

# Biotage<sup>®</sup> Extrahera<sup>™</sup>

## User Manual



# Biotage® Extrahera™

## User Manual

### CONTENTS

<b>1</b>	<b>System Overview</b>	
1	Liquid Handling	
1	Working Area	
2	Carousel and Lifter	
2	Columns, Test Tubes, and Plates	
2	Pressure Unit	
3	Waste Kit and Vacuum	
3	Safety	
3	Visual and Audible Alarm	
3	Lighting	
3	Adjustable Touch Screen	
3	Barcode and QR Scanner (Optional)	
3	Biotage® Extrahera™ GLP Software License (Optional)	
<b>4</b>	<b>Power Failure</b>	
<b>5</b>	<b>Biotage® Extrahera™ GLP Software</b>	
5	User Accounts and Access Levels	
5	E-mail Notifications	
6	Network Share	
6	Biotage® Extrahera™ Remote Viewer	
6	System Backup and Restore	
6	Restricted USB Export and Protected PDF Files	
7	Confirmation with Reason and Password	
7	Editing and Locking Methods	
7	Sample Batch Worklist (SBWL) and Identification Information	
8	Clog Detection	
8	Dynamic Reporting	
8	Audit Trails	
<b>9</b>	<b>Manage User Accounts (GLP)</b>	
9	User Parameters	
<b>12</b>	<b>Connect the System to Your Network (GLP)</b>	
12	Configure Network Connection	
12	Enable/Disable the Remote Viewer	
13	Configure E-mail Notifications	
13	Configure Network Share	
14	Synchronize the System with a Network Time Server	
<b>15</b>	<b>Set Date and Time (GLP)</b>	
<b>16</b>	<b>Set Export Options (GLP)</b>	
<b>17</b>	<b>Perform and Schedule Backups (GLP)</b>	
17	Schedule Backups	
17	Perform a Manual Backup	
18	Restore the System Database	
<b>19</b>	<b>Set Up Reminders for Pipette Pump Calibration</b>	
<b>20</b>	<b>Manage Solvents, Sample Types, Plates, Racks, and Pipette Tips</b>	
20	Predefined Entries	
20	Custom Entries	
21	Manage Solvents	
22	Manage Sample Types	
23	Manage Extraction Media	
23	Manage Sample Plates and Racks	
24	Manage Pipette Tips	
<b>25</b>	<b>Set Up a Method</b>	
25	Predefined Methods	
25	New, Copy, and Edit a Method	
26	Method Operations	
27	Method Parameters	
28	Set Up a Pressure Gradient	
29	Specify the Collection Plate/ Rack Height (Filtration Only)	
29	Clog Detection Settings (GLP)	
30	Set Up the Report (GLP)	
30	Lock and Unlock a Method (GLP)	
<b>31</b>	<b>Export, Import, and Delete Methods</b>	
31	Export Methods	
31	Import Methods	
31	Delete Methods	
<b>32</b>	<b>Set Up and Start a Run</b>	
32	Verify the System Setup	
32	Select the Method	
32	Load the Extraction Plate or Column Rack	
33	Adjust the Air Pressure	
33	Enter Sample Information (GLP)	
33	Load Solvent Pipette Tips	
34	Load Sample Pipette Tips	
35	Load Collection Plate(s) or Rack(s)	
35	Enter the Report Name and a Comment (Optional)	
35	Assign Solvent Bottles and Prime	
36	Assign Manually Loaded Solvents (Optional)	
37	Load the Sample Plate or Rack	
37	Start the Run	

**38** Enter Sample Information (GLP)

- 38 Configure Headers
- 38 Enter Sample Information Using the Touch Screen
- 38 Enter Sample Information Using a Sample Batch Worklist

**40** Monitor and Control a Run

- 40 Monitor the Run
- 40 Pause or Abort the Run
- 41 Clog Detection (GLP)
- 41 End of Run Comment (GLP)
- 41 Post-Run Activities

**42** View, Export, and Delete Reports

- 42 View Reports in Network Share Folder (GLP)
- 42 Export Reports
- 42 Delete Reports

**43** Remotely Monitor Runs and View Reports (GLP)

- 43 Log In to the Remote Viewer
- 43 Monitor the Run
- 43 Download Reports

**44** View and Export Audit Trails (GLP)

- 44 View an Audit Trail
- 44 Export an Audit Trail

**46** Maintenance

- 46 Change the System Settings
- 46 Export the System Logs
- 47 Clean the Exterior of the System
- 47 Clean the Interior of the System
- 48 Replace the Solvent Tubing
- 49 Clean or Replace the Waste Tubing
- 49 Pipette Pump Calibration and Adjustment
- 51 Replace the Pressure Head Seal
- 51 Replace the Fuses
- 52 Drain the Filter Unit
- 52 Replace the Filters in the Filter Unit

**53** Manual Control

- 53 Door
- 53 Maintenance
- 53 Method Development

**54** Troubleshooting

- 54 Clog Detection (GLP)
- 54 Extraction Plate/Rack
- 54 Pipette Pump
- 54 Pipetting Tips
- 54 Power Failure
- 55 Pressure Head
- 55 Pressurized Air and Nitrogen
- 55 Robot
- 55 Sample Cross-Contamination
- 55 Solvent Contamination
- 55 Solvent Pumps
- 56 Ventilation Fan
- 56 Waste and Lifter

**57** Switch Between 24, 48, and 96 Format

- 57 Hardware Configuration
- 57 Software Configuration

**58** General Information

- 58 Consumables and Accessories
- 59 Manufacturer
- 59 Contact Us

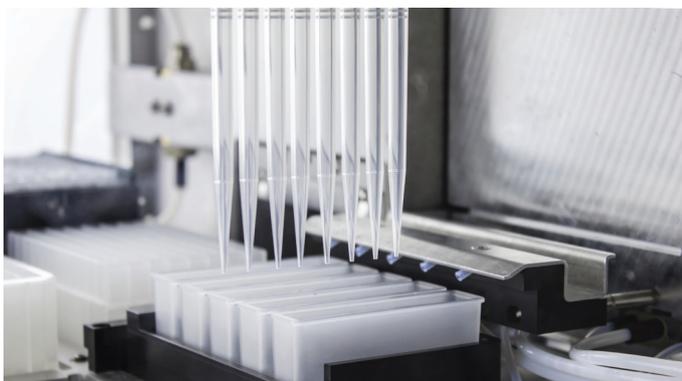
# System Overview

Biotage® Extrahera™ is an automation system for sample preparation methods. Extrahera can automate: Supported Liquid Extraction (SLE), Solid Phase Extraction (SPE), Phospholipid Depletion (PLD), Protein Precipitation (PPT), and Dual Mode Extraction with in-situ hydrolysis (Hydro DME+). The system also offers two filtration methods, Filtration (extraction media already containing sample) and Filtration+ (with sample load and optional pretreatment).

## Liquid Handling

Extrahera is equipped with five solvent inlets found on the right hand side of the system (S1-S5). Solvents are pumped into five 25 mL disposable solvent reservoirs inside the system (in position **5** on the working area) where the robot can aspirate solvent using disposable pipette tips; see Figure 1. A maximum of 4 or 8 tips can be used depending on the system setup.

The system scans the solvent level in the reservoirs (S1-S5), and fills/refills when necessary, each time a run is started and every 30 minutes during the run. Solvents that are defined as highly volatile are filled just before the solvent is used for the first time in the run.



**Figure 1.** The robot is aspirating solvent from the solvent reservoirs inside the system using disposable pipette tips.

It is possible to have an extra solvent rack with five 25 mL or 100 mL solvent reservoirs in position **6** on the working area. These reservoirs have to be filled manually by the user.

To ensure that the system cannot be set to aspirate more liquid into a pipette tip than it can accommodate, the maximum aspiration volume has to be specified for each pipette tip that is configured in the software.

After completion of a pump operation, the robot can be programmed to move the pipette tips either back to the pipette tip rack (to be reused) or to the pipette tip waste bin. Note that it is only possible to reuse a sample pipette tip when mixing following pretreatment and when loading a sample in aliquots; see “Large Volumes” below.

The system contains corrosion sensitive parts. Best practice is to avoid sustained continuous exposure to acidic and basic vapors by always removing the solvent reservoirs when the system is not in use, and cleaning the system following usage. Usage of strong acids (e.g. TFA and TCA) and inorganic acids (e.g. nitric, sulfuric, hydrochloric acid, and perchloric acids) in the solvent pumps is not supported at any concentration.

## Large Volumes

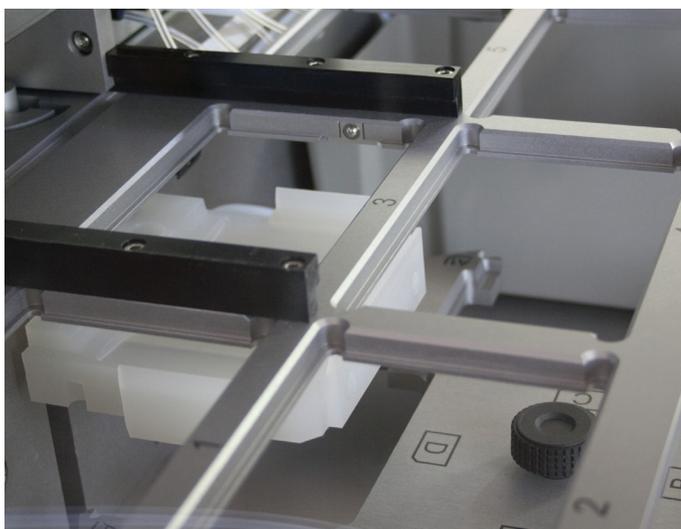
When a sample/solvent volume exceeds the specified capacity of the selected extraction media, the sample/solvent will be dispensed in aliquots, with application of positive pressure in between each aliquot.

A user can choose to either reuse the sample pipette tip or use a new sample pipette tip for each aliquot. This is defined when setting up a method in the software’s **Manage Methods** view. If the run requires more than the available quantity of sample pipette tips, the system will automatically pause when it runs out of tips and prompt the user to load more.

## Working Area

The working area has seven positions (see Figure 2):

- » **1:** Solvent pipette tips.
- » **2:** Sample pipette tips.
- » **3:** Extraction plate or columns.
- » **4:** Sample plate or test tubes.
- » **5:** Solvent reservoirs, 5 x 25 mL. Filled using the five solvent pumps.
- » **6:** Optional solvent reservoirs, 5 x 25 mL or 5 x 100 mL. Manually filled. Note that the 100 mL reservoir has a maximum fill volume of 90 mL.
- » **WASTE:** Waste bin for used pipette tips.

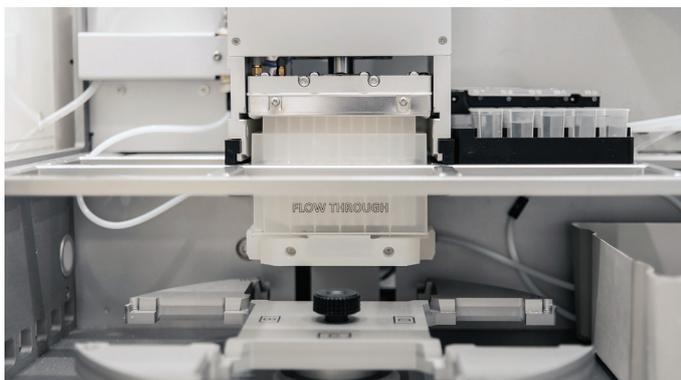


**Figure 2.** The working area has seven positions (1-6 and WASTE) and the carousel has four positions (A-D).

## Carousel and Lifter

The carousel has three positions for collection plates or racks with test tubes (**A-C**) and one for a flow-through plate (**D**), which is used for guiding waste into the extraction waste collector eliminating the risk of cross-contamination.

Before each operation in the method, the carousel moves the flow-through plate or the specified collection plate/rack to the inner carousel position. When in position, the plate/rack is moved up by a lifter to a position just underneath the extraction plate or columns (see Figure 3), so that the Luer fittings of the plate or columns cannot splash droplets onto each other or adjacent wells or tubes during the operation.



**Figure 3.** The plate/rack is lifted up from the carousel to just underneath the extraction plate or columns, located in position 3 on the working area.

## Columns, Test Tubes, and Plates

The following formats are supported:

**Extraction:** 96-well extraction plates, 96-array plates for 1 and 2 mL wells, 96-position extraction racks for 1 mL (tablets) columns (A format), 48-well extraction plates, 48-position extraction racks for 3 mL (tablets) columns (B format), and 24-position extraction racks for 1, 3, and 6 mL (tablets) columns (A, B, and C format).

**Sample:** 1 mL x 96, 2 mL x 96, 5 mL x 48, and 10 mL x 24 sample plates, 96-position retaining plate for 1.4 mL matrix sample tubes, 48-position sample rack for 12 x 75 mm test tubes, and 24-position sample racks for 12 x 75 mm, 16 x 75 mm, 18 x 75 mm, 13 x 100 mm, and 16 x 100 mm test tubes.

**Collection:** 1 mL x 96, 2 mL x 96, 5 mL x 48, and 10 mL x 24 collection plates, 48-position collection rack for 12 x 75 mm test tubes, and 24-position collection rack for 12 x 75 mm, 16 x 75 mm, and 18 x 75 mm test tubes.

**Flow-through plate:** The flow-through plate is used for guiding waste into the extraction waste collector eliminating the risk of cross-contamination. The plate can be cleaned and reused. There are three types of flow-through plates, one for 96-position plates and column racks (it can also be used for 48-position column racks), one for 48-position plates and column racks, and one for 24-position column racks.

## Pressure Unit

The pressure unit is designed to process extraction plates or columns using pressurized gas. There are two pressure heads available, one for 48 and 96 formats and one for 24 format.

The gas connected to the **AIR** port (at the right side of the system) is used to seal the plate or columns and its pressure has to be adjusted according to how many positions in the plate or column rack that are populated. Use  $6 \pm 0.2$  bar ( $0.6 \pm 0.02$  MPa;  $87 \pm 3$  psi) for a fully populated extraction plate/rack and lower to approximately 4 bar (0.4 MPa; 58 psi) when 50% of the plate/rack is populated and 3 bar (0.3 MPa; 44 psi) when 25% of the plate/rack is populated.

The gas connected to the **N<sub>2</sub>** port is used when processing samples. The processing pressure is adjustable from 0 to 5 bar in the software, while the pressure into the system has to be set to  $6 \pm 0.2$  bar ( $0.6 \pm 0.02$  MPa;  $87 \pm 3$  psi). The gas flow when processing is between 0 and 10 mL/min during all operations except for plate dry, where it is approximately 600 mL/min at 5 bar. Note that older systems (unless upgraded) do not have dual flow and always process at 0 to 10 mL/min.

The gas applied to the samples must be according to ISO 8573-1, classification 1-6-1. This is essential to prevent sample contamination and general fouling of the pressure unit. The filter unit that is supplied with the system delivers according to ISO 8573-1, class 1-x-1. If the gas applied is not according to class x-6-x, an air dryer needs to be ordered separately (P/N 416441SP).

### Pressure Gradients

When setting up a method, it is possible to create pressure gradients for conditioning, equilibration, sample load, wash, collection, and elution steps. For more information, see page 28.

### Waste Kit and Vacuum

A laboratory vacuum source, or a vacuum pump (sold separately, P/N 356330SP), is required for collecting the waste in the 5 liters waste reservoir outside the system. Always ensure that there is sufficient volume in the waste reservoir before starting a run.

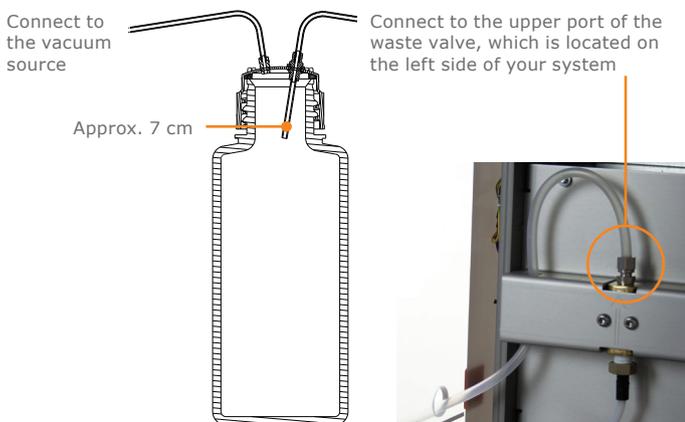


Figure 4. The setup of the waste kit.

### Safety

The ventilated system enclosure protects the user against mechanical hazards and potentially harmful solvents and/or vapors. The system cannot be operated when:

- » the door is open, and/or
- » the integral system ventilation fan is not working.



Figure 5. The outlet of the Extrahera top ventilation.

### Visual and Audible Alarm

The system’s visual and audible alarm is triggered by non-user-initiated pauses, scheduled pauses (defined in the method), and system errors:

- » When a non-user-initiated or scheduled pause occurs, the software background flashes in blue and an alarm with short beeps sounds (see Figure 6).
- » If a system error occurs, the software background flashes in red and an alarm with longer beeps sounds (see Figure 6).

The alarm stops when the touch screen is pressed. If desired, the audible alarm can be disabled in the software’s **Maintenance** view (see page 46).

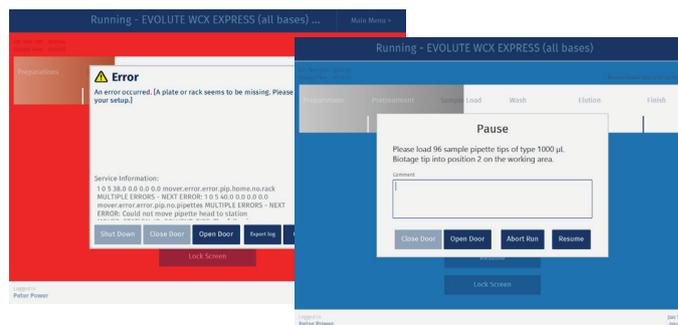


Figure 6. When a non-user-initiated or scheduled pause occurs, the software background flashes in blue. If a system error occurs, the software background flashes in red.

### Lighting

To provide better visibility for the user, there are lamps available inside the system. These can be turned on and off in the software’s **Maintenance** view (see page 46). There is one control for the upper lamps and one for the lower.

### Adjustable Touch Screen

Extrahera is operated through a 12" touch screen that is adjustable for analyst height, and can be front facing or side facing. There are two ports for connecting USB memory devices on the left side of the touch screen frame (on the underside on older systems).

### Barcode and QR Scanner (Optional)

The barcode and QR scanner (sold separately) can be connected to one of the two USB ports on the touch screen frame and be used instead of the touch keyboard to enter information.

### Biotage® Extrahera™ GLP Software License (Optional)

See “Biotage® Extrahera™ GLP Software” on page 5.

**Note:** This manual covers both systems running with the Extrahera non-GLP software and the Extrahera GLP software.

# Power Failure

## Warning

- » If the system is found with the door closed and the power off, ensure to ventilate the system properly before turning the system back on.

The system has open solvent reservoirs. If the ventilation fails and solvent vapors are not removed, an explosive environment could be generated. If the system is found with the door closed and the power off, you must:

1. Ventilate the system properly by opening the door manually using the T25 Torx screwdriver supplied with the system; see Figure 7. Ensure to take the necessary precautions to avoid exposure to potentially harmful solvents and/or vapors.
2. Remove all solvent reservoirs and remove any spillage before turning the system back on.

We do not recommend that the system is left unattended for an extended period of time when using flammable solvents.



**Figure 7.** Open the door manually by turning the screw counterclockwise using the T25 Torx screwdriver supplied with the system.

# Biotage® Extrahera™ GLP Software

This chapter describes the main features of the optional Biotage® Extrahera™ GLP Software license. The license is sold separately (see page 58) and must be installed by an authorized Biotage service engineer.



Figure 8. The login view when using a system with the Extrahera GLP software license installed.

## User Accounts and Access Levels

To protect the system against unauthorized usage, each user must log in to the system using a unique user account with an alpha-numeric, time-sensitive, password.

The user accounts are set up by a user with system administration access; see Figure 9. Each user is provided a defined role which limits the capacity to interact with the system; see Table 1 on page 11. Five user profiles are available: system administrator, power user, routine user, QA/QC, and monitor.

The system locks the screen after a set number of seconds of user inactivity. The screen must then be unlocked, either by the logged in user or a user with power user access. The latter is not possible when the logged in user has system administrator or service user access. The time limit for inactivity is set for each user individually.

For more information, see “Manage User Accounts (GLP)” on page 9.

## E-mail Notifications

With the Extrahera system connected to an e-mail server, routine and power users can receive e-mail notifications when the following occurs during their run:

- » Scheduled pauses, i.e. pauses that are defined in the method.
- » Unscheduled pauses, e.g. when the system has run out of pipette tips or a clogged well/column has been detected.
- » The run is completed. If the **Comment at the end of run** option is enabled in the method, the user is also notified when it is time to enter the comment.
- » The run is aborted.
- » The run failed.
- » System errors.

The notifications are enabled by a system administrator for each user individually; see Figure 9.

Users with power user or monitor access can get e-mail notifications for other users’ runs.

For more information, see “Configure E-mail Notifications” on page 13 and “Manage User Accounts (GLP)” on page 9.

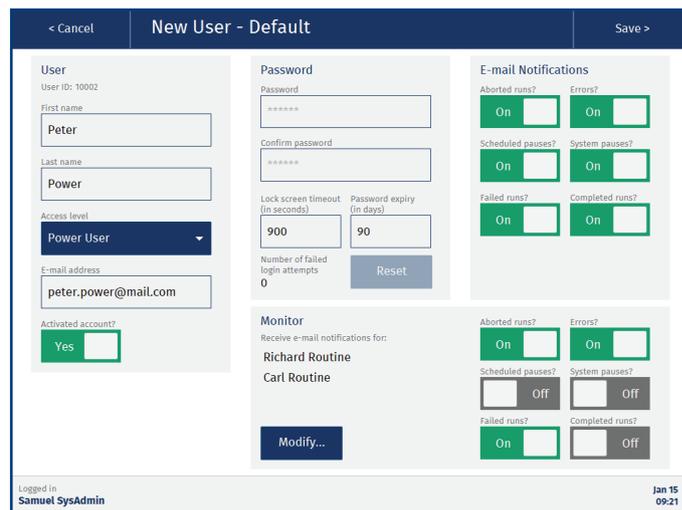


Figure 9. Adding a user with power user access.

## Network Share

With the Extrahera system connected to the network, it is possible for a system administrator to give the system access to a network share folder.

The share folder can be used for backups, import of methods and sample batch worklists, and export of methods, reports, audit trails, and system logs.

For more information, see “Configure Network Share” on page 13.

## Biotage® Extrahera™ Remote Viewer

Biotage® Extrahera™ Remote Viewer (see Figure 10) allows the users to monitor their runs and download reports when away from the system.

Power and monitor users can log in remotely at any time to a system allowing remote access, while routine and QA/QC users only can log in remotely (and stay logged in) when logged in locally on the system. For more information, see “Remotely Monitor Runs and View Reports (GLP)” on page 43.

Remote access has to be enabled by a system administrator. For more information, see “Enable/Disable the Remote Viewer” on page 12.

**Figure 10.** During the run, the same run progress information is displayed in the remote viewer as on the system.

## System Backup and Restore

Backups can be scheduled and started manually by a system administrator; see Figure 11.

Depending on which export options are enabled on the system, the backups can be stored on a USB memory device and/or in a network share folder.

For more information, see “Perform and Schedule Backups (GLP)” on page 17.

**Figure 11.** To get a quick overview of the backup setup and when the last backup was performed, see the Backup Status field in the System Administration view.

## Restricted USB Export and Protected PDF Files

The system offers the possibility to import and export both from/to a USB memory device and a network share folder (if configured). Whether both export destinations are allowed or not is controlled by a system administrator; see “Set Export Options (GLP)” on page 16

All PDF files exported from the system are locked using automatically generated, non-recoverable passwords and cannot be edited.

## Confirmation with Reason and Password

The following actions, that can be performed by power users, require that the user enter a reason for the change and the user password:

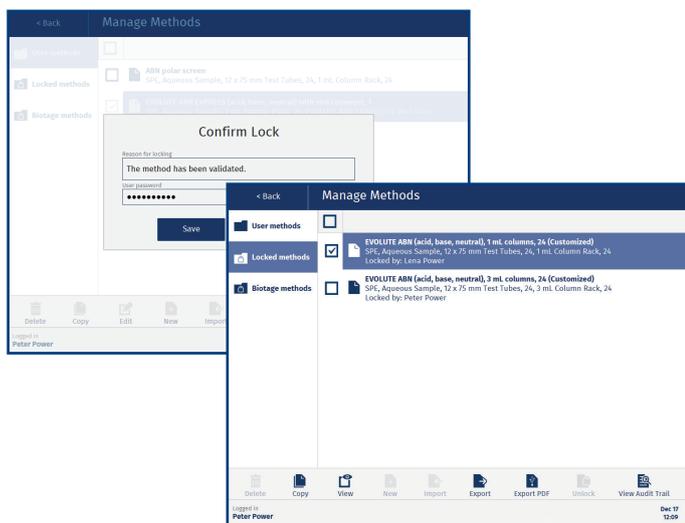
- » Deleting an entry in the **Data Administration** view.
- » Locking a solvent to a specific solvent reservoir in position **5** on the working area.
- » Editing, locking, unlocking, and deleting a method.
- » Deleting a report.

## Editing and Locking Methods

When setting up a method, a timestamp inside the method displays when it was last edited and by whom. Check the method audit trail for detailed information.

Methods that contain all information required to be run can be locked. The method is then moved to the **Locked methods** folder and cannot be modified or deleted, and can only be unlocked by the same user; see Figure 12.

Only power users can set up and lock methods. For more information, see “Set Up a Method” on page 25.



**Figure 12.** The locking of a method has to be confirmed by entering a comment and the user password. A locked method cannot be modified or deleted, and can only be unlocked by the same user. In the Locked methods folder, you can see which user that locked a method.

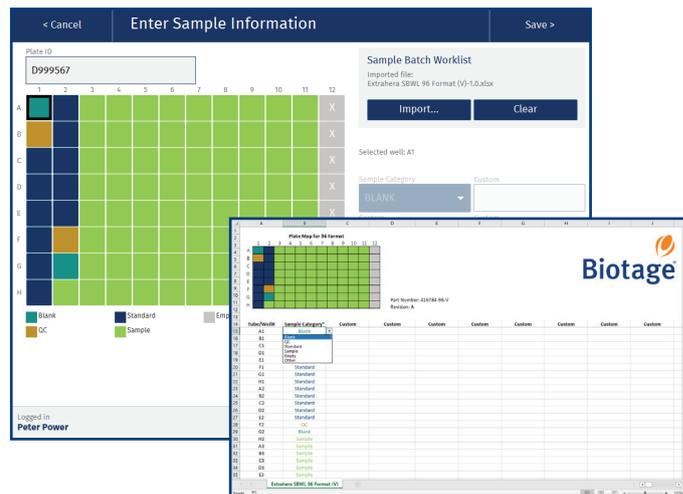
## Sample Batch Worklist (SBWL) and Identification Information

When setting up a run, sample information can be entered either manually or by importing a sample batch worklist (SBWL).

Biotage supplies SBWL Excel templates for all supported formats\* with color coded plate/rack map and 11 custom fields; see Figure 13. You can also use tsv, csv, and txt files.

For more information, see “Enter Sample Information (GLP)” on page 38.

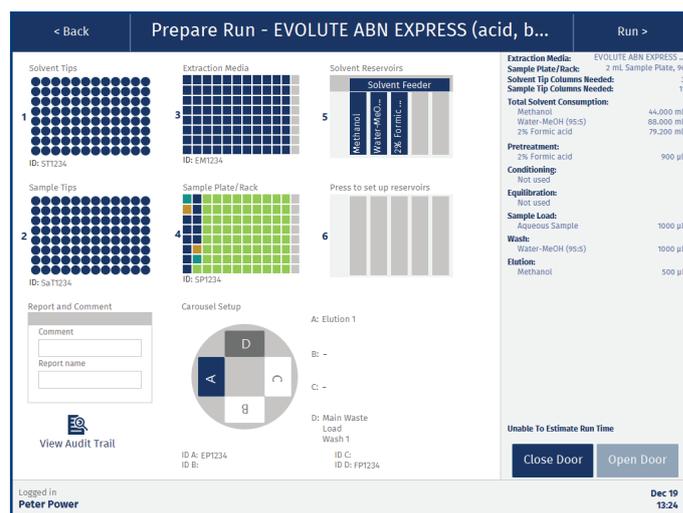
\* 96 positions plate and column rack, 48 position plate, 48 position column rack, and 24 position column rack.



