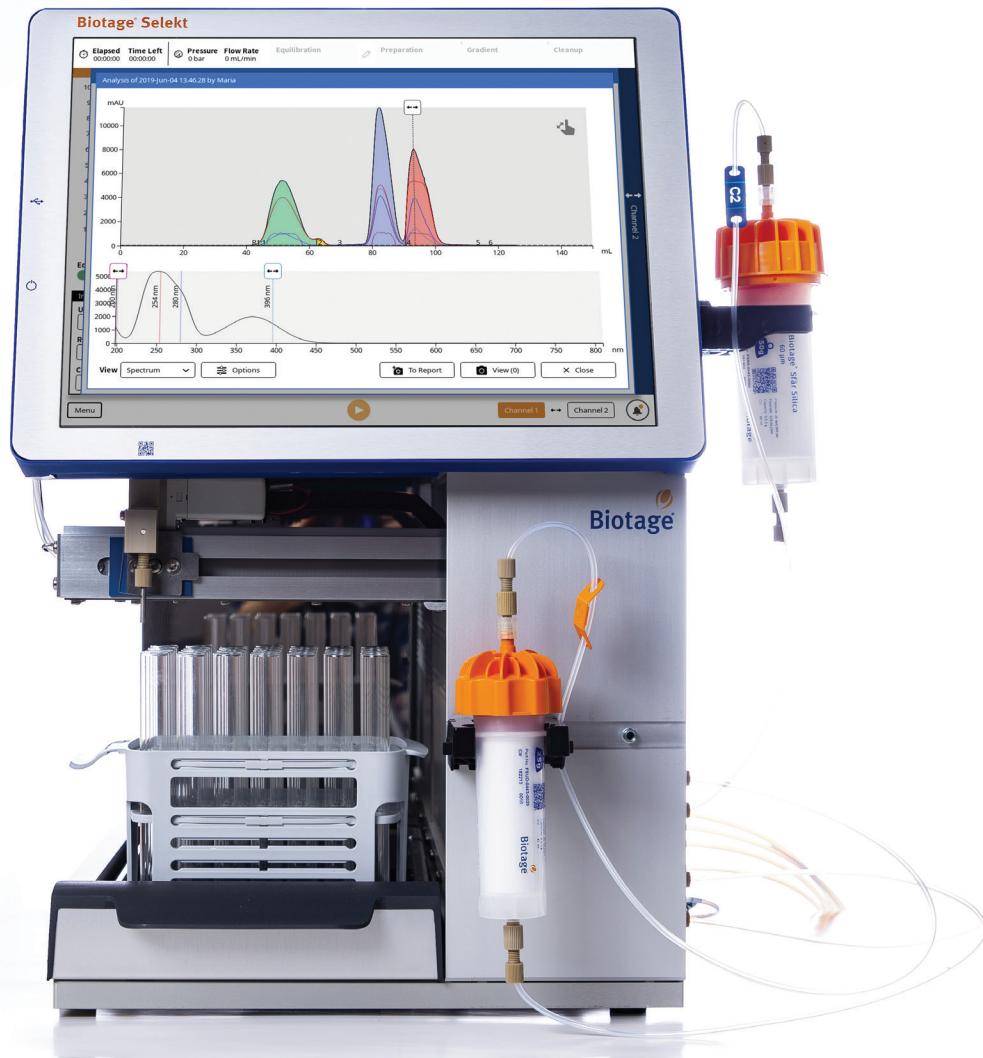


Biotage® Selekt

User Manual



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System Overview

Biotage® Selekt is an automated flash purification system with a built-in QR reader for Biotage® Sfär columns, RFID reader for Selekt collection racks, UV detector, pump, fraction collector, and touch screen. Optional accessories from Biotage that can be used with the system are Biotage® Solvent Detector, an instrument tray, and a secondary solvent containment. It is also possible to connect an external detector with analog output signal.

Columns

The system has two column channels. Columns can be placed both on the right side of the system and on the front (up to 50g); see Figure 1.



Figure 1. Biotage® Selekt with two columns.

QR Reader

All Biotage® Sfär columns have a QR code that can be read by the QR reader underneath the touch screen; see Figure 2. When scanning columns using the QR reader, the system will be able to trace all runs performed on a specific column based on its ID.



Figure 2. Scanning a Biotage® Sfär column.

Racks and Vessels

The system collects fractions into a variety of collection racks and vessels. The following Selekt racks are available:

- » 48 positions for 13 x 100 mm tubes with a vessel volume of 9 mL.
- » 35 positions for 16 x 100 mm tubes with a vessel volume of 14 mL.
- » 35 positions for 16 x 150 mm tubes with a vessel volume of 22 mL.
- » 28 positions for 18 x 150 mm tubes with a vessel volume of 27 mL.
- » 15 positions for 25 x 150 mm tubes with a vessel volume of 45 mL.
- » 6 positions for 120 mL flasks.
- » 10 positions for 240 mL flasks.
- » 8 positions for 480 mL flasks.

The collection bed can either hold a collection tray with up to three of the racks with vessel volumes up to 120 mL (Figure 3), or one of the 240 or 480 mL flask racks.

One collection tray is standard, but by extending the fraction collector, it is possible to use two collection trays at the same time. The maximum collection volume with no rack change is 3840 mL for standard bed and 7680 mL for extended bed.

RFID Tags

All Selekt collection racks have an RFID (radio-frequency identification) tag that is automatically identified by the system when placed on the collection bed. It is also possible to view the last run a Selekt rack was used for, if performed on the same system, or to see what system it was last used on.



Figure 3. Collection tray with three racks.

Solvent Supply

The system is equipped with four solvent inlets found on the right side of the system (S1-S4).

Secondary Solvent Containment with Biotage® Solvent Detector*

A maximum of four 5-liter reservoirs can be placed on the optional secondary solvent containment; see Figure 4. Larger reservoirs than 5 liters must be placed elsewhere.

Note: To be compliant with the US secondary containment regulations, do not use reservoirs larger than 4 liters.



Figure 4. The optional secondary solvent containment.

Solvent and Waste Monitoring

The system can maintain a running calculation of the fluid levels in the reservoirs based on information entered by the user. With solvent and waste monitoring enabled, the system will:

- » Inform the user when there is not enough solvent or waste capacity for a run.
- » Issue an on-screen notification when a solvent level is below 20% of the set capacity.
- » Issue an on-screen notification when the waste level is above 85% of the set capacity.
- » Pause the system when it is time to refill a solvent reservoir (when 10% is left) or empty the waste reservoir (when 95% full).

Instrument Tray with Biotage® Solvent Detector*

An optional instrument tray with a solvent detector is available for safe unattended operation. When solvent is detected, the system is paused and all pump functionality disabled until the solvent detector is dry again.



Figure 5. The optional instrument tray with a solvent detector.

* It is only possible to connect one Biotage Solvent Detector to the system.

Internal UV Detector

The system includes either a 200 to 400 nm UV detector or a 198 to 810 nm UV-VIS detector.

External Detector

It is possible to connect an external detector with analog output signal. For more information, see the Biotage® Selekt Installation and Safety document (P/N 416182).

Collection and Fractionation Methods

Available detection signals are:

- » **λ-All:** The system uses average absorbance within a user-defined wavelength range for collection and fractionation. Only available on systems with a Spektra software license.
- » **UV1 and UV2:** The system uses one or two wavelength signal(s) for collection and fractionation.
- » **EXT:** The system uses the signal from an external detector for collection and fractionation. Optional.

Possible collection and fractionation parameters are Collect All, Threshold, and Valley Fractionation. The system always fractionates on volume, which is when a test tube or bottle reaches the specified vessel volume or a user-defined maximum fraction volume for the run. At any time, you can manually switch to a new collection vessel by pressing **New Fraction**/F₄ in the chromatogram.

Any signal combination can be used for collection and fractionation. Signals that are not used can be used for monitoring.

Audible Alarm

When the audible alarm is enabled in the system settings, a warning will sound when an error has occurred.

Lighting

To provide better visibility and status information for the user, there is a light strip underneath the touch screen and a mirror behind the collection racks.

When the light strip is enabled in the system settings, the color indicates the status of the system:

- » **White:** System idle or processing.
- » **Orange:** User interaction required for the run on channel 1.
- » **Blue:** User interaction required for the run on channel 2.
- » **Green:** Run completed.
- » **Red:** System error. The system needs to be restarted.

Prepare the System

Inspect the Tubing

Warning

- » Shut down the system before replacing any tubing. Use only tubing designed for the Selekt system and supplied by Biotage.

Inspect all tubes before each run to ensure that they do not show signs of wear or damage and that they are properly connected and tightened. Use caution when finger tightening fittings to prevent stripped threads or crushed ferrules.

All external tubing on the system except for the tubing on the collection arm can be replaced by the user.

Note: All tube types, dimensions, and lengths are essential for the performance of the system. Only replace tubes with the equivalent tubes designed for the Selekt system and supplied by Biotage.

Mount Column Holders

The system is shipped with column holders of different sizes. Ensure that they are mounted in the desired positions on the system. Figure 6 shows how to mount a column holder on the right side of the system. There are also two positions for column holders on the front of the system that can be used for Biotage columns up to 50g; see Figure 7.



Figure 6. Slide the column holder screw into the desired position on the right side of the system and then place the holder over the screw and fasten.



Figure 7. Biotage columns up to 50g can be placed on the front of the system.

Start Up the System

Turn on the system using the power switch located on the left side of the system; see Figure 8.



Figure 8. The power switch is located on the left side of the system.

Assign Solvents and Set Reservoir Volumes

When a purification is run, the software determines which solvent inlets are connected to the solvents used in the run.

Note: For reversed-phase purification with methanol and water, it is strongly recommended to premix the water with 5% of methanol and degass either through vacuum or sonication. Degassing of protic solvent blends decreases out-gassing of entrapped air during gradient elution, which will impact gradient performance and flow rates.

Note: With solvent and waste monitoring enabled (see page 19), the capacity and current fluid level must be entered each time you empty a waste reservoir or refill a solvent.

Note: All four solvent inlets must be primed with solvent to achieve the specified pump performance.

1. In the software, press **Menu** and then **Solvent Setup**.
2. Assign a solvent to each solvent inlet using the solvent drop-down lists (see Figure 9).

To add solvents to the list, press **Solvent Administration**. For more information, see page 17.

3. If solvent monitoring is enabled, enter the capacity and the current solvent level of each solvent reservoir.
4. If waste monitoring is enabled, enter the capacity and the current waste level of the waste reservoir.
5. Prime the solvent inlets that have been assigned a new solvent; see page 4.

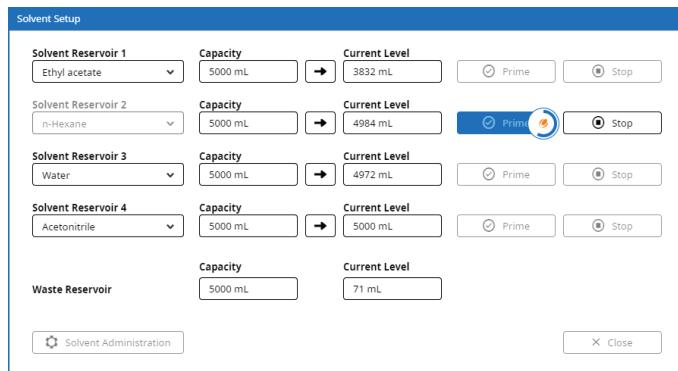


Figure 9. The Solvent Setup window with solvent and waste monitoring enabled.

