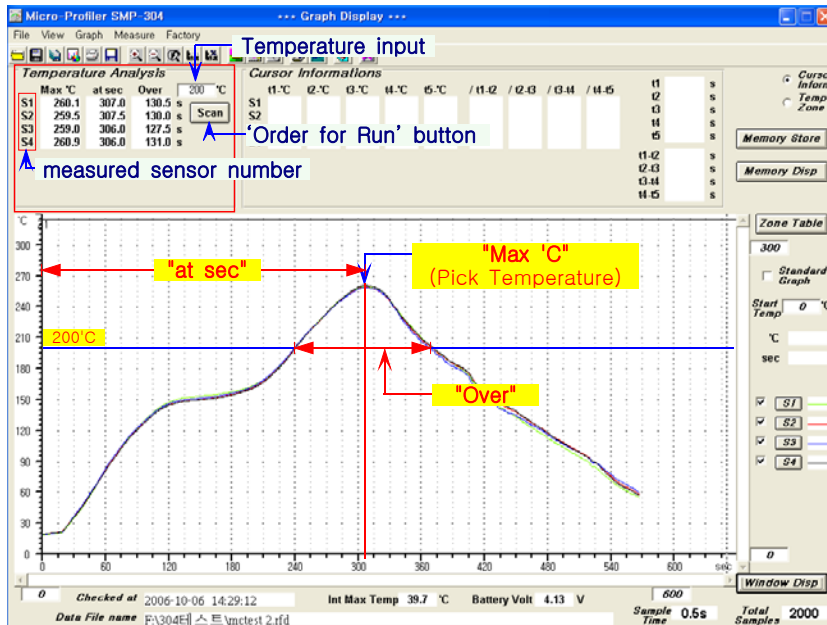
1. Product information is stored together with data. If you run Program again after finishing, the product information which you have entered before will appear automatically.
2. Zone numbers are determined by the selection of file extension from the right bottom of Main Screen.
 - You cannot change data type once you received the same.
3. Zone length is automatically input when you select "Auto".
4. Speed and Zone Length which were entered into Product Information will be automatically calculated and displayed on the Graph Screen if you select "Window Disp".
5. You can see the temperature inclination per zone through "Zone Table".

5.3. Printout

If you select the icon of a Printer, product information and data will be printed out.