**Figure 13.** Once a SBWL has been imported, the user cannot edit the information on the system.

## Identification (ID) Information

Identification (ID) information can be entered for all solvents, racks, plates, and pipette tips used in the run by pressing the corresponding positions in the **Prepare Run** view; see Figure 14.



**Figure 14.** The Prepare Run view.

## Clog Detection

Clog detection can be enabled for any load, wash, and elute step in SPE, SLE, and Filtration+ methods.

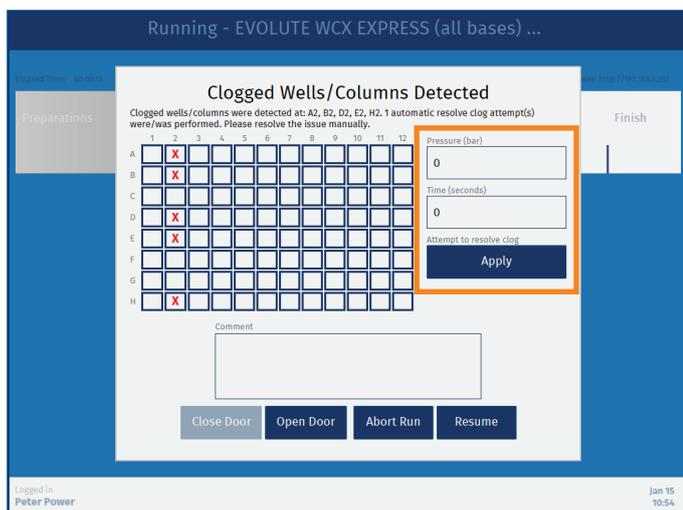
The system can be set up to automatically try to clear clogged wells/columns by applying pressure up to three times.

The pressure, time, and number of attempts are defined in the method. The plate/rack is scanned after each attempt and if the clogged wells/columns have been cleared, the run is immediately resumed.

If there are still clogged wells/columns when the maximum number of attempts have been made, or if that feature is not enabled, the **Clogged Wells/Columns Detected** dialog opens (see Figure 15).

If enabled in the method, the user is given the option to apply pressure in the **Clogged Wells/Columns** dialog.

For more information, see “Clog Detection Settings (GLP)” on page 29.



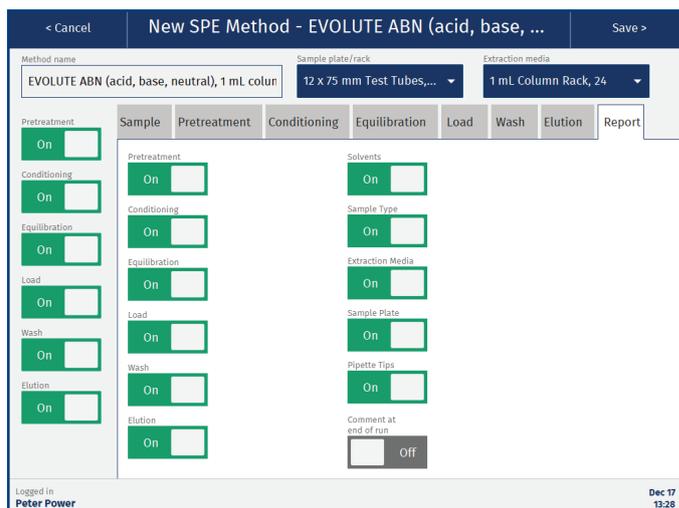
**Figure 15.** The Clogged Wells/Columns Detected dialog. If enabled in the method, you can try to clear the clogged well(s)/column(s) by applying pressure (see the highlighted section).

## Dynamic Reporting

The contents of the report is set up in the method. The power user that sets up the method can enable/disable information for each operation individually and the details for the sample type, solvents, extraction media, sample plate, and pipette tips used in the run (see Figure 16).

It is also possible to let the operator add a comment to the report just before the report is generated by enabling the **Comment at the end of run** option.

For more information, see “Set Up a Method” on page 25.



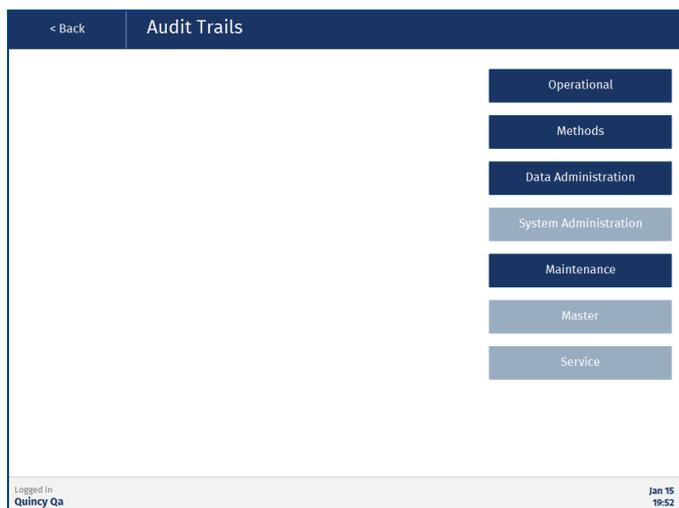
**Figure 16.** The Report tab in an SPE method.

## Audit Trails

Seven different audit trails log all changes and actions performed on the system together with date, time, and user ID.

Audit trails can be exported either as a text file or a secure PDF. The format is set by a system administrator.

For more information, see “Set Export Options (GLP)” on page 16 and “View and Export Audit Trails (GLP)” on page 44.



**Figure 17.** The Audit Trails view when logged in as a QA/QC user. For user access rights, see Table 1 on page 11.

# Manage User Accounts (GLP)

## System Administration



User accounts can be created, edited, and deactivated in the **Manage Users** view (see Figure 19) by users with system administrator access.

Each user account has an access level that determines which functionality is available to the user; see Table 1 on page 11.

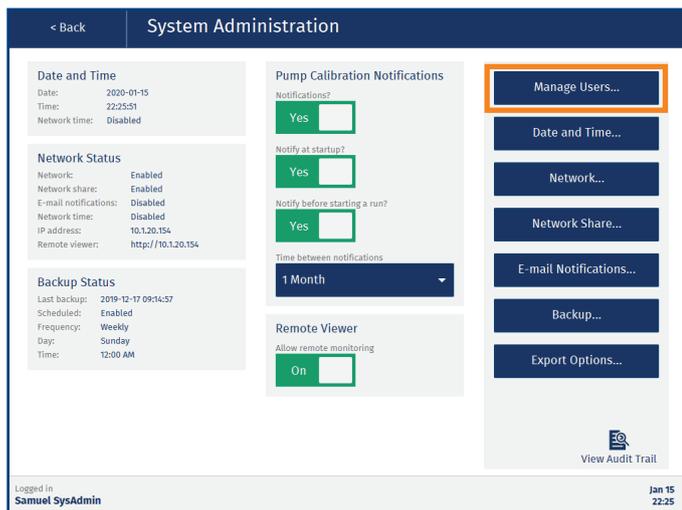


Figure 18. The System Administration view.

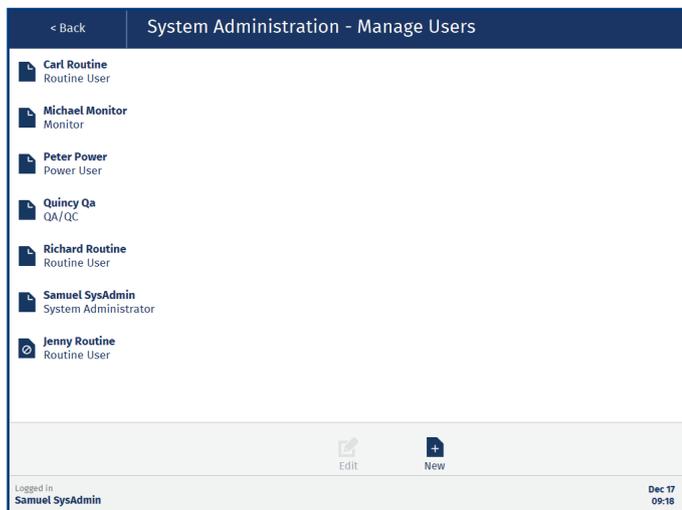


Figure 19. The Manage Users view. Jenny’s user account is deactivated.

## User Parameters

The following parameters are available in a user account (see Figure 20).

### User

- » **User ID:** When a new user account is created, the system gives it a unique ID that is used in the audit trails.
- » **First name:** The user’s first name.
- » **Last name:** The user’s family name.
- » **Access level:** The user’s access level; see Table 1 on page 11.
- » **E-mail address:** The user’s e-mail address, which is used for e-mail notifications (see page 10).
- » **Activated account:** Whether the user account is activated or not. When deactivated, the user will not be able to log in to the system or the remote viewer (if enabled) but all reports on runs performed by the user will still be available to other users in the **Reports** view.

### Password

- » **Password:** The user’s password for logging in to the system and the remote viewer (if enabled). The password must contain between 8 and 40 characters, at least one upper case and one lower case character, and at least one number.
- » **Lock screen timeout (in seconds):** Number of seconds of inactivity before the system locks the screen. The screen must then be unlocked, either by the logged in user or a user with power user access. The latter is not possible when the logged in user has system administrator or service user access.
- » **Password expiry (in days):** The number of days the password is valid. When the password has expired, the user will be prompted to change it.
- » **Number of failed login attempts:** When a user fails to log in five times, the user account is locked. If e-mail notifications are allowed on your system (see page 13), all users with system administrator access (and an e-mail address registered) will be notified that the account has been locked. To unlock the account, press **Reset** (see Figure 20).

### E-mail Notifications

When your system is connected to a network and has e-mail notifications enabled, it is possible for users with routine or power user access to receive the following e-mail notifications for their runs:

- » **Aborted runs:** The user is notified when a run is aborted.
- » **Errors:** The user is notified if a system error occurs during a run. The error message is included in the e-mail.
- » **Scheduled pauses:** The user is notified when a scheduled pause occurs, i.e. a pause that is defined in the method.
- » **System pauses:** The user is notified when an unscheduled pause occurs, e.g. when the system has run out of pipette tips or a clogged well/column has been detected.
- » **Failed runs:** The user is notified when a run fails.
- » **Completed runs:** The user is notified when a run is completed. If the **Comment at the end of run** option is enabled in the method, the user is also notified when it is time to enter the comment.

Figure 20. Editing a user with power user access.

### Monitor

Users with power user or monitor access can get e-mail notifications for other users' runs. Available notifications are the same as the ones listed above. To define which users to monitor, press **Modify...**, select the user(s) in the **Monitor – Add/Remove Users** view (see Figure 21), and press **Save** in the top pane.

Figure 21. Only users that can perform runs on the system (routine or power users) are listed in the Monitor - Add/Remove Users view.

Feature	 Routine	 Power	 QA/QC	 Admin.	 Monitor	 Service	Comment
<b>Login to the System</b>	✓ <sup>(1)</sup>	✓ <sup>(1)</sup>	✓ <sup>(1)</sup>	✓	✗	✓	(1) Overridable by a power user when the screen is locked.
<b>Run Methods</b>							
Locked Methods	✓	✓	✗	✗	✗	✗	
Unlocked Methods	✗	✓	✗	✗	✗	✗	
Biotage Methods	✗	✓	✗	✗	✗	✗	
Get E-mail Notifications	✓	✓	✗	✗	✓	✗	
<b>Reports</b>							
Delete	✗	✓	✗	✗	✗	✗	If the reports are only saved in a network share folder, the <b>Reports</b> view is disabled to all users.
View and Export as PDF	✓	✓	✓	✗	✗	✗	
<b>Manage Methods</b>							
Create, Import, Export, Edit, and Lock	✗	✓	✗	✗	✗	✗	A method can only be unlocked by the same user that locked it.
View and Export as PDF	✓	✓	✓	✗	✗	✗	
<b>Data Administration</b>							
Create and Delete Entry, and Lock Solvent	✗	✓	✗	✗	✗	✗	Solvents, sample types, extraction media, sample plate and racks, and pipette tips.
View Entry	✗	✓	✓	✗	✗	✗	
<b>System Administration</b>							
Configure Pipette Pump Notifications	✗	✗	✗	✓	✗	✓	
Enable the Remote Viewer	✗	✗	✗	✓	✗	✓	
Manage User Accounts	✗	✗	✗	✓	✗	✓	
Set Date and Time	✗	✗	✗	✓	✗	✗	
Network Services	✗	✗	✗	✓	✗	✗	
Perform and Schedule Backup	✗	✗	✗	✓	✗	✗	
Export Options	✗	✗	✗	✓	✗	✗	
<b>Maintenance</b>							
System Settings	✓	✓	✓	✗	✗	✗	System settings: alarm, lights, instrument type, PPT/PLD mode, and headers for SBWL.
Calibrate Pipette Pump	✗	✓	✓	✗	✗	✗	
Manual Control	✓	✓	✗	✗	✗	✗	
Flush Solvent Inlets	✓	✓	✗	✗	✗	✗	
Export Logs	✓	✓	✗	✗	✗	✗	
Re-initialize the System	✓	✓	✗	✗	✗	✗	
<b>View and Export Audit Trails</b>							
Operational	✓	✓	✓	✗	✗	✗	If the reports are only saved in a network share folder, the operational audit trails are not accessible on the system.
Methods	✓	✓	✓	✗	✗	✗	
Data Administration	✗	✓	✓	✗	✗	✗	
System Administration	✗	✗	✗	✓	✗	✓	
Maintenance	✓	✓	✓	✗	✗	✗	
Master	✗	✗	✗	✓	✗	✓	
Service	✗	✗	✗	✗	✗	✓	
<b>Access Remote Viewer (if enabled)</b>	✓ <sup>(2)</sup>	✓	✓ <sup>(2)</sup>	✗	✓	✗	(2) When logged in to the system.

Table 1. User access rights.

# Connect the System to Your Network (GLP)

## System Administration



Network configurations can be done in the **System Administration** view (see Figure 22) by users with system administrator access.

With the Extrahera system connected to your network, it is possible to get e-mail notifications, monitor the run and download reports through a remote viewer, use a network share folder, and synchronize the system with a network time server.

To get an overview of which network features that are enabled on your system, see the **Network Status** field in the **System Administration** view (see Figure 22).

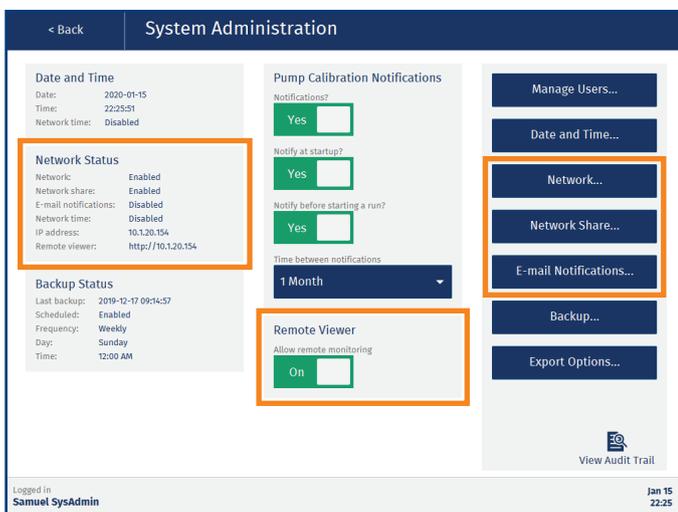


Figure 22. The System Administration view.

## Configure Network Connection

**Note:** Any change to the network settings will require a restart of the system.

**Note:** If you disable the network connection, the latest network settings are saved until enabled again.

1. Connect a network cable between the **LAN** port located on the right hand side of the system and your network.
2. In the **System Administration** view, press **Network....**
3. In the **Network** view (see Figure 23), enable the **Network** option.

4. Enter the required network settings. Please contact your IT department for help with entering the correct settings for your network.

**Note:** The **Host name** will be used to identify the system in the network and it is also displayed in the remote viewer (see Figure 83 on page 43), if enabled.

5. When done, press **Save** in the top pane and restart the system when prompted.

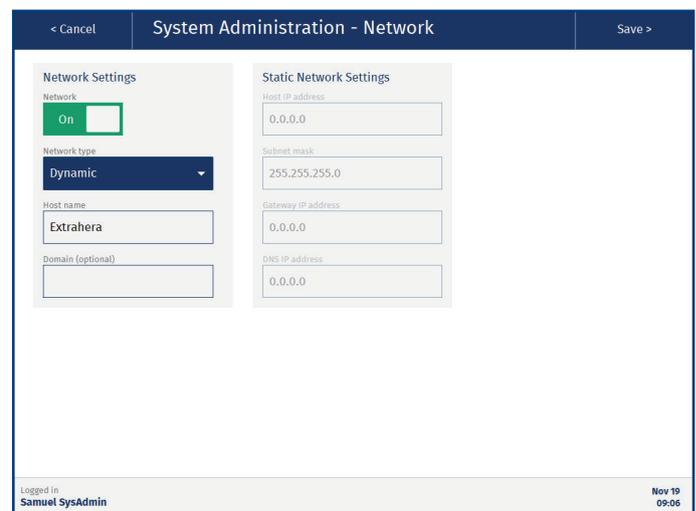


Figure 23. The Network view.

## Enable/Disable the Remote Viewer

The remote viewer allows the user to monitor the run and download reports when away from the system; see “Remotely Monitor Runs and View Reports (GLP)” on page 43.

The remote viewer is enabled/disabled using the **Allow remote monitoring** option in the **Remote Viewer** field; see Figure 22.

The IP address of the remote viewer is displayed in the **Network Status** field. It is also displayed in the upper right corner in the **Running** view; see Figure 76 on page 40.

**Note:** The remote viewer is supported on Microsoft Edge, Mozilla Firefox, and Google Chrome.

## Configure E-mail Notifications

During a run, the system can send out e-mail notifications to the user that started the run and to users that monitor the user's runs. For more information, see "E-mail Notifications" on page 10.

1. Ensure that you have an e-mail address registered in your user account.
2. In the **System Administration** view, press **E-mail Notifications...**
3. In the **General** and **SMTP Security** fields (see Figure 24), enter the required information. Please contact your IT department to get the correct settings for your e-mail server.
4. When done, send a test e-mail to the e-mail address registered to your user account by pressing **Test Configuration**.
5. If you receive a test e-mail, press **Save** in the top pane.
6. If you do not receive a test e-mail, check that the correct e-mail address has been registered. For help troubleshooting, please contact your IT department.

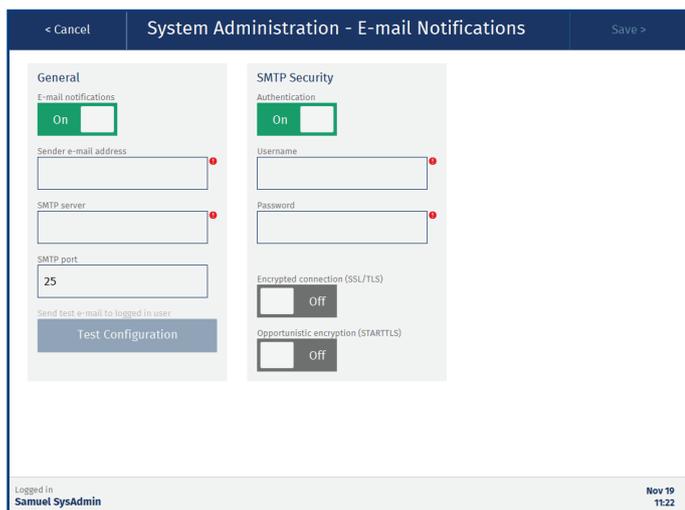


Figure 24. The E-mail Notifications view.

## Configure Network Share

**Note:** For help configuring network share, please contact your IT department.

A system administrator can give the system access to a share folder on the network. The share folder can be used for backups, import of methods and sample batch worklists, and export of methods, reports, audit trails, and system logs.

The system will create a sub folder in the share folder with the name Extrahera + the system's serial number (**extrahera\_serialnumber**). In this way the share folder can be used by several Extrahera systems.

## Example on How to Create a Share Folder Using a Windows 10 Computer

**Note:** This procedure requires administrator permission on the Windows 10 computer.

1. Create or select a folder that you want to share. The folder can be located anywhere on the computer.
2. Right-click the folder and select **Properties** from the right-click menu.
3. In the **Properties** dialog, select the **Sharing** tab.
4. In the **Sharing** tab, click **Advanced Sharing**.
5. In the **Advanced Sharing** dialog, select the **Share this folder** check box and click **Permissions**.
6. Add the users that you want to give access to the folder and give them at least the permission to Change and Read.
7. When done, click **OK** twice to close the **Permissions** and **Advanced Sharing** dialogs.
8. Click **Close** in the **Properties** dialog.

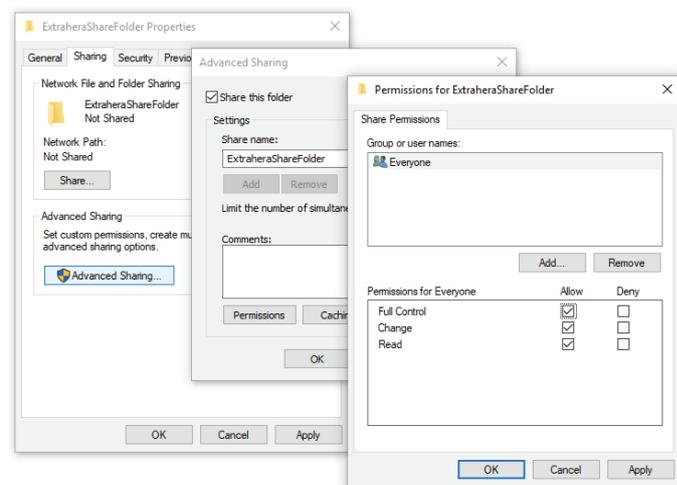


Figure 25. Creating a share folder on a Windows 10 computer. In this example the user group Everyone has been given full control of the share folder "ExtraheraShareFolder".

## Give the Extrahera System Access to the Share Folder

1. In the **System Administration** view, press **Network Share...**
2. In the **Network Share** view (see Figure 26), enable the **Network share** option.
3. Enter the host name or IP address of the computer sharing the folder in the **SMB/CIFS host** text box. When using a Windows 10 computer, the host name is the **Computer name** that can be found in the Control Panel (Control Panel\System and Security\System).
4. In the **SMB/CIFS version** drop-down list, select the correct version for the computer sharing the folder, e.g. modern Windows computers need at least version 2.0.

5. Enter the name of the share folder in the **Share folder** text box.  
**Note:** The folder must exist.
6. Enter the username and password for a user with read/write access to this folder. This can be skipped if the folder is set up to be accessed by anyone that has access to the network.
7. Press **Test Connection**. The system will try to access the share folder and create a **extrahera\_serialnumber** sub folder.
8. If the test is successful, press **Save** in the top pane.
9. If the test fails, please contact your IT department for help troubleshooting.

**Note:** Export to the network share folder has to be enabled in the **Export Options** view; see page 16.

The screenshot shows a configuration window for a Network Share. The title bar reads "System Administration - Network Share". The main content area is titled "SMB/CIFS Network Share" and contains the following fields and controls:

- Network share:** A toggle switch set to "On".
- SMB/CIFS host:** A text input field containing "ComputerA".
- SMB/CIFS version:** A dropdown menu set to "3.0".
- Share folder:** A text input field containing "ExtraheraShareFolder".
- Username:** A text input field containing "john.doe".
- Password:** A text input field with masked characters (dots).
- Test Connection:** A blue button at the bottom of the form.

The footer of the window displays "Logged In: Samuel SysAdmin" on the left and "Dec 18 16:24" on the right.

**Figure 26.** The Network Share view. In this example, the host name of the computer sharing the folder is "ComputerA" and the share folder name is "ExtraheraShareFolder".

## Synchronize the System with a Network Time Server

See "Set Date and Time (GLP)" on page 15.

# Set Date and Time (GLP)

## System Administration



The date and time can be set in the **Date and Time** view (see Figure 28) by users with system administrator access.

Either enter the date and time manually or, if your system is connected to a network, synchronize the system with an NTP time server:

1. In the **System Administration** view, press **Date and Time...** (see Figure 27).
2. Enable the **Network date and time** option.
3. Enter the address to the time server in the **NTP time server** text box (see Figure 28). Please contact your IT department for more information.
4. Press **Synchronize**.
5. If the synchronization is successful, press **Close** in the **Synchronizing** dialog and then **Save** in the top pane.
6. If the synchronization fails, please contact your IT department for help troubleshooting.

The synchronization is performed every 10 minutes and cannot be changed.

Select the time zone from the **Time zone** drop-down list. Changing the time zone requires a restart of the system.

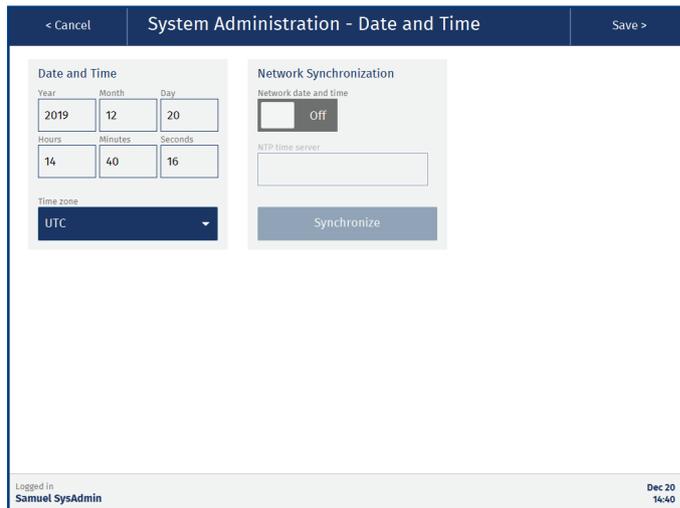


Figure 28. The Date and Time view.

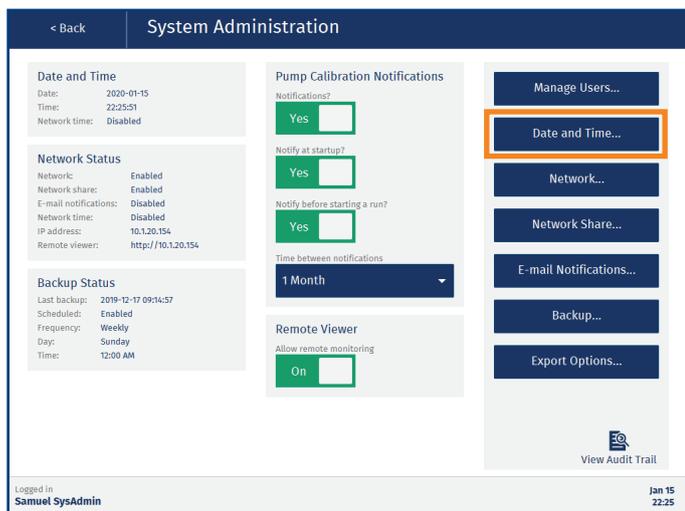


Figure 27. The System Administration view.

# Set Export Options (GLP)

## System Administration



Export options can be enabled/disabled in the **Export Options** view (see Figure 30) by users with system administrator access.

**Note:** The export options for network share can only be enabled when network share is configured (see page 13).

- In the **System Administration** view, press **Export Options...** (see Figure 29).
- In the **Export Destination** field (see Figure 30), enable the desired option(s):
  - » **Allow export to USB:** The USB ports on the system can be used for backups and export of methods, reports, audit trails, and system logs.
  - » **Allow export to network share:** The network share folder can be used as the destination for backups and export of methods, reports, audit trails, and system logs.
- In the **Report Auto-Features** field (see Figure 30), enable the desired option(s):
  - » **Auto-export reports to network share:** Reports and operational audit trails are automatically saved in the network share folder.
 

**Note:** If the system fails to export a report (e.g. when the network is down), the system will retry every 15 minutes until the report is successfully exported. If the system is turned off, it will retry within 5 minutes after startup. The system will pop up a notification each time the auto-export fails.
  - » **Auto-delete reports from system:** Reports and audit trails are permanently deleted from the system after they have been exported to the network share folder (see the option above). The **Report** view will be disabled to all users.

- In the **Export Format** field (see Figure 30), select the format (PDF or TXT) to be used when exporting an audit trail.
 

**Note:** All PDF files exported from the system are locked using automatically generated, non-recoverable passwords and cannot be edited.
- When done, press **Save** in the top pane.