Prime the Solvent Inlets

Before you start a purification on your system, you might need to prime the solvent inlets to:

- » Remove any air bubbles from the pump and the solvent inlets by flushing them with solvents.
- » Empty the solvent inlets of solvents used in the previous purification and fill them with new solvents.

Note: All four solvent inlets must be primed with solvent to achieve the specified pump performance.

Note: We recommend to have all solvent reservoirs on the same physical height to improve accuracy in the solvent mixing.

1. In the software, press **Menu** and then **Solvent Setup**.
2. Prime the solvent inlets by pressing the corresponding **Prime** buttons (see Figure 9). Note that 27 mL of the assigned solvent is used for each prime.

Flush the System

If the automatic line flush is disabled on your system (see page 19), ensure to flush the column flow path before each run (see page 11).

Set Up a Purification

Warning

- Never exceed the maximum pressure or flow rate for the used column.

- In the software, select the column channel to be used by pressing **Channel 1** or **Channel 2** in the lower right corner, or by swiping left or right on the channel tab along the edge.
- To base the purification on a previous run, press **Runs** and then see “Base a New Run on a Previous Run” on page 14.
- Either scan your column using the QR reader underneath the touch screen (see Figure 10) or select the column type from the **Column Type** drop-down list in the **Column** panel (see Figure 11).



Figure 10. The QR reader is located underneath the touch screen.

- Place the column in a column holder on the right side of the system or on the front (up to 50g).
- Connect the correct inlet and outlet tubing to the column. The tubes for channel 1 are labeled **C1** with orange tags and the tubes for channel 2 are labeled **C2** with blue tags.
- Place the collection rack(s) that you want to use on the collection bed. Racks with vessel volumes up to 120 mL require the collection tray. Selekt racks are automatically identified by the system when placed on the collection bed. If automatic rack detection has been disabled (see page 19), select the collection rack manually (see “Specify the Rack Parameters” on page 7).
- Set up the run parameters as described in the following sections.

Note: An invalid setting is highlighted with a red frame (see Figure 11); press in the bottom right corner for more information.

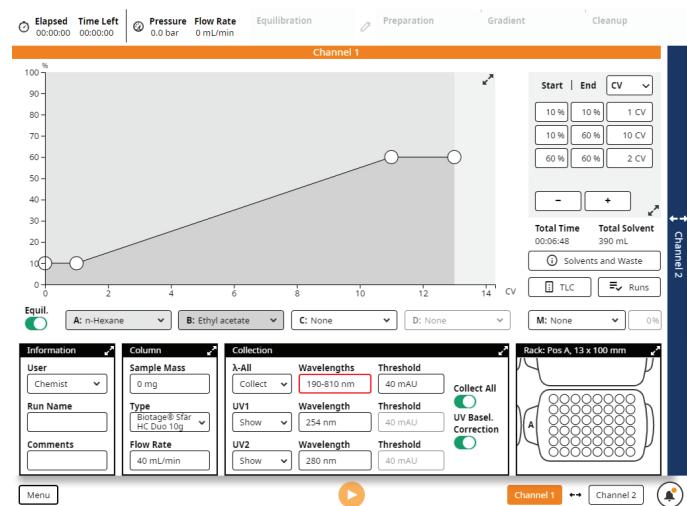


Figure 11. The run setup view.

Specify the Gradient

The gradient can be set up using the gradient graph or the gradient table. It is also possible to calculate a gradient from R_f values obtained from a TLC analysis (see page 6).

Gradient Graph and Table

Expand the gradient graph or the gradient table by pressing .

Change the length unit by selecting **CV**, **mm:ss**, or **mL** from the unit drop-down menu in the gradient table or the expanded gradient graph.

To add a gradient segment, press **+** in the gradient table or the expanded gradient graph. The new segment will be added after the selected segment or node or at the end of the gradient if nothing is selected.

To delete a node or segment, select it and press **-** in the gradient table or the expanded gradient graph.

To increase or decrease the length of a gradient segment or change the solvent mix, either 1) drag the segment or node to the desired position in the gradient graph, or 2) change the value in the gradient table.

Note that it is possible to zoom in and out of the gradient using the pinch-to-zoom feature.

Gradient Parameters

- Unit or CV/mL/mm:ss:** The gradient length unit. CV (column volumes), milliliters, or minutes and seconds; see Figure 12.
- Start:** The percentage of the strong solvent at the beginning of the gradient segment.

- » **End:** The percentage of the strong solvent at the end of the gradient segment.
- » **Length:** The length of the gradient segment.
- » **A-D:** The solvents to be used.
- » **M/Modifier:** If you want to use a fixed percentage of modifier during the purification, select the solvent to be used and its percentage in the solvent mix.
- » **Equil./Equilibration:** The column is equilibrated before the run, unless this option is turned off. The equilibration volume and flow rate are set automatically based on the selected column type. To see the settings, expand the **Column** panel (see Figure 14). We strongly recommend that the equilibration is not turned off.

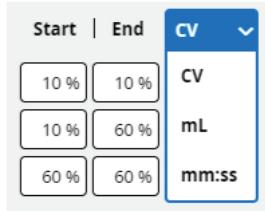


Figure 12. The gradient length unit can be selected in the gradient table (as shown above) and in the expanded gradient graph.

Calculate a Gradient from TLC Data

Note the following when using the TLC to Gradient editor:

- » Accuracy of prediction can be reduced if using alcohols, such as methanol and ethanol, very volatile modifiers such as diethyl ether, or modifiers that permanently alter the properties of the silica.
 - » Reversed-phase TLC is not supported.
 - » Slight variations in migration rates may occur if samples are applied too close to the edge of the TLC plate. Apply samples at least 10 mm from the edge to avoid the edge effect.
- To calculate a purification gradient from the R_f values obtained from a TLC analysis:
1. Open the **TLC to Gradient** editor (see Figure 13) by pressing **TLC**.
 2. Select the **Strong Solvent** text box and enter the percentage of the strongest (most polar) solvent in the TLC analysis.
 3. Mark the solvent front of the TLC plate by sliding the **Front** line to the correct position.
 4. Enter the R_f value of the product of interest in the **R_f Product** text box or by sliding the **Product** line to the correct position on the TLC plate.
 5. Enter the R_f value of the impurity closest below and above the product in the **R_f Impurity 1** and **R_f Impurity 2** text boxes or by sliding the corresponding lines to the correct positions on the TLC plate. A value for R_f Impurity 1 is required.
 6. If you have two plates, press **Add Plate** and repeat steps 2 through 5 for the second plate. One plate gives a linear gradient and two plates give a step gradient.

7. To calculate a purification gradient and the column load capacity, press **Create**.

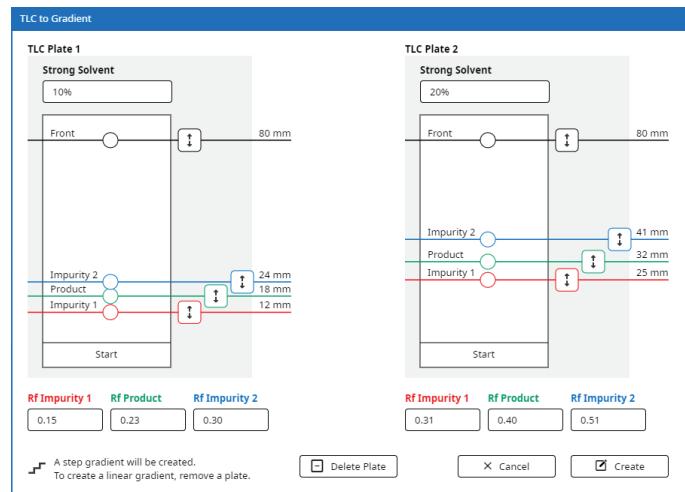


Figure 13. The TLC to Gradient editor.

Specify the Information Parameters

- » **User:** The name of the user. If you have not been assigned a user name, please contact your system supervisor.
- » **Run Name:** The name of the run. If left blank, the name will be auto-generated based on date and time when the purification is performed.
- » **Comments:** Comments on the purification run. (Optional.)

Specify the Column Parameters

- » **Sample Mass:** The crude sample mass.
- » **Column Type:** The column type. Either scan the column using the QR reader underneath the touch screen or select a column type from the drop-down list. If a column is scanned, the icon is shown in the **Column** panel. If the column name is orange or red, its load capacity is smaller than the entered sample mass.
- » **Flow Rate:** The default (recommended) flow rate for the selected column type is preselected. If you want to change it, consider that the maximum flow rate applied depends on the following:
 - » The max pressure or flow rate setting for the column and any other accessories used in the setup.
 - » The maximum aspiration rate(s) defined for the used solvent(s).

Note: If you expand the **Column** panel, all of the settings for the selected column type are displayed (see Figure 14). If the column has been scanned, the column's ID and the number of times it has been used is also displayed. For more information, see “Administrare Column Types” on page 17.

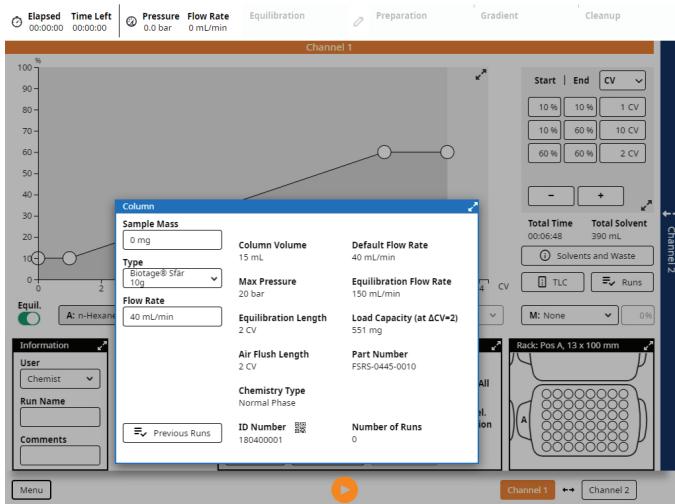


Figure 14. The Column panel expanded.

Specify the Collection Parameters

- » **λ-All***: Select whether the average absorbance within a user-defined wavelength range should be used for collection and fractionation (**Collect**), used for monitoring (**Show**), or not be shown during the run (**Hide**).
- » **UV1 and UV2**: Select whether the wavelength signals should be used for collection and fractionation (**Collect**), used for monitoring (**Show**), or not be shown during the run (**Hide**).
- » **EXT**: Select whether the signal from the external detector (optional) should be used for collection and fractionation (**Collect**), used for monitoring (**Show**), or not be shown during the run (**Hide**).
- » **Wavelengths***: The shortest and longest wavelength to be included in the λ-All signal. The range is 200 to 400 nm (UV detector) or 198 to 810 nm (UV-VIS detector).
- » **Wavelength**: The wavelength to be used for UV1 and UV2. The range is 200 to 400 nm (UV detector) or 198 to 810 nm (UV-VIS detector).
- » **Threshold**: Used to collect samples when the signal level exceeds the set threshold.
- » **Collect All**: Used to collect the entire run.
- » **UV Baseline Correction***: When this option is turned on, the gradient run is preceded by a light absorbance detection phase. During this phase, the light absorbance of the used solvents (A, B, and modifier) is measured for the whole detector range. The measurement results in a baseline containing the maximum absorbance of the solvents. During the gradient run, the baseline is subtracted from the detector signal affecting UV1, UV2, λ-All, and the absorbance spectrum.

* Only available on systems with a Spektra software license.

Specify the Rack Parameters

The Selekt racks have RFID tags that are automatically identified by the system when placed on the collection bed.

If the RFID rack detection feature is disabled in the system settings (see page 19), it is possible to select the collection rack manually by expanding the **Rack** panel (see Figure 15).

