

# Biotage® Initiator+ SP *Wave*

Getting Started Guide for Peptide Synthesis



# Biotage® Initiator+ SP Wave

## Getting Started Guide for Peptide Synthesis

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# Quick Start

## Warning

- » Observe general as well as specific safety regulations for the use of the system and its accessories and consumables at all times, in order to reduce the risk of personal injury, fire, and explosion; see the "Warning Summary" in the "Biotage® Initiator+ Installation and Safety" document (P/N 355976).

## Set Up User Accounts

See the instructions in the "Biotage® Initiator+ Getting Started Guide for Organic Synthesis" (P/N 355975). Note that the chemist privilege gives the user access to both organic and peptide synthesis modes when using an Biotage® Initiator+ SP Wave system and that it is only possible to request an e-mail when an experiment has been completed in organic synthesis mode.

## Prepare the System

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

1. Ensure that the vortex unit is mounted on the system, i.e. the system is set up for peptide synthesis. Please refer to "Switch Between Peptide and Organic Synthesis" on page 7.
2. If necessary, empty the waste bottle. Ensure to turn off the vacuum and release the pressure (see page 12) before opening the waste bottle.
3. Verify that the scrubber setup is suitable for the synthesis; see "Waste and Scrubber Kit and Vacuum" on page 4.
4. If present, remove the cavity insert from the microwave cavity.
5. Fill the system solvent bottle with the desired solvent. Ensure that no foreign matter (e.g. molecular sieve) is present in the bottle. If necessary, filter the solvent.
6. Fill the three 100 mL bottles on the reagent rack with the desired reagents and/or solvents.

## Assign Reagents and Solvents

The software references the liquid assignments to determine which bottle contains the liquid used in a fill or wash operation.

1. If you are not in peptide synthesis mode, press **Log Out** to get to the main menu and then press **Peptide Synthesis**.
2. Select the **Liquids** tab in the right-hand panel.
3. Expand the bottle pane for the bottle you want to assign a liquid to by pressing ►.
4. Press the **Liquid** text box and select the liquid that you want to assign to the bottle. To add a new liquid, see "2. Liquids" on page 6.

5. If assigning a liquid to the system solvent bottle (S4), press the **Maximum Volume** text box and enter the maximum amount of liquid the bottle can hold.
6. Press the **Available Volume** text box and enter the amount of the liquid that is present, or press **Fill** if the bottle is full.
7. Repeat steps 3 through 6 for all four bottles.

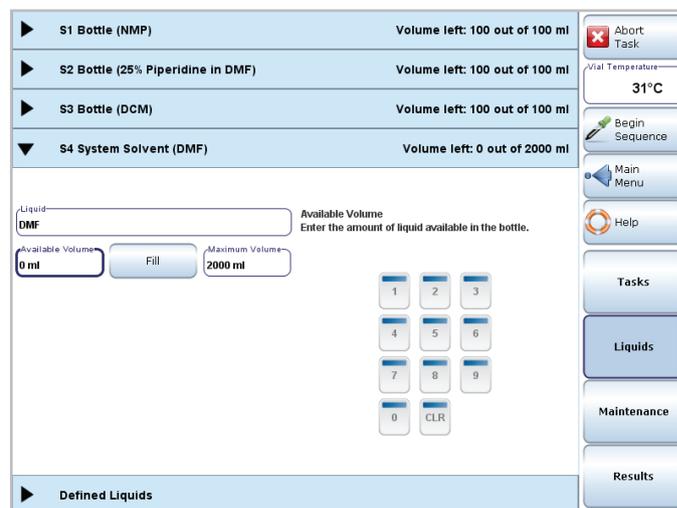


Figure 1. The view when assigning a liquid to the system solvent bottle (S4).

## Prime the System

If you need to empty the tubing of the system solvent used in the previous experiment and fill it with new solvent, it is necessary to prime the system.

1. Ensure that the vacuum is turned on.
2. Select the **Maintenance** tab in the right-hand panel.
3. Open the **Prime** task by pressing it.
4. Start the prime by pressing **Run**.

## Set Up and Run the Peptide Synthesis

**Note:** Fmoc amino acids and coupling reagents have to be added manually. When using a predefined coupling task, you will be prompted when a manual operation is to be performed.

**Note:** When heating a reaction mixture, ensure that the target temperature is at least 20°C below the boiling point of the solvent used (i.e. with a boiling point of 80°C, set the target temperature between room temperature and 60°C).

## Prepare and Load the Reactor Vial

1. Weigh the resin and place it in a new reactor vial.
2. Insert the appropriate vial extension into the vial.
3. Load the vial into the microwave cavity using the vial loading tool. Ensure to insert the vial correctly.

## Run Single Tasks

4. Select the **Tasks** tab in the right-hand panel.
5. Open the desired task by pressing it. Ensure that the task is designed for the vial size you are using; see the setting in the **Vial** text box.
6. Start the task by pressing **Run**.

## Run a Peptide Sequence

The least manual intervention and longest cycle is from coupling to coupling; start with a deprotection before you enter the sequence.

4. Select the **Tasks** tab in the right-hand panel.
5. Open the desired deprotection task by pressing it. Ensure that the task is designed for the vial size you are using; see the setting in the **Vial** text box.
6. Start the task by pressing **Run**.
7. When the deprotection is completed, press **Begin Sequence** in the right-hand panel. The **Begin Amino Acid Sequence** dialog opens.
8. Press the **Sequence** text box, enter the sequence using the appearing keyboard, and press **Apply**. All characters available in the keyboard are permitted as well as single and multiple character codes. Multi character codes must be separated by “-” (minus sign). It is also possible to import a sequence from a USB memory device by pressing **Import**.
9. Press the **Vial** text box and select the vial size.
10. If desired, select user (press the **User** text box) and enter a comment (press the **Notes** text box).
11. To change the resin type from normal to pre-loaded or vice versa, press the **Resin Type** text box.
12. Save the sequence information by pressing **OK**.
13. Open the desired task by pressing it.
14. Start the task by pressing **Run**.

