

Lambda 465 Peltier Control Single Cell with Peltier Controller Installation Instructions

This instruction sheet describes the installation of this accessory which is used with the Lambda 465 Spectrophotometer.

NOTE: Read these instructions before you install this accessory.

Contacting PerkinElmer

Supplies, replacement parts, and accessories can be ordered directly from PerkinElmer, using the part numbers.

See our website:

<http://perkinelmer.com>

PerkinElmer's catalog service offers a full selection of high-quality supplies.

To place an order for supplies and many replacement parts, request a free catalog, or ask for information:

If you are located within the U.S., call toll free 1-800-762-4000, 8 a.m. to 8 p.m. EST. Your order will be shipped promptly, usually within 24 hours.

If you are located outside of the U.S., call your local PerkinElmer sales or service office.

Features

- Easy to install
- Full software control
- Liquid cooling system
- N₂ gas purging available



Figure 1. Lambda 465 Peltier control Single Cell [P/N: N4104009]

Dimensions and Specifications

Dimensions of Peltier Controller

| Physical Characteristic | Specification |
|---------------------------------------|---|
| Power | 100-240 VAC, 50/60 Hz, 300W, Free Voltage |
| Temperature Range | -10 to 100°C (Maximum Internal Temperature) |
| Maximum Ambient Operating Temperature | 40°C |
| Dimensions | 310 (W) x 410 (D) x 275 (H) |
| Weight | 20.0 kg |
| Coolant Volume | 2 L |
| N ₂ Gas Available | 100 psi (6.9 bar) |
| Liquid Cooling System | |
| Magnetic Stirrer Control Available | |
| Emergency Power Off Switch Available | |

Dimensions of Peltier Control Single Cell

| Physical Characteristic | Specification |
|--------------------------------|-----------------------------|
| Dimensions | 101(W) x 189(D) x 133(H) mm |
| Weight | 2.2 kg |
| Temperature Accuracy | ±0.15°C |
| Temperature Precision | ±0.1°C |
| Temperature Stability | ±0.1°C |
| Ramping Time (from 0 to 100°C) | 4 minutes |

Safety Warnings

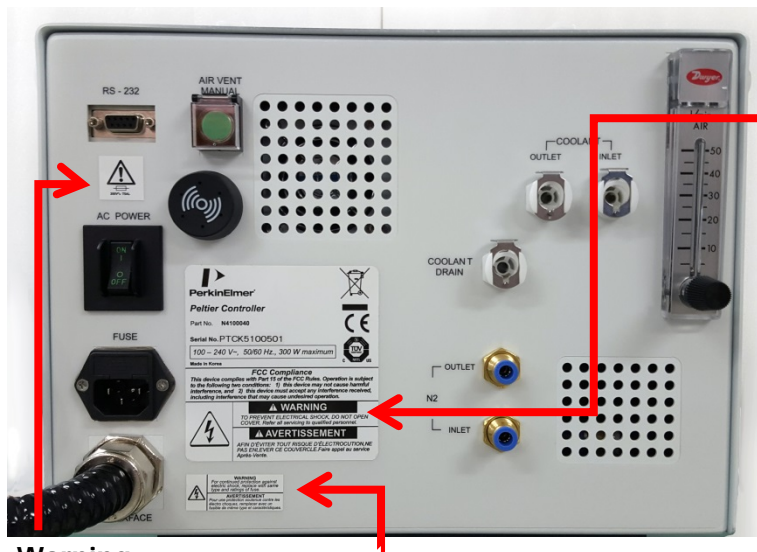


WARNING

When this label is attached to an instrument it means refer to the manual.

Lorsque cette étiquette est attachée à un instrument, il est nécessaire de voir le manuel.

See the following figure for the location of warning labels on the back of the instrument:



Warning

To prevent electrical shock, do not open cover. Refer all servicing to qualified personnel.

Avertissement

Afin d'éviter tout risque d'électrocution ne pas enlever

Warning

FUSE

Avertissement

FUSE

Warning

For continued protection against electrical shock, replace with same type and ratings of fuse

Avertissement

Pour assurer la protection contre le risque de choc électrique, remplacez le fusible seulement avec le même type et la même valeur nominale.

Description

Configuration of the Peltier Control Single Cell Holder

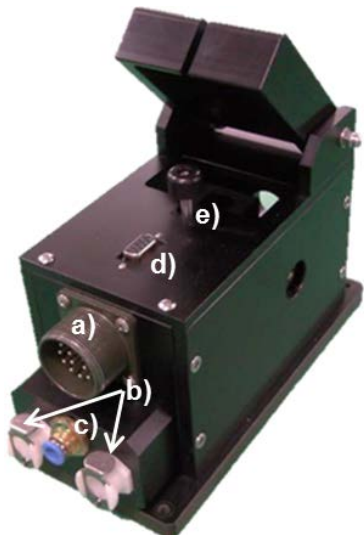


Figure 2 Lambda 465 Peltier Control Single Cell

- a) **Interface connector between Peltier Single Cell Holder and Peltier Controller**
- b) **Coolant Inlet/Outlet Quick Coupler**
- c) **N₂ gas fitting**
- d) **Interface slot for Temperature Probe**
- e) **Cell Lifting knob**
- f) **Temperature probe**



Figure 3 Temperature Probe Accessory



Figure 4 Base Plate



Figure 5 Wrench bolt M5, Length 15 mm, 2 ea



Figure 6 Phillips round head screw with washer M4, 15 mm, 4 ea

Front View of Peltier Controller



Figure 7 Front view of the Peltier Controller

- a. **Manual touch pad with Display:** Temperature Control Unit (Heating/Cooling Block)
- b. **LED Indicators:** Indicate the status of the operation of Coolant circulation, Fan, Pump, etc. (If there is a problem in the components, Red LED will flash with beep alarm.).
- c. **Manual ON/OFF button:** As the Manual ON/OFF button is ON, the temperature can be controlled manually by a) Manual touch pad with display.

NOTE: *Manual operation is used only for the manufacturing process so it should be turned off during the measurement.*

- d. **N₂ gas ON/OFF button:** It is used for using N₂ gas to remove the frost from the heating and cooling.
- e. **Stirrer ON/OFF button:** It is used for controlling of the stirring.
- f. **Stirrer Speed Controlling Knob:** Control the stirring speed (rpm).
- g. **Emergency switch:** Stop all the operations in an emergency situation.

NOTE: *During the operation, the emergency switch should be turned off.*

- h. **Coolant Inlet**

Rear View of Peltier Controller



Figure 8 Rear view of the Peltier Controller

- a. **RS-232 port**
- b. **AC POWER:** Main Power ON/OFF
- c. **FUSE:** AC Socket + Fuse Holder
- d. **INTERFACE:** Interface cable for connecting with Peltier control Single Cell
- e. **Air Vent Manual switch:** Used for removing the air in the coolant hose.
- f. **Buzzer:** It makes an alarm sound. If there is any problem before the measurement, the buzzer beeps 6 times every 10 sec. If the malfunction occurs during the operation, the buzzer beeps twice every 10 sec.
- g. **Quick Coupler of Coolant Inlet/Outlet**
- h. **Quick Coupler of Coolant Drain**
- i. **N₂ Gas Inlet/Outlet ports**

NOTE: *N₂ gas is not always required [Tube for N₂ gas is not supplied with the accessory].*

- j. **Flow Gauge:** Indicator of the flow rate of N₂ gas.

Configuration of the equipment

Peltier control Single Cell
Peltier Controller
Power Cord, 3ea
Base Plate, 1ea
Wrench bolt. 2ea
Phillips round head screw with washer, 4ea
Coolant Hose, 1ea
Magnetic Stirrer, 1ea
Coolant, 2ea
Waste Basket for Coolant, 1ea
Waste Hose for Coolant, 1ea
Interface Cable (RS-232 or USB to RS-232), 1 each
Spare Fuse (AC 250V T5AL), 2ea
Temperature Probe, 1ea

Installation

CAUTION *Make sure the instrument is turned off while installing this accessory.*

ATTENTION *Assurez-vous que l'instrument est éteint lors de l'installation de cet accessoire.*

1. Place the Lambda 465, Peltier Controller and Peltier Control Single Cell in a location that is compatible with the required environmental conditions for the operation.
2. Open the lid of the coolant inlet on top of the Peltier Controller.



Figure 9 Lid of coolant inlet

3. Fill up the liquid coolant using the funnel.

NOTE: *Keep the amount of liquid coolant to the level where the indicator is located between the 'L' (low) and 'H' (high) mark in the scale on the left side of the Peltier Controller. When the coolant is running short for the operation, the LED of Low Water Level changes to red with an alarm sounding.*

CAUTION

*The liquid coolant must be used as refrigerant. **Do not use any water (tap water, DI, etc).** In case that the water is used as refrigerant, Peltier Controller's components might be corroded and its performance may be deteriorated.*

Use any kind of liquid coolant in normal grade as is available (e.g. liquid coolant including Distilled Water 70 wt%, Propylene Glycol 27 wt%, Additives 3 wt%).