If you want to use a lower fraction volume than the one defined for the selected rack(s), expand the **Rack** panel, enable the **Max Fraction Volume** option, and enter the desired volume. Note that this setting will only be applied on racks with a higher vessel volume.

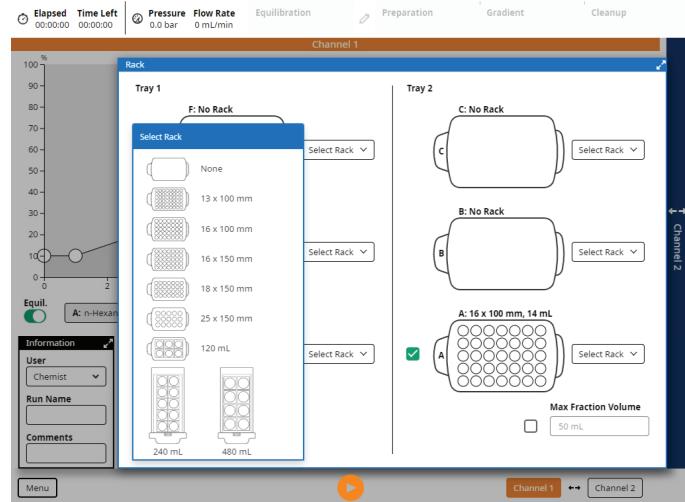


Figure 15. The Rack panel expanded on a system with extended collection bed.

Start, Monitor, and Control a Purification

Warning

- » Read and follow the safety precautions against static electricity in the Biotage® Selekt Installation and Safety document (P/N 416182) that is supplied with the system.
- » Always ensure that the settings for the column selected in the software are correct for the column to be used before starting a run. Never exceed the maximum pressure or flow rate for the used column.
- » Keep hands away from the collection arm area until the arm has returned to its home position (in the inner right corner) and the system is paused or in standby.
- » The system may be pressurized when paused.
- » Monitor the waste reservoir to prevent overflow during operation.

Start a Purification

1. Ensure that a sufficient quantity of the correct solvent is present in each solvent reservoir and that the waste reservoir has sufficient capacity for the run. To view the estimated amounts for the run, press **Solvents and Waste**.
2. Start the purification by pressing . If the button is disabled, press in the bottom right corner for more information.
If solvent and waste monitoring is enabled, you will be notified if there is not enough solvent or waste capacity for the run when you press .
3. When the **Sample Load** dialog opens, load your sample.
4. Start the gradient run by pressing the appropriate button in the **Sample Load** dialog. We recommend that a gradient run is not started until the UV lamp is sufficiently warmed up.

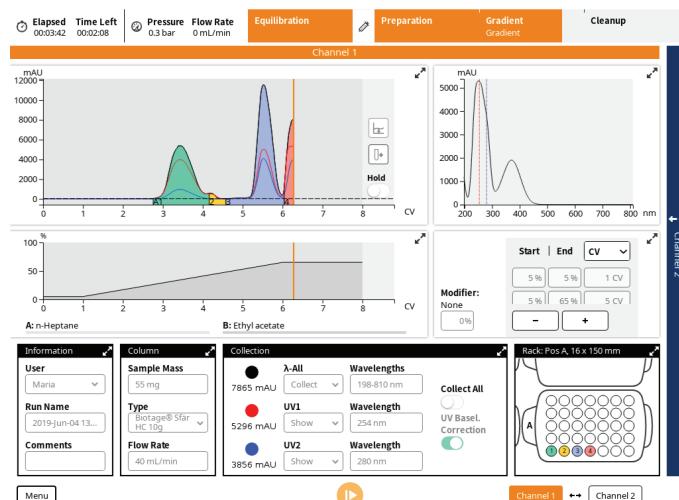


Figure 16. The run view.

Monitor the Purification in Progress

While a purification is running, the programmed gradient (both graph and table, excluding the modifier) and a dynamic chromatogram are displayed in the run view (see Figure 16). If a Spektra software license has been installed on your system, an absorbance spectrum for the whole detector range is also displayed.

Expand a graph or the gradient table by pressing . Change the length unit for the chromatogram by selecting **CV**, **mm:ss**, or **mL** from the drop-down menu in the gradient table or the expanded gradient graph.

Fractions

Fractions that are already collected can be located by matching their colors and numbers in the chromatogram with the vessel colors and numbers in the **Rack** panel. Fractions from the same peak have the same color. Fractions only collected due to the **Collect All** option are colored gray.

Chromatogram

The signals and the start thresholds (if defined) are displayed in the chromatogram using the following colors:

= Light absorption measured by the internal detector for the whole λ-All range and the threshold in mAU. (Requires a Spektra software license.)

= Light absorption measured by the internal detector at wavelength UV1 and the threshold in mAU.

= Light absorption measured by the internal detector at wavelength UV2 and the threshold in mAU.

= Signal from the external detector (when connected) and the threshold in mV.

The defined wavelengths and real-time measurements of the absorption are displayed in the **Collection** panel.

Zoom in on the Gradient and Chromatogram

When the run is paused, it is possible to zoom in and out of the gradient and the chromatogram using the pinch-to-zoom feature (see Figure 17).

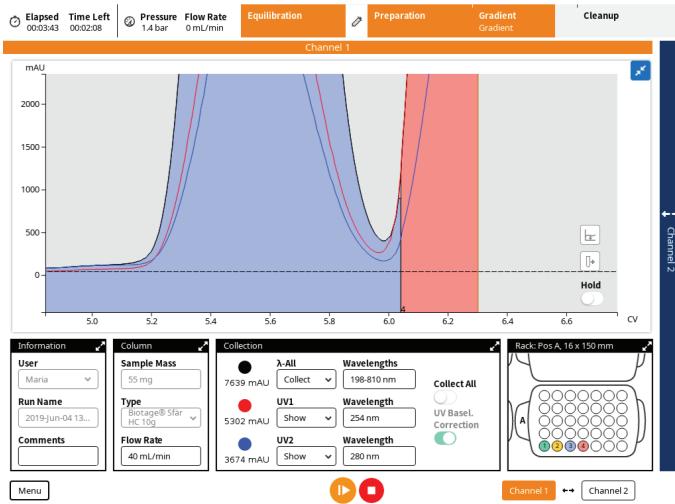


Figure 17. Zoomed-in chromatogram.

Status in the Top Pane

- » **Conversion:** When reversed phase is run on one channel and normal phase on the other, a solvent flush is performed between runs that are using different channels. Note that conversions are not performed when one of the runs uses more than two solvents.
- » **Equilibration Flush:** The system empties the solvent inlets of solvents used in the previous purification and fills them with new solvents.
- » **Equilibration:** The system is running a column equilibration.
- » **Purge:** The system releases the column pressure before sample loading is enabled.
- » **Sample Load:** Sample can be loaded onto the column.
- » **UV Warm-Up:** The UV lamp is being warmed up.
- » **UV Zero:** The system is setting the UV zero level using the solvent mix used at the start of the gradient.
- » **Baseline Detection:** The system is measuring the light absorbance of the used solvents (A, B, and modifier) for the whole detector range. During the gradient run, the baseline (containing the maximum absorbance of the solvents) is subtracted from the signal.
- » **Baseline Flush:** After baseline detection, the system is flushed with the solvent mix used at the start of the gradient.
- » **Gradient:** The system is running a purification.

» Line Flush, Purge, and Detector Flush:

At the end of a run, i.e. after the gradient purification stage is completed or ended by the user, the system performs the flushes that are enabled in the system settings (see page 19) and a system decompression (purge).

- » **Finished:** The purification run was completed or ended/aborted by the user.
- » **Failed:** The purification run failed.

Manual UV Zero

During the gradient run, it is possible to manually set the current UV absorbance level to zero AU by pressing in the chromatogram. This feature can be enabled/disabled in the system settings; see page 19.

Note: If a Spektra software license is installed on your system, the button is only enabled when **UV Baseline Detection** is turned off.

Start and End an Isocratic Segment

At any time during the gradient run, you can start an isocratic segment by enabling the **Isocratic Hold** option in the chromatogram or in the expanded gradient view. End the segment by disabling the option.

Add and Replace Racks During the Run

Note: To add/remove racks during a run, the run must be paused. If more fractions are to be collected than can fit in the available rack(s), the system pauses, the collection arm returns to the home position (the inner right corner), and you are prompted to load more racks. When you have resumed the run, the collection is resumed in the first vessel in the lowest lettered rack. For example, if racks B and C are enabled, the collection is resumed in rack B in vessel 1.

Manually Fractionate

At any time during the gradient run, you can switch to a new collection vessel by pressing **New Fraction**/

Enable or Disable Collect All

At any time, you can enable/disable the **Collect All** option in the **Collection** panel.

Line Flush, Decompression, and Detector Flush

At the end of a run, i.e. after the gradient purification stage is completed, the system performs a line flush (if enabled), system decompression (purge), and a detector flush (if enabled). To enable or disable flushes and specify whether enabled flushes are collected or not, see page 19.

Auto Extend

If the collection criteria are still met (light absorption is above threshold level) when the system reaches the end of a purification, the system extends the gradient purification stage of the run with 25% of the total gradient length using the final conditions of the run.

Pause, End, or Abort a Purification

Note: Pausing a purification may cause gradient inconsistency due to heat, solvent and sample diffusion, etc.

Pause and Resume a Purification Run

1. To pause the purification in progress, press . The collection arm returns to its home position (in the inner right corner) and the system is paused.
2. To resume the run from the point at which it was paused, press .

End the Equilibration Step or End or Abort the Purification Run

1. Press . The collection arm returns to its home position (in the inner right corner) and the system is paused.
2. Press .
3. When the **System Paused** dialog opens, select one of the available options:
 - » **Skip Equilibration:** End the equilibration step and move on to the gradient.
 - » **Cleanup:** End the purification run and perform all necessary flushes.
 - » **Abort:** End the purification run without performing any flushes.

Edit and Manually Extend a Purification

To edit and manually extend a purification in progress:

1. Press . The collection arm returns to its home position (in the inner right corner) and the system is paused.
2. Edit the run settings; see “Set Up a Purification” on page 5. Note that some of the parameters cannot be changed at this point. To undo all changes, press .
3. **Note:** To add a solvent combination to the gradient, expand the gradient graph.
3. To apply the changes and resume the run, press .

Unload a Purification

Flush the Column with Air

Empty the column of remaining solvents using the air flush feature; see page 16.

Purge the Column

Any remaining pressure after a purification can be released using the purge feature; see page 16.

Unload the Run

When the purification is finished, unload the column and rack(s). To avoid leakage, plug the column inlet and outlet fittings and couple the column inlet and outlet tubes together (see Figure 18).



Figure 18. When a run is finished, couple the column inlet and outlet tubes together.

Flush the System

If the last purification of the day is performed with a halogenated solvent (e.g. DCM), we recommend that you assign methanol or a similar solvent to the inlet line used with the halogenated solvent (see page 3) and flush with at least 30 mL (see page 15).

Shut Down the System

Warning

- » Failure to perform an orderly system shutdown may result in user data corruption and/or remaining pressure.

An orderly system shutdown helps prevent data corruption. For critical applications, the use of a suitable Uninterruptable Power Supply (UPS) may help avoid data loss during a power outage.

1. When the system is not processing, press **Menu, Shut Down**, and then **Yes** to confirm.
2. When the message saying it is safe to turn off the system appears on the touch screen, turn off the system. The power switch is located on the left side of the system; see Figure 19.
3. If desired, unplug the power cord from the power outlet.



Figure 19. The power switch is located on the left side of the system.

