THERMO EVOLUTION 220 UV-Vis SOP

09/13/2018 Janina Ruprecht jruprecht@unr.edu

IMPORTANT

Keep all covers closed during operation to avoid exposure to UV radiation
Do not allow moisture to leak into the instrument interior
Wipe off spilled chemicals and other dust immediately
If instrument needs to be moved, do so slowly to not bring the optical beam path out of line

Turning the system ON and OFF

System power on/off switch on back side next to main power cord (normally kept ON)

Press power button on keypad until blue indicator light starts blinking
Wait for system to initialize until the power indicator stops blinking after several minutes
If the power indicator starts blinking rapidly, initialization has failed. Contact lab manager!

To power off, press and hold power button for 4 seconds

INSIGHT software

Group: Classic

Template: File where measurement parameters are stored
Select a template to be used for acquisition after choosing the operation type.

Workbook: File where data is stored that was acquired using a template or a custom setup.

Types of Operation:

Fixed: The Fixed application measures the light passing through the sample at one or more wavelengths.
Scan: The Scan application measures light that passes through the sample over a range of wavelengths.
Quant: Use the Quant application to set up and perform quantitative analyses of sample data for Fixed or Scan applications.
Rate: Use the Rate application to make time- and temperature-based kinetics measurements.
Live Display: Use the Live Display application for quick measurements and simplified data collections in Fixed or Scan mode.

FIXED:

Open **FILE** menu > **NEW WORKBOOK** to create your own workbook for current data storage. To append new data to an existing workbook, go to **MY DATA** > **WORKBOOKS**. *Note that you will not be able to change the data acquisition parameters in an existing workbook.*

Click **MY DATA** > **TEMPLATE** tab > select template (basic fixed). To change the template parameters, go to **SETTINGS** > Set data acquisition parameters (see page 98pp. in the manual for specifications). This will only change parameters for this run, but not in the original template.

Click **SETTINGS > INSTRUMENT** tab > **Reference wavelength correction**. When selected, automatically acquires a reference measurement at the specified wavelength each time a sample measurement is taken (double beam), reference is then being subtracted from that. Only the corrected result is reported. **Load your solvent** in a reference cuvette and into the reference compartment (to the right of the sample compartment).

Click **MEASURE FIXED**
Load the sample to use to measure the zero into sample compartment
Click **ZERO**
Click **MEASURE** > Save Workbook > Follow instructions, enter sample info
Load your sample into sample compartment
Click **CONTINUE** > Follow instructions

View Data Display and Sample Measurement Table and create Reports (see below)

SCAN:

Open **FILE** menu > **NEW WORKBOOK** to create your own workbook for current data storage. To append new data to an existing workbook, go to **MY DATA** > **WORKBOOKS**. *Note that you will not be able to change the data acquisition parameters in an existing workbook.*

Click **MY DATA** > **TEMPLATE** tab > select template. To change the template parameters, go to **SETTINGS** > Set data acquisition parameters (see page 104pp. in the manual for specifications). This will only change parameters for this run, but not in the original template.

MEASURE SCAN
Load the sample to use to measure the baseline into sample compartment
Click **BASELINE**
Click **MEASURE** > Save Workbook > Follow instructions, enter sample info
Load your sample into sample compartment
Click **CONTINUE** > Follow instructions

View Data Display and Sample Measurement Table and create Reports (see below)

QUANT:

Open **FILE** menu > **NEW WORKBOOK** to create your own workbook for current data storage. To append new data to an existing workbook, go to **MY DATA** > **WORKBOOKS**. *Note that you will not be able to change the data acquisition parameters in an existing workbook.*

Click **MY DATA** > **TEMPLATE** tab > select template (basic quant). To change the template parameters, go to **SETTINGS** > Set data acquisition parameters (see page 110pp. in the manual for specifications). This will only change parameters for this run, but not in the original template.

Quantify sample using standards:

Click **SETTINGS** > **TYPE** tab > select one: MEASURE SINGLE STANDARD, STANDARD CURVE, STANDARD CURVE WITH TWO WAVELENGTHS, or ADVANCED STANDARD CURVE
Click **SETTINGS** > **STANDARDS** > modify according to your needs
Click **SETTINGS** > **SAMPLES** > modify according to your needs
Click **MEASURE QUANT**
Click **MEASURE** > Save Workbook > Follow instructions (depending on SETTINGS > STANDARDS tab selections), enter standard info
Click **CONTINUE** > Follow instructions, load standards
STANDARD CURVES tab > Standard curve is displayed, specify standards to be used by selecting YES or NO in the USE column
Click **MEASURE** > Follow instructions, depending on settings in samples tab in SETTINGS, enter sample info
Load your sample into sample compartment
Click **CONTINUE** > Follow instructions

