Easy O$_2$ PROFILER™

Operation Manual

MODEL : SOP-501KT / SOP-510KT

PC Software Ver 1.0

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1. Product composition and specification
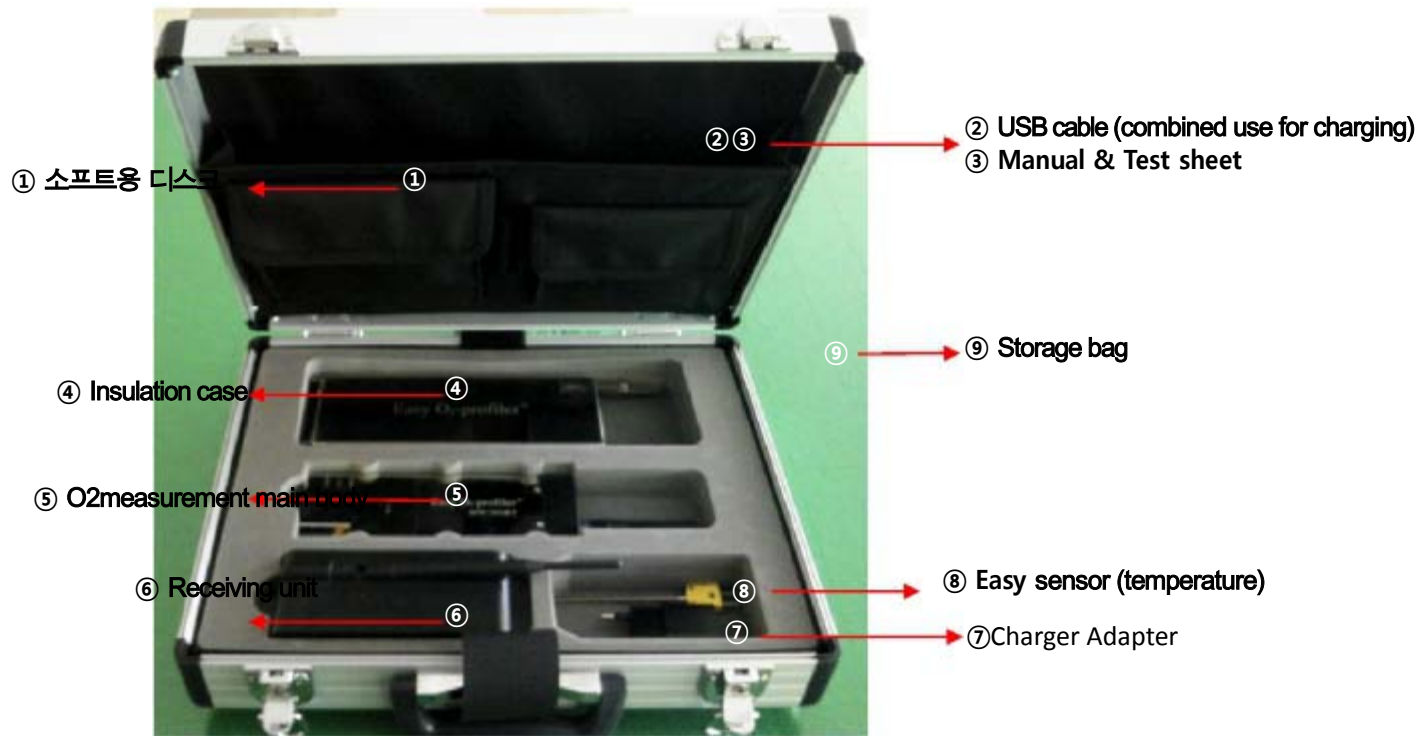
1-1. Easy O$_2$ Profiler™ product composition(S0P-501KT / 510KT)

① 소프트용 디스크

Disk for Soft

② ③   ② USB cable (combined use for charging)
         ③ Manual & Test sheet

⑨   ⑨ Storage bag

④ Insulation case ④

⑤ O2measurement main ⑤

⑥ Receiving unit   ⑧   ⑧ Easy sensor (temperature)
⑥   ⑦   ⑦Charger Adapter

SOP-501KT / SOP-510KT

1-2. Easy O2 Profiler™ product feature (S0P-501KT / 510KT)

1). Product dimension

MODEL	SOP-501KT / SOP-510KT
Memory Unit	130 x 57.8 x 19
Protect Case	180 x 71.6 x 30

2). Temperature condition on use : 0~400℃

※ When measuring high temperature environment, heat-resistant
   case must be used.
※ Time limit in case of measurement on high temperature
   condition: 200℃ → max minutes, 250℃ → max 2minutes
 Time limit in case of measurement on high temperature condition

3). Measuring range of oxygen concentration
   - SOP-501KT   10ppm ~ 1,000ppm
   - SOP-510KT 100ppm ~10,000ppm

4). Measuring channel
   - O2 concentration : 1ch sensor
   - Temperature : 1 ch sensor (K-type)
   - Vibration : 2ch (X-axis, Z-axis vibration)

5). BATTERY
   - For 3.7V Li-Polymer charging
   - Use only the dedicated adapter (5V / 2A) and charging
     cable enclosed in
     case of charging
   ※ Battery life: about 6 months
      (Battery life may vary depending on the condition of use)

6). Resolution
  1) Sampling Time : 0.5s, 1s, 2s, 5s, 10s
  2) Total Samples : 500sec, 1000sec, 2000sec, 4000sec, 6000sec,
                8000sec
   ex) Sampling Time : Select 0.5s
      Total Samples : Select 2000 → Measurement can be done for
      about 16 minutes.

7). Temperature to guaranty the performance of the measuring
      equipment: Internal temperature less than 70 ℃ / 5-minute

8). P.C Spec
  - IBM compatible or equivalent.
  - Microsoft Windows XP. Windows7. Windows8.1
  - SVGA graphic card(256 color) or more.
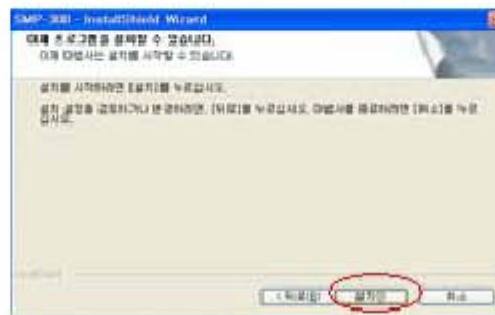 - Resolution :1024 * 768 pixel or higher

9). Weight :

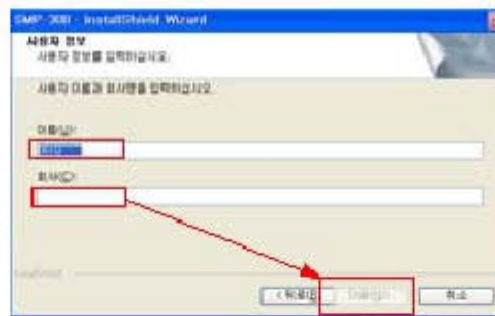| MODEL	SOP-501KT / 510KT
Memory Unit	250g
Protect Case	370g