6. Introduction to the functions of your PC Program

6.1. Temperature Analysis



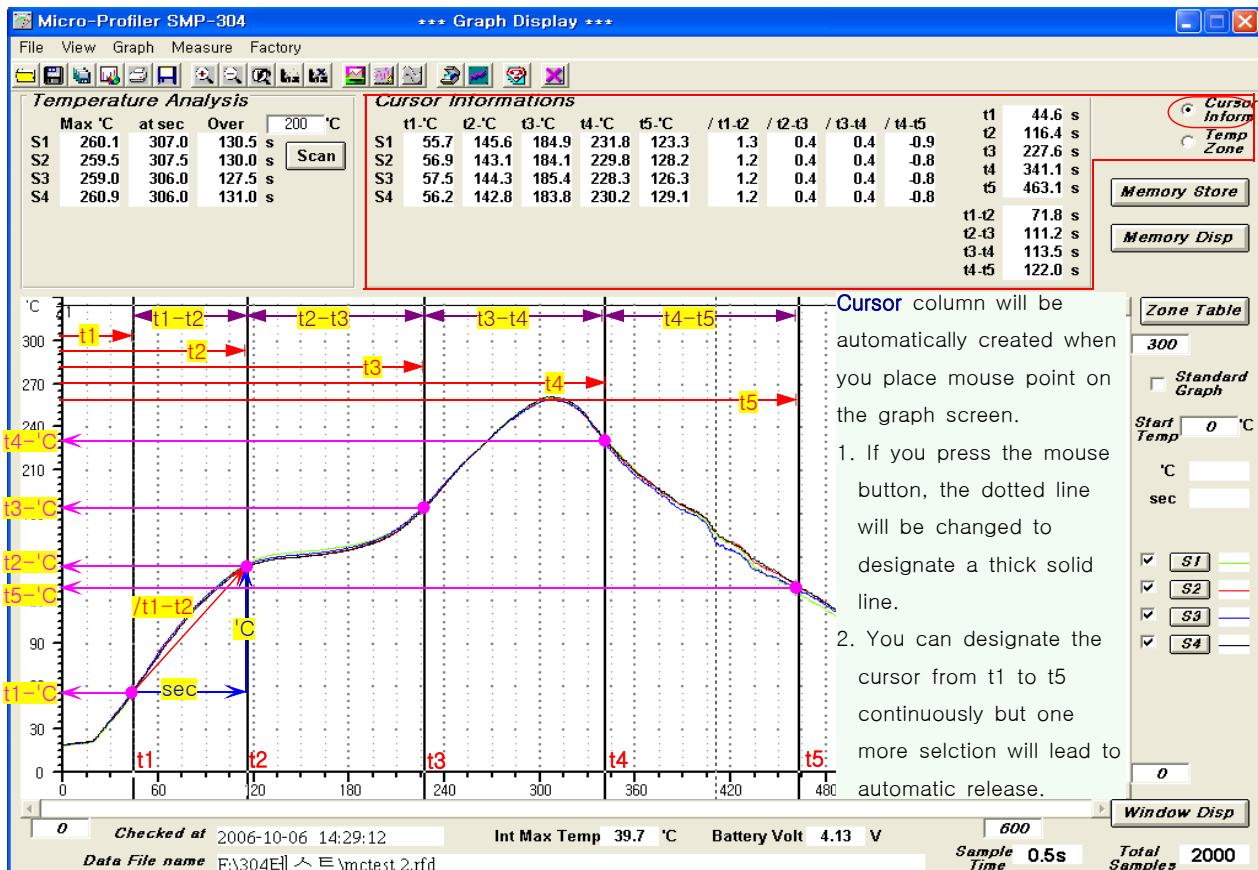
1. Max. °C : shows the maximum temperature among the measured data per sensor.
2. at sec : shows the time elapsed from the start of measurement to the time point of measurement the maximum temperature.
3. Over : shows the total time span in which higher temperature was recorded than the one you have entered.

6.2. Cursor Informations

◇ Cursor Information (Data based on time zone)

1. $t1-^{\circ}\text{C}$: temperature of each sensor at the cross point of $t1$ (cursor) and graph.
2. $/t1-t2$: Average inclination of temperature change in the section between $t1$ and $t2$.
3. $t1$: time per each sensor channel from the 0 sec to the point of $t1$.
4. $t1-t2$: time per each sensor channel form the $t1$ point to $t2$ point.

Tips. Cursor column basically selects $t1-t2$ and will be gone when you select $t1-t2$