ATTENTION

*Le liquide de refroidissement doit être utilisé comme réfrigérant. **N'utilisez jamais d'eau (eau du robinet, eau déminéralisée, etc.)** L'eau risque en effet de corroder les composants du contrôleur Peltier et de réduire les performances de ce dernier.*

Utilisez un liquide de refroidissement du commerce de qualité normale (par exemple, un liquide de refroidissement à base d'eau distillée à 70 % M/V, de propylène glycol à 27 % M/V et d'additifs à 3 % M/V).

4. Connect the power cord and the communication cable of the Lambda 465.

NOTE: *Make sure that the instrument is turned off when the accessory is installed.*

5. Take apart the existing cell holder in the sample compartment.



Figure 10 Taking apart the existing cell holder

- Place the base plate at the bottom of the sample compartment and tighten the bolt with a wrench. Next fix and tighten the Peltier Control Single Cell with the Phillips round screw.

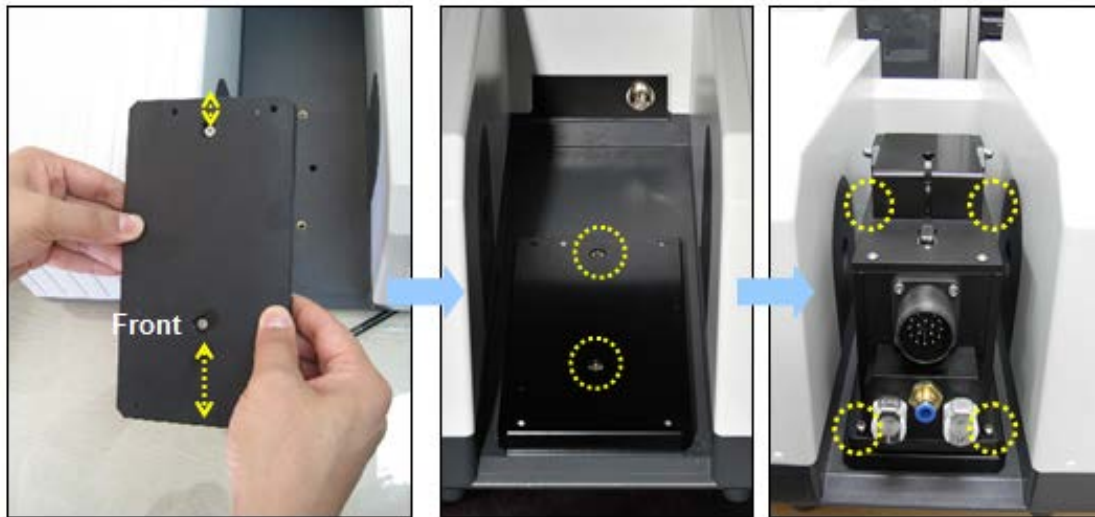


Figure 11 Placing the plate at the bottom of the sample compartment

- Connect the accessory interface cable of the Peltier Controller to the interface connector of the Peltier Control Single Cell.

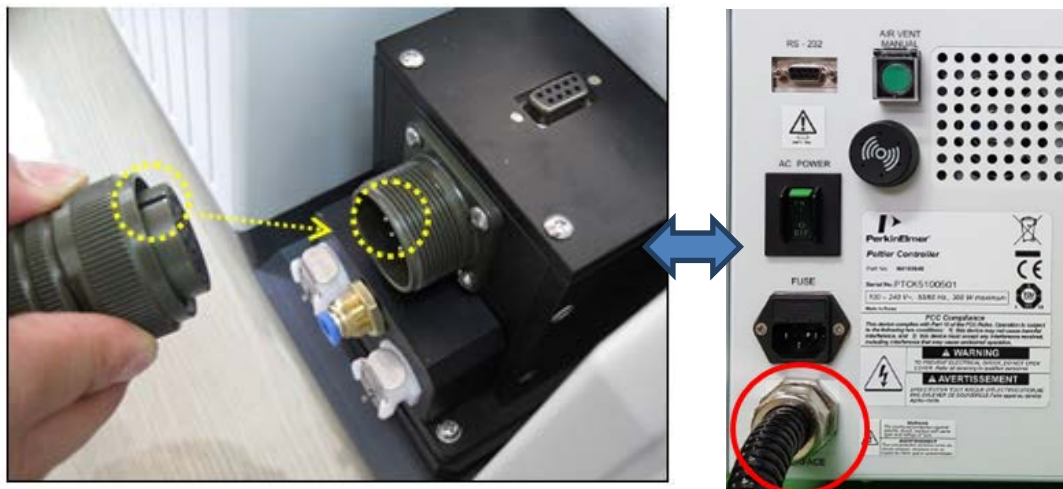


Figure 12 Connecting the accessory interface cable of the Peltier Controller to the interface connector

8. Connect the coolant inlet/outlet and N₂ gas tube between the Peltier Controller and the Peltier Control Single Cell.

NOTE: N₂ gas is not always required, so the gas and inlet hose are not supplied.

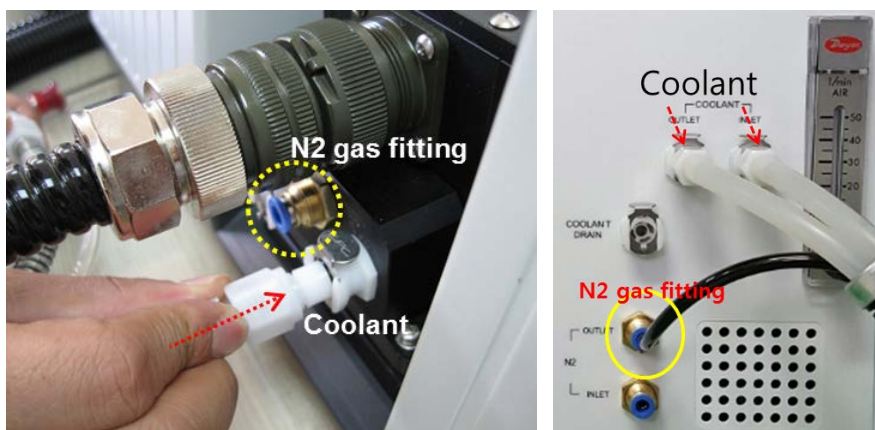


Figure 13 Connecting the coolant inlet/outlet and N₂ gas tube

9. Connect the temperature probe to the interface slot of the Peltier Control Single Cell.

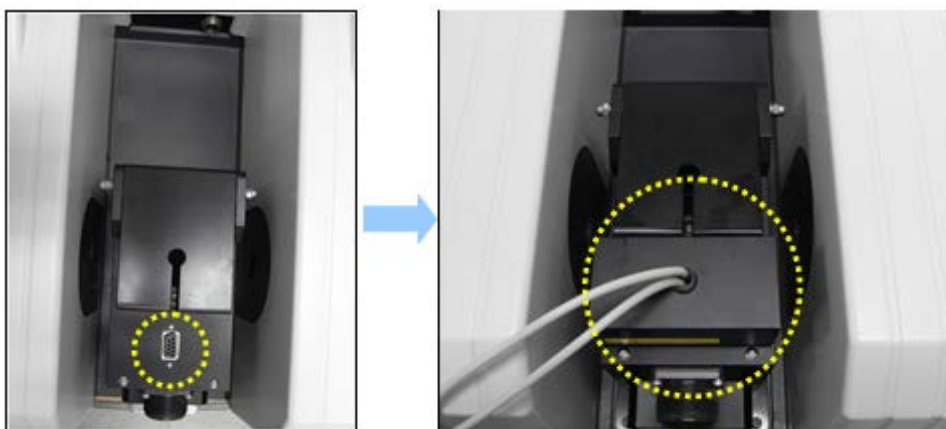


Figure 14 Connecting the temperature probe

10. Connect the Peltier Controller with the PC via the RS-232 or USB to RS-232 cable. See Installing the USB to RS-232 driver on page 15 when you use the USB to RS-232 cable.