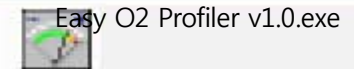## 2. Product program installation

Easy O2 Profiler v1.0.exe

2-1. How to install PC program– Easy O₂ Profiler Program

Press OK on the the message left and continue

2. Product program installation
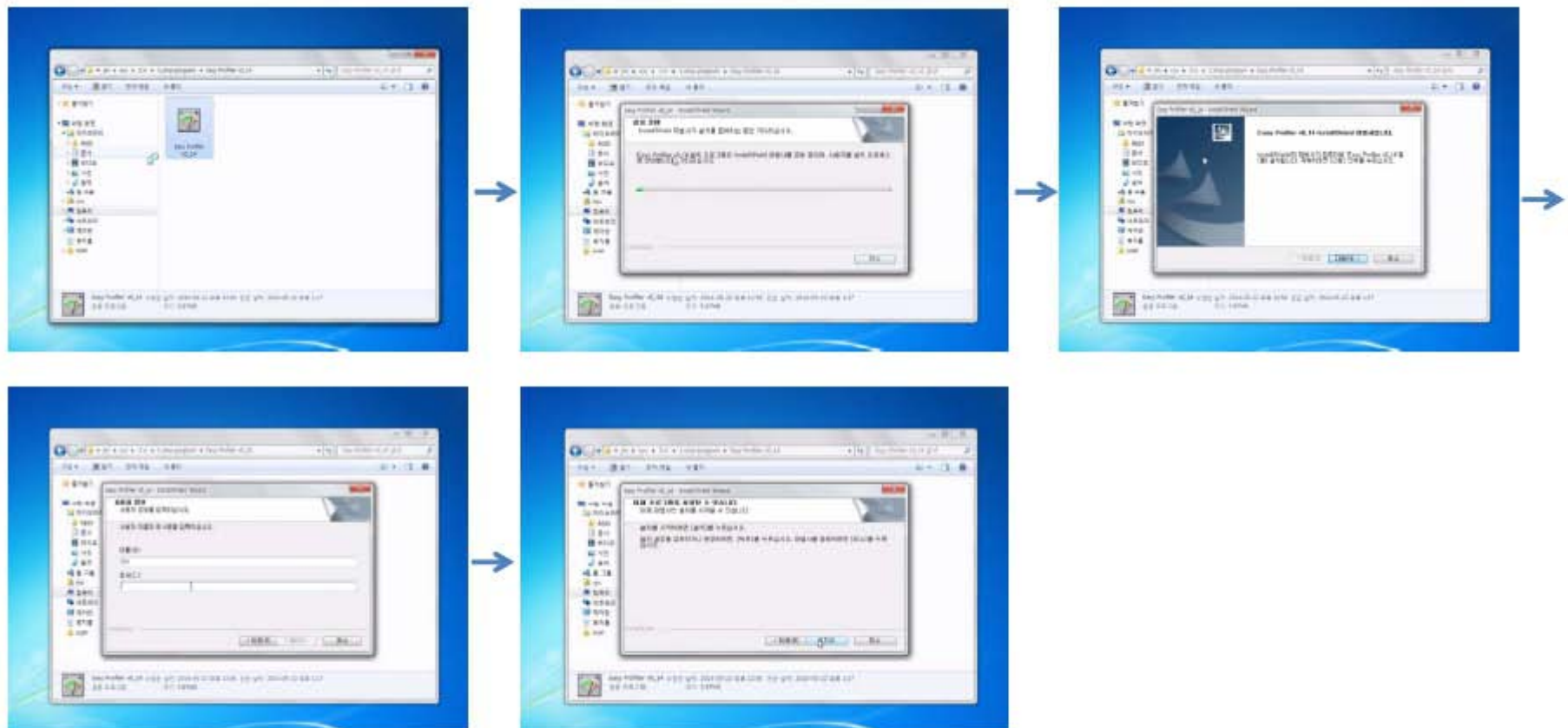
Easy O2 Profiler v1.0.exe

2-1-1. How to install PC program

 1)Environment for use (PC environment for the use of Micro-profiler)

  WINDOWS 8, Resolution: 1024 x 768 pixels or higher.

 2)Software installation

  After running CD, execute installation by running "CP210x_VCP_Win2k_XP_S2K3.exe" & "Easy O2 Profiler v1_0.exe" in the following order.

2. Product program installation

2-2. How to set up PC communication program and port – USB PROGRAM

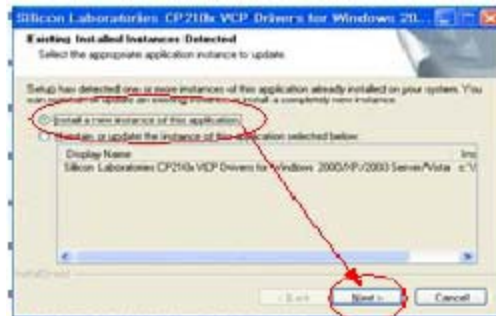1) Environment for use (PC environment for the use of Easy O2 profiler)
  - WINDOWS XP, resolution : 1024*768 pixels 상. or more
2) Software installation
  - After running CD, execute installation by running **"CP210x_VCP_Win2k_XP_S2K3.exe" & "Easy O2 Profiler v1_0.exe"** in the following order.

CP210x_VCP_Win2K_XP_S2K3.exe
Setup.exe
Macrovision Corporation

Easy O2 Profiler v1.0.exe
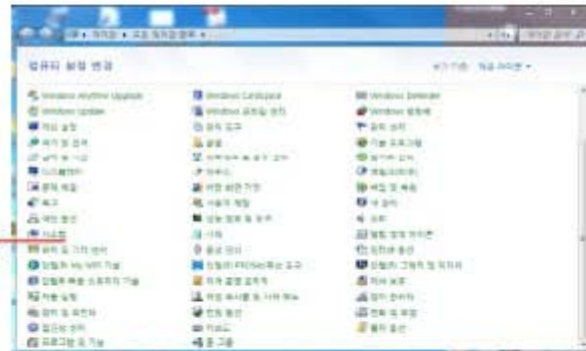

● Re-run the PC after installation

2. Product program installation

2-2-1. How to set-up PC communication port(USB communication set-up)

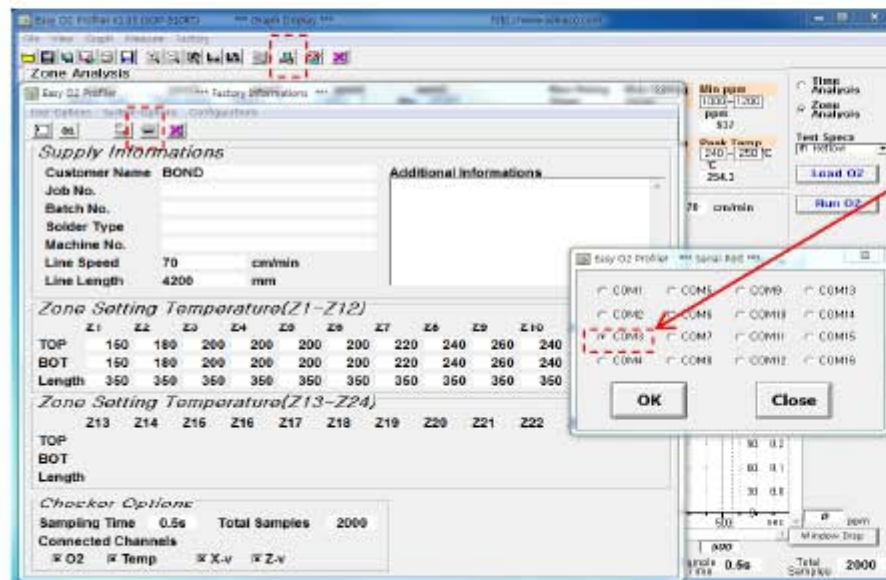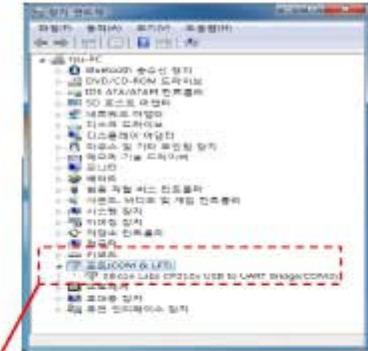1) Communication port matching between PC system manager and SOP-501KT (510KT) program