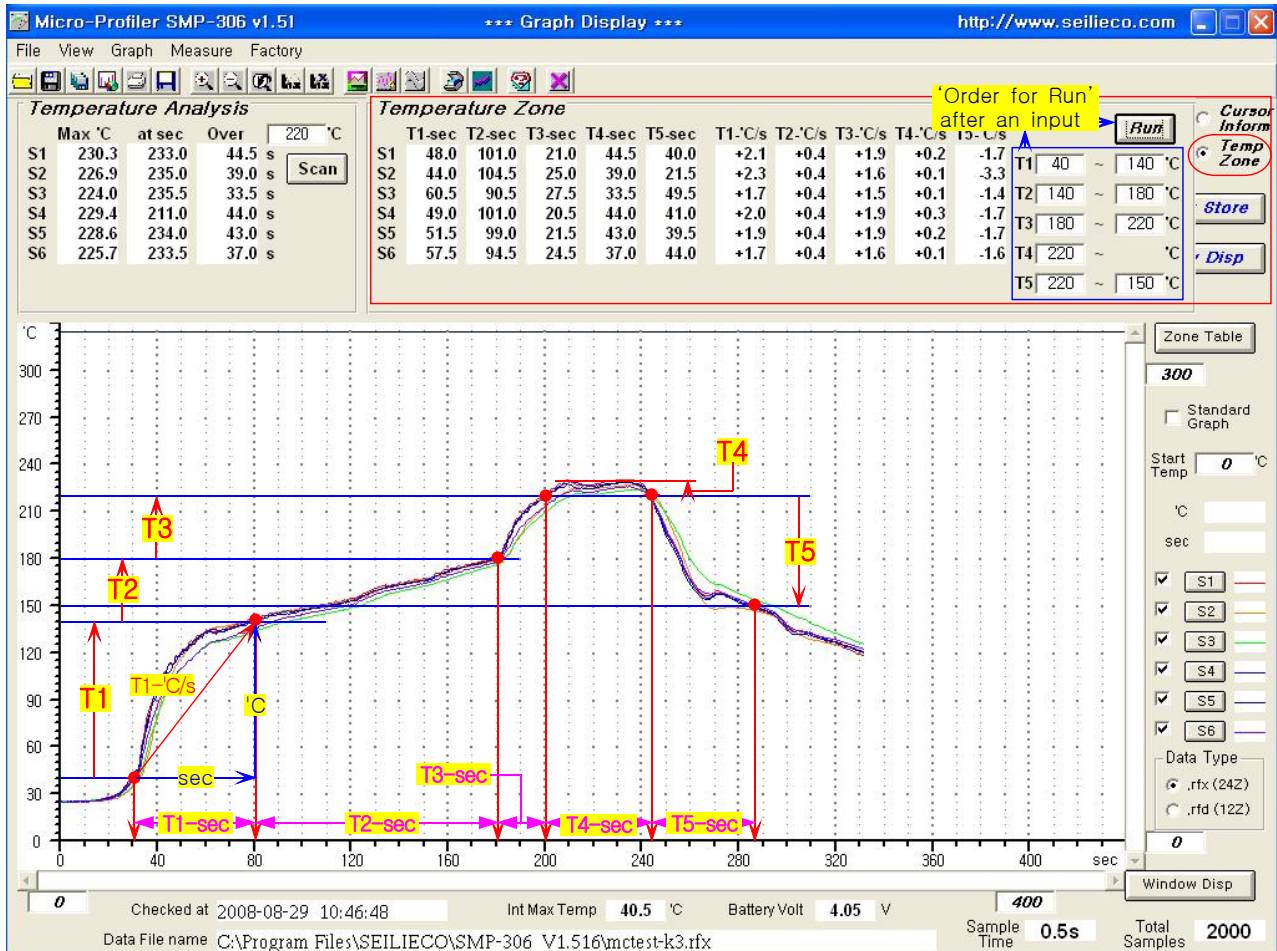


Cursor column will be automatically created when you place mouse point on the graph screen.

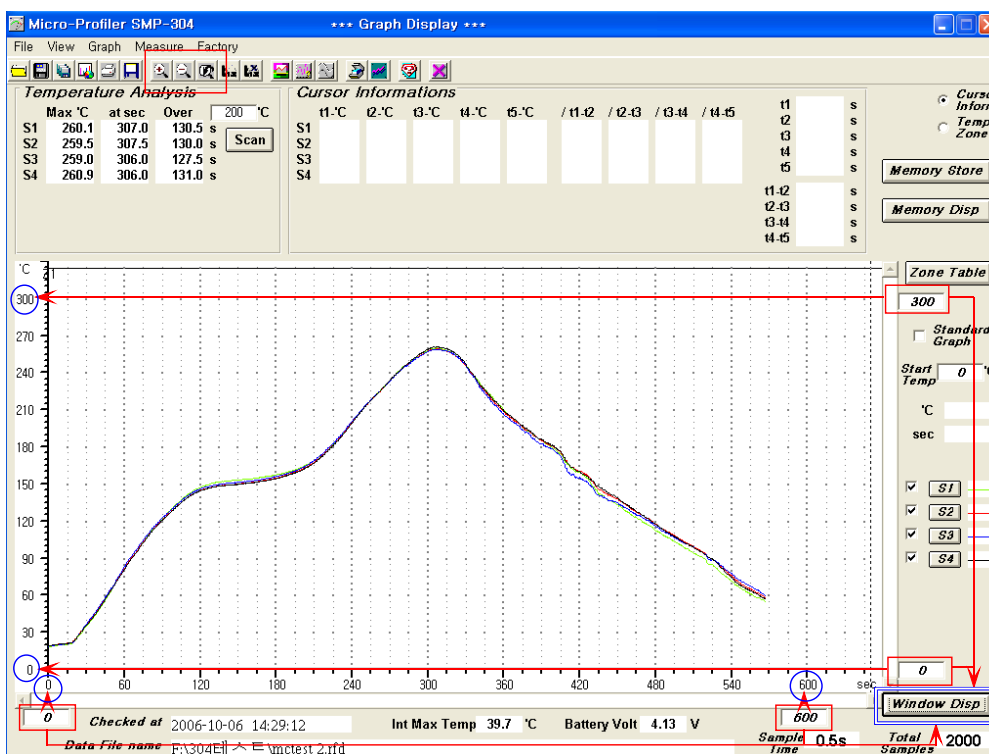
1. If you press the mouse button, the dotted line will be changed to designate a thick solid line.
2. You can designate the cursor from $t1$ to $t5$ continuously but one more selection will lead to automatic release.