View Data Display and Sample Measurement Table and create Reports (see below)

Standard curves tab > Shows relationship between standard curve, spectral intensity (horizontal line to standard curve) and calculated concentration (vertical line to standard curve)
Run chart tab > Shows concentration of measured components versus sample number

Quantify sample without standard:

Click **SETTINGS > TYPE** tab > select MANUALLY ENTERED FACTOR
Click **MEASURE QUANT**
Load the sample to use to measure the zero into sample compartment
Click **BLANK**
Click **MEASURE** > Save Workbook > Follow instructions, enter sample info
Load your sample into the sample compartment
Click **CONTINUE** > Follow instructions

View Data Display and Sample Measurement Table and create Reports (see below)

RATE:

Open **FILE** menu > **NEW WORKBOOK** to create your own workbook for current data storage. To append new data to an existing workbook, go to **MY DATA** > **WORKBOOKS**. *Note that you will not be able to change the data acquisition parameters in an existing workbook.*

Click **MY DATA** > **TEMPLATE** tab > select template. To change the template parameters, go to **SETTINGS** > Set data acquisition parameters (see page 120pp. in the manual for specifications). This will only change parameters for this run, but not in the original template.

Click **SETTINGS > INSTRUMENT** tab > **Reference wavelength correction**. When selected, automatically acquires a reference measurement at the specified wavelength each time a sample measurement is taken (double beam), reference is then being subtracted from that. Only the corrected result is reported. **Load your solvent** in a reference cuvette and into the reference compartment (to the right of the sample compartment).

To perform a fixed rate measurement:

Click **SETTINGS** > **TYPE** tab > select SINGLE WAVELENGTH or MULTIPLE WAVELENGTHS
Click **MEASURE RATE**
Load the sample to use to measure the zero into sample compartment
Click **ZERO**
Click **MEASURE** > Save Workbook > Follow instructions, enter sample info
Load your sample into the sample compartment
Click **CONTINUE** > Follow instructions

DATA tab > click **EXTEND TIME** to extend measurement without interrupting the data collection

ANALYZE > to perform rate calculations (see Modifying a Rate Curve in the manual on page 82)

To perform a scanning rate measurement:

Click **SETTINGS** > **TYPE** tab > select SCAN DATA ACQUISITION
Click **MEASURE RATE**
Load the sample to use to measure the zero into sample compartment
Click **ZERO**
Click **MEASURE** > Save Workbook > Follow instructions, enter sample info
Load your sample into the sample compartment
Click **CONTINUE** > Follow instructions

Right-click **DATA** tab for layout options

Setting up a custom Template

You can save data acquisition parameters from an existing workbook as a new template for future measurements, or open a new workbook with custom settings to create a new template.

For a new workbook choose the operation type > open **FILE** menu > **NEW WORKBOOK** > save as needed. Change settings while in this workbook to desired settings (no measurement necessary).

For an existing workbook choose the operation type > click **MY DATA** > choose workbook

Open **FILE** menu > **SAVE WORKBOOK SETTINGS AS TEMPLATE**. Saves the current workbook settings as template that can be shared to be used by the specified user group (save in 'classic') or be saved in own folder.

Configuring and Printing a Report

Reports contain a table of sample data and other specified info. Reports can be saved, printed, and exported.

In a workbook or after a sample measurement, click **REPORTS**. Select the desired sample results in the **SAMPLES** tab. Click **REPORTABLE DATA** tab to specify data output.

LAYOUT > to specify that all items span the full width of a page select **FIT TO PAGE WIDTH** in the print navigation pane.

Click **PREVIEW** to preview report

Click **PRINT** to print report

Exporting Data

In a workbook or after a sample measurement, click **REPORT**. Select the desired sample results in the **SAMPLES** tab.

Click **EXPORT** and follow instructions; all available file extensions can be opened in Excel, and all extensions without an 'x' can also be opened in Notepad. See pages 132/133 in the instrument manual for file extension specifications.
Only the extension .iwbk is not compatible as it is the extension for the local Insight workbooks.

1.0 nm Resolution, Double-beam Configuration

DESIGNED FOR ULTIMATE PERFORMANCE AND USER EXPERIENCE

Engineered to perform, the Evolution 201 and 220 systems deliver high-performance, reliable data, and features that enhance the user experience.

Double-beam Geometry

Anytime a sample changes during the course of the measurement period, a double-beam spectrophotometer delivers the most accurate data. Taking the ratio of the sample to the reference beam at each data point negates the effects of changing samples – especially useful for kinetics, long-term process monitoring and difficult samples.