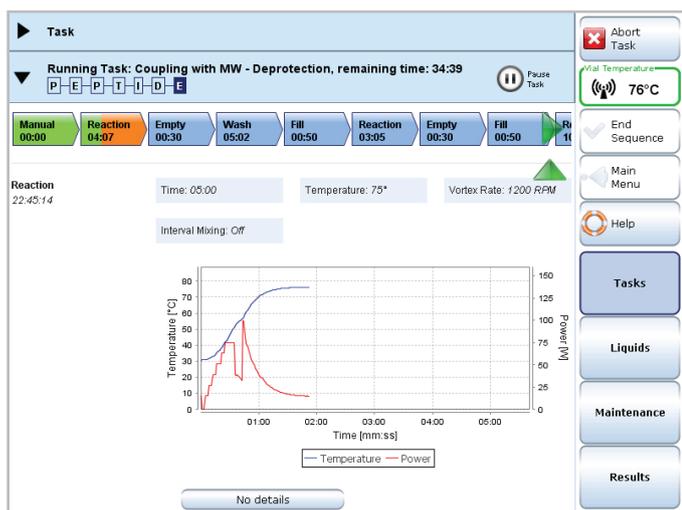


Figure 2. The progress of a task is displayed at the Tasks tab.

15. When the task is completed, start the next task and repeat until the sequence is completed.
16. When the sequence is completed, press **End Sequence** in the right-hand panel.

**Note:** The cycle counter is linked to deprotection tasks, i.e. tasks with the **Function** parameter set to **Deprotection** or **Coupling + Deprotection**. Note that continuous deprotection without coupling in between will not move the cycle counter.

## Unload the Reactor Vial

Place the vial loading tool over the reactor vial and then gently press the vial eject lever to release the vial from the microwave cavity. Never remove the vial by only using the vial eject lever.

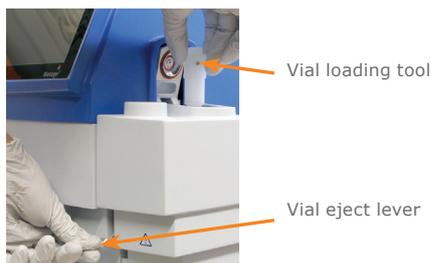


Figure 3. Unloading the reactor vial.

## Monitor the Progress

The progress of a task is displayed at the **Tasks** tab. When the system is performing microwave heating, a process graph with real time measurements of temperature and applied power is displayed.

## View Results

1. Select the **Results** tab in the right-hand panel.
2. Expand the **Manage Peptide Synthesis Results** pane by pressing ►.
3. Enter the desired search criteria by pressing the **Date**, **User**, and/or **Sequence** text box.
4. To search the results, press **Search Results**. All results that match the search criteria are listed.
5. Select the result (row) you want to view and then expand the **Viewing Result** pane by pressing ►.

## Empty the Waste and Scrubber Kit

See “Empty the Waste and Scrubber Kit” on page 11.

## More Information

For more information and instructions, see “Software Overview” on page 5 and the online **Help**.

# Instrument Overview



**Figure 4.** A = touch screen, B = mains switch, C = vial eject lever, D = cavity insert located in the insert holder, E = cavity lid, F = robot arm, G = needle tool, H = needle wash station, I = reagent rack with three bottles, and J = robot.

The system is equipped with a touch screen used for experimental planning, instrument control, and reaction monitoring. In peptide synthesis mode, the system status is displayed at the **Tasks** tab:

- » Idle = The system is not processing.
- » Paused Task = The system is paused. When pressing **Pause Task**, the operation in progress is completed before the processing is stopped.
- » Running Task = The system is processing. When microwaves are generated,  is displayed in the right-hand panel.

## Reactor Vials

In peptide synthesis mode, the Initiator+ system can process reaction volumes (resin + liquid) between 0.8 and 6.4 mL. The following reactor vials are available:

- » 2 mL reactor vial (0.8–1.1 mL)
- » 5 mL reactor vial (1.6–3.2 mL)
- » 10 mL reactor vial (3.2–6.4 mL)

Do not exceed or fall below the vial's specified volume range, in brackets above, and only use new vials supplied by Biotage.



## Vial Loading

Always insert a vial extension of the correct size into the reactor vial before loading the vial into the microwave cavity using the vial loading tool. Ensure to insert the vial correctly and only use vial extensions supplied by Biotage.



10 mL, 5 mL, and 2 mL vial extensions.

Note that the cavity insert must be removed from the microwave cavity before loading reactor vials.

Unload a reactor vial by placing the vial loading tool over the vial and then gently pressing the vial eject lever to release the vial from the microwave cavity (see Figure 3 on page 2).

If the temperature inside the reactor vial is above 59°C when the lid is opened, the text "Warning, hot vial!" is displayed in the right-hand panel. Wait until this text disappears, i.e. the temperature drops to 59°C, before unloading the vial.



Cavity insert.