Results

The reports for the purifications that have been processed on the system can be accessed by pressing **Menu** and then **Results**.

The full Selekt report contains the chromatogram, the gradient (graph and table), TLC data (if entered), run parameters, rack information, system information, and the run log. It is also possible to add analysis pictures and a report note after the run has been completed.

If desired, you can create a customized report where you can disable some of the report content. Whether the full Selekt report or the customized version will be displayed in the **Results** view, depends on the setting for the **Apply Report Setup** option.

The result can be analyzed by selecting the report and pressing **Analysis**. The default view shows the chromatogram and rack(s) and can be used for finding fractions. A second view, which requires a Spektra software license, shows the chromatogram and the absorbance spectrum for the whole detector range for one given point in the chromatogram. This optional view can be used for spectrum analysis.

Search the Results

The results can be filtered on user name and chemistry type, normal or reversed phase; see Figure 20. The reports are listed in chronological order with favorites at the top. Add a report to your favorites by pressing the star to the left (★ = favorite).

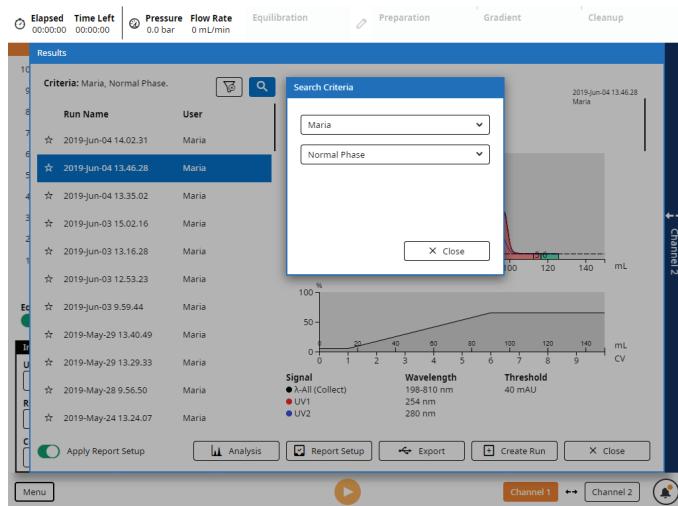


Figure 20. The report view.

Results Based on Column ID

If you scan the Biotope columns using the QR reader, the system will be able to trace all runs performed using a specific column based on its ID.

To see all runs that have been performed using a column:

1. Scan the column.
2. Expand the **Column** panel and press **Previous Runs**. The **Results** view opens showing all runs performed using the scanned column.

Results Based on Rack ID

If the RFID feature is enabled (see page 19), it is possible to view the last run a Selekt rack was used for, if performed on the same system.

To view the last run a Selekt rack was used for:

1. When the system is idle, place the rack on the collection bed.
2. Expand the rack panel and press **Previous Runs**. The **Result** view opens; see Figure 21.
3. Select the rack's position on the collection bed. The report for the last run is displayed. If several racks were used in the run, the selected rack will be highlighted in the report.

Note: If a rack was last used on another system, that system ID (found in the **About** view) will be presented instead of a report.

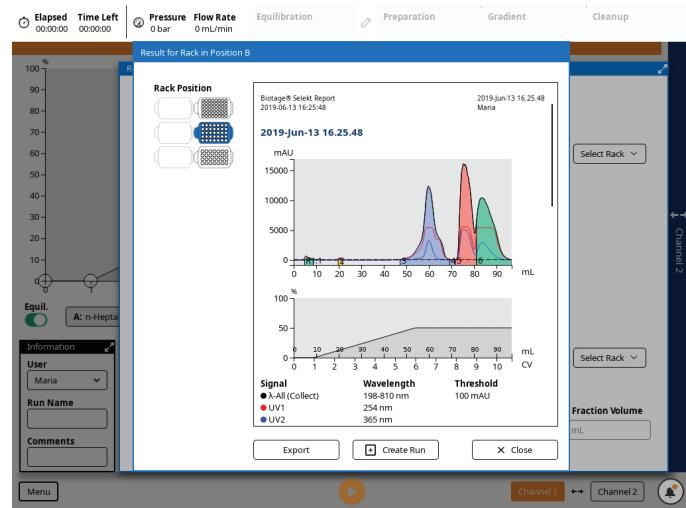


Figure 21. The report for the last run performed on the rack in position A. (The example shows a system with an extended collection bed.)

Analysis of the Result

Analyze the result by selecting the report in the **Results** view and pressing **Analysis**.

Find Fractions

In the default **Analysis** view, the chromatogram and rack(s) are shown (see Figure 22). The chromatogram can be zoomed using the pinch-to-zoom feature, and the signals and UV baseline correction (if used) can be disabled and enabled individually by pressing **Options**. Use this view to find your fractions.

Fractions can be located by matching their colors and numbers in the chromatogram with the vessel colors and numbers in the rack(s). Fractions from the same peak have the same color. Fractions only collected due to the **Collect All** option are gray.

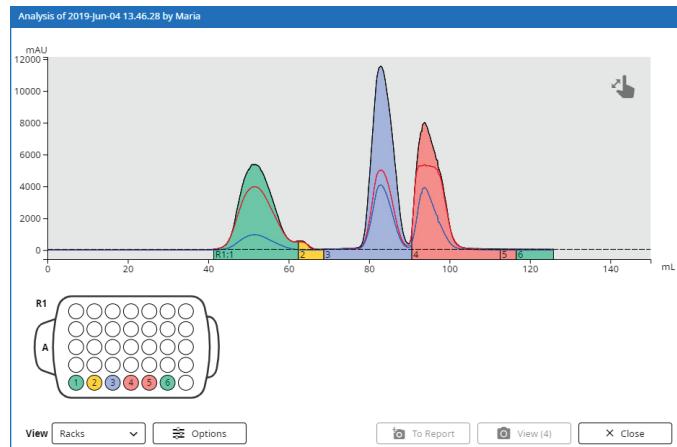


Figure 22. The Analysis view showing the chromatogram and the rack(s).

Analyze the Spectrum

If a Spektra software license is installed, it is possible to switch from viewing the rack(s) to viewing an absorbance spectrum by selecting **Spectrum** from the **View** drop-down list (see Figure 23). In this view, you can:

- » Drag the line in the chromatogram to the position/time for which you want see the absorbance spectrum.
- » Drag the λ_1 and λ_2 lines to the desired wavelengths in the spectrum. The curves for the extra wavelengths will be added to the chromatogram.
- » Zoom the chromatogram using the pinch-to-zoom feature.
- » Enable and disable signals and the UV baseline correction (if used) individually by pressing **Options**; see Figure 24.

Note: Toggling the **UV Baseline Correction** option only affects the spectrum and the λ_1 and λ_2 signals.

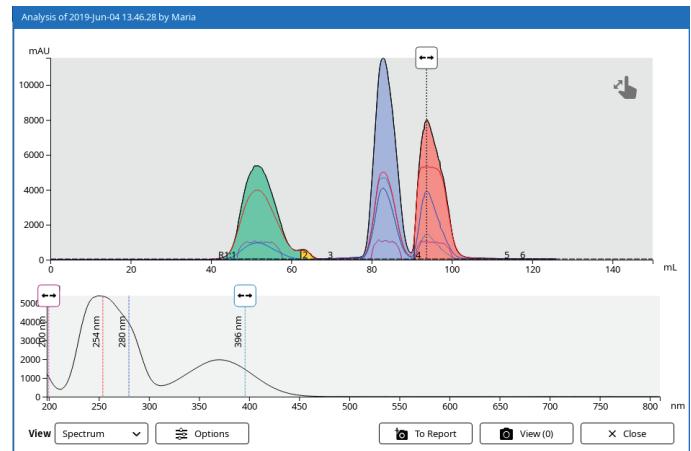


Figure 23. The Analysis view showing the chromatogram and the absorbance spectrum. Requires a Spektra software license.

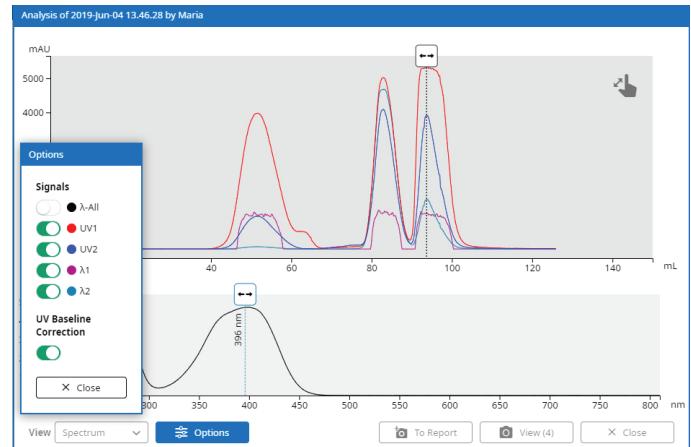


Figure 24. The Options dialog.

Add Analysis Pictures to the Report

It is possible to add one or more pictures of the chromatogram with a changed zoom factor and/or enabled/disabled signals and UV baseline correction to the report. If a Spektra software license is installed, the spectrum is also included in the pictures.

To add a picture, press **To Report** in the racks or spectrum view (see Figure 22 and Figure 23). To view the picture(s) that have been taken, press **View**. To delete a picture, select it in the **Pictures in Report** dialog and press **Delete** (Figure 25).



Figure 25. The Pictures in Report dialog.

Add a Report Note

Add a report note by selecting the report and pressing **Report Setup**. In the **Report Setup** view, enter the run note in the **Report Note** field and press **Save** (see Figure 26).

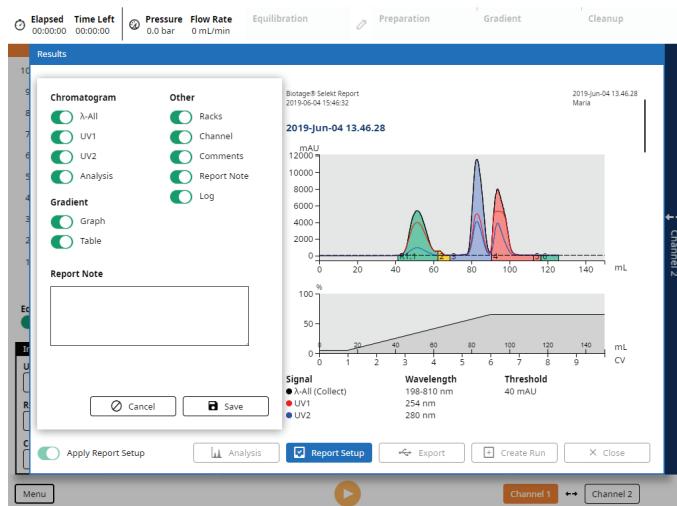


Figure 26. The Report Setup view.

Customize the Report

Customize a report by selecting it in the **Results** view and pressing **Report Setup**. In the **Report Setup** view (see Figure 26), the following content can be enabled or disabled in the report. The changes are shown in real time.

- » **λ-All:** The lambda all signal in the chromatogram.
- » **UV1:** The UV1 signal in the chromatogram.
- » **UV2:** The UV2 signal in the chromatogram.
- » **EXT:** The external detector signal in the chromatogram.
- » **Analysis:** Pictures taken in the analysis view; see “Add Analysis Pictures to the Report” above.
- » **Gradient Graph:** The gradient graph.

- » **Gradient Table:** The gradient table.
- » **TLC Data:** The TLC data.
- » **Racks:** Rack illustrations with the fractions.
- » **Channel:** The channel that was used for the run (1 or 2).
- » **Comments:** The comments entered before the run was started and during the run.
- » **Report Note:** The report note that can be entered in the **Report Note** field in the **Report Setup** view.
- » **Log:** The run log.