Figure 15 Connecting the Peltier Controller

11. Connect the power cord to the Peltier Controller.



Figure 16 Connecting the power cord

12. Turn on the power of the Lambda 465 and the Peltier Controller.



Figure 17 Back of the instrument connections

CAUTION *The Air vent manual button should be off before turning on the main power of the Peltier Controller and also during the operation since it could make a trouble for the communication between Lambda 465 and Peltier Controller.*

ATTENTION *Le bouton d'actionnement manuel de la ventilation doit être désactivé avant que le contrôleur Peltier ne soit mis sous tension et pendant le fonctionnement de ce dernier afin d'éviter qu'une erreur de communication entre le Lambda 465 et le contrôleur Peltier ne se produise.*

13. Check that the power LED shows a blue color.



Figure 18 Power LED is blue

Peltier controller auto tuning setup

Peltier controller can be compatible with various peltier cell holders (Single or Multi) so whenever you exchange the existing peltier cell holder to the other one, you should proceed "AUTO TUNING" set up to minimize the temperature fluctuation at the target temperature

1. Push the Manual button on the control panel of the peltier controller then button light is on.



2. Set any SP temperature between 30~37°C using the \wedge \vee button.



3. Press and hold the SET/ENT button until shown "G.AT".



4. Push the SET/ENT button again.



5. Push the \uparrow button (OFF \rightarrow ON).



6. Press the SET/ENT button, MAN LED will blink.



7. MAN LED will be off after a few minutes.



8. Push Manual Button (Stop) and then light goes off.



CAUTION *If you hear the alarm sound during the operation, push the emergency switch to stop all functions immediately and check the status of Peltier Controller carefully. Then, turn the switch to the right again when everything is solved properly and the functions will be on again.*

ATTENTION *Si l'alarme se déclenche en cours de fonctionnement, appuyez sur l'interrupteur d'urgence pour arrêter immédiatement toutes les fonctions et contrôlez soigneusement l'état du contrôleur Peltier. Ensuite, tournez à nouveau l'interrupteur vers la droite une fois la situation rétablie afin de restaurer les fonctions.*



Figure 19 Emergency switch

14. Turn off the power after the experiment.

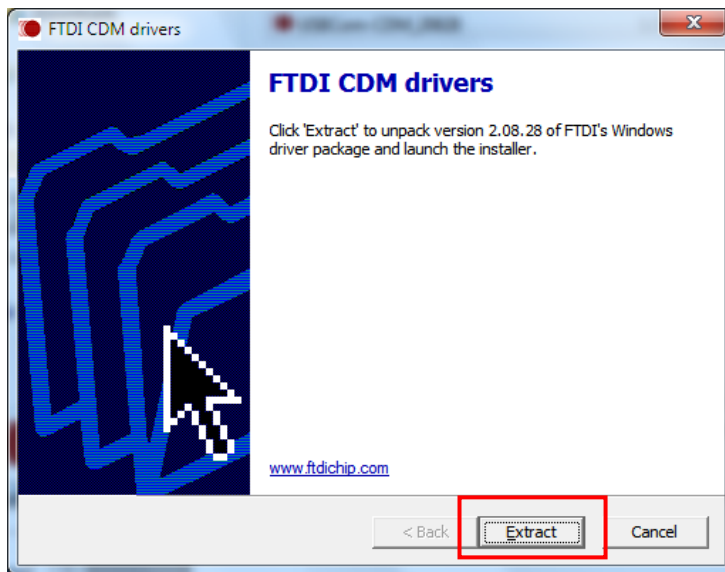
How to drain the coolant from Peltier Controller

- Push the **Air Vent Manual** button to be switched on the rear panel of Peltier Controller before operation.
- Connect the waste hose to the **Coolant Drain** port to the rear panel and prepare a waste bucket.
- Turn on the power of Peltier Controller, and then the coolant will be drained automatically.
- As draining is completed, turn off the power to the Peltier Controller.

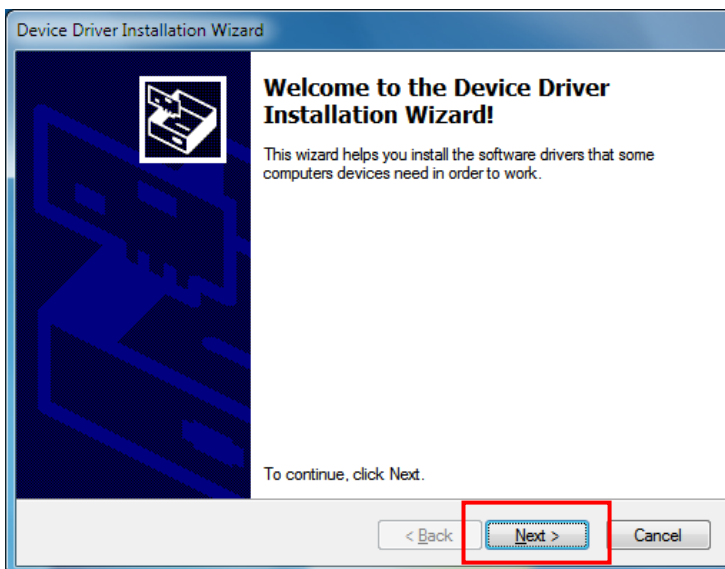
Installing the USB to RS-232 Driver

When using the RS-232 cable, install the COM port drive properly according to the following procedure.

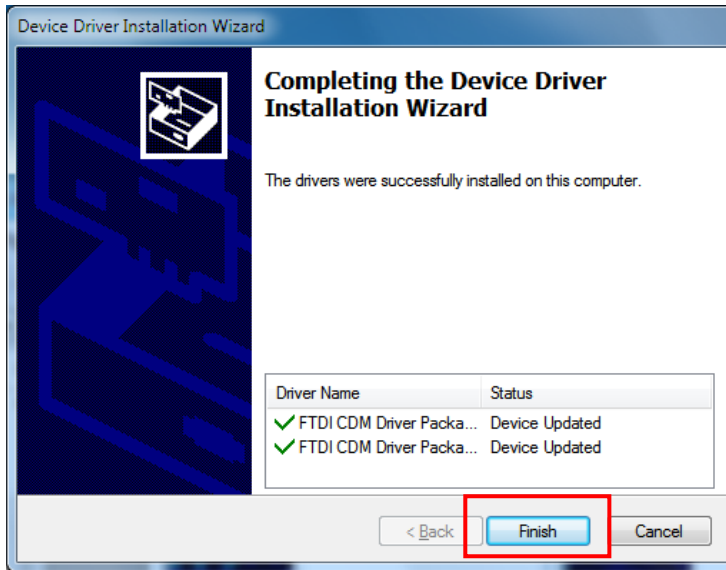
1. Turn on the computer and the Peltier controller.
2. Connect the USB to RS-232 cable between the computer and the Peltier controller.
3. Select **C>UV Lab> USB Drivers> Lambda 465> USB2** folder.
4. Double click **USBCom-CDM_20828**.
5. Select **Extract**.



6. Select **Next**.



7. The following dialog box will appear. After the installation is completed successfully, select **Finish**.

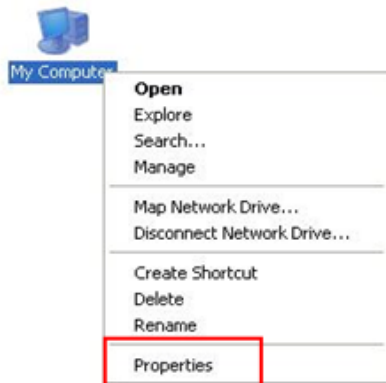


8. Change the USB serial ports after finishing driver setup. See the following section.

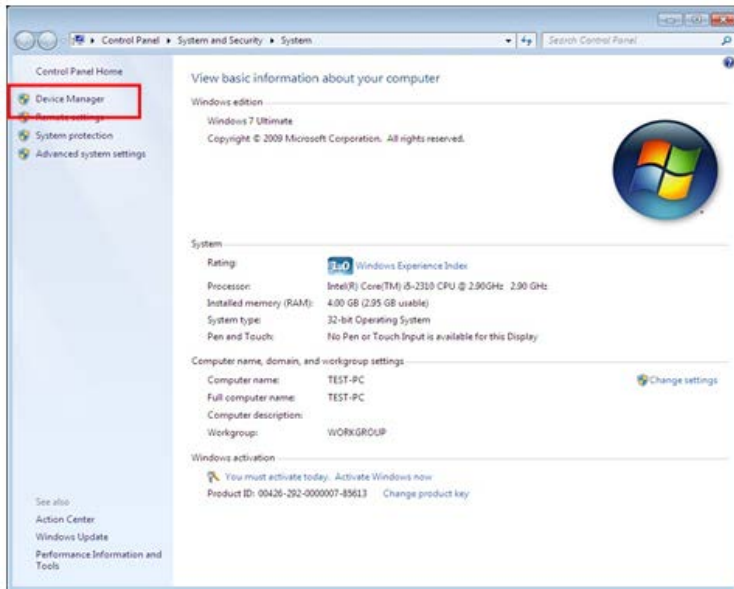
Setting USB to RS-232 port

Change the port setting as follow when communication is not connected by using the USB to RS-232 convert.