## Robot Automation

The needle on the vertical robot arm is used to dispense liquids into the reactor vial inside the microwave cavity using the integrated syringe pump. Liquids can be aspirated from the three bottles located on the reagent rack and from the system solvent bottle. Four GL45 laboratory glass bottles are delivered with the system; three 100 mL bottles for reagents and/or solvents and one 2000 mL bottle for system solvent.

After completion of a liquid operation, the robot arm moves the needle to the needle wash station. At the needle wash station, excess liquid is discarded and the needle is rinsed both externally and internally using system solvent. The needle wash station is emptied using vacuum.

## Heating and Agitation

When the reactor vial has been inserted into the microwave cavity and the cavity lid has been closed, high-frequency microwaves (2.45 GHz), generated by the magnetron, heat the reaction mixture. Microwave heated peptide syntheses can be performed at temperatures between 40°C and 100°C.

During the heating process, the reactor vial is agitated by vortex mixing. The mixing speed can be set to a value between 500 and 1300 RPM. 1200 RPM is recommended.

After processing, the cavity lid is opened and the next task can be started or the reactor vial removed.

## Audible Alarm

Operations that have to be performed manually by the user, e.g. adding Fmoc amino acids and coupling reagents or take a sample of the resin, can be prompted by an audible alarm.

## Inert Atmosphere (Optional)

If the system is connected to an inert gas supply, the microwave cavity can be flushed with inert gas during the heating and draining (empty) process. For more information, please refer to the “Biotage® Initiator+ Installation and Safety” document (P/N 355976).

## Waste and Scrubber Kit and Vacuum

A vacuum pump (sold separately, P/N 356330SP), is required for emptying the reactor vial and the needle wash station. The waste and scrubber kit is used to collect the chemical waste generated during a synthesis. Set up the waste and scrubber kit as described in the instructions supplied with the kit.

The 500 mL scrubber bottle needs to be emptied after each synthesis. Always ensure that the waste bottle is not full before operating the system.

Ensure to turn off the vacuum and release the pressure (see page 12) before opening the scrubber or waste bottle.



**Figure 5.** The waste and scrubber kit contains a 5 liter waste bottle, a 0.5 liter scrubber bottle, and the tubing shown above. The vacuum pump is sold separately (P/N 356330SP).

## Organic Synthesis Mode

When using an Initiator+ SP *Wave* system it is possible to perform either peptide or organic synthesis.

To run experiments in organic synthesis mode, the system has to be modified. Please refer to “Switch from Peptide to Organic Synthesis” on page 7 and the “Biotage® Initiator+ Getting Started Guide for Organic Synthesis” (P/N 355975).

### Biotage® Initiator Peptide Workstation

Biotage® Initiator Peptide Workstation is an optional accessory for manual microwave peptide synthesis and cleavage using any Initiator system in organic synthesis mode. The workstation can be used to perform various types of chemistry including solution phase and solid phase peptide synthesis, and organic and PNA synthesis.

Initiator Peptide Workstation consists of a specially designed microwave peptide vial and wash station. Peptide synthesis is performed in the microwave peptide vial (glass vial) under atmospheric conditions at temperatures up to 100°C using any Initiator system. The vial contents are quickly filtered and washed using the wash station connected to a vacuum pump.



Note that the microwave peptide vials (glass vials) can only be used in organic synthesis mode with the robot disconnected.



**Figure 6.** When processing in organic synthesis mode, microwave reaction vials are moved to the microwave cavity by the robot.

# Software Overview

## Software Modes

- » **Peptide Synthesis:** Perform peptide synthesis experiments, and view and manage the results.
- » **Organic Synthesis:** Perform organic synthesis experiments, and view and manage the results.
- » **System:** Change system settings, manage users, configure a network connection, save logs and organic synthesis reports on a USB memory device, and calibrate the robot. Only users with system owner privilege can log into system mode.
- » **Service:** Service can only be performed by an authorized Biotage service engineer.

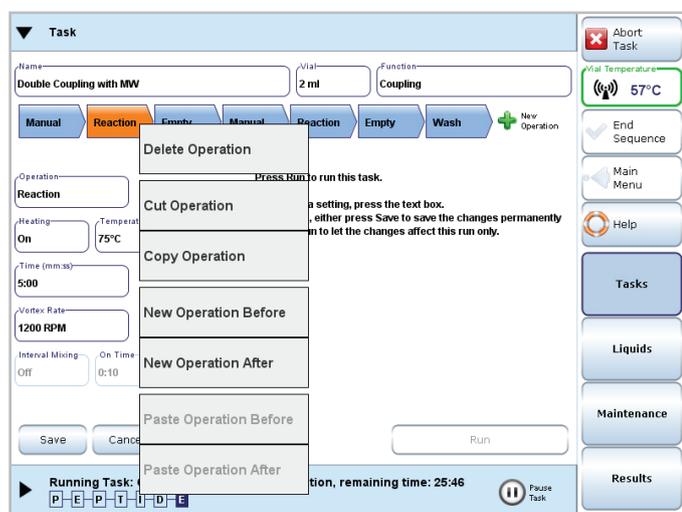
To switch between peptide and organic synthesis modes, see “Switch Between Peptide and Organic Synthesis” on page 7.

## Perform Peptide Synthesis, and View and Manage the Results

The software in peptide synthesis mode consists of four tabs: Tasks (1), Liquids (2), Maintenance (3), and Results (4).

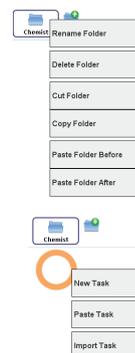
### 1. Tasks

At the **Tasks** tab, you can set up and run single tasks or peptide sequences and monitor the task in progress. The software comes with a number of predefined tasks that are divided into three folders; one for each reactor vial size (2, 5, and 10 mL). These folders and tasks cannot be deleted or modified but can be copied and then modified and saved.