Note that the full Selekt report is not overwritten and can always be accessed by turning off the **Apply Report Setup** option.

Export the Report to USB

To save a report as a PDF file on a USB memory device:

1. Connect the memory device to a USB port on the left side of the system; see Figure 19 on page 11.
2. Select the desired report.
3. Select whether to export the full Selekt report or a customized version by turning the **Apply Report Setup** option off or on. To customize the report, see the instructions above.
4. Press **Export**. The report is saved as a PDF file at `\biotage\selekt\user name`.

Base a New Run on a Previous Run

To create a new run with the same purification parameters as in a previous run:

1. Select the run to base the next run on.
2. Press **Create Run** and then select **Channel 1** or **Channel 2** in the appearing dialog.

Flushes and Purge

Warning

- » Never flush the system without a column mounted on the system or without the column inlet and outlet tubing coupled together.
- » To prevent leakage, check all tubes and fittings before flushing the system.

Enter the **Flushes and Purge** view (see Figure 27) by pressing **Menu** and then **Flushes and Purge**.

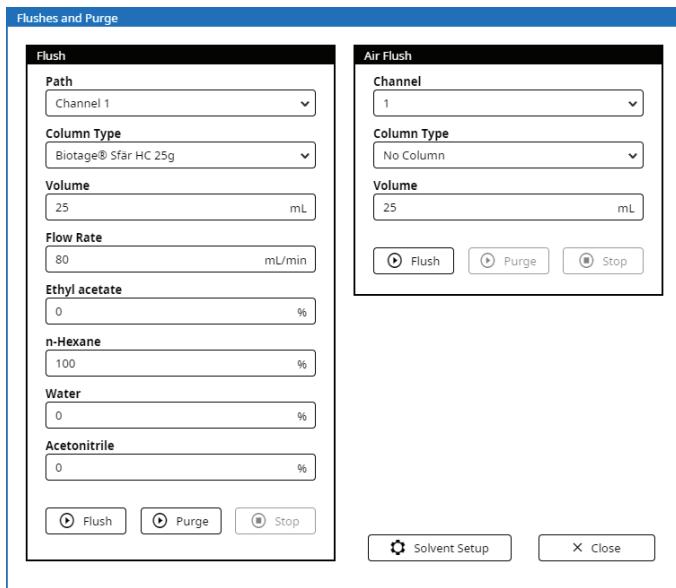


Figure 27. The Flushed and Purge view.

Flush

Use the flush feature to e.g.:

- » Clean the flow path. If the last purification of the day is performed with a halogenated solvent (e.g. DCM), we recommend that you assign methanol or a similar solvent to the inlet line used with the halogenated solvent (see page 3) and flush with at least 30 mL.
- » Check for leaks in the tubing and fittings.

To flush the system:

1. Select the path to be flushed from the **Path** drop-down menu. To flush the flow path except column channel, select the bypass option. To flush a column channel, select a channel option. See a schematic of the flow paths in Figure 28.
2. If a channel option was selected, select the column mounted from the **Column Type** drop-down menu. If selecting “No Column”, ensure that the column inlet and outlet tubing are coupled together.
3. Enter the flush volume in the **Volume** text box.
4. Enter the flow rate in the **Flow Rate** text box. Note that maximum flow rate applied depends on the max pressure setting of the column type (if used) and the maximum aspiration rate(s) for the used solvent(s).
5. Enter the percentage to be used of each solvent connected to the system. If several solvents are listed and you only want to use one solvent, enter “100” for that solvent and “0” for the other ones.
6. Ensure that a sufficient quantity of each selected solvent is present in the solvent reservoirs.
7. Ensure that the waste reservoir has sufficient capacity for the flush.
8. Press **Flush**.

Flow Paths

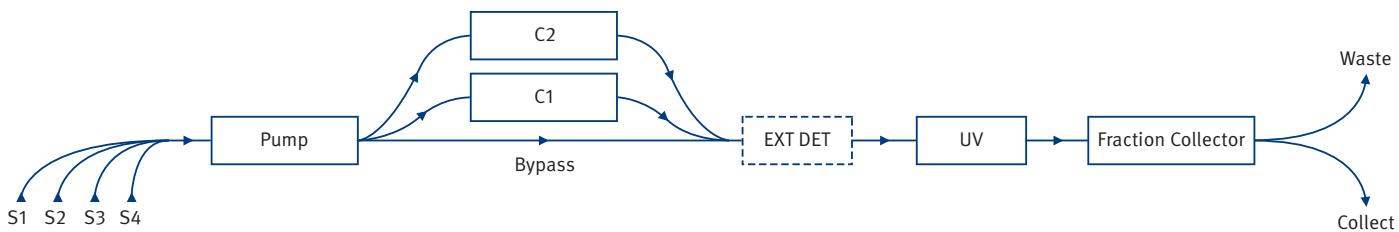


Figure 28. The flow paths in the system.

Air Flush

Use the air flush feature to e.g. empty a column of remaining solvents after a purification run.

1. Select the channel to be flushed from the **Channel** drop-down menu.
2. Select the column mounted on the selected channel from the **Column Type** drop-down menu. If selecting “No Column”, ensure that the column inlet and outlet tubing are coupled together.
3. Enter the air flush volume in the **Volume** text box. The default volume is the recommended volume for the selected column, if selected.
4. Press **Flush**.

Purge

Use the purge feature to manually release any pressure in the column.

1. Select the channel to be purged from the **Channel** drop-down menu.
2. Select the column mounted on the selected channel from the **Column Type** drop-down menu.
3. Press **Purge**. Note that the current pressure is displayed in the top left corner of the software.

Data Administration

Note: Only users with system owner privilege can administrate column types, solvents, and user accounts.

Administristrate Column Types

The software comes with a preconfigured list of column types and their settings. To add, edit, and delete user-defined column types, press **Menu**, **Data Administration** and then **Column Administration** (see Figure 29).

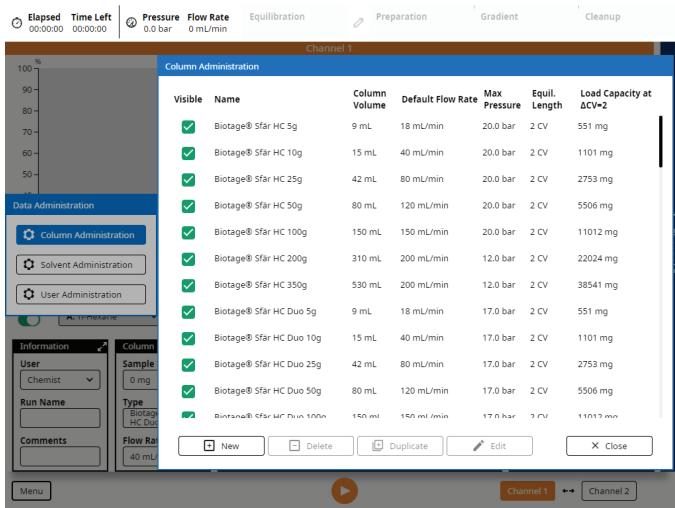


Figure 29. The Column Administration view.

Column Parameters

Warning

- Never exceed the maximum pressure or flow rate for the column.

Note: The preconfigured Biotage column types cannot be edited or deleted. We recommend that you disable **Visible** for any column that will not be used.

- Visible:** If enabled, the column type is available for use.
- Name:** The name of the column type.
- Column Volume:** The column volume (CV) in mL.
- Default Flow Rate:** The default flow rate in mL/min.
- Max Pressure:** The safety pressure in bar or psi (see page 19). If reached, the flow rate will be reduced to keep the pressure at this level.
- Equilibration Pressure:** The maximum pressure during the equilibration, in bar or psi (see page 19). If reached, the flow rate will be reduced to keep the pressure at this level.
- Equil./Equilibration Length:** The equilibration length in CV.
- Equilibration Flow Rate:** The equilibration flow rate in mL/min.

» **Air Flush Length:** The air flush length in CV. This value will be used as the default volume for the air flush feature (see page 16).

» **Load Capacity at $\Delta CV=2$:** The approximate load capacity when delta CV is 2.

» **Chemistry Type:** The type of chromatography the column is used for, normal or reversed phase.

» **Part Number:** The manufacturer's part number.

Administristrate Solvents

The software comes with a preconfigured list of solvents and their settings. To add, edit, and delete user-defined solvents, press **Menu**, **Data Administration** and then **Solvent Administration** (see Figure 30).

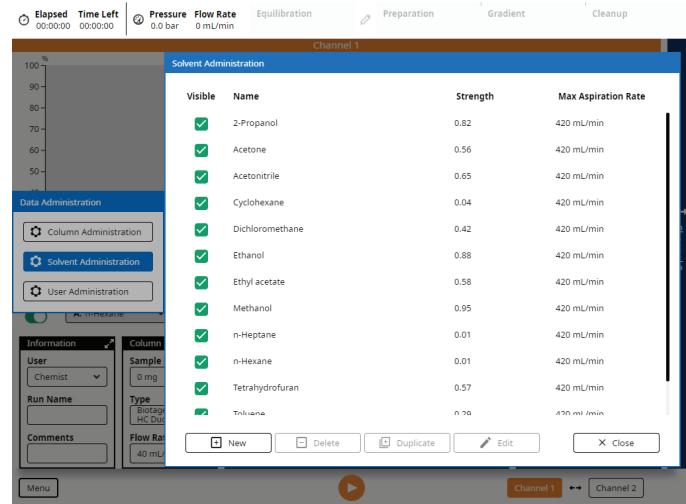


Figure 30. The Solvent Administration view.

Solvent Parameters

Note: The preconfigured Biotage solvents cannot be edited or deleted. We recommend that you disable **Visible** for any solvent that will not be used.

- Visible:** If enabled, the solvent is available for use.
- Name:** The solvent name.
- Strength:** The solvent strength value, a value between 0 and 1.^{1,2}
- Max Aspiration Rate:** The maximum rate at which the solvent can be drawn into the pump during the fill stroke, in mL/min. To achieve the system's maximum flow rate (300 mL/min), use 420 mL/min. If necessary, reduce the flow rate to avoid cavitation.

¹ Neue U. D. HPLC Columns Theory, Technology, and Practice, Wiley-VCH (1997).

² Dean J. A. Lange's Handbook of Chemistry, 15th edition, McGraw-Hill (1999).

Administrate User Accounts

To add, edit, and delete user accounts, press **Menu**, **Data Administration** and then **User Administration** (see Figure 31).

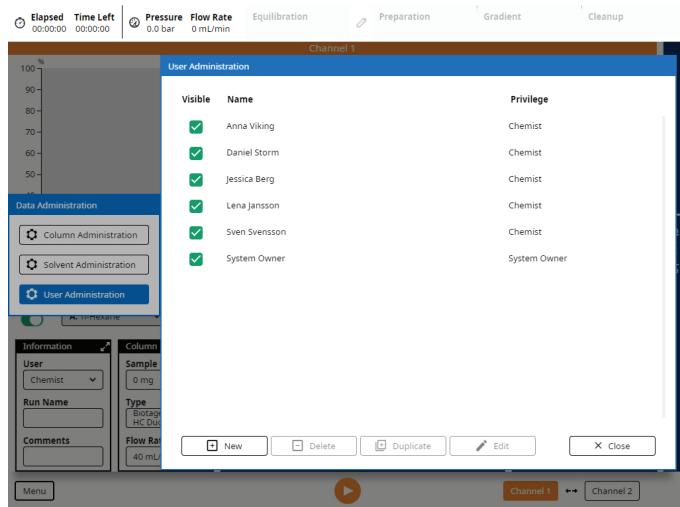


Figure 31. The User Administration view.