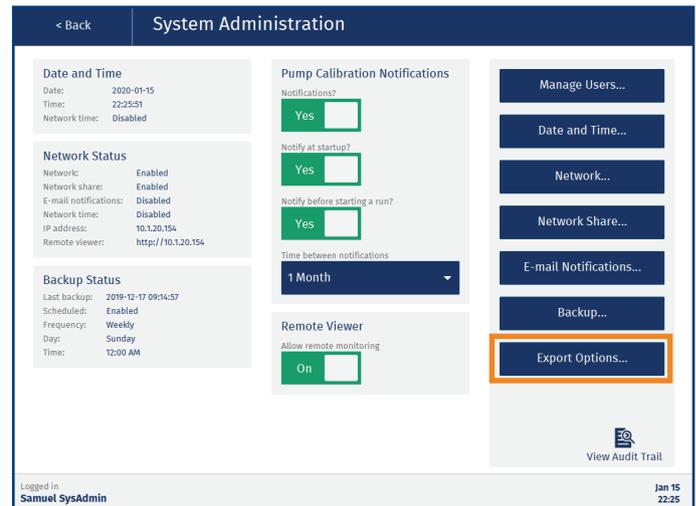


Figure 29. The System Administration view.



Figure 30. The Export Options view.

# Perform and Schedule Backups (GLP)

## System Administration



Backups can be scheduled and started manually in the **Backup** view (see Figure 32) by users with system administrator access.

Depending on which export options are enabled on your system (see page 16), backups can be stored on a USB memory device and/or in a network share folder.

To get a quick overview of the backup setup and when the last backup was performed, see the **Backup Status** field in the **System Administration** view (see Figure 31).

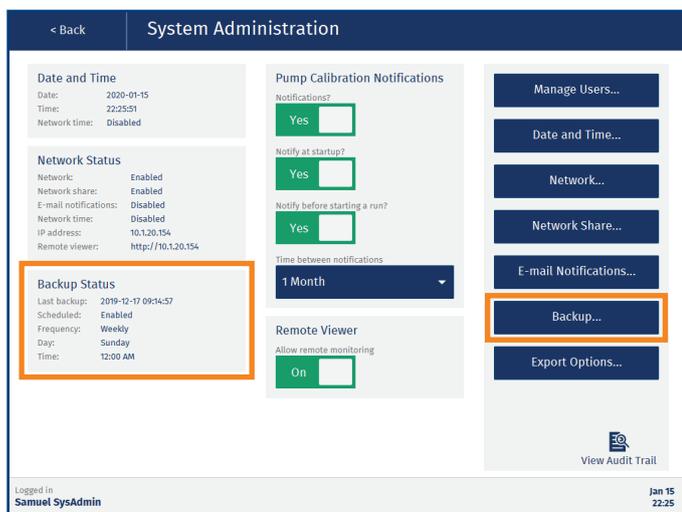


Figure 31. The System Administration view.

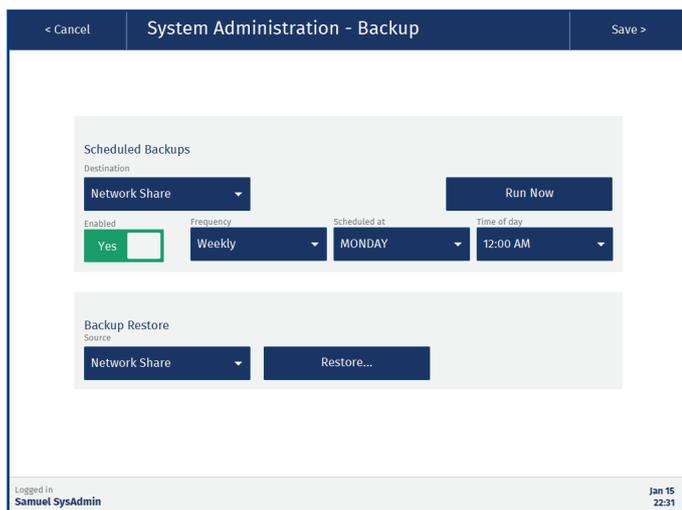


Figure 32. The Backup view.

## Schedule Backups

**Note:** If the system is turned off, the power goes out during a backup, or the backup destination is not accessible at the time of a scheduled backup, the backup fails and has to be performed manually. The system will pop up a notification asking a system administrator to perform a manual backup.

**Note:** Scheduled backups can be performed during runs.

1. In the **System Administration** view, press **Backup...** (see Figure 31).
2. If the system has both network share and USB export enabled, select where you want the backup to be stored from the **Destination** drop-down list (see Figure 32).
3. For USB backup, connect a USB memory device to one of the USB ports on the touch screen frame.
4. Enable the **Enabled** option.
5. Select how often the backups shall be performed (daily, weekly, or monthly) from the **Frequency** drop-down list.
6. If applicable, select the weekday or the day of month to perform the scheduled backup from the **Scheduled at** drop-down list.
 

**Note:** If the day of month is set to 31, a backup will not be scheduled for months with less than 31 days.
7. Select the time of the day to perform the scheduled backups from the **Time of day** drop-down list.
8. Press **Save** in the top pane.

## Perform a Manual Backup

1. In the **System Administration** view, press **Backup**.
2. If the system has both network share and USB export enabled, select where you want the backup to be stored from the **Destination** drop-down list.
3. For USB backup, connect a USB memory device to one of the USB ports on the touch screen frame.
4. Press **Run Now**. The file name for backups is based on the system's serial number and the date and time of the backup.

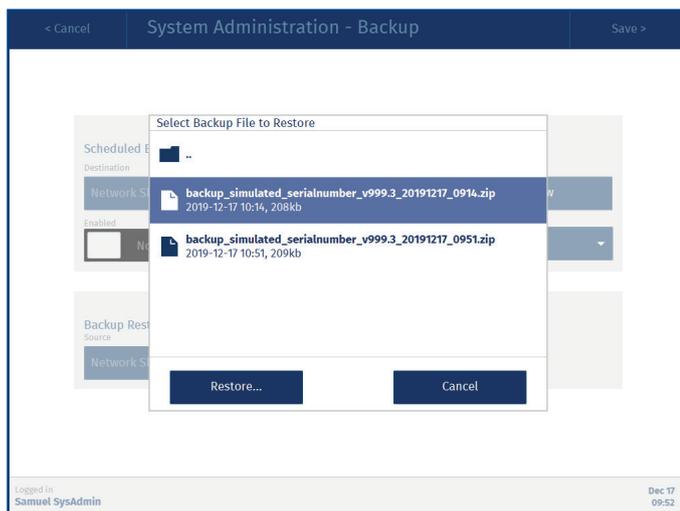
## Restore the System Database

**Note:** All the current data on the system will be erased and replaced with the data in the used backup file.

1. In the **System Administration** view, press **Backup...** (see Figure 31).
2. Perform a safety backup; see “Perform a Manual Backup” above.
3. If restoring the database using a backup file on a USB memory device, connect it to one of the USB ports on the touch screen frame.
4. If the system has both network share and USB export enabled, select the location of the backup file from the **Source** drop-down list (see Figure 32).
5. Press **Restore....**
6. In the **Select Backup File to Restore** dialog (see Figure 33), browse to the file location (if necessary) and select the backup file to be used. The file name for backups is based on the system’s serial number and the date and time of the backup.

**Note:** Do not use a backup file from another system. To verify that the file comes from the system, check the system’s serial number (press **About** in the main menu) and compare it to the serial number in the backup file name.

7. Press **Restore...** and confirm that the system is restarted and the database is restored in the **Confirm Restore** dialog.



**Figure 33.** The Select Backup File to Restore dialog.

# Set Up Reminders for Pipette Pump Calibration

## System Administration



Reminders for pipette pump calibration can be set up in the **System Administration** view (see Figure 34). When using the Extrahera GLP software, the notifications can only be set up by users with system administrator access.

The following settings are available:

- » **Notifications?:** If enabled, the system will notify the user that the pipette pump calibration has expired at startup and/or before a run is started, depending on the setting for the following two options.
 

**Note:** If none of the following two options are enabled, the user will not be notified but the reports will contain a note that the run was performed with an expired pipette pump calibration.
- » **Notify during startup:** The system will pop up a notification at startup.
- » **Notify before starting a run:** The system will pop up a notification before a run is started.
- » **Time between notifications:** How often the pipette pump should be calibrated, once a month, once every third month, once every sixth month, or once a year.

The pipette pump can be calibrated in the **Maintenance** view (see page 49).



Figure 34. The System Administration view.

# Manage Solvents, Sample Types, Plates, Racks, and Pipette Tips

## Data Administration



When using the Extrahera GLP software, the **Data Administration** view can be accessed by power and QA/QC users. QA/QC users can only view the data.

Solvents, sample types, extraction media, sample plates and racks, and pipette tips can be created, copied, edited (not in GLP), and deleted in the **Data Administration** view. It is also possible to lock a solvent to a specific reservoir in the solvent rack in position **5** on the working area.

**Note:** The robot is a precision instrument, i.e. it is important that you enter the correct values when setting up solvents, sample types, plates, racks, and pipette tips in the **Data Administration** view (see Figure 35).

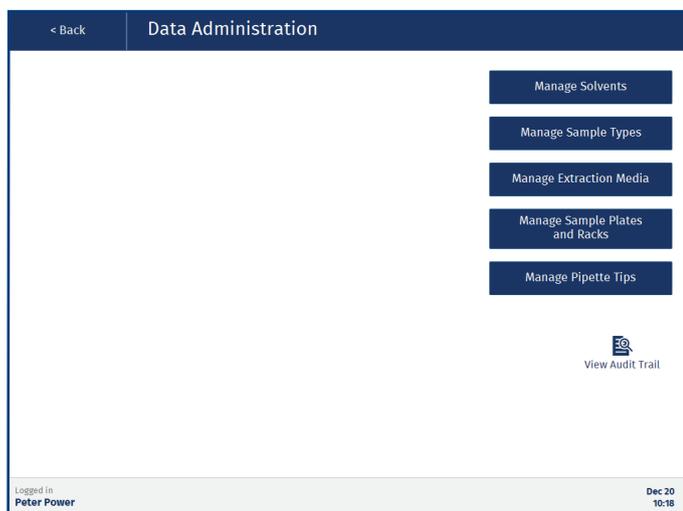


Figure 35. The Data Administration view.

## Predefined Entries

The system comes with a number of predefined entries in the **Data Administration** view that cannot be edited or deleted. If desired, these can be copied and edited to your preferences.

## Custom Entries

Custom entries cannot be deleted when used in a method or on the system, e.g. when a solvent is locked to a specific solvent reservoir.

When using the Extrahera GLP software, custom entries cannot be edited, and when deleting an unused entry, a reason for deleting and the user password have to be entered.

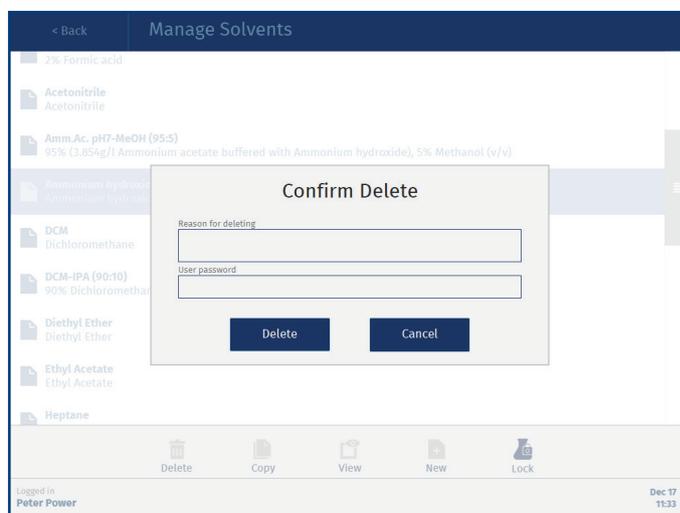


Figure 36. The Confirm Delete dialog when using the Extrahera GLP software.

## Manage Solvents

To add, copy, edit (not in GLP), view, and delete solvents, and lock a solvent to a specific solvent reservoir, press **Data Administration** in the main menu and then **Manage Solvents** (see Figure 35).

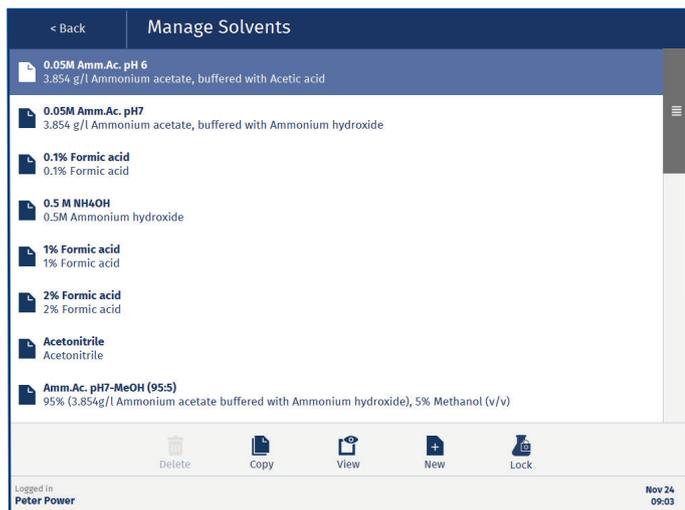


Figure 37. The Manage Solvents view.

### Solvent Parameters

**Note:** Usage of strong acids (e.g. TFA and TCA) and inorganic acids (e.g. nitric, sulfuric, hydrochloric acid, and perchloric acids) in the solvent pumps is not supported at any concentration.

The following parameters are available for solvents (see Figure 38):

- » **Solvent name:** The name of the solvent that will be displayed in the software.
- » **Solvent description:** The solvent including all additives.
- » **Aspiration flow rate (mL/min):** The flow rate that will be used when aspirating the solvent.
- » **Dispense flow rate (mL/min):** The flow rate that will be used when dispensing the solvent.
- » **Aspirate post dispense?:** Whether air is aspirated into the pipette tip after dispensing solvent (Yes) or not (No).
- » **Aspirate post dispense flow rate (mL/min):** The flow rate that will be used when aspirating post dispense.
- » **Aspirate post dispense volume (µL):** The volume of the post dispense aspiration.
- » **Serial dispensing allowed?:** Whether serial dispensing is allowed (Yes) or not (No). Note that serial dispensing is faster, while individual dispensing has a higher precision.
- » **Chlorinated?:** Whether the solvent is chlorinated (Yes) or not (No).
- » **Highly volatile?:** Whether the solvent is highly volatile (Yes) or not (No). When a highly volatile solvent is assigned to the solvent rack in position 5 on the working area, the

reservoir is filled just before the solvent is used for the first time in the run. The user will be prompted to ensure that the solvent reservoir is empty before the run is started.

- » **Lower air gap flow rate (mL/min):** The flow rate that will be used when aspirating and dispensing the lower air gap.
- » **Lower air gap volume (µL):** The volume of the lower air gap.
- » **Upper air gap flow rate (mL/min):** The flow rate that will be used when aspirating and dispensing the upper air gap.
- » **Upper air gap volume (µL):** The volume of the upper air gap.
- » **Upper air gap dispense pause (ms):** The amount of time that the system will pause between the solvent dispensation and the upper air gap dispensation. The default value of 300 ms can be adjusted when dealing with viscous, volatile, or low surface tension solvents.
- » **Requires tip conditioning?:** Whether the pipette tip requires conditioning (Yes) or not (No).
- » **Conditioning frequency:** How often the pipette tips are conditioned; once before the first aspiration, before each step, or before every aspiration.
- » **Conditioning, number of times:** The number of conditioning iterations. This field is only enabled when **Requires tip conditioning** is set to **Yes**.
- » **Conditioning flow rate (mL/min):** The flow rate that will be used when conditioning the pipette tip. This field is only enabled when **Requires tip conditioning** is set to **Yes**.
- » **Conditioning volume (% of tip capacity):** The percentage of the pipette tip that will be filled with solvent when conditioning the tip. This field is only enabled when **Requires tip conditioning** is set to **Yes**.

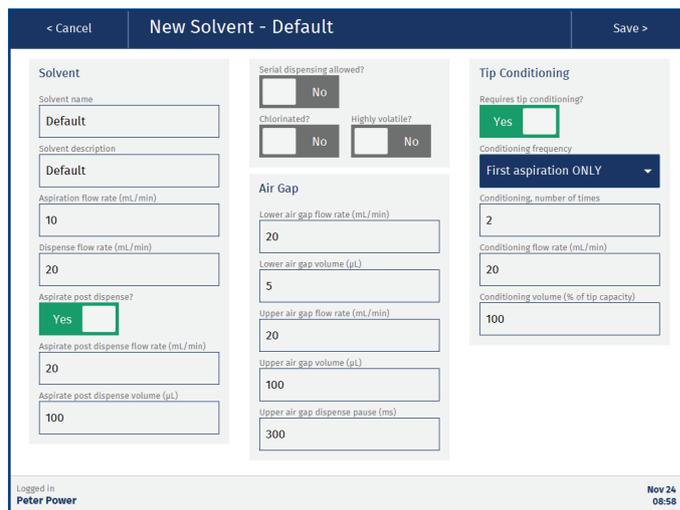


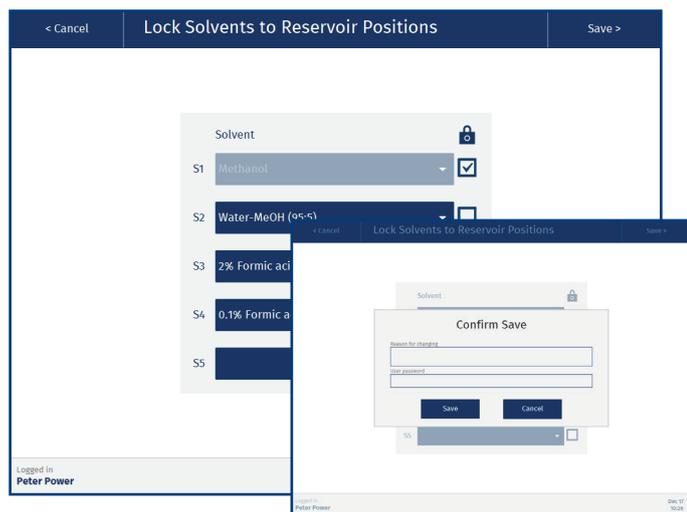
Figure 38. The New Solvent view.

## Lock and Unlock a Solvent

To lock a solvent to a specific solvent reservoir in position **5** on the working area:

1. Press **Lock** in the **Manage Solvents** view (see Figure 37).
2. In the **Lock Solvents to Reservoir Positions** view, select the solvent to be locked from the desired reservoir drop-down list (see Figure 39) and select the corresponding check box.
3. If the **Confirm Save** dialog opens (only GLP), enter the reason for locking the solvent and your password, and then press **Save**.

As long as the solvent is locked to the reservoir, no other solvent can be used in that position. To unlock, clear the check box and press **Save**.



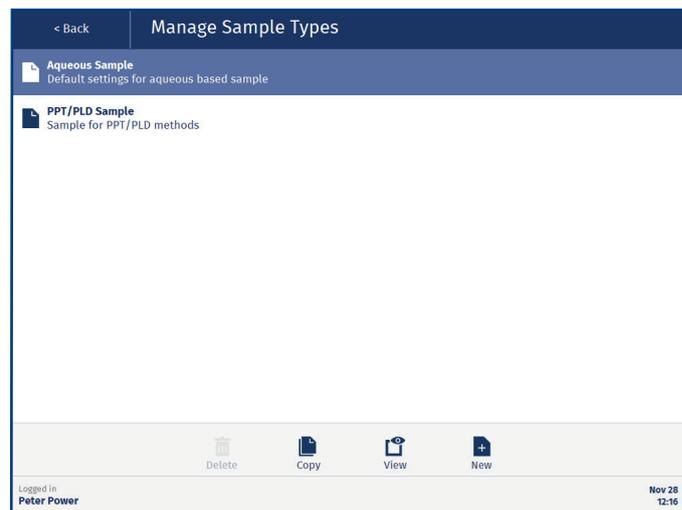
**Figure 39.** The Lock Solvents to Reservoir Positions view with methanol locked to reservoir S1 (in the back). When using the Extrahera GLP software, you have to confirm locking/unlocking by entering a reason and your password (in the front).

## Manage Sample Types

To add, edit (not in GLP), copy, and delete sample types, press **Data Administration** in the main menu and then **Manage Sample Types** (see Figure 35 on page 20). These settings are important if you work with a wide variety of different sample matrices whose liquid handling properties can vary.

The following parameters are available for sample types:

- » **Sample name:** The name of the sample that will be displayed in the software.
- » **Sample description:** A description of the sample.
- » **Aspiration flow rate (mL/min):** The flow rate that will be used when aspirating samples.
- » **Dispense flow rate (mL/min):** The flow rate that will be used when dispensing samples.
- » **Aspirate post dispense?:** Whether air is aspirated into the pipette tip after dispensing sample (Yes) or not (No).
- » **Aspirate post dispense flow rate (mL/min):** The flow rate that will be used when aspirating air post dispense.
- » **Aspirate post dispense volume (µL):** The volume of the post dispense aspiration.
- » **Lower air gap flow rate (mL/min):** The flow rate that will be used when aspirating and dispensing the lower air gap.
- » **Lower air gap volume (µL):** The volume of the lower air gap.
- » **Upper air gap flow rate (mL/min):** The flow rate that will be used when aspirating and dispensing the upper air gap.
- » **Upper air gap volume (µL):** The volume of the upper air gap.
- » **Upper air gap dispense pause (ms):** The amount of time that the system will pause between the sample dispensation and the upper air gap dispensation. The default value of 300 ms can be adjusted when dealing with viscous or pretreated samples that behave differently.



**Figure 40.** The Manage Sample Types view.

## Manage Extraction Media

To add, edit (not in GLP), copy, and delete extraction plates and column racks, press **Data Administration** in the main menu and then **Manage Extraction Media** (see Figure 35 on page 20).

The following parameters are available for extraction media:

- » **Name:** The name of the extraction plate or column rack that will be displayed in the software.
- » **Manufacturer:** The manufacturer’s name.
- » **Part number:** The manufacturer’s part number.
- » **Capacity volume (µL):** The amount of liquid that each well or column can accommodate. If the sample load/solvent volume (in the SPE method) exceeds this, the sample/solvent will be dispensed in aliquots, with application of positive pressure in between each aliquot. Note that this aliquot feature is disabled when the capacity volume is set to zero, which is the default value.
- » **Format:** The number of wells or columns: a 24 positions column rack, a 48 positions column rack, a 48 positions plate, or a 96 positions plate/column rack.
- » **Comment:** Optional information about the plate or rack.
- » **Solvent/Sample dispensation height (mm):** The height where the solvent/sample is dispensed by the pipette tip, measured from the robot’s top position. See “Tune Pipetting Heights” below.
- » **Aspiration height (mm):** The height where the sample mixture is aspirated by the pipette tip during mixing in a PPT or PLD plate or column rack, measured from the robot’s top position. See “Tune Pipetting Heights” below.

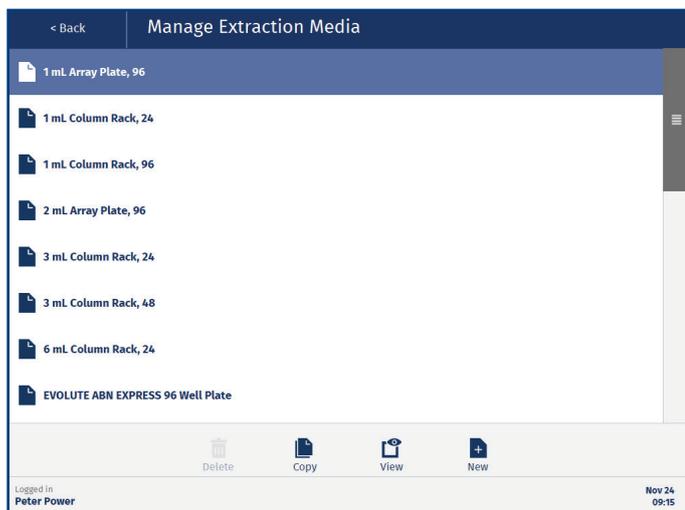


Figure 41. The Manage Extraction Media view.

## Tune Pipetting Heights

The pipetting heights for plates and column racks can either be entered manually or set using a wizard (see Figure 42). To open the software wizard, press **Tune Pipetting Heights...** when setting up the new plate or rack. Note that only one type of pipette tip is required for the tuning of the pipetting heights.

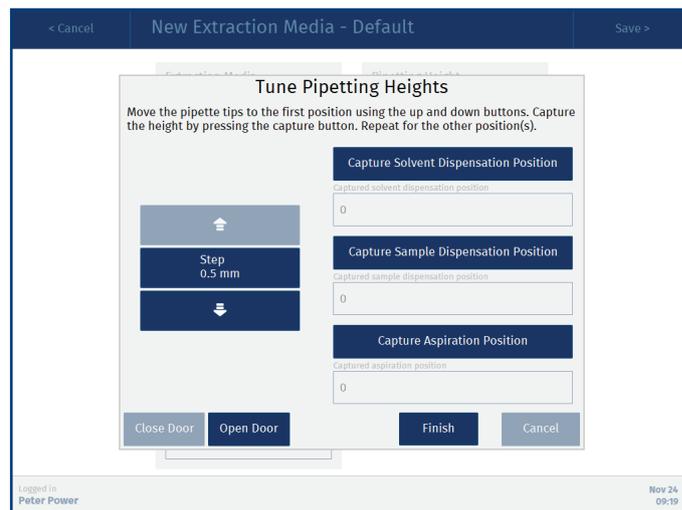


Figure 42. Wizard for setting the pipetting heights for plates and column racks.

## Manage Sample Plates and Racks

To add, edit (not in GLP), copy, and delete sample plates and racks, press **Data Administration** in the main menu and then **Manage Sample Plates and Racks** (see Figure 35 on page 20).

The following parameters are available for sample plates/racks:

- » **Name:** The name of the sample plate or rack that will be displayed in the software.
- » **Capacity volume (µL):** The maximum amount of liquid that each well or test tube can accommodate.
- » **Plate/rack height (mm):** The distance between the bottom of the pipette head (when in its highest position) and the top of the plate/rack. This setting is important when clog detection is used on a GLP system. For instruction on how to measure the height, see “Measure the Sample Plate/Rack Height” below.
- » **Format:** The number of wells or columns: a 24 positions column rack, a 48 positions column rack, a 48 positions plate, or a 96 positions plate/column rack.
- » **Aspiration height (mm):** The height where the sample is aspirated and premixed by the pipette tip, measured from the robot’s top position. See “Tune Pipetting Heights” above.
- » **Pretreatment dispensation height (mm):** The height where pretreatment solvent is dispensed by the pipette tip, measured from the robot’s top position. See “Tune Pipetting Heights” above.

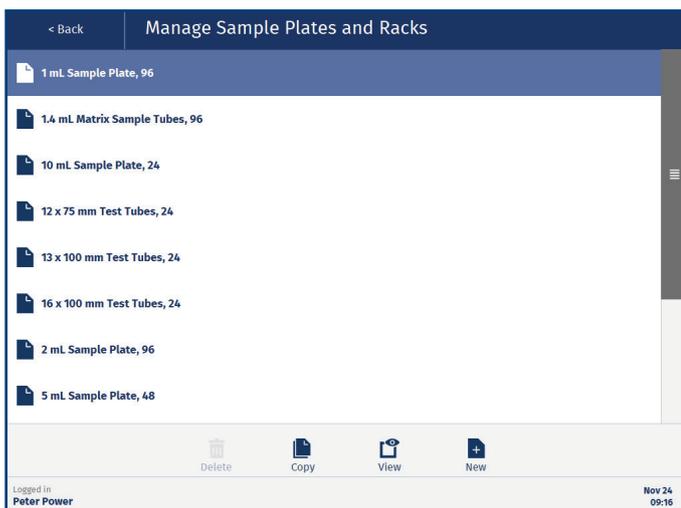


Figure 43. The Manage Sample Plates and Racks view.

### Measure the Sample Plate/Rack Height

The plate/rack height setting is important when clog detection is used on a GLP system.

1. Place the sample plate/rack that you want to measure in position **4** on the working area.
2. Measure the distance from the surface of the working area to the top of the sample plate/sample tubes. As a reference, this value is between 36 and 61 mm for the default Biotage sample plates/racks.
3. Calculate the plate/rack height value as described below:  
*your measured value in mm* – 149 = the height to be entered into the **Plate/rack height** text box.

**Note:** The plate/rack height value must be negative.

**Example:** If your measured distance is 44 mm, enter  $-105$  ( $44-149=-105$ ) into the **Plate/rack height** text box.

