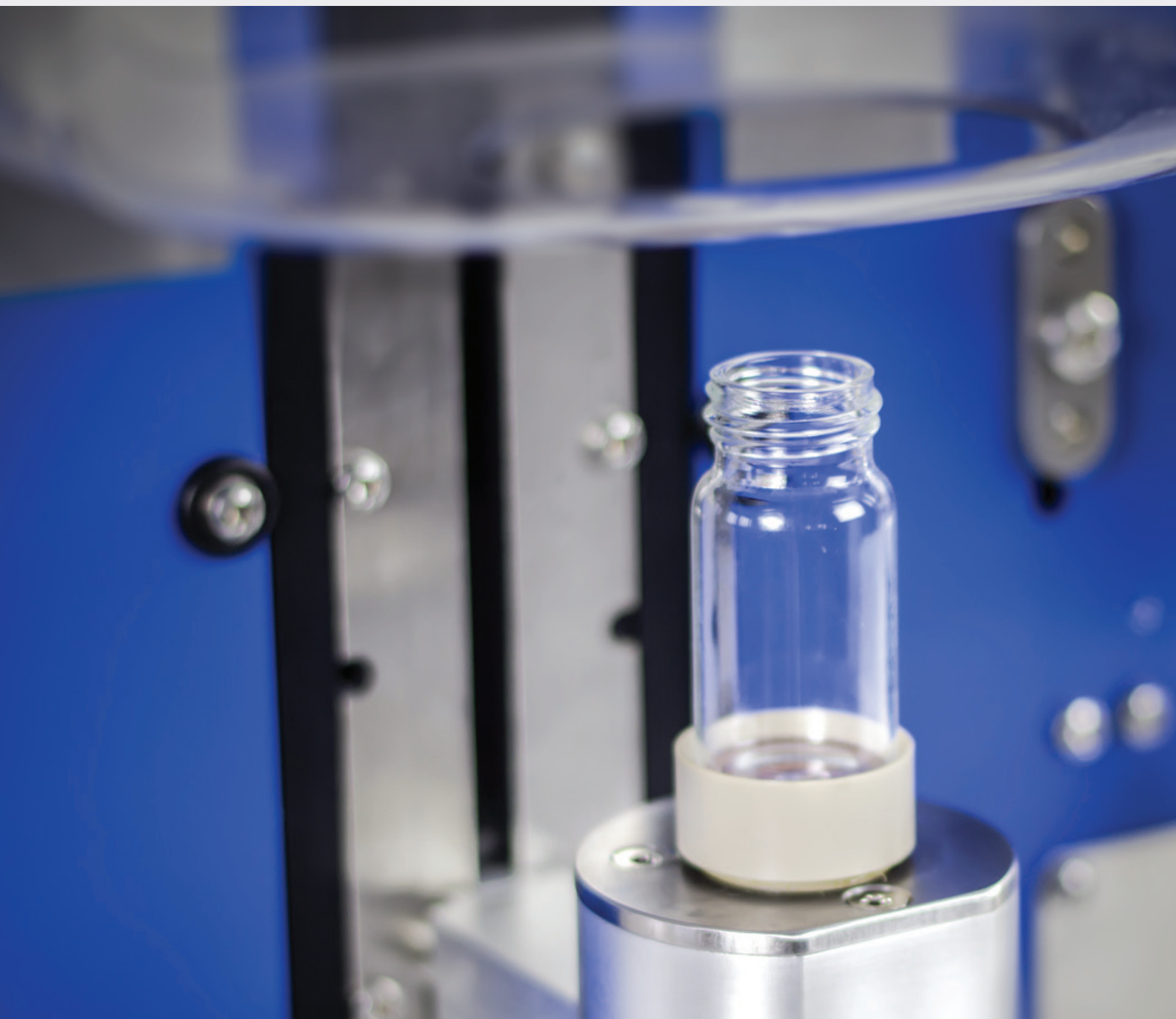


Biotage® V-10 Touch

User Manual



Biotage® V-10 Touch

User Manual

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System Overview

Biotage® V-10 Touch is a solvent evaporator system for applications in organic and inorganic chemistry. The evaporator is operated via its touch screen or V-10 Touch Control Centre.

The system enables evaporation of single samples (up to 12 mL) or large pooled volumes using a built-in sample pump (optional). Adding a vial carousel enables unattended evaporation of up to 16 samples.

By connecting a liquid handler, multiple fractions from different test tubes and racks can be combined and dried in a single vial in one operation. This requires the built-in sample pump and V-10 Touch Control Centre; see page 2.

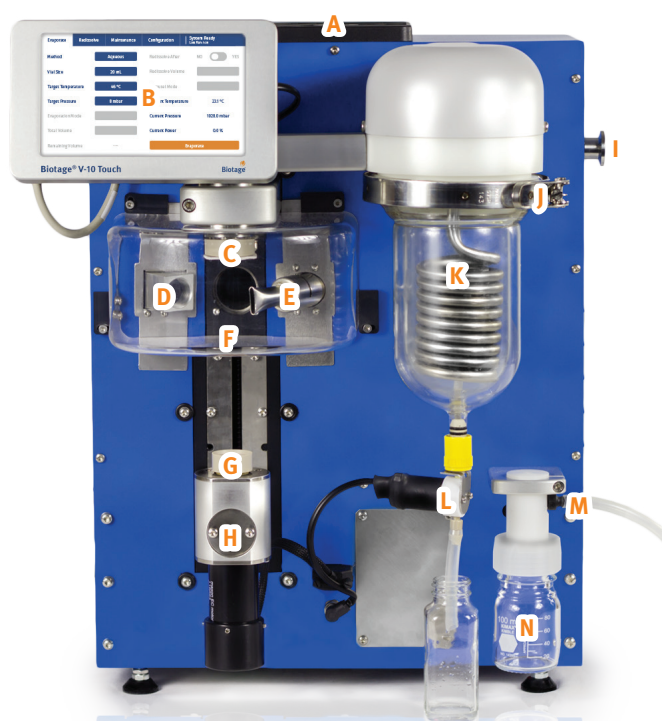


Figure 1. The front side of Biotage® V-10 Touch without a carousel or built-in sample pump. A = ventilation panel, B = touch screen, C = upper vial holder, D = IR sensor, E = sample heater, F = plastic guard, G = lower vial holder, H = vial loading arm, I = connection for external vacuum pump, J = condenser pot clamp, K = vacuum insulated condenser pot, L = drain valve, M = pump exhaust connector, and N = pump exhaust catchpot.

Evaporation Methods

The system comes with eight predefined methods that cover the majority of evaporation requirements; see Table 1. You can also define your own methods; see page 3.

The evaporation method should be selected based on the solvent with the highest atmospheric boiling point (BP). For a list of solvents and their boiling points, see page 25.

Method	Description	Boiling Point (BP)
Very High Boil	Very high boiling point.	> 160°C
High Boil	High boiling point.	110°C ≤ BP ≤ 160°C
Aqueous		90°C ≤ BP ≤ 110°C
Mixed Vol & HBP	Mixed volatile and high boiling point.	55°C ≤ BP ≤ 160°C
HPLC Fractions	Fractions from reverse phase Flash and prep LC.	55°C ≤ BP ≤ 110°C
Volatile		55°C ≤ BP ≤ 90°C
Mixed Volatile	Fractions from Flash chromatography.	55°C ≤ BP ≤ 90°C
High Volatile	Highly volatile.	< 55°C

Table 1. The eight predefined Biotage methods.

Vials

Samples can be dried in vials of volumes 4, 8, 16, 20, and 30 mL. The 20 and 30 mL vials are the standard vials. 4, 8, and 16 mL vials require vial adapters (see Figure 2) and, if a carousel is used, different carousel sample holders (see page 6). Use the vial with the most appropriate volume for your sample; see Table 2.

Total Vial Volume (mL)	Maximum Fill Volume (mL)	Needs Upper Vial Adapter	Needs Lower Vial Adapter
30	12	-	-
20	8	-	-
16	8	-	Yes
8	4	Yes	Yes
4	2	Yes	Yes

Table 2. The maximum fill volume and adapter requirements for the five predefined Biotage vials.



Figure 2. Upper and lower vial adapters.

External Vacuum Pump (Optional)

The system has a built-in vacuum pump. It is also possible to connect an external vacuum pump. An external vacuum pump is recommended to reach the low pressure needed for the evaporation methods Very High Boil, High Boil, and Mixed Vol & HBP.

Automation (Optional)

Adding the vial carousel enables unattended evaporation of up to 16 samples.

Carousel Control Box

The carousel status is indicated by four LEDs located on the carousel control box behind the carousel; see A in Figure 3.

LED	Description
1	A green light is lit when the carousel is turned on.
2	The light is turned off when no carousel sample holder is mounted. A yellow light is lit when a carousel sample holder is mounted but not locked. A green light is lit when the carousel sample holder is in a locked position.
3	A yellow light is blinking when the carousel is busy.
4	A red light is lit when a carousel error has occurred. See the error dialog that opens on the touch screen.



Figure 3. Biotage® V-10 Touch with a carousel and a built-in sample pump. A = carousel control box with four LEDs, B = carousel sample holder, C = carousel carriage, D = pump manifold, E = sample loop, F = system solvent bottle, and G = external sample flask.

Solvent Manager (Optional)

If the system is equipped with a built-in sample pump, the following features are enabled:

- » Evaporation of large volumes. Multiple injections from a single sample.
- » Solvent replacement. Samples can be automatically redissolved after evaporation.
- » Combining fractions. Multiple injections from multiple samples; see "Liquid Handler (Optional)" below.

Liquid Handler (Optional)

By connecting a liquid handler (Gilson GX-271, see Figure 4), multiple fractions from different test tubes and racks can be combined and dried in a single vial in one operation. This requires the built-in sample pump and V-10 Touch Control Centre.

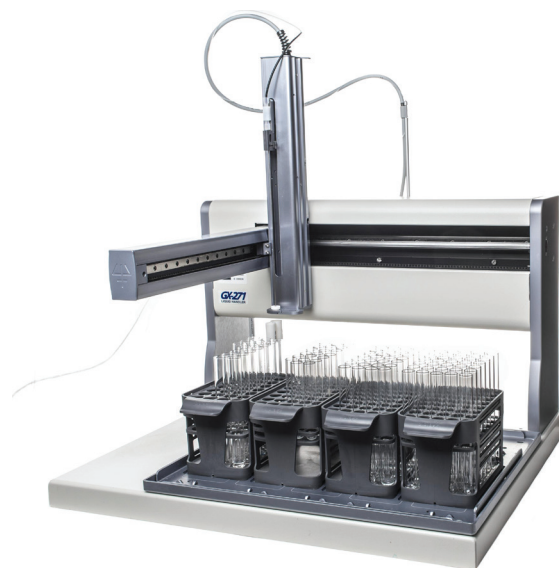


Figure 4. Gilson GX-271 with Isolera™ racks. Chromatography fractions can be combined and concentrated directly from the chromatography system rack without manual intervention.

Biotage® V-10 Touch Control Centre (Optional)

V-10 Touch Control Centre can be used to control any V-10 Touch system. The software is installed on an external computer and adds the capabilities of integrating the V-10 Touch system with a liquid handler as well as running the carousel with different methods for different carousel positions.

V-10 Touch Control Centre consists of two application programs:

- » **Controller.** Use this application to control runs on the V-10 Touch system; see page 13.
- » **Editor.** Use this application to create and modify workspaces that allow racks to be loaded onto the liquid handler bed; see page 17.

Define Methods, Vials, and System Settings

The system comes with eight predefined methods (see Table 3) and five predefined vials (see Table 2 on page 1). The predefined methods, vials, and other system settings have been set to provide optimal evaporation of most solvents.

You can also define your own methods and vials by modifying the methods and vials named Custom 1, Custom 2, and Custom 3.

When using a carousel, a liquid handler, and/or an external vacuum pump, they must be enabled in the system settings (see "Define System Settings" on page 4). Note that even though it is possible to use a liquid handler without enabling it in the system, it must be enabled to prevent users from performing tasks from the touch screen that involve the sample inlet tube.

To reset settings to factory default, see "Reset Parameter Settings" on page 5.

Note: To define V-10 Touch Control Centre settings, see page 13.

Parameter	Very High Boil	High Boil	Volatile	HPLC Fractions	Aqueous	Mixed Volatile	High Volatile	Mixed Vol & HBP
Target Temperature (°C)	56	48	36	46	46	36	36	48
Max Evap Power (%)	100	100	100	100	100	50	50	50
Start Heating Temp (°C)	15	15	5	5	15	5	5	5
Target Pressure (mbar)	0	0	30	30	8	30	100	30
Vac Pump Speed 1 (mbar/s)	150 (Max)	150 (Max)	50 (Med)	100 (High)	150 (Max)	15 (Low)	50 (Med)	50 (Med)
Vac Pump Speed 2 (mbar/s)	25 (Max)	25 (Max)	2 (Low)	5 (Med)	10 (High)	2 (Low)	2 (Low)	2 (Low)
Rotational Speed (rpm)	6000	6000	6000	6000	6000	7000	6000	7000
End of Evaporation	Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto
Min Evap Time (min)	2	2	1	1	1	1	1	5
Max Evap Time (min)	20	20	10	20	20	10	10	20
Final Dry (min)	3	3	2	3	3	2	2	3
Use Ext Vac Pump	YES	YES	NO	NO	NO	NO	NO	YES

Table 3. The default settings of the eight predefined Biotage methods.