① Control board → System → System manager generation

② System

③

④ Connect EASY O2 PROFILER RF UNIT to PC by USB cable

EASY PROFILER RF UNIT

⑤ Automatic

▷ 키보드
◢ 포트(COM & LPT)
  Silicon Labs CP210x USB to UART Bridge(COM3)
▷ 프로세서

1. If USB connection is released, the contents in ⑤ above disappear automatically from system manager.

2. If communicate cannot be done while using the product, check whether system manager port and the port set in SEP-306RFV program are same and make them match up with each other

3. PC system manager generates port numbers in the sequence of connected order of the devices. Therefore, in case other communication device is connected while SEP-306RFV RF UNT product is not connected, port number can be changed.
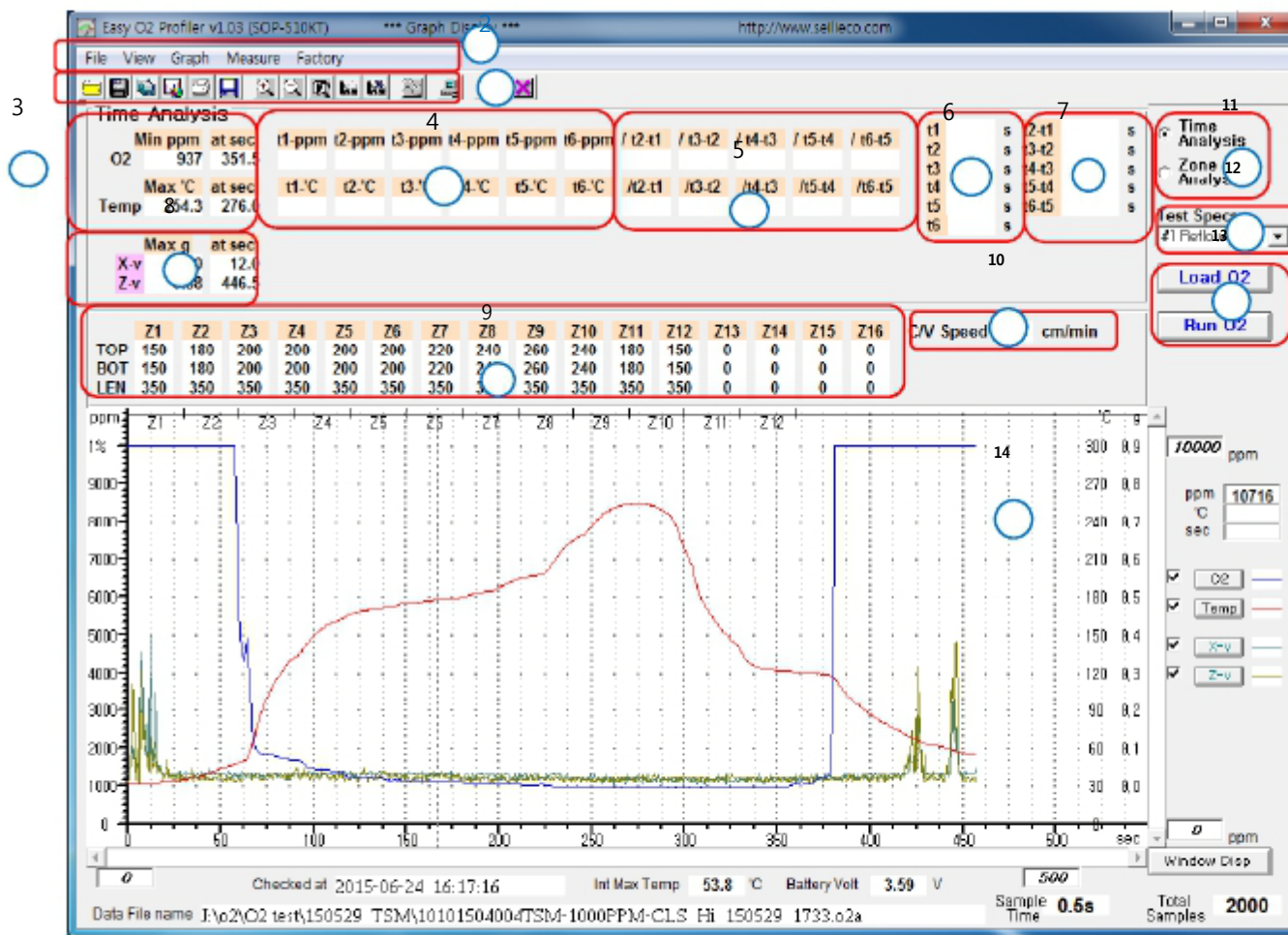
Zone Analysis

Easy O2 Profiler *** Factory Informations ***

Supply Informations
Customer Name BOND
Job No.
Batch No.
Solder Type
Machine No.
Line Speed 70 cm/min
Line Length 4200 mm

Additional Informations

Zone Setting Temperature(Z1-Z12)

	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	Z9	Z10
TOP	150	180	200	200	200	200	220	240	260	240
BOT	150	180	200	200	200	200	220	240	260	240
Length	350	350	350	350	350	350	350	350	350	350

Zone Setting Temperature(Z13-Z24)

Z13	Z14	Z15	Z16	Z17	Z18	Z19	Z20	Z21	Z22
TOP
BOT
Length

Checker Options
Sampling Time 0.5s Total Samples 2000
Connected Channels
☒ O2 ☒ Temp ☒ X-v ☒ Z-v

Easy O2 Profiler *** Serial Port ***

☐ COM1	☐ COM5	☐ COM9	☐ COM13
☐ COM2	☐ COM6	☐ COM10	☐ COM14
☒ COM3	☐ COM7	☐ COM11	☐ COM15
☐ COM4	☐ COM8	☐ COM12	☐ COM16

OK   Close

2. Product program installation

2-3. PC Program function description (**Easy O₂ Profiler Program**)
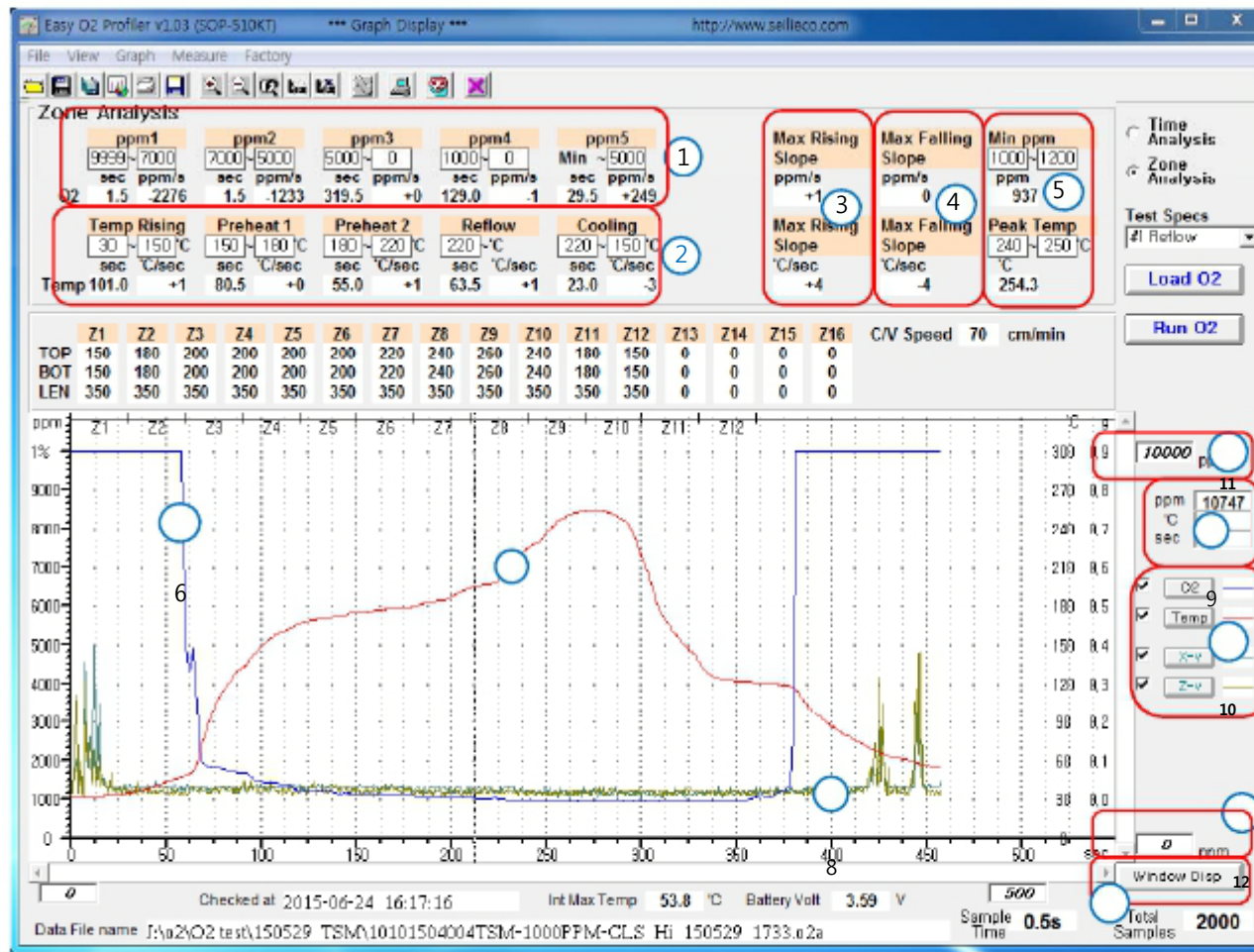
Easy O₂ Profiler v1.0.exe

