QIAsymphony® SP/AS
User Manual —
General Description

For use with software version 4.0

QIAGEN®

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1 Safety Information

Before using the QIAsymphony SP/AS instruments, it is essential that you read this user manual carefully and pay particular attention to the safety information. The instructions and safety information in the user manual must be followed to ensure safe operation of the instruments and to maintain the instruments in a safe condition.

The following types of safety information appear throughout the QIAsymphony SP/AS User Manuals.

WARNING	The term WARNING is used to inform you about situations that could result in **personal injury** to you or other persons. Details about these circumstances are given in a box like this one.

CAUTION	The term CAUTION is used to inform you about situations that could result in **damage to the instruments** or other equipment. Details about these circumstances are given in a box like this one.

The advice given in this manual is intended to supplement, not supersede, the normal safety requirements prevailing in the user's country.

1.1 Proper use

WARNING/ CAUTION ⚠	**Risk of personal injury and material damage** [W1] Improper use of the QIAsymphony SP/AS instruments may cause personal injuries or damage to the instruments. The QIAsymphony SP/AS instruments must only be operated by qualified personnel who have been appropriately trained. Servicing of the QIAsymphony SP/AS instruments must only be performed by QIAGEN Field Service Specialists.

Note: Do not place items on top of the QIAsymphony SP/AS hoods.

Perform the maintenance as described in Section 9. QIAGEN charges for repairs that are required due to incorrect maintenance.

CAUTION ⚠	**Damage to the instrument(s)** [C1] Avoid spilling water or chemicals onto the QIAsymphony SP/AS instruments. Damage caused by water or chemical spillage will void your warranty.

In case of emergency, switch off the QIAsymphony SP/AS instruments at the power switch at the front of the QIAsymphony SP and unplug the power cord from the power outlet.

CAUTION ⚠	**Damage to the instrument(s)** [C2] Do not lean on the touchscreen when it is folded down.

1.2 Electrical safety

Note: If operation of the instruments is interrupted in any way (e.g., due to interruption of the power supply or a mechanical error), first switch off the instruments using the power switch, then disconnect the electrical cord from the power supply and contact QIAGEN Technical Services.

WARNING	**Electrical hazard** [W2]
⚠	Any interruption of the protective conductor (earth/ground lead) inside or outside the instruments or disconnection of the protective conductor terminal is likely to make the instrument dangerous. Intentional interruption is prohibited. **Lethal voltages inside the instruments** When the instruments are connected to line power, terminals may be live. Opening covers or removing parts is likely to expose live parts.

To ensure satisfactory and safe operation of the QIAsymphony SP/AS instruments, follow the advice below:

■ The line power cord must be connected to a line power outlet that has a protective conductor (earth/ground).

■ Do not adjust or replace internal parts of the instruments.

■ Do not operate the instruments with any covers or parts removed.

■ If liquid has spilled inside the instruments, switch off the instruments, disconnect them from the power outlet, and contact QIAGEN Technical Services.

If the QIAsymphony SP/AS instruments become electrically unsafe, prevent other personnel from operating them, and contact QIAGEN Technical Services; the instruments may be electrically unsafe when:

■ The instruments or the line power cord appear to be damaged.

■ The instruments have been stored under unfavorable conditions for a prolonged period.

■ The instruments have been subjected to severe transport stresses.

■ Liquids have come into direct contact with electrical components of the QIAsymphony SP/AS instruments.

1.3   Environment

Operating conditions

WARNING	**Explosive atmosphere** [W3]
⚠	The QIAsymphony SP/AS instruments are not designed for use in an explosive atmosphere.

WARNING	**Risk of overheating** [W4]
⚠	To ensure proper ventilation, maintain a minimum clearance of 5 cm (1.97 in.) at the rear of the QIAsymphony SP/AS instruments. Slits and openings that ensure the ventilation of the QIAsymphony SP/AS instruments must not be covered.

1.4   Biological safety

Specimens and reagents containing materials from humans should be treated as potentially infectious. Use safe laboratory procedures as outlined in publications such as *Biosafety in Microbiological and Biomedical Laboratories*, HHS (www.cdc.gov/od/ohs/biosfty/biosfty.htm).

Samples

Samples may contain infectious agents. You should be aware of the health hazard presented by such agents and should use, store, and dispose of such samples according to the required safety regulations.

WARNING	**Samples containing infectious agents** [W5]
	Some samples used with the QIAsymphony SP/AS instruments may contain infectious agents. Handle such samples with care and in accordance with the required safety regulations.
	The responsible persons (e.g., laboratory manager) must take the necessary precautions to ensure that the workplace is safe, and that the instrument operators are suitably trained and not exposed to hazardous levels of infectious agents as defined in the applicable Safety Data Sheets (SDSs) or OSHA,* ACGIH,† or COSHH‡ documents. Venting for fumes and disposal of wastes must be in accordance with all national, state, and local health and safety regulations and laws.

* OSHA: Occupational Safety and Health Administration (United States of America).

† ACGIH: American Conference of Government Industrial Hygienists (United States of America).

‡ COSHH: Control of Substances Hazardous to Health (United Kingdom).

1.5 Chemicals

WARNING	Hazardous chemicals [W6]
	Some chemicals used with the QIAsymphony SP/AS instruments may be hazardous or may become hazardous after completion of the protocol run. Always wear safety glasses, gloves, and a lab coat. The responsible person (e.g., laboratory manager) must take the necessary precautions to ensure that the surrounding workplace is safe and that the instrument operators are not exposed to hazardous levels of toxic substances (chemical or biological) as defined in the applicable Safety Data Sheets (SDSs) or OSHA,* ACGIH,[†] or COSHH[‡] documents. Venting for fumes and disposal of wastes must be in accordance with all national, state, and local health and safety regulations and laws.

* OSHA: Occupational Safety and Health Administration (United States of America).

[†] ACGIH: American Conference of Government Industrial Hygienists (United States of America).

[‡] COSHH: Control of Substances Hazardous to Health (United Kingdom).

Toxic fumes

If working with volatile solvents or toxic substances, you must provide an efficient laboratory ventilation system to remove vapors that may be produced.

WARNING	Toxic fumes [W7]
	Do not use bleach to clean or disinfect the QIAsymphony SP/AS instruments. Bleach in contact with salts from the buffers can produce toxic fumes.

WARNING	Toxic fumes [W8]
	Do not use bleach to disinfect used labware. Bleach in contact with salts from the buffers used can produce toxic fumes.

1.6 Mechanical hazards

The hoods of the QIAsymphony SP/AS instruments must remain closed during operation. Only open the hoods when instructed to do so by the software.

WARNING	Moving parts [W9]
⚠️	To avoid contact with moving parts during operation of the QIAsymphony SP/AS instruments, the instruments must be operated with the hoods closed. If the hood sensors are not functioning correctly, contact QIAGEN Technical Services.

1.7 Magnetic hazard

The QIAsymphony SP uses magnetic rods for processing magnetic particles. These magnetic rods generate a strong magnetic field.

WARNING	Strong magnetic field [W10]
⚠️	Persons with metal prostheses should not operate the QIAsymphony SP/AS instruments. Prostheses may be damaged by close contact with the instrument.

CAUTION	Strong magnetic field [C3]
⚠️	Do not place the QIAsymphony SP/AS instruments near magnetic storage systems (e.g., computer discs). Do not use metal tools when handling the magnetic rods. Do not allow the magnetic rods to come into contact with other magnets.

1.8 Heat hazard

The QIAsymphony SP supports a lysis station that can be heated, if required by the protocol. In addition, both the QIAsymphony SP and the QIAsymphony AS support a UV lamp.

WARNING ⚠	**Hot surface** [W11] The lysis station and the UV lamps can reach temperatures of up to 70°C (158°F). Avoid touching them during operation.

1.9 Maintenance safety

WARNING/ CAUTION ⚠	**Risk of personal injury and material damage** [W12] Only perform maintenance that is specifically described in this user manual.

WARNING/ CAUTION ⚠	**Risk of personal injury and material damage** [W13] Improper use of the QIAsymphony SP/AS instruments may cause personal injuries or damage to the instruments. The QIAsymphony SP/AS instruments must only be operated by qualified personnel who have been appropriately trained. Servicing of the QIAsymphony SP/AS must only be performed by QIAGEN Field Service Specialists.

CAUTION ⚠	**Damage to the instrument(s)** [C4] Do not use bleach, solvents, or reagents containing acids, alkalis, or abrasives to clean the QIAsymphony SP/AS instruments.

CAUTION ⚠	**Damage to the instrument(s)** [C5] Do not use spray bottles containing alcohol or disinfectant to clean surfaces of the QIAsymphony SP/AS instruments. Spray bottles should be used only to clean items that have been removed from the worktables.

CAUTION	**Damage to the instrument(s)** [C6]
	After wiping the drawers and lysis station with paper towels, make sure that no bits of paper towel remain. Pieces of paper towel remaining on the worktable could lead to a worktable collision.

CAUTION	**Damage to the instrument hood(s) or side panels** [C7]
	Never clean the instrument hood(s) or side panels with alcohol or alcohol-based solutions. Alcohol will damage the hood and the side panels. To clean the hood(s) and side panels, use distilled water.

WARNING	**Risk of electric shock** [W14]
	Do not open any panels on the QIAsymphony SP/AS instruments.
	Risk of personal injury and material damage
	Only perform maintenance that is specifically described in this user manual.

WARNING	**Risk of fire** [W15]
	When cleaning the QIAsymphony SP/AS instruments with alcohol-based disinfectant, leave the instrument hoods open to allow flammable vapors to disperse. Only clean the QIAsymphony SP/AS instruments with alcohol-based disinfectant when worktable components have cooled down.

CAUTION	**Damage to the instrument(s)** [C8]
	Make sure to install the tip guards before operating the QIAsymphony SP/AS instruments.

CAUTION	**Damage to the instrument(s)** [C9]
	Make sure to install the magnetic-head guards before operating the QIAsymphony SP.

CAUTION ⚠	**Damage to the instrument(s)** [C10] Make sure not to damage the cables and the electronic board when wiping the magnetic head.

Waste disposal

Used consumables, such as sample tubes, sample prep cartridges, 8-Rod Covers, disposable filter-tips, reagent tubes, and elution racks, may contain hazardous chemicals or infectious agents from the purification or assay setup process. Such wastes must be collected and disposed of properly according to local safety regulations.

For disposal of waste electrical and electronic equipment (WEEE), see page A-4.

WARNING ☣	**Hazardous chemicals and infectious agents** [W16] The waste contains samples and reagents. This waste may contain toxic or infectious material and must be disposed of properly. Refer to your local safety regulations for proper disposal procedures.

1.10   Symbols on the QIAsymphony SP/AS instruments

The following symbols appear on both the QIAsymphony SP and QIAsymphony AS instruments, except the heat hazard symbol, which appears only on the QIAsymphony SP.

Symbol	Location	Description
	Lysis station	Heat hazard — the temperature of the lysis station can reach up to 70°C (158°F)
	QIAsymphony SP — near the tip rack slots/tip disposal bag QIAsymphony AS — on the worktable, near the magnetic lock of the hood	Biohazard — the tip rack slots, waste, and the worktable may be contaminated with biohazardous material and must be handled with gloves
	Robotic arm	Avoid looking directly into UV light Do not expose your skin to UV light
	On the worktable	Read the manual
CAUTION LASER RADIATION DO NOT STARE INTO BEAM DIODE LASER 1.3 mW MAX OUTPUT at 620-680 nm CLASS II LASER PRODUCT	Next to the type plate on back of the instrument	Laser radiation — do not stare into beam
CE	Type plate on the back of the instrument	CE marking for European Conformity

Symbol	Location	Description
	Type plate on the back of the instrument	CSA listing mark for Canada and the USA
CB	Type plate on the back of the instrument	CB mark of the IECEE member states
	Type plate on the back of the instrument	FCC mark of the United States Federal Communications Commission
	Type plate on the back of the instrument	C-Tick mark for Australia (supplier identification N17965)
	Type plate on the back of the instrument	RoHS mark for China (the restriction of the use of certain hazardous substances in electrical and electronic equipment)
	Type plate on the back of the instrument	WEEE mark for Europe

2 Introduction

Thank you for choosing the QIAsymphony SP/AS instruments. We are confident they will become an integral part of your laboratory.

Before using the QIAsymphony SP/AS instruments, it is essential that you read the user manuals carefully and pay particular attention to the safety information. The instructions and safety information in the user manuals must be followed to ensure safe operation of the instruments and to maintain the instruments in a safe condition.

2.1 Provided user documents

The QIAsymphony SP/AS instruments are provided with the QIAsymphony — Pure Performance CD-ROM, which contains the following documents:

General Description	■ Features of the QIAsymphony SP/AS instrument(s) ■ Functions (e.g., handling files) that are the same for the QIAsymphony SP and the QIAsymphony AS ■ Maintenance (including cleaning) ■ Troubleshooting
Operating the QIAsymphony SP	■ Description of how to operate the QIAsymphony SP
Operating the QIAsymphony AS	■ Description of how to operate the QIAsymphony AS

QIAsymphony SP/AS Consolidated Operating Guide	■ Consolidated content of the three previously listed user manuals, above
	Note: This operating guide is available in different languages on CD.
QIAsymphony Management Console User Manual	Information about how to use the QIAsymphony Management Console software:
	■ "File Transfer"
	■ "Checksum Validation"
	■ "Process Definition" editor tools
	■ "IC-Calculator"
QIAsymphony Cabinet SP/AS User Guide	■ Features of the QIAsymphony SP/AS Cabinet
	■ Maintenance (including cleaning)

2.2 General information

2.2.1 Technical assistance

At QIAGEN we pride ourselves on the quality and availability of our technical support. Our Technical Services Departments are staffed by experienced scientists with extensive practical and theoretical expertise in molecular biology and the use of QIAGEN® products. If you have any questions or experience any difficulties regarding the QIAsymphony SP/AS instruments or QIAGEN products in general, do not hesitate to contact us.

QIAGEN customers are a major source of information regarding advanced or specialized uses of our products. This information is helpful to other scientists as well as to the researchers at QIAGEN. We therefore encourage you to contact us if you have any suggestions about product performance or new applications and techniques.

For technical assistance and more information call one of the QIAGEN Technical Services Departments (for contact information see the back cover, or visit www.qiagen.com).

2.2.2 Policy statement

It is the policy of QIAGEN to improve products as new techniques and components become available. QIAGEN reserves the right to change specifications at any time.

In an effort to produce useful and appropriate documentation, we appreciate your comments on this user manual. Please contact QIAGEN Technical Services.

2.2.3 Version management

This document is the *General Description, version 3.1* (for use with software version 4.0 or higher).

2.3 Intended use of the QIAsymphony SP

The QIAsymphony SP instrument is designed to perform automated purification of nucleic acids.

It is intended to be used only in combination with QIAsymphony Kits indicated for use with the QIAsymphony SP for the applications described in the kit handbooks.

The QIAsymphony SP is intended for use by professional users, such as technicians and physicians trained in molecular biological techniques and the operation of the QIAsymphony SP instrument.

2.4 Intended use of the QIAsymphony AS

The QIAsymphony AS instrument is designed to perform automated assay setup.

If used in combination with QIAGEN Kits indicated for use with the QIAsymphony AS instrument it is intended for the applications described in the respective QIAGEN Kit handbooks. If the QIAsymphony AS instrument is used with kits other than QIAGEN kits, it is the user's responsibility to validate the performance of such product combination for any particular application.

The QIAsymphony AS instrument is intended for use by professional users trained in molecular biology techniques and the operation of the QIAsymphony AS instrument.

2.4.1 Requirements for QIAsymphony SP/AS users

The following table covers the general level of competence and training necessary for transportation, installation, use, maintenance, and servicing of the QIAsymphony SP/AS instruments.

Task	Personnel	Training and experience
Delivery	No special requirements	No special requirements
Installation	**QIAGEN Field Service Specialists only**	Regularly trained, certified, and authorized by QIAGEN
Routine use (running protocols)	Laboratory technicians or equivalent	Professional users, such as technicians and physicians, trained in molecular biology techniques
Routine maintenance	Laboratory technicians or equivalent	Professional users, such as technicians and physicians, trained in molecular biology techniques
Servicing and annual preventive maintenance	**QIAGEN Field Service Specialists only**	Regularly trained, certified, and authorized by QIAGEN

2.4.2 Training for QIAsymphony SP/AS users

Customers are trained by a QIAGEN representative upon installation of the QIAsymphony SP/AS instrument(s). The training takes 1–3 days, depending on the subject and the knowledge level of the customer.

Basic training covers general operation of the system, user management, configuration, QIAsymphony Management Console (QMC) software, regular maintenance, and basic troubleshooting. Application-specific topics will be addressed in an advanced training.

QIAGEN can also provide retraining, for example after software updates, or for new laboratory personnel. Please contact QIAGEN Technical Services to get more information about retraining.

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3 General Description

The QIAsymphony SP performs sample preparation and the QIAsymphony AS performs assay setup. The QIAsymphony AS directly interfaces with the QIAsymphony SP, enabling automation of this complete workflow. Both instruments are operated using the built-in touchscreen located on the QIAsymphony SP.

3.1 QIAsymphony SP

The QIAsymphony SP performs fully automated purification of nucleic acids using magnetic-particle technology. Samples can be processed in batches of up to 24 samples. The instrument controls integrated components including a lysis station, 4-channel pipetting system, robotic gripper, and an array of magnetic rods that are protected by rod covers. These rods can pick up or release magnetic particles in the wells of a sample prep cartridge, depending on whether the magnetic rods are inserted in the rod covers or not.

The QIAsymphony SP is preinstalled with various protocols and corresponding Assay Control Sets for purification of RNA, genomic DNA, and viral and bacterial nucleic acids. The user loads reagents (in prefilled, sealed reagent cartridges) and consumables into the appropriate drawer, loads the samples, and selects a protocol using the touchscreen. The user then starts the protocol, which provides all necessary commands for sample lysis and purification. A fully automated inventory scan (either after closing the individual drawers or before the run starts) helps to ensure that the QIAsymphony SP is correctly set up for the protocol.

There are 3 default software configurations that can be used for operating the QIAsymphony SP, see Section 6.2.1 for more details.

3.1.1 QIAsymphony SP principle

Sample preparation using the QIAsymphony SP usually consists of 4 main steps: lyse, bind, wash, elute.

1. Samples are lysed in the lysis station, which can be heated, if required by the protocol.
2. Nucleic acids bind to the surface of the magnetic particles and are washed to remove contaminants.
3. Purified nucleic acid is eluted.
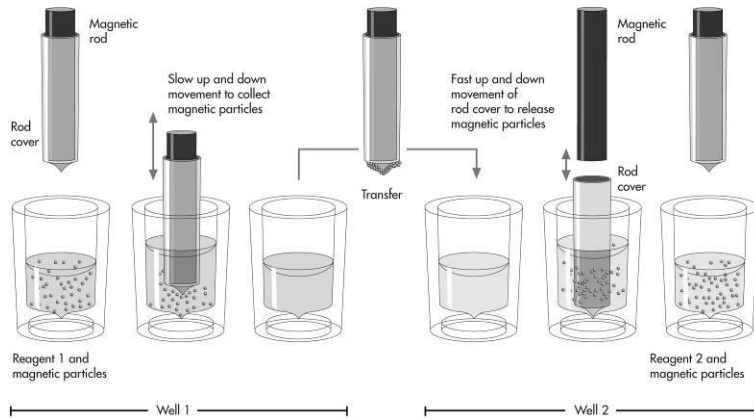
Schematic of QIAsymphony SP principle.

The QIAsymphony SP processes a sample containing magnetic particles as follows:*

1. A magnetic rod protected by a rod cover enters a well containing the sample and attracts the magnetic particles.
2. Sample prep cartridges are positioned below the magnetic rod with cover.

The QIAsymphony SP uses a magnetic head containing an array of 24 magnetic rods, and can therefore process 24 samples simultaneously. Steps 1 and 2 are repeated several times during sample processing.

Attracting magnetic particles

To attract magnetic particles, the magnetic rod is first fully inserted into a rod cover. The magnetic rod with rod cover then moves slowly up and down in the well containing the sample to ensure maximal attraction of magnetic particles.

Releasing magnetic particles

To release magnetic particles, the magnetic rod with rod cover is first moved down into a well. The magnetic rod is then withdrawn from the rod cover, and the rod cover is lowered into the well. The rod cover is moved quickly up and down to ensure maximal release and mixing of magnetic particles in the solution in the well.

Washing magnetic particles

The QIAsymphony SP washes magnetic particles by transferring them from one solution to another. To improve washing efficiency, the rod covers are designed so that minimal liquid is transferred along with the magnetic particles.

To ensure that magnetic particles are evenly distributed in a solution during a long incubation, the QIAsymphony SP occasionally moves the rod cover (without magnetic rod) up and down in the well.

Concentrating magnetic particles

The QIAsymphony SP concentrates magnetic particles by attracting magnetic particles from a solution of large volume, and releasing the particles in a solution of low volume.

* Technology is covered by US patents US2001/0022948, US6.448.092, US6.447.729, US6.207463, 6.065.605, US6.040.192, US5.942.124, US6.020.211, US5.647.994, and equivalents in other countries owned by Thermo Labsystems OY.

3.2   External features of the QIAsymphony SP

1	Hood	**8**	USB port
2	Touchscreen	**9**	Network interface
3	"Sample" drawer	**10**	Appliance inlet
4	"Reagents and Consumables" drawer	**11**	Adjustable feet
5	"Waste" drawer	**12**	Handheld bar code scanner
6	"Eluate" drawer	**13**	QIAsymphony Cabinet SP
7	Power switch	**14**	LED lights (blue)

Instrument panels and hood

Parts of the side panels and the hood are made of acrylic glass. Acrylic glass is sensitive to UV light. To avoid damage to the instrument, do not expose the QIAsymphony SP to UV light. If the room in which the QIAsymphony SP is placed needs to be decontaminated with UV light, cover the instrument. Decontamination of the QIAsymphony SP using the integrated UV light will not damage the acrylic glass.

Hood

The instrument hood protects users from the moving robotic arm and from potentially infectious material on the worktable. The hood can be manually opened to gain access to the worktable (e.g., for cleaning). During operation of the QIAsymphony SP, the hood of the instrument must remain closed and should only be opened when instructed to do so by the software. During sample preparation, the QIAsymphony SP hood is locked. If force is used to open the hood during a run, the run will be paused.

Important: If the hood is opened during sample processing, the instrument will not immediately stop. The instrument will stop when processing of the current protocol step is finished. In some cases, this may take some time.

Power switch

The power switch is located at the front left of the QIAsymphony SP. To switch the QIAsymphony SP on, press the power switch. The startup screen appears; this may take some time. The instrument then automatically performs initialization tests.

To conserve energy, the QIAsymphony SP can be switched off when not in use. To do this, press the power switch.

Note: After the QIAsymphony SP is switched off, the power switch flashes a few times. When the power switch stops flashing it is safe to switch the QIAsymphony SP on again.

Touchscreen

The QIAsymphony SP is controlled using a swivel-mounted touchscreen. The touchscreen allows the user to, for example, select and run protocols, and upload/download files (e.g., Assay Control Sets) from/to a USB stick (for more details, see Section 8). During sample processing, the touchscreen displays the sample preparation user interface, providing information about each of the sample batches, including batch status.

Drawers

The QIAsymphony SP contains 4 drawers:
- "Sample" drawer
- "Reagents and Consumables" drawer
- "Waste" drawer
- "Eluate" drawer

For more information about the drawers, see Section 3.3.

USB ports

The USB ports at the front left and front right of the QIAsymphony SP allow connection of the QIAsymphony SP to a USB stick and a handheld bar code scanner (supplied with the QIAsymphony SP). New protocols, Assay Control Sets, new labware files (e.g., files enabling new types of tube to be used with the QIAsymphony SP), and work lists can be uploaded to the QIAsymphony SP via the USB port. Data files, such as system log files, report files, loading information files, and rack files can also be transferred via the USB port from the QIAsymphony SP to the USB stick.

Important: The USB port is only for use with the USB stick provided by QIAGEN.

Important: Do not remove the USB stick while downloading or uploading files.

Network interface

The network interface allows connection of the QIAsymphony SP to a network via a CAT5 ethernet network cable.

QIAsymphony status LEDs

Light-emitting diodes (LEDs) at the front of the QIAsymphony SP are illuminated when sample preparation is in progress. The status LEDs flash when a batch/run is finished or if an error occurs. Touching the screen turns off the flashing.

QIAsymphony Cabinet SP (optional)

The QIAsymphony Cabinet SP is an optional accessory for the QIAsymphony SP. The QIAsymphony Cabinet SP is specially designed for positioning the QIAsymphony SP in your laboratory. For more information, contact QIAGEN Technical Services.

3.3   QIAsymphony SP drawers

Samples, reagents and consumables, eluates, and waste are separated in different drawers in the QIAsymphony SP. When a drawer is opened and then closed, the user confirms whether an inventory scan of the drawer should be performed. During sample preparation, the QIAsymphony SP drawers are locked.

Inventory scan

An inventory scan of each drawer of the QIAsymphony SP must be performed before a sample preparation protocol can be run. The QIAsymphony SP uses a laser to check the type and number of consumables, and the type and location of adapters loaded in each drawer. A bar code detection system recognizes and scans 1D or 2D bar codes (e.g., on the reagent cartridge). The laser and bar code camera are integrated in the robotic arm. This ensures that positions over the whole worktable can be scanned. The inventory scan is drawer specific. This means that only the drawer that has been opened will be scanned for changes.

3.3.1 "Sample" drawer
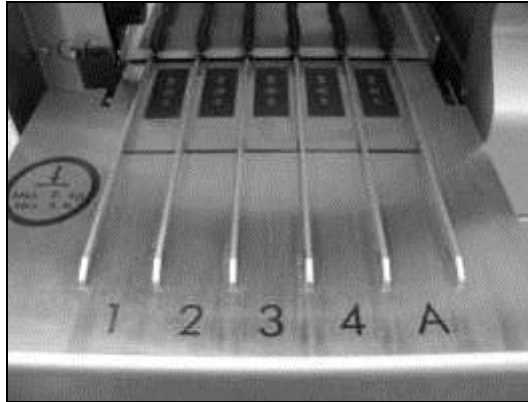
Interior of the "Sample" drawer.

The sample input drawer is located at the front left of the QIAsymphony SP. Samples can be loaded into the drawer in either primary or secondary tubes or multi-well sample racks. For more information about compatible tubes and plates, see www.qiagen.com/goto/QIAsymphony.

Use of tube and plate carriers enables samples to be loaded in a variety of formats. Two types of sample carrier can be used with the QIAsymphony SP.

■ Tube carrier for up to 24 primary tubes or tubes containing internal controls with diameters of 8–16 mm.

■ Plate carrier for up to four 24-, or 96-well plates or for up to 4 racks of tubes, each containing up to 24 tubes.

Note: It is not possible to use tube and plate carriers at the same time.
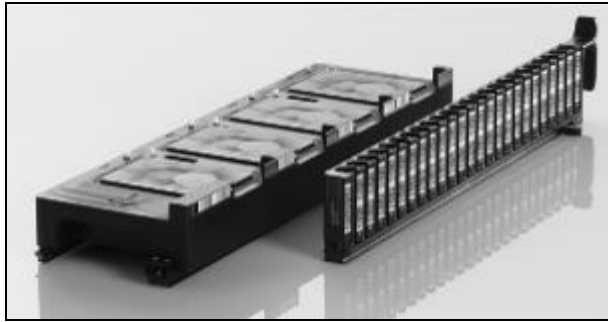
Plate and tube carriers

The QIAsymphony SP has an integrated bar code reader that can read bar codes on the tube and plate carriers and also on sample tubes and plates. This enables the QIAsymphony SP to identify the type of sample carrier being used.

Primary tubes can be labeled with bar codes. For samples in 96-well plates, a bar code can be used for identification of the complete set of samples, but information about each individual sample must be entered by the user.

The bar code reader of the "Sample" drawer scans:
■ The position bar codes of the tube carriers.
■ The bar code labels on sample tubes.
■ The bar code on the adapter or sample plate.

Each slot in a tube carrier has a bar code at the back of the slot. If the position is empty, the bar code at the back of the slot can be read by the bar code reader. This enables the QIAsymphony SP to detect which positions in the tube carrier contain a tube and which are empty.

If you are using sample tubes that are not labeled with bar codes and your QIAsymphony SP has a configuration other than configuration 3, tubes containing clear liquids, or volumes of liquid with a liquid height lower than the bottom edge of the bar code on the tube carrier may not be detected. In this case, use a blank bar code label to enable detection of the sample tube. See Section 6.2 for more details about the different software configurations that are possible.

The scanned sample ID lists can be manually corrected (depending on the software configuration of the QIAsymphony SP) and assigned into batches based on existing sample information or following user input.

Four tube carriers are available for use with sample tubes. In some protocols, samples may also be processed with positive or negative controls. A fifth tube carrier accommodates tubes containing internal controls that will be added to the samples.

Note: Be sure to use the correct tube inserts and adapters. For information about compatible tubes and plates, visit www.qiagen.com/goto/QIAsymphony.

Note: Some protocols provide a clot detection function which is only active when the correct tubes are used. For detailed information about which tubes to use with each protocol, visit www.qiagen.com/goto/QIAsymphony.

Note: With some software configurations of the QIAsymphony SP, bar code labeled sample tubes or plates must be used. If other tubes or plates are used, a batch or run cannot be defined.

Note: Be sure to support the tube carrier with your second hand during the loading process. Otherwise, there is a risk of handle breakage.

LEDs on the inside of the "Sample" drawer simplify sample loading and unloading. The color of the LEDs denotes the status of sample loading.

- Green — slot is free and ready for loading
- Orange — tube or plate carrier is loaded
- Red — tube or plate carrier is currently locked (carrier is currently in use, or the carrier has been incorrectly inserted)

Note: If the tube/plate carrier has been incorrectly inserted, take the carrier out of the "Sample" drawer and reinsert.

For increased process safety, each sample slot is equipped with a lock. This prevents accidental unloading of sample racks that will be processed in the batch currently running.

Tube carrier

The QIAsymphony SP tube carrier can accommodate up to 24 sample tubes of the following outer diameter:

■ 14–16 mm (no insert required)

■ 13 mm (with tube insert 01; cat. no. 9241034)

■ 13 mm (tube insert 1a; cat. no. 9242058)

■ 11.5 mm (with tube insert 02; cat. no. 9241033)

■ 11.5 mm (tube insert 2a; cat. no. 9242057)

■ Insert Sarstedt® tube 2 ml (with insert 03; cat. no. 9241032)

■ Insert Sarstedt tube 2 ml (insert 3b; cat. no. 9242083)

Example of insert for tube carrier.

The instrument detects tube size by reading the bar code on the insert or on the tube carrier. If a tube is used that is not the default tube type, the user must specify the tube type when defining the sample batch. For more information about compatible and default tubes, visit www.qiagen.com/goto/QIAsymphony.

Note: Default tubes can be configured. For more details, see Section 6.1.2.

Plate carrier

The plate carrier has 4 slots that can accommodate up to 4 sample racks. Sample plates in 24-and 96-well format can be used. The plate carrier can also be loaded with tubes in an adapter. Different plate formats can be used within the same carrier at the same time. For more information about compatible plates and tubes, visit www.qiagen.com/goto/QIAsymphony.

3.3.2 "Reagents and Consumables" drawer

The "Reagents and Consumables" drawer accommodates all consumables and reagents required for the protocol run. Before starting a protocol run, the drawer must be loaded with the appropriate reagents in prefilled, sealed reagent cartridges, sample prep cartridges, 8-Rod Covers, and disposable filter-tips. In some cases, an Accessory Trough and buffer bottle may be required. For more information, refer to the handbook of the QIAsymphony Kit you are using.

Consumables

Unit boxes

Consumables required for sample preparation are placed onto the QIAsymphony SP worktable in unit boxes. Unit boxes are provided with a lid. Simply remove the lid, and place unit boxes containing either unused 8-Rod Covers or sample prep cartridges into the "Reagents and Consumables" drawer. Unit boxes are designed so that they fit into the instrument drawer only in the correct orientation.

The lids can be reused to close unit boxes containing clean or used sample prep cartridges or 8-Rod Covers.

Consumables used in sample preparation on the QIAsymphony SP.

Sample prep cartridges

Sample prep cartridges are the vessels used by the QIAsymphony SP during purification of nucleic acids. Each well of a sample prep cartridge can hold up to 3 ml of liquid.

Sample prep cartridges are provided in sealed unit boxes. Each unit box can hold a maximum of 28 cartridges. A specific pattern on the top and bottom edge of a sample prep cartridge enables automatic detection by the QIAsymphony SP during the inventory scan. The number of sample prep cartridges in a unit box is also detected during the inventory scan. The robotic handling system can pick up a maximum of 3 sample prep cartridges simultaneously.

Purification of nucleic acids takes place in sample prep cartridges.

8-Rod Covers

An 8-Rod Cover is an array of 8 rod covers that cover the magnetic rods of the magnetic head. 8-Rod Covers are provided in sealed unit boxes. Each unit box can hold a maximum of twelve 8-Rod Covers. There is a spacer between the bottom of the unit box and the last 8-Rod Cover. A specific pattern on the top and bottom edge of an 8-Rod Cover enables automatic detection by the QIAsymphony SP during the inventory scan. The number of 8-Rod Covers in a unit box is also detected during the inventory scan.

8-Rod-Covers cover the magnetic rods of the magnetic head.

Filter-tips

The QIAsymphony SP uses 1500 μl filter-tips and 200 μl filter-tips. Filter-tips are provided in sealed blister packs, with 32 filter-tips in one tip rack. For increased ease of use, racks containing 1500 μl filter-tips are black and racks containing 200 μl filter-tips are blue.

Note: Only use filter-tips designed for use with the QIAsymphony SP.

Note: Each tip type contains a filter to help prevent cross-contamination.

Each type of tip rack has a different pattern on the upper and lower side. This enables detection of the type of filter-tip during the inventory scan.

Note: Do not refill partially used tip racks. The number of filter-tips will be detected during the inventory scan.

Reagent cartridges

Reagents required for the purification procedure are provided in prefilled, sealed reagent cartridges. Up to 2 reagent cartridges can be loaded into the "Reagents and Consumables" drawer. For increased ease of use, reagent cartridges fit only in the correct orientation. The user first removes the seal from the magnetic-particle trough. The reagent cartridge is then automatically opened by the QIAsymphony SP, which eliminates manual handling and pouring of reagents. Each individual reagent in the reagent cartridge is labeled with a 2D bar code, enabling tracking of reagents through the entire purification procedure.

Novel, prefilled reagent cartridges eliminate manual pouring of reagents.

The reagent cartridge contains sufficient reagents for up to 192 samples, depending on the protocol being run. Troughs of partially used reagent cartridges should be sealed immediately after use with Reuse Seal Strips (provided in the QIAsymphony Kit).

Note: Do not refill partially used reagent cartridges as this may lead to performance and pipetting errors.

Important: The length of time that the reagent cartridge is open must be kept as short as possible. For more detailed information, refer to the handbook of the QIAsymphony Kit.

Components of the reagent cartridge

The reagent cartridge consists of 5 parts: reagent cartridge holder, magnetic-particle trough, reagent troughs, enzyme rack, and piercing lid.

Assembled reagent cartridge sealed with Reuse Seal Strips.

Reagent cartridge holder

The reusable reagent cartridge holder, provided with the QIAsymphony SP, holds the reagent cartridge and enzyme rack in the "Reagents and Consumables" drawer. The holder has a cut-out grip for easy handling. The holder can accommodate one reagent cartridge containing 7 buffer troughs, one magnetic-particle trough, and one enzyme rack.

Note: The reagent cartridge holder has slots for holding the screw-caps of enzyme tubes. This helps to prevent mix-up of caps and subsequent contamination of reagents.

Reagent troughs and enzyme rack

The reagent cartridge consists of removable troughs containing buffers and magnetic particles and also a rack containing tubes of accessory enzymes (for more information, refer to the handbook of the QIAsymphony Kit you are using). Reagent troughs and the magnetic-particle trough are prefilled and factory sealed.

Note: Be sure to remove the foil from the magnetic-particle trough before first use of the reagent cartridge.

All reagent troughs and enzyme racks are labeled at the side with the name of the buffer contained in the trough. A unique 2D bar code on top of each trough enables the QIAsymphony SP to detect the reagent cartridge and the contents of each trough.

Visually check all reagent troughs for precipitates. If precipitates are present, refer to the handbook of the QIAsymphony Kit you are using for more information.

Note: Make sure that reagents and enzymes are at room temperature (15–25°C) before placing into the "Reagents and Consumables" drawer.

Note: Do not autoclave a prefilled reagent cartridge. Do not change the order of the troughs within the reagent cartridge.

Note: Do not refill partially used reagent cartridges.

Piercing lid

The piercing lid enables the buffer troughs to be automatically opened by the QIAsymphony SP during first use of the reagent cartridge. The piercing lid is placed on top of the reagent cartridge in the reagent cartridge holder. The piercing device of the QIAsymphony SP, which is integrated in the "Reagents and Consumables" drawer, presses the piercing lid into the troughs when the reagent cartridge is loaded in the drawer.

Note: Do not pierce the reagent cartridge manually.

Important: The piercing lid has sharp edges and can damage your gloves.

Buffer bottle

Depending on the kit being used, an additional bottle of buffer may be provided. The bottle is prefilled with up to 60 ml of reagent. For more information about the provided reagent, refer to the corresponding kit handbook.

Accessory Trough

If the purification procedure requires additional ethanol, this must be poured by the user into an Accessory Trough, which is then placed into either tip rack slot 5 or 12 in the "Reagents and Consumables" drawer. Accessory Troughs are automatically detected during the inventory scan.

If additional ethanol is required, refer to the relevant kit handbook for the volume to be used.

3.3.3 Inventory scan of "Reagents and Consumables" drawer

The inventory scan of the "Reagents and Consumables" drawer is divided into 2 main parts, each with several subparts.

Laser scan

1. Reagent cartridge slots are scanned.
   - ■ If a reagent cartridge is detected by the QIAsymphony SP, the instrument will check first for sealed troughs in the respective reagent cartridge.

   Note: The inventory scan is not able to detect whether the piercing lid is in place on top of the reagent cartridge or not. If the piercing lid is missing, the QIAsymphony SP will detect an error during first use of the reagent cartridge and processing of the corresponding sample batch will be aborted.
   - ■ 2D bar codes on reagent troughs, the magnetic-particle trough, and the enzyme rack are checked. In addition, the piercing status of the reagent cartridge is checked.

Note: Ensure that all 2D bar codes are accessible by the sensor.

■ If the reagent cartridge is sealed and not pierced, the liquid level of all reagents in the reagent cartridge is set to the original value. An additional liquid-level check will not be performed.

■ Both reagent cartridge slots are scanned.
Note: Do not mix enzyme racks, buffer, or magnetic-particle troughs from different reagent cartridges.

2. Tip rack slots are scanned.

■ All 18 tip rack slots are scanned to determine the type of tip rack loaded.

■ All tip rack slots in which a tip rack was detected are scanned to determine the number of tips. If a tip is detected in the first and last position of the tip rack, the tip rack will be categorized as full. If the first or last tip is missing, a full scan will be performed to determine the number of tips in the tip rack.

3. Unit box slots are scanned.

■ The unit box slots are scanned to detect the presence of unit boxes in the 4 slots.

