



TCD-104/S400 | TCD-104/S400/B

TCD-108/S400 | TCD-108/S400/B

Operation Manual



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1. Introduction

TCD-104/S400 | TCD-108/S400 | TCD-104/S400/B | TCD-108/S400/B temperature measurement module can provide high-precision temperature measuring capability with standard K-type thermocouple. Besides, The temperature data logger has built-in over-temperature protection, intelligent temperature data logging capability, automatic analysis result output (highest Tin temperature, tinning time, heating rate, etc.).



Features

- 4/8-channel K-type thermocouple (± 0.5 °C Accuracy)
- High-Precision Measurement
- Sampling Rate: 50 ms to 60000 seconds
- Max. recording for each channel: 450,000/300,000
- Powered by 4x AAA batteries (60 hours @ 50 ms sampling rate)
- 400°C Operating Temperature with Optional Thermal Insulation Box
- Easy-to-use interface
- Traceable temperature data

Applications

- SMD Assembly Manufacturing
- PC Board Manufacturing
- Footwear Manufacturing
- Food Industry
- Pharmaceutical Industry
- Any Temperature Measurement Required Industries



2. Getting Started

2.1. Package Checking

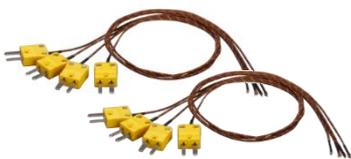
Before starting any task, please check the package contents. If any of the following package contents are missing or damaged, contact your dealer, distributor.



Carrying Case



TCD-104/S400 | TCD-108/S400 |
TCD-104/S400/B | TCD-108/S400/B
Temperature Data Logger



K-Type Thermocouple (0.5 m)

TCD-104/S400 | TCD-104/S400/B x 4

TCD-108/S400 | TCD-108/S400/B x 8



Thermal Insulation Box



Micro USB Cable
(CA-USB20)



iTCLogger Software



Calibration Report



AAA Battery x 4

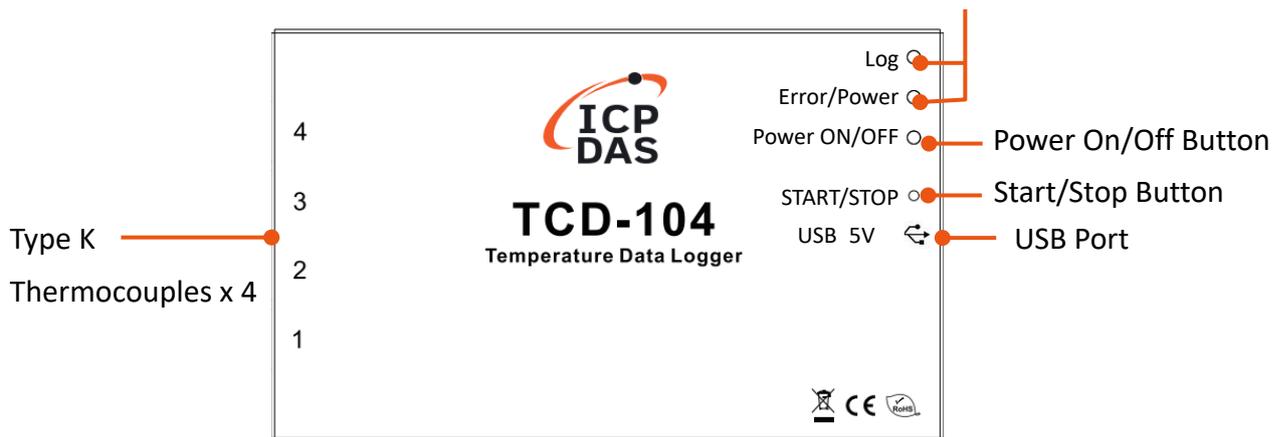
(For TCD-104/S400/B and
TCD-108/S400/B Asia only)

2.2. Overview

This section provides an overview of the interface of the data logger.

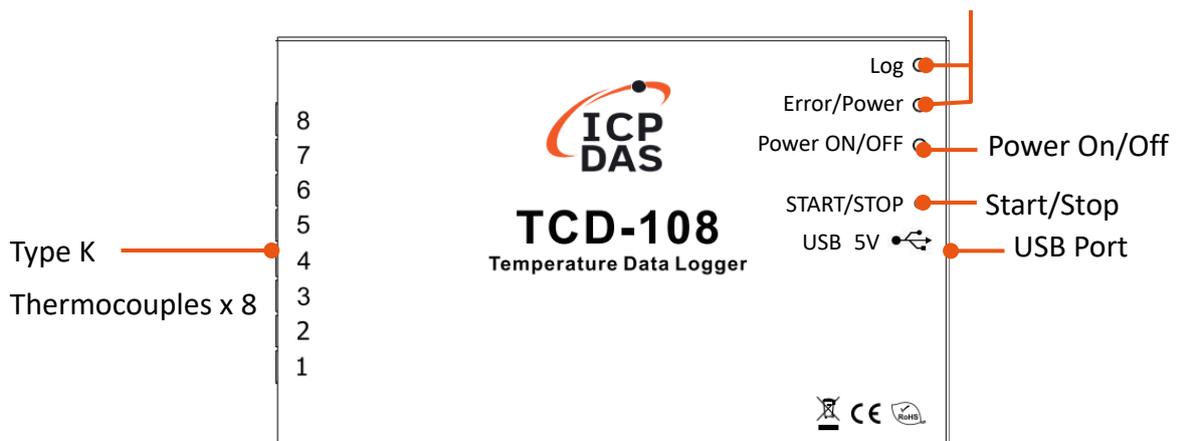
TCD-104/S400 and TCD-104/S400/B

System LED Indicator x 2, For more details, see the 2.6. LED Indicators and Operating Modes



TCD-108/S400 and TCD-108/S400/B

System LED Indicator x 2, For more details, see the 2.6. LED Indicators and Operating Modes



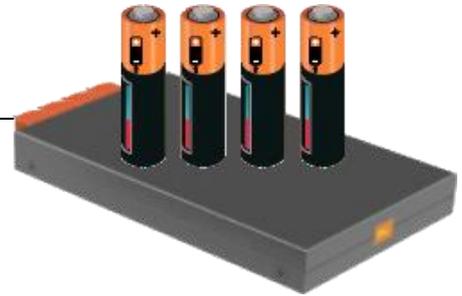
2.3. Hardware Installation

This section describes the procedure for the basic installation of the data logger.

2.3.1. Installing and Replacing the Battery

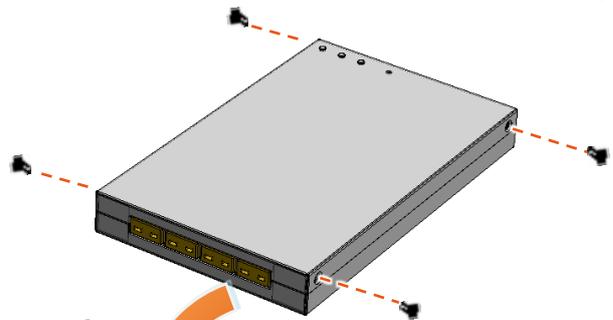
This section describes how to install and replace the battery.

The data logger uses four AAA batteries.

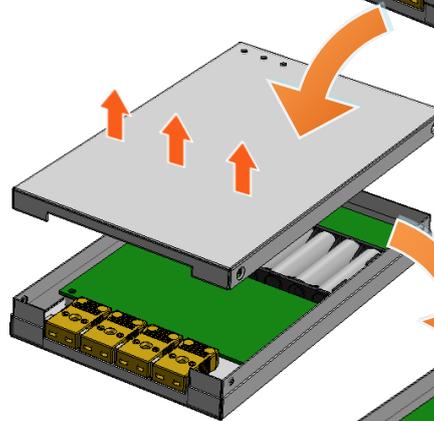


Remove the batteries from devices that will not be used for a long time. Otherwise, battery leakage or damage of device may be caused by the gas generated from the battery.

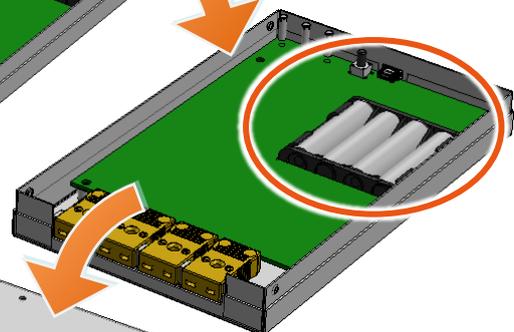
1. Power off the data logger, and then remove all the connected cables



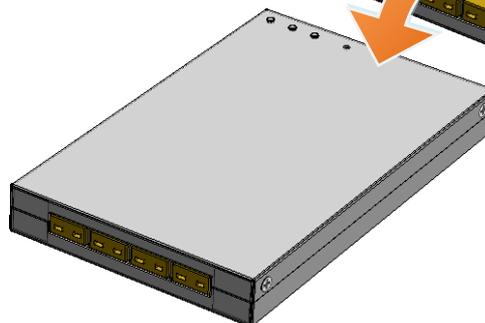
2. Unscrew the screws, and then remove the top cover



3. Remove the old battery, and then install the new battery



4. Install the top cover, and then screw the screws tightly



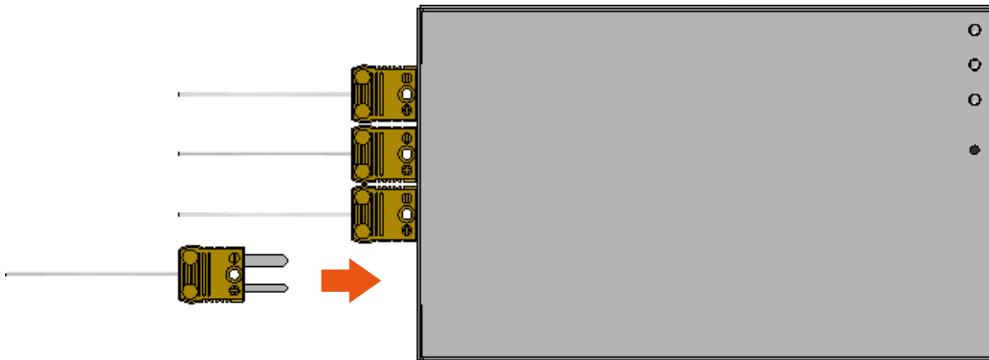
2.3.2. Installing the Thermocouple Cable

This section describes how to install the thermocouple cable.



Do not bend the thermocouple cable repeatedly, this will weaken the wires and may cause them to break.

Insert the K-type thermocouple cable into the interface.



2.3.3. Installing the Thermal Insulation Box

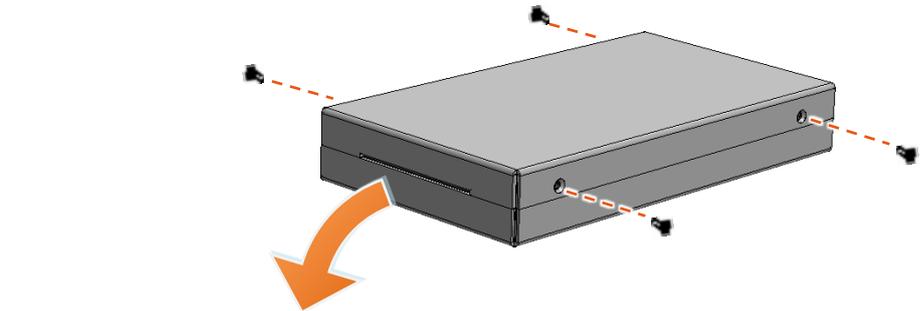
This section describes how to install the thermal insulation box.

The data logger with the Insulation box can be measured from -20°C to $+400^{\circ}\text{C}$.



If you need to use the thermal insulation box, please refer to section 「[2.5. Measurement and Analysis Procedures](#)」 for the instructions of using the thermal insulation box.

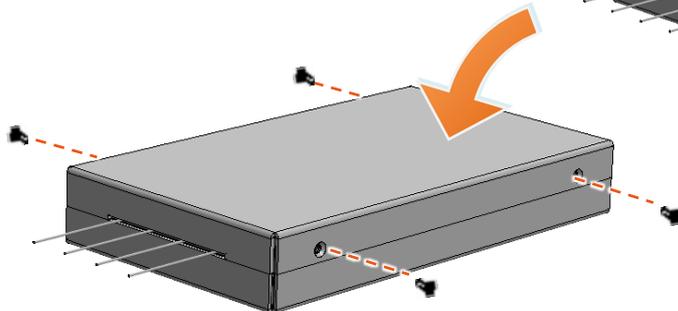
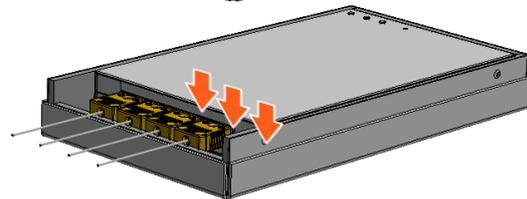
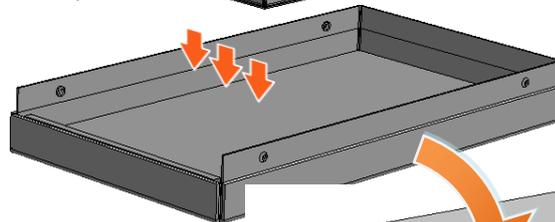
1. Remove the screws of the thermal insulation box.