◇ Temp Zone(Data based on temperature)

1. T1 : Temperature zone you input to show on the graph.
2. T1-sec : Time zone per each sensor channel at the cross point of graph and time zone input of T1.
3. T1-°C/s : average inclination of temperature change per each sensor channel at t1 section.



6.3. Graph Zoom In/Out & Re-display(Zoom100%)



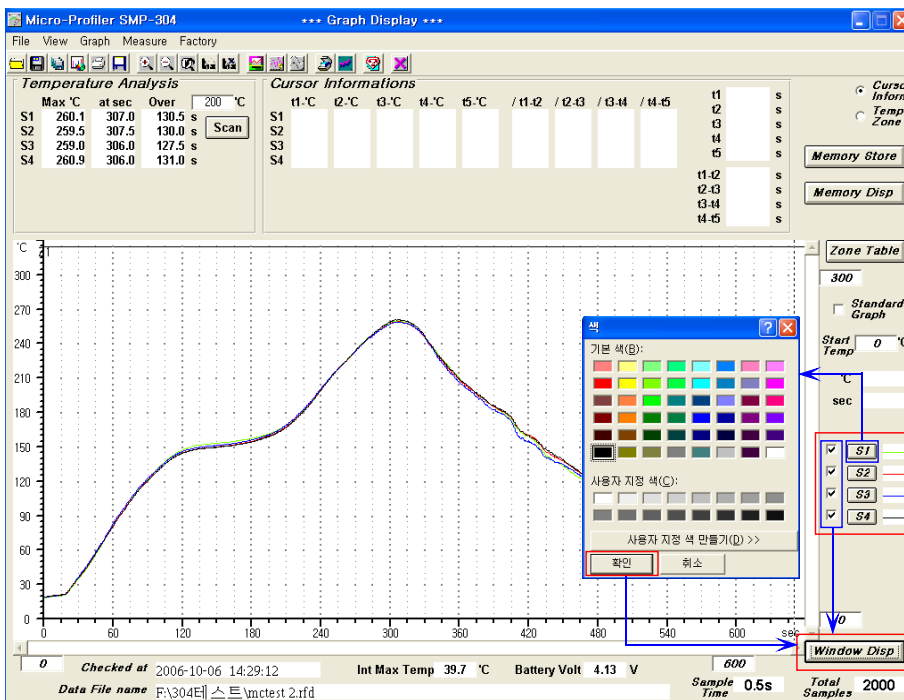
◎ Quick Zoom

- ⊕ : Can enlarge 4 times continuously
- ⊖ : can contract 4 times continuously
- ↻ : Re-display, Return the graph screen to the original size.

◎ User Zoom

- If you want an part enlargement of the graph in length or width, please enter the value and select "Window Disp" to get a change.
- Select ↻ if you want to return to the original size

6.4. Changing graph line color and hiding graph lines



◎ Line Color

Select the check box of the sensor channel the color of which you want to change and designate color and click the “Window Disp” button.

