



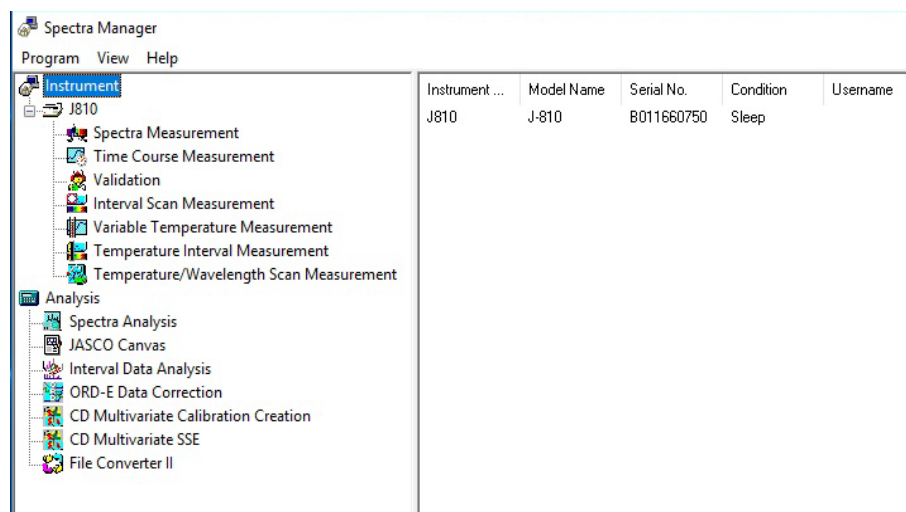
Jasco J-810 Spectropolarimeter

Operation instructions

Turn the system on

Please, follow exact instructions for turning the system on. Not following the procedure may result in damage of the equipment.

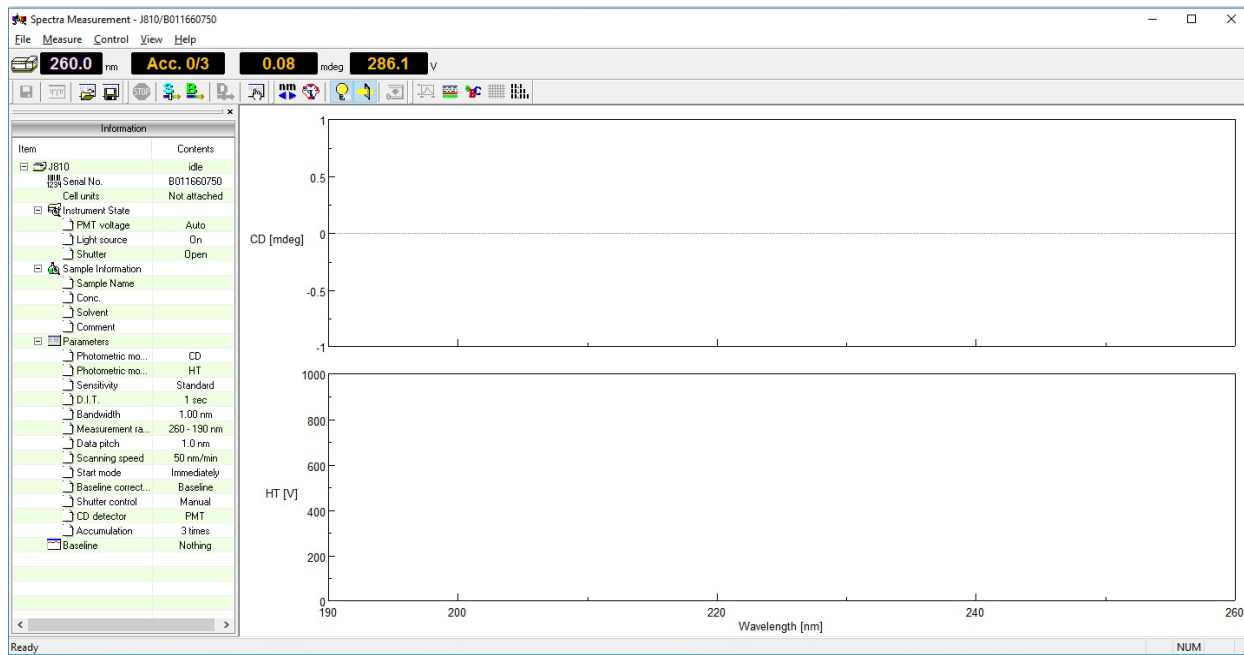
1. **Turn on N₂ gas cylinder** (Main valve). The flowmeter is located near sample compartment and should read at least **~35 SCFH** measured by the top of the floating metal cylinder. **Wait for 15 minutes.**
If the flow is less or bigger than 35 SCFH, adjusted by the knob on the flow meter. In case you are not able to increase flow to sufficient level by this knob, you may try to increase the incoming pressure by the control valve close to the nitrogen tank.
Please, check the flow every 3-5 minutes during the whole time of your measurements. Please, do not leave the instrument operating unattended for more than 3-5 minutes.
2. **Turn on the Jasco J-810 power switch** located at the lower left. You will hear an audible sounds. The shutter LED will turn green.
3. **Start the Spectra Manager Program.**
 - Select Spectrum Measurement.



- A self-diagnosis will be performed and the Xe lamp should automatically turns ON. The LED lamp indicator on the instrument turns green. It is recommended to wait for about 10min to warm the lamp up before proceeding.

4. Spectra Measurement menu.

When selecting the [Spectra Measurement] menu, the following window appears:



File menu:

- **Save data.** Saves experimental setup data, measurement parameters, and set terms as a .jws format file.
- **Analysis Send.** Transfers experimental data to the [Spectra Analysis] window, which starts up automatically when [Analysis Send] is used.
- **Open Baseline.** Opens baseline data file, which are .cdsl format files.
- **Save Baseline.** Saves baseline data to disk as .cdsl format files.
- **Open Parameters.** Opens parameters which are set in the [Parameter Settings] dialog box. The file format is .cdsp.
- **Save Parameters.** Save parameters as a .cdsp format file.
- **Exit.** Exits the [Spectra Measurement] window.

Measure menu

- **Parameters.** Sets parameters, turns [Baseline] measurements and auto-shutter control ON/OFF, edits comments and saves and loads measurement parameters and data.
- **Sample.** Starts measurement of sample.
- **Baseline.** Starts [Baseline] measurement.
- **Cancel.** Stops blank and sample measurement.

Control menu

- **Move Wavelength.** Moves the current wavelength to desired value.
- **CD Detector.** Sets detector (CD/ORD/LD/UV) sensitivity.
- **Light Source.** Turns the light source ON/OFF. Displays/clears the light source operating time.
- **Shutter.** Opens or closes the shutter (when installed).
- **Auto Zero.** Zeroes the photometric value of ORD-M (when installed).
- **Accessory.** Registers compatible accessories.

5. Measurement menu / Parameters.

Sets parameters, turns shutter ON/OFF for blank measurements and auto-shutter drive, edits comments and saves and loads measurement parameters and data onto or from disk. The parameters dialog box is made up of four dialog boxes: [General], [Control], [Information] and [Data]. They can be changed by clicking the appropriate tab at the top of the box. Clicking the tab [Data], for example, when the [Parameters Settings] dialog box is active displays the [Data] dialog box. The dialog boxes are described below.