2. Put the data logger into the thermal insulation box



3. Install the cover and then screw the screws tightly



2.4. Software Installation

This section describes how to install the USB driver and iTCLogger Utility.

iTCLogger Utility

iTCLogger Utility is used to configure and download the data from the data logger via the USB. It can display the trend chart and calculate some static values, like max., min, mean.

For more details, please refer to 「[3.iTCLogger Utility](#)」

System Requirements

Windows XP, it requires .NET Framework 3.5 to be installed.

Windows 7, it requires .NET Framework 3.5 to be installed.

Windows 10

For Windows XP, Windows 7 users, the Microsoft .NET Framework 3.5 Service Pack 1 can be obtained from: <https://www.microsoft.com/zh-tw/download/details.aspx?id=25150>

2.4.1. Installing the USB Driver

This section describes how to install the USB driver.

1. Get the latest version of the USB driver

The USB driver of the data logger can be obtained from the ICP DAS download Center.

TCD-104/S400 Download Center:

<https://www.icpdas.com/en/download/index.php?model=TCD-104/S400>

TCD-104/S400/B Download Center:

<https://www.icpdas.com/en/download/index.php?model=TCD-108/S400/B>

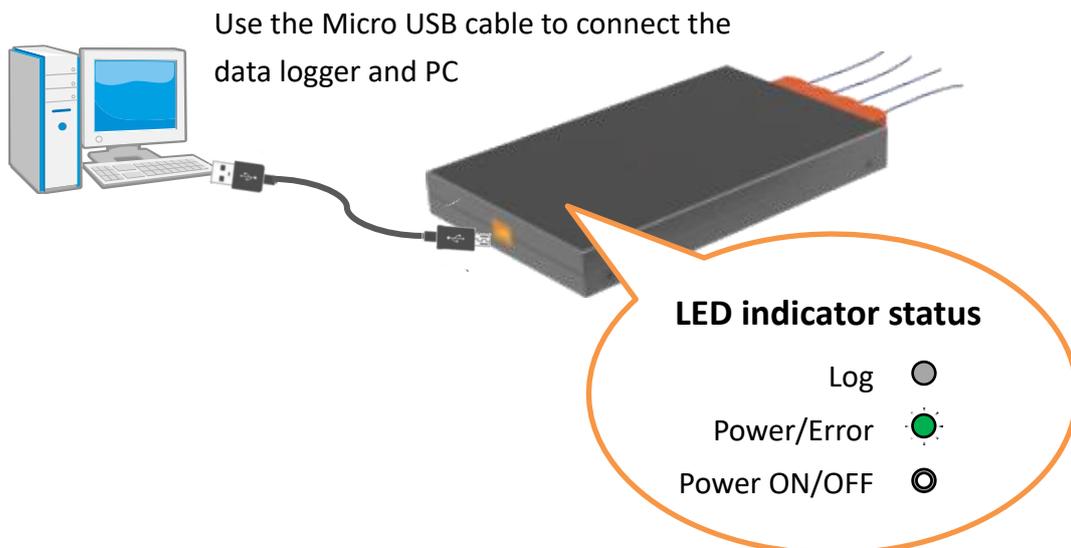
TCD-108/S400 Download Center:

<https://www.icpdas.com/en/download/index.php?model=TCD-108/S400>

TCD-108/S400/B Download Center:

<https://www.icpdas.com/en/download/index.php?model=TCD-108/S400/B>

2. Use the included micro USB cable to connect the data logger and the PC



3. Open the 「 Device Manager 」 in Windows

Windows XP: From the [Start] menu, open the [Control panel], double-click [System] icon and then click the [Hardware] tab, and click the [Device Manager] button.

Windows 7 and Windows 10: Right-click the [ ] windows icon, and then select the [Device Manager].

4. Expand the [Ports (COM & LPT)], and then right-click on the target USB device

5. Select the [Update drive ...] to install the latest version of the USB driver

2.4.2. Installing the iTCLLogger Utility

This section describes how to install the iTCLLogger Utility.

1. Get the latest version of the iTCLLogger Utility

The iTCLLogger Utility can be obtained from the ICP DAS download Center.

TCD-104/S400 Download Center:

<https://www.icpdas.com/en/download/index.php?model=TCD-104/S400>

TCD-104/S400/B Download Center:

<https://www.icpdas.com/en/download/index.php?model=TCD-108/S400/B>

TCD-108/S400 Download Center:

<https://www.icpdas.com/en/download/index.php?model=TCD-108/S400>

TCD-108/S400/B Download Center:

<https://www.icpdas.com/en/download/index.php?model=TCD-108/S400/B>

2. Get the iTCLLogger.exe file

After downloading the file, unzip it and open the file. The iTCLLogger.exe file can be found inside the file.



2.5. Measurement and Analysis Procedures

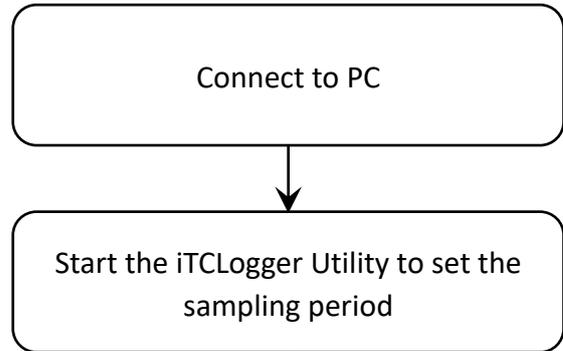
This section describes how to use TCD-104/S400 | TCD-108/S400 to measure and analyze the data.

The procedures below describe how to measure the temperature and analyze the measured data.

Configuring the Data Logger

For more details, please refer to section

「[2.5.1. Setting the Data Logger](#)」



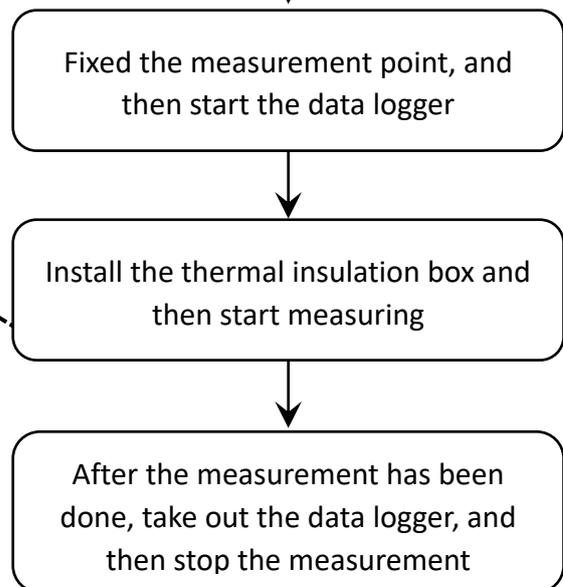
Collecting the Measured Data

For more details, please refer to section

「[2.5.2. Selecting the Measurement Point and Measuring](#)」



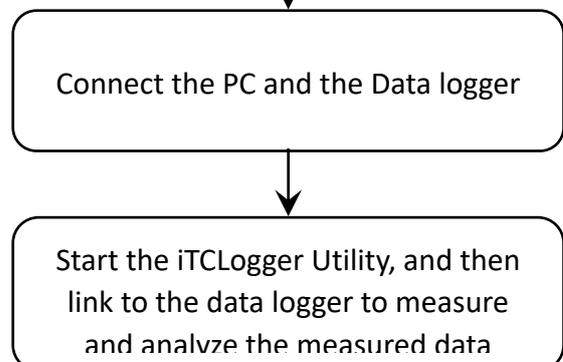
TCD-104/S400 | TCD-108/S400
With an optional thermal insulation box, they can operate in 20 to 400 °C environment. Do not exceed a hour at +400 °C



Analyzing the Measurement Data

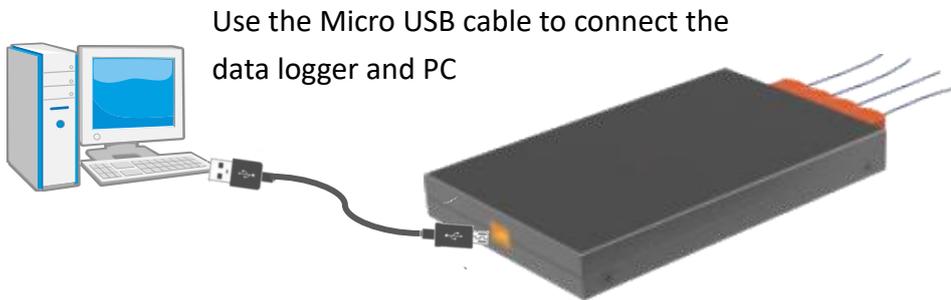
For more details, please refer to section

「[2.5.3. Analyzing the Measurement Data](#)」



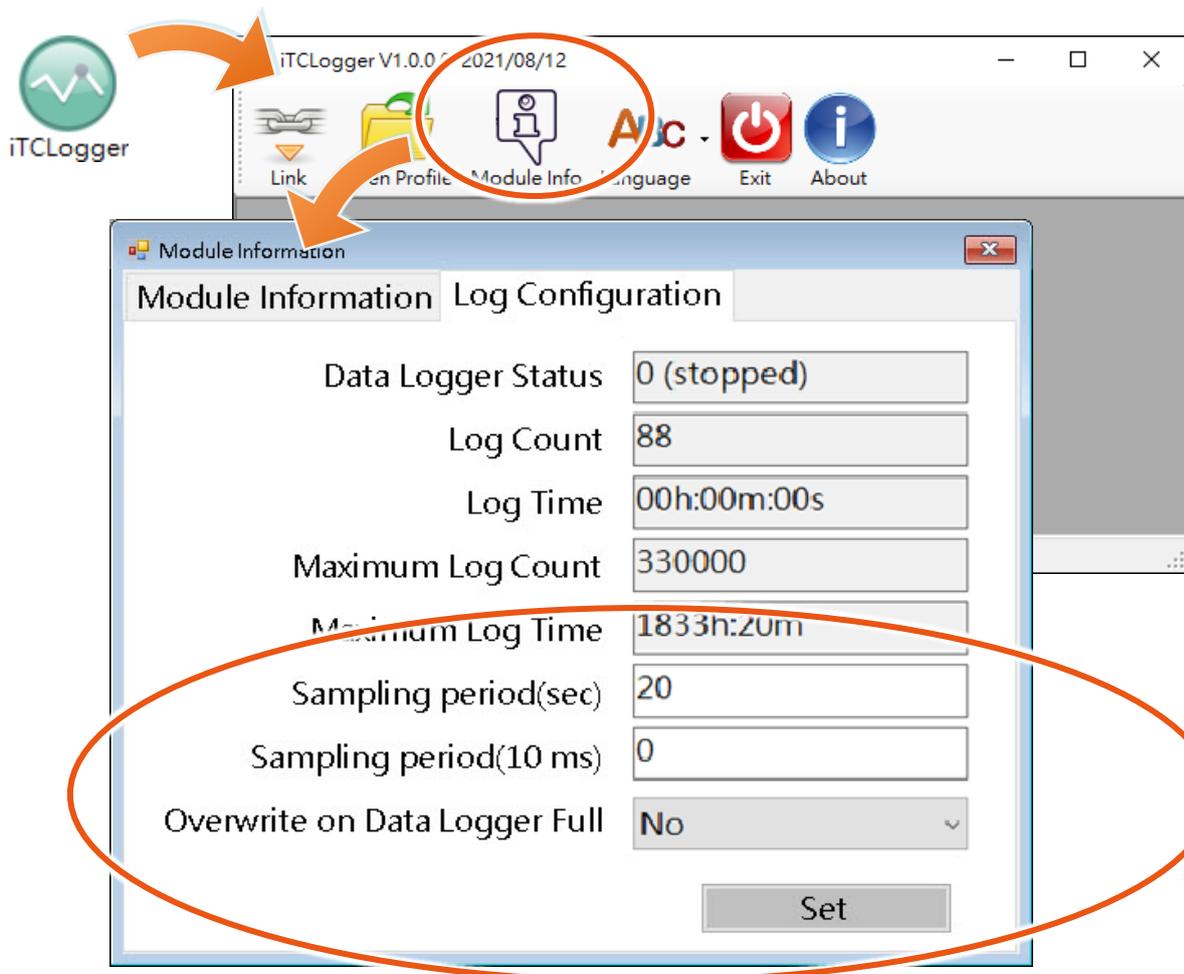
2.5.1. Setting the Data Logger

1. Use the included micro USB cable to connect the data logger and the PC



2. Run the iTCLogger Utility, and then click the 「Module Info」 to set the sampling period

For more detailed information about the sampling period settings, please refer to section 「3.2.3. Setting the Sampling period and storing information」.