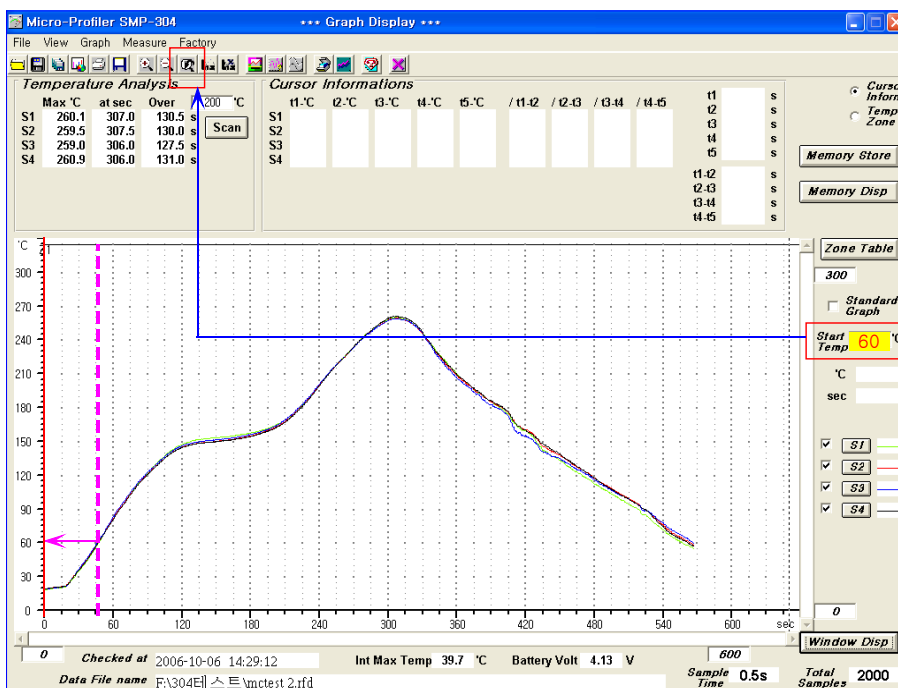
◎ Line Hidden

Deselect the check box of the sensor channel the line of which you want to hide and click the “Window Disp” button.

Tips.

Changed data are stored in the relevant file separately. When you restart the Program, the screen will automatically show you the result that you changed last.

6.5. Changing the Start Point on graph



◎ Start Temp

– If you want to change the Start Point on graph.

- 1) Memory Unit starts to measure/record from the moment the ‘STR’ switch is pressed.
- 2) As there is no time requirement for installing the device, the start point can vary every time you do measurement.
- 3) Temperature can change when you install the device
- 4) You can have a constant graph if you set the changed temperature as “Start Temp”

Tips.

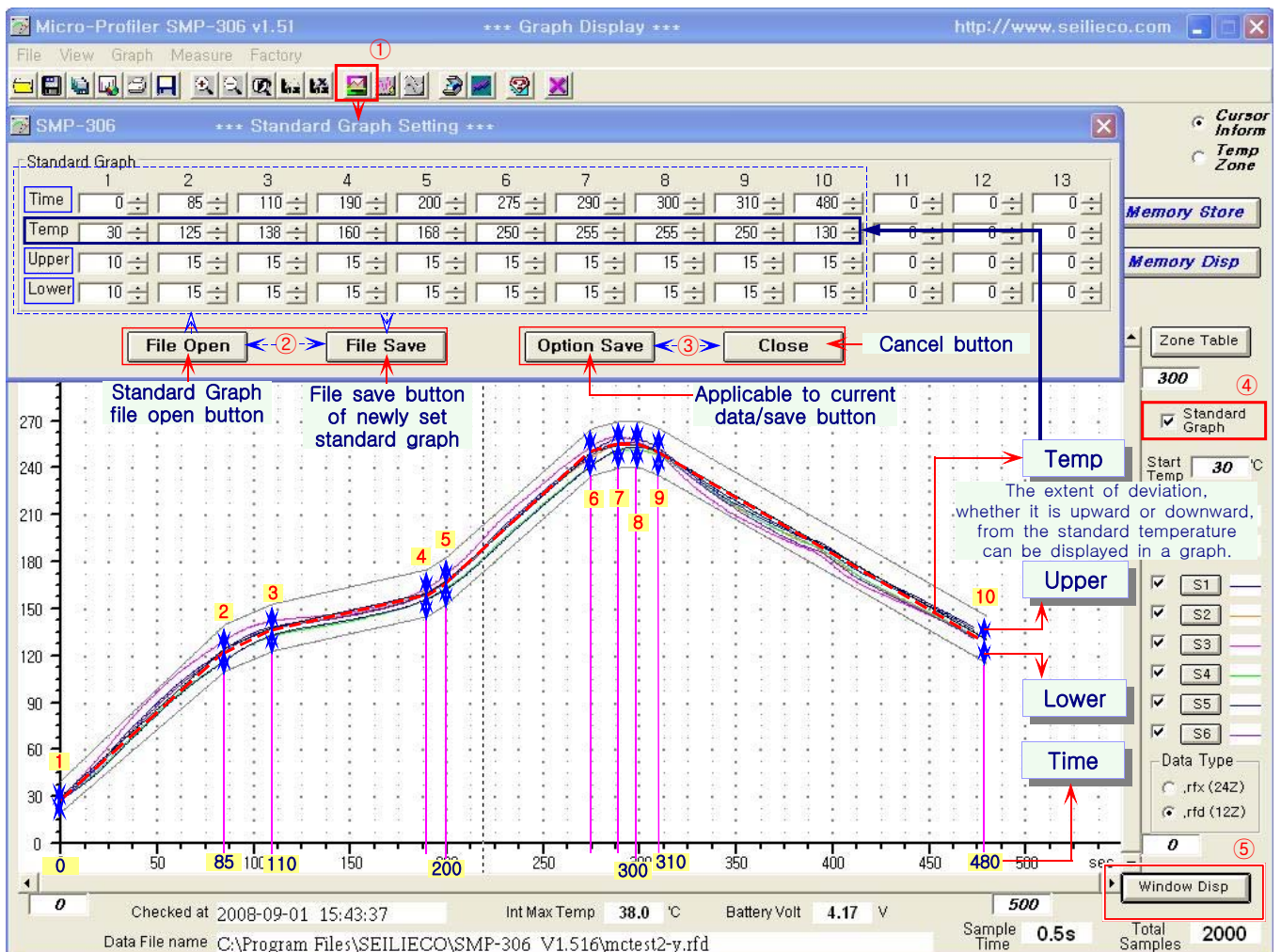
When you restart the Program, the screen will produce the result that you finally Entered.