■ Afterwards, the type (8-Rod Cover or sample prep cartridge) and number of consumables are determined.

4. Buffer bottle slot is scanned.

■ The buffer bottle slot is scanned to determine whether a buffer bottle has been loaded.

Note: The user also has the option of scanning the reagent cartridges and buffer bottle in the same scan. This option can be chosen when only the reagent cartridges have been exchanged and the rest of the inventory remains unchanged. This partial scan can also be chosen if an error occurred while scanning the reagent cartridges, which avoids having to perform another complete inventory scan.

Liquid-level scan of detected reagents

This scan is only performed if the liquid level is not known (e.g., for a partially used reagent cartridge).

1. Liquid-level scan of detected reagents.
   Note: The inventory scan will only enable detection of the liquid level of open and recognized vessels.
2. Liquid-level check of the buffer bottle (if detected).
3. Liquid-level check of the Accessory Trough (if detected).
   Note: These checks use 1500 μl and 200 μl filter-tips. If insufficient tips are available or if one of the tip types is missing, the inventory scan will be aborted and queued sample batches cannot be started.

Partial inventory scan

If you need to repeat an inventory scan for the "Reagents and Consumables" drawer (e.g., if a change has been made on the worktable), you can perform a partial inventory scan. You can choose to scan the following worktable items separately:

■ Tip racks
■ Unit boxes
■ Reagents
■ Accessory trough (also named "Alco Trough" in touchscreen)
■ Buffer bottle

3.3.4 "Waste" drawer

Used 8-Rod Covers and sample prep cartridges are discarded by the robotic gripper into the "Waste" drawer and are collected in 4 unit boxes in the drawer. A container in the "Waste" drawer collects liquid waste from the sample preparation procedure. It is not possible to close the "Waste" drawer if this liquid waste container is not installed. Used disposable filter-tips are discarded into a tip disposal bag. A tip park station in the waste drawer allows used tips to be temporarily stored on the worktable for reuse in a later protocol step.

Note: If using the QIAsymphony SP in combination with the QIAsymphony Cabinet SP, see the *QIAsymphony Cabinet SP/AS User Guide* for information about tip disposal.

3.3.5 Inventory scan of the "Waste" drawer

The inventory scan of the "Waste" drawer consists of a laser scan. It does not perform 2D bar code scans, liquid-level detection, or checks of the liquid waste container. It is therefore important that the user checks the liquid waste container and empties it before starting a batch.

Laser scan

1. The tip park station slot is scanned. This checks that the tip park station is mounted.
2. The tip chute slot is scanned. This checks that the tip chute is installed.
3. The unit box slots are scanned. First of all, each of the 4 unit box slots is scanned to detect whether a unit box is in the slot. Afterwards, the content of each box is determined (e.g., amount and type of consumables in each box).

3.3.6 "Eluate" drawer

Purified nucleic acids are transferred to the "Eluate" drawer. The "Eluate" drawer contains 4 slots that can be used for elution into plates or tubes. "Elution slot 1" enables eluate

cooling and requires use of a specially designed cooling adapter for various plate formats (e.g., 96-well, PCR tubes). "Elution slot 2" and "Elution slot 3" can accommodate 96-well plates, 24-well plates, and tubes. "Elution slot 4" can accommodate 24-well plates or tubes in special adapters.

For technical reasons, 96-well elution racks cannot be used on "Elution Slot 4".

Adapters are available for the following types of consumables:

■ Microplate, round bottom
■ Sarstedt screw-cap tubes (2 ml)
■ PCR plate
■ Elution Microtubes CL, cat. no. 19588

For a complete list of 96-well plates and tubes that can be used in the "Eluate" drawer, and the corresponding names used in the QIAsymphony operating software, visit www.qiagen.com/goto/QIAsymphony.

If multiple sample batches are being processed, eluted nucleic acids can be removed from the "Eluate" drawer as soon as each batch is ready. The "Eluate" drawer will unlock and the "E" button will become green. The green color of the "E" button informs the user that eluates may be removed. For more information, see Section 3.3.1 of *Operating the QIAsymphony SP*.

A handheld bar code reader is used to identify bar codes on elution racks and elution slots in the "Eluate" drawer. The handheld bar code reader is connected to the QIAsymphony SP via the USB port at the bottom right of the instrument.

If using the QIAsymphony SP/AS instruments in integrated mode (Section 3.5), elution racks can be automatically transferred via the transfer module from "Elution slot 1" of the "Eluate" drawer of the QIAsymphony SP to slot 2 of the "Eluate and Reagents" drawer of the QIAsymphony AS. To perform an automatic transfer, a transfer frame must be installed in the "Eluate" drawer. For more details about the transfer module and about how to install the transfer frame, see Section 3.8.2 and 3.8.3.

3.3.7   Inventory scan of the "Eluate" drawer

The QIAsymphony SP checks the elution slots to make sure that selected elution slots contain an elution rack. It is possible to select the elution slots on which the bar codes of adapters will be scanned in the "Process SP 1" tab of the "Configuration" menu (i.e., none or 1–4).

If the QIAsymphony SP detects a discrepancy between the expected and actual elution rack(s) that are loaded in the "Eluate" drawer, a message appears in the touchscreen prompting the user to correct the problem. Open the "Eluate" drawer and place the elution rack(s) onto the correct position(s) or edit the slot/rack assignment in the touchscreen.

A message appears in the following situations:

■ The detected bar code and the adapter bar code specified in the labware file are different.

■ A bar code is detected but the selected labware file does not specify an adapter bar code.

■ No bar code is detected, but the selected labware file specifies an adapter bar code that is required.

Note: The QIAsymphony SP only detects whether an elution slot is occupied by an elution rack or adapter and is not able to identify the elution rack type on the respective elution slot.

3.4   Internal features of the QIAsymphony SP

3.4.1   Lysis station

The lysis station, a heated orbital shaker, enables automated lysis of up to 24 samples in 1 batch. After sample lysis, the lysis station moves upward so that samples can be transferred for further processing.

3.4.2   Robotic arm

The robotic arm provides accurate and precise positioning of the robotic gripper and pipettor head. The robotic arm also includes an optical sensor, a 2D bar code camera, and a UV lamp.

Robotic gripper

The robotic gripper transfers consumables (8-Rod Covers and sample prep cartridges) to the required position on the worktable during sample preparation.

Pipettor head

The pipettor head is mounted on the robotic arm and moves in the X, Y, and Z directions in order to reach different locations on the worktable.

The pipettor head contains 4 pipetting channels with high-precision syringe pumps that are connected to tip adapters. The tip adapters can be attached to disposable filter-tips. The syringe pumps can operate simultaneously to allow aspiration and dispensing of small volumes of liquid (20–1500 μl) via the attached disposable filter-tips.

Each pipetting channel can perform two types of liquid-level detection: capacitive-based liquid-level detection (cLLD) and pressure-based liquid-level detection (pLLD). To detect the liquid level, changes in capacitance or pressure between the disposable filter-tip and the liquid are measured.

Tip guards

Each pipettor head is equipped with 4 tip guards. During a run, the tip guards are positioned below the disposable tips to catch any drops of liquid that may fall. This helps to minimize the risk of cross-contamination.

Tip guards help to prevent cross-contamination.

Optical sensor

During an inventory scan, the optical sensor checks that the consumables are correctly loaded in the drawers and that there are sufficient consumables loaded for the run.

2D bar code camera

As part of the inventory scan of the "Reagents and Consumables" drawer, the 2D bar code camera on the QIAsymphony SP identifies the different reagents in the reagent cartridge and also checks that the correct reagent cartridge has been loaded.

Bar code types

The bar code reader can read the following types of bar codes:

■ Code 39
■ Code 128 and subtypes
■ Codabar

Important: Do not use the bar code Interleaved 2 of 5. This bar code type has a high information density and no checksum. It can therefore generate errors.

For information about attaching 1D bar code labels to tubes, see Appendix A.

UV lamp

A UV lamp is mounted on the robotic arm and is used to decontaminate the worktable of the respective instrument. See Section 9.4 for information about operation of the UV lamps.

3.4.3   Magnetic head

The magnetic head is comprised of an array of 24 magnetic rods for processing magnetic particles, a conveyor, and magnetic-head guards.
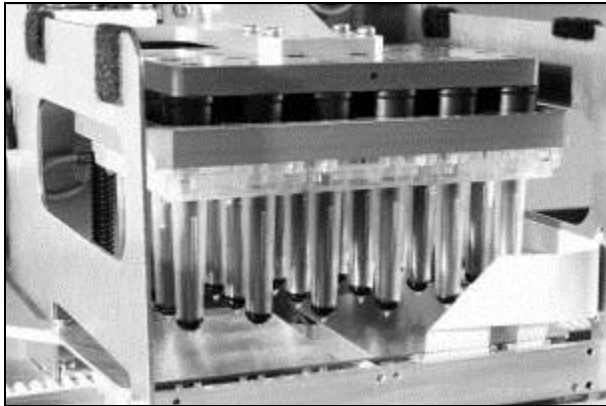
Magnetic head of the QIAsymphony SP.

The magnetic head comprises a rod-cover drive for mixing samples and a magnetic-rod drive for separation and resuspension of magnetic particles.

The conveyor moves the sample prep cartridges from the start position to the processing position and finally to the output position.

The magnetic-head guards move underneath the magnetic head and help to prevent contamination of the worktable or samples by any liquid that may drip from the rod covers.

Important: To prevent liquid from entering the QIAsymphony SP, only operate the instrument with the magnetic-head guard installed.

3.5 QIAsymphony AS

The QIAsymphony AS performs fully automated assay setup using a 4-channel pipetting system, and is operated using the built-in touchscreen located on the QIAsymphony SP. The QIAsymphony AS is switched on using the power switch on the QIAsymphony SP. During assay setup, the touchscreen displays the assay setup user interface, providing information about assay runs, including their progress.

Single or multiple assays can be set up in a single assay run, and master mix can be premixed or can be prepared by the instrument. The QIAsymphony AS is provided with predefined protocols, specifically designed for use with QIAGEN kits. These protocols are called Assay Definitions. Assay Parameter Sets define the parameters for a protocol. These files, including other QIAsymphony AS files (e.g., cycler files, result files), can be transferred to/from the QIAsymphony SP/AS instruments via the USB ports on the QIAsymphony SP.

When an assay run has been defined using the touchscreen, the software automatically calculates the worktable requirements for a defined run (e.g., number and type of filter-tips, volume of reagent). An automated inventory scan (performed when the drawers are closed, or before an assay run starts) ensures that each drawer is correctly set up for the defined assay run. It is possible to reload filter-tips during a run.

There are 2 modes of system operation to suit your workflow requirements — integrated and independent. In integrated mode, samples processed on the QIAsymphony SP are transferred directly to the QIAsymphony AS via an internal transfer module, reducing manual handling steps and documentation. For added flexibility, the QIAsymphony SP and QIAsymphony AS can also be operated independently of each other in independent mode.
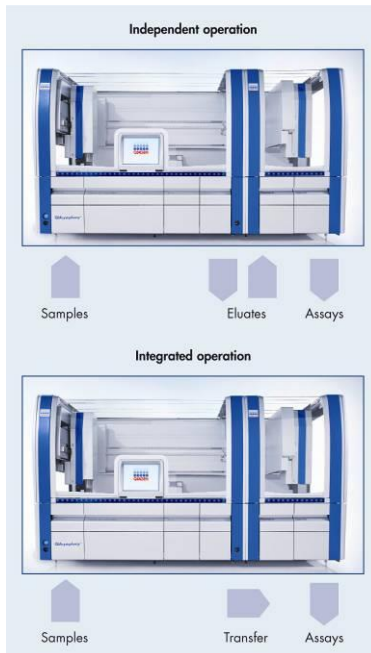
Independent and integrated operation.

After assay setup, assays are removed from the QIAsymphony AS and can be manually transferred to a PCR cycler for detection. A choice of output formats enables use of different PCR cyclers (e.g., Rotor-Gene® Q, 96-well cyclers, 32-capillary cyclers) for detection. Cycler files can be exported from the QIAsymphony SP/AS instruments to selected PCR cyclers.

3.5.1   QIAsymphony AS principle

An assay setup run using the QIAsymphony AS usually consists of 3 main steps — master mix preparation, master mix distribution, and transfer of templates (e.g., samples, assay controls, and assay standards).

1. Master mix is prepared with the required reagents. The volume of each master mix component depends on the number of reactions to be set up. After preparation, a mixing step is performed to ensure that the master mix is homogeneous.

> **Note**: If using ready-to-use master mix, this step will not be performed.

2. Master mix is distributed to the appropriate plate/tube positions in the "Assays" drawer.

3. Assay controls, assay standards, and samples are transferred to the appropriate plate/tube positions in the "Assays" drawer.

> **Note**: For further information about the pipetting order, see Section 2.9 of *Operating the QIAsymphony AS*.

3.6 External features of the QIAsymphony AS

1	"Eluate and Reagents" drawer	**4**	Adjustable feet
2	"Assays" drawer	**5**	LED lights (blue)
3	Hood	**6**	QIAsymphony Cabinet AS

Instrument panels and hood

The instrument panels and hood of the QIAsymphony AS are manufactured from the same materials as for the QIAsymphony SP and should be treated in the same way (see page 3-5). Additional information is provided in the following section.

Hood

The QIAsymphony AS hood functions in the same way as the QIAsymphony SP hood. During an assay run, the QIAsymphony AS hood is locked. If force is used to open the hood during an assay run, the run will be paused.

Important: If the QIAsymphony AS hood is opened, the instrument will not immediately stop. The instrument will stop when processing of the current protocol step is finished. In some cases, this may take some time.

Drawers

The QIAsymphony AS contains 2 drawers:
■ "Eluate and Reagents" drawer
■ "Assays" drawer

For more information about the drawers, see Section 3.7.

QIAsymphony status LEDs

Light emitting diodes (LEDs) at the front of the QIAsymphony AS are illuminated when an assay run is in progress. The status LEDs flash when an assay run is finished, or if an error occurs. Touching the screen turns off the flashing.

QIAsymphony Cabinet AS

The QIAsymphony Cabinet AS is an optional accessory for the QIAsymphony AS. The QIAsymphony Cabinet AS is specially designed for positioning the QIAsymphony AS in your laboratory. For more information, visit www.com/goto/QIAsymphony or contact QIAGEN Technical Services.

Note: The QIAsymphony Cabinet AS is specially designed for use in combination with the QIAsymphony Cabinet SP.

3.7 QIAsymphony AS drawers

Eluates and reagents, and assays are separated in 2 different drawers in the QIAsymphony AS. When a drawer is opened and then closed, the user confirms whether an inventory scan of the drawer should be performed. During assay setup, the QIAsymphony AS drawers are locked.

Inventory scan

An inventory scan of each drawer of the QIAsymphony AS must be performed before an assay run can be started. This is performed in the same way as for the QIAsymphony SP drawers.

3.7.1 "Eluate and Reagents" drawer

Purified nucleic acids can be transferred to the "Eluate and Reagents" drawer from the "Eluate" drawer of the QIAsymphony SP by automatic transfer (via the transfer module), or by manual transfer. The "Eluate and Reagents" drawer has 3 positions — slots 1, 2, and 3 — that have options for cooling and can accommodate plates and tubes in special adapters. Slots 1 and 2 can be used to accommodate sample racks and slots 1 and 3 can be used to accommodate reagent racks. Slot 1 can be defined as a sample or reagent slot as required. In addition, there are 6 positions that can be used to accommodate disposable filter-tips in tip racks.

It is possible to use the following combinations of sample and reagent racks in the "Eluate and Reagents" drawer:
- One sample rack and one reagent rack
- Two sample racks and one reagent rack
- One sample rack and two reagent racks

Adapters are available for the following types of consumables:
- 96-well plates
- Microplates

- Sarstedt screw-cap tubes
- PCR plates
- Elution Microtubes CL, cat. no. 19588

For more information about the types of 96-well plates and tubes that can be used in the "Eluate and Reagents" drawers, and the corresponding names used in the software, visit www.qiagen.com/goto/QIAsymphony.

Reagent holders are available for holding reagents in 2 ml tubes, 5 ml tubes, and 30 ml bottles:

- Reagent holder 1 (18 x 2 ml tubes, 6 x 5 ml tubes)
- Reagent holder 2 (18 x 2 ml tubes, 2 x 5 ml tubes, 2 x 30 ml bottles)
- Micro Tube Screw Cap QS (24 x 2 ml tubes)

Filter-tips

The QIAsymphony AS uses the same disposable filter-tips as the QIAsymphony SP, see Section 3.3.2 for more information. In addition to 200 μl and 1500 μl filter-tips, the QIAsymphony AS also uses 50 μl filter-tips. Tip racks containing 50 μl filter-tips are gray.

Note: Only use filter-tips designed for use with the QIAsymphony AS.

3.7.2 Inventory scan of "Eluate and Reagents" drawer

The inventory scan of the "Eluate and Reagents" drawer consists of the following steps in the following order:

1. Bar codes of slots 1–3 or bar codes of adapters on slots 1–3 are scanned.

    Note: For a particular slot, either the bar code of the slot is scanned or, if an adapter is present on the slot, the bar code of the adapter is scanned.

    - Bar codes of slots 1–3 are scanned to determine whether the slots are empty or occupied.
    - Bar codes of adapters on slots 1–3 are scanned to determine whether a particular adapter type is present on a particular slot.

■ If the expected and actual status of the slots/adapters does not match, a message will appear to prompt the user to correct the problem.
Note: The QIAsymphony AS only detects whether a slot is occupied by an adapter and the adapter type. The QIAsymphony AS is not able to identify the type of consumables on the adapter. It is therefore important that the correct plates/tubes are loaded on the adapters, as defined in the software.

2. Tip rack slots are scanned.

■ The disposable filter-tips are scanned to ensure that the correct tip type has been loaded and that there are sufficient filter-tips available for the defined assay run.

■ All tip rack slots in which a tip rack was detected are scanned to determine the number of tips. If a tip is detected in the first and last position of the tip rack, the tip rack will be categorized as full. If the first or last tip is missing, a full scan will be performed to determine the number of tips in the tip rack.

■ If there are not enough filter-tips of the correct type available, a message will appear on the touchscreen prompting the user to load more tips.

Note: If there are insufficient tips available for the defined assay run and it is not possible to load more tips before starting the run, tips can be reloaded during the assay run. This will be documented in the loading information file, and in the result file if user interaction was required. Pausing the run to reload tips will result in the samples being flagged as "unclear".

Partial inventory scan

If you need to repeat an inventory scan for the "Eluate and Reagents" drawer (e.g., if a change has been made on the worktable), you can perform a partial inventory scan. You can choose to scan the following worktable items separately:

- Tip Racks left
- Tip Racks right
- Adapters left
- Adapters right
- Reagents LLD

3.7.3 "Assays" drawer

Assays are set up in plates or tubes in the "Assays" drawer. The "Assays" drawer has 3 positions — slots 4, 5, and 6 — that can be cooled and used to accommodate assay racks in special adapters. It also has 6 positions that can be used to accommodate disposable filter-tips in tip racks (see page 3-32 for more information about disposable filter-tips).

Note: For subsequent analysis on the Rotor-Gene Q, assays can also be set up in Rotor-Discs. In this case, slots 4–6 must be covered with the Rotor-Disc® Adapter Base Unit QS and up to 2 Rotor-Disc 72 Loading Blocks. Rotor-Disc 72 can then be placed onto each Rotor-Disc 72 Loading Block.

Note: Assays that include a normalization step can use slot 6 for positioning a normalization rack. In case a normalization rack is needed, slot 6 cannot be used for an assay rack.

Adapters are available for the following types of consumables:

- 96-well PCR plates
- Rotor-Gene Strip Tubes
- Rotor-Disc 72
- Glass capillaries (20 μl) (for use with the LightCycler®)

For more information about the types of plates and tubes that can be used in the "Assays" drawer, and the corresponding names used in the software, visit www.qiagen.com/goto/QIAsymphony.

3.7.4   Inventory scan of "Assays" drawer

The inventory scan of the "Assays" drawer is performed on slots 4–6 as for slots 1–3 of the "Eluate and Reagents" drawer. See Section 3.7.2 for a more detailed description.

If an inventory scan of the "Assays" drawer needs to be repeated, it is also possible to perform a partial inventory scan where tip racks and adapters can be scanned separately.

3.8   Internal features of the QIAsymphony AS

3.8.1   Robotic arm

This feature is the same as for the QIAsymphony SP, except it does not support a robotic gripper (see Section 3.4.2 for description). The QIAsymphony AS pipettor head can dispense 2–1500 μl. As part of the inventory scan on the "Eluate and Reagents" and "Assays" drawers, the 2D bar code camera on the robotic arm identifies occupied/empty slots and the corresponding adapter types.

3.8.2   Transfer module

The transfer module is a component of the QIAsymphony AS and is located at the interface between the QIAsymphony SP and QIAsymphony AS instruments, under the separation window. Use of the transfer module is optional. It enables automatic transfer of an elution rack (placed in the appropriate adapter) from slot 1 of the "Eluate" drawer of the QIAsymphony SP to slot 2 of the "Eluate and Reagents" drawer of the QIAsymphony AS.

Note: To transfer an elution rack to the QIAsymphony AS from any slot other than slot 1 of the QIAsymphony SP, a manual transfer must be performed.

For automatic transfer using the transfer module, a transfer frame must be inserted between slot 1 and the cooling adapter. Before performing an automatic transfer, the QIAsymphony SP/AS instruments check whether the transfer frame is present. In order to save time, the presence check of the transport frame is executed in parallel with the plate carrier inventory scan. An error message appears if the frame is not present. The frame is lifted by the transfer module, with the adapter on top, and is then transferred to the QIAsymphony AS and positioned on slot 2.

For more information about how to insert the transfer frame, see Section 3.8.3.

3.8.3 Transfer frame

The transfer frame consists of a base frame and a handle. If you intend to use automatic transfer of an elution rack to the QIAsymphony AS via the transfer module, ensure that the transfer frame is installed before placing the relevant adapter onto slot 1 of the "Eluate" drawer.

To do this, place the transfer frame onto slot 1, so that the 4 pins under the base frame fit into the screw holes of slot 1. The handle should face toward the back left corner of slot 1.
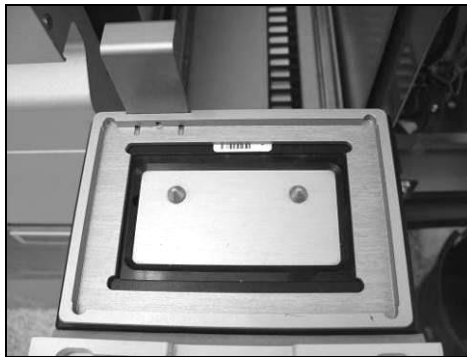
Transfer frame placed onto slot 1 of the "Eluate" drawer.

Place the appropriate adapter and elution rack on top of the transfer frame and continue as described in Section 2.5 of *Operating the QIAsymphony SP*.
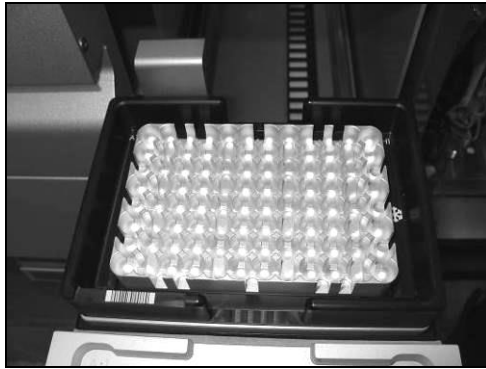
Adapter placed onto the transfer frame on slot 1 of the "Eluate" drawer.

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4 Installation Procedures

4.1 Instrument delivery and installation

The unpacking and installation of the QIAsymphony SP/AS instruments is carried out by a certified QIAGEN Field Service Specialist. A member of your group who is familiar with laboratory and computer equipment should be present during the installation.

Note: See "Packing List QIAsymphony SP" and "Packing List QIAsymphony AS" for a full list of components that are supplied with each instrument. These lists are delivered with the instruments.

4.2 Requirements

Site

The QIAsymphony SP/AS instruments must be located out of direct sunlight, away from heat sources, and away from sources of vibration and electrical interference. Refer to Appendix A for the operating conditions (temperature and humidity). The site of installation should be free of excessive drafts, excessive moisture, excessive dust, and not subject to large temperature fluctuations.

We recommend positioning the QIAsymphony SP/AS instruments on the QIAsymphony Cabinet SP/AS. For more information about the QIAsymphony Cabinet SP/AS, visit www.qiagen.com/goto/QIAsymphony.

If you choose to position the QIAsymphony SP/AS instruments on an alternative workbench, ensure that it is large enough and strong enough to accommodate the instruments. Refer to Appendix A for the weight and dimensions of the QIAsymphony SP/AS instruments. Ensure that the workbench is dry, clean, vibration proof, and has additional space for accessories. For further information about required specifications of the workbench, contact QIAGEN Technical Services.

Note: It is extremely important that the QIAsymphony SP/AS instruments are placed on a stable surface.

If you need to move your QIAsymphony SP/AS instruments, contact QIAGEN Technical Services.

The QIAsymphony SP/AS instruments must be placed within approximately 1.5 m (59 in.) of a properly grounded (earthed) AC power outlet.

WARNING	**Explosive atmosphere** [W3]
⚠️	The QIAsymphony SP/AS instruments are not designed for use in an explosive atmosphere.

WARNING	**Risk of overheating** [W4]
⚠️	To ensure proper ventilation, maintain a minimum clearance of 5 cm (1.97 in.) at the sides and rear of the QIAsymphony SP/AS instruments. Slits and openings that ensure the ventilation of the QIAsymphony SP/AS instruments must not be covered.

4.3 AC power connection

Power requirements

The QIAsymphony SP operates at:
- 100–240 V AC, 50–60 Hz
- 800 VA

If your QIAsymphony SP is connected to a QIAsymphony AS, your instruments operate at:
- 100–240 V AC, 50–60 Hz
- 1400 VA

Ensure that the voltage rating of the instrument(s) is compatible with the AC voltage available at the installation site. Mains supply voltage fluctuations are not to exceed 10% of nominal supply voltages.

Grounding requirements

To protect operating personnel, the QIAsymphony SP/AS instruments must be correctly grounded (earthed). The QIAsymphony SP is equipped with a 3-conductor AC power cord. To preserve this protection feature, do not operate the instruments from an AC power outlet that has no ground (earth) connection. The QIAsymphony AS does not support a power cord.

Installation of AC power cord

Connect one end of the AC power cord to the socket located at the left side of the QIAsymphony SP, and the other end to the AC power outlet.

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5 General Operation

5.1 Switching on the QIAsymphony SP/AS instruments

The power switch is located at the bottom-left corner of the QIAsymphony SP.

Power switch

1. Make sure that all drawers and the hoods are closed. If the hood(s) are opened during instrument startup, the system test will fail.
2. Press the power switch at the bottom-left corner of the QIAsymphony SP.
3. The startup screen appears. The screen displays the progress of instrument startup.

4. The QIAsymphony SP/AS instruments initialize. During initialization, the instruments carry out a self-test routine to check that the electronics and mechanics are functioning properly.

    During initialization, the following visible actions occur on the QIAsymphony SP:

    ■ The lysis station moves down and up until it reaches its home position.

    ■ The conveyor moves left and right until it reaches its home position.

    ■ The magnet/rod-cover plate of the magnetic head moves down and up until it reaches its home position.

    ■ The bar code camera and LEDs of the sample input drawer initialize.

    ■ The robotic arm moves to the tube waste (sample prep cartridges or 8-Rod Covers) at position 4 in case cartridges need to be released from the handler. Please note that the unit box in position 4 must be empty. Afterwards, the robotic arm moves to the tip disposal chute. The syringes are initialized and any tips that are attached are removed. The robotic arm moves to its home position.

    The following visible actions occur on the QIAsymphony AS:

    ■ The robotic arm moves to the back, then to the front, then to the left, and then to the right.

    ■ The robotic arm then moves to the tip disposal chute. The syringes are initialized and any tips that are attached are removed. The robotic arm moves to its home position.

    Note: If there are any problems during the initialization phase a warning will appear. Refer to the *Troubleshooting* section, page 10-1.

    Note: An empty unit box must be placed into slot 4 of the "Reagents and Consumables" drawer because during initialization the handler goes down into the unit box in position 4. If it was not empty, the handler would crash.

5. After successful startup, the QIAsymphony SP/AS instruments are ready for use, and the sample preparation user interface appears on the touchscreen.
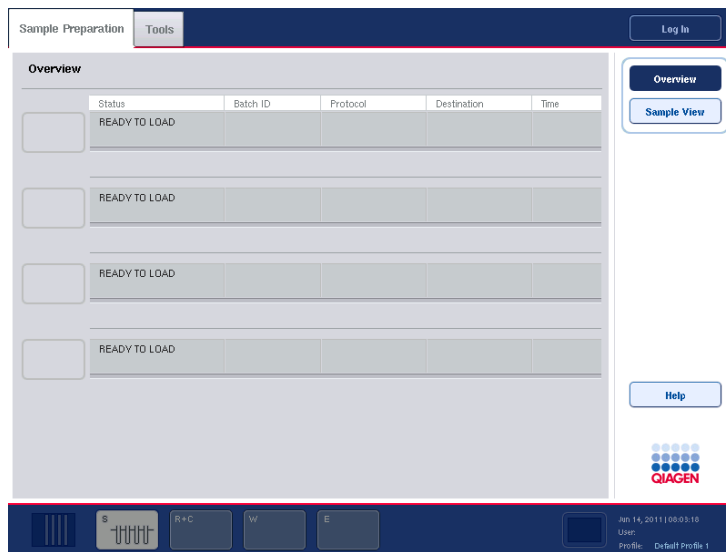
Sample preparation user interface.

5.2   Getting Started

Before operating the QIAsymphony SP/AS instruments, the user with the "Supervisor" user ID needs to manage the user accounts for the other users. If necessary, the "Supervisor" can also adjust the configuration settings.

1. User with the "Supervisor ID" logs in using the default password (**iue2ad**). See Section 5.3 for further details about logging in.

2. Change the default password to a new, secure password.

3. Because login names cannot be changed, we recommend creating a new user with a new login name who has "Supervisor" rights. For further information about adding users, see Section 7.1.

4. After the new user account with "Supervisor" rights has been created, the old "Supervisor" user ID can be inactivated. For further information, see Section 7.

5. Log out then log in again using the name and password for the new user account with "Supervisor" rights.

6. Assign the "Operator" role to all users who will operate the QIAsymphony SP/AS instruments; assign the user ID "Supervisor" to all users who should have the user rights to manage other users or to transfer files.

7. Optional: If the "Automatic File Transfer" tool included in the QIAsymphony Management Console is to be used, select the User "FileTransfer" and provide a password for this user. This user password will not expire, but can be changed if desired. For more information about the "Automatic File Transfer" tool, refer to the *QIAsymphony Management Console User Manual*.

8. Optional: The "Supervisor" can change the configuration settings. See Section 6 for more details about configuring the QIAsymphony SP/AS instruments. If the configuration is not changed, Default Profile 1 will be used.

9. The QIAsymphony SP/AS can now be operated by the users.

5.3   Logging in

In order to be able to operate the QIAsymphony SP/AS instruments, you must first log in. If no user is logged in, all drawers are locked.

After startup of the instruments, the sample preparation user interface is displayed in the touchscreen.
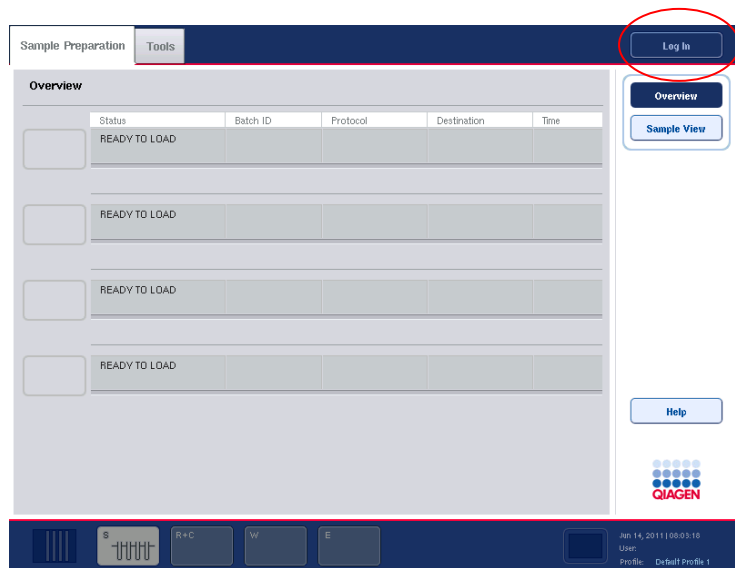
"Sample Preparation" screen.

To log in, follow the instructions below.

1. Press the "Log In" button at the top right of the screen.

   Note: The "Log In" button is also available in the "Assay Setup" screen.

2. Select your login name in the list.

3. The "Keyboard" screen appears.

4. Enter your specific password to log in and press "OK". You are now logged in and your user name is displayed in the status bar at the bottom right of the screen.

Note: After successful login, you may be prompted by the software to enter a new password. This is due to the date that has been set for the password expiry date. This can be configured in the software by the "Supervisor".

If no user is logged in, the instruments cannot be operated. But when the operator presses a disabled button on the touchscreen, you will be informed by the software that no user is logged in. The information also explains how to login.

5.4 Logging out

To operate the QIAsymphony SP/AS instruments, you must first log in with either a "Supervisor" or "Operator" user ID. After performing a task, you can log out so that another user can log in. After pressing the "Run" button, you have the option to log out. The run will continue.

5.4.1 Active logout

To log out, press the "Log Out" button at the top of the "Sample Preparation" or "Assay Setup" screen.
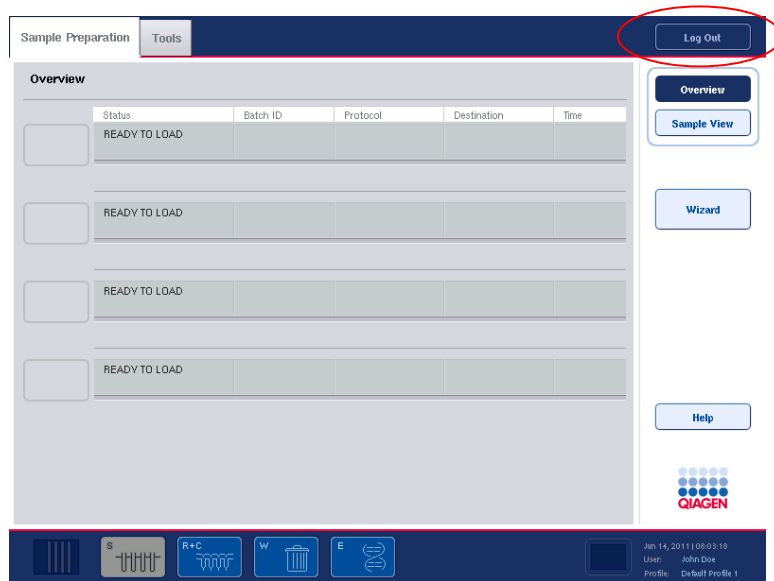
You are logged out. The status bar only displays the date and time.

5.4.2 Automatic logout

After a defined period of user inactivity, the user currently logged in is automatically logged out. The default setting for this period of user inactivity is 15 minutes. Ask the "Supervisor" to adjust the time period to suit your needs or to switch it off, if required. See Section 6.1.4 for more details about how to do this.

Note: Automatic Logout does not work if a message box remains open on the touch screen and/or a batch definition workflow is active.

We do not recommend leaving the instrument with an open message box and/or active batch definition workflow.

5.5 Switching off the QIAsymphony SP/AS instruments

To switch off the QIAsymphony SP/AS instruments, press the power switch at the front of the QIAsymphony SP in the lower left corner. We recommend switching off the instruments after use.

The power switch is also the emergency stop of the QIAsymphony SP/AS instruments. In case of emergency, switch the instruments off using the power switch.

Note: Do not switch off the instruments during sample preparation or assay setup unless you need to stop the instruments due to an emergency. You will not be able to resume the protocol or assay run and the samples cannot be processed further by the QIAsymphony SP/AS instruments.

Note: The QIAsymphony SP/AS instruments will lose all inventory information when the instruments are switched off.

Note: After the QIAsymphony SP/AS instruments are switched off, the power switch flashes a few times. When the power switch stops flashing it is safe to switch the QIAsymphony SP/AS instruments on again.

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6 Configuration

The user with the "Supervisor" user ID can change a range of configuration settings using the "Configuration" menu.

To configure a parameter, proceed as follows:

1. Log in with the "Supervisor" account details.
2. Press the "Tools" tab.
3. Press the "Configuration" button.
4. The "Configuration" menu appears.
5. Select the relevant tab and depending on which parameter will be modified (i.e., date and time, default tube types, system settings, or process parameters), proceed as outlined in the following sections.

Tabs in the "Configuration" menu

Time	Enables the user to configure the date and the time.
Adapters AS	Enables the user to configure the adapters and holders for the QIAsymphony AS.
Tubes	Enables the user to configure the default tube type for different tube inserts for the QIAsymphony SP.
System 1	Enables the user to configure system settings.
System 2	Enables the user to configure system settings.
Process Profiles	Enables the user to select a default or custom process configuration profile. Custom profiles can also be created in this tab.
General Process	Enables the user to configure individual process parameters that affect operation of both the QIAsymphony SP and the QIAsymphony AS.

Process SP 1 Enables the user to configure individual process parameters that affect operation of the QIAsymphony SP.

Process SP 2 Enables the user to configure individual process parameters that affect operation of the QIAsymphony SP.

Process SP 3 Enables the user to configure individual process parameters that affect operation of the QIAsymphony SP.

Process AS Enables the user to configure individual process parameters that affect operation of the QIAsymphony AS.

Command bar

Tools Press the "Tools" button to access the "Tools" menu.

Cancel Press to close the "Configuration" menu without saving changes.

Save Press to save changes made to parameters in the individual tabs. If only the settings for the default tubes were changed, there is no need to restart the QIAsymphony SP/AS instruments.

Save + Reboot	Press to save changes made to parameters in the individual tabs, and to restart the QIAsymphony SP/AS instruments. The button is only active if the changes require a reboot of the instruments.
	Upon pressing a button, a warning message appears. Press "Yes" to continue.
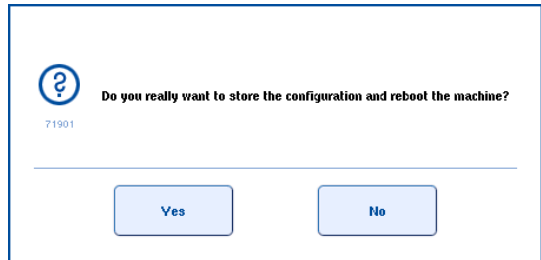
A second message then appears to inform you that the change is not part of a software configuration. See Section 6.2.1 for details about software configuration profiles.

6.1 Configuring the QIAsymphony SP/AS instruments

6.1.1 Date and time

The current date and time is displayed in the status bar and also appears in run documentation such as the result file.