**Figure 7.** At the Tasks tab, you can set up and run single tasks or peptide sequences and monitor the task in progress.

Create a new folder by pressing . A folder created by a user can be copied, moved, renamed, and deleted by pressing and holding on the folder until a menu appears (see the image to the right).



Create a new task, or paste or import a task by pressing and holding on an empty space in a user-defined folder until a menu appears (see the image to the right).

Copy, move, export, or delete a task by pressing and holding on the task until a menu appears. To edit a task, open it by pressing it. A task consists of one or more operations. To add, copy, move, or delete an operation, press and hold on the tab until a menu appears. To add an operation at the end of the task, press . The following operations are available to choose from:

- » **Manual:** Used for operations that will be performed by the user, e.g. adding Fmoc amino acids and coupling reagents or removing a sample of the resin. The operation will be prompted by a user-defined message and, if desired, an audible alarm. Select whether the cavity lid is to be opened or not before the operation.
- » **Fill:** Used to dispense liquids into the reactor vial.
- » **Empty:** Used to drain the reactor vial using vacuum. Either specify the empty time or let the system detect when the vial is empty.
- » **Reaction:** Used for reactions at room temperature (RT) or at temperatures between 40°C and 100°C. When heating a reaction mixture, ensure that the target temperature is at least 20°C below the boiling point of the solvent used (i.e. with a boiling point of 80°C, set the target temperature between room temperature and 60°C).
 

**Note:** The time parameter specifies the length of reaction time at the target temperature. The reactor vial is agitated continuously when heated and continuously or in intervals when at room temperature.
- » **Wash:** Used to wash the reactor vial. This operation is made up of a fill and an empty operation. The reactor vial can be agitated continuously or in intervals during the wash.

An operation highlighted in orange is open for editing. Modify a parameter by pressing the corresponding text box and entering/selecting the desired setting or by repeatedly pressing the text box until the desired setting is displayed. To save changes, press **Save**.

To run a single task, open it by pressing it and then press **Run**. Ensure that the task is designed for the reactor vial size you are using; see the setting in the **Vial** text box. Changes can be made before the task is started without having to save them.

If you want to run a peptide sequence, start with a deprotection task before you enter the sequence. This offers the least manual intervention. To enter the sequence, vial size, resin type, and, if desired, the user and a comment, press **Begin Sequence** in the right-hand panel. When the sequence is completed, press **End Sequence**. The cycle counter is linked to deprotection tasks, i.e. tasks with the **Function** parameter set to **Deprotection** or **Coupling + Deprotection**. Note that continuous deprotection without coupling in between will not move the cycle counter.

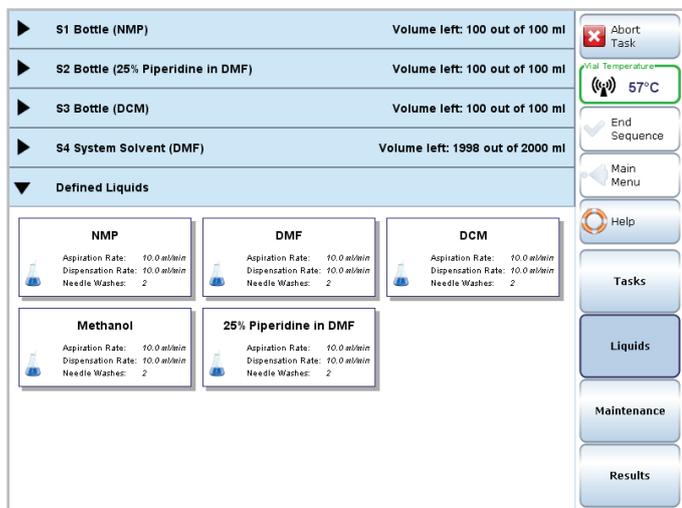
During the process, the operation tabs in the task function as a progress bar. When the system is heating, a temperature and power graph is displayed.

## 2. Liquids

At the **Liquids** tab, you can specify the contents of the three bottles available in the reagent rack (S1-S3) and the system solvent bottle (S4). The positions for the bottles on the reagent rack are displayed on the rack. Ensure that the rack and bottles are located correctly.

When a task is run, the software references the liquid assignments to determine which bottle contains the liquid used in a fill or wash operation. Therefore, it is important that the liquids are assigned correctly.

The system will issue a warning when it is time to replenish a liquid. Ensure that the correct volume is entered each time a bottle is replenished.



**Figure 8.** To add a liquid, press and hold where there is an empty space and then select Add Liquid in the appearing menu.

When assigning a new system solvent, prime the system to empty the tubing of the solvent used in the previous experiment and fill it with the new solvent.