General. Sets the parameters of the spectrometer.

Parameter Settings

General Control Information Data

Photometric mode

Channels Num: 2

Channel #1: CD

Channel #2: HT

Channel #3: External.1

Channel #4: External.2

Start: 260 nm

End: 190 nm

Data pitch: 1.0 nm

Start mode: Immediately

Scanning mode: Continuous

Scanning speed: 50 nm/min

Sensitivity: Standard

D.I.T. : 1 sec

Band width: 1.00 nm

Slit width: 100 um

Accumulation/Repeat

Accumulation

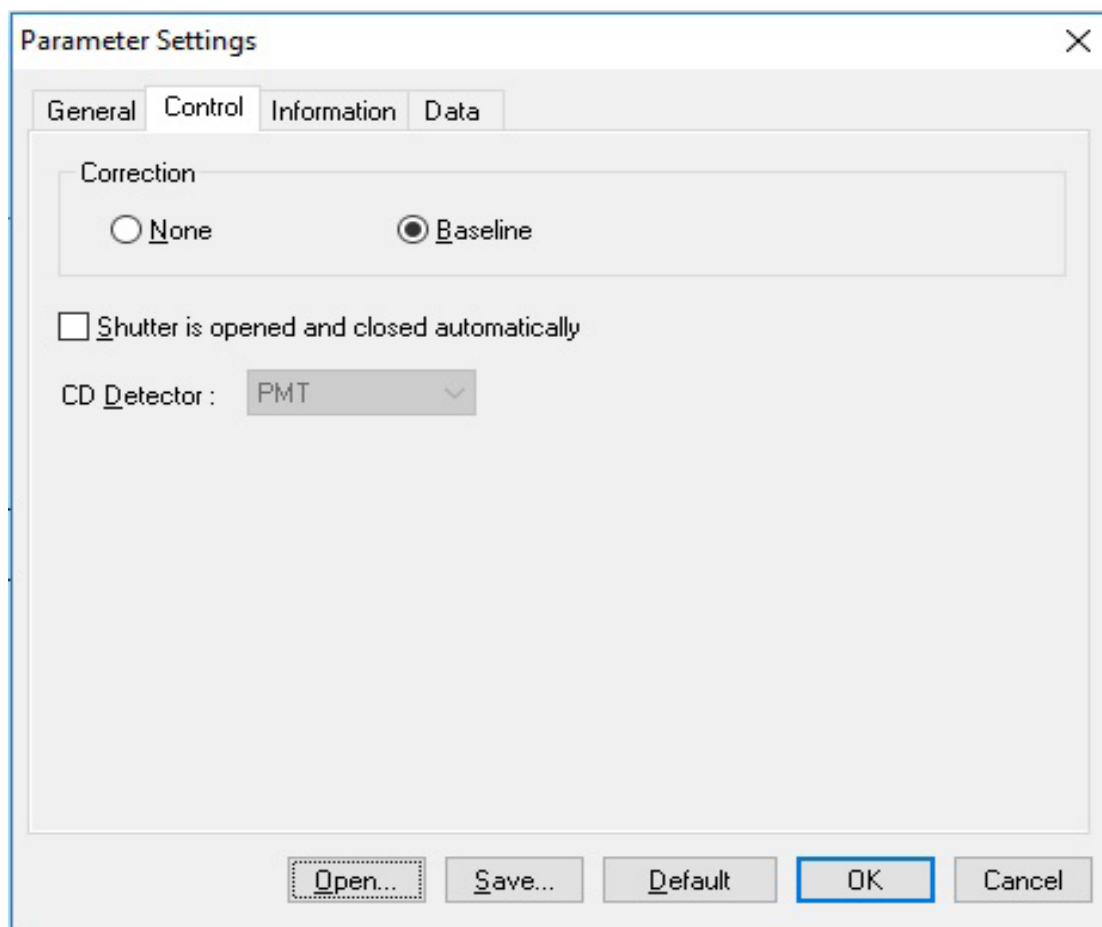
Accumulations: 3

Open... Save... Default OK Cancel

- **Photometric mode.**
- **Channel Num.** Maximum of four channels. Four types of data can be acquired simultaneously.
- **Channel #1** The selectable range varies with an optional accessory. CD: Circular dichroism signal, which is given by $\sim AC/DC$ with 50 kHz. CD/DC: This is the same with CD mode when DC is set to 1 V. This mode is useful when the DC varies (i.e., HT is fixed at an arbitrary value) with the sample absorption.
- **Channel #2.** Selectable range: HT: Photomultiplier tube voltage, DC: Photomultiplier tube DC voltage, and Abs: calculated absorption value using the HT value.
- **Sensitivity.** Selects the sensitivity from the drop-down list. Low Up to 1000 mdeg Standard Up to 200 mdeg, High Up to 5 mdeg.
- **D.I.T.** Digital integration time per data. When the scan mode is set to **Step** (Auto Response), designate a range (in this case, the effective value extends to msec order).