To configure the date and time, proceed as follows:

1. Select the "Time" tab in the "Configuration" screen.
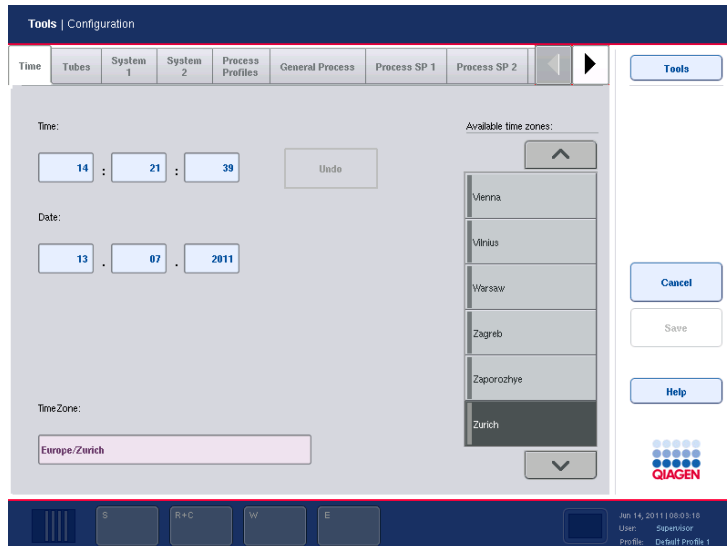
"Time" tab.

2. Change the time and date settings by pressing the corresponding text fields.

3. The "Keyboard" screen will appear where values need to be entered.

4. If necessary, select a city in the "Available time zones" list.

5. Press the "Save + Reboot" button to save the changes. The QIAsymphony instrument(s) will restart.

6.1.2 Default tube types

The default tube type for different tube inserts can be configured for the QIAsymphony SP. This function is particularly relevant when using "Fast Setup", see Section 2.12 of *Operating the QIAsymphony SP*.

To set the default tube types, proceed as follows:

1. Select the "Tubes" tab.
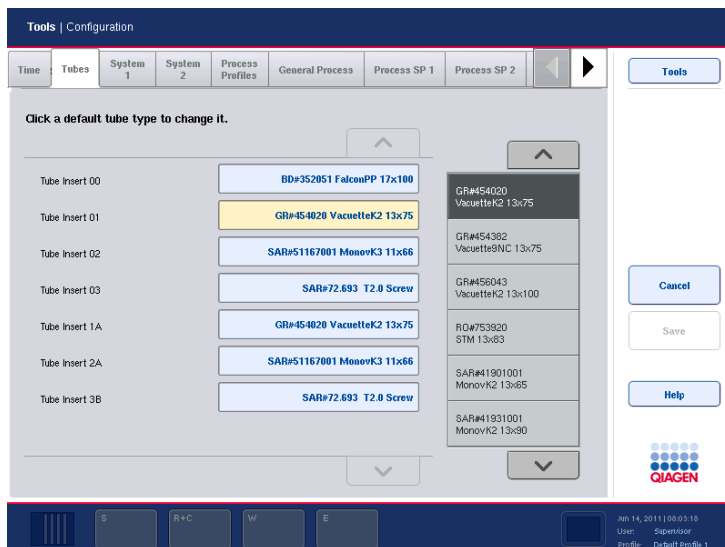
"Tubes" tab.

2. Change the default tube type for the different tube inserts by pressing the corresponding text fields.

3. Select the tube type from the list on the right.

4. If necessary, repeat steps 2–3 for the other tube inserts.

5. Press "Save" to save the changes.

Note: Changing the default tube type for the different tube inserts affects the default tube type for internal control (IC) tubes. A limited number of tube types can be used with internal controls (see the handbooks of the corresponding protocols for details). In some cases, the supervisor may wish to change the default tube type to a tube type that cannot be used with the IC. The user must then manually override the default IC tube type (see Section 2.8.5 of *Operating the QIAsymphony SP*).

6.1.3   Adapters and holders (QIAsymphony AS only)

If you have a QIAsymphony AS, available adapters and the available quantities must be configured. The software requires this information to determine which reagent holders are needed and how many sample and assay adapters can be used for a defined run.

Note: If a new adapter or an additional adapter is received, ensure that this adapter is configured in the software. If it is not configured, it will not be recognized by the software.

To configure available adapter(s) and holder(s), proceed as follows:

1. Select the "Adapters AS" tab. A list of adapters and holders is displayed.
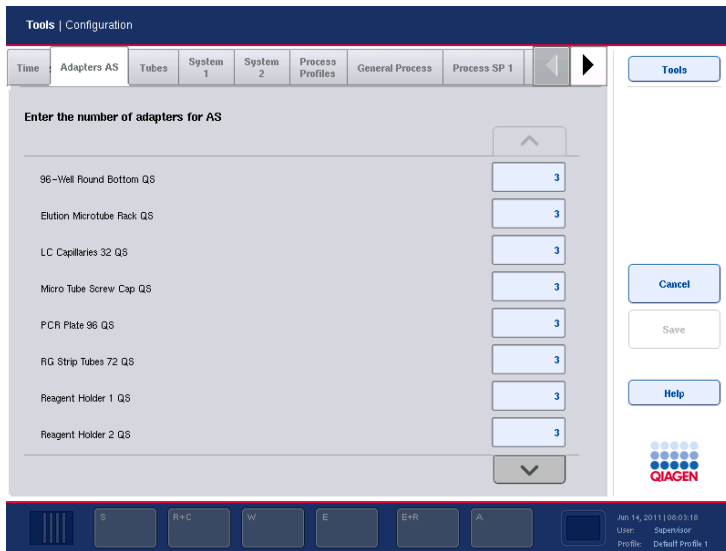
"Adapters AS" tab.

2. Enter the available number of adapters and holders. To do this, press on the associated field for a particular adapter or holder.

3. The "Adapter Count Configuration" screen will appear.

4. Enter the correct number using the keyboard.

5. Press "OK" to continue.

6. Repeat steps 2–5 for all adapters and holders.

7. Press "Save".

6.1.4   System settings

The "Supervisor" can configure system settings in the "System 1" and "System 2" tabs.

To change any of the settings, proceed as follows:

1. Select the "System 1" or "System 2" tab.

2. Press on a field to modify it, or press "Yes" or "No".

3. When all required changes have been made, press "Save + Reboot". The QIAsymphony instrument(s) will restart.
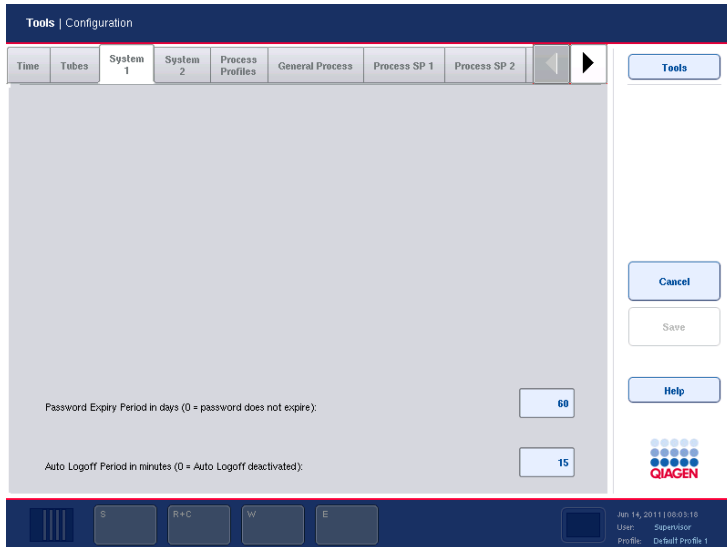
"System 1" tab.

Dialog panel

Password Expiry Period (0 = password does not expire)	Specifies the number of days for which the password is valid. If "0" is entered, the password will not expire.
Auto Logoff Period in minutes (0 = Auto Logoff deactivated)	Indicates the number of minutes of inactivity until the user is logged off automatically. If "0" is entered, automatic log off is deactivated and the user will not be logged out automatically.

"System 2" tab.

Dhcp Enabled	Defines whether the dynamic host control protocol (DHCP) is enabled.
	Set to "Yes" if you are using a dynamic IP address. In this case, the system retrieves an IP address during start up and transmits the host name to the local name server. The IP address value is ignored.
	Set to "No" if you are using a static IP configuration. In this case, enter the IP address in the following "IP address" field.
	Check with your local network administrator that the DHCP server is running in the local area network.

IP address	If you are not using the DHCP, enter the static IP network address provided by your IT department.
	It is important to ensure that any IP address is coordinated with the local network administrator. It can cause network failures if an IP address is duplicated.
Netmask	Enter the netmask IP settings provided by your IT department. If the DHCP is not used, the IP-Netmask defines the size of the subnet where the system is located.
Gateway IP address	Enter the IP address of the network node provided by your IT department. This is usually a router or a bridge that connects the local network to another network.
IP Name Servers	Enter the list of name servers provided by your IT department. Multiple servers can be entered, separated by spaces.
Domain Search	The primary search domain is usually the same as the domain name of the system. There may be additional search domains; these can be separated with commas or spaces.
	This option has to be set together with the local network administrator.
Assay Setup Installed	Select "No" if the QIAsymphony SP is not connected to a QIAsymphony AS.
	Select "Yes" if the QIAsymphony SP is connected to a QIAsymphony AS.

6.2 Process settings

The "Supervisor" can modify the software configuration of the QIAsymphony SP/AS instruments in the "Process" tabs of the "Configuration" menu. A range of configuration parameters can be adjusted, and these changes can be saved in configuration profiles so that it is possible to switch between different configurations.

6.2.1 Changing the software configuration

Process configuration settings are saved in a single file called a process configuration file.

There are 3 default process configuration profiles, also called software configurations:

- ■ Default Profile 1 — Restrictive
- ■ Default Profile 2 — Open with bar codes
- ■ Default Profile 3 — Open without bar codes

Note: Default Profile 1 is the software configuration that is automatically preselected.

Note: These default software configurations do not affect operation of the QIAsymphony AS.

Profile descriptions

	Default Profile 1	Default Profile 2	Default Profile 3
Sample handling			
Sample tubes/racks with or without bar code labels can be used	Yes	Yes	Yes
The same bar code can only be used once within a batch or run	No	Yes	Yes

A virtual bar code will be created for empty sample positions	No	No	Yes
User can modify the sample and IC tube type	Yes	Yes	Yes
Eluate handling			
Enter rack ID to confirm removal of elution rack	No	No	No
Elution racks must have bar code or manually entered ID	Yes	No	No
Reagent handling			
Enable use of expired reagents	No	Yes	Yes
Enable use of reagent cartridges with different lot numbers in the same SP batch	No	Yes	Yes

Additional custom process configuration profiles can be created on the instrument and saved. It is also possible to create custom process profiles on a different QIAsymphony SP instrument, and then transfer these profiles to your instrument using the USB stick or QIAsymphony Management Console. See Section 6.3 for more details about custom process profiles.

Selecting a process profile

1. Select the "Process Profiles" tab.

"Process Profiles" tab.

2. Select the process profile to be applied in the "Available profiles" list on the right. Profiles are listed under the categories "Default profiles" and "Custom profiles". If there are no custom profiles available, this category will not be available. Use the up and down arrows to scroll through the list.

3. Optional: Review the individual process parameters in the displayed table.

4. Press "Apply".

5. Press "Save + Reboot".

6.2.2 Changing individual configuration parameters

The "Supervisor" can configure individual process parameters in the "General Process", "Process SP 1", "Process SP 2", and "Process SP 3" tabs. They can also configure parameters in the "Process AS" tab if a QIAsymphony AS is installed.

Parameters in the "General Process" tab affect operation of the QIAsymphony SP and/or the QIAsymphony AS. Parameters in the "Process SP 1", "Process SP 2", and "Process SP 3" tabs only affect operation of the QIAsymphony SP. Parameters in the "Process AS" tab only affect operation of the QIAsymphony AS.

To change any of the settings, proceed as follows:

1. Select the relevant tab.
2. Modify the parameter(s) in the screen.
3. When all changes have been made, press "Save + Reboot".

"General Process" tab.

Enable use of expired reagents?	This parameter only affects operation of the QIAsymphony SP.
	If "Yes" is selected, use of expired reagents is allowed.
	If "No" is selected, use of expired reagents is not allowed.

Number of days for which a work list is valid?	Specifies the number of days after a work list is last modified that this work list expires. If "0" is entered, work lists will not expire.
Allow information for single samples in work lists to be overwritten?	If "Yes" is selected, assignments that have been made by a work list during run/batch definition can be changed. If "No" is selected, this is not possible.
Use magnetic head sensors (8-rod covers)?	If "Yes" is selected, the system checks whether the correct number of 8-Rod Covers have been taken. When "No" is selected, these sensors are deactivated. This parameter only affects operation of the QIAsymphony SP.
Use magnetic head sensors (sample prep cartridges)?	If "Yes" is selected, the system checks whether the correct number of sample prep cartridges is taken. When "No" is selected, these sensors are deactivated. This parameter only affects operation of the QIAsymphony SP.

"Process SP 1" tab.

Enable use of sample racks without bar codes?	Specifies whether sample racks can be processed if they do not have a rack ID.
	If "Yes" is selected, samples can be assigned to sample racks that do not have a rack ID.
	If "No" is selected, samples can only be assigned to sample racks that have an ID that is either entered by the "Supervisor", or is read by the bar code scanner.
Enable use of sample tubes without bar codes?	Specifies whether the "Operator" can enter/modify sample IDs manually.
	If "Yes" is selected, the "Operator" can enter/modify sample IDs manually.
	If "No" is selected, only sample tubes with bar codes that are read automatically by the bar code scanner can be used.

Automatically assign a randomly generated ID to samples without bar codes?	If "Yes" is selected, a virtual bar code ID (composed of the current batch ID and the position) is set to empty positions on the tube carrier. This setting can be useful if tubes without bar codes are used and the bar code scanner detects "Empty position bar codes" on the tube carrier through the inserted tubes. However, the user must select positions to be processed manually when assigning Assay Control Sets.
Automatically assign a randomly generated ID to samples with bar code reading errors?	If "Yes" is selected, a virtual bar code ID (composed of the current batch ID and the position) is set to all positions where a bar code was not detected. If tubes without bar codes are used, "Yes" should be selected (see "Parameters P1 and P2" below.

Parameters P1 and P2

P1: Automatically assigns a randomly generated ID to samples without bar codes.

P2: Automatically assigns a randomly generated ID to samples with bar code reading errors.

Condition	**P1** = yes **P2** = yes	**P1** = yes **P2** = no	**P1** = no **P2** = yes
Readable	Original bar code	Original bar code	Original bar code
Not readable	Generated bar code	Erroneous (editable)	Generated bar code
Without bar code	Generated bar code	Erroneous (editable)	Generated bar code
Empty position	Generated bar code	Generated bar code	Empty

Enables use of duplicate bar codes in a run?	Specifies whether duplicate sample IDs can be used. If "Yes" is selected, duplicate sample IDs can be used. If "No" is selected, duplicate sample IDs are not allowed.
Allow assignment of randomly generated IDs to elution racks?	If "Yes" is selected, a virtual rack ID is assigned to the elution rack when it is loaded in the "Eluate" drawer.
Confirm bar code of elution rack before removing	Specifies whether an elution rack ID must be entered when removing an elution rack from the "Eluate" drawer. This is used as confirmation of removal of the rack.
On which elution slots should adapter bar codes be scanned?	Specifies on which elution slots adapter bar codes should be scanned. "None", "1", or "1..4" can be selected.
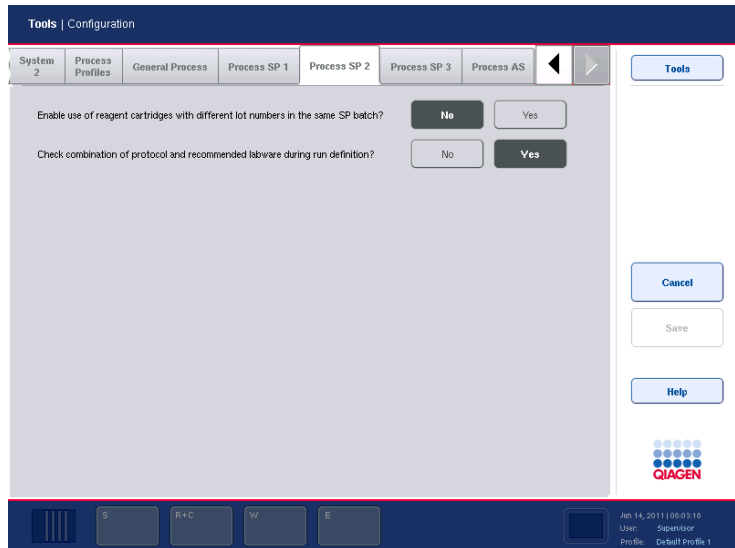
"Process SP 2" tab.

Enable use of reagent cartridges with different lot numbers in the same SP batch?	If "Yes" is selected, a run with 2 reagent cartridges with different lot numbers can be performed. If "No" is selected, this is not possible.
Check combination of protocol and recommended labware during run definition?	If "Yes" is selected, the combination of labware and protocol is checked during batch/run definition. If a combination of protocol and labware is "not recommended", a warning is shown. The recommendation of labware/protocol combinations is controlled by the file data/Labware/SP.xml. The check is performed when Assay Control Sets are assigned to samples, when the eluate slot is selected, and when an elution rack is loaded on a slot that has batches assigned.

"Process SP 3" tab.

Number of seconds enabled for user intervention before batch suspension?	Specifies the number of seconds for which a message appears if validation errors (e.g., internal control missing) occur. During the time that the message is displayed, the "Operator" can correct the issue. After the defined time period, the message box is closed, the batch is suspended, and processing of the next batch is started automatically.
	If this field is set to "0", the next batch is started immediately and there is no time period in which the error can be corrected.
Enable operator to change default tube types?	If "Yes" is selected, any user can change the default tubes that are selected when using a particular tube insert.
	If "No" is selected, only the "Supervisor" can modify default tube types.

Write start batch confirmation files?	If "Yes" is selected, a start batch confirmation file is generated when processing of a batch is started. See Section 8.7 for more details about start batch confirmation files.
Allow processing of samples without a work list entry?	If "Yes" is selected, samples that are not defined in a work list can be manually defined. If "No" is selected, all samples in a batch/run must be defined using a work list.
Allow combination of multiple work lists for one batch?	If "Yes" is selected, more than one work list can be used to define one batch. If "No" is selected, only one work list can be used to define one batch.
Allow partial use of work lists?	If set to "yes", it is still possible to use the work list and to process the batch even if there are samples that are defined in the work list, but are not present. Entries for missing samples will be ignored. If set to "No", it is not possible to process a batch if there are samples that are defined in the work list that are not present. It is not possible to ignore missing samples.

Check sample tube type required by work list?	If "Yes" is selected, the work list must specify the required sample tube type for a particular sample to be processed on the QIAsymphony SP. The used sample tubes must therefore match the sample tubes that are defined in the work list.
	Note: If "Yes" is selected, it is not possible to use the plate carrier for loading samples.
	If "No" is selected, required sample tube types for particular samples must not be specified in work lists.
Check elution rack ID required by work list?	If "Yes" is selected, the work list must specify the required elution rack ID for a particular sample to be processed on the QIAsymphony SP. It is therefore only possible to start processing of a batch if the rack ID of the loaded elution rack matches the elution rack ID that is specified in the work list.
	If "No" is selected, a required elution rack ID must not be specified in the work list for particular samples.
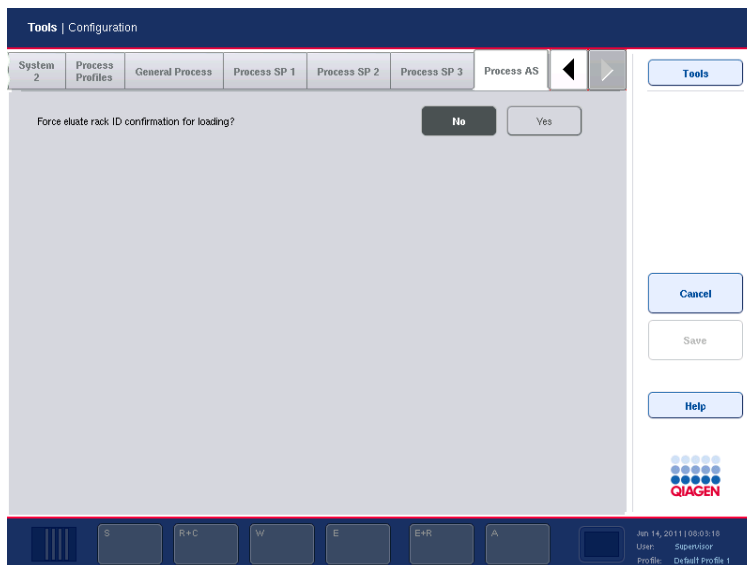
"Process AS" tab.

Force eluate rack ID confirmation for loading?	Specifies whether sample rack bar code must be scanned when loading or unloading sample rack in "Assay setup / Loading Information" screen.
	If "Yes" is selected, when pressing "Load" or "Unload" in "Assay setup / Loading Information" for a sample rack the "Manual Input" screen opens. Enter a sample ID using the keyboard or enter a sample ID using the bar code scanner.
	If "No" is selected, the "Manual Input" screen is skipped when loading or unloading a sample rack,
	This parameter only affects operation of the QIAsymphony AS.

6.3 Using process configuration profiles

Current process configuration settings can be saved as a process configuration profile. A process configuration profile defines all process configuration parameters in both ***.xml** format and in an easy-to-read ***.html** format.

Note: Only parameters that can be modified under the "Process Profiles", "General Process", "Process SP 1", "Process SP 2", "Process SP 3", and "Process AS" (if a QIAsymphony AS is installed) tabs are saved in a process configuration profile.

Process configuration profiles can be transferred to and from the USB stick and the QIAsymphony Management Console, if available.

6.3.1 Creating a custom process configuration profile

1. Modify the process configuration parameters as desired.
2. Select the "Process Profiles" tab.
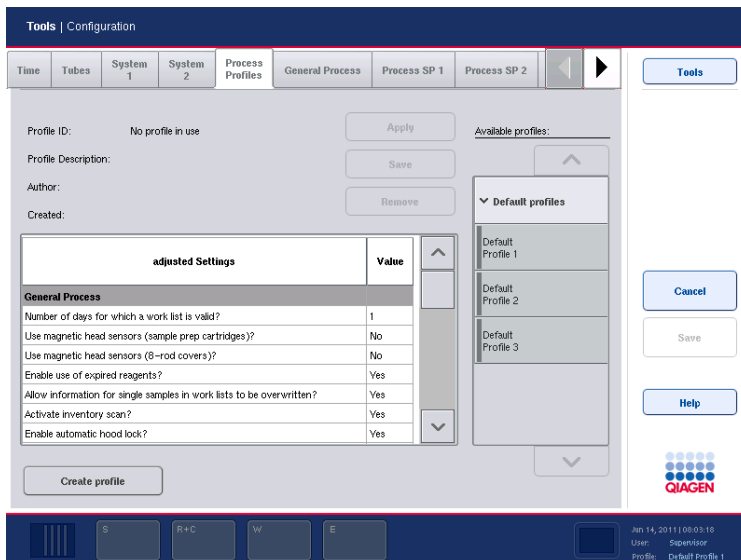
3. Press the "Create" button to create a new profile.
4. Press the "Profile ID" field and enter an ID for the new process profile using the keyboard screen that appears.

5. Press "OK" to close the keyboard screen.

6. Enter a description of the new process profile in the "Profile Description" field. Press "OK" to close the keyboard screen.

7. Press "Create".

8. The new process profile has been saved and will now appear in the list of available profiles, in the "Custom profiles" category.

6.3.2 Modifying a process configuration profile

To change the settings in an existing process profile, proceed as follows:

Note: It is only possible to modify "Custom profiles". The Default Profiles cannot be modified.

1. Select the "Process Profiles" tab.

2. Select the process profile to be modified from the list of available profiles. Use the up and down arrows to scroll through the list.

3. Optional: To use the settings in the selected process profile as a base, press "Apply". All process parameters will be set to the values specified in the selected process profile.

4. Modify the process parameters as required in the individual process tabs, as outlined in Section 6.2.2.

5. When all changes have been made, select the "Process Profiles" tab and the table shows the current changes made.

   ■ If a custom profile is selected, press "Save" to save the changes in the custom profile.

   ■ If no custom profile is selected, no profile is in use and a new profile must be created in order to save the new process parameters. Proceed as follows:

      1. Press the "Create" button.

      2. Select the "Profile ID" field and enter a new ID using the keyboard that appears.

      3. Select the "Profile Description" field and enter a new description using the keyboard that appears.

      4. Press "Create" to continue.

6.3.3 Removing a custom profile

There are 3 ways to remove custom profiles:

- Select the profile in the "Custom profiles" category in the "Process Profiles" tab of the "Configuration" menu, and then press "Remove".
- Synchronize files on the QIAsymphony SP/AS with files on the USB stick, see Section 8.4 for more details.
- Use the QIAsymphony Management Console to remove individual process configuration profiles, see the *QIAsymphony Management Console User Manual* for more details.

6.3.4 Handling saved process configuration profiles

Process configuration profiles can be transferred to a PC using the USB stick or the QIAsymphony Management Console, see Section 8. Each process configuration profile is a ***.zip** archive that contains a ***.xml** and ***.html** file. The ***.xml** file is digitally signed by a checksum and cannot be changed. The ***.html** file contains an overview of the settings defined by the ***.xml** file.

Note: Process configuration profiles can only be modified using the "Configuration" menu, they cannot be manually modified.

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7   Managing Users

The QIAsymphony SP/AS instruments recognize 2 different types of user IDs:

■   "Operator"

■   "Supervisor"

Each type of user confers different access rights and allows the user to perform different types of action. See Section 8 for a detailed list of the file types that can be transferred by each user.

Operator   The "Operator" enables the preparation and running of batches and assay runs. In addition, the "Operator" can:

■   Transfer input and output files from the QIAsymphony SP/AS instruments to a USB stick.

■   Transfer rack files and work lists from a USB stick to the QIAsymphony SP/AS instruments.

Supervisor   The "Supervisor" enables the preparation and running of batches and assay runs. The "Supervisor" can configure the users, default tube types for the QIAsymphony SP, and adapters/holders for the QIAsymphony AS. The "Supervisor" can also configure the system and define custom configuration profiles. In addition, the "Supervisor" can:

■   Transfer input and output files, process files, and most instrument setup files from the QIAsymphony SP/AS instruments to the USB stick.

■   Transfer rack files, work list files, process files and most instrument setup files from the USB stick to the QIAsymphony SP/AS instruments.

■ Synchronize rack files, work list files, process files, and most instrument setup files between the QIAsymphony SP/AS instruments and the USB stick.

7.1 Create new users

Users with the "Supervisor" role can create accounts for new users. Therefore, the user with the "Supervisor" user ID is responsible for user management. The default password for the first log in is **iue2ad**.

To create new users or to reset user passwords, follow the instructions below.

1. Log in with your password. If you log in for the first time as the user with the "Supervisor" role, enter the default password and then a new password.
2. Press the "Tools" tab.
3. Press the "User Management" button.
4. The "User Overview/Please Select User" (Supervisor login) screen appears.

5. Press the "Add User" button.
6. The "Create User" screen appears.

7. Press the "Login:" text field and enter the user login name in the "Keyboard" screen.

8. Press "OK".

9. Optional: Press the "First name (optional)" text field to enter a first name for the user account to be created. Enter the first name in the "Keyboard" screen and press "OK".

10. Optional: Press the "Last name (optional)" text field to enter a last name for the user account to be created. Enter the last name in the "Keyboard" screen and press "OK".

11. Press the "Initial Password" text field and enter the initial password for the user in the "Keyboard" screen. Press "OK".

12. Press the "Confirm Initial Password" text field to confirm the initial password. Enter the password in the "Keyboard" screen again and press "OK".

13. Press "Next" in the command bar.

14. The "Assign Roles" screen appears.
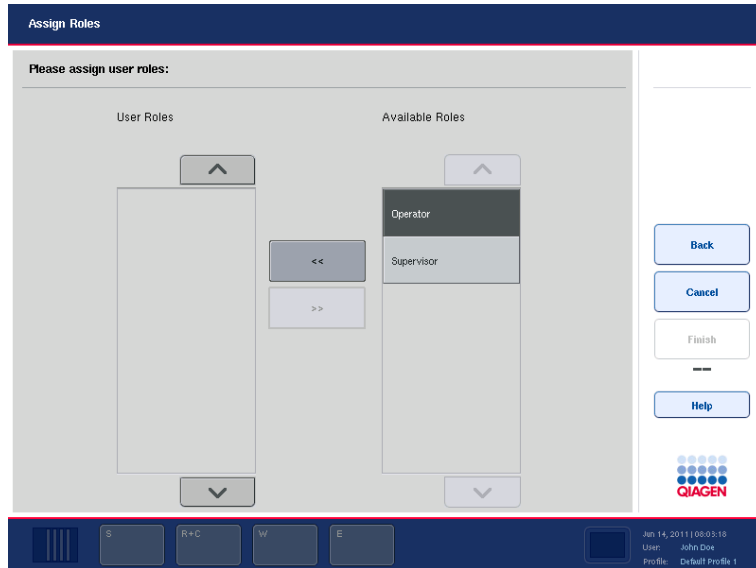
15. In the "Available Roles" list, select the role of the user account to be created. Press the [<<] button to assign the selected role to the newly created user. For more information about the user rights of the different roles, see Section 7.

16. The assigned role is displayed in the "User Roles" list.
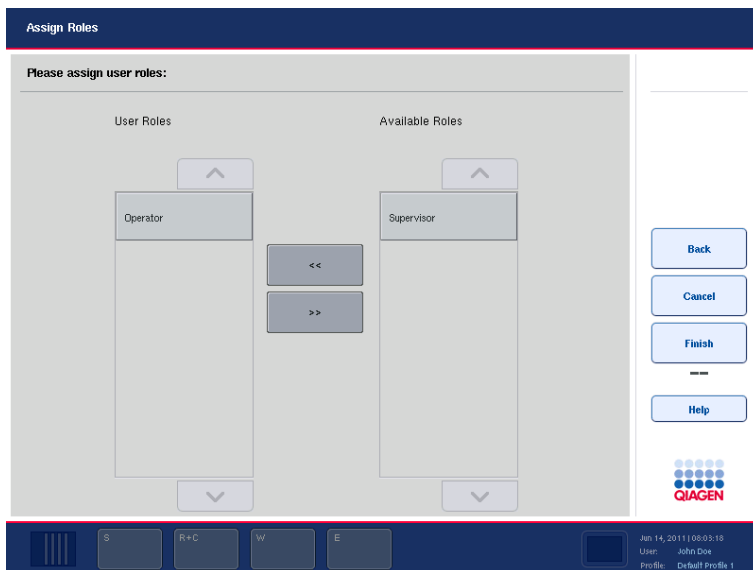
17. Press "Finish" to save the login information of the newly created user. The "User Overview/Please Select User" screen appears again. The "Activated Users" list now contains the newly created user account.

18. Inform the user of their login name and password.

19. Create more new users, if required.

7.2 Activate/inactivate user accounts

User accounts cannot be deleted and must be deactivated instead. If a user account needs to be removed from the list of users, the user with the "Supervisor" user ID must deactivate the account so that it is no longer displayed in the "Activated Users" list. When the user account is deactivated, the user can no longer log in and operate the QIAsymphony SP/AS instruments.

To inactivate/activate a user account:

1. Log in with the "Supervisor" account details.

2. Press the "Tools" tab.

3. Press the "User Management" button.

4. The "User Overview/Please Select User" (Supervisor login) screen appears.

5. If the user account is active, select the user name from the list in the "Activated Users" package. If the user account has been deactivated, select the user name from the list in the "Deactivated Users" package.

6. To deactivate an active user account, press "No". To reactivate a deactivated user account, press "Yes".

7. Press "Save" in the command bar.

8. The user account now appears in the "Activated Users" or "Deactivated Users" package, respectively.

7.3 Change of user role

The user role of an existing user can be changed by the user with the "Supervisor" user ID.

To change a user role:

1. Log in with the "Supervisor" account details.

2. Press the "Tools" tab.

3. Press the "User Management" button.

4. The "User Overview/Please Select User" (Supervisor login) screen appears.

5. Select the appropriate user account from "Activated Users" or "Deactivated Users".
6. Press the "Change Roles" button in the command bar.
7. The "Assign Roles" screen is displayed.
8. Change the role of the selected user.
9. Press "OK".
10. The "User Overview/Please Select User" screen is displayed again.
11. Press "Save" in the command bar to save the changes.

7.4 Change of password by the "Supervisor"

The "Supervisor" can change/reset the password for all users. This may be necessary if a user has forgotten their password. The "Supervisor" can exchange the old password for a new one so that the user is able to log in and enter a new password.

To change a password:
1. Log in with the "Supervisor" account details.
2. Press the "Tools" tab.
3. Press the "User Management" button.
4. The "User Overview/Please Select User" (Supervisor login) screen appears.
5. Select the user name from "Activated Users" or "Deactivated Users" for which the password should be changed.

6. Press the "New Password" text field and enter the new password in the "Keyboard" screen. Press "OK".
   Note: The password must be a minimum of 6 characters and contain at least one letter and one digit. It must be different from the old password.

7. Press the "Confirm new password" text field and enter the password again in the "Keyboard" screen. Press "OK".

8. Press "Save" in the command bar to save the new password.

7.5   Change of password by "Operator"

7.5.1   Automatic request of new password

You may be prompted by the instrument software to enter a new password. This may happen the first time you log in, after the "Supervisor" resets your password, or if your password has expired. Passwords expire after 60 days by default. This setting can be changed by the "Supervisor" in the "Configuration" menu in the "System 1" tab (Section 6.1.4). It is also possible to deactivate the password expiration setting.

If a password has expired, you will be prompted to enter a new password after logging in.

To change your password:

1. Press the "New password" text field.
2. The "Keyboard" screen appears.
3. Enter a new password and press "OK".
4. The "Login/Please enter your new password" screen appears again.

5. Press the "Confirm New Password" text field.

6. The "Keyboard" screen appears again. Enter the new password again to confirm it.

7. Press "OK".

7.5.2 User request for password change ("Operator" role)

It is also possible to change your password independently from the password expiration.

1. Log in using the old password.

2. Press the "Tools" tab.

3. Press the "User Management" button.

4. The "User Overview/Your user data" screen appears.

5. Press the "Change PWD" button in the command bar.

6. The "User Overview/Please enter your new password" screen appears.

7. Press the "Old password" text field.

8. The "Keyboard" screen appears.

9. Enter the old password and press "OK".

10. Press the "New Password" text field.

11. The "Keyboard" screen appears.

12. Enter a new password and press "OK".

13. Press the "Confirm New Password" text field.

14. The "Keyboard" screen appears.

15. Confirm the new password by entering it again and press "OK".

8   Handling Files

The QIAsymphony SP/AS instruments recognize 2 different types of user — "Operator" and "Supervisor".

Note: The QIAsymphony SP/AS instruments are provided with one user account with "Supervisor" rights. The "Supervisor" has to create user accounts for users with the "Operator" role.

Each role confers different access rights and allows the user to perform different types of action.

Operator   The "Operator" enables transfer of the following file types from the QIAsymphony SP/AS instruments to the USB stick:

■   Log files
■   Result file SP
■   Result file AS
■   Confirmation files
■   Loading information files
■   Cycler files
■   Instrument report files
■   Rack files
■   Work lists

The "Operator" enables transfer of the following file types from the USB stick to the QIAsymphony SP/AS instruments:

■   Rack files
■   Work lists
■   Concentration data files

In addition, the "Operator" enables synchronization of the following file types between the QIAsymphony SP/AS instruments and the USB stick:

■   Rack files
■   Work lists
■   Concentration data files

Supervisor

The "Supervisor" enables transfer of the following file types from the QIAsymphony SP/AS instruments to the USB stick:

- Log files
- Result files
- Confirmation files
- Loading information files
- Cycler files
- Instrument report files
- Duration files
- Rack files
- Work lists
- Assay Control Sets
- Protocols
- Assay Parameter Sets
- Assay Definitions
- Normalization Definitions
- Process configuration profiles
- Cartridge information
- User information
- Labware SP
- Service scripts SP
- Labware AS
- Service scripts AS

The "Supervisor" enables transfer of the following file types from the USB stick to the QIAsymphony SP/AS instruments:

- Concentration data files
- Duration files
- Rack files
- Work lists
- Assay Control Sets
- Protocols
- Assay Parameter Sets
- Assay Definitions
- Normalization Definitions

- Process configuration profiles
- Cartridge information
- Labware SP
- Service scripts SP
- Labware AS
- Service scripts AS

In addition, the "Supervisor" enables synchronization of the following file types between the QIAsymphony SP/AS and the USB stick:

- Rack files
- Work lists
- Concentration data files
- Assay Control Sets
- Protocols
- Assay Parameter Sets
- Assay Definitions
- Normalization Definitions
- Process configuration profiles
- Labware SP
- Labware AS

The" Supervisor" can also back up the file that contains information about all user accounts created.

Files can be handled directly using a USB stick or, alternatively, using the "File Transfer" tool in the QIAsymphony Management Console. Result files, work list files, loading information files, cycler files, and log files can also be handled using the "Automatic File Transfer" tool. For more information about both tools refer to the *QIAsymphony Management Console User Manual*. If the "Automatic File Transfer" tool is used, the user with the "Supervisor" user ID must assign a password to the "File Transfer" user. See the *QIAsymphony Management Console User Manual* for details about how to do this.

Note: For an independent run, an Assay Definition and Assay Parameter Set must be transferred. For successful transfer of the Assay Parameter Set, the Assay Definition must first be transferred.

Note: For an integrated run, a Protocol, Assay Control Set, Assay Definition, and Assay Parameter Set must be transferred. For successful transfer of the Assay Parameter Set, the Protocol, Assay Control Set, and Assay Definition must first be transferred.

8.1 Summary QIAsymphony SP/AS files

This table provides a summary of QIAsymphony SP/AS files, listed in alphabetical order.

File type	Description	Source
Assay Control Set (ACS)	The combination of a protocol for the QIAsymphony SP, plus additional parameters defined (e.g., internal control)	Provided by QIAGEN. Can be modified using the QIAsymphony Management Console.
Assay Definition (AD)	A set of instructions for the QIAsymphony AS that enables the instrument to perform an assay setup.	Provided by QIAGEN.
Assay Parameter Set (APS)	The combination of an Assay Definition with additional parameters defined (e.g., number of replicates and assay standards).	Provided by QIAGEN. Can be modified using the QIAsymphony Management Console.

Table continued on next page.

Table continued from previous page.

File type	Description	Source
Cartridge Information	The cartridge information/reagent definition files provide information that is required for recognizing the different reagent cartridges.	Provided by QIAGEN.
Concentration data file	A list of sample IDs with concentration values. Used to import the results of concentration measurements on eluates, which is needed for normalization on the QIAsymphony AS.	Raw data format is generated by external quantification device. File format is obligatory ***.xml** format in order to be used by the QIAsymphony AS. This can be created manually or by using Microsoft® Excel®.
Configuration profile	Defines the configuration settings (process and system) for the QIAsymphony SP and AS instruments.	Default profiles (1, 2, and 3) are supplied by QIAGEN. Custom profiles can be created by the system.
Cycler file	Contains sample information (e.g., sample ID, sample position) that can be transferred to selected PCR cyclers (i.e., Rotor-Gene Q, ABI cyclers).	Generated by the QIAsymphony AS when an assay run is finished and the assays have been removed.
Duration file	Provides information on duration of script execution.	Created by the system when executing scripts. Can also be moved from one instrument to another.

Table continued from previous page.