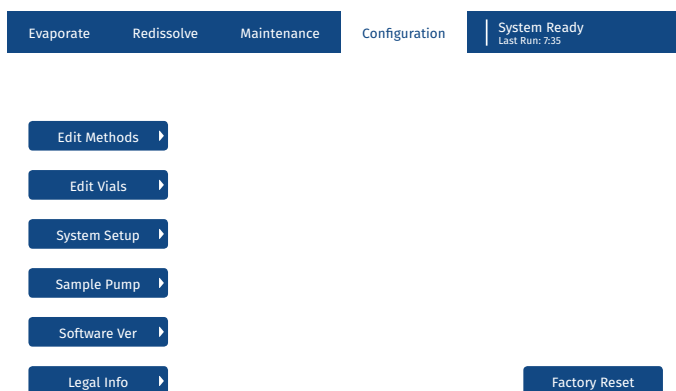


Figure 5. The Configuration view.

Define a Method

Enter the method view (see Figure 7) by pressing **Configuration** in the menu bar (see Figure 5) and then **Edit Methods** (see Figure 6). Select the method that you want to edit. The following method parameters are available:

- » **Target Temperature:** The target and maximum allowed vial temperature (in °C).
- » **Max Evap Power:** The maximum heating power (in percentages) generated by the vial heater.
- » **Start Heating Temp:** If the regulator conditions for starting the heater have not yet been fulfilled when the vial temperature is below this value (in °C), the heater is started.
- » **Target Pressure:** The target pressure (in mbar) for the evaporation.

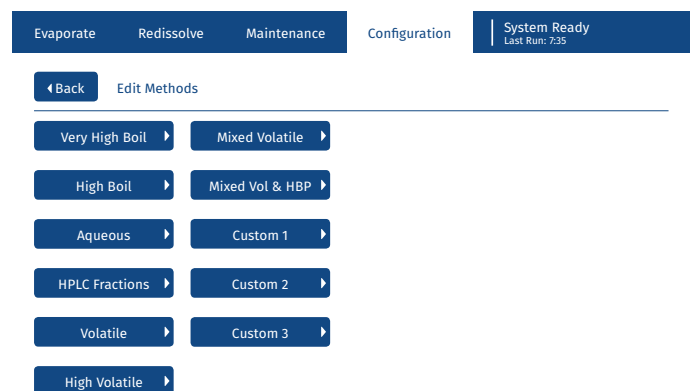


Figure 6. The Edit Methods view.

- » **Vac Pump Speed 1:** The pressure drop (in mbar/s) when the pressure is above or equal to 150 mbar. Possible settings are:
 - » Low – 15 mbar/s
 - » Med – 50 mbar/s
 - » High – 100 mbar/s
 - » Max – 150 mbar/s
- » **Vac Pump Speed 2:** The pressure drop (in mbar/s) when the pressure is below 150 mbar. Possible settings are:
 - » Low – 2 mbar/s
 - » Med – 5 mbar/s
 - » High – 10 mbar/s
 - » Max – 25 mbar/s
- » **Rotational Speed:** The rotational speed of the vial (in rpm) during the evaporation.
- » **End of Evaporation:** This parameter controls when the evaporation is ended. Possible values are:
 - » **Auto:** The evaporation is ended automatically when the vial is dry.
 - » **Continual:** The evaporation is ended manually by pressing **Stop**.
 - » **Timed:** The evaporation is ended when the **Max Evap Time** is reached.

Note: If using a liquid handler, **Auto** or **Timed** must be selected.
- » **Min Evap Time:** If **End of Evaporation** is set to **Auto**, this is the minimum time (in minutes) for an evaporation before auto dry detection starts.
- » **Max Evap Time:** If **End of Evaporation** is set to:
 - » **Auto**, this is the maximum time (in minutes) for an evaporation.
 - » **Timed**, this is the total time (in minutes) for an evaporation.

- » **Final Dry:** The drying time (in minutes) for finalizing the run at lowest possible pressure.
- » **Use Ext Vac Pump:** Defines whether an external vacuum pump (if enabled in the **System Setup** view) is to be used (YES) or not (NO). An external vacuum pump is recommended to reach the low pressure needed when using the following predefined methods:
 - » Very high boiling point (Very High Boil)
 - » High boiling point (High Boil)
 - » Mixed volatile and high boiling point (Mixed Vol & HBP)

Define a Vial

Enter the vial view (see Figure 8) by pressing **Configuration** in the menu bar and then **Edit Vials**. Select the vial that you want to edit. The following vial parameters are available:

- » **Dispense Volume:** The volume (in mL) that may be dispensed into the vial. It is important that this value does not exceed the maximum fill volume; see Table 2 on page 1.
- » **Dispense Rate*:** The flow rate (in mL/min) when dispensing sample solution from the sample loop into the vial, using the built-in sample pump.

Note: When using V-10 Touch Control Centre, the **Sample Dispense Rate (mL/min)** parameter (see page 13) overrides this parameter.

Define System Settings

Enter the **System Setup** view (see Figure 9) by pressing **Configuration** in the menu bar and then **System Setup**. The following system parameters are available:

- » **Redissolve Speed*:** The rotational speed of the vial (in rpm) when a sample is automatically redissolved after evaporation.

Note: When using V-10 Touch Control Centre, the **Speed (rpm)** parameter (see page 14) overrides this parameter.

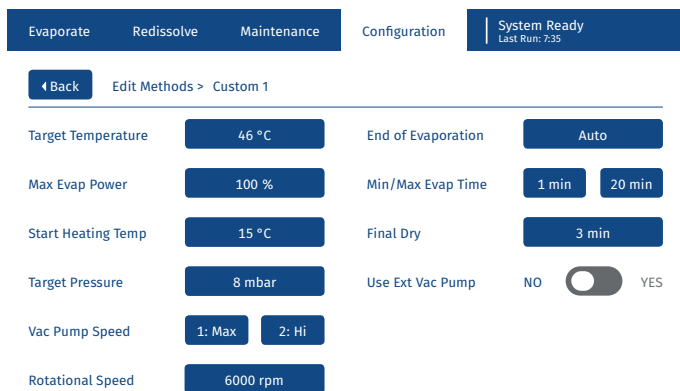


Figure 7. Use the methods Custom 1, Custom 2, and Custom 3 to define your own methods.

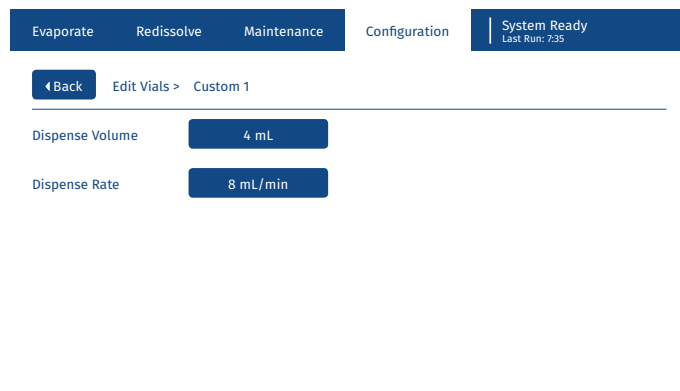


Figure 8. Use the vials Custom 1, Custom 2, and Custom 3 to define your own vials.

- » **Redissolve Cycles***: The number of spin cycles when a sample is automatically redissolved after evaporation.
Note: When using V-10 Touch Control Centre, the **Cycles** parameter (see page 14) overrides this parameter.
- » **Date:** The current date.
- » **Time:** The current time.
- » **IP Address:** The system's IP address is used to communicate with an external computer running V-10 Touch Control Centre. It is recommended that the default IP address is used. For information on how to connect an external computer, see the “Biotage® V-10 Touch Installation and Safety” document (P/N 414661).
- » **Brightness:** The brightness of the touch screen (in percentages).
- » **Liquid Handler***: Defines whether a liquid handler is connected (YES) or not (NO). When set to **YES**, it is not possible to perform tasks from the touch screen that involve the sample inlet tube i.e. set the evaporation mode to **External Flask** and perform a prime.
- » **Carousel†:** Defines whether the carousel can be used (YES) or not (NO).
- » **Ext Vacuum Pump:** Defines whether an external vacuum pump is connected (YES) or not (NO).
- » **Ext Vacuum Trig Point:** If the external vacuum pump is enabled in the method, it will be activated when the pressure reaches this value. This field is only enabled when the **Ext Vacuum Pump** is set to **YES**.

Define Sample Pump Settings

If the system is equipped with a built-in sample pump, enter the **Sample Pump** view (see Figure 10) by pressing **Configuration** in the menu bar and then **Sample Pump***. The following sample pump parameters are available:

- » **Prime Aspiration Rate:** The aspiration rate (in mL/min) when priming the tubing with system solvent.

- » **Prime Dispense Rate:** The dispense rate (in mL/min) when priming the tubing with system solvent.
Note: The higher the prime rate, the more efficient the removal of air bubbles will be.
- » **Sample Aspiration:** The flow rate (in mL/min) when aspirating sample solution into the sample loop.
Note: The default rate (10 mL/min) should work for most solvents. However, we suggest a lower aspiration rate for solvents with high viscosity or low boiling points.
- » **Sample Tube Volume:** The volume of the probe and sample inlet tube (in mL). This volume is taken into account when aspirating sample solution from an external flask into the sample loop. When using the probe and sample inlet tube supplied by Biotage, it must be set to 1.2 mL.
Note: The sample pump settings above are not used when using V-10 Touch Control Centre. To define V-10 Touch Control Centre settings, see page 13.

Reset Parameter Settings

To reset the settings in the **System Setup** view (see Figure 9) or for a single predefined method or vial to the factory defaults, press **Reset to Default** in the applicable view and then **Yes** to confirm.

To reset all settings in the **Configuration** view (see Figure 5 on page 3), except those of the methods and vials named Custom 1, Custom 2, and Custom 3, and the date and time, to the factory defaults:

1. Select **Configuration** in the menu bar.
2. Press **Factory Reset** and then **Yes** to confirm.

Note that the carousel, liquid handler, and external vacuum pump features are disabled by default.

* Only enabled if the system is equipped with a built-in sample pump.
† Only enabled if the system is equipped with a carousel.

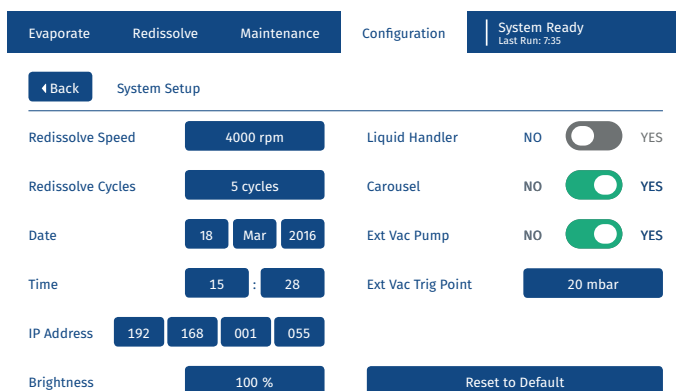


Figure 9. The System Setup view.

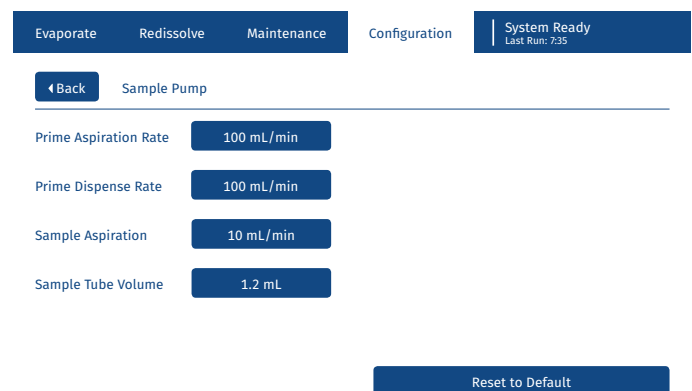


Figure 10. The Sample Pump view.

Prepare and Start the System

Warning

- » Observe general as well as specific safety regulations for the use of the equipment at all times; see the "Biotage® V-10 Touch Installation and Safety" document (P/N 414661).

Change Upper Vial Holder

Warning

- » Ensure that the system is turned off and the power cord is disconnected.
- » The heater nozzle may get warm during operation.
- » Never operate the system with the plastic guard removed.

Ensure that the correct upper vial holder is used on the system; see Figure 11.