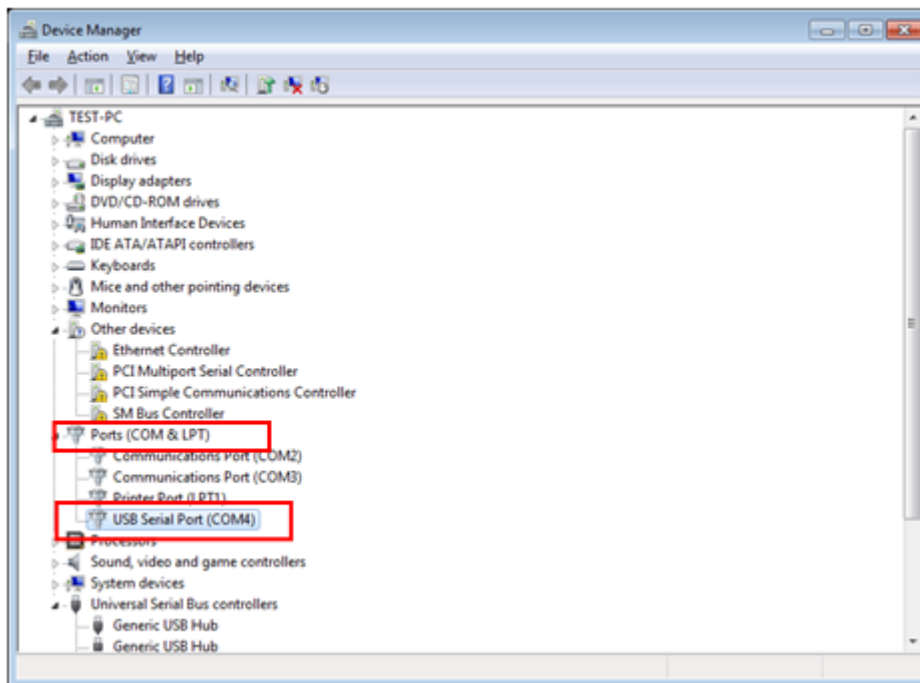
1. Select **My Computer** → **Properties**.



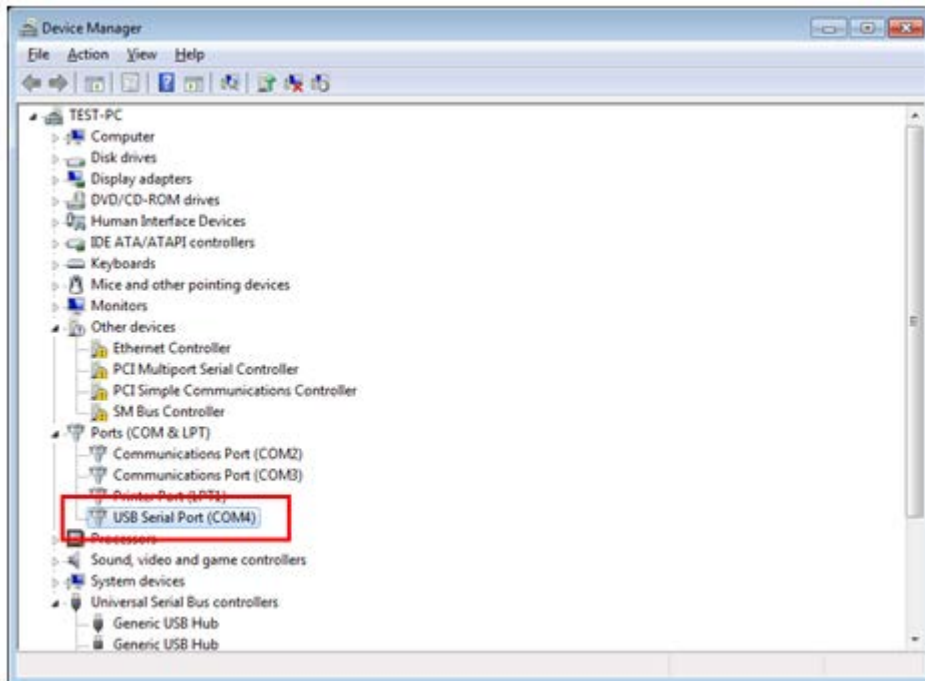
2. Select **Device Manager**.



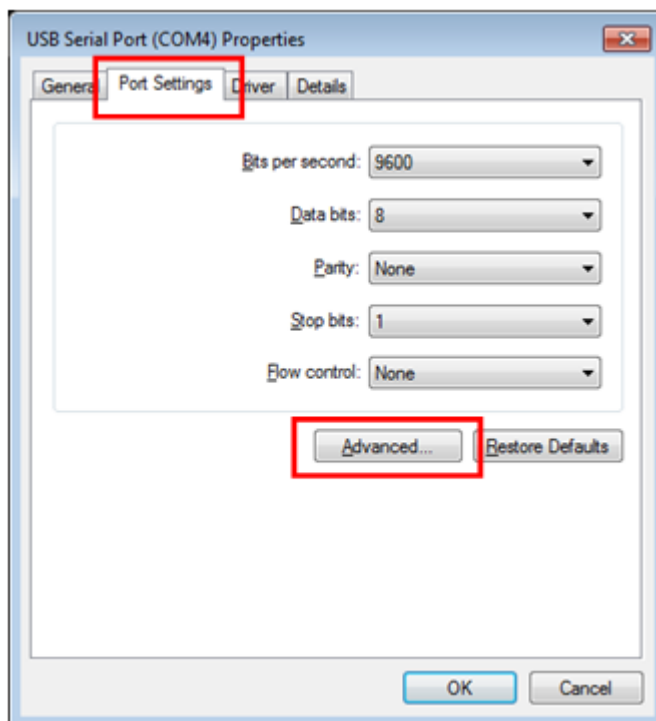
3. Select **Ports (COM & LPT)** to expand the listing. These are the devices currently connected to the COM ports. USB Serial Port (COMx) is visible when the driver installation is completed successfully.



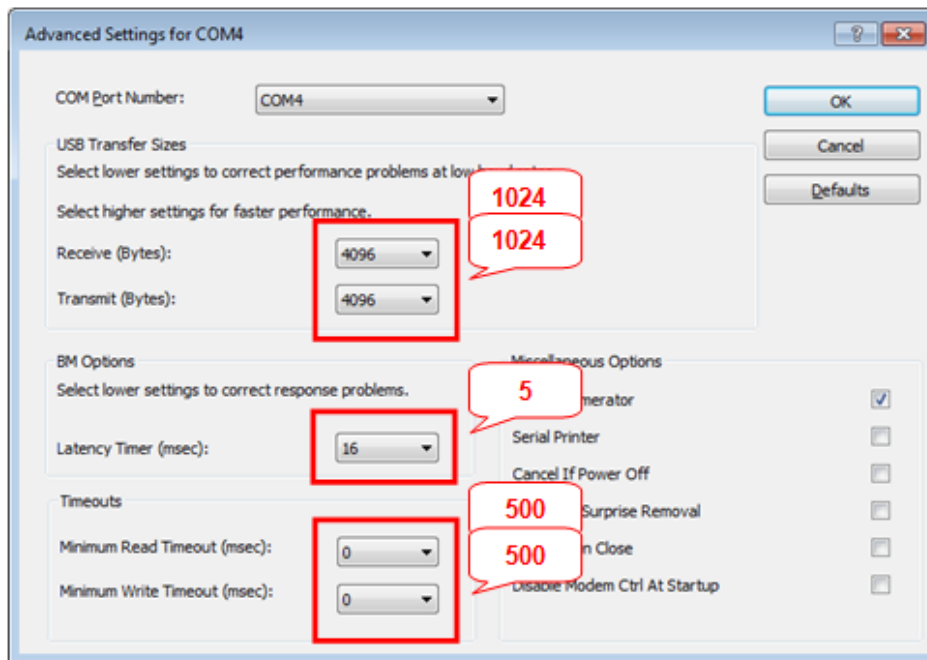
4. Double click on the **USB Serial Port (COMx)** of the **Ports (COM & LPT)** section.



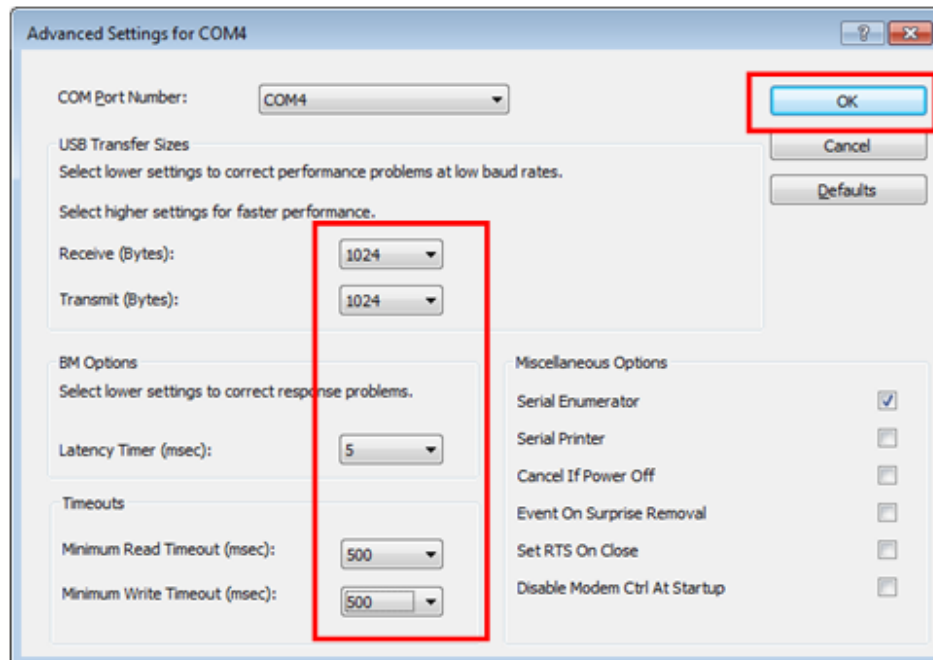
5. Select the **Port Settings** tab and select the **Advanced...** button.