File type	Description	Source
Labware AS	Provides information about consumables for use with the QIAsymphony AS.	Provided by QIAGEN.
Labware SP	Provides information about consumables for use with the QIAsymphony SP.	Provided by QIAGEN.
Loading information	Data file that contains detailed information about which reagents, sample rack(s), assay rack(s), and disposable filter-tips are required for setup of the QIAsymphony AS worktable.	Generated by the QIAsymphony AS, after pressing "Queue" in the assay definition process.
Log files	Data file(s) that contain general information about the QIAsymphony SP/AS instruments, user interactions, and details about the protocol being run.	Generated by the QIAsymphony SP/AS.
Normalization Definition (ND)	A set of instructions for the QIAsymphony AS that enables the instrument to perform a normalization step as part of an assay run.	Provided by QIAGEN.
Process configuration profile	Contains all configured process parameters.	Default process profiles are provided by QIAGEN. Custom process profiles are generated by the QIAsymphony SP/AS instruments upon request by the user.

Table continued from previous page.

File type	Description	Source
Protocol	A set of instructions for the QIAsymphony SP that allows the instrument to perform automated purification procedure.	Provided by QIAGEN.
Rack file	Contains information about sample racks or assay racks (i.e., rack type, rack ID, sample volumes, and sample IDs).	Can be automatically generated by the QIAsymphony SP/AS instruments, or can be created and modified manually.
Result files	Data file that is generated for each protocol or assay run that is performed on the QIAsymphony SP/AS instruments.	The final result file is generated by the QIAsymphony SP/AS instruments when the protocol has finished, or when the assay run is finished and the assays have been removed.
Start Batch Confirmation file	Provides information about samples that will be processed in a batch on the QIAsymphony SP.	Generated by the QIAsymphony SP when a batch changes its status from queued to running.
Scripts SP	A set of instructions for maintenance procedure(s) on the QIAsymphony SP.	Provided by QIAGEN.
Scripts AS	A set of instructions for maintenance procedures on the QIAsymphony AS.	Provided by QIAGEN.

Table continued from previous page.

File type	Description	Source
Users	Contains information about the users that have been configured and the corresponding access rights.	Updated by the QIAsymphony SP/AS instruments whenever the user configuration is updated.
Work list	Provides information that assigns specific samples to Assay Control Sets or Assay Parameter Sets.	Can be generated by a LIMS, or can be manually generated.

8.2 Using a USB stick with the QIAsymphony SP/AS instruments

The QIAsymphony SP/AS instruments have 2 USB ports enabling connection of USB devices. The USB ports are at the front of the QIAsymphony SP in the lower left and lower right corners.

A USB stick is supplied with the QIAsymphony SP. Only use the provided USB stick for transfer of files between the instruments and a PC.

Plugging in the USB stick

Plug the USB stick into one of the USB ports at the front of the QIAsymphony SP.

The QIAsymphony SP will automatically recognize the USB stick.

Removing the USB stick

The USB stick can be removed by simply unplugging it from the USB port.

Note: Do not remove a USB stick when it is in use (e.g., during file transfer). If the USB stick is removed while in use, loss of data may occur. Please note that data transfer may take some time.

8.3   Data transfer via the USB stick

8.3.1   Setting up the USB stick

Note: If you are using the QIAsymphony Management Console to synchronize your data, the file/folder structure of the USB stick is set up automatically.

Set up the following file/folder structure on the USB stick:

/data/AssayControlSets/	Directory for Assay Control Sets
/data/AssayDefinitions/	Directory for Assay Definitions
/data/AssayParameterSets/	Directory for Assay Parameter Sets

/data/BioScripts/	Directory for protocols
/data/ConcentrationData	Directory for concentration data files
/data/Config/Profiles	Directory for process profiles
/data/Duration	Directory for duration files
/data/Labware/AS	Directory for QIAsymphony AS labware files
/data/Labware/SP	Directory for QIAsymphony SP labware files
/data/NormalizationDefinitions	Directory for Normalization Definitions
/data/RackFiles/	Directory for rack files
/data/ReagentDefinitions	Directory for reagent cartridge information
/data/ServiceScripts/AS/operator	Directory for QIAsymphony AS operator service scripts
/data/ServiceScripts/SP/operator	Directory for QIAsymphony SP operator service scripts
/data/ServiceScripts/AS/maintenance	Directory for QIAsymphony AS maintenance scripts

/data/ServiceScripts/SP/maintenance	Directory for QIAsymphony SP maintenance scripts
/data/Users/	Directory for user data
/data/Worklists/	Directory for work lists
/log/	Directory for log files
/log/CyclerExport	Directory for cycler files
/log/InstrumentReports/	Directory for instrument report files
/log/LoadingInformation/	Directory for loading information files
/log/Results/AS/	Directory for QIAsymphony AS result files
/log/Results/SP	Directory for QIAsymphony SP result files
/log/StartBatchConfirmation/SP	Directory for confirmation files

Data can be transferred from the USB stick to the QIAsymphony SP/AS instruments (uploaded) and also from the QIAsymphony SP/AS instruments to the USB stick (downloaded).

8.3.2 Transferring files from the QIAsymphony SP/AS to the USB stick

Note: File transfer of both QIAsymphony SP and QIAsymphony AS files is performed using the "File Transfer" menu. For a summary of file types, see Section 8.1.

To store the data generated by the QIAsymphony SP/AS instruments, you can transfer files to the USB stick if the QIAsymphony Management Console is not available.

If the QIAsymphony SP/AS instruments are not connected to the network this function can also be used to supply the "Process Definition" editor tool of the QIAsymphony Management Console with the data required to create new Assay Control Sets and Assay Parameter Sets.

If you are using the QIAsymphony Management Console, refer to the *QIAsymphony Management Console User Manual* for more details.

To transfer files from the QIAsymphony SP/AS instruments to the USB stick, follow the steps below.

1. Log in to the QIAsymphony SP/AS instruments. See page 8-1 for a summary of which file types the "Supervisor" and "Operator" roles have access to transfer.

2. Insert the USB stick into one of the USB ports at the front of the QIAsymphony SP.

3. Press "File Transfer" in the "Tools" screen. The "In-/Output Files" tab of the "File Transfer" menu opens.
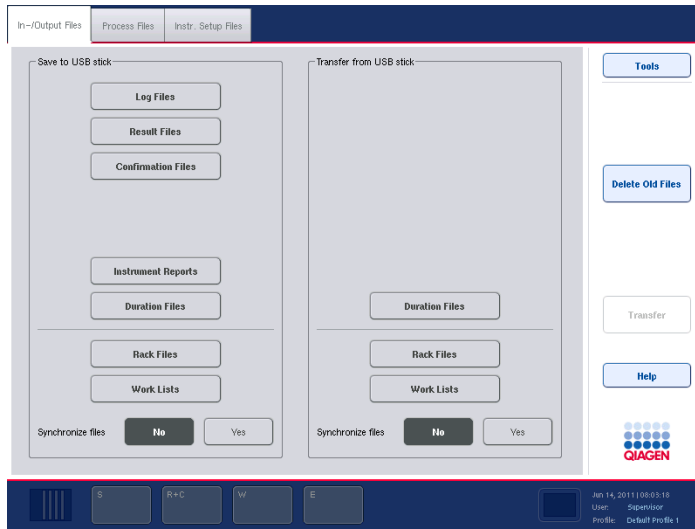
"In-/Output Files" tab of the "File Transfer" menu.

4. Select one of the file transfer tabs ("In-/Output Files", "Process Files", "Instr. Setup Files"). The following files can be transferred to the USB stick from the different tabs.

Tab	Files that can be transferred to the USB stick
In-/Output Files	■ Log files ■ Result files ■ Confirmation files ■ Loading information files ■ Cycler files ■ Instrument report files ■ Duration Files ■ Rack files ■ Work lists
Process Files	■ Assay Control Sets ■ Protocols ■ Assay Parameter Sets ■ Assay Definitions ■ Normalization Definitions
Instr. Setup Files	■ Configuration (there may be some entries that are not visible to all users) ■ Process configuration profiles ■ Cartridge Information files ■ Users files ■ Labware SP and AS files ■ Service scripts SP ■ Service scripts AS
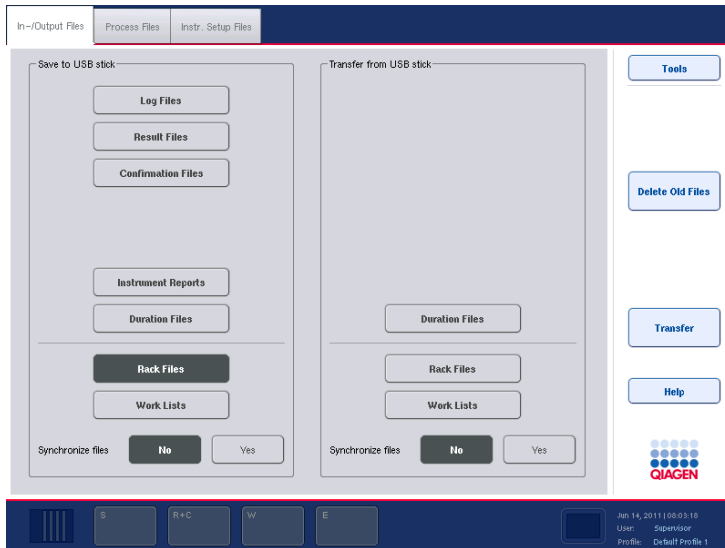
"In-/Output Files" tab with rack files selected.
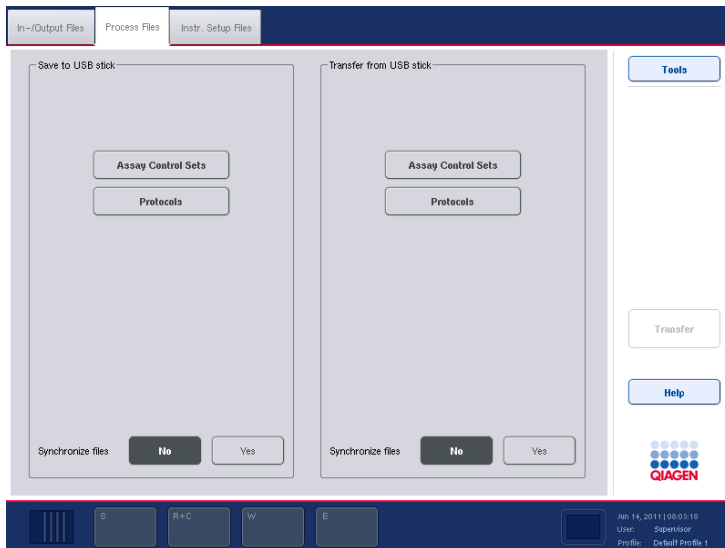
"Process Files" tab.
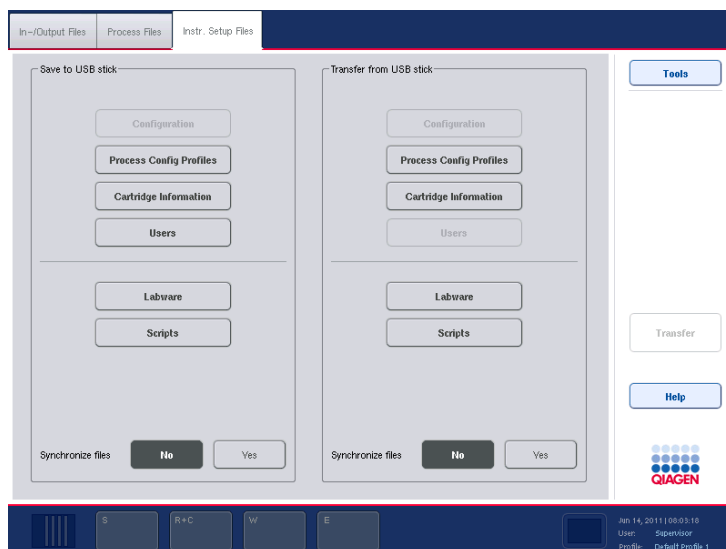
"Instr. Setup Files" tab.

5. Select the file type(s) to be downloaded to the USB stick by pressing the appropriate button in the "Save to USB stick" panel.
   Note: To save time, select more than one file type.

6. Press the "Transfer" button in the command bar of the screen to transfer the selected files to the USB stick.

7. A message appears informing you that the files will be transferred from the QIAsymphony SP/AS instruments to the USB stick. Press "Yes" to confirm that the files should be transferred.

8. During data transfer, an information message will be displayed.

9. After successful data transfer, a message will appear confirming data transfer.

10. Remove the USB stick.
    Note: Do not remove the USB stick during data transfer otherwise loss of data may occur.

8.3.3 Transferring files from the USB stick to the QIAsymphony SP/AS instruments

Note: File transfer of both QIAsymphony SP and QIAsymphony AS files is performed using the "File Transfer" menu. For a summary of file types, see Section 8.1.

You can transfer files from the QIAsymphony Management Console to the QIAsymphony SP/AS instruments. Alternatively, if you are not connected to the network, you can transfer files using the USB stick.

Transfer files from the USB stick to the QIAsymphony SP/AS instruments as follows:

1. Copy the files to be uploaded to the corresponding directory on the USB stick. See Section 8.3.1 for the folder structure on the USB stick.

2. Log in to the QIAsymphony SP/AS instruments (for more information, see "Logging in", Section 5.3). See Section 8.1 for a summary of which file types the "Supervisor" and "Operator" user IDs have access to transfer.

3. Insert the USB stick into one of the USB ports at the front of the QIAsymphony SP.

4. Press "File Transfer" in the "Tools" screen to enter the "In-/Output Files" tab.

5. Select one of the file transfer tabs ("In-/Output Files", "Process Files", "Instr. Setup Files"). The following files can be transferred from the USB stick from the different tabs.

Tab	Files that can be transferred from the USB stick
In-/Output Files	■ Concentration data files ■ Duration Files ■ Rack files ■ Work lists
Process Files	■ Assay Control Sets ■ Protocols ■ Assay Parameter Sets ■ Assay Definitions ■ Normalization Definitions

Instr. Setup Files

- Configuration (there may be some entries that are not visible to all users)
- Process configuration profiles
- Cartridge Information files
- Labware SP
- Scripts SP
- Labware AS
- Scripts AS

6. Select the file type(s) to be uploaded to the QIAsymphony SP/AS instruments by pressing the appropriate button(s) in the "Transfer from USB stick" panel.
   Note: You can select more than one file type at once.
   Important: Make sure that "Synchronize files" is set to "No".
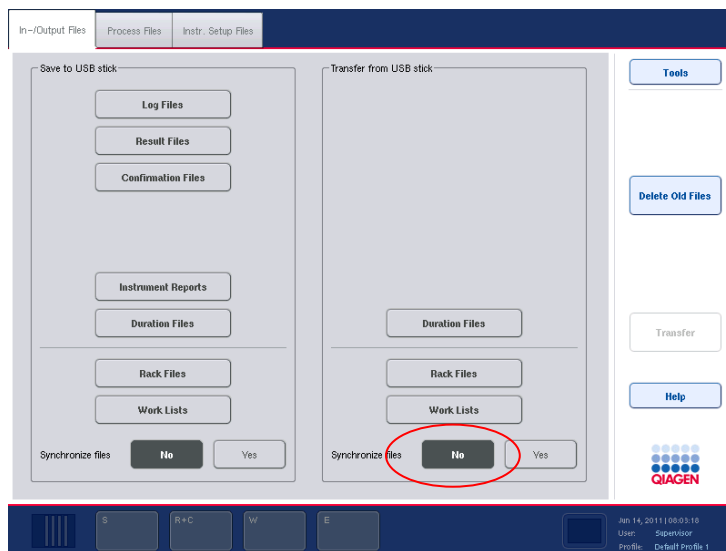
7. When the first file type has been selected, the "Transfer" button becomes active. Press the "Transfer" button to transfer all selected file types from the USB stick to the QIAsymphony SP/AS instruments.

8. A message appears informing you that the files will be transferred from the USB stick to the QIAsymphony

SP/AS instruments. Press "Yes" to confirm that the files should be transferred.

9. During data transfer, an information message will be displayed.

10. After successful data transfer, a message will appear confirming the data transfer.

11. Remove the USB stick.
    Note: Do not remove the USB stick during data transfer otherwise loss of data may occur.

8.4   Synchronization of files

Files stored on the QIAsymphony SP/AS instruments can be synchronized with files on the USB stick.

■ If the file already exists on the QIAsymphony SP/AS it will be overwritten.

■ Files that exist on the QIAsymphony SP/AS instruments but do not exist on the USB stick are deleted from the QIAsymphony SP/AS instruments.

■ After synchronization the content of files of the same type that are stored on the QIAsymphony SP/AS instruments and the USB stick are identical.

Users with "Supervisor" and "Operator" access rights are allowed to synchronize different file types, as outlined in the table below.

Operator   The "Operator" enables synchronization of the following file types between the QIAsymphony SP/AS instruments and the USB stick:

■ Rack files
■ Work lists

Supervisor   The "Supervisor" enables synchronization of the following file types between the QIAsymphony SP/AS instruments and the USB stick:

■ Rack files
■ Work lists
■ Assay Control Sets

■ Protocols
■ Assay Parameter Sets
■ Assay Definitions
■ Normalization Definitions
■ Process configuration profiles
■ Labware SP
■ Labware AS
■ Instrument Report files

8.4.1 Synchronizing files on the QIAsymphony SP/AS instruments with files on the USB stick

Files on the QIAsymphony SP/AS instruments can be synchronized with files on the USB stick.

To synchronize files on the QIAsymphony SP/AS instruments with files on the USB stick follow the steps below:

1. Log in to the QIAsymphony SP/AS instruments.

2. Prepare the USB stick with the files for synchronization. Store the files you want to upload to the QIAsymphony SP/AS instruments in their corresponding folders on the USB stick (e.g., a newly defined rack file in the folder **/data/Worklists/**).

3. Insert the USB stick into one of the USB ports at the front of the QIAsymphony SP.

4. Press "File Transfer" in the "Tools" screen to enter the "In-/Output Files" menu.

5. Select one of the file transfer tabs ("In-/Output Files", "Process Files", "Instr.Setup Files"). For example, to synchronize work lists, select the "In-/Output Files" tab.

6. Select the file type(s) on the QIAsymphony SP/AS instruments that should be synchronized with the files on the USB stick by pressing the appropriate button(s) in the "Transfer from USB stick" panel.
   Note: You can select more than one file type at the same time. The number of file types that can be selected by the user is limited by the user role.

7. Set "Synchronize files" to "Yes" by pressing the "Yes" button.
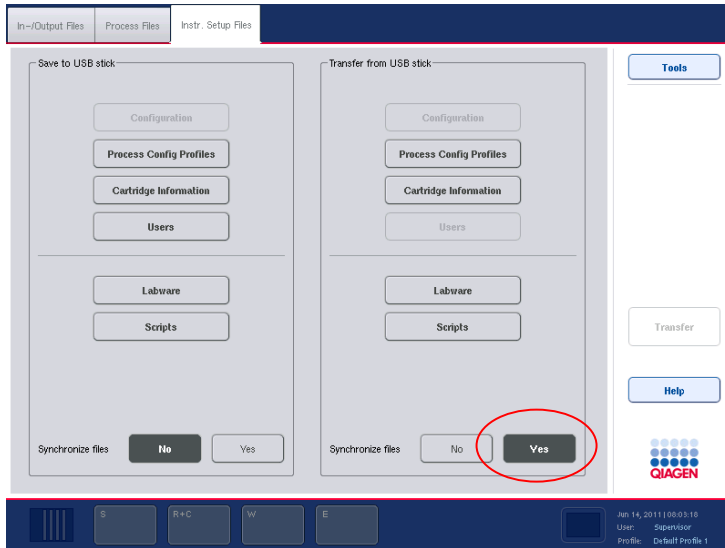
8. Press the "Transfer" button in the command bar of the screen to synchronize the selected files type(s).

9. A message appears informing you that the files will be synchronized. Check that the information is correct. To continue with the synchronization, press "Yes".

10. After successful synchronization, a message will appear confirming synchronization. Press "OK" to continue.

11. Remove the USB stick.
    Note: Do not remove the USB stick during data transfer otherwise loss of data may occur.

12. Log out of the QIAsymphony SP/AS instruments (for more information, see Section 5.4).

8.4.2 Synchronization of files on the USB stick with files on the QIAsymphony SP/AS

Files on the USB stick can be synchronized with files on the QIAsymphony SP/AS.

This means that files stored on the QIAsymphony SP/AS are transferred to the USB stick. If the file already exists on the USB stick it will be overwritten by the file from the QIAsymphony SP/AS instruments. Files that exist on the USB stick but do not exist on the QIAsymphony SP/AS instruments are deleted from the USB stick.

To synchronize files on a USB stick with files on the QIAsymphony SP/AS follow the steps below.

1. Log in to the instrument with the "Supervisor" user ID.

2. Prepare the USB stick for synchronization. Insert the USB stick into one of the USB ports at the front of the QIAsymphony SP.

3. Press "File Transfer" in the "Tools" screen to enter the "In-/Output Files" tab menu.

4. Select one of the file transfer tabs ("In-Output Files", "Process Files", "Instr. Setup Files").

5. Select the file type(s) that should be synchronized by pressing the appropriate button(s) in the "Save to USB stick" panel.
   Note: You can select more than one file type at once.

6. Set "Synchronize files" to "Yes" by pressing the "Yes" button.
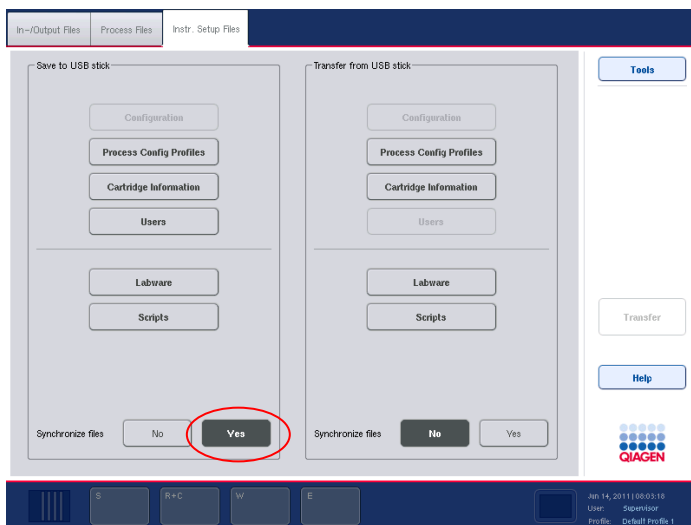
7. Press the "Transfer" button in the command bar of the screen to synchronize the selected files.

8. A message appears informing you that the files will be synchronized. Check that the information is correct. To continue with the synchronization, press "Yes".

9. After successful synchronization, a message will appear confirming synchronization.

10. Remove the USB stick.
    Note: Do not remove the USB stick during data transfer otherwise loss of data may occur.

11. Log out of the QIAsymphony SP/AS instruments (for more information, see Section 5.4).

8.5   Deleting files

Different tools can be used to delete files from the QIAsymphony SP/AS instruments. We recommend using the "File Transfer" tool of the QIAsymphony Management Console.

If the QIAsymphony SP/AS is not connected to the network, there is a method for deleting all input and output files, except log files (Section 8.5.1), and a method for deleting all other files (Section 8.5.2).

8.5.1   Deleting input and output files from the QIAsymphony SP/AS

The user will be notified when the QIAsymphony SP/AS instruments are short of storage space for output files (i.e., result, rack, work list, instrument report, loading information, and cycler files).

All input and output files, except log files, can be deleted from the QIAsymphony SP/AS instruments using the touchscreen. Follow the steps below to delete files older than 10 days. This time period is the default setting and can be adjusted by the "Supervisor".

To delete these files, follow the steps below.

1. Press "File Transfer" in the "Tools" screen.

2.   Select the "In-/Output Files" tab.
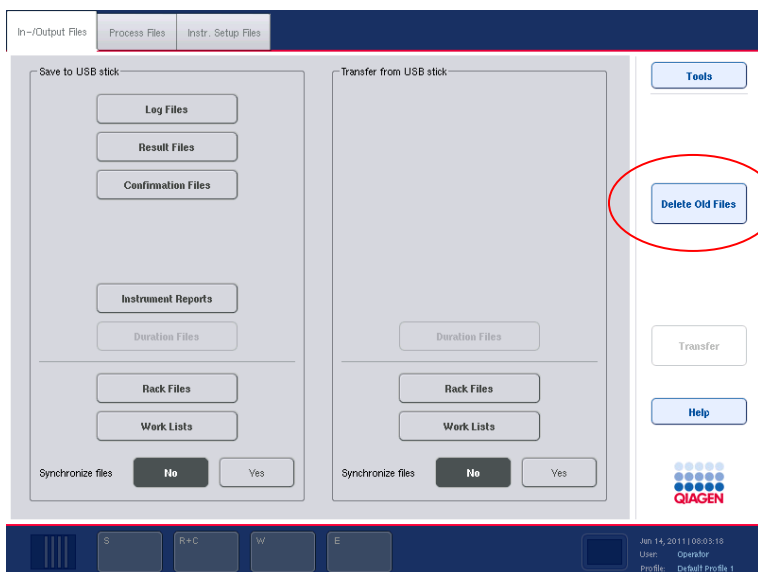
3.   Press "Delete Old Files" in the command bar of the screen. The following message appears.
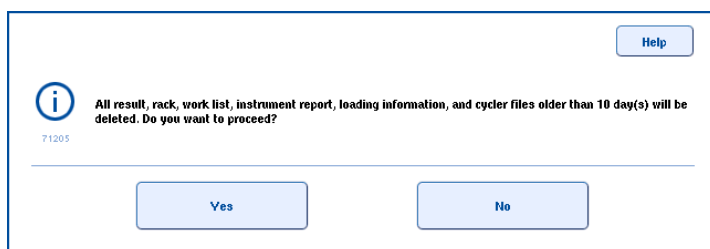
4.   Press "Yes" to delete the old files.

After the files have been successfully deleted, a message will appear confirming the deletion. Press "OK" to confirm the message.

Note: The QIAsymphony will automatically delete the concentration data file after use (also see Section 2.4.4, "Import concentration data (only for run with normalization)" in *Operating the QIAsymphony AS*).

8.5.2 Deleting other files

If your QIAsymphony SP/AS is not connected to the network, use the synchronize function if you need to delete file types other than input and output files from the QIAsymphony SP/AS. With the synchronize function you can delete the file types in the table in Section 8.4.The following example guides you through the steps required to delete some of the Assay Control Sets from the QIAsymphony SP/AS.

1. Delete all Assay Control Sets saved on the USB stick in **data/AssayControlSets**.
2. Log in to the instruments with the "Supervisor" user ID.
3. Insert the USB stick into one of the USB ports at the front of the QIAsymphony SP.
4. Press "File Transfer" in the "Tools" screen.
5. Select the "Process Files" tab.
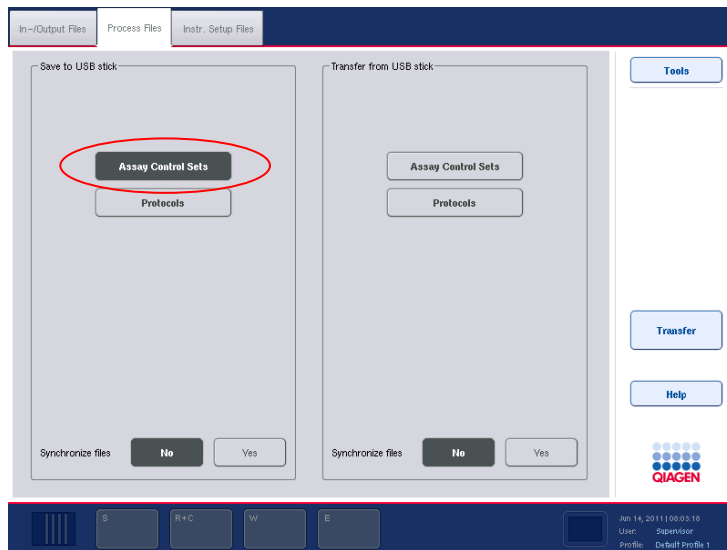
6. Select Assay Control Sets by pressing the "Assay Control Sets" button in the "Save to USB stick" panel.
   Important: Make sure that "Synchronize files" is set to "No".
7. Press the "Transfer" button in the command bar on the right side of the screen.

8. A message appears informing you how many files will be transferred from the QIAsymphony SP/AS instruments to the USB stick. To continue with file transfer, press "Yes".

9. After successful data transfer, a message will appear confirming data transfer.

10. Remove the USB stick.

11. Connect the USB stick to a PC.

12. Delete the Assay Control Sets that should be removed from the QIAsymphony SP/AS instruments. Access the files on the USB stick using Windows Explorer or the QIAsymphony Management Console.

13. Insert the USB stick into one of the USB ports at the front of the QIAsymphony SP again.

14. Press "File Transfer" in the "Tools" screen.

15. Select the "Process Files" tab.
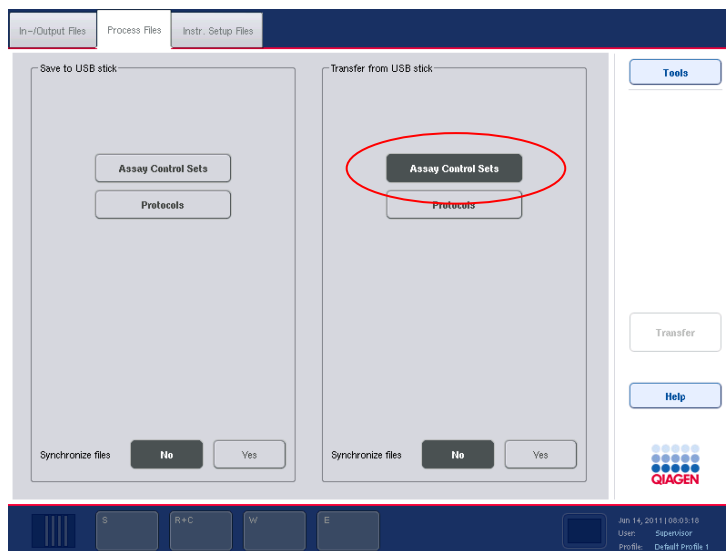
16. Select Assay Control Sets as the file type by pressing the "Assay Control Sets" button in the "Transfer from USB stick" panel.

17. Set "Synchronize files" to "Yes" by pressing the "Yes" button.

18. Press the "Transfer" button in the command bar on the right side of the screen.

19. A message appears informing you how many files will be deleted from the QIAsymphony SP/AS instruments. To continue, press "Yes".

20. After the files have been successfully deleted, a message will appear.

21. Remove the USB stick.

22. Log out of the QIAsymphony SP/AS instruments (for more information, see Section 5.4).

8.6 Process configuration profile

Process configuration settings can be saved in a single file called a process configuration profile. Each process configuration profile is provided as a ***.zip** file, containing the file in ***.xml** format and ***.html** format. The ***.xml** file is digitally signed with a checksum and cannot be changed. The ***.html** file contains an overview of the settings defined by the ***.xml** file.

Note: Process configuration profiles cannot be manually modified; this must be done using the "Configuration" menu.

Process profiles can be transferred to and from the QIAsymphony SP/AS instruments using the USB stick (Section 8.3.2) or the QIAsymphony Management Console.

8.7 Start batch confirmation file

The start batch confirmation file provides information about the samples that will be processed in a batch on the QIAsymphony SP.

This file contains information about:

■ The elution rack
■ The batch that will be processed to the elution rack
■ Samples, including sample IDs
■ The protocol and Assay Control Set used for processing

Start batch confirmation files are generated and saved on the QIAsymphony SP/AS instruments in ***.xml** format. A start batch confirmation file is generated when a batch changes its status from queued to running. The content of a start batch confirmation file is similar to the QIAsymphony SP result file, but only contains information about one batch. The start batch confirmation file does not contain information about the batch that is collected during the run, only information known about the batch until processing of the batch starts.

The file name is created automatically with the following nomenclature:

YYYYMMDD_<BatchID>.xml

YYYY, MM, and DD are the year, month, and day in which the file was created. For example, 20091127_1000004.xml.

Note: Start batch confirmation files are only written if the process parameter "Write start batch confirmation files" is set to "Yes". For more details about modifying process parameters, see Section 6.2.

8.8   QIAsymphony SP result file

Result files are generated for each elution rack. When the elution rack is removed from the "Eluate" drawer, the corresponding result file is generated and can be downloaded from the QIAsymphony SP/AS instruments.

The file name is created automatically with the following nomenclature:

YYYYMMDDHHMMSS_ElutionRackID.HTML
YYYYMMDDHHMMSS_ElutionRackID.XML

When downloading the result files, the ***.html** and ***.xml** files are available as zipped (***.zip**) files on the USB stick.

When using the "File Transfer" tool, these files will be automatically unzipped.

Result file content

General information

Elution rack ID	ID of the elution rack used.
Elution rack type	Type of the elution rack used.
Elution slot number	Number of the elution slot used.
Overall status check	"Passed" if all samples have been processed correctly. "Unclear", if at least one sample is unclear, but there are no invalid samples. "Failed" if samples have not been processed correctly.
File	Name of the ***.xml** result file.
Start time	The time at which processing of the first batch started.
End time	The time at which processing of the last batch finished.
Eluate removed	Time at which the elution rack was removed.
QIAsymphony SP serial number	Serial number of the QIAsymphony SP on which the run was executed.
Software Version	Current software version.
Process Configuration Profile	The process configuration profile that was generated when the batch was processed. See Section 8.6 for details about process configuration profiles.

Reagent rack information

Reagent Rack Number	Number of the reagent rack used (i.e., 1, 2, or 3).
Reagent Rack Slot	Number of the reagent rack slot used.
	Note: In case that the buffer bottle is exchanged, the number is incremented. This means, in this case the number does not identify the slot.
Homogeneity check	"Passed" if the lot numbers/IDs of the reagent rack and enzyme rack are matching. "Failed" if they do not match.
Reagent Rack Description	Description of the reagent rack used.
Reagent Cartridge Lot Number	Lot number of the reagent cartridge used.
Enzyme Rack Lot Number	Lot number of the enzyme rack used.
Expiration Date	Expiration date of the reagent rack.

Reagent rack information is listed for each reagent rack that is listed in the inventory before the start of the batch. If in use, the buffer bottle and accessory trough are also listed.

Reagent information

Position	The index of the reagent (i.e., 1, 2, or 3).
Buffer	Name of the buffer.
Lot Number	Lot number of the reagent.

Quantity	Volume of reagent used.
Expiration Date	Expiration date of the reagent.
Expired	"Yes" if the reagent has expired. "No" if the reagent has not expired.

The reagent information is listed for each reagent that is listed in the inventory before the start of the batch.

Batch information

Batch ID	Batch ID generated by the QIAsymphony SP.
Assay Control Set	Name of the Assay Control Set.
Protocol name	Name of the protocol used.
User	Name of user who queued the batch.
Batch queuing time	Date and time at which the batch was queued by the user.
Start Time	Date and time at which the batch was started by the user.
End Time	Date and time at which processing of the batch finished.
Sample Rack Slot	The sample rack slot used. Number 1–4 for the tube carrier. Number 6–9 for the plate carrier, starting with the back position.
Carrier type	Type of carrier (i.e., "Tube" if a tube carrier was used) or the type of rack, if a rack carrier was used.
Sample Rack ID	ID of the sample rack.

Internal control information

IC	Name of the internal control.
Bar code	Bar code of the internal control.
Assay Control Set	Name of the Assay Control Set.
Tube position (labware)	Position of the internal control (IC) tube in the IC carrier, and the tube type.
Position/Level detection	Internal control position and aspiration mode for liquid-level detection: "C"=capacitive, "P"=pressure, "N"=none.
Time	Creation time.
Message ID	ID of the message.
Message	Message text.
Command	Defines the protocol command affected by the message.

The internal control information is listed for each internal control that is used during processing.

Assay control set information

In addition, information for each Assay Control Set that was used for processing is listed.

Batch ID	ID of the batch that uses the ACS.
Assay Control Set	Name of the ACS; each ACS is mentioned only once per batch.

ACS authentic — Specifies if the assay control set is a genuine QIAGEN-ACS:

- "QIAGEN file" if it is a genuine ACS
- "Custom file" otherwise

IC — Name of the IC that was used by the ACS.

Bar code — ID of the IC (bar code from IC tube).

The following user actions are listed in the messages table:
- manual changes to sample bar codes
- pause
- continue
- stop

"Sample" table information

Sample ID — ID of the sample.

Labware — Input labware type. The carrier type is either "Tube" or "Rack". In case of tube carriers, the labware of the tubes is shown. In case of a plate carrier, this column is not shown.

Input position — Name of the input position.

Type — Indicates the sample type, i.e., sample or extraction control.

Liquid-level detection — Aspiration mode for liquid-level detection: "C"=capacitive, "P"=pressure, "N"=none.

Output position	Name of the output position.
Assay Control Set	Name of the Assay Control Set.
Reagent rack (beads + reagents)	Number of the reagent rack for beads and reagents.
Regent rack (enzymes)	Number of the reagent rack for enzymes.
IC tube position/Liquid-level detection	Internal control position and aspiration mode for liquid-level detection:

- "C"=capacitive
- "P"=pressure
- "N"=none

Eluate volume	Indicates the elution volume. Depending on the protocol, this field may or may not appear. If the elution volume is in bold font, the elution volume was defined by the user.
Minimal eluate volume	Indicates the minimum elution volume in the elution rack at the time of transfer. Depending on the protocol, this field may not be shown. If this field is in bold font, the elution volume was defined by the user.
Initial elution volume	The initial volume of buffer. This field is displayed depending on the protocol.

Validity of result	"valid", "unclear", "invalid". If sample is "unclear" or "invalid", error codes are listed.

The sample information is listed for each sample that is processed.

Abbreviations

S	Sample
EC+	Positive extraction control
EC−	Negative extraction control
C	Capacitive
P	Pressure
N	None

Temperature information

Batch	Batch ID.
Lysis temperature	Status information of the lysis temperature: "OK" or "not OK".
Cooling position temperature	Status information of the cooling position temperature: "OK", "not OK", "disabled" or "not required".

The temperature information is listed for each batch that is processed.

Deletion of result files

The user will be notified when the QIAsymphony SP is short of storage space for result files. The user can then choose to delete files older than 10 days from the instruments. For more information, see Section 8.5.1.

The validity of result files can be checked using a "Checksum Validation" tool. This tool is part of the QIAsymphony Management Console. For detailed information, see the *QIAsymphony Management Console User Manual*.

Sample status

Samples are classified in one of three ways.

■ "valid" — the sample was processed correctly.

  Note: Pipetting performance is not monitored.

■ "unclear" — if the run was paused, the samples will be generally classified as "unclear". Furthermore, unclear classification is possible in some cases where insufficient sample volume is available or the cooling temperature is out of range.

■ "invalid" — a serious error occurred during sample processing (e.g., the run may have stopped and could not be continued).

If a sample is classified as "invalid", it will not be processed further. The sample will be removed from the sample prep cartridge and transferred to the liquid waste container.

Note: If the elution rack has not been removed from the "Eluate" drawer, sample classifications can be viewed in the "Sample View" screen of the "Sample Preparation" menu. After the elution rack has been removed, sample classifications are documented in the result file.

8.9 QIAsymphony AS result file

A result file is generated for each assay run. It contains all information about the defined assay run and its parameters. For further details about the content of a result file, see the tables below.