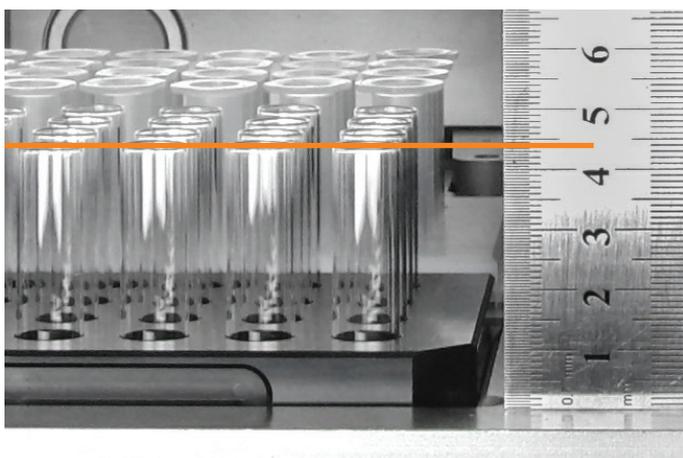


Figure 44. The height for this sample rack is 44 mm, which gives  $-105$  ( $44-149$ ) to be entered into the Plate/rack height text box.

## Manage Pipette Tips

To add, edit (not in GLP), copy, and delete pipette tips, press **Data Administration** in the main menu and then **Manage Pipette Tips** (see Figure 35 on page 20).

The following parameters are available for pipette tips:

- » **Name:** The name of the pipette tip that will be displayed in the software.
- » **Manufacturer:** The manufacturer's name.
- » **Part number:** The manufacturer's part number.
- » **Capacity ( $\mu\text{L}$ ):** The maximum amount of liquid that can be aspirated. This setting ensures that the system cannot attempt to aspirate more liquid into the pipette tip than it can accommodate.
- » **Length (mm):** The length of the pipette tip.

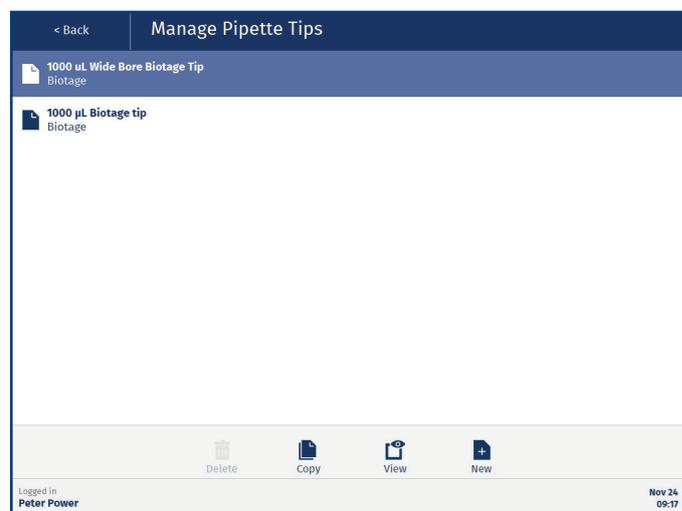


Figure 45. The Manage Pipette Tips view.

# Set Up a Method

## Manage Methods



When using the Extrahera GLP software, methods can be set up by power users. QA/QC and routine users can view methods.

Methods can be created, copied, edited, viewed, locked (only GLP), imported, exported, and deleted in the **Manage Methods** view (see Figure 46).

For instructions on how to import, export, and delete methods, see “Export, Import, and Delete Methods” on page 31.

## Predefined Methods

The system comes with a number of predefined Biotage methods that cannot be modified or deleted. If desired, they can be copied and then edited to your preferences.

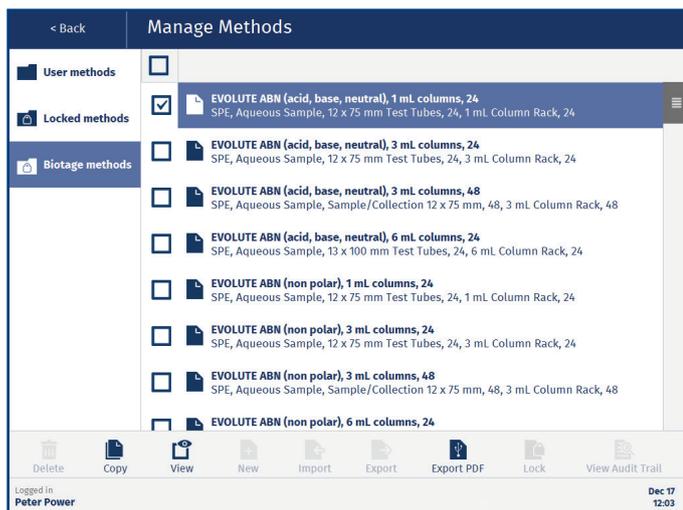


Figure 46. The Manage Methods view.

## New, Copy, and Edit a Method

To create a new method, press **Manage Methods** in the main menu, select the **User methods** folder, press **New**, and then select the type of method (see Figure 47):

- » **SLE** (Supported Liquid Extraction)
- » **SPE** (Solid Phase Extraction)
- » **PPT/PLD** (Protein Precipitation/Phospholipid Depletion)
- » **Filtration** (collects filtrate from extraction media that is preloaded with sample)
- » **Filtration+** (sample load and filtration preceded by an optional pretreatment operation)
- » **Hydro DME+** (Dual Mode Extraction)

**Note:** There are two PPT/PLD modes, **Solvent First** or **Sample First**, where the sample is either added before or after the solvent. The mode can be changed in the **Maintenance** view (see page 46). This has to be done before you set up the method.

**Note:** The pressure unit is not mobilized nor used in the Filtration method.

To copy or edit a method, select the folder containing the method, select the method, and then press **Copy** or **Edit** (see Figure 46). Copies are saved in the **User methods** folder.

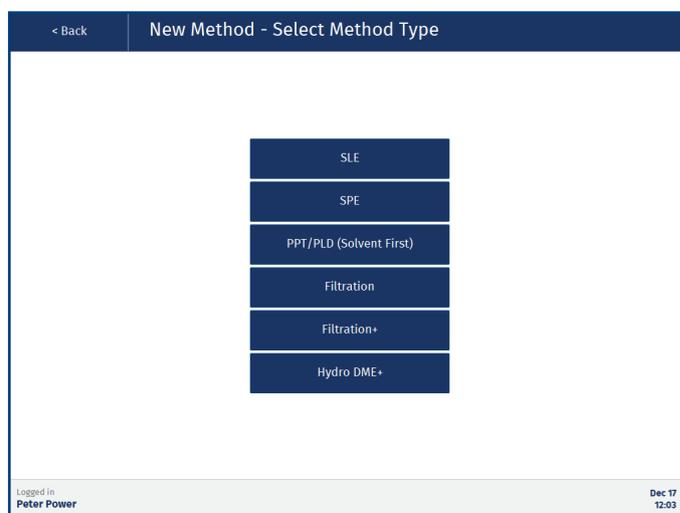


Figure 47. The Select Method Type view.

To save changes in a displayed method, press **Save** in the top pane. To return to the **Manage Methods** view without saving, press **Cancel** in the top pane.

For information on the available method parameters, see the following sections in this chapter.

### Exclamation Mark

When setting up a method, the exclamation mark (⚠) shows which information is required to run the method (see Figure 48).

Methods that do not contain all the required information are highlighted with an exclamation mark (⚠) in the **Manage Methods** view (see Figure 49).

### Timestamps (GLP)

The timestamp in a red-brown frame (see Figure 50) shows when the method was last changed and by whom. Check the method audit trail for detailed information; see page 44.

Method name: New SPE Method

Sample plate/rack: [Dropdown]

Extraction media: [Dropdown]

Steps: Pretreatment, Conditioning, Equilibration, Load, Wash (2), Elution, Report

Wash step parameters: Number of steps: 2, Pressure (bar): 0.0, Plate dry after last wash? [No], Plate dry time (s): 0, Dispose solvent tips after each step? [No]

Equilibration step parameters: Solvent: <None>, Volume (µL): 0, Collect in position: D (Waste), Positive pressure time (s): 0, Advanced pressure settings: Edit...

Load step parameters: Solvent: <None>, Volume (µL): 0, Collect in position: D (Waste), Positive pressure time (s): 0, Advanced pressure settings: Edit...

Elution step parameters: Repeat (number of times): 1, Pause after this step? [No], Clog detection? [No]

Logged in: Peter Power, Jan 15 12:15

**Figure 48.** Setting up an SPE method. The exclamation mark (⚠) shows which information is required to run the method.

Manage Methods

- User methods: [Empty]
- Locked methods:
  - ABN polar screen (⚠)
- Biotage methods:
  - EVOLUTE ABN EXPRESS (acid, base, neutral) with end comment

Bottom bar: Delete, Copy, Edit, New, Import, Export, Export PDF, Lock, View Audit Trail

Logged in: Peter Power, Dec 17 12:15

**Figure 49.** User methods highlighted with ⚠ do not have all the necessary information to be run and are not displayed in the Run view.

Method name: EVOLUTE ABN (acid, base, neutral), 1 mL column

Sample plate/rack: 12 x 75 mm Test Tubes,...

Extraction media: 1 mL Column Rack, 24

Sample type: Aqueous Sample

Starting sample volume in plate/rack (µL): 300

Reuse tips for pretreatment mix and sample load? [No]

Sample pipette tip type: 1000 µL Biotage tip

Timestamp: Modified: 2019-12-17 08:32 by Peter Power

Logged in: Peter Power, Dec 20 14:41

**Figure 50.** The timestamp with a red-brown frame shows when the method was last changed and by whom.

## Method Operations

The following operations can be enabled or disabled when setting up a method:

Operation	SLE	SPE	PPT/PLD	Filtration	Filtration+	Hydro DME+
Pretreatment	✓	✓ <sup>3</sup>			✓	✓
Conditioning		✓				
Equilibration		✓				
Load/Solvent load	✓ <sup>1</sup>	✓ <sup>1</sup>	✓ <sup>2</sup>		✓ <sup>4</sup>	✓ <sup>1</sup>
Wash		✓				
Elution	✓	✓				
Collection			✓	✓	✓	✓

**Table 2.** Method operations that can be enabled or disabled.

- Sample load.
- The sample is either added before or after the solvent depending on a system setting. To change this setting, press **Maintenance** in the main menu and then disable or enable the **Add solvent first** option in the **PPT/PLD Mode** field. This has to be done before you set up the method.
- The pretreatment step can be moved to take place immediately before load.
- A load operation is incorporated into the collection operation.

## Method Parameters

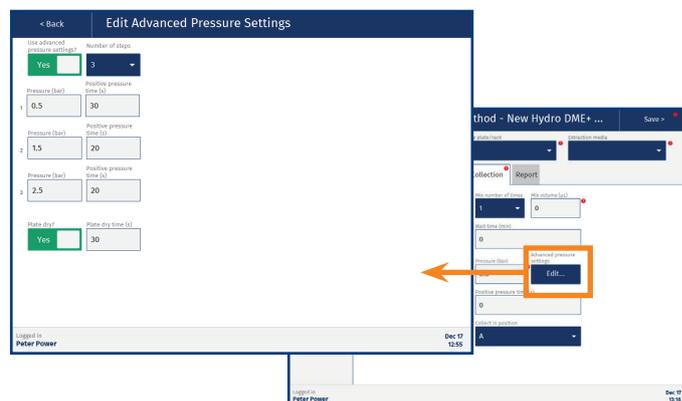
Available method parameters are listed in alphabetical order:

- » **Advanced pressure settings:** Press **Edit...** to set up a pressure gradient. For more information, see page 28.
- » **Air push after last elution?:** Whether to apply positive pressure with a gas flow of approximately 10 mL/min after the last elution (Yes) or not (No). SLE only.
- » **Air push time (s):** The amount of time, in seconds, that positive pressure with a gas flow of approximately 10 mL/min will be applied to the extraction plate or columns to trigger gravity loading or elution. This field is only enabled for elution when **Air push after last elution?** is set to **Yes**. SLE only. Note that this field is disabled when a pressure gradient is enabled; see “Set Up a Pressure Gradient” on page 28.
- » **Clog detection?:** Clog detection can be enabled for any load, wash, or elution step. For more information, see page 29.
- » **Clog settings:** Press **Edit...** to set up the clog detection settings. For more information, see page 29.
- » **Collect in position:** In which position the collection plate/rack or the flow-through plate (waste) is to be loaded onto the carousel.
- » **Collection plate height (%):** How high, in percentage of the maximum height, the collection plate/rack is moved up by the lifter. See Table 3 on page 29 for guidelines. Filtration only.
- » **Conditioning solvent:** The solvent to be used for pipette tip conditioning. SPE only. This field is only visible when **Tip conditioning?** is set to **Yes**.
- » **Dispose solvent tips?:** Whether the pipette tips will be disposed of after the solvent load (Yes) or reused (No). PPT/PLD (solvent first) only.
- » **Dispose solvent tips after each step?:** Whether the pipette tips will be disposed of after each step (Yes) or reused (No). Note that it is not possible to reuse a pipette tip after sample dispensation. Not available for Filtration and PPT/PLD.
- » **Extraction media:** The type of extraction plate or columns.
- » **Method comment:** Optional information about the method.
- » **Method name:** The name of the method.
- » **Mix number of times:** The number of mixing iterations when mixing the sample with a solvent following pretreatment (except for PPT/PLD). Not available for Filtration.
- » **Mix volume (µL):** The aspiration volume when mixing the sample with a solvent following pretreatment (except for PPT/PLD). Not available for Filtration.
- » **Move pretreatment step:** Use the arrow buttons to move the pretreatment operation to the desired position, before conditioning (default) or before load. SPE only.
- » **Number of steps:** The number of steps the operation contains. Not available for Filtration and PPT/PLD.
- » **Number of times:** The number of mixing iterations in the sample plate. This field is only enabled when **Premix?** is set to **Yes**. Not available for Filtration.
- » **Pause after this step/last step/each load?** Whether to pause after a certain step or operation (Yes) or not (No). When the system is paused, it is possible to open the door and check for clogged wells or columns. Not available for Filtration and PPT/PLD.
- » **Plate dry after last elution?:** Whether to remove the last residual solvent from the sorbent bed using positive pressure at 5 bar with a gas flow of approximately 600 mL/min after the last elution (Yes) or not (No). SPE only.
- » **Plate dry after last wash?:** Whether to remove the last residual solvent from the sorbent bed using positive pressure at 5 bar with a gas flow of approximately 600 mL/min (Yes) or not (No). SPE only.
- » **Plate dry time (s):** The amount of time, in seconds, that positive pressure at 5 bar with a gas flow of approximately 600 mL/min will be applied to remove the last residual solvent from the sorbent bed. This field is only enabled when **Plate dry after last elution/wash?** is set to **Yes**. SPE only.
- » **Positive pressure time (s):** The amount of time, in seconds, that positive pressure will be applied to the extraction plate or columns. Not available for SLE. Note that this field is disabled when a pressure gradient is enabled; see “Set Up a Pressure Gradient” on page 28.
- » **Premix?:** Whether the sample will be premixed (Yes) or not (No) before it is loaded into the extraction plate or column. Not available for Filtration.
- » **Pressure (bar):** The pressure, in bar, that will be applied to the extraction plate or columns. Not available for SLE. Note that this setting will not be used when a pressure gradient is enabled; see “Set Up a Pressure Gradient” on page 28.
- » **Repeat (number of times):** The number of times this step will be repeated. SPE and SLE only.
- » **Reuse tips for pretreatment mix and sample load?:** Whether to reuse a sample pipette tip when mixing following pretreatment, when loading a sample in aliquots, or when rinsing the wells or test tubes in the sample plate/rack (Yes) or not (No). Not available for Filtration, PPT/PLD, and Hydro DME+.

- » **Number of times:** The number of mixing iterations in the sample plate. This field is only enabled when **Premix?** is set to **Yes**. Not available for Filtration.
- » **Rinse repeat number of times:** The number of rinsing iterations in the sample plate. This field is only enabled when **Premix?** is set to **Yes**. SPE only. This field is only visible when **Rinsing?** is set to **Yes**.
- » **Rinse solvent:** The solvent to be used to rinse the wells or test tubes in the sample plate/rack. SPE only. This field is only visible when **Rinsing?** is set to **Yes**.
- » **Rinse volume (µL):** The amount of rinsing solvent to be used for each well or test tube in the sample plate/rack. SPE only. This field is only visible when **Rinsing?** is set to **Yes**.
- » **Rinsing?:** Whether to remove the last residual sample from the sample plate/rack by rinsing the wells or test tubes with solvent, and then transferring the liquid to the extraction media (Yes) or not (No). SPE only.
- » **Sample pipette tip type:** The type of pipette tips to be used when loading the sample. Not available for Filtration.
- » **Sample plate/rack:** The type of sample plate or test tubes. Not available for Filtration.
- » **Sample type:** The type of sample. This setting is important if you work with a wide variety of different sample matrices whose liquid handling properties can vary.
- » **Sample volume (µL):** The amount of sample to be used for each well or column in the extraction plate/rack. If the volume exceeds the specified capacity of the selected extraction plate or columns, the sample will be dispensed in aliquots, with application of positive pressure in between each aliquot. This large volume feature is disabled when the capacity of the selected extraction plate or columns is set to zero, which is the default value. Not available for Filtration.  
**Note:** When loading a sample in aliquots, the sample pipette tip can be reused. See Reuse tips for pretreatment mix and sample load above.
- » **Solvent:** The solvent to be used for this step. Not available for Filtration.
- » **Starting sample volume in plate/rack (µL):** The amount of available liquid in each well or test tube in the sample plate/rack, prior to starting the method.
- » **Tip conditioning?:** Whether to condition the pipette tip with a solvent (Yes) or not (No). SPE only.
- » **Volume (µL):** The amount of solvent to be used. Not available for Filtration.
- » **Wait time (min):** The amount of time to wait to complete the process step.

## Set Up a Pressure Gradient

When setting up an SPE method, it is possible to create a pressure gradient for any conditioning, equilibration, load, wash, or elution step. Pressure gradients are also available for load and elution steps in SLE methods, and for the collection step in PPT/PLD, Filtration, Filtration+, and Hydro DME+ methods. To set up a pressure gradient, press the **Edit...** button for the desired step (see Figure 51).



**Figure 51.** In the Edit Advanced Pressure Settings view, you can set up a pressure gradient for a conditioning, equilibration, sample load, wash, collection, or elution step.

The following pressure gradient parameters are available (see Figure 51):

- » **Use advanced pressure settings?** Whether to use a pressure gradient (Yes) or not (No).
- » **Number of steps:** The number of steps the pressure gradient contains.
- » **Pressure (bar):** The pressure, in bar, that will be applied to the extraction plate or columns.
- » **Positive pressure time (s):** The amount of time, in seconds, that positive pressure will be applied to the extraction plate or columns.
- » **Air push/Plate dry:** Whether to apply positive pressure with a gas flow of approximately 10 mL/min (air push) or 600 mL/min at 5 bar (plate dry) after the pressure gradient has been completed (Yes) or not (No).
- » **Air push time/Plate dry time (s):** The amount of time, in seconds, that positive pressure will be applied to remove the last residual solvent from the sorbent bed. This field is only enabled when **Air push/Plate dry?** is set to **Yes**.

## Specify the Collection Plate/Rack Height (Filtration Only)

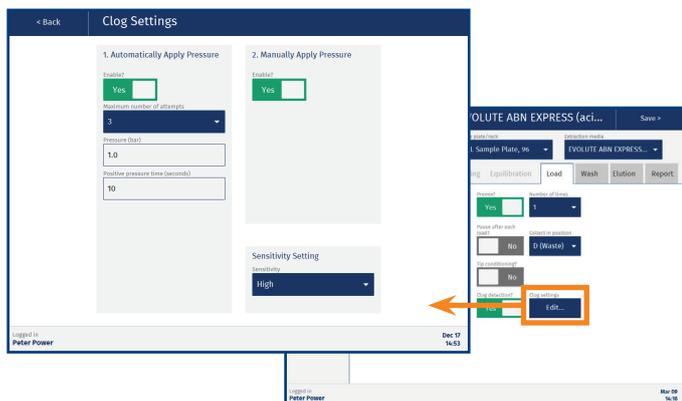
When setting up a Filtration method, you need to specify how high the collection plate/rack is to be moved up by the lifter toward the extraction media. The height is specified in percentage of the maximum height. The table below lists the approximate settings for the **Collection plate height (%)** parameter for some combinations of collection plate/rack and extraction media.

Collection Plate/Rack	Extraction Media	Height (%)
1/2 mL Collection Plate, 96	Extraction Plate, 96	80
1/2 mL Collection Plate, 96	1 mL Array Plate, 96	69
1/2 mL Collection Plate, 96	1 mL Column Rack, 96	69
5 mL Collection Plate, 48	Extraction Plate, 48	80
12 x 75 mm Test Tubes	3 mL Column Rack, 48	24
10 mL Collection Plate, 24	1 mL Column Rack, 24	69
10 mL Collection Plate, 24	3 mL Column Rack, 24	58
10 mL Collection Plate, 24	6 mL Column Rack, 24	55
12/16/18 x 75 mm Test Tubes	1 mL Column Rack, 24	33
12/16/18 x 75 mm Test Tubes	3 mL Column Rack, 24	22
12/16/18 x 75 mm Test Tubes	6 mL Column Rack, 24	19

**Table 3.** Examples of settings for the Collection plate height (%) parameter that is used in the Filtration method.

## Clog Detection Settings (GLP)

Clog detection can be enabled for any load, wash, and elute step in SPE, SLE, and Filtration+ methods. Press the **Edit...** button next to the enabled clog detection option to open the **Clog Settings** view (see Figure 52). The clog settings have to be set up for each clog detection.



**Figure 52.** The Clog Settings view.

## Automatically Apply Pressure

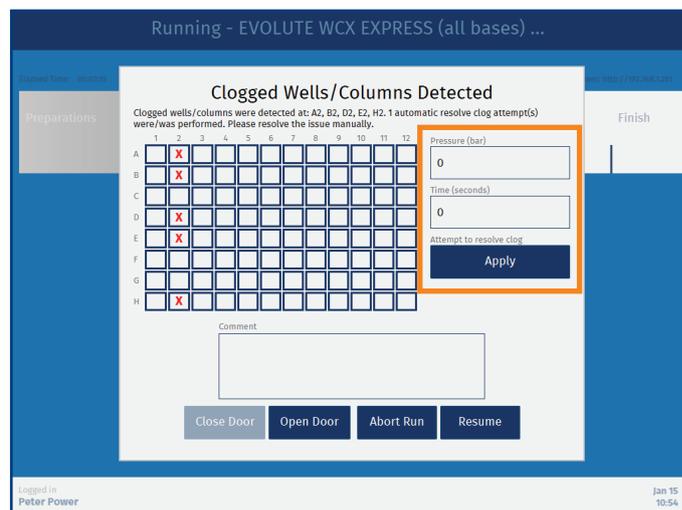
When **Automatically Apply Pressure** is enabled (see Figure 52), the system will attempt to clear clogged wells/columns by applying pressure up to three times. Select the desired number of attempts from the **Maximum number of attempts** drop-down list. Enter the pressure and time settings for each attempt in the **Pressure** and **Positive pressure time** text boxes.

The system scans the wells/columns after each attempt. If the clogged wells/columns have been successfully cleared, the run is immediately resumed.

If there are still clogged wells/columns when the maximum number of attempts have been made, or **Automatically Apply Pressure** is disabled, the run is paused and the **Clogged Wells/Columns Detected** dialog opens; see Figure 53.

## Manually Apply Pressure

If **Manually Apply Pressure** is enabled (see Figure 52), the user will be given the option to apply pressure in the **Clogged Wells/Columns** dialog as shown in Figure 53.



**Figure 53.** The Clogged Wells/Columns Detected dialog when Manually Apply Pressure is enabled.

## Scans and Sensitivity Setting

The following scans are performed when clog detection is enabled:

- » **Height scan:** In the preparation phase, the system scans the height of the extraction plate/rack and compares it with the height defined for the used sample plate/rack. The scan is used to determine a safe scan height.
- » **Reference scan:** In the preparation phase, the system measures the distance to the bottom of the extraction well/column.
- » **Clog scan:** After a load/wash/elute step has been completed, the system measures the distance to the bottom of the extraction well or column.

The system compares the clog scan value with the reference scan value to determine if the well/column is clogged. The allowed difference is set by the **Sensitivity** setting:

- » **Low:** >4 mm = clog.
- » **Medium:** >3 mm = clog.
- » **High:** >2 mm = clog.

### Supported Solvents

Solvent/Solvent Combination	Clog Detection Compatibility
Acetone	Good
Acetonitrile	Excellent
Chloroform	Poor
Dichloromethane	Poor
Diethyl ether	Poor
Dimethylformamide (DMF)	Excellent
Dimethylsulfoxide (DMSO)	Excellent
Ethanol	Excellent
Ethyl acetate	Good
Heptane	Good
Hexane	Poor
Isooctane	Good
Isopropanol	Excellent
Methanol	Excellent
Pentane	Poor
Tetrahydrofuran (THF)	Poor
Toluene	Excellent
Water	Excellent
Methyl tert-butyl ether (MTBE)	Poor
IPA 30%	Excellent
Ammonium hydroxide 5%	Excellent
Formic acid 4.6M	Excellent
DCM/IPA, [90:10]	Poor
DCM/IPA, [95:5]	Poor
DCM/IPA/NH <sub>4</sub> OH [78:20:2]	Poor
DCM/MeOH/NH <sub>4</sub> OH [78:20:2]	Poor
MeOH/NH <sub>4</sub> OH [95:5]	Excellent

### Currently Not Supported Consumables

The following Biotage and competitor consumables are not supported when using clog detection:

- » ISOLUTE® PPT+
- » ISOLUTE® PLD+
- » ISOLUTE® FILTER+ Plate
- » Waters Oasis  $\mu$ Elution Plates
- » Tecan NBE and Cerex Columns
- » 1 mL Columns, 24 Positions Configuration
- » 1 mL Columns, 96 Positions Configuration

## Set Up the Report (GLP)

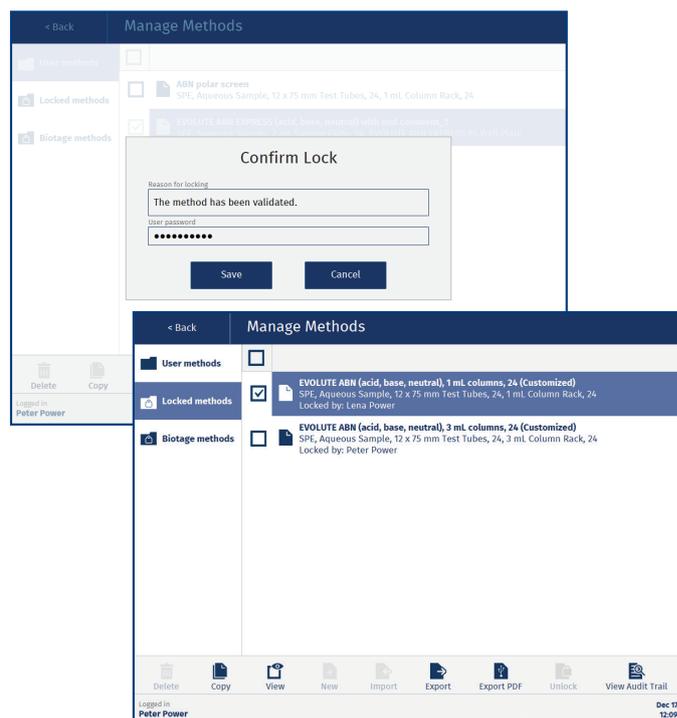
At the **Report** tab, you can set up the contents of the report that is generated at the end of the run when using the method.

You can enable/disable information for each operation individually and the details for the sample type, solvents, extraction media, sample plate, and pipette tips used in the run (see Figure 16 on page 8).

It is also possible to let the operator add a comment to the report just before the report is generated by enabling the **Comment at the end of run** option.

## Lock and Unlock a Method (GLP)

Methods that contain all required information can be locked by a power user. To lock a method, select the **User methods** folder, select the method, and press **Lock**. The lock action has to be confirmed by entering a comment and your password (see Figure 54). The method is then moved to the **Locked methods** folder and cannot be modified or deleted, and can only be unlocked by the same user (see Figure 54).



**Figure 54.** The Confirm Lock dialog (in the back). In the Locked methods folder, you can check which user that locked a method (in the front).

# Export, Import, and Delete Methods

## Manage Methods



When using the Extrahera GLP software, methods can be exported, imported, and deleted by power users. QA/QC and routine users can view methods and export them as PDF files.

For instructions on how to set up a method, see “Set Up a Method” on page 25.

## Export Methods

To export method(s) for backup or to be used on another Extrahera system:

1. For USB export, connect a USB memory device to one of the USB ports on the touch screen frame.
2. Press **Manage Methods** in the main menu.
3. Select the method(s) that you want to export and press **Export**. To select all the methods in the folder, select the check box in the header.
4. If the **Export Destination** dialog opens (only GLP), select the export destination and press **Continue**.
5. When the export is completed, press **Close** in the **Exporting Method(s)** dialog.