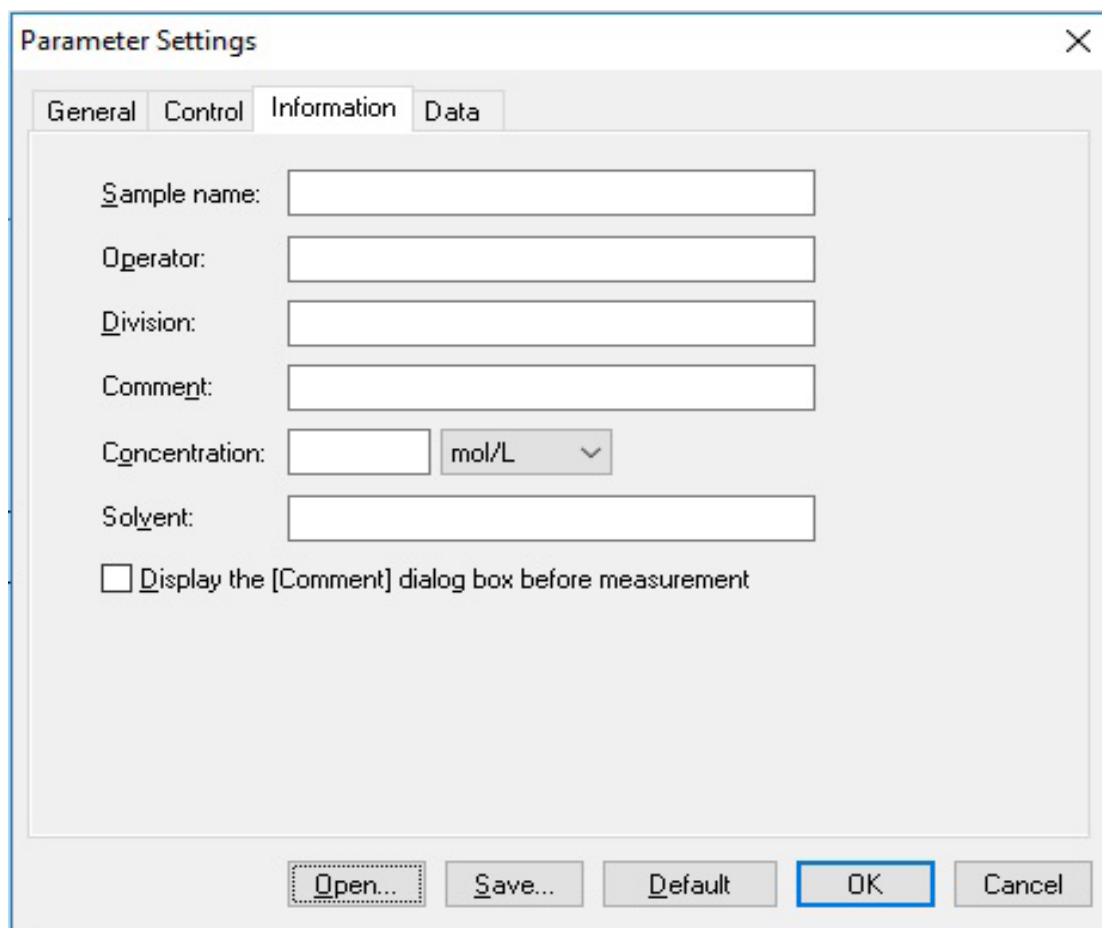
- **Band Width.** Sets the spectrum band width. Range: 0.01 nm – 15 nm, which is can be specified to two decimal places.
 - **Slit Width.** Sets the slit width. Can be entered by inserting a check mark in **Slit Width**. Range: 30 μ m to 3000 μ m (integer values only).
 - **Start.** Measurement start wavelength (long wavelength end). Range: 163 nm – 1100 nm.
 - **End.** Measurement end wavelength (short wavelength end). Range: 163 nm – 1100 nm.
 - **Data Pitch.** Selects the data acquisition interval from the drop-down list. Effective value extends to ms order.
 - **Start Mode.** This depends on the external trigger, which is intrinsic to an accessory. Immediate: Performs a measurement without an external trigger. Wait for trigger: Sets whether measurement is to be started by an external trigger or not.
 - **Scanning Mode.** Selects continuous scan or step scan as the scanning mode. Continuous mode: Performs “continuous scanning”. Step mode: Performs “step scanning”. Step (Auto Response) mode: Performs “step scanning” in which the DIT is variable.
 - **Scanning Mode.** Selects continuous scan or step scan as the scanning mode. Continuous mode: Performs “continuous scanning”. Step mode: Performs “step scanning”. Step (Auto Response) mode: Performs “step scanning” in which the DIT is variable.
 - **Scanning Speed.** Selects a wavelength scanning speed. Can be entered when the scan mode is set to **Continuous**.
 - **Accumulation/Repeat.** Sets the number of the accumulations for a measurement. Can be entered by inserting a check mark. Range: 1 – 999 times. **Cycle Times** sets the number of measurements, which defines the number of the spectra acquired. Can be entered by inserting a check mark when **Accumulation** is off. Range: 1 – 999 times. **Cycle Interval** sets the time between measurements. This is displayed when a number is entered in the **Cycle Times** box. Range: 0 – 15000 sec.
 - **Open** Loads the setting parameters from the disk. Clicking this button displays the **Open dialog box**. Selecting a baseline data file and clicking the **Open** button loads the baseline data into the memory. The data is in a .cdsp format file.
 - **Save.** Saves the parameters in a .cdsp format file.
 - **Default.** Reverts to the default parameters.
-

Control dialog box. Turns baseline correction ON/OFF and auto shutter driving. If baseline correction is turned on, the baseline data will be subtracted from the sample spectra .



- **Baseline.** Turns the baseline term ON, which results in a spectra measurement where the horizontal axis is time.
- **None.** Turns the correction OFF.
- **Auto shutter** is automatically opens the shutter just before measurement starts. Uncheck this function.

Information dialog box. Set sample name, operator, division, comment, solvent, etc.

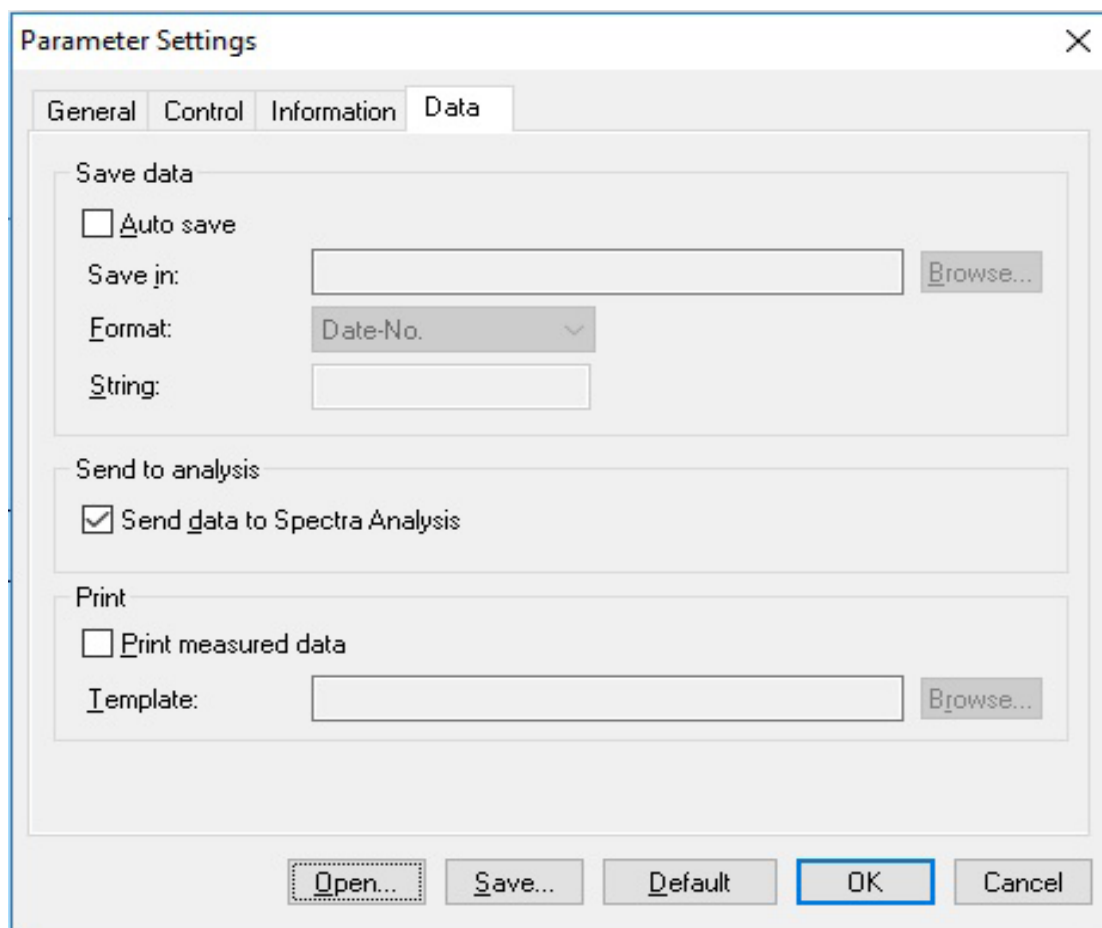


The image shows a software dialog box titled "Parameter Settings" with a close button (X) in the top right corner. The dialog has four tabs: "General", "Control", "Information" (which is selected), and "Data". The "Information" tab contains the following fields and controls:

- Sample name:** A text input field.
- Operator:** A text input field.
- Division:** A text input field.
- Comment:** A text input field.
- Concentration:** A text input field followed by a dropdown menu currently showing "mol/L".
- Solvent:** A text input field.
- Display the [Comment] dialog box before measurement**

At the bottom of the dialog, there are five buttons: "Open..." (with a dotted border), "Save...", "Default", "OK" (highlighted with a blue border), and "Cancel".