Note: The first time you log into the Data Administration view, log in using the user account “System Owner” and the password “1234”. Before you log out, it is strongly recommended that this password is changed.

User Parameters

- » **Visible:** If enabled, the user account is available for use.
- » **Name:** The user name, which will be used in the user name selection boxes as well as in the purification reports. If you change the user name, all reports associated with the user will be updated. If deleting a user, their reports will still be accessible but they will not state the user name.
- » **Password:** It is possible to password-protect a user account with System Owner privilege. The password will be used when entering the Data Administration, System Settings, and Maintenance views.
- » **Privilege:** A user can have chemist or system owner privilege:
 - » **Chemist:** The user can set up and run purifications, and view results.
 - » **System Owner:** The user has both the chemist privilege (see above) and access to the Data Administration view (see page 17), System Settings view (see page 19) and Maintenance view (see page 21).

System Settings

Note: Only users with system owner privilege can change the system settings.

Enter the software's settings view (see Figure 32) by pressing **Menu** and then **System Settings**. The following system settings are available.

System

- » **Date (yyyy:mm:dd):** Setting the date correctly ensures an accurate date stamp for your purification reports.*
- » **Time (hh:mm:ss):** Setting the time correctly ensures an accurate time stamp for your purification reports.*
- » **Language:** The language to be used in the software's purification mode. English is always used in the Data Administration, System Settings, and Maintenance views, and in the reports.
- » **Pressure Unit:** The unit to be used by the system, bar or psi.
- » **Mouse Pointer:** When connecting a mouse to one of the USB ports, you need to enable the mouse pointer.
- » **Audible Alarm:** If enabled, a warning will sound when an error has occurred.
- » **LED Light:** If enabled, the light strip underneath the touch screen is lit when the system is on. The color indicates the status of the system; see "Lighting" on page 2.

* The system has to be restarted for the new configuration to take effect.

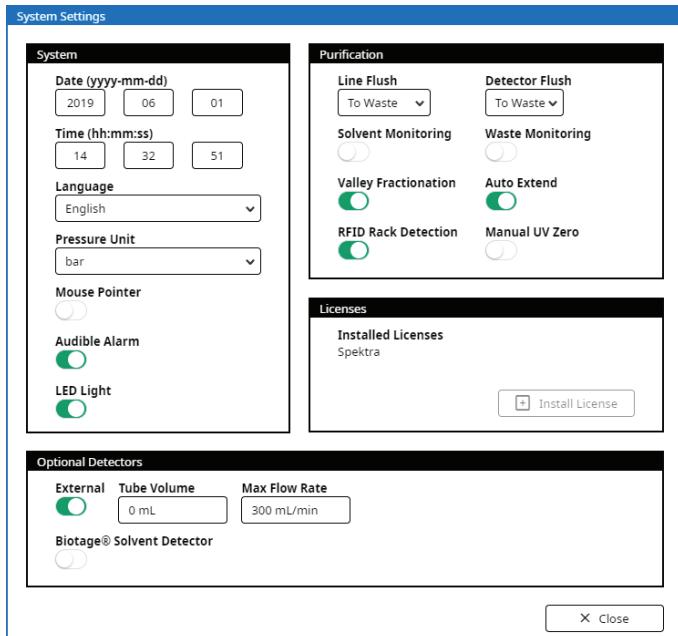


Figure 32. The System Settings view.

Purification

Note: Collected flushes are added to the gradient in the report.

- » **Line Flush:** If enabled, the system flushes the column inlet line at the end of the run using the run's weakest solvent. Select whether to **Collect** the flush (using the same collection criteria as during the gradient run) or send it **To Waste**.

Note: If the automatic line flush is disabled (**Off**), ensure to flush the column flow path before each run.

- » **Detector Flush:** If enabled, the system flushes the internal detector and any external detector connected to the system at the end of the run using the run's strongest solvent. Select whether to **Collect** the flush (using the same collection criteria as during the gradient run) or send it **To Waste**.

Note: We recommend that the detector flush is enabled. A contaminated detector flow cell has decreased transmissivity, which causes increased noise levels, decreased response, and difficulties performing UV Zero.

- » **Solvent Monitoring:** If enabled, the system will notify the user when a solvent level is below 20% of the set capacity (see Figure 33). When 10% is left, the system will be paused and the user will be prompted to refill the solvent.
- » **Waste Monitoring:** If enabled, the system will notify the user when the waste level is above 85% of the set capacity (see Figure 33). When the waste level is at 95% of the set capacity, the system will be paused and the user will be prompted to empty the waste reservoir.



Figure 33. Level notification for waste and solvent.

- » **Valley Fractionation:** If enabled, fractionation will occur when a valley is detected between two peaks in one of the signals in the chromatogram.
- » **Auto Extend:** If enabled and the collection criteria are still met (light absorption is above threshold level) when the system reaches the end of a purification, the system extends the gradient purification stage of the run with 25% of the total gradient length using the final conditions of the run.
- » **RFID Rack Detection:** If enabled, Selekt racks are automatically identified by the system when placed on the collection bed.
- » **Manual UV Zero:** If enabled, it is possible to manually set the current UV absorbance level to zero AU during the gradient run.

Note: The system automatically performs a UV Zero using the initial gradient mix before the run is started.

Licenses

To enable λ -all detection mode and baseline correction, you need a Spektra software license. To purchase a Spektra software license, please contact your local representative.

To install a license:

1. Create a directory called \biotage\selekt\ on a USB memory device and save the license file to this location.
2. Connect the memory device to a USB port on the left side of the system.
3. Press **Install License** in the **Licenses** field.
4. When a message saying that the license was successfully installed appears, remove the USB memory device.

Optional Detectors

- » **External:** Enable this option when an external detector is connected to the system. The following parameters are available for the external detector:
 - » **Tube Volume:** Enter the volume of the additional tubing and/or flow cell of the external detector in the **Tube Volume** text box. This amount of solvent will be added to the automatic flushes.
 - » **Max Flow Rate:** Enter the maximum flow rate that can be used with the external detector. This will depend on the back pressure generated in the detector and its tubing, and the technical specification of the detector.
- » **Biotage® Solvent Detector:** Enable this option when the optional solvent detector from Biotage is connected to the system.

Maintenance

Warning

- » There are potentially lethal voltages inside the system. Do not remove the cover panels; there are no user serviceable parts inside.
- » If the system has been damaged or does not function properly, shut it down immediately and contact Biotage® 1-Point Support™ (www.biotage.com).

Back Up and Restore the System's Database

The system database contains all results and registered solvents, column types, and user accounts.

Note: Restart is required after both backup and restore.

Note: Do not remove the USB memory device until the backup/restore has been completed.

To back up the database:

1. Press **Menu** and then **Maintenance**.
2. Connect an empty memory device to a USB port on the left side of the system.
3. Press **Back Up Database....** The **Confirm Backup** dialog opens.
4. To confirm backup, press **Yes**.
5. When a message saying that the backup has been completed appears, remove the memory device and press **Shut Down**. The backup file is saved at `\biotage\selekt\backup\`.

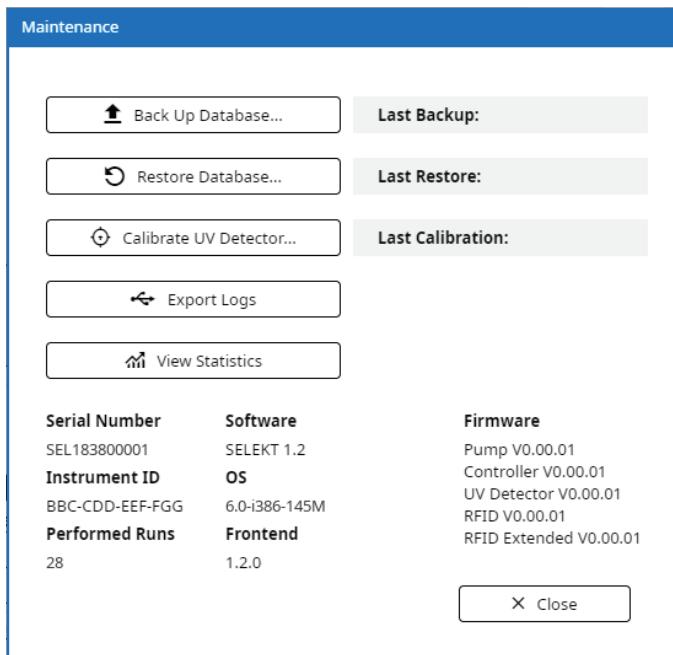


Figure 34. The Maintenance view.

To restore the database:

1. Press **Menu** and then **Maintenance**.
2. Connect the memory device that contains the backup to a USB port on the left side of the system.
3. Press **Restore Database....**
4. In the **Select Backup File** dialog, select the backup file and press **Restore**. The **Confirm Restore** dialog opens.
5. To confirm restore, press **Yes**.
6. When a message saying that the restore has been completed appears, remove the memory device and press **Shut Down**.

Calibrate the Internal UV Detector

If the internal detector needs to be recalibrated (e.g. when a new flow cell has been installed), use the following procedure.

1. Press **Menu** and then **Maintenance**.
2. Press **Calibrate UV Detector....** Read and follow the instructions that appear on the screen.

Clean the Exterior of the System

Regular cleaning of the touch screen, if performed properly, extends the touch screen life and reduces wear.

Warning

- » When cleaning the touch screen, use only non ammonia-based window cleaner and do not apply the liquid directly to the screen as this could damage electronic components.

Note: Avoid harsh cleaners and chemicals, and moisture getting into the system.

1. Shut down the system as described on page 11.
2. Disconnect the power cord from the power outlet.
3. Clean the touch screen using a clean, non-abrasive, dry cloth. If this does not clean the screen properly, the cloth can be lightly dampened with a non ammonia-based window cleaner. After cleaning, wipe dry with a clean, non-abrasive cloth.
4. Clean the exterior surfaces of the system using a clean, lint-free cloth lightly dampened with water. If required, a small amount of mild soap may also be used. After cleaning, wipe dry with a clean, lint-free cloth.

Clean the Flow Cell of the Internal UV Detector

Warning

- » Ultraviolet (UV) light can injure your eyes. Always turn off the system before removing the flow cell. Never have the system turned on when the flow cell is removed or when the retaining nut is loosened.

Note: Always handle the flow cell using gloves and never touch the fiber optics; see Figure 35.

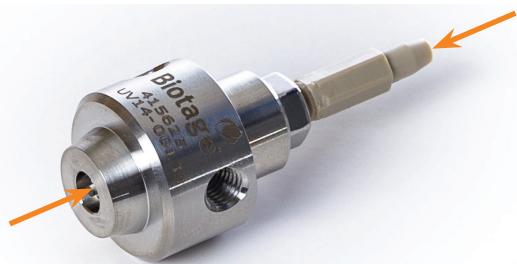


Figure 35. The fiber optics on the flow cell. Do not touch.

Keep the detector flow cell clean and protect it from dust and chemical spills. Particular attention should be paid to prevent the flow cell from leaking.

A contaminated flow cell has decreased transmissivity, which causes increased noise levels, decreased response, and difficulties performing UV Zero.

To clean the detector flow cell:

1. Shut down the system as described on page 11.
2. Remove the flow cell by holding the flow cell with one hand while loosening the retaining nut.
3. Disconnect the inlet and outlet tubing from the flow cell and visually inspect the cell for contamination.