1

Explanation on main screen configuration

① Menu bar
② Icon bar
③ The time indicating max O2 and temperature
④Temperature display at each Cursor zone
⑤ Graph slope for each Cursor zone
⑥ Time for each Cursor zone
⑦ Time between Cursor zone
⑧ Vibration measurement value
⑨ **REFLOW ZONE temperature**
⑩ **C/V speed**
⑪ - **Time Anaiysis**
(**Time, zone measurement**)
– Zone Analysis
(**Set-up zone measurement**)
⑫ **O2** instrument set-up
⑬ **Measurement start/ DISPLAY**
⑭ **Measurement graph**

2. Product program installation

2-3-1. PC Program function description (**Easy O₂ Profiler Program**)
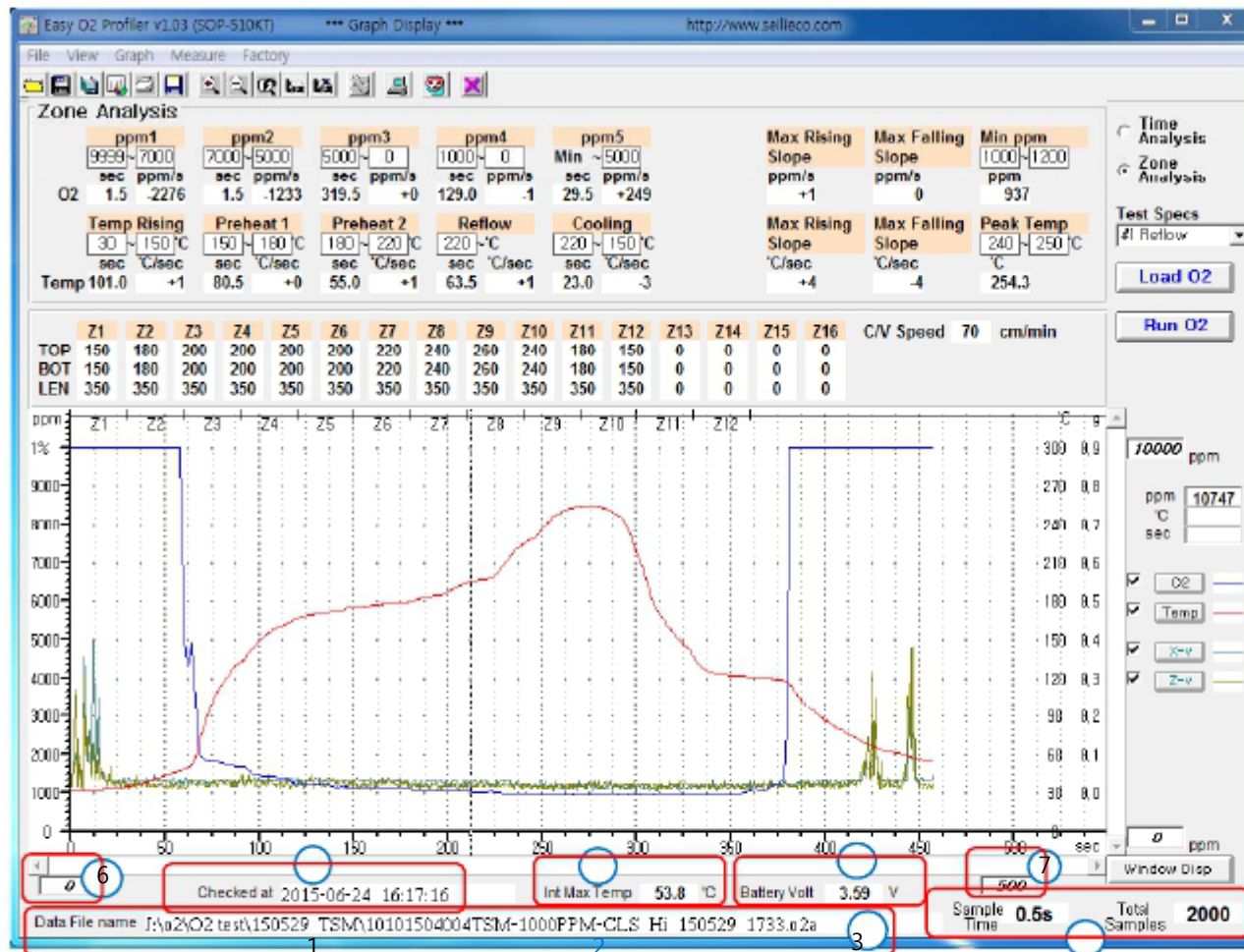
Easy O₂ Profiler v1.0.exe

Explanation on main screen configuration

① O2 measurement value /time for each zone
② Temperature measurement time/slope for each zone
③ Rising O2 and temperature slope
④ Falling O2 and temperature slope
⑤ Average O2 value, Max temperature value
⑥ O2 graph
⑦ Temperature graph
⑧ Vibration X, Z-axis graph
⑨ Current mouse value
⑩ Graph color selection / deletion
⑪ O₂ Maximum value (can be changed)
⑫ O₂ Minimum value (can be changed)
⑬ Expansion apply button

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2. Product program installation

2-3-2. PC program function description (**Easy O₂ Profiler Program**)