6. Change the parameter values as shown in the following screen.

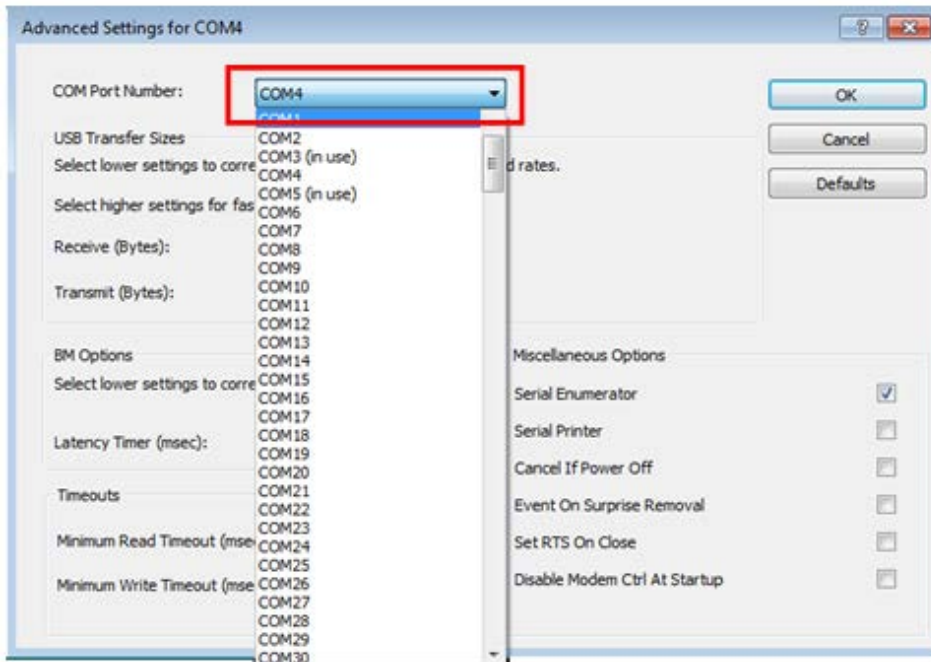


7. Select **OK** after checking the changed parameter values.

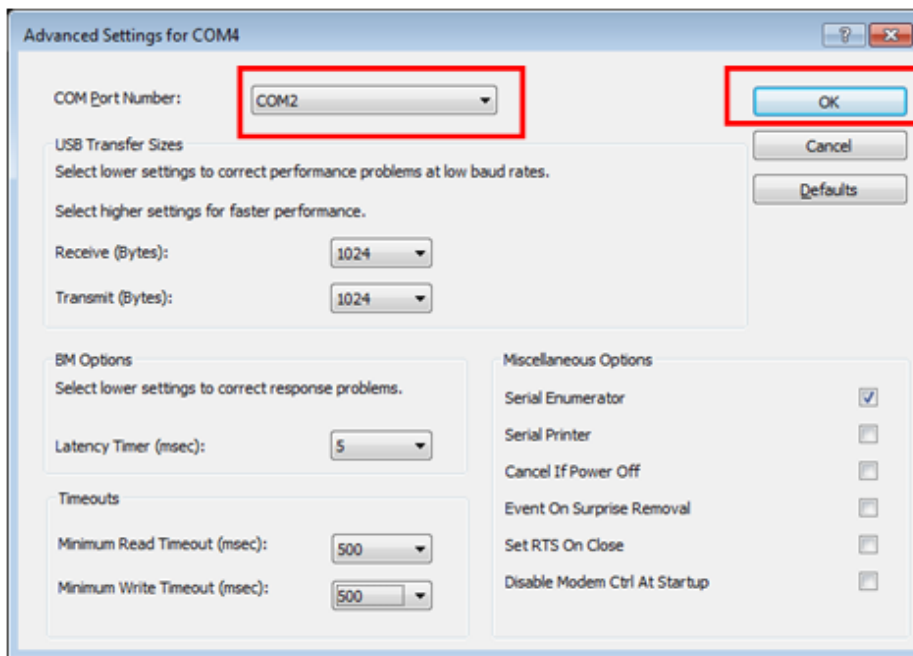


8. If the Peltier controller fails to communicate with the PC, change the COM Port Number in the following steps.
9. Open the **Advanced Setting for COMx** window following steps 1 to 6 in this procedure.

10. Select the **COM Port number list** to expand it and change the COM port number another one which is not in use from COM 1 to COM 10.



11. Make sure that the changed COM Port Number is applied, and select **OK**.



12. After the port setting is changed, restart the computer.

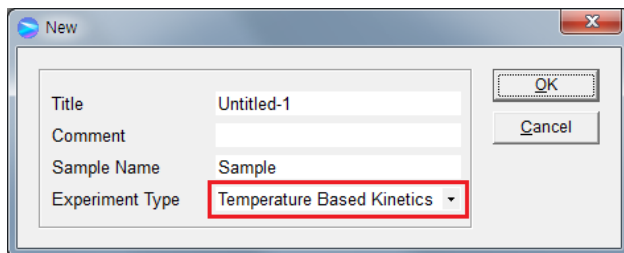
Measurement

NOTE: Start the sample measurement after warming up the system for at least 20 minutes.

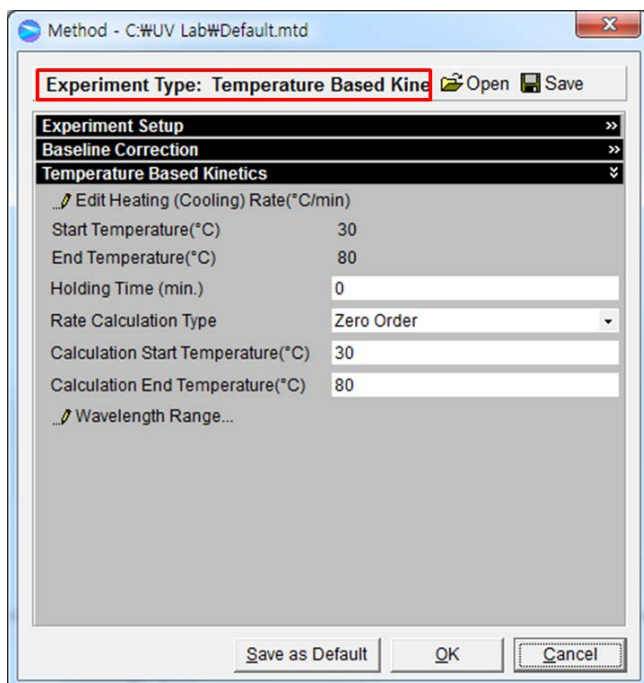
This accessory can be operated in Temperature Based Kinetics in the Kinetics mode and Thermal Denaturation in the Bio analysis mode.

Temperature Based Kinetics

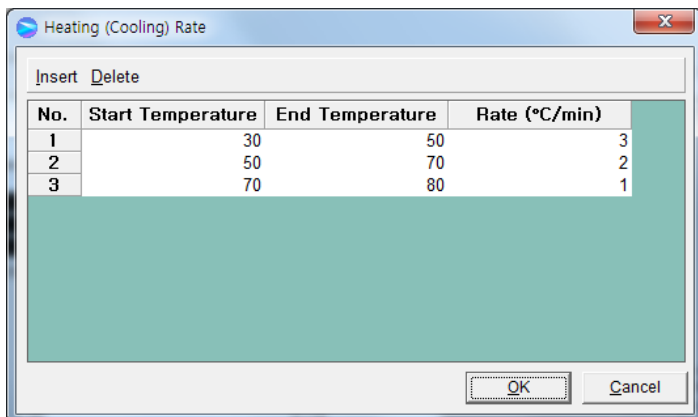
1. Launch UV Lab software. When the window below is appeared, select **Experiment Type** and click **OK**.



2. The following dialog box will be displayed.



3. Setup test parameters as follows:
 - a. **Edit Heating (Cooling) Rate (°C/min):** Set the heating (cooling) temperature rate in each temperature range. Sample is measured whenever it reaches the set temperature by the rate (°C/min), and the sample is also measured at the Start Temperature and the End Temperature. Click on **Insert** and **Delete** to edit the temperature range and the rate.