To export the selected method(s) as PDF file(s) instead, press **Export PDF**. Exported methods are saved in a **methods** folder.

## Import Methods

1. To import methods from a USB memory device, connect it to one of the USB ports on the touch screen frame.
2. Press **Manage Methods** in the main menu.
3. Select the **User methods** folder and press **Import**.
4. If the **Import Source** dialog opens (only GLP), select the location of the file containing the method(s) and press **Continue**.
5. In the **Select the File to Import** dialog, browse to the file location (if necessary), select the file, and press **Import**.
6. In the **Confirm Import** dialog, press **Yes**.
7. When the import is completed, press **Close** in the **Importing Method(s)** dialog.

If you import a method containing a solvent, pipette tip, plate, or rack that is not available on the system, it will also be imported. The decision is based on the name of the solvent, pipette tip, plate and rack, and will not consider their settings.

## Delete Methods

When using the non-GLP Extrahera software, it is possible to delete several methods at a time. To delete a method, select the method and press **Delete**. Note that all methods in the folder will be deleted if you select the check box in the header.

When using the Extrahera GLP software, only one method at a time can be deleted by power users. Before the method and its operational audit trail can be deleted, the user has to export the audit trail and enter a reason for deleting and the user password:

1. Press **Manage Methods** in the main menu. Select the **User methods** folder.
2. Select the method and press **Delete**. The **Export Audit Trail and Delete** dialog opens; see Figure 55.
3. For USB export of the audit trail, connect a USB memory device to one of the USB ports on the touch screen frame and press **Export**.
4. If the **Export Destination** dialog opens, select the export destination (USB or Network Share) and press **Continue**.
5. When the export is completed, press **Close** in the **Exporting Audit Trail** dialog.
6. Enter the reason for deleting and your password, and then press **Delete**.

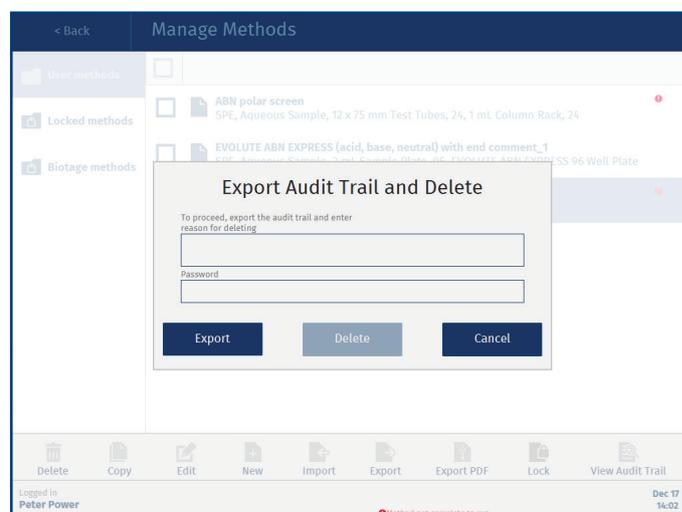


Figure 55. The Export Audit Trail and Delete dialog.

# Set Up and Start a Run

## Run Method/Run Individual Samples



When using the Extrahera GLP software, runs can be performed by power and routine users. Routine users can only run locked custom methods.

### Warning

- » All samples and waste should be treated as potentially biohazardous.

## Verify the System Setup

Verify the following before operating the system:

1. Ensure that all connections are properly connected and tightened; see the “Connections” section in the “Biotage® Extrahera™ Installation and Safety” document, P/N 414157.
2. Ensure that the extraction waste collector is in place; see F in Figure 91 on page 47.
3. Ensure that the vacuum is turned on and that there is sufficient volume in the waste reservoir.
4. If using a vacuum pump, ensure that the vacuum pump fumes are directed into a proper ventilation system.
5. Ensure that the pipette tip waste bin (below the **WASTE** position on the working area) is empty.
6. Ensure that there is a solvent rack, with reservoirs in all five rack positions, in position **5** on the working area and that the solvent feeder is in position (see Figure 56). The solvent feeder is orange in the **Prepare Run** view when it is not in position.

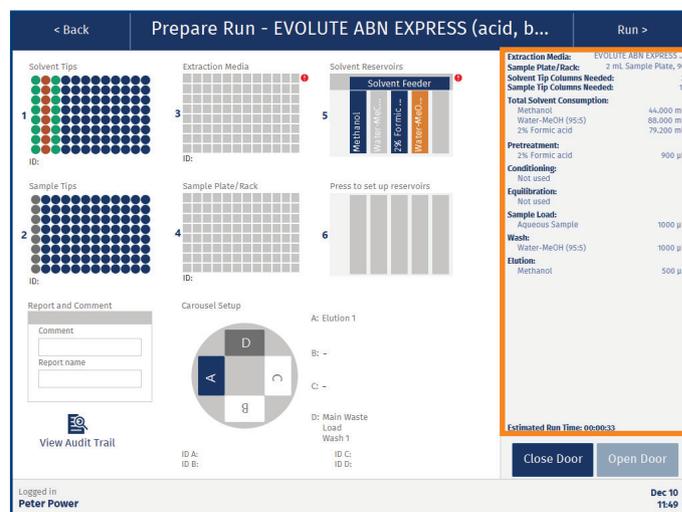


**Figure 56.** The solvent feeder in position to deliver solvent to the five reservoirs in position 5 on the working area.

## Select the Method

7. In the main menu, press **Run Method** or **Run Individual Samples**. When running individual samples, a maximum of 3 or 7 samples (depending on the format) can be processed.
8. In the **Run – Select Method** view, select the method to run and press **Prepare Run**. Only methods relevant to the current system configuration are displayed; see “Switch Between 24, 48, and 96 Format” on page 57.

9. When using the non-GLP Extrahera software, the **Sample Plate/Rack ID**, **Extraction Media Lot No**, and **Collection Plate/Rack ID** can be entered in the **Prepare Run** view.



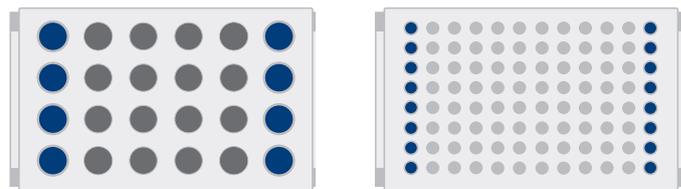
**Figure 57.** The method summary in the Prepare Run view. The information is updated when the setup is changed. (The Extrahera GLP software is shown.)

## Load the Extraction Plate or Column Rack

10. Load an extraction plate or column rack into position **3** on the working area. Ensure that the correct type of plate/rack is used; see the method summary in the **Prepare Run** view (see Figure 57).

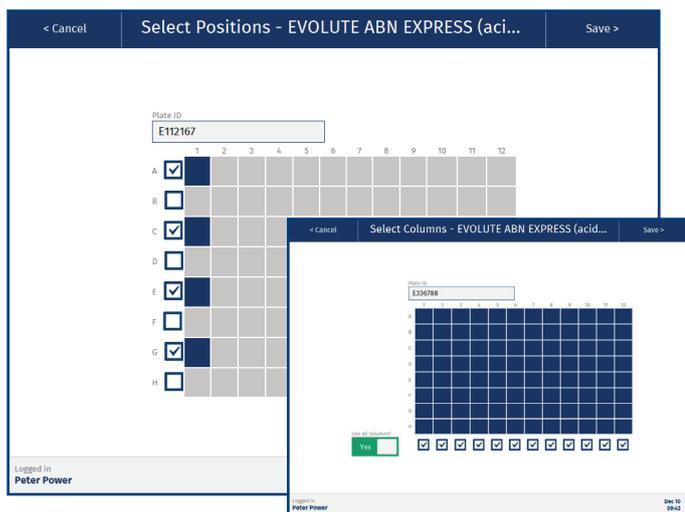
If using an array plate or column rack with empty positions:

- » Load the wells or columns symmetrically from the outside in so that the pressure head can be positioned horizontally over the plate/rack; see Figure 58.
- » Load wells and columns in all positions in a plate/rack column, regardless of whether they are being used or not.



**Figure 58.** Load the columns symmetrically from the outside in and use all positions in a plate/rack column.

11. Press the illustration of the extraction plate or column rack in the **Prepare Run** view (position 3) and set up the plate/rack:
  - a. If you selected **Run Method** in step 7, select the plate/rack columns to be used in the **Select Columns** view (see Figure 59). To use all columns, enable the **Use all columns** option.
  - b. If you selected **Run Individual Samples** in step 7, the samples must be loaded in the first plate/rack column. Select the wells/columns to be used in the **Select Positions** view (see Figure 59).
  - c. Enter the extraction plate/rack ID in the **Plate ID** text box. (Only available with the Extrahera GLP software.)
  - d. When done, press **Save** in the top pane.



**Figure 59.** The Select Columns view (in the front) and the Select Positions view for when running individual samples (in the back).

## Adjust the Air Pressure

12. Adjust the pressure of the gas connected to the **AIR** port using the external pressure regulator. The gas connected to the **AIR** port is used to seal the plate or columns and its pressure has to be adjusted according to how many positions in the plate or column rack that are populated:
  - » Use 6 ± 0.2 bar (0.6 ± 0.02 MPa; 87 ± 3 psi) for a fully populated extraction plate/rack.
  - » Use approximately 4 bar (0.4 MPa; 58 psi) when 50% of the extraction plate/rack is populated.
  - » Use 3 bar (0.3 MPa; 44 psi) when 25% of the extraction plate/rack is populated.

**Note:** The pressure of the gas connected to the **N2** port always has to be 6 ± 0.2 bar (0.6 ± 0.02 MPa; 87 ± 3 psi).

## Enter Sample Information (GLP)

13. Press the illustration of the sample plate/rack in the **Prepare Run** view (position 4).

14. Enter the information manually or by importing a sample batch worklist and press **Save** in the top pane. For more information, see “Enter Sample Information (GLP)” on page 38.

## Load Solvent Pipette Tips

15. Press the illustration of the solvent pipette tips in the **Prepare Run** view (position 1) and ensure that the **Setup Solvent Tips** view (see Figure 60) corresponds to the physical pipette tip rack holder in position 1 on the working area. The required number of pipette tips is displayed in the **Setup Solvent Tips** view. The number of tips reflects the number of solvents used in the method. Ensure that the correct tip type is selected in the **Pipette tip type** drop-down list.

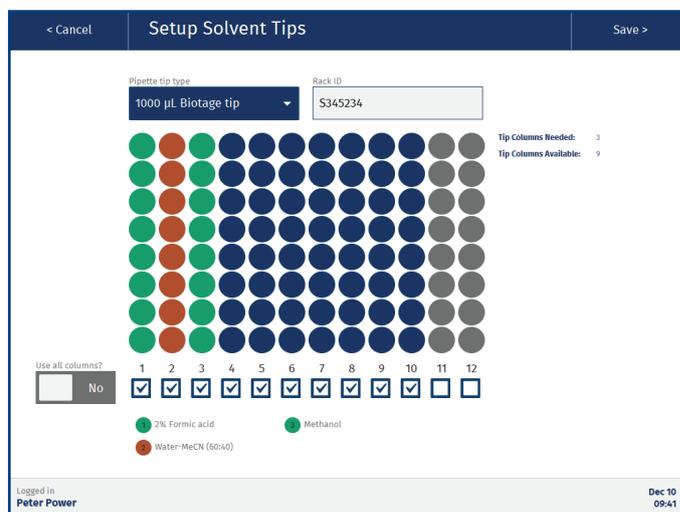
-  Pipette tip available. (If green/red, see below.)
-  No pipette tip available. (If blue border, see below.)

### Reuse of Solvent Pipette Tips

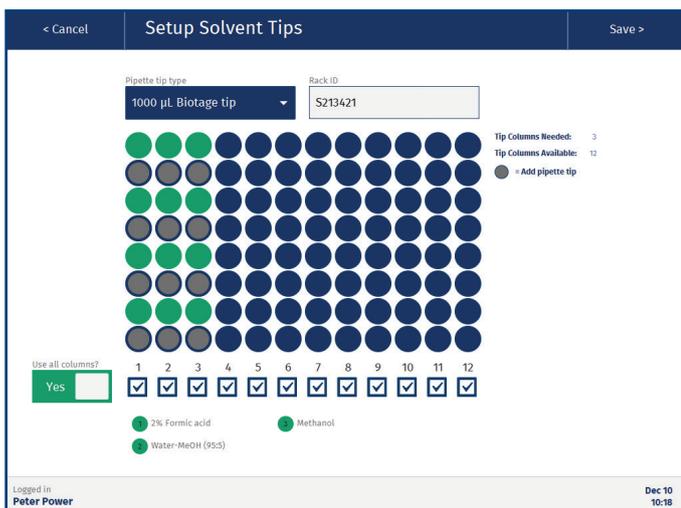
-  Pipette tip available for reuse with the solvent listed below the rack; see Figure 60.
-  Pipette tip available for reuse but will not be used in this run (wrong solvent); see Figure 60.
-  Removed pipette tip due to a previous run of individual samples; see Figure 61. Reinsert these to reuse the tips in this column.

If pipette tips from a previous run are not to be reused, remove them and clear the check box for the column(s).

**Note:** If a column that contains removed tips is not cleared (see Figure 61), pressing **Save** is considered a confirmation that they have been reinserted.



**Figure 60.** The Setup Solvent Tips view.



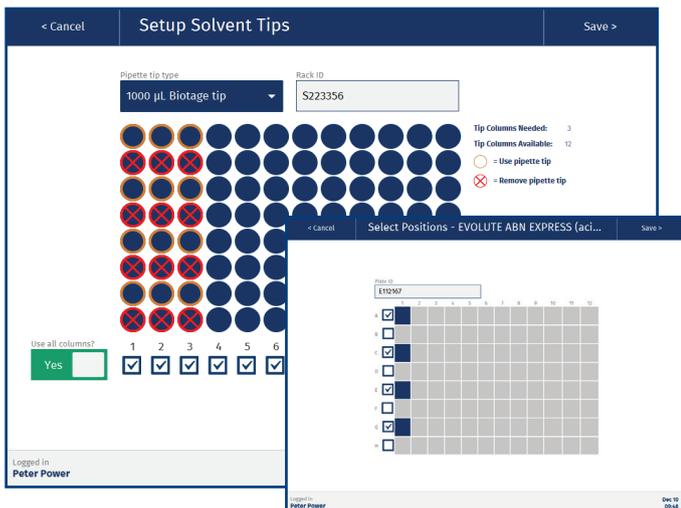
**Figure 61.** When setting up a run after a run of individual samples, the software highlights the positions that have to be refilled (grey circle with blue border) to reuse the pipette tips in the previous run.

### Solvent Pipette Tips for Individual Samples

If running individual samples, it is important that the pipette tips are loaded correctly. The software highlights the positions that must contain pipette tips and the ones that must be empty; see Figure 62.

-  Pipette tip available but will not be used.
-  This pipette tip will be used. If green, it is reused from the previous run for the solvent listed below the rack; see Figure 60.
-  Remove this pipette tip.

16. Enter the pipette tip rack holder ID in the **Rack ID** text box. (Only available with the Extrahera GLP software.)
17. When done, press **Save** in the top pane to confirm the setup.



**Figure 62.** The Setup Solvent Tips view (in the back) when running individual samples in position A1, C3, E5, and G1 on the extraction media (in the front).

## Load Sample Pipette Tips

18. Press the illustration of the sample pipette tips in the **Prepare Run** view (position **2**) and ensure that the **Setup Sample Tips** view (see Figure 63) corresponds to the physical pipette tip rack holder in position **2** on the working area.

The required number of tips is displayed in the **Setup Sample Tips** view. If the run requires more than the available quantity of sample pipette tips, the system will automatically pause when it runs out of tips and prompt the user to load more.

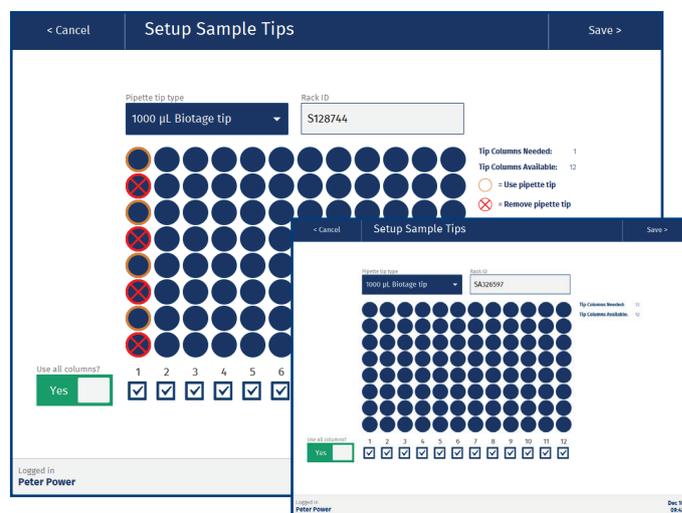
The sample pipette tip type is defined in the method. If the wrong tip type is selected in the **Pipette tip type** drop-down list, the software will notify you and the run cannot be started.

### Sample Pipette Tips for Individual Samples

If running individual samples, it is important that the pipette tips are loaded correctly. The software highlights the positions that must contain pipette tips and the ones that must be empty; see Figure 63.

-  Pipette tip available but will not be used.
-  This pipette tip will be used.
-  Remove this pipette tip.

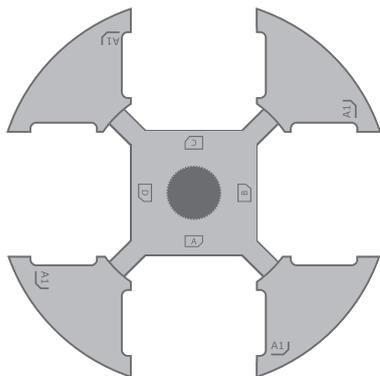
19. Enter the pipette tip rack holder ID in the **Rack ID** text box. (Only available with the Extrahera GLP software.)
20. When done, press **Save** in the top pane to confirm the setup.



**Figure 63.** The Setup Sample Tips view when running full plate/rack columns (in the front) and when running individual samples (in the back).

## Load Collection Plate(s) or Rack(s)

21. Load 24-, 48-, or 96-well collection plate(s) or rack(s) onto the carousel as specified in the method; see the **Carousel Setup** in the **Prepare Run** view. Ensure to load them in the correct direction; see the location of the A1 position of the plate/rack in Figure 64.



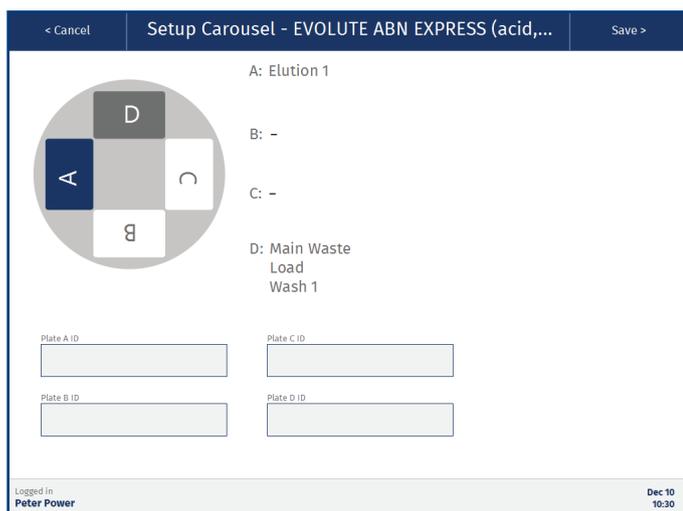
**Figure 64.** Ensure that the collection plates/racks are loaded correctly into the carousel. Note the location of the A1 position of the plate/rack.

22. Load the correct flow-through plate into position **D**:

- » **96 wells:** Used for 96 positions plates and column racks (P/N 414201SP). It can also be used for 48 positions column racks.
- » **48 wells:** Used for 48 positions plates and column racks (P/N 414516SP).
- » **24 wells:** Used for 24 positions column racks (P/N 414203SP).

The plate is used for guiding waste into the extraction waste collector, eliminating the risk of cross-contamination.

23. If using the Extrahera GLP software, press the illustration of the carousel setup in the **Prepare Run** view and enter the IDs of the plates/racks in the **Plate ID** text boxes. When done, press **Save** in the top pane.



**Figure 65.** The Setup Carousel view for entering plate/rack IDs is only available with the Extrahera GLP software.

## Enter the Report Name and a Comment (Optional)

The name will be used in the **Reports** view and in the file name when exporting the report (see page 42). If no name is entered, the method name will be used.

24. Press the **Report and Comment** field in the **Prepare Run** view.
25. In the **Report Name and Comment** view, add a comment in the **Comment** text box and enter the name of the report in the **Report name** text box.
26. When done, press **Save** in the top pane.

## Assign Solvent Bottles and Prime

**Note:** Each reservoir has a dead volume of 4 mL to prevent the system from aspirating air.

**Note:** When a solvent defined as highly volatile (see page 21) is assigned to a solvent reservoir in position **5**, that reservoir is filled just before the solvent is used for the first time in the run.

27. Ensure that the solvent bottles (S1-S5) contain the necessary amount of the solvents needed for the run; see **Total Solvent Consumption** in the method summary in the **Prepare Run** view (see Figure 57 on page 32).

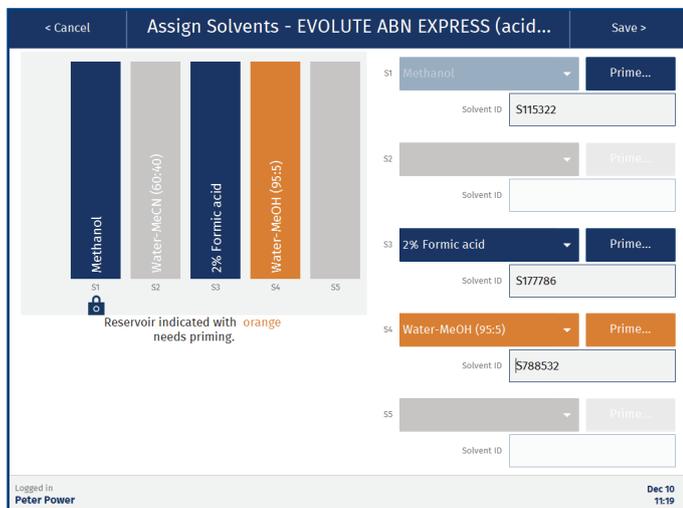
When any of the solvents used on the system has to be exchanged, the miscibility of the solvent presently connected and the new solvent to be connected is important and has to be considered. The use of a miscible co-solvent is advised and will minimize the time taken for successful priming and therefore the volume of solvent wasted during multiple prime occurrences.

Ensure that no foreign matter (e.g. molecular sieve) is present in the bottles. If necessary, filter the liquids. Use appropriate caps on the bottles to prevent harmful solvent vapors from escaping and the contents from being spilled. Always place the bottles on the side of the system.

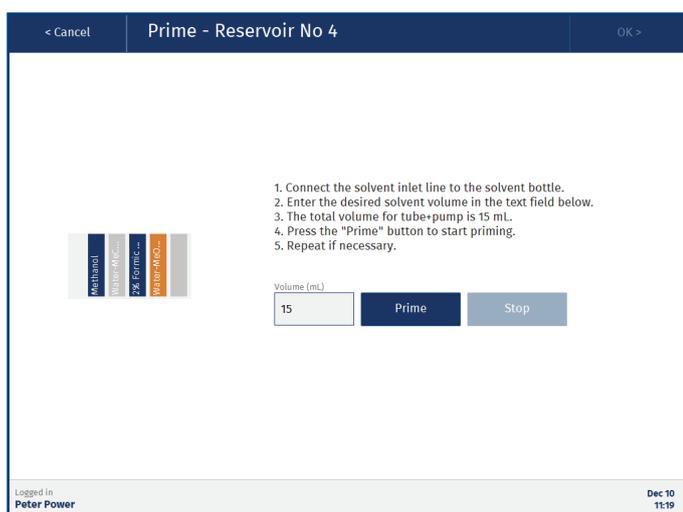
28. Press the illustration of the solvent reservoirs in the **Prepare Run** view (position **5**) and ensure that the solvent bottles (S1-S5) are assigned correctly in the **Assign Solvents** view (Figure 66). If necessary, change by using the drop-down lists.
29. If a solvent reservoir is orange in the **Assign Solvents** view (see Figure 66), prime the solvent inlet line:
- a. Ensure that the solvent reservoir (in position **5** on the working area) is empty. If not, replace it with a new one.
  - b. Press **Prime....**
  - c. In the **Prime** view (see Figure 67), enter the prime volume and press **Prime**. Approximately 2-3 times 15 mL is required to fill the solvent inlet line and pump with the new solvent.
 

**Note:** The reservoir can contain a maximum of 25 mL.
  - d. Ensure that no air bubbles are visible in the tubing. If necessary, empty the solvent reservoir and prime again.

- e. When you have finished priming, press **OK** in the top pane and repeat the procedure for any other inlet that needs to be primed.

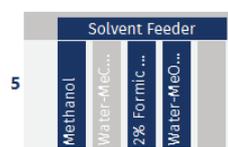


**Figure 66.** An orange solvent reservoir needs to be primed. A grey reservoir is either empty or not used in this run. Methanol is locked to S1 in this example and cannot be moved.



**Figure 67.** The Prime view for solvent reservoir S4.

30. Enter the IDs of the solvents in the **Solvent ID** text boxes. (Only available with the Extrahera GLP software.)
31. When done, press **Save** in the top pane.
32. Ensure that the solvent feeder is in position, i.e. that it is blue in the **Prepare Run** view. The solvent feeder is orange when pushed back.



**Figure 68.** The Solvent Feeder is blue in the Prepare Run view when it is positioned over the reservoirs and orange when it has been pushed back.

## Assign Manually Loaded Solvents (Optional)

If more than five solvents are required to run the method or if you prefer to load the solvents manually, setup a solvent rack in position **6** on the working area.

**Note:** The 100 mL reservoir has a maximum fill volume of 90 mL.

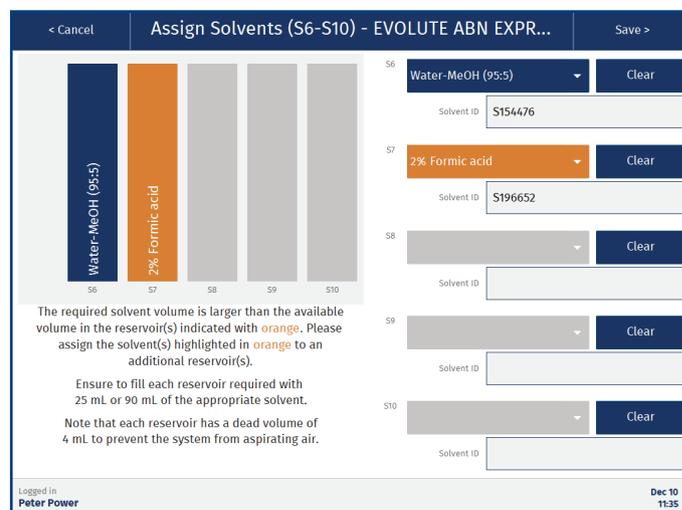
**Note:** The reservoirs cannot be refilled during the run.

**Note:** Each reservoir has a dead volume of 4 mL to prevent the system from aspirating air.

**Note:** We recommend that solvents that are defined as highly volatile are assigned to the solvent bottles; see “Assign Solvent Bottles and Prime” above.

33. Press the illustration of the optional solvent reservoirs in the **Prepare Run** view (position **6**).
34. In the **Select Position 6 Accessory** view, select the desired reservoir size, 25 mL or 100 mL, and press **Save**.
35. Press the illustration of the optional solvent reservoirs in the **Prepare Run** view (position **6**) and assign a solvent to each reservoir to be used; see Figure 69.

If a reservoir is orange, the total volume of that solvent is less than required. Add another reservoir with the same solvent or consider having the solvent in one of the five solvent bottles (see “Assign Solvent Bottles and Prime” above).



**Figure 69.** The reservoirs in position 6 have to be filled manually and cannot be refilled during the run. If a reservoir is orange, the total volume of that solvent is less than required.