Easy O₂ Profiler v1.0.exe

– Explanation on main screen configuration–

① Measuring time
② internal temperature of the O2 measuring device
③ Battery level indicator of the O2 measuring device
④ **Measured value saving location**
⑤ Measuring criteria (by hour)
⑥ Measurement start time (subject to change)
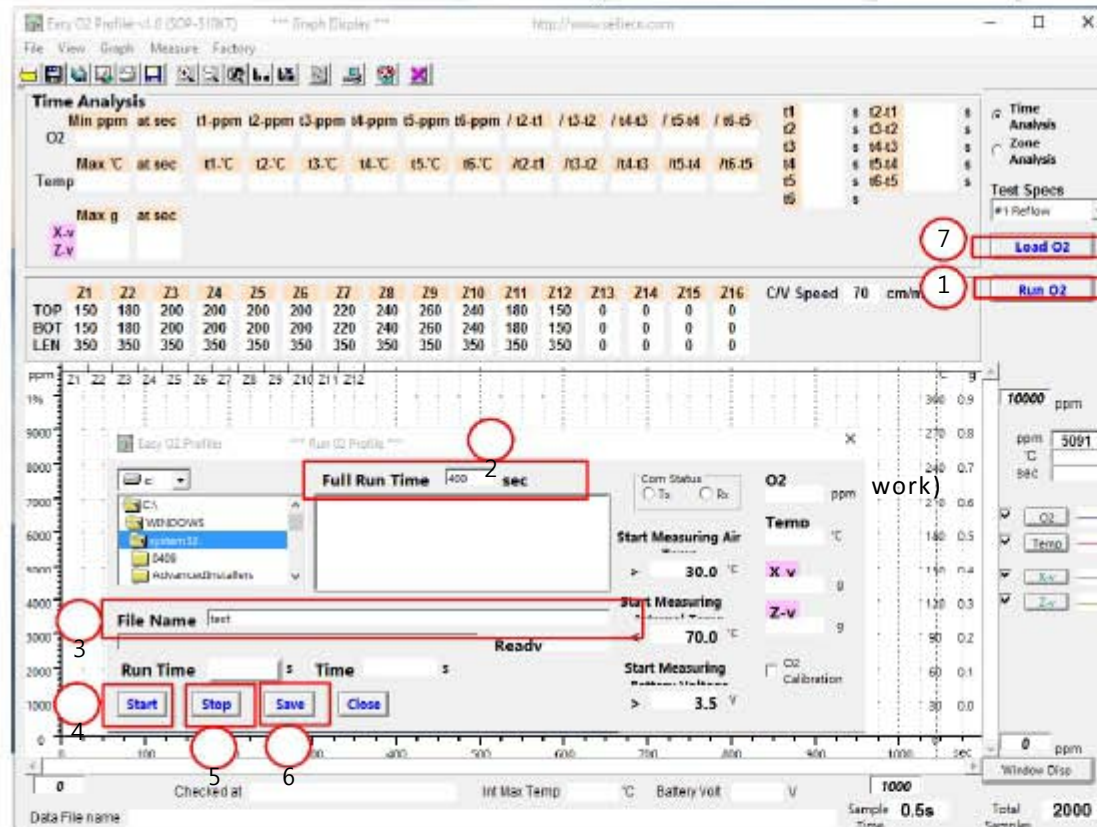⑦ Measurement end time (subject to change)

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3. Explanation on product operation

3-1. Easy O2 Profiler easy operation method 1

| Zone / Temperature Setting | → | ① Run O2 | → | ② Load O2 |

How to measure control manager O2

① **Run O2** Click
② Full Run
   Time Setting
   (Reflow full run time
   – 400sec by SMT standard)
③ File Name identification (user input)
④ Start Click
⑤ Stop Click (In case auto saving doesn't work)
⑥ Save Click (In case auto saving doesn't work)
⑦ Load Click (Display)

Full Easy –Run REF PCB- File Name Explanation

Model name Test_Hi_140611_1644.o2a

RUN REF pcb always constant Measuring Year / Month / Date / min.

Ex) File Name (Model name must be always same)

_ , - cannot be used in model name

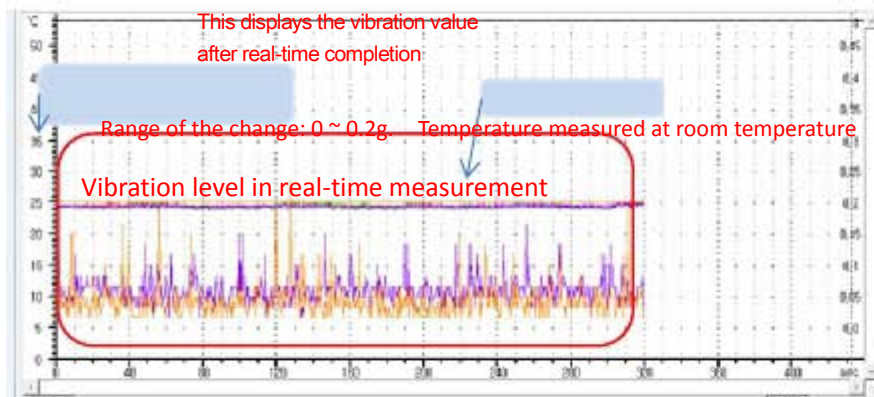Used in **Easy Profiler and caution needs to be paid**

3. Explanation on product operation

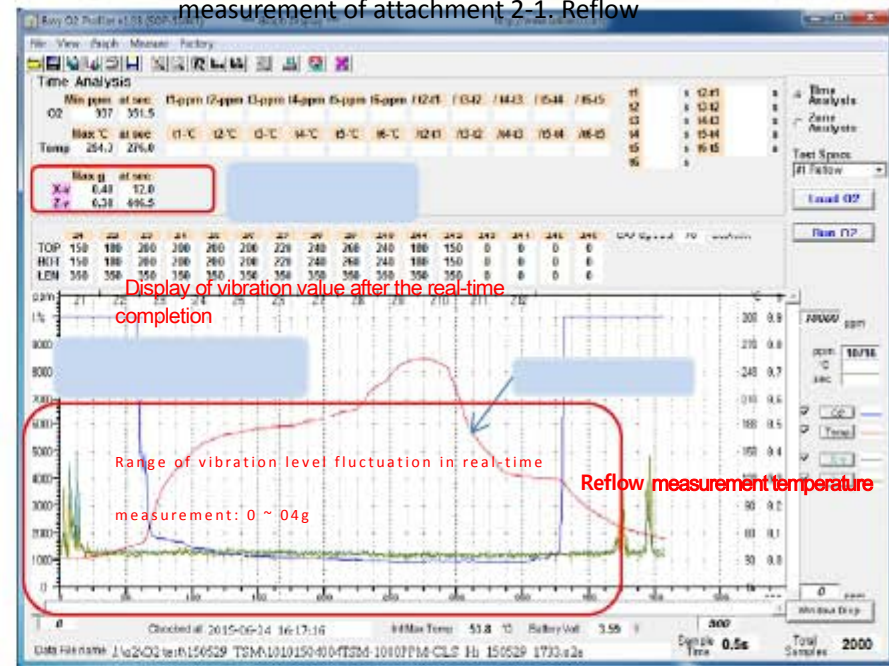3-2. Easy O2 Profiler vibration sensing function/measurement

- This is to do constant monitoring of Reflow M / C in order to prevent damage caused by falling parts due to M/C conveyer vibration during Reflow Bottom Soldering

Picture 1) This is the screen capture state after real-time measurement of non-vibration test (RT) on the work table.