3. Click the 「Set」 button to confirm the settings

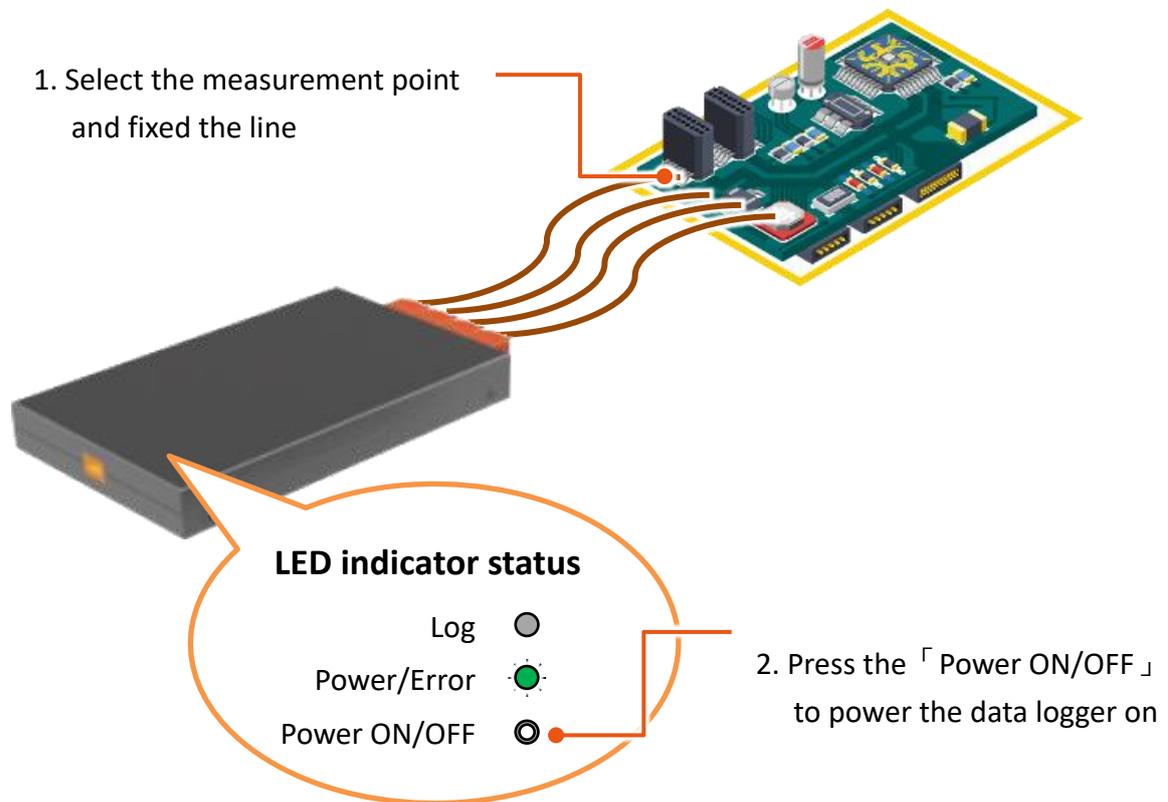
2.5.2. Selecting the Measurement Point and Measuring Temperature

1. Select the measurement point and fixed the line

2. Press the 「 Power ON/OFF 」 button to power the data logger on

After power on, the data logger will enter the stand-by mode and the LED indicator will display as shown below.

For more detailed information about the LED indicator displays, please refer to section 「 2.6. LED Indicators and Operating Modes 」 .



3. Put the data logger in the thermal insulation box (install the top cover of the thermal insulation after the step 4)

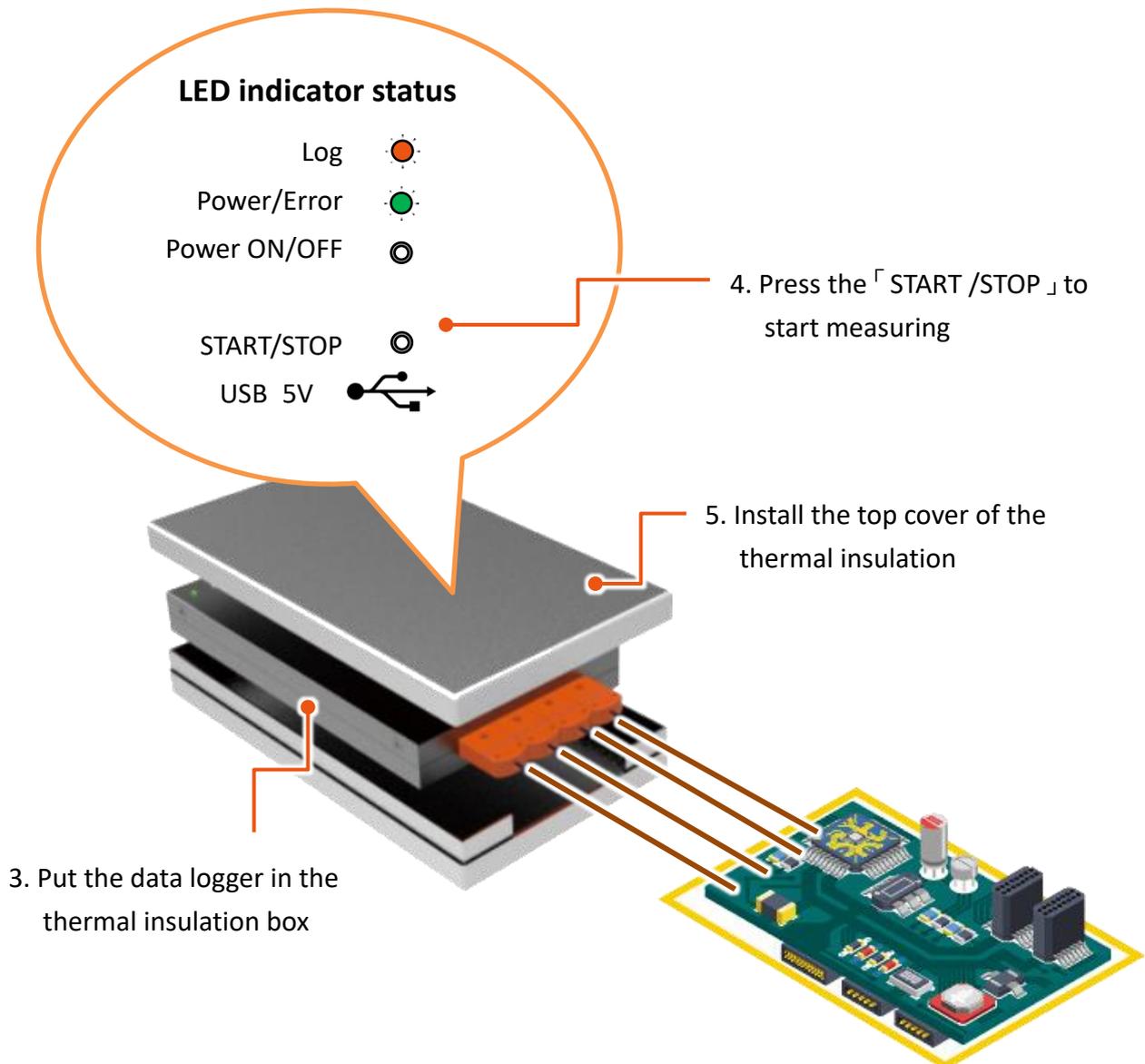
4. Press the 「 START/STOP 」 button to start measuring temperature

After pressing the button to start measuring, the data logger will enter the measuring mode and the LED indicator will display as shown below.

For more detailed information about the LED indicator displays, please refer to section 「 2.6. LED Indicators and Operating Modes 」 .

5. Install the top cover of the thermal insulation

For more detailed information about the thermal insulation use and installation, please refer to section 「 2.3.3. Installing the Thermal Insulation Box 」



6. After the measurement has been performed , take out the data logger from the thermal insulation



When the measurement is completed, the surface of the thermal insulation box may be very hot, please wear gloves when taking it out.

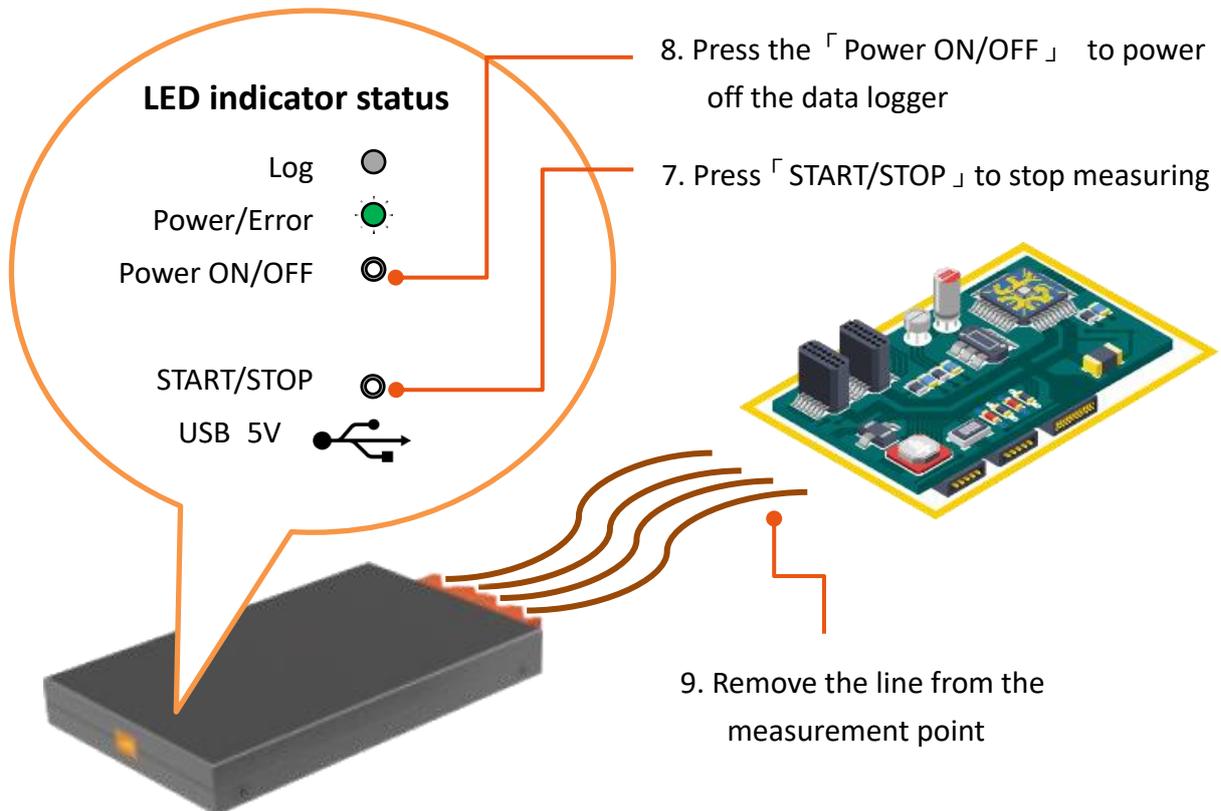
7. Press 「 START/STOP 」 button to stop measuring

After the measurement has been completed, the data logger will enter the stand-by mode and the LED indicator will display as shown below.

For more detailed information about the LED indicator displays, please refer to section 「 2.6. LED Indicators and Operating Modes 」 .

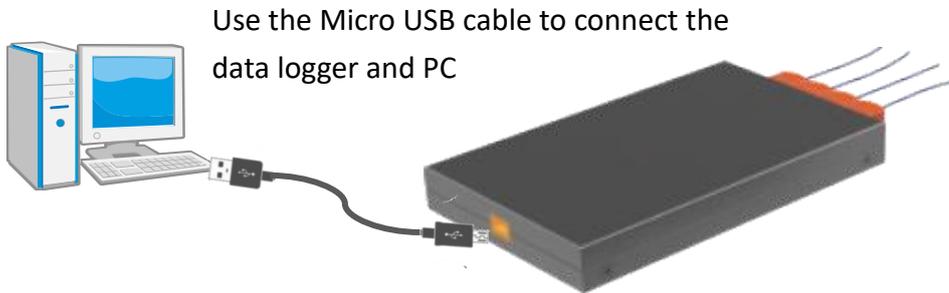
8. Press the 「 Power ON/OFF 」 button to power off the data logger

9. Remove the line from the measurement point



2.5.3. Analyzing the Measurement Data

1. Use the included micro USB cable to connect the data logger and the PC



1. Click on 「Link」 to enter the dashboard window for managing and analyzing the measured data and configuring the analysis conditions

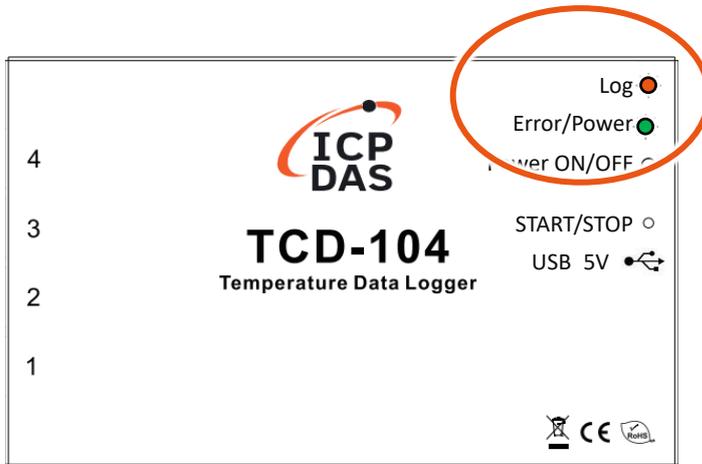
For more detailed information about the LED indicator displays, please refer to section 「2.6. LED Indicators and Operating Modes」.