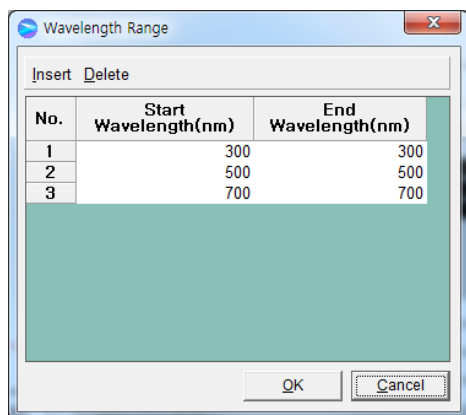


- **Start Temperature:** Enter the start temperature for the measurement.
- **End Temperature:** Enter the end temperature for the measurement.
- **Rate (°C/min):** Enter the heating (cooling) rate.

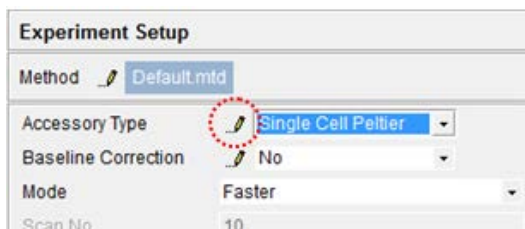
- b. **Holding Time:** Enter the holding time before sample measurement after it reaches the each set temperature.
- c. **Rate calculation Type:** Select the rate calculation type. See V-3 Kinetics Mode of UV Lab Software User Guide for more information.
- d. **Calculation Start Temperature:** Enter the start temperature for the calculation.
- e. **Calculation End Temperature:** Enter the end temperature for the calculation.

NOTE: *Calculation Start Temperature and Calculation End Temperature must be entered within Start Temperature and End temperature range.*

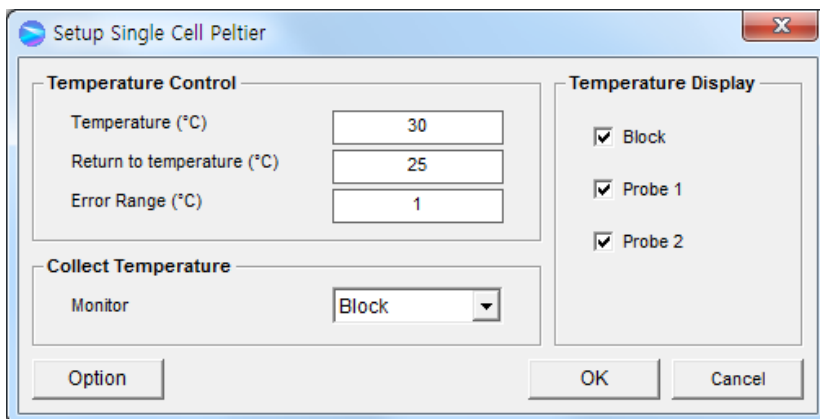
4. Select **Wavelength Range** and enter the wavelength range for the measurement.



5. After setting parameters for **Experiment Setup, Baseline Correction** and **Temperature Based Kinetics**, select **OK**.
6. Select **Single Cell Peltier** in the **Accessory Type** on the main screen of the software.
7. Select **setup button (pencil icon)** in the **Experiment Setup** on the main screen of the software.



8. The **Setup Single Cell Peltier** window will be shown. Set parameters according to the experiment conditions.



➤ **Temperature Control**

- a. Temperature (°C): Enter the preset temperature for the experiment.

NOTE: *Starting the temperature of experiment needs to be set up in the method window.*

- b. Return to temperature (°C): Enter the returning temperature after the experiment is finished.
- c. Error Range (°C)
Enter the temperature tolerance between the sampling temperature and monitored temperature. The measurement will start when the temperature tolerance reaches within the set Error Range.

Example: Set the starting temperature as 20°C and error range as 1°C then, the monitoring temperature is set as the temperature of cell block. In this case, the measurement will start when the temperature of the cell block reaches between 19°C and 21°C.

NOTE: *When selecting probe for Monitor in Collect Temperature box, the slower the real heating speed may be, the smaller the set Error range (°C) is.*

➤ **Collect Temperature**

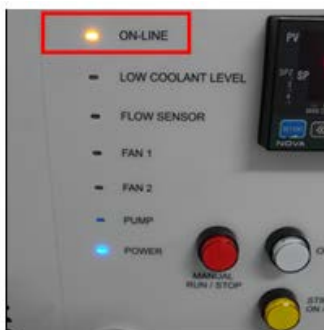
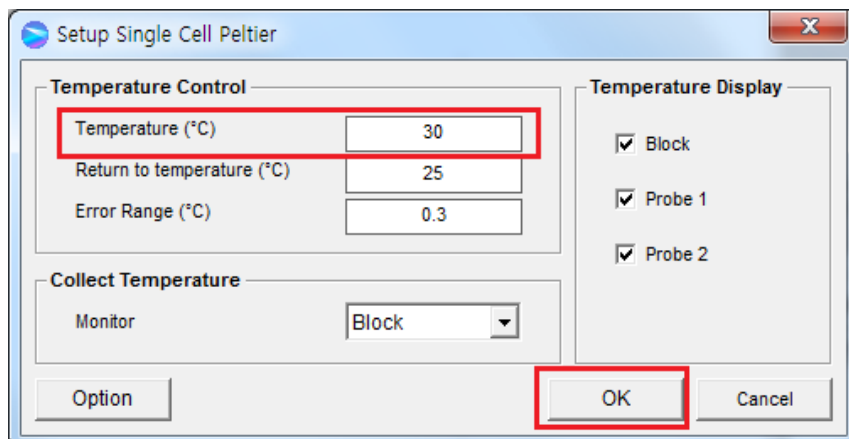
- a. Monitor: Select which temperature will be monitored in the display panel.
- Block: The temperature of Cell Block
 - Probe 1: The temperature of Probe 1
 - Probe 2: The temperature of Probe 2

Example: If Block is selected, measurement will start when the temperature of the cell block reaches the setting temperature.

➤ **Temperature Display**

Select which temperature will be displayed on the panel: Block, Probe 1 or Probe 2. The selected temperature is only displayed in real time.

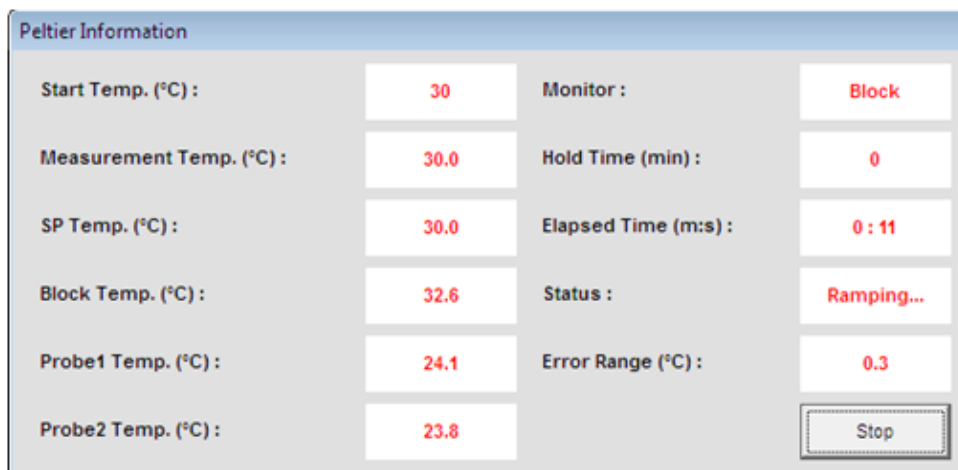
- **Option:** This function is used to adjust temperature. It is only used for the manufacturing process, so do not modify the values.
9. After completing the parameter setup, select **OK**. Then the LED for On-LINE is turned on and it will start heating up or cooling down to the set temperature in the Setup Single Cell Peltier.



10. Insert the blank solution into the cell holder. Select **Blank**, and then the blank is measured when it reaches the set Start Temperature.

NOTE: *To monitor the probe temperature, the probes should be immersed in the sample, or to use the block temperature for monitoring, the cell lid should be closed tightly*

11. Remove the blank solution from the sample cell holder and insert the sample solution into the sample cell holder. Select **Sample** and then the measurement will be started after the temperature reaches the target temperature.



- a. **Start Temp (°C)**: Shows starting temperature of the experiment.
- b. **Measurement Temp. (°C)**: Shows the temperature at which the sample will be measured.
- c. **SP Temp (°C)**: Shows the current temperature while it goes up/down to the measurement temperature.
- d. **Block Temp (°C)**: The temperature of Cell Block.
- e. **Probe 1 Temp (°C)**: The temperature of Probe 1.
- f. **Probe 2 Temp (°C)**: The temperature of Probe 2.
- g. **Monitor**: Monitored temperature is shown out of Block, Probe 1 and Probe 2.
- h. **Hold time (min)**: Shows the set holding time.
- i. **Elapsed time (m:s)**: Shows the elapsed time to reach the sampling temperature.
- j. **Status**: Shows the status of experimental progress.
- k. **Error Range (°C)**: Shows the temperature tolerance between the sampling temperature and monitored temperature. The measurement will be made only when the temperature tolerance reaches within the set error range.

