2. Temperature Controller

Available temperature controllers are listed in Table 2.1.

Table 2.1 Temperature Controllers

Type	Model	Name	Applicable Instrument			Recognition
			1100	1500	1700	
Temperature Controller	PTC-510	Peltier Thermostatted Single Cell Holder		✔	✔	Auto
	PTC-514	Peltier Thermostatted Single Cell Holder	✔			Auto
	PTC-517	Peltier Thermostatted Single Cell Holder		✔	✔	Auto

This chapter describes procedures for starting a program and measuring the samples, for practice in operating the temperature controller.

2.1 Overview of Temperature Controller Operations

Turning on the CD Spectrometer and Starting a Measurement Program
Refer to Section 2.2

↓

Specifying Measurement Parameters — Refer to Section 2.3

↓

Controlling the Temperature Controller — Refer to Section 2.4

↓

Measuring the Sample — Refer to Section 2.5

↓

Exiting the Program — Refer to Section 2.6

2.2 Turning on the CD Spectrometer and Starting a Measurement Program

(1) Flow cooling water to the cell holder unit (flow rate: 1 L/min).

Note:	*Ensure that the temperature of the cooling water is 20 ℃.*

(2) Turn on the CD spectrometer.

(3) Turn on the PC and monitor.

(4) Start the [Spectra Manager]. The [Spectra Manager] window is displayed.

(5) To start the measurement program, double-click the measurement program name from the [Instrument] list of [Spectra Manager]. The window in Fig. 2.1 is displayed.

Note:	*In this section, the [Spectra Measurement] program is used as an example of starting and using a measurement program.*

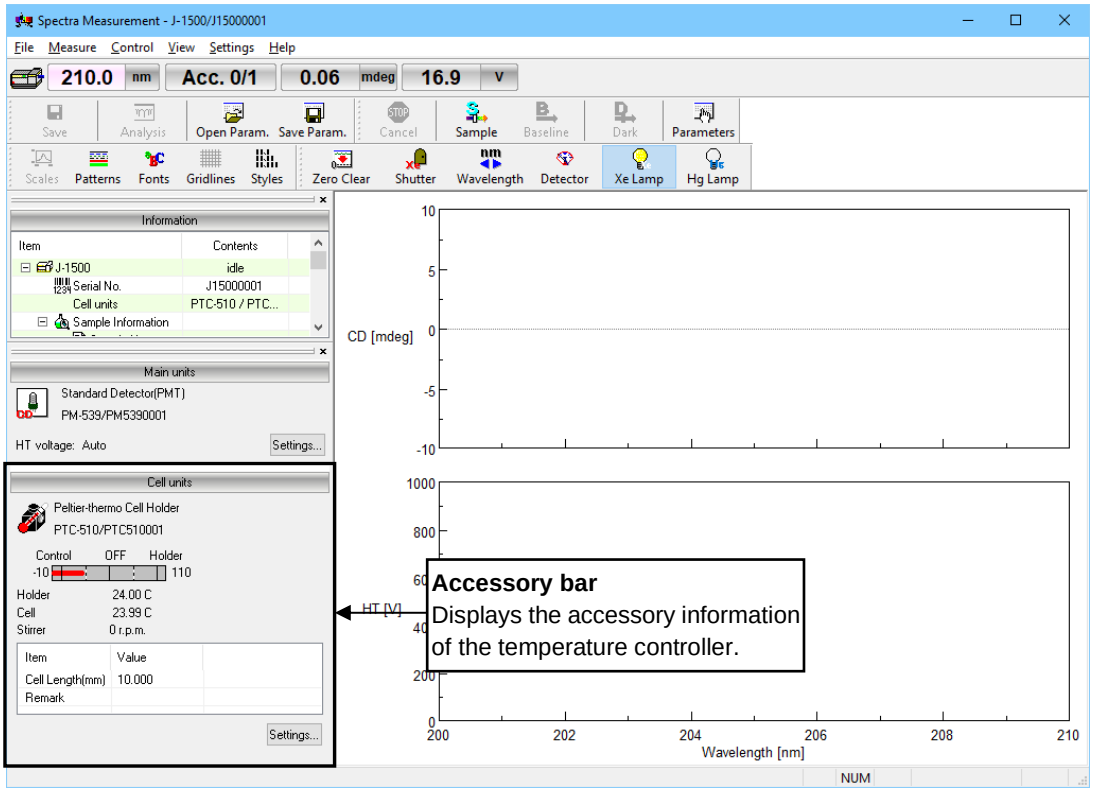

Figure 2.1 [Spectra Measurement] window

[Accessory] bar of the [Spectra Measurement] window displays the accessory information of the temperature controller to be used (see Fig. 2.1).
Items such as [Cell Length(nm)] and [Remark] can be entered. When the measurement results are saved, the information entered for these items is saved together with the measurement results. Enter the information as required.