A preliminary version of the result file is generated during the assay run. When the run is removed from the "Assays" drawer (see Section 2.10 of *Operating the QIAsymphony AS* for details about how to do this), the final version of the result file is created. The result file can then be downloaded from the QIAsymphony SP/AS instruments.

The filename is generated automatically with the following nomenclature:

ResultFile_YYYYMMDD_HHMMSS_RunID.HTM
ResultFile_YYYYMMDD_HHMMSS_RunID.XML

When downloading the result files, the ***.html** and ***.xml** files are available as zipped (***.zip**) files on the USB stick. When using the "File Transfer" tool, these files can be transferred individually and will be automatically unzipped.

Preliminary files are available as ***.htm** and ***.xml** files. The file name contains the suffix **_preliminary**.

Note: A single result file is generated for each assay setup run for AS batches in Integrated mode. Therefore each result file can contain information about up to 2 sample racks and more than one Assay Parameter Set.

Note: When performing an integrated run, one result file is generated for each AS batch. The "Sample rack ID" in the QIAsymphony AS result file is identical to the "Elution rack ID" in the corresponding QIAsymphony SP result file and in its file name. The run time and date in the AS result file and in the SP result file should be the same. If samples are classified as "invalid" or "unclear" in the QIAsymphony AS result file, the corresponding QIAsymphony SP result file will provide more information about the validity of the result.

Note: Preliminary result files contain the comment "This is a preliminary result file. It will be overwritten with the final result file, when the last output plate is removed. Please note that final status information may deviate from preliminary status. For final sample assessment please use final result file". The comment is highlighted in yellow.

Result file content

General information

User	Name of user who defined the run.
Role	Role(s) of the user who assigned the run (i.e., "Operator" or "Supervisor").

Run ID	Run ID generated by the QIAsymphony AS.
Overall status check	General information about the run status. If "Passed" is displayed, the run (including SP run for Integrated run) was successful. "Unclear" is displayed if at least one sample is unclear, but there are no invalid samples. "Failed" is displayed if errors occurred during the run. See Section 10 for more details about how to deal with errors.
Start time (yyyy-mm-dd hh:mm:ss)	Time at which the AS run was started.
End time (yyyy-mm-dd hh:mm:ss)	Time at which the AS run (for Integrated run) ended. This is defined as the time at which the last sample was transferred to the assay rack.
Duration (hh:mm:ss)	Duration of the AS run (for Integrated run).
QIAsymphony AS SN	Serial number of the QIAsymphony AS.
Software Version	Current software version.
Process Configuration Profile	Configuration profile that was used when defining the run.
Loading file	File name of the ***.xml** loading information file.
Result file	File name of the ***.xml** result file.

Reagent information

Kit bar codes

Assay	Name of the selected Assay Parameter Set.
Bar code	Kit bar code for the used assay. QIAGEN bar code or custom bar codes can be entered, providing information about lot number and expiration date. See "Defining customized kit bar codes", Section 2.5.1 of the *Operating the QIAsymphony AS*.
	If no bar code was entered, this field will not be displayed in the result file.
Product No.	If a QIAGEN kit was used, the product number of the QIAGEN kit is displayed.
Lot. No.	Lot number of the used kit.
Expiration date	Expiration date of the used kit (mm/dd/yyyy).
Status	Status of the used kit. "Expired" indicates that a kit had passed the expiration date. "OK" indicates that the kit had not passed the expiry date.
Accepted	"Yes" indicates that an expired kit was accepted and used in the assay run. If no expired kits were used, "n/a" is displayed in this field.

Reagent slot information

Slot	Position of the adapter in the "Eluate and Reagents" drawer. This can be slot 1 or 3.
Adapter type	Name of the required reagent adapter. For a full list of available adapters, visit www.qiagen.com/goto/QIAsymphony.

Standard curves information (optional)

Name of standard curve	Name of the standard curve. This is used as prefix of the standard names.
Assay	Name of the assay.
No. of dilution concentrations (including first undiluted standard)	Number of the standards from the standard curve (including the first undiluted standard).
Dilution factor	Factor in format "1:x" Example: Dilution factor "1:100" means that 1 part of previous standard are added and 99 parts of diluent.

Detailed information for standard curve X (optional)

Slot of Reagentadapter	Position of the adapter in the "Eluate and Reagents" drawer. This can be slot 1 or 3.
Pos. on Reagentadapter	The position index.
Standard name	The name of the standard.

Dilution ratio   The ratio of the concentration of the predecessor standard and of this standard, in the form "1:x". For the initial standard, "None" instead.

                            Example: Dilution ratio "1:100" means that 1 part of previous standard are added and 99 parts of diluent.

Concentration   The concentration of the standard.

Normalization information (optional)

Normalization rack information

Slot   The slot number used for the normalization rack.

Rack type   The rack type used for the normalization rack.

Adapter type   The adapter type used for the normalization rack, if any.

Detailed information for Normalization Rack on Slot X

Dest. Pos.   Position on normalization rack.

Sample ID   ID of the input sample.

Source Concentration   The concentration of the template.

Source Template slot   Slot from which template was taken.

Source Template pos.   Position on slot from which template was taken.

Source Diluent slot   Slot from which diluent was taken.

Source Diluent pos.	Position on slot from which diluent was taken.
Template Volume	Volume of transferred template. Format: #.1 μl.
Diluent Volume	Volume of transferred diluent. Format: #.1 μl.
Concentration	Concentration of the normalization and concentration unit.
Diluent transfer	Status of diluent transfer: "done", "failed" or "-" if the step was not performed.
Template transfer	Status of template transfer: "done", "failed" or "-" if the step was not performed.

Overview for Normalization Rack on Slot X

This section is only available for 96-well formats. It displays a graphical overview of the normalization rack. Each used well contains the abbreviation "N" for normalized eluate.

Assay information

Sample rack information

Sample rack ID	ID of the sample rack used.
Slot	Position of the sample rack in the "Eluate and Reagents" drawer. This can be slot 1 or 2. **Note**: In an Integrated run, this can only be slot 2.
Rack type	Name of the selected rack type.
Adapter type	Name of the required adapter for the selected rack type. For a full list of available adapters, visit www.qiagen.com/goto/QIAsymphony.
Rack file status	Name of the rack file and the status of the system-generated rack file for the sample rack is displayed here. "Signature valid" indicates that the rack file was created by the QIAsymphony SP/AS instruments, "Signature invalid" indicates that the rack file was manually modified, or "Signature unsigned" indicates that the rack file was not created by the QIAsymphony SP/AS instruments, or that the signature was removed. If not used a rack file: "created".

Assay rack information

Assay rack ID	ID of the assay rack used.
Slot	Position of the assay rack in the "Assays" drawer. This can be slot 4, 5, or 6. If a Rotor-Disc is used, this can be slot A or B.

Rack type	Name of the selected rack type.
Adapter type	Name of the required adapter for the selected rack type. For a full list of available adapters, visit www.qiagen.com/goto/QIAsymphony.
Cycler file	Name of the cycler file that is generated.

Detailed information for Assay Rack X on Slot Y

Dest. Pos.	Destination position of a specific template.
Sample ID	ID of the sample.
Source Concentration	Only visible if assay uses normalization. The concentration of the template.
Type	Defines the type of sample. For further details, see "List of abbreviations" in this section. If the type was changed automatically (e.g., for 2-step PCR), also indicates the original sample type.
IC SP	Name of the internal control (IC) that was used during sample preparation on the QIAsymphony SP. This is based on information defined in the rack file, for further details see Section 8.12.
Source slot	Source slot of specific template (i.e., slot 1, 2, or 3). **Note**: If the assay uses a normalization source slot, slot 6 (for the normalization rack) may also be used.
Source pos.	Source position of a specific template.

Assay	Name of the selected Assay Parameter Set (APS) for a specific template.
Work list	Index of the work list used. If a work list was not used, "n/a" is displayed in this field. A table below this one assigns an index to each used work list.
Template volume	Only visible if assay includes a normalization step.
	Amount of template volume transferred for normalization.
	This is set to "maximum template volume" if indirect normalization is performed and a normalization rack is in use for the position. A reference to a footer is displayed as ** after the value. The footer is shown below the table.
Diluent volume	Only visible if assay includes a normalization step.
	Amount of diluent volume transferred for normalization.
	This is set to "-" if indirect normalization is done and normalization rack is in usage for the actual position.
MM transfer	Shows whether the master mix (MM) was transferred to a specific position. "Done" indicates that the master mix transfer was successful. "-" indicates that a problem occurred during master mix transfer.

Template transfer	Shows whether the template was transferred to a specific position. "Done" indicates that template transfer was successful. "-" indicates that a problem occurred during template transfer.
Diluent transfer	Only visible if assay includes a normalization step.
	Status of diluent transfer: "done", "failed" or "-" if the step was not performed.
Validity AS result	Shows the validity of an assay run for each assay position (i.e., "valid", "unclear", or "invalid"). See "Sample status", page 8-51 for more information.
	"Removed" if assay point was removed without replanning the batch (only possible in integrated run).

Abbreviations

AC	Assay control
EC+	Positive extraction control
EC–	Negative extraction control
IC	Internal control
n/a	Not applicable
N	Normalized eluate/sample/EC+/EC–
NTC	No template control
NTC+IC	No template control containing master mix with internal control

NTC–IC	No template control containing master mix without internal control
S	Sample
Std	Assay standard

Overview for Assay Rack X on Slot X

This section is only available for 96-well formats. It displays a graphical overview of each assay rack that is set up during an assay run. The validity of each assay is indicated by a color. For more information, see "Sample status", page 8-51. Each well contains an abbreviation for the template type and an index for the corresponding assay.

	1	2	3	4	5	6	7	8	9	10
A	[1]: S	[1]: S	[1]: Std	[2]: S	[2]: AC	[3]: S				
B	[1]: S	[1]: S	[1]: Std	[2]: S	[2]: NTC+IC	[3]: S				
C	[1]: S	[1]: S	[1]: Std	[2]: S	[3]: S	[3]: Std				
D	[1]: S	[1]: S	[1]: AC	[2]: S	[3]: S	[3]: Std				
E	[1]: S	[1]: S	[1]: NTC+IC	[2]: S	[3]: S	[3]: Std				
F	[1]: S	[1]: S	[2]: S	[2]: Std	[3]: S	[3]: AC				
G	[1]: S	[1]: S	[2]: S	[2]: Std	[3]: S	[3]: NTC+IC				
H	[1]: S	[1]: S	[2]: S	[2]: Std	[3]: S					

Index	Assay
[1]	PCR_4_96well
[2]	PCR_5_96well
[3]	PCR_6_96well

Slot temperature profiles

Slot temperature profiles are listed only, if a temperature violation was detected.

Time	Time at which the temperature was documented.
Slot x	Temperature of the specific slot. X defines the slot number.

Time span information

Time span information is listed for the different steps of assay setup for each assay that is set up during a run.

Start	Start time of the step in the assay run.
End	End time of the step in the assay run.
Duration (hh:mm:ss)	Time taken for a particular step within the assay run.
Max. allowed duration (hh:mm:ss)	Maximum duration of an assay run. This is defined in the assay definition. If "n/a" is displayed this indicates that there is no maximum duration defined in the assay definition.
Creation of master mix	Time taken from the transfer of the first reagent to the transfer of the last reagent.
Reagents on instrument slot X	Time taken from pressing of "Load" button until transfer of last reagent to master mix.
Run	Total duration of the assay setup run.
Samples loaded	Time taken from pressing of "Load" button until transfer of first sample. **Note**: In case of integrated run, this time span is not shown, since the rack is loaded automatically by the transfer module.
Transfer of master mix	Time from the transfer of the master mix to the first assay position to the last assay position.
Transfer of samples	Time from the transfer of the first sample to the transfer of the last sample.

Waiting time until unloading, rack X	Measured from the last transfer to assay rack X to the removal of the run.

Assay parameter information

The "Assay parameters" section provides information about those assay parameters that can be modified with the "Process Definition" editor tool of the QIAsymphony Management Console or on the touchscreen. For further details about the "Process Definition" editor tool see the *QIAsymphony Management Console User Manual*.

APS format version	Version of the ***.xml** structure of an Assay Parameter Set.
APS version	Assay Parameter Set (APS) version.
Last change	Date that the Assay Parameter Set was last modified (yyyy/mm/dd).
Author	Name or role of the user that created the Assay Parameter Set with the QIAsymphony Management Console. If the author is "Unknown" the QIAsymphony Management Console was not connected to the QIAsymphony SP/AS instruments when the Assay Parameter Set was defined. For more details, refer to the *QIAsymphony Management Console User Manual*.
APS authentic	"Custom file" indicates that the Assay Parameter Set was modified by a user. "QIAGEN file" indicates that this is an original file from QIAGEN and has not been modified by a user.

Number of samples, excluding controls	Number of samples, not including assay controls.
Assay definition	Name of the Assay Definition.
AD version	Version of the Assay Definition.
AD authentic	"Custom file" indicates that the Assay Definition was modified by a user. "QIAGEN file" indicates that this is an original file from QIAGEN and has not been modified by a user.
Cycler group	Name of the cycler group to which the assay definition refers.
Dyes	Dye(s) which were used. If ABI dyes were used it shows a table within the Dyes section showing the ABI dye information (Detector, Reporter, …). Shows a list of dyes if other dyes were used.
Template volume (µl)	Template volume used for each assay position.
Master mix volume (µl)	Volume of master mix used for each assay position.
Pattern based positioning	"Yes" is only shown if Assay Parameter Set defines a user-defined output pattern.

Assay parameters

Replicates, samples	Number of sample replicates.
Replicates, EC+	Number of positive extraction control replicates.
Replicates, EC–	Number of negative extraction control replicates.
Assay-specific IC in samples	Indicates whether an assay specific internal control is present in samples. "Yes" indicates that there is an assay specific internal control in samples. "No" indicates that there is no assay specific internal control in samples.
Number, assay positive controls	Number of assay positive controls, not for user-defined output patterns.
Replicates, assay positive controls	Number of replicates of assay positive controls, not for user-defined output patterns.
Replicates, assay no template controls (with MM+IC)	Number of replicates of no template controls with master mix and internal control, not for user-defined output patterns.
Replicates, assay no template controls (with MM–IC)	Number of replicates of no template controls with master mix and without internal control, not for user-defined output patterns.
Number, assay standard	Number of assay standards.

Replicates, assay standard	Number of replicates of assay standards.
Ready-to-use master mix	Indicates whether a ready-to-use master mix was used. "Yes" indicates that a ready-to-use master mix was used. "No" indicates that a ready-to-use master mix was not used.

Detailed run information

This section lists any errors that may have occurred during the assay run. See the *Troubleshooting* section, page 10-1, for more details about errors.

Sample status

Samples that are processed on the QIAsymphony AS are classified as "valid", "unclear", or "invalid", and are color coded according to their state in the QIAsymphony AS result file.

"valid" (green)	The sample was processed correctly.
[2]: S	

"unclear" (yellow)	If the run was paused, the samples will be generally classified as "unclear". Furthermore, unclear classification is possible in some cases where insufficient sample volume is available or the cooling temperature is out of range.
unclear, 31115	

"invalid" (red)	A serious error occurred during sample processing (e.g., the run stopped and could not be continued). An "invalid" sample cannot be processed by the QIAsymphony AS and cannot be assigned to an Assay Parameter Set.
[3]: S	

"Removed"	If SP batch was removed from integrated run, related assay points are marked as removed.

Note: If the assay rack has not been removed from the "Assays" drawer, sample states can be viewed in the "Sample View" screen of the "Assay Setup" menu. After the assay rack has been removed, sample states are documented in the result file.

8.10 Loading information file

After pressing "Queue" in the assay setup user interface the loading information file will be created and can be printed. The loading information file contains detailed information about required reagents, normalization rack, sample rack(s), assay rack(s), and disposable filter-tips for setting up an assay run on the QIAsymphony AS.

The filename is generated automatically with the following nomenclature:

LoadingInformation_YYYYMMDD_HHMMSS_Run ID.htm

LoadingInformation_YYYYMMDD_HHMMSS_Run ID.xml

When downloading a loading information file, the ***.htm** and ***.xml** file are available as zipped (***.zip**) files on the USB stick. When using the "File Transfer" tool, these files will be automatically unzipped.

Content of loading information file

General information

User	Name of user who defined the run.
Role	Role of the user who assigned the run (i.e., "Operator" or "Supervisor").
Date (yyyy-mm-dd)	Date of run.

Run ID	Run ID generated by the QIAsymphony AS.
QIAsymphony AS SN	Serial number of the QIAsymphony AS.
Loading file	File name of the ***.xml** loading information file.

Reagent information

Adapter	Name of the required reagent adapter. For a full list of available adapters, visit www.qiagen.com/goto/QIAsymphony.
Slot	Position of the reagent adapter on the "Eluate and Reagents" drawer. This could be slot 1 or slot 3.
Assay	Name of the Assay Parameter Set.
Assay definition	Name of the Assay Definition.
Reagent	Reagent names as defined in the Assay Definition.
Conc.	Concentration of specific reagents such as assay standards.
Volume (µl), required	Volume of reagent(s) that must be available on the worktable before starting an assay run.
Tube type	Required consumables for holding reagent(s) on the worktable.
Pos.	Position of reagent tube(s) on the reagent adapter.

Additional reagent information

If ready-to-use master mix is used, the following information is also included in the loading information file.

Assay	Name of the Assay Parameter Set for which the reagent is required.
Reagent	Name of the reagent(s).
Volume (µl)	Required volume of master mix.

Sample rack information

Sample rack ID	ID of the sample rack used.
Slot	Position of the sample rack in the "Eluate and Reagents" drawer. This can be slot 1 or 2.
Rack type	Name of the selected rack type.
Category	Name of the category to which the rack type belongs.
Adapter type	Name of the required adapter for the selected rack type. For a full list of available adapters, visit www.qiagen.com/goto/QIAsymphony.
Rack file status	If a rack file was used, the file name and status are documented. "Signature valid" indicates that the rack file was created by the QIAsymphony SP/AS instruments, "Signature invalid" indicates that the rack file was manually modified, or "Signature unsigned" indicates that the rack file was not created by the QIAsymphony SP/AS instruments, or that the signature was removed.

Normalization rack information

If the assay includes a normalization step, the following information is also included in the loading information file.

Slot	Position of the normalization rack in the "Assays" drawer (i.e., slot 6).
Rack type	Name of the rack type as defined in Assay Parameter Set.
Adapter type	Name of the required adapter for the rack type. For a full list of available adapters, visit www.qiagen.com/goto/QIAsymphony.

Assay rack information

Assay rack ID	ID of the assay rack used.
Slot	Position of the assay rack in the "Assays" drawer. This can be slot 4, 5, or 6. If a Rotor-Disc is used, this can be slot A or B.
Rack type	Name of the selected rack type.
Adapter type	Name of the required adapter for the selected rack type. For a full list of available adapters, visit www.qiagen.com/goto/QIAsymphony.
Plasticware	Number of tubes or strip tubes that must be loaded into the defined positions.

Tip information

Tip type	Tip types used for the run. These can be 50, 200, and/or 1500 μl.
Required tips	Number of tips of a specific type that are required for a run.

Notes

This section lists things that must be done or checked before starting a run.

■ Empty tip waste
■ Provide waste bag
■ Install tip chute

QIAsymphony AS instrument layout
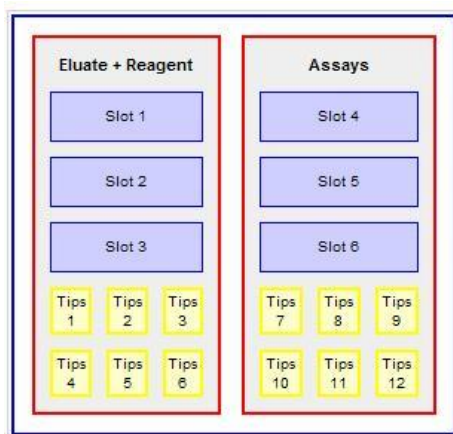
Deletion of loading information files

The user will be notified when the QIAsymphony SP/AS instruments are short of storage space for loading information files. For more information about deleting files, see Section 8.5.

8.11 Work list files

Work list files are designed to reduce manual editing during assay definition. They enable automatic assignment of samples to Assay Control Sets and Assay Parameter Sets. Work list files can be generated by a Laboratory Information Management System (LIMS) or manually by the user. The "Work list tool" is available for download from www.qiagen.com/goto/QIAsymphony. This Microsoft Excel tool enables work lists to be created quickly and easily. Work

lists can be saved in ***.xml** format, which is compatible with the QIAsymphony SP/AS instruments.

If a sample ID matches a sample ID that is defined in a work list file, the assigned Assay Control Set and/or Assay Parameter Set will be preselected in the software. If a sample ID is associated with more than one work list, and these work list files are associated with incompatible Assay Control Sets, the user can choose which work list to use. See Section 2.11 of *Operating the QIAsymphony SP* for more details about how to do this.

Work list files must be created as tab delimited text files (***.txt** or ***.csv**) in a text editor (e.g., Notepad or Microsoft Excel), or using the "Work list tool" for Microsoft Excel that is available for download from the "User Support" tab at www.qiagen.com/goto/QIAsymphony. Before the work lists can be transferred to the QIAsymphony SP/AS instruments they must be converted to ***.xml** format (see "CSV Conversion" tool in the *QIAsymphony Management Console User Manual* for details about how to do this).

Work lists that are in ***.xml** format can be transferred to the QIAsymphony SP/AS instruments using a USB stick or the "File Transfer" tool and "Auto Transfer" tool of the QIAsymphony Management Console (see the *QIAsymphony Management Console User Manual* for more details). Work list files are saved as ***.xml** files on the QIAsymphony SP/AS instruments in the directory **/data/Worklists**.

Note: Work lists are not automatically deleted. For information about how to delete work list files see Section 8.5.

Note: Work list files have an expiry date. The time period until expiry can be configured. The expiry date of a work list file can be modified by the "Supervisor" in the "General Process" tab of the "Configuration" menu. See Section 6.2.2 for more details about this.

Work list configuration parameters

A number of work list parameters determine how the QIAsymphony SP/AS instruments handle work lists. These parameters can be modified in the "General Process" and "Process SP 3" tabs of the "Configuration" menu.

Work list parameters that can be configured in the "General Process" tab:

■ Number of days for which a work list is valid?

■ Allow information for single samples in work lists to be overwritten?

Work list parameters that can be configured in the "Process SP 3" tab:

■ Allow processing of samples without a work list entry?

■ Allow combination of multiple work lists for one batch?

■ Allow partial use of work lists?

■ Check sample tube type required by work list?

■ Check elution rack ID required by work list?

For more detailed information about modifying these parameters, see Section 6.2.2.

Creating work list files

We recommend creating work list files using the "Work list tool" that is available for download from the "User Support" tab at www.qiagen.com/goto/QIAsymphony. This tool enables users to quickly and easily create work list files that can be saved in ***.csv** or ***.xml** format.

Work list files can also be created in text editors (e.g., Notepad or Microsoft Excel). A tab delimited text file, created in a text editor, must have the layout in the following table to enable it to be converted into ***.xml** format. Each row in the table represents one line in the text file. In addition, see the examples (page 8-60) for the layout of a work list file created in Notepad, and the layout of a work list file created in Microsoft Excel.

The tab delimited text file must have the same field delimiter that is configured in the "CSV Conversion" tool of the QIAsymphony Management Console. The recommended delimiter is ";". This delimiter is also the default delimiter in Microsoft Excel.

Note: Text is case sensitive. Blank lines will be ignored by the conversion. Blanks within a line should only be used if they belong to a name or attribute.

Row 1 — FileType;Worklist;1	Specifies the file type. This is required for the "CSV Conversion" tool.
Row 2 — Table;Worklist	Specifies the next table. This is required for the "CSV Conversion" tool.
Row 3 — SampleID;AssayControlSetName;RequiredSPSampleTubeType;RequiredSPElutionRackID;AssayParameterSetName	Specifies the table headers. Defines what information must be entered into which column. **Note**: The column "RequiredSPSample TubeType" is only used if the parameter "Check sample type required by work list?" is set to "Yes". **Note**: The column "RequiredSPElutionRackID" is only used if the parameter "Check elution rack ID is required by work list?" is set to "Yes".
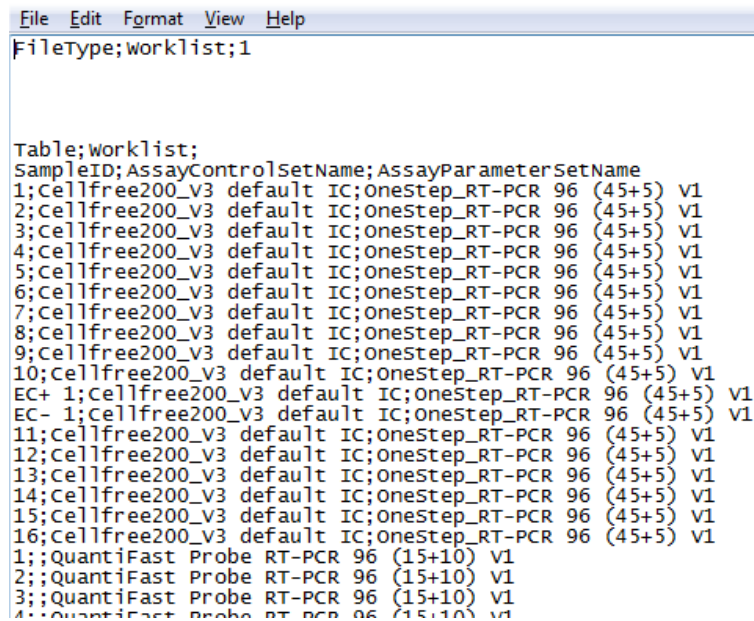
Row 4 … — Sample IDs and the associated Assay Control Sets and Assay Parameter Sets are listed.	Specifies which Assay Control Set and Assay Parameter Sets should be used to process a sample. Each row defines one sample.

Note: To use more than one Assay Parameter Set with the same sample ID, an additional row must be added with the sample ID, additional Assay Parameter Set(s), and the Assay Control Set.

Note: For consumables and rack types the names defined in the software must be used. For a full list of names, visit www.qiagen.com/goto/QIAsymphony.

Work list file created with Notepad

```
File  Edit  Format  View  Help
FileType;Worklist;1



Table;Worklist;
SampleID;AssayControlSetName;AssayParameterSetName
1;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
2;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
3;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
4;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
5;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
6;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
7;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
8;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
9;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
10;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
EC+ 1;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
EC- 1;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
11;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
12;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
13;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
14;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
15;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
16;Cellfree200_V3 default IC;OneStep_RT-PCR 96 (45+5) V1
1;;QuantiFast Probe RT-PCR 96 (15+10) V1
2;;QuantiFast Probe RT-PCR 96 (15+10) V1
3;;QuantiFast Probe RT-PCR 96 (15+10) V1
4;;QuantiFast Probe RT-PCR 96 (15+10) V1
```

Work list file created with Microsoft Excel

	A	B	C
1	FileType	Worklist	1
2			
3			
4			
5			
6	Table	Worklist	
7	SampleID	AssayControlSetName	AssayParameterSetName
8	1	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
9	2	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
10	3	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
11	4	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
12	5	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
13	6	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
14	7	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
15	8	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
16	9	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
17	10	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
18	EC+ 1	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
19	EC- 1	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
20	11	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
21	12	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
22	13	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
23	14	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
24	15	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
25	16	Cellfree200_V3 default IC	OneStep_RT-PCR 96 (45+5) V1
26	1		QuantiFast Probe RT-PCR 96 (15+10) V1
27	2		QuantiFast Probe RT-PCR 96 (15+10) V1

Note: Be sure to include the specifier "1", highlighted in the red circle. The "CSV Conversion" tool requires this numeric specifier for recognition of the work list file.

Note: If samples specified in a work list are to be processed in a single batch, the Assay Control Sets must be compatible. Only Assay Control Sets that refer to the same protocol and have the same elution volume can be processed within the same batch. The internal control within the Assay Control Sets of a work list may vary (Section 2.13 of *Operating the QIAsymphony SP*). For more information about batch/run definition, see Section 2.11 of the *Operating the QIAsymphony SP*.

8.12   Rack file

Rack files contain information about sample racks, elution racks, or assay racks (i.e., rack type, rack ID, sample ID, sample type, sample volumes, assay volumes). Rack files can be generated automatically by the QIAsymphony SP/AS instruments (e.g., for elution racks processed on the QIAsymphony SP). The unique rack ID of a sample or assay rack enables the QIAsymphony SP/AS instruments to identify the corresponding rack file. When the rack ID is entered, the QIAsymphony SP/AS instruments scan the rack file directory and select the correct rack file. Only one rack file can be assigned to each slot per assay run.

Existing rack files are updated during an assay run. For example, if the original sample volume was 200 μl and 50 μl was used during an assay run, the rack file is updated and will inform the user that only 150 μl sample volume remains.

Rack files must be created as tab delimited text files (***.txt** or ***.csv**) using a text editor (e.g., Notepad or Microsoft Excel). Before the rack files can be transferred to the QIAsymphony SP/AS they must be converted to ***.xml** format (see "CSV Conversion" tool in the *QIAsymphony Management Console User Manual* for details about how to do this).

Rack files that are in ***.xml** format can be transferred to the QIAsymphony SP/AS instruments using a USB stick or the "File Transfer" tool of the QIAsymphony Management Console.

Note: Rack files can be used several times. They have no expiry date.

Note: Rack files can be downloaded from the QIAsymphony SP/AS as ***.xml** files and can be converted into ***.csv** format using the "CSV Conversion" tool of the QIAsymphony Management Console.

Note: Rack files are not deleted automatically. For information about how to delete rack files see Section 8.5.

Creating rack files manually

A tab delimited text file, created using a text editor (e.g., Notepad or Microsoft Excel), must have the layout in the following table to enable it to be converted into ***.xml** format. Each row in the table represents one line in the text file. In addition, see the examples (page 8-65) for the layout of a rack file created in Notepad, and the layout of a rack file created in Microsoft Excel.

The tab delimited text file must have the same field delimiter that is configured in the "CSV Conversion" tool of the QIAsymphony Management Console. The recommended delimiter is ";". This delimiter is also the default delimiter in Microsoft Excel.

Note: Text is case sensitive. Blank lines will be ignored by the conversion. Blanks within a line should only be used if they belong to a name or attribute.

Row 1 — Filetype;RackFile;1	Specifies the file name. This is required for the "CSV Conversion" tool.
Row 2 — Table;RackInfo	Specifies the next table. This is required for the "CSV Conversion" tool.
Row 3 — RackID;RackLabware;DateTime;Usage;ReadyForAS;	Specifies the table headers. Defines what information must be entered into which column.
Row 4 — Rack ID	Specifies the rack ID and the rack type.
Row 5 — Table;RackPosition	Specifies the next table.

Row 6 — SampleID:PositionName;PositionIndex;Labware;TotalVolume;Internal ControlName;State;SampleType;Concentration	Specifies the headlines of the table. Concentration is optional and can be omitted.
Row 7… — lists the sample IDs and information associated with position, consumables, and volume etc.	–

Note: For consumables and rack types the names defined in the software must be used. For a full list of names, visit www.qiagen.com/goto/QIAsymphony.

To generate a rack file you must enter some mandatory information into the ***.csv** file, using a text editor (e.g., Notepad or Microsoft Excel). See the example "Rack file created with Microsoft Excel" for the mandatory entries (page 8-65). The empty rows and columns will be filled by the software when the rack file is used on the instruments.

The "RackId" is important. The ID listed here is the name of the rack file displayed on the touchscreen. Labware listed under "RackLabware" must have the correct name, as written in the software. For the QIAsymphony AS, "Eluate" must be written under "Usage". For the QIAsymphony SP, "Sample" must be written under "Usage".

In addition, information about sample ID, position, volume, sample state, and sample type is required. The "PositionName" must have the format "letter:number". The sample state must be "valid". The "SampleType" can be "Sample", "ExtractionControl_Pos", or "ExtractionControl_Neg".

Rack file created with Notepad

```
File  Edit  Format  View  Help
FileType;RackFile;1;;;;;

Table;RackInfo;;;;;;
RackId;RackLabware;DateTime;Usage;;;
Example;QIA#19588 *EMTR;20111010 11:11:11;Eluate;;;

Table;RackPosition;;;;;;
SampleID;PositionName;PositionIndex;Labware;TotalVolume;InternalControlName;State;SampleType
1;A:1;0;QIA#19588 *EMTR;200.0;;valid;Sample
2;B:1;1;QIA#19588 *EMTR;200.0;;valid;Sample
3;C:1;2;QIA#19588 *EMTR;200.0;;valid;Sample
4;D:1;3;QIA#19588 *EMTR;200.0;;valid;Sample
5;E:1;4;QIA#19588 *EMTR;200.0;;valid;Sample
6;F:1;5;QIA#19588 *EMTR;200.0;;valid;Sample
7;G:1;6;QIA#19588 *EMTR;200.0;;valid;Sample
8;H:1;7;QIA#19588 *EMTR;200.0;;valid;Sample
9;A:2;8;QIA#19588 *EMTR;200.0;;valid;Sample
10;B:2;9;QIA#19588 *EMTR;200.0;;valid;Sample
11;C:2;10;QIA#19588 *EMTR;200.0;;valid;Sample
12;D:2;11;QIA#19588 *EMTR;200.0;;valid;Sample
13;E:2;12;QIA#19588 *EMTR;200.0;;valid;Sample
14;F:2;13;QIA#19588 *EMTR;200.0;;valid;Sample
15;G:2;14;QIA#19588 *EMTR;200.0;;valid;Sample
16;H:2;15;QIA#19588 *EMTR;200.0;;valid;Sample
17;A:3;16;QIA#19588 *EMTR;200.0;;valid;Sample
18;B:3;17;QIA#19588 *EMTR;200.0;;valid;Sample
19;C:3;18;QIA#19588 *EMTR;200.0;;valid;Sample
20;D:3;19;QIA#19588 *EMTR;200.0;;valid;Sample
21;E:3;20;QIA#19588 *EMTR;200.0;;valid;Sample
22;F:3;21;QIA#19588 *EMTR;200.0;;valid;Sample
EC+ 1;A:9;64;QIA#19588 *EMTR;200.0;;valid;ExtractionControl_Pos
EC+ 2;B:9;65;QIA#19588 *EMTR;200.0;;valid;ExtractionControl_Pos
EC- 1;C:9;66;QIA#19588 *EMTR;200.0;;valid;ExtractionControl_Neg
EC- 2;D:9;67;QIA#19588 *EMTR;200.0;;valid;ExtractionControl_Neg
```

Rack file created with Microsoft Excel

	A	B	C	D	E	F	G	H
1	FileType	RackFile	1					
2								
3	Table	RackInfo						
4	RackId	RackLabware	DateTime	Usage				
5	Example	QIA#19588 *EMTR	20111010 11:11:11	Eluate				
6								
7	Table	RackPosition						
8	SampleID	PositionName	PositionIndex	Labware	TotalVolume	InternalControlName	State	SampleType
9	1	A:1	0	QIA#19588 *EMTR	200.0		valid	Sample
10	2	B:1	1	QIA#19588 *EMTR	200.0		valid	Sample
11	3	C:1	2	QIA#19588 *EMTR	200.0		valid	Sample
12	4	D:1	3	QIA#19588 *EMTR	200.0		valid	Sample
13	5	E:1	4	QIA#19588 *EMTR	200.0		valid	Sample
14	6	F:1	5	QIA#19588 *EMTR	200.0		valid	Sample
15	7	G:1	6	QIA#19588 *EMTR	200.0		valid	Sample
16	8	H:1	7	QIA#19588 *EMTR	200.0		valid	Sample
17	9	A:2	8	QIA#19588 *EMTR	200.0		valid	Sample

8.13 Cycler files

If the assigned assay racks are compatible with selected PCR cyclers a cycler file will be created after each assay run. The cycler file contains information (i.e., sample IDs, sample positions, concentration, and units for assay standards) that can be exported to the PCR cycler.

Cycler files are available for the Rotor-Gene Q and ABI cyclers. If one of these cycler files does not meet your requirements or for further information about the maintained ABI cycler models, please contact QIAGEN Technical Services.

Rotor-Gene Q cycler file

The Rotor-Gene Q cycler file has the following layout.

QIAsymphony sample type	Rotor-Gene Q sample type	Color in column C of the Rotor-Gene Q sample settings
Sample (S)	Unknown	
Extraction control negative (EC-)	None	
Extraction control positive (EC+)	PosControl	
Assay standard (Std)	Standard	
No template control (NTC)	NTC	
Assay control (AC)	None	

ABI cycler file

To create a cycler file for ABI cyclers the dye list must have the layout described in Section 13.6 in the *QIAsymphony Management Console User Manual*.

For further information about the maintained ABI cycler models please contact QIAGEN Technical Services.

8.14   Instrument report file

Instrument report files are password-protected ***.zip** files that are only intended for QIAGEN Technical Services, to help with troubleshooting.

You may be requested by QIAGEN Technical Services to create an instrument report file in the "Instrument Report" menu. In this case, refer to Section 10.3.2 in "Troubleshooting" for more details. For more details about information that can be found in the "Instrument Report" menu, see Section 3.14 in *Operating the QIAsymphony SP*.

8.15   Log files

The log files are data files that contain general information about the QIAsymphony SP/AS, user interactions, and details about the protocol being run.

The log files are written in plain text document and can be displayed using a text editor (e.g., Notepad).

To download a log file to the USB stick, see page 8-11. Log files can also be downloaded using the QIAsymphony Management Console. See the *QIAsymphony Management Console User Manual* for more information.

Log files contain information that may be required for Troubleshooting and for QIAGEN Technical Services.

8.16   Concentration data file

The concentration data file contains a concentration value for each sample ID. This data file is only relevant if a QIAsymphony AS system is connected to the QIAsymphony SP. The concentration data file should be used as a basis if the user wants to apply a normalization step (refer to Section 2.3.3 "Recommended workflow for independent run with normalization" in the *QIAsymphony SP/AS User Manual — Operating the QIAsymphony AS* for further information about the normalization workflow on the QIAsymphony AS).

The raw data format is generated by an external quantification device (cycler). The file format used by the QIAsymphony AS is a predefined ***.xml** format. Use the CSV Conversion tool of the QIAsymphony Management Console to convert the concentration data from ***.csv** to ***.xml** format. The concentration data can be created as tab delimited text files (***.txt** or ***.csv**) in a text editor (e.g., Notepad or Microsoft Excel).

Alternatively, it is possible to write the concentration data directly to rack files and to upload the rack file (refer to Section 2.4.4 of the *QIAsymphony SP/AS User Manual — Operating the QIAsymphony AS* for further information about the import of rack file data).

The concentration data file can be uploaded to the QIAsymphony AS via USB stick or by using the QIAsymphony Management Console. After importing the concentration data file and writing the concentration data into the rack file, the QIAsymphony AS automatically deletes the concentration data file. If all concentration data is already defined in the rack file before uploading the rack file on the QIAsymphony AS, there is no need to create and use a concentration data file.

We recommend creating concentration data files using the "concentration data tool". This tool can be downloaded from the "User Support" tab at www.qiagen.com/goto/QIAsymphony. This tool enables users to quickly and easily create concentration files that can be saved in ***.csv** or ***.xml** format.

Concentration data files can also be created in text editors (e.g., Notepad or Microsoft Excel). A tab delimited text file, created in a text editor, must have the layout in the following table to enable it to be converted into ***.xml** format. Each row in the table represents one line in the text file.