Picture 2) This is the state of the screen captured after real-time measurement of attachment 2-1. Reflow

This displays the vibration value after real-time completion

Range of the change: 0 ~ 0.2g.   Temperature measured at room temperature

Vibration level in real-time measurement

Display of vibration value after the real-time completion

Range of vibration level fluctuation in real-time measurement: 0 ~ 04g

Reflow measurement temperature
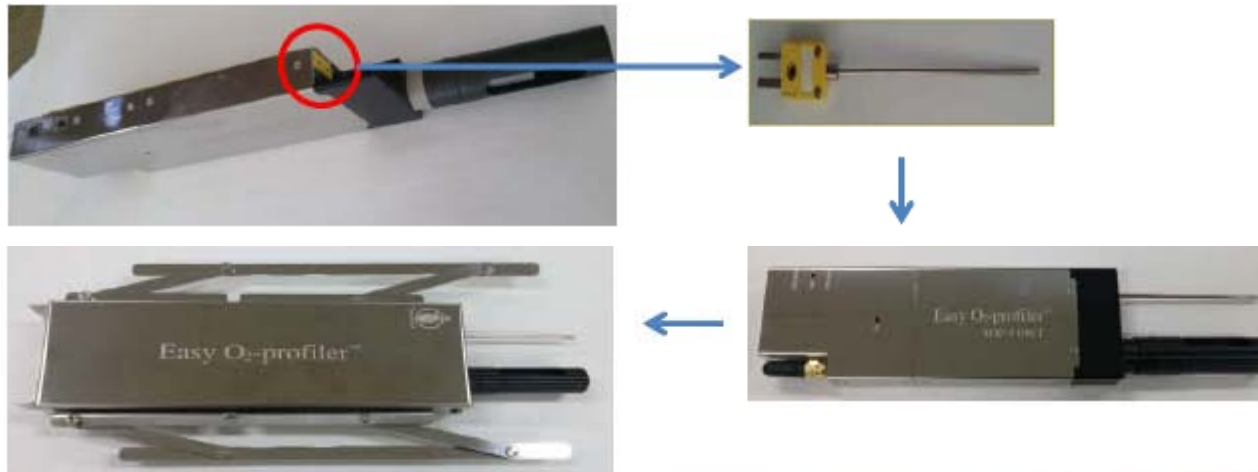
4. Easy O2 Profiler measurement

4-1. Easy O2 Profiler measurement method and preparation

1) REF PCB measurement preparation work and method for that

    1-1) Connect 1 ea of easy sensor to Memory Unit

- **Caution**

  - Easy sensor is damaged in case it is bent or external force is put on it and needs to be replaced.
  - When connecting sensor, insert it after checking +/- shape of it

  - Do not use excessive force when inserting sensor.
  - To careful because sensor wire is thin and it is easily damaged.

1-2) When LED green light is turned on after
five minutes preheating of O2 sensor after power on,
install it on heat-resistant case and start measurement

1-2 Easy O2 Profiler Measurement preparation work

  and method

4. Easy O2 Profiler measurement

4-2. Easy O2 Profiler operation/measurement

1). Move up the "PWR ON" switch of the SOP-501KT / 510KT Memory unit (main body) to ON direction (STR direction).

(1) At this time, green light is turned on (means measurement can be done) 5 minutes after "STR" LED has been turned on with green/red color alternately.

(In case it is turned ON again after turned OFF, it is in standby mode and transmission cannot be done)

- "STR": Run (green) / Warning (red)
- In case the device is under alternative lighting state, it is under the state of device checking and "STR" switch should not be turned ON.

(2) In case it stops with red color: Memory unit may need charging or it may be under the state that internal temperature is very high , therefore, it needs enough cool down.

- In case internal temperature is above 60 ℃ , red warning light is turned on; it needs to be cooled down until room temperature is reached.

- In case battery voltage is lower than DC4.0V, LED becomes red color, and in case of complete drain, it is turned OFF (for battery charging, refer to page 15).

(2) Measurement starts when Start Click is done, and STR LED is turned on. Make sure to be familiar with the operating procedure and operation method at the room temperature state before input into heating device.

1) STR green LED flashes and measurement is recorded by the set interval (0.5 seconds).

(3) After the completion of measurement, "automatic stop and STOP Click at PC program" stops.

- In case "PWR ON" switch is not tuned OFF, device automatically enters to sleep mode after measuring basic number of time set before (100 times).

※ For details about PC data transfer, device setting, etc. Refer to page 8.

4. Easy O2 Profiler measurement

4-3. How to use heat-resistant case
(1) Heat-resistant case Locker release.
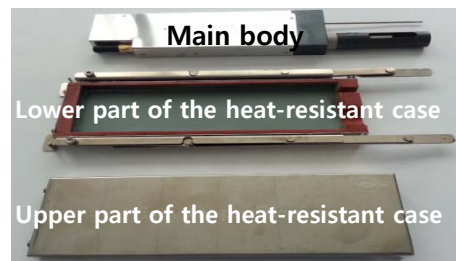(2) Align the width of extension wing in line with the PCB width.
※ after the adjustment of width, tighten the bolt while case cover is opened or tighten with hexagon
※ in case it is not fastened tightly, width may be contracted during conveyer movement due to vibration and it needs attention.
(3) Open the cover and insert Memory Unit, measurement starts. Make sure to be familiar with operating procedure and method at room temperature before putting into heating device.
1)   After inserting Memory Unit, turn on "PWR ON" switch and **check "STR" LED Lamp Status** (Can be used after 5 minutes preheating).
2)   2) Put the cover and fix

Main body

Lower part of the heat-resistant case

Upper part of the heat-resistant case

① before the assembly of SOP-501KT/510KT heat-resistant case

② Mount SOP-501 / 510KT main body on the heat-resistant case in the lower part

③ Mount the heat-resistant case in the upper part at the hook which is at the sensor direction of the lower part case

⑥ **Heat-resisting case is the state of completion of assembly before it insert into reflow machine.**

⑤ Hang the two hooks on the opposite part of the sensor.

④ After correctly fixing on both sides of the hook, cover the heat-resistant case in the upper part

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4. Easy O$_2$ Profiler measurement

4-4) O$_2$ Profiler Reflow insertion method   (example: in case conveyer direction from left to right)

Reflow processing direction

4. Easy O$_2$ Profiler measurement

4-4. Precaution on the use of Easy O2 Profiler

① Be sure to **use heat-resistant case** when inserting SOP-501KT / 510KT Memory Unit into Reflow M / C into heating unit.

② Be sure to insert into heating device after fully understanding the process of the use and operation method at room temperature

③ In case "STR" LED of the SOP-501KT / 510KT Memory Unit is red and heat is felt, make sure to use **after cooling sufficiently**.

④ In case of PWR 'OFF after measurement, the DATA measured and recorded are deleted.

⑤ Be sure to "OFF" after transmitting the data in the SOP-501KT / Data 510KT Memory Unit to PC and SAVE it.

⑥ Do not put excessive force or bend the RF antenna connecting area of the SOP-501KT / 510KT Memory Unit →It may be the major cause of damage to product (wireless transmission cannot be done)

⑦ Avoid contact or interference with the end of the other sensor.

⑧ SOP-501KT / 510KT Memory Unit has to be cooled at room temperature and it shouldn't be put into refrigerator, etc.

5. How to operate program

5-1. Measurement data import

How to open O2

① File OPEN
② File click
③ Open

5. How to operate program

5-2. Equipment information input

5. How to operate program

Before Zone setting

5-2. Equipment information input

5. How to operate program

After Zone setting

5-2. Equipment

information input

5. How to operate program

5-2. Equipment information input

Measurement parameter setting

1. O_2 Meter model selection / input
   SOP-510KT / SOP-501KT
2. O_2 meter model selection :
3. O2 measurement setting by zone
   ppm Measurement range / time
   settings
4. Temperature range setting
5. Application