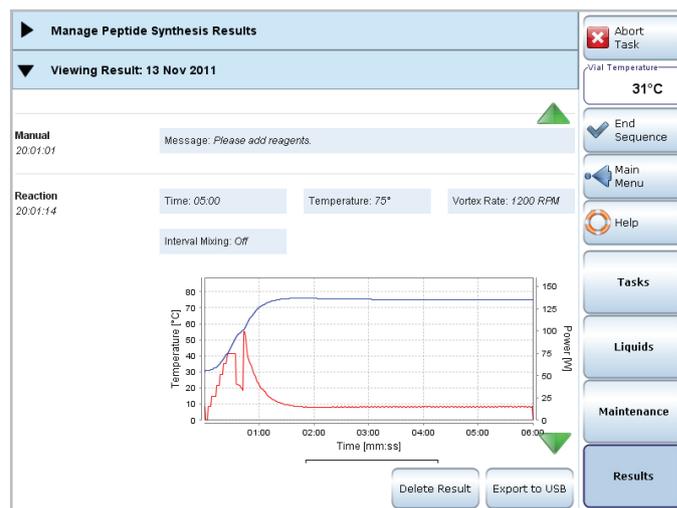
The system comes with a number of predefined solvents and reagents to choose from. These cannot be deleted or modified. To add a liquid, expand the **Defined Liquids** pane (by pressing ►), press and hold where there is an empty space, and then select **Add Liquid** in the appearing menu. The parameters are: name, aspiration and dispensation rates, and the number of needle washes after a dispensation. We recommend 50 mL/min and no washes for system solvents and 10 mL/min and two washes for reagents.

## 3. Maintenance

At the **Maintenance** tab, tasks are available for troubleshooting and performing maintenance on the system, such as cleaning the liquid path, priming the system, washing the needle, and emptying the reactor vial or wash station. Note that it is not possible to add, edit, or delete tasks at the **Maintenance** tab.

## 4. Results

At the **Results** tab, you can search, view, and delete the results of single tasks and peptide sequences. It is also possible to save reports as PDF files on a USB memory device.



**Figure 9.** A report either contains a single task or all tasks performed between pressing Begin Sequence and End Sequence.

## More Information

For more information and instructions, see “Quick Start” on page 1 and the online **Help**.

# Switch Between Peptide and Organic Synthesis

## Switch from Peptide to Organic Synthesis

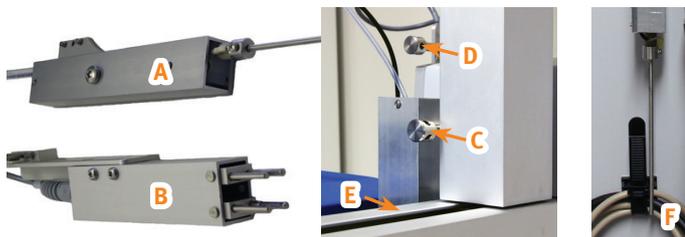
### Warning

- » Failure to follow these instructions may result in personal injury and/or equipment damage.
- » Ensure that the power cord, cables, and tubing connected to the system cannot come in contact with water or chemicals.

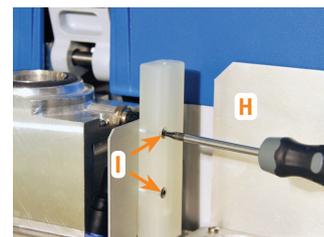
To be able to perform organic synthesis on an Initiator+ SP Wave system, follow the procedure shown below.

The following items supplied with the system are required: the T20 Torx screwdriver and the waste tray and cavity cover used for organic synthesis. You also need a T10 Torx screwdriver.

1. Clean the liquid path as described on page 11.
2. Empty the system of liquid by priming with air; use the **Prime** task at the **Maintenance** tab.
3. Turn off the vacuum pump or, if your system is equipped with an external vacuum system, close the valve.
4. Release the pressure:
  - a. Select the **Maintenance** tab in the right-hand panel.
  - b. Open the **Empty wash station** task by pressing it.
  - c. Release the pressure by pressing **Run**.
  - d. Repeat steps b through c until equilibrium is achieved.
5. Shut down the system, i.e. press **Main Menu/Log Out** and then **Shut Down**.
6. When the message “Safe to power off” appears on the screen, turn off the system and disconnect the power cord.
7. Replace the needle tool (A) with the gripper tool (B):
  - a. Gently pull the needle tool toward you.
  - b. Remove the needle tool by removing the retaining screw (C) and then gently pushing the tool away from you.
  - c. Remove the gripper tool from the “park” position by holding the tool with one hand and then removing the retaining screw (D).
  - d. Fasten the gripper tool to the robot arm (E).
  - e. Fasten the needle tool in the “park” position. Do not bend the needle toward the cords (F) on the left side of the robot.

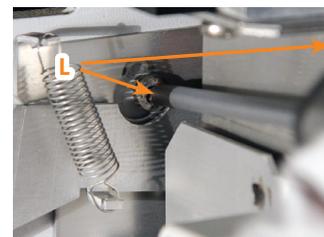
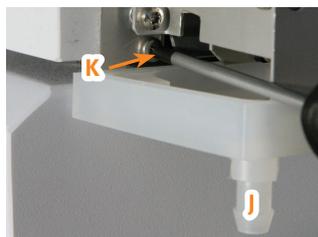


8. Gently pull the gripper tool toward you and ensure that it is aligned properly in the center of the cavity. If not, use the calibration feature in system mode to move the gripper tool in or out.
9. Remove the cavity cover (G) and the reagent rack (H).
10. Remove the wash station (I) by removing the two screws (T10 Torx screwdriver) and disconnecting the wash station tube from the **Wash** port on the right side of the SP Wave module (see “Connections” on page 9).