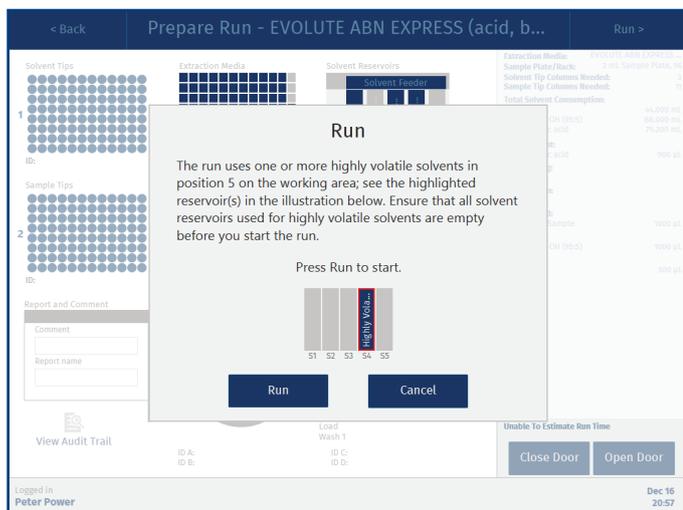
36. Enter the IDs of the solvents in the **Solvent ID** text boxes. (Only available with the Extrahera GLP software.)
37. When done, press **Save** in the top pane.
38. Fill a solvent rack with solvent reservoirs containing 25 mL or 90 mL of the solvents defined in step 35 and load the rack into position **6** on the working area.

## Load the Sample Plate or Rack

39. Load the sample plate or rack into position **4** on the working area. Ensure that the correct type of plate or test tubes is/are used; see the method summary in the **Prepare Run** view (see Figure 57 on page 32).

## Start the Run

40. In the **Prepare Run** view, press **Run** in the top pane. The **Run** dialog opens.
41. When a highly volatile solvent is assigned to a solvent reservoir in position **5**, its position is highlighted in the **Run** dialog (see Figure 70). Ensure that all highlighted reservoirs are empty.
42. To start the run, press **Run**.



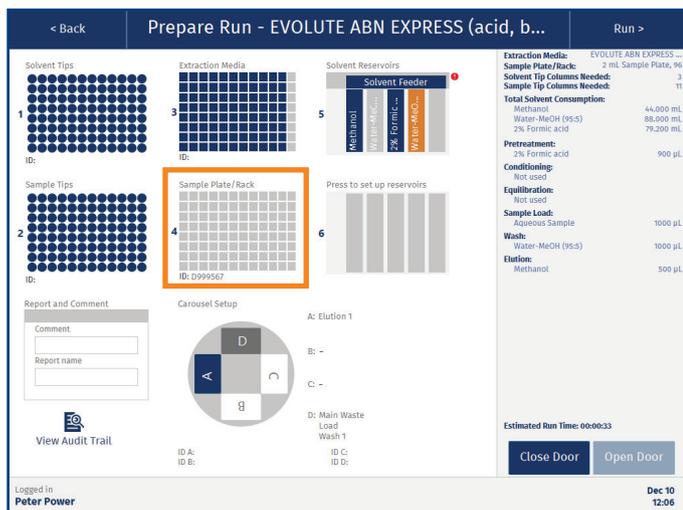
**Figure 70.** The Run dialog when using a highly volatile solvent in reservoir S4 on the working area.

# Enter Sample Information (GLP)

## Prepare Run



It is possible to enter custom information for the individual samples in the **Enter Sample Information** view (see Figure 72) during the setup of a run. There are two ways to do this, manually or by importing a sample batch worklist.



**Figure 71.** The Enter Sample Information view is reached by pressing position 4 in the Prepare Run view.

## Configure Headers

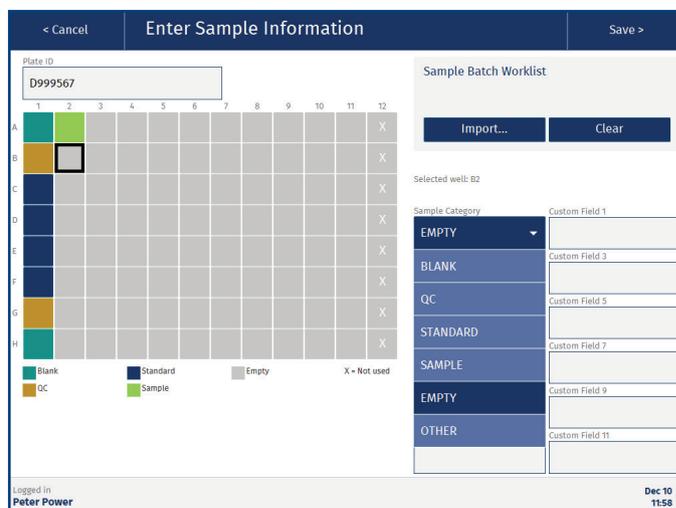
The headers in the **Enter Sample Information** view (Custom Field 1 to 11) can be setup by pressing **Headers...** in the **Maintenance** view (see page 46).

**Note:** If the headers in the imported sample batch worklist differ from the configured headers, the headers in the imported worklist will be used.

## Enter Sample Information Using the Touch Screen

1. In the **Enter Sample Information** view, select a well/column in the plate/rack by pressing it. Note that only the wells/columns that have been enabled in the extraction plate/rack in position **3** in the **Prepare Run** view will be enabled in the sample plate/rack.
2. Select the sample category from the drop-down list; see Figure 72. Each category has its own color; see the color legend below the plate/rack.
3. Enter the desired information for the selected position in the **Custom Field** text boxes.

4. Enter the sample plate/rack ID in the **Plate ID** text box in the **Enter Sample Information** view; see Figure 72.
5. When done, press **Save** in the top pane.



**Figure 72.** The Enter Sample Information view. Wells or columns that are not enabled in the extraction media are marked with an X (see column 12).

## Enter Sample Information Using a Sample Batch Worklist

A sample batch worklist can be used to import custom information for individual samples in the **Enter Sample Information** view; see Figure 72.

### Create a Sample Batch Worklist

#### File Formats

- » .xlsx for when using one of the SBWL Excel templates supplied by Biotage.
- » .tsv for tab separated data.
- » .csv for comma separated data.
- » .txt for tab, semicolon, comma or | separated data. The software will detect the separator by reading the first row (the headers). The separator is tested in the following order: tab, semicolon, comma, and then |.

### Rules

The SBWL Excel templates supplied by Biotage (see Figure 73) already follow the rules below. Just make sure that there is only one # and one \* available in the headers (the predefined ones).

- » The file must contain a column with the tube/well position (A1, A2, etc).
- » The file must contain a column with the sample category.
- » The file can contain up to eleven columns with custom values and their headers.
- » The headers for the tube/well position column must contain a hash tag. e.g. “Tube/Well#”. This must be the only hash tag in the headers.
- » The headers for the sample category column must contain a star, e.g. “Sample Category\*”. This must be the only star in the headers.
- » The file must contain at least one row in addition to the header row.
- » The sample category is case sensitive and must be set to one of the following values: Blank, QC, Standard, Sample, Empty, or Other.
- » The tube/well position must be unique and be valid for the rack/plate that will be used.
- » Each row in the file must contain the same amount of values/separators. A field can be left empty but the separator must be entered.

### Import a Sample Batch Worklist

The sample batch worklist (SBWL) will be included in the operational audit trail. It can also be included in the report by enabling the **Sample Plate** report option in the method (see page 30).

1. To import the SBWL file using a USB memory device, save the file in a **sample\_batch\_worklists** folder on the memory device and connect it to one of the USB ports on the touch screen frame.
2. To import the SBWL file from the network share folder (if configured); save the file in a **sample\_batch\_worklists** folder in the share folder. Get the location of the folder from a user with system administrator access.
3. In the **Enter Sample Information** view, press **Import...** (see Figure 74).
4. If the **Import Source** dialog opens, select the location of the SBWL file and press **Continue**.
5. In the **Select File** dialog, browse to the file location (if necessary), select the SBWL file, and press **Select**.
6. When the data has been imported, press **Close** in the **Import Completed** dialog and verify that the headers and the information in the text boxes are correct in the **Enter Sample Information** view. Wells/tubes that will not be processed are marked with an X.
7. Enter the sample plate/rack ID in the **Plate ID** text box in the **Enter Sample Information** view.

8. Press **Save** in the top pane.

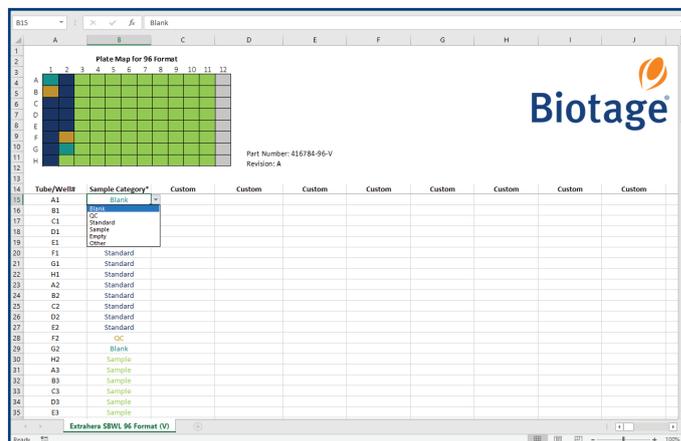


Figure 73. A SBWL Excel template supplied by Biotage.

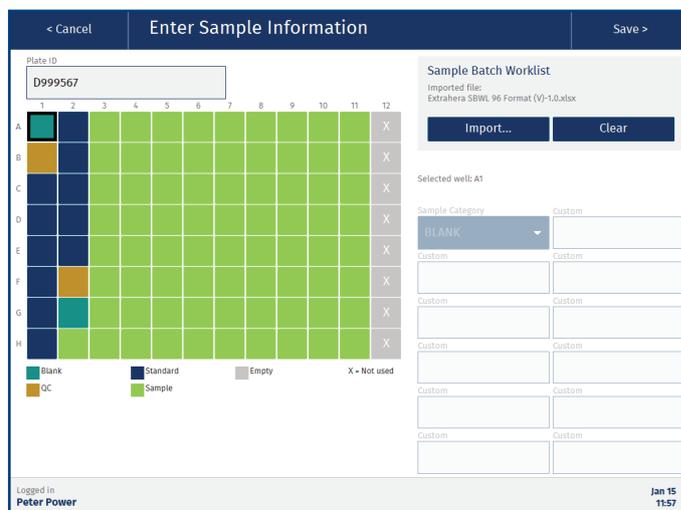


Figure 74. Imported Sample Batch Worklist. Wells/tubes that will not be processed are marked with an X.

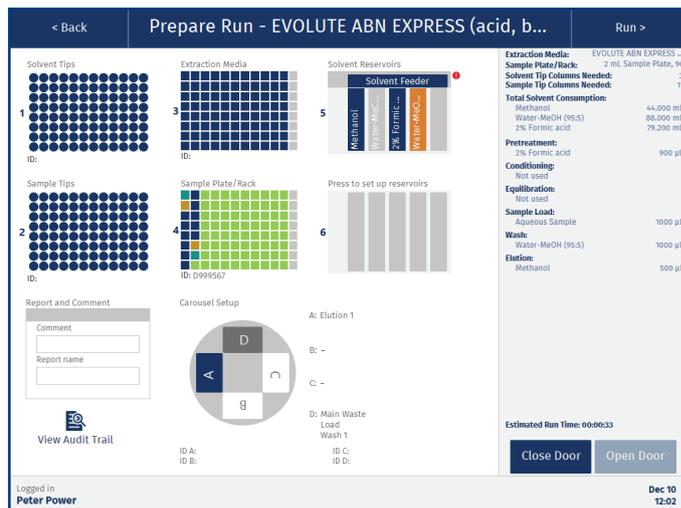


Figure 75. The Prepare Run view.

# Monitor and Control a Run

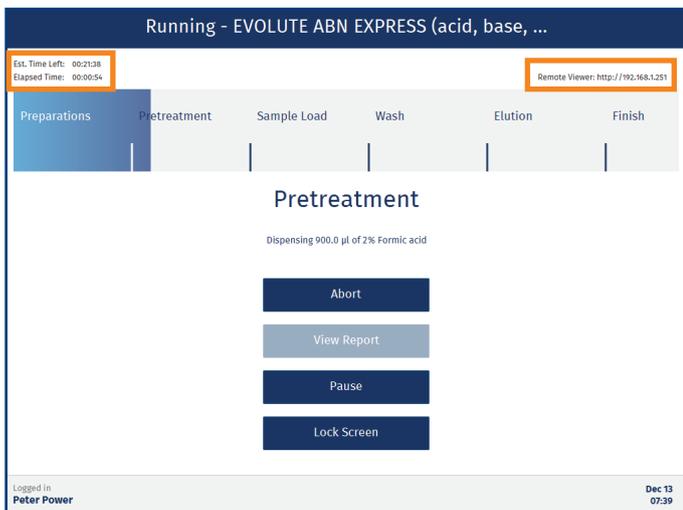
## Running



When using the Extrahera GLP software, runs can be monitored and controlled from the system by power and routine users. Runs can also be monitored by power, routine, and monitor users when away from the system using the remote viewer (if enabled); see page 43.

## Monitor the Run

The progress of the run is displayed in the **Running** view; see Figure 76. If the method has been run before, the estimated time left is displayed in the top left corner.



**Figure 76.** The Running view with the estimated time left displayed in the top left corner and the remote viewer address (GLP) in the top right corner.

### Visual and Audible Alarm

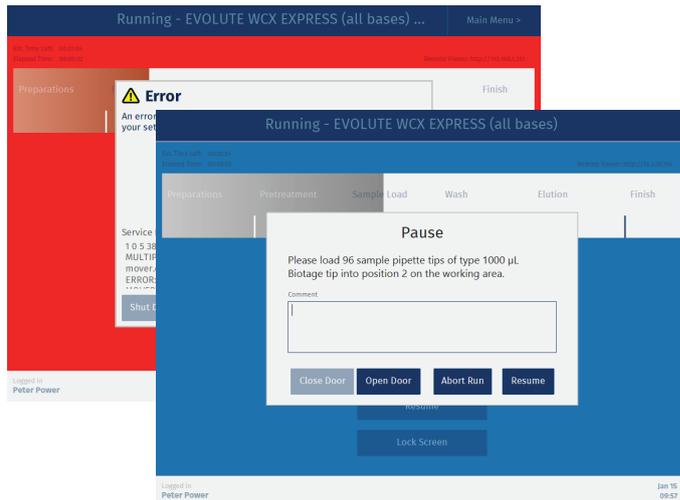
When a non-user-initiated or scheduled pause (defined in the method) occurs, the software background flashes in blue and an alarm with short beeps sounds. See Figure 77.

If a system error occurs, the software background flashes in red and an alarm with longer beeps sounds. See Figure 77.

The alarm stops when the touch screen is pressed. If desired, the audible alarm can be disabled in the **Maintenance** view (see page 46).

### E-mail Notifications (GLP)

If your system has e-mail notifications enabled, it is possible to receive e-mail notifications when user interaction is required for your runs, and when they have been completed. For more information, see page 5.



**Figure 77.** When a non-user-initiated or scheduled pause occurs, the software background flashes in blue (image in the front). If a system error occurs, the software background flashes in red (image in the back).

## Pause or Abort the Run

If you need to pause or abort a run that is in progress, press **Pause** or **Abort** in the **Running** view (see Figure 76). Note that the system will finish the task in progress before it pauses or ends the run. To undo a “queued” pause, press **Cancel Pause**.

### Pause

When the **Pause** dialog opens (see Figure 78), it is possible to open the door to, for example, load more pipette tips or check for clogged wells or columns. If desired, a pause comment for the report can be entered. The report will also show when and for how long the door was opened. If you wish to resume the run, press **Close Door** and then **Resume**. If you wish to abort the run, press **Abort Run**.

### Abort

When the **Abort** dialog opens, enter an abort comment for the report (if desired) and then press **Restore** to dispose of the pipette tips in use (if any) and restore the system, i.e. return the pipette head, pressure unit, carousel, and lifter to their home positions.

When the run has been cancelled, please ensure that the correct number of pipette tips are available in the pipette tip rack holders (positions **1** and **2** on the working area) according to the setup in the **Prepare Run** view before starting a new run.

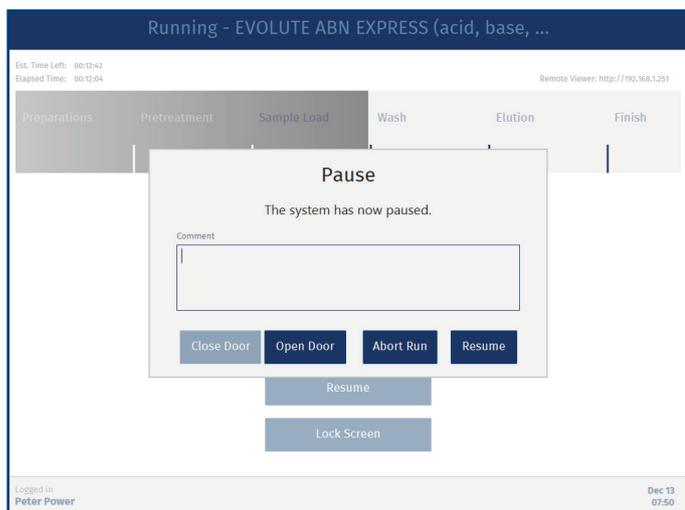


Figure 78. The Pause dialog.

### Clog Detection (GLP)

The system can be set up to automatically try to clear clogged wells/columns by applying pressure up to three times. The pressure, time, and number of attempts are defined in the method. The plate/rack is scanned after each attempt and if the clogged wells/columns have been cleared, the run is immediately resumed.

If there are still clogged wells/columns when the maximum number of attempts have been made, or if that feature is not enabled, the **Clogged Wells/Columns Detected** dialog opens (see Figure 79). If enabled in the method, the user is given the option to apply pressure in the **Clogged Wells/Columns** dialog.

For more information on clog detection, see “Clog Detection Settings (GLP)” on page 29.

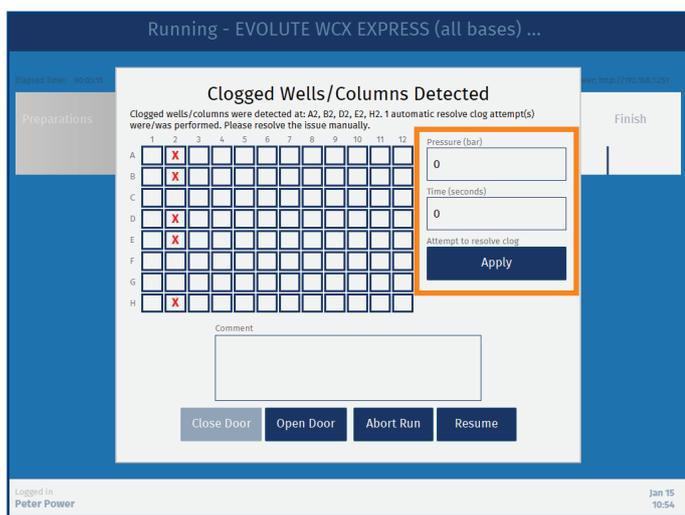


Figure 79. The Clogged Wells/Columns Detected dialog. If enabled in the method, you can try to clear the clogged well(s)/column(s) by applying pressure (see the highlighted section).

### End of Run Comment (GLP)

If the method has the **End of run comment** option enabled, the **End of Run** dialog opens when the run has been completed but before the report is generated. If desired, enter a comment that will be added to the report and press **Finish**.

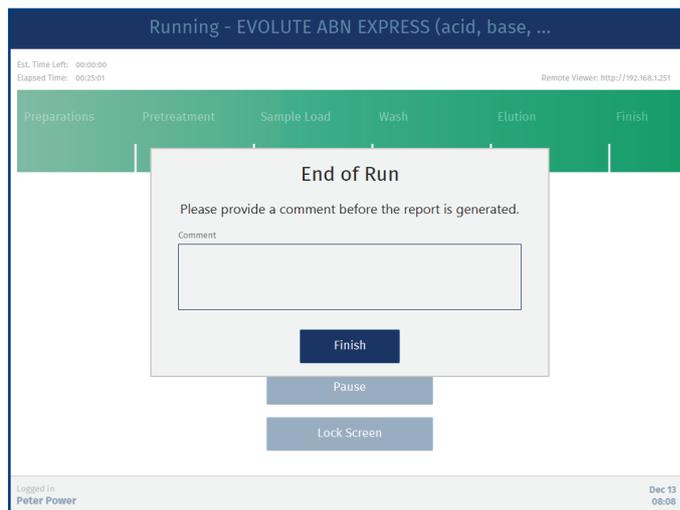


Figure 80. The End of Run Comment dialog.

### Post-Run Activities

#### Warning

- » All samples and waste should be treated as potentially biohazardous.
- » Handle chemical and liquid waste according to the Safety Data Sheets and to local/national guidelines on laboratory safety procedures.

1. Remove all plates and racks, and empty the pipette tip waste bin.
  2. If the waste reservoir is full, turn off the vacuum and then empty the reservoir.
  3. If you are leaving the system, you should also:
    - a. Empty the solvent reservoirs in position **5** and **6** on the working area and replace them with new, empty reservoirs.
- Note:** The solvent reservoirs are disposables.
- b. Clean the extraction waste collector and the flow-through plate; see “Clean the Accessories” on page 47.
  4. When necessary, clean the exterior and interior of the system and all the accessories as described on page 47.

# View, Export, and Delete Reports

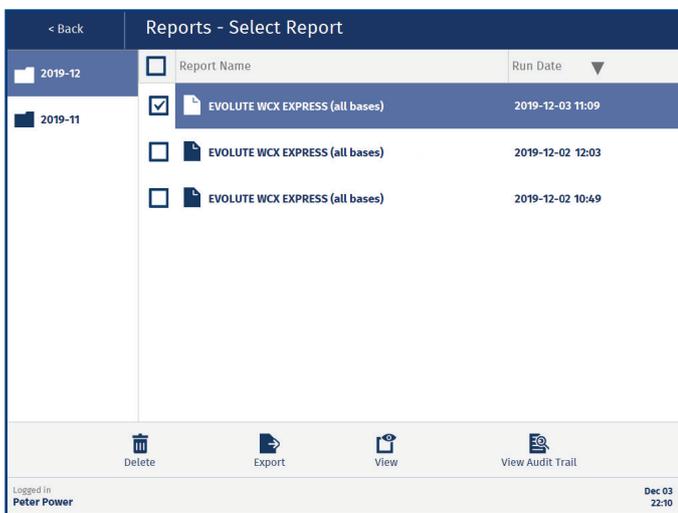
## Reports



When using the Extrahera GLP software, the **Reports** view can be accessed by power, QA/QC, and routine users. Only power users can delete reports.

Reports that are stored on the system can be viewed, exported, and deleted in the **Reports** view; see Figure 81. The reports are organized in folders by month of creation, and can be sorted in chronological or alphabetical order within a folder by pressing the **Run Date** or **Report Name** header.

To display a report, select it and press **View**.



**Figure 81.** The Reports view. The reports can be sorted in chronological or alphabetical order.

### View Reports in Network Share Folder (GLP)

If your system has been set up to only store the reports in a network share folder, you will not be able to access the reports from the system (the **Report** button is disabled). Get the location of the network share folder from a user with system administrator access.

### Export Reports

When using the non-GLP Extrahera software, reports can be exported to a USB memory device.

When using the Extrahera GLP software, reports can be exported to a USB memory device and/or a network share folder depending on which export destinations that are available/allowed on the system (see page 16). Reports can also be downloaded from the remote viewer (if enabled); see page 43.

To export reports:

1. For USB export, connect a USB memory device to one of the USB ports on the touch screen frame.
2. Select the report(s) that you want to export and press **Export**. To select all the reports in the folder, select the check box in the header.
3. If the **Export Destination** dialog opens (only GLP), select the export destination and press **Continue**.

The reports are saved as PDF files in a **reports** folder. They are locked using automatically generated, non-recoverable passwords and cannot be edited. The file name is based on the report name, run date, and start time, e.g. EVOLUTE\_WCX\_EXPRESS\_(all\_bases)\_20191202\_1049.pdf.

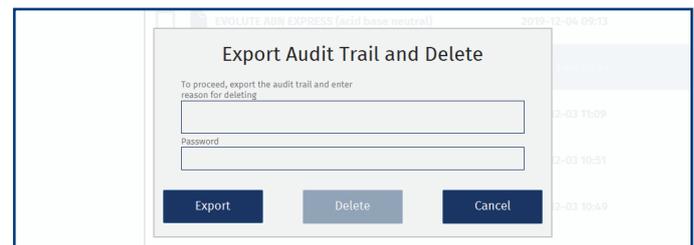
### Delete Reports

**Note:** Deleted reports cannot be recovered.

When using the non-GLP Extrahera software, delete one or more reports by selecting the report(s) and pressing **Delete**.

When using the Extrahera GLP software, only one report at a time can be deleted by power users. Before the report and its operational audit trail can be deleted, the user has to export the audit trail and enter a reason for deleting and the user password:

1. Select the report and press **Delete**. The **Export Audit Trail and Delete** dialog opens; see Figure 82.
2. For USB export of the audit trail, connect a USB memory device to one of the USB ports on the touch screen frame and press **Export**.
3. If the **Export Destination** dialog opens, select the export destination (USB or Network Share) and press **Continue**.
4. When the export is completed, press **Close** in the **Exporting Audit Trail** dialog.
5. Enter the reason for deleting and your password, and then press **Delete**.



**Figure 82.** The Export Audit Trail and Delete dialog.

# Remotely Monitor Runs and View Reports (GLP)

## Biotage® Extrahera™ Remote Viewer



The remote viewer allows power, routine, and monitor users to monitor runs and download reports when away from the system. QA/QC users can use the remote viewer to download reports.

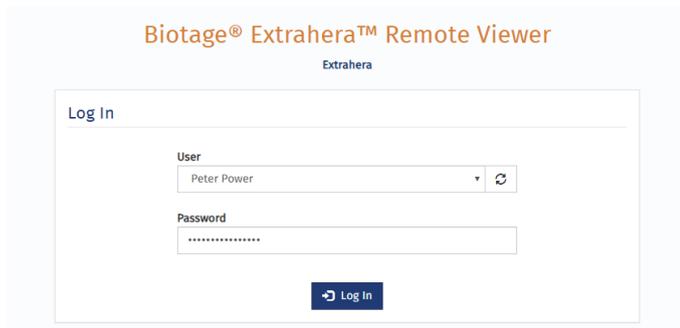
**Note:** The remote viewer can only be accessed when the system is connected to your network and the remote viewer option is enabled; see page 12.

**Note:** The remote viewer is supported on Microsoft Edge, Mozilla Firefox, and Google Chrome.

### Log In to the Remote Viewer

Enter the IP address displayed in the upper right corner when in the **Running** view (see Figure 76 on page 40) into a web browser. You can also get the address from a user with system administrator access.

Log in to the remote viewer using the same user name and password as on the system; see Figure 83. Power and monitor users can log in at any time to a system allowing remote access, while routine and QA/QC users only can log in remotely (and stay logged in) when they are logged in locally on the system.



**Figure 83.** Log in to the remote viewer using the same user name and password as on the system. “Extrahera” in blue is the host name that the system administrator entered in the network settings for this system.

### Monitor the Run

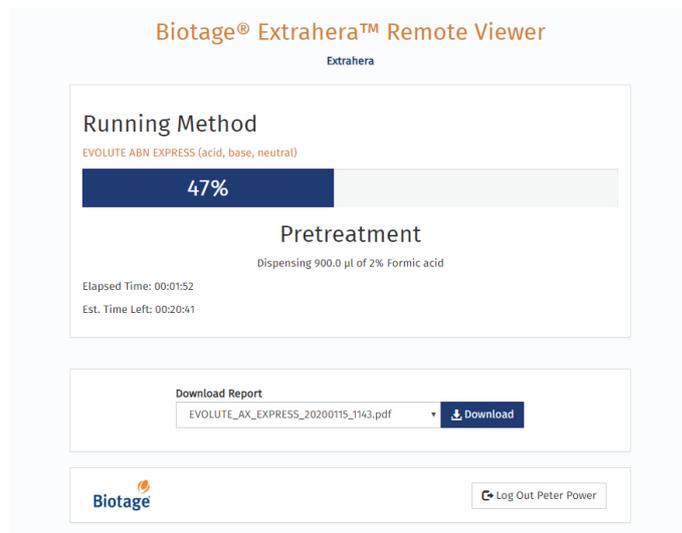
During the run, the same run progress information is displayed in the remote viewer as on the system (see Figure 84).

### Download Reports

When the run is completed, the report can be downloaded to the **Downloads** folder on your computer as a PDF file. The file is locked using automatically generated, non-recoverable password and cannot be edited.

You may also download any of the other reports that are stored on the system. The reports are listed in chronological order with the newest at the top. The file name is based on the report name, run date, and start time; see Figure 85.

**Note:** If your system has been set up to only store the reports in a network share folder, you will not be able to access the reports from the remote viewer.