Data dialog box. Sets automatic saving, transfers to Spectra Analysis.



The screenshot shows the 'Parameter Settings' dialog box with the 'Data' tab selected. The dialog is divided into three sections: 'Save data', 'Send to analysis', and 'Print'. The 'Save data' section includes an unchecked 'Auto save' checkbox, a 'Save in:' text box with a 'Browse...' button, a 'Format:' dropdown menu set to 'Date-No.', and a 'String:' text box. The 'Send to analysis' section has a checked 'Send data to Spectra Analysis' checkbox. The 'Print' section has an unchecked 'Print measured data' checkbox and an 'I'emplate:' text box with a 'Browse...' button. At the bottom, there are buttons for 'Open...', 'Save...', 'Default', 'OK', and 'Cancel'.

- **Save Data.** Sets whether measured spectrum is to be saved automatically or not. If a check mark is put in the [Auto Save] box, enter a dialog box where a filename and directory are defined. This is useful for the repeatable measurement.
- **Save in.** Puts the file and directory name. The **Browse** button is useful for assigning the address.
- **Format.** Date-No. displays date and file number. Sample-No. displays sample name and file number.

6. Making measurements

- Click or select **Parameter** from **Measure** menu. The following dialog box appears.

The screenshot shows the 'Parameter Settings' dialog box with the following configuration:

- Photometric mode:** Channels Num: 2; Channel #1: CD; Channel #2: HT; Channel #3: External.1; Channel #4: External.2
- Start:** 260 nm
- End:** 190 nm
- Data pitch:** 1.0 nm
- Start mode:** Immediately
- Scanning mode:** Continuous
- Scanning speed:** 50 nm/min
- Sensitivity:** Standard
- D.I.T.:** 1 sec
- Band width:** 1.00 nm
- Slit width:** 100 um
- Accumulation/Repeat:** Accumulation; Accumulations: 3

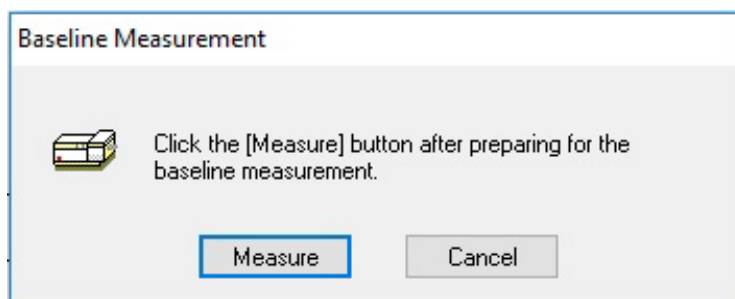
Parameters currently displayed in the [Parameters] dialog box are commonly used for checking CD accuracy using *d*-10-ammonium camphorsulfonic acid (NH₄-CSA) in a pure water solution.

- Set **Sensitivity**. Usually, standard mode is employed, which is effective up to ± 200 mdeg. For measuring small CD values, the low mode is the most effective. On the other hand, for large CD values, greater than ± 200 mdeg, the high mode should be employed.
- Set **Start Mode**. If the external trigger is not required such is the case when using stopped flow accessories, use the immediate mode.
- Set **Start** and **End**. Enter the upper wavelength into the **Start** text box, and the lower wavelength into the **End** text box.

- Set **Scan Mode**. Almost all measurements can be performed in **Continuous** mode. In rare cases, gas phase CD measurements for example, “step scanning” should be employed. When selecting **Step (Auto Response)**, the limits for the **D.I.T.** value must be set.
- Set **Scan Speed**.
- Set **Band Width**. Input the half-width value in the **Band Width** text box.
- Set **D.I.T.** This is restricted by the **Scanning Speed** and by the **Band Width**. Supposing that the **Scanning Speed** and the **Band Width** have the values given like in figure. In this case, a single scan takes 1.2 sec/nm. So a band width of 1.0 nm is reasonable if the **D.I.T.** is set to be 1 sec or less. But a **D.I.T.** of over 1.2 sec is often preferred because the liquid phase broadens the CD spectrum considerably. An appropriate **D.I.T.** value should be selected by considering such broadening with the specified **Scanning Speed** and **Band Width**.
- Set **Data Pitch**.
- Set **Accumulation Times**. The cycle time can also be specified.
- Set the Control parameters and the values of Information and Data.

7. Measuring the baseline.

Clicking the **Baseline** from the **Measure** menu or the following button:



Click **Measure** and the sample spectrum is acquired and the progress of measurement is displayed on the screen.

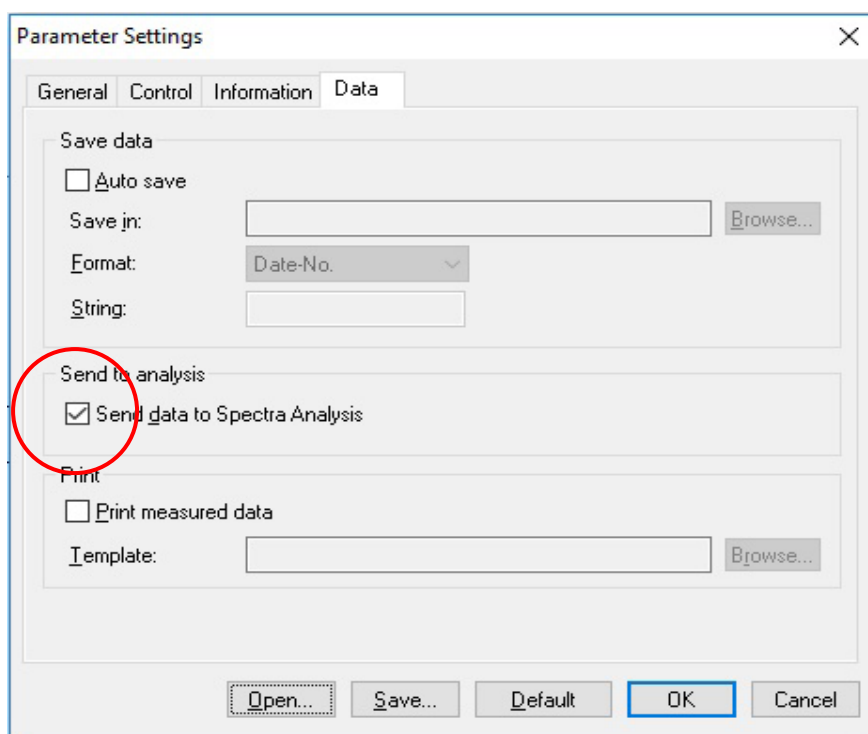
8. Measuring the sample.