6.6. Other functions

- : File Open – Open the stored files (Select after you confirm the data type).
- : Change the file name
- : Change the excel file (Stored in the data folder)
- : Change the graph screen to image file(*bmp) (Stored in the data folder)
- : Setting Standard Graph and its application
- : Finish Program

6.7. Standard Graph.

The Standard Graph is intended to check whether the data graph falls within the permissible range it has set.



- ①  Select icon
- ② “File Open” : Open the Standard Graph which is already in store
or “File Save” : Save the Standard Graph that you have newly made
- ③ “Option Save” : Apply and save the Standard Graph to the graph in the screen
or “Close” : Cancel and close the screen
- ④ Select the check box of “Standard Graph”
- ⑤ Click the “Window Disp” button. Standard Graph will be displayed onto the data graph

Tips

1. Input data are shown as straight line in each section and Standard Graph is a continuation of these lines.
2. You can increase the numbers of sections to max. 25 by selecting “Data Type” at the right bottom of Main Screen.
3. If you change “Data Type”, current data will disappear, so you have to call the data again from Memory Unit.

7. Resetting the Program of Memory Unit

Note : Please be careful when you reset the Program,

for the existing data will be deleted once you reset the Program.

7.1. Sampling Time & Total Samples

1. **Sampling Time** : time interval for measurement the temperature.

Total Samples : total frequency of measurement

Ex) sampling time – 0.5s, total samples – 2000

Means measurement of 2000 times at the time

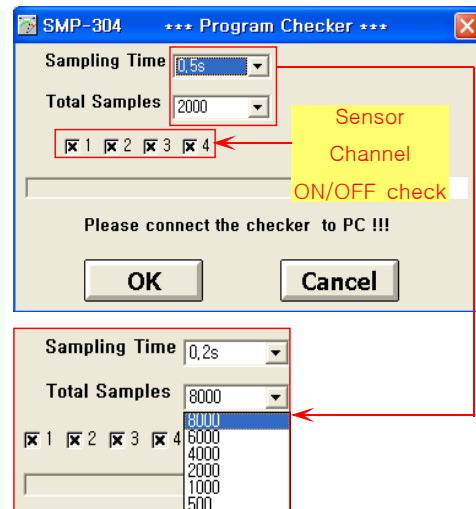
interval of 0.5 second before the device stops working

– 0.5 sec x 2000 = 10000 sec (measurement/recording about 16 minutes before the device stops)



2. Automatically switches to Save-Electricity Mode when measurement is finished

※ Default setting at the time of delivery

- Sampling Time : 0.5s
- Total Samples : 2000



◇ Setting Order

- ① Connect Memory Unit to your PC with USB cable and switch on the “PWR” button of Memory Unit.
- ② Select  from PC Program and select  (Program Checker) from side window.
- ③ Select “Sampling Time” and “Total Samples” and click “OK” button.
- ④ “Ready” changes to “Tx End” when the transfer is completed.