9   Maintenance

The table below describes the types and frequencies of maintenance required and the personnel required to carry out the maintenance. Following these procedures ensures optimum performance of your QIAsymphony SP/AS instruments.

Important: If liquid is spilt on the QIAsymphony SP/AS worktables, wipe it away as soon as the run has finished in accordance with the required safety regulations. Do not allow the liquid to dry.

Note: Optional maintenance is not mandatory for instrument function, but is highly recommended to reduce risk of contamination.

Type of task	Frequency	Personnel
Regular maintenance	At the end of each run	Laboratory technicians or equivalent
Daily maintenance	At the end of each day, after the regular maintenance	Laboratory technicians or equivalent
Weekly maintenance	Once per week, after the regular and daily maintenance	Laboratory technicians or equivalent
Annual preventive maintenance and servicing	Once per year	**QIAGEN Field Service Specialists only**

Cleaning agents

The following disinfectants and detergents are recommended for cleaning the QIAsymphony SP/AS instruments:

■ Mikrozid® Liquid (Schülke & Mayr GmbH; www.schuelke-mayr.com) — ethanol-based disinfectant for spraying onto items that have been removed from the QIAsymphony SP/AS worktables

■ Mikrozid Wipes (Schülke & Mayr GmbH; www.schuelke-mayr.com) — moistened with ethanol-based disinfectant for wiping surfaces of the QIAsymphony SP/AS

■ Mikrozid Sensitive Liquid (Schülke & Mayr GmbH; www.schuelke-mayr.com) — quaternary ammonium salt based disinfectant for alcohol-sensitive surfaces (consists of 0.26 g quaternary ammonium compounds, benzyl-C12-C16-alkyldimethyl, chlorides; 0.26 g Didecyldimethylammonium chloride and 0.26 g quaternary ammonium compounds, benzyl-C12-C14-alkyl[(ethylphenyl)methyl]dimethyl, chlorides per 100 g Mikrozid Sensitive Liquid)

Removal of RNase contamination

■ 5 PRIME RNaseKiller (5 PRIME, cat. no 2500080) — for cleaning surfaces and submerging worktable items

■ 0.1 M NaOH — as an alternative to 5 PRIME RNaseKiller

Removal of nucleic acid contamination (DNA and RNA)

■ DNA-ExitusPlus™ IF (AppliChem, cat. no. A7409,0100; indicator-free variant of DNA-ExitusPlus) — for cleaning surfaces and submerging worktable items

Important: Do not use alcohol or alcohol-based disinfectants to clean the QIAsymphony SP/AS hoods or side panels. Exposure of the QIAsymphony SP/AS hoods and side panels to alcohol or alcohol-based disinfectants will cause surface cracking. Clean the QIAsymphony SP/AS hoods and side panels with distilled water or Mikrozid Sensitive Liquid only.

Europe

Gigasept® Instru AF (Schülke & Mayr GmbH; www.schuelke-mayr.com) — disinfectant for submerging worktable items (consists of 14 g cocospropylene-diamine-guanidine diacetate, 35 g phenoxypropanols, and 2.5 g benzalkonium chloride per 100 g Gigasept Instru AF , with anticorrosion components, fragrance, and 15–30% nonionic surfactants).

USA

DECON-QUAT® 100 (Veltek Associates, Inc.; www.sterile.com) — quaternary ammonium salt based disinfectant concentrate for submerging worktable items (contains 5% alkyldimethylbenzylammonium chloride and 5% alkyldimethylethylbenzylammonium chloride).

Note: If you want to use disinfectants different from those recommended, ensure that their compositions are similar to those described above. A suitable alternative to Mikrozid Liquid is Incidin® Liquid (Ecolab; www.ecolab.com).

CAUTION	**Damage to the instrument(s)** [C4]
⚠	Do not use bleach, solvents, or reagents containing acids, alkalis, or abrasives to clean the QIAsymphony SP/AS instruments.

CAUTION	**Damage to the instrument(s)** [C5]
⚠	Do not use spray bottles containing alcohol or disinfectant to clean surfaces of the QIAsymphony SP/AS instruments. Spray bottles should be used only to clean items that have been removed from the worktables.

CAUTION	**Damage to the instrument(s)** [C6]
⚠	After wiping the drawers and lysis station with paper towels, make sure that no bits of paper towel remain. Pieces of paper towel remaining on the worktable could lead to a worktable collision.

If solvents or saline, acidic, or alkaline solutions are spilt on the QIAsymphony SP/AS instruments, wipe them away immediately.

CAUTION	**Damage to the instrument hood(s) or side panels** [C7] Never clean the instrument hood(s) or side panels with alcohol or alcohol-based solutions. Alcohol will damage the hood and the side panels. To clean the hood(s) and side panels, use distilled water or Mikrozid Sensitive Liquid only.

Important: Do not use alcohol or alcohol-based reagents to clean the QIAsymphony hood(s) or side-panels.

WARNING	**Risk of electric shock** [W14] Do not open any panels on the QIAsymphony SP/AS instruments. **Risk of personal injury and material damage** Only perform maintenance that is specifically described in this user manual.

Disconnect the line power cord from the power outlet before servicing.

Servicing

The QIAsymphony SP/AS instruments are supplied with a 1-year warranty that includes all repairs due to mechanical breakdown. Worldwide, the maximum time for response to a breakdown is 5 days. Application development, software upgrades, worktable accessories, and disposable items are not included in the warranty.

QIAGEN offers comprehensive Service Support Agreements, including IQ/OQ, Warranty Extensions, Full Cover Support Agreements, and Preventive Maintenance Agreements. Service Support Agreements maximize productivity and ensure high performance from your instrument. In addition, service histories are fully documented and all parts are certified and guaranteed.

Contact your QIAGEN Field Service representative or your local distributor for more information about flexible Service Support Agreements from QIAGEN.

9.1 Regular maintenance procedure

Regular maintenance is required after each run on the QIAsymphony SP/AS. A separate maintenance routine should be performed for the QIAsymphony SP and QIAsymphony AS.

Important: Before running a service protocol from the "Maintenance SP" or "Maintenance AS" menu, ensure that the QIAsymphony SP/AS hoods are closed.

WARNING/ CAUTION	**Risk of personal injury and material damage** [W1] Improper use of the QIAsymphony SP/AS instruments may cause personal injuries or damage to the instruments. The QIAsymphony SP/AS instruments must only be operated by qualified personnel who have been appropriately trained. Servicing of the QIAsymphony SP/AS must only be performed by QIAGEN Field Service Specialists.

WARNING	**Hazardous chemicals and infectious agents** [W16] The waste contains samples and reagents. This waste may contain toxic or infectious material and must be disposed of properly. Refer to your local safety regulations for proper disposal procedures.

9.1.1 Regular maintenance procedure for the QIAsymphony SP

1. Remove and safely store eluates from the "Eluate" drawer. As an optional step, download the result file(s) as described on page 8-11 and ensure that the files have been backed up.
2. Remove used sample tubes/plates from the "Sample" drawer and discard according to your local safety regulations.

3. Remove reagent cartridges from the "Reagents and Consumables" drawer. Seal partially used reagent cartridges and store according to the instructions in the handbook of the QIAsymphony Kit you are using. Discard used reagent cartridges according to your local safety and environmental regulations.

4. Replace the tip disposal bag.

   Note: Residual liquid from the tip disposal chute may drip.

   Note: If using the QIAsymphony SP in combination with the QIAsymphony Cabinet SP, check if the tip disposal bag is full. If it is full, empty the tip disposal bag. The waste container should be emptied to avoid contamination inside the cabinet.

5. Close unit boxes filled with waste plasticware and discard according to your local safety regulations.

6. Check the magnetic-head guards. If required, clean before starting the next protocol run.

   ■ Open the "Maintenance SP" menu and run the service protocol "Magnetic head guards". Gently raise the catches to release the magnetic-head guards.

   ■ Wipe the magnetic-head guards with ethanol-based disinfectant (e.g., Mikrozid), and incubate as appropriate.

   ■ Wipe with a lint-free cloth moistened with water and wipe dry with paper towels. Replace the magnetic-head guards.

7. Open the "Maintenance SP" menu and run the service protocol "Open magnetic head guards".

CAUTION	**Damage to the instrument(s)** [C9]
⚠	Make sure to replace the magnetic-head guards before operating the QIAsymphony SP.

8. Perform UV decontamination of the worktable (optional).

You may now run another protocol or switch off the QIAsymphony SP/AS instruments.

9.1.2 Regular maintenance procedure for the QIAsymphony AS

1. Remove the assay run by pressing the "Remove" button.

2. Remove assays from the "Assays" drawer. If desired, transfer assays directly to the PCR cycler.

3. Optional: Download the result file and, if available, the cycler file. See page 8-11 for more details. Ensure that these files have been backed up.

4. Remove used sample tubes/plates from the "Eluate and Reagents" drawer. Either store safely or discard according to your local safety regulations.

5. Remove reagent tubes and bottles from the "Eluate and Reagents" drawer and discard according to your local safety regulations.

6. Discard empty tip racks.
   Note: Do not refill used tip racks.

7. Replace the tip disposal bag after each run.
   Note: Residual liquid from the tip disposal chute may drip.
   Note: If using the QIAsymphony AS in combination with the QIAsymphony Cabinet AS, check if the tip disposal bag is full. If it is full, empty the tip disposal bag. The waste container should be emptied to avoid contamination inside the cabinet.

8. Perform UV decontamination of the worktable (optional).

You may now perform another assay run or switch off the QIAsymphony SP/AS instruments.

9.2 Daily maintenance procedure

After performing the last run of the day, perform the daily maintenance procedure, described below.

Important: Before running a service protocol from the "Maintenance" menu, ensure that the QIAsymphony SP/AS hoods are closed. Pay attention to the safety instructions.

WARNING	**Hazardous chemicals and infectious agents** [W16]
	The waste contains samples and reagents. This waste may contain toxic or infectious material and must be disposed of properly. Refer to your local safety regulations for proper disposal procedures.

WARNING	**Toxic fumes** [W7]
	Do not use bleach to clean or disinfect the QIAsymphony SP/AS instruments. Bleach in contact with salts from the buffers can produce toxic fumes.

WARNING	**Risk of fire** [W15]
	When cleaning the QIAsymphony SP/AS instruments with alcohol-based disinfectant, leave the instrument hoods open to allow flammable vapors to disperse. Only clean the QIAsymphony SP/AS instruments with alcohol-based disinfectant when worktable components have cooled down.

CAUTION	**Damage to the instrument(s)** [C5]
	Do not use spray bottles containing alcohol or disinfectant to clean surfaces of the QIAsymphony SP/AS instruments. Spray bottles should be used only to clean items that have been removed from the worktable.

9.2.1 Daily maintenance procedure for the QIAsymphony SP

Tip disposal bag

Note: When using the QIAsymphony SP Cabinet the tip disposal bag is not required. However, the waste bin should be emptied before starting the next run to avoid contamination inside the cabinet.

Note: For details about the maintenance of the QIAsymphony SP/AS cabinets, follow the instructions given in the "Maintenance" section of the QIAsymphony Cabinet SP/AS User Guide.

Note: The tip disposal bag for the QIAsymphony SP is located at the front of the "Waste" drawer. See Section 9.6 for information about how to mount the tip disposal bag holder.

UV decontamination of the worktable (optional)

See Section 9.4 for details about how to perform UV decontamination of the worktable.

Drawers and lysis station

1. Remove all removable objects (tube/plate carriers, adapters, inserts, liquid waste station/tip park station, tip disposal chute, liquid waste bottle, waste bag holder, reagent box holder) from the drawers.

2. Wipe the drawers, the removed objects, and the lysis station with ethanol-based disinfectant (e.g., Mikrozid) and incubate as appropriate. Then wipe with a cloth moistened with water and dry with paper towels. Return the objects to the drawers.

3. Optional: Clean the removed objects by soaking them in a glyoxal and quaternary ammonium salt-based disinfectant (e.g., Gigasept Instru AF) according to the manufacturer's instructions. After incubation according to manufacturer's instructions, rinse the removed objects thoroughly with water.

Important: There are spikes below the piercing device in the "Reagents and Consumables" drawer that ensure that the reagent cartridge is correctly positioned. Take care when cleaning the "Reagents and Consumables" drawer.

Conveyor base tray (optional)

1. Carefully remove the conveyor base tray from below the magnetic head.

2. Soak in a glyoxal and quaternary ammonium salt based disinfectant (e.g., Gigasept Instru AF) for at least 15 min.

3. Rinse with water and wipe dry with paper towels.
   Note: The tray can also be autoclaved at 121°C for 20 min.

Robotic gripper

1. Wipe the robotic gripper with a lint-free cloth moistened with ethanol-based disinfectant (e.g., Mikrozid). Incubate as appropriate.
   Important: Only wipe the weight. Do not wipe the rods otherwise the ball mechanism may become jammed.

2. Wipe with a lint-free cloth moistened with water and dry with paper towels.

Pipetting system tip guards

1. Open the "Tools" screen and press "Maintenance SP".

2. Move the robotic arm to the cleaning position by pressing "Tip guards".

3. Remove all 4 tip guards by pushing each tip guard upward until it clicks out of place and can be removed.

4. Soak in a glyoxal and quaternary ammonium salt based disinfectant (e.g., Gigasept Instru AF) for at least 15 min.

5. Rinse with water and wipe dry with paper towels.

CAUTION	Damage to the instrument(s) [C8]
⚠	Make sure to install the tip guards before operating the QIAsymphony SP/AS instruments.

Tip disposal chute

Note: When using the QIAsymphony Cabinet SP follow instructions given in the Maintenance section of the *QIAsymphony Cabinet SP/AS User Guide*.

1. Remove the tip disposal chute from the "Waste" drawer.
   Note: Residual liquid from the tip disposal chute may drip.

2. Soak in a glyoxal and quaternary ammonium salt based disinfectant (e.g., Gigasept Instru AF) for at least 15 min.

3. Rinse with water and wipe dry with paper towels.

Liquid waste container

1. Remove the liquid waste container from the "Waste" drawer.

2. Empty the liquid waste container. Dispose of the liquid waste according to your local safety regulations.

3. Clean the liquid waste container with a glyoxal and quaternary ammonium salt based disinfectant (e.g., Gigasept Instru AF) according to the manufacturer's instructions.

4. Rinse the liquid waste container with deionized water.

5. Replace the liquid waste container in the "Waste" drawer.

9.2.2 Daily maintenance procedure for the QIAsymphony AS

Tip disposal bag

The tip disposal bag of the QIAsymphony AS is located at the front of the "Assay" drawer. See Section 9.6 for details about how to install and remove a tip disposal bag, the procedure is the same as for the QIAsymphony SP.

UV decontamination of the worktable (optional)

See page 9-16 for details about how to perform UV decontamination of the worktable.

Drawers

1. Remove all removable objects (tubes/plates, adapters) from the drawers.

2. Wipe the drawers and the removed adapters with quaternary ammonium salt based disinfectant (e.g., Gigasept Instru AF) and incubate as appropriate. Then wipe with a cloth moistened with water and dry with paper towels. Return the objects to the drawers.

3. Optional: Clean the removed adapters by soaking them in a glyoxal and quaternary ammonium salt based disinfectant (e.g., Gigasept Instru AF) according to the manufacturer's instructions. After incubation according

to manufacturer's instructions, rinse the removed objects thoroughly with water.

4. We recommend storing the adapters at 4°C, so that they will be precooled and ready for use in the next assay run.

Pipetting system tip guards

1. Open the "Tools" screen and press "Maintenance AS".
2. Move the robotic arm to the cleaning position by pressing "Tip guards".
3. Remove all 4 tip guards by pushing each tip guard upward until it clicks out of place and can be removed.
4. Soak in a glyoxal and quaternary ammonium salt based disinfectant (e.g., Gigasept Instru AF) for at least 15 min.
5. Rinse with water and wipe dry with paper towels.

CAUTION	**Damage to the instrument(s)** [C8]
⚠️	Make sure to install the tip guards before operating the QIAsymphony SP/AS instruments.

Tip disposal chute

Note: When using the QIAsymphony Cabinet AS follow instructions given in the Maintenance section of the *QIAsymphony Cabinet SP/AS User Guide*.

1. Open the "Tools" screen and press "Maintenance AS".
2. Press "Robotic arm left" to move the robotic arm to the left.
3. Open the QIAsymphony AS hood.
4. Remove the tip disposal chute from the worktable.
   Note: Residual liquid from the tip disposal chute may drip.
5. Soak in a glyoxal and quaternary ammonium salt based disinfectant (e.g., Gigasept Instru AF) for at least 15 min.
6. Rinse with water and wipe dry with paper towels.

9.3 Weekly maintenance procedure

File management

1. Download the result file(s) (for QIAsymphony SP and AS) and loading information files (QIAsymphony AS only) as described on page 8-11 and ensure that the files are backed up.

1. Delete result files older than 10 days (default setting) as described on page 8-22.

Cleaning the touchscreen (optional)

Wipe the touchscreen with ethanol-based disinfectant (e.g., Mikrozid). Then wipe with a cloth moistened with water and dry with paper towels.

CAUTION	Damage to the instrument(s) [C5]
⚠	Do not use spray bottles containing alcohol or disinfectant to clean surfaces of the QIAsymphony SP/AS instruments. Spray bottles should be used only to clean items that have been removed from the worktable.

Cleaning the QIAsymphony SP/AS hoods (optional)

To clean the hoods of the QIAsymphony SP/AS instruments, wipe the surface with a soft lint-free cloth moistened with deionized water, or use wipes soaked with Mikrozid Sensitive Liquid. Then wipe dry with a dry soft lint-free cloth or paper towel.

Important: Do not use ethanol-based disinfectant; use distilled water or Mikrozid Sensitive Liquid only.

Checking the tip adapter O-ring

The tightness of the tip adapter O-rings should be checked weekly as described on page 9-19.

9.3.1 Weekly maintenance procedure for the QIAsymphony SP

Cleaning the tube and plate carriers

1. Remove tube/plate carriers, adapters, and inserts and soak them in disinfectant (e.g., Gigasept Instru AF). Incubate for at least 15 minutes, then rinse with water and dry with paper towels.

2. Check the condition of the bar code labels and ensure that they are not scratched.

Cleaning the optical sensor

Wipe the window of the optical sensor with a lint-free cloth. Moisten the cloth with 70% ethanol if required.

### Magnetic head (optional)

CAUTION ⚠	**Damage to the instrument(s)** [C10] Make sure not to damage the cables and the electronic board when wiping the magnetic head.

1. Remove the cover from the magnetic head.

2. Move the magnetic head up and carefully push the rod cover holder down.
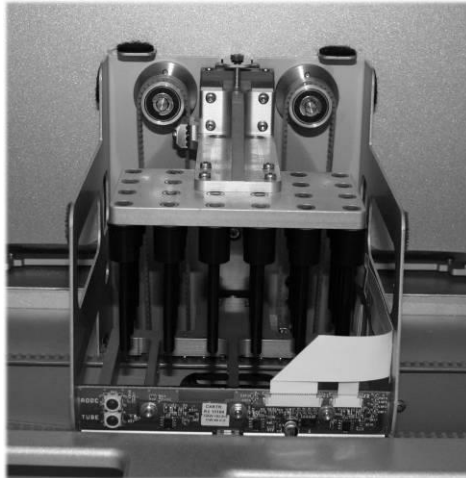
3. Wipe the exterior of the magnetic head with a lint-free
    cloth moistened with ethanol-based disinfectant (e.g.,
    Mikrozid), and incubate as appropriate.

    Note: Insert the cloth from the sides of the magnetic
    head in order not to damage the cable and electronic
    board at the front.

4. Wipe with a lint-free cloth moistened with water and dry
    with paper towels.

Liquid waste container (optional)

1. Remove the liquid waste container from the "Waste"
    drawer.

2. Empty the liquid waste container. Dispose of the liquid
    waste according to your local safety regulations.

3. Disinfect the liquid waste container using ethanol-based
    disinfectant (e.g., Mikrozid).

4. Replace the liquid waste container in the "Waste" drawer.

9.3.2 Weekly maintenance procedure for the QIAsymphony AS

Cleaning adapters

1. Remove the adapters from the "Eluate and Reagents" and "Assays" drawers and soak them in disinfectant (e.g., Gigasept Instru AF). Incubate for at least 15 minutes.

2. Rinse with water and dry with paper towels.

3. Check the condition of the bar code labels and ensure that they are not scratched.

9.4 UV decontamination of the worktable

UV decontamination helps to reduce possible pathogen contamination of the QIAsymphony SP/AS worktables. The efficiency of inactivation has to be determined for each specific organism and depends, for example, on layer thickness and sample type. QIAGEN cannot guarantee complete eradication of specific pathogens.

Note: It is not possible to start the UV decontamination on the QIAsymphony SP and QIAsymphony AS worktables at the same time.

Important: Before starting the UV irradiation procedure ensure that all samples, eluates, reagents, consumables, and assays have been removed from the worktable. Close all drawers and the hoods. Once the UV irradiation procedure has been started, it will continue for the defined period of time, or until interrupted by the user.

We recommend using the following formula to calculate the duration of decontamination in minutes:

$$\text{Dose (mW x s/cm}^2\text{) x 10.44} = \text{Duration (seconds)}$$

1. Remove all removable objects (tubes/plates, adapters, consumables, tip disposal chute) except for liquid waste bottle from the drawers.

2. Enter the "Maintenance" screen. Press "Tools", then press "Maintenance SP" or "Maintenance AS" in the "Tools" screen.

3. To start the UV cleanup procedure, press the "Start UV light" button.
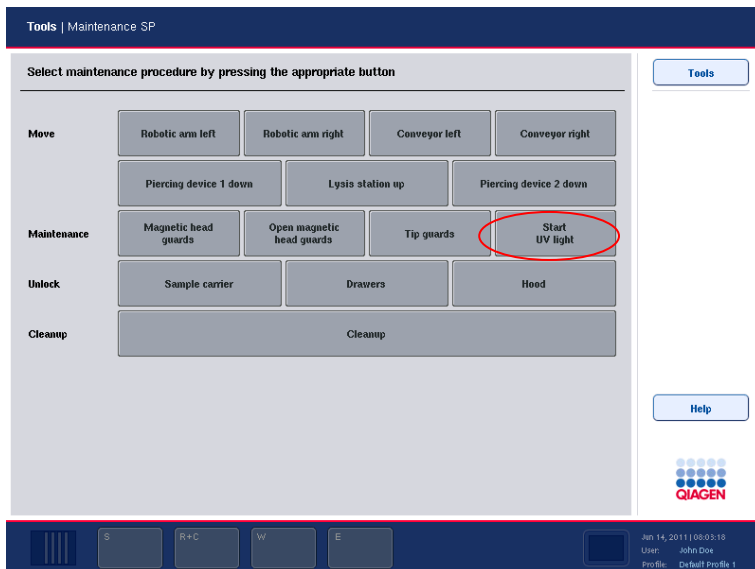
**"Maintenance SP" screen.**
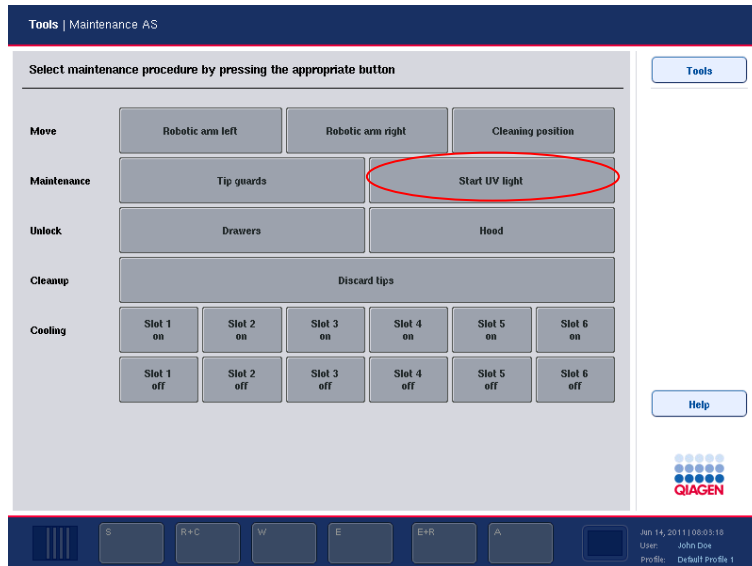
"Maintenance AS" screen.

4. Enter the duration of the decontamination in minutes.
   The default setting is 15 minutes. The UV irradiation time
   is dependent on the pathogen. Use the formula above to
   calculate the irradiation time and then enter the time into
   the input box.

5. A message appears asking you to check whether all
   plasticware and consumables have been removed from
   the worktable. Confirm that all removable objects have
   been removed from the worktable by pressing "OK".
   Press "OK" to start the UV irradiation procedure. The UV
   lamp then starts and the robotic arm moves over the
   worktable surface for the set irradiation time.

   Note: To stop the UV irradiation procedure before the
   defined period of time has elapsed, press "Cancel". The
   procedure will stop as soon as the robotic arm completes
   the current movement.

   Note: UV irradiation of the QIAsymphony SP and AS
   must be performed sequentially and cannot be
   performed in parallel. The second irradiation may be left
   to run overnight.
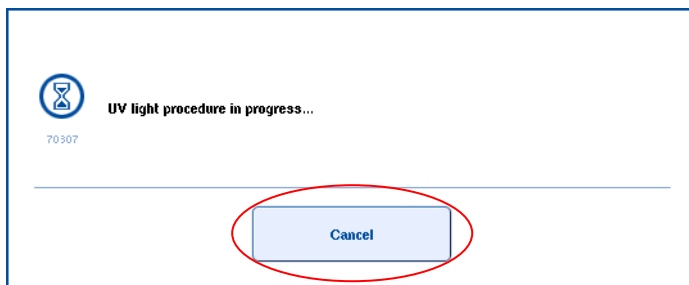
9.5 Maintenance of the tip adapter O-ring

This section describes how to check the tightness of the tip-adapter O-ring and how to replace it, if necessary. The tightness of the tip-adapter O-ring should be checked weekly and the O-ring must be changed monthly for both the QIAsymphony SP and the QIAsymphony AS.

Note: Please contact QIAGEN Technical Services if the tightness check of the tip-adapter O-ring fails repeatedly, even after changing the O-ring.

9.5.1 Checking the O-ring for wear and tear

Note: The tightness of the tip adapter O-ring should be checked weekly and the O-ring must be changed monthly.

1. In the "Tools" screen, press "Service SP" or "Service AS". Then select the service script "CheckPipettingChannelORing.lua".
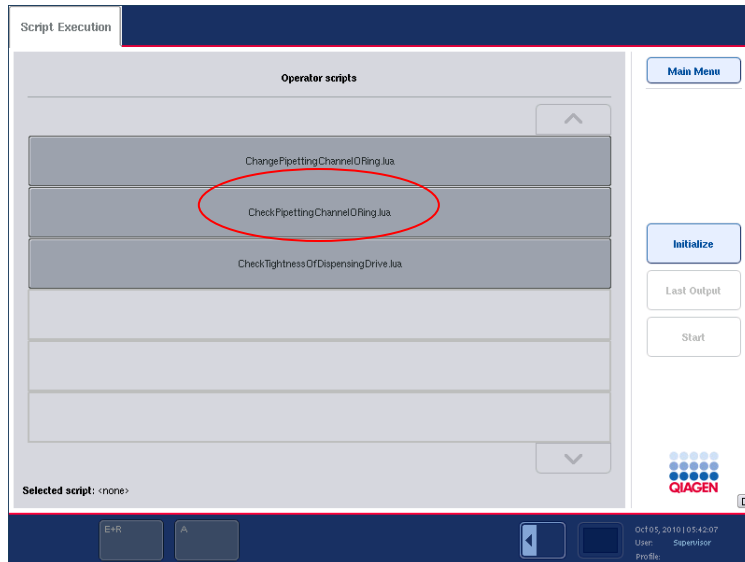
2. Press "Start" to start the tightness test.

3. Follow the instructions in the messages displayed on the touchscreen. When instructed to do so by the software, place an empty tip-rack containing 4 test tips into the tip rack slot shown in the software message (see picture on next page).

   Note: Do not start an inventory scan during the protocol run. When the inventory scan message appears, press "No, nothing changed".

Test tip
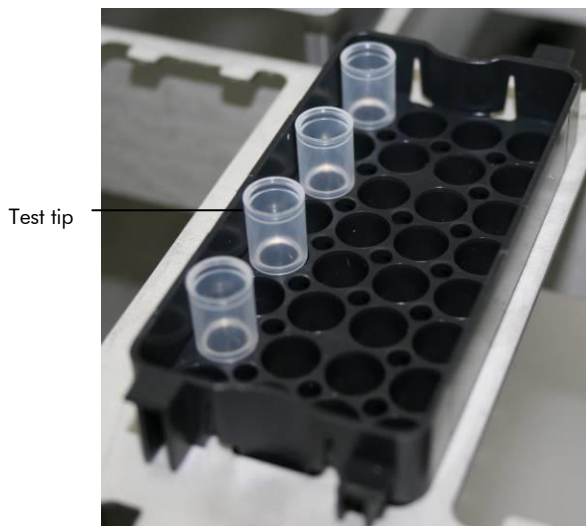
4. If after running the tightness test for a particular tip adapter a message is displayed with "Failed", the O-ring must be changed. If one tip adapter fails the tightness test, we recommend changing all 4 O-rings at the same time.

    Note: For more information about test tips, contact QIAGEN Technical Services.

9.5.2 O-ring change procedure

The O-rings must be changed every month using the "O-Ring Change Tool Set" (cat. no. 9019164).

Using the "O-Ring Change Tool Set" to perform O-ring change

Before removing the old O-ring, the new O-ring must be prepared. These steps should be performed for both the QIAsymphony SP and the QIAsymphony AS instruments.

For instructions, refer to the quick guide that is included with the "O-Ring Change Tool Set" (cat. no. 9019164). If there is no "O-Ring Change Tool Set" available, contact QIAGEN Technical Services.

9.6 Mounting the tip disposal bag

Note: When using the QIAsymphony Cabinet SP/AS the following procedure for mounting the tip disposal bag is not used.

To mount the tip disposal bag proceed as follows:

Each tip disposal unit consists of an upper and lower holder that grip the tip disposal bag, and 2 extendable sliding rods that hold the complete assembly.
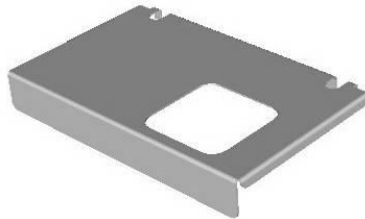
Upper holder

Lower holder
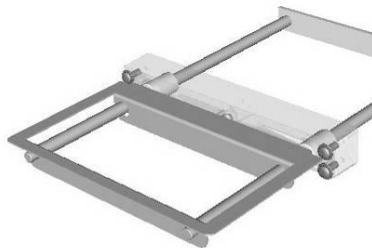
Extendable sliding rods

To install a tip disposal bag, proceed as follows:

1. Pull out the holder and sliding rods.

2. Grip the upper part of the holder and pull it toward you.

3. Lift the upper part of the holder and pull it backwards until the cutouts are resting on the rods.

4. Attach the tip disposal bag to the lower part of the holder.

5. Attach the upper part of the holder to the lower part, and slide in the rods by pushing them toward the instrument.

   Note: The tip disposal bag is not checked during the inventory scan. Ensure that a tip disposal bag is installed before starting a batch.

   Note: If the tip disposal bag is not properly installed, a tip jam may occur. Ensure that the tip disposal bag is correctly installed and is not crinkled.

To remove a tip disposal bag, proceed as follows:

1. Pull out the holder and sliding rods. Grip the upper part of the holder and pull it toward you.

2. Lift the upper part of the holder and push it backwards until the cutouts are resting on the rods.

3. Remove the disposal bag from the lower part of the holder.

4. Attach the upper part of the holder to the lower part, and slide in the rods by pushing them toward the instrument.

Discard the waste according to your local safety regulations.

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10 Troubleshooting

10.1 Error messages and warnings

If a problem occurs during operation of the QIAsymphony SP and/or AS, an error message or warning will appear on the touchscreen.

See Section 3.2.3 of *Operating the QIAsymphony SP* for more information about the different symbols that may occur in error messages.

If the error has an error code it is displayed on the left side of the message, below the error symbol (see below). The error message is displayed in the middle of the dialog box.
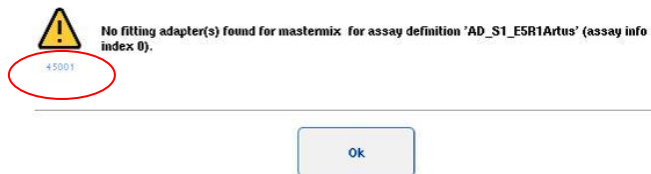
10.1.1 Errors indicated in the status bar

In some cases, errors are indicated by the drawer buttons flashing yellow in the status bar. Press the flashing button to view the error message and follow instructions.

10.1.2 Errors indicated in the tab headers

The different tab headers support an error indicator within the tab. Thus, in some cases, errors are indicated by a warning sign icon next to the tab header name.

10.1.3   Errors indicated in the command bar

In case of an error, a warning sign icon will be displayed within the menu button affected, next to the name.

Switch to the affected tab or press the command bar button concerned for an overview of the error situation within the dialog.
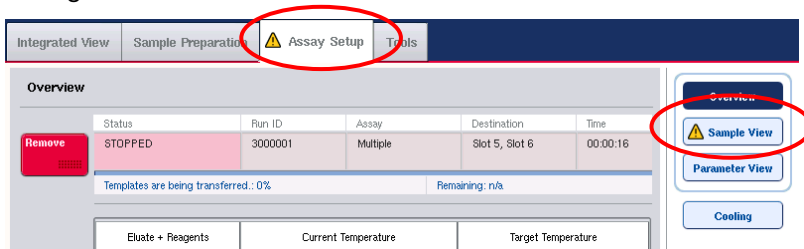
Error indication in tab headers and command bar buttons.

10.1.4   Messages with "Help" button

If a message appears with a "Help" button, the user has access to instructions about how to solve the problem.

Proceed as follows:

1. Press the "Help" button. A new message will appear.
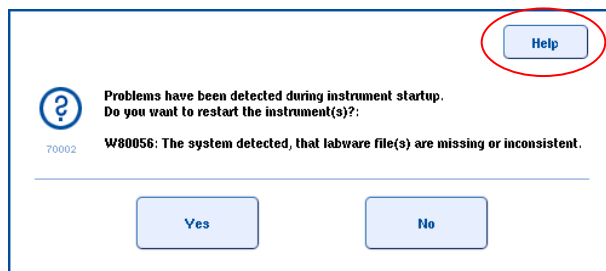
2. Carefully read the instructions and then press "OK".
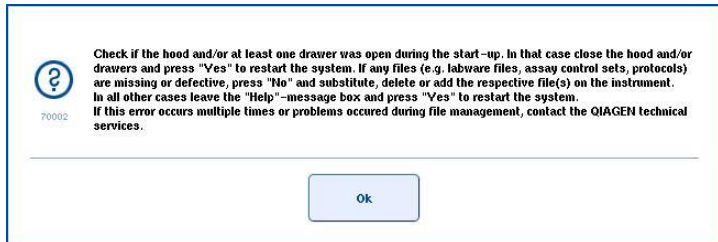
3. Close the message and follow the instructions.

   Note: To read the message again, select "Instrument Report" in the "Tools" screen. Then select the "Errors" tab. Recent error messages will be listed there.
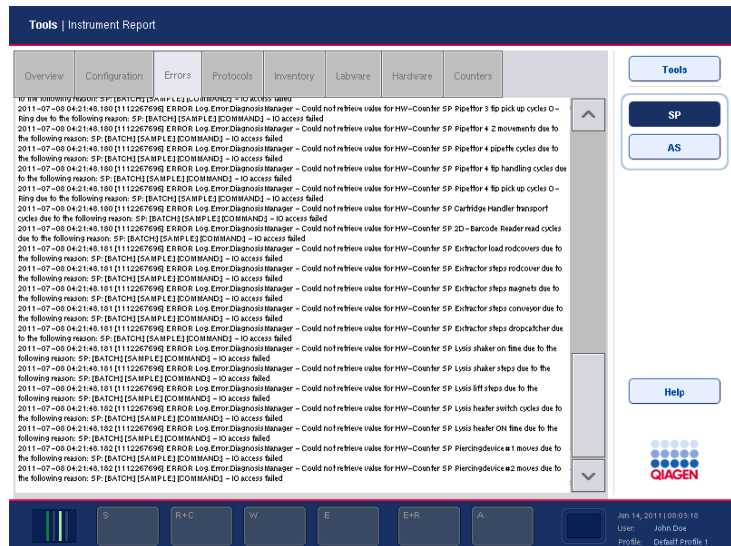
10.1.5   Messages without "Help" button

If a message appears that does not have a "Help" button, perform one of the following:

■ Confirm the message and then follow the instructions that were outlined in the message.

■ If the message has an error code, follow the instructions for that particular error code listed in Section 10.4.

Note: If a message appears that has an error code that is not listed, contact QIAGEN Technical Services.

■ If the message does not have an error code, refer to Section 10.5 for context-specific errors and associated instructions.

■ Call QIAGEN Technical Services if recommended or required.

10.2 Software help boxes

In order to assist and guide the user, the QIAsymphony SP/AS provides a software help for all screens.

To access the software help texts, press the "Help" button in the command bar, which appears in all screens. Pressing this "Help" button will open a dialog in front of the actual screen. The displayed text within the help message gives advice on how to handle the current screen. To return to the original screen, press "OK" inside the help dialog.
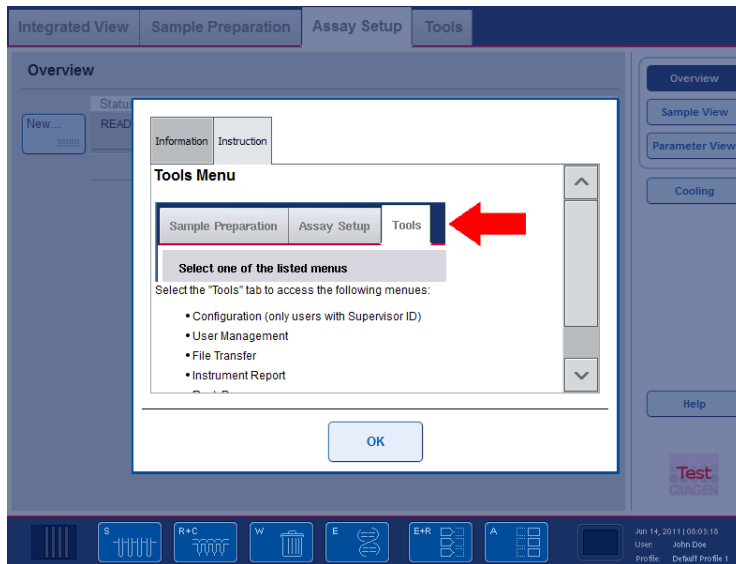
Help dialog.

10.2.1 Structure of software help boxes

A help box consists of a maximum of 3 different tabs (in the following sequence): "Information", "Instruction", and "Checklist".

Information   Displays notes about the screen's behavior and/or information about the screen's view. The help text describes options for the user in context.

Instruction   Shows a detailed description of the steps the user will need to execute.