Table 1: Analysis Data

Name	Heat up	Time 150° C-185°C	Time above 220.0°C	Time above 230.0°C	Peak	Cool down	Result
Analysis	40~150(°C)	150~185(°C)	220(°C)	230(°C)	-	180~100(°C)	
Condition	0~3(°C/sec)	30~120(sec)	0~100(sec)	28~100(sec)	230~250(°C)	3~0(°C/sec)	
Channel 1	1.50	73.00	49.00	30.00	239.90	0.99	OK
Channel 2	1.44	69.00	48.00	30.00	241.20	0.97	OK
Channel 3	1.52	68.00	59.00	42.00	246.20	0.80	OK
Channel 4	1.52	68.00	59.00	42.00	246.20	0.80	OK
Channel 5	1.44	69.00	48.00	30.00	241.20	0.97	OK
Channel 6	1.52	68.00	59.00	42.00	246.20	0.80	OK
Channel 7	1.44	69.00	48.00	30.00	241.20	0.97	OK
Channel 8	1.52	68.00	59.00	42.00	246.20	0.80	OK

2.6. LED Indicators and Operating Modes

This section describes the LED indicator and operating modes for TCD-104/S400 | TCD-108/S400.



Modes	Description	LED Indicators	
		Log	Error/Power
Self-test Mode and Stand-by Mode	<ol style="list-style-type: none"> Press the 「 Power ON/OFF 」 button, the data logger will enter the self-test mode. Once the self-test completes. The data logger will enter the stand-by mode. In measuring mode, press 「 START/STOP 」 button to exit the measurement. The data logger will enter the self-test mode, and then enter the stand-by mode. 	-	Green, Flash
Measuring Mode	In stand-by mode, press the 「 START/STOP 」 button can enter the measuring mode.	Orange, Blink	Green, Flash
Error Mode	If the self-test failed, the data logger will enter the error mode.	-	Red, On
Low-Power Voltage Mode	<ol style="list-style-type: none"> In self-test mode, if the is low, the data logger will enter the low-power voltage mode. In measuring mode, the system will continuously check the battery voltage. If the battery voltage is low, the data logger will enter the low-power voltage mode 	Orange, Flash slowly	Green, Flash slowly
Communication Mode	When the data logger and the PC are connected. The data logger is in communication mode.	-	Green, Flash

3. iTCLLogger Utility

iTCLLogger Utility is used to configure and download the data from TCD-104/S400 and TCD-108/S400 via the USB. It can display the trend chart and calculate some static values, like max., min, mean

Start the iTCLLogger Utility

Double-click the iTCLLogger icon to start the iTCLLogger Utility.



iTCLLogger Utility Functions

iTCLLogger Utility includes the following function buttons:



- **Link** – connect to the data logger to enter the dashboard window for managing and analyzing the measured data and configuring the analysis conditions.
- **Open Profile** – import the measured data.
- **Module Info** – connect to the data logger to check the module information, upgrade the firmware, adjust time and set the sampling period.
- **Language** – set the user interface language. It supports Traditional Chinese and English.
- **Exit** – exit the system.
- **About** – check the information about system version and developer.

3.1. Measurement Data Analysis and Settings

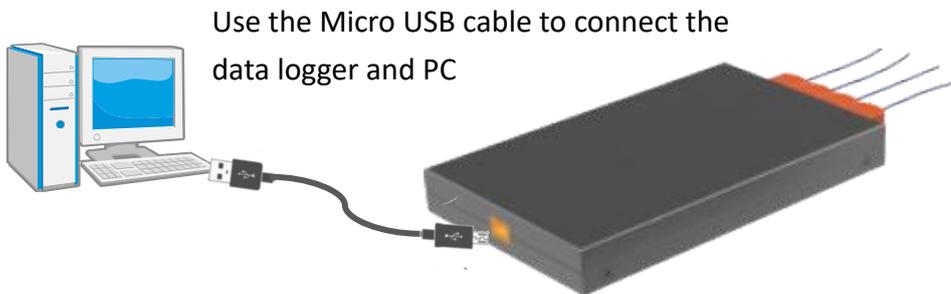
This section describes how to monitor, set up and analyze measurement data.

Enter the Measurement and Analysis Configuration Interface

Click on 「Link」 to enter the measurement and analysis configuration interface.



Before using the iTCLogger Utility, make sure the TCD-104/S400 | TCD-108/S400 and PC are connected.



Importing the Measurement data to analyze

Click 「Open Profile」 to import the measurement data to analyze . It supports offline mode.



3.1.1. Introducing the Dashboard

Click on 「Link」 to enter the dashboard window. The information below provides a brief overview of the dashboard.

Function Menu

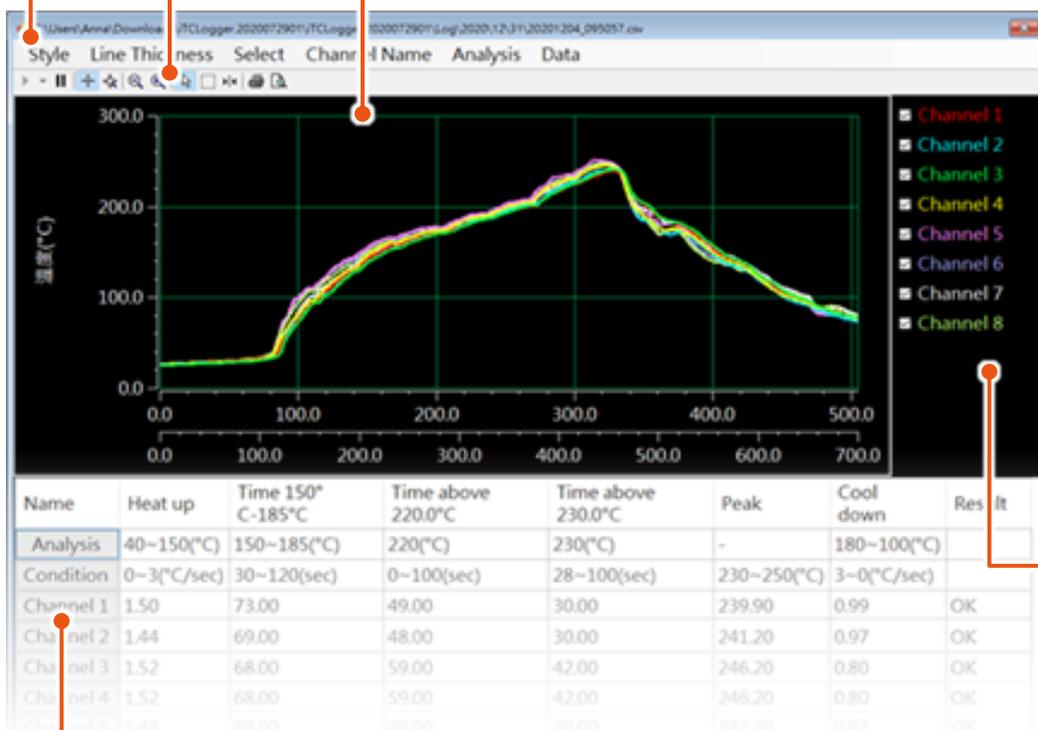
For more detailed information on how to use these Function menus, please refer to the following sections.

Chart Toolbar

The chart toolbar is used to customize and print charts.

Measurement Trend Chart

For more detailed information about the style of the chart, please refer to section 「3.1.2 Setting the Chart Layout and Style」 and 「3.1.3 Setting the Line Thickness of the Chart」



The measurement point selection

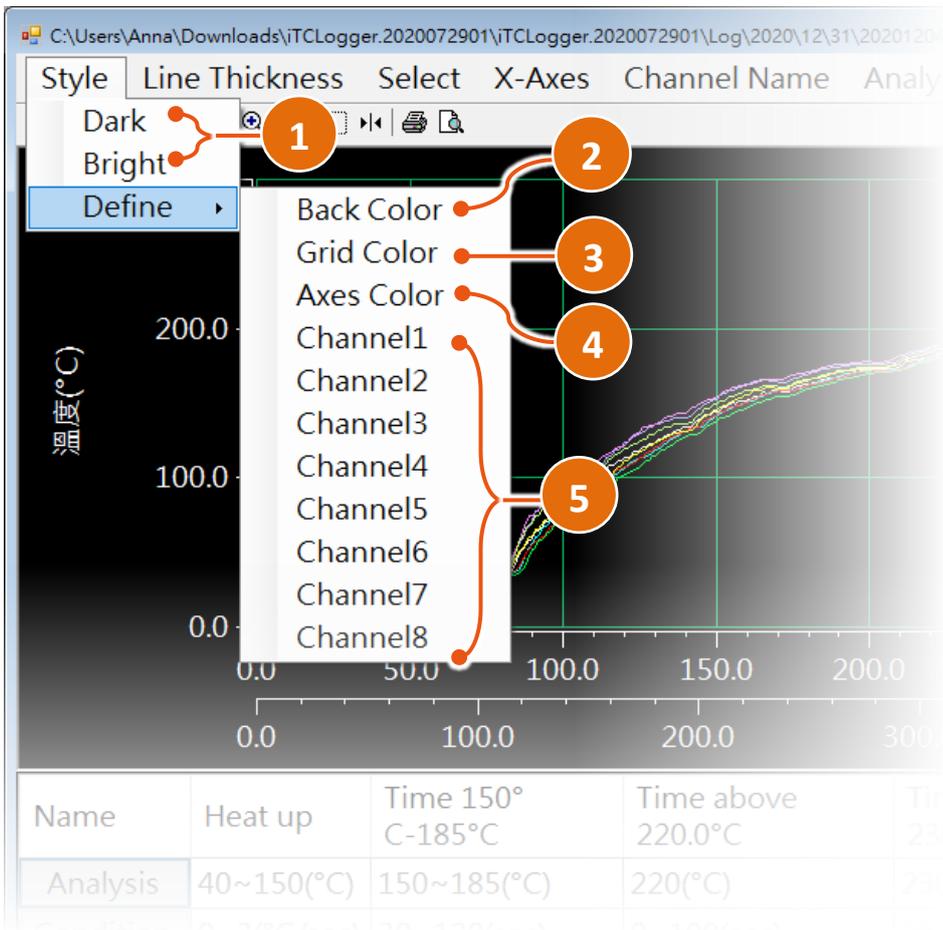
For more detailed information on how to select the measurement point, please refer to 「3.1.4. Setting the Line Thickness of the Chart」

Measurement data analysis

For more detailed information on how to set the measurement conditions, please refer to section 「3.1.6. Setting the Analysis Conditions」

3.1.2. Setting the Chart Layout and Style

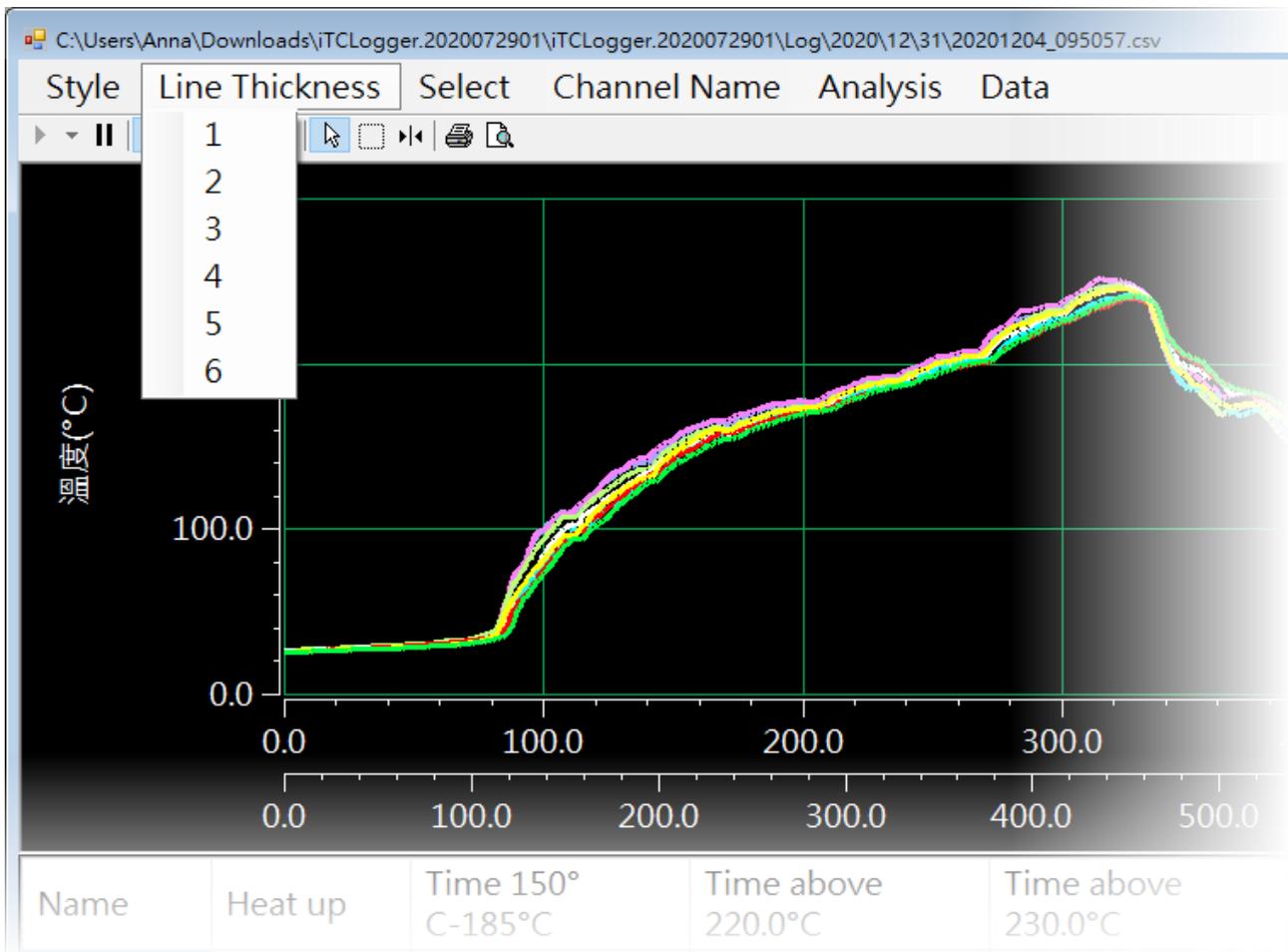
Click on 「Style」 to set the chart layout and style.