Tips. “Program Checker Setting” will not be affected even if you turn off the power of Memory Unit.

Running Time of Memory Unit per “Sampling Time” and “Total Samples”

0.1s			0.2s			0.5s		
8000	800sec	≒ 13min	8000	1600sec	≒ 26min	8000	4000sec	≒ 66min
6000	600sec	≒ 10min	6000	1200sec	≒ 20min	6000	3000sec	≒ 50min
4000	400sec	≒ 6min	4000	800sec	≒ 13min	4000	2000sec	≒ 33min
2000	200sec	≒ 3min	2000	400sec	≒ 6min	2000	1000sec	≒ 16min
1000	100sec	≒ 2min	1000	200sec	≒ 3min	1000	500sec	≒ 8min
500	50sec	50sec	500	100sec	≒ 2min	500	250sec	≒ 4min
2s			5s			10s		
8000	16000sec	≒ 4hr 26min	8000	40000sec	≒ 11hr 6min	8000	80000sec	≒ 22hr 13min
6000	12000sec	≒ 3hr 20min	6000	30000sec	≒ 8hr 20min	6000	60000sec	≒ 16hr 40min
4000	8000sec	≒ 133min	4000	20000sec	≒ 5hr 33min	4000	40000sec	≒ 11hr 6min
2000	4000sec	≒ 66min	2000	10000sec	≒ 2hr 46min	2000	20000sec	≒ 5hr 33min
1000	2000sec	≒ 33min	1000	5000sec	≒ 83min	1000	10000sec	≒ 2hr 46min
500	1000sec	≒ 16min	500	2500sec	≒ 41min	500	5000sec	≒ 83min

- ※ 1. Battery consumption is directly proportional to the measurement frequency and time.
You have to check battery status before use if you set sampling time at over 0.5s.
2. If the measurement time is over one(1) hour, it is suggested to use USB power source at normal temperature.
Otherwise, the data will be lost.

7.2. Selection of Sensor Channel

You can reduce battery consumption by keeping in OFF position the sensor channels of Memory Unit which are not used.

※ If you cannot measure temperature despite the connection of the sensors of Memory Unit, the possible causes are

1. Sensor channel is made OFF as explained above.
2. Sensor wire is cut. (sensor is a consumable, so regular check and replacement is necessary)
3. Sensor channel is deleted due to the noise of static electricity during measurement.
(Recheck the earthing of the device)

8. How to maintain Battery

8.1. Battery Specification

- 1) 3.6V Rechargeable Battery(LG Rechargeable battery or its equivalent)
Model : B-1522(Ni-Mn, 3.6V 550mAh)
- 2) Life of battery
 - about six months, which can vary depending upon working condition.
(8000 hours based on the use of 3 times a day at the default setting)
 - One-time charging enables a measurement of 8-10 times and battery performance will deteriorate as the measurement frequency increases.
(measurement frequency can vary in case of natural discharge and deterioration of the battery, but it has nothing to do with the performance of Micro-profiler)
 - Battery life can be prolonged if you recharge the battery only after it is completely discharged.
- 3) Precautions to be taken for the use of battery
 - Charge the battery fully before use
 - Never try to disassembly the battery
 - Never use unlicensed battery. (It can damage the performance of Micro-profiler)

8.1. Charging Battery



As show in the picture, connect Memory Unit terminal with PC terminal with USB cable.

◇ Display of Charging status

- ① **Charging is completed** : **Green light** comes on "CHG" LED of Memory Unit.
- ② **Charging underway** : **Red light** comes on "CHG" LED of Memory Unit.