Figure 11. A: Upper vial holder for 4, 8, 20, and 30 mL vials. B: Upper vial holder for 16 mL vials.

1. Turn off (O) the system and disconnect the power cord.
2. Remove the plastic guard by loosening the four mounting screws using the T20 Torx screwdriver supplied with the system; see Figure 12A.
3. Remove the heater nozzle by pulling it straight out; see Figure 12B.
4. Replace the upper vial holder by pulling it down firmly (see Figure 12C) until it is completely free of its mounting.
5. Put the heater nozzle and the plastic guard back in place.

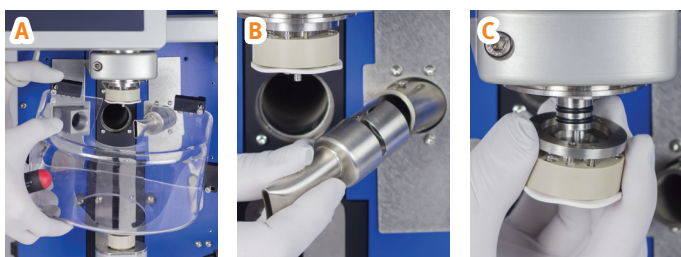


Figure 12. Removing the plastic guard (A), nozzle (B), and upper vial holder (C).

Change Carousel Sample Holder

There are four different carousel sample holders available: 20 and 30 mL vials (P/N 411181), 16 mL vials (P/N 411985), 4 mL vials type A and B (P/N 411182), and 4 mL vials type C (P/N 411183).

Note: Ensure that the system is idle before removing or mounting a carousel sample holder.

Remove the Carousel Sample Holder

Release the carousel sample holder by turning it counterclockwise until it stops and then lift it straight up.

Mount the Carousel Sample Holder

1. Insert the two front pegs on the bottom of the carousel sample holder into the corresponding holes in the carousel carriage (see Figure 13) and let the sample holder fall into place.

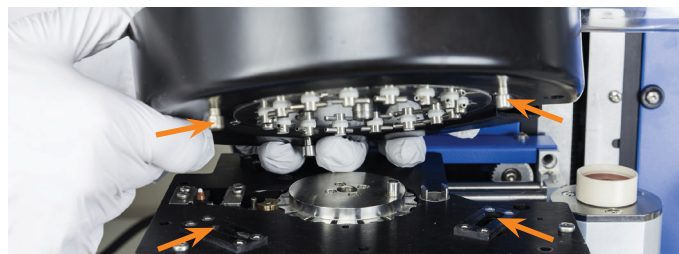


Figure 13. Aligning the front pegs with the holes on the carousel carriage.

2. If the carousel sample holder does not fall into place, rotate the vial holders until the driving wheel peg on the carousel carriage slides into the hole on the bottom of the sample holder. See Figure 14.

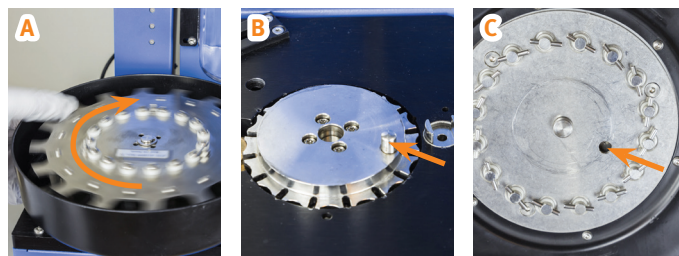


Figure 14. Rotate the vial holders (A) until the driving wheel peg (B) slides into the hole on the bottom of the carousel sample holder (C).

3. Lock the carousel sample holder by turning it clockwise until it stops. When the system is on, correct mounting is indicated by the second LED from the top on the carousel control box being green.

Fluid Connections

If the system is equipped with a built-in sample pump, all fluid connections should be connected as shown in Figure 15. Note that the sample inlet tube (blue in Figure 15) can be connected to either an external flask or a liquid handler.

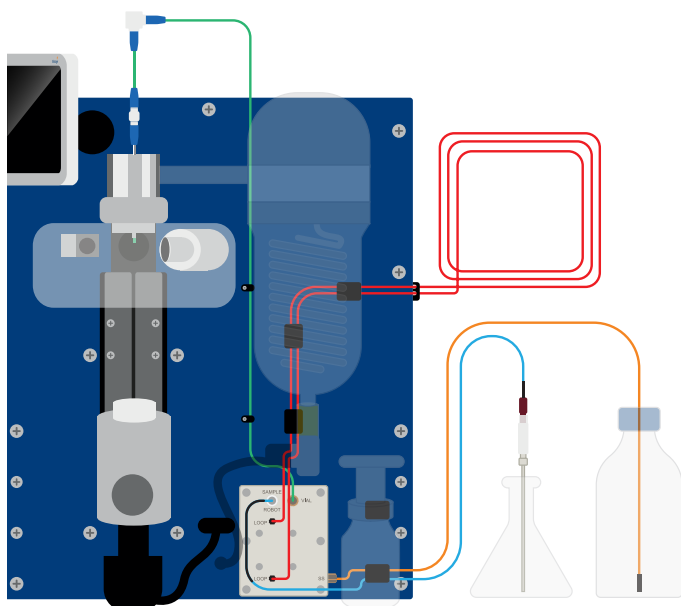


Figure 15. The fluid connections (not to scale).

The following ports are available on the pump manifold:

Port	Connect
LOOP (x2)	The sample loop (red in Figure 15).
SAMPLE ROBOT	The sample inlet tube (blue in Figure 15). The system is shipped with a sample inlet tube that must be used when aspirating sample solution from an external flask. If using a liquid handler, use the sample inlet tube that is supplied with the liquid handler. Note: During a prime operation that is started from the touch screen, the sample inlet tube must be placed in a suitable waste container.
VIAL	The vial tubing that is connected to the sample inlet connection (green in Figure 15). The green vial tube must stick out 2 to 3 mm from the upper vial holder or the upper vial adapter; see Figure 16.
SS	The system solvent inlet tube (orange in Figure 15).

Adjust the Green Vial Tube

The height of the green vial tube has to be adjusted according to the vial being used:

- » **Vials without upper vial adapter:** The tube must stick out 2 to 3 mm from the upper vial holder; see Figure 16A.
- » **Vials with upper vial adapter:** The tube must stick out 2 to 3 mm from the upper vial adapter; see Figure 16B.

Adjust the height by loosening the upper fitting at the sample inlet connection; see B in Figure 37 on page 23.

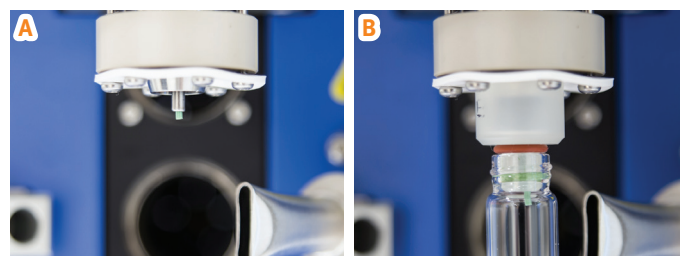


Figure 16. The tube must stick out 2 to 3 mm from the upper vial holder (A) or the upper vial adapter (B).

Start the System

Warning

- » If the system is equipped with a carousel, keep your hands away from the carousel during initialization.

1. Turn on (I) the system using the mains switch on the left side of the system.
2. If applicable, ensure that the external vacuum pump is connected and turned on during the evaporation operation.
Note: The external vacuum pump will only be used if it has been enabled both in the **System Setup** view (see "Define System Settings" on page 4) and in the method (see "Define a Method" on page 3).
3. If the system is equipped with a carousel, the **Alert – Initializing Carousel** dialog opens on the touch screen. Press **Initialize Carousel** and keep your hands away from the carousel until it has stopped moving.
Note: The carousel can only be used if it has been enabled in the **System Setup** view; see "Define System Settings" on page 4.
4. When the **Confirm Collection Vessel** dialog opens on the touch screen, ensure that the lower end of the drain tube is inserted into a collection vessel of a suitable size, and that the tube cannot become immersed in the waste liquid.

5. Press **Tube and Vessel in Position** to start the drain operation and to perform the condenser start-up.
6. Please wait for the condenser to reach its target temperature (-25 °C). This can take up to 20 minutes.

Note: If the system is used before the condenser temperature is below -20°C, the evaporation performance will be compromised. If the condenser is already cold, i.e. the system has recently been operated, the condenser start-up step is skipped.

Defrost and Drain the Condenser

As the condenser accumulates ice it becomes less efficient. If ice has built up, a defrost operation must be performed. See instructions on page 22. After the defrost operation is completed, the condenser will be drained.

The condenser is automatically drained when the system is started, after each evaporation, and after each defrost operation. It is also possible to drain the condenser manually; see instructions on page 22.

When using V-10 Touch Control Centre, it is possible to automatically defrost the condenser after a certain amount of sample solution has been evaporated using the liquid handler. If enabled, the automatic defrost will be performed after a job is completed and not in the middle of a job. See "Define Biotage® V-10 Touch Control Centre Settings" on page 13.

Prime the System

Warning

- » Handle chemical and liquid waste according to the Safety Data Sheets and to local/national guidelines on laboratory safety procedures.

If the system is equipped with a built-in sample pump, use the prime function to 1) remove any air bubbles from the pump and tubing by flushing them with system solvent or 2) empty the pump and tubing of system solvent used in the previous operation and fill them with a new system solvent.

Note: If a liquid handler is connected to the system, see "Prime Using Biotage® V-10 Touch Control Centre" below.

Note: If you need to abort a prime operation, e.g. in case of leakage, switch off (O) the system using the mains switch on the left side of the system.

1. If necessary, clean the tubing that is connected to the **VIAL** port on the pump manifold as described on page 23 before priming.
2. Insert the system solvent inlet tube into a suitable system solvent bottle.


Note: The system solvent should be miscible with the previous sample's system solvent and compatible with the next sample solution to be evaporated.

3. Insert the sample inlet tube, which is connected to the **SAMPLE ROBOT** port on the pump manifold, into a clean and empty waste container.
4. Select **Maintenance** from the menu bar on the touch screen.
5. Press **Prime**.
6. Press the **Prime Volume** field and enter the amount of system solvent to be used. 45 mL is the recommended minimum volume.

Note: The prime rate is defined in the **Sample Pump** view; see "Define Sample Pump Settings" on page 5.
7. Press **Prime** and then **Tube and Waste Container in Position** to start the prime operation.
8. When the prime operation is completed, the text "System Ready" is displayed in the top right corner of the touch screen. Remove and empty the waste container.

Prime Using Biotage® V-10 Touch Control Centre

1. If necessary, clean the tubing that is connected to the **VIAL** port on the pump manifold as described on page 23 before priming.
2. In the Controller application, select **Settings...** from the **File** menu. The **Settings** dialog opens.
3. Set the **Needle Drain Volume** to 40 mL and the **Needle Wash Volume** to 5 mL.
4. Insert the system solvent inlet tube into a suitable system solvent bottle.

Note: The system solvent should be miscible with the previous sample's system solvent and compatible with the next sample solution to be evaporated.
5. Click .
6. When the prime operation is completed, the text "Completed" is displayed in the top right corner of the software. If necessary, remove and empty the waste container.
7. Change the **Needle Drain Volume** and **Needle Wash Volume** parameters back to the desired settings for when cleaning the needle. Recommended volumes are 10 and 5 mL.

Set Up the Liquid Handler (Optional)

Before running an evaporation job using a liquid handler, ensure that the liquid handler is correctly set up.

1. Ensure that the liquid handler has the Z-arm positioned at 175 mm. To adjust the height, loosen the two screws holding the arm in position using a 2.5 mm Allen wrench. See Figure 17.



Figure 17. Ensure that the Z-arm is positioned at 175 mm (A). Adjust by loosening the two screws holding the arm in position (B).

2. Ensure that the needle is flush with the bottom of the needle guide (see Figure 18A) and not bent. To adjust the needle height, loosen the needle holder screw (see Figure 18B).

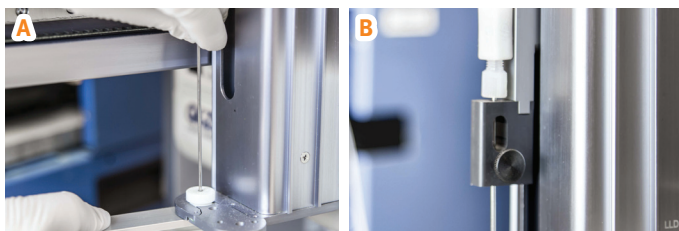


Figure 18. Ensure that the needle is flush with the bottom of the needle guide (A). Adjust by loosening the needle holder screw (B).

Evaporate

Warning

- » Keep your hands away from the vial loading arm and carousel (if used) while the vial is being loaded or unloaded.

Note: To evaporate using V-10 Touch Control Centre, see page 13.

Set Up and Start an Evaporation Run

Note: The carousel and the built-in sample pump are optional.