Checklist   Includes a selection of different topics the user may check for the actual context. The particular checks described within the checklist do not need to be rigorously executed.
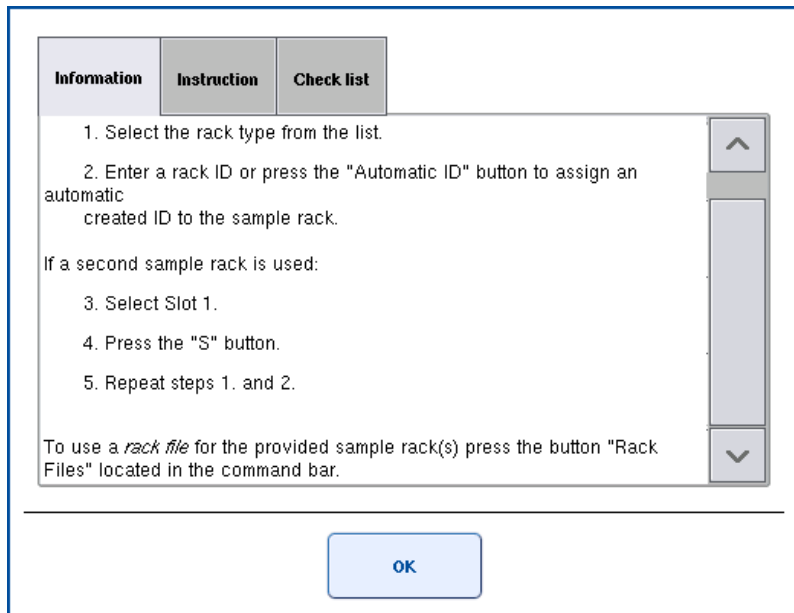
Note: A software help dialog may consist of fewer than the 3 types of text.

10.3 Contacting QIAGEN Technical Services

If an error persists and you need to contact QIAGEN Technical Services, make a record of the incident and create an instrument report file.

10.3.1 Make a record of the incident

1. Note down all steps that were performed before and after the error occurred.

2. Document any messages that appeared on the touchscreen.

   Note: It is important that you can tell us the error code and the associated text. This information will help the QIAGEN Field Service Specialist and Technical Services to resolve the error.

Note: In some cases the software does not list the error message on the touchscreen. The error is documented in the system log file either for the QIAsymphony AS or QIAsymphony SP.

3. Note the date and time at which the error occurred.

4. Provide a detailed description of the incident. For example, provide a photograph of the worktable and record the following information:
   - Where on the QIAsymphony SP/AS instruments did the error occur?
   - In which step of the protocol did the error occur?
   - What was observed (e.g., has something broken, are tips or sample prep cartridges in unusual places on the worktable?) and what was expected?
   - Was there any unexpected noise?

5. In addition, if relevant, provide the following information.
   - If tips were lost during pipetting, provide the lot number and tip type.
   - Were tip racks manually refilled?
   - Which reagent adapter, including manufacturer and ordering number, was used?
   - Which sample and eluate racks, including manufacturer and ordering number, were used?
   - Which assay rack, including manufacturer and ordering number, was used?

10.3.2 Creating an instrument report file

If you are requested by QIAGEN Technical Services to create an instrument report file, proceed as follows:

1. Log in to the instrument(s).

2. Select "Instrument Report" in the "Tools" menu. The "Overview" tab of the "Instrument Report" menu appears and instrument data will be retrieved.
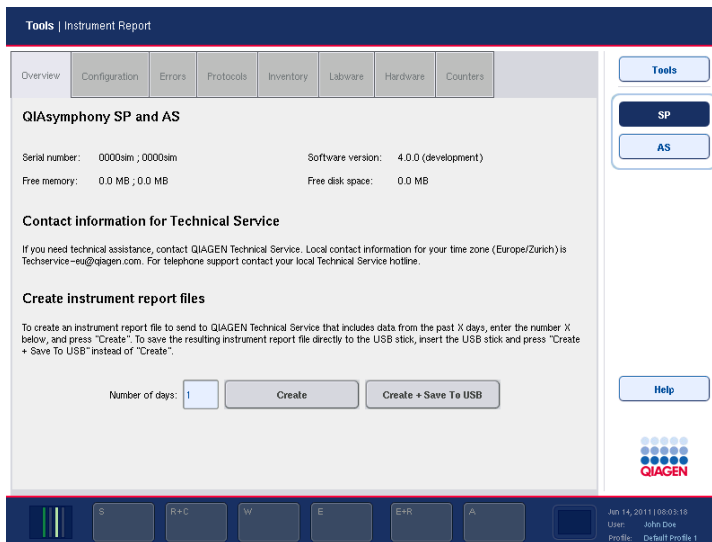
3. To create an instrument report for the QIAsymphony SP, select "SP". To create an instrument report for the QIAsymphony AS, select "AS".

4. Enter the number of days for which you want the instrument report file to cover.

5. Press "Create", or to save the file directly to the USB stick, insert the USB stick and then press "Create + Save to USB".

To download all instrument report files to the USB stick, see Section 8.3.2. Instrument report files can also be downloaded using the QIAsymphony Management Console. See Section 4 of the *QIAsymphony Management Console User Manual* for more information.

10.4 Error codes

Error code	Description	Comments and suggestions
23	XYC/PCM: invalid position.	One or more positions are inaccessible. If the problem occurs during eluate transfer, ensure that only a 24-well elution rack is used on "Elution slot 4".
		If the error is related to another position on the instrument worktable, contact QIAGEN Technical Services.
2070	Pipetting channel module: no liquid level found.	Source container could be empty or an error occurred during liquid-level detection. Samples are flagged as "invalid".
2081	Clot detected.	A clot has formed in a sample and cannot be transferred by the QIAsymphony SP. Remove the clot(s) and process the sample in a new batch.
31656	The inventory scan detected an unexpected eluate rack on slot X that is not registered in the system.	The inventory scan of the "Eluate" drawer detected an elution rack on the displayed elution slot. Open the "Eluate" drawer, define the elution rack type by selecting the elution slot, and then assign an elution rack type from the list. Alternatively, remove the elution rack from the "Eluate" drawer. Close the "Eluate" drawer and run another inventory scan.

Error code	Description	Comments and suggestions
31657	The Inventory Scan detected a missing eluate rack on slot X (expected rack type: Y).	A rack has been removed from slot X, but this rack was not removed in the software. Either replace the missing rack on the slot, or remove the rack in the software.
31658	The Inventory Scan cannot detect an adapter bar code on eluate rack on slot X (expected rack type: Y).	A rack has been detected on slot X that does not match the rack that is defined for the run in the software. Either remove the rack from the slot, or adjust the rack definition in the software.
31659	The Inventory Scan detected a wrong adapter type on eluate rack on slot X (expected rack type: Y).	A rack on slot X has been replaced with another rack that does not match the rack that is defined for the run in the software. Either replace the original rack on the slot, or remove the original rack and redefine the new rack in the software.
31680	The eluate labware X is not recommended for use with the ACS Y.	See Error Code 70505.
32010	Can't change batch, batch is in state ON_HOLD.	Remove all samples from the QIAsymphony SP and insert them again. Redefine sample batch(es).
32015	The eluate cooling for slot X is not supported.	If the protocol requires cooling of the elution rack, use slot 1 and activate cooling.

Error code	Description	Comments and suggestions
33021	Unexpected cartridge found on slot "Extractor-2".	Rod covers have been detected on the magnetic head. The run cannot be started.
		Check and then clean the worktable.
45001	No fitting adapter(s) found for master mix X for assay definition 'Y' (assay info index Z).	The reagent holders do not have the capacity to hold the calculated volumes of reagent.
		To reduce the number of tube positions required on the reagent holders, reduce the number of assays or reduce the number of samples. Alternatively you could reduce the number of replicates for samples, assay controls, assay standards, and no template controls.
45008	Selected assay(s) and a number of assay points cannot be used as there are no adapters available that can hold the required amount of reagent and/or number of assay control tubes.	Ensure that all available adapters are listed in the "Adapters AS" list. Configure the correct number of available adapters in the "Configuration" menu, see Section 6.1.3 for more information.
		To reduce the number of tube positions required on the reagent holders, reduce the number of assays or reduce the number of samples. Alternatively you could reduce the number of replicates for samples, assay controls, assay standards, and no template controls.

Error code	Description	Comments and suggestions
45101	There is not enough space on all assay racks to handle the defined samples, assay controls, and assay standards.	Reduce the number of selected samples, assay standards, assay controls, and no template controls.
		You could also reduce the number of replicates for samples, assay controls, assay standards, and no template controls.
45103	There are not enough adapters (X) available for labware type Y. Check the adapter configuration of your QIAsymphony AS.	Ensure that all available adapters are listed in the "Adapters AS" list. Configure the correct number of available adapters in the "Configuration" menu, see Section 6.1.3 for more details about how to do this.
		If there are no more adapters of that type available, reduce the number of replicates for samples, assay standards, and assay controls.
		If the error persists, contact QIAGEN Technical Services.
70110	A disk space overrun was recognized. The current usage is X. Do you want to delete result files older than Y days?	The system detected that there is less than 15% free disk space. Result files older than 10 days (default) can be deleted from the instrument(s). Press "Yes" to free up file space and delete older result files.
		Note: If you choose to delete results files, they cannot be recovered. Be sure to download result files older than 2 days to the USB stick before you decide to free up disk space.

Error code	Description	Comments and suggestions
70118	Bar code reading error on slot X. Try insertion again and reduce insertion speed!	A bar code reading error occurred. A sample tube may be incorrectly positioned, a bar code may be dirty, or a bar code may not be clearly printed.

Either, correct the position of the sample tube, clean the bar codes, check the bar code printout, or reduce the speed at which the sample tubes are loaded. |
| 70401 | Some of the combinations of ACS and sample labware that you selected are marked as "not recommended" [List of not recommended combinations].

Press "No" to stay in this dialog and assign different ACS or go to the previous dialog to change the sample labware.

Do you want to continue anyway? | The selected sample tubes/rack are not recommended for use with the Assay Control Set.

Perform one of the following:

■ Press "Yes" to ignore the message.
■ Press "No" and change the sample tube/rack. Use the "Labware Browser" menu or the labware lists to identify which labware is recommended for use with which protocols. Labware lists are available for download at www.qiagen.com/goto/QIAsymphony.
■ The "Supervisor" can go to the "Configuration" menu and disable the parameter "Check combination of protocol and recommended labware during run definition?" in the "Process SP 2" tab. |

Error code	Description	Comments and suggestions
70402	Sample X: Labware Y is not recommended for use with ACS Z.	The sample tube/rack is not recommended for use with the Assay Control Set. See error code 70401.
70504	It was not possible to define all batches automatically. You must define them separately.	Not all sample batches could be defined using the "Fast Setup" button. Define each batch separately. If sample errors occurred, these will be displayed during definition of the relevant batch.
70505	Some of the selected combinations of ACS and elution rack types that you selected are marked as "not recommended" [List of not recommended combinations]. Press "No" to stay in this dialog and change the elution rack or continue without any changes by pressing "Yes".	Perform one of the following: ■ Press "Yes" to ignore the message. ■ Press "No" and change the elution rack. Use the "Labware Browser" menu or the labware lists to identify which labware is recommended for use with which protocols. Labware lists are available for download at www.qiagen.com/goto/QIAsymphony. ■ The "Supervisor" can go to the "Configuration" menu and disable the parameter "Check combination of protocol and recommended labware during run definition?" in the "Process SP 2" tab.

Error code	Description	Comments and suggestions
71840	Leaving the dialog without successful inventory scan will lead to unexpected results. Do you really want to skip the scan and cancel the dialog?	If you do not perform an inventory scan of the "Eluate" drawer, eluates may be transferred to a slot that does not contain an elution rack. Run an inventory scan of the "Eluate" drawer to make sure that the selected elution slots contain elution racks.

Note: If the inventory scan of the "Eluate" drawer persistently fails, contact QIAGEN Technical Services. |
| 72002 | A rack file is already assigned to a sample slot. | It is not possible to change the information for this slot as a rack file is assigned. To modify information for this slot, restart the assay definition process without a rack file. |
| 72202 | Errors have been identified in the work lists shown below. Please ensure that work lists contain a unique elution rack ID per batch and an elution rack ID for all samples.

Work lists with inconsistencies or errors: Worklist_X (missing required elution rack ID for samples: 'Y'; multiple elution rack IDs: "Z". | A work list file defines 2 different required elution rack IDs for the samples of the batch currently being defined. This work list therefore cannot be used.

Either change the required elution rack ID in the work list or define the batch in that way that the samples to be processed uses just one elution rack ID. |

Error code	Description	Comments and suggestions
72204	The following samples in work list X are not present: Y. Please place the missing samples on the sample input or correct the work list.	A sample was listed in a work list file, but this sample is not part of the batch being defined. The work list file can therefore not be used. Perform one of the following: ■ Add the missing sample(s) to the batch. ■ Delete the missing sample(s) from the work list. ■ Set the configuration parameter "Allow partial use of work lists" or "Allow processing of samples without a work list entry" to "Yes" in the "Process SP 3" tab of the "Configuration" menu. This can only be performed by the "Supervisor".
72208	The following samples cannot be processed because they are not listed in any work list: X. Please remove these samples from the sample input or correct the work list.	A sample that is part of the batch currently being defined is not listed in a work list file. The batch can therefore not be defined. Perform one of the following: ■ Remove the sample from the batch. ■ Add the sample to a work list. ■ Set the configuration parameter "Allow processing of samples without a work list entry?" to "Yes" in the "Configuration" menu. This can only be performed by the "Supervisor".

Error code	Description	Comments and suggestions
75108	Unable to assign one rack to more than one slot. A rack ID may have been used more than once.	It is not possible to assign the same rack file to more than one "Sample" slot. Deselect one "Sample" slot and repeat the assignment of the rack file.
75111	The adapter for the selected rack type "QIA#19588 *EMTR" is not configured. If available, configure the adapter using the "Configuration" menu. If the adapter is not available select a different rack type.	The selected rack type requires an adapter that has not been configured in the list of available adapters and holders. If you have the adapter type that is required, update the list of available adapters and holders. See Section 6.1.3. If you do not have the required adapter type, change the rack type assignment according to the types of adapters that are available.

Error code	Description	Comments and suggestions
75403	The following Assay Parameter Sets in the work list are unknown: X.	The work list contains Assay Parameter Set(s) that are not available on the QIAsymphony SP/AS instruments.
		If the Assay Parameter Set(s) are not required for the assay run, continue and select the required assay(s).
		If the Assay Parameter Set(s) are required for the assay run, cancel the assay definition process. Transfer the required Assay Parameter Set(s) to the QIAsymphony SP/AS instruments. See Section 8.3.3 for more information.
		Check whether the Assay Parameter Set name is spelled correctly in the work list file. If required, modify the name of the Assay Parameter Set in the work list and then transfer the modified work list file to the QIAsymphony SP/AS instruments.
		Restart the assay definition process.
75503	Your current process configuration does not allow you to clear an assignment of an X to a sample which is linked to this Y in the work list.	This sample is linked to the Assay Control Set/Assay Parameter Set in the work list.
		Either use the assignments in the work list, or the "Supervisor" can set the parameter "Allow information for single samples in work lists to be overwritten?" to "Yes" in the "General Process" tab of the "Configuration" menu.

Error code	Description	Comments and suggestions
75505	Your current process configuration does not allow you to assign an X to a sample which is not linked to this Y in the work list.	The sample is not linked to the Assay Control Set/Assay Parameter Set in the work list. Either use the assignments in the work list, or set the parameter "Allow information for single samples in work lists to be overwritten?" to "Yes" in the "Configuration" menu.
76202	An unknown kit bar code has been entered.	Ensure that the entered bar code is either a QIAGEN bar code or that it meets the requirements for a custom bar code, as described in "Defining customized kit bar codes" in Section 2.5.1 of *Operating the QIAsymphony AS*.
76203	The kit bar code has not been entered for every assay. Do you want to continue?	Only one kit bar code for a multi-assay run has been entered or scanned. If this was on purpose because the other assays do not have kit bar codes, press "Yes" to continue. If this was not on purpose and the other assays do have kit bar codes, return to the "Loading reagents" screen list view and enter or scan the kit bar code(s) for the other assays.

Error code	Description	Comments and suggestions
76611	You selected X samples for processing in this batch. However, the calculation of the required reagents and consumables was based on Y samples. The new sample count might require additional reagents or consumables which must be loaded before starting the run. To avoid this, press "No" and reduce the number of selected samples. Do you want do continue anyway?	More samples were assigned to a protocol than were defined in the "Wizard/ACS and Number of Samples" screen. Perform one of the following: ■ Press "No" and unassign some samples. Try again. ■ Press "Yes" and complete the Wizard. Then press "R+C" and check whether there are any missing reagents or consumables.
100011	Reference point X RP Y was not recognized.	Restart the run. If this does not resolve the error, restart the QIAsymphony SP/AS instruments. If the problem persists, contact QIAGEN Technical Services.
130725	Removing tips into waste failed: X.	A Z-drive movement error occurred while discarding tips. Check the tip chute and the tip disposal bag.

Error code	Description	Comments and suggestions
130906	The batch timer W has been expired before it was evaluated. Nominal time span: X, actual time span: Y, timer overrun sec: Z.	The time required for a protocol step was exceeded. **Note**: Do not pause the run for an extended period of time. Inventory scans (e.g., inventory scan of the "Eluate" drawer) may result in the lysis time being exceeded. All samples in the corresponding batch will be flagged as "unclear".

Error code	Description	Comments and suggestions
140036	Not enough liquid available. Sample volume is too small. Or Not enough liquid available Slot x Pos Y ReagentZ.	This error code can occur during operation of the QIAsymphony SP and during operation of the QIAsymphony AS. Samples may be flagged as "unclear" or "invalid". For the QIAsymphony SP: Be sure to insert and to define the sample tube. Use only compatible sample tubes or plates. For more information about compatible sample tubes and plates, see www.qiagen.com/goto/QIAsymphony. Make sure that sample tubes and plates fit correctly in the tube/plate carrier. Use an appropriately sized vessel for the sample volume. **Note**: Be sure to use at least the minimum sample volume required for the protocol. Refer to the handbook of the QIAsymphony Kit you are using for more information about sample amounts and volumes. For the QIAsymphony AS: Ensure that the correct tube type is used. Ensure that there are no bubbles on the surface of the liquid. If necessary centrifuge the tube to remove any bubbles. Ensure that the required amount of liquid is available and that the tube is positioned correctly. If necessary, add more liquid.

Error code	Description	Comments and suggestions
140055	Wrong number or position of tube cartridges detected in the extractor.	The number of sample prep cartridges in the inventory differs from the number detected by the sensors on the magnetic head. This could be due to incorrect placement of sample prep cartridges, or sample prep cartridges could have been lost during transfer. Check the worktable, execute clean up, and restart the batch.
140056	Wrong number of rod cover detected on rod cover plate in the extractor.	The number of 8-Rod Covers detected in the inventory differs from those detected by the sensors on the magnetic head. Check the worktable, perform worktable cleanup and restart the batch.
140057	There are still rod covers on the rod cover plate in the extractor after unloading all rod cover.	8-Rod Covers have been detected on the magnetic head after 2 attempts to remove them. Check the worktable, perform worktable cleanup, and restart the batch.

Error code	Description	Comments and suggestions
140060	Heating/cooling temperature on slot X not reached within Y seconds.	A problem occurred during heating or cooling of the samples.
		Note: Do not pause the run during the lysis step. Inventory scans (e.g., inventory scan of the "Eluate" drawer) may result in the lysis time being exceeded. All samples in the corresponding batch will be flagged as "unclear".
		The lysis station did not reach the preset lysis temperature before the lysis step started. Restart the QIAsymphony SP.
		This error is logged in the result file. All samples in the corresponding batch will be flagged as "unclear".
		If the error persists, contact QIAGEN Technical Services.
180038	Slot cooling supervision detected temperature violation begin for slot Rxn X Drawer$RackCarrier-Y.	Ensure that the adapters are precooled to 4°C before placing them on the cooling positions.
		Ensure that the operating conditions meet the specifications as described in Appendix A.
		If the error persists, contact QIAGEN Technical Services.

Error code	Description	Comments and suggestions
266005	X input position(s) do(es) not contain enough liquid in order to process the configured run. Check sample volumes, assay definitions, and assignments of sample to assay definitions.	The sample volume is insufficient for the assay(s) and/or number of replicates. Check if the sample volume corresponds to the sample volume defined in the "Sample Rack Layout" screen. Provide sufficient sample volume and update the volume information for the sample rack. Alternatively assign a different Assay Parameter Set, remove assay assignments from samples, or change the number of replicates for samples.
300009	An error from the X was detected during initialization of the system and the system will now restart.	An error occurred during initialization. Restart the instrument(s). If the problem persists, contact QIAGEN Technical Services and provide the trace file.
310003	File transfer has not been processed. No instruments are configured in the automatic transfer file configuration file "X" of the QIAsymphony Management Console.	File transfer cannot be processed. Check the configuration of the "Automatic File Transfer" tool in the QIAsymphony Management Console. Ensure that the QIAsymphony SP/AS instruments are configured for "Automatic File Transfer". For more information, see Section 8 of the *QIAsymphony Management Console User Manual*.

Error code	Description	Comments and suggestions
330005	The entered bar code of the rack is already in use in a rack file associated with another drawer and therefore cannot be used on this drawer.	A rack with this bar code has been used previously. The following situations may have occurred: ■ The bar code was used for a sample rack on the QIAsymphony SP and was then used for an eluate rack on the QIAsymphony AS. ■ The bar code was used for an eluate rack on the QIAsymphony SP and afterwards for a sample rack on the QIAsymphony SP. ■ The bar code was used for an assay rack on the QIAsymphony AS and then for a sample rack on the QIAsymphony SP. Use a different bar code for the rack.
330007	Rack file for rack X does not match the requirements for a QIAsymphony rack file format	The rack file has a format that is incompatible with the QIAsymphony SP/AS instruments. Ensure that the rack file has the correct format. Use the "CSV Conversion" tool of the QIAsymphony Management Console to do this. See Section 8.12 for more details.

Error code	Description	Comments and suggestions
330015	Rack file for ID X is locked by another system.	The QIAsymphony SP and the QIAsymphony AS are trying to use the same rack file at the same time. To avoid corruption of rack files, this is not allowed.
		Do not attempt use the same rack file at the same time on the QIAsymphony SP and the QIAsymphony AS.
330023	The rack file for rack X cannot be removed, because it is locked.	The rack file is currently in use.
		Wait for the end of the run, when the rack file will not be in use.
		If the QIAsymphony instrument(s) crashed, restart the instrument(s) and the system will unlock the locked rack files.
330024	The rack file for rack X cannot be updated, because it is locked.	The rack file is currently in use and locked.
		If the QIAsymphony instrument(s) crashed, restart the instrument(s) and the system will unlock the locked rack files.

10.5 General errors that do not have error codes

Error	Comments and suggestions
The startup screen does not appear and the status LEDs are not illuminated	Contact QIAGEN Technical Services.
Error occurs during an assay run	An assay run was in progress on the QIAsymphony AS and an error occurred. The QIAsymphony SP/AS instruments must be switched off. Upon restarting the instruments it is not possible to continue with the assay run or a protocol that was in progress at the same time on the QIAsymphony SP.
Error occurs during a protocol	If a protocol was in progress on the QIAsymphony SP and an error occurs, the QIAsymphony SP/AS instrument must be switched off. Upon restarting the instruments, it is not possible to continue with the protocol or an assay run that was in progress on the QIAsymphony AS.
	For information on how to continue with manual assay setup, see Section 2.13 of the *Operating the QIAsymphony AS*.
No run time estimation shown in Overview Screens (Sample Preparation, Assays Setup, or Integrated Run Tab)	Run time estimation is based on the stored run times from previous, valid runs with identical settings. Changes of some settings (e.g., sample/assay point number or assay specifications) may lead to a missing run time estimation.

10.5.1   File handling errors

Error	Comments and suggestions
Connection between Management Console and the instrument cannot be established	Make sure that the QIAsymphony SP/AS instruments are switched on and that the instruments are properly connected to the network.

Certain antivirus software has the functionality to monitor and filter communication on port 80 (HTTP). This may lead to communication problems between the QIAsymphony Management Console and the instrument.

Possible solutions:

■ Change the communications port on the instrument from port 80 to another port.
■ Disable the HTTP port filtering function in the antivirus software.
■ For more information about errors that may occur when using the Management Console, see the *QIAsymphony Management Console User Manual*. |
| USB stick or other USB device was not recognized | Only use the USB stick provided with the QIAsymphony SP. Try connecting the USB stick to the other USB port. Restart the QIAsymphony SP/AS instruments.

If the problem persists, contact QIAGEN Technical Services.

Note: For file transfer, use the QIAsymphony Management Console. |
| Signature invalid | During file transfer via a USB stick, all Assay Control Sets are loaded again. If an Assay Control Set is unsigned, the error message "Signature invalid" will be displayed. However, the name of the invalid file is not given. The newly transferred file could be invalid, but this is not necessarily the case.

For protocols and Assay Control Sets only, check the validity in the QIAsymphony Management Console. Delete any unsigned protocols or Assay Control Sets. Do not delete other file types. |

10.5.2 File errors

General file errors

Error	Comments and suggestions
File not transferred	Check that the file is in the correct folder on the USB stick.
File not correctly converted	Check that the content of the file and the general structure meets the requirements of the "CSV Conversion" tool of the QIAsymphony Management Console.
Invalid check sum	Ensure that the file was created by the QIAsymphony SP/AS instruments or using the QIAsymphony Management Console.

Rack file errors

Error	Comments and suggestions
Rack file could not be loaded	Ensure that the rack file has been uploaded to the QIAsymphony SP/AS instruments.
	Check the parameter "Ready for AS". This parameter should be set to "Yes".
	If it is not set to "Yes", the rack file must be modified. To do this, convert the ***.xml** file to ***.csv** format using the "CSV Conversion" tool of the QIAsymphony Management Console. Then, correct the parameter using Microsoft Excel or Notepad. See Section 8.12 for more information.
Rack file contains wrong labware	Ensure that the racks/tubes and adapters that are written in the rack file are compatible with the QIAsymphony SP/AS instruments. For a full list of compatible racks and adapters, visit www.qiagen.com/goto/QIAsymphony.
	Ensure that the names of the racks and adapters are correctly spelled and that there are no incorrect blanks at the beginning or the end of the names.

Error	Comments and suggestions
Sample positions are incorrect	For a user-generated rack file convert the ***.xml** file back to ***.csv** format using the "CSV Conversion" tool of the QIAsymphony Management Console. Correct the positions of the samples using Microsoft Excel or Notepad.
	Ensure that the correct rack file is selected.
Rack file could not be found	Ensure that the correct rack file has been transferred to the QIAsymphony SP/AS instruments.
	Ensure that the correct rack file has been transferred to the QIAsymphony SP/AS instruments before starting assay definition.
	The rack file must be in a format that can be recognized by the QIAsymphony SP/AS instruments (i.e., ***.xml**). Ensure that the rack file has been converted from ***.csv** format to ***.xml** format using the "CSV Conversion" tool of the QIAsymphony Management Console.
Content of system generated file is wrong	Check whether actualization is correct.
	Ensure that no errors occur during the process.

Work list errors

Error	Comments and suggestions
Work list could not be found	Ensure that the correct work list has been transferred to the QIAsymphony SP/AS instruments before starting assay definition.
	Ensure that the work list has been converted to ***.xml** format using the "CSV Conversion" tool of the QIAsymphony Management Console.
	If using the QIAsymphony AS, ensure that the work list has not expired. Press "Assay Lists" and check if the required Assay Parameter Set(s) are listed. If the required Assay Parameter Set(s) are listed, the work list has probably expired.
Assay list does not display expected Assay Parameter Set	Ensure that the work list has not expired. Press "Assay Lists" and check if the required Assay Parameter Set(s) are listed. If the required Assay Parameter Set(s) are listed, the work list has probably expired.
	Ensure that the Assay Parameter Set(s) and Assay Definition files that are defined in the work list have been transferred to the QIAsymphony SP/AS instruments before starting assay definition.
	Ensure that the name and unique ID of the Assay Parameter Set that is defined in the work list is identical to the name and unique ID that is defined in the Assay Parameter Set.

Assay Parameter Set and Assay Control Set errors

Error	Comments and suggestions
Invalid check sum	Ensure that the Assay Parameter Set/Assay Control Set was created using the QIAsymphony Management Console.

Labware errors

Error	Comments and suggestions
The labware is not visible in the "Assay Setup | Sample Rack(s)" and "Assay Setup | Assay Rack(s)" screen	Check the "Labware Browser" menu (see Section 3.16 of *Operating the QIAsymphony SP*, and Section 3.8 of *Operating the QIAsymphony AS*).
	Ensure that the labware file has been transferred to the "Labware AS" folder.
	Ensure that the labware file was saved in the correct folder on the USB stick (**data/Labware/AS/**).
	Ensure that the labware file has been transferred to the QIAsymphony SP/AS instruments before starting assay definition.
	Check all categories of listed labware.

Cycler file errors

Error	Comments and suggestions
Cycler file is not created or is not correct for the cycler	The QIAsymphony SP/AS instruments automatically create a cycler file when an assay run is finished. The format of the cycler file depends on the assay rack type.
	Ensure that the correct cycler file format for the assay rack(s) is defined in the Assay Parameter Set. If necessary, modify the cycler file format in the Assay Parameter Set using the "Process Definition" editor tool of the QIAsymphony Management Console.
	If the required assay rack format for a particular cycler file format is not available to be selected in the QIAsymphony Management Console, ensure that the available assay racks are updated in the QIAsymphony Management Console. See the *QIAsymphony Management Console User Manual* for more details about how to do this.
	If the problem persists, contact QIAGEN Technical Services.

Result file AS errors

Error	Comments and suggestions
The final result file is not created. / Only a preliminary result file is visible	The QIAsymphony SP/AS instruments create a preliminary result file when an assay run is started. The final result file is created when "Remove" is pressed at the end of an assay run.
	If using automatic transfer, check in the related folder to see if the correct printer is listed.
	Ensure that the assay run has been removed before attempting to download the result file.
	Ensure that you are looking in the correct folder for the QIAsymphony SP result files or the QIAsymphony AS result files. The correct folder is log/Results/SP or log/Results/AS.
Sample status	If errors/problems occur during an assay run, sample status can be affected.
	If samples were successfully processed, the sample status is "valid". If the batch was paused, the samples will be "unclear" and if, for example, cooling problems occur during a run, the sample status may be "unclear". If problems occur during master mix or sample transfer, the sample status is "invalid".
	If a QIAsymphony SP rack file is used on the QIAsymphony AS, the sample status will only be changed if errors/problems occur during the assay run. If sample status is changed, the reason for this change will be recorded in the QIAsymphony AS result file. The message, the message ID, and the sample status is listed in the "Detailed Run Information" section of the QIAsymphony AS result file.

Loading information file errors

Error	Comments and suggestions
The loading information file is not created	A loading information file should be generated after pressing "Queue". Ensure that you are looking for the loading information file in the correct folder. The correct folder is **\log\LoadingInformation**. If using the automatic file transfer tool of the QIAsymphony Management Console, check in the related configuration to see if the correct printer is listed.

Log file errors

Error	Comments and suggestions
General transfer problems	Ensure that the QIAsymphony SP/AS instruments are connected to the network when using the QIAsymphony Management Console for file transfer. Ensure that the USB stick is correctly plugged in and that the small LED on the USB stick is glowing.

10.5.3   Tip waste errors

Error	Comments and suggestions
Tips are stacking in the tip chute	Ensure that the tip disposal bag is empty and that it is not jammed between the drawer and the workbench.
Tips are spilled in the lab	Ensure that the tip disposal bag is correctly attached to the waste bag holder.

10.5.4　Maintenance errors

Error	Comments and suggestions
Interruption of a maintenance protocol	It is not possible to stop a maintenance protocol after it has been started.
Hood open	During some maintenance protocols the hood might be open. Ensure that the hood is closed afterwards.
Wrong cleaning agents	Only use recommended cleaning agents. Use of cleaning agents that are not recommended may result in damage to the QIAsymphony SP/AS instruments.

10.5.5　"Configuration" menu errors

Error	Comments and suggestions
The adapter for AS is not displayed in the configuration dialog	Ensure that you have transferred the adapter file(s) to the "Labware AS" folder.

10.6   QIAsymphony SP errors that do not have error codes

10.6.1   "Eluate" drawer

Error	Comments and suggestions
Filter-tips are bent or deformed after eluate transfer	Be sure to define the correct type of eluate rack on the corresponding elution slot. Make sure that the elution rack is correctly positioned on the elution slot. Only use elution racks that are compatible with the specified adapter.
The inventory scan of the "Eluate" drawer detects an elution rack on "Elution slot X" although no elution rack has been placed there	If there is an adapter on the elution slot, be sure to remove it. Do not expose the instrument to direct sunlight (see Section 4.2). Ensure that the bar codes on the drawer can be easily read. If the error persists, contact QIAGEN Technical Services.
The bar code of the elution slot/elution rack cannot be read using the handheld bar code scanner	Make sure that the handheld bar code scanner is properly connected to the QIAsymphony SP. Try to read other bar codes with the scanner. Make sure that all bar codes can be easily read. Define the elution slot/elution rack by manually entering the information into the touchscreen.
Tips/channels are incorrectly positioned on the elution slot during the elution step	Make sure to place the elution rack onto the elution slot in the correct orientation. Be sure to insert and to define the same sample tube. Only use compatible sample tubes/ racks. For more information about tubes and racks, visit www.qiagen.com/goto/QIAsymphony. If the error persists, contact QIAGEN Technical Services.

Error	Comments and suggestions
The "Eluate" drawer cannot be opened	The "Eluate" drawer is locked during eluate transfer. After transfer of eluates to the elution rack, the system unlocks the "Eluate" drawer.
	If the "Eluate" drawer cannot be opened after eluate transfer, open the "Maintenance" menu and press the "Drawers" button under "Unlock".
	If the error persists, contact QIAGEN Technical Services.
It is not possible to define an elution rack	Open the "Elution" drawer and leave the drawer open while defining an elution rack.
The elution drawer was opened while an inventory scan was running and the "Elution Rack" screen cannot be exited	The scan of the "Elution" drawer is queued and will be performed as soon as the current inventory scan has finished.
Eluates are not in the corresponding elution rack as described in the result file	Wait for the protocol to finish. Be sure to set up the elution rack with well A1 at the upper left corner.

Error	Comments and suggestions
After closing the "Eluate" drawer, the information about the elution rack entered by the user was not stored by the system and an error message is displayed after performing the inventory scan	After you have entered information about the elution rack, press the "Add" button before you close the drawer so that the changes to the information are saved.
After starting and closing the "Eluate Drawer" dialog without changes the inventory scan of the "Eluate" drawer starts	This is the correct behavior if you open and close the hood and press "No, nothing changed" on the displayed message box. After this, a full scan will be performed on leaving the "Eluate Drawer" dialog without changes.

10.6.2 "Sample" drawer

Error	Comments and suggestions
Sample carrier locks do not release and/or bar code reader does not move forward	Make sure that the QIAsymphony SP is switched on and the LEDs in the "Sample" drawer are illuminated green. Be sure to insert all tube/plate carriers with the bar codes oriented to the left. Move the carrier up to the stop line and wait. Make sure that all bar codes can be read. If this does not resolve the problem, restart the QIAsymphony SP/AS instruments.
	If the error persists, contact QIAGEN Technical Services.

Error	Comments and suggestions
Tube/plate carrier is locked in place and cannot be removed	Open the "Maintenance SP" menu and press the "Sample carrier" button under "Unlock".
Tube/plate carrier was not recognized during loading	Remove the tube/plate carrier and load it into the QIAsymphony SP again. Slide the carrier continuously into the "Sample" drawer. Make sure that all bar codes are oriented to the left and that bar codes can be read.
	If you are using duplicate sample bar codes do not place them next to each other in the sample carrier. In this case, place different sample bar codes between the identical ones.
	If the error persists, contact QIAGEN Technical Services.
Sample bar codes are not read properly	Only use compatible bar codes. Refer to Appendix A for detailed information about compatible bar codes.
	Be sure that bar codes can be easily read and are oriented to the left.
	Be sure to position the bar code at an appropriate height in the rack. Make sure that the bar code fits into the cut-out of the tube carrier and position the bar code at the height of the plate carrier's bar codes.
Samples have been physically removed from the system but a result file cannot be downloaded	The sample information is stored until the elution rack is removed from the inventory or the system is switched off. Some information about samples that have been removed but which are still stored in the inventory is displayed in the "Sample View" screen of the "Sample Preparation" menu.
	In order to download a result file containing detailed information about the samples, remove the corresponding elution rack from the inventory.

10.6.3 "Waste" drawer

Error	Comments and suggestions
Liquid in the "Waste" drawer	Check that the lid of the liquid waste container has been removed. Make sure to insert the liquid waste container in the correct orientation. If the liquid waste container overflowed, contact QIAGEN Technical Services.
"Waste" drawer cannot be opened	The "Waste" drawer is locked during a run and during the inventory scan. If the drawer cannot be opened after the protocol has finished, open the "Maintenance SP" menu and select "Drawers" under "Unlock".
	If the problem persists contact QIAGEN Technical Services.
"Waste" drawer cannot be closed	Make sure to place the liquid waste container in the "Waste" drawer at the right-hand side of the drawer. Remove the lid of the liquid waste container before you place it in the "Waste" drawer.

10.6.4 "Reagents and Consumables" drawer

Error	Comments and suggestions
The "Reagents and Consumables" drawer cannot be opened	The "Reagents and Consumables" drawer is locked during a run and during the inventory scan.
	If the drawer still cannot be opened after the protocol has finished, open the "Maintenance SP" menu and select "Drawers" under "Unlock".
	Be sure that both piercing devices/reagent cartridges have been moved to the lower position. If not, open the "Maintenance SP" menu and select "Piercing Device 1/2 down" under "Move".
	If the problem persists contact QIAGEN Technical Services.
	Note: Do not use force to open the drawer.
Reagent cartridge cannot be placed in the "Reagents and Consumables" drawer	Make sure that the correct inserts for the reagent cartridges are in the "Reagents and Consumables" drawer and that the reagent cartridge is inserted in the right orientation.

10.6.5 Errors that may occur when starting a batch/run

Error	Comments and suggestions
Run button is inactive	Make sure that the tube/plate carrier has been loaded and that the batch status is "QUEUED".
One or more batches cannot be queued	The system detected 2 or more samples with the same sample ID. Make sure the sample ID is unique.
	Sample ID could not be read during loading of the tube/plate carrier. Remove the tube/plate carrier and reload it more slowly. Make sure that all bar codes are oriented to the left and are readable.

Error	Comments and suggestions
Samples in the tube carrier are not detected by the system although they have been loaded	The bar code of the tube carrier could not be properly read by the system. Remove the carrier and insert again more slowly. Remember to pause at the stop line.
Wrong sample IDs are shown in sample view	If two or more tube carriers are inserted: ■ Remove all carriers. ■ Insert a carrier and wait until the bar code camera has returned to its home position and the corresponding batch has changed state. ■ Insert remaining carriers in the same way. ■ Before inserting a new carrier, wait until the corresponding batch has changed state.
Run cannot be started because an inventory scan has to be performed	Before the user can start a run, an inventory scan of each drawer except the "Sample" drawer must be performed. Open and close the drawers to start the inventory scan. If an inventory scan has already been performed, do not open the hood before starting the run. If the hood was opened after performing an inventory scan the scan has to be carried out again.