Trigger Connections

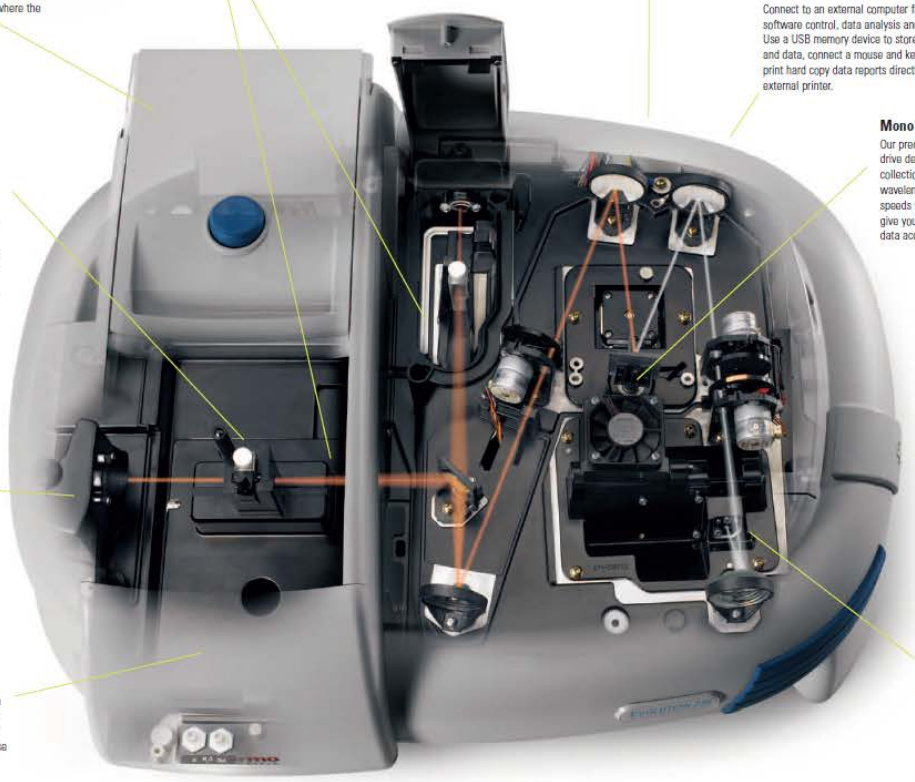
Triggers help you interact with the world outside your measurements. Whether you need a trigger output to start the next part of your process or you need to wait for a trigger to take a measurement, the Evolution 201 and 220 spectrophotometers can accommodate your communication and connectivity needs.

Quick Release Lid

Unique sliding sample compartment door provides push button convenience for assays where the user has their hands full.

USB Interface

Connect to an external computer for INSIGHT software control, data analysis and storage. Use a USB memory device to store methods and data, connect a mouse and keyboard, or print hard copy data reports directly to an external printer.



Application Focused Beam Geometry (AFBG)

AFBG technology optimizes the optics of the instrument to your application. The Evolution 220 system features AFBG options for solids and materials, fiber optics, and microcell applications. Customized to match our accessories, the Materials and Fiber Optics selections provide maximum performance. The tightly focused, small beam from the Micro AFBG allows over 80% of light to pass through the 2 x 2 mm aperture of a 40 µL microcell.

Mono Drive

Our precision monochromator drive delivers fast scanning data collection without compromising wavelength accuracy. Variable scan speeds from < 1 to 6,000 nm/min give you increased flexibility for data acquisition.

Removable Sample Beam Detector

Accommodates a wide array of accessories with their own integrated detectors. Build your own unique detector configurations for customized analysis.

Mercury Lamp Port

The Evolution 201 and 220 spectrophotometers are the only instruments in their class to offer a Mercury Lamp Calibration accessory. This accessory delivers full-range wavelength accuracy and wavelength repeatability verification. In the rare case that re-calibration is necessary, use this accessory to measure and store the same calibration as performed in our factory.

Sample Compartment

Room light immunity allows the sample compartment to remain open during measurements for maximum versatility, ease-of-use and specialized accessories.

Xenon Flash Lamp

Sending intense flashes of light only when measurements are being made, the long lifetime xenon lamp is guaranteed for 3 years of continuous use. Other benefits of the xenon flash lamp include low cost of ownership, longer time between maintenance cycles, and high intensity in the UV and visible regions of the spectrum. Most importantly, xenon lamps require no warm-up time allowing instant measurements.

Powerful Convenience at Your Fingertips

Color Touch Screen

The touch screen of the local control Evolution 201 and 220 spectrophotometers provides powerful instrument control using a built-in computer. Routine operations can be accessed with fingertip control. Use a stylus or a USB mouse and keyboard for more sophisticated tasks.

Keypad

Offered on both the local and computer control instruments, the integrated keypad allows communication with INSIGHT software. Start measurements with the Run and Zero/Baseline buttons. Launch CUE scripts or other applications using the four programmable buttons.