- 1 Set the theme of the chart
- 2 Set the background of the chart
- 3 Set the grid color of the chart
- 4 Set the axes color and font color of the chart
- 5 Set the color of the measurement point

3.1.3. Setting the Line Thickness of the Chart

Click on 「Line Thickness」 to set the line thickness of the chart.



3.1.4. Selecting the Measurement Point to be Displayed

Click on 「Select」 to select or cancel the measurement point to be displayed. If you want to select the measurement point individually, you can select it in the left area of the windows.

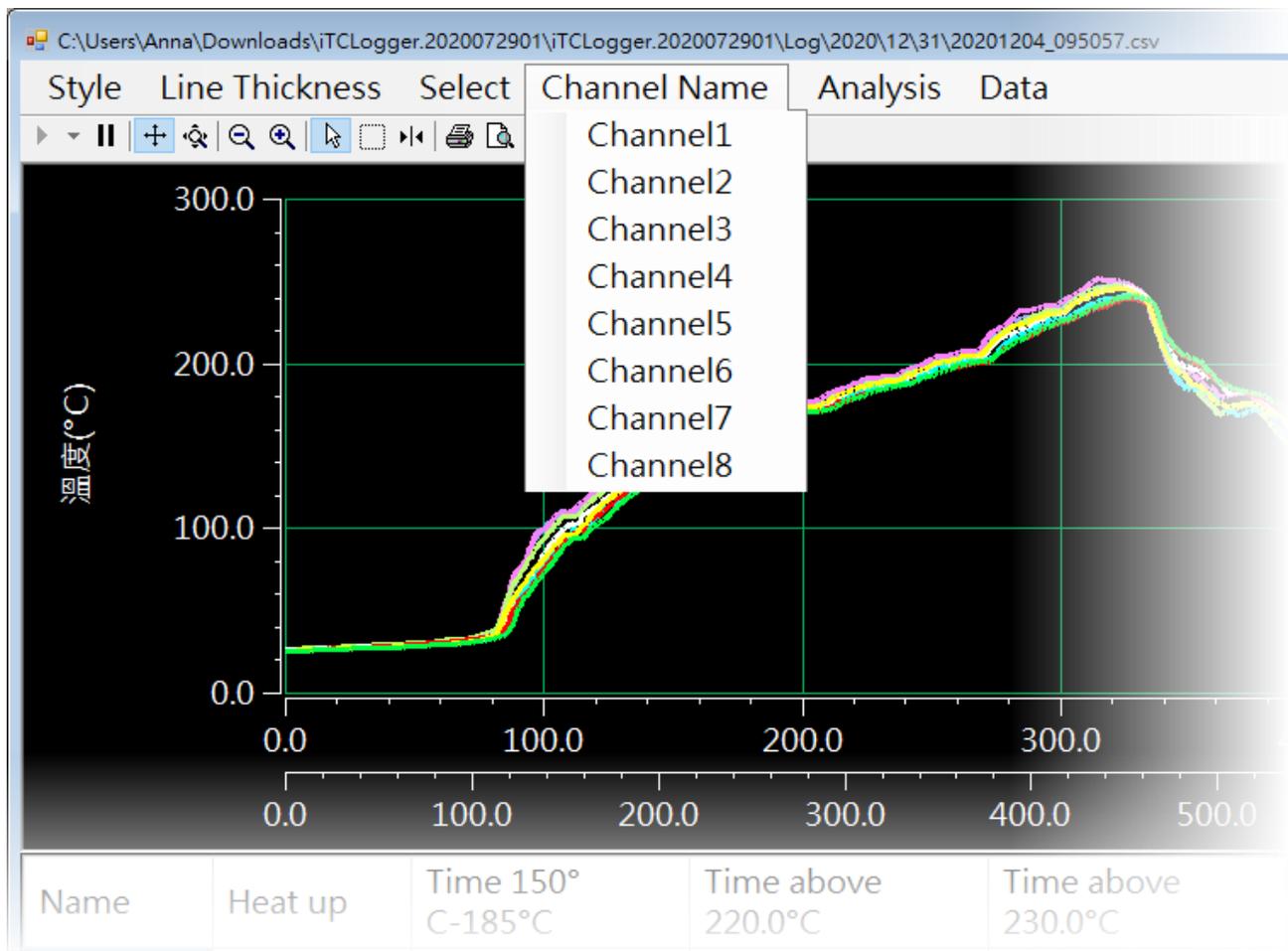
The screenshot displays the software interface for data analysis. The top window shows a graph with a 'Select' menu open, offering 'All' and 'None' options. The bottom window shows a detailed graph with a legend on the right for Channel 1 through Channel 8, each with a checked checkbox. Below the graph is a data table with columns for Name, Heat up, Time 150°C-185°C, Time above 220.0°C, Time above 230.0°C, Peak, Cool down, and Result. A red arrow points from the legend area to the caption below.

Name	Heat up	Time 150° C-185°C	Time above 220.0°C	Time above 230.0°C	Peak	Cool down	Result
Analysis	40~150(°C)	150~185(°C)	220(°C)	230(°C)	-	180~100(°C)	
Condition	0~3(°C/sec)	30~120(sec)	0~100(sec)	28~100(sec)	230~250(°C)	3~0(°C/se)	
Channel 1	1.50	73.00	49.00	30.00	239.90	0.99	OK
Channel 2	1.44	69.00	48.00	30.00	241.20	0.97	OK
Channel 3	1.52	68.00	59.00	42.00	246.20	0.80	OK
Channel 4	1.52	68.00	59.00	42.00	246.20	0.80	OK
Channel 5	1.44	69.00	48.00	30.00	241.20	0.97	OK
Channel 6	1.52	68.00	59.00	42.00	246.20	0.80	OK
Channel 7	1.44	69.00	48.00	30.00	241.20	0.97	OK
Channel 8	1.52	68.00	59.00	42.00	246.20	0.80	OK

Select the measurement point individually

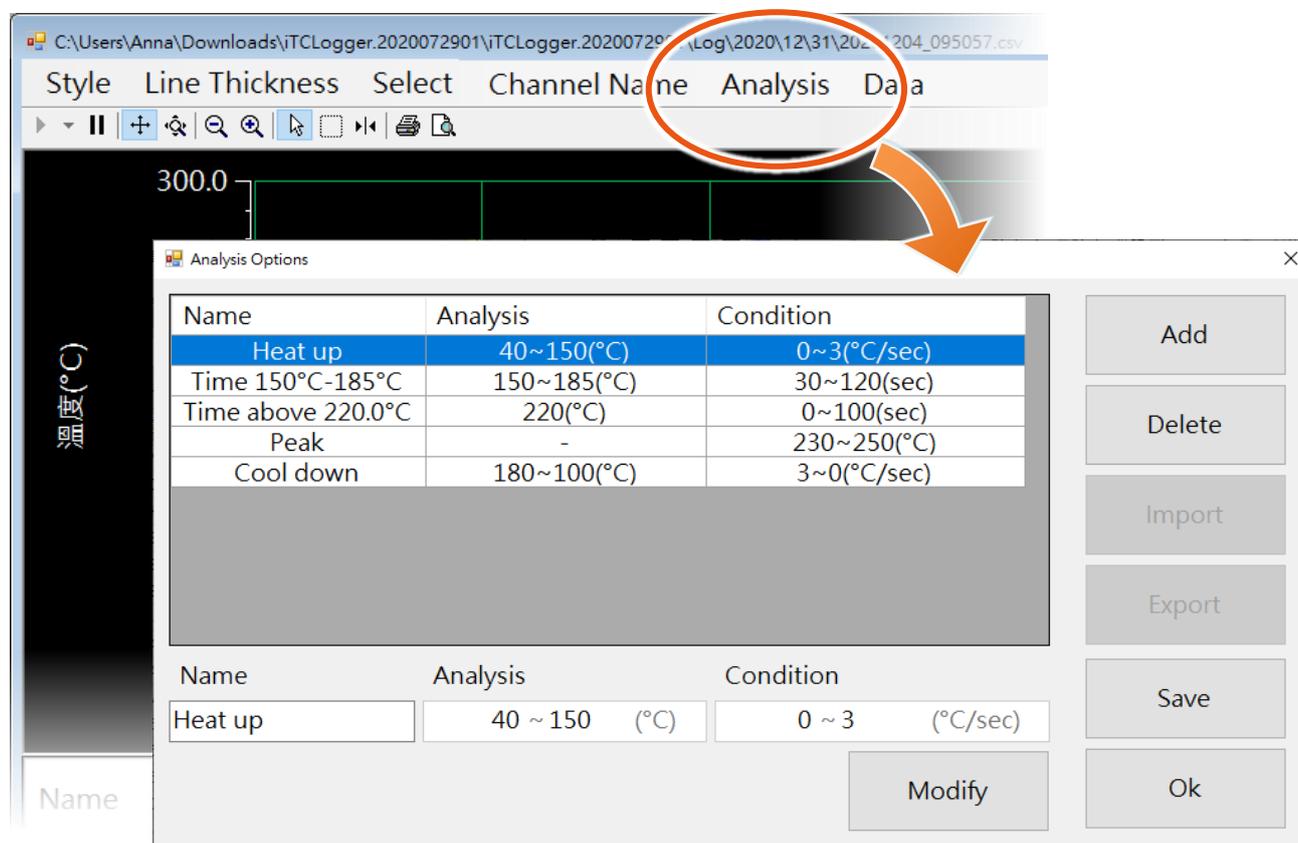
3.1.5. Setting the Name of the Measurement point

Click the 「Channel Name」 to assign the name of each measurement point.



3.1.6. Setting the Analysis Conditions

Click 「Analysis」 to enter the configuration of the analysis condition dialog. It supports the settings of temperature raise, range, and maximum temperature, minimum temperature.



The default settings of the Analysis condition

The table below shows the default settings for each analysis condition.

Analysis Condition	Default Item	Name	Analysis	Condition
Slope-Heat up		Heat up	40 ~ 150 (°C)	0 ~ 3 (°C/sec)
Temperature-Range		Time 150°C - 180°C	150 ~ 185 (°C)	30 ~ 120 (sec)
Temperature-Above		Time above 220.0°C	220 (°C)	0 ~ 100 (sec)
Temperature-Peak		Peak	-	230 ~ 250 (°C)
Slope-Cool down		Cool down	180 ~ 100 (°C)	3 ~ 0 (°C/sec)

To add the analysis condition

You can add the analysis condition by performing the following steps.