NOTE: To pull out the cell easily, use the cell lifting knob.

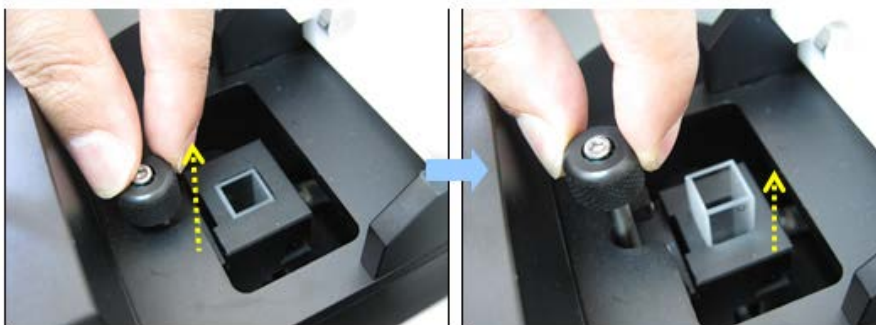


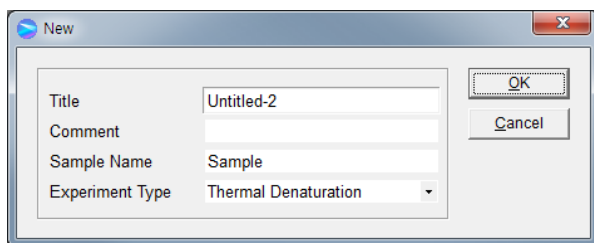
Figure 20 Pull out the cell

12. After the measurement is finished, the results are displayed in the result window. Save or print the results as required.

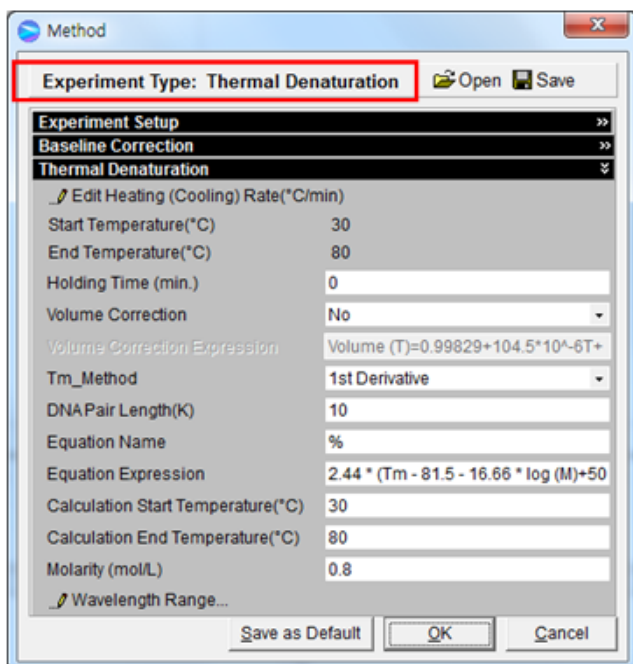
Thermal Denaturation

NOTE: Start the sample measurement after warming up the system for at least 20 minutes.

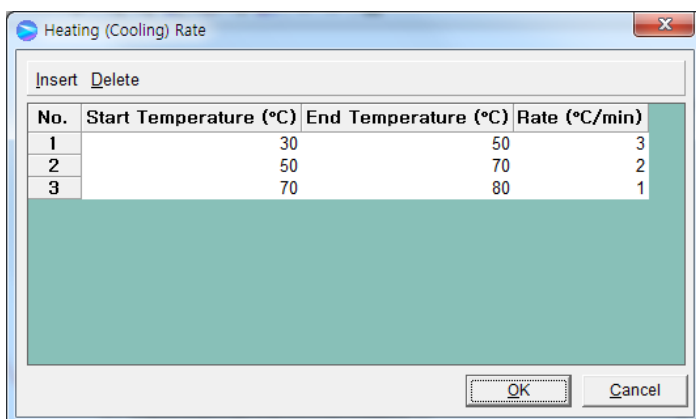
1. Launch the UV Lab software and then, select **Thermal Denaturation** in the **Experiment Type** and click **OK**.



2. The following dialog box will be displayed.



3. Setup test parameters as follows:
- Edit Heating (Cooling) Rate (°C/min):** Set the heating (cooling) temperature rate in each temperature range. Sample is measured whenever it reaches the set temperature by the Rate (°C/min), and the sample is also measured at the Start Temperature and the End Temperature. Click on **Insert** and **Delete** to edit the temperature range and the rate.



- **Start Temperature (°C):** Enter the start temperature for the measurement.
 - **End Temperature (°C):** Enter the end temperature for the measurement.
 - **Rate (°C/min):** Enter the heating (cooling) rate.
- Holding Time (min):** Enter the holding time before sample measurement after it reaches the each set temperature.
 - Volume Correction:** If the volume correction is selected, the baseline corrected absorbance value is corrected for the thermal expansion of an aqueous buffer. The default equation for volume correction is:

$$\text{Volume (T)} = 0.99829 + 104.5 * 10^{-6}T + 3.5 * 10^{-6}T^2$$

T is the Celsius temperature (°C).

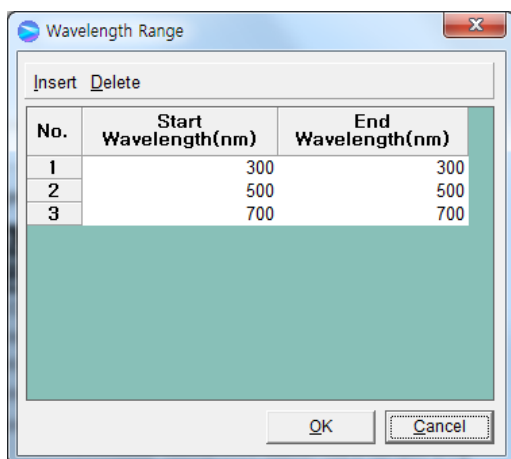
- d. **Tm method:** Select a method for determining Tm (DNA melting temperature). Options include: 1st derivative and Average.
 - e. **DNA Pair Length (K):** Enter the DNA base pair length. If a DNA base pair length is above 5000, enter as 0.
 - f. **Equation Name and Expression:** The melting range is calculated within the specified calculation range by defining the low temperature where the slope begins to increase steadily, and the high temperature where the slope approaches zero again. The default equation for the calculation of %G-C (Guanine-Cytosine) base pairs is:

$$\%G-C = 2.44 * (Tm - 81.5 - 16.66 * \log (M) + 500/K)$$

Where M is the molarity of salt in mol/l, K is the DNA base pair length.

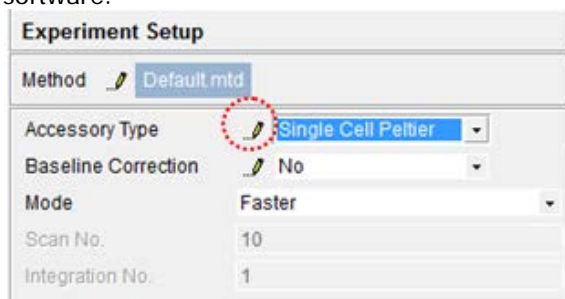
If a DNA base pair length (K) is entered as '0', then the equation becomes:

$$\%G-C = 2.44 * (Tm - 81.5 - 16.66 * \log (M))$$
 - g. **Calculation Start Temperature (°C):** Enter the start temperature for calculating the Tm value using the selected method.
 - h. **Calculation End Temperature (°C):** Enter the end temperature for calculating the Tm value using the selected method.
 - i. **Molarity (mol/L):** Enter the salt molarity of the solution [mol/l].
4. Select **Wavelength Range** and enter the wavelength range for the measurement.