6. Program function description1
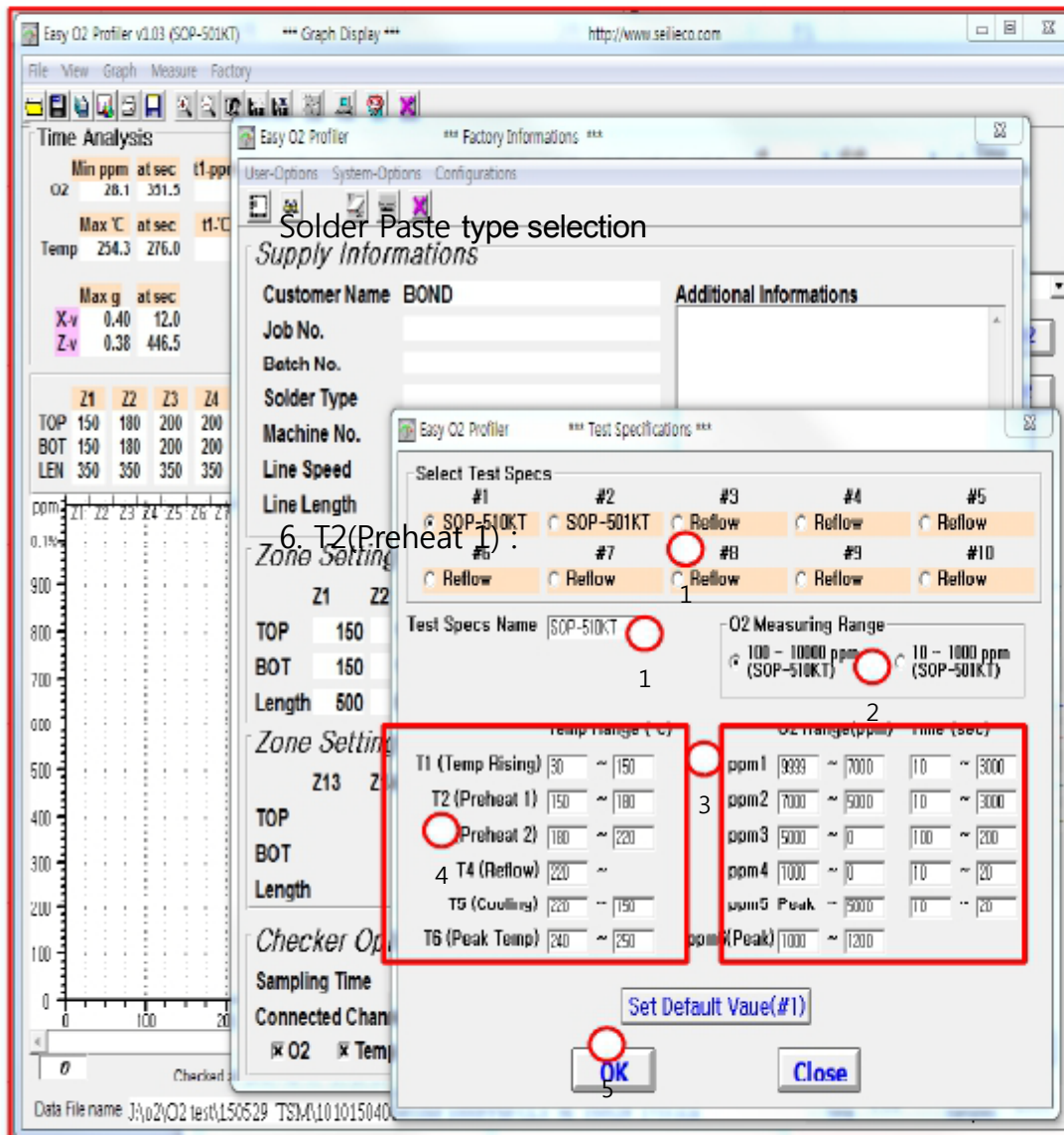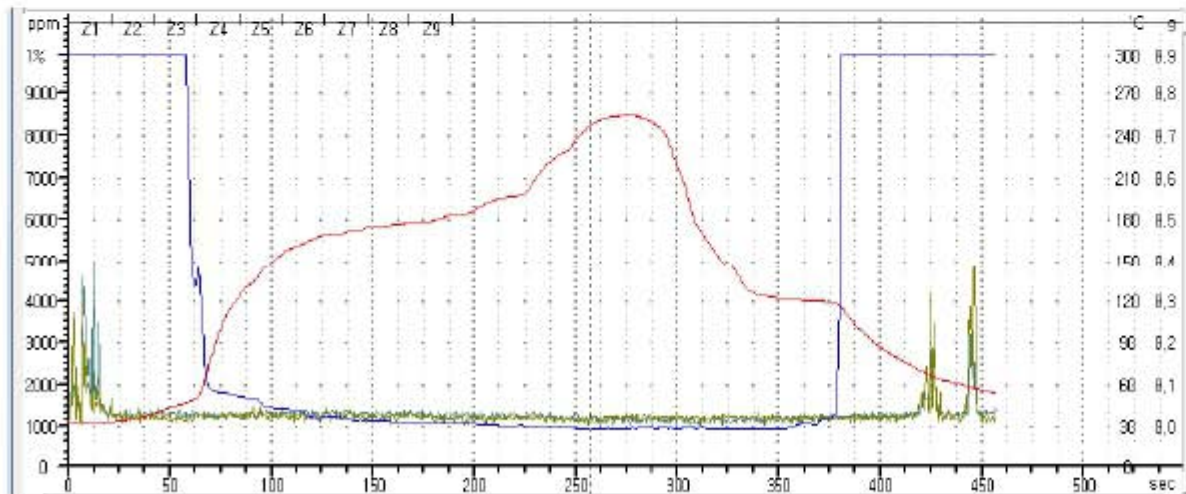
6.1. Cursor Informations

◇ Cursor Inform(data based on time)

1. t1-'C: Temperature for each channel at the intersection point of t1 (cursor) and graph
2. / t1-t2: Slope of the average temperature change for each channel at t1 zone and t2 zone
3. t1: Time for each channel from starting point up to the point marked t1
4. t1-t2: Time for each channel from the point marked t1 up to the point marked t2
Reference; ----- is selected for cursor bar by default and it is cleared when----- is selected.

◇ Time Zone(data based on temperature)

1. T1: Input of the temperature range to be achieved on the graph.

2. T1−sec: Time range for each channel at the intersection point of the temperature range entered at T1 and graph

3. T1−'C / s: Slope of the average temperature change for each channel at the T1 zone.

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

◎ Quick Zoom

: Magnification for four consecutive times possible,

: Contraction for four consecutive times possible,

: Re-display,

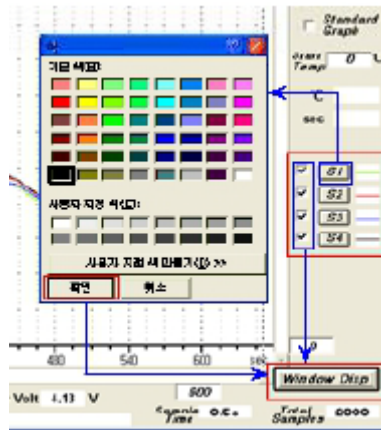Reverting screen of the graph to original state

◎ User Zoom

In case you want individual magnification by length

and width of the graph, enter the number in the input

column and select "Window Disp", then, relevant unit

is changed.

- Select   if you want to revert to original

state

6. Program function description1 2

6.3. Graph Line Color changing and hiding

◎ Line Color
Select the button of the sensor channel
to be changed and set the color, and select
"Window Disp" button after that.

◎ Line Hidden
Deselect the check box of
the sensor channel to be hided,
and select "Window Disp" button.

Reference.
When saved in the file after the change,
It is saved individually, and when it is newly executed
after program finish,
It is operated by the final set state

6.4. Other function description.

: Open File - Open data stored (select after checking Data Type).

: Save the file with different name.

: Convert to Excel file (saved into the folder that contains the data).

: Convert the graph screen to an image file (∗ .bmp)
(Saved into the folder that contains the data).

: End program.

6.5. Standard Graph.

The function to compare whether the measured data falls into the range of standard graph designated as standard.
① Icon selection
② "File Open": select when you open the file of the standard graph saved,
or "File Save": Select when you save a newly created standard graph.
③ "Option Save": Apply/save the standard graph to the graph on the screen,
or "Close": Used to cancel application and close window.
④Select "Window Disp" button and standard graph is shown on the graph screen.

Reference.