1. Prepare the system as described in "Prepare and Start the System" on page 6.
2. Depending on whether the built-in sample pump is used or not, insert the sample inlet tube into the sample solution or dispense the sample solution into the vial or vials (if using the carousel). Ensure that the dispensed volume does not exceed the maximum fill volume of the vial; see Table 2 on page 1.
3. Ensure that the correct upper and lower vial adapters are used, if applicable. See Table 2 on page 1.
4. Depending on whether the carousel is used or not, put the vial(s) into the carousel sample holder or put the vial into the lower vial holder.

To put vials into all carousel positions, remove the carousel sample holder, load the vials, and then remount the sample holder. See instructions on page 6.

5. Select **Evaporate** from the menu bar and set up the run; see Figure 19. For more information, see "Evaporation Parameters" below.
6. To start the run, press **Evaporate**.
7. If the **Confirm Fill Volume** dialog opens, confirm that the maximum fill volume has not been exceeded (see step 2) by pressing **Fill Volume is Correct**.

Evaporation Parameters

Note: Changes made in the **Evaporate** view will not be saved in the selected method.

The following evaporation parameters are available:

- » **Method:** The evaporation method. For more information, see "Evaporation Methods" on page 1.
- » **Vial Size:** The selected vial size; see "Vials" on page 1.
- » **Target Temperature:** The target temperature defined in the selected method.
- » **Target Pressure:** The target pressure defined in the selected method.
- » **Evaporation Mode*:** The selected evaporation mode:
 - » **Prefilled Vials:** Manual load with prefilled vials.
 - » **External Flask:** Multiple injections from a single sample, using the built-in sample pump. This feature is disabled when a liquid handler is enabled; see "Define System Settings" on page 4.

- » **Total Volume*:** The total volume of the sample solution to be evaporated. If the total volume is larger than the dispensation volume for the selected vial (see "Define a Vial" on page 4), the sample solution will be evaporated in aliquots. This field is only enabled when **Evaporation Mode** is set to **External Flask**.

Note: The volume of the sample inlet tube (+ probe) is taken into account when aspirating sample solution into the sample loop (see "Define Sample Pump Settings" on page 5).

Note: To clean the tubing, 2.8 mL of system solvent is added to the vial when all the sample solution has been aspirated.

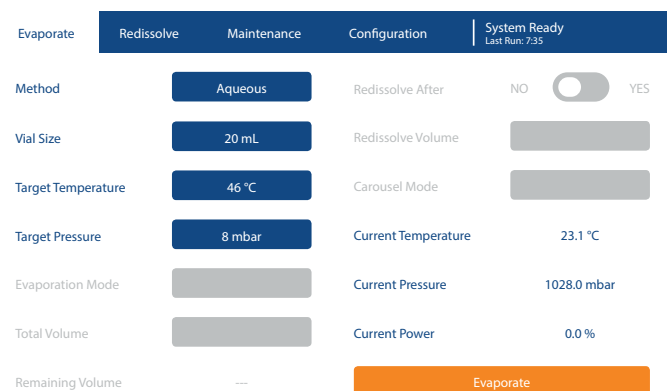


Figure 19. The Evaporate view during setup. This system has neither a built-in sample pump nor a carousel.

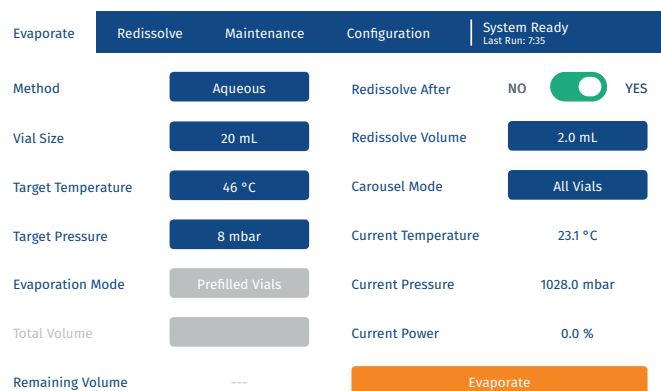


Figure 20. The Evaporate view during setup. This system has both a built-in sample pump and a carousel.

- » **Redissolve After**[†]: Defines whether the sample will be automatically redissolved after the evaporation (YES) or not (NO).
- » **Redissolve Volume**^{*}: The amount of system solvent to be used to redissolve the sample. This field is only enabled when **Redissolve After** is set to **YES**.

Note: The redissolve speed and the number of spin cycles is defined in the **Sample Pump** view; see "Define Sample Pump Settings" on page 5.
- » **Carousel Mode**[†]: The selected carousel mode:
 - » **Not Used:** Vials are placed manually into the lower vial holder.
 - » **All Vials:** The carousel will move the vials, one at the time, to the vial lift until all vial positions have been processed. Empty positions will be skipped over.
 - » **Continual:** The carousel will move the vials, one at the time, to the vial lift continually until you press **Stop**. The evaporation operation will not stop automatically when all vial positions have been processed. Empty positions will be skipped over.

* Only enabled if the system is equipped with a built-in sample pump.

† Only enabled if the system is equipped with a carousel.

Monitor an Evaporation Run

The current vial temperature, vacuum pressure, and applied heater power can be monitored in the **Evaporate** view; see Figure 21.

The task in progress is displayed in the top right corner of the touch screen.

Edit an Evaporation Run

During the evaporation run, it is possible to increase the target temperature and/or decrease the target pressure in the **Evaporate** view. To change these values, simply press the **Target Temperature** field and/or the **Target Pressure** field.

End and Unload an Evaporation Run

If the evaporation run is not ended automatically (the **End of Evaporation** is set to **Continual** in the used method or **Carousel Mode** is set to **Continual**), end the run by pressing **Stop**.

When the evaporation run is completed, the text "System Ready" followed by the total run time is displayed in the top right corner of the touch screen.

The vial will be unloaded when the pressure has been equalized. Remove the vial(s) and, if necessary, defrost the condenser (see page 22) and empty the drain collection vessel. The condenser is automatically drained after each evaporation.

If the sample solution was dispensed from an external flask using the built-in sample pump, clean the outside of the sample probe (connected to the sample inlet tube) and then clean the sample inlet tube and the inside of the probe by priming with 10 mL of a suitable solvent (see "Prime the System" on page 8).

Stop an Evaporation Run

To abort an evaporation run, at any time, press **Stop**. Any sample solution that has been aspirated but not dispensed into the vial will be returned to the external flask. Note that the vial will not be unloaded until the pump operation in progress (if any) has been completed and the pressure has been equalized.

To abort a pump operation, e.g. in case of leakage, switch off (O) the system using the mains switch on the left side of the system.

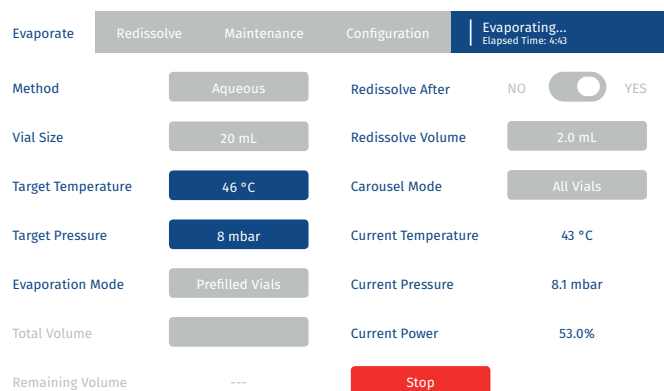


Figure 21. The Evaporate view during a run.

Redissolve

Set Up and Start a Redissolve Operation

In addition to the possibility of having a sample automatically redissolved after evaporation, it is possible to manually redissolve a sample at any time.

Warning

- » Keep your hands away from the vial loading arm and carousel (if used) while the vial is being loaded or unloaded.

Note: The carousel and the built-in sample pump are optional.

1. Prepare the system as described in "Prepare and Start the System" on page 6.
2. If not using the built-in sample pump, dispense the solvent into the vial or vials (if using the carousel). Ensure that the dispensed volume does not exceed the maximum fill volume of the vial; see Table 2 on page 1.
3. Ensure that the correct upper and lower vial adapters are used, if applicable. See Table 2 on page 1.
4. Depending on whether the carousel is used or not, put the vial(s) into the carousel sample holder or put the vial into the lower vial holder.
To put vials into all carousel positions, remove the carousel sample holder, load the vials, and then remount the sample holder. See instructions on page 6.
5. Select **Redissolve** from the menu bar and set up the redissolve operation; see Figure 22. For more information, see "Redissolve Parameters" below.
6. To start, press **Redissolve**.
7. If the **Confirm Fill Volume** dialog opens, confirm that the maximum fill volume has not been exceeded (see step 2) by pressing **Fill Volume is Correct**.

Evaporate	Redissolve	Maintenance	Configuration	System Ready Last Run: 7:35
Redissolve Speed	4000 rpm			
Redissolve Cycles	5 cycles			
Vial Size	20 mL			
Dispense Method	Auto			
Redissolve Volume	2.0 mL			
Carousel Mode	Not Used			
Redissolve				

Figure 22. The Redissolve view during setup. This system has both a built-in sample pump and a carousel.

8. When the redissolve operation is completed, the text "System Ready" is displayed in the top right corner of the touch screen. Remove the vial(s).

Redissolve Parameters

The following redissolve parameters are available:

- » **Redissolve Speed:** The rotational speed of the vial (in rpm) during the redissolve operation.
- » **Redissolve Cycles:** The number of spin cycles.
- » **Vial Size:** The selected vial size.
- » **Dispense Method*:** The selected dispense method:
 - » **Auto:** Solvent is added using the built-in sample pump.
 - » **Manual:** Solvent is added manually.
- » **Redissolve Volume*:** The amount of system solvent to be used to redissolve the sample. This field is only enabled when **Dispense Method** is set to **Auto**.
- » **Carousel Mode†:** The selected carousel mode:
 - » **All Vials:** The carousel will move the vials, one at the time, to the vial lift until all vial positions have been processed. Empty positions will be skipped over.
 - » **Not Used:** Vials are placed manually into the lower vial holder.

* Only enabled if the system is equipped with a built-in sample pump.

† Only enabled if the system is equipped with a carousel.

Stop a Redissolve Operation

To abort a redissolve operation, press **Stop**. Note that the vial will not be unloaded until the pump operation in progress (if any) has been completed and the pressure has been equalized.

To abort a pump operation, e.g. in case of leakage, switch off (O) the system using the mains switch on the left side of the system.

Evaporate Using Biotage® V-10 Touch Control Centre

Warning

- » The system can be controlled either through the touch screen or through an external computer running V-10 Touch Control Centre. When using V-10 Touch Control Centre, it is your responsibility to ensure that you will not interfere with an operation that is about to be started through the touch screen.

V-10 Touch Control Centre is installed on an external computer and adds the capabilities of integrating the V-10 Touch system with a liquid handler as well as running the carousel with different methods for different carousel positions.

V-10 Touch Control Centre consists of two application programs, Controller and Editor. Use the Controller to control runs on the V-10 Touch system and the Editor to define workspaces for the liquid handler bed (see page 17).

Note: Never run the Controller and Editor simultaneously as only one of them will be able to communicate with the system.

Connect an External Computer

For information on how to connect the V-10 Touch system to an external computer running V-10 Touch Control Centre, see the “Biotage® V-10 Touch Installation and Safety” document.

Prepare the System

Prepare the system as described in "Prepare and Start the System" on page 6.

Define Biotage® V-10 Touch Control Centre Settings

To change V-10 Touch Control Centre settings, open the Controller application and select **Settings...** from the **File** menu. The following parameters are available in the **Settings** dialog:

- » **Needle Drain Volume (mL):** The amount of system solvent that is used to clean the tubing at the drain station before cleaning the needle. Recommended minimum volume is 10 mL.
- » **Needle Wash Volume (mL):** The amount of system solvent that is used to clean the inside and outside of the needle at the wash station. Recommended minimum volume is 5 mL.
- » **Needle and Sample Inlet Tube Volume (mL):** The volume of the needle and sample inlet tube. This volume is taken into account when aspirating sample solution from a test tube on the liquid handler bed into the sample loop. When using the needle and sample inlet tube supplied by Biotage, it must be set to 2 mL.

- » **Flush Volume for Needle and Sample Inlet Tube (mL):** The amount of system solvent that is used to purge the needle and sample inlet tube (to remove air) before moving to the next source tube in the same job. Recommended volume is 2 mL.

- » **Sample Aspiration Rate (mL/min):** The flow rate when aspirating sample solution into the sample loop.

Note: The default rate (10 mL/min) should work for most solvents. However, we suggest a lower aspiration rate for solvents with high viscosity or low boiling points.

- » **Sample Dispense Rate (mL/min):** The flow rate when dispensing sample solution from the sample loop into the evaporation vial.

Note: This setting overrides the **Dispense Rate** setting for the used vial; see page 4.

- » **Use Carousel:** Defines whether the carousel can be used () or not () from V-10 Touch Control Centre.