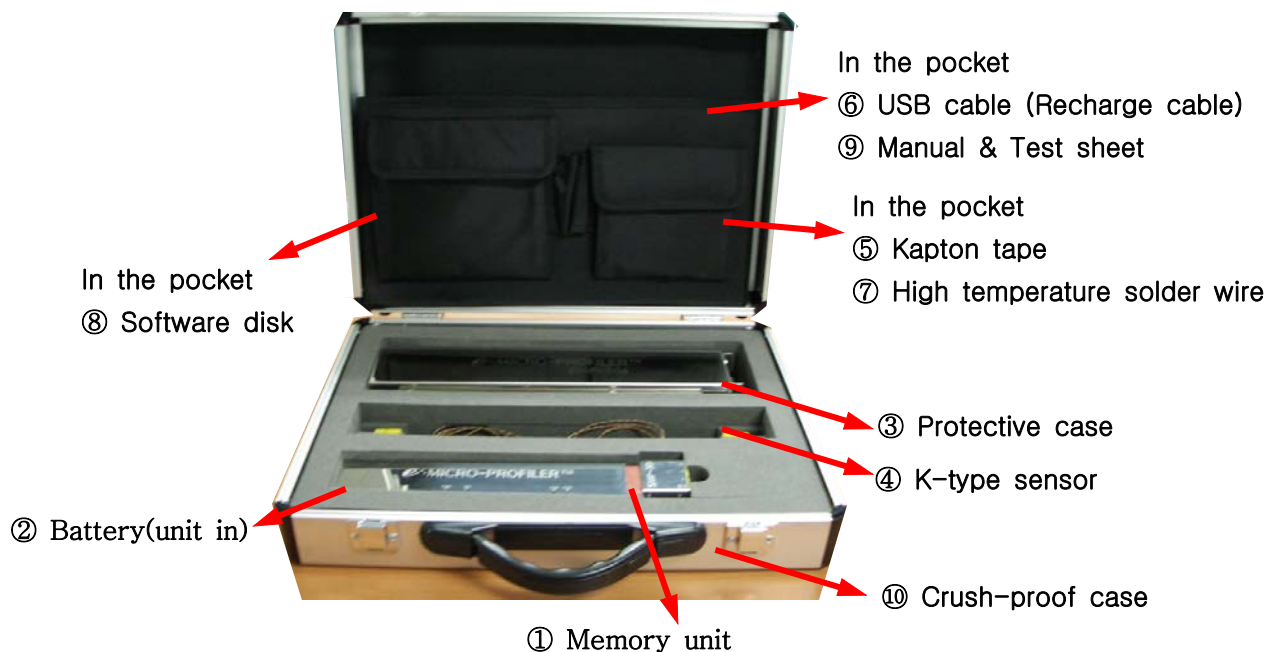
◇ How to check the usability of battery

- Step 1) When you press "ON" switch, "R/W" LED blinks and stops in green
- Step 2) After pressing "ON" switch of Memory Unit, you can call the memory from PC Program (refer to P 8)

◇ Other Signals

- **Low Voltage Warning Sign** : When you press "ON" switch, "R/W" LED blinks in green and red alternately before red light comes on quickly
- **Complete discharge** : When you press "ON" switch, no light comes on LED
(time required for recharging : 4-5 hours)

9. Item list of Micro-Profiler™ (SMP-304 & SMP-306)



9.1. Part List.

No.	Description	No.	Contents	Etc.
①	Memory unit	M-001	Main memory equipment for temperature profile	
②	Battery	M-002	3.6(Ni-Mn) Rechargeable Battery	CSP
③	Protect case	M-003	For Product to memory unit from high temperature of reflow M/C	
④	K-type sensor	M-004	Made connector Ass'y (about 40cm)	CSP
⑤	Kapton tape	M-005	10mm(w) X 15m	CSP
⑥	USB cable(Recharge cable)	M-006	USB Port	
⑦	High temperature solder wire	M-007	Samples	CSP
⑧	Software disk	M-008	Microsoft Window XP	
⑨	Manual & Test sheet	M-009	User's manual	
⑩	Parking case	M-010	Quality assurance of memory unit	

※ CSP : Consumption goods, OPT : Option

If you order one set of SMP-XXX, all the items listed above will be supplied to you.
And if you need some extra quantity of them, we are always ready to make them available to you.
Please note SMP-XXX is the reference number you have to indicate when you place an order.