1. Standard graph is the graph connecting each of the zones entered with a straight line.

2. Zone number can be increased up to 25 by selecting the "Data Type" at the bottom right of the main screen of the program.

3. When "Data Type" is changed, the data opened at that moment is closed, and data must be transferred again from Memory Unit

7. Memory Unit program reset-1

Caution: Measurement data saved in the Memory Unit is deleted when reset is done, therefore, start operation after checking this.

7.1. Sampling Time & Total Samples

1. **Sampling Time** :   The interval to measure temperature
 Total Samples : Total number of measurement

If setting is made as
 "Sampling Time 0.5s and Total Samples 2000 ",
It means that temperature is measured 200 times at 0.5 sec interval and stops after that.
- 0.5sec × 2000 = 1000sec (stop after measuring and recording about 16 minutes)

2. Measurement automatically directed into sleep mode
 after the completion.
 ※ Following are the settings made when product was shipped
 from the factory.
 - Sampling Time : 0.5s
- Total Sampling : 1000

Setting sequence

① After connecting Memory Unit to PC via USB cable, **"PWR" ON** the Memory Unit.
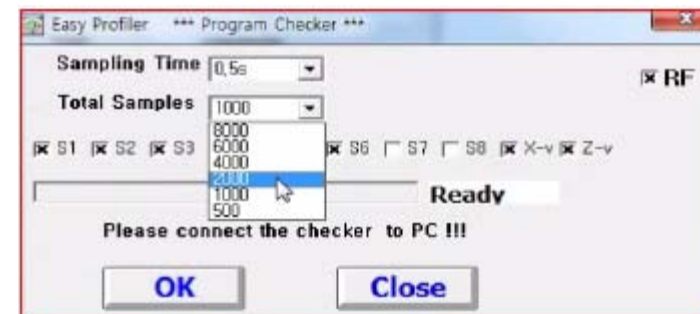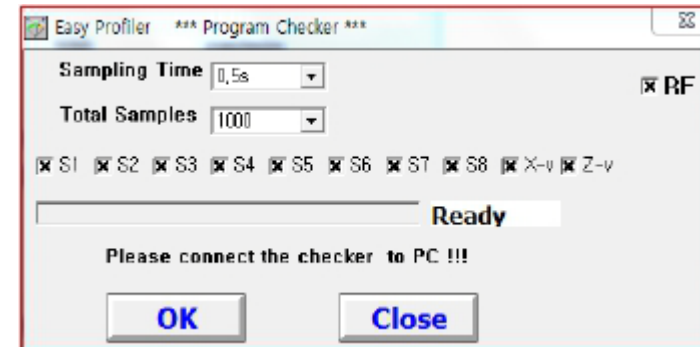
② After selecting from the program, select (Program Checker) from secondary window screen.

③ Select the **"Sampling Time"** and **"Total Sampling"** you want to select, and then select "OK".

④ When transmission is completed, 'Ready' is switched to **'End Tx'**.

Reference:

Even if power of the Memory Unit is OFF, the contents of the "Program Checker Setting" is not deleted.

7. Memory Unit program reset -2

Sampling Time table

Memory Unit operation time table in accordance with the selection of the "Sampling Time" & "Total Samples"								
			0.5s			**1S**		
			8000	4000sec	≒ 66 minutes	8000	8000sec	≒ 2 hours 10 minutes
			6000	3000sec	≒ 50 minutes	6000	6000sec	≒ 1 hour 40 minutes
			4000	2000sec	≒ 33 minutes	4000	4000sec	≒ 1 hour 6 minutes
			2000	1000sec	≒ 16 minutes	2000	2000sec	≒ 32 minutes
			1000	500sec	≒ 8 minutes	1000	1000sec	≒ 16 minutes
			500	250sec	≒ 4 minutes	500	500sec	≒ 8 minutes
2S			**5S**			**10S**		
8000	16000sec	≒ 4 hours 26 minutes	8000	40000sec	≒ 11 hours 6 minu	8000	80000sec	≒ 22 hours 13 minutes
6000	12000sec	≒ 3 hours 20 minutes	6000	30000sec	≒ 8 hours 20 minutes	6000	60000sec	≒ 16 hours 40 minutes
4000	8000sec	≒ 133 minutes	4000	20000sec	≒ 5 hours 33 minutes	4000	40000sec	≒ 11 hours 6 minutes
2000	4000sec	≒ 66 minutes	2000	10000sec	≒ 2 hours 46 minutes	2000	20000sec	≒ 5 hours 33 minutes
1000	2000sec	≒ 33 minutes	1000	5000sec	≒ 83 minutes	1000	10000sec	≒ 2 hours 46 minutes
500	1000sec	≒ 16 minutes	500	2500sec	≒ 41 minutes	500	5000sec	≒ 83 minutes

※ 1. Battery consumption of the Memory Unit is proportional to measurement number and time, in case it is used with the setting state of over 0.5s; battery charge state has to be checked.

2. In case it is used under the setting state more than 1 hour, it must be used under the state of room temperature/USB power supply, because data may be lost during measurement.

8. How to charge and transmit

8-1.Battery Spec.

1) 3.6V Rechargeable Battery

   MODEL : B-1522 (Li-Polymer. 3.7V 2950mAh)
   (Please contact us for battery purchase and other questions)

2) Battery life

- O2 Profiler product can be used about six months depending on the

number of battery charge, and for stable use of the product,

it is recommended to replace battery after 6 months.

- O2 Profiler product has built-in PCM protection circuit and it blocks 2.7V

in case of battery discharge and 4.1V over charge in case of battery charge

and extend battery life.

 (However, if battery is discharged naturally, battery life is reduced significantly.)

[Safe Battery charge range]

3) Precautions for Battery Handling

 - When charging O2 Profiler product, Please be sure to charge after main body power

switch OFF.

 - Do not use non-genuine Battery. (That may lead to degradation of the product)

8. How to charge and trasmit

8-2. Charge

As shown in the picture, connect the USB adapter of the Memory unit to charger adapter for charging.

Charge state display

Charging: "CHG" LED of the Memory Unit turns to red color.
2 Completion of Charging: "CHG" LED of the Memory Unit turns to green color.
3 Overcharging: In case charging is continued after the completion of charging, "CHG" LED turns to red color. (There is no problem even though overcharging is made)

How to check availability for use:

1) When switch is turned ON, "RW" LED flashes red/green alternately and stops at green.

2) Bring memory from PC program at the state of turning on Memory Unit "ON" switch (refer to page 8).

Other displays

- Warning for low voltage: When "ON" switch is turned on, "R / W" LED flashes green/red color alternately and then red color flashes quickly after that.

- When fully discharged: When "ON" switch is turned on, LED does not flash (Time needed for charging: 4-5 hours).

9. Easy O₂ Profiler component-1

In the pocket
⑥ USB cable (Recharge cable)
⑨ Manual & Test sheet

In the pocket
⑧ Software disk

③ Protective case

④ Easy sensor

② Receiver

① Memory unit

제품과 기술, 미래를 설계하는 기업 세일리코주식회사 SEILIECO CORPORATION

9. Easy O₂ Profiler component -2

Part List.

No.	Description.	No.	Contents.	Etc.
①	Memory unit	M-001	Main memory equipment for temperature profile	
②	Battery	M-002	3.6(Li-Polymer) 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 40㎝)	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	

EASY O2 Profiler Feature and Effect of Application

1. The oxygen (O2) concentration N2 Reflow M / C can be measured on real time basis
2. Temperature and C / V vibration can be measured and displayed at the same time.
3. The oxygen (O2) concentration can be measured ultra-precisely by 10 ~ 10,000ppm.
4. Real-time monitoring at low cost.
5. Vibration Measurement possible (prevents falling of the defective parts): Can check Reflow Conveyor vibration