Clicking the **Sample** from the **Measure** menu or the following button:



The measured spectrum is automatically will be send to **Spectra Analysis** if this option has been selected in **Data** tab of **Parameter Settings**.

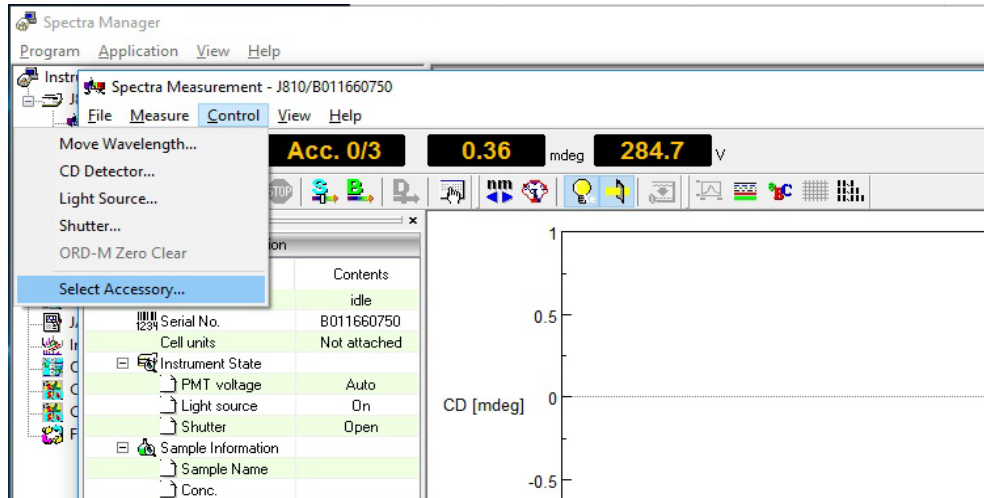
If this option has not been checked, the data can be sent to **Spectra Analysis** via **File / Send to Spectra Analysis**.



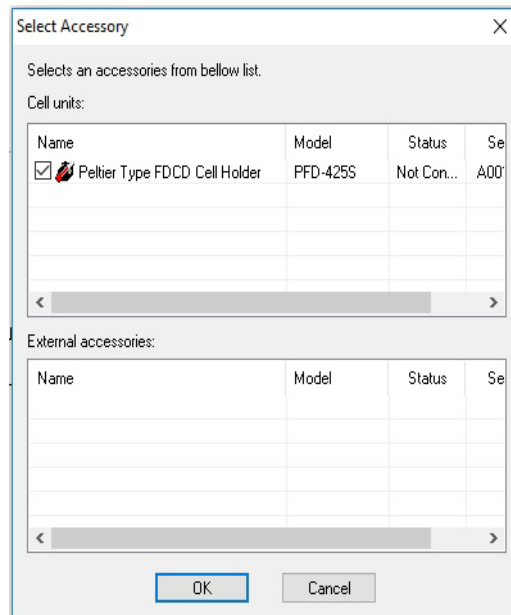
9. Variable temperature program.

To use the Peltier Temperature Control Device which is already mounted inside sample compartment do the following:

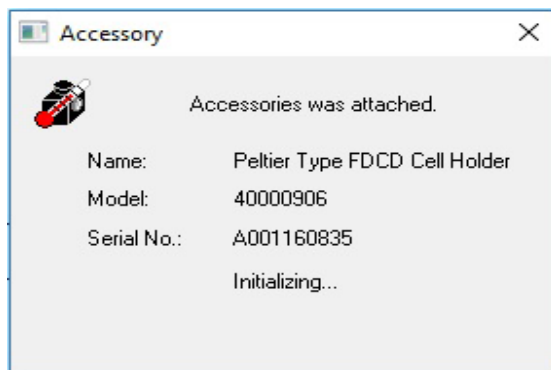
- Switch on the water circulation at the computer tower.
- Turn ON Jasco PFD-425 Temperature control device that is next to monitor.
- Follow to menu Control, then Accessory. Select available accessory - Jasco Peltier Type (Single RTE off).



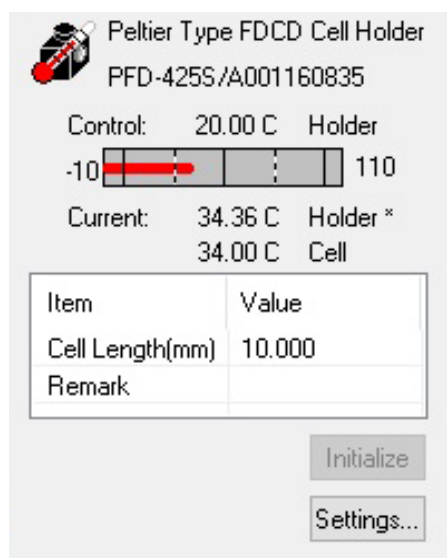
- Select available accessory - Jasco Peltier Type (Single RTE off).



- After selecting the Peltier thermostatted cell holder, the following window will appear:



- After the initialization, the additional section in measurement program will appear:



Temperature tab:

Parameter Settings

Temperature Start/End General Control Information Data

Start temperature: 20 C Reverse Hold time: 0 sec

	Sampling(C)	Target(C)	Ramp Rate(C/min)	Wait(sec)
1	1.0	30	1.0	0
2				

Control sensor: Holder Cell

Monitor sensor: Holder Cell

Halt temperature ramping during measurement.

Open... Save... Default OK Cancel

- Sets the initial and target temperatures. Temperature increases during course of measurement. Temperature range: -10.0°C – 110.0°C . Temperature can be specified to the first decimal place.
- **Sampling.** Selects the data acquisition interval. Range: 0.1°C – 10.0°C .
- **Ramp Rate.** Sets the temperature increasing and decreasing rate (temperature/time). The units $^{\circ}\text{C}/\text{minute}$ or $^{\circ}\text{C}/\text{hour}$ can be selected. Range: 0 – $10^{\circ}\text{C}/\text{min}$ and 0 – $600^{\circ}\text{C}/\text{hr}$. It can be specified to the sixth decimal place.
- **Wait.** Sets the delay time, which is the time before the measurement commences after the target temperature has been reached. Range: 0 sec – 3600 sec, where only integers can be entered.
- **Reverse.** After the completion of measurement will make reverse measurement.

Start/EndI tab:

The screenshot shows a dialog box titled "Parameter Settings" with a close button (X) in the top right corner. The dialog has five tabs: "Temperature", "Start/End", "General", "Control", "Information", and "Data". The "Start/End" tab is selected. The dialog is divided into two main sections: "Start condition" and "End condition".