Note: The carousel also has to be enabled in the **System Setup** view on the touch screen; see page 4.

- » **Instrument IP Address:** The IP address of the V-10 Touch system that the external computer is connected to. The address is found in the **System Setup** view on the touch screen; see page 4.


- » **Automatic Defrost After Sample Volume (mL):** If enabled, the system will automatically defrost the condenser when the specified amount of sample solution has been evaporated using the liquid handler. Note that an automatic defrost is done after a job is completed and not in the middle of a job.

- » **Sample Volume Since Last Automatic Defrost (mL):** The amount of sample solution that has been evaporated, using the liquid handler, since the last automatic defrost operation. If performing a manual defrost, the counter can be reset by pressing **Reset Counter**.

Note: For information on system settings that are entered through the touch screen, see page 4.

Clean the Needle and Vial Tubing

The needle and vial tubing are cleaned automatically (separately) after the last sample aspiration in each job. The system solvent that is used to clean the vial tubing (2.8 mL) is added to the vial and evaporated.

It is also possible to clean the needle manually at any time when the system is not processing by clicking . First the needle is lowered into the drain station where the tubing is cleaned, then into the wash station where the inside and outside of the needle are cleaned. The amount of system solvent used in each step is defined in the **Settings** dialog; see above.

Set Up an Evaporation Job

Warning

- » Keep your hands away from the vial loading arm and carousel (if used) while the vial is being loaded or unloaded.

1. Start the Controller application.
2. If using a liquid handler:
 - a. Open the workspace that fits your setup; select **Open Workspace...** from the **File** menu. To define a new workspace; see page 17.
 - b. Load the racks and source tubes onto the liquid handler bed. Ensure that they correspond to the workspace setup.
 - c. In the software, select the test tubes that contain the sample solution for the job. A selected source tube is highlighted in red; see Figure 23.
3. Set up the evaporation parameters. For more information, see "Evaporation Parameters" below.
4. Click **Add Rack Job** or **Add Prefilled Vial** to add the job to the queue. If using a carousel, the next free carousel position (counting from "A") is automatically assigned and displayed in the **Slot** column in the job list. Put the vial into that position. Otherwise, the vial has to be put into the lower vial holder when prompted by the software. Ensure that the correct upper and lower vial adapters are used, if applicable. See Table 2 on page 1.

Note: If processing prefilled vials, ensure that the dispensed volume does not exceed the maximum fill volume of the selected vial; see Table 2 on page 1.
5. To set up another job, repeat step 2c through 4.

Evaporation Parameters

The following evaporation parameters are available in the Controller application:

- » **User:** The name of the user. The predefined user list has four users (User A-D). To add a user and/or change a user name, edit the users.txt file, located at C:\Program Files (x86)\Biotage\Biotage V-10 Touch Control Centre, using a text editor. Each user must be listed on its own line. Note that Controller has to be restarted for the changes to take effect.
- » **Method:** The evaporation method. For more information, see "Evaporation Methods" on page 1.

Note: If using a liquid handler, only use methods that have the parameter **End Evaporation** set to **Auto** or **Timed**; see "Define a Method" on page 3.
- » **Vial Size:** The selected vial size; see "Vials" on page 1.
- » **Sample Name:** The sample name. Optional.
- » **Sample Volume (mL):** The amount of sample solution that shall be aspirated from each source tube in the job.

- » **Test Tube Rinse:** Defines whether all the source tubes except for the last one will be rinsed (Yes) or not (No) after its content has been dispensed. The rinse liquid will be added to the vial and evaporated.
- » **Volume (mL):** The amount of system solvent to be used to rinse in-between the source tubes.
- » **Last Tube Rinse:** The number of times (none, once, or twice) the last source tube will be rinsed after its content has been dispensed. The rinse liquid will be added to the vial and evaporated.
- » **Volume (mL):** The amount of system solvent to be used to rinse the last source tube.
- » **Redissolve After:** Defines whether the sample is to be automatically redissolved after the evaporation (Yes) or not (No).
- » **Volume (mL):** The amount of system solvent to be used to redissolve the sample.*
- » **Speed (rpm):** The rotational speed of the vial (in rpm) during the redissolve operation.*
- » **Cycles:** The number of spin cycles for the redissolve operation.*
- » **Notes:** A note about the job. Optional.

* Only enabled when the parameter **Redissolve After** is set to "Yes".

Modify or Delete a Queued Evaporation Job

Modify a Queued Evaporation Job

An evaporation job can be modified before it has been started.

1. Select the job in the job list. If it is a rack job, the source tubes are highlighted in purple.
2. To remove a source tube, click it. A removed vial shifts from purple to blue.
3. To add a source tube, click it. An added tube is highlighted in red.
4. Edit the desired evaporation parameters; see "Evaporation Parameters" above.
5. When done, click **Modify Selected Job** to save the changes.

Note: If you want to cancel the changes, click an empty row in the job list or deselect (click) the selected job.

Delete a Queued Evaporation Job

To delete a queued job, select it in the job list and click **Delete Selected Job**. After an evaporation job has been deleted, its carousel position (if used) becomes available for a new sample.

Note: It is not possible to delete a job that is being processed.

Save and Open a Job List

It is possible to save a job list and use it again.

Note: Any jobs that are currently in the job list will be deleted when a job list is opened.

To save a job list:

1. Select **Save Job List...** from the **File** menu.
2. In the **Save a JobList File** dialog, select the folder to save the job list in, enter the file name, and click **Save**.

To open a job list:

1. Select **Open Job List...** from the **File** menu.
2. In the **Open** dialog, select the desired job list and click **Open**.


Start the Queue

Warning

» The system can be controlled either through the touch screen or through an external computer running V-10 Touch Control Centre. When using V-10 Touch Control Centre, it is your responsibility to ensure that you will not interfere with an operation that is about to be started through the touch screen.

1. Ensure that the V-10 Touch Control Centre settings are according to your requirements; see page 13.
2. Ensure that all the jobs in the job list have their source tubes on the liquid handler bed and, if using the carousel, their evaporation vials in the assigned positions in the carousel sample holder.

When selecting a queued job in the job list, its source tubes are highlighted in purple and the assigned carousel position (if applicable) is highlighted in red (rack job) or green (prefilled vial). See Figure 24.

3. If the carousel is not used, put the evaporation vial for the first job into the lower vial holder. Ensure that the correct upper and lower vial adapters are used, if applicable. See Table 2 on page 1.
4. Click  to start the first job in the job list.
5. If the carousel is not used and there is more than one evaporation job in the job list, the **Job Complete** dialog opens when an evaporation job is completed. Replace the vial and click **Yes** to start the next evaporation job.

Note: If you click **No**, the text “Stopped” appears in the upper right corner of the software and the next evaporation will not start until you click .

6. When the system has processed all the jobs in the queue, empty the drain collection vessel.

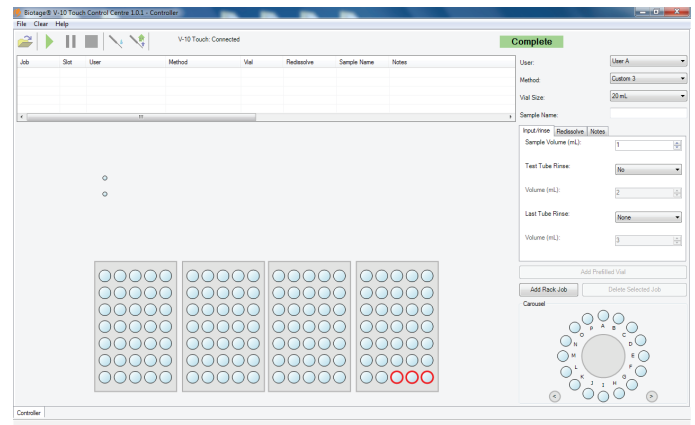


Figure 23. The Controller application when setting up a rack job. Selected source tubes are highlighted in red.

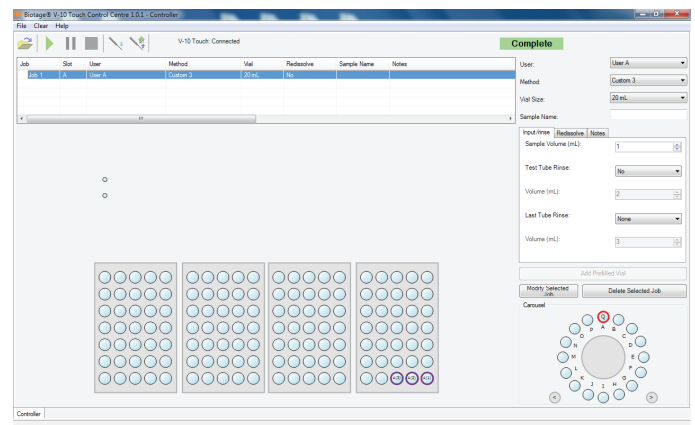


Figure 24. When selecting a queued rack job in the job list, the source tubes are highlighted in purple and the assigned carousel position in red.

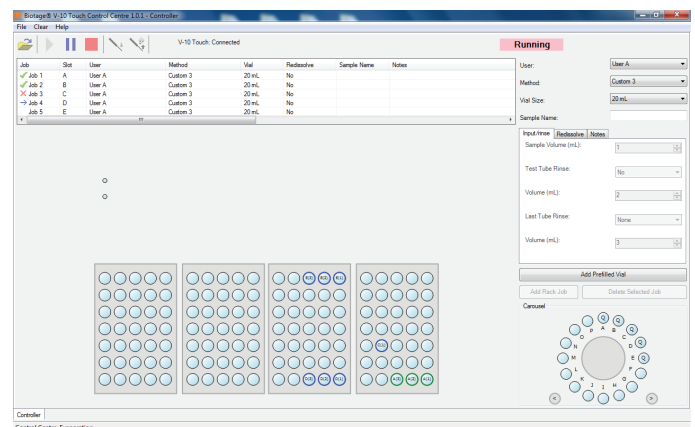





Figure 25. The Controller application when processing jobs. Blue source tubes on the workspace are assigned to queued or failed jobs and green to completed jobs. The following icons are used to display the status of a job:  = in progress,  = completed, and  = failed.

Monitor an Evaporation Job

When an evaporation job is being processed, the text “Running” appears in the upper right corner of the software and the → icon is displayed to the left of the job name in the job list. See Figure 25.

The current vial temperature, vacuum pressure, and applied heater power can be monitored in the **Evaporate** view on the touch screen; see Figure 26.

The task in progress is displayed in the top right corner of the touch screen during the evaporation phase and in the lower left corner of the Controller application when the system is loading and unloading the vial and pumping and moving liquids.

When an evaporation job is completed, the text “Completed” appears in the upper right corner of the Controller application, the source tubes change from blue to green, and the ✓ icon is displayed to the left of the job name in the job list.

Edit an Evaporation Job in Progress

During the evaporation run, it is possible to increase the target temperature and/or decrease the target pressure in the **Evaporate** view on the touch screen. To change these values, simply press the **Target Temperature** field and/or the **Target Pressure** field.

Unload and Clear an Evaporation Job

Warning

- » Keep your hands away from the vial loading arm and carousel (if used) while the vial is being loaded or unloaded.
- » Handle chemical and liquid waste according to the Safety Data Sheets and to local/national guidelines on laboratory safety procedures.

When a completed job is selected in the job list, the carousel position (if applicable) is highlighted in red (rack job) or green (prefilled vial). The source tubes are green and labeled with the same letter as the carousel position.

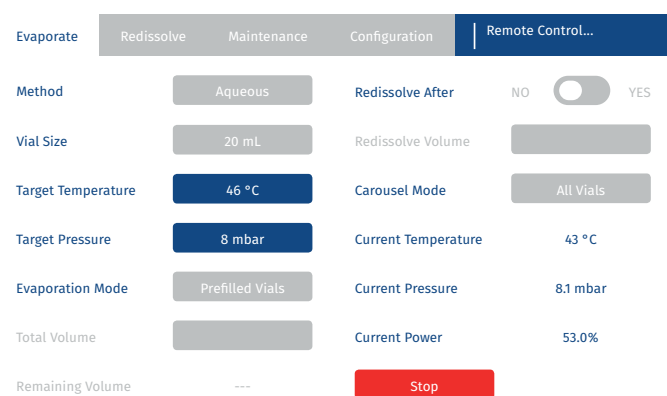


Figure 26. When a run is controlled by V-10 Touch Control Centre, the text “Remote Control” is displayed in the top right corner of the touch screen when the system is loading and unloading the vial and pumping and moving liquids.

When a failed job is selected in the job list, the source tubes are highlighted in purple and the carousel position in red (rack job) or green (prefilled vial).

To clear carousel and/or rack positions, select one of the following options from the **Clear** menu:

- » **All Completed Tubes:** Clears all rack positions that are assigned to completed jobs.
- » **All Completed Jobs:** Clear all carousel and rack positions that are assigned to completed jobs.
- » **All Failed Jobs.** Clear all carousel and rack positions that are assigned to failed jobs.