10.6.6 Protocol errors

Error	Comments and suggestions
Assay Control Set is not displayed	Make sure that the Assay Control Set was transferred to the QIAsymphony SP. Check all categories in the "Assay Control Set" list. If a problem occurred during transfer of the Assay Control Set from the USB stick to the QIAsymphony SP, see Sections 10.5.1 and 10.5.2.

10.6.7 Errors that may occur while operating the QIAsymphony SP

Error	Comments and suggestions
One or more channels had a Z-drive movement error	Be sure to insert and to define the same tube/plate. Only use compatible tubes/racks. For more information, visit www.qiagen.com/goto/QIAsymphony.
	Make sure that the tubes/plates are properly inserted in the tube carrier/adapter. Use an appropriately sized tube or rack for the volume.
	If filter-tips are still attached to the tip adapters, open the "Maintenance SP" menu and select "Cleanup" under "Cleanup". Select the "Crash occurred" branch of the cleanup procedure.
	If the problem persists, contact QIAGEN Technical Services.
	Important: After successful cleanup it is necessary to empty all slot positions in the "Sample" and "Eluate" drawer and restart the machine. New runs can then be started.
Sample is not detected by the system and is flagged as "invalid"	Make sure the samples do not contain foam. Be sure to use at least the minimum volume of sample required for the protocol. For more information, refer to the handbook of the QIAsymphony Kit you are using.
	If the problem persists, contact QIAGEN Technical Services.
Nothing happens when the "Cleanup" button in the "Maintenance SP" menu is pressed	Check that the hood and all drawers are closed.

Error	Comments and suggestions
Lysis timer exceeded the time limit	The lysis time of the sample batch was exceeded. Do not pause the run during the lysis step.
	Note: If another inventory scan of the "Eluate" drawer is performed after the run has started, this may result in the samples being flagged as "unclear".

10.6.8 Protocol interruption

Error	Comments and suggestions
System paused due to too few consumables in the "Reagents and Consumables" drawer	Open the "Reagents and Consumables" drawer and add missing items. Close the drawer and perform an inventory scan.
	Note: Samples will be flagged as "unclear".
	Note: If one or more tip adapters cannot pick up filter-tips, contact QIAGEN Technical Services.
Inventory scan of the "Eluate" drawer starts even though a batch is running	Each time the "Eluate" drawer is open and closed an inventory scan must be performed. During the scan the batch/run is paused, which leads to samples being flagged as "unclear". The batch continues when the inventory scan has finished. After a successful scan of the "Eluate" drawer, the user must press "Close" to continue.
	Note: All drawers except the "Eluate" drawer are unlocked during an inventory scan of the "Eluate" drawer.

Error	Comments and suggestions
The protocol was interrupted or stopped by the system due an error	The worktable must be cleaned up. Open the "Maintenance SP" menu and select "Cleanup" under "Cleanup". Select the "Crash occurred" branch of the cleanup procedure. See Section 2.23.1 of *Operating the QIAsymphony SP*.
	Important: After successful cleanup it is necessary to empty all slot positions in the "Sample" and "Eluate" drawer and restart the machine. New runs can then be started.
The system stopped because an 8-Rod Cover or sample prep cartridge could not be released from the robotic gripper	Do not initialize the QIAsymphony SP/AS instruments.
	Switch off the QIAsymphony SP/AS instruments and try to remove the 8-Rod Cover or sample prep cartridge from the QIAsymphony SP manually. If it cannot be removed manually, contact QIAGEN Technical Services.

10.6.9   Inventory scan errors

Error	Comments and suggestions
Unit box is not recognized during the inventory scan of the "Waste" drawer	Check that the lid of the unit box has been removed. If the error persists, try using another unit box.
	If this does not resolve the error, contact QIAGEN Technical Services.
Items in the "Waste" drawer are not detected	Make sure to perform an inventory scan of the "Waste" drawer after closing the drawer.
	Replace unit boxes and perform the inventory scan again.
	If the problem persists or occurs frequently, contact QIAGEN Technical Services.

Error	Comments and suggestions
Tip racks have been loaded but are not detected	Make sure to load tip racks correctly.
Consumables in a unit box are not recognized	Check that the lid has been removed from the unit box. Place the unit box into a different slot and perform another inventory scan. **Note**: Do not refill partially used unit boxes. If this does not resolve the error, contact QIAGEN Technical Services.
One or more buffers were not recognized	Make sure that the Reuse Seal Strips have been removed from the troughs of the reagent cartridge. If the error persists, contact QIAGEN Technical Services.
Buffer bottle was not detected	Check that the lid of the buffer bottle was removed. If the error persists, contact QIAGEN Technical Services.
Accessory Trough was not detected	Only place Accessory Troughs into tip rack slots 5 and 12. If the error persists, contact QIAGEN Technical Services.
Volume check of buffer bottle failed	Make sure that the bottle contains sufficient volume of buffer. If the error persists, contact QIAGEN Technical Services.
Volume check of the Accessory Trough failed	Make sure that the Accessory Trough contains sufficient volume of ethanol. For more information, refer to the handbook of the QIAsymphony Kit you are using. Perform another inventory scan of the "Reagents and Consumables" drawer. If the error persists, contact QIAGEN Technical Services.

Error	Comments and suggestions
Reagent cartridge was not opened automatically by the system	If the inventory scan detects an unopened reagent cartridge, the reagent cartridge will be opened automatically before the first use in a protocol. **Note**: Make sure that a piercing lid was attached to the reagent cartridge.
Inventory scan does not start	Close the hood and all drawers and make sure to press "Yes" in the message that appears. Check that the drawer is properly closed. Make sure that the instrument is switched on.
Another inventory scan was requested by the user while an inventory scan was already running	The inventory scan has been queued and will be started as soon as the current inventory scan has finished.

10.7 QIAsymphony AS errors that do not have error codes

10.7.1 Assay definition errors

Error	Comments and suggestions
Wrong rack file content	Ensure that the content of the selected rack file is correct.
	If the content is not correct, it can be modified using the touchscreen or the QIAsymphony Management Console.
Wrong rack type	If possible, return to the "Sample Rack(s)" screen and change the rack type. If this is not possible, press "Cancel" and restart the assay definition process.
	If you are using a rack file, ensure that the correct rack file is selected.
Wrong volume information for the eluate rack	If the actual sample volume available is greater than the volume that was defined in the "Sample Rack Layout" screen, overflow may occur during aspiration.
	If the actual sample volume available is lower than the volume that was defined in the "Sample Rack Layout" screen, signals may be missing.
Sample cannot be assigned to an APS	Samples with the status "invalid" cannot be processed on the QIAsymphony AS and therefore cannot be selected during assay definition.
	Ensure that the sample you want to select is not "invalid".

Error	Comments and suggestions
Assay list does not display expected Assay Parameter Set	Ensure that the required Assay Parameter Set(s) and Assay Definition files have been transferred to the QIAsymphony SP/AS instruments before starting assay definition.
	Check all categories in the "Available assays" list for the expected Assay Parameter Sets.
	Check whether the expected Assay Parameter Set was configured for usage in Independent or Integrated mode.
	In "Assay Setup/Assay Selection" screen, if using a work list, switch between the "Assay list" and the "Work list" mode and check all categories in the "Available assays" list for the expected Assay Parameter Sets. **Note**: This only applies in Independent mode.

10.7.2 Inventory scan errors

Error	Comments and suggestions
The inventory scan of the drawers detects an adapter on "slot X" although no adapter has been placed there	Do not expose the QIAsymphony SP/AS instruments to direct sunlight (see Section 4.2).
	Ensure that the bar codes on the drawer are clean and can be easily read.
	If the error persists, contact QIAGEN Technical Services.

Error	Comments and suggestions
The bar code of an elution or assay rack cannot be read using the handheld bar code scanner	Make sure that the handheld bar code scanner is correctly connected to the QIAsymphony SP/AS instruments. Try to read other bar codes with the scanner. Ensure that all bar codes can be easily read.
	Check that the bar code format can be read by the handheld bar code scanner. See Appendix A for a list of compatible bar code types.
	Define the elution slot/elution rack using the touchscreen.
Adapter bar code not readable	Do not expose the QIAsymphony SP/AS instruments to direct sunlight (see Section 4.2).
	Ensure that the bar codes on the drawer are clean and can be easily read.
Run cannot be started because an inventory scan must be performed	Before an assay run can be started an inventory scan of each drawer must be successfully performed. Open and then close each drawer to start the inventory scan.
	If an inventory scan has already been performed, do not open the hood before starting the assay run. If the hood was opened after performing an inventory scan, the inventory scan must be performed again.
Tip chute not detected	Ensure that the tip chute is correctly installed on the QIAsymphony AS.
	Do not expose the QIAsymphony SP/AS instruments to direct sunlight (see Section 4.2).
Tip racks have been loaded but are not detected	Ensure that tip racks are correctly loaded.
	We recommend only loading full tip racks.
Inventory scan does not start	Ensure that the hood and all drawers are properly closed. Press "Yes" in the message that appears.

Error	Comments and suggestions
Another inventory scan was requested by the user while an inventory scan was already running	The inventory scan was queued and will be started as soon as the current inventory scan is complete.

10.7.3   Errors occurring during an assay run

Problems with labware or with liquid spills

Error	Comments and suggestions
Wrong reagent tube placed in adapter	Problems with tip positioning could occur. This may result in pipetting of incorrect volumes and problems during the assay run and data analysis. In addition, the tip might crash into the tube/plate and result in damage to the QIAsymphony AS.
Positioning in xy direction changes	Ensure that the workbench that the QIAsymphony SP/AS instruments are placed on meets the requirements (see Section 4.2). We recommend using the QIAsymphony Cabinet SP/AS for correct positioning of the QIAsymphony SP/AS instruments. Ensure that the drawers are properly closed.
Liquids in adapter	Ensure that all consumables are placed in the correct positions on the worktable. The inventory scan does not check whether the correct tubes/plates are placed in the corresponding adapters.
Condensation on the worktable	Depending on the environment in the laboratory, it is possible that condensation forms on the worktable. Wipe away condensation according to the daily maintenance procedures, see Section 9.2.

Error	Comments and suggestions
Filter-tips are bent or deformed after liquid transfer	Ensure that the correct rack type is defined on the correct slot.
	Ensure that the rack is correctly positioned on the adapter.
	Only use rack types that are compatible with the defined adapter.

Assay run interruption

Error	Comments and suggestions
Inventory status during run not correct	Ensure that an inventory scan is performed on each drawer if something on the worktable has been changed.
The protocol was interrupted or stopped by the system due to an error	Remove consumables from the worktable. If necessary, see Section 2.13 of the *QIAsymphony SP/AS User Manual — Operating the QIAsymphony AS* for details about protocol recovery and manually completing assay setup.
	The length of time that a protocol can be stopped/interrupted may be defined in some protocols. Any stop, pause, or interruption of a protocol will lead to samples being flagged as "unclear".
Missing tips	If insufficient tips are available, reload tips onto the worktable.
	If sufficient tips are available and the error persists, change the tip rack position. It is possible that the pipetting head cannot reach the tips.

Error	Comments and suggestions
Not enough liquid found	Ensure that the correct volume is provided and that the plates/tubes and adapters as defined in the assay definition are provided.
	Ensure that there are no air bubbles on the surface of the liquid.
	Add more liquid.

10.7.4   Data analysis errors

Missing or wrong signal for assay standards and assay controls (e.g., internal control)

Error	Comments and suggestions
Wrong reagent tube placed in adapter	If the shape of a tube differs slightly from the required tube type, problems during aspiration may occur. For instance, a lower volume than expected may be transferred.
No tube placed in a position on the reagent holder	If the requested volume is above the liquid-level detection limit, a "not-enough-liquid" message will appear.
	If the requested volume is below the liquid-level detection limit, the QIAsymphony AS will not recognize a missing tube or the liquid level and will continue with the assay run.
Frozen liquids or closed tubes	Ensure that the lids were removed from all tubes and that the liquids are completely thawed.
Mix-up of reagent and assay standard tubes	If the volume is lower than expected, a message will appear indicating that there is not enough liquid available. Ensure that the reagent and assay standard tubes are correctly positioned.
	If the volume is higher than expected, or is below the liquid-level detection limit, the assay run will continue which may result in missing signals.

Error	Comments and suggestions
Air bubbles or foam enclosed by liquid	Air was aspirated, perhaps due to bubbles on the surface of the liquid. This may result in missing signals.
	Always ensure that there are no bubbles on the liquid surface. To remove bubbles, centrifuge the tubes.

Missing sample signal

Error	Comments and suggestions
Evaporation	If eluates/assays are left to stand on the QIAsymphony SP/AS instruments for a long time after a run is complete, evaporation will occur.
	Ensure that eluate racks and assay racks are removed immediately when a run is completed.
Wrong volume information	The eluate volume as defined in the rack file or on the touchscreen is higher than the actual eluate volume.
	The QIAsymphony SP/AS instruments may not be able to transfer the correct sample volumes. This may result in reduced performance.
Fluctuations in eluate volumes	We recommend inspecting the assay rack visually to check for differences in sample volumes. Large differences in volume indicate that the actual eluate volume differs from the expected volume and that insufficient eluate was transferred to the assay rack.
	If problems persist, reduce the eluate volume.
Wrong rack type selected for eluate or assay rack	Ensure the correct adapters and consumables, as defined for the current run, are loaded on to the worktable.
	Use of different consumables may result in damage to the QIAsymphony SP/AS instruments and may cause pipetting problems.

Error	Comments and suggestions
Reactions are not in the corresponding position on the assay rack	Ensure that the assay rack and the elution rack are set up with well A1 in the upper left corner.
	If 2 elution racks are in use, ensure that the elution racks on slot 1 and 2 are correctly placed.
Tips/channels are incorrectly positioned on the elution slot during the elution step	Ensure that the elution rack is placed on the elution slot in the correct orientation.
	Ensure that the correct sample tubes are loaded, as defined in the run. Only use sample tubes/racks that are compatible with the QIAsymphony SP/AS instruments. For a full list of compatible sample tubes/racks, visit www.qiagen.com/goto/QIAsymphony.
	If the error persists, contact QIAGEN Technical Services.

10.8 Integrated run errors that do not have error codes

10.8.1 "Eluate" drawer

Error	Comments and suggestions
The "Eluate" drawer cannot be opened	The "Eluate" drawer is locked as soon as "Define Run" button in the "Integrated Run/Overview" is selected (see Section 2.4, "Defining an integrated run", in *Operating the QIAsymphony AS*).
	It is only possible to open the "Eluate" drawer if no integrated batch is loaded or queued in the "Integrated Run/Overview" screen. To open the "Eluate" drawer, remove "Integrated Batch(es)" in the "Integrated Run/Overview" (see Section 2.16.1, "Unloading the worktable", in *Operating the QIAsymphony AS*).

10.8.2   Removal of an integrated run

Error	Comments and suggestions
Integrated batch cannot be removed in the "Integrated Run" Overview	To remove an Integrated run which cannot be removed in the "Integrated run/Overview", the Assay Setup has to be manually booked out from the system (e.g., if sample preparation has finished and the AS batch cannot be started due to a previously stopped AS batch).
	To manually book out the AS batch from the integrated run, remove the AS batch by selecting the "Assay Setup" tab and press "Remove" in the "Overview" screen (see Section 2.9, "Removing assays after an AS run" in *Operating the QIAsymphony AS*). After removing the AS batch, return to the "Integrated Run/Overview" and remove the Integrated run by pressing the "Integrated Batch X" button (see Section 2.16.1, "Unloading the worktable", in *Operating the QIAsymphony AS*).
	If the error persists, contact QIAGEN Technical Services.

10.8.3   Maintenance, service, and configuration

Error	Comments and suggestions
Maintenance is not accessible	Remove loaded Integrated batches to access the Maintenance menu.
Service is not accessible	Remove loaded Integrated batches to access the service menu.
Configuration is not accessible	Remove eluate plate and scan the empty eluate drawer.

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Term	Description
AC	Abbreviation for assay control.
Accessory Trough	An item of labware that is filled with ethanol by the user and placed into the "Reagents and Consumables" drawer, if required by the protocol.
AD	Abbreviation for Assay Definition.
Adapter	Metal block that can hold consumables (e.g., microplate) on the worktable. For a list of available adapters, visit www.qiagen.com/goto/QIAsymphony.
APS	Abbreviation for Assay Parameter Set.
"Eluate and Reagents" drawer	QIAsymphony AS drawer into which sample racks, filter-tips, and reagents are placed.
"Assays" drawer	QIAsymphony AS drawer into which assay racks are placed and in which assays are set up.
Assay Control Set	The combination of a protocol plus additional parameters, such as internal control.
Assay definition	A set of instructions for the QIAsymphony AS that allows the instrument to perform an assay run.
Assay Parameter Set	The combination of an Assay Definition with additional parameters defined, such as replicate count and number of assay standards. In Integrated run mode, it is also connected to the ACS.
Assay rack	Name of the output formats of the QIAsymphony AS.

Term	Description
Assay rack ID	Identification number that is associated with an assay rack. This can be manually or automatically entered.
Assay specific IC	An internal control (IC) used during sample preparation that is specific for a particular assay. If this assay is selected on the QIAsymphony AS, the master mix for those samples does not need an internal control.
Bar code camera (2D)	A device on the QIAsymphony SP that reads bar codes on consumables.
Bar code scanner	A handheld device that enables scanning of bar codes and conversion of them into data that is transmitted to the QIAsymphony SP/AS.
Buffer bottle	An additional bottle of buffer that is placed into the "Reagents and Consumables" drawer, if required by the protocol.
Conveyor	A component of the QIAsymphony SP that moves sample prep cartridges below the magnetic head during sample preparation.
Cycler file	A data file that is generated by the QIAsymphony that can be transferred to certain cyclers (i.e., Rotor-Gene Q, ABI cyclers). The cycler file contains information about sample ID, sample position, and concentration and unit of assay standards.
EC–	Abbreviation for negative extraction control.
EC+	Abbreviation for positive extraction control.
Eluate	Purified nucleic acids.

Term	Description
"Eluate" drawer	Drawer into which purified nucleic acids are eluted.
Elution rack	Name of the output format of the QIAsymphony SP. An elution rack can be used as the input format for the QIAsymphony AS.
Error code	A number that is associated with a specific error that occurred on the QIAsymphony SP/AS instruments.
Filter-tip	A consumable that is picked up by a tip adapter during operation of the QIAsymphony SP/AS instruments. Liquid is aspirated into and dispensed from a filter-tip.
Hood	The QIAsymphony SP/AS hoods protect users from the moving robotic arms and from potentially infectious material on the worktable.
IC	Abbreviation for internal control.
Independent run	An independent run is a run that is performed either on the QIAsymphony SP or the QIAsymphony AS, where the run is performed independently of the other instrument. It is possible to perform 2 independent runs (one on the QIAsymphony SP and one on the QIAsymphony AS) at the same time, where neither run influences the other.
	It is also possible to perform an independent run on the QIAsymphony SP, and then transfer eluates via the transfer module to the QIAsymphony AS. Here samples can be processed using an independent assay setup run. In this case, sample preparation run definition must be performed first, and when the eluate rack is transferred to the QIAsymphony AS, assay setup run definition is performed.

Term	Description
Integrated run	An integrated run consists of a sample preparation run on the QIAsymphony SP and then an assay setup run on the QIAsymphony AS. Eluates are automatically transferred from the QIAsymphony SP to the QIAsymphony AS via the transfer module. An integrated run is defined in the software for the complete workflow before starting the run.
Internal control	*artus* kits contain a second heterologous amplification system which is detected as an internal control (IC) in a second fluorescence channel. The IC allows the user both to control the nucleic acid isolation procedure and to check for possible PCR inhibition. An IC can either be used during sample preparation or during PCR.
Inventory scan	An inventory scan is performed to check that drawers are correctly loaded and that the QIAsymphony SP/AS instruments have all required reagents and consumables for a protocol.
Labware	A piece of labware is a plastic/consumable item (e.g., PCR plate, microplate, reagent tubes, filter-tips) that samples, reagents, assays are put into and that can be used on the QIAsymphony SP/AS instruments.
Loading information file	A data file generated by the QIAsymphony AS that contains detailed information about required reagents, sample rack(s), assay rack(s), and disposable filter-tips.
Lysis station	A component of the QIAsymphony SP that accommodates sample prep cartridges and enables automated lysis of up to 24 samples in one batch.

Term	Description
Log file	Data file(s) generated by the QIAsymphony SP/AS instruments that contains general information about the instruments, user interactions, and details about the protocol being run.
Magnetic head (MH)	An array of 24 magnetic rods for processing magnetic particles.
Magnetic-head guards	The magnetic-head guards move below the magnetic head during sample preparation and catch any drops that may fall from the 8-Rod Covers.
MM	Abbreviation for master mix.
MM+IC	Abbreviation for master mix with internal control.
MM–IC	Abbreviation for master mix without internal control.
n/a	Not applicable
Network interface	The network interface allows connection of the QIAsymphony SP/AS instruments to a network via an ethernet cable.
Normalization	An optional processing step performed by the QIAsymphony AS. The normalization step is performed after sample preparation and before assay setup. Normalization involves diluting eluates to a predefined target concentration.
Normalization definition	A file containing a set of instructions for the QIAsymphony AS that allows the instrument to perform normalization as part of an assay run.
NTC	Abbreviation for no template control.

Term	Description
NTC–IC	Abbreviation for no template control with master mix, without internal control.
NTC+IC	Abbreviation for no template control with master mix and with internal control.
Optical sensor	A component of the QIAsymphony SP and AS that checks that consumables are correctly loaded in the "Reagents and Consumables", "Eluate and Reagents", and "Assays" drawer during an inventory scan.
Panel	A group of Assay Parameter Sets.
Piercing device	A device integrated in the "Reagents and Consumables" drawer that enables reagent cartridges to be automatically opened by the QIAsymphony SP.
Piercing lid	A lid that is placed on top of the reagent cartridge that enables the reagent cartridge to be automatically opened by the QIAsymphony SP.
Pipettor head	A component of the QIAsymphony SP/AS instruments that aspirates and dispenses liquid. Each pipettor head contains 4 syringe pumps, each of which is connected to a tip adapter.
Plate carrier	A carrier that can accommodate up to 4 sample racks on the QIAsymphony SP worktable.
Power switch	A button located at the front left of the QIAsymphony SP in the bottom-left corner. It allows the user to switch the QIAsymphony SP/AS instruments on and off.
Protocol	A set of instructions for the QIAsymphony SP that allows the instrument to perform an automated purification procedure.

Term	Description
QIAsymphony Cabinet SP/AS	Cupboard that is specially designed to position the QIAsymphony SP/AS instruments.
QIAsymphony Management Console	Software that is provided with the QIAsymphony instrument(s) that enables users to manage files, create Assay Control Sets and/or Assay Parameter Sets, convert **.csv** formatted rack files, work list files, or concentration data files into **.xml** files, and to check that result files have not been modified.
QS	Abbreviation for quantification standard.
Quantification standard	External positive controls that are supplied with *artus* kits, enabling the determination of the amount of viral DNA.
Rack file	File that contains information about sample racks or assay racks (i.e., rack type, rack ID, sample volumes, assay rack volumes). Rack files can be generated manually or automatically.
Rack type	Type of rack that will be used on the worktable.
Ready-to-use master mix	Master mix that has been premixed by the user. The QIAsymphony AS will not prepare the master mix.
Reagent cartridge	An item of labware that contains a magnetic-particle trough, reagent troughs, and enzyme rack. A reagent cartridge is prefilled with reagents.
Reagent holder	An adapter that holds reagent tubes on the QIAsymphony AS. There are 2 available reagent holders (Reagent Holder 1 and Reagent Holder 2) that support different tube types at the same time.

Term	Description
"Reagents and Consumables" drawer	Drawer that accommodates consumables and reagents required for the protocol run.
Result file SP	A data file that is generated by the QIAsymphony SP for each elution rack. The file contains general information, batch-related information, and information about the reagent cartridge.
Result file AS	A data file that is generated by the QIAsymphony AS for each assay run/AS batch in Integrated mode. It contains all information about the defined assay run and its parameters.
Robotic gripper	A component of the QIAsymphony SP robotic arm that transfers consumables (sample prep cartridges and 8-Rod Covers) to the required position on the worktable during sample preparation.
8-Rod Cover	An array of 8 rod covers that cover the magnetic rods of the magnetic head.
Run status	Indicates the status of a batch or assay run. This could be "READY TO LOAD", "QUEUED", "RUNNING", "COMPLETED" or "STOPPED". For more details, see Section 2.20.2 of *Operating the QIAsymphony SP*.
"Sample" drawer	Drawer that accommodates samples in primary or secondary tubes or multi-well sample racks.
Sample prep cartridge	A vessel with 8 wells that is used by the QIAsymphony SP for purification of nucleic acids.
Sample rack	A rack for holding samples.

Term	Description
Sample rack ID	Identification number/code that is assigned to a sample rack. This can be automatically or manually assigned.
Sample tube	A tube for holding a sample containing nucleic acids to be purified.
Sample status	Indicates the status of a sample. This could be "valid", "unclear", or "invalid".
Slot	A worktable position on the QIAsymphony SP and AS.
Standard curve	QIAsymphony AS provides the ability to create standards with varying concentration automatically from one highly concentrated standard and dilution buffer in terms of a serial dilution. The initial standard and the dilution buffer are provided by the user.
Status LEDs	Blue illuminated status bar, located at the front of the QIAsymphony SP and AS. When the instrument(s) are switched on, the status bar is illuminated.
Std	Abbreviation of assay standards used for quantification.
Target temperature	The temperature which cooling positions will be cooled to, as defined in the Assay Definition.
Tip adapter	Each pipetting channel is equipped with a tip adapter which picks up the disposable tips from the tip rack.
Tip chute	Passage through which used tips are disposed of from the QIAsymphony SP/AS worktables. Each instrument has a separate tip chute.
Tip disposal bag	Used tips are stored in a tip disposal bag. They are ejected from the QIAsymphony SP or AS worktable through a tip chute and into a tip disposal bag.

Glossary

Term	Description
Tip guard	The tip guard is positioned below the disposable tip to avoid aerosol contamination.
Tip rack slots	A metal rack that accommodates tip racks containing filter-tips.
Touchscreen	The user interface that allows the user to operate the QIAsymphony SP and AS.
Transfer module	Located under the separation window between the QIAsymphony SP and AS, the transfer module enables automatic transfer of eluate racks from the QIAsymphony SP to the QIAsymphony AS.
Tube carrier	A carrier that can accommodate up to 24 tubes.
Unit box	A plastic box with a lid that contains either sample prep cartridges or 8-Rod Covers.
User-defined output pattern	An alternative pipetting scheme for assay racks, that is defined by the user in the APS editor by defining four patterns and the size of an eluate block.

The four patterns are the initial pattern before eluate block, the pattern after eluate block, and the final pattern. Each of these patterns consists of a fixed set of assay control, NTC, quantification standard and empty positions.

The QIAsymphony AS places the eluates in the following order on the assay rack: first the initial pattern, followed by one or more sets of "patterns before eluate blocks", eluates and "patterns after eluate blocks". The assay rack ends with a final pattern.

The pipetting order differs from the placing order. |

Term	Description
UV lamp	A light source of ultraviolet light for worktable decontamination.
Validation	The QIAsymphony Operating Software checks if the file(s) that are transferred to the QIAsymphony SP/AS instruments meet certain criteria. For instance the software verifies whether all files have a specific ***.xml** structure.
"Waste" drawer	Drawer in which used consumables and liquid waste from the sample preparation procedure is collected.
Worktable	The surface of the QIAsymphony SP or QIAsymphony AS where sample preparation or assay setup takes place.
Work list	File that enables automatic assignment of samples to Assay Control Sets and Assay Parameter Sets. Work list files can be generated by a LIMS or manually by the user.

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Appendix A

Technical data

QIAGEN reserves the right to change specifications at any time.

Environmental conditions

Operating conditions

Power QIAsymphony SP	100–240 V AC, 50–60 Hz, 800 VA
Power QIAsymphony SP and QIAsymphony AS	100–240 V AC, 50-60 Hz, 1400 VA

Mains supply voltage fluctuations are not to exceed 10% of nominal supply voltages.

Overvoltage category	II
Air temperature	15–32°C (59–89.6°F)
Relative humidity	15–75% (noncondensing)

Maximum 75% relative humidity for temperatures up to 31°C (88°F), decreasing linearly to 50% humidity at 32°C (89.6°F)

Altitude	Up to 2000 m (6500 ft.)
Place of operation	For indoor use only
Pollution level	2
Environmental class	3K2 (IEC 60721-3-3) 3M2 (IEC 60721-3-3)

Transportation conditions

Air temperature   –25ºC to 70ºC (–13ºF to 158ºF) in manufacturer's package

Relative humidity Maximum of 75% (noncondensing)

Environmental   2K2 (IEC 60721-3-2)
class   2M2 (IEC 60721-3-2)

Storage conditions

Air temperature   5ºC to 40ºC (41ºF to 104ºF) in manufacturer's package

Relative humidity Maximum of 85% (noncondensing)

Environmental   1K2 (IEC 60721-3-1)
class   1M2 (IEC 60721-3-1)

Mechanical data and hardware features

QIAsymphony SP

Dimensions   Width: 128 cm (50.4 in.)
              Height: 103 cm (40.6 in.)
              Depth: 73 cm (28.7 in.)

Weight   175 kg (385.8 lb.)

QIAsymphony AS

Dimensions   Width: 59 cm (23.2 in.)
              Height: 103 cm (40.6 in.)
              Depth: 73 cm (28.7 in.)

Weight   90 kg (198 lb.)

QIAsymphony SP and AS (integrated operation)

Dimensions   Width: 185 cm (72.8 in.)
Height: 103 cm (40.6 in.)
Depth: 73 cm (28.7 in.)

Weight   265 kg (584 lb.)

Bar code labels

The bar code reader in the "Sample" drawer can read the following types of bar codes:

■ Code 39

■ Code 128 and subtypes

■ Codabar

To ensure error-free bar code reading, slide tube carriers into the "Sample" drawer so that loading takes 3 seconds or longer (0.2 m/s) and slide plate carriers into the "Sample" drawer so that loading takes 2 seconds or longer (0.3 m/s).

Specifications of 1D bar codes

Width   Bar code line width of 0.128–0.305 mm.

Print quality   Bar codes with a line width of 0.128 mm must be printed in high resolution.

Position   When using primary tubes, bar codes should be positioned 1 cm from the bottom of the tube. The bar code reader has a reading area of 8 cm. Bar codes should be attached to Sarstedt tubes so that the tube bar code is no higher than the insert bar code.

Open source software

This laboratory device contains open source software. According to chapter 3.a of the GPLv2. QIAGEN delivers a machine-readable copy of the corresponding source code on the QIAsymphony — Pure Performance CD.

For any additional questions, write to:

QIAGEN GmbH
R&D Instrumentation
QIAGEN Strasse 1
40724 Hilden
Germany
E-mail: open.source@qiagen.com

The following table lists all open source software components used by the QIAsymphony Operating Software. For details, load the "**qiasymphony-open-source.tar.bz2**" file, which is included on the QIAsymphony — Pure Performance CD.

Title	License
Linux	GPLv2
Busybox	GPLv2
Bind	ISC
Glibc	LGPLv2.1
libxml2	Private
e2fsprogs	GPLv2
dhcp	ISC
linux-ftpd	UCLA
netkit-base	UCLA
netkit-telnet	UCLA
ncurses	FSF

Title	License
nfs-utils	GPLv2
ntp	Private
peak-linux-driver	GPLv2
portmap	UCLA
u-boot	GPLv2
xinetd	Private
zlib	Private
tftp-hpa	UCLA
lua	MIT
1-Wire-Public-Domain-Kit	Dallas Sem. Corp.
CryptoPP	Private
libxslt	Private
log4cplus	APL 1.1
quazip	LGPLv2.1

Waste Electrical and Electronic Equipment (WEEE)

This section provides information about disposal of waste electrical and electronic equipment by users in the European Union.

The European Directive 2002/96/EC on WEEE requires proper disposal of electrical and electronic equipment when it reaches its end of life. The crossed-out wheeled bin symbol (see below) indicates that this product must not be disposed of with other waste; it must be taken to an approved treatment facility or to a designated collection point for recycling, according to local legislation. The separate collection and recycling of waste electronic equipment at the time of disposal helps to conserve natural resources and ensures that the product is recycled in a manner that protects human health and the environment.

QIAGEN accepts its responsibility in accordance with the specific WEEE recycling requirements and, where a replacement product is being supplied by QIAGEN, provides free recycling of its WEEE-marked electronic equipment in Europe. If a replacement product is not being purchased from QIAGEN, recycling can be provided upon request at additional cost. To recycle electronic equipment, contact your local QIAGEN sales office for the required return form. Once the form is submitted, you will be contacted by QIAGEN either to request follow-up information for scheduling collection of the electronic waste or to provide you with an individual quote.

FCC declaration

The ''United States Federal Communications Commission'' (USFCC) (in 47 CFR 15. 105) declared that the users of this product must be informed of the following facts and circumstances.

''This device complies with part 15 of the FCC:

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.''

"This Class A digital apparatus complies with Canadian ICES-0003.''

The following statement applies to the products covered in this manual, unless otherwise specified herein. The statement for other products will appear in the accompanying documentation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

QIAGEN GmbH Germany is not responsible for any radio television interference caused by unauthorized modifications of this equipment or the substitution or attachment of connection cables and equipment other than those specified by QIAGEN GmbH, Germany. The correction of interference caused by such unauthorized modification, substitution, or attachment will be the responsibility of the user.

Declaration of Conformity — QIAsymphony SP

Name and address of the company

QIAGEN GmbH
QIAGEN Strasse 1
40724 Hilden
Germany

We herewith declare under our sole responsibility that the product

QIAsymphony SP

meets all applicable requirements of the following European Directives

Low Voltage Directive (LVD)	**2006/95/EC**
Electromagnetic Compatibility Directive (EMC)	**2004/108/EC**
In vitro diagnostic medical devices (IVD)*	**98/79/EC**

Hombrechtikon, 30 July 2010

$C\,E$

Pit Muggli

Senior Director Quality and Compliance
Automated Systems

* only in combination with the dedicated QIAsymphony DSP Kits

Declaration of Conformity — QIAsymphony AS

Name and address of the company

QIAGEN GmbH
QIAGEN Strasse 1
40724 Hilden
Germany

We herewith declare under our sole responsibility that the product

QIAsymphony AS

meets all applicable requirements of the following European Directives

Low Voltage Directive (LVD)	**2006/95/EC**
Electromagnetic Compatibility Directive (EMC)	**2004/108/EC**
In vitro diagnostic medical devices (IVD)*	**98/79/EC**

Hombrechtikon, 30 July 2010

C E

Pit Muggli

Senior Director Quality and Compliance
Automated Systems

* only in combination with the dedicated *artus* assays

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Appendix B

Liability Clause

QIAGEN shall be released from all obligations under its warranty in the event repairs or modifications are made by persons other than its own personnel, except in cases where the Company has given its written consent to perform such repairs or modifications.

All materials replaced under this warranty will be warranted only for the duration of the original warranty period, and in no case beyond the original expiration date of original warranty unless authorized in writing by an officer of the Company. Read-out devices, interfacing devices, and associated software will be warranted only for the period offered by the original manufacturer of these products. Representations and warranties made by any person, including representatives of QIAGEN, which are inconsistent or in conflict with the conditions in this warranty shall not be binding upon the Company unless produced in writing and approved by an officer of QIAGEN.

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Appendix C

QIAsymphony SP/AS accessories

Product	Contents	Cat. no.
Sample Prep Cartridges, 8-well (336)	8-well sample prep cartridges for use with the QIAsymphony SP	997002
8-Rod Covers (144)	8-Rod Covers for use with the QIAsymphony SP	997004
Filter-Tips, 200 μl (1024)	Sterile, Disposable Filter-Tips, racked; (8 x 128)	990332
Filter-Tips, 1500 μl (1024)	Sterile, Disposable Filter-Tips, racked; (8 x 128)	997024
Tip Disposal Bags (15)	For use with the QIAsymphony SP/AS instruments	9013395
Accessory Trough (10)	For use with the QIAsymphony SP	997012
Reagent Cartridge Holder (2)	For use with the QIAsymphony SP	997008
Sample Carrier, plate, Qsym	Plate carrier for sample input; for use with the QIAsymphony SP	9017660
Tube Insert, 13 mm, sample carrier, Qsym (24)	Primary tube adapter (13 mm, with tube insert 01) for use with the QIAsymphony SP tube carrier	9242058
Tube Insert 02, 11 mm, Revision, sample carrier, Qsym (24)	Primary tube adapter (11 mm, with tube insert 02) for use with the QIAsymphony tube carrier	9242057

Product	Contents	Cat. no.
Insert, 2.0 ml v2, samplecarr. (24), Qsym	Secondary tube adapter (for 2 ml screw-cap tubes, tube insert 3B) for use with the QIAsymphony tube carrier	9242083
Cooling Adapter, 2ml, v2, Qsym	Cooling adapter for 2 ml screw-cap tubes; for use with the QIAsymphony SP/AS instruments	9020674
Cooling Adapter, EMT, v2, Qsym	Cooling adapter for EMT racks; for use with the QIAsymphony SP/AS instruments	9020730
Cooling Adapter, MTP, RB, v2, Qsym	Cooling adapter for round bottom microplates (MTP); for use with the QIAsymphony SP/AS instruments	9020729
Cooling Adapter, PCR, v2, Qsym	Cooling adapter for PCR plates; for use with the QIAsymphony SP/AS instruments	9020732
Starter pack, QIAsymphony AS	Pack includes consumables required for operating the QIAsymphony AS	997199
Tubes, conical, 5 ml, Qsym AS (500)	Conical tubes (5 ml) for holding reagent	997104
Filter-Tips, 50 μl, Qsym AS (1024)	Sterile, Disposable Filter-Tips, racked; (8 x 128)	997120
Reagent Bottles, 30 ml, QSym AS (50)	Reagent bottles (30 ml) with lids	997108
Tubes, conical, 2 ml, Qsym AS (500)	Conical tubes (2 ml) for holding reagent	997102

Product	Contents	Cat. no.
Cooling Adapter, LC Capillaries 32, Qsym	Adapter for holding up to 32 capillaries (20 µl) for the LightCycler; for use with the QIAsymphony SP/AS instruments	9018093
Cooling Adapter, SBS Universal, Qsym	Adapter for holding microplates; for use with the QIAsymphony SP/AS instruments	9243384
Rotor-Disc 72 Loading Block	Aluminum block for manual and automated reaction setup in Rotor-Disc 72 discs; for use with the QIAsymphony AS only	9018910
Loading Block, GeneDisc, Qsym	Adapter for holding up to 2 x Rotor-Disc 72 on Rotor-Disc 72 Loading Blocks; for use with the QIAsymphony AS only	9242204
Cooling Adapter, RG Strip Tubes 72, Qsym	Adapter for holding 18 strips of 4 tubes; for use with the QIAsymphony AS only	9018092
Cooling Adapter, Reagent Holder 1, Qsym	Adapter for holding 18 x 2 ml conical tubes, and 6 x 5 ml conical tubes; for use with the QIAsymphony AS only	9018090
Cooling Adapter, Reagent Holder 2, Qsym	Adapter for holding 18 x 2 ml conical tubes, 2 x 5 ml conical tubes, and 2 x reagent bottles, 30 ml; for use with the QIAsymphony AS only	9018089

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