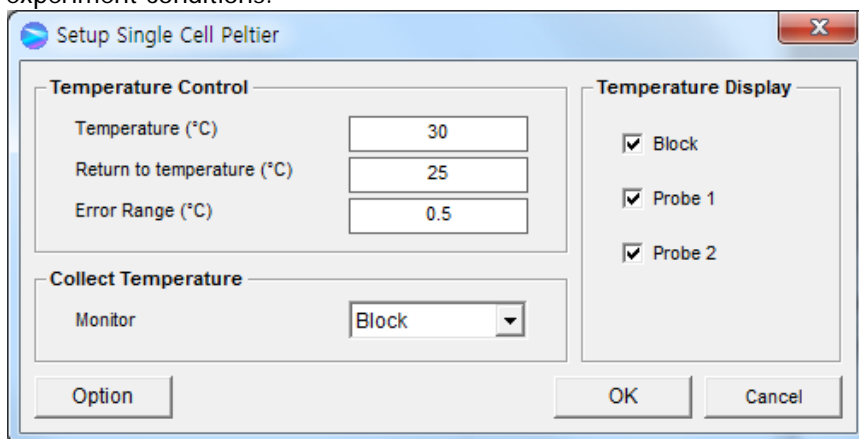


5. After setting the parameters for **Experiment Setup**, **Baseline Correction** and **Thermal Denaturation**, select **OK**.
6. Select the **Single Cell Peltier** in the **Accessory Type** on the main screen of the software.

7. Click on the **setup button (pencil icon)** in the **Experiment Setup** on the main screen of the software.



8. **Setup Single Cell Peltier** window will be shown. Set the parameters according to the experiment conditions.



➤ **Temperature Control**

- a. Temperature (°C): Enter the preset temperature for the experiment.

NOTE: *Starting the temperature of experiment needs to be set up in the method window.*

- b. Return to temperature (°C): Enter the returning temperature after the experiment is finished.
 c. Error Range (°C) : Enter the temperature tolerance between the sampling and monitored temperature. The measurement will start when the temperature tolerance reaches within the set Error Range.

Example: Set the starting temperature as 30°C and error range as 0.5°C then, the monitoring temperature is set as the temperature of cell block. In this case, the measurement will start when the temperature of cell block reaches between 29.5°C and 30.5°C.

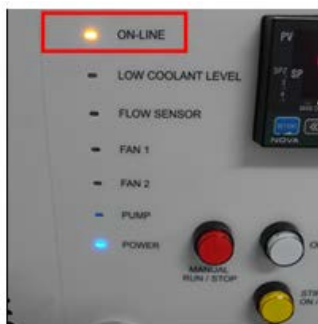
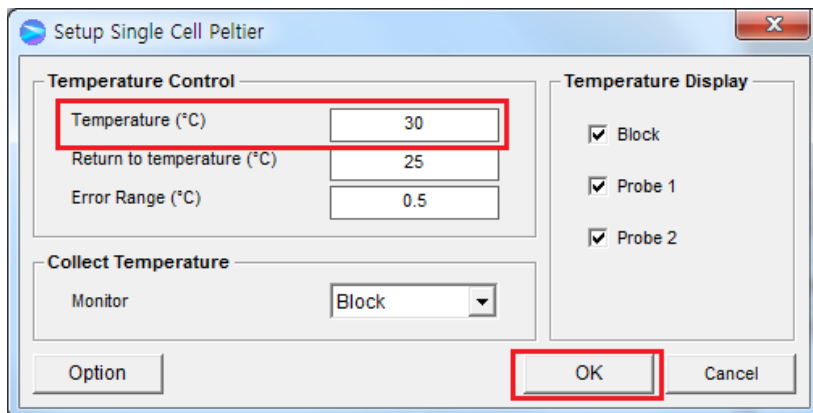
NOTE: *When selecting probe for Monitor in Collect Temperature box, the slower the real heating speed may be, the smaller the set Error range (°C) is.*

➤ **Collect Temperature**

- a. Monitor: Select which temperature will be monitored in the display panel.
- Block: The temperature of Cell Block
 - Probe 1: The temperature of Probe 1
 - Probe 2: The temperature of Probe 2

Example: If Block is selected, measurement will start when the temperature of the cell block reaches the setting temperature.

- **Temperature Display:** Selected temperature will be displayed on the panel: Block, Probe1 or Probe2. The selected temperature is only displayed in real time.
 - **Option:** This function is used to adjust temperature. It is only used for the manufacturing process, so do not modify the values.
9. After completing the parameter setup, select **OK**. Then the LED for **ON-LINE** is turned on and it will start heating up or cooling down to the set temperature in the Setup Single Cell Peltier.



10. Insert the blank solution into the cell holder. Select **Blank**, and then the blank is measured when it reaches the set start temperature.

NOTE: *To monitor the probe temperature, the probes should be immersed in the sample, or to use the block temperature for monitoring, the cell lid should be closed tightly*

11. Remove the blank solution from the sample cell holder and insert the sample solution into the sample cell holder. Select **Sample** and then the measurement will be started after the temperature reaches the target temperature.

| Peltier Information | | | |
|-------------------------|------|---------------------|------------|
| Start Temp. (°C): | 30 | Monitor: | Block |
| Measurement Temp. (°C): | 30.0 | Hold Time (min): | 0 |
| SP Temp. (°C): | 30.0 | Elapsed Time (m:s): | 0 : 11 |
| Block Temp. (°C): | 32.6 | Status: | Ramping... |
| Probe1 Temp. (°C): | 24.1 | Error Range (°C): | 0.5 |
| Probe2 Temp. (°C): | 23.8 | | Stop |

- Start Temp (°C):** Shows the starting temperature of experiment.
- Measurement Temp (°C):** Shows the temperature at which the sample will be measured.
- SP Temp (°C):** Shows the current temperature while it goes up/down to the measurement temperature.
- Block Temp (°C):** Show the set temperature to measurement temperature.
- Probe 1 Temp (°C):** Shows the temperature of Probe 1.
- Probe 2 Temp (°C):** Shows the temperature of Probe 2.
- Monitor:** Monitored temperature is shown out of Block, Probe 1 and Probe 2.
- Hold time (min):** Shows the set holding time.
- Elapsed time (m:s):** Shows the elapsed time to reach the sampling temperature.
- Status:** Shows the status of experimental progress.
- Error Range (°C):** Shows the temperature tolerance between the sampling temperature and monitored temperature. The measurement will be made only when the temperature tolerance reaches within the set error range

NOTE: To pull out the cell easily, use the cell lifting knob.

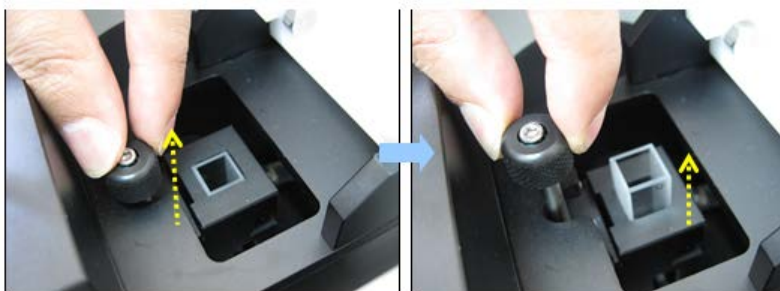



Figure 21 Using the cell lifting knob

- After the measurement is finished, the results are displayed in the result window. Save or print results as required.

Troubleshooting

Power LED is not lit on

1. Check the connection of the power cable or the fuse. The fuse is located at the rear of the instrument.

| | |
|---|--|
|  <p>WARNING</p> | <p>There is risk of receiving a fatal electric shock if the fuses are replaced with the power cord connected.</p> <p>Il y a un risque d'électrocution si les fusibles sont remplacés tandis que le cordon d'alimentation est encore branché.</p> |
|---|--|

2. Turn off and unplug the instrument.
3. Locate the fuse cover on the left rear panel of the instrument.
4. Carefully open the compartment latch where the fuse is located.



Location of latch on the fuse compartment door

5. Disconnect the fuse.
6. Replace with a new T5AL fuse (AC 250V). One spare is contained in the power module.
7. Close the compartment door.
8. Plug in the instrument and turn on.

On-Line LED is not lit on

1. Check whether the communication cable is connected tightly.
2. Check whether the **Air Vent Manual** button is switched off.
3. Check whether the emergency switch is off.
4. When you use USB to RS-232 cable, change the port following the procedure Setting USB to RS-232 Port.

FAN LED is lit on with an alarm sound

1. Fan needs to be replaced.

Low Water Level LED blinks with an alarm sound

1. Check the coolant level and if it is lower than L (low) mark, fill up the coolant more.



2. Restart the Peltier Controller.

Flow Sensor LED is lit on with an alarm sound

1. Check whether the tubing is bent or whether it is connected correctly, and then restart the Peltier Controller.
2. Push the **Air Vent Manual** button to be switched on and check if coolant flows properly for about one minute after the error occurs. If the Flow Sensor LED is continuously lit on with an alarm sounding, contact your PerkinElmer service representative.

Pump LED is lit on with an alarm sound

1. Check whether the tubing is bent or whether it is connected correctly, and then restart the Peltier Controller.
2. Push the **Air Vent Manual** button to be switched on and check if coolant flows properly for about 1 minute after the error occurs. If the Pump LED is continuously lit on with an alarm sounding, contact your PerkinElmer service representative.

Connection fails

1. Check whether the Interface connector is lined properly.
2. Check whether the **MANUAL RUN/STOP** button is pushed on. If yes, turn off the Manual button.