Pause an Evaporation Job

To pause a job, click ⏸. Note that task in progress will be completed and the pressure will be equalized before the job is paused and the text “Paused” appears in the upper right corner of the software. If pausing when the system is evaporating, the evaporation will be completed and the vial will be unloaded before the job is paused. Resume the processing by clicking ▶.

Stop an Evaporation Job

To abort an evaporation job, click ⏹. Any sample solution that has been aspirated but not dispensed into the evaporation vial will be returned to the source tube. Note that the evaporation vial will not be unloaded until the pump operation in progress (if any) has been completed and the pressure has been equalized.

When an evaporation job has been stopped, the text “Cancelled” appears in the upper right corner of the software and the ✖ icon is displayed to the left of the job name in the job list. To re-start the job, select the job, click **Re-Submit Job**, and then click ▶.

To abort a pump operation, e.g. in case of leakage, switch off (O) the system using the mains switch on the left side of the system.

Log Files

Job information is logged in a dated log file at C:\Program Files (x86)\Biotage\Biotage V-10 Touch Control Centre\logs. A new file is started each month (“WorkLog_YYYY_MM.xls”, where “YYYY” represents the year and “M” is the number of the month). The logs files are saved for a year.

It is also possible to export two more detailed log files containing all the system events and errors that have occurred. Export the logs by selecting **Settings...** from the **File** menu and then pressing **Export Log Files...** in the **Settings** dialog.

Define Workspaces for a Liquid Handler

If you cannot use any of the predefined workspaces, you can use the Editor application to create a workspace that allows your racks to be loaded onto the liquid handler bed.

Note: Never run the Editor and Controller applications simultaneously as only one of them will be able to communicate with the system.

Create and Edit a Rack

1. Start the Editor application and select the **Rack Editor** tab. The default rack is displayed; see Figure 27.
2. To edit or base a new rack on an existing one, select **Open Rack...** from the **File** menu, select the desired rack, and then click **Open**. The selected rack opens.

Note: Editing a rack does not alter the definition of that rack in existing workspaces.
3. To create a new rack from scratch, select **Clear Rack** from the **Edit** menu.
4. Enter the desired rack settings; see "Rack Parameters" below.
5. When done, select **Save Rack...** from the **File** menu. The **Save As** dialog opens.
6. Select the folder to save the rack in, enter the file name, and click **Save**. The predefined racks are located in the *Racks and workspaces* folder (C:\Program Files (x86)\Biotage\Biotage V-10 Touch Control Centre\Racks and workspaces).

Rack Parameters

The following rack parameters are available:

- » **Width:** The maximum width of the rack in millimeters. Used for defining the required footprint on the liquid handler bed.
- » **Length:** The maximum length of the rack in millimeters. Used for defining the required footprint on the liquid handler bed.
- » **RackOffset:** The **X** and **Y** coordinates of the top left corner of the rack in reference to the **SiteOffset** position, in millimeters.
- » **SiteOffset:** The **X** and **Y** coordinates of the centre of the first test tube in millimeters. It is recommended to be set to "0, 0". It positions the test tube array within the defined rack footprint.
- » **FlushDepth:** The distance between the top of the test tube and the flush position, in millimeters. Normally the flush position will be a few millimeters below the rim of the test tube, so that most of the test tube's inner surface is flushed with system solvent when the **Test Tube Rinse** and/or **Last Tube Rinse** parameters are enabled (see "Set Up an Evaporation Job" on page 14).

- » **Pitch:** The distance (in millimeters) between adjacent sites within the rack, along the **X**- and **Y**-axes, center-to-center of the test tube positions.
- » **Diameter:** The diameter of the test tube (in millimeters) sets the visual representation of the rack. It also affects the test tube capacity (see the last bullet in the list).
- » **Count:** The number of test tubes along the **X**- and **Y**-axes. The total number of test tubes is the product of these two numbers.
- » **Depth:** The distance (in millimeters) from the top to the bottom of the test tube. This affects the test tube capacity (see the last bullet).
- » **TestTubeCapacity:** The test tube capacity (in milliliters) is calculated from the diameter and depth settings.

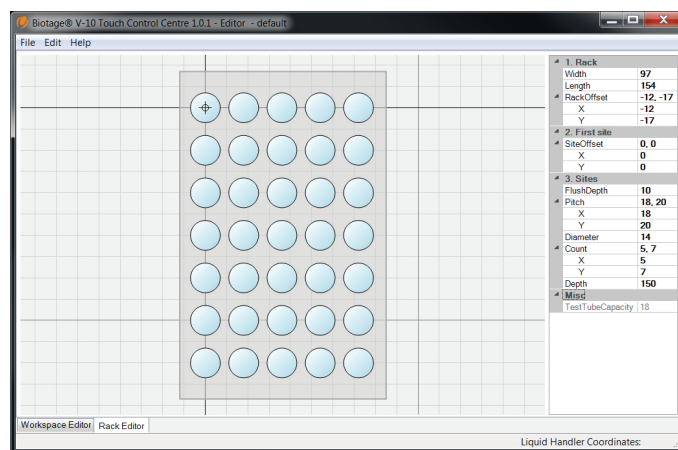


Figure 27. The rack editor with the default rack.

Create and Edit a Workspace

1. Ensure that the liquid handler has the Z-arm positioned at 175 mm and the needle is flush with the bottom of the needle guide and not bent; see Figure 17 and Figure 18 on page 9.
2. Start the Editor application and select the **Workspace Editor** tab. The default workspace (without racks) is displayed.
3. To edit or base a new workspace on an existing one:
 - a. Select **Open Workspace...** from the **File** menu. The **Open** dialog opens.
 - b. Select the desired workspace and click **Open**. The selected workspace with its racks opens.
 - c. To remove a rack, select the rack and click **Remove**.
 - d. Select each one of the racks that you want to keep and ensure that they have the correct **Rack Location** settings; see "Rack Location Settings" on page 18.

4. To insert a rack:
 - a. Click **Insert....** The **Open** dialog opens.
 - b. Select a rack and click **Open**. The selected rack is then floating in the workspace, moving with the cursor.
 - c. Optionally, modify the setting in the **Snap** list. This setting controls the accuracy of the cursor. Recommended value is 1 mm (default).
 - d. Click to position the rack. The rack is dropped onto the liquid handler bed.
 - e. Ensure that the rack has the correct **Rack Location** settings; see "Rack Location Settings" below.
5. To move a rack, either select it and change the **X** and/or **Y** coordinates under **Rack Location** or right-click the rack and select **Move Rack** in the appearing menu.
6. When the workspace setup is completed, select **Save Workspace....** from the **File** menu. The **Save As** dialog opens.
7. Select the folder to save the workspace in, enter the file name, and click **Save**. The predefined workspaces are located in the *Racks and workspaces* folder (C:\Program Files (x86)\Biotage\Biotage V-10 Touch Control Centre\Racks and workspaces).
8. Verify the workspace setup before using it; see below.

Workspace Parameters

Liquid Handler Settings

Note: If the liquid handler is set up correctly (see Figure 17 and Figure 18 on page 9), the default settings for the **Liquid Handler** parameters should be used.

- » **Drain:** The **X** and **Y** coordinates of the drain station, which is used for dispensing waste liquid, in millimeters. Default: 3,2.
- » **DrainDepth:** The distance between the bottom of the needle guide (needle home) and the drain position, in millimeters. Default: 40.
- » **Wash:** The **X** and **Y** coordinates of the wash station, which is used for cleaning the inside and outside of the needle, in millimeters. Default: 3,21.
- » **WashDepth:** The distance between the bottom of the needle guide (needle home) and the wash position, in millimeters. Default: 110.
- » **Workspace:** The area where the needle can reach along the **X**-, **Y**- and **Z**-axes in millimeters; the green area in Figure 28. The measurements are based on the used liquid handler and cannot be changed. Gilson GX-271: 389 x 294 x 175.

Rack Location Settings

- » **X, Y:** The **X** and **Y** coordinates of the centre of the first test tube in the rack in reference to the top left corner of the workspace area (the home position), in millimeters.
- » **Z:** The distance between the rim of the test tube and the bottom of the needle guide (needle home), in millimeters.

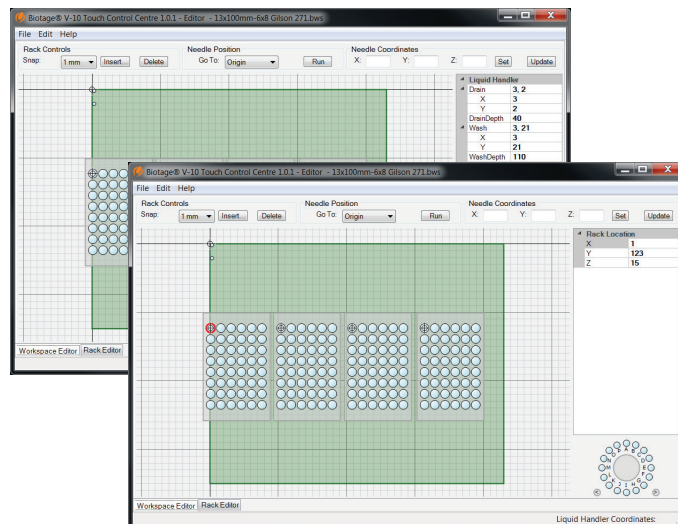


Figure 28. The workspace editor showing the liquid handler settings (top) and the rack location settings (bottom).

Verify the Setup of a Workspace

Verify Liquid Handler Settings

Verify the home, drain, and wash positions of the liquid handler by selecting the following commands from the **Go To** list and clicking **Run**.

- » **Home:** Moves the needle to the home position of the liquid handler.
- » **Drain:** Lowers the needle into the drain station. This position is decided by the **Drain** and **DrainDepth** parameters in the workspace setup; see above.
- » **Wash:** Lowers the needle into the wash station. This position is decided by the **Wash** and **WashDepth** parameters in the workspace setup; see above.

Note: To reduce the risk of bending the needle, loosen the needle using the needle holder screw before using the **Wash** command.

Verify Rack and Rack Location Settings

Note: Editing a rack does not alter the definition of that rack in an existing workspace.

To reduce the risk of bending the needle and/or breaking a test tube, we recommend the following procedure:

1. Ensure that the liquid handler has the Z-arm positioned at 175 mm and that the needle is flush with the bottom of the needle guide and not bent; see Figure 17 and Figure 18 on page 9.
2. Verify the **Rack Location** settings (see page 18) for each rack:
 - a. Remove the first test tube (top left) in the rack and select its position in the software.

- b. Select **Tube - Top** from the **Go To** list and click **Run**. Ensure that the needle moves to the centre of the selected rack position and to the height where the rim of the test tube would have been if present. Otherwise, adjust the **Rack Location** settings (see page 18) and try again.
 - c. Repeat steps 2a through 2b for the other racks.
 3. Verify a rack's **Pitch** settings (see page 17):
 - a. Remove the test tube in the lower left rack position in the first rack and select its position in the software.
 - b. Select **Tube - Top** from the **Go To** list and click **Run**. Ensure that the needle is in the centre of the selected rack position. Otherwise, adjust the **Y** coordinate for the rack's **Pitch** parameter (see page 17), re-import the rack, and try again.
 - c. Remove the test tube in the lower right rack position in the first rack and select its position in the software.
 - d. Select **Tube - Top** from the **Go To** list and click **Run**. Ensure that the needle is in the centre of the selected rack position. Otherwise, adjust the **X** coordinate for the rack's **Pitch** parameter (see page 17), re-import the rack, and try again.
 - e. If applicable, repeat steps 3a through 3d for other rack types that are present on the workspace.
 4. Now verify the **Rack Location** settings with a test tube in place using the **Tube - Top** command. Do this for at least one rack position in each rack.
 5. Verify the flush position:
 - a. Select a rack position with a test tube in place.
 - b. Select **Tube - Flush** from the **Go To** list and click **Run**. Ensure that needle moves to the desired flush position. Otherwise, adjust the rack's **FlushDepth** parameter (see page 17), re-import the rack, and try again.
 - c. Repeat steps 5a through 5b for at least one test tube in each rack.
 6. Verify the length of the test tubes:
 - a. To reduce the risk of bending the needle and/or breaking a test tube, loosen the needle using the needle holder screw.
 - b. Select a rack position with a test tube in place in the software.
 - c. Select **Tube - Bottom** from the **Go To** list, and click **Run**. Ensure that the needle reaches the bottom of the test tube. Otherwise, adjust the rack's **Depth** parameter (see page 17), re-import, and try again.

Note: If the needle hits the bottom of a test tube, go to the home position using the **Home** command and readjust the needle before you proceed. When in home position, the needle must be flush with the bottom of the needle guide.
 - d. Repeat steps 6a through 6c for at least one test tube in each rack.

Maintenance

Clean the Exterior of the System

Warning

- » Ensure that the system is turned off and the power cord is disconnected.