Note:	*When the accessory is not recognized, check if the cables are properly connected.*

2.3 Specifying Measurement Parameters

When a temperature controller is recognized, the [Cell unit] tab is displayed in the [Parameters] dialog box. Selecting the [Cell unit] tab displays the dialog box in Fig. 2.2. Specify the parameters for the temperature controller in the dialog box.

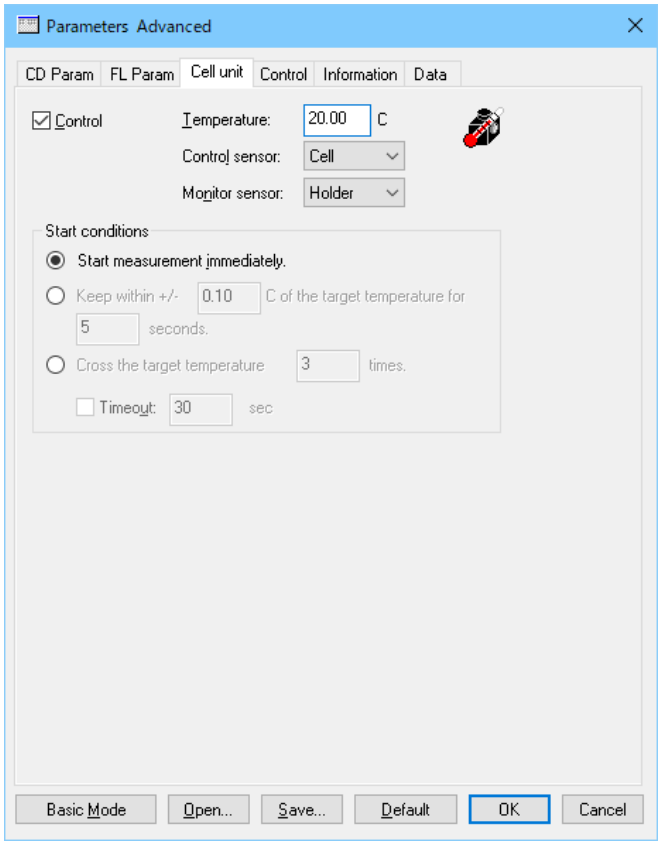

Figure 2.2 [Cell unit] tab in [Parameters] dialog box (advanced mode)

[Control]	Controls the temperature controller with the specified parameters.
[Temperature]	Specifies the temperature for the tempertature controller. Input range: -40 to 130 ºC Control range: 0 to 100 ºC (when the temperature of the cooling water is 20 °C)
[Control sensor]	Selects the sensor for controlling the temperature. Options Holder: Controls the temperature using the holder sensor. Cell: Controls the temperature using the sensor inserted into the cell.
[Monitor sensor]	Selects the sensor for monitoring the temperature that is saved with the measurement results. Options Holder: Monitors the temperature of the cell holder. Cell: Monitors the sample temperature by using the sensor inserted in the cell.

Start conditions	Specifies the temperature conditions for starting the measurement.
[Start measurement immediately]	Starts measurement immediately after clicking the measurement button.
[Keep within ±□ ºC of the target temperature, for □ seconds]	Starts a measurement when the temperature of the control sensor is maintained within ± 0.02 to 10 ºC of the target temperature for a period of 1 to 10 seconds.
[Cross the target temperature □ times]	Starts a measurement when the temperature of the control sensor crosses the target temperature 1 to 10 times.
[Timeout]	If the timeout time (seconds) is exceeded before the measurement starts, the sample measurement is automatically started. Input range: 1 to 3600 seconds

Note: After the sample measurement has started, the temperature begins to adjust to the temperature specified in the [Cell unit] tab in the [Parameters] dialog box. Even when the <OK> button is clicked in Fig. 2.2, the temperature is not adjusted to the target temperature.

Refer to "J-1000 series CD Spectrometer Software Manual" for details about specifying the other measurement parameters.

2.4 Controlling the Temperature Controller

(1) When a temperature controller is recognized, the accessory name command is displayed on the [Control] menu (Fig. 2.3).

Note 1: When [Control] is selected in the [Cell unit] tab of the [Parameters] dialog box, the settings in Fig. 2.4 are not applied for measurement, but are for monitoring or controlling the current status of the temperature. When [Control] is deselected, the specified temperature conditions in Fig. 2.4 are applied for measurement.

Note 2: Use this function to return the temperature of the Peltier device to room temperature after measuring data at a high or low temperature or for controlling the temperature at a target temperature after inserting a sample.