Start condition:

- Keep within +/- C of the target temperature for sec
- Cross the target temperature times

End condition:

- Return to start temperature
- Keep end temperature
- Change to specified temperature C

At the bottom of the dialog, there are five buttons: "Open..." (with a dotted border), "Save...", "Default", "OK" (highlighted with a blue border), and "Cancel".

- **Start Condition.** Two criteria for attaining the target temperatures are presented.

CASE I: Determines the temperature range (°C) and the time (seconds) after the temperature enters the specified temperature range. The ranges are 0 – 10°C and 0 – 60 sec, respectively. They can be specified to the first decimal place and as an integer, respectively.

CASE II: Determines the number of crossing points (times) with the target temperature. Range: 0 – 10 times.

General tab:

Parameter Settings

Temperature Start/End **General** Control Information Data

Photometric mode

Channels Num: 2

Channel #1: CD

Channel #2: HT

Channel #3: External.1

Channel #4: External.2

Sensitivity: Standard

D.I.T.: 1 sec

Band width: 1.00 nm

Slit width: 100 um

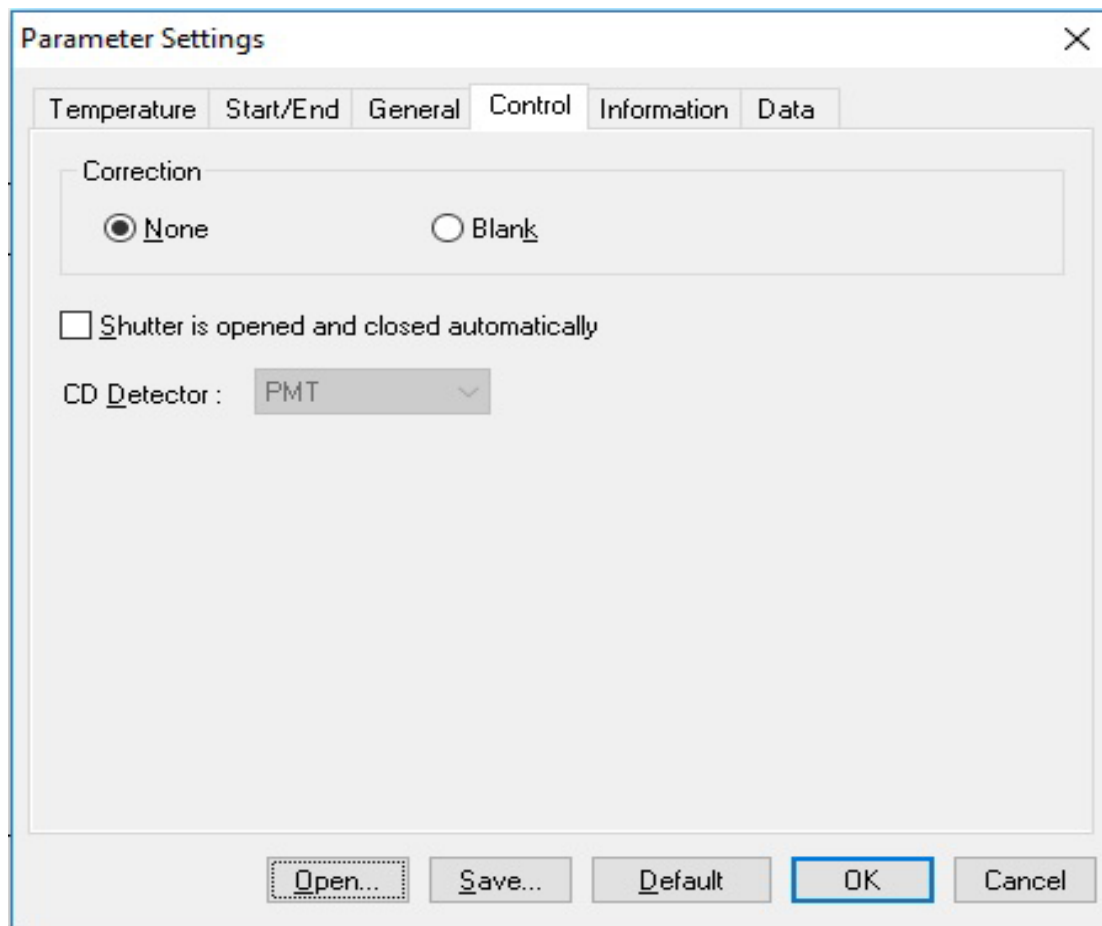
Wavelength:

	Wavelength [nm]
1	260.0
2	

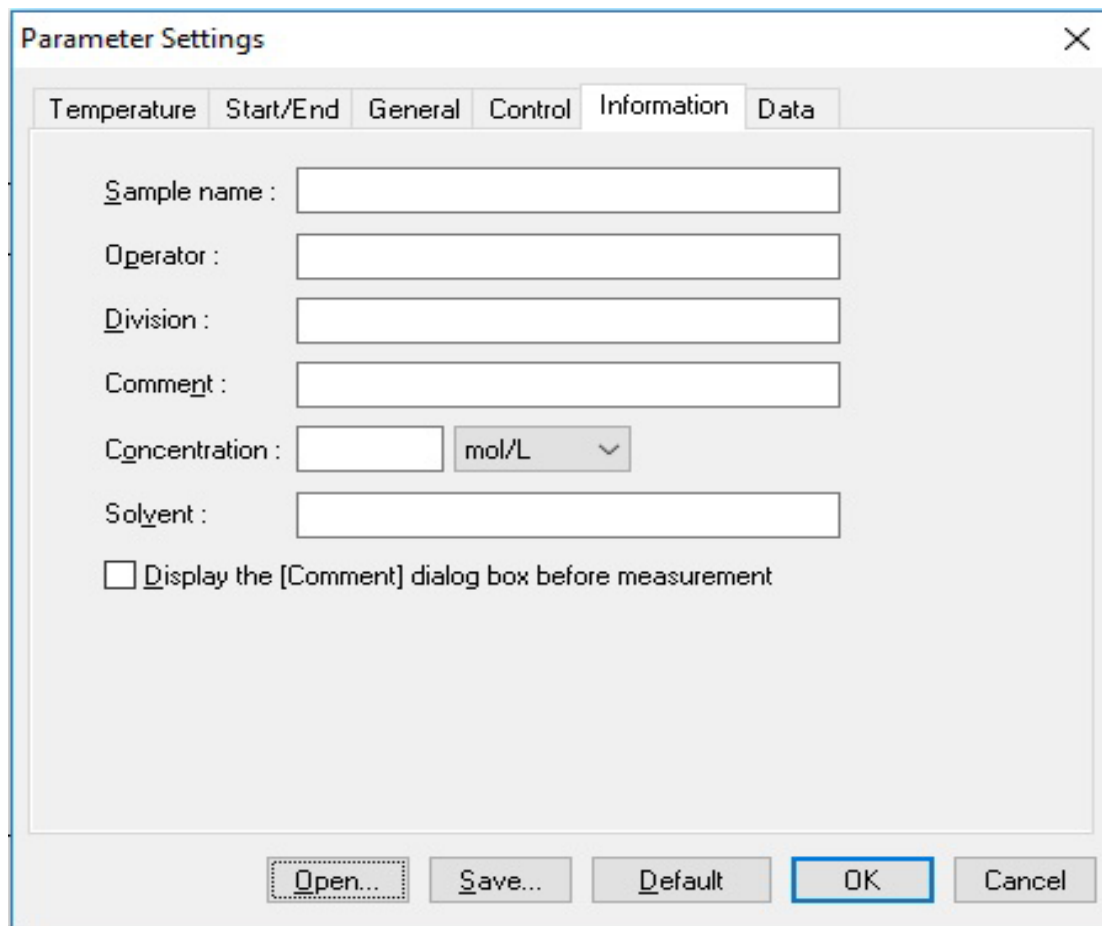
Open... Save... Default OK Cancel

- **Wavelength.** Wavelength of interest at which the variable temperature curve will be measured.
- **Channel Num.** Maximum of four channels. Four types of data can be acquired simultaneously.
- **Channel #1** The selectable range varies with an optional accessory. CD: Circular dichroism signal, which is given by $\sim AC/DC$ with 50 kHz. CD/DC: This is the same with CD mode when DC is set to 1 V. This mode is useful when the DC varies (i.e., HT is fixed at an arbitrary value) with the sample absorption.
- **Channel #2.** Selectable range: HT: Photomultiplier tube voltage, DC: Photomultiplier tube DC voltage, and Abs: calculated absorption value using the HT value.
- **Sensitivity.** Selects the sensitivity from the drop-down list. Low Up to 1000 mdeg Standard Up to 200 mdeg, High Up to 5 mdeg.

- **D.I.T.** Digital integration time per data. When the scan mode is set to **Step** (Auto Response), designate a range (in this case, the effective value extends to msec order).
- **Band Width.** Sets the spectrum band width. Range: 0.01 nm – 15 nm, which is can be specified to two decimal places.
- **Slit Width.** Sets the slit width. Can be entered by inserting a check mark in **Slit Width**. Range: 30 μ m to 3000 μ m (integer values only).
- **Open** Loads the setting parameters from the disk. Clicking this button displays the **Open dialog box**. Selecting a baseline data file and clicking the **Open** button loads the baseline data into the memory. The data is in a .cdsp format file.
- **Save.** Saves the parameters in a .cdsp format file.
- **Default.** Reverts to the default parameters.

Control tab:

- Turns the blank correction ON/OFF and auto shutter driving. If blank correction is turned on, the blank data will be subtracted from the sample spectra .

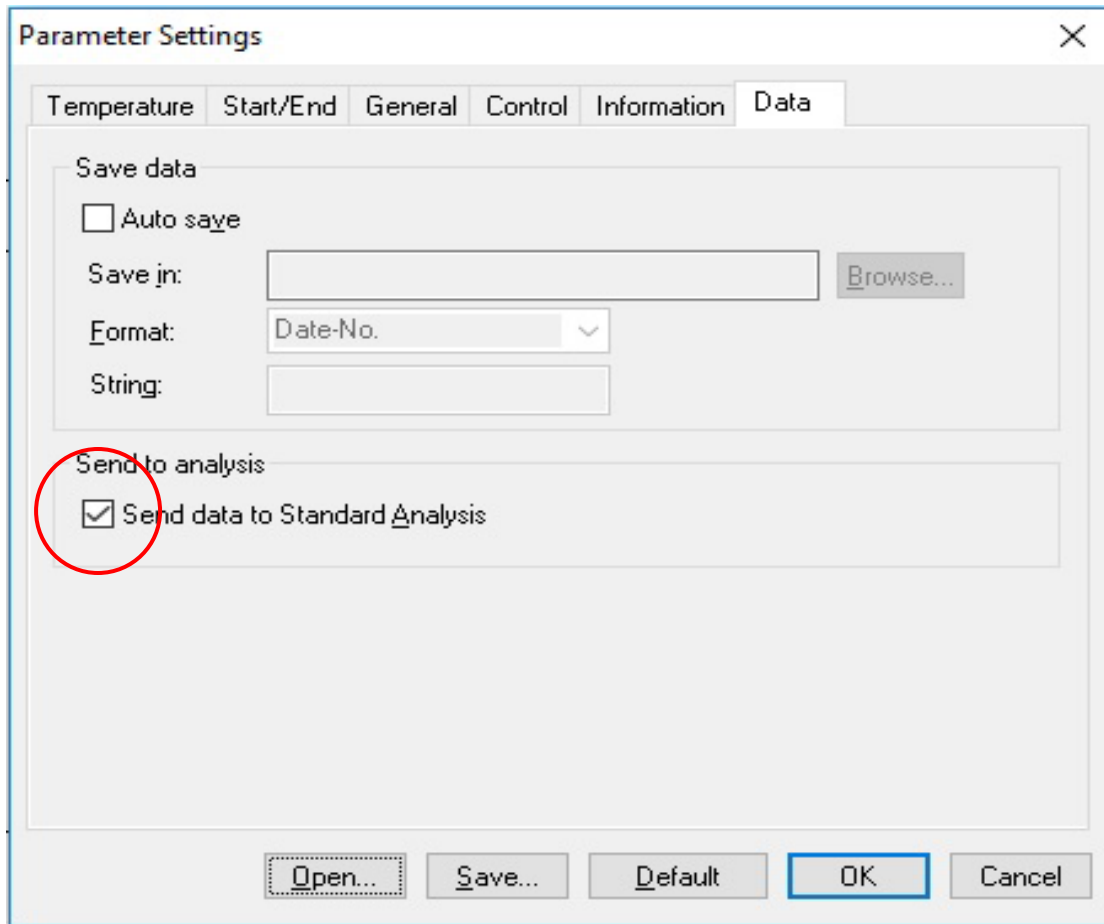
Information tab:

The screenshot shows a 'Parameter Settings' dialog box with the 'Information' tab selected. The dialog has a title bar with a close button (X) and a tabbed interface with tabs for 'Temperature', 'Start/End', 'General', 'Control', 'Information', and 'Data'. The 'Information' tab contains the following fields and controls:

- Sample name : [text input field]
- Operator : [text input field]
- Division : [text input field]
- Comment : [text input field]
- Concentration : [text input field] mol/L [dropdown menu]
- Solvent : [text input field]
- Display the [Comment] dialog box before measurement

At the bottom of the dialog are five buttons: 'Open...' (with a dotted border), 'Save...', 'Default', 'OK' (highlighted with a blue border), and 'Cancel'.

- Set sample name, operator, division, comment, solvent, etc.