Clean the exterior of the system as often as required. If the touch screen has been contaminated by chemicals, it must be cleaned immediately.

1. Turn off (O) the system and disconnect the power cord.
2. Clean the touch screen with a soft and clean cloth. The cloth can be lightly dampened with isopropanol or ethanol.
3. Clean the exterior of the system with a soft and clean cloth. The cloth can be lightly dampened with ethanol or similar.

Clean the Condenser Pot

Warning

- » Defrost the condenser before cleaning the condenser pot.
- » The drain valve may get warm during the drain operation.
- » Ensure that the system is turned off and the power cord is disconnected before cleaning the condenser pot.

To prevent the drain valve from becoming clogged, the condenser pot should be cleaned once a week.

1. Defrost the condenser as described on page 22.
2. Turn off (O) the system and disconnect the power cord.
3. Remove the condenser pot:
 - a. Remove the drain tube from the collection vessel.
 - b. Unscrew and carefully pull out the drain valve from the condenser pot; see Figure 29A.
 - c. While holding the condenser pot, loosen the clamp by pulling the lever away from the pot. See Figure 29B.
 - d. Disengage the condenser pot from the clamp and carefully remove the pot; see Figure 29C.



Figure 29. A: Removing the drain valve from the condenser pot. B: Loosening the clamp. C: Removing the condenser pot.

4. Clean the condenser pot using a solvent suitable for the residues.
5. Remount the condenser pot:
 - a. Ensure that the seal is in place and in good condition; see Figure 30A. If the seal is broken or worn, replace it (P/N 410184).
 - b. Carefully place the condenser pot around the condenser coils and raise it until the glass flange is sitting within the steel clamp ring. Ensure that the condenser pot is flush with the surface and enclosed by the clamp.
 - c. Ensure that the clamp's locking arm is in position before tightening the clamp; see Figure 30B. If necessary, adjust the toggle clamp so it applies only gentle pressure to the sealing faces and clamp the toggle shut.
 - d. Reconnect the drain valve. If the two O-rings on the drain valve are broken or worn, replace them (P/N 410191).
 - e. Insert the lower end of the drain tube back into the collection vessel. Ensure that the tube cannot become immersed in the waste liquid.

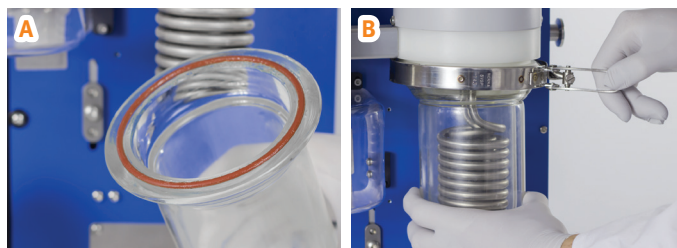


Figure 30. A: The seal in place. B: Clamping the toggle shut.

Clean the Lower Vial Holder

Warning

- » Ensure that the system is turned off and the power cord is disconnected.

1. Turn off (O) the system and disconnect the power cord.
2. Loosen the center screw by using the T20 Torx screwdriver supplied with the system; see Figure 31A.
3. Remove the lower vial holder by rocking it side-to-side until it is free.
4. Clean the lower vial holder and underneath it.
5. Put the lower vial holder back in place. Ensure that the cutout on the underside of the holder is aligned with the vial loading arm. See Figure 31B.

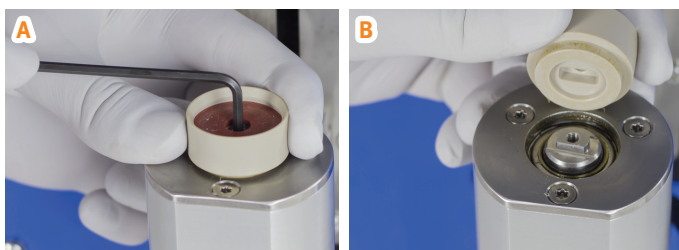


Figure 31. A: Remove the lower vial holder by loosening the center screw. B: Align the lower vial holder with the vial loading arm.

Clean the Plastic Guard

Warning

- » Ensure that the system is turned off and the power cord is disconnected.
- » The heater nozzle may get warm during operation.
- » Never operate the system with the plastic guard removed.

1. Turn off (O) the system and disconnect the power cord.
2. Loosen the plastic guard's four mounting screws, using the T20 Torx screwdriver supplied with the system, and remove the guard by pulling it straight out. See Figure 32.
3. Clean the plastic guard and the area behind the guard using a clean and soft cloth lightly dampened with a suitable solvent, such as ethanol or isopropanol.
4. Put the plastic guard back in place.

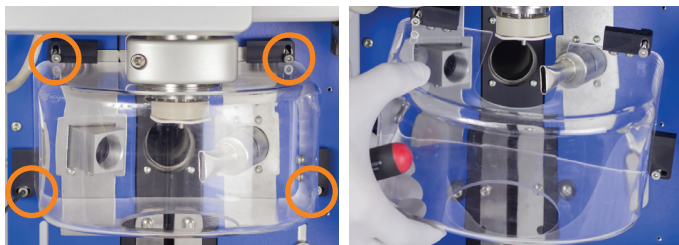


Figure 32. Remove the plastic guard by loosening the four mounting screws holding the guard in place.

Clean or Replace the Vial Face Seal and Lubricate or Replace the Vial Holder O-rings

Warning

- » Ensure that the system is turned off and the power cord is disconnected.
- » The heater nozzle may get warm during operation.
- » Never operate the system with the plastic guard removed.

1. Turn off (O) the system and disconnect the power cord.

2. Remove the plastic guard as described in step 2 in "Clean the Plastic Guard" above.
 3. Remove the heater nozzle by pulling it straight out; see Figure 33A.
 4. Pull down firmly on the upper vial holder until it is completely free of its mounting; see Figure 33B.
 5. If the vial face seal and upper vial holder are contaminated, clean them with a clean and soft cloth lightly dampened with a suitable solvent, such as ethanol or isopropanol.
 6. If the vial face seal is broken or worn:
 - a. Use your fingers to pry the vial face seal off the screws on the upper vial holder; see Figure 33C.
- Note:** It is important that the screws that keep the vial face seal in place are not removed or loosened.
- b. Press a new seal (P/N 410790 or 412866 when using the 16 mL vial holder) tightly beneath the screws. Ensure that the inner edge of the vial face seal is pressed tight to the base of the center hub of the upper vial holder.



Figure 33. A: Removing the heater nozzle. B: Removing the upper vial holder. C: Loosening the vial face seal.

7. If the upper vial holder O-rings (see Figure 34A) need to be lubricated, apply a thin layer of vacuum grease to the inside of the upper vial holder (see Figure 34B).

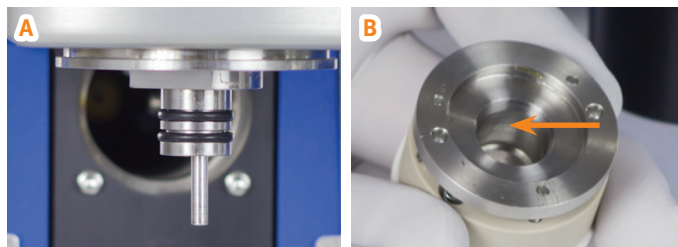


Figure 34. A: The upper vial holder O-rings. B: Lubricate the O-rings by applying a thin layer of vacuum grease to the inside of the upper vial holder.

8. If the upper vial holder O-rings need to be replaced (P/N 410262), use a pointed utensil (e.g. a small screwdriver) to pry them off the upper vial holder, one at a time.
9. Put the upper vial holder, the heater nozzle, and the plastic guard back in place.

Clean the Upper Spin Head, Vapor Duct, and Condenser Pot Inlet Region

Refer to Technical Bulletin TB00020.

Defrost the Condenser

As the condenser accumulates ice it becomes less efficient. If ice has built up, a defrost operation must be performed. After the defrost operation is completed, the condenser will be drained.

Note: When using a liquid handler, it is possible to set up the system to automatically defrost when a certain amount of sample solution has been evaporated. See "Define Biotage® V-10 Touch Control Centre Settings" on page 13.

Warning

- » Handle chemical and liquid waste according to the Safety Data Sheets and to local/national guidelines on laboratory safety procedures.

1. Ensure that a flexible, solvent resistant tube with an inner diameter of 6 mm (1/4 inch) is connected to the condenser drain connector (see Figure 35), and inserted into a collection vessel of a suitable size. Ensure that the tube cannot become immersed in the waste liquid.
2. Select **Maintenance** from the menu bar on the touch screen.
3. Press **Defrost**.
4. Press the **Defrost Time** field and enter the defrost time.
5. Press the **Drain Time** field and enter the drain time.
6. Press **Defrost** and then **Tube and Vessel in Position** to start the defrost operation.
7. Ensure that the condenser is free of ice and liquid. Otherwise, perform another defrost operation.

Drain the Condenser

The condenser is automatically drained when the system is started, after each evaporation, and after each defrost operation. It is also possible to drain the condenser manually.

Warning

- » Handle chemical and liquid waste according to the Safety Data Sheets and to local/national guidelines on laboratory safety procedures.

1. Ensure that a flexible, solvent resistant tube with an inner diameter of 6 mm (1/4 inch) is connected to the condenser drain connector (see Figure 35), and inserted into a collection vessel of a suitable size. Ensure that the tube cannot become immersed in the waste liquid.
2. Select **Maintenance** from the menu bar on the touch screen.
3. Press **Drain**.

4. Press the **Drain Time** field and enter the drain time.
5. Press **Drain** and then **Tube and Vessel in Position** to start the drain operation.



Figure 35. The drain tube on the condenser drain connector.

Replace the Drain Tube

Warning

- » Ensure that the system is turned off and the power cord is disconnected.

1. Turn off (O) the system and disconnect the power cord.
2. Remove the collection vessel.
3. Carefully remove the drain tube from the condenser drain connector; see Figure 35.
4. Gently push a new flexible, solvent resistant drain tube with an inner diameter of 6 mm (1/4 inch) onto the condenser drain connector until secure.
5. Insert the lower end of the drain tube back into the collection vessel. Ensure that the tube cannot become immersed in the waste liquid.

Replace the Fuses

Warning

- » Ensure that the system is turned off and the power cord is disconnected.
- » Use only exact replacement fuses supplied by Biotage. Incorrect fuses create a potential fire hazard.

1. Turn off (O) the system and disconnect the power cord.
2. Unscrew the two fuse holders at the power inlet; see Figure 36.



Figure 36. The fuse holders at the power inlet.

- Clean the new fuses using a cloth lightly dampened with ethanol and wipe them dry with a dry cloth.
Note: Do not touch the metal surfaces after the fuses have been cleaned.

- Replace both of the old fuses.
- Put the two fuse holders back in place.

If the fuses blow shortly after replacing them, please contact Biotage® 1-Point Support™.

Clean the Tubing

Warning

- » Handle chemical and liquid waste according to the Safety Data Sheets and to local/national guidelines on laboratory safety procedures.
- » Keep your hands away from the vial loading arm while the vial is being loaded or unloaded.

If the system is equipped with a built-in sample pump, clean the tubing as described below as often as required.

Clean the Vial Tubing

Clean the vial tubing, which is connected to the **VIAL** port on the pump manifold, by performing a redissolve operation using a suitable solvent.

- Insert the system solvent inlet tube into a container with a suitable cleaning solvent.
Note: The solvent should be miscible with the previous sample's system solvent and with the next sample solution to be evaporated.
- Put an empty 16, 20, or 30 mL vial into the lower vial holder. If using a 16 mL vial, insert a lower vial adapter of the correct size into the lower vial holder.
- Ensure that the correct upper vial holder is used; see "Change Upper Vial Holder" on page 6.
- Select **Redissolve** from the menu bar on the touch screen and set up the redissolve operation. For more information, see page 12. Recommended **Redissolve Volume** is 8 mL.
- Press **Redissolve** to start the cleaning.

Clean the Sample Loop and Inlet Tubing

Clean the sample loop and the system solvent and sample inlet tubing (connected to the **SS** and **SAMPLE ROBOT** ports) by performing a prime operation; see page 8.

Replace the Tubing

Over time, it may be necessary to replace some of the tubing.

Note: Only use tubing supplied by Biotage.

Replace the Vial Tubing

Warning

- » Ensure that the system is turned off and the power cord is disconnected.

- Turn off (O) the system and disconnect the power cord.
- Disconnect the transparent vial tube from the **VIAL** port on the pump manifold.
- Loosen the two clips holding the transparent vial tube in position using the T10 Torx screwdriver supplied with the system.
- Loosen the touch screen holder screw (A in Figure 37) and position the touch screen so that there is free access to the sample inlet connection.
- Loosen the upper fitting at the sample inlet connection (B in Figure 37) and pull out the green vial tube.