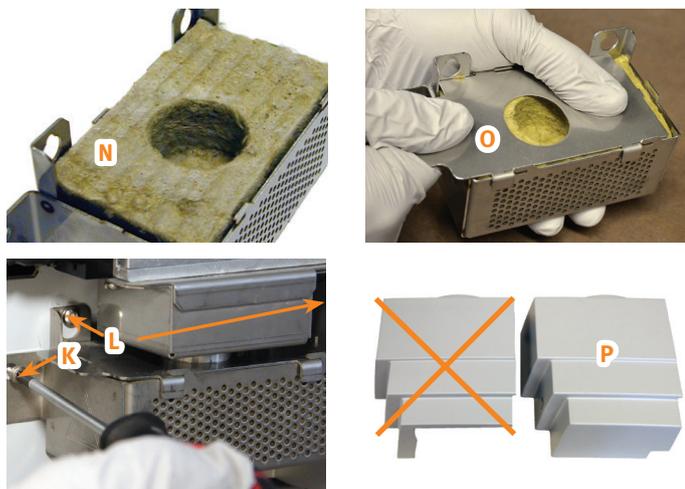


11. Remove the vortex unit using the T20 Torx screwdriver:
  - a. Disconnect the vortex unit from the **VORTEX** port at the rear of the SP Wave module (see “Connections” on page 9).
  - b. Disconnect the drain tube from the **Vial** port on the right side of the SP Wave module.
  - c. If connected, disconnect the drain tube from the cavity drain port (J).
  - d. Remove the lower screw (K) holding the vortex unit to the cavity wall.
  - e. Loosen the two upper screws (L).
  - f. Lift the vortex unit up by a few millimeters so that the upper screws can be tightened without them supporting the vortex unit; this will avoid damaging and make it easier to remove the vortex unit in the next step.
  - g. Remove the vortex unit by carefully lowering it straight down.

**Note:** Do not bend the mixer motor (M) as this will damage it.



12. Disconnect the SP *Wave* module from Initiator+ by disconnecting the communication cable from the **PUMP** port at the rear of the system (see “Connections” on page 9).
13. Mount the waste tray on the cavity wall using the T20 Torx screwdriver:
  - a. Ensure that the waste tray has a clean and intact waste tray insert (N) and is closed properly using the waste lid (O).
  - b. Hang the waste tray on the cavity wall by loosening the two upper screws (L) slightly.
  - c. Fasten the lower screw (K) and tighten the two upper screws (L).
14. Ensure that a pressurized air supply is connected to the pressurized air inlet at the rear of the system (above the power inlet).
15. Place the cavity cover used for organic synthesis (P) in its position.
16. Connect the power cord and turn on the system.



### Disconnect Robot Eight

The microwave peptide vials, used with Initiator Peptide Workstation, can only be used in organic synthesis mode with the robot disconnected from the Initiator+ system:

1. Shut down the system, i.e. press **Main Menu/Log Out** and then **Shut Down**.
2. When the message “Safe to power off” appears on the screen, turn off the system.
3. Disconnect the communication cable from the **ROB** port at the rear of the system (see “Connections” on page 9).
4. Turn on the system.

**Note:** Turn off the system before reconnecting the robot.

## Switch from Organic to Peptide Synthesis

### Warning

- » Failure to follow these instructions may result in personal injury and/or equipment damage.
- » Ensure that the power cord, cables, and tubing connected to the system cannot come in contact with water or chemicals.

To be able to perform peptide synthesis on an Initiator+ SP *Wave* system, follow the procedure shown below.

The following items supplied with the system are required: the T20 Torx screwdriver, cavity cover used for peptide synthesis, vortex unit, wash station, and reagent rack. You also need a T10 Torx screwdriver.

1. Shut down the system, i.e. press **Main Menu/Log Out** and then **Shut Down**.
2. When the message “Safe to power off” appears on the screen, turn off the system and disconnect the power cord.
3. Replace the gripper tool (B) with the needle tool (A):
  - a. Gently pull the gripper tool toward you.
  - b. Remove the gripper tool by removing the retaining screw (C) and then gently pushing the tool away from you.
  - c. Remove the needle tool from the “park” position by holding the tool with one hand and then removing the retaining screw (D).
  - d. Fasten the needle tool to the robot arm (E).
  - e. Fasten the gripper tool in the “park” position.
4. Remove the cavity cover (G).
5. Remove the waste tray by removing the lower screw (K), loosening the two upper screws (L), and unhooking the waste tray.
6. Tighten the two upper screws (L).



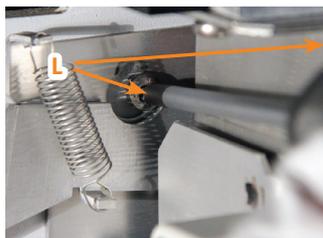
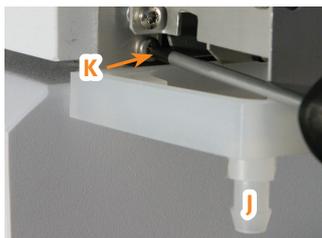
## 7. Mount the vortex unit using the T20 Torx screwdriver:

- a. With the T20 Torx screwdriver in reach, carefully lift the vortex unit straight up into its position in the microwave cavity.

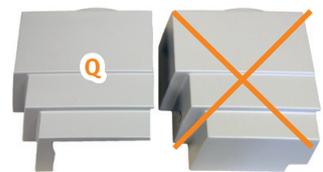
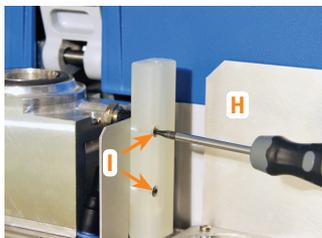


**Note:** Do not bend the mixer motor (M) as this will damage it.

- b. While holding the vortex unit in one hand, loosen the two upper screws (L) slightly and hang the vortex unit on the cavity wall.
- c. Fasten the lower screw (K) and tighten the two upper screws (L).
- d. Connect the drain tube to the **Vial** port on the right side of the SP Wave module (see “Connections” below).
- e. If desired, connect a tube to the drain port (J) and insert the tube into an empty container.
- f. Connect the vortex unit to the **VORTEX** port at the rear of the SP Wave module (see “Connections” below).