1. Click the 「Add」 button to enter the configuration dialog
2. Choose a condition and then select the 「OK」 button.

The descriptions of the analysis conditional are as follows:

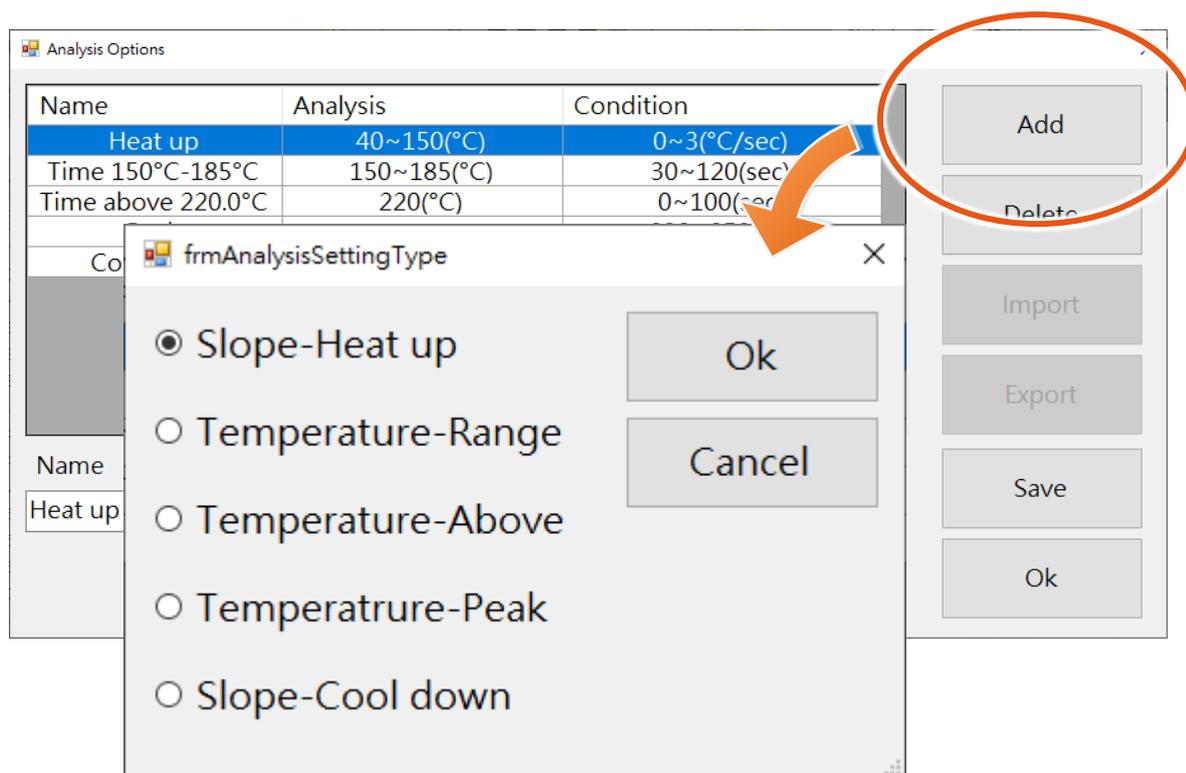
Slope-Heat up: The rate of temperature increases per second during a limited time period.

Temperature-Range: The measuring range during a limited time period.

Temperature-Above: The upper temperature limit during a limited time.

Temperature-Peak: The temperature peak.

Slope-Cool down: The rate of temperature decreases per second during a limited time period.



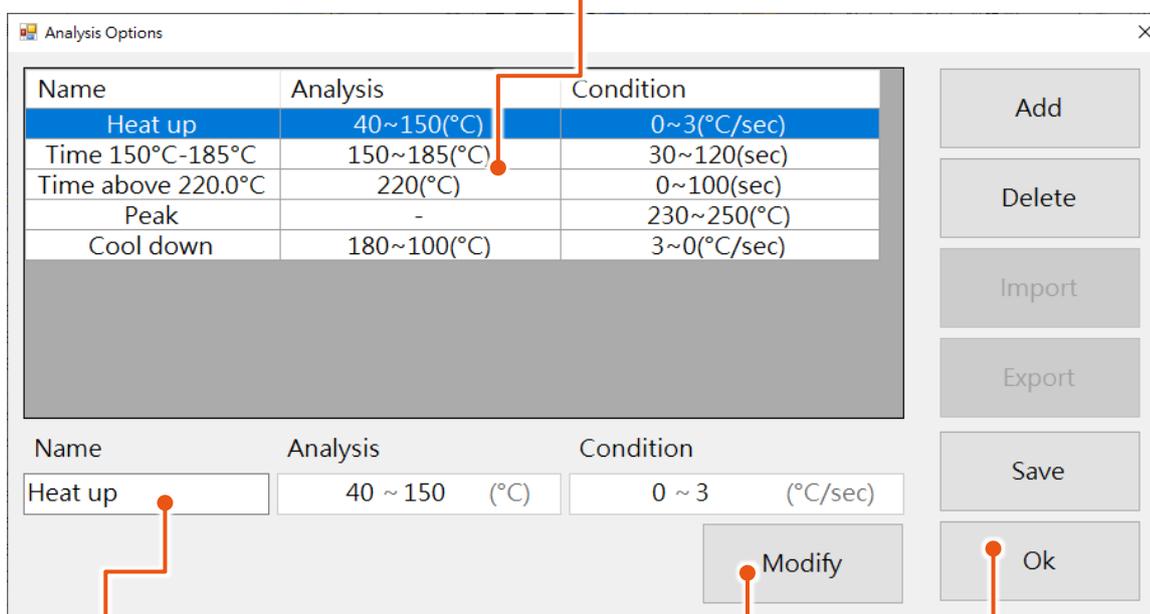
3. Each analysis condition has default settings, if you would like to change the settings. Then continue as described in the next section

To modify the analysis condition

You can modify the analysis condition by performing the following steps.

1. Select the condition that you want to modify.
2. Modify the parameters of the condition
3. Click the 「Modify」 button to confirm the changes
4. After modifying all the desired conditions, click the 「OK」 button to save the changes

1. Select the condition that you want to modify



2. Modify the parameters of the condition

3. Click the 「Modify」 to confirm the changes

4. Click the 「OK」 to save the changes

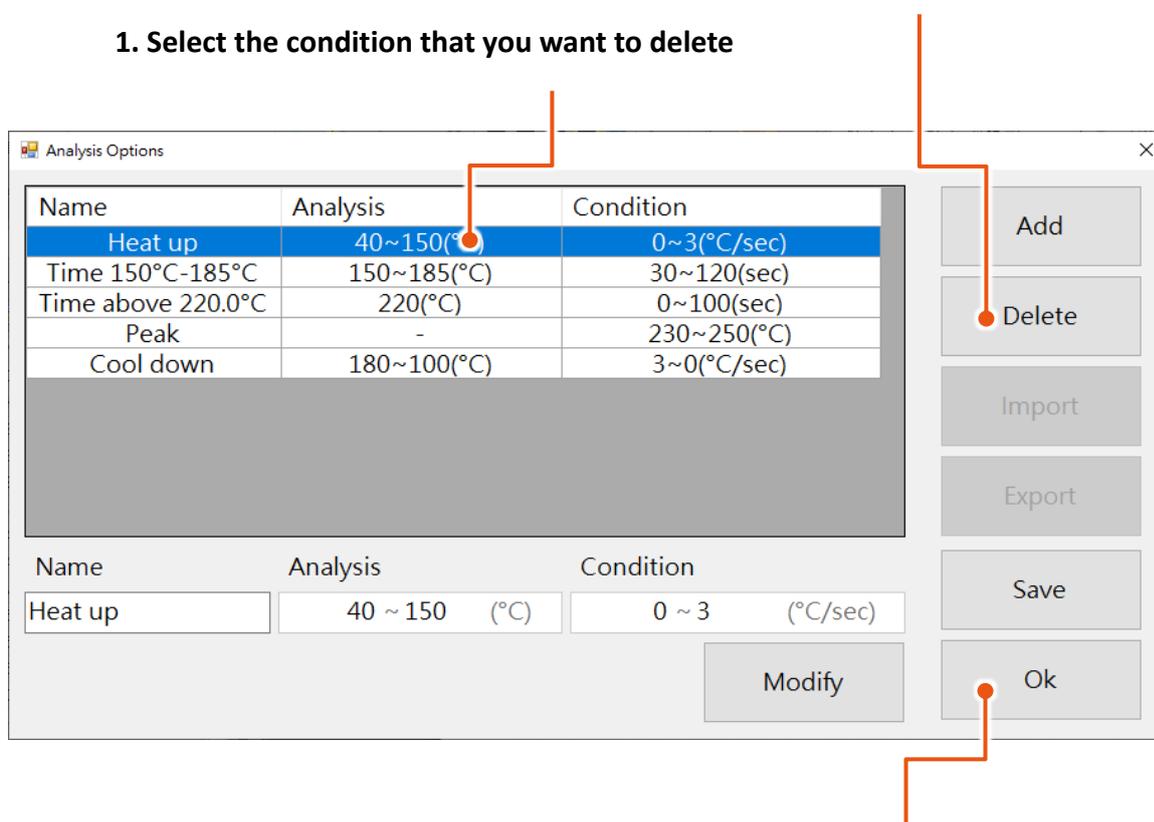
To delete the analysis condition

You can delete the analysis condition by performing the following steps.

1. Select the condition that you want to delete.
2. Click the 「Delete」 button to delete the condition
3. After editing all the desired conditions, click the 「OK」 button to save the changes

2. Click the 「Modify」 to confirm the changes

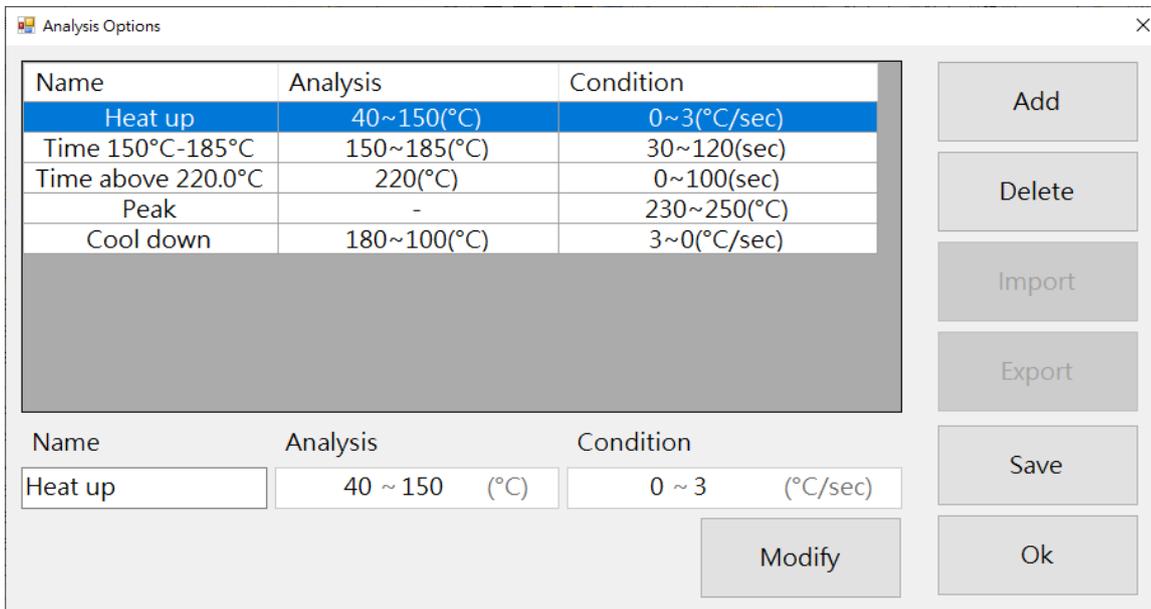
1. Select the condition that you want to delete



3. Click the 「OK」 to save the changes

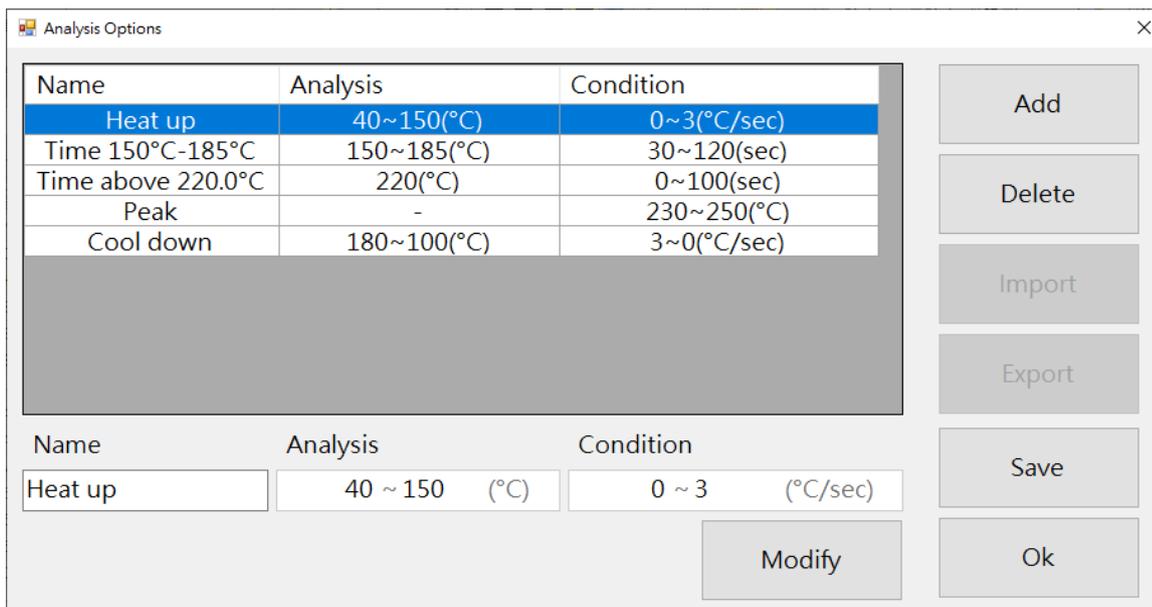
To Import the Analysis Condition

Click 「Import」 button to import the analysis condition.