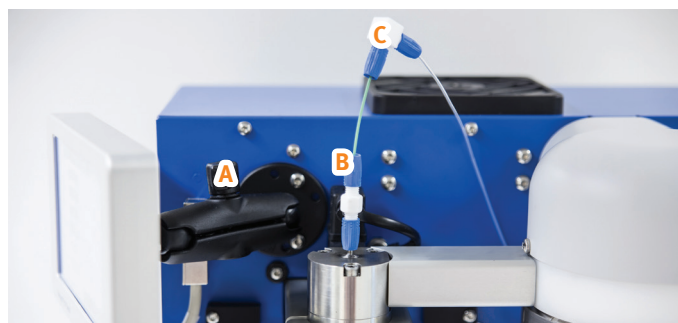


Figure 37. A = the touch screen holder screw used to change the angle of the touch screen, B = the upper fitting at the sample inlet connection, and C = the angled connector that connects the two vial tubes.

- Insert a green replacement tube (P/N 415064) into the sample inlet connection. Adjust the height of the tube as described in Figure 38 and then tighten the upper fitting.

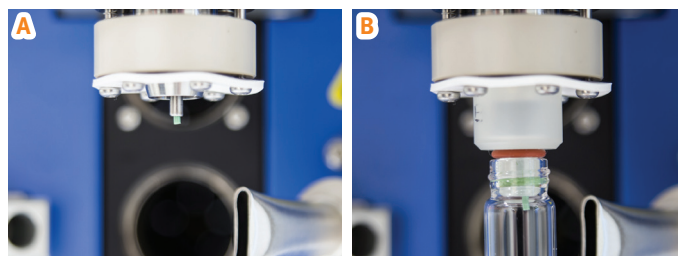



Figure 38. The vial tube must stick out 2 to 3 mm from the upper vial holder (A) or the upper vial adapter (B).

- Connect a new angled connector to the green vial tube and then to a new transparent vial tube (both are included in P/N 415064).
- Connect the other end of the transparent vial tube to the **VIAL** port on the pump manifold.
- Fasten the tube clips.

Replace the Sample Loop, Sample Inlet Tube, or System Solvent Inlet Tube

Warning

» Ensure that the system is turned off and the power cord is disconnected before replacing tubing.

1. If possible, empty the tubing of all liquid by priming with air:
 - a. Remove the system solvent inlet tube from the system solvent bottle and place it in an empty, clean bottle.
 - b. If using a system without a liquid handler:
 - i. Place the sample inlet tube in a clean and empty waste container.
 - ii. Select **Maintenance** from the menu bar on the touch screen.
 - iii. Press **Prime**.
 - iv. Press the **Prime Volume** field and enter 45 mL.
 - v. Press **Prime** and then **Tube and Waste Container in Position** to start the prime operation.
 - vi. When the prime operation is completed, proceed to step 2.
 - c. If using a system with a liquid handler:
 - i. In the Controller application, select **Settings...** from the **File** menu. The **Settings** dialog opens.
 - ii. Set the **Needle Drain Volume** to 40 mL and the **Needle Wash Volume** to 5 mL.
 - iii. Click .
 - iv. When the prime operation is completed, change the **Needle Drain Volume** and **Needle Wash Volume** parameters back to the desired settings for when cleaning the needle. Recommended volumes are 10 and 5 mL.
2. Turn off (O) the system and disconnect the power cord.
3. Replace a tube by unsnapping the clips holding it in position and then disconnecting the tube from the pump manifold.

Liquid Handler Maintenance

If using a liquid handler, ensure to keep it well maintained as described in the user documentation supplied by the manufacturer.

Hints and Tips

Methods for Various Solvents

Solvent Name	Alternative Name	Boiling Point (°C)	Method
1,2-Dichlorobenzene		179.0	Very High Boil ¹
1,2-Dichloroethane	DCE	83.5	Volatile
1,4-Dioxane		101.5	Aqueous
1-Methyl-2-pyrrolidinone	NMP	202.0	Very High Boil ¹
Acetic acid	HOAc	117.9	High Boil ¹
Acetone	Propanone or 2-propanone	56.1	Volatile
Acetonitrile	ACN or MeCN	81.6	Volatile
Ammonia	NH ₃	33.3	High Volatile
Butan-1-ol	n-BuOH	117.7	Aqueous
Butan-2-ol		99.5	Aqueous
Chloroform		61.1	Volatile
Dichloromethane	DCM	40.0	High Volatile
Diethyl ether		34.5	High Volatile
Dimethyl sulfide		37.3	High Volatile
Dimethyl sulfoxide	DMSO	189.0	Very High Boil ¹
Ethanol	EtOH	78.2	Volatile
Ethyl acetate	EtOAc or AcOEt	77.1	Volatile
Formic acid	HCOOH	101.0	Aqueous
Heptane		98.5	Aqueous
Hexane		68.7	Volatile
Isopropanol	IPA (isopropyl alcohol) or Propan-2-ol	82.3	Volatile
Methanol	MeOH	64.6	Volatile
Methyl t-butyl ether	MTBE or t-butyl methyl ether	55.2	High Volatile
N,N-Dimethylacetamide	DMA or DMAc	165.0	High Boil ¹
N,N-Dimethylformamide	DMF	153.0	High Boil ¹
Pentane		36.1	High Volatile
Propanoic acid	Propionic acid	141.2	High Boil ¹
Pyridine		115.2	Aqueous
Tetrahydrofuran	THF	65.0	Volatile
Toluene	PhMe	110.6	Aqueous
Trifluoroacetic acid	TFA	73.0	Volatile
Trimethoxymethane	TMM (trimethyl orthoformate)	104.0	Aqueous
Water	H ₂ O	100.0	Aqueous

¹ The method is by default set to use an external vacuum pump, if enabled in the System Setup view (see page 4).

Troubleshooting

Condenser

If the condenser temperature does not reach below -20°C :

- » Ensure that the inlet fan at the back top of the system is working and that it is not blocked.
- » Ensure that the exhaust fans at the top and the back of the system are working and are not blocked.
- » If any of the fans are not working, or both the exhaust fans and inlet fan are working properly but the problem persists, contact Biotage 1-Point Support.

Vacuum

Pressure Barely Drops Below Ambient

If the pressure barely drops below ambient, either the condenser pot is not installed correctly or the pot seal needs to be replaced. See "Clean the Condenser Pot" on page 20.

Pressure Barely Drops Below 30 mbar

If the pressure barely drops below 30 mbar, this may be due to previous use of a volatile solvent. Thus, the built-in vacuum pump might temporarily be incapable of reaching the low pressure needed. To recondition the built-in vacuum pump:

1. Select **Maintenance** in the menu bar on the touch screen.
2. If necessary, drain the condenser as described on page 22. When done, press **Back**.
3. Press **Vacuum Pump**.
4. Press the **Vent Duration** field and enter 15 min.
5. Press **Ventilate Vacuum Pump**.

Pressure Does Not Drop Below 5 mbar

If the pressure does not drop below 5 mbar:

- » Recondition the built-in vacuum pump as described in the "Pressure Barely Drops Below 30 mbar" section above.
- » Ensure that there is no leakage in the drain valve:
 - a. Insert the lower end of the drain tube into a vessel with liquid. Ensure that the drain tube is below the surface.
 - b. Start an evaporation run and look for liquid rising in the drain tube. If there is, quit the run and drain the condenser as described on page 22. If the problem persists, the drain valve may be worn. Please contact Biotage 1-Point Support.
- » Ensure that the vial face seal is clean and not worn or broken. See "Clean or Replace the Vial Face Seal and Lubricate or Replace the Vial Holder O-rings" on page 21.

- » Ensure that there is no leakage in the sample inlet connection:
 - a. Loosen the touch screen holder screw and position the touch screen so that there is free access to the sample inlet connection.
 - b. Remove the nuts and ferrules from the sample inlet connection; see Figure 39A.
 - c. Place a face seal around the sample inlet connection.
 - d. Turn a 20 mL vial upside down and place it on the face seal; see Figure 39B.
 - e. Start an evaporation run with a low target pressure. If the pressure now drops below 5 mbar, the nuts and ferrules are leaking and need to be replaced.

Note that the sample inlet connection is only used when the system is equipped with a built-in sample pump.

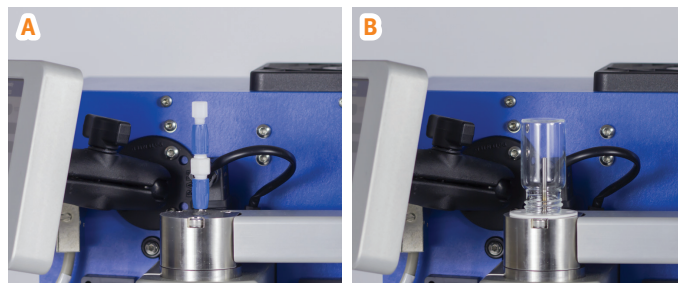


Figure 39. If a vacuum leakage is eliminated by removing the nuts and ferrules (A) and placing a face seal and a 20 mL vial around the sample inlet connection (B), the nuts and ferrules need to be replaced.

Carousel

Note that the carousel is optional.

If the carousel is stuck and the bottom LED on the carousel control box is red, re-initialize the carousel as described below.

Warning

- » Keep your hands away from the carousel during initialization.

1. Wait until the carousel has stopped moving.
2. Ensure that there is no object obstructing the carousel.
3. Select **Maintenance** from the menu bar on the touch screen.
4. Press **Initialize Carousel**. The **Alert – Initializing Carousel** dialog opens.
5. Press **Initialize Carousel** and keep your hands away from the carousel until it has stopped moving.

Sample Pump

Note that the built-in sample pump is optional.

Redissolve Volume

If the precision of the redissolve volume is out of range (see the technical specification in the “Biotage® V-10 Touch Installation and Safety” document, P/N 414661), this may be due to air in the tubing. Ensure that all tubes are connected properly and then prime the system; see “Prime the System” on page 8. Note that the higher the prime rate, the more efficient the removal of air bubbles will be.

Blocked Tubing

Warning

- » Ensure that the system is turned off and the power cord is disconnected.
- » Handle chemical and liquid waste according to the Safety Data Sheets and to local/national guidelines on laboratory safety procedures.

To remove sample precipitation in blocked tubing:

1. Turn off (O) the system and disconnect the power cord.
2. Disconnect the tubing to isolate the blocked line.
3. Sonicate or clean the tubing with a solubilizing solvent.
4. If cleaning does not work, see “Replace the Tubing” on page 23.

General Information

Accessories and Spare Parts


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

Part No.	Description	Qty
411027	Vacuum 20 mL Upper Head Assembly (also for the 4, 8, and 30 mL vials)	1
410790	Vial Face Seal 20 mL (also for the 4, 8, and 30 mL vials)	10
412867	Vacuum 16 mL Upper Head Assembly	1
412866	Vial Face Seal 16 mL	10
410647	4 mL Vial Upper Adapter Kit (Type A), 8.5 mm Neck Inner Diameter	5
410648	4 mL Vial Upper Adapter Kit (Type B), 11.1 mm Neck Inner Diameter	5
410649	4 mL Vial Upper Adapter Kit (Type C), 12.0 mm Neck Inner Diameter	5
413351	8 mL Vial Upper Adapter Kit (Type J), 9.0 mm Neck Inner Diameter	5
411031	4 mL Vial Lower Adapter Kit (Type A), 14.8 mm Vial Diameter	2
411032	4 mL Vial Lower Adapter Kit (Type B), 14.1 mm Vial Diameter	2
411033	4 mL Vial Lower Adapter Kit (Type C), 16.3 mm Vial Diameter	2
411999	8 mL Vial Lower Adapter Kit (Type D), 17.2 mm Vial Diameter	2
412000	16 mL Vial Lower Adapter Kit (Type E), 20.7 mm Vial Diameter	2
412905	External Vacuum Pump, Vacuubrand RZ 2.5, US 120 V	1
413149	External Vacuum Pump, Vacuubrand RZ 2.5, EU 230 V	1
410184	Condenser Pot Sealing Ring	1
410191	O-ring for Drain Valve	1
410262	O-ring for Spin Head Assembly	1
414955	Nuts and Ferrules for the Sample Inlet Connection	1
411182	Carousel Sample Holder 4 mL, 14.5 mm (Type A and B)	1
411183	Carousel Sample Holder 4 mL, 16.5 mm (Type C)	1
411985	Carousel Sample Holder 16 mL, 20.7 mm	1

Part No.	Description	Qty
411181	Carousel Sample Holder 20 and 30 mL	1
415063	Sample Loop, 15 mL	1
415064	Vial Tubing	1
415065	System Solvent Inlet Tube	1
410431	Sample Inlet Tube with Probe	1
411816	Gilson Liquid Handler GX-271	1
414867	Start-Up Kit for Liquid Handlers	1
411038	Kit, Aspiration Needle and Tubing for Liquid Handlers	1
411039	Aspiration Needle for Liquid Handlers	1
414742	Fuse, F10A/250VAC, 6.3x32mm	2
414865	Solvent Manager Upgrade	1
410876	Automation Upgrade	1

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