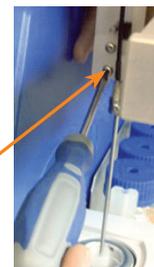


8. Mount the wash station (I) by connecting the wash station tube to the **Wash** port on the right side of the SP Wave module (see “Connections” below) and then fastening the station in its position using the two screws (T10 Torx screwdriver).
9. Place the reagent rack (H) in its position. Ensure that it is positioned correctly.
10. Connect the SP Wave module to Initiator+ by connecting the communication cable to the **PUMP** port at the rear of the system (see “Connections” below).
11. Place the cavity cover used for peptide synthesis (Q) in its position.



12. Ensure that the robot is connected to the **ROB** port at the rear of the system.

13. Gently pull the needle tool toward you and ensure that it is aligned properly in the center of the microwave cavity. If not, use the calibration feature in system mode to move the needle in or out, and/or move the needle to the left or right by using the two screws under the tool's front cover (remove the front cover by removing the screw at the front).



14. Connect the power cord and turn on the system.

## Connections

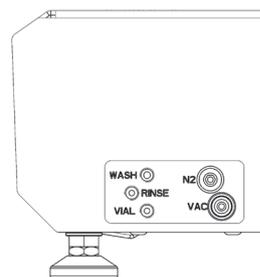


Figure 10. Connections on the right side of the SP Wave module.

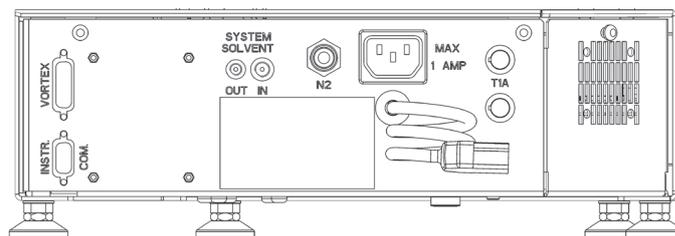


Figure 11. Connections at the rear of the SP Wave module.

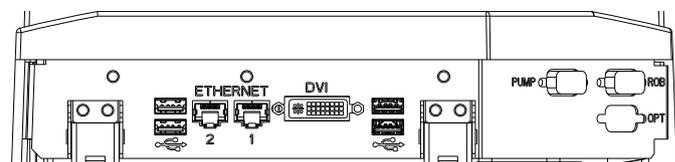


Figure 12. Connections at the rear of the system.

## User Documentation

The following user documentation is available:

- » Biotage® Initiator+ Installation and Safety, P/N 355976.
- » Biotage® Initiator+ Safety Translations, P/N 355977.
- » Biotage® Initiator+ Getting Started Guide for Organic Synthesis, P/N 355975.
- » Biotage® Initiator+ SP Wave Getting Started Guide for Peptide Synthesis, P/N 356071 (this document).
- » Online help.

# Maintenance

## Clean the Drain Valves

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

If the wash station or a reactor vial inside the microwave cavity is not emptied properly or is constantly drained, the problem may be resolved by cleaning the drain valves.

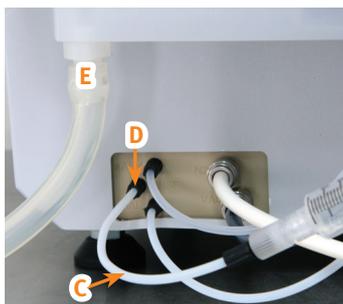
**Note:** If the cleaning is not performed according to the instructions below, the drain valves may break.

**Required:** 20 mL of ethanol or similar, the vial loading tool, the injection maintenance kit (syringe and injection tube) supplied with the system, a drain tube with an inner diameter of 9–10 mm, and an empty container that can hold at least 30 mL.

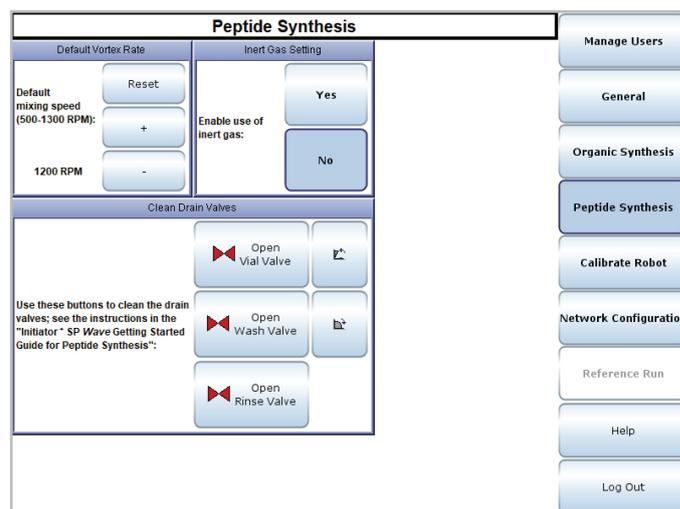
1. If the system is processing and cleaning of the drain valves is required, press **Abort Task** in the right-hand panel to abort the task in progress. Press **OK** in the dialog that opens to move the robot arm to the wash station.
2. Remove any vial located in the microwave cavity; place the vial loading tool (A) over the vial and then gently press the vial eject lever (B) to release the vial.