**Figure 84.** The run can be monitored when away from the system using the remote viewer.



**Figure 85.** The reports are listed in chronological order with the newest at the top.

# View and Export Audit Trails (GLP)

## Audit Trails



The audit trails can be accessed from the **Audit Trails** view (see Figure 86). For user access rights, see Table 1 on page 11.

The audit trails log all changes and actions performed on the system together with date, time, the system's serial number, and user ID.

**Note:** A method/operational audit trail is deleted when the corresponding method/report is deleted. The audit trail has to be exported before deletion can be approved.

**Note:** Methods created and reports generated before the GLP software license was installed, do not have audit trails. The first time a method is edited after the license has been installed, a method audit trail is created.

### View an Audit Trail

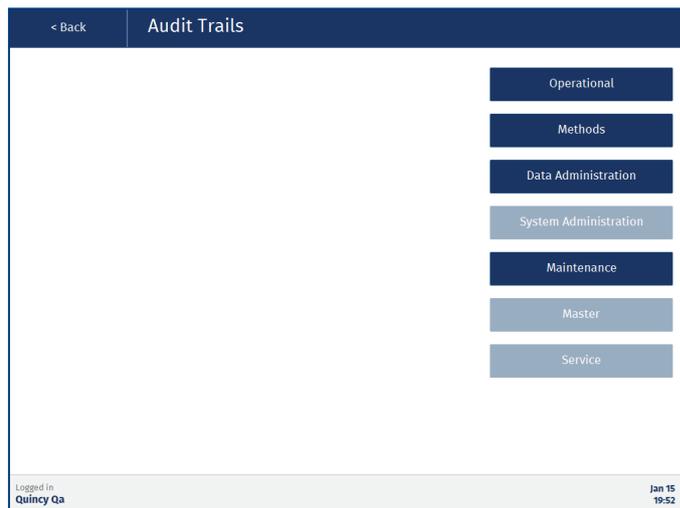
All audit trails can be accessed from the **Audit Trails** view (see Figure 86). The audit trails, except for the master, can also be accessed by pressing  in the lower right corner in the corresponding view (see Figure 87).

The following audit trails are available:

- » **Operational Audit Trail:** Logs run data. Each run has its own audit trail that contains more detailed information than the report that is generated at the end of the run.
- » **Method Audit Trail:** Logs all changes in a method. Each method has its own audit trail.
- » **Data Administration Audit Trail:** Logs all creations and deletions of custom solvents, sample types, plates, racks, and pipette tips, and locking and unlocking of solvents.
- » **System Administration Audit Trail:** Logs all logins and logouts to the system and actions performed in the **System Administration** view.
- » **Maintenance Audit Trail:** Logs all changes and actions performed in the **Maintenance** view.
- » **Master:** Logs all backup, restore database, import, export, and delete actions performed on the system, and all downloads of reports from the remote viewer.
- » **Service Audit Trail:** Logs all changes and actions performed in the **Service** view.

For more detailed information, see Table 4 on page 45.

For user access rights, see Table 1 on page 11.



**Figure 86.** The Audit Trails view when logged in as a QA/QC user. For user access rights, see Table 1 on page 11.

### Export an Audit Trail

A user that can view an audit trail can also export it. The audit trail can be exported either as a PDF or plain text file to a USB memory device or a network share folder. The file format and available export destinations are set up in the **System Administration** view (see page 16). Note that the PDF file is locked using an automatically generated, non-recoverable password and cannot be edited.

1. For USB export, connect a USB memory device to one of the USB ports on the touch screen frame.
2. Open the audit trail and press **Export** (see Figure 87).
3. If the **Export Destination** dialog opens, select the export destination and press **Continue**.

The audit trails are exported to an **audit\_trails** folder, with one sub folder for methods and one for operational audit trails.

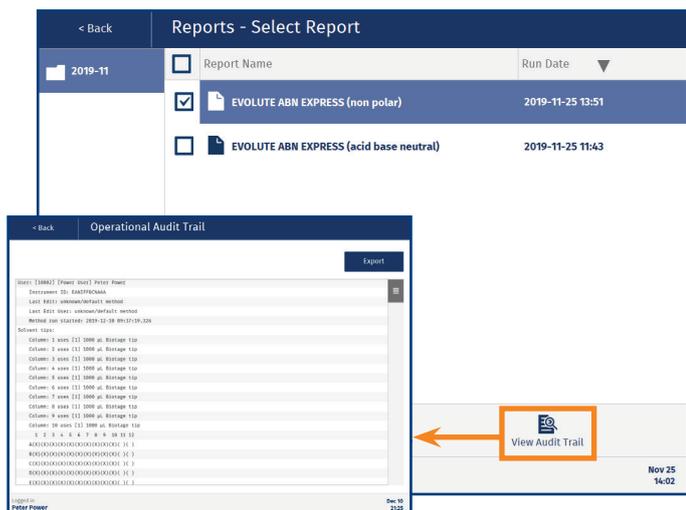


Figure 87. There is one operational audit trail for each run.

Audit Trail	Contents
<b>Operational</b>	<ul style="list-style-type: none"> <li>» Date and time when the audit trail was created, and the system's serial number.</li> <li>» Method database ID and name.</li> <li>» Instrument ID.</li> <li>» User that started the run with user ID, name, e-mail address, and access level.</li> <li>» Run started at date and time.</li> <li>» Date, time, and user for the last edit of the method.</li> <li>» Solvent pipette tips setup and the rack ID entered at the run setup.</li> <li>» Sample pipette tips setup and the rack ID entered at the run setup.</li> <li>» Used extraction media with all the information in the database and the ID entered at the run setup.</li> <li>» Used sample plate/rack with all the information in the database and the ID entered at the run setup.</li> <li>» Used sample type. Only the name and the database ID.</li> <li>» Used method with all the settings.</li> <li>» Used sample batch worklist.</li> <li>» Used solvents with reservoir positions, all the information in the database, and the ID entered at the run setup.</li> <li>» The IDs for the used collection plates entered at the run setup.</li> <li>» System software and firmware versions.</li> <li>» Execution log, e.g. <i>Closing door, Docking pressure unit, Measured volume in reservoir #TWO, was 21.0 ml, Pause triggered by user.</i> Each entry has a date and timestamp.</li> </ul> <p><b>Methods</b></p> <p><u>Created:</u></p> <ul style="list-style-type: none"> <li>» All method settings and the database ID.</li> <li>» Date, time, system's serial number, user ID, user access level, and username.</li> </ul> <p><u>Changes:</u></p> <ul style="list-style-type: none"> <li>» The old values, e.g. <i>DELETED: Starting sample volume in plate/rack (uL): 300.0.</i></li> <li>» The new values, e.g. <i>ADDED: Starting sample volume in plate/rack (uL): 500.0.</i></li> <li>» Change ID.</li> <li>» Reason for changing.</li> <li>» Date, time, system's serial number, user ID, user access level, and name.</li> </ul>

Audit Trail	Contents
<b>Data Administration</b>	<ul style="list-style-type: none"> <li>» Navigation in the view, e.g. <i>Enter Page "Manage Sample Plates and Racks" and Exit (Save) "New Sample Plate/Rack".</i></li> <li>» Pressed buttons, e.g. <i>Button Pressed "New".</i></li> <li>» Changes to database/configuration.</li> <li>» All settings for the new entry are logged.</li> <li>» Reason for deleting an entry or locking/unlocking a solvent to a specific reservoir.</li> <li>» Each entry includes date, time, system's serial number, user ID, and name.</li> </ul>
<b>System Administration</b>	<ul style="list-style-type: none"> <li>» Navigation in the view, e.g. <i>Enter Page "Backup" and Exit (Save) "Backup".</i></li> <li>» Pressed buttons, e.g. <i>Button Pressed "Run Now".</i></li> <li>» Changes to database/configuration. In most cases all the settings in the view are logged with the change(s) highlighted either with an asterisk (*) of by having the old value in brackets behind the new value.</li> <li>» User logins (including failed attempts) and logouts.</li> <li>» Each entry includes date, time, system's serial number, user ID, and name.</li> </ul>
<b>Maintenance</b>	<ul style="list-style-type: none"> <li>» Navigation in the view, e.g. <i>Enter Page "Flush Solvent Inlets" and Exit (Save) "Calibrate Pipette Pump".</i></li> <li>» Entered values, e.g. <i>S1 Volume (mL): 20.</i></li> <li>» Pressed buttons, e.g. <i>Button Pressed: "Flush S1".</i></li> <li>» Changes to database/configuration, e.g. <i>Audible alarms: Disabled.</i></li> <li>» Each entry includes date, time, system's serial number, user ID, and name.</li> </ul>
<b>Master</b>	<ul style="list-style-type: none"> <li>» All backup, restore database, import, export, and delete actions performed on the system, and downloads of reports from the remote viewer</li> <li>» Reason for deleting an entry.</li> <li>» Each entry includes date, time, and system's serial number. Export and import of methods and deletion of an entry also includes user ID and name.</li> </ul>

Table 4. Audit trail contents.

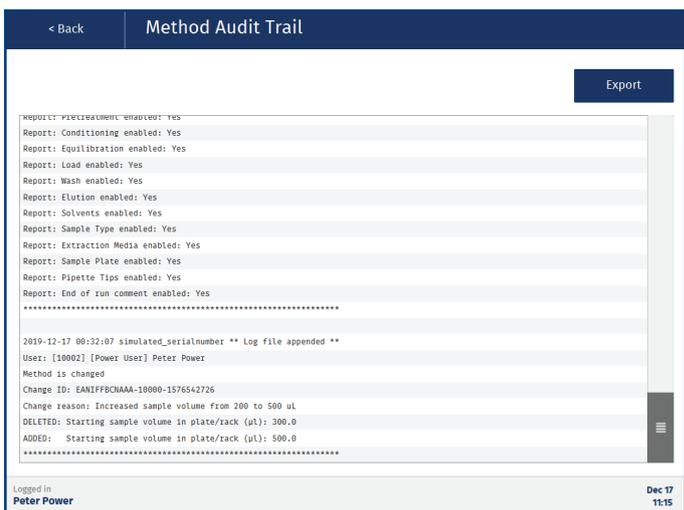


Figure 88. Example of a method audit trail.

# Maintenance

## Maintenance



When using the Extrahera GLP software, the **Maintenance** view can be accessed by power, QA/QC, and routine users. For access rights to the different features, see Table 1 on page 11.

The **Maintenance** view (see Figure 89) contains the system settings listed in the “Change the System Settings” section below and the following maintenance features:

- » **Calibrate Pipette Pump:** See “Pipette Pump Calibration and Adjustment” on page 49.
- » **Manual Control:** Used for method development and maintenance tasks; see page 53.
- » **Flush Solvent Inlets:** Used for cleaning the solvent pump and tubing and for emptying the tubing before replacing them (see “Replace the Solvent Tubing” on page 48).
- » **Export Logs:** Used for exporting the system logs when they are required for troubleshooting by Biotage® 1-Point Support™; see “Export the System Logs” below.
- » **Re-Initialize System:** Used for restoring the system to its initial state, i.e. the system returns the pipette head, pressure unit, carousel, and lifter to their home positions.

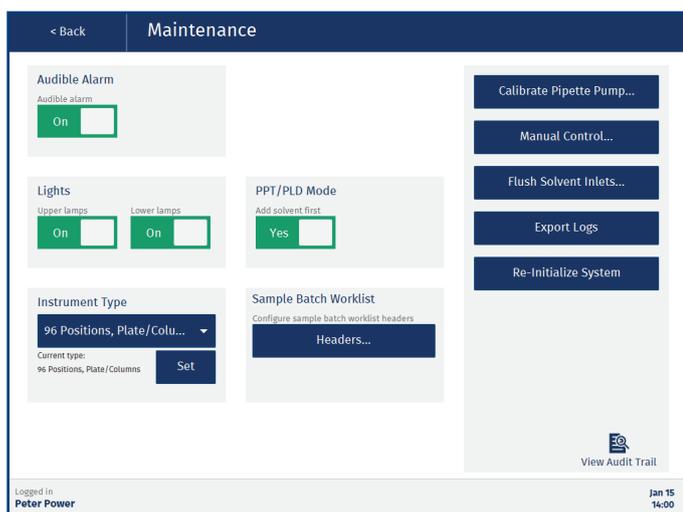


Figure 89. The Maintenance view.

## Change the System Settings

In the **Maintenance** view, the following system settings are available (see Figure 89):

- » **Audible Alarm:** Whether an audible alarm will sound or not for non-user-initiated pauses, scheduled pauses (defined in the method), and system errors. For more information, see “Visual and Audible Alarm” on page 3.
- » **Lights:** Whether the lamps inside the system will be lit or not when the system is on. There is one control for the upper lamps and one for the lower.
- » **Instrument Type:** The system can be configured to process up to 24, 48, or 96 samples during a run. There are two different options for the 48 format, 48 positions plates and 48 positions column racks.  
**Note:** The selected instrument type must match the system’s hardware configuration; see “Switch Between 24, 48, and 96 Format” on page 57.
- » **PPT/PLD Mode:** Whether the sample will be added before or after the solvent. This setting is used when creating new PPT/PLD methods and does not affect a method that has already been created.
- » **Sample Batch Worklist:** Press **Headers...** to configure the sample batch worklist headers. The headers will be used for the custom text boxes in the **Enter Sample Information** view. For more information, see page 38. (Only available in with the Extrahera GLP software.)

## Export the System Logs

When reporting a problem with your system to Biotage 1-Point Support, you may be requested to send in the system logs.

**Note:** The system log files are password protected and can only be read by Biotage 1-Point Support.

1. For USB export, connect a USB memory device to one of the USB ports on the touch screen frame.
2. Press **Export Logs**.
3. If the **Export Destination** dialog opens (only GLP), select the export destination and press **Continue**.

The logs are saved as a zip file in a **logs** folder. The file name is *logs\_serialnumber\_date\_time.zip*.

## Clean the Exterior of the System

### Warning

- » Ensure that the system is turned off and the power cord is disconnected before cleaning.
- » Never leave solvents, samples, or waste inside the system when the ventilation is turned off.

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

1. Shut down the system by pressing **Shut Down** in the main menu or login view (GLP) and then **Yes** to confirm.
2. When the message saying that it is safe to turn off the system appears on the screen, turn off the system and disconnect the power cord.
3. If there are solvent racks that contain liquid in position **5** and **6** on the working area, empty the racks or place them in a fume hood until the system has been switched back on.
4. 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.
5. When the system has been cleaned, connect the power cord and turn on the system.

## Clean the Interior of the System

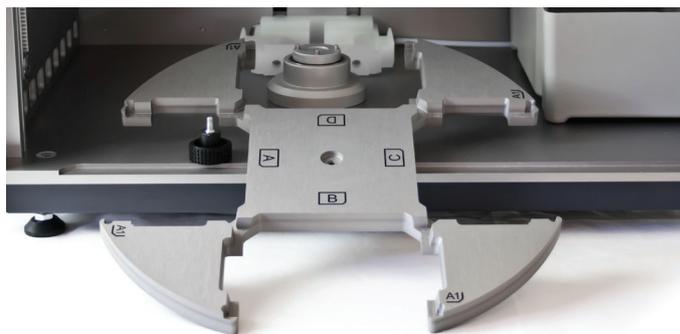
### Warning

- » Ensure that the system is turned off and the power cord is disconnected before cleaning.
- » All samples and waste should be treated as potentially biohazardous.
- » Never leave solvents, samples, or waste inside the system when the ventilation is turned off.
- » Handle chemical and liquid waste according to the Safety Data Sheets and to local/national guidelines on laboratory safety procedures.

1. Shut down the system by pressing **Shut Down** in the main menu or login view (GLP) and then **Yes** to confirm.
2. When the message saying that it is safe to turn off the system appears on the screen, turn off the system and disconnect the power cord.
3. If there are solvent racks that contain liquid in position **5** and **6** on the working area, empty the racks or place them in a fume hood until the system has been switched back on.
4. Clean the interior of the system, using a soft and clean cloth. The cloth can be dry or lightly dampened with a cleaning solution that is suitable for the residues. If desired, the carousel can be removed for better access by unscrewing the center knob (see Figure 90).

**Note:** Only use water, IPA, or ethanol when cleaning the door and the side walls.

5. Allow the system to dry completely before reconnecting the power cord and turning it back on.



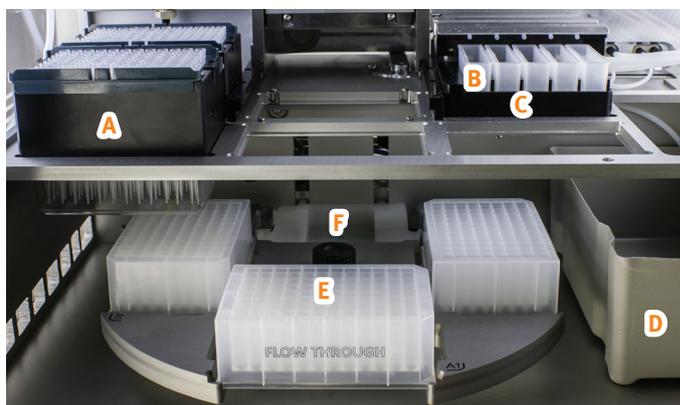
**Figure 90.** The carousel can be removed for better access when cleaning the interior of the system.

### Clean the Accessories

When necessary, clean the column rack (if used), sample rack (if used), solvent rack(s), pipette tip rack holders, pipette tip waste bin, extraction waste collector, and flow-through plate using a dishwasher program for plastic with a maximum cleaning temperature of 95°C.

To clean without using a laboratory dishwasher, use soap, water, and/or ethanol.

**Note:** The solvent reservoirs used inside the system are disposables.

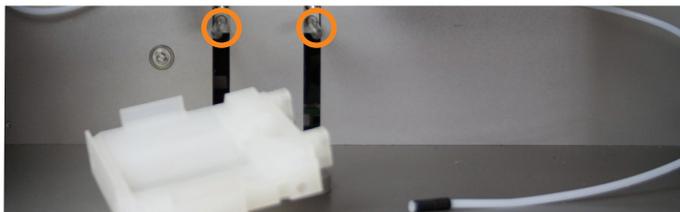


**Figure 91.** A = pipette tip rack holder, B = solvent reservoir, C = solvent rack, D = pipette tip waste bin, E = flow-through plate, and F = extraction waste collector.

### Remove the Extraction Waste Collector

1. Press **Maintenance** in the main menu and then **Manual Control....**
2. If there are plates on the carousel, press **Open** in the **Door** field (if applicable) and remove them.
3. Press **Close** in the **Door** field.
4. If there is liquid in the extraction waste collector and/or in the waste tubing, ensure that the vacuum is on and then press **Open** in the **Waste Valve** field. When the liquid has been removed, press **Close** in the **Waste Valve** field.
5. Press **Move Out** in the **Pressure Unit** field.
6. Press **Raise** in the **Extraction Waste Collector** field.
7. Open the door by pressing **Open** in the **Door** field.

8. Remove the extraction waste collector by pulling it straight out.
9. Unscrew the waste tube connected on the right side of the extraction waste collector; see Figure 92.
10. Ensure that the O-rings on the mounting pins are correctly seated; see Figure 92.



**Figure 92.** Removing the extraction waste collector. In this image, the carousel has been removed, which is not required. The mounting pins are highlighted.

### Reinstall the Extraction Waste Collector

When the extraction waste collector has been cleaned, put it back in place and restore the system to its initial state:

1. Reconnect the waste tube to the extraction waste collector and put the extraction waste back in place.
2. Restore the system to its initial state by pressing **Back** in the top pane, **Re-Initialize System** in the **Maintenance** view, and then **Yes** to confirm.

## Replace the Solvent Tubing

### Warning

- » Ensure that the system is turned off and the power cord is disconnected before replacing the tubing.
- » Never leave solvents, samples, or waste inside the system when the ventilation is turned off.
- » Use only tubing, nuts, and ferrules supplied by Biotage.
- » Use caution when finger-tightening fittings to prevent stripped threads or crushed ferrules.
- » Handle chemical and liquid waste according to the Safety Data Sheets and to local/national guidelines on laboratory safety procedures.

1. Empty the solvent inlet lines of liquid by flushing with air:
  - a. Remove the solvent inlet lines from their bottles and place them in an empty, clean bottle.
  - b. Ensure that you have five empty solvent reservoirs in the solvent rack in position **5** on the working area.
  - c. Press **Maintenance** in the main menu and then **Flush Solvent Inlets...**
  - d. Enter the flush volume for S1. 25 mL is required to empty the solvent inlet line and pump of liquid.
  - e. Press **Flush** for S1.
  - f. When done flushing the inlet line with air, repeat steps d to e for the other solvent inlet lines (S2-S5).

2. Shut down the system by pressing **Shut Down** in the main menu or login view (GLP) and then **Yes** to confirm.
3. When the message saying that it is safe to turn off the system appears on the screen, turn off the system and disconnect the power cord.
4. Remove the solvent rack in position **5** on the working area and empty it of solvent.
5. If there is a solvent rack in position **6** on the working area that contains liquid, empty the rack or place it in a fume hood until the system has been switched back on.
6. Remove the solvent feeder by pulling it straight out.
7. To replace the five solvent inlet lines (see Figure 93), unscrew them from the back wall and mount new ones. Ensure to tighten the screw connectors properly.



**Figure 93.** The solvent inlet connections at the back wall.

8. To replace the five solvent tubes between the back wall and the solvent feeder:
  - a. Unscrew the tubes from the back wall (see Figure 94).
  - b. Open the solvent feeder by unscrewing the two screws and remove the old tubes.
  - c. Reassemble the solvent feeder with new tubes.
  - d. Connect the new tubes to the back wall. Ensure to tighten the screw connectors properly.



**Figure 94.** The connections on the back wall for the five solvent tubes connected to the solvent feeder.

9. Put the solvent feeder back in place. Ensure that the tubes are positioned correctly; see Figure 95.



**Figure 95.** All the solvent tubes in position.

- Put the solvent rack back in place and pull out the solvent feeder; see Figure 96.



Figure 96. The solvent feeder in position.

- When done, connect the power cord and turn on the system.
- Press **Maintenance** in the main menu and check all tubes and connections for leaks using the **Flush Solvent Inlets** function. If a leak is detected, tighten the solvent's both screw connectors on the back wall. If air is visible in one of the tubes between the back wall and the solvent feeder, tighten the inlet line connector for that solvent.

**Note:** A solvent that is not cleared from its inlet line (S1-S5) in the **Flush Solvent Inlets** view will appear in the same position in the **Prepare Run** view.

## Clean or Replace the Waste Tubing

### Warning

- » Clean the waste tubing regularly to avoid leakage caused by the tubing getting clogged.
- » Use only tubing, nuts, and ferrules supplied by Biotage.
- » Use caution when finger-tightening fittings to prevent stripped threads or crushed ferrules.

### Clean the Waste Tubing

- Remove the extraction waste collector and disconnect the waste tube from the extraction waste collector as described in “Remove the Extraction Waste Collector” on page 47.
- Insert the waste tube into a container with a cleaning solution that is suitable for the residues.
- Ensure that the vacuum is on and press **Open** in the **Waste Valve** field to clean the waste tubing. When done, press **Close** in the **Waste Valve** field.
- Remove the container with the cleaning solution.
- Put the waste tube and extraction waste collector back in place and restore the system to its initial state as described in “Reinstall the Extraction Waste Collector” on page 48.

### Replace the Waste Tubing

- Press **Maintenance** in the main menu and then **Manual Control...**
- If there is liquid in the extraction waste collector and/or in the waste tubing, ensure that the vacuum is on and then press **Open** in the **Waste Valve** field. When the liquid has been removed, press **Close** in the **Waste Valve** field.

- To replace the waste tube connected between the extraction waste collector and the waste valve (see A in Figure 97):
  - If there are plates on the carousel, press **Open** in the **Door** field (if applicable) and remove them.
  - Press **Close** in the **Door** field.
  - Press **Move Out** in the **Pressure Unit** field.
  - Press **Raise** in the **Extraction Waste Collector** field.
  - Press **Open** in the **Door** field.
  - Remove the extraction waste collector by pulling it straight out.
  - Unscrew and replace the tube (see A in Figure 97). Ensure to secure the tube in the correct position using the holders/clips that are highlighted in Figure 97.
  - Put the extraction waste collector back in place.
- To replace the waste outlet tube connected between the waste valve and the waste reservoir (see B in Figure 97):
  - Turn off the vacuum.
  - Release the pressure in the tube by pressing **Open** in the **Waste Valve** field.
  - If the door is closed, press **Open** in the **Door** field.
  - Unscrew and replace the tube (see B in Figure 97).
  - Press **Close** in the **Waste Valve** field.
- When done, restore the system to its initial state by pressing **Back** in the top pane, **Re-Initialize System** in the **Maintenance** view, and then **Yes** to confirm.

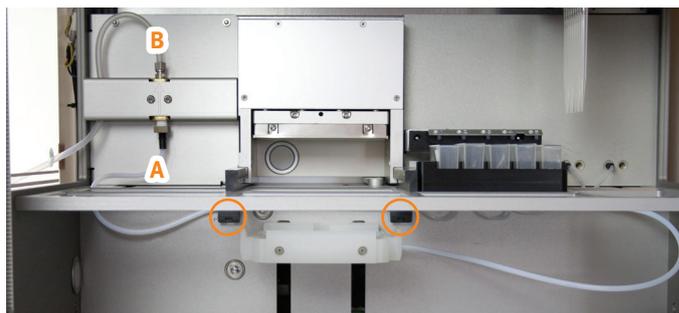


Figure 97. The two waste tubes (A and B). Note the two tube holders/clips above the extraction waste collector.

## Pipette Pump Calibration and Adjustment

**Note:** When using the Extrahera GLP software, a QA/QC user needs the help of a power user to set up and perform the runs that are required in the calibration procedures.

You need a 24-position sample rack or a 96-well sample plate, the appropriate number of tubes for individual weighing (see “Calibrate”), a scale with 0.1 mg readability, and deionized water.

If you need to change the hardware and/or software configuration, see “Switch Between 24, 48, and 96 Format” on page 57.

## Set Up Calibration Methods

Set up a calibration method for each calibration volume as described below. Use calibration volumes that are appropriate for your applications, e.g. 100 and 1000  $\mu\text{L}$ .

**Figure 98.** A calibration method for 100  $\mu\text{L}$  when using a 96-format system (Instrument Type is set to “96 Positions, Plate/Columns”).

1. Press **Data Administration** in the main menu.
2. Set up a 24-position sample rack or 96-well sample plate with tubes for individual weighing with the appropriate values for the aspiration and dispensation heights. For more information, see “Manage Sample Plates and Racks” on page 23.
3. Press **Manage Methods** in the main menu.
4. Set up an SLE method for each calibration volume containing only a pretreatment operation using the default water and the sample plate or rack created in the previous steps; see Figure 98. To be able to run the method, you will also have to select a sample type and sample pipette tip type in the **Sample** tab and an extraction plate or column rack of the appropriate format in the **Extraction media** drop-down list.

## Calibrate

Calibrate an aspiration volume as described below. If the accuracy is not within specification, adjust as described in “Adjustment” below and then calibrate again. If the precision is outside the specification, see “Pipette Pump” on page 54.

1. Weigh empty tubes and place them in the sample plate or rack. We recommend that you use 12 tubes for each pipette nozzle, i.e. in total 48 or 96 tubes.
2. Press **Run Method** in the main menu.
3. Select the method for the volume to be calibrated and press **Prepare Run** in the top pane.

4. Press the illustration of the extraction media (position **3**), enable the **Use all columns** option or select e.g. every second column and run the sample plate/rack in several runs (see note below), and then press **Save** in the top pane.

**Note:** To minimize evaporation, the plate/rack can be divided into several runs.

5. Prime the solvent pump until water comes out of the solvent feeder:
  - a. Press the illustration of the solvent reservoirs in the **Prepare Run** view (positions **5**).
  - b. Press **Prime...** for the solvent inlet line that contains the water.
  - c. Ensure that the solvent reservoir is empty. If not, replace it with a new, empty one.
  - d. Enter the prime volume. Approximately 2-3 times 15 mL is required to fill the solvent inlet line and pump with water.

**Note:** The solvent reservoir can contain a maximum of 25 mL.

- e. Press **Prime**.
  - f. If necessary, empty the solvent reservoir and prime again. Ensure that there are no air bubbles visible in the tubes. If you have problems with air bubbles, check the screw connectors.
  - g. When you have finished priming, press **OK** and then **Save** in the top pane.
- Note:** You only need to prime before the first calibration.
6. If desired, enter the sample plate/rack ID.
  7. Press **Run**. If using a 24-format system and 48 tubes, you need to run the method at least twice.
  8. When finished, weigh the individual tubes again and calculate:
    - a. Individual volumes. Take temperature into account when choosing the water density value.
    - b. Average, accuracy, and coefficient of variation (CV) for the individual channels and the entire set.
  9. If the accuracy is outside the specification, adjust the system as described below. The technical specification is  $\pm 2.0\%$  at 50  $\mu\text{L}$  and 100  $\mu\text{L}$ ,  $\pm 1.5\%$  at 500  $\mu\text{L}$ , and  $\pm 1.0\%$  at 1000  $\mu\text{L}$ , but it is your responsibility to ensure that the result is within the tolerance for your applications.