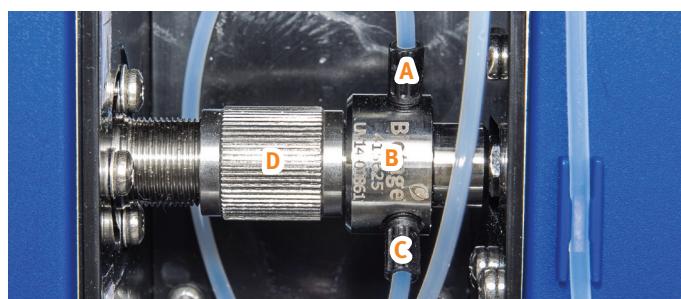


Figure 36. The flow cell of the internal detector. A = flow cell outlet tube, B = flow cell, C = flow cell inlet tube, and D = retaining nut.

4. Flush the flow cell with a series of miscible solvents using the injection maintenance kit supplied with the system. Select the solvents based on the contamination. It is possible to use both organic and inorganic solvents and diluted solutions of acids (e.g. H₂SO₄ or HNO₃ diluted with distilled water in a ratio of 1:20 to 1:10), unless they react with stainless steel, PTFE, or fused silica windows.

5. Visually re-examine cell windows for visible contamination. If contamination is still present, repeat step 4. If you are not able to remove the contamination, we recommend that you replace the flow cell (P/N 415625SP) and recalibrate the UV detector (see page 21).

6. Carefully insert the flow cell and close the retaining nut:
 - a. Insert the flow cell cone straight into its housing inside the UV detector; see the highlighted section in Figure 37.
 - b. Close the retaining nut. **Tip!** At the last couple of turns, hold the flow cell flat against the retaining nut while closing the nut completely.

Note: The retaining nut should close with little effort. If it is difficult to close, the flow cell is probably misaligned.

7. Reconnect the tubing to the flow cell.

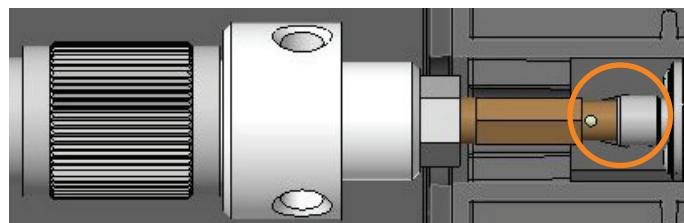


Figure 37. Cross section of the flow cell properly inserted into the UV detector.

Clean or Release Check Valves

Clean the Pump Check Valves

If the last purification of the day is performed with a halogenated solvent (e.g. DCM), we recommend that you assign methanol or a similar solvent to the inlet line used with the halogenated solvent (see page 3) and flush the pump check valves with at least 30 mL (see page 15).

Release Stuck Check Valves

Low or inconsistent flow delivery volume and/or superimposed periodic UV or UV-VIS signals can be signs of stuck check valves.

Warning

- » When releasing a stuck check valve, there is a risk of small amount of solvent splashing out.

1. Release the pressure by slowly unscrewing the check valve cap from one of the **CV OUT** valves using the Torx 50 screwdriver supplied with the system; see Figure 38.



Figure 38. Removing the check valve cap from one of the CV OUT valves.

2. Remove the check valve by pushing an unused pipette tip or similar into the check valve and then pulling it out; see Figure 39A.
3. Push on the ball inside the check valve using an unused pipette tip or similar; see Figure 39B. Ensure that the ball moves freely. Otherwise, replace the check valve (P/N 415115SP).
4. Repeat the procedure for the other three check valves.

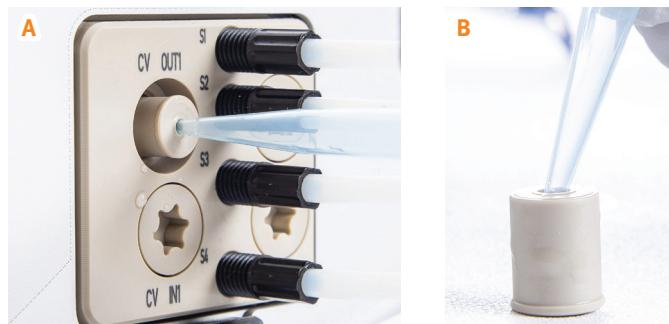


Figure 39. Release stuck check valves.

Manually Change Between Normal and Reversed Phase

To avoid issues during a solvent change, it is necessary to perform the change throughout the entire chromatographic system (i.e. in the reservoir, pump, tubing, and detector).

The procedure is to flush the system (see page 15), with a series of mutually miscible solvents until a gradual change to the new solvent is accomplished. If this procedure is not followed, precipitation may occur not only in the flow cell of the internal detector but also in other parts of the system. For example, to change from an organic solvents to aqueous solutions, it is necessary to flush the whole system with acetone or an alcohol.

Leaks

Warning

- » Always handle leakage immediately.
- » Follow all generally-accepted lab safety procedures and applicable laws and regulations.
- » Always follow local and national safety regulations and the solvent manufacturer's safety, handling, storage, and disposal recommendations; refer to the safety data sheets (SDS).
- » Electrical equipment can introduce ignition hazards. Ensure that all solvent manufacturers' recommendations are followed with respect to handling, ventilation, and operating environment.
- » Personnel working with or near the system must wear protective clothing, safety gear, and eye protection in accordance with applicable local and national safety regulations.
- » Shut down the system before replacing any tubing. Use only tubing designed for the Selekt system and supplied by Biotage.

Shut Down the System at Leakage

If a leakage is observed, shut down the system as follows:

1. If a purification is in progress, press **●** and then **Abort**.

2. If a prime or flush is in progress (started by the user), press **Stop**.
3. Press **Menu**, **Shut Down**, and then **Yes** to confirm.
4. When the message saying it is safe to turn off the system appears on the touch screen, turn off the system. The power switch is located on the left side of the system.

External Leakage

External leakage may occur due to e.g. loose fittings or damaged tubing. Any leakage in the flow cell of the internal detector is drained via the drip sheet; see Figure 40.



Figure 40. Drainage of leakage from the flow cell of the internal detector.

All external tubing on the system except for the tubing on the collection arm can be replaced by the user; a list of spare parts is available at www.biotage.com.

Note: All tube types, dimensions, and lengths are essential for the performance of the system. Only replace tubes with the equivalent tubes designed for the Selekt system and supplied by Biotage.

If an external leakage is observed:

1. Shut down the system as described above.
2. Disconnect the power cord from the power outlet.
3. Remove the spillage using the appropriate safety precautions. In the event of leakage from a column, allow all solvent vapor to dissipate before removing the column. Do not wipe away any excess solvent from the column surface as this can generate additional static charge.
4. If using the optional instrument tray, ensure that the tray and the solvent detector (including the space underneath the detector) are cleaned and wiped dry. To remove the solvent detector, unsnap the detector cable from the two tube clips, open the hatch holding the solvent detector in position, and pull the detector sideways (see Figure 41).



Figure 41. Instrument tray with a solvent detector. A = tube clips holding the detector cable and B = the solvent detector hatch open.

5. If using the optional secondary solvent containment:
 - a. Ensure that the secondary solvent containment and solvent detector (including the space underneath the detector) are cleaned and wiped dry. To remove the solvent detector, remove the cable locking plate, open the hatch holding the solvent detector in position, and pull the detector sideways (see Figure 42). If you are using the solvent containment on the top of the system and need to remove it to clean it, unscrew (Torx 20) and remove (slide out) the two brackets at the rear of the system (see Figure 43). Reassemble by reversing the procedure.



Figure 42. Secondary solvent containment with a solvent detector.
A = cable locking plate and B = the solvent detector hatch open.

- b. If using the secondary solvent containment on the top of the system, ensure that the drain tube is not damaged and is properly connected to the drain port at the rear; see A in Figure 43. The other end shall be inserted into a waste reservoir.



Figure 43. The two screws holding the brackets for the optional secondary solvent containment (circled) and the drain port (A).

6. Check all external tubes and connections for leaks. Use caution when finger tightening fittings to prevent stripped threads or crushed ferrules. Replace damaged tubing.
7. Once you have located and resolved the leakage, reconnect the system to power and turn on the system.
8. Check all tubes and connections for leaks using the flush function; see page 15. Flush with water or another suitable solvent.

9. If the problem persists:
 - a. End the flush by pressing **Stop**.
 - b. Shut down the system and disconnect the power cord from the power outlet.
 - c. Contact Biotage 1-Point Support.

Internal Leakage

Internal leakage, due to e.g. worn pump seals or tube fittings, is drained through drain ports underneath the system.

If an internal leakage is observed:

1. Shut down the system as described above.
2. Disconnect the power cord from the power outlet.
3. Ensure that the leakage is not external; see above.
4. Contact Biotage 1-Point Support.

Replace the Fuses

Warning

» Use only exact replacement fuses specified by Biotage (P/N 411916SP). Incorrect fuses create a potential fire hazard.

1. Shut down the system as described on page 11.
2. Disconnect the power cord from the power outlet.
3. Unplug the power cord from the rear of the system.
4. Loosen the fuse holder by carefully prying under the notch at the bottom of the holder with a small standard (flat blade) screwdriver; see Figure 44.
5. Grab the fuse holder with your fingers and remove it from the system.
6. Replace the two fuses with new fuses of the same type and rating specified by Biotage (P/N 411916SP).
7. Put the fuse holder back in place.

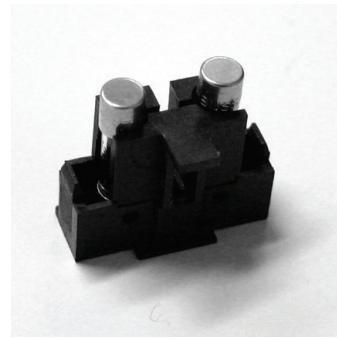
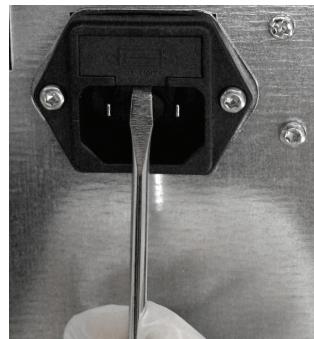


Figure 44. Loosening the fuse holder.

Replace the Needle

1. Shut down the system as described on page 11.
2. Remove the needle.
3. Assemble the new needle, ferrule, and peek nut (P/N 411915).
Ensure that the needle is flush with the end of the ferrule;
see A in Figure 45.
4. Mount the needle on the collection arm. Ensure that the
needle is touching the needle guide; see B in Figure 45.

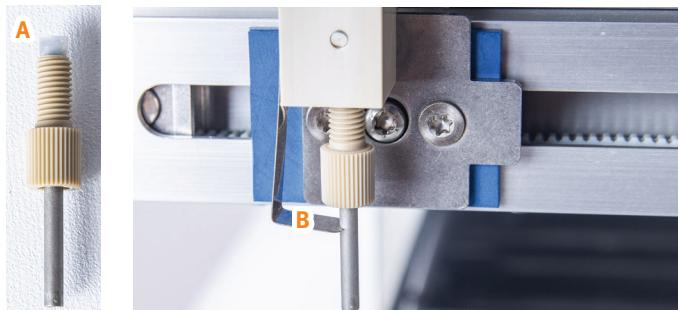


Figure 45. Assemble the needle, ferrule (A), and nut, and assemble it on the collection arm. Ensure that the needle is touching the needle guide (B).