3. Fasten the injection tube (C) to the **Rinse** port (D) on the right side of the SP Wave module.



4. Connect a drain tube to the cavity drain port (E) and insert the other end into an empty container.
5. Fill the syringe with 10 mL of ethanol or similar and connect it to the injection tube (C).
6. Log into the software's system mode:
  - a. Press **Main Menu** in the right-hand panel.
  - b. Press **System** in the main menu. All user accounts with system owner privilege are listed in the **Select User** dialog.
  - c. Select your user account and press **OK**. If you do not have an account with system owner privilege, please contact your system supervisor.
  - d. If your account is password-protected, the **Input Password** dialog opens. Enter your password and press **OK**.
7. Select the **Peptide Synthesis** tab.



**Figure 13.** The Peptide Synthesis tab in system mode.

8. Press  to close the lid.
9. Press **Open Rinse Valve** and **Open Vial Valve**.
10. Inject the syringe contents.
 

**Note:** The syringe contents will be pushed through the vial valve and into the microwave cavity. The microwave cavity is drained via the drain tube connected to the cavity drain port (E).
11. Press  to open the lid.
12. Press **Close Rinse Valve** and **Close Vial Valve**.
13. Remove the syringe from the injection tube (C) and fill it with 10 mL of ethanol or similar.

14. Reconnect the syringe to the injection tube (C).
15. Press **Open Rinse Valve** and **Open Wash Valve**.
16. Inject 5 mL of the syringe contents.
17. Ensure that the vacuum is turned on for the rest of the steps.
18. Press **Close Rinse Valve** to empty the wash station.
19. When the wash station has been emptied, press **Open Rinse Valve**.
20. Inject the rest of the syringe contents.
21. Press **Close Rinse Valve** to empty the wash station.
22. When the wash station has been emptied, press **Close Wash Valve**.
23. Remove the syringe and the injection tube (C).
24. If necessary, clean the microwave cavity.
25. Empty the container that collected the waste from the drain tube.

## Clean the Liquid Path

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

We recommend that the liquid path (pump, tubing, valves, and needle) is cleaned at least once every month.

**Required:** 60 mL of ethanol or similar, an empty 10 mL reactor vial, a 10 mL vial extension, and the vial loading tool.

1. Ensure that the vacuum is turned on.
2. Insert an empty 10 mL reactor vial with the appropriate vial extension into the microwave cavity using the vial loading tool.
3. Replace the system solvent (S4) with ethanol or similar. 60 mL is required for the task.
4. Select the **Liquids** tab in the right-hand panel.
5. Expand the **S4 System Solvent** pane by pressing ► and assign ethanol as the system solvent. We recommend a flow rate of 50 mL/min.
6. Select the **Maintenance** tab.
7. Open the **Clean liquid path** task and press **Run**.
8. When done, place the vial loading tool over the reactor vial and then gently press the vial eject lever to release the vial.

## Clean the Exterior of the System

### Warning

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

If the touch screen has been contaminated by chemicals, it must be cleaned immediately.

1. Shut down the system, i.e. press **Main Menu/Log Out** and then **Shut Down**.
2. When the message “Safe to power off” appears on the screen, turn off the system and disconnect the power cord.
3. Clean the touch screen and the exterior of the system, using a soft and clean cloth. The cloth can be dry or lightly dampened with a neutral detergent or alcohol.
4. When the system has been cleaned, connect the power cord and turn on the system.

## Clean the Microwave Cavity and IR-Sensor

### Warning

- » Do not attempt to operate the system if the microwave cavity contains trapped objects or moisture. There is a risk of damage to the system and microwave leakage.
- » Ensure that the cavity cover, cavity lid seals, and vortex unit are in position when the system is processing.

The microwave cavity and IR-sensor must be cleaned after the occurrence of a vial leakage; see instructions in the “Biotage® Initiator+ Getting Started Guide for Organic Synthesis” (P/N 355975).

Note that the system is equipped with a vortex unit instead of the waste tray. To remove the vortex unit, see step 11 in “Switch from Peptide to Organic Synthesis” on page 7. Clean the vortex unit with a solvent suitable for the residues.

## Empty the Waste and Scrubber Kit

The 500 mL scrubber bottle needs to be emptied after each synthesis. The 5 liter waste bottle needs to be emptied when it is full.

Before emptying, remember to turn off the vacuum and release the pressure as described in “Release the Pressure” on page 12.

## Release the Pressure

Before emptying or exchanging a scrubber or waste bottle, it is important to release the pressure.

1. Turn off the vacuum pump or, if your system is equipped with an external vacuum system, close the valve.
2. Select the **Maintenance** tab in the right-hand panel.
3. Open the **Empty wash station** task by pressing it.
4. Release the pressure by pressing **Run**.
5. Repeat steps 3 through 4 until no pressure remains.

## Replace the Fuses

### Warning

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

See instructions in the “Replace the Fuses” section in the “Biotage® Initiator+ Getting Started Guide for Organic Synthesis” (P/N 355975).

## Turn Off the System

1. Turn off the vacuum pump or, if your system is equipped with an external vacuum system, close the valve.
2. Release the pressure:
  - a. Select the **Maintenance** tab in the right-hand panel.
  - b. Open the **Empty wash station** task by pressing it.
  - c. Release the pressure by pressing **Run**.
  - d. Repeat steps b through c until no pressure remains.
3. Turn off the software by pressing **Main Menu/Log Out**, and then **Shut Down**.
4. When the message “Safe to power off” appears on the screen, turn the system off. The mains switch is at the front of the system.

# 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](http://www.biotage.com).

## Manufacturer



Biotage Sweden AB

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Please contact your local Biotage representative. See contact information on the back of this document or visit our website [www.biotage.com](http://www.biotage.com).

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