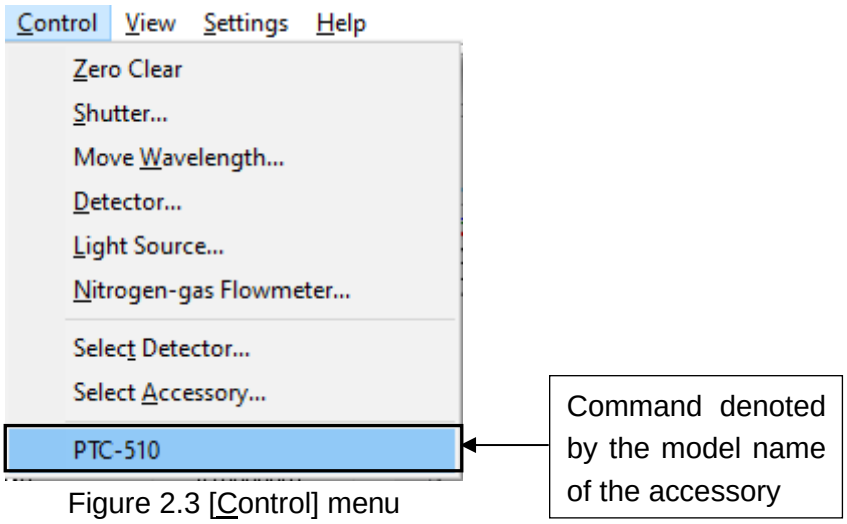

Figure 2.3 [Control] menu

(2) Select the command to display the dialog box in Fig. 2.4.

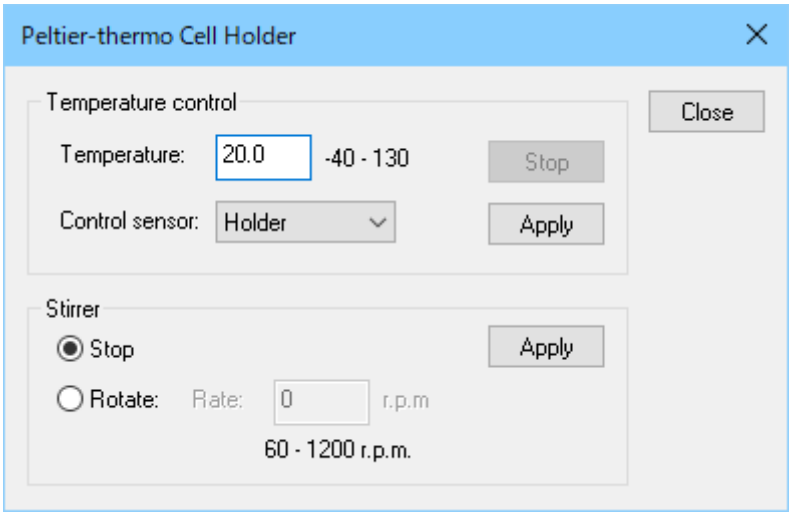

Figure 2.4 Dialog boxes for temperature control

Temperature control	
[Temperature]	Input range: -40 to 130 ºC Control range: 0 to 100 ºC (when the temperature of the cooling water is 20 °C)
[Control sensor]	Selects the sensor to use for controlling temperature. Options: Holder, Cell
<Apply>	Applies changes to the temperature control settings.
Stirrer	
[Stop]	Stops the stirrer.
[Rotate]	Rotates the stirrer.
[Rate]	Specifies the rotation rate of the stirrer. Input range: 60 to 1200 r.p.m
<Apply>	Applies changes to the stirrer settings.

Note 1: The stirrer can be controlled using the PC.
Note 2: The temperature controller can also be controlled by clicking the <Settings...> button in the [Accessory] bar of the measurement window.

2.5 Measuring the Sample

(1) Baseline measurement

1) Set the cell filled with the solvent in the cell holder.

2) Select [Baseline Measurement] from the [Measure] menu (or click the 

button) to set the current CD signal to zero.

Note: [Baseline Measurement] is available when [Baseline] is selected in the [Control] tab in the [Parameters] dialog box.

(2) Sample measurement

1) Set the cell filled with the sample solution in the cell holder. Set a stir bar in the cell if necessary.

2) When [Cell] is selected for [Control sensor] or [Monitor sensor] in Fig. 2.2, put the cell sensor in the cell.

3) Select [Sample Measurement] from the [Measure] menu (or click the 

button) to measure the spectrum of the sample.

2.6 Exiting the Program

(1) Exiting the measurement program

Select [Exit] from the [File] menu to close the measurement program, leaving the [Spectra Manager] window displayed.

(2) Exiting the [Spectra Manager] program

Select [Exit] from the [Program] menu.

(3) Exiting *Windows*

Exit *Windows* in accordance with standard *Windows* operation procedures.

(4) Turning off the PC and CD spectrometer

Turn off the PC and monitor.
Turn off the CD spectrometer and stop the flow of the cooling water. Store the stir bar in its case.

Note 1: When measuring a sample at a high or low temperature, remove the sample after returning the Peltier device to room temperature. Failure to follow this procedure may result in burns or condensation on the cell holder windows.
Note 2: Remove the accessory from the sample compartment and replace it with the standard cell holder if necessary. After removing the accessory, keep it in a safe place that is free of dust.