## Adjustment

If the accuracy is outside the specification, adjust the system as described below and repeat the calibration.

1. Press **Maintenance** in the main menu.
2. Press **Calibrate Pipette Pump...**
3. Set **Desired volume one** to the first calibration volume.
4. Set **Obtained volume one** to the average for the entire set at the first volume calculated in the calibration step above.

- Set **Desired volume two** to the second calibration volume.
- Set **Obtained volume two** to the average for the entire set at the second volume calculated in the calibration step above.
- Press **Calculate**. The calculated calibration coefficient and offset is displayed.
- If you want to use the calculated values, press **Apply** and then **Save** in the top pane.
- Verify that the accuracy is within specification by repeating the calibration.

It is possible to restore an old set of calibration coefficient and offset values by selecting the values, pressing **Restore Selected Values**, and then pressing **Save** in the top pane. Note that the coefficient and offset values that are used when performing a calibration are taken into account when calculating new values.

Figure 99. The Calibrate Pipette Pump view.

## Replace the Pressure Head Seal

- Remove any plates/racks located in position **3** and **4** on the working area.
- Remove the two screws holding the pressure head to the pressure unit; see Figure 100.



Figure 100. The two screws attaching the pressure head to the pressure unit.

- Remove the pressure head by pulling it down and then pulling it out.  
**Note:** If you have a system with only one gas tube connected to the pressure head, you have to tilt the pressure head horizontally to be able to pull it out.
- Disconnect the gas tubes from the pressure head by pushing in the collar of each connector against the fitting and pulling the tubing out.
- Put the pressure head on a clean and lint-free surface.
- Pull off the old pressure head seal. Note that the seal cannot be reused.
- Remove the paper liner on the new self-adhesive pressure head seal.
- Apply the seal to the pressure head. Ensure that there are no air bubbles between the seal and the pressure head.
- Reconnect the gas tubes. Ensure that the tubes are properly fastened by pulling on them, and that the tubes are on the left side of the bracket as shown in Figure 101.
- Put the pressure head back in place using the two screws. Do not overtighten the screws.

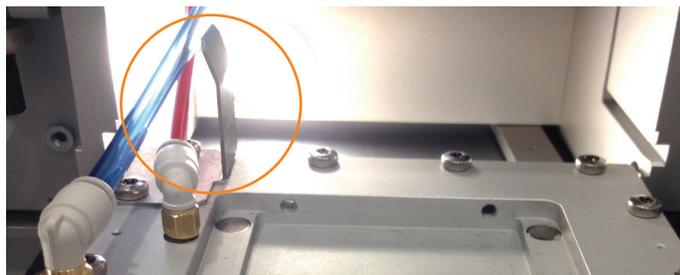


Figure 101. Ensure that the gas tubes are on the left side of the highlighted bracket.

## Replace the Fuses

### Warning

- » Ensure that the system is turned off and the power cord is disconnected before replacing the fuses.
- » Use only exact replacement fuses supplied by Biotage. Incorrect fuses create a potential fire hazard.
- » Never leave solvents, samples, or waste inside the system when the ventilation is turned off.

- Shut down the system by pressing **Shut Down** in the main menu or login view (GLP) and then **Yes** to confirm.
- When the message saying that it is safe to turn off the system appears on the screen, turn off the system and disconnect the power cord.
- If there are solvent racks that contain liquid in position **5** and **6** on the working area, empty the racks or place them in a fume hood until the system has been switched back on.

- Unscrew the two fuse holders at the power inlet on the right side of the system; see Figure 102.
- 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 with your hands after the fuses have been cleaned.

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

**Note:** If the fuses blow shortly after replacing them, contact Biotage 1-Point Support.



Figure 102. Fuse holders at the power inlet.

## Drain the Filter Unit

When liquid is visible in either sight glass of the first two filters (the two filters to the left in Figure 103), drain them by opening the screw at the bottom of the filters.

## Replace the Filters in the Filter Unit

We recommend that the three filters in the filter unit are replaced once every year (P/N 416492SP includes all three filters).

If you can see red spots in the color check window on the last filter (the filter to the right in Figure 103), replace it immediately.

- Before replacing the filters, the pressure head must be removed to protect it from contamination; see steps 1 through 5 in “Replace the Pressure Head Seal” on page 51.
- Disconnect the filter unit from the system.
- Replace the filters.
- Put the filter unit back in place.



Figure 103. The setup of the filter unit for the N<sub>2</sub> port.

- Purge the system:
  - Press **Maintenance** in the main menu and then **Manual Control....**
  - In the **Manual Control** view (see Figure 104), press **Close** in the **Door** field.
  - Press **Move Out** in the **Pressure Unit** field.
  - Enter 0.5 bar in the **Pressure (bar)** text box.
  - Press **Apply**, wait for 15 seconds and then press **Stop**.
  - Press **Move In** in the **Pressure Unit** field.
  - Press **Open** in the **Door** field.

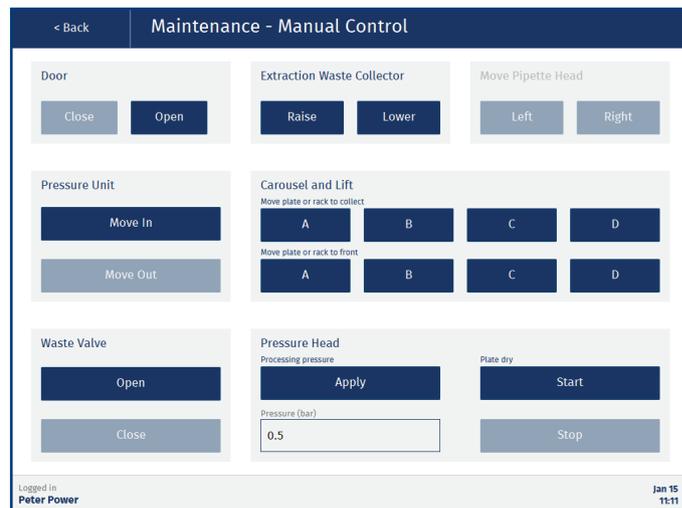


Figure 104. The Manual Control view.

- Put the pressure head back in place; see steps 9 and 10 in “Replace the Pressure Head Seal” on page 51.
- When you are done, restore the system to its initial state by pressing **Back** in the top pane, **Re-Initialize System** in the **Maintenance** view, and then **Yes** to confirm.

# Manual Control

## Maintenance



When using the Extrahera GLP software, the **Manual Control** view can be accessed by power and routine users.

To control the system manually e.g. to perform method development or maintenance tasks (see page 46), press **Maintenance** in the main menu and then **Manual Control....**

**Note:** All functions except for the waste valve control are disabled when the door is open.



Figure 105. The Manual Control view.

### Door

Functionality for opening and closing the door.

**Note:** After the door is closed, the carousel is homed and, if applicable, the pressure head is moved in, the pipette head is moved to the right, and the extraction waste collector is lowered.

### Maintenance

#### Extraction Waste Collector

Functionality for raising the extraction waste collector so that it can be removed. Used in the following maintenance tasks: “Clean the Accessories” on page 47 and “Clean or Replace the Waste Tubing” on page 49.

**Note:** It is not possible to raise the extraction waste collector when the pressure unit is in its inner position.

#### Move Pipette Head

Functionality for moving the pipette head into a position where it can be easily accessed to e.g. remove and mount nozzles; see “Switch Between 24, 48, and 96 Format” on page 57.

**Note:** It is not possible to move the pipette head when the pressure unit is in its outer position.

#### Waste Valve

Functionality for opening and closing the waste valve. Used in the following maintenance tasks: “Remove the Extraction Waste Collector” on page 47 and “Clean or Replace the Waste Tubing” on page 49.

## Method Development

### Pressure Unit

To process an extraction plate or column rack, first move the pressure head in position by pressing **Move Out** in the **Pressure Unit** field.

To unload an extraction plate or column rack, press **Move In** in the **Pressure Unit** field. To open the door, press **Open** in the **Door** field.

### Carousel and Lift

To lift a flow-through plate or a collection plate/rack to the position just underneath the extraction plate or columns, press its position (**A-D**) on the carousel using the **Move plate or rack to collect** buttons.

To unload or load a flow-through plate or a collection plate/rack, press its position (**A-D**) on the carousel using the **Move plate or rack to front** buttons. This lowers the lift and moves the selected position to the outer position. To open the door, press **Open** in the **Door** field.

**Note:** It is not possible to lift a plate/rack when the pressure unit is in its inner position.

### Waste Valve

When using a flow-through plate, ensure that the vacuum is on and then press **Open** in the **Waste Valve** field before applying pressure.

### Pressure Head

To apply a processing pressure with a gas flow of between 0 and 10 mL/min, enter the desired pressure (up to 5 bar) in the **Pressure (bar)** text box in the **Pressure Head** field and then press **Apply**. When done, press **Stop**.

To apply a plate dry with a gas flow of approximately 600 mL/min and a pressure at 5 bar, press **Start** in the **Pressure Head** field. When done, press **Stop**.

**Note:** The pressure head must be moved out to apply pressure.

**Note:** Older systems (unless upgraded) do not have dual flow and always process at 0 to 10 mL/min.

# Troubleshooting

If you need to restore the system to its initial state, press **Maintenance** in the main menu, press **Re-Initialize System**, and then **Yes** to confirm.

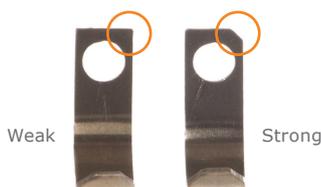
## Clog Detection (GLP)

- » If the plate/rack height scan fails, check that there is an extraction plate or column rack in position **3** on the working area.
- » If the reference scan fails; check that the extraction plate/rack is supported with clog detection (see page 29).
- » If the clog detection fails/gives false results:
  - » Check that your extraction plate/rack is supported with clog detection; see page 29.
  - » Check that the solvent or solvent combination is compatible with clog detection; see page 29.
  - » Change the clog sensitivity setting; see page 29.
- » If the pipette head collides with the sample tubes during the clog detection scan, check that the sample rack has the correct height setting (see “Manage Sample Plates and Racks” on page 23).

For more information on clog detection, see “Clog Detection Settings (GLP)” on page 29.

## Extraction Plate/Rack

If the extraction plate/rack is moved out of its position when the pressure head is lifted, or it is difficult to insert or remove the extraction plate/rack, the retaining clips in position **3** on the working area (if installed on your system) may need to be adjusted. By default, there are two strong clips to the right and two weak to the left (P/N 416128SP).



**Figure 106.** Retaining clips, weak and strong.

## Pipette Pump

If you suspect that the pipetting precision or accuracy is incorrect, calibrate and adjust the system as described in “Pipette Pump Calibration and Adjustment” on page 49.

If the precision of the system is outside the specification when measured as described on page 49:

- » Check that the correct pipette tip type is used.
- » Check that new pipette tips are used.
- » Check that the nozzles on the pipette head are securely tightened.
- » If the precision is still outside the specification, contact Biotage 1-Point Support.

## Pipetting Tips

Check that the pipette tip waste bin has sufficient space for pipette tips being disposed during the run and that the waste bin is correctly positioned with no collision risk for the carousel or the door.

If you see big differences in the volumes being aspirated into the pipette tips, fluid may have entered the pump:

- » Contact Biotage 1-Point Support.
- » Check that the capacity parameter for the pipette tip is set to the correct value; see “Manage Pipette Tips” on page 24.

If the pipette tips collide with system components or consumables during the process:

- » Check that the correct pipette tips are placed in the pipette tip rack holder.
- » Check that the sample plate or rack is correctly tuned; see “Manage Sample Plates and Racks” on page 23.
- » Check that the extraction plate or column rack is correctly tuned; see “Manage Extraction Media” on page 23.
- » Check that the length parameter for the pipette tip is set to the correct value; see “Manage Pipette Tips” on page 24.
- » Check that the correct nozzles are mounted properly on the pipette head for the current system configuration; see Table 5 on page 57.

## Power Failure

The system has open solvent reservoirs. If the ventilation fails and solvent vapors are not removed, an explosive environment can be generated. If the system is found with the door closed and the power off, you must ventilate the system properly before turning it back on. Follow the instructions in “Power Failure” on page 4.

## Pressure Head

If the pressure head collides with the extraction plate or columns:

- » Check that the extraction plate or columns are supported and correctly configured.
- » Check that the extraction plate or columns are correctly positioned and level.

## Pressurized Air and Nitrogen

If there is a leakage when pressurized air or nitrogen is applied:

- » Check that the gas tubing is securely attached.
- » Check that the correct gas tubing is used; the outer diameter should be 6 mm and the inner diameter 4 mm. Always use tubing supplied by Biotage.

If the pressure head does not move down or up:

- » Check that the **AIR** inlet at the right side of the system is connected to pressurized air or nitrogen and that the pressure is suitable for the method. Use  $6 \pm 0.2$  bar ( $0.6 \pm 0.02$  MPa;  $87 \pm 3$  psi) for a fully populated extraction plate/rack and lower to approximately 4 bar (0.4 MPa; 58 psi) when 50% of the plate/rack is populated and 3 bar (0.3 MPa; 44 psi) when 25% of the plate/rack is populated.
- » Check that all external valves for the incoming air are open.

If the extraction plate or columns do not empty:

- » Check that the **N<sub>2</sub>** inlet at the right side of the system is connected to nitrogen or pressurized air at  $6 \pm 0.2$  bar ( $0.6 \pm 0.02$  MPa;  $87 \pm 3$  psi).
- » Check that the **AIR** inlet at the right side of the system is connected to pressurized air or nitrogen and that the pressure is suitable for the method. The gas connected to the **AIR** port is used to seal the plate/columns and its pressure has to be adjusted according to how many positions in the plate or column rack that are populated. Use  $6 \pm 0.2$  bar ( $0.6 \pm 0.02$  MPa;  $87 \pm 3$  psi) for a fully populated extraction plate/rack and lower to approximately 4 bar (0.4 MPa; 58 psi) when 50% of the plate/rack is populated and 3 bar (0.3 MPa; 44 psi) when 25% of the plate/rack is populated.
- » Check that all external valves for the incoming pressurized air and/or nitrogen are open.
- » Check that the extraction plate or columns are not damaged.
- » Check that the gas tubes are connected properly to the pressure head and that the pressure head seal and tubing is not damaged. See instructions on how to remove the pressure head in “Replace the Pressure Head Seal” on page 51.
- » Check that the correct pressure head is used for the current system configuration (Table 5 on page 57).

## Robot

If the robot fails to pick up pipette tips or they fall off:

- » Check that the correct pipette tip type is used.
- » Check that the pipette tip rack holder is in the correct position.
- » Check that the pipette tip rack holder and pipette tip rack (delivered with the pipette tips) are not damaged.
- » Check that new pipette tips are used.
- » Check that the correct nozzles are mounted properly on the pipette head for the current system configuration; see Table 5 on page 57.

## Sample Cross-Contamination

To eliminate the risk of sample cross-contamination, always use a flow-through plate in the waste position (**D**) on the carousel and ensure that the pressure head seal is clean and not damaged (see “Replace the Pressure Head Seal” on page 51).

## Solvent Contamination

If you suspect contamination after changing a solvent:

- » Clean the solvent pump and tubing thoroughly using the **Flush Solvent Inlets** function at the **Maintenance** view. Repeat the flush cycle until the pump and tubing are clean.
- » If necessary, change the solvent tubing as described in “Replace the Solvent Tubing” on page 48.

## Solvent Pumps

If the pumped volume is too low:

- » Check the solvent level in the solvent bottle.
- » Check that the solvent bottle is placed in level with the system.
- » Flush the solvent pump and tubing repeatedly using the **Flush Solvent Inlets** function at the **Maintenance** view. If this does not help, check that both the screw connectors are securely tightened and flush again.

If solvent leaks from the solvent tubing in the back wall:

- » Check that the screw connectors are securely tightened.
- » Check that the correct tubing is used. Always use tubing supplied by Biotage.
- » Remove spillage; see “Clean the Interior of the System” on page 47.

If solvent leaks from behind the back wall, shut down the system, remove any solvents, samples, and waste inside the system, and contact Biotage 1-Point Support.

## Ventilation Fan

If the integral system ventilation fan stops working, shut down the system, remove any solvents, samples, and waste inside the system, and contact Biotage 1-Point Support.

The system has open solvent reservoirs. If the ventilation fails and solvent vapors are not removed, an explosive environment can be generated. If the system is found with the door closed and the power off, you must ventilate the system properly before turning it back on. Follow the instructions in “Power Failure” on page 4.

## Waste and Lifter

If the system does not evacuate waste:

- » Check that the system is connected to a vacuum pump or another vacuum source.
- » Check that the vacuum pump or source is operational.
- » Check that the vacuum tubing is not blocked.
- » Check that the extraction waste collector is not clogged. If clogged, clean as described in “Clean the Accessories” on page 47.
- » Check that the tube between the extraction waste collector and the waste reservoir is not clogged or blocked. If necessary, clean or replace the tube as described in “Clean or Replace the Waste Tubing” on page 49.
- » Remove any spillage; see “Clean the Interior of the System” on page 47.

If the extraction waste collector leaks, check that the tube between the extraction waste collector and the waste valve is securely tightened.

If the extraction waste collector does not reach its lower position, ensure that nothing is stuck underneath the extraction waste collector.

# Switch Between 24, 48, and 96 Format



The system can be configured to process up to 24, 48, or 96 samples during a run.

## Hardware Configuration

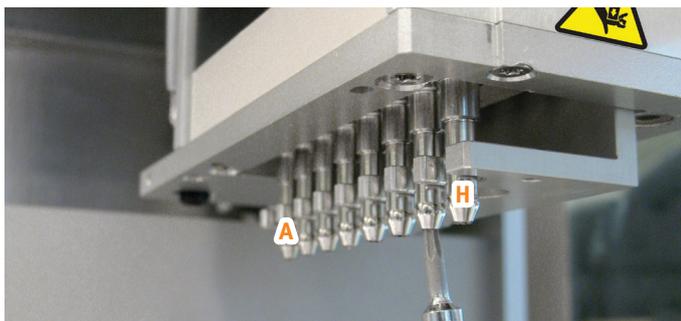
There are two hardware configuration kits available, one for the 24 format and one for the 96 format; see page 58.

Format	No of Nozzles	Nozzle Positions	Pressure Head	Flow-Trough Plate
96 positions plate/column rack	8	A-H	96	96
48 positions plate	8	A-H	96	48
48 positions column rack	4	A, C, E, G	96	48/96
24 positions column rack	4	B, D, F, H	24	24

**Table 5.** The different hardware configurations.

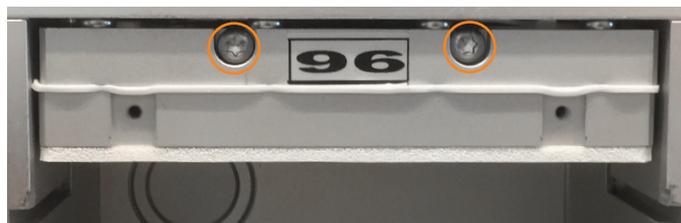
To change the hardware configuration:

1. Remove any plates/racks located in position **3** and **4** on the working area.
2. Press **Maintenance** in the main menu and then **Manual Control...**
3. If the door is not closed, press **Close** in the **Door** field.
4. Press **Left** in the **Move Pipette Head** field. The pipette head is moved into a position where it can be easily accessed.
5. Open the door by pressing **Open** in the **Door** field.
6. Ensure that the correct nozzles are mounted on the pipette head; see Table 5 above. Remove/mount nozzles using the supplied T9 Torx screwdriver; see Figure 107. Place unused nozzles in a clean and dust-free container with a lid.



**Figure 107.** There are eight positions for nozzles on the pipette head, with A in the inner position and H in the outer position.

7. Ensure that the correct pressure head is used; see Table 5 above. To change pressure head:
  - a. Remove the two screws holding the pressure head to the pressure unit; see Figure 108.

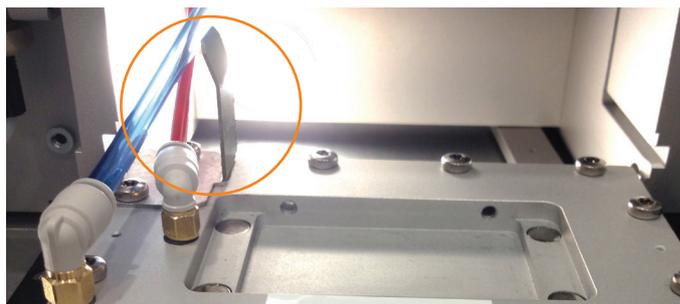


**Figure 108.** The screws attaching the pressure head to the pressure unit.

- b. Remove the pressure head by pulling it down and then pulling it out.

**Note:** If you have a system with only one gas tube connected to the pressure head, you have to tilt the pressure head horizontally to be able to pull it out.

- c. Disconnect the gas tubes from the pressure head by pushing in the collar of each connector against the fitting and pulling the tubing out.
- d. Put the pressure head in a clean and dust-free container with a lid.
- e. Connect the gas tubes to the pressure head of the desired format. Ensure that the tubes are properly fastened by pulling on them, and that the tubes are on the left side of the bracket as shown in Figure 109.



**Figure 109.** Ensure that the gas tubes are on the left side of the highlighted bracket.

- f. Install the pressure head by reversing step a to b above. Do not overtighten the screws.
8. When you are done, restore the system to its initial state by pressing **Back** in the top pane, **Re-Initialize System** in the **Maintenance** view, and then **Yes** to confirm.

## Software Configuration

1. Press **Maintenance** in the main menu.
2. Select the new system configuration from the **Instrument Type** drop-down list.
3. Press **Set** and then **Yes** to confirm.

# General Information

## Consumables and Accessories

Only genuine Biotage 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).

For a complete list, please visit our website [www.biotage.com](http://www.biotage.com).

Part No.	Description	Qty	Part No.	Description	Qty
416990	Biotage® Extrahera™ GLP Package - On Site Activation	1	121-5208	24-Well Collection Plate, 10 mL	50
416932SP	Biotage® Extrahera™ GLP Package - Upgrade Kit	1	414511SP	Collection Rack 12 x 75 mm 24 Positions	1
415040	Configuration Kit 96 Positions Dual Flow	1	414512SP	Collection Rack 18 x 75 mm 24 Positions	1
415041	Configuration Kit 24 Positions Dual Flow	1	414578SP	Inserts for 12 x 32 mm vials for Collection Rack 12 x 75 mm 24 Positions	24
415604SP	Pressure Head Seal Self Adhesive 96 Positions	5	413991SP	Solvent Rack for 25 mL Reservoirs	1
415603SP	Pressure Head Seal Self Adhesive 24 Positions	5	414045SP	Solvent Reservoir 25 mL	25
414253SP	Column Rack 96 x 1 mL (tabless)	1	415560SP	Solvent Rack for 100 mL Reservoirs	1
415556SP	Column Rack 48 x 3 mL	1	414214SP	Solvent Reservoir 100 mL	5
414169SP	Column Rack 24 x 1 mL	1	414330SP	Kit, Solvent Inlet Lines (S1-S5)	5
414174SP	Column Rack 24 x 3 mL	1	414579	Solvent Safety Kit (inc. GL45 Caps, Filters and Bottles, Qty 5)	1
413640SP	Column Rack 24 x 6 mL (tabless)	1	413686SP	Tip Rack Holder	1
414256SP	Sample Rack 12 x 75 mm 24 Positions	1	414141	Biotage Disposable Tips 1000 µL Clear	10x96
414255SP	Sample Rack 13 x 100 mm 24 Positions	1	416444	Biotage Disposable Tips 1000 µL Wide Bore, Clear	10x96
414254SP	Sample Rack 16 x 100 mm 24 Positions	1	414201SP	Flow-Through Plate for 96 Plates and Columns	1
415555SP	Sample/Collection Rack 12 x 75 mm 48 Positions	1	414516SP	Flow-Through Plate for 48 Plates and Columns	1
415491	Sample/Collection Rack 12 x 75 mm 24 Positions	1	414203SP	Flow-Through Plate for 24 Columns	1
415585	Sample/Collection Rack 16 x 75 mm 24 Positions	1	414703SP	Spacer for µElution and SPEC Fixed Well Plates	1
415492	Sample/Collection Rack 18 x 75 mm 24 Positions	1	414702SP	Matrix Tube Retaining Plate	1
C44651	12 x 75 mm Test Tube	1000	416128SP	Retaining Clip Kit, 4 Weak and 4 Strong	1
413282	16 x 75 mm Test Tube	1000	414272SP	Waste Kit incl. Waste Reservoir 5 L and Tubing	1
414574	18 x 75 mm Test Tube	304	414218SP	Pipette Tip Waste Bin	1
C40707	13 x 100 mm Test Tube	1000	415985SP	Extraction Waste Collector for Lifter	1
C40708	16 x 100 mm Test Tube	1000	414137SP	Waste Tubing	1
121-5202	96-Well Collection Plate, 1 mL, Square	50	411916SP	Fuse, 4A/250VAC, 5x20mm	5
121-5203	96-Well Collection Plate, 2 mL, Square	50	C67361	Mains Cord-Set (EU)	1
121-5213	96-Well Collection Plate, 2 mL, Round	50	C65902	Mains Cord-Set (US/CA)	1
121-5210	48-Well Collection Plate, 5 mL	20	C128195	Mains Cord-Set (UK)	1
			416440SP	Filter Unit	1
			416441SP	Air Dryer	1
			416492SP	Replacement Filters for Filter Unit	1
			356330SP	Vacuum Pump ME1C, 100 to 230VAC 50/60Hz	1
			415149	Handheld Barcode and QR Scanner	1

## Manufacturer



Biotage GB Limited United Kingdom for  
Biotage Sweden AB

## Contact Us

### **Biotage Sweden AB**

Box 8

SE-751 03 Uppsala

SWEDEN

Visiting address: Vimpelgatan 5

Phone: +46 18 56 59 00

Fax: +46 18 59 19 22

E-mail: [info@biotage.com](mailto:info@biotage.com)

Website: [www.biotage.com](http://www.biotage.com)

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).



# Your Complete Partner for Effective Chemistry

Biotage is a worldwide supplier of instruments and accessories designed to facilitate the work of laboratory and process chemists. With our deep knowledge of the industry, academic contacts and in-house R&D teams, we can deliver the best solutions to your challenges. We take great pride in our flexibility and ability to meet our customer's individual needs. With strong foundations in both analytical, organic and process chemistry, we can offer the widest range of solutions available on the market.

## EUROPE

Main Office: +46 18 565900  
Toll Free: +800 18 565710  
Fax: +46 18 591922  
Order Tel: +46 18 565710  
Order Fax: +46 18 565705  
order@biotage.com  
Support Tel: +46 18 56 59 11  
Support Fax: + 46 18 56 57 11  
eu-1-pointsupport@biotage.com

## NORTH & LATIN AMERICA

Main Office: +1 704 654 4900  
Toll Free: +1 800 446 4752  
Fax: +1 704 654 4917  
Order Tel: +1 704 654 4900  
Order Fax: +1 434 296 8217  
ordermailbox@biotage.com  
Support Tel: +1 800 446 4752  
Outside US: +1 704 654 4900  
us-1-pointsupport@biotage.com

## JAPAN

Tel: +81 3 5627 3123  
Fax: +81 3 5627 3121  
jp\_order@biotage.com  
jp-1-pointsupport@biotage.com

## CHINA

Tel: +86 21 68162810  
Fax: +86 21 68162829  
cn\_order@biotage.com  
cn-1-pointsupport@biotage.com

## KOREA

Tel: + 82 31 706 8500  
Fax: + 82 31 706 8510  
korea\_info@biotage.com  
kr-1-pointsupport@biotage.com

## INDIA

Tel: +91 22 4005 3712  
india@biotage.com

Distributors in other regions  
are listed on [www.biotage.com](http://www.biotage.com)

Part Number: 414158-M

© 2020 Biotage. All rights reserved. No material may be reproduced or published without the written permission of Biotage. Information in this document is subject to change without notice and does not represent any commitment from Biotage. E&OE. A list of all trademarks owned by Biotage AB is available at [www.biotage.com/legal](http://www.biotage.com/legal). Other product and company names mentioned herein may be trademarks or registered trademarks and/or service marks of their respective owners, and are used only for explanation and to the owners' benefit, without intent to infringe.