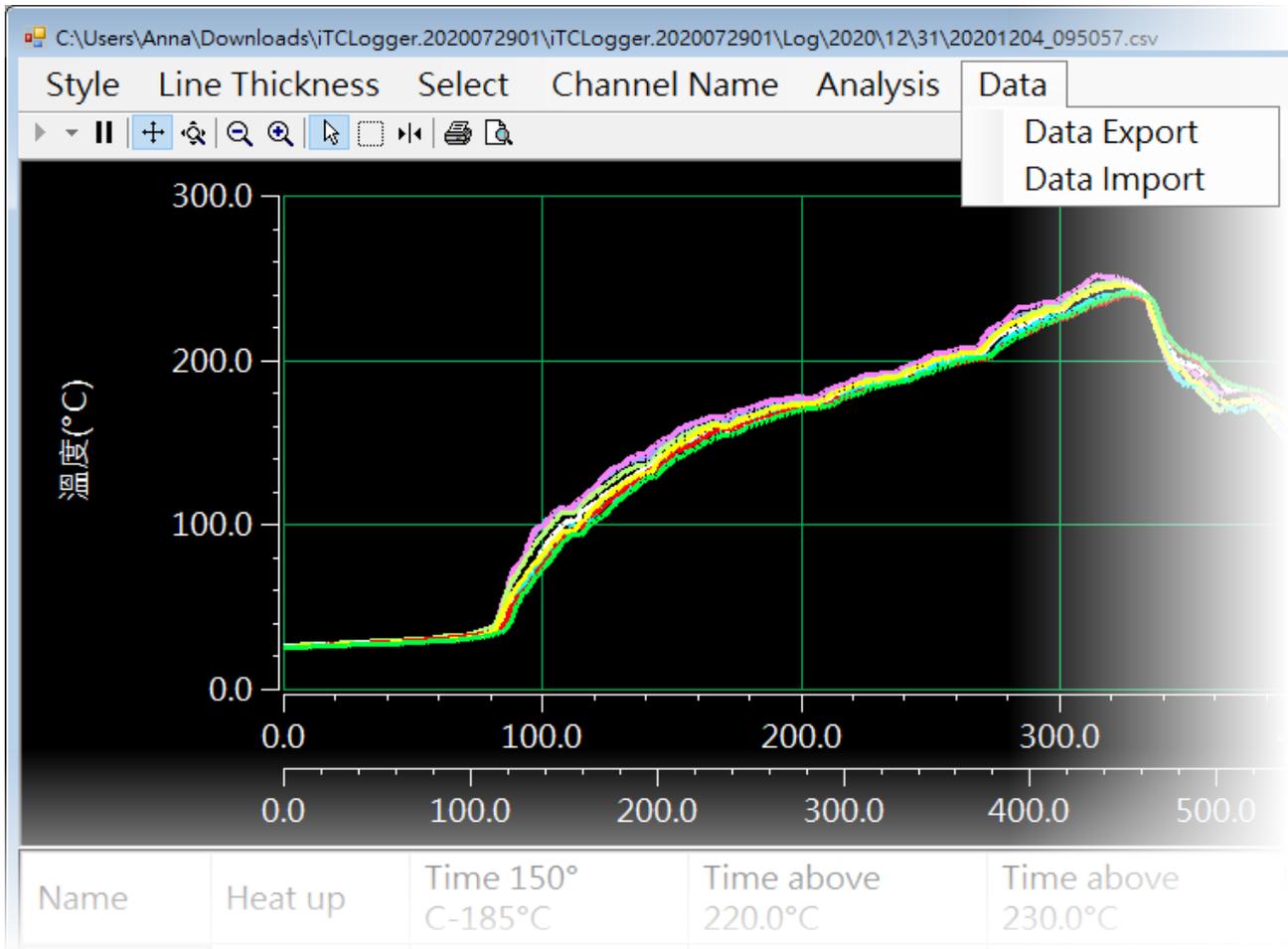
To Export the Analysis Condition

Click 「Export」 button to import the analysis condition.



3.1.7. Importing and Exporting the Data logger

Click 「Data」 to import and export the measurement data.



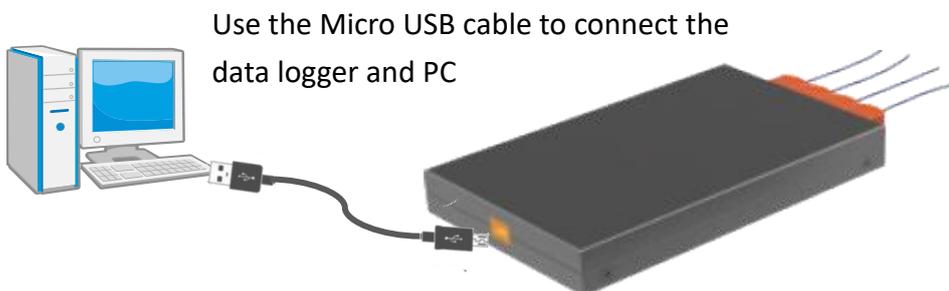
3.2. Data Logger Configuration

This section describes how to check and configure the system settings of the TCD-104/S400 | TCD-108/S400 .

Click 「 Module Info 」 to check and configure the system settings.



Before using the iTCLogger Utility, make sure the TCD-104/S400 | TCD-108/S400 and PC are connected.



Use the Micro USB cable to connect the data logger and PC

3.2.1. Checking and Upgrading the Firmware

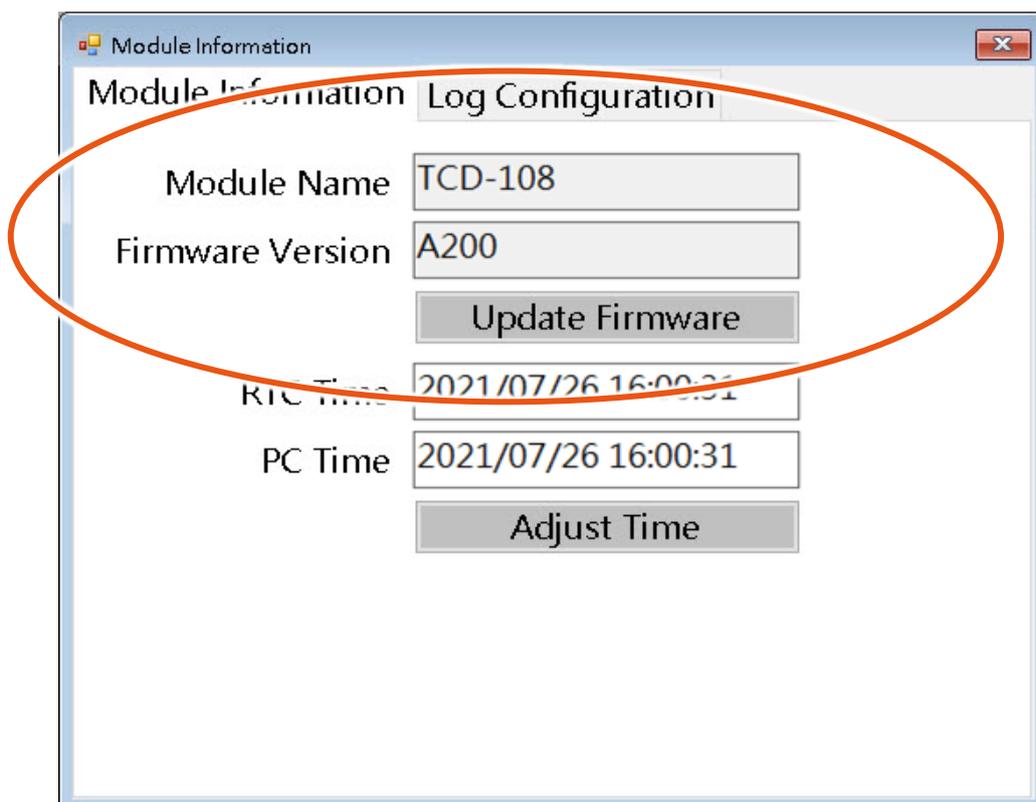
In the 「Module Information」 tab, you can check the current firmware of your data logger.

If there is a new firmware available, you can click the 「Update Firmware」 button to update the new firmware to the data logger.

ICP DAS will continue to add additional features to TCD-104/S400 | TCD-108/S400 in the future, so we advise you to periodically check the ICP DAS Download Center for the latest updates.

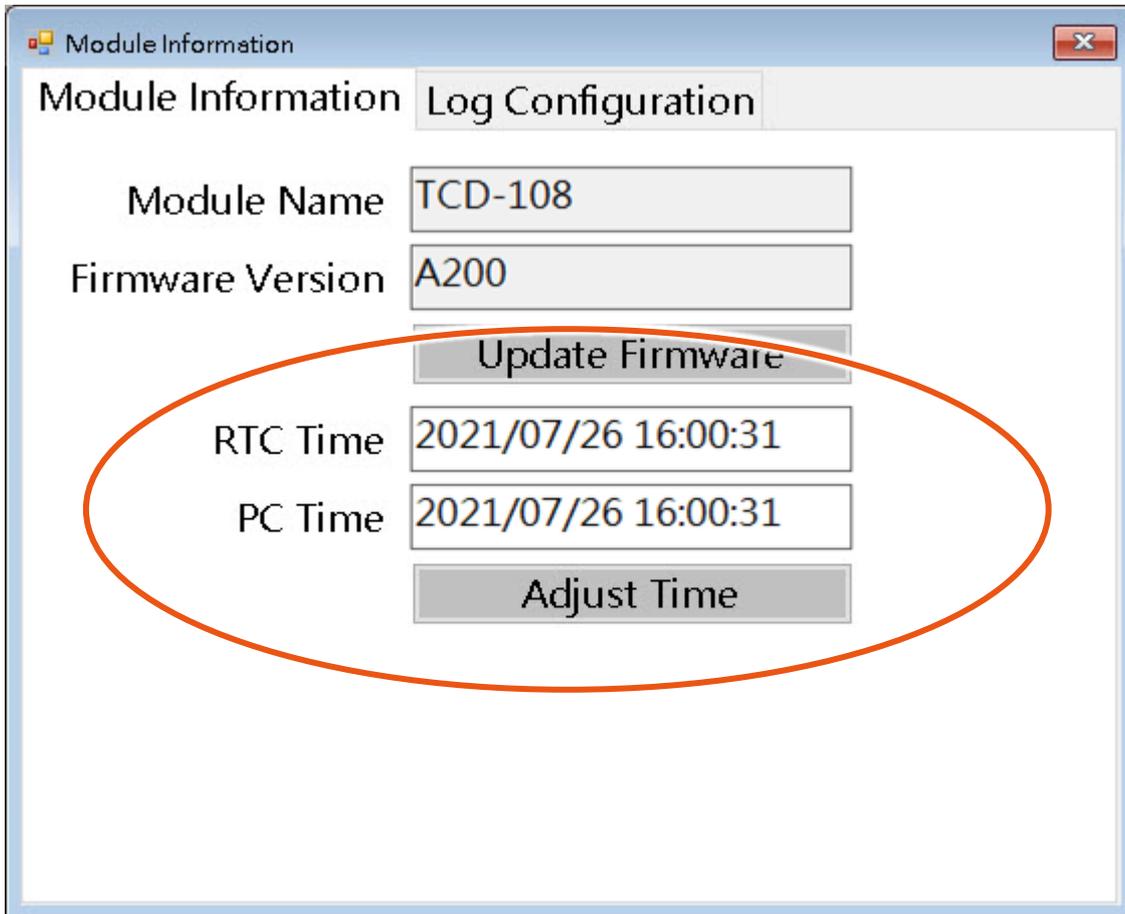
The firmware of the TCD-104/S400 | TCD-108/S400 can be obtained from the ICP DAS download Center.

- TCD-104/S400 Download Center:
<https://www.icpdas.com/en/download/index.php?model=TCD-104/S400>
- TCD-104/S400/B Download Center:
<https://www.icpdas.com/en/download/index.php?model=TCD-108/S400/B>
- TCD-108/S400 Download Center:
<https://www.icpdas.com/en/download/index.php?model=TCD-108/S400>
- TCD-108/S400/B Download Center:
<https://www.icpdas.com/en/download/index.php?model=TCD-108/S400/B>



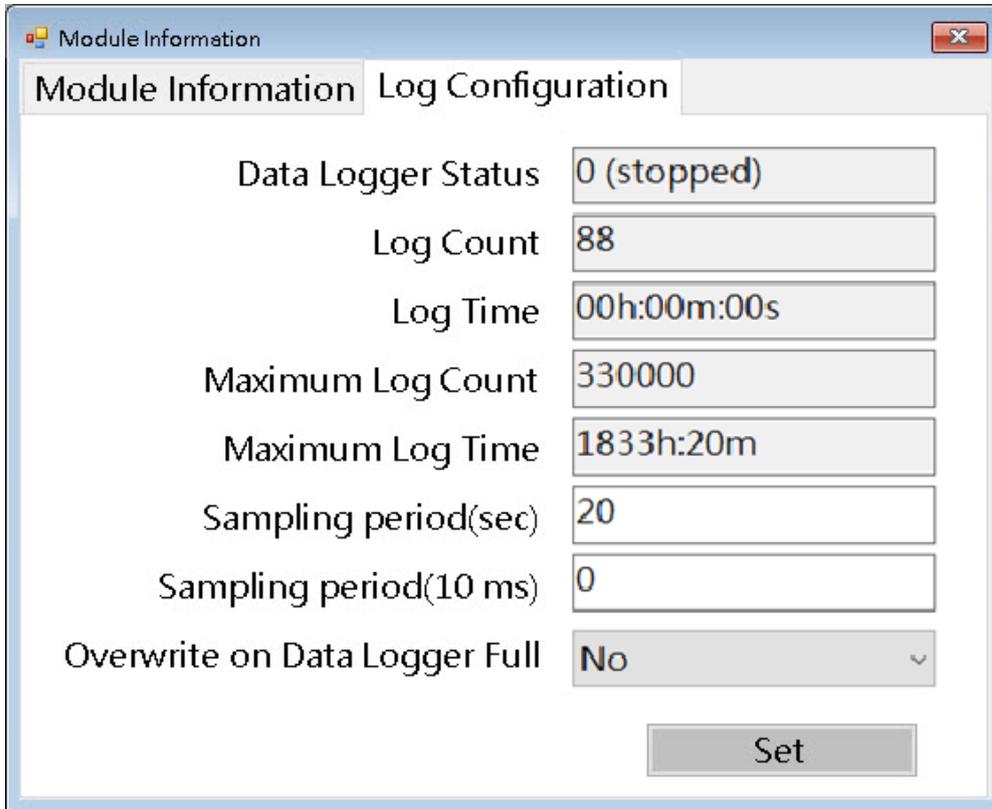
3.2.2. Calibrating the Internal RTC

In the 「Module Information」 tab, you can check the information of the 「RTC Time」 and 「PC Time」. It shows the RTC time and system time, if the RTC time has started to drift a bit from the system time. You can click the 「Adjust Time」 button to calibrate the RTC time.