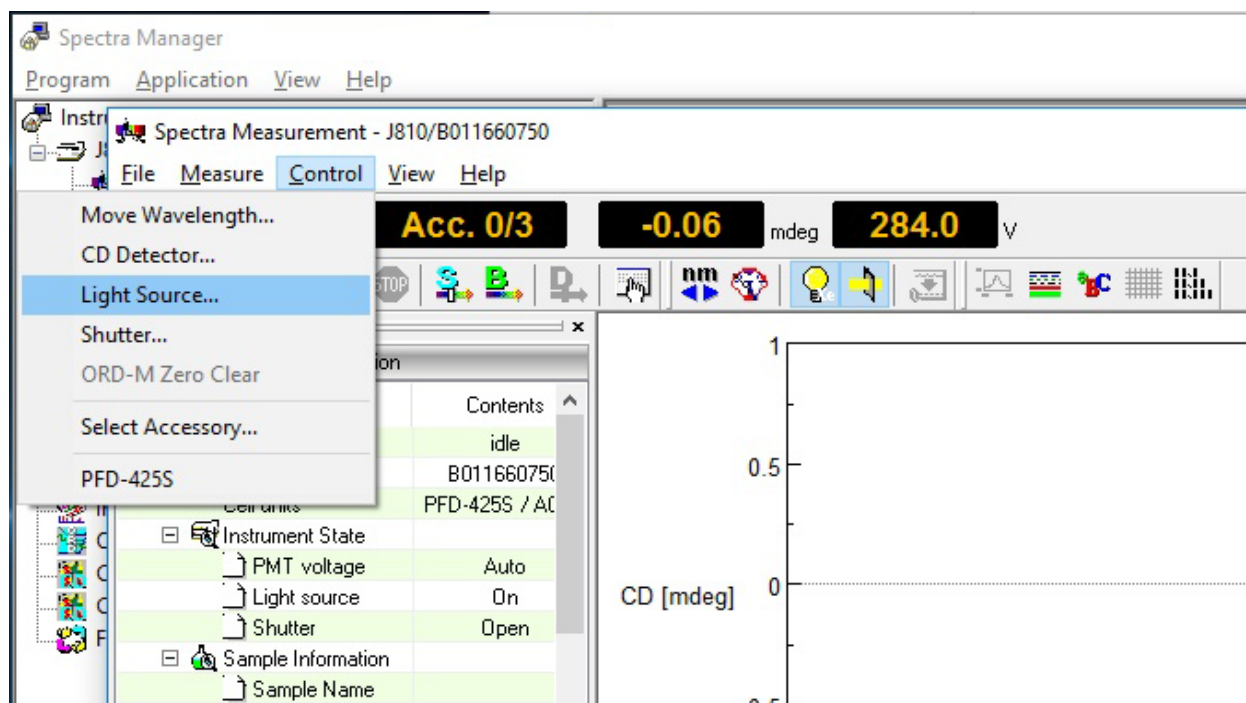


- **Save Data.** Sets whether measured spectrum is to be saved automatically or not. If a check mark is put in the [Auto Save] box, enter a dialog box where a filename and directory are defined. This is useful for the repeatable measurement.
- **Save in.** Puts the file and directory name. The **Browse** button is useful for assigning the address.
- **Format.** Date-No. displays date and file number. Sample-No. displays sample name and file number.
- **Send to analysis.** If this option has not been checked, the data can be sent to **Spectra Analysis** via **File / Send to Spectra Analysis**.

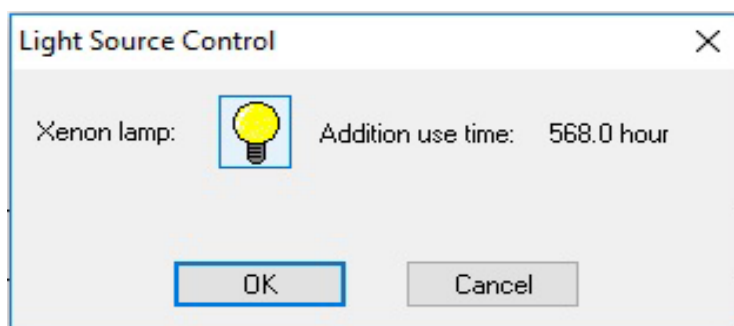
10. Shutdown Procedure

Please, follow exact instructions for turning the system off. Not following the procedure may result in damage of the equipment.

- Turn off the Xe lamp by going to **Control / Light Source**.



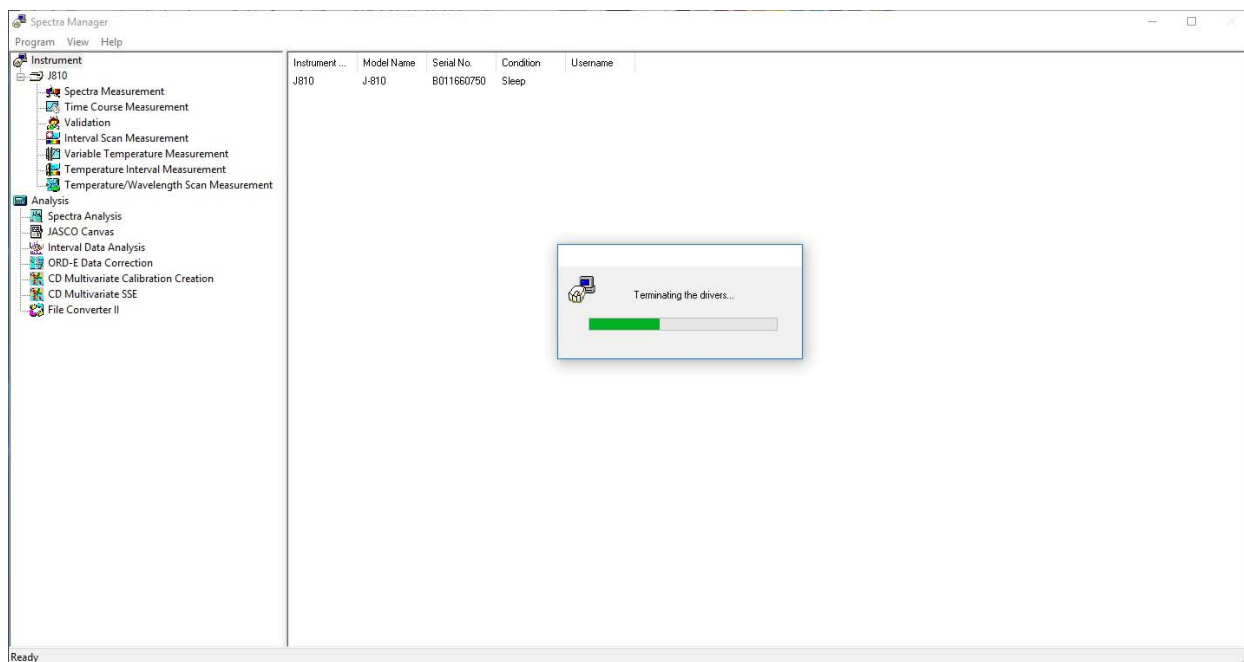
- Click on the “light box” to switch off the light source:



Make sure the LED lamp indicator on the instrument has switched off.

- If in use, turn off the water Circulator and the temperature control device.
- Close **Spectra Analysis** program.

- Close **Spectrum Measurement (Variable Temperature** or any other program that was in use).
- Close **Spectra Manager**. The following window will appear and drivers will be terminated:



- Only after the drivers have been terminated, turn off the CD instrument.
- **Wait for 15 minutes** then shut OFF the main valve of N₂ tank.