Sonicate Solvent Inlet Filters

A solvent inlet filter is installed on the end of each solvent inlet line. The solvent inlet filters protect the pump and columns from damage due to particulate contamination. These filters should be cleaned (sonicated) or replaced every 1000 hours of operation or every 12 months, whichever comes first. If replacing, we recommend that you replace both the inlet lines and the filters (P/N 413008SP includes four inlet lines and four filters).

Troubleshooting

Fraction Collector-Related Problems

» **The collection arm does not position correctly over each collection vessel:**

- » Ensure that the racks and tray(s) are aligned correctly.
- » Ensure that the correct rack type has been selected for the run.
- » Ensure that there is nothing obstructing or restricting the arm movement.

If this does not solve the problem, the collection arm may need to be recalibrated. Contact Biotage 1-Point Support.

» **Dripping needle and/or inconsistent dispensing volumes** can be signs of a dirty collect valve.

Please contact Biotage 1-Point Support.

Gradient Problems

Low composition gradient is not correct

When generating solvent mixtures where the composition contains less than 10% of one solvent, ensure that the strong solvent is pumped first, i.e. is mounted on a solvent inlet with a lower number than the other solvent.

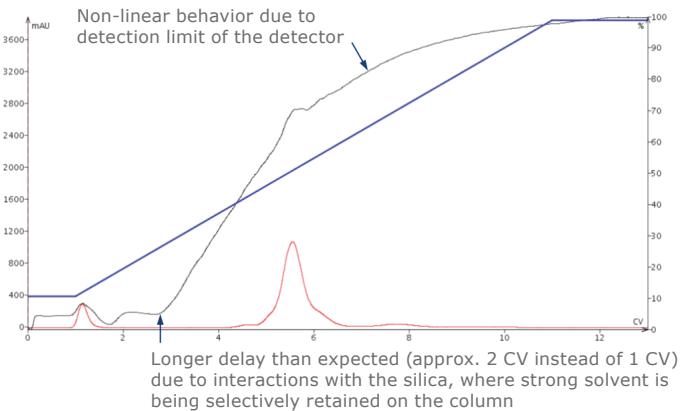
If the problem persists, premix the solvent using the desired final % strong solvent in the weak solvent and use this as solvent B. Program the gradient from 0 to 100% B using the pre-mixed solvent B.

The baseline drift is different from the programmed gradient

Two factors contribute to altering the gradient as observed by the internal detector:

1. As it takes at least 1 CV for the solvent to pass through the column and reach the internal detector, the initial front of the gradient will always be delayed by at least 1 CV compared to the programmed gradient. A longer gradient delay may be due to interactions with the silica, where strong solvent is being selectively retained on the column.
2. The gradient as observed by the internal detector will at times decline and plateau before the programmed gradient does. This is due to the detection limit of the internal detector. Any increase in the concentration of strong solvent will not be registered as no light is reaching the detector at those particular wavelengths.

If using a system with a Spektra software license, try performing the run with the **UV Baseline Correction** option turned on.



Internal UV Detector-Related Problems

» **No signal.** Check that the UV flow cell is correctly mounted, see step 6 in “Clean the Flow Cell of the Internal UV Detector” on page 22.

» **Noise** may be due to a contaminated flow cell. Clean the flow cell; see page 22.

» **Drifting baseline** may be due to:

- » Contaminated flow cell. Clean the flow cell; see page 22.
- » Used solvent is absorbing light at the selected wavelength(s). Change the collection and fractionation wavelength(s) or turn on the UV Baseline Correction option (only on systems with a Spektra software license).
- » Defective UV lamp. Contact Biotage 1-Point Support.

» **UV baseline correction is not eliminating drifting baseline:**

- » B/C or C/D solvents are used. The UV baseline correction is only adjusting for absorbance of the A/B solvents.
- » The gradient is modified by the user during the run. If the gradient is changed outside of its original boundaries, this is not covered by the UV baseline correction.
- » The modifier percentage is changed by the user during the run. The UV baseline correction is based on the original percentage.

» **Missing peaks when using UV baseline correction.**

If expected peaks do not show when you have the UV Baseline Correction option turned on and you are using solvents that are high-absorbing over a wide range of wavelengths (e.g. acetone or toluene), try performing the run without UV baseline correction.

» UV detector error during UV Zero.

The problem may be due to:

- » Contaminated flow cell. Clean the flow cell; see page 22.
- » Highly absorbing solvent(s). Choose less absorbing solvent(s).
- » Sample in the flow cell. Flush the system (see page 15) and retry performing the run.
- » The UV detector needs to be recalibrated; see page 21.

Leak Detected

See “Leaks” on page 23.

Overpressure Detected

Blockage due to precipitate or kinked tubing

Warning

- » Shut down the system before replacing any tubing. Use only tubing designed for the Selekt system and supplied by Biotage.

Note that there may be precipitate in areas not visible.

1. Once the pressure has decreased to an acceptable level (the current pressure is displayed in the top left corner of the software), shut down the system (see page 11).

Note: If the pressure does not reach ambient within a few minutes, release the contained pressure as described in “Power failure or shutdown with overpressure” below.

2. If applicable, straighten or replace kinked tubing. Only replace tubes with the equivalent tubes designed for the Selekt system and supplied by Biotage.
3. Visually inspect all tubing for precipitation. If found, remove and clean the tubing.
4. Visually inspect the flow cell for precipitation. If found, clean the flow cell (see page 22).
5. Turn on the system.

The flow rate is too high for a purification or flush

1. If the overpressure occurred during a flush, press **Purge** in the **Flushes and Purge** view. Once the pressure has decreased to an acceptable level (the current pressure is displayed in the top left corner of the software), start a new flush at a lower flow rate.

2. If the overpressure occurred during a run, wait until the pressure has decreased to an acceptable level (the current pressure is displayed in the top left corner of the software) and then lower the flow rate and resume the run.

Power failure or shutdown with overpressure

Warning

- » When releasing a stuck check valve, there is a risk of a small amount of solvent splashing out.

1. Release the pressure by slowly unscrewing the check valve cap from one of the **CV OUT** valves using the Tork 50 screwdriver supplied with the system; see Figure 46.
2. Once the pressure has been reduced to an acceptable level (the current pressure is displayed in the top left corner of the software), fasten the check valve cap.



Figure 46. Removing the check valve cap from one of the CV OUT valves.

Pump-Related Problems

Note: If using highly volatile (i.e. high vapor pressure) solvents such as DCM, reservoir elevation is strongly recommended. Have all solvents on the same physical height to improve accuracy in the solvent mixing. It is also highly advisable to reduce the max aspiration rate (see “Administate Solvents” on page 17) and, if possible, lower the ambient temperature. See “Solvent Specifications” on page 29 for the vapor pressure of different solvents.

- » **Air bubbles moving through the column inlet tubing in a steady stream during solvent delivery** may be due to:
 - » Little or no solvent in the lines. Refill the solvent reservoir(s) and ensure that all used solvent inlet lines are submerged (see “Prime the Solvent Inlets” on page 4).
 - » One or more solvent inlet lines are loose. Check fittings and tighten if necessary.
 - » One or more solvent inlet filters are plugged. Sonicate or replace the solvent inlet filters; see page 25. Note that particulate-free solvent is required and that re-circulating of the solvent is not recommended.
 - » Solvent cavitation or degassing during aspiration stroke. Possible solutions are: 1. Elevate the solvent reservoirs. 2. Lower the ambient temperature. 3. Sonicate or replace the solvent inlet filters; see page 25. 4. Reduce the max aspiration rate for the used solvents; see “Administate Solvents” on page 17.
- » **Low or inconsistent flow delivery volume and/or superimposed periodic detector signals** may be due to:
 - » Not all four solvent inlets have been primed. To achieve the specified pump performance, ensure that all solvent inlets have been primed (see page 4).
 - » One or more pump check valves are not functioning properly. Flush with methanol or a similar solvent (see page 15) and check for leaks in the tubing or fittings (see “Leaks” on page 23). If this does not solve the problem, release the check valves as described on page 22.
 - » Solvent cavitation or degassing during aspiration stroke. Possible solutions are: 1. Elevate the solvent reservoirs. 2. Lower the ambient temperature. 3. Sonicate or replace the solvent inlet filters; see page 25. 4. Reduce the max aspiration rate for the used solvents; see “Administate Solvents” on page 17.

» The pump does not deliver solvent.

The problem may be due to:

- » No or insufficient solvent in the reservoir(s). Refill the solvent reservoir(s) and ensure that all used solvent inlet lines are submerged in solvent (see “Prime the Solvent Inlets” on page 4).
- » Stuck pump check valve(s). Flush with methanol or a similar solvent; see page 15.
- » Blockage in solvent line(s). Sonicate or replace the solvent inlet filters; see page 25. Straighten or replace kinked tubing. If this does not solve the problem, flush the entire system with methanol or isopropanol at a low flow rate (see page 15).
- » Leakage. Check for leaks in the tubing or fittings; see “Leaks” on page 23.

QR Reader Problems

If the QR reader underneath the touch screen is not lit, please contact Biotage 1-Point Support.

Contact Biotage® 1-Point Support™

For assistance at any time during troubleshooting or if your problem persists, contact Biotage 1-Point Support. See contact information on the back of this document or visit our website www.biotage.com.

Solvent Specifications

Warning

- Many solvents are considered hazardous to humans and the environment, so take appropriate safety precautions when using them. Comply with Safety Data Sheets (SDS) and any other applicable regulations for the safe use, handling, transporting, storage, and disposal of these solvents.

Solvent	CAS No.	Strength ^{1,2}	Selectivity Class ³	UV Cutoff (nm)	Vapor Pressure at 20°C (psi)	Vapor Pressure at 20°C (mbar)
Acetone	67-64-1	0.56	6 (VIa)	330	3.6	247.4
Acetonitrile	75-05-8	0.65	6 (Vib)	190	1.4	93.6
Cyclohexane	110-82-7	0.04	0	210	1.5	103.4
Dichloromethane (DCM)	75-09-2	0.42	5 (V)	235	6.9	475.3
Ethanol	64-17-5	0.88	2 (II)	210	1.3	90.0
Ethyl acetate	141-78-6	0.58	6 (VIa)	255	1.4	98.3
n-Heptane	142-82-5	0.01	0	210	0.7	47.4
n-Hexane	110-54-3	0.01	0	210	2.3	161.6
Methanol	67-56-1	0.95	2 (II)	210	1.9	129.7
2-Propanol (IPA, isopropanol)	67-63-0	0.82	2 (II)	210	0.6	44.0
Tetrahydrofuran	109-99-9	0.57	3 (III)	220	2.5	172.4
Toluene	108-88-3	0.29	7 (VII)	286	0.4	29.1
Water	7732-18-5	1.00*	0	190	0.3	23.4

Table 1. Solvent specifications.

¹ Neue U. D. HPLC Columns Theory, Technology, and Practice, Wiley-VCH (1997).

² Dean J. A. Lange's Handbook of Chemistry, 15th edition, McGraw-Hill (1999).

³ Snyder L. R. and Kirkland J. J. Introduction to Modern Liquid Chromatography, Wiley (1979).

* When water is used in reversed phase chromatography, the strength value is 0.

General Information

Consumables and Accessories

Only genuine Biotage consumables and accessories must be used in the system. To order consumables and accessories, see contact information on the back of this document or visit our website www.biotage.com.

Accessories that may be necessary for the “Maintenance” section are listed below.

Part No.	Description	Qty
415115SP	Inlet Check Valve,	4
415625SP	Flow Cell	1
411915	Fraction Collector Needle	1
411916SP	Fuse 4.0 TA/250 VAC, 5 x 20 mm	5
413008SP	Four solvent inlet lines and filters (S1-S4)	1
411851SP	Waste outlet tube	1

Manufacturer



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Notes

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