3.2.3. Setting the Sampling period and storing information

In the 「Log Configuration」 tab, you can check the operating modes and data stored statistics, and set the sampling period, enable the overwrite function.



Checking the data stored statistics

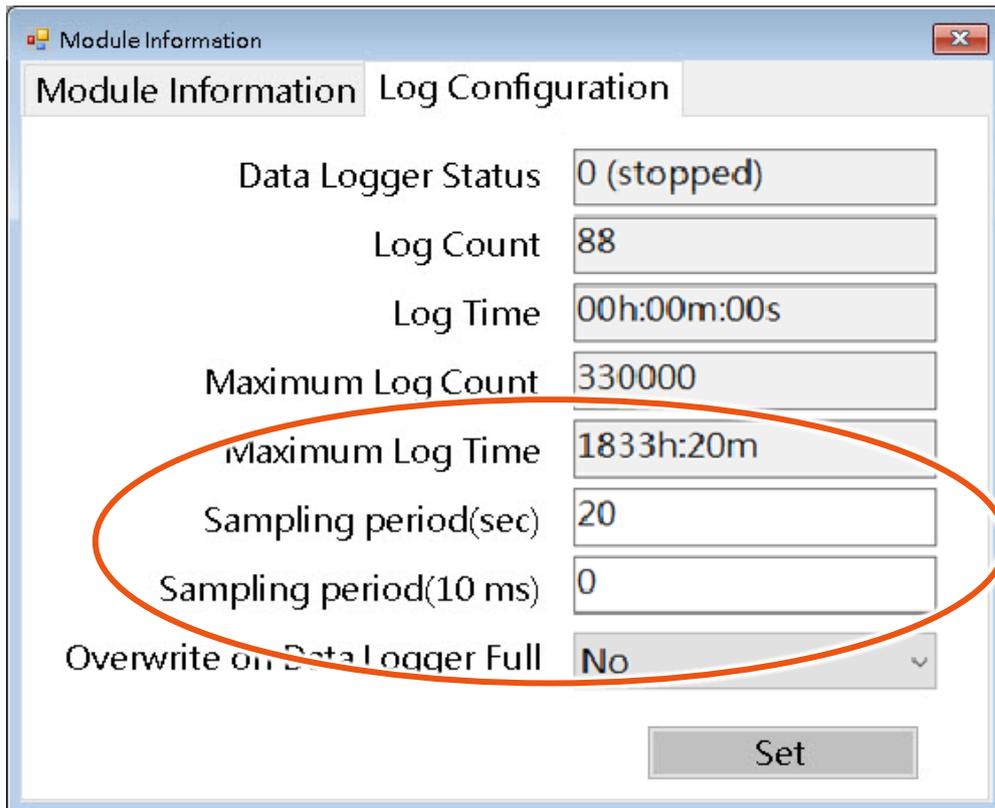
The table below shows the description of the statistics item.

Item	Description
Data Logger Status	The operating modes of the data logger
Log Count	The calculated amount of data that the data logger recorded.
Log Time	The calculated amount of time that the data logger recorded.
Maximum Log Count	The calculated amount of data that the data logger will record
Maximum Log Time	The calculated amount of time that the data logger will record

Setting the Sampling Period and Rate

The following steps show how to set the sampling period.

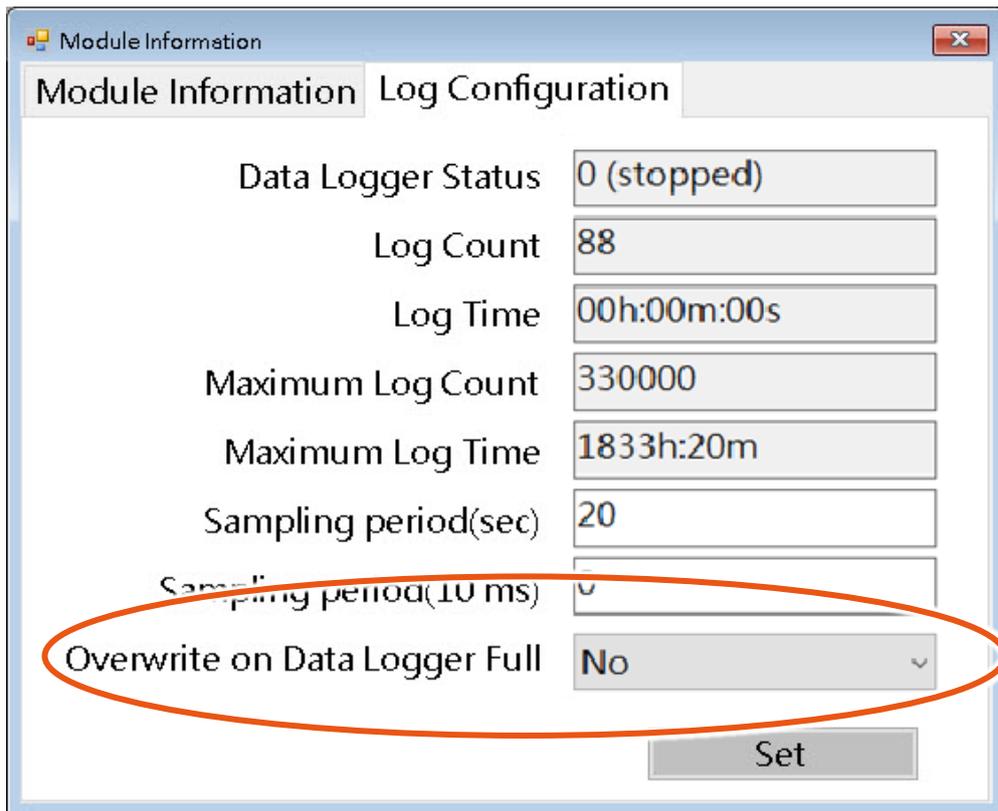
1. Set the 「 Sampling period (sec) 」 and 「 Sampling period (10 ms) 」
2. Click the 「 Set 」 button to confirm the settings.



Enabling the Overwrite Mode

The following steps show how to enable the overwrite mode.

1. Select the 「Overwrite on Data Logger Full」 to turn on/off the function
2. Click the 「Set」 button to confirm the settings.



3.3. System Settings

This section describes how to configure the system settings of iTCLogger Utility.

3.3.1. Setting the Interface Language

To set the user interface language that consists of English and Traditional Chinese.



3.3.2. Exiting the iTCLogger Utility

To exit the iTCLogger Utility.



3.3.3. About the iTCLogger Utility

To provide the information about the version and the software developer.



4. Troubleshooting & Misc

4.1. Troubleshooting

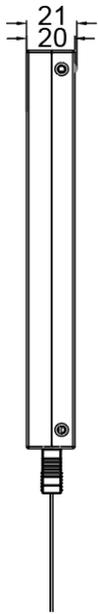
Problem	Possible Cause	Action
The unit doesn't work	The energy of the battery is not enough to work	To change the battery
The USB driver installation failed, as shown below.	The usber.sys of the Windows component may be missing.	1. The usbser.sys can be obtained from: http://www.dll-found.com/usbser.sys_download.html 2. Put the file in the following path: C:\Windows\System32\drivers\
The data logger can read the old measurement point, but can't read the new measurement point.	The software version is too old.	Make sure the software is the latest version.
A measurement point cannot be read.	The k-type thermocouple cable or measurement point is damaged or corrupted.	To change the k-type thermocouple cable or repair the measurement point.

4.2. Specifications

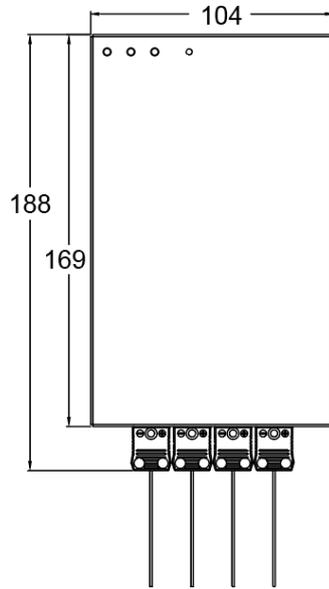
Model	TCD-104/S400	TCD-104/S400/B	TCD-104/S400	TCD-108/S400/B
Measurement				
Sensor Type	K			
Channels	4		8	
Range	-270°C to 1372°C (-454°F to 2502°F)			
Accuracy	±0.5°C			
Resolution	0.1 °C			
System				
Data Logger	450,000 records		300,000 records	
LED Indicator				
Data Logger	1, Yellow			
Power	1, Green			
Alarm	1, Red			
Interface				
USB	USB 2.0 full-speed			
Power				
Battery Usage Life	Operating for more than 60 hours with heavy-duty AAA battery x 4			
Consumption	0.06 W Max			
Mechanical				
Dimensions	104 mm x 169 mm x 21 mm (W x L x H)			
Environmental				
Overheat Protection	Internal temperature > 100 °C, the measurement will stop. Internal temperature > 105 °C, the power will be off.			
Operating Temperature	-40 to +400°C			
Humidity	10 to 95% RH, Non-condensing			

4.3. Dimensions

TCD-104/S400 Inner Shell

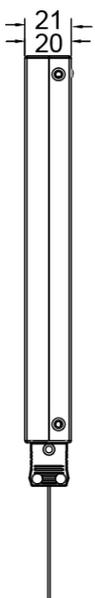


Left View

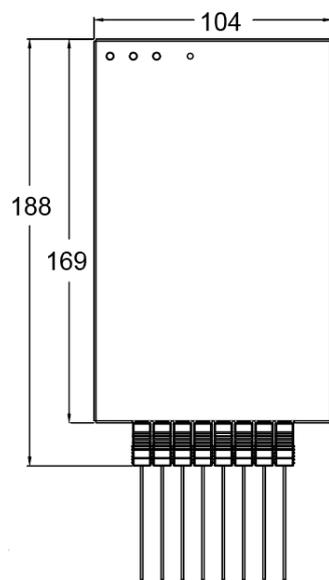


Front View

TCD-108/S400 Inner Shell

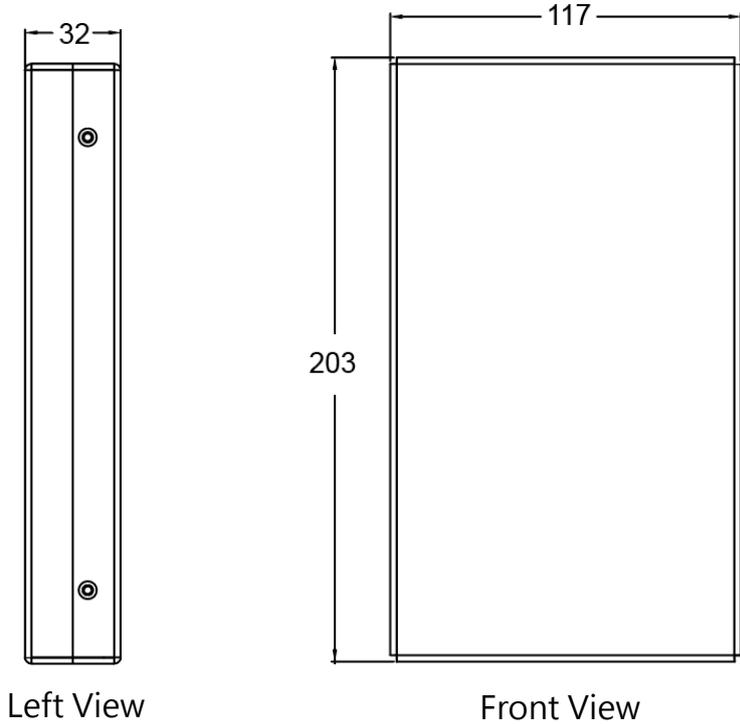


Left View



Front View

Thermal Insulation Box



Appendix. Revision History

This appendix provides revision history information to this document

Version	Release Date	Description
1.0.1	October